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# INTERFACE CONTROL DOCUMENT FOR THE RDA/RPG

**Prepared by:**

**WSR-88D Radar Operations Center**
**1313 Halley Circle**
**Norman, OK 73069**

**APPROVED FOR USE AS PRODUCT BASELINE BY & SUBMITTED BY:**

THOMPSON.DALE.JAMES.1387207992

Digitally signed by THOMPSON.DALE.JAMES.1387207992
Date: 2024.10.25 14:30:41 -05'00'

**Dale J. Thompson**
**Team Lead, Configuration Management**
**WSR-88D Radar Operations Center**

**INTERFACE CONTROL DOCUMENT**
**FOR THE RDA/RPG**
**2620002**

**DOCUMENT REVISION RECORD FORM**

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| **Appendix C** | R | T | | V | W | Y |

**REVISION RECORD**

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| **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.<br>a. Added new Table XVII for Message 31 for Build 10.<br>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.<br>c. Updated Message 5 for super resolution selection parameters.<br>d. Made corrections to Message 1 for velocity ranges. | 25 March 2008 |

| | | |
|---|---|---|
| | e. Made segmentation changes to Table II Message Header Data.<br>f. Updated Table I Data Message Types for Message 31.<br>g. Changes to increase number to 25 clutter regions.<br>h. Removed unused alarms.<br>i. Updated Source address in Section 2. | |
| 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<br>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,<br>NA12-00234, NA12-00338, NA13-00111 | 06 January 2014 |
| Revision P | Updated for RDA Build 17.0.<br>NA15-00083, NA08-00310 | 21 April 2016 |
| Revision R | Updated for RDA and RPG Build 18.0<br>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, NA18-00042 | 28 February 2018 |
| Revision T | Updated for RDA and RPG Build 19.0. CCRs included in the update:<br>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:<br>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 |

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| Revision W | Updated for RDA and RPG Build 22.0. CCRs included in the update:<br>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 |
| Revision Y | Updated for RDA and RPG Build 23.0. CCRs included in the update:<br>NA22-00280, NA23-00104, NA23-00139, NA23-00193, NA23-00195, NA23-00223, NA23-00226, NA23-00227, NA23-00228, NA23-00229, NA23-00251, NA23-00286, NA23-00288, NA23-00289, NA23-00290, NA23-00291 | 25 June 2024 |

**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<br>1313 Halley Circle<br>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<br>445 Hoes Lane<br>PO Box.1331<br>Piscataway NJ 08855-1331<br>http://www.standards.ieee.org/ |
| NIST Special Publication 330, 2001 Edition | The International System of Units (SI) |
| **Source:** | United States Department of Commerce<br>National Institute of Standards and Technology<br>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:<br>Legacy<br>0 = Single Channel (no bits set)<br>1 = Redundant Channel 1 (bit 0 set)<br>2 = Redundant Channel 2 (bit 1 set)<br>ORDA<br>8 = Single Channel (bit 3 set)<br>9 = Redundant Channel 1 (bits 3 & 0 set)<br>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 message 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 in echo power between two resolution cells for them not to be labeled "overlayed" | Scaled Integer*2 | dB | 0.0 to 20.0 | ± .1/ ± .1 | 64 and 65 |
| 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<br>−127 to +126 | ± 1/0.5<br>± 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 Indicator (Hex) | Setting (Hex) | Bad Data (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<br>•Standby<br>•Restart<br>•Operate<br>•Spare<br>•Spare | •Code*2 (7) | •N/A | •As Listed<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set)<br>•32 (bit 5 set)<br>•64 (bit 6 set) | •N/A | •1 |
| OPERABILITY STATUS | •RDA - On-line<br>•RDA - Maintenance Action Required<br>•RDA - Maintenance Action Mandatory<br>•RDA - Commanded Shut Down<br>•RDA - Inoperable | •Code*2 | •N/A | •As Listed<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set)<br>•32 (bit 5 set) | •N/A | •2 |
| CONTROL STATUS | •Local Only<br>•RPG (Remote) Only<br>•Either | •Code*2 (7) | •N/A | •As Listed<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set) | •N/A | •3 |
| AUXILIARY POWER GENERATOR STATE | •Switched to Auxiliary Power<br>•Utility PWR Available<br>•Generator On<br>•Transfer Switch - Manual<br>•Commanded Switchover | •Code*2 | •N/A | •As Listed<br>•1 (bit 0 set)<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set) | •N/A | •4 |
| AVERAGE TRANSMITTER POWER | Calculated over a range of samples | Integer*2 | W | 0 to 9999 | ± 1/<br>± 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)<br>•None<br>•Reflectivity<br>•Velocity<br>•Width | •Code*2 | •N/A | •As Listed<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set) | •N/A | •7 |
| VOLUME COVERAGE PATTERN NUMBER | (Magnitude defines Pattern, Sign defines selection)<br>•No Pattern<br><br>•RDA Local Pattern Selected<br>•RDA Remote Pattern Selected | •SInteger*2 | •N/A | •As Listed<br><br>•0 (no bits set)<br><br>•Negative<br>•Positive | •1 | •8 |
| RDA CONTROL AUTHORIZATION | <br>•No Action<br>•Local Control Requested<br>•Remote Control Requested (a.k.a. Local Control Released) | •Code*2 (7) | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •9 |
| RDA BUILD NUMBER | RDA major & minor build version information | Scaled Integer*2 | N/A | 0 to 9999 (6) | N/A | 10 |
| OPERATIONAL MODE | •Operational<br>•Maintenance | •Code*2 (7) | •N/A | •As Listed<br>•4 (bit 2 set)<br>•8 (bit 3 set) | •N/A | •11 |
| SUPER RESOLUTION STATUS | <br>•Enabled<br>•Disabled | •Code*2 (7) | N/A | As Listed<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •12 |
| CLUTTER MITIGATION DECISION STATUS | •Disabled<br>•Enabled<br>•Bypass Map Segments where Clutter Mitigation Decision Applied | •Code*2 | •N/A | •As Listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•Bits 1-5 (9) | •N/A | •13 |
| RDA SCAN AND DATA FLAGS | •AVSET Enabled<br>•AVSET Disabled<br>•EBC Status | •Code*2 (10) | •N/A | •As Listed<br>AVSET BITS:<br>• Enabled bit 1 set | •N/A | •14 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | •RDA Log Data Status<br>•Time Series Data Recording Status | | | •Disabled bit 2 set<br>EBC BIT:<br>•Enabled bit 3 set<br>•Disabled bit 3 zero<br>RDA Log Data BIT:<br>•Enabled bit 4 set<br>•Disabled bit 4 zero<br>Time Series Data Recording:<br>•Enabled bit 5 set<br>•Disabled bit 5 zero | | |
| RDA ALARM SUMMARY | •No Alarms<br>•Tower/Utilities<br>•Pedestal<br>•Transmitter<br>•Receiver<br>•RDA Control<br>•Communication<br>•Signal Processor | •Code*2 | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set)<br>•32 (bit 5 set)<br>•64 (bit 6 set)<br>•128 (bit 7 set) | •N/A | •15 |
| COMMAND ACKNOWLEDGMENT | •No Acknowledgment<br>•Remote VCP Received<br>•Clutter Bypass map Received<br>•Clutter Censor Zones Received<br>•Redundant Chan Ctrl Cmd Accepted | •Code*2 | •N/A | •As listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•2 (bit 1 set)<br>•3 (bits 0 and 1 set)<br>•4 (bit 2 set) | •N/A | •16 |
| CHANNEL CONTROL STATUS | Identifies whether channel is the controlling channel:<br>• Controlling<br>• Non-controlling | •Code*2 | •N/A | •As Listed<br><br>•0 (no bits set)<br>•1 (bit 0 set) | •N/A | •17 |
| SPOT BLANKING STATUS | Status of Spot Blanking: | •Code*2 (7) | •N/A | •As Listed<br>•0 (no bits set) | •N/A | •18 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | •Not Installed<br>•Enabled<br>•Disabled | | | •2 (bit 1 set)<br>•4 (bit 2 set) | | |
| 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:<br>•Not Installed<br>•OFF<br>•OK<br>•UNKNOWN | •Integer*2 | •NA | •As Listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•3 (bits 0 and 1 set)<br>•4 (bit 2 set) | •N/A | •24 |
| RMS CONTROL STATUS | Status of RMS Control:<br>•NON-RMS SYSTEM<br>•RMS IN CONTROL<br>•RDA IN CONTROL | •Code*2 (7) | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •25 |
| PERFORMANCE CHECK STATUS | Status of Performance Check:<br>•NO COMMAND PENDING<br>•FORCE PERFORMANCE CHECK PENDING<br>•In Progress | •Code*2 (7) | N/A | As Listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•2 (bit 1 set) | N/A | 26 |
| ALARM CODES | One condition per halfword | Integer*2 | N/A | 0 to 800 | N/A | 27 to 40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (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. | | | | | |
| SIGNAL PROCESSING OPTIONS | Flags indicating whether various signal processing options are enabled or disabled | Code*2 | N/A | As Listed<br>•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 58 |
| DOWNLOADED PATTERN NUMBER | The VCP number the RDA is acknowledging. Remote VCP received flag of the 'Command Acknowledgement' should be set if this is not 0. | Integer*2 | N/A | 0 = No VCP<br>1 – 767 The remote VCP pattern number The RPG has downloaded. | N/A | 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|
| 445 | N/A | N/A | N/A | N/A | SPARE |
| 446 | MR | ED | CTR | 1 | LOG DISK SPACE LOW |
| 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 |

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|---|---|---|---|---|---|
| 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 FAIL |
| 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 - 599 | N/A | N/A | N/A | N/A | SPARE |
| 600 | SEC | OC | CTR | N/A | LINUX USER ACCOUNT PASSWORD EXPIRING SOON |
| 601 | SEC | OC | CTR | N/A | LINUX USER ACCOUNT PASSWORD EXPIRED |
| 602 | SEC | OC | CTR | N/A | LINUX ROOT ACCOUNT PASSWORD NEEDS UPDATING SOON |
| 603 | SEC | OC | CTR | N/A | LINUX ROOT ACCOUNT PASSWORD REQUIRES UPDATING |
| 604-678 | 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 | Integer*4 | byte | 0 to $2^{32}$-1 | 1 | N/A | 7 - 8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | applications on managed device | | | | | | |
| 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<br>1=Backup in Use<br>2=Backup Down Failure<br>3=Backup Commanded Down<br>4=Backup Not Installed | 12 |
| T1 Port Status | The status of the T1 port | Integer*2 | N/A | N/A | 1 | 1=Up<br>2=Down<br>3=Test<br>Other values unknown. | 13 |
| Router Dedicated Ethernet Port status | The status of a local/dedicated Ethernet connection to the RPG. | Integer*2 | N/A | N/A | 1 | 1=Up<br>2=Down<br>3=Test | 14 |
| Router Commercial Ethernet Port status | The status of a commercial Ethernet connection to the RPG. | Integer*2 | N/A | N/A | 1 | 1=Up<br>2=Down<br>3=Test | 15 |
| SPARE | N/A | N/A | N/A | N/A | N/A | N/A | 16 - 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 | Integer*4 | s | 0 to $2^{32}$-1 | 1 | N/A | 27 - 28 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | previous 24 hours. | | | | | | |
| 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 Chassis 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,<br>1=Fail,<br>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,<br>1=Channel 1,<br>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<br>1 = H + V<br>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<br>1 = ON | 66 |
| AME A/D Converter Status | | Integer*2 | N/A | 0 to 1 | 1 | 0 = OK<br>1 = FAIL | 67 |
| AME State | | Integer*2 | N/A | 0 to 3 | 1 | 0 = START<br>1 = RUNNING<br>2 = FLASH<br>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<br>1 = MAINTENANCE | 85 |
| AME Peltier Mode | | Integer*2 | N/A | 0 to 1 | 1 | 0 = COOL<br>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<br>1 - NOT OK | 99 |
| RCP STRING | Descriptive string for the radar control programs state | String | N/A | N/A | N/A | N/A | 100 - 107 |
| 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<br>Bit 1 Set – This channel's DAQ PED power button is off.<br>Bit 2 Set – Channel 2 DAQ power button is off (Channel 1 | 108 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | only)<br>Bit 3 Set – Channel 2 DAQ PED power button is off.<br>(Channel 1 only)<br>Bit 4 Set - This is Channel 1 of a redundant configuration. | |
| 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 converter/power supply | Integer*2 | N/A | 0 to 1 | 1 | 0=OK, 1=Fail | 308 |
| 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 | Antenna is in the upper “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 | | Integer*2 | N/A | 0 to 1 | 1 | 0=OK, 1=Fail | 342 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Select Oscillator | | | | | | | |
| 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:<br>Bit 0 - Surveillance<br>Bit 1 - Doppler<br>Bit 2 - Staggered | Code*2 | N/A | 0 to 7 | 1 | For each bit: 0=Fail, 1=OK | 444 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | PRT | | | | | | |
| 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<br>Bit 0 – RSP System Drive 'SMART' Status<br>Bit 1 – RSP Data Drive 'SMART' Status<br>Bit 2 – RSP CPU 1 'Overtemp'<br>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<br>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<br>1 = FAIL<br>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:<br>•No Change<br>•Stand-By<br>•Operate<br>•Restart | •Code*2 | N/A | As Listed<br>•0 (no bits set)<br>•32769 (bit 0 & 15 =1)<br>•32772 (bit 2 & 15 =1)<br>•32776 (bit 3 & 15 =1) | •N/A | •1 |
| RDA LOG COMMAND | RDA Log Command Values:<br>•No Change<br>•Enable<br>•Disable | •Code*2 | N/A | As Listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•2 (bit 1 set) | •N/A | •2 |
| AUXILIARY POWER GENERATOR CONTROL Note(4) | Aux. Power Generator Control Values:<br>•No Change<br>•Switch to Auxiliary Power<br>•Switch to Utility Power | •Code*2 | N/A | As Listed<br>•0 (no bits set)<br>•32772 (bit 2 & 15 =1)<br>•32770 (bit 1 & 15 =1) | •N/A | •3 |
| RDA CONTROL COMMANDS AND AUTHORIZATION | •No Change<br>•Control Command Clear<br>•Local Control Enabled<br>•Remote Control Accepted<br>•Remote Control Requested | •Code*2 | •N/A | •As listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set)<br>•8 (bit 3 set)<br>•16 (bit 4 set) | •N/A | •4 |
| RESTART VCP OR ELEVATION CUT | Restart VCP or Elevation Cut Values:<br>•None<br>•Restart Volume Coverage Pattern<br>•Restart Elevation Cut | •Code*2 | N/A | As Listed<br>•0 (no bits set)<br>•32768 (bit 15 = 1)<br>•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<br>•Pattern Number<br>•No Change | •Integer*2 | •N/A | •As Listed<br>•0 (no bits set)<br>•1 to 767<br>•32767 | •1 | •6 |
| SPARE | N/A | N/A | N/A | 0 | | 7 |
| SUPER RESOLUTION CONTROL | Values:<br>•No change<br>•Enable<br>•Disable | •Code*2 (4) | N/A | As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •8 |
| CLUTTER MITIGATION DECISION CONTROL | Values:<br>•No change<br>•Enable<br>•Disable | •Code*2 (4) | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •9 |
| AVSET CONTROL | Values:<br>•No change<br>•Enable<br>•Disable | •Code*2 (4) | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•4 (bit 2 set) | •N/A | •10 |
| SPARE | N/A | N/A | N/A | 0 | N/A | 11 |
| CHANNEL CONTROL COMMAND | •No Change<br>•Set to Controlling Channel<br>•Set to Non-controlling Channel | •Code*2 | •N/A | •As Listed<br>•0 (no bits set)<br>•1 (bit 0 set)<br>•2 (bit 1 set) | •N/A | •12 |
| PERFORMANCE CHECK CONTROL | No Change<br>Force Performance Check | Code*2 | N/A | As Listed<br>•0 (no bits set)<br>1 (bit 0 set) | N/A | 13 |
| ZDR BIAS ESTIMATE WEIGHTED MEAN | Values(8)<br>•Not Available<br>•No Change<br>•Coded Value | •Integer*2 | •dB | •As Listed<br>•0<br>•1<br>•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<br>•Enable Spot Blanking<br>•Disable Spot Blanking | •Code*2 | •N/A | •As Listed<br>•0 (no bits set)<br>•2 (bit 1 set)<br>•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:<br>•Operational<br>•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:<br>•0.5<br>•1.0 | •Code*1 | •m/s | •As Listed<br>•2 (set bit 9)<br>•4 (set bit 10) | •N/A | •6 (1) |
| PULSE WIDTH | Pulse Width Values:<br>•Short<br>•Long | •Code*1 | •N/A | •As listed<br>•2 (set bit 1)<br>•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<br>•Number of Elevations<br>•Maximum SAILS Cuts<br>•Sequence Active<br>•Truncated VCP | •Code*2(15) | •N/A | •<br>Bits 0-4<br>Bits 5-6<br>Bit 13 set<br>Bit 14 set | N/A | 9 |
| VCP SUPPLEMENTAL DATA(14) | VCP SUPPLEMENTAL VALUES<br>•SAILS VCP<br>•Number SAILS Cuts<br>•MRLE VCP<br>•Number of MRLE Cuts<br>•Spares<br>•MPDA Cuts Added<br>•MPDA VCP | •Code*2(16) | •N/A | •<br>Bit 0 set<br>Bits 1-3<br>Bit 4 set<br>Bits 5-7<br>Bits 8-9<br>Bit 10 set<br>Bit 11 set | | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | •BASE TILT VCP<br>•Number of BASE TILTS | | | Bit 12 set<br>Bits 13-15 | | |
| 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:<br>•Constant Phase<br>•Random Phase<br>•SZ2 Phase | •Code*1 | •N/A | •As Listed<br>•0<br>•1<br>•2 | •N/A | E2 (1) |
| WAVEFORM TYPE | Waveform Type Values:<br>•Contiguous Surveillance<br>•Contiguous Doppler w/ Ambiguity Resolution<br>•Contiguous Doppler w/o Ambiguity Resolution<br>•Batch<br>•Staggered Pulse Pair | •Code*1 | •N/A | •As Listed (8)<br>•1<br>•2<br>•3<br>•4<br>•5 | •N/A | E2 (2) |
| SUPER RESOLUTION CONTROL | Super Resolution Control Values:<br>• 0.5 degree azimuth<br>• 1/4 km reflectivity<br>• Doppler to 300 km<br><br>Dual Polarization Control<br>• Dual Polarization to 300 km | Code*1 | N/A | As Listed (13)<br>• Bit 0 set<br>• Bit 1 set<br>• Bit 2 set<br>• 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<br>•SAILS Cut<br>•SAILS Sequence Number<br>•MRLE Cut<br>•MRLE Sequence Number<br>•Spare<br>•MPDA Cut<br>•BASE TILT Cut | •Code*2 | •N/A | •<br>Bit 0 set<br>Bits 1-3<br>Bit 4 set<br>Bits 5-7<br>Bit 8<br>Bit 9 set<br>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 a 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)<br>•Bypass Map in Control<br>•Clutter Filtering Forced | •Code*2 | •N/A | •As Listed<br>•0<br>•1<br>•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<br>•Request RDA Performance/Maintenance Data<br>•Request Clutter Filter Bypass Map<br>•Request Clutter Filter Map<br>•Request RDA Adaptation Data<br>•Request Volume Coverage Pattern Data | •Code*2 | •N/A | •As Listed<br>•129 (bits 0&7=1)<br>•130 (bits 1&7=1)<br>•132 (bits 2&7=1)<br>•136 (bits 3&7=1)<br>•144 (bits 4&7=1)<br>•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<br>Bypass map in Control<br>Force Filter | Code*2 | N/A | As Listed<br>0<br>1<br>2 | N/A | *R1* |
| 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 an 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_FORM AT | FORMAT OF ADAPTATION DATA FILE | String (13) | N/A | N/A | N/A | 12 - 15 |
| ADAP_REVIS ION | 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 ENCODERMEASURE MENT | Real*4 | s | 0.0000 to 2.0000 | .0001 | 48 - 51 |
| 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 | Real*4 | s | 0.000 to 2.000 | .001 | 56 - 59 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | ENCODER MEASUREMENT | | | | | |
| 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 | Real*4 | % | 0.0 to 100.0 | 0.1 | 100 - 103 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | HEIGHT/CAPACITY CONVERSION (80% HGT) | | | | | |
| 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 | Real*4 | deg C | 0.0 to 50.0 | 0.1 | 152 - 155 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | SHELTER ALARM TEMPERATURE | | | | | |
| 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 INSERTION LOSSES (9dB) | Real*4 | dB | -10.00 to -8.00 | 0.01 | 264 - 267 |
| 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 | Real*4 | dB | -14.00 to -12.00 | 0.01 | 280 - 283 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | INSERTION LOSSES (13dB) | | | | | |
| 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 |

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|---|---|---|---|---|---|---|
| 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 INSERTION LOSSES (34dB) | Real*4 | dB | -35.00 to -33.00 | 0.01 | 364 - 367 |
| 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 | Real*4 | dB | -39.00 to -37.00 | 0.01 | 380 - 383 |

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|---|---|---|---|---|---|---|
| | INSERTION LOSSES (38dB) | | | | | |
| 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 |

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| 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 INSERTION LOSSES (59dB) | Real*4 | dB | -60.00 to -58.00 | 0.01 | 464 - 467 |
| 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 | Real*4 | dB | -64.00 to -62.00 | 0.01 | 480 - 483 |

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| | INSERTION LOSSES (63dB) | | | | | |
| 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 |

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| 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 INSERTION LOSSES (84dB) | Real*4 | dB | -85.00 to -83.00 | 0.01 | 564 - 567 |
| 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 | Real*4 | dB | -89.00 to -87.00 | 0.01 | 580 - 583 |

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| | INSERTION LOSSES (88dB) | | | | | |
| 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 |

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| 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 |

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| 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 TRANSMITTER LOSS | Real*4 | dB | -40.00 to -20.00 | 0.01 | 836 - 839 |
| 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 |

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| 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 |

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| 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 NORMALIZATION (2.5 deg to 3.0 deg) | Real*4 | N/A | 1.000 to 1.800 | 0.001 | 968 - 971 |
| 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 | Real*4 | dB/km | -0.0200 to -0.0020 (3) | 0.0001 | 1008 - 1011 |

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| | LOSS/KM (1.0 deg to 1.5 deg) | | | | | |
| 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 |

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| 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 ELEVATION ANGLE (6) | Real*4 | deg | -1.000 to 45.000 | 0.001 | 1068 - 1071 |
| 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 |

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| 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 |

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|---|---|---|---|---|---|---|
| H_TS_CW | AME HORIZONTAL TEST SIGNAL POWER | Real*4 | dBm | 0.00 to 30.00 | 0.01 | 1184 - 1187 |
| 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 |
| THRESHOLD 1 | BYPASS MAP GENERATOR NOISE THRESHOLD | Real*4 | dB | 0.0 to 36.0 | 0.1 | 1216 - 1219 |
| THRESHOLD 2 | 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 TARGET VERTICAL DBZ0 LIMIT | Real*4 | dB | 1.0 to 10.0 | 0.1 | 1240 - 1243 |

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| 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 |

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| 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 |
| DIG_RCVR_CLOCK_FREQ | RECEIVER CLOCK FREQUENCY | Real*8 | MHz | 50.0 to 250.0 | 0.0000001 | 2500-2507 |
| COHO_FREQ | COHO FREQUENCY | Real*8 | MHz | 0.0 to 100.0 | 0.0000001 | 2508-2515 |
| SPARE | N/A | N/A | N/A | 0 | N/A | 2516 - 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 SUSTAINING DRIVE | Real*4 | N/A | 0.00 to 7.00 | 0.01 | 8396 - 8399 |
| AZ_NEG_SUSTAIN_DRIVE | AZIMUTH MOTOR NEGATIVE SUSTAINING DRIVE | Real*4 | N/A | -7.00 to 0.00 | 0.01 | 8400 - 8403 |

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| 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 FEEDBACK CURVE | Real*4 | N/A | 0.50 to 20.00 | 0.01 | 8436 - 8439 |
| 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 |

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| 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 - 8495 |
| AZ_STOW_ANGLE | AZIMUTH STOW ANGLE FOR ENCODER ALIGNMENT | Real*4 | deg | 0.000 to 359.999 | 0.001 | 8496-8499 |
| EL_STOW_ANGLE | ELEVATION STOW ANGLE FOR ENCODER ALIGNMENT | Real*4 | deg | -180.000 to 180.000 | 0.001 | 8500-8503 |
| AZ_ENCODER_ALIGNMENT | AZIMUTH ENCODER ALIGNMENT ETU ANGLE AT STOW | Real*4 | deg | 0.000 to 359.999 | 0.001 | 8504-8507 |
| EL_ENCODER_ALIGNMENT | ELEVATION ENCODER ALIGNMENT ETU ANGLE AT STOW | Real*4 | deg | -180.000 to 180.000 | 0.001 | 8508-8511 |
| SPARE | N/A | N/A | N/A | 0 | N/A | 8512-8687 |
| 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 NORMALIZATION (1.0 deg to 1.5 deg) | Real*4 | N/A | 1.000 to 1.800 | 0.001 | 8716 - 8719 |
| 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 |

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| 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 EL_INDEX PARAMETERS | Integer*4 | N/A | 0 to 11 | 1 | 8768 - 8771 |
| SEG2LIM | CLUTTER MAP BOUNDARY ELEVATION BETWEEN SEGMENTS 2 & 3. | Real*4 | deg | 0.80 - 4.50 | 0.01 | 8772 - 8775 |

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| 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 ENABLED (FAA ONLY) | String | N/A | T or F | N/A | 8812 - 8815 |
| 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 | Real*4 | dB | 0.0 to 10.0 | 0.1 | 8824 - 8827 |

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| | OFFSET DEGRADE LIMIT | | | | | |
| 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 STEPPER MOTOR IS ENABLED | String (15) | N/A | T or F | N/A | 9000 - 9003 |
| 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 | Real*4 | deg C | -20.00 to 20.00 | 0.1 | 9032 - 9035 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | TEMPERATURE WARNING LIMIT | | | | | |
| 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<br>1 = compressed using BZIP2<br>2 = compressed using zlib<br>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)<br>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 (see Table XVII-H) (10) | Integer*4 | N/A | 100 or greater | 1 | 40 to 43 |
| 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", | 1 | 1 to 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | "ZDR", "CFP" | | |
| 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 echo power between two resolution gates for them not to be labeled "overlayed" | Scaled Integer*2 | dB | 0.0 to 20.0 | ± 0.1/ 0.1 | 14 and 15 |
| 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<br>1 = recombined azimuthal radials<br>2 = recombined range gates<br>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 mean sea level | SInteger*2 | m | -100 to 12000 | ± 1/1 | 16 and 17 |
| Tower Height | Height of tower above ground level | 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 $\Phi_{DP}$ 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<br>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 ($\Phi_{DP}$) | 16 | 10 | Integer* 2 | 2.0 | 2.836 1 | 2 to 1023 (21) | 0.0 to 360.0 | deg | ±2.5° (23)/ 0.35 | 300 | 2400 |
| "RHO " | Correlation Coefficient ($\rho_{hv}$) | 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 | ±1.0/0.50 | 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 $\Phi_{DP}$, 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 $\rho_{hv}$, 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<br><br>•Contiguous Serveillance<br>•Contiguous Doppler w/Ambiguity Resolution<br>•Staggered Pulse Pair | •Code*2 | •N/A | •As listed(1)<br>•1<br>•2<br>•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<br>•Uncompressed<br>•GZIP<br>•BZIP2<br>•ZIP<br>Higher Values Reserved | Code*4 | As Listed<br>• 0<br>• 1<br>• 2<br>• 3<br>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 - 1988 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 | 23.0 |
|---|---|---|---|---|---|---|
| | 11 | 11 | 12(2) | 12 | 12 | 12 |
| | 12 | 12 | 31(2) | 31 | 31 | 31 |
| | 21 | 21 | 32(2) | 32 | 35 | 34 |
| | 31 | 31 | 35 | 35 | 112 | 35 |
| | 32 | 32 | 121(2) | 112(2) | 212 | 112 |
| | 121 | 121(1) | 212(2) | 212 | 215 | 212 |
| | 211 | 211 | 215 | 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. VCP 112 is MPDA by default, but MPDA can be turned on at the RPG for SZ-2 based precipitation VCPs.

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.

| ICAO | Supplemental Low Elevation Angle (deg) |
|---|---|
| KBMX | 0.4 |
| KBUF | 0.3 |

| | |
|---|---|
| KCLE | 0.4 |
| KCLX | 0.3 |
| KCRP | 0.3 |
| KDGX | 0.3 |
| KDLH | 0.2 |
| KDOX | 0.3 |
| KEVX | 0.3 |
| KFSX | -0.2 |
| KGJX | 0.0 |
| KGSP | 0.2 |
| KHDC | 0.3 |
| KICX | 0.2 |
| KLGX | 0.2 |
| KMAX | -0.2 |
| KMBX | 0.3 |
| KMOB | 0.2 |
| 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**

| **PULSE LENGTH:** | | | | **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**

| **PULSE LENGTH:** | | | | **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.

**PULSE LENGTH:**

| **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**

| **PULSE LENGTH:** | | | | **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**

| **PULSE LENGTH:** | | | | **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**

| **PULSE LENGTH:** | | | | **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.

**VOLUME COVERAGE PATTERN 34**

| **PULSE LENGTH:** | | | | **LONG PULSE** | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Scan | | | | Surveillance | | Doppler PRF No. | SNR (dB) | | |
| Elevation (deg) | AZ Rate (deg/sec) | Period (sec) | WF Type | PRF No. | PRF No. | 1 No. Pulses | R | V/SW | DP |
| 0.5 | 5.043 | 71.39 | CS | 1 | 63 | | 0.0 | 0.0 | 0.0 |
| 0.5 | 8.491 | 42.40 | CD/W | | | 52 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.9 | 5.043 | 71.39 | CS | 1 | 63 | | 0.0 | 0.0 | 0.0 |
| 0.9 | 8.491 | 42.40 | CD/W | | | 52 | 0.0 | 0.0 | 0.0 |
| 1.3 | 5.445 | 66.12 | CS | 2 | 63 | | 0.0 | 0.0 | 0.0 |
| 1.3 | 8.491 | 42.40 | CD/W | | | 52 | 0.0 | 0.0 | 0.0 |
| 1.8 | 5.880 | 61.22 | B | 3 | 11 | 63 | 0.0 | 0.0 | 0.0 |
| 2.4 | 8.491 | 42.40 | CD/WO | | | 52 | 0.0 | 0.0 | 0.0 |
| 3.1 | 8.491 | 42.40 | CD/WO | | | 52 | 0.0 | 0.0 | 0.0 |
| 4.5 | 8.491 | 42.40 | CD/WO | | | 52 | 0.0 | 0.0 | 0.0 |

**Figure C-8 Volume Coverage Pattern 34**
For Long Pulse VCPs, the PRF number is fixed and cannot be changed.