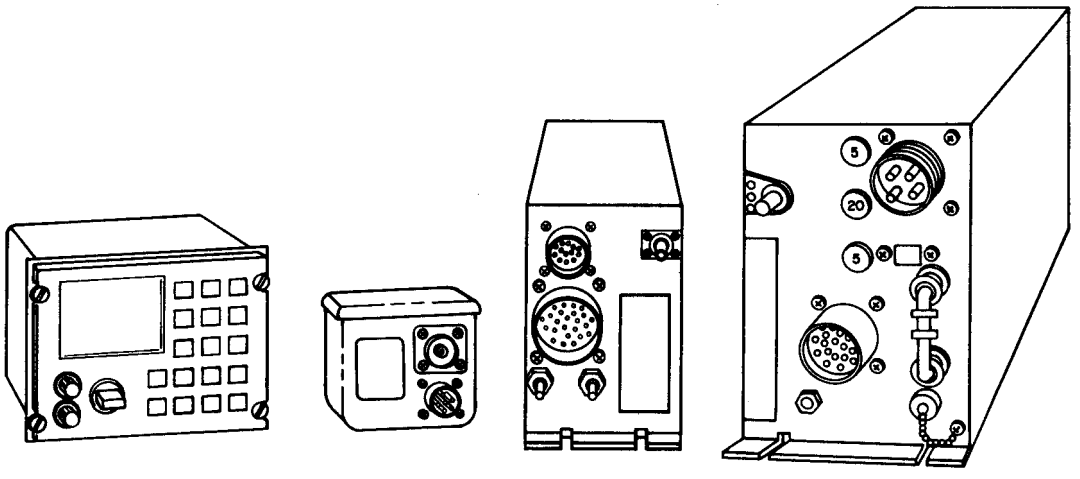
OPERATOR'S, AVIATION UNIT, AND INTERMEDIATE MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

RADIO SET AN/ARC-199

(NSN 5821-01-167-8296)



HEADQUARTERS, DEPARTMENT OF THE ARMY

1 AUGUST 1991

WARNING

CONTACT WITH HIGH VOLTAGES CAN KILL YOU

Serious injury or death can occur if you touch the Radio Set AN/ARC-199 antenna while it is transmitting. Precautions must be followed to ensure personnel safety when the Radio Set AN/ARC-199 is transmitting.

1. DO NOT lean against or grasp the antenna. When the antenna is operating, severe burns may result.

2. DO NOT operate the transmitter unless you have determined that no one is within 20 inches of the antenna. High levels of electromagnetic radiation exist in the area. Severe burns may result.

SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high-voltage supply turned on. Under certain conditions, dangerous potentials may exist when the power is in the off position, due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Refer to FM 21-11 for detailed first aid procedures.

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

Technical Manual

No. 11-5821-330-13&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 August 1991

Operator's, Aviation Unit Maintenance
And
Aviation Intermediate Maintenance Manual
(Including Repair Parts and Special Tools List)
RADIO SET AN/ARC-199
(NSN 5821-01-167-8296)

Current as of 30 April 1991

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5000. A reply will be furnished direct to you.

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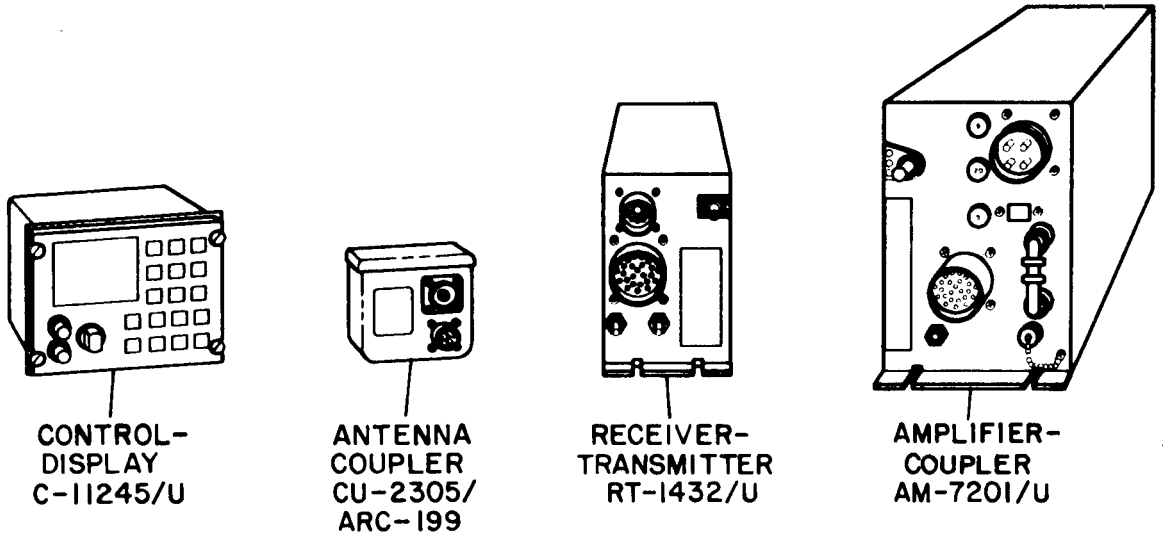
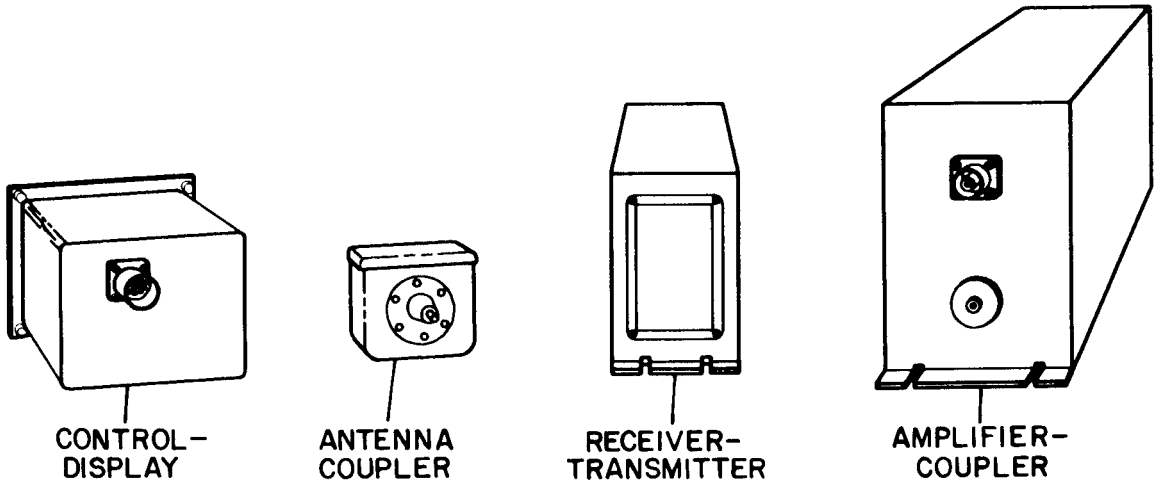


FRONT VIEW



REAR VIEW

Figure 1-1. Radio Set AN/ARC-199

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope

a. ***Type of Manual.*** **Operator's, Aviation Unit, and Intermediate Maintenance Manual (organizational and intermediate level).**

b. ***Model Number and Equipment Name.*** **Radio Set AN/ARC-199.**

c. ***Purpose of Equipment.*** **Used to transmit and receive voice and data between stations beyond the range of line-of-sight radios.**

d. ***Configuration.*** **Supports radio sets with serial numbers 2031B through 2178B and 2179-B and up.**

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will he those prescribed by DA Pam 738-750 as contained in Maintenance Management Update.

b. Report of Item and Packaging Discrepancies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/ SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. Preparation For Storage or Shipment

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage, PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in chapter 3.

1-5. Destruction of Army Electronics Materiel to Prevent Enemy Use

Destruction of Army Electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. Official Nomenclature, Names, and Designations

COMMON NAME	OFFICIAL NOMENCLATURE
Radio Set	Radio Set AN/ARC-199
Control-Display	Control-Display C-11245/U
Amplifier-Coupler	Amplifier-Coupler, Radio Frequency AM-7201/U
Receiver-Transmitter	Receiver-Transmitter RT-1432/U
Antenna Coupler	Coupler, Antenna CU-2305/ARC-199

1-7. Reporting Equipment Improvement Recommendations (EIR)

If your radio set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Product Deficiency Report). Mail it to us at Commander, U S Army Communications-Electronics and Fort Monmouth, ATTN: AMSEL-ED-PH, Fort Monmouth, NJ 07703-5000. We'll send you a reply.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-9. Purpose of Radio Set.

The radio set is the airborne portion of a ground and airborne communications system used to transmit and receive voice and data between stations that are beyond the range of line-of-sight radios.

1-10. Equipment Characteristics, Capabilities, and Features

Characteristics, Capabilities, and Features

- **High-frequency, single-sideband radio.**
- **Selectable output levels of 4, 40, and 170 Watts Peak Envelope Power (PEP).**
- **Operates from a nominal 27.5 Vdc power source.**
- **Frequency of operation is from 2.0 to 29.9999 MHz.**
- **Transmit and receive frequencies are programmable in 100 Hz increments on 21 presettable channels, for a total of 280,000 possible frequencies.**
- **Emission modes available include upper and lower sideband (USB/LSB), double sideband (DSB), amplitude modulation equivalent (AM E), and modulated carrier wave (MCW).**
- **Data may be transmitted or received in the USB, LSB, or AME modes.**
- **Operable at all times in a half-duplex, push-to-talk mode.**
- **Syllabic squelch is controlled from the control-display panel by the operator, and is adjustable from OFF through eight levels to maximum.**
- **Selective squelch, or Selective Addressing (S ELADR), is provided to eliminate the reception of unwanted RF signals and atmospheric noise.**
- **Capable of retransmission of data or voice.**
- **Securable with TSEC/KY 75 and KY 65 voice security equipment. Can be used with COMSEC equipment.**
- **Capable of scanning channels that have been programmed onto the scan list.**
- **Incorporated Built-In Test (BIT) continuously checks operating conditions.**
- **If BIT detects a fault, the faulty unit is identified on the CRT display.**
- **Capable of being remotely controlled from a MIL-STD-1553 data bus, and features both an active and standby MIL-STD-1553 data bus.**
- **If the MIL-STD-1553 data bus is not being used for control. Operation modes are controlled by the operator from the keyboard on the control-display, and will be displayed on the CRT screen.**
- **The CRT display and the control panel can be used with night vision goggles.**

1-11. Location and Description of Major Components

Control-Display. **Located on aircraft console, includes a 17-key keyboard and a 3-inch diagonal CRT screen on front, with electrical connections on the back via a single connector for amplifier-coupler and receiver-transmitter connections.**

Amplifier- Coupler. **Mounted in an equipment bay or in the tail boom, includes connections for the power source, receiver-transmitter, antenna coupler, and testing.**

Receiver- Transmitter. **Mounted in an equipment bay, includes connections to the amplifier-coupler, to the control-display, connectors for operation from a MIL-STD-1553 data bus.**

Antenna Coupler. **Mounted to internal aircraft structure, contains tuning elements for use with a shorted loop antenna. Provides interface to antenna from the amplifier-coupler.**

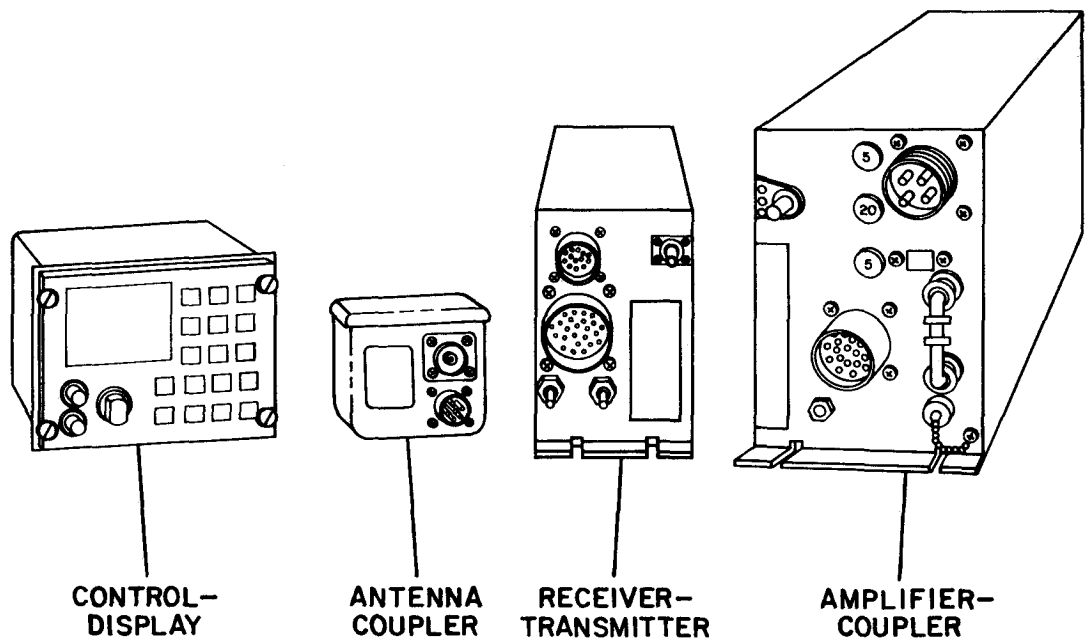


Figure 1-2. Radio Set, AN/ARC-199 LRUs

1-12. Equipment Data

Table 1-1. Radio Set AN/ARC-199 Equipment Data

CHARACTERISTIC	SPECIFICATION			
Major Components:	Control-display, amplifier-coupler, receiver-transmitter, and antenna coupler			
Size:	LRU	L x W x H		Cubic Inches
	XControl-Display	8.60 in. 5.70 in. 4.50 in.	=	220.59
	Amplifier-Coupler	16.10 in. 5.40 in. 7.20 in.	=	625.97
	Receiver-Transmitter	13.60 in. 4.10 in. 5.25 in.	=	292.74
	Antenna Coupler	5.62 in. 3.66 in. 3.46 in.	=	71.17
Weight:	31.05 lbs			
Operating Modes:	USB/LSB/AME/DSB/CW			
Operating Temperatures:	-40°F to +161° F			
Antenna:	Shorted loop (P/O Aircraft)			
Tune Time	50 ms for each previously tuned channel frequency; for new frequency, multiple tunes are performed automatically, normally within 60 sec. To achieve maximum antenna power, the best tune is stored in non-volatile channel memory.			
Reliability	500 hours Mean Time Between Failure (MTBF) (ROC)			
Warmup Time	5 sec nominal			
Channels:	21 preset			
Frequency Range:	2.0 to 29.9999 MHz in 100 Hz increments (280,000 possibilities)			
Power Input:	500 W, 27.5 Vdc			

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data

CONTROL-DISPLAY C-11245/U	
SPECIFICATION	**CHARACTERISTIC**
Height:	4.50 in.
Length (including rear connector and bezel):	8.60 in.
Width:	5.70 in.
Weight:	5.0 lbs
Mounting:	Standard aircraft turnlock fastener rail
Power Input:	Supplied by amplifier-coupler (27.5 Vdc)
CRT Display Size:	3 in. diagonal showing 8 rows of characters.
CRT Color:	Green
Panel Lighting:	Electroluminescent, green
Audio Volume Control:	16 positions: minimum, 1-14, maximum.
Night Vision Goggles:	Usable with Night Vision Goggles

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data-Continued

AMPLIFIER-COUPLER, RADIO FREQUENCY AM-7201/U

SPECIFICATION	CHARACTERISTIC
Height:	7.20 in.
Length:	16.10 in.
Width:	5.40 in.
Weight:	15.0 lbs
Mounting:	Shock-mounted tray fastened to aircraft
Cooling:	Convection
Power Input:	27.5 Vdc, 18 A transmit/1.0 A receive
Output Power:	4, 40, or 170 W PEP
High Power Lockout:	OFF prevents unauthorized use of high power mode. ON permits use of high power mode.
Input Impedance:	50 ohms
Power Amp Input Level:	-4 dBm PEP nominal

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data-Continued

AMPLIFIER-COUPLER, RADIO FREQUENCY AM-7201/U - Continued

SPECIFICATION	CHARACTERISTIC
Suppression of Harmonics/ Spurious Oscillations:	F is less than cf -100 Hz or F is more than cf +3500 Hz, not less than 30 dB. F is less than cf -3100 Hz or F is greater than cf +5900 Hz, not less than 38 dB. F is less than cf -6100 Hz or F is more than cf +8900 Hz, not less than 43 dB.
AME Carrier Noise Suppression:	Greater than 40dB.
VSWR:	1.5 to 1 or less after tuning.
Antenna Impedance Range:	
R Component:	0 to 48,000 ohms
X_L Component:	0 to 1,125 ohms
X_c Component:	0 to 1,125 ohms
Total Impedance:	Greater than 5.5 ohms
Q:	Less than 100
Protective Features:	Overvoltage in the coupler (arcing), or over temperature in power amplifier, or failed transmitter output. System fault message to control-display if coupler is unable to tune antenna at a given frequency. High Power Lockout Switch ON: full power output; OFF: power output limited to medium or low power

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data-Continued

RECEIVER-TRANSMITTER RT-1432/U	
SPECIFICATION	**CHARACTERISTIC**
Height:	5.25 in.
Length (with connector):	13.60 in.
Width:	4.10 in.
Weight:	10.0 lbs
Mounting:	Shock-mounted tray fastened to the aircraft.
Power Input:	Supplied by amplifier-coupler (27.5 Vdc, 3.0A Peak, 1.75A nominal)
Receiver:	
Input Impedance:	50 ohms
Frequency Stability:	±20 Hz from 2.0 to 29.9999 MHz
Audio Response/Bandwidth:	Not more than 5 dB variation, 350 to 3050 Hz.
Audio Distortion	
AM:	Harmonic not more than 12%
SSB:	Third order 25 dB below PEP at 100,000 microvolt
Spurious Response:	Greater than 60 dB down from 0.09 to 600 MHz
Image Response:	Greater than 40 dB down from 0.09 to 600 MHz
Selectivity	
AM:	cf ±2.75 KHz not more than 6 dB variation. Less than cf -20.0 KHz or greater than cf +20.0 KHz not less than 60 dB.
SSB:	cf +350 Hz to cf +3050 Hz not more than 5 dB variation. Less than cf -2150 Hz and greater than cf +5000 Hz, not less than 60 dB rejection (LSB similar)

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data-Continued

RECEIVER-TRANSMITTER RT-1432/U - Continued

SPECIFICATION	CHARACTERISTIC
Sensitivity:	
AM:	Not more than 3 microvolt for 6 dB (S+N)/N
SSB:	Not more than 1 microvolt for 10 dB (S+N)/N
AGC:	Not more than 6 dB change for 10 microvolts to 500,000 microvolt input change
Intercom Audio Output:	150 ohms, 0 to 1 mW, 0 to 50 mW, 1 mW fixed, or 50 mW fixed; harness selectable.
Transmitter:	
Output Impedance:	50 ohms nominal.
Frequency Stability:	±20 Hz from 2.0 to 29.9999 MHz.
Spectrum Control Audio Response:	cf +350 Hz to cf +3050 Hz with not more than 5dB variation
Spectrum:	Less than cf -100 Hz or greater than cf +3500 Hz, not less than 30 dB. Less than cf -3100 Hz or greater than cf +5900 Hz, not less than 38 dB. Less than cf -6100 Hz or greater than cf +8900 Hz, not less than 43 dB.
Audio Distortion:	In-band intermodulation distortion more than 25 dB below PEP
Carrier Suppression:	Greater than 40 dB
Power Output:	5 dBm maximum PEP
ALC Range:	25 dB minimum
Data Input/Output:	0 dBm, 600 ohms
IM Distortion:	In-band not less than 35 dB below PEP to -4 dBm in cipher or data mode.
Speech Processing:	3 dB average power increase of SSB voice modulation.

Table 1-2. Radio Set AN/ARC-199 Component Equipment Data-Continued

ANTENNA COUPLER CU-2305/ARC-199

SPECIFICATION	CHARACTERISTIC
Height:	3.46 in.
Length:	5.62 in.
Width:	3.66 in.
Weight:	1.05 lbs
Frequency Range:	2 to 29.9999 MHz
Relay Power:	28 Vdc

Section III. PRINCIPLES OF OPERATION

1-13. General

The radio set is a high-frequency, single-sideband radio with selectable output power levels of 4, 40, and 170 watts PEP, and operates from a nominal 27.5 Vdc power supply. Frequency of operation is from 2.0 to 29.9999 MHz. Transmit and receive frequencies are programmable in 100 Hz increments on 21 presettable channels, for a total of 280,000 possible frequencies.

The radio set is operable at all times in a half-duplex, push-to-talk mode. Syllabic squelch is controlled from the display panel, and is adjustable from off through eight levels to maximum. Selective squelch, or SELADR, is provided to eliminate the reception of unwanted RF signals. When the SELADR feature is operational, the receiver is automatically squelched until the pre-programmed SELADR code is detected. The squelch is then automatically set to its minimum level, and an audio tone is generated which notifies the operator of an incoming call.

BIT, incorporated in the radio set, includes continuous monitoring of important operating conditions, and operator-initiated BIT. If a fault is detected, the faulty unit (Control-Display, Amplifier-Coupler, or Receiver-Transmitter) is identified on the CRT.

1-14. Simplified Block Diagram

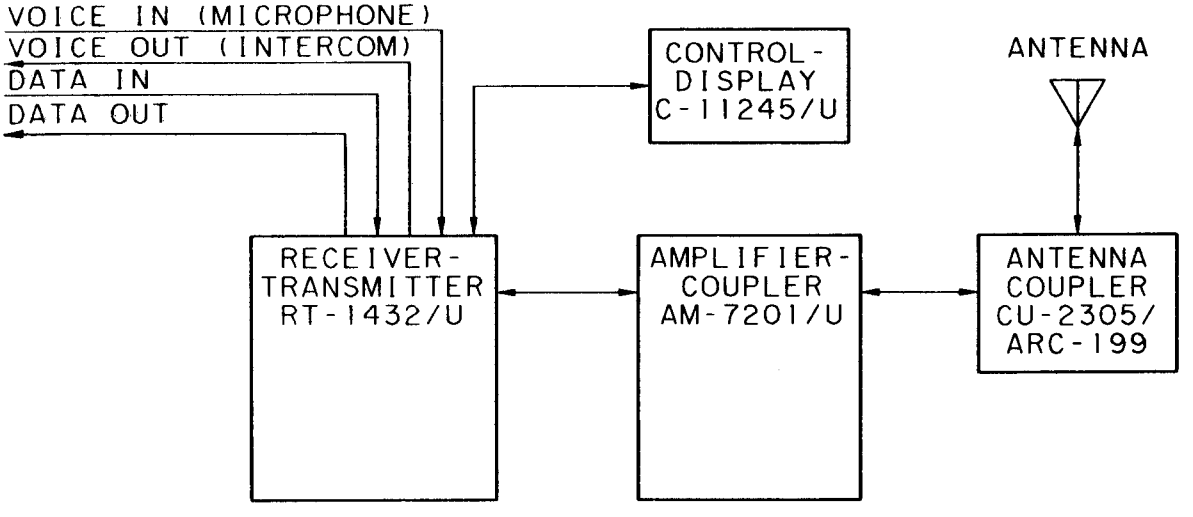


Figure 1-3. Radio Set AN/ARC-199 Simplified Block Diagram

a. Control-Display

- **The control-display provides for complete operator control of the radio set. It includes a 17-key keyboard for programming the operating limits and a 3-inch diagonal CRT screen for displaying those limits.**

- **The control-display contains BIT capability. When BIT is commanded by the operator, the control-display performs a processor and memory self-test, then tests the CRT screen with an alternating checkerboard pattern. Refer to figure 2-15 for checkerboard patterns.**

- **The control-display will constantly monitor the high voltage, horizontal deflection, and vertical deflection signals applied to the display CRT and yoke circuitry. If a failure is detected the CRT electron beam is biased off, preventing phosphor burn.**

- **All keyboard control information from the control-display is sent to the receiver-transmitter by means of a data bus, and status information is returned to the control-display for display by means of a second data bus.**

- **In installations using the MIL-STD-1553 data bus for control of the system, the control-display is not required.**

b. Amplifier-Coupler

- **The amplifier-coupler contains a power amplifier capable of amplifying the output of the receiver-transmitter to selected output power levels of 4, 40, or 170 W PEP.**

- **Coupler circuits match the amplifier output impedance to the impedance of the shorted loop antenna for maximum power transfer.**

- **A high power lockout switch on the front panel of the amplifier-coupler prevents unauthorized use of the high power (170W) mode. The OFF position restricts use to low (4W) or medium power (40W) power only.**

- **BIT in the amplifier-coupler constantly monitors ALC, temperature in medium and high power modes, bias voltage, reverse power, arcing, and VSWR. When initiated, the amplifier-coupler performs a processor and memory self test. The amplifier-coupler also will monitor it's power input from the receiver-transmitter for fault isolation during the system transmitter test.**

- **Initiated BIT also checks the power supplies, preamp gain, power amp output, ALC circuits, forward and reverse power, resistance and phase discriminators.**

c. Receiver-Transmitter

The receiver-transmitter performs the following functions:

- **Supplies the RF signal to the power amplifier at a nominal maximum level of 0 dBm.**
- **Translates received RF signals to audio.**
- **Distributes the audio to the aircraft intercom system or the KY 75 voice security equipment.**
- **In the transmit mode, the transmitter portion translates through modulation, the audio from the intercom or the KY 75 voice security equipment to the selected RF operating frequency for amplification and transmission by the amplifier-coupler.**
- **The receiver-transmitter interfaces with the amplifier coupler by means of tuner control and tuner status serial data buses. Antenna tuning information, derived in the amplifier-coupler, is separately stored in the receiver-transmitter for each tuned channel. Once a channel is tuned to a specific frequency, subsequent tuning is not needed.**
- **The receiver-transmitter interfaces with the MIL-STD-1553 data bus and accepts full control from the MIL-STD-1553 data bus.**
- **BIT in the receiver-transmitter constantly monitors the synthesizer for an out-of-lock condition, and monitors the integrity of the data bus communication between the control-display and the amplifier-coupler.**
- **Initiated BIT causes the receiver-transmitter to first perform a processor and memory self test which checks the timer, synthesizer, amplifier-courder and SELADR serial links, the SELADR board, and the MIL-STD-1553 data bus hardware.**
- **The system receiver test occurs during initiated BIT and checks the receiver and squelch circuits using a 2 MHz signal generated by the amplifier-coupler.**
- **The system transmitter test occurs during initiated BIT. This test is performed in conjunction with the amplifier-coupler and does the following at six different frequencies between 2 and 30 MHz:**
  - **Checks the receiver-transmitter for proper RF output** level.
  - **Checks the ALC monitoring in the amplifier-coupler.**
  - **Checks the ALC circuitry in the receiver-transmitter.**

- **Performs an open loop exciter ALC test.**
- **Performs a system closed loop ALC medium power test.**
- **Performs a system closed loop ALC high power test.**
- **Tunes into an internal 50 ohm load.**

d. Antenna Coupler

- **The antenna coupler is used in conjunction with the internal coupler section of the amplifier-coupler to provide a more efficient matching network to tune out the excessive inductive reactance of the shorted loop antenna on the aircraft at lower frequencies.**
- **The purpose of the antenna coupler is to improve power transfer efficiency from the amplifier-coupler to the antenna.**
- **Internal shunting capacitance is switched by relay commands from the amplifier-coupler.**

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

2-1. General

Before attempting to use the radio set, make certain you are familiar with the location and operation of all controls and indicators.

NOTE

After a channel(s) has been programmed and tuned, retuning or reprogramming each time the radio set is turned on is not necessary. To operate the radio set, simply turn the function select knob to CHAN, then select the desired channel using the SET knob. The radio is now ready for normal transmit/receive operation.

2-2. Control-Panel Controls and Indicators

The control-display front panel is used for selecting, viewing, and modifying the various operating limits for the channel being used.

a. *Control Panel Knobs.* Figure 2-1 illustrates the control-display front panel. Table 2-1 explains the function of each of the control panel knobs.

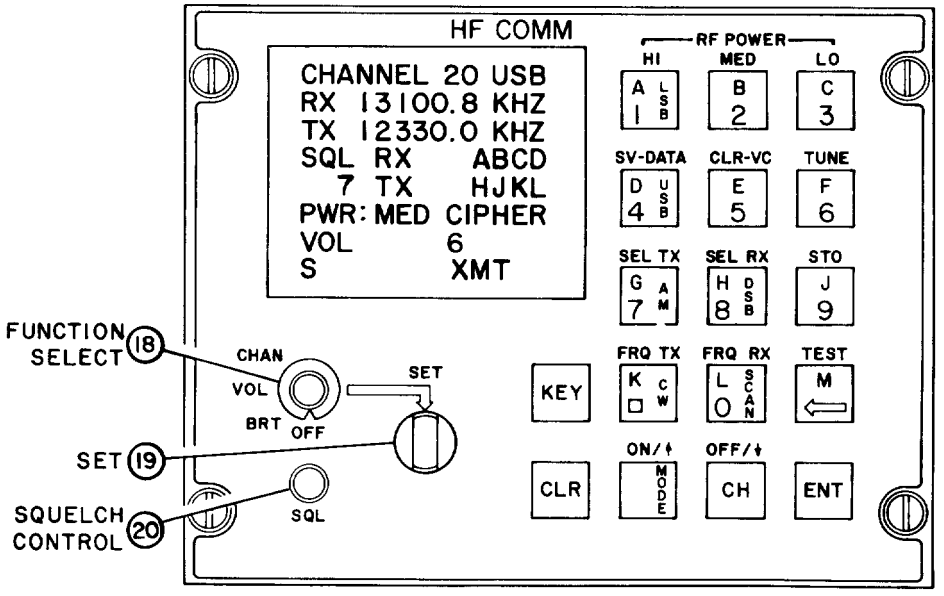


Figure 2-1. Control-Display Panel Knobs

TABLE 2-1. Functions of Control Panel Knobs

FIGURE 2-1 ITEM	CONTROL	FUNCTION
18	FUNCTION SELECT	Power off (OFF), CRT brightness (BRT), audio volume (VOL), and channel number selection (CHAN). Functions selected by this knob are adjusted with the SET knob.
19	SET	Single-step, snap-in-place-type switch, with continuous rotation in either direction. CRT brightness, audio volume or channel number can be increased with clockwise rotation. For CRT brightness and audio volume, the knob has no affect after the limit of that function has been reached. In the channel select mode, the SET knob is continuously active (channel 20 is always one position counterclockwise from channel 0).
20	SQUELCH CONTROL	Continuous rotation in either direction with squelch level displayed in field 14 (figure 2-2) on CRT. Once squelch MAX has been reached, further clockwise rotation of the knob has no effect. Rotation CCW from squelch OFF selects NET mode, selective address (SEL) mode and selective address scan (SEL) mode.

b. *Display Fields.* Figure 2-2 shows a CRT screen with possible fields displayed. Table 2-2 explains the functions of the fields.

NOTE

All displayed information pertains to the currently displayed channel number as shown in figure 2-2. Instructions for changing fields or information for interpreting other data are given in Table 2-3.

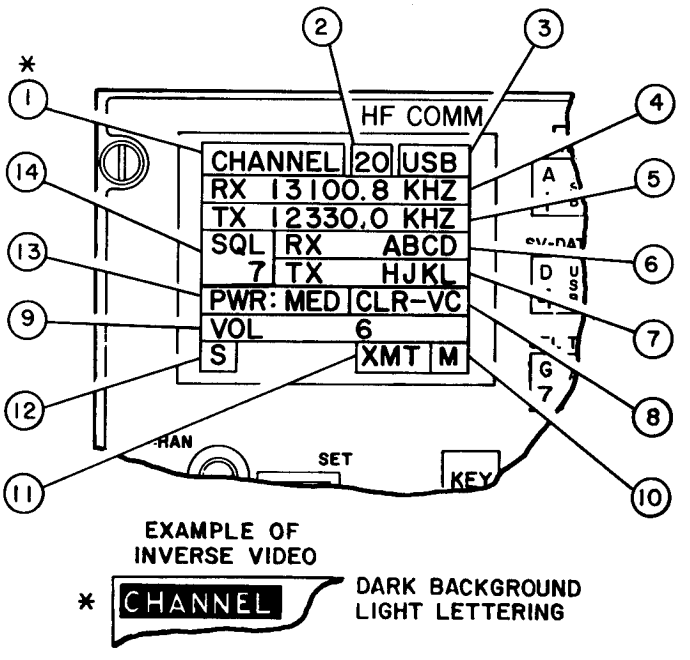


Figure 2-2. Display Field Functions

Table 2-2. Functions of CRT Display Fields

FIGURE 2-2 DISPLAY FIELD	FIELD MESSAGE	FUNCTION
1	CHANNEL	CHANNEL appears in inverse video to indicate that current channel information is not stored. When information is stored, the inverse video disappears. Refer to figure 2-2 for an example of inverse video.
2	20	Indicates active channel number from 0 thru 20.
3	USB	Shows modulation mode, which appears as USB, LSB, AM, DSB, or CW. CW represents MCW and may be used with the KEY pushbutton or the aircraft push-to-talk switch to transmit code.

Table 2-2. Functions of CRT Display Fields-Continued

FIGURE 2-2 DISPLAY FIELD	FIELD **MESSAGE**	FUNCTION
4	**RX 13100.8 KHz**	**Indicates the receive frequency in kilohertz.**
5	**TX 12330.0 Ktiz**	**Indicates the transmit frequency in kilohertz.**
6	**RX ABCD**	**Indicates Receive Selective Address. If SELADR is operational for RX, ON is displayed on the same line.**
7	**TX HJKL**	**Indicates Transmit Selective Address. If SELADR is operational for TX, ON is displayed on the line with the TX.**
8	**CIPHER**	**Indicates modulation source. Possible displays include:** **DATA (Indicates 600-ohm data input.)** **CIPHER (Indicates input from KY 75 in cipher mode.)** **CLR-VC (Indicates 150-ohm microphone input.)**
9	**VOL 6**	**Indicates either a fault or the audio volume level. Displays and indications include:** **VOL MIN,1 through 14, MAX (audio volume level)** **DATA NOT SAVED (unstored channel information)** **UNTUNED (displayed channel is not tuned)** **RT:MJR (major receiver-transmitter fault)** **RT:MNR (minor receiver-transmitter fault)** **AM:MJR (major amplifier-coupler fault)** **AM:MNR (minor amplifier-coupler fault)**

Table 2-2. Functions of CRT Display Fields-Continued

FIGURE 2-2 DISPLAY FIELD	FIELD MESSAGE	FUNCTION
10	M ↓↑	Normally will be blank. An M indicates MODE pushbutton has been pressed and USB, LSB, DSB, AM, CW, or SCAN should be selected next. Arrows indicate slewing may be used, or scan flag may be set or cleared.
11	XMT	Display has function indicated: XMT: Transmitter is keyed TEST: BIT mode is selected SCAN: SCAN mode is active STORE: Store function is selected TUNE: Tune mode selected TUNING: Tune mode active ENTRY ERROR: Out of range channel
12	S	Indicates that the currently displayed channel is on the scan list.
13	PWR: MED	Indicates transmitter output power with display of LO, MED, or HI.
14	SQL 7	Shows squelch level displayed as OFF, 1 through 7, to MAX (maximum), in conjunction with squelch knob. Also indicates NET mode, and selective address (SEL) mode.

C. *Operating Modes and Pushbutton Functions.* Figure 2-3 shows the pushbutton arrangement for the control-display panel. The pushbuttons on the control-display front panel are multi-function. When used in the right combinations and sequences, each pushbutton may be used to accomplish a number of different operations. The letters A to M may be used in designated combinations in groups of four to select specific pre-determined transmit and receive selective address codes. The numbers on the pushbuttons are used to select the operating frequencies and channels. Other functions of the pushbuttons are to select specific modes of operation for the radio set. The detailed operating instructions are in Section II. Table 2-3 identifies the pushbuttons and describes the function of each.

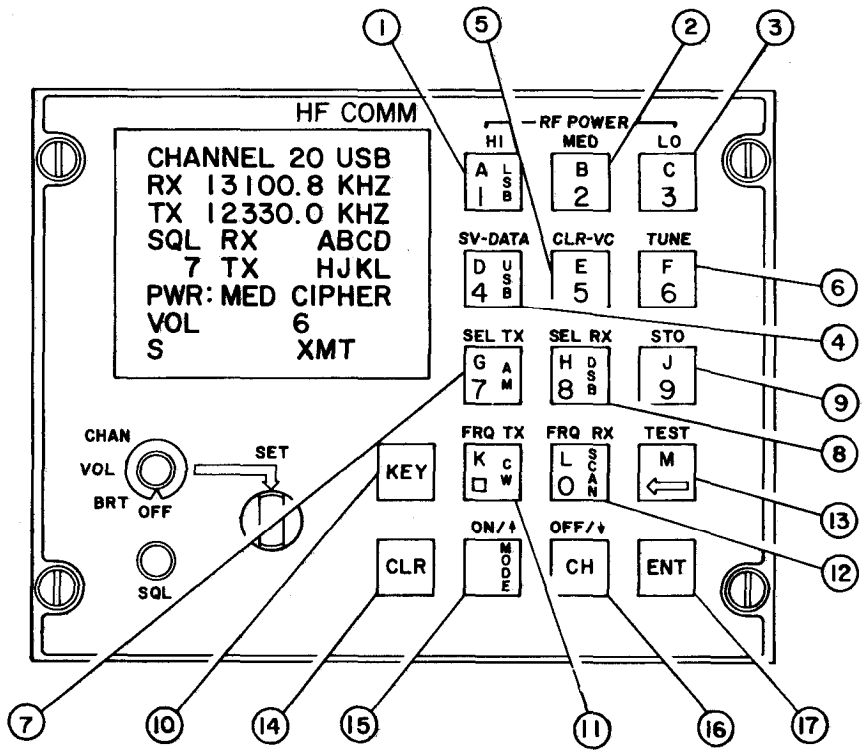


Figure 2-3. Control-Display Panel Pushbutton Layout

Table 2-3. Operating Modes and Pushbutton Functions

FIGURE 2-3 ITEM	PUSHBUTTON	FUNCTION
	NOTE	
	Numbers 0 thru 9 and alpha letters A thru M are provided on the pushbuttons for entering data. Most pushbuttons have more than one function, For complete operating instructions, see Section II.	
1	1 A LSB HI	Selects numeric one (1), alpha A, Lower Sideband Modulation, or HI Power Output.
2	2 B MED	Selects numeric two (2), alpha B, or medium power output.
3	3C LO	Selects numeric three (3), alpha C, or low power output.
4	4 D USB SV-DATA	Selects numeric four (4), alpha D, or upper sideband modulation (USB). SV-DATA selects the 600-ohm data input as the modulation source. Modulation source is not a stored limit.
5	5 E CLR-VC	Selects numeric five (5), alpha E, or selects the 150 ohm compressed audio (microphone) input (CLR-VC) as the modulation source.
6	6 F TUNE	Selects numeric six (6), alpha F, or the currently displayed channel to be tuned to the antenna. TUNE stores tuning information for future use with no retuning necessary.
7	7 G AM SEL TX	Selects numeric seven (7), alpha G, or amplitude modulation (AM). SEL TX is used to select the transmit selective address code to be programmed.

Table 2-3. Operating Modes and Pushbutton Functions-Continued

FIGURE 2-3 ITEM	PUSHBUTTON	FUNCTION
8	8 **H DSB SEL RX**	**Selects numeric eight (8), alpha H, or double sideband modulation (DSB). SEL RX is used to select the receive selective address code to be programmed.**
9	**9 J STO**	**Selects numeric nine (9), or alpha J. STO is used to store currently displayed channel information.**
10	**KEY**	**When radio set is in the CW mode, this key allows the operator to transmit with coded communication, such as Morse code, rather than transmitting with normal voice communication.**
11	**■ K CW FRQ TX**	**Selects decimal point (shown on the pushbutton with a square), or alpha K, or carrier wave (CW). FRQ TX is used to select transmit frequency to be entered.**
12	0 **L SCAN FRQ RX**	**Selects numeric zero (0), or alpha L. SCAN is used to review/select channels on the stored scan list. FRQ RX selects receive frequency to be entered. Frequencies from 2.0 to 29.9999 MHz may be programmed in 100 Hz steps.**
13	**M ← TEST**	**Sets alpha M, or BIT to be initiated. Arrow on M pushbutton is used with the receive frequency mode by displaying a cursor on the CRT over the rightmost number in the frequency displayed. The arrow allows the cursor to be moved to the left so the receive frequency number can be changed.**
14	**CLR**	**Clears the function in process in the control-display. Returns the screen to the last stored mode.**

Table 2-3. Operating Modes and Pushbutton Functions-Continued

FIGURE 2-3 ITEM	PUSHBUTTON	FUNCTION
15	MODE ON/↑	Shifts the keyboard to select the LSB, USB, AM, CW, or DSB modulation modes. It is used to initiate SCAN operations. This pushbutton is also used to increase (upward arrow) channel number or receive frequency.
16	CH OFF/↓	Used to activate channel selection. This pushbutton is also used to decrease (downward arrow) channel number or receive frequency.
17	ENT	Initiates the "ENTER" process when selecting channel data or modes, and causes the new information to become operational.

2-3. Amplifier Coupler Controls And Indicators

Refer to figure 2-4. Located on the front of the antenna coupler are three circuit breakers. Circuit breaker (1) is a 5 A circuit breaker which controls power to the control-display. Circuit breaker (2) is a 20 A circuit breaker which controls power to the amplifier-coupler. Circuit breaker (3) is a 5 A circuit breaker which controls power to the receiver-transmitter. Circuit breakers should remain in closed position (pressed in) to function properly.

Elasped Time Indicator (4) is a digital display indicating time period that system has been under power.

High Power Lockout Switch (5) is a screwdriver-set switch and prevents unauthorized use of high power mode when turned counter clockwise.

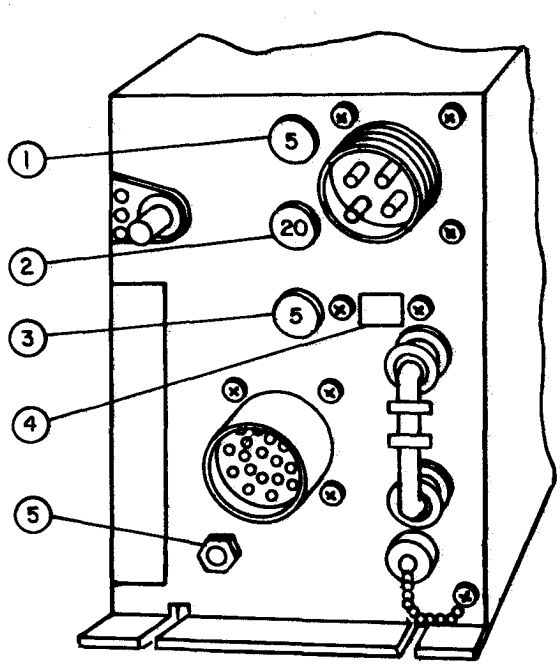


Figure 2-4. Amplifier-Coupler Controls

2-3. Amplifier Coupler Controls And Idicators

Refer to figure 2-4. Located on the front of the antenna coupler are three circuit breakers. Circuit breaker (1) is a 5 A circuit breaker which controls power to the control-display. Circuit breaker (2) is a 20 A circuit breaker which controls power to the amplifier-coupler. Circuit breaker (3) is a 5 A circuit breaker which controls power to the receiver-transmitter. Circuit breakers should remain in closed position (pressed in) to function properly.

NOT BOLD

Elasped Time Indicator (4) is a digital display indicating time period that system has been under power.

High Power Lockout Switch (5) is a screwdriver-set switch and prevents unauthorized use of high power mode when turned counter clockwise.

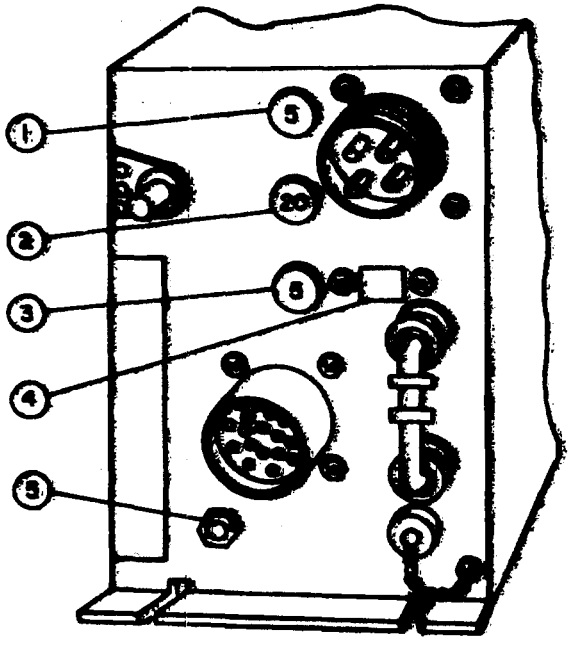


Figure 2-4. Amplifier-Coupler Controls

CLOSER TOGETHER

Section II. OPERATION UNDER USUAL CONDITIONS

2-4. Preoperating Procedure

Before you operate the radio set, be sure you know how to apply power to the aircraft. This can be learned from the aircraft technical manuals. It is also important that you know the local rules for keying a transmitter.

Be sure that radio set LRUs are secured and wired in the aircraft. Apply power to the aircraft.

Power is applied to the radio set by turning the function select knob to BRT. When the radio set is initially powered up, the channel 0 information will be displayed. Channel 0 may be programmed and operated in the same manner as channels 1 thru 20. Set CRT brightness and audio volume as instructed in table 2-1. To program a channel, set squelch, select channel, set operating parameters, store channel information, tune, and test according to procedures given in paragraph 2-5.

2-5. Detailed Operating Procedures

NOTE

All transmitted and received signals should be loud and clear. Data should be accurate during operation. All controls and indicators are on the control display LRU unless otherwise noted.

When using the control-display panel shown in figure 2-5, the mode of operation and other channel data may be changed as often as desired until the appropriate terminating pushbutton is pressed. Both the ENT pushbutton (17) and the decimal point pushbutton (11) are defined as terminating pushbuttons.

CRT Display fields, indicated by the number of the field, are shown in figure 2-5. In the channel number, RX (field 4) and TX (field 5) frequency, and selective address fields, RX (field 6) and TX (field 7), the first character entered is displayed in the position furthest to the right in that field. Later entries shift the earlier entries to the left. After the entry field is full, further entries shift the characters to the left and out of the display field.

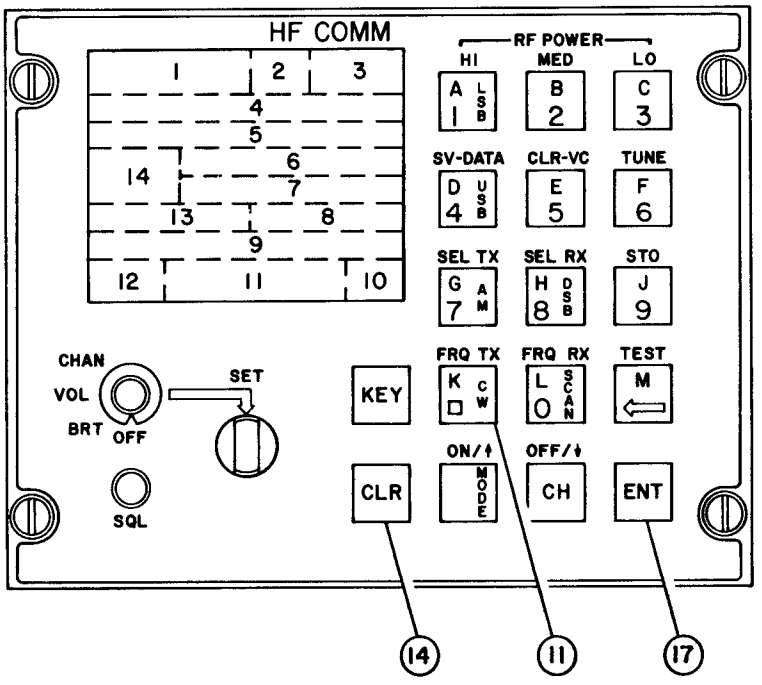


Figure 2-5. Control-Display Panel Identification Fields

NOTE

If entry of an invalid frequency or illegal SELADR code is attempted, the entry field for that data rejects the illegal entry and defaults to the frequency or SELADR code previously displayed. The header for that particular field remains in inverse video until the entry error is corrected. Refer to figure 2-2 for an example of inverse video. If an error is made while entering data, pressing the CLR pushbutton clears the incorrect data.

a. Channel *Selection.* Refer to figure 2-6. There are three methods to choose from when selecting a channel: manual tuning, channel slewing, and using numbered keys. These procedures provide a convenient method of selecting channels if the SET knob (manual tuning) is damaged or otherwise inoperable. The channel selected appears on the top line of the data displayed on the CRT screen. Refer to field 2 (figure 2-5)

1. *Manual tuning.* Turn the function select knob (18) to CHAN. Rotate the SET knob (19) in a clockwise direction to set the channel number to a higher numbered channel, or counterclockwise to set it to a lower numbered channel. After the channel is selected, turn the function select knob (18) to VOL.

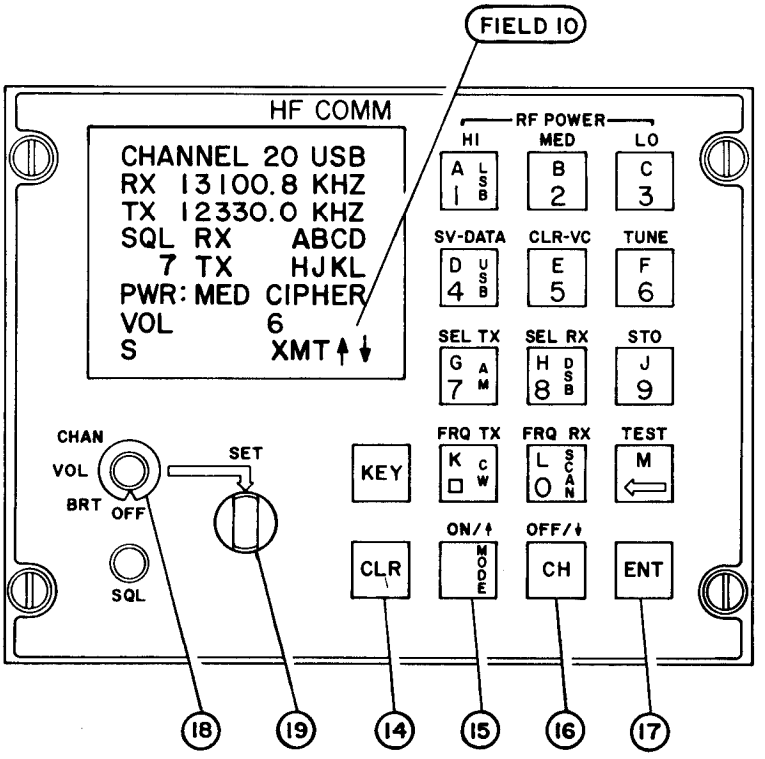


Figure 2-6. Channel Selection, Controls and Indicators

2. ***Channel slewing.*** **Press the CH pushbutton (16). Up and down arrows appear in the lower right corner in field 10 (figure 2-6) of the CRT screen. To change channel to a higher number, press the up arrow pushbutton (15). To change channel to a lower number, press the down arrow pushbutton (16). The channel changes one number for each keystroke. After CH pushbutton (16) is pressed, the display on the CRT screen blanks except for the arrows, the word CHANNEL in inverse video, the channel number. After channel is selected, press ENT pushbutton (17), and channel information is displayed.**

NOTE

If the CLR pushbutton (14) is pressed before the ENT pushbutton (17) is pressed, when using the channel slewing and numbered keys procedures to select a channel, the information displayed is that displayed before the channel change began.

3. ***Using numbered keys.*** **Press CH pushbutton (16), then use numbered pushbuttons (figure 2-3, callouts 1 through 9) to enter channel number. After CH pushbutton (16) is pressed, the display is blank except for the word CHANNEL in inverse video, the channel number, and the arrows. After channel is selected, press ENT pushbutton (17), and channel information is displayed.**

b. ***Receive and Transmit Frequency Select.*** **Refer to figure 2-7.**

1. ***Receive frequency select.*** **Frequencies can be selected by either the frequency select or the frequency slewing method.**

(a) To initially program or change the receive frequency for the displayed channel, press FRQ RX pushbutton (12), enter operating frequency with decimal point (for example, 13100.8). It is not necessary to enter the decimal point if the sixth digit is O. When the decimal point pushbutton (11) has been pressed, only the 100 Hz frequency can be changed. When the new frequency is correctly entered, press the ENT pushbutton (17). This makes the new receive frequency operational, but not stored.

(b) When the FRQ RX pushbutton (12) is pressed, arrows appear on the CRT screen. RX and the 100 Hz digit will appear in inverse video. When the first digit of the new frequency is entered, the previous frequency is cleared. After the new frequency is completely entered and the ENT pushbutton (17) is pressed, the display returns to normal, with CHANNEL in inverse video. To remove inverse video, perform STORE operation.

(c) When entering a new frequency, a minimum of four digits must be entered before the decimal point is entered or an error results. If the frequency number entered is invalid or out of range, ENTRY ERROR will be displayed in field 11 (figure 2-5) after pressing the ENT pushbutton (17). When this occurs, the display returns to the previously entered operating frequency. The operator must then re-enter a correct frequency.

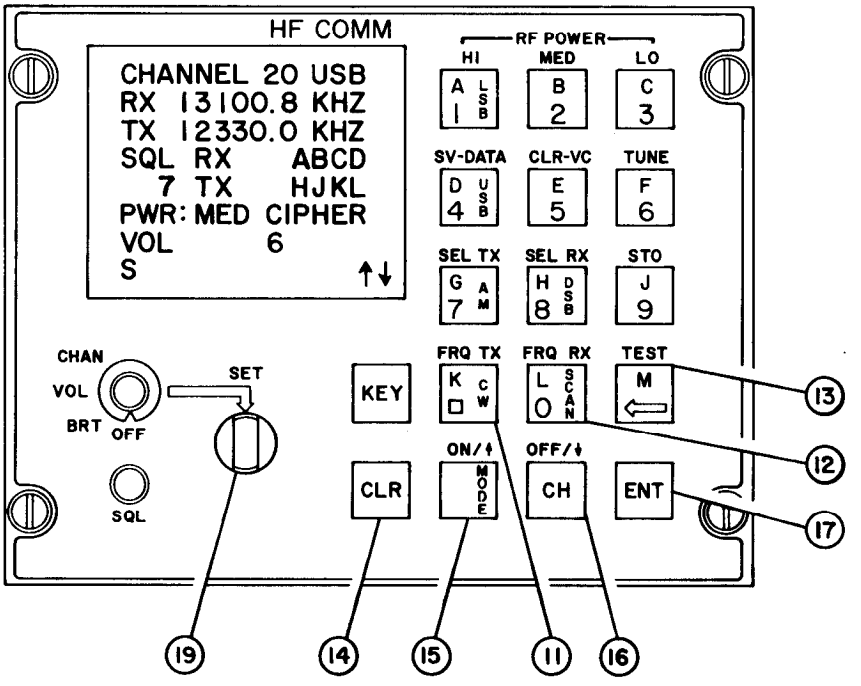


Figure 2-7. Receive/Transmit Channel Selection, Controls

2. ***Frequency dewing*** **(receive only).**

(a) **The frequency stewing mode allows any digit of the receive frequency, except the 1O-MHZ digit to be changed as desired.**

(b) To use the frequency slewing mode, first press FRQ RX pushbutton (12). The cursor will appear in the 1OO-HZ position and arrows will appear in field 10 (figure 2-5). Press either the up arrow pushbutton (15) or the down arrow pushbutton (16) to change the 100-Hz digit as desired. The SET knob may also be used to change any of the digits.

(c) To change a digit in the other positions (except 10-MHZ position), press the M **pushbutton (13) to move the cursor to the desired position. Then use the up arrow pushbutton (15) or the down arrow pushbutton (16) or the SET knob (19) to change the digit. When the desired frequency appears on the CRT screen, press the ENT pushbutton (17). This makes the new receive frequency operational.**

3. Transmit frequency select.

(a) Transmit frequency is programmed the same way as the receive frequency, using the FRQ TX pushbutton (11) rather than the FRQ RX pushbutton (12). When FRQ TX pushbutton (11) is pressed, the transmit frequency field, field 5 (figure 2-5) header appears in inverse video. The receive frequency may be copied to the transmit frequency by pressing the FRQ TX (11) and ENT (17) pushbuttons.

(b) To initially program or change the transmit frequency for the displayed channel, press FRQ TX pushbutton (11), then enter the desired operating frequency with the decimal point (for example, 13100.8). It is not necessary to enter the decimal point if the sixth digit is O. When the decimal point pushbutton (11) has been pressed, only the 100-HZ frequency can be changed. When the new frequency is correctly entered, press the ENT pushbutton (17). This makes the new transmit frequency operational, but not stored.

(c) When the FRQ TX pushbutton (11) is pressed. TX will appear in inverse video. When the first digit of the new frequency is entered, the previous frequency is cleared. After the new frequency is completely entered and the ENT pushbutton (17) is pressed, the display returns to normal, except channel in inverse video, indicating unstored TX frequency.

(d) When entering a new frequency, a minimum of four digits must be entered before the decimal point is entered or an error results. If the frequency number entered is invalid or out of range, ENTRY ERROR will be displayed in field 11 (figure 2-5) after pressing the ENT pushbutton (17). When this occurs, the display returns to the previously entered operating frequency. The operator must then re-enter a correct frequency.

c. *Power Select Level.* Refer to figure 2-8. To select power level, press pushbutton for HI (l), MED (2), or LO (3), then press ENT pushbutton (17). The power display in field 13 (figure 2-5) appears in inverse video when the power level pushbutton is pressed, and remains in inverse video until ENT pushbutton (17) is pressed. Refer to figure 2-2 for an example of inverse video. When high power lockout is in effect, and HI (1) is selected, the transmitter is limited to medium power.

NOTE

There is a switch on the front of the amplifier-coupler which can inhibit the high output power mode. Refer to figure 2-4.

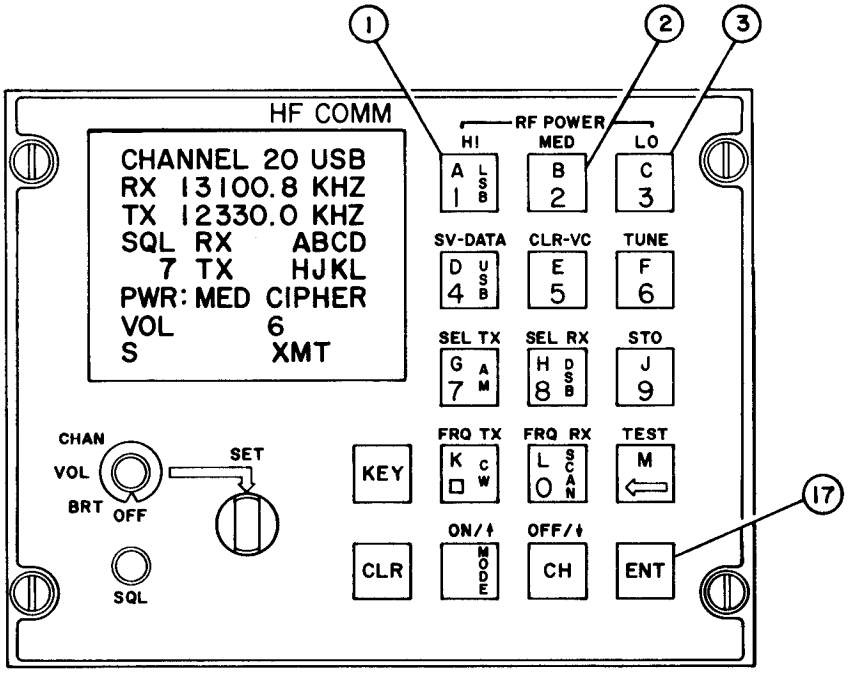


Figure 2-8. Power Level Select, Controls

d. ***Modulation Source Selection.*** **Refer to figure** *2-9*. **To select modulation source, press either SV-DATA pushbutton (4) or CLR-VC pushbutton (5), then press ENT pushbutton (17). The SV-DATA pushbutton (4) selects the 600-ohm data input to the radio set, or the CLR-VC pushbutton (5) selects the 150 ohm compressed audio input. The source selected appears in field 8 (figure 2-5) in inverse video when SV-DATA (4) or CLR-VC pushbutton (5) is pressed, and returns to regular video when ENT pushbutton (17) is pressed. Refer to figure 2-2 for an example of inverse video.**

NOTE

If voice security equipment is used which incorporates output circuitry to indicate that its output is encoded, the display on the CRT screen shows CIPHER in field 8 (figure 2-5).

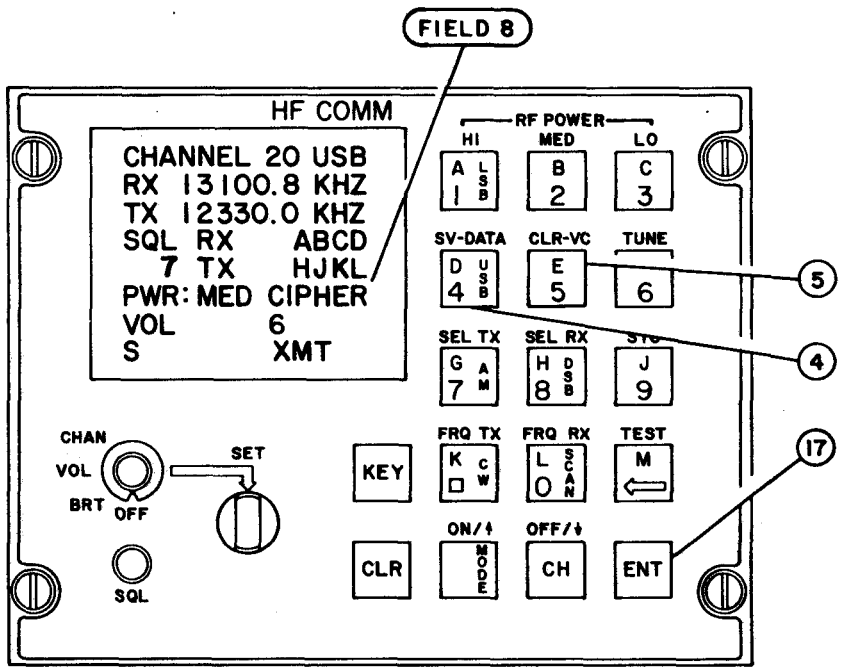


Figure 2-9. Modulation Source Selection, Controls

e. ***Modulation Mode.*** **Refer to figure 2-10. To select the modulation mode, press the MODE pushbutton (15). Then press the mode desired, choosing from the LSB pushbutton (l), the USB pushbutton (4), the AM pushbutton (7), the CW pushbutton (11) or the DSB pushbutton (8). Press the ENT pushbutton (17) to enter data. After the selected mode pushbutton is pressed, the modulation mode display in field 3 (figure 2-5) on the CRT screen appears in inverse video until the ENT pushbutton (17) is pressed. Refer to figure 2-2 for an example of inverse video. An "M" which appears in field 10 (figure 2-5) to indicate that the mode is being changed, also disappears after the ENT pushbutton (17) is pressed.**

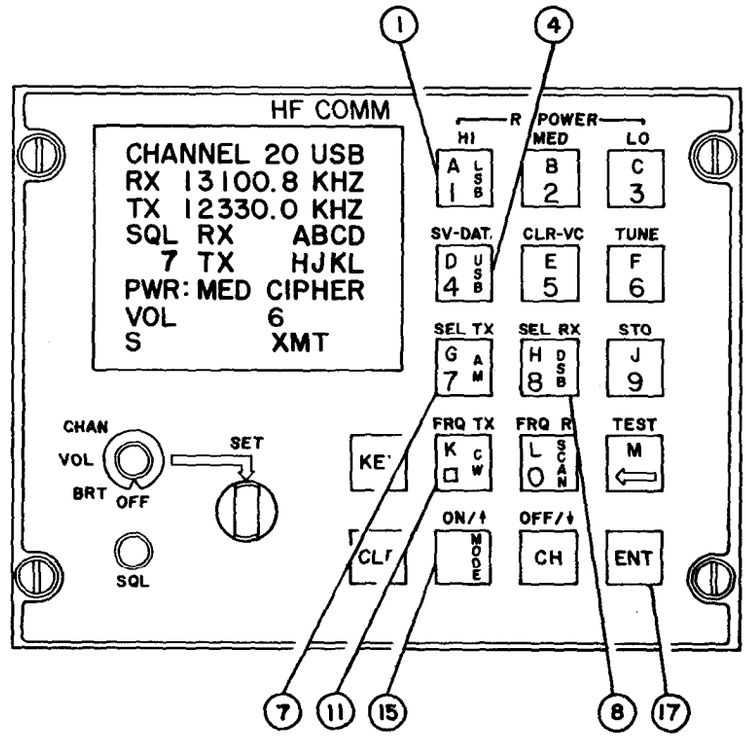


Figure 2-10. Modulation Mode, Controls

f. *Store.* Refer to figure 2-11. If new channel data, such as receive frequency, modulation mode, or power level, is entered but not saved, DATA NOT SAVED appears in the fault field, field 9 (figure 2-5) and the word CHANNEL appears in inverse video. Refer to figure 2-2 for an example of inverse video. Any other fault messages have priority over the DATA NOT SAVED message. To save the new channel information, press the STO pushbutton (9) followed by the ENT pushbutton (17). When the STO pushbutton (9) is pressed, the word STORE appears in field 11 (figure 2-5) in inverse video. When the ENT pushbutton (17) is pressed, STORE is cleared from the display and the word CHANNEL changes to normal video after the store operation is complete.

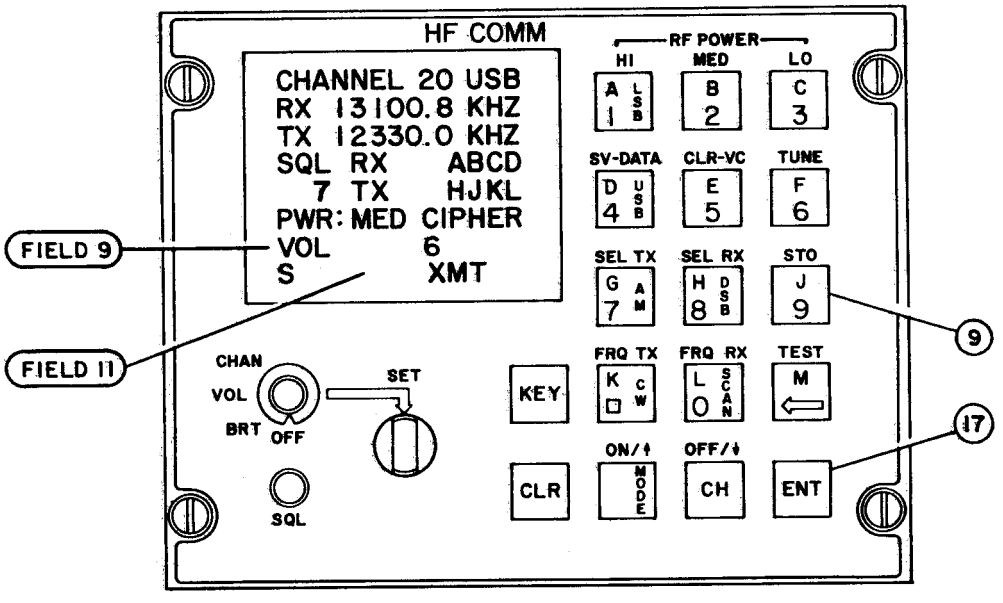


Figure 2-11. Store Function, Controls

g. ***Tune Mode.*** **Refer to figure** 2-12. **The tune mode tunes only the channel currently displayed by pressing the TUNE pushbutton (6) and the ENT pushbutton (17). When the TUNE pushbutton (6) is pressed, TUNE appears on the display in field 11 (figure *2-5).* When the ENT pushbutton (17) is pressed, TUNING appears on the display in field 11 (figure *2-5).* It remains until tuning is complete. The tune function also performs a store operation.**

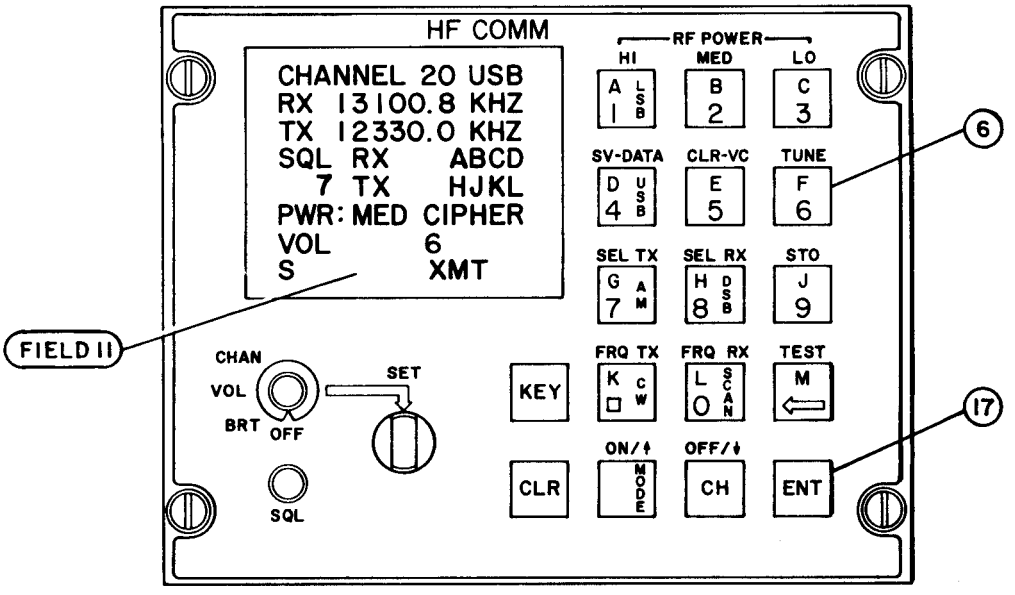


Figure 2-12. Tune Mode Function, Controls

h. ***Selective Address.*** **Refer to figure 2-13. Selective addresses for receive and transmit, with operating instructions are given in the following information.**

NOTE

Four different letters must be used in the code, though the arrangement of letters does not matter. For example, the code ABCD is identical to the code BADC, and the letters are displayed in alphabetical order.

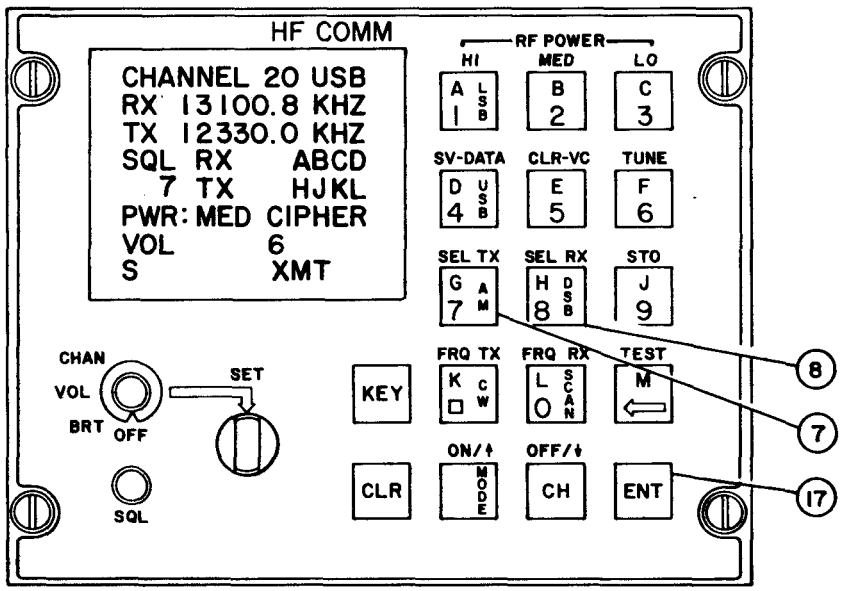


Figure 2-13. Selective Address Function, Controls

1. ***Selective receive address.*** **Refer to figure 2-13. To enter selective receive address, press the SEL RX pushbutton (8), then the four letters of the new address from the alphabet letters A thru M on the pushbuttons, then press the ENT pushbutton (17). When the SEL RX pushbutton (8) is pressed, the receive address field header RX goes to inverse video. Refer to figure 2-2 for an example of inverse video. New code letters also appear in inverse video when entered. After the address has been entered and ENT pushbutton (17) has been pressed, the display returns to regular video.**

2. ***Selective transmit address.*** **Refer to figure 2-14. To enter selective transmit address, press the SEL TX pushbutton (7), then the four letters of the new address from the alphabet letters A thru M on the pushbuttons. Then press the ENT pushbutton (17). When the SEL TX pushbutton (7) is pressed, the transmit address field header TX goes to inverse video. Refer to figure 2-2 for an example of inverse video. New code letters also appear in inverse video when entered. After the address has been entered and ENT pushbutton (17) has been pressed, the display returns to regular video, except for CHANNEL in inverse video, indicating unstored SELADR code.**

i. ***SELADR O/V/OFF.*** **Select address can be enabled for receive or transmit. Operating instructions are given in the following information.**

1. ***SELADR receive***

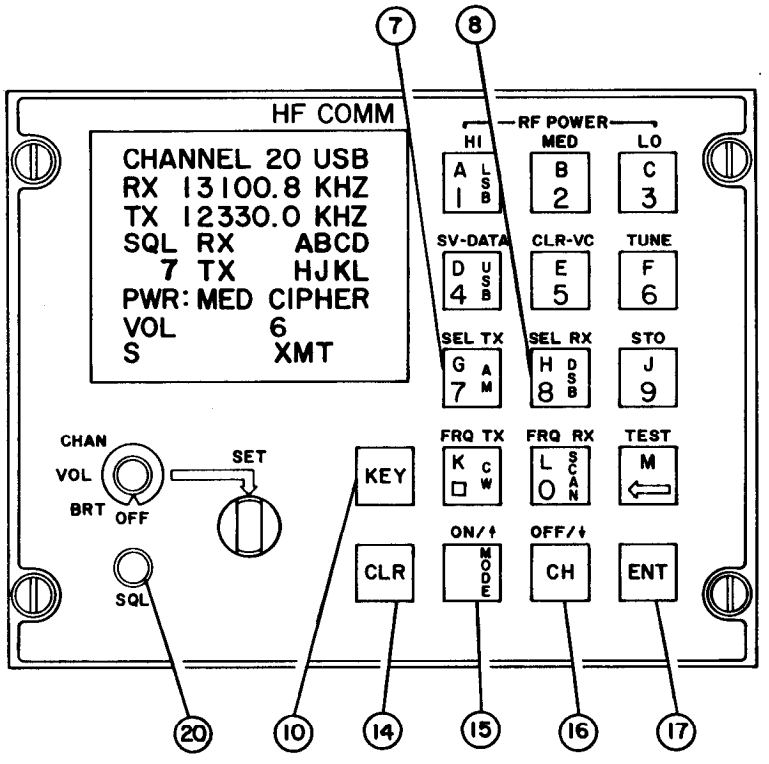


Figure 2-14. SELADR Receive/Transmit Function, Controls

Refer to figure 2-14. SELADR receive may be selected by simply turning the SQL squelch knob (20) to the second stop counter clockwise from the OFF position. SELADR receive may also be selected by pressing the SEL RX pushbutton (8) followed by pressing the ENT pushbutton (17).

With SELADR enabled, the receiver is fully squelched until the correct SELADR tones are received. To receive the SELADR tones, the radio set must be either tuned to the frequency on which the SELADR tones are to be transmitted, or it must be scanning for that frequency. Reception of a matching, four-tone SELADR code causes the following to occur:

- SELADR RX is deactivated;
- An audio tone alerts the operator that he is being called;
- If the unit previously was scanning, the scanning stops;
- Squelch is automatically set to off.

The operator can now transmit and receive in normal radio fashion with no squelch. At end of contact, pressing the "KEY" pushbutton (10) return-s the radio to the SELADR receive mode. "

The operator can take the radio set out of the SELADR RX mode by pressing the CLR pushbutton (14).

Pressing CLR (14) returns the radio to normal transmit/receive operation with no squelch. Operating the aircraft push-to-talk switch enables SELADR transmit mode.

2. *SELADR transmit*

Refer to figure 2-14. To enable the SELADR transmit, press the SEL TX pushbutton (7), and the ENT pushbutton (17). SELADR transmit may also be enabled by first activating SELADR receive or NET mode and then operating the aircraft push-to-talk (PTT) switch. When SELADR transmit is activated, XMT appears in display in field 11 (figure 2-5) and ON appears in display in field 7 (figure 2-5). At the same time, the four letter code is automatically transmitted for a predetermined length of time (approximately one second for each channel on the scan list). To transmit the SELADR tones for longer than the predetermined time, press and hold the aircraft push-to-talk switch while the tones are being transmitted. The tones continue to be transmitted until the microphone key is released. At the end of the tone code transmission, the operator can receive and transmit in normal radio fashion with no squelch.

When the contact is complete, pushing the KEY pushbutton will return the radio to the previous SELADR receive or NET monitoring mode. Pressing the CLR key (14) takes the radio set out of the SELADR TX mode.

3. NET MODE The Net mode is identical to the SELADR receive mode (reference paragraph i.1) in all respects except one. The tone code which is transmitted and monitored in the NET feature is a dedicated code and not user selectable. This decreases operator time and attention required to reliably use the NET communication mode.

The radio is first put into the NET mode by turning the SQL squelch knob (20) counter clockwise one stop from the squelch OFF position. The radio will immediately squelch the audio out signal and begin monitoring for the NET tone code (JKLM) on the user selected channel for NET. This is indicated on the CRT screen by the appearance of the word NET directly below SQL in field 14. The selective receive and transmit addresses stored on the channel are still displayed. Monitoring continues indefinitely or until any of the following occur:

- Incoming NET contact detected.
- Operation of Push-to-Talk (see Transmit Operation).
- SQL squelch knob (20) is turned which deselects NET.
- CLR (14) pushbutton is pressed.

When an incoming call is detected by the presence of the dedicated NET tone code (JKLM), the radio unsquelches the audio to allow tones to be heard.

At the end of the tone code, the operator can transmit and receive in normal radio fashion with no squelch.

The operator indicates end-of-contact by pushing the KEY pushbutton on the control display front panel.

The radio then returns to the NET monitoring mode.

NET Transmit Operation

As in receive operation, the radio is first put in the NET mode by turning the squelch knob to the NET position after the desired channel is selected.

Then key the radio by pressing the PTT switch.

The radio responds by transmitting the dedicated NET tone code for a four second-interval. Tone code should be heard in sidetone.

At the end of the tone code transmission the operator can transmit and receive in normal radio fashion with no squelch.

When the contact is complete, pushing the KEY pushbutton on the control-display front panel returns the radio to the NET monitoring mode.

j. *Test Mode/Display.* Refer to figure 2-15. Test mode/display is used for running the BIT sequence. Operation procedures for the modes are given in the following information.

1. *Test mode.* Refer to figure 2-16. Press TEST pushbutton (13), followed by ENT pushbutton (17). The CRT screen displays a checkerboard pattern for a few seconds. Then it shows an inverse checkerboard pattern to test the individual character spaces on the CRT. When this part of the test is completed, the words TEST IN PROGRESS are displayed on the CRT. To stop BIT before testing is completed, any pushbutton may be pressed. For consistency, it is recommended that the CLR pushbutton (14) be used to stop the testing.

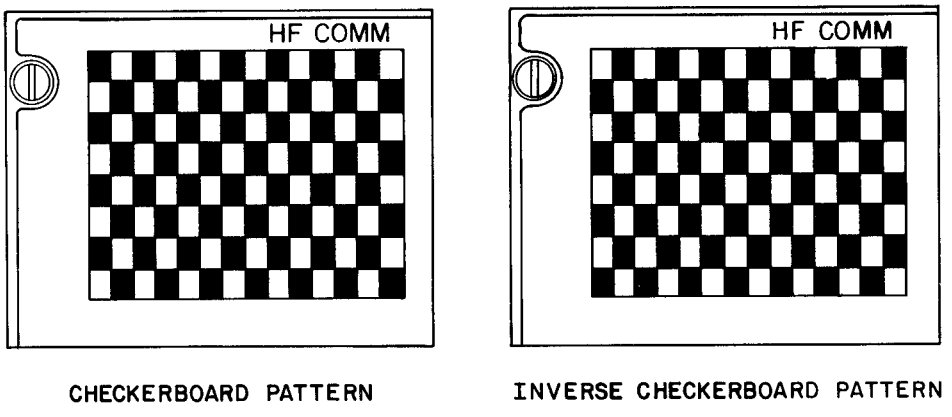


Figure 2-15. CRT Display of BIT Test Checkerboard Patterns

NOTE

After BIT is completed, the CRT displays a message which indicates whether the system failed or passed the BIT test. After BIT is completed and the failed or passed display appears, the CLR pushbutton (14) MUST be pressed to return the system to normal operating conditions

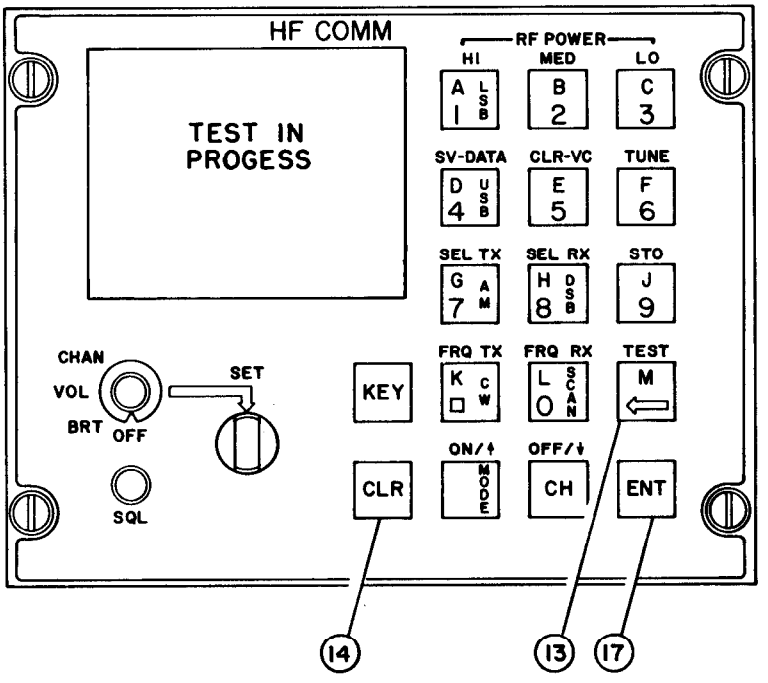


Figure 2-16. Test Mode Function, Controls

2. ***Failed test display.*** **Refer to figure 2-17. The failed test display has six lines of data. Explanation of the codes is as follows:**

LINE	DISPLAY	EXPLANATION
(1)	**TEST FAIL**	**Test has failed**
(3)	**FAULT C**	**Control-Display has failed**
(4)	**FAULT AM X**	**Amplifier-Coupler has failed** Displays MJR for major or MNR for minor failures of either the Amplifier-Coupler or the Receiver-Transmitter on the line with the failed unit
(5)	**FAULT RT**	**Receiver-Transmitter has failed**
(7)	**PRESS CLR**	**Exit instructions**

NOTE

Major faults indicate that the unit is not usable and should be shut down or used for emergency transmission only. Minor faults indicate a temporary problem or possibly a problem only on a particular frequency. Try a different frequency and check system wiring and antenna connections to clear a minor fault.

The seventh and eighth lines of the display give the test exit instructions (6).

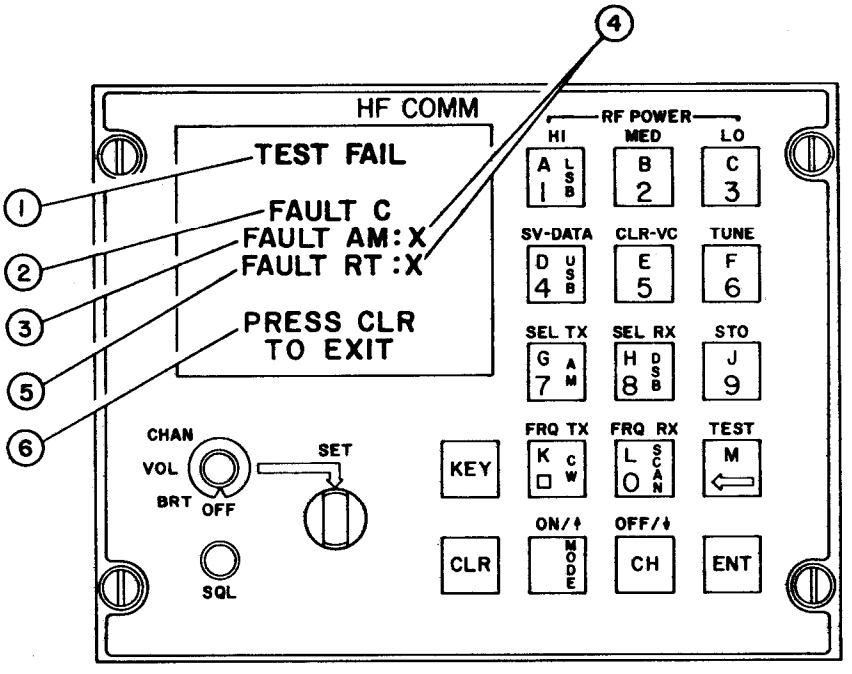


Figure 2-17. Failed Test Display

3. ***Passed test display.*** **Refer to figure 2-18. For a passed test, the CRT screen displays the words TEST PASS, and gives test exit instructions at the bottom of the screen.**

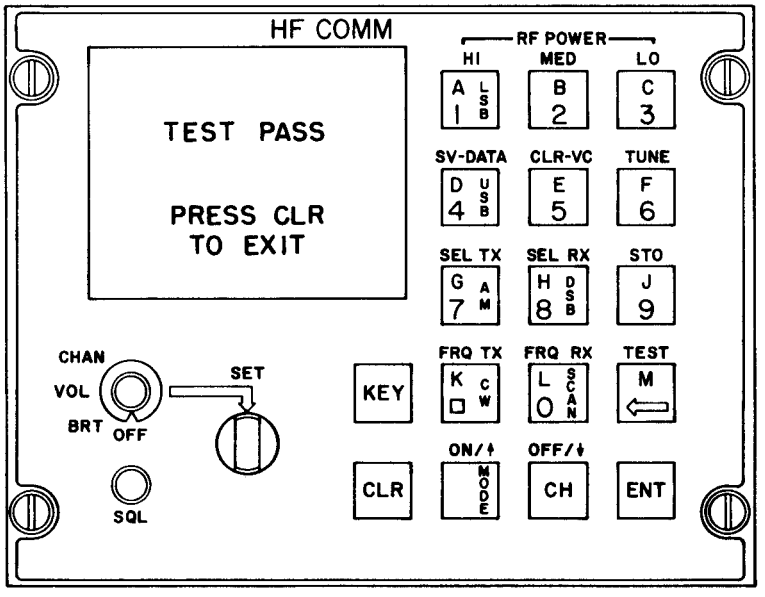


Figure 2-18. Passed Test Display

k. ***Scan Mode.*** **Refer to figure 2-19. The two operations necessary for scanning are, programming channels onto the scan list, and initiating the scan.**

1. ***Programming scan.*** **To add or remove a channel from the scan list, press the MODE pushbutton (15) then the SCAN pushbutton (12). The word SCAN is displayed in field 11 on the CRT screen and arrows are displayed in field 10 (figure 2-5). To set the scan flag for the displayed channel, press the ON/MODE pushbutton (15). To clear the scan flag from the displayed channel, press the OFF pushbutton (16). After the scan flag has been set or cleared, press the ENT pushbutton (17). The arrows and the SCAN are cleared from the display. If the scan flag was set, an "S" is displayed in field 12, indicating that the displayed channel is on the scan list.**

NOTE

The scan flag must be stored after being entered in order for the channel to be retained on the scan list.

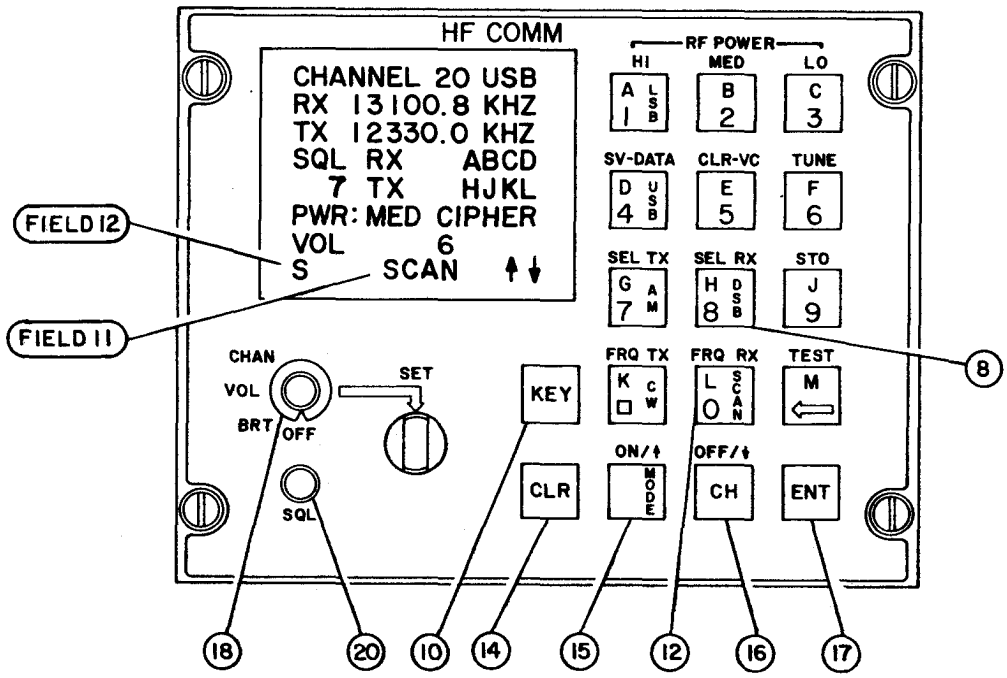


Figure 2-19. Scan Mode Function, Controls and Indicators

2. *Executing scan.* To scan all channels which have been stored on the scan list, press the MODE pushbutton (15), the SCAN pushbutton (12), and the ENT pushbutton (17). After ENT (17) has been pressed, the CRT screen is blank except for the word CHANNEL, the channel number, the SQL header and squelch setting, and the word SCAN. The channel number changes as scanning takes place. To stop scanning, any pushbutton may be pressed; however, it is recommended that the CLR pushbutton (14) be used. Normal radio operation is restored for the channel which was being displayed in the scan mode before the scanning was stopped.

3. *Selective address scan.* The purpose of this mode is to scan two or more selected channels while the radio receiver is squelched. In this mode, the radio is monitoring for the selective address receive code(s) which are programmed on the scanned channels.

   This mode may be entered in one of two ways:

   (a) Using the SQL squelch knob (20), select the third position counter clockwise from the squelch OFF position.

(b) Press the following pushbuttons: SEL RX (8) + ON (15) + SCAN (12). The audio will immediately be squelched out and the radio will begin scanning the channels previously entered on the scan list (see paragraph k.1.). Scanning will continue indefinitely or until any of the following occur:

(1) A matching four-tone code is detected for one of the scanned channels.

(2) The SQL (20) squelch knob is turned which deselects SELADR Scan.

(3) The CLR pushbutton (14) is pressed.

In the case of (1) and (3) above, the sequence of events described in paragraph il. occurs. For case (2), the squelch functions as indicated in Table 2-1.

After the contact is completed, the operator may push the KEY pushbutton (10) to reenter the SELADR Scan mode. Otherwise, step 2 above may be used to reenter the SELADR Scan mode. The display during SELADR Scan appears as in figure 2-20 with the CHANNEL word and SCAN in inverse video. The channel number changes as each channel is scanned.

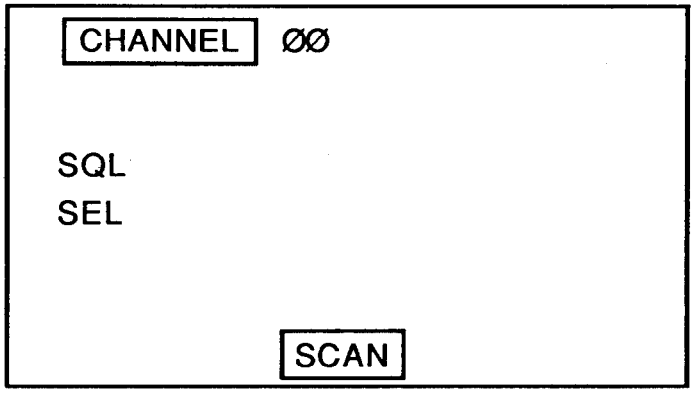


Figure 2-20. SELADR Scan Display

CHAPTER 3
AVIATION UNIT MAINTENANCE (AVUM)

Section I. REPAIR PARTS, SPECIAL TOOLS, TEST MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

3-1. Common Tools and Equipment

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-2. Special Tools, TMDE and Support Equipment

No special tools, TMDE or support equipment required.

3-3. Repair Parts

Repair parts are listed and illustrated in Appendix E.

Section II. SERVICE UPON RECEIPT

3-4. Unpacking

Before unpacking, check shipping container(s) for obvious damage or mishandling. Carefully unpack System and check each LRU for external damage. Verify all items on packing slip are accounted for. Save all packing materials until System has been installed in an aircraft and checked out. Report any damage or unsatisfactory equipment received, using DA PAM 738-751.

a. *Packaging.*

1. Control-Display
   (a) 18.625 in. long X 10.25 in. deep X 10.25 in. wide
   (b) Packed box weighs 9.0 lb. max.
   (c) Total volume is 1956.78 cubic in.

2. Antenna-Coupler
   (a) 10.25 in. long X 8.5 in. deep X 8.5 in. wide
   (b) Packed box weighs 5.0 lb. max.
   (c) Total volume is 740.56 cubic in.

3. **Receiver-Transmitter**
   (a) 19.125 in. long X 10.125 in. deep X 9.625 in. wide
   (b) Packed box weighs 14.0 lb. max.
   (c) Total volume is 1863.79 cubic in.

4. **Amplifier-Coupler**
   (a) 18.125 in. long X 12.875 in. deep X 9.625 in. wide
   (b) Packed box weighs 19.0 lb. max.
   (c) Total volume is 2246.08 cubic in.

b. Removing Contents. The following procedure is a typical procedure for all the radio set LRUS .

1. **Cut the tape along the top of the shipping carton and fold back the flaps.**
2. **Lift off the urethane top and remove the LRU from the urethane bottom.**
3. **Cut and take off the static shielding bag from the LRU.**
4. **Store the urethane top and bottom in the shipping carton for later shipment or storage of the LRU.**

c. *Checking Contents.* The following procedure is a typical procedure for checking unpacked equipment.

1. **Check to be sure the radio set LRUS are of the latest revision in accordance with DA PAM 750-10 US Army Equipment Index of Modification work orders.**
2. **Preform PMCS system functional test.**

3-5. Tools Required For Installation

All installation can be performed with tools provided in tool kit TK-101/G (item 1 in appendix B, section III).

3-6. LRU Location

Typicial System Locations are described in paragraph 1-11. Refer to TM-11 for your aircraft type for specific LRU locations.

3-7. LRU Installation

Refer to detailed LRU installation procedures in section V of this chapter. Procedures in section V assume the A-Kit, including wire harness, is correctly installed in aircraft.

Section III. PREVENTIVE MAINTENANCE CHECKS and SERVICES (PMCS)

3-8. General

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent trouble from occurring, to reduce downtime, and to maintain the equipment in a serviceable condition. To be sure that the equipment is always ready for a mission, you must do scheduled PMCS.

3-9. PMCS Inspections

a. Periodic inspection of System is specified in aircraft checklists. Perform following PMCS inspections at the intervals stated in checklist for your aircraft type. (If the radio set is not covered by aircraft checklist, use intervals in PMCS tables).

b. These PMCS inspections shall also be performed after replacing any LRU in the system. Remove all power to the system before performing PMCS inspections described in this paragraph. Set control switch OFF and set aircraft circuit breaker for System to OFF.

c. PMCS Table Column Definitions

Item No. Indicates the LRU, (first digit) and specific task number (second digit). For example, PMCS Number 2-6 is step 6 for indicator (Unit 2).

Interval. Use the intervals stated in checklits for your aircraft. If the AN/ARC-199 is not covered by aircraft checklist, use intervals in this column. Interval codes in this column are; B= Before operation, W= Weekly, and M= Monthly.

Item To Be Inspected/Procedure. Detailed PMCS task descriptions appear in this column.

Equipment is Not Ready/Available If. If the system fails any PMCS step take corrective action.

d. The equipment is not ready/available if the procedure column tells you why your equipment cannot be used.

e. If your equipment does not perform as required, refer to section IV. Report any malfunctions or failures on the proper form DA 2404 or refer to DA Pam 738-751. Deficiencies that cannot be corrected must be reported to higher category maintenance personnel.

Table 3-1. Preventive Maintenance Checks and Services

Item No.	Interval B	Interval W	Interval M	ITEM TO BE INSPECTED PROCEDURE	Eqpt not Rdy/Avail if:
1.				**Radio Set AN/ARC-199**	
	●		•	a. Visually inspect System for dust, oil, dirt, foreign matter, or dents, breaks, or cracks. If necessary, clean all equipment, removing dirt with a mild soap item 5 appendix D and a soft rag item 4, appendix D. Anodized surfaces may be cleaned with denatured alcohol or ammonia.	
	●		•	b. Check interconnecting cables for splits, cracks, breaks, or other damage.	Cables are cracked, broken, or damaged.
				NOTE	
				If cables must be replaced, notify your supervisor for correct action.	
	●		●	c. Check that connectors are properly installed on each LRU. Pull gently on connector to make sure it will not pull loose from the LRU.	Connector not properly installed on LRU.
2.				**Control-Display**	
	●		●	a. Refer to Figure 2-3. Visually inspect for dirt, cracks, or broken glass. If CRT screen is dirty, clean with glass cleaner and a lint free cloth item 6, appendix D.	
	●		●	b. Check that pushbutton markings are clean and legible. Clean with mild soap item 5, appendix D and a soft rag item 4, appendix D.	

Table 3-1. Preventive Maintenance Checks and Services - Continued

Item No.	Interval B	W	M	ITEM TO BE INSPECTED PROCEDURE	Eqpt not Rdy/Avail if:
	●		●	c. Check that knobs are tight and turn properly.	Knobs are loose or will not turn. Refer to paragraph 3-18.

3-10. PMCS System Functional Test

When performing a functional check of the radio set, it is best to choose a station that is far away on the fringe of the range of the radio system. The far away station can tell better if your signal is being-sent out as expected.

a. ***BIT Test***

1. **Power is applied to the radio set by placing the control display function switch (18) to BRT.**
2. **Check panel lights and CRT for brightness and uniformity.**
3. **Initiate the BIT sequence. Refer to paragraph 2-5, j.**

b. ***Receiver Test***

1. **Select frequencies** such as 2.5, 3.334, 5, 7.335, 10, 15, or 20 **MHz in order to receive a broadcast of time and frequency primary standards.**
2. **Set squelch potentiometer SQL to OFF.**
3. **Select AM mode and wait for reference audio tone modulation from the standards station.**
4. **Note the pitch of the audio tone received, then change to USB mode. The pitch of the tone should not change significantly.**
5. **Note the pitch of the audio tone received, then change to LSB mode. The pitch of the tone should not change significantly.**
6. **Vary the squelch setting and verify that the audio can be muted and unmuted depending upon the squelch setting.**

c. *Antenna Tune Test*

1. Program the radio set with one transmit frequency in each of the following bands:

- 2.0000 - 3.0999 MHz
- 3.1000 - 4.8999 MHz
- 4.9000 - 7.5999 MHz
- 7.6000 - 11.8999 MHz
- 11.9000 - 18.0999 MHz
- 18.1000 - 29.9999 MHz

2. Verify that the radio set system can tune the frequency in each band.

NOTE

Failure to hold tune at high power may mean arcing or an intermittent antenna system.

d. *Communications Check Test.* Communicate with a compatible ground station on one authorized test frequency. The ground station shall be located within 3 miles of the aircraft under test. Check the action of the volume control and note that up and back signal reports are comparable. Check that adequate sidetone is audible during all transmissions.

Section IV. TESTING AND TROUBLESHOOTING

3-11. Scope

Make sure that the radio set LRUs are properly installed in the aircraft, and that wiring between LRUs is correct. Perform system functional test (section III) and if anything does not work right, proceed as outlined below. After an LRU is replaced, rerun system functional test to make sure the new LRU works correctly.

This section contains procedures for troubleshooting problems in the radio set by using three methods. Visual inspection shall be used anytime a failure or fault is suspected. The radio set performs continuous Built-In-Test during normal operation and will display faults resulting from continuous BIT on the CRT. Initiated Built-In-Test shall be performed by maintenance personnel either on a periodic basis or upon detection of a fault during operation.

3-12. Troubleshooting Data

The BIT troubleshooting for the radio set (table 3-2) lists the item, action taken, normal indication, and corrective action needed.

Table 3-2. Troubleshooting the Radio Set

ITEM	ACTION	INDICATION	CORRECTIVE ACTION
1.	Check 3 circuit breakers located on the amplifier coupler. Refer to figure 2-4, item 3, receiver transmitter: item 2, amplifier coupler: item 1, control display. Re-check circuit breakers after each failure.	Circuit breakers should remain in the closed position (pressed in). If circuit breaker opens (out position), take corrective action.	Replace LRU.
	NOTE An open receiver-transmitter circuit breaker may cause control-display to appear defective. If control-display CRT is not operational, be sure to check receiver-transmitter circuit breaker before replacing control-display.		

Table 3-2. Troubleshooting the Radio Set - Continued

ITEM	ACTION	INDICATION	CORRECTIVE ACTION
2.	**Inspection**		
	Inspect all LRUs for physical damage.	**Bent or broken connectors or pins; dented, broken, pierced, or otherwise damaged case; or burns, abrasions or corrosion.**	**Replace LRU. If no damage, proceed to step 3.**
3.	**Continuous BIT Test.**		
	a. Turn function select on control display to BRT position. Use SET knob to adjust CRT brightness.		
	b. Observe control display.	**Display should generally appear as shown in figure 2-1, except that stored channel data may be different. If there is no display or channel data is missing or incomplete, take corrective action.**	**Replace control display.**
		If **one of the following indications appears in field 9 (figure 2-5) of the CRT, take corrective action.**	
		AM:MJR or MNR	**Replace amplifier coupler.**

Table 3-2. Troubleshooting the Radio Set - Continued

ITEM	ACTION	INDICATION	CORRECTIVE ACTION
		RT:MJR **or MNR**	**Replace receiver/ transmitter.**
	c. If **no fault is indicated, continue with step 4.**		
4.	**Initiated BIT test.**		
	a. Depress M TEST pushbutton on control display front panel.	**CRT displays TEST on bottom line of CRT.**	If **TEST is not displayed, depress M TEST pushbutton.** If **TEST is not displayed, replace control display.**
	b. Depress ENT pushbutton on control display front panel.	**CRT displays a checkerboard pattern for a few seconds, then the CRT displays an inverse checkerboard to test the individual character spaces on the CRT.**	If **checkerboard pattern does not appear, replace control display.** If **checkerboard is incomplete, replace control display.** If **inverse checker-board is replaced by a TEST FAILED message, see step c.** **Refer to figure 2-15 for example of checkerboard patterns.**
		TEST IN **PROGRESS will be displayed on the CRT for approximately 2 minutes.**	

Table 3-2. Troubleshooting the Radio Set - Continued

ITEM	ACTION	INDICATION	CORRECTIVE ACTION
		For a passed test, the CRT will display TEST PASSED, and will give exit instructions.	**Press CLR pushbutton to exit test mode.**
	c. Observe control display panel.	**For a failed test, TEST FAIL, exit instructions, and one of the following messages will appear on the CRT:**	
		FAULT C (major control display fault)	**Replace control display.**
		FAULT RT:MJR or MNR (receiver transmitter major or minor fault)	**Replace receiver transmitter.**
		FAULT AM:MJR or MNR (amplifier coupler major or minor fault)	**Replace amplifier coupler.**

Table 3-2. Troubleshooting the Radio Set - Continued

ITEM	ACTION	INDICATION	CORRECTIVE ACTION
5.	**Antenna coupler check.**	**Won't tune or stay tuned during communications check and/or tune test.**	**Check all cables and antenna for loose connections, cracks, corrosion, any type of damage. RF cables should be tightened with appropriate tool, finger tightening is inadequate. Coax connection from power amplifier/coupler, antenna feed connection from coupler, antenna ground, or coupler antenna grounds are the most probable causes. Replace antenna coupler as last resort.**

NOTE

There is no absolute way to fault isolate the antenna coupler without test equipment. The indications stated above could also be a symptom of malfunction in the coupler section of the amplifier-coupler.

Some frequencies which have been tuned on the ground may become untuned when the aircraft is airborne. Retune when airborne or maintain two channels for each operational frequency, one for ground tune, the second for airborne tune.

Section V. MAINTENANCE PROCEDURES

3-13. Introduction

The following maintenance procedures include removal and installation repair, and cleaning of the LRUS . Tools needed to perform the operations found in this section are accomplished with hand tools provided in tool kit TK 101/G (item 1, Appendix B).

Repair of the radio set is accomplished by removing and replacing the faulty LRU as described in the following paragraphs. No other repairs are authorized at AVUM during, RIW.

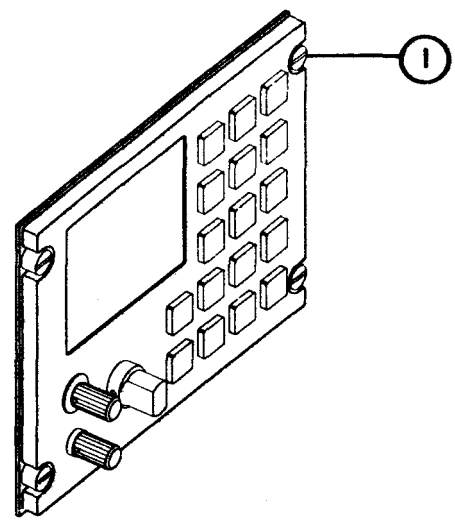


Figure 3-1. Control-Display Panel

3-14. Removal/Installation of Control-Display Panel.

a. Removal

1. **Refer to figure 3-1. Loosen four captive retaining screws (1) on front panel of control-display with flat tip screwdriver.**
2. **Refer to figure 3-2. Remove connector from J9711 on the rear of the control-display.**
3. **Remove the control-display from its mounting location.**

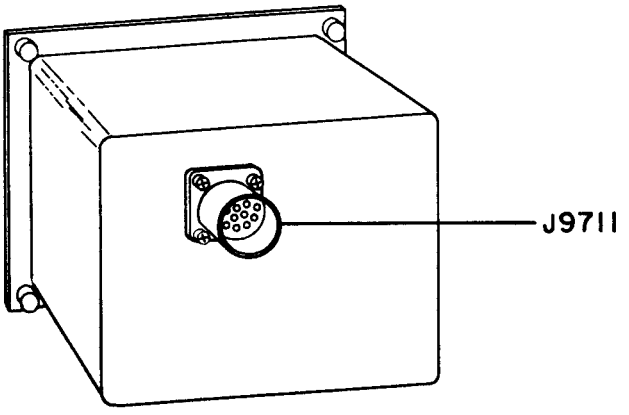


Figure 3-2. Control-Display Connector

b. Installation

1. **Refer to figure 3-2. Place control-display in mounting location and secure connector to J9711 on the rear of unit.**
2. **Refer to figure 3-1. Tighten four captive retaining screws (1) on front panel of control-display with flat tip screwdriver.**

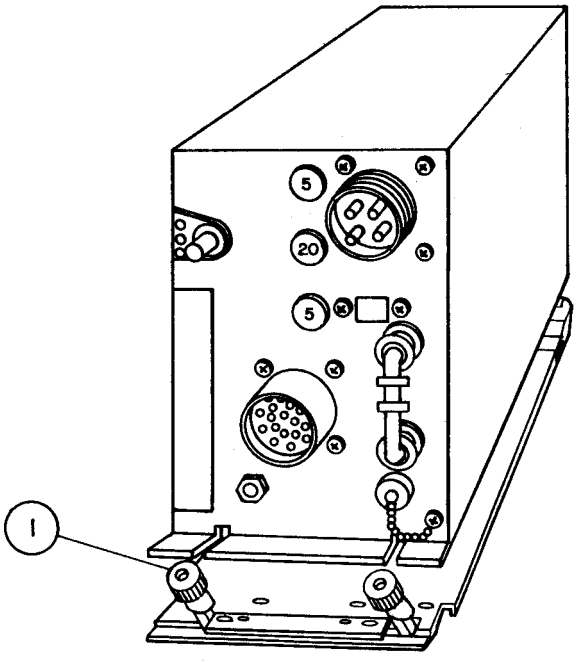


Figure 3-3. Amplifier-Coupler Fasteners

3-15. Removal/Installation Amplifier-Coupler.

a. Removal

1. **Refer to figure 3-3. Loosen the two fluted nuts on the fasteners (1) securing the amplifier-coupler.**
2. **Refer to figure 3-4. Remove cable connectors from J9725 (3), J9724 (6), J9721 (7), and J9726 (5).**
3. **Remove nut (1) and washer (2) securing ground strap (4) to rear of amplifier-coupler and remove ground strap.**
4. **Remove the amplifier-coupler from its mounting location.**

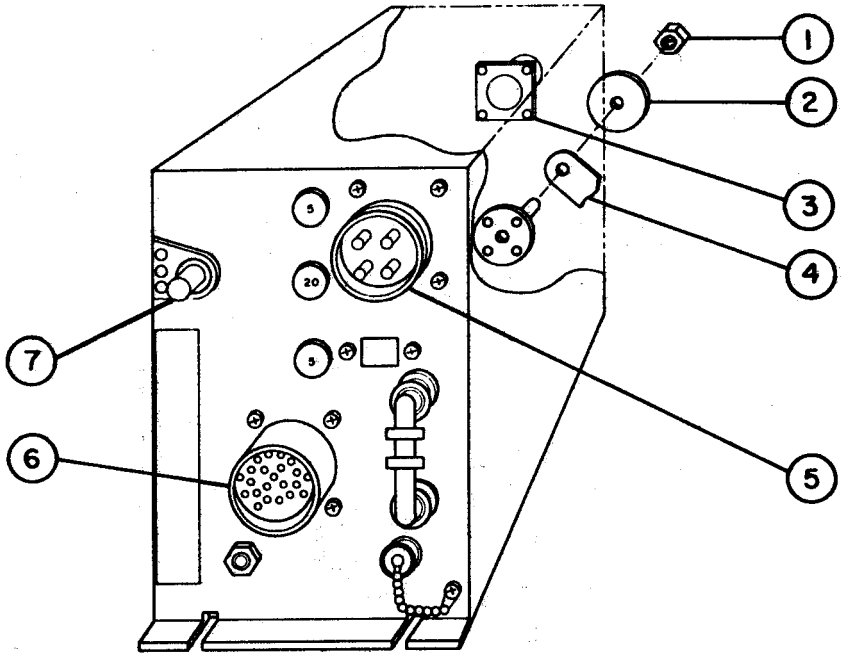


Figure 3-4. Amplifier-Coupler, Connectors

b. Installation

1. **Refer to figure 3-4. Place the amplifier-coupler in its mounting location.**
2. **Attach ground strap (4) to rear of amplifier-coupler using the washer (2) and nut (l).**
3. **Attach cable connectors to J9725 (3), J9724 (6), J9721 (7), and J9726 (5).**
4. **Refer to figure 3-3. Tighten two fluted nuts on fasteners (1) to secure the amplifier-coupler in its mounting location.**

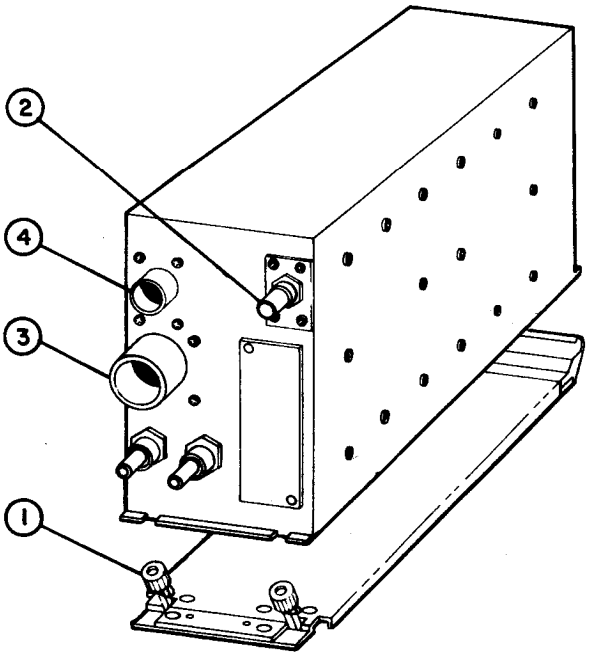


Figure 3-5. Receiver-Transmitter, Connectors and Mounting Hard ware

3-16. Removal/Installation of Receiver-Transmitter.

a. Removal

1. **Refer to figure 3-5. Loosen the two fluted nuts (1) securing the receiver-transmitter.**
2. **Remove cable connectors from J9732 (2), J9733 (3) and J9731 (4).**
3. **Remove the receiver-transmitter from its mounting location.**

b. Installation

1. **Refer to figure 3-5. Place the receiver-transmitter in its mounting location.**
2. **Attach cable connectors to J9732 (2), J9733 (3) and J9731 (4).**
3. **Tighten two fluted nuts (1) to secure the receiver-transmitter in its mounting location.**

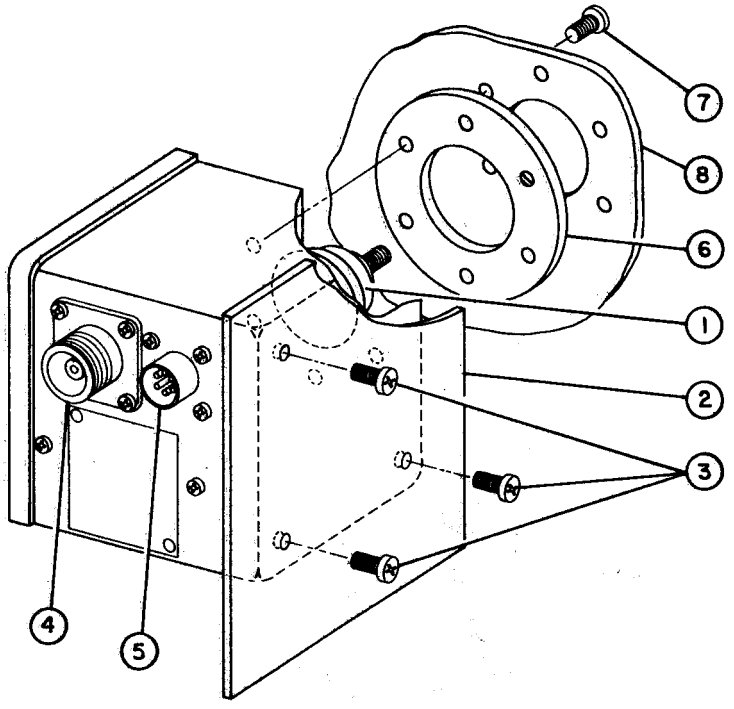


Figure 3-6. Antenna-Coupler, Mounting

3-17. Removal/Installation of Antenna-Coupler.

NOTE

If the antenna-coupler is mounted on the aircraft skin, see paragraph 3-17c and 3-17d.

a. **Removal (Bracket or Panel Mount)**

1. **Refer to figure** 3-6. **Remove cable connectors from J9741 (4), J9742** (5) and J9743 (l).
2. **Remove the four phillips head screws (3) that secure the antenna coupler to its mounting bracket or shelf (2).**
3. **Remove the antenna-coupler from its mounting location.**

b. **Installation (Bracket or Panel Mount)**

1. **Refer to figure 3-6. Position antenna-coupler on its mounting bracket or shelf (2). Secure it by inserting and tightening four phillips head screws (3).**
2. **Attach cable connectors to J9741 (4), J9742 (5), and J9743 (1).**

NOTE

If antenna-coupler is bracket or panel mounted, see paragraph 3-17a and 3-17b.

c. Removal (Aircraft Skin Mount)

1. **Refer to figure 3-6. Remove cable connectors from J9741 (4), J9742 (5) and J9743 (1).**
2. **Remove the six phillips head screws (7) that secure the antenna-coupler and spacer (6) to the aircraft skin (8).**
3. **Remove the antenna-coupler from its aircraft skin mounting location.**

d. Installation (Aircraft Skin Mount).

1. **Refer to figure 3-6. Position the antenna-coupler and spacer (6) at its aircraft skin mounting location. Secure it by tightening the six phillips head screws (7).**
2. **Attach cable connectors to J9741 (4), J9742 (5) and J9743 (1).**

3-18. Replacement of Control-Display Front Panel Knobs

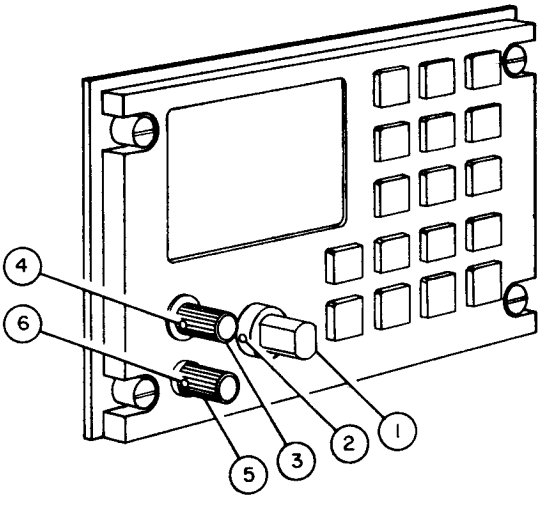


Figure 3-7. Control-Display Front Panel Knobs

a. Removal of SET knob

1. Refer to figure 3-7. Use spline screwdriver to loosen two set screws (2) from SET knob (1).
2. Gently pull SET knob (1) from control-display front panel.

b. Installation of SET knob

1. Refer to figure 3-7. Install SET knob (1) on control-display front panel.
2. Using spline screwdriver, tighten two set screws (2) in SET knob (1).

c. Removal of CHAN/VOL/BRT/OFF (function select] knob (3)

1. Refer to figure 3-7. Use spline screwdriver to loosen two set screws (4) from CHAN/VOL/BRT/OFF [function select) knob (3).
2. Gently pull CHAN/VOL/BRT/OFF (function select) knob (3) from control-dispiay panel.

d. Installation of CHAN/VOL/BRT/OFF (function select) knob (3)

1. Refer to figure 3-7. Install CHAN/VOL/BRT/OFF (function select) knob (3) on control-display panel.
2. Using spline screwdriver, tighten two set screws (4) in CHAN/VOL/BRT/OFF (function select) knob (3).

e. Removal of SQL (squelch control) knob

1. Refer to figure 3-7. Use spline screwdriver to loosen two set screws (6) from SQL (saqelch control) knob (5).
2. Gently pull SQL (squelch control) knob (5) from control-display panel.

f. Installation of SQL (squelch control) knob

1. Refer to figure 3-7. Install SQL (squelch control) knob (5) on control-display panel.
2. Using spline screwdriver, tighten two set screws (6) in SQL (squelch control) knob (5).

3-19. Removal and Installation of Amplifier-Coupler Connector Adapters

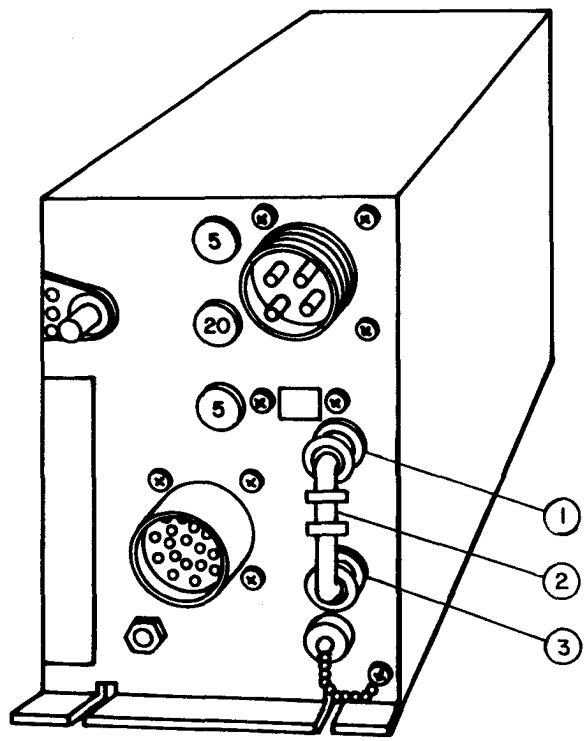


Figure 3-8. Amplifier-Coupler Connector Adapters

a. Removal

1. **Refer to figure 3-8. Twist ribbed portion of two connector adapters (1 and 3) at connections to amplifier-coupler so that guide pins move from the locked position. Gently pull assembled unit of two connector adapters (1 and 3) and middle connector adapter (2) from amplifier-coupler.**
2. **Twist ribbed portions of middle connector adapter (2) so that guide pins move from the locked position. Gently pull two connector adapters (1 and 3) from middle adapter (2).**

b. Installation

1. **Refer to figure 3-8. Slide connector adapter (1) into one end of middle connector adapter (2) so that the guide pin fits into the slot in the middle connector adapter (2). Twist ridged portion of the middle connector adapter (2) until the guide pin locks in place.**
2. **Repeat step one for connector adapter (3).**
3. **Place assembled unit on amplifier-coupler . Twist ridged portions of connector adapters (1 and 3) until guide pins lock in place.**

3-20. Touch-up Painting

a. Refer to TB 43-0118 for painting and preserving electronics command equipment, to TM 43-0139 for painting instructions for field use, and appendix D for materials.

b. Remove rust and corrosion from metal surfaces by lightly sanding with fine sandpaper (refer to appendix D). Apply two thin coats of paint on bare metal to prevent corrosion.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

3-21. Preservation and Packaging

Make sure that radio set LRUs are clean and dry. Pack in original cartons as described in section II. The LRUs must be packed one per carton. Pack with approved desiccant in each cavity within the urethane foam. Seal box with reinforced paper tape.

3-22. Administrative Storage

When storage is for short term (1 to 45 days) store the Line Replaceable Units (LRUs) indoors in a safe area protected from damage and adverse weather.

3-23. Intermediate and Long Term Storage

For intermediate storage (46 to 180 days) or long term storage (180 days or more) pack the equipment in accordance with the instructions in paragraph 3-21.

CHAPTER 4
AVIATION INTERMEDIATE MAINTENANCE (AVIM)

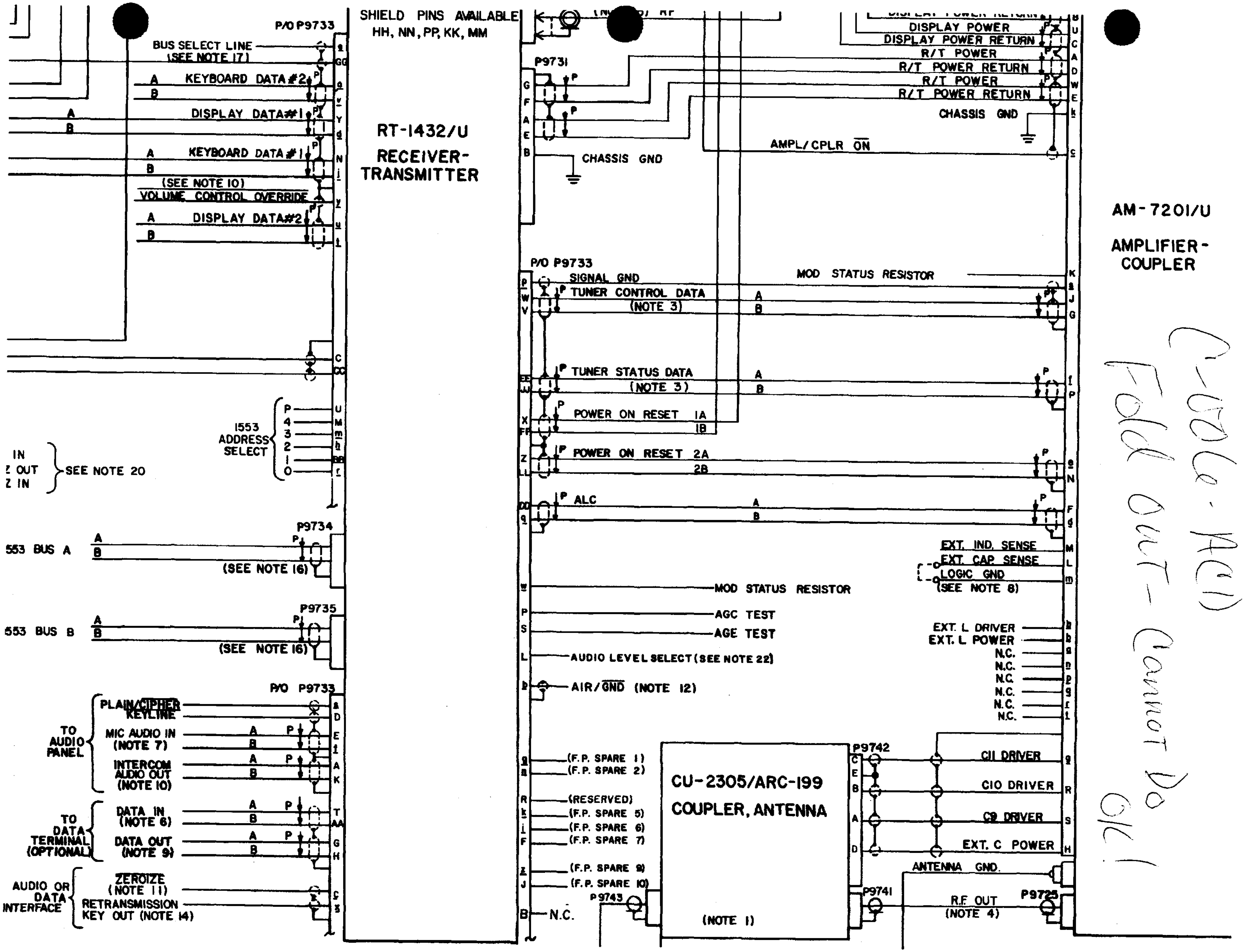
Scope of AVIM Maintenance

There are no maintenance procedures performed at the AVIM level. Refer to Chapter 3, Section V for maintenance procedures at the AVUM level.

CHAPTER 5

DIAGRAMS

This chapter presents a foldout diagram (figure F0-1) showing how the radio set LRUs connect into Nap-of-the-Earth mission aircraft. Figure F0-1 shows the AN/ARC-199 system interconnect.


SHIELD PINS AVAILABLE HH, NN, PP, KK, MM
P/O P9733
BUS SELECT LINE (SEE NOTE 17)
KEYBOARD DATA #2
DISPLAY DATA #1
KEYBOARD DATA #1
(SEE NOTE 10)
VOLUME CONTROL OVERRIDE
DISPLAY DATA #2
RT-1432/U
RECEIVER-TRANSMITTER
P9731
CHASSIS GND
DISPLAY POWER
DISPLAY POWER RETURN
R/T POWER
R/T POWER RETURN
R/T POWER
R/T POWER RETURN
CHASSIS GND
AMPL/CPLR ON
AM-7201/U
AMPLIFIER-COUPLER
P/O P9733
SIGNAL GND
MOD STATUS RESISTOR
TUNER CONTROL DATA (NOTE 3)
TUNER STATUS DATA (NOTE 3)
POWER ON RESET 1A
1B
POWER ON RESET 2A
2B
ALC
1553 ADDRESS SELECT
IN
Z OUT
Z IN
SEE NOTE 20
P9734
553 BUS A
(SEE NOTE 16)
P9735
553 BUS B
(SEE NOTE 16)
EXT. IND. SENSE
EXT. CAP. SENSE
LOGIC GND
(SEE NOTE 8)
MOD STATUS RESISTOR
AGC TEST
AGE TEST
AUDIO LEVEL SELECT (SEE NOTE 22)
AIR/GND (NOTE 12)
EXT. L DRIVER
EXT. L POWER
N.C.
P/O P9733
TO AUDIO PANEL
PLAIN/CIPHER
KEYLINE
MIC AUDIO IN (NOTE 7)
INTERCOM AUDIO OUT (NOTE 10)
TO DATA TERMINAL (OPTIONAL)
DATA IN (NOTE 6)
DATA OUT (NOTE 9)
AUDIO OR DATA INTERFACE
ZEROIZE (NOTE 11)
RETRANSMISSION KEY OUT (NOTE 14)
(F.P. SPARE 1)
(F.P. SPARE 2)
(RESERVED)
(F.P. SPARE 5)
(F.P. SPARE 6)
(F.P. SPARE 7)
(F.P. SPARE 9)
(F.P. SPARE 10)
P9743
N.C.
CU-2305/ARC-199
COUPLER, ANTENNA
(NOTE 1)
P9742
C11 DRIVER
C10 DRIVER
C9 DRIVER
EXT. C POWER
ANTENNA GND.
P9741
R.F. OUT (NOTE 4)
P9725

APPENDIX A

REFERENCES

A-1 SCOPE

This Appendix lists all pamphlets, forms, bulletins, and technical manuals referenced in this TM.

A-2 PAMPHLETS

Consolidated Index of Army Publications and Blank Forms . . . . . .DA PAM 25-30

The Army Maintenance Management System-Aviation .....DA PAM 738-751

US Army Equipment Index of Modification Work Orders . . . .DA PAM 750-10

A-3 FORMS AND RECORDS

Product Quality Deficiency Report SF-368
Report of Discrepancy (ROD) SF-364
Transportation Discrepancy Report (TDR) SF-361
Recommended Changes of Publications and Blank Forms. . . . . .DA Form 2028
Recommended Changes to Equipment Technical Manuals. . . . . .DA Form 2028-2

A-4 SUPPLY BULLETINS

Painting Instructions for Army Materiel .....TM 43-0139

Procedures for Destruction of Army Materiel to Prevent Enemy Use (Electronics Command) .....TM 750-244-2

A-5 MISCELLANEOUS PUBLICATION

Field Instructions for Painting and Preserving Communications-Electronics Equipment .....TM 43-0118

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

B-1 MAINTENANCE ALLOCATION CHART

a. This Maintenance Allocation Chart (MAC) assigns maintenance functions in accordance with the Three Levels of Maintenance concept for Army aviation. These maintenance levels - Aviation Unit Maintenance (AVUM), Aviation Intermediate Maintenance (AVIM), and Depot Maintenance - are depicted on the MAC as:

AVUM, which corresponds to an O Code in the Repair Parts and Special Tools List (RPSTL)

AVIM, which corresponds to an H Code in the RPSTL

DEPOT, which corresponds to a D Code in the RPSTL

b. The maintenance to be performed below depot and in the field is described as follows:

(1) AVUM activities will be staffed and equipped to perform high frequency on-aircraft maintenance tasks required to retain or return aircraft systems to a serviceable condition. The maintenance capability of the AVUM will be governed by the MAC and limited by the amount of complexity of ground support equipment (GSE), facilities required, authorized manning strength, and critical skills available. The range and quantity of spare modules/components will be consistent with the mobility requirements dictated by the air mobility concept. (Assignments of maintenance tasks to divisional company size aviation units will consider the overall size of the maintenance capability of the division, the requirement to conserve personnel and equipment resources, and air mobility requirements.)

(a) **Company Size Aviation Units: Perform those tasks which consist primarily of preventive maintenance and maintenance repair and replacement functions associated with sustaining a high level of aircraft operational readiness. Perform maintenance inspections and servicing to include preflight, daily, intermediate, periodic (or phased), and special inspections as authorized by the MAC or higher headquarters. Identify the cause of equipment/system malfunctions using applicable technical manual troubleshooting instructions, built-in-test equipment (BITE), installed aircraft instruments, or test, measurement, and diagnostic equipment (TMDE). Replace worn or damaged modules/components that do not require complex adjustments or system alignment and which can be removed/installed with available skills, tools, and ground support equipment. Perform operational and continuity checks and make minor repairs to the electrical system. Inspect, service and make operational, capacity, and pressure checks to hydraulic systems. Perform servicing, functional adjustments and minor repair/replacement to the flight control, propulsion, power train, and fuel systems. Accomplish air frame repair that does not require extensive disassembly, jigging, or alignment. The manufacture of airframe parts will be limited to items which can be fabricated with tools and equipment that can be found currently in air mobile tool and shop sets. Evacuate unserviceable modules/components and end items beyond the repair capability of AVUM to the supporting AVIM.**

(b) Less than Company Size Aviation Units: Aviation elements organic to brigade, group, battalion headquarters, and detachment size units are normally small and have less than 10 aircraft assigned. Maintenance tasks performed by these units wilt be those which can be accomplished by the aircraft crew chief or assigned aircraft repair person and will normally be limited to preventive maintenance, inspections, servicing, spot painting, stop drilling, application of nonstress patches, minor adjustments, module/components fault diagnosis, and replacement of selected modules/components. Repair functions will normally be accomplished by the supporting AVIM unit.

(2) AVIM provides mobile responsive one-stop maintenance support. (Maintenance functions which are not conducive to sustaining air mobility will be assigned to depot maintenance.) AVIM may perform all maintenance functions authorized to be done at AVUM. Repair of equipment for return to user will emphasize support or operational readiness requirements. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available skills, tools and equipment. AVIM establishes the Direct Exchange (DX) program for AVUM unit by repairing selected items for return to stock when such repairs cannot be accomplished at the AVUM level. The AVIM level inspects, troubleshoots, performs diagnostic tests, repairs, adjusts, calibrates, and aligns aircraft system modules/components. AVIM units will have capability to determine the serviceability of specified modules/components removed prior to the expiration of the Time Between Overhaul (TBO) or finite life. Modules/components disassembly and repair will support the DX program and will normally be limited to tasks requiring cleaning and the replacement of seals, fittings and items of common hardware. Airframe repair and fabrication of parts will be limited to those maintenance tasks which can be performed with available tools and test equipment. Unserviceable repairable modules/components and end items which are beyond the capability of AVIM to repair will be evacuated to Depot Maintenance. AVIM will perform aircraft weight and balance inspections and other special inspections which exceed AVUM capability. AVIM provides quick response maintenance support, including aircraft recovery, air evacuation, on-the-job training, and technical assistance through the use of mobile maintenance contact teams. AWM maintains authorized operational readiness float aircraft and provides collection and classification services for serviceable/unserviceable material. (The aircraft maintenance company within the maintenance battalion of a division will perform AVIM functions consistent with air mobility requirements and conservation of personnel and equipment resources. Additional intermediate maintenance support will be provided by the supporting nondivisional AVIM unit.)

B-2 USE OF THE MAINTENANCE ALLOCATION CHART (SECTION II)

a. The Maintenance Allocation Chart assigns maintenance functions to the lowest level of maintenance based on past experience and the following considerations:

(1) Skills available.

(2) Worktime required.

(3) Tools and test equipment required and or available.

b. Only the lowest level of maintenance authorized to perform a maintenance function is indicated. If the lowest maintenance level cannot perform all tasks of any single maintenance function (eg. test, repair), then the higher maintenance level(s) that can accomplish additional tasks will also be indicated.

c. A maintenance function assigned to a maintenance level will automatically be authorized to be performed at any higher maintenance level.

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher maintenance level. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the commander that has the authority to direct such tasking.

e. The assignment of a maintenance function will not be construed as authorization to carry the related parts or spares in stock. Information to requisition or otherwise secure the necessary repair parts will be as specified in the associated Repair Parts and Special Tools List (RPSTL).

f. Normally there will be no deviation from the assigned level of maintenance. In cases of operational necessity, maintenance functions assigned to a maintenance level may, on a one-time basis and at the request of the lower maintenance level, be specifically authorized by the maintenance officer of the level of maintenance to which the function is assigned. The special tools, equipment, etc., required by the lower level of maintenance to perform this function will be furnished by the maintenance level to which the function is assigned. This transfer of a maintenance function to a lower maintenance level does not relieve the higher maintenance level of the responsibility for the function. The higher level of maintenance will provide technical supervision and inspection of the function being performed at the lower level.

g. Changes to the MAC will be based on continuing evaluation and analysis by responsible personnel and on reports received from field activities.

B-3 MAINTENANCE FUNCTIONS.

Maintenance function will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and or electrical characteristics with established standards through examination (eg. by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Replace. To remove an unserviceable item and to install a serviceable counterpart in its place. Replacement is authorized by the MAC and is shown as the third position code of the SMR code.

g. Repair. The application of maintenance services (i.e., inspect, test, service, adjust, calibrate, or replace) or other maintenance actions (i.e., welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to identify troubles, and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item or system.

B-4 GROUP NUMBER AND COMPONENT/ASSEMBLY (COLUMN 1 AND 2, RESPECTIVELY)

a. Column 1. Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, and modules with the next higher assembly.

b. Column 2. Component/Assembly. Column 2 contains the noun names of components, assemblies, and modules for which maintenance is authorized.

B-5 MAINTENANCE FUNCTION (COLUMN 3)

Column 3 lists the functions to be performed on the items listed in column 2.

B-6 MAINTENANCE LEVELS AND WORKTIMES (COLUMN 4)

The maintenance levels AVUM, AVIM, and DEPOT are listed on the MAC with individual columns that include the worktimes for maintenance functions at each maintenance level. Worktime presentations such as 0.1 indicate the average time it requires a maintenance level to perform a specified maintenance function. If a worktime has not been established, the columnar presentation shall indicate "--.--". Maintenance levels higher than the level of maintenance indicated are authorized to perform the indicated function.

B-7 TOOLS AND TEST EQUIPMENT (COLUMN 5 AND SECTION III)

Common tool sets (not individual tools), special tools, test, and support equipment required to perform maintenance functions are listed alphabetically in Section III with a reference number to permit cross-reference to column 5 in the MAC. In addition, the maintenance level authorized to use the device is listed along with the item National Stock Number (NSN) and, if applicable, the tool number to aid in identifying the tool/device.

B-8 REMARKS (COLUMN 6 AND SECTION IV)

Remarks (identified by an alphabetic code in column 6) and other notes (identified by a number in parentheses in the applicable column) are listed in Section IV to provide a ready reference to the definition of the remark/note.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
RADIO SET AN/ARC-199

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level			(5) Tools and Eqpt	(6) Remarks
			AVUM	AVIM	DEPOT		
00	Radio Set AN/ARC-199	Inspect	0.1				
		Test	0.1				A
		Replace	0.4				
		Repair	0.2			1	B
01	Control-Display	Replace	0.1				
	C-11245/U	Repair	0.2			1	D
		Repair			X		C
02	Amplifier-Coupler,	Replace	0.1				
	Radio Frequency	Repair	0.1				F
	AM-7201/U	Repair			X		C
03	Receiver-Transmitter	Replace	0.1				
	RT-1432/U	Repair			X		C
04	Coupler, Antenna	Replace	0.1				
	CU-2304/ARC-199	Repair	0.2			1	E
		Repair			X		C

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO SET AN/ARC-199

Tool or Test Equipment Ref. Code	Maintenance Level	Nomenclature	National/NATO Stock Number	Tool Number
1	A V U M	Tool Kit, TK-101/G	5120-00-064-5178	

SECTION IV. REMARKS FOR RADIO SET AN/ARC-199

Reference Code	Remarks
A	Built In Test
B	Repair by Replacement of Receiver-Transmitter, and/or Control-Display, Amplifier-Coupler or Antenna-Coupler.
C	Depot Level Repair Not Authorized, item is returned to contractor, as per ARIL (Automatic Return Item List)
D	Repair is Limited to Replacement of Knobs.
E	Repair is Limited to Replacement of Antenna Connecting Nut.
F	Repair is Limited to Insuring Circuit Breaker is Closed (pressed in) on Front Plate of Amplifier-Coupler.

APPENDIX C

COMPONENTS OF END ITEM LIST

SECTION I INTRODUCTION

C-1. SCOPE

This appendix lists components of end items for the AN/ARC-199 to help you inventory items for safe and efficient operation.

C-2. GENERAL

Section II. Components of end item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1)-Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

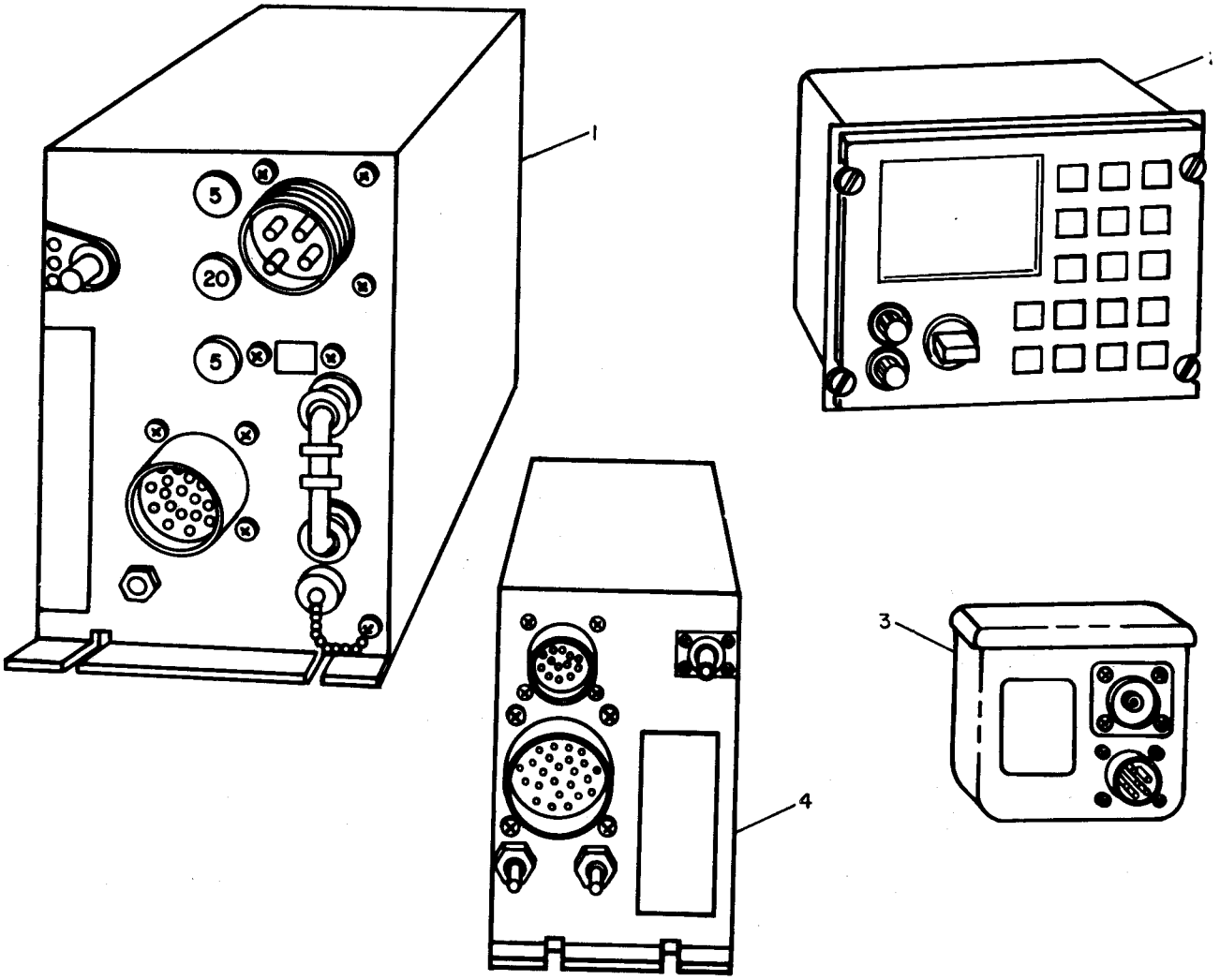
b. Column (2)-National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3)-Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line of each item indicates the CAGE (in parentheses) followed by the part number. The "Usable On" code is not applicable.

d. Column (4)-Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e. Column (5)-Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

SECTION II. COMPONENTS OF END ITEM



(1) Illus Number	(2) National Stock Number	(3) Description CAGE and Part Number	U O C	(4) U / M	(5) Qty Rqr
1	5821-01-172-2880	Amplifier-Coupler, RF: (80058) AM-7201/U		E A	1
2	5821-01-172-2879	Control-Display: (80058) C-11245/U		E A	1
3	5985-01-177-0800	Coupler, Antenna: (80058) CU-2305/ARC-199		E A	1
4	5821-01-172-2924	Receiver-Transmitter: (80058) RT-1432/U		E A	1

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1 SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/ARC-199. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician.

D-2 EXPLANATION OF COLUMNS

a. *Column (1) - Item number.* This number is assigned to the entry in the listing an-d-is referenced in the narrative instructions to identify the material. For example, "Use detergent (item 5, appendix D).

b. *Column (2) - Level.* This column identifies the lowest level of maintenance that requires the listed item.

AVUM - Aviation Unit Maintenance
AVIM - Aviation Intermediate Maintenance
D - Depot Maintenance

c. *Column (3) - National stock number.* This is the national stock number assigned to the item; use it to request or requisition the item.

d. *Column (4) - Description.* Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial And Government Entity (CAGE) in parenthesis followed by the part number.

e. *Column (5) - Unit of measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a 2-character alphabetical abbreviation (eg, ea, in., and pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item number	(2) Level	(3) National stock number	(4) Description	(5) U / M
1	A V U M	9505-01-054-2676	wire, nonelectric (96906) MS20995C32	lb
2	A V U M	8010-00-616-9143	enamel, black (81348) TT-E-527	pt
3	A V U M	5350-00-598-5537	paper, abrasive (58536) A-A-1202	hd
4	A V U M	7920-00-148-9666	rag, wiping (58536) A-A-531	be
5	A V U M	7930-00-357-7386	detergent, general (81348) P-P-1747	bt
6	A V U M	7920-00-205-3570	rag, wiping (58536) A-A-531	be
7	A V U M	6850-00-105-3084	cleaning, compound (81349) MIL-C-81302	pt

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I
INTRODUCTION

E-1. Scope.

This appendix lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of aviation unit maintenance (AVUM), and aviation intermediate maintenance (AVIM) of the AN/ARC-199. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

E-2 . General.

This Repair Parts and Special Tools List iS divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending numeric sequence, with the parts in each group listed in ascending item number sequence. Figure numbers are listed directly beneath the group header. Items listed are shown on the associated illustration.

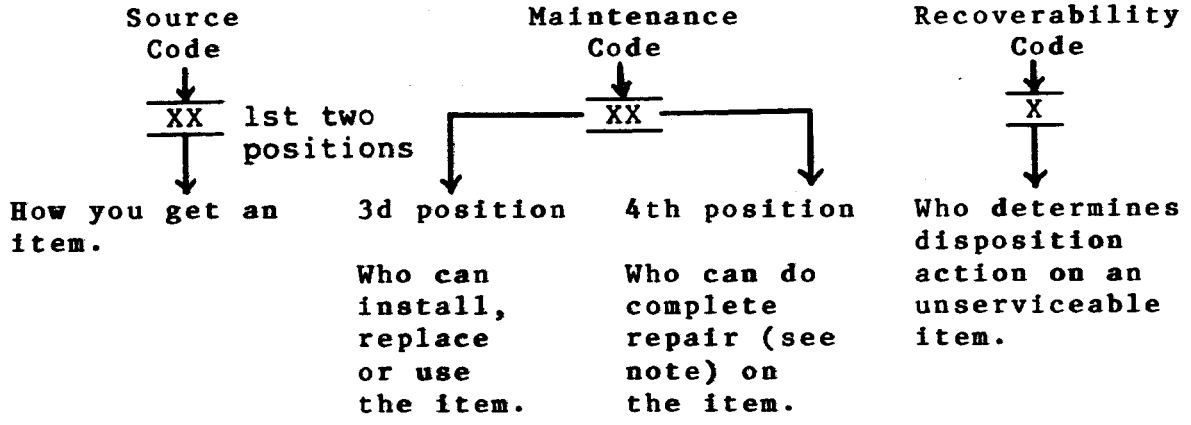
b. Section III. Special Tools List. Not applicable.

c. Section IV. Cross-Reference Indexes. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphameric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

E-3. Explanation of Columns (Section II and III)

a. Item No. (Column (1)). Indicates the number used to identify Items called out in the illustration.

b. SMR Code (Column (2)). The source, maintenance, and recoverability (SMR) code is a five-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instructions, as shown in the following breakout:



NOTE

Complete repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Explanation
PA PB PC PD PE PF PG	Stocked items: use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the third position of the SMR code. NOTE Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the third position of the SMR code. The complete kit must be requestioned and applied.

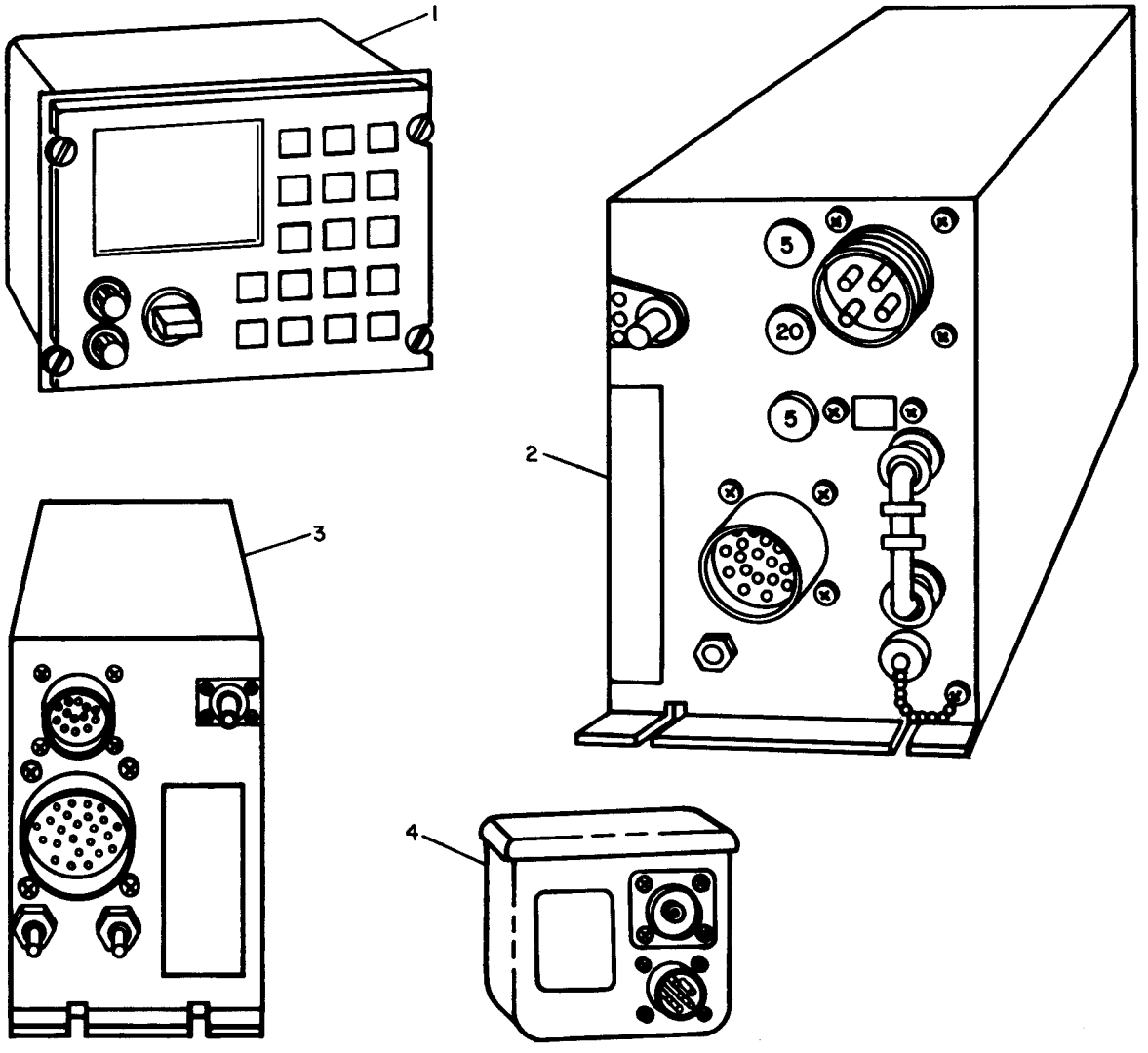


Figure 1. AN/ARC-199 Radio Set

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USEABLE ON CODES(UOC)	(6) QTY
				GROUP 00 AN/ARC-199 RADIO SET	
				FIGURE 1	
1	PAODD	80058	C-11245/U	CONTROL-DISPLAY	1
2	PAODD	80058	AM-7201/U	AMPLIFIER-COUPLER,RF.	1
3	PAODD	80058	RT-1432/U	RECEIVER-TRANSMITTER	1
4	PAODD	80058	CU-2305/ARC-199	COUPLER,ANTENNA	1
				END OF FIGURE	

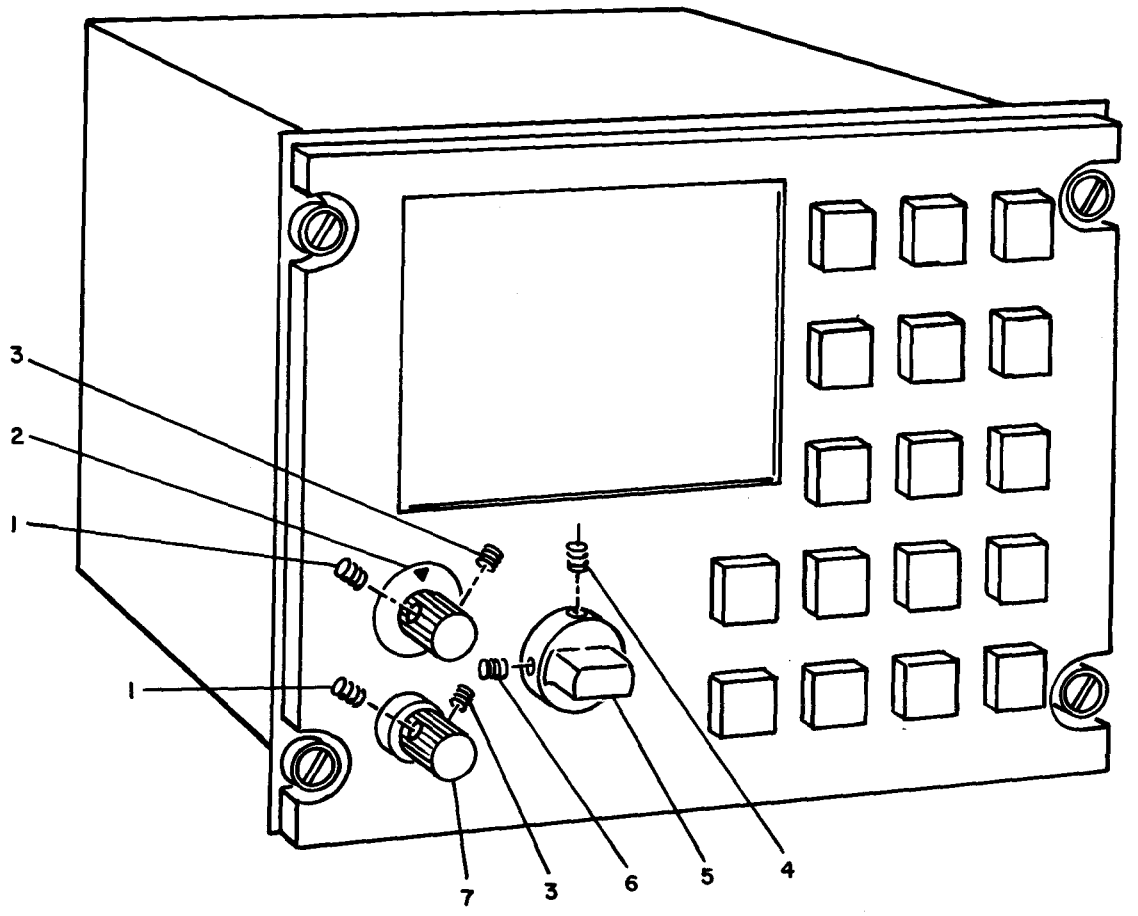


Figure 2. C-11245/U Control Display

(1) ITEM No	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USEABLE ON CODES(UOC)	(6) QTY
				GROUP 02 CONTROL-DISPLAY C-l124S/U	
				FIGURE 2	
1	PAOZZ	22373	089-06204-0003	SETSCREW	2
2	PAOZZ	22373	076-01361-0001	KNOB	1
3	PAOZZ	22373	089-06204-0004	SETSCREW	2
4	PAOZZ	22373	089-06204-0008	SETSCREW	1
6	PAOZZ	22373	076-01363-0001	KNOB	1
6	PAOZZ	22373	089-06204-0006	SETSCREW	1
7	PAOZZ	22373	076-01362-0001	KNOB	1
				END OF FIGURE	

Code	Explanation
MO - Made at org/AVUM category MF - Made at DS/AVIM category MH - Made at GS category ML - Made at Specialized Repair Activity (SRA) MD - Made at Depot	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the description and usable on code (UOC) column and listed in the Bulk Material group of the repair parts list. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at a higher category, order the item from the higher category of maintenance.
AO - Assembled by org/AVUM category AF - Assembled by DS/AVIM category AH - Assembled by GS category AL - Assembled by SRA AD - Assembled by Depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the category of maintenance indicated by the source code. If the third position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher category, order the item from the higher category of maintenance.

Code	Explanation
XA -	Do not requisition an "XA" coded item. Order its next higher assembly.
XB -	If an "XB" item is not available from salvage, order it using the CAGEC and part number given.
X C -	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturers part number.
XD -	Item is not stocked. Order an "XD" coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

(2) Maintenance code. Maintenance codes tell you the category of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance category authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following categories of maintenance.

Code	Application/Explanation
C -	Crew or operator maintenance done within organizational or aviation maintenance.
O -	organizational or aviation unit category can remove, replace, and use the item.
F -	Direct support or aviation intermediate category can remove, replace, and use the item.
H -	General support category can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
D -	Depot category can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance category with the capability to do complete repair (i.e., perform all authorized repair functions). This position will contain one of the following maintenance codes.

NOTE

Some limited repair may be done on the item at a lower category of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

Code	Application/Explanation
O -	Organizational or aviation unit is the lowest category that can do complete repair of the item.
F -	Direct support or aviation intermediate is the lowest category that can do complete repair of the item.
H -	General support is the lowest category that can do complete repair of the item.
L -	Specialized repair activity (designate the specialized repair activity) is the lowest category that can do complete repair of the item.
D -	Depot is the lowest category that can do complete repair of the item.

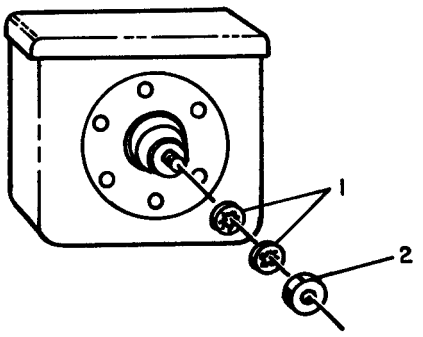


Figure 3. CU-2305/ARC-199 Antenna Coupler

(1) ITEM NO	(2) SMR CODE	(3) CAGE	(4) PART NUMBER	(5) DESCRIPTION AND USEABLE ON CODES (UOC)	(6) QTY
				GROUP 04 ANTENNA COUPLER CU-2305/ARC-199 FIGURE 3	
1	PAOZZ	22373	089-08018-0051	WASHER,LOCK.....	2
2	PAOZZ	98906	MS21042-3	NUT,SELF-LOCKING,EXTENDED WASHER,HEX.	1
				END OF FIGURE	

Code	Application/Explanation
z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc. , at the user category.

(3) Recoverability code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability codes	Application/Explanation
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the category of maintenance shown in the third position of SMR code.
O -	Reparable item. When uneconomically reparable, condemn and dispose of the item at organizational or aviation unit category.
F -	Reparable item. When uneconomically reparable, condemn and dispose of the item at direct support or aviation intermediate category.
H -	Reparable item. When uneconomically reparable, condemn and dispose of the item at general support category.
D -	Reparable item. When beyond lower category repair capability, return to depot. Condemnation and disposal of item not authorized below depot category.
L -	Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material) . Refer to appropriate manuals/directives for specific instructions.

CAGEC (Column (3)). The Commerical and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc. , that supplies the item.

d. Part Number (Column (4)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) , which controls the design and characteristics of the Item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. Description and Usable on Code (UOC) (Column (5)). This column includes the following information.

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The statement "END OF FIGURE" appears just below the last item description in Column (5) for a given figure in both section II and section III.

f. Qty (Column (6)). Indicates the quantity of the item used in 'the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

E-4. Explanation of Columns (Section IV)

a. National Stock Number (NSN) Index.

(1) Stock number column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. When requisitioning Items use the complete NSH (13 digits).

(2) Fig. column. This column lists the number of the figure where the item is identified/located. The illustrations are in numerical sequence in sections II and III.

(3) Item column. The item number identifies the item associated with the figure listed in the adjacent Fig. column. This item is also identified by the NSN listed on the same line.

b. Part Number Index. Part numbers in this index are listed by part number in ascending alphameric sequence.

(1) CAGEC column. This column lists the Commercial and Government Entity (CAGE) code.

(2) Part number column. This column indicates the part number assigned to the item.

(3) Stock number column. This column lists the National stock number for the associated part number and manufacturer identified in the part number and CAGEC columns to the left.

(4) Fig. column. This column lists the number of the figure where the item is identified/located in sections II and III.

(5) Item column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. Cross-Reference Part Number Index. Part numbers in this index are listed by the new King part number in ascending numeric sequence.

(1) New King part number column. This column indicates the new King part number assigned to the item.

(2) Old King part number column. This column indicates the old King part number assigned to the item in the adjacent column.

NOTE

Parts or documents represented either by
the old 9 digit or the newly expanded
12 digit part number are identical and interchangeable

E-5. Special Information.

National Stock numbers (NSN's) that are missing from P source coded items have been applied for and will be added to this TM by future change/revision when they are entered in the Army Master Data File (AMDF). Until the NSH'S are established and published, submit exception requisitions to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN : AMSEL-LC-MM, Fort Monmouth, MJ 07703-5000 for the part required to support your equipment.

E-6 . How to Locate Repair Parts

a. When National stock number or part number Is not known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number .

(4) **Fourth.** Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) Fifth. Refer to the Part Number Index to find the NSN, if assigned.

b. **When National stock number or part number is known.**

(1) First. Using the index of National stock numbers and part numbers, find the pertinent National stock number. The NSN index is in National item identification number (NIIN) sequence (paraE-4a(l)). The part numbers in the part number index are listed in ascending alphameric sequence (para E-4b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) Second. After finding the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

E-7. Abbreviations.

Not applicable.

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL PART NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
5310-00-807-1467	3	2
5821-01-172-2879	1	1
5821-01-172-2880	1	2
5821-01-172-2924	1	3
5985-01-177-0800	1	4

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80058	C-11245/U	5821-01-172-2879	1	1
80058	RT-1432/U	5821-01-172-2924	1	3
80058	AM-7201/U	5821-01-172-2880	1	2
80058	CU-2305/ARC-199	5985-01-177-0800	1	4
96906	MS21042-3	5310-00-807-1467	3	2
22373	089-06204-0003		2	1
22373	076-01361-0001		2	2
22373	089-06204-0004		2	3
22373	089-06204-0006		2	6
22373	089-06204-0008		2	4
22373	076-01363-0001		2	5
22373	076-01362-0001		2	7
22373	089-08018-0051		3	1

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

CROSS-REFERENCE PART NUMBER INDEX

NEW KING PN	OLD KING PN
089-06204-0003	089-6204-03
076-01361-0001	076-1361-01
089-06204-0004	089-6204-04
089-06204-0006	089-6204-06
089-06204-0008	089-6204-08
076-01363-0001	076-1363-01
076-01362-0001	076-1362-01
089-08018-0051	089-8018-51

GLOSSARY

Section I. ABBREVIATIONS

ABBREVIATION	DEFINITION
±	Plus or Minus
AGC	Automatic Gain Control
ALC	Automatic Level Control
AME	Amplitude Modulation Equivalent
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
BIT	Built-In Test
C	Centigrade
CRT	Cathode Ray Tube
Cw	Carrier Wave (Modulated Carrier Wave--MCW)
cf	Carrier Frequency
dBm	Decibels referenced to 1 milliwatt
DISREP	Discrepancy in Shipment Report
EIR	Equipment Improvement Recommendations
DSB	Double Sideband
HF	High-Frequency
Hz	Hertz
LRU	Line Replaceable Unit
LSB	Lower Sideband
MAC	Maintenance Allocation Chart
MCW	Modulated Carrier Wave
MHz	Megahertz (equals 1,000 kilohertz)
ms	Millisecond
MTBF	Mean Time Between Failure
NOE	Nap-of-the-Earth
NVIS	Near Vertical Incident Skywave
PEP	Peak Envelope Power
pf	Picofarads
PMCS	Preventive Maintenance Checks and Services
RIW	Reliability Improvement Warranty
RPSTL	Repair Parts and Special Tools List
ROD	Report of Discrepancies
SELADR	Selective Addressing
TMDE	Test, Measurement and Diagnostics Equipment
USB	Upper Sideband
UUT	Unit Under Test
Vdc	Volts Direct Current
VSWR	Voltage Standing Wave Ratio

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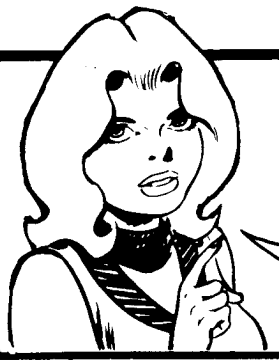

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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
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Stateside Army pot
ATTN: AMSTA-US
Stateside, N.J. 07703-5007

DATE SENT
4 April 1978

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-14&P	23 Jan 74	Radar Set AN/PRC-76

BE EXACT . . . PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
E-5				For item 2, change the NSN to read: 5835-00-134-9186. REASON: Accuracy.
E-8		E-3		Identify the cover on the junction box (item no. 5). REASON: It is a separate item and is not called out on figure 19.
E-9				Add the cover of the junction box as an item in the listing for figure 19. REASON: Same as above.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

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CONVERSION TO METRIC MEASURES

SYMBOL	GIVEN	MULTIPLY BY	TO OBTAIN	SYMBOL
		LENGTH		
in	inches	2.54	centimeters	cm
ft	feet	30.48	centimeters	cm
yd	yards	0.9144	meters	m
mi	miles	1.609	kilometers	km
		AREA		
in^2	square inches	6.452	sq centimeters	cm
ft^2	square feet	0.0929	sq meters	m^2
yd^2	square yards	0.8361	sq meters	m^2
mi^2	square miles	2.590	sq kilometers	km^2
		MASS (WEIGHT)		
oz	ounces	28.35	grams	g
lb	pounds	0.4536	kilograms	kg
		VOLUME		
fl Oz	fluid ounces	29.57	milliliters	mL
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.0283	cubic meters	m^3
yd^3	cubic yards	0.7646	cubic meters	m^3
		TEMPERATURE		
‘F	Fahrenheit temp.	5/9 (°F -32)	Celsius temp.	°C

PIN: 068336-000