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INTERFACE CONTROL DOCUMENT FOR THE RDA/RPG

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INTERFACE CONTROL DOCUMENT
FOR THE RDA/RPG
2620002

DOCUMENT REVISION RECORD FORM

REVISION	**-**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**M**
RELEASED BY	ROC	ROC	ROC	ROC	ROC	ROC	ROC	ROC	ROC	ROC	ROC	ROC
RELEASE DATE	03/01/96	06/26/98	09/11/01	04/13/05	02/08/06	5/25/07	03/25/08	03/03/09	11/04/09	06/07/10	7/29/11	3/7/2012
EFFECTIVITY	03/01/96	06/26/98	09/11/01	04/13/05	02/08/06	5/25/07	03/25/08	03/03/09	11/04/09	06/07/10	7/29/11	3/7/2012
AUTHORITY	F0048	F0095	F0103	0126/0209	0126/0210	0250	0286	0349	0445	0465/0476	0274	0420
FAST TRACK	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
REV HISTORY	BLD 9.0	BLD 10.0	OPEN BLD 1.0	RPG BLD 7.0	RPG BLD 8.0	RPG BLD 9.0	RPG BLD 10.0	RPG BLD 11.0	RPG BLD 11.2	RDA BLD 11.5/RPG BLD 12.1	RDA BLD 12.0	RDA BLD 13.0
Section 1	-	A	B	C								M
Section 2	-	A	B	C			F					
Section 3	-	A	B	C	D	E	F	G	H	J	K	M
Section 4	-	A	B	Deleted								
Section 5	-	A	B	Deleted								
Section 6	-	A	B	Deleted								
Section 7	-	A	B	Deleted								
Section 8	-	A	B	Deleted								
Section 9	-	A	B	Deleted								
Section 10	-	A	B	Deleted								
Appendix A	-	A	B	C								
Appendix B						E						
Appendix C							F					

Revision record continued on next page.

REVISION	**N**	**P**	**R**	T	U	**V**	**W**		
RELEASED BY	ROC	ROC	ROC	ROC	ROC	ROC	ROC		
RELEASE DATE	1/06/2014	4/21/16	2/28/18	3/3/20	7/21/21	6/2/22	6/5/2023		
EFFECTIVITY	1/06/2014	4/21/16	2/28/18	3/3/20	7/21/21	6/2/22	6/5/2023		
AUTHORITY	0599	0437F	ECP 0747	ECP 0813	ECP 0881	ECP 0941	ECP 0985		
FAST TRACK	NO	NO	NO	NO	NO	NO	NO		
REV HISTORY	RDA BLD 14.0	RDA BLD 17.0	RDA/RPG BLD 18.0	RDA/RPG BLD 19.0	RDA/RPG BLD 20.0	RDA/RPG BLD 21.0	RDA/RPG BLD 22.0		
Section 1									
Section 2									
Section 3	N	P	R	T	U	V	W		
Section 4		P							
Section 5									
Section 6									
Section 7									
Section 8									
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Section 10									
Appendix A			R	T		V			
Appendix B			R						
Appendix C			R	T		V	W		

REVISION RECORD

Document Originally Released as 1208321H and then converted to ROC Document 2620002

Revision	**Description**	**Date**
Revision A	Updated for Build 10.0	26 June 1998
Revision B	Updated for ORPG Build 1.0.	11 September 2001
Revision C	Define new client/server interface between ORDA and RPG. Update message formats for ORDA. Divided this document into two documents, communication protocol and application layer. The communications protocol will be documented in 2620060, RDA/RPG TCP/IP ICD.	13 April 2005
Revision D	Updated for RPG Build 8.0	08 February 2006
Revision E	Updated for RPG Build 9.0. Added Appendix B.	25 May 2007

Revision F	Updated for RPG Build 10.0. a. Added new Table XVII for Message 31 for Build 10. b. Made correction to Table XVII-B for SNR threshold precision from 0.1 to 0.125 dB and range of -12.0 to + 20.0 dB to match usage in Message 5. c. Updated Message 5 for super resolution selection parameters. d. Made corrections to Message 1 for velocity ranges. e. Made segmentation changes to Table II Message Header Data. f. Updated Table I Data Message Types for Message 31. g. Changes to increase number to 25 clutter regions. h. Removed unused alarms. i. Updated Source address in Section 2.	25 March 2008
Revision G	Updated for Build 11.0.	03 March 2009
Revision H	Updated for RPG Build 11.2. Changed the valid range of "RDA BUILD NUMBER" in the summary status message (halfword 10), from "0 to 999", to "0 to 9999", to allow for the new scaling factor of 100 that the build number will be using.	04 November 2009
Revision J	Updated Table IV-A RDA Alarm Messages for RDA Build 11.5. Updated Figure C-6 VCP 121 for RPG Build 12.1.	07 June 2010
Revision K	RDA Build 12.0 changes for Dual Polarization.	29 July 2011
Revision M	Updated for RDA Build 13.0.	7 March 2012
Revision N	Updated for RDA/RPG Build 14.0 CCRs Affected: NA12-00299, NA12-00018, NA12-00019, NA12-00378, NA12-00233, NA12-00046, NA12-00023, NA12-00022, NA12-00373, NA12-00046, NA13-00044, NA12-00022, NA12-00023, NA12-00256, NA12-00421, NA11-00198, NA12-00234, NA12-00338, NA13-00111	06 January 2014
Revision P	Updated for RDA Build 17.0. NA15-00083, NA08-00310	21 April 2016
Revision R	Updated for RDA and RPG Build 18.0 CCRs included in the update: NA12-00422, NA13-00184, NA15-00260, NA15-00286, NA16-00024, NA16-00044, NA16-00071, NA16-00135, NA16-00150, NA16-00151, NA16-00152, NA16-00158, NA16-00175, NA16-00221, NA16-00299, NA16-00306, NA16-00330, NA17-00006, NA17-00041, NA17-00066, NA17-00085, NA17-00098, NA17-00107,	28 February 2018

	NA18-00042	
Revision T	Updated for RDA and RPG Build 19.0. CCRs included in the update: NA14-00166, NA16-00327, NA17-00170, NA17-00178, NA17-00220, NA17-00241, NA17-00275, NA17-00288, NA17-00293, NA17-00295, NA18-00054, NA18-00081, NA18-00083, NA18-00094, NA18-00099, NA18-00151, NA18-00178, NA18-00212, NA18-00213, NA18-00215, NA18-00217, NA18-00371, NA18-00398	3 March 2020
Revision U	Updated for RDA and RPG Build 20.0 CCRs included in the update: NA19-00311, NA19-00360, NA19-00372, NA20-00030, NA20-00233	21 July 2021
Revision V	Updated for RDA and RPG Build 21.0 CCRs included in the update: NA20-00312, NA21-00147, NA21-00191, NA21-00220, NA22-00156	2 June 2022
Revision W	Updated for RDA and RPG Build 22.0. CCRs included in the update: NA21-00109, NA22-00061, NA22-00138, NA22-00190, NA22-00226, NA22-00258, NA22-00259, NA22-00260, NA22-00261, NA22-00262, NA22-00263	5 June 2023

Table of Contents

1 SCOPE

1.1 Identification

This document defines the interface between the Radar Data Acquisition (RDA) and Radar Product Generation (RPG) functional areas of the WSR-88D system. This document revision is applicable to the RDA design employing client/server technology and to the RPG design employing client/server technology. This new RDA design is more commonly called the Open RDA (ORDA). This new RPG design is more commonly called the Open RPG (ORPG).

1.2 Security

The RDA and RPG subnets are mission critical networks. No firewall will be used between these trusted systems; however, access control will be employed. The services allowed would include Network Time Protocol (NTP), radar data, Internet Control Message Protocol (ICMP), and Master System Control Function (MSCF) display data, all other services shall be denied.

1.3 System Overview

The WSR-88D acquires, generates, and distributes Doppler radar products for meteorological and hydrological applications. Specifically, the RDA functional area acquires radar data; controls antenna, transmitter, and receiver electronics; prepares radar data in a digital format; transmits radar data and status to the RPG; and processes control information from the RPG. The RPG functional area receives radar data and status information from the RDA, formats and sends control commands to the RDA, generates radar products, and distributes radar products for graphical and alphanumeric display systems.

The WSR-88D system was developed in the mid to late 1980s. Full scale deployment began in 1992 and was completed in 1995. DoD, DoC, and DoT jointly sponsored the development, acquisition, and deployment of the WSR-88D. There are 159 operating sites which include the RDA and RPG functional areas.

1.4 Documentation Overview

This document provides information needed to interface either the RDA or the RPG functional areas of the WSR-88D. Contents include detailed description of the interface components including hardware and software parameters. The document is structured to address applicable layers of the Open System Interconnect (OSI) model and Transmission Control Protocol/Internet Protocol (TCP/IP) communications reference models.

Section 1 provides information regarding the identification, scope, purpose, and organization of this document.

Section 2 provides information about documentation relevant to this ICD, including applicable and informative documents.

Section 3 provides a description of the Application Layer.

Appendix A provides a list of acronyms included in this document.

Appendix B provides a definition of the units and symbology used in this document.

Appendix C provides Volume Coverage Patterns.

2 REFERENCE DOCUMENTS

This section lists the number, title, revision, and date of all documents referenced in this specification. This section shall also identify the source for all documents not available through normal Government stocking activities.

2.1 Government Documents

2.1.1 Specifications

Reference Number	Title
2810000K	WSR-88D System Specification
2830013	WSR-88D System/Subsystem Design Document
2820001, Pt 1	Computer Program Development Specification for RDA Status and Control Program (CPCI-01)
2820003N, Pt1	Computer Program Development Specification for Radar Product Generation Program (SRS, CPCI-03)
2830006, Pt 1	Critical Item Development Specification for Wideband Communications Link (CI-06)
2620015A	Microwave Line of Sight (MLOS) Fault Alarm System
2620036	RPG to Base Data Distribution Server (BDDS) ICD
2830007 Pt. 1	RPG Equipment B1 and update (CI-07)
2830009 Pt.1	RDA Equipment B1 (CI-09)
2620060	RDA/RPG TCP/IP ICD
Source:	WSR-88D Radar Operations Center 1313 Halley Circle Norman, OK 73069

2.2 Non-Government Documents

2.2.1 Industry Standards

Reference Number	Title
IEEE 754-1985	IEEE Standard for Binary Floating-Point Arithmetic
Source:	IEEE Customer Service 445 Hoes Lane PO Box.1331 Piscataway NJ 08855-1331 http://www.standards.ieee.org/
NIST Special Publication 330, 2001 Edition	The International System of Units (SI)
Source:	United States Department of Commerce National Institute of Standards and Technology http://physics.nist.gov

3 RDA TO RPG APPLICATION LAYER

The applications messages associated with TCP/IP for the RPG to RDA interface are specified herein. The specific WSR-88D operating procedures and product message formats are defined also.

3.1 Session Specific

3.1.1 TCP Client/Server Relationship

The TCP connection on the RPG side will be the client. The RDA connection will be the server.

3.1.2 TCP Port Mapping

One TCP connection to the host is established and as a Permanent Virtual Channel (PVC).

3.1.3 General Message Descriptions

All session messages have a three word integer header. All fields in the header are four octets in network (big endian) byte order. The first field (first four octets) of the header is the message type. The second field's function is message type dependent. The third field is the message size (number of octets of data following the header) excluding the message header.

TCM Message Header

Message Type	Message Type Dependent	Server/Client Data Size
←——— 4 ¾¾¾® octets	←——— 4 ¾¾¾® octets	←——— 4 ¾¾¾® octets

The following table contains the message types and message codes.

Session Message Type	Message Code
LOGIN	0
LOGIN ACKNOWLEDGEMENT	1
DATA	2
DATA ACKNOWLEDGEMENT	3
KEEP ALIVE	4

3.1.4 Error Handling

Either side of a session link will close and disconnect TCP connections for all PVCs on the detection of an error on any PVC. A disconnected client may attempt to reconnect at any time.

3.1.5 Disconnect

To disconnect the RPG session, simply close TCP connections for all PVCs. The session layer is not established unless all PVCs for the link have valid TCP connections.

3.2 Application Specific

3.2.1 Data Formats

The following data formats are referenced in this document:

Code*1	One byte (8 bits) of integer data representing a bit field.
Code*2	Two bytes (16 bits) of integer data representing a bit field.
Integer*1	One byte (8 bits) of unsigned integer data.

Integer*2	Two bytes (16 bits) of unsigned integer data.
Integer*4	Four bytes (32 bits) of unsigned integer data.
Real*4	Four bytes (32 bits) of single precision floating point data in IEEE 754 format.
Real*8	Eight bytes (64 bits) of double precision floating point data in IEEE 754 format.
Scaled Integer*1	Floating point data represented by a 1-byte unsigned integer with an assumed decimal point whose position is defined by the precision of the item.
Scaled Integer*2	Floating point data represented by a 2-byte unsigned integer with an assumed decimal point whose position is defined by the precision of the item.
Scaled Integer*4	Floating point data represented by a 4-byte unsigned integer with an assumed decimal point whose position is defined by the precision of the item.
Scaled SInteger*2	Floating point data represented by a 2-byte signed integer with an assumed decimal point whose position is defined by the precision of the item.
Scaled SInteger*4	Floating point data represented by a 4-byte signed integer with an assumed decimal point whose position is defined by the precision of the item.
SInteger*1	One byte (8 bits) of integer data in standard 2's complement format.
SInteger*2	Two bytes (16 bits) of integer data in standard 2's complement format.
SInteger*4	Four bytes (32 bits) of integer data in standard 2's complement format.
String	One or more 8-bit data items, each representing one ASCII character. Values that do not take up the entire field size will be padded with NULL characters.

3.2.2 Operating Procedures

The data messages to be transferred between the RDA and the RPG are listed in Table I. The data messages will be exchanged after a successful session is established. A message header of format specified in Table II is attached to each message transmitted across the link.

3.2.2.1 Table I Data Message Types

Type	Description	Source	Recipient	Format
1†	Digital Radar Data	RDA	RPG	Table III
2*	RDA Status Data	RDA	RPG/RMS	Table IV
3*	Performance/Maintenance Data	RDA	RPG/RMS	Table V
4	Console Message	RDA	RPG/RMS	Table VI
5*	Volume Coverage Pattern	RDA	RPG	Table XI
6	RDA Control Commands	RPG	RDA	Table X
7	Volume Coverage Pattern	RPG	RDA	Table XI
8	Clutter Censor Zones	RPG	RDA	Table XII
9	Request for Data	RPG	RDA	Table XIII
10	Console Message	RPG	RDA/RMS	Table VI
11	Loop Back Test	RDA	RPG	Table VIII
12	Loop Back Test	RPG	RDA	Table VIII
13+	Clutter Filter Bypass Map	RDA	RPG	Table IX
14	Spare	N/A	N/A	N/A
15*	Clutter Filter Map	RDA	RPG	Table XIV
16	Reserved/FAA RMS Only	N/A	N/A	N/A
17	Reserved/FAA RMS Only	N/A	N/A	N/A

18*	RDA Adaptation Data	RDA	RPG/RMS	Table XV
20	Reserved	N/A	N/A	N/A
21	Reserved	N/A	N/A	N/A
22	Reserved	N/A	N/A	N/A
23	Reserved	N/A	N/A	N/A
24	Reserved/FAA RMS only	N/A	N/A	N/A
25	Reserved/FAA RMS only	N/A	N/A	N/A
26	Reserved/FAA RMS only	N/A	N/A	N/A
29	Reserved	N/A	N/A	N/A
31	Digital Radar Data Generic Format	RDA	RPG	Table XVII
32	RDA PRF Data	RDA	RPG	Table XVIII
33	RDA Log Data	RDA	RPG	Table XVIV

*** =** metadata
† = Data Message Type 31 has replaced Data Message Type 1 as of Build 10.
+ = Data Message Type 13 is no longer sent as of Build 19

3.2.2.2 Messages from RDA

Per Table I, data transmitted from the RDA to the RPG consists of Digital Radar Data Generic Format (Message 31) plus RDA Status Data (Message 2), RDA Performance/Maintenance Data (Message 3), Console Messages (Message 4), Volume Coverage Pattern Data (Message 5), Loop Back Test (Message 11), Clutter Filter Map (Message 15), RDA Adaptation Data (Message 18), RDA PRF Data (Message 32) and RDA Log Data (Message 33).

Digital Radar Data format is given in Table III, RDA Status Data format is given in Table IV, RDA Performance/Maintenance Data format is given in Table V, Console Message format is given in Table VI, Volume Coverage Pattern Data is given in Table XI, Loop Back Test format is given in Table VIII, Clutter Filter Bypass Map format is given in Table IX, Clutter Filter Map Data is given in table XIV, RDA Adaptation Data is given in Table XV, Digital Radar Data Generic Format is given in Table XVII, and RDA PRF Data format is given in Table XVIII. RDA Log Data format is given in Table XVIV.

The RDA sends the ICD formatted message to the RPG. At the RPG end, the communications manager (RPG software task) inserts an additional 12 bytes to the ICD format message. The communications manager also inserts a communications manager header to the message, and then the message is sent to the RPG ingest application. This is also the same information, which is sent to the Base Data Distribution System (BDDS) processor.

3.2.2.2.1 Metadata Message Types and Purpose

The capability to perform Level II recording has been moved from the RDA to the RPG. In order to continue to provide Metadata for Level II, the following Message Types need to be sent from the RDA to the RPG (see Table I) along with Message Type 31, Digital Radar Data Generic Format:

2 - RDA Status Data
3 - Performance/Maintenance Data
5 - Volume Coverage Pattern Data
15 - Clutter Filter Map Data
18 - RDA Adaptation Data

The RDA will send messages 2, 3, 5, 15, 18, and 32 upon wideband connection and prior to going to "OPERATE" state.

The RDA will send messages 2, 3 and 5 prior to sending message 31 at the beginning of each VCP.

The RDA will send message 15 whenever there is a change to Clutter Filter Map Data.

The RDA will send message 18 whenever there is a change to RDA Adaptation Data.

3.2.2.2.2 Non-Metadata Messages and Purpose

Some messages from the RDA to RPG will not be recorded as Metadata. This is because long term storage of the messages is not needed. The messages are meant to help the ROC with field support issues.

33 – RDA Log Data

Message 33 is the only non-data, non-metadata message from the RDA to the RPG at this time.

The RDA Log Data message is frequently sent from the RDA to RPG as log data accumulates.

3.2.2.3 Messages from RPG

Per Table I, data to be transmitted from the RPG to the RDA consists of:
RDA Control Commands (Message 6) , Volume Coverage Patterns data (Message 7), Clutter Censor Zones data (Message 8), Requests for Data (Message 9), Console Messages (Message 10) and Loop Back Test (Message 12).

RDA Control Command format is given in Table X, Volume Coverage Pattern format is given in Table XI, Clutter Censor Zones format is given in Table XII, Requests for Data format is given in Table XIII, Console Messages format is given in Table VI and Loop Back Test messages format in Table VIII.

The transmitted message to the RDA will then consist of the RDA/RPG ICD format message (i.e., message header followed by message data).

3.2.3 Message Descriptions

The following sections define the message formats exchanged via this interface.

The Message Header, as defined in Table II, is appended to the beginning of all messages transmitted between the RDA and the RPG. The Message Header identifies system configuration, message number of information following the header, date, time and number of segments to be transmitted.

Starting in Build 19, messages exchanged between the RDA and RPG are no longer segmented. For messages smaller than 65534 halfwords, the number of message segments and message segment numbers are set to 1. For messages larger than 65534 halfwords, an alternate form of message size definition is specified.

3.2.3.1 Digital Radar Data

3.2.3.1.1 Message Type 1

Data Message Type 31 has replaced Data Message Type 1 as of Build 10.

Digital Radar Data message format is provided in Table III. The message consists of base data information, that is, reflectivity, mean radial velocity and spectrum width, azimuth angle, elevation angle, cut type, scanning strategy and calibration parameters. The frequency and volume of the message will be dependent on the scanning strategy and the type of data associated with that scanning strategy.

3.2.3.1.2 Message Type 31

Digital Radar Data message format is provided in Table XVII. The message consists of base data information, that is, reflectivity, mean radial velocity, spectrum width, differential reflectivity, differential phase, correlation coefficient, azimuth angle, elevation angle, cut type, scanning strategy and calibration parameters. The frequency and volume of the message will be dependent on the scanning strategy and the type of data associated with that scanning strategy.

3.2.3.2 RDA Status Data

RDA Status Data message format is provided in Table IV. The message contains information about the current RDA state, system control, operating status, scanning strategy selected, performance parameters such as transmitter power and calibration and alarms. Alarms contained in this message are summarized in Table IV-A. The RDA Status Data message is sent upon wideband connection, following state or control changes, at the beginning of each volume scan and after a RPG request.

3.2.3.3 Performance/Maintenance Data

The Performance/Maintenance Data message format is provided in Table V. The Performance/Maintenance Data message contains status of RDA sub-functions such as the receiver, transmitter and antenna/pedestal. The RDA sends this message upon wideband connection, at the beginning of each volume scan and after a RPG request.

3.2.3.4 Console Message

The Console Message format is provided in Table VI. When the RDA sends this message to the RPG, the Message Type indicated in the Message Header is 4. When the RPG sends this message to the RDA, the Message Type indicated in the Message Header is 10. The Console Message consists of an ASCII text string composed by the system user to communicate with other RDA, RPG or RMS users. The RDA sends the Console Message upon selection by the system user.

NOTE: In Build 13 message types 4 will be NULL terminated strings

3.2.3.5 Volume Coverage Pattern

The Volume Coverage Pattern message format is provided in Table XI. When the RDA sends this message to the RPG, the Message Type indicated in the Message Header is 5. When the RPG sends this message to the RDA, the Message Type indicated in the Message Header is 7. The RDA sends the Volume Coverage Pattern message upon wideband connection and at the beginning of each volume scan.

3.2.3.6 RDA Control Commands

The RDA Control Commands message format is provided in Table X. The message contains commands to select RDA state, control, channel and volume scan strategies. The control commands can also enable/disable Super Resolution, CMD and AVSET. The RPG can also command the RDA to perform a full performance check at the end of the current VCP, in-lieu of the typical re-trace

calibration. The RDA site can be commanded to run on generator power, or switch to utility. Spot Blanking can be enabled, or disabled at sites where spot blanking capability has been installed at the RDA.

3.2.3.7 Clutter Censor Zone

The Clutter Censor Zone message format is provided in Table XII. The message contains range, azimuth and elevation information for operator defined clutter censor zones. When the RDA receives a Clutter Censor Zone message, the Clutter Filter Map message is recomputed and transmitted to the RPG.

3.2.3.8 Request for Data

The Request for Data message format is provided in Table XIII. The message allows an RPG operator to request RDA Status Data, Performance/Maintenance Data, Clutter Filter Map, RDA Adaptation Data and Volume Coverage Pattern Data.

3.2.3.9 Loop Back Test

The Loop Back Test message format is provided in Table VIII. When the RDA sends this message to the RPG, the Message Type indicated in the Message Header is 11. When the RPG sends this message to the RDA, the Message Type indicated in the Message Header is 12. The Loop Back Test message transmits a sequence of bit data to verify RDA to RPG communication. The RDA sends Message Type 11 to the RPG upon wideband connection. After receipt, the RPG re-sends Message Type 11 to the RDA without any modifications. The RPG sends Message Type 12 to the RDA upon wideband connection. After receipt, the RDA re-sends Message Type 12 to the RPG without any modifications.

3.2.3.10 Clutter Filter Bypass Map

The Clutter Filter Bypass Map message format is provided in Table IX. The Clutter Filter Bypass Map contains information about which range bins are designated as clutter for the designated elevation segment and azimuth angle.

3.2.3.11 Clutter Filter Map

The Clutter Filter Map message format is provided in Table XIV. The Clutter Filter Map contains the clutter censor zone information formatted as in Table XIV. The RDA sends the Clutter Filter Map message upon wideband connection and whenever there is a change to the Clutter Filter Map.

3.2.3.12 RDA Adaptation Data

The Adaptation Data message format is provided in Table XV. The Adaptation Data message contains system parameters used by the RDA to determine alarm thresholds, signal processing parameters, and system configuration. The RDA sends the Adaptation Data message upon wideband connection and whenever there is a change to the data.

3.2.3.13 RDA PRF Data

The PRF Data message format is provided in Table XVIII. The PRF Data message contains the value of the PRFs used by the RDA for each type of Waveform, in millihertz. Waveform Type codes are the same as for the Volume Coverage Pattern message (Table XI). For example the surveillance code in "E3" of Table XI, would come from the given code value of the Surveillance waveform type. Similarly the Doppler code in E13, would be executed at the RDA as the same code number from the Doppler section of the PRF Data message.

3.2.3.14 RDA Log Data

The Log Data message format is provided in Table XVIV. The Log data message contains "text" log statements that are used to monitor the RDA system performance.

3.2.4 Message Tables

3.2.4.1 Table II Message Header Data

NAME	DESCRIPTION (3)	FORMAT	UNITS (4)	RANGE	ACCURACY/ PRECISION	BYTE LOCATION
Message Size	Message size in halfwords (1) (6)	Integer*2	halfword	9 to 65535	1	0 and 1
RDA Redundant Channel	Channel Numbers for: Legacy 0 = Single Channel (no bits set) 1 = Redundant Channel 1 (bit 0 set) 2 = Redundant Channel 2 (bit 1 set) ORDA 8 = Single Channel (bit 3 set) 9 = Redundant Channel 1 (bits 3 & 0 set) 10 = Redundant Channel 2 (bits 3 & 1 set)	Integer*1	N/A	0 to 10	1	2
Message Type	Integer code from Table I	Integer*1	N/A	1 to 33	N/A	3
I.D. Sequence Number	Message Sequence Number	Integer*2	N/A	0 to 65535 then roll over to 0	1	4 and 5
Julian Date	Julian Date - 2440586.5 (2)	Integer*2	d	1 to 65,535	1	6 and 7
Milliseconds of Day	Number of milliseconds from Midnight, Greenwich Mean Time	Integer*4	msec	0 to 86,399,999	± 2000/ ± 1	8 to 11
Number of Message Segments	If the message size is less than 65534 halfwords, the number of message segments is set to 1. Otherwise, halfwords 12-15 specify the size of the message, in bytes. (7)	Integer*2	N/A	1 to 65535	1	12 and 13

Message Segment Number	If the mssage size is less than 65534 halfwords, the message segment number is set to 1. Otherwise, halfwords 12-15 specify the size of the message, in bytes. (7)	Integer*2	N/A	1 to 65535	1	14 and 15

Notes:
1. This is the message size for this message segment, not for the total of all segments in the message.
2. 1 January 1970 00.00 Greenwich Mean Time = 1 Modified Julian Date.
3. All bit locations are referenced to location 0 (LSB).
4. See Appendix B for unit definitions and standard symbology.
6. A size value 65535 indicates that byte locations 12-15 are used to specify the message size, in bytes. This accommodates messages larger than 65534 halfwords. This method of specifying size assumes the message is one segment. See note 7 .
7. When the size field (byte location 0 and 1) value is 65535, bytes 12 and 13 denote the Most Significant Halfword of the message size while bytes 14 and 15 denote the Least Significant Halfword of the message size. The message is assumed one (1) segment with size expressed in bytes.

3.2.4.2 Table III Digital Radar Data (Message Type 1)

Data Message Type 31 has replaced Data Message Type 1 as of Build 10.

NAME	DESCRIPTION	FORMAT	UNITS (18)	RANGE (1)	ACCURACY/ PRECISION	BYTE LOCATION
Collection Time	Zulu reference time at which radial data was collected	Integer*4	msec	0 to 86,399,999	± 2000/ ± 1	0 to 3
Modified Julian Date	Current Julian date - 2440586.5(2)	Integer*2	d	1 to 65,535	1	4 and 5
Unambiguous Range	Unambiguous range, Interval Size	Scaled Integer*2	km	115 to 511	± 0.1/ ± 0.1	6 and 7
Azimuth Angle	Azimuth angle at which radial data was collected	Code*2 (4)	deg	0 to 359.956055	± 0.1°/ ± 0.043945°	8 and 9
Azimuth Number	Radial number within elevation cut	Integer*2	N/A	1 to 400	1	10 and 11
Radial Status	Radial Status (e.g. first, last)	Code*2 (5)	N/A	0 to 133	N/A	12 and 13
Elevation Angle	Elevation angle at which radial radar data was collected	Code*2 (4)	deg	353 to 70	± 0.1°/ ± 0.043945°	14 and 15
Elevation Number	Elevation number within volume scan	Integer*2	N/A	1 to 25	1	16 and 17
Surveillance Range	Range to center of first surveillance gate (BIN)	Code*2 (7)	km	-32.768 to +32.767	± 0.05/ ± 0.001	18 and 19

Doppler Range	Range to center of first Doppler gate (BIN)	Code*2 (7)	km	-32.768 to +32.767	± 0.05/ ± 0.001	20 and 21
Surveillance Range Sample Interval	Size of surveillance sample interval	Code*2 (7)	km	0.25 to 4	± 0.05/ ± 0.001	22 and 23
Doppler Range Sample Interval	Size of Doppler Sample Interval	Code*2 (7)	km	0.25 to 4	± 0.05/ ± 0.001	24 and 25
Number of Surveillance Bins	Number of surveillance bins for current radial	Integer*2	N/A	0 to 460	1	26 and 27
Number of Doppler Bins	Number of Doppler bins for current radial	Integer*2	N/A	0 to 920	1	28 and 29
Cut Sector Number	Sector Number within cut	Integer*2	N/A	0 to 3(14)	1	30 and 31
Calibration Constant (dBZ0)	Scaling constant used by Signal Processor to calculate reflectivity	Real*4	dB	-99.0 to +99.0	± 1/ N/A	32 to 35
Surveillance Pointer	Byte offset to surveillance data (15)	Integer*2	byte	100 (8)	1	36 and 37
Velocity Pointer	Byte offset to velocity data (15)	Integer*2	byte	100 to 560 (8)	1	38 and 39
Spectral Width Pointer	Byte offset to spectral width data (15)	Integer*2	byte	100 to 1480(8)	1	40 and 41
Doppler Velocity Resolution	Indicates scaling used for the Doppler Velocity	Code*2	N/A	2 = 0.5 m/s 4 = 1.0 m/s	N/A	42 and 43
Volume Coverage Pattern Number	Identifies Volume Coverage Pattern being used	Integer*2	N/A	1 to 767	1	44 and 45
Spare	Reserved for use by V + V Simulator (CPCI 24)	N/A	N/A	N/A	N/A	46 to 53
Spare	N/A	N/A	N/A	N/A	N/A	54 and 55
Spare	N/A	N/A	N/A	N/A	N/A	56 and 57
Spare	N/A	N/A	N/A	N/A	N/A	58 and 59
Nyquist Velocity	Nyquist Velocity	Scaled Integer*2	m/s	8 to 35.61 (17)	± .003/ ± .01	60 and 61
ATMOS	Atmospheric Attenuation Factor	Scaled Integer*2	dB/km	−0.02 to −0.002	± .004/ ± .001	62 and 63
TOVER	Threshold parameter which specifies the minimum difference	Scaled Integer*2	dB	0.0 to 20.0	± .1/ ± .1	64 and 65

	in echo power between two resolution cells for them not to be labeled "overlayed"					
Radial Spot Blanking Status	Spot blanking status for current radial, elevation cut and volume scan.	Integer*2 (9)	N/A	1=radial 2=elevation 4=volume	N/A	66 and 67
Spare	N/A	N/A	N/A	N/A	N/A	68 to 99
Reflectivity	Weather radar surveillance data (0 to 460 Cells)	Code*1 (10)(11)	dBZ	-32 to +94.5	± 1/ ± 0.5	100 to 559
Doppler Velocity	Weather radar velocity data (0 to 920 Cells)	Code*1 (10)(11)	m/s	−63.5 to +63 −127 to +126	± 1/0.5 ± 1/1	100 to 1479 (12)
Doppler Spectrum Width	Weather radar spectral width data (0 to 920 Cells)	Code*1 (10)(11)	m/s	-63.5 to +63	± 1/0.5	100 to 2399 (13)

Notes:
1. This field represents the range of the item after any applicable scaling and conversion is done.
2. 1 January 1970 00.00 GMT = 1 Modified Julian Date
4. Format Defined in Table III-A
5. Format Defined in Table III-C
7. Format Defined in Table III-B
8. A 0 indicates No Data.
9. Equals 0 when spot blanking disabled; equals 4 when spot blanking enabled and no spot blanking radials in current elevation cut; equals 6 when there are spot blanked radials in current elevation cut and current radial not spot blanked; equals 7 when current radial is spot blanked.
10. Value of 00 (prior to scaling) is Signal Below Threshold, value of 01 (prior to scaling) is Signal Overlaid
11. See Table III-E for Scaling - Range of Doppler Velocity set in accordance with Doppler Velocity Resolution
12. Byte Start Location depends on length of Reflectivity Field, Byte Stop Location depends on Length of Velocity Field.
13. Byte Start Location depends on length of Reflectivity and Velocity Fields, Byte Stop Location depends on Length of Spectral Width Field.
14. 0 is valid only for continuous surveillance cuts.
15. Offset from the start of the Digital Radar Data message.
17. Values shown exceed practical range used by NEXRAD radar that is larger than typical minimum and maximum values.
18. See Appendix B for unit definitions and standard symbology.

3.2.4.3 Table III-A Angle Data Format

	Angle Data Format (Degrees)
BIT #	**MEANING**
15	180 deg
14	90 deg
13	45 deg

12	22.5 deg
11	11.25 deg
10	5.625 deg
9	2.8125 deg
8	1.40625 deg
7	0.70313 deg
6	0.35156 deg
5	0.17578 deg
4	0.08789 deg
3 (LSB)	0.043945 deg
2	X
1	X
0	X

X = NOT APPLICABLE
NOTE: A positive elevation angle is defined as being up from the horizontal plane, and a positive azimuth angle is defined as being clockwise from true north, when looking down at the radar.

NOTE: Elevation angles greater than 90 degrees will be interpreted as a negative angle and the actual elevation angle will be computed as the angle value minus 360 degrees.

NOTE: For Elevation and Azimuth Position Correction factors, angles greater than 1 degree will be interpreted as a negative angle and the actual correction factor will be computed as the angle value minus 360 degrees.

Table III-B Range Format

	Range Format (Km)
BIT #	**MEANING**
15	Sign
14	16.384
13	8.192
12	4.096
11	2.048
10	1.024
9	0.512
8	0.256
7	0.128
6	0.064
5	0.032
4	0.016
3	0.008
2	0.004
1	0.002
0 (LSB)	0.001

3.2.4.4 Table III-C Radial Status Data Format

Radial Status	Setting (Hex)	Bad Data (Hex)

Indicator (Hex)		
Start of new Elevation	00	80
Intermediate Radial Data	01	81
End of Elevation	02	82
Beginning of Volume Scan	03	83
End of Volume Scan	04	84
Start of new Elevation - Last Elevation in VCP	05	85

3.2.4.5 Table III-E Base Data Scaling

LSB = 0.5	R = NINT [2.*(R_{num} + 32.)] + 2
LSB = 0.5	V = NINT [2.*(V_{num} + 63.5)] + 2
LSB = 1.0	V = NINT [V_{num} + 127.] + 2
LSB = 0.5	SW = NINT [2.*(SW_{num} + 63.5)] + 2

Where:
NINT is a rounding function (i.e., NINT[1.5] returns 2) R_{num}, V_{num}, SW_{num} are values before scaling.
The inverse relationships are:
$R_{num} = (R \div 2) - 33.0$
$V_{num} = (V \div 2) - 64.5$ or $V - 129.0$
$SW_{num} = (SW \div 2) - 64.5$

3.2.4.6 Table IV RDA Status Data (Message Type 2)

NAME	DESCRIPTION	FORMAT (3), (4)	UNITS (8)	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
RDA STATUS	•Start-Up •Standby •Restart •Operate •Spare •Spare	•Code*2 (7)	•N/A	•As Listed •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set) •32 (bit 5 set) •64 (bit 6 set)	•N/A	•1
OPERABILITY STATUS	•RDA - On-line •RDA - Maintenance Action Required •RDA - Maintenance Action Mandatory •RDA - Commanded Shut Down •RDA - Inoperable	•Code*2	•N/A	•As Listed •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set) •32 (bit 5 set)	•N/A	•2

CONTROL STATUS	•Local Only •RPG (Remote) Only •Either	•Code*2 (7)	•N/A	•As Listed •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set)	•N/A	•3
AUXILIARY POWER GENERATOR STATE	•Switched to Auxiliary Power •Utility PWR Available •Generator On •Transfer Switch - Manual •Commanded Switchover	•Code*2	•N/A	•As Listed •1 (bit 0 set) •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set)	•N/A	•4
AVERAGE TRANSMITTER POWER	Calculated over a range of samples	Integer*2	W	0 to 9999	± 1/ ± 1	5
HORIZONTAL REFLECTIVITY CALIBRATION CORRECTION (delta dBZ0)	Difference from Adaptation Data	Scaled Integer*2	dB	-198.00 to +198.00 (5)	1/0.01	6
DATA TRANSMISSION ENABLED	(Any combination of Data Enabled) •None •Reflectivity •Velocity •Width	•Code*2	•N/A	•As Listed •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set)	•N/A	•7
VOLUME COVERAGE PATTERN NUMBER	(Magnitude defines Pattern, Sign defines selection) •No Pattern •RDA Local Pattern Selected •RDA Remote Pattern Selected	•SInteger*2	•N/A	•As Listed •0 (no bits set) •Negative •Positive	•1	•8
RDA CONTROL AUTHORIZATION	•No Action •Local Control Requested •Remote Control Requested (a.k.a. Local Control Released)	•Code*2 (7)	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•9
RDA BUILD NUMBER	RDA major & minor build	Scaled Integer*2	N/A	0 to 9999 (6)	N/A	10

	version information					
OPERATIONAL MODE	•Operational •Maintenance	•Code*2 (7)	•N/A	•As Listed •4 (bit 2 set) •8 (bit 3 set)	•N/A	•11
SUPER RESOLUTION STATUS	•Enabled •Disabled	•Code*2 (7)	N/A	As Listed •2 (bit 1 set) •4 (bit 2 set)	•N/A	•12
CLUTTER MITIGATION DECISION STATUS	•Disabled •Enabled •Bypass Map Segments where Clutter Mitigation Decision Applied	•Code*2	•N/A	•As Listed •0 (no bits set) •1 (bit 0 set) •Bits 1-5 (9)	•N/A	•13
RDA SCAN AND DATA FLAGS	•AVSET Enabled •AVSET Disabled •EBC Status •RDA Log Data Status •Time Series Data Recording Status	•Code*2 (10)	•N/A	•As Listed AVSET BITS: • Enabled bit 1 set •Disabled bit 2 set EBC BIT: •Enabled bit 3 set •Disabled bit 3 zero RDA Log Data BIT: •Enabled bit 4 set •Disabled bit 4 zero Time Series Data Recording: •Enabled bit 5 set •Disabled bit 5 zero	•N/A	•14
RDA ALARM SUMMARY	•No Alarms •Tower/Utilities •Pedestal •Transmitter •Receiver •RDA Control •Communication •Signal Processor	•Code*2	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set) •32 (bit 5 set) •64 (bit 6 set) •128 (bit 7 set)	•N/A	•15

COMMAND ACKNOWLEDGMENT	•No Acknowledgment •Remote VCP Received •Clutter Bypass map Received •Clutter Censor Zones Received •Redundant Chan Ctrl Cmd Accepted	•Code*2	•N/A	•As listed •0 (no bits set) •1 (bit 0 set) •2 (bit 1 set) •3 (bits 0 and 1 set) •4 (bit 2 set)	•N/A	•16
CHANNEL CONTROL STATUS	Identifies whether channel is the controlling channel: • Controlling • Non-controlling	•Code*2	•N/A	•As Listed •0 (no bits set) •1 (bit 0 set)	•N/A	•17
SPOT BLANKING STATUS	Status of Spot Blanking: •Not Installed •Enabled •Disabled	•Code*2 (7)	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•18
BYPASS MAP GENERATION DATE	Julian Date - 2440586.5 Note (1)	Integer*2	d	1 to 65535	1	19
BYPASS MAP GENERATION TIME	Number of minutes since midnight, Greenwich Mean Time	Integer*2	min	0 to 1440	1	20
CLUTTER FILTER MAP GENERATION DATE	Julian date - 2440586.5 Note (1)	Integer*2	d	1 to 65535	1	21
CLUTTER FILTER MAP GENERATION TIME	Number of minutes since Midnight, Greenwich Mean Time	Integer*2	min	0 to 1440	1	22
VERTICAL REFLECTIVITY CALIBRATION CORRECTION	Difference from Adaptation Data	Scaled Integer*2	dB	-198.00 to +198.00 (5)	1/0.01	23
TRANSITION POWER SOURCE STATUS	Status of TPS: •Not Installed •OFF •OK •UNKNOWN	•Integer*2	•NA	•As Listed •0 (no bits set) •1 (bit 0 set) •3 (bits 0 and	•N/A	•24

				1 set) •4 (bit 2 set)		
RMS CONTROL STATUS	Status of RMS Control: •NON-RMS SYSTEM •RMS IN CONTROL •RDA IN CONTROL	•Code*2 (7)	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•25
PERFORMANCE CHECK STATUS	Status of Performance Check: •NO COMMAND PENDING •FORCE PERFORMANCE CHECK PENDING •In Progress	•Code*2 (7)	N/A	As Listed •0 (no bits set) •1 (bit 0 set) •2 (bit 1 set)	N/A	26
ALARM CODES	One condition per halfword (Maximum of 14 alarms sent at a time). See Alarm Message Table IV-A for individual alarm codes. MSB set indicates alarm has been cleared.	Integer*2	N/A	0 to 800	N/A	27 to 40
SIGNAL PROCESSING OPTIONS	Flags indicating whether various signal processing options are enabled or disabled	Code*2	N/A	As Listed •Bit 0 set when CMD's rho-hv test is enabled	•N/A	•41
SPARES	N/A	Integer*2	N/A	N/A	N/A	42 to 59
STATUS VERSION	Version Number of Status Message	Integer*2	N/A	N/A	1	60

(1) January 1970 00.00 Greenwich Mean Time = 1 Modified Julian Date
(3) All bit references start from 0 (LSB).
(4) Unless otherwise indicated as mutually exclusive, Integer Code Formats can set multiple bits in the same message. For example, in case bits 1 and 2 are set, then the integer value passed would be 2 + 4 = 6.
(5) The data in this field is stored as a scaled integer. The format is XXX.YY. For example, -198.00 equals a value of -19800. A value of +0.25 would equal a value of 25.
(6) If value divided by 100 is greater than 2, then the Build Version is the value divided by 100.

Otherwise, the Build Version is value divided by 10.
(7) Values listed are mutually exclusive.
(8) See Appendix B for unit definitions and standard symbology.
(9) Bits 1 through 5 represent elevation segments of the Bypass Map. Bit is set if the corresponding elevation segment has CMD applied.
(10) Halfword 14 will continue to serve as the status of various pieces of RDA functionality. Bits 1 and 2 are mutually exclusive and represent AVSET status. Bit 3 is EBC status. Bit 4 is RDA Log Data status, when enabled Message 33 (Table XVIV) is used to send RDA log data to the ROC, when disabled no logs are transmitted with message 33. Bit 5 is for local time series recording being performed at the RDA.

3.2.4.6.1 RDA Alarm Message Summary

This following table summarizes alarms generated by the CPCI-01 Program. Alarms are grouped by functional areas. Each alarm is described as it is seen displayed in the alarm message on the RDA HCI and at the RPG.
The "CODE" column is the unique alarm number given for identification purposes.
The "STATE" column indicates the state of the RDA as a result of the alarm indicated:

- MM = Maintenance Mandatory
- MR = Maintenance Required
- IN = Inoperative
- SEC = Secondary (secondary alarms are not specifically tied to a "STATE" change).
- N/A = Not applicable

The "ALARM TYPE" column indicates that alarms are classified as three different alarm types based on how alarms are reported to the RDA.

- ED - Alarms identified in the table as ED (Edge Detected) are reported every time the test associated with the alarm fails consecutively for a number of times equal to the alarm reporting count (see "Sample" column). Such alarms will be cleared (MSB set) when the test outcome first passes after the alarm is reported.
- OC - Alarms identified in the table as OC (Occurrence) are reported each time the outcome of the associated test is FAILED.
- FO - Alarms identified in the table as FO (Filtered Occurrence) are reported each time the outcome of the associated test is failed, but are not reported within 15 minutes of the last reporting.

The "DEVICE" column indicates the hardware device area where the alarm has occurred (if applicable); acronyms under the DEVICE column are as follows:

- CTR = Control
- PED = Pedestal
- RCV = Receiver
- SIG = Signal Processor
- COM = RDA Communications
- UTL = Tower/Utilities
- XMT= Transmitter

The “SAMPLE” column indicates the number of samples (failures) that must occur before this alarm is displayed.

The "ALARM MESSAGE" column is an abbreviated description of the alarm message that is displayed at both the RDA and RPG.

3.2.4.6.2 Table IV-A RDA Alarm Messages

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
0	N/A	N/A	N/A	N/A	NO ALARMS
1	N/A	N/A	N/A	N/A	RESERVED
2	N/A	N/A	N/A	N/A	RESERVED
3 - 13	N/A	N/A	N/A	N/A	SPARE
14	MR	ED	COM	1	ALTERNATE ROUTE TO RPG IN USE
15	MR	ED	COM	1	ALTERNATE ROUTE TO RPG IS DOWN
16	SEC	FO	COM	N/A	SEND WIDEBAND STATUS TIMED OUT
17	MR	ED	COM	1	NTP FAILURE
18	N/A	N/A	N/A	N/A	SPARE
19	N/A	N/A	N/A	N/A	SPARE
20	MM	ED	COM	1	RPG LINK - RED ALARM (NO RX)
21	N/A	N/A	N/A	N/A	SPARE
22	N/A	N/A	N/A	N/A	SPARE
23	N/A	N/A	N/A	N/A	SPARE
24	MR	ED	COM	2	SNMP TIME OUT: LAN SWITCH
25	MR	ED	COM	2	SNMP TIME OUT: ROUTER
26	N/A	N/A	N/A	N/A	SPARE
27	MR	ED	COM	2	SNMP TIME OUT: POWER ADMINISTRATOR
28	N/A	N/A	N/A	N/A	SPARE
29	N/A	N/A	N/A	N/A	SPARE
30	MR	ED	COM	2	SNMP TIME OUT: CONSOLE SERVER
31	MR	ED	COM	1	LAN SWITCH PORT 1 FAIL
32	N/A	N/A	N/A	N/A	SPARE
33	MR	ED	COM	1	LAN SWITCH PORT 3 FAIL
34	N/A	N/A	N/A	N/A	SPARE
35	N/A	N/A	N/A	N/A	SPARE
36	MR	ED	COM	1	LAN SWITCH PORT 7 FAIL
37	MR	ED	COM	1	LAN SWITCH PORT 12 FAIL
38-39	N/A	N/A	N/A	N/A	SPARE
40	IN	ED	XMT	2	FILAMENT POWER SUPPLY OFF
41-42	N/A	N/A	N/A	N/A	SPARE
43	IN	ED	XMT	3	WAVEGUIDE SWITCH FAILURE
44	IN	ED	XMT	2	WAVEGUIDE/PFN TRANSFER INTERLOCK
45	IN	ED	XMT	2	XMTR IN MAINTENANCE MODE
46	IN	ED	XMT	2	XMTR UNAVAILABLE
47	IN	ED	XMT	3	PFN/PW SWITCH FAILURE

48	MM	ED	XMT	2	XMTR +5VDC POWER SUPPLY 6 FAIL
49	MM	ED	XMT	2	XMTR +15VDC POWER SUPPLY 4 FAIL
50	MM	ED	XMT	2	XMTR +28VDC POWER SUPPLY 3 FAIL
51	MM	ED	XMT	2	XMTR -15VDC POWER SUPPLY 5 FAIL
52	MM	ED	XMT	2	XMTR +45VDC POWER SUPPLY 7 FAIL
53	MM	ED	XMT	1	FILAMENT POWER SUPPLY VOLTAGE FAIL
54	MM	ED	XMT	1	VACUUM PUMP POWER SUPPLY VOLTAGE FAIL
55	MM	ED	XMT	1	FOCUS COIL POWER SUPPLY VOLTAGE FAIL
56	MM	ED	XMT	2	CIRCULATOR OVERTEMP
57	MM	ED	XMT	2	SPECTRUM FILTER LOW PRESSURE
58	MM	ED	XMT	2	WAVEGUIDE ARC/VSWR
59	MM	ED	XMT	1	XMTR CABINET INTERLOCK OPEN
60	MM	ED	XMT	2	XMTR CABINET OVER TEMP
61	MM	ED	XMT	2	XMTR CABINET AIR FLOW FAIL
62	MR	ED	XMT	1	XMTR MAINTENANCE REQUIRED
63	N/A	N/A	N/A	N/A	SPARE
64	MM	ED	XMT	1	MODULATOR OVERLOAD
65	MM	ED	XMT	1	MODULATOR INVERSE CURRENT FAIL
66	MM	ED	XMT	1	MODULATOR SWITCH FAILURE
67	MM	ED	XMT	1	XMTR MAIN POWER OVER VOLTAGE
68	MM	ED	XMT	1	CHARGING SYSTEM FAILURE
69	MM	ED	XMT	1	CHARGING SYSTEM INVERSE CURRENT FAILURE
70	MM	ED	XMT	1	TRIGGER AMPLIFIER FAILURE
71	N/A	N/A	N/A	N/A	SPARE
72	MM	ED	XMT	1	XMTR OVER VOLTAGE
73	MM	ED	XMT	1	XMTR OVER CURRENT
74	MM	ED	XMT	1	FOCUS COIL CURRENT FAILURE
75	MM	ED	XMT	1	FOCUS COIL AIRFLOW FAILURE
76	MM	ED	XMT	2	XMTR OIL OVER TEMP
77	MM	ED	XMT	1	PRF LIMIT
78	MM	ED	XMT	2	XMTR OIL LEVEL LOW
79	N/A	N/A	N/A	N/A	SPARE
80	MM	ED	XMT	1	KLYSTRON OVER CURRENT
81	MM	ED	XMT	1	KLYSTRON FILAMENT CURRENT FAIL

82	MM	ED	XMT	1	KLYSTRON VACION CURRENT FAIL
83	MM	ED	XMT	2	KLYSTRON AIR OVER TEMP
84	MM	ED	XMT	2	KLYSTRON AIR FLOW FAILURE
85	MM	ED	XMT	1	XMTR PEAK POWER LOW
86	MM	ED	XMT	1	XMTR PEAK POWER HIGH
87	MM	ED	XMT	1	XMTR POWER METER ZERO OUT OF LIMIT
88	MM	ED	XMT	1	XMTR POWER BITE FAIL
89 - 92	N/A	N/A	N/A	N/A	SPARE
93	MR	ED	XMT	2	XMTR MODULATOR SWITCH REQUIRES MAINT
94	MR	ED	XMT	2	XMTR POST CHARGE REG REQUIRES MAINT
95	MM	ED	XMT	2	WAVEGUIDE HUMIDITY/PRESSURE FAULT
96	IN	ED	XMT	3	XMTR HV SWITCH FAILURE
97	MM	ED	XMT	1	XMTR RECYCLING
98	IN	ED	XMT	2	XMTR INOPERATIVE
99	MM	ED	XMT	1	XMTR/SPIP INTERFACE FAILURE
100 - 117	N/A	N/A	N/A	N/A	SPARE
118	MM	ED	UTL	1	POWER ADMINISTRATOR OVERLOAD
119	N/A	N/A	N/A	N/A	SPARE
120	MM	ED	UTL	2	AC UNIT#1 COMPRESSOR SHUTOFF
121	MM	ED	UTL	2	AC UNIT#2 COMPRESSOR SHUTOFF
122	MR	ED	UTL	2	GENERATOR MAINTENANCE REQUIRED
123	N/A	N/A	N/A	N/A	SPARE
124	MM	ED	UTL	2	GEN STARTING BATTERY VOLTAGE LOW
125	MM	ED	UTL	2	GENERATOR ENGINE MALFUNCTION
126	MM	ED	UTL	2	TPS IS OFF-LINE
127	N/A	N/A	N/A	N/A	SPARE
128	MM	ED	UTL	2	GENERATOR AUTO/RUN/OFF SWITCH NOT AUTO
129	MM	ED	UTL	1	GENERATOR EXERCISE FAILURE
130	MM	ED	UTL	2	AIRCRAFT HAZARD LIGHTING FAILURE
131	MR	ED	UTL	2	EQUIP SHELTER FIRE DETECTION SYSTEM FAULT
132	N/A	N/A	N/A	N/A	SPARE
133	MM	ED	UTL	2	FIRE/SMOKE IN EQUIP SHELTER
134 - 135	N/A	N/A	N/A	N/A	SPARE
136	MR	ED	UTL	2	FIRE/SMOKE IN GENERATOR SHELTER

137	MR	ED	UTL	1	POWER SYSTEM MISMATCH
138 - 143	N/A	N/A	N/A	N/A	SPARE
144	MR	ED	UTL	2	UNAUTHORIZED SITE ENTRY
145	MR	ED	UTL	2	SECURITY SYSTEM EQUIPMENT FAILURE
146	MR	ED	UTL	2	SECURITY SYSTEM DISABLED
147 - 150	N/A	N/A	N/A	N/A	SPARE
151	IN	ED	UTL	1	RADOME ACCESS HATCH OPEN
152	MR	ED	UTL	2	AC UNIT#1 FILTER DIRTY
153	MR	ED	UTL	2	AC UNIT#2 FILTER DIRTY
154	MR	ED	UTL	2	XMTR FILTER DIRTY
155	IN	ED	CTR	1	PMDC BOUNCING - RSP REBOOT INITIATED
156	IN	ED	CTR	1	RPGC BOUNCING - RSP REBOOT INITIATED
157	IN	ED	CTR	1	VCPC BOUNCING - RSP REBOOT INITIATED
158	IN	ED	CTR	1	AMEC BOUNCING - RSP REBOOT INITIATED
159	IN	ED	CTR	1	AMEC BOUNCING - RSP REBOOT INITIATED
160 - 169	N/A	N/A	N/A	N/A	SPARE
170	SEC	FO	UTL	1	EQUIPMENT SHELTER TEMP LOW
171	MM	ED	UTL	2	EQUIPMENT SHELTER TEMP EXTREME
172	MM	ED	UTL	2	AC UNIT#1 DISCHARGE TEMP EXTREME
173	MM	ED	UTL	2	XMTR EXHAUST AIR TEMP EXTREME
174	SEC	FO	UTL	1	RADOME AIR TEMP EXTREME
175	MM	ED	UTL	2	GENERATOR SHELTER TEMP EXTREME
176	MR	ED	UTL	2	GENERATOR FUEL STORAGE TANK LEVEL LOW
177	MR	ED	UTL	1	COMMANDED POWER SWITCH FAILED
178	SEC	OC	UTL	N/A	RECOMMEND SWITCH TO UTILITY POWER
179 - 180	N/A	N/A	N/A	N/A	SPARE
181	MM	ED	CTR	1	PMDC FAILED - PMDC RESTART INITIATED
182	IN	ED	CTR	1	RDAC FAILED - RSP REBOOT INITIATED
183	IN	ED	CTR	1	WDOG FAILED - RSP REBOOT INITIATED
184	MM	ED	UTL	2	AC UNIT#2 DISCHARGE TEMP EXTREME
185-187	N/A	N/A	N/A	N/A	SPARE

188	MR	ED	CTR	1	NMSC FAILED - NMSC RESTART INITIATED
189	MM	ED	CTR	1	RPGC FAILED - RPGC RESTART INITIATED
190	MR	ED	CTR	1	HCIS FAILED - HCIS RESTART INITIATED
191	MR	ED	CTR	1	RMSS FAILED - RMSS RESTART INITIATED
192	N/A	N/A	N/A	N/A	SPARE
193	MM	ED	CTR	1	NMPC FAILED - NMPC RESTART INITIATED
194	MM	ED	CTR	1	VCPC FAILED - VCPC RESTART INITIATED
195	MM	ED	CTR	1	DSPC FAILED - DSPC RESTART INITIATED
196	MR	ED	CTR	1	CHNS FAILED - CHNS RESTART INITIATED
197	MR	ED	CTR	1	RSTS FAILED - RSTS RESTART INITIATED
198 - 201	N/A	N/A	N/A	N/A	SPARE
202	MM	ED	CTR	1	AMEC FAILED - AMEC RESTART INITIATED
203	N/A	N/A	N/A	N/A	SPARE
204	MM	ED	CTR	1	AME COMMUNICATIONS ERROR
205	INOP	ED	CTR	1	MULTIPLE AME COMM ERROR - RDA FORCED TO STBY
206	MR	ED	XMT	5	TX DETECT ERROR AT AME
207	MM	ED	PED	1	AME INTERNAL TEMPERATURE HIGH
208	MM	ED	PED	1	AME INTERNAL TEMPERATURE LOW
209	MM	ED	PED	1	AME RECEIVER MODULE TEMPERATURE HIGH
210	MM	ED	PED	1	AME RECEIVER MODULE TEMPERATURE LOW
211	MM	ED	PED	1	AME BITE/CAL MODULE TEMPERATURE HIGH
212	MM	ED	PED	1	AME BITE/CAL MODULE TEMPERATURE LOW
213	MM	ED	PED	1	AME +3.3V PS VOLTAGE OUT OF TOLERANCE
214	MM	ED	PED	1	AME +5V PS VOLTAGE OUT OF TOLERANCE
215	MM	ED	PED	1	AME +6.5V PS VOLTAGE OUT OF TOLERANCE
216	MM	ED	PED	1	AME +15V PS VOLTAGE OUT OF TOLERANCE
217	MM	ED	PED	1	AME +48V PS VOLTAGE OUT OF TOLERANCE

218	MM	ED	XMT	2	RF PALLET PHASE SHIFTER MOTOR TIMEOUT
219	MM	ED	PED	1	AME STALO POWER DEGRADED
220	MR	ED	PED	1	AME STALO POWER MAINTENANCE REQUIRED
221	MM	ED	PED	1	HORIZONTAL TR LIMITER DEGRADED
222	MR	ED	PED	1	HORIZONTAL TR LIMITER FAILED
223	MM	ED	PED	1	VERTICAL TR LIMITER DEGRADED
224	MR	ED	PED	1	VERTICAL TR LIMITER FAILED
225	MM	ED	PED	1	AME POWER SUPPLY TEMPERATURE DEGRADED
226	MR	ED	PED	1	AME POWER SUPPLY TEMPERATURE MAINT REQUIRED
227	MM	ED	PED	1	AME ADC CALIBRATION FAULT
228-231	N/A	N/A	N/A	N/A	SPARE
232	MM	ED	RCV	1	HORIZONTAL INPUT WAVEGUIDE SWITCH POSITION ERROR
233	MM	ED	RCV	1	HORIZONTAL OUTPUT WAVEGUIDE SWITCH POSITION ERROR
234	MM	ED	RCV	1	VERTICAL INPUT WAVEGUIDE SWITCH POSITION ERROR
235	MM	ED	RCV	1	VERTICAL OUTPUT WAVEGUIDE SWITCH POSITION ERROR
236	MR	ED	PED	1	AME PELTIER CURRENT FAULT
237	MR	ED	PED	1	AME PELTIER INSIDE FAN CURRENT FAULT
238	MR	ED	PED	1	AME PELTIER OUTSIDE FAN CURRENT FAULT
239-250	N/A	N/A	N/A	N/A	SPARE
251	N/A	N/A	N/A	N/A	SPARE
252	SEC	OC	PED	1	EBC MAX CORRECTION APPLIED
253	MM	ED	CTR	2	SPIP +28V POWER SUPPLY FAIL
254	MM	ED	CTR	2	SPIP +15V POWER SUPPLY FAIL
255	MM	ED	CTR	2	SPIP +5V POWER SUPPLY FAIL
256	MM	ED	CTR	2	SPIP -15V POWER SUPPLY FAIL
257	INOP	ED	PED	1	SPIP DAQ POWER BUTTON OFF
258	INOP	ED	PED	1	SPIP PED POWER BUTTON OFF
259	INOP	ED	PED	1	SPIP CH2 DAQ POWER BUTTON OFF
260	INOP	ED	PED	1	SPIP CH2 PED POWER BUTTON OFF
261	MM	ED	PED	2	ELEVATION IN -DEAD LIMIT
262	MM	ED	PED	2	ELEVATION IN +DEAD LIMIT
263 - 299	N/A	N/A	N/A	N/A	SPARE
300	IN	ED	PED	2	ELEVATION AMPLIFIER INHIBIT

301	MM	ED	PED	2	ELEVATION AMPLIFIER CURRENT LIMIT
302	MM	ED	PED	2	ELEVATION AMPLIFIER OVERTEMP
303	MM	ED	PED	2	PEDESTAL +150V OVER VOLTAGE
304	MM	ED	PED	2	PEDESTAL +150V UNDER VOLTAGE
305	MM	ED	PED	2	ELEVATION MOTOR OVERTEMP
306	IN	ED	PED	2	ELEVATION STOW PIN ENGAGED
307 - 309	N/A	N/A	N/A	N/A	SPARE
310	MM	ED	PED	2	ELEVATION + NORMAL LIMIT
311	MM	ED	PED	2	ELEVATION - NORMAL LIMIT
312	N/A	N/A	N/A	N/A	SPARE
313	MM	ED	PED	2	ELEVATION ENCODER LIGHT FAILURE
314	MM	ED	PED	2	ELEVATION GEARBOX OIL LEVEL LOW
315	IN	ED	PED	2	AZIMUTH AMPLIFIER INHIBIT
316	MM	ED	PED	2	AZIMUTH AMPLIFIER CURRENT LIMIT
317	MM	ED	PED	2	AZIMUTH AMPLIFIER OVERTEMP
318 - 319	N/A	N/A	N/A	N/A	SPARE
320	MM	ED	PED	2	AZIMUTH MOTOR OVERTEMP
321	IN	ED	PED	2	AZIMUTH STOW PIN ENGAGED
322 - 323	N/A	N/A	N/A	N/A	SPARE
324	MM	ED	PED	2	AZIMUTH ENCODER LIGHT FAILURE
325	MM	ED	PED	2	AZIMUTH GEARBOX OIL LEVEL LOW
326	MM	ED	PED	2	BULL GEAR OIL LEVEL LOW
327	N/A	N/A	N/A	N/A	SPARE
328	IN	ED	PED	2	ELEVATION HANDWHEEL ENGAGED
329	IN	ED	PED	2	AZIMUTH HANDWHEEL ENGAGED
330 - 333	N/A	N/A	N/A	N/A	SPARE
333	MM	ED	PED	2	PEDESTAL +28V POWER SUPPLY FAIL
334	MM	ED	PED	2	AZIMUTH AMP POWER SUPPLY FAIL
335	MM	ED	PED	2	ELEVATION AMP POWER SUPPLY FAIL
336	N/A	N/A	N/A	N/A	SPARE
337	IN	ED	PED	1	PEDESTAL SAFE SWITCH OPEN
338	N/A	N/A	N/A	N/A	SPARE
339	IN	ED	PED	1	PEDESTAL UNABLE TO PARK
340 - 353	N/A	N/A	N/A	N/A	SPARE
354	IN	ED	PED	1	RCP SOFT ELEVATION +LIMIT
355	IN	ED	PED	1	RCP SOFT ELEVATION -LIMIT

356	IN	ED	PED	1	RCP IN CONTROL SHUTDOWN STATE
357	IN	ED	PED	1	RCP AZ CONTROL UNRESPONSIVE
358	IN	ED	PED	1	RCP EL CONTROL UNRESPONSIVE
359	N/A	N/A	N/A	N/A	SPARE
360	MM	ED	RCV	1	RF GEN FREQ SELECT OSCILLATOR FAIL
361	MM	ED	RCV	1	RF GEN RF/STALO FAIL
362	MM	ED	RCV	2	RF GEN PHASE SHIFTED COHO FAIL
363	MM	ED	RCV	1	RF IFDR COHO INPUT MISSING
364	MM	ED	RCV	2	RCVR +5V POWER SUPPLY 5 FAIL
365	MM	ED	RCV	2	RCVR +/-18V POWER SUPPLY 1 FAIL
366	MM	ED	RCV	2	RCVR -9V POWER SUPPLY 4 FAIL
367	MM	ED	RCV	2	RCVR +9V POWER SUPPLY 6 FAIL
368	MM	ED	RCV	2	SINGLE CHANNEL RDAIU +5V POWER SUPPLY 9 FAIL
369	MM	ED	RCV	2	COHO/CLOCK FAILURE
370	IN	ED	RCV	1	SIGNAL PROCESSOR TO IFDR COMMUNICATION FAILURE
371	MM	ED	RCV	4	MISSING BURST PULSE SIGNAL
372 - 380	N/A	N/A	N/A	N/A	SPARE
381	MR	ED	SIG	1	SIGNAL PROCESSOR TRIGGER SEQUENCE TRUNCATED
382	MR	ED	SIG	1	SIGNAL PROCESSOR TRIGGER PATTERN ALTERED
383	MR	ED	SIG	1	SIGNAL PROCESSOR TRIGGER PERIOD ALTERED
384 - 386	N/A	N/A	N/A	N/A	SPARE
387	MR	ED	SIG	1	SIGNAL PROCESSOR TRIGGER ERROR
388	SEC	FO	SIG	N/A	SIGNAL PROCESSOR SELF CHECK FAILED
389	MR	ED	SIG	1	IFDR TEST SWITCH POSITION ERROR
390	N/A	N/A	N/A	N/A	SPARE
391	SEC	OC	COM	N/A	RPG LOOP TEST TIMED OUT
392	SEC	OC	COM	N/A	RPG LOOP TEST VERIFICATION ERROR
393	SEC	OC	CTR	N/A	INVALID REMOTE VCP RECEIVED
394	SEC	OC	CTR	N/A	REMOTE VCP NOT DOWNLOADED
395	SEC	OC	CTR	N/A	INVALID RPG COMMAND RECEIVED
396	SEC	FO	SIG	N/A	RADIAL DATA LOST
397	N/A	N/A	N/A	N/A	SPARE

398	SEC	OC	CTR	N/A	STANDBY FORCED BY INOP ALARM
399 - 400	N/A	N/A	N/A	N/A	SPARE
401 - 420	N/A	N/A	N/A	N/A	RESERVED FOR INTERNAL RDA USE
421 - 429	N/A	N/A	N/A	N/A	SPARE
430	MR	ED	CTR	1	BYPASS MAP FILE READ FAILED
431	MR	ED	CTR	1	BYPASS MAP FILE WRITE FAILED
432 - 433	N/A	N/A	N/A	N/A	SPARE
434	MR	ED	CTR	1	CLUTTER MAP FILE READ FAILED
435	MR	ED	CTR	1	CLUTTER MAP FILE WRITE FAILED
436	MR	ED	CTR	1	CLUTTER CENSOR FILE READ FAILED
437	MR	ED	CTR	1	CLUTTER CENSOR FILE WRITE FAILED
438	MR	ED	CTR	1	STATE FILE READ FAILED
439	MR	ED	CTR	1	STATE FILE WRITE FAILED
440	MR	ED	CTR	1	CURRENT ADAPTATION FILE READ FAILED
441	MR	ED	CTR	1	CURRENT ADAPTATION FILE WRITE FAILED
442	MR	ED	CTR	1	BASELINE FILE READ FAILED
443	N/A	N/A	N/A	N/A	SPARE
444	SEC	OC	CTR	N/A	CLUTTER MAP FILE GENERATION ERROR
445	N/A	N/A	N/A	N/A	SPARE
446	MR	ED	CTR	1	TOO MANY LOG FILES - PLEASE REMOVE SOME
447	MR	ED	CTR	1	DISK I/O ERROR
448	MR	ED	CTR	1	RSP SYSTEM HARD DRIVE ‘SMART’ FAILURE DETECTED
449	MR	ED	CTR	1	REMOTE VCP FILE WRITE FAILED
450	MR	ED	CTR	1	REMOTE VCP FILE READ FAILED
451	MR	ED	CTR	1	RSP DATA HARD DRIVE ‘SMART’ FAILURE DETECTED
452	MM	ED	COM	1	RPG LINK INITIALIZATION ERROR
453	IN	ED	CTR	1	SPIP COMM ERROR
454	IN	ED	SIG	1	MULTIPLE SIGNAL PROCESSOR COMMAND ERROR - RDA FORCED TO STBY
455	MM	ED	SIG	1	SIGNAL PROCESSOR COMMAND ERROR
456	IN	ED	SIG	1	SIGNAL PROCESSOR LAUNCH ERROR
457	MR	ED	CTR	1	RSP COMPONENT OVERTEMP
458	N/A	N/A	N/A	N/A	SPARE

459	N/A	N/A	N/A	N/A	SPARE
460	SEC	FO	CTR	N/A	HCI COMMUNICATION ERROR
461	N/A	N/A	N/A	N/A	SPARE
462 - 463	N/A	N/A	N/A	N/A	SPARE
464	MM	ED	CTR	1	REDUNDANT CHANNEL COMM ERROR
465 - 468	N/A	N/A	N/A	N/A	SPARE
469	MM	ED	CTR	1	INTERPANEL LINK FAILED
470	MM	ED	RCV	1	HORIZONTAL NOISE LEVEL DEGRADED
471	MM	ED	RCV	1	HORIZONTAL NOISE TEMPERATURE DEGRADED
472	MM	ED	RCV	1	VERTICAL NOISE LEVEL DEGRADED
473	MM	ED	RCV	1	VERTICAL NOISE TEMPERATURE DEGRADED
474	MM	ED	RCV	1	HORIZONTAL NOISE TEMPERATURE LOW
475	MM	ED	RCV	1	VERTICAL NOISE TEMPERATURE LOW
476	N/A	N/A	N/A	N/A	SPARE
477	MM	ED	RCV	1	HORIZONTAL POWER SENSE LOW
478	MM	ED	RCV	1	VERTICAL POWER SENSE LOW
479	MM	ED	RCV	1	SYSTEM DIFFERENTIAL REFLECTIVITY OFFSET DEGRADED
480	MM	ED	RCV	1	VERTICAL GAIN CALIBRATION CONSTANT DEGRADED
481	MM	ED	RCV	1	HORIZONTAL GAIN CALIBRATION CONSTANT DEGRADED
482	N/A	N/A	N/A	N/A	SPARE
483	MM	ED	RCV	1	VELOCITY/WIDTH CHECK DEGRADED
484	N/A	N/A	N/A	N/A	SPARE
485	MM	ED	RCV	1	HORIZONTAL DYNAMIC RANGE DEGRADED
486	MM	ED	RCV	1	HORIZONTAL CLUTTER REJECTION DEGRADED
487 - 489	N/A	N/A	N/A	N/A	SPARE
490	MM	ED	RCV	1	VERTICAL DYNAMIC RANGE DEGRADED
491-521	N/A	N/A	N/A	N/A	SPARE
522	MM	ED	RCV	1	HORIZONTAL LINEARITY SLOPE DEGRADED
523	MM	ED	RCV	1	HORIZONTAL LINEARITY TEST SIGNAL DEGRADED
524	MR	ED	RCV	1	HORIZONTAL LINEARITY TEST SIGNAL - MAINT REQUIRED

525	MM	ED	RCV	1	VERTICAL LINEARITY TEST SIGNAL DEGRADED
526	MR	ED	RCV	1	VERTICAL LINEARITY TEST SIGNAL - MAINT REQUIRED
527	MM	ED	RCV	1	VERTICAL LINEARITY SLOPE DEGRADED
528 - 532	N/A	N/A	N/A	N/A	SPARE
533	MM	ED	RCV	1	KLYSTRON OUT TEST SIGNAL DEGRADED
534 - 542	N/A	N/A	N/A	N/A	SPARE
543	SEC	OC	CTR	N/A	RPG COMMAND REJECTED
544	SEC	OC	CTR	N/A	RMS COMMAND REJECTED
545	SEC	OC	CTR	N/A	RDA COMMAND REJECTED
546 - 547	N/A	N/A	N/A	N/A	SPARE
548	SEC	OC	CTR	N/A	RMS CONTROL COMMAND REJECTED INVALID COMMAND
549	SEC	OC	CTR	N/A	RMS CONTROL COMMAND REJECTED INVALID PARAMETER
550 - 552	N/A	N/A	N/A	N/A	SPARE
553	SEC	OC	CTR	N/A	CHANNEL ALREADY CONTROLLING - CMD REJECTED
554	SEC	OC	CTR	N/A	CHANNEL ALREADY NON-CONTROLLING - CMD REJECTED
555	MR	ED	CTR	1	CHANNEL CONTROL FAILURE - RDAIU SWITCH MISMATCH
556	SEC	OC	CTR	N/A	CHANNEL SWITCH TIMEOUT
557	SEC	OC	CTR	N/A	CHANNEL SWITCH FAILED
558 - 560	N/A	N/A	N/A	N/A	SPARE
561	SEC	OC	CTR	N/A	INVALID CONTROL FOR CHANNEL SWITCH
562	SEC	OC	CTR	N/A	INVALID STATUS FOR CHANNEL SWITCH
563	SEC	OC	CTR	N/A	INVALID CHANNEL SWITCH - OTHER CHANNEL IN MAINTENANCE MODE
564	SEC	OC	CTR	1	INVALID CHANNEL SWITCH - CALIBRATION IN PROGRESS
565	IN	ED	CTR	1	ELEVATION HOUSING PS FAIL
566	IN	ED	CTR	1	AZIMUTH HOUSING PS PAIL
567 - 590	N/A	N/A	N/A	N/A	SPARE
591	IN	ED	CTR	1	MULTIPLE PROCESS FAILURE - FORCED TO STANDBY INOP
592	SEC	OC	CTR	N/A	SYSTEM STATUS MONITOR INITIALIZATION ERROR - REBOOT INITIATED
593	SEC	OC	CTR	N/A	SYSTEM STATE TRANSITION TIMEOUT
594 - 678	N/A	N/A	N/A	N/A	SPARE

679	SEC	OC	CTR	N/A	INVALID CENSOR ZONE MESSAGE RECEIVED
680 - 697	N/A	N/A	N/A	N/A	SPARE
698	MM	ED	PED	1	CUT TRANSITION TIMEOUT
699	SEC	OC	CTR	N/A	CUT TIMEOUT-RESTART VCP INITIATED
700	SEC	OC	CTR	N/A	INIT SEQ TIMEOUT-REBOOT INITIATED
701	SEC	OC	CTR	N/A	PERF CHECK TIMEOUT-REBOOT INITIATED
702	MM	ED	XMT	1	TRANSMIT BIAS DEGRADED
703- 800	N/A	N/A	N/A	N/A	SPARE

3.2.4.7 Table V Performance/Maintenance Data (Message Type 3)

NAME	DESCRIPTION	FORMAT	UNITS(5)	RANGE	LSB	REMARKS	HALFWORD LOCATION
Communications							
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	1
Loop Back Test Status		Integer*2	N/A	0 to 3	1	0=Pass, 1=Fail, 2=Timeout, 3=Not Tested (1)	2
T1 Output Frames	The number of octets received on interface, including frame octets	Integer*4	octet	0 to 2^{32}-1	1	N/A	3 - 4
T1 Input Frames	The number of octets sent on interface, including frame octets	Integer*4	octet	0 to 2^{32}-1	1	N/A	5 - 6
Router Memory Used	Bytes currently in use by applications on managed device	Integer*4	byte	0 to 2^{32}-1	1	N/A	7 - 8
Router Memory Free	Bytes currently free on managed device	Integer*4	byte	0 to 2^{32}-1	1	N/A	9 - 10
Router Memory Utilization		Integer*2	%	0 to 100	1	N/A	11
Route to RPG	Status of backup communications route to the RPG	Integer*2	N/A	0 to 4	N/A	0=Normal 1=Backup in Use 2=Backup Down Failure 3=Backup Commanded Down	12

						4=Backup Not Installed	
SPARE	N/A	N/A	N/A	N/A	N/A	N/A	13 - 20
CSU 24hr Errored Seconds (6)	Number of errored seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	21 - 22
CSU 24hr Severely Errored Seconds (6)	Number of severely errored seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	23 - 24
CSU 24hr Severely Errored Framing Seconds (6)	Number of severely errored framing seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	25 - 26
CSU 24hr Unavailable Seconds (6)	Number of unavailable seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	27 - 28
CSU 24hr Controlled Slip Seconds (6)	Number of controlled slip seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	29 - 30
CSU 24hr Path Coding Violations (6)	Number of path coding violations in previous 24 hours.	Integer*4	N/A	0 to 2^{32}-1	1	N/A	31 - 32
CSU 24hr Line Errored Seconds (6)	Number of line errored seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	33 - 34
CSU 24hr Bursty Errored Seconds (6)	Number of bursty errored seconds in previous 24 hours.	Integer*4	s	0 to 2^{32}-1	1	N/A	35 - 36
CSU 24hr Degraded Minutes (6)	Number of degraded minutes in previous 24 hours.	Integer*4	min	0 to 2^{32}-1	1	N/A	37 - 38
SPARE	N/A	N/A	N/A	N/A	N/A	See Note (3)	39 - 40
LAN Switch CPU Utilization		Integer*4	%	0 to 100	1	N/A	41 - 42
LAN Switch Memory Utilization		Integer*2	%	0 to 100	1	N/A	43
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	44
IFDR Chasis Temperature	Temperature of the IFDR case	Integer*2	deg C	-30 to 150	1	N/A	45
IFDR FPGA Temperature	Temperature of IFDR's FPGA	Integer*2	deg C	-30 to 150	1	N/A	46

NTP Status	NTP synchronization status	Integer*2	N/A	0 to 2	1	0=OK, 1=Fail	47
Spare	N/A	N/A	N/A	N/A	N/A	N/A	48 - 52
IPC Status	Status of the communications between channels on a redundant system. N/A on a Single channel system.	Integer*2	N/A	0 to 2	1	0=OK, 1=Fail, 2=N/A	53
Commanded Channel Control	Indicates which channel the RDA has commanded to be the controlling channel. This is not necessarily the channel which is in control.	Integer*2	N/A	0 to 2	1	0=N/A, 1=Channel 1, 2=Channel 2	54
SPARE	N/A	N/A	N/A	N/A	N/A	See Note (3)	55-57
AME							
Polarization		Integer*2	N/A	0 to 2	1	0 = H Only 1 = H + V 2 = V Only	58
AME Internal Temperature		Real*4	deg C	-40.0 to +125.0	0.1	N/A	59-60
AME Receiver Module Temperature		Real*4	deg C	-40.0 to +125.0	0.1	N/A	61-62
AME BITE/CAL Module Temperature		Real*4	deg C	-40.0 to +125.0	0.1	N/A	63-64
AME Peltier Pulse Width Modulation		Integer*2	%	0 to 100	1	N/A	65
AME Peltier Status		Integer*2	N/A	0 to 1	1	0 = OFF 1 = ON	66
AME A/D Converter Status		Integer*2	N/A	0 to 1	1	0 = OK 1 = FAIL	67
AME State		Integer*2	N/A	0 to 3	1	0 = START 1 = RUNNING 2 = FLASH 3 = ERROR	68
AME +3.3V PS Voltage		Real*4	V	0.00 to 4.09	0.01	N/A	69-70

AME +5V PS Voltage		Real*4	V	0.00 to 6.10	0.01	N/A	71-72
AME +6.5V PS Voltage		Real*4	V	0.00 to 7.50	0.01	N/A	73-74
AME +15V PS Voltage		Real*4	V	0.00 to 19.00	0.01	N/A	75-76
AME +48V PS Voltage		Real*4	V	0.00 to 60.00	0.01	N/A	77-78
AME STALO Power		Real*4	V	0.00 to 4.09	0.01	N/A	79-80
Peltier Current		Real*4	A	0.00 to 16.00	0.01	N/A	81-82
ADC Calibration Reference Voltage		Real*4	V	0.000 to 2.048	0.001	N/A	83-84
AME Mode		Integer*2	N/A	0 to 1	1	0 = READY 1 = MAINTENANCE	85
AME Peltier Mode		Integer*2	N/A	0 to 1	1	0 = COOL 1 = HEAT	86
AME Peltier Inside Fan Current		Real*4	A	0.00 to 4.00	0.01	N/A	87-88
AME Peltier Outside Fan Current		Real*4	A	0.00 to 4.00	0.01	N/A	89-90
Horizontal TR Limiter Voltage		Real*4	V	0.00 to 5.00	0.01	N/A	91-92
Vertical TR Limiter Voltage		Real*4	V	0.00 to 5.00	0.01	N/A	93-94
ADC Calibration Offset Voltage		Real*4	mV	-50.000 to +50.000	0.01	N/A	95-96
ADC Calibration Gain Correction		Real*4	N/A	0.990 to 1.010	0.001	N/A	97-98
RCP/SPIP Power Button Status							
RCP STATUS	Integer Code for third party radar control program's status	Integer*2	N/A	0 to 1	N/A	0 - RCP OK 1 - NOT OK	99
RCP STRING	Descriptive string for the radar	String	N/A	N/A	N/A	N/A	100 - 107

	control programs state						
SPIP Power Buttons	State of SPIP power buttons	Code*2	N/A	N/A	N/A	Bit 0 Set – This channel's DAQ power button is off Bit 1 Set – This channel's DAQ PED power button is off. Bit 2 Set – Channel 2 DAQ power button is off (Channel 1 only) Bit 3 Set – Channel 2 DAQ PED power button is off. (Channel 1 only) Bit 4 Set - This is Channel 1 of a redundant configuration.	108
SPARE	N/A	N/A	N/A	N/A	N/A	See Note (3)	109 - 110
Power							
Master Power Administrator Load		Real*4	A	0.00 to 12.00	0.01	N/A	111 - 112
Expansion Power Administrator Load		Real*4	A	0.00 to 12.00	0.01	N/A	113 - 114
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	115 - 136
Transmitter							
+5 VDC PS		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	137
+15 VDC PS		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	138
+28 VDC PS		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	139
-15 VDC PS		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	140
+45 VDC PS		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	141

Filament PS Voltage		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	142
Vacuum Pump PS Voltage		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	143
Focus Coil PS Voltage		Integer*2	N/A	0 to 1	1	0=OK,1=Fail	144
Filament PS		Integer*2	N/A	0 to 1	1	0=On, 1=Off	145
Klystron Warmup		Integer*2	N/A	0 to 1	1	0=Normal, 1=Preheat	146
Transmitter Available		Integer*2	N/A	0 to 1	1	0=Yes, 1=No	147
WG Switch Position		Integer*2	N/A	0 to 1	1	0=Antenna, 1=Dummy Load	148
WG/PFN Transfer Interlock		Integer*2	N/A	0 to 1	1	0=OK, 1=Open	149
Maintenance Mode		Integer*2	N/A	0 to 1	1	0= No, 1=Yes	150
Maintenance Required		Integer*2	N/A	0 to 1	1	0=No, 1=Required	151
PFN Switch Position		Integer*2	N/A	0 to 1	1	0=Short Pulse, 1=Long Pulse	152
Modulator Overload		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	153
Modulator Inv Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	154
Modulator Switch Fail		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	155
Main Power Voltage		Integer*2	N/A	0 to 1	1	0=OK, 1=Over	156
Charging System Fail		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	157
Inverse Diode Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	158
Trigger Amplifier		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	159
Circulator Temperature		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	160
Spectrum Filter Pressure		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	161
WG ARC/VSWR		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	162
Cabinet Interlock		Integer*2	N/A	0 to 1	1	0=OK, 1=Open	163

Cabinet Air Temperature		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	164
Cabinet Airflow		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	165
Klystron Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	166
Klystron Filament Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	167
Klystron Vacion Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	168
Klystron Air Temperature		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	169
Klystron Airflow		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	170
Modulator Switch Maintenance		Integer*2	N/A	0 to 1	1	0=OK, 1=Required	171
Post Charge Regulator Maintenance		Integer*2	N/A	0 to 1	1	0=OK, 1=Maintenance	172
WG Pressure/Humidity		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	173
Transmitter Overvoltage		Integer*2	N/A	0 to 1	1	0=OK, 1=Over	174
Transmitter Overcurrent		Integer*2	N/A	0 to 1	1	0=OK, 1=Over	175
Focus Coil Current		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	176
Focus Coil Airflow		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	177
Oil Temperature		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	178
PRF Limit		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	179
Transmitter Oil Level		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	180
Transmitter Battery Charging		Integer*2	N/A	0 to 1	1	0=Yes, 1=No	181
High Voltage (HV) Status		Integer*2	N/A	0 to 1	1	0=On, 1=Off	182
Transmitter Recycling Summary		Integer*2	N/A	0 to 1	1	0=Normal, 1=Recycling	183
Transmitter Inoperable		Integer*2	N/A	0 to 1	1	0=OK, 1=INOP	184

Transmitter Air Filter		Integer*2	N/A	0 to 1	1	0=Dirty, 1=OK	185
Zero Test Bit 0		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	186
Zero Test Bit 1		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	187
Zero Test Bit 2		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	188
Zero Test Bit 3		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	189
Zero Test Bit 4		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	190
Zero Test Bit 5		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	191
Zero Test Bit 6		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	192
Zero Test Bit 7		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	193
One Test Bit 0		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	194
One Test Bit 1		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	195
One Test Bit 2		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	196
One Test Bit 3		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	197
One Test Bit 4		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	198
One Test Bit 5		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	199
One Test Bit 6		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	200
One Test Bit 7		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	201
XMTR/SPIP Interface		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	202
Transmitter Summary Status		Integer*2	N/A	0 to 4	1	0=Ready, 1=Alarm, 2=Maintenance, 3=Recycle, 4=Preheat	203
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	204
Transmitter RF Power (Sensor)		Real*4	mW	0.0000 to 10.0000	.0001	N/A	205 - 206
Horizontal XMTR Peak Power		Real*4	kW	0 to 999.9	0.1	N/A	207 - 208

XMTR Peak Power		Real*4	kW	0 to 999.9	0.1	N/A	209 - 210
Vertical XMTR Peak Power		Real*4	kW	0 to 999.9	0.1	N/A	211 - 212
XMTR RF Avg Power		Real*4	W	0 to 9999.9	0.1	N/A	213 - 214
Spare		N/A	N/A	N/A	N/A	See Note (3)	215 - 216
XMTR Recycle Count		Integer*4	N/A	0 to 999,999	1	N/A	217 - 218
Receiver Bias (Measurement)		Real*4	dB	-999.9999 to 999.9999	0.0001	N/A	219 - 220
Transmit Imbalance		Real*4	dB	-999.9999 to 999.99	0.01	N/A	221 - 222
XMTR Power Meter Zero		Real*4	V	0.01 to 8.00	0.01	N/A	223 - 224
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	225 - 228
Tower/Utilities							
AC Unit #1 Compressor Shut off		Integer*2	N/A	0 to 1	1	0=OK, 1=Shutoff	229
AC Unit #2 Compressor Shut off		Integer*2	N/A	0 to 1	1	0=OK, 1=Shutoff	230
Generator Maintenance Required		Integer*2	N/A	0 to 1	1	0=Yes, 1=No	231
Generator Battery Voltage		Integer*2	N/A	0 to 1	1	0=Low, 1= OK	232
Generator Engine		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	233
Generator Volt/Frequency		Integer*2	N/A	0 to 1	1	0=Not available, 1=Available	234
Power Source		Integer*2	N/A	0 to 1	1	0=Utility Power, 1=Generator Power	235
Transitional Power Source (TPS)		Integer*2	N/A	0 to 1	1	0=OK, 1=Off	236
Generator Auto/Run/Off Switch		Integer*2	N/A	0 to 1	1	0=Manual, 1=Auto	237

Aircraft Hazard Lighting		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	238
Spare	N/A	N/A	N/A	N/A	1	See Note (3)	239 - 249
Equipment Shelter							
Equipment Shelter Fire Detection System	N/A	Integer*2	N/A	0 to 1	1	0 = OK, 1 = Fail	250
Equipment Shelter Fire/Smoke		Integer*2	N/A	0 to 1	1	0=OK, 1=Fire	251
Generator Shelter Fire/Smoke		Integer*2	N/A	0 to 1	1	0=Fire, 1=OK	252
Utility Voltage/Frequency		Integer*2	N/A	0 to 1	1	0=Not available, 1=Available	253
Site Security Alarm		Integer*2	N/A	0 to 1	1	0=Alarm, 1=OK	254
Security Equipment		Integer*2	N/A	0 to 1	1	0=Fail, 1=OK	255
Security System		Integer*2	N/A	0 to 1	1	0=Disabled, 1=OK	256
Receiver Connected to Antenna		Integer*2	N/A	0 to 2	1	N/A on a single channel system. 0=Connected, 1=Not Connected, 2=N/A	257
Radome Hatch		Integer*2	N/A	0 to 1	1	0=Open, 1=Closed	258
AC Unit #1 Filter Dirty		Integer*2	N/A	0 to 1	1	0=Dirty, 1=OK	259
AC Unit #2 Filter Dirty		Integer*2	N/A	0 to 1	N/A	0=Dirty, 1=OK	260
Equipment Shelter Temperature		Real*4	deg C	0.00 to +50.00	0.01	N/A	261 - 262
Outside Ambient Temperature		Real*4	deg C	-50.00 to +50.00	0.01	N/A	263 - 264
Transmitter Leaving Air Temp		Real*4	deg C	-10.00 to +60.00	0.01	N/A	265 - 266

AC Unit #1 Discharge Air Temp		Real*4	deg C	0.00 to +50.00	0.01	N/A	267 - 268
Generator Shelter Temperature		Real*4	deg C	0.00 to +50.00	0.01	N/A	269 - 270
Radome Air Temperature		Real*4	deg C	-50.00 to +50.00	0.01	N/A	271 - 272
AC Unit #2 Discharge Air Temp		Real*4	deg C	0.00 to +50.00	0.01	N/A	273 - 274
SPIP +15v PS		Real*4	V	N/A	0.01	N/A	275 - 276
SPIP -15v PS		Real*4	V	N/A	0.01	N/A	277 - 278
SPIP +28V PS status	Power supply that powers the SPIP	Integer *2	N/A	0 to 1	1	0 = Fail, 1 = OK	279
SPARE	N/A	N/A	N/A	N/A	N/A	See Note (3)	280
SPIP +5v PS		Real*4	V	0.00 to 6.64	0.01	N/A	281 - 282
Converted Generator Fuel Level		Integer*2	%	0 to 100	1	N/A	283
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	284 - 299
Antenna/Pedestal							
Elevation + Dead Limit	Antenna is in the upper dead limit	Integer*2	N/A	0 to 1	1	0=OK, 1=In Limit	300
+150V Overvoltage		Integer*2	N/A	0 to 1	1	0=OK, 1=Overvoltage	301
+150V Undervoltage		Integer*2	N/A	0 to 1	1	0=OK, 1=Overvoltage	302
Elevation Servo Amp Inhibit		Integer*2	N/A	0 to 1	1	0=Normal, 1=Inhibit	303
Elevation Servo Amp Short Circuit		Integer*2	N/A	0 to 1	1	0=Normal, 1=Short Circuit	304
Elevation Servo Amp Overtemp		Integer*2	N/A	0 to 1	1	0=Normal, 1=Overtemp	305
Elevation Motor Overtemp		Integer*2	N/A	0 to 1	1	0=OK, 1=Overtemp	306
Elevation Stow Pin		Integer*2	N/A	0 to 1	1	0=Operational, 1=Engaged	307
Elevation Housing 5V PS	The elevation house DC to DC	Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	308

	converter/power supply						
Elevation - Dead Limit	Antenna is in the lower dead limit	Integer*2	N/A	0 to 1	1	0=OK, 1=In Limit	309
Elevation +Normal Limit		Integer*2	N/A	0 to 1	1	0=OK, 1=In Limit	310
Elevation - Normal Limit		Integer*2	N/A	0 to 1	1	0=OK, 1=In Limit	311
Elevation Encoder Light		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	312
Elevation Gearbox Oil		Integer*2	N/A	0 to 1	1	0=OK, 1=Oil Level Low	313
Elevation Handwheel		Integer*2	N/A	0 to 1	1	0=Operational, 1=Engaged	314
Elevation Amp PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	315
Azimuth Servo Amp Inhibit		Integer*2	N/A	0 to 1	1	0=OK, 1=Inhibit	316
Azimuth Servo Amp Short Circuit		Integer*2	N/A	0 to 1	1	1=Short Circuit, 0=OK	317
Azimuth Servo Amp Overtemp		Integer*2	N/A	0 to 1	1	0=OK, 1=Overtemp	318
Azimuth Motor Overtemp		Integer*2	N/A	0 to 1	1	0=OK, 1=Overtemp	319
Azimuth Stow Pin		Integer*2	N/A	0 to 1	1	0=Operational, 1=Engaged	320
Azimuth Housing 5V PS	The azimuth housing DC to DC converter/power supply	Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	321
Azimuth Encoder Light		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	322
Azimuth Gearbox Oil		Integer*2	N/A	0 to 1	1	0=OK, 1=Oil Level Low	323
Azimuth Bull Gear Oil		Integer*2	N/A	0 to 1	1	0=OK, 1=Oil Level Low	324

Azimuth Handwheel		Integer*2	N/A	0 to 1	1	0=Operational, 1=Engaged	325
Azimuth Servo Amp PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	326
Servo		Integer*2	N/A	0 to 1	1	0=On, 1=Off	327
Pedestal Interlock Switch		Integer*2	N/A	0 to 1	1	0=Operational, 1=Safe	328
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3).	329 - 340
RF Generator/Receiver							
COHO/Clock		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	341
Rf Generator Frequency Select Oscillator		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	342
Rf Generator RF/STALO		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	343
Rf Generator Phase Shifted COHO		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	344
+9v Receiver PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	345
+5v Receiver PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	346
±18v Receiver PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	347
-9v Receiver PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	348
+5v Single Channel RDAIU PS		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	349
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	350
Horizontal Short Pulse Noise		Real*4	dBm	-100.00 to -50.00	0.01	N/A	351 - 352
Horizontal Long Pulse Noise		Real*4	dBm	-100.00 to -50.00	0.01	N/A	353 - 354
Horizontal Noise Temperature		Real*4	K	0 to 9999.99	0.01	N/A	355 - 356
Vertical Short Pulse Noise		Real*4	dBm	100.00 to -50.00	0.01	N/A	357 - 358
Vertical Long Pulse Noise		Real*4	dBm	-100.00 to -50.00	0.01	N/A	359-360

Vertical Noise Temperature		Real*4	K	0 to 9999.99	0.01	N/A	361-362
Calibration							
Horizontal Linearity		Real*4	N/A	0.5000 to 1.5000	0.0001	N/A	363 - 364
Horizontal Dynamic Range		Real*4	dB	0.000 to 120.000	0.001	N/A	365 - 366
Horizontal Delta dBZ0		Real*4	dB	-198.00 to +198.00	0.01	N/A	367 - 368
Vertical Delta dBZ0		Real*4	dB	-198.00 to +198.00	0.01	N/A	369 - 370
KD Peak Measured		Real*4	dBm	-99.90 to +99.90	0.01	N/A	371 - 372
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	373 - 374
Short Pulse, Horizontal dBZ0		Real*4	dBZ	-99.900 to +99.900	0.0001	N/A	375 - 376
Long Pulse, Horizontal dBZ0		Real*4	dBZ	-99.9000 to +99.9000	0.0001	N/A	377 - 378
Velocity (Processed)		Integer*2	N/A	0 to 1	1	0=Good, 1=Fail	379
Width (Processed)		Integer*2	N/A	0 to 1	1	0=Good, 1=Fail	380
Velocity (RF Gen)		Integer*2	N/A	0 to 1	1	0=Good, 1=Fail	381
Width (RF Gen)		Integer*2	N/A	0 to 1	1	0=Good, 1=Fail	382
Horizontal I0		Real*4	dBm	-999.9000 to +999.9000	0.0001	N/A	383 - 384
Vertical I0		Real*4	dBm	-999.9000 to +999.9000	0.0001	N/A	385 - 386
Vertical Dynamic Range		Real*4	dB	0.000 to 120.000	0.001	N/A	387 - 388
Short Pulse, Vertical dBZ0		Real*4	dBZ	-99.9000 to +99.9000	0.0001	N/A	389 - 390
Long Pulse, Vertical dBZ0		Real*4	dBZ	-99.9000 to +99.9000	0.0001	N/A	391 - 392
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	393 - 394
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	395 - 396
Horizontal Power Sense		Real*4	dBm	-999.9000 to +999.9000	0.0001	N/A	397 - 398

Vertical Power Sense		Real*4	dBm	-999.9000 to +999.9000	0.0001	N/A	399 - 400
ZDR Offset		Real*4	dB	-999.9000 to +999.9000	0.0001	N/A	401 - 402
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	403 - 408
Clutter Suppression Delta		Real*4	dB	-99.90 to +99.90	0.01	N/A	409-410
Clutter Suppression Unfiltered Power		Real*4	dBZ	-99.90 to +99.90	0.01	N/A	411 - 412
Clutter Suppression Filtered Power		Real*4	dBZ	-99.90 to +99.90	0.01	N/A	413 - 414
Spare		N/A	N/A	N/A	N/A	See Note (3)	415 - 416
Spare		N/A	N/A	N/A	N/A	See Note (3)	417 - 418
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	419 - 422
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	423 - 424
Vertical Linearity		Real*4	N/A	0.5000 to 1.5000	0.0001	N/A	425 - 426
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	427 - 430
File Status							
State File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	431
State File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	432
Bypass Map File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	433
Bypass Map File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	434
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	435
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	436
Current Adaptation File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	437
Current Adaptation File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	438
Censor Zone File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	439

Censor Zone File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	440
Remote VCP File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	441
Remote VCP File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	442
Baseline Adaptation File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	443
Read Status of PRF Sets	Bitfield of PRF set read status: Bit 0 - Surveillance Bit 1 - Doppler Bit 2 - Staggered PRT	Code*2	N/A	0 to 7	1	For each bit: 0=Fail, 1=OK	444
Clutter Filter Map File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	445
Clutter Filter Map File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	446
General Disk I/O Error		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	447
RSP Status	Bitfield of RSP Health Status Bit 0 – RSP System Drive 'SMART' Status Bit 1 – RSP Data Drive 'SMART' Status Bit 2 – RSP CPU 1 'Overtemp' Bit 3 – RSP CPU 2 'Overtemp'	Code*1	N/A	N/A	N/A	For each bit,: 1=Fail, 0 = OK	448 – Byte 0
SPARE	N/A	N/A	N/A	N/A	N/A	N/A	448 – Byte 1
CPU 1 Temperature	RSP CPU 1 Temperature	Integer*1	deg C	0 - 255	1	See Note 7	449 – Byte 0
CPU 2 Temperature	RSP CPU 2 Temperature	Integer*1	deg C	0 - 255	1	See Note 7	449 – Byte 1
RSP Motherboard Power	RSP Power used; measured by the RSP motherboard sensor	Integer*2	Watts	0 – 2000	1	See Note 7	450
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	451 - 460
Device Status							

SPIP Comm Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	461
HCI Comm Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	462
SPARE	N/A	N/A	N/A	N/A	N/A	See Note (3)	463
Signal Processor Command Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	464
AME Communication Status		Integer*2	N/A	0 to 1	1	0 = OK 1 = FAIL	465
RMS Link Status		Integer*2	N/A	0 to 1	1	0 = Connected, 1 = Not Connected	466
RPG Link Status		Integer*2	N/A	0 to 1	1	0 = Connected, 1 = Not Connected	467
Interpanel Link Status	The link between channel 1 SPIP to channel 2 SPIP for power, and communications	Integer*2	N/A	0 to 2	1	0 = OK 1 = FAIL 2 = N/A (Single Channel System)	468
Performance Check Time	Unix Epoch Time of the next performance check is due. (This is a 32 bit time_t)	Integer*4	N/A	N/A	1		469 - 470
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	471 - 479
Version	Version Number for the Performance Data Message	Integer*2	N/A	N/A	1	Expected to change if any other change rest of the message	480

Notes:
(1) No = Not connected or not configured.
(3) Value of the field will be zero.
(4) This note is not used.
(5) See Appendix B for unit definitions and standard symbology.
(6) 24 hour statistics are updated at 15 minute intervals.
7) For these values the maximum value of the range is used to denote a suspected sensor failure, so 255 for the temperature values is a failing code, as is 65535 for the RSP motherboard temperature. These values are well past physically reasonable and so are convenient for using as code values.

3.2.4.8 Table VI Console Message (Message Types 4, 10)

NAME	DESCRIPTION	FORMAT	UNITS	RANGE	ACCURACY/ PRECISION	HALF WORD
Console Message Size	Number of bytes/characters in message.	Integer*2	N/A	2 to 404	N/A	1
Message	Console message text including embedded carriage returns, line feeds, etc.	String	N/A	N/A	N/A	2 to 203

3.2.4.9 Table VIII Loopback Test (Message Type 11 and Message Type 12)

Loopback message 11 is sent by the RDA to the RPG upon initial connection. The RPG will resend message 11, without any changes to the RDA. In addition, loopback message 12 will be sent from the RPG to the RDA upon initial connection. The RDA will simply retransmit message 12 to the RPG without any modifications.

NAME	DESCRIPTION	FORMAT	UNITS	RANGE	ACCURACY/ PRECISION	HALF WORD
Loopback Message Size	Number of halfwords in message (does not include message header)	Integer*2	N/A	2 to 1200	N/A	1
Bit Pattern	Bit Pattern of 0's and 1's used to test interface.	N/A	N/A	N/A	N/A	2 to 1200

3.2.4.10 Table IX Clutter Filter Bypass Map (Message Type 13)

NAME	DESCRIPTION	FORMAT	UNITS(5)	RANGE	ACCURACY/ PRECISION	HALFWORD LOCATION
Bypass Map Generation Date	Julian Date - 2440586.5(3)	Integer*2	d	1 to 65535	1	1
Bypass Map Generation Time	Number of Minutes since Midnight Greenwich Mean Time	Integer*2	min	0 to 1440	1	2
Number of Segments	Number of Elevation Segments	Integer*2	N/A	1 to 5	1	3
For Each Segment (1)						
Segment Number	Segment Number	Integer*2	N/A	1 to 5	1	E1
Range Bins	Radial 1, Range Bins 0 to 15	Code*2	N/A	0 or 1 (2)	1 (4)	E2
Range Bins	Radial 1, Range Bins 16 to 31	Code*2	N/A	0 or 1 (2)	1 (4)	E3
...	...	...	...	...	...	...
Range Bins	Radial 1, Range Bins 496 to 511	Code*2	N/A	0 or 1 (2)	1 (4)	E33

Range Bins	Radial 2, Range Bins 0 to 15	Code*2	N/A	0 or 1 (2)	1 (4)	E34
Range Bins	Radial 2, Range Bins 16 to 31	Code*2	N/A	0 or 1 (2)	1 (4)	E35
...	...	...	...	...	...	...
Range Bins	Radial 2 Range Bins 496 to 511	Code*2	N/A	0 or 1 (2)	1 (4)	E65
...	...	...	...	...	...	...
Range Bins	Radial 360 Range Bins 0 to 15	Code*2	N/A	0 or 1 (2)	1 (4)	E11490
Range Bins	Radial 360 Range Bins 16 to 31	Code*2	N/A	0 or 1 (2)	1 (4)	E11491
...	...	...	...	...	...	...
Range Bins	Radial 360 Range Bins 496 to 511	Code*2	N/A	0 or 1 (2)	1 (4)	E11521

(1) Each elevation segment includes 360 azimuth radials. Each azimuth radial consists of 512 range cells. Each range cell has 1 kilometer resolution starting at 0 to 1 kilometer. The first azimuth radial, R0, subtends the angle $0.0 \leq R0 < 1.0$ degrees, with the next azimuth radial, R1, subtending the angle $1.0 \leq R1 < 2.0$ degrees, etc. Increasing angles are taken to be clockwise relative to true north. Elevation segment number 1 is closest to the ground, increasing segment numbers denote increasing elevation.
(2) Each bit represents a range bin. Range Bins: 0 = perform clutter filtering; 1 = bypass the clutter filters
(3) 1 January 1970 00.00 Greenwich Mean Time = 1 Modified Julian Date
(4) MSB equals the lowest numbered bin (i.e., for HW E2, MSB = Bin 0)
(5) See Appendix B for unit definitions and standard symbology.

3.2.4.11 Table X RDA Control Commands (Message Type 6)

NAME	DESCRIPTION	FORMAT(2)	UNITS(6)	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
RDA STATE COMMAND (1)	RDA State Command Values: •No Change •Stand-By •Operate •Restart	•Code*2	N/A	As Listed •0 (no bits set) •32769 (bit 0 & 15 =1) •32772 (bit 2 & 15 =1) •32776 (bit 3 & 15 =1)	•N/A	•1
RDA LOG COMMAND	RDA Log Command Values: •No Change •Enable •Disable	•Code*2	N/A	As Listed •0 (no bits set) •1 (bit 0 set) •2 (bit 1 set)	•N/A	•2
AUXILIARY POWER GENERATOR CONTROL	Aux. Power Generator Control Values: •No Change	•Code*2	N/A	As Listed •0 (no bits set) •32772 (bit 2 & 15 =1)	•N/A	•3

Note(4)	•Switch to Auxiliary Power •Switch to Utility Power			•32770 (bit 1 & 15 =1)		
RDA CONTROL COMMANDS AND AUTHORIZATION	•No Change •Control Command Clear •Local Control Enabled •Remote Control Accepted •Remote Control Requested	•Code*2	•N/A	•As listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set) •8 (bit 3 set) •16 (bit 4 set)	•N/A	•4
RESTART VCP OR ELEVATION CUT	Restart VCP or Elevation Cut Values: •None •Restart Volume Coverage Pattern •Restart Elevation Cut	•Code*2	N/A	As Listed •0 (no bits set) •32768 (bit 15 = 1) •32768 + cut number (bit 15 = 1; set binary number of cut in bits 0 to 7)	•N/A	•5
SELECT LOCAL VCP NUMBER FOR NEXT VOLUME SCAN	•Use Remote Pattern •Pattern Number •No Change	•Integer*2	•N/A	•As Listed •0 (no bits set) •1 to 767 •32767	•1	•6
SPARE	N/A	N/A	N/A	0		7
SUPER RESOLUTION CONTROL	Values: •No change •Enable •Disable	•Code*2 (4)	N/A	As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•8
CLUTTER MITIGATION DECISION CONTROL	Values: •No change •Enable •Disable	•Code*2 (4)	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•9
AVSET CONTROL	Values: •No change •Enable •Disable	•Code*2 (4)	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•10
SPARE	N/A	N/A	N/A	0	N/A	11
CHANNEL CONTROL COMMAND	•No Change •Set to Controlling Channel •Set to Non-	•Code*2	•N/A	•As Listed •0 (no bits set) •1 (bit 0 set) •2 (bit 1 set)	•N/A	•12

	controlling Channel					
PERFORMANCE CHECK CONTROL	No Change Force Performance Check	Code*2	N/A	As Listed •0 (no bits set) 1 (bit 0 set)	N/A	13
ZDR BIAS ESTIMATE WEIGHTED MEAN	Values(8) •Not Available •No Change •Coded Value	•Integer*2	•dB	•As Listed •0 •1 •2 to 1058	•± 0.4/0.03(8)	•14
SPARE	N/A	N/A	N/A	0	N/A	15 to 20
SPOT BLANKING	•No Change •Enable Spot Blanking •Disable Spot Blanking	•Code*2	•N/A	•As Listed •0 (no bits set) •2 (bit 1 set) •4 (bit 2 set)	•N/A	•21
SPARE	N/A	N/A	N/A	0	N/A	22 to 26

(1) Only one command is allowed at a time; except Restart, which is allowed with operational commands.
(2) A halfword is defined to be 16 bits. All specified bit locations are referenced from 0 (the LSB) to 15 (the MSB).
(4) The states are mutually exclusive.
(5) This note is no longer used.
(6) See Appendix B for unit definitions and standard symbology.
(7) "Offline Operate" has been removed from the RDA software in the build 19.
(8) See Table XVII-I, for the encoding of the ZDR block. Values 0 and 1 reserved for "Not Available", and "No Change", otherwise the same encoding is used for this item.

3.2.4.12 Table XI Volume Coverage Pattern Data (Message Types 5 & 7)

NAME	DESCRIPTION	FORMAT(4)	UNITS (10)	RANGE (OR VALUE)(7)	ACCURACY/ PRECISION	HALFWORD LOCATION
MESSAGE SIZE	Number of Halfwords in Message	Integer*2	halfword	34 to 747	1	1
PATTERN TYPE	Constant Elevation Cut	Code*2	N/A	As listed 2	N/A	2
PATTERN NUMBER	Pattern Number Values: •Operational •Constant Elevation Types (11)	•Integer*2	•N/A	•See Appendix C for available VCPs	•1	•3
NUMBER OF ELEVATION CUTS	Number of elevation cuts in one complete volume scan	Integer*2	N/A	1 to 32	1	4

VERSION	VCP version number	Integer*1	N/A	1 to 99	1	5 (1)
CLUTTER MAP GROUP NUMBER	Clutter map groups are not currently implemented.	Integer*1	N/A	1 to 2 (12)	1	5 (2)
DOPPLER VELOCITY RESOLUTION	Doppler Velocity Resolution Values: •0.5 •1.0	•Code*1	•m/s	•As Listed •2 (set bit 9) •4 (set bit 10)	•N/A	•6 (1)
PULSE WIDTH	Pulse Width Values: •Short •Long	•Code*1	•N/A	•As listed •2 (set bit 1) •4 (set bit 2)	•N/A	•6 (2)
RESERVED(14)	N/A	N/A	N/A	N/A	N/A	7-8
VCP SEQUENCING(14)	VCP SEQUENCING VALUES •Number of Elevations •Maximum SAILS Cuts •Sequence Active •Truncated VCP	•Code*2(15)	•N/A	• Bits 0-4 Bits 5-6 Bit 13 set Bit 14 set	N/A	9
VCP SUPPLEMENTAL DATA(14)	VCP SUPPLEMENTAL VALUES •SAILS VCP •Number SAILS Cuts •MRLE VCP •Number of MRLE Cuts •Spares •MPDA VCP •BASE TILT VCP •Number of BASE TILTS	•Code*2(16)	•N/A	• Bit 0 set Bits 1-3 Bit 4 set Bits 5-7 Bits 8-10 Bit 11 set Bit 12 set Bits 13-15		10
RESERVED(14)	N/A	N/A	N/A	N/A	N/A	11
Repeat for each elevation angle (18)						
ELEVATION ANGLE (3)	The elevation angle for this cut	Code*2 (6)	deg	0.000000 to 359.956055	0.043945	E1
CHANNEL CONFIGURATION	Channel Configuration Values: •Constant Phase •Random Phase	•Code*1	•N/A	•As Listed •0 •1 •2	•N/A	•E2 (1)

	•SZ2 Phase					
WAVEFORM TYPE	Waveform Type Values: •Contiguous Surveillance •Contiguous Doppler w/ Ambiguity Resolution •Contiguous Doppler w/o Ambiguity Resolution •Batch •Staggered Pulse Pair	•Code*1	•N/A	•As Listed (8) •1 •2 •3 •4 •5	•N/A	•E2 (2)
SUPER RESOLUTION CONTROL	Super Resolution Control Values: • 0.5 degree azimuth • 1/4 km reflectivity • Doppler to 300 km Dual Polarization Control • Dual Polarization to 300 km	Code*1	N/A	As Listed (13) • Bit 0 set • Bit 1 set • Bit 2 set • Bit 3 set	N/A	E3 (1)
SURVEILLANCE PRF NUMBER(5)	The pulse repetition frequency number for surveillance cuts	Integer*1	N/A	0 to 8	1	E3 (2)
SURVEILLANCE PRF PULSE COUNT/RADIAL(5)	The pulse count per radial for surveillance cuts	Integer*2	N/A	0 to 999	1	E4
AZIMUTH RATE	The azimuth rate of the cut	Code*2 (9)	deg/s	-44.989 to +44.989	0.010986328125	E5
REFLECTIVITY THRESHOLD	Signal to noise ratio (SNR) threshold for reflectivity	Scaled SInteger*2	dB	-12.0 to +20.0	.125	E6
VELOCITY THRESHOLD	Signal to noise ratio (SNR) threshold for velocity	Scaled SInteger*2	dB	-12.0 to +20.0	.125	E7

SPECTRUM WIDTH THRESHOLD	Signal to noise ratio (SNR) threshold for spectrum width	Scaled SInteger*2	Db	-12.0 to +20.0	.125	E8
DIFFERENTIAL REFLECTIVITY THRESHOLD	Signal to noise ratio (SNR) threshold for differential reflectivity	Scaled SInteger*2	dB	-12.0 to +20.0	.125	E9
DIFFERENTIAL PHASE THRESHOLD	Signal to noise ratio (SNR) threshold for differential phase	Scaled SInteger*2	dB	-12.0 to +20.0	.125	E10
CORRELATION COEFFICIENT THRESHOLD	Signal to noise ratio (SNR) threshold for correlation coefficient	Scaled SInteger*2	dB	-12.0 to +20.0	.125	E11
EDGE ANGLE	Sector 1 Azimuth Clockwise Edge Angle (denotes start angle)	Code*2 (6)	deg	0.000000 to 359.956055	0.043945	E12
DOPPLER PRF NUMBER(5)	Sector 1 Doppler PRF Number	Integer*2	N/A	0 to 8	1	E13
DOPPLER PRF PULSE COUNT/RADIAL(5)	Sector 1 Doppler Pulse Count/Radial	Integer*2	N/A	0 to 999	1	E14
SUPPLEMENTAL DATA(14)	Supplemental Data Values •SAILS Cut •SAILS Sequence Number •MRLE Cut •MRLE Sequence Number •Spare •MPDA Cut •BASE TILT Cut	•Code*2	•N/A	• Bit 0 set Bits 1-3 Bit 4 set Bits 5-7 Bit 8 Bit 9 set Bit 10 set	N/A	E15(17)
SAME AS E12 to E14 FOR SECTOR 2						E16 to E18
EBC ANGLE	The correction added to the elevation angle for this cut	Code*2(6)	deg	0.000000 to 359.956055	0.043945	E19
SAME AS E12 to E14 FOR SECTOR 3						E20 to E22
RESERVED(14)	N/A	N/A	N/A	N/A	N/A	E23

(1) Upper byte.
(2) Lower byte.
(3) For Each Elevation Cut, repeat E1-E23
(4) A halfword is defined to be 16 bits. All specified bit locations are referenced from 0 (the LSB) to 15 (the MSB).
(5) Zero values are only to be used when the field is non-applicable. For example ... for VCP 21, cut 1 is a contiguous surveillance cut. The Doppler fields will all have "0" for their value. Cut 2 is a contiguous doppler cut, thus the surveillance fields will have "0" for their value.
(6) Format defined in Table III-A.
(7) Values shown are after applicable scaling and conversion is done.
(8) Values are mutually exclusive.
(9) Format defined in Table XI-D.
(10) See Appendix B for unit definitions and standard symbology.
(11) Currently all operational VCP patterns are constant elevation types.
(12) Clutter map groups are not currently used. The currently used value for this field is 1.
(13) Values can be independently set and are not exclusive.
(14) Reserved for RPG use. These values will be byte swapped as half words in the RDA and returned to the RPG.
(15) VCP Sequencing information used by the RPG. A VCP that is part of a VCP Sequence may be truncated in the number of elevation cuts without changing the VCP number. Bits 0-4 are used to denote the number of elevation cuts within this truncated VCP. The truncated VCP may also support Supplemental Adaptive Intra-volume Low elevation Scan (SAILS) with a limited number of SAILS cuts. This is denoted using bits 5-6. The maximum allowed is 3. Bit 13 is set if this VCP is part of an active VCP Sequence. Bit 14 is set if this VCP is part of an active VCP Sequence and the VCP is truncated in the number of elevation cuts.
(16) Supplemental Scan information used by the RPG. Bit 0 is set if this VCP contains SAILS cuts. Bits 1-3 are used to denote the number of SAILS cuts in the VCP limited to a maximum of 3. Bit 4 is set if this VCP contains Mid-volume Rescan of Low-level Elevations (MRLE) cuts. Bits 5-7 denote the number of MRLE cuts in the VCP limited to a maximum of 4. SAILS and MRLE cannot be simultaneously active. Bits 8-10 are spares. Bit 11 is set if the VCP is an Multi-PRF Dealiasing Algorithm (MPDA) VCP. Bit 12 is set if the VCP contains at least one BASE TILT. Bits 13-15 denotes the number of BASE TILTS in the VCP. Currently only 1 BASE TILT is supported.
(17) This word defines information about whether the elevation cut is a SAILS or a MRLE cut. If a SAILS cut (bit 0 set), bits 1-3 denote the SAILS sequence number. If a MRLE cut (bit 4 set), bits 5-7 denote the MRLE sequence number. The MRLE sequence number will be the same as the RPG elevation index of the cut. By definition, the RPG elevation indexing scheme treats split cuts as the same elevation index. An elevation cut cannot be both a SAILS cut and a MRLE cut. If the elevation cut is a Multi-PRF Dealiasing (MPDA) cut, bit 9 is set. An MPDA cut can also be either a SAILS cut or MRLE cut. If the elevation cut is a BASE TILT cut, bit 10 is set.
(18) E value halfword locations are determined by EX = (12 + (X-1)) + ((Cut - 1) * Number_of_E_Values). Currently the Number_of_E_Values is 23.

3.2.4.12.1 Table XI-D Azimuth and Elevation Rate Data

BIT	**WEIGHT** (1) (2)
0	X
1	X
2	X
3	0.010986328125
4	0.02197265625
5	0.0439453125

6	0.087890625
7	0.17578125
8	0.3515625
9	0.703125
10	1.40625
11	2.8125
12	5.625
13	11.25
14	22.5
15	Sign Bit (1 indicates negative) (3)

Notes:
1. X indicates not applicable
2. Units are degrees per second.
3. Format is 2's complement binary scaled integer (i.e., SInteger *2)

3.2.4.13 Table XII Clutter Censor Zones (Message Type 8)

NAME	DESCRIPTION	FORMAT	UNITS(3)	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION (2)
OVERRIDE REGIONS	Number of Clutter Map Override Regions	Integer*2	N/A	0 to 25	1	1
START RANGE (1)	The start range for this clutter map override region.	Integer*2	km	0 to 511	1	R1 [2 + (i*6)]
STOP RANGE	The stop range for this clutter map override region.	Integer*2	km	0 to 511	1	R2 [3 + (i*6)]
START AZIMUTH	The start azimuth for this clutter map override region.	Integer*2	deg	0 to 360	1	R3 [4 + (i*6)]
STOP AZIMUTH	The stop azimuth for this clutter map override region.	Integer*2	deg	0 to 360	1	R4 [5 + (i*6)]
ELEVATION SEGMENT NUMBER	Elevation segment 1 is closest to the ground, increasing segment number denotes increasing elevation.	Integer*2	N/A	1 to 5	1	R5 [6 + (i*6)]
OPERATOR SELECT CODE	•Bypass Filter Forced (no filtering) •Bypass Map in Control •Clutter Filtering Forced	•Code*2	•N/A	•As Listed •0 •1 •2	•N/A	•R6 [7 + (i*6)]

Notes:
1. For each subsequent region, halfwords R1 through R6 shall be repeated. For example, region 0

will use halfwords 2 through 7, region 1 will use halfwords 8 through 13, region 2 will use halfwords 14 through 19, etc.
2. Where "i" is used, i = override region number (0-based).
3. See Appendix B for unit definitions and standard symbology.

3.2.4.14 Table XIII Request for Data (Message Type 9)

NAME	DESCRIPTION	FORMAT (1)	UNITS	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
Data Request Type	•Request Summary RDA Status •Request RDA Performance/Maintenance Data •Request Clutter Filter Bypass Map •Request Clutter Filter Map •Request RDA Adaptation Data •Request Volume Coverage Pattern Data	•Code*2	•N/A	•As Listed •129 (bits 0&7=1) •130 (bits 1&7=1) •132 (bits 2&7=1) •136 (bits 3&7=1) •144 (bits 4&7=1) •160 (bits 5&7=1)	•N/A	•1

Notes:
1. LSB = bit 0

3.2.4.15 Table XIV Clutter Filter Map (Message Type 15)

NAME	DESCRIPTION	FORMAT	UNITS(5)	RANGE (OR VALUE)	ACCURACY /PRECISION	HALFWORD LOCATION
Map Generation Date	Julian Date - 2440586.5 (1)	Integer*2	d	1 to 65535	1	1
Map Generation Time	Number of Minutes since Midnight Greenwich Mean Time	Integer*2	min	0 to 1440	1	2
Number of Elevation Segments	Number of elevation segments in map.	Integer*2	N/A	1 to 5	1	3
Repeat for each Elevation Segment (2)						
Repeat for each Azimuth Segment (3)						
Number of Range Zones	Number of defined range zones for this azimuth.	Integer*2	N/A	1 to 20	1	*A1*
Range Zone (4)						
Op Code	Bypass Filter Bypass map in Control	Code*2	N/A	As Listed 0 1	N/A	*R1*

	Force Filter			2		
End Range (4)	Stop Range per Zone	Integer*2	km	0 to 511	1	*R2*
Same as R1 & R2 for Range Zone 1						
...	...	...	...	...	...	...
Same as R1 & R2 for # of Range Zones specified						

Notes:
1. 1 January 1970 00.00 Greenwich Mean Time = 1 Modified Julian Date
2. There can be up to 5 elevation segments. Typically, only 2 elevation segments are used. The first elevation segment is closest to the ground, increasing segment numbers denote increasing elevation.
3. There are 360 azimuth segments (segment 0 through segment 359). The first azimuth radial, R0, subtends the angle ($0.0 \leq R0 < 1.0$) degrees, with the next azimuth radial, R1, subtending the angle ($1.0 \leq R1 < 2.0$) degrees, etc. Increasing angles are taken to be clockwise relative to true north.
4. There are 20 possible range zones. Not all range zones need to be defined. The last range zone must have end range of 511.
5. See Appendix B for unit definitions and standard symbology.

3.2.4.16 Table XV. RDA Adaptation Data (Message Type 18)

NAME	DESCRIPTION	FORMAT	UNITS(6)	RANGE (OR VALUE)(8)	ACCURACY/ PRECISION	BYTE LOCATION
ADAP_FILE_NAME	NAME OF ADAPTATION DATA FILE	String (12)	N/A	N/A	N/A	0 - 11
ADAP_FORMAT	FORMAT OF ADAPTATION DATA FILE	String (13)	N/A	N/A	N/A	12 - 15
ADAP_REVISION	REVISION NUMBER OF ADAPTATION DATA FILE	String (14)	N/A	N/A	N/A	16 - 19
ADAP_DATE	LAST MODIFIED DATE ADAPTATION DATA FILE	String (1)	N/A	N/A	N/A	20 - 31
ADAP_TIME	LAST MODIFIED TIME OF ADAPTATION DATA FILE	String (2)	N/A	N/A	N/A	32 - 43
LOWER_PRE_LIMIT	ANGLE OF THE LOWER PRE-LIMIT SWITCH	Real*4	deg	3.000 to 0.000	0.001	44 - 47
AZ_LAT	LATENCY OF AZIMUTH	Real*4	s	0.0000 to 2.0000	.0001	48 - 51

	ENCODERMEASUREMENT					
UPPER_PRE_LIMIT	ANGLE OF THE UPPER PRE-LIMIT SWITCH	Real*4	deg	55.000 to 66.000	0.001	52 - 55
EL_LAT	LATENCY OF ELEVATION ENCODER MEASUREMENT	Real*4	s	0.000 to 2.000	.001	56 - 59
PARKAZ	PEDESTAL PARK POSITION IN AZIMUTH	Real*4	deg	0.00 to 359.99	0.01	60 - 63
PARKEL	PEDESTAL PARK POSITION IN ELEVATION	Real*4	deg	-1.00 to 55.00	0.01	64 - 67
A_FUEL_CONV(0)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (0% HGT)	Real*4	%	0.0 to 100.0	0.1	68 - 71
A_FUEL_CONV(1)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (10% HGT)	Real*4	%	0.0 to 100.0	0.1	72 - 75
A_FUEL_CONV(2)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (20% HGT)	Real*4	%	0.0 to 100.0	0.1	76 - 79
A_FUEL_CONV(3)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (30% HGT)	Real*4	%	0.0 to 100.0	0.1	80 - 83
A_FUEL_CONV(4)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (40% HGT)	Real*4	%	0.0 to 100.0	0.1	84 - 87
A_FUEL_CONV(5)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (50% HGT)	Real*4	%	0.0 to 100.0	0.1	88 - 91
A_FUEL_CONV(6)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (60% HGT)	Real*4	%	0.0 to 100.0	0.1	92 - 95

A_FUEL_CONV(7)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (70% HGT)	Real*4	%	0.0 to 100.0	0.1	96 - 99
A_FUEL_CONV(8)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (80% HGT)	Real*4	%	0.0 to 100.0	0.1	100 - 103
A_FUEL_CONV(9)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (90% HGT)	Real*4	%	0.0 to 100.0	0.1	104 - 107
A_FUEL_CONV(10)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (100% HGT)	Real*4	%	0.0 to 100.0	0.1	108 - 111
A_MIN_SHELTER_TEMP	MINIMUM EQUIPMENT SHELTER ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	112 - 115
A_MAX_SHELTER_TEMP	MAXIMUM EQUIPMENT SHELTER ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	116 - 119
A_MIN_SHELTER_AC_TEMP_DIFF	MINIMUM A/C DISCHARGE AIR TEMPERATURE DIFFERENTIAL	Real*4	deg C	0.0 to 10.0	0.1	120 - 123
A_MAX_XMTR_AIR_TEMP	MAXIMUM TRANSMITTER LEAVING AIR ALARM TEMPERATURE	Real*4	deg C	0.0 to 55.0	0.1	124 - 127
A_MAX_RAD_TEMP	MAXIMUM RADOME ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	128 - 131
A_MAX_RAD_TEMP_RISE	MAXIMUM RADOME MINUS AMBIENT TEMPERATURE DIFFERENCE	Real*4	deg C	0.0 to 10.0	0.1	132 - 135
LOWER_DEAD_LIMIT	ANGLE OF LOWER DEAD LIMIT SWITCH	Real*4	deg	-4.000 to 0.000	0.001	136 - 139

UPPER_DEAD_LIMIT	ANGLE OF THE UPPER DEAD LIMIT SWITCH	Real*4	deg	60.000 to 66.000	0.001	140 - 143
SPARE	N/A	N/A	N/A	0	N/A	144 - 147
A_MIN_GEN_ROOM_TEMP	MINIMUM GENERATOR SHELTER ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	148 - 151
A_MAX_GEN_ROOM_TEMP	MAXIMUM GENERATOR SHELTER ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	152 - 155
SPIP_5V_REG_LIM	SPIP +5 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	156 - 159
SPIP_15V_REG_LIM	SPIP +/- 15 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	160 - 163
SPARE	N/A	N/A	N/A	0	N/A	164 - 175
RPG_CO_LOCATED	RPG CO-LOCATED	String (15)	N/A	T or F	N/A	176 - 179
SPEC_FILTER_INSTALLED	TRANSMITTER SPECTRUM FILTER INSTALLED	String (15)	N/A	T or F	N/A	180 - 183
TPS_INSTALLED	TRANSITION POWER SOURCE INSTALLED	String (15)	N/A	T or F	N/A	184 - 187
RMS_INSTALLED	FAA RMS INSTALLED	String (15)	N/A	T or F	N/A	188 - 191
A_HVDL_TST_INT	PERFORMANCE TEST INTERVAL	Integer*4	h	2 to 72	1	192 - 195
A_RPG_LT_INT	RPG LOOP TEST INTERVAL	Integer*4	min	1 to 20	1	196 - 199
A_MIN_STAB_UTIL_PWR_TIME	REQUIRED INTERVAL TIME FOR STABLE UTILITY POWER	Integer*4	min	1 to 20	1	200 - 203
A_GEN_AUTO_EXER_INTERVAL	MAXIMUM GENERATOR AUTOMATIC EXERCISE INTERVAL	Integer*4	h	5 to 1000	1	204 - 207
A_UTIL_PWR_SW_REQ_INTERVAL	RECOMMENDED SWITCH TO UTILITY POWER TIME INTERVAL	Integer*4	min	5 to 30	1	208 - 211
A_LOW_FUEL_LEVEL	LOW FUEL TANK WARNING LEVEL	Real*4	%	0.0 to 100.0	0.1	212 - 215

CONFIG_CHAN_NUMBER	CONFIGURATION CHANNEL NUMBER	Integer*4	N/A	1 or 2	1	216 - 219
SPARE	N/A	N/A	N/A	0	N/A	220 - 223
REDUNDANT_CHAN_CONFIG	REDUNDANT CHANNEL CONFIGURATION (1 = SINGLE CHAN, 2 = FAA, 3 = NWS REDUNDANT)	Integer*4	N/A	1 to 3	1	224 - 227
ATTEN_TABLE(0)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (0dB)	Real*4	dB	-1.00 to 1.00	0.01	228 - 231
ATTEN_TABLE(1)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (1dB)	Real*4	dB	-2.00 to 0.00	0.01	232 - 235
ATTEN_TABLE(2)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (2dB)	Real*4	dB	-3.00 to -1.00	0.01	236 - 239
ATTEN_TABLE(3)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (3dB)	Real*4	dB	-4.00 to -2.00	0.01	240 - 243
ATTEN_TABLE(4)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (4dB)	Real*4	dB	-5.00 to -3.00	0.01	244 - 247
ATTEN_TABLE(5)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (5dB)	Real*4	dB	-6.00 to -4.00	0.01	248 - 251
ATTEN_TABLE(6)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (6dB)	Real*4	dB	-7.00 to -5.00	0.01	252 - 255
ATTEN_TABLE(7)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (7dB)	Real*4	dB	-8.00 to -6.00	0.01	256 - 259
ATTEN_TABLE(8)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (8dB)	Real*4	dB	-9.00 to -7.00	0.01	260 - 263
ATTEN_TABLE(9)	TEST SIGNAL ATTENUATOR	Real*4	dB	-10.00 to -8.00	0.01	264 - 267

	INSERTION LOSSES (9dB)					
ATTEN_TABLE(10)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (10dB)	Real*4	dB	-11.00 to -9.00	0.01	268 - 271
ATTEN_TABLE(11)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (11dB)	Real*4	dB	-12.00 to -10.00	0.01	272 - 275
ATTEN_TABLE(12)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (12dB)	Real*4	dB	-13.00 to -11.00	0.01	276 - 279
ATTEN_TABLE(13)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (13dB)	Real*4	dB	-14.00 to -12.00	0.01	280 - 283
ATTEN_TABLE(14)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (14dB)	Real*4	dB	-15.00 to -13.00	0.01	284 - 287
ATTEN_TABLE(15)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (15dB)	Real*4	dB	-16.00 to -14.00	0.01	288 - 291
ATTEN_TABLE(16)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (16dB)	Real*4	dB	-17.00 to -15.00	0.01	292 - 295
ATTEN_TABLE(17)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (17dB)	Real*4	dB	-18.00 to -16.00	0.01	296 - 299
ATTEN_TABLE(18)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (18dB)	Real*4	dB	-19.00 to -17.00	0.01	300 - 303
ATTEN_TABLE(19)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (19dB)	Real*4	dB	-20.00 to -18.00	0.01	304 - 307
ATTEN_TABLE(20)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (20dB)	Real*4	dB	-21.00 to -19.00	0.01	308 - 311
ATTEN_TABLE(21)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (21dB)	Real*4	dB	-22.00 to -20.00	0.01	312 - 315

ATTEN_TABLE(22)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (22dB)	Real*4	dB	-23.00 to -21.00	0.01	316 - 319
ATTEN_TABLE(23)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (23dB)	Real*4	dB	-24.00 to -22.00	0.01	320 - 323
ATTEN_TABLE(24)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (24dB)	Real*4	dB	-25.00 to -23.00	0.01	324 - 327
ATTEN_TABLE(25)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (25dB)	Real*4	dB	-26.00 to -24.00	0.01	328 - 331
ATTEN_TABLE(26)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (26dB)	Real*4	dB	-27.00 to -25.00	0.01	332 - 335
ATTEN_TABLE(27)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (27dB)	Real*4	dB	-28.00 to -26.00	0.01	336 - 339
ATTEN_TABLE(28)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (28dB)	Real*4	dB	-29.00 to -27.00	0.01	340 - 343
ATTEN_TABLE(29)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (29dB)	Real*4	dB	-30.00 to -28.00	0.01	344 - 347
ATTEN_TABLE(30)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (30dB)	Real*4	dB	-31.00 to -29.00	0.01	348 - 351
ATTEN_TABLE(31)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (31dB)	Real*4	dB	-32.00 to -30.00	0.01	352 - 355
ATTEN_TABLE(32)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (32dB)	Real*4	dB	-33.00 to -31.00	0.01	356 - 359
ATTEN_TABLE(33)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (33dB)	Real*4	dB	-34.00 to -32.00	0.01	360 - 363
ATTEN_TABLE(34)	TEST SIGNAL ATTENUATOR	Real*4	dB	-35.00 to -33.00	0.01	364 - 367

	INSERTION LOSSES (34dB)					
ATTEN_TABLE(35)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (35dB)	Real*4	dB	-36.00 to -34.00	0.01	368 - 371
ATTEN_TABLE(36)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (36dB)	Real*4	dB	-37.00 to -35.00	0.01	372 - 375
ATTEN_TABLE(37)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (37dB)	Real*4	dB	-38.00 to -36.00	0.01	376 - 379
ATTEN_TABLE(38)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (38dB)	Real*4	dB	-39.00 to -37.00	0.01	380 - 383
ATTEN_TABLE(39)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (39dB)	Real*4	dB	-40.00 to -38.00	0.01	384 - 387
ATTEN_TABLE(40)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (40dB)	Real*4	dB	-41.00 to -39.00	0.01	388 - 391
ATTEN_TABLE(41)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (41dB)	Real*4	dB	-42.00 to -40.00	0.01	392 - 395
ATTEN_TABLE(42)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (42dB)	Real*4	dB	-43.00 to -41.00	0.01	396 - 399
ATTEN_TABLE(43)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (43dB)	Real*4	dB	-44.00 to -42.00	0.01	400 - 403
ATTEN_TABLE(44)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (44dB)	Real*4	dB	-45.00 to -43.00	0.01	404 - 407
ATTEN_TABLE(45)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (45dB)	Real*4	dB	-46.00 to -44.00	0.01	408 - 411
ATTEN_TABLE(46)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (46dB)	Real*4	dB	-47.00 to -45.00	0.01	412 - 415

ATTEN_TABLE(47)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (47dB)	Real*4	dB	-48.00 to -46.00	0.01	416 - 419
ATTEN_TABLE(48)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (48dB)	Real*4	dB	-49.00 to -47.00	0.01	420 - 423
ATTEN_TABLE(49)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (49dB)	Real*4	dB	-50.00 to -48.00	0.01	424 - 427
ATTEN_TABLE(50)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (50dB)	Real*4	dB	-51.00 to -49.00	0.01	428 - 431
ATTEN_TABLE(51)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (51dB)	Real*4	dB	-52.00 to -50.00	0.01	432 - 435
ATTEN_TABLE(52)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (52dB)	Real*4	dB	-53.00 to -51.00	0.01	436 - 439
ATTEN_TABLE(53)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (53dB)	Real*4	dB	-54.00 to -52.00	0.01	440 - 443
ATTEN_TABLE(54)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (54dB)	Real*4	dB	-55.00 to -53.00	0.01	444 - 447
ATTEN_TABLE(55)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (55dB)	Real*4	dB	-56.00 to -54.00	0.01	448 - 451
ATTEN_TABLE(56)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (56dB)	Real*4	dB	-57.00 to -55.00	0.01	452 - 455
ATTEN_TABLE(57)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (57dB)	Real*4	dB	-58.00 to -56.00	0.01	456 - 459
ATTEN_TABLE(58)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (58dB)	Real*4	dB	-59.00 to -57.00	0.01	460 - 463
ATTEN_TABLE(59)	TEST SIGNAL ATTENUATOR	Real*4	dB	-60.00 to -58.00	0.01	464 - 467

	INSERTION LOSSES (59dB)					
ATTEN_TABLE(60)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (60dB)	Real*4	dB	-61.00 to -59.00	0.01	468 - 471
ATTEN_TABLE(61)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (61dB)	Real*4	dB	-62.00 to -60.00	0.01	472 - 475
ATTEN_TABLE(62)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (62dB)	Real*4	dB	-63.00 to -61.00	0.01	476 - 479
ATTEN_TABLE(63)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (63dB)	Real*4	dB	-64.00 to -62.00	0.01	480 - 483
ATTEN_TABLE(64)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (64dB)	Real*4	dB	-65.00 to -63.00	0.01	484 - 487
ATTEN_TABLE(65)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (65dB)	Real*4	dB	-66.00 to -64.00	0.01	488 - 491
ATTEN_TABLE(66)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (66dB)	Real*4	dB	-67.00 to -65.00	0.01	492 - 495
ATTEN_TABLE(67)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (67dB)	Real*4	dB	-68.00 to -66.00	0.01	496 - 499
ATTEN_TABLE(68)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (68dB)	Real*4	dB	-69.00 to -67.00	0.01	500 - 503
ATTEN_TABLE(69)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (69dB)	Real*4	dB	-70.00 to -68.00	0.01	504 - 507
ATTEN_TABLE(70)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (70dB)	Real*4	dB	-71.00 to -69.00	0.01	508 - 511
ATTEN_TABLE(71)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (71dB)	Real*4	dB	-72.00 to -70.00	0.01	512 - 515

ATTEN_TABLE(72)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (72dB)	Real*4	dB	-73.00 to -71.00	0.01	516 - 519
ATTEN_TABLE(73)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (73dB)	Real*4	dB	-74.00 to -72.00	0.01	520 - 523
ATTEN_TABLE(74)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (74dB)	Real*4	dB	-75.00 to -73.00	0.01	524 - 527
ATTEN_TABLE(75)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (75dB)	Real*4	dB	-76.00 to -74.00	0.01	528 - 531
ATTEN_TABLE(76)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (76dB)	Real*4	dB	-77.00 to -75.00	0.01	532 - 535
ATTEN_TABLE(77)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (77dB)	Real*4	dB	-78.00 to -76.00	0.01	536 - 539
ATTEN_TABLE(78)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (78dB)	Real*4	dB	-79.00 to -77.00	0.01	540 - 543
ATTEN_TABLE(79)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (79dB)	Real*4	dB	-80.00 to -78.00	0.01	544 - 547
ATTEN_TABLE(80)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (80dB)	Real*4	dB	-81.00 to -79.00	0.01	548 - 551
ATTEN_TABLE(81)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (81dB)	Real*4	dB	-82.00 to -80.00	0.01	552 - 555
ATTEN_TABLE(82)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (82dB)	Real*4	dB	-83.00 to -81.00	0.01	556 - 559
ATTEN_TABLE(83)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (83dB)	Real*4	dB	-84.00 to -82.00	0.01	560 - 563
ATTEN_TABLE(84)	TEST SIGNAL ATTENUATOR	Real*4	dB	-85.00 to -83.00	0.01	564 - 567

	INSERTION LOSSES (84dB)					
ATTEN_TABLE(85)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (85dB)	Real*4	dB	-86.00 to -84.00	0.01	568 - 571
ATTEN_TABLE(86)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (86dB)	Real*4	dB	-87.00 to -85.00	0.01	572 - 575
ATTEN_TABLE(87)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (87dB)	Real*4	dB	-88.00 to -86.00	0.01	576 - 579
ATTEN_TABLE(88)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (88dB)	Real*4	dB	-89.00 to -87.00	0.01	580 - 583
ATTEN_TABLE(89)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (89dB)	Real*4	dB	-90.00 to -88.00	0.01	584 - 587
ATTEN_TABLE(90)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (90dB)	Real*4	dB	-91.00 to -89.00	0.01	588 - 591
ATTEN_TABLE(91)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (91dB)	Real*4	dB	-92.00 to -90.00	0.01	592 - 595
ATTEN_TABLE(92)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (92dB)	Real*4	dB	-93.00 to -91.00	0.01	596 - 599
ATTEN_TABLE(93)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (93dB)	Real*4	dB	-94.00 to -92.00	0.01	600 - 603
ATTEN_TABLE(94)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (94dB)	Real*4	dB	-95.00 to -93.00	0.01	604 - 607
ATTEN_TABLE(95)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (95dB)	Real*4	dB	-96.00 to -94.00	0.01	608 - 611
ATTEN_TABLE(96)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (96dB)	Real*4	dB	-97.00 to -95.00	0.01	612 - 615

ATTEN_TABLE(97)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (97dB)	Real*4	dB	-98.00 to -96.00	0.01	616 - 619
ATTEN_TABLE(98)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (98dB)	Real*4	dB	-99.00 to -97.00	0.01	620 - 623
ATTEN_TABLE(99)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (99dB)	Real*4	dB	-100.00 to -98.00	0.01	624 - 627
ATTEN_TABLE(100)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (100dB)	Real*4	dB	-101.00 to -99.00	0.01	628 - 631
ATTEN_TABLE(101)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (101dB)	Real*4	dB	-102.00 to -100.00	0.01	632 - 635
ATTEN_TABLE(102)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (102dB)	Real*4	dB	-103.00 to -101.00	0.01	636 - 639
ATTEN_TABLE(103)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (103dB)	Real*4	dB	-104.00 to -102.00	0.01	640 - 643
SPARE	N/A	N/A	N/A	0	N/A	644 - 667
PATH_LOSSES(7)	PATH LOSS - VERTICAL IF HELIAX TO 4AT16	Real*4	dB	-5.00 to -0.00	0.01	668 - 671
SPARE	N/A	N/A	N/A	0	N/A	672 - 683
SPARE	N/A	N/A	N/A	0	N/A	684 - 687
SPARE	N/A	N/A	N/A	0	N/A	688 - 691
PATH_LOSSES(13)	PATH LOSS - 2A9A9 RF DELAY LINE	Real*4	dB	-60.00 to -40.00	0.01	692 - 695
SPARE	N/A	N/A	N/A	0	N/A	696 - 699
SPARE	N/A	N/A	N/A	0	N/A	700 - 715
SPARE	N/A	N/A	N/A	0	N/A	716 - 719
SPARE	N/A	N/A	N/A	0	N/A	720 - 751
PATH_LOSSES(28)	PATH LOSS - HORIZONTAL IF HELIAX TO 4AT17	Real*4	dB	-5.00 to 0.00	0.01	752 - 755
H COUPLER XMT LOSS	RF PALLET HORIZONTAL COUPLER TRANSMITTER LOSS	Real*4	dB	-40.00 to -20.00	0.01	756 - 759

SPARE	N/A	N/A	N/A	0	N/A	760 - 763
SPARE	N/A	N/A	N/A	0	N/A	764 - 767
PATH_LOSSES(32)	PATH LOSS - WG02 HARMONIC FILTER	Real*4	dB	-0.50 to -0.05	0.01	768 - 771
PATH_LOSSES(33)	PATH LOSS - WAVEGUIDE KLYSTRON T0 SWITCH	Real*4	dB	-1.00 to -0.01	0.01	772 - 775
SPARE	N/A	N/A	N/A	N/A	N/A	776 - 779
PATH_LOSSES(35)	PATH LOSS - WG06 SPECTRUM FILTER	Real*4	dB	-0.50 to 0.00	0.01	780 - 783
SPARE	N/A	N/A	N/A	0	N/A	784 - 787
SPARE	N/A	N/A	N/A	0	N/A	788 - 791
SPARE	N/A	N/A	N/A	0	N/A	792 - 795
PATH_LOSSES(39)	PATH LOSS - WG04 CIRCULATOR	Real*4	dB	-0.50 to -0.05	0.01	796 - 799
PATH_LOSSES (40)	PATH LOSS - A6 ARC DETECTOR	Real*4	dB	-0.50 to -0.01	0.01	800 - 803
SPARE	N/A	N/A	N/A	0	N/A	804 - 807
PATH_LOSSES(42)	PATH LOSS - 1DC1 TRANSMITTER COUPLER COUPLING	Real*4	dB	-40.00 to -20.00	0.01	808 - 811
PATH_LOSSES(43)	PATH LOSS - A33 PAD	Real*4	dB	-10.00 to 0.00	0.01	812 - 815
PATH_LOSSES(44)	PATH LOSS - COAX TRANSMITTER RF SAMPLE TO A33 PAD	Real*4	dB	-3.00 to 0.40	0.01	816 - 819
PATH_LOSSES(45)	PATH LOSS - A20J1_4 POWER SPLITTER	Real*4	dB	-8.00 to -4.00	0.01	820 - 823
PATH_LOSSES(46)	PATH LOSS - A20J1_3 POWER SPLITTER	Real*4	dB	-8.00 to -4.00	0.01	824 - 827
PATH_LOSSES(47)	PATH LOSS - A20J1_2 POWER SPLITTER	Real*4	dB	-8.00 to -4.00	0.01	828 - 831
H_COUPLER_CW_LOSS	RF PALLET HORIZONTAL COUPLER TEST SIGNAL LOSS	Real*4	dB	-40.00 to -20.00	0.01	832 - 835
V_COUPLER_XMT_LOSS	RF PALLET VERTICAL COUPLER	Real*4	dB	-40.00 to -20.00	0.01	836 - 839

	TRANSMITTER LOSS					
SPARE	N/A	N/A	N/A	0	N/A	840 - 843
AME_TS_BIAS	AME TEST SIGNAL BIAS	Real*4	dB	N/A	N/A	844 - 847
PATH_LOSSES(52)	PATH LOSS - 1AT4 TRANSMITTER COUPLER PAD	Real*4	dB	-6.00 to 0.00	0.01	848 - 851
V_COUPLER_CW_LOSS	RF PALLET VERTICAL COUPLER TEST SIGNAL LOSS	Real*4	dB	-40.00 to -20.00	0.01	852 - 855
SPARE	N/A	N/A	N/A	0	N/A	856 - 859
SPARE	N/A	N/A	N/A	0	N/A	860 - 863
PWR SENSE BIAS	POWER SENSE CALIBRATION OFFSET BIAS	Real*4	dB	-10.00 to 10.00	0.01	864 - 867
AME V NOISE ENR	AME NOISE SOURCE EXCESS NOISE RATIO	Real*4	dB	10.00 to 35.00	0.01	868 - 871
PATH_LOSSES(58)	PATH LOSS - 4AT17 ATTENUATOR	Real*4	dB	-7.00 to 0.00	0.01	872 - 875
PATH_LOSSES(59)	PATH LOSS - IFDR IF ANTI-ALIAS FILTER	Real*4	dB	-4.00 to 0.00	0.01	876 - 879
PATH_LOSSES(60)	PATH LOSS - A20J1_5 POWER SPLITTER	Real*4	dB	-8.00 to -4.00	0.01	880 - 883
PATH_LOSSES(61)	PATH LOSS - AT5 50dB ATTENUATOR	Real*4	dB	-53.00 to -47.00	0.01	884 - 887
SPARE	N/A	N/A	N/A	0	N/A	888 - 891
PATH_LOSSES(63)	PATH LOSS - A39 RF_IF BURST MIXER	Real*4	dB	-16.0 to -6.00	0.01	892 - 995
PATH_LOSSES(64)	PATH LOSS - AR1 BURST IF AMPLIFIER	Real*4	dB	23.00 to 33.00	0.01	896 - 899
PATH_LOSSES(65)	PATH LOSS - IFDR BURST ANTI-ALIAS FILTER	Real*4	dB	-4.00 to 0.00	0.01	900 - 903
PATH_LOSSES(66)	PATH LOSS - DC3 J1_3 6dB COUPLER, THROUGH	Real*4	dB	-3.00 to 0.00	0.01	904 - 907
PATH_LOSSES(67)	PATH LOSS - 4DC3J1 TO 4A39 L	Real*4	dB	-15.00 to -5.00	0.01	908 - 911

PATH_LOSSES(68)	PATH LOSS - AT2+AT3 26dB COHO ATTENUATOR	Real*4	dB	-29.00 to -23.00	0.01	912 - 915
SPARE	N/A	N/A	N/A	0	N/A	916 - 919
CHAN_CAL_DIFF	NONCONTROLLING CHANNEL CALIBRATION DIFFERENCE	Real*4	dB	0.00 to 4.00	0.01	920-923
PATH_LOSSES(70 - 71)	SPARE LOCATIONS IN THE PATH_LOSSES ARRAY	N/A	N/A	N/A	N/A	924 - 927
SPARE	N/A	N/A	N/A	0	N/A	928 - 931
SPARE	N/A	N/A	N/A	0	N/A	932 - 935
V_TS_CW	AME VERTICAL TEST SIGNAL POWER	Real*4	dBm	0.00 to 30.00	0.01	936 - 939
H_RNSCALE(0)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (-1.0 deg to -0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	940 - 943
H_RNSCALE(1)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (-0.5 deg to 0.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	944 - 947
H_RNSCALE(2)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (0.0 deg to 0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	948 - 951
H_RNSCALE(3)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (0.5 deg to 1.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	952 - 955
H_RNSCALE(4)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (1.0 deg to 1.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	956 - 959
H_RNSCALE(5)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (1.5 deg to 2.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	960 - 963
H_RNSCALE(6)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (2.0 deg to 2.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	964 - 967
H_RNSCALE(7)	HORIZONTAL_RECEIVER NOISE	Real*4	N/A	1.000 to 1.800	0.001	968 - 971

	NORMALIZATION (2.5 deg to 3.0 deg)					
H_RNSCALE(8)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (3.0 deg to 3.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	972 - 975
H_RNSCALE(9)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (3.5 deg to 4.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	976 - 979
H_RNSCALE(10)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (4.0 deg to 4.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	980 - 983
H_RNSCALE(11)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (4.5 deg to 5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	984 - 987
H_RNSCALE(12)	HORIZONTAL_RECEIVER NOISE NORMALIZATION (> 5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	988 - 991
ATMOS(0)	TWO WAY ATMOSPHERIC LOSS/KM (-1.0 deg to -0.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	992 - 995
ATMOS(1)	TWO WAY ATMOSPHERIC LOSS/KM (-0.5 deg to 0.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	996 - 999
ATMOS(2)	TWO WAY ATMOSPHERIC LOSS/KM (0.0 deg to 0.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1000 - 1003
ATMOS(3)	TWO WAY ATMOSPHERIC LOSS/KM (0.5 deg to 1.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1004 - 1007
ATMOS(4)	TWO WAY ATMOSPHERIC LOSS/KM (1.0 deg to 1.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1008 - 1011
ATMOS(5)	TWO WAY ATMOSPHERIC LOSS/KM (1.5 deg to 2.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1012 - 1015
ATMOS(6)	TWO WAY ATMOSPHERIC LOSS/KM (2.0 deg to 2.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1016 - 1019

ATMOS(7)	TWO WAY ATMOSPHERIC LOSS/KM (2.5 deg to 3.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1020 - 1023
ATMOS(8)	TWO WAY ATMOSPHERIC LOSS/KM (3.0 deg to 3.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1024 - 1027
ATMOS(9)	TWO WAY ATMOSPHERIC LOSS/KM (3.5 deg to 4.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1028 - 1031
ATMOS(10)	TWO WAY ATMOSPHERIC LOSS/KM (4.0 deg to 4.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1032 - 1035
ATMOS(11)	TWO WAY ATMOSPHERIC LOSS/KM (4.5 deg to 5.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1036 - 1039
ATMOS(12)	TWO WAY ATMOSPHERIC LOSS/KM (> 5.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 (3)	0.0001	1040 - 1043
EL_INDEX(0)	BYPASS MAP GENERATION ELEVATION ANGLE (0)	Real*4	deg	-1.000 to 45.000	0.001	1044 - 1047
EL_INDEX(1)	BYPASS MAP GENERATION ELEVATION ANGLE (1)	Real*4	deg	-1.000 to 45.000	0.001	1048 - 1051
EL_INDEX(2)	BYPASS MAP GENERATION ELEVATION ANGLE (2)	Real*4	deg	-1.000 to 45.000	0.001	1052 - 1055
EL_INDEX(3)	BYPASS MAP GENERATION ELEVATION ANGLE (3)	Real*4	deg	-1.000 to 45.000	0.001	1056 - 1059
EL_INDEX(4)	BYPASS MAP GENERATION ELEVATION ANGLE (4)	Real*4	deg	-1.000 to 45.000	0.001	1060 - 1063
EL_INDEX(5)	BYPASS MAP GENERATION ELEVATION ANGLE (5)	Real*4	deg	-1.000 to 45.000	0.001	1064 - 1067
EL_INDEX(6)	BYPASS MAP GENERATION	Real*4	deg	-1.000 to 45.000	0.001	1068 - 1071

	ELEVATION ANGLE (6)					
EL_INDEX(7)	BYPASS MAP GENERATION ELEVATION ANGLE (7)	Real*4	deg	-1.000 to 45.000	0.001	1072 - 1075
EL_INDEX(8)	BYPASS MAP GENERATION ELEVATION ANGLE (8)	Real*4	deg	-1.000 to 45.000	0.001	1076 - 1079
EL_INDEX(9)	BYPASS MAP GENERATION ELEVATION ANGLE (9)	Real*4	deg	-1.000 to 45.000	0.001	1080 - 1083
EL_INDEX(10)	BYPASS MAP GENERATION ELEVATION ANGLE (10)	Real*4	deg	-1.000 to 45.000	0.001	1084 - 1087
EL_INDEX(11)	BYPASS MAP GENERATION ELEVATION ANGLE (11)	Real*4	deg	-1.000 to 45.000	0.001	1088 - 1091
TFREQ_MHZ	TRANSMITTER FREQUENCY	Integer*4	MHz	2700 to 3000	1	1092 - 1095
BASE_DATA_TCN	POINT CLUTTER SUPPRESSION THRESHOLD (TCN)	Real*4	dB	0.0 to 30.0	0.1	1096 - 1099
REFL_DATA_TOVER	RANGE UNFOLDING OVERLAY THRESHOLD (TOVER)	Real*4	dB	0.0 to 20.0	0.1	1100 - 1103
TAR_H_DBZ0_LP	HORIZONTAL TARGET SYSTEM CALIBRATION (dBZ0) FOR LONG PULSE	Real*4	dBZ	-65.00 to -45.00	0.01	1104 - 1107
TAR_V_DBZ0_LP	VERTICAL TARGET SYSTEM CALIBRATION (DBZ0) FOR LONG PULSE	Real*4	dBZ	-65.00 to -45.00	0.01	1108 - 1111
INIT_PHI_DP	INITIAL SYSTEM DIFFERENTIAL PHASE	Integer*4	deg	0 to 359	1	1112 - 1115
NORM_INIT_PHI_DP	NORMALIZED INITIAL SYSTEM DIFFERENTIAL PHASE	Integer*4	deg	0 to 359	1	1116 - 1119

LX_LP	MATCHED FILTER LOSS FOR LONG PULSE	Real*4	dB	-3.00 to 0.00	0.01	1120 - 1123
LX_SP	MATCHED FILTER LOSS FOR SHORT PULSE	Real*4	dB	-3.00 to 0.00	0.01	1124 - 1127
METEOR_PARAM	/K/**2 HYDROMETEOR REFRACTIVITY FACTOR	Real*4	N/A	0.10 to 1.10	0.01	1128 - 1131
SPARE	N/A	N/A	N/A	0	N/A	1132 - 1135
ANTENNA_GAIN	ANTENNA GAIN INCLUDING RADOME	Real*4	dB	43.00 to 47.00	0.01	1136 - 1139
SPARE	N/A	N/A	N/A	0	N/A	1140 - 1143
SPARE	N/A	N/A	N/A	0	N/A	1144 - 1147
SPARE	N/A	N/A	N/A	0	N/A	1148 - 1151
VEL_DEGRAD_LIMIT	VELOCITY CHECK DELTA DEGRADE LIMIT	Real*4	m/s	0.5 to 2.0	0.1	1152 - 1155
WTH_DEGRAD_LIMIT	SPECTRUM WIDTH CHECK DELTA DEGRADE LIMIT	Real*4	m/s	0.5 to 2.0	0.1	1156 - 1159
H_NOISETEMP_DGRAD_LIMIT	HORIZONTAL SYSTEM NOISE TEMP DEGRADE LIMIT	Real*4	K	200.0 to 500.0	0.1	1160 - 1163
H_MIN_NOISETEMP	HORIZONTAL SYSTEM NOISE TEMP TOO LOW LIMIT	Integer*4	K	1 to 150	1	1164 - 1167
V_NOISETEMP_DGRAD_LIMIT	VERTICAL SYSTEM NOISE TEMP DEGRADE LIMIT	Real*4	K	200.0 to 500.0	0.1	1168 - 1171
V_MIN_NOISETEMP	VERTICAL SYSTEM NOISE TEMP TOO LOW LIMIT	Integer*4	K	1 to 150	1	1172 - 1175
KLY_DEGRADE_LIMIT	KLYSTRON OUTPUT TARGET CONSISTENCY DEGRADE LIMIT	Real*4	dB	1.0 to 10.0	0.1	1176 - 1179
TS_COHO	COHO POWER AT A1J4	Real*4	dBm	23.00 to 29.00	0.01	1180 - 1183
H_TS_CW	AME HORIZONTAL	Real*4	dBm	0.00 to 30.00	0.01	1184 - 1187

	TEST SIGNAL POWER					
SPARE	N/A	N/A	N/A	0	N/A	1188 - 1191
SPARE	N/A	N/A	N/A	0	N/A	1192 - 1195
TS_STALO	STALO POWER AT A1J2	Real*4	dBm	12.00 to 18.00	0.01	1196 - 1199
AME_H_NOISE_ENR	AME NOISE SOURCE HORIZONTAL EXCESS NOISE RATIO	Real*4	dB	10.00 to 35.00	0.01	1200 - 1203
XMTR_PEAK_PWR_HIGH_LIMIT	MAXIMUM TRANSMITTER PEAK POWER ALARM LEVEL	Real*4	kW	500.00 to 950.00	0.01	1204 - 1207
XMTR_PEAK_PWR_LOW_LIMIT	MINIMUM TRANSMITTER PEAK POWER ALARM LEVEL	Real*4	kW	200.00 to 700.00	0.01	1208 - 1211
H_DBZ0_DELTA_LIMIT	DIFFERENCE BETWEEN COMPUTED AND TARGET HORIZONTAL DBZ0 LIMIT	Real*4	dB	1.0 to 10.0	0.1	1212 - 1215
THRESHOLD1	BYPASS MAP GENERATOR NOISE THRESHOLD	Real*4	dB	0.0 to 36.0	0.1	1216 - 1219
THRESHOLD2	BYPASS MAP GENERATOR REJECTION RATIO THRESHOLD	Real*4	dB	0.0 to 10.0	0.1	1220 - 1223
CLUT_SUPP_DGRAD_LIM	CLUTTER SUPPRESSION DEGRADE LIMIT	Real*4	dB	20.0 to 50.0	0.1	1224 - 1227
SPARE	N/A	N/A	N/A	0	N/A	1228 - 1231
RANGE0_VALUE	TRUE RANGE AT START OF FIRST RANGE BIN	Real*4	km	0.000 to 3.000	0.001	1232 - 1235
XMTR_PWR_MTR_SCALE	SCALE FACTOR USED TO CONVERT TRANSMITTER POWER BYTE DATA TO WATTS	Real*4	W (4)	0.0000100 to 0.0015000	0.0000001	1236 - 1239
V_DBZ0_DELTA_LIMIT	DIFFERENCE BETWEEN COMPUTED AND	Real*4	dB	1.0 to 10.0	0.1	1240 - 1243

	TARGET VERTICAL DBZ0 LIMIT					
TAR_H_DBZ0_SP	HORIZONTAL TARGET SYSTEM CALIBRATION (dBZ0) FOR SHORT PULSE	Real*4	dBZ	-58.00 to -38.00	0.01	1244 - 1247
TAR_V_DBZ0_SP	VERTICAL TARGET SYSTEM CALIBRATION (DBZ0) FOR SHORT PULSE	Real*4	dBZ	-58.00 to -38.00	0.01	1248 - 1251
DELTAPRF	SITE PRF SET (A=1, B=2, C=3, D=4, E=5)	Integer*4	N/A	1 to 5	1	1252 - 1255
SPARE	N/A	N/A	N/A	0	N/A	1256 - 1259
SPARE	N/A	N/A	N/A	0	N/A	1260 - 1263
TAU_SP	PULSE WIDTH OF TRANSMITTER OUTPUT IN SHORT PULSE	Integer*4	nsec	1000 to 2000	1	1264 - 1267
TAU_LP	PULSE WIDTH OF TRANSMITTER OUTPUT IN LONG PULSE	Integer*4	nsec	3000 to 6000	1	1268 - 1271
NC_DEAD_VALUE	NUMBER OF 1/4 KM BINS OF CORRUPTED DATA AT END OF SWEEP	Integer*4	N/A	1 to 10	1	1272 - 1275
TAU_RF_SP	RF DRIVE PULSE WIDTH IN SHORT PULSE	Integer*4	nsec	500 to 2000	1	1276 - 1279
TAU_RF_LP	RF DRIVE PULSE WIDTH IN LONG PULSE MODE	Integer*4	nsec	3000 to 6000	1	1280 - 1283
SEG1LIM	CLUTTER MAP BOUNDARY ELEVATION BETWEEN SEGMENTS 1 & 2	Real*4	deg	0.50 - 3.00	0.01	1284 - 1287
SLATSEC	SITE LATITUDE - SECONDS	Real*4	s	0.0000 to 59.9999	0.0001	1288 - 1291
SLONSEC	SITE LONGITUDE - SECONDS	Real*4	s	0.0000 to 59.9999	0.0001	1292 - 1295
SPARE	N/A	N/A	N/A	0	N/A	1296 - 1299

SLATDEG	SITE LATITUDE - DEGREES	Integer*4	deg	0 to 89	1	1300 - 1303
SLATMIN	SITE LATITUDE - MINUTES	Integer*4	min	0 to 59	1	1304 - 1307
SLONDEG	SITE LONGITUDE - DEGREES	Integer*4	deg	0 to 179	1	1308 - 1311
SLONMIN	SITE LONGITUDE - MINUTES	Integer*4	min	0 to 59	1	1312 - 1315
SLATDIR	SITE LATITUDE - DIRECTION	String	N/A	N or S	N/A	1316 - 1319
SLONDIR	SITE LONGITUDE - DIRECTION	String	N/A	E or W	N/A	1320 - 1323
SPARE	N/A	N/A	N/A	0	N/A	1324 - 1327
SPARE	N/A	N/A	N/A	0	N/A	1328 - 2499
SPARE	N/A	N/A	N/A	0	N/A	2500 - 3671
SPARE	N/A	N/A	N/A	0	N/A	3672 - 4843
SPARE	N/A	N/A	N/A	0	N/A	4844 - 6015
SPARE	N/A	N/A	N/A	0	N/A	6016 - 7187
SPARE	N/A	N/A	N/A	0	N/A	7188 - 8359
AZ_CORRECTION_FACTOR	AZIMUTH BORESIGHT CORRECTION FACTOR	Real*4	deg	-1.000 to 1.000	0.001	8360 - 8363
EL_CORRECTION_FACTOR	ELEVATION BORESIGHT CORRECTION FACTOR	Real*4	deg	-1.000 to 1.000	0.001	8364 - 8367
SITE_NAME	SITE NAME DESIGNATION	String	N/A	N/A	N/A	8368 - 8371
ANT_MANUAL_SETUP.IELMIN	MINIMUM ELEVATION ANGLE	SInteger*4 (7)	deg	-39.99573 to 39.99573 (9)(10)	$360/2^{16}$	8372 - 8375
ANT_MANUAL_SETUP.IELMAX	MAXIMUM ELEVATION ANGLE	Integer*4	deg	0.00000 to 219.99573 (9)(11)	$360/2^{16}$	8376 - 8379
ANT_MANUAL_SETUP.FAZVELMAX	MAXIMUM AZIMUTH VELOCITY	Integer*4	deg/s	0 to 100	1	8380 - 8383
ANT_MANUAL_SETUP.FELVELMAX	MAXIMUM ELEVATION VELOCITY	Integer*4	deg/s	0 to 48	1	8384 - 8387
ANT_MANUAL_SETUP.IGND_HGT	SITE GROUND HEIGHT (ABOVE SEA LEVEL)	Integer*4	m	-100 to 12000	1	8388 - 8391
ANT_MANUAL_SETUP.IRAD_HGT	SITE RADAR HEIGHT (ABOVE GROUND)	Integer*4	m	0 to 1000	1	8392 - 8395
AZ_POS_SUSTAIN_DRIVE	AZIMUTH MOTOR POSITIVE	Real*4	N/A	0.00 to 7.00	0.01	8396 - 8399

	SUSTAINING DRIVE					
AZ_NEG_SUSTAIN_DRIVE	AZIMUTH MOTOR NEGATIVE SUSTAINING DRIVE	Real*4	N/A	-7.00 to 0.00	0.01	8400 - 8403
AZ_NOM_POS_DRIVE_SLOPE	INITIAL ESTIMATE FOR AZIMUTH POSITIVE DRIVE SLOPE	Real*4	N/A	0.00 to 3.00	0.01	8404 - 8407
AZ_NOM_NEG_DRIVE_SLOPE	INITIAL ESTIMATE FOR AZIMUTH NEGATIVE DRIVE SLOPE	Real*4	N/A	0.00 to 3.00	0.01	8408 - 8411
AZ_FEEDBACK_SLOPE	AZIMUTH VELOCITY FEEDBACK SLOPE	Real*4	N/A	0.000 to 15.000	0.001	8412 - 8415
EL_POS_SUSTAIN_DRIVE	ELEVATION MOTOR POSITIVE SUSTAINING DRIVE	Real*4	N/A	0.00 to 7.00	0.01	8416 - 8419
EL_NEG_SUSTAIN_DRIVE	ELEVATION MOTOR NEGATIVE SUSTAINING DRIVE	Real*4	N/A	-7.00 to 0.00	0.01	8420 - 8423
EL_NOM_POS_DRIVE_SLOPE	INITIAL ESTIMATE FOR ELEVATION POSITIVE DRIVE SLOPE	Real*4	N/A	0.00 to 3.00	0.01	8424 - 8427
EL_NOM_NEG_DRIVE_SLOPE	INITIAL ESTIMATE FOR ELEVATION NEGATIVE DRIVE SLOPE	Real*4	N/A	0.00 to 3.00	0.01	8428 - 8431
EL_FEEDBACK_SLOPE	ELEVATION VELOCITY FEEDBACK SLOPE	Real*4	N/A	0.000 to 15.00	0.001	8432 - 8435
EL_FIRST_SLOPE	SLOPE FOR FIRST INTERVAL OF ELEVATION POSITION	Real*4	N/A	0.50 to 20.00	0.01	8436 - 8439

	FEEDBACK CURVE					
EL_SECOND_SLOPE	SLOPE FOR SECOND INTERVAL OF ELEVATION POSITION FEEDBACK CURVE	Real*4	N/A	0.10 to 20.00	0.01	8440 - 8443
EL_THIRD_SLOPE	SLOPE FOR THIRD INTERVAL OF ELEVATION POSITION FEEDBACK CURVE	Real*4	N/A	0.00 to 20.00	0.01	8444 - 8447
EL_DROOP_POS	NEUTRAL DROOP ANGLE	Real*4	deg	-360.00 to 360.00	0.01	8448 - 8451
EL_OFF_NEUTRAL_DRIVE	90 DEGREE OFF NEUTRAL DRIVE	Real*4	N/A	-7.00 to 7.00	0.01	8452 - 8455
AZ_INERTIA	AZIMUTH MOMENT OF INERTIA	Real*4	N/A	0.5 to 7.0	0.1	8456-8459
EL_INERTIA	ELEVATION MOMENT OF INERTIA	Real*4	N/A	0.5 to 7.0	0.1	8460-8463
SPARE	N/A	N/A	N/A	0	N/A	8464 - 8687
REFINED_PARK	REFINED PARK IN USE	String	N/A	T or F	N/A	8688 - 8691
SPARE	N/A	N/A	N/A	0	N/A	8692-8695
RVP8NV.IWAVEGUIDE_LENGTH	WAVEGUIDE LENGTH	Integer*4	m	0 to 1000	1	8696 - 8699
V_RNSCALE(0)	RECEIVER NOISE NORMALIZATION (-1.0 deg to -0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	8700 - 8703
V_RNSCALE(1)	VERTICAL RECEIVER NOISE NORMALIZATION (-0.5 deg to 0.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8704 - 8707
V_RNSCALE(2)	VERTICAL RECEIVER NOISE NORMALIZATION (0.0 deg to 0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	8708 - 8711
V_RNSCALE(3)	VERTICAL RECEIVER NOISE NORMALIZATION (0.5 deg to 1.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8712 - 8715
V_RNSCALE(4)	VERTICAL RECEIVER NOISE	Real*4	N/A	1.000 to 1.800	0.001	8716 - 8719

	NORMALIZATION (1.0 deg to 1.5 deg)					
V_RNSCALE(5)	VERTICAL RECEIVER NOISE NORMALIZATION (1.5 deg to 2.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8720 - 8723
V_RNSCALE(6)	VERTICAL RECEIVER NOISE NORMALIZATION (2.0 deg to 2.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	8724 - 8727
V_RNSCALE(7)	VERTICAL RECEIVER NOISE NORMALIZATION (2.5 deg to 3.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8728 - 8731
V_RNSCALE(8)	VERTICAL RECEIVER NOISE NORMALIZATION (3.0 deg to 3.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	8732 - 8735
V_RNSCALE(9)	VERTICAL RECEIVER NOISE NORMALIZATION (3.5 deg to 4.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8736 - 8739
V_RNSCALE(10)	VERTICAL RECEIVER NOISE NORMALIZATION (4.0 deg to 4.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	8740 - 8743
VEL_DATA_TOVER	VELOCITY UNFOLDING OVERLAY THRESHOLD	Real*4	dB	0.0 to 20.0	0.1	8744 - 8747
WIDTH_DATA_TOVER	WIDTH UNFOLDING OVERLAY THRESHOLD	Real*4	dB	0.0 to 20.0	0.1	8748 - 8751
V_RNSCALE(11)	VERTICAL RECEIVER NOISE NORMALIZATION (4.5 deg to 5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8752 - 8755
V_RNSCALE(12)	VERTICAL RECEIVER NOISE NORMALIZATION (>5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	8756 - 8759
SPARE	N/A	N/A	N/A	0	N/A	8760 - 8763
DOPPLER_RANGE_START	START RANGE FOR FIRST DOPPLER RADIAL	Real*4	km	-32.768 to 32.768	0.001	8764 - 8767
MAX_EL_INDEX	THE MAXIMUM INDEX FOR THE	Integer*4	N/A	0 to 11	1	8768 - 8771

	EL_INDEX PARAMETERS					
SEG2LIM	CLUTTER MAP BOUNDARY ELEVATION BETWEEN SEGMENTS 2 & 3.	Real*4	deg	0.80 - 4.50	0.01	8772 - 8775
SEG3LIM	CLUTTER MAP BOUNDARY ELEVATION BETWEEN SEGMENTS 3 & 4.	Real*4	deg	1.00 - 6.00	0.01	8776 - 8779
SEG4LIM	CLUTTER MAP BOUNDARY ELEVATION BETWEEN SEGMENTS 4 & 5.	Real*4	deg	1.00 - 8.00	0.01	8780 - 8783
NBR_EL_SEGMENTS	NUMBER OF ELEVATION SEGMENTS IN ORDA CLUTTER MAP.	Integer*4	N/A	1 - 5	1	8784 - 8787
H_NOISE_LONG	HORIZONTAL RECEIVER NOISE FOR LONG PULSE	Real*4	dBm	-95.0 to -80.0	0.1	8788 - 8791
ANT_NOISE_TEMP	ANTENNA NOISE TEMPERATURE	Real*4	K	30.0 to 200.0	0.1	8792 - 8795
H_NOISE_SHORT	HORIZONTAL RECEIVER NOISE FOR SHORT PULSE	Real*4	dBm	-90.0 to -75.0	0.1	8796 - 8799
H_NOISE_TOLERANCE	HORIZONTAL RECEIVER NOISE TOLERANCE	Real*4	dB	0.0 to 6.0	0.1	8800 - 8803
MIN_H_DYN_RANGE	MINIMUM HORIZONTAL DYNAMIC RANGE	Real*4	dB	85.0 to 95.0	0.1	8804 - 8807
GEN_INSTALLED	AUXILIARY GENERATOR INSTALLED (FAA ONLY)	String	N/A	T or F	N/A	8808 - 8811
GEN_EXERCISE	AUXILIARY GENERATOR AUTOMATIC EXERCISE	String	N/A	T or F	N/A	8812 - 8815

	ENABLED (FAA ONLY)					
V_NOISE_TOLERANCE	VERTICAL RECEIVER NOISE TOLERANCE	Real*4	dB	0.0 to 6.0	0.1	8816 - 8819
MIN_V_DYN_RANGE	MINIMUM VERTICAL DYNAMIC RANGE	Real*4	dB	85.0 to 95.0	0.1	8820 - 8823
ZDR_OFFSET_DGRAD_LIM	SYSTEM DIFFERENTIAL REFLECTIVITY OFFSET DEGRADE LIMIT	Real*4	dB	0.0 to 10.0	0.1	8824 - 8827
BASELINE ZDR OFFSET	BASELINE SYSTEM DIFFERENTIAL REFLECTIVITY OFFSET	Real*4	dB	-10.0000 to 10.0000	0.0001	8828 - 8843
V_NOISE_LONG	VERTICAL RECEIVER NOISE FOR LONG PULSE	Real*4	dBm	-95.0 to -80.0	0.1	8844 - 8847
V_NOISE_SHORT	VERTICAL RECEIVER NOISE FOR SHORT PULSE	Real*4	dBm	-90.0 to -75.0	0.1	8848 - 8851
ZDR_DATA_TOVER	ZDR UNFOLDING OVERLAY THRESHOLD	Real*4	dB	-10.00 to 10.00	0.1	8852 - 8855
PHI_DATA_TOVER	PHI UNFOLDING OVERLAY THRESHOLD	Real*4	dB	-10.00 to 10.00	0.1	8856 - 8859
RHO_DATA_TOVER	RHO UNFOLDING OVERLAY THRESHOLD	Real*4	dB	-10.00 to 10.00	0.1	8860 - 8863
STALO_POWER_DGRAD_LIMIT	STALO POWER DEGRADE LIMIT	Real*4	V	0.00 to 1.00	0.01	8864 - 8867
STALO_POWER_MAINT_LIMIT	STALO POWER MAINTENANCE LIMIT	Real*4	V	0.00 to 1.00	0.01	8868 - 8871
MIN_H_PWR_SENSE	MINIMUM HORIZONTAL POWER SENSE	Real*4	dBm	70.00 to 90.00	0.01	8872 - 8875
MIN_V_PWR_SENSE	MINIMUM VERTICAL POWER SENSE	Real*4	dBm	70.00 to 90.00	0.01	8876 - 8879
H_PWR_SENSE_OFFSET	HORIZONTAL POWER SENSE CALIBRATION OFFSET	Real*4	dB	-100.00 to -50.00	0.01	8880 - 8883

V_PWR_SENSE_OFFSET	VERTICAL POWER SENSE CALIBRATION OFFSET	Real*4	dB	-100.00 to -50.00	0.01	8884 - 8887
PS_GAIN_REF	POWER SENSE GAIN REFERENCE VALUE	Real*4	dB	-40.00 to -20.00	0.01	8888 - 8891
RF_PALLET_BROAD_LOSS	RF PALLET BROADBAND LOSS	Real*4	dB	-10.00 to 0.00	0.01	8892 - 8895
SPARE	N/A	N/A	N/A	0	N/A	8896 - 8959
AME_PS_TOLERANCE	AME POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	8960 - 8963
AME_MAX_TEMP	MAXIMUM AME INTERNAL ALARM TEMPERATURE	Real*4	deg C	0.0 to 65.0	0.1	8964 - 8967
AME_MIN_TEMP	MINIMUM AME INTERNAL ALARM TEMPERATURE	Real*4	deg C	-10.0 to 20.0	0.1	8968 - 8971
RCVR_MOD_MAX_TEMP	MAXIMUM AME RECEIVER MODULE ALARM TEMPERATURE	Real*4	deg C	0.0 to 65.0	0.1	8972 - 8975
RCVR_MOD_MIN_TEMP	MINIMUM AME RECEIVER MODULE ALARM TEMPERATURE	Real*4	deg C	-10.0 to 20.0	0.1	8976 - 8979
BITE_MOD_MAX_TEMP	MAXIMUM AME BITE MODULE ALARM TEMPERATURE	Real*4	deg C	0.0 to 75.0	0.1	8980 - 8983
BITE_MOD_MIN_TEMP	MINIMUM AME BITE MODULE ALARM TEMPERATURE	Real*4	deg C	-10.0 to 20.0	0.1	8984 - 8987
DEFAULT_POLARIZATION	DEFAULT (H+V) MICROWAVE ASSEMBLY PHASE SHIFTER POSITION	Integer*4	N/A	0 to 60000	1	8988 - 8991
TR_LIMIT_DGRAD_LIMIT	TR LIMITER DEGRADE LIMIT	Real*4	V	0.00 to 1.00	0.01	8992 - 8995
TR_LIMIT_FAIL_LIMIT	TR LIMITER FAILURE LIMIT	Real*4	V	0.00 to 1.00	0.01	8996 - 8999
RFP_STEPPER_ENABLED	WHETHER THE RF PALLETS	String (15)	N/A	T or F	N/A	9000 - 9003

	STEPPER MOTOR IS ENABLED					
SPARE	N/A	N/A	N/A	0	N/A	9004 - 9007
AME_CURRENT_TOLERANCE	AME PELTIER CURRENT TOLERANCE	Real*4	%	0.0 to 100.0	0.1	9008 - 9011
H_ONLY_POLARIZATION	HORIZONTAL (H ONLY) MICROWAVE ASSEMBLY PHASE SHIFTER POSITION	Integer*4	N/A	0 to 60000	1	9012 - 9015
V_ONLY_POLARIZATION	VERTICAL (V ONLY) MICROWAVE ASSEMBLY PHASE SHIFTER POSITION	Integer*4	N/A	0 - 60000	1	9016 - 9019
SPARE	N/A	N/A	N/A	0	N/A	9020 - 9027
SUN_BIAS	SUN MEASUREMENT BIAS	Real*4	dB	-5.00 to 5.00	0.01	9028 - 9031
A_MIN_SHELTER_TEMP_WARN	LOW EQUIPMENT SHELTER TEMPERATURE WARNING LIMIT	Real*4	deg C	-20.00 to 20.00	0.1	9032 - 9035
POWER_METER_ZERO	POWER METER 0 BIAS VOLTAGE	Real*4	v	-10.00 to 10.00	.01	9036 - 9039
TXB_BASELINE	Expected value of the RDA transmit bias (TXB) between the horizontal and vertical channels	Real*4	dB	-1.000 to 1.000	0.001	9040 - 9043
TXB_ALARM_THRESH	Threshold for delta between an actual measurement of TXB, and the expected TXB BASELINE value for the RDA to set an alarm	Real*4	dB	0 to 5.000	0.001	9044 - 9047
SPARE	N/A	N/A	N/A	0	N/A	9048 - 9467

Notes:
1. Format is "mm/dd/yy", where mm = month, dd = day, and yy = year.
2. Format is "hh-mm-ss", where hh = hour, mm = minutes, and ss = seconds.
3. See Table XVI for default value.
4. Value of the LSB of the power measurement.
5. N/A.

6. See Appendix B for unit definitions and standard symbology.
7. Two's complement integer value should be multiplied by $360/2^{16}$ to get the actual value in degrees.
8. Range shown is after applicable scaling and conversion has been applied.
9. Precision is shown to 5 decimal places. Actual precision is 13 digits.
10. Integer range is -7281 to 7281.
11. Integer range is 0 to 40049.
12. Format is "baseline" or "current".
13. Format is "14", null terminated string.
14. Format is "20", null terminated string. This number is the message revision number, and changes by incrementing the value if and when the format of the message changes.
15. "T" or "F", null terminated string.

3.2.4.16.1 Table XVI. Two Way Atmospheric Loss

Elevation Sector		Atmospheric Attenuation (dB/km)	
Angles	Range		Defaults
1	-1.0 deg to -0.5 deg	-0.0200 to -0.0020	-0.0150
2	-0.5 deg to 0.0 deg	-0.0200 to -0.0020	-0.0150
3	0.0 deg to 0.5 deg	-0.0200 to -0.0020	-0.0120
4	0.5 deg to 1.0 deg	-0.0200 to -0.0020	-0.0110
5	1.0 deg to 1.5 deg	-0.0200 to -0.0020	-0.0100
6	1.5 deg to 2.0 deg	-0.0200 to -0.0020	-0.0090
7	2.0 deg to 2.5 deg	-0.0200 to -0.0020	-0.0080
8	2.5 deg to 3.0 deg	-0.0200 to -0.0020	-0.0070
9	3.0 deg to 3.5 deg	-0.0200 to -0.0020	-0.0060
10	3.5 deg to 4.0 deg	-0.0200 to -0.0020	-0.0060
11	4.0 deg to 4.5 deg	-0.0200 to -0.0020	-0.0050
12	4.5 deg to 5.0 deg	-0.0200 to -0.0020	-0.0050
13	>5.0 deg	-0.0200 to -0.0020	-0.0050

3.2.4.17 Table XVII Digital Radar Data Generic Format Blocks (Message Type 31)

3.2.4.17.1 Table XVII-A Data Header Block

NAME	**DESCRIPTION**	**FORMAT**	**UNITS (1)**	**RANGE (2)**	**ACCURACY/ PRECISION**	**BYTE LOCATION (3)**
Radar Identifier	ICAO Radar Identifier	String	N/A	(e.g., "KTLX")	N/A	0 to 3
Collection Time	Radial data collection time in milliseconds past midnight GMT	Integer*4	msec	0 to 86,399,999	± 2000/ 1	4 to 7
Modified Julian Date	Current Julian date - 2440586.5 (4)	Integer*2	d	1 to 65,535	1	8 and 9
Azimuth Number	Radial number within elevation scan	Integer*2	N/A	1 to 720	1	10 and 11
Azimuth Angle	Azimuth angle at which radial data was collected	Real*4	deg	0 to 359.956055	± 0.1°/ NA	12 to 15

Compression Indicator	Indicates if message type 31 is compressed and what method of compression is used. The Data Header Block is not compressed.	Code*1	N/A	0 = uncompressed 1 = compressed using BZIP2 2 = compressed using zlib 3 = future use	N/A	16
Spare	Spare and forces halfword alignment	N/A	N/A	N/A	N/A	17
Radial Length	Uncompressed length of the radial in bytes including the Data Header block length	Integer*2	N/A	9360 to 14296 bytes	1	18 and 19
Azimuth Resolution Spacing	Azimuthal spacing between adjacent radials	Code*1	N/A	1 = 0.5° (5) 2 = 1.0°	N/A	20
Radial Status	Radial Status (e.g. first, last)	Code*1	N/A	0 to 132 (6)	N/A	21
Elevation Number	Elevation number within volume scan	Integer*1	N/A	1 to 32	1	22
Cut Sector Number	Sector Number within cut	Integer*1	N/A	0 to 3 (7)	1	23
Elevation Angle	Elevation angle at which radial radar data was collected	Real*4	deg	-7.0° to 70.0°	± 0.1°/ NA	24 to 27
Radial Spot Blanking Status	Spot blanking status for current radial, elevation scan and volume scan	Code*1	N/A	0=none (8) 1=radial 2=elevation 4=volume	N/A	28
Azimuth Indexing Mode	Azimuth indexing value (Set if azimuth angle is keyed to constant angles)	Scaled Integer*1	N/A	0=no indexing 1 to 100 means indexing angle of 0.01° to 1.00°	± 0.1°/ 0.01	29
Data Block Count	Number of data blocks (N)	Integer*2	N/A	4 to 10 (9)	1	30 and 31
Data Block pointer	Pointer to Data Block for Volume Data Constant Type (see Table XVII-E) (10)	Integer*4	N/A	44 to 64	1	32 to 35
Data Block pointer	Pointer to Data Block for Elevation Data Constant Type (see Table XVII-F) (10)	Integer*4	N/A	92 or greater	1	36 to 39
Data Block pointer	Pointer to Data Block for Radial Data Constant Type	Integer*4	N/A	100 or greater	1	40 to 43

	(see Table XVII-H) (10)					
Data Block pointer	Pointer to Data Block for Moment "REF" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	44 to 47
Data Block pointer	Pointer to Data Block for Moment "VEL" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	48 to 51
Data Block pointer	Pointer to Data Block for Moment "SW " (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	52 to 55
Data Block pointer	Pointer to Data Block for Moment "ZDR" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	56 to 59
Data Block pointer	Pointer to Data Block for Moment "PHI" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	60 to 63
Data Block pointer	Pointer to Data Block for Moment "RHO" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	64 to 67
Data Block pointer	Pointer to Data Block for Moment "CFP" (see Tables XVII-B and XVII-I) (11)(12)	Integer*4	N/A	120 or greater	1	68 to 71

3.2.4.17.2 Table XVII-B Data Block (Descriptor of Generic Data Moment Type)

NAME	**DESCRIPTION**	**FORMAT**	**UNITS**	**RANGE**	**ACCURACY/ PRECISION**	**BYTE LOCATION (3)**
Data Block Type	Indicates Data Moment Type	String	N/A	"D"	1	0
Data Moment Name	Name of data moment	String	N/A	"VEL", "REF", "SW", "RHO", "PHI", "ZDR", "CFP"	1	1 to 3
Reserved (14)	Reserved (14)	Integer*4	N/A	Set to 0	1	4 to 7
Number of Data Moment Gates	Number of data moment gates for current radial (NG)	Integer*2	N/A	0 to 1840	1	8 and 9
Data Moment Range	Range to center of first range gate	Scaled Integer*2	km	0.000 to 32.768	± 0.05/ 0.001	10 and 11
Data Moment Range Sample Interval	Size of data moment sample interval	Scaled Integer*2	km	0.25 to 4.0	± 0.05/ 0.001	12 and 13
TOVER	Threshold parameter which specifies the minimum difference in	Scaled Integer*2	dB	0.0 to 20.0	± 0.1/ 0.1	14 and 15

	echo power between two resolution gates for them not to be labeled "overlayed"					
SNR Threshold	SNR threshold for valid data (31)	Scaled SInteger*2	dB	-12.0 to +20.0	±0.1/0.125	16 and 17
Control Flags	Indicates special control features	Code*1	N/A	0 = none 1 = recombined azimuthal radials 2 = recombined range gates 3 = recombined radials and range gates to legacy resolution	1	18
Data Word Size	Number of bits (DWS) used for storing data for each Data Moment gate	Integer*1	N/A	8 or 16	1	19
Scale	Scale value used to convert Data Moments from integer to floating point data (15)	Real*4	N/A	Greater than 0.0 to 65535.0	1	20 to 23
Offset	Offset value used to convert Data Moments from integer to floating point data (15)	Real*4	N/A	2.0 to 65535.0	1	24 to 27
Data Moments	Variable length array of data moments	See Table XVII-I		See Table XVII-I	1	28 to 2427

3.2.4.17.3 Table XVII-E Data Block (Volume Data Constant Type)

NAME	**DESCRIPTION**	**FORMAT**	**UNITS**	**RANGE**	**ACCURACY/ PRECISION**	**BYTE LOCATION (3)**
Data Block Type	Indicates Data Constant Type	String	N/A	"R"	N/A	0
Data Name	Volume Data Constant Block	String	N/A	"VOL"	N/A	1 to 3
LRTUP (size of data block)	Size of data block in bytes(32)	Integer*2	N/A	52	1	4 and 5
Version Number	Major Change (17)	Integer*1	N/A	1 to 255 See Note (1)	N/A	6
Version Number	Minor Change (18)	Integer*1	N/A	0 to 255 See Note (1)	N/A	7

Lat	Latitude	Real*4	deg	0.0 to 90.0	TBD/NA	8 to 11
Long	Longitude	Real*4	deg	-180.0 to +180.0	TBD/NA	12 to 15
Site Height	Height of site base above sea level	SInteger*2	m	-100 to 12000	± 1/1	16 and 17
Feedhorn Height	Height of feedhorn above ground	Integer*2	m	0 to 1000	± 1/1	18 and 19
Calibration Constant (dBZ0)	Reflectivity scaling factor without correction by the ground noise scaling factors given in the adaptation data message(26)	Real*4	dB	-99.0 to +99.0	± 1/ NA	20 to 23
Horizontal SHV Tx Power	Transmitter Power for Horizontal Channel	Real*4	kW	0 to 999.9	± 0.5/ NA	24 to 27
Vertical SHV Tx Power	Transmitter Power for Vertical Channel	Real*4	kW	0 to 999.9	± 0.5/ NA	28 to 31
System Differential Reflectivity	Calibration of system Z_{DR}	Real*4	dB	-7.8750 to +7.7500	± 0.1/ NA	32 to 35
Initial System Differential Phase	Initial Φ_{DP} for the system	Real*4	deg	0.0 to 360.0	± 1.0°/NA	36 to 39
Volume Coverage Pattern Number	Identifies Volume Coverage Pattern being used	Integer*2	N/A	1 to 767 See Appendix C for available VCPs	1	40 and 41
Processing Status (28)	Processing option bits	Integer*2	N/A	Bit 0 - RxR Noise Bit 1 - CBT	N/A	42 and 43
ZDR Bias Estimate Weighted Mean	RPG Weighted Mean ZDR Bias Estimate	Integer*2(33)	dB	-13.0 to + 20.0	± 0.4/ 0.03	44 and 45
Spare	N/A	N/A	N/A	N/A	N/A	46 to 51

3.2.4.17.4 Table XVII-F Data Block (Elevation Data Constant Type)

NAME	**DESCRIPTION**	**FORMAT**	**UNITS**	**RANGE**	**ACCURACY/ PRECISION**	**BYTE LOCATION (3)**
Data Block Type	Indicates Data Constant Type	String	N/A	"R"	N/A	0
Data Name	Elevation Data Constant Block	String	N/A	"ELV"	N/A	1 to 3

LRTUP (size of data block)	Size of data block in bytes	Integer*2	N/A	12	1	4 and 5
ATMOS	Atmospheric Attenuation Factor	Scaled SInteger*2	dB/km	-0.02 to -0.002	± 0.004/ 0.001	6 and 7
Calibration Constant (dBZ0)	Scaling constant used by the Signal Processor for this elevation to calculate reflectivity	Real*4	dB	-99.0 to + 99.0	±1/NA	8 to 11

3.2.4.17.5 Table XVII-H Data Block (Radial Data Constant Type)

NAME	**DESCRIPTION**	**FORMAT**	**UNITS**	**RANGE**	**ACCURACY/ PRECISION**	**BYTE LOCATION** (3)
Data Block Type	Indicates Data Constant Type	String	N/A	"R"	N/A	0
Data Name	Radial Data Constant Block	String	N/A	"RAD"	N/A	1 to 3
LRTUP (size of data block)	Size of data block in bytes(32)	Integer*2	N/A	28	1	4 and 5
Unambiguous Range	Unambiguous range, Interval Size	Scaled Integer*2	km	115 to 511	± 0.1/ 0.1	6 and 7
Noise Level	Horizontal Channel	Real*4	dBm	-100.0 to -50.0	± 0.2 / NA	8 to 11
Noise Level	Vertical Channel	Real*4	dBm	-100.0 to -50.0	± 0.2 / NA	12 to 15
Nyquist Velocity	Nyquist Velocity	Scaled Integer*2	m/s	8 to 35.61	± 0.003/ 0.01	16 and 17
Radial Flags	Radial Flags to support RPG processing	Integer*2	N/A	Set to 0	1	18 and 19
Calibration Constant(dBZ 0)	Horizontal Channel	Real*4	dBZ	-99.0 to +99.0	N/A	20 to 23
Calibration Constant(dBZ 0)	Vertical Channel	Real*4	dBZ	-99.0 to +99.0	N/A	24 to 27

3.2.4.17.6 Table XVII-I Data Moment Characteristics and Conversion for Data Names (Production (25))

Data Name	**Data Moment Description**	**Data Word Size (bits)**	**Data Size (bits)** (19)	**Format**	**Offset** (15)(20)	**Scale** (15)(20)	**Data Range as coded**	**Data Range after conversion**	**Units**	**Accuracy/ Precision**(27)	**Range (km)**	**LDM** (16)
"REF "	Reflectivity (Z)	8	8	Integer* 1	66.0	2.0	2 to 255 (21)	-32.0 to +94.5	dBZ	± 1.0/ 0.50	460	1840

"VEL "	Velocity (V)	8	8	Integer* 1	129.0	2.0 or 1.0	2 to 255 (21)	-63.5 to +63.0 or -127.0 to +126.0	m/s	± 1.0/0.50 or ± 1.0/1.00	300	1200
"SW "	Spectrum Width (σ)	8	8	Integer* 1	129.0	2.0	2 to 255 (21)	-63.5 to +63.0	m/s	± 1.0/ 0.50	300	1200
"ZDR "	Differential Reflectivity (Z_{DR})	16	11	Integer* 2	418.0	32.0	2 to 1058 (21)	-13.0 to +20.0	dB	± 0.4 (22) / 0.03	300	2400
"PHI "	Differential Phase (Φ_{DP})	16	10	Integer* 2	2.0	2.8361	2 to 1023 (21)	0.0 to 360.0	deg	±2.5° (23)/ 0.35	300	2400
"RHO "	Correlation Coefficient (ρ_{hv})	8	8	Integer* 1	-60.5	300.0	2 to 255 (21)	0.2083 to 1.0516	N/A	±0.006 (24)/ 0.0033	300	1200
"CFP"	Clutter Filter Power Removed (29)	8	8	Integer* 1	8	1	8 to 81 (30)	0.0 to 73.0	dB	±1.0/0.5 0	460	1840

3.2.4.17.7 No Longer Applicable

(1) See Appendix B for unit definitions and standard symbology.
(2) This field represents the range of the item after any applicable scaling and conversion is done.
(3) Byte location is relative to beginning of this message.
(4) 1 January 1970 00.00 GMT = 1 Modified Julian Date.
(5) Azimuthal spacing of radials is the commanded value not necessarily the actual spacing.
(6) Format Defined in Table III-C. (Radial status definition)
(7) A value of 0 is valid only for continuous surveillance cuts.
(8) Equals 0 when spot blanking disabled; equals 4 when spot blanking enabled and no spot blanking radials in current elevation cut; equals 6 when there are no spot blanked radials in current elevation cut and current radial not spot blanked; equals 7 when current radial is spot blanked.
(9) The number of data moments in each radial can vary from 1 to 7 depending on the VCP in use. There will always be 3 data blocks for "VOL", "ELV", and "RAD" plus the data moment block for "REF". Therefore, this parameter varies from 4 to 10; however, future updates may add blocks. For forward compatibility, it is recommended that readers do not fail when more blocks are present than expected and that readers ignore unknown block types.
(10) Pointer is offset relative to beginning of Data Header Block (see table XVII-A). Note the Data Header Block for data blocks "VOL", "ELV", and "RAD" must always be present but the pointers are not order or location dependent but shown in this order in Table XVII-A for illustrative and clarity purposes.
(11) Pointer is offset relative to beginning of Data Header Block (see table XVII-A) but if the pointer value is 0, there is no Data Moment Block referenced. Normally, if the Data Moment is missing, this pointer would not be present and the Data Block Count reduced. However, it is optional to set pointers to zero or simply delete the pointer to the missing Data Moment Block.

(12) The presence of these Moment Pointers in each radial is determined by the VCP controlling the radar and can vary from none to 7 unique Moments.
(13) Format Defined in Table III-B. (Range conversion)
(14) "Reserved" means the field has a specific future use but not implemented at this time and must be set to zero. The field is not a "Spare" available for arbitrary future use. "Spare" fields must be set to 0 as well.
(15) A non-zero Scale value indicates unsigned integer data that can be converted to floating point data using the Scale and Offset fields, i.e., F = (N - OFFSET) / SCALE where N is the integer data value and F is the resulting floating point value. A scale value of 0 indicates floating point moment data for each range gate.
(16) LDM is the amount of space in bytes required for a data moment array and equals ((NG * DWS) / 8) where NG is the number of gates at the gate spacing resolution specified and DWS is the number of bits stored for each gate (DWS is always a multiple of 8).
(17) Major version number. A larger major version number indicates a structural change has occurred within the ICD description. The current version is 3 for Build 20.
(18) Minor version number. A larger minor version number indicates that one or more data moment parameters have been added but the major structure is intact. The current version is 1 for Build 19.0.
(19) Data Size is the number of bits for the specified data moment used to offset and scale the data for recording into the Data Word Size (DWS). As long as the Offset and Scaling parameters are applied correctly to the recorded data for conversion back to engineering units, no knowledge of the Data Size is needed.
(20) The Scale and Offset values shown in Table XVII-I are typical values for the Moments shown. The conversion of the recorded integer values to meteorological values should always use the Scale and Offset values found in the Data Moment Block for each Data Moment since they could change from radial to radial in future implementations.
(21) For all Reflectivity, Velocity, Spectrum Width, Differential Reflectivity, Differential Phase, and Correlation Coefficient, integer values N = 0 indicates received signal is below threshold and N = 1 indicates range folded data. Actual data range begins at N = 2.
(22) For Z_{DR}, the accuracy of 0.3 dB can be achieved for SNR ≥20 dB, for $\rho_{hv} \geq 0.99$ (rain), for $\sigma > 2$ ms^{-1}, and the dwell time of 50 ms.
(23) For Φ_{DP}, the accuracy of 2.0 degrees can be achieved for SNR ≥20 dB, for $\sigma > 2$ ms^{-1}, and the dwell time of 50 ms.
(24) For r_{hv}, the accuracy of 0.005 can be achieved for SNR ≥20 dB, for $\rho_{hv} \geq 0.99$ (rain), for $\sigma > 2$ ms^{-1}, and the dwell time of 50 ms.
(25) Accuracy, precision, and range of each data moment is officially specified in the System Specification Document.
(26) This volumetric dBZ0 value is relative to the blue sky noise level shown in performance data in the appropriate pulse width field -- "Short Pulse Noise" or "Long Pulse Noise".
(27) The precision can be calculated exactly as 1.0/Scale but is shown here with only a selected number of significant digits.
(28) Bits not listed in Processing Status are reserved for future use.
(29) The CFP moment is the difference between clutter filtered reflectivity and unfiltered reflectivity for a given gate.
(30) For Clutter Filter Power Removed, integer value N=0 indicates the clutter filter was not applied. N=1 indicates point clutter filter was applied. N=2 indicates dual pol variables were filtered but not single pol moments. Values 3 through 7 are reserved for future use. Actual data range begins at N=8.
(31) SNR Threshold is not applied to the CFP moment
(32) Future updates may add fields to the end of blocks where needed. For forward compatibility, it is recommended that readers do not fail when the size is larger than expected where possible.

(33) Encoding is the same as the "ZDR" data block, except a value of 0 means not available.

3.2.4.18 Table XVIII RDA PRF Data (Message Type 32)

NAME	DESCRIPTION	FORMAT	UNITS	RANGE	ACCURACY/ PRECISION	HALFWORD LOCATION
Number of Waveforms	The number of waveforms that PRF values are provided for	Integer*2	N/A	1 - 5	N/A	1
SPARE	N/A	N/A	N/A	0	N/A	2
First WAVEFORM TYPE	WAVEFORM TYPE of the first set of PRF DATA •Contiguous Serveillance •Contiguous Doppler w/Ambiguity Resolution •Staggered Pulse Pair	•Code*2	•N/A	•As listed(1) •1 •2 •5	•N/A	•P1(2)
PRF Count	The number of PRFs following that are defined for this waveform type	Code*2	N/A	0 - 255	N/A	P2
PRF 1	The PRF value for the first code of the waveform type	Scaled Integer*4	Hz	0 to 1500000	0.001	P3
PRF 2	Same as above, but for the second code	Scaled Integer*4	Hz	0 to 1500000	0.001	P5
PRF 3	Same as above, but for the third code	Scaled Integer*4	Hz	0 to 1500000	0.001	P7
PRF 4	Same as above, but for the fourth code	Scaled Integer*4	Hz	0 to 1500000	0.001	P9
PRF 5	Same as above, but for the fifth code	Scaled Integer*4	Hz	0 to 1500000	0.001	P11
PRF 6	Same as above, but for the sixth code	Scaled Integer*4	Hz	0 to 1500000	0.001	P13
PRF 7	Same as above, but for the seventh code	Scaled Integer*4	Hz	0 to 1500000	0.001	P15
PRF 8	Same as above, but for the eighth code	Scaled Integer*4	Hz	0 to 1500000	0.001	P17
...PRF N	Same as above, but for the 'N'th PRF code	Scaled Integer*4	Hz	0 to 1500000	0.001	P'X'(3)

(1) For waveform type 3, the same PRFs as waveform type 2 will be used by the RDA. And for waveform type 4, the surveillance portion of Batch waveform uses the waveform type 1 PRFs, and the Doppler portion of the Batch waveform uses the codes from waveform type 2.
(2) Repeat the format of P1 - P'X' (3), for each of the subsequent PRF data sections.
(3) 'X' can be calculated as 3 + 2*(N-1) for the Nth PRF code of the waveform type.

3.2.4.19 Table XVIV RDA Log Data (Message Type 33)

NAME	DESCRIPTION	FORMAT	RANGE (OR VALUE)	HALFWORD LOCATION
Version	Version for Message Type 33 format decoding	Integer*4	1-10000	0-1
Identifier	Log file name. (e.g. AzServoLog)	String	N/A	2-14
Data Version	Version for this Identifier	Integer*4	1-10000	15-16
Compression Type	Code for compression types •Uncompressed •GZIP •BZIP2 Higher Values Reserved	Code*4	As Listed • 0 • 1 • 2 Higher Values Reserved	17-18
Compressed Size	Bytes of compressed data appended to this message.	Integer*4	2-2,000,000,000	19-20
Decompressed Size	Size of the appended data when decompressed	Integer*4	2-2,000,000,000	21-22
Spare	N/A	N/A	0	23-33
Data	The log string for this message.	Array of type Integer*1	Each element 0-255	34-End of Message[1]

[1] The number of halfwords to the end of each message is variable. It will end at sufficient Half Words to hold the compressed size of the text data, which can at times lead to a non-consequential NULL byte that is not part of the message, to fill out the ICD frame.

3.2.5 Network Time Protocol (NTP)

3.2.5.1 LAN (RDA/RPG) Clock Synchronization

Network Time Protocol (NTP) will be implemented for clock synchronization of the RPG and Master System Control Function (MSCF) processors. The RDA will serve as the master clock. The RPG A processor will serve as a secondary master clock in the event the RDA is unavailable. LAN components within the RPG and RDA (e.g. routers, LAN switches, etc.) will also use the RDA clock as the master and the RPG as a secondary. In FAA Redundant, the NTP master and secondary relationship is only specific to a given channel. Cross-channel secondary NTP sources are not implemented. For the hub routers serving DoD MSCFs, the local host NWS RDA and RPG are the primary and secondary time servers, respectively. For the hub routers serving FAA MSCFs, the hub router will obtain time from only one of the FAA RDAs as primary and its respective RPG as secondary. The radar chosen for time service will correspond to the MSCF that is used to configure the hub router. Reference the TCP/IP ICD for design detail.

3.2.5.2 Applicable Standards

The Network Time Protocol Standard RFC 5905 applies to the RDA/RPG LAN interface. If the master clock sends a time adjustment packet ± 1000 seconds, the client RPG processor(s) will reject the packet and manual intervention will be required to reset the client clocks within ± 1000 seconds of the RDA master clock. The exception is during the boot sequence of the client RPG processor(s). During the boot sequence, NTP will allow for a one-time setting of the client clock that is > 1000 seconds from its master clock. The initial clock set during RPG software loads should be set within ± 1000 seconds of the RDA clock.

4 APPENDIX A GLOSSARY TABLE

Acronym / Abbreviation	Description
A	Antenna/Pedestal
A/D	Analog/Digital
AC	Air conditioner
AIS	Alarm Indication Signal
AMP	Ampere
ANSI	American National Standards Institute
ANT	Antenna
ARC/VSWR	Arc/Voltage Standing Wave Ratio
ARP	Address Resolution Protocol
ASCII	American Standard Code for Information Interchange
ATTEN	Attenuator
AVSET	Automated Volume Scan Evaluation and Termination
AZRATE	Azimuth Rate
BASE TILT	Supplemental Low-elevation cut added to a VCP
BDDS	Base Data Distribution System
BITE	Built-in-Test-Equipment
C	Another designator for Communications
CAL	Calibration
CF	Clutter Filter
CHAN	Channel
CI	Configuration Item (hardware)
CMD	Command
COHO	Coherent
COM	Communications
CPCI	Computer Program Configuration Item
CSU	Channel Service Unit
CTR	Control
CW	Contiguous Wave
DOC	Department of Commerce
DoD	Department of Defense
DOT	Department of Transportation
EBC	Elevation Bias Correction
ED	Edge Detected
EQUIP	Equipment
FAA	Federal Aviation Administration
FO	Filtered Occurrence
FREQ	Frequency
GEN	Generator
GPS	Global Positioning System
HCI	Human Computer Interface
I/O	Input/Output
ICD	Interface Control Document
ICMP	Internet Control Message Protocol
ID, I.D.	Identification
IHL	Internet Header Length

IN	Inoperative
INIT	Initialization
IP	Internet Protocol
KD	Delayed Klystron
KLY	Klystron
KM	Kilometer
KW	Kilowatts
LAN	Local Area Network
LOG	Logarithmic
LSB	Least Significant Bit
MAINT	Maintenance
MLOS	Microwave Line-Of-Sight
MM	Maintenance Mandatory
MR	Maintenance Required
MPDA	Multi-PRF Dealiasing Algorithm
MSB	Most Significant Bit
MSCF	Master Station Console Function
N/A	Not Applicable
NTP	Network Time Protocol
NWS	National Weather Service
OC	Occurrence
ORDA	Open RDA
ORPG	Open RPG
OSF	Operational Support Facility
OSI	Open System Interconnect
PED	Pedestal
PFN	Pulse Forming Network
PRF	Pulse Repetition Frequency
PVC	Permanent Virtual Channel
PWR	Power
PCU	Pedestal Control Unit
PMC	Program Management Committee
PPP	Point-to-Point Protocol
R	Another designator for the Receiver
RAI	Resource Availability Indication
RCV	Another representation for Receiver
RCVR	Receiver
RDA	Radar Data Acquisition area (hardware and software)
REG	Regulator
RF	Radiated Frequency
RMS	Remote Monitoring Subsystem
RPG	Radar Product Generation area (hardware and software)
SEC	Secondary Alarm
SEQ	Sequence
SG	Sigmet
SIG	Signal
SNMP	Simple Network Management Protocol
SNR	Signal to Noise Ratio
SP	Signal Processor

SPIP	Signal Processor Interface Panel
ST	System Test Software
STALO	Stable Local Oscillator
SW	Spectrum Width
SYS	System Information
T	Tower/Utilities
T1	Type 1 communications carrier link (1.544 megabits/second)
TCM	Trellis Encoded Modulation
TCP	Transmission Control Protocol
TEMP	Temperature
TOUTS	Time-outs
TR	Another designator for the Transmitter
TST	Test
UART	Universal Asynchronous Receiver/Transmitter
UDP	User Datagram
UPS	Uninterruptible Power Supply
UTL	Utilities
V	Volts
V & V	Verification & Validation
VCP	Volume Coverage Pattern
VDC	Volts Direct current
VEL	Velocity
VSWR	Voltage Standing Wave Ratio
WG	Wave Guide
WSR-88D	Weather Service Radar - 88 Doppler
XMT	Another representation for Transmitter

5 APPENDIX B - UNIT DEFINITIONS AND SYMBOLOGY

Unless otherwise noted, the units and symbology contained in this document adhere to those set forth in The International System of Units (SI). In some special cases there may be system limitations that force the use of non-standard symbology. In other special cases the quantity might not be recognized by the SI but is commonly used within the meteorological and radar engineering communities.

References:
1) NIST Reference on Constants, Units, and Uncertainty (http://physics.nist.gov/cuu/index.html)

Quantity	**Name**	**Symbol**
Angular Velocity	radian per second (2)	rad/s
	degree per second (4)	deg/s (5)
Area	square meter (2)	m^2 (5)
Computer Data	byte (4)	byte (5)
	octet (4)	octet (5)
	halfword (4)	halfword (5)
Electrical Current	ampere (1)	A
Electrical Potential Difference	volt (2)	V
	kilovolt	kV
	millivolt	mV
Frequency	hertz (2)	Hz
	megahertz	MHz
Height	kilometer	km
Length	meter (1)	m
	kilometer	km
	nautical mile (3)	nm (5)
	statute mile (4)	mi (5)
Mass	kilogram (1)	kg
Percent	percent (4)	% (5)
Plane Angle	degree (3)	deg (5)
	minute (3)	min (5)
	radian (2)	rad
	second (3)	s (5)
Power	decibel	dB (3)
	decibels above one milliwatt (4)	dBm (5)
	kilowatt	kW
	megawatt	MW
	milliwatt	mW
	watt (2)	W
Pressure	bar (3)	bar
	millibar (3)	mb (5)
Reflectivity	decibels of equivalent reflectivity	dBZ
Speed	knot(3)	kt(5)
	meter per second (2)	m/s
	mile per hour (4)	mph (5)
Thermodynamic Temperature	degrees Celsius (2)	deg C (5)
	K	kelvin (1)
Time	second (1)	s

	microsecond	usec (5)
	millisecond	msec (5)
	nanosecond	nsec (5)
	minute (3)	min
	hour (3)	h
	day (3)	d
	month (4)	mo (5)
	year (4)	yr (5)
Volume	cubic meter (2)	m^3 (5)

Notes:
1. SI base unit
2. SI derived unit
3. Non-SI unit deemed acceptable for use by the SI
4. Unit not recognized by SI
5. Non-SI unit symbology

6 APPENDIX C VOLUME COVERAGE PATTERNS

The following table indicates the VCP numbers implemented for each build. Definitions for each VCP may be redefined for each build.

Build Number	9.0	10.0	18.0	19.0	22.0
	11	11	12(2)	12	12
	12	12	31(2)	31	31
	21	21	32(2)	32	35
	31	31	35	35	112
	32	32	121(2)	112(2)	212
	121	121(1)	212(2)	212	215
	211	211	215	215	
	212	212			
	221	221			

(1) The VCP Definition has changed for this build.
(2) The VCP Definitions changed because separate Surveillance and Doppler PRF tables were introduced in Build 18.0.

WF Type Legend

Abbreviation	WF Type
CS	Contiguous Surveillance
CD/W	Contiguous Doppler with Range Ambiguity
B	Batch
CD/WO	Contiguous Doppler **without** Range Ambiguity
SZCS	Contiguous Surveillance with SZ-2 Phase Coding
SZCD	Contiguous Doppler with SZ-2 Phase Coding

Notes on VCP definitions:

For SZCD waveform types, the pulse counts must be 64 regardless of the PRF number used. The Azimuth Rate values assume the default PRF is used. If the PRF used is not the default, the RPG adjusts the Azimuth Rate accordingly to constrain the angle subtended by the radial during data collection to be approximately 1 deg. That is, the rate is derived from rate = 1.0/(N*T), where rate is in deg/secs, N is the number of pulses and T is the Pulse Repetition Time in secs. The rate is then converted to the nearest BAMS value (see Table XI-D) for the encoding of the Azimuth Rate in the VCP definition.

For Multi-PRF Dealiasing Algorithm (MPDA) VCPs, the PRF numbers on the SZCD or CD/W cuts (whichever is used) are fixed and not editable. As of Build 21, the only MPDA VCP is VCP 112.

Signal to Noise (SNR) Thresholds are not editable at the RPG.

The following tables provide the standard definitions for each VCP. Some WSR-88D network sites have a one additional Supplemental Low Elevation angle. Currently there are 23 sites with a Supplemental Low Elevation Angle:

ICAO	**Supplemental Low Elevation Angle (deg)**
KBUF	0.3
KCLE	0.4
KCLX	0.3
KCRP	0.3
KDGX	0.3
KDLH	0.2
KFSX	-0.2
KGJX	0.0
KGSP	0.2
KHDC	0.3
KICX	0.2
KLGX	0.2
KMAX	-0.2
KMBX	0.3
KMSX	-0.2
KMTX	0.0
KMUX	0.0
KPAH	0.3
KPDT	0.2
KRAX	0.2
KRGX	0.0
KSGF	0.2
KSHV	0.3

VOLUME COVERAGE PATTERN 12

SCAN STRATEGY: 12 Build 18				**SHORT PULSE**											
Scan				Surveillance		Doppler PRF No.							SNR (dB)		
Elevation (deg)	AZ Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No Pulses	2 No. Pulses	3 No. Pulses	4 No. Pulses	5 No. Pulses	6 No. Pulses	7 No. Pulses	8 No. Pulses	R	V/SW	DP
0.5	21.149	17.02	CS	1	15			-	-	-	-	-	2.0	2.0	2.0
0.5	24.994	14.40	CD/W	-	-	32	34	37	**40**	43	46	50	3.5	3.5	3.5
0.9	21.149	17.02	CS	1	15			-	-	-	-	-	2.0	2.0	2.0
0.9	24.994	14.40	CD/W	-	-	32	34	37	**40**	43	46	50	3.5	3.5	3.5
1.3	23.031	15.63	CS	2	15			-	-	-	-	-	2.0	2.0	2.0
1.3	25.994	14.40	CD/W	-	-	32	34	37	**40**	43	46	50	3.5	3.5	3.5
1.8	25.716	14.00	B	3	3	23	25	27	**29**	32	34	37	3.5	3.5	3.5
2.4	25.934	13.88	B	4	3	23	25	27	**30**	32	35	38	3.5	3.5	3.5
3.1	26.738	13.46	B	5	3	23	25	27	**30**	32	35	38	3.5	3.5	3.5
4.0	27.594	13.05	B	6	3	23	25	27	**30**	32	35	38	3.5	3.5	3.5
5.1	27.665	13.01	B	6	3	24	26	28	**31**	33	36	39	3.5	3.5	3.5
6.4	27.614	12.86	B	6	3	25	27	29	**32**	35	37	40	3.5	3.5	3.5
8.0	28.400	12.68	CD/WO	-	-	28	30	32	35	**38**	41	44	3.5	3.5	3.5
10.0	28.807	12.50	CD/WO	-	-	27	29	32	35	37	**40**	44	3.5	3.5	3.5
12.5	28.490	12.64	CD/WO	-	-	28	30	32	35	38	41	**44**	3.5	3.5	3.5
15.6	28.490	12.64	CD/WO	-	-	28	30	32	35	38	41	**44**	3.5	3.5	3.5
19.5	28.490	12.64	CD/WO	-	-	28	30	32	35	38	41	**44**	3.5	3.5	3.5

Figure C-1 Volume Coverage Pattern 12
Default Doppler PRF numbers are bolded and underlined.

VOLUME COVERAGE PATTERN 31

SCAN STRATEGY 3				**LONG PULSE**				
Scan						SNR (dB)		
Elevation (deg)	AZ Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No Pulses	R	V/SW	DP
0.50	5.043	71.39	CS	1	63	0.0	0.0	0.0
0.50	5.065	71.08	CD/W	1	87	0.0	0.0	0.0
1.50	5.043	71.39	CS	1	63	0.0	0.0	0.0
1.50	5.065	71.08	CD/W	1	87	0.0	0.0	0.0
2.50	5.043	71.39	CS	1	63	0.0	0.0	0.0
2.50	5.065	71.08	CD/W	1	87	0.0	0.0	0.0
3.50	5.065	71.08	CD/WO	1	87	0.0	0.0	0.0
4.50	5.065	71.08	CD/WO	1	87	0.0	0.0	0.0

Figure C-2 Volume Coverage Pattern 31

For Long Pulse VCPs, the PRF number is fixed and cannot be changed.

VOLUME COVERAGE PATTERN 212

SCAN STRATEGY: SZ2				**SHORT PULSE**				**Number of Pulses or AZ Rate for SZ non-default PRF's**							
Scan				Surveillance				Doppler PRF No. (Default Underlined)					SNR (dB)		
Elevation (deg)	AZ Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No. Pulses	2 No. Pulses	3 No. Pulses	4 No. Pulses	5 No. Pulses	6 No. Pulses	7 No. Pulses	8 No. Pulses	R	V/SW	DP
0.5	21.149	17.02	SZCS	1	15	-		-	-	-	-	-	2.0	2.0	2.0
0.5	17.108	21.30	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	3.5	3.5	3.5
0.9	21.149	17.02	SZCS	1	15			-	-	-	-	-	2.0	2.0	2.0
0.9	17.108	21.30	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	3.5	3.5	3.5
1.3	23.031	17.02	SZCS	2	15			-	-	-	-	-	2.0	2.0	2.0
1.3	17.108	21.30	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	3.5	3.5	3.5
1.8	26.385	13.64	B	3	3	21	23	26	**28**	30	32	35	3.5	3.5	3.5
2.4	27.332	13.17	B	4	3	22	24	26	**28**	31	33	36	3.5	3.5	3.5
3.1	28.227	12.75	B	5	3	22	24	26	**28**	31	33	36	3.5	3.5	3.5
4.0	26.400	13.64	B	6	3	23	25	27	**30**	32	35	38	3.5	3.5	3.5
5.1	26.400	13.64	B	6	3	24	26	28	**31**	33	36	39	3.5	3.5	3.5
6.4	26.400	13.64	B	6	3	24	26	28	**31**	33	36	39	3.5	3.5	3.5

8.0	28.410	12.68	CD/WO	-	-	28	30	32	35	**38**	41	44	3.5	3.5	3.5
10.0	28.413	12.67	CD/WO	-	-	28	30	32	35	38	**41**	45	3.5	3.5	3.5
12.5	28.740	12.53	CD/WO	-	-	27	29	32	35	38	41	**44**	3.5	3.5	3.5
15.6	28.740	12.53	CD/WO	-	-	27	29	32	35	38	41	**44**	3.5	3.5	3.5
19.5	28.740	12.53	CD/WO	-	-	27	29	32	35	38	41	**44**	3.5	3.5	3.5

Figure C-4 Volume Coverage Pattern 212
Default Doppler PRF numbers are bolded and underlined.

VOLUME COVERAGE PATTERN 215

SCAN STRATEGY: SZ-2				**SHORT PULSE**		**Number of Pulses or AZ Rate for SZ non-default PRF's**									
Scan				Surveillance		Doppler PRF No. (Default Underlined)							SNR (dB)		
Elevation (deg)	Az Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No. Pulses	2 No. Pulses	3 No. Pulses	4 No. Pulses	5 No. Pulses	6 No. Pulses	7 No. Pulses	8 No. Pulses	R	V/SW	DP
0.5	11.46	31.41	SZCS	1	28	-	-	-	-	-	-	-	0.0	0.5	2.0
0.5	17.108	21.04	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	0.0	0.5	3.5
0.9	13.375	26.92	SZCS	1	24	-	-	-	-	-	-	-	0.0	0.5	2.0
0.9	17.108	21.04	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	0.0	0.5	3.5
1.3	15.921	23.54	SZCS	1	22	-	-	-	-	-	-	-	0.0	0.5	2.0
1.3	17.108	21.04	SZCD	-	-	12.533	13.393	14.468	15.836	**64**	18.455	20.032	0.0	0.5	3.5
1.8	16.771	21.47	B	3	3	40	42	46	**50**	54	58	63	3.0	1.0	3.5
2.4	20.650	17.43	B	4	3	32	34	37	**40**	43	47	51	3.0	1.0	3.5
3.1	19.536	18.43	B	5	5	32	34	37	**40**	43	47	51	3.0	1.0	3.5
4.0	20.232	17.79	B	6	5	32	34	37	**40**	44	47	51	3.0	1.0	3.5
5.1	20.232	17.79	B	6	5	32	34	37	**40**	44	47	51	3.0	1.0	3.5
6.4	20.232	17.79	B	6	5	32	34	37	**40**	44	47	51	3.0	1.0	3.5
8.0	24.864	14.48	CD/WO	-	-	32	34	37	41	**44**	47	52	1.0	1.0	3.5
10.0	25.640	14.04	CD/WO	-	-	31	33	36	40	43	46	**50**	1.0	1.0	3.5
12.0	25.640	14.04	CD/WO	-	-	31	33	36	40	43	46	**50**	1.0	1.0	3.5
14.0	25.640	14.04	CD/WO	-	-	31	33	36	40	43	46	**50**	1.0	1.0	3.5
16.7	25.640	14.04	CD/WO	-	-	31	33	36	40	43	46	**50**	1.0	1.0	3.5
19.5	25.640	14.04	CD/WO	-	-	31	33	36	40	43	46	**50**	1.0	1.0	3.5

Figure C-5 Volume Coverage Pattern 215
Default Doppler PRF numbers are bolded and underlined.

VOLUME COVERAGE PATTERN 35

SCAN STRATEGY: SZ-2				**SHORT PULSE**		**Number of Pulses or AZ Rate for SZ non-default PRF's**									
Scan				Surveillance		Doppler PRF No. (Default Underlined)							SNR (dB)		
Elevation (deg)	Az Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No. Pulses	2 No. Pulses	3 No. Pulses	4 No. Pulses	5 No. Pulses	6 No. Pulses	7 No. Pulses	8 No. Pulses	R	V/SW	DP
0.5	4.966	72.49	SZCS	1	64	-	-	-	-	-	-	-	0.0	0.5	0.5
0.5	15.836	22.73	SZCD	-	-	12.533	13.393	14.468	**64**	17.108	18.455	20.032	0.0	0.5	0.5
0.9	4.966	72.49	SZCS	1	64	-	-	-	-	-	-	-	0.0	0.5	0.5
0.9	15.836	22.73	SZCD	-	-	12.533	13.393	14.468	**64**	17.108	18.455	20.032	0.0	0.5	0.5
1.3	5.473	65.78	SZCS	2	64	-	-	-	-	-	-	-	0.0	0.5	0.5
1.3	15.836	22.73	SZCD	-	-				**64**				0.0	0.5	0.5
1.8	15.489	23.24	B	3	3	44	47	50	**55**	59	64	70	3.0	1.0	1.0
2.4	17.756	20.27	B	4	3	38	41	44	**48**	52	56	61	3.0	1.0	1.0
3.1	16.926	21.27	B	5	5	38	41	44	**48**	52	56	61	2.0	1.0	1.0
4.0	18.068	19.92	B	6	5	36	39	42	**46**	50	54	58	2.0	1.0	1.0
5.1	18.068	19.92	B	6	5	36	39	42	**46**	50	54	58	1.0	1.0	1.0
6.4	18.068	19.92	B	6	5	36	39	42	**46**	50	54	58	1.0	1.0	1.0

Figure C-6 Volume Coverage Pattern 35

Default Doppler PRF numbers are bolded and underlined.

VOLUME COVERAGE PATTERN 112

SCAN STRATEGY MPDA				**SHORT PULSE**		**Number of Pulses or AZ Rate for SZ non-default PRF's**									
Scan				Surveillance		Doppler PRF No. (Default Underlined)							SNR (dB)		
Elevation (deg)	AZ Rate (deg/sec)	Period (sec)	WF Type	PRF No.	No Pulses	2 No. Pulses	3 No. Pulses	4 No. Pulses	5 No. Pulses	6 No. Pulses	7 No. Pulses	8 No. Pulses	R	V/SW	DP
0.5	18.677	19.29	SZCS	1	17			-	-	-	-	-	2.0	2.0	2.0
0.5	20.032	17.97	SZCD			-	-	-	-	-	-	**64**	3.5	3.5	3.5
0.5	14.468	24.88	SZCD			-	-	**64**	-	-	-	-	3.5	3.5	3.5
0.9	19.842	18.14	SZCS	1	16								2.0	2.0	2.5
0.9	20.032	17.97	SZCD			-	-	-	-	-	-	**64**	3.5	3.5	3.5
0.9	15.836	22.73	SZCD			-	-	-	**64**	-	-	-	3.5	3.5	3.5
1.3	21.556	17.51	SZCS	2	16			-	-	-	-	-	2.0	2.0	2.5
1.3	20.032	17.97	SZCD			-	-	-	-	-	-	**64**	3.5	3.5	3.5
1.3	17.108	21.04	SZCD			-	-	-	-	**64**	-	-	3.5	3.5	3.5
1.8	26.385	13.64	B	3	3	21	23	26	**28**	30	32	35	3.5	3.5	3.5
2.4	27.332	13.17	B	4	3	22	24	26	**28**	31	33	36	3.5	3.5	3.5
3.1	28.227	12.75	B	5	3	22	24	26	**28**	31	33	36	3.5	3.5	3.5
4.0	26.400	13.67	B	6	3	23	25	27	**30**	32	35	46	3.5	3.5	3.5
5.1	26.000	13.64	B	6	3	24	26	28	**31**	33	36	59	3.5	3.5	3.5
6.4	26.400	13.64	B	6	3	24	26	28	**31**	33	36	44	3.5	3.5	3.5
8.0	28.418	12.68	CD/WO			28	30	32	35	**38**	41	44	3.5	3.5	3.5
10.0	28.413	12.67	CD/WO			28	30	32	35	38	**41**	44	3.5	3.5	3.5
12.5	28.740	12.67	CD/WO			27	29	32	35	38	41	**44**	3.5	3.5	3.5
15.6	28.740	12.67	CD/WO			27	29	32	35	38	41	**44**	3.5	3.5	3.5
19.5	28.740	12.67	CD/WO			27	29	32	35	38	41	**44**	3.5	3.5	3.5

Figure C-7. Volume Coverage Pattern 112
Default Doppler PRF numbers are bolded and underlined.