

Document Number 2620002E
Code Identification 0WY55
WSR-88D ROC
25 May 2007
Open Build 9.0

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

**Prepared by:
WSR-88D Radar Operations Center
3200 Marshall Ave
Norman, OK 73072**

SUBMITTED BY: _____ **DATE:** _____
Cheryl A. Stephenson
Team Leader, Configuration Management
WSR-88D Radar Operations Center

DISTRIBUTION STATEMENT A: Approved for public release; distribution unlimited.

Document Number 2620002E
 Code Identification 0WY55
 WSR-88D ROC
 25 May 2007
 Open Build 9.0

INTERFACE CONTROL DOCUMENT
 FOR THE RDA/RPG
 2620002
 DOCUMENT REVISION RECORD FORM

REVISION	-	A	B	C	D	E
RELEASED BY	ROC	ROC	ROC	ROC	ROC	ROC
RELEASE DATE	03/01/96	06/26/98	09/11/01	04/13/05	02/08/06	05/25/07
EFFECTIVITY	03/01/96	06/26/98	09/11/01	04/13/05	02/08/06	05/25/07
AUTHORITY	F0048	F0095	F0103	0126/0209	0126/0210	0250
FAST TRACK	NO	NO	NO	NO	NO	NO
REV HISTORY	BLD 9.0	BLD 10.0	OPEN BLD 1.0	OPEN BLD 7.0	OPEN BLD 8.0	OPEN BLD 9.0
Section 1	-	A	B	C		
Section 2	-	A	B	C		
Section 3	-	A	B	C	D	E
Section 4	-	A	B	Deleted		
Section 5	-	A	B	Deleted		
Section 6	-	A	B	Deleted		
Section 7	-	A	B	Deleted		
Section 8	-	A	B	Deleted		
Section 9	-	A	B	Deleted		
Section 10	-	A	B	Deleted		
Appendix A	-	A	B	C		
Appendix B						E

REVISION RECORD

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

Revision	Description	Date
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 Build 8.0	08 February 2006
Revision E	Updated for Build 9.0. Added Appendix B.	25 May 2007

TABLE OF CONTENTS

1	Scope.....	1-1
1.1	Identification	1-1
1.2	Security.....	1-1
1.3	System Overview.....	1-1
1.4	Documentation Overview	1-1
2	Reference Documents.....	2-1
2.1	Government Documents	2-1
2.1.1	Specifications.....	2-1
2.2	Non-Government Documents	2-2
2.2.1	Industry Standards.....	2-2
3	RDA to RPG Application Layer	3-1
3.1	Session Specific	3-1
3.1.1	TCP Client/Server Relationship.....	3-1
3.1.2	TCP Port Mapping	3-1
3.1.3	General Message Descriptions	3-1
3.1.3.1	Login Message.....	3-1
3.1.3.1.1	Login Message Header	3-1
3.1.3.1.2	Login Message Body	3-2
3.1.3.2	Login Acknowledgement Message.....	3-2
3.1.3.2.1	Login Acknowledgement Message Header.....	3-2
3.1.3.2.2	Login Acknowledgement Message Body	3-3
3.1.3.3	Data Message.....	3-3
3.1.3.3.1	Data Message Header.....	3-3
3.1.3.4	Data Acknowledgement Message	3-4
3.1.3.4.1	Data Acknowledgement Message Header	3-4
3.1.3.5	Keep Alive Message.....	3-4
3.1.3.5.1	Keep Alive Message Header.....	3-4
3.1.4	Error Handling.....	3-4
3.1.5	Disconnect	3-4
3.2	Application Specific.....	3-5
3.2.1	Data Formats	3-5
3.2.2	Operating Procedures	3-5
3.2.2.1	Messages from RDA	3-6
3.2.2.1.1	Metadata Message Types and Purpose	3-7
3.2.2.2	Messages from RPG.....	3-7
3.2.3	Message Descriptions	3-7
3.2.3.1	Digital Radar Data	3-7
3.2.3.2	RDA Status Data	3-8
3.2.3.3	Performance/Maintenance Data	3-8
3.2.3.4	Console Message	3-8
3.2.3.5	Volume Coverage Pattern	3-8
3.2.3.6	RDA Control Commands.....	3-8
3.2.3.7	Clutter Censor Zone	3-8
3.2.3.8	Request for Data	3-8
3.2.3.9	Loop Back Test.....	3-8
3.2.3.10	Clutter Filter Bypass Map	3-9
3.2.3.11	Clutter Filter Map	3-9
3.2.3.12	Adaptation Data	3-9
3.2.3.12.1	RDA Alarm Message Summary	3-22
	Appendix A Glossary Table.....	A-1

Appendix B - Unit Definitions and Symbology B-1

INDEX OF TABLES

Table I Data Message Types	3-6
Table II Message Header Data	3-10
Table III Digital Radar Data (Message Type 1)	3-11
Table III-A Angle Data Format	3-14
Table III-B Range Format.....	3-15
Table III-C Radial Status Data Format	3-16
Table III-E Base Data Scaling.....	3-17
Table IV RDA Status Data (Message Type 2).....	3-18
Table IV-A RDA Alarm Messages	3-23
Table V Performance/Maintenance Data (Message Type 3)	3-32
Table VI Console Message (Message Types 4, 10).....	3-47
Table VIII Loopback Test (Message Type 11 and Message Type 12).....	3-47
Table IX Clutter Filter Bypass Map (Message Type 13).....	3-48
Table X RDA Control Commands (Message Type 6).....	3-49
Table XI Volume Coverage Pattern Data (Message Types 5 & 7).....	3-51
Table XI-D Azimuth and Elevation Rate Data.....	3-54
Table XII Clutter Censor Zones (Message Type 8).....	3-55
Table XIII Request for Data (Message Type 9)	3-56
Table XIV Clutter Filter Map (Message Type 15)	3-57
Table XV. RDA Adaptation Data (Message Type 18).....	3-58
Table XV-B. Two Way Atmospheric Loss.....	3-89

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 158 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.

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

<u>Reference Number</u>	<u>Title</u>
2810000C	WSR-88D System Specification
2830013	WSR-88D System/Subsystem Design Document
2820001	Computer Program Development Specification for RDA Status and Control Program (CPCI-01)
2820003	Computer Program Development Specification for Radar Product Generation Program (B5, 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 3200 Marshall Avenue, Suite 110 Norman, OK 73072

2.2 Non-Government Documents

2.2.1 Industry Standards

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

3 RDA TO RPG APPLICATION LAYER

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

3.1 Session Specific

3.1.1 TCP Client/Server Relationship

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

3.1.2 TCP Port Mapping

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

3.1.3 General Message Descriptions

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

<u>TCM Message Header</u>		
Message Type	Message Type Dependent	Server/Client Data Size
←→ 4 octets	←→ 4 octets	←→ 4 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

3.1.3.1 Login Message

3.1.3.1.1 Login Message Header

The login message has the following format:

<u>TCM LOGIN Message Header</u>		
Message Code = 0	WSR-88D Constant = 20983610	Message Length = Server/Client Data Size
←→ 4 octets	←→ 4 octets	←→ 4 octets

Where message code is the LOGIN message code with a value of 0. The WSR-88D Constant is an integer value equal to 20983610 (Decimal). This constant is used as a unique number for identifying the initial valid messages in communicating with WSR-88D system. The message length is the number of octets in the message excluding the header.

3.1.3.1.2 Login Message Body

The message body follows the header. The message body format is of variable string length:

TCM LOGIN Message Body

Link Index		Number of PVCs on Link		PVC Index		Password
ASCII String Representing Integer Value of Link Index	Space	ASCII String Representing Integer Value of Number of PVCs, Typically Value of 1 or 2	Space	ASCII String Representing Integer Value of Number of PVCs, Typically Value of 0 or 1	Space	ASCII String Representing the Client's Password

The message body must be a NULL terminated ASCII string. Additional bytes following the string are allowed and ignored. The client side must send an appropriate LOGIN message on each PVC defined for the link. The password must be identical for all PVC's and must match that specified at the RDA. A link's PVCs are sequentially from 0 (PVC index) and may be opened in any order. An example of a login for the PVC 0 connection on link 5, which has 2 PVCs, will look like "5 2 0 password".

The client side must send a login message after a connection is established on each applicable PVC. Following successful login messages on all defined PVC's for a link, a login acknowledgment message is transmitted by the server on PVC 0. If any PVC's LOGIN message is incorrect, contains erroneous fields, or if LOGIN messages for all of the link's PVCs are not received within 30 seconds the initial LOGIN message, the entire link (all PVCs) is closed.

After the login message(s) from have been verified, the server side will send an acknowledgment message on PVC 0 connection and normal user message exchanges can then begin.

3.1.3.2 Login Acknowledgement Message

3.1.3.2.1 Login Acknowledgement Message Header

The LOGIN ACKNOWLEDGMENT message has the following header:

TCM LOGIN Ack Header

Message Code = 1	WSR-88D Constant = 20983610	Message Length = Server/Client Data Size
←→ 4 octets	←→ 4 octets	←→ 4 octets

Where message code is for the LOGIN ACKNOWLEDGEMENT message code which has a value of 1.

The WSR-88D Constant is equal to 20983610 (Decimal). This constant value is used as a unique number for identifying initial valid messages in communicating with WSR-88D system.
 The message length is the number of octets in the message excluding this header.

3.1.3.2.2 Login Acknowledgement Message Body

The format for the Login Acknowledgment message body which follows the header is:

<u>TCM LOGIN ACK Message Body</u>				
Link Index		Number of PVCs on Link		Connected
ASCII String Representing Integer Value of Link Index	Space	ASCII String Representing Integer Value of Number of PVCs, Typically Value of 1 or 2.	Space	ASCII String Representing the word "Connected"

The message body must be a NULL terminated ASCII string. Additional bytes following the string are allowed and ignored. The client side must send appropriate TCM_LOGIN message(s) on the PVCs defined for the link. The password must be identical for all PVCs and must match with that specified in the RDA TCP manager configuration file. A link's PVCs are identified from 0 (PVC index) and may be opened in any order. An example of the login acknowledgement message is string "5 2 connected", which indicates that link 5 of 2 PVCs is successfully connected and ready for user exchange. The server side sends a LOGIN ACKNOWLEDGMENT message on PVC 0 when all PVCs are connected and verification/authentication are completed. No other messages are allowed on any PVC until the login/login acknowledge sequence is complete.

3.1.3.3 Data Message

3.1.3.3.1 Data Message Header

The data message has the following header:

<u>TCM Data Message Header</u>		
Message Code = 2	Sequence	Message Length = Server/Client Data Size
←→ 4 octets	←→ 4 octets	←→ 4 octets

Where message code is for the DATA message which is 2. The sending user application layer (either the RPG client or the RDA server) may employ the sequence field for message acknowledgment purposes. If the sequence field is non-zero, the receiving user application should interpret it to mean that a data acknowledgment message is expected by the sending application. A sequence field of "0" indicates that no acknowledgment of this message is expected.

The user's application layer (either the RPG client or the RDA server) may employ the sequence field, to request data acknowledgment messages, as needed for individual applications using these links. Use of sequential message numbers, acknowledgment of all data messages or acknowledgment of only specific data messages at certain times, any timeout handling for expected acknowledgments, etc., is left to the user application. Both server and client applications should implement support for data acknowledgement messages.

The Message Length is the length in octets of the application layer message which follows the Data Message Header. The application layer messages will follow this message header (See Section 3.2 Application Specific).

3.1.3.4 Data Acknowledgement Message

3.1.3.4.1 Data Acknowledgement Message Header

The data acknowledgment message has the following header:

<u>TCM DATA ACK Message Header</u>		
Message Code = 3	Sequence Field	Message Length = 0
←→ 4 octets	←→ 4 octets	←→ 4 octets

Where Message Code is for the DATA ACKNOWLEDGMENT message type which is 3. This message should be sent by the receiving user application when a data message with non-zero sequence number is received. It is sent on the same PVC the data message was received. The "sequence" field contains the same number as the data message to be acknowledged. There is no data following the header so the message length is 0.

3.1.3.5 Keep Alive Message

3.1.3.5.1 Keep Alive Message Header

The keep-alive message has the following header:

<u>TCM KEEP ALIVE Message Header</u>		
Message Code = 4	Initializing Loopback	Message Length = 0
←→ 4 octets	←→ 4 octets	←→ 4 octets

Where Message Code is for the KEEP ALIVE message which is 4. When a user application on one side of the PVC needs determine whether the line is still OK, it sends this message with a non-zero "init" field. A user application on either side, upon receiving this message, should respond by the same message with "init" reset to 0. There is no data following the header so the message length is 0.

3.1.4 Error Handling

Either side of a session link will close and disconnect TCP connections for all PVCs on the link 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*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.

Table I Data Message Types
 * = metadata

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

3.2.2.1 Messages from RDA

Per Table I, data transmitted from the RDA to the RPG consists of Digital Radar Data (Message 1), 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 Bypass Map (Message 13), Clutter Filter Map (Message 15) and RDA Adaptation Data (Message 18).

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 and RDA Adaptation Data is given in Table XV.

The RDA sends the ICD format 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.

3.2.2.1.1 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 the Level II, the following Message Types need to be sent from the RDA to the RPG (see Table I) along with Message Type 1, Digital Radar Data:

- 1 - Digital Radar Data
- 2 - RDA Status Data
- 3 - Performance/Maintenance Data
- 5 - Volume Coverage Pattern Data
- 13 - Clutter Filter Bypass Map Data
- 15 - Clutter Filter Map Data
- 18 - RDA Adaptation Data

The RDA will send messages 2, 3, 5, 13, 15 and 18 upon wideband connection and prior to going to "OPERATE" state.

The RDA will send messages 2, 3 and 5 prior to sending message 1 at the beginning of each VCP.
RDA will send message 13 whenever there is a change to the Clutter Filter Bypass Map Data.
RDA will send message 15 whenever there is a change to Clutter Filter Map Data.
RDA will send message 18 whenever there is a change to RDA Adaptation Data.

3.2.2.2 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 for messages exceeding 1208 halfwords, including the Message Header. Messages with lengths greater than 1208 halfwords (2416 bytes) are divided into multiple segments, each with a maximum length of 1208 halfwords. For messages with length less than 1208 halfwords, the number of message segments is one and the individual segment number in the Message Header is not applicable.

3.2.3.1 Digital Radar Data

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.

3.2.3.2 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 an 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 an 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.

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, operating mode, channel and volume scan strategies.

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 Bypass Map, 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. When the RDA generates a new clutter bypass map, the Clutter Filter Map message is recomputed and transmitted to the RPG.

3.2.3.11 Clutter Filter Map

The Clutter Filter Map message format is provided in Table XIV. The Clutter Filter Map contains the combined clutter censor zone information and clutter bypass map information. The RDA sends the Clutter Filter Map message upon wideband connection and whenever there is a change to the Clutter Filter Map. When the RDA generates a new clutter bypass map or receives new clutter censor zone information, the Clutter Filter Map message is recomputed and transmitted to the RPG.

3.2.3.12 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.

Table II Message Header Data

NAME	DESCRIPTION ⁽³⁾	FORMAT	UNITS ⁽⁴⁾	RANGE	ACCURACY/ PRECISION	BYTE LOCATION
Message Size	Message size in halfwords ⁽¹⁾	Integer* 2	halfword	9 to 1208	1	0 and 1
RDA Redundant Channel	Channel Numbers for: Legacy 0 = Single Channel (no bits set) 1 = Redundant Channel 1 (bit 0 set) 2 = Redundant Channel 2 (bit 1 set) ORDA 8 = Single Channel (bit 3 set) 9 = Redundant Channel 1 (bits 3 & 0 set) 10 = Redundant Channel 2 (bits 3 & 1 set)	Integer* 1	N/A	0 to 10	1	2
Message Type	Integer code from Table I	Integer* 1	N/A	1 to 26	N/A	3
I.D. Sequence Number	Message Sequence Number	Integer* 2	N/A	0 to 32,767 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 86,399,9 99	± 2000/ ± 1	8 to 11
Number of Message Segments	Message larger than 1208 halfwords are segmented and transmitted separately	Integer* 2	N/A	1 to 32,767	1	12 and 13
Message Segment Number	Segment number of this message	Integer* 2	N/A	1 to 32,767	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.

Table III Digital Radar Data (Message Type 1)

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 132	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

NAME	DESCRIPTION	FORMAT	UNITS (¹⁸)	RANGE ⁽¹⁾	ACCURACY/ PRECISION	BYTE LOCATION
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	-.02 to -.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 "overlaid"	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	-36 to +36	± 1/0.5 ± 1/1	100 to 1479 ⁽¹²⁾
Doppler Spectrum Width	Weather radar spectral width data (0 to 920 Cells)	Code*1 ⁽¹⁰⁾⁽¹¹⁾	m/s	-63.5 to +63	± 1/0.5	100 to 2399 ⁽¹³⁾

Notes:

1. This field represents the range of the item after any applicable scaling and conversion is done.
2. 1 January 1970 00.00 GMT = 1 Modified Julian Date
4. Format Defined in Table III-A

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

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

BIT #	Range Format (Km)
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

Document Number 2620002E
Code Identification 0WY55
WSR-88D ROC
25 May 2007
Open Build 9.0

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

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:

$$R_{num} = (R \div 2) - 33.0$$

$$V_{num} = (V \div 2) - 64.5 \text{ or } V - 129.0$$

$$SW_{num} = (SW \div 2) - 64.5$$

Table IV RDA Status Data (Message Type 2)

NAME	DESCRIPTION	FORMAT T (3), (4)	UNITS (8)	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
RDA STATUS	Start-Up Standby Restart Operate Spare Off-line Operate	Code*2 ⁽⁷⁾	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set) 16 (bit 4 set) 32 (bit 5 set) 64 (bit 6 set)	N/A	1
OPERABILITY STATUS	RDA - On-line RDA - Maintenance Action Required RDA - Maintenance Action Mandatory RDA - Commanded Shut Down RDA - Inoperable RDA - Automatic Calibration Disabled	Code*2	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set) 16 (bit 4 set) 32 (bit 5 set) Add 1 (bit 0) to above codes	N/A	2
CONTROL STATUS	Local Only RPG (Remote) Only Either	Code*2 ⁽⁷⁾	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set)	N/A	3
AUXILIARY POWER GENERATOR STATE	Utility PWR Available Generator On Transfer Switch - Manual Commanded Switchover Switched to Auxiliary Power	Code*2	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set) 16 (bit 4 set) Add 1 (bit 0) to above codes	N/A	4
AVERAGE TRANSMITTER POWER	Calculated over a range of samples	Integer* 2	W	0 to 9999	± 1/ ± 1	5
REFLECTIVITY CALIBRATION CORRECTION (delta dBZ0)	Difference from Adaptation Data	Scaled Integer* 2	dB	-198.00 to +198.00 ⁽⁵⁾	1/0.01	6
DATA TRANSMISSION ENABLED	(Any combination of Data Enabled) None Reflectivity Velocity Width	Code*2	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set) 16 (bit 4 set)	N/A	7
VOLUME COVERAGE PATTERN NUMBER	(Magnitude defines Pattern, Sign defines selection) No Pattern	SInteger *2	N/A	As Listed 0 Number >	1	8

NAME	DESCRIPTION	FORMAT ^{(3), (4)}	UNITS ⁽⁸⁾	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
	Test Operational Constant Elevation Types RDA Local Pattern Selected RDA Remote Pattern Selected			255 Number ≤ 255 1 to 99 Negative Positive		
RDA CONTROL AUTHORIZATION	No Action Local Control Requested Remote Control Enabled (a.k.a. Local Control Released)	Code*2 ⁽⁷⁾	N/A	As Listed 0 2 (bit 1 set) 4 (bit 2 set)	N/A	9
RDA BUILD NUMBER	RDA major & minor build version information	Scaled Integer*2	N/A	0 to 999 ⁽⁶⁾	N/A	10
OPERATIONAL MODE	Test Operational Maintenance	Code*2 ⁽⁷⁾	N/A	As Listed 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set)	N/A	11
SPARE	N/A	N/A	N/A	N/A	N/A	12
SPARE	N/A	N/A	N/A	N/A	N/A	13
SPARE	N/A	N/A	N/A	N/A	N/A	14
RDA ALARM SUMMARY	No alarms Tower/Utilities Pedestal Transmitter Receiver RDA Control Communication Signal Processor	Code*2	N/A	As Listed 0 2 (bit 1 set) 4 (bit 2 set) 8 (bit 3 set) 16 (bit 4 set) 32 (bit 5 set) 64 (bit 6 set) 128 (bit 7 set)	N/A	15
COMMAND ACKNOWLEDGMENT	No Acknowledgment Remote VCP Received Clutter Bypass map Received Clutter Censor Zones Received Redundant Chan Ctrl Cmd Accepted	Code*2	N/A	As listed 0 1 2 3 4	N/A	16
CHANNEL CONTROL STATUS	Identifies whether channel is the controlling channel:	Code*2	N/A	As Listed 0	N/A	17

NAME	DESCRIPTION	FORMAT ^{(3), (4)}	UNITS ⁽⁸⁾	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALFWORD LOCATION
	Controlling Non-controlling			1 (bit 0 set)		
SPOT BLANKING STATUS	Status of Spot Blanking: Not Installed Enabled Disabled	Code*2 ⁽⁷⁾	N/A	As Listed 0 2 (bit 1 set) 4 (bit 2 set)	N/A	18
BYPASS MAP GENERATION DATE	Julian Date - 2440586.5 Note ⁽¹⁾	Integer*2	d	1 to 65535	1	19
BYPASS MAP GENERATION TIME	Number of minutes since midnight, Greenwich Mean Time	Integer*2	min	0 to 1440	1	20
CLUTTER FILTER MAP GENERATION DATE	Julian date - 2440586.5 Note ⁽¹⁾	Integer*2	d	1 to 65535	1	21
CLUTTER FILTER MAP GENERATION TIME	Number of minutes since Midnight, Greenwich Mean Time	Integer*2	min	0 to 1440	1	22
SPARE	N/A	N/A	N/A	N/A	N/A	23
TRANSITION POWER SOURCE STATUS	Status of TPS: Not Installed OFF OK	Integer*2	NA	As Listed 0 1 3	N/A	24
RMS CONTROL STATUS	Status of RMS Control: NON-RMS SYSTEM RMS IN CONTROL RDA IN CONTROL	Code*2 ⁽⁷⁾	N/A	As Listed 0 2 (bit 1 set) 4 (bit 2 set)	N/A	25
SPARE	N/A	N/A	N/A	N/A	N/A	26
ALARM CODES	One condition per halfword (Maximum of 14 alarms sent at a time). See Alarm Message Table IV-A for individual alarm codes. MSB set indicates alarm has been cleared.	Integer*2	N/A	0 to 800	N/A	27 to 40

(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) Build Version format is XX.Y where XX indicates the major build version and Y indicates the minor build version. This information is stored in scaled integer format. For example, Build 7.0

Document Number 2620002E
Code Identification 0WY55
WSR-88D ROC
25 May 2007
Open Build 9.0

equals a value of 70. Build 99.9 equals a value of 999.

(7) Values listed are mutually exclusive.

(8) See Appendix B for unit definitions and standard symbology.

3.2.3.12.1 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 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.

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 - 15	N/A	N/A	N/A	N/A	SPARE
16	SEC	FO	COM	N/A	SEND WIDEBAND STATUS TIMED OUT
17	MR	ED	COM	1	NTP FAILURE
18	MR	ED	COM	1	GPS FAILURE
19	MR	ED	COM	1	GPS ANTENNA FAILURE
20	MM	ED	COM	1	RPG LINK - RED ALARM (NO RX)
21	MM	ED	COM	1	RPG LINK - YELLOW ALARM
22	MM	ED	COM	1	RPG LINK - BLUE ALARM
23	MM	ED	COM	1	RDA CSU FAILURE
24	MR	ED	COM	2	SNMP TIME OUT: LAN SWITCH
25	MR	ED	COM	2	SNMP TIME OUT: ROUTER
26	MR	ED	COM	2	SNMP TIME OUT: RDA UPS
27	MR	ED	COM	2	SNMP TIME OUT: POWER ADMINISTRATOR
28	MR	ED	COM	2	SNMP TIME OUT: GPS
29	N/A	N/A	N/A	N/A	SPARE
30	MR	ED	COM	2	SNMP TIME OUT: REMOTE ACCESS SERVER
31	MR	ED	COM	1	LAN SWITCH PORT 1 FAIL
32	MR	ED	COM	1	LAN SWITCH PORT 2 FAIL
33	MR	ED	COM	1	LAN SWITCH PORT 3 FAIL
34	N/A	N/A	N/A	N/A	SPARE
35	MR	ED	COM	1	LAN SWITCH PORT 5 FAIL
36	MR	ED	COM	1	LAN SWITCH PORT 11 FAIL
37	MR	ED	COM	1	LAN SWITCH PORT 12 FAIL
38	N/A	N/A	N/A	N/A	SPARE
39	N/A	N/A	N/A	N/A	SPARE
40	IN	ED	XMT	2	FILAMENT POWER SUPPLY OFF
41	N/A	N/A	N/A	N/A	SPARE
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	1	XMTR UNAVAILABLE
47	IN	ED	XMT	3	PFN/PW SWITCH FAILURE
48	MM	ED	XMT	2	XMTR +5VDC POWER SUPPLY 6 FAIL

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
49	MM	ED	XMT	2	XMTR +15VDC POWER SUPPLY 4 FAIL
50	MM	ED	XMT	2	XMTR +28VDC POWER SUPPLY 3 FAIL
51	MM	ED	XMT	2	XMTR -15VDC POWER SUPPLY 5 FAIL
52	MM	ED	XMT	2	XMTR +45VDC POWER SUPPLY 7 FAIL
53	MM	ED	XMT	1	FILAMENT POWER SUPPLY VOLTAGE FAIL
54	MM	ED	XMT	1	VACUUM PUMP POWER SUPPLY VOLTAGE FAIL
55	MM	ED	XMT	1	FOCUS COIL POWER SUPPLY VOLTAGE FAIL
56	MM	ED	XMT	2	CIRCULATOR OVERTEMP
57	MM	ED	XMT	2	SPECTRUM FILTER LOW PRESSURE
58	MM	ED	XMT	2	WAVEGUIDE ARC/VSWR
59	MM	ED	XMT	1	XMTR CABINET INTERLOCK OPEN
60	MM	ED	XMT	2	XMTR CABINET OVER TEMP
61	MM	ED	XMT	2	XMTR CABINET AIR FLOW FAIL
62	MR	ED	XMT	1	XMTR MAINTENANCE REQUIRED
63	N/A	N/A	N/A	N/A	SPARE
64	MM	ED	XMT	1	MODULATOR OVERLOAD
65	MM	ED	XMT	1	MODULATOR INVERSE CURRENT FAIL
66	MM	ED	XMT	1	MODULATOR SWITCH FAILURE
67	MM	ED	XMT	1	XMTR MAIN POWER OVER VOLTAGE
68	MM	ED	XMT	1	CHARGING SYSTEM FAILURE
69	MM	ED	XMT	1	CHARGING SYSTEM INVERSE CURRENT FAILURE
70	MM	ED	XMT	1	TRIGGER AMPLIFIER FAILURE
71	N/A	N/A	N/A	N/A	SPARE
72	MM	ED	XMT	1	XMTR OVER VOLTAGE
73	MM	ED	XMT	1	XMTR OVER CURRENT
74	MM	ED	XMT	1	FOCUS COIL CURRENT FAILURE
75	MM	ED	XMT	1	FOCUS COIL AIRFLOW FAILURE
76	MM	ED	XMT	2	XMTR OIL OVER TEMP
77	MM	ED	XMT	1	PRF LIMIT
78	MM	ED	XMT	2	XMTR OIL LEVEL LOW
79	N/A	N/A	N/A	N/A	SPARE
80	MM	ED	XMT	1	KLYSTRON OVER CURRENT
81	MM	ED	XMT	1	KLYSTRON FILAMENT CURRENT FAIL
82	MM	ED	XMT	1	KLYSTRON VACION CURRENT FAIL
83	MM	ED	XMT	2	KLYSTRON AIR OVER TEMP
84	MM	ED	XMT	2	KLYSTRON AIR FLOW FAILURE
85	MM	ED	XMT	1	XMTR PEAK POWER LOW
86	MM	ED	XMT	1	XMTR PEAK POWER HIGH
87	MM	ED	XMT	1	XMTR POWER METER ZERO OUT OF LIMIT
88	MM	ED	XMT	1	XMTR POWER BITE FAIL
89 - 92	N/A	N/A	N/A	N/A	SPARE

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
93	MR	ED	XMT	2	XMTR MODULATOR SWITCH REQUIRES MAINT
94	MR	ED	XMT	2	XMTR POST CHARGE REG REQUIRES MAINT
95	MM	ED	XMT	2	WAVEGUIDE HUMIDITY/PRESSURE FAULT
96	IN	ED	XMT	3	XMTR HV SWITCH FAILURE
97	MM	ED	XMT	1	XMTR RECYCLING
98	IN	ED	XMT	2	XMTR INOPERATIVE
99 - 109	N/A	N/A	N/A	N/A	SPARE
110	MM	ED	XMT	1	XMTR/DAU INTERFACE FAILURE
111	IN	ED	UTL	1	RDA UPS ON BATTERY
112	MM	ED	UTL	1	RDA UPS OVERLOAD
113	MR	ED	UTL	1	RDA UPS VOLTAGE REGULATION
114	MM	ED	UTL	1	RDA UPS SHUTDOWN
115	MR	ED	UTL	1	RDA UPS BATTERY FAIL
116	MM	ED	UTL	1	RDA UPS DIAGNOSTICS FAIL
117	MR	ED	UTL	1	RDA UPS LOW BATTERY
118	MM	ED	UTL	1	POWER ADMINISTRATOR OVERLOAD
119	MM	ED	UTL	1	POWER ADMINISTRATOR FAILURE
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	MR	ED	UTL	1	RDA UPS DETECTS A SITE WIRING FAULT
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 DETECTIONS SYSTEM FAULT
132	N/A	N/A	N/A	N/A	SPARE
133	MR	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	N/A	N/A	N/A	N/A	SPARE
138	N/A	N/A	N/A	N/A	SPARE
139	N/A	N/A	N/A	N/A	SPARE
140 - 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	N/A	N/A	N/A	N/A	SPARE

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
148	N/A	N/A	N/A	N/A	SPARE
149	N/A	N/A	N/A	N/A	SPARE
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 - 170	N/A	N/A	N/A	N/A	SPARE
171	MM	ED	UTL	2	EQUIPMENT SHELTER TEMP EXTREME
172	MM	ED	UTL	2	AC UNIT#1 DISCHARGE TEMP EXTREME
173	MM	ED	UTL	2	XMTR EXHAUST AIR TEMP EXTREME
174	MR	ED	UTL	2	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 - 183	N/A	N/A	N/A	N/A	SPARE
184	MM	ED	UTL	2	AC UNIT#2 DISCHARGE TEMP EXTREME
185	N/A	N/A	N/A	N/A	SPARE
186	IN	ED	CTR	1	RDAC FAILED - RCP REBOOT INITIATED
187	IN	ED	CTR	1	WDOG FAILED - RCP REBOOT INITIATED
188	MR	ED	CTR	1	NMSC FAILED - SNMP TRAFFIC NOT MONITORED
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	MM	ED	CTR	1	DAUC FAILED - DAUC RESTART INITIATED
193	N/A	N/A	N/A	N/A	SPARE
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	IN	ED	CTR	1	DAUC BOUNCING - RCP REBOOT INITIATED
199	IN	ED	CTR	1	RPGC BOUNCING - RCP REBOOT INITIATED
200	IN	ED	CTR	1	VCPC BOUNCING - RCP REBOOT INITIATED
201	IN	ED	CTR	1	DSPC BOUNCING - RCP REBOOT INITIATED
202-248	N/A	N/A	N/A	N/A	SPARE
249	IN	ED	CTR	2	DAU UART FAILURE
250	MM	ED	CTR	2	DAU +28V POWER SUPPLY FAIL
251	MM	ED	CTR	2	DAU +15V POWER SUPPLY FAIL
252	MM	ED	CTR	2	DAU +5V POWER SUPPLY FAIL
253 - 264	N/A	N/A	N/A	N/A	SPARE
265	MM	ED	CTR	2	DAU -15V POWER SUPPLY FAIL

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
266	MM	ED	CTR	2	DAU A/D LOW LEVEL OUT OF TOLERANCE
267	MM	ED	CTR	2	DAU A/D MID LEVEL OUT OF TOLERANCE
268	MM	ED	CTR	2	DAU A/D HIGH LEVEL OUT OF TOLERANCE
269 - 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	MM	ED	PED	2	ELEVATION PCU DATA PARITY FAULT
308	MM	ED	PED	2	ELEVATION IN DEAD LIMIT
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	N/A	N/A	N/A	N/A	SPARE
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	MM	ED	PED	2	AZIMUTH PCU DATA PARITY FAULT
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	MM	ED	PED	2	ENCODER +5V POWER SUPPLY FAIL
328	IN	ED	PED	2	ELEVATION HANDWHEEL ENGAGED
329	IN	ED	PED	2	AZIMUTH HANDWHEEL ENGAGED
330	MM	ED	PED	2	PEDESTAL +15V POWER SUPPLY 1 FAIL
331	MM	ED	PED	2	PEDESTAL -15V POWER SUPPLY 1 FAIL
332	MM	ED	PED	2	PEDESTAL +5V POWER SUPPLY 1 FAIL
333	MM	ED	PED	2	PEDESTAL +28V POWER SUPPLY 2 FAIL
334	MM	ED	PED	2	AZIMUTH AMP POWER SUPPLY FAIL
335	MM	ED	PED	2	ELEVATION AMP POWER SUPPLY FAIL
336	IN	ED	PED	1	PEDESTAL DYNAMIC FAULT
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	SEC	OC	PED	N/A	PEDESTAL INITIALIZATION ERROR
341	IN	ED	PED	3	PED SERVO SWITCH FAILURE
342 - 358	N/A	N/A	N/A	N/A	SPARE

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
359	MM	ED	RCV	1	RECEIVER PROTECT RESPONSE FAILED
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 IFD COHO INPUT MISSING
364	MM	ED	RCV	2	RCVR +5V POWER SUPPLY 5 FAIL
365	MM	ED	RCV	2	RCVR +/-18V POWER SUPPLY 1 FAIL
366	MM	ED	RCV	2	RCVR -9V POWER SUPPLY 4 FAIL
367	MM	ED	RCV	2	RCVR +9V POWER SUPPLY 6 FAIL
368	MM	ED	RCV	2	RCVR +5V POWER SUPPLY 9 FAIL
369	MM	ED	RCV	2	COHO/CLOCK FAILURE
370	IN	ED	RCV	1	SIGNAL PROCESSOR TO IFD COMMUNICATION FAILURE
371	MM	ED	RCV	4	MISSING BURST PULSE SIGNAL
372 - 382	N/A	N/A	N/A	N/A	SPARE
383	N/A	N/A	N/A	N/A	SPARE
384	MR	ED	SIG	1	RVP TRIGGER SEQUENCE TRUNCATED
385	MR	ED	SIG	1	RVP TRIGGER PATTERN ALTERED
386	MR	ED	SIG	1	RVP TRIGGER PERIOD ALTERED
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	IFD 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	N/A	N/A	N/A	N/A	SPARE
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

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
442	MR	ED	CTR	1	BASELINE FILE READ FAILED
443	N/A	N/A	N/A	N/A	SPARE
444	SEC	OC	CTR	N/A	CLUTTER MAP FILE GENERATION ERROR
445	N/A	N/A	N/A	N/A	SPARE
446	MR	ED	CTR	1	TOO MANY LOG FILES - PLEASE REMOVE SOME
447	MR	ED	CTR	1	DISK I/O ERROR
448	MM	ED	CTR	1	DAU COMMUNICATION ERROR
449	MR	ED	CTR	1	REMOTE VCP FILE WRITE FAILED
450	MR	ED	CTR	1	REMOTE VCP FILE READ FAILED
451	N/A	N/A	N/A	1	SPARE
452	MM	ED	COM	1	RPG LINK INITIALIZATION ERROR
453	N/A	N/A	N/A	N/A	SPARE
454	N/A	N/A	N/A	N/A	SPARE
455	N/A	N/A	N/A	N/A	SPARE
456 - 457	N/A	N/A	N/A	N/A	SPARE
458	MM	ED	PED	1	PEDESTAL SELF TEST 1 ERROR
459	MM	ED	PED	1	PEDESTAL SELF TEST 2 ERROR
460	SEC	FO	CTR	N/A	HCI COMMUNICATION ERROR
461	MM	ED	PED	1	PEDESTAL BIT RESPONSE ERROR
462	IN	ED	SIG	1	SIGNAL PROCESSOR COMMUNICATION ERROR
463	MM	ED	PED	1	PEDESTAL COMMUNICATION ERROR
464	MM	ED	CTR	1	REDUNDANT CHANNEL COMM ERROR
465	IN	ED	CTR	1	MULTIPLE DAU COMM ERROR - RDA FORCED TO STBY
466	IN	ED	SIG	1	MULTIPLE SIGNAL PROCESSOR COMM ERROR - RDA FORCED TO STBY
467	IN	ED	PED	1	MULTIPLE PED COMM ERROR - RDA FORCED TO STBY
468	SEC	OC	CTR	N/A	DAU INITIALIZATION ERROR
469	IN	ED	CTR	1	MULT DAU CMD TOUTS - RDA FORCED TO STBY
470	MM	ED	RCV	1	NOISE LEVEL DEGRADED
471	MM	ED	RCV	1	NOISE TEMP DEGRADED
472 - 480	N/A	N/A	N/A	N/A	SPARE
481	MM	ED	RCV	1	GAIN CALIBRATION CONSTANT DEGRADED
482	MM	ED	RCV	1	CABINET-FRONT END MISMATCH
483	MM	ED	RCV	1	VELOCITY/WIDTH CHECK DEGRADED
484	MR	ED	RCV	1	VELOCITY/WIDTH CHECK-MAINT REQUIRED
485	MM	ED	RCV	1	DYNAMIC RANGE DEGRADED
486	MM	ED	RCV	1	CLUTTER REJECTION DEGRADED
487	MR	ED	RCV	1	CLUTTER REJECTION - MAINT REQUIRED
488 - 520	N/A	N/A	N/A	N/A	SPARE
521	MR	ED	RCV	1	NOISE TEMP - MAINT REQUIRED
522	MM	ED	RCV	1	LINEARITY SLOPE DEGRADED

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
523	MM	ED	RCV	1	LINEARITY TEST SIGNAL DEGRADED
524	MR	ED	RCV	1	LINEARITY TEST SIGNAL - MAINT REQUIRED
525 - 532	N/A	N/A	N/A	N/A	SPARE
533	MM	ED	RCV	1	KLYSTRON OUT TEST SIGNAL DEGRADED
534 - 541	N/A	N/A	N/A	N/A	SPARE
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 - 551	N/A	N/A	N/A	N/A	SPARE
552	SEC	OC	CTR	N/A	NONCONTROLLING CHANNEL FORCED TO STANDBY
553	SEC	OC	CTR	N/A	CHANNEL ALREADY CONTROLLING - CMD REJECTED
554	SEC	OC	CTR	N/A	CHANNEL ALREADY NON-CONTROLLING - CMD REJECTED
555	SEC	OC	CTR	N/A	CHANNEL CONTROL FAILURE - WAVEGUIDE SWITCH MISMATCH
556	SEC	OC	CTR	N/A	CHANNEL SWITCH TIMEOUT
557	SEC	OC	CTR	N/A	CHANNEL SWITCH FAILED
558	SEC	OC	CTR	N/A	CHANNEL SWITCH REJECTED
559	MR	ED	CTR	1	CHANNEL 1 LOST DAU COMMS
560	MR	ED	CTR	1	CHANNEL 2 LOST DAU COMMS
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 - 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 - 616	N/A	N/A	N/A	N/A	SPARE
617	N/A	N/A	N/A	N/A	SPARE
618 - 650	N/A	N/A	N/A	N/A	SPARE
651 - 678	N/A	N/A	N/A	N/A	SPARE
679	SEC	OC	CTR	N/A	INVALID CENSOR ZONE MESSAGE RECEIVED
680 - 689	N/A	N/A	N/A	N/A	SPARE

Document Number 2620002E
Code Identification 0WY55
WSR-88D ROC
25 May 2007
Open Build 9.0

CODE	STATE	ALARM TYPE	DEVICE	SAMPLE	ALARM MESSAGE
690	N/A	N/A	N/A	N/A	SPARE
691	N/A	N/A	N/A	N/A	SPARE
692- 698	N/A	N/A	N/A	N/A	SPARE
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- 800	N/A	N/A	N/A	N/A	SPARE

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 (No)	2
T1 Output Frames	The number of octets received on interface, including frame octets	Integer*4	octet	0 to 2 ³² -1	1	N/A	3 - 4
T1 Input Frames	The number of octets sent on interface, including frame octets	Integer*4	octet	0 to 2 ³² -1	1	N/A	5 - 6
Router Memory Used	Bytes currently in use by applications on managed device	Integer*4	byte	0 to 2 ³² -1	1	N/A	7 - 8
Router Memory Free	Bytes currently free on managed device	Integer*4	byte	0 to 2 ³² -1	1	N/A	9 - 10
Router Memory Utilization		Integer*2	%	0 to 100	1	N/A	11
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	12
CSU Loss of Signal	Number of times Loss of Signal event detected	Integer*4	N/A	0 to 2 ³² -1	1	N/A	13 - 14
CSU Loss of Frames	Number of times Loss of Frames event detected	Integer*4	N/A	0 to 2 ³² -1	1	N/A	15 - 16
CSU Yellow Alarms	Number of times Resource Availability Indication (RAI) (yellow) alarm received.	Integer*4	N/A	0 to 2 ³² -1	1	N/A	17 - 18
CSU Blue Alarms	Number of times Alarm Indication Signal (AIS) (blue) alarm received.	Integer*4	N/A	0 to 2 ³² -1	1	N/A	19 - 20
CSU 24hr Errored Seconds	Number of errored seconds in previous 15	Integer*4	s	0 to 2 ³² -1	1	N/A	21 - 22

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
	minute interval.						
CSU 24hr Severely Errored Seconds	Number of severely errored seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	23 - 24
CSU 24hr Severely Errored Framing Seconds	Number of severely errored framing seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	25 - 26
CSU 24hr Unavailable Seconds	Number of unavailable seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	27 - 28
CSU 24hr Controlled Slip Seconds	Number of controlled slip seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	29 - 30
CSU 24hr Path Coding Violations	Number of path coding violations in previous 15 minute interval.	Integer*4	N/A	0 to 2^{32} -1	1	N/A	31 - 32
CSU 24hr Line Errored Seconds	Number of line errored seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	33 - 34
CSU 24hr Bursty Errored Seconds	Number of bursty errored seconds in previous 15 minute interval.	Integer*4	s	0 to 2^{32} -1	1	N/A	35 - 36
CSU 24hr Degraded Minutes	Number of degraded minutes in previous 15 minute interval.	Integer*4	min	0 to 2^{32} -1	1	N/A	37 - 38
LAN Switch Memory Used	Bytes currently in use by applications on this device	Integer*4	byte	0 to 2^{32} -1	1	N/A	39 - 40
LAN Switch Memory Free	Bytes currently free on this device	Integer*4	byte	0 to 2^{32} -1	1	N/A	41 - 42
LAN Switch Memory		Integer*2	%	0 to 100	1	N/A	43

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Utilization							
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	44
NTP Rejected Packets	Number of packets rejected by NTP application layer	Integer*4	N/A	0 to 2^{32} -1	1	N/A	45 - 46
NTP Estimated Time Error	Current estimated time error of the time server	SInteger*4	usec	-(2^{31}) to +(2^{31} -1)	1	N/A	47 - 48
GPS Satellites	Current number of GPS satellites used in position and time fix calculation	SInteger*4	N/A	-(2^{31}) to +(2^{31} -1)	1	N/A	49 - 50
GPS Max Signal Strength	Strongest signal strength of all tracking satellites as seen by receiver	SInteger*4	dB	-(2^{31}) to +(2^{31} -1)	1	N/A	51 - 52
IPC Status	Status of the communications between channels on a redundant system. N/A on a Single channel system.	Integer*2	N/A	0 to 2	1	0=OK, 1=Fail, 2=N/A	53
Commanded Channel Control	The last channel commanded to controlling	Integer*2	N/A	0 to 2	1	0=N/A, 1=Channel 1, 2=Channel 2	54
DAU Test 0		Integer*2	N/A	0 to 255	1	10 = Normal 7-11 = Good all other values=fault	55
DAU Test 1		Integer*2	N/A	0 to 255	1	127 = Normal 118-136 = Good all other values=fault	56
DAU Test 2		Integer*2	N/A	0 to 255	1	245 = Normal	57

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
						221-252 = Good all other values=fault	
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	58 - 98
<u>Power</u>							
UPS Battery Status		Integer*4	N/A	1 to 3	1	1=Unknown, 2=OK, 3=Low	99 - 100
UPS Time on Battery		Integer*4	s	0 to 2 ³² -1	1	N/A	101 - 102
UPS Battery Temperature		Real*4	deg C	N/A	0.01	N/A	103 - 104
UPS Output Voltage		Real*4	V	114.00 to 126.00	0.01	N/A	105 - 106
UPS Output Frequency		Real*4	Hz	57.00 to 63.00	0.01	N/A	107 - 108
UPS Output Current		Real*4	A	0.00 to 12.00	0.01	N/A	109 - 110
Power Administrator Load		Real*4	A	0.00 to 12.00	0.01	N/A	111 - 112
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	113 - 136
<u>Transmitter</u>							
+5 VDC PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	137
+15 VDC PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	138
+28 VDC PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	139
-15 VDC PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	140
+45 VDC PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	141
Filament PS Voltage		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	142
Vacuum Pump PS Voltage		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	143
Focus Coil PS Voltage		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	144
Filament PS		Integer*2	N/A	0 to 1	1	1=Off, 0=On	145
Klystron Warmup		Integer*2	N/A	0 to 1	1	1=Preheat, 0=Normal	146
Transmitter Available		Integer*2	N/A	0 to 1	1	1=No, 0=Yes	147
WG Switch		Integer*2	N/A	0 to 1	1	1=Dummy	148

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Position						Load, 0=Antenna	
WG/PFN Transfer Interlock		Integer*2	N/A	0 to 1	1	1=Open, 0=OK	149
Maintenance Mode		Integer*2	N/A	0 to 1	1	1=Yes, 0=No	150
Maintenance Required		Integer*2	N/A	0 to 1	1	1=Required, 0=No	151
PFN Switch Position		Integer*2	N/A	0 to 1	1	1=Long Pulse, 0=Short Pulse	152
Modulator Overload		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	153
Modulator Inv Current		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	154
Modulator Switch Fail		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	155
Main Power Voltage		Integer*2	N/A	0 to 1	1	1=Over, 0=OK	156
Charging System Fail		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	157
Inverse Diode Current		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	158
Trigger Amplifier		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	159
Circulator Temperature		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	160
Spectrum Filter Pressure		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	161
WG ARC/VSWR		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	162
Cabinet Interlock		Integer*2	N/A	0 to 1	1	1=Open, 0=OK	163
Cabinet Air Temperature		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	164
Cabinet Airflow		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	165
Klystron Current		Integer*2	N/A	0 to 1	1	N/A	166
Klystron Filament Current		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	167
Klystron Vacion Current		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	168
Klystron Air Temperature		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	169

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Klystron Airflow		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	170
Modulator Switch Maintenance		Integer*2	N/A	0 to 1	1	1=Required, 0=OK	171
Post Charge Regulator Maintenance		Integer*2	N/A	0 to 1	1	1=Maintenance, 0=OK	172
WG Pressure/Humidity		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	173
Transmitter Overvoltage		Integer*2	N/A	0 to 1	1	1=Over, 0=OK	174
Transmitter Overcurrent		Integer*2	N/A	0 to 1	1	1=Over, 0=OK	175
Focus Coil Current		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	176
Focus Coil Airflow		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	177
Oil Temperature		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	178
PRF Limit		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	179
Transmitter Oil Level		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	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	1=Recycling, 0=Normal	183
Transmitter Inoperable		Integer*2	N/A	0 to 1	1	1=INOP, 0=OK	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	1=Fail, 0=OK	186
Zero Test Bit 1		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	187
Zero Test Bit 2		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	188
Zero Test Bit 3		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	189
Zero Test Bit 4		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	190
Zero Test Bit 5		Integer*2	N/A	0 to 1	1	1=Fail,	191

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
						0=OK	
Zero Test Bit 6		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	192
Zero Test Bit 7		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	193
One Test Bit 0		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	194
One Test Bit 1		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	195
One Test Bit 2		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	196
One Test Bit 3		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	197
One Test Bit 4		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	198
One Test Bit 5		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	199
One Test Bit 6		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	200
One Test Bit 7		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	201
XMTR/DAU Interface		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	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
Spare		N/A	N/A	N/A	N/A	See Note (3)	207 - 208
XMTR Peak Power		Real*4	kW	0 to 999.9	0.1	N/A	209 - 210
Spare		N/A	N/A	N/A	N/A	See Note (3)	211 - 212
XMTR RF Avg Power		Real*4	W	0 to 9999.9	0.1	N/A	213 - 214
XMTR Power Meter Zero		Integer*2	N/A	0 to 255	1	N/A	215
Spare		N/A	N/A	N/A	N/A	See Note (3)	216
XMTR Recycle Count		Integer*4	N/A	0 to 999,999	1	N/A	217 - 218
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	219 - 228
Tower/Utilities							
AC Unit #1		Integer*2	N/A	0 to 1	1	1=Shutoff,	229

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Compressor Shut off						0=OK	
AC Unit #2 Compressor Shut off		Integer*2	N/A	0 to 1	1	1=Shutoff, 0=OK	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	1= OK, 0=Low	232
Generator Engine		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	233
Generator Volt/Frequency		Integer*2	N/A	0 to 1	1	1=Available , 0=Not 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	1=Off, 0=OK	236
Generator Auto/Run/Off Switch		Integer*2	N/A	0 to 1	1	1=Auto, 0=Manual	237
Aircraft Hazard Lighting		Integer*2	N/A	0 to 1	1	1=OK, 0=Fail	238
DAU UART		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	239
Spare	N/A	N/A	N/A	N/A	1	See Note (3)	240 - 250
<u>Equipment Shelter</u>							
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	1=OK, 0=Fire	252
Utility Voltage/Frequency		Integer*2	N/A	0 to 1	1	1=Available , 0=Not 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		Integer*2	N/A	0 to 2	1	N/A on a single	257

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Antenna						channel system. 1=Not Connected, 0=Connected, 2=N/A	
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
DAU +15v PS		Real*4	V	0.00 to 20.00	0.01	N/A	275 - 276
DAU -15v PS		Real*4	V	-20.00 to 0.00	0.01	N/A	277 - 278
DAU +28v PS		Real*4	V	0.00 to 37.40	0.01	N/A	279 - 280
DAU +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 - 290
<u>Antenna/Pedestal</u>							
Pedestal +28v PS		Real*4	V	0.00 to 40.80	0.01	N/A	291 - 292

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
Pedestal +15v PS		Real*4	V	0.00 to 20.00	0.01	N/A	293 - 294
Encoder +5v PS		Real*4	V	0.00 to 18.36	0.01	N/A	295 - 296
Pedestal +5v PS		Real*4	V	0.00 to 6.64	0.01	N/A	297 - 298
Pedestal -15v PS		Real*4	V	-20.00 to 0.00	0.01	N/A	299 - 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	1=Inhibit, 0=Normal	303
Elevation Servo Amp Short Circuit		Integer*2	N/A	0 to 1	1	1=Short Circuit, 0=Normal	304
Elevation Servo Amp Overtemp		Integer*2	N/A	0 to 1	1	1=Overtemp, 0=Normal	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	1=Engaged, 0=Operational	307
Elevation PCU Parity		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	308
Elevation Dead Limit		Integer*2	N/A	0 to 1	1	1=In Limit, 0=OK	309
Elevation +Normal Limit		Integer*2	N/A	0 to 1	1	1=In Limit, 0=OK	310
Elevation - Normal Limit		Integer*2	N/A	0 to 1	1	1=In Limit, 0=OK	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	1=Oil Level Low, 0=OK	313
Elevation Handwheel		Integer*2	N/A	0 to 1	1	1=Engaged, 0=Operational	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	1=Inhibit, 0=OK	316

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
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	1=Overtemp, 0=OK	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	1=Engaged, 0=Operational	320
Azimuth PCU Parity		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	321
Azimuth Encoder Light		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	322
Azimuth Gearbox Oil		Integer*2	N/A	0 to 1	1	1=Oil Level Low, 0=OK	323
Azimuth Bull Gear Oil		Integer*2	N/A	0 to 1	1	1=Oil Level Low, 0=OK	324
Azimuth Handwheel		Integer*2	N/A	0 to 1	1	1=Engaged, 0=Operational	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	1=Off, 0=On	327
Pedestal Interlock Switch		Integer*2	N/A	0 to 1	1	1=Safe, 0=Operational	328
Azimuth Position Correction		Code*2	deg	-1 to +1	.043945	See Table III-A for format. See Note (4).	329
Elevation Position Correction		Code*2	deg	-1 to +1	.043945	See Table III-A for format. See Note (4).	330
Self Test 1 Status		Integer*2	N/A	1 to 3	1	1=No, 2=OK, 3=Fail See Note(1)	331
Self Test 2 Status		Integer*2	N/A	1 to 3	1	1=No, 2=OK, 3=Fail See Note(1)	332
Self Test 2 Data		Integer*2	N/A	N/A	1	Hex See Note 2	333
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	334 - 340
RF Generator/Receiver							

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
COHO/Clock		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	341
Rf Generator Frequency Select Oscillator		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	342
Rf Generator RF/STALO		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	343
Rf Generator Phase Shifted COHO		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	344
+9v Receiver PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	345
+5v Receiver PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	346
±18v Receiver PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	347
-9v Receiver PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	348
+5v Receiver Protector PS		Integer*2	N/A	0 to 1	1	1=Fail, 0=OK	349
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	350
Short Pulse Noise		Real*4	dBm	-100.00 to -50.00	0.01	N/A	351 - 352
Long Pulse Noise		Real*4	dBm	-100.00 to -50.00	0.01	N/A	353 - 354
Noise Temperature		Real*4	K	0 to 9999.99	0.01	N/A	355 - 356
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	357 - 362

Calibration

Linearity		Real*4	N/A	0.5000 to 1.5000	0.0001	N/A	363 - 364
Dynamic Range		Real*4	dB	0.000 to 120.000	0.001	N/A	365 - 366
Delta dBZ0		Real*4	dB	-198.00 to +198.00	0.01	N/A	367 - 368
Rcv Prot Attenuation		Real*4	dB	-99.90 to +99.90	0.01	N/A	369 - 370
KD Peak Measured		Real*4	dBm	-99.90 to +99.90	0.01	N/A	371 - 372
KD Injection Point Difference		Real*4	dB	-99.90 to	0.01	N/A	373 - 374

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
				+99.90			
Short Pulse, dBZ0		Real*4	dBZ	-99.900 to +99.900	0.0001	N/A	375 - 376
Long Pulse, 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
I0		Real*4	dBm	-999.9000 to +999.9000	0.0001	N/A	383 - 384
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	385 - 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
Transmit Burst Power		Real*4	dBm	-99.90 to +99.90	0.01	N/A	415 - 416
Transmit Burst Phase		Real*4	deg	-99.00 to +99.90	0.01	N/A	417 - 418
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	419 - 430
<u>File Status</u>							
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		Integer*2	N/A	0 to 1	1	0=OK,	434

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
File Write Status						1=Fail	
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
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	444
Clutter Filter Map File Read Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	445
Clutter Filter Map File Write Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	446
General Disk I/O Error		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	447
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	448 - 460
Device Status							
DAU 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
Pedestal Comm Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	463
Signal Processor Comm Status		Integer*2	N/A	0 to 1	1	0=OK, 1=Fail	464
Spare		N/A	N/A	N/A	N/A	See Note (3)	465
RMS Link Status		Integer*2	N/A	0 to 1	1	0 = Connected,	466

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁵⁾	RANGE	LSB	REMARKS	HALFWORD LOCATION
						1 = Not Connected	
RPG Link Status		Integer*2	N/A	0 to 1	1	0 = Connected, 1 = Not Connected	467
Spare	N/A	N/A	N/A	N/A	N/A	See Note (3)	468 - 480

Notes:

- (1) N/A = Not connected or not configured.
- (2) For Legacy RDA systems, see 2620014 ICD for the Antenna/Pedestal to RDA Control Processor.
 For Open RDA systems, see 2620049 ICD for the Antenna/Pedestal to DAU.
- (3) Value of field will be zero.
- (4) Display precision should be three decimal places.
- (5) See Appendix B for unit definitions and standard symbology.

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 imbedded carriage returns, line feeds, etc.	String	N/A	N/A	N/A	2 to 203

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

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.

Table X RDA Control Commands (Message Type 6)

NAME	DESCRIPTION	FORMAT ⁽²⁾	UNITS ⁽⁶⁾	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALF WORD LOCATION
RDA STATE COMMAND ⁽¹⁾	RDA State Command Values: <ul style="list-style-type: none">• Stand-By• Offline Operate• Operate• Restart• No Change	Code*2	N/A	As Listed <ul style="list-style-type: none">• 32769 (bit 0 & 15 =1)• 32770 (bit 1 & 15 =1)• 32772 (bit 2 & 15 =1)• 32776 (bit 3 & 15 =1)• 0	N/A	1
BASE DATA TRANSMISSION ENABLE Note ⁽³⁾	Base Data Transmission Enable Values: <ul style="list-style-type: none">• Reflectivity• Velocity• Width• None• No Change	Code*2	N/A	As Listed <ul style="list-style-type: none">• 32769 (bit 0 & 15 =1)• 32770 (bit 1 & 15 =1)• 32772 (bit 2 & 15 =1)• 32768 (bit 15 = 1)• 0	N/A	2
AUXILIARY POWER GENERATOR CONTROL Note ⁽⁴⁾	Aux. Power Generator Control Values: <ul style="list-style-type: none">• Switch to Auxiliary Power• Switch to Utility Power• No Change	Code*2	N/A	As Listed <ul style="list-style-type: none">• 32772 (bit 2 & 15 =1)• 32770 (bit 1 & 15 =1)• 0	N/A	3
RDA CONTROL COMMANDS AND AUTHORIZATION	<ul style="list-style-type: none">• No Change• Control Command Clear• Local Control Enabled• Remote Control Accepted• Remote Control Requested	Code*2	N/A	As listed <ul style="list-style-type: none">• 0• 2• 4• 8• 16	N/A	4
RESTART VCP OR ELEVATION CUT	Restart VCP or Elevation Cut Values: <ul style="list-style-type: none">• Restart Volume Coverage Pattern• Restart Elevation Cut• None	Code*2	N/A	As Listed <ul style="list-style-type: none">• 32768 (bit 15 = 1)• 32768 + cut number (bit 15 = 1; set binary number of cut in bits 0 to 7)• 0	N/A	5

NAME	DESCRIPTION	FORMAT ⁽²⁾	UNITS ⁽⁶⁾	RANGE (OR VALUE)	ACCURACY/ PRECISION	HALF WORD LOCATION
SELECT LOCAL VCP NUMBER FOR NEXT VOLUME SCAN	<ul style="list-style-type: none"> • Pattern Number • Use Remote Pattern • No Change 	Integer*2	N/A	As Listed <ul style="list-style-type: none"> • 1 to 767 • 0 • 32767 	1	6
AUTOMATIC CALIBRATION OVERRIDE	<ul style="list-style-type: none"> • Automatic Calibration • Calibration Override • No Change 	SInteger*2	dB	As Listed <ul style="list-style-type: none"> • 32766 • -10.00 to +10.00 • 32767⁽⁵⁾ 	1 0.01 1	7
SPARE	N/A	N/A	N/A	N/A	N/A	8 to 10
SELECT OPERATING MODE	<ul style="list-style-type: none"> • Leave at Current State • Test • Operational 	Code*2	N/A	As Listed <ul style="list-style-type: none"> • 0 • 2 • 4 	N/A	11
CHANNEL CONTROL COMMAND	<ul style="list-style-type: none"> • No Change • Set to Controlling Channel • Set to Non-controlling Channel 	Code*2	N/A	As Listed <ul style="list-style-type: none"> • 0 • 1 • 2 	N/A	12
SPARE	N/A	N/A	N/A	N/A	N/A	13 to 20
SPOT BLANKING	<ul style="list-style-type: none"> • No Change • Enable Spot Blanking • Disable Spot Blanking 	Code*2	N/A	As Listed <ul style="list-style-type: none"> • 0 • 2 • 4 	N/A	21
SPARE	N/A	N/A	N/A	N/A	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).

(3) Any and all combinations of data enabling are allowed; as well as all, and none.

(4) The states are mutually exclusive.

(5) The data in this field is stored as a scaled integer. The format is XX.YY. For example, -10.00 equals a value of -1000. A value of +0.25 would equal a value of 25.

(6) See Appendix B for unit definitions and standard symbology.

Document Number 2620002E
 Code Identification 0WY55
 WSR-88D ROC
 25 May 2007
 Open Build 9.0

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	23 to 594	1	1
PATTERN TYPE	Constant Elevation Cut	Code*2	N/A	As listed 2	N/A	2
PATTERN NUMBER	Pattern Number Values: • Maintenance/Test • Operational • Constant Elevation Types ⁽¹¹⁾	Integer*2	N/A	As Listed • number > 255 • number <=255 • 1 to 255	1	3
NUMBER OF ELEVATION CUTS	Number of elevation cuts in one complete volume scan	Integer*2	N/A	1 to 25	1	4
CLUTTER MAP GROUP NUMBER	Clutter map groups are not currently implemented.	Integer*2	N/A	1 to 2 ⁽¹²⁾	1	5
DOPPLER VELOCITY RESOLUTION	Doppler Velocity Resolution Values: • 0.5 • 1.0	Code*1	m/s	As Listed • 2 (set bit 9) • 4 (set bit 10)	N/A	6 ⁽¹⁾
PULSE WIDTH	Pulse Width Values: • Short • Long	Code*1	N/A	As listed • 2 (set bit 1) • 4 (set bit 2)	N/A	6 ⁽²⁾
SPARE	N/A	N/A	N/A	N/A	N/A	7 to 11
Repeat for each elevation angle						
ELEVATION ANGLE ⁽³⁾	The elevation angle for this cut	Code*2 ⁽⁶⁾	deg	0.000000 to 359.956055	0.043945	E1
CHANNEL CONFIGURATION	Channel Configuration Values: • Constant Phase • Random Phase • SZ2 Phase	Code*1	N/A	As Listed • 0 • 1 • 2	N/A	E2 ⁽¹⁾
WAVEFORM TYPE	Waveform Type Values:	Code*1	N/A	As Listed ⁽⁸⁾	N/A	E2 ⁽²⁾

NAME	DESCRIPTION	FORMAT (4)	UNITS (10)	RANGE (OR VALUE) ⁽⁷⁾	ACCURACY/ PRECISION	HALFWORD LOCATION
	<ul style="list-style-type: none"> • Contiguous Surveillance • Contiguous Doppler w/ Ambiguity Resolution • Contiguous Doppler w/o Ambiguity Resolution • Batch • Staggered Pulse Pair 			<ul style="list-style-type: none"> • 1 • 2 • 3 • 4 • 5 		
SURVEILLANCE PRF NUMBER ⁽⁵⁾	The pulse repetition frequency number for surveillance cuts	Integer*2	N/A	0 to 8	1	E3
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	0.01098632812 5	E5
REFLECTIVITY THRESHOLD	Signal to noise ratio (SNR) threshold for reflectivity	Scaled Integer*2	dB	-12.0 to +20.0	.125	E6
VELOCITY THRESHOLD	Signal to noise ratio (SNR) threshold for velocity	Scaled Integer*2	dB	-12.0 to +20.0	.125	E7
SPECTRUM WIDTH THRESHOLD	Signal to noise ratio (SNR) threshold for spectrum width	Scaled Integer*2	dB	-12.0 to +20.0	.125	E8
SPARE	N/A	N/A	N/A	N/A	N/A	E9 to 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
SPARE	N/A	N/A	N/A	N/A	N/A	E15
SAME AS E12 to E15 FOR SECTOR 2						E16 to E19
SAME AS E12 to E15 FOR SECTOR 3						E20 to 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.

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)

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 15	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	<ul style="list-style-type: none"> • Bypass Filter Forced (no filtering) • Bypass Map in Control • Clutter Filtering Forced 	Code*2	N/A	As Listed <ul style="list-style-type: none"> • 0 • 1 • 2 	N/A	R6 [7 + (i*6)]

Notes:

1. For each subsequent region, halfwords R1 through R6 shall be repeated. For example, region 0 will use halfwords 2 through 7, region 1 will use halfwords 8 through 13, region 2 will use halfwords 14 through 19, etc.
2. Where "i" is used, i = override region number (0-based).
3. See Appendix B for unit definitions and standard symbology.

Table XIII Request for Data (Message Type 9)

NAME	DESCRIPTION	FORMAT (1)	UNITS	RANGE (OR VALUE)	ACCURACY / PRECISION	HALFWORD LOCATION
Data Request Type	<ul style="list-style-type: none"> • Request Summary RDA Status • Request RDA Performance/Maintenance Data • Request Clutter Filter Bypass Map • Request Clutter Filter Map • Request RDA Adaptation Data • Request Volume Coverage Pattern Data 	Code*2	N/A	As Listed <ul style="list-style-type: none"> • 129 (bits 0&7=1) • 130 (bits 1&7=1) • 132 (bits 2&7=1) • 136 (bits 3&7=1) • 144 (bits 4&7=1) • 160 (bits 5&7=1) 	N/A	1

Notes:

1. LSB = bit 0

Table XIV Clutter Filter Map (Message Type 15)

NAME	DESCRIPTION	FORMAT	UNITS (5)	RANGE (OR VALUE)	ACCURACY /PRECISION	HALFWORD LOCATION
Map Generation Date	Julian Date - 2440586.5 ⁽¹⁾	Integer*2	d	1 to 65535	1	1
Map Generation Time	Number of Minutes since Midnight Greenwich Mean Time	Integer*2	min	0 to 1440	1	2
Number of Elevation Segments	Number of elevation segments in map.	Integer*2	N/A	1 to 5	1	3
Repeat for each Elevation Segment ⁽²⁾						
Repeat for each Azimuth Segment ⁽³⁾						
Number of Range Zones	Number of defined range zones for this azimuth.	Integer*2	N/A	1 to 20	1	A1
Range Zone ⁽⁴⁾						
Op Code	Bypass Filter Bypass map in Control Force Filter	Code*2	N/A	As Listed 0 1 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 January 1970 00.00 Greenwich Mean Time = 1 Modified Julian Date
- 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.
- 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.
- There are 20 possible range zones. Not all range zones need to be defined. The last range zone must have end range of 511.
- See Appendix B for unit definitions and standard symbology.

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	N/A	N/A	N/A	0 - 11
ADAP_FORMAT	FORMAT OF ADAPTATION DATA FILE	String	N/A	N/A	N/A	12 - 15
ADAP_REVISION	REVISION NUMBER OF ADAPTATION DATA FILE	String	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
K1	AZIMUTH POSITION GAIN FACTOR (K1)	Real*4	N/A	0.50 to 2.00	0.01	44 - 47
AZ_LAT	LATENCY OF DCU AZIMUTH MEASUREMENT	Real*4	s	0.0000 to 2.0000	.0001	48 - 51
K3	ELEVATION POSITION GAIN FACTOR (K3)	Real*4	N/A	0.50 to 2.00	0.01	52 - 55
EL_LAT	LATENCY OF DCU ELEVATION MEASUREMENT	Real*4	s	0.0000 to 2.0000	.0001	56 - 59
PARKAZ	PEDESTAL PARK POSITION IN AZIMUTH	Real*4	deg	0.00 to 359.99	0.01	60 - 63
PARKEL	PEDESTAL PARK POSITION IN ELEVATION	Real*4	deg	-1.00 to 55.00	0.01	64 - 67
A_FUEL_CONV(0)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (0% HGT)	Real*4	%	0.0 to 100.0	0.1	68 - 71
A_FUEL_CONV(1)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (10% HGT)	Real*4	%	0.0 to 100.0	0.1	72 - 75

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
A_FUEL_CONV(2)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (20% HGT)	Real*4	%	0.0 to 100.0	0.1	76 - 79
A_FUEL_CONV(3)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (30% HGT)	Real*4	%	0.0 to 100.0	0.1	80 - 83
A_FUEL_CONV(4)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (40% HGT)	Real*4	%	0.0 to 100.0	0.1	84 - 87
A_FUEL_CONV(5)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (50% HGT)	Real*4	%	0.0 to 100.0	0.1	88 - 91
A_FUEL_CONV(6)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (60% HGT)	Real*4	%	0.0 to 100.0	0.1	92 - 95
A_FUEL_CONV(7)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (70% HGT)	Real*4	%	0.0 to 100.0	0.1	96 - 99
A_FUEL_CONV(8)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (80% HGT)	Real*4	%	0.0 to 100.0	0.1	100 - 103
A_FUEL_CONV(9)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (90% HGT)	Real*4	%	0.0 to 100.0	0.1	104 - 107
A_FUEL_CONV(10)	GENERATOR FUEL LEVEL HEIGHT/CAPACITY CONVERSION (100% HGT)	Real*4	%	0.0 to 100.0	0.1	108 - 111

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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 60.0	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
PED_28V_REG_LIM	PEDESTAL +28 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	136 - 139
PED_5V_REG_LIM	PEDESTAL +5 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	140 - 143
PED_15V_REG_LIM	PEDESTAL +/- 15 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
A_MAX_GEN_ROOM_TEMP	MAXIMUM GENERATOR SHELTER ALARM TEMPERATURE	Real*4	deg C	0.0 to 50.0	0.1	152 - 155
DAU_5V_REG_LIM	DAU +5 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	156 - 159
DAU_15V_REG_LIM	DAU +/- 15 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.0 to 20.0	0.1	160 - 163
DAU_28V_REG_LIM	DAU +28 VOLT POWER	Real*4	%	0.0 to 20.0	0.1	164 - 167
EN_5V_REG_LIM	ENCODER +5 VOLT POWER SUPPLY TOLERANCE	Real*4	%	0.00 to 20.00	0.01	168 - 171
EN_5V_NOM_VOLTS	ENCODER +5 VOLT POWER SUPPLY NOMINAL VOLTAGE	Real*4	V	0.00 to 6.60	0.01	172 - 175
RPG_CO_LOCATED	RPG CO-LOCATED	String	N/A	T or F	N/A	176 - 179
SPEC_FILTER_INSTALLED	TRANSMITTER SPECTRUM FILTER INSTALLED	String	N/A	T or F	N/A	180 - 183
TPS_INSTALLED	TRANSITION POWER SOURCE INSTALLED	String	N/A	T or F	N/A	184 - 187
RMS_INSTALLED	FAA RMS INSTALLED	String	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 500	1	204 - 207

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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
A_RPG_LINK_TYPE	RPG WIDEBAND LINK TYPE (0 = DIRECT, 1 = MICROWAVE, 2 = FIBER OPTIC)	Integer*4	N/A	0 to 2	1	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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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 INSERTION LOSSES (13dB)	Real*4	dB	-14.00 to -12.00	0.01	280 - 283
ATTEN_TABLE(14)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (14dB)	Real*4	dB	-15.00 to -13.00	0.01	284 - 287
ATTEN_TABLE(15)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (15dB)	Real*4	dB	-16.00 to -14.00	0.01	288 - 291

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(16)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (16dB)	Real*4	dB	-17.00 to -15.00	0.01	292 - 295
ATTEN_TABLE(17)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (17dB)	Real*4	dB	-18.00 to -16.00	0.01	296 - 299
ATTEN_TABLE(18)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (18dB)	Real*4	dB	-19.00 to -17.00	0.01	300 - 303
ATTEN_TABLE(19)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (19dB)	Real*4	dB	-20.00 to -18.00	0.01	304 - 307
ATTEN_TABLE(20)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (20dB)	Real*4	dB	-21.00 to -19.00	0.01	308 - 311
ATTEN_TABLE(21)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (21dB)	Real*4	dB	-22.00 to -20.00	0.01	312 - 315
ATTEN_TABLE(22)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (22dB)	Real*4	dB	-23.00 to -21.00	0.01	316 - 319
ATTEN_TABLE(23)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (23dB)	Real*4	dB	-24.00 to -22.00	0.01	320 - 323
ATTEN_TABLE(24)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (24dB)	Real*4	dB	-25.00 to -23.00	0.01	324 - 327
ATTEN_TABLE(25)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (25dB)	Real*4	dB	-26.00 to -24.00	0.01	328 - 331
ATTEN_TABLE(26)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (26dB)	Real*4	dB	-27.00 to -25.00	0.01	332 - 335

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(38)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (38dB)	Real*4	dB	-39.00 to -37.00	0.01	380 - 383
ATTEN_TABLE(39)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (39dB)	Real*4	dB	-40.00 to -38.00	0.01	384 - 387
ATTEN_TABLE(40)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (40dB)	Real*4	dB	-41.00 to -39.00	0.01	388 - 391
ATTEN_TABLE(41)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (41dB)	Real*4	dB	-42.00 to -40.00	0.01	392 - 395
ATTEN_TABLE(42)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (42dB)	Real*4	dB	-43.00 to -41.00	0.01	396 - 399
ATTEN_TABLE(43)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (43dB)	Real*4	dB	-44.00 to -42.00	0.01	400 - 403
ATTEN_TABLE(44)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (44dB)	Real*4	dB	-45.00 to -43.00	0.01	404 - 407
ATTEN_TABLE(45)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (45dB)	Real*4	dB	-46.00 to -44.00	0.01	408 - 411
ATTEN_TABLE(46)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (46dB)	Real*4	dB	-47.00 to -45.00	0.01	412 - 415
ATTEN_TABLE(47)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (47dB)	Real*4	dB	-48.00 to -46.00	0.01	416 - 419
ATTEN_TABLE(48)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (48dB)	Real*4	dB	-49.00 to -47.00	0.01	420 - 423

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(49)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (49dB)	Real*4	dB	-50.00 to -48.00	0.01	424 - 427
ATTEN_TABLE(50)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (50dB)	Real*4	dB	-51.00 to -49.00	0.01	428 - 431
ATTEN_TABLE(51)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (51dB)	Real*4	dB	-52.00 to -50.00	0.01	432 - 435
ATTEN_TABLE(52)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (52dB)	Real*4	dB	-53.00 to -51.00	0.01	436 - 439
ATTEN_TABLE(53)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (53dB)	Real*4	dB	-54.00 to -52.00	0.01	440 - 443
ATTEN_TABLE(54)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (54dB)	Real*4	dB	-55.00 to -53.00	0.01	444 - 447
ATTEN_TABLE(55)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (55dB)	Real*4	dB	-56.00 to -54.00	0.01	448 - 451
ATTEN_TABLE(56)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (56dB)	Real*4	dB	-57.00 to -55.00	0.01	452 - 455
ATTEN_TABLE(57)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (57dB)	Real*4	dB	-58.00 to -56.00	0.01	456 - 459
ATTEN_TABLE(58)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (58dB)	Real*4	dB	-59.00 to -57.00	0.01	460 - 463
ATTEN_TABLE(59)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (59dB)	Real*4	dB	-60.00 to -58.00	0.01	464 - 467

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(60)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (60dB)	Real*4	dB	-61.00 to -59.00	0.01	468 - 471
ATTEN_TABLE(61)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (61dB)	Real*4	dB	-62.00 to -60.00	0.01	472 - 475
ATTEN_TABLE(62)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (62dB)	Real*4	dB	-63.00 to -61.00	0.01	476 - 479
ATTEN_TABLE(63)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (63dB)	Real*4	dB	-64.00 to -62.00	0.01	480 - 483
ATTEN_TABLE(64)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (64dB)	Real*4	dB	-65.00 to -63.00	0.01	484 - 487
ATTEN_TABLE(65)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (65dB)	Real*4	dB	-66.00 to -64.00	0.01	488 - 491
ATTEN_TABLE(66)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (66dB)	Real*4	dB	-67.00 to -65.00	0.01	492 - 495
ATTEN_TABLE(67)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (67dB)	Real*4	dB	-68.00 to -66.00	0.01	496 - 499
ATTEN_TABLE(68)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (68dB)	Real*4	dB	-69.00 to -67.00	0.01	500 - 503
ATTEN_TABLE(69)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (69dB)	Real*4	dB	-70.00 to -68.00	0.01	504 - 507
ATTEN_TABLE(70)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (70dB)	Real*4	dB	-71.00 to -69.00	0.01	508 - 511

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(71)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (71dB)	Real*4	dB	-72.00 to -70.00	0.01	512 - 515
ATTEN_TABLE(72)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (72dB)	Real*4	dB	-73.00 to -71.00	0.01	516 - 519
ATTEN_TABLE(73)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (73dB)	Real*4	dB	-74.00 to -72.00	0.01	520 - 523
ATTEN_TABLE(74)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (74dB)	Real*4	dB	-75.00 to -73.00	0.01	524 - 527
ATTEN_TABLE(75)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (75dB)	Real*4	dB	-76.00 to -74.00	0.01	528 - 531
ATTEN_TABLE(76)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (76dB)	Real*4	dB	-77.00 to -75.00	0.01	532 - 535
ATTEN_TABLE(77)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (77dB)	Real*4	dB	-78.00 to -76.00	0.01	536 - 539
ATTEN_TABLE(78)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (78dB)	Real*4	dB	-79.00 to -77.00	0.01	540 - 543
ATTEN_TABLE(79)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (79dB)	Real*4	dB	-80.00 to -78.00	0.01	544 - 547
ATTEN_TABLE(80)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (80dB)	Real*4	dB	-81.00 to -79.00	0.01	548 - 551
ATTEN_TABLE(81)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (81dB)	Real*4	dB	-82.00 to -80.00	0.01	552 - 555

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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 INSERTION LOSSES (88dB)	Real*4	dB	-89.00 to -87.00	0.01	580 - 583
ATTEN_TABLE(89)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (89dB)	Real*4	dB	-90.00 to -88.00	0.01	584 - 587
ATTEN_TABLE(90)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (90dB)	Real*4	dB	-91.00 to -89.00	0.01	588 - 591
ATTEN_TABLE(91)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (91dB)	Real*4	dB	-92.00 to -90.00	0.01	592 - 595
ATTEN_TABLE(92)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (92dB)	Real*4	dB	-93.00 to -91.00	0.01	596 - 599

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATTEN_TABLE(93)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (93dB)	Real*4	dB	-94.00 to -92.00	0.01	600 - 603
ATTEN_TABLE(94)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (94dB)	Real*4	dB	-95.00 to -93.00	0.01	604 - 607
ATTEN_TABLE(95)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (95dB)	Real*4	dB	-96.00 to -94.00	0.01	608 - 611
ATTEN_TABLE(96)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (96dB)	Real*4	dB	-97.00 to -95.00	0.01	612 - 615
ATTEN_TABLE(97)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (97dB)	Real*4	dB	-98.00 to -96.00	0.01	616 - 619
ATTEN_TABLE(98)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (98dB)	Real*4	dB	-99.00 to -97.00	0.01	620 - 623
ATTEN_TABLE(99)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (99dB)	Real*4	dB	-100.00 to -98.00	0.01	624 - 627
ATTEN_TABLE(100)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (100dB)	Real*4	dB	-101.00 to -99.00	0.01	628 - 631
ATTEN_TABLE(101)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (101dB)	Real*4	dB	-102.00 to -100.00	0.01	632 - 635
ATTEN_TABLE(102)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (102dB)	Real*4	dB	-103.00 to -101.00	0.01	636 - 639
ATTEN_TABLE(103)	TEST SIGNAL ATTENUATOR INSERTION LOSSES (103dB)	Real*4	dB	-104.00 to -102.00	0.01	640 - 643

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(1)	PATH LOSS - 2A3J1_2/2A7J1_2 RECEIVER PROTECTOR	Real*4	dB	-3.00 to -0.10	0.01	644 - 647
PATH_LOSSES(2)	PATH LOSS - 2A3J3/2A7J3 RECEIVER PROTECTOR TEST COUPLER	Real*4	dB	-24.00 to -16.00	0.01	648 - 651
PATH_LOSSES(3)	PATH LOSS - 2A4J1_2/2A8J1_2 LOW NOISE AMPLIFIER	Real*4	dB	24.00 to 32.00	0.01	652 - 655
PATH_LOSSES(4)	PATH LOSS - A4 PRESELECT BANDPASS FILTER	Real*4	dB	-3.50 to -0.50	0.01	656 - 659
PATH_LOSSES(5)	PATH LOSS - DC2 DIRECTIONAL COUPLER	Real*4	dB	-25.00 to -15.00	0.01	660 - 663
PATH_LOSSES(6)	PATH LOSS - W102 RECEIVE COAX A4 TO A5	Real*4	dB	-0.50 to 0.00	0.01	664 - 667
PATH_LOSSES(7)	PATH LOSS - LOW NOISE AMPLIFIER TO A36 PAD	Real*4	dB	-5.00 to -0.50	0.01	668 - 671
PATH_LOSSES(8)	PATH LOSS - A5J1_3 MIXER PREAMPLIFIER	Real*4	dB	15.00 to 25.00	0.01	672 - 675
PATH_LOSSES(9)	PATH LOSS - A5J1_4 MIXER PREAMPLIFIER	Real*4	dB	0.00 to 10.00	0.01	676 - 679
PATH_LOSSES(10)	PATH LOSS - A5J1_5 MIXER PREAMPLIFIER	Real*4	dB	-25.00 to -15.00	0.01	680 - 683
PATH_LOSSES(11)	PATH LOSS - A5J2_6 MIXER PREAMPLIFIER	Real*4	dB	-35.00 to -25.00	0.01	684 - 687
PATH_LOSSES(12)	PATH LOSS - A5J1_7 MIXER PREAMPLIFIER	Real*4	dB	-13.00 to -2.00	0.01	688 - 691
PATH_LOSSES(13)	PATH LOSS - A21 RF DELAY LINE	Real*4	dB	-60.00 to -40.00	0.01	692 - 695
PATH_LOSSES(14)	PATH LOSS - DC1 DIRECTIONAL COUPLER	Real*4	dB	-45.00 to -35.00	0.01	696 - 699

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(15)	PATH LOSS - A22J1_5 FOUR POSITION TEST SWITCH	Real*4	dB	9.00 to 15.00	0.01	700 - 703
PATH_LOSSES(16)	PATH LOSS - A22J2_5 FOUR POSITION TEST SWITCH	Real*4	dB	-5.00 to -0.50	0.01	704 - 707
PATH_LOSSES(17)	PATH LOSS - A22J3_5 FOUR POSITION TEST SWITCH	Real*4	dB	-5.00 to -0.50	0.01	708 - 711
PATH_LOSSES(18)	PATH LOSS - A22J4_5 FOUR POSITION TEST SWITCH	Real*4	dB	-5.00 to -0.50	0.01	712 - 715
PATH_LOSSES(19)	PATH LOSS - A22J2_6 FOUR POSITION TEST SWITCH	Real*4	dB	-35.00 to -25.00	0.01	716 - 719
PATH_LOSSES(20)	PATH LOSS - A22J3_7 FOUR POSITION TEST SWITCH	Real*4	dB	-35.00 to -25.00	0.01	720 - 723
PATH_LOSSES(21)	PATH LOSS - A23J1_2 TEST ATTENUATOR	Real*4	dB	-8.00 to -3.00	0.01	724 - 727
PATH_LOSSES(22)	PATH LOSS - A23J1_3 TEST ATTENUATOR	Real*4	dB	-35.00 to -25.00	0.01	728 - 731
PATH_LOSSES(23)	PATH LOSS - A23J1_4 TEST ATTENUATOR	Real*4	dB	-30.00 to -20.00	0.01	732 - 735
PATH_LOSSES(24)	PATH LOSS - A24J1_2 TWO POSITION TEST SWITCH	Real*4	dB	-5.00 to -0.50	0.01	736 - 739
PATH_LOSSES(25)	PATH LOSS - A24J1_3 TWO POSITION TEST SWITCH	Real*4	dB	-5.00 to -0.50	0.01	740 - 743
PATH_LOSSES(26)	PATH LOSS - A24J1_4 TWO POSITION TEST SWITCH	Real*4	dB	-25.00 to -15.00	0.01	744 - 747

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(27)	PATH LOSS - W103 COAX A24J3 TO DC2	Real*4	dB	-2.00 to 0.00	0.01	748 - 751
PATH_LOSSES(28)	PATH LOSS - TEST COAX TO RECEIVER PROTECT COUPLER	Real*4	dB	-5.20 to - 0.20	0.01	752 - 755
PATH_LOSSES(29)	SPARE IN PATH_- LOSS ARRAY	N/A	N/A	N/A	N/A	756 - 759
PATH_LOSSES(30)	PATH LOSS - A5 ELEVATION ROTARY JOINT	Real*4	dB	-0.50 to - 0.05	0.01	760 - 763
PATH_LOSSES(31)	PATH LOSS - WAVEGUIDE COUPLER TO ANTENNA	Real*4	dB	-1.00 to - 0.10	0.01	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 TO SWITCH	Real*4	dB	-1.00 to - 0.01	0.01	772 - 775
PATH_LOSSES(34)	PATH LOSS - 2A1A4 WAVEGUIDE CHANNEL AZIMUTH ROTARY JOINT	Real*4	dB	-0.50 to - 0.05	0.01	776 - 779
PATH_LOSSES(35)	PATH LOSS - WG06 SPECTRUM FILTER	Real*4	dB	-0.50 to 0.00	0.01	780 - 783
PATH_LOSSES(36)	PATH LOSS - COAX TRANSMITTER RF DRIVE TO A22J2	Real*4	dB	-5.00 to - 0.50	0.01	784 - 787
PATH_LOSSES(37)	PATH LOSS - WAVEGUIDE SWITCH TO AZIMUTH ROTARY JOINT	Real*4	dB	-1.80 to - 0.05	0.01	788 - 791

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(38)	PATH LOSS - WAVEGUIDE SWITCH	Real*4	dB	-1.00 to - 0.05	0.01	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
PATH_LOSSES(41)	PATH LOSS - 1DC1 TRANSMITTER COUPLER STRAIGHT THRU	Real*4	dB	-0.10 to - 0.01	0.01	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
PATH_LOSSES(48)	PATH LOSS - 2DC1 ANTENNA COUPLER STRAIGHT THRU	Real*4	dB	-0.10 to 0.01	0.01	832 - 835
SPARE	N/A	N/A	N/A	N/A	N/A	836 - 839
PATH_LOSSES(50)	PATH LOSS - WAVEGUIDE AZIMUTH JOINT TO ELEVATION JOINT	Real*4	dB	-0.50 to - 0.05	0.01	840 - 843
SPARE	N/A	N/A	N/A	N/A	N/A	844 - 847

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(52)	PATH LOSS - 1AT4 TRANSMITTER COUPLER PAD	Real*4	dB	-6.00 to 0.00	0.01	848 - 851
PATH_LOSSES(53)	PATH LOSS - A36 PAD	Real*4	dB	-7.00 to 0.00	0.01	852 - 855
PATH_LOSSES(54)	PATH LOSS - A34 PAD	Real*4	dB	-20.00 to 0.00	0.01	856 - 859
PATH_LOSSES(55)	PATH LOSS - T/R CIRCULATOR - PORT 2 TO PORT 3	Real*4	dB	-0.50 to 0.00	0.01	860 - 863
SPARE	N/A	N/A	N/A	N/A	N/A	864 - 867
SPARE	N/A	N/A	N/A	N/A	N/A	868 - 871
PATH_LOSSES(58)	PATH LOSS - AT4 3dB ATTENUATOR	Real*4	dB	-7.00 to 0.00	0.01	872 - 875
PATH_LOSSES(59)	PATH LOSS - IFD 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
PATH_LOSSES(62)	PATH LOSS - AT6(3dB)/AT7(6dB) BURST PULSE OPTIONAL ATTENUATOR	Real*4	dB	-8.00 to 0.00	0.01	888 - 891
PATH_LOSSES(63)	PATH LOSS - A39 RF_IF BURST MIXER	Real*4	dB	-11.00 to -6.00	0.01	892 - 895
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 - IFD 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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
PATH_LOSSES(67)	PATH LOSS - DC3 J1_2 6dB COUPLER, COUPLED	Real*4	dB	-10.00 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
PATH_LOSSES(69)	PATH LOSS - AT9(10db)/AT10(6 db) ATTENUATOR	Real*4	dB	-11.00 to -5.00	0.01	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
LOG_AMP_FACTOR(1)	RF DETECTOR LOG AMPLIFIER SCALE FACTOR FOR CONVERTING RECEIVER TEST DATA	Real*4	V/dBm	0.0010 to 0.1000	0.0001	928 - 931
LOG_AMP_FACTOR(2)	RF DETECTOR LOG AMPLIFIER BIAS FOR CONVERTING RECEIVER TEST DATA	Real*4	V	0.0000 to 75.0000	0.0001	932 - 935
SPARE	N/A	N/A	N/A	N/A	N/A	936 - 939
RNSCALE(0)	RECEIVER NOISE NORMALIZATION (-1.0 deg to -0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	940 - 943
RNSCALE(1)	RECEIVER NOISE NORMALIZATION (-0.5 deg to 0.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	944 - 947

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
RNSCALE(2)	RECEIVER NOISE NORMALIZATIO N (0.0 deg to 0.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	948 - 951
RNSCALE(3)	RECEIVER NOISE NORMALIZATIO N (0.5 deg to 1.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	952 - 955
RNSCALE(4)	RECEIVER NOISE NORMALIZATIO N (1.0 deg to 1.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	956 - 959
RNSCALE(5)	RECEIVER NOISE NORMALIZATIO N (1.5 deg to 2.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	960 - 963
RNSCALE(6)	RECEIVER NOISE NORMALIZATIO N (2.0 deg to 2.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	964 - 967
RNSCALE(7)	RECEIVER NOISE NORMALIZATIO N (2.5 deg to 3.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	968 - 971
RNSCALE(8)	RECEIVER NOISE NORMALIZATIO N (3.0 deg to 3.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	972 - 975
RNSCALE(9)	RECEIVER NOISE NORMALIZATIO N (3.5 deg to 4.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	976 - 979
RNSCALE(10)	RECEIVER NOISE NORMALIZATIO N (4.0 deg to 4.5 deg)	Real*4	N/A	1.000 to 1.800	0.001	980 - 983

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
RNSCALE(11)	RECEIVER NOISE NORMALIZATIO N (4.5 deg to 5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	984 - 987
RNSCALE(12)	RECEIVER NOISE NORMALIZATIO N (> 5.0 deg)	Real*4	N/A	1.000 to 1.800	0.001	988 - 991
ATMOS(0)	TWO WAY ATMOSPHERIC LOSS/KM (-1.0 deg to -0.5 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	992 - 995
ATMOS(1)	TWO WAY ATMOSPHERIC LOSS/KM (-0.5 deg to 0.0 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	996 - 999
ATMOS(2)	TWO WAY ATMOSPHERIC LOSS/KM (0.0 deg to 0.5 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1000 - 1003
ATMOS(3)	TWO WAY ATMOSPHERIC LOSS/KM (0.5 deg to 1.0 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1004 - 1007
ATMOS(4)	TWO WAY ATMOSPHERIC LOSS/KM (1.0 deg to 1.5 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1008 - 1011
ATMOS(5)	TWO WAY ATMOSPHERIC LOSS/KM (1.5 deg to 2.0 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1012 - 1015
ATMOS(6)	TWO WAY ATMOSPHERIC LOSS/KM (2.0 deg to 2.5 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1016 - 1019
ATMOS(7)	TWO WAY ATMOSPHERIC LOSS/KM (2.5 deg to 3.0 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1020 - 1023
ATMOS(8)	TWO WAY ATMOSPHERIC LOSS/KM (3.0 deg to 3.5 deg)	Real*4	dB/km	-0.0200 to - 0.0020 ⁽³⁾	0.0001	1024 - 1027

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
ATMOS(9)	TWO WAY ATMOSPHERIC LOSS/KM (3.5 deg to 4.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 ⁽³⁾	0.0001	1028 - 1031
ATMOS(10)	TWO WAY ATMOSPHERIC LOSS/KM (4.0 deg to 4.5 deg)	Real*4	dB/km	-0.0200 to -0.0020 ⁽³⁾	0.0001	1032 - 1035
ATMOS(11)	TWO WAY ATMOSPHERIC LOSS/KM (4.5 deg to 5.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 ⁽³⁾	0.0001	1036 - 1039
ATMOS(12)	TWO WAY ATMOSPHERIC LOSS/KM (> 5.0 deg)	Real*4	dB/km	-0.0200 to -0.0020 ⁽³⁾	0.0001	1040 - 1043
EL_INDEX(0)	BYPASS MAP GENERATION ELEVATION ANGLE (0)	Real*4	deg	-1.000 to 45.000	0.001	1044 - 1047
EL_INDEX(1)	BYPASS MAP GENERATION ELEVATION ANGLE (1)	Real*4	deg	-1.000 to 45.000	0.001	1048 - 1051
EL_INDEX(2)	BYPASS MAP GENERATION ELEVATION ANGLE (2)	Real*4	deg	-1.000 to 45.000	0.001	1052 - 1055
EL_INDEX(3)	BYPASS MAP GENERATION ELEVATION ANGLE (3)	Real*4	deg	-1.000 to 45.000	0.001	1056 - 1059
EL_INDEX(4)	BYPASS MAP GENERATION ELEVATION ANGLE (4)	Real*4	deg	-1.000 to 45.000	0.001	1060 - 1063
EL_INDEX(5)	BYPASS MAP GENERATION ELEVATION ANGLE (5)	Real*4	deg	-1.000 to 45.000	0.001	1064 - 1067
EL_INDEX(6)	BYPASS MAP GENERATION ELEVATION ANGLE (6)	Real*4	deg	-1.000 to 45.000	0.001	1068 - 1071

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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_DBZ0_LP	TARGET SYSTEM CALIBRATION (dBZ0) FOR LONG PULSE	Real*4	dBZ	-45.00 to -65.00	0.01	1104 - 1107
SPARE	N/A	N/A	N/A	N/A	N/A	1108 - 1111
SPARE	N/A	N/A	N/A	N/A	N/A	1112 - 1115
SPARE	N/A	N/A	N/A	N/A	N/A	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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
METEOR_PARAM	/K/**2 HYDROMETEOR REFRACTIVITY FACTOR	Real*4	N/A	0.10 to 1.10	0.01	1128 - 1131
BEAMWIDTH	ANTENNA BEAMWIDTH	Real*4	deg	0.80 to 1.00	0.01	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	N/A	N/A	1140 - 1143
VEL_MAINT_LIMIT	VELOCITY CHECK DELTA MAINTENANCE LIMIT	Real*4	m/s	0.5 to 2.0	0.1	1144 - 1147
WTH_MAINT_LIMIT	SPECTRUM WIDTH CHECK DELTA MAINTENANCE LIMIT	Real*4	m/s	0.5 to 2.0	0.1	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
NOISETEMP_DGRAD_ LIMIT	SYSTEM NOISE TEMPERATURE DEGRADE LIMIT	Real*4	K	350.0 to 1200.0	0.1	1160 - 1163
NOISETEMP_MAINT_ LIMIT	SYSTEM NOISE TEMPERATURE MAINTENANCE LIMIT	Real*4	K	300.0 to 1200.0	0.1	1164 - 1167
SPARE	N/A	N/A	N/A	N/A	N/A	1168 - 1171
SPARE	N/A	N/A	N/A	N/A	N/A	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
TS_CW	CW TEST SIGNAL AT A22J3	Real*4	dBm	20.00 to 30.00	0.01	1184 - 1187

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
TS_RF_SP	RF DRIVE TEST SIGNAL SHORT PULSE AT 3A5J4	Real*4	dBm	19.00 to 28.00	0.01	1188 - 1191
TS_RF_LP	RF DRIVE TEST SIGNAL LONG PULSE AT 3A5J4	Real*4	dBm	19.00 to 28.00	0.01	1192 - 1195
TS_STALO	STALO POWER AT A1J2	Real*4	dBm	12.00 to 18.00	0.01	1196 - 1199
TS_NOISE	RF NOISE TEST SIGNAL EXCESS NOISE RATIO AT A22J4	Real*4	dB	45.00 to 80.00	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
DBZ0_DELTA_LIMIT	LIMIT FOR DIFFERENCE BETWEEN COMPUTED AND TARGET SYSTEM CALIBRATION COEFFICIENT (dBZ0)	Real*4	dB	1.0 to 10.0	0.1	1212 - 1215
THRESHOLD1	BYPASS MAP GENERATOR NOISE THRESHOLD	Real*4	dB	-6.0 to 10.0	0.1	1216 - 1219
THRESHOLD2	BYPASS MAP GENERATOR REJECTION RATIO THRESHOLD	Real*4	dB	0.0 to 10.0	0.1	1220 - 1223
CLUT_SUPP_DGRAD_LIM	CLUTTER SUPPRESSION DEGRADE LIMIT	Real*4	dB	35.0 to 50.0	0.1	1224 - 1227
CLUT_SUPP_MAINT_LIM	CLUTTER SUPPRESSION MAINTENANCE LIMIT	Real*4	dB	20.0 to 50.0	0.1	1228 - 1231

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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
N_SMOOTH	RECEIVER NOISE CALIBRATION SMOOTHING COEFFICIENT	Real*4	N/A	0.05 to 1.00	0.01	1240 - 1243
TAR_DBZ0_SP	TARGET SYSTEM CALIBRATION (dBZ0) FOR SHORT PULSE	Real*4	dBZ	-38.00 to -58.00	0.01	1244 - 1247
SPARE	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	1256 - 1259
SPARE	N/A	N/A	N/A	N/A	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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
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	N/A	N/A	1296 - 1299
SLATDEG	SITE LATITUDE - DEGREES	Integer*4	deg	0 to 89	1	1300 - 1303
SLATMIN	SITE LATITUDE - MINUTES	Integer*4	min	0 to 59	1	1304 - 1307
SLONDEG	SITE LONGITUDE - DEGREES	Integer*4	deg	0 to 179	1	1308 - 1311
SLONMIN	SITE LONGITUDE - MINUTES	Integer*4	min	0 to 59	1	1312 - 1315
SLATDIR	SITE LATITUDE - DIRECTION	String	N/A	N or S	N/A	1316 - 1319
SLONDIR	SITE LONGITUDE - DIRECTION	String	N/A	E or W	N/A	1320 - 1323
SPARE	N/A	N/A	N/A	N/A	N/A	1324 - 1327
VCPAT11	VOLUME COVERAGE PATTERN NUMBER 11 DEFINITION	See Note (5)	N/A	N/A	N/A	1328 - 2499
VCPAT21	VOLUME COVERAGE PATTERN NUMBER 21 DEFINITION	See Note (5)	N/A	N/A	N/A	2500 - 3671
VCPAT31	VOLUME COVERAGE PATTERN NUMBER 31 DEFINITION	See Note (5)	N/A	N/A	N/A	3672 - 4843
VCPAT32	VOLUME COVERAGE PATTERN NUMBER 32 DEFINITION	See Note (5)	N/A	N/A	N/A	4844 - 6015

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
VCPAT300	VOLUME COVERAGE PATTERN NUMBER 300 DEFINITION	See Note (5)	N/A	N/A	N/A	6016 - 7187
VCPAT301	VOLUME COVERAGE PATTERN NUMBER 301 DEFINITION	See Note (5)	N/A	N/A	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
SPARE	N/A	N/A	N/A	N/A	N/A	8396 - 8695
RVP8NV.IWAVEGUIDE_LENGTH	WAVEGUIDE LENGTH	Integer*4	m	0 to 1000	1	8696 - 8699
SPARE	N/A	N/A	N/A	N/A	N/A	8700 - 8743
VEL_DATA_TOVER	VELOCITY UNFOLDING OVERLAY THRESHOLD	Real*4	dB	0.0 to 20.0	0.1	8744 - 8747

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
WIDTH_DATA_TOVER	WIDTH UNFOLDING OVERLAY THRESHOLD	Real*4	dB	0.0 to 20.0	0.1	8748 - 8751
SPARE	N/A	N/A	N/A	N/A	N/A	8752 - 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
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
NOISE_LONG	RECEIVER NOISE, 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

NAME	DESCRIPTION	FORMAT	UNITS ⁽⁶⁾	RANGE (OR VALUE) ⁽⁸⁾	ACCURACY/ PRECISION	BYTE LOCATION
NOISE_SHORT	RECEIVER NOISE, SHORT PULSE	Real*4	dBm	-90.0 to -75	0.1	8796 - 8799
NOISE_TOLERANCE	RECEIVER NOISE TOLERANCE	Real*4	dB	0.0 to 6.0	0.1	8800 - 8803
MIN_DYN_RANGE	MINIMUM DYNAMIC RANGE	Real*4	dB	85.0 to 95.0	0.1	8804 - 8807
SPARE	N/A	N/A	N/A	N/A	N/A	8808 - 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 XV-B for default value.
4. Value of the LSB of the power measurement.
5. See Table XI for format.
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.

Table XV-B. Two Way Atmospheric Loss

Elevation Sector Angles		Atmospheric Attenuation (dB/km)	
		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

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
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
DAU	Data Acquisition Unit
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation
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

Acronym / Abbreviation	Description
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
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
SP	Signal Processor
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

Acronym / Abbreviation	Description
TCP	Transmission Control Protocol
TEMP	Temperature
TOUTS	Time-outs
TR	Another designator for the Transmitter
TST	Test
UART	Universal Asynchronous Receiver/Transmitter
UDP	User Datagram
UPS	Uninterruptible Power Supply
UTL	Utilities
V	Volts
V & V	Verification & Validation
VCP	Volume Coverage Pattern
VDC	Volts Direct current
VEL	Velocity
VSWR	Voltage Standing Wave Ratio
WG	Wave Guide
WSR-88D	Weather Service Radar - 88 Doppler
XMT	Another representation for Transmitter

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⁾

Quantity	Name	Symbol
	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