TO: Holders of RTA-44D VHF Data Radio System Maintenance Manual, I.B. 1144-1.

REVISION NO. 5

to

MAINTENANCE MANUAL, I.B. 1144-1

Covering

Date of Original Publication	Sep/93
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INSTRUCTIONS:

1. This revision is a completely revised reissue of I.B. 1144-1, which contains the information printed in the original manual and all subsequent revisions. The manual was extensively revised to reflect the latest manufacturing configurations and up-to-date information.
2. Discard the original issue and all previous issues of this publication, and replace with Revision Number 5, dated Mar 01/02.
3. A bar in the left-hand column indicates where changes were made in this latest revision.
4. Revision stripes are applied where data has changed.
5. Discard this information page after completion.

Honeywell

System
Maintenance Manual

RTA-44D
VHF Data Radio System

Honeywell
CAGE Code 97896

Honeywell

NOTE

IF ANY UNUSUAL OR SPECIAL SERVICE PROBLEMS ARISE, CONTACT HONEYWELL AIRLINES AND AVIONICS PRODUCTS CUSTOMER SUPPORT DEPARTMENT.

PROPRIETARY NOTICE

REVISION NO. 5

Mar 01/02

REVISION HIGHLIGHTS

Pages that have been revised are listed below, together with the highlights of the revision.

PAGE NUMBER	DESCRIPTION OF CHANGE
T-1	Updated Title Page format to current standards.
RH-1/RH-2	Updated Revision Highlights pages for Revision No. 5.
LEP-1/LEP-2	Updated "List of Effective Pages" for this revision.
1	Added reference to Mode 2 functionality of VDR.
2	Added -2000 and -2051 units to RTA-44D VHF Data Radio System Components table, Figure 2.
3	Added reference to -2000 and -2051 units in Related Publications table, Figure 4.
4	Added reference to VDR Mode 2 functionality and made corrections to Configurations Available table, Figure 5.
5	Added Mode 2 VDR functionality to RTA-44D VHF Data Radio Features table, Figure 6.
6	Added VDR Mode 2 units to Leading Particulars listing, Figure 7.
7	Changed number of pages in Figure 7.
8	Changed number of pages in Figure 7.
8.1	Added 750 Digital Mode to Leading Particulars table, Figure 7.
8.2	Added ARINC 429 Input Labels table, Figure 7.1
8.3/8.4	Added ARINC 429 Output Labels table, Figure 7.2
9	Added -2000 and -2051 units to Environmental Certification table, Figure 8.
10	Restructured Paragraph 4 to preserve logical order. Figure 11 moved to Figure 10.
11	Restructured Paragraph 4 to preserve logical order. Figure 10 moved to Figure 10.1.
12	Restructured Paragraph 4 to preserve logical order. Figure 13 moved to Figure 11. Added VDR Mode 2 to primary modes of operation listing.
13	Added Auxiliary Processor Module to System Component Description.
14	Added VDR Mode 2 Units (-2000 and -2051) Internal Architecture Diagram, Figure 13. (This replaced old Figure 13, which moved to become 11.)
16	Added reference to Production Test Mode (PTM) Tool Quantum Line Tester to I/O Section discussion. Added Basic Theory of Operation of Auxiliary Processor Module paragraph.
17/18	Adjusted formatting to accommodate added Theory of Operation of Auxiliary Processor Module paragraph.

101	Added VDR Mode 2 Units, (-2000 and -2051) "Normal Screen" diagram to Figure 101. Corrected screen nomenclature for consistency.
102	Updated LCD Control Flow by adding CMU PORT STATUS page to Figure 101.1
103	Corrected screen nomenclature for consistency.
106	Corrected screen nomenclature for consistency.
107	Added explanation of numeric/alpha notation to display screens.
109	Moved text from page 110 to page 109 to accommodate Figures 114.1 and 114.2.
110	Added new Failure pages from VDR Mode 2 units (-2000 and -2051), as Figures 114.1 and 114.2. Corrected screen nomenclature for consistency.
111	Added "Tuning Port Status Page" Screen for VDR Mode 2 units (-2000 and -2051) as Figure 116.1.
112	Added Valid Data Examples of "Tuning Port Status Page" Screen (-2000 and -2051) as Figure 116.2.
113	Added "Discrete Input Status Page 4" Screen for VDR Mode 2 units (-2000 and -2051) as Figure 119.1.
114	Eliminated Figure 122.
115	Updated discussion of Previous Flight Legs Failure data. Corrected screen nomenclature for consistency.
116	Corrected "Previous Flight Legs Failures Data Page" Screen, Figure 125.
202	Added mention of maximum cable loss specification.
203	Added mention of ARINC specification for ground path resistance.
204	Updated Radio Connector Determinants Table, Figure 201, Sheet 3.
205	Updated Radio Connector Determinants Table, Figure 201, Sheet 4
206	Updated Radio Connector Determinants Table, Figure 201, Sheet 5
207	Updated Radio Connector Determinants Table, Figure 201, Sheet 6
209	Added Software On Board Loadable Instructions.
210	Added Software On Board Loadable Instructions.
211	Added Software On Board Loadable Instructions
212	Added Software On Board Loadable Instructions
213	Added Software On Board Loadable Instructions
214	Added "Normal Mode" Screen for VDR Mod 2 units (-2000 and -2051), Figure 203.1.
215	Text moved from previous revision to accommodate new data on previous pages and correction to "Test Complete, Failures" Screen, Figure 206 .
216	Text moved from previous revision to accommodate new data on previous pages .
217/218	Text moved from previous revision to accommodate new data on previous pages and Figure 207 updated.
219/220	Text moved from previous revision to accommodate new data on previous pages and Figure 208 updated.

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	RR-2	No Date
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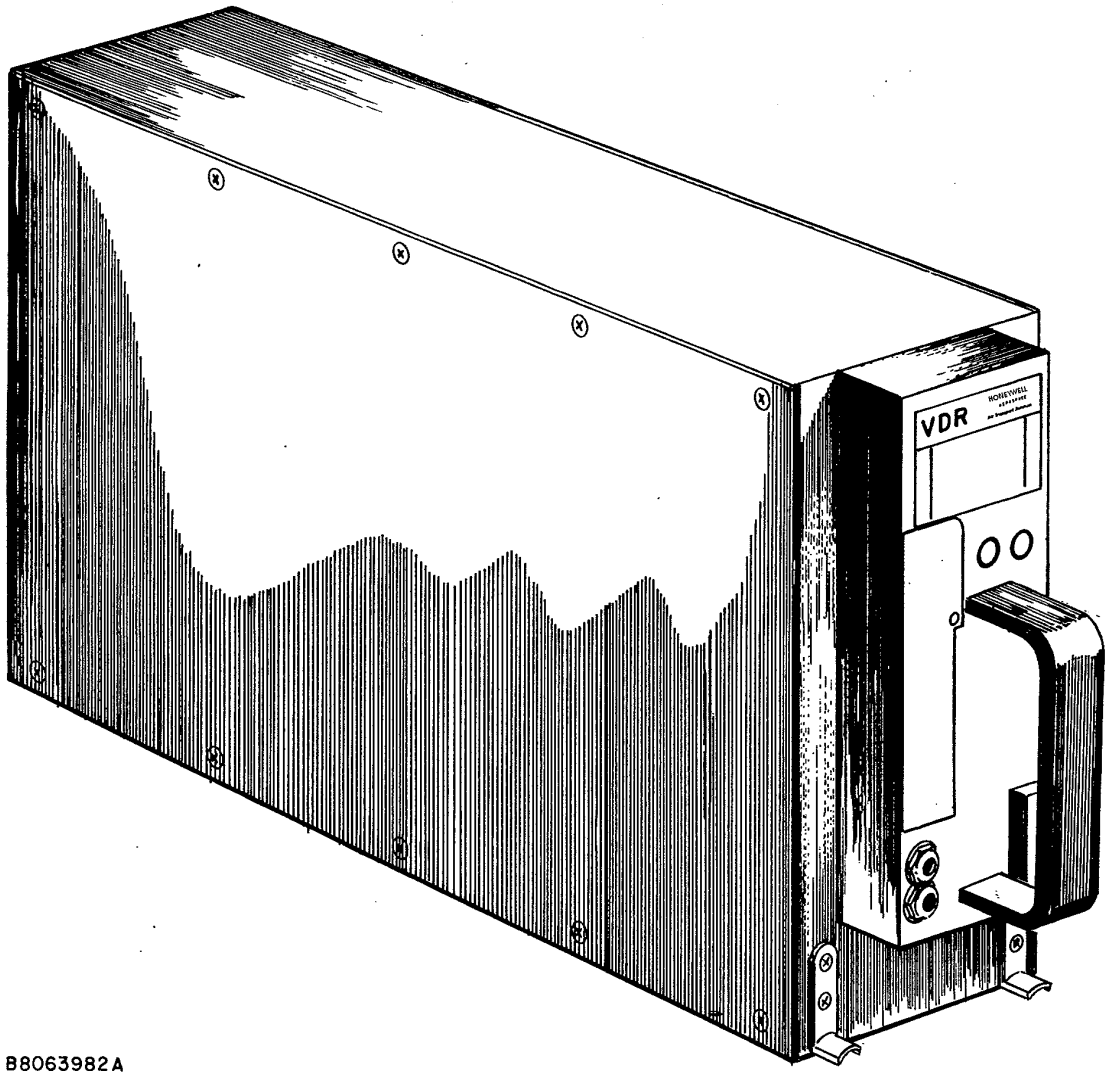
INTRODUCTION

This manual, I.B. 1144-1 (23-20-02), contains information covering description and operation, installation, and flight-line checkout procedures for the Honeywell International, Airlines and Avionics Products RTA-44D VHF Data Radio System



RTA-44D VHF Data Radio
Figure 1

DESCRIPTION AND OPERATION

1. General

This section contains descriptive information covering the RTA-44D VHF Data Radio (VDR) System and lists other components required for system operation. The RTA-44D VHF Data Radio (VDR) is illustrated in Figure 1.

A. Purpose of Equipment

The RTA-44D VHF Radio (VDR) System is an airborne VHF Communications Transceiver designed to provide voice and data communication between on-board aircraft systems, to other aircraft systems, and to ground-based systems.

The VDR is designed to Aeronautical Radio Incorporated (ARINC) 716 Airborne VHF Communications Transceiver and ARINC 750 Airborne VHF Data Radio Specifications, Radio Technical Commission for Aeronautics (RTCA) documents number DO-186a Minimum Operational Performance Standards (MOPS) for Airborne Radio Communications Equipment Operating within the Radio Frequency Range 117.975 - 137.000 Megahertz and number DO-207 MOPS for Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Unintentional Transmissions, and European Organization for Civil Aviation Equipment (EUROCAE) ED-23B Minimum Performance Specification for Airborne VHF Communications Equipment Operating in the Frequency Range 117.975 - 137.000 MHz.

The VDR is fully interchangeable with the earlier ARINC 716 RTA-44A VHF Communications Transceiver for backward compatibility.

In an Aircraft Communications Addressing and Reporting System (ACARS), the VDR is a simple transceiver with an analog interface to the ACARS Management Unit (MU) or a MSK modem.

In Mode 2, the VDR contains a D8PSK modem and a digital high speed ARINC 429 link to the MU/CMU/ATSU per Mode 2 functionality in ARINC 750-3.

The VDR system requires an antenna for its RF inputs and outputs, a control head or radio management panel, an audio input source and output sink for its analog voice functions, and an ACARS MU, CMU or ATSU for its digital control and data functions. The VDR system may also be connected to a Central Maintenance Computer (CMC) or Central Fault Display System (CFDS) to transfer maintenance data.

Depending upon the selected mode, the VDR operates with the following equipment:

- an ARINC 597, 724, or 724B ACARS MU,
- an ARINC 604 and Airbus Industrie ABD-0048C Centralized Fault Display Interface Unit (CFDIU),
- an ARINC 716 voice audio input source and output sink,
- an ARINC 716 voice frequency control source,
- an ARINC 758 CMU or ATSU.
- an antenna.

B. Equipment Part Numbers

Components of the RTA-44D VHF Data Radio System supplied by Honeywell are listed in Figure 2. The figure lists the currently available components of the system, along with part numbers and equipment type numbers.

EQUIPMENT TYPE NUMBER	EQUIPMENT DESCRIPTION	Honeywell PART NUMBER
RTA-44D VHF Data Radio	Airborne VHF Data Radio (VDR) capable of VHF COM (ARINC 716, EUROCAE ED-23B) voice and analog data processing through digital signal processing (DSP) over a frequency range of 118.000 to 136.975 MHz with 25-kHz channel spacing. The VDR contains 8.33-kHz channel spacing capability per ARINC 716, Supplement 8. VDR is also capable of RTCA DO-207 "stuck mike" detection without warning tone. Complies with DO-178B. Capable of interfacing CMC per ARINC 604. Capable of data recording and loading from the front of the unit, and software loading from the rear connector through an ARINC 615 data loader. The VDR contains an RS-232 port on the front panel for ease of maintenance. Meets DO-160C lightning protection and 200-ms power interrupt transparency requirements. Meets HIRF requirements and ICAO Annex 10 requirements (RTCA DO-186a).	064-50000-0101
	Same as -0101, except added new software to adjust squelch when 8.33-kHz channel spacing is selected.	064-50000-0110
	Same as -0101, except "stuck mike" detection emits a 1-khz interrupted warning sidetone during last five seconds of 35-second transmission. Capable of interfacing CFDS per ARINC 604 and Airbus Industrie ABD-0048C.	064-50000-0202
	Same as -0202, except capable of interfacing CFDS in accordance to McDonnell Douglas software requirements (replaces ABD-0048C implementation).	064-50000-0303
	Same as -0202, except it adds Mode A functionality per ARINC 750-3.	064-50000-0505
	Same as -0110, except it adds Mode A and Mode 2 functionality specified in ARINC 750-3 and meets DO-160D requirements.	064-50000-2000
	Same as -0505, except it adds Mode 2 functionality specified in ARINC 750-3 and meets DO-160D requirements.	064-50000-2051

RTA-44D VHF Data Radio System Components
(Honeywell Supplied)
Figure 2

C. Equipment Required but Not Supplied

Figure 3 lists equipment required for the RTA-44D VHF Data Radio System, but not supplied by Honeywell.

EQUIPMENT	DESCRIPTION
Power Source	DC power supply of 27.5 volts. Receive - 1 ampere, Transmit - 7 amperes (at stated input voltage.)
Audio Distribution System	Audio system with an input impedance of 200 to 10,000 ohms.
Control Panel	Provides remote control of frequency selection for 25-kHz or 8.33-kHz channel spacing system operation (serial digital, ARINC 429-7 and ARINC 716, Supplement 8), power on/off, volume, and squelch in conformance to ARINC 716.
MU/CMU/ATSU	Provides control and data source/sink when operating in the 750 data mode.
3 MCU Unit Mount	Provides a means of mounting RTA-44D VHF Data Radio in the aircraft.
VHF Antenna	Capable of receiving and transmitting VHF signals over a frequency range of 118.000 through 136.975 MHz.
Microphone	150-ohm impedance microphone (either carbon or transistor) operating from approximately 16-volt power supply.
Cables and Connectors	Necessary connectors and cables as shown in RTA-44D VHF Data Radio System Interwiring Diagram, Figure 208.

Equipment Required but Not Supplied
Figure 3

D. Related Publications

Figure 4 lists the publications covering the RTA-44D VHF Data Radio and test procedure supporting the system.

PUBLICATION	Honeywell IDENTIFICATION NUMBER	ATA IDENTIFICATION NUMBER
RTA-44D VHF Data Radio Part Numbers 064-50000-0101, -0110 and -2000 Component Maintenance Manual	I.B. 1144A-2	23-20-36
RTA-44D VHF Data Radio Part Numbers 064-50000-0202, -0303, -0505 and -2051 Component Maintenance Manual	I.B. 1144A-3	23-20-38

Related Publications
Figure 4

2. Configurations Available

Figure 5 lists the available configurations of the RTA-44D VHF Data Radio and the features contained in each configuration. Figure 6 contains a brief description of each feature.

Honeywell PART NUMBER 064-50000	FEATURES								
				COMPATIBILITY				Mode A	Mode 2
					INTERFACE		8.33-kHz CHANNEL SPACING		
	BASIC UNIT	FAULT MEMORY	STUCK MIKE ALARM	ACARS	BOEING CMC	CFDS			
-0101	X	X		X	X		X		
-0110	X	X		X	X		X		
-0202	X	X	X	X		X[1]	X[3]		
-0303	X	X	X	X		X[2]	X		
-0505	X	X	X	X		X[1]	X	X	
-2000	X	X	X	X	X[4]	X[4]	X	X	X
-2051	X	X	X	X		X[1]	X	X	X

1 = Airbus CFDS interface software.
2 = McDonnell Douglas CFDS interface software.
3 = All -0202 hardware capable. 02/02 software required for squelch adjustment for 8.3-kHz channel spacing.
4 =On Board Loadable Dependent.

RTA-44D VHF Data Radio, Configurations Available
Figure 5

FEATURE	DESCRIPTION
Basic Unit	Airborne solid-state VDR is capable of receiving and transmitting ARINC 716 voice and ARINC 716 data over a frequency range of 118.000 to 136.975 MHz with 25-kHz channel spacing. Channel spacing capability of 8.33-kHz per ARINC 716, Supplement 10 is available as well as RTCA DO-207 "stuck mike" detection. Complies with DO-178B software requirements and enhanced BITE requirements of Airbus, Boeing, and McDonnell Douglas.

RTA-44D VHF Data Radio Features
Figure 6
Sheet 1 of 2

FEATURE	DESCRIPTION
Basic Unit (Continued)	Capable of data recording and loading from the front of the VDR, and software loading from the rear connector through an ARINC 615 data loader. Contains an RS-232 port on the front panel for ease of maintenance. Meets RTCA DO-160C lightning protection and 200 ms power interrupt transparency requirements. Meets HIRF requirements and ICAO Annex 10 requirements (RTCA DO-186a). Front panel LCD displays unit's characteristics (part number, serial number), BITE status with fault location help pages, line maintenance values with help pages, and software data loading help screens.
Fault Memory	A nonvolatile, single-chip fault memory that allows the recording of faults associated with a particular flight leg. Sixty-four flight legs are available with each flight leg made up of a flight-leg information header containing a fault record section for recording ten airborne faults and three ground faults. When all flight legs have been used, the oldest flight leg shall be reused.
Stuck Microphone Alarm	After the VDR detects that the microphone is in the transmit (keyed) position for a time duration longer than 30 seconds, a 1 kHz interrupted tone (½ second on, ½ second off) is emitted for five seconds via the audio/sidetone output. After a total of 35 seconds, the VDR turns off the transmitter and the 1 kHz interrupted sidetone. To reactivate the transmitter, the microphone push-to-talk button must be released and then rekeyed.
ACARS Compatible	The VDR ensures proper processing of the ACARS messages.
CMC Interface	The VDR interfaces fault memory and BITE data between the VDR and line maintenance Centralized Maintenance Computer (CMC) for the purpose of extracting maintenance information and initiating tests. Designed to conform with ARINC 429 interfaces and ARINC 604 requirements.
CFDS Interface	The VDR interfaces fault memory and BITE data between the VDR and line maintenance Centralized Fault Display Interface Unit (CFDIU) for the purpose of extracting maintenance information and initiating tests. Designed to conform with ARINC 429 interfaces, ARINC 604 and Airbus Industrie ABD-0048C or McDonnell Douglas software requirements.
8.33-kHz Channel Spacing Capability	The VDR is capable of 8.33-kHz channel spacing to meet the European narrow-band (8.33-kHz) VHF voice communications systems. The narrow-band mode of operation is limited to voice communications.
Mode A	The Mode A VDR contains an ACARS MSK modem and a digital high speed ARINC 429 link to the MU/CMU/ATSU per the Mode A functionality specified in ARINC 750-3.
Mode 2	The Mode 2 VDR contains a D8PSK modem and a digital high speed ARINC 429 link to the MU/CMU/ATSU per Mode 2 functionality in ARINC 750-3. The Mode 2 VDR meets DO-160D requirements.

RTA-44D VHF Data Radio Features
Figure 6 (Sheet 2 of 2)

3. System Leading Particulars

A. Unit Specifications

Figure 7 lists the leading particulars for the RTA-44D VHF Data Radio System.

CHARACTERISTICS	DESCRIPTION
General - Overall VDR	
Form Factor	3 MCU (ARINC 600)
Dimensions	Refer to outline drawing, Figure 207.
Weight	9.6 LBS., (4,4Kg) Maximum
General - Overall VDR	
Power Requirements	27.5 Vdc nominal (+10%, -20%) 1.0A - Receive (-0101, -0110, -0202, -0303 and -0505) 1.5A - Receive (-2000 and -2051) 7.0A - Transmit (All Units)
Temperature	
Operating	-55°C to +70°C (-67°F to +158°F) (-0101, -0110, -0202, -0303 and -0505) -15°C to +70°C (5°F to 158°F) (-2000 and -2051)
Storage	-65°C to +85°C (-85°F to +185°F) (All Units)
Cooling	ARINC 600
Humidity	Zero to 95%
Altitude	To 15,240 meters (50,000 feet)
Warm-up period	None; stable operation after power application.
Frequency Control	ARINC, 429 Mark, 33 (Serial Digital)
Frequency Range	118.000 MHz to 136.975 MHz
Channel Spacing	25-kHz and 8.33-kHz
Frequency Stability	±0.0005%
Duty Cycle	Continuous operation from -55°C to +70°C with ARINC 600 cooling.
Certification	
-0101, -0110, -0202, -0303 and -0505 Units	TSO C37d Class 3 and 5 and C38d Class C and E; DO-160C Categories /A2D2/ZCA/MNB/XXXXXXAAAZZUZ/XXE2/XX DO-186a, DO-178B, DO-207 AND EUROCAE ED-23B
-2000, -2051 Units	TSO C37d Class 3 and 5 and C38d Class C and E; DO-160D Categories [(A2)(D2)Z]BAB[RB1]XXXXXXZAAZCRRL[A2C2]XXA DO-186a, DO-178B, DO-207 AND EUROCAE ED-23B
General - Analog Voice/Data Channel Changing Time Transmit to Receive Recovery	Less than 50 milliseconds to stabilize on a new channel frequency. Less than 50 milliseconds after transmission to provide 90% of its output at an input level of 10 µV modulated 30% at 1000 Hz.

Leading Particulars
Figure 7 (Sheet 1 of 4)

CHARACTERISTICS	DESCRIPTION
Analog Voice Receiver	
Sensitivity	Greater than 6 dB SINAD for -107 dBm signal modulated 30% at 1000 Hz.
Selectivity	
25-kHz Channel Spacing	±8-kHz at 6 dB bandwidth, ±17-kHz at 60 dB bandwidth.
8.33-kHz Channel Spacing	±2.78-kHz at 6 dB bandwidth, ±7.365-kHz at 60 dB bandwidth.
Cross Modulation	Meets requirements of ARINC 716, Section 3.6.4.
AGC	Within 3 dB with inputs from 5 µV to 100,000 µV and not more than 6 dB with inputs from 5 µV to 500,000 µV.
Audio Output	40 milliwatts maximum into a 600 ±20% ohm resistive load, factory set at 10 mW at 1000 Hz.
Audio Output Frequency Response	Within 6 dB from 300 to 2500 Hz.
Audio Output Harmonic Distortion	Total harmonic distortion will not exceed 5% with 1000 µV input signal modulated 30% at 1000 Hz.
Audio Output Regulation	No more than 2 dB voltage change from a 10 mW reference level into 600 ohms for resistive load variations between 450 ohms to 2400 ohms, and no more than 6 dB voltage change for resistive load variations between 200 ohms and 20k ohms.
Voice Phase Shift Limit	Audio output does not depart from that of the positive-going modulation envelope at the receiver input by more than -30° to +120° with a 1000 µV input signal modulated 30% at 1000 Hz and an output level adjusted for 40 milliwatts into a 600-ohm resistive load.
Undesired Responses	80 dB
Input Impedance	50 ohms, nominal
Analog Voice Transmitter	
Output Power	25 watts (nominal)
Harmonic and Spurious Emission	Any harmonics of the desired frequency is attenuated at least 60 dB below the desired carrier level and any other emission will be attenuated at least 118 dB below the carrier level.

Leading Particulars
Figure 7 (Sheet 2 of 4)

CHARACTERISTICS	DESCRIPTION
Analog Voice Transmitter (Con't)	
Transmitter Modulation Frequency Response	Flat within 6 dB from 300 Hz to 2500 Hz.
Audio Distortion	6% maximum for 30% modulation and 10% maximum for 90% modulation with a 0.5 volt input and a modulating frequency from 300 Hz to 2500 Hz.
Modulation Level	90% modulation minimum for an input level of 0.25 volts rms at 1000 Hz.
Analog Data Receiver	
Gain SELCAL/Output	0.6 volts rms minimum with a 2 µV signal modulated 30% at 1000 Hz into a 600-ohm load.
Frequency Response SELCAL Output	±2.5 dB from 312 Hz to 1200 Hz (post detection response with respect to 1000 Hz is ±4.5 dB from 300 Hz to 6600 Hz).
Distortion SELCAL Output	4.5% maximum with an input signal of 1000 µV modulated 30% at 1000 Hz and a level adjusted to provide 0.5 volts into a 600-ohm load.
AGC Attack Time SELCAL Output	Reaches 90% of its steady-state value within 30 milliseconds maximum after the step application of an RF carrier of 1000 µV modulated 30% at 1000 Hz.
AGC Decay Time SELCAL Output	Reaches 90% of its steady-state value within 45 milliseconds maximum after the receiver input of 1000 µV modulated 30% at 1000 Hz is step reduced to 10 µV.
Analog Data Transmitter	
Modulation Level Data Input	70% modulation minimum for a frequency of 1000 Hz at a -10 dBm level.
Frequency Response Data Input	Flat within 5.5 dB from 600 Hz to 6600 Hz.
Distortion Data Input	9.5% maximum distortion at modulation level up to 90% over frequency range of 600 Hz to 6600 Hz.

Leading Particulars
Figure 7 (Sheet 3 of 4)

CHARACTERISTICS	DESCRIPTION
Digital Data Receiver (750 Mode)	
Sensitivity	<0.01 message error rate @ -104 dBm (Mode A) $<10^{-3}$ Uncorrected BER @ -98 dBm (Mode 2)
Dynamic Range	Min. -7 dBm.
Adjacent Channel Rejection +/-25-kHz +/-50-kHz +/-100-kHz and beyond	 +44 dBc +50 dBc +60 dBc
Interference Rejection Out-of-Band Co-Channel	Per ARINC 750-3, para 4.3.4.3 -20 dBc Interferer
Channel Sensing	Modulated Signal Sensed (Mode A) Carrier Sensed (Mode 2)
Digital Data Transmitter (750 Mode)	
Output Power	25W nominal (Mode A) 17.5 +/- 2W (Mode 2)
Modulation Type and Data Rate	2400 bps Amplitude Modulated Minimum Shift Keying, AM-MSK (Mode A) 31,500 bps Differential 8-Phase Shift Keying, D8PSK (Mode 2).
Duty Cycle	20% as defined in ARINC 750-3 para. 4.2.2
Transmitter Emissions (Mode) Adjacent Channel +/- 25kHz (25kHz BW) +/- 25kHz (16kHz BW) +/- 50kHz (25kHz BW) +/- 100kHz (25kHz BW) Wideband Noise	 +2 dBm -18 dBm -28 dBm -38 dBm Decreases 5 dB/octave from +/-100-kHz to -53 dBm max emission in 25-kHz BW (118-136.975 MHz)
Phase/Amplitude Balance (Mode 2)	8% Error Vector Magnitude
Spurious Radiation	Per ARINC 750-3 para. 4.2.8.6
Tuning Time	100 ms
Transmitter Ramp-up	2 ms for Pre-key (Mode A) reaches 90% at least 3 symbols prior to Preamble (Mode 2)
Data Clock Stability	0.005%

Leading Particulars
Figure 7 (Sheet 4 of 4)

429 INPUT LABEL	RATE	DESCRIPTION
Tuning Bus A and B (Low Speed)		
030	200 ms	Tuning Frequency 25-kHz
047	200 ms	Tuning Frequency 8.33-kHz
276	500 ms	Voice/Data Indication
CMU Input Bus 1 and 2 (High Speed) (-0505, -2000, -2051)		
270	1 second	CMU Status Word
250, 251, 252, 253 (When Own Aircraft SDI is 0, 1, 2, or 3 respectively	Whenever Data available	CMU Solo words and BOP files
Data Loader Input Bus (High Speed)		
251	Follows ARINC 615 protocol	ARINC 615 Data loader
CMC Data Input Bus 1 and 2 (Low Speed)		
040	1 second (+.5)	City Pair 1
041	1 second (+.5)	City Pair 2
042	1 second (+.5)	City Pair 3
125	1 second (+.5)	UTC
126	1 second (+.5)	Flight Phase
155[1]	1 second (+.5)	Aircraft Configuration 1
156[1]	1 second (+.5)	Aircraft Configuration 2
157[1]	1 second (+.5)	Aircraft Configuration 3
227	1 second (+.5)	Command Word
233	1 second (+.5)	Flight Number 1
234	1 second (+.5)	Flight Number 2
235	1 second (+.5)	Flight Number 3
236	1 second (+.5)	Flight Number 4
237	1 second (+.5)	Flight Number 5
260	1 second (+.5)	Date
261[2]	1 second (+.5)	Flight Number
301	1 second (+.5)	Aircraft ID 1
302	1 second (+.5)	Aircraft ID 2
303	1 second (+.5)	Aircraft ID 3
304	1 second (+.5)	Aircraft ID 4
NOTES:		
[1] For Airbus Only (-0202, -0505, -2051)		
[2] For McDonnell Douglas Only (-0303)		

VDR ARINC 429 Input Labels
Figure 7.1

429 OUTPUT LABEL	RATE	DESCRIPTION
CMU Output Bus (High Speed) (-0505, -2000, -2051)		
270	1 second	VDR Status Word
172	1 second	System Address Label
377	1 second	Equipment Identifier
304	Whenever data to send to CMU	VDR Solo words and BOP Files
Data Loader Output Bus (High Speed)		
226	Follows ARINC 615 protocol	ARINC 615 Data Loader
CMC Output Bus (Low Speed)		
350	750 ms	Fault Summary Word
354	50 ms to 250 ms	LRU Identification (P/N and S/N)
356	50 ms to 250 ms 3 ms and 3 seconds max.	ISO 5 Fault Message Normal Mode Interactive Mode
377	1 second maximum	ARINC 429 Equipment Identification

VDR ARINC 429 Output Labels
Figure 7.2

B. Environmental Certification

The RTA-44D VHF Data Radio meets the environmental conditions of the Radio Technical Commission for Aeronautics (RTCA) document number DO-160C (DO-160D for -2000 and -2051), "Environmental Conditions and Test Procedures for Airline Electronic/Electronical Equipment and Instruments". The environmental certification categories of the VDR, P/N 064-50000-0101, -0110, -0202, -0303 and -0505, are: /A2D2/ZCA/MNB/XXXXXXAAAZZUZ/XXE2/XX.

The environmental certification categories of the VDR, P/N 064-50000-2000 and -2051 are: [(A2)(D2)Z]BAB[RB1]XXXXXXZAAZCRRL[A2C2]XXA.

TEST	CATEGORY FOR UNITS P/N 064-50000	
	-0101, -0110, -0202, -0303, -0505	-2000, -2051
Temperature and Altitude	A2D2	A2D2
In-Flight Loss of Cooling	Z	Z
Temperature Variation	C	B
Humidity	A	A
Operational Shocks and Crash Safety	Meets Specification	B
Vibration	MNB	RB1
Explosion Proofness	X	X
Waterproofness	X	X
Fluids and Susceptibility	X	X
Sand and Dust	X	X
Fungus Resistance	X	X
Salt Spray	X	X
Magnetic Effect	A	Z
Power Input	A	A
Voltage Spike	A	A
Audio Frequency Conducted Susceptibility - Power Inputs	Z	Z
Induced Signal Susceptibility	Z	C
Radio Frequency Susceptibility (Radiated and Conducted)	U	RR
Emission of Radio Frequency Energy	Z	L
Lightning Induced Transient Susceptibility	XXE2	A2C2
Lightning Direct Effects	X	X
Icing	X	X
Electrostatic Discharge		A

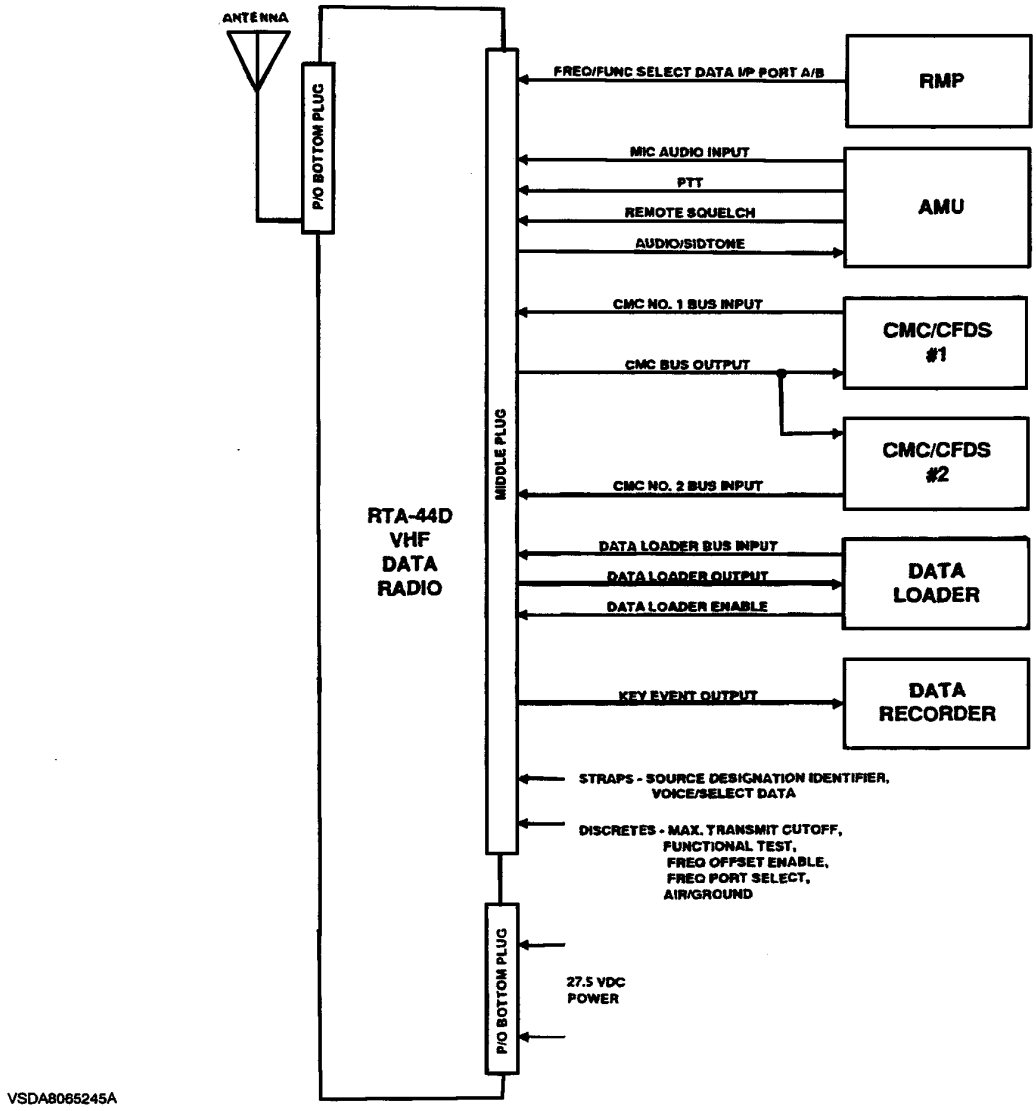
Environmental Certification Categories of RTA-44D
Figure 8

4. System Description

Figure 9 Deleted by Revision 3

A. VDR System

The VDR system consists of an antenna for its rf inputs and outputs, a control head or radio management panel (RMP) (refer to Figure 10) and an audio input source and output sink for its analog voice functions. The VDR system may also be connected to a Central Maintenance Computer (CMC) or Centralized Fault Display System (CFDS) to transfer maintenance data.



VHF Communications for Voice Operation
Figure 10

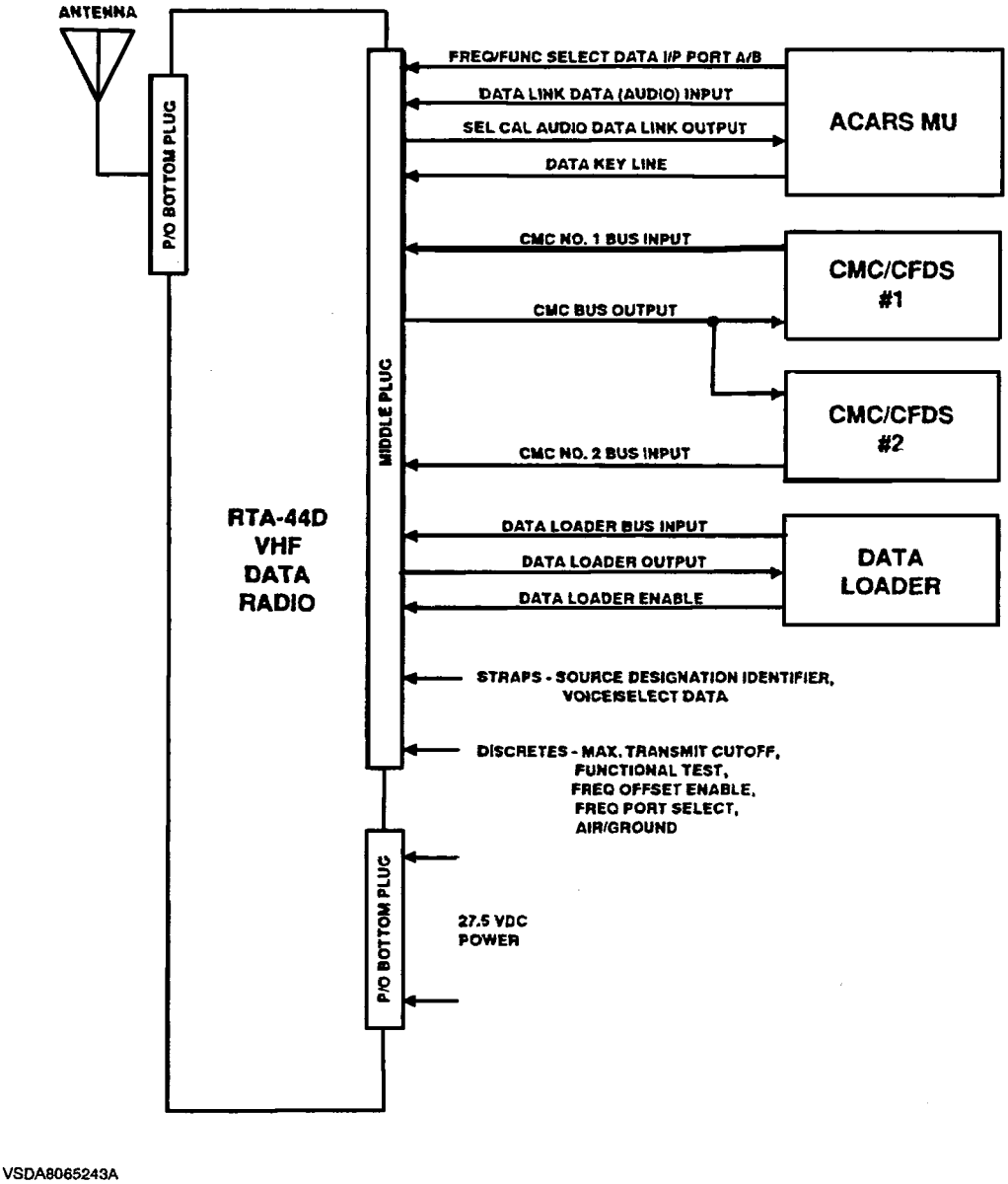
There are four primary modes of operation in the VDR system:

- ARINC 716 voice compatibility mode, 25-kHz or 8.33-kHz channel spacing,
- ARINC 716 data compatibility mode.
- ARINC 750 Mode A
- ARINC 750 Mode 2

The ARINC 716 voice and data modes emulate the current ARINC 716 radio functions found in the previous RTA-44A VHF Transceiver System.

B. ARINC 716 Data Mode

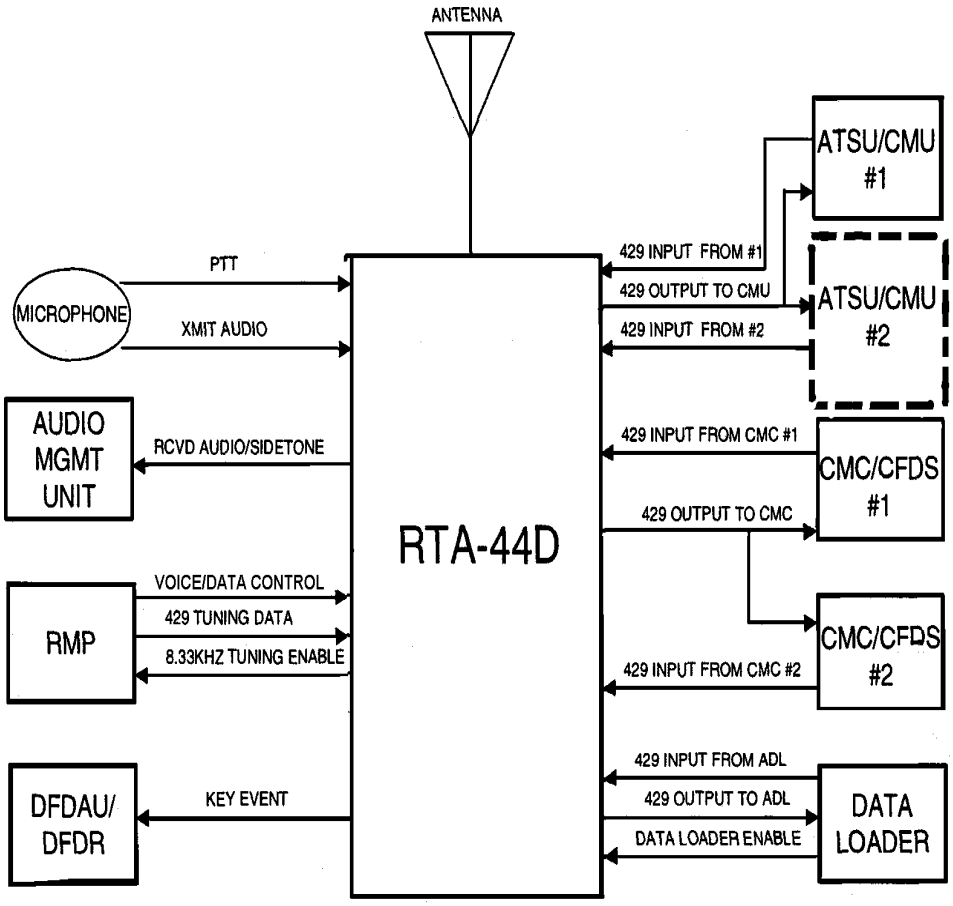
In ACARS, the VDR system is a simple transceiver with an analog interface to the ACARS Management Unit (MU) (refer to Figure 10.1).



ACARS Audio Interface
Figure 10.1

C. ARINC 750 Modes A and 2

Figure 11 illustrates the same interfaces when the radio is operating in ARINC 750 Mode with a compatible CMU, ACARS MU, or ATSU. This wiring configuration would be used for Mode A and Mode 2 operation. The Mode A and Mode 2 VDR can be installed in an ARINC 716 configuration, if Mode A and Mode 2 operation is not required.



RTA-44D External Interfaces (ARINC 750 Mode)
Figure 11

5. System Component Description

A. RTA-44D VHF Data Radio

The VDR is a VHF transmitter-receiver that provides modulation for double-sideband amplitude modulation for analog voice/data operation in the 25-kHz or 8.33-kHz spaced channels from 118.000 MHz to 136.975 MHz. Frequency selection is provided through a serial-digital format in accordance with ARINC Specification 429.

The VDR is completely solid state and is housed in an ARINC 3-MCU case per ARINC Specification 600. A handle is located on the front panel of the VDR to facilitate installation, removal, and transport of the VDR.

The VDR uses a low insertion force, size one shell ARINC 600 rear panel connector with two inserts. The middle insert is used for aircraft interconnections and the bottom insert is used for input power and coaxial antenna connectors. The keying pins are set to index pin code "04".

Forced air cooling, in accordance with ARINC specification 600, is required for cooling the VDR.

For maintenance purposes, a microphone jack and headphone jack are provided on the front panel of the VDR. A front panel display provides an interface to an operator via a liquid crystal display (LCD) that is visible from the front of the VDR to display messages in simple language in one of four modes: normal operation, BITE display, maintenance, and software loading.

Software loading and data recording of data to/from the CPU is via the front panel Personal Computer Memory Card International Association (PCMCIA) slot. Intel Series 1 Flash Cards with capabilities ranging from 1 up to 64 megabytes are supported.

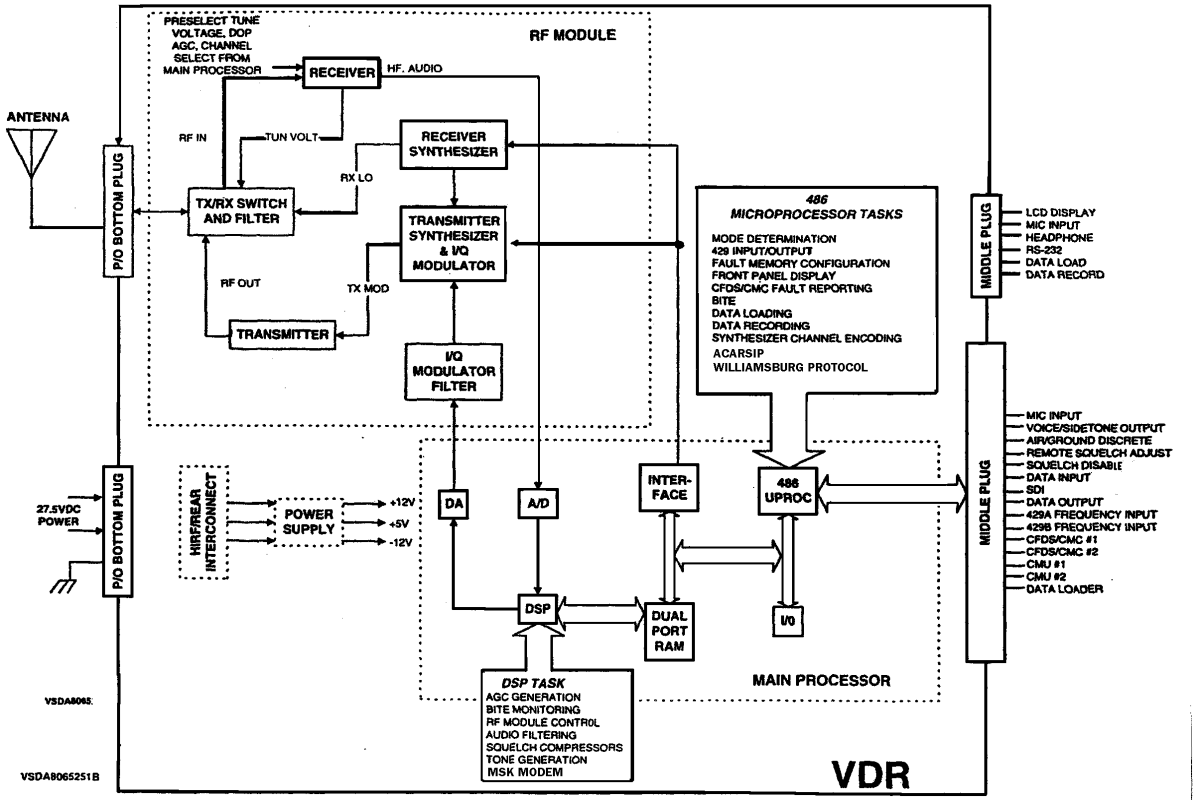
Two pushbutton switches allow operator interface with the VDR LCD.

In normal operation, the front panel LCD displays the unit's characteristics: unit identification, part number, and serial number. The BITE display mode is activated after manual self-test has been exercised either from the front panel test pushbutton or remotely. In the BITE mode, BITE status is reported and in the event of a detected failure, additional help screens are provided to locate the detected failure to a module. BITE help pages are provided. In the maintenance mode, a set of maintenance words are displayed and decoded showing the names of data fields and the value of the data. Maintenance help pages are provided. For loading software, a series of screens direct the operator during the data loading process. Software version and loading status are provided during the update process.

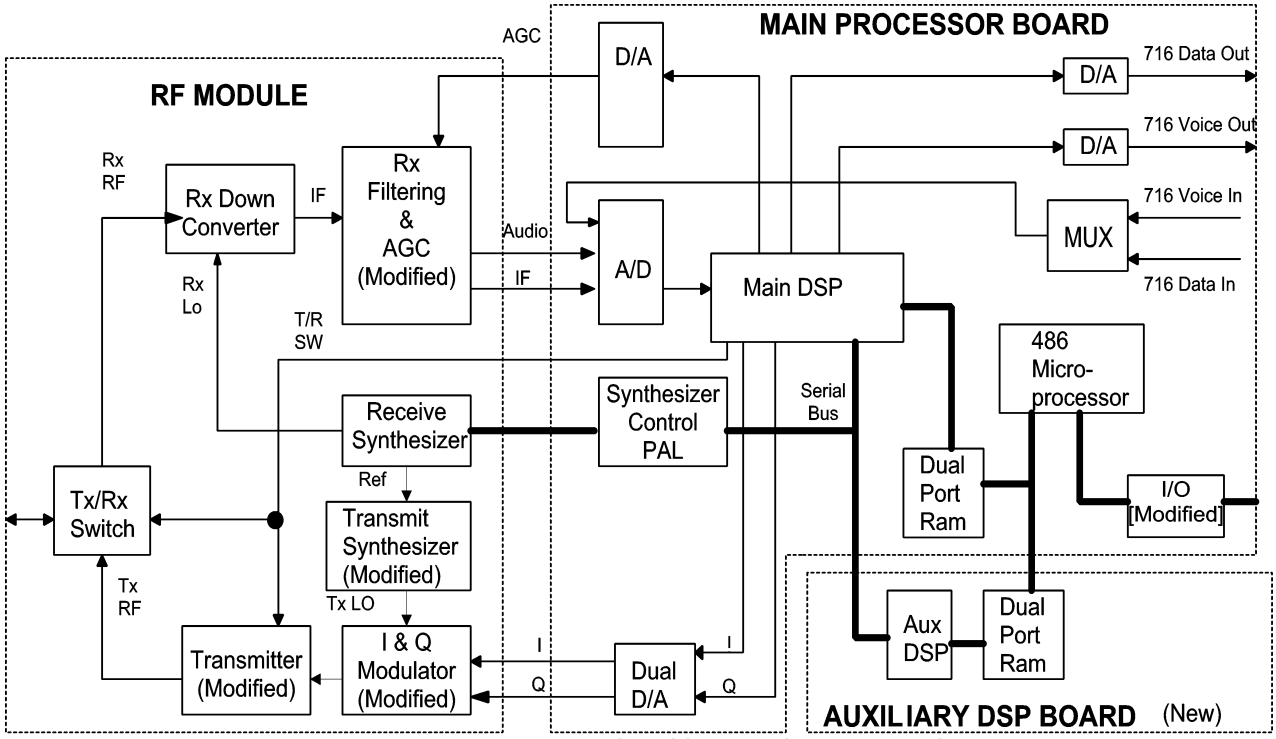
The VDR is partitioned into six subassemblies: RF Module, Main Processor Module, HIRF/Interconnect Module, Power Supply Assembly, Display Assembly, and Flash Card Memory Module (refer to Figure 12). An Auxiliary Processor Module was added for ARINC 750 Mode 2 (-2000, -2051) operation (refer to Figure 13).

B. Other Components in the System

Other VDR system components are not supplied by Honeywell AIrlines and Avionics Products. Information on these units must be obtained from their respective manufacturers.



RTA-44D VHF Data Radio, Simplified Block Diagram
Figure 12



RTA-44D Internal Architecture (-2000, -2051)
Figure 13

6. Operation

A. General

Operation of the VDR is either controlled by a control unit (for voice operation) which provides squelch threshold and operating frequency or by the MU or data operation.

The VDR has two basic areas of operation: as a standard double sideband AM analog voice transceiver and as a data-capable transceiver. Depending on the selected data mode, the VDR performs transceiver, modem, and/or link layer functions.

In an AVPAC system, the VDR is either a simple transceiver with an analog interface or a link layer bridge for the subnetwork. In an ACARS system, the VDR is either a simple transceiver with analog interface to the ACARS Management Unit or a MSK modem.

Three modes of operation are available: ARINC 716 voice mode compatibility, ARINC 716 data mode compatibility, and ARINC 750 data mode. The ARINC 716 voice and data modes emulate the current ARINC 716 radio functions. While in the ARINC 750 data mode, the VDR bridges ACARS traffic between the MU/VDR digital bus and its internal 2.4 Kbps MSK modem or bridge AVPAC traffic between the MU/VDR digital bus and its 2.4 Kbps MSK modem or its 31.5 Kbps DPSK modems.

The ARINC 716 voice mode is the basic VHF communications transceiver compatible voice mode defined in ARINC 716 and retained for backward compatibility. Voice signals are provided via normal audio I/O, with transmit and receive conditions initiated by the operator with the microphone. The RF signal in space is a double sideband amplitude modulation. Tuning/frequency selection is made by low-speed ARINC 429 data words from an associated radio control panel.

The ARINC 716 data mode is the basic VHF communications transceiver compatible data mode defined in ARINC 716 and retained for backward compatibility. Data is transferred via analog discrete methods using two conductor twisted pairs. Tuning data is provided via a low-speed ARINC 429 data bus, while transmit/receive commands are discrete digital signals from the management unit. Operating air/ground protocols are either ARINC 618 (ACARS) or ARINC 631 (AVPAC).

When in the ARINC 750 data mode, both tuning and digital data is received over a high-speed ARINC 429 port. While in the ARINC 750 mode, the management unit (MU) may command the VDR to operate as either an ACARS MAC bridge or as an AVPAC link layer bridge. While in this mode, the data rate and modulation scheme is determined by the management unit.

B. Basic Theory

(1) RF Module

When receiving, the VDR RF Module amplifies and converts the RF signals received by the antenna into analog signals for processing by the digital-signal processor (DSP) section of the main processor module. Conversely, when transmitting, the RF Module modulates the analog signals provided by the DSP section into RF signals for transmission through the antenna.

(2) Main Processor Module

The Main Processor controls the VDR's mode of operation, the aircraft interfaces, and the data displayed on the front panel. In the receive mode, the Main Processor Module processes the analog signals from the RF Module and generates the voice and MSK audio output when in the ARINC 716 voice or data mode. In the transmit mode, the Main Processor Module processes the voice and MSK audio inputs when in the ARINC 716 voice and data modes, and generates analog signals to the RF Module.

(a) DSP Section

The DSP section is used to process the analog outputs from the RF Module and to generate some of the control signals to the RF Module for transmit modulation, automatic gain control, and test signals.

The receiver 455-kHz I-F from the RF Module is digitized using an A/D converter. The A/D converter is also used to monitor signals from the BITE test points on the RF Module and

the power supply voltages. The digitized data from the A/D converter is stored in a FIFO which is accessed by the DSP.

A D/A converter routes the DSP generated AGC and test control signals to the RF Module. A second D/A converter provides the audio outputs which are amplified to provide up to 40 milliwatts into a load ranging from 200 ohms to 600 ohms.

Data is exchanged with the CPU section through a dual-port RAM (random access memory) providing maximum throughput of both processors.

(b) CPU Section

The CPU section is used to process the data from the DSP section, to provide information to the front panel display, and to provide the data and control signals to the I/O section.

The microprocessor in the CPU section controls all major functions to the VDR. Programmable logic devices serve as the microprocessor controller and provide the interfaces to the memory devices (boot routine, program, fault, and data), the data recorder/data loader flash card, and the front panel display driver.

Data is exchanged with the DSP section through a dual-port RAM.

(c) I/O Section

The I/O section provides the interfaces with other aircraft systems including the ACARS Management Unit (MU), Central Maintenance Computer (CMC), Data Loader, control panels, and displays.

ARINC 429 inputs from the tuning control panels, data loader, and CMC are processed by the ARINC 429 LSIs. These LSIs also provide the ARINC 429 data loader, and CMC outputs. External buffers are used to satisfy the ARINC 429 characteristics for the transmitters.

All discrete inputs and outputs external to the VDR are processed by discrete components and digital latches.

The I/O section also contains an RS-232C test interface. This test interface is also used to update serial number, part number and memory configuration, as applicable, utilizing the stand alone version of the Production Test Mode (PTM) Tool or PTM utility in the RTS software when the Main Processor Module is replaced.

(3) Auxiliary Processor Module

The Auxiliary Module's DSP communicates with the Main Processor's TMS320C31 via a single, bi-directional, on-chip serial port. 84-kHz sampled RF receiver data are transferred serially from the Main Processor's DSP to the Auxiliary Processor's DSP to be processed. The Auxiliary Module's higher performance TMS320VC33 DSP is then used to perform decimation, frequency correction, symbol synchronization, equalization, time tracking, D8PSK symbol decoding, descrambling, de-interleaving, RS block error correction, flag and bit removal, transmission header decoding, preamble detection, frequency error estimation and symbol timing estimation.

(4) Power Supply Module

The 27.5 volts dc aircraft power is converted by the Power Supply Module into the dc operating voltages required by the various modules within the VDR. A self-contained, high efficiency switching power supply is used to minimize power dissipation.

(5) HIRF/Rear Interconnect

To prevent High Intensity Radiation Fields (HIRF) or lightning from affecting operation by entering via rear connector cables, a HIRF compartment is formed in the rear of the VDR. The signal and power cables are filtered by using discrete and distributed filter elements and limiting devices on

the Rear Interconnect Module located inside this HIRF compartment. The filtered lines are then fed to the appropriate points in the VDR.

The VDR is packaged in an aluminum casting. This seamless main frame ensures HIRF cannot enter the unit through structural seams. The slots formed by the removable side covers are sealed against HIRF with protective gaskets and metal covers.

(6) Front Panel Display Assembly

The Front Panel Display Module is mounted behind the front panel and provides an interface to an operator via a low-power liquid crystal display (LCD) that is visible from the front of the VDR. In addition to the LCD, the module contains "Light Pipe" backlighting, temperature compensation circuitry, and a PC board containing an associated LCD driver, two pushbutton switches, and a D-sub, nine-pin, RS-232 serial type connector.

The LCD is a bit-mapped display capable of displaying alphanumeric and graphical symbols. Simple messages written in plain language minimize the potential for misunderstanding or incorrect interpretation. The LCD displays the following:

- Part Number/Software Identification,
- Status,
- Results of Level 1 BITE Tests,
- Maintenance Help Pages,
- Shop Maintenance Data,
- Flight Fault Memory Contents,
- Software Loading Status

(7) Memory Card Interface Module

The Memory Card Interface Module is used to load software program data into the CPU or record software program data from the CPU. The Memory Card Interface Module supports Series 2 FLASH cards via the front panel Personal Computer Memory Card International Association (PCMCIA) slot. Cards with the capabilities ranging from 1 up to 64 megabytes are supported. The FLASH card is inserted through the front panel. In one mode, data stored on the flash card memory module is used to update program or data memory in the VDR. In another mode, the flash card memory module functions as a data recorder.

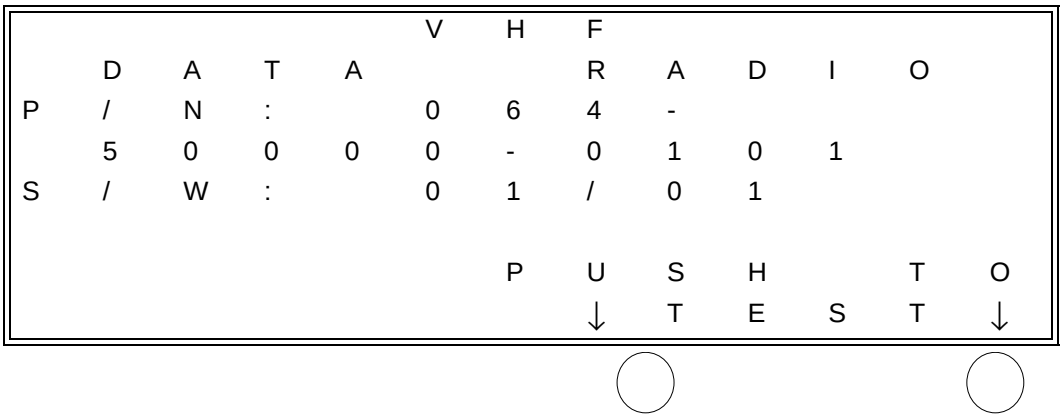
FAULT ISOLATION

1. General

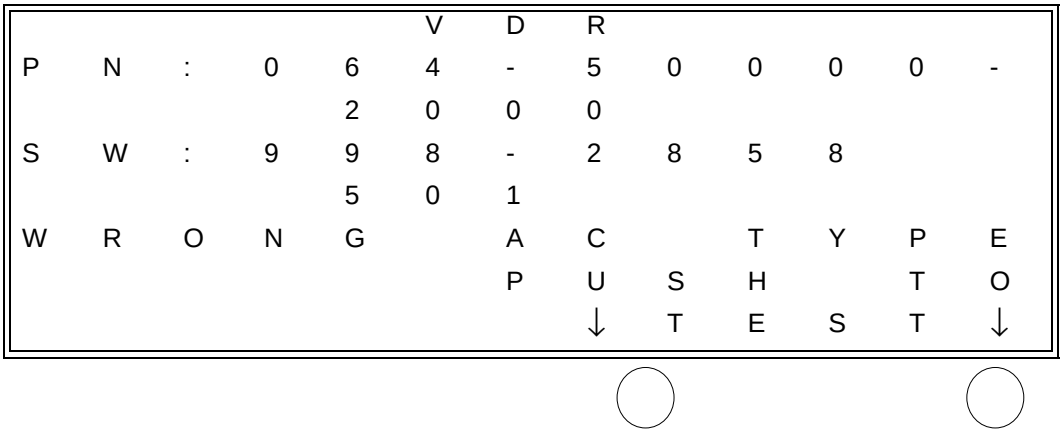
Fault isolation is the process of isolating the source of a system failure to an LRU (line replaceable unit) or to the aircraft wiring.

Fault isolation in the RTA-44D VHF Data Radio System includes a continuity check of the interwiring, and the assurance that proper installation techniques and procedures have been followed.

A functional self test of the LRU may be initiated by pressing the "test" key pushbutton switch as designated on the front panel LCD (Figure 101). Although the "Normal Mode" Screen indicates that this is actuated from the right key, the left key has the same function if pressed while the VDR LCD is in its Normal Mode.



Typical "Normal Mode" Screen (-0101, -0110, -0202, -0303 and -0505)



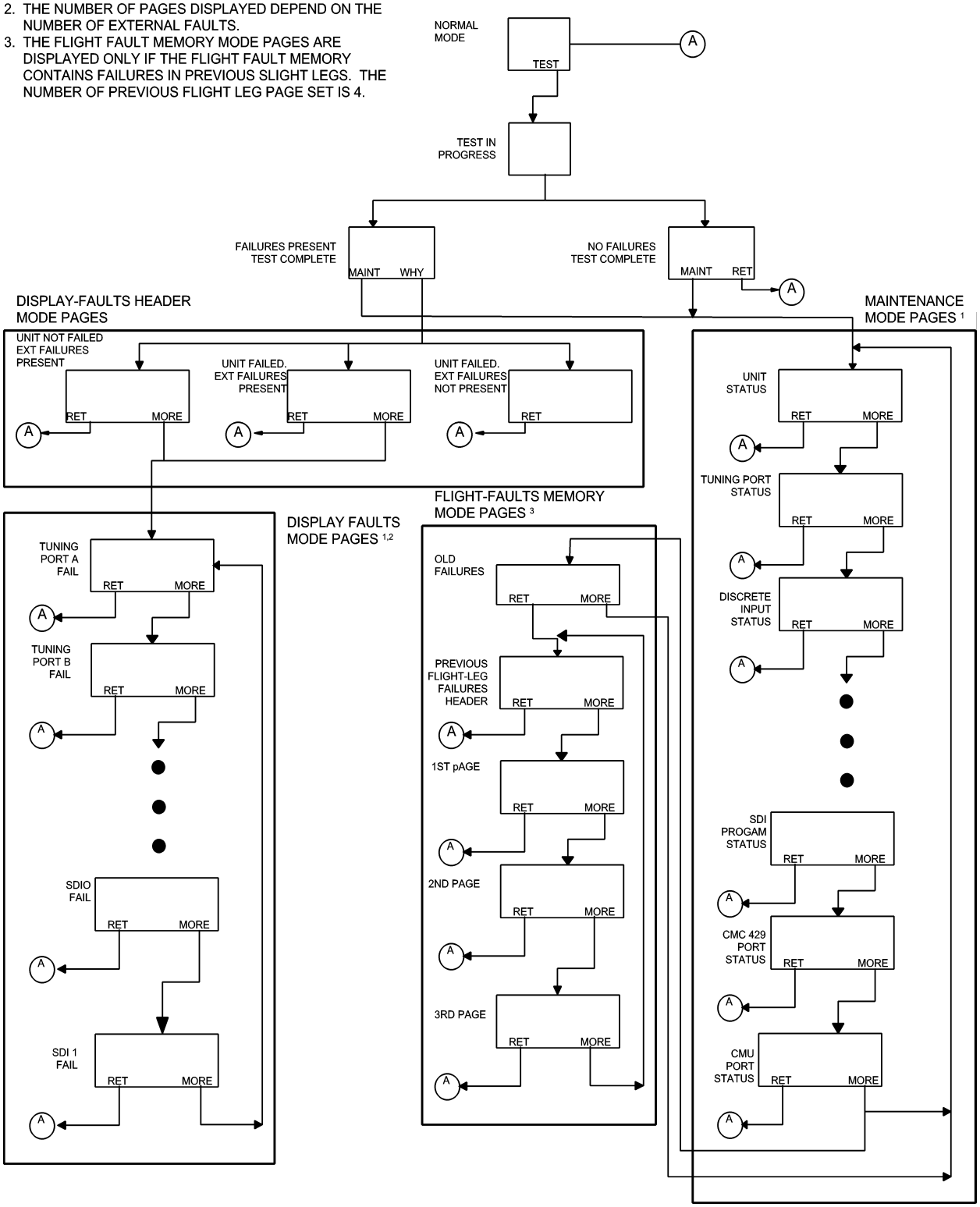
NOTE: "Wrong AC Type" appears only if discretes are not correct at MP-C11 and MP-A14 - see Figure 208 (11) .

Typical "Normal Mode" Screen (-2000 and -2051)
Figure 101

Figure 101.1 illustrates the control flow of the LCD screens (except for the data loading and data recording screens).

A complete functional test of the system can be performed as described in paragraph 7.B. in "Maintenance Practices" Section 200 of this manual.

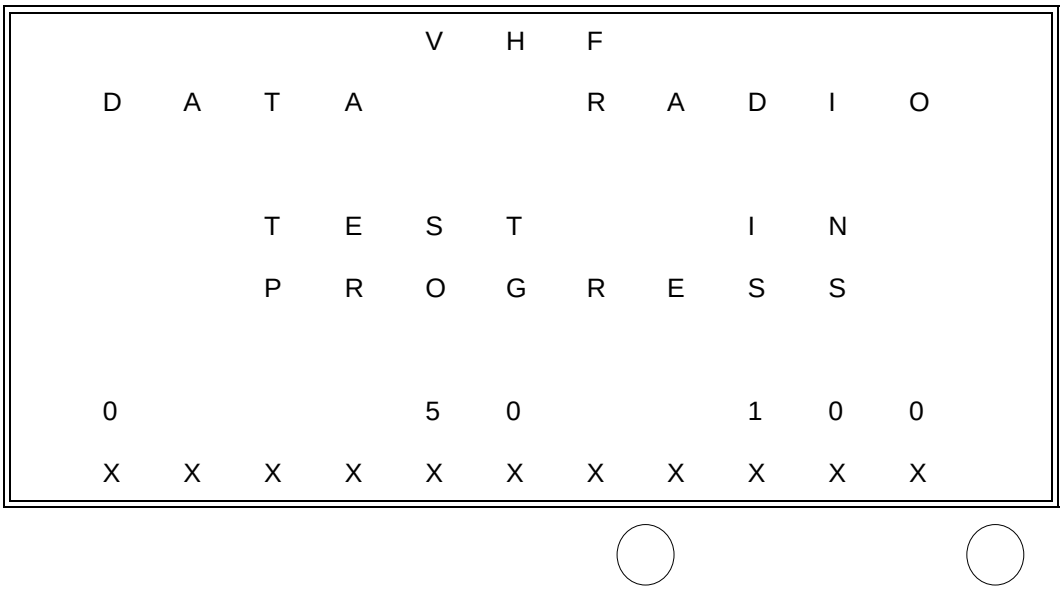
NOTES:
1. THE PAGES SHOWN HERE ARE SAMPLE PAGES ONLY.
2. THE NUMBER OF PAGES DISPLAYED DEPEND ON THE NUMBER OF EXTERNAL FAULTS.
3. THE FLIGHT FAULT MEMORY MODE PAGES ARE DISPLAYED ONLY IF THE FLIGHT FAULT MEMORY CONTAINS FAILURES IN PREVIOUS SLIGHT LEGS. THE NUMBER OF PREVIOUS FLIGHT LEG PAGE SET IS 4.



LCD Control Flow
Figure 101.1

2. Self-Test Mode

The Self-Test Mode starts by displaying the "Test in Progress" Screen (Figure 102) one second after pressing the "test" key. This is displayed for four seconds with a moving thermometer along the bottom of the LCD indicating the progress of the test from one to five seconds.



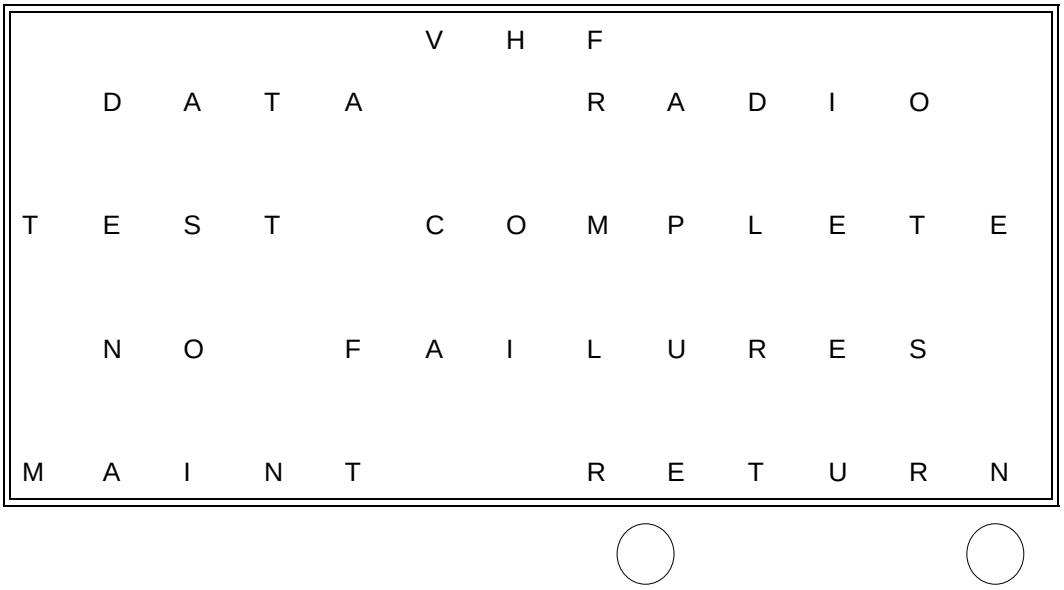
"Test in Progress" Screen
Figure 102

The "Normal Mode" Screen (Figure 101) is displayed for the first second of the test sequence.

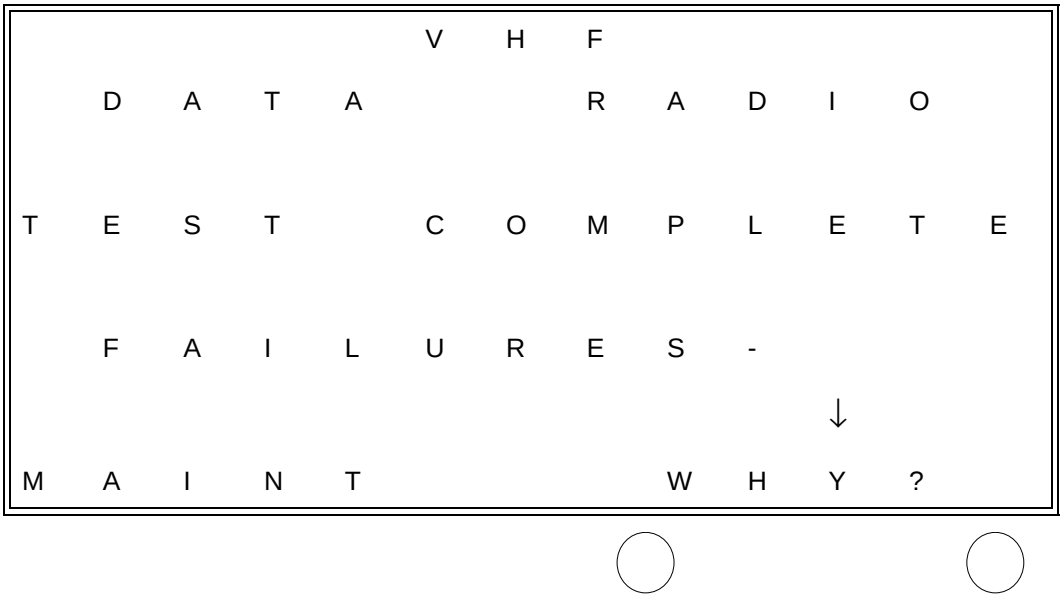
Once complete, the "Test Complete, No Failures" Screen is displayed (Figure 103), or the "Test Complete, Failures" Screen is displayed (Figure 104). Both screens contain two key selections each: "MAINT" and "RETURN" or "MAINT" and "WHY?", respectively.

- "MAINT" - For both screens, "MAINT" is located on the left key. This allows the initiation of the extended maintenance pages of the system for troubleshooting. Refer to paragraph 4.
- "RETURN" - In the "Test Complete, No Failures" Screen, the "RETURN" key to the right returns the system to its "Normal Mode" Screen (Figure 101).
- "WHY?" - In the "Test Complete, Failures" Screen, the "WHY?" key to the right puts the system into the Display-Failures Mode where individual system failures are displayed one per page. Refer to paragraph 3.

While in the Self-Test Mode, not pressing either key for five minutes causes the system to return to the "Normal Mode" Screen (Figure 101).



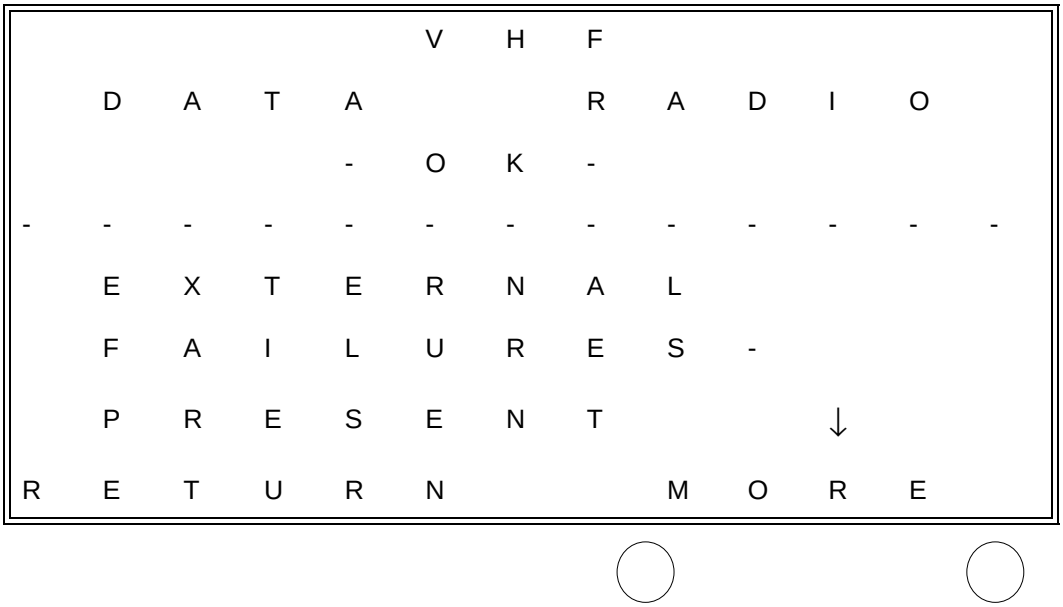
"Test Complete, No Failures" Screen
Figure 103



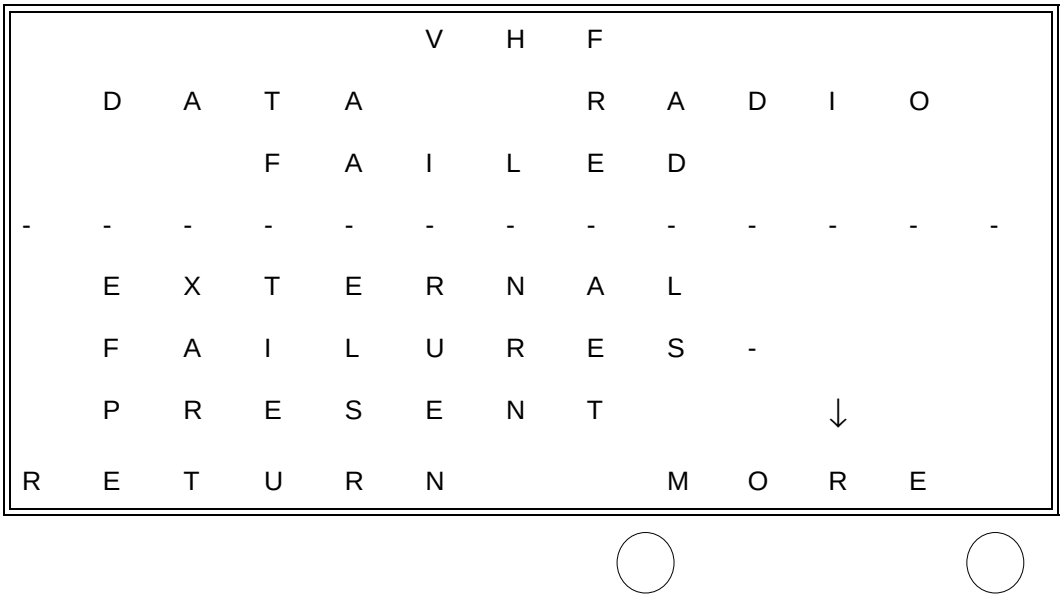
"Test Complete, Failures" Screen
Figure 104

3. Display-Failures Mode

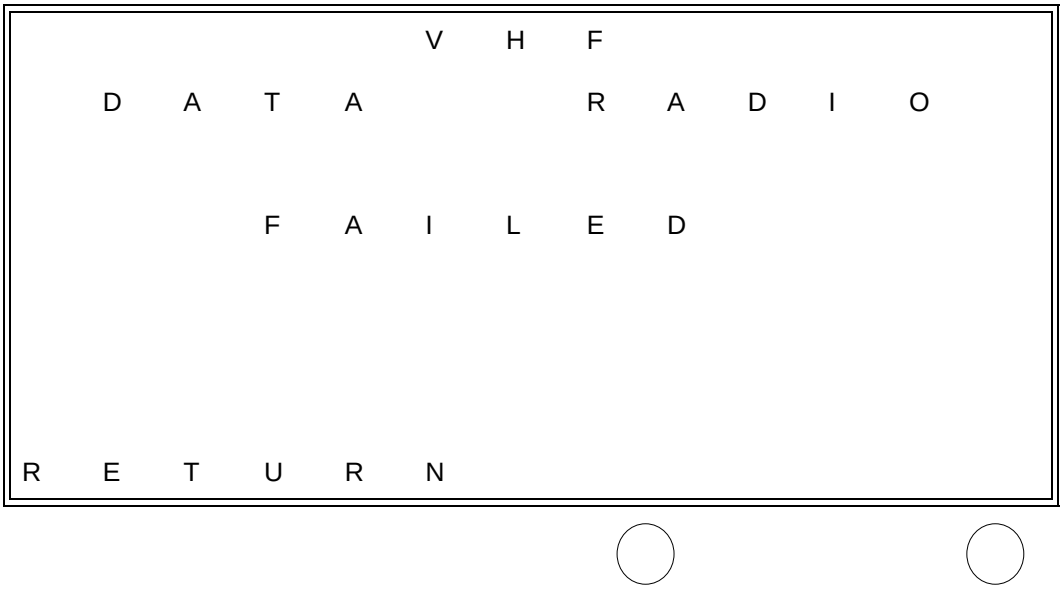
One of three failure possibilities exist: the VDR is okay, but there are external failures (Figure 105), the VDR failed and there are external failures (Figure 106), and the VDR failed, but there are no external failures (Figure 107).



"VHF Data Radio OK, External Failures Present" Screen
Figure 105



"VHF Data Radio Failed, External Failures Present" Screen
Figure 106



"VHF Data Radio Failed, External Failures Not Present" Screen
Figure 107

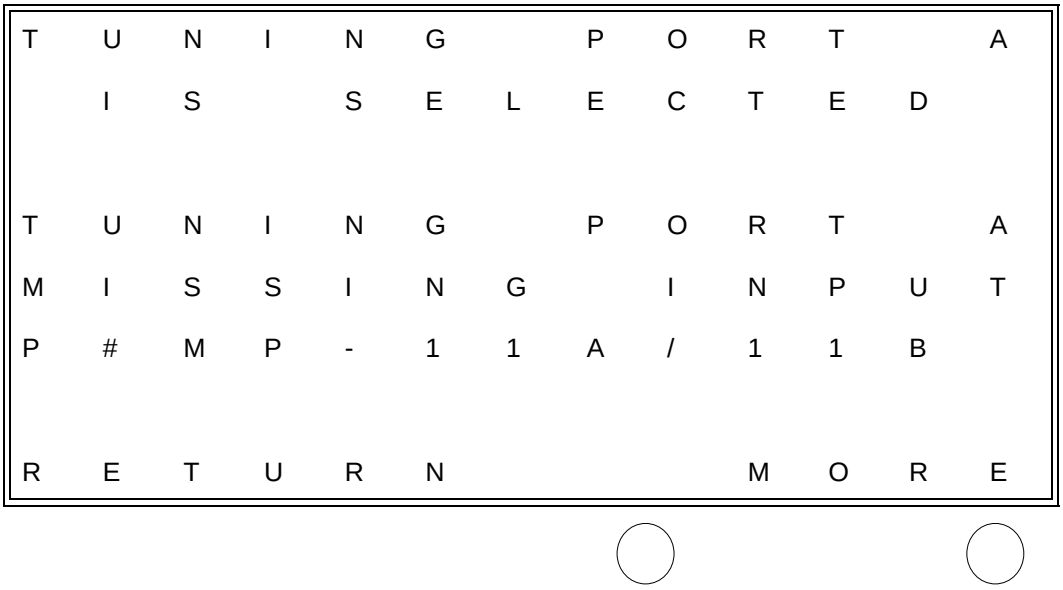
All "Display-Failures Mode" Screens have the "MORE" selection on the right key. The only exception is when there is only one failure page. This only happens when the VDR itself has failed and no other external failure exists (Figure 107).

- "MORE" - Pressing this key cycles through all of the failures present. When on the last page, the "MORE" key causes a return to the first displayed failure page (Figure 105 or 106).

All "Display-Failures Mode" Screens have the "RETURN" selection on the left key.

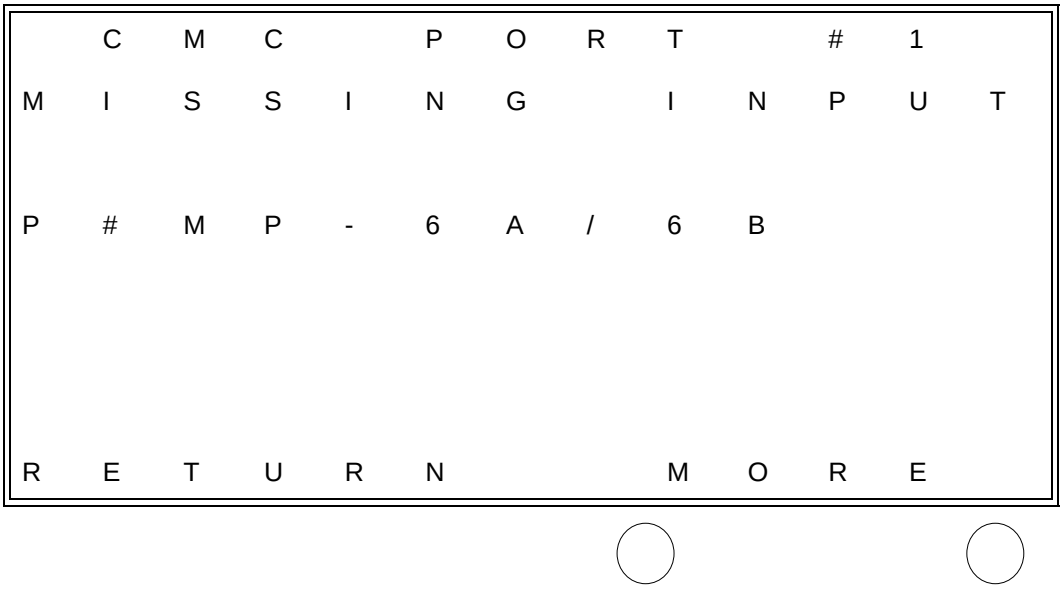
- "RETURN" - Pressing this key causes the system to return to the "Normal Mode" Screen (Figure 101).

While in the Display-Failures Mode, not pressing either key for five minutes causes the system to return to the "Normal Mode" Screen (Figure 101).



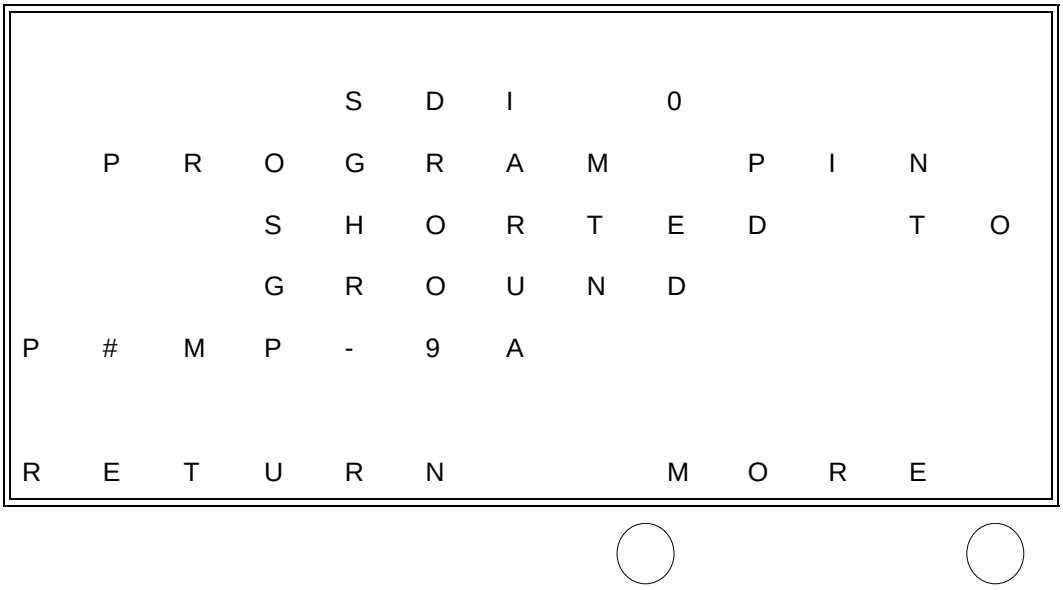
NOTE: Designation of pin names can be shown with numeric/alpha position in either format ANN or NNA, e.g. MP-11A is equivalent to MP-A11.

"Tuning Port A Failure" Screen
Figure 108

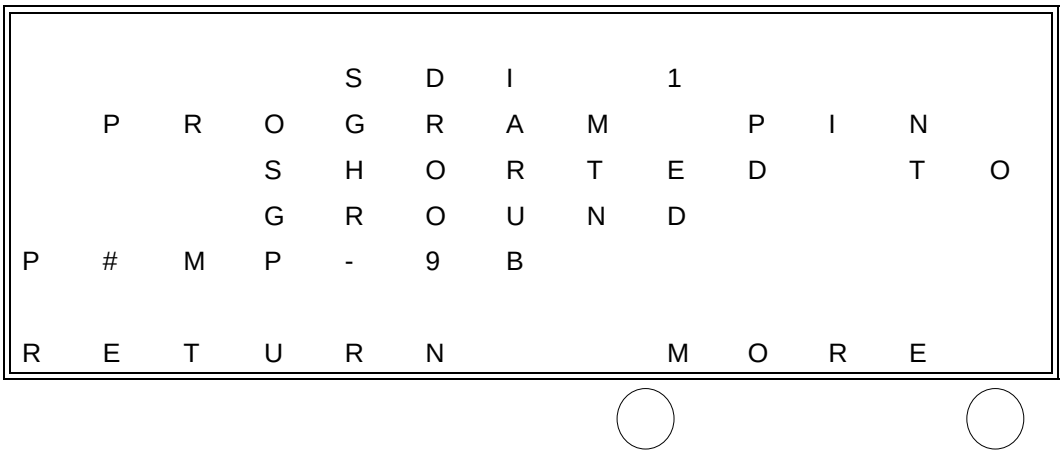


"Tuning Port B Failure" Screen
Figure 109

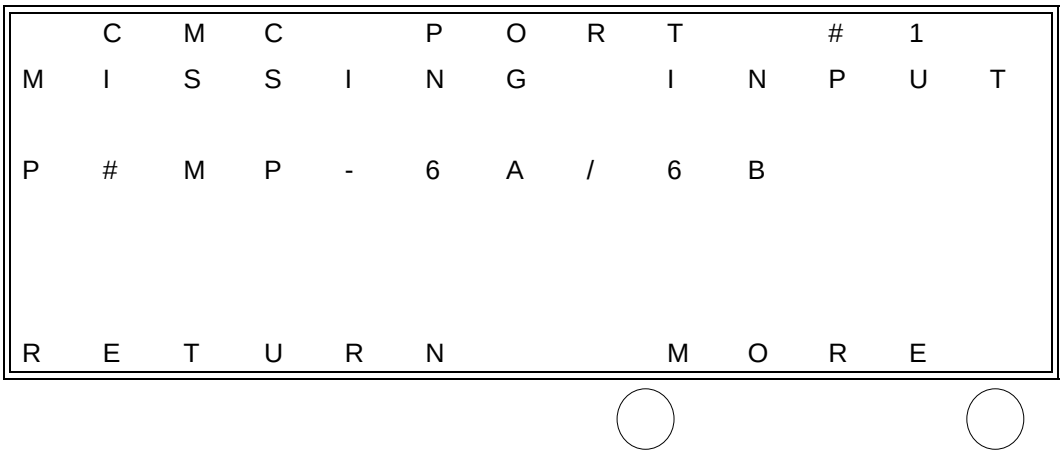
Figure 110 deleted by Revision No. 4



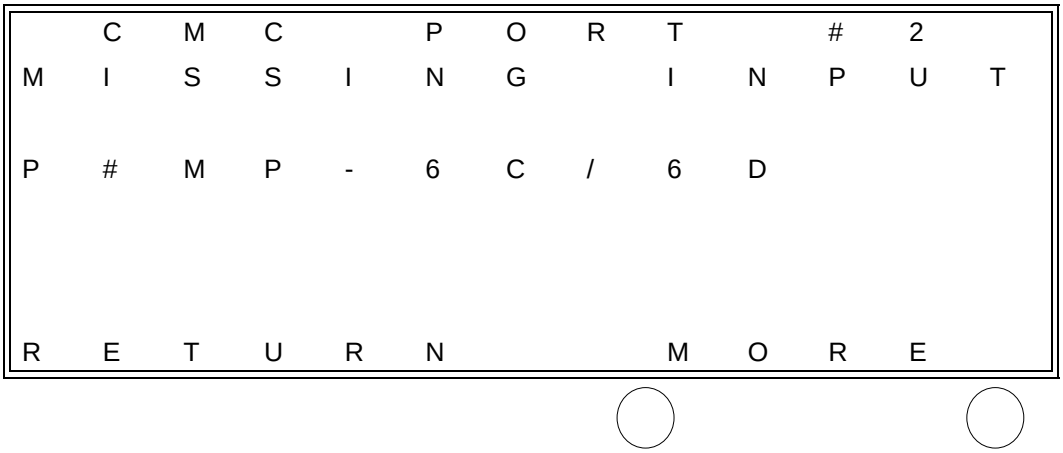
"SDI 0 Program Pin Failure" Screen
Figure 111



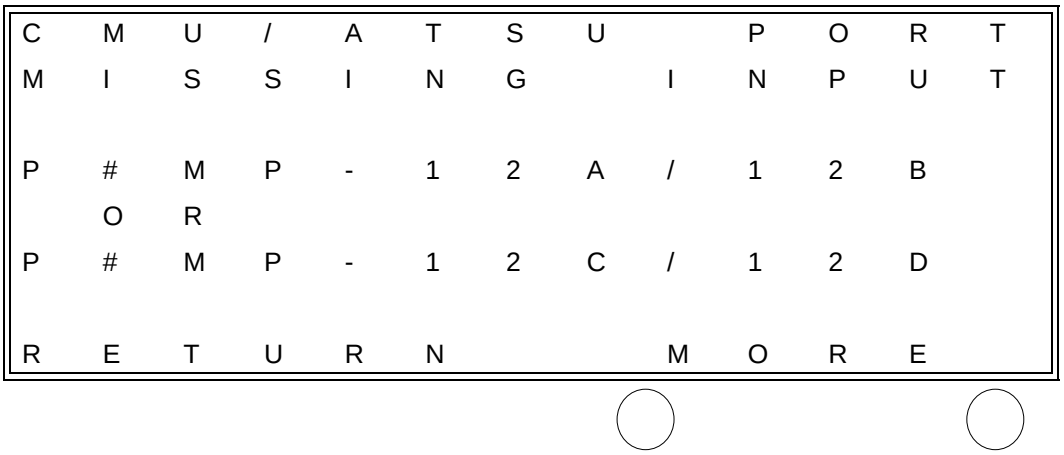
"SDI 1 Program pin Failure" Screen
Figure 112



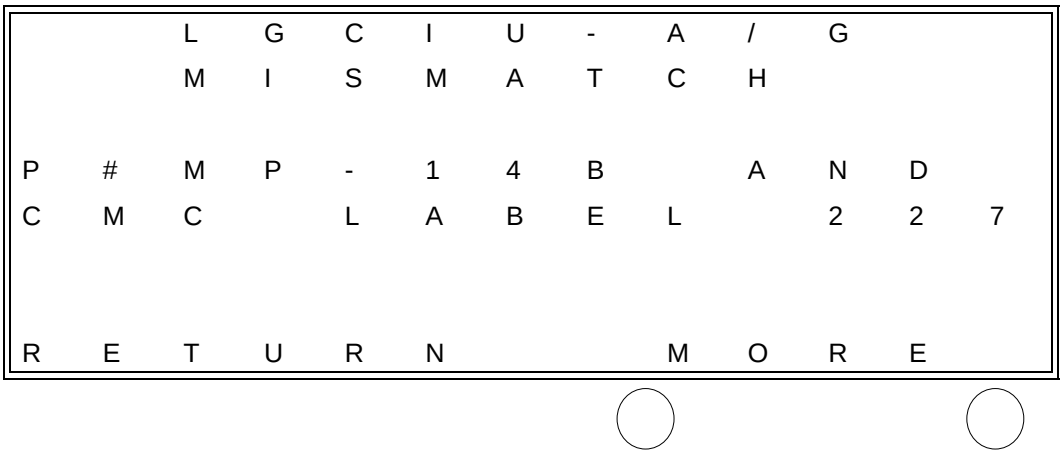
"CMC Port #1 Failure" Screen
Figure 113



"CMC Port#2 Failure" Screen
Figure 114



"CMU/ATSU Failure Page" Screen (-2000 and -2051)
Figure 114.1



"LGCIU Failure Page" Screen (-2000 and -2051)
Figure 114.2

4. Maintenance Mode

The Maintenance Mode is entered from either one of the two "Test Complete" Screens (Figures 103 or 104). The Maintenance Mode allows troubleshooting of all components of the VDR system, both internal and external.

All pages have the "MORE" selection on the right key.

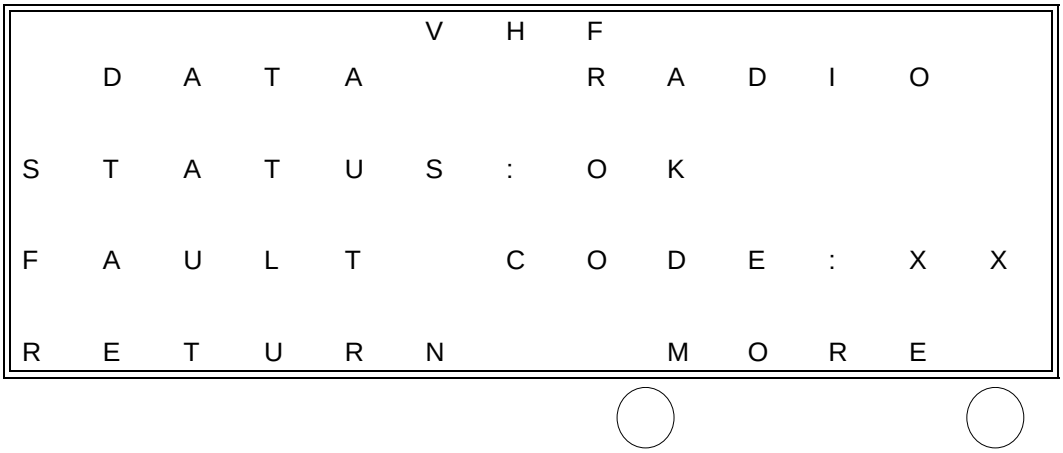
- "MORE" - Pressing this key cycles through all of the maintenance pages. When on the last page, the "MORE" key causes a return to the first displayed maintenance screen.

All pages have the "RETURN" selection on the left key.

- "RETURN" - Pressing this key causes the system to return to the "Normal Mode" Screen (Figure 101).

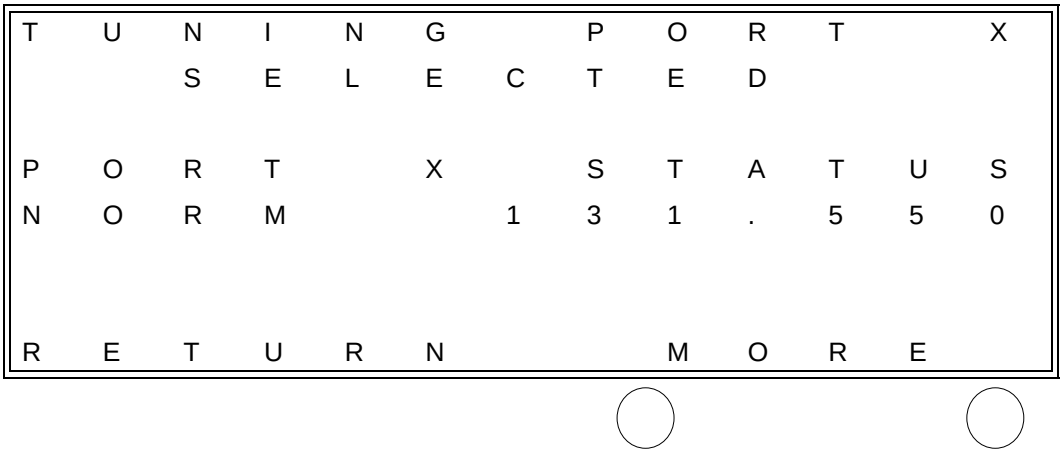
There is no timeout in the Maintenance Mode when the aircraft is on the ground. But while in the air, not pressing a key for five minutes causes the system to return to the "Normal Mode" Screen (Figure 101).

Figures 115 through 122 show typical Maintenance Mode Pages that may be encountered.

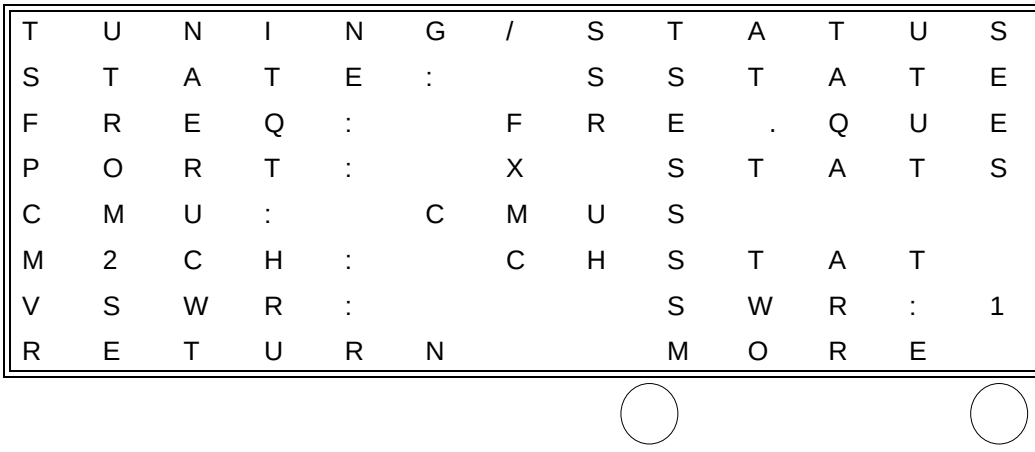


NOTE: The "Status" field displays "FAILED" if either an external or an internal failure is detected.

"VDR Unit Status (OK, Failed)" Screen
Figure 115



"Tuning Port Status (NORM, FAIL, TEST, NCD, NODAT)" Screen
Figure 116

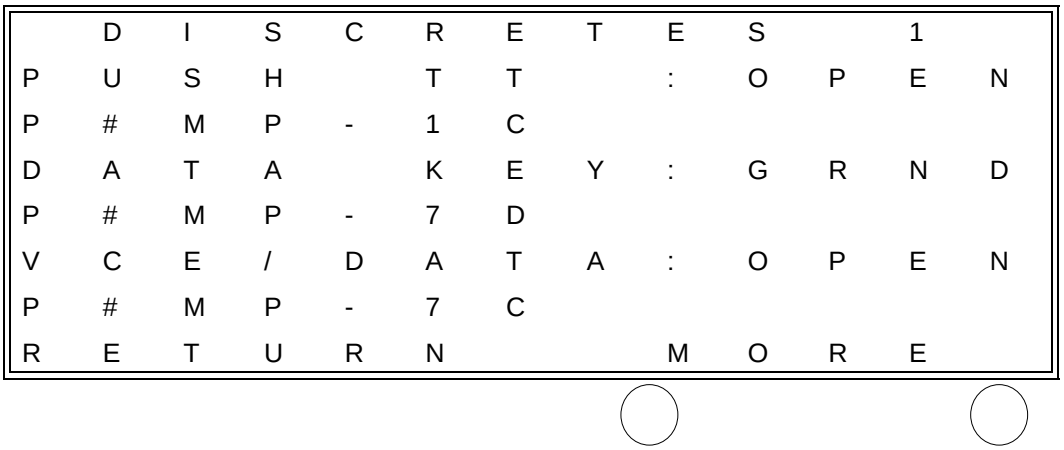


"Tuning Port Status Page" Screen (-2000 and -2051)
Figure 116.1

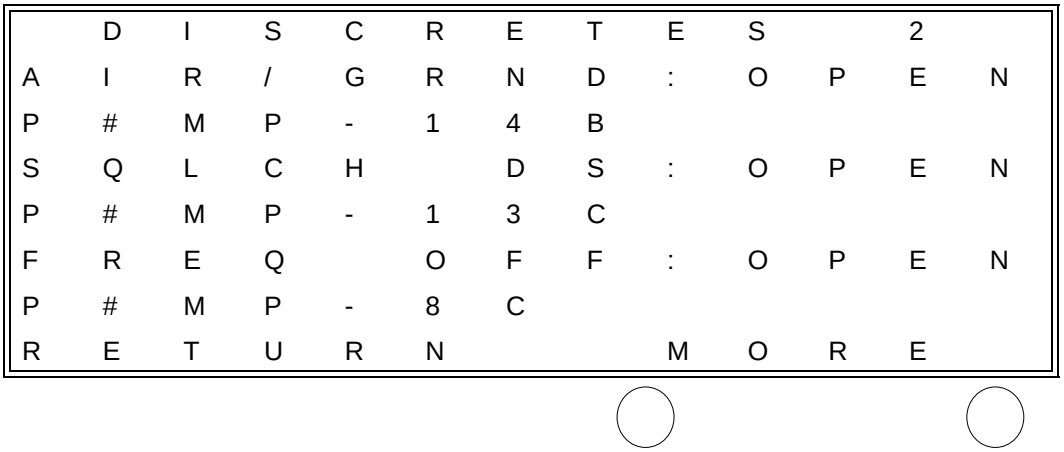
VARIABLE FIELD	VALID DATA
SSTATE	BERTM (S0) 716VP (S3)716DB (S6)750DSA (S7-A) 716VN (S1 716DP (S4)750DN (S7-N)750DR2 (S7-R2) 716DM (S2) 716VB (S5)750DRA (S7-RA)750DS2 (S7-2)
FRE.QUE	Operating Frequency (e.g. 131.550)
X	A, B
STATS	NORM, TEST, NCD, NODAT
CMUS	NULL, CMU1, CMU2
CHSTAT	N/A, TX. RXBUSY, RXIDLE

NOTE: See ARINC 750 specification for data definitions.

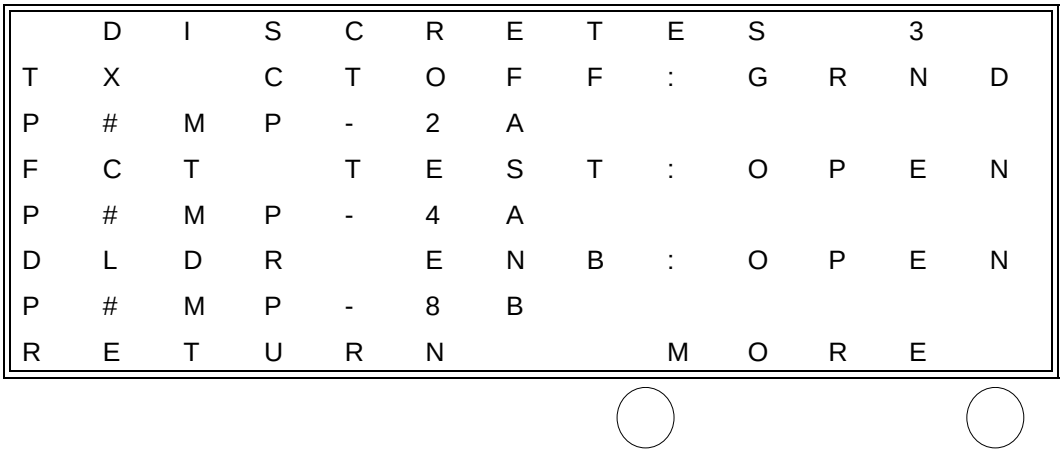
Valid Data Field Examples of "Tuning Port Status Page " Screen (-2000 and -2051)
Figure 116.2



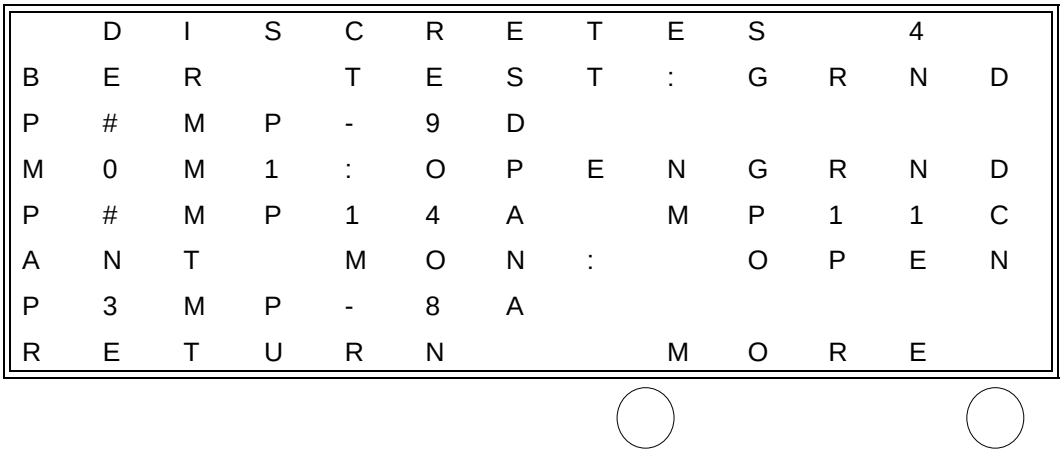
"Discrete Input Status Page 1 (OPEN, GRND)" Screen
Figure 117



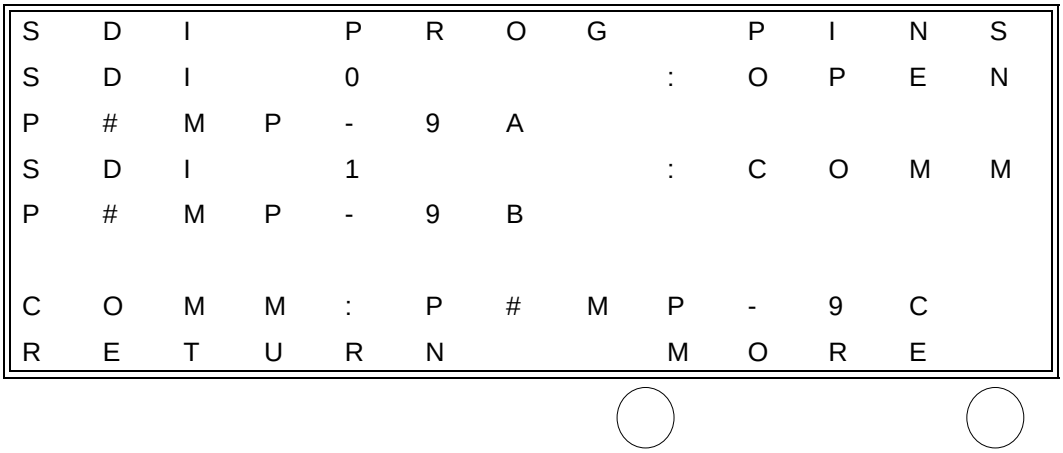
"Discrete Input Status Page 2 (OPEN, GRND)" Screen
Figure 118



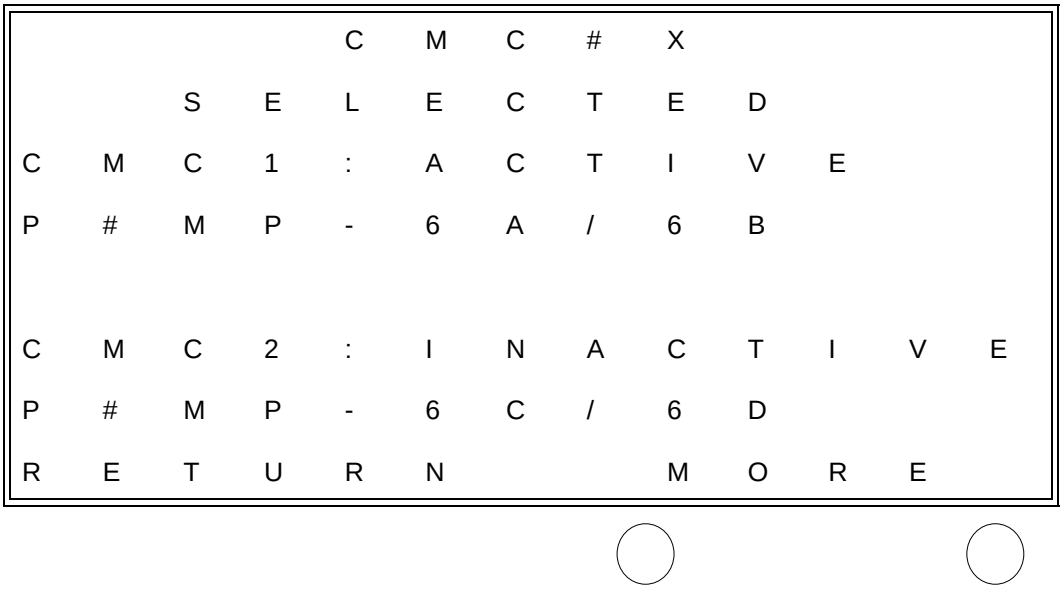
"Discrete Input Status Page 3 (OPEN, GRND)" Screen
Figure 119



"Discrete Input Status Page 4 (OPEN, GRND)" Screen (-2000 and -2051)
Figure 119.1



"SDI Program Pin Status Page (OPEN, COMM)" Screen
Figure 120



"CMC Port Status (ACTIVE, INACTIVE)" Screen
Figure 121

Figure 122 is eliminated by Revision 5 of this Maintenance Manual.

5. Flight Fault Memory Mode

When the Flight-Fault Memory contains failures from previous flight legs, an "Old Failures" Screen (Figure 123) is presented as the last page of the Maintenance Mode Screens. This page allows the viewing of previous flight leg failures, one flight leg at a time by pressing the "YES" key. Pressing the "MORE" key from this page bypasses this function and returns the system back to the first page of the maintenance data.

Once in the Flight-Fault Memory Mode, flight legs are displayed from the most recent, backwards. The VDR stores up to 10 "in air" failures and up to 3 "on ground" failures per flight leg, there will be up to four pages displayed on the LCD. There are over 120 different fault codes that can be stored for each of the 13 failures. These are described in the Component Maintenance Manuals (CMM) I.B. 1144A-2 (23-20-36) and I.B.1144A-3 (23-20-38), in the "Testing and Troubleshooting" Section.

The first page of each flight leg contains the date, flight number, aircraft number, and departure/destination stations, as shown in the "Previous Flight Legs Failures First Page" Screen (Figure 124). The second page displays failures 1-5, the third page displays failures 6-10 and the fourth page displays failures 11-13, as shown in the "Previous Flight Legs Data Page" Screens (Figure 125).

All flight fault memory pages have the "MORE" selection on the right key.

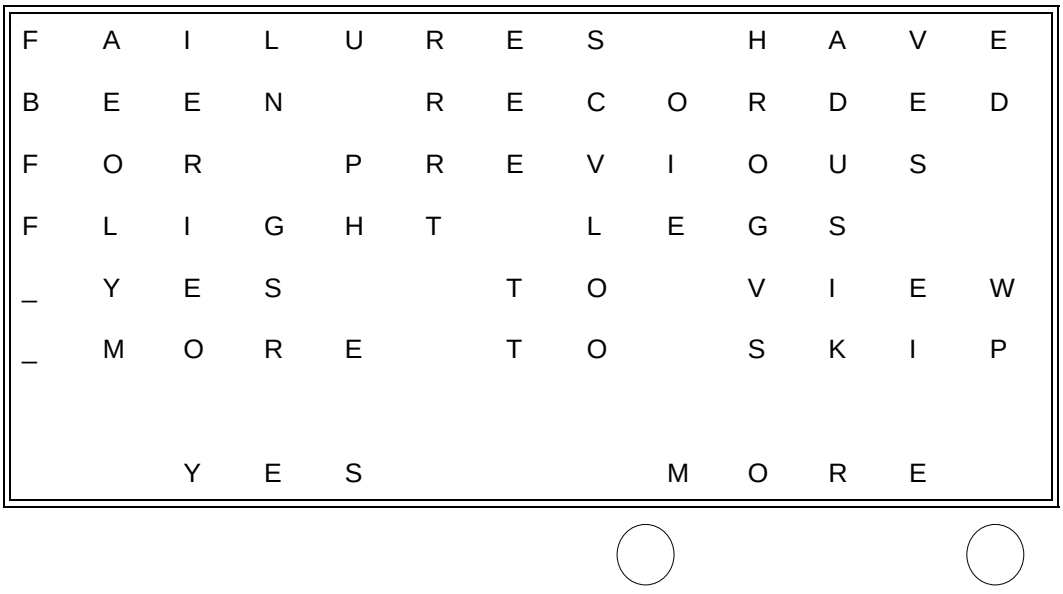
- "MORE" - Pressing the key cycles through all of the Flight-Fault Memory pages. When on the last page, the "MORE" key causes a return to the first page.

All flight fault memory pages have the "RETURN" selection on the left key.

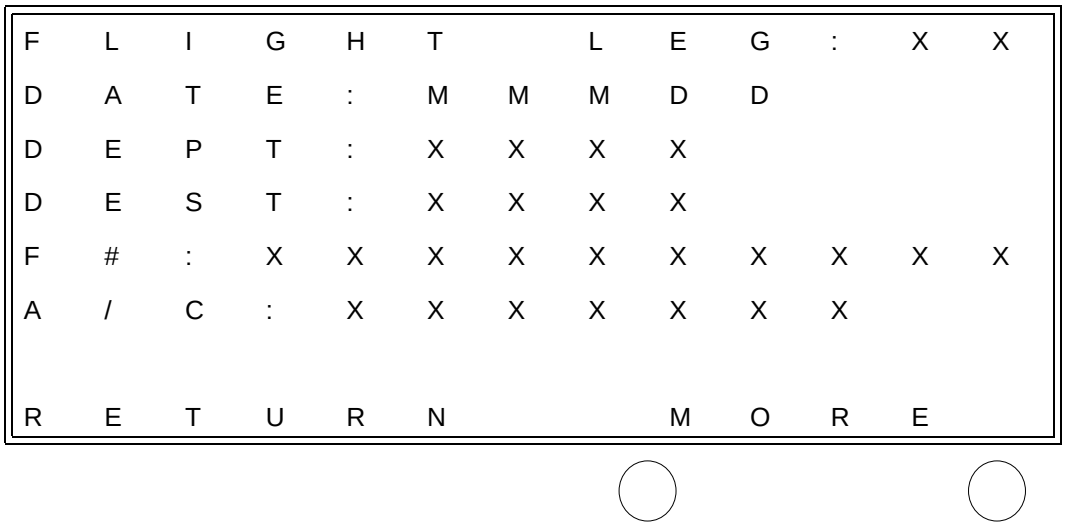
- "RETURN" - Pressing this key causes the system to return to Normal Mode Screen (Figure 101).

There is no timeout in this mode when the aircraft is on the ground. But, while in the air, not pressing a key for five minutes causes the system to return to the "Normal Mode" Screen (Figure 101)

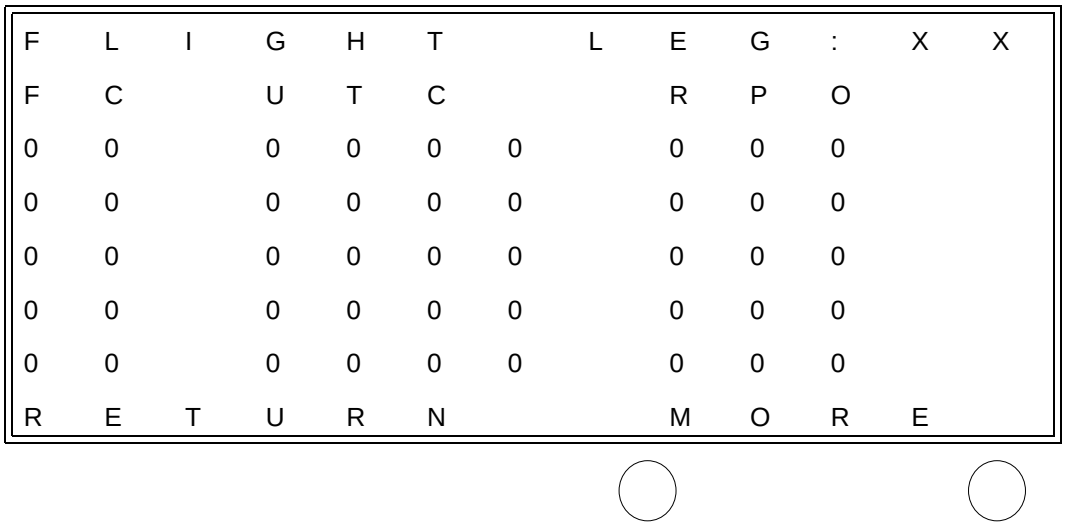
.



"Old Failures Page" Screen
"Previous Flight Legs Failures First Page" Screen
Figure 123



"Previous Flight Legs Failures First Page" Screen
Figure 124



NOTE: "FC" is fault code, "UTC" is time, "R" is repetition count, "P" is phase, "O" is origin.

"Previous Flight Legs Failures Data Page" Screen
(Three Screens per Flight Leg)
Figure 125

All "Display-Failures Mode" Screens have the "RETURN" selection on the left key.

- "RETURN" - Pressing this key causes the system to return to the "Normal Mode" Screen (Figure 101).

While in the Display-Failures Mode, not pressing either key for five minutes causes the system to return to the "Normal Mode" Screen (Figure 101).

MAINTENANCE PRACTICES

1. General

This section of the manual provides service personnel with installation and maintenance information for the RTA-44D VHF Data Radio (VDR) System. Installation instructions are supported by mechanical outline drawings and a electrical interconnection diagram. These drawings, located at the back of this section, should be reviewed by the installer, and requirements peculiar to the airframe should be established before starting the installation.

2. Inspection After Unpacking

CAUTION: THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. EQUIPMENT, MODULES, AND ESDS DEVICES MUST BE HANDLED WITH APPROPRIATE PRECAUTIONS.

Visually inspect the RTA-44D VHF Data Radio System and all associated equipments for possible damage which may have occurred during shipment. Inspect for dents, deep abrasions, chipped paint, etc. If any equipment is damaged, notify the transportation carrier immediately.

A Honeywell Airlines and Avionics Products test and inspection record and quality report tag is included with each shipped unit. This ensures the customer that the necessary production tests and inspection operations have been performed on that particular unit.

One copy of the report tag is affixed to each unit by the first assembly inspector. As the unit proceeds through production and stock to the shipping area, the appropriate blocks on the test and inspection record of the tag are stamped. This tag accompanies the unit when it is shipped to the customer. Customers are requested to complete the Honeywell Airlines and Avionics Products quality report portion of the tag and return it to the Honeywell Airlines and Avionics Products Quality Assurance Department. This portion of the tag provides Honeywell Airlines and Avionics Products with the necessary information required to evaluate shipping methods as well as test and inspection effectiveness.

Completed cards are accumulated to provide information for a periodic analysis.

3. Preinstallation Testing

The components in the RTA-44D VHF Data Radio System have been adjusted and tested prior to shipment. Therefore, preinstallation testing is not required. However, if preinstallation testing of the units is desired, refer to the customer acceptance criteria given in the Component Maintenance Manual for the appropriate unit in the system. Refer to Figure 4 in the "Description and Operation" Section of this manual for a list of related Component Maintenance Manuals.

4. Equipment Changes and Marking

Honeywell Airlines and Avionics Products uses a standardized marking system to identify equipment and their subassemblies which have had changes incorporated. Refer to the front of the appropriate Component Maintenance Manual for a list of Service Bulletins affecting the unit.

5. Interchangeability

The RTA-44D VHF Data Radio System will operate in any installation that complies with ARINC Characteristic 750; it will also operate as a RTA-44A VHF Transceiver System replacement in any installation that complies with ARINC 716. Refer to System Interwiring Diagram, Figure 208, for particulars.

6. Installation

A. General

The RTA-44D VHF Data Radio System should be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices, and in accordance with the instructions set forth in this publication. To ensure that the system has been properly and safely installed in the aircraft, the installer should make a thorough visual inspection and conduct an overall operational and functional check of the system on the ground prior to flight.

CAUTION: AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK SHOULD BE MADE WITH AIRCRAFT PRIMARY POWER BEING SUPPLIED TO THE MOUNT CONNECTORS TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN INTERWIRING DIAGRAM FIGURE 208.

B. Location of Equipment

Location of the RTA-44D VHF Data Radio System in the aircraft is not critical, as long as the environment is compatible with the equipment design. Refer to the Leading Particulars, Figure 7, in the "Description and Operation" section of this manual. Forced air cooling is required for cooling the RTA-44D VHF Data Radio in accordance with ARINC Characteristic 600. The associated cooling equipment must be mounted in accordance with the manufacturer's instructions.

Antenna mounting should be in accordance with the manufacturer's instructions for the antenna being used. The coaxial cable connecting the antenna to the mount should be as short and direct as possible and any required bends should be gradual. When two or more RTA-44D VHF Data Radios are installed in an aircraft, it is necessary to provide adequate space isolation between antennas of each system to ensure that the use of one transceiver does not interfere with reception from another system. A minimum of 35 dB of space isolation should be provided, and any steps which can be taken to provide further isolation should be considered. Maximum cable loss should be < 3dB.

Control unit location and mounting can be determined by mutual agreement between the user and airframe manufacturer.

C. Interwiring and Cable Fabrication

(1) General

Figure 208 is the complete aircraft interwiring diagram for a single RTA-44D VHF Data Radio System and associated components. This diagram requires thorough study before the installer begins installation of the aircraft wiring.

When two or more systems are being installed in the aircraft, the interconnecting wiring shown in Figure 208, as well as all other installation instructions must be duplicated.

Cabling must be fabricated by the installer in accordance with Figure 208. Wires connected to parallel pins should be approximately the same length, so that the best distribution of current can be effected. Honeywell Airlines and Avionics Products recommends that all wires, including spares, shown on interwiring diagram Figure 208 be included in the fabricated harness. However, if full ARINC wiring is not desired, the installer should ensure that the minimum wiring requirements for the features and functions to be used are incorporated.

NOTE: To allow for inspection or repair of the connector, or the wiring to the connector, sufficient lead length should be left so that the rear connector assembly can be pulled forward several inches when the mounting hardware for the rear connector assembly is removed. A bend should be made in the harness near the connector to allow water droplets, that might form on the harness from condensation, to drip off at the bend and not collect at the connector.

When the cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chafing. Additional protection should also be provided in all locations where the cables may be subject to abuse. In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pick-up and similar interference. When routing cables through the airframe, try to avoid running cables or wire close to power sources (400-Hz generator, etc). If unavoidable, the cables should cross high-level lines at a right angle, or high-quality shielded conductors should be used.

If a cable must pass through a bulkhead between pressurized and unpressurized zones, this passage must conform to the aircraft manufacturer's specifications.

The assembler must be knowledgeable of any system variations peculiar to the installation, and must thoroughly understand the complexities associated with handling related problems of line lengths, capacitance, and of susceptibility to interference.

Electrical bonding interface characteristics per ARINC 600 Section 3.2.4 states that ground path resistance should not exceed 0.5 milliohms.

The following determinants are the responsibility of the installation agency for fabrication of the wiring harness, see Figures 201 and 208.

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPA1	Input	Mic Audio Input (HI)	Microphone audio input. Part of the standard four wire microphone interwiring as described in Attachment 6 of ARINC 716-10. Required for ARINC 716 VHF COMM only.
MPB1	Input	Mic Audio Input (LO)	
MPC1	Input	Mic PTT	Microphone push-to-talk discrete input. Gnd/Low = Transmitter keyed; Open/High = Transmitter not keyed. Part of the standard four wire microphone interwiring as described in Attachment 6 of ARINC 716-10. Required for ARINC 716 VHF COMM only.
MPD1	Output	Key Event	Discrete input to Flight Recorder. Follows the state of Mic PTT input. Gnd/Low = Transmitter keyed; Open/High = Transmitter not keyed. Required for ARINC 716 VHF COMM only.
MPA2	Input	Max. Trans Time Cutoff Function	Discrete input that enables the maximum transmit cutoff function. Gnd/Low = Cutoff disabled; Open/High = Cutoff enabled.

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 1 of 6

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPB2	-	Mic Input Ground	Required for ARINC 716 VHF COMM only.
MPC2	Input	Data Loader Input Bus A	A high speed ARINC 429 input port to allow onboard data loading for software.
MPD2	Input	Data Loader Input Bus B	
MPA3	Input	Optional Remote Squelch (HI)	To accommodate an optional remote squelch adjustment if so required or provided. Required for ARINC 716 VHF COMM only.
MPB3	Input	Optional Remote Squelch (ARM)	
MPC3	Input	Optional Remote Squelch (LO)	
MPD3	-	DC Ground	Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
MPA4	Input	Functional Test	Discrete input that activates LRU functional test function. Gnd/Low = activate functional test. Required for ARINC 716 VHF COMM
MPB4	-	Audio Ground	Required for ARINC 716 VHF COMM only.
MPC4	Output	Data Loader Output Bus A	A high speed ARINC 429 output port to allow onboard data loading for software.
MPD4	Output	Data Loader Output Bus B	
MPA5	Input	Data Link Data Input (HI)	Analog 2400 bps ACARS data input. Required for ARINC 716 VHF COMM only.
MPB5	Input	Data Link Data Input (LO)	
MPC5	-	Reserved #1	Leave open.

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 2 of 6

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPD5	Output	8.33-kHz Programming	Discrete output that indicates to control panel the VDR is capable of 8.33-kHz or 25- kHz operation. This output is internally grounded.
MPA6	Input	Data from OMS/CFDS #1 Input Port (A)	One of two low speed ARINC 429 data input ports provided for dual OMS/CFDS's. Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
MPB6	Input	Data from OMS/CFDS #1 Input Port (B)	
MPC6	Input	Data from OMS/CFDS #2 Input Port (A)	One of two low speed ARINC 429 data input ports provided for dual OMS/CFDS's. Required for ARINC 750 VDR only.
MPD6	Input	Data from OMS/CFDS #2 Input Port (B)	
MPA7	Input	Freq/Funct Select Data I/P Port B (A)	One of two low speed ARINC 429 input ports to provide frequency tuning data. Required for ARINC 716 VHF COMM only.
MPB7	Input	Freq/Funct Select Data I/P Port B (B)	
MPC7	Input	Voice/Data Select	Discrete input that enables either the PTT key line (MPC1) or the Data key line (MPD7). Gnd/Low = Data Key line enabled; Open/High = PTT enabled. Required for ARINC 716 VHF COMM only.
MPD7	Input	Data Key Line	Discrete input that keys the transmitter. Gnd/Low = Transmitter keyed; Open/High = Transmitter not keyed. Required for ARINC 716 VHF COMM only.
MPA8	-	Spare	
MPB8	Input	Data Loader Enable Input	Discrete input to allow onboard data loading of software. Required for ARINC 750 VDR only.

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 3 of 6

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPC8	Input	Freq Offset Enable	Discrete input that enables the offsetting of the transmit frequency by a board-strap programmable value. Gnd/Low = Frequency offset enabled; Open/High = Frequency offset disabled. Required for ARINC 716 VHF COMM only.
MPD8	-	Data Key Line Return	Required for ARINC 716 VHF COMM only.
MPA9	Input	SDI Bit 0 Prog	A discrete input pair prewired at the rear connector to identify the specific VHF radio location in the aircraft. Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
MPB9	Input	SDI Bit 1 Prog	
MPC9	-	SDI Prog Pin Common	Ground for the SDI code inputs. Required for ARINC 716 VHF COMM only.
MPD9	Output	AGC OUT	AGC output signal for test purposes.
MPA10	-	Spare	
MPB10	-	Spare	
MPC10	Output	Data to CMU #1, CMU #2 Output Port (A)	A high speed ARINC 429 output port to CMU/MU/ATSU's #1 and #2. Required for ARINC 750 VDR only.
MPD10	Output	Data to CMU #1, CMU #2 Output Port (B)	
MPA11	Input	Freq/Funct Select Data I/P Port A (A)	One of two low speed ARINC 429 input ports to provide frequency tuning data. Required for ARINC 716 VHF COMM only.
MPB11	Input	Freq/Funct Select Data I/P Port A (B)	
MPC11	Input	Maintenance System ID 1	Identifies CFDS type along with MPA14 (See Figure 208).
MPD11	Input	Freq Port Select	Discrete input used to select either Frequency/Function Select Data I/P Port A or B. Gnd/Low = Select Port A, Open/High = Select Port B. Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 4 of 6

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPA12	Input	CMU #1 Input Bus A	A high speed ARINC 429 input port from CMU/MU/ATSU #1. Used to receive commands/status/data in Williamsburg files, and periodic and aperiodic ARINC 429 words. Required for ARINC 750 VDR only.
MPB12	Input	CMU #1 Input Bus B	
MPC12	Input	CMU #2 Input Bus A	A high speed ARINC 429 input port from CMU/MU/ATSU #2. Used to receive commands/status/data in Williamsburg files, and periodic and aperiodic ARINC 429 words. Required for ARINC 750 VDR only.
MPD12	Input	CMU #2 Input Bus B	
MPA13	Output	SELCAL Audio and Data Link Output (HI)	An analog output to provide 2400 bps MSK data to the ACARS MU. May also be used for SELCAL provisions. Required for ARINC 716 VHF COMM only.
MPB13	Output	SELCAL Audio and Data Link Output (LO)	
MPC13	Input	Squelch Disable	A discrete input to provide squelch override or disable capability. Required for ARINC 716 VHF COMM only.
MPD13	-	Squelch Disable Return	
MPA14	Input	Maintenance System ID 0	Identifies CFDS type along with MPC11 (See Figure 208).
MPB14	Input	Air/Ground Discrete	A discrete input to indicate if the aircraft is in the air or on the ground. Gnd/Low = Airborne, Open/High = On Ground. Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
MPC14	Output	Data to OMS/CFDS Output Port A	A low speed ARINC 429 output port to one or two OMS/CFDS's. Required for both ARINC 716 VHF COMM and ARINC 750 VDR; Functions are identical.
MPD14	Output	Data to OMS/CFDS Output Port B	
MPA15	Output	Audio/Sidetone Output (HI)	An analog output for receiver audio during receive mode and sidetone audio during voice transmit modes. Required for ARINC 716 VHF COMM only.
MPB15	Output	Audio/Sidetone Output (LO)	

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 5 of 6

PIN NO.	TYPE	SIGNAL NAME	FUNCTION
MPC15	Input	Muting	An optional two wire discrete output to provide a switch closure internal to the VHF COMM for external system muting applications during transmit modes. Open = Muting Off, Gnd = Muting On. Required for ARINC 716 VHF COMM only.
MPD15	-	Muting Return	
BP1	Input/ Output	Antenna RF Input	Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
BP2	Input	DC Power Input +27.5VDC	Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
BP3	-	Spare	
BP4	-	DC Power GND	Required for both ARINC 716 VHF COMM and ARINC 750 VDR; functions are identical.
BP5	-	Spare	

RTA-44D VHF Data Radio Connector Determinants
Figure 201
Sheet 6 of 6

(2) Reserved and Spare Wires

If the installer does not wish to connect all wires, he may select wires reserved for optional functions which his system does not contain and delete these wires. He should also decide which future spare wires to include in the installation. Reserved and spare wires are identified in Figure 201 and in interwiring diagram Figure 208.

D. Installation of System

The RTA-44D VHF Data Radio is secured in the airframe with 3-MCU unit mounts. The mounts are designed to be removed without rewiring the connectors. Follow the equipment manufacturer's installation instructions to install the mount into the airframe.

To wire the mounts into the system, first remove the mount connector cover and connector plate assembly. Then crimp or solder (as applicable) the interconnecting wiring to the appropriate connector pins. Finally, return the connector plate assembly and cover to their original positions.

The RTA-44D VHF Data Radio (VDR) is installed in the mount as follows.

(1) Slide the VDR into the mount until the guide pins are aligned and the electrical connectors are firmly engaged.

(2) Secure the front of the VDR to the mount by tightening the two knurled screw clamps (located on the front of the mount) until they are firmly seated over hold-down hooks located on the front of the unit.

(3) Safety-wire the two screw clamps.

7. Inspection and System Check Procedures

NOTE: Inspection and check procedures for the RTA-44D VHF Data Radio System includes checkout of all interfacing units that may affect performance of the VDR.

A. Inspection

Figure 202 is a visual inspection check procedure and should be performed after system installation, prior to system checkout. In addition, the procedure should be used as a periodic inspection check.

EQUIPMENT	INSPECTION/CHECK PROCEDURE
3 MCU Unit Mount	As defined by manufacturer's instructions.
RTA-44D VHF Data Radio	(1) Check that unit is fully inserted in mount and that the knurled screw clamps which secure the unit in the mount are tight and safety wired. (2) Inspect the case for deformation, dents, corrosion, and damage to finish; ensure that ventilation holes in the unit are not clogged.
ARINC 716/750 Control Panel	As defined by manufacturer's instructions.
ARINC 716/750 VHF Antenna	As defined by manufacturer's instructions.

Inspection/Check Procedures
Figure 202

B. System Checkout

(1) General

After installation of the RTA-44D VHF Data Radio System, and inspection of the equipment per previous Figure 202, perform a continuity and visual check of the system interwiring per paragraph 7.B.(2). A post-installation test per paragraph 7.B.(3) should then be performed.

(2) System Interwiring Check

Visually check the system interwiring for abnormalities, such as cables rubbing unprotected metal edges or tightly stretched cables. Check continuity of all interwiring. In particular, check the following:

(a) Check that the VDR is properly installed and the hold-down screw clamps are tight.

(b) Check wiring harness connectors for security and connection to the VDR.

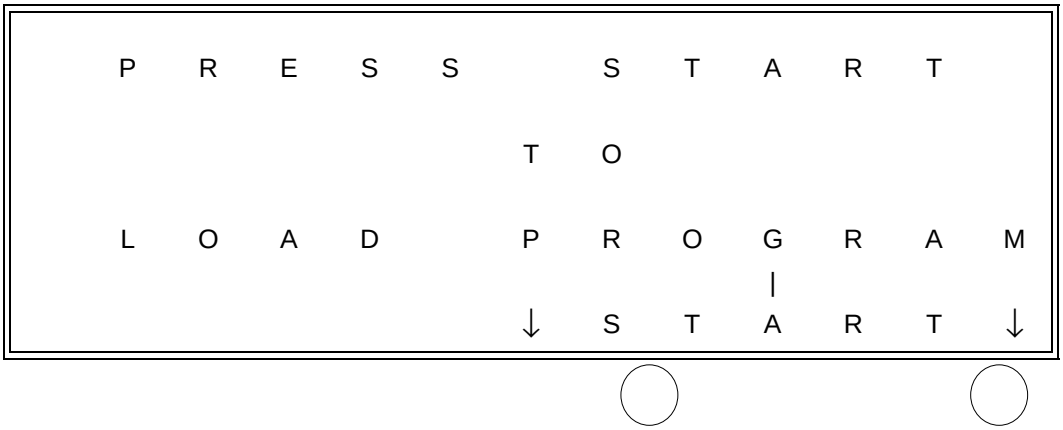
(c) Check that antenna transmission line connectors are securely fastened.

(d) Check that cables do not interfere with aircraft controls or other equipment.

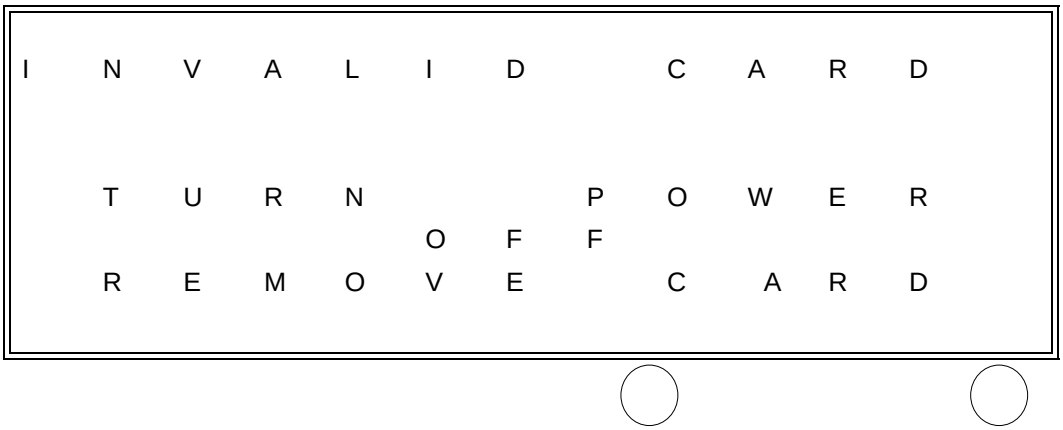
(3) Software On Board Loadable Instructions

The VDR Mode 2 is capable of on board software loadability. The following describes this process:

(a) Loosen Phillips head screw on cover, left of handle, to expose the front panel PCMCIA slot. When the main program card is inserted into this slot, the front panel LCD will display either the "Program Prompt" Screen (Figure 202.1) or the "Invalid Card" Screen (Figure 202.2).



"Program Prompt" Screen
Figure 202.1

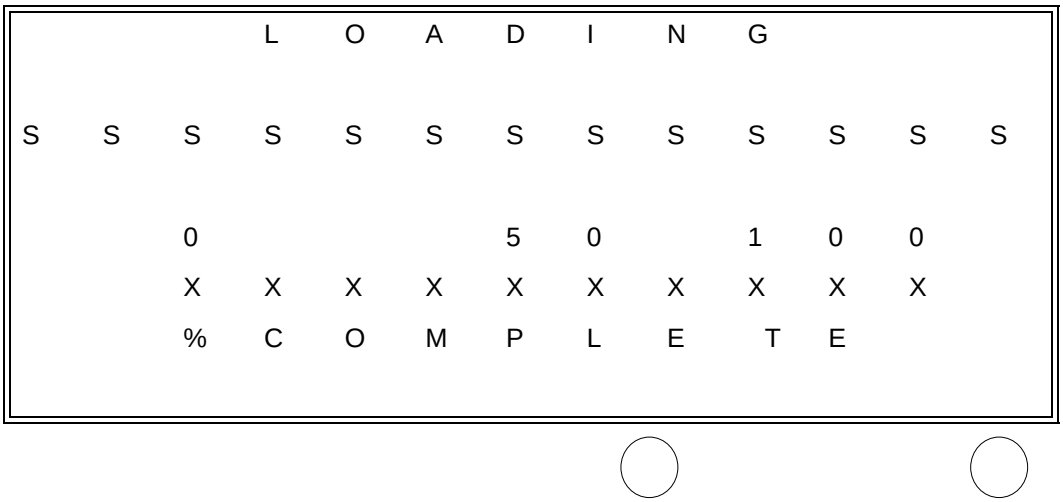


"Invalid Card" Screen
Figure 202.2

(b) When the "Start" key of the "Program Prompt" Screen (Figure 202.1) is pressed, program loading starts and the front panel LCD displays the "Programming in Progress" Screen, (Figure 202.3).

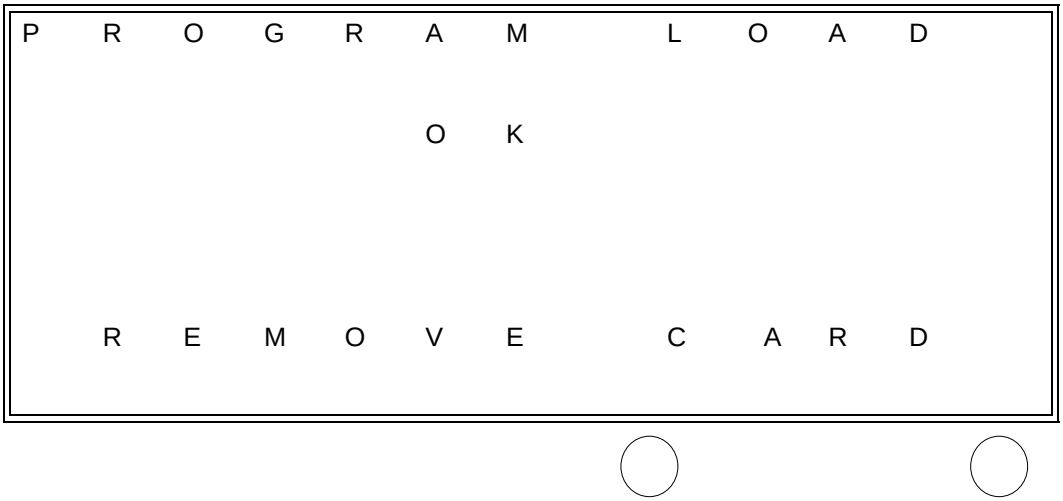
(c) The "S....S" field in the third row of the display is a string that shows the module presently loading. After loading of the individual modules ends, the "S...S" field momentarily shows the software part number.

(d) The moving thermometer-type display near the bottom half of the display indicates the percent completion of the program load.

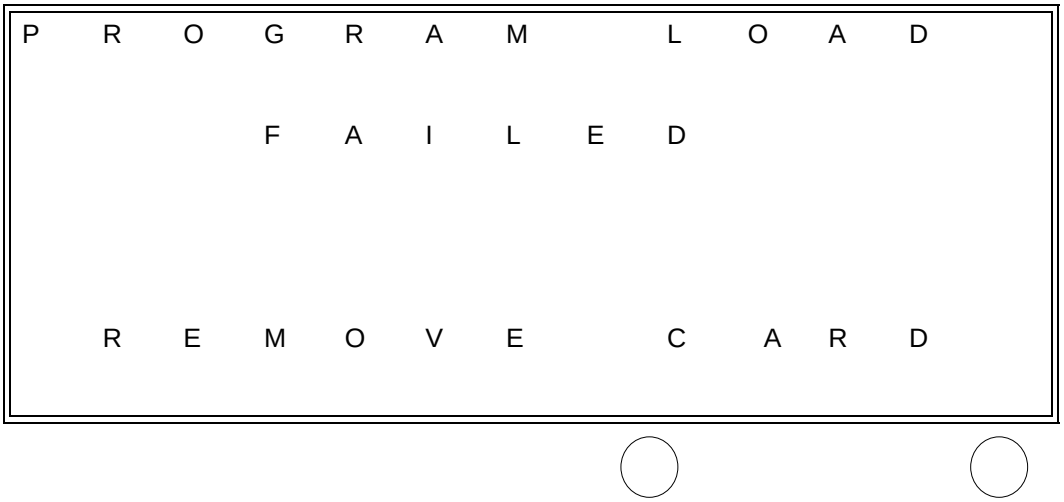


"Programming in Progress" Screen
Figure 202.3

(e) When the program loading is complete, the front panel LCD displays either the "Load Complete" Screen (Figure 202.4) if the program loading was successful, or the "Load Failed" Screen (Figure 202.5) if the program loading failed.

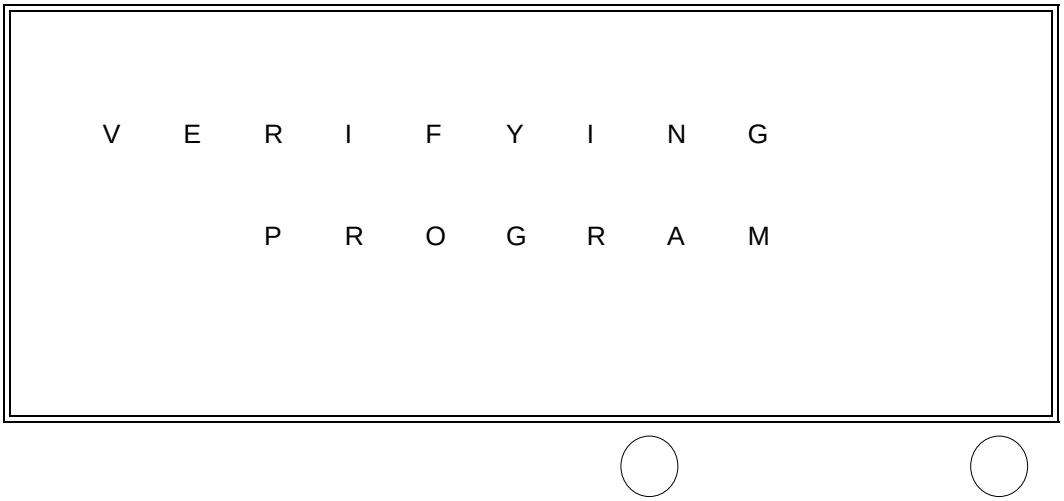


"Load Complete" Screen
Figure 202.4



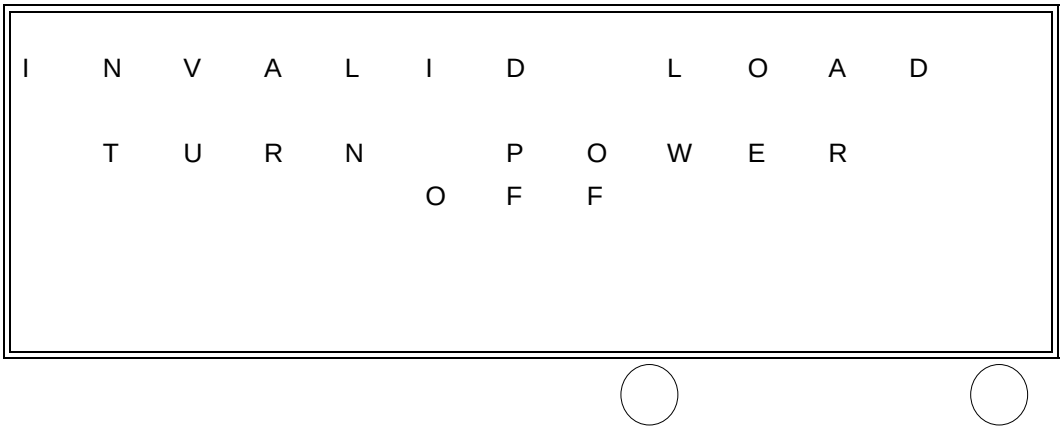
"Load Failed" Screen
Figure 202.5

(f) If the program was successfully loaded, the front panel LCD displays the "Verifying Program" Screen (Figure 202.6) when the program card is removed. The verification consists of checking the cyclic redundancy check (CRC) of the loaded program.



"Verifying Program" Screen
Figure 202.6

(g) When the program verification is completed, the front panel LCD displays either the "Normal Mode" Screen (Figure 203.1) if the verification succeeded, or the "Invalid Load" Screen (Figure 202.7) if the verification failed.



"Invalid Load" Screen
Figure 202.7

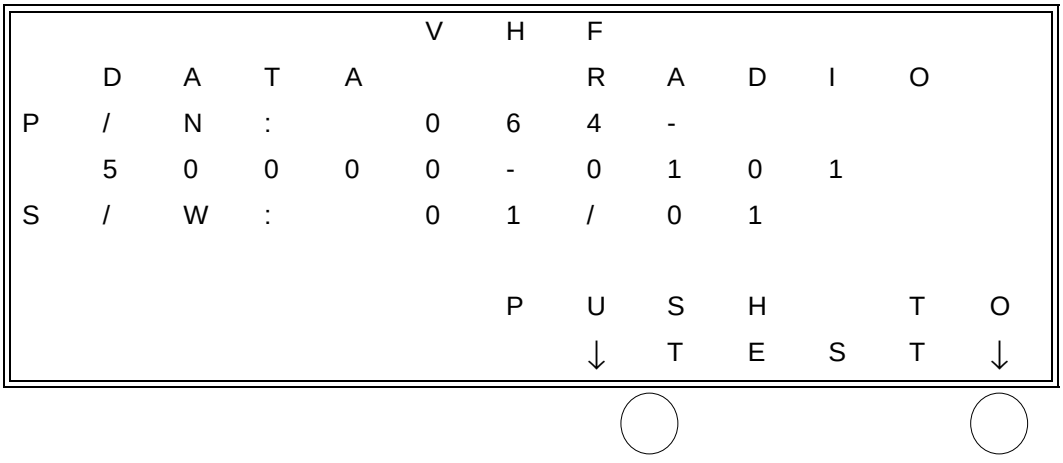
(4) Post-Installation Check

(a) Test Equipment Required

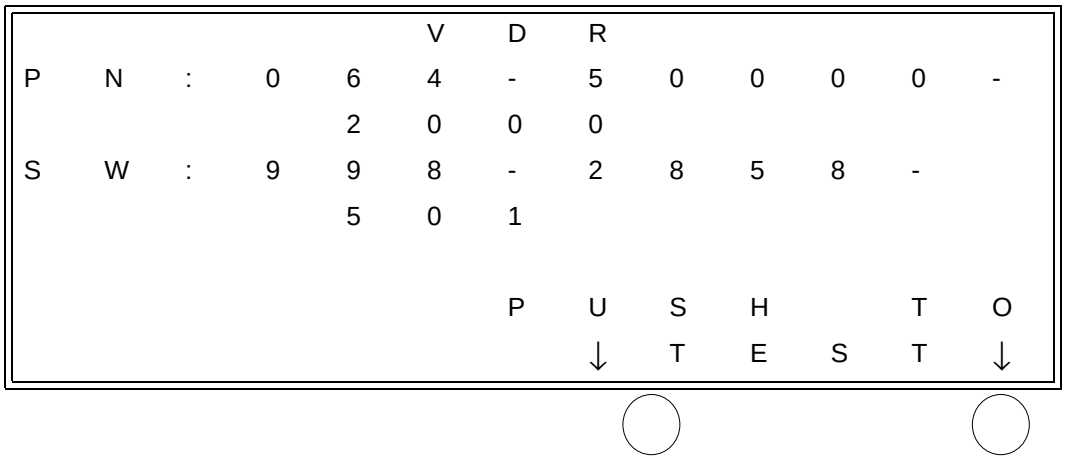
None required.

(b) System Test

A functional self test of the RTA-44D VHF Data Radio System may be initiated by pressing the "test" key pushbutton switch as designated on the front panel LCD (Figures 203 and 203.1). Although the "Normal Mode" Screen indicates that this is actuated from the right key, the left key has the same function if pressed while the VDR LCD is in its normal mode.

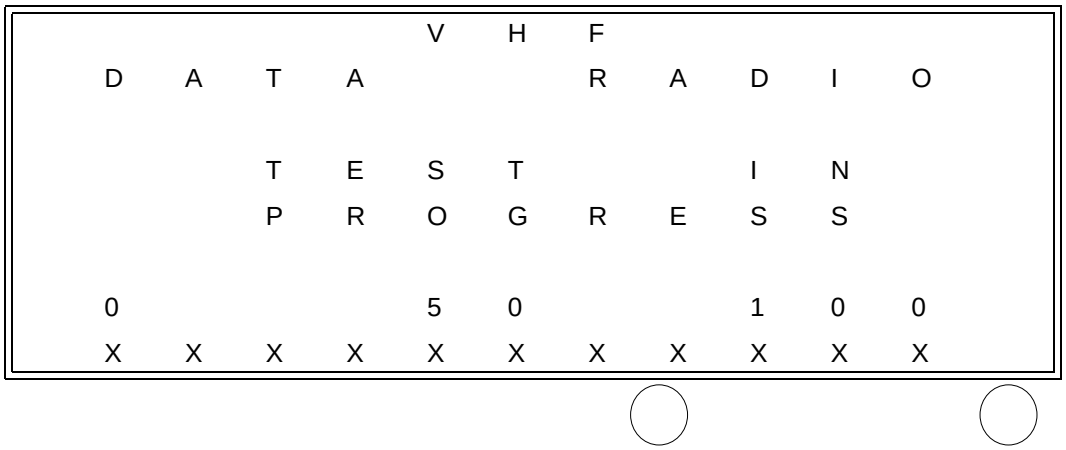


"Normal Mode" Screen (-0101, -0110, -0202, -0303 and -0505)
Figure 203



"Normal Mode" Screen (-2000 and -2051)
Figure 203.1

The Self-Test Mode starts by displaying the "Test in Progress" Screen (Figure 204) one second after pressing the "test" key. This is displayed for four seconds with a moving thermometer along the bottom of the LCD indicating the progress of the test from one to five seconds



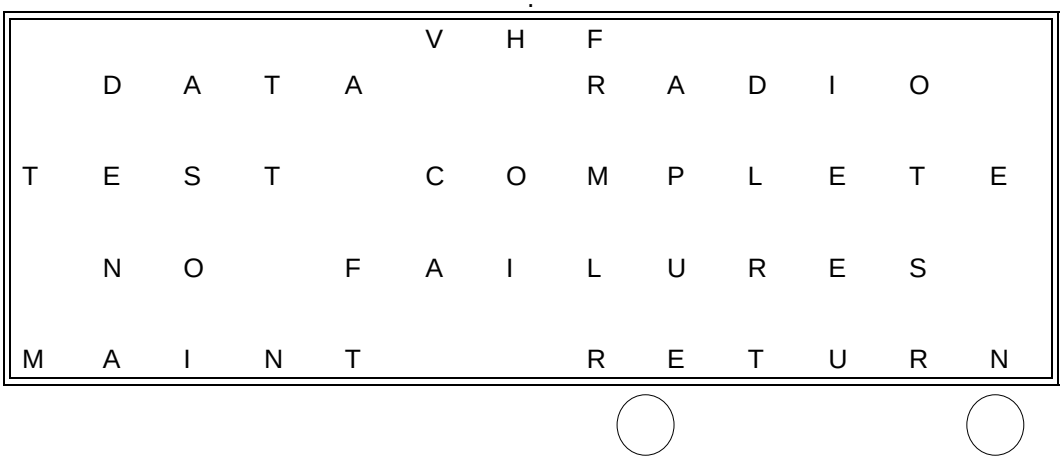
"Test in Progress" Screen
Figure 204

The "Normal Mode" Screen (Figures 203 and 203.1) is displayed for the first second of the test sequence. Once complete, the "Test Complete, No Failures" Screen is displayed (Figure 205), or the "Test Complete, Failures" Screen is displayed (Figure 206). Both screens contain two key selections each: "MAINT" and "RETURN" or "MAINT" and "WHY?", respectively.

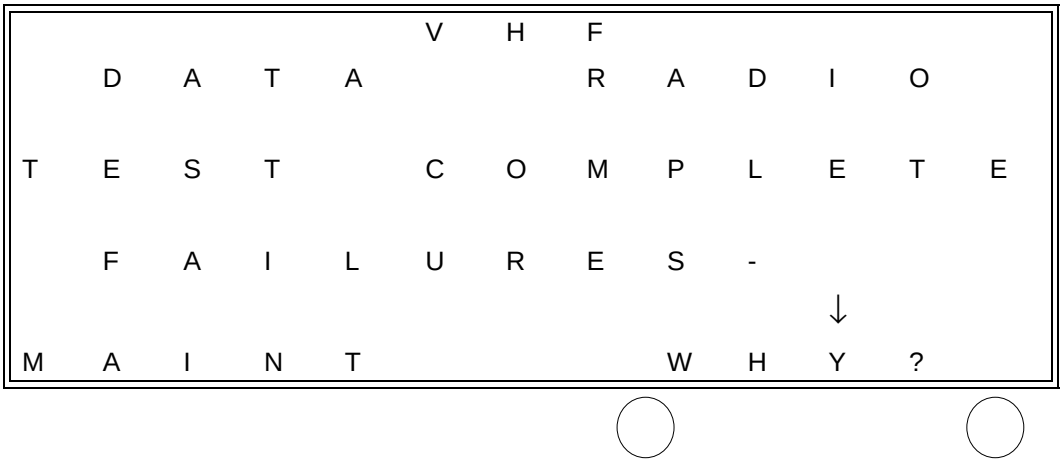
- "MAINT" - For both screens, "MAINT" is located on the left key. This allows the initiation of the extended maintenance pages of the system for troubleshooting. Refer to Paragraph 4 of "Fault Isolation" Section 100 of this manual.
- "RETURN" - In the "Test Complete, No Failures" Screen, the "RETURN" key to the right returns the system to its "Normal Mode" Screen (Figures 203 and 203.1).

•"WHY?" - In the "Test Complete, Failures" Screen, the "WHY?" key to the right puts the system into the Display-Failures Mode where individual system failures are displayed one per page. Refer to Paragraph 3 of "Fault Isolation" Section 100 of this manual.

While in the Self-Test Mode, not pressing either key for five minutes causes the system to return to the "Normal Mode" Screen (Figures 203 and 203.1)



"Test Complete, No Failures" Screen
Figure 205



"Test Complete, Failures" Screen
Figure 206

C. Flight Tests

(1) Preflight Test

(a) General

The following test procedure gives instructions for a preflight test which ensures that the RTA-44D VHF Data Radio System is functioning in an acceptable manner prior to takeoff.

(b) Test Procedures

1 Establish the initial control settings listed below.

CONTROL PANEL	POSITION
Power	On
Frequency Selector	Tune to any local VHF frequency (local control tower or ground control frequency)
Volume Control	Midrange

2 Using the system's headphone (or speaker) and microphone, check operation of the RTA-44D VHF Data Radio System.

3 Key the microphone and speak into it; speech should be audible. Request a radio check, and release the push-to-talk button.

4 Listen through the headphones (or speaker) and press the SQ/TEST pushbutton. A squelch break should be audible.

5 As soon as possible, a local flight check should be made to verify system operation for both local and distant stations.

(2) In-Flight Confidence Test

Upon completion of the post-installation and preflight checks, a local flight may be made to verify system operation for both local and distant stations. Repeat the test procedure found in paragraph 7.C.(1)(b).

8. Removal and Replacement

A. Removal

(1) Loosen the two knurled screw clamps (located on the front of mount) that secure the VDR to the mount.

(2) Gently pull the VDR forward until it is disconnected from the rear connector and guide pins.

B. Replacement

(1) Slide the VDR onto the tray of the mount and then gently push the VDR until the guide pins are aligned and the connectors make a firm connection.

(2) Tighten the two knurled screw clamps located on the front of the mount until they are firmly seated over the hold-down hooks located on the front of the VDR.

(3) Safety wire the two knurled screw clamps.

9. Maintenance Procedures

A. Adjustments and Alignments

There are no adjustments or alignments required for the RTA-44D VHF Data Radio System. All alignment and adjustment procedures are accomplished during bench maintenance. The technician should remove the unit from the aircraft and reference should be made to the related maintenance manual when unit performance indicates an adjustment or an alignment is required.

B. System Protection

The system should be protected by a 10-ampere circuit breaker located at the circuit breaker panel in the aircraft.

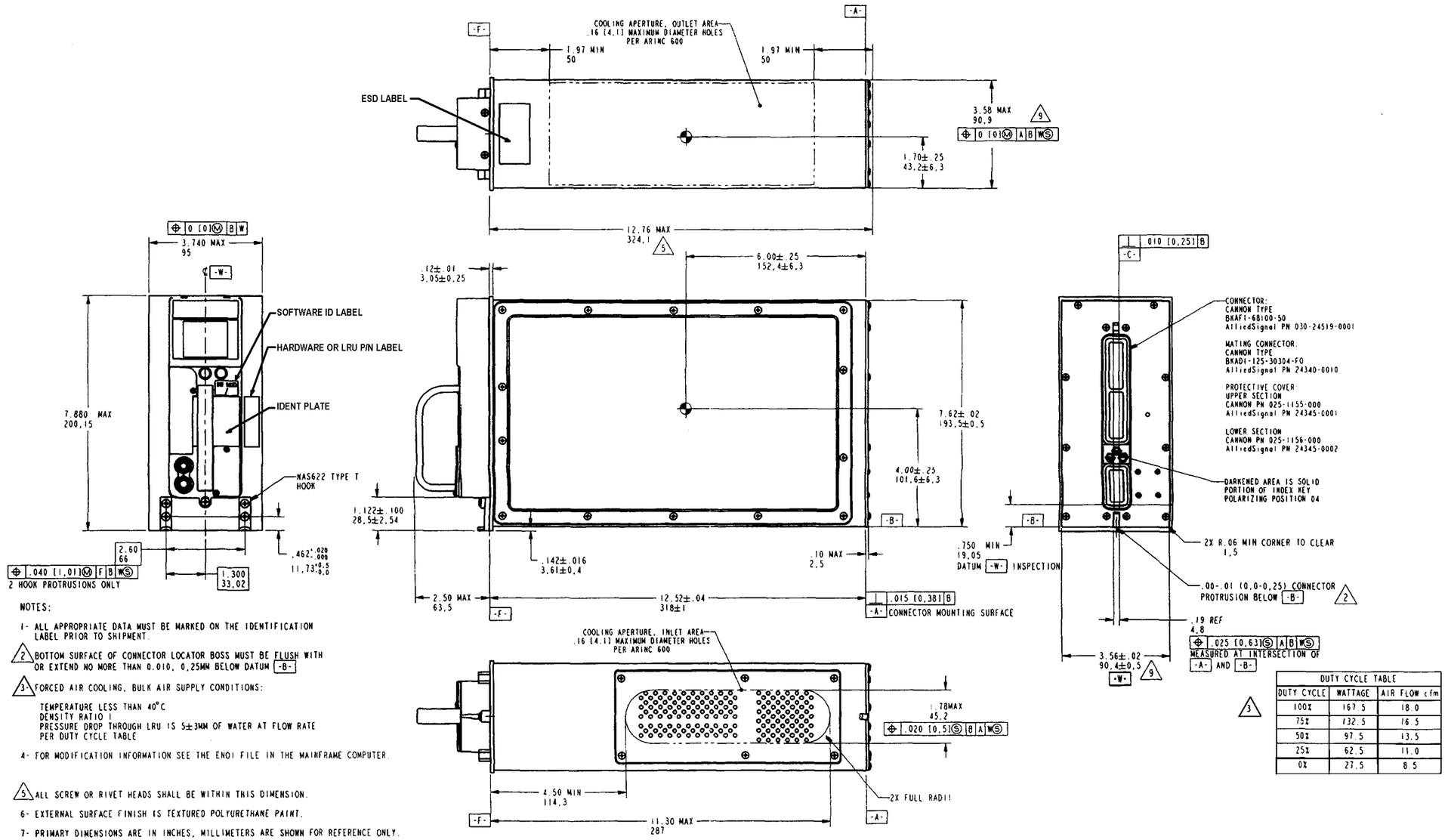
C. Lubrication Practices

There are no requirements for lubrication of any RTA-44D VHF Data Radio System components.

D. Cleaning

When deemed necessary, depending upon the environment to which the equipment is exposed and the intensity of use, periodic cleaning should be performed. Any dust on the RTA-44D VHF Data Radio System LRU's should be wiped off with a lint-free cloth.

NOTE: Any cleaning of equipment interiors should be limited to that required when performing overhaul (bench-type) work.



DUTY CYCLE TABLE		
DUTY CYCLE	WATTAGE	AIR FLOW cfm
100%	167.5	18.0
75%	132.5	16.5
50%	97.5	13.5
25%	62.5	11.0
0%	27.5	8.5

NOTES:

1- ALL APPROPRIATE DATA MUST BE MARKED ON THE IDENTIFICATION LABEL PRIOR TO SHIPMENT.

2 BOTTOM SURFACE OF CONNECTOR LOCATOR BOSS MUST BE FLUSH WITH OR EXTEND NO MORE THAN 0.010, 0.25MM BELOW DATUM -B-

3 FORCED AIR COOLING, BULK AIR SUPPLY CONDITIONS:

TEMPERATURE LESS THAN 40°C
DENSITY RATIO 1
PRESSURE DROP THROUGH LRU IS 5±3MM OF WATER AT FLOW RATE PER DUTY CYCLE TABLE

4- FOR MODIFICATION INFORMATION SEE THE ENOI FILE IN THE MAINFRAME COMPUTER.

5 ALL SCREW OR RIVET HEADS SHALL BE WITHIN THIS DIMENSION.

6- EXTERNAL SURFACE FINISH IS TEXTURED POLYURETHANE PAINT.

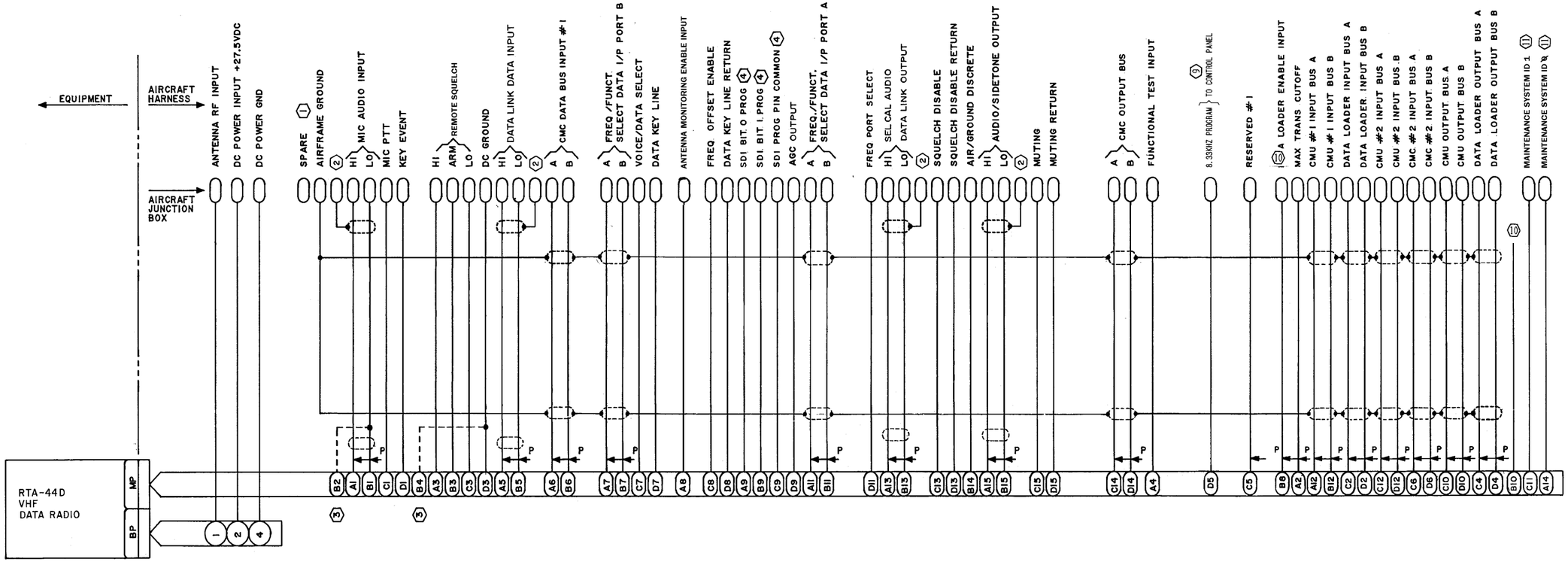
7- PRIMARY DIMENSIONS ARE IN INCHES, MILLIMETERS ARE SHOWN FOR REFERENCE ONLY.

8- MAXIMUM UNIT WEIGHT IS 9.6 LBS, 4.4 KG
⊕ SYMBOL DENOTES UNIT CENTER OF GRAVITY.

9 THE 3.56 DIMENSION APPLIES ACROSS THE CONNECTOR PLATE ONLY. THE CHASSIS, COVERS AND ATTACHING HARDWARE SHALL NOT EXCEED 3.58, 90,9MM

11- CAUTION: THIS ASSEMBLY EITHER CONTAINS OR IS ASSOCIATED WITH ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. HANDLE WITH CARE IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE REPAIR SECTION OF THE SERVICE MANUAL.

RTA-44D VHF Data Radio Dimensional Outline Drawing
Figure 207



① DELETED

② GROUND AT AUDIO SYSTEM END ONLY; NOT GROUNDED AT VHF DATA RADIO END.

③ MP-PINS B2 AND B4 USED TO GROUND MIC INPUT. CONNECT JUMPERS FROM B2 TO B1 AND FROM B4 TO D3

④ TO ENCODE LOCATION OF VHF DATA RADIO IN AIRCRAFT, LEAVE PINS AS OPEN CIRCUIT OR CONNECTED TO MPC9 AS FOLLOWS:

COM NO.	CONNECTOR PIN	
	MPA9	MPB9
1/2/3	OPEN	OPEN
1	OPEN	TO MPC9
2	TO MPC9	OPEN
3	TO MPC9	TO MPC9

⑤ RACK MOUNT LOGIC CAN HELP IDENTIFY PROPER LRU ENGAGEMENT. TO ENABLE THIS FEATURE CONNECT PIN MPA14 TO GROUND AND ADD A JUMPER FROM MPB10 TO MPC11.

6. P INDICATES TWISTED PAIR.

7. CMC= CENTRAL MAINTENANCE COMPUTER.

8. CMU = COMMUNICATIONS MANAGEMENT UNIT.

⑨ WHEN MPD5 IS INTERNALLY GROUNDED, THE VDR IS CAPABLE OF OPERATING IN EITHER OF 8.33 KHZ OR 25 KHZ MODES. CONTROL PANEL PROGRAMMING IS OPTIONAL.

⑩ RESERVED.

⑪ MAINTENANCE SYSTEM IDENTIFICATION:

MPC11	MPA14	AIRCRAFT/OMS
GROUND	GROUND	AIRBUS
GROUND	OPEN	BOEING
OPEN	GROUND	MCDONNELL-DOUGLAS
OPEN	OPEN	UNDEFINED

8056190D

RTA-44D VHF Data Radio System Interwiring Diagram
Figure 208