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TECHNICAL MANUAL

OPERATIONS INSTRUCTIONS
RADAR PRODUCT GENERATION (RPG)

DOPPLER METEOROLOGICAL RADAR
WSR-88D

OFFICE OF PRIMARY RESPONSIBILITY:
NATIONAL WEATHER SERVICE RADAR OPERATIONS CENTER

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TOTAL NUMBER OF PAGES IN THIS MANUAL ARE 440 CONSISTING OF THE FOLLOWING

Page No.	*Change No.	Page No.	*Change No.	Page No.	*Change No.
Cover Page	**3**	2-40	1	2-111	1
Title Page	**3**	**2-41 - 2-42**	**3**	2-112 - 2-115	0
A.	**3**	2-43	2	2-116	2
B/C Blank	**3**	2-44	1	2-117 - 2-126	0
i - xxiv	**3**	2-45 - 2-46	1	2-127 - 2-136.2	2
1-1 - 1-2	0	2-47	2	**2-137**	**3**
1-3	1	2-48 - 2-49	1	2-138	0
1-4	0	2-50 - 2-61	0	**2-139 - 2-140**	**3**
1-5 - 1-9	2	**2-62 - 2-64**	**3**	2-141 - 2-146	0
1-10	0	2-65	1	2-147	1
1-11	2	**2-66**	**3**	2-148 - 2-152	0
1-12	1	2-67	1	2-153	2
1-13 - 1-21	2	2-68 - 2-74	0	2-154	1
1-22 Blank	2	**2-75**	**3**	**2-155 - 2-156**	**3**
2-1 - 2-7	0	2-76	0	2-157 - 2-158	1
2-8 - 2-10.1	2	2-77	1	**2-159 - 2-166.2**	**3**
2-10.2 Blank.	2	2-78 - 2-82	0	2-167 - 2-178	0
2-11 - 2-14	0	2-83	1	2-179	1
2-15 - 2-17	**3**	2-84 - 2-92	0	2-180 - 2-196	0
2-18	2	2-93	2	2-197	2
2-19	0	2-94 - 2-98	0	2-198	1
2-20	1	2-99 - 2-101	1	2-199 - 2-203	0
2-21 - 2-29	0	2-102 - 2-104	0	2-204	1
2-30 - 2-31	1	2-105	2	2-205 - 2-206	0
2-32 - 2-35	0	2-106 - 2-108	0	2-207 - 2-218	1
2-36	1	2-109	1	2-219 - 2-225	0
2-37 - 2-39	0	2-110	0	2-226 - 2-228	1

*Zero in this column indicates an original page.

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

Page No.	*Change No.
2-229 - 2-231	0
2-232	1
2-233 - 2-236	0
2-237	1
2-238 - 2-242	0
2-243 - 2-256	1
3-1 - 3-15	0
3-16	2
3-17 - 3-18	0
3-19	2
3-20 - 3-22	0
3-23	2
3-24 - 3-35	0
3-36	2
3-37	1
3-38	0
3-39	1
3-40 - 3-42	0
3-43	2
3-44	1
3-45	2
3-46 - 3-52.1	**3**
3-52.2 Blank	**3**
3-53 - 3-59	0
3-60	2
3-61 - 3-63	1
3-64	0
3-65	1
3-66	0
3-67 - 3-71	1
3-72	0
3-73	1
3-74 - 3-76	0
A-1 - A-23	0
A-24 - A-26	**3**
Index -1 - Index-13/ 14 Blank	**3**
Glossary-1	0
Glossary-2	2
Glossary-3	**3**
Glossary-4 - Glossary-7	0
Glossary-8	**3**

TABLE OF CONTENTS

Paragraph		Page
CHAPTER 1	GENERAL INFORMATION	1-1
SECTION 1-1.	INTRODUCTION	1-1
1-1.1	Purpose of Manual.	1-1
1-1.2	Contents of Manual.	1-1
1-1.3	Scope of Manual.	1-2
SECTION 1-2.	CHAPTER CONTENTS	1-3
SECTION 1-3.	HARDWARE FUNCTIONALITY	1-4
1-3.1	RPG Functionality.	1-4
1-3.1.1	RPG Processor.	1-4
1-3.1.2	Local Area Network (LAN).	1-4
1-3.1.3	Power Administrator Masterswitch.	1-4
1-3.1.4	Uninterruptible Power Supply (UPS).	1-4
1-3.1.5	Base Data Distribution Server (BDDS).	1-5
1-3.1.6	RDA/RPG Gateway.	1-5
1-3.1.7	Communication Server.	1-5
1-3.1.8	Router.	1-5
1-3.1.9	Dedicated/Dial Modem Rack Assembly.	1-5
1-3.1.10	Archive Storage Device.	1-5
1-3.1.11	Keyboard, Video, Mouse (KVM) Switch.	1-5
1-3.1.12	17-Inch Monitor.	1-5
1-3.1.13	Keyboard and Mouse	1-5
1-3.1.14	Short-Haul Modem.	1-6
1-3.1.15	RS-232/RS-422 Converter.	1-6
1-3.1.16	Dial Patch Panel.	1-6
1-3.1.17	Dial Adapter Panel.	1-6
1-3.1.18	Dedicated Adapter Panel.	1-6
1-3.1.19	Dedicated Patch Panels.	1-6
1-3.1.20	Channel Service Unit (CSU) (NWS only).	1-6
1-3.2	Wideband Communication Links.	1-6
1-3.3	Narrowband Communication Links.	1-7
1-3.4	Redundant Systems.	1-7
1-3.4.1	NWS Redundant System.	1-7
1-3.4.1.1	Remote RDA Maintenance Terminal.	1-7
1-3.4.2	FAA Redundant System.	1-7
1-3.4.2.1	FAA Remote Monitoring Subsystem (RMS).	1-7
1-3.4.2.2	Remote Monitoring Subsystem (RMS) Power Administrator.	1-7
1-3.4.2.3	Relay Box.	1-8
1-3.4.2.4	Remote BDDS Equipment.	1-8
1-3.4.2.4.1	Remote BDDS Processor.	1-8
1-3.4.2.4.2	Remote LAN Switch.	1-8

TABLE OF CONTENTS

Paragraph		Page
1-3.4.2.4.3	Remote Router.	1-8
1-3.5	Master System Control Function (MSCF) Equipment UD71.	1-8
1-3.5.1	Local MSCF.	1-9
1-3.5.2	Distant MSCF.	1-9
1-3.5.3	Remote MSCF.	1-9
1-3.6	Printer.	1-9
SECTION 1-4.	SPECIFIC HARDWARE DESCRIPTION	1-10
1-4.1	RPG Equipment Description.	1-10
1-4.2	RPGPCA UD70.	1-13
1-4.2.1	RPG Processor.	1-13
1-4.2.2	LAN Switch.	1-13
1-4.2.3	Power Administrator Masterswitch.	1-13
1-4.2.4	UPS.	1-13
1-4.2.5	BDDS.	1-14
1-4.2.6	Communication Server.	1-14
1-4.2.7	Router.	1-14
1-4.2.8	Narrowband Communications Equipment.	1-14
1-4.2.9	Archive Storage Device.	1-14
1-4.2.10	Channel Service Unit (CSU) (NWS only).	1-14
1-4.3	Remote BDDS Equipment UD72/UD73/UD74.	1-15
1-4.3.1	LAN Switch.	1-15
1-4.3.2	Remote BDDS.	1-15
1-4.3.3	Remote Router.	1-15
1-4.4	MSCF Equipment.	1-15
1-4.4.1	MSCF Terminal Suite.	1-15
1-4.4.2	DOD and FAA MSCF Communications.	1-16
1-4.4.3	NWS Communications.	1-16
1-4.5	FAA Unique Hardware.	1-16
1-4.5.1	RMS Power Administrators.	1-16
1-4.5.2	Relay Box.	1-16
1-4.6	NWS Unique Hardware - Remote RDA Maintenance Terminal (UD32).	1-16
SECTION 1-5.	SOFTWARE DESCRIPTION	1-19
1-5.1	RPG Group Software.	1-19
1-5.2	UNIX Operating System.	1-19
1-5.3	RPG Software Program (CPCI 03).	1-19
1-5.3.1	Acquire Radar Data.	1-20
1-5.3.2	Acquire Rain Gauge Data.	1-20
1-5.3.3	Generate Products.	1-20
1-5.3.4	Distribute Products.	1-20
1-5.3.5	Control System.	1-20
1-5.3.6	CPCI 03 Interface Requirements.	1-20

TABLE OF CONTENTS

Paragraph		Page
1-5.3.6.1	Hardware Interfaces.	1-20
1-5.3.6.2	Operational Computer Program Interfaces.	1-20
SECTION 1-6.	CONSUMABLES/EXPENDABLES	1-21
CHAPTER 2	OPERATIONS	2-1
SECTION 2-1.	INTRODUCTION	2-1
2-1.1	General.	2-1
2-1.2	Chapter Organization.	2-1
SECTION 2-2.	MASTER SYSTEM CONTROL FUNCTION (MSCF)	2-2
2-2.1	Introduction.	2-2
2-2.2	MSCF Configurations.	2-2
2-2.2.1	Local MSCF.	2-2
2-2.2.2	Distant MSCF.	2-2
2-2.2.3	Remote MSCF.	2-2
2-2.3	Display.	2-3
2-2.3.1	Common Desktop Environment.	2-3
2-2.3.1.1	Windows.	2-3
2-2.3.1.2	Workspaces.	2-3
2-2.3.1.3	Controls.	2-3
2-2.3.1.4	Menus.	2-3
2-2.3.1.5	Front Panel.	2-3
2-2.4	Graphical RPG Applications Software.	2-6
2-2.4.1	RPG Human-Computer Interface Controls.	2-6
2-2.4.1.1	Windows.	2-7
2-2.4.1.2	Icons.	2-8
2-2.4.1.3	Buttons.	2-8
2-2.4.1.3.1	Sensitized Buttons.	2-8
2-2.4.1.3.2	Desensitized Buttons.	2-9
2-2.4.1.4	Indicators.	2-9
2-2.4.1.5	Color-coding.	2-9
2-2.4.1.6	Warning Popups.	2-9
2-2.4.1.7	Padlock Window	2-10
2-2.4.1.8	Controls.	2-11
2-2.4.1.9	Workspace Menu.	2-13
2-2.5	Keyboard Usage.	2-14
2-2.5.1	Alphanumeric Keys.	2-15
2-2.5.2	Space Bar.	2-15
2-2.5.3	Return Key.	2-15
2-2.5.4	Cursor Control Keys.	2-16
2-2.5.4.1	Cursor Movement Keys	2-16

TABLE OF CONTENTS

Paragraph		Page
2-2.5.4.2	Tab Key	2-16
2-2.5.4.3	Home Key	2-16
2-2.5.4.4	Page Up/Page Down Keys	2-16
2-2.5.4.5	Back Space Key	2-16
2-2.5.5	Insert Key	2-17
2-2.5.6	Delete Key	2-17
2-2.5.7	Numeric Keypad	2-17
2-2.5.8	Shift Keys	2-17
2-2.5.9	Capital Lock.	2-17
2-2.5.10	Power On/Off Key	2-17
2-2.6	Mouse.	2-18
2-2.6.1	Left Mouse Button.	2-18
2-2.6.2	Middle Mouse Button.	2-19
2-2.6.3	Right Mouse Button.	2-19
2-2.6.4	Keystroke Alternatives to Mouse Buttons	2-20
2-2.7	MSCF Window.	2-20
2-2.7.1	Close Button.	2-22
2-2.7.2	Comms Status Button.	2-22
2-2.7.2.1	Comms Status Window.	2-24
2-2.7.2.1.1	CISCO Switch.	2-24
2-2.7.2.1.2	CISCO Router.	2-26
2-2.7.2.1.3	Router Card Status.	2-28
2-2.7.2.2	Update Button.	2-30
2-2.7.3	Power Control Button.	2-30
2-2.7.3.1	Power Control - Turn Off	2-30
2-2.7.3.2	Power Control - Turn On.	2-31
2-2.7.3.3	Power Control - Reboot	2-31
2-2.7.4	RPG HCI.	2-31
2-2.7.5	RDA HCI.	2-31
2-2.7.6	BDDS HCI.	2-31
2-2.7.6.1	Start BDDS.	2-32
2-2.7.6.2	Stop BDDS.	2-32
2-2.7.6.3	Update Info.	2-32
2-2.7.6.4	Terminate Clients.	2-32
2-2.7.6.5	Assign New Clients.	2-33
2-2.7.7	FAA Redundant.	2-33
2-2.7.8	Hardware Status/Warnings Window.	2-35
2-2.7.9	Show Pull Down Menu.	2-35
2-2.7.10	Search.	2-35
2-2.7.11	Lines.	2-35
2-2.7.12	Find.	2-35
2-2.7.13	Clear Button.	2-36
2-2.7.14	Network Connectivity.	2-36

TABLE OF CONTENTS

Paragraph		Page
SECTION 2-3.	HUMAN COMPUTER INTERFACE (HCI)	2-37
2-3.1	RDA Status/Control Region	2-38
2-3.2	RDA Power Source.	2-38
2-3.3	Radome.	2-38
2-3.4	Tower.	2-39
2-3.5	Transitional Power Source (TPS).	2-39
2-3.6	Displayed Elevation Angle and Current VCP.	2-39
2-3.6.1	VCP Control Window.	2-39
2-3.6.1.1	Close Button	2-40
2-3.6.1.2	Auto PRF Function.	2-40
2-3.6.1.3	CHANGE to RDA VCP.	2-41
2-3.6.1.4	DOWNLOAD VCP from RPG	2-41
2-3.6.1.5	Modify VCP	2-42
2-3.6.1.5.1	PRF Selection (Modify Current VCP) Window	2-44
2-3.6.1.5.1.1	Control Section.	2-44
2-3.6.1.5.1.2	Obscuration Table Section.	2-45
2-3.6.1.5.1.3	Graphical Display Section.	2-45
2-3.6.1.5.1.4	Modify Current VCP Adaptation Data Window.	2-47
2-3.6.1.5.2	Modify VCP Adaptation Data Window.	2-49
2-3.6.1.6	Restart VCP.	2-53
2-3.6.1.7	Restart Elevation.	2-53
2-3.7	RDA Alarm Summary.	2-53
2-3.8	MLOS Control Box.	2-54
2-3.8.1	MLOS Status Window.	2-54
2-3.8.1.1	FAS P16 Check Buttons.	2-54
2-3.8.1.2	Configuration/Messages Section.	2-54
2-3.8.1.3	Alarm Channel Status Section.	2-55
2-3.9	RDA Control Indicator.	2-55
2-3.10	RDA Icon.	2-56
2-3.10.1	RDA Control/Status Box.	2-56
2-3.10.1.1	Close Button.	2-58
2-3.10.1.2	Get Status Button.	2-58
2-3.10.1.3	RDA Alarms Button.	2-58
2-3.10.1.4	Moments Button.	2-58
2-3.10.1.5	VCP.	2-59
2-3.10.1.6	RDA State.	2-60
2-3.10.1.6.1	RDA Standby.	2-61
2-3.10.1.6.2	RDA Restart.	2-61
2-3.10.1.6.3	RDA Operate.	2-61
2-3.10.1.6.4	RDA Offline Operate.	2-61
2-3.10.1.6.5	RDA Playback.	2-62
2-3.10.1.6.5.1	Activate Button	2-62
2-3.10.1.6.5.2	Playback Start	2-63

TABLE OF CONTENTS

Paragraph		Page
2-3.10.1.7	RDA Control.	2-64
2-3.10.1.7.1	Enable Local (RDA) Button	2-64
2-3.10.1.7.2	Select Remote (RPG) Button	2-64
2-3.10.1.7.3	Control Either	2-64
2-3.10.1.8	RDA Power Source.	2-65
2-3.10.1.8.1	Utility Button	2-65
2-3.10.1.8.2	Auxiliary Button	2-66
2-3.10.1.9	Interference Suppression.	2-66
2-3.10.1.9.1	Enabled ISU Button	2-66
2-3.10.1.9.2	Disabled ISU Button	2-66
2-3.10.1.10	Calibration.	2-67
2-3.10.1.10.1	Automatic Calibration Button	2-67
2-3.10.1.10.2	Manual Calibration Button	2-67
2-3.10.1.11	FAA Redundant Control.	2-68
2-3.10.1.11.1	FAA Channel 1.	2-68
2-3.10.1.11.2	FAA Channel 2.	2-69
2-3.10.1.11.3	FAA Redundant Channel Status and Adapt.	2-69
2-3.10.1.12	Additional RDA Status Information.	2-69
2-3.10.1.12.1	Operational Mode	2-70
2-3.10.1.12.2	Control Authority	2-70
2-3.10.1.12.3	Transmitter Power	2-70
2-3.10.1.12.4	Calib. Correction	2-70
2-3.10.1.12.5	Interference Rate	2-70
2-3.10.1.12.6	Moments Enabled.	2-71
2-3.10.2	RDA Alarms.	2-71
2-3.10.2.1	Maximum Displayable Alarms.	2-73
2-3.10.2.2	Device.	2-73
2-3.10.2.3	Filter Parameters.	2-73
2-3.10.2.3.1	MMDDYY Blocks.	2-74
2-3.10.2.3.2	HHMMSS Blocks.	2-74
2-3.10.2.3.3	Search Block.	2-74
2-3.10.2.3.4	Clear Button.	2-74
2-3.10.2.4	RDA Alarm Messages Scrolled List.	2-74
2-3.10.3	Archive Base Data Icon.	2-75
2-3.10.3.1	Archive II Control Buttons.	2-76
2-3.10.3.1.1	Archive II Close.	2-76
2-3.10.3.1.2	Archive II Record.	2-76
2-3.10.3.1.3	Archive II Playback.	2-77
2-3.10.3.1.3.1	Archive II Playback Activate	2-77
2-3.10.3.1.3.2	Archive II Playback Start	2-77
2-3.10.3.1.4	Archive II Stop.	2-79
2-3.10.3.2	Volume Status.	2-79
2-3.10.3.3	Current Archive II Status.	2-79

TABLE OF CONTENTS

Paragraph		Page
2-3.10.3.4	Archive II Data Flow.	2-80
2-3.11	RDA Power Source Icons.	2-80
2-3.12	RDA/RPG Interface Status.	2-81
2-3.12.1	RDA/RPG Interface Control/Status Window.	2-82
2-3.12.1.1	State Text	2-83
2-3.12.1.2	Wideband Control Buttons	2-83
2-3.12.1.2.1	Wideband Connect Button.	2-83
2-3.12.1.2.2	Wideband Disconnect Button.	2-83
2-3.12.1.3	Wideband Interface Parameters.	2-84
2-3.12.1.3.1	Retries.	2-84
2-3.12.1.3.2	Timeouts.	2-84
2-3.12.1.3.3	Loopback Rate.	2-84
2-3.13	RPG Icon.	2-84
2-3.13.1	RPG Control Window.	2-85
2-3.13.1.1	RPG Close, State, and Mode.	2-86
2-3.13.1.2	RPG System Control Block.	2-86
2-3.13.1.2.1	RPG Restart-All Tasks.	2-86
2-3.13.1.2.2	RPG Restart - Options.	2-87
2-3.13.1.2.2.1	Activate Button.	2-88
2-3.13.1.2.2.2	Initialization Options.	2-88
2-3.13.1.2.3	RPG Shutdown.	2-89
2-3.13.1.2.4	RPG Shutdown - Standby	2-89
2-3.13.1.2.5	RPG Mode - Operate.	2-90
2-3.13.1.2.6	RPG Mode - Test.	2-90
2-3.13.1.3	Default Wx (Weather) Mode.	2-90
2-3.13.2	RPG Products Window.	2-91
2-3.13.2.1	Adaptation Data.	2-91
2-3.13.2.1.1	Alert/Threshold.	2-91
2-3.13.2.1.2	Generation List.	2-95
2-3.13.2.1.3	Load Shed Products.	2-101
2-3.13.2.1.4	Selectable Parameters.	2-104
2-3.13.2.1.4.1	Contour Product Parameters.	2-107
2-3.13.2.1.4.2	OHP/THP Data Levels.	2-109
2-3.13.2.1.4.3	STP Data Levels.	2-111
2-3.13.2.1.4.4	Cell Product Parameters.	2-113
2-3.13.2.1.4.5	RCM Product Parameters.	2-115
2-3.13.2.1.4.6	VAD and RCM Heights Selections.	2-117
2-3.13.2.1.4.7	Layer Product Parameters.	2-119
2-3.13.2.1.4.8	RCM Reflectivity Data Levels.	2-121
2-3.13.2.1.4.9	Velocity Data Levels.	2-123
2-3.13.2.1.5	Algorithms.	2-125
2-3.13.2.1.6	Saving Adaptation Data	2-128
2-3.13.2.1.6.1	Saving RPG Adaptation Data from the RPG	2-128

TABLE OF CONTENTS

Paragraph		Page
2-3.13.2.1.6.2	Saving RPG Adaptation Data from the MSCF	2-129
2-3.13.2.1.6.3	Saving MSCF Adaptation Data from the RPG	2-129
2-3.13.2.1.6.4	Saving MSCF Adaptation Data from the MSCF	2-130
2-3.13.2.1.7	Restoring Adaptation Data	2-131
2-3.13.2.1.7.1	Restoring RPG Adaptation Data from the RPG	2-131
2-3.13.2.1.7.2	Restoring RPG Adaptation Data from the MSCF	2-132
2-3.13.2.1.7.3	Restoring MSCF Adaptation Data from the RPG	2-134
2-3.13.2.1.7.4	Restoring MSCF Adaptation Data from the MSCF	2-135
2-3.13.2.2	Display - Products in Database.	2-136
2-3.13.2.2.1	Search Date/Time Box.	2-136.1
2-3.13.2.2.2	Select Product Box.	2-136.1
2-3.13.3	RPG Status.	2-136.1
2-3.13.3.1	RPG Alarm Summary.	2-138
2-3.13.3.2	Message Filter.	2-139
2-3.13.3.3	System Log Messages.	2-139
2-3.13.3.4	Selected Message Information.	2-140
2-3.13.3.5	Print RPG Log Messages.	2-140
2-3.13.4	RMS Button.	2-140
2-3.13.4.1	RMS Messages (FAA: 1 or 2) Window.	2-141
2-3.13.4.1.1	RMS Inhibit Time Window.	2-142
2-3.13.4.1.2	RMS Free Text Message Window.	2-143
2-3.13.5	Archive III Products.	2-143
2-3.13.5.1	Unmount Disk Button.	2-145
2-3.13.5.2	Read From Archive III.	2-145
2-3.13.5.2.1	Archive III Product Read.	2-146
2-3.13.5.2.2	Archive III Status Log Read.	2-147
2-3.13.5.3	Text Line - Status of Archive III	2-150
2-3.13.5.4	Auto Archive III Control/Status.	2-150
2-3.13.5.5	Archive III Status.	2-151
2-3.13.5.6	Archive Products.	2-151
2-3.13.6	Archive III Status Boxes.	2-152
2-3.13.7	Archive III Data Flow.	2-152
2-3.14	Narrowband Connections Graphics.	2-153
2-3.15	USERS Icon.	2-153
2-3.15.1	Product Distribution Comms Status Window.	2-153
2-3.15.1.1	Password.	2-157
2-3.15.1.2	Product Distribution Lines Section.	2-157
2-3.15.1.2.1	Prev-Next Arrows.	2-157
2-3.15.1.3	Sort Options.	2-157
2-3.15.1.4	Line Control Buttons.	2-158
2-3.15.1.5	General Parameters Section.	2-158
2-3.15.1.6	Line Management Section.	2-158
2-3.15.1.6.1	Type.	2-159

TABLE OF CONTENTS

Paragraph		Page
2-3.15.1.6.2	Port Password.	2-159
2-3.15.1.6.3	Baud Rate.	2-159
2-3.15.1.6.4	Time Limit.	2-159
2-3.15.1.6.5	Comms Option.	2-159
2-3.15.1.7	Line/User Info Section.	2-160
2-3.15.1.7.1	Class.	2-160
2-3.15.1.7.2	Method.	2-160
2-3.15.1.8	Dial-in Users Section.	2-160
2-3.15.1.8.1	Paging Capability For Dial-in Lines.	2-160
2-3.15.1.8.2	User.	2-161
2-3.15.1.8.3	ID/Name.	2-161
2-3.15.1.8.4	Pswd (Password).	2-161
2-3.15.1.8.5	Ovr.	2-161
2-3.15.1.8.6	T Limit	2-161
2-3.15.1.8.7	Class.	2-161
2-3.15.1.8.8	Method.	2-161
2-3.15.1.8.9	Add Dial-in User Button.	2-161
2-3.15.1.8.10	Delete Dial-in User Button.	2-163
2-3.15.1.9	Save Button.	2-163
2-3.15.1.10	Undo Button.	2-163
2-3.15.1.11	Baseline: Restore/Update Buttons.	2-163
2-3.15.2	User Products.	2-164
2-3.15.2.1	Password.	2-165
2-3.15.2.2	User Class.	2-165
2-3.15.2.3	Set All Products.	2-166
2-3.15.2.4	Filter Products List.	2-166.1
2-3.15.2.5	Products List.	2-166.1
2-3.15.2.6	Save Button.	2-166.2
2-3.15.2.7	Undo Button.	2-166.2
2-3.15.2.8	Baseline Restore/Update Buttons.	2-166.2
2-3.15.3	User Status.	2-167
2-3.16	Text Strings.	2-168
2-3.16.1	Top Center.	2-168
2-3.16.2	Top of Radome.	2-168
2-3.16.3	Left of Radome.	2-169
2-3.16.4	Center (near top) in Radial Lines in VCP button.	2-169
2-3.16.5	Center (near top) under Radial Lines.	2-169
2-3.16.6	Center of Tower - TPS.	2-169
2-3.16.7	Center Left: Gen Off or On Line.	2-169
2-3.16.8	Above Wideband Graphic.	2-169
2-3.16.9	Center Top of RPG Icon.	2-169
2-3.16.10	Bottom Lower Left.	2-169
2-3.16.10.1	Feedback.	2-170

TABLE OF CONTENTS

Paragraph		Page
2-3.16.10.2	Status.	2-170
2-3.16.10.3	Alarms.	2-170
2-3.16.11	Lower Left Under Archive Base Data Icon.	2-170
2-3.16.12	Lower Center under Archive Products Icon.	2-170
2-3.16.13	Lower Right.	2-170
2-3.16.14	Lower Right Under Users Icon.	2-170
2-3.16.14.1	Precip Cat (Precipitation Category).	2-170
2-3.16.14.1.1	Modify Precipitation Detection Parameters.	2-173
2-3.16.14.1.1.1	Add Precipitation Table Item.	2-173
2-3.16.14.1.1.2	Modify Precipitation Table Item.	2-174
2-3.16.14.1.1.3	Delete Precipitation Table.	2-176
2-3.16.14.1.1.4	Save and Undo Buttons.	2-176
2-3.16.14.1.1.5	Baseline: Restore and Update.	2-176
2-3.16.14.1.2	Precipitation Status.	2-177
2-3.16.14.1.2.1	Time Until Clear Air.	2-177
2-3.16.14.1.2.2	Detection Algorithm Executed.	2-177
2-3.16.14.1.2.3	Category: Current.	2-177
2-3.16.14.1.2.4	Time Last Detected, Light and Significant.	2-177
2-3.16.14.1.2.5	Table of Threshold and Detection Data.	2-177
2-3.16.14.2	VAD Update.	2-178
2-3.16.14.3	Auto PRF.	2-178
2-3.16.14.4	Calib (Value) AUTO.	2-178
2-3.16.14.5	Load Shed.	2-178
2-3.16.14.6	Audio Alarms.	2-180
2-3.16.14.7	RDA Messages.	2-181
2-3.16.14.8	FAA Redundant Adaptable Parameters Match.	2-181
2-3.17	Applications Icons.	2-181
2-3.17.1	Base Data Display.	2-182
2-3.17.1.1	Scan and Elevation Buttons.	2-183
2-3.17.1.2	Data Range.	2-183
2-3.17.1.3	Filter.	2-185
2-3.17.1.4	Moments Buttons.	2-185
2-3.17.1.5	Grid Buttons.	2-185
2-3.17.1.6	Map Buttons.	2-185
2-3.17.1.7	Raw/Zoom Mode Buttons.	2-185
2-3.17.2	Clutter Regions.	2-185
2-3.17.3	Bypass Map Editor.	2-185
2-3.17.4	PRF Selection.	2-185
2-3.17.5	RDA Performance Data.	2-186
2-3.17.5.1	Antenna/Pedestal Performance Data.	2-188
2-3.17.5.2	Calibration Performance Data.	2-189
2-3.17.5.3	Calibration Check Performance Data.	2-190
2-3.17.5.4	Device Status Performance Data.	2-191

TABLE OF CONTENTS

Paragraph		Page
2-3.17.5.5	Disk File Status Performance Data.	2-192
2-3.17.5.6	Receiver/Signal Processor Performance Data.	2-193
2-3.17.5.7	Tower Utilities Performance Data.	2-194
2-3.17.5.8	Transmitter Performance Data.	2-195
2-3.17.5.9	Wideband Communications Performance Data.	2-196
2-3.17.6	Console Messages.	2-196
2-3.17.6.1	Destinations.	2-197
2-3.17.6.2	Incoming Messages.	2-197
2-3.17.6.3	Outgoing Messages.	2-198
2-3.17.7	Environmental Data.	2-198
2-3.17.8	HCI Properties.	2-199
2-3.17.8.1	Change Passwords.	2-199
2-3.17.8.2	Colors.	2-200
2-3.17.8.3	Font Properties.	2-200
2-3.18	Multiple Editors.	2-201
2-3.19	Low Bandwidth.	2-201
SECTION 2-4.	LOGIN/LOGOUT PROCEDURES	2-202
2-4.1	General.	2-202
2-4.2	Login.	2-202
2-4.2.1	Display Locked Window.	2-202
2-4.2.2	User Name.	2-202
2-4.2.3	Password.	2-203
2-4.2.4	Common Desktop Environment.	2-203
2-4.2.5	Sun Window.	2-204
2-4.2.6	Workspace Menu.	2-204
2-4.2.7	Console Window.	2-205
2-4.2.8	MSCF - Start.	2-205
2-4.3	Logout.	2-205
SECTION 2-5.	LOADING SOFTWARE, BACKING UP SOFTWARE, EMERGENCY RECOVERY PROCEDURES	2-207
2-5.1	General.	2-207
2-5.2	System Time/Date.	2-207
2-5.3	Loading Software.	2-207
2-5.4	Backing Up Software.	2-207
2-5.4.1	System Software Backup Using ufsdump.	2-208
2-5.4.2	RPG Applications Software Backup.	2-208
2-5.4.3	MSCF Applications Software Backup.	2-208
2-5.4.4	Backup of BDDS User Accounts Using tar.	2-208
2-5.4.5	Backup of RPG or MSCF User Accounts Using tar.	2-208
2-5.5	Emergency Recovery Procedures.	2-208
2-5.5.1	System Software Restoral Using ufsrestore (Individual File System Example).	2-208

TABLE OF CONTENTS

Paragraph		Page
2-5.5.2	RPG Applications Software Restoral.	2-208
2-5.5.3	MSCF Applications Software Restoral.	2-208
2-5.5.4	Restoral of RPG or MSCF User Accounts Made Using tar.	2-208
2-5.5.5	Restoral of BDDS User Accounts Made Using tar.	2-209
SECTION 2-6.	ARCHIVE LEVEL II AND LEVEL III	2-210
2-6.1	General.	2-210
2-6.2	Archive III Storage Device.	2-210
2-6.2.1	Formatting Blank JAZ Disks	2-210
2-6.2.2	Non-formatted Disk.	2-211
2-6.2.3	Formatting a JAZ Disk at the RPG Drive and Other Options.	2-211
2-6.3	Archive III Disk.	2-212
2-6.3.1	Archive III Disk Insertion.	2-212
2-6.3.2	Archive III Disk Removal	2-212
2-6.3.3	Corrupted Disk Removal	2-212
2-6.3.4	Archive III Disk Capacity.	2-213
2-6.4	Archive III Messages.	2-213
2-6.4.1	Archive III Feedback Messages.	2-213
2-6.4.2	Archive III Status Messages.	2-214
2-6.5	Archive III Functions.	2-214
2-6.5.1	Read Products from Archive III.	2-215
2-6.5.2	Read Status From Archive III.	2-215
2-6.5.3	Auto Archive III Control/Status.	2-216
2-6.5.4	Archive Products.	2-217
2-6.6	Archive II Functions.	2-217
2-6.6.1	Archive II Record.	2-218
2-6.6.2	Archive II Playback.	2-218
2-6.6.3	Archive II Stop.	2-218
2-6.6.4	Archive II Error Messages.	2-218
SECTION 2-7.	REDUNDANT CONTROL	2-219
2-7.1	Introduction.	2-219
2-7.2	NWS Redundant System Control.	2-219
2-7.3	FAA Redundant System Control.	2-219
2-7.3.1	MSCF Indication.	2-219
2-7.3.2	FAA HCI Indications and Controls.	2-221
2-7.3.2.1	RMS Button.	2-222
2-7.3.2.1.1	RMS Messages (FAA: 1 or 2) Window.	2-222
2-7.3.2.1.1.1	RMS Inhibit Time Window.	2-223
2-7.3.2.1.1.2	RMS Free Text Message Window.	2-224
2-7.3.2.2	RMS Lock Buttons.	2-224
2-7.3.2.2.1	RDA Lock RMS Button.	2-224
2-7.3.2.2.2	RPG Lock RMS Button.	2-226

TABLE OF CONTENTS

Paragraph		Page
2-7.3.2.3	Comms State.	2-226
2-7.3.2.4	Adapt Times Match/Mismatch.	2-226
2-7.3.3	Changing Control Channels.	2-228
2-7.3.3.1	FAA:1 HCI, Switching From Channel 2 To Channel 1.	2-228
2-7.3.3.2	FAA:2 HCI, Switching from Channel 1 to Channel 2 and Back Again.	2-230
2-7.3.4	Changing Adaptable Parameters on FAA Channels	2-232
2-7.4	FAA Channels and LOCA Passwords.	2-232
2-7.5	State of the System.	2-232
SECTION 2-8.	HELP	2-234
2-8.1	General.	2-234
2-8.2	The Electronic Performance Support System Concept.	2-234
2-8.3	Access to the EPSS.	2-234
2-8.3.1	EPSS Index.	2-234
2-8.3.2	Example of EPSS Text.	2-235
SECTION 2-9.	SECURITY	2-237
2-9.1	System Security Overview.	2-237
2-9.1.1	Definition of Terms and Services	2-237
2-9.1.1.1	Accountability and Audit	2-237
2-9.1.1.2	Discretionary Access Control (DAC).	2-237
2-9.1.1.3	Trusted Facility Operations.	2-237
2-9.1.1.4	Identification and Authentication (I&A).	2-237
2-9.1.1.5	Files, Directories, and Permissions.	2-238
2-9.1.2	Threats and Vulnerabilities.	2-238
2-9.1.3	Countermeasures.	2-238
2-9.1.4	Assumptions.	2-238
2-9.1.5	Separation of Administrative Roles.	2-238
2-9.1.5.1	User Requirements.	2-238
2-9.1.5.2	Administrator Requirements.	2-239
2-9.1.6	System Security Policy.	2-239
2-9.2	Protection Mechanisms Available to Users.	2-239
2-9.2.1	System Access.	2-239
2-9.2.2	Setting User Passwords.	2-239
2-9.2.3	Warning Banner (Consent to Monitoring).	2-240
2-9.2.4	Incident Response.	2-240
2-9.3	Protection Mechanisms Available to Administrators.	2-240
2-9.3.1	Accountability.	2-240
2-9.3.1.1	Identification and Authentication Functions.	2-240
2-9.3.1.2	Login Parameters.	2-240
2-9.3.2	Audit.	2-241
2-9.3.2.1	Setting up User Account Auditing.	2-241
2-9.3.2.2	Reviewing the Audit Log.	2-241

TABLE OF CONTENTS

Paragraph		Page
2-9.3.2.3	Saving the Audit Security Log.	2-241
2-9.3.2.4	Viewing Archived Security Logs.	2-241
2-9.3.3	Routine Operations.	2-243
2-9.3.3.1	Group Accounts.	2-243
2-9.3.3.2	Security Relevant Files and Directories.	2-243
2-9.3.3.3	Establishing User and Group Accounts.	2-243
2-9.3.3.4	Changing/Modifying User Account and Password.	2-249
2-9.3.3.5	Changing User Passwords.	2-249
2-9.3.3.6	Changing File Permissions.	2-251
CHAPTER 3	OPERATIONAL CONSIDERATIONS	3-1
SECTION 3-1.	INTRODUCTION	3-1
3-1.1	Scope Of Operational Considerations.	3-1
SECTION 3-2.	RPG DATA PROCESSING	3-2
3-2.1	Introduction.	3-2
3-2.2	RPG Processor.	3-2
3-2.3	Wideband Communications.	3-3
3-2.4	Narrowband Communications.	3-3
3-2.5	HCI.	3-3
SECTION 3-3.	LOAD SHEDDING	3-4
3-3.1	Introduction.	3-4
3-3.2	CPU Load Control.	3-4
3-3.2.1	HCI Operator Control.	3-5
3-3.3	Distribution Load Shed.	3-5
3-3.3.1	HCI Operator Control.	3-10
3-3.4	Product Storage Load Shed.	3-10
3-3.4.1	HCI Operator Control.	3-10
3-3.5	RDA Radial Load Shed.	3-11
3-3.6	RPG Radial Load Shed.	3-11
3-3.7	Archive III Load Shed.	3-11
SECTION 3-4.	ADAPTATION DATA	3-12
3-4.1	Adaptation Data.	3-12
3-4.1.1	Alert/Threshold.	3-12
3-4.1.2	Generation List.	3-12
3-4.1.3	Load Shed Products.	3-13
3-4.1.4	Selectable Parameters.	3-13
3-4.1.5	Algorithms.	3-14
SECTION 3-5.	VOLUME COVERAGE PATTERN	3-15

TABLE OF CONTENTS

Paragraph		Page
3-5.1	VCP Control Window.	3-15
3-5.1.1	Auto PRF On/Off.	3-15
3-5.1.2	Change to RDA VCP.	3-15
3-5.1.3	Download VCP from RPG.	3-15
3-5.1.4	Modify VCP.	3-15
3-5.1.4.1	Modify VCP - Current.	3-15
3-5.1.4.1.1	Velocity Interval.	3-17
3-5.1.4.1.2	Modify Elevations Range.	3-17
3-5.1.4.1.3	Area Obscuration Table.	3-18
3-5.1.4.1.4	Composite Reflectivity and Obscuration Data Display Region.	3-18
3-5.1.4.1.5	Modify Current VCP Adaptation Data Table.	3-18
3-5.1.4.2	Modify VCP - Adaptation.	3-20
3-5.1.4.2.1	VCP Selection.	3-21
3-5.1.4.2.2	Show PRF# or RMAX.	3-22
3-5.1.4.2.3	Velocity Interval.	3-22
3-5.1.4.2.4	Adaptation Data Table.	3-22
3-5.1.5	Restart VCP.	3-22
3-5.1.6	Restart Elevation.	3-22
3-5.2	PRF Selection Window.	3-22
SECTION 3-6.	VOLUME COVERAGE PATTERN (VCP) CHANGES AND AUTOMATIC PRF SELECTION..	3-25
3-6.1	Introduction.	3-25
3-6.2	VCP Modification and PRF Selection.	3-25
3-6.2.1	VCP Modification.	3-25
3-6.2.2	Automatic PRF Selection.	3-26
3-6.2.2.1	AUTO PRF in the OFF Position.	3-26
3-6.2.2.2	Auto PRF in the ON Position.	3-26
SECTION 3-7.	SELECTION OF PRODUCT PARAMETERS	3-27
3-7.1	Introduction.	3-27
3-7.2	Contour Product.	3-27
3-7.2.1	Ref Contour Interval.	3-29
3-7.2.2	Echo Top Base.	3-29
3-7.2.3	Filter Level.	3-29
3-7.2.4	Combined Shear Interval.	3-29
3-7.3	Cell Product.	3-29
3-7.3.1	How the Storm Cells are Limited.	3-31
3-7.3.2	Considerations.	3-31
3-7.4	Layer Product.	3-31
3-7.4.1	Layer 0 Height (KFt. MSL).	3-33
3-7.4.2	Layer 1 Height (KFt. MSL).	3-33
3-7.4.3	Layer 2 Height (KFt. MSL).	3-33

TABLE OF CONTENTS

Paragraph		Page
3-7.4.4	Layer 3 Height (KFt. MSL).	3-33
3-7.4.5	Range Limit.	3-33
3-7.5	OHP/THP Data Levels.	3-33
3-7.5.1	First and Second Levels.	3-35
3-7.5.2	Third through Sixteenth Levels.	3-35
3-7.6	RCM Product.	3-35
3-7.6.1	Range Threshold.	3-37
3-7.6.2	Centroid Count.	3-37
3-7.6.3	Edit Decision Time.	3-37
3-7.6.4	Edit Time-Out.	3-37
3-7.6.5	Product Generation Time 1 and 2.	3-37
3-7.6.6	Restrict Class IV.	3-37
3-7.6.7	Selection of Generation Time 1 and 2.	3-37
3-7.6.8	Editable PUP.	3-37
3-7.7	RCM Reflectivity Data Levels.	3-37
3-7.8	STP Data Levels.	3-39
3-7.8.1	First and Second Levels.	3-40
3-7.8.2	Third Through Sixteenth Levels.	3-40
3-7.9	VAD and RCM Height.	3-40
3-7.10	Velocity Data Levels.	3-42
3-7.10.1	First through Ninth Levels.	3-43
3-7.10.2	Tenth through Fifteenth Levels.	3-43
3-7.10.3	Sixteenth Level.	3-43
3-7.11	Gage Bias Adjustment Toggle.	3-43
SECTION 3-8.	CLUTTER REGIONS	3-44
3-8.1	Introduction.	3-44
3-8.2	Clutter Regions Window Title.	3-45
3-8.3	First Line of Commands.	3-46
3-8.3.1	File Button and Files Window.	3-46
3-8.3.2	Undo and Download Buttons.	3-48
3-8.3.3	Baseline Restore and Update Buttons.	3-48
3-8.3.4	Last Download.	3-49
3-8.4	Graphics Utilization.	3-49
3-8.4.1	Current Display - Black Rectangular Square.	3-49
3-8.4.2	Two Circular Bypass Map Displays: Doppler Channel and Surveillance Channel.	3-49
3-8.4.3	Two Rows of Selections/Options for the Current Display.	3-50
3-8.4.3.1	Segment: Low/High.	3-50
3-8.4.3.2	Mode: Zoom/Sector.	3-50
3-8.4.3.3	Scale.	3-51
3-8.4.3.4	Background Product.	3-51
3-8.4.3.4.1	Specific Product.	3-51

TABLE OF CONTENTS

Paragraph		Page
3-8.4.3.4.2	CFC Product.	3-51
3-8.4.4	Tabular Listing of Low/High Elevation Segments.	3-52
3-8.4.4.1	Delete Button.	3-52
3-8.4.4.2	Azimuth Changes.	3-52
3-8.4.4.3	Range Changes.	3-52
3-8.4.5	Select Code.	3-52.1
3-8.5	Impact on Meteorological Data Interpretation.	3-52.1
3-8.6	Base Data Estimate Bias Due to Ground Clutter Contamination.	3-52.1
3-8.6.1	Reflectivity (Z) Estimate.	3-53
3-8.6.2	Mean Radial Velocity (V) Estimate.	3-54
3-8.6.3	Spectrum Width (W) Estimate.	3-54
3-8.6.4	Impact.	3-54
3-8.7	Simplified Conceptional Model of Clutter Suppression Filter.	3-54
3-8.8	Overview of WSR-88D Clutter Suppression.	3-55
3-8.8.1	Default Notch Width Map.	3-55
3-8.8.2	Bypass Map.	3-55
3-8.8.3	Operator-Defined Clutter Suppression Regions.	3-55
3-8.8.3.1	No Clutter Suppression.	3-55
3-8.8.3.2	Bypass Map in Control Using the Operator-Specified Notch Width.	3-55
3-8.8.3.3	Forced Clutter Suppression Using the Operator-Specified Notch Width.	3-55
3-8.8.4	Notch Width Selections.	3-56
3-8.8.4.1	Notch Width Selection 1.	3-56
3-8.8.4.2	Notch Width Selection 2.	3-56
3-8.8.4.3	Notch Width Selection 3.	3-56
3-8.9	Negative Impacts of Inappropriate, Operator-Forced Clutter Suppression.	3-57
3-8.9.1	Zero Isodop Apparent in the Reflectivity Field.	3-57
3-8.9.2	Data Smearing.	3-57
3-8.10	Benefits Attained by Appropriate Clutter Suppression.	3-57
3-8.10.1	Improved Base Data Accuracy.	3-57
3-8.10.2	Increased Availability of Second-Trip Velocity and Spectrum Width Data	3-58
3-8.10.3	Decreased Velocity Dealiasing Failures in Clear Air Mode.	3-58
3-8.10.4	Improved Ability to Stay in Clear-Air Mode.	3-58
3-8.11	Suggested Clutter Suppression Management.	3-59
SECTION 3-9.	BYPASS MAP EDITOR	3-60
3-9.1	Introduction.	3-60
3-9.2	Top Row of Commands.	3-61
3-9.2.1	Close Button.	3-61
3-9.2.2	Padlock Button.	3-61
3-9.2.3	Save Button.	3-61

TABLE OF CONTENTS

Paragraph		Page
3-9.2.4	Load Baseline Button.	3-61
3-9.2.5	Undo Button.	3-62
3-9.2.6	Request Button.	3-62
3-9.2.7	Download Button.	3-62
3-9.3	Remaining Controls.	3-62
3-9.3.1	Mode: Edit.	3-62
3-9.3.2	Mode: Zoom.	3-63
3-9.3.3	Grid On/Off.	3-63
3-9.3.4	Segment Number.	3-63
3-9.4	Generated: Line.	3-63
3-9.5	Edit Window.	3-63
SECTION 3-10.	ENVIRONMENTAL DATA	3-64
3-10.1	Introduction.	3-64
3-10.2	Top Row of Commands.	3-65
3-10.2.1	Close Button.	3-66
3-10.2.2	Save Button.	3-66
3-10.2.2.1	VAD Update Off.	3-66
3-10.2.2.2	VAD Update On.	3-66
3-10.2.3	Undo Button.	3-66
3-10.2.4	Clear Button.	3-66
3-10.2.5	Data Entry button.	3-66
3-10.2.5.1	Environmental Winds Data.	3-68
3-10.2.5.2	Hail Temperature Heights.	3-68
3-10.2.5.3	Default Storm Motion.	3-69
3-10.3	VAD Update Commands and Units Selection Commands.	3-69
3-10.3.1	VAD Update.	3-70
3-10.3.2	Wind Speed Units.	3-70
3-10.4	Text Line of Last Updates.	3-70
3-10.5	Click and Drag Entries.	3-70
3-10.6	Red Outline, Environmental Data Icon, HCI.	3-71
SECTION 3-11.	PRECIPITATION DETECTION FUNCTION	3-72
3-11.1	Introduction.	3-72
3-11.2	Precipitation Detection Function and Nominal Clutter Area.	3-72
3-11.2.1	Precipitation Detection Function (PDF).	3-72
3-11.2.2	Three Precipitation Categories.	3-74
3-11.2.3	Volume Coverage Pattern (VCP).	3-74
3-11.2.4	Suggested Strategy.	3-74
3-11.3	Nominal Clutter Area Adjustments.	3-75
3-11.3.1	Clutter Suppression.	3-75
3-11.3.2	Nominal Clutter Area.	3-75
3-11.3.3	Anomalous Propagation Impact.	3-76

TABLE OF CONTENTS

Paragraph		Page
3-11.3.4	Light Precipitation Impact.	3-76
APPENDIX A	OPERATING FUNCTION OVERVIEW	A-1
A-1	OPERATIONAL MODES.	A-1
A-1.1	Clear Air Mode.	A-1
A-1.2	Precipitation Mode.	A-2
A-1.3	Mode Characteristics.	A-2
A-1.3.1	Volume Coverage Patterns (VCP).	A-2
A-1.3.1.1	Scan Pattern.	A-2
A-1.3.2	PRI Patterns.	A-3
A-1.3.2.1	Contiguous Surveillance.	A-3
A-1-3.2.2	Contiguous Doppler.	A-3
A-1-3.2.3	Batch Waveforms.	A-3
A-1.3.3	Scan Strategies.	A-3
A-1.3.3.1	Scan Strategy 1.	A-6
A-1-3.3.2	Scan Strategy 2.	A-6
A-1-3.3.3	Scan Strategy 3.	A-6
A-2	RADAR DATA PROCESSING MODES	A-6
A-2.1	Base Data	A-6
A-2.2	Surveillance Channel Waveforms.	A-7
A-2.3	Surveillance PRI Waveforms.	A-7
A-2.4	Range Unfolding.	A-7
A-2.5	Time Series Data Array.	A-7
A-2.6	Echo Return Processing.	A-8
A-2.6.1	Reflectivity.	A-8
A-2.6.2	Mean Radial Velocity.	A-8
A-2.6.3	Spectrum Width.	A-8
A-3	PRODUCT DISPLAY, ANNOTATIONS, AND SYMBOLS.	A-8
A-3.1	Base Products.	A-15
A-3.1.1	Reflectivity (R).	A-15
A-3.1.2	Mean Radial Velocity (V).	A-15
A-3.1.3	Spectrum Width (SW).	A-15
A-3.2	Derived Products.	A-15
A-3.2.1	Combined Shear (CS).	A-15
A-3.2.2	Combined Shear Contour (CSC).	A-16
A-3.2.3	Composite Reflectivity (CR).	A-16
A-3.2.4	Composite Reflectivity Contour (CRC).	A-16
A-3.2.5	Echo Tops (ET).	A-17
A-3.2.6	Echo Tops Contour (ECT).	A-17
A-3.2.7	Severe Weather Analysis Display (SWR, SWV, SWW, SWS).	A-17

TABLE OF CONTENTS

Paragraph		Page
A-3.2.8	Severe Weather Probability (SWP).	A-17
A-3.2.9	Velocity Azimuth Display (VAD) Winds.	A-17
A-3.2.10	Combined Moment (CM).	A-18
A-3.2.11	Cross Section (RCS, SCS, VCS).	A-18
A-3.2.12	Weak Echo Region (WER).	A-18
A-3.2.13	Storm Relative Mean Radial Velocity (SRM)	A-19
A-3.2.14	Vertically Integrated Liquid (VIL)	A-19
A-3.2.15	Storm Tracking Information (STI).	A-19
A-3.2.16	Hail Index (HI).	A-19
A-3.2.17	Mesocyclone (M).	A-20
A-3.2.18	Tornado Vortex Signature (TVS).	A-20
A-3.2.19	Storm Structure (SS).	A-20
A-3.2.20	Layer Composite Reflectivity (LRA, LRM).	A-20
A-3.2.21	User Alert Message (UAM).	A-21
A-3.2.22	Radar Coded Message (RCM).	A-21
A-3.2.22.1	Part A, Reflectivity.	A-21
A-3-2.22.2	Part B, VAD Winds.	A-22
A-3-2.22.3	Part C, Remarks.	A-22
A-3.2.23	Free Text Message (FTM).	A-22
A-3.2.24	Surface Rainfall Accumulation (OHP, THP).	A-22
A-3.2.25	Storm Total Rainfall Accumulation (STP).	A-22
A-3.2.26	Hourly Digital Precipitation Array (DPA).	A-23
A-3.2.27	Supplemental Precipitation Data (SPD).	A-23
A-3.2.28	Digital Hybrid Scan Reflectivity (DHR).	A-23
A-3.2.29	Hybrid Scan Reflectivity (HSR).	A-23
A-3.2.30	Layer Composite Reflectivity - AP Removed (APR).	A-23
A-3.2.31	Composite Reflectivity Edited - AP Removed (CRE).	A-24
A-3.2.32	ITWS Digital Base Velocity (IDBA).	A-24
A-3.2.33	Clutter Likelihood Products	A-24
A-3.2.34	Clutter Likelihood Reflectivity (CLR)	A-24
A-3.2.35	Clutter Likelihood Doppler (CLD)	A-24
A-3.2.36	SuperOb (SO)	A-25
A-3.2.37	Digital VIL (DVL)	A-25
A-3.2.38	User Selectable Layer Composite Reflectivity (ULR)	A-25
A-3.2.39	Digital Storm Total Rainfall Accumulation (DSP)	A-26

INDEX Index-1

GLOSSARY OF TERMS Glossary-1

LIST OF ILLUSTRATIONS

Figure		Page
Figure 1-1.	RPG Processor/Communications Assembly Cabinet	1-11
Figure 1-2.	MSCF Components	1-12
Figure 1-3.	Remote RDA Maintenance Terminal (Sheet 1 of 2)	1-17
Figure 2-1.	RPG Control/Status	2-7
Figure 2-2.	Warning_popup	2-10
Figure 2-3.	Warning_Popup with Continue button	2-10
Figure 2-4.	Password	2-11
Figure 2-5.	Keyboard	2-15
Figure 2-6.	Mouse	2-18
Figure 2-7.	MSCF Window	2-21
Figure 2-8.	Comms Status	2-23
Figure 2-9.	CISCO Switch	2-25
Figure 2-10.	CISCO Router	2-27
Figure 2-11.	Router Card Status	2-29
Figure 2-12.	Power Control	2-30
Figure 2-13.	BDDS HCI	2-32
Figure 2-14.	MSCF - FAA	2-34
Figure 2-15.	RPG Control/Status	2-37
Figure 2-16.	VCP Control	2-40
Figure 2-17.	PRF Selection (Modify Current VCP)	2-43
Figure 2-18.	Modify Current VCP Adaptation Data	2-47
Figure 2-19.	Modify VCP Adaptation Data	2-50
Figure 2-20.	MLOS Status	2-54
Figure 2-21.	RDA Icon	2-56
Figure 2-22.	RDA Control/Status	2-57
Figure 2-23.	Moments	2-59
Figure 2-24.	VCP Control	2-60
Figure 2-25.	RDA State	2-60
Figure 2-26.	Playback Base Data	2-62
Figure 2-27.	RDA Control	2-64
Figure 2-28.	RDA Control - Either	2-65
Figure 2-29.	RDA Power Source	2-65
Figure 2-30.	Interference Suppression	2-66
Figure 2-31.	Calibration	2-67
Figure 2-32.	Reflectivity Calibration	2-68
Figure 2-33.	Additional RDA Status Information	2-70
Figure 2-34.	RDA Alarms	2-72
Figure 2-35.	Archive II	2-75
Figure 2-36.	Record Base Data	2-76
Figure 2-37.	Playback Base Data	2-77
Figure 2-38.	RDA Power Source Icons	2-80
Figure 2-39.	Bars Representing Three Moments	2-82
Figure 2-40.	RDA/RPG Interface Control/Status	2-82

LIST OF ILLUSTRATIONS

Figure **Page**

Figure 2-41. RPG Icon 2-85
Figure 2-42. RPG Control 2-85
Figure 2-43. RPG Init Options 2-88
Figure 2-44. RPG Products 2-91
Figure 2-45. Alert Threshold Editor 2-93
Figure 2-46. RPG Product Generation Table Editor 2-96
Figure 2-47. RPG Product Generation Table Editor - Password Protected 2-98
Figure 2-48. RPG Product Priority (Load Shed Products) 2-102
Figure 2-49. Edit Selectable Product Parameters 2-105
Figure 2-50. Contour Product Parameters 2-108
Figure 2-51. OHP/THP Data Levels 2-110
Figure 2-52. STP Data Levels 2-112
Figure 2-53. Cell Product Parameters 2-114
Figure 2-54. RCM Product Parameters 2-116
Figure 2-55. Editable PUP Menu 2-117
Figure 2-56. VAD and RCM Heights Selections 2-118
Figure 2-57. Layer Product Parameters 2-120
Figure 2-58. RCM Reflectivity Data Levels 2-122
Figure 2-59. Velocity Data Levels 2-124
Figure 2-60. Algorithms 2-126
Figure 2-60.1 Algorithm Adapatation Item Pull Down Menu 2-127
Figure 2-61. Products in Database 2-136.1
Figure 2-62. RPG Status 2-137
Figure 2-63. RPG Alarm Summary 2-138
Figure 2-64. Failed Task List Window 2-139
Figure 2-65. Print RPG Log Message 2-140
Figure 2-66. HCI - FAA 2-141
Figure 2-67. RMS Messages. 2-142
Figure 2-68. RMS Inhibit Time 2-142
Figure 2-69. RMS Free Text Message 2-143
Figure 2-70. Archive III Control/Status 2-144
Figure 2-71. Read Product from Archive III 2-146
Figure 2-72. Read Status from Archive III 2-148
Figure 2-73. Print RPG Log Messages 2-149
Figure 2-74. USERS Icon 2-153
Figure 2-75. Product Distribution Comms Status - Lines 1-24 2-155
Figure 2-76. Add Dial-In User 2-162
Figure 2-77. RPG Product Distribution Control - Class 2 Users 2-165
Figure 2-78. RPG Product Distribution Control - Class 4 Users 2-166
Figure 2-79. PUP/RPGOP Status 2-167
Figure 2-80. RPG Control/Status 2-168
Figure 2-81. Lower Right Under Users Icon 2-170
Figure 2-82. Precipitation Status 2-172

LIST OF ILLUSTRATIONS

Figure		Page
Figure 2-83.	Modify Precipitation Detection Parameters	2-173
Figure 2-84.	Add Precipitation Table Item	2-174
Figure 2-85.	Modify Precipitation Table Item	2-175
Figure 2-86.	Load Shed Categories	2-179
Figure 2-87.	Applications Icon	2-182
Figure 2-88.	RPG Base Data Display	2-183
Figure 2-89.	Set Data Range	2-184
Figure 2-90.	RDA Performance Data	2-186
Figure 2-91.	RDA Antenna/Pedestal Performance Data	2-188
Figure 2-92.	RDA Calibration Performance Data	2-189
Figure 2-93.	RDA Calibration Check Performance Data	2-190
Figure 2-94.	RDA Device Status Performance Data	2-191
Figure 2-95.	RDA Disk File Status Performance Data	2-192
Figure 2-96.	RDA Receiver/Signal Processor Performance Data	2-193
Figure 2-97.	RDA Tower Utilities Performance Data	2-194
Figure 2-98.	RDA Transmitter Performance Data	2-195
Figure 2-99.	RDA Wideband Communications Performance Data	2-196
Figure 2-100.	Console Messages	2-197
Figure 2-101.	HCI Properties	2-199
Figure 2-102.	Change Passwords	2-199
Figure 2-103.	Font Properties	2-201
Figure 2-104.	CDE Login Window	2-203
Figure 2-105.	Workspace Menu	2-205
Figure 2-106.	Logout Confirmation	2-206
Figure 2-107.	Master System Control Functions - FAA	2-220
Figure 2-108.	HCI-FAA	2-222
Figure 2-109.	RMS Messages (FAA:1 or 2)	2-223
Figure 2-110.	RMS Inhibit Time	2-223
Figure 2-111.	RMS Free Text Message	2-224
Figure 2-112.	RDA Control/Status - FAA	2-225
Figure 2-113.	RPG Control RMS Button	2-226
Figure 2-114.	Adapt Times: Match	2-227
Figure 2-115.	Adapt Times: Mismatch	2-227
Figure 2-116.	Adapt Times: Mismatch in RDA Control Window	2-228
Figure 2-117.	RDA Control/Status - (FAA:1)	2-229
Figure 2-118.	RDA Control/Status - (FAA: 2)	2-231
Figure 2-119.	EPSS Icon	2-234
Figure 2-120.	Workspace Menu	2-244
Figure 2-121.	Admintool: Users	2-245
Figure 2-122.	Admintool: Users Edit	2-246
Figure 2-123.	Admintool: Add User	2-247
Figure 2-124.	Account Security Password Options	2-248
Figure 2-125.	File Manager Icon	2-251

LIST OF ILLUSTRATIONS

Figure **Page**

Figure 2-126. File Manager 2-252
Figure 2-127. File Manager - Selected Menu 2-253
Figure 2-128. Properties - XXX 2-254
Figure 2-129. Properties - (None) 2-255
Figure 2-130. File Selection Dialog 2-256
Figure 3-1. Load Control Processing Tasks (Sheet 1 of 2) 3-8
Figure 3-2. VCP Control 3-15
Figure 3-3. PRF Selection (Modify Current VCP) 3-16
Figure 3-4. Modify Current VCP Adaptation Data 3-19
Figure 3-5. Modify VCP Adaptation Data 3-21
Figure 3-6. PRF Selection (Modify Current VCP) 3-23
Figure 3-7. Contour Product 3-28
Figure 3-8. Cell Product 3-30
Figure 3-9. Layer Product 3-32
Figure 3-10. OHP-THP Data Levels 3-34
Figure 3-11. RCM Product 3-36
Figure 3-12. RCM Reflectivity Data Levels 3-38
Figure 3-13. STP Data Levels 3-39
Figure 3-14. VAD and RCM Heights 3-41
Figure 3-15. Velocity Data Level 3-42
Figure 3-16. Clutter Regions 3-45
Figure 3-17. Clutter Region Files 3-46
Figure 3-18. Clutter Region Filename 3-47
Figure 3-19. Clutter Background Pull-Down Menu 3-51
Figure 3-19.1 CFC Product Channel Selection 3-52
Figure 3-20. Base Data Estimate 3-53
Figure 3-21. Clutter Bypass Map Editor 3-60
Figure 3-22. Environmental Data Editor 3-65
Figure 3-23. Environmental Data Entry 3-67
Figure 3-24. Precipitation Status 3-73
Figure A-1. One Degree Radial Scan in Azimuth for Contiguous Surveillance and Contiguous Doppler Waveforms A-10
Figure A-2. Time Series Array Storage Format A-11
Figure A-3. Resolution of Contiguous Doppler Ambiguity A-12
Figure A-4. Special Symbols A-14

LIST OF TABLES

Table		Page
Table 3 - 1.	Expanded Version of Load Shed Products Window	3-6
Table 3 - 2.	Notch Width Selections and Suppression Values	3-56
Table A - 1:	Pulse Repetition Period Data Delta A	A-4
Table A - 2:	Pulse Repetition Period Data Delta B	A-4
Table A - 3:	Pulse Repetition Period Data Delta C	A-5
Table A - 4:	Pulse Repetition Period Data Delta D	A-5
Table A - 5:	Pulse Repetition Period Data Delta E	A-6
Table A - 6:	Product Parameters and Annotations	A-13

CHAPTER 1
GENERAL INFORMATION

SECTION 1-1. INTRODUCTION

The Radar Product Generation (RPG) Group represents the main input/control center for the Weather Surveillance Radar - 1988 Doppler (WSR-88D) system. A separate group called the Master System Control Function (MSCF) with a Human Computer Interface (HCI) is used by the operators for data entry, program control, local product generation, storage, selection and distribution, and as an on-line display and data interface for radar mode control. In addition, the HCI can be used by maintenance technicians for system test and troubleshooting.

The RPG Group equipment provides product generation, storage and distribution, system control, and data entry resources to support applicable computer program configuration items to which other WSR-88D system functions are allocated. It also provides the communications interfacing capability for other subsystems in the WSR-88D, including the Radar Data Acquisition (RDA) Group and all users of the products generated by the RPG, including the associated and non-associated users.

For ease of description, the term RPG in the context of this manual actually refers to RPG Applications.

1-1.1 Purpose of Manual.

The purpose of this manual is to provide the user with an overview of the RPG operation, equipment, and associated communications, detailed information on how to operate the radar, and operational guidance on how to optimize the performance of the radar.

1-1.2 Contents of Manual.

The contents of this manual include RPG Group hardware configurations and software descriptions, MSCF and HCI activations, shutdowns, and recoveries, relevant operations-oriented HCI functions, and definitive step-by-step instructions leading to product generation, distribution, and manipulation. The major categories of instructions are:

- RDA Control and Alarms
- Wideband Status Control
- RPG Control, Products, and Status
- Product Distribution Communications Status
- Users Communications, Products, and Status
- Archiving
- Base Data
- Clutter Regions
- Bypass Map Editor
- PRF Selection
- RDA Performance data
- Console Messages
- Environmental Data
- HCI Properties

1-1.3 Scope of Manual.

This manual provides the information and procedures to enable the user to exercise all capabilities and functions of the RPG and MSCF Group equipment in support of a WSR-88D facility. It is divided into three chapters and an appendix which are listed below:

- Chapter 1 GENERAL INFORMATION - RPG and MSCF general information, operating concepts, equipment descriptions, and reference data.
- Chapter 2 OPERATIONS - Controls, Indicators, Alarms Status, Users, Archive, Communications, Startup/Shutdown and Emergency/Recovery Procedures.
- Chapter 3 OPERATIONAL CONSIDERATIONS - Operational considerations to include Data Processing, Clutter Regions, Bypass Map, VCP Control, PRF Selection, RDA P/M Data, Console Messages, Alert Threshold, Paired Products, and Environmental Winds.
- Appendices
  - Operating Function Overview
  - Glossary of Terms
  - Acronyms

SECTION 1-2. CHAPTER CONTENTS

This chapter is organized into sections as follows:

Section 1-1. Introduction - Provides an introduction to the Radar Product Generation (RPG) Group and describes the purpose of the equipment.

Section 1-2. Chapter Contents - Describes the various sections of Chapter One.

Section 1-3. Hardware Functionality - Describes the general equipment components which make up the RPG Group.

Section 1-4. Specific Hardware Description - Identifies the detailed information about the specific component.

Section 1-5. Software Description - Describes the software programs used in the RPG Group.

Section 1-6. Consumables/Expendables - Identifies the consumables and expendables used with the RPG group equipment.

SECTION 1-3. HARDWARE FUNCTIONALITY

The RPG primarily consists of the RPG Processor/Communications Assembly (RPGPCA) and a Master System Control Function (MSCF) terminal suite and printer. Wideband Communication Links, which connect the RDA to the RPG, along with Narrowband Communications Links, which provide communications with Associated and Non-Associated Users, are also part of the RPG Group. For NWS redundant systems, the RPG Group also includes a Remote RDA Maintenance terminal. For FAA redundant systems, there are two complete channels, each comprised of an RPG and RDA, plus a Remote Monitoring Subsystem.

1-3.1 RPG Functionality.

The RPG receives base data from the RDA Group and processes the data using stored algorithms to develop a set of derived meteorological products. The resulting product set, including the base products, is made available for distribution over narrowband communications links to Associated and Non-Associated Users. The RPG is also capable of distributing RDA digital-format base data to Base Data Users via an optional Base Data Distribution Server (BDDS). The RPG functional group includes all the hardware and software required for real-time generation, storage, and distribution of products for operational use. It also includes the hardware and software required for system remote control, status monitoring and error detection, product archiving, and hydro-meteorological data processing.

1-3.1.1 RPG Processor. The RPGPCA has an RPG Processor which provides product generation, local storage, distribution control, and archiving of selected products and derived data. It provides for control of the RDA operating mode and monitoring of the operational status of the overall WSR-88D system. It provides the graphical HCI for system control and monitoring. It also provides a retransmission of the wideband data to the Base Data Distribution Server. The RPG Processor includes a processor, monitor, keyboard, and mouse. The RPG Processor exercises remote control of the RDA as controlled from the MSCF which has an identical HCI to the RPG.

1-3.1.2 Local Area Network (LAN). The LAN Switch provides the ethernet Transmission Control Protocol (TCP)/Internet Protocol (IP) network backbone for the system. Most of the RPGPCA components communicate with each other using the TCP/IP, and the LAN Switch provides the central interconnectivity point for these devices.

1-3.1.3 Power Administrator Masterswitch. The Power Administrator Masterswitch provides for individual control of the AC power to selected devices (eight maximum). This allows a selected device to be powered off and on remotely, thus achieving a remote reset capability for the device. The Power Administrator Masterswitch has eight 120-VAC, 15-Amp power receptacles and a 15-Amp circuit breaker.

1-3.1.4 Uninterruptible Power Supply (UPS). An UPS provides uninterrupted AC power to the Power Administrator Masterswitch and other selected devices in the RPGPCA cabinet. The UPS comes with Powerchute software which allows the system administrator to monitor the UPS performance.

1-3.1.5 Base Data Distribution Server (BDDS). The BDDS receives a retransmission of the wideband data from the RPG Processor and converts it to a unique, secure format for retransmission to the optional BDDS users. The BDDS can be housed in the RPGPCA or may be located in the NWS office. When located outside of the RPGPCA Cabinet, it is known as the Remote BDDS and will be discussed later. However, their functions are identical regardless of location.

1-3.1.6 RDA/RPG Gateway. The High Density Line Control (HDLC) T1 wideband data enters the RPGPCA from the RDA. The RDA/RPG Gateway converts this data from the T1 DSX-1 analog format to high speed serial RS-530 data. This data is then fed directly to the Communication server. For NWS systems, the data first passes through the Channel Service Unit (CSU).

1-3.1.7 Communication Server. After generation, products from the RPG Processor are forwarded as TCP/IP to the Communication Server via the LAN. The Communication Server performs the protocol conversion from TCP/IP to X.25 and then ships the data to the Dedicated/Dial modem Rack Assembly for distribution to Associated and Non-Associated Users.

1-3.1.8 Router. The Router provides external access into the RPG LAN. It receives a TCP/IP feed from the LAN Switch. For the DOD and FAA systems, this Router allows the MSCF to access both the RPG LAN and the Power Administrator Masterswitch through a modem link. For the FAA system, it also allows the MSCF to access the Channel 1 and Channel 2 RPG LAN and the Power Administrator Masterswitch through this modem link.

1-3.1.9 Dedicated/Dial Modem Rack Assembly. The Dedicated/Dial Modem Rack Assembly is comprised of analog modems or modem-type devices for forwarding products and alert information in some cases, to the Associated and Non-Associated Users, using the designated dedicated or dial line. The Dedicated/Dial Modem Rack Assembly receives data for narrowband transmission from the Communication Server via a RS-232 serial link. DOD and FAA systems have an additional modem link for their distant MSCF.

1-3.1.10 Archive Storage Device. The RPGPCA has an archive storage device which can act as an Archive III unit and/or for creating back-up copies of system software. The archive storage device is connected directly to the RPG Processor in the RPGPCA. Currently only NWS sites have an Archive III requirement. A second archive storage device will be an expansion item not available at all sites.

1-3.1.11 Keyboard, Video, Mouse (KVM) Switch. The KVM Switch is an optional piece of equipment which will be located in the RPGPCA cabinet when the BDDS is also located in the RPGPCA cabinet. It allows the RPG Processor and BDDS processor to share a single Keyboard, Video Monitor, and Mouse.

1-3.1.12 17-Inch Monitor. The 17-Inch Monitor is connected to the RPG processor. When the BDDS processor is also located in the RPGPCA cabinet, the monitor will be directly connected to the KVM switch to allow sharing of the Monitor between the two processors.

1-3.1.13 Keyboard and Mouse. The Keyboard and Mouse will be connected to the RPG processor. When the BDDS processor is located in the RPGPCA cabinet, then Keyboard and Mouse will be

directly connected to the KVM switch to allow sharing between the two processors.

1-3.1.14 Short-Haul Modem. The Short-Haul Modem is used to interface the MLOS Radio Cabinet alarm link to the RPG Processor. It receives a modulated audio carrier via a twisted pair cable and converts it to serial digital data for input to the RPG Processor.

1-3.1.15 RS-232/RS-422 Converter. The RS-232 to RS-422 Converter is part of the NWS-only communication link. The RPG and the collocated PUP communicate without the use of modems since they are a short distance from each other. The two systems can communicate at a rate of up to 56Kbps. To widen the bandwidth of the channel, an RS-422 link is used. LED indicators on the front of the converter panel indicate the status of the RS-232 and RS-422 signals.

1-3.1.16 Dial Patch Panel. The Dial Patch Panel supports the testing of up to twenty-four, 2-wire dial lines. The panel connects the dial-port modems via the Automatic Call Unit (ACU), Dial Adapter Panel, and the telephone company's demarcation frame to the public telephone switched network.

1-3.1.17 Dial Adapter Panel. The Dial Adapter Panel is used to connect the dial-port modems to the Dial Patch Panel. It provides a cable transition between the output cables for up to 24 modems and the single input cable to the telephone patch panel.

1-3.1.18 Dedicated Adapter Panel. The Dedicated Adapter Panel is used to connect the dedicated port modems to the Dedicated Patch Panels. It provides a cable transition between the output cables for up to 24 modems and input cables from up to two telephone patch panels.

1-3.1.19 Dedicated Patch Panels. Each Dedicated Patch Panel supports the testing of up to twelve, 4-wire leased telephone lines. The panel connects the Dedicated Adapter Panel's port modems to the telephone lines via the telephone company's demarcation frame. Two Dedicated Patch Panels can be used in system configurations.

1-3.1.20 Channel Service Unit (CSU) (NWS only). The Tl DSX-1 formatted wideband data enters into the RPGPCA CSU from the RDA and then the data is forwarded on to the RDA/RPG Gateway. The CSU provides proper interface for the Tl circuit and regenerating the signal.

1-3.2 Wideband Communication Links.

A wideband communications link is used to exchange both base data and radar status and control data between an RDA and its associated RPG group. Depending on the distance and local requirements, the wideband communications link between particular sites may be a Direct Wire link (for distances up to 400 ft.) or a Microwave Line-of-Sight (MLOS) link (for distances from 0.6 through 24 miles). Two types of T1 carrier systems may also be used: private T1 and telephone company (TELCO) T1. Private T1 is used when the link distance is less than 3,000 feet. In a TELCO T1 system, the telephone company's facilities are used as the medium for the digital pulse stream. A RDA CSU and a RDA/RPG Gateway in the RPG PCA are used to hook into the telephone system. For NWS systems, the RDA CSU sends the Tl signal to the CSU in the RPGPCA cabinet before being

sent to the RDA/RPG Gateway. TELCO T1 provides communications for unlimited distances; it is used when it is available and economically feasible.

1-3.3 Narrowband Communication Links.

Narrowband communication links are used between the RPG and its Associated Users for internal product requests and distribution, for inter-unit product requests and distribution, and for distribution of products to Non-Associated Users. The narrowband communications links are modem-based serial data links which are either directly interconnected for internal communications, or utilize transmission over dedicated or dial-up commercial telephone lines for external data distribution.

1-3.4 Redundant Systems.

There are two types of redundant systems. They are National Weather Service (NWS) Redundant Systems and Federal Aviation Administration (FAA) Redundant Systems named respectively after the agencies that own them.

1-3.4.1 NWS Redundant System. The NWS Redundant System contains one RPG, two RDAs, and a switch which sends either RDA's information to the single RPG. Selecting between the two RDAs and control of the system is performed at a remote RDA maintenance terminal inside the NWS office.

1-3.4.1.1 Remote RDA Maintenance Terminal. For NWS Redundant Systems, a remote RDA maintenance terminal provides the interface that allows the user to interact with the RDA Processor operating system, application and maintenance programs, and the Control Diagnostics System (CDS). The remote RDA maintenance terminal connects to the Channel 1 RDA through a dial line. The terminal contains a dial port modem and STATMUX to transmit/receive and multiplex/demultiplex the application and system port lines of both Channels 1 and 2. It also contains a Dual A/B switch used to select which channel is connected to the terminal.

1-3.4.2 FAA Redundant System. The FAA Redundant System contains two RPGs, each connected to a corresponding RDA. Each RDA/RPG pair is referred to as a channel. Channel 1 RPG is designated UD170. Channel 2 the RPG is designated UD70. The FAA redundant system also contains a relay box that switches either RPG’s information to associated and non-associated users via narrowband communication lines. Selection between the two channels, data entry, and program control for the system is performed at a distant MSCF.

1-3.4.2.1 FAA Remote Monitoring Subsystem (RMS). The FAA has a Remote Monitoring Subsystem that allows the FAA user to monitor and operate both RPGs, both RDAs, and all the tower facilities from a remote location. The system controls the channel selection, power sources, and all aspects of the redundant system remotely.

1-3.4.2.2 Remote Monitoring Subsystem (RMS) Power Administrator. FAA Redundant Systems have additional Power Administrators. These Power Administrators are controlled through the FAA RMS.

1-3.4.2.3 Relay Box. Only FAA Redundant Systems have a relay box. The relay box contains up to 60 relays that are used to switch narrowband communication lines from Channel 1 or Channel 2 to associated and non-associated users. The relay box is not located within the RPGPCA, but mounted on the RDA shelter wall.

1-3.4.2.4 Remote BDDS Equipment. The Remote BDDS equipment will be found with FAA and DOD systems. With these sites, it is more appropriate to locate the BDDS equipment at a NWS office instead of with the FAA and DOD RPGPCA. This is so the BDDS user can be easily connected to user interface equipment. These unique configuration items are necessary for a "remote BDDS" and will consist of the following:

- Remote BDDS Processor with Monitor, Keyboard, and Mouse
- Remote Local Area Network (LAN) Switch
- Remote Router

1-3.4.2.4.1 Remote BDDS Processor. This Remote BDDS Processor is the same BDDS that would normally be found in a RPGPCA discussed earlier. However, the Remote BDDS will be located outside of the RPGPCA, normally within the NWS building. DOD and FAA systems require the Remote BDDS.

1-3.4.2.4.2 Remote LAN Switch. A identical LAN Switch similar to the LAN switch in the RPGPCA is installed within the NWS building. It is identical to the LAN discussed earlier. This LAN Switch and the identical one in the DOD or FAA RPGPCA cabinet are physically connected within the same addressing domain and this LAN Switch just provides an extension of the DOD or FAA RPGPCA LAN.

1-3.4.2.4.3 Remote Router. This Router will be similar to the RPGPCA Router discussed earlier. Both will make use of the optional CSU/DSU module. It is designed to provide external access into the RPG LAN. This Remote Router is used to provide an ethernet T1 circuit out of the CSU/DSU module to the Router in the RPGPCA and the RDA/RPG Shelter. The CSU/DSU module will be located in both the Router in the RPGPCA and the Remote Router.

1-3.5 Master System Control Function (MSCF) Equipment UD71.

The MSCF is the man/machine interface that allows the operator or maintenance technician to interact with the RPG Processor operating system, application software, and maintenance programs. The application specifically designed to provide the graphical control interface to the RPG Processor is the HCI. The MSCF provides control over the RPG processing functions by permitting the selection of products to be routinely generated and a product subset to be archived. It also provides the interface to access the operating system, initialize the RPG Processor, and perform first level analysis of system malfunctions.

The MSCF is comprised of a terminal suite containing a processor, monitor, keyboard, and a color printer. The MSCF will also have a dial modem to provide a true remote MSCF via a dial-in connection from a laptop personal computer (PC) or the RDA/RPG Remote Access Terminal (RRRAT).

1-3.5.1 Local MSCF. The MSCF is normally collocated with the associated user. Thus, with NWS systems, the MSCF will be located locally (within the same building) with the RPG Processor. For NWS systems, the MSCF is considered to be local to the RPG and has a direct TCP/IP path to the RPG Processor (through the LAN Switch). The MSCF also has a serial connection for access to the Power Administrator Masterswitch in the RPGPCA.

1-3.5.2 Distant MSCF. The Distant MSCF may be many miles from the RPG Processor. For DOD and FAA systems, a Distant MSCF is connected to the RPG via a narrowband communications link using 33.6 Kbits/sec modems at both the MSCF and RPG. When the MSCF is distant, the following two configurations will exist.

- DOD Collocated RDA/RPG: For DOD systems, the MSCF is considered to be distant from the RPG Processor because the RPG is collocated with the RDA and usually miles away from the MSCF. The MSCF is linked to the RPG via a dedicated modem at both the MSCF and RPGPCA. The majority of the DOD systems now have the MSCF at NWS sites.

- FAA Collocated RDA/RPG: For FAA systems, the MSCF is considered to be distant from the RPG Processor because the RPG is collocated with the RDA normally a long distance away from the MSCF.

1-3.5.3 Remote MSCF. The Remote MSCF configuration allows a remote system external from the RPG system, such as a laptop computer, to gain access to the MSCF processor. This is done by dialing in to the Remote Access Modem contained within the MSCF Processor.

1-3.6 Printer.

The MSCF color printer is a Tektronix Phaser 750 Laser Color Printer that comes standard with 32 MB of memory. The resolution is a maximum 1200dpi resolution (600 dpi for color resolution). Printer speed is 5 ppm with color printing, 16 ppm with black and white printing. There are four toner cartridges: black, cyan, magenta, and yellow. The black cartridge has a 6,000 page capacity while the color cartridges have a 5,000 page capacity. The MSCF color printer resides on a printer table normally adjacent to the MSCF components.

SECTION 1-4. SPECIFIC HARDWARE DESCRIPTION

1-4.1 RPG Equipment Description.

The RPG Group is the RPGPCA, Remote Base Data Distribution System (BDDS) equipment, and Remote RDA Maintenance Terminal. This section lists and describes the major components which make up the RPG Group. This equipment is shown in Figure 1-1.

The MSCF Group is comprised of the MSCF terminal suite, modem, and color printer. This equipment is shown in Figure 1-2.

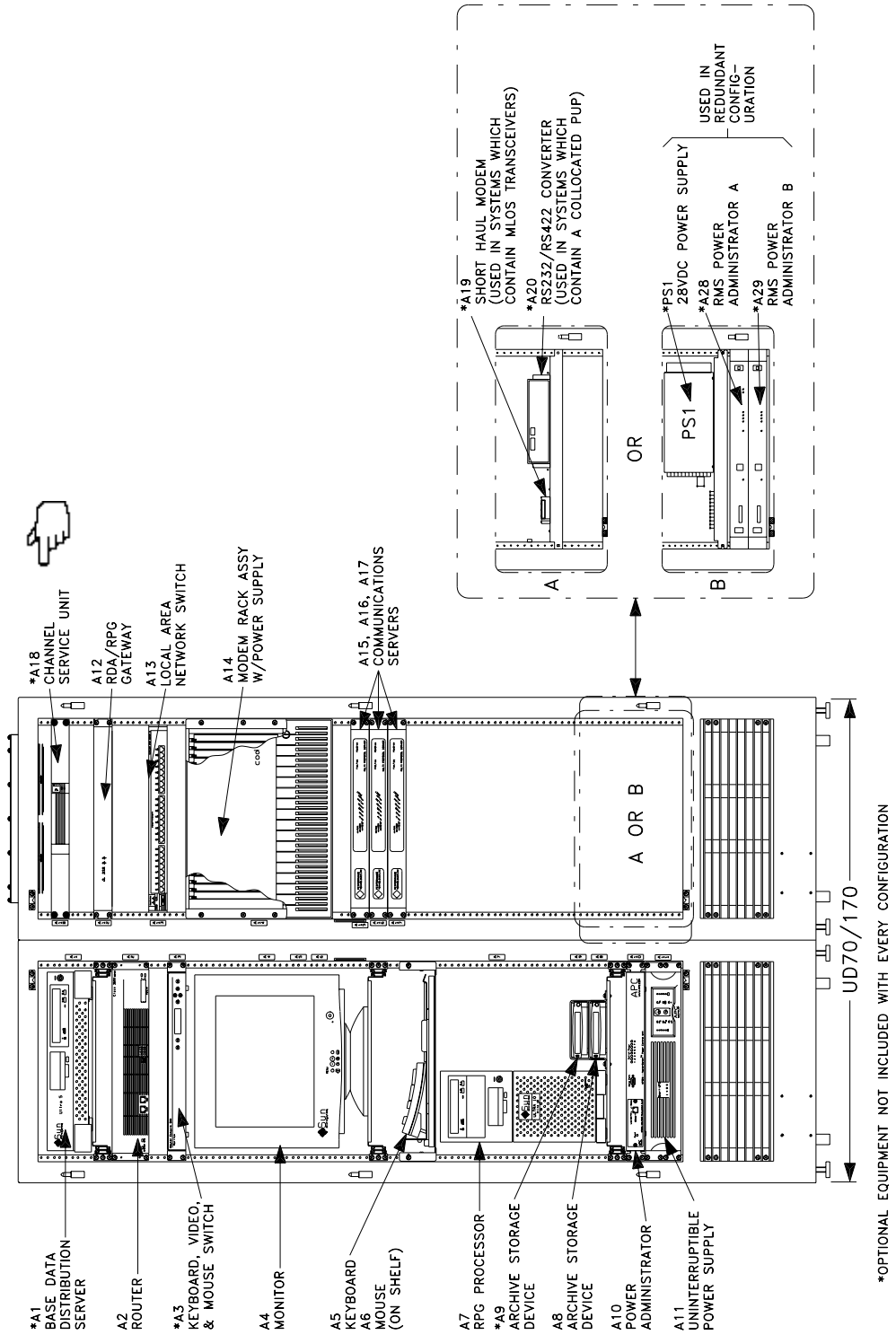

Figure 1-1. RPG Processor/Communications Assembly Cabinet

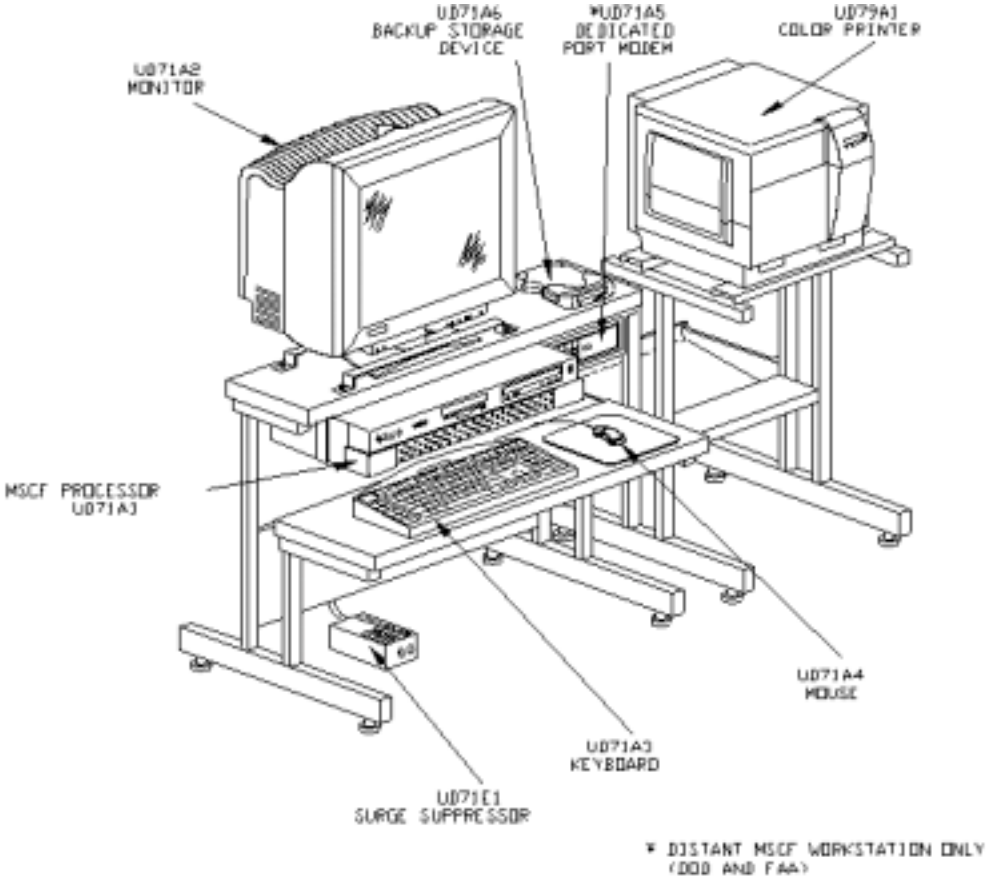

Figure 1-2. MSCF Components

1-4.2 RPGPCA UD70.

The RPGPCA UD70 (Figure 1-1) provides the computation, storage, and data entry resources necessary to support on-line product generation and off-line execution of RPG test software.

The RPGPCA components are listed as follows:

- RPG Processor
- LAN Switch
- Power Administrator Masterswitch
- UPS
- BDDS
- Communications Server
- Router
- Narrowband Communications Equipment
- Archive Storage Device
- Channel Service Unit (CSU) (NWS only)

1-4.2.1 RPG Processor. The RPG Processor is a Sun Ultra 10 workstation (UD70A7). It is a uniprocessor system that uses an UltraSPARC 440 MHz or faster Processor. The RPG Processor has two 128 Mbyte DIMMs for a total of 256 Mbytes of RAM. The standard diskette drive (floppy) supports standard 3.5 inch diskettes. A CD-ROM drive is included. The primary hard drive has a 9.1 GB formatted capacity. An optional (slave) hard drive may also be installed. The remainder of the workstation consists of a Sun 17 inch color monitor, keyboard, and mouse.

1-4.2.2 LAN Switch. The Cisco 2924 LAN Switch is the backbone of the RPG system. This LAN Switch (UD70A13) provides 24 switchable 10BaseT or 100BaseT RJ-45 jacks. The switch is a self-contained unit with an integrated power supply and 4 MB of internal memory. The switch provides auto-sensing for switching between 100 Mbps and 10 Mbps and also provides autonegotiation of half-duplex and full duplex operations.

1-4.2.3 Power Administrator Masterswitch. American Power Conversion (APC) Power Administrator Masterswitch (UD70A10) provides for individual control of AC power to selected devices (eight maximum). This allows a selected device to be powered off and on remotely, thereby achieving a remote reset capability for the device. The Power Administrator Masterswitch has eight 120-VAC 15-amp power receptacles and a 15-amp circuit breaker.

1-4.2.4 UPS. An APC SmartUPS 1400 (UD70A11) provides the uninterrupted AC power for the Power Administrator Masterswitch and other selected devices in the RPG Processor/Communications Assembly (UD70). It has a maximum load of 950 watts or 1400 VA (950 W * 1.4). It has 6 outlet receptacles for components to utilize the UPS. Its runtime is dependent on the load utilizing the UPS; it ranges from 7.4 minutes at full-load to 21 minutes at half-load. Recharge time to return UPS to 90% from 50% is 1 to 2 hours. The UPS comes with Powerchute software which allows the user to monitor the UPS performance.

1-4.2.5 BDDS. The BDDS Processor is a Sun Ultra 5 workstation. It is a uniprocessor system that uses an UltraSPARC 333 MHz Processor. The BDDS has 256 Mbytes of RAM. The BDDS Processor Ultra 5 has one 128 Mbyte DIMM for RAM. The standard diskette drive (floppy) supports standard 3.5 inch diskettes. A CD-ROM drive is included. The hard drive for the system has a 9.1 GB formatted capacity. The remainder of the workstation consists of a keyboard and mouse. The BDDS shares a Sun 17 inch color monitor, keyboard, and mouse (via a KVM switch) with the RPG Processor.

1-4.2.6 Communication Server. The PTI MPS 800 Multi-Protocol Server (MPS) is a LAN-to-WAN data communications server. It connects to the LAN through a TCP/IP Ethernet interface and provides wide-area network connectivity via its serial ports. In the RPG system, three communication servers are used and each can "serve" up to eight separate communications links. It utilizes a Motorola MPC860T Power PC as the main processor/communications controller and a Motorola MC68360 as a slave processor/communications controller. It has 16 MB of main memory, 1 MB of Synchronous Static Random Access Memory (SSRAM), 1 MB of applications flash memory, and 512 KB of boot flash memory. The servers perform the protocol conversion from TCP/IP and then ship the data to the Dedicated/Dial Modem Rack Assembly for distribution to associated, non-associated, and other users.

1-4.2.7 Router. The Cisco 3640 Router is a multifunction platform that combines dial access, routing and LAN-to-LAN services. The standard components include a 100-MHz IDT R4700 RISC Processor, 2 PCMCIA slots, high-speed console and auxiliary ports, and 36 MB of DRAM memory. For NWS systems, the Router acts as a bridge between the two LAN systems (RPG and AWIPS). For DOD and FAA systems, the Router provides a link for the Distant MSCF through use of a serial RS-232 port. The Router provides for a protocol translation from TCP/IP to a serial-asynchronous Point-to-Point Protocol (PPP).

1-4.2.8 Narrowband Communications Equipment. The RPG Narrowband Communications Equipment consists of Class 1 (dedicated) and Class 2 (dial) modems and a RS-232/RS-422 converter. The narrowband equipment allows communication between the RPG Processor and end users.

1-4.2.9 Archive Storage Device. The Iomega JAZ Archive Storage Device is a portable external archive storage device which uses disks for data storage. Each JAZ disk has the capacity to store 2 GB (2,000 MB) of data. Average transfer rate of data is 7.4 MB/sec. This component is used for Archive III purposes which are applicable to NWS systems. For all RPG systems, this is the component used to backup RPG system software. A second archive storage device is an expansion item and may not be fielded at all sites.

1-4.2.10 Channel Service Unit (CSU) (NWS only). The Tl DSX-1 formatted wideband data enters into the RPGPCA CSU from the RDA (via the cabinet I/O entrance panel) and then the data is forwarded on to the RDARPG Gateway UD70A12. The CSU is responsible for providing proper electrical interface to the Tl circuit and for shaping and regenerating the signal. The CSU supports a loopback test from a remote end and a test switch is provided to activate a loopback test from the local end.

1-4.3 Remote BDDS Equipment UD72/UD73/UD74.

These unique configuration items are necessary for remote BDDS and will consist of a LAN Switch, BDDS, and Router. Remote BDDS configuration will only exist at NWS offices that receive base data from separate DoD or FAA systems.

1-4.3.1 LAN Switch. A Cisco 2924 LAN Switch is installed within the WFO building and has a fiber optic module (NWS) system or a T1 link (DOD and FAA) system to the RDA shelter. It is similar to the LAN discussed in paragraph 1-4.2.2. This LAN Switch and the one in the RPG cabinet are physically connected within the same addressing domain. The remote LAN Switch just provides an extension of the RPG LAN.

1-4.3.2 Remote BDDS. This BDDS Sun Ultra 5 is normally found in the RPGPCA (discussed in paragraph 1-4.2.5 BDDS.) and will be found with NWS systems. If a BDDS is needed at a DOD or FAA site, it is normally more appropriate to locate the BDDS equipment at a WSFO. There it becomes a remote BDDS and the BDDS users can easily connect to the equipment.

1-4.3.3 Remote Router. This 2621 Cisco Router will be similar to the RPGPCA Cisco 3640 Router discussed in paragraph 1-4.2.7 Router.; however, it will be located inside the WSFO instead of inside the RPGPCA. It is designed to provide external access into the RPG LAN. For NWS systems this Router will provide a LAN-to-LAN connection between the second LAN Switch (see paragraph 1-4.3.1 LAN Switch.) and the AWIPS system. For DOD and FAA systems that require the remote BDDS, this Router is used to provide an ethernet T1 circuit to the Router in the RPGPCA in the RDA/RPG shelter.

1-4.4 MSCF Equipment.

A single MSCF is provided for the RPG. The MSCF provides an operator interface from which control and monitoring functions are carried out.

The MSCF major components are listed as follows:

- MSCF Terminal Suite (Processor, Monitor, Keyboard and Mouse)
- MSCF Color Printer
- MSCF Table
- Dedicated-Port Modem (DOD and FAA Only)
- Backup Storage Device
- Surge Suppressor

1-4.4.1 MSCF Terminal Suite. Included in the MSCF Terminal Suite is a Sun Ultra 5 computer, monitor, keyboard, and mouse. The MSCF Processor is a uniprocessor system that uses an UltraSPARC 400 Mhz or faster Processor. The MSCF Processor Ultra 5 has one 128 Mbyte DIMM for RAM. The standard diskette drive (floppy) supports standard 3.5 inch diskettes. A CD-ROM drive is included. The hard drive for the system has a 9.1 GB formatted capacity. The monitor for the MSCF is a Sun 21 inch color monitor. The MSCF (See Figure 1-2. MSCF Components) includes the MSCF Terminal Suite (which supports the operator interface that is necessary to implement the

RPG and RDA control and status monitoring functions), a color printer, backup storage device, and the MSCF table. The MSCF components are located on the table with the surge suppressor on the floor under the MSCF table.

1-4.4.2 DOD and FAA MSCF Communications. The distant MSCF has a Codex 3261 FAST Dedicated Port Modem and provides an operator interface from which control and monitoring functions are carried out. The distant MSCF data communications with the RPG are via a dedicated narrowband communications link using a 33.6 Kbits/sec modem at both the MSCF and RPG. DOD and FAA systems support this type of setup.

1-4.4.3 NWS Communications. With NWS systems a local MSCF is located with the RPG, and a direct TCP/IP link via the RPG LAN is provided to the local MSCF.

1-4.5 FAA Unique Hardware.

FAA Redundant Systems have equipment which are unique to the FAA system. These are the RMS Power Administrator Masterswitch and Relay Box.

1-4.5.1 RMS Power Administrators. Two Baytech Power Administrators are used in the FAA system. They are housed in the RPGPCA. They provide for individual control of AC power to selected devices (four maximum on each administrator). This allows a selected device to be powered off and on remotely. However, unlike the APC Power Administrator Masterswitch, these RMS Power Administrators are not controlled through the LAN or a serial connection to the MSCF Processor. Rather, they are controlled through a serial RS-232 connection from the FAA RMS.

1-4.5.2 Relay Box. The relay box is used with FAA redundant systems. It is housed on an inner wall of the RDA shelter. It contains two relay driver circuits and 60 relays, some of which are not used. The relays are used to switch narrowband communication lines from/to associated and non-associated Users to either RPG Channel 1 or RPG Channel 2. The relays are controlled by the RPG data Processors in each RPG channel.

1-4.6 NWS Unique Hardware - Remote RDA Maintenance Terminal (UD32).

The Remote RDA Maintenance Terminal (see Figure 1-3, Sheet 1 for sites with CDT-100 Monitor or Sheet 2 sor sites with RDA/RPG Remote Access Terminal (RRRAT) equipment) is provided to NWS Redundant Systems only. Its major components are:

- Alphanumeric terminal with keyboard
- RRRAT with CPU, Keyboard and Mouse
- Standalone dial port modem
- Dual A/B switch
- Statmux

It consists of a CDT 100 alphanumeric terminal with keyboard or a RRRAT CPU, Keyboard, and Mouse, a stand-alone dedicated-port modem, and a dual A/B switch. The dual A/B switch enables the terminal to access the application and system ports of either RDA Channel 1 or Channel 2.

Communication with the two RDA channels is accomplished via the dedicated-port modem.

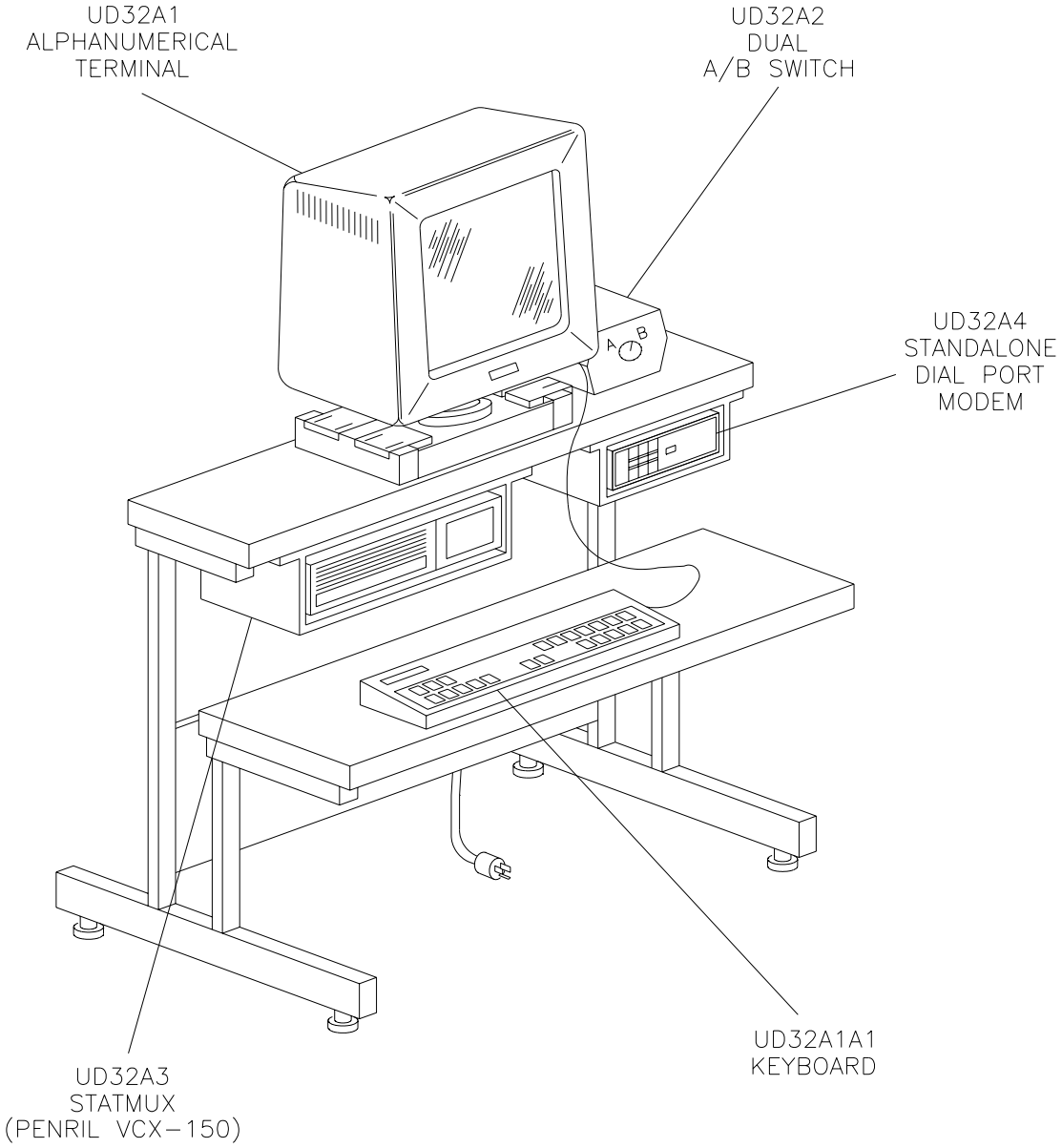

Figure 1-3. Remote RDA Maintenance Terminal (Sheet 1 of 2)

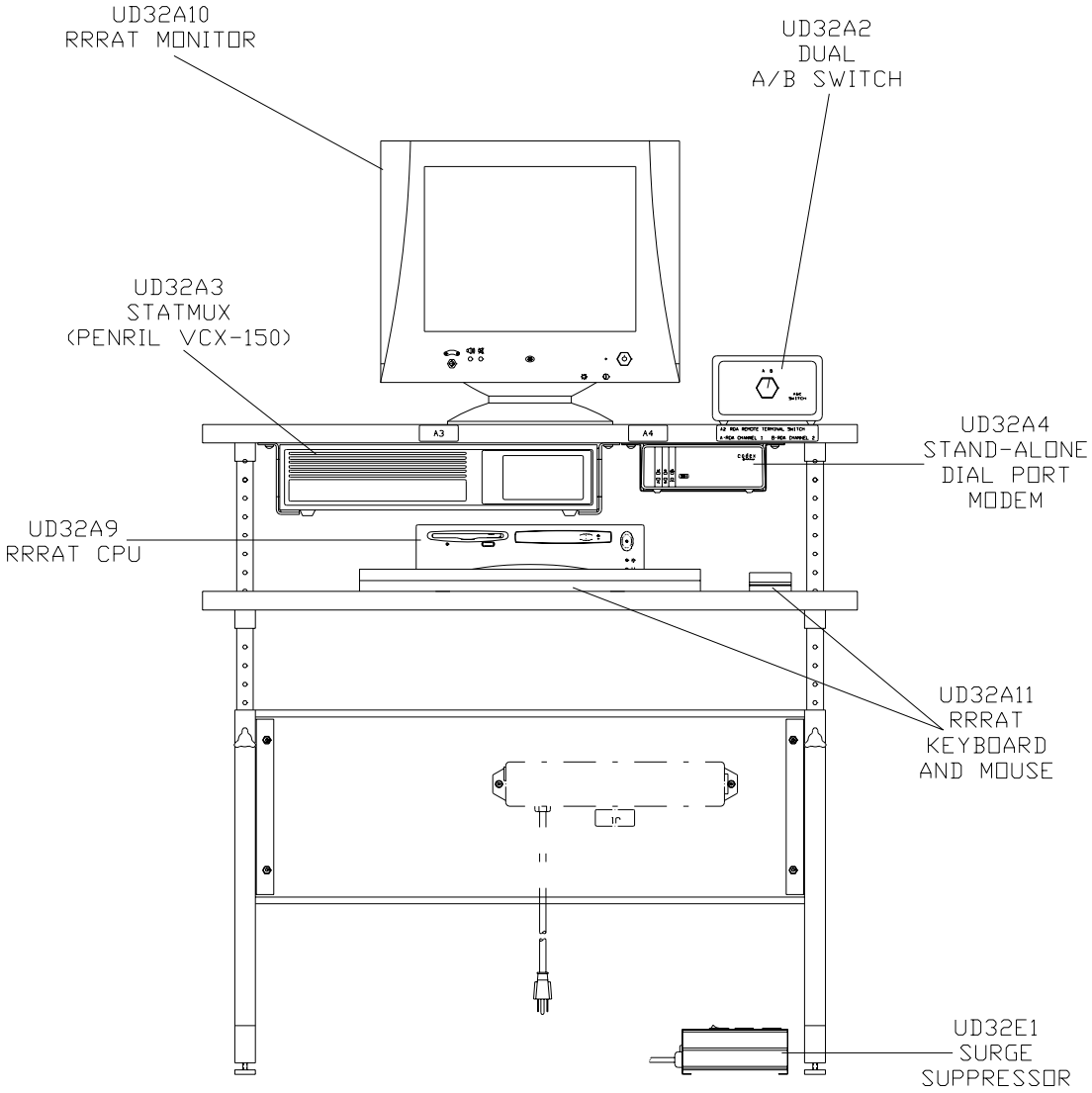

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Figure 1-3. Remote RDA Maintenance Terminal UD32 (NWS Redundant) Component Location (Sheet 2 0f 2)

SECTION 1-5. SOFTWARE DESCRIPTION

1-5.1 RPG Group Software.

The operational software is executed in the processing equipment associated with the RPG functional area to accomplish all operational requirements. The program software controls and monitors the operational equipment and permits operator/machine interfacing actions. The Computer Program Configuration Items (CPCIs) identify computer software programs unique to the WSR-88D system. These computer software programs consist of operating system software and application software.

The RPG operational software programs consist of the following:

- UNIX Operating System
- RPG Software Program (CPCI 03)

1-5.2 UNIX Operating System.

UNIX is a multi-user, multi-tasking operating system (OS) originally developed by AT&T. The UNIX OS manages memory, controls hard and floppy disk drives, and loads and executes programs. The UNIX OS is comprised of two key components: the kernel and the shell.

The kernel is the program responsible for the machine level operation of the system and for the connection to hardware devices. The kernel can communicate to the hardware or to the shell to complete fundamental tasks.

The shell is the command line interface that processes user commands and can talk to all of the system except hardware. The shell retrieves the files that hold instructions for every command that's typed in and it allows the user to utilize the services of the kernel. The three available shells are the C shell, Bourne shell, and Korn shell. The C shell is used for the RPG software.

1-5.3 RPG Software Program (CPCI 03).

This CPCI provides an operator interactive computer program which operates in a multiprocessing environment. It is possible, however, to perform RPG functions in either a fully automated or an operator interface mode. The RPG processes radar data to generate products containing information on related meteorological phenomenon. These products can then be stored, archived, and/or distributed to the users of the WSR-88D system. The RPG program is divided into five tasks:

- Acquire Radar Data
- Acquire Rain Gauge Data
- Generate Products
- Distribute Products
- Control System

1-5.3.1 Acquire Radar Data. This function interfaces with the RDA via a bidirectional wideband link to receive base data and status information and to transmit RDA control information. In addition, it provides for the distribution of base data to optional base data users.

1-5.3.2 Acquire Rain Gauge Data. This function polls the Rain Gauge Data Acquisition Computer (RGDAC) for precipitation data used in hydrometeorological processing. Not all of the RPGs require this capability.

1-5.3.3 Generate Products. This function converts base data into meteorological products consisting of base, derived, and alphanumeric products.

1-5.3.4 Distribute Products. This function provides for the distribution of products to Associated and Non-Associated Users, and provides for the on-line storage and archiving of these products.

1-5.3.5 Control System. This function performs system control tasks including RDA control, RPG processing control, system control (MSCF), and WSR-88D System status monitoring and error detection.

1-5.3.6 CPCI 03 Interface Requirements. This CPCI functionally interfaces with operational position hardware, operational CPCIs, WSR-88D System interfaces, and support CPCIs.

1-5.3.6.1 Hardware Interfaces. The RPG software program operates on a Sun Ultra 10 Processor and peripherals. The hardware interfaces consist of RPG Processor(s), mass storage, display terminal, Archive III storage, and communications equipment.

1-5.3.6.2 Operational Computer Program Interfaces. The RPG software program interfaces with the CPCI 01 (Radar Data Acquisition Status and Control (RDASC) program), the CPCI 04 (Product Display Program), and the operating system software.

SECTION 1-6. CONSUMABLES/EXPENDABLES

The listing of consumables/expendables required for RPG Group and MCSF Group maintenance is:

General housecleaning:
Cleaner, glass (Windex or equivalent)
Cloth, lint-free
Detergent, Liquid

Printer, Color (Tektronic):

Laser Paper	8 1/2 x 11 inches
Black Ink Cartridge	Tektronix P/N O16-1684-OO or equivalent
Cyan Ink Cartridge	Tektronix P/N O16-1685-OO or equivalent
Magenta Ink Cartridge	Tektronix P/N O16-1686-OO or equivalent
Yellow Ink Cartridge	Tektronix P/N O16-1687-OO or equivalent
Iomega Jaz Disks	2 Gigabytes Storage Disk, Read Many, Write Many Available through GSA.

CHAPTER 2
OPERATIONS

SECTION 2-1. INTRODUCTION

2-1.1 General.

Chapter 2 contains descriptions of the MSCF Group. It provides information on procedures, controls and indicators and gives the user an understanding of the overall operations and tasks performed in the RPG.

2-1.2 Chapter Organization.

Chapter 2 is organized into nine sections as follows:

- Section 2-1. INTRODUCTION - This section provides descriptions of the Chapter 2 sections.
- Section 2-2. Master System Control Function - This section provides an overview of the makeup and use of the MSCF.
- Section 2-3. HUMAN COMPUTER INTERFACE (HCI) - This section will discuss aspects of the HCI which are most important to the operator and maintainer. This includes RDA/RPG control, system restart actions, and collection of status/alarm information.
- Section 2-4. LOGIN/LOGOUT PROCEDURES- This section provides a functional set of instructions for bringing the RPG Group to a fully operational state or fully shutdown state.
- Section 2-5. LOADING SOFTWARE, BACKING UP SOFTWARE, EMERGENCY RECOVERY PROCEDURES - This section provides guidance for restoring the RPG Group to normal operation.
- Section 2-6. ARCHIVE LEVEL II AND LEVEL III - This section provides instructions on how to operate the Archive units.
- Section 2-7. REDUNDANT CONTROL - This section provides guidance on how to operate the redundant control of the RPG and RDA.
- Section 2-8. HELP - This section provides guidance on how to utilize the Help function.
- Section 2-9. SECURITY - This section provides the security measures to be in place for the RPG and MSCF for both Users and Administrators.

Section 2-2. Master System Control Function

2-2.1 Introduction.

The MSCF hardware consists of a Sun Microsystems Ultra 5 computer and a Sun 21 inch monitor with a separate keyboard and mouse. The MSCF is connected to the RPG processor in a variety of different configurations and is used to control the WSR-88D System to include mode selection, modification of RPG adaptation data, setting of product generation lists, control of communications lines, archive functions, monitoring of RPG and RDA status, alarm, and performance data, and performing maintenance functions. The software used to exercise this control is the HCI. This section describes the various MSCF configurations, the terminal display, and some unique keyboard and mouse functions.

NOTE

> This section will discuss some graphical manipulations using a mouse. The word "click" indicates a standard single left mouse click. When a right, middle, or double-click is required, it will be specifically indicated. The word "drag" indicates a standard left mouse click and hold while moving the mouse pointer at the same time. Dragging can be used to move a window, highlight text, or make a menu selection.

2-2.2 MSCF Configurations.

The MSCF has three different configurations to meet the unique needs of each WSR-88D field site. The configurations are called Local, Distant, and Remote, and each one contains a device called a Router that is located in the RPG cabinet. The following paragraphs describe each of the three configurations.

2-2.2.1 Local MSCF. The Local MSCF configuration is a cable connection from the Router to the MSCF processor that is located locally within the same building. (For additional information see paragraph 1-3.5.1 Local MSCF.)

2-2.2.2 Distant MSCF. The Distant MSCF configuration provides for a connection from the Router to the MSCF processor because the MSCF processor is located away from the building that contains the RPG cabinet. This link is provided through a dedicated narrowband telephone line that is connected through a dedicated MSCF modem and RPG modem. (For additional information see paragraph 1-3.5.2 Distant MSCF.)

2-2.2.3 Remote MSCF. The Remote MSCF configuration allows a remote system external from the RPG system, such as a laptop computer, to gain access to the MSCF processor by dialing in to the Remote Access Modem that is contained within the MSCF processor. Once connectivity has been established, the Remote MSCF system will be able to perform limited MSCF commands that include, but are not limited to, RPG and RDA control commands.

2-2.3 Display.

The RPG Applications Software and other graphical applications are displayed on the MSCF terminal in a format that is used universally by many different computer vendors called the Common Desktop Environment (CDE). This section contains descriptions of these various displays that are seen on the MSCF terminal.

2-2.3.1 Common Desktop Environment. The CDE is a GUI that is designed to make UNIX easier for users. CDE is automatically started as part of a normal boot process and is configured to run in a multi-user, networked environment. To help the user organize and manage work, CDE provides windows, workspaces, controls, menus, and the Front Panel.

2-2.3.1.1 Windows. Windows contain software applications and are framed with controls that allow the user to move them, re-size them, or place them in other workspaces.

2-2.3.1.2 Workspaces. Workspaces are the areas of the window where the user places one or more windows that are needed to perform their current work.

2-2.3.1.3 Controls. Controls enable the user to manipulate objects, select choices, or type information. A more detailed description of the controls used in the HCI windows is found in paragraph 2-2.4.1 RPG Human-Computer Interface Controls.

2-2.3.1.4 Menus. Menus provide access to commands which the operator uses to manage windows and operate applications. This includes the customized Workspace Menu which is described in paragraph 2-2.4.1.9 Workspace Menu.

2-2.3.1.5 Front Panel. The Front Panel is the horizontal window located at the bottom of the display in every workspace. It is a collection of controls which represent frequently used applications. The default Front Panel contains the controls listed below. Since it can be customized, each Front Panel may contain additional or different controls. The following terms are used to describe the functions of the Front Panel controls:

Indicator: What the image of the control represents.

Click: What happens when the control is clicked on once with the left mouse button.

Drop: What happens when a file or folder icon is dragged and released onto the control.

Clock
Indicator: Displays the current local time.
Click: Starts the default web browser.

Calendar
Indicator:Displays the current date.
Click:Starts the Calendar application. If the Calendar application is already running, its window is raised to the top of the window stack.
Drop: Schedules the dropped appointment on the correct date in the calendar.

File Manager
Click: Opens a File Manager view of the home folder.
Drop: Opens a File Manager view of the dropped folder.

Personal Application (Text Editor)
This control position is reserved for a personal application of the user's choice. A personal application can be placed here by first installing the application's icon into the Personal Applications subpanel, and then using the control's pop-up menu to place that icon on the front panel.

Mailer
Indicator:Indicates the arrival of new mail.
Click: Starts the Mailer. If the Mailer is already running, its window is raised to the top of the window stack.
Drop: Opens the dropped file's contents in the Mailer's Compose window.

Lock
Click: Locks the workstation, preventing unauthorized input.

Workspace Switch
Indicator: Indicates which workspace is currently being displayed.
Click: Displays other workspaces or allows the user to rename the current workspace.

Progress Indicator
Indicator:Spins when the system is running an action.
Click: Opens the Action: Go... window.

Exit
Click: Logs the user out of the current session.

Default Printer
Click: Opens the Printer Jobs window which displays the status of the default printer, and lets the user cancel print jobs that were sent to that printer.
Drop: Prints the dropped file on the default printer.

Style Manager
Click: Starts the Style Manager application. If the Style Manager application is already running, its window is raised to the top of the window stack.

Performance Meter
Indicator: Indicates the amount of activity on the Central Processing Unit (CPU) and the system disk.
Click: Opens the Performance Meter window.

Help Manager
Click: Opens a Help Viewer displaying the top level of help.

Trash Can
Indicator: Looks full if it contains deleted files or folders.
Click: Opens the Trash Can window. If the Trash Can window is already opened, it is raised to the top of the window stack.
Drop: Moves the dropped file or folder to the Trash Can.

Up Arrows
Indicator: Indicates that the Front Panel control immediately below the Up Arrow has an expandable Subpanel.
Click: Opens the Subpanel of the Front Panel control immediately below the arrow. The Up Arrows and Down Arrows alternately occupy the same space on the Front Panel and acts as a toggle. Once an Up Arrow is clicked on, it becomes a Down Arrow, and once a Down Arrow is clicked on, it becomes an Up Arrow.

Down Arrows
Indicator: Indicates that the Front Panel control immediately below the Down Arrow has an expanded Subpanel displayed immediately above the arrow.
Click: Closes the Subpanel of the Front Panel control immediately below the arrow. The Up Arrows and Down Arrows alternately occupy the same space on the Front Panel and acts as a toggle. Once a Down Arrow is clicked on, it becomes an Up Arrow, and once an Up Arrow is clicked on, it becomes a Down Arrow.

Minimize Button
Click: Minimizes the Front Panel making it an icon that is labeled with the name of the current workspace.

Window Menu Button
Click: Displays the Window Menu of controls that are available for the Front Panel. The items in this Window Menu are used to control the Front Panel.

Move Handles (Located on both sides of the Front Panel)
Click: Click on either Move Handle, and while holding down the mouse button, drag the Front Panel to move and place it in a new location and then release the mouse button.

For more information about the CDE Front Panel, Subpanels, or Controls, click on the Help Manager's up arrow on the CDE Front Panel and then click on Front Panel Help on the Subpanel.

2-2.4 Graphical RPG Applications Software.

The RPG Applications Software employs a GUI to make the operation of the system easier for the user. The GUI is usually started as part of a normal boot process. To help the user operate and monitor the WSR-88D system, this GUI provides windows, icons, buttons, indicators, color-coding, warning_popups, controls, and the Workspace Menu. The RPG Applications Software process that manages the GUI is called the RPG Human-Computer Interface (HCI).

2-2.4.1 RPG Human-Computer Interface Controls. The RPG HCI is the process of the RPG Applications Software that interfaces the user with the RPG computer system. The HCI is automatically started as part of a normal boot process. It displays the RPG HCI window, called the RPG Control/Status Window, See Figure 2-1. RPG Control/Status. This window gives the user an overall graphical representation of the current status of the system and provides links to other windows.

For the NWS Redundant configuration, the title bar on top will contain additional information. To the right of the RPG Status/Control title will be (NWS: X) where X is 0 for no wideband link, 1 for RDA Channel 1, or 2 for RDA Channel 2. There are no commands available in the HCI to switch RDA Channels. The remote RDA maintenance terminal will still be the only way to change the RDAs from one to another.

For the FAA Redundant configuration, the title bar on top will contain additional information. To the right of the RPG Status/Control title will be (FAA: X) (where X is 1 or 2, depending upon which channel's HCI was selected), followed by the Active/Inactive status and Controlling/Non-controlling status of that respective channel. It is suggested to pull up both RPG HCIs (one for each separate FAA channel) and view/interact with them both on the computer terminal screen. If there is a disconnect with the communications, the Controlling/Non-controlling status changes to Unknown.

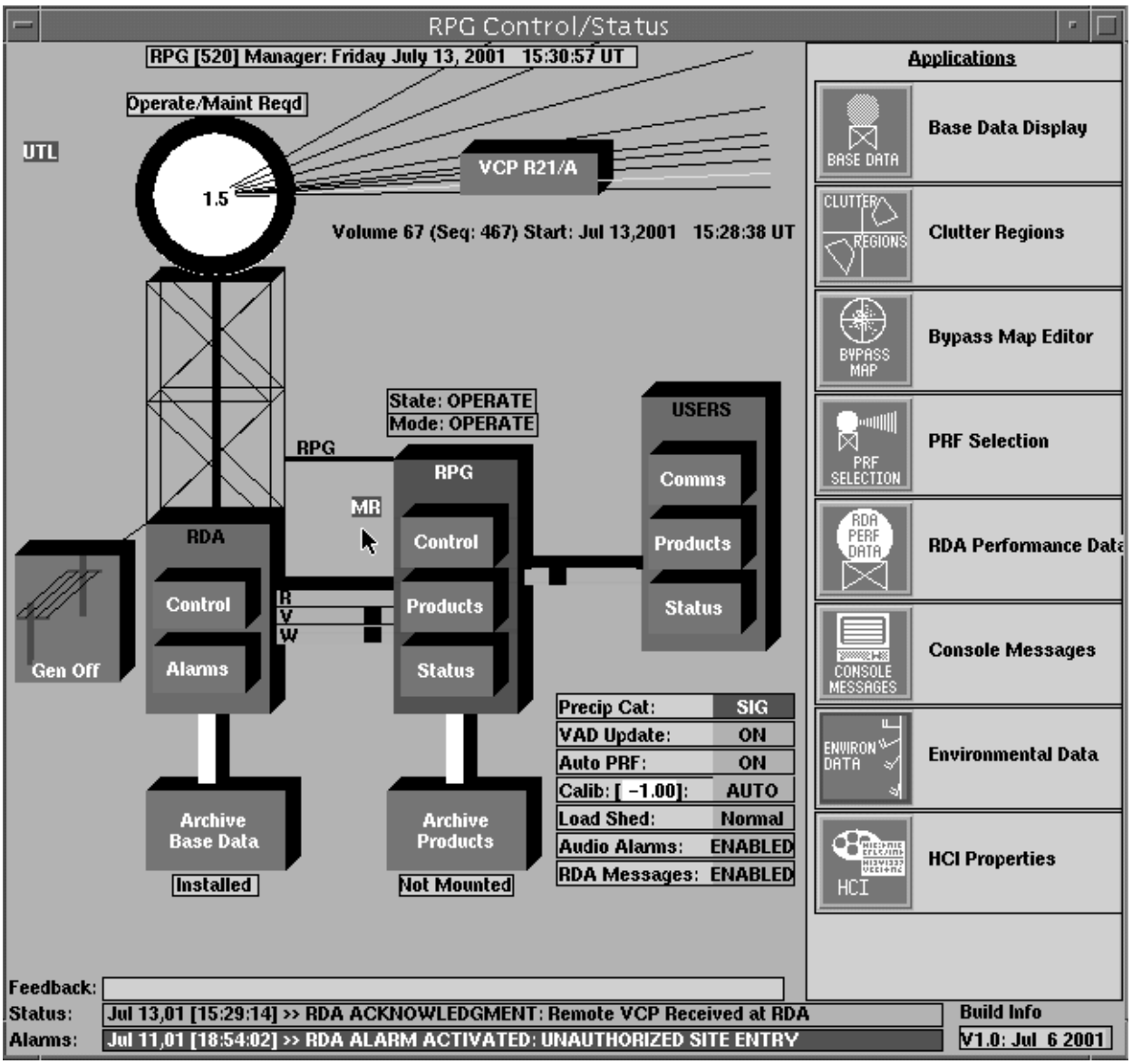


Figure 2-1. RPG Control/Status

2-2.4.1.1 Windows. Windows are smaller framed areas within the workspace display that contain different RPG applications software menus. Windows are opened when the user clicks on the appropriate icon or button. Each window has a title bar across the top of it that contains the name of the application. Multiple windows can be opened or displayed at the same time, but only one window at a time can be active. When a window is active, or ready for use, it generally comes to the foreground or the top of the window stack to become fully visible, and its frame becomes highlighted. An inactive window has its frame grayed-out. To change the active window from one window to another, click anywhere within an inactive window.

NOTE

To avoid making an unwanted selection at the same time, click somewhere in the inactive window that does not contain any buttons or icons, like the title bar.

2-2.4.1.2 Icons. In an HCI window, icons are small graphical representations, or pictures that either symbolize other windows or individual components of the WSR-88D system. Some HCI windows can be minimized which essentially turns them into icons and moves them over to the left side of the window. Those windows that can be minimized will have two small buttons in the upper right hand corner of the window, one containing a small square and the other containing a large square. Clicking on the small square turns the window into an icon. (Clicking on the large square turns the window into the full size of the monitor screen.) The icon will appear with either a generic design or a variety of text strings in the middle, with an abbreviated text string from the original window on the bottom title bar. To reopen the window, click on the icon and a drop down menu appears. Click on the Restore option, and the window is restored to its original size and turns into the active window on the HCI.

NOTE

For frequently used windows, it is recommended to minimize the windows to icons instead of closing them each time. This reduces the length of time to reopen the window. This could be especially helpful when a site has a low bandwidth configuration. Windows such as the RPG Status and the Product Distribution Comms Status would be good choices to reduce as icons when not in use.

Other icons that are used routinely to open windows are found along the right hand side of the window in the area called Applications. These icons represent windows which are frequently used in the everyday operations and maintenance of the system. Click on these icons (when the pointing hand appears) and the respective window opens. If these windows are minimized, they appear as new icons along the left hand margin. If these windows are closed, they return to the Applications area of icons in their previous location.

A third use of icons are located on the HCI window itself. The Tower, Radome, RDA, and RPG icons represent the existence of these components in the WSR-88D configuration, but clicking on any of these icons do not open up any windows. Notice that there is no pointing hand when the cursor is moved over these display only icons.

2-2.4.1.3 Buttons. Buttons are contained within the HCI windows and are used to execute commands or select different configuration options. Buttons are labeled with the name of the associated command or configuration option. Throughout the numerous HCI windows, several different types or styles of buttons are present such as rectangles, dots, or squares. Generally speaking, clicking on a button executes a command.

2-2.4.1.3.1 Sensitized Buttons. When a button has solid black lettering and is described as sensitized, that means the button is enabled in the software and will respond to a mouse click or Return key or Space Bar input.

2-2.4.1.3.2 Desensitized Buttons. When a button's lettering is grayed-out and is described as desensitized, that means the button is not enabled in the software and will not respond to any clicking on the mouse or keyboard stroke.

2-2.4.1.4 Indicators. An indicator is used to display information and it offers no additional functionality to the user. A few examples of where indicators are used in the HCI windows are the VCP elevation angle display, the antenna azimuth position display, the system status line (directly above the radome) on the HCI, and the RDA status information that is displayed at the bottom of the RDA Control window.

2-2.4.1.5 Color-coding. Different colors are used throughout the various windows of the HCI to indicate different categories, deltas, selections, and statuses, along with the traditional use associated with meteorological data.

The overall color scheme of the HCI follows a few simple rules:

Blue -	Buttons invoking commands/menus
Red -	Signifies Major Alarms
Yellow -	Signifies Minor Alarms
Green-	Normal Operations
Other -	Highlights

Within some windows, the same item may have the capability of being displayed in two or more different colors. This makes it easier for the user to distinguish when a change has occurred within a window as opposed to changing some text. For example, on the HCI Main Menu, Figure 2-1. RPG Control/Status, there is a Status Area near the lower right hand corner of the window that includes a line called Precip Cat:. Depending on the category of precipitation detected by the radar, this line can display the word NONE in green, LIGHT in yellow, or SIG in red. More specifics of color-coding and how it is used in the HCI are included in the detailed descriptions of each individual window in Section 2-3. HUMAN COMPUTER INTERFACE (HCI).

2-2.4.1.6 Warning Popups. Any time the user clicks on an HCI button that issues a command which changes the state of the system, a yellow warning_popup window opens prior to that command being executed (Figure 2-2. Warning_popup). This window essentially reminds the user of the selection that was made, and informs the user about how the state of the system will change. If necessary, it will also inform the user if the change will occur at the beginning of the next volume scan. The yellow warning_popup window also contains the question “Do you want to continue?”, and offers a “Yes” and a “No” button which gives the user the option of proceeding with or cancelling the selection. When the “No” button is clicked, the yellow warning_popup window disappears, essentially returning the user back to the previous window without executing any command. When the “Yes” button is clicked, the yellow warning_popup window disappears, and the selected command is then executed.

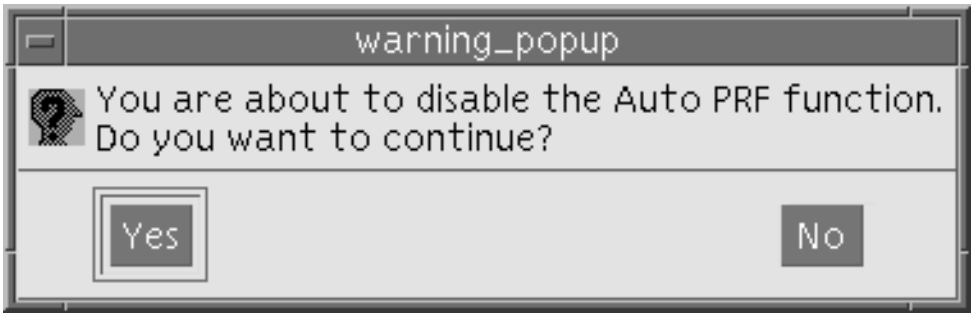


Figure 2-2. Warning_popup

If the warning_ popup provides information only and does not require a Yes or No decision but only needs to allow the user to continue, there will be a Continue button under the text string that the user must click on in order to continue the process. This is mostly found where an invalid entry has been made in an edit field, and the warning_popup informs the user of the incorrect value and the valid range. Figure 2-3. Warning_Popup with Continue button.

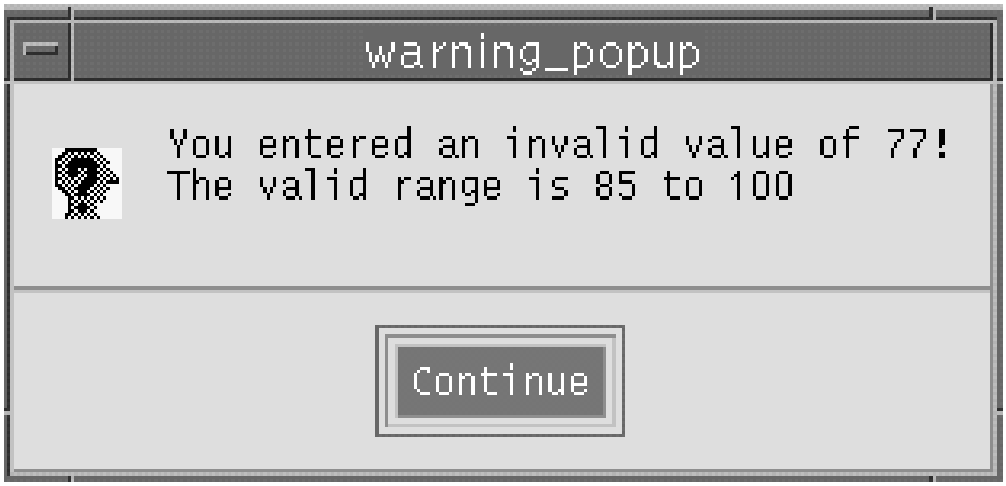


Figure 2-3. Warning_Popup with Continue button

2-2.4.1.7 Padlock Window. When a window is password protected, a small closed padlock will appear in a window in the upper right hand corner of the window. In order to open the editable fields of the window, the user must first enter the correct password. Click on the closed padlock, and the Password window opens. See Figure 2-4. Password.

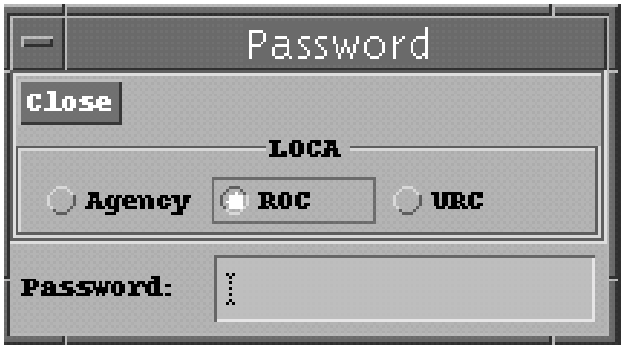


Figure 2-4. Password

There is a Close button in the upper left hand corner that, when clicked, closes the Password window, desensitizes the editable fields, and returns the user to the initial window.

The second line has three choices of Level Of Change Authority (LOCA) available to the user: Agency, Radar Operations Center (ROC), and Unit Radar Committee (URC). Click on either the button to the left of the desired LOCA or the name of the LOCA itself. The button changes to white, a red outline frame appears around the selected LOCA, and the editable fields of the initial window turn to white.

Move the cursor to the edit box just right of the title Password: and click; a blinking cursor

appears in the left margin of the edit box. Type in the correct password and press the Return key. The fields in the original window that are editable are now sensitized and available for edits. The Password window disappears and the padlock turns to red and is opened with the LOCA identified next to the padlock. The Baseline: Restore and Update buttons, if in the original window, are now sensitized.

If an incorrect password is entered and the Return key pressed, a warning_popup appears that states: "Invalid password entered!" with a Continue button. Click on the Continue button and the user is returned to the Password window to enter another password.

To close the editable fields of the original window, click on the open padlock in the upper right hand corner. The padlock returns to the closed figure, the editable fields are desensitized, and the user is returned to the initial window. If the open padlock is clicked and any unsaved edits are detected, a warning_popup appears that states: "Do you want to save the changes you made to the XXX?" XXX represents the window that the operator was editing. Click Yes to save all edits and lock the window. Click No to discard all edits and lock the window.

If a LOCA does not have edit permission in that window, then that LOCA will not appear in the Password window. There will not be the title nor the control button available for that LOCA.

2-2.4.1.8 Controls. All of the HCI windows, including those that may have been minimized into icons, contain controls that allow the user to manipulate them in a number of different ways. Some of these controls are also imbedded within the window frame allowing the user to use them with the mouse. All of the HCI window controls are listed and described below, but not all of them are available in every HCI window. Clicking (left or right) on the Window Menu Button in the upper left hand corner of the HCI window frame (or icon if the HCI window has been minimized) will display a menu of controls that are available for that window or icon. The right click can be done anywhere on the window frame or icon and does not turn an inactive window or icon into an active one. Menu controls which are grayed-out are not available for selection. Changes that are made to the HCI windows using these controls are temporary and only last until the window is either closed or the RPG applications software is stopped. Any time an HCI window is opened, it uses the default control settings for that window. The controls (with alternate key strokes when available) are:

- Restore (Alt+F5) - Restores a window to its previous size and location if it had been maximized. This also restores an icon back to a window of its previous size and location. This will appear grayed-out if the window is not maximized or minimized. The same functionality exists by either double-clicking on an icon, or by clicking on the Maximize Button a second time.
- Move (Alt+F7) - Places a special mouse pointer in the center of the window or icon, and then by moving the pointer with the mouse, it allows the user to move the window or icon to another location on the same workspace. A thin outline of the window or icon frame is displayed to assist the user until it is placed in its new location by clicking on the left or right mouse button. The same functionality exists by dragging either the title bar of the

window or anywhere on the icon.

- Size (Alt+F8) - For the HCI windows that allow it, this places a special mouse pointer in the center of the window, and then by using the mouse to move the pointer outside the frame of the window, it allows the user to change the size of the window. A thin outline of the new window frame is displayed to assist the user until it is placed in its new position by clicking on the left or right mouse button. The same functionality exists by dragging any of the four corners or four sides of the window frame. This will appear grayed-out if the window has been minimized. However, many of the HCI windows have fixed sizes and do not allow this type of control even when this doesn't appear grayed-out. In addition, some of the HCI windows that do allow this do not resize the text within the window to fit the new frame size. So if the user makes an HCI window smaller, then some of the text may not be displayed. Except for the HCI windows that do fully support this type of control, like the Main Menu, it is better that the user doesn't change the size of any HCI windows.
- Minimize (Alt+F9) - For the HCI windows that allow it, this turns the window into an icon. The icon is placed on the left side of the window and given a label of HCI with the specific name of the HCI window displayed within the icon. This will appear grayed-out if the window has already been minimized. The same functionality exists by clicking on the Minimize Button which is the second button from the right in the upper right hand corner of the window frame. To restore the window to its previous size and location, the user can either double-click on the icon, or select Restore from the icon's HCI Window Menu.
- Maximize (Alt+F10) - For the HCI windows which allow it, this enlarges the window or icon to its greatest size. This will appear grayed-out if the window has already been maximized. Some HCI windows can be enlarged to fill the entire size of the terminal display while others have a fixed size and cannot be enlarged beyond that. The same functionality exists by clicking on the Maximize Button which is the first button on the right in the upper right hand corner of the window frame. To restore the window to its previous size and location, the user can either click on the Maximize Button again, or select Restore from the HCI Window Menu.
- Lower (Alt+F3) - If other windows or icons are on the workspace, this moves the window or icon to the background, or lowers it to the bottom of the window stack (When two or more windows are open, they overlay each other and are called a window stack.). This does not cause an active window or icon to became inactive. To bring the window or icon back to the foreground, or raise it to the top of the window stack, click anywhere on its frame or title bar. Similar functionality exists by clicking anywhere on or inside the frame of another window or icon. However, this action will move the newly selected window or icon to the top of the window stack and make it active. The previously active window or icon does not drop all the way down to the bottom of the window stack, but just one level below the newly active window.
- Occupy Workspace... - This allows the user to select the workspace in which the window or icon will be displayed. Clicking on it opens up the Occupy Workspace dialog box which is described below. Only one of these

dialog boxes can be opened at a time. Attempting to open a second one automatically closes the first one.

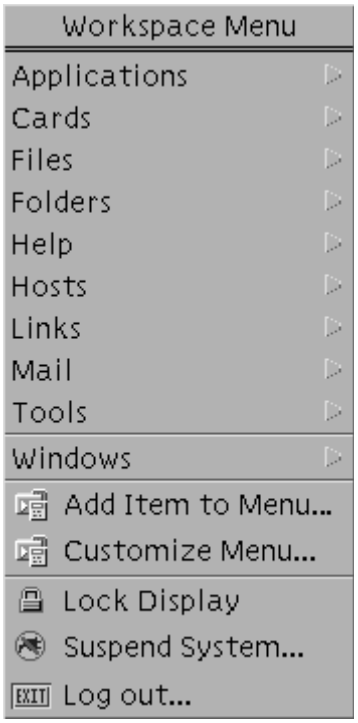
- •• Window:/Icon: - Displays the name of the window or icon that the Occupy Workspace dialog box originated from and applies to.
- •• Workspaces: - Lists the name(s) of the available workspace(s) from which the user may select. When the Occupy Workspace dialog box is initially opened up, the name(s) that are already highlighted indicate the name(s) of the workspace(s) where the window or icon is already being displayed. To select a single workspace, click on its name and it will become highlighted if it wasn't already. If other workspace names were already highlighted, they will become unhighlighted. To select more than one workspace, either click and drag the mouse over contiguous workspace names, or hold down the CTRL key while clicking on discontiguous workspace names.
- •• All Workspaces - When clicked on once, a check mark opens in the box and all of the workspace names become highlighted indicating that the window or icon will be displayed in all workspaces. The same functionality exists by selecting Occupy All Workspaces from the HCI Window Menu. When clicked on again, the check mark disappears from the box, and only the top name on the workspace list will be highlighted.
- •• OK - Applies the currently selected workspace settings and closes the dialog box.
- •• Cancel - Restores the previous workspace settings and closes the dialog box.
- •• Help - Displays the Occupy Workspace Dialog Box help topic within the Workspace Manager - Help window.

- Occupy All Workspaces - Displays the window or icon in all workspaces.
- Unoccupy Workspace - Removes the window or icon from the current workspace. This will appear grayed-out if the window or icon is only present in the current workspace.
- Close - (Alt+F4) Closes the window or icon, removing it from the workspace. The same functionality exists by double-clicking on the Window Menu Button in the upper left hand corner of the window frame.

2-2.4.1.9 Workspace Menu. The Workspace Menu is a list of items used to manage the workspace and which contains submenus used for starting applications and other workspace functions. Some of these functions can also be invoked from the CDE Front Panel or its subpanels. The Workspace Menu is available in all workspaces and is opened by right clicking anywhere on the

workspace background (i.e. outside of all application window and icons). An arrow next to a menu item indicates that the item has a submenu. To open a menu item's submenu, click on the arrow. Clicking on any Workspace Menu or submenu item selects the item and closes the Workspace Menu. To close the Workspace Menu without selecting an item, move the mouse pointer anywhere off of the menu and click. As is the case with the RPG, the Workspace Menu can be customized to better fit the needs of the user. Additional information on the Workspace Menu is available from the site's system administrator and the Sun workstation manuals.

The following listing is an example of a typical Workspace Menu. The > represents the arrow indication that there is a submenu.



2-2.5 Keyboard Usage.

The alphanumeric keyboard has a number of different types of keys used to enter and/or manipulate alphanumeric data on the HCI. These key types are described in the following sections. Refer to Figure 2-5. Keyboard, for the locations of each key type.

Certain keys, as noted below, have an “auto repeat” feature. When a character is depressed for at least one second, the terminal generates a stream of that character at a rate of 15 characters per second until the key is released.

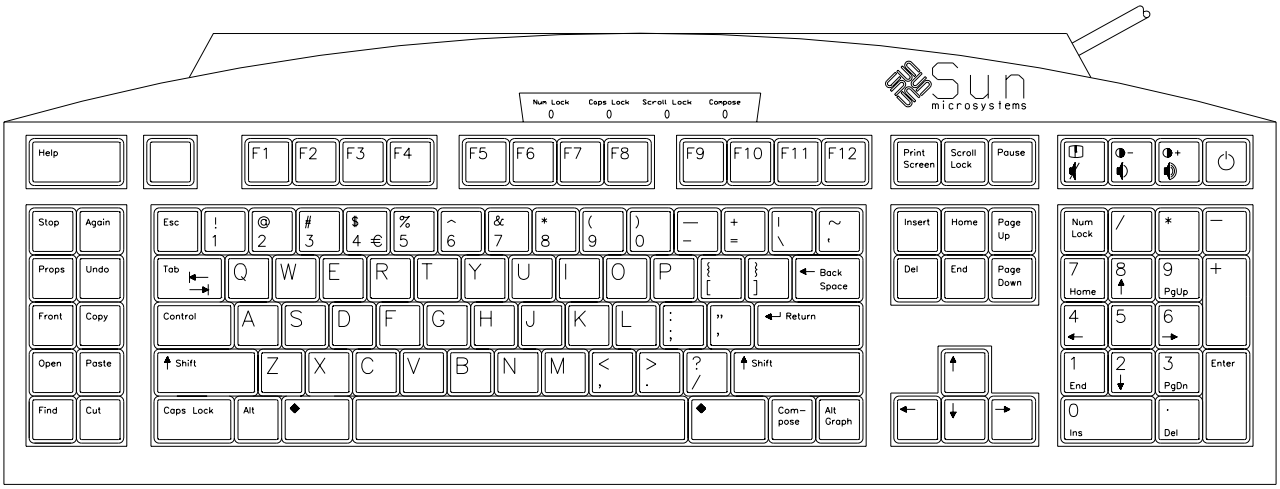


Figure 2-5. Keyboard

2-2.5.1 Alphanumeric Keys. The alphanumeric keys have the auto repeat feature. When the cursor is positioned within an unprotected field, depression of an alphanumeric key will cause the corresponding character to replace any character currently at that location. The cursor will then be automatically repositioned at the next unprotected character on the window. In order to transfer over to the next subfield, either tab over or use the mouse and click in the new desired subfield. On the keyboard, the numeric keys each contain two symbols. The lower symbol is the character displayed by depressing the key. The upper symbol is the character displayed by depressing the key in conjunction with either one of the two Shift keys. The alphabetic keys are normally displayed in lower case by depressing the desired keys. The corresponding uppercase alphabetic characters are displayed by depressing the desired keys in conjunction with one of the Shift keys. Use the Cap Lock key to facilitate typing a string of uppercase characters.

2-2.5.2 Space Bar. While the alphanumeric keys operate in a manner very similar to a typewriter, the Space Bar is an important exception. The Space Bar actually produces a blank character which replaces whatever is currently at the cursor location. Therefore, the mouse or the cursor control keys must be used to nondestructively skip over window data. In addition, when using the Tab key to move from one unprotected subfield to another, pressing the Space Bar will activate the newly selected subfield. The Space Bar has the auto repeat feature.

Another feature of the Space Bar is that it can toggle on or off the latest window that has been opened from the HCI. For example, from the HCI, click on the RDA Control button. The RDA Control window appears. Now press on the Space Bar, and the RDA Control window disappears. Press on the Space Bar again, and the RDA Control window reappears.

2-2.5.3 Return Key. Prior to depressing the Return key, the operator can use the alphanumeric

keys, editing keys, the numeric keypad, and certain auxiliary operation keys to enter/alter characters in the unprotected areas of the window in order to format the command or data. Upon completion of such enter/alter operations, depression of the Return Key causes the data on the window to be interpreted.

2-2.5.4 Cursor Control Keys. Certain keys facilitate the movement of the cursor without intervention of the HCI software, and without altering the contents of the alphanumeric window. These cursor control keys include Cursor Movement, Tab, Home, Page Up, and Page Down. All cursor control keys except for Home have the auto repeat feature.

2-2.5.4.1 Cursor Movement Keys. The cursor movement portion of the keyboard consists of the Home key and four keys labeled with arrows for each 90 degree direction of a full 360 degree circle. The four keys hereinafter are referred to as Arrow keys.

NOTE

The Arrow keys move the cursor throughout the various unprotected areas of the window, but not always in the expected direction. Depending upon the arrangement of the unprotected areas, there may not be any vertical movement of the cursor, even though the vertical movement arrow keys are depressed.

2-2.5.4.2 Tab Key. The Tab key can be operated with or without the Shift key. When the Tab key is depressed unshifted, the cursor moves to the right to the next unprotected area of the window. This is in a horizontal direction until no more unprotected areas remain on that line. Then the cursor is moved to the first unprotected area of the next line down.

NOTE

When entering data in two columns, the cursor shifts from column to column and then down a line, not down one column in a numerically logical sequence. If there are no unprotected areas between the current cursor location and the end of the window, the cursor is moved to the first position of the first unprotected area on the window. When the Tab key is depressed in conjunction with the Shift key, the cursor moves to the left to the first position of the previous unprotected field. If the cursor is currently in the first position of the first unprotected field, it goes to the last position of the last unprotected field on that window.

2-2.5.4.3 Home Key. The Home key moves the cursor to the left most position of the first unprotected area of the window. However, it does not function on many of the HCI windows.

2-2.5.4.4 Page Up/Page Down Keys. The Page Up/Page Down keys function when there are multiple pages of information on the HCI window. One complete page at a time is scrolled forward (for Page Up) or backwards (for Page Down). If there is just one page of information, then the Page Up/Page Down keys do not function.

2-2.5.4.5 Back Space Key. The Back Space Key moves the cursor one space at a time to the left, deleting any alphanumeric entry that may have existed in each space. This key has the auto repeat feature.

2-2.5.5 Insert Key. The Insert key is a toggle for entering alphanumeric data. When toggled on, the Insert key allows the data to be entered without overwriting the existing information. It advances the cursor with each keystroke and advances the existing information. When toggled off, any keystroke entry writes over the existing information, advances to the next location, and does not advance the existing information.

2-2.5.6 Delete Key. The Delete key is used to delete the alphanumeric character on which the cursor is blinking on any unprotected field. If the operator wants to delete a series of alphanumeric characters, then click, and drag to highlight the characters desired, then press the Delete key. The Delete key has the auto repeat feature.

2-2.5.7 Numeric Keypad. The numeric keypad is located in the lower right portion of the keyboard and consists of the Return key and a full set of numeric keys, including a minus sign, a plus sign, an asterisk sign, a back slash, a decimal, Delete (Del) key, Insert (Ins) key, Home key, End key, Page (Pg) Up and Page (Pg) Down keys, four Arrow keys, and a Number (Num) Lock key. This keypad is provided to facilitate numeric data entry for people who are proficient at operating adding machines. The number keys on this keypad operate the same as the unshifted number keys at the top of the alphanumeric keyboard. The decimal, plus, minus, asterisk, and back slash keys all operate the same as the regular entries from the alphanumeric keyboard.

The Num Lock key acts as a toggle switch. When the Num Lock is engaged, the numbers, decimal, plus, minus, asterisk, and back slash keys function regularly. However, the Home, End, Page Up, Page Down, Delete, Insert, and four Arrow Keys all require the shift key be depressed at the same time. When the Num Lock is not engaged, then just the other functions work. The state of the Num Lock key is indicated by the Num Lock indicator at the upper portion of the keyboard. When the light is on, the Num Lock is engaged. When the light is off, the Num Lock is not engaged. All keys on the numeric keypad have the auto repeat feature.

2-2.5.8 Shift Keys. There are two Shift keys, one on either side of the alphanumeric keyboard. These keys do nothing when used alone, but are used in conjunction with other keys to increase the number of actions which a single key can perform. The two Shift keys operate identically. The effect of using Shift in conjunction with any given key is described in the section pertaining to the particular key.

2-2.5.9 Capital Lock. When the Capital Lock (Caps Lock) key is pushed and the light is illuminated, then all the alphabetical keys are entered as capitol letters. When pushed again, the light is turned off and all alphabetical keys are entered as lower case letters.

2-2.5.10 Power On/Off Key. In the upper right hand corner of the keyboard is a Power On/Off key. Its original function has been desensitized and no longer acts as a Power On/Power Off key. It does give the operator a "...v..." character in the terminal window when pressed, but does nothing else. To power off any portions of the system, it is recommended that the operators use only the windows available through the HCI. The technicians, with their maintenance training, should use the more intensive shutdown options available in the MSCF and the Terminal windows (with keystroke commands).

2-2.6 Mouse.

The MSCF mouse is a product of Sun Microsystems and has three buttons. In the WSR-88D RPG configuration, the MSCF processor will always have its own keyboard, mouse, and terminal, while the RPG processor will only have its own keyboard, mouse, and terminal if there is no BDDS installed on the system. In that configuration, the RPG processor and the BDDS processor share the same keyboard, mouse, and terminal. The on-line Help Manager that is available from the CDE Front Panel refers to the three mouse buttons as one, two, and three. This manual refers to the same buttons as left, middle, and right respectively. Each mouse button can be used in the standard click, double-click, or drag functions. The mouse's orientation can be changed from right-handed to left-handed by using the Style Manager available from the CDE Front Panel (Tools pull-up menu, Customize Workspace Menu, Tools, Style Manager, Mouse). This section refers to the buttons as they are oriented for right-handed operation. The following paragraphs list and describe some of the most common, unique, and helpful functions that are available for each mouse button.

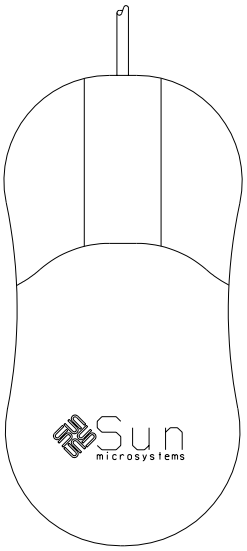


Figure 2-6. Mouse

2-2.6.1 Left Mouse Button. The MSCF and HCI are designed to be operated primarily with a mouse, with the keyboard used only to enter in data, modify parameters, or to describe search titles. The majority of the actions will be taken using the left mouse button (for the right handed operator). The types of task that can be performed by clicking the left mouse button once include the following:

- Selecting a window or an icon, making it active.
- Choosing a button or a hyperlink within a window or a control on the Front Panel.
- Choosing an item within a window.
- Selecting a secondary window by positioning the cursor until the pointing hand indicator or the cursor opens over the desired task.
- Selecting a task or an action by clicking on the correct response.
- Pulling down a screen by selecting the correct arrow.
- Closing windows.

NOTE

The word “click” in the text of this manual indicates a standard single left button click. When a middle click, right click, or double click is required, it will be specifically indicated.

The types of tasks that can be performed by double-clicking the left mouse button include the following:

- Restoring a minimized icon into a window.
- Closing a window (Double-click on the Window Menu button in the upper left hand corner of the window frame.

The types of tasks that can be performed by dragging with the left mouse button include the following:

- Moving a window or an icon by positioning the cursor over the top title bar and dragging the mouse with the left mouse button pressed.
- Highlighting text.
- Making a menu selection.
- Dragging a vertical slider bar within a window's scroll bar to scroll through the window's contents.
- Dragging a horizontal slider bar to expand the width of view of a window.
- Changing the size of a window, either on an edge or on a corner. Some windows allow this feature, others do not. The graphics are resized and repositioned accordingly. However, to preserve the integrity of all the graphics, a minimum window size of 550x400 pixels is maintained.

2-2.6.2 Middle Mouse Button. A task that can be performed by clicking on the middle mouse button include the following:

- Once a text string or a command has been highlighted by dragging over it, pressing the middle mouse button copies and pastes it to the end of the current line.

2-2.6.3 Right Mouse Button. The types of tasks that can be performed by clicking on the right

mouse button is:

- Opening the Window Control Menu (Right-click on an icon or anywhere on a window frame.)
- Opening the Workspace Menu (Right-click anywhere on the workspace background.)
- Opening a CDE Front Panel or Subpanel control's popup menu. (Right--click on the control on the CDE Front Panel or Subpanel.)

2-2.6.4 Keystroke Alternatives to Mouse Buttons. When a window is opened, a rectangular outline may appear in the upper left hand corner over a control button or a block of data. This outline can be moved throughout the window using the Tab key to advance the outline first horizontally to the right hand margin and then scroll downwards, one "line" at a time. When the outline surrounds a control button, pressing on the Return key or the Space bar will activate that button, similar to clicking on the button with the left mouse button. When the outline surrounds a block of data, that data may be changed or deleted using the keyboard (assuming any password protection has been properly addressed.)

Once the outline reaches the lower right hand corner of the window, it starts again in the upper left hand corner. To make the outline move backwards, hold the shift key down while pressing the tab key.

2-2.7 MSCF Window.

Once the user has successfully entered the password and logged in to the Solaris system, the system should automatically boot up a Console window, a Terminal window, the MSCF, a Clock, and the CDE front panel. If the MSCF does not appear, go to the Console window and at the : prompt, type in "mscf &" and press the Return key. The MSCF window then opens up for access to the rest of the system.

Figure 2-7. MSCF Window

2-2.7.1 Close Button. The top row of the MSCF window contains six buttons that provide an interface with the five components. The first button in the upper left is the Close button. Clicking on this button will close the MSCF window and return the user to the terminal window.

2-2.7.2 Comms Status Button. The second button from the left is the Comms Status button. Click on this button and the Comms Status window opens. See Figure 2-8. Comms Status.

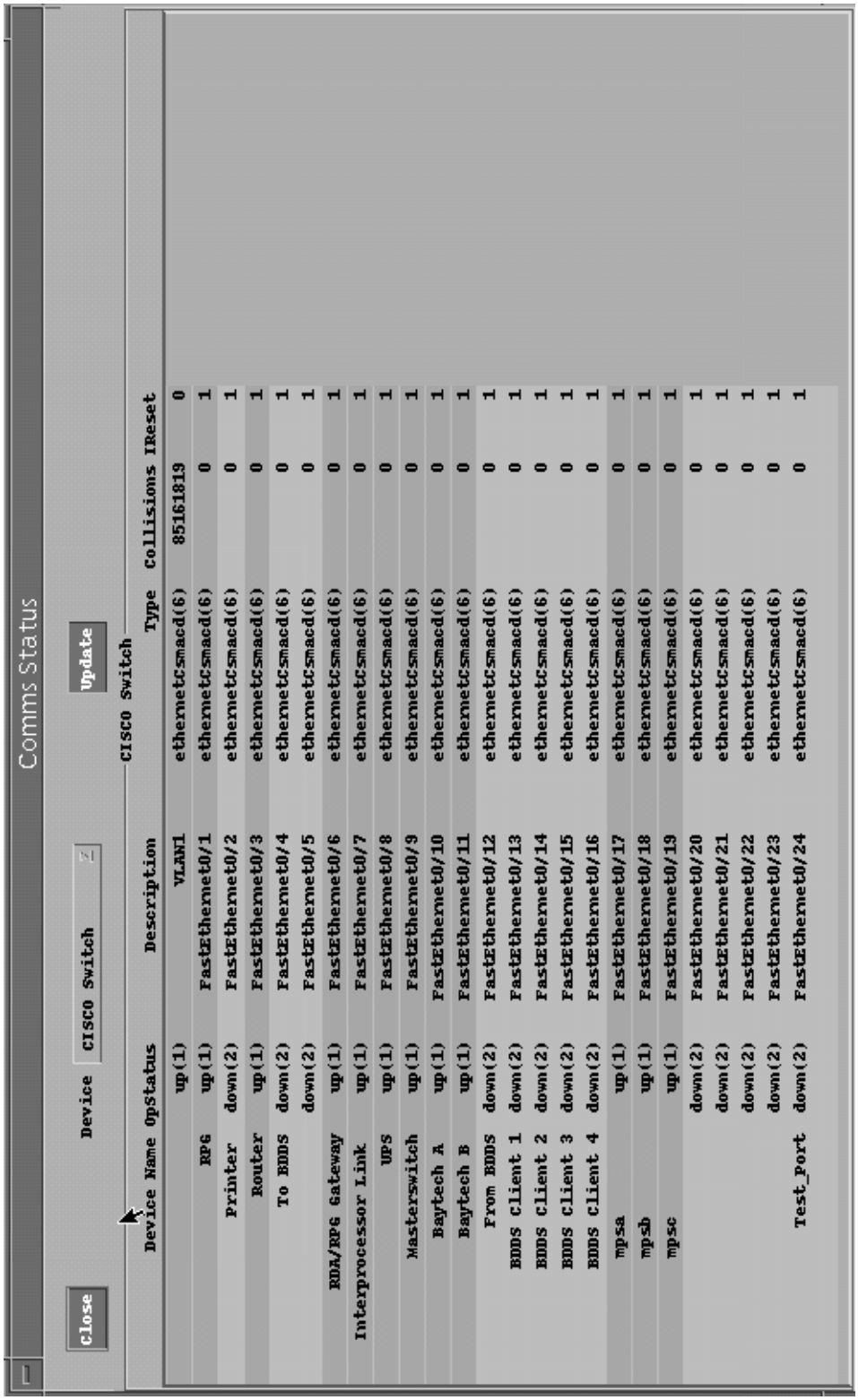
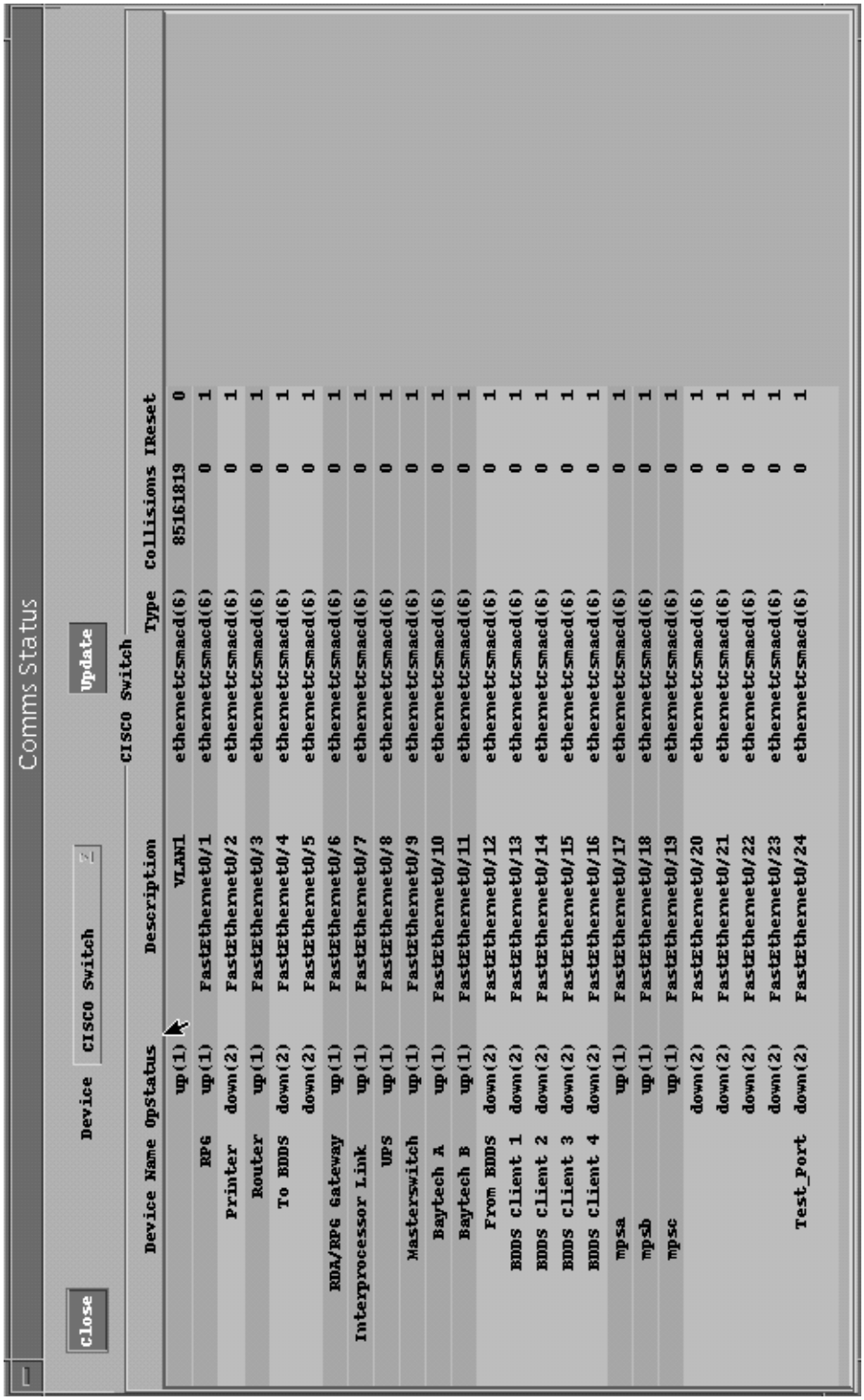


Figure 2-8. Comms Status

2-2.7.2.1 Comms Status Window. The top row of the Comms Status Window has two control buttons and one pull down menu. The first button in the upper left is the Close button. Clicking on this button will close the Comms Status window and return the user to the MSCF window.

The middle item is the pull down menu. This provides the user with the selection of which device to display on the status window. Click on the down arrow and the menu opens. The options in the pull down menu are: CISCO Switch, CISCO Router, and Router Card Status. Click on the desired device, the title turns to white with a black background, and the status window refreshes itself with the information about that device. Each device displays a variety of information. These are discussed below.

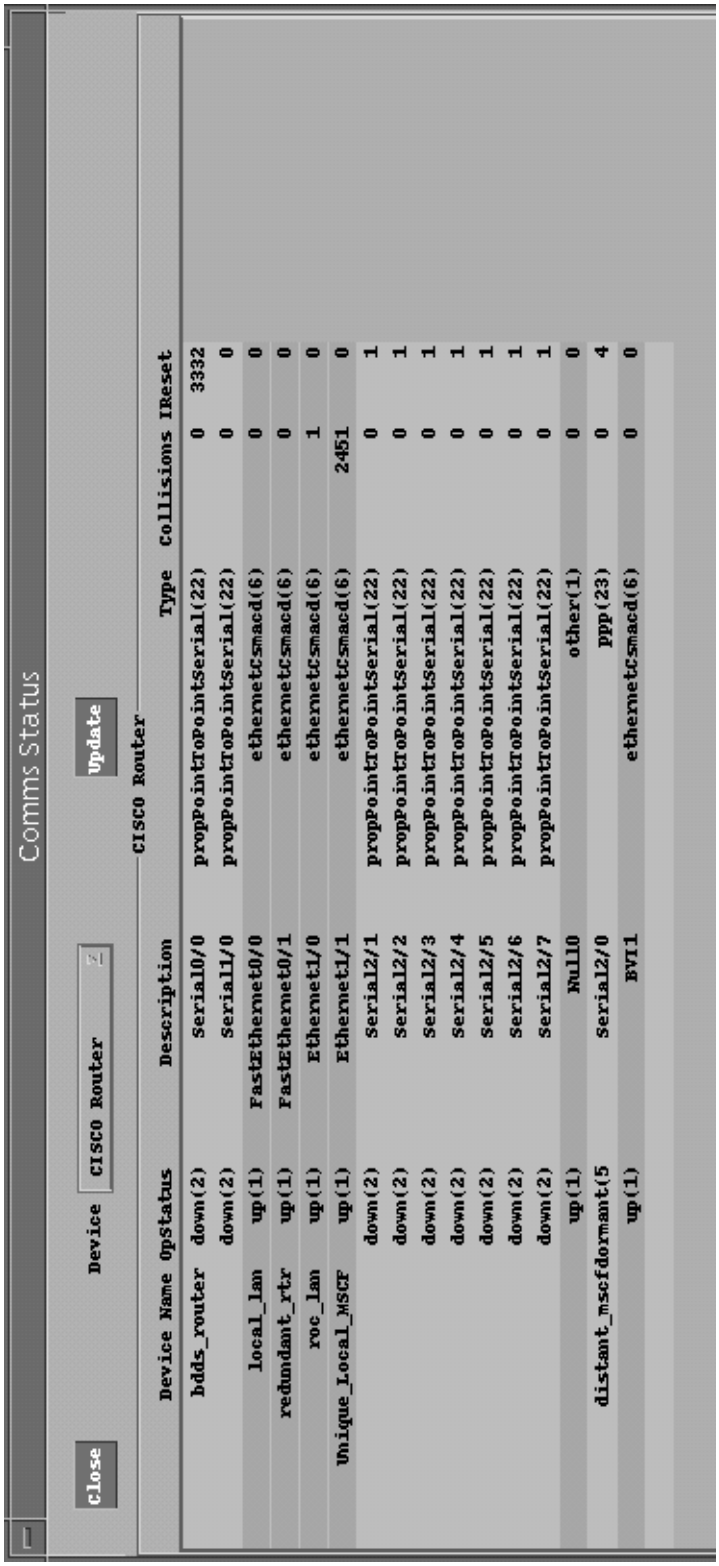
2-2.7.2.1.1 CISCO Switch. This window displays the CISCO Switch Device Name, OpStatus, Description, Type, Collisions, and IReset. The data is color coded with green and gray backgrounds. A green background indicates that the data is Up and a gray background indicates that the data is Down. See Figure 2-9. CISCO Switch.



Device Name	Opstatus	Description	Type	Collisions	IReset
	up(1)	VLAN1	ethernetCsmacd(6)	85161819	0
RPG	up(1)	FastEthernet0/1	ethernetCsmacd(6)	0	1
Printer	down(2)	FastEthernet0/2	ethernetCsmacd(6)	0	1
Router	up(1)	FastEthernet0/3	ethernetCsmacd(6)	0	1
To BDDS	down(2)	FastEthernet0/4	ethernetCsmacd(6)	0	1
	down(2)	FastEthernet0/5	ethernetCsmacd(6)	0	1
RDA/RPG Gateway	up(1)	FastEthernet0/6	ethernetCsmacd(6)	0	1
Interprocessor Link	up(1)	FastEthernet0/7	ethernetCsmacd(6)	0	1
UPS	up(1)	FastEthernet0/8	ethernetCsmacd(6)	0	1
Masterswitch	up(1)	FastEthernet0/9	ethernetCsmacd(6)	0	1
Baytech A	up(1)	FastEthernet0/10	ethernetCsmacd(6)	0	1
Baytech B	up(1)	FastEthernet0/11	ethernetCsmacd(6)	0	1
From BDDS	down(2)	FastEthernet0/12	ethernetCsmacd(6)	0	1
BDDS Client 1	down(2)	FastEthernet0/13	ethernetCsmacd(6)	0	1
BDDS Client 2	down(2)	FastEthernet0/14	ethernetCsmacd(6)	0	1
BDDS Client 3	down(2)	FastEthernet0/15	ethernetCsmacd(6)	0	1
BDDS Client 4	down(2)	FastEthernet0/16	ethernetCsmacd(6)	0	1
mpsa	up(1)	FastEthernet0/17	ethernetCsmacd(6)	0	1
mpsb	up(1)	FastEthernet0/18	ethernetCsmacd(6)	0	1
mpsc	up(1)	FastEthernet0/19	ethernetCsmacd(6)	0	1
	down(2)	FastEthernet0/20	ethernetCsmacd(6)	0	1
	down(2)	FastEthernet0/21	ethernetCsmacd(6)	0	1
	down(2)	FastEthernet0/22	ethernetCsmacd(6)	0	1
	down(2)	FastEthernet0/23	ethernetCsmacd(6)	0	1
Test_Port	down(2)	FastEthernet0/24	ethernetCsmacd(6)	0	1

Figure 2-9. CISCO Switch

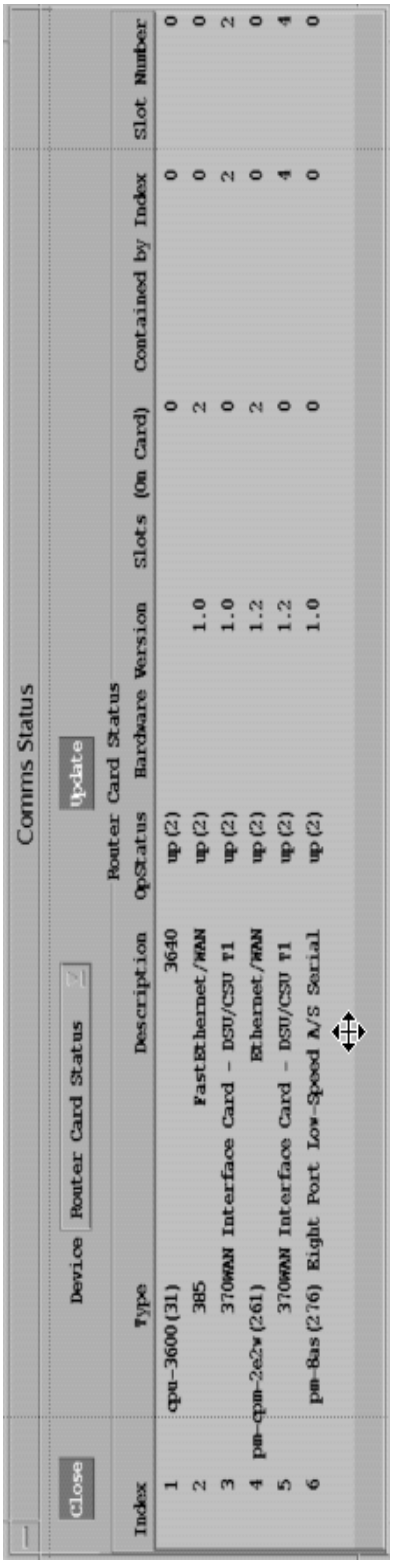
2-2.7.2.1.2 CISCO Router. This window displays the router Device Name, OpStatus, Description, Type, Collisions, and IReset. The data is color coded with green and gray backgrounds. A green background indicates that the status is Up and a gray background indicates that the status is Down. See Figure 2-10. CISCO Router.



Device Name	Opstatus	Description	Type	Collisions	IReset
bdds_router	down(2)	Serial0/0	propPointtoPointSerial(22)	0	3332
	down(2)	Serial1/0	propPointtoPointSerial(22)	0	0
local_lan	up(1)	FastEthernet0/0	ethernetCsmacd(6)	0	0
redundant_rtr	up(1)	FastEthernet0/1	ethernetCsmacd(6)	0	0
roc_lan	up(1)	Ethernet1/0	ethernetCsmacd(6)	1	0
Unique_Local_MSCF	up(1)	Ethernet1/1	ethernetCsmacd(6)	2451	0
	down(2)	Serial2/1	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/2	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/3	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/4	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/5	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/6	propPointtoPointSerial(22)	0	1
	down(2)	Serial2/7	propPointtoPointSerial(22)	0	1
	up(1)	Null0	other(1)	0	0
distant_mscfdormant(5		Serial2/0	ppp(23)	0	4
	up(1)	EVI1	ethernetCsmacd(6)	0	0

Figure 2-10. CISCO Router

2-2.7.2.1.3 Router Card Status. This window displays the RouterCard Index, Type, Description, OpStatus, Hardware Version, Slots (On Card), contained by Index, and Slot Number. See Figure 2-11. Router Card Status. The user must use the arrow controls on the bottom of the window to expand the right hand margin to review the entire contents.



Index	Type	Description	OpStatus	Hardware Version	Slots	(On Card)	Contained by Index	Slot Number
1	cpu-3600(31)	3640	up(2)		0		0	0
2	385	FastEthernet/WAN	up(2)	1.0	2		0	0
3	370WAN Interface Card - DSU/CSU T1		up(2)	1.0	0		2	2
4	pm-cpm-2e2w(261)	Ethernet/WAN	up(2)	1.2	2		0	0
5	370WAN Interface Card - DSU/CSU T1		up(2)	1.2	0		4	4
6	pm-8as(276) Eight Port Low-Speed A/S Serial		up(2)	1.0	0		0	0

Figure 2-11. Router Card Status

2-2.7.2.2 Update Button. Click on the Update button to refresh and update the particular window the user is looking at. Even if the window has an automatic update feature, this button will still update it with the latest available information.

2-2.7.3 Power Control Button. The third from the left button is the Power Control button. Click on the Power Control button and the Power Control window opens. See Figure 2-12. Power Control. The purpose of this window is to provide power control to various devices plus provide a last resort route to possibly recover equipment by rebooting the power.

Figure 2-12. Power Control

There are five controlling buttons plus a graphic representation of the power outlets to various devices. The upper left Close button closes the Power Control window and returns the user to the MSCF window. The upper right Update button refreshes the window with the latest information. If the power is on for an outlet, it will have a green background. If the outlet has been clicked on by the user, the background turns to yellow and the connection is now available for modification. If the background is red, then the outlet has been turned off because of hardware power failure.

The power outlets in this example are, from left to right: RPG, LAN, Router, Comms Server, RDA/RPG Gateway, BDDS, COMMS, and COMMS Server. This arrangement may vary as the hardware evolves.

2-2.7.3.1 Power Control - Turn Off. To turn off an outlet server that is presently on (green), click on the desired outlet (turns yellow), then click on the Turn Off button in the lower left corner of the window. A warning_popup opens that states: “You are about to turn OFF devices: XXXX. Do you want to continue?” Click on Yes or No. XXXX is the legend for the power connection that was selected. If Yes, the outlet is turned off and the outlet background color changes to red. If No, the user is returned to the Power Control window. If there is no icon selected and the turn off button is clicked, a warning popup opens that states: “You need to select the appropriate device(s) by clicking on the selector icon.” Click on the Continue button to return to the Power Control window.

NOTE

The user cannot turn off/on the LAN, Router, or the Comm Servers A, B, or C. When any of these outlets are selected, the Turn Off/Turn On Buttons become grayed-out and desensitized.

2-2.7.3.2 Power Control - Turn On. To turn on an outlet that is presently off (red), click on the desired outlet (turns yellow), then click on the Turn On button in the middle of the bottom of the window. A warning_popup opens that states: “You are about to turn ON devices: XXXX. Do you want to continue?” Click on Yes or No. XXXX is the legend for the power connection that was selected. If Yes, the outlet is turned on and the outlet background color changes to green. If No, the user is returned to the Power Control window. If the user has not selected an outlet yet, a warning_popup opens that states: “You need to select the appropriate device(s) by clicking on the selector icon.” Click on the Continue button to return to the Power Control window

2-2.7.3.3 Power Control - Reboot. To reboot the outlets, select the desired outlet(s), then click on the Reboot button. If the user has not selected an outlet yet, a warning_popup opens that states: “You need to select the appropriate device(s) by clicking on the selector icon.” Click on the Continue button to return to the Power Control window.

When rebooting the RPG, it is recommended to have the HCI already selected and visible on the screen. The user can more easily tell when the RPG has finished rebooting by the information displayed on the HCI such as the Operate text line and the data flow.

While the RPG is rebooting, additional windows will open temporarily. There is a Waiting Window that displays a text string and XXX countdown clock stating: "Waiting for graceful shutdown of the RPG. XXX seconds remaining." A second window that will appear is titled Waiting for Network Connectivity. Its text string will read: "Node "RPG" is not reachable. Waiting for a valid network connection. HCI will exit after 90 seconds. XX seconds remaining." XX is a countdown in seconds of the time remaining." The user has to take no action with any of these temporary windows. It does take approximately 2 ½ minutes for the RPG to fully reboot itself.

The RPG Reboot clears out the entire data base and brings up the RPG in a clean start. This has a more significant impact on the RPG than the Restart buttons (All Tasks or Options) found in the RPG Control window.

2-2.7.4 RPG HCI. The fourth button from the left is labeled RPG HCI. Click on this button and the HCI window opens. If the RPG is a distance from the MSCF, a Data Transfer Meter will appear for a few seconds. Then a Waiting for Network Connectivity window will appear that states: “Node “rpg” is not reachable. Waiting for a valid network connection. HCI will exit after 90 seconds. XX seconds remaining” XX is a countdown in seconds of the time remaining. Click on the Cancel button to cancel the request for the HCI and return to the MSCF.

2-2.7.5 RDA HCI. The fifth button from the left is labeled RDA HCI. This button is reserved for future software builds and is not implemented at this time.

2-2.7.6 BDDS HCI. Only NWS sites have the BDDS HCI button; FAA and DOD sites do not

display this button. The last button on this row is the BDDS HCI button. Click on the BDDS HCI button and the Base Data Distribution Server window opens.

Figure 2-13. BDDS HCI

The BDDS window has five control buttons and a table of BDDS Clients. The upper left button is the Close button. Clicking on the Close button will return the user to the MSCF window. To the right of the Close button is a text string labeled “BDDS Status:” with two texts available; Active with a green background and Not Active with a yellow background.

The second row of buttons contains the following controls.

2-2.7.6.1 Start BDDS. Click on this button to activate the BDDS. If the BDDS is already active, the Start BDDS button is grayed-out and desensitized.

2-2.7.6.2 Stop BDDS. Click on this button to stop the BDDS. If the BDDS is not active, the Stop BDDS button is grayed-out and desensitized. A warning_popup opens that states: “You are about to stop the BDDS server. Do you want to continue?”. Click on Yes or No.

2-2.7.6.3 Update Info. Click on this button to manually refresh the BDDS information in the window.

2-2.7.6.4 Terminate Clients. If the user first clicks on this button before selecting any Clients from the display box in the lower middle portion of the window, a warning_popup opens that states: “Please select Clients first.” Click on the Continue button and the user is returned to the BDDS window. Move the cursor to the BDDS Clients box in the bottom of the window and click on the Client(s) that are to be terminated. The user can click and drag to select several Clients in a vertical column. Once the name opens with a black background, then click on the Terminate Clients button and a warning_popup opens that states: “Are you going to terminate X number of Clients, AAAA?” Click on Yes or No. X number is the total number selected; XXXX are the actual Clients selected. If Yes, the Clients are terminated from the listing and the user returned to

the BDDS window. If No, the Clients remain active and in the list of Clients and the user is returned to the BDDS window.

2-2.7.6.5 Assign New Clients. A BDDS Client can only be added by the BDDS Client itself. The BDDS window at the MSCF has no commands to add a Client and the BDDS server at the RPG can not add Clients on its own. The customer at the BDDS Client system has to start the application software to begin receiving the data and to be listed as a Client in the BDDS window.

2-2.7.7 FAA Redundant. If the radar is a FAA redundant configuration, there will be another block to the far right that is titled: Channels. Directly underneath the title are two control buttons. The left button has a “1” beside it; the right button has a “2” beside it. These numbers represent the Channel 1 or Channel 2 in the FAA redundant configuration. See Figure 2-14. MSCF - FAA.

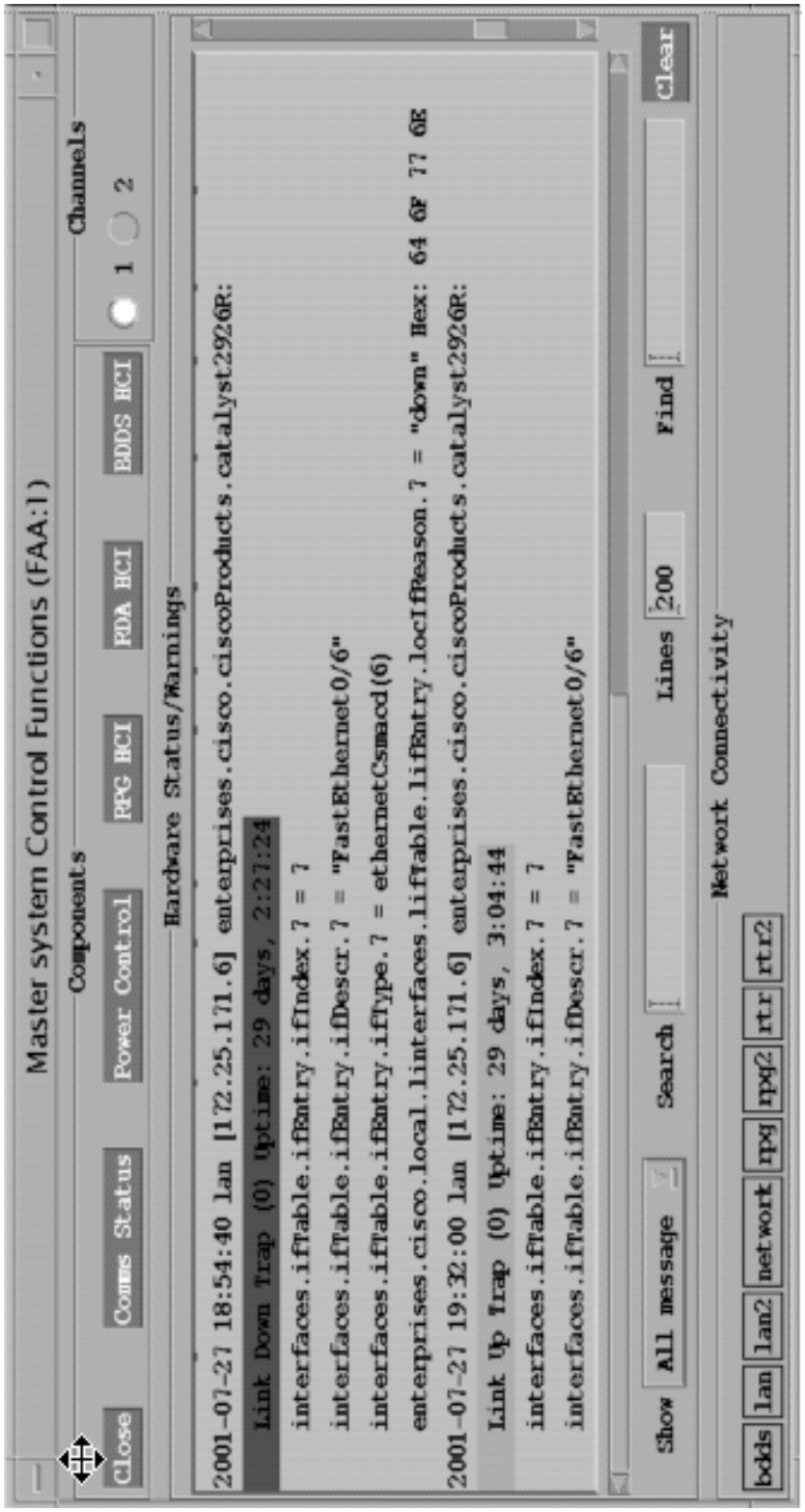


Figure 2-14. MSCF - FAA

To perform all functions for a particular channel such as selecting the RPG HCI, checking the power, or reading the Hardware Status/Warnings, the button directly to the left of that channel's number must be highlighted white. Click on the button to the left of the “1” and Channel 1 becomes the displayable channel when the button turns white. To display and interact with Channel 2, click on the button to the left of the “2”. When it becomes white, then Channel 2 becomes the displayable channel. These two buttons act as toggle switches. Only one can be highlighted at a time.

The messages and warnings displayed in the middle of the MSCF are for the selected channel. It does NOT have to be the controlling channel to show the information. The Hardware Status/ Warnings Section is refreshed when the other FAA channel is selected.

2-2.7.8 Hardware Status/Warnings Window. In the center of the MSCF window is a separate window that displays the Hardware Status/Warnings from Simple Network Management Protocol (SNMP) traps. This log displays all the lines from the SNMP traps. They are color coded to facilitate interpretation. When the background color is green, that represents a link up trap. When the background color is red, that represents a link down trap. When the background color is gray, that represents information only. The SNMP trap information is mostly useful for maintenance personnel. If an operator notices a lot of red background lines, that is an indication that maintenance should be notified.

2-2.7.9 Show Pull Down Menu. In the lower left hand corner of the MSCF window, just above the bottom row, is the “Show” pull down menu of the categories of status and warnings that are displayed in the middle window. Click on the down arrow and the categories that appear are: All Messages, Critical, APC, and CISCO. Click on the desired category, the middle window refreshes with the selected type of information, and that label opens in the Show block.

2-2.7.10 Search. The second item from the left on the next to the bottom row is a Search Option for the Hardware Status/Warnings window. Move the cursor inside the box just to the right of the label Search and type in the character string that the user wants to search for in the Hardware Status/Warnings. The entries are case sensitive. Once the string is entered, press the Return key and the center window is refreshed with just those sections of messages containing that string. The SNMPs come in a Section of messages, so it may appear that the user received more than just the selected individual messages. If the string is identified in any portion of a section, then that entire section is displayed. To clear the Search box, click on the Clear button to the far right of this same line. To restore the status/messages to their original listing, clear out the Search box and then press the Return key.

2-2.7.11 Lines. The third item from the left on the next to the bottom row is the editable field of the number of lines that will be displayed in the Hardware Status/Warnings window. Move the cursor inside the box just to the right of the label Line and type in the number of messages to be displayed. The maximum number of lines allowed is 1200. If a number larger than 1200 is entered, a warning_popup opens that states: “The maximum number of lines is 1200”. Click on the Continue button and the user is returned to the MSCF window.

2-2.7.12 Find. The next-to-last item to the far right on the next to the bottom row is a Find option

for the Hardware Status/Warnings window. Move the cursor to inside the box just to the right of the label Find and type in the text string that the user wants to search for and highlight in the Hardware Status/Warnings. The text string entries are case sensitive. Once the string is entered, press the Return key. The oldest message in the file that contains that string will now be highlighted by changing to white lettering. All the sections and messages still remain in the window, but the cursor moves to the next occurrence of the Find string. Use the arrow slide bar along the right hand margin to scroll through the sections, looking for the highlighted individual messages. To clear the Find option text string and remove the white background from the Find option result, click on the Clear button to the right of the Find box.

2-2.7.13 Clear Button. The Clear button is used to close both the Search and the Find option text strings. It has no other effect on the Search Option. The white line that highlighted the Find option is deleted when the Clear button is clicked.

2-2.7.14 Network Connectivity. The bottom line of the MSCF contains a series of color coded boxes that represent devices on all RPG configurations as described below. Color coding gives a quick overall status of the network devices at a glance. Devices displayed in green are currently connected and those in red are not. This area only displays status information and no commands are initiated by clicking on any of the device boxes. To take action on any of these connects or disconnects, the user must go to the Power Control window.

NWS/DOD displays at the RPG Maintenance Position Terminal have boxes labeled: bdds, lan, mscf, network, and rtr.

NWS/DOD displays at the MSCF have boxes labeled: bdds, lan, network, rpg, and rtr.

FAA displays at the RPG Maintenance Position Terminal have boxes labeled: bdds, lan, lan2, mscf, network, rpg2, rtr, and rtr2.

FAA displays at the MSCF have boxes labeled: bdds, lan, lan2, network, rpg, rpg2, rtr, and rtr2. All boxes are easily identifiable by their component label except for the new one called the network box. The network box represents the link between the RPG and the MSCF. The MSCF sends out a ping once every ten seconds to the RPG and to all other nodes in that network. If the links are intact, the network box remains green. If the links are not intact, the network box turns red.

SECTION 2-3. HUMAN COMPUTER INTERFACE (HCI)

This section describes how to use the HCI component of the RPG. Its primary purpose is to control various functions of the RPG and RDA and provide overall system status. The HCI is titled RPG Control/Status window and is referred to as either the HCI or the RPG Control/Status window. The RPG Control/Status window can be broken into four major regions: RDA Status/Control, RPG Status/Control, Users/Status, and Applications. At any given moment, the state of each of the major components can be determined by visual inspection of the display. Data flowing between components are represented by "moving boxes" along the connections. Menus and commands can be invoked by clicking (one left button click) a specific button. A button or object is identified as selectable in the RPG Control/Status window if the cursor shape changes to a pointing hand as the cursor moves over it. This is only true when the cursor is inside the RPG Control/Status window. See Figure 2-15. RPG Control/Status.

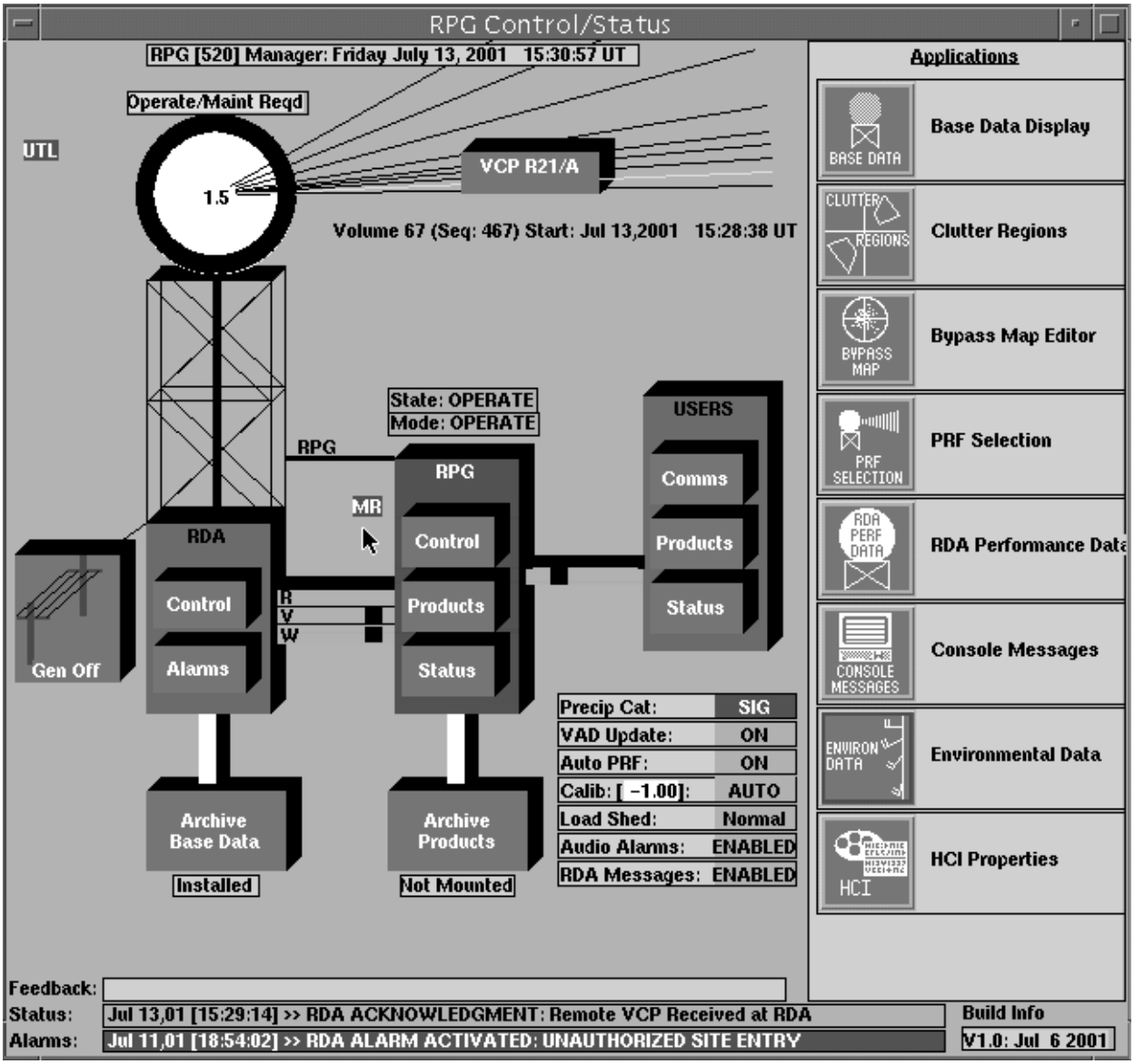


Figure 2-15. RPG Control/Status

The size of the RPG Status/Control window can be changed at any time by positioning the cursor over one of the window corners and dragging the mouse with the left mouse button pressed. Buttons and graphics are resized and repositioned accordingly. To preserve the integrity of all buttons and graphics, a minimum window size of 640x550 pixels is fixed.

2-3.1 RDA Status/Control Region.

The left third of the RPG Control/Status window is devoted to RDA specific items. The display consists of the RDA icon containing the Control button and the Alarm button, the Archive Base Data icon, and a graphical representation of the radar tower, radome, and power source. In addition, if active RDA alarms are present (as indicated by the RDA Alarm Summary in the latest RDA status message), red buttons are created for each RDA device category identified as having an active alarm. The following RDA devices (and button mnemonic) are identified:

Tower/Utilities	(UTL)
Pedestal	(PED)
Transmitter	(XMT)
Receiver/Signal Processor	(RSP)
RDA Control	(CTR)
User Communications	(USR)
Archive II	(ARC)

2-3.2 RDA Power Source.

The RDA power source is either utility or generator and is reported by information contained in the latest RDA status message. The utility source is represented by a pair of utility poles with a wire connecting one of the poles to the top of the RDA icon. The generator source is represented by a picture of a shelter and a fuel tank. The fuel level is displayed inside the fuel tank. If the power source is utility and the generator is on, or if the power source is generator and utility power is available, a text message is displayed beneath the power source graphic. When the RDA power source is generator, an automatic request for new RDA performance data is sent to the RDA at the beginning of each volume scan. The graphical representation of the fuel level in the fuel tank reflects the latest fuel level information provided by RDA performance data.

2-3.3 Radome.

The Radome graphic is used to display the position of the antenna. When the system is in operate, the azimuthal position is displayed as a black arc drawn inside the radome. The leading edge on the arc is the current azimuth. When the leading edge of the trace meets the beginning azimuth position of that elevation scan, this completes a 360 degree trace around the outside edge of the radome. The completed circle disappears and then the whole process starts over again at the next elevation angle of operation. While the RDA is in Standby and the antenna is in the park position, the antenna's azimuth position is not displayed. The elevation angle is displayed as a text string at the center of the radome. The elevation angle is not displayed in when the RDA is in standby. Above the radome, the RDA status and operability status are displayed as text (separated by a "/"). The color of the text is dependent on the RDA operability status.

The possible RDA status that can be displayed for the RDA are:

- Start-up
- Standby
- Restart
- Operate
- Playback
- Offline Operate
- Unknown

The possible RDA operability status (and color) that can be displayed for the RDA are:

- Online (Green)
- Maint Reqd (Yellow)
- Maint Mand (Orange)
- Cmd Shutdown (Yellow)
- Inoperable (Red)

2-3.4 Tower.

The tower is used to separate the RDA control box from the radome. Its relative height and number of vertical sections does not reflect the actual height of the tower.

2-3.5 Transitional Power Source (TPS).

If the site has a TPS installed and configured, a text line appears inside the tower near the middle. If the TPS status is OK, the text "TPS:OK" is displayed in green. If the TPS status is off, the text "TPS:OFF" is displayed in red.

2-3.6 Displayed Elevation Angle and Current VCP.

The lines emanating from the center of the radome to the center of the RPG Control/Status window represent the various elevation slices of the current VCP. The actual angle of the lines are scaled by a factor of 2 to provide better visual separation, When the RDA is in Operate, all the lines are black except for the current elevation slice that the radar is obtaining data in, and that line is highlighted yellow. When the RDA is in standby, all elevation lines are black. Inside the elevation angle lines is a blue box containing a text string (beginning with the string "VCP") that identifies the current VCP in use by the RDA. If a local (RDA) pattern is used, the VCP number is preceded by the letter "L". If a remote (RPG) pattern is used, the VCP number is preceded by the letter "R". The weather mode is displayed to the right of the VCP number as the letters "A" (Precipitation), "B" (Clear Air), or "M" (Maintenance). The current volume scan start time is displayed as a text string beneath the VCP graphic. Click in the VCP text string box and the VCP Control window is opened.

2-3.6.1 VCP Control Window. Click on the Current VCP box (once the cursor turns into the

pointing hand) to bring up the VCP Control window. See Figure 2-16. VCP Control. This window contains selections to edit and change VCPs and control when they are updated.

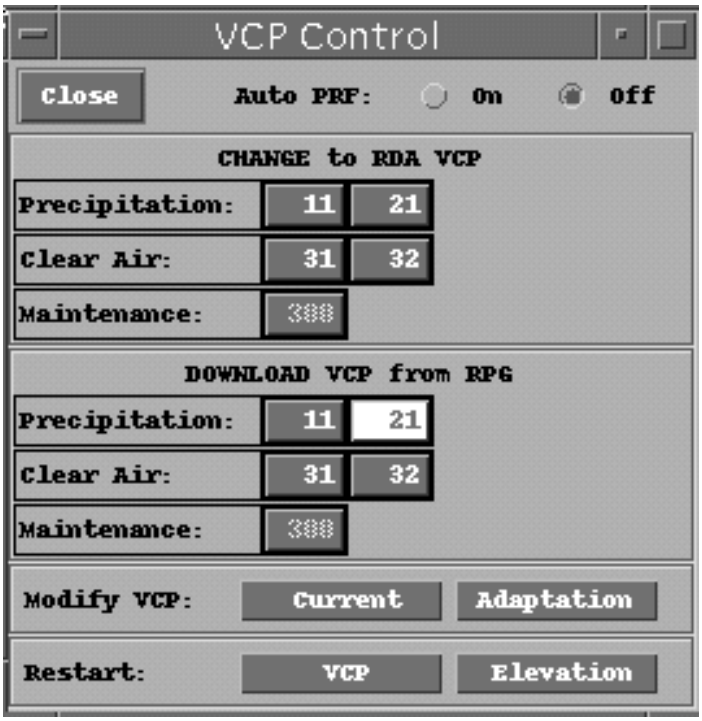


Figure 2-16. VCP Control

2-3.6.1.1 Close Button. Click on the close button to return to the HCI (if no changes have been made to this window). If edits had been made and not yet saved, clicking on this button will bring up a warning_popup that states: "You made changes to the Current VCP data which were not saved. Do you want to save them?" Click on either Yes or No to select the desired response. If Yes, the changes are saved and the user returned to the HCI. If No, the changes remain in the windows and the user remains at the VCP Control window.

2-3.6.1.2 Auto PRF Function. To the right of the Close button are two buttons used to control the Auto PRF function: On and Off. Only one button can be set at a time. When the Auto PRF function is on, the On button is set and the button is green. When the Auto PRF function is off, the Off button is set and the button is red. These states match the Auto PRF status displayed in the RPG Control/Status window. When the Auto PRF function is on, the Auto PRF function determines the PRF that results in the least amount of range folding (obscuration) and, if the RDA is not in local control, downloads an updated VCP to the RDA. This updated VCP takes effect at the start of the next volume scan.

To change the Auto PRF state click on the button which is not set. If the button or the title On is clicked, a warning_popup window appears that states: "You are about to enable the Auto PRF function. Do you want to continue?" Clicking Yes will turn the Auto PRF function on; clicking No will leave the Auto PRF function off. If the button or the title Off is clicked, a warning_popup appears that states: "You are about to disable the Auto PRF function. Do you want to Continue?".

Clicking Yes will turn the Auto PRF function off; clicking No will leave the Auto PRF function on.

2-3.6.1.3 CHANGE to RDA VCP. The CHANGE to RDA VCP section in the VCP Control Window provides the user with selections to invoke a local VCP from VCP adaptation data stored at the RDA. Selections are organized by weather mode. If the RPG mode is Operate, the selections for all Maintenance VCPs (VCPs with numbers greater than 255) are desensitized. Maintenance VCPs are selectable only when the RPG is in one of the "Test" modes. Refer to section 2-3.13.1.2.5 RPG Mode - Operate. and 2-3.13.1.2.6 RPG Mode - Test. on how to change RPG mode. If the text and background colors of one of the selections is the reverse of all of the others, it indicates that this VCP is currently active at the RDA. This is normally indicated by the white button indicating the VCP that is active and all others being the background color.

NOTE

Sites with an Enterprise Electronics Corporation (EEC) RDA cannot go into Test Mode and cannot use VCP Maintenance 300.

When in VCP Maintenance 300, in the RPG Control window, the Test Mode button is grayed-out and desensitized while the Operate Mode button is sensitized. In order to return the RPG to normal operations, first select the desired VCP (11,21,31, or 32) from the VCP Control window. A warning_popup opens that states: "You are about to change to a VCP stored as adaptation data at the RDA. It will take effect at the start of the next volume scan. Do you want to continue?" Click on Yes or No. If No, the user is returned to the VCP Control window. If Yes, the newly selected VCP is invoked at the RDA at the start of the next volume scan and the user is returned to the VCP Control window. Then in the RPG Control window, click on Operate Mode. A warning_popup opens that states: "You are about to change to Operate mode. Do you want to continue?" Click on Yes or No. If No, the user is returned to the RPG Control window. If Yes, the RPG goes into Operate mode and the user is returned to the RPG Control window.

When the Auto PRF is ON and the operator clicks on and accepts a CHANGE to RDA VCP, that change will take place at the next volume scan, and the active (white) block will automatically switch down to the next section, the DOWNLOAD VCP from RPG. If the Auto PRF is OFF, the active (white) block will remain in the CHANGE to RDA VCP regardless of the number of volume scans that are processed.

2-3.6.1.4 DOWNLOAD VCP from RPG. The DOWNLOAD VCP from RPG section in the VCP Control window provides the user with selections to invoke a remote VCP from VCP adaptation data stored at the RPG. Selections are organized by weather mode. If the RPG mode is Operate, the selections for all Maintenance VCPs (VCPs with numbers greater than 255) are desensitized. Maintenance VCPs are selectable only when the RPG is in one of the "Test" modes. Refer to paragraph 2-3.13.1.2.5 RPG Mode - Operate., on how to change RPG mode. If the text and background colors of one of the selections is the reverse of all of the others, it indicates that this VCP is currently active at the RDA. This is normally indicated by the white button indicating the VCP that is active and all others being the background color.

NOTE

Sites with an Enterprise Electronics Corporation (EEC) RDA cannot go into Test Mode and cannot use VCP Maintenance 300.

To request change to a remote VCP, click one of the non-active buttons. A warning_popup window appears that states: "You are about to change to a VCP stored as adaptation data at the RPG. It will take effect at the start of the next volume scan. Do you want to continue?". Click the Yes button to proceed or click the No button to cancel the request. In either case, the user will return to the VCP Control window.

2-3.6.1.5 Modify VCP. The third block, Modify VCP, has two options for the user to select: Current or Adaptation. Clicking on Current brings up the PRF Selection (Modify Current VCP) window. See Figure 2-17. PRF Selection (Modify Current VCP). Clicking on Adaptation brings up the Modify VCP Adaptation Data window. Both of these are discussed in detail below.

NOTE

If the RDA-RPG link is not connected or if the RDA is in local control, this window will not open. A warning_popup appears that states: "PRF selection is not allowed while the RDA is in local control or the RDA-RPG link is not connected." Click on the OK button to continue.

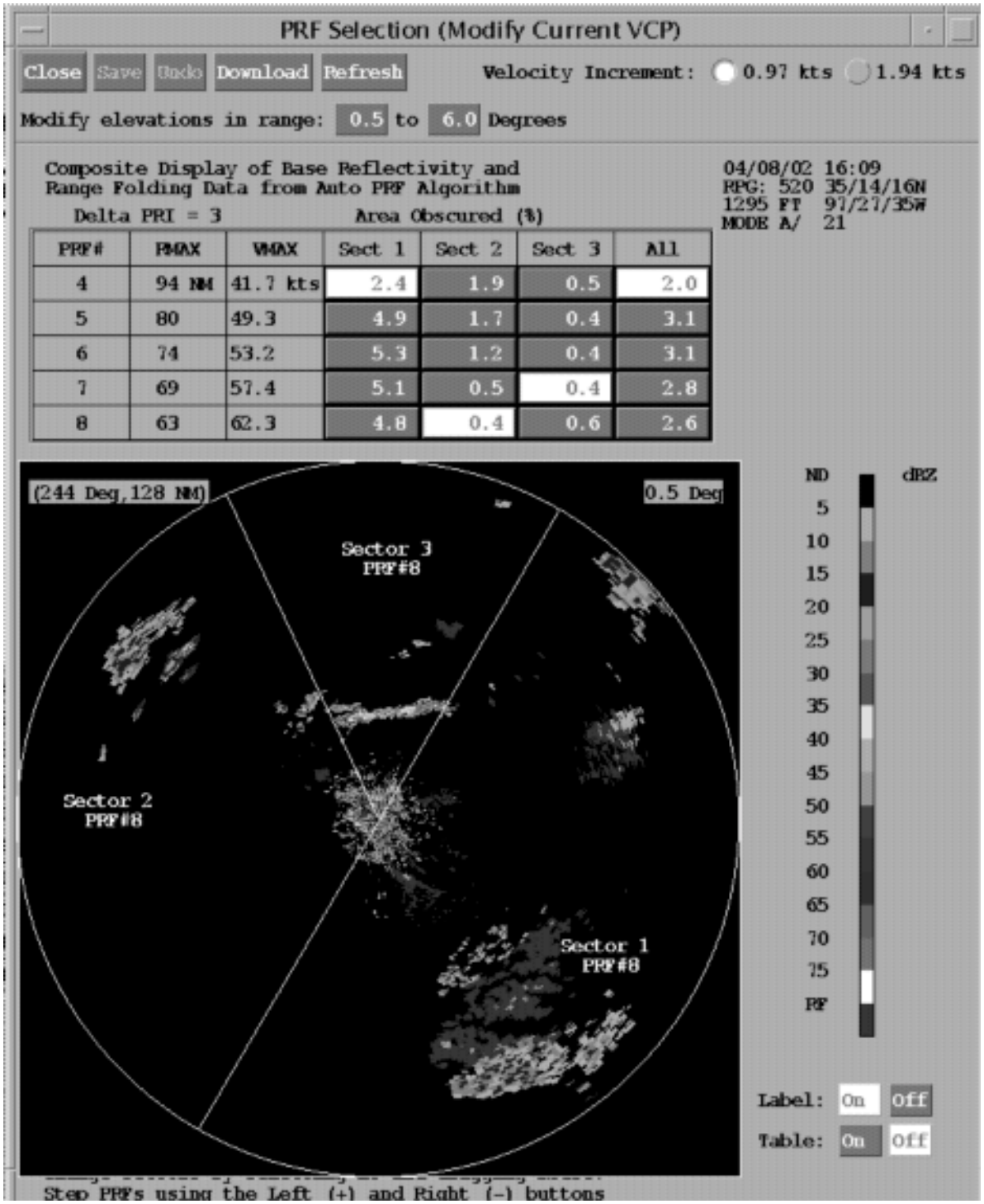


Figure 2-17. PRF Selection (Modify Current VCP)

2-3.6.1.5.1 PRF Selection (Modify Current VCP) Window. This window provides selections to modify current VCP adaptation data and download the data to the RDA. It provides a tabular and graphical display of range folding (obscuration) information calculated by the Auto PRF function so the user can determine the best PRF to use for a given sector in order to minimize the amount of obscuration for a meteorological target. The PRF Selection (Modify current VCP) window consists of three main sections: Control, obscuration table, and graphical display.

2-3.6.1.5.1.1 Control Section. The control section contains a set of buttons to save and undo edits, download the current VCP adaptation data to the RDA, refresh the base reflectivity and obscuration data displayed in the obscuration table and graphical display region, set the velocity increment, and define the range of elevations affected by selecting items in the obscuration table and graphical display region.

2-3.6.1.5.1.1.1 Close Button. Clicking the Close button closes the PRF Selection (Modify Current VCP) Window. If any unsaved edits are detected, a warning_popup window appears that states: "You made changes to the current VCP data which were not saved. Do you want to save them?". Click on Yes to save the edits before closing the window. Click on No to close the window and discard the edits. If the Modify current VCP Adaptation Data window is open, it is also closed.

2-3.6.1.5.1.1.2 Save Button. Click the Save button to copy the edited current VCP adaptation data to file. When selected, a warning_popup window appears that states: "You are about to overwrite the current VCP data with your edits. Do you want to continue?". Click Yes to save the edits. Click No to do nothing and leave all local edits intact. The Save button is sensitized only when unsaved edits are detected.

2-3.6.1.5.1.1.3 Undo Button. Click the Undo button to discard all unsaved edits. Data displayed in the PRF Selection (Modify Current VCP) and Modify Current VCP Adaptation Data windows are refreshed. The Undo button is sensitized only when edits are detected, otherwise it is desensitized.

2-3.6.1.5.1.1.4 Download Button. Click on the Download button to request that the contents of the current VCP adaptation data file be downloaded to the RDA and used at the start of the next volume scan. When clicked, a warning_popup window appears that states: "You are about to download the current VCP changes to the RDA. Do you want to continue?". Clicking Yes will continue with the download procedure. Clicking No will do nothing and leave all local edits intact. If Yes is clicked and any unsaved edits are identified, a warning_popup window is displayed which states: "Do you want to save your changes to the current VCP before downloading?". Clicking Yes will save the edits and continue the download procedure. Clicking No will continue the download procedure without saving edits. All local edits will remain intact. If the Auto PRF function is enabled, a warning_popup appears that states: "The Auto PRF function is currently enabled. If you do not disable it, your changes may be lost at the next volume scan. Do you want to disable the Auto PRF function?". Clicking Yes will disable the Auto PRF function before proceeding with the download. Clicking No will leave the Auto PRF function enabled and proceed with the download.

2-3.6.1.5.1.1.5 Refresh Button. Click on the Refresh button to cause the obscuration and base reflectivity products used in the obscuration table and graphical display regions to be updated (latest times available). New base reflectivity and obscuration products are available in the RPG products data base after the 0.5 degree Doppler cut has completed. The data in the obscuration table and graphical display regions are not automatically updated when the new products are available.

2-3.6.1.5.1.1.6 Velocity Increment Buttons. The buttons to the right of the "Velocity Increment" label control which velocity resolution is used in the current VCP. Two velocity resolutions are available: 0.97 kts (0.5 m/s) and 1.94 kts (1.0 m/s). The button corresponding to the currently active velocity resolution is set with a white button (routinely). To change the velocity resolution, click on the button (or the corresponding title) that is not sensitized. The two act as a toggle switch between the two values.

2-3.6.1.5.1.1.7 Modify Elevation Range Buttons. The two buttons to the right of the label Modify elevations in range are used to control the range of elevations affected by changing PRF numbers and sector boundaries in the obscuration and graphical display regions. The elevation angle defined by the first button is always less than or equal to the elevation angle defined by the second button. Clicking one of the buttons advances the elevation angle to the next one defined in the current VCP. If the first button is clicked and the new elevation angle is greater than the second elevation angle, the second elevation angle is advanced. If the elevation angles defined by both buttons are equal and also the last elevation cut in the current VCP, clicking either button will reset the elevation angles defined for both buttons to the first elevation cut in the current VCP.

2-3.6.1.5.1.2 Obscuration Table Section. The obscuration table section consists of a table of labels and buttons. The size of the table is dependent on the number of PRFs which are allowed for the current VCP. A row is defined for each allowable PRF. The first table column consists of the PRF number label. The second table column contains a label defining the unambiguous range (in nautical miles) for the corresponding PRF number. The third table column contains a label defining the maximum velocity (in knots) for the corresponding PRF number. The fourth through sixth columns contain buttons with labels defining the amount of obscuration, as determined by the Auto PRF algorithm for the most recent volume scan, in each of the three sectors for the corresponding PRF number. The last column contains a button with a label defining the total amount of obscuration for all sectors. A single button in each sector column is displayed in reversed colors from the other buttons identifying the PRF number with the least amount of obscuration. Normally white represents the least amount of obscuration.

Clicking a button in one of the sector columns changes the PRF number for the range of elevation cuts defined by the Modify Elevation Range Buttons to the corresponding PRF number in the table. Clicking a button in the last (All) column changes the PRF number for all sectors in the elevation range. In each case, the data displayed in the graphical display region are updated.

2-3.6.1.5.1.3 Graphical Display Section. The graphical display section contains a composite display of a base reflectivity product and corresponding obscuration data, indicating areas where velocities cannot be resolved for the specified PRF number. PRF Sector boundaries are overlain along with labels defining the sector number and current sector PRF number for each sector. In

the upper left corner is a label defining the azimuth/range position of the cursor when it is inside the graphical display region. In the upper right corner is the label "0.5" indicating the data displayed corresponds to the 0.5 degree elevation cut.

When the cursor is inside the circle defining the maximum range of the product, the function of the mouse buttons change. If the position of the cursor is within two (2) degrees of a sector boundary, the cursor changes to a pointing hand indicating that pressing the left mouse button and dragging it will move the sector boundary. Releasing the left mouse button will terminate the sector boundary move. At this time, data displayed in the obscuration table and graphical display will be updated. If the cursor is more than two (2) degrees from a sector boundary and inside the circle, selecting the left mouse button will increment the PRF number and force an update to the data displayed in the obscuration table and graphical display. If the left mouse button is pressed when the maximum allowable PRF number is defined, the PRF number changes to the minimum allowable PRF number. Pressing the right mouse button has the opposite effect. The PRF number is decremented instead of incremented. If the right mouse button is pressed when the minimum allowable PRF is defined, the PRF number changes to the maximum allowable PRF.

When the user drags sector boundaries across another sector boundary, the sector numbers change to preserve clockwise ordering. However, the PRF number associated with the sector doesn't change so the new sector gets assigned the value that was previously assigned for that sector number. The PRF number should be re-mapped as well as the sector number.

In some cases, the sector number and sector PRF number label overlays will obscure important data. In these cases, the user can click the Off button to the right of the Label title. Sector number and sector PRF number labels will be turned off. To turn them back on, select the On button to the right of the Label title. The currently active label mode is identified by the button with the reversed foreground and background colors. This will normally be white.

A tabular view of the current VCP adaptation data can be presented by clicking the On button to the right of the Table title. Clicking the On button brings up the Modify Current VCP Adaptation Data Window. See Figure 2-18. Modify Current VCP Adaptation Data. Clicking the Off button closes the Modify VCP Adaptation Data Window. The currently active table mode is identified by the button with the reversed foreground and background colors (normally the white color is active).

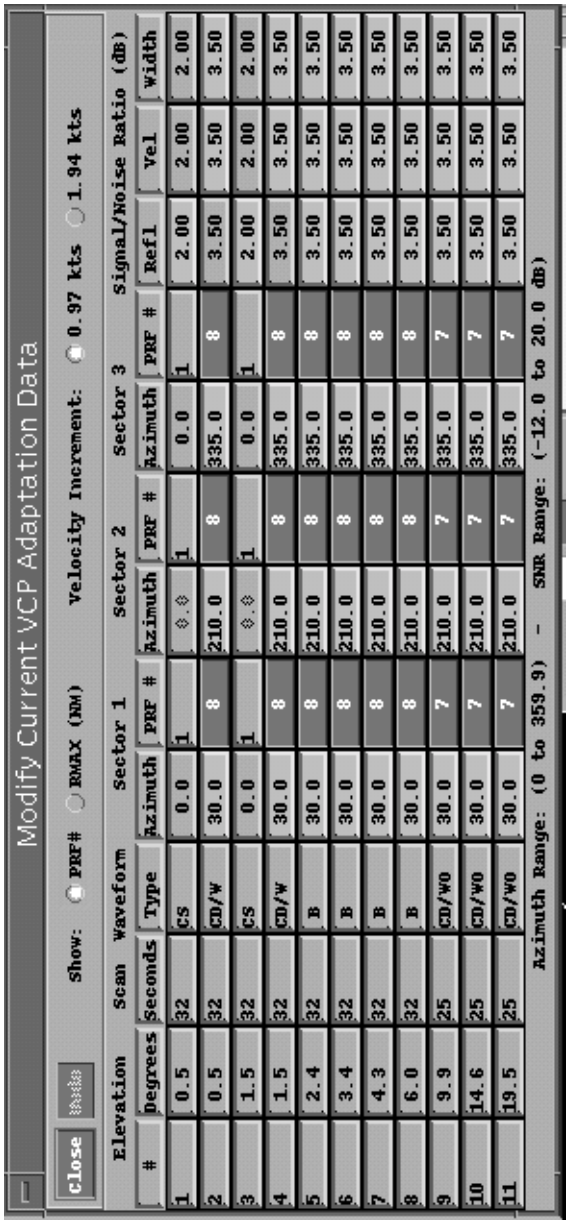


Figure 2-18. Modify Current VCP Adaptation Data

2-3.6.1.5.1.4 Modify Current VCP Adaptation Data Window. The Modify current VCP Adaptation Data window presents a tabular view of the current VCP adaptation data. It provides a means to view and edit individual data elements. In addition to editing sector boundary, PRF number, and

velocity increment definitions, signal to noise ratios can be edited.

2-3.6.1.5.1.4.1 Close Button. Clicking the Close button closes the Modify Current VCP Adaptation Data window. Since the PRF Selection (Modify Current VCP) Window is left open, no warning_popup window appears if any unsaved edits are detected.

2-3.6.1.5.1.4.2 Undo Button. Clicking the Undo button discards all unsaved edits. Data displayed in the PRF Selection (Modify Current VCP) and Modify Current VCP Adaptation Data windows are refreshed. The Undo button is sensitized only when edits are detected, otherwise it is grayed-out and desensitized.

2-3.6.1.5.1.4.3 Show Buttons. To the right of the "Show" label are two buttons: PRF# and Rmax (NM). These buttons allow the user to view either PRF number or unambiguous range in the table sector definitions. The button corresponding to the currently active mode is set and is normally displayed in white.

2-3.6.1.5.1.4.4 Velocity Increment Buttons. The buttons to the right of the Velocity Increment label control which velocity resolution is used in the current VCP. Two velocity resolutions are available: 0.97 kts (0.5 m/s) and 1.94 kts (1.0 m/s). The button corresponding to the currently active velocity resolution is set and normally displayed in white.

2-3.6.1.5.1.4.5 Current VCP Table. The current VCP adaptation data table contains an entry for each cut number defined in the current VCP. The cut number and corresponding elevation angle are presented in the first two columns. These values are not editable. The scan rate and waveform type are presented in the next two columns. The waveform types are represented by mnemonics which are defined as follows:

Mnemonic	Description
CS	Contiguous Surveillance
CD	Contiguous Doppler
CD/W	Contiguous Doppler with Ambiguity Resolution
CD/WO	Contiguous Doppler without Ambiguity resolution
B	Batch
SPP	Staggered Pulse Pair

These values are also not editable.

Following the waveform column are three pairs of columns for editing the sector azimuth boundary and PRF number for the three sectors. The sector azimuth boundary represents the end boundary, in the clockwise direction for the sector and the beginning boundary of the next sector. The sector 3 azimuth boundary represents the beginning boundary for sector 1. The azimuth angles must be in the range 0.0 to 360.0 degrees. Entering a value outside this range will result in a warning_popup window appearing that states: "You entered an invalid value of X.X. The valid range is 0.0 to 359.9", where X.X is the value input by the user. Click on the Continue button to return to the field that is being edited. The sector azimuth boundary and PRF number cannot be

edited for contiguous surveillance waveform type cuts.

The PRF number for a given sector and cut can be changed by clicking the associated button. The PRF number (and button label) will change to the next allowable PRF for the VCP. If the maximum allowable PRF is defined and the button is selected, the PRF number changes to the minimum allowable PRF number for the VCP.

If the "Rmax (NM)" button is set (or white), then the unambiguous range is displayed for the PRF number button label instead of the PRF number. Internally, the unambiguous range is always mapped to a PRF number.

Following the sector definition columns are the signal to noise ratio columns. Signal to noise ratios are defined for each of the three moments. For contiguous surveillance waveform type cuts, only the reflectivity signal to noise ratio can be edited. For contiguous Doppler with ambiguity resolution waveform type cuts, only the velocity and spectrum width signal to noise ratios can be edited. Input signal to noise ratios must be in the range -12 dB to 20 dB. Entering a value outside this range will result in a warning_popup appearing that states: "You entered an invalid value of X.XX. The valid range is -12.00 to 20.00", where X.XX is the value input by the user. Click on the Continue button to return to the field that is being edited.

If the user changes PRF number or sector azimuth angles in the table, the changes are reflective in the graphical display, no matter which cut was changed in the table. The design of the task intended that only changes to the 0.5 degree cut in the table would be reflected in the graphical display. In an operational environment, it is recommended that the PRF number and sector boundaries will be changed via the graphical display, not the table, since the user can visually see what the changes will do. The table should be used if Signal/Noise Ratio (SNR) values need to be changed.

If any unsaved changes were made on this PRF Selection window and the user clicks on the Close button in the upper left hand corner, a warning_popup appears that states: "You made changes to the current VCP data which were not saved. Do you want to save them?" Click on either Yes or No to select the desired response.

2-3.6.1.5.2 Modify VCP Adaptation Data Window. Click on the Adaptation button in the VCP Control window and the Modify VCP Adaptation Data window opens. See Figure 2-19. Modify VCP Adaptation Data. The Modify VCP Adaptation Data Window provides selections to modify any of the VCP adaptation data files stored at the RPG. The window is password protected.

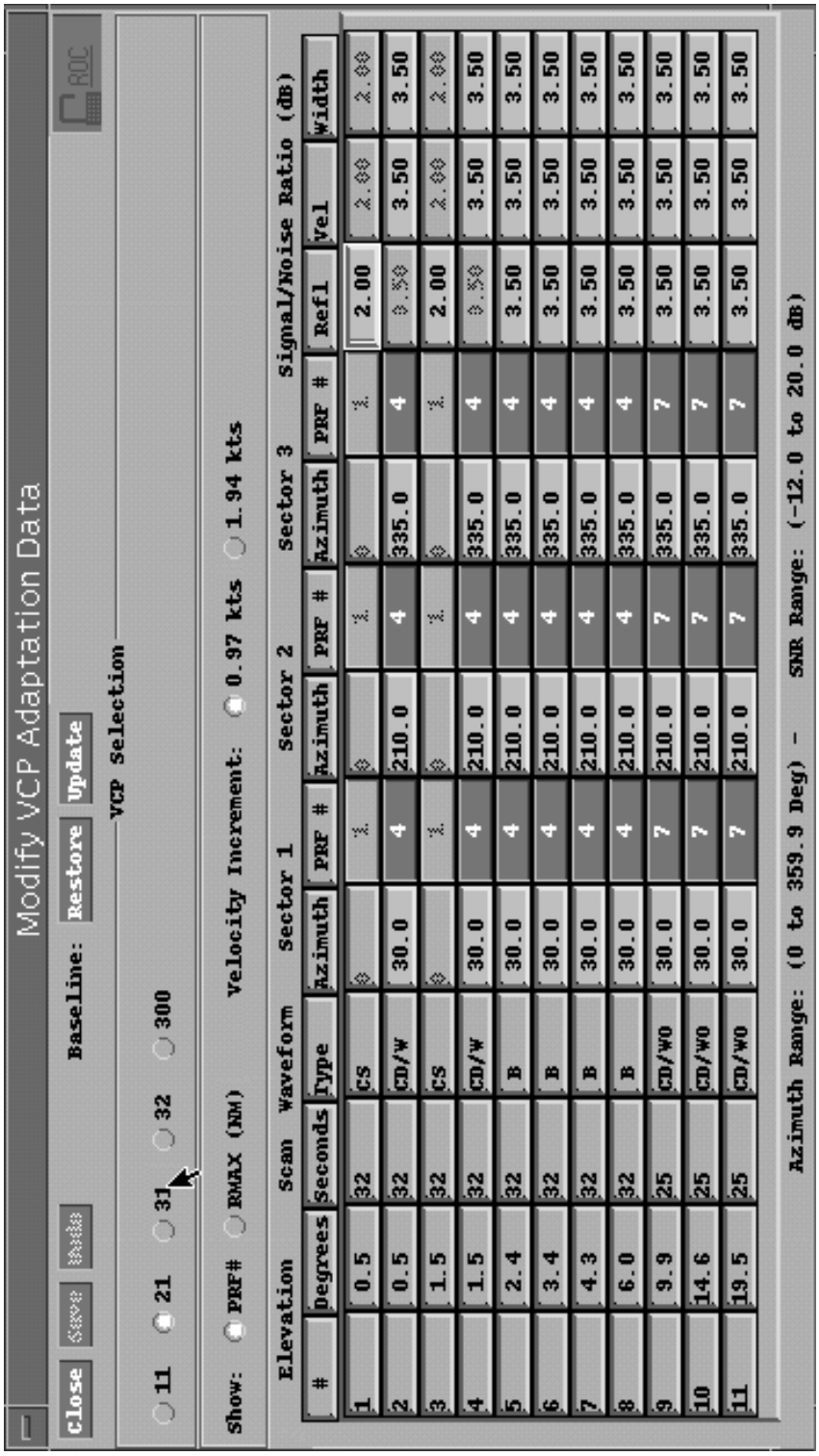


Figure 2-19. Modify VCP Adaptation Data

The top line has five buttons and the padlock for the password protected entries. The first button, Close, closes the window and returns the user to the VCP Control window. The other four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized. If any unsaved edits are detected, a warning_popup appears that states: "Do you want to save the change you made to the currently selected VCP?" Click Yes to save the edits before closing the window. Click No to close the window and discard the edits.

Beneath the "VCP Selection" label are a set of buttons for selecting the VCP for display and edit. A button is defined for all VCPs defined in the VCP adaptation data file. By default, the VCP which matches the currently active VCP is selected. In order to just display the desired data, the padlock (password protection) does not have to be opened. However, if the user wants to edit any VCP, (paragraph 2-3.6.1.5.2 Modify VCP Adaptation Data Window.) selections, a warning_ popup appears that states: "Do you want to save the changes you made to the currently selected VCP?". Click Yes to write all edits to the previously active VCP to the working file before changing to the new VCP. Click No to discard unsaved edits to the previously selected VCP. The state of the Velocity Increment buttons and VCP table will be updated with data for the newly selected VCP.

To the right of the Show label are two buttons: PRF# and Rmax (NM). These buttons allow the user to view either PRF number or unambiguous range in the table sector definitions. The button corresponding to the currently active mode is set and is usually displayed in white.

The buttons to the right of the Velocity Increment label control which velocity resolution is used in the current VCP. Two velocity resolutions are available: 0.97 kts (0.5 m/s) and 1.94 kts (1.0 m/s). The button corresponding to the currently active velocity resolution is set and is usually displayed in white.

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

Once a password has been accepted, a user can now edit the window. The selected VCP adaptation data table contains an entry for each cut number defined in the selected VCP. The cut number and corresponding elevation angle are presented in the first two columns. These values are not editable. The scan rate and waveform type are presented in the next two columns. The waveform types are represented by mnemonics which are defined as follows:

Mnemonic	Description
CS	Contiguous Surveillance
CD	Contiguous Doppler
CD/W	Contiguous Doppler with Ambiguity Resolution
CD/WO	Contiguous Doppler without Ambiguity resolution
B	Batch
SPP	Staggered Pulse Pair

These values are also not editable.

Following the waveform column are three pairs of columns for editing the sector azimuth boundary and PRF number for the three sectors. The sector azimuth boundary represents the end boundary, in the clockwise direction for the sector and the beginning boundary of the next sector. The sector 3 azimuth boundary represents the beginning boundary for sector 1. The azimuth angles must be in the range 0.0 to 359.9 degrees. Entering a value outside this range will result in a warning_popup window appearing that states: "You entered an invalid value of X.X. The valid range is 0.0 to 359.9", where X.X is the value input by the user. Click on the Continue button to return to the field that is being edited. The sector azimuth boundary and PRF number cannot be edited for contiguous surveillance waveform type cuts.

The PRF number for a given sector and cut can be changed by clicking the associated button. The PRF number (and button label) will change to the next allowable PRF for the VCP. If the maximum allowable PRF is defined and the button is selected, the PRF number changes to the minimum allowable PRF number for the VCP.

If the "Rmax (NM)" button is set (or white), then the unambiguous range is displayed for the PRF number button label instead of the PRF number. Internally, the unambiguous range is always mapped to a PRF number.

Following the sector definition columns are the signal to noise ratio columns. Signal to noise ratios are defined for each of the three moments. For contiguous surveillance waveform type cuts, only the reflectivity signal to noise ratio can be edited. For contiguous Doppler with ambiguity resolution waveform type cuts, only the velocity and spectrum width signal to noise ratios can be edited. Input signal to noise ratios must be in the range -12 dB to 20 dB. Entering a value outside this range will result in a warning_popup appearing that states: "You entered an invalid value of X.XX. The valid range is -12.00 to 20.00", where X.XX is the value input by the user. Click on the Continue button to return to the field that is being edited.

Once the changes have been made and are within the allowable ranges, then the Save and Undo buttons are sensitized. The Close button will close the window. If the changes have not yet been saved, a warning_popup opens that states: “Do you want to save the changes you made to the currently selected VCP?” Click on either the Yes or No button to select the desired response. The Save button saves the changes but first brings up a warning_popup that states: “Do you want to save the changes you made to the currently selected VCP? Click on either the Yes or No button to select the desired response. If Yes is selected, the changes are saved, the Save and Undo buttons

grayed-out and desensitized, and the user returned back to the Modify VCP Adaptation Data window. If No is selected, the changes are not saved but remain in the window, and the Save and Undo buttons are still active. The Undo button undoes all the changes without any warning_popup window and desensitizes the Save and Undo buttons.

The Baseline: Restore and Update buttons are sensitized and available to the operator either after the password has been entered or the Save/Undo buttons have been utilized. Click on the Restore button to replace the working copy of VCP adaptation data with the backup copy. A warning_popup appears that states: "You are about to restore ALL VCP adaptation data to baseline values. Do you want to continue?" Click Yes to replace the working copy with the backup copy and update data displayed in the Modify VCP Adaptation Data window. Click No to do nothing but return to the same window. Click on the Update button to replace the backup copy of VCP adaptation data with the working copy. A warning_popup appears that states: "You are about to replace the baseline VCP adaptation data values. Do you want to continue?" Click Yes to replace the backup copy with the working copy. Click No to do nothing but return to the same window.

2-3.6.1.6 Restart VCP. Clicking the VCP button to the right of the Restart label brings up a warning_popup that states: "You are about to stop the current data collection and start over at the lowest elevation cut. Do you want to continue?" Click Yes to cause a volume scan restart command to be sent to the RDA. The message "Requesting the VCP to be restarted" is displayed in the feedback line of the RPG Control/Status window. The message "Command RDA to Restart Volume Scan" is written to the system status log. Click No and the user is returned to the VCP Control window with no other action taken.

2-3.6.1.7 Restart Elevation. Clicking the Elevation button to the right of the Restart label brings up a warning_popup that states: "You are about to stop the current data collection and start the elevation cut over. Do you want to continue?". Click Yes to cause an elevation restart command to be sent to the RDA. The message "Requesting the elevation cut to be restarted" is displayed in the feedback line of the RPG Control/Status window. The message "Commanding RDA to Restart RDA Elevation Cut x", where "x" is the current elevation cut number, is written to the system status log. Click No and the user is returned to the VCP Control window with no other action taken.

2-3.7 RDA Alarm Summary.

If any of the eight RDA components has an active alarm (as indicated in the latest RDA status message), red buttons with labels corresponding to the RDA components with active alarms are displayed to the left of the radome/tower. Each label is defined by a mnemonic for each of the eight RDA components. These are:

ARC - Archive II
CTR - Control
PED - Antenna/Pedestal
RSP - Receiver/Signal Processor
USR - User Link
UTL - Tower/Utilities

WID - Wideband
XMT - Transmitter

Each of the buttons are clickable (cursor shape changes to a pointing hand when it is moved over any of the buttons). Clicking a button opens the RDA Alarms window (if it isn't already) and sets the device filter to the RDA component corresponding to the button. Only alarms for that component are displayed. A detailed description of the RDA Alarms window can be found in paragraph 2-3.10.2 RDA Alarms.

2-3.8 MLOS Control Box.

For sites which are configured for Microwave Line-Of-Site (MLOS) connectivity, a box containing the label "MLOS" is displayed to the right of the tower. Click on the "MLOS" button (the cursor changes to a pointing hand when it is moved over the box) to open the MLOS Status window. See Figure 2-20. MLOS Status.

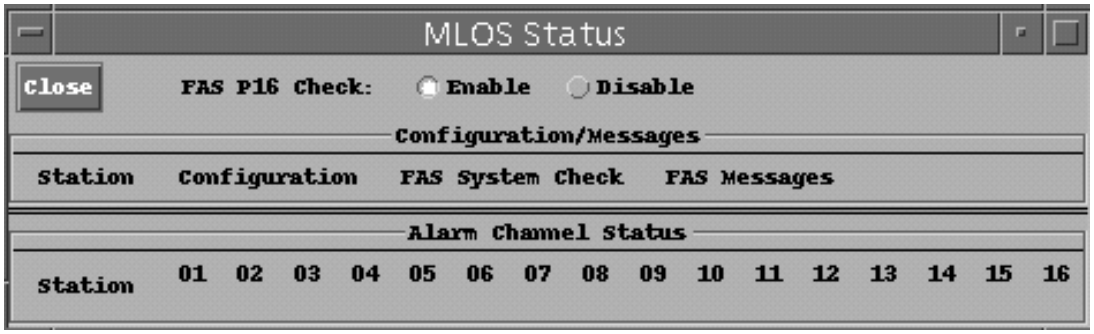


Figure 2-20. MLOS Status

2-3.8.1 MLOS Status Window. The MLOS Status window is divided into three sections: Control, Configuration/Messages, and Alarm Channel Status. The Control section contains buttons to close the window and to control the handling of Fault Alarm System (FAS) channel 16 messages. In the upper left hand corner is a Close button. Click on this Close button to close the MLOS Status window and return the user to the HCI.

2-3.8.1.1 FAS P16 Check Buttons. The buttons to the right of the "FAS P16 Check" label control channel 16 message handling by the RPG. Clicking on the Enable button enables FAS channel 16 message handling by the RPG. Clicking on Disable button disables FAS channel 16 message handling by the RPG. The button corresponding to the currently active state is set and normally displayed in white. The FAS P16 checks are not currently done by the RPG.

2-3.8.1.2 Configuration/Messages Section. Beneath the Configuration/Messages label is a table containing information on station configuration and status. Each configured station is represented by a row in the table. The first table column contains the station ID. The second table column contains the station configuration. The possible configurations are:

RPG NON DIV
RPG DIV
RDA NON DIV
RDA DIV
RPT NON DIV
RPT DIV
RPT ND/DIV

The third table column contains a label indicating the station FAS System Check state. The color coded label has two possible states: NORMAL (green) and FAIL (red). In the last table column is the latest FAS message received from the station. The list of FAS messages and corresponding FAS system check states are:

FAIL Database Verified
NORMAL Power Fail Reset
FAIL Station Failure COS
NORMAL Communications Restored

2-3.8.1.3 Alarm Channel Status Section. Beneath the "Alarm Channel Status" label is a table containing channel alarm information for each station. A station entry is represented by a row of colored boxes representing the alarm state of channels 1-16. A box is green and unlabeled if the corresponding channel state is normal. A box is red and contains the string A if the corresponding channel is in an alarm state. The alarm meaning for channels 01-06 are dependent on the MLOS station configuration. The meaning for channel 07-15 alarms are as follows:

07 - Unauthorized Entry
08 - Utility Power
09 - Generator Power
10 - Converter Output Voltage
11 - Battery Voltage
12 - Transfer Switch in Utility Position
13 - Low Fuel Level
14 - Transfer Switch Not in Automatic
15 - Aircraft Warning Light Failure

See the "Interface Control Document for the MLOS Fault Alarm System" for more information on MLOS alarms.

2-3.9 RDA Control Indicator.

Between the tower icon and RPG icon is a connecting line. If the RDA-RPG wideband link is connected there is a label displayed just above the line indicating who has control of the RDA. If the label status is RDA, the RDA is in local control and will not accept RDA control commands from the RPG. Non-controlling functions such as requesting status and bypass maps are allowed when the RDA has control. If the label status is RPG, the RPG has remote control of the RDA and

RDA control commands are accepted by the RDA from the RPG. If the label status is EITHER, the RDA can be controlled by either the RDA or RPG. No label is displayed above the line when the RDA-RPG wideband link is not connected.

2-3.10 RDA Icon.

Beneath the tower icon is a icon/box containing the label RDA and two buttons labeled Control and Alarms. Click on the Control and Alarms buttons when the cursor changes to a pointing hand as it is moved over them to bring up additional windows. See Figure 2-21. RDA Icon.

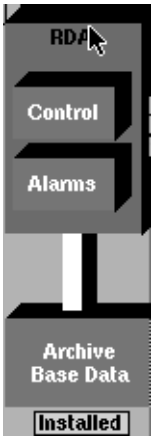


Figure 2-21. RDA Icon

2-3.10.1 RDA Control/Status Box. Click on the Control Box button to open the RDA Control/ Status window which shows the current state of the RDA. See Figure 2-22. RDA Control/Status. If the RDA control has been given to the RPG, this window allows the operator to change the state of the RDA. The top line of the window will be described first, followed by the five major boxes in the middle of the window, and finally the six additional informational categories on the bottom of the window.

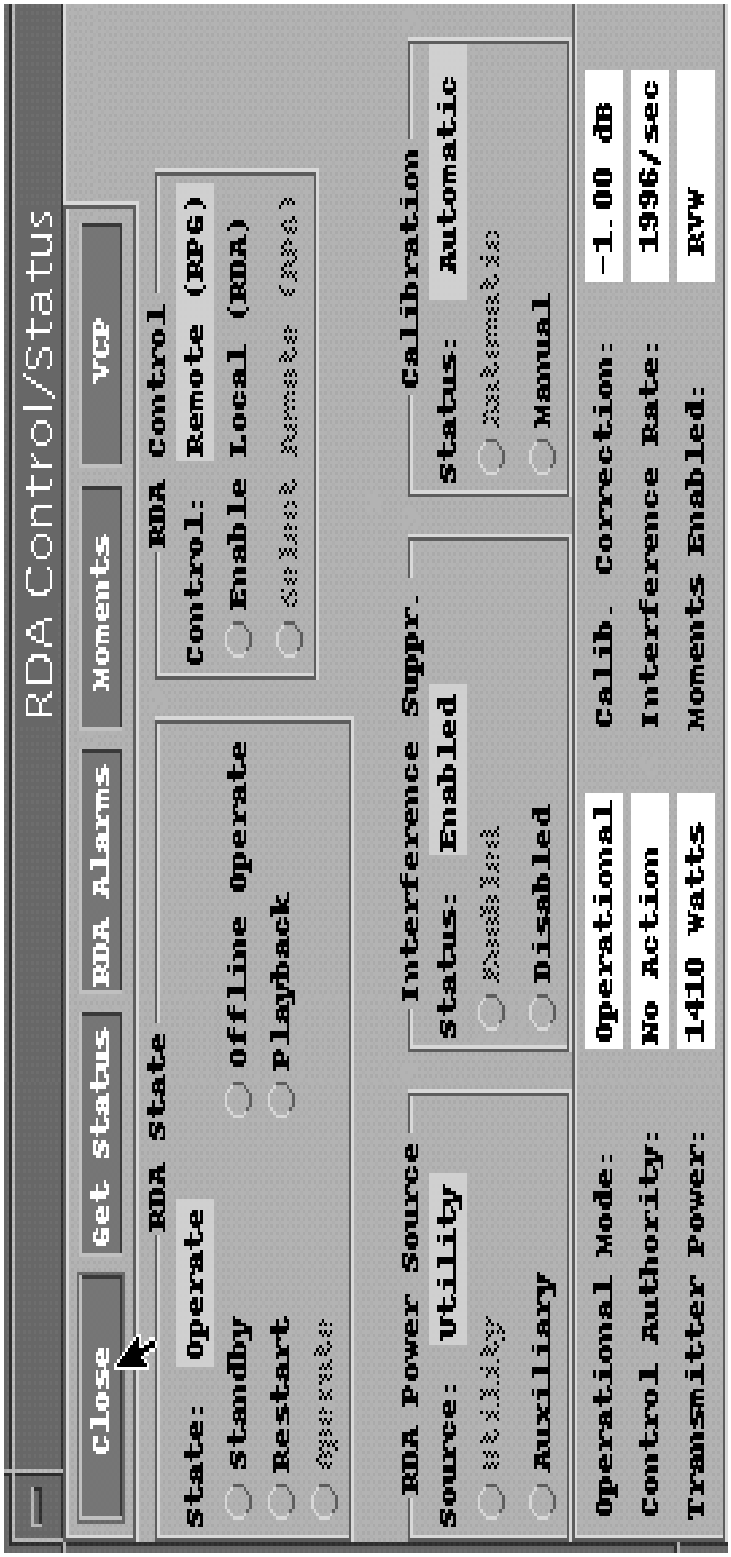


Figure 2-22. RDA Control/Status

For the FAA Redundant configuration, there is an additional box in the second line to the right of the RDA Control/Status Window that is used to switch channels. This is called Redundant Control and has two formats, one for FAA Channel 1 and the other for FAA Channel 2. These are described in more detail in paragraph 2-7.3 FAA Redundant System Control.

2-3.10.1.1 Close Button. Click on the Close button in the upper left hand corner to close the RDA Control/Status window and return the operator to the HCI.

2-3.10.1.2 Get Status Button. This button requests the latest RDA status information from the RDA. The new information will be reflected at the bottom of the RDA Control/Status window. The RDA status information is routinely updated once per volume scan. This button provides the opportunity to update the routine input. The message "Requesting RDA Status data" is displayed in the feedback line of the RPG Control/Status window. When a new RDA status message is received by the RPG, the message "Requested RDA Status Data is Available" is written to the system log file and displayed in the status line of the RPG Control/Status window. If the wideband is disconnected, the Get Status button becomes grayed-out and the functionality is desensitized. That is, clicking on it will not update the status information because new data is not available when there is no wideband connection.

2-3.10.1.3 RDA Alarms Button. Click on the RDA Alarm button to open the RDA Alarms window. The RDA Alarms window contains color coded lists of the most recent RDA alarm messages. The check boxes near the top of the alarm list allow the user to select which types of RDA alarms will be shown in the alarm list table. See paragraph 2-3.10.2 for full details on the RDA Alarms window.

2-3.10.1.4 Moments Button. Click on the Moments button and the Moments window is opened. Figure 2-23. Moments, though seldom accessed, is used to select those data moments which are to be sent from the RDA to the RPG. The top row contains two buttons, Close and Apply. The Close button closes the Moments window and returns the user to the RDA Control/Status window. The Apply button is selected after the choices have been made and will be discussed below. By default, all three moments (Reflectivity, Velocity, and Spectrum Width) are enabled. These are displayed by having check marks in the box to the left of the title of each moment. These boxes act as a toggle. Clicking on the box or on the title itself will deselect the moment and remove the check mark in the box. Clicking on it again will select it and cause the check mark to appear in the box. Any combination of moments can be selected by the user.

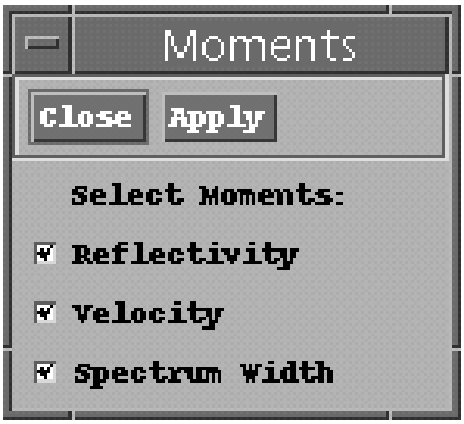


Figure 2-23. Moments

Once the moments have been selected (or deselected), click on the Apply button. A warning_popup opens that states: “You are about the change the transmitted moments. These changes will not take effect until the start of the next volume scan. Do you want to continue?” Click on either the Yes or No button to select the desired response. Click Yes to send the command to the RDA to implement the change(s) at the start of the next volume scan, return the user to the Moments window, and display the message: "Requesting data transmission change" in the feedback line in the RPG Control/Status window. Click No to not implement the change(s) yet still return the user to the Moments window. If the user makes changes within this window but then clicks on the Close button without clicking on the Apply button first, no change will take effect. There are no warning_popups to state that changes were made but not saved or applied.

If the wideband is disconnected or the RDA has control, the Moments button will be grayed-out and the functionality desensitized. Clicking on it will not open the Moments window.

2-3.10.1.5 VCP. Click on the VCP button to bring up the VCP Control window. See Figure 2-24. VCP Control.

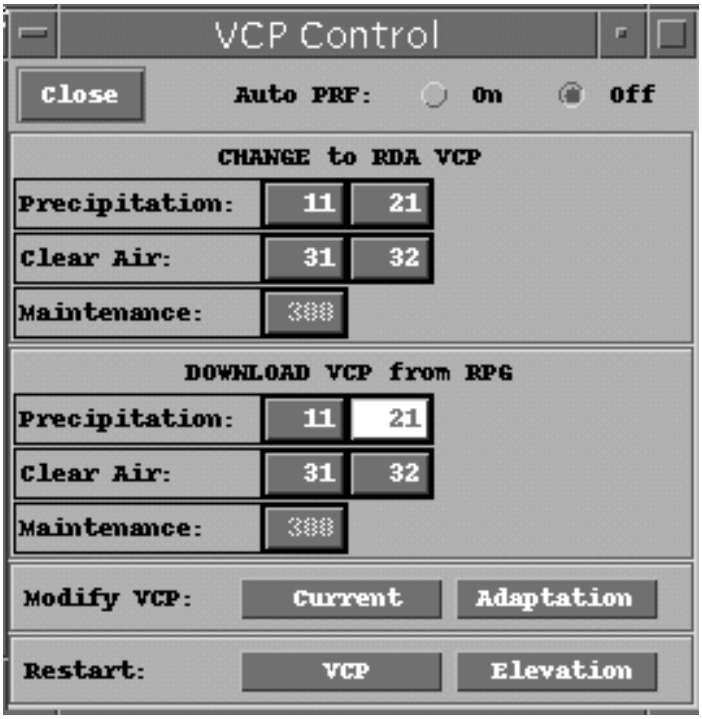


Figure 2-24. VCP Control

A full description of the VCP Control window can be found in paragraph 2-3.6.1 VCP Control Window.

2-3.10.1.6 RDA State. This section of the RDA Control/Status window reflects the current state of the RDA. See Figure 2-25. RDA State.

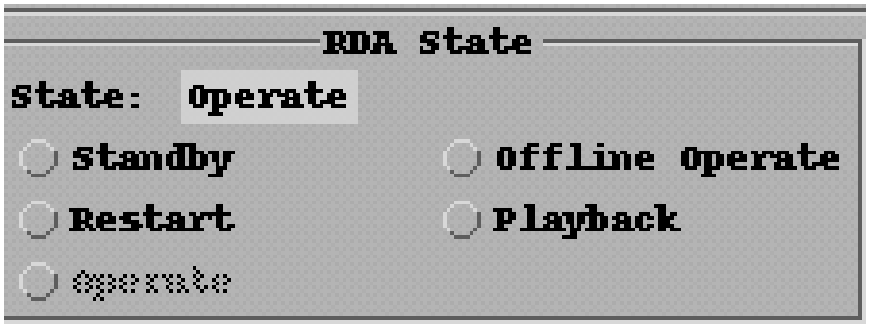


Figure 2-25. RDA State

Beneath the "RDA State" label is a highlighted label indicating the current RDA state. Beneath the highlighted label is a group of buttons that are used to control the RDA state. The possible RDA states are: Standby, Restart, Operate, Offline Operate, and Playback. If the wideband is not connected or if no RDA status information is available, the label is displayed as "Unknown". If

the status is "Unknown" or if the RDA control state is local, all RDA State buttons are grayed-out and desensitized. If the RDA-RPG wideband link is connected and the RDA control state is remote or either, all RDA State buttons are sensitized except the one matching the current RDA state.

2-3.10.1.6.1 RDA Standby. To command the RDA to go into a standby state click on the Standby button. A warning_popup appears that states: "You are about to change the RDA state. Do you want to continue?". Click Yes to send a command to the RDA, requesting the RDA state to be changed to standby. The message "Change RDA to Standby state" will be displayed in the feedback line of the RPG Control/Status window. When the RDA state changes, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA Status displayed above the radome in the RPG Control/Status window will be updated. The RDA Control/Status window will also be updated. The Standby button will be desensitized. The RDA control state will change to Either. Click No to abort the request. The Standby button will remain sensitized.

NOTE

The Operate and Offline Operate commands are the only ways to regain remote control when the RDA is in a standby state.

2-3.10.1.6.2 RDA Restart. To command the RDA to go into a restart state click the Restart button. A warning_popup appears that states: "You are about to change the RDA state. Do you want to continue?". Click Yes to send a command to the RDA requesting the RDA to be restarted. The message "Change RDA to Restart state" will be displayed in the feedback line of the RPG Control/Status window. The RDA-RPG wideband link will disconnect, the RDA State label will change to "Unknown" and all RDA control buttons in the RDA Control/Status window will be grayed-out and desensitized. When the RDA completes its restart, the RDA will go to a standby state and the RDA-RPG wideband link will be connected. The RDA Status displayed above the radome in the RPG Control/Status window will be updated. The RDA Control/Status window will also be updated. The "Standby" radio button will be grayed-out and desensitized. Click No to abort the request. The Restart button will remain sensitized.

2-3.10.1.6.3 RDA Operate. To command the RDA to go into an operate state click the Operate button. A warning_popup appears that states: "You are about to change the RDA state. Do you want to continue?". Click Yes to send a command to the RDA requesting the RDA state to be changed to operate. The message "Change RDA to Operate state" will be displayed in the feedback line of the RPG Control/Status window. When the RDA state changes, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA Status displayed above the radome in the RPG Control/Status window will be updated. The RDA-RPG wideband link will indicate data flow between the RDA and RPG as indicated by boxes moving from the RDA to the RPG icons. The azimuth indicator inside the radome will be active as indicated by the drawing of a black circle inside the outer edge. The RDA Control/Status window will also be updated. The Operate button will be grayed-out and desensitized. Click No to abort the request. The Operate button will remain sensitized.

2-3.10.1.6.4 RDA Offline Operate. To command the RDA to go into a offline operate state click

the Offline Operate button. A warning_popup appears that states: "You are about to change the RDA state. Do you want to continue?". Click yes to send a command to the RDA requesting the RDA state to be changed to offline operate. The message "Change RDA to Standby state" will be displayed in the feedback line of the RPG Control/Status window. When the RDA state changes, a message will be written to the system status log and displayed in the status line of the RPG Control/ Status window. The RDA Status displayed above the radome in the RPG Control/Status window will be updated. The RDA Control/Status window will also be updated. The Offline Operate button will be grayed-out and desensitized. Click No to abort the request. The Offline Operate radio button will remain sensitized.

NOTE

This function is not applicable with an EEC RDA.

2-3.10.1.6.5 RDA Playback. If Archive II playback capability is installed and enabled in the RDA Adaptation data, selecting the Playback button activates the Playback Base Data window. The Playback Base Data window provides selections to define the start date/time of the first volume scan to read from an Archive II tape and to activate playback. See Figure 2-26. Playback Base Data. Clicking on the Close button closes the Playback Base Data window. Any date/time data entered by the user are discarded.

NOTE

This function is not applicable with an EEC RDA.

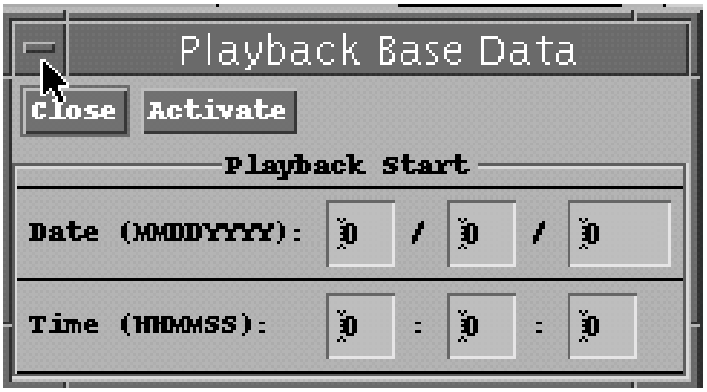


Figure 2-26. Playback Base Data

2-3.10.1.6.5.1 Activate Button. Click on the Activate button. A warning_popup appears that states: "You are about to command Archive II to PLAYBACK. Do you want to continue?". Click Yes to send a playback command to the RDA. If an invalid date or time was entered, a warning_popup appears that states: "An invalid start date was entered!". Click on Continue to return the user back to the Playback Base Data window to correct the date/time error. When a valid date/time is entered, base data will be read from the Archive II tape and sent to the RPG to be processed. The message "Commanding Archive II to playback" will be displayed in the feedback line of the RPG Control/Status window. The label Playback will be displayed beneath the Archive Base

Data box. Data flow will be graphically represented by boxes moving from the Archive Base Data box to the RDA box. In the RDA Control/Status window, RDA State section, the label Playback will be displayed in the States: text line while the command Playback will be grayed-out and desensitized in the lower part of the section. The user is returned to the RDA Control/Status window. Click No to abort the request, keep the user at the Playback Base Data window, and leave the Playback button sensitized.

2-3.10.1.6.5.2 Playback Start. Below the Playback Start label are a set of edit boxes for defining the playback start date and time. When activated, playback will start with the first volume scan beginning at or after the specified date/time and proceeding until the end of tape or until the user stops it.

Three edit boxes are defined for entering the date. The order of input is: Month (MM), Day (DD), and Year (YYYY).

The month must be in the range 0 to 12. Any value outside this range results in a warning_popup which states: "You entered an invalid month of X. The valid range is 0 (not set) to 12.", where X is the input month value. Click Continue to close the warning_popup and return to the edit box to correct the invalid month. A value of 0 indicates data will be read back from the beginning of the tape, regardless of whether a day and year is specified.

The day must be in the range 0 to 31. Any value outside this range results in a warning_popup which states: "You entered an invalid day of X. The valid range is 0 (not set) to 31.", where X is the input day value. Click Continue to close the warning_popup and return to the edit box to correct the invalid day. A value of 0 indicates data will be read back from the beginning of the tape, regardless of whether a month or year was specified.

The year must be in the range 1988 to 2100. Any value outside this range results in a warning_popup which states: "You entered an invalid year of X. The valid range is 0 (not set) and 1988 to 2100.", where X is the input year value. Click Continue to close the warning_popup and return to the edit box to correct the invalid year. A value of 0 indicates data will be read back from the beginning of the tape regardless of whether a day or month was specified.

Three edit boxes are defined for entering the time. The order of input is: Hour (HH), Minute (MM), and Second(SS).

The hour must be in the range 0 to 23. Any value outside this range results in a warning_popup which states: "You entered an invalid hour of X. The valid range is 0 to 23.", where X is the input hour value. Click Continue to close the warning_popup and return to the edit box to correct the invalid hour.

The minute must be in the range 0 to 59. Any value outside this range results in a warning_popup which states: "You entered an invalid minute of X. The valid range is 0 to 59.", where X is the input minute value. Click Continue to close the warning_popup and return to the edit box to correct the invalid minute.

The second must be in the range 0 to 59. Any value outside this range results in a warning_popup which states: "You entered an invalid second of X. The valid range is 0 to 59.", where X is the input second value. Click Continue to close the warning_popup and return to the edit box to correct the invalid second.

2-3.10.1.7 RDA Control. Beneath the RDA Control label are a pair of buttons to control who has control of the RDA. Above the buttons is a highlighted label indicating the current RDA control status. The possible RDA control states are: Local (RDA), Remote (RPG), and Either. The state that is highlighted will be grayed-out and desensitized in the lower part of the section. If the RDA-RPG wideband link is not connected or if no RDA status information is available, the label is displayed as Unknown and both options in the lower part will be grayed-out and desensitized. See Figure 2-27. RDA Control.

Figure 2-27. RDA Control

2-3.10.1.7.1 Enable Local (RDA) Button. When the RDA control state is remote (RPG), the RPG operator can enable the RDA to take control of the RDA by clicking on the Enable Local (RDA) button. When clicked, a command is sent to the RDA enabling local control of the RDA; no warning_popup is displayed. The message "Enable RDA control of RDA" is displayed in the feedback line of the RPG Control/Status window.

2-3.10.1.7.2 Select Remote (RPG) Button. When the RDA control state is local (RDA), the RPG operator can request the RDA to enable remote control from the RPG by selecting the Select Remote (RPG) button. When clicked, a command is sent to the RDA requesting the enabling of remote control of the RDA; no warning_popup is displayed. The message "Request RPG to control RDA" is displayed in the feedback line of the RPG Control/Status window.

2-3.10.1.7.3 Control Either. When the control label reads "Either", then either the RDA or RPG has control and both buttons in the RDA Control section will be grayed-out and desensitized. This option can be obtained by the following procedure. When at the RDA Control/Status window and the RPG is in control, the control label will read "Remote (RPG)" and the Enable Local (RDA) option will be sensitized. Click on the Enable Local (RDA), and the label will change to Either until either the RDA accepts control or a timer of approximately 4 ½ minutes expires. If the RDA accepts control, then the label switches to Local (RDA) and the Select Remote (RPG) button becomes sensitized. If the timer expires without any action at the RDA, the label switches back to Remote (RPG) and the Enable Local (RDA) button becomes sensitized again. See Figure 2-28. RDA Control - Either.

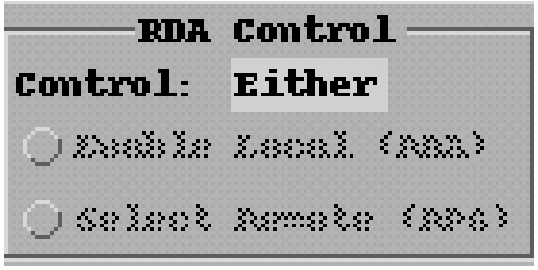


Figure 2-28. RDA Control - Either

2-3.10.1.8 RDA Power Source. Beneath the "RDA Power Source" label are a pair of buttons to control the power source for the RDA. If the RDA-RPG wideband link is not connected or if the RDA control state is local, both buttons are grayed-out and desensitized. Otherwise, only the button corresponding to the current RDA power source is grayed-out and desensitized. Above the buttons is a highlighted status label indicating the current RDA power source. The possible RDA power source states are: Utility and Auxiliary. If the RDA-RPG wideband link is not connected or if no RDA status information is available, the label is displayed as "Unknown". See Figure 2-29. RDA Power Source.

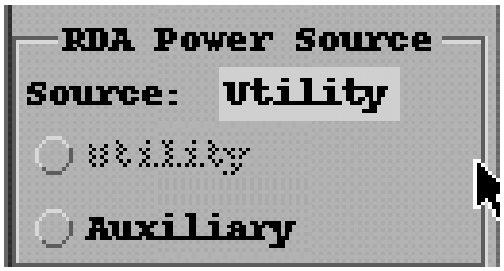


Figure 2-29. RDA Power Source

Information about the RDA power source is also displayed graphically in the RPG Control/Status window (paragraph 2-3.2 RDA Power Source.).

2-3.10.1.8.1 Utility Button. When the RDA power source is auxiliary, the operator can request the RDA power source to change to utility by clicking the Utility button. When clicked, a warning_popup appears that states: "You are about to change the RDA power source. Do you want to continue?". Click Yes to send a command to the RDA requesting the RDA power source to be changed to utility. The message "Request switch to Utility Power" will be displayed in the feedback line of the RPG Control/Status window. When the RDA power source changes, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA power source graphic displayed to the left of the RDA icon in the RPG Control/Status window will be updated. The RDA Control/Status window will also be updated. The Utility button will be grayed-out and desensitized and the Auxiliary button will be sensitized. Click No to will abort the request. The Utility button will remain sensitized and the "Auxiliary" radio will remain desensitized

2-3.10.1.8.2 Auxiliary Button. When the RDA power source is utility, the operator can request the RDA power source to change to auxiliary by clicking the Auxiliary button. When clicked, a warning_popup appears that states: "You are about to change the RDA power source. Do you want to continue?" Click Yes to send a command to the RDA requesting the RDA power source to be changed to auxiliary. The message "Request switch to Auxiliary Power" will be displayed in the feedback line of the RPG Control/Status window. When the RDA power source changes, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA power source graphic displayed to the left of the RDA icon in the RPG Control/Status window will be updated. The RDA Control/Status window will also be updated. The Auxiliary button will be desensitized and the Utility button will be sensitized. Click No to abort the request. The Auxiliary button will remain sensitized and the Utility button will remain desensitized.

2-3.10.1.9 Interference Suppression. Beneath the Interference Suppression label are a pair of buttons to enable/disable the Interference Suppression Unit (ISU) at the RDA. If the RDA-RPG wideband link is not connected or if the RDA control state is local, both buttons are grayed-out and desensitized. Otherwise, only the button corresponding to the current ISU state is desensitized. Above the buttons is a highlighted label indicating the current ISU status. The possible ISU states are Enabled and Disabled. If the RDA-RPG wideband link is not connected or if no RDA status information is available, the label is displayed as Unknown. See Figure 2-30. Interference Suppression.

NOTE

This function is not applicable with an EEC RDA, or where ISU is not installed.

Figure 2-30. Interference Suppression

2-3.10.1.9.1 Enabled ISU Button. When the ISU state is disabled, the operator can request the ISU to be enabled by clicking on the Enabled button. A warning_popup will appear that states: "You are about to issue a request to disable interference suppression. Do you want to continue?".
Click Yes to send a command to the RDA requesting the ISU to be disabled. The message "Disable Interference Suppression Unit" is displayed in the feedback line of the RPG Control/Status window. When the RDA disables the ISU, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA Control/Status window will be updated. The Disabled button will be desensitized and the Enabled button will be sensitized. Click No to abort the request. The Enabled button will remain sensitized and the Disabled button will remain desensitized.

2-3.10.1.9.2 Disabled ISU Button. When the ISU state is enabled, the operator can request the ISU to be disabled by clicking the Disabled button. A warning_popup will appear that states: "You are about to issue a request to enable interference suppression. Do you want to continue?". Click

Yes to send a command to the RDA requesting the ISU to be enabled. The message "Enable Interference Suppression Unit" is displayed in the feedback line of the RPG Control/Status window. When the RDA enables the ISU, a message will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA Control/Status window will be updated. The Enabled radio button will be grayed-out and desensitized and the Disabled button will be sensitized. Click No to abort the request. The Disabled button will remain sensitized and the Enabled button will remain desensitized.

2-3.10.1.10 Calibration. Beneath the Calibration label are a pair of buttons to change the reflectivity calibration mode at the RDA. If the RDA-RPG wideband link is not connected or if the RDA control state is local, both radio buttons are desensitized. Otherwise, only the button corresponding to the current reflectivity calibration mode is desensitized. Above the buttons is a highlighted label indicating the current reflectivity calibration status. The possible reflectivity calibration modes are Automatic and Manual. If the RDA-RPG wideband link is not connected or if no RDA status information is available, the label is displayed as Unknown. Information about the RDA reflectivity calibration mode is also displayed graphically in the RPG Control/Status window, lower right hand corner, text lines. See Figure 2-31. Calibration.

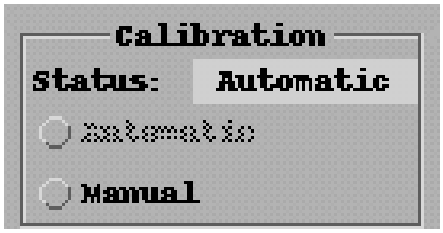


Figure 2-31. Calibration

2-3.10.1.10.1 Automatic Calibration Button. When the reflectivity calibration mode is manual, the operator can request the reflectivity calibration mode to be automatic by clicking the Automatic button. A warning_popup appears that states: "You are about to enable Auto Calibration. It will take effect at the start of the next volume scan. Do you want to continue?".

Click Yes to send a command to the RDA requesting automatic reflectivity calibration to be enabled. The message "Enable Auto-calibration" is displayed in the feedback line of the RPG Control/Status window. At the beginning of the next volume scan, a message will be written to the system status log indicating the new reflectivity calibration state and displayed in the status line of the RPG Control/Status window. The RDA Control/Status window will be updated. The Automatic button will be desensitized and the Manual button will be sensitized. Click No to abort the request. The Automatic and Manual buttons will remain sensitized.

2-3.10.1.10.2 Manual Calibration Button. When the reflectivity calibration mode is manual or automatic, the operator can request the RDA to use an operator defined reflectivity calibration value by clicking the Manual button. When clicked, the Reflectivity Calibration (Refl Calib) window appears. See Figure 2-32. Reflectivity Calibration.

Figure 2-32. Reflectivity Calibration

The Refl Calib window contains a slider bar and Close and Apply buttons. The Close button is sensitized and when clicked, returns the user to the HCI. The Apply button is grayed-out and desensitized until a manual input has been made on the slider bar. Then it becomes sensitized. The user can define a manual calibration in the range -10 to +10 dBZ by moving the slider to the left or right using the left mouse button. When the left mouse button is released, the calibration value is rounded to the nearest 0.25 dBZ and displayed above the slider bar. To invoke the manual reflectivity calibration, click the Apply button. A warning_popup appears that states: "You are about to change to a manual calibration. It will take effect at the start of the next volume scan. Do you want to continue?".

Click Yes to send a command to the RDA requesting the manual reflectivity calibration be used. The message "Calibration correction set to X.XX" where "X.XX" is the reflectivity calibration value, is displayed in the feedback line of the RPG Control/Status window. When the RDA begins the next volume scan, a message indicating that the reflectivity calibration state has been changed will be written to the system status log and displayed in the status line of the RPG Control/Status window. The RDA Control/Status window will be updated. The Automatic and Manual buttons will be sensitized. The Refl Calib window remains open. Click No to abort the request. The Automatic and Manual buttons will be sensitized if the reflectivity calibration state is manual (the manual button remains sensitized in manual mode so the user can change the reflectivity calibration value). If the state is Automatic, only the Manual button will be sensitized. Click on the Close button to close the Refl Calib window.

2-3.10.1.11 FAA Redundant Control. If the configuration is FAA Redundant, a set of buttons and labels are displayed to the right of the RDA Control window. At the top is the label Redundant Control. Beneath the Redundant Control label are two groups of labels and buttons titled Local Channel and Redundant Channel.

Within the Local Channel group are two labels, Status and Adapt and one or two buttons, depending on the channel. The Status label can have one of two states, Controlling and Non-Controlling. The Adapt label contains the date and time of the last adaptation data update.

2-3.10.1.11.1 FAA Channel 1. If the local channel is 1, only one button, Controlling, is defined

since only the primary channel, 2, can be commanded into a non-controlling state. The button is grayed-out and desensitized when the local channel status is Controlling. If the local channel status is Non-controlling, the Controlling radio button is sensitized. Clicking it makes a warning_popup appear that states: "You are about to change the control state of this channel. Do you want to continue?".

Click Yes will send a command to the RDA requesting Channel 1 be controlling. The message "Command RDA Channel 1 to Controlling" is displayed in the feedback line of the RPG Control/Status window. The RDA will send an acknowledgment to the RPG which will be written to the system status log and displayed in the status line of the RPG Control/Status window. The Controlling button will become grayed-out and desensitized. The local RPG obtains the narrowband/wideband relay and goes active. Click No to abort the request. The Controlling button will remain sensitized.

2-3.10.1.11.2 FAA Channel 2. If the local channel is 2, two buttons, Controlling and Non-controlling are defined since the primary channel, 2, can be commanded into a non-controlling state. The Controlling button is grayed-out and desensitized and the Non-controlling button is sensitized when the local channel status is Controlling. If the local channel status is Non-controlling, the Controlling button is sensitized and the Non-controlling button is grayed-out and desensitized. Clicking either one makes a warning_popup appear that states: "You are about to change the control state of this channel. Do you want to continue?".

Click Yes to send a command to the RDA requesting Channel 2 be controlling if Controlling was clicked and non-controlling if Non-controlling was clicked. The message "Command RDA Channel 2 to Controlling" is displayed in the feedback line of the RPG Control/Status window if Controlling was selected and the message "Command RDA Channel 2 to Non-controlling" is displayed in the feedback line of the RPG Control/Status window if Non-controlling was selected. The RDA will send an acknowledgment to the RPG which will be written to the system status log and displayed in the status line of the RPG Control/Status window. The Controlling button will be sensitized when the local channel control state becomes non-controlling and desensitized when the local channel control state becomes controlling. The Non-controlling button will be sensitized when the local channel control state becomes controlling and desensitized when the local channel control state becomes non-controlling. The local RPG obtains the narrowband/wideband relay and goes active if the local channel becomes controlling. Click No to abort the request. The button sensitivities will remain the same.

2-3.10.1.11.3 FAA Redundant Channel Status and Adapt. Within the Redundant Channel group are two labels, Status and Adapt. The information to the right of these labels indicate the current state of the redundant channel. The Status label can have one of two states, Controlling and Non-controlling. The Adapt label contains the date and time of the last adaptation data update on the redundant channel. If the adaptation data update times on the local and redundant channels are different, they are displayed with a red background.

2-3.10.1.12 Additional RDA Status Information. Beneath the different RDA control groups are six pair of labels displaying additional RDA status information. Each label pair consists of a name followed by a corresponding status. The status is displayed with a white background to dis-

tinguish it from the label. If the RDA-RPG wideband link is in a failed state, or if no RDA status messages have been received by the RPG, no status is reported for all items. See Figure 2-33. Additional RDA Status Information.

Figure 2-33. Additional RDA Status Information

2-3.10.1.12.1 Operational Mode. Displayed to the right of the Operational Mode label is the RDA operational mode. The possible modes are Operational and Maintenance. When the RDA is in operational mode, the RPG will be in one of the RPG test modes.

2-3.10.1.12.2 Control Authority. Displayed to the right of the Control Authority label is the RDA control authority state. The possible states are No Action, Local Requested, and Remote Enabled.

When the RPG is in remote control of the RDA and the RDA operator requests local control, a new RDA status message is sent from the RDA to the RPG indicating local RDA control is requested. The label Local Requested is displayed for the control authority state. After the RPG operator enables local control (see paragraph 2-3.10.1.7.1 Enable Local (RDA) Button) and the RDA takes control of the RDA, a new RDA status message is sent by the RDA to the RPG indicating the RDA is in local control and No Action is displayed for the control authority state.

When the RDA is in local control and the RDA operator enables remote control, a new RDA status message is sent from the RDA to the RPG indicating remote control is enabled. The label Remote Enabled is displayed for the RDA control authority state. Once the RPG takes control of the RDA, a new RDA status message is sent by the RDA to the RPG setting the control authority state to No Action.

2-3.10.1.12.3 Transmitter Power. Displayed to the right of the Transmitter Power label is the RDA transmitter power. The power is displayed in watts.

2-3.10.1.12.4 Calib. Correction. Displayed to the right of the Calib. Correction label is the reflectivity calibration value used by the RDA. The reflectivity calibration value is displayed in decibels (dB). If the calibration mode is manual, the value is the same as that defined by the operator. If the calibration mode is automatic, the value is updated every volume scan by the RDA software.

2-3.10.1.12.5 Interference Rate. Displayed to the right of the Interference Rate label is the interference suppression rate. The interference suppression rate value is displayed in units per second. If interference suppression is enabled, the value should be updated every volume scan by the

RDA software.

2-3.10.1.12.6 Moments Enabled. Displayed to the right of the Moments Enabled label are a coded list of the moments currently enabled for transmission by the RDA. The following codes are used to represent each moment:

R - Reflectivity
V - Velocity
W - Spectrum Width

For example, if the code list is "RVW", all three moments are enabled for transmission.

2-3.10.2 RDA Alarms. Click on the Alarms button to open the RDA Alarms window. The RDA Alarms window consists of a number of buttons and edit boxes and a scrolled list of color coded RDA alarm messages. See Figure 2-34. RDA Alarms. The upper left hand corner contains the Close button. Click on this button and the operator is returned to the HCI. All changes made to this menu are automatically saved.

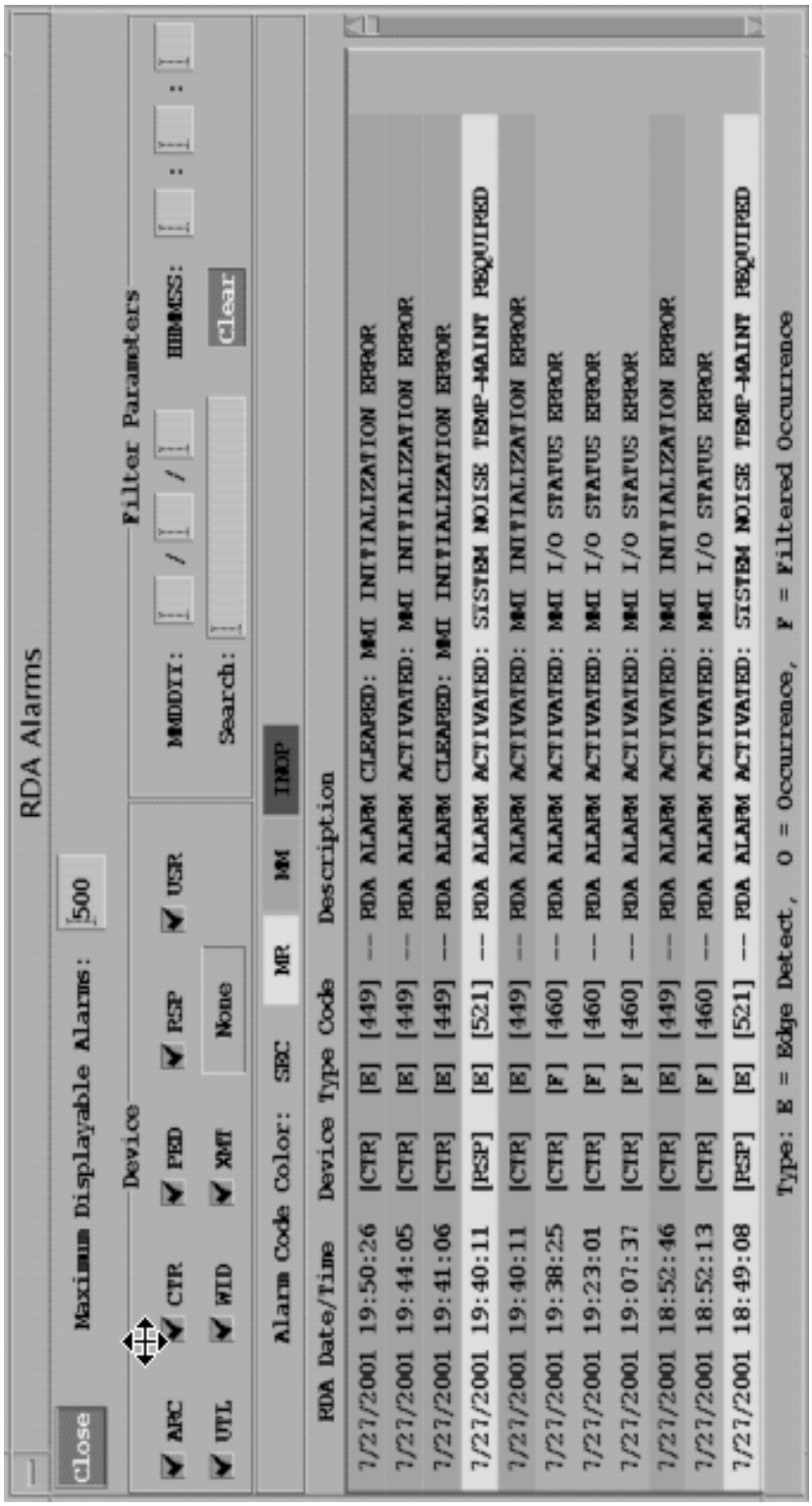


Figure 2-34. RDA Alarms

2-3.10.2.1 Maximum Displayable Alarms. To the right of the Close button is an edit box preceded by the label Maximum Displayable Alarms. This edit box controls the number of color coded RDA alarm messages contained in the scrolled list. By default, a maximum of 500 RDA alarm messages can exist in the scrolled list. Any number in the range 0 - 9999 is accepted. However, it should be noted that the larger the number is, the longer the scrolled list will take to refresh when new RDA alarms are received by the RPG.

2-3.10.2.2 Device. Above the RDA alarm messages scrolled list are a set of check boxes and a button inside a section labeled Device. These boxes and buttons are used to control which RDA alarm messages are displayed in the RDA alarm messages scrolled list. A check box is defined for each RDA defined device. Each device is identified by a mnemonic which is defined as follows:

ARC - Archive III
CTR - RDA Control
PED - Antenna/Pedestal
RSP - Receiver/Signal Processor
USR - User
UTL - Tower/Utilities
WID - Wideband
XMT - Transmitter

All RDA alarm messages map to one of the aforementioned RDA devices. Only those RDA alarm messages corresponding to a selected (checked) RDA device are displayed in the scrolled list.

Following the last RDA device selection is a button containing either the label All or None. Clicking on this button when the label is None will deselect all RDA device selections and no RDA alarm messages will be displayed in the scrolled list. Clicking on this button when the label is All will select all RDA device selections and all RDA alarm messages (up to the maximum defined) will be displayed in the scrolled list. After clicking this button, the label will change to the other state.

2-3.10.2.3 Filter Parameters. To the right of the Device section is a section labeled Filter Parameters. This section contains a set of edit boxes used to control the age and content of the messages displayed in the scrolled list.

The user can control the date and time of the latest messages in the list by entering a date in the MMDDYY edit boxes and a time in the HHMMSS edit boxes. If the date/time fields are blank, no date/time check is performed. Normal range checking is performed on each date/time field. Only the last two digits of the year should be entered. If an invalid date/time element is entered (for this example, an invalid month), a warning_popup window appears which states: "You entered an invalid month (XX). The valid range is 0 (ignore) to 12". Similar warning_popups appear for invalid days, hours, minutes, and seconds. There is no warning_popup for years. Click on the Continue button to return to the edit box.

The user can control which messages are displayed, by content, by specifying a search string field

in the edit box to the right of the Search: label. For example, if the search string is "VCP", only those RDA messages containing the string "VCP" are displayed in the scrolled list. NOTE The search string is not case sensitive (i.e.,"VCP", "vCP", "vcP", VCP", "vcp", "Vcp", and "VCp" are all considered the same).

The user can quickly clear all filter parameters by selecting the Clear button. All date/time and search fields are removed. No messages are filtered in the scrolled list. The user remains at the RDA Alarms window.

2-3.10.2.3.1 MMDDYY Blocks. At the MMDDYY blocks, type in the two digit month, day, and the year for the desired date. When the Return key is pushed, the log of alarms will change to show only those alarms with the specified date or earlier.

2-3.10.2.3.2 HHMMSS Blocks. At the HHMMSS blocks, type in the desired time, using digits each for hour (HH), minutes (MM) and seconds (SS). When the Return key is pushed, the log of alarms will change to only show those alarms at that specific time or earlier.

2-3.10.2.3.3 Search Block. In the Search block, type in the keystrokes to be used in the search of the alarms. When the Return key is pushed, the word or string will search through the Description column of the Alarm listing and then list only the alarms that have the specific word or string in its description. The entry is not case sensitive.

2-3.10.2.3.4 Clear Button. In the lower right hand corner is a Clear button. One click on this Clear button and the entries from the other three blocks (Date, Time, and Search) are all cleared and the corresponding lists of alarms cleared.

2-3.10.2.4 RDA Alarm Messages Scrolled List. Beneath the device and filter parameter sections are a set of labels and a color coded scrolled list of RDA alarm messages. The labels are used to describe the contents of the messages. One set of labels define the message colors and their meaning. These are:

SEC - Secondary alarms (normal background color)
MR - Maintenance Required alarms (yellow background color)
MM - Maintenance Mandatory alarms (orange background color)
INOP - Inoperable alarms (red background color)

Just above the scrolled list are a set of labels defining each part of an RDA alarm message entry. These are: RDA Date/Time, Device, Type, Code, and Description.

The RDA Date/Time field corresponds to the RDA date and time (UT) the message was generated. Note: The RDA and RPG times can be considerably different since they are generated from independent clocks. One can determine the time difference by comparing a specific message time in the RDA Alarms and RPG Status (all RDA alarm messages are written to the RPG system log file and are tagged with the time they were received at the RPG) windows.

The Device field defines which RDA device the RDA alarm message is tied to. These devices have been described in paragraph 2-3.10.2.2 Device.

The Type field defines the RDA alarm type from one of the following:

E - Edge Detected
O - Occurrence
F - Filtered Occurrence

Edge Detected alarms are reported by the RDA as activated every time the test associated with the alarm fails consecutively for a specific number of times. When the test first passes after an alarm is reported as activated, the alarm is reported as cleared.

Occurrence alarms are reported as activated each time the outcome of the associated test is failed. No corresponding cleared alarm is reported when the condition does not fail.

Filtered Occurrence alarms are reported each time the outcome of the associated test is failed, but are not reported within 15 minutes of the last reporting. No corresponding cleared alarm is reported when the condition does not fail.

The Code field is the integer code reported by the RDA corresponding to the RDA alarm being reported. Up to 800 RDA alarm codes are defined in the RDA/RPG ICD.

The Description field maps the RDA alarm code to a descriptive message. The message is preceded by the string "RDA ALARM ACTIVATED" when an alarm is set and "RDA ALARM CLEARED" when an alarm is cleared. Not all RDA alarms are cleared.

Entries in the RDA alarm messages scrolled list are displayed in reverse chronological order (newest first and oldest last). The list is automatically updated when new RDA alarms are reported.

2-3.10.3 Archive Base Data Icon. The Archive Base Data Icon is located just below the RDA icon and represents the Archive II device. The Archive II window consists of a number of buttons and status labels. Clicking on this icon brings up the Archive II window. See Figure 2-35. Archive II.

NOTE

This function is not applicable with an EEC RDA.

Figure 2-35. Archive II

2-3.10.3.1 Archive II Control Buttons. The top row of this window contains the following four buttons: Close, Record, Playback, and Stop.

2-3.10.3.1.1 Archive II Close. Clicking on this button closes the Archive II window. If the Record Base Data or Playback base data windows are open, they are also closed.

2-3.10.3.1.2 Archive II Record. Clicking on this button opens up the Record Base Data window. See Figure 2-36. Record Base Data. This window is used to begin the process of recording base data on the Archive II device. The user can select the number of volume scans to be recorded (1-900), or choose to record all volume scans by entering a 0 in the Record field. Enter in the numeric values and press the Return key or click on the Activate button. If an incorrect value (XXX) has been entered, a warning_popup will appear that states: “You entered an invalid value of XXX. The valid range is 0 (ALL) to 900.” Click on the Continue button or the Space Bar and the user will return to the Record Base Data window.

Once the desired number of scans has been successfully entered, click on the Activate button to begin recording. A warning_popup will appear that states: “You are about to command Archive II to RECORD. Do you want to continue?” Click on either the Yes or No button to select the desired response.

Click Yes to send the Record command to the RDA. The message "Commanding Archive II to record X volumes" will be displayed in the feedback line of the RPG Control/Status window, where X is the number of volumes to be recorded. If the number of volumes is 0, then the label ALL will be displayed instead of the number. The Record Base Data window is closed.

Clicking No will result in only the warning_popup window being closed.

When the Archive II device begins recording, the label Record will be displayed beneath the Archive Base Data icon along with a label indicating the current tape number and the estimated number of volumes left on the tape. This information will also be displayed in the Archive II window. Data flow will be graphically represented by boxes moving from the RDA box to the Archive Base Data box. In the Archive II window, the Record button will become grayed-out and desensitized and the Stop button sensitized.

Figure 2-36. Record Base Data

2-3.10.3.1.3 Archive II Playback. The Playback button is normally grayed-out and desensitized unless it is enabled in the RDA Adaptation data. It will also appear grayed-out and desensitized if Archive II is not installed at the RDA. If it is sensitized, then the user can click on the Playback button and bring up a second window titled Playback Base Data. The Playback Base Data window provides selections to define the start date/time of the first volume scan to read from an Archive II tape and to activate playback. Clicking on the Close button closes the Playback Base data window and discards any date/time data that might have been entered. See Figure 2-37. Playback Base Data.

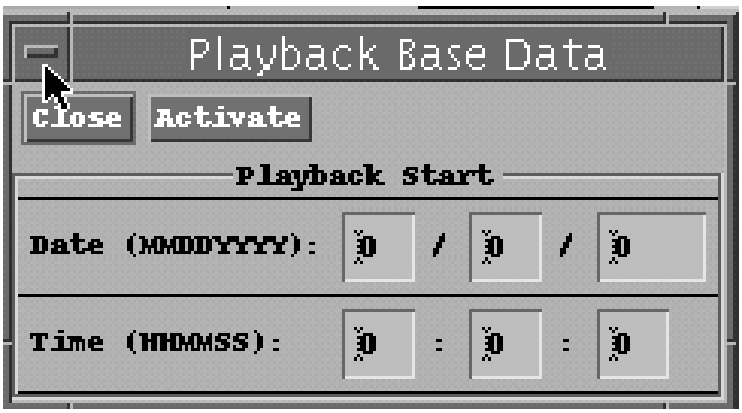


Figure 2-37. Playback Base Data

2-3.10.3.1.3.1 Archive II Playback Activate. Click on the Activate button and a warning_popup appears that states: "You are about to command Archive II to PLAYBACK. Do you want to continue?".

Click Yes to send a Playback command to the RDA. If an invalid date or time was entered, a warning_popup appears that states: "An invalid start date was entered!". Click Continue to return the user back to the Playback Base Data window to correct the date/time error. When a valid date/time is entered, base data will be read from the Archive II tape and sent to the RPG to be processed. The message "Commanding Archive II to playback" will be displayed in the feedback line of the RPG Control/Status window. The label Playback will be displayed beneath the Archive Base Data icon. Data flow will be graphically represented by boxes moving from the Archive Base Data icon to the RDA icon. In the Archive II window, the Playback button will become grayed-out and desensitized and the Stop button sensitized.

Click No to abort the request. The Playback radio button will remain sensitized.

2-3.10.3.1.3.2 Archive II Playback Start. Below the Playback Start label are a set of edit boxes for defining the playback start date and time. When activated, playback will start with the first volume scan beginning at or after the specified date/time and proceeding until the end of tape or until the user stops it.

NOTE

When selecting a volume start time, use either the volume header times from the Archive II tape or subtract anywhere from 15 seconds to a minute from the RPG volume (first radial) time. The RPG first radial time and the RDA Archive II tape header times will never be exactly the same. They will always be different because the RDA cannot simultaneously transmit and record the same data. The RPG first radial time is always after the tape header time. It is usually between 0.3 to 2 seconds later, but sometimes over 10 seconds later. This will insure that the correct volume scan is played back.

Three edit boxes are defined for entering the date. The order of input is Month (MM), Day (DD), and Year (YYYY).

The month must be in the range 0 to 12. Any value outside this range results in a warning_popup which states: "You entered an invalid month of X. The valid range is 0 (not set) to 12.", where X is the input month value. Click Continue to close the warning_popup and return to the edit box to correct the invalid month. A value of 0 indicates data will be read back from the beginning of the tape, regardless of whether a day and year is specified.

The day must be in the range 0 to 31. Any value outside this range results in a warning_popup which states: "You entered an invalid day of X. The valid range is 0 (not set) to 31.", where X is the input day value. Click Continue to close the warning_popup and return to the edit box to correct the invalid day. A value of 0 indicates data will be read back from the beginning of the tape, regardless of whether a month or year was specified.

The year must be in the range 1988 to 2100. Any value outside this range results in a warning_popup which states: "You entered an invalid year of X. The valid range is 0 (not set) and 1988 to 2100.", where X is the input year value. Click Continue to close the warning_popup and return to the edit box to correct the invalid year. A value of 0 indicates data will be read back from the beginning of the tape regardless of whether a day or month was specified.

Three edit boxes are defined for entering the time. The order of input is: Hour (HH), Minute (MM), and Second(SS).

The hour must be in the range 0 to 23. Any value outside this range results in a warning_popup which states: "You entered an invalid hour of X. The valid range is 0 to 23.", where X is the input hour value. Click Continue to close the warning_popup and return to the edit box to correct the invalid hour.

The minute must be in the range 0 to 59. Any value outside this range results in a warning_popup which states: "You entered an invalid minute of X. The valid range is 0 to 59.", where X is the input minute value. Click Continue to close the warning_popup and return to the edit box to correct the invalid minute.

The second must be in the range 0 to 59. Any value outside this range results in a warning_popup which states: "You entered an invalid second of X. The valid range is 0 to 59.", where X is the

input second value. Click Continue to close the warning_popup and return to the edit box to correct the invalid second.

2-3.10.3.1.4 Archive II Stop. Whenever the Archive II device is recording or playing back data, the "Stop" button is sensitized. Clicking on it will result in a warning_popup appearing which states: "You are about to command Archive II to STOP. Do you want to continue?".

Click Yes to send a stop archive command to the RDA. The message "Commanding Archive II to stop" will be displayed in the feedback line of the RPG Control/Status window. The user is returned to the HCI.

Click No will result in only the warning_popup window being closed.

2-3.10.3.2 Volume Status. This middle section of window also contains a Volume Status area where two different values are highlighted. One value that is next to the Tape # line is used to display which tape cartridge, of the ten available Archive II jukebox cartridges, is currently in use. To the right of the Volumes Remaining line the value displayed indicates the approximate number of volumes that the current Archive II tape can record before it runs out of space. .

If the archive II state is Record and the number of estimated volumes left on the tape is less than or equal to 10, the background color of the labels is red. If the value is less than or equal to 20, the background color of the labels is yellow.

2-3.10.3.3 Current Archive II Status. The current Archive II state is displayed beneath the Current Archive II Status label. The possible Archive II states are:

- Check Label - Checking the tape for a valid label. If no label is found, a new label is written.
- Fast Forward - The tape is fast forwarding to the end of written data.
- Installed - An Archive II device is installed but not currently active.
- Loaded - Ready to begin recording at the beginning of the next volume.
- Not Installed - There is no Archive II device installed.
- Playback - Currently playing back data. This is allowed only when Archive II playback is enabled at the RDA.
- Playback Avail - An Archive II device is installed and playback is enabled at the RDA.
- Record - Currently recording data.
- Reserved (WP)- Reserved (Write Protected)
- Reserved - Reserved
- Search - Conducting a binary search of the tape for a particular file.
- Tape Transfer - The Archive II device is in the process of changing tapes.
- Unknown - No valid status is available or the latest RDA status message

contains unknown data.

2-3.10.3.4 Archive II Data Flow. In addition to the Archive II status displayed in the Archive II window, additional status is indicated by the state of the graphical connection between the RDA and Archive Base Data icons. If the RDA-RPG wideband link is not connected, no connection is displayed beneath the RDA and Archive Base Data icons. If the Archive II state is Playback or Record, the connection is displayed in green. Otherwise, the connection is displayed in white. If the Archive II state is Record, black boxes are moved along the connection from the RDA icon to the Archive Base Data icon. If the Archive II state is Playback, the black boxes are moved along the connection from the Archive Base Data icon to the RDA icon.

2-3.11 RDA Power Source Icons.

Just to the left of the RDA icon is a graphic representing the current power source of the RDA shelter. The two utility poles with connecting wires graphically represents the utility or commercial power source. The shelter and fuel tank graphic represents the generator or auxiliary power source and fuel level. A message below the graphics inform the user of the status of the power. When the utility poles are present, the message will read: Gen Off. When the generator and fuel tank is present, the message will read: Util Avail. If there is no wideband connection between the RDA and RPG, then this entire box is blank. See Figure 2-38. RDA Power Source Icons.

Figure 2-38. RDA Power Source Icons

When the text line reads Gen Off, it in fact may not be off if it is being exercised or is during a cooling down period. When the text line reads Util Avail, utility power may not be available due to factors external to the WSR-88D site.

If the RPG software has control of the RDA, the power source may be changed to auxiliary or to utility by clicking anywhere in the graphic when the pointing hand is available. A warning_popup will appear that states: “You are about to change the RDA power source. Do you want to continue?” Click on either the Yes or No button to select the desired response. If the user is on utility power and selects to change to generator, then the message under the utility poles will change to “Gen On” once the generator is on, and the graphic will change to the generator building and fuel tank once the power has been transferred.

For sites with Transitional Power Source (TPS), the RDA will not be powered down during a power transfer. With the TPS operational, manual switching from generator to utility is not necessary. The TPS automatically checks the utility power every ten minutes. If it is adequate, then the

RDA is switched over to utility from generator. Even if manually selected to go off generator, the operator will see no change in power source until the TPS does its check. For sites without TPS, the RDA will shut off because its power source is removed temporarily. When power is restored, the RDA returns to the mode it was in before it lost power (either Standby or Operate). It is recommended to put the RDA in Standby when conducting a power transfer as that is an easier transition on the equipment.

2-3.12 RDA/RPG Interface Status.

The connection between the RDA and RPG is represented both graphically and textually. There are three bars that represent the three base data moments. See Figure 2-39. Bars Representing Three Moments. The top bar, labeled “R”, represents Reflectivity. The middle bar, labeled “V”, represents Velocity. The bottom bar, labeled “W”, represents Spectrum Width. The bars are displayed in white, red, green, or no color. A white display indicates that the wideband line is connected but there is no base data flowing. A red display indicates that the moment has been disabled. All three red may indicate a failure. A green display indicates that the wideband line is connected and there is base data flowing. In addition, when the bars are green, there is an additional small black box that repeatedly moves within each bar from left to right (or from the RDA icon to the RPG icon) adding further graphical indication that base data is enabled and flowing. A missing display indicates the wideband line is not connected.

If the RDA/RPG wideband link is not connected, then the bars are replaced by a label indicating the current wideband state. The following RDA/RPG wideband link states are defined:

Connected - The link is connected.
Connect Pending - The link is currently being connected.
Disconnect Pending - The link is currently being disconnected.
Disconnect HCI - The link was disconnected by a command from the HCI operator.
Disconnect CM - The link was disconnected by the comms manager.
Disconnect SHUTDOWN - The link was disconnected because the RPG was shutdown.
Failure - A link could not be established between the RDA and RPG. The probable cause is the RDA is unavailable.
Unknown - An unrecognized link status was reported.

Click on the RDA/RPG wideband link when the cursor turns into a pointing hand when it is over the status graphic) and the RDA/RPG Interface Control/Status window appears. See Figure 2-40. RDA/RPG Interface Control/Status. This window contains selections to control the RDA/RPG wideband link.

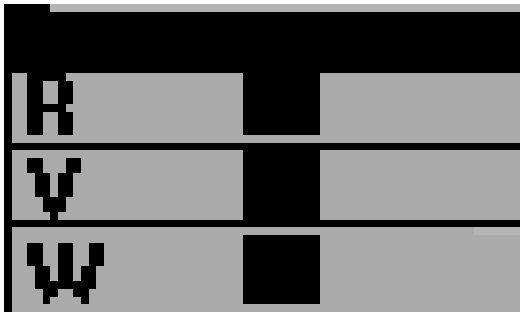


Figure 2-39. Bars Representing Three Moments

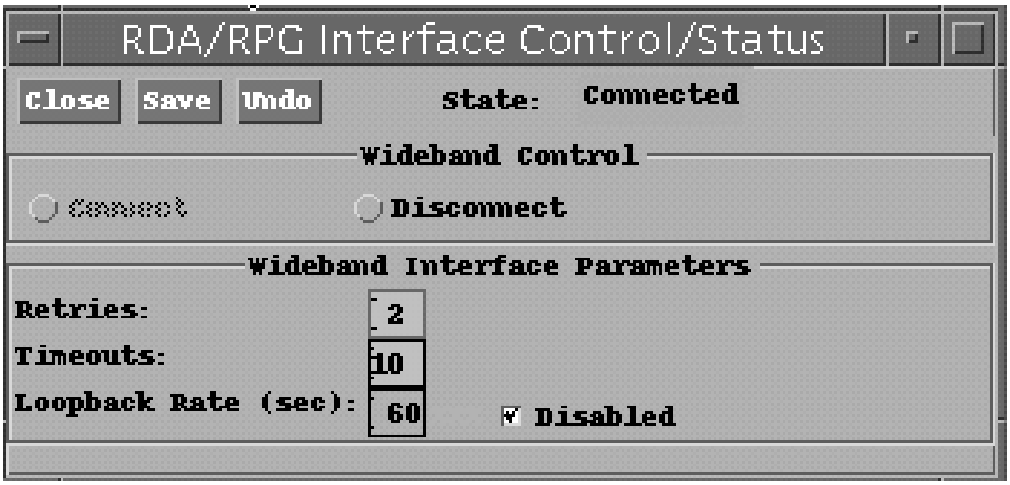


Figure 2-40. RDA/RPG Interface Control/Status

2-3.12.1 RDA/RPG Interface Control/Status Window. This window has three control buttons on the top line, followed by a text line defining the state of the Interface.

Clicking on the Close button closes the RDA/RPG Interface Control/Status window. If any edits were made to the wideband interface parameters but not saved, a warning_popup appears that states: "Do you want to save your changes?". Clicking Yes will first save the edits before closing the window. Clicking No will discard the edits and close the window.

The Save button is only sensitized when edits have been made to the wideband interface parameters. Clicking it will make a warning_popup appear that states: "Do you want to save your changes?". Click Yes will save the edits to a file. The Save and Undo buttons then become grayed-out and desensitized. Click No will not save the edits but leave them intact in the window. The Save and Undo buttons will remain sensitized.

The Undo button is only sensitized when edits have been made to the wideband interface parameters. When selected, all unsaved edits are discarded. No warning_popup window appears. The

Save and Undo buttons become desensitized.

2-3.12.1.1 State Text. The current RDA/RPG wideband link state is displayed at the top of the window to the right of the State: label. The state is displayed as a color coded text string. The following color coded RDA/RPG wideband link states are defined:

Connected	- Green
Connect Pending	- Yellow
Disconnect Pending	- Yellow
Disconnected (HCI)	- Yellow
Disconnected (CM)	- Yellow
Disconnected (SHUTDOWN)	- Yellow
Failure	- Red
Unknown	- Red

2-3.12.1.2 Wideband Control Buttons. The Wideband Control buttons are used to connect and disconnect the RDA/RPG wideband link. These radio buttons are always sensitized, regardless of the RDA/RPG wideband link state.

2-3.12.1.2.1 Wideband Connect Button. Click on the Connect button and a warning_popup appears that states: "You are about to issue a request to enable the connection between the RDA and RPG. Do you want to continue?"

Click Yes to send a command to connect the RDA/RPG wideband link. The message "Connect Wideband Link" is displayed in the feedback line of the RPG Control/Status window. The message "Wideband Line is CONNECTED" is written to the RPG system status log and displayed in the status line of the RPG Control/Status window as soon as the wideband line is connected. The wideband link graphic in the RPG Control/Status window should change from a label to a set of horizontal bars. The State label in the RDA/RPG Interface Control/Status window should change to "Connected".

Click No to abort the connect request.

2-3.12.1.2.2 Wideband Disconnect Button. Click on the Disconnect button and a warning_popup appears that states: "You are about to issue a request to disable the connection between the RDA and RPG. Do you want to continue?"

Click Yes to send a command to disconnect the RDA/RPG wideband link. The message "Disconnect wideband link" is displayed in the feedback line of the RPG Control/Status window. The message "Wideband Line DISCONNECTED by HCI" is written to the RPG system status log and displayed in the status line of the RPG Control/Status window as soon as the wideband line is disconnected. The wideband link graphic in the RPG Control/Status window should change from a set of horizontal bars to the label Disconnected HCI. The State label in the RDA/RPG Interface Control/Status window should change to Disconnected (HCI).

Click No to abort the disconnect request.

2-3.12.1.3 Wideband Interface Parameters. The group of items in the Wideband Interface Parameters section are used to control how the RDA control process monitors the RDA/RPG wideband link.

2-3.12.1.3.1 Retries. The user can control the number of times the RDA control task attempts to connect the wideband communications link before it reports a failed status by changing the edit field to the right of the Retries: label. The valid range is 0 to 5. Any value outside this range results in a warning_popup appearing that states: "X is out of range, must be in the range 0 <= X <= 5.", where X is the input value. Click on the Continue button to return to the same Retries field for another entry.

2-3.12.1.3.2 Timeouts. The user can control the number of seconds the RDA control task will wait before it considers a response to a RDA control command overdue by changing the edit field to the right of the Timeouts: label. The valid range is 1 to 30. Any value outside the range results in a warning_popup appearing that states: "X is out of range, must be in the range 1 <= X <= 30", where X is the input value. Click on the Continue button to return to the same Timeouts field for another entry.

2-3.12.1.3.3 Loopback Rate. The user can control the rate at which loopback messages are passed between the RDA and RPG by changing the edit and check box fields to the right of the Loopback Rate (sec): label. If the Disabled box is checked (set), loopback tests are disabled. If the Disabled box is not checked (not set), loopback tests are enabled and the user can specify a loopback rate in the range 60 to 300 seconds. Any value outside the range results in a warning_popup appearing that states: "X is out of range, must be in the range 60 <= X <= 300", where X is the input value. Click on the Continue button to return to the same Loopback Rate field for another entry.

2-3.13 RPG Icon.

The middle third of the RPG Status/Control Window is devoted to RPG specific items. See Figure 2-41. RPG Icon. The display consists of a set of control buttons. These are the RPG Control button, RPG Products button, and RPG Status button. The Control button opens up the RPG Control window that controls the RPG. The Products button has two additional sets of buttons which are the Adaptation Data (Alert/Thresholds, Generation List, Load Shed Products, Selectable Parameters and Algorithms) and the Display (Products in Database). The Status button contains all the logs of the entire RPG system.

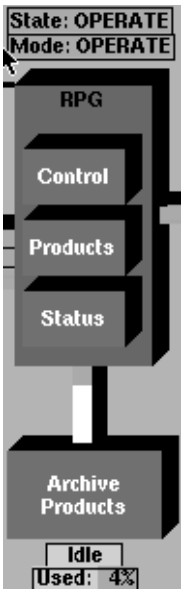


Figure 2-41. RPG Icon

For the FAA Redundant Configuration with the RMS, there is a fourth button, directly under the Status button, labeled RMS. This button is described in more detail in paragraph 2-3.13.4 RMS Button.

2-3.13.1 RPG Control Window. Click on the Control box when the cursor has changed to the pointing hand and the RPG Control window appears. The window consists of numerous control buttons and a status region. The top line of the RPG Control window contains system information, the middle section provides various system controls, and the bottom section indicates the default weather mode. See Figure 2-42. RPG Control.

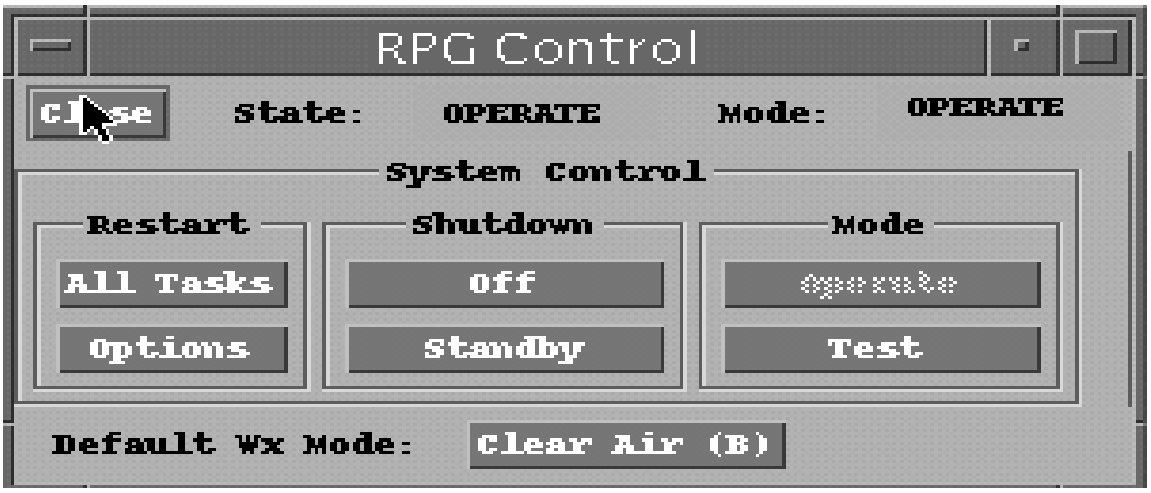


Figure 2-42. RPG Control

2-3.13.1.1 RPG Close, State, and Mode. Clicking on the Close button in the upper left hand corner will close the RPG Control window and return the user to the HCI.

The middle of the top line has a text line that displays the State of the RPG. The possible States and their respective background colors are:

- OPERATE(Green) - The RPG is operating
- SHUTDOWN(Red) - The RPG is off. Starting the RPG from this state initializes the RPG.
- STANDBY (Red) - The RPG is off. Starting the RPG from this state does not initialize the RPG.
- TRANSITION (Yellow) - The RPG is in a transition state between operate and shutdown/standby.
- FAILED(Red) - The RPG has failed for some reason.
- POWERFAIL (Red) - The power to the RPG has failed for some reason.
- UNKNOWN(Red) - The RPG state being reported is not defined.

The right hand side of the top line has a text line that defines the Mode of the RPG. The possible Modes and their respective background colors are:

- OPERATE(Green) - The RPG is operating and products can be distributed to all narrowband users.
- TEST (RDA) (Yellow) - The RPG is in test mode because the RDA is in maintenance mode. Products can only be sent to the RPGOP user.
- TEST (RPG) (Yellow) - The RPG is in test mode as a result of a command from the RPG operator. Products can only be sent to the RPGOP user.

2-3.13.1.2 RPG System Control Block. The RPG System Control block is comprised of three columns: Restart, Shutdown, and Mode. Each is discussed separately below.

2-3.13.1.2.1 RPG Restart-All Tasks. Click on the All Tasks button and a warning_popup appears if the current RPG state is OPERATE, STANDBY, or SHUTDOWN. Otherwise, no action is performed. The All Tasks button is grayed-out and desensitized when the RPG is in a TRANSITION state.

If the current RPG state is OPERATE or STANDBY, the warning_popup states: "You are about to restart all of the RPG processes. Contents of datastores will be preserved. Do you want to continue?".

Click Yes to sent a restart command to the RPG manager. If the restart command is successful, the message "RPG Restart Command Accepted" is displayed in the feedback line of the RPG Control/Status window. The RPG state will first go to TRANSITION, and then to OPERATE.

The message "RPG operability Status: COMMANDED SHUTDOWN" will first be displayed in the status line of the RPG Control/Status window. As the RPG is restarted, numerous messages will be written to the RPG system status log and displayed in the status line while in the TRANSITION state. When the state becomes OPERATE, the message "RPG State: OPERATE" will be displayed. If the restart command is not successful, the message "RPG Restart Command Failed" is displayed in the feedback line of the RPG Control/Status window.

Click No will close the warning_popup window and do nothing.

If the current RPG state is SHUTDOWN, the warning_popup states "You are about to start all of the RPG processes. Contents of some datastores will be reinitialized. Do you want to continue?".

Click Yes to send a startup command to the RPG manager. If the startup command is successful, the message "RPG Startup Command Accepted" is displayed in the feedback line of the RPG Control/Status window. The RPG state will first go to TRANSITION, and then to OPERATE. The message "RPG operability Status: COMMANDED SHUTDOWN" will first be displayed in the status line of the RPG Control/Status window. As the RPG is restarted, numerous messages will be written to the RPG system status log and displayed in the status line while in the TRANSITION state. When the state becomes OPERATE, the message "RPG State: OPERATE" will be displayed. If the startup command is not successful, the message "RPG Startup Command Failed" is displayed in the feedback line of the RPG Control/Status window.

Click No will close the warning_popup window and do nothing.

2-3.13.1.2.2 RPG Restart - Options. Selecting the Options button brings up the RPG Init Options Window. his window contains a set of selections to initialize various RPG components at specific RPG states. See Figure 2-43. RPG Init Options. Click on the Close button to close the RPG Init Options window and return the user to the RPG Control window.

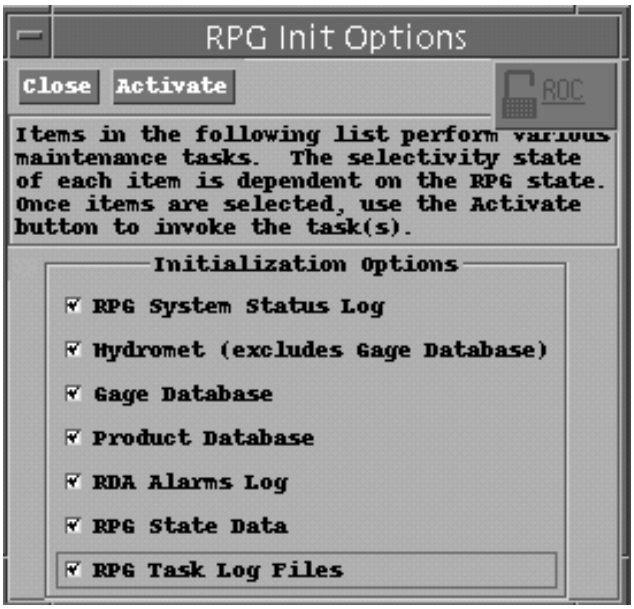


Figure 2-43. RPG Init Options

2-3.13.1.2.2.1 Activate Button. The Activate button is only sensitized when the window is unlocked. To open the Initialization Options for selection, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

Click the Activate button and a warning_popup appears that states: "You are about to initialize all of the data selected in the Initialization Options list. Do you want to continue?".

Click Yes to invoke the initialization task associated with each item selected in the "Initialization Options" list. Most initialization tasks generate a system log message which is displayed in the status line of the RPG Control/Status window.

Click No to close the warning_popup window only and leave the user at the RPG Init Options window.

2-3.13.1.2.2.2 Initialization Options. Within the Initialization Options section is a list of initialization tasks which are only selectable when the window is unlocked and the RPG is in a predefined state. At the present time, the only state which items are selectable is SHUTDOWN. The following initialization options are available:

- RPG System Status Log: -This task deletes all messages from the RPG system status log file.
- Hydromet: - This option initializes the hydromet database;

excluding the rain gage database.

- Gage Database: - This option initializes the rain gage database only.
- Product Database: - This option deletes all products from the RPG products database.
- RDA Alarm Log: - This option deletes all RDA alarm messages in the RDA alarms log file but does not delete RDA alarm messages from the system status log file.
- RPG State Data: - This option initializes RPG state data.
- RPG Task Log Files - Clicking on this option causes the task log files to be cleared out when the RPG is restarted. Otherwise the log files remain intact.

2-3.13.1.2.3 RPG Shutdown. Clicking the Off button brings up a warning_popup which states: "You are about to stop all of the RPG processes. Do you want to continue?".

Click Yes to send a shutdown command to the RPG manager. If the shutdown command is accepted, the message "RPG Shutdown Command Accepted" is displayed in the feedback line of the RPG Control/Status window. The RPG state will first go to TRANSITION, and then to SHUTDOWN. The message "RPG operability Status: COMMANDED SHUTDOWN" will be written to the RPG system status log and displayed in the status line of the RPG Control/Status window. If the shutdown command is not accepted, the message "RPG Shutdown Command Failed" is displayed in the feedback line of the RPG Control/Status window.

Click No to close the warning_popup window and do nothing.

The Off button is sensitized when the RPG state is OPERATE or STANDBY. Otherwise, it is desensitized.

NOTE

When starting the RPG from a SHUTDOWN state, full initialization is done. If full initialization is not desired, first put the RPG state in STANDBY before starting it up.

2-3.13.1.2.4 RPG Shutdown - Standby. Click the Standby button brings up a warning_popup which states: "You are about to stop all of the RPG processes. Do you want to continue?".

Click Yes to send a standby command to the RPG manager. If the standby command is accepted, the message "RPG Standby Command Accepted" is displayed in the feedback line of the RPG Control/Status window. The RPG state will first go to TRANSITION, and then to STANDBY. The message "RPG operability Status: COMMANDED SHUTDOWN" will be written to the RPG system status log and displayed in the status line of the RPG Control/Status window. If the standby command is not accepted, the message "RPG Standby Command Failed" is displayed in the feedback line of the RPG Control/Status window.

Click No to close the warning_popup window and do nothing.

The Standby button is sensitized when the RPG state is in OPERATE or SHUTDOWN. Otherwise, it is grayed-out and desensitized.

NOTE

When starting the RPG from a STANDBY state, no initialization is done. If the user wants initialization to happen, first put the RPG state in SHUTDOWN before starting it up.

2-3.13.1.2.5 RPG Mode - Operate. Click on the RPG Mode Operate button and a warning_popup appears that states: "You are about to change to Operate mode. Do you want to continue?".

Click Yes to send an operate command to the RPG manager. If the operate command is accepted, the message "RPG Commanded to Operate" is displayed in the feedback line of the RPG Control/Status window. The message "RPG State: OPERATE" will be written to the RPG system status log and displayed in the status line of the RPG Control/Status window. The Mode: label at the top of the RPG Control window will change to OPERATE.

Click No to close the warning_popup and do nothing.

The Operate button is grayed-out and desensitized when the RPG mode is OPERATE.

2-3.13.1.2.6 RPG Mode - Test. Click on the test button and a warning_popup appears that states: "You are about to change to Test mode. Do you want to continue?".

Click Yes to send a test mode command to the RPG manager. If the test mode command is accepted, the message "RPG Commanded to Test Mode" is displayed in the feedback line of the RPG Control/Status window. The message "RPG State: TEST Mode" will be written to the RPG system status log and displayed in the status line of the RPG Control/Status window. The Mode: label at the top of the RPG Control window will change to TEST (RPG).

Click No to close the warning_popup and do nothing.

The Test button is grayed-out and desensitized when the RPG mode is TEST (RPG).

NOTE

If the RPG is in test mode as a result of the RDA going to maintenance mode (TEST (RDA)), it is possible to prevent the RPG from going back to operate mode when the RDA goes to operate by clicking the Test button.

2-3.13.1.3 Default Wx (Weather) Mode. The bottom line of the RPG Control window highlights the Default Wx (Weather) Mode. To change the default weather mode, click on the button to the right of the Default Wx Mode: label. The button label always displays the current default weather mode. A warning_popup appears that states: "Do you want to permanently change the default weather mode?"

If the current weather mode is Precipitation (A), clicking Yes will change the default weather mode to Clear Air (B). If the current weather mode is Clear Air (B), clicking Yes will change the default weather mode to Precipitation (A).

Clicking No keeps the current default mode unchanged and returns the user to the RPG Control window.

2-3.13.2 RPG Products Window. The Products window has two subsets. See Figure 2-44. RPG Products. The first is Adaptation Data with five separate windows, and the second is Products in the Database Display.

Figure 2-44. RPG Products

2-3.13.2.1 Adaptation Data. There are five subsets of Adaptation Data for the RPG. These are Alert/Threshold, Generation List, Load Shed Products, Selectable Parameters, and Algorithms. Each is described in detail in the following paragraphs.

2-3.13.2.1.1 Alert/Threshold. Click on the “Alert/Threshold” button and the Alert Threshold Editor window opens. See Figure 2-45. Alert Threshold Editor. The top line has five buttons, the three Group types (Grid Products, Volume Products, and Forecast Products) and the padlock password block. The first button, Close, closes the window and returns the user to the RPG Products window. The other four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes

have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized. To view the complete right hand side border of the window, use the horizontal scroll bar along the bottom of the window. The user can click and drag on the bar, or click the arrows to move right or left along the window.

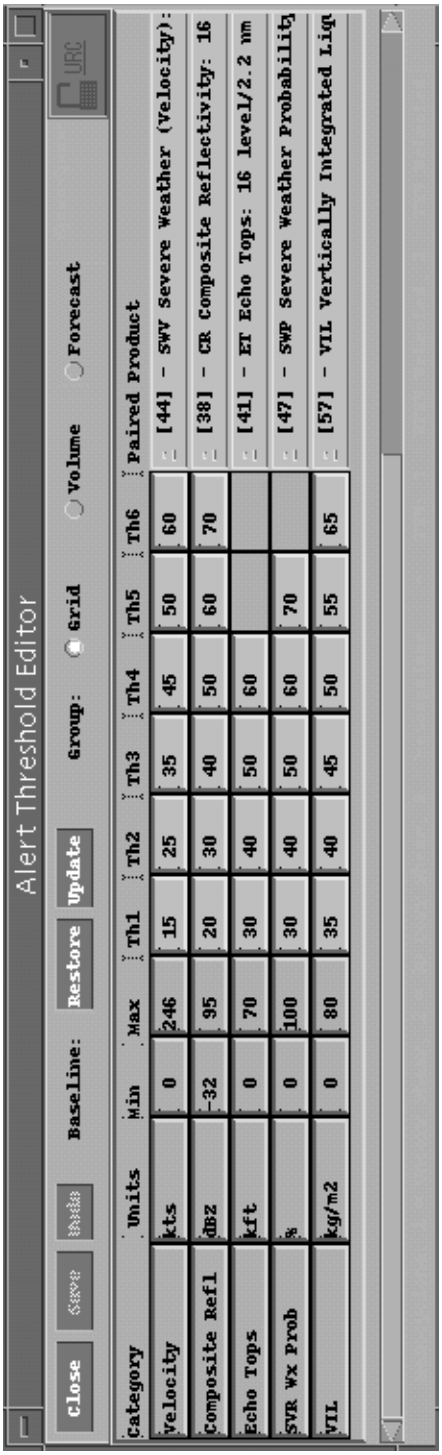


Figure 2-45. Alert Threshold Editor

To view the three groupings, click on the button to the left of each title (or on the title itself). The button turns to white and the table is refreshed with the categories of each group. Each group's window contains the product Category, Units, Minimum and Maximum values allowed, six threshold categories, and the Paired Product. The Grid Products category consists of Velocity, Composite Reflectivity, Echo Tops, Severe Weather Probability, and Vertically Intergrated Liquid (VIL). The Volume Products group includes Velocity Azimuth Display (VAD), Maximum Hail Size, Mesocyclone, Tornado Vortex Signature (TVS), Maximum Storm Reflectivity, Probability of Hail, Probability of Severe Hail, Storm Top, and Maximum 1 Hour Precipitation. The Forecast Products group lists Maximum Hail Size, Mesocyclone, TVS, Maximum Storm Reflectivity, Probability of Hail, Probability of Severe Hail, and Storm Top.

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

To modify the six threshold values, move the cursor to the desired spot and click (or use the tab key to move the red outline to the desire spot). Using the number keys, enter the appropriate value. Then move the curser to another location and click. If the value is within the range allowed for that box, it will be temporarily accepted while the operator edits another box. If the value is not within the range allowed, a warning_popup will appear that states: “You entered an invalid value of XXX. The valid range is AA to BB.” (XXX is the value just entered, AA is the lowest value the user can enter, BB is the highest value the user can enter.) Click on the Continue button, the original value of the box will be restored, and the user is returned to the same area in the Alert Threshold Editor window.

To change the Paired Product, move the cursor to the existing paired product title and click. A new window opens with the available products from which to select. Select the new paired product by moving the cursor to the new title and click. The new selection will show up in the Paired Product column and the user is returned to the Alert Threshold Editor window automatically. Repeat this process for any other changes in the Paired Product column.

Once the desired changes have been made for that window, move the cursor to the top line of the window. The Close, Save, and Undo buttons are sensitized and functional.

Clicking on the Close button first will bring up a warning_popup that states: “You modified the alert threshold data but did not save your changes. Do you want to save your changes?” Click on Yes or No. If Yes, the changes are saved and the user returned to the RPG Products window. If No, the changes are not saved and the user returned to the HCI.

The Save button will allow the user to save the changes that were just made. Click on the Save button and a warning_popup opens that states: “You are about to overwrite the alert threshold data. Do you want to continue?” Click on either Yes or No. If Yes, the changes are saved, the Save button becomes grayed-out and desensitized, the password protected fields are closed, and the user is returned to the Alert Threshold Editor. If No, the changes are still on the window, the Save button is still sensitized, the password protected fields are still open, and the user remains in the Alert Threshold Editor window. Clicking on the Close button now will close the Editor and return the user to the RPG Products window with no other warning_popup windows.

The Undo button undoes any changes that had been made since the last Save. There is no warning_popup as the changes are deleted, the Undo button becomes grayed-out and desensitized, the password protected fields are closed, and the user is back to the Alert Threshold Editor window. Clicking on the Close button now will close the Editor and return the user to the RPG Products window with no other warning_popup windows.

Once the Save and Undo buttons are grayed-out and desensitized, the Baseline: Restore and Update buttons become sensitized and available to the operator. The Restore and Update buttons both apply to the baseline values. Click on the Restore button and a warning_popup opens that states: “You are about to restore the alert/threshold adaptation data to baseline values. Do you want to continue?” Click on either Yes or No. The appropriate actions are made and the user is returned to the Alert Threshold Editor window. Click on the Update button and a warning_popup opens that states: “You are about the replace the alert/threshold adaptation data values. Do you want to continue?” Click on either Yes or No. The appropriate actions are taken and the user is returned to the Alert Threshold Editor window.

2-3.13.2.1.2 Generation List. Place the cursor on the Generation List button, click, and the RPG Product Generation Table Editor window opens. See Figure 2-46. RPG Product Generation Table Editor. The top line contains three control buttons (Close, Save, and Undo) followed by the choice of four tables.

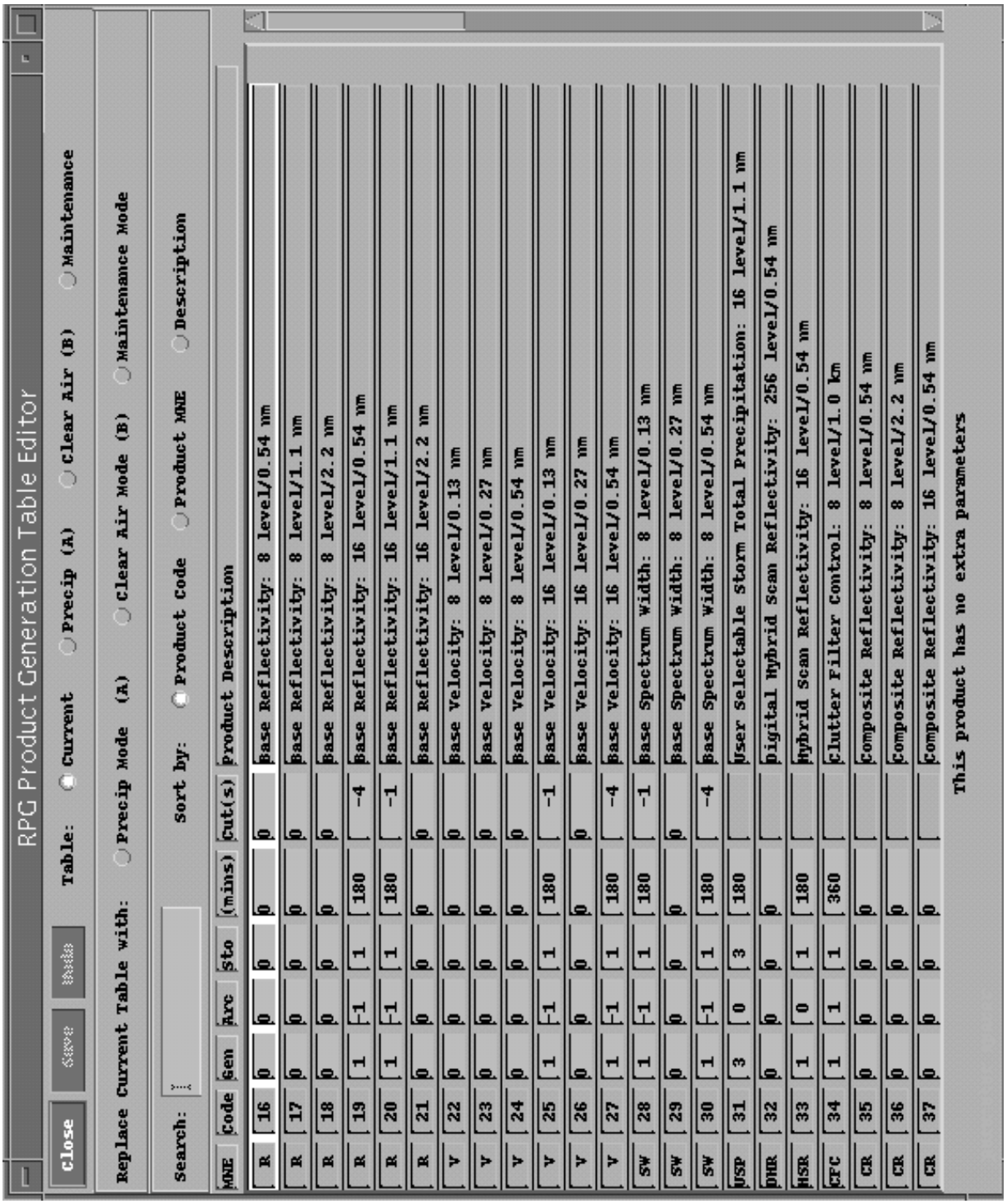


Figure 2-46. RPG Product Generation Table Editor

The Close button (if no changes have been made) closes the Editor window and returns the user to the RPG Products window. If changes have been made and not saved, a warning_popup opens that states: “Do you want to save changes to the current generation table?” Click on either Yes or No. The user is then returned to the HCI. The Save and Undo buttons are initially grayed-out and desensitized until changes are made in any of the generation lists. (They are described later in this section.)

The four generation tables to choose from are: Current, Precip (A), Clear Air (B), and Maintenance. Move the cursor to the button left of the table titles (or to the titles themselves), click, the button turns to white, and the appropriate generation table opens. If any other table besides Current is selected, there are several changes to the window. See Figure 2-47. RPG Product Generation Table Editor - Password Protected. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window. In addition, the second line of the window has changed to become the control buttons for the Baseline Restore and Update.

NOTE

Once changes are made to any of the generation tables and saved, the changes will take effect at the start of the next volume scan. There is no need to shutdown and restart the RPG for the changes to be incorporated because the tables are polled at the start of each volume scan automatically.

Once the password has been successfully entered, the first column of the RPG Product Generation table Editor will become a Product ID (PrID) number and can be sorted by that column.

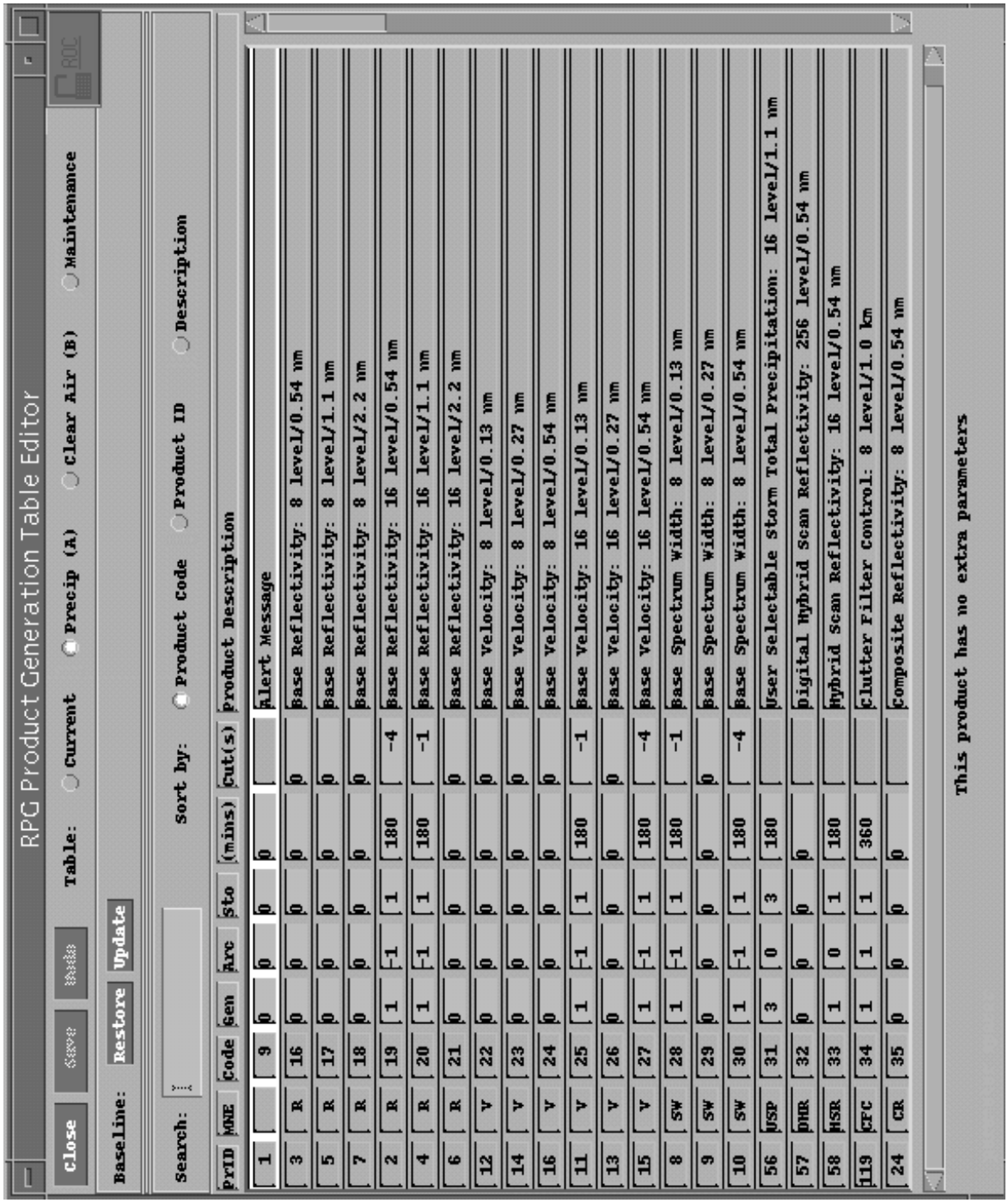


Figure 2-47. RPG Product Generation Table Editor - Password Protected

The second line changes to Baseline: Restore and Update. The third line Sort by: category of Product MNE becomes Product ID. A new column is added as the first column and is labeled PrID, for Product ID. Also, the entire window is now password protected, and a closed padlock block opens in the upper right corner.

Initially, the second line provides the user with options to replace the current generation table. The title is “Replace Current Table with:” followed by the options Precip Mode (A), Clear Air Mode (B), and Maintenance Mode. Click on the button left of the titles (or the titles themselves) and a warning_popup opens that states: “You are about to replace the contents of the Current List with the Default Precip (A) List/Clear Air (B) List/Maintenance List. Do you want to continue?” Click on either Yes or No. If yes, the changes are made and the Save and Undo buttons are sensitized. If no, the user is returned to the Editor window. If the password protected fields have been opened for editing, the second line changes to Baseline: with the two buttons: Restore and Update.

The four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized. Clicking on the Restore button brings up a warning_popup that states: “You are about to replace the Precip (A) table/Clear Air (B) table/ Maintenance table with baseline values. Do you want to continue?” Click on either Yes or No. Clicking on the Update button brings up a warning_popup that states: “You are about to replace the baseline Precip (A) table/Clear Air (B) table/Maintenance table with new values. Do you want to continue?” Click on either Yes or No.

The third line provides the user a Search and a Sort capability. To search, move the cursor to the box just right of the title “Search:” and click. Then, using the alphanumeric keyboard, type in the word/phrase/letters that will be used to search and press the Return key. The search goes through the Product Title column and lists all the products that have the same text string of characters. In order the restore the full list of products, the user must delete the text string in the search box and press the Return key. To the right of the search block is the sort capability with three options: Product Code, Product Mnemonic (MNE), or Description. Click on the button to the left of the sort description or on the title itself. The button will turn white and the table below will be resorted accordingly. The Product Code sorts the products in numerical sequence. The Product MNE sorts the products alphabetically by mnemonics. The Description sorts the products in alphabetical order based on the product description. If editing one of the password protected tables, the Sort by: option changes from Product MNE to Product ID. Clicking on the button to Sort by Product ID performs a numerical sort of all the products by the first column, PrID.and refreshes the table with the new listing.

Columns of data that are not editable are the Product ID (with password protected tables), Product MNE, Product Code, and Product Description.

The columns of data that can be edited are described below with their edit options:

- Generation (Gen): Options are 0 or 1. Enter in a 0 to have the product not generated. Enter in a 1 to have the product generated.

- Archive (Arc): Range is -20 to 20. Enter in a negative number to archive the "N" lowest slices. Enter in a positive number to designate the "N" interval of volume scans for which the product will be archived.

NOTE:
In order to archive a selected number of slices, the same or higher number of slices need to be listed in the Cut(s) column.

- Storage (Sto): Options are 0 or 1. Enter in a 0 to have the product not stored. Enter in a 1 to have the product stored.

- Minutes (mins): Range is 30 to 360. This is the range in minutes that the product will be stored in the database. The Sto value in the previous column must be set at 1 in order to have this storage time go into effect.

- Cut (s): Range is -20 to 45.0. Enter in a negative number to generate the "N" lowest slices. Enter in a positive number to designate the specific elevation slice to be generated. The positive number will correlate to the closest elevation slice available for the respective VCP that is being used.

NOTE:
The number of slices to be generated must be equal to or higher than the number of slices selected to be archived.

If a product has additional parameters that are editable, a secondary window will appear at the bottom of the table once the product has been clicked. Move the cursor to those fields and edit according to the limits that are listed with each parameter.

If invalid entries are made in any of the edit fields, warning_popups will appear that describe the invalid value, display the valid range, or explain the proper correlation between various columns that must exist. Click on the Continue box of the warning_popup to return to the RPG Product Generation Table Editor window.

Once the desired changes have been made for that window, move the cursor to the top line of the window. There are three buttons that are now sensitized: Close, Save, and Undo.

If the user is in the Current Generation list, clicking on the Close button first will bring up a warning_popup that states: “Did you want to save changes to the current generation table?” Click on either Yes or No. The user is then returned to the RPG Products window. Clicking on the Save button will bring up the same warning_popup; the user remains at the Editor window and both the Save and Undo buttons are grayed-out and desensitized. Clicking on the Undo button removes the changes, grays-out and desensitizes the Save and Undo buttons, and leaves the user at the Editor window. Once the Save and Undo buttons are grayed-out and desensitized, the Base-

line: Restore and Update buttons become sensitized and available to the operator. Clicking on the Close button now will close the Editor and return the user to the RPG Products window with no other warning_popup windows.

If the user is in the Precip, Clear Air, or Maintenance table, clicking on the Close button first will bring up a warning_popup that states: “Do you want to save changes to the Precip Mode (A) / Clear Air Mode/Maintenance Mode generation table?” Click on either Yes or No. The Editor is closed and the user is returned to the HCI. Clicking on the Save button will bring up the same warning_popup, but the user remains at the Editor window. The Save and Undo buttons are grayed-out and desensitized and the password protected fields are left open. When changes are made to the editable fields and the Return key pressed or another block clicked, the Save and Undo buttons become sensitized. Clicking on the Save button brings up a warning_popup that states: “Do you want to save changes to the Precip (A)/Clear Air (B)/Maintenance table?” Click on either Yes or No. The changes are either saved or not, and the user returned to the editor field with both the Save and Undo buttons still sensitized and the password protected fields are left open. Clicking on the Undo button removes the changes, grays-out and desensitizes the Save and Undo buttons, leaves the user at the Editor window, and leaves the password protected fields open. The Baseline: Restore and Update buttons become sensitized initially when the password has been successfully entered. This provides the user with the opportunity to restore or update previously entered data. Clicking on the Restore button will bring up a warning_popup that states: “You are about to replace the Precip (A)/Clear Air (B)/Maintenance table with baseline values. Do you want to continue?” Click on either Yes or No. Clicking on the Update button will bring up a warning_popup that states: “You are about to replace the baseline Precip (A)/Clear Air (B)/Maintenance table with new values. Do you want to continue?” Click on either Yes or No. Once data has been entered in any of these three tables, the Restore and Update buttons become grayed-out and desensitized until the changes have been saved. Once the changes have been saved, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized and function the same as described earlier in this paragraph. Once the Save and Undo buttons are grayed-out and desensitized, the Baseline: Restore and Update buttons become sensitized and available to the operator. Clicking on the Close button now will close the Editor and return the user to the RPG Products window with no other warning_popup windows.

2-3.13.2.1.3 Load Shed Products. Click on the block “Load Shed Products” and the RPG Product Priority (Load Shed Products) window opens. See Figure 2-48. RPG Product Priority (Load Shed Products). The top line has five buttons and the password protection padlock. The first button, Close, closes the window and returns the user to the RPG Products window if there have been no changes made. The next four buttons: Save, Undo, and Baseline: Restore, and Update are grayed-out and desensitized until the password is entered. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

ID	Code	Mode A	Mode B	Mode M	Product Description
1	9	255	255	255	Alert Message
3	16	56	56	56	Base Reflectivity: 8 level/0.54 nm
5	17	55	55	55	Base Reflectivity: 8 level/1.1 nm
7	18	54	54	54	Base Reflectivity: 8 level/2.2 nm
2	19	89	89	89	Base Reflectivity: 16 level/0.54 nm
4	20	88	88	88	Base Reflectivity: 16 level/1.1 nm
6	21	87	87	87	Base Reflectivity: 16 level/2.2 nm
12	22	53	53	53	Base Velocity: 8 level/0.13 nm
14	23	52	52	52	Base Velocity: 8 level/0.27 nm
16	24	51	51	51	Base Velocity: 8 level/0.54 nm
11	25	86	86	86	Base Velocity: 16 level/0.13 nm
13	26	85	85	85	Base Velocity: 16 level/0.27 nm
15	27	84	84	84	Base Velocity: 16 level/0.54 nm
8	28	60	60	60	Base Spectrum Width: 8 level/0.13 nm
9	29	59	59	59	Base Spectrum Width: 8 level/0.27 nm
10	30	58	58	58	Base Spectrum Width: 8 level/0.54 nm
56	31	57	57	57	User Selectable Storm Total Precipitation: 16 level/1.1 nm
57	32	57	57	57	Digital Hybrid Scan Reflectivity: 256 level/0.54 nm
58	33	57	57	57	Hybrid Scan Reflectivity: 16 level/0.54 nm
119	34	99	99	99	Clutter Filter Control: 8 level/1.0 km
24	35	48	48	48	Composite Reflectivity: 8 level/0.54 nm

Figure 2-48. RPG Product Priority (Load Shed Products)

The second line contains a Search Block and three Sort by categories: Product Code, Product MNE, or Description. To perform a search, move the cursor to the box just to the right of the title "Search:" and click. Then, using the alphanumeric keyboard, type in the text string (word, phrase, letters, or numbers) that will be used to search through the Product Description and press the Return key. The table below the Search block will then refresh with only the products that match the search. In order to return back to the full listing, delete the text string and press the Return key. To the right of the search block is the Sort by: capability with three options: Product Code, Product MNE, or Description. Click on the button to the left of the sort description or on the title itself. The button will turn white and the table below will be resorted accordingly. The Product Code sorts the products in alphabetical order. The Product MNE sorts the products in numerical sequence. The Description sorts the products in alphabetical order based on the product description.

The table initially contains the following information: Product MNE, Product Code, Mode A, Mode B, Mode M, and Product Description. Once the password protected blocks have been opened, the Product MNE column turns to Product ID, the Sort by: Product MNE turns to Sort by: Product ID, and the rank ordering of the products for each mode can now be changed. Once the password has been successfully entered, the first column of information changes from Product MNE to Product ID and the search option changes from Product MNE to Product ID. Once the password protected blocks have been opened, the rank ordering of the products for each mode can be changed. The valid range for making changes is from 0 to 254. The smaller the number, the higher the priority. Click on the desired block, enter the new desired number, and then click in another block, press the Return key, click on any control button. If the number is accepted, there will be no warning_popup window. If the number exceeds the range, then a warning_popup opens that states: "An invalid priority of XXXXX was entered. The valid range is 0 to 254." XXXXX is the invalid entry. Click on the Continue button and the invalid entry will be deleted, the former value restored, and the user returned to the area to attempt another change.

To scroll through the table, use the vertical scroll bar along the right hand margin. To display more text on a particular line, use the horizontal scroll bar along the bottom of the window.

Once any desired changes have been made, the Close, Save, and Undo buttons are sensitized and functional. The Baseline: Restore and Update buttons have been grayed-out and desensitized. If the user clicks on the Close button at this time, a warning_popup opens that states: "Do you want to save changes you made to the priority table?" Click on either Yes or No. If Yes, the changes are saved and the user returned to the HCI. If No, the user will be returned to the HCI without any changes being saved.

Clicking on the Save button will bring up a warning_popup that states: "Do you want to save changes you made to the priority table?" Click on either Yes or No. If Yes, the changes will be saved, the user returned to the RPG Product Priority window, and the Save and Undo buttons are grayed-out and desensitized. Clicking on the Close button now closes the window and returns the user to the RPG Products window with no warning_popup. If No, the changes are not saved and the user returned to the RPG Product Priority window, but the edited changes are still in the table. Clicking on the Close button calls up a warning_popup window that states: "Do you want to save changes you made to the priority table?" Click Yes or No. The changes are saved or not, depend-

ing on the user's response, and the user is returned to the RPG Products window.
Click on the Undo button to delete all the changes that have been made, restore the previous values, grayed-out and desensitize the Save and Undo buttons, and remain at the RPG Product Priority window. Clicking on the Close button now closes the window and returns the user to the RPG Products window with no warning_popup.

Once the Save and Undo buttons are grayed-out and desensitized, the Baseline: Restore and Update buttons become sensitized and available to the operator. Click on the Baseline Restore button to restore all values back to the baseline values. A warning_popup opens that states: "You are about to restore the product priority adaptation data to baseline values. Do you want to continue?" Click on either Yes or No. If Yes, the values are restored to the baseline values. If No, then no changes are made and the user returns to the RPG Product Priority window.

Click on the Baseline Update button to change the baseline values to include the changes that were just been made. A warning_popup opens that states: "You are about to replace the baseline product priority adaptation data values. Do you want to continue?" Click on either Yes or No. If Yes, the baseline values are changed and the user returns to the RPG Product Priority window. If No, then no changes are made and the user returns to the RPG Product Priority window.

2-3.13.2.1.4 Selectable Parameters. Click on the "Selectable Parameters" button and the Edit Selectable Product Parameters window opens. See Figure 2-49. Edit Selectable Product Parameters. The top line has five buttons and the padlock for the password protected entries. The first button, Close, closes the window and returns the user to the RPG Products window. The four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

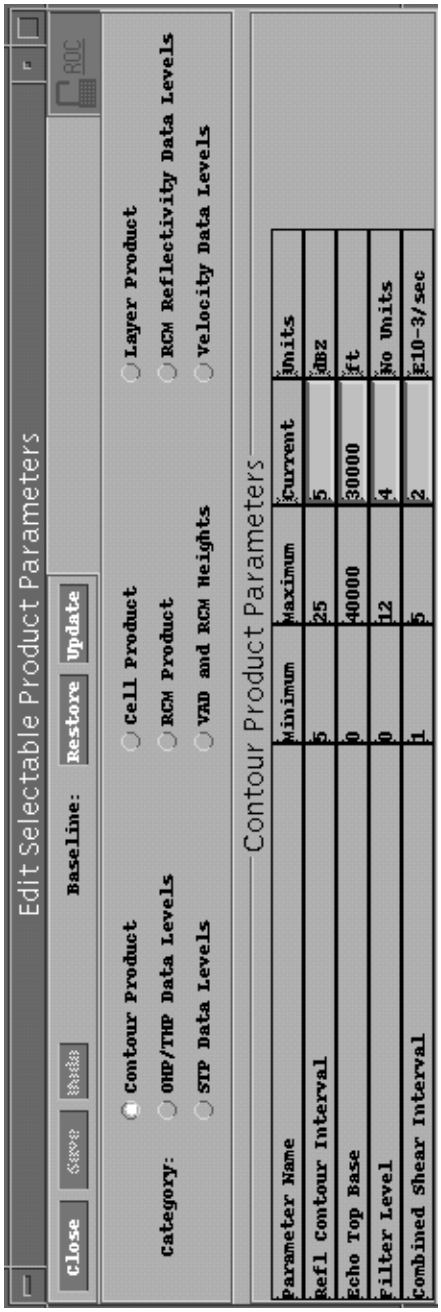


Figure 2-49. Edit Selectable Product Parameters

The second block contains the nine categories of parameters that can be viewed as is or edited once the password has been accepted. These categories are: Contour Products, One Hour Precipitation (OHP)/Three Hour Precipitation (THP) Data Level, Storm Total Precipitation (STP) Data Levels, Cell Product, Radar Coded Message (RCM) Product, VAD and RCM Heights, Layer Product, RCM Reflectivity Data Levels, and Velocity Data Levels. To view the parameters, click on the button to the left of each title (or on the title itself), the button turns to white, and the table below this block is refreshed with the appropriate parameters.

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

To modify the various parameters, move the cursor to the desired spot and click. Using the numeric keyboard, enter in the appropriate value. Then move the curser to another location and click. If the value is within the range allowed for that box, it will be temporarily accepted while the operator edits another box. If the value is not within the range allowed, a warning_popup will appear that states: “XXX is not valid, numeric value must be between AA and BB.” (XXX is the value just entered, AA is the lowest acceptable value and BB is the highest acceptable value.) Click on the Continue button, the original value of the box will be restored, and the user is returned to the same area in the Edit Selectable Product Parameters window.

Once any desired changes have been made, the Close, Save, and Undo buttons are now sensitized and functional. The Baseline: Restore and Update buttons have been grayed-out and desensitized. If the user clicks on the Close button at this time, a warning_popup opens that states: “You modified selectable parameters but did not save your changes. Do you want to save your changes?” Click on either Yes or No. If Yes, the changes are saved and the user returned to the HCI. If No, the changes are not saved and the user returned to the HCI.

Clicking on the Save button after allowable changes have been made will bring up a warning_popup that states: “Do you want to save your changes?” Click on either Yes or No. If Yes, the changes will be saved, the user returned to the Edit Selectable Product Parameters window, and the Save and Undo buttons are grayed-out and desensitized. Clicking on the Close button now closes the window and returns the user to the RPG Products window with no warning_popup. If No, the changes are not saved and the user is returned to the Edit Selectable Product Parameters window, but the edited changes are still in the table. Clicking on the Close button calls up a warning_popup window that states: “You modified selectable parameters but did not save your changes. Do you want to save your changes?” Click on either Yes or No. If Yes, the changes will be saved and the user returned to the HCI. If No, the changes are not saved and the user returned to the HCI.

Click on the Undo button to delete all the changes that have been made, restore the previous values, grayed-out and desensitize the Save and Undo buttons, and remain at the Edit Selectable Product Parameters window. Clicking on the Close button now closes the window and returns the user to the RPG Products window with no warning_popup.

Click on the Baseline Restore button to restore all values on that window back to the baseline values. A warning_popup opens that states: “You are about to restore the product parameters adapta-

tion data to baseline values. Do you want to continue?" Click on either Yes or No. If Yes, the values are restored to the baseline values and the user returned to the Edit Selectable Product Parameters window. If No, then no changes are made and the user returned to the Edit Selectable Product Parameters window.

Once the Save and Undo buttons are grayed-out and desensitized, the Baseline: Restore and Update buttons become sensitized and available to the operator. Click on the Baseline Update button to change the baseline values with the changes that have been just made. A warning_popup opens that states: "You are about to replace the baseline product parameters adaptation data values. Do you want to continue?" Click on either Yes or No. If Yes, the baseline values are changed and the user returned to the Edit Selectable Product Parameters window. If No, then no changes are made and the user returned to the Edit Selectable Product Parameters window.

Each of the nine categories are now discussed in detail.

2-3.13.2.1.4.1 Contour Product Parameters. The Contour Product Parameters window is the first window that opens when the Selectable Parameters button is clicked once. See Figure 2-50. Contour Product Parameters. There will be a white button to the left of the Contour Product title. Open the edit fields by entering the appropriate password. The four parameters that can be changed are: Reflectivity Contour Interval, Echo Top Base, Filter Level, and Combined Shear Interval. Click the cursor onto the highlighted blocks for the parameter that is to be changed. Using the keyboard, enter in the desired numerical value. The allowable ranges are just to the left under the Minimum and Maximum columns. Under the Current column, up to five digits can be entered. Once the desired figure has been entered, click to the next entry. If the figure is within the allowable range, then the user can continue with the next entry. If the figure is outside the allowable range, a warning_popup opens that states: "DDD is out of range, must be in the range AA <= X <= BB" where DDD is the value just entered, AA is the Minimum value, X is the allowable value, and BB is the Maximum value. Click on the Continue button and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore, or Update the parameters.

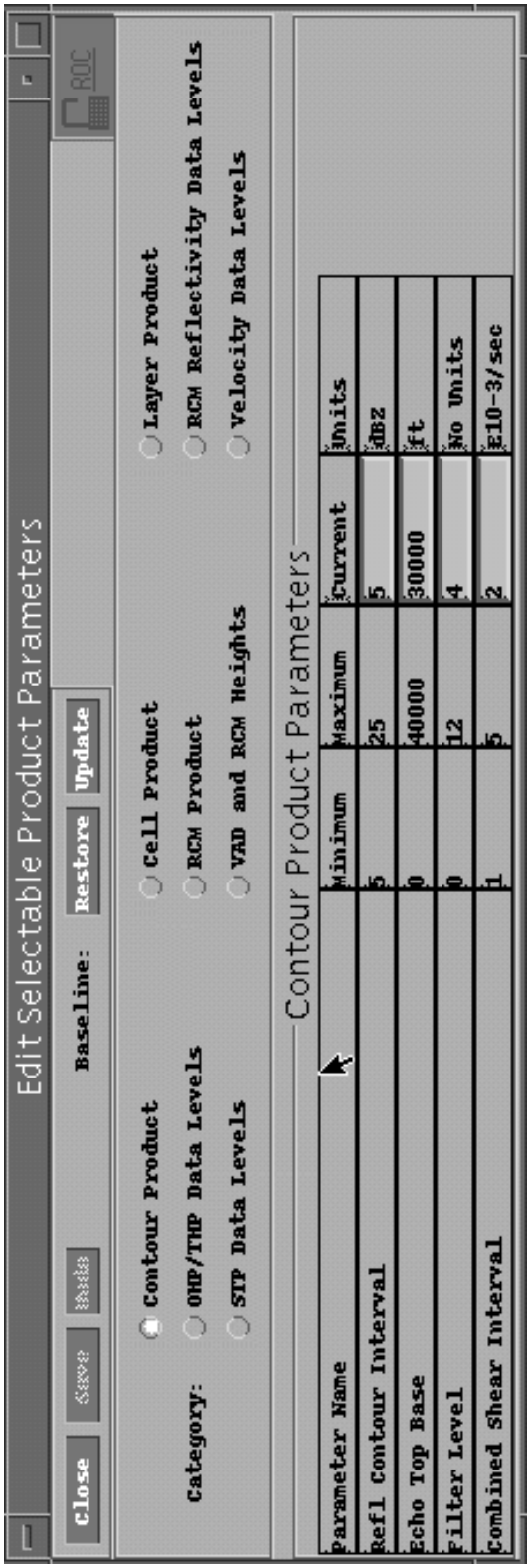


Figure 2-50. Contour Product Parameters

2-3.13.2.1.4.2 OHP/THP Data Levels. Click the button or the OHP/THP Data Levels Title. The button will turn white and the OHP/THP Data Levels window opens. See Figure 2-51. OHP/THP Data Levels. Using the password procedures, open the edit fields. The permissible value range is from 0.00 to 12.70 inches in multiples of 0.05. Using the keyboard, enter in the desired numerical value. The value entered represents the minimum value of the data level. Any number that is not an even multiple of 0.05 will be rounded down to the next lowest x.x5 value. Under the Current column, up to five digits can be entered. If a value outside the overall limits of 0.00 to 12.7 inches is entered, a warning_popup opens that states: "DDDD.D is out of range, must be in the range 0.00 <= X <= 12.7" where DDDD.D is the value just entered and X is the allowable range. Click on the Continue button. The user is returned to the OHP/THP Data Levels window. Once the desired value has been entered, click to the next entry. If the value is within the allowable range, then the user can continue with the next entry. If the value is outside the allowable range, a warning_popup opens that states: "DDD is not valid for data code element AA, it must be greater than BB and less than CC" where DDD is the value just entered, AA is the data code currently being edited, BB is the value of the data code below AA, and CC is the value of the data code above AA. Click on the Continue button and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

Editing changes to the OHP/ THP data levels can be somewhat cumbersome if the desired values fall outside the current ranges of each level. For significant changes in this table, it is recommended to start at the LARGEST DATA LEVEL to be changed and make the desired changes downward to the smallest data level.

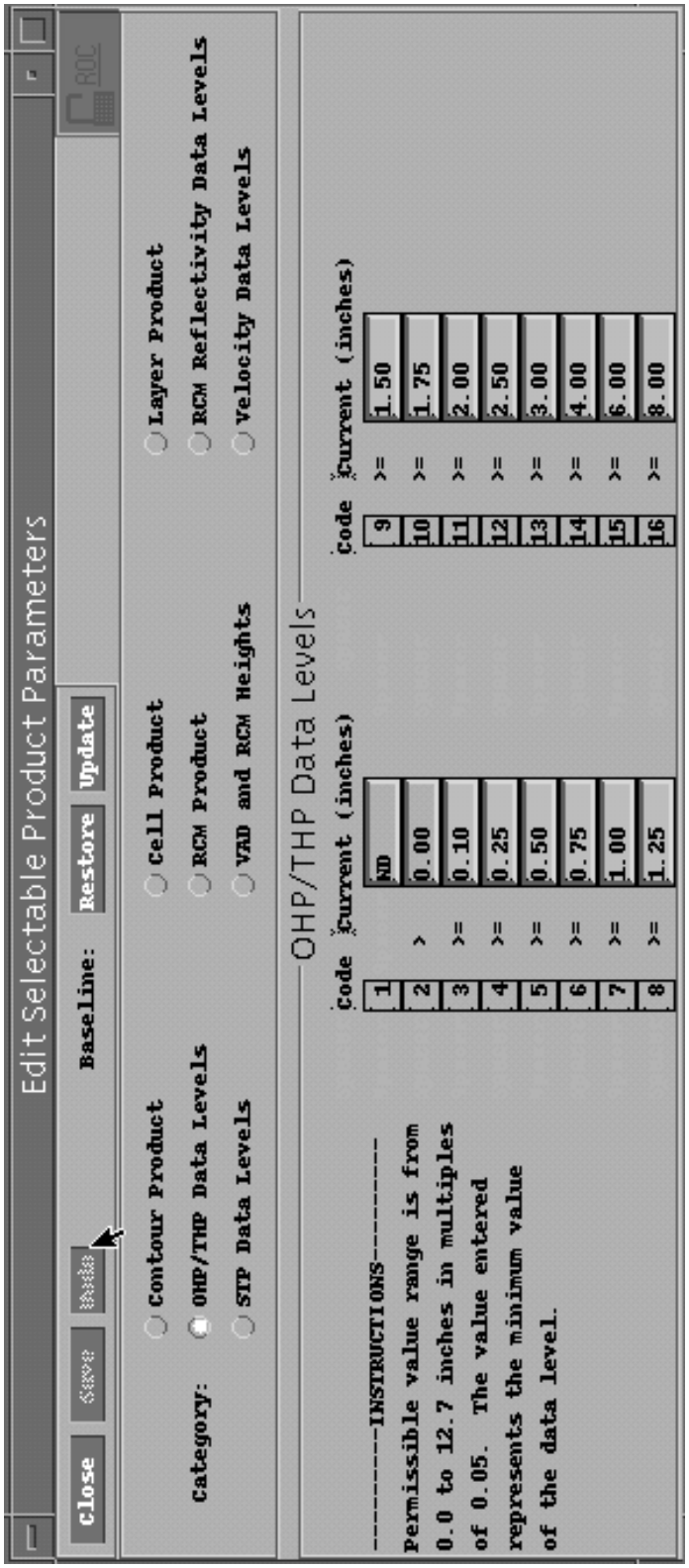


Figure 2-51. OHP/THP Data Levels

2-3.13.2.1.4.3 STP Data Levels. Click on the button or the STP Data Levels title. The button will turn white and the STP Data Levels window opens. See Figure 2-52. STP Data Levels. Using the password procedures described earlier, open the edit fields. The permissible value range is from 0.1 to 25.4 inches in multiples of 0.1. Using the keyboard, enter in the desired numerical value. The value entered represents the minimum value of the data level. Under the Current column, up to four digits can be entered. If a value outside the overall limits of 0.05 to 25.4 inches is entered, a warning_popup opens that states: "DDDD.D is out of range, must be in the range 0.00 <= X <= 25.4" where DDDD.D is the value just entered and X is the allowable range. Click on the Continue button. The user is returned to the STP Data Levels window. Once the desired value has been entered, click to the next entry. If the value is within the allowable range, then the user can continue with the next entry. If the value is outside the allowable range, a warning_popup opens that states: "DDD is not valid for data code AA, it must be greater than BB and less than CC" where DDD is the value just entered, AA is the data code currently being edited, BB is the value of the data code below AA, and CC is the value of the data code above AA. Click on the Continue button and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, Baseline Restore, or Baseline Update the parameters.

Editing changes to the STP data levels can be somewhat cumbersome if the desired values fall outside the current ranges of each level. For significant changes in this table, it is recommended to start at the LARGEST DATA LEVEL to be changed and make the desired changes downward to the smallest data level.

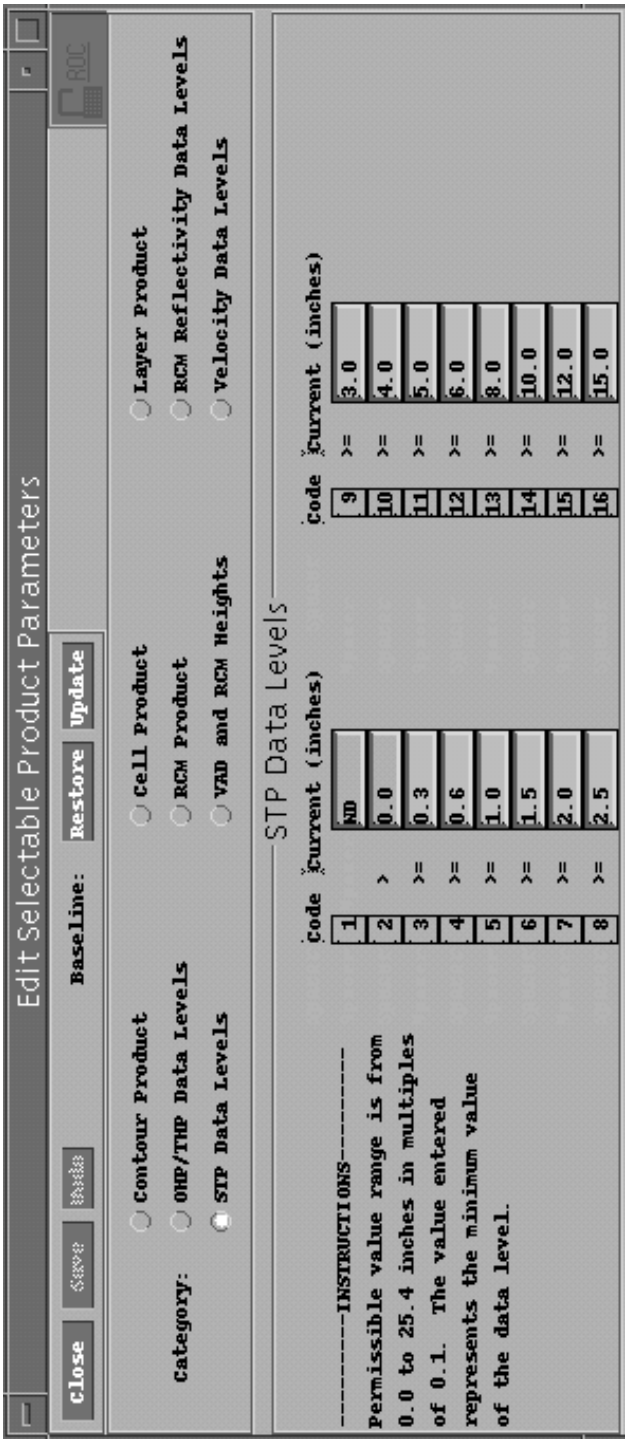


Figure 2-52. STP Data Levels

2-3.13.2.1.4.4 Cell Product Parameters. Click on the button or the Cell Product title. The button will turn white and the Cell Product window opens. See Figure 2-53. Cell Product Parameters. Using the password procedures, open the edit fields. There are six values that can be modified on this window. They are the Max Cells in the STI, SS, and Hail Alphanumeric products and the Max Cells in the STI, Combined, and Hail Attribute Tables. Click the cursor in the highlighted blocks for the parameters that are to be changed. Using the keyboard, enter the desired numerical value. The allowable ranges are just to the left under the Minimum and Maximum columns. Under the Current column, up to eight digits can be entered. Once the desired value has been entered, click to the next entry. If the value is within the allowable range, then the user can continue with the next entry. If the value is outside the allowable range, a warning_popup opens that states: “DDD is out of range, must be in the range AA <= X <= BB” where DDD is the value just entered, AA is the Minimum value, X is the allowable value, and BB is the Maximum value. Click on the Continue button and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

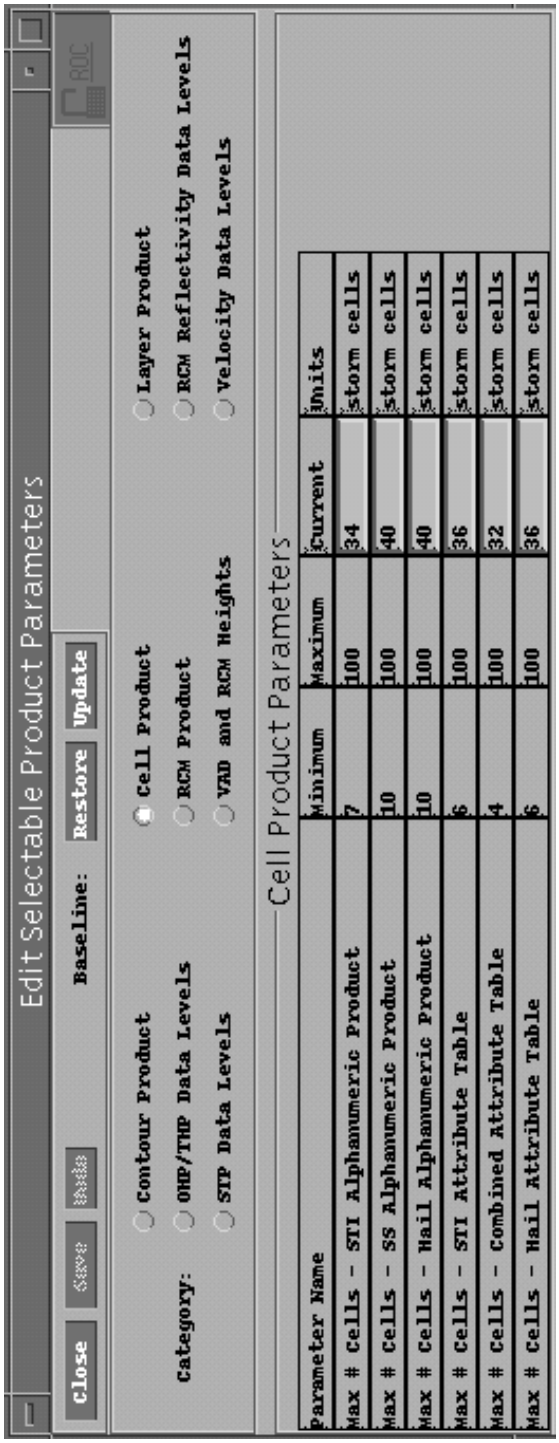


Figure 2-53. Cell Product Parameters

2-3.13.2.1.4.5 RCM Product Parameters. Click on the button or the RCM Product title. The button will turn white and the RCM Product Parameters window opens. See Figure 2-54. RCM Product Parameters. Using the password procedures described earlier, open the edit fields. There are seven values that can be modified. These are Range Threshold, Centroid Count, Edit Decision Time, Edit Time-Out, Product Generation Time 1, and Product Generation Time 2. Click the cursor onto the highlighted blocks for the parameters that are to be changed. Using the keyboard, enter in the desired numerical value. The allowable ranges are just to the left under the Minimum and Maximum columns. Under the Current column, up to eight digits can be entered. Once the desired figure has been entered, click to the next entry. If the figure is within the allowable range, then the user can continue with the next entry. If the figure is outside the allowable range, a warning_popup opens that states: “DDD is out of range, must be in the range AA <= X <= BB” where DDD is the value just entered, AA is the Minimum value, X is the allowable value, and BB is the Maximum value. Click on the Continue button and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

On the bottom of this window are three check blocks that act as toggles (on and off). These are Restrict Class IV, Generation Time 1, and Generation Time 2. Click on the square box or the title itself to toggle this value on or off. When the block is white with a black check mark, it is activated. When it is the background color with no check mark, it is not activated. The Restrict Class IV switch, when on, restricts the distribution of the unedited RCM messages from the RPG to the Class IV users. The Generation Time 1, when on, activates the sending of the RCM product at the specific time identified in the table above. The Generation Time 2, when on, activates the sending of the RCM product at the specific time identified in the table above. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

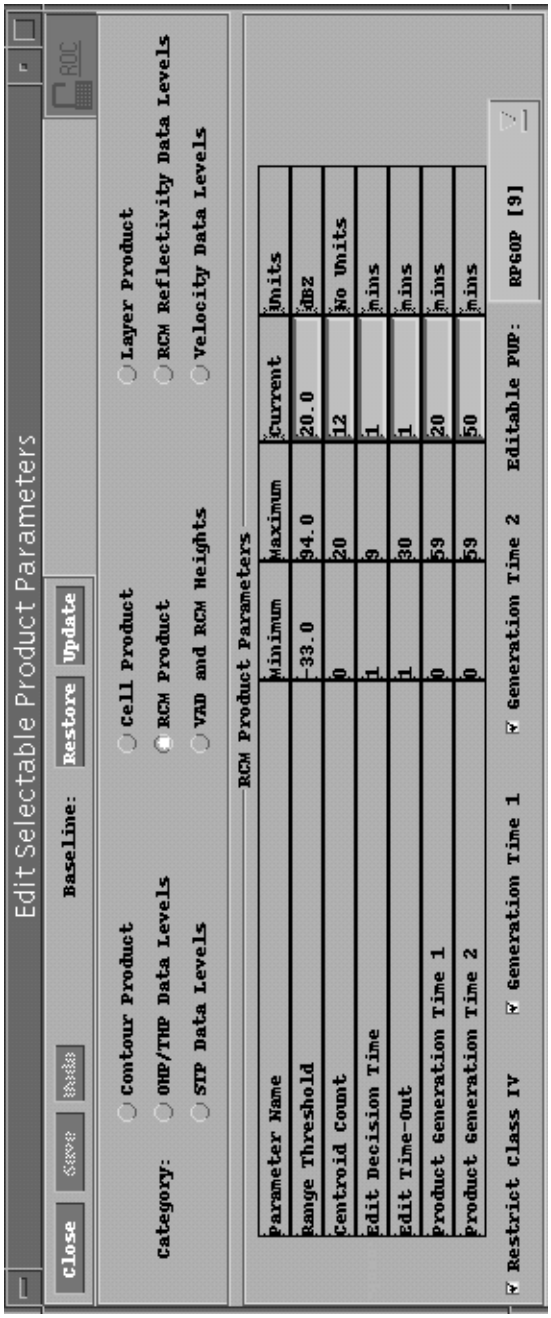


Figure 2-54. RCM Product Parameters

In the lower right hand corner of the RCM Product window is a pull down table that identifies the Editable PUP: This represents the PUP at which the operator can edit the RCM See Figure Figure 2-55. Editable PUP Menu. Click on the down arrow to display the menu. Then click on the desired PUP name and it will appear to the right of the Editable PUP: title when the table pulls up. Pull down the menu a second time and the current selection with be highlighted by a black background.

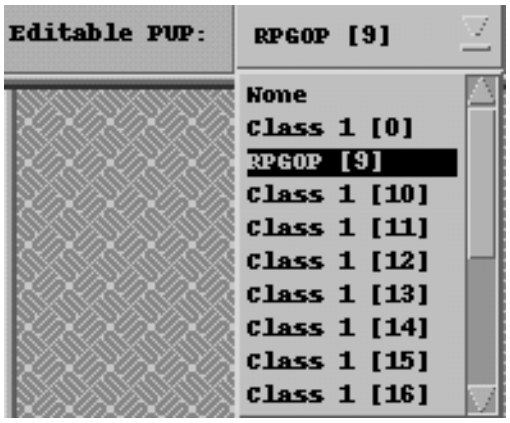


Figure 2-55. Editable PUP Menu

2-3.13.2.1.4.6 <u>VAD and RCM Heights Selections</u>. Click on the button or the VAD and RCM Heights title. The button will turn white and the VAD and RCM Heights Selections window opens. See Figure 2-56. VAD and RCM Heights Selections. Using the password procedures described earlier, open the edit fields. Height levels are represented in thousands of feet (Kft), from 1,000 ft to 70,000 ft. For sites at elevations above 1,000 ft, the level(s) below their elevation height will be grayed-out and desensitized. Instead, using the mouse, each block under the VAD and RCM columns can be turned on or off as a toggle switch for each 1,000 ft level. Select the heights desired with the cursor and click. Up to 30 VAD height levels can be selected. Up to 19 RCM height levels can be chosen. An RCM level must be paired with a VAD height level. If an RCM height is selected that does not have the VAD height selected, the VAD height will automatically be selected, the block turns to white and the black check opens as long as the maximum numbers of VAD and RCM heights have not been exceeded. If more than 30 VAD heights are selected, a warning_popup window opens that states: “You have already reached the maximum number of VAD heights. Deselect a height and try again”. Click on the Continue button and the user will be returned to the previous window. The 31st VAD height has been deselected. If more than 19 RCM heights are selected, a warning_popup window opens that states: “You have already reached the maximum number of RCM heights. Deselect a height and try again”. Click on the Continue button and the user will be returned to the previous window. The 20th RCM height has been deselected. If an RCM height is selected that is not associated with a VAD height yet 30 VAD heights have already been selected, a warning_popup window opens that states: “You have reached the maximum number of VAD heights. RCM heights are paired with VAD heights. Deselect a heights and try again”. Click on the Continue button and the user will be returned to the previous window. The RCM height that had just been selected will be deselected. Once all changes have been made and they are within the allowable ranges, follow the procedures

described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

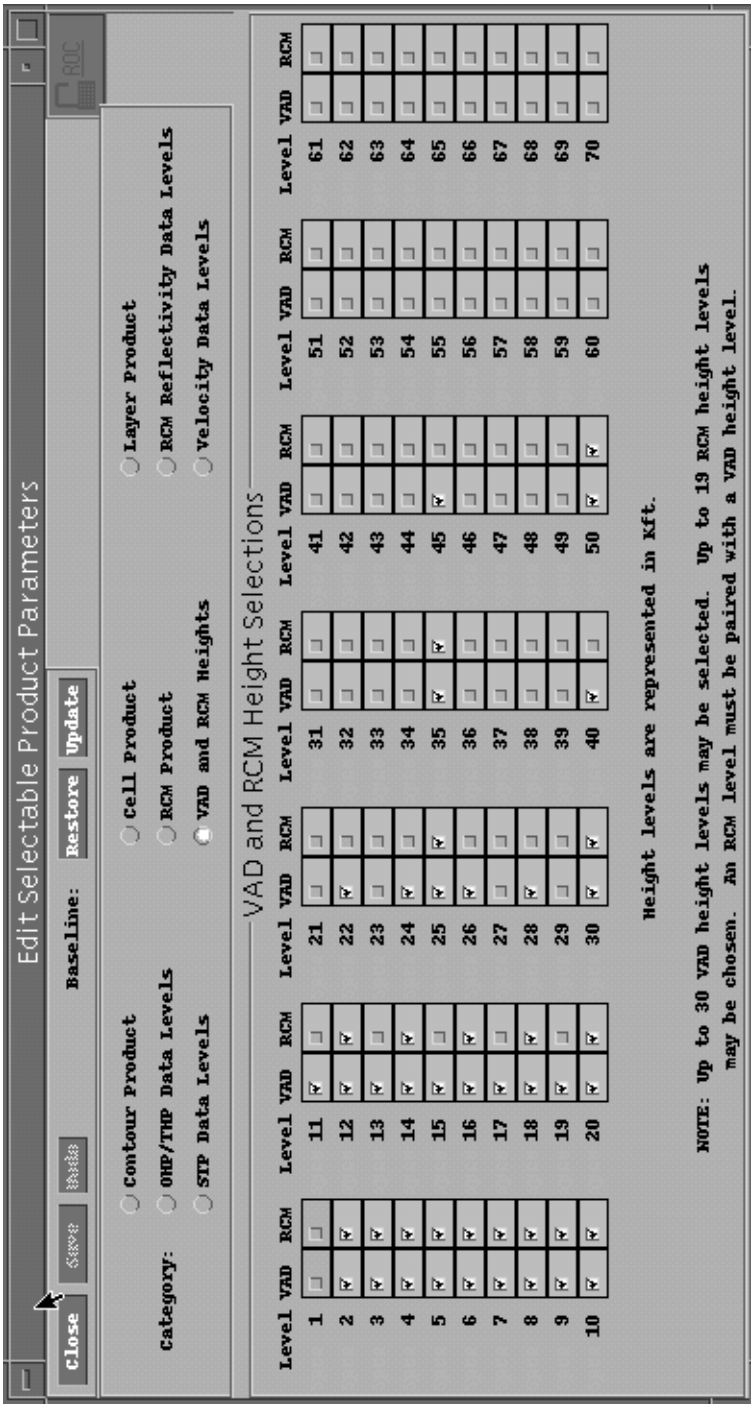


Figure 2-56. VAD and RCM Heights Selections

2-3.13.2.1.4.7 Layer Product Parameters. Click on the button or the Layer Product title. The button will turn white and the Layer Product window opens. See Figure 2-57. Layer Product Parameters. Using the password procedures described earlier, open the edit fields. There are five values that can be modified. These are Layer 0 Height, Layer 1 Height, Layer 2 Height, Layer 3 Height, and Range Limit. Click the cursor in the highlighted blocks for the parameter that is to be changed. Using the keyboard, enter in the desired numerical value. The allowable ranges are just to the left under the Minimum and Maximum columns. Under the Current column, up to eight digits can be entered. Once the desired value has been entered, click to the next entry. If the value is within the allowable range, then the user can continue with the next entry. If the value is outside the allowable range, a warning_popup opens that states: "DDD is out of range, must be in the range A <= X <= B" where DDD is the value entered, A is the Minimum value, X is the allowed value, and B is the Maximum value. Click on the Continue button, and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

For the Layer 0 height, if too low a value (in Kft) is entered, a warning_popup opens that states: "The first layer height must be above the RDA elevation and 6 Kft below the next layer." Click on the Continue button and the user is returned to the Layer Product window.

For the remainder of the layer heights, if the user enters a value that is within 6 Kft of either layer above or below, a warning_popup opens that states: "The layer height must be at least 6 Kft from the adjacent layers." Click on the Continue button and the user is returned to the Layer Product Parameter window.

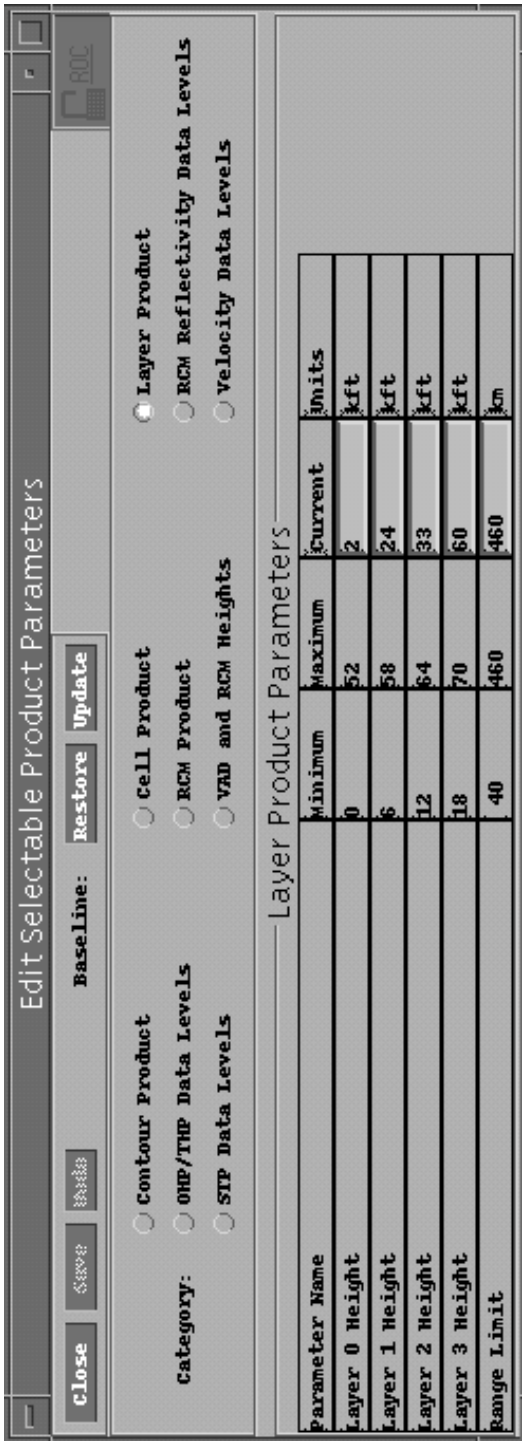


Figure 2-57. Layer Product Parameters

2-3.13.2.1.4.8 RCM Reflectivity Data Levels. Click on the button or the RCM Reflectivity Data Levels title. The button will turn white and the RCM Reflectivity Data Levels window opens. See Figure 2-58. RCM Reflectivity Data Levels. Using the password procedures described earlier, open the edit fields. Seven values can be entered. Reflectivity Data values range from -33.0 to 95.0 dBZ. Each of the seven cutoff values are identified by a code, 1 through 7, and the values are the lower (inclusive) cutoff value. Code 1 is always No Data (ND). Codes 2 through 7 are selectable by the user. Click the cursor in the highlighted blocks for the parameter that is to be changed. Using the keyboard, enter in the desired numerical value. Under the Current column, up to five digits can be entered. Once the desired value has been entered, click to the next entry. If the value is within the allowable range, then the user can continue with the next entry. If the figure is outside the allowable range of -33 to 95, a warning_popup opens that states: "XXX is out of range, it must be in the range -33<= X<=95." Click on the Continue button and the user will be returned to the same window. If the value is within the overall range but not within the range for that particular data code, then a different warning_popup opens that states: "XX is not valid for data code A, it must be greater than BB and less than CC." XX is the up to five digits just entered, A is the data code being modified, BB is the value of the data code below A, and CC is the value of the data code above A." Click on the Continue button, and the user will be returned to the previous window. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

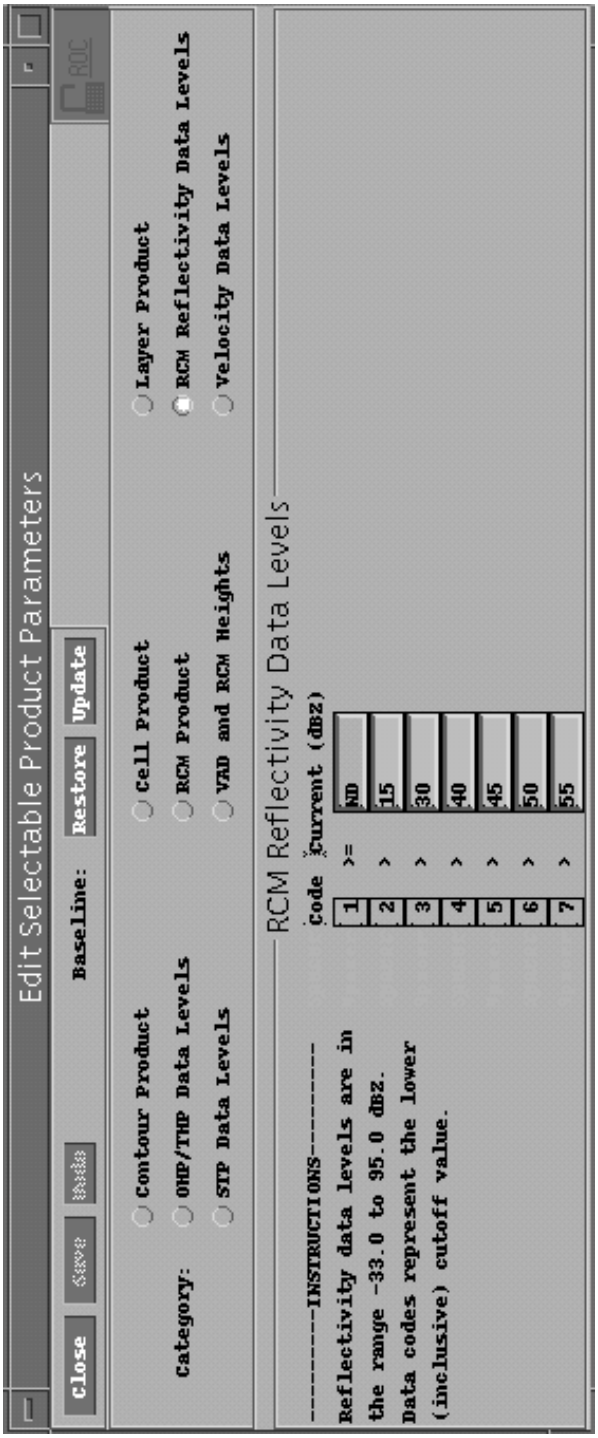


Figure 2-58. RCM Reflectivity Data Levels

2-3.13.2.1.4.9 Velocity Data Levels. Click on the button or the Velocity Data Levels title. The button will turn white and the Velocity Data Levels window opens. See Figure 2-59. Velocity Data Levels. Using the password procedures described earlier, open the edit fields. There are eight velocity tables to select from on the left center side of the window. The default table is Precip (16/0.97). The first value, 16, represents the number of color levels, and the second value, 0.97, represents the velocity increment. The other seven tables can be selected by selecting the button or title line and clicking. The other seven tables are Precip (16/1.94), Precip (8/.97), Precip (8/1.94) Clear Air (16/.97), Clear Air (16/1.94), Clear Air (8/.97), and Clear Air (8/1.94). Once the table has been selected from these eight, click to the highlighted edit boxes. Using the keyboard, enter in the desired numerical value. The permissible data range is from 2 Kts to 122 Kts. Under the Current column, up to six digits can be entered. Once the desired figure has been entered, click to the next entry. If the figure is within the allowable range, then the user can continue with the next entry. If the figure is outside the allowable range of 2 to 122, a warning_popup opens that states: “XXX is out of range, it must be in the range 2<=X<=122”. XXX is the value just entered. Click on the Continue button to return to the Current column. If the figure is inside the allowable range of 2 to 122 but outside the range of that respective box (higher than the previous block, lower to the following block), a warning_popup opens that states “XXX is not valid to data code A. It must be greater than BB and less than CC.” XXX is the value just entered. A is the data code being modified, BB is the lower limit, and CC is the upper limit. Click on the Continue button and the user will be returned to the Current column. Once all changes have been made and they are within the allowable ranges, follow the procedures described earlier to Close, Save, Undo, and Baseline: Restore or Update the parameters.

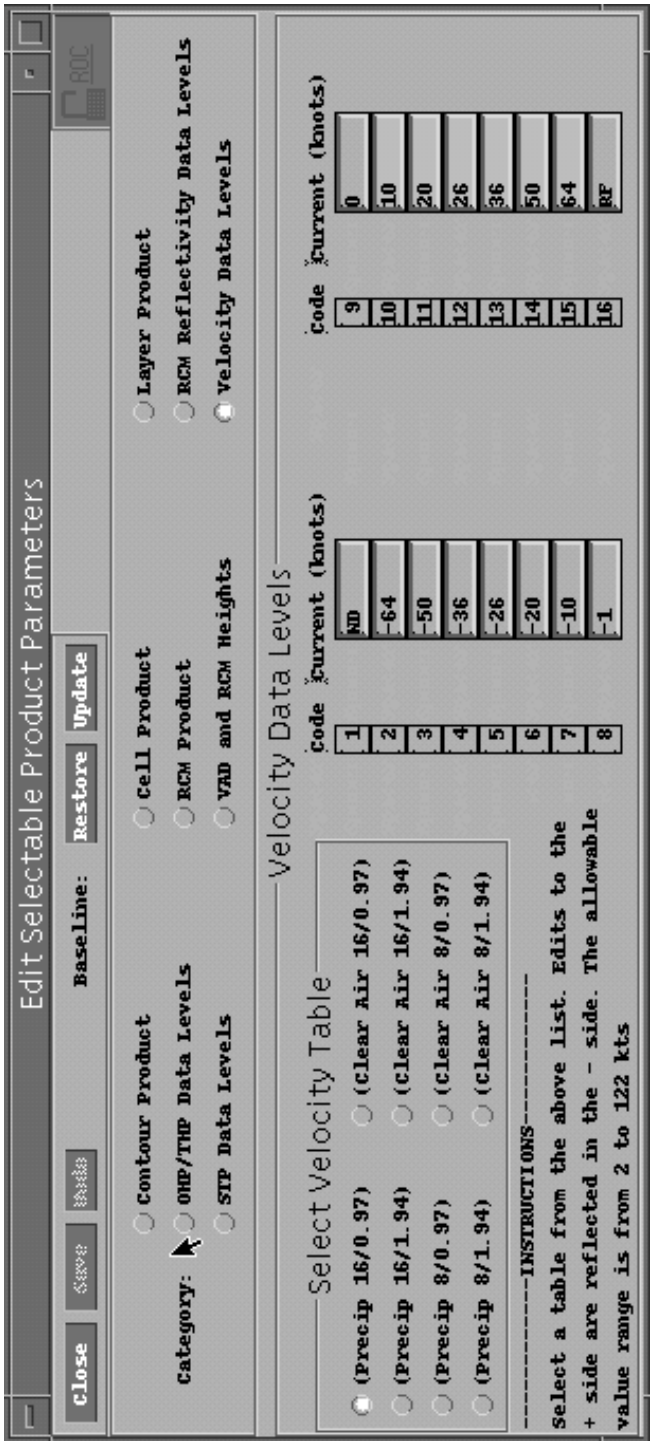


Figure 2-59. Velocity Data Levels

2-3.13.2.1.5 Algorithms. Clicking on the Algorithms button opens the Algorithms window. See Figure 2-60. Algorithms. The top line has five buttons and the padlock for the password protected entries. The first button, Close, closes the window and returns the user to the RPG Products window. The four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

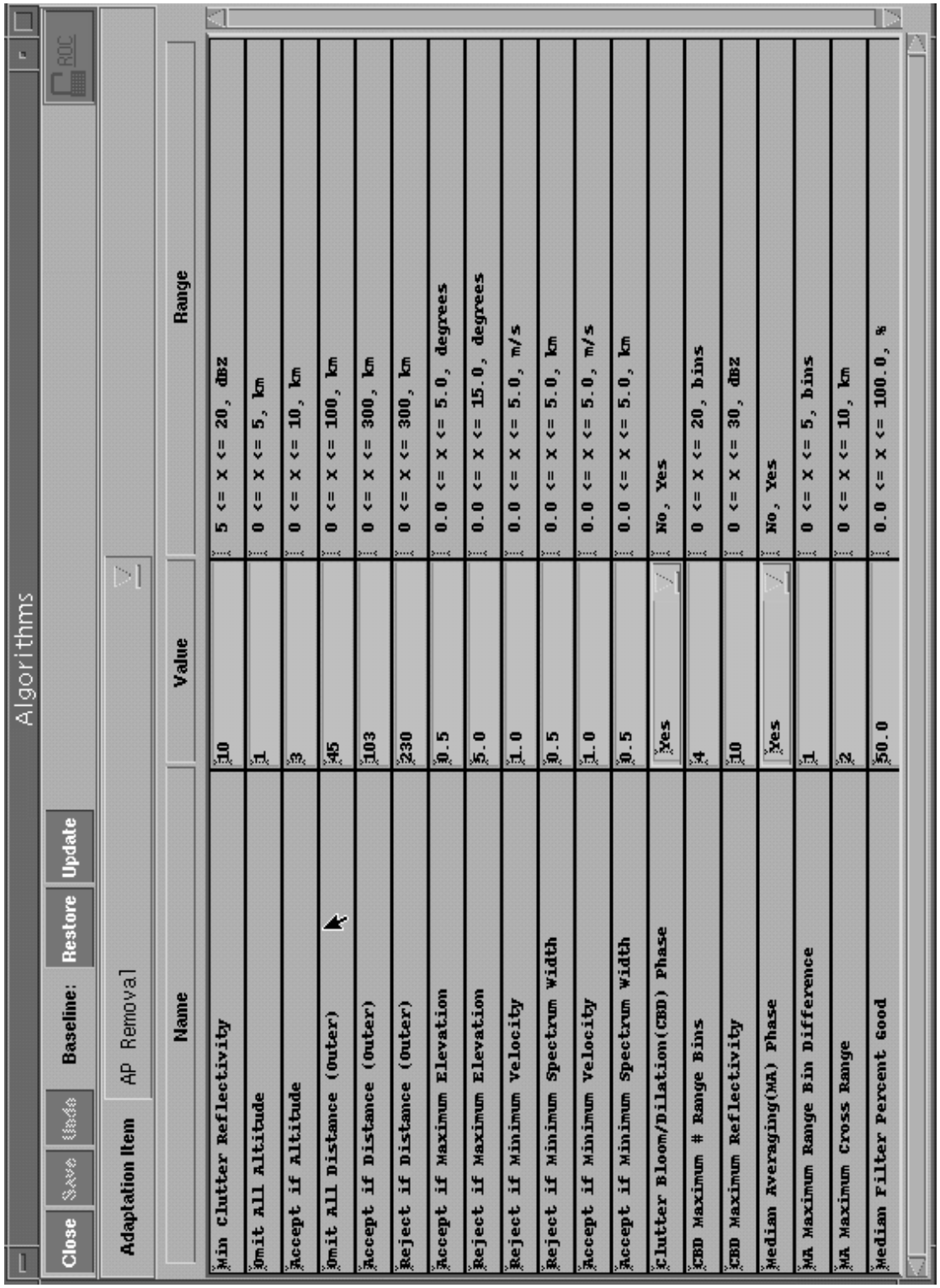


Figure 2-60. Algorithms

In order to just view the current values for each algorithm, move the cursor to the second line of the window to the title Adaptation Item, and go to the far right edge inside the background box on the down arrow. Click on this arrow to display a secondary pull-down menu that lists all the algorithms that are on file. See Figure 2-60.1 Algorithm Adaptation Item Pull Down Menu.

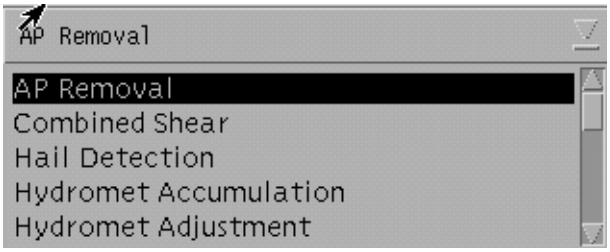


Figure 2-60.1 Algorithm Adaptation Item Pull Down Menu

By scrolling up and down on the bar on the right side, the user can review the entire list and select the algorithm of interest by clicking on the title. Clicking on that algorithm will put the title into the box labeled Adaptation Item, and refresh the original algorithm window to include all the names, current values, and ranges for the adaptation variables for that particular algorithm. There are presently nineteen algorithms that can be reviewed. The algorithms are individually displayed and the variable parameters discussed in Chapter 8, RPG Products - Algorithms of the Guidance on Adaptable Parameters Operator Handbook, Volume 4, RPG.

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

Enter the new desired value for the various algorithms using the keyboard and press the Return key. If the value falls within the accepted range, then no messages appear but the Save and Undo buttons on the top row become sensitized. If the value (XX) falls outside the accepted range, a warning_popup window opens that states: “XX should be between AA and BB.” Click on the Continue button and the cursor returns to the block where the incorrect value was originally entered. AA and BB are listed in the third column as the allowable range that can be entered.

Once any desired changes have been made and are within the allowable ranges, the Close, Save, and Undo buttons are now sensitized and functional. The Baseline: Restore and Update buttons have been grayed-out and desensitized. The Close button will close the window. If the changes have not yet been saved, a warning_popup window opens that states: “You modified adaptable parameters. Do you want to save your changes?” Click on the desired response, Yes or No. In either case, the user is returned to the RPG Products window. The Save button saves the changes but first brings up a warning_popup window that states: “Are you sure you want to save your changes?” Click on the desired response, Yes or No. The Undo button, undoes all the changes without any warning_popup window. Clicking on Undo removes all the changes and desensitizes the Save and Undo buttons. The Restore button restores the values from the baseline files. Click on the Restore button and a warning_popup window opens that states: “Adaptable parameter modifica-

tions will be lost. Are you sure you want to restore from baseline?" Click on the desired response, Yes or No. The Update button takes the changes that have been made and updates the baseline values. Click on the Update button and a warning_popup window opens that states: "Are you sure you want to update baseline adaptation data?" Click on the desired response, Yes or No.

2-3.13.2.1.6 Saving Adaptation Data. There are separate adaptation data files at both the RPG and the MSCF. It is possible to save the files for both sites from either site. Below are the four sets of instructions that provide this capability to the user. The same diskette can be used at both locations as the file names automatically identify the RPG and MSCF adaptation data as two different files.

2-3.13.2.1.6.1 Saving RPG Adaptation Data from the RPG. At the RPG Terminal window, regular user account, perform the following steps:

1. At the Command line, enter:
   save_adapt_floppy<Return>

2. Feedback will consist of three lines:
   --->Saving Adaptation Data
   --->Insert a new floppy into the floppy drive
   --->Hit return when ready

3. Insert a new floppy into the floppy drive of the RPG

4. Press **<Return>**

5. Feedback will consist of the following:
   --->Mounting floppy
   --->Saving RPG adaptation data to /floppy/floppy0
   Saving RPG adaptation data...
   Saved adaptation data into rpg: /floppy/floppy0/adapt00001.site.rpg.date-time.Z

6. The user will now be returned to the command line.

7. To initiate the disk removal process, first enter the following command:
   eject<Return>

This places the adaptation data from a buffer zone onto the disk If the operator inadvertently pushed the manual button on the disk drive before entering this command, the files would not be transferred to the disk. The operator would have to insert the disk into the drive again and then type in the eject command.

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Label the diskette with the

title: RPG Adaptation Data Backup, RPG site, and the date. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the RPG or a new save needs to be performed.

2-3.13.2.1.6.2 Saving RPG Adaptation Data from the MSCF. At the MSCF Terminal window, regular user account, perform the following steps:

1. At the Command line, enter:
   save_adapt_floppy -o rpg<Return>

2. Feedback will consist of three lines:
   --->Saving Adaptation Data
   --->Insert a new floppy into the floppy drive
   --->Hit return when ready

3. Insert a new floppy into the floppy drive of the MSCF

4. Press **<Return>**

5. Feedback will consist of the following:
   --->Mounting floppy
   --->Saving RPG adaptation data to /floppy/floppy0
   Saving RPG adaptation data.
   Saved adaptation data into rpg: /floppy/floppy0/adapt00001.site.rpg.date-time.Z

6. The user will now be returned to the command line.

7. To initiate the disk removal process, first enter the following command:
   eject<Return>

This places the adaptation data from a buffer zone onto the disk If the operator inadvertently pushed the manual button on the disk drive before entering this command, the files would not be transferred to the disk. The operator would have to insert the disk into the drive again and then type in the eject command.

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Label the diskette with the title: RPG Adaptation Data Backup, RPG site, and the date. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the RPG or a new save needs to be performed.

2-3.13.2.1.6.3 Saving MSCF Adaptation Data from the RPG. At the RPG Terminal window, regular user account, perform the following steps:

1. At the Command line, enter:
   save_adapt_floppy -o mscf<Return>

2. Feedback will consist of three lines:
   ---->Saving Adaptation Data
   ---->Insert a new floppy into the floppy drive
   ---->Hit return when ready

3. Insert a new floppy into the floppy drive of the RPG

4. Press **<Return>**

5. Feedback will consist of the following:
   ---->Mounting floppy
   ---->Saving RPG adaptation data to /floppy/floppy0
   Saving RPG adaptation data...
   Saved adaptation data into rpg: /floppy/floppy0/adapt00001.site.mscf.date-time.Z

6. The user will now be returned to the command line.

7. To initiate the disk removal process, first enter the following command:
   eject<Return>

This places the adaptation data from a buffer zone onto the disk If the operator inadvertently pushed the manual button on the disk drive before entering this command, the files would not be transferred to the disk. The operator would have to insert the disk into the drive again and then type in the eject command.

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Label the diskette with the title: MSCF Adaptation Data Backup, RPG site, and the date. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the MSCF or a new save needs to be performed.

2-3.13.2.1.6.4 Saving MSCF Adaptation Data from the MSCF. At the MSCF Terminal window, regular user account, perform the following steps:

1. At the Command line, enter:
   save_adapt_floppy<Return>

2. Feedback will consist of three lines:
   ---->Saving Adaptation Data
   ---->Insert a new floppy into the floppy drive

--->Hit return when ready

3. Insert a new floppy into the floppy drive of the MSCF

4. Press **<Return>**

5. Feedback will consist of the following:
   --->Mounting floppy
   --->Saving RPG adaptation data to /floppy/floppy0
   Saving RPG adaptation data...
   Saved adaptation data into rpg: /floppy/floppy0/adapt00001.site.mscf.date-time.Z

6. The user will now be returned to the command line.

7. To initiate the disk removal process, first enter the following command:
   eject<Return>

This places the adaptation data from a buffer zone onto the disk If the operator inadvertently pushed the manual button on the disk drive before entering this command, the files would not be transferred to the disk. The operator would have to insert the disk into the drive again and then type in the eject command.

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Label the diskette with the title: MSCF Adaptation Data Backup, RPG site, and the date. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the MSCF or a new save needs to be performed.

2-3.13.2.1.7 Restoring Adaptation Data. There are separate adaptation data files at both the RPG and the MSCF. It is possible to restore the files for both sites from either site. Below are the four sets of instructions that provide this capability to the user.

2-3.13.2.1.7.1 Restoring RPG Adaptation Data from the RPG. At the RPG Terminal, regular user account, perform the following steps:

1. At the Command line, enter:
   restore_adapt_floppy<Return>

2. Feedback will consist of three lines:
   --->Restoring from Floppy
   --->Insert the adaptation backup floppy into the floppy drive
   --->Hit return when ready

3. Push the diskette with the adaptation data previously recorded into the RPG disk drive.

4. Press **<Return>**

5. Feedback will consist of the following:
   ---->Mounting floppy
   --->Restoring RPG adaptation data from /floppy/floppy0
   Restoring adaptation data...
   Restored adaptation data from rpg: /floppy/floppy0/adapt00001.site.rpg.date-time.Z
   The restored adaptation data will be used on the next application startup.

NOTE

There is no need to enter in the date/time of the most recent restored RPG adaptation data file. The software automatically looks at all the RPG adaptation data dates and selects the most recent one. Therefore the operator can use the same diskette for numerous saves of the adaptation data without any problem of older files being restored on the system.

6. The user will now be returned to the command line.

7. To get the floppy diskette out of the drive, enter the following command:
   eject<Return>

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the RPG or a new save needs to be performed.

10. To perform the next application startup, go to the RPG, open a terminal window, and at the user prompt, enter:
    mrpg shutdown <Return>

Wait for the State: box, center of HCI, top line above the RPG Box to turn red and read: State: SHUTDOWN.

The last line on the terminal window will read: RPG Processes are notified to shut down.

Then, at the user prompt, enter:
mrpg shutdown <Return>

When the State: box turns to green and reads: State: OPERATE, the operator is finished. This will incorporate the new adaptation data for the RPG and the MSCF.

2-3.13.2.1.7.2 Restoring RPG Adaptation Data from the MSCF. At the MSCF Terminal, regular

user account, perform the following steps:

1. At the Command line, enter:
   restore_adapt_floppy -o rpg<Return>

2. Feedback will consist of three lines:
   --->Restoring from Floppy
   --->Insert the adaptation backup floppy into the floppy drive
   --->Hit return when ready

3. Push the diskette with the adaptation data previously recorded into the MSCF disk drive.

4. Press **<Return>**

5. Feedback will consist of the following:
   --->Mounting floppy
   --->Restoring RPG adaptation data from /floppy/floppy0
   Restoring adaptation data...
   Restored adaptation data from rpg: /floppy/floppy0/adapt00001.site.rpg.date-time.Z
   The restored adaptation data will be used on the next application startup.

   NOTE

   There is no need to enter in the date/time of the most recent restored RPG adaptation data file. The software automatically looks at all the RPG adaptation data dates and selects the most recent one. Therefore the operator can use the same diskette for numerous saves of the RPG adaptation data without any problem of older files being restored on the system.

6. The user will now be returned to the command line.

7. To get the floppy diskette out of the drive, enter the following command:
   eject<Return>

8. Feedback will consist of the following:
   /vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the RPG or a new save needs to be performed.

10. To perform the next application startup, go to the RPG, open a terminal window, and at the user prompt, enter:
    mrpg shutdown <Return>

Wait for the State: box, center of HCI, top line above the RPG Box to turn red and read: State:

SHUTDOWN.

The last line on the terminal window will read: RPG Processes are notified to shut down.

Then, at the user prompt, enter:

mrpg shutdown <Return>

When the State: box turns to green and reads: State: OPERATE, the operator is finished. This will incorporate the new adaptation data for the RPG and the MSCF.

2-3.13.2.1.7.3 Restoring MSCF Adaptation Data from the RPG. At the RPG Terminal window, regular user account, perform the following steps:

1. At the Command line, enter:

   restore_adapt_floppy -o mscf<Return>

2. Feedback will consist of three lines:

   --->Restoring from Floppy
   --->Insert the adaptation backup floppy into the floppy drive
   --->Hit return when ready

3. Push the diskette with the adaptation data previously recorded into the RPG disk drive.

4. Press **<Return>**

5. Feedback will consist of the following:

   --->Mounting floppy
   --->Restoring RPG adaptation data from /floppy/floppy0
   Restoring adaptation data...
   Restored adaptation data from rpg: /floppy/floppy0/adapt00001.site.mscf.date-time.Z
   The restored adaptation data will be used on the next application startup.

   NOTE

   There is no need to enter in the date/time of the most recent restored MSCF adaptation data file. The software automatically looks at all the MSCF adaptation data dates and selects the most recent one. Therefore the operator can use the same diskette for numerous saves of the MSCF adaptation data without any problem of older files being restored on the system.

6. The user will now be returned to the command line.

7. To get the floppy diskette out of the drive, enter the following command:

   eject<Return>

8. Feedback will consist of the following:

   /vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the MSCF or a new save needs to be performed.

10. To perform the next application startup, go to the RPG, open a terminal window, and at the user prompt, enter:

mrpg shutdown <Return>

Wait for the State: box, center of HCI, top line above the RPG Box to turn red and read: State: SHUTDOWN.

The last line on the terminal window will read: RPG Processes are notified to shut down.

Then, at the user prompt, enter:

mrpg shutdown <Return>

When the State: box turns to green and reads: State: OPERATE, the operator is finished. This will incorporate the new adaptation data for the RPG and the MSCF.

2-3.13.2.1.7.4 Restoring MSCF Adaptation Data from the MSCF. At the MSCF Terminal, regular user account, perform the following steps:

1. At the Command line, enter:

restore_adapt_floppy<Return>

2. Feedback will consist of three lines:

--->Restoring from Floppy
--->Insert the adaptation backup floppy into the floppy drive
--->Hit return when ready

3. Push the diskette with the adaptation data previously recorded into the MSCF disk drive.

4. Press **<Return>**

5. Feedback will consist of the following:

--->Mounting floppy
--->Restoring RPG adaptation data from /floppy/floppy0
Restoring adaptation data...
Restored adaptation data from rpg: /floppy/floppy0/adapt00001.site.mscf.date-time.Z
The restored adaptation data will be used on the next application startup.

NOTE

There is no need to enter in the date/time of the most recent restored MSCF adaptation data file. The software automatically looks at all the MSCF adaptation data

dates and selects the most recent one. Therefore the operator can use the same diskette for numerous saves of the MSCF adaptation data without any problem of older files being restored on the system.

6. The user will now be returned to the command line.

7. To get the floppy diskette out of the drive, enter the following command:
eject<Return>

8. Feedback will consist of the following:
/vol/dev/rdiskette0/unnamed_floppy #1 can now be manually ejected

9. Removable Media Manager Window appears with the same text and an OK button. Click on the OK button and then push on the manual button to remove the diskette. Store the diskette in a safe, secure location where it can be easily retrieved in case the adaptation data needs to be restored on the MSCF or a new save needs to be performed.

10. To perform the next application startup, go to the RPG, open a terminal window, and at the user prompt, enter:
mrpg shutdown <Return>

Wait for the State: box, center of HCI, top line above the RPG Box to turn red and read: State: SHUTDOWN.

The last line on the terminal window will read: RPG Processes are notified to shut down.

Then, at the user prompt, enter:
mrpg shutdown <Return>

When the State: box turns to green and reads: State: OPERATE, the operator is finished. This will incorporate the new adaptation data for the RPG and the MSCF.

2-3.13.2.2 Display - Products in Database. Click on the Products in Database button and the Products in Database window opens. See Figure 2-61. Products in Database. The top line of the window contains the Close button in the upper left hand corner (which closes the window and returns the user to the RPG Products window) and a text string which describes the current volume number and its start date/time. This field is not editable by the operator. There are two buttons that are used to identify specific products. These are the Search Date/Time button and the Select Product button. Click on either of the two buttons.

If there are no products in the data base, the Products in Database window will not appear, but instead a warning_popup appears that states: "No Products in Database." Click on the Continue button, and the operator is returned to the RPG Products window. This warning_popup is not the Products in Database window and will not be replaced by it when products first exist in the products database. The operator must close the warning_popup and reselect the Products in database button. When the RPG is started with a clean database, the first products start appearing after the first ele-

vation cut is completed. In addition, once the product database contains products, the Products in Database window will only refresh itself at the start of each volume.

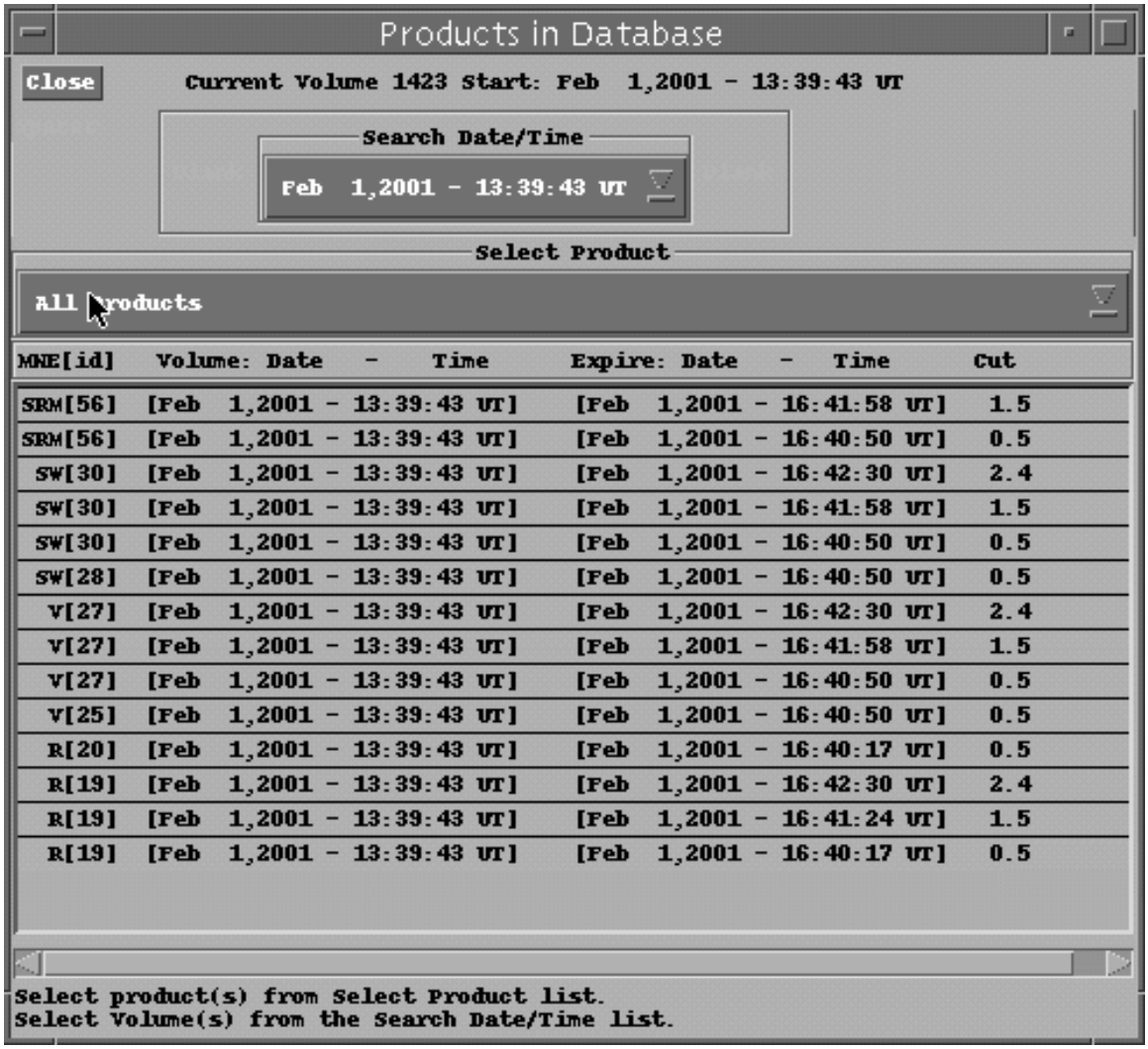


Figure 2-61. Products in Database

2-3.13.2.2.1 Search Date/Time Box. Move the cursor to the far right side of the box under the Search Date/Time title and click on the down arrow. This opens a drop down menu of options. Select the option desired by moving the cursor to the line and clicking. The selected line will be highlighted by changing to a white background with blue letters and display the products from that volume in the section in the middle of the page. The section contains the MNE (id.), Volume, Date, and Time, the Expiration: Date and Time, and the elevation Cut of the product where applicable.

2-3.13.2.2.2 Select Product Box. Move the cursor to the far right side of the box under the Select Product title and click on the down arrow. This opens a drop down menu of options. The default is All Products. Select the option desired by moving the cursor to the line and clicking. The selected

line will be highlighted by changing to a white background with blue letters and display the products on the section in the middle of the page.

2-3.13.3 RPG Status. Click on the Status button and the RPG Status window opens. See Figure 2-62. RPG Status. The top line consists of a Close button (which closes the window) and a Print Log Messages button.

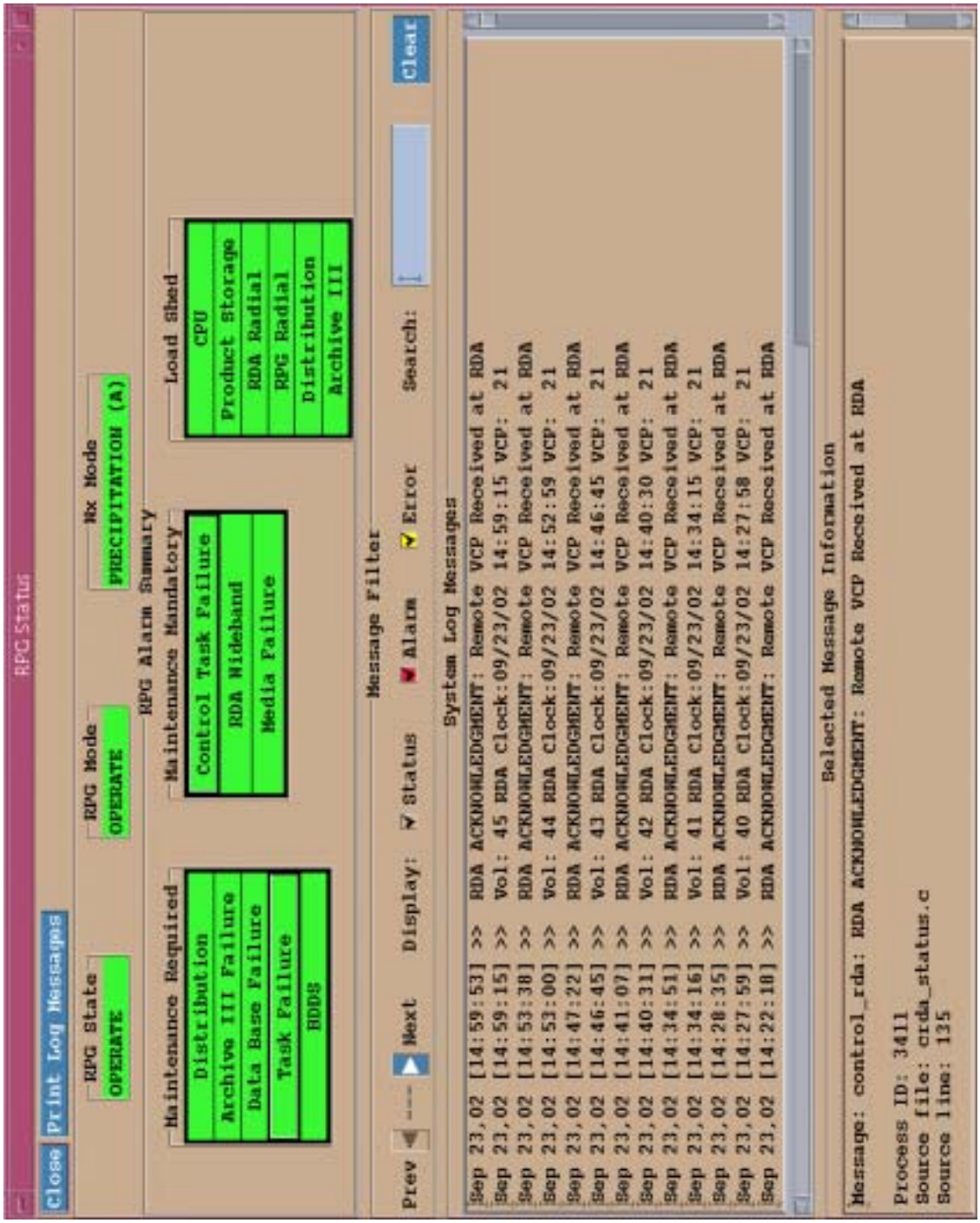


Figure 2-62. RPG Status

The first block of information contains three individual areas: RPG State, RPG Mode, and WX (Weather) Mode. These are color coded and automatically updated, but are not editable by the user. These three selections display the following information:

RPG State:	Background Color:
OPERATE	Green
TRANSITION	Yellow
STANDBY	Red
POWER FAIL	Red
SHUTDOWN	Red

RPG Mode:	Background Color:
OPERATE	Green
TEST	Yellow

Weather Mode:	Background Color:
PRECIPITATION (A)	Green
CLEAR AIR (B)	Green

2-3.13.3.1 RPG Alarm Summary. The second block of information, called "RPG Alarm Summary", contains three more areas: Maintenance Required, Maintenance Mandatory, and Load Shed. See Figure 2-63. RPG Alarm Summary.

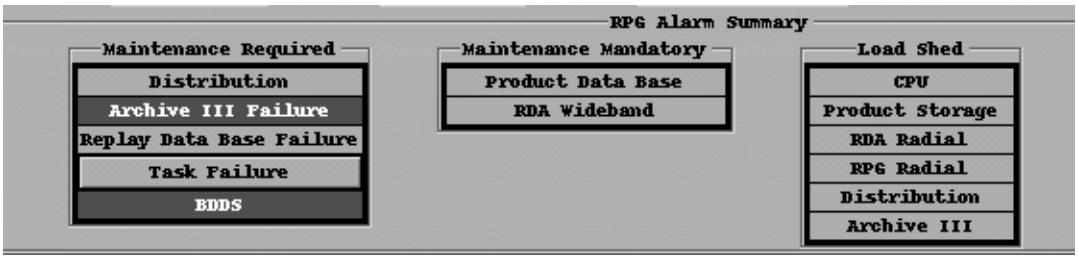


Figure 2-63. RPG Alarm Summary

If no alarms are present, all listings have a green background with black letters. If an alarm becomes active, the background turns to red and has white letters. These are automatically updated but are not editable by the user. Additional information is available from only one of these fields on this window, and that is the "Task Failure" under the Maintenance Mandatory column. Click on the Task Failure bar and another window opens which is the Failed Task List Window. See Figure 2-64. Failed Task List Window.

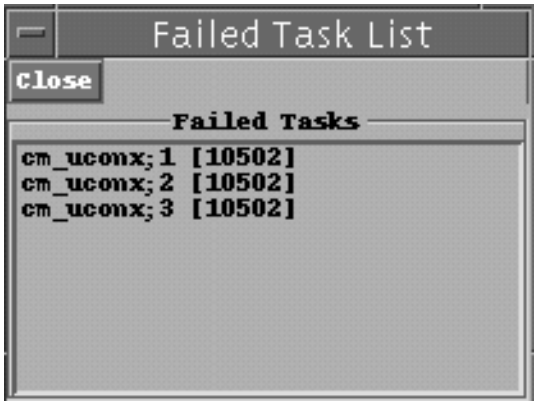


Figure 2-64. Failed Task List Window

This is a list of all the tasks that have failed. There is a Close button in the upper left hand corner that closes this window.

2-3.13.3.2 Message Filter. The third block is the Message Filter. The first entry is a Previous - left arrow - right arrow - Next display. This allows the operator to select the page of System Log Messages that is currently displayed in the bottom half of the window. There are eight pages of 250 messages each. By default, the latest 250 messages are displayed in the first page. Use the scroll bar on the right hand side of the System Log Messages window to scroll through the entire 250 messages on that page. The left arrow is grayed-out and desensitized, and the right arrow is white with a blue background and sensitized. Clicking on the right arrow refreshes the System Log Messages with the next page of 250 messages. Once the operator reaches the last page (oldest 250 messages), the right arrow is grayed-out and desensitized. The eight pages will hold a total of 2,000 messages.

Three preselected categories of messages are available for display: Status, Alarm, and Error. By clicking on either the box or the title itself, the type of message can be selected. These can be turned on or off with a check mark in the box signifying that type of message has been selected. When selected (or deselected), the actual log of messages below this line refreshes with the appropriate change(s). The Status messages are black lettering whereas the Alarm messages are color coded red and the Error messages are color coded yellow.

The Search field provides the user the opportunity to enter a string of characters that searches through the listed alarms and lists only those whose characters match the entered string. The Search field is not case sensitive but it can include numbers and other keyboard characters. Click on the box, enter the desired string, and press Return. The log of messages will refresh with only those messages containing that string of characters. The Clear button to the far right clears out the Search field and returns the log of messages to the original unfiltered display.

2-3.13.3.3 System Log Messages. The large block titled "System Log Messages" contains the listing of the 250 messages for the selected page. If there are less than 250 messages, they will all appear on the default first page. If a sort has been done by either the three specific categories or by

the Search entry method, the sort will look at all 2,000 messages, and then display the sorted criteria. If there are less than 250 messages sorted, they will all be contained on the first page. If there are more than 250 messages sorted, additional pages will be available to view the remaining messages. Use the scroll bar along the right hand side to view the 250 messages on each page. Use the scroll bar along the bottom to view longer messages. The maximum number of messages available in this block is 2000 messages.

2-3.13.3.4 Selected Message Information. By double clicking with the left button on any one of the messages in the System Log Messages, additional information called Selected Message Information is then displayed in the bottom block. If the text exceeds the viewable space, there is a scroll bar along the right hand edge of this block that enables the user to scroll through the rest of the text. Once a message has been selected for review, the messages following it can be reviewed by pressing the tab key once to advance to the next older message. Using this procedure, the Selected Message information will be automatically pulled up on each message.

2-3.13.3.5 Print RPG Log Messages. Click on the Print Log Messages button and a secondary window opens that is titled “Print RPG Log Messages.” See Figure 2-65. Print RPG Log Message. The default selection is Print All Messages. If a specific number of messages is desired to be printed instead, click on the box with a check mark or anywhere on the Print All Messages title and it becomes desensitized. Move the cursor to the box in the middle of the line below that states Print XXX messages, click, and the numeric block becomes active with a blinking cursor. Type in the number of messages desired (up to four digits can be entered) and then click on either the Print or the Cancel button. If a value has been entered that exceeds the limit, a warning_popup appears that states: "You entered an invalid number of messages to print (XXXX). It should be in the range 1 to 2,000." XXXX is the value entered. Click on the Continue button and the user is returned to the Print RPG Log Messages window. The default number of messages to be printed is 2,000. To return to the Print All Messages value, click on the square or the title; it acts as a toggle switch. The block turns white and contains a black check mark while the numeric block becomes grayed-out and desensitized. After clicking on the Print or the Cancel button, the user is returned to the RPG Status window.

Figure 2-65. Print RPG Log Message

2-3.13.4 RMS Button. This button is visible only on the FAA redundant systems with RMS installed. See Figure 2-66. HCI - FAA.

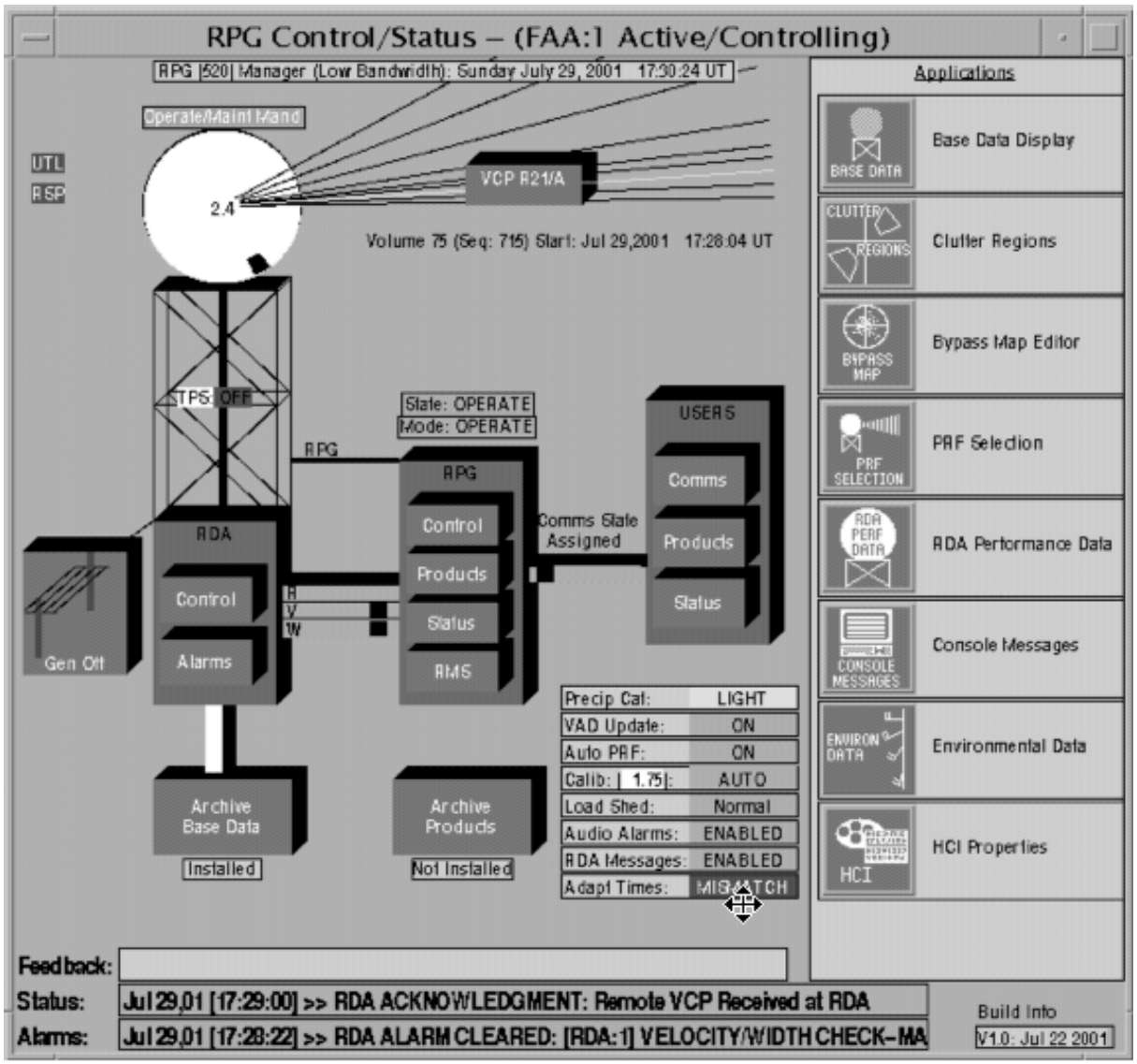


Figure 2-66. HCI - FAA

It is located inside the RPG Control box in the HCI as the fourth button (under the Control, Products, and Status buttons). If the RMS button has a blue background, then the RMS interface is functioning. If the RMS button has a red background, then the RMS interface is inoperative.

2-3.13.4.1 <u>RMS Messages (FAA: 1 or 2) Window</u>. Click on the RMS button and the RMS Messages (FAA: 1 or 2) window opens. See Figure 2-67. RMS Messages.

Figure 2-67. RMS Messages.

The RMS Messages (FAA: 1 or 2) window has a Close button in the upper left hand corner. Clicking on the Close button returns the user to the HCI. Under the title RPG to RMS Messages, there are two choices: RMS Inhibit and RMS Free Text. Click on either one of those choices and a separate window opens when the RMS interface is functioning. If the RMS interface is not functioning, clicking on either the RMS Inhibit button or the RMS Free Text button will bring up a warning_popup that states: "RMS interface is down." Click on OK and the user is returned to the HCI.

2-3.13.4.1.1 RMS Inhibit Time Window. Clicking on the RMS Inhibit button brings up the RMS Inhibit Time window. See Figure 2-68. RMS Inhibit Time.

Figure 2-68. RMS Inhibit Time

The top line contains three control buttons. The Close button closes the window and returns the user to the RMS Messages window. The Send button sends the time period entered in the second row of this same window to the RMS to be used as the time period that no commands will be accepted from the RMS to the RPG. This time period is effective as of the send time. The Clear button clears the data entry box in the second line.

The second line of this window contains the title Enter Time (1-3600 sec): and a data entry box. Click on the data entry box, have the blinking cursor in the left hand side of the box, and the user can then enter in a time period from 1 second to 3,600 seconds. This will be the desired time period that the RMS can not send any commands to the RPG. If an invalid entry is made and the Send button is clicked (or the Return key pressed), a warning_popup opens that states: “Value must be between 1 and 3600. Do you want to change the value?” Click on Yes or No. Clicking on Yes will return the user to the RMS Inhibit Time window. Clicking on No will return the user to the RMS Messages window. Once the desired value is entered, click on the Send button to

send the time period to the RMS.

2-3.13.4.1.2 RMS Free Text Message Window. Clicking on the RMS Free Text button brings up the RMS Free Text Message window. See Figure 2-69. RMS Free Text Message.

Figure 2-69. RMS Free Text Message

The top line contains three control buttons. The Close button closes the window and returns the user to the RMS Messages window. The Send button sends the free text message entered in the bottom data entry block of this same window to the RPG. The Clear button clears the data entry box of any previous input.

The second line of this window contains the title Free Text Message: and a data entry box. Click on the data entry box, have the blinking cursor in the upper left hand corner of the box, and the user can then enter in any type of free text message that is desired to be sent to the RMS. A maximum of 400 characters can be entered in the data entry box. If more than 400 are entered and the Send button clicked, a warning_popup appears that states: "RMS messages cannot exceed 400 characters. Message is XXX characters long. Do you want to change it?" XXX is the number of characters entered. Click on Yes to return to the data entry box to make the appropriate changes. Click on No and the user is returned to the RMS Free Text Message window with the message not sent nor edited. Once the text has been completely entered, click on the Send button and the text message is sent to the RMS.

2-3.13.5 Archive III Products. Directly under the RPG icon is the Archive Products icon. It is connected by a color coded bar, with white representing idle configuration and green with a moving black box representing an operational configuration. Moving the cursor to the Archive Products icon and clicking when the hand pointer opens the Archive III Control/Status window. See Figure 2-70. Archive III Control/Status. There are five separate sections to this window and they are addressed separately below.

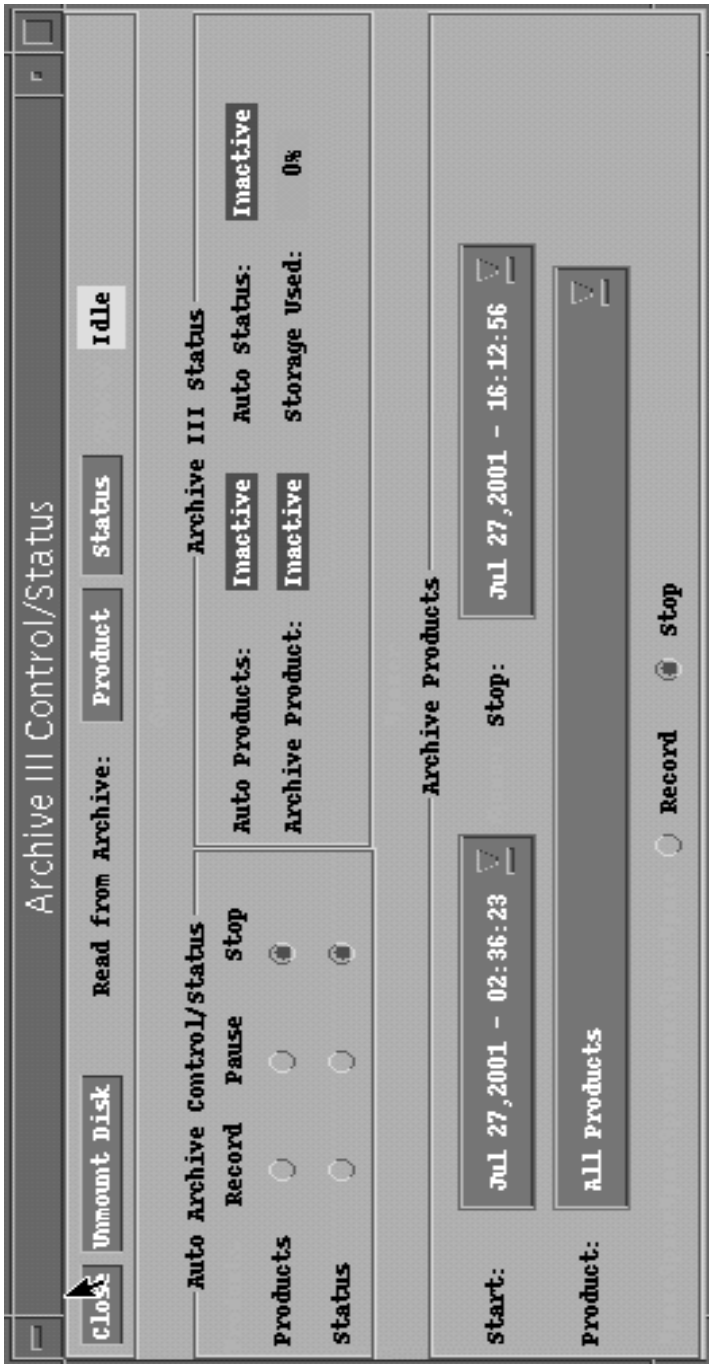


Figure 2-70. Archive III Control/Status

Once all required or desired actions have been taken, close this box by clicking the Close button.

2-3.13.5.1 Unmount Disk Button. The second button from the upper left reads Unmount Disk.

NOTE

The Unmount Disk button will only be sensitized when the Archive Read processes are either in Pause or Stop. If the Unmount Disk button is grayed-out and desensitized, then it can not be unmounted using this standard procedure. The operator must make sure that the Auto Archives are in Pause or Stop, the Archive Products are in Stop, and the Read from Archive has been completed.

When the Unmount Disk button is sensitized and the operator wants to unmount the disk, click on this button and a warning_popup opens that states: "You are about to unmount the Archive III disk. Do you want to continue?" Click on either Yes or No. If No, the user is returned to the Archive III Control/Status window with the disk still mounted. If Yes, the Jaz disk will be electronically unmounted and partially ejected from the disk drive. The status of the Archive III will first go to Unmount Pending with a yellow background, and then to Not Mounted with a red background. In order to start recording again, the disk must be remounted. The disk must be physically pushed back into the drive or another disk used in its place. Once the disk clicks into the drive, the automatic mount process activates. Once the status line reads Idle with a yellow background, the Archive III drive is ready to accept other commands.

If the user attempts to use the Unmount Disk button while using the terminal window to look at the /jaz directory or any of its sub-directories, the unmount will not be successful. The media will remain in the drive, and the user returned to the Archive III Control/Status window after approximately 30 seconds. This is by design because if the mount point is active, the user cannot unmount from it. Having a /jaz directory open makes the mount point active.

If there is a problem with the unmounting of a disk, the Unmount Pending text will stay in the text line with a yellow background for approximately a minute and then change back to Idle. The Unmount button becomes sensitized again, and a warning_popup opens that states: "Disk unmount timeout error". Click on the Continue button and the user is returned to the Archive III Control/Status window. The disk remains in the device and is not partially ejected. The problem could either be another window that is open in the terminal or console (NOT the HCI) or an actual mechanical problem with the Archive III device.

2-3.13.5.2 Read From Archive III. The first line of the Archive III window provides the ability to read data from the Archive III media to the RPG current data base.

NOTE

To read products from a disk into the RPG data base, the operator MUST be at the RPG JAZ drive and at the RPG Terminal. This function will not operate correctly at the MSCF terminal nor using the MSCF JAZ drive.

There are two choices: Product and Status. A listing of the products read back is viewable and the status messages read back appear in the status window. If the Product and Status button are

grayed-out and desensitized then the Archive III is not installed or functioning and these features are not available to the user.

2-3.13.5.2.1 Archive III Product Read. To select products to read, move the cursor to the Product button, click, and another window opens titled Read Product from Archive III. See Figure 2-71. Read Product from Archive III. The top line contains the Close button (which closes the window) and the Execute Read button. Just to the right of the Execute Read button is a data line titled Read Product that displays the following information: Inactive with a red background or Active with a green background. The block of options directly below these three buttons is titled Product Retrieval Criteria and has three options for the user to select. If the Execute Read button and all of the blocks are grayed-out and desensitized with the words "Not Available' in each block, then the Archive III device is not loaded. Once the Archive III device has been loaded with the desired data and the blocks are sensitized, the user needs to select the specific details.

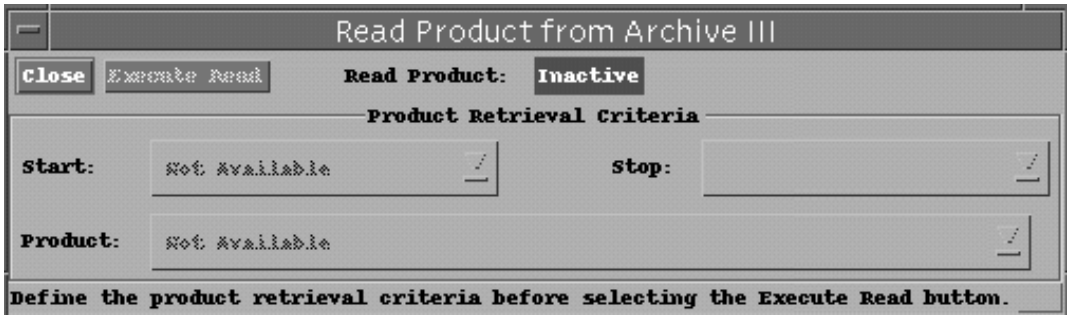


Figure 2-71. Read Product from Archive III

The first two boxes are used to identify the Start and the Stop times. Move the cursor to the far right hand side of the Start: dark blue box over the down arrow and click. A pull down menu will appear with the times that are available in reverse chronological order from the volume scans currently in the data base. Select the desired start time by moving the cursor to the desire time and clicking. The selected start time becomes highlighted with a white background, the time is automatically transferred to the Start: field, and the pull down menu disappears. If the user does not want to select any of the start times, click on the down arrow again and the pull down menu is retracted. The user can also click anywhere else in the Read Product from Archive III window to have the pull down menu disappear. Repeat the process for the Stop time.

The third dark blue box labeled Product: enables the user to select either All Products for the selected time or a specific product. Click on the down arrow to the far right hand side of the dark blue box and a pull down menu appears with all the products that are available. Select the desire product or the default selection of All Products by moving the cursor to the desired product and clicking. The selected product becomes highlighted with a white background, the title is automatically transferred to the top of the Product field, and the pull down menu is retracted. If the user does not want to select any new product, click on the down arrow again and the pull down menu is retracted. The user can also click anywhere else in the Read Product from Archive III window

to have the pull down menu disappear.

Once the start time, stop time, and product(s) have been selected, move the cursor to the top line and click on the Execute Read button. . If the user accidentally selected a start time after a stop time, a warning_popup window opens that states: "You must select a start time which is less than or equal to the stop time." Click on the Continue button and the user is returned to the Read Product from Archive III window.

If the start and stop times are valid, clicking on the Execute Read button and the selected Product (or All Products) are read from the Archive III disk to the RPG data base. The Read Product status changes to Active with a green background and the Archive III status in the Archive III Control/Status window turns to Active with a green background. Once the read is complete, the Read Product returns on Inactive with a red background and the Archive III status returns to Idle with a yellow background.

If the start and stop times are valid but cover a time frame that includes too many products, a warning_popup appears that states: "Too many products were requested. The last volume that will be retrieved is Date Time. Do you want to continue? Yes/No" Click on Yes or No to either perform the read from Archive for the listed time period or return to the Read Product from Archive III window to select a different date/time period or products. For an average archive list, approximately 24 hours worth of data can be retrieved at one time.

Once the Read is completed, the operator can verify the products are in the data base by returning to the HCI, clicking on RPG Products button, then under the Display title, clicking on Products in Database. The Products in Database window will open and the operator can then look for the appropriate date/time and product selection. It is recommend NOT to have this window open while the products are being read into the RPG date base as this window does not refresh itself at a rate consistent with the Archive III read and the operator could interpret that to mean that the products are not being read.

2-3.13.5.2.2 Archive III Status Log Read. To read the status logs from archive, move the cursor to the Status button, click, and another window opens titled Read Status from Archive III. See Figure 2-72. Read Status from Archive III.

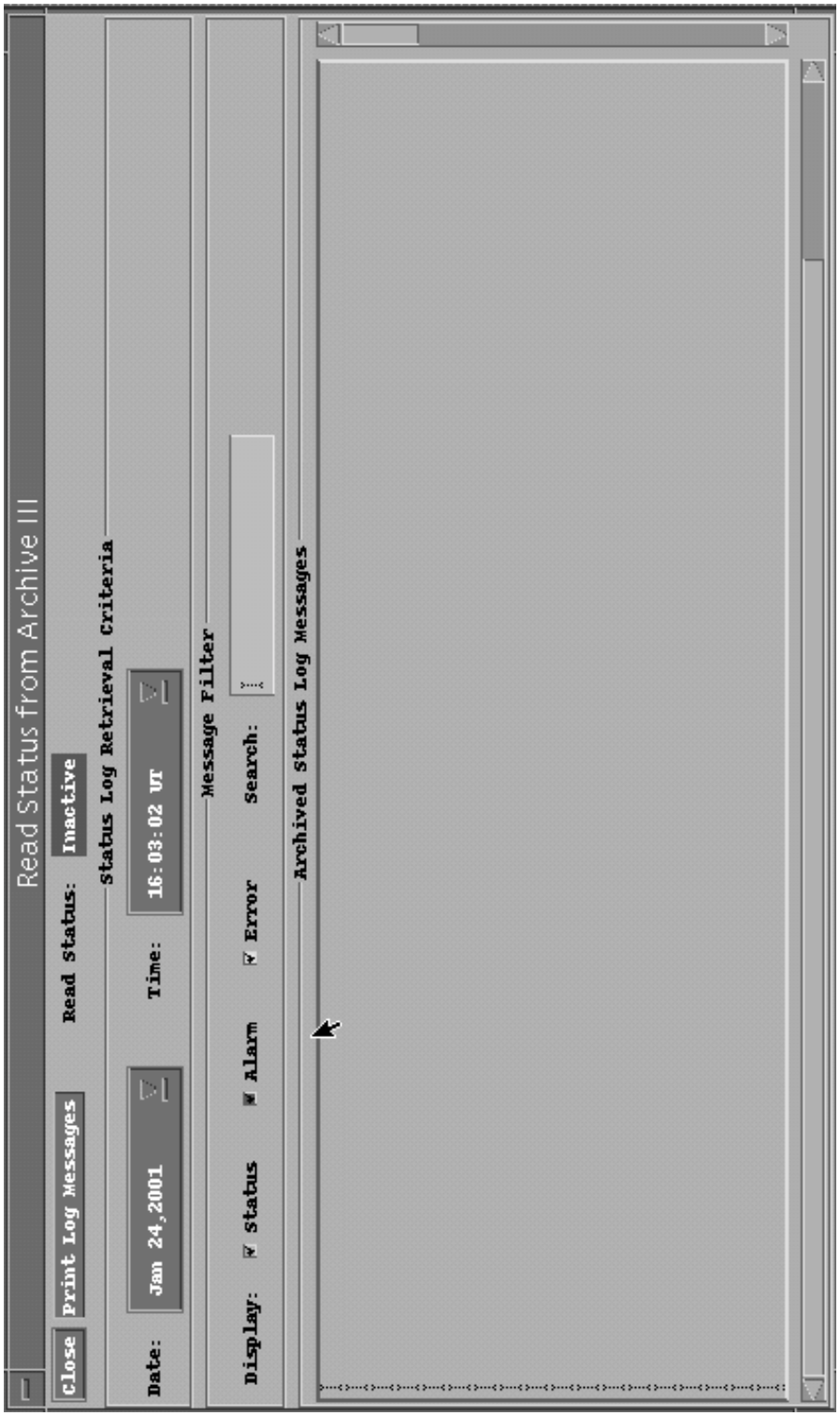


Figure 2-72. Read Status from Archive III

The top line contains the Close button (which closes the window) and the Print Log Messages button. Just to the right of the Print Log Messages button is a data line titled “Read Product” that displays the following information: Inactive with a red background or Active with a green background. Click on the Print Log Message button and a secondary window opens that is titled “Print RPG Log Messages.” See Figure 2-73. Print RPG Log Messages.

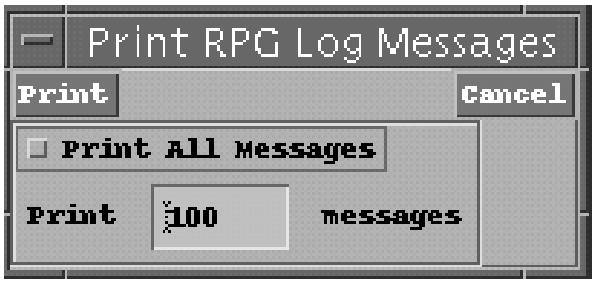


Figure 2-73. Print RPG Log Messages

The default selection is Print All Messages. If the user desires to print a specific number of messages, click on the white box with a check mark or anywhere on the Print All Messages title and it becomes desensitized and the numeric field becomes active with a blinking cursor. Type in the number of messages desired (up to 1600 messages can be requested) and then click on either the Print or the Cancel button. If a value has been entered that exceeds the limit, a warning_popup appears that states: "You entered an invalid number of messages to print (XXXX). It should be in the range 1 to 1600." XXXX is the value entered. Click on the Continue button and the user is returned to the Print RPG Log Messages window. To return to the Print All Messages block, click on the button or the title as it acts as a toggle switch. The block turns white and contains a black check mark while the numeric field becomes grayed-out and desensitized. After clicking on the Print or the Cancel button, the user is returned to the Read Status from Archive III window.

The first block of options is titled Status Log Retrieval Criteria. In the Date and Time boxes, scroll through the available selections by clicking on the down arrows in each category. Once the desired date/time is shown, click on the values and they will become highlighted in the boxes. If the Date and Time blocks are grayed-out and desensitized, then the Archive III device is not loaded. Once the Archive III device has been loaded with the desired data and the blocks are sensitized, the user needs to select the specific details. Once a date and time are selected, the Read Status field turns to Active with a green background and the log is refreshed with the messages. When the message playback is complete, the Read Status field turns to Inactive with a red background.

The second block is the Message Filter. Three preselected categories of messages are available for display: Status, Alarm, and Error. By clicking on either the box or the title itself, the type of message can be displayed. These act as a toggle switch, on or off, with a check mark in the box signifying that type of message has been selected. When selected (or deselected), the actual log of messages below this line refreshes with the appropriate change(s). The Status messages are black lettering whereas the Alarm messages have a red background and the Error messages have a yellow background.

The Search field provides the user the opportunity to enter in a string of characters that searches through the listed messages and displays only those messages that contain the character string. The Search field is not case sensitive but it can include numbers and other keyboard characters. Click on the box, enter in the desired string, and press Return. The log of messages will refresh with only those messages containing that string of characters. If no messages are found that contain the entered string, the display of messages will be blank.

The third block titled Archived Status Log Messages contains the listing of all the messages that have been selected by either the three specific categories or by the Search entry method. The display is continuously updated with the latest message appearing on the top line. Scroll bars are available along the right hand side to view older messages and along the bottom to view longer messages. The maximum number of messages that this block can display is 1600 messages.

2-3.13.5.3 Text Line - Status of Archive III. To the right of the Product and Status button is a text line that provides the current status of Archive III. The possible status messages are:

Active	(green background)
Idle	(yellow background)
Inactive	(red background)
Installed	(gray background)
Not Installed	(gray background)
Not Mounted	(gray background)
Unmount Pending	(gray background).

2-3.13.5.4 Auto Archive III Control/Status. The second block of controls provides the control and a visual status of the auto archive process. There are two sets of three control buttons: Record, Pause, and Stop for both Products and Status. When active, the buttons are color coded to clearly represent the current condition. The buttons under the Record column are green when auto archive is on. The buttons under the Pause column are yellow when the auto archive is paused. The buttons under the Stop column are red when auto archive is stopped.

The default status for auto archive is Stop. In order to activate Product or Status auto archive, move the cursor to the Record button(s) and click. The Record button turns to green and a warning_popup opens that states: “You are about to start Auto Archive Products/Status. Do you want to continue?” Click on either the Yes or No block. If Yes, then the green Record button will remain on. If No, then the previous status (Pause or Stop) will be restored with the appropriate color.

If the operator wants to pause the recording of the Products or Status Messages, click on the Pause button(s). The Pause button turns to yellow and a warning_popup opens that states: “You are about to pause Auto Archive Products/Status. Do you want to continue?” Click on either the Yes or No block. If Yes, then the yellow Pause button will remain on. If No, then the previous status (Record) will be restored with the green color. The user can not go from Stop to Pause. To restart recording, the user has to click on the Record button and answer the warning_popup accordingly. The Archive III can be paused up to one hour and then restarted with no loss of data.

If the operator wants to stop the recording of the Products or Status Messages, click on the Stop

button(s). The Stop button turns to red and a warning_popup opens that states: “You are about to stop Auto Archive Products/Status. Do you want to continue?” Click on either the Yes or No block. If Yes, then the red stop button will remain on. If No, then the previous status (Record or Pause) will be restored with the appropriate color.

If a Jaz disk has been used at another site to record Products and Status messages, then it can only be used at a second location to record Products. Any attempt to record Status messages from a second RPG will be unsuccessful. This is because products identify the site in its legend, but the status messages are identified only by the three digit site ID that is entered as the first data on the Jaz disk.

2-3.13.5.5 Archive III Status. The block to the right of the Auto Archive Control/Status block is titled Archive III Status and contains four categories of information. They are: Auto Products, Auto Status, Archive Product, and Storage Used. For the Products, Status, and Product categories, the information is color coded, automatically updated, and will be either Active (Green) or Inactive (Red). The Storage Used category is displayed in % and is color coded as Green (0 % to Warning Threshold %), Yellow (Warning Threshold % to Alarm Threshold %), and Red (at or above Alarm Threshold %). These thresholds can be set by the user as load shed parameters but the user must go to the Load Shed Categories window to the right of the Archive III block and select it from the main menu. See paragraph 2-3.16.14.5 Load Shed.

2-3.13.5.6 Archive Products. The bottom half of the Archive III Control/Status window is titled Archive Products and allows the operator to archive products by time frame or product name. The first two boxes are used to identify the Start and the Stop times. Move the cursor to the far right hand side of the Start: dark blue box over the down arrow and click. A pull down menu will appear with the times that are available in reverse chronological order from the volume scans currently in the data base. Select the desired start time by moving the cursor to the desire time and clicking. The selected start time becomes highlighted with a white background, the time is automatically transferred to the Start: field, and the pull down menu disappears. If the user does not want to select any of the start times, click on the down arrow again and the pull down menu is retracted. The user can also click anywhere else in the Archive III Control/Status window to have the pull down menu disappear. Repeat the process for the Stop time.

The third dark blue box labeled Product: enables the user to select either All Products for the selected time or a specific product. Click on the down arrow to the far right hand side of the dark blue box and a pull down menu appears with all the products that are available. Select the desire product or the default selection of All Products by moving the cursor to the desired product and clicking. The selected product becomes highlighted with a white background, the title is automatically transferred to the top of the Product field, and the pull down menu is retracted. If the user does not want to select any new product, click on the down arrow again and the pull down menu is retracted. The user can also click anywhere else in the Archive III Control/status window to have the pull down menu disappear.

Once the start time, stop time, and product(s) have been selected, move the cursor to the bottom line and click on the Record button. If the user accidentally selected a start time after a stop time, a warning_popup window opens that states: "The start time must be less than or equal to the stop

time. Define a new time interval and try again." Click on the Continue button and the user is returned to the Archive III Control/Status window.

If the user had valid start and stop times and All Products selected, click on the Record button, and a different warning_popup window opens that states: "You are about to archive ALL products in the selected time span. Do you want to continue? Yes/No" Click on Yes and the recording starts. The Record button turns on green, the Archive Product Status line turns to Active with a green background, and the Archive status text in the upper right hand corner turns to Active with a green background. Once the archive is complete, the Record button turns off, the Stop button turns on red, the Archive Product: turns to Inactive with a red background, and the Archive Status turns to Idle with a yellow background. If the user had clicked on No, then they are returned to the Archive III Control/Status window with nothing happening.

If the user had valid start and stop times and a specific product selected, click on the Record button and a third warning_popup window opens that states: "You are about to archive the following product: XXXXXX. Do you want to continue? Yes/No" (XXXXXX is the product selected). Click on Yes and the recording starts. The Record button turns to green, the Archive Product Status line turns to Active with a green background, and the Archive status text in the upper right hand corner turns to Active with a green background. Once the archive is complete, the Record button turns off, the Stop button turns on red, the Archive Product: turns to Inactive with a red background, and the Archive Status turns to Idle with a yellow background. If the user had clicked on No, then they are returned to the Archive III Control/Status window with nothing happening.

If the user clicks on the Stop button, a warning_popup appears that states: "Do you really want to cancel all archive product operations? Yes/No" Click on Yes and any archive product operations currently ongoing will be cancelled and the user is returned to the Archive III Control/Status window. Click on No and the archive product operations continue while the user is returned to the Archive III Control/Status window.

2-3.13.6 Archive III Status Boxes. Directly under the Archive Products icon are two status lines that provide information about the Archive III device. The top line states whether the archive is Active, Idle, Not Mounted, Unmount Pending, Installed, or Not Installed. It is not color coded. The bottom line indicates the amount of Archive III media used in percentage (%). It is color coded as Green (0 % to Warning Threshold %), Yellow (Warning Threshold % to Alarm Threshold %), and Red (at or above Alarm Threshold %). These thresholds can be set by the user as load shed parameters in the Load Shed Categories window to the right of the Archive III button and select it from the HCI. See paragraph 2-3.16.14.5 Load Shed.

2-3.13.7 Archive III Data Flow. There is a solid bar connecting the RPG icon with the Archive Products icon when there is an Archive III device installed on the RPG. (If no bar, then there is no device). The bar is color coded white when the archive III is installed but is idle (i.e. not operating). The bar turns to green and has a small black box moving repeatedly within the bar when the Archive III device is operating. The black box moves from the RPG icon (top) to the Archive Products icon (bottom) when any sort of data flow is taking place, either recording or playback.

2-3.14 Narrowband Connections Graphics.

Located between the RPG icon and the Users icon is a graphic consisting of one green bar that represents the narrowband connections. There is also an additional small black box that repeatedly moves within the bar from left to right (RPG icon to the Users icon) that represents the flow of product data. Clicking on this graphic (when the cursor changes to a pointing hand) brings up the Product Distribution Comms Status window that contains information about the configuration and status of every RPG communications line. See Figure 2-75. Product Distribution Comms Status - Lines 1-24. The Product Distribution Comms Status window is described in detail in paragraph 2-3.15.1 Product Distribution Comms Status Window.

If the connecting bar is white and has a red block moving from left to right, that means the RPG is in test mode and that only the RPGOP is receiving any products.

2-3.15 USERS Icon.

There are three buttons within the green USERS icon that provide links to other windows. They are the Comms button, Products button, and the Status button. See Figure 2-74. USERS Icon. Click the cursor on the respective button and the following windows will be opened:

Comms button opens the Product Distribution Comms Status window
Products button opens the RPG Product Distribution Control window
Status button opens the PUP/RPGOP Status window

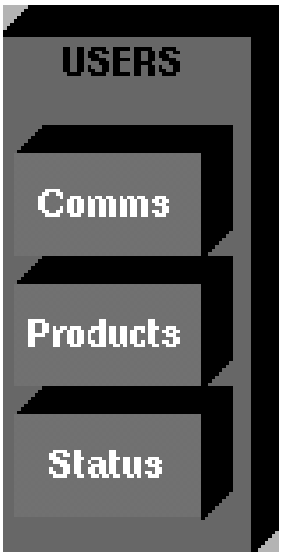


Figure 2-74. USERS Icon

2-3.15.1 Product Distribution Comms Status Window. Click on the Comms button and the Product Distribution Comms Status window opens. See Figure 2-75. Product Distribution Comms Sta-

tus - Lines 1-24. The top line has five buttons and the padlock for the password protected entries. The first button, Close, closes the window and returns the user to the HCI. The other four buttons: Save, Undo, Baseline: Restore and Update are initially greyed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become greyed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are greyed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

If an edit has been made and not saved or undone and the Close button is clicked, a warning_popup will appear that states: “Do you want to save your changes?” Click on either Yes or No. Answering Yes will save the changes and send the user back to the HCI. Answering No will not save the changes but still send the user back to the HCI.

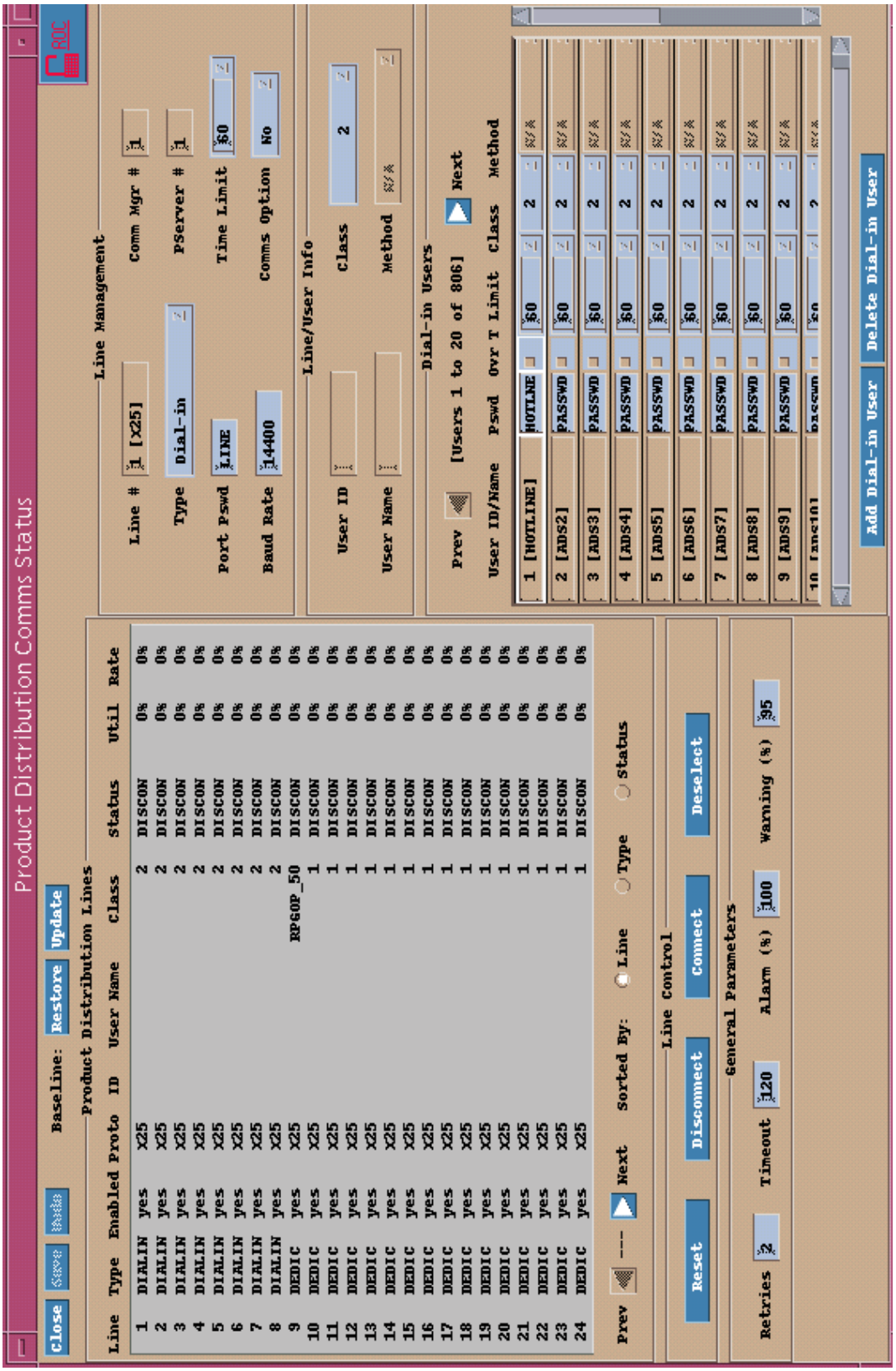


Figure 2-75. Product Distribution Comms Status - Lines 1-24

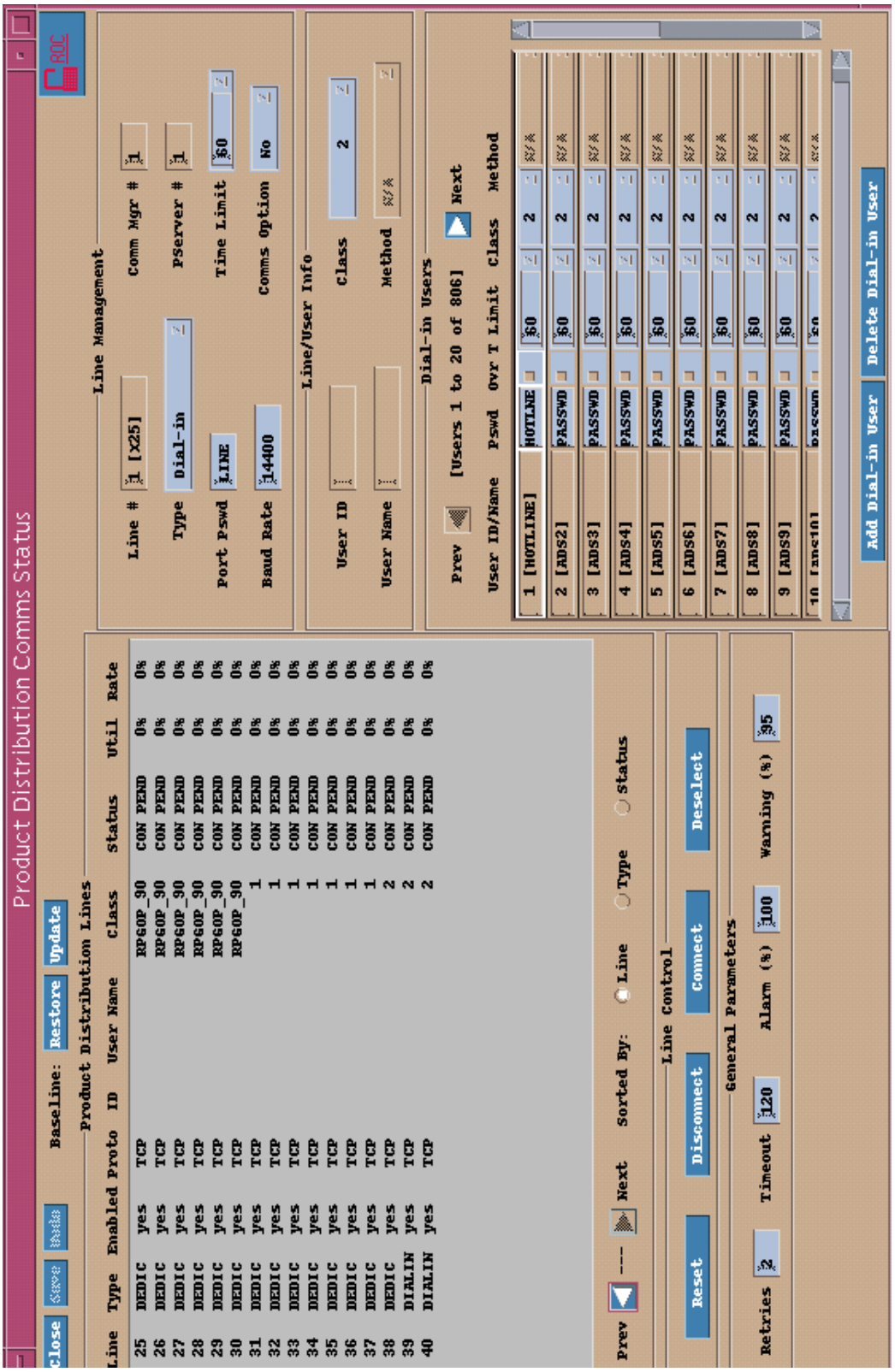


Figure 2-75. Product Distribution Comms Status - Lines 25 - 40 cont.

2-3.15.1.1 Password. To make any changes in the General Parameters, Line Management, or Dial-In Users Areas, the appropriate level password must be entered. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

2-3.15.1.2 Product Distribution Lines Section. The first major section in the left hand side of the window is the Product Distribution Lines listing. It is organized into ten columns which are defined as follows:

- Line — RPG narrowband line number
- Type — DEDIC or DIALIN
- Enabled — Yes or No
- Proto — x25 Protocol or TSP
- ID — ID number of the user connected to that line
- User Name — User Name connected to that line (Currently empty)
- Class — Class of user (1, 2, 4, RPGOP_50 or RPGOP_90) that is connected to that line. The class number displayed for a particular line may change when a user connects. This happens when the line default class is different from the user class. This applies only to dial-in users as they must identify themselves before they are connected.
- Status — CONNECT, DISCON, or PENDING
- Util — Percentage of line capacity currently being utilized.
- Rate — The estimate achieved data transmission rate of the narrowband line. This is displayed as a % of the nominal data transmission rate specified by the software and serves as a measure of the narrowband line's quality.

2-3.15.1.2.1 Prev-Next Arrows. Directly under the first three columns are the Prev-Next arrows. When the first screen of 24 lines is displayed, the "Prev" arrow is grayed-out and desensitized, and the "Next" arrow is colored white with a blue background and sensitized. Click on the sensitized arrow and the second screen of the remaining 16 lines is displayed.

When the second screen of 16 lines is displayed, the "Next" arrow is grayed-out and desensitized, and the "Prev" arrow is colored white with a blue background and sensitized. Click on the sensitized arrow and the initial screen of 24 lines is displayed.

The "Prev" and "Next" arrows maintain their same functionality regardless of the "Sorted By" option that is selected.

2-3.15.1.3 Sort Options. The Product Distribution Lines can be sorted by three options listed directly under the table. To the right of the words: Sorted By: are three options: Line, Type, and Status. Click on the option or the button to the left of the option and the table will be sorted in that category. The button that is currently white is the option that is currently selected. The Line option lists the lines numerically by Line number (first column). The Type option lists the lines alphabetically by Type (second column). The Status option lists the lines alphabetically by Status

(eighth column).

2-3.15.1.4 Line Control Buttons. The communication lines themselves can be modified by the four Line Control buttons at any time as this portion of the window is not password protected. The four Line Control buttons are: Reset, Disconnect, Connect, and Deselect. First select the line(s) from the table above by clicking once on the specific line, or click and drag across all the lines that need to be modified to highlight them. Then move the cursor to the desired Line Control button and click.

For single line selections, when clicking on the Reset, Disconnect, and Connect buttons, a warning_popup opens that states: "Do you want to Reset (Disconnect)(Connect) the selected line? Line Selected: X" where X is the line number. For multiple line selections, a warning_popup opens that states: "Do you want to Reset (Disconnect)(Connect) the selected A lines? Lines Selected: B, C, D, etc." where A is the total number of lines selected and B, C, D, etc. are the specific line numbers.

Click on either Yes or No and the appropriate action will be taken.

Clicking on the Deselect button will deselect the lines in the above table that had been highlighted or selected and no other actions are taken on those lines. There is no warning_popup that opens with this button.

2-3.15.1.5 General Parameters Section. Once the password has been successfully entered, the General Parameters section of the window is now editable by the user. There are four categories that can be edited: the number of Retries to connect, length of time of Timeouts, Alarm threshold, and Warning threshold.

Retries is defined as the number of attempts to reconnect the line before it is marked as disconnected on the status display. The range of values that can be entered in the retries field is 1 - 999. Timeouts is defined as the number of seconds elapsed when the response to a communications command is considered overdue. The range of values that can be entered in the Timeouts field is 60-999. The Alarm (%) and Warning (%) values are Load Shedding adaptable parameters that are also changeable on the distributions line in the Load Shed Categories window. See Figure 2-72. Read Status from Archive III.

Click in the box to the right of each category in order to perform an edit. If an entry outside any of the limits above is entered and then another block selected or the Return key pressed, a warning_popup opens that states: "The value you entered is invalid. It must be in the range AAA to BBB" where AAA and BBB are the range values listed above. Click on the Continue button and the user is returned to the General Parameters section for another entry.

2-3.15.1.6 Line Management Section. Once the password has been successfully entered, the Line Management section of the window is now editable by the user. This section contains the following information:

- Line # — RPG Line Number
- Type — DEDICATED or DIAL-IN
- Port Pswd — The encrypted password that the line must match before it is allowed to connect
- Baud Rate — The programmed baud rate of that line
- Comms Mgr # — The comms number controlling that line
- PServer # — The p_server number controlling that line
- Time Limit — The maximum time that the line is allowed to stay connected before it automatically disconnects. The pull down menu provides the option to select the Class defined maximum connect time.
- Comms Option — Yes/No The comms option is applicable only to those sites with satellite communication links.

To select the line to edit, take the cursor to the Product Distribution Lines table and scroll through the lines until the cursor arrives at the line that needs editing. Using the left mouse button, double click anywhere on the specific line. That line's information will appear in the Line Management section. The Line #, Comms Mgr #, and PServer # are filled in when the line is selected, but are not editable by the user. Under the Line/User Info section, the User ID and User Name are filled in when the line is selected, but are not editable by the user. Also, the Method block will only be editable for Class 4 lines and will remain grayed-out and desensitized for all others. Click on the other specific blocks that are editable (with a blue background) and enter in the new information.

2-3.15.1.6.1 Type. The Type block is a pull down menu with an arrow to the right of the block. The options available are Dedicated or Dial-in.

2-3.15.1.6.2 Port Password. The Port Password can be up to a four digit combination of numbers, letters, or characters.

2-3.15.1.6.3 Baud Rate. The Baud Rate currently functions in the range 9,600 to 128,800. It is possible to enter a seven digit value up to 9,999,999 which supports higher LAN based connections in the future. There are no warning_popups that appear for any entry in this field.

2-3.15.1.6.4 Time Limit. The Time Limit is the maximum time that the communication line is allowed to stay connected before it automatically disconnects. The Time Limit must be in the range 1 to 1440 minutes. Attempting to enter a value outside of this range will bring up a warning_popup that states: "The value you entered is invalid. It must be in the range 1 to 1440." Click on Continue and the user is returned to the Line Management section. Click on the arrow to the right of the editable field value and a pull down menu appears with the option: "Class". Click on Class, the class defined maximum connect time is inserted in the field, and the user returned to the edit field.

2-3.15.1.6.5 Comms Option. The Comms Option is a pull down menu with an arrow to the right of the block. The options available are Yes or No. This is applicable only to those sites with satellite communication links.

2-3.15.1.7 Line/User Info Section. Once the password has been successfully entered, the Line/User Info section of the window is now editable by the user. This section contains the following information:

- User ID — The ID number of the user connected to that line
- User Name — The name of the user connected to that line
- Class — The class of user (RPGOP_50, RPGOP_90,1,2, or 4) that is connected to that line
- Method — The method of distribution (for Class 4 users only) is four categories that consist of SSET, RSET, 1TIM, or COMB. SSET is a single set of products, RSET is a single set of products repeatedly transmitted, 1TIM is a one-time request of a limited set of products, and COMB is a combination of RSET and 1TIM.

The User ID and User Name are filled in when the line is selected, and are not editable by the user. Also, the Method field will only be editable for class 4 lines and will remain grayed-out and desensitized for all others. Click on the other specific blocks that are editable and enter in the desired information.

2-3.15.1.7.1 Class. The Class type is a pull down menu with an arrow to the right of the block. The options available are RPGOP_50, RPGOP_90, 1, 2, or 4. If the line is dedicated, only classes which are allowed for dedicated lines are included in the pull down menu. If the line is dial-in, only classes which are allowed for dial-in lines are included in the pull down menu. When making changes to a lines configuration, save the changes before going to another line. Changes are not applied to that line until a user reconnects.

2-3.15.1.7.2 Method. The Method is a pull down menu with an arrow to the right of the block, and is only sensitized for a Class 4 user. The options available are SSET, RSET, 1TIM, or COMB. SSET is a single set of products, RSET is a single set of products repeatedly transmitted, 1TIM is a one-time request of a limited set of products, and COMB is a combination of RSET and 1TIM.

2-3.15.1.8 Dial-in Users Section. The lower right hand corner of the window contains the Dial-in Users table. It has six columns, four of which can be edited in this section. For each dial-in user there is an entry in the Dial-in Users list. The class for each line can be defined from the Class pull down menu for each user. Changes do not have to be saved every time a class is changed to a different dial-in user. The operator can wait to save the changes until all editing is done in this list. After saving edits, changes are applied the next time a dial-in user connects. A brief description of each follows.

2-3.15.1.8.1 Paging Capability For Dial-in Lines. A paging capability is the first line of the Dial-in Users section. The list displays up to twenty records at a time. When sensitized, the left and right arrow buttons load in the next/previous page. Click on the appropriate arrow and the list will be refreshed with the next/previous twenty lines. If the arrow buttons are grayed out and desensitized, then the operator is at the start/end of the list. Between the two arrows is a text line that describes the range of user Ids currently loaded and also the maximum user ID number. This text

line is updated as the same time the list is refreshed.

2-3.15.1.8.2 User. This is the User number in numerical listing and is not editable.

2-3.15.1.8.3 ID/Name. This is the four digit user identification number and is not editable.

2-3.15.1.8.4 Pswd (Password). This is the up to 8 digit password of the user. This field is editable in this window.

2-3.15.1.8.5 Ovr. This is the toggle on/off override disconnect option in which the user may override the line disconnect time limit. This field is editable in this window.

2-3.15.1.8.6 T Limit. This is the time limit in minutes that the dial line will remain connected. The user can enter a specific value or select "Class" so the class defined maximum connect time is used. Since the maximum connect time can be defined for the line, class, and user, here is how the p_server determines the maximum connect time:

- Set the maximum connect time to the general limit (1440 minutes).
- If the user maximum connect time is defined by its class, then set the user maximum connect time to the class value.
- If the line maximum connect time is defined by its class, then set the line maximum connect time to the class value.
- Finally, the maximum connect time used for the port is the smallest of the three steps above.

The allowable range is 1 to 1440 minutes. Enter in a value within this range, press the Return key, and the value is accepted. If a value outside this range is entered and the Return key is pressed, a warning-popup appears that states: "The value you entered is invalid. It must be in the range 1 to 1440. Continue." Click on the Continue button and the operator is returned to the edit field to correct the entry.

Click on the arrow to the right of the editable field value and a pull down menu appears with the option: "Class". Click on Class, the class value is inserted in the field, and the user returned to the edit field.

2-3.15.1.8.7 Class. This is the pull down menu which allows a choice of either Class 2 or Class 4. This field is editable in this window.

2-3.15.1.8.8 Method. This field is for Class 4 lines only and is editable in this window when Class 4 is selected in the block above. The methods of distribution are: SSET, RSET, 1TIM, or COMB. SSET is a single set of products, RSET is a single set of products repeatedly transmitted, 1TIM is a one-time request of limited set of products, and COMB is a combination of RSET and 1TIM.

2-3.15.1.8.9 Add Dial-in User Button. At the bottom left of the Dial-in User section is the Add Dial-in User button. Click on this button to pull up Figure 2-76. Add Dial-In User.

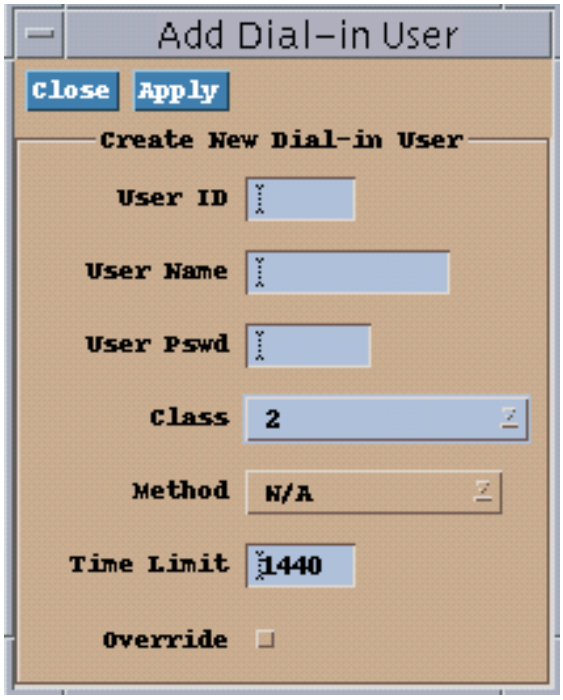


Figure 2-76. Add Dial-In User

Click in the block to the right of User ID and enter in the ID number ranging from 1 to 9999. If an entry is too large, a warning_popup opens that states: “The value you entered is invalid. It must be in the range 1 - 9999.” Click on Continue and the user gets returned to the Add Dial-in User window.

The second entry is User Name. It can hold up to nine digits of letters, numbers, or characters.

The third entry is User Pswd. It can hold up to nine digits of letters, numbers, or characters.
The fourth entry is Class. It has a pull down menu with an arrow to the right of the block. The options are either Class 2 or Class 4.

The fifth entry is Method. It has a pull down menu with an arrow to the right of the block. If the Class type is Class 2, then this entry is not sensitized. If the Class type is Class 4, then this entry turns blue and is editable. Options listed are SSET (1), RSET (2), 1TIM (3), and COMB (4).

The sixth entry is Time Limit. It has a range of 1 to 1440 minutes. Enter in the numeric value of the time desired for the dial-in line to remain on-line.

The seventh entry is Override. This is a check in the box toggle switch. Click on the square box and a black check mark opens which means the user may override the line disconnect time limit. The absence of a check mark means no override.

Once the applicable entries have been made, move the cursor to the top of the Add Dial-in User window and click on the Apply button. There are several checks that are made before the data is

accepted. If the user failed to enter a valid User ID, a warning_popup opens that states: "You must enter a valid user ID". Click on the Continue button. If the user failed to enter a User Password, a warning_popup opens that states: "You must enter a password." Click on the Continue button. If all entries are accepted, then the window disappears and the new Dial-in User line is listed in the Dial-in User table.

The Close button in the upper left hand corner closes the window without any action being taken on any line. Any edits made in any of the categories are lost unless the Apply button has been clicked.

2-3.15.1.8.10 Delete Dial-in User Button. The Delete Dial-in User button is in the lower right hand corner of the window, at the bottom of the Dial-in User section. In the Dial-in User table, click on the Pswd block of the line that is to be deleted and a white outline appears around the User ID/Name, Pswd, and Ovr columns. Then click on the Delete Dial-in User button. A warning_popup opens that states: "Are you sure you want to delete user XXXXX?" where XXXXX is the user number and ID/Name of the line. Click on the Yes or No button and the appropriate action will be taken. If no line is identified at first, the button defaults to the first line in the table. If this line is accidentally deleted, it can be restored by going to the Baseline: Restore button at the top of the Product Distribution Comms Status window to restore the baseline table.

2-3.15.1.9 Save Button. Once a change has been made to the window, the Save button becomes sensitized. Click on the Save button and a warning_popup opens that states: "You are about to overwrite the product distribution comms data. Do you want to continue?" Click on either Yes or No. If Yes is selected, the changes are saved and the Save button becomes grayed-out and desensitized. If No is selected, the changes are not saved but are still in the fields, and the Save button remains sensitized.

The editable changes for each line must be saved or discarded before a second line is selected. If the user accidentally selects another line before saving the changes, a warning_popup opens that states: "Do you want to save your changes?" Click on either Yes or No. Only then can the user go to another line to edit.

2-3.15.1.10 Undo Button. The Undo button undoes any changes that have been made since the last Save. There is no warning_popup as the changes are deleted and the user is returned to the Product Distribution Comms Status window. Once the changes have been deleted, the Undo and the Save buttons become grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized and available to the operator.

2-3.15.1.11 Baseline: Restore/Update Buttons. The Baseline: Restore and Update buttons are sensitized either after the password has been initially successfully entered or after changes have been saved or undone. While changes are being made and the window edited, the Baseline: Restore and Update buttons remain grayed-out and desensitized.

Click on the Restore button and a warning_popup opens that states: "You are about to restore the product distribution comms data from baseline. Do you want to continue?" Click on either Yes or No. The appropriate actions are made and the user is returned to the Product Distribution Comms Status window.

Click on the Update button and a warning_popup opens that states: “You are about to update the product distribution comms data. Do you want to continue?” Click on either Yes or No. The appropriate actions are made and the user is returned to the Product Distribution Comms Status window.

2-3.15.2 User Products. Click on the Products box and, by default, the RPG Product Distribution Control window for Class 2 Users (Permission) opens. See Figure 2-69, RPG Product Distribution Control - Class 2 Users. The top of the window contains the control boxes. In the upper left hand corner, the Close button closes the entire window (if no changes were made) and returns the user to the HCI. Three of the other four buttons are initially grayed out and desensitized (Save, Undo, and Baseline Update). The Baseline: Restore button is sensitized and available at any time for the operator to restore the window to the baseline values. When the password is successfully entered, the Base: Update button is sensitized. When changes are made to the data, the Save and Undo buttons become sensitized, the Baseline: Restore button remains sensitized, and the Baseline: Update button becomes grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized. The Baseline: Restore button remains sensitized, and the Baseline: Update buttons returns to the sensitized state only if the password had been previously entered.

The Class 2 Users (Permission) and Class 4 Users (Distribution) windows act differently than any other windows. These two windows are editable without a password since they are considered the current lists, not the default lists. The default lists are maintained by the baseline copy and changing them, using the Baseline: Update button, requires a ROC level password.

The operator can edit the working copy of both classes of data without a password, and can save or undo them at any time. The operator can also go back to the original default setting by simply selecting the Baseline: Restore button, again without needing a password.

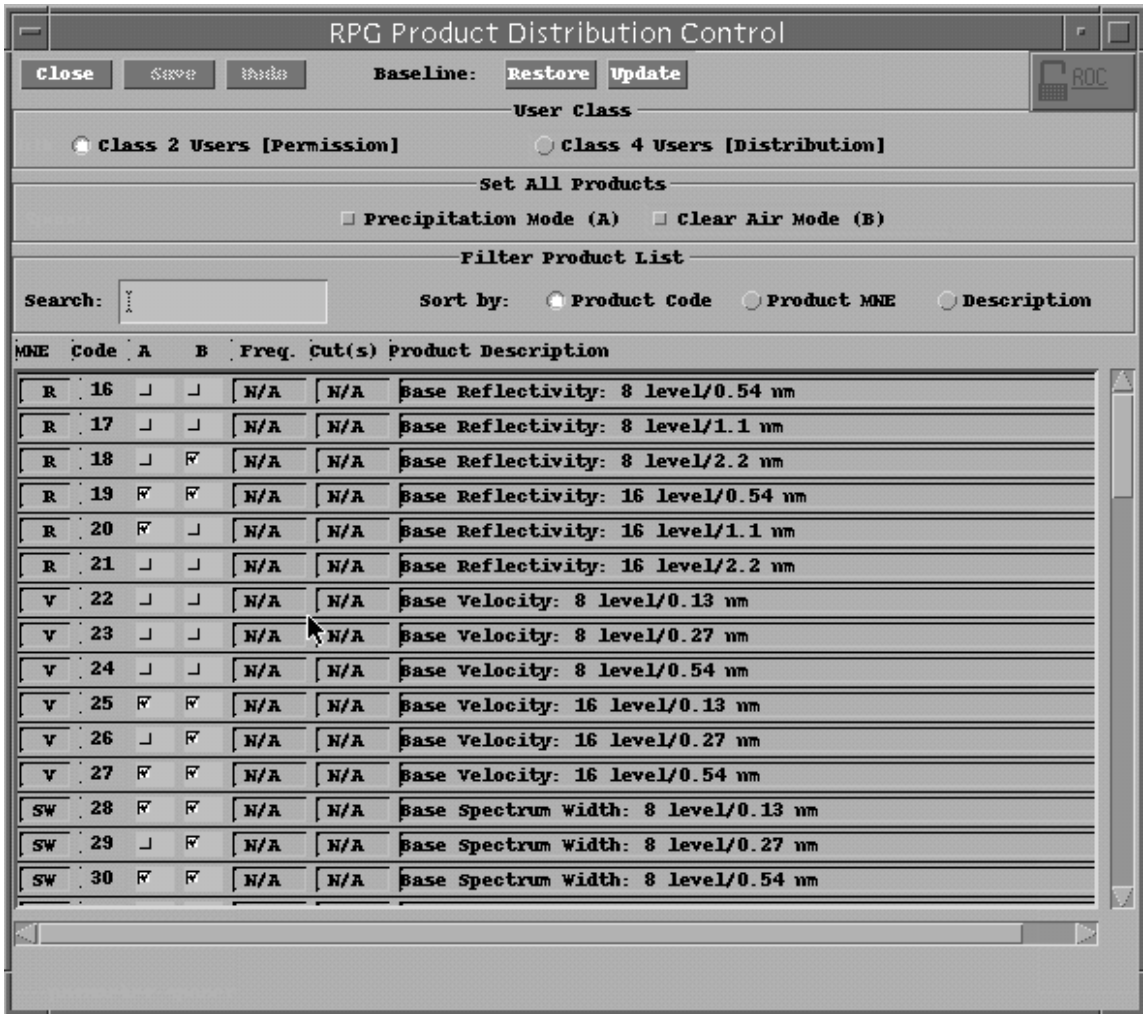


Figure 2-77. RPG Product Distribution Control - Class 2 Users

2-3.15.2.1 Password. To edit the fields in the RPG Product Distribution Control windows or to restore the baseline values, no password is necessary. However, in order to update the baseline values, the ROC LOCA password must be successfully entered. Follow the procedures described in paragraph 2-2.4.1.7 Padlock Window.

2-3.15.2.2 User Class. By default, the Class 2 Users (permission) option appears on the window. This allows the editable fields of either Precipitation Mode A or B be selected for each product. Clicking on the Class 4 Users (Distribution) option in the second line (User class) of the window opens up the Class 4 Users (Distribution) option. See Figure 2-78. RPG Product Distribution Control - Class 4 Users. Click on the button to the left of the title or on the title itself. The active option will have the button turn white and a red outline around the title.

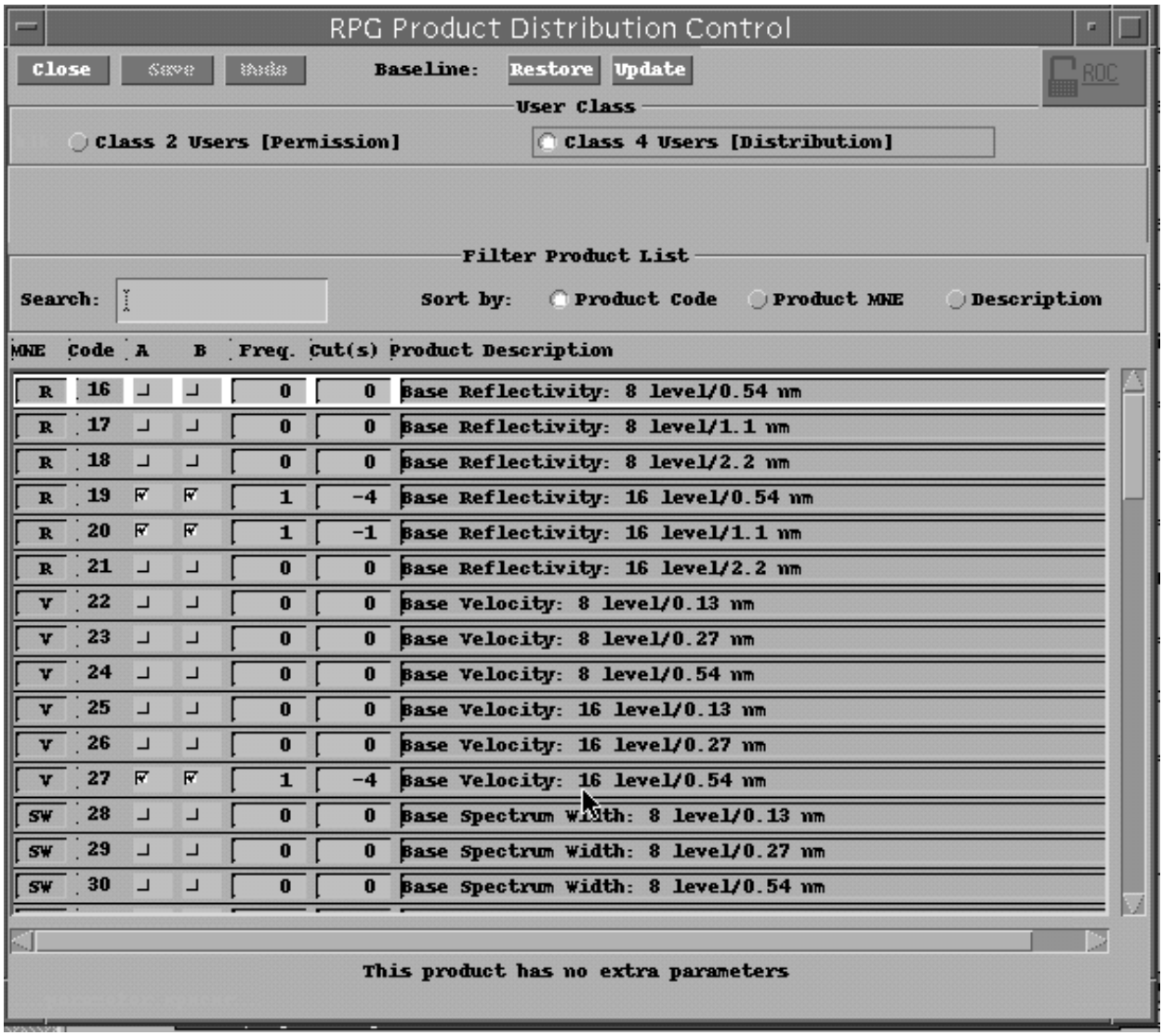


Figure 2-78. RPG Product Distribution Control - Class 4 Users

With the Class 4 Users (Distribution) option selected, the operator can still change the Precipitation Mode A or B setting and can also now change the Frequency and Cut(s) of each product.

2-3.15.2.3 Set All Products. The second line of options is only available with the class 2 Users (Permission) window, and is used to set All Products. (Note that when Class 4 Users (Distribution is selected, this portion of the window goes blank). If the box to the left of each option is blank, then neither option is selected. Click on the box or on the title itself, and a black check mark with white background opens in the box. This indicates that the related product list has been selected. Once the box has been checked, all the products listed in the table below will have the corresponding column A or B selected. To delete the entire list, click again on the box (or the title) and all the check marks in column A or B will be deleted. To return to the default values, click on the Base-

line: Restore button on the top line of the window and answer Yes to the warning_popup window.

2-3.15.2.4 Filter Products List. The next set of options allows the user to filter the product list. This can be done either by the Search capability, or by the preset Sort by options of Product Code, Product MNE, or Description. If there are no characters entered in the Search box, then the filter process will determine which of the three fixed options have been selected. If Product Code is clicked or has a white button to the left of the title, the products will be sorted numerically by Product Code. If Product MNE or Description is clicked or has a white button to the left of the title, the product will be sorted in alphabetical order of either the MNE or the Product Description.

If there are characters (letter, numbers, or any other keystrokes) entered in the Search box and the Return key pressed, the filter process will refresh the table and list only those Products found with those characters, in either the MNE column or the Product Description column.

To return to a full display of products, clear out all the characters in the search box and press the Return key.

Once one of these four options has been selected, a red outline box surrounds the option, the button turns to white (for the three fixed options), and the filter or sort process takes place in the table below.

2-3.15.2.5 Products List. There are seven columns in the Product List at the bottom of the window. These are:

MNE	(Mnemonic of Product)
Code	(Numerical Number of Product)
A	(Weather Mode A)
B	(Weather Mode B)
Freq	(Frequency)
Cut(s)	(Elevation cuts)
Product Description	(Product Description)

There is a scroll bar down the right hand side of the window to facilitate viewing the list of all the products.
The user has the option to select if the product(s) will be listed either under the Precipitation Mode (A), the Clear Air Mode (B), both of the modes, or neither of the modes. To select the product for a mode, click on the box under column A or B. The box turns to white and a black check mark opens. If both boxes are checked for a product, then it will appear in both modes. If neither box is checked, then it will not appear in either mode.

To change the frequency of the product, click on the Freq. block for the desired product, enter the desired numeric value, and press the Return key. The allowable range is 0 to 50. For example, an entry of 2 would mean that the product would be available every second volume scan. If a entry outside of this range is entered, a warning_popup appears that states: "You entered an invalid frequency of XXX. The valid range is 0 to 50." XXX is the value just entered by the operator. Click on the Continue box to return back to the same editable field.

To change the Cut (s) selection, click on the Cut(s) block for the desired product, enter the desired numeric value, and press the Return key. To select a specific slice, enter in a positive number from 1 to 20. For example, an entry of 2 would mean that the product would be available for the second elevation slice. If too large of a value would be entered, a warning_popup appears that states: "You entered an invalid elevation of XXX. The valid range is 0 to 20." XXX is the value just entered by the operator. Click on the Continue box to return back to the same editable field. To select the lowest levels, enter in a negative value (range is from -1 to -20). For example, an entry of -3 would mean that the product would be available for the lowest three elevation slices. If too large a negative value is entered, a warning_popup appears that states: "You entered an invalid slice of -XXX. The valid range is -1 to -20." XXX is the value just entered by the operator. Click on the Continue button to return to the same editable field.

2-3.15.2.6 Save Button. Once a change has been made to the window, the Save button becomes sensitized. Click on the Save button and a warning_popup opens that states: “Do you want to save your changes to the product distribution control data?” Click on either Yes or No. If Yes is selected, the changes are saved and the Save button becomes grayed-out and desensitized. If No is selected, the changes are not saved but are still in the fields and the Save button remains sensitized.

If only a weather mode or a frequency has been selected and a Save/yes has been attempted, another warning_popup appears that states: "An incomplete record was detected. You must define both a frequency and wx mode. Do you want to continue with the save and discard the incomplete records?" Click on either Yes or No. If Yes, the changes are saved except for the discarded incomplete records and the Save and Undo buttons are grayed-out and desensitized. If No, the operator is returned to the RPG Product Distribution Control window and the Save and Undo buttons are still sensitized.

2-3.15.2.7 Undo Button. The Undo button undoes any changes that have been made since the last Save. There is no warning_popup as the changes are deleted and the user is returned to the Product Distribution Control window. Once the changes have been deleted, the Undo and the Save buttons become grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized and available to the operator.

2-3.15.2.8 Baseline Restore/Update Buttons. First paragraph, all four lines, delete those lines and replace them with the following:

The Baseline: Restore button is sensitized at all times. The Baseline: Update button is grayed-out and desensitized unless the ROC LOCA password has been successfully entered. Then it still remains grayed-out and desensitized until edits have been made and Saved. Then, and only then, will the Baseline: Update button be sensitized and functional.

Click on the Restore button and a warning_popup opens that states: “You are about to restore the product distribution control data to baseline values. Do you want to continue?” Click on either Yes or No. The appropriate actions are made and the user is returned to the Product Distribution

Control window.

Click on the Update button and a warning_popup opens that states: “You are about to update the product distribution control data. Do you want to continue?” Click on either Yes or No. The appropriate actions are made and the user is returned to the Product Distribution Control window.

2-3.15.3 User Status. Clicking on the Status button in the Users icon opens the PUP/RPGOP Status window which displays information about each of the communication lines. See Figure 2-79. Three columns appear: Line ID, State, and Error Status. There is a scroll bar to the far right of this top window that allows the operator to scroll through the entire list of communication lines.

Figure 2-79. PUP/RPGOP Status

Click on any line under the Line ID column and the new status will be updated on that line. A command line will appear on top of the column headings that states: “Cmd: Requesting PUP Status for line X.”

Click on any line under the Error Status column and the Active Errors will be displayed in the table labeled Active Errors (below the line listing). Scroll bars are available in the active errors to expand the view to read the entire text.

Click on the Close button in the upper left hand corner of the Status Box window to return the

operator to the HCI.

2-3.16 Text Strings.

Text Strings are located around the HCI in a variety of locations. They are described below by location and then by text description.

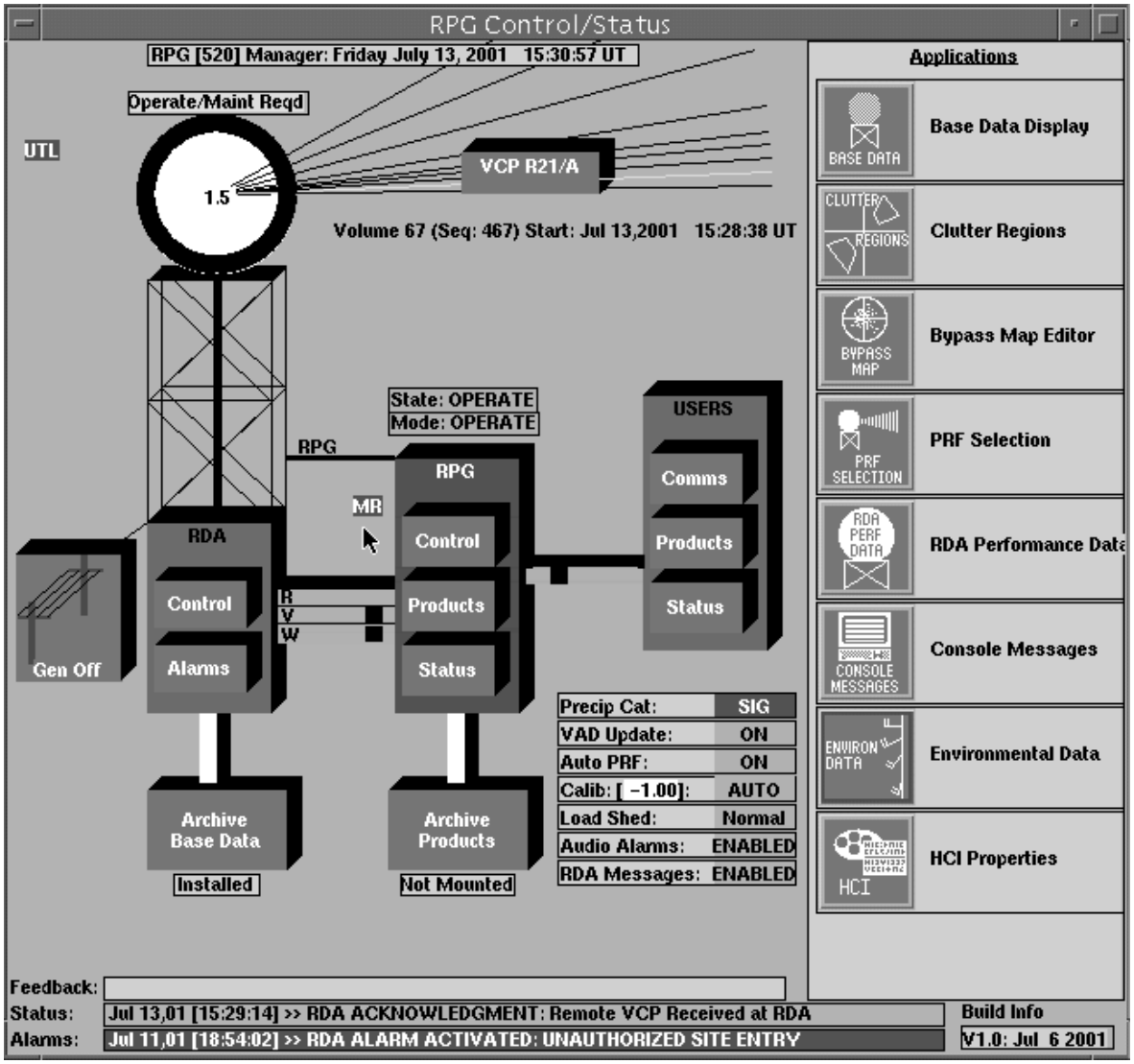


Figure 2-80. RPG Control/Status

2-3.16.1 Top Center. RPG Site System Manager, Date, Time (Universal Greenwich Mean Time)

2-3.16.2 Top of Radome. The state and condition of the RDA are listed in the text string displayed over the top of the radome. The state is listed first, followed by the condition if appropriate. The state of the RDA will be listed as one of the following:

Operate

Standby
Startup
Restart
Playback
Offline Operate
Unknown

The condition will be listed second and is the determinate in the color coding of the text string. The condition and the associated background colors are:

Operate	(Green)
Secondary	(Green)
Maint Reqd	(Yellow)
Maint Mand	(Orange)
Inoperable	(Red)
Unknown	(Red)

If the state and condition are both the same (i.e. Operate/Operate) only one of the words will be displayed in the text string.

2-3.16.3 Left of Radome. The RDA Alarms are identified by the three letter acronyms ARC, CTR, PED, RSP, USR, STL, WID, and XMT with a red background. These are explained in more detail in paragraph 2-3.7, RDA Alarm Summary.

2-3.16.4 Center (near top) in Radial Lines in VCP button. Current VCP.

2-3.16.5 Center (near top) under Radial Lines. Volume number, Sequence number, and the Start date/time of the volume scan. The Volume number will range from 1 to 80 and is used for easy reference and in the algorithms. The Sequence number (of the volume) will range from 1 to 9999 and is important internally to the RPG.

2-3.16.6 Center of Tower - TPS. If the site has a TPS installed and it is operational, there will be a text string appear in the center of the tower that states TPS OK. If the TPS is not operational, it will state: “TPS INOP.: If there is no TPS installed, there will be no text string.

2-3.16.7 Center Left: Gen Off or On Line. Click the text for the warning_popup to change the RDA power source.

2-3.16.8 Above Wideband Graphic. One of the three text messages (RDA, RPG, or Either) indicates which system currently has control of the RDA.

2-3.16.9 Center Top of RPG Icon. Top line describes the state of the RPG. Bottom line describes the Operational Mode of the RPG.

2-3.16.10 Bottom Lower Left. Three lines of information display the Feedback from the HCI, and the Status and Alarms from the RPG. These are discussed in more detail in the following subparagraphs.

2-3.16.10.1 Feedback. The Feedback line provides responses to inputs by the user throughout the windows in the HCI. It is not an editable field but is for information only. It will have a gray background.

2-3.16.10.2 Status. The status line displays the most recent status message (that is not an Alarm or error related message) received in the RPG system log. The full listing of status messages is available for viewing by clicking on the Status button in the RPG icon in the center of the HCI.

2-3.16.10.3 Alarms. The Alarm line displays the most recent alarm or error-related message received on the RPG system log. The background color is color coded the same as the alarm coding: Red for Alarm, Yellow for Error, and Green for Alarm cleared. The full listing of alarms and errors is available for viewing by clicking on the Status button in the RPG control box in the center of the HCI.

2-3.16.11 Lower Left Under Archive Base Data Icon. Top line is Status of Archive II. Bottom line (present only when Archive II is recording) is "XXX vols left on tape # ___"

2-3.16.12 Lower Center under Archive Products Icon. Top Line is status of Archive III. Bottom line is amount of recording media used by Archive III.

2-3.16.13 Lower Right. Software Build Date.

2-3.16.14 Lower Right Under Users Icon. There are seven lines of information available. See Figure 2-81.

In an FAA Redundant configuration, there will be an eighth line of information labeled Adapt: Match or Mismatch. This is described in paragraph 2-7.3.2.4.

Precip Cat:	SIG
VAD Update:	ON
Auto PRF:	OFF
Calib: [-1.00]:	AUTO
Load Shed:	Normal
Audio Alarms:	ENABLED
RDA Messages:	ENABLED

Figure 2-81. Lower Right Under Users Icon

2-3.16.14.1 Precip Cat (Precipitation Category). This line displays the current precipitation category as Significant (SIG in red background), Light (LIGHT in yellow background), or None (NONE in green background). Click on the category to open up the Precipitation Status window.

See Figure 2-82.

Click on the Close button in the upper left hand corner of the Precipitation Status window to close the entire window and return the user to the HCI. The only other action the user can take is to click on the Modify Parameters button. All of the rest of the information in the Precipitation Status window is non-editable.

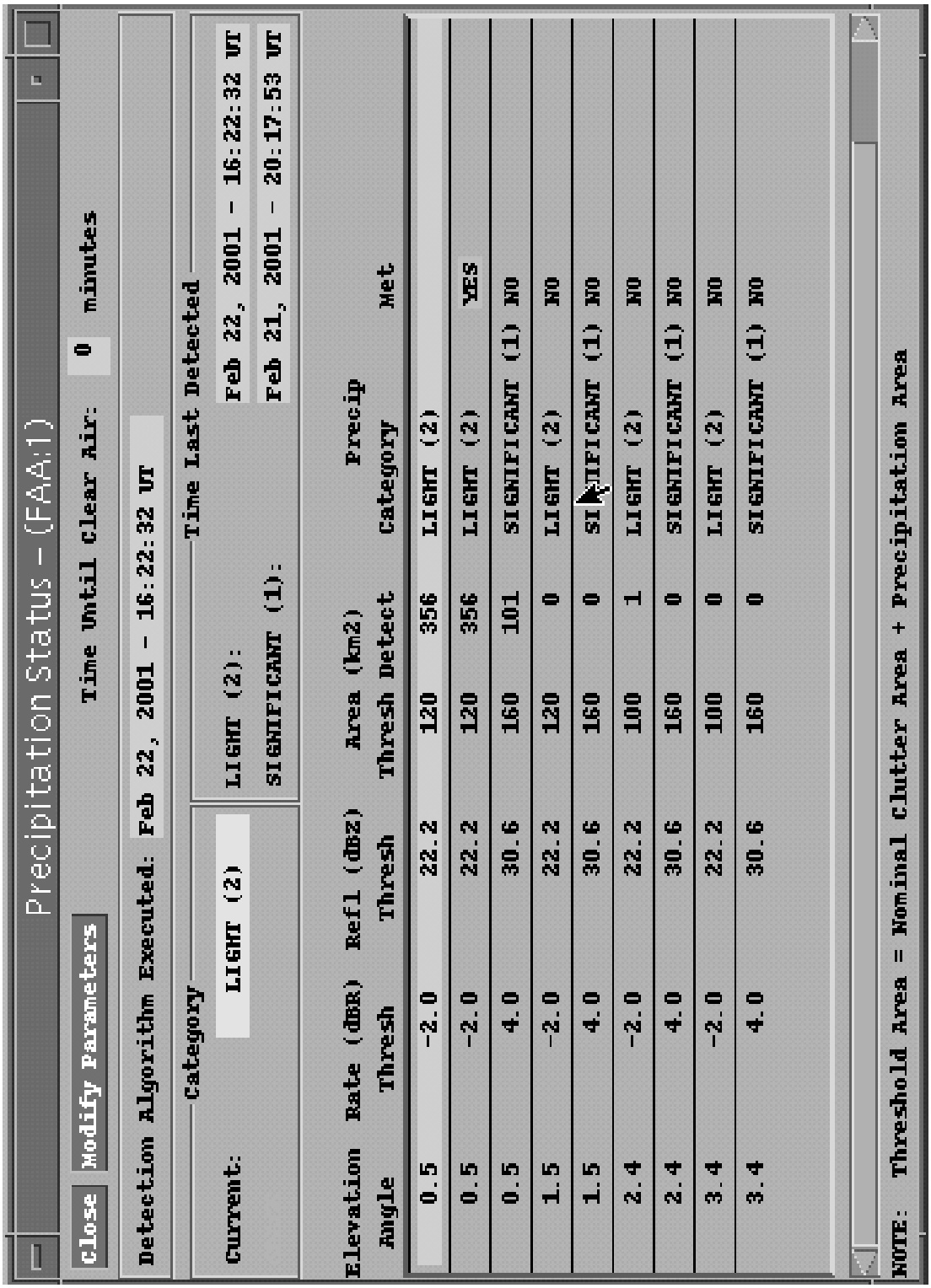


Figure 2-82. Precipitation Status

2-3.16.14.1.1 Modify Precipitation Detection Parameters. To change the parameters that are used to detect precipitation, click on the Modify Parameter button, upper left of Precipitation Status Window. The Modify Precipitation Detection parameters window opens. See Figure 2-83. The top line has five buttons and the padlock for the password protected entries. The first button, Close, closes the window and returns the user to the Precipitation Status window. The other four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

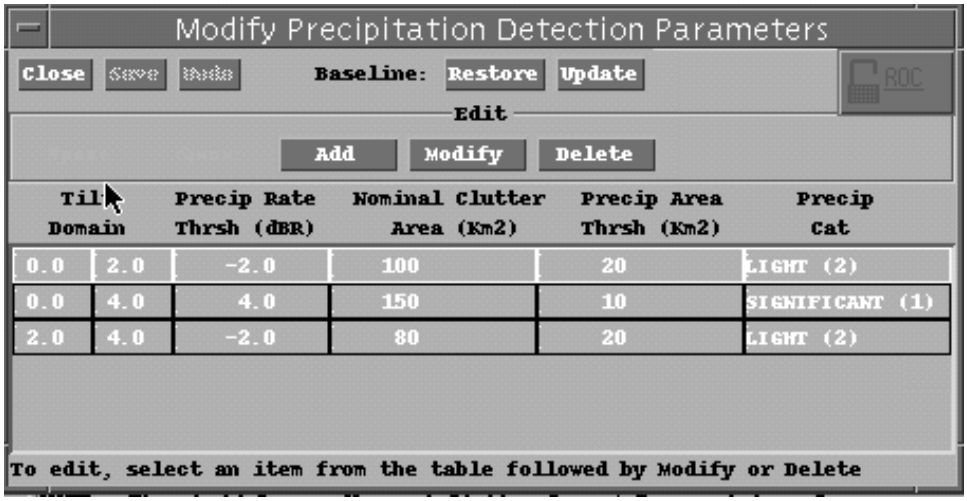


Figure 2-83. Modify Precipitation Detection Parameters

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7.

The user must now go to the second line in the window under the Edit title where there are three buttons: Add, Modify, or Delete. Click on the appropriate button for the changes that are to be made, and a separate window opens. The editable fields in each of these three windows are now highlighted with a light blue background and can be edited.

2-3.16.14.1.1.1 Add Precipitation Table Item. Click on the Add button and the Add Precipitation Table Item window opens. See Figure 2-84. The Close button is sensitized and when clicked, returns the user to the Modify Precipitation Detection Parameters window. The Apply button is grayed-out and desensitized until an input has been made in the table. Then it becomes sensitized. There are six categories of information that may be edited. The six categories and their ranges of authorized values are:

Minimum Elevation Angle (-1 Degree to + 40 Degrees)
Maximum Elevation Angle (-1 Degree to + 40 Degrees)

Precipitation Rate Threshold (-30 to + 50 dBR Threshold)
Nominal Clutter Area (0 to 80000 Km2)
Precipitation Area Threshold (0 to 80000 Km2)
Precipitation Category (None - 0 - white; Significant - 1 - red; Light - 2 - yellow)

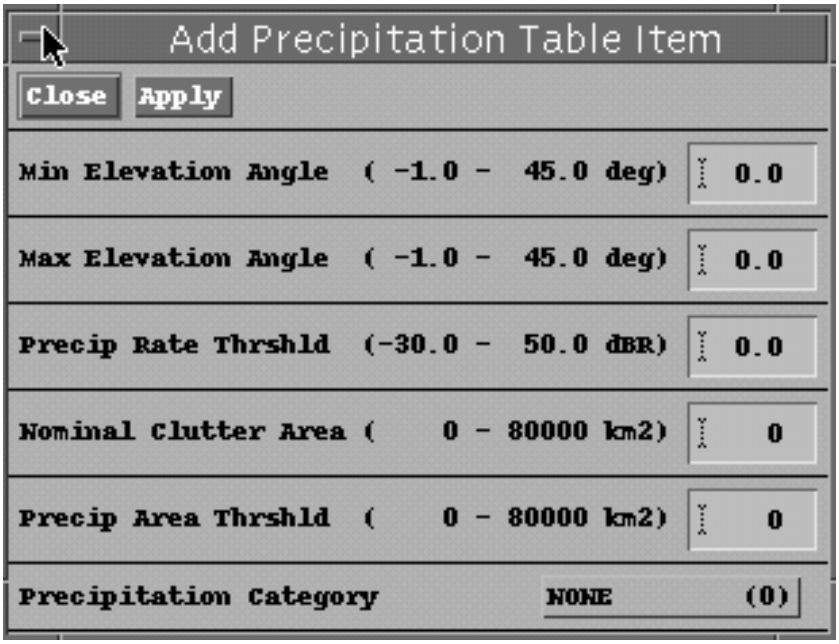


Figure 2-84. Add Precipitation Table Item

If a numerical input is made that is outside the respective ranges and the Return key is pressed or mouse clicked elsewhere, a warning_popup opens that states: “You entered an invalid value of XXX. The valid range is AA to BB.” (XXX is the value just entered, AA is the lowest value the user can enter, BB is the highest value the user can enter.) Click on Continue, the original value of the box will be restored, and the user is returned to the Add Precipitation Table Item Window. If a correct entry has been made, move the cursor and click to the next category. For the Precipitation category, click on the category box and the three options will scroll in sequence. Continue to click until the desired category is listed.

Once all the categories have been correctly entered, move the cursor to the Apply button in the upper left hand corner and click. This enters the information into the Modify Precipitation Detection Parameters Table and determines the Precipitation Category that is displayed on the bottom line of the Add Precipitation Table Item window. To close this window, move the cursor to the Close button in the upper left hand corner and click.

2-3.16.14.1.1.2 Modify Precipitation Table Item. To modify a line, click on any item in that particular line. Then click on the Modify button and the Modify Precipitation Table Item window opens with the current values selected. See Figure 2-85.

NOTE

The Modify Precipitation Table Item window will not open if there is an Add Precipitation Table Item window open. Likewise, the Add Precipitation Table Item window will not open if the operator has already opened a Modify Precipitation Table Item window. Only one or the other can be opened at any one time.

The Close button is sensitized and when clicked, returns the user to the Modify Precipitation Detection Parameters window. The Apply button is grayed-out and desensitized until an input has been made in the table. Then it becomes sensitized. There are six categories of information that can be modified. The six categories and their ranges of authorized values are:

Minimum Elevation Angle (-1 Degree to + 40 Degrees)
Maximum Elevation Angle (-1 Degree to + 40 Degrees)
Precipitation Rate Threshold (-30 to + 50 dBR Threshold)
Nominal Clutter Area (0 to 80000 Km2)
Precipitation Area Threshold (0 to 80000 Km2)
Precipitation Category (None - 0 - white; Significant - 1 - red; Light - 2 - yellow)

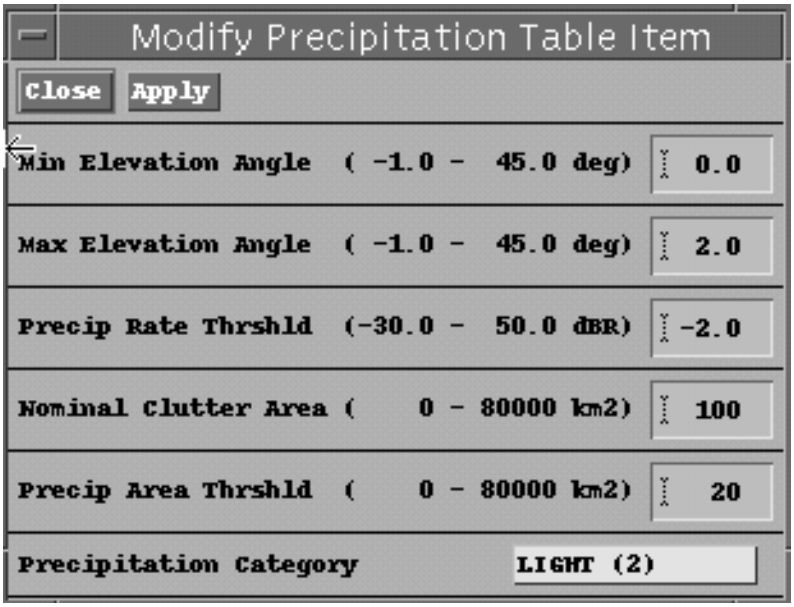


Figure 2-85. Modify Precipitation Table Item

If a numerical input is made that is outside these respective ranges and the Return key is pressed (or mouse clicked elsewhere once), a warning_popup opens that states: “You entered an invalid value of XXX. The valid range is AA to BB.” (XXX is the value just entered, AA is the lowest value the user can enter, BB is the highest value the user can enter). Click on Continue, the original value will be restored, and the user is returned to the Add Precipitation Table Item. If a correct entry has been made, move the cursor and click to the next category. For the Precipitation category, click on the category box and the three options will scroll in sequence. Continue to click

until the desired category is listed.

Once all the categories have been correctly entered, move the cursor to the Apply button in the upper left hand corner and click. This enters the information onto the Modify Precipitation Detection Parameters Table. To close this window, move the cursor to the Close button in the upper left hand corner and click. If the Close button has been clicked before the Apply button, then the changes are not made to the table and the user is returned to the Modify Precipitation Detection Parameters window.

2-3.16.14.1.1.3 Delete Precipitation Table. To delete a line in the Precipitation table, first click on any value in that line. Then click on the Delete button. A warning_popup appears that states: "You are about to delete the highlighted Precipitation Detection record. Do you want to continue?" Click on either Yes or No. If Yes, the line is deleted and the user returned to the Modify Precipitation Detection Parameters window. The Save and Undo buttons are now sensitized. If No, nothing is deleted and the user returned to the Modify Precipitation Detection Parameters window.

2-3.16.14.1.1.4 Save and Undo Buttons. Once changes have been added, modified, or deleted, then the Save and Undo buttons are sensitized. Click on the Save button to save the changes made to the Precipitation categories and tables. A warning_popup opens that states: “You are about to modify Precipitation Threshold Adaptation Data. Do you want to continue?” Click on either Yes or No. If Yes, the changes are saved and the user is returned to the Modify Precipitation Detection Parameters window. If No, the changes are not saved and the user is returned to the Modify Precipitation Detection Parameters window. Clicking on the Close button returns the user to the Precipitation Status window with no warning_popup.

Click on the Undo button to undo the changes that were made. There are no warning-popups and the user is returned to the Modify Precipitation Detection Parameter window. The Undo and Save buttons become grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized and available to the operator.

If the user clicks on the Close button before the Save or Undo button, a warning_popup opens that states: “You modified Precipitation Threshold Adaptation Data without saving it. Do you want to save it?” Click on either Yes or No. If Yes, the changes are saved and the user is returned to the Precipitation Status window. If No, the changes are not saved and the user is returned to the Precipitation Status window.

After the changes have been saved, they go into effect at the beginning of the next volume scan.

2-3.16.14.1.1.5 Baseline: Restore and Update. The Baseline: Restore and Update buttons are sensitized either after the password has been initially successfully entered or after changes have been saved or undone. While changes are being made and the window edited, the Baseline: Restore and Update buttons remain grayed-out and desensitized.

Click on the Baseline: Restore button to restore all values in that window back to the baseline values. A warning_popup opens that states: “You are about to restore the product parameters adapta-

tion data to baseline values. Do you want to continue?" Click on either Yes or No. If Yes, the values are restored to the baseline values and the user is returned to the Modify Precipitation Detection Parameters window. If No, then no changes are made and the user is returned to the Modify Precipitation Detection Parameters window.

Click on the Baseline Update button to modify the baseline values to include these changes that have been just made. A warning_popup opens that states: "You are about to replace the baseline product parameters adaptation data values. Do you want to continue?" Click on either Yes or No. If Yes, the baseline values are changed and the user returned to the Modify Precipitation Detection Parameters window. If No, then no changes are made and the user is returned to the Modify Precipitation Detection Parameters window.

2-3.16.14.1.2 Precipitation Status. The rest of the window provides information to the operator. None of the fields are editable by the user.

2-3.16.14.1.2.1 Time Until Clear Air. This is the time remaining until Clear Air, which starts 60 minutes after Significant Precipitation (Category 1) was last detected.

2-3.16.14.1.2.2 Detection Algorithm Executed. This is the date/time of the most recent execution (start) of the Precipitation Detection Algorithm.

2-3.16.14.1.2.3 Category: Current. The Category Current: is the category of precipitation that is currently being detected by the algorithm.

2-3.16.14.1.2.4 Time Last Detected, Light and Significant. Time Last Detected: Light (2) is the date/time that Light precipitation was detected. Time Last Detected: Significant (1) is the date/time that Significant precipitation was detected.

2-3.16.14.1.2.5 Table of Threshold and Detection Data. The displayed precipitation category field is determined by the Table Threshold and Detection Data. The criteria are:

- If detected precipitation category field is 1 (Significant), then the detection and threshold data that met the category 1 criterion is displayed. If none, then the detection and threshold data with the largest detected area that met the category 2 (Light) is displayed. If currently no detection, then "DATA NOT AVAILABLE" is displayed.
- If detection precipitation category field is 2 (Light), then the detection and threshold data with the largest detected area that met the category 2 criterion is displayed.
- If detected precipitation category field is 0 (None), then the category 1 criterion and threshold data for the largest detected area is displayed.
- Only the three most significant threshold data lines will be displayed. There may be other criteria lines in the Modify Precipitation Detection Parameters window, but the lower category lines will not be displayed in this table.

The following columns of information are displayed:

- Elevation Angle: Radar elevation angle in degrees for which a row in the Precipitation threshold table applies.
- Rate (dBR) Thresh: Minimum rainfall rate (in dBR) for a Reflectivity bin to count toward the precipitation area for a particular row in the related Precipitation Detection window. (Equivalent to the Reflectivity (in dBZ)).
- Refl (dBZ) Thresh: Minimum reflectivity (in dBZ) for a Reflectivity bin to count toward the precipitation area for particular row in the related Precipitation Detection window. (Equivalent to the rainfall rate (in dBR)).
- Area (km2) Thresh: Minimum area (in km squared) covered by precipitation in the Precipitation Threshold Table. (Note that the threshold area will consist of the nominal clutter area and the precipitation area.)
- Area (km2) Detect: The actual precipitation area detected (in km squared).
- Precip Category: The code for the current precipitation category:
  0 - No Precipitation
  1 - Significant Precipitation
  2 - Light Precipitation
- Precip Met: Either Yes or No.

2-3.16.14.2 VAD Update. This is the on/off toggle for the Auto VAD Update function. It displays either the word ON with a green background or the word OFF with a red background. The user can initiate a change of this selection by clicking on the word ON or OFF. A warning_popup opens that asks: “Do you want to disable (enable) VAD update?” Click either Yes or No. The change will be made and the user returned to the HCI.

2-3.16.14.3 Auto PRF. This is the on/off toggle for the Auto PRF function. It displays either the word “ON” with a green background or the word “OFF” with a red background. The user can initiate a change of this selection by clicking on the word ON or OFF. A warning_popup opens that asks: “You are about to disable (enable) the Auto PRF function. Do you want to continue?” Click either the Yes or No block. The change will be made and the user returned to the HCI.

There is one situation where the user can not enable the Auto PRF. If the reflectivity moment is not enabled and the user attempts to toggle the Auto PRF on, a warning_popup will appear that states: “You cannot enable Auto PRF when reflectivity is not enabled.” Click on Continue and the user is returned to the HCI.

2-3.16.14.4 Calib (Value) AUTO. This displays the current Delta System calibration value of the RDA in 0.25 dBZ increments when Auto calibration is on (AUTO with a green background) or shows the manually selected calibration value when auto calibration is off (MANUAL with a red background). When the wideband line is connected, clicking on the word AUTO opens the Reflectivity Calibration window where the user selects a manual calibration value. Click on the word MANUAL to initiate a change back to Auto Calibration. See paragraph 2-3.10.1.10.2, for a complete detail on how to use the Reflectivity Calibration window.

2-3.16.14.5 Load Shed. This line displays the status of various Load Shed categories with

either the word Normal with a green background, the word Warning with a yellow background, or the word Alarm with a red background. Click on any of these three words to open the Load Shed Categories window. See Figure 2-86. This window displays the thresholds for the warning and alarm levels as well as the current levels for all of the load shed categories. If the user has opened this window because a load shed alarm has occurred, a quick glance at the window will reveal which category is the cause. The current value is highlighted to match the threshold level. If the current value is at the alarm level, it will be highlighted in red. If the current value is at the warning level and up to the alarm level, it will be highlighted in yellow. If the current value is below the warning level, it will be highlighted in green. The load shed categories are as follows:

- CPU
- Distribution
- Product Storage
- RDA Radial
- RPG Radial
- Archive III

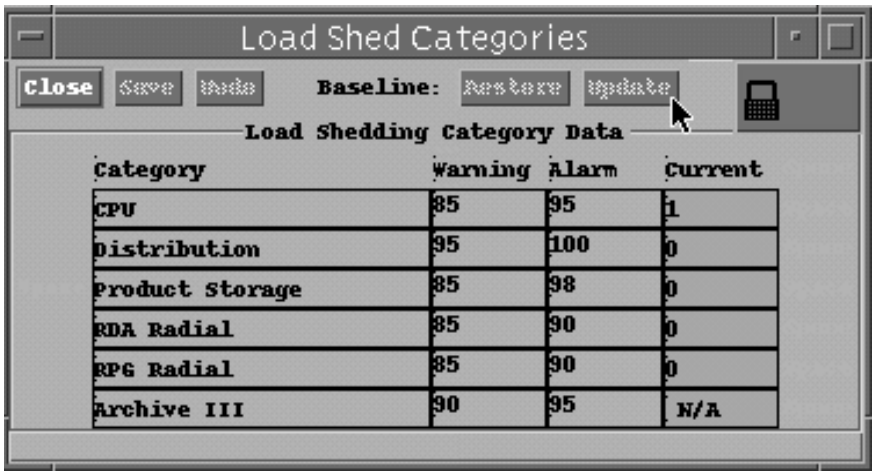


Figure 2-86. Load Shed Categories

The top of the window contains the control boxes. In the upper left hand corner, the Close button closes the entire window (if no changes were made) and returns the user to the HCI. The other four buttons: Save, Undo, Baseline: Restore and Update are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7.

To change parameters in the Warning column, click on the desired block and enter the value desired. The allowable range is from 0 to the Alarm Value. If the user enters a value too large, a warning_popup opens that states “You entered an invalid value of XXX. The valid range is 0 to AAA”. (XXX is the value entered by the user. AAA is the value of that particular category's Alarm Value.) Click on Continue to return to the Load Shed Categories window. The invalid entry is deleted and the previous value restored to that block.

To change parameters in the Alarm column, click on the desired block and enter the value desired. The allowable range is from the Warning value to 100. If the user enters a value outside that range, a warning_popup opens that states “You entered an invalid value of XXX. The valid range is BBB to 100.” (XXX is the value entered by the user. BBB is the value of that particular category's Warning value.) Click on Continue to return to the Load Shed Categories window. The invalid entry is deleted and the previous value restored to that block.

Once the password has successfully been entered, two of the control buttons in the center top of the window become sensitized and are no longer grayed-out. These are the Baseline: Restore and Update buttons. Clicking on the Restore button brings up a warning_popup that states: “You are about to restore the load shed adaptation data to baseline values. Do you want to continue?” Click on the Yes button and the figures are reset to the baseline values. Click on the No button and the window disappears without any changes and returns the user to the Load Shed Categories window. Clicking on the Update button brings up a warning_popup window that states: “You are about to replace the baseline load shed adaptation data values. Do you want to continue?” Click on the Yes button or Space Bar and the baseline value are reset to the values currently showing on the Load Shed Categories window. Click on the No button and the window disappears without any changes to the baseline and returns the user to the Load Shed Categories window.

Once any changes have been successfully made to the Warning or Alarm columns, then the Save and Undo buttons in the upper left corner of the window become sensitized. At the same time, the Baseline: Restore and Update buttons become desensitized. Clicking on the Save button brings up a warning_popup that states: “Do you want to save your changes?” Click on the Yes button to save the changes, or click on the No button and the changes will not be saved. Clicking on the Undo button removes all the changes that were made and the window is restored to its previous values. There is no warning_popup window with the Undo block. The Undo and Save buttons become grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized and available to the operator.

If at any time the red open padlock is clicked, a warning_popup opens that states: “Do you want to save your changes?” Click on the Yes button to save the changes, or click on the No button and the changes will not be saved. The user is then returned to the Load Shed Categories window and the padlock turns to black and is locked.

2-3.16.14.6 Audio Alarms. Click on the right hand side of the text line (when the pointing hand opens) to toggle the audio alarm between ENABLED with a green background and DISABLED with a red background. This toggles the audio alarms on or off.

2-3.16.14.7 RDA Messages. Click on the right hand side of the text line (when the pointing hand opens) to toggle the RDA messages between ENABLED with a green background to DISABLED with a red background. This toggles the RDA messages on or off.

2-3.16.14.8 FAA Redundant Adaptable Parameters Match. In an FAA Redundant configuration, there will be an eighth text line that states Adapt Times: MATCH (with a green background) or MISMATCH (with a red background). If at the HCI of the non-controlling channel, nothing will happen when the MATCH/MISMATCH button is clicked. If at the HCI of the controlling channel, then the cursor will turn to the pointing hand over the word MATCH or MISMATCH.

Clicking on either the MATCH or MISMATCH title brings up a warning_popup that states: “Are you sure you want to force an update of adaptation data on the other channel?” Click on either Yes or No. If Yes, the older adaptation data will be updated and match the newer adaptattion data and the text string will change to MATCH with a green background. If No, the user will be returned to the HCI.

2-3.17 Applications Icons.

The right side of the RPG Status/Control window is devoted to activating various applications that are frequently used in the everyday operations and maintenance of the system. See Figure 2-87. These applications can be accessed primarily by clicking on the square icon button. A red outline will appear around the button, and the associated window will open for that particular application. The Applications available are:

- Base Data Display
- Clutter Regions
- Bypass Map Editor
- PRF Selection
- RDA Performance Data
- Console Messages
- Environmental Data
- HCI Properties

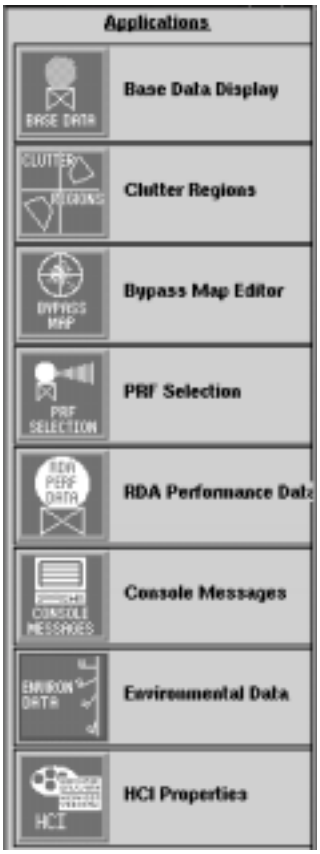


Figure 2-87. Applications Icon

The applications that deal primarily with operational considerations will be described in complete detail in Chapter 3. These are: Clutter Regions, Bypass Map Editor, PRF Selection, and Environmental Data. The other applications that are strictly functional are described below.

2-3.17.1 Base Data Display. Clicking on the Base Data Display icon brings up the RPG Base Data Display window. See Figure 2-88. By default, the contents of the Base Data window are updated as new base data are ingested into the RPG. The options on displaying the data are grouped down the left side of the window. The options are: Elevation, Data Range, Filter, Moment, Grid, Map, and Mode. Click on the Close button in the upper left hand corner to close the window and return the user to the HCI.

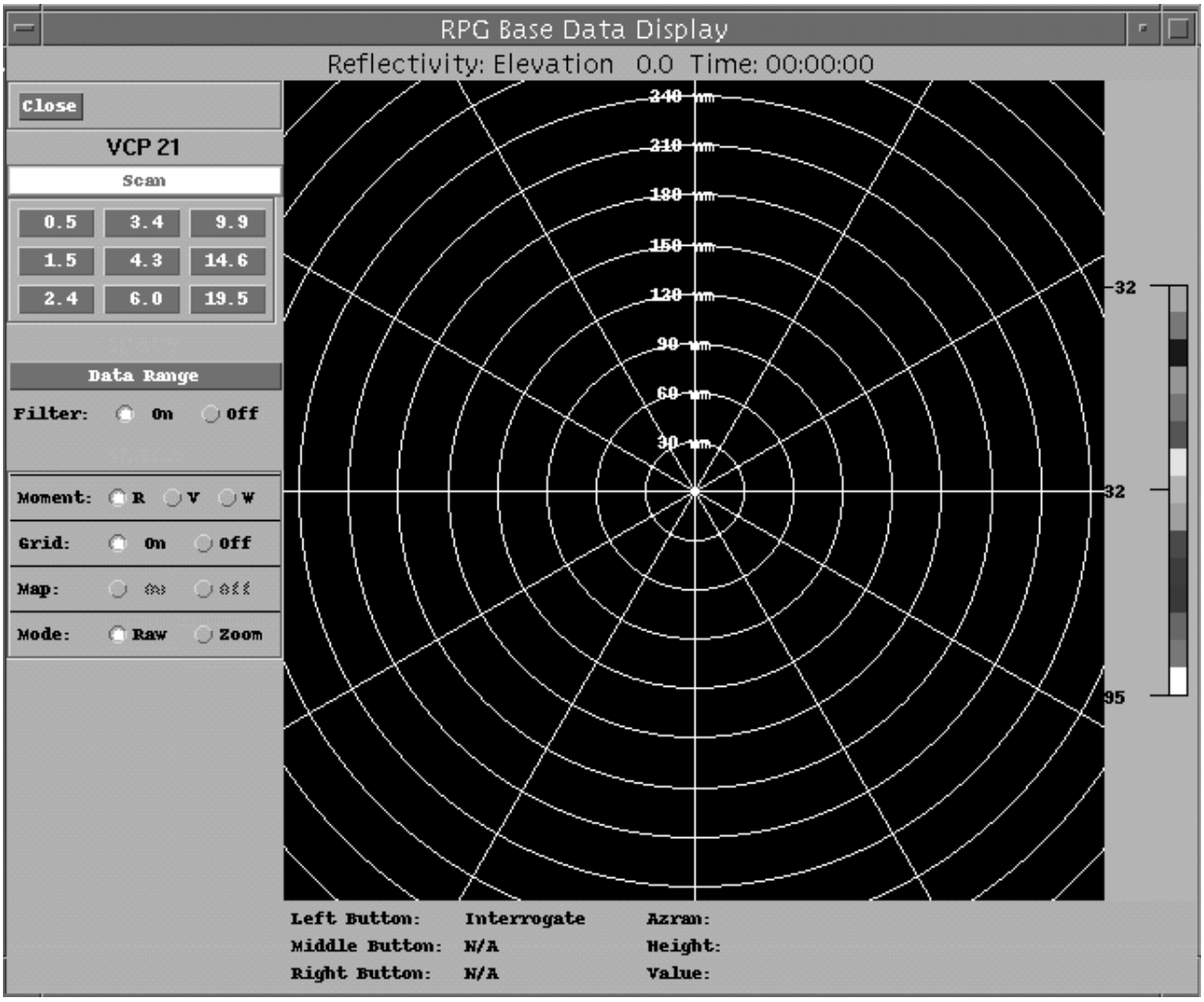


Figure 2-88. RPG Base Data Display

2-3.17.1.1 Scan and Elevation Buttons. Data displayed in this window is not available at a Distant MSCF (DoD and FAA) by design because of the limited bandwidth. The data can only be displayed at a Local MSCF or the RPG Terminal in the RPG cabinet.

The top button, Scan, places the Base Data Display window in dynamic mode. In this mode, the display is updated as each new radial is ingested from the RDA. When a new elevation scan is detected, data from the old elevation scan is cleared.

The rest of the Elevation buttons are used to select the newest previously ingested elevation scan for display and place the RPG Base Data Display window in static mode. In static mode, new radials are ingested from the RDA but are not displayed. The static elevation buttons match the elevation angles in the current VCP.

2-3.17.1.2 Data Range. Click on the Data Range button in the middle of the left hand column and the Set Data Range window opens. See Figure 2-86. There are six categories that are avail-

able for user to set. They are: Minimum Reflectivity (-32 dBZ to 95 dBZ), Maximum Reflectivity (-32 dBZ to 95 dBZ), Minimum Velocity (-246 kts to 244 kts), Maximum Velocity (-246 kts to 244 kts) Minimum Spectrum Width (0 kts to 20 kts), and Maximum Spectrum Width (0 kts to 20 kts).

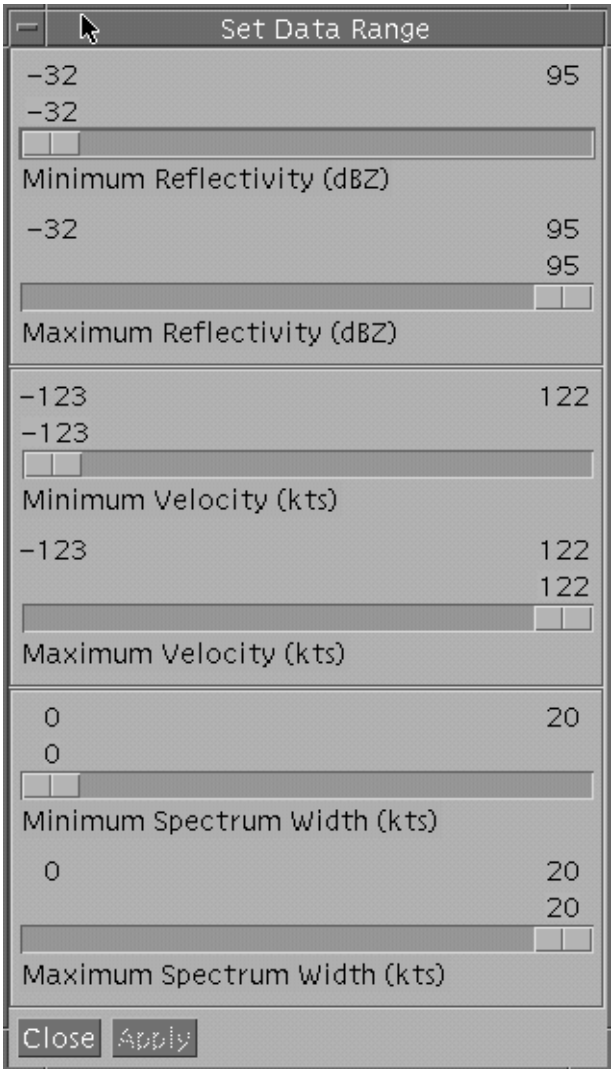


Figure 2-89. Set Data Range

Using the left mouse button, click, hold, and drag the horizontal sliding bar to the desired value for each field. The user can also use the arrow keys to move the cursor horizontally once the cursor has been placed on the sliding bar. There are checks with each pair of categories: minimum will always be less than the maximum and the maximum will always be more than the minimum. If the user accidentally slides one bar's value across its paired category, the bar will spring back to the nearest allowable value.

There are two control buttons, Close and Activate, on the left bottom of the window. Clicking on the Close button closes the window and sends the user back to the RPG Data Display window.

Any changes made are still in the Set Data Range window but they have not been applied to the RPG Base Data Display window. Click on the Activate button and the changes are made in the Base Data Display but the user remains in the Set Data Range window. There are no warning_popups that appear with this window.

2-3.17.1.3 Filter. The Filter On/Off option allows the operator to filter the data being displayed. When the filter is selected On, any data less than the lowest value on the scale or higher than the highest value on the scale will not be displayed. When the filter is selected Off, then all data less than the lowest value or higher than the highest value will be displayed in those appropriate colors. This filter works for all three of the moments and for all selected scales.

2-3.17.1.4 Moments Buttons. The Moment buttons are displayed along the middle left of the RPG Base Data Display window. They are used to change the currently displayed data through the various moments of reflectivity (R), velocity (V), and spectrum width (W). The moment currently displayed in the window will have the respective button to the immediate left of the R, V, or W colored white. Click on the desired moment's letter or its button and the display will be updated with the new selection.

2-3.17.1.5 Grid Buttons. The concentric circular grid is turned either On or Off with a click over the desired button or the desired On/Off title. The white dot indicates which option is currently selected.

2-3.17.1.6 Map Buttons. The On/Off Map overlays are either turned On or Off with a click over the desired button or on the desired On/Off title. The white dot indicates which option is currently functional. The default map extends to 240 nm. There are no maps that are presently available. There is no requirement at this time for this feature to be implemented, but the buttons are in place, desensitized, and grayed out.

2-3.17.1.7 Raw/Zoom Mode Buttons. The Raw/Zoom Mode buttons toggle between Raw Mode and Zoom Mode. In Zoom Mode, clicking anywhere in the RPG Base Data Display window places the clicked point is the center of the RPG Base Data Display window. The left button zooms in and the right button zooms out. In Raw Mode, if the Clutter Region Editor is not open, the left button click causes the data at the specified point to be displayed underneath the elevation buttons. If the Clutter Region Editor is opened and the base data window is in raw mode, dragging the left mouse button creates clutter suppression regions. Zoom mode operation is allowed when the Clutter Region Editor is opened.

2-3.17.2 Clutter Regions. Clicking on this icon opens the Clutter Regions Editor windows. It provides a window in which the user can define the attributes of clutter censor zones. It is described in complete detail in Chapter 3.

2-3.17.3 Bypass Map Editor. Clicking on this icon opens the Clutter Bypass Map Editor window. It provides a window in which the user can define the areas to bypass the clutter. It is described in complete detail in Chapter 3.

2-3.17.4 PRF Selection. Clicking on this icon opens the PRF Selection (Modify Current VCP)

window. It provides a window in which the user can modify the PRF selection. It is described in complete detail in Chapter 3.

2-3.17.5 RDA Performance Data. Clicking on the RDA Perf (Performance) Data icon opens the RDA Performance Data window. See Figure 2-90. There are nine categories of data that are represented by an associated button. The Close button in the upper left hand corner closes this window and returns the user to the HCI. The user can see in the Last Update: field when the RDA performance data was last updated. If there is no connection with the RDA, the field will read Data Not Available. Clicking on any of the nine categories will bring up that associated window.

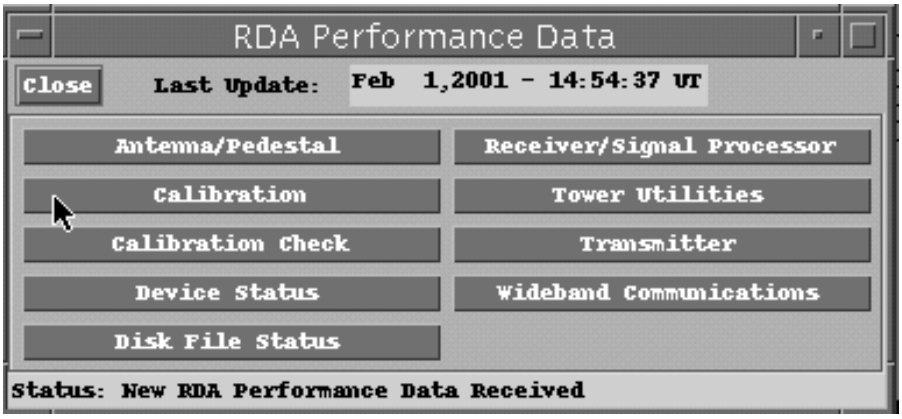


Figure 2-90. RDA Performance Data

Select from the following buttons to view the most recent performance data from the RDA. The bottom Status: line is a non-editable line of information that is automatically sent to the window that describes the availability of the RDA data.

- Figure 2-91. RDA Antenna/Pedestal Performance Data
- Figure 2-92. RDA Calibration Performance Data
- Figure 2-93. RDA Calibration Check Performance Data
- Figure 2-94. RDA Device Status Performance Data
- Figure 2-95. RDA Disk File Status Performance Data
- Figure 2-96. RDA Receiver/Signal Processor Performance Data
- Figure 2-97. RDA Tower Utilities Performance Data
- Figure 2-98. RDA Transmitter Performance Data
- Figure 2-99. RDA Wideband Communications Performance Data

Clicking on each button listed above will produce one of three different results. If no performance data is available, then the window will not even open and a warning_popup window opens that states: “RDA Performance Data unavailable.” Click on Continue and the user is returned to the RDA Performance Data window.

If old performance data is available, then the associated window is opened and it will display the

most current data as indicated within the window in the Last Update field.

If new data is available, then the window is opened and then updated automatically at the same time. This process is observed by the user when the screen is refreshed. The old data is replaced by new data and the date and time changes in the Last Update field.

If any of these windows are left opened, they will not update automatically when new performance data is available from the RDA. To display any new data, the user must click on the Update button within the window. Shortly after clicking on the Update button, the screen will be refreshed, old data is replaced by new, and the Last Update field changed.

Several different RDA Performance Data windows can be open at the same time. However, it is important to be aware of the fact that opening any of these windows not only updates that window, but also updates any other windows that are already opened. Additionally, if more than one of these windows are open, clicking on the Update button in any of these windows will not only update that specific window, but it will also update all of the other windows that are already opened.

Clicking on the Close button within any of the RDA Performance Data windows will close that specific window. Clicking on the Close button within the main RDA Performance Data selection menu window not only closes that specific window, but also closes all of the specific RDA Performance Data windows that had been opened from it.

2-3.17.5.1 Antenna/Pedestal Performance Data.

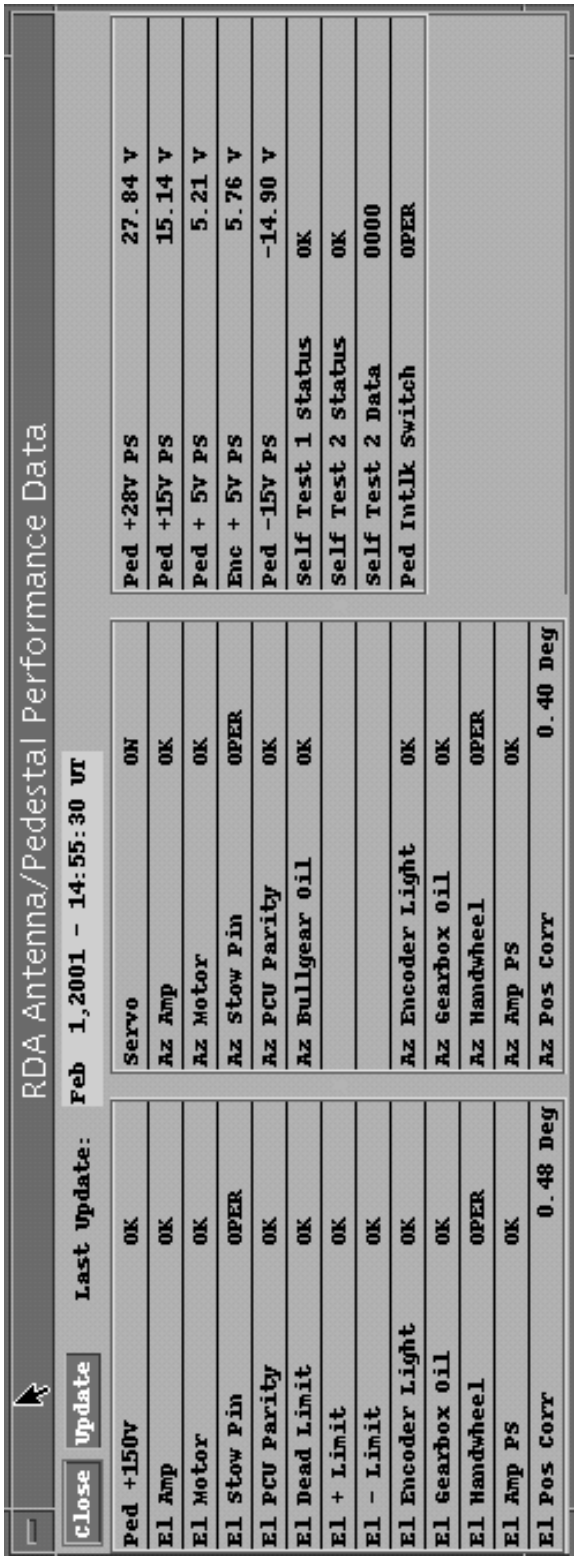


Figure 2-91. RDA Antenna/Pedestal Performance Data

2-3.17.5.2 Calibration Performance Data.

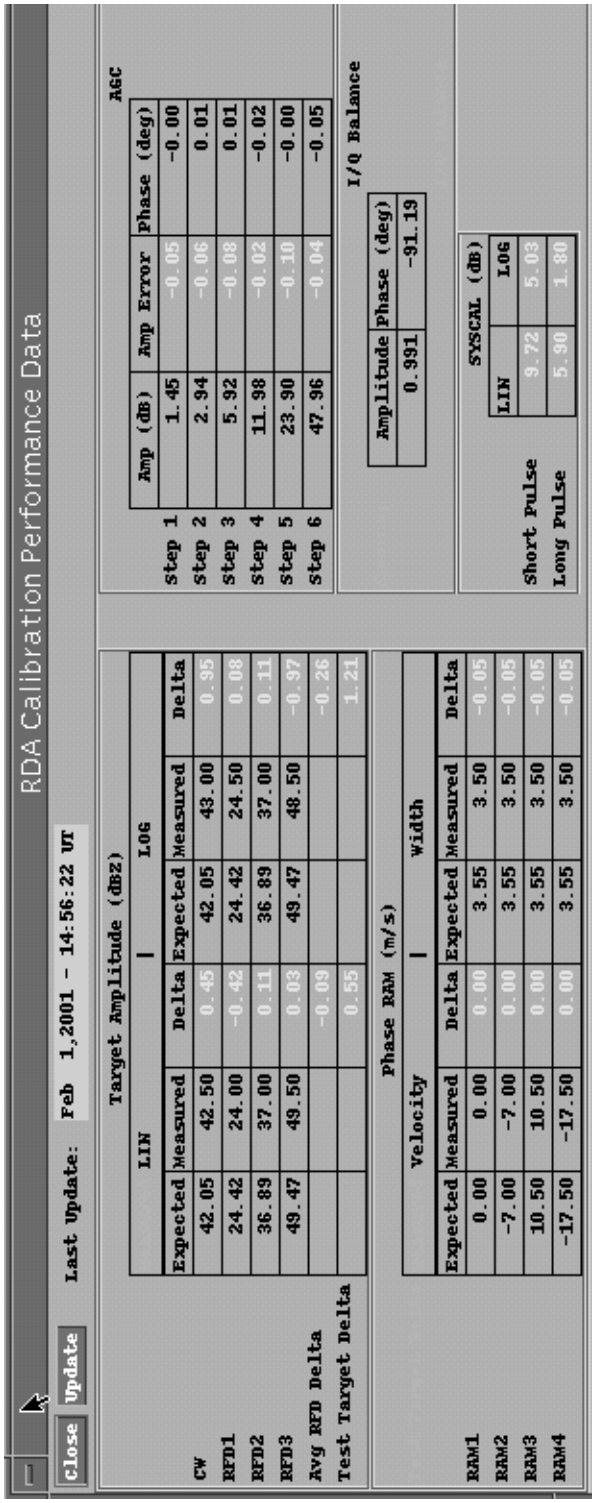


Figure 2-92. RDA Calibration Performance Data

2-3.17.5.3 Calibration Check Performance Data.

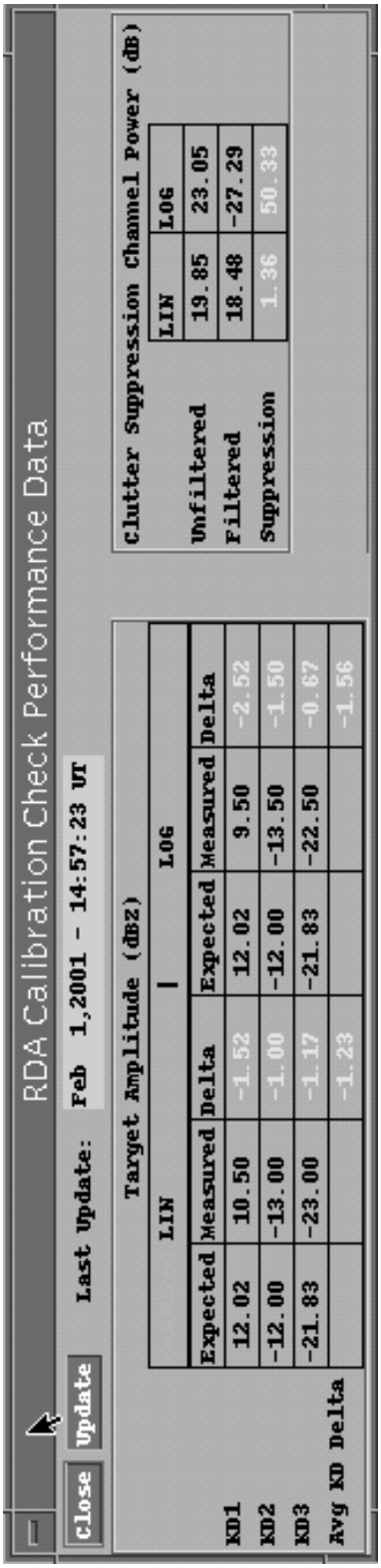


Figure 2-93. RDA Calibration Check Performance Data

2-3.17.5.4 Device Status Performance Data.

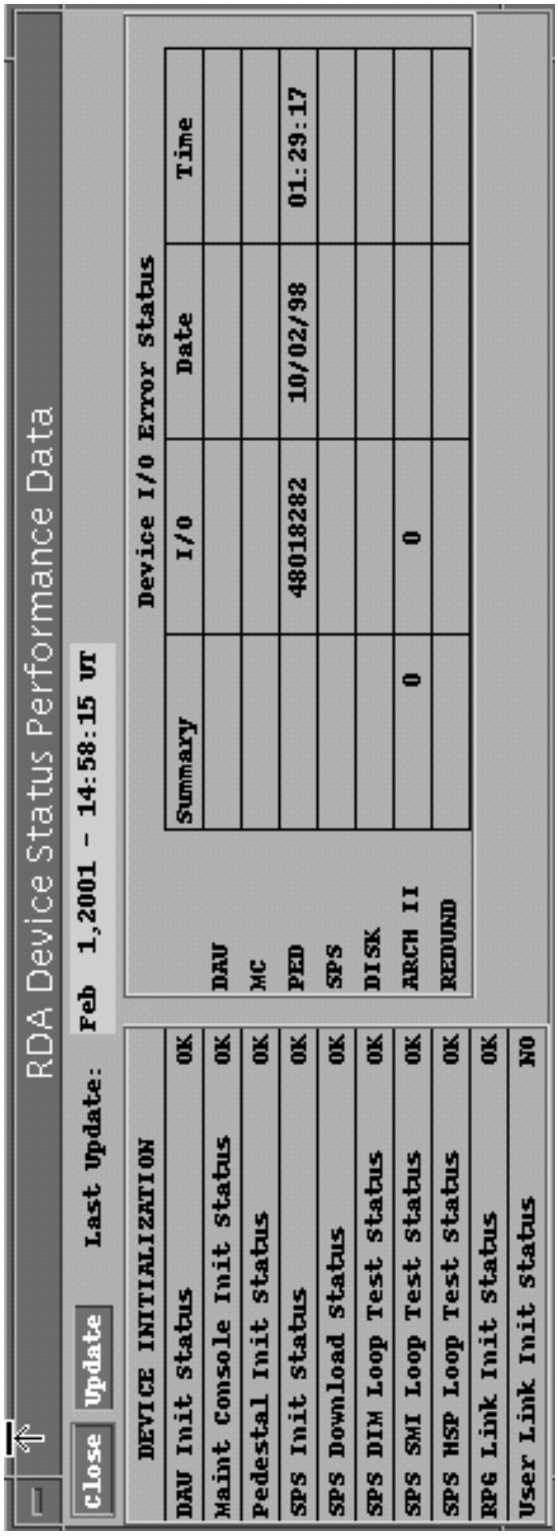


Figure 2-94. RDA Device Status Performance Data

2-3.17.5.5 Disk File Status Performance Data.

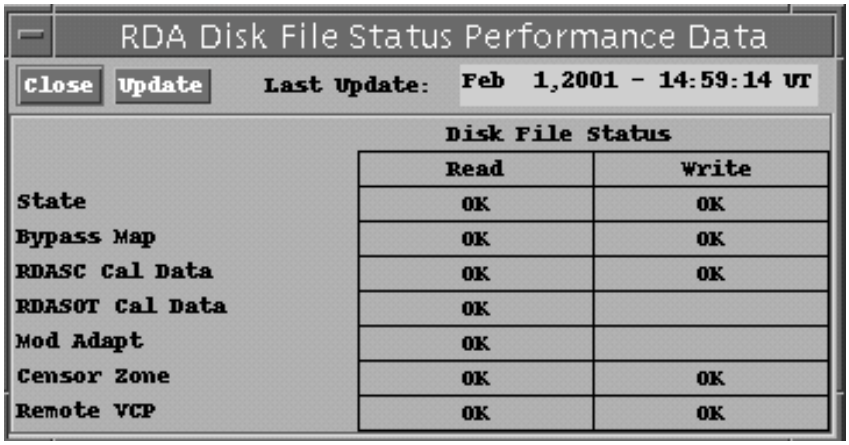


Figure 2-95. RDA Disk File Status Performance Data

2-3.17.5.6 Receiver/Signal Processor Performance Data.

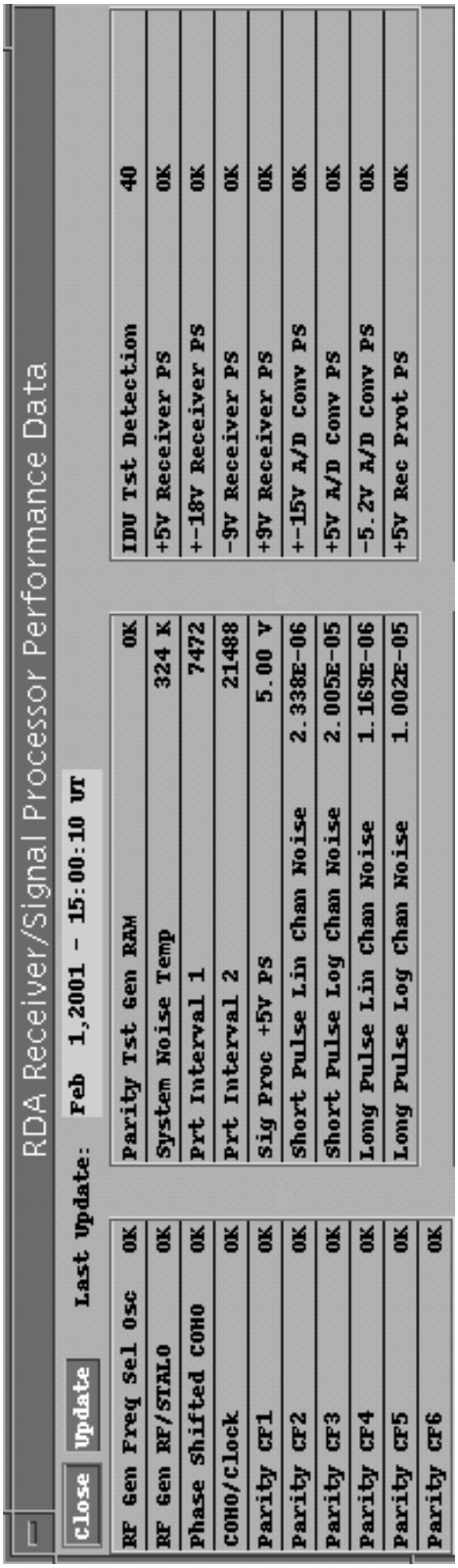


Figure 2-96. RDA Receiver/Signal Processor Performance Data

2-3.17.5.7 Tower Utilities Performance Data.

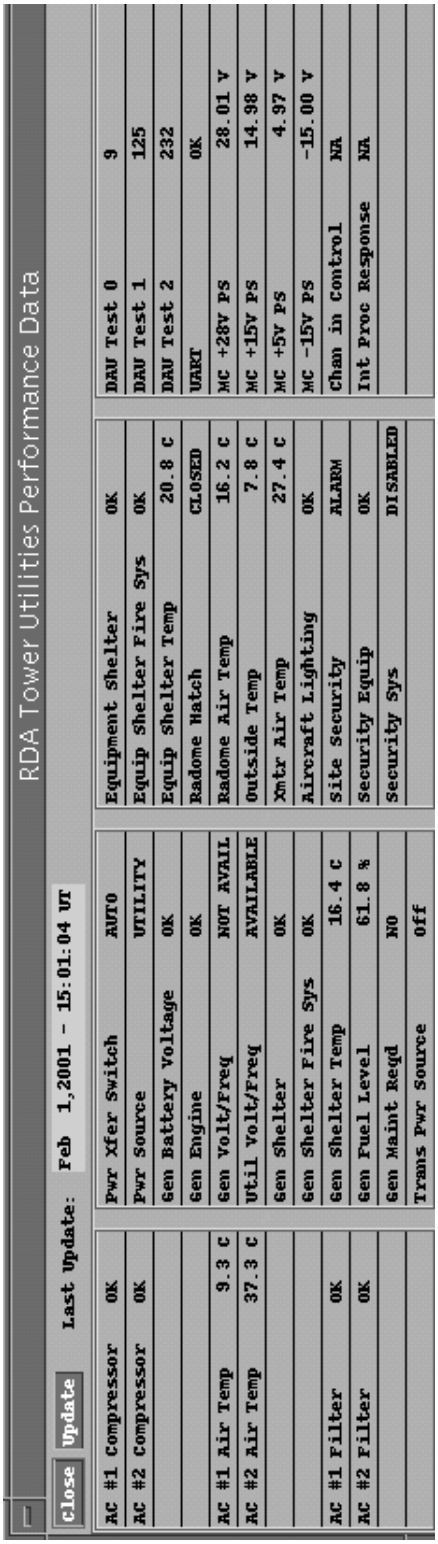


Figure 2-97. RDA Tower Utilities Performance Data

2-3.17.5.8 Transmitter Performance Data.

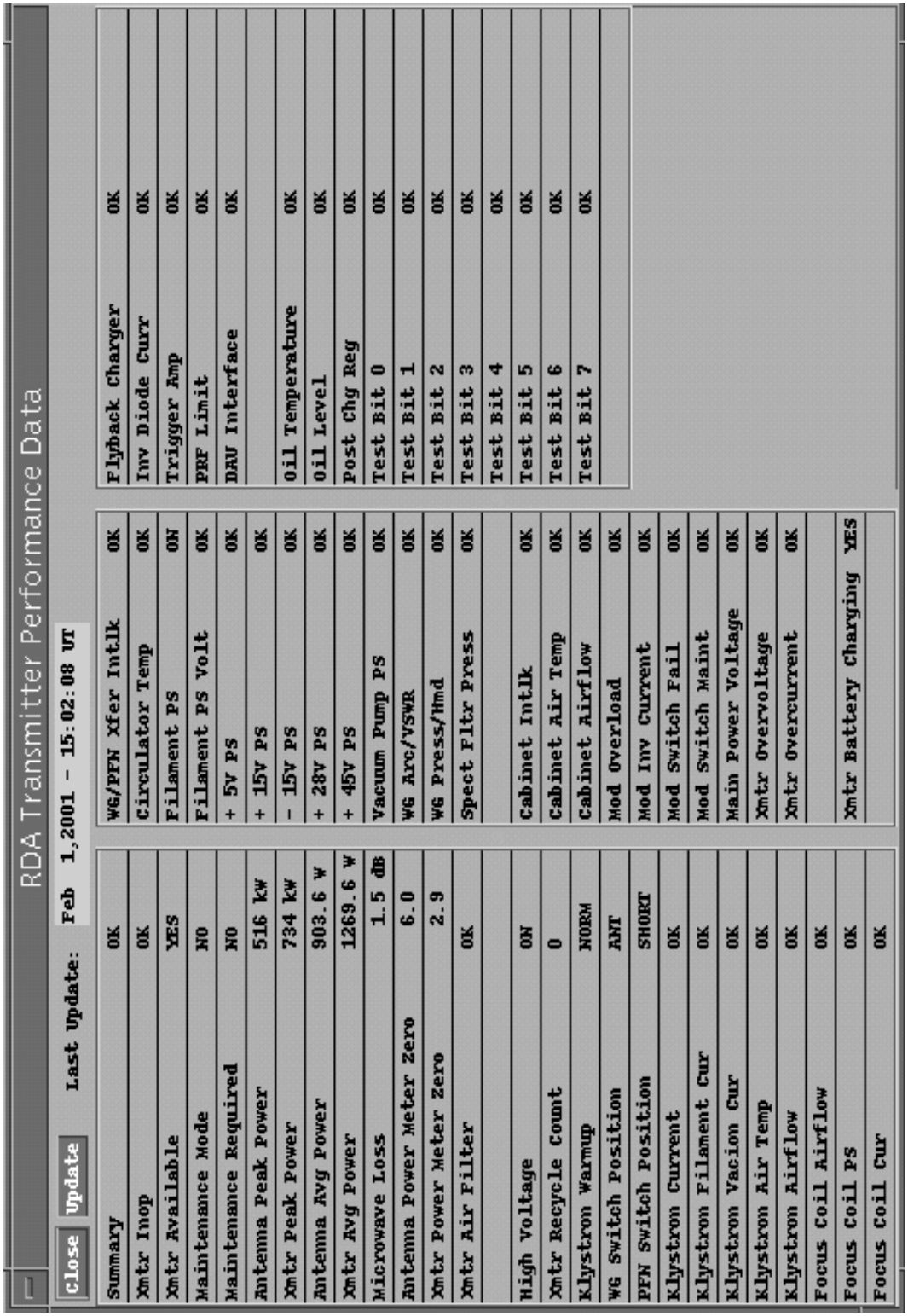


Figure 2-98. RDA Transmitter Performance Data

2-3.17.5.9 Wideband Communications Performance Data.

RDA Wideband Communications Performance D

Close Update Last Update: Feb 1,2001 - 15:03:03 UT

	Wideband Link	
	RPG	USER
DCU Status	0000	0000
General Error Code	1F	00
SVC 15 Error Code	00	00
Outgoing Frames	20402	0
Frames with FCS Errors	0	0
Retransmitted I-Frames	0	0
Polls Sent and Received	55	0
Poll Time-Outs	0	0
Min Buffers in Read-Pool	5	0
Max Buffers in Read-Done List	1	0
Loop-Back Test	PASS	NOT CNFG

Figure 2-99. RDA Wideband Communications Performance Data

2-3.17.6 Console Messages. Clicking on the Console Messages icon opens the Console Messages window. See Figure 2-100. Clicking on the Close button will close the Console Messages window. There are three ares within this window that allow the user to select the Destination(s), look at incoming messages, and prepare and send outgoing messages.

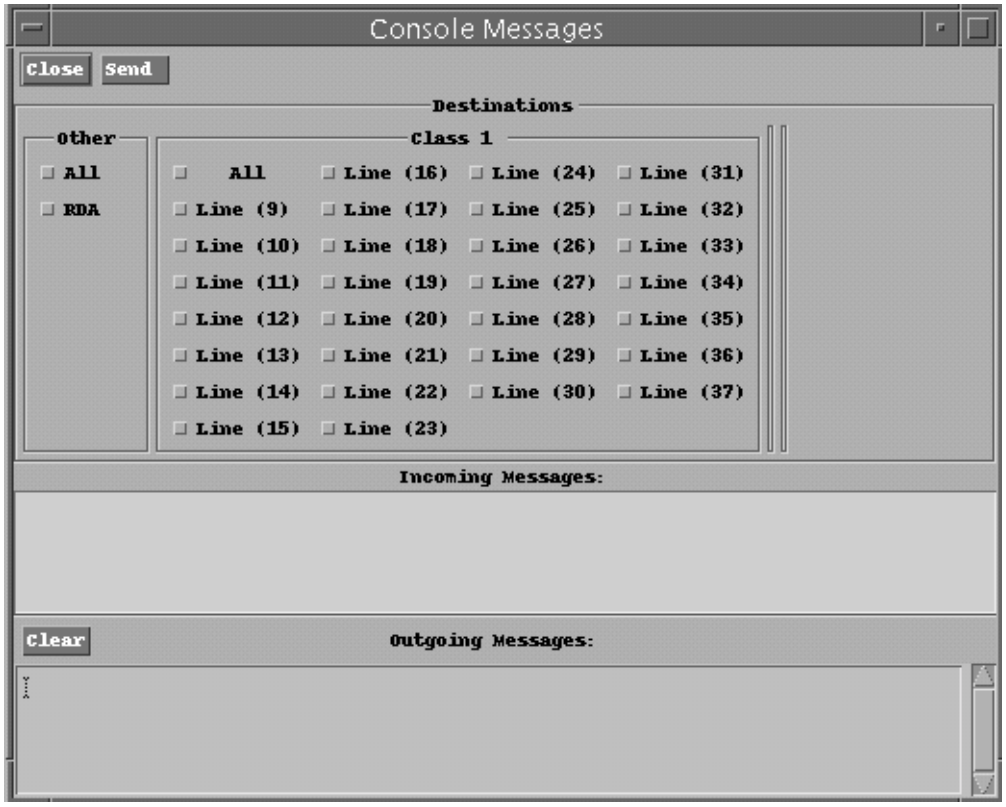


Figure 2-100. Console Messages

2-3.17.6.1 Destinations. The possible destinations for an outgoing message are:

- Other: All and RDA (and RMS for FAA sites). The selection of ALL does NOT include the Class 1 destinations but is only for the RDA (and the RMS)
- Class 1: All and each specific Class 1 user. This includes the RPGOP_50 and RPGOP_90 lines. The selection of All does NOT include the Other destinations (RDA and RMS) but is only for the Class 1 lines.

Select a destination(s) for the outgoing message by clicking on the box next to the desired destination(s) (or on the destination name itself) which places a check mark in the box. Only the destination selection(s) that have a check mark present in the box will be sent the outgoing message. The "All" selections are a toggle that will alternately select and deselect all of the destinations within that class.

2-3.17.6.2 Incoming Messages. All incoming messages are displayed in the "Incoming Messages:" area of the window. They are listed in order from newest to oldest, with the newest being at the top of the list. When a new incoming message is received from any source, this window will

open automatically and the new message is displayed at the bottom of the list in the “Incoming Messages:” area. There is no indication given at the RPG to inform the user of the source of any incoming message unless it was written into the message itself by the sender. The possible sources of an incoming message are the RDA and the RPGOP.

2-3.17.6.3 Outgoing Messages. To send a message to any destination, the user must first click on the “Outgoing Messages:” area of the window to activate it. By clicking on the Clear button, the entire “Outgoing Messages:” area is completely cleared out of any text that may be left from the previous outgoing message. Next, the user types in the desired message. After typing the message, click on the desired destination and then click on the Send button. If the user clicks on the Send button without selecting a destination, a warning_popup opens that states: “A destination(s) must be selected before the message can be sent.” Click on the Continue button and the user is returned to the Console Messages window. A destination can then be selected, the Send button clicked, and the message will be sent.

There are limitations to the length of messages allowed. Messages to the RDA can only be 404 characters. Messages to the RMS (for FAA sites) can only be 400 characters. Messages to the users have a maximum size of 48 lines of 80 characters each. If any of these limits are exceeded and the Send button clicked, a warning_popup will appear that defines the limitation and describes how much of the message was truncated. For example, if sending a message that is too long to the RDA, the warning_popup will state: "The message to the RDA was truncated to 404 characters. XXX characters were discarded. Continue" XXX are the number of characters that were discarded. Click on the Continue button to return back to the Console Messages window, even though the truncated message has already been sent. If the user wants to edit the message and send it again, the entire text is still in the Outgoing Messages edit box.

Once a message is sent, the Feedback line at the bottom of the HCI will display the one line text of "Sending Console Message."

2-3.17.7 Environmental Data. Clicking on the Environmental Data icon opens the Environmental Data Editor window. It provides a window in which the user can modify the environmental conditions used by the algorithms. It is described in complete detail in Chapter 3.

2-3.17.8 HCI Properties. Clicking on the HCI Properties icon opens the HCI Properties window that allows the user to select Passwords, Colors or Font Properties. See Figure 2-101. The Close button closes the HCI Properties window and returns the user to the HCI.

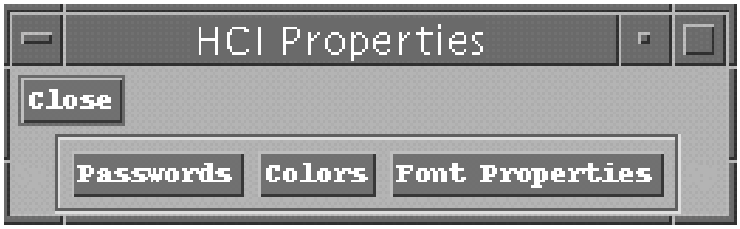


Figure 2-101. HCI Properties

2-3.17.8.1 Change Passwords. Clicking on the Passwords button opens the Change Passwords window. See Figure 2-90 Change Passwords.

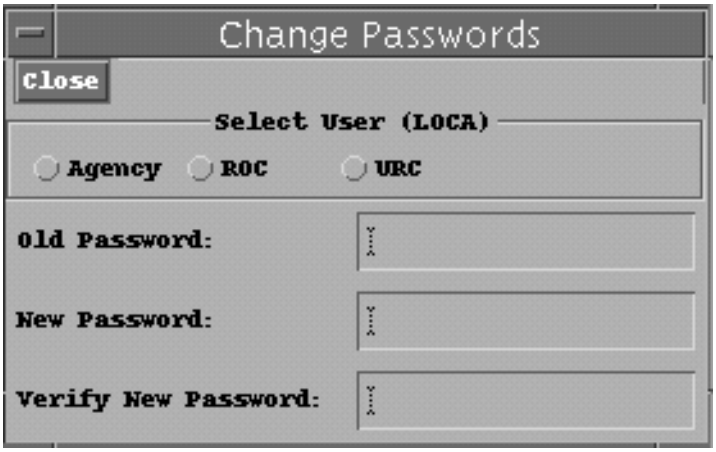


Figure 2-102. Change Passwords

Click on the Close button to close the window and return the user to the HCI Properties window. In order the change the password, select the desired LOCA by clicking on the button to the left of the LOCA or on the LOCA itself. The button will change to white. Then move the cursor to the editing field labeled Old Password and click to get the cursor blinking in that field. The field will turn to blue. Enter in the old password correctly, press the return key, and the cursor will then move to the New Password: editing field. The three LOCAs and the Old Password field entry are grayed-out and desensitized. The Old Password field turns back to the background color and the New Password field turns blue with the blinking cursor in the left hand margin of the field.

However, if an incorrect password was entered, a warning_popup window opens that states: “You entered an invalid password!”. Click on the Continue button and the user is returned to the Old Password: field. Reenter the correct old password in order to move to the New Password: field.

Once the field for the new password has turned blue, enter the new password (case sensitive) and press the Return key. The cursor then moves to the Verify New Password: field and turns the field to blue. Enter the new password again and press the Return key. If the entry is correct, a warning_popup window opens that states: “The password has been changed!”. Click on the Continue button and the user is sent back to the Change Passwords window. Then click on the Close button to return to the HCI Properties window.

However, if the New Password and Verify New Password fields don’t match, a warning_popup window opens that states: “You entered an invalid password!”. Click on the Continue button and the user is returned to the Change Passwords window to start all over again.

2-3.17.8.2 Colors. Click on the colors button and a warning_popup window opens that states: “This function is not available at this time!” Click on the Continue button and the user is returned to the HCI Properties window.

2-3.17.8.3 Font Properties. Click on the Font Properties button and the Font Properties window opens. See Figure 2-103. There are three control buttons across the top and two categories of data entry: Size and Point. Clicking on the Close button closes the Font Properties window and returns the user to the HCI Properties window.

Click on the Default button to restore the Size and Point values to the original values. The change(s) will be seen immediately in the Font Properties window, but the numerical values will not change until the Apply button is clicked and the Font Properties window closed and then reopened. There is no warning_popup associated with the Default button.

The Apply button is grayed-out and desensitized until a change has been made in an edit field. Once that has occured, the apply button is sensitized.

Click on the Apply button to have the values apply to all the pull up windows on the HCI. This applies to both the default values and the operator entered values.

To change the Size, click in the field box to the right of the title Size to get the cursor blinking in the edit field. The allowable range is 80 to 100. If an incorrect value XXX is entered, a warning_popup opens that states: “You entered an invalid font size of XXX. The value must be in the range 80 to 100.” Click on the Continue button and the user is returned to the Font Properties window. If a correct value is entered and the Return key pressed, the change is shown immediately on the Font Properties window and the new value is shown in the box.

To change the Point, click in the box to the right of the title Point to get the cursor blinking in the edit field. The allowable range is 80 to 100. If an incorrect value XXX is entered, a warning_popup opens that states: “You entered an invalid font point of XXX. The value must be in the range 80 to 100.” Click on the Continue button and the user is returned to the Font Properties window. If a correct value is entered and the Return key pressed, the change is shown immediately on the Font Properties window and the new value is shown in the box.

New font properties DO NOT apply to the HCI, all window title bars, or warning_popup windows.

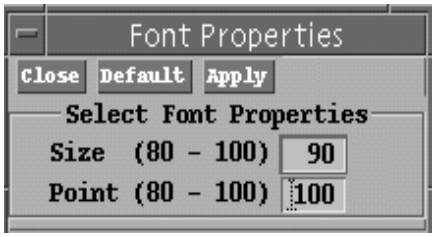


Figure 2-103. Font Properties

2-3.18 Multiple Editors.

It is possible to have multiple edit windows opened at the same time by the same operator or with a remote HCI to another site, opened by two different operators. However, when an edit window is opened which is currently being edited by another user (or the same user), a warning_popup opens that states: “Another user is currently editing XXXXX data. Any modifications you make may be overwritten by the other user. Do you want to proceed with the unlock?” Click Yes or No and that action will be taken. “XXXXX” will be one of the following HCI tasks:

Clutter Suppression Regions Editor
Clutter Bypass Map Editor
Alert Threshold Table Editor
Product Priority
Selectable Product Parameters
Algorithm Adaptation Data Editor
Product Generation Table Editor (Last sentence of warning_popup is omitted for this editor as there is no password control on this window)

NOTE

When multiple edit windows are open, the one that is saved and closed first will have its edits lost when the second window is saved. There is no prioritization of edits being saved based on who opened the windows at which time, nor from which location the edits are being made.

2-3.19 Low Bandwidth.

If the site has a distant MSCF, an extra comment "<LB> will be displayed in the title bar. An example of the title is: "PRF Selection (Modify Current VCP) <LB> (FAA:2). This identifies a Low bandwidth version of some HCI windows that were designed to run on Distant MSCFs because of their limited bandwidth design.

SECTION 2-4. LOGIN/LOGOUT PROCEDURES

2-4.1 General.

The RPG software is designed to be operational continuously. The system should not be manually shut off for any routine procedures by any operators. Detailed information on the UNIX operating system is available in the NWS EHB 6-525, Maintenance Manual. However, for the scope of this manual, only the routine Login/Logout procedures will be addressed.

2-4.2 Login.

For routine operations, the RPG will be fully operational with the screen saver leaving the screen blank. The user must either move the mouse or press any key to refresh the screen.

2-4.2.1 Display Locked Window. The first window that may appear will state:

Display locked by user (xxxx).
Enter password to unlock.
Password: (text entry field)

Enter in the correct password (case sensitive) and press the Return key. This allows the user to then continue with the log in procedures that follow.

Depending upon the site's configuration, this Display Locked Window may not appear. Instead, the user will see the full screen warning - Warning US Government System window in the paragraph below as the first window.

2-4.2.2 User Name. The “Warning - Site Name - Warning - US Government System text message” window will appear with the Sun logo along the right hand side.

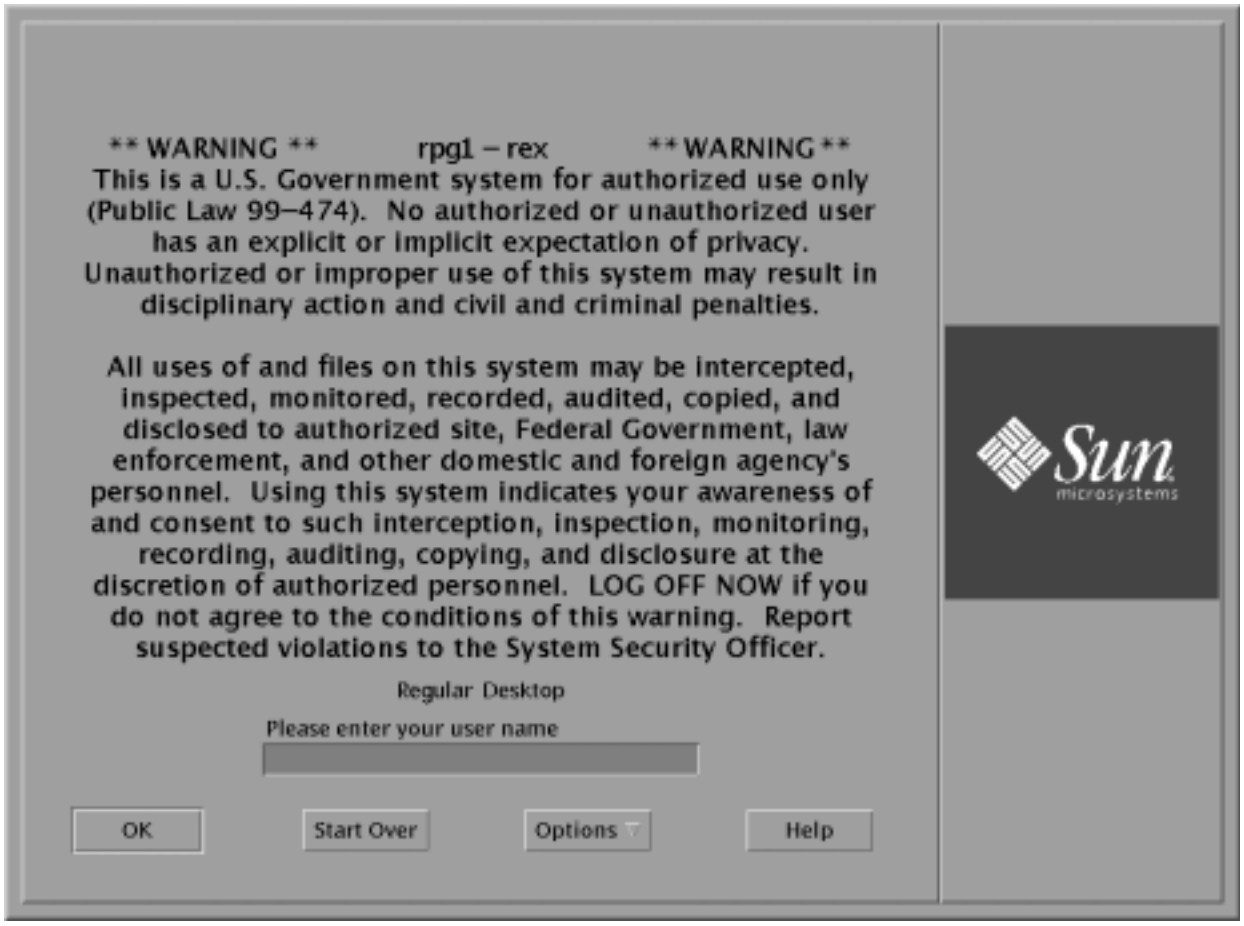


Figure 2-104. CDE Login Window

Just below the text of the warning will be the message: “Please enter your user name” with a dark gray text entry block with a blinking cursor. Enter in the user name (case sensitive) and press the Return key. There are four buttons below the text entry field that may be used if necessary. They are: OK, Start Over, Options (with a pull down menu) and Help.

2-4.2.3 Password. Once a valid user name has been entered and the Return key pressed, the next window to appear has the user name on the top, a message near the bottom that states: “Please enter your password” with a text entry field with a blinking cursor. Enter the password (case sensitive) and press the Return key. The screen does not echo or display the characters entered or any wid card characters for security purposes. The same four additional blocks are below the text entry block that may be used. They are: OK, Start Over, Options (with a pull down menu) and Help.

2-4.2.4 Common Desktop Environment. Once the user has successfully entered the password and logged in to the Solaris system, the system should automatically boot up a Console window, a Terminal window, the MSCF, a Clock, and the CDE front panel.

If the MSCF does not appear, go to the Console window and at the : prompt, type in "mscf &" and press the Return key. The MSCF window then opens up for access to the rest of the system.

If there is no Console window but a Solaris window that states:

Welcome to Solaris. The following desktops are available. Which one would you like to use as your default desktop? Note: You can change this default at any time by using the Session Menu located on the Desktop Logic Screens Options Menu. Choose One:

Common Desktop Environment
Fail Safe session
Regular Desktop
Open Windows Desktop
User's Last Desktop

There are two other buttons below these choices: OK and Cancel.

Click on the Common Desktop Environment (CDE) option and then on the OK button.

If a previous login had been recently performed, this window may not open but automatically forward the user to the Sun window.

2-4.2.5 Sun Window. The user will end up with the Sun window, the CDE Front Panel at the bottom, a Console window, and a Terminal window.

2-4.2.6 Workspace Menu. Right click anywhere on the Sun window background and the Workspace Menu opens. The menu will list the following options:

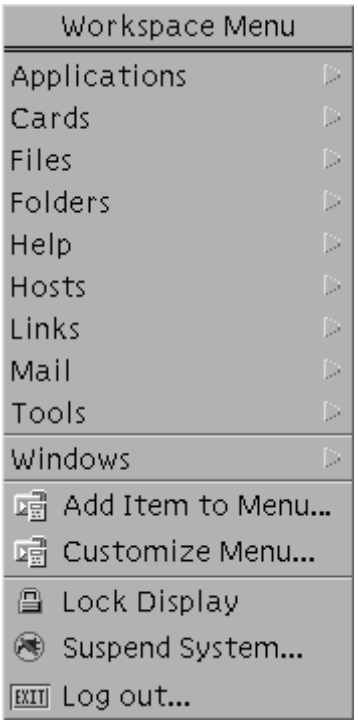


Figure 2-105. Workspace Menu

2-4.2.7 Console Window. Several lines of information will be at the top of the interactive screen inside the window. Then, within a minute, the Master System Control Functions window opens. If it doesn't, enter “mscf” and press the Return key.

2-4.2.8 MSCF - Start. Once the MSCF window has appeared, click on the RPG HCI button to bring up the HCI. The user is then ready to use the fully operational HCI.

2-4.3 Logout.

When the user has completed their actions on the RPG, or are ending their shift and turning the radar over to another user, they need to log out of the HCI and MSCF. With the HCI fully operational, use the left mouse button and double click on the upper left hand corner of the HCI. This will return the user to the MSCF window.

At the MSCF window, click on the close button in the upper left hand corner and the user will be sent back to the Console window. Don't close the Console window, but instead click on the EXIT button in the CDE front panel. This opens the Logout Confirmation window. See Figure 2-106.

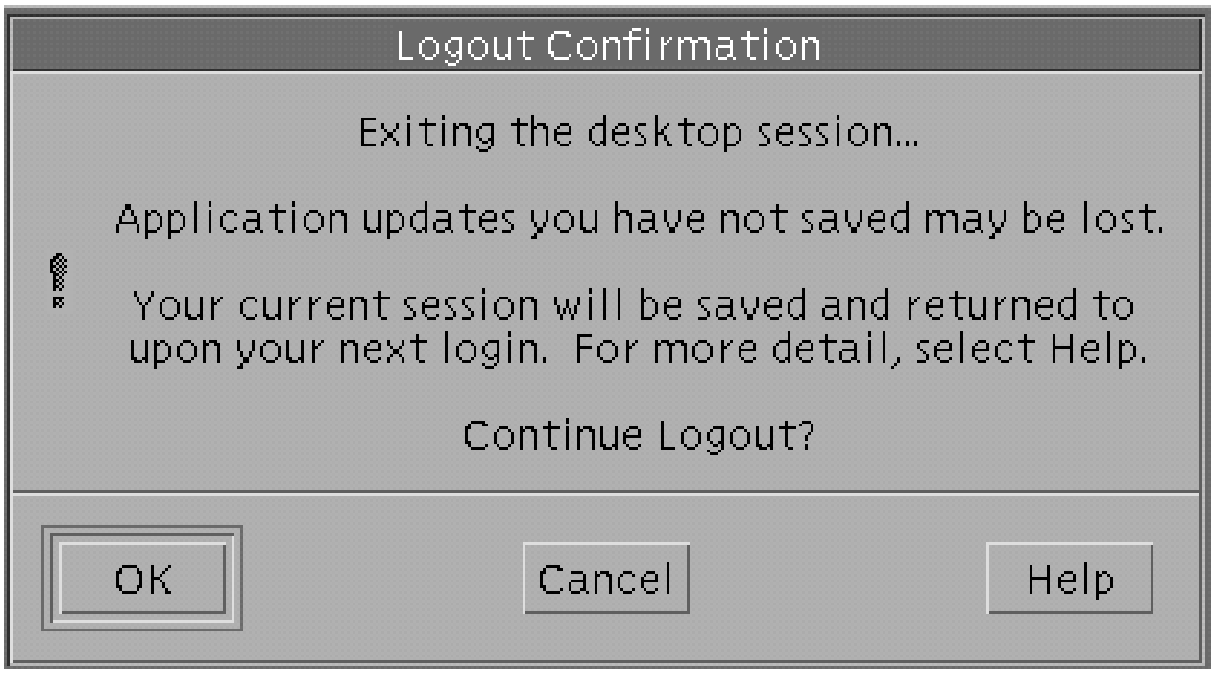


Figure 2-106. Logout Confirmation

Click on the OK button, the screen becomes blank, and the user is returned to the CDE Login window. The user is now logged out of the RPG.

SECTION 2-5. LOADING SOFTWARE, BACKING UP SOFTWARE, EMERGENCY RECOVERY PROCEDURES

2-5.1 General.

At most sites the System Administrator or Site Technician will handle all software loading, backing up the current software (especially as adaptable parameters are entered or modified), and any emergency recovery procedures. If a situation arises where those personnel are not available, then the procedures identified in the NWS EHB 6-525 Maintenance Instructions Radar Product Generator (RPG) can be used to assist a site in updating or restoring the RPG to an operational status.

2-5.2 System Time/Date.

Network Time Protocol (NTP) has been added in Software Build 1.2. For NWS, NTP will keep the MSCF, BDDS, and RPG within a second of the master AWIPS time. For FAA or DOD, NTP will keep the BDDS and RPG within a second of the MSCF master time. The date/time shall be manually set on the initial installation of the system. The System Administrator needs to make sure that all the systems start within 1000 seconds of the master clock. The automated NTP process will not attempt to synchronize clocks outside of plus or minus 1000 seconds. When a system is outside of the 1000 second rule the console will display messages like **"Dec 30 2:44:52 xntpd: time error -10306.13 is was too large (set clock manually)"**. When this occurs, the System Administrator or Site Technician must manually set the system time/date described in the EHB 6-525, Table 4-76.

2-5.3 Loading Software.

When the RPG is installed at the site, the installation team will load the initial software and insure it is fully operational. There could be occasions where site personnel would need to perform a new software load such as a hardware replacement or a new software build. In such situations, the software loading procedures are available in Chapter 4, NWS EHB 6-525.

When future software builds are released to the site, the System Administrator or site technician should perform the loading procedures. Specific load procedures will be included with each software build.

2-5.4 Backing Up Software.

There are five different options available to backup the software data. These five are listed in detail with specific procedures in the NWS EHB 6-525 and are referenced here. Obtain the NWS EHB 6-525 Manual and utilize the appropriate tables from that manual.

The System Administrator will normally have the backup disks secured in a specific location. When changes are made to the site's adaptation data, new backups will need to be made. These backups should be performed and clearly documented so there is no confusion about the most recent backup disk.

2-5.4.1 System Software Backup Using ufsdump. Use of the ufsdump (User File System Dump) utility allows software to be backed up individually for each file system. This allows software to be restored individually for each file system. Thus, it allows for restoration of one file system without having to restore all file systems at the same time. For further information, see the System Software Backup Using ufsdump table in Chapter 4, NWS EHB 6-525.

2-5.4.2 RPG Applications Software Backup. The RPG Applications Software should be backed up after it is loaded and all adaptable parameters are set as desired. It should also be backed up after any changes are made to adaptable parameters. For further information, see the RPG Applications Software Backup table in Chapter 4, NWS EHB 6-525.

2-5.4.3 MSCF Applications Software Backup. Use the MSCF Applications Software Backup table in Chapter 4, NWS EHB 6-525 to make a backup of the MSCF Applications software table.

2-5.4.4 Backup of BDDS User Accounts Using tar. Use the Backup of BDDS User Accounts Using tar table in Chapter 4, NWS EHB 6-525 to make a backup of the BDDS user accounts.

2-5.4.5 Backup of RPG or MSCF User Accounts Using tar. Use Backup of RPG or MSCF User Accounts Using tar table in Chapter 4, NWS EHB 6-525 to make a backup of the RPG or MSCF user accounts.

2-5.5 Emergency Recovery Procedures.

There are five different options available to restore the software to the RPG. These are listed in detail with specific procedures in the NWS EHB 6-525 and are referenced here. Obtain the NWS EHB 6-525 Manual and utilize the appropriate tables from that manual.

2-5.5.1 System Software Restoral Using ufsrestore (Individual File System Example). The System Software Restoral Using usfrestore table in Chapter 4, NWS EHB 6-525 provides the procedures for a partial restoration of the system software backup made using ufsrestore. In this procedure, individual file systems can be restored. This table is an example of an individual file system restoration.

2-5.5.2 RPG Applications Software Restoral. The RPG Applications Software Restoral table in Chapter 4, NWS EHB 6-525 provides the procedures for restoring the RPG applications software backup made using the procedures in NWS EHB 6-525 RPG Applications Software Backup table.

2-5.5.3 MSCF Applications Software Restoral. The MSCF Applications Software Restoral table in Chapter 4, NWS EHB 6-525 provides the procedures for restoring the MSCF applications software backup made using the procedures in the MSCF Applications Software Backup table, NWS EHB 6-525.

2-5.5.4 Restoral of RPG or MSCF User Accounts Made Using tar. The Restoral of RPG or MSCF User Accounts Made Using tar table in Chapter 4, NWS EHB 6-525 provides the procedures for restoring the RPG or MSCF user accounts from the backup made using the procedures in the Backup of RPG or MSCF User Accounts Using tar table, NWS EHB 6-525.

2-5.5.5 Restoral of BDDS User Accounts Made Using tar. The Restoral of BDDS User Accounts Made Using tar table in Chapter 4, NWS EHB 6-525 provides the procedures for restoring the BDDS user accounts made using the procedures in the Backup of BDDS User Accounts Using tar table, NWS EHB 6-525.

SECTION 2-6. ARCHIVE LEVEL II AND LEVEL III

2-6.1 General.

Section 2-6 contains detailed information about the Archive Level II and Level III functions, commonly referred to as Archive II and Archive III.

RDA Archive II can be selected via the HCI when the RPG is in control of the RDA. Those functions are selected from two windows: Archive Base Data icon and the RDA Control button, RDA State area, Playback selection. The Archive II functions are used to record and playback base data streams. Operational field sites will not have playback base data capability.

RPG Archive III functions are selected from the Archive Products icon. The Archive III functions are used to record products (including annotations and attributes) and status file data. Product data may be read from archive media.

2-6.2 Archive III Storage Device.

The RPG uses an Iomega JAZ Archive Storage Device connected directly to the RPG Processor for both an Archive III storage unit and for creating backup copies of system software.

2-6.2.1 Formatting Blank JAZ Disks. Before a JAZ disk can be used for Archive III or for copying software, it must be formatted. Use the MSCF JAZ drive.

NOTE:
Formatting a disk with data on it will cause the data to be lost.

To format a JAZ 2GB disk cartridge, follow the steps below:

1. MSCF JAZ drive	Insert a blank JAZ 2GB disk cartridge in the MSCF drive.	Loads the blank disk cartridge.
2. MSCF	Click on a terminal window at the MSCF. At the normal user prompt, enter: **su<Return>** and then **"root-password"<Return>**.	This takes the user to the superuser level. If not allowed, contact the System Administrator for assistance with this procedure.
3. MSCF Terminal window	At the # prompt, enter: **newfs -v /dev/rdsk/ c1t3d0s2<Return>** When prompted with the question "Do you want to construct a new file system...?" enter: **y <Return>**	This creates a new file system on the JAZ disk cartridge. Perform this only one time for each JAZ disk cartridge. Length of time: Less than two (2) minutes Response to see once finished: Command Prompt: # returns.

4. MSCF Terminal window	At the # prompt, enter: **jazmount<Return>**	The jazmount script will mount the Jaz disk to the /jaz mount point, update the group ID, and update the permissions for the mount point. It takes approximately 20 seconds.
5. MSCF Terminal window	At the # prompt, enter: **umount /jaz<Return>**	Unmounts the Jaz disk cartridge from the mount point.
6. MSCF Terminal window	At the # prompt, enter: **mount<Return>**	There should be no line showing a mount for "/jaz on /dev/dsk/c1t3d0s2..." This proves the Jaz disk did correctly unmount. If it is still mounted, repeat step #5.
7. MSCF JAZ disk drive	Press the button on the MSCF JAZ disk drive to eject the disk cartridge.	The disk cartridge is ejected.
8. JAZ disk	Label the disk with the date it was formatted and its purpose:	EXAMPLE: Formatted April 15, 2001. Archive III, KCRI, Start:
9. MSCF Terminal window	At the # prompt, enter: **exit<Return>**	This exists the superuser mode.

The disk is now ready to use to record for Archive III. Write the date that the disk is initially used to start recording Archive III. Then insert the disk in the JAZ drive at the RPG. The Automount will start and mount the JAZ disk properly. The text string under the Archive Products box will change to Mounted.

2-6.2.2 Non-formatted Disk. If a non-formatted JAZ disk is inserted into the RPG JAZ drive, the message back to the operator will be "Mounton not successful" The text line under the Archive Products button will read "Not Mounted" and the Unmount Disk button in the Archive III Control/Status window will be grayed-out and desensitized.

2-6.2.3 Formatting a JAZ Disk at the RPG Drive and Other Options. An alternate procedure is available to the operator to format a Jaz disk at the RPG drive. It is not the preferred method but is an option. The method is more detailed and is explained in NWS EHB 6-525.

Other options that may be needed to format a Jaz disk if the above steps do not format the disk can also be found in the NWS EHB 5-525. There are three different tables with supplemental information about each.

2-6.3 Archive III Disk.

The JAZ Archive Storage Device uses a disk for data storage. Each JAZ disk has the capacity to store 2 Gigabytes (2,000 Megabytes) of data. The average transfer rate is 7.4 MB/sec.

2-6.3.1 Archive III Disk Insertion. Take the Iomega JAZ disk, hold it with the label up, spindle on bottom, and front curved edge facing the drive. Slide it gently into the empty slot in the drive until the disk is secured and pulled in the rest of the way by the internal mechanism of the drive.

If the disk is not accepted by the drive, contact maintenance to check out the drive.

2-6.3.2 Archive III Disk Removal. If the amber light is flickering, that means there is data being transferred and the drive is mounted. The Archive III unit should be unmounted before removing the disk. Click on the Archive Products button and the Archive III Control/Status window opens. Click on the Unmount Disk button (Top row, second button from left) and the disk will be automatically unmounted. The right hand status text string will change to read Unmounted Pending, and then to Not Mounted once the procedure is complete.

Once the Not Mounted text string has appeared, the disk will be automatically released from the drive and pushed out approximately one-fourth of the way out of the slot. If the Unmount Disk button is grayed-out and desensitized, the user can still unmount the disk manually by pushing on the button to the right of the disk drive slot. Once the disk has been electronically unmounted, it will then be released from the drive and pushed out approximately one-fourth of the way out of the slot. Gently pull straight out to remove the disk. Write on the label the information that has been placed on the disk. Place it in the protective case and store it in a suitable location.

If the user accidentally pushes the eject button before the unit has been unmounted, nothing will happen as the button is not sensitized.

NOTE

Once changes are made to any of the generation tables and saved, the changes will take effect at the start of the next volume scan. There is no need to shutdown and restart the RPG for the changes to be incorporated because the tables are polled at the start of each volume scan automatically.

2-6.3.3 Corrupted Disk Removal. There may be a situation where the Archive III disk has become corrupted and is not readable by the JAZ drive. In that case, the disk will remain stuck in the drive unit, the manual button on the unit will not release the disk, and the Unmount Disk button in the Archive III Control/Status window is grayed-out and desensitized.

None of the Archive processes should be functioning at this time, but to insure they aren't, open the Archive III Control/Status window and make sure the Auto Archive are in Pause or Stop, the Archive Products is in Stop, and the Read from Archive: is not active. Then proceed with the following step:

In order to remove the corrupted disk, go to a Terminal window, routine user account, and at the

Command line, enter:

eject_ar3<Return>

This command will electronically eject the disk and push it approximately one-fourth of the way out of the slot. Gently pull straight out to remove the disk completely. Write on the label that the disk did not function (could be corrupted). Do not insert it back into the JAZ drive.

Next, go to the MSCF window, Click on the Power Control button to open the Power Control window. At the Power Control window, click on the RPG outlet and then click on the Reboot button in the lower right hand side of the window. A warning_popup will appear that states: "You are about to REBOOT devices: RPG. Do you want to continue? Yes/No" Click on Yes and then wait for the RPG to reboot. This will clear up any of the processes that might have led to the corruption of the old disk and prevent the next one being inserted from becoming corrupt.

To resume Archive III functions, insert a new disk or another functioning disk.

2-6.3.4 Archive III Disk Capacity. The JAZ disk has the capacity to store 2 Gigabytes of data. This capacity is estimated to hold up to 651,500 products and status message groups, plus 34 background maps. The 34 background maps are archived automatically when a new disk is used. The disk becomes full when either 2 Gigabytes have been used or when 651,500 products and status messages groups have been archived.

2-6.4 Archive III Messages.

There are two sources of information that describe the Archive III operations. These are displayed in the Feedback text line and Status text line, both located on the bottom of the RPG Control/Status window. They are plain language, self-explanatory messages and are listed below in the two categories in which they are displayed.

2-6.4.1 Archive III Feedback Messages. The following messages will appear in the Feedback section of the RPG Control/Status window when the respective Archive III operation is taking place:

- Requesting archived RPG status log
- Starting Auto-archive Products function
- Pausing Auto-archive Products function
- Stopping Auto-archive Products function
- Starting Auto-archive Status function
- Pausing Auto-archive Status function
- Stopping Auto-archive Status function
- Starting Archive One Product function
- Stopping Archive One Product function
- Starting Archive Product by Time function
- Stopping Archive Product by Time function
- Requesting archived RPG products
- ERROR: Unable to print system log
- Archived System Log file sent to printer
- Unmounting Archive III Disk

2-6.4.2 Archive III Status Messages. The following messages will appear in the Status section of the RPG Control/Status window when the respective Archive III operation is taking place:

- Archive One Product function completed
- Archive By Time Span function completed
- Archive III, cannot access product database
- Archive III is not operational because Archive device is not present or is not mounted properly or there is a read/write error
- This archive device has archived messages from a different RPG
- Error reading Archive III Status
- Eject Command Failed
- Cannot execute unmount
- Cannot execute eject
- Product Read complete
- Status Log Read complete

2-6.5 Archive III Functions.

The Archive III Functions can be accessed via the Archive Products icon. The following subsections describe the various archive functions as selectable by the operator:

- Read Products from Archive
- Read Status Messages from Archive
- Auto Archive Control/Status
- Archive Products by Time Span
- Archive One Product

2-6.5.1 Read Products from Archive III. This function is active only when no other archive functions are active or when only auto archive functions are active. The options are to select the date the products were archived, the time period desired (start to end, maximum of 24 hours for that date), the product itself, and the elevation desired (if applicable for that product). Use the pull down menus that display the dates, times, and products available on the storage disk.

The Read Products from Archive III function will read a specific product from the Archive III storage disk for the selected time period (up to 24 hours) for a specific date. The products are placed into the RPG current data base. When all products have been read, the following message will be displayed on the system status line: READ FUNCTION COMPLETE.

For successful completion of this function, two criteria must be met. The storage disk with the desired products must be inserted in the disk drive and the disk drive on line. The disk may stay inserted in the drive for successive reads to be made sequentially.

If reads are desired from different dates, then multiple commands need to be entered using the different date.

To determine the status of the Read Products from Archive, look at the block to the right of the Products/Status buttons. It will state either Active with a green background, Idle with a yellow background, or Inactive with a red background.

Products are written to disk using the Archive Products by Time Span, Archive One Product, and Auto Archive functions. The Read Products by Time Span function can read products placed on disk by any of the above functions.

2-6.5.2 Read Status From Archive III. This function is active only when no other archive functions are active or when only auto archive functions are active. Available options are: view or print the status messages, select the date/time to start the viewing or printing, and filter the messages by status, alarm, error, or a specific text string search.

The Read Status from Archive III can display the most current 1600 messages that are routed to the system status log. For each entry, the date and time of the message is displayed. Selection of a filter will display only those messages that meet the filter criteria.

To select a specific date and time from which to start displaying the messages, use the pull down windows for each parameter. This time and date will be the start time and date and will only apply to messages that are on the archive disk.

To print either the filtered or the total list of messages from the system status log on the archive disk, click on the Print Log Messages button and select either all messages or enter the number of messages to be printed.

For successful completion of this function, two criteria must be met. The storage disk with the desired status messages must be inserted in the disk drive and the disk drive must be on line. The disk may stay inserted in the drive for successive reads to be made sequentially.

To determine the status of the Read Status from Archive III, look at the block to the right of the Products/Status control blocks. It will be either Active with a green background, Idle with a yellow background, or Inactive with a red background.

Status messages are written to disk using the Auto Archive function. The Read Status from Archive III function can read messages placed on disk by the Auto Archive function.

2-6.5.3 Auto Archive III Control/Status. This function is not available during Archive III read functions. The only buttons are Record, Pause, and Stop for both Products and Status.

The Auto Archive function affords the user the ability to archive products automatically as they are generated at the RPG. When that product is generated at the RPG, it will be automatically archived at the frequency specified in the Arc (Archive) column of the RPG Product Generation Table Editor window (Click on RPG Products button, then click on Generation List button).

To cancel this function, the user must click on the Stop buttons. This will end the auto archive function and products on the Generation Control list designated for automatic archive will not be automatically archived.

To pause this function, the user must click on the Pause buttons. This will pause the auto archive function for up to sixty minutes. If the Record button is clicked before the sixty minutes is up, the archive of products generated from the RPG will resume. In addition, products produced during that time period will also be archived after the archive resumes. (All of these products must still be listed on the Generation Control list for automatic archive.) This option can be used to provide the user the opportunity to reload another disk without losing any of the data. If the Record button is not clicked by the end of the sixty minutes, then the auto archive function will be cancelled automatically.

For successful completion of this function, three criteria must be met. A storage disk with space available must be inserted in the disk drive, the write protect disabled, and the disk drive on line. The disk may stay inserted in the drive for successive writes to be made sequentially.

When a function has been completed automatically or stopped manually, the following message will be displayed on the system status line: ARCHIVE FUNCTION COMPLETE. The status of this function will be visible by looking at the Archive III Status block, just to the right of Auto Products: and Auto Status:. It will be either Active with a green background or Inactive with a red background.

Products and Status written to disk using the Auto Archiving function can be retrieved from the disk by using the Read Product/Read Status from Archive III window.

2-6.5.4 Archive Products. This function allows the operator to archive All Products or specific products from the RPG database to the Jaz disk for a specified volume scan or range of volume scans. The dates/times of the volume scans that are in the database are available via pull down menus. The specific products available in the database (or the All Products option) are also on a pull down menu.

To archive the entire data base of products, select the earliest date/time to start and the latest date/time to stop. To archive all products for a specific interval, select the desired start date/time and the desired stop date/time. To archive all products generated at a single time and date, enter the same date/time for both start date/time and stop date/time. Select the All Products option from the Product pull down menu. Then click on the Record button.

To archive a single product for a desired time period, select the earliest date/time to start and the latest date/time to stop. To archive a single product generated at a single date and time, enter the same date/time for both start date/time and stop date/time. Select the specific product from the Product pull down menu. Then click on the Record button.

Archive of these products will begin at the end-of-data position on the disk. The user may archive many time/date spans of product(s) on a single disk.

For successful completion of this function, two criteria must be met. A storage disk with space available must be inserted in the disk drive, and the disk drive be mounted. The disk may stay inserted in the drive for successive writes to be made sequentially. If these two criteria are not met, the Record and Stop buttons will be grayed out and desensitized. The operator can still select date/times and products as those are in the RPG database, but nothing can be recorded.

When this function has successfully completed, the following message will be displayed on the HCI System Status line: ARCHIVE FUNCTION COMPLETE. In the Archive III Control/Status window, the status of this function will be visible by looking at the Archive III Status section, to the right of the Archive Product: title. It will read either Active with a green background or Inactive with a red background.

Products written to the disk by using the Archive Products functions can be retrieved from the disk by using the Read Product from Archive III window.

2-6.6 Archive II Functions.

The Archive II functions (when the RPG is in control of the RDA) can be selected from two windows: The Archive Base Data icon and the RDA Control button, RDA State area, Playback selection. Detailed procedures can be found in paragraph 2-3.10.3. The Archive II functions are always available unless the wideband link is not connected, the Archive II device is not installed, or in the case of playback, when playback is not enabled at the RDA Adaptation data.
The following subsections describe the various Archive II functions as selectable by the RPG

operator.

2-6.6.1 Archive II Record. The user can initiate archiving of base data on the Archive II device. When Archive II is recording, the tape number and the approximate number of volume scans remaining on that tape will be displayed in the Archive II window. When the record button is clicked, the Archive II device will load the tape, and then wait until the start of the next volume scan to start recording.

2-6.6.2 Archive II Playback. If the Playback button is sensitized in the Archive II window or RDA Control/Status window (enabled in the RDA Adaptation data), the user can send a playback request of archived base data for a selected time and date or for a specific tape. When data is played back, it is sent across the wideband in a “real-time” manner to the RPG.

2-6.6.3 Archive II Stop. The user can stop the recording of base data with this button.

If the user clicks on the Stop button while Archive II is recording, the recording will continue until the end of the current volume scan.

If the user clicks on the Stop button while Archive II is in playback mode, nothing will happen. The only way to stop Archive II playback is to command the RDA to Standby.

2-6.6.4 Archive II Error Messages. The following messages may be seen on the RDA Alarms window (if ARC is selected) and provide additional information to the user. They are generally self explanatory, but more detailed information is available in the NWS EHB 6-525, Maintenance Instructions Radar Product Generator.

- ARCHIVE II I/O ERROR
- ARCH II ALLOCATION/MEDIA FULL ERROR
- ARCHIVE II FILE MANAGEMENT ERROR
- ARCHIVE II LOAD ERROR
- ARCH II PLAYBACK VOLUME SCAN NOT FOUND
- ARCH II CAPACITY LOW
- ARCH II NEW 8MM TAPE INSTALLED
- ARCH II UNABLE TO LOAD TAPE
- ARCH II WRITE_PROTECT TAPE ERROR
- ARCH II TAPE HEAD CLEANING REQ'D

SECTION 2-7. REDUNDANT CONTROL

2-7.1 Introduction.

There are two types of redundant configurations in the WSR-88D series of radars. One is the NWS Redundant configuration with one RPG, two RDAs, and a switch which sends either RDA's information to the single RPG. Each RDA is called a channel. The other is the FAA Redundant configuration which contains two RPGs, each connected to a corresponding RDA. Each RDA/ RPG pair is called a channel. Instructions on how to switch between channels for either system are described below.

2-7.2 NWS Redundant System Control.

The NWS Redundant System Control is not fully developed at this time. However, there should be several windows that provide information on which RDA is active.

The MSCF should have an RDA 1 HCI and RDA 2 HCI when those controls are implemented.

The HCI should have a comment somewhere on the window or in the title bar stating RDA 1 or RDA 2 is active.

The RDA Alarm Summary should have RDA1 or RDA2 used as a title to indicate which RDA has the alarm.

There are no controls at the RPG that allow the user to switch from one RDA to the other RDA.

The above information will not be displayed on non-redundant configurations.

2-7.3 FAA Redundant System Control.

There are portions of several windows that provide status on which channel is active and which is inactive plus how to change from one channel to another. These portions of the windows are not displayed in non-redundant configurations.

2-7.3.1 MSCF Indication. There is an area to the far right that is titled: Channels. Directly underneath the title are two buttons. The left button has a “1” beside it; the right button has a “2” beside it. These numbers represent the Channel 1 or Channel 2 in the FAA redundant configuration. See Figure 2-107. The button that is highlighted white means that particular channel’s data is being displayed in that MSCF window.

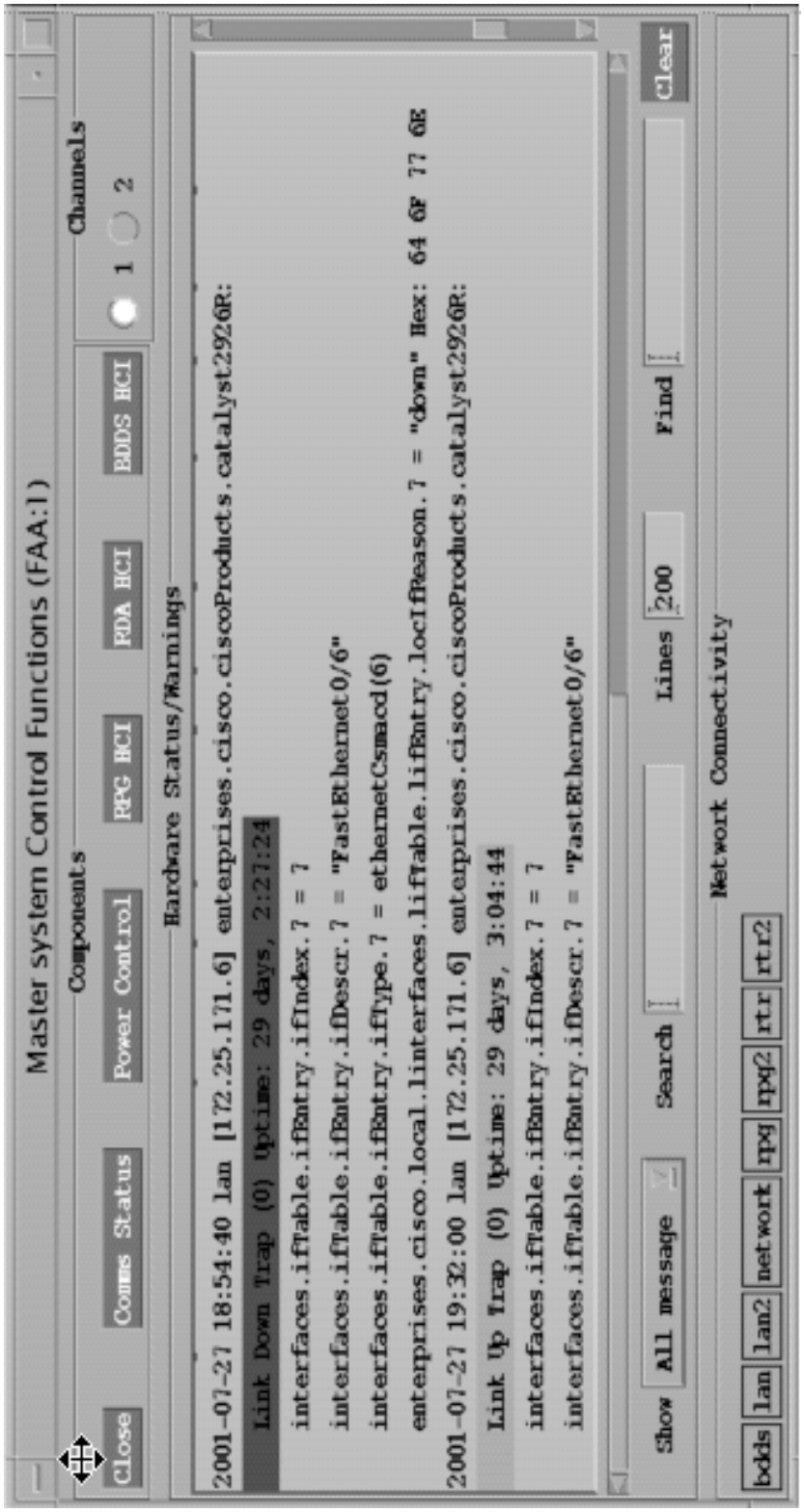


Figure 2-107. Master System Control Functions - FAA

To perform all functions for a particular channel such as selecting the RPG HCI, checking the power, or reading the Hardware Status/Warnings, the button directly to the left of that channel's number must be highlighted white. Click on the button to the left of the “1” and Channel 1 becomes the displayable channel when the button turns white. To display and interact with Channel 2, click on the button to the left of the “2”. When it becomes white, then Channel 2 becomes the displayable channel. These two buttons act as toggle switches. Only one can be highlighted white at a time.

2-7.3.2 FAA HCI Indications and Controls. In the title bar of the FAA HCI are two text lines that identify the channels as FAA:1 and FAA:2. The active channel will have the phrase “Active/Controlling” after the channel number. The inactive channel will have the phrase “Inactive/Non-Controlling” after the channel number. See Figure 2-108.

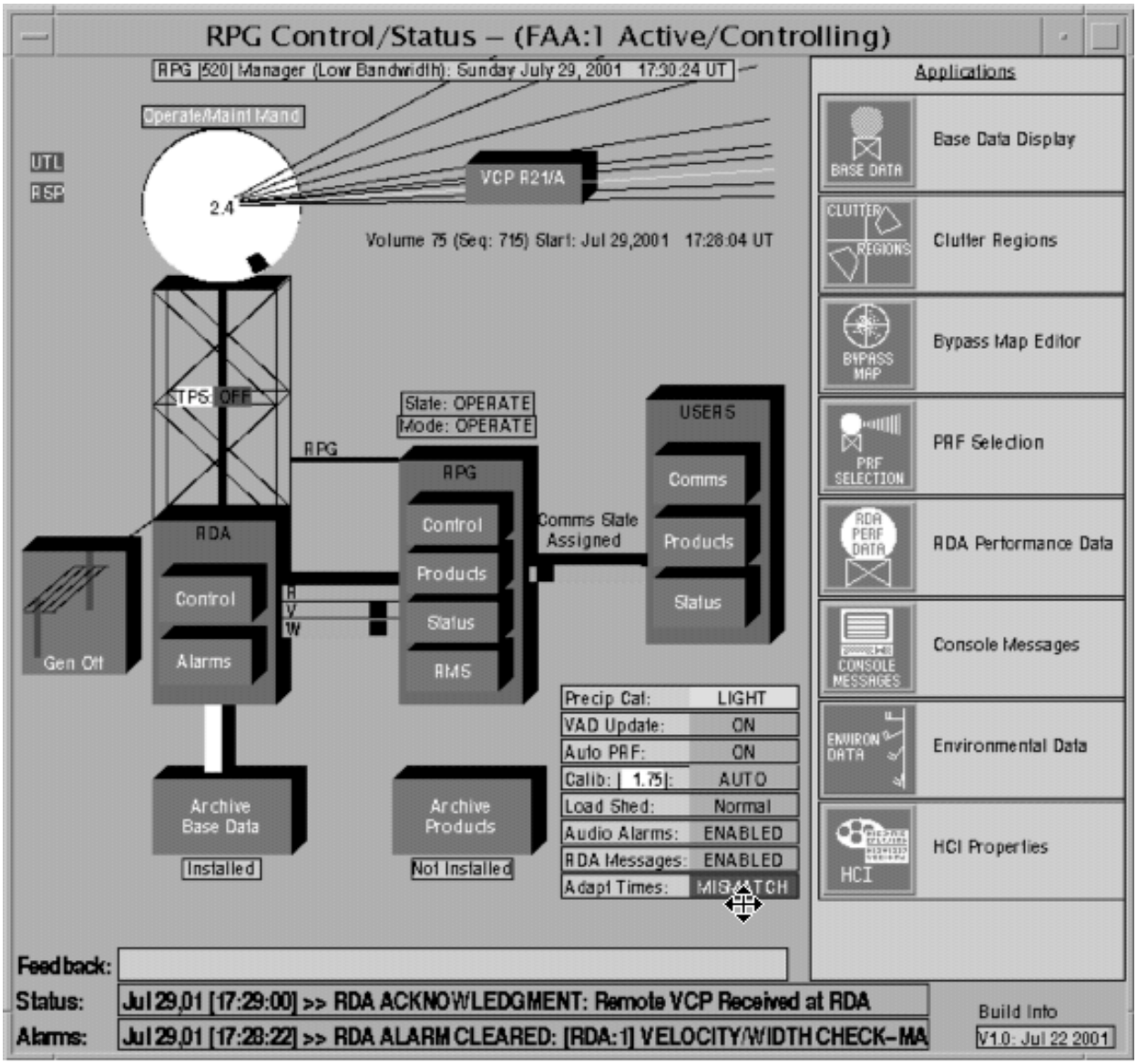


Figure 2-108. HCI-FAA

2-7.3.2.1 RMS Button. This button is visible only on the FAA redundant systems with RMS installed. It is located inside the RPG icon in the HCI as the fourth button (under the Control, Products, and Status buttons). If the RMS button has a blue background, then the RMS interface is functioning. If the RMS button has a red background, then the RMS interface is inoperative.

2-7.3.2.1.1 RMS Messages (FAA: 1 or 2) Window. Click on the RMS button and the RMS Messages (FAA: 1 or 2) window opens. See Figure 2-109.

Figure 2-109. RMS Messages (FAA:1 or 2)

The RMS Messages (FAA:1 or 2) window has a Close button in the upper left hand corner. Clicking on the Close button returns the user to the HCI. Under the title RPG to RMS Messages, there are two button: RMS Inhibit and RMS Free Text. Click on either one of those button and a separate window opens when the RMS interface is functioning. If the RMS interface is not functioning, clicking on the RMS Inhibit button will bring up a warning_popup that states: "RMS Interface is Down. Click on OK to Continue." Click on OK and the user is returned to the HCI. Clicking on the RMS Free Text button while the RMS interface is not functioning will not create any response at all. The user remains in the RMS Messages window.

2-7.3.2.1.1.1 RMS Inhibit Time Window. Clicking on the RMS Inhibit button brings up the RMS Inhibit Time window. See Figure 2-110.

Figure 2-110. RMS Inhibit Time

The top line contains three control buttons. The Close button closes the window and returns the user to the RMS Messages window. The Send button sends the time period entered in the second row of this same window to the RMS to be used as the time period that no commands will be accepted from the RMS to the RPG. This time period is effective as of the send time. The Clear button clears the data entry field in the second line.

The second line of this window contains the title Enter Time (1-3600 sec): and a data entry field. Click on the data entry field, move the blinking cursor to the left hand side of the field, and the user can then enter in a time period from 1 second to 3,600 seconds. This will be the desired time period that the RMS can not send any commands to the RPG. If an invalid entry is made and the Send button is clicked a warning_popup opens that states: "Value must be between 1 and 3600. Do you want to change the value?" Click on Yes or No. Clicking on Yes will return the user to the RMS Inhibit Time window. Clicking on No will return the user to the RMS Messages window. Once the desired value is entered, click on the Send button to send the time period to the

RMS.

2-7.3.2.1.1.2 RMS Free Text Message Window. Clicking on the RMS Free Text button brings up the RMS Free Text Message window. See Figure 2-111.

Figure 2-111. RMS Free Text Message

The top line contains three control buttons. The Close button closes the window and returns the user to the RMS Messages window. The Send button sends the free text message entered in the bottom data entry block of this same window to the RPG. The Clear button clears the data entry box of any previous input.

The second line of this window contains the title Free Text Message: and a data entry box. Click on the data entry box, have the blinking cursor in the upper left hand corner of the box, and the user can then enter in any type of free text message that is desired to be sent to the RMS. A maximum of 400 characters can be entered in the data entry box. If more than 400 are entered and the Send button clicked, a warning_popup appears that states: "RMS messages cannot exceed 400 characters. Message is XXX characters long. Do you want to change it?" XXX is the number of characters entered. Click on Yes to return to the data entry box to make the appropriate changes. Click on No and the user is returned to the RMS Messages window with the message being deleted from the RMS Free Text Message edit block without being sent. Once the text has been completely entered, click on the Send button and the text message is sent to the RMS.

2-7.3.2.2 RMS Lock Buttons. There is the capability to lock out the FAA RMMS from transmitting any commands to either the RDA or the RPG.

2-7.3.2.2.1 RDA Lock RMS Button. Click on RDA Control button and the RDA Control/Status window opens. See Figure 2-112.

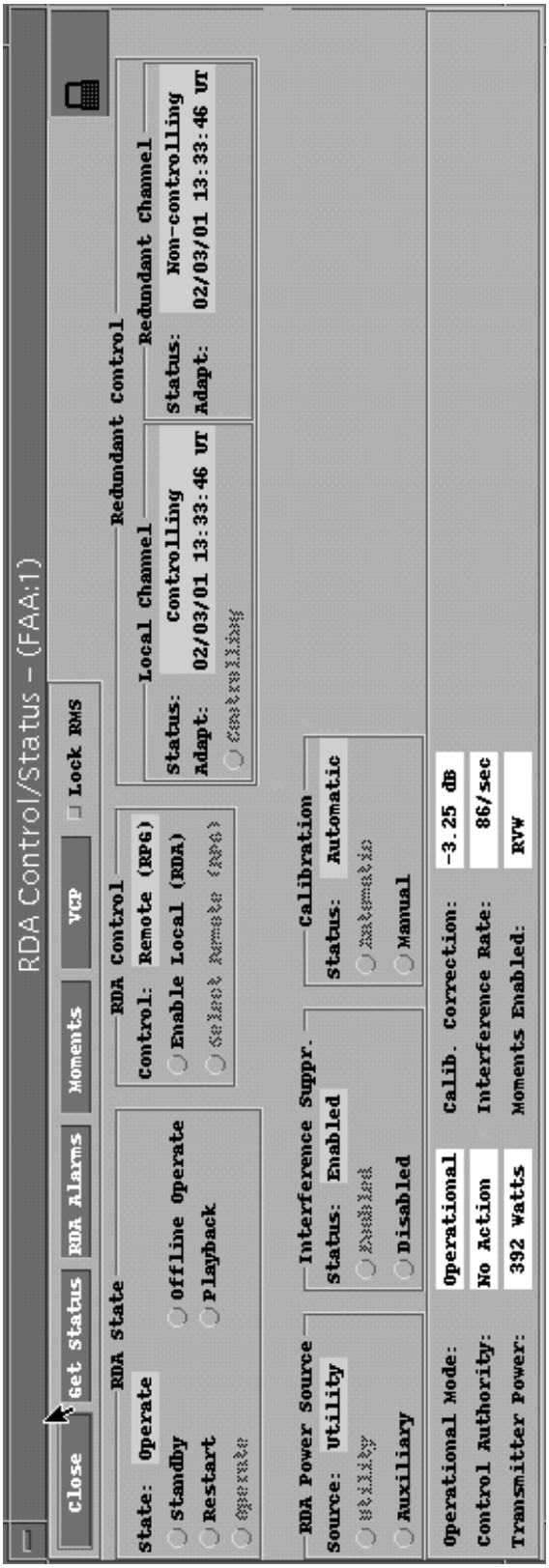


Figure 2-112. RDA Control/Status - FAA

On the right side of the top line of control buttons is a Lock RMS button. It is a on/off toggle switch. When clicked on (black check mark on white background), the RMS cannot send any commands to the RDA. When clicked off (no check mark and the background color in the button), the RMS can send commands to the RDA.

When changing the status of the Lock RMS button, a warning_popup will appear that states: "You are about to enable/disable the RMMS to RDA commands. Do you want to continue?" Click on either Yes or No. The appropriate action will be taken and the user is returned to the RDA Control/Status window.

2-7.3.2.2.2 RPG Lock RMS Button. Click on RPG Control button and the RPG Control window opens. See Figure 2-113.

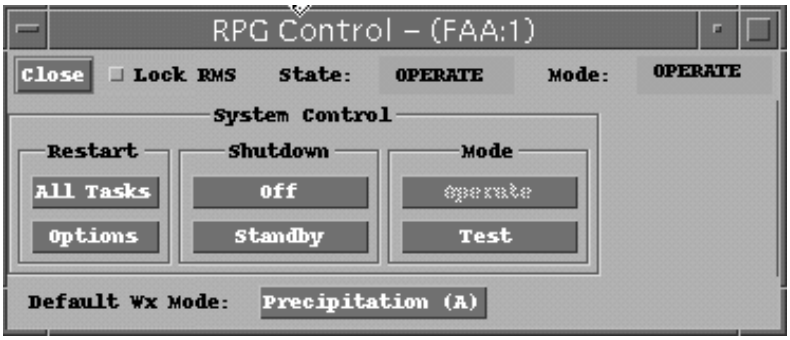


Figure 2-113. RPG Control RMS Button

On the left side of the top line of control buttons is a Lock RMS button. It is a on/off toggle switch. When clicked on (black check mark on white background), the RMS cannot send any commands to the RPG. When clicked off (no check mark and the background color in the button), the RMS can send commands to the RPG.

When changing the status of the Lock RMS button, a warning_popup will appear that states: "You are about to enable/disable the RMMS to RPG commands. Do you want to continue?" Click on either Yes or No. The appropriate action will be taken and the user is returned to the RPG Control window.

2-7.3.2.3 Comms State. Directly above the connecting bar from the RPG Box to the Users Box is a text line that reads: Comms State Assigned (or Unassigned). When looking at the HCI for the active channel, the status will be Assigned. When looking at the HCI for the inactive channel, the status will be Unassigned. The term Assigned means that all product distribution dial and dedicated modem circuits are connected to that channel.

2-7.3.2.4 Adapt Times Match/Mismatch. In the lower right hand corner of the FAA HCI is an eighth text line that states Adapt Times: MATCH (with a green background) or MISMATCH (with a red background). See Figure 2-114 and Figure 2-115.

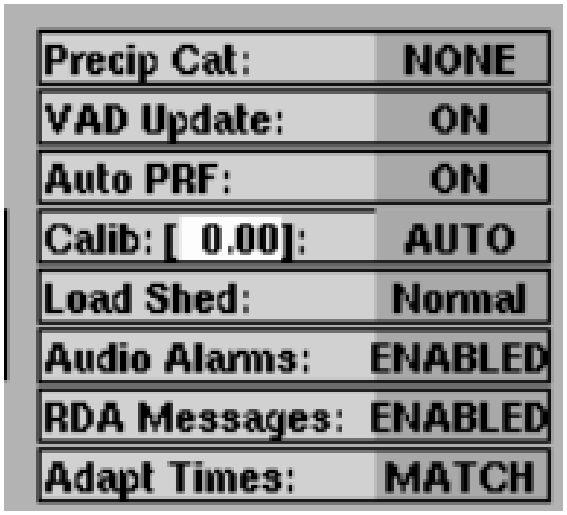


Figure 2-114. Adapt Times: Match

Figure 2-115. Adapt Times: Mismatch

When any adaptation data is changed and saved on the active/controlling channel, the "Mismatch" title with the red background will briefly appear until the changes are automatically transferred over to the inactive/non-controlling channel. At that time, the "Match" title will reappear with the green background. No action is required by the operator to transfer the adaptation data and make the channels match each other.

Another area that will show the Match/Mismatch of the adaptation data is in the Redundant Control Section of the RDA Control window. The Adapt lines for both the Controlling and Non-con-

trolling will have either the same date/time for Matching data with the grey background, or the different dates/times of Mismatching data with a red background. See Figure 2-116.

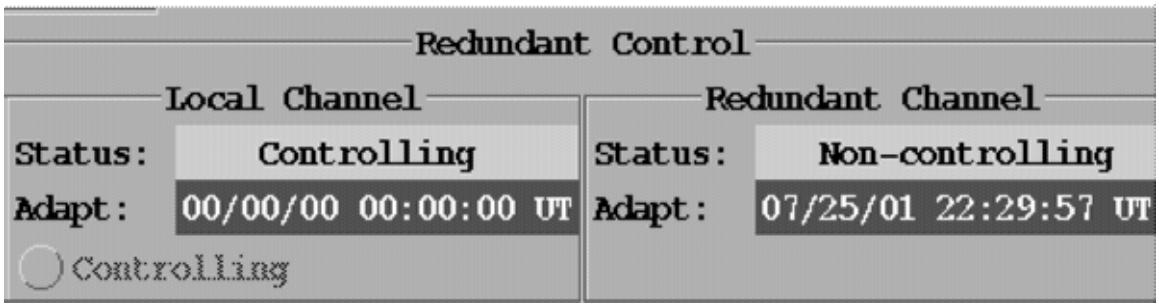


Figure 2-116. Adapt Times: Mismatch in RDA Control Window

2-7.3.3 Changing Control Channels. Click on the RDA Control button and the RDA Control / Status window opens. An additional text line to the right of the title reads either (FAA:1) or (FAA:2). See Figure 2-117.

To the far right of the RDA Control/Status window is a section labeled Redundant Control with two subsections under the title. The left subsection is called the Local Channel and the right subsections is called the Redundant Channel. Under both of these headings are two categories of information: Status: and Adapt:

These subsections vary depending on whether FAA:1 HCI is the selected HCI or FAA:2 HCI is the selected HCI, so they are described independently along with the available options for changing channels in each.

2-7.3.3.1 FAA:1 HCI, Switching From Channel 2 To Channel 1. When the HCI for FAA:1 is selected and viewed, Channel 1 is represented in the left subsection and is called the Local Channel. Channel 2 is called the Redundant Channel and is in the right subsection. See Figure 2-117.

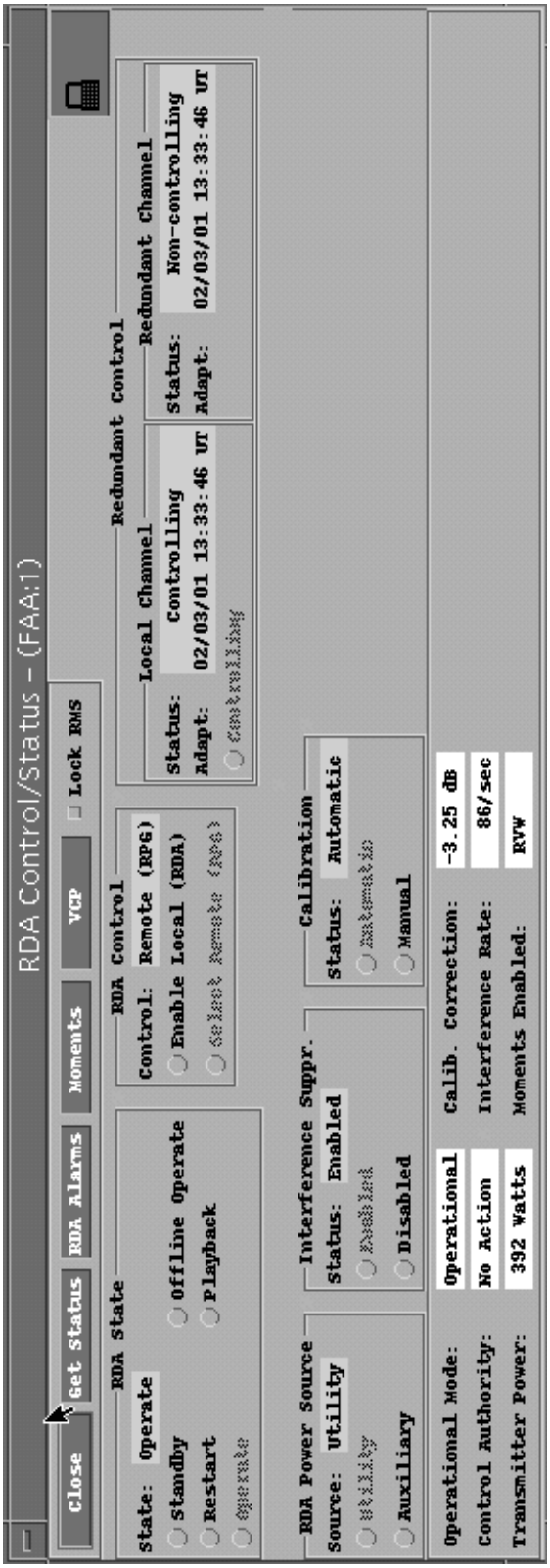


Figure 2-117. RDA Control/Status - (FAA:1)

The controls to change the channels are password protected. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7.

Underneath the Local Channel is only one button that is labeled Controlling. If the button and label are grayed-out and desensitized, then Channel 1 is the active/controlling channel. If the button and label are sensitized, then Channel 1 is inactive/non-controlling. The user can then click on this button and a warning_popup opens that states: “You are about to change the control state of this channel. Do you want to continue?” Click on either Yes or No. If Yes, Channel 1 will become the active/controlling channel and the button and label become grayed-out and desensitized. If No, then no changes take place and the user is returned to the HCI.

From this HCI (FAA:1), the user can only switch from Channel 2 to Channel 1.

Once the channels have been switched, the HCIs are no longer on the screen. The user has to go to the MSCF and reopen both HCIs. Also, the RDAs have been put into Standby. The user must click on the active channel RDA Control button, RDA State section, and click the Operate button in order to place the RDA in operation.

2-7.3.3.2 FAA:2 HCI, Switching from Channel 1 to Channel 2 and Back Again. When the HCI for FAA:2 is selected and viewed, Channel 2 is represented in the left subsection and is called the Local Channel. Channel 1 is called the Redundant Channel and is in the right subsection. See Figure 2-118.

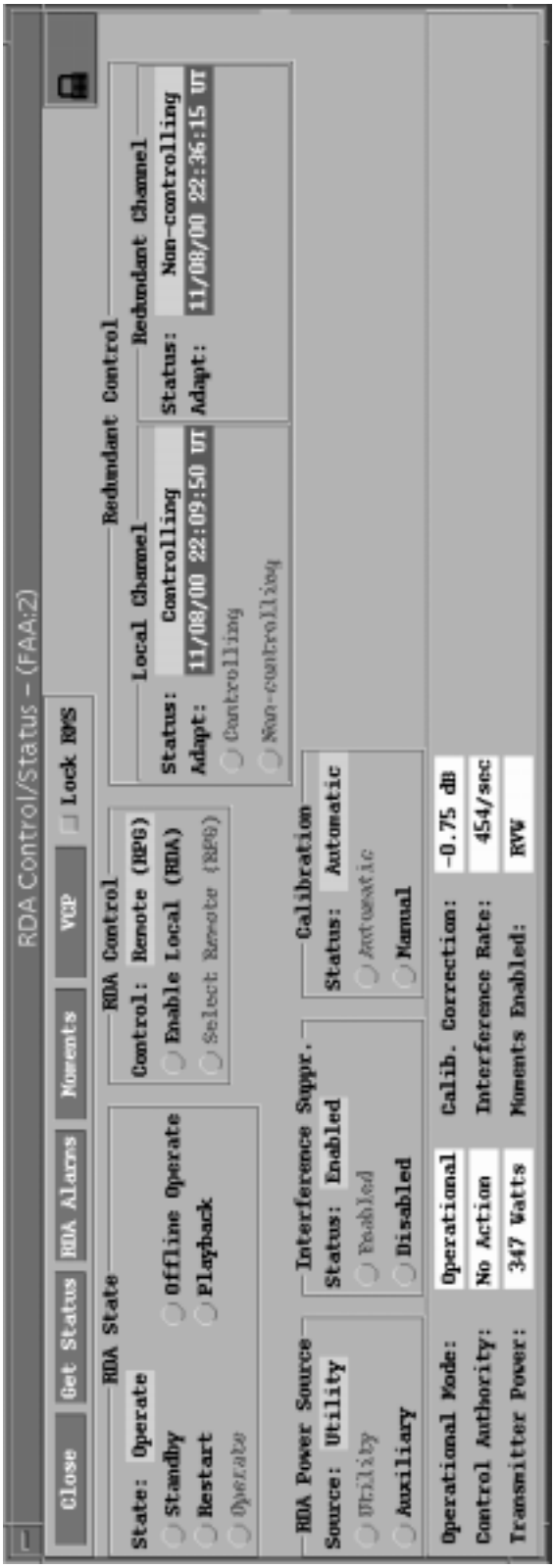


Figure 2-118. RDA Control/Status - (FAA: 2)

The controls to change the channels are password protected. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7.

Underneath the Local Channel are two buttons that are labeled Controlling and Non-controlling. If the Controlling button and label are sensitized and the Non-controlling button and label are grayed-out and desensitized, then Channel 2 is inactive/non-controlling. If the Controlling button and label are grayed-out and desensitized and the Non-controlling button and label are sensitized, then Channel 2 is active/controlling. The user can click on the sensitized button and a warning_popup opens that states: “You are about to change the control state of this channel. Do you want to continue?” Click on either Yes or No. If Yes, Channel 2 will change to the new control state and that button and label become grayed-out and desensitized. If No, then no changes take place and the user is returned to the HCI.

Underneath the Redundant Channel is one button that is labeled Controlling. If the button and label are sensitized, then Channel 1 is inactive/non-controlling. The user can click on this button and a warning_popup opens that states: “You are about to change the control state of this channel. Do you want to continue?” Click on either Yes or No. If Yes, Channel 1 will become the active/controlling channel and the button and label become grayed-out and desensitized. If No, then no changes take place and the user is returned to the HCI.

From this HCI (FAA:2), the user can switch back and forth between Channel 2 and Channel 1.

Once the channels have been switched, the HCIs are no longer on the screen. The user has to go to the MSCF and reopen both HCIs. Also, the RDAs have been put into Standby. The user must click on the active channel RDA Control button, RDA State section, and click the Operate button in order to place the RDA in operation.

2-7.3.4 Changing Adaptable Parameters on FAA Channels. The operator can change adaptable parameters on the active controlling channel at any time through the various windows on the HCI. However, if the operator attempts to change adaptable parameters on the non-active, non-controlling channel, a warning_popup will appear that states: "You cannot edit this data because the other RPG channel is Active." Click on the Continue button and the user is returned to the open window.

2-7.4 FAA Channels and LOCA Passwords.

When LOCA passwords on changed on one channel through the HCI Properties Password window, those passwords are changed for both channels. This precludes the operator from having one set of passwords on one channel and a second set of passwords on the other channel.

2-7.5 State of the System.

For FAA redundant configurations, it is recommended to place the RDA and RPG in standby before any channel changes take place. The user must then remember to place the RDA and RPG back into operate once the new channel has become the active channel. If the RDA and RPG are left in operate mode, they do switch to standby during the changeover, but then automatically

return to operate once the new channel becomes fully operational. Only one channel can be in on-line operate at a time, so be careful with which RDA/RPG is restored to operate.

For NWS redundant configurations, it is recommended to place the RDA in standby before any channel changes take place. The user must then remember to place the RDA back into operate once the new channel has become the active channel. If the RDA is left in operate mode, it does switch to standby during the changeover, but then automatically returns to operate once the new channel becomes fully operational. Only one channel can be in on-line operate at a time, so be careful with which RDA is restored to operate.

SECTION 2-8. HELP

2-8.1 General.

This section describes the Help system that is available with the HCI. It discusses the concept and then provides an example of how to actually use the system.

2-8.2 The Electronic Performance Support System Concept.

The Electronic Performance Support System (EPSS) provides the user with just-in-time, interactive, step-by-step instructions on performing a selected task. The EPSS provides both task/functional domain information and step-by-step instructions. In addition, it provides an "either or" facility for accessing information more specific to a particular area or task. For example, the user can select either information on a theory of operation or how to perform a step or steps to accomplish a task.

Additionally, the EPSS allows the user to decide how much or how little information is needed at the time the task is being performed relative to their experience/skill level and frequency of task performance. The user can navigate sequentially through each step within a selected task, "jump" to particular steps with which they are less familiar, and /or access further information regarding a specific step through the use of hypertext links.

The HCI EPSS provides the user with task and problem-based help selections along with concise functional domain information. The EPSS runs as a stand-alone module at the MSCF with no direct links to the MSCF software.

2-8.3 Access to the EPSS.

The EPSS is accessible via the EPSS icon on the left hand side of the Solaris front panel. The icon consists of a WSR-88D Tower and a Question Mark over Pages of Text to the right side of the tower. (See Figure 2-119) Click on the Icon and the EPSS Index appears.

Figure 2-119. EPSS Icon

2-8.3.1 EPSS Index. The EPSS Index is in alphabetical order with the major topic along the left hand margin and subsets of each topic indented. Scroll through the listings and find the item of interest. Once the desired topic has been found, double click on the title to display the detailing information in a separate screen. The first half page of the index is shown in the following example:

RPG HCI

Electronic Performance Support System (EPSS)

Alert Paired Products
Alert Thresholds,
-Groupings
-Setting
Alarms, RDA,
-Displaying
-Sorting
Archive II,
-Determining status of
-Record(ing)
-Stop(ping)
Archive III,
-Archival by time span
-Canceling
-Determining status of
-Status Messages, Displaying
-Status Messages, Index of
-One product archival
-Pausing
-Reading from optical disk
-Resuming
-Starting

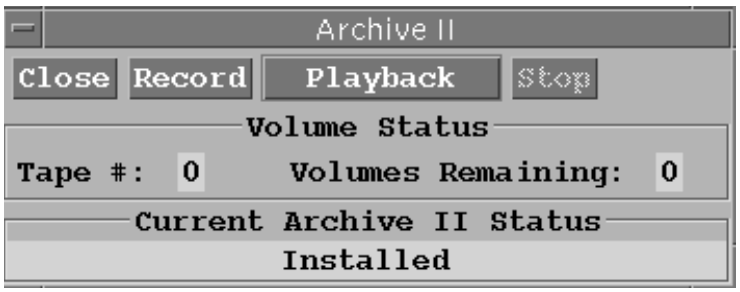
CONTINUED

2-8.3.2 Example of EPSS Text. Once a topic or sub-topic has been identified, double click with the left button on it and the EPSS text will be pulled up. The left hand side contains the text, step-by-step instructions, and comments while the right hand side displays the associated screens, buttons, and figures. An example of the text for Archive II - Status is shown in the following example:

EXAMPLE - EPSS
Archive II - Status

Determining Status

The primary source of Archive II (base data archival) status is located on the RPG Human-Computer Interface main window just below the Archive Base Data Icon. When Archive II is record active, the amount of tape available for recording (in volume scans for the current VCP) is indicated.



A secondary source of Archive II information can be accessed at the Archive II control window by left clicking once on the Archive II Base Data Icon. This window displays the additional information of which tape is currently in use.

Status Types

Installed - This indicates the Archive II unit is available for use but is record active. This message is also displayed during the period between record command issuance and the time recording actually begins.

Recording - The Archive II device is actually recording level II data.

CONTINUED

SECTION 2-9. SECURITY

Security features include physical (gates, locks, guards, etc.), administrative (personnel windowing), and technical (hardware, software, and firmware) attributes sufficient to protect the data stored, processed, or transmitted within the system.

2-9.1 System Security Overview.

The security features for the RPG operating system are specific to UNIX as implemented by Sun Solaris. The site system administrator personnel require an administrative knowledge of UNIX. Security implementation is based on a preventive approach to system security emphasizing system security, discretionary access control mechanisms, need-to-know, accountability of users (or operators) for their actions, auditing, resource isolation, and configuration management. Properly implemented and monitored, this becomes the first defense against intrusion into and misuse of the system. The system security configuration as implemented uses a combination of automated features and procedural (manual) instructions that are enforced and maintained by the site system administration and security staff.

2-9.1.1 Definition of Terms and Services.

2-9.1.1.1 Accountability and Audit. Accountability is the state of the system that enables violators or attempted violators of system security to be identified and held accountable for their actions. Review of system records and activities (audit) test the adequacy of the system controls to ensure compliance with established policy and operational procedures.

2-9.1.1.2 Discretionary Access Control (DAC). DAC is a means of restricting access to objects based on the identity of subjects or groups to which they belong. The user determines who (owner, group, or world) is able to read, write, or execute a system object (files, directories, etc.). Authorized users will only have access to system objects granted by DAC mechanisms. Improperly controlled file access can permit unauthorized users access to information that they do not have a need-to-know and can potentially compromise system security. DAC should not be confused with classification or category designations that are assigned to system information and data.

2-9.1.1.3 Trusted Facility Operations. Trusted Facility Operations refers to the procedures and functions that enforce system security procedures and practices. The ultimate objective of trusted facility operations is to support the system security policy during day-to-day operations. Trusted facility management, in the daily administrative sense, is the responsibility of designated site personnel such as the System Administrators, and is the responsibility of all personnel who enter the facility, physically or logically. Therefore, everyone, particularly system users, should be aware of what constitutes normal operations and what may be misuse of system resources or suspicious or abnormal operating conditions.

2-9.1.1.4 Identification and Authentication (I&A). This security mechanism ensures that only authorized users have access to system resources and that system users are held individually accountable for their actions. Users identify themselves to a system component through their user

ID, which requires authentication by presenting a valid password before permission is granted to access system resources or data.

2-9.1.1.5 Files, Directories, and Permissions. The site System Administrator monitors workstations and servers to verify and maintain the system security configuration. Users must not attempt to load unauthorized software or change file permissions or directories without system administrator permission. Additionally, users must not change file permissions unless it is within the scope of their job, required for the mission, and they have received proper authorization.

2-9.1.2 Threats and Vulnerabilities. Threats to the RPG System may come in two forms: natural and intended. Natural threats include fire, power failure, environmental failure, etc. Standard safety checks and recovery procedures are established to react to natural threats. Intended threats are human-perpetrated, may occur at any time, and are significantly more difficult to detect. If users suspect or detect misuse, in-progress attacks, or other aberrant system activity, they should immediately contact the site system administrators or security staff. It is important to report the incident immediately to prevent further possible compromise or damage to the system. Users must be aware that the failure of a single site to ensure security puts all sites at risk.

2-9.1.3 Countermeasures. Local operating procedures are in-place for dealing with natural events such as fire, power failure, and environmental malfunctions. To counter intended threats, the RPG System employs safeguard features such as identification and authentication, discretionary access control, accountability, redundancy, auditing, and physical security rules. Each site should develop countermeasure procedures to follow when misuse or system attacks are suspected or detected. When a site has a suspected or actual security incident that compromises the security of the RPG System or the WSR-88D network, they must report the incident to the ROC Hotline immediately. Misuse of the RPG System is illegal and protected under federal and local statutes.

2-9.1.4 Assumptions. The fundamental responsibilities of the system administration or security staff are:

- Understand the system security policy, the certified security configuration requirements, and the security architecture for the RPG System.
- Maintain system security configuration and security services.
- Monitor system activities using audit and security services.
- Identify, investigate, and report abnormal system activities.
- Establish and manage user and group accounts.

2-9.1.5 Separation of Administrative Roles. Only those personnel specifically responsible for site system administrative and security functions have access to system administration accounts. Given the nature of the RPG System and limited site staffing, the same individuals may perform system administration functions as well as system security functions.

2-9.1.5.1 User Requirements. Users are personnel who establish the system requirements and support the WSR-88D mission. Users are the operational users, administrators, and maintainers of the RPG System and components. All users shall comply with RPG system security policies

and procedures and shall report security problems. Users must be familiar with the RPG System security policy, the sensitivity and criticality of the data provided by the RPG System, the need for keeping login information private, and to whom they report suspected system anomalies.

2-9.1.5.2 Administrator Requirements. The site system administrators have the primary responsibility of ensuring that the site complies with security guidance and doctrine, and maintain the security posture of their system. Security policy shall be applied at all sites regardless of size, staffing, or other pertinent qualifiers.

2-9.1.6 System Security Policy. The RPG System Security Policy provides system administrator guidance for maintaining security of the system, operational controls of the system, life cycle security responsibilities, and documentation. Compliance with the RPG System Security Policy and higher level security policies and procedures is required to ensure the integrity of the system.

2-9.2 Protection Mechanisms Available to Users.

Users must be aware that they are responsible for their actions on the RPG System. Users should notify the site system administrators of any other security-related issues, misuse, or compromise of the system.

2-9.2.1 System Access. The Common Desktop Environment is automatically started as part of the normal boot process and is configured to run in a multi user, networked environment. Logging into the RPG System environment causes the operating system to create an active session tailored to the user account identified during the login process. The initial session reflects a default set of account, group, and profile attributes that are assigned by the site system administrators. These attributes determine what the user may access while connected to the system. The user account attributes assigned to a user are:

- User Identification
- User Number
- Password
- Default Profile
- Group Membership

2-9.2.2 Setting User Passwords. The site system administrator provides each new general user with a unique user ID and password. When the user logs into the RPG System for the first time, the user is required to change the password immediately so that only the user knows the password.

The following general rules apply to constructing a password:

- Users are responsible for protecting their passwords against loss or disclosure and will be held liable for any improper use of the password.
- User-generated passwords are required to have the following characteristics:
  - Be at least eight characters in length.
  - Contain at least six alphabetic characters and two numeric or special characters.
  - May not be a password that was used within the previous three password changes.

In addition to the required minimum characteristics, the user may also choose to include upper and lower case letters in the password.

Password lifetime (also known as password aging) refers to how long a password is valid on the system. The maximum lifetime of a password on the RPG System is 90 days. Therefore, users must change their passwords at least every 90 days.

CAUTION

Because UNIX passwords are case-sensitive, users must always enter their password exactly the way they created it. If a user forgets their password, the system administrators may reset the password for the user to logon and change the password again.

2-9.2.3 Warning Banner (Consent to Monitoring). Users logging into the RPG System should take the time to read and understand the information displayed on the Consent to Monitoring Banner. The banner describes the security nature of the environment, proper behavior while operating in this environment, and the security guidelines defining its operation.

2-9.2.4 Incident Response. Misuse of the RPG System is illegal and protected under federal laws as well as local statutes. The site users are responsible for abiding by applicable policies, guidelines, and directives to ensure they understand what constitutes system misuse. The primary reason for preventing misuse is to ensure that the system configuration complies with security configuration requirements defined in this document. The site system administrators or security staff can provide specific guidance on security issues that are of concern to the site users.

2-9.3 Protection Mechanisms Available to Administrators.

Administrator accounts shall not be used to accomplish the day-to-day mission work on the RPG System. Each user with administrative duties must have a uniquely identifiable account so that any administrative work can be tracked back to that individual. The root account is reserved for maintenance of the system, and for certain system security-relevant functions. The root privilege must be tightly controlled and given to only those administrative personnel who specifically require the privilege to accomplish their duties and responsibilities. Standard procedure should be to log on as a normal user and then “su” to root.

2-9.3.1 Accountability. System access warning banners are used to notify each user that, by accessing a federal computer system, their actions are subject to review and that they expressly consent to authorized monitoring. The system displays the Consent to Monitoring Banner each time the system boots up and at each login session.

2-9.3.1.1 Identification and Authentication Functions. All RPG System users, including site system administrative users, must enter a valid user identification and password in the Login dialog box to gain access to the system resources.

2-9.3.1.2 Login Parameters. The RPG System employs an interactive, local login (the user data-

base is stored on the operating site RPG System server). When the user enters a unique user identification and password in the Login dialog box, (i.e., username and password), the information is verified against the user account database.

2-9.3.2 Audit. User account auditing is enabled and controlled by site system administrators. Site system administrators may audit success, failure or both for login and logout, file and object access, use of user rights, user and group management, security policy changes, system restarts, shutdowns, events impacting system security or the system security log, and process tracking.

2-9.3.2.1 Setting up User Account Auditing. For the RPG System, the following audit flags in the auditing configuration files specify which classes of events to audit. As a minimum, the following events will be audited:

Short Name	Long Name	Description
Lo	login_logout	all successful login and logout events
Ad	administrative	all successful administrative events
-pc	process	all failed process operations: fork, exec, exit, etc.
fc	file_creation	all successful creation of objects
fd	file_delete	all successful deletions of objects
fm	file_attr_mod	all successful change of object attributes: chown, flock, etc.
-fw	file_write	all failed write of data, open for writing, etc.
-io	ioctl	all failed ioctl system calls

Use additional audit flags to monitor and obtain details on system access and processes when you suspect the system security is being violated. (For more information on modifying the classes of events to be audited, see the audit class (4) man page.)

CAUTION:

Adding more event attributes to be logged can make the audit log become very large, very quickly, and may cause the buffer to overwrite or stop logging events.

2-9.3.2.2 Reviewing the Audit Log. The system administrator will be allowed privileges to view the audit logfiles. From the RPG, BDDS, or MSCF, type cat /etc/security/audit_data at the command line. The current logfile (within 24hours) for that terminal will be displayed.

2-9.3.2.3 Saving the Audit Security Log. The RPG System automatically invokes audit_purge to gzip files from the last 24 hours (the terminated ones) and delete all files older than 90 days. The purged files are stored in /var/tmpaudit. The gzip is used to save space and be able to maintain 90 days worth of system event logs on the hard drive.

2-9.3.2.4 Viewing Archived Security Logs. The RPG System maintains audit logs for a 90 day period in the temporary file tmpaudit. For the System Administrator to review the data, the following steps must be performed:

Step 1 Create a symbolic link directory for auditreduce commands. At the command line prompt, enter the command “ln -s /var/tmpaudit/data /var/tmpaudit/data/files” and press the return

key.

Step 2 The symbolic link called files is displayed, and pointing to the data subdirectory. At the command line prompt, enter the command “ls -l /var/tmpaudit/data” and press the return key.

Step 3 At the command line prompt, enter the command “cp /var/audit/* /var/tmpaudit/data” and press the return key.

Step 4 At the command line prompt, enter the command “ls /var/tmpaudit/data” and press the return key.

Step 5 At the command line prompt, enter the command “/usr/local/bin/gunzip /var/tmpaudit/data/*.gz”. Files with the .gz extension are displayed and press the return key.

Step 6 At the command line prompt, enter the command “ls /var/tmpaudit/data” and press the return key.

Step 7 **To display information on a specific active account:** At the command line prompt, enter the command “auditreduce -R /var/tmpaudit/data -u xxx -c lo | praudit” where xxx is the name of an active account and press the return key.

The system will display a message in the following format:
The header line contains the type of action (logout/login) and the time.
The subject line contains the user name and group name, hostname.
The text line shows the command/status.
The return line shows the status.

EXAMPLE:
header,77,2,logout,,Tue Mar 14 15:16:37 2000, + 291150493 msec
subject,auser,auser,rpg,auser,rpg,10708,10708,0 0 rocrpg6
text,logout auser
return,success,0
header,81,2,login - local,,Tue Mar 14 15:19:37 2000, + 351826315 msec
subject,anuser,anuser, rpg,anuser,rpg,11121,11121,0 0 rocrpg6
text,invalid password
return,failure: Interrupted system call,-1

NOTE

This step demonstrates the capability of the administrator to track the activities of a particular user.

Step 8 To display information on a specific timeframe: At the command line prompt, enter the command “auditreduce -R /var/tmpaudit/data -d yyyymmddhhmmss | praudit” where yyyymmddhhmmss is a particular time, e.g. 20000324080000 and press the return key.

The system will display a message in the following format:
The header line contains the type of action (logout/login) and the time.
The subject line contains the user name and group name, hostname.
The text line shows the command/status.
The return line shows the status.

EXAMPLE:
header,77,2,logout,,Tue Mar 24 8:00:00 2000, + 291150493 msec
subject,auser,auser,rpg,auser,rpg,10708,10708,0 0 rocrpg6
text,logout auser
return,success,0
header,81,2,login - local,,Tue Mar 24 08:00:00 2000, + 351826315 msec
subject,anuser,anuser,rpg,anuser,rpg,11121,11121,0 0 rocrpg6
text,invalid password
return,failure: Interrupted system call,-1

NOTE

This step demonstrates the capability of the administrator to track the activities that occurred at a particular time.

2-9.3.3 Routine Operations.

2-9.3.3.1 Group Accounts. Groups establish a logical grouping of application, menus, and icons that are required to perform a set of tasks. Local accounts utilize the standard UNIX account data bases (e.g., the /etc/passwd and/etc/group files) and only provide access to the system where the accounts are registered.

2-9.3.3.2 Security Relevant Files and Directories. Several directory hierarchies are considered critical to the RPG System and security administration. These hierarchies must be monitored and maintained to ensure that the general user community can neither accidentally or maliciously cause damage to the system operation by manipulating the key configuration files within them. These directories include:

- /(root) directory is the home directory for the root-user and the parent for all hierarchies in the file system.
- /etc directory is the primary administrative and security directory on the UNIX file system.
- Audit Logs and Online Archives must be protected from unauthorized access or manipulation.

2-9.3.3.3 Establishing User and Group Accounts. The CDE provides an interface for RPG users and workstation management, password control, and administrative functions. To establish or modify a user's identity for the RPG and MSCF processors, use the following procedures. If needing to create a user on a BDDS processor, refer to Table 4-82, NWS EHB 6-525 for the additional steps.

Step 1. Exit the existing CDE screen by clicking on the EXIT button along the bottom Command

line.

Step 2. Once the US Government Warning window reappears with the edit block for the user name, enter in the name of the super user level for your system. At the next window, enter in the password for the super user level and the CDE screen appears with a terminal window open at the super user level (# prompt).

Step 3. Right click anywhere on the workspace background and the Workspace menu opens. See Figure 2-120.

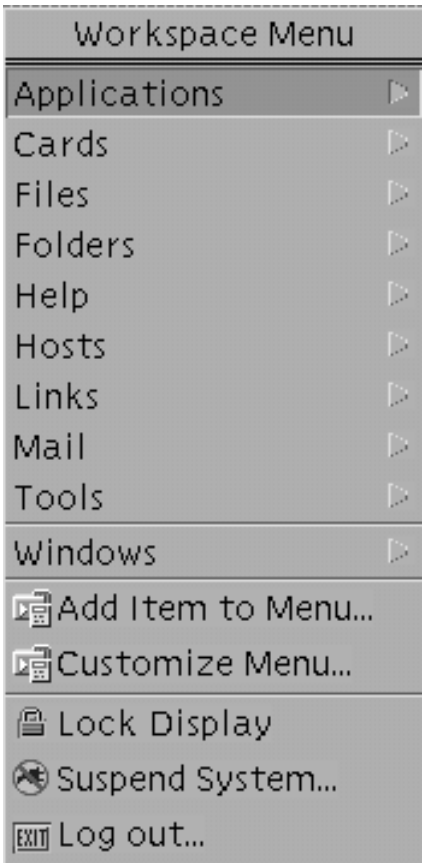


Figure 2-120. Workspace Menu

Step 4. Scroll down the Workspace menu to Tools and click on Tools. A secondary menu opens titled Tools. Scroll down the Tools menu to Admintools and click. This opens the Admintool: Users window. See Figure 2-121.

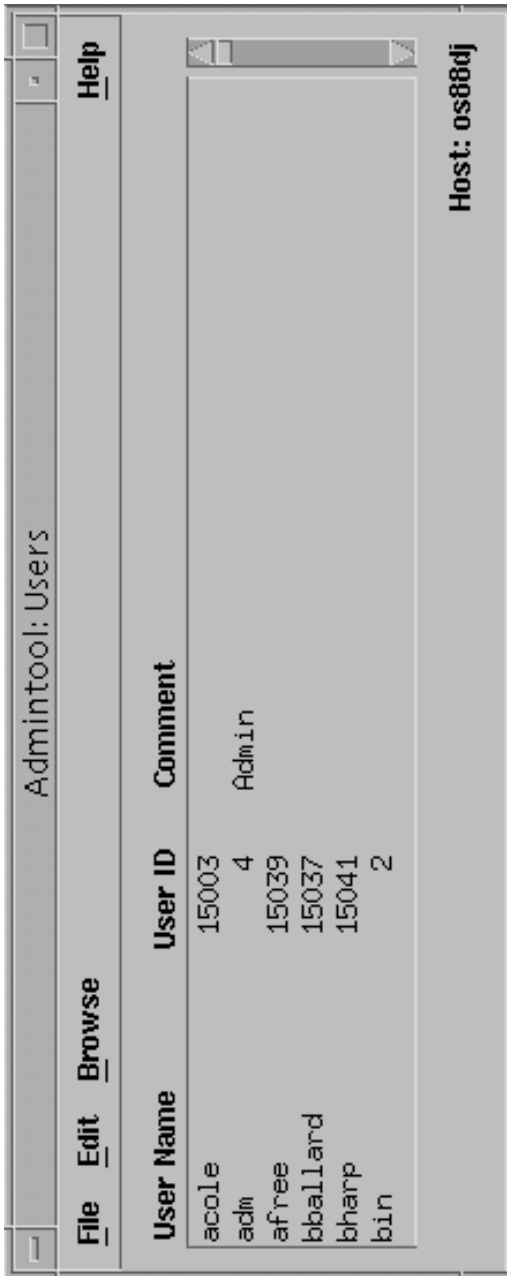


Figure 2-121. Admintool: Users

Step 5. Click on Edit, and a pull down menu appears. See Figure 2-122.

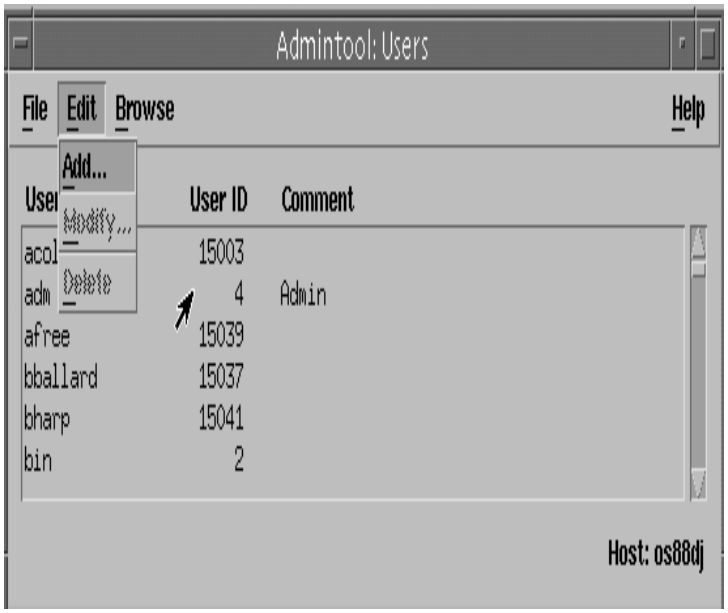


Figure 2-122. Admintool: Users Edit

Step 6. Click on Add, and the Admintool: Add User window opens. See Figure 2-123.

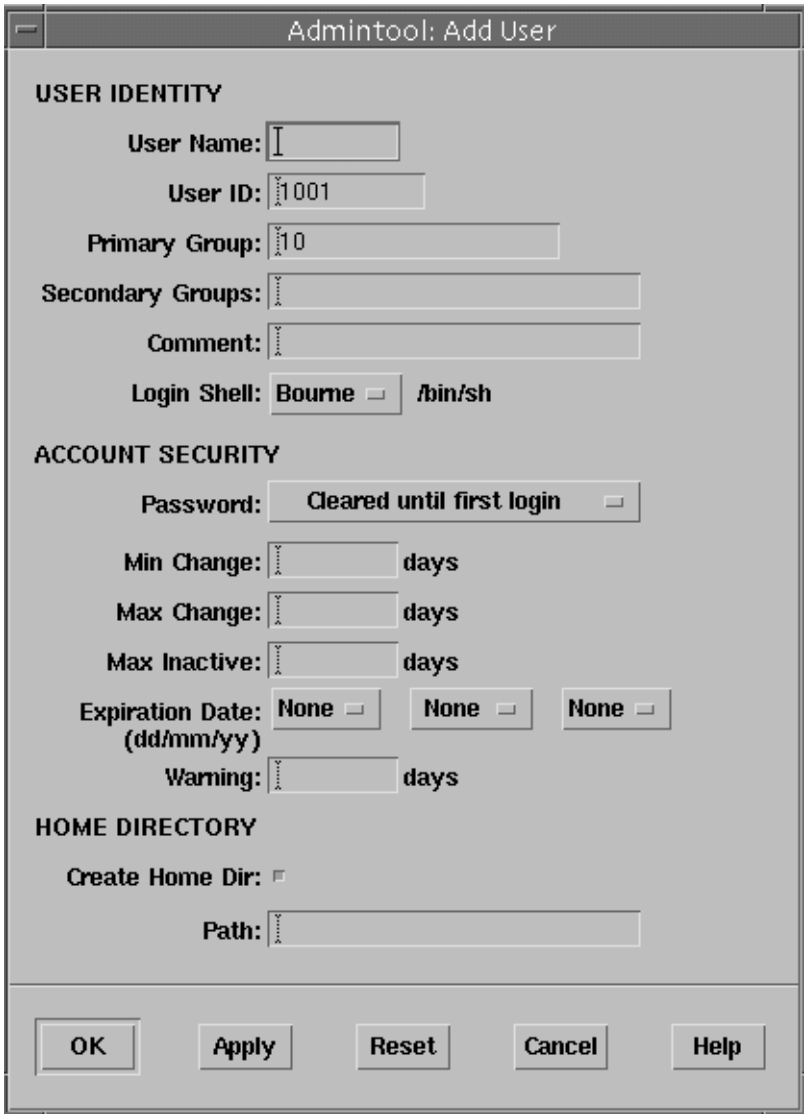


Figure 2-123. Admintool: Add User

Step 7. Under the section labeled USER IDENTITY, using the keyboard, enter the:
- User Name in the User Name field
- User ID in the User ID field. (Use the default ID number or assign a unique ID. Use only ID numbers between 1001 and 20,000.)
- Group name of "101" in the Primary Group field. (The name "101" is the RPG group.)
- User's name, job title, or any other pertinent information maintained on the user in the Comment field (Optional).

Step 8. Position the cursor on the right hand button of the Login Shell: edit field. Click on the button, and four options appear (Bourne, C, Korn, or Other). Click on the "C" option, and the C shell will then be listed as the Login Shell.

Step 9. Under the section labeled ACCOUNT SECURITY, position the cursor on the right hand button of the Password: edit field. Click on the button, and four options appear (Cleared until first login, Account is locked, No password–setuid only, and Normal Password...). Click on the Normal Password... option, and that opens up the Set User Password window. See Figure 2-124.

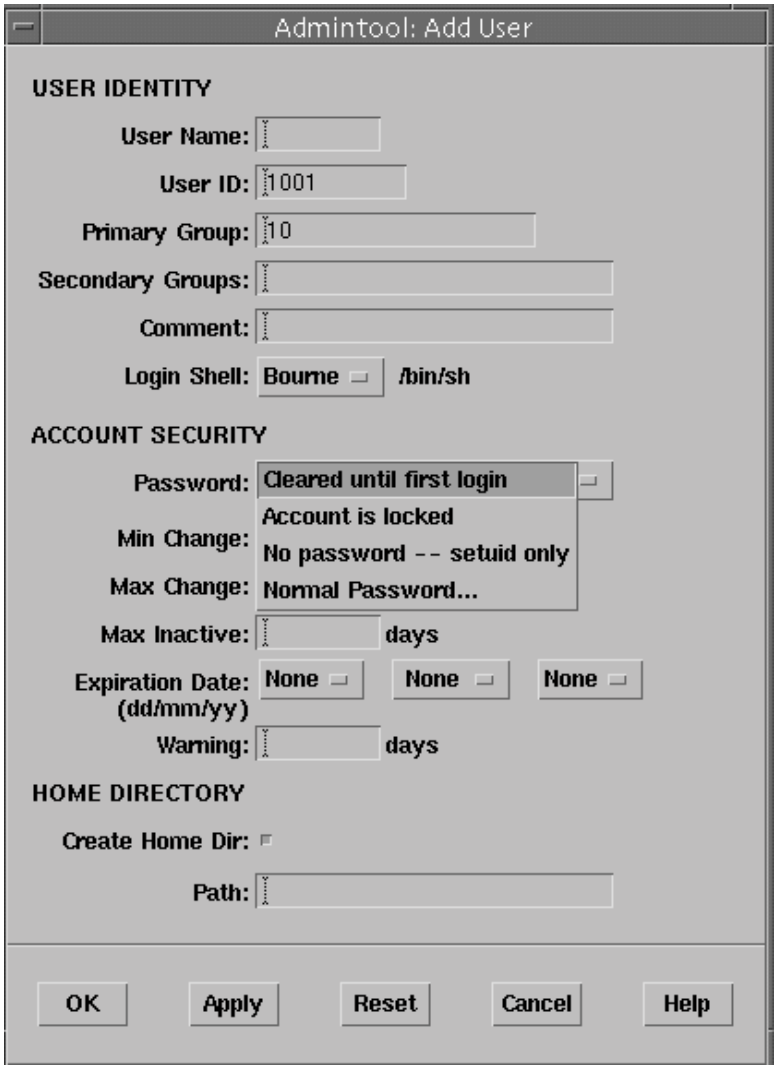


Figure 2-124. Account Security Password Options

Type in the password in the Enter Password: edit field, press the Tab key, type in the same password in the Verify Password: edit field, and then click on OK to have the password accepted.

Step 10. Still in the ACCOUNT SECURITY section, using the keyboard, enter in:
- Min Change: Optional (Suggest leave blank)
- Max Change: "90". Maximum number of days for the user to use the same password. This is recommended to be 90 days.
- Max Inactive: Optional (Suggest leave blank)
- Expiration date: Optional (Suggest leave as None)
- Warning: "5". Number of days for the user to be prompted to change their password. This is recommended to be 5 days.

Step 11. In the HOME DIRECTORY section, in the edit field to the right of the title Path: enter the following information: **/export/home/user_name <Return>**. (For individual user accounts, the user_name is the same that was inserted in step 7, first entry.)

Step 12. Click on the OK window, the desired changes will be accepted, and the Admintool: Add User window will be closed.

Step 13. At the Admintool: Users window, under the File button, click on File, Exit. This exits the operator from the Admintool: Users window.

Step 14. At a terminal window super user # prompt, enter: **cd /export/home<Return>**. This changes to the home directory location of all users, including the applications software user account.

Step 15. At the # prompt, enter: **ls -1<Return>**. Note the present version account name for the RPG or MSCF applications software (e.g. v1.15 or v1.5).

Step 16. At the # prompt, enter: **cd version_acct<Return>** where version_acct is the applications software name observed in the previous step.

Step 17. At the # prompt, enter: **./update_users<Return>**. This automatically updates all users' cshrc files as required to run the applications software and also adds any new user IDs.

Step 18. Close out the CDE window by clicking on the EXIT button. Once the US Government Warning window reappears with the edit block for the user name, enter in the name of the normal user for your system. At the next window, enter in the password for the same normal user, and the CDE screen appears with a terminal window open at the normal user level.

2-9.3.3.4 Changing/Modifying User Account and Password. System administrators, refer to step 8 above. In the Admintool: Add User window, under ACCOUNT SECURITY. If a users account is to be locked, using the pull down menu next to Password, choose the Account is Locked option. Click on the Apply button on the bottom of the window, then click on the OK button. To unlock the account, choose the Normal Password and follow steps 9 through 12 above.

2-9.3.3.5 Changing User Passwords. Users are required to change their initial password at their first login to the system. Users will then be required, depending upon the site setup, to change their password at least every 90 days. To remind each individual user, a separate prompt will start

appearing five days before the password is to expire, and will continue to count down each day until the last day, and then hourly the last 24 hours.

If a user suspects their password has been compromised, notify the site system administrator and change their password immediately.

Each user can change their password at the regular Terminal window by performing the following steps:

Step 1. Click in the terminal window to activate the blinking cursor at the : prompt.

Step 2. At the : prompt, type: **exit<Return>**

Step 3. At the : prompt, type: **passwd<Return>**

Step 4. The following two lines of text will appear:
passwd: Changing password for XXXXXXXX (XXXXXXX is user name)
Enter login password:

Step 5. At the Enter login password: prompt, type:
AAAAAAAA<Return> (AAAAAAAA is your current password)

Step 6. Next text line will read:
New password:

Step 7. At the New password: prompt, type:
BBBBBBBB<Return> (BBBBBBBB is your new password)

NOTE

The new password must differ by at least 3 positions. It must contain at least two alphabetic characters and at least one numeric or special character. If an invalid password is entered, another text line will appear that reads: "passwd(SYSTEM) with a comment as to the problem encountered. Examples of comments are: Password too short - must be at least 8 characters; Passwords must differ by at least 3 positions. The prompt: New password: will then reappear. If the comment: Too many failures - try later appears, that means that the user made more than three attempts and must start over. Type in the word "**Exit<Return>**" and return to step 2 of these procedures.

Step 8. Next text line will read:
Re-enter new password:

Step 9. At the Re-enter new password: prompt, type:
BBBBBBBB<Return> (BBBBBBBB is still your new password)

Step10. If the new password has been successfully entered, the next two text lines will read:

passwd (SYSTEM); passwd successfully changed for XXXXXXXX
2 rpg-site /export/home/XXXXXXXX :

NOTE

If the new password was not successfully entered, the next two text lines will read:
passwd(SYSTEM): They don't match; try again.
New password:
(Return to step 7 and enter your new password again. This time try not to goof it up!)

Step 11. At the : prompt, type:
csh<Return>

The user will be returned to their regular prompt with the new password in effect. If the MSCF was closed down, at the : prompt, enter: **mscf &<Return>**.

2-9.3.3.6 Changing File Permissions. The site system administrators must ensure that user permissions set on home directories conform to the least privilege concept. System administrators and users must understand that the permissions on objects or files created may restrict access exclusively, to the owning user and creator of that object or file. Sharing objects or files within the users home directory requires that permissions on the directory allow another user access to the specific objects.

There are three types of permissions associated with a user's files and directories:
r - read the file or directory.
w - write to the file or directory.
x - execute the file or search the directory.

These permissions can be set for three types of users:
o - the owner of the file(s).
g - the members of the group to which the owner belongs.
w - all other users.

File management is a feature provided through the CED interface. To change file permissions on user controlled files, take the following steps:

Step 1. Click on the File Manager icon. See Figure 2-125.

Figure 2-125. File Manager Icon

Step 2. The File Manager - XXX window opens. See Figure 2-126.

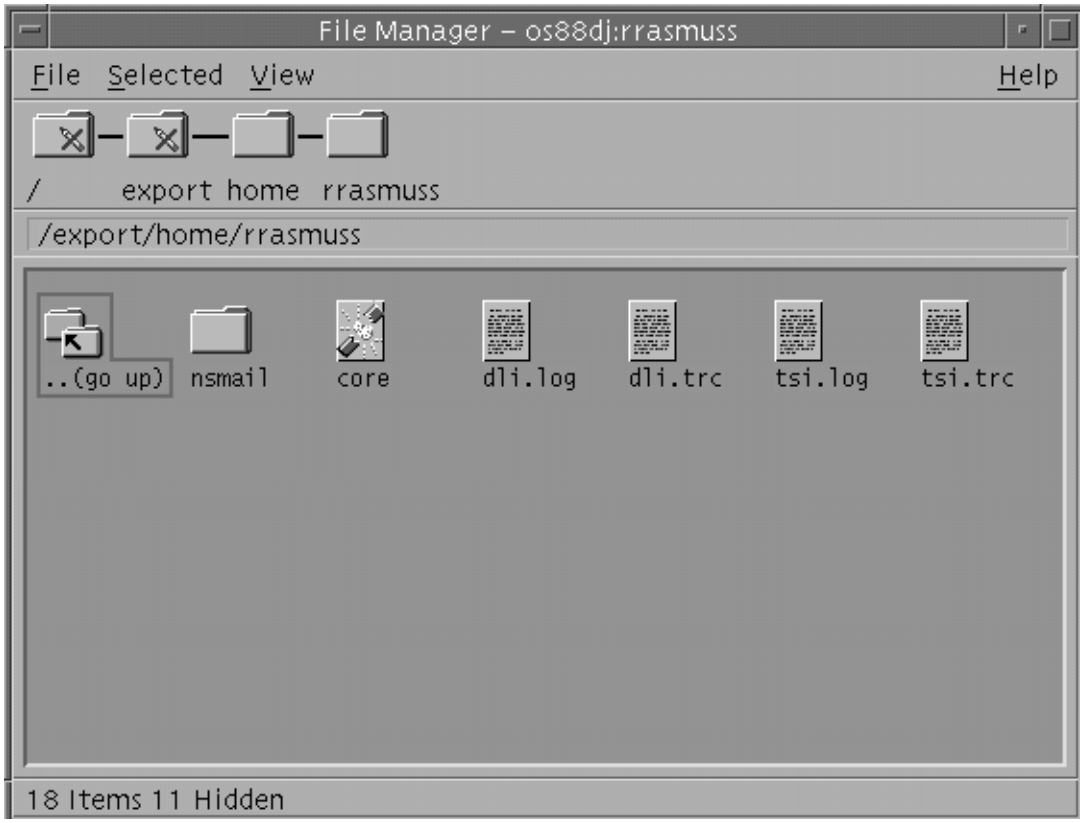


Figure 2-126. File Manager

Step 3. Click on the file in the center of the window whose permission are to be changed. The file will be highlighted. Then click on the Selected command. A pull down menu opens. See Figure 2-127.

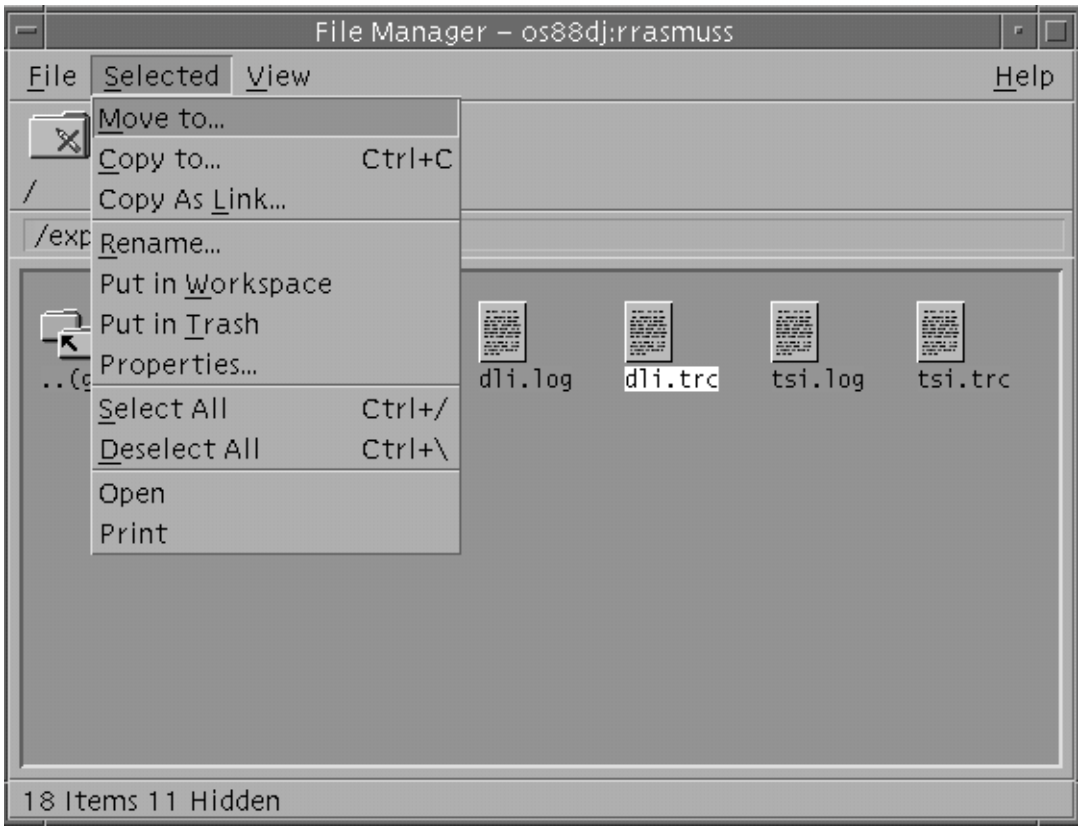


Figure 2-127. File Manager - Selected Menu

Step 4. Click on the Properties option, and the Properties - XXX window opens. XXX represents the file that was highlighted in Step 3 above. See Figure 2-128.

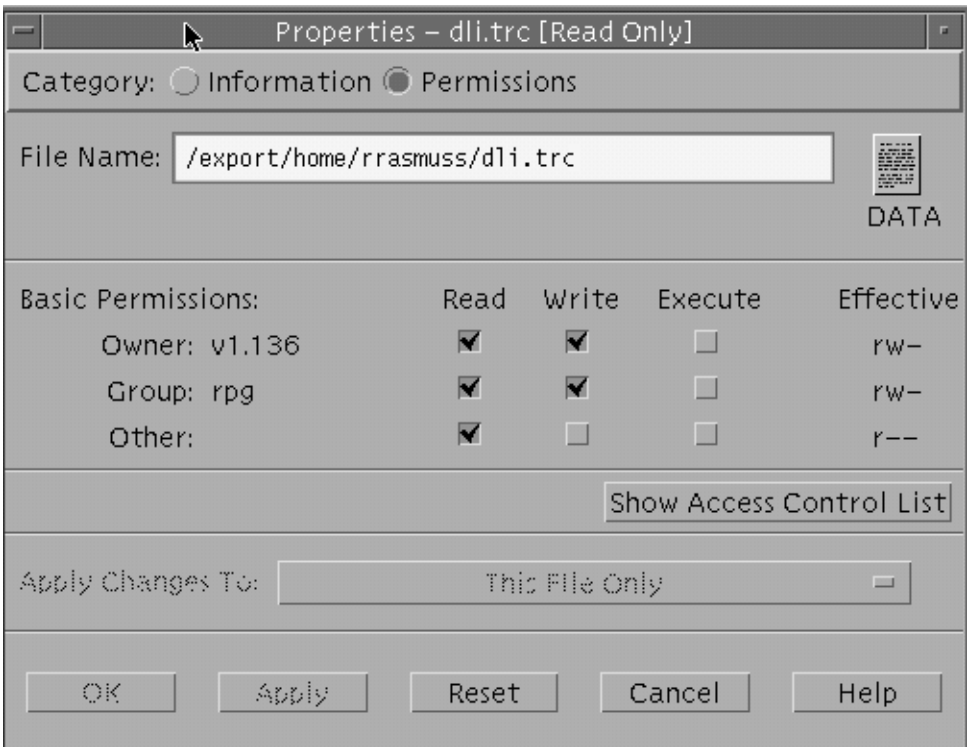


Figure 2-128. Properties - XXX

Step 5. Click on the basic permissions that are to be changed. Then click on OK to accept these changes and to close the window.

An alternative way to open the Properties window and browse through all the files is the following:

Step 1. Right click anywhere on the workspace background and the Workspace Menu opens. See Figure 2-120.

Step 2. Scroll down the Workspace Menu to Files and click on Files. A secondary menu opens titled Files. Scroll down the Files menu to Properties and click. This opens the Properties - (None) window. See Figure 2-129.

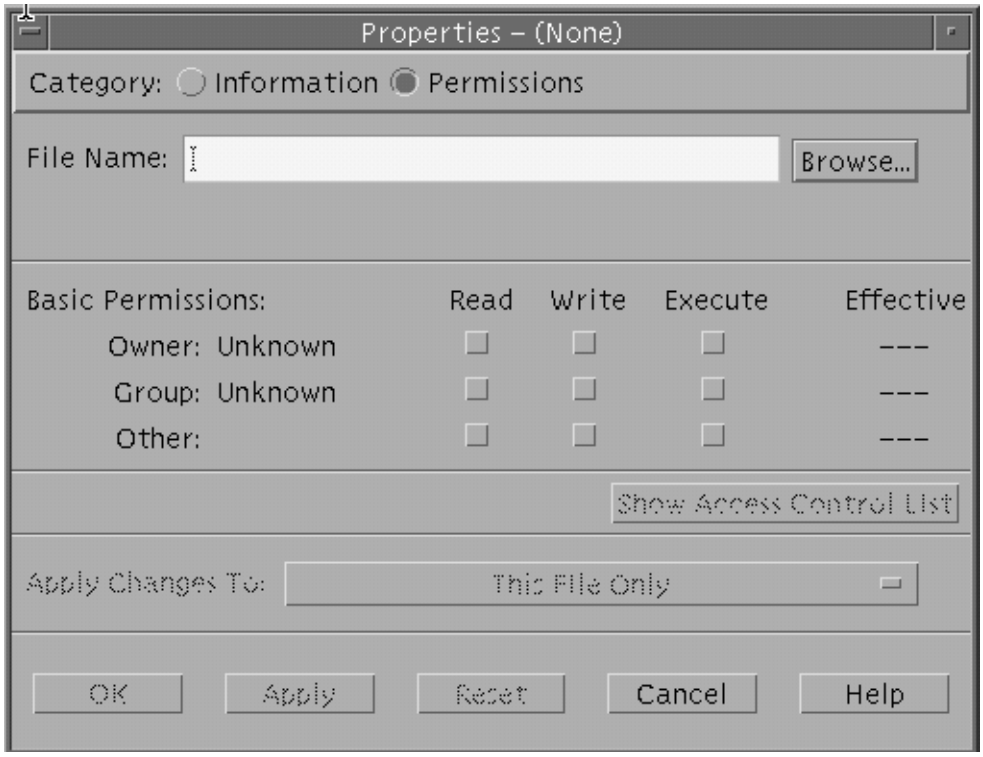


Figure 2-129. Properties - (None)

Step 3. To browse through the files that may be selected, click on the Browse button to the right of the File Name Editable field. This opens the File Selection Dialog window. See Figure 2-130.

Figure 2-130. File Selection Dialog

Step 4. Select the file desired by using the options available in the window, then click on OK to transfer the file to the Properties window and close the File Selection Dialog window.

Step 5. Click on the Permissions desired, then click on OK to accept these changes and to close the window.

CHAPTER 3
OPERATIONAL CONSIDERATIONS

SECTION 3-1. INTRODUCTION

3-1.1 Scope Of Operational Considerations.

This chapter provides reference information for the operator. The chapter is divided into the following sections:

Section 3-1. INTRODUCTION

Section 3-2. RPG DATA PROCESSING

Section 3-3. LOAD SHEDDING

Section 3-4. ADAPTATION DATA

Section 3-5. VOLUME COVERAGE PATTERN

Section 3-6. VOLUME COVERAGE PATTERN (VCP) CHANGES AND AUTOMATIC PRF SELECTION.

Section 3-7. SELECTION OF PRODUCT PARAMETERS

Section 3-8. CLUTTER REGIONS

Section 3-9. BYPASS MAP EDITOR

Section 3-10. ENVIRONMENTAL DATA

Section 3-11. PRECIPITATION DETECTION FUNCTION

SECTION 3-2. RPG DATA PROCESSING

3-2.1 Introduction.

Data processing in the RPG functional area is accomplished in the RPGPCA cabinet. Data is received over the wideband communications link from the RDA functional area and over the narrowband communications link to the Associated and Non-Associated Users. The data received from the RDA is the base data consisting of Reflectivity, Velocity, and Spectrum Width. Request for products and data are received from the associated and non-associated users for the RPG to handle and process. The HCI controls the processing of the data in the RPG. A brief description of the following interrelated functions of the RPG are discussed in subsequent paragraphs:

- RPG Processor
- Wideband Communications
- Narrowband Communications
- HCI

NOTE

For further information refer to the Meteorological Handbook, FMH-11.

3-2.2 RPG Processor.

The RPG processor function provides product generation, local storage, distribution control, and archiving of selected base and derived products, data arrays, and status data. It controls the RDA operating modes and monitoring of the operational status of the overall WSR-88D unit. The RPG processor receives the following data from the RDA:

- RDA Status Data
- Digital Radar Data
- RDA Performance Maintenance Data
- Console Messages
- Loopback Test
- Clutter Filter Bypass Map

The processor stores this data until it is accessed and transferred. The processing equipment transfers the data from memory, processes the base data, and converts it into weather products. These products are then stored on mass storage. The processor responds to requests from the RDA, associated and non-associated users, River Forecast Centers (RFC) and other users. The RPG processor also transmits the following data to the RDA functional area:

- RDA Control Commands
- Volume Coverage Patterns
- Clutter Censor Zones
- Requests for Data
- Loopback Tests
- Edited Clutter Filter Bypass Map
- Console Messages

3-2.3 Wideband Communications.

The wideband link receives base data and status from the RDA and passes it to the memory of the RPG processor. The wideband communication medium may be microwave line of sight or hard-wire (collocated), private T1, or commercial (TELCO) T1. Command and control data is also passed over the wideband communication link from the RPG to the RDA data processor.

3-2.4 Narrowband Communications.

The narrowband communications link receives selected base/derived products, status and alert messages for distribution from the RPG and sends them to the designated units. The RPG also receives the requests from designated units over the narrowband lines for processing.

3-2.5 HCI.

The HCI is a software application that is the man/machine interface that provides control over the processing functions by permitting the selection of products to be routinely generated and a product subset to be archived.

SECTION 3-3. LOAD SHEDDING

3-3.1 Introduction.

The RPG software is designed to handle a larger load than a standard hardware configuration would support normally. Additionally, this software is designed to prevent an overloaded condition. The categories for which the operator can, to some extent, monitor and/or control the load include:

- CPU
- Distribution
- Product Storage
- RDA Radial
- RPG Radial
- Archive III

There are two direct types of operator control for overload: product priorities and category utilization. Indirect controls are available primarily through product request and generation selection. Load control is tailed for each of the categories in a different manner. Product generation includes routinely generated products through the Product Generation and Distribution List, Associated Users/Collocated Users Routine Product Set lists, one time requests, and products selected for alert based generation.

3-3.2 CPU Load Control.

CPU load control is applied as product requests are scheduled for generation. Products scheduled for routine generation are generated in a product priority order. Products may be prioritized at the HCI under the RPG Products, Load Shed Products window on a product-type by product-type basis. Table 3 - 1. Expanded Version of Load Shed Products Window is an example for illustrative purposes which contains two columns of data (Range and Mnemonic) which are not present on the operational RPG Product Priority (Load Shed Products) window.

For example, 16 data level .54 nm resolution reflectivity products may have one priority assigned while 8 data level .54 nm resolution reflectivity products may have another priority. If the 8 data level version has a higher priority, it will be scheduled in preference to the 16 data level version.

The product prioritization defined on the RPG product generations and distribution list determines the product type generation schedule. The highest priority values (81, 80, 79, 78, and 77) are assigned to the five reflectivity products #16 through #20 which are scheduled in the order indicated for early generation. Following these, the six Velocity products # 22 through #27 are assigned the next highest priority values of 76, 75, 74, 73, 72, and 71, and are the next scheduled for generation. These are followed by the ET, ETC, and VIL products with the next lower priority values respectively of 65, 64, and 63 and are generated after the velocity products.

Note that the Reflectivity product 21 with a priority of 50 will not be generated until all other

product types with higher prioritization numbers are generated. The Reflectivity task is rerun at that time to accommodate this product.

Replay products (e.g., products generated from data stored within the last two volume scans in response to one time requests) which are scheduled in groups from one time requests are treated in a similar manner. As products are scheduled for generation in priority order, the projected loading is accumulated until such time as the utilization for the CPU category is exceeded. When this occurs, scheduling of product requests for generation is terminated and any products remaining to be generated are CPU loadshed. From volume scan, to volume scan the CPU utilization is measured and updated.

3-3.2.1 HCI Operator Control. The HCI operator can make inputs of product loadshed priorities on the Load Shed Products window where lower priority number corresponds to lower priority product generation. Indirect controls include selection of background loading on the RPG such as the selection of products from the Users window, RPG User Profile Editor, for distribution to all other users and classes of users.

3-3.3 Distribution Load Shed.

Distribution overload occurs when the loading on the RPG causes base data to back up in the RPG input buffers. When the backup is projected to exceed an alarm threshold set at the HCI, Load Shed Categories window, in the lower right corner of the HCI, products are shed in priority order to avoid loss of data base.

RPG software consists of a number of processing tasks. Some of these tasks directly produce products from base data while others produce intermediate output which is ultimately used to produce products. Some examples of this are shown in the diagrams in Table 3 - 1. Expanded Version of Load Shed Products Window. This example also illustrates three processing tasks which produce base products.

In this example, the BASRFLCT and BASVLCTY tasks respectively produce six base reflectivity products and six base velocity products, each of which differs in range, resolution, and data level. The VILETALG task is the processing task which produces the volume-based products ETPRODD, ETCPROD, and VILPROD.

In order to alleviate an input buffer overload, some processing tasks must be shed. Product priorities at the HCI Load Shed Products window will be used to select products for shedding until all outputs of a given task are shed and hence the task is shed.

Figure 3-1. Load Control Processing Tasks (Sheet 1 of 2). If the input buffer utilization level exceeds the alarm level, shedding will occur. Assume the priority settings described in the following table.

Table 3 - 1. Expanded Version of Load Shed Products Window

Product	Resolution (nm)	Data Level	Range (nm)	Priority Mnemonic	Priority (unitless)
R	.54	8	124	BREF16	80
R	1.1	8	248	BREF17	80
R	2.2	8	248	BREF18	79
R	.54	16	124	BREF19	78
R	1.1	16	248	BREF20	77
R	2.2	16	248	BREF21	50
V	.13	8	32	BVEL22	76
V	.27	8	62	BVEL23	75
V	.54	8	124	BVEL24	74
V	.13	16	32	BVEL25	73
V	.27	16	62	BVEL26	72
V	.54	16	124	BVEL27	71
ET	2.2		124	ETPRODD	65
ETC			124	ETCPROD	64
VIL	2.2		124	VILPROD	63

BREF21 is selected first for potential shedding. The BASRFLCT task itself is not yet shed. Next VIL, ETC, and ET product types are selected for shedding. Assuming algorithm output is not required for SWP or alerting, this is adequate to shed the VILETALG task which does consume base data. The downstream tasks: ETPRODD, ETCPROD, and VILPROD, are also terminated. Since VILETALG is a task which produces volume-based output, processing is terminated for this task for the entire volume scan. If this shedding is adequate to lower the projected input buffer utilization below the warning level, no more shedding occurs. In this case, note BREF21 will be produced since the BASRFLCT task was not shed.

If projected utilization is not reduced below the warning level, BVEL27 through BVEL22 are selected for shedding in that order, which leads to shedding of the BASVLCTY task. Since this task produces elevation-based output, the task is shed only for that elevation. All the base velocity products in that specific elevation angle (products 22 through 27) are load shed and they will

not be generated. If this shedding is adequate to lower the projected input buffer utilization below the warning level, no more shedding occurs. In this case BREF21 will be produced since the BASRFLCT task was not shed.

A parameter in the startup file for the RPG is available to increase the amount of buffer space available for input buffers. The primary tradeoff is between input buffer and memory load shedding. As more space is reserved for input buffers, less space is available for product generation. It should be noted that expanding the buffer space can lead to degraded throughput, because as the base data backs up, processing is delayed. The probability of memory loadshed can be reduced through increased utilization of memory reserve and expansion.

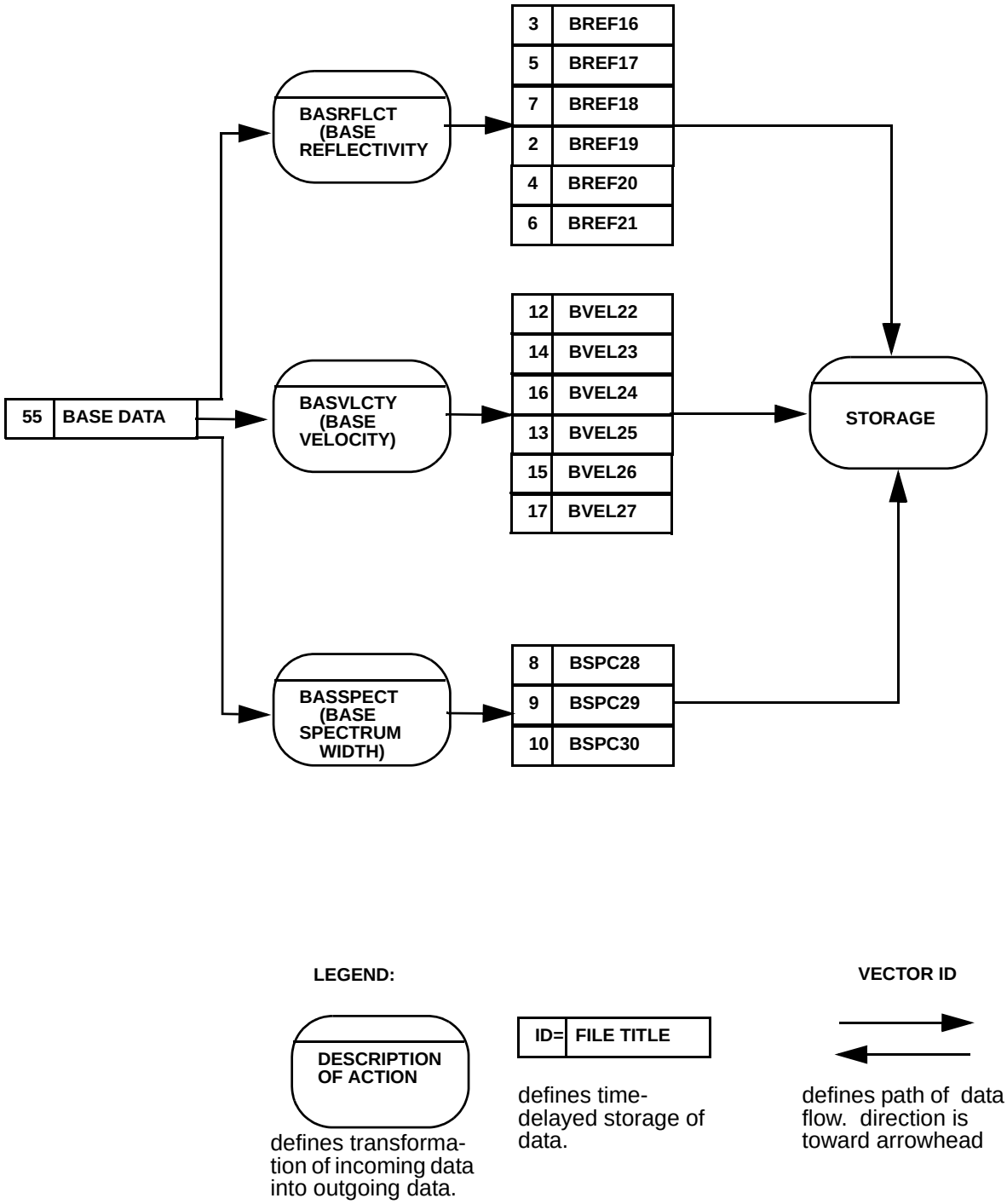


Figure 3-1. Load Control Processing Tasks (Sheet 1 of 2)

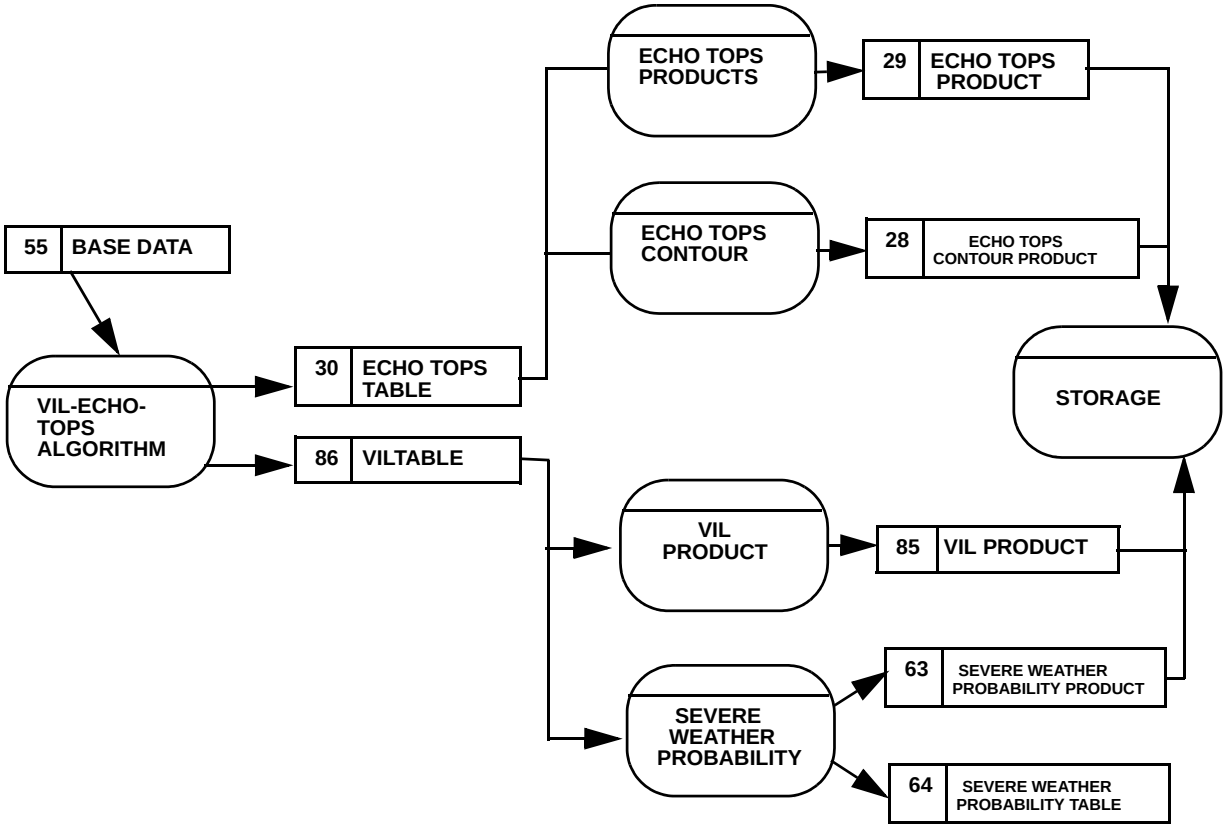


Figure 3-1. Load Control Processing Tasks (Sheet 2 of 2)

3-3.3.1 HCI Operator Control. Direct controls are based on product loadshed priorities at the Load Shed Products window and selection of warning and alarm levels at the Load Shed Categories window by the HCI operator. The parameter controlling buffer space is currently set to 27 to achieve a balance between memory and input buffer loadshed. A maximum value of 40 allows backup of a full elevation. For purposes of input buffer load control it makes sense to group product priorities on a task basis. Assigning lower priorities at the HCI to heavy processing task products (e.g., shear contour and layer composite turbulence) provides for more effective load control.

Indirect controls are based on distribution load shed for primarily routine product generation as selected at the HCI and associated users. Secondary controls are based on one time product generation through alert product pairing and associated users, and through direct requests, distribution of products and alert product selection to non-associated users. Additional, volume coverage pattern selection impacts input buffer utilization. A higher data rate (e.g. VCP 11 which is 14 elevations in 5 minutes) increases the probability of load shedding.

The above guidelines will vary depending on product loading, volume coverage pattern selection and, to a lesser extent, the weather conditions.

3-3.4 Product Storage Load Shed.

Product storage load control is provided for the product data base. This data base is used to store products generated by the RPG. Since the disk space is dynamically allocated for product storage, this type of load control is needed to provide some control over the utilization of the product data base. Although the amount of disk space allocated for product storage is fixed, individual product space is not specifically reserved. Thus, whatever disk space a product requires, dependent upon its size, will be accommodated. The controls available for this type of loadshedding are limited to selections on the Loadshed Categories window. These selections are Warning and Alarm percentage utilization.

All radar products are stored in the product data base and retained for a period of approximately two volume scans. Further, a retention time can be specified at the HCI under the RPG Products window, Generation List, RPG Product Generation Table Editor, Column Six: (mins), ranging up to 360 minutes. When the amount of data in the product data base exceeds the warning level as specified on the Loadshed Categories window, a warning message is issued. When the amount of data exceeds the alarm level, a load shedding procedure is automatically activated. The procedure involves deleting the oldest products in the data base until the amount of data goes below the warning level. Once this occurs, the procedure is terminated.

3-3.4.1 HCI Operator Control. It is recommended to set the alarm level high (e.g., to approximately 95%) and to set the warning level to a significantly lower setting (e.g., 60%). The higher setting allows storage of a larger amount of data, while the larger spread between warning and alarm prevents rapid cycling between an overload/underload situation. Raising the warning level may be appropriate to reduce nuisance warning messages. Alarm level selection to less than 100% provides some space while the load shed procedure is invoked.

Upon receipt of a warning message the operator may adjust (reduce) the allocated retention time

defined on the RPG Product Generation Table Editor window. This would free space for additional products written to disk.

3-3.5 RDA Radial Load Shed.

The RDA Radial Load Shed category corresponds to the data buffer used to receive raw messages from the RDA. The numbers represent the percentage of unread messages to the total number of messages allowed in the buffer. This buffer is input to the Process Base Data (PBD) task. If the task cannot process the messages fast enough (the percentage of unread messages reaches the alarm threshold) the RDA Radial Load Shed alarm in the RPG Status window will be set (red). The RPG container in the RPG Control/Status window will be red to indicate an RPG alarm is active. If the Process Base Data task tries to read a message that no longer exists a volume scan restart will be issued.

This category is combined internally with the RPG Radial Load Shed category to an Input Buffer load shed category to support the single Input Buffer alarm in the general status message sent to narrowband users. An alarm condition in either of these categories will activate the Input Buffer alarm in the general status message. The use of two input categories better isolates data flow or buffer size problems.

3-3.6 RPG Radial Load Shed.

The RPG Radial load shed category corresponds to the base data input buffer to the Velocity Dealiasing task (data output from the Process Base Data task). The numbers represent the percentage of unread messages to the total number of messages allowed in the buffer. If the task cannot process the messages fast enough (the percentage of unread messages reaches the alarm threshold) the RPG Radial load shed alarm in the RPG Status window will be set (red). The RPG container in the RPG Control/Status window will be red to indicate an RPG alarm is active.

This category is combined internally with the RDA Radial Load Shed category to an Input Buffer load shed category to support the single Input Buffer alarm in the general status message sent to narrowband users. An alarm condition in either of these categories will activate the Input Buffer alarm in the general status message. The use of two input categories better isolates data flow or buffer size problems.

3-3.7 Archive III Load Shed.

There is no load shedding of archived data. The only situation when data is not archived is when the archive medium is full. There are warning and alarm levels that can be set to notify the user of disks becoming full, but there is no process to load shed any specific data being sent to archive. The Archive III alarm level is not fixed at 100%, so it is recommended to be set at 100%. In systems that have an optional setup of two archive devices, the capability of having the second drive automatically start Archive III recording once the first one is 100% full has not yet been developed.

SECTION 3-4. ADAPTATION DATA

3-4.1 Adaptation Data.

Click on the RPG Products button, and the RPG Products window opens. There are five categories under the Adaptation Data block:

- Alert/Threshold
- Generation List
- Load Shed Products
- Selectable Parameters
- Algorithms.

These are the parameters that are modifiable at the HCI to adapt the RPG for use at a particular site or for alternative missions and modes of operations. Each is discussed individually below.

3-4.1.1 Alert/Threshold. The Alert Threshold Editor window lists all categories for which alert thresholds may be assigned. The alert categories are Grid Group, Volume Group, and Forecast Group. Listed for each category are the Units, Minimum and Maximum values, the six Thresholds, and the Paired Product. The user can alter any one of the values to be alerted on, but the number of thresholds or categories cannot be altered. Changes to alert thresholds through the edit window must be made only with proper authorization.

For the product Alert Pairing, the user can define the product to be paired with any alert (grid, volume, or forecast categories) phenomenon. That product paired with each alert on this window is the product that will be generated and sent to the Associated User (if requested) when that threshold is met or exceeded. Only one product may be paired with any single alert.

3-4.1.2 Generation List. The RPG Product Generation Table Editor window lists all the categories that can be modified by the user. There are four basic tables that the user can select: Current, Precipitation (A), Clear Air (B), and Maintenance. The RPG Product Generation, Archive, Storage, Storage time in minutes, and the number of elevation cuts are identified for each of the four tables. All products that may be generated routinely are listed. These lists are generated separately from the Associated User routine product set lists. The current list is volatile because whenever the mode changes, this list will disappear and be replaced with the list associated with the adaptation control data generated.

The Generation Table Editor is displayed for editing and selecting products with specific parameters for routine generation. Mode changes will cause this list to be replaced with the one generated. This editor is used to define the default product generation and distribution list for Precipitation Mode A and Clear Air Mode B. This list satisfies the product requirements for other users, including non-associated users.

The lists A or B may be downloaded to the RPG with the Download button, or it is automatically downloaded if the operational mode changes from B to A as a result of the precipitation detection algorithms detecting precipitation.

The Current Generation window is used to make online changes to the currently executing list. When changes are made and saved, the list is downloaded automatically for use on the next volume scan.

3-4.1.3 Load Shed Products. The RPG Product Priority (Load Shed Products) window provides the user the capability to specify the load shed priority for the three modes: Precipitation (A), Clear Air (B), and Maintenance (M).

The load shedding of products is task-based. The highest priority assigned to any product in the task becomes the task priority. Load shed parameters for base products are set on the basis of "product type". For example, one priority is set for all products of Base reflectivity, 8 level, 0.54 nm, for all elevations. Load shedding priorities are not specified to individual elevation angles. Volume scan products are specified for load shedding as individual products. Examples of load shedding are discussed in detail in Section 3-3. LOAD SHEDDING.

3-4.1.4 Selectable Parameters. The Edit Selectable Product Parameters window provides the user the capability to edit the selectable parameters on nine products/windows. These are:

- Contour Product
- OHP/THP Data Levels
- STP Data Levels
- Cell Product
- RCM Product
- VAD and RCM Heights
- Layer Product
- RCM Reflectivity Data Levels
- Velocity Data levels

These selections are password protected for making any changes. These selections may be viewed by clicking on the title or the button to the left of each title. However, in order to change any parameters, the current password for the level of change authority desired must be entered for the parameter values to become sensitized and changeable.

For the Contour, Cell, RCM, and Layer Product parameters listed, the user can change the Current parameters as the Minimum and Maximum values and the respective units are fixed values within the table.

For the OHP, THP, and STP Data Levels, the minimum values in inches of precipitation can be changed.

For the VAD and RCM Heights, the height levels are already identified for each 1,000ft above site elevation and the desired heights can be selected. There are a maximum of 30 heights that can be selected for the VAD and a corresponding maximum of 19 heights that can be selected for the RCM.

For the RCM Reflectivity Data Levels, the lower (inclusive) cutoff value in dBZ can be entered.

For the Velocity Data Levels, there are eight Velocity tables to select from, and then the range in kts can be entered for each respective table.

3-4.1.5 Algorithms. Meteorological algorithm parameters are allowed to be adjusted in various subwindows when the Algorithms window is selected. The pull down window of the adaptation item is in alphabetical order and lists the following algorithms:

- AP Removal
- Combined Shear
- Hail Detection
- Hydromet Accumulation
- Hydromet Adjustment
- Hydromet Preprocessing
- Hydromet Rate
- Mesocyclone
- Severe Weather Probability
- Storm Cell Components
- Storm Cell Segments
- Storm Cell Tracking
- Tornado Detection
- VAD
- Velocity Dealiasing _ Long Pulse
- Velocity Dealiasing _ Short Pulse
- Vil Echo Tops

These selections are password protected for making any changes. These selections may be viewed by clicking on the title or the button to the left of each title. However, in order to change any parameters, the current password for the level of change authority desired must be entered for the parameter values to become sensitized and changeable.

For each of the adaptation items, the name of the variable and the Range allowed (and units if applicable) is listed. The user selects the value desired for each item. Specific details on how to work with the Algorithm window is found in paragraph 2-3.13.2.1.5 Algorithms.

SECTION 3-5. VOLUME COVERAGE PATTERN

3-5.1 VCP Control Window.

The VCP Control window allows different volume coverage patterns to be downloaded to, or changed at, the RDA for use in the next volume scan. In addition, dialogs are provided for modifying existing VCP data. See Figure 3-2. VCP Control.

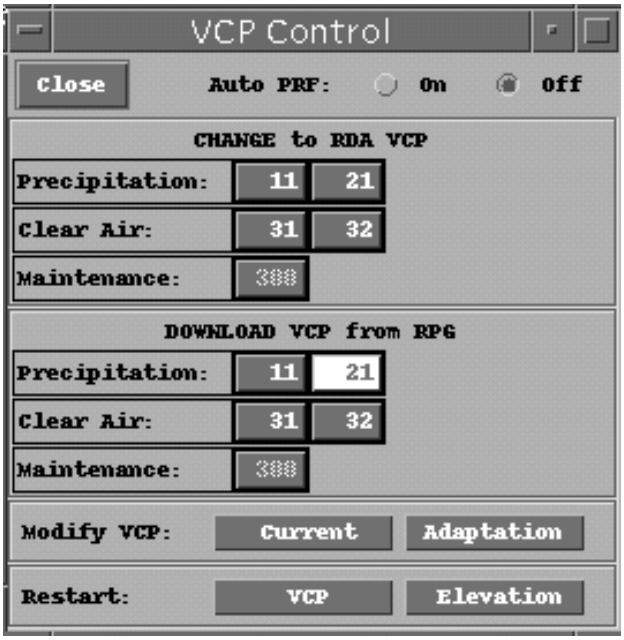


Figure 3-2. VCP Control

3-5.1.1 Auto PRF On/Off. The top line of the VCP Control window enables the user to turn the Auto PRF on or off.

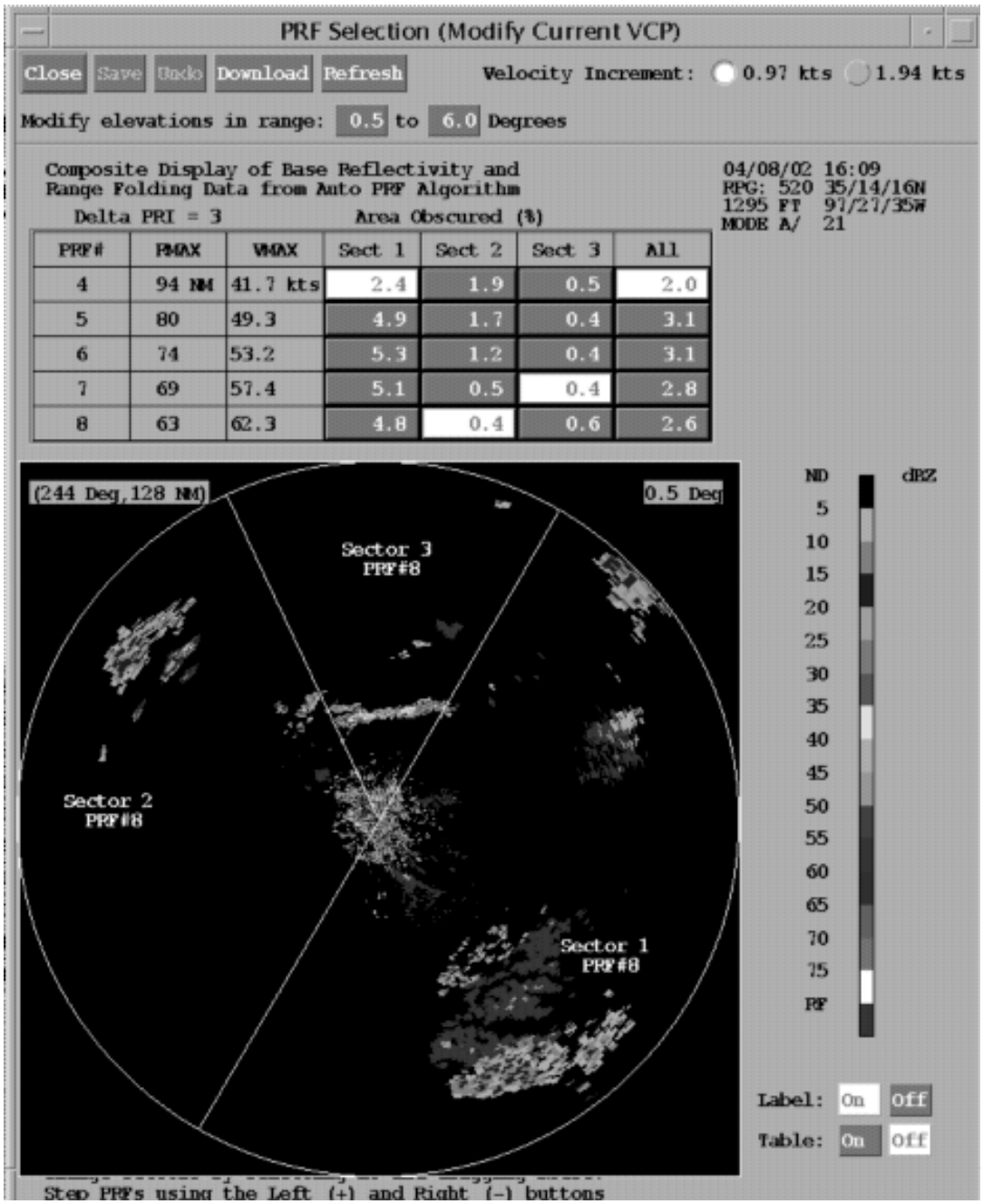
3-5.1.2 Change to RDA VCP. To request a new volume coverage pattern using VCP data defined at the RDA, click on the appropriate VCP button. If the request is successful, the new volume coverage pattern will begin with the next volume scan.

3-5.1.3 Download VCP from RPG. To request a new volume coverage pattern defined at the RPG to be downloaded to the RDA, click on the appropriate VCP button. If the request is successful, the new volume coverage pattern will begin with the next volume scan.

3-5.1.4 Modify VCP. The Modify VCP selections allow the user to modify the attributes of the currently active VCP or any one of the adaptation VCPs. Once data for a VCP is modified, it can be saved and downloaded to the RDA.

3-5.1.4.1 Modify VCP - Current. When the Current button is selected, another window opens that is called the PRF Selection (Modify Current VCP) window. There are selections to change

the Velocity Increments, to modify elevations, an Area Obscuration tabular listing of the three Sectors for each PRF, and a window that visualizes and easily modifies the sector definitions.



PRF#	PMAX	VMAX	Sect 1	Sect 2	Sect 3	All
4	94 NM	41.7 kts	2.4	1.9	0.5	2.0
5	80	49.3	4.9	1.7	0.4	3.1
6	74	53.2	5.3	1.2	0.4	3.1
7	69	57.4	5.1	0.5	0.4	2.8
8	63	62.3	4.8	0.4	0.6	2.6

Figure 3-3. PRF Selection (Modify Current VCP)

The top line contains five control buttons (Close, Save, Undo, Download, and Refresh) plus the Velocity Increment selection choices. The first button in the upper left hand corner is the Close button. Clicking on the Close button without making any changes closes the screen and returns the user to the HCI.

The Save button is grayed-out and desensitized until changes are made on the screen. Then it becomes active and/when clicked on, brings up a warning_popup that states: "You are about to overwrite the current VCP data with your edits. Do you want to continue?" Click on either the Yes or No button to select the desired response. Selecting Yes returns the user to the PRF Selection (Modify Current VCP) screen and desensitizes the Save button; selecting No also returns the user to the PRF Selection (Modify Current VCP) window but leaves the Save button active.

The Undo button is grayed-out and desensitized until changes are made on the window. Then it becomes active. After making any changes in the window and the user does not want to save any of the changes, then click on the Undo button and all edits are deleted.

The Download button will allow the user to transfer all the changes made on the existing window to the current VCP at the RDA (assuming that the auto PRF function is disabled.) When the Download button is clicked, a warning_popup opens that states: "You are about to download the current VCP changes to the RDA. Do you want to continue?" Click on either the Yes or No button to select the desired response. If the Auto PRF function is enabled, then the user cannot make any changes to the current VCP. To keep from having to go back to the VCP Control screen, a second warning_popup opens (if the user selected Yes to the previous Download option) that states "The Auto PRF function is currently enabled. If you do not disable it, your changes may be lost at the next volume scan. Do you want to disable the Auto PRF function?" Click on either the Yes or No button to select the desired response. Selecting Yes will turn the Auto PRF to Off and return the user to the PRF Selection screen.

The Refresh button allows the user to update the base reflectivity and obscuration data while editing the field. When the window is initially pulled up, the latest base reflectivity and obscuration data is obtained from the latest products available in the data base. The date/time is shown over the top of the color bar scale. While the window is being edited, the background data stays the same, even if new products become available. If the user wants to see the latest data available, then click on the Refresh button. There is no warning_popup window that opens. The latest data will appear on the edit screen, and the date/time will update with the product date/time.

3-5.1.4.1.1 Velocity Interval. The Velocity Interval of 0.97 kts (0.5 m/s) or 1.94 kts (1 m/s) can be selected by clicking on the appropriate button.

3-5.1.4.1.2 Modify Elevations Range. These buttons define a range of elevations for applying PRF# and sector boundary changes. When a PRF# or sector boundary is changed, the new PRF# or sector boundary will be applied to all elevations in the range shown. Both the minimum and maximum elevation ranges can be modified by selecting the appropriate button. If changing the minimum range would cause the minimum range to be greater than the maximum range, the maximum range will be increased automatically to match the minimum range. When the highest elevation angle is reached, selecting either button will cause the elevation range to start all over again

at the lowest elevation angle for this VCP.

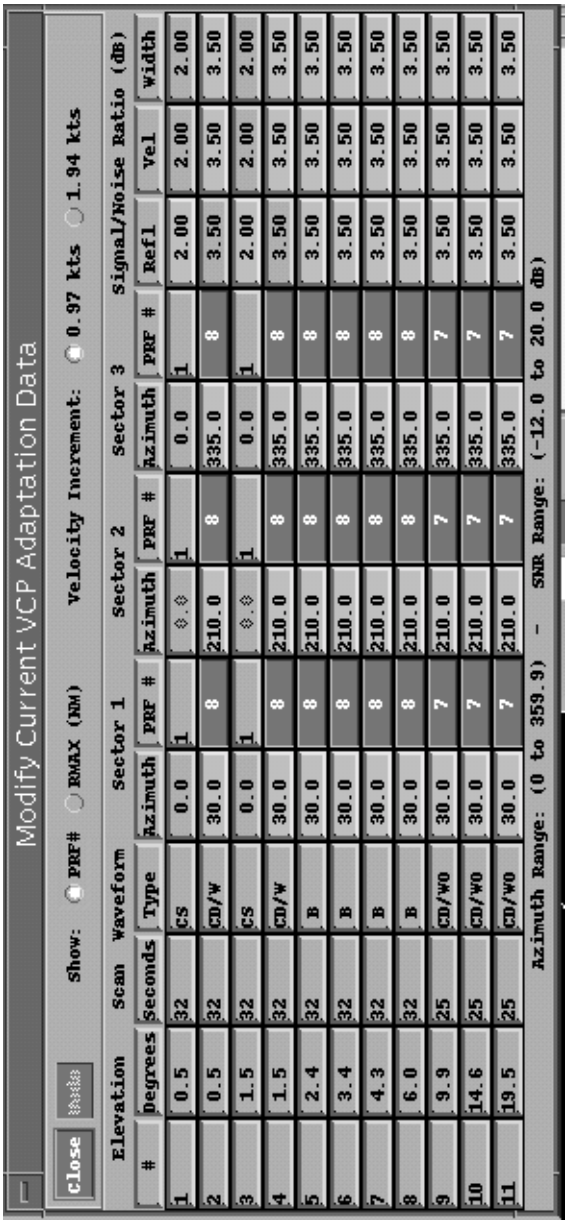
3-5.1.4.1.3 Area Obscuration Table. This table contains a set of buttons whose labels represent the percentage of area obscured in a given sector for each allowable PRF#. When a button is selected, obscuration data for the appropriate sector is updated in the display region. If new sector boundaries are defined, the labels for the buttons are updated reflecting the new percentages of obscuration for those sectors.

The row of data that has a white background is a visual aid to the user that identifies the minimum PRF values for that screen. This field is not editable by the user, but is automatically produced each time the window is requested.

3-5.1.4.1.4 Composite Reflectivity and Obscuration Data Display Region. The Composite Reflectivity and Obscuration Data Display window provides a composite display of base reflectivity and obscuration data along with lines representing each of the three sector boundaries. When the cursor is close to a sector boundary line, it changes appearance from an arrow to a pointing hand. This indicates that the sector boundary line can be moved by pressing the left button while dragging the line. When the left button is released, the data in the display are updated. The relative position of the cursor (in azimuth and range) is always displayed in the upper left corner of the display region. As new sector boundaries are defined, data in the Area Obscuration table and PRF Sectors Data window are updated.

This window provides information about which regions will be obscured (range folded) in velocity and spectrum width products for a given PRF# by displaying the base reflectivity overlaid with obscuration data generated by the auto PRF algorithm. Since range folding will not occur in base reflectivity products, base reflectivity can be used to identify where meteorological targets are. The obscuration data will show areas where velocities and spectrum widths will be unresolvable for a given PRF#.

3-5.1.4.1.5 Modify Current VCP Adaptation Data Table. By clicking on the “Table On” button in the lower right hand corner, the user can then modify the current VCP adaptation data. The Modify Current VCP Adaptation Data table provides a textual presentation of data associated with the current VCP. See Figure 3-4. Modify Current VCP Adaptation Data. Items which are editable are displayed in light blue and dark blue. Items which are not editable are displayed with a background and desensitized. The text entry items, sector azimuths and signal/noise ratios, can be modified using the keyboard. PRF# values can be changed by repeatedly selecting an item until the desired PRF# is displayed. Changes made in this window do not automatically get displayed in the PRF Selection (Modify Current VCP) window. The Refresh button has to be clicked to display the changes. For additional information and detail, refer to Chapter 2, paragraph 2-3.6.1.4.1 PRF Selection (Modify Current VCP) Window.



Modify Current VCP Adaptation Data

close

Show: PRF# RMAX (NM) Velocity Increment: 0.97 kts 1.94 kts

	Elevation	Scan	Waveform	Sector 1			Sector 2			Sector 3			Signal/Noise Ratio (dB)		
#	Degrees	Seconds	Type	Azimuth	PRF #		Azimuth	PRF #		Azimuth	PRF #		Refl	Vel	width
1	0.5	32	CS	0.0	1		◇.◇	1		0.0	1		2.00	2.00	2.00
2	0.5	32	CD/W	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
3	1.5	32	CS	0.0	1		◇.◇	1		0.0	1		2.00	2.00	2.00
4	1.5	32	CD/W	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
5	2.4	32	B	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
6	3.4	32	B	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
7	4.3	32	B	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
8	6.0	32	B	30.0	8		210.0	8		335.0	8		3.50	3.50	3.50
9	9.9	25	CD/WO	30.0	7		210.0	7		335.0	7		3.50	3.50	3.50
10	14.6	25	CD/WO	30.0	7		210.0	7		335.0	7		3.50	3.50	3.50
11	19.5	25	CD/WO	30.0	7		210.0	7		335.0	7		3.50	3.50	3.50

Azimuth Range: (0 to 359.9) - SNR Range: (-12.0 to 20.0 dB)

Figure 3-4. Modify Current VCP Adaptation Data

3-5.1.4.2 Modify VCP - Adaptation. When the Adaptation button is clicked, the Modify VCP Adaptation Data window opens. See Figure 3-5. Modify VCP Adaptation Data. It is password protected so the proper password for the level desired must be successfully entered before any editing can be done. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window. The Close, Save, Undo, and Baseline: Restore and Update buttons are explained in detail in Chapter 2, paragraph 2-3.6.1.5.2 Modify VCP Adaptation Data Window.

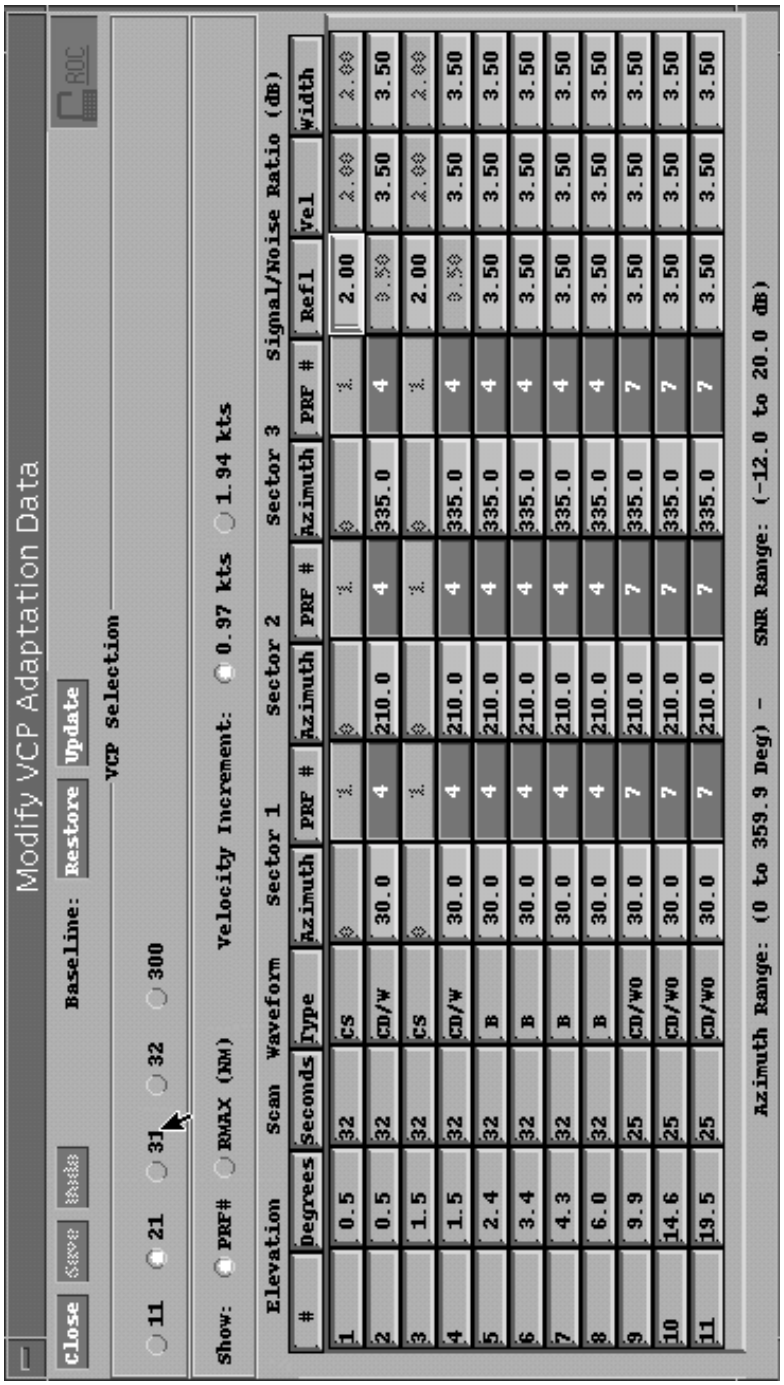


Figure 3-5. Modify VCP Adaptation Data

3-5.1.4.2.1 <u>VCP Selection</u>. There are five buttons that identify the five selections of VCP that can be made. By default, the adaptation data version of the currently active VCP is displayed.

3-5.1.4.2.2 Show PRF# or RMAX. The user can toggle between the PRF# or the RMAX (Maximum Range in NM) and the table on the window is automatically refreshed.

3-5.1.4.2.3 Velocity Interval. The Velocity Interval can be changed to 0.97 kts (0.5 m/s)(High) or 1.94 kts (1 m/s) (Low) by clicking on the appropriate button.

The default value is 0.97 kts and has a resolution of 0.5 m/s. If any of the ambient winds are expected to exceed 124 kts, then use the velocity interval of 1.94 kts as that is the only way the radar can measure those higher wind speeds. Even though the resolution then becomes 1.0 m/s, the impact on accuracy would be minimal. This applies to not only surface winds but any level winds the radar may see. This may be most applicable at coastal sites that may be affected by tropical cyclones.

3-5.1.4.2.4 Adaptation Data Table. The Modify VCP Adaptation Data table provides a textual presentation of data associated with the selected VCP. Items which are editable are displayed a light blue background. Items which are not editable are displayed with a brown background and desensitized. The text entry items, sector azimuths and signal/noise ratios, can be modified using the keyboard. PRF# values can be changed by repeatedly selecting an item until the desired PRF# is displayed. Changes made in this window do not automatically get updated for the selected VCP until the Save button or Baseline Update buttons are clicked on.

3-5.1.5 Restart VCP. This button provides the user with the opportunity to restart the VCP. Click on the VCP button and a warning_popup opens that states: “You are about to stop the current data collection and start over at the lowest elevation cut. Do you want to continue?” Click on either the Yes or No button to select the desired response. It is recommended not to restart the VCP unless the antenna is below 5.3 degrees elevation.

3-5.1.6 Restart Elevation. This button provides the user with the opportunity to restart the current elevation angle. Click on the Elevation button and a warning_popup opens that states: “You are about to stop the current data collection and start the elevation cut over. Do you want to continue?” Click on either the Yes or No button to select the desired response.

3-5.2 PRF Selection Window.

Click on the PRF Selection icon under the Applications column and the PRF Selection (Modify Current VCP) window opens. See Figure 3-6. PRF Selection (Modify Current VCP). This is the most direct way to open this window. There are two other routes the operator may use to open this window.

NOTE

If the RDA-RPG link is not connected or if the RDA is in local control, this window will not open. A warning_popup appears that states: "PRF selection is not allowed while the RDA is in local control or the RDA-RPG link is not connected." Click on the OK button to continue.

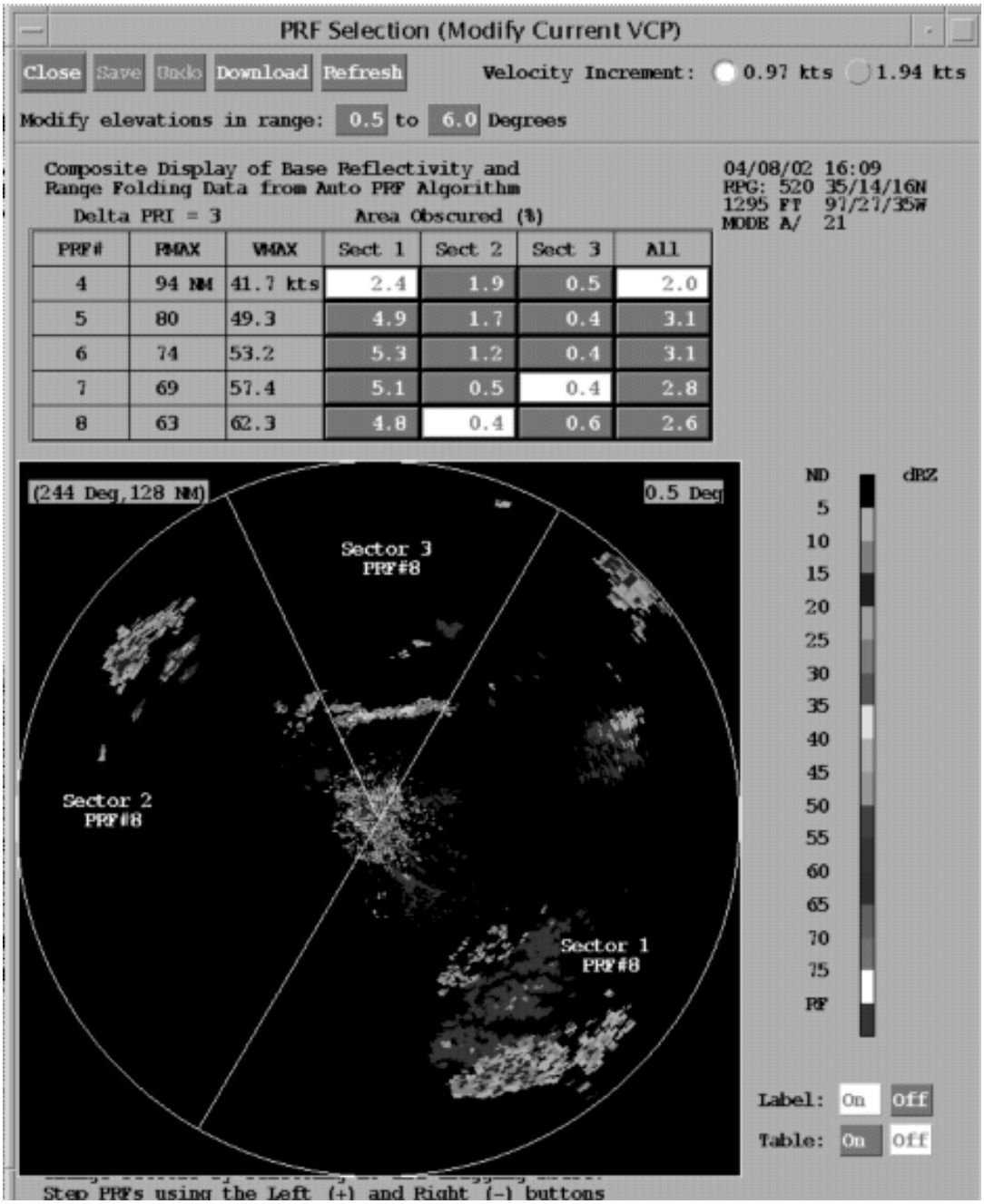


Figure 3-6. PRF Selection (Modify Current VCP)

The second route to the PRF Selection window is via the VCP Control window. Click on the VCP button that overlays the radials near the top of the HCI. Once in the VCP Control window, click on the Modify VCP Current button.

The third route is via the RDA Control window. Click on RDA Control, then on the VCP button, and the VCP Control window then opens. Once in the VCP Control window, click on the Modify VCP Current button.

The PRF Selection window is described in three sections. In paragraph 3-5.1.4.1 Modify VCP - Current. and Figure 3-3. PRF Selection (Modify Current VCP), the window is described in detail. Also, in Chapter 2, paragraphs 2-3.6.1.5 Modify VCP and Figure 2-19. Modify VCP Adaptation Data and 2-3.6.1.5.1 PRF Selection (Modify Current VCP) Window the same window is described in detail. Therefore it is not addressed again here.

SECTION 3-6. VOLUME COVERAGE PATTERN (VCP) CHANGES AND AUTOMATIC PRF SELECTION.

3-6.1 Introduction.

There are four defined scan strategies. They are: VCP 11 (fourteen elevation scans, five minutes), VCP 21 (nine elevation scans, six minutes), VCP 31 (five elevation scans, ten minutes, long pulse), and VCP 32 (same as VCP 31 except short pulse).

For each of these scan strategies, there is default VCP Adaptation data which is initially defined for optimum effectiveness in weather detection for the specific site. Changes may be made to these through the VCP Control window to the password protected Modify VCP Adaptation Data window.

Changes to a VCP which are intended to be temporary may be accomplished through the VCP Control, Modify VCP Current selection, PRF Selection (Modify Current VCP) window which is not password protected. Manual PRF changes are generally required to minimize or change the range folded data areas related to detected weather.

3-6.2 VCP Modification and PRF Selection.

VCP modification and PRF selection will be discussed separately below:

3-6.2.1 VCP Modification. VCP should be modified through the VCP Control window, Modify VCP Adaptation Selection if it is intended as a semi-permanent change to the default values. The Modify VCP Adaptation Data window allows the operator to modify the following quantities:

- Doppler Velocity resolution
- Beginning and ending azimuth for each azimuth sector
- Doppler Range for each azimuth sector

Validity checks on the entered values for these quantities ensure that: the Doppler Velocity Resolution is either 0.97 nmi or 1.94 nmi; successive Edge Azimuth values (if selected) are monotonically increasing in a clockwise direction and the Doppler range values entered are those that are applicable for the range of 2,4,5,6,7, and 8. If the operator selection is invalid, an error message will be displayed; a valid selection results in an acknowledgement message.

To reduce range folding, the user can set the Doppler range of all azimuth sectors in each elevation cut below 7.0 degrees with a single entry. In this case, the PRF number used is that PRF value which provides the Unambiguous Range closest to the operator-selected range within the allowable limits. To aid the operator in selecting the unambiguous range, the current site-specific set of PRF numbers in use is displayed on the RDA control menu. When all modifications are completed, they are saved by either clicking on the Save button and then Yes or clicking on the Close button and then Yes.

For the modified VCP to become active, the user must download the VCP to the RDA by clicking

on Save then Yes on the Modify VCP Adaptation data window, then clicking on the desired VCP in the center of the VCP Control box under the category: "Download VCP from RPG".

3-6.2.2 Automatic PRF Selection. When Automatic PRF Selection is enabled by the user, the Auto PRF Selection Algorithm analyzes reflectivity data from the lowest elevation cut to determine the PRF number which results in the smallest range folded area for that cut. This PRF number is then inserted into all azimuth sectors of each elevation cut below seven degrees in the current volume coverage pattern. When the Auto PRF is clicked On, the Doppler PRF values in the current VCP will be modified automatically.

This is accomplished for each volume scan, based on the current input data, for each of the Doppler PRFs to determine that PRF which minimizes the range folded area. The power returns are compared bin by bin to determine those areas that are above or below an adaptable power difference threshold which in turn determines range folded areas.

It is important to note that while auto PRF minimizes the range folded data area, this may not remove range folded data in the area of operator concern. In order to move range folded data in a specific area of interest, it may be necessary for the operator to make a manual PRF selection.

The Auto PRF will minimize range folded data but not totally eliminate it.

3-6.2.2.1 AUTO PRF in the OFF Position. Here the PRF is fixed, and those values defined in either the adaptation VCP (default) or the HCI operator-modified VCP version are obtained. No changes other than those entered manually will be made.

3-6.2.2.2 Auto PRF in the ON Position. In this case, the PRF is automatically selected based on the PRF selection algorithm. This algorithm obtains the most current values regardless of which VCP (Adaptation or operator-modified versions) is active.

SECTION 3-7. SELECTION OF PRODUCT PARAMETERS

3-7.1 Introduction.

These password protected Edit Selectable Product Parameters windows are used to adjust adaptation parameters controlling the appearance of products. Clicking on the RPG Products button, then clicking on the Selectable Parameters button pulls up the Edit Selectable Product Parameters windows. The nine types of product parameters which can be adjusted are:

- Contour Product Parameters
- Cell Product Parameters
- Layer Product Parameters
- OHP/THP Data Levels
- RCM Product Parameters
- RCM Reflectivity Data Levels Selections
- STP Data Levels
- VAD and RCM Height Selections
- Velocity Data Levels Selections

The standard controls for each window: Close, Save, Undo, Baseline Restore, Baseline Update, and Password Protection are fully described in Chapter 2. To open the password protected fields for edit, follow the procedures described in paragraph 2-2.4.1.7 Padlock Window. Specific instructions applicable to each window are also described in Chapter 2. The operational considerations for each of the windows are discussed below in detail.

3-7.2 Contour Product.

This window (see Figure 3-7. Contour Product) is used to adjust the following adaptation parameters:

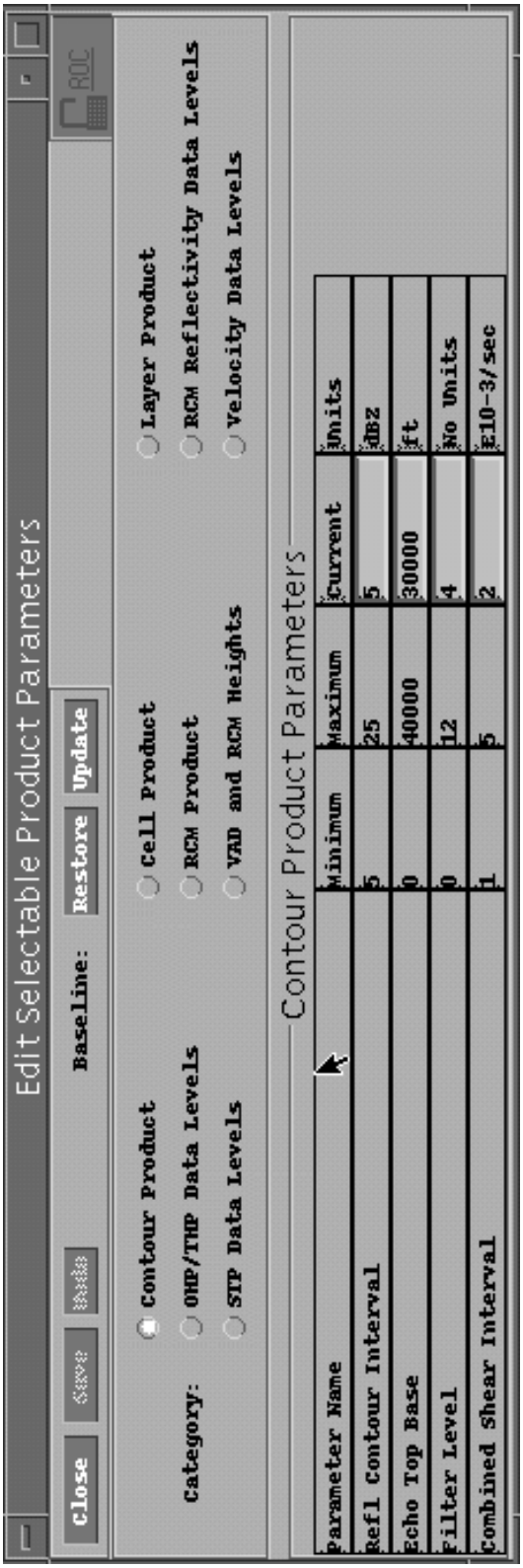


Figure 3-7. Contour Product

3-7.2.1 Ref Contour Interval. This parameter is the interval in dBZ at which contours are drawn for the composite reflectivity contour products. The default value for the interval is 10; other valid values are 5, 15, 20, and 25. The smaller the interval value, the more CPU resources will be used to make the product. If the product is load shedded, consider raising the interval value to the next level.

3-7.2.2 Echo Top Base. This parameter defines the base height at which echo top contours are drawn. The contour interval is user selectable at the PUP. The default value for the contour base is 30000 and the range is from 0 to 40000.

3-7.2.3 Filter Level. This parameter specifies the minimum size of a contour, in terms of number of linked-vectors, that will be retained in the product output buffer and, ultimately, displayed in the graphic product. All contours at or below the size of the Contour Filter Level are removed. With the default value of three, almost all contours of significance are retained. In the event of system load shedding, or if contour products are displaying the message "PRODUCT TOO BIG - NOT ALL CONTOURS DRAWN," the Contour Filter Level should be increased. Increasing the value to four will remove many additional contours, i.e., those drawn around single isolated grid-points, and should be tried first. The total range of this parameter is 0 to 12. Note that this filter does not affect the highest level at which contours are drawn in any given product. At this level, a default filter level of three is used to maintain continuity and is set internally. The highest level will vary depending upon the values of the data that are being contoured.

3-7.2.4 Combined Shear Interval. This parameter is the interval in $E10^{-3}$/sec at which shear interval contours are drawn for the combined shear products. The range is from 1 to 5 $E10^{-3}$/sec, with a default of 2 $E10^{-3}$/sec.

3-7.3 Cell Product.

This window (see Figure 3-8. Cell Product) is used to adjust the following adaptation parameters:

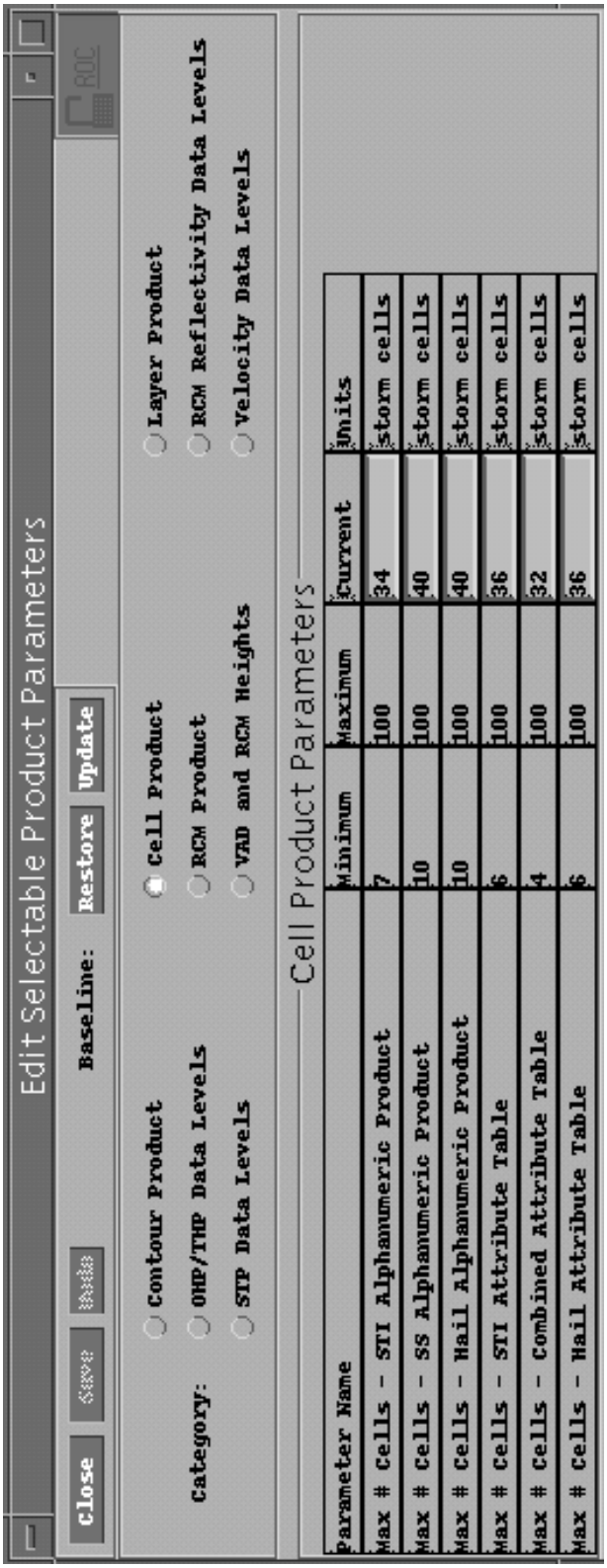


Figure 3-8. Cell Product

- Maximum number of cells in STI Alphanumeric Product
- Maximum number of cells in SS Alphanumeric Product
- Maximum number of cells in HAIL Alphanumeric Product
- Maximum number of cells in STI Attribute Table
- Maximum number of cells in Combined Attribute Table
- Maximum number of cells in HAIL Attribute Table

This menu is used to adjust the maximum number of storm cells in the STI (Storm Track Information), SS (Storm Structure), and Hail Alphanumeric products as well as the STI, Hail, and Combined Attribute tables. The primary reason for limiting the number of storm cells in products is to reduce the product sizes and, hence, reduce the chances of narrowband loadshedding. The parameters in this menu do NOT affect the number of storm cells identified and tracked or the number of storm cells in the STI and Hail graphic products or overlays.

3-7.3.1 How the Storm Cells are Limited. The storm cells are sorted by a 'severity' attribute. For example, in the STI product, the storm cells are sorted first by Cell-based VIL and secondly by maximum reflectivity. When the number of storm cells identified exceed the maximum number of storm cells in a particular portion of a product (example, within a 10 nm radius), the storm cells nearest the top of the sorted list (i.e. “The most severe” storm cells) are included. The storms at the bottom of the list (least severe) are removed from the visual window, thereby retaining the most severe storm cells.

3-7.3.2 Considerations. When changing these parameters, one must consider that all users of the product will be affected. A compromise between the number of 'useful' storm cells and narrowband loadshedding should be the goal.

In the range of values, the upper limit is 100 which is the same as the upper limit on the maximum number of storm cells per volume scan (see the CENTROIDS Algorithm Adaptable Parameters). The lower limit for each parameter is the number of storm cells which fit on the first page of that part of the product. For example, there can be up to 10 storm cells on the first page of the Hail Alphanumeric product. To reduce the product sizes most efficiently, decrease the maximum number of storm cells by the number of storm cells which fit on whole pages of a product. The number of storm cells which fit on each page is equal to the lower limit in the range of acceptable values, except for the STI Alphanumeric product. For example, the number of storm cells per page of the Hail Attribute Table is 6. For the STI Alphanumeric product, the first page lists up to 7 storm cells, but each additional page can list up to 9 storm cells.

3-7.4 Layer Product.

This window (see Figure 3-9. Layer Product) is used to adjust the following adaptation parameters for the Layer Products:

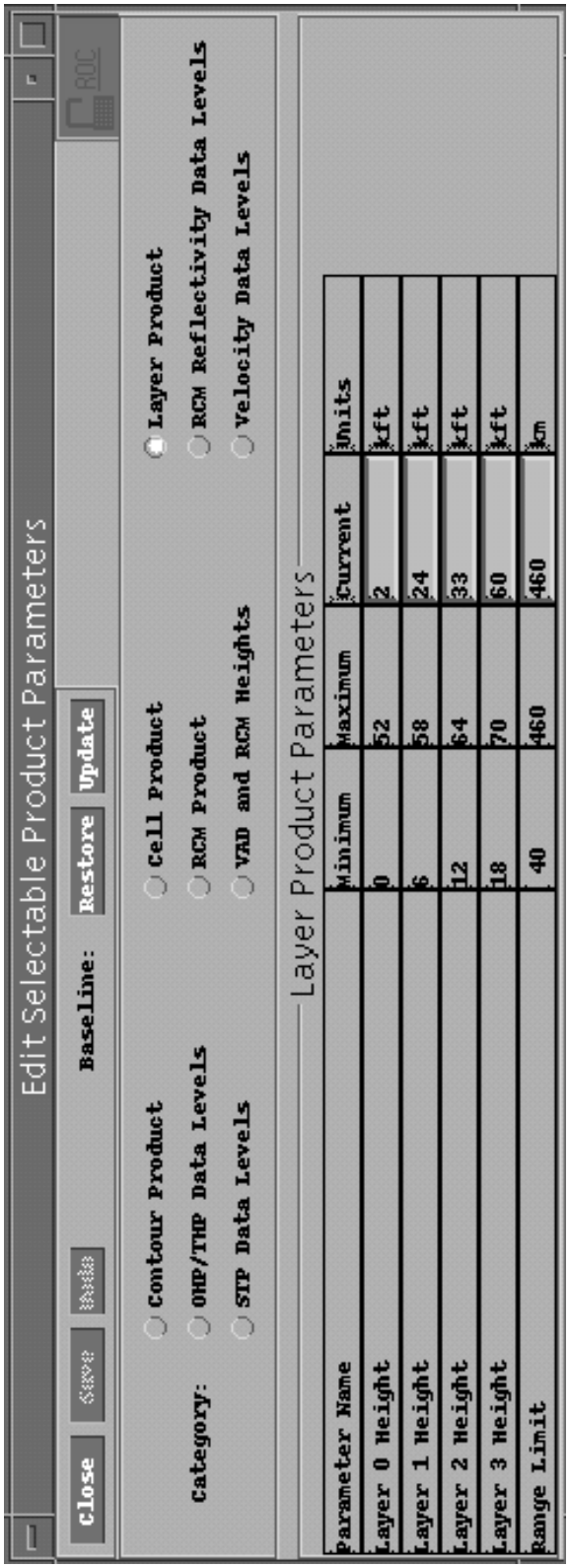


Figure 3-9. Layer Product

3-7.4.1 Layer 0 Height (KFt. MSL). These parameters define the height of the bottom of the first layer in thousands of feet above mean sea level for Layer Composite Reflectivity products.

3-7.4.2 Layer 1 Height (KFt. MSL). These parameters define the height of the top of the first layer in thousands of feet above mean sea level for Layer Composite Reflectivity products.

3-7.4.3 Layer 2 Height (KFt. MSL). These parameters define the height of the top of the second layer in thousands of feet above mean sea level for Layer Composite Reflectivity products.

3-7.4.4 Layer 3 Height (KFt. MSL). This parameter defines the height of the top of the third layer in thousands of feet above mean sea level for Layer Composite Reflectivity products.

3-7.4.5 Range Limit. This parameter defines the range of coverage in kilometers for Layer Composite Reflectivity products.

NOTE

The top height of layer 1 is the bottom height of layer 2. The top height of layer 2 is the bottom height of layer 3. These parameters affect both the average and maximum layer composite reflectivity products.

3-7.5 OHP/THP Data Levels.

This window (see Figure 3-10. OHP-THP Data Levels) is used to adjust certain precipitation accumulation Data Levels displayed for the One Hour Precipitation (OHP) and Three Hour Precipitation (THP) products. The adjustable levels are associated with fixed color codes 3 to 16 and fixed levels with color codes 1 and 2.

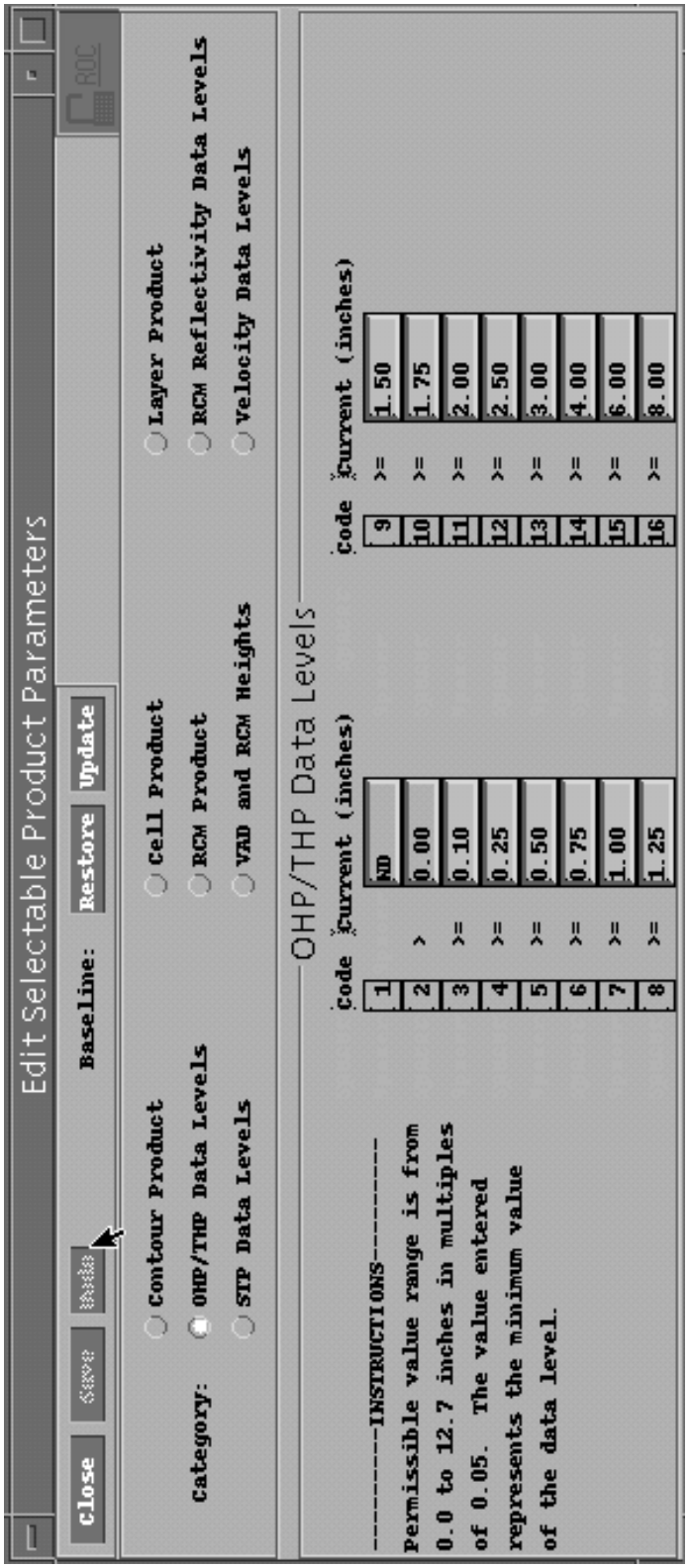


Figure 3-10. OHP-THP Data Levels

3-7.5.1 First and Second Levels. The first level is non-modifiable and is shown as the non-modifiable characters "ND", standing for "No Data". This denotes that color code 1 will be displayed for regions that have no accumulation and for the region outside the circular area of product coverage.

The second level cannot be edited and has the value of 0.00 inches denoting that color code 2 will be displayed for regions that have accumulations greater than zero inches but less than the level for code 3.

3-7.5.2 Third through Sixteenth Levels. The remaining levels 3 to 16 are modifiable and range from 0.05 through 12.70 in increments of multiples of 0.05. If any value is entered that is not evenly divisible by 0.05, the number will be automatically rounded up or down to the closest 0.05 value. One level cannot equal the level above or below it; there must be at least a 0.05 difference in value. Additionally, no number outside of 0.00 to 12.70 is accepted. If any number is entered that violates these rules, there are two different warning_popup windows that will appear. For numbers (XX.XX) that are outside the 0.00 to 12.70, the warning_popup states: “XX.XX is not valid, numeric value must be between 0.00 and 12.70.” For any other incorrect entry (XX.XX) yet inside the range of 0.00 to 12.70, the warning_popup states, “XX.XX is not valid for table element AA, it must be greater than BB and less than CC.” AA is the desired data table element, BB is the data table element below AA, and CC is the data table element above AA.

For code 3, accumulations greater than or equal to the level at code 3, and less than the level at code 4, will have color code 3. For code 16, any accumulations greater than or equal to the level at code 16 will be displayed with color code 16. If the accumulation exceeds the current value for Code 16, then the value of Code 16 should be periodically increased until the maximum range of 12.7 inches is entered. Consider increasing the codes below Code 16 to still present a proportional representation of the ongoing precipitation.

3-7.6 RCM Product.

This window (see Figure 3-11. RCM Product) is used to adjust the following parameters:

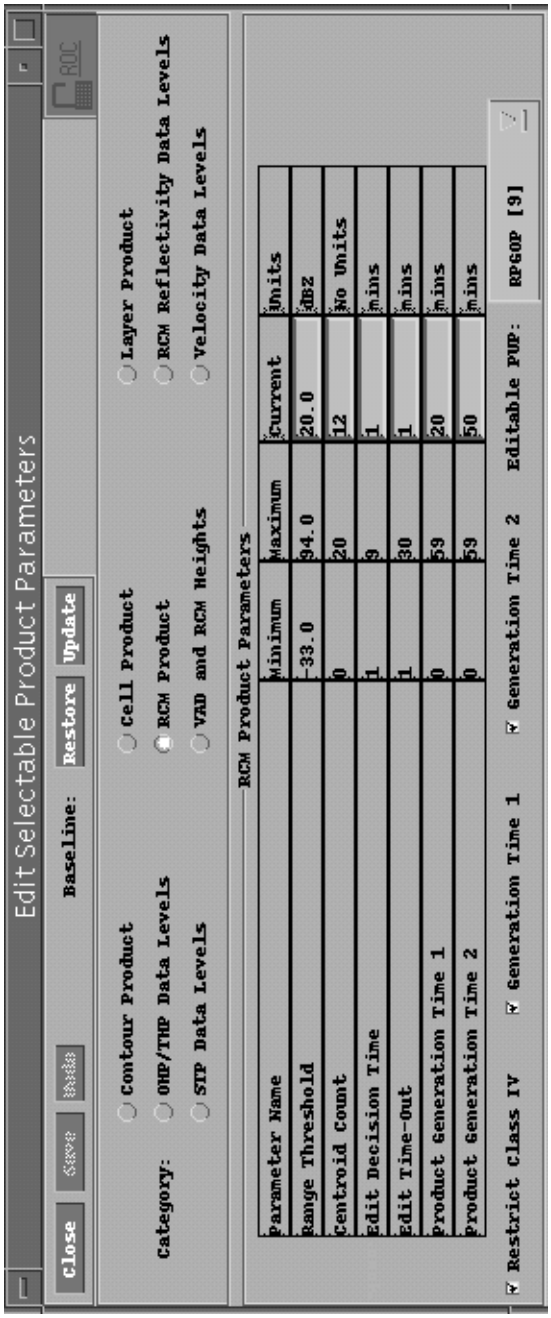


Figure 3-11. RCM Product

3-7.6.1 Range Threshold. This parameter is the reflectivity level, in dBZ, that defines the two color codes for RCM data outside 124 nm. This parameter is defined as the low end of the second color level.

3-7.6.2 Centroid Count. This is the maximum number of Centroids that will be identified in the RCM product. The allowable range is from 0 to 20, with a default of 12.

3-7.6.3 Edit Decision Time. This is the amount of time in minutes that the RPG will wait after an unedited RCM has been transmitted to the designated PUP for notification that the RCM will be edited. The RPG is notified that the RCM will be edited automatically when the operator begins the edit process.

3-7.6.4 Edit Time-Out. This is the number of minutes for the editing process to complete. The RPG initiates this timer when it receives notification from the designated editor that editing will occur. If the timer expires and the RPG has not received the edited RCM back, the unedited version will be distributed.

3-7.6.5 Product Generation Time 1 and 2. These parameters define the time (in minutes past the hour), that an unedited RCM product will be produced. Up to two products can be produced per hour. A one-time product request is issued for the RCM at the specified time (estimated RDA time). The resulting product is generated from most recently completed volume scan.

3-7.6.6 Restrict Class IV. This parameter, when selected, restricts the distribution of unedited RCMs to Class IV users from the RPG. This does not prevent an associated user from distributing it unless independently restricted by the user. Class IV users are Other Users.

3-7.6.7 Selection of Generation Time 1 and 2. These two parameters, when selected, will make the RPG generate and send the unedited RCM to the designated user at that specific time. The two times are independent of each other.

3-7.6.8 Editable PUP. The pull-down window to the right of the title Editable PUP provides the user the option of selecting the PUP to be designated as the RCM editor. After selecting the desired PUP, the window must be saved using the Save button in the upper left hand corner in order to use the new selected PUP. The Class 1 line (0) is the wideband line in the Comms Link Configuration file. The Class 2 lines (1-8, 39-40) are not listed as they are dial-in only. The dedicated lines: the RPGOP 50 line, all the RPGOP 90 lines, and all the Class 1 lines are listed, even though they are accessible only through the ROC level of authorization.

3-7.7 RCM Reflectivity Data Levels.

This window (see Figure 3-12. RCM Reflectivity Data Levels) is used to adjust the data level codes for displaying the specific reflectivity intensity cutoff value for each grid box of the RCM intermediate graphic product.

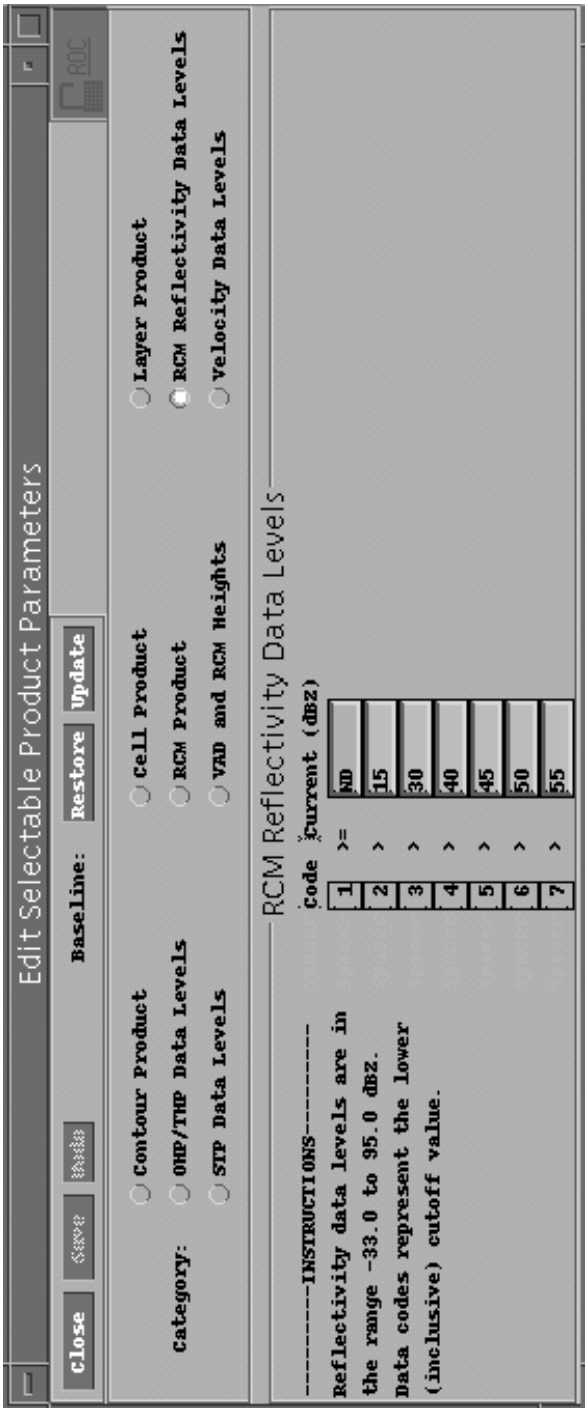


Figure 3-12. RCM Reflectivity Data Levels

3-7.8 STP Data Levels.

This window (see Figure 3-13. STP Data Levels) is used to adjust certain precipitation accumulation data levels displayed for Storm Total Precipitation (STP) products. The adjustable levels are associated with fixed color codes 3 to 16, and fixed levels with color codes 1 and 2.

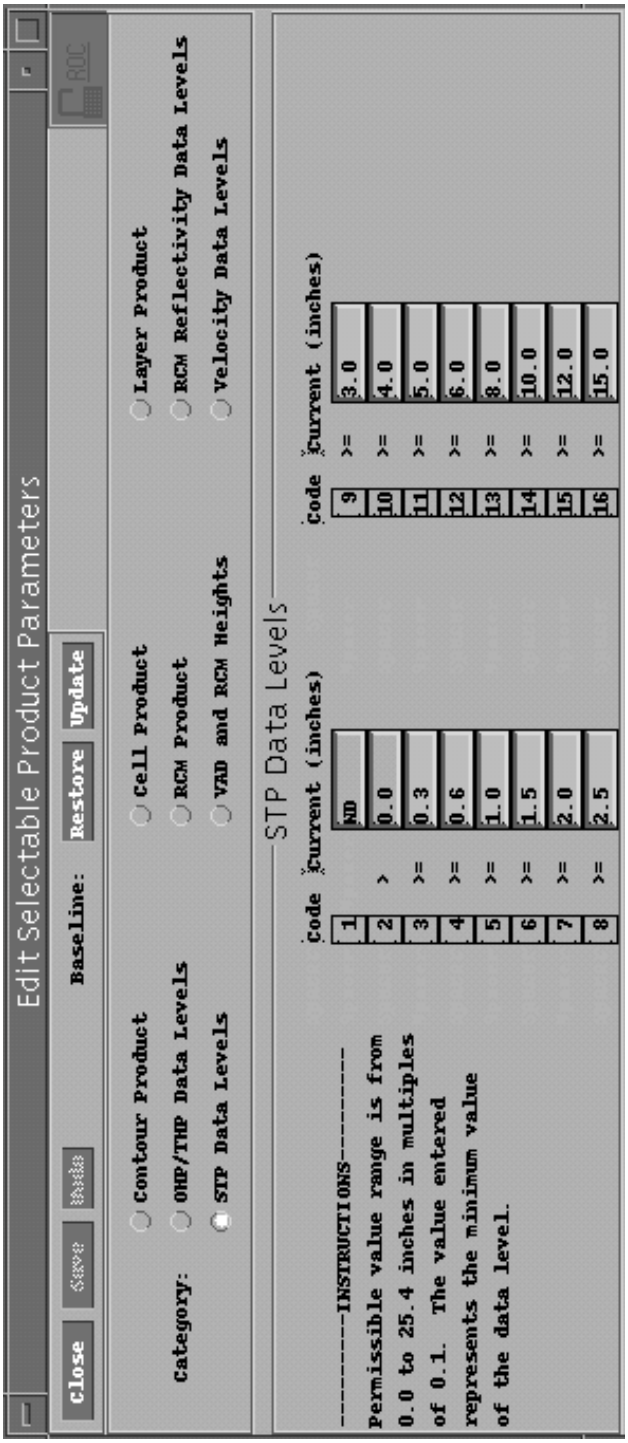


Figure 3-13. STP Data Levels

3-7.8.1 First and Second Levels. The first level is non-modifiable and is shown as the non-modifiable characters “ND,” standing for “No Data” and denoting that color code 1 will be displayed for regions that have no accumulation, and also for the region outside the circular area of product coverage. The second level is non-modifiable and has the value of 0.00 denoting that color code 2 will be displayed for regions that have accumulations greater than zero but less than the level for code 3.

3-7.8.2 Third Through Sixteenth Levels. The remaining levels 3 through 16 are modifiable and range from 0.0 to 25.4 in increments of multiples of 0.1. If the user puts in an value outside this range, a warning_popup opens that states: “XX.X is out of range, it must be in the range 0.0 <= A <= 25.4” where XX.X is the value entered and A is the allowable value. Click on the Continue button and the user is returned to the STP Data Levels window. If the user puts in a value inside the overall range, but not within the range for a specific table element, a warning_popup opens that states: “XX.X is not valid for table element TE, it must be greater than BB.B and less than CC.C” where XX.X is the value entered, TE is the table element the value was entered for, BB.B is the lower table element value, and CC.C is the upper table element value. Click on the Continue button and the user is returned to the STP Data Levels window.

3-7.9 VAD and RCM Height.

This window (see Figure 3-14. VAD and RCM Heights) is used to determine which heights will be used by VWP and/or RCM when they are generated. The units of the heights selected are thousands of feet above mean sea level. Up to 30 VWP heights may be selected of which up to 19 may be both RCM and VWP.

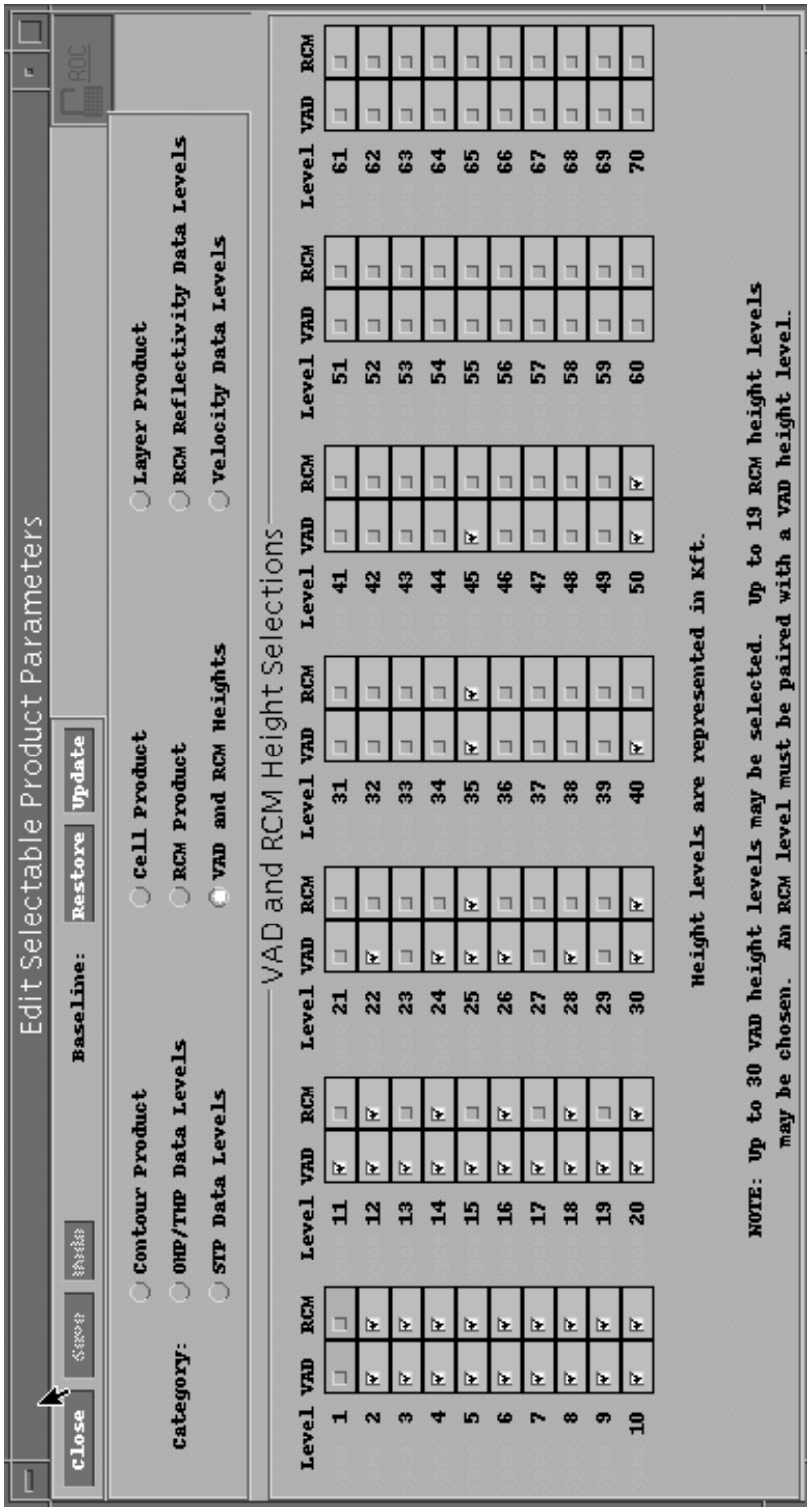


Figure 3-14. VAD and RCM Heights

3-7.10 Velocity Data Levels.

This window (see Figure 3-15. Velocity Data Level) is used to adjust the ranges of velocity data levels displayed. Velocity increment units are expressed in knots.

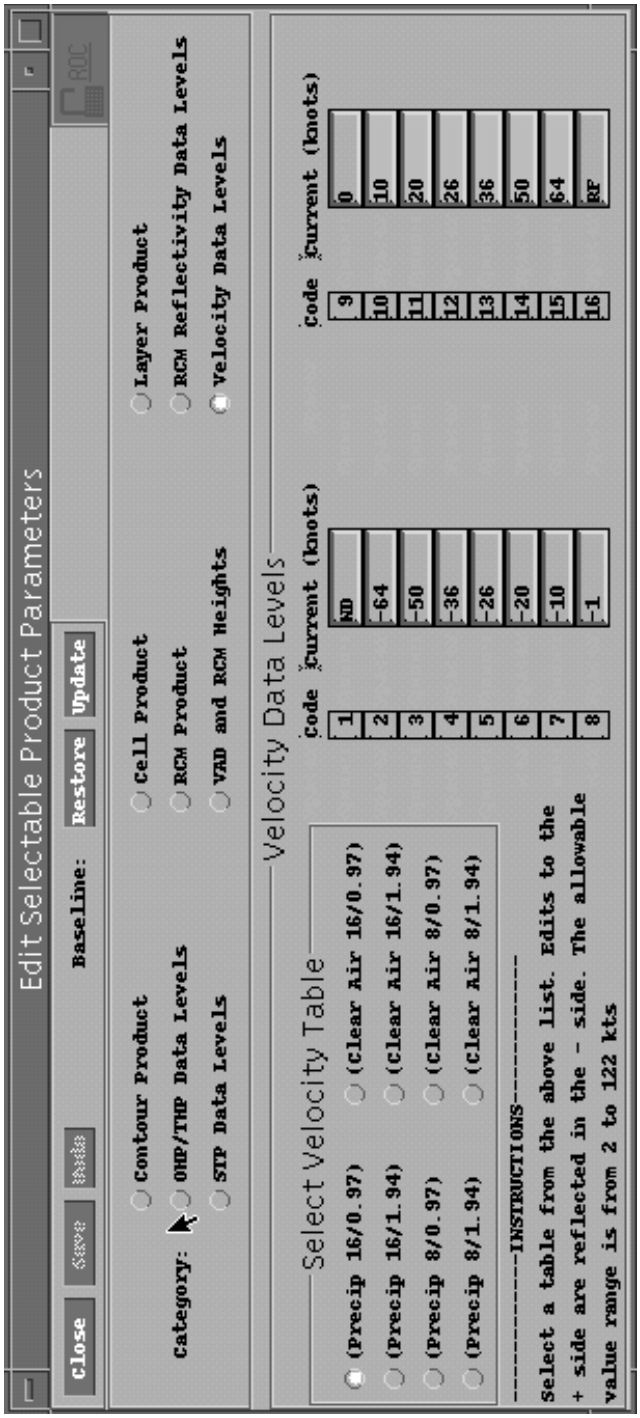


Figure 3-15. Velocity Data Level

3-7.10.1 First through Ninth Levels. These represent the negative (incoming) velocities and are not editable by the user. Level one is non-modifiable and is shown as the non-modifiable characters “ND”, standing for “No Data” and denoting that color code 1 will be displayed for regions that have no velocity value. Levels two through seven are non-modifiable by the user, but change to the corresponding negative velocities when positive values are entered correctly in the levels 10 through 15. Levels eight and nine are fixed values and are not editable by the user.

3-7.10.2 Tenth through Fifteenth Levels. The first level is non-modifiable and is shown as the non-modifiable characters "ND", standing for "No Data". This denotes that color code 1 will be displayed for regions that have no accumulation and for the region outside the circular area of product coverage.

3-7.10.3 Sixteenth Level. The sixteenth level is not editable, but represents that value that cannot be determined, and is classified as Range Folding (RF).

3-7.11 Gage Bias Adjustment Toggle.

A Radar/rain-gage bias is computed by the AWIPS and sent to the RPG. The RPG precipitation products will optionally apply the bias to the rainfall accumulation products to provide a more accurate depiction of rainfall quantities. The adjustment corrects for systematic biases between measurements of rainfall via rain-gage and via radar.

Click on RPG Products, then click on Algorithms, then scroll down the list of Algorithms to the Hydromet Adjustment Algorithm. Click on the Hydromet Adjustment Algorithm, and scroll to the bottom line titled Bias Flag. The default setting is False which means the bias is not being applied. Open the password window at the URC level and the setting can then be changed. A pull down menu appears with either False or True as the available selection. Click on the desired selection and that becomes the new value and the pull down menu disappears. The Save button in the upper left of the window must now be clicked in order to save the new value for the Bias Flag. If the selection True is clicked and saved, then the bias will start being applied at the next volume scan.

SECTION 3-8. CLUTTER REGIONS

3-8.1 Introduction.

The Clutter Regions bypass map has two segments: One for elevations at and below 1.5 degrees, and one for elevations above 1.5 degrees. Each sector contains clutter filter bypass control data required to configure the SPS clutter filters for a specific elevation and azimuth region. The clutter filtering is performed for specified regions despite the bypass map. However, the bypass map remains in control for all unspecified areas. The RDASOT function, Generate Clutter Map, is used to build the bypass map automatically.

Editing of the clutter suppression regions are allowed from the Clutter Regions window. This is used to define both the degree of clutter suppression to be applied by the bypass filter and as an override to clutter suppression instructions dictated by the bypass filter. Up to fifteen individual clutter suppression regions may be defined in one file in terms of azimuth start/stop (0-360 degrees) and range start/stop (0–511 km). Up to 19 files (of 15 regions each) can be created at each site and stored in the RPG. When one of the files is downloaded to the RDA, it overwrites the file that had been previously downloaded. The Clutter Regions window is obtained by moving the cursor under the right hand side column called Applications and clicking on the square Clutter Regions icon. See Figure 3-16. Clutter Regions.

For FAA Redundant configurations, the user can edit the clutter regions only on the RPG channel that is active. If the user tries to edit the regions on the non-active channel, access is not even allowed to the window. When clicking on the padlock to open the editable fields, a warning_popup opens that states: “You cannot edit this data because the other RPG channel is Active.” Click on the Continue button and the user is returned to the Clutter Regions window.

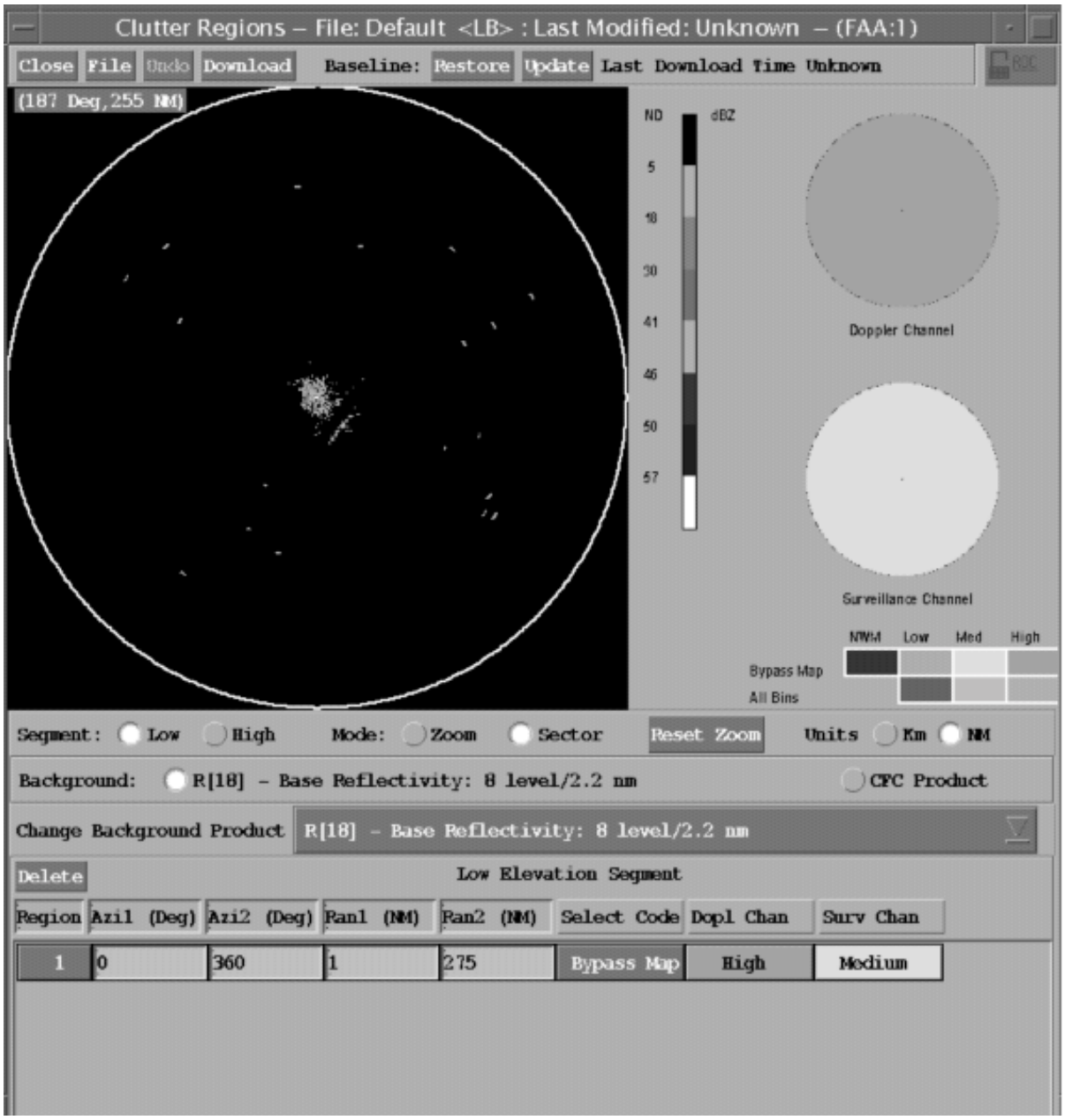


Figure 3-16. Clutter Regions

3-8.2 <u>Clutter Regions Window Title</u>.

The title line contains not only the title "Clutter Regions" but also two sources of information. The word File: identifies the file name of the current clutter region. (The listing of regions can be found by clicking on the File button, second line.) The second category called Last Modified: identifies the date that the active clutter region was last changed. It will either have a date/time or the word Unknown if no file is available.

3-8.3 First Line of Commands.

The first button to the far left is the Close button. If no changes have been made, clicking on the Close button will close the window and return the user to the HCI.

If changes have been made and the Close button is clicked (without any other buttons being selected), a warning_popup opens that states: “You did not save your edits. Do you want to save them?” Click on Yes or No and the desired response will be taken. If No, the user is returned to the HCI. If Yes, then a separate Clutter Region Filename window opens, allowing the user to type in the label desired for the changes. Click in the box to get the blinking cursor in position to type in the new label. Once entered, click on Accept and the file is stored. If the user initially clicks on Close instead, the edits are not saved and the user returned to the HCI. If the Accept and then Close buttons are clicked in that order, the edits are saved before the user is returned to the HCI.

To open the password protected fields for edit, follow the procedures described in Paragraph 2-2.4.1.7. Padlock Window.

The rest of the commands are discussed as separate paragraphs below.

3-8.3.1 File Button and Files Window. The second button from the left is the File button. Clicking on the File button brings up the Clutter Regions Files window. See Figure 3-17. Clutter Region Files.

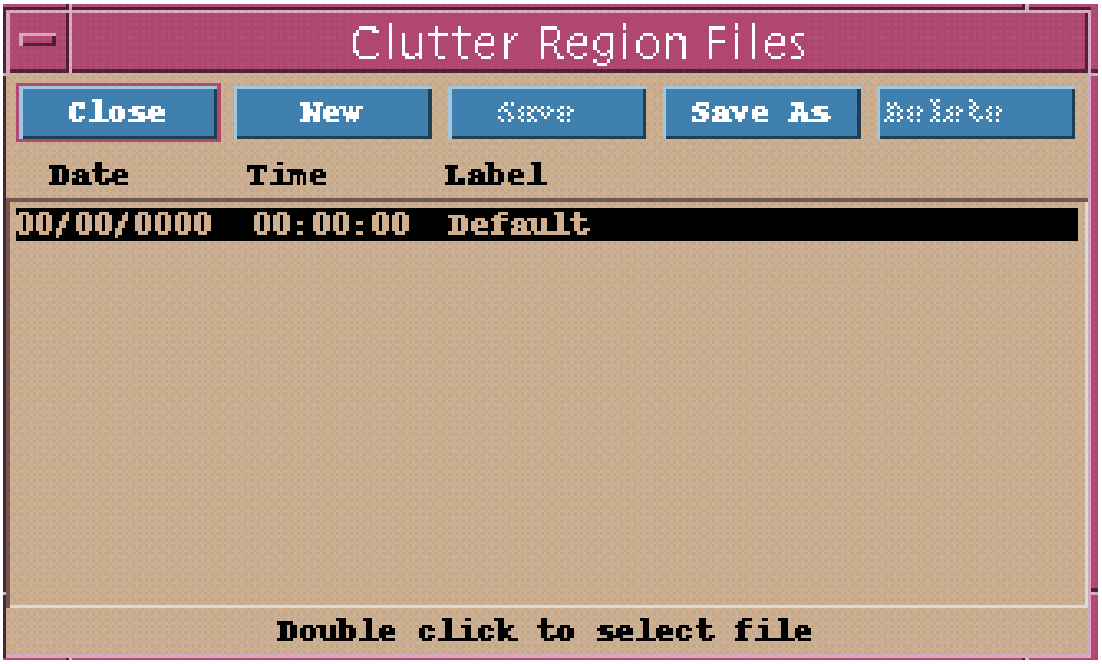


Figure 3-17. Clutter Region Files

This window has five commands plus a table of all the Clutter Region Files that are available to the user. The five commands are: Close, New, Save, Save As, and Delete. When this Clutter Region Files window is opened and no password has been entered in the original Clutter Regions window,

by default, the following commands are sensitized and operational: Close, New, and Save As.

These three buttons allow the user to make a new clutter region file and select it for use without needing the site password. The user can also select an existing file, make changes to it, but then has to save it as a new file (i.e. the user cannot make a change to an existing file and then save it under the same name). The user cannot save any new files to the baseline, nor can the user delete any current clutter files.

Clicking on the Close button simply closes the Clutter Region Files window.

Clicking on the New button returns the user to the edit window and allows a new clutter region file to be developed. This action first copies the default file as a template. Then the user can edit the screen. This has no impact on any other file.

To save the changes as a separate file, click on the Save As button and another window opens titled: "Clutter Region Filename". See Figure 3-18. Clutter Region Filename.

Figure 3-18. Clutter Region Filename

Click on the light box to the right of the title Label: and type in the desired filename. Then click on the Accept button to accept the filename, or click on the Cancel button to cancel the action and delete the file. If the filename is accepted, the Clutter Region Files window will refresh and the new file will appear. If the new filename has already been used, a warning_popup will appear that states: “The filename you specified is already used. Select a new filename.” Click on the Continue button and the user is returned to the Clutter Region Filename window.

The site operator can enter in only 19 Clutter Regions files. If the operator creates a 20th file and clicks on the Save As button in order to bring up the Clutter Region Filename window, nothing happens. The operator must first delete a clutter regions file (Default file is not one that can be deleted) before adding a new file if there are already 19 site-created files saved and listed in the Clutter Region Files window.

To sensitize the Save and Delete buttons of the Clutter Region Files window, the URC password must be successfully entered. Once the padlock is open, the user can select an existing file, make changes to it, and save it under the same existing name. Clicking on the Save button will open a warning_popup that states: "Are you sure you want to save your clutter regions changes?" Click on Yes, and the changes will be made to the Clutter Region File highlighted by the black bar. Click on No and the changes remain in the window, all buttons remain sensitized, and the user remains at the Clutter Region Files window.

Returning to the control buttons on the Clutter Region Files window, to delete a file, click on the file, then click on the Delete button and a warning_popup opens that states: “You are about to delete the selected clutter suppression regions file. Do you want to continue?” Click on either Yes or No and the appropriate action will be taken and the user returned to the Clutter Region Files window. If there is only the one default file left and the user clicks on the Delete button, a warning_popup opens that states: “You cannot delete the Default Clutter Suppression Region File.” Click on Continue and the user is returned to the Clutter Region Files window.

Double-click on a selected file and its corresponding filters appear on the Clutter Region window. The title to the window displays the name and date/time the file was last changed. However, it has not yet been downloaded to the RDA. The user must click on the Download button as discussed below.

3-8.3.2 Undo and Download Buttons. The third button is the Undo button. By default it is sensitized. Once changes have been made on the graphic window, the Undo button becomes sensitized. By clicking on the Undo button, the changes are deleted, no warning_popup windows appear, the Undo button becomes grayed-out and desensitized, and the Baseline: Restore and Update buttons become sensitized.

The fourth button is the Download button. By default it is grayed-out and desensitized. If no edits has been made and the Download button clicked, a warning_popup appears that states: "You are about to download the currently displayed clutter regions file. Do you want to continue? Yes/No?" Click Yes to download, click No to not download, and in both cases the operator is returned to the Clutter Regions window. If edits have been made on the edit screen, then clicking on the Download button brings up the same warning_popup that states: "You are about to download the currently displayed clutter regions file. Do you want to continue? Yes/No?" Click No and the operator is returned to the Clutter Regions window. Click Yes and a different warning_popup appears that states: "You made edits but did not save them. You must save edits for them to be downloaded to the RDA. Do you want to save them and download or abort? Continue/Abort?" Click on Continue and the Clutter Region Filename window appears to enter the desired filename. (See Figure 3-18. Clutter Region Filename. Type in the desired Label: and click Accept to save the edits. Click on Cancel to return to the Clutter Regions window and not save the edits.) Click on Abort and the operator is returned to the Clutter Regions window but the edits are still in the edit screen.

The RDA will update its map only for the updated regions. The unmodified regions of the downloaded map will have no impact on the RDA map. At the end of the current volume scan, this will become the new clutter suppression map. This map will be used until another map is downloaded. Even though clutter suppression regions are specified by VCP, once the clutter map is sent to the RDA, the RDA invokes it regardless of the VCP.

3-8.3.3 Baseline Restore and Update Buttons. The next two buttons are the Baseline: Restore and Update buttons. By default, the Baseline: Restore and Update buttons are initially grayed-out and desensitized. When the password is successfully entered, the Baseline: Restore and Update buttons are sensitized. When changes are made to the data, the Save and Undo buttons become sensitized while the Baseline: Restore and Update buttons become grayed-out and desensitized. Once the

changes have been saved or undone, then the Save and Undo buttons are grayed-out and desensitized and the Baseline: Restore and Update buttons become sensitized.

To restore the baseline figures to the clutter regions, click on the Restore button. A warning_popup opens that states: "You are about to restore the clutter regions adaptation data to baseline values. Do you want to continue?" Click on either Yes or No and the appropriate action will be taken.

NOTE

If the user made any changes to existing files or added new files and saved them, they will still be DELETED if the Restore button is clicked. The user MUST FIRST click on the Update button and place the changes or new files into the baseline before using the Restore button.

To incorporate the changes or files just made into the baseline, click on the Update button and a warning_popup opens that states: "You are about to update the baseline Clutter Regions adaptation data. Do you want to continue?" Click on either Yes or No and the appropriate action will be taken The Baseline files will be modified with the latest changes and files.

3-8.3.4 Last Download. The next to last item in this top row is information only. The title Last Download will identify either the date and time of the last download or state Unknown.

3-8.4 Graphics Utilization.

There are five areas that graphically display or control the display of the clutter regions. These are described separately below.

3-8.4.1 Current Display - Black Rectangular Square. The black rectangular square with the white radius circle is the graphic box that is used to display the clutter regions for each selected file and is where the changes can be made with the mouse, using the click, hold down, drag, and release technique.

The upper left hand corner contains the readout of the azimuth and range of the cursor from the center of the display when it is moved around within the square. This feature cannot be modified except for the units (km versus miles) in which the range is displayed.

If the password has not been entered, the current existing clutter region files can be viewed, but not modified. If the password has been successfully entered, then the selected files can be modified or new files created.

NOTE

In order to "draw" new clutter regions, the display has to be in Sector Mode. (Right hand side of top line of commands under the Current Display.)
See Instructions below.

The background on the display will be either a reflectivity product, a CFC product, or a statement that Background Product Not Available.

3-8.4.2 Two Circular Bypass Map Displays: Doppler Channel and Surveillance Channel. On the right hand side of the window there are two large circular Bypass Map displays. The top display is the Doppler Channel and the bottom display is the Surveillance Channel.

The colors inside each display represent the region defined, are user selectable, and are defined in the color bar scales beneath the two displays. The color options for the Bypass Map are purple (NWM - Notch Width Map), green (Low), yellow (Medium) and orange (High). The NWM is the Default Bypass Map, and has the same default conditions as Region 1 of the clutter files (medium suppression on the surveillance channel, high suppression on the Doppler channel.) The NWM turns both Circular Bypass Map Displays totally purple, and can only be invoked by deleting all the regions in the table. It is not recommended to delete the Region 1 as that is the default map. If the operator accidentally deletes it, however, simply close the Clutter Regions Window, then reopen it and the Region 1 file will reappear. The color options for the Bins selected are Low (dark blue), Medium (light blue), and High (teal green). To select a different value, go to the table in the center lower portion of the window. Instructions are discussed below. Default values for the Bypass Map are High (orange) for Doppler Channel and Medium (yellow) for Surveillance Channel.

3-8.4.3 Two Rows of Selections/Options for the Current Display. Directly below the current display are user selections that affect the display. These selections are in two rows and consist of the following:

3-8.4.3.1 Segment: Low/High. The top row has two command options for the user. The first is Segment: Low or High. Click on the button to the left of each category or on the name itself. If the button is white, then that is the selected option. If it is brown, it is not selected. When a change is made from one to the other, the current display is refreshed with the new option, and the table of the segments on the bottom of the window is also updated. Default option is the Low segment.

3-8.4.3.2 Mode: Zoom/Sector. The second command is the Mode: Zoom or Sector, followed by a Reset Zoom button. Click on the button to the left of each category or on the name itself. If the button is white, then that is the selected option. If it is brown, it is not selected. Default option is the Sector mode.

When the display is in Zoom mode, clicking anywhere on the current display will zoom up to five times magnification, one click at a time. Each click doubles the magnification. At any time, in order to reset the zoom feature to the original level, click once on the Reset Zoom button and the current display is restored to its original scale.

When Zoom Mode is selected, maximum zoom is 5X magnification and can be accomplished with five (5) single clicks on the area of interest in the display. Each click increases the magnification. To reset the zoom feature to the original scale, click on the Reset Zoom button.

When the Mode: is Sector, the operator can create new clutter regions in the edit field by use of the mouse. Click on a starting point inside the field and drag the mouse to create the desired region. Moving the mouse clockwise will create an arc clockwise. Increasing in distance from the center will form a region further away from the center. Decreasing in distance from the center will form a region toward the center. Moving the mouse counterclockwise will create a region of 360 degrees minus the amount moved. The same movement away from or toward the center will make the same similar sized region.

The maximum number of regions allowed are fifteen. If the operator attempts to make more than fifteen, a warning_popup appears that states: "The maximum number of regions (15) has been reached. You must first delete an existing region before adding a new one. Continue" Click on Continue and the operator is returned to the Clutter Regions window.

3-8.4.3.3 Scale. The units are selectable between Km and NM. Click on the button to the left of each category or on the name itself. If the button is white, then that is the selected option. If it is brown, it is not selected. When a change is made from one to the other, the cursor to the current display is changed and the table of the segments on the bottom of the window is also updated.

3-8.4.3.4 Background Product. The second line of command options starts with the title Background: and provides the operator with two choices: Specific Product or CFC Product. There is a select button just to the left of either choice. When the button is white, then that choice is the product shown as the background on the display window on the top left half of the window.

3-8.4.3.4.1 Specific Product. The first choice with a selector button is a specific product with a pull down menu available directly under the selector button and the currently selected product. Click on the pull down menu and, with the help of the scroll bar on the left hand side of the menu, the operator can select from the following products which one will be the background product. See Figure 3-19. Clutter Background Pull-Down Menu.

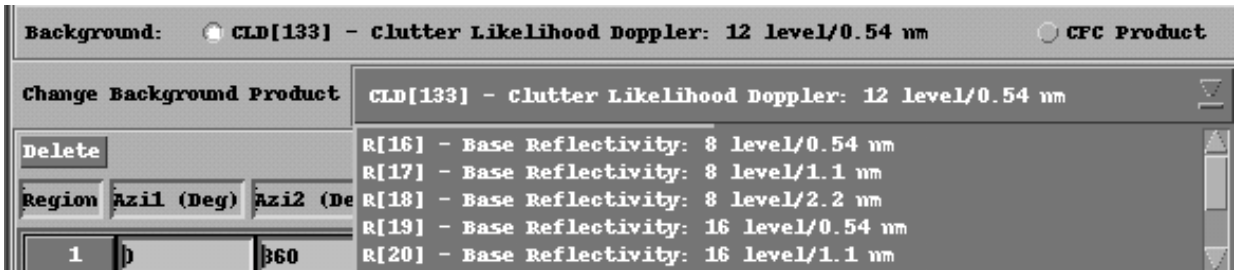


Figure 3-19. Clutter Background Pull-Down Menu

The options are:

- R[16] - Base Reflectivity: 8 level/0.54 nm
- R[17] - Base Reflectivity: 8 level/1.1 nm
- R[18] - Base Reflectivity: 8 level/2.2 nm
- R[19] - Base Reflectivity: 16 level/0.54 nm
- R[20] - Base Reflectivity: 16 level/1.1 nm
- R[21] - Base Reflectivity: 16 level/2.2 nm
- CLR[132] - Clutter Likelihood Reflectivity: 11 level/0.54 nm
- CLD[133] - Clutter Likelihood Doppler: 12 level/0.54 nm

3-8.4.3.4.2 CFC Product. When the second choice, CFC Product, is selected, the Pull Down menu disappears and is replaced by a line with two new options for the CFC Channel, Doppler or

Surveillance. See Figure 3-19.1 CFC Product Channel Selection.

Figure 3-19.1 CFC Product Channel Selection

Click on either the button to the left of the title or the title itself to select the channel desired.

3-8.4.4 Tabular Listing of Low/High Elevation Segments. The tabular listing of the Low/High Elevation Segments provides the user the flexibility to modify the segments by entering in new values for Azimuth and Range start and stop points for each region. They are password protected so by default they are grayed-out and desensitized. The correct password must be entered before the columns are sensitized.

3-8.4.4.1 Delete Button. A Delete button is in the upper left hand corner of this tabular listing. Clicking on it will delete the region identified in the listing with a white background. The current display window will be refreshed with the deletion taking place. However, the change is not deleted in the file and can be restored by going to the Clutter Regions Files window and double clicking on the desired file.

3-8.4.4.2 Azimuth Changes. To make changes to any segments, click on the desired block and type in the desired change. The Azi1 block identifies the start of the segment and the Azi2 block identifies the stop of the segment in a clockwise direction. The range of values allowed is from 0 to 360 degrees. If any number outside that range is entered, a warning_popup opens that states: “You entered an invalid number of XXX. The valid range is 0 to 360.” Click on the Continue button and the user is returned to the table.

3-8.4.4.3 Range Changes. The range of the segment can be modified by entering in the starting and stopping distances from the center of the window in the Ran1 (start) and Ran2 (stop) blocks. The range of values allowed is from 1 to 275 NM (or 2 to 510 Km). If any number outside that range is entered, a warning popup opens that states: “You entered an invalid number of XXX. The valid range is 1 to 275 (or 2 to 510).” Click on the Continue button and the user is returned to the table.

The start range must always be less than the stop range. If a start range is entered that equals or is larger than the stop range, a warning_popup opens that states: “You entered an invalid start range (XXX). The start range must be less than the stop range (BBB).” XXX is the just entered start entry, BBB is the current stop range. Click on the Continue button and the user is returned to the table.

The stop range must always be greater than the start range. If a stop range is entered that equals or is less than the start range, a warning_popup opens that states: “You entered an invalid stop range

(XXX). The stop range must be greater than the start range (CCC)." XXX is the just entered stop range, CCC is the current start range. Click on the Continue button and the user is returned to the table.

3-8.4.5 Select Code. For each region, the user can select different code for the Bypass Maps, All Bins, or None. Under the column heading Select Code, click through the options of Bypass Maps, All Bins, or None until the desired one is displayed. Then move to the two columns to the right under the headings Dopl Chan (Doppler Channel) and Surv Chan (Surveillance Channel). Click on the respective blocks through the color coded options of Low, Medium, and High until the desired value is displayed. For the Bypass Maps, the colors are green (Low), yellow (Medium), and orange (High). For the All Bins, the colors are dark blue (Low), light blue (Medium), and teal green (High). For None, the blocks become desensitized and the display turns black. The displays in the upper right of the window will be refreshed each time as the option changes.

3-8.5 Impact on Meteorological Data Interpretation.

Ground clutter is generally defined as radar return from non-meteorological, ground-based targets. Ground clutter is usually limited to within 20 to 30 NM of the RDA site and to the lowest elevation slices. However, in rough terrain and under certain meteorological conditions, clutter contamination may be present to the furthest extent of the radar coverage area and may affect several elevation slices.

Ground clutter contamination has a significant effect on the accuracy of the base data estimates. Clutter-induced bias of base data not only brings into question the reliability of data presented on the base products, but also has a detrimental effect on all downstream algorithms.

Recovery of usable meteorological data from range bins contaminated by ground clutter return is the primary purpose of the clutter suppression technique employed by the WSR-88D. The amount of data that can be recovered and the reliability of the reflectivity, velocity and spectrum width estimates from clutter contaminated range bins are functions of the active clutter suppression filter and the characteristics of the clutter itself. In the following paragraphs, the clutter suppression process is explained along with data improvements attainable with proper implementation of clutter suppression, pitfalls associated with improper clutter suppression application, and suggested operational methods to optimize the effectiveness of clutter suppression implementation.

3-8.6 Base Data Estimate Bias Due to Ground Clutter Contamination.

Ground clutter targets, by the very nature of their composition, are very efficient reflectors of

electromagnetic energy. The innate ability of ground clutter targets to reflect more energy than nearby meteorological targets allows the clutter return to dominate the returned energy (power) for the affected range bin (See Figure 3-20. Base Data Estimate).

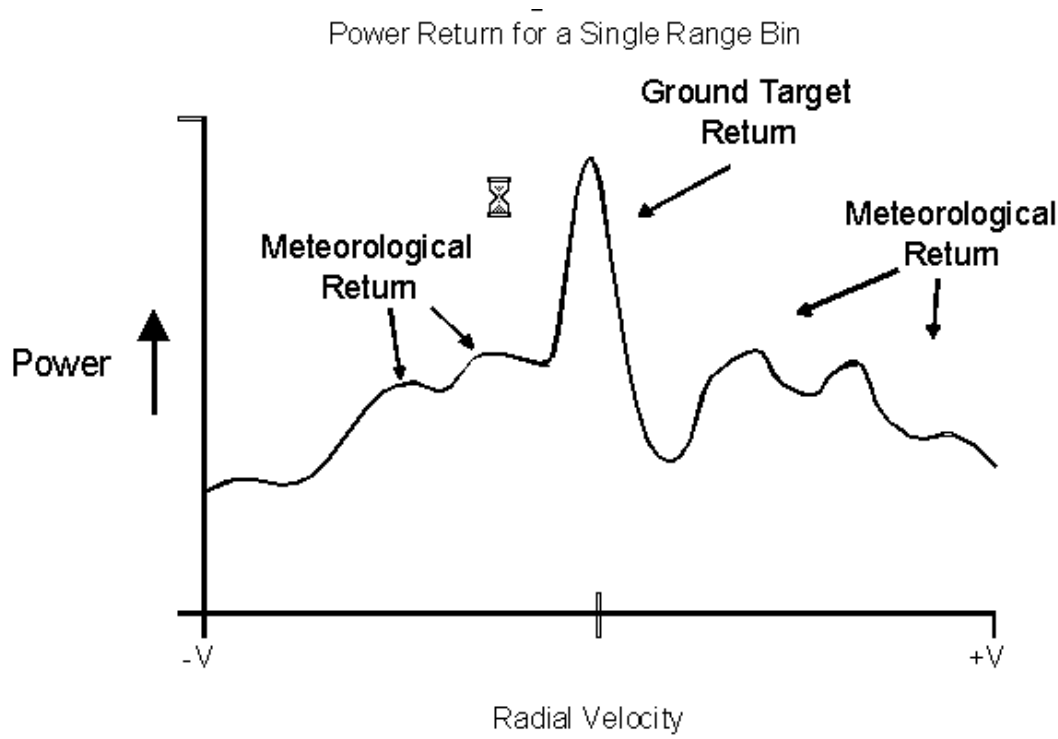


Figure 3-20. Base Data Estimate

A range bin is .13 nm (250 meters) in range by 1 degree in azimuth. Each range bin is made up of a number of range resolution cells. A range resolution cell is 1/2 pulse length (.13 nm) deep by one range sweep wide. A range sweep is defined as the azimuthal width of the area sampled by a single pulse which falls within the radial of interest. (The number of range sweeps per range bin varies based on the number of pulses per degree; therefore, the width of the range resolution cell also varies.) If the beam center line falls within the radial of interest, the data returned from that pulse is assigned to a range resolution cell location within a range bin for that radial. All range resolution cell values in a given range bin are used in calculating the base data estimate for that bin.

The base data estimate for each range bin is calculated using return from each range resolution cell contained within the confines of the range bin.

3-8.6.1 Reflectivity (Z) Estimate. Reflectivity is the measure of the efficiency of a target to reflect (absorb and re-radiate) radar energy. It is calculated by averaging the echo power from four successive range bins and then normalizing this average power for atmospheric attenuation and system noise. In general, clutter contamination will cause significantly higher reflectivity estimates because of the highly reflective nature of ground targets and the dependence of reflectivity

(Z) on the magnitude of returned power.

3-8.6.2 Mean Radial Velocity (V) Estimate. Mean radial velocity is a power-weighted average of the motions from each radar range resolution cell contained within the range bin. Ground clutter return that dominates the echo power return for a given range resolution cell will produce a velocity estimate near zero knots for that range resolution cell. The velocity estimate for each range bin is calculated by measuring and averaging the rate of change between data points assigned to adjacent range resolution cells contained within the bin. Therefore, ground clutter return present in the range bin will bias the velocity estimate toward zero.

3-8.6.3 Spectrum Width (W) Estimate. Spectrum width is a measure of the velocity difference between adjacent range resolution cells within a range bin. Any clutter contamination in the velocity estimate will also affect the spectrum width estimate.

3-8.6.4 Impact. The impact that the dominating clutter power return has on the base data estimates can be substantial. Additionally, the clutter-induced bias in the base data estimates affect the performance of ALL WSR-88D algorithms and products.

Clutter suppression for the WSR-88D is performed on each .13 nm by 1 degree range bin prior to the calculation of the base data estimates. Therefore, with appropriate clutter suppression invoked, the bias of the base data estimates due to clutter contamination within the range bin can be minimized.

3-8.7 Simplified Conceptional Model of Clutter Suppression Filter.

Clutter is the radar return from non-meteorological, ground-based targets, either man-made or natural. Meteorological returns have a mean radial velocity which may fall anywhere within the Nyquist co-interval and produce a spectrum width of up to several meters per second. However, clutter returns consistently produce signals with near zero (<0.97 kts) radial velocities and narrow (<0.2 kts to 0.6 kts) spectrum widths. These characteristics of clutter return allow the WSR-88D to employ filters to remove or reduce the power contribution from clutter, thereby decreasing its influence on base data estimates.

Clutter suppression filters are designed to reduce signal power whose mean radial velocity is at or near zero knots. To do this, clutter suppression filters reduce signal power within a “notch width” centered about the zero mean radial velocity value. This reduction in signal power effectively decreases the clutter's power contribution in the given range bin. To maintain meteorological return integrity, only the signal power whose radial motion falls within the notch width is reduced.

Remember, the goal of clutter suppression is to reduce only the power return contributed by clutter targets from the range bin prior to the calculation of the base data estimates. Therefore, for each range bin in areas where clutter suppression is in effect, the portion of the power return with near zero radial velocity will be reduced (filtered).

Any clutter return (power) not completely removed by the clutter filter is known as residual clutter. This residual clutter will be included in the calculation of the base data estimates for the range

bin in which it resides.

3-8.8 Overview of WSR-88D Clutter Suppression.

The WSR-88D provides for the suppression (reduction) of returned power whose radial velocity is near zero knots within predefined areas. The signal processor uses the Bypass Map, Default Notch Width Map, and operator-defined Clutter Suppression Regions to determine the areas in which to invoke suppression, and the amount of signal reduction to apply. The Bypass Map and Default Notch Width Map are used to identify and suppress areas of known ground clutter return. The operator may control the application of clutter suppression to known ground clutter areas and transient areas through the definition of clutter suppression regions. A brief definition of the clutter suppression options follows.

3-8.8.1 Default Notch Width Map. The Default Notch Width Map consists of up to three concentric range definitions and includes a notch width value and an operator select code for each defined range. These definitions are ROC-controlled RDA adaptable parameters, not editable at the HCI. The current configuration specifies the Bypass Map in control and applies medium suppression to the Surveillance (reflectivity) channel and high suppression to the Doppler (velocity/ spectrum width) channel out to 280 nm.

3-8.8.2 Bypass Map. The Bypass Map, generated by the Radar Data Acquisition System Operability Test (RDASOT) program, identifies areas measuring 1.40 by .54 nm which contain return from normal ground clutter targets. Only these 1.40 by .54 nm identified areas will have suppression applied when the Bypass Map is in control.

3-8.8.3 Operator-Defined Clutter Suppression Regions. The HCI operator may specify up to 15 individual regions per each of the four Clutter Suppression Region Files (11, 21, 31, 32). (Note: Clutter Suppression Region Files are not associated with any specific VCP.) Each region is delineated by start and stop ranges, start and stop azimuths, and an elevation segment number. The elevation segment number specifies which set of predefined elevation slices to include within the region definition. The elevations included in the different segments are defined in the RDA adaptation data.

The Clutter Suppression Regions are used to control the application of clutter suppression within the defined area by selecting from the options listed below. Within each operator-defined region, the UCP operator has three choices to determine how filtering will be invoked.

3-8.8.3.1 No Clutter Suppression. Operator Select Code None. This selection will turn off all filtering, including the Bypass Map identified areas, within the confines of the operator-defined region.

3-8.8.3.2 Bypass Map in Control Using the Operator-Specified Notch Width. Operator Select Code Bypass Map. This selection will invoke the selected suppression level (notch width) for each area identified by the Bypass Map within the confines of the operator-defined region.

3-8.8.3.3 Forced Clutter Suppression Using the Operator-Specified Notch Width. Operator

Select Code All Bins. This option forces the specified suppression level (notch width) for every range bin within the confines of the operator-defined region.

3-8.8.4 Notch Width Selections. There are three notch width selections, or levels of suppression, available for inclusion in the Default Notch Width Map definitions and Clutter Suppression Region definitions (with Operator Select Codes Bypass Map or All Bins). The notch width determines the target motions, around the zero radial velocity, that will be subjected to signal power reduction (suppression). The Surveillance channel and Doppler channel are suppressed using different notch width values (see Table 3 - 2. Notch Width Selections and Suppression Values) to reduce base data estimate bias in the different channels.

3-8.8.4.1 Notch Width Selection 1. Invokes a suppression level of approximately 30 dB (Low). See Table 3 - 2. Notch Width Selections and Suppression Values for typical notch width values.

3-8.8.4.2 Notch Width Selection 2. Invokes a suppression level of approximately 40 dB (Medium). See Table 3 - 2. Notch Width Selections and Suppression Values for typical notch width values.

3-8.8.4.3 Notch Width Selection 3. Invokes a suppression level of approximately 50 dB (High). See Table 3 - 2. Notch Width Selections and Suppression Values for typical notch width values.

Table 3 - 2. Notch Width Selections and Suppression Values

Channel	1		2		3	
	kts	dB	kts	dB	kts	dB
Surveillance	3.38	≈30	4.85	≈40	6.79	≈50
Doppler	4.58	≈30	6.05	≈40	8.92	≈50

Note: By design, the notch widths vary based upon antenna rotation rate. Therefore, the value listed in Table 3 - 2. Notch Width Selections and Suppression Values is an approximation and varies with elevation angle and antenna rotation rate.

The final filtering applied to each radial is a compilation of the Default Notch Width Map, the Bypass Map and the operator-defined Clutter Suppression Regions. The Bypass Map and Default Notch Width Map control the application of clutter suppression for each range bin not contained within an operator-defined Clutter Suppression Region. The operator-defined Clutter Suppression Regions have precedence for the application of clutter suppression. The hollow squares are areas previously defined for suppression by the Bypass Map, but are superseded by the operator-defined Clutter Suppression Regions.

In the absence of any operator-defined Clutter Suppression Regions, the WSR-88D will use the Bypass Map to determine where to apply clutter suppression and the Default Notch Width Map notch width definitions (stored RDA adaptation data) to determine the amount of suppression to be applied.

3-8.9 Negative Impacts of Inappropriate, Operator-Forced Clutter Suppression.

Forcing clutter suppression (Operator Select Code All bins) for every range bin within an operator-defined region will effectively remove the power contribution of non-moving targets from the base data estimate. This strategy is appropriate to temporarily mitigate the effects of anomalous propagation. However, caution is warranted when such a strategy is employed as a long term solution for removal of clutter contamination from the base data estimates.

3-8.9.1 Zero Isodop Apparent in the Reflectivity Field. The clutter suppression technique employed by the WSR-88D applies power reduction factors to “clutter” returns to reduce their impact on valid meteorological data. The portion of the signal attributed to “clutter” is identified by its lack of motion. The WSR-88D applies a power reduction factor to the non-moving returned signal.

The WSR-88D sees only the radial component of the actual target motion. Therefore, if the target is moving perpendicular to the radar beam it has a zero (or near zero) radial motion. If clutter suppression has been invoked for a given range bin whose radial target motion is zero (or near zero), the defined power reduction factor will be applied to that bin. This power reduction will result in a significantly reduced reflectivity estimate for the range bins whose mean radial velocity is at or near zero.

3-8.9.2 Data Smearing. Data smearing is an artificial displacement of the returned power maxima into azimuthally adjacent range resolution cells. Data smearing is an artifact of the clutter filter response times and occurs when high reflectivity gradients are present. The clutter filter decay rate is slower with narrower notch widths, therefore, data smearing is more likely to be seen when low suppression levels are used.

When data smearing occurs, weak reflectivity features on the trailing edge (azimuthally) of a high reflectivity gradient may be obscured. Additionally, the apparent areal extent of high reflectivity will be increased. The impacts of data smearing on the velocity and spectrum width estimates vary depending upon the relative power contributions from the range resolution cells for the affected range bin.

Base data estimate bias introduced by clutter suppression filters can be mitigated by invoking clutter suppression regions only in areas where clutter is present.

3-8.10 Benefits Attained by Appropriate Clutter Suppression.

The most obvious improvement as a result of proper clutter suppression is that ground clutter is removed from the graphical products displayed at the user workstation. However, several more important data quality improvements can be realized by the intelligent application of clutter suppression.

3-8.10.1 Improved Base Data Accuracy. The most important benefit is the improved accuracy of the WSR-88D products. Since clutter suppression occurs prior to the calculation of the base data estimates, proper clutter filtering will result in the base data estimates being more representative

of the actual meteorological situation. Consequently, the more accurate the base data estimates, the more reliable the output from downstream processing and algorithms and, as a result, the more accurate base and derived products.

3-8.10.2 Increased Availability of Second-Trip Velocity and Spectrum Width Data. By removing (reducing) the power contribution of ground targets from the base data estimate for first-trip range bins, the likelihood of assigning valid velocity and spectrum width data to second-trip range bins is increased.

The range unfolding of velocity (and spectrum width) data is a two-step process. First, the occurrence of overlying range bins (data from two or more range bins appearing at the same range due to multi-tripping of the high Doppler PRF) is determined by range folding the return at the surveillance PRF into the Doppler PRF intervals. If the difference in power of the two (or more) range bins being compared is less than or equal to the user-specified power difference (TOVER), both range bins are flagged as range folded (obscured). If the difference in power is greater than the specified power difference, the velocity data are assigned to the range bin having the greater power. The range bin with the weaker power is then flagged as range folded (obscured). In the situation of second (or third) trip meteorological return compared with strong clutter return from close to the radar (first trip), the return power of the clutter will usually exceed the meteorological power return by the specified power difference (TOVER). Therefore, if the clutter is not suppressed, the clutter contaminated bin will be assigned the velocity (and spectrum width) data while the bin with real meteorological targets will be flagged as range folded (obscured).

NOTE

When velocity and spectrum width range bins are flagged as range folded, those range bins are treated as “missing” by all downstream algorithms.

3-8.10.3 Decreased Velocity Dealiasing Failures in Clear Air Mode. A large number of velocity dealiasing failures that occur in VCP 31 and VCP 32 can be attributed to ground clutter induced bias in the base velocity estimate. The removal of the ground clutter bias from the base velocity estimate will result in meteorologically plausible ambiguous velocity estimates. These ambiguous velocity estimates can then be readily dealiased by the dealiasing algorithm. However, residual ground clutter will continue to cause velocity dealiasing algorithm failures.

3-8.10.4 Improved Ability to Stay in Clear-Air Mode. The Clear-Air Mode Deselection logic employed by the WSR-88D compares the areal coverage of precipitation-like return to a specified value (nominal clutter area plus precipitation area threshold). If the areal coverage of precipitation-like return exceeds this value, the RPG computer commands the RDA computer to switch to Precipitation Mode.

The reduction of non-meteorological data from the areal coverage computation will result in a more accurate estimate of the actual precipitation present; thereby, reducing the likelihood of prematurely switching to precipitation mode due to ground clutter returns. This also increases the accuracy of precipitation estimates by avoiding collection of precipitation on ground returns.

3-8.11 Suggested Clutter Suppression Management.

Proper clutter filtering will enhance the accuracy and readability of the base products as well as the reliability of the derived products. The following suggestions are made for improved clutter suppression management.

- Generate a new Bypass Map on a seasonal basis. This should be done when the meteorological conditions allow standard radar beam propagation In addition, generate a new Bypass Map whenever the "normal" ground clutter pattern changes (e.g., a high rise building is erected).

- Generate a hard copy of the 0.50 reflectivity product with and without Bypass Map clutter suppression in effect. These hard copies will give the forecasters a sense of the effectiveness of the clutter filter in dealing with the normal ground clutter return.

- Select a Clutter Suppression Region File to set aside as the baseline file. Using this file number, define two clutter suppression regions, one for each elevation segment number. These regions should encompass the entire radar coverage area, specify the Bypass Map in control (Operator Select Code Bypass Map), and use a notch width selection of Medium for the Surveillance channel and a selection of High for the Doppler channel. This Clutter Suppression Region File can be used to return to baseline clutter filtering after the requirement for forced clutter suppression (Operator Select Code All Bins) has abated.

- At the beginning of each shift, download the baseline clutter suppression region file. This baseline clutter suppression region file will negate any forced clutter suppression, thereby revealing any ground clutter still present. This will serve to ensure that the forecasters know what clutter suppression file is in effect and will enable them to make an informed decision as to whether any forced clutter filtering is required.

- Document any changes to operator-defined clutter suppression regions and a procedure for recording the date, time and file number each time a Clutter Suppression Region File is downloaded to the RDA. This procedure will ensure that everyone responsible for data interpretation can determine the active clutter suppression region file.

SECTION 3-9. BYPASS MAP EDITOR

3-9.1 Introduction.

Under the Applications column, click on the icon labeled Bypass Map Editor. This opens up the Clutter Bypass Map Editor window. See Figure 3-21. Clutter Bypass Map Editor. The Bypass Map Editor, by default, loads and displays the edited bypass map data, not the baseline, when the window is first opened. (If there is no edited version, then it creates one from the baseline version. The baseline version is created when a new bypass map is generated at the RDA.).

For FAA Redundant configurations, the user can edit the Bypass Maps only on the RPG channel that is active. If the user tries to edit the maps on the non-active channel, access is not even allowed to the window. When clicking on the padlock to open the editable fields, a warning_popup opens that states: "You cannot edit this data because the other RPG channel is Active." Click on the Continue button and the user is returned to the Bypass Map Editor window.

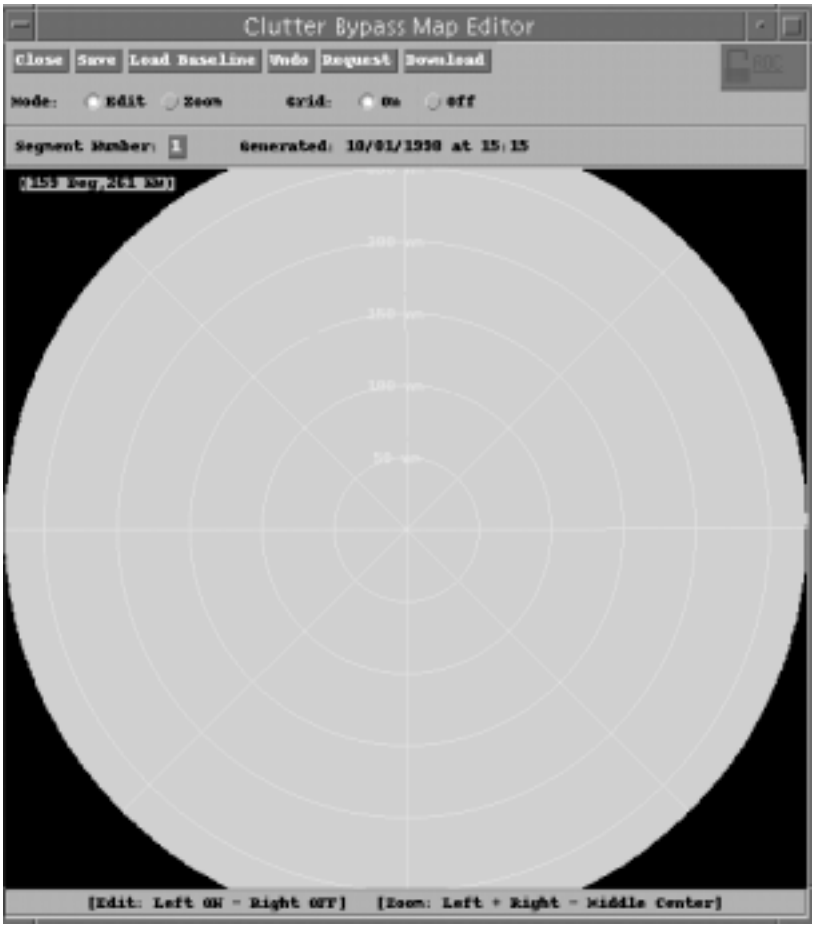


Figure 3-21. Clutter Bypass Map Editor

3-9.2 Top Row of Commands.

The top row contains seven buttons to be used when making changes to the Bypass Map.

3-9.2.1 Close Button. The first button to the far left is the Close button. If no changes have been made, clicking on the Close button will close the window and return the user to the HCI.

If changes had been made and the Close button is clicked (without any other buttons being selected), a warning_popup opens that states: “Do you want to save your bypass map edit changes?” Click on either the Yes or No button to select the desired response. The changes are either saved or deleted, and the user returned to the HCI.

3-9.2.2 Padlock Button. To open the password protected fields for edit, follow the procedures described in Paragraph 2-2.4.1.7. Padlock Window.

When the padlock is unlocked, a warning_popup will appear that states: "If you want to edit the latest clutter bypass may you should first request one from the RDA (Request button), wait for it to be received at the RPG (a message should appear in the system log when it is received), and then load it (Load Baseline button)). Click on the Continue button and the user is now able to edit the clutter bypass map.

3-9.2.3 Save Button. By default the Save button is grayed-out and desensitized. It only becomes active once a change has been made to the Edit window. When the Save button is then clicked, a warning_popup opens that states: “Do you want to save your bypass map edit changes?” Click on either the Yes or No button, to select the desired response. If Yes, the changes are saved, the Save button grayed-out and desensitized, and the user returned to the Clutter Bypass Map Editor window. If No, the changes are not saved but are still on the Edit window, the Save button is still sensitized, and the user returned to the Clutter Bypass Map Editor.

If the user makes edits and then selects a different file from the clutter files list without first saving the edits, a warning_popup opens that states: "You are changing clutter files but did not save edits to the previous file. Do you want to save them?" Click on the Yes button to save the edits or click on the No button to discard the previous edits. In both cases, the Save and Undo buttons become grayed-out and desensitized. The user can also tab the red outline to the desired response and press the Return key or Space Bar.

The clutter suppression regions adaptation data consists of up to 20 files. Since only one file can be edited at a time, edits must be saved when changing files or the edits are discarded. If another file is not selected, then the edits can be preserved unless the user selects the Undo button, in which case they are discarded.

3-9.2.4 Load Baseline Button. The third button from the left is the Load Baseline button. This button is by default grayed-out and desensitized. Once the password has been successfully entered, this button becomes sensitized. Click on the Load Baseline button and the latest RPG copy of the RDA generated clutter bypass map is copied into the local edit buffer for display and edit. It does not replace the physical copy of the edited bypass map. The window turns to a black

background and the bins that are active are in gray.

It is possible but difficult to edit this map because it is backward imaged. To add individual bins, right click in the window. To delete each individual bin, left click on the specific bin.

It is easier to modify and/or delete if the window is zoomed in several times.

3-9.2.5 Undo Button. Once any changes have been made to the edit window, the Undo button becomes sensitized. Clicking on the Undo button will erase all the most recent edits that have not been saved. There is no warning_popup that opens.

3-9.2.6 Request Button. Click the Request button to request the currently implemented bypass map from the RDA. This copies the current bypass map into the baseline file but does not yet make it visible to the operator. A message is written in the system log file when the RPG receives this latest clutter bypass map from the RDA. The operator must then click on the Load Baseline button to bring the newly rewritten baseline file into the edit window for display or modification.

3-9.2.7 Download Button. Once the password has been successfully entered, the Download button becomes sensitized. Click on this Download button when the user wants to download the Bypass map currently in the edit buffer to the RDA. A message will appear in the status log file that states the edited bypass map has been downloaded to the RDA. Once clicked, a warning_popup opens that states: “You are about to download a new clutter bypass map to the RDA. Do you want to continue?” Click on either Yes or No to select the desired response. The map is either downloaded or not, and the user is returned to the Clutter Bypass Map Editor. If downloaded, the new map will be incorporated at the start of the next volume scan.

3-9.3 Remaining Controls.

There are two more lines of controls that the user can utilize in making changes to the Bypass Map. The second row contains the Mode options: Edit or Zoom; and the Grid On/Off toggle control. The third row contains the Segment Number selection block.

3-9.3.1 Mode: Edit. In order to edit the window, the password must be successfully entered and the Edit button activated. If the button to the left of the title Edit is white, then it is activated. If it is brown, click on either the button or the Edit title, and the Edit capability becomes activated.

NOTE

This is a toggle switch between the Edit Mode and the Zoom Mode.

Using the mouse, place the cursor on the space containing bins which are to be activated in the Bypass Map. Click for individual bins, or click, hold down, drag, and then release for areas of bins. In order to erase or undo individual bins, place the cursor on the desired bins and right click. For larger areas to erase, continue to use the right button by the click, hold down, drag, and then release sequence.

It is easier to modify and/or delete bins if the window is zoomed in several times.

3-9.3.2 Mode: Zoom. In order to zoom or move the edit window, click the button to the left of the title Zoom or click on the title itself. Once the button has become white, the zoom feature is activated. It is not password protected and can be activated at any time. (This is basically a toggle switch between the Edit Mode and the Zoom Mode.)

Place the cursor on the point of the edit window that you want to enlarge, and left click once. The window will be magnified to twice its size, centered on the point you selected. To continue to magnify the point, continue to left click. The zoom feature can zoom up to five times itself, one click at a time. The grid is automatically resized to represent the size of the window.

In order to zoom back out, right click with the cursor on the point of the edit window that you want to decrease in size. To get back to the original window size, continue to right click until the desired size is achieved.

To recenter the edit window without zooming in or out, place the cursor over the point that you want to be the new center, and click once with the middle button of the mouse. The edit window will refresh with the new location now as the center of the edit window. In order to restore the window, move the cursor to the center of the overlay and click once with the middle button.

3-9.3.3 Grid On/Off. This is a toggle switch between the two options, On and Off. Click on either the buttons to the left of each option or on the titles themselves. The active option will have the button turned white. When a change is made, the edit window refreshes itself accordingly with or without the grid.

3-9.3.4 Segment Number. This is a toggle switch between the #1 Segment (Low elevation, encompassing 1.5 degrees and below) and the #2 Segment (High elevation, above 1.5 degrees). Move the cursor to the box containing the number 1 or 2 to the right of the title Segment Number: and click. The number changes and the edit window is refreshed with the corresponding bypass map.

3-9.4 Generated: Line.

The information displayed to the right of the title Generated: in the center of the third row of the window is for information only. It displays the date and time that the last Clutter Bypass Map was generated by the RDASOT. This field is not editable by the user.

3-9.5 Edit Window.

The rest of the window contains the Edit window. In the upper left hand corner of the window is an Azimuth/Range display that automatically displays the location of the cursor when it is moved in the window. The default window can be edited out to approximately 275 nm. The top and bottom (north and south) borders of the 360 degree circle are hidden from initial view by the boundaries of the window. If the user wants to edit these portions of the map, use the center button of the mouse to click on a new center point to displace the circle far enough to display the desired area.

SECTION 3-10. ENVIRONMENTAL DATA

3-10.1 Introduction.

Under the Applications column, click on the icon labeled Environmental Data. This opens up the Environmental Data Editor. See Figure 3-22. Environmental Data Editor. This window is used to observe and edit the environmental winds. The environmental winds is a display of wind speeds and directions, at 1,000 ft height increments, from the ground to 70,000 ft. Speeds can be displayed in either kts or m/s. Winds speeds and directions are routinely updated on a volume scan basis by the VAD task when Auto VAD Update is active. Otherwise, the data will not be updated unless entered manually. Display values are used by the radial preprocessor task for velocity dealiasing and are sent to the radial preprocessor task automatically on a volume scan basis.

When the Environmental Data icon has a thick red outline, that signifies that the environmental winds have not been manually updated for the past twelve (12) hours. Once the winds have been updated, the thin red outline signifies that the Environmental Data window has been selected to be opened.

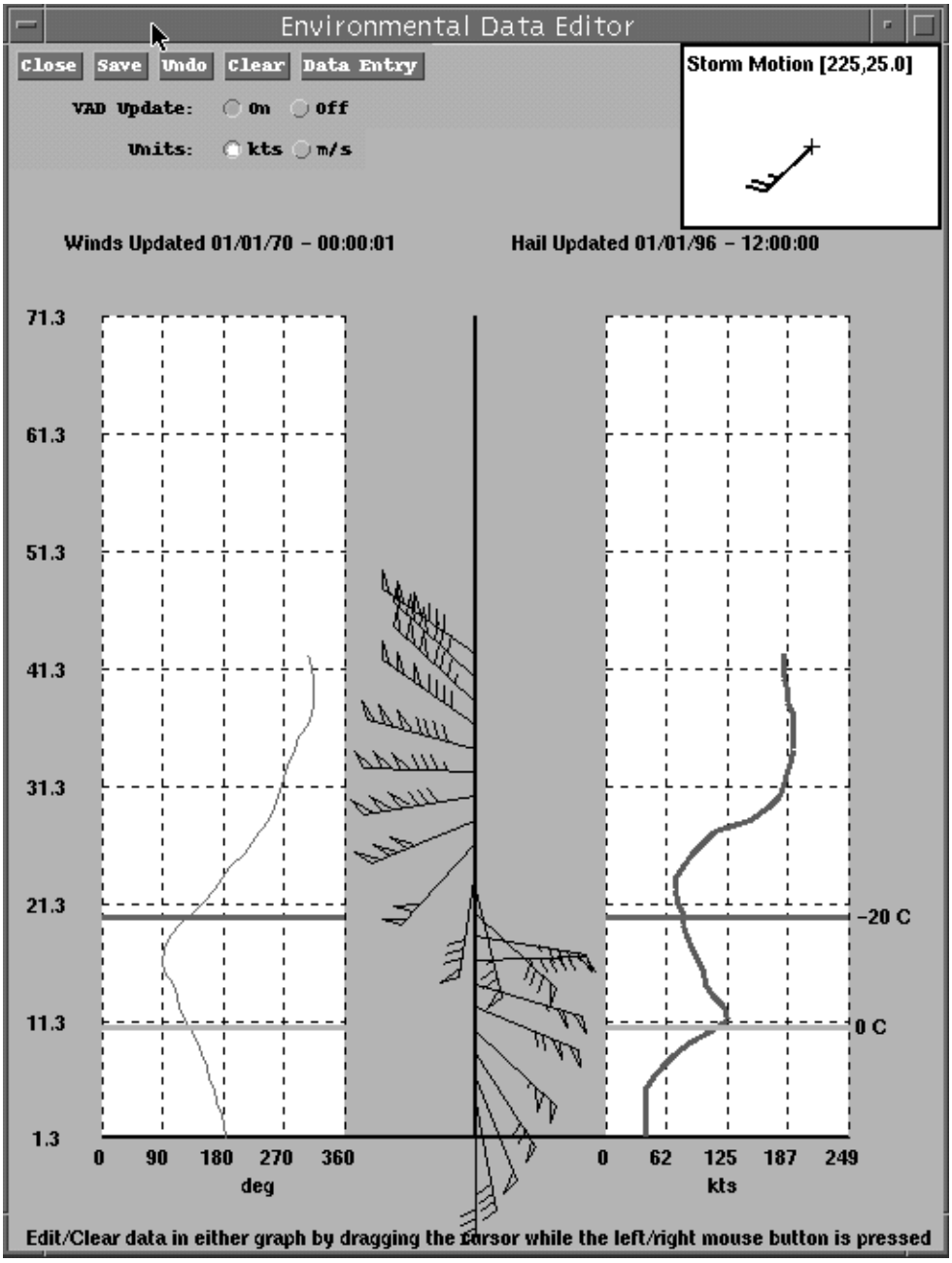


Figure 3-22. Environmental Data Editor

3-10.2 <u>Top Row of Commands</u>.

The top row contains five buttons for the user to utilize when making changes to the Environmental Data Editor window.

3-10.2.1 Close Button. The first button to the far left is the Close button. If no changes have been made, clicking on the Close button will close the window and return the user to the HCI.

NOTE

When changes are made, the VAD Update is automatically kept on.

If changes have been made and the Close button is clicked (without any other buttons being selected), a warning_popup opens that states: "You made changes, but did not save them. Do you want to save your changes?" Click on either Yes or No to select the desired response. The changes are either saved or deleted. If the VAD Update is off, then the user is returned to the HCI. If the VAD Update is on, then a second warning_popup opens that states: "Do you want to disable VAD Update?" Click on either Yes or No to select the desired response. If Yes, the VAD Update is turned off and the user returned to the HCI. If No, the VAD Update remains on and the user returned to the HCI.

3-10.2.2 Save Button. By default the Save button is grayed-out and desensitized. It only becomes active once a change has been made to the Edit window. When the Save button is then clicked, a warning_popup opens that states: "You are about to replace environmental adaptation data. Do you want to continue?" Click on either Yes or No to select the desired response.

3-10.2.2.1 VAD Update Off. If the VAD Update is off and the user clicks on Yes, the changes are saved, the Save button grayed-out and desensitized, and the user stays at the Environmental Data Editor window. If the user clicks on No, the changes are not saved but remain on the edit window, all buttons remain sensitized, and the user remains at the Environmental Data Editor window.

3-10.2.2.2 VAD Update On. If the VAD Update is on and the user clicks on Yes, a second warning_popup opens that states: "VAD Update is enabled. Do you want to disable it?" Click on either Yes or No to select the desired response. If the user clicks on Yes, the VAD Update is turned off, the changes are saved and the user remains at the Environmental Data Editor window. If the user clicks on No, the VAD Update remains on, changes are not saved but still on the edit screen, and the user remains at the Environmental Data Editor window.

3-10.2.3 Undo Button. By default the Undo button is grayed-out and desensitized. It only becomes active once a change has been made to the Edit window. When the Undo button is then clicked, all changes that had just been made (since the last Save) will be deleted and the user remains at the Environmental Data Editor window. There are no warning_popups with this button.

3-10.2.4 Clear Button. Click on the Clear button and all the existing wind data from the edit screen is removed. If changes had just been made, those changes are also removed. There are no warning_popups with this button.

3-10.2.5 Data Entry button. There are two ways to enter data into the environmental database. The first way is to click on the Data Entry button and the Environmental Data Entry window opens. See Figure 3-23. Environmental Data Entry. On this window, the data is entered via the keyboard. (The second way is to click and drag on the edit window. That method is discussed in

paragraph 3-10.5 Click and Drag Entries.)

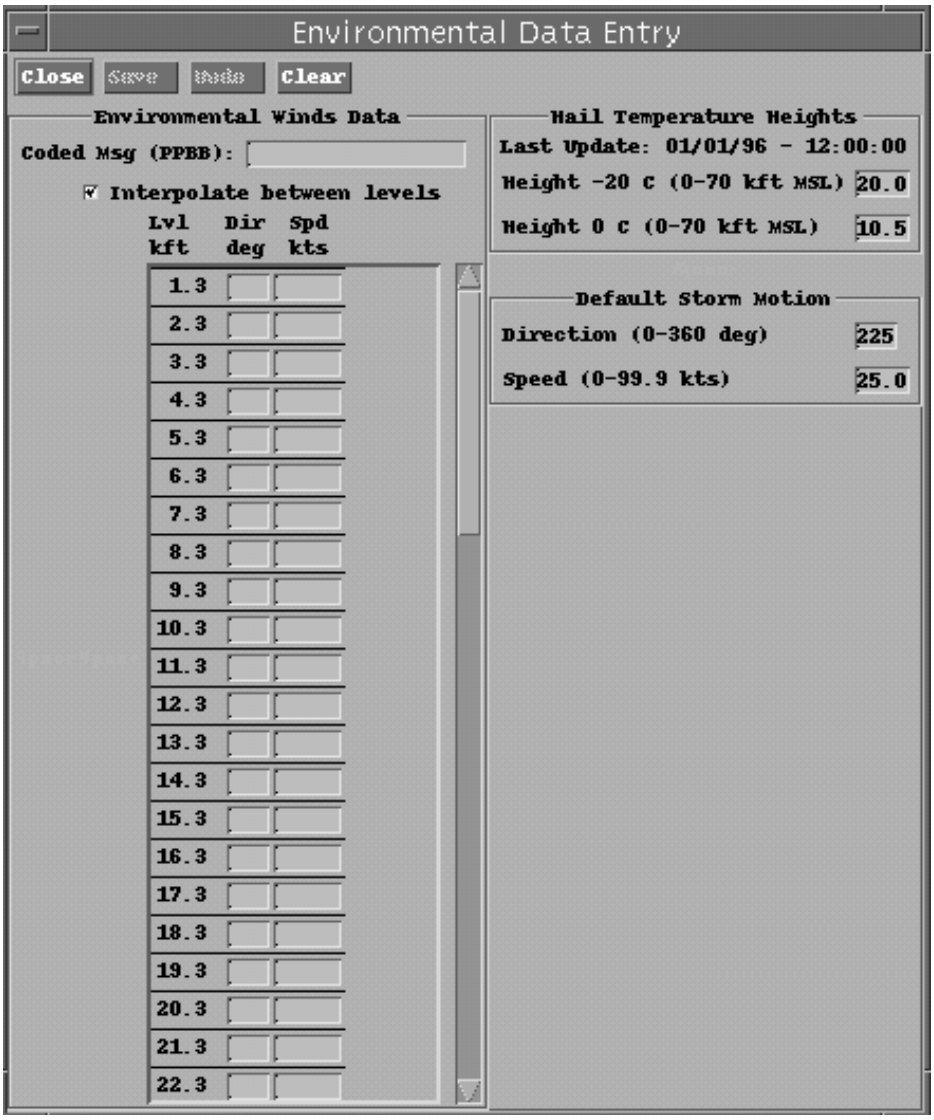


Figure 3-23. Environmental Data Entry

The top row contains four buttons. In the upper left hand corner, clicking on the Close button closes the Environmental Data Entry window and returns the user to the Environmental Data Editor. If changes have been made but not saved, the Save and Undo buttons on the Environmental Data Editor window are now sensitized and provide the user the opportunity to save the changes. If the Close button on the Environmental Data Editor is clicked also without any saving done of the changes, then the user is led through the same process of warning_popups as is described above in paragraph 3-10.2.2 Save Button.

Once changes have been made, the Save button becomes sensitized. Clicking on the Save button brings up a warning_popup opens that states: “You are about to replace environmental adaptation data. Do you want to continue?” Click on either Yes or No to select the desired response. The

data is either saved or remains in the edit field and the user remains at the Environmental Data Entry window.

By default the Undo button is grayed-out and desensitized. It only becomes active once a change has been made to the Edit window. When the Undo button is then clicked, all changes that had just been made (since the last Save) will be deleted and the user remains at the Environmental Data Entry window. There are no warning_popups with this button.

Click on the Clear button and all the existing wind data from the edit screen is removed. If changes had just been made, those changes are also removed. There are no warning_popups with this button.

3-10.2.5.1 Environmental Winds Data. The left hand side of the window is titled Environmental Winds Data. The first line contains the entry block for the Coded Msg (PPBB): Enter in the coded Significant Level winds from a local sounding. Start with the five-digit height indicator code "9XXXX", followed by the three wind speed and direction five-digit codes for the respective heights. Type in the PPBB data exactly as the coded message is viewed. Include all the /// marks and the = (equal) sign at the end of the transmission. Once all the desired levels have been entered and the = (equal) sign added to the end of the data, press the Return key and the data will be displayed on the tabular data below this entry and on the two vertical windows in the Environmental Data Editor window.

The second line is a toggle switch (on/off) to interpolate between levels. Clicking on the square box to make it turn white with a black check mark makes the interpolate function active for all data entered. Clicking on the box to make it return to the brown background color with no check mark in it verifies that the interpolation window is turned off. When the interpolation is turned on, it interpolates all the blank fields from the first data point entered to the last data point entered. Both wind speed and wind direction have to be inserted in order for the interpolation to take place.

The remainder of the block has three columns. The left hand column is the altitude in thousands of feet, from the surface to 70,000 feet AGL. The user can select any altitude and insert the direction in degrees of the wind and the temperature. Click on the boxes to the right of the desired altitude, delete the current numbers (if desired), and enter in the new desired value. For wind direction, the range is 0 to 360 degrees. If a number greater than 360 degrees is entered and the Return key pressed or another block clicked on, a warning_popup opens that states: "You entered an invalid direction of XXX. The valid range is 0 to 360." Click on the Continue button and the user is returned to the Environmental Winds Data window. For wind speed, the range is 0 to 249 kts (0 to 128 m/s). If a number greater than 249 kts (128 m/s) is entered and the Return key pressed or another block clicked on, a warning_popup opens that states: "You entered an invalid value of XXX. The valid range is 0 to 249 kts (0 to 128 m/s)." Click on the Continue button and the user is returned to the Environmental Winds Data window. Use the sliding gray bar to the right hand side of the winds data table to select the entire range of altitudes.

3-10.2.5.2 Hail Temperature Heights. The upper right hand block is labeled Hail Temperature Heights and provides the user the opportunity to edit the heights of the 0 degree and -20 degree temperature level. The first line of information labeled Last Update: reflects the last date/time

that either of the temperature levels were modified. This field is not editable by the user but is for information only.

Click on the box to the right of the title Height -20 C (0-70 Kft MSL) and enter in the desired values. Follow the exact same procedure for the Height 0 C (0-70 Kft MSL) level. The allowable altitude range for both temperatures is 0 to 70 Kft. If an incorrect altitude value XX is entered, a warning popup opens that states: "XX is out of range, must be in the range 0.000 <= X <= 70.000." Click on the Continue button and the user is returned to the Environmental Data Entry window.

Once allowable Heights are made for either value, the new values are automatically transposed to the graphical display in the Environmental Data Editor window. The user can return to the Environmental Data Editor window and observe the newly entered values as colored horizontal lines in the Direction and Speed vertical displays. The -20 deg C height is a dark blue horizontal line; the 0 deg C height is an aqua horizontal line.

3-10.2.5.3 Default Storm Motion. The second block (from the top) on the right hand side is the Default Storm Motion entry blocks. There are two values the user can enter: Direction and Speed.

Click on the box to the right of the label Direction (0 - 360 degrees) and, using the keyboard, enter in the desired Default Storm Motion direction. The allowable range is 0 to 360 degrees. Press the Return key or click onto another block. If an incorrect value is entered, a warning_popup opens that states: "XXX is out of range, must be in the range 0 <= X <=360." Click on the Continue button and the user is returned to the Default Storm Motion portion of the window.

To modify the Default Storm Motion Speed, click on the box to the right of the label Speed (0 - 99.9 kts) and, using the keyboard, enter in the desired speed. The allowable range is 0 to 99.9 kts. If an incorrect value is entered, a warning_popup opens that states: "XXX is out of range, must be in the range 0.000 <= X <= 99.900." Click on the Continue button and the user is returned to the Default Storm Motion portion of the window. If a blank space is entered between numbers, a different warning_popup opens that states: "X X is not a valid integer for type Default (Direction)" or "X X is not a valid integer for type Default (Speed)." Click on the Continue button and the user is returned to the Default Storm Motion potion of the window.

Once either value or both values have been correctly entered, the entries are automatically transposed to the graphical display in the Environmental Data Editor window. The user can return to the Environmental Data Editor window and observe the newly entered values in the upper right hand corner of the window graphical display labeled Storm Motion (AAA,BBB) where AAA is the direction and BBB is the speed. The new default values will then be used at the start of the next volume scan by the Storm Track algorithm. That is assuming that there is no storm motion value already calculated based on existing storms.

3-10.3 VAD Update Commands and Units Selection Commands.

The second row of commands in the Environmental Data Editor window contains the selection of the VAD Update On or Off. The third row of commands contains the selection of wind speeds in

either kts or m/s.

3-10.3.1 VAD Update. The commands for VAD Update consist of an On and Off selection with a sensitized button just to the left of each choice. When the VAD Update is On, the button to the left of On is green. When the VAD Update is Off, the button to the left of Off is red. Click on either the button or the title, and the VAD Update is changed. These two options toggle between each other.

3-10.3.2 Wind Speed Units. The commands for selecting the Wind Speed units consist of the two titles: kts and m/s with a sensitized button just to the left of each choice. The units that is currently displayed in the windows has a white button to the left of the title. To change to the other unit, click on either the button or the title, and the units are changed. These two buttons toggle between each other. When the user clicks on the sensitized button/title, the corresponding units are changed in the Environmental Data Editor window and in the Environmental Data Entry window. The Storm Motion units does not change, however, but stays in kts. There are no warning_popups that appear with either of these selections.

3-10.4 Text Line of Last Updates.

The fourth line in the Environmental Data Editor window contains the text information of the last time (in date and time) the Winds were updated and the last time (in date and time) the hail was updated. This field is not editable by the user, but is automatically updated by the RDA.

3-10.5 Click and Drag Entries.

The second way to enter data into the environmental database is to click and drag on the edit window itself. Both the wind direction and wind speed vertical windows function the same. Move the cursor to the desired location and press down on the left button. A pencil figure will replace the cursor, and the user can now edit the values. Using the mouse, adjust the direction (or speed) to the desired values. The vertical lines are modified as the mouse is moved. If both wind speed and direction values are available at the same level, a graphical wind barb opens along the black vertical bar between the two windows.

These entries can also be confirmed by clicking on the Data Entry button and viewing the Environmental Winds Data table.

Directly above each vertical window is a white block that opens when the cursor is placed somewhere in each vertical window. For the wind direction, the white block displays the location of the cursor by showing a constant readout of height and direction. Heights are in thousands of feet and direction is in degrees. For the wind speed, the white block displays the location of the cursor by showing a constant readout of height and speed. Heights are in thousands of feet and speed is in kts or m/s, depending on the selected unit in the third row of command buttons.

The click and drag technique can also be used on the Default Storm Motion Window in the upper right hand corner of the Environmental Data Editor. Click and drag to the direction desired either clockwise or counterclockwise. The wind speed increases as the user drags away from the center

point. The numerical values change at the same time in both the Default Storm Motion window and in the Default Storm Motion editable fields in the accompanying Environmental Data Entry window.

NOTE

Be very careful when clicking and dragging in the Storm Motion corner window. The operator may intend to change just the direction, but can easily modify the wind speed also depending where along the wind barb the cursor is clicked. The wind speed click and drag is very sensitive along the entire length of the barb. Recommend both values be checked (after clicking and dragging) in either the top row text line of the Storm Motion corner window or in the Default Storm Motion section of the Environmental Data Entry window.

The 0 degree and -20 degree Hail Temperature Heights are easily modified by the Click and Drag function. Position the cursor on the black title of each respective height line along the right hand side of the wind speed column. Press and hold down the left button, and drag the height line either up or down until the desired height is reached. Once at the desired height, release the left hand button. Repeat if desired for the other height line. The Hail Temperature Heights are now temporarily set at the new values. The corresponding new heights will also appear in the Environmental Data Entry window, upper right hand section, in the blue blocks in the Hail Temperature Heights section. The operator must now save those changes by clicking on the Save button of either the Environmental Data Entry window or the Environmental Data Editor window. (Both Save buttons become sensitized once either one of the hail temperature heights lines have been repositioned.) Once the Save has been completed, the new date and time will be shown on the Last Update: text string of the Environmental Data Entry window and the Hail Updated: text string on the Environmental Data Editor.

3-10.6 Red Outline, Environmental Data Icon, HCI.

When the Environmental Data Icon in the lower right hand corner of the HCI is outlined with a red box, that indicates that the environmental data has not been updated within the past twelve hours. To update the data, either select the VAD Update to On or manually enter and save environmental data.

SECTION 3-11. PRECIPITATION DETECTION FUNCTION

3-11.1 Introduction.

There are several usages of the Precipitation Detection Function that determine the effectiveness of the radar's accumulation algorithms. The first area of concern is understanding the effects of the settings of the Nominal Clutter Area (NCA) on underestimating Precipitation Accumulation. The second area covers Nominal Clutter Area adjustments, and the impact of the Clutter Suppression on the Nominal Clutter Area. These are addressed separately in the following paragraphs.

3-11.2 Precipitation Detection Function and Nominal Clutter Area.

A common reason for the failure of the accumulation algorithms to be activated by the Precipitation Detection Function (PDF) is because the Nominal Clutter Area (NCA) is set too high. To clear up any misconception about precipitation accumulation and volume coverage pattern selection, here is a brief review of the Precipitation Detection Function.

3-11.2.1 Precipitation Detection Function (PDF). The PDF is designed to automatically determine if precipitation is occurring within 124 nm of the radar. After computing the areal coverage of reflectivities above a certain intensity (the Rate Threshold), the PDF compares this coverage to the Area Threshold which is the sum of the Precipitation Area Threshold and the Nominal Clutter Area Threshold. The PDF does not discern between a ground return and a real precipitation target. The NCA is intended to account for the areal coverage of residual clutter. See Figure 3-24. Precipitation Status.

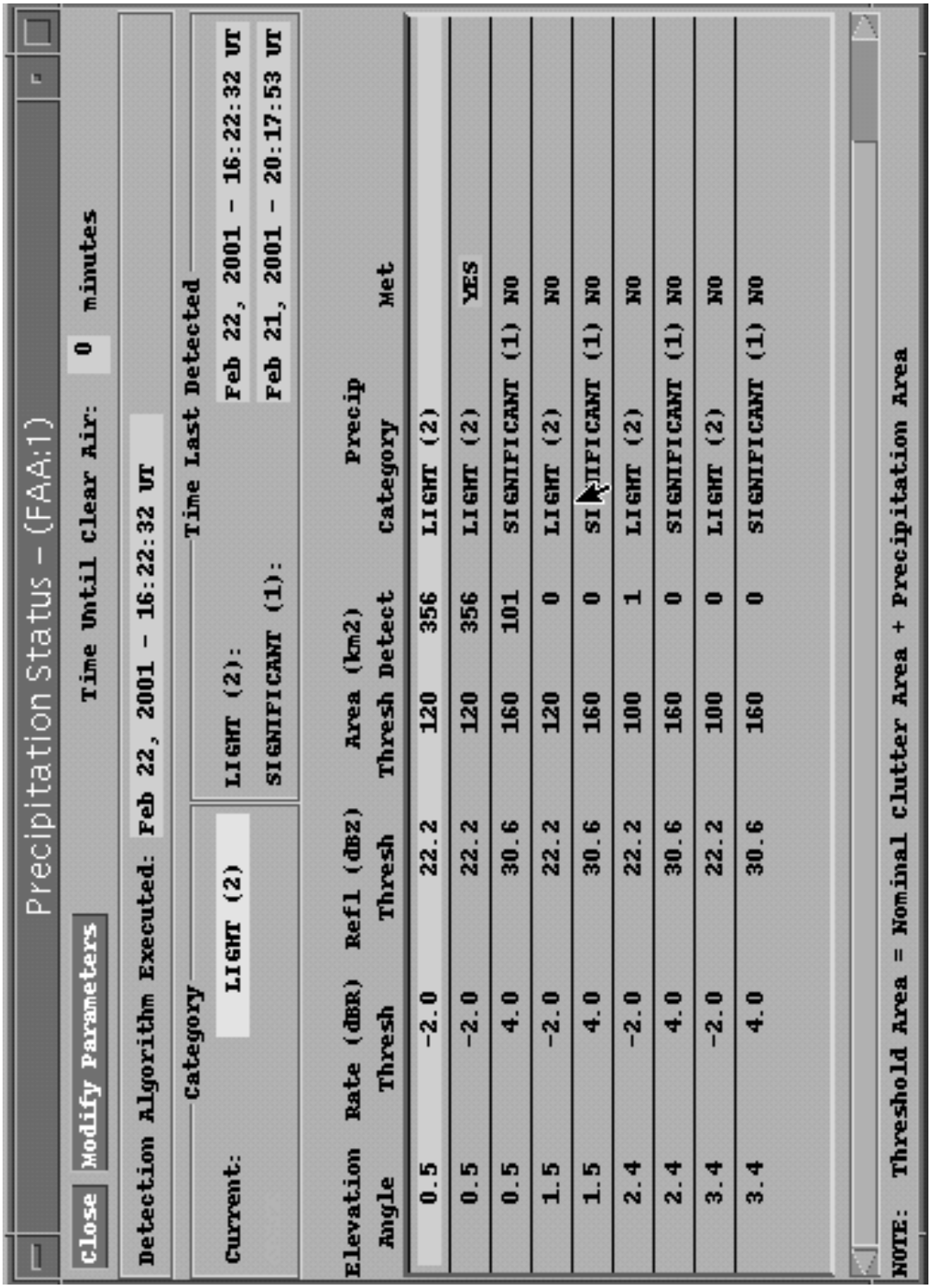


Figure 3-24. Precipitation Status

3-11.2.2 Three Precipitation Categories. One of the following three Precipitation Categories is assigned each volume scan depending on which combination of thresholds are met or exceeded:

- Category 0 - No precipitation detected. The total area of reflectivities ≥ 22 dBZ (≥ 30 dBZ) ***did not*** meet or exceed the Area Threshold for Category 2.

- Category 1 - Significant precipitation detected. The total area of reflectivities ≥ 30 dBZ ***did*** meet or exceed the Area Threshold for Category 1.

- Category 2 - Light precipitation detected. The total area of reflectivities ≥ 22 dBZ ***did*** meet or exceed the Area Threshold for Category 2.

When the assigned Category is 1 or 2, the Precipitation Accumulation Algorithms compute rainfall accumulations. When the assigned Category is 0, rainfall products with zero accumulations are generated, regardless of the active VCP.

By setting the NCA to represent the residual clutter, Categories 1 and 2 will be assigned by the PDF when real precipitation is occurring anywhere within 124 nm of the radar. In order to correctly set the NCA, the detected area of reflectivity returns can be checked on the Precipitation Status window. (Click on Precipitation Detection and the Precipitation Status window opens.) For example, on a precipitation-free day with no Anomalous Propagation (AP), the detected area is a good first guess for a typical NCA setting for your site. This window provides the results from the PDF for each volume scan, including the currently assigned precipitation category and the time left until the operator may select a Clear Air Mode volume coverage pattern.

3-11.2.3 Volume Coverage Pattern (VCP). When Category 1 has not been detected during the past hour, any VCP can be selected. When the assigned Category is 1, the radar can only be operated in Precipitation Mode (VCP 11 or 21). In either case, whether the precipitation accumulation algorithms will run or not is based on the Precipitation Category, not the VCP.

3-11.2.4 Suggested Strategy. Here is a suggested strategy that ensures the precipitation algorithms are active when precipitation is present and still allows the user the flexibility to control the operational mode.

The NCA should not generally be used to prevent the radar from switching into Precipitation Mode A due to the presence of AP. AP should be filtered by the application of clutter suppression. If appropriate clutter suppression cannot properly remove all of the AP and the decision is made to increase the NCA to prevent the radar from switching into Precipitation Mode A, then the user should only increase the value of NCA for Category 1 (line 2 in the example window). Category 1 is the only category that requires a Precipitation Mode VCP. Thus once the residual AP has dissipated, the NCA for Category 1 must be promptly returned to the proper smaller residual clutter value to permit the radar to switch to Precipitation Mode when significant rainfall begins.

Never increase the values of NCA beyond the residual clutter value for Category 2. In the event of AP with NCA for Category 2 set to proper low values, the precipitation algorithms will execute as expected and automatically remove the negative effects of anomalous propagation on the pre-

cipitation estimates through quality control logic internal to the algorithms.

At times, precipitation accumulations may be desired while the radar is operating in a Clear Air Mode VCP. This is appropriate for very light rain or snow events. In this case, it is permissible under URC guidelines to raise the NCA threshold value for Category 1 precipitation, but leave it set relatively low for Category 2 precipitation. If this is done, the Precipitation Rate and Area Thresholds will be exceeded for Category 2, but will not be exceeded for Category 1. Any VCP can be invoked, and precipitation products will accumulate rainfall estimates.

The user has direct control over the NCA settings which frequently contribute to underestimation, and therefore can fix it. The key aspect is the assigned precipitation category. When the assigned category is either 1 or 2 the precipitation accumulation algorithms are activated. Regardless of the active VCP, the accumulation algorithms do not execute until the PDF assigns precipitation Category 1 or 2. Indiscriminately high NCA values prevent the precipitation accumulation algorithms from executing when in fact it is raining, resulting in an unrecoverable loss of rainfall accumulation.

3-11.3 Nominal Clutter Area Adjustments.

Each site needs to the use of Clutter Suppression Regions vs Nominal Clutter Area adjustments. Some sites increase the NCA area to extremely high values (sometimes termed as “forced clear air” mode) to account for clutter and AP. However, there is an impact on the base data estimates and these actions could affect other users. With the software now fielded, there are very few legitimate reasons for making adjustments to the NCA. Below is a discussion about Clutter Suppression and Nominal Clutter Area, and then a discussion about impacts of these items at sites.

3-11.3.1 Clutter Suppression. Clutter suppression is used to remove the power returned by clutter targets from a range bin prior to the calculation of the base data.

Ground clutter contamination has a significant effect on the accuracy of the base data. The clutter induced bias in the base data not only brings into question the reliability of the data presented on the base products but also has a detrimental effect on all downstream algorithms.

Clutter suppression filters are designed to reduce signal power whose mean radial velocity is at or near zero. To do this, clutter suppression filters reduce signal power within a “notch width” centered about the zero mean radial velocity value. This reduction in signal power effectively decreases the clutter's power contribution in the given range bin. To maintain meteorological return integrity, only the signal power whose radial motion falls within the notch width is reduced. Therefore, with appropriate clutter suppression invoked, the bias in the base data (R, V and SW) estimates due to clutter contamination within the range bin can be minimized.

3-11.3.2 Nominal Clutter Area. The Nominal Clutter Area (NCA) (in km^2) value is used by the Precipitation Detection Function to account for the total areal coverage of residual ground clutter within 124 nm of the RDA. (Residual ground clutter is the non-meteorological signal that remains after clutter filtering.) The NCA plus the Precipitation Area determine the areal threshold that must be exceeded for Category 1 (significant precipitation) or Category 2 (light precipita-

tion). NCA is the only adaptable parameter on the Precipitation Detection Screen that may be changed under URC level of authority. All others are under ROC level of change authority.

The NCA value only affects the minimum areal threshold for beginning and ending precipitation accumulation. Thus the NCA will affect the accumulation estimate, but has no impact on the quality of other radar data.

3-11.3.3 Anomalous Propagation Impact. The correct way to prevent non-meteorological returns from triggering a switch from Clear Air to Precipitation Mode is to apply clutter suppression regions. Increasing the nominal clutter area to force the system to stay in clear air mode with the development of AP will still allow the clutter to contaminate the base data and all downstream products and algorithm output. In some cases, aircraft operations have been negatively impacted by the appearance of AP on Reflectivity-based products.

Any intermittent non-meteorological returns must be removed via clutter suppression regions!

3-11.3.4 Light Precipitation Impact. Rainfall can accumulate in Clear Air Mode (category 2) with the proper settings. This is intended only for light precipitation, which is defined by the default parameters of the Precipitation Detection Function. The default parameters for light precipitation are reflectivities equaling or exceeding 22 dBZ (but less than 26 dBZ) over an area of at least 100 km^2. (This minimum area can be set to as much as 80,000 km^2, which covers about 44% of the 124 nm coverage area). In qualitative terms, Clear Air Mode rainfall accumulations are appropriate only for light rain or snow events. There have been cases of convection occurring while the radar was in Clear Air Mode, so the user must be cautious in this situation.

The user could (under URC guidelines) increase the NCA for category 1 only, allowing the system to remain in Clear Air Mode with category 2, thus accumulating rainfall. This may be appropriate in some marginal events, but the decision should be coordinated with the River Forecast Center. Forecasters need to understand that rainfall estimates built from 10 minute sampling intervals will have higher errors than estimates from 5 to 6 minute sampling.

For most events, if reflectivities meet or exceed 26 dBZ over 90 km^2 or more, then the default criteria for significant precipitation has been detected, and the system should be allowed to switch to precipitation mode.

Appendix A

Operating Function Overview

A-1 OPERATIONAL MODES.

The principal users (DOC, DOD, and DOT) have a common requirement for weather radar data on a continuous basis. Therefore, for any radar providing weather radar data to more than one principal user, one of the basic operational requirements is that the RDAs/RPGs be operated continuously, 24 hours a day, in predefined scanning modes and provide a set of data and products which have been approved by the user agencies. The principal users define the modes of operation of the WSR-88D System. These operational modes are a function of the weather conditions, season, and location of the radar. During operations, the antenna is controlled by automatic scanning programs. Different volume coverage patterns, which are matched to the operational mode, are available to optimize the product generation for the particular type of weather situation. The use of different volume coverage patterns and meteorological algorithm groupings is governed by strict interagency protocol whenever two or more agencies are using the weather information generated by the site (in the case of DOD, interagency agreements are established for each site). For any operational mode, radar scanning is continuous, in time, to support the various needs of the users. Any exception to continuous scanning requires the concurrence of all principal users. Operational procedures are established and agreed to by the principal users for automatic control of the changeover to the precipitation scanning mode at various sites. At all times, principal users' units are informed of the radar scanning program in use through the use of system status and product header data. There are two currently defined operational modes of operation which are used to acquire the meteorological data necessary to detect the weather and translate the results into products. These products are displayed at the PUP functional area to allow the user to make quick and accurate judgments on the impact of the detected weather on any operation being monitored. The operational modes are the Clear Air Mode and the Precipitation Mode. The Clear Air Mode can be selected manually only. The Precipitation Mode can be selected manually at any time and is also selected automatically whenever the system detects precipitation (based on pre-determined values and area coverage of reflectivity dBz).

A-1.1 Clear Air Mode.

The Clear Air mode is oriented toward the gathering of data which will facilitate the detection of precursors to the development of precipitation activity. There are certain variabilities in low level velocity and air density that may be detected to give clues to precipitation activity development. The radar is operated at a relatively slow scan rate which allows the sampling of five contiguous elevation angles (0.55 to 4.55) in a period of ten minutes. This slow rotation rate coupled with a low Pulse Repetition Frequency (PRF) offers high sensitivity (range of dBz starting from approximately minus 30 dBz up to plus 20 dBz or greater) and maximum detection capability. Weather phenomena normally monitored in this mode are associated with possible precipitation development (noted in clear air velocity measurements and atmospheric moisture or density gradients at low levels, which may be observed as reflectivity gradients). The number of algorithms that are exercised in this mode is significantly less than those in the precipitation mode. The Clear Air mode is the least demanding in terms of RPG utilization and PUP product receipt and display activity. The Clear Air mode provides high sensitivity to subtle changes in atmospheric conditions at long range. This mode is used when there is little or no convective activity in the range of the radar and is employed to detect possible precursors to heavy weather and precipitation. To achieve this, the WSR-88D uses a volume coverage pattern that employs a slow scan rate of .84 RPM. This permits the antenna to dwell for a longer time in any given volume of space and accumulate more returns, allowing operation at a lower S/N ratio. In this mode, a

wide pulse width of approximately 4.7µ sec and a low PRF (from 320.51 Hz to 451.81 Hz) may also be used. It provides about 8 dB greater echo power for a given dBz of reflectivity. The long pulse width forces lower PRF, which results in longer unambiguous range and a low Nyquist velocity. The Clear Air Mode employs a low-elevation volume coverage pattern, ranging from 0.55 to 4.55. When the WSR-88D detects precipitation it automatically switches out of Clear Air into the Precipitation Mode. There is also a short-pulse Clear Air Mode which is used in regions of high spectral width. The short-pulse mode has advantages at high Nyquist velocities (over 25 ms-1). Its disadvantage is less sensitivity.

A-1.2 Precipitation Mode.

The Precipitation mode has a scan rate, which is a function of elevation angle, to accommodate the greatest number of elevation angles possible in sampling the total radar volume. Volume coverage patterns (VCPs) are currently defined to implement two scan strategies. They provide for sampling of 14 elevation angles in five minutes or 9 elevation angles in six minutes. Weather phenomena normally monitored in this mode are associated with the development of precipitation involving convective storms (rain showers, hail, severe thunderstorms, tornadoes, etc.) and large scale synoptic systems. A significant number of meteorological algorithms make use of the base data of reflectivity, velocity, and spectrum width to generate derived products (display of meteorological phenomena in direct terms) for use by the PUP operator. For the precipitation mode, nearly all the algorithms are exercised and a maximum load is imposed system wide on data processing and product distribution. Currently, these algorithms are applied equally in all areas of the United States (U.S.), but eventually they may be tailored to geographic areas and seasons of the year. The precipitation mode is the most demanding in terms of communications, RPG utilization for product generation, and PUP product receipt and display. In the Precipitation mode, the scan rate is increased to allow a greater number of elevation angle scans within the volume scan update time. The scanning strategy enables contiguous scanning from the base antenna tilt setting up to a 4.55 tilt angle and for "optimum" spacing of the higher angles in the volume scan. When operating at higher scan rates, the resulting higher data rates impact on product generation and throughput/response times as the capacity of the RPG is approached. The Precipitation mode provides a faster scan rate to monitor a larger volume of space in a shorter time. This permits the tracking of rapidly moving meteorological phenomena found in convective weather patterns. This mode is characterized by the use of a narrow pulse width (1.57µ sec) at both high and low PRFs, and the use of unique scan rates (from 1.89 to 4.45 rpm) at specific elevations.

A-1.3 Mode Characteristics.

Each operational mode is defined by unique sets of characteristics, consisting of a volume coverage pattern, which implements a scan strategy and specifies a specific set of waveform/PRI patterns, and predefined product generation and product request lists.

A-1.3.1 Volume Coverage Patterns (VCP).

In order to implement the operational modes, the WSR-88D employs a set of pre-defined VCPs to collect radar data. Each VCP is composed of specific antenna scan patterns, and specific transmitted waveforms with corresponding PRI patterns.

A-1.3.1.1 Scan Pattern.

The scan pattern is made up of a set of "elevation cuts," each one being a single full rotation of the antenna (in azimuth) at a discrete elevation angle. Depending on the VCP being used, elevation cut angles may be repeated using different waveforms. Each of the two rotations at the fixed elevation are called a "split cut." Corresponding to each cut is a specified scan rate. The scan rate, the speed at which the antenna turns, is constant for the entire cut. Elevation cuts are divided into approximately one degree radials. Radar data is accumulated for processing on a

radial-to-radial basis. The exact width of the radials depends on the antenna scan rate, the PRF, and the exact number of pulses of transmitted waveforms specified for the radial; however, the design center is for 365 radials per each 360.5 degree cut. Elevation angles of cuts are based on an antenna beamwidth of 0.955. VCPs 11 and 21 are used for Precipitation mode and 31 is normally used for clear air, although an optional Clear Air mode using short pulse is also provided: refer to (VCP 32).

A-1.3.2 PRI Patterns.

The Pulse Repetition Interval (PRI) pattern is composed of the transmitted waveforms that correspond to the elevation cuts of the scan pattern in a particular VCP. The transmitted waveforms are composed of discrete numbers of RF pulses, where PRF is defined within each radial of a cut. The pulses within each radial may or may not be evenly spaced, but the waveform pattern will repeat from radial to radial within each cut. The pulse width is constant over the entire volume scan. Waveforms are characterized into three different categories or groups; Contiguous Surveillance (CS), Contiguous Doppler (CD), and Batch (B).

A-1.3.2.1 Contiguous Surveillance.

Contiguous Surveillance waveforms use a long pulse repetition interval and are range-unambiguous over the full coverage range of the radar (at least 460 km). They are used at low elevation angles where maximum clutter suppression is needed. The long pulse interval provides good reflectivity data and echo power data that is used to resolve the range ambiguities of Doppler waveform data.

A-1-3.2.2 Contiguous Doppler.

Doppler waveforms use a shorter pulse repetition interval and have fewer velocity ambiguities than the surveillance waveforms. The short pulse interval is used at low elevation angles to generate mean radial velocity and spectrum width base data. The shorter pulse interval is also used at high elevation angles where it is range-unambiguous to the maximum coverage altitude (data is only processed to 70,000 feet) to generate reflectivity, velocity, and spectrum width base data. Doppler waveforms also allow maximum clutter suppression.

A-1-3.2.3 Batch Waveforms.

Batch waveforms, used at mid-elevations, combine alternating groups of surveillance (long PRI) and Doppler (short PRI) pulses to produce radial velocity, spectrum width, and reflectivity. The long PRI pulses provide unambiguous range echo power data which is used to resolve the shorter PRI pulses, which are better suited to provide velocity data. The batch waveform can cover a volume in about 15 percent less time than required by a combination of contiguous surveillance and contiguous Doppler cuts but allow poor clutter suppression. The waveforms are constructed by selecting one, or a combination of, PRIs from a set of 8 discrete values available to each WSR-88D site. The eight basic pulse repetition intervals have five variant "delta" PRIs each. The deltas are provided to allow use of techniques to minimize pulse interference between radars. A particular delta PRI set to be used is assigned to each specific site through the adaptation data. The PRIs within each set are indexed from 1 to 8 and labeled PRI 1, 2, 3, etc. PRI 1 is range unambiguous over 460 km and is used primarily for surveillance. PRI 2 is range-unambiguous to 330 km. It is used for surveillance at slightly greater elevation angles and for Doppler waveforms with long pulse widths. PRIs 3 and 4 are used for surveillance, particularly with batch waveform types at intermediate elevation angles, and PRIs 5 and up are used for Doppler waveforms at all elevation angles. The particular Doppler PRI used is selectable to minimize loss of data through the overlaying of range-ambiguous signals. Table A-1 through Table A-5 give the pulse repetition period data for each delta PRI set.

A-1.3.3 Scan Strategies.

Multiple scan strategies are available for use in performing the WSR-88D mission. These scan strategies are embodied in various volume coverage patterns which are designed to optimize performance for agency usage under specific meteorological conditions. They consist of various combinations of waveform types, scan rates, volume coverage periods, and number of elevation cuts. Other scan strategies and volume coverage patterns may be added later. Typically, surveillance and Doppler waveforms are combined at low elevation angles where maximum ground clutter suppression is required. Batch waveform types are used at the intermediate elevations where ground clutter is less severe to avoid the need for multiple antenna revolutions at each elevation angle, and Doppler waveform types are used at the higher elevation angles where the Doppler PRIs are range unambiguous.

Table A - 1: Pulse Repetition Period Data Delta A

PRI #	PRI clocks	Period µ sec.	PRF	Ra KM
1	29440	3066.7	326.09	460
2	21248	2213.3	451.81	332
3	14720	1533.3	652.17	230
4	11072	1153.3	867.05	173
5	9344	973.3	1027.40	146
6	8640	900.0	1111.11	135
7	8000	833.3	1200.00	125
8	7360	766.7	1304.35	115
Constants T	2880	300.0	3333.33	45

Table A - 2: Pulse Repetition Period Data Delta B

PRI #	PRI clocks	Period µ sec.	PRF	Ra KM
1	29632	3086.7	323.97	463
2	21376	2226.7	449.10	334
3	14848	1546.7	646.55	232
4	11136	1160.0	862.07	174
5	9408	980.0	1020.41	147
6	8704	906.7	1102.94	136
7	8064	840.0	1190.48	126
8	7424	773.3	1293.10	116

Table A - 3: Pulse Repetition Period Data Delta C

PRI #	PRI clocks	Period µ sec.	PRF	Ra KM
1	29824	3106.7	321.89	466
2	21504	2240.0	446.43	336
3	14912	1553.3	643.78	233
4	11200	1166.7	857.14	175
5	9472	986.7	1013.51	148
6	8768	913.3	1094.89	137
7	8128	846.7	1181.10	127
8	7488	780.0	1282.05	117

Table A - 4: Pulse Repetition Period Data Delta D

PRI #	PRI clocks	Period µ sec.	PRF	Ra KM
1	29952	3120.0	320.51	468
2	21632	2253.3	443.79	338
3	14976	1560.0	641.03	234
4	11264	1173.3	852.27	176
5	9536	993.3	1006.71	149
6	8832	920.0	1086.96	138
7	8192	853.3	1171.88	1268
8	7552	786.7	1271.19	118

Table A - 5: Pulse Repetition Period Data Delta E

PRI #	PRI clocks	Period µ sec.	PRF	Ra KM
1	30144	3140.0	318.47	471
2	21760	2266.7	441.18	340
3	15104	1573.3	635.59	236
4	11328	1180.0	847.46	177
5	9600	1000.0	1000.00	150
6	8896	926.7	1079.14	139
7	8256	860.0	1162.79	129
8	7616	793.3	1260.50	119

A-1.3.3.1 Scan Strategy 1.
Scan Strategy 1 provides for a volume scan time of five minutes. It consists of 14 unique elevation scan levels from 0.5 to +20.5 degrees in elevation with the lowest 6.5 degrees of elevation having no gaps between the one-way pattern 3 dB points of adjacent elevation scans. This provides the greatest amount of meteorological base data and is designed for use in severe convection activity conditions. Scan Strategy 1 is implemented in volume coverage pattern 11.

A-1-3.3.2 Scan Strategy 2.
Scan Strategy 2 provides for a volume scan time of six minutes. It consists of nine unique elevation scan levels from 0.5 to +20.5 degrees of elevation with the lowest four degrees of elevation having no gaps between the one-way 3 dB points of adjacent elevation scans. As compared to Scan Strategy 1, it sacrifices volume coverage, but the longer dwells afforded by the lower scan rates provide better clutter cancellations, more accurate base data estimates, and slightly better sensitivity. Scan Strategy 2 is implemented in volume coverage pattern 21.

A-1-3.3.3 Scan Strategy 3.
Scan Strategy 3 provides essentially contiguous volume coverage to 5 degrees elevation in 5 elevation cuts in a volume scan time of 10 minutes. The primary use is in non-precipitation conditions. It is currently implemented in VCP 31 and 32. VCP 31 uses long pulse width (4.5 µsec) transmitted pulses which restricts the maximum PRI number to 2. It uses only the contiguous surveillance waveform and Doppler waveform types, and consequently has the best clutter suppression and the best sensitivity of the available volume coverage patterns. VCP 32 uses short pulses (1.5 µsec in width).

A-2 RADAR DATA PROCESSING MODES.

A-2.1 Base Data.
Base data is acquired using either the surveillance (reflectivity) channel, or the Doppler (velocity) channel of the radar. Each radar channel is associated with unique transmitted energy waveforms and receiver signal processing methods to achieve the desired data detection capabilities. Each type of processing is associated with certain limitations relating to range and velocity ambiguity to determine the useful operational range and elevation scan of the selected process-

ing mode.

A-2.2 Surveillance Channel Waveforms.
The surveillance (reflectivity) channel waveforms use a long PRI and produce data which is range-unambiguous to 460 km. Doppler channel waveforms use a shorter PRI, and the Doppler channel unambiguous range is limited.

A-2.3 Surveillance PRI Waveforms.
Surveillance PRI waveforms are used at lower elevation cuts (scans), where maximum clutter suppression and unambiguous range are provided. Doppler PRI waveforms are used at high elevation angles, where second-time-around echoes are not a factor, i.e., Doppler PRIs are range-unambiguous. Surveillance and Doppler PRI waveforms are also alternated in a "split cut" at low elevation angles. Batch waveform processing, which consists of interleaved surveillance and Doppler PRIs, are used in intermediate elevation scans to provide resolution (dealiasing) of both range and velocity ambiguities.

A-2.4 Range Unfolding.
Range unfolding is accomplished by using data gathered from a Surveillance cut to determine whether data received at that azimuth on a Doppler cut is overlaid by signals from a different range interval, and if not, determines the correct range interval for the range sample. Velocity dealiasing is accomplished using an algorithm in the RPG which uses data from multiple radials to correctly dealiase the wind data.

A-2.5 Time Series Data Array.
During the listening time of a single PRI, the analog portion of the WSR-88D receiver produces analog In (I) and Quadrature (Q) video. This I and Q video contains the amplitude and phase data of the return echo. The I and Q video is then sampled at a rate equivalent to 250 meter intervals (approx. 1.66 µsec). This sampling establishes the maximum range resolution of the WSR-88D radar. Each 250 meter interval is called a Range Resolution Cell. A Range Sweep is defined as all the range resolution cells sampled during a single PRI. A radial range bin is defined as all the range cells sampled in successive range sweeps at a single range for one radial. The radial thus consists of M sweeps indexed by the sweep number m in time sequence from O to M. Each sweep is divided into N range resolution cells, indexed from O to N-1 in order of increasing range-cell number n. Spacing between cells is at a range resolution of 250 meters. To get the spacial sense of this concept, refer to Figure A-1. One Degree Radial Scan in Azimuth for Contiguous Surveillance and Contiguous Doppler Waveforms. Each I and Q video sample is converted to a discrete 12-bit binary word (one for I and one for Q) in an A/D converter and sent to a prescaler. The prescaler adjusts the magnitude of each sample, to compensate for attenuation inserted by the AGC circuits of the analog portion of the receiver, and converts the data to a floating point format having 6-bit exponent and 12-bit significant. This format can support the full dynamic range of the radar. The output of the prescaler is processed in a clutter filter to suppress ground clutter that appears at low elevation cuts. The output of the clutter filter is called time-series data or samples. The time-series samples are similar to the output of the A/D converters inasmuch as they are composed of individual packets of digital data representing the voltage of the I and Q video for each range cell in each sweep. The time-series array is an accumulation of the time-series samples stored for one radial in the input memory of the PSP. The structure of this array in memory is shown in Figure A-2. Time Series Array Storage Format. Two time-series arrays are present in the Batch Waveform mode of operation. Both arrays are of similar structure as described in the preceding paragraphs of this section, but of different sweep and resolution cell numbers. First of the two is the Surveillance Time-Series array; it results from time sampling within a low PRF pulse group. The second is called the Doppler time-series array; it results from sampling at a higher PRF pulse group. Figure A-3. Resolution of Contigu-

ous Doppler Ambiguity illustrates the physical relationship between the two arrays. In order to get a physical sense of the radial time-series array, consider a single range bin within a radial. The bin is composed of a range cell containing I and Q data deposited by each sweep in the radial at the range bin in question. All the data in this range bin is used quantitatively to derive a single set of base data values unique to that range bin in that radial in the elevation cut under investigation. Thus, the minimum volume of space that can be rezoned is the width of one radial with a depth of 250 meters and a height of the radar beam width.

A-2.6 Echo Return Processing.

RF Echoes (reflected RF) received by the WSR-88D radar are processed to produce weather related information in the form of three basic parameters: reflectivity, mean radial velocity, and spectrum width.

A-2.6.1 Reflectivity.

Reflectivity is a measure of how well meteorological objects (clouds, rain, dust, etc.) reflect RF energy. It is calculated by normalizing the received echo power with the attenuation of space encountered at the range of the echo and with receiver gain calibration term. The space attenuation has two terms: one is the attenuation due to square law dispersion of the reflected RF from the target, and the other is the attenuation of the atmosphere as a function of range. The echo power is the average power of the time-series samples taken over all the range cells in 4 adjacent range bins. The echo power is stored in a one dimensional matrix called the echo-power array. This array has one value for each range bin in a radial. It should be noted that the power associated with the time-series samples in each range cell is proportion to the square of the time-series sample magnitude. The reflectivity is a function of the composition and density of an object and is independent of its range. The reflectivity is given in units of dBz.

A-2.6.2 Mean Radial Velocity.

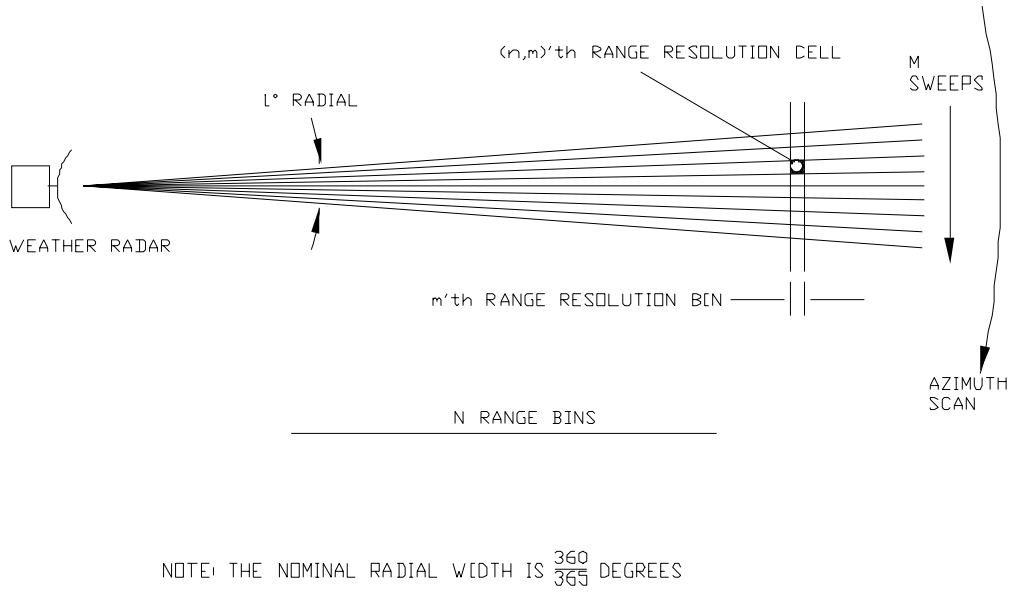
Mean radial velocity is the speed (inbound or outbound) of some object along the line of sight of the radar antenna. It is calculated by measuring and averaging the rate of change in phase of the return echo between adjacent sweeps in each range bin of a radial. (Strictly, the argument (i.e. the phase) of the auto correlation function of the returned signal is used instead of the phase difference being averaged since it is a more accurate estimator.) This average phase rate is scaled to vary between +.5 and .5 instead of +180i and 180i. The phase is then multiplied by the Nyquist velocity which is inversely proportional to the PRF being used. The results are classified as ambiguous velocity since it is possible that the W phase could have rotated an entire 3605 between sweeps before being sampled. A series of cross checks are performed to unfold ambiguous velocities. The velocity of a cell is compared to that of adjacent cells, initially in range, the presumption being that the velocity change between cells will not exceed half the Nyquist velocity. If it does, then the velocity is incremented by a Nyquist interval to measure the difference. Cross checks are performed in azimuth to help ensure consistency in the unfolded velocity field. If the velocity is determined after testing to be accurate, it becomes the unambiguous velocity and is used as such.

A-2.6.3 Spectrum Width.

Spectrum width is a measure of the velocity deviation of particle velocities within a range bin of a radial. It is indicative of the air turbulence and the range of velocities within the volume of space defined by a radial range bin. The estimate of spectrum width is calculated using echo power and the magnitude of the auto correlation function calculated when estimating mean radial velocity.

A-3 PRODUCT DISPLAY, ANNOTATIONS, AND SYMBOLS.

The products displayed at the PUP workstation are products contained in the PUP data base and received from an RPG. These products, depending on the one selected, contain certain parameters. The parameters for each product are also displayed on the monitor on the right side. The annotations area describes the product currently being displayed. The parameters for each product list the product name, product ID, data levels, etc. Refer to Table Table A - 6: Product Parameters and Annotations for a listing and description of the product parameters and annotations that are displayed. Refer to Figure A-4. Special Symbols for special symbols that are displayed on the screen for specific weather conditions.



NOTE: THE NOMINAL RADIAL WIDTH IS $\frac{360}{365}$ DEGREES

Figure A-1. One Degree Radial Scan in Azimuth for Contiguous Surveillance and Contiguous Doppler Waveforms

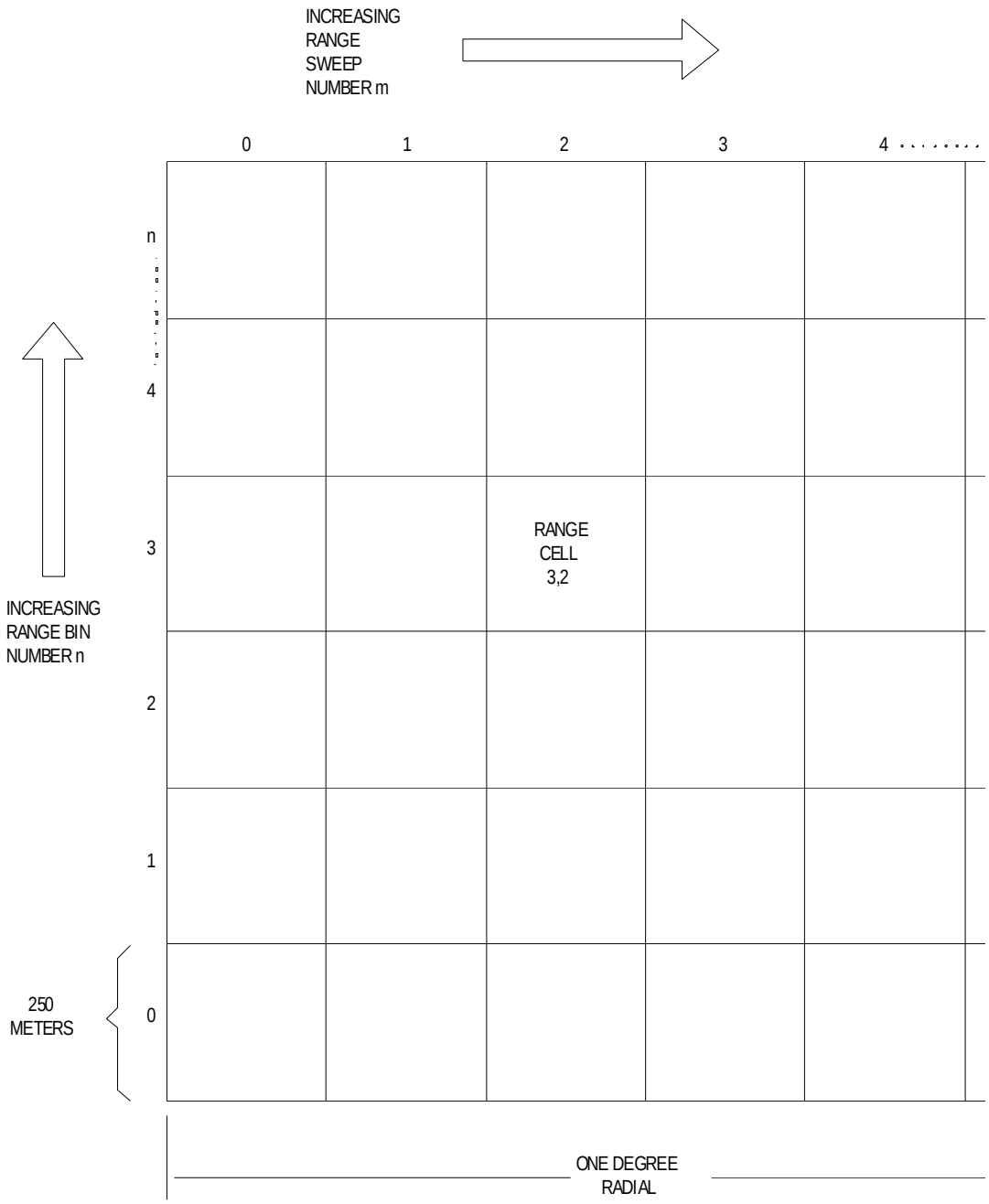


Figure A-2. Time Series Array Storage Format

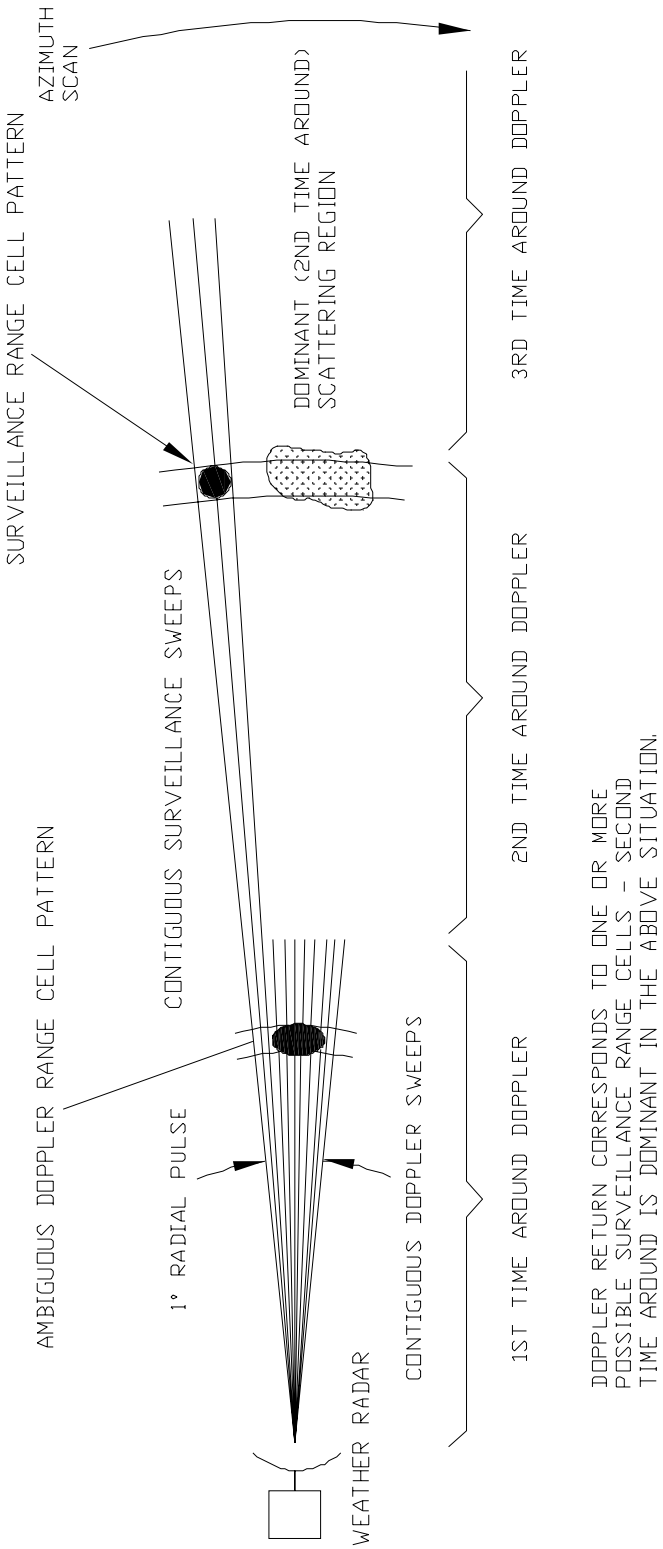


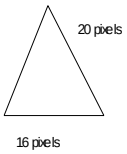
Figure A-3. Resolution of Contiguous Doppler Ambiguity

Table A - 6: Product Parameters and Annotations

Parameter/Annotation	Description
Date and Time	Current date and time is displayed at all times in upper right side.
Product Name	Name of product currently being displayed.
Product ID	Product ID# of product being displayed.
Product Mnemonic	Product mnemonic of product name currently being displayed.
Resolution and/or Coverage Area	Resolution and coverage area in nautical miles of displayed product.
Radar ID Mnemonic With Elevation And Position	Radar mnemonic and position in latitude/longitude. The elevation of the antenna's center of radiation above mean sea level displayed in feet.
Scan Date and Time, Spot Blank Indicator	Product volume scan date and time for the displayed product
Product Elevation, Altitude, Max Precipitation or Elevation Segment Number	Product elevation, altitude maximum precipitation accumulation, or elevation segment number when appropriate.
Mode and VCP or Channel	Displays mode of operation (precipitation or clear air) and VCP that was current when the product data was collected. Channel is only used for clutter filter control products.
Center Coordinates	The center of the current display in azimuth/range format.
Max	Maximum data value detected.
Product Dependent Data	Product dependent data which provides useful information about the displayed product. A combination of maximum data levels, contour interval, storm speed and direction, and height of phenomenon are displayed, as applicable.

1. Hail

Probability of Severe Hail:

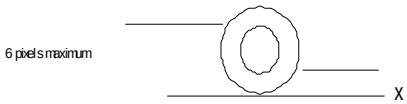


A large filled green isoseles triangle or an unfilled green isoseles triangle.

Probability of Hail: Same as above except the triangle is 12 pixels by 8 pixels.

2. Mesocyclone

Mesocyclone:



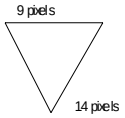
A yellow centroid with x=4 pixels.

3D Correlated Shear: Same as above except x=1 pixel.

NOTE: The circle size is proportional to the diameter of the mesocyclone.

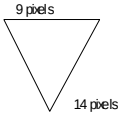
3. Tornado

Tornado Vortex Signature (TVS):



A filled red inverted triangle.

Elevated Tornado Vortex Signature (ETVS):



An unfilled red inverted triangle.

4. Storm Track

Past

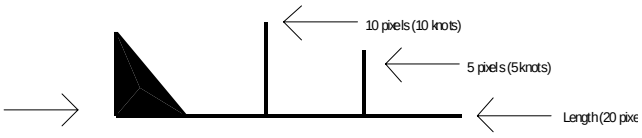
Current

Forecast Positions

White filled circles, 5 pixels in diameter.

White plus signs, 5 pixels wide, 5 pixels high.

5. Wind Direction / Speed



10 pixels with 4 pixel base (40 knots)

NOTE: Color of complete vector is a function of RMS code.

Figure A-4. Special Symbols

A-3.1 Base Products.

Base products consist of reflectivity, mean radial velocity, and radial velocity spectrum width presented for display on the color monitors at the workstation. The base products and azimuth coverage areas in kilometers (km) are listed below:

- Reflectivity - 0-230 km
- Mean Radial - 0-460 km
  0-60 km
- Velocity - 0-115 km
  0-230 km
- Spectrum Width - 0-60 km
  0-115 km
  0-230 km

The display of the base products is discussed in paragraphs A-3.1.1 Reflectivity (R). through A-3.1.3 Spectrum Width (SW).

A-3.1.1 Reflectivity (R).

This product provides the reflectivity data displayable as an image. Variations of the product are organized to provide various areas of coverage and display resolutions. The product can be generated for any azimuth scan at a single elevation angle based on user requirements. Each scan is updated once per volume scan time. Each product is available for both 8 and 16 reflectivity data levels. Each product includes annotations for the product name, radar ID, time and date of scan, data level code, elevation angle, maximum data value (dBz), radar position, radar elevation above Mean Sea Level (MSL), and radar operational mode.

A-3.1.2 Mean Radial Velocity (V).

This product provides the mean radial velocity data displayable as an image. Variations of the product are organized to provide various areas of coverage and display resolution. The product can be generated for any azimuth scan at a single elevation angle based on user requirements. Each scan is updated once per volume scan time. Each product includes both 8 and 16 mean radial velocity data levels. Each product includes annotations for the product name, radar ID, time and date of scan, data level code, elevation angle, maximum data value detected (knots, positive and negative), radar position, radar elevation above MSL, and radar operational mode.

A-3.1.3 Spectrum Width (SW).

This product provides the radial velocity spectrum width data displayable as an image. Variations of the product are organized to provide various areas of coverage and display resolutions. The product can be generated for any azimuth scan at a single elevation angle based on user requirements. Each scan is updated once per volume scan time. Each product is available for 8 spectrum width data levels. Each product includes annotations for the product name, radar ID, time and date of scan, data level code, elevation angle, maximum data value detected (knots), radar position, radar elevation above MSL, and radar operational mode.

A-3.2 Derived Products.

Derived products are described as those products generated within the RPG functional area that represent either some combination of base products or a base product that has been enhanced or otherwise changed by the use of manual or automated processing techniques. Derived products can be used for graphics of weather radar information or for further processing by a user.
A description of each of the derived products is discussed in paragraphs A-3.2.1 Combined Shear (CS). throughA-3.2.28 Digital Hybrid Scan Reflectivity (DHR)..

A-3.2.1 Combined Shear (CS).

This product provides the combined (radial and azimuthal) shear of the mean radial velocity for

a 230 km area centered at the radar position. The shear information presented in this product is the output of the Combined Shear Algorithm. It is presented as a displayable image of shear values containing 16 data levels. The capability of establishing the product resolution is a MSCF function. This product is produced for one elevation angle, as selected at the MSCF, with the lowest elevation angle as the default. This product is updated once per volume scan time. This product includes annotations for product name, radar ID, date and time of elevation scan, elevation angle, data level code, position and value of maximum shear value, radar position, radar elevation above MSL, product resolution and radar operational mode. Upon user request, all site-adaptable parameters identified as inputs to the algorithms used to generate data for this product are available at the alphanumeric display.

A-3.2.2 Combined Shear Contour (CSC).

This product provides contours of the combined shear and is produced by contouring the output of the Combined Shear Algorithm used to produce the Combined Shear Product. The contours in interval(s) are site-adaptable. This product is displayable alone or as an overlay on reflectivity or velocity base products. This product is updated once per volume scan time. It also contains annotations for the product name, radar ID, time and date of scan, position and value of the maximum shear value, elevation angle, radar position, radar elevation above MSL, radar operational mode, spatial resolution of contoured shear data and contouring interval(s). Upon user request, all site-adaptable parameters identified as inputs to the algorithm used to generate data for this product are available at the alphanumeric display.

A-3.2.3 Composite Reflectivity (CR).

This product provides composite reflectivity data displayable as an image. For each geographical resolution element, this product provides the highest reflectivity value above the resolution element available from any elevation angle scan of a volume scan. This product is updated once per volume scan time. The product is available for both 8 and 16 reflectivity data levels. The product includes annotations for the product name, radar ID, time and date of scan, data level code, maximum data value (dBz), radar position, radar elevation above MSL and radar operational mode. In addition, storm information generated by the various meteorological algorithms, e.g., the Storm Series (SS) or Tornado Vortex Signature Algorithms, (TVSA) is included as annotations or graphic overlays, or both, as the user selects. When selected, the algorithm-generated information is provided for all identified storms. When these additional annotations or overlays are selected by the user, they are provided routinely until deselected. The information in these optional overlays and annotations is updated once per volume scan time.

A-3.2.4 Composite Reflectivity Contour (CRC).

This product provides composite reflectivity data as line-contoured areas displayable as an image. For each geographical resolution element, this product provides the highest reflectivity value above the resolution element available from any elevation angle scan of a volume scan. This product is similar to the Composite Reflectivity Product except the imagery data is converted to a contoured format. This product is updated once per volume scan time. The number of contour intervals is adaptable. The product includes annotations for the product name, radar ID, time and date of scan, maximum data value detected (dBz), radar position, radar elevation above MSL, and radar operational mode. In addition, storm information generated by the various meteorological algorithms, e.g. the SS or TVSA, is included as annotations or graphic overlays, or both, as the user selects. When selected, the algorithm-generated information is provided for all identified storms. When these additional annotations or overlays are selected by the user, they are provided routinely until deselected. The information in these optional overlays and annotations is updated once per volume scan time.

A-3.2.5 Echo Tops (ET).
This product provides the echo tops information displayed as an image. This product is produced from the output of the Echo Tops Algorithm. The product is updated once per volume scan time. The product is available for 16 altitude range data levels referenced to mean sea level. The product includes annotations for product name, radar ID, time and date of scan, maximum data value detected (Height in feet, MSL), radar position, radar elevation above MSL, and radar operational mode.

A-3.2.6 Echo Tops Contour (ECT).
This product provides the echo tops information as line-contoured areas displayable as an image. The contouring interval is user-selectable (in 1000 foot increments) with a minimum interval of 2000 feet and default to 5000 feet. The base contour value is site-adaptable and defaults to 30,000 feet MSL. All contour values are annotated and displayed referenced to mean sea level. The product is updated once per volume scan time. The product includes annotations for product name, radar ID, time and date of scan, maximum data value detected (Height in feet, MSL), radar position, radar elevation above MSL, and radar operational mode.

A-3.2.7 Severe Weather Analysis Display (SWR, SWV, SWW, SWS).
This product provides, at the highest product resolution available, separate maps of reflectivity, mean radial velocity, spectrum width, and radial shear for 50 x 50 km areas. When produced because this product has been selected for generation due to the detection of an alert condition, the product is automatically generated for the elevation angle nearest the critical altitude for the meteorological phenomenon causing the alert condition, and is centered at the coordinates of the meteorological phenomenon causing the alert condition. This product is also generated upon user request for a user-specified elevation angle and geographic center point. The capability exists to modify the mean radial velocity map by removing the storm motion of an operator-selected storm from the velocity data. The modified map is centered on the same geographic location as the original map. The method of removal is described in paragraph A-3.2.13 Storm Relative Mean Radial Velocity (SRM). The product contains 16 data levels for each data type displayed except spectrum width which contains 8 data levels. The product includes annotations for product name, radar ID, radar position, time and date of scan, Elevation angle, Height (AGL) of the phenomenon centerpoint, maximum data values detected, and any applicable alert mnemonic.

A-3.2.8 Severe Weather Probability (SWP).
This product provides an alphanumeric set of severe weather probability values displayable in a graphic map format. These SWP values are produced using the SWP Algorithm. This product is updated each time the Vertically Integrated Liquid (VIL) product is updated. The product is produced in a form that can be used to generate an alphanumeric SWP value for overlaying the VIL image product or which can be displayed independently with the SWP value assigned to the VIL box corresponding to the center of an individual cell. Each product includes annotations for the product name, radar ID, time and date of volume scan which are used to produce the product, data level code, maximum data value detected (percent), radar position, radar elevation above MSL, and radar operational mode.

A-3.2.9 Velocity Azimuth Display (VAD) Winds.
This product provides the VAD Algorithm derived wind speed and direction. Two versions of the product are produced. For the first version, the wind speed and direction at up to 30 altitudes is computed and displayed as wind barbs on a height scale. The specific altitude levels at which VAD winds are computed and reported are site-adaptable in one thousand foot increments. The specific altitudes at which winds are requested are used to derive the specific slant range and elevation angle for the VAD algorithm analysis. Wind speed and direction is reported to the

highest altitude level at which sufficient signal is available for processing by the VAD algorithm. The current and up to 10 previous height plots (user selectable) are displayed simultaneously on a time versus height scale. Altitude levels are shown referenced to mean sea level. This version of the product includes annotations for the product name, radar ID, radar position, radar elevation above MSL, time and date of volume scan, and maximum wind speed and associated direction of most current plot. Upon user request, all site-adaptable parameters identified as inputs to the algorithm used to generate data for this product are made available at the alphanumeric display. A second version of the VAD winds product is produced upon user request. This version presents the VAD wind analysis for a specific altitude. The data displayed consists of the Doppler velocity data used to compute the VAD wind and the best fit function used to determine the horizontal wind speed and direction. The data is presented to the user as a graphical plot for the actual Doppler velocity and the best fit function on an orthogonal axis of speed versus azimuth. The vertical axis presents speed, scaled as necessary to allow all data to be displayed. The Nyquist velocity for the specific scan is graphically annotated on the display if the range of the scaled vertical axis is sufficient. The horizontal axis is azimuth, scaled from 0-360 degrees with true north as 0/360 degrees. This product is made available for any wind value included in the most recent time-height cross-section version of the VAD Winds Product. This version of the product includes annotations for the product name, radar ID, radar position, radar elevation above MSL, time and date of volume scan, slant range, elevation angle, wind speed and direction, computed altitude of winds, RMS error, and best fit function.

A-3.2.10 Combined Moment (CM).

This product provides the reflectivity, mean radial velocity, and spectrum width data combined into a single product displayable as an image. The product is generated on request for any user-defined elevation scan and product center point coordinates. Each product includes annotations for product name, radar ID, time and date of scan, elevation angle, product center point coordinates, maximum data values, radar position, radar elevation above MSL, and radar operational mode.

A-3.2.11 Cross Section (RCS, SCS, VCS).

This product provides a vertical cross section of reflectivity, mean radial velocity data, or spectrum width displayable as an image for a user-selected vector. This vector is defined by the operator using two end-points, up to 230 km apart, and at any orientation and location within 230 km of the radar. This product is produced by mapping the nearest value in range along a radial, to a point in the plane of the vertical cross section defined by the intersection of the plane and the radial. The displayable version of the product is produced by linearly interpolating between the mapped values, both horizontally and vertically as necessary. The product is generated only on request. The product is made available for both 8 and 16 data levels defining the intensity range and velocity range data levels, and 8 data levels only for spectrum width. The product includes annotations for the product name, radar ID, time and date of volume scan, maximum data value and location(s), radar position, radar elevation above MSL, and the radar operational mode. The location of the vector center and the end points (az/ran) is also indicated.

A-3.2.12 Weak Echo Region (WER).

This product provides the WER displayable as an image for a user-selectable storm. Information defining the weak echo region is derived from the Storm Structure Algorithm. The product is generated only on request. The product includes annotations for the product name, radar ID, time and data of scan, radar position, maximum data value (dBz), radar position, radar elevation above MSL, and radar operational mode. The WER product is displayed as a set of up to eight stacked planes in perspective view. The (x,y) coordinate of the storm as output by the Storm Structure Algorithm is used to establish the centerpoint of all planes. Reflectivity data from a single elevation angle is displayed on a single plane, with the lowest elevation angle on the low-

est plane. Elevation angles are shown in ascending order. Eight planes are included in the product. The specific elevation angle assigned to each plane is user selectable from those available in the current scan strategy at the time the product is requested, and defaults to the lowest 8 elevation angles. The areal extent of a single plane wholly contains the delimiting (e.g., 30 dBz) contour (as used to determine segments in the Storm Segment Algorithm) of the storm with at least a 50% margin of excess to a maximum of 50 x 50 km such that no plane obscures any other plane.

A-3.2.13 Storm Relative Mean Radial Velocity (SRM).
This product provides mean radial velocity for the following: (a) a small geographic area centered upon or near an identified storm of interest with the storm motion removed, or (b) the entire area of radar coverage (to 230km) with the average storm motion removed. This product is produced upon request for any azimuth scan at any elevation angle. The product is generated as a displayable image by removing the radial (velocity component away from the radar antenna) component of storm motion from the mean radial velocity values. The radial component of storm motion is computed using the storm motion value computed for the identified storm by the Storm Tracking Algorithm, the vector average of all currently identified storms, or a value input by the user. The value of storm motion used to adjust the mean radial velocity values is user-selectable at the time of product request, or defaults to the vector average of all currently identified storms if not selected. Each product contains 16 data levels for storm-adjusted mean radial velocity. Each product includes annotations for the product name, radar ID, time and date of scan, elevation angle, storm motion, coordinates of product center, radar position, radar elevation above MSL, and radar operational mode.

A-3.2.14 Vertically Integrated Liquid (VIL).
This product provides vertically integrated liquid values displayed as an image. The output of the VIL Algorithm is used to produce this product. The product is updated once per volume scan time. The product is available for 16 data levels. Each product includes annotations for product name, radar ID, time and date of volume scan, maximum data value (VIL value), radar position, radar elevation above MSL, and the radar operational mode.

A-3.2.15 Storm Tracking Information (STI).
This product provides information concerning the past, present and future positions of each identified storm. This product is generated from the output of the Storm Tracking and Storm Position Forecast Algorithms. It is produced in a tabular format of alphanumeric values, as a standalone graphic product, and in a format for generating graphic overlays to other products. This product is updated once per volume scan time. Each product includes annotations for product name, radar ID, date and time of volume scan, maximum data value per storm, radar position, radar elevation above MSL, radar operational mode, and total number of identified storms for which tracking is available. Upon user request, all site-adaptable parameters identified as inputs to the algorithm(s) used to generate data for this product are made available at the alphanumeric display.

A-3.2.16 Hail Index (HI).
This product provides, for each storm identified by the storm series algorithms, an indication that the storm will or will not produce hail. The hail indication values that are shown for each storm are generated by the Hail Algorithm. This product is produced in a format that can be used to generate an alphanumeric tabular type of display, an alphanumeric annotation to other products, or a graphic overlay. This product is updated concurrently with the storm structure product. This product includes annotations for the product name, radar ID, time and date of last volume scan used to generate updated values, radar position, radar elevation above MSL, and radar operational mode. Upon user request, all site-adaptable parameters identified as inputs to the algorithm(s) used to generate data for this product are made available at the alphanumeric

display.

A-3.2.17 Mesocyclone (M).
This product provides information about identified shear and mesocyclone features. This product is generated from the output of the Mesocyclone Detection Algorithm. This product is generated in a format that can be used to generate an alphanumeric tabular display for any identified feature or all features simultaneously, a graphic display, or a graphic overlay or other products. This product is updated once per volume scan time. If on a particular volume scan there is no output from the Mesocyclone Detection Algorithm (i.e., no features of any type are identified), a version of the product is produced that exhibits the negative condition. This product includes annotations for the product name, radar ID, date and time of volume scan, radar position, radar elevation above MSL, and radar operational mode. Upon user request, all site-adaptable parameters identified as inputs to the algorithm(s) used to generate data for this product are made available at the alphanumeric display.

A-3.2.18 Tornado Vortex Signature (TVS).
This product provides information regarding the existence and location of an identified TVS. This product is produced from the output of the TVS Algorithm. This product produces an alphanumeric tabular display of the algorithm output data for each identified mesocyclone and generates a graphic overlay of the TVS signatures information when such is identified. This product is updated once per volume scan time. This product includes annotations for the product name, radar ID, time and date of volume scan, radar position, radar elevation above MSL, and radar operational mode. Upon user request, all site-adaptable parameters identified as inputs to the algorithm(s) used to generate data for this product are made available at the alphanumeric display.

A-3.2.19 Storm Structure (SS).
This product provides, for each identified storm, information regarding the structure of the storm. This product is produced from, and contain the values that are output by, the Storm Structure Algorithm. This product is updated once per volume scan time. This product is produced in a tabular alphanumeric format and includes annotations for the product name, radar ID, time and date of volume scan used to generate the latest set of values, radar position, radar elevation above MSL, and radar operational mode. Upon user request, all site-adaptable parameters identified as inputs to the algorithm(s) used to generate data for this product are made available at the alphanumeric display.

A-3.2.20 Layer Composite Reflectivity (LRA, LRM).
Each product contains annotations for product name, radar ID, date and time of volume scan, maximum data value detected, radar position, radar elevation above MSL, and radar operational mode. All layer products are on a geographically based cartesian grid, centered on the radar. Up to three layers are available for layer products at each site; the depth of each layer is controlled via adaptation data. No layer is less than 6,000 ft. thick. Each layer product is updated on a volume scan basis. Eight data levels are available for each product, including one for data below the minimum threshold and one for no data. The default values for the reflectivity are the standard NWS DVIP levels, as defined in Federal Meteorological Handbook (FMH) #7. The data level thresholds are controlled via adaptation data. Before layering, the reflectivity data are thresholded with respect to mean noise level and are also filtered to remove spurious isolated data caused by point targets. It is possible to select either a maximum value or the average reflectivity for the grid box, but not both simultaneously. The range of coverage for each product is controlled via adaptation data; the default is a 460 km X 460 km square centered on the radar. A three-dimension (3-D) grid box is defined as the vertical projection of the geographically based cartesian grid square through the appropriate layer. All radar resolution volumes whose centers

re contained in a given 3-D grid box are included in the computation for the 3-D grid box. All 3-D boxes whose centers fall in a radar resolution volume include the radar resolution volume in the computation for that 3-D grid box. A center that falls on a boundary is considered to fall on both/ all sides of the boundary. The product resolution is 4 km X 4 km.

A-3.2.21 User Alert Message (UAM).
This product provides a message of when a user adaptable selected threshold has been reached or exceeded. The message contains the location, type and severity of the weather event, and storm speed and direction of movement. The product is updated once per volume scan. The product includes annotations for the product name, radar ID, time and date of scan, radar position, radar elevation above MSL, and severe weather information as appropriate.

A-3.2.22 Radar Coded Message (RCM).
The Radar Coded Message (RCM) is produced in 2 stages: a pre-edit stage and a post-edit stage. The pre-edit stage is automatically produced and transmitted to a single, associated PUP, designated by the MSCF, and made available for editing. After editing, or editing opportunity as described below, the post-edit stage is produced and made available from the RPG. The capability is provided to prohibit the distribution of the unedited post-edit stage RCM to Class IV users. The RCM is produced in 3 parts: Part A, Reflectivity; Part B, VAD Winds, and Part C, Remarks. After the editing opportunity, parts A, B and C are combined into a single message ready for transmission. The specific data content of each part is described below.

A-3.2.22.1 Part A, Reflectivity.
The pre-edit stage of Part A contains an intermediate graphic product and a tabular listing of alphanumerics. The intermediate graphic product contains reflectivity data for the 1/16 LFM grid over the radar area of coverage out to 460 km. The reflectivity intensity value for each grid box is determined by assigning the maximum value of all Composite Reflectivity boxes whose centers are contained within the 1/16 Limited Area Fine Mesh (LFM) grid square. The intermediate graphic product is based on the 16 level, 4 km X 4 km Composite Reflectivity Product but contains only 9 data categories: 6 for data within 230 km, 1 for missing or blow threshold data within 230 km, and 2 for data beyond 230 km. The selection of which composite reflectivity levels map into which of the 6 radar-coded message categories is adaptable at the MSCF. For data beyond 230 km, a separate adaptable threshold is provided for which:

- all data above that threshold are labeled as category 8, and
- all data below that threshold are labeled as category 9

The intermediate graphic product is presented to the user at the PUP for graphic editing by deleting data or changing data to another data level within areas outlined by using the cursor control device. Each area is a variable-sized polygon of up to 20 sides. Other normal PUP functions such as magnify and cursor linking are available during the edit procedure. A readout of the location of the cursor control device is provided to indicate the 3-letter designation of the 1/16 LFM grid box. This readout is displayed continuously while using this product and is updated at least once per second. The alphanumeric list contains the height (MSL) and position of the maximum echo top. The height, and the position where provided, are derived from the Echo Tops Product. The alphanumeric list also includes the location of the largest mass-ranked centroid within 230 km of the radar. The number of centroids reported are MSCF-adaptable from 1-20, with a default value of 12. Locations of these centroids is provided graphically by overlaying their respective storm identifiers on the intermediate graphic product. As available from the output of the Storm Position Forecast Algorithm, the forecast centroid speed and direction are also listed. The capability to manually edit these alphanumerics is provided. When the user deletes an area during a graphic editing session, the centroids contained in those areas and the associated alphanumerics are automatically deleted. After editing, the graphics and alphanu-

merics are formatted into part A of the radar-coded message.

A-3-2.22.2 Part B, VAD Winds.
Part B of the radar-coded message contains a single profile of the horizontal wind information derived from the output of the VD algorithm. The capability to edit these alphanumerics is provided.

A-3-2.22.3 Part C, Remarks.
Part C of this product contains remarks in a alphanumeric format. These remarks consist of both meteorological-algorithm-derived information and manually encoded remarks. The algorithm-derived information gives the position of each detected mesocyclone or uncorrelated shear feature (as derived from the Mesocyclone Detection Algorithm) and each detected TVS (as provided by the TVS Algorithm). In addition, for each centroid included in part A, part C contains the Hail Index (as provided by the hail Algorithm), and the Storm Tops information (as provided by the storm Structure Algorithm). The capability for entry of formatted remarks is designed to minimize format errors and the manual entry and editing time. Unformatted remarks and the editors initials are input through the keyboard. The capability to edit, add to, or restore the pre-edit alphanumeric text of part C is provided. The pre-edit stage of this product is produced automatically up to 2 times per hour based on time of day specified at the MSCF in minutes after the hour. This product is also produced upon one-time request form the designated RPGOP/PUP using data from the last completed volume scan. For a continually scanning radar, the product is produced from the last completed volume scan prior to the scheduled time. Once alerted that the pre-edit version of the product is available, if the operator does not begin the editing procedure within an elapsed time, T (site-adaptable, default of 120 seconds), the unedited post-edit version of the product is produced automatically within 20 seconds. When the product is complete, it is sent back to its RPG for distribution.

A-3.2.23 Free Text Message (FTM).
This product provides a capability for defining an alphanumeric message for one-time transmission to specific WSR-88D Unit interface(s). The product is generated by an operator through the MSCF or Radar Product Generation Operational Position (RPGOP) or transmission to the RPG's users or by the PUP operator for transmission to the PUP's users. Messages may be designated to be transmitted to a specific or several WSR-88D Unit interfaces. Product includes radar ID, date, and time that the message was completed.

A-3.2.24 Surface Rainfall Accumulation (OHP, THP).
These products provide a 1-hour and 3-hour rainfall accumulation maps displayed as an image. The 1-hour map is updated every volume scan time and the 3-hour map is updated once per hour. These products are available for 16 accumulated precipitation data levels. Each product includes annotations for the product name, radar ID, date and ending time (TSavgcur or clock hour as appropriate) of the rainfall rate integration, maximum data value, radar position, radar elevation above MSL, radar operational mode, the bias in the radar estimate of the precipitation rate (Bcur), and the error variance of the bias estimate (MSEcur).

A-3.2.25 Storm Total Rainfall Accumulation (STP).
This product provides a rainfall accumulation map displayed as an image. The product format and content are the same as the Surface Rainfall Accumulation Product except the time period is a variable and equals the period of continuous rainfall in the radar area of coverage. This product is updated every volume scan time. This product includes annotations for product name, radar ID, maximum data value detected, radar position, times and dates of the beginning and end (TSavgcur or clock hour as appropriate) of the rainfall rate integration, radar position, radar elevation above MSL, radar operational mode, the bias in the radar estimate of the precipitation

rate current bias (Bcur), and the error variance of the bias estimate current Mean Square Error (MSEcur).

A-3.2.26 Hourly Digital Precipitation Array (DPA).
This product provides hourly running total digital radar-rainfall estimates in an array format (not display-oriented) to support processing performed external to the WSR-88D System. This product is updated once per volume scan time. The product is available for 100 data levels for each array element. Each product includes annotations for product name, radar ID, date and ending time (TSavgcur or clock hour as appropriate) of the rainfall rate integration, radar position, the radar operational mode, the maximum data value, the bias in the radar estimate of the precipitation rate (Bcur), and the error variance of the bias estimate (MSEcur).

A-3.2.27 Supplemental Precipitation Data (SPD).
This product provides selected supplemental data generated or collected during the operation of the precipitation processing subsystem algorithms in a compacted array and/or an alphanumeric message format (not a display-compatible format). This product provides up to 10 different preselected sets of supplemental data using a single request code. This product is updated once per volume scan time. This product includes annotations for product name, radar ID, date and time of volume scan, maximum data value, radar position, radar elevation above MSL, and radar operational mode.

A-3.2.28 Digital Hybrid Scan Reflectivity (DHR).
This product provides digital radar reflectivity values for the composite Hybrid Scan, assembled from the lowest four elevation angles and yielding a representative reflectivity value at every sample bin location of a 1 degree by 1 kilometer polar grid, out to a range of 230 kilometers (124 nautical miles). This digital data is provided to support processing performed by external systems and is not display oriented. This product will be updated once every volume scan time. This product is available for 256 data levels at each sample bin location. Each product includes a standard set of annotations, the hybrid scan data and time of the scan, and the maximum data value (db) and its location.

A-3.2.29 Hybrid Scan Reflectivity (HSR).
This product is a 16 data level reflectivity product derived from the four lowest elevation angles. Determination of which of the four lowest elevation angles is used at every azimuth and range is based on the Terrain-Based Hybrid Scan. The product displays the reflectivity that is used in developing the precipitation products and the RCM. The HSR product can assist in assessing the accuracy of the precipitation products, searching for inconsistencies in the data, and discriminating between precipitation returns and ground returns due to anomalous propagation.

A-3.2.30 Layer Composite Reflectivity - AP Removed (APR).
This product is an 8-data level reflectivity display similar in appearance to the existing Layer Composite Reflectivity Maximum (LRM) products. The APR product does not replace any of the existing LRM products. It is derived from the output of an algorithm which processes base reflectivity, velocity, and spectrum width data with the goal of distinguishing between meteorological returns and returns from ground clutter/AP. The algorithm will generate a Surface to 24,000 ft Layer Composite Reflectivity Maximum product every volume scan with the algorithm-identified ground targets removed. The algorithm used to identify and remove clutter was developed at Lincoln laboratories, and is based on the observations that ground targets tend to affect mainly the lowest antenna tilts, and are typically associated with low radial velocity and low spectrum width.

A-3.2.31 Composite Reflectivity Edited - AP Removed (CRE).
This product provides composite reflectivity data displayable as an image but with the effects of anomalous propagation removed. For each geographical resolution element this product provides the highest reflectivity value above the resolution element available from any elevation angle scan of a volume scan. This product is updated once per volume scan time. The product will be available for both 8 and 16 reflectivity data levels. The products includes a standard set of annotations, data level code, maximum data value (db) and its position, and product resolution. In addition, storm information generated by the various meteorological algorithms, e.g. the Storm Cell Identification and Tracking or Tornado Vortex Signature algorithms, will be included as graphic overlays. When selected the algorithm generated information will be provided for all identifies storm cells. When these additional overlays are selected, they will be provided routinely until deselected. The information in these optional overlays will be updated once per volume scan time.

A-3.2.32 ITWS Digital Base Velocity (IDBA).
This product is not a visual product but is digital only and is not sent to any standard user. This product provides a digital input of base velocity data comprised of 256 data levels in spherical coordinates. The product is generated for any elevation scan based on user requirements. Each scan is updated once per volume scan time. Each product includes a standard set of annotations, data level code, elevation angle, product resolution, identification of range obscured data, and other housekeeping information required to facilitate analysis, e.g., all data in the radial headers, synchronization, calibration, and other data required to interpret the base velocity data including antenna position, PRF, etc.

A-3.2.33 Clutter Likelihood Products
These products provide an image to the user showing where base data may be contaminated by ground clutter. The display will show a "percentage likelihood" base data contaminated by ground clutter. There are two products and each are elevation based. The product codes and mnemonics are described in the new two sub-paragraphs.

A-3.2.34 Clutter Likelihood Reflectivity (CLR)
This product is requested like a base reflectivity product (example: Product 19), uniquely identified by the product code and elevation angle. The product code for the CLR is 132. It is displayed like other 4-bit run-length-encoded (packet code AF1F) products. The data levels are specified in the Product Spec ICD and are summarized as: 0 is "no data", code 1 is >/=0%, 2 is >/=10%, 3 is >/= 20%, ..., 10 is >-90%. The color scale emphasizes critical thresholds (generally, values less than 50 percent are not important.) The spatial resolution is 1 degree azimuth by 0.54 nmi (21 km), extending out to 230 km. This product has an alphanumeric portion which contains the adaptable parameters used by the Radar Echo Classifier, the algorithm that produces the Clutter Likelihood products. The message code for the alphanumeric portion is 110 for the CLR. The alphanumeric portion of the product is formatted similar to other products containing this feature (example: 1-hour rainfall accumulation, 3-hr rainfall accumulation).

A-3.2.35 Clutter Likelihood Doppler (CLD)
This product is requested like a base reflectivity product (example: Product 19), uniquely identified by the product code and elevation angle. The product code for the CLD is 133. It is displayed like other 4-bit run-length-encoded (packet code AF1F) products. The data levels are specified in the Product Spec ICD and are summarized as: 0 is "no data", code 1 is >/=0%, 2 is >/=10%, 3 is >/= 20%, ..., 10 is >-90%. For the CLD, code 11 (hexadecimal B) is RF for range folded (like other Doppler products such as base velocity or base spectrum width.) The color scale emphasizes critical thresholds (generally, values less than 50 percent are not important.) The spatial resolution is 1 degree azimuth by 0.54 nmi (21 km), extending out to 230 km. This product has an alphanumeric portion which contains the adaptable parameters used by the Radar Echo Classifier, the algorithm that

produces the Clutter Likelihood products. The message code for the alphanumeric portion is 111 for the CLD. The alphanumeric portion of the product is formatted similar to other products containing this feature (example: 1-hour rainfall accumulation, 3-hr rainfall accumulation).

A-3.2.36 SuperOb (SO)

This product provides radial wind observations for NCEP models. It is generated once per hour and sent to AWIPS for transfer to NCEP. It is not displayable at the RPG nor at AWIPS. The product code is 136 and the mnemonic is SO. It contains an average of radial velocities within small azimuth-range sectors (called SuperOb cells) for each elevation angle. It is generated periodically (adaptable at the RPG), but the default is not expected to change. The initial default will cause generation once an hour at 30 minutes past the hour. The product size will be proportional to the amount of weather. Recent measurements using a widespread severe storm case revealed that the product can exceed 250K bytes. Starting with Build 2.0 of the RPG, there is an option to compress products using BZIP2. A compression of nearly 50% was demonstrated for SuperOb with the severe storm case cited above. If configured to be compressed, the RPG will leave the message header Block and Product Description Block unaltered. Flags will be set in the Product Description Block to denote that the product was compressed, the compression type, and the uncompressed product length. All product data following the Product Description Block will be compressed.

A-3.2.37 Digital VIL (DVL)

This high resolution VIL product is intended for the FAA ITWS project. However, it may prove useful to NWS operations. The product code is 134 and the mnemonic is: DVL. It contains VIL data on a much higher spatial and data resolution than the current VIL product. Like the standard VIL (57) product, it is volume based. The product is in polar coordinates, uses packet code 16, and is formatted like other products already displayable on AWIPS (examples: DHR(32), DR(94), and DV(99)). The spatial resolution is 1 degree by 1 km, extending out to 460 km. The VIL data resolution is unusual is that it varies to emphasize low value VILS. It is an 8-bit (0-255) mapping that preserves resolution in low VIL (Mainly in values from 0.5 to 10 kg/m**2), but that gives no worse resolution in high VIL values than the current NEXRAD mapping (units of 5 kg/m**2) and covers the full range of VIL currently covered (0 to 80 kg/m**2). The data levels are translated according to the following:

- Data level 0 is a VIL of less than 0.05 kg/m**2,
- Less than or equal to data level 18 is a VIL calculated by the equation VIL=((data+5.1635)/123.2702).
- Greater than 18 is a VIL calculated by the equation VIL=exp((data-82.9028)/38.8763)).

The product is large, roughly 164 Kbytes, and would benefit greatly with the BZIP2 compression if that option is employed by the FAA.

A-3.2.38 User Selectable Layer Composite Reflectivity Maximum (ULR)

The User Selectable Layer Composite Reflectivity Maximum (ULR, Product 137) product gives users the ability to display the composite reflectivity maximums for a selected specific layer through a user request message. The user selects the bottom and top of the desired layer (in Kft), and the resulting product is a volume based final product for each user request. The algorithm can handle up to 10 user requests per volume scan. The final product is a 16 data level ICD formatted radial data message in polar coordinate presentation (360 radials X 230 km, with resolution 1 km X 1 degree). The ULR product is not selectable as a paired product.

Under the RPG Products, Product Generation, RPG Product Generation Table Editor, using the Current table, the user can preset default values and select the generation interval so the product can be generated routinely. At an APUP or NAPUP, creating a user function, the user can pre-

specify the lower and upper values. The user can also use both the graphic table and alphanumeric terminal to specify the values of the levels and then send in a one-time request. User Selectable Layer Reflectivity Maximum Products listed on the Pick-A-Product menu shall indicate both the lower and upper levels.

A-3.2.39 Digital Storm Total Rainfall Accumulation (DSP)

The Digital Storm-total Precipitation (DSP, Product 138) product is a full-resolution (i.e., 256 data-level), digital version of the Storm Total product that can be used to determine accumulations for the duration of a storm event as well as discrete accumulations over short time periods (i.e., volume scan to volume scan). This product will provide better support to AWIPS applications, including Multi-sensor Precipitation Estimation (MPE) (WFO version) and Flash Flood Monitoring & Prediction (FFMP). The DSP will generate rainfall accumulations on a 2-km x 1-deg (115 x 360) polar grid in scaled, linear units. The basic output units are of .01" resolution, scaled as a function of the maximum data value in the output grid as follows: if the max data value is less than or equal to 2.55", the scaling factor (or increment between data values) is .01"; if the max data value exceeds 2.55" but is less than or equal to 5.10", the scaling factor is .02"; if the max data value exceeds (2 x 2.55") but is less than or equal to (3 x 2.55"), the scaling factor is .03"; etc. The DSP product will also generate an appended layer of ASCII data containing ancillary information such as present adaptation data settings and supplemental results determined during the algorithm processing. The DSP product is not selectable as a paired product.

INDEX

Title	Page
Numerics	
17-Inch Monitor	1-5
A	
A/D	A-7
Above Wideband Graphic	2-169
AC	1-4
Acquire Radar Data	1-20
Acquire Rain Gauge Data	1-20
ACU	1-6
ADAPTATION DATA	3-12
Adaptation Data	2-91, 3-12
Adaptation Data Table	3-22
Add Dial-in User Button	2-161
Add Precipitation Table	2-173
Additional Status Categories	2-69
AGC	A-7
Alarm Color Codes	2-74
Alarms	2-170
Alert/Threshold	2-91, 3-12
Algorithm	3-31
Centroid	3-31
Contour	3-27, 3-29
RCM	3-35, 3-37
VAD	3-40
VIL	3-31
Algorithms	2-125
Alphanumeric Keys	2-15
Anomalous Propagation Impact	3-76
Antenna/Pedestal Performance Data	2-188
APC	1-13
Applications Control Box	2-181
Archive Base Data Icon	2-75
Archive II Close	2-76
Archive II Control Buttons	2-76
Archive II Data Flow	2-80
Archive II Error Messages	2-218
Archive II Functions	2-217
Archive II Playback	2-77, 2-218
Archive II Record	2-76, 2-218
Archive II Stop	2-79, 2-218
Archive III Data Flow	2-152
Archive III Disk	2-212
Archive III Disk Capacity	2-213

INDEX

Title	Page
Archive III Disk Removal	2-212
Archive III Functions	2-214
Archive III Load Control	3-11
Archive III Product Playback	2-146
Archive III Products	2-143
Archive III Products by Time Span	2-151, 2-217
Archive III Status	2-151
Archive III Status Boxes	2-152
Archive III Status Log Playback	2-147
Archive III Storage Device	2-210
ARCHIVE LEVEL ii AND LEVEL iii	2-210
Archive Storage Device	1-5, 1-14
Area Obscuration Table	3-18
Audio Alarms	2-180
Auto Archive III Control/Status	2-150, 2-216
Auto PRF	2-178
Auto PRF Function	2-40
Auto PRF in the ON position	3-26
Auto PRF On/Off	3-15
Automatic PRF Selection	3-26
Azimuth Changes	3-52
B	
Back Space Key	2-16
Background Product	3-51
Backing Up Software	2-207
Backup of BDDS User Accounts Using tar	2-208
Backup of RPG or MSCF User Accounts Using tar	2-208
Base Data Display	2-182
Base Data Distribution Server (BDDS)	1-5, 1-14, 1-15
Base Data Estimate Bias Due to Ground Clutter Contamination	3-53
Baseline Restore and Update	2-176
Baseline Restore and Update Buttons	3-48
Baseline Restore/Update Buttons	2-163, 2-168
Baud Rate	2-159
BDDS	1-4
BDDS HCI	2-31
Benefits Attained by Appropriate Clutter Suppression	3-57
Bottom Lower Left	2-169
Bottom Lower Right	2-170
Buttons	2-8
Bypass Map	3-55
BYPASS MAP EDITOR	3-60
Bypass Map Editor	2-185

INDEX

Title **Page**

Bypass Map in Control Using the Operator-Specified Notch Width 3-55

C
Calib (Value) Auto 2-178
Calibration 2-67
Calibration Check Performance Data 2-190
Calibration Performance Data 2-189
Capital Lock/Scroll Lock 2-17
Category
Current and Previous 2-177
CDE 2-3
CD-ROM 1-13
Cell Product 2-113, 3-29
Center (near top) in Radial Lines 2-169
Center (near top) under Radial Lines 2-169
Center Left
Gen Off or On Line 2-169
Center of Tower - TPS 2-169
Center Top of RPG Control Box 2-169
Centroid Count 3-37
Change Colors 2-200
Change Passwords 2-199
CHANGE to RDA VCP 2-41
Change to RDA VCP 3-15
CISCO Router 2-26
CISCO Switch 2-24
Clear Button 2-36, 2-74
Click and Drag Entries 3-70
Close Button 2-22, 2-58
Clutter Regions 2-185, 3-44
Clutter Regions Window Title 3-45
Clutter Suppression 3-75
Color-coding 2-9
Combined Shear Interval 3-29
Common Desktop Environment (CDE) 2-3, 2-203
Comms Status Button 2-22
Comms Status Window 2-24
Communication Server 1-5, 1-14
Composite Reflectivity and Obscuration Data Display Region 3-18
Considerations 3-31
Console Messages 2-196
Console Window 2-205
Consumables/Expendables 1-21
Contour Products 2-107

INDEX

Title	Page
Control System	1-20
Controls	2-3, 2-11
CPCI 03 Interface Requirements	1-20
CPU Load Control	3-4
Current Archive II Status	2-79
Current Display - Black Rectangular Square	3-49
Current VCP	2-39
Cursor Control Keys	2-16
Cursor Movement Keys	2-16
D	
Data Range	2-183
Data Smearing	3-57
Decreased Velocity Dealiasing Failures in Clear Air Mode	3-58
Dedicated Adapter Panel	1-6
Dedicated Patch Panel and Patch Panel Expansion	1-6
Dedicated/Dial Modem Rack Assembly	1-5
Default Notch Width Map	3-55
Default Weather Mode	2-90
Delete Button	3-52
Delete Dial-in User Button	2-163
Delete Key	2-17
Delete Precipitation Table	2-176
Detection Algorithm Executed	2-177
Device	2-73
Device Status Performance Data	2-191
Dial Adapter Panel	1-6
Dial Patch Panel	1-6
Dial-in Users	2-160
Disk File Status Performance Data	2-192
Disk Load Control	3-10
Display - Products in Database	2-136
Distant MSCF	1-9, 2-2
Distribute Products	1-20
DOD and FAA MSCF Communications	1-16
Download Time	3-49
DOWNLOAD VCP from RPG	2-41
Download VCP from RPG	3-15
E	
Echo Tops Base	3-29
Edit Decision Time	3-37
Edit Time-Out	3-37
Edit Window	3-63

INDEX

Title **Page**

Editable PUP 3-37
Elevation Buttons 2-183
Emergency Recovery Procedures 2-208
ENVIRONMENTAL DATA 3-64
Environmental Data 2-198
Extended LAN/Remote BDDS Equipment 1-15

F
FAA Redundant Adaptable Parameters Match 2-181
FAA Redundant Configuration 2-68
FAA Redundant System 1-7
FAA Redundant System Control 2-219
FAA Remote Maintenance System 1-7
FAA Unique Hardware 1-16
Feedback 2-170
File Button and Files Window 3-46
Filter Level 3-29
Filter Parameters 2-73
Filter Products List 2-167
Find 2-35
First and Second Levels 3-35, 3-40
First Line of Commands 3-46
First through Ninth Levels 3-43
Font Properties 2-200
Forced Clutter Suppression Using the Operator-Specified Notch Width 3-56
Front Panel 2-3

G
Gage Bias Adjustment Toggle 3-43
General Parameters Window 2-158
Generate Products 1-20
Generated: Line 3-63
Generation 3-12
Generation List 2-95, 3-12
Get Status Button 2-58
Graphical RPG Applications Software 2-6
Graphics Utilization 3-49
Grid Buttons 2-185

H
HARDWARE FUNCTIONALITY
RPG Functionality 1-4
Hardware Functionality 1-4
Hardware Interfaces 1-20

INDEX

Title	Page
Hardware Status/Warnings Window	2-35
HCI	1-1, 3-3
HCI Operator Control	3-5, 3-10
HCI Properties	2-199
HHMMSS Block	2-74
Home Key	2-16
How the Storm Cells are Limited	3-31
HUMAN COMPUTER INTERFACE (HCI)	2-37
I	
Icons	2-8
Impact on Meteorological Data Interpretation	3-53
Improved Ability to Stay in Clear-Air Mode	3-58
Improved Base Data Accuracy	3-57
Incoming Messages	2-197
Increased Availability of Second-Trip Velocity and Spectrum Width Data	3-58
Indicators	2-9
Input Buffer Load Control	3-5
Insert Key	2-17
Interference Suppression	2-66
Introduction	3-64
IP	1-4
K	
Keyboard and Mouse	1-5
Keyboard Usage	2-14
Keyboard, Video, Mouse	1-5
KVM	1-5
L	
LAN	1-4
Layer 0 Height (KFt. MSL)	3-33
Layer 1 Height (KFt. MSL)	3-33
Layer 2 Height (KFt. MSL)	3-33
Layer 3 Height (KFt. MSL)	3-33
Layer Product	2-119, 3-31
layer product	3-31
Left Mouse Button	2-18
Left of Radome	2-169
Light Precipitation Impact	3-76
Line Control Buttons	2-158
Line Management Window	2-158
Lines	2-35
Load Baseline Button	3-61

INDEX

Title **Page**

Load Shed 2-178
load shed 3-29
Load Shed Products 2-101
LOAD SHEDDING 3-4
Loading Software 2-207
LOADING SOFTWARE, BACKING UP SOFTWARE,
EMERGENCY RECOVERY PROCEDURES 2-207
Local Area Network (LAN) 1-4, 1-13
Local Area Network (LAN) Switch 1-15
Local MSCF 1-9, 2-2
login/logout procedures 2-202
Logout 2-205
Lower Center under RPG Control Box and Archive Products Box 2-170
Lower Left Under RDA Control Box and Archive Base Data Box 2-170
Lower Right Under Users Control Box 2-170

M
Map Buttons 2-185
MASTER SYSTEM CONTROL FUNCTION (MSCF) 2-2
MSCF Configurations 2-2
Maximum Displayable Alarms 2-73
Mean Radial Velocity (V) Estimate 3-54
Menus 2-3
Message Filter 2-139
Middle Mouse Button 2-19
MLOS Control Box 2-54
MMDDYY Block 2-74
Mode
Zoom/Sector 3-50
Modify Current VCP Adaptation Data Table 3-18
Modify Elevations Range 3-17
Modify Precipitation Detection Parameters 2-173
Modify Precipitation Table 2-174
Modify VCP 2-42, 3-15
Modify VCP - Adaptation 3-20
Modify VCP - Current 3-15
Modify VCP Adaptation Data Window 2-49
Moments 2-58
Mouse 2-18
MSCF 1-1
MSCF - Start 2-205
MSCF Applications Software Backup 2-208
MSCF Applications Software Restoral 2-208
MSCF Equipment 1-15

INDEX

Title **Page**

MSCF Terminal Suite 1-15
MSCF Window 2-20
Multiple Editors 2-201

N
Narrowband Communication Links 1-7
Narrowband Communications 3-3
Narrowband Communications Equipment 1-14
Narrowband Connections Graphics 2-153
Negative Impacts of Inappropriate, Operator-Forced Clutter Suppression 3-57
Network Connectivity 2-36
No Clutter Suppression 3-55
Nominal Clutter Area 3-75
Nominal Clutter Area Adjustments 3-75
Notch Width Selection 1 3-56
Notch Width Selection 2 3-56
Notch Width Selection 3 3-56
Notch Width Selections 3-56
Numeric Keypad 2-17
NWS Communications 1-16
NWS Redundant System 1-7
NWS Redundant System Control 2-219
NWS Unique Hardware - Remote RDA Maintenance Terminal 1-16

O
OHP/THP Data Levels 2-109, 3-33
Operational Computer Program Interfaces 1-20
Operator-Defined Clutter Suppression Regions 3-55
Outgoing Messages 2-198
Overview of WSR-88D Clutter Suppression 3-55

P
Padlock 3-61
Padlock Button 3-61
Page Up/Page Down Keys 2-16
Password 2-157, 2-165, 2-203
Port Password 2-159
Power Administrator Masterswitch 1-4, 1-13
Power Control Button 2-30
Precip Category 2-170
PRECIPITATION DETECTION FUNCTION 3-72
Precipitation Detection Function and Nominal Clutter Area 3-72
Precipitation Status 2-177
PRF in the OFF position 3-26

INDEX

Title	Page
PRF Selection	2-185
PRF Selection (Modify Current VCP) Window	2-44
PRF Selection Window	3-22
Printer	1-9
Product Distribution Comms Status Window	2-153
Product Distribution Lines	2-157
Product Generation Time 1 and 2	3-37
Products List	2-167
PUP	3-29
R	
Radome	2-38
Range Changes	3-52
Range Limit	3-33
Range Threshold	3-37
Raw/Zoom Mode Buttons	2-185
RCM Product	2-115, 3-35
RCM Reflectivity Data Levels	2-121, 3-37
RDA Alarm Summary	2-53
RDA Alarms	2-71, 2-181
RDA Alarms Button	2-58
RDA Control	2-56, 2-64
RDA Control Status	2-55
RDA Control/Status Box	2-56
RDA HCI	2-31
RDA Offline Operate	2-61
RDA Operate	2-61
RDA Performance Data	2-186
RDA Playback	2-62
RDA Power Source	2-38, 2-65
RDA Power Source Icons	2-80
RDA Restart	2-61
RDA Standby	2-61
RDA State	2-60
RDA Status/Control Region	2-38
RDA/RPG Interface Control/Status	2-82
RDA/RPG Wideband Status	2-81
Read from Archive III	2-145
Read Products from Archive III	2-215
Read Status Messages From Archive III	2-215
Receiver/Signal Processor Performance Data	2-193
REDUNDANT CONTROL	2-219
Redundant Systems	1-7
Ref Contour Interval	3-29

INDEX

Title	Page
Reflectivity (Z) Estimate	3-53
Relay Box	1-8, 1-16
Remote BDDS Equipment	1-8
Remote BDDS Processor	1-8
Remote LAN Switch	1-8
Remote Monitoring Subsystem (RMS) Power Administrator Masterswitch	1-7
Remote MSCF	1-9, 2-2
Remote RDA Maintenance Terminal	1-7
Remote Router	1-8
Rest of User Controls	3-62
Restart Elevation	2-53, 3-22
Restart VCP	2-53, 3-22
Restoral of BDDS User Accounts Made Using tar	2-209
Restoral of RPG or MSCF User Accounts Made Using tar	2-208
Return key	2-15
Right Mouse Button	2-19
RMS Power Administrator Masterswitch	1-16
Router	1-5, 1-14, 1-15
Router Card Status	2-28
RPG Alarm Summary	2-138
RPG Applications Software Backup	2-208
RPG Applications Software Restoral	2-208
RPG Close, State, and Mode	2-86
RPG Control Window	2-85
RPG Controls	2-84
RPG Equipment Description	1-10
RPG Functionality	1-4
RPG Group Software	1-19
RPG HCI	2-31
RPG Human-Computer Interface (HCI) Controls	2-6
RPG Mode	2-90
RPG Processor	1-4, 1-13, 3-2
RPG Products Window	2-91
RPG Restart	2-86
RPG Shutdown	2-89
RPG Software Program (CPCI 03)	1-19
RPG Status	2-137
RPG System Control Block	2-86
RPGPCA	1-4, 1-13
RS-232/RS-422 Converter	1-6
S	
Save and Undo Buttons	2-176
Save Button	2-163, 2-168, 3-61

INDEX

Title	Page
Scale	3-51
Search	2-35
Search Block	2-74
Search Date/Time Box	2-137
Second Row of Commands, VAD Update and Units	3-69
Security	2-237
Segment: Low/High	3-50
Select Code	3-53
Select Product Box	2-137
Selectable Parameters	2-104, 3-13
Selected Message Information	2-140
Selection of Generation Time 1 and 2	3-37
SELECTION OF PRODUCT PARAMETERS	3-27
Set All Products	2-166
Shift Keys	2-17
Short-Haul Modem	1-6
Show PRF# or RMAX	3-22
Show Pull Down Menu	2-35
Simplified Conceptional Model of Clutter Suppression Filter	3-54
Sixteenth Level	3-43
Software Description	1-19
Sort Options	2-157
Source/Destination	2-197
Space Bar	2-15
Spectrum Width (W) Estimate	3-54
SSRAM	1-14
Start BDDS	2-32
State of the System	2-232
Status	2-170
Stop BDDS	2-32
STP Data Levels	2-111, 3-39
Suggested Clutter Suppression Management	3-59
Sun Window	2-204
System Log Messages	2-139
System Security Overview	2-237
System Software Backup Using ufsdump	2-208
System Software Restoral Using ufsrestore (Individual File System Example)	2-208
T	
Tab Key	2-16
Table of Threshold and Detection Data	2-177
Tabular Listing of Low/High Elevation Segments	3-52
TCP	1-4
Tenth through Fifteenth Levels	3-43

INDEX

Title **Page**

Terminate Clients 2-32
Text Line of Last Updates 3-70
Text Strings 2-168
Third through Sixteenth Levels 3-35, 3-40
Time Last Detected, Light and Significant 2-177
Time Limit 2-159
Time Until Clear Air 2-177
Top Center 2-168
Top of Radome 2-168
Top Row of Commands 3-61, 3-65
Tower 2-39
Tower Utilities Performance Data 2-194
Transitional Power Source (TPS) 2-39
Transmitter Performance Data 2-195
Two Circular Bypass Map Displays:
Doppler Channel and Surveillance Channel 3-50
Two Rows of Selections/Options for the Current Display 3-50

U
Undo and Download Buttons 3-48
Undo Button 2-163, 2-168
Uninterruptible Power Supply (UPS) 1-4, 1-13
UNIX Operating System 1-19
Unmount Archive III Disk Button 2-145
Update Button 2-30
Update Info 2-32
UPS 1-4
User Class 2-165
User ID 2-159
User Name 2-202
User Products 2-164
User Status 2-167
USERS Control Box 2-153

V
VAD and RCM Height 3-40
VAD and RCM Heights 2-117
VAD Update 2-178
VCP 2-59
VCP Control Window 2-39, 3-15
VCP Modification 3-25
VCP Modification and PRF Selection 3-25
VCP Selection 3-21
Velocity Data Levels 2-123, 3-42

INDEX

Title **Page**

Velocity Interval 3-17, 3-22
VOLUME COVERAGE PATTERN 3-15
Volume Coverage Pattern (VCP) Changes And Automatic PRF Selection . . . 3-25
Volume Status 2-79

W
WAN 1-14
Warning popups 2-9
Wideband Communication Links 1-6
Wideband Communications 3-3
Wideband Communications Performance Data 2-196
Windows 2-3, 2-7
Workspace Menu 2-13, 2-204
Workspaces 2-3

Z
Zero Isodop Apparent in the Reflectivity Field 3-57

GLOSSARY OF TERMS

Acronym or Non-Standard Term	Definition
A & E	Architects and Engineers
ABM	Asynchronous Balanced Mode
AC	Alternating Current
ACU	Arithmetic Control Unit, Automatic Call Unit
ACUI	Automatic Calling Unit Interface
A/D	Analog-to-Digital
ADCCP	Advanced Data Communications and Control Procedures
AF	Air Force
AFB	Air Force Base
AFWA	Air Force Weather Agency
AGC	Automatic Gain Control
AGL	Elevation Angle and Height
AIR	Auxiliary Instruction Register
Aliasing	The process by which frequencies too high to be analyzed with the given sampling interval appear at a frequency less than the Nyquist frequency.
ALB	Analog Loopback
ALU	Arithmetic Logic Unit
AM	Amplitude Modulation
AMP	Amplifier
A/N	Alphanumeric
ANSI	American National Standards Institute
AP	Anomalous Propagation
API	Applications Programming Interface
APUP	Associated Principal User Processor
Areal	Amount of Area Covered
ARTCC	Air Route Traffic Control Center
ASCII	American Standard Code for Information Inter change
ATE	Automatic Test Equipment
AU	Arithmetic Unit
AZ	Azimuth
B	Batch
Barbs	A symbol used to represent wind speed and direction. A line pointing in the direction of the wind with smaller lines protruding perpendicular from it to represent speed.
BASRFLCT	Processing task which produces base reflectivity products
BASVLCTY	Processing task which produces base velocity products
BB	Broad Band
B BUS	Bottom Bus
Bcur	Current BIAS, the current multiplicative factor that adjusts for the radar bias when compared to surface precipitation measurements.

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
BIT	Built In Test
BITE	Built-In Test Equipment
BIU	Bus Interface Units
BP	Bandpass
BPI	Bi-Polar Interface
BYTE	8 Contiguous Bits
CA	Computer Accelerator
CC	Condition Code
CC/EDS	Commercial Computers/Equipment Documentation Set
CCITT	International Telegraph and Telephone Consultative Committee
CCM	Command Control Module
CD	Contiguous Doppler
CDS	Control Diagnostic System
CI	Configuration Item
CMM	Composite Memory Module
COHO	Coherent Oscillator
CONUS	Continental United States
COTS	Commercial Off the Shelf
CPC	Computer Program Component
CPCI	Computer Program Configuration Items
CPU	Computer Processing Unit
CRC	Cyclic Redundancy Check
CRT	Cathode Ray Tube
CS	Contiguous Surveillance/Control Store
CSAR	Control Store Address Register
CSC	Computer Software Component
CSCI	Computer Software Configuration Item
CSU	Channel Service Unit
CTL	Control
CTM	Channel Terminal Manager
CW	Continuous Wave
CWSU	Center Weather Service Unit
Dealiase	The action or process of restoring the correct frequency information (which represents wind velocity) to a digital signal which may have become distorted during the conversion from an analog signal.
D/A	Digital-to-Analog
DAU	Data Acquisition Unit
dB	Decibels
dBz	Reflectivity
DC	Direct Current
DCB	Device Control Block
DCE (See also DTE)	Data Circuit-terminating Equipment, Data Communications Equipment
DCTE	Data Circuit Terminating Equipment
DCU	Digital Communications Unit

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
DIO	Digital Input/Output
DIOS	Digital Input/Output System
DIP	Dual-In-line Package
DLB	Digital Loopback
DMA	Direct Memory Access
DME	Data Manipulation Executive
DMI	Direct Memory Interface
DMS	Data Management System
DOORS	Dynamic Object Oriented Requirements System
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation
DP	Data Processor
DRAM	Decoder RAM
DROM	Decoder ROM
DRT	Round Trip Distance
DSP	Digital Storm Total Rainfall Accumulation
DTE (See also DCE)	Data Terminal Equipment, Data Transfer Engine
EDMA	Extended DMA
EEC	Enterprise Electronics Corporation
E/ET	End To End Test
EMAM	Enhanced Memory Access Multiplexer
EMAR	EDMA Memory Access Register
EPF	Early Power Failure
ESD	Electrostatic Sensitive Device
ET	Echo Tops
ETC	Echo Tops Counter
ETCPROD	Echo Tops Contour product
ETPRODD	Echo Tops product
Exp	Expanded
FAA	Federal Aviation Administration
FAS	Fault Alarm System
FAT	Factory Acceptance Test
FR	Flag Register
FCS	Frame Check Sequence, Fixed Control Store
FD	Doppler Frequency
FFT	Fast Fourier Transform
FIFO	First In, First Out
FM	Frequency Modulator
FMH	Federal Meteorological Handbook
FO	Fiber Optic
FPU	Floating Point Unit
GDR	Good Data Register
GFI	Government Furnished Information
GHz	Gigahertz
GI	Graphics Interface
GPIF	Graphics Peripheral Interface
GUI	Graphical User Interface
GUY	Tension Support rope for antenna

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
HDLCM	High Density Line Conditioning Module
HSDH	High Speed Data Handler
HSP	Hardwired Signal Processor
HVAC	Heat, Ventilation, and Air Conditioning
Hydrometeorological	Components (such as temperature, pressure, humidity, wind, rainfall, and cloudiness) which determine the state of the weather.
I/O	Input/Output
IAW	In Accordance With
IAGC	Instantaneous Automatic Gain Control
ICD	Interface Control Document
ID	Identification
IDR	Input Data Register
IF	Intermediate Frequency
IOC	Input/Output Controller
IOT&E	Initial Operational Test and Evaluation
IPC	Intelligent Peripheral Controller
I Phase	In Phase
IPP	Image Pipeline Processor
IR	Instruction Register
ISC	Input Signal Condition
ISU	Interference Suppression Unit
Kb	Kilobyte (kilo = 1,024)
Kbps	Kilobytes per second
Klystrons	An electronic tube used as a low-power oscillator or a high-power amplifier at ultrahigh frequencies. Noted for exceptional stability over long period of transmission.
Km	Kilometers
LAL	Local Analog Loopback
LBC	Local Bank (Memory) Controller
LCM	Line Conditioner Module
LDM	Limited Distance Modem
LED	Light Emitting Diode
LFM	Limited Area Fire Mesh
LH	Left Hand
LIN	Linear
LMA	Local Memory Address
LMB	Local Memory Bus
LOC	Location Counter
LOCA	Level Of Change Authority
LOG	Logarithmic
LOS	Line of Sight
LPI	Lines Per Inch
LR	Link Register
LRC	Longitudinal Redundancy Check
LRU	Line Replaceable Unit
LSB	Least Significant Bit
LSU	Loader Storage Unit

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
LTD	Limited Distance Modem
LUT	Lookup Table
MAR	Memory Address Register
MAT	Memory Address Translator
MAX	Maximum
Mb	Megabyte (mega = 1,048,576)
Mb/s	Megabits Per Second (mega = 1,000,000)
MRD	Memory Data Register
MDS	Memory Data System
Meso	Center
Mesocyclone	A 3-dimensional region in a storm that rotates (usually cyclonically) and is closely correlated with severe weather.
Mhz.	Mega Hertz
MIL-STD	Military Standard
MIN	Minimum
MIP.	Mega Instructions Per Second (mega = 1,000,000)
MLOS	Microwave Line of Sight
MMI	Man-Machine Interface
Mode A	Convective Mode (Precipitation/Severe Weather)
Mode B	Clear Air Mode
MODEM.	Modulate, Demodulate
MOU	Memorandum of Understanding
MPC	Multiple Peripheral Control
MPE	Micro-Interrupt Priority Encoder
M/S	Meters Per Second
MSEcur	Current Mean Square Error (MSE) of current BIAS value.
MSB	Most Significant Bit
MSL	Mean Sea Level
MTBF	Mean Time Between Failures
MTC	Magnetic Tape Controller
MUX.	Multiplexer
N/A	Not Applicable
NAPUP	Non_Associated Principal User Processor
NB	Narrowband
NEC	National Electrical Code
NEXRAD	Next Generation Weather Radar
NHA	Next Higher Assembly
NHC	National Hurricane Center
NMC.	National Meteorological Center
NR	No Requirement
NS.	Nanosecond
NSSL	National Severe Storms Laboratory
NUOC.	NEXRAD User's Operation Concept
NWS	National Weather Service
Nyquist.	Transmitting pulse signals through a system
ODC	Optical Disk Controller

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
ODR	Output Data Register
OED	Overhead Encoder/Decoder
OLTE	Optical Line Terminating Equipment
OMT	Othogonal Mode Transducer
ORX	Optical Receiver
OS	Operating System
OTX	Optical Transmitter
PA	Program Address
PAL	Programmable Array Logic
PCU	Pedestal Control Unit
PDL	Product Distribution List
PGP	Product Generation Processor
PIC/LFC	Precision Interval Clock/Line Frequency Check
PIE	Priority Interrupt Encoder
PMFL	Performance Monitoring and Fault Localization
P-MUX	Private MUX
PPA	Pedestal Power Amplifier
PPAU	Pedestal Power Amplifier Unit
PPF	Primary Power Fail
PPI	Plan Position Indicator
PPP	Pulse Pair Processing
PRF	Pulse Repetition Frequency
PRI	Pulse Repetition Interval
PROM	Programmable Read-Only Memory
PRT	Pulse Repetition Time
PSP	Programmable Signal Processor
PSTN	Public System Telephone Network
PSW	Program Status Word
PUES	Principal User External System
PUP	Principal User Processor
PWA	Printed Wire Assembly
Q	Quadrature
QAM	Quadrature Amplitude Modulation
QSA	Quad Synchronous Adapter
RAL	Remote Analog Loopback
RALU	Register Arithmetic Logic Unit
RAM	Random Access Memory
RBUS	Result Bus
RCM	Radar Coded Message
RCVR	Receiver
RD	Receiver Data
RDA	Radar Data Acquisition
RDADP	Radar Data Acquisition Data Processor
RDASC	Radar Data Acquisition Status and Control
RDASOT	Radar Data Acquisition System Operational Test
RDL	Remote Digital Loopback
RDMI	Receive Data Message Initialization

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
RF	Radio Frequency
RFC	River Forecast Center
RGBS	Red, Green, Blue, Sync
RGDAC	Rain Gauge Data Acquisition Computer
RH	Right Hand
RMAX	Maximum Range
RMS	Remote Monitoring Subsystem
RMS	Root Mean Square
ROC	Radar Operation Center
ROM	Read-Only Memory
RPG	Radar Product Generation
RPGOP	Radar Product Generation Operational Position
RPIE	Real Property Installed Equipment
RPM	Revolutions Per Minute
RPS	Routine Product Set
RST	Remote Self-Test
RTS	Request to Send
RX	Receiver
S	Sample
SAR	Specific Absorption Rate
SBI	System Bus Interface
SCA	Shear Contour Azimuth
SCR	Silicon Control Rectifier, Shear Contous Radial
SCSI	Small Computer System Interface
SDF	Software Development Facility
SDR	Status Data Request
SELCH	Select Channel
SERD	Support Equipment Requirement Data
SIMD	Single Instruction, Multiple Data
SHEF	Standard Hydro-meteorological Exchange Format
SMI	Serial Maintenance Interface
SOPS	Swing-Out Power Subsystem
SOT	System Operability Testing
SP	Signal Processor
SPS	Signal Processor Subsystem
SS	Storm Series
STALO	Stable Local Oscillator
STATMUX	Statistical Multiplexer
STM	Storage Module
SYNC	Synchronous
SW	Spectrum Width
SWP	Severe Weather Probability
T Bus	Top Bus
TBD	To Be Determined
TD	Transmitter Data
TODY	Time of Day Clock
TPMS	Transition Power Maintenance Shelter

GLOSSARY - CONT.

Acronym or Non-Standard Term	Definition
TPS	Transition Power Source
TPS JB	Transmitter Power Supply Junction Box
TRM	Transmitter Receiver Module
TSG	Test Sequence Generator
TTL	Transistor-Transistor Logic
TVS	Tornado Vortex Signature
TVSA	Tornado Vortex Signature Algorithms
TX	Transmitter
UART	Universal Asynchronous Receiver/Transmitter
UCP	Unit Control Position
UD	Unit Designation
ULI	Universal Logic Interface
URL	User Selectable Layer Composite Reflectivity
V	Volts, Velocity
VAC	Volts Alternating Current
VAD	Velocity Azimuth Display
VCI	VMEbus to Concurrent I/O Bus Interface
VCP	Volume Coverage Pattern
VIC	VMEbus Interface Controller VME Interface Chip
VIL	Vertically Integrated Liquid
VILETALG	Processing task which produces volume-based products
VILPROD	Vertically Integrated Liquid product
VME	Versa Module Eurocard
VMEbus	Versa Module Eurocard Bus
VSWR	Voltage Standing Wave Ratio
VT	Video Twelve
V&V	Verification and Validation
WB	Wideband
WBC	Wideband Communications
WCCM	Wideband Communications Control Module
WER	Weak Echo Region
WF	Waveform
WFO	Warning and Forecast Office
WL	Wavelength
WSFO	Weather Service Forecast Office
WSR	Weather Surveillance Radar
WSR-88D	Weather Surveillance Radar - 1988 Doppler
XMTR	Transmitter
ZBID	Zero-Bit Insert/Delete