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Organizational Maintenance Manual
ELECTRICAL EQUIPMENT CONFIGURATIONS
ARMY MODEL AH-1S HELICOPTERS
(NSN 1520-00-804-9112)

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1. The title of the manual is changed as shown above.
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Technical Manual
No. 11-1520-236-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *29 April 1977*

Organizational Maintenance Manual

HELICOPTER, ARMY MODEL AH-1S

REPORTING OF ERRORS

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to the Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

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FO-2.	Master SCAS Wiring Diagram	Located in back of manual

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual covers maintenance of the electronic equipment configuration in Army model AH-1S Helicopter, serial numbers 76-22567 through 76-22610, 76-22692 through 76-22713, and 77-22729 through 77-22810. The manual includes instructions for organizational (AVIM) maintenance personnel to perform periodic preventive maintenance and troubleshooting procedures for the electronic communications and navigational equipment when the equipment is installed in the aircraft. This manual also lists tools and test equipment required by maintenance personnel to maintain the configuration.

b. Operating instructions are contained in TM55-1520-236-10. Some of the electronic equipments used in this configuration are covered in detail in other technical manuals; the pertinent technical manuals are listed in appendix A. When servicing components of these electronic equipments independent of the aircraft, refer to the applicable technical manuals for detailed troubleshooting procedures, and for replacing and repairing maintenance parts.

c. Maintenance of Army aircraft is transitioning to three categories of maintenance. These maintenance categories are Aviation Unit Maintenance (AVUM); Aviation Intermediate Maintenance (AVIM); and Depot Maintenance. AVUM and AVIM will replace organizational, direct support, and general support maintenance. In the interim, as maintenance units are reorganized into three categories of maintenance activities, this publication will be used by AVUM or organizational maintenance personnel for the maintenance of the electronic equipment configuration. The maintenance allocation chart (MAC) in appendix B is configured to the three-category maintenance concept where the code O represents AVUM; the code F represents AVIM and D represents depot maintenance. Those organizations not yet assigned complete AVUM responsibilities should use caution in utilization of this publication. Whatever maintenance is performed must consider available skills, tools, test equipment, and time required to perform the maintenance.

d. Throughout this manual, the following terms are used:

(1) Configuration includes all basic electronic equipment and electronic installation items.

(2) Basic electronic equipment denotes Government-furnished equipment for which there are Department of the Army publications covering detailed maintenance instructions.

(3) Electronic installation items denote items furnished by the airframe manufacturer for which there are no official publications covering detailed maintenance instructions.

(4) System denotes a major subdivision of the configuration; for example, communications system.

(5) Facility denotes a group of components that are interrelated to perform a function or service; for example: ultra high frequency (uhf) amplitude modulation (am) facility.

(6) Component denotes an individual item of a facility; for example: uhf receiver-transmitter.

e. Block diagram discussions of the configuration basic electronic equipment and installation items are covered in chapter 3.

1-2. Indexes of Publications.

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new additions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO) pertaining to the equipment.

1-3. Forms and Records.

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B and DSAR 4500.15.

Section II. DESCRIPTION OF CONFIGURATION AND ELECTRONIC EQUIPMENT

1-4. Configuration and Serial Numbers

One basic configuration is covered in this manual. All serial numbers of helicopter model AH-1S covered by this manual are included within this configuration.

1-5. Facilities and Electronic Equipment

The figure and chart below show and list each operational facility provided in helicopter model AH-1S. The chart lists all electronic equipment components used for each facility indicated in the equipment or component column. Components are listed by Army part number and/or manufacturers part number. A letter X in the *Configuration* column indicates that the particular component was installed in the aircraft. A letter Y in the *Configuration* column indicates that complete facilities for the component are provided but the component is not installed. Numbers in parentheses indicate quantities. These facilities provide easy installation of the equipment when required for a special geographical location or mission application.

a. Communications Facilities. (Figure 1-1)

Facility	Equipment or Component	Configuration I	Remarks
Interphone (ICS)	Control, Interphone System (ICS Control Panel) C-6533()/ARC	X (2)	
	Audio Threshold 1021-D001 (206-075-597)	X	
	Foot Switch M8805/55-001	X (2)	
	Hot Mike Switch (Ground Crew) MS24523-23	X (2)	
VHF FM	Radio Set AN/ARC-114A	X	FM homing data is displayed on pilot HSI and attitude indicator.
	Control, KY-28 C-8157/ARC	X	

a. Communications Facilities.(Con't)

Facility	Equipment or Component	Configuration I	Remarks
	Security Set TSEC/KY-28	X	
	Filter, FM Communication 205-075-380-1	X	
	Antenna, FM Communication P/O 209-077-203	X	
	Antenna, FM Homing AS-3205/ARC (209-075-345)	X	
	Filter, VHF FM 209-077-062-1	X (2)	
VHF AM	Radio Set AN/ARC-115	X	
	Filter, VHF BPF 40-03P (205-075-382)	X	
	Antenna, VHF AS-3204/ARC (209-075-550)	X	
UHF AM	Radio Set AN/ARC-116 or RT-1167/ARC-164(V) Radio Receiver-Transmitter	X	
	Filter, UHF HPF 40-01T (205-075-381)	X	
	Antenna, UHF AT-256A	X	

b. Navigation Facilities (Figure 1-2)

Facility	Equipment or Component	Configuration I	Remarks
Gyromagnetic Compass Set AN/ASN-43	Compensator, Compass CN-405/ASN	X	Compass heading is displayed on pilot HSI and gunner course indicator.
	Transmitter, Compass T-611/ASN	X	
	Gyro, Directional CN-998()/ASN	X	
	Controller, Compass C-6347/ASN	X	

b. Navigation Facilities.(Con't)

Facility	Equipment or Component	Configuration I	Remarks
ADF Set AN/ARN-89B	Control Unit, ADF C-7392A/ARN-89B	X	ADF data is displayed on pilot and gunner course indicator.
	Receiver, ADF R-1496A/ARN-89B	X	
	Amplifier, Impedance Matching AM-4859A/ARN-89	X	
	Antenna, Loop AS-2108A/ARN-89A	X	
	Antenna, Sense 209-030-133-3	X	
VOR/ILS Set AN/ARN-123	Control Panel, VOR/ILS C-10048/ARN-123(V)	X	
	Control Panel, HSI Display 209-077-081	X	
	Receiver, VOR R-2023/ARN-123 (V)	X	
	Antenna, Marker Beacon AT-640/ARN-123(V)	X	
	Antenna, Glideslope AS-3188/ARN (214-077-092-1)	X	
	Antenna, OMNI AS-1304/ARN	X	
Radar Altimeter Set AN/APN-209	Indicator, RT-1115( )/APN-209	Y	Altitude data is displayed on pilot height indicator.
	Antenna, AS-2595( )/APN-194	Y (2)	

c. Radar Warning Facility (Figure 1-1)

Facility	Equipment or Component	Configuration I	Remarks
Radar Warning Set AN/APR-39	Control Panel, Radar Warning C-9326( )/APR-39	Y	NOTE All repair of these components is the Logistic responsibility of ASA.
	Indicator, Radar Warning ID-1150( )/APR-39	Y	
	Comparator, Radar Warning CM-440( )/APR-39	Y	
	Receiver, Dual R-1838( )/APR-39	Y (2)	
	Antenna, Blade AS-2890( )/APR-39	Y	
	Antenna, Spiral AS-2891( )/APR-39	Y (2)	
	Antenna, Spiral AS-2892( )/APR-39	Y (2)	

d. Identification Facility. (Figure 1-1)

Facility	Equipment or Component	Configuration I	Remarks
Transponder Set AN/APX-72	Receiver-Transmitter RT-859A/APX	X	
	Computer, Mark XII KIT-1A/TSEC	Y	
	Test Set, Transponder TS-1843A/APX	X	
	Control, Transponder C-6280/APX-72	X	
	Antenna, AT-884/APX	X	

e. Indicators. (Figure 1-3)

Facility	Equipment or Component	Configuration I	Remarks
	Attitude Director 209-075-661	X	
	Course 212-070-180	X	
	Horizontal Situation (HSI) 209-075-660	X	
	Radar Altimeter RT-1115( )/ARN-209	Y	
	Radar Warning ID-1150( )/APR-39	Y	
	Remote Proximity Warning JG1054AA	Y	

f. Power Source. (Figure 1-1)

Facility	Equipment or Component	Configuration I	Remarks
AC Source	Main Inverter PP-7274/A	X	
	Stby Inverter PU-543/A	X	
DC Source	Battery BB-649/A	X	

g. Stability and Control Augmentation System Model 570A (SCAS). (Figure 1-4)

Facility	Equipment or Component	Configuration I	Remarks
Stability and Control Augmentation System.	SCAS Control Panel P/N 209-074-084	X	
	SCAS Sensor Amplifier Unit P/N 570-074-010.	X	
	Pylon Compensation Unit P/N 570-074-131.	X	

h. Proximity Warning System YG1054 (Figure 1-5)

Facility	Equipment or Component	Configuration I	Remarks
Proximity Warning System YG1054	Receiver-Transponder HG1001AD01	Y	
	Antenna 10027834-101;	Y (2)	
	Remote Indicator JG1054AA	Y	

1-6. Differences in Electronic Equipment Models.

One basic configuration is covered in this manual. All serial numbers of helicopter model AH-1S covered by this manual are covered within this configuration.

1-7. Equipment Technical Characteristics.

Electronic components within the scope of this manual not covered in separate Department of the Army technical manuals include the following:

a. Audio Threshold 206-075-597.

Voltage Requirements	28 Vdc
Input Signal	Audio
Output Signal	Audio

b. Antenna, FM Homing 209-075-345.

Type	Homing loop
Frequency	30 to 75.95 MHz.
Impedance	50 ohms
Power	5 watts min.

c. Filter, Vhf 205-075-382.

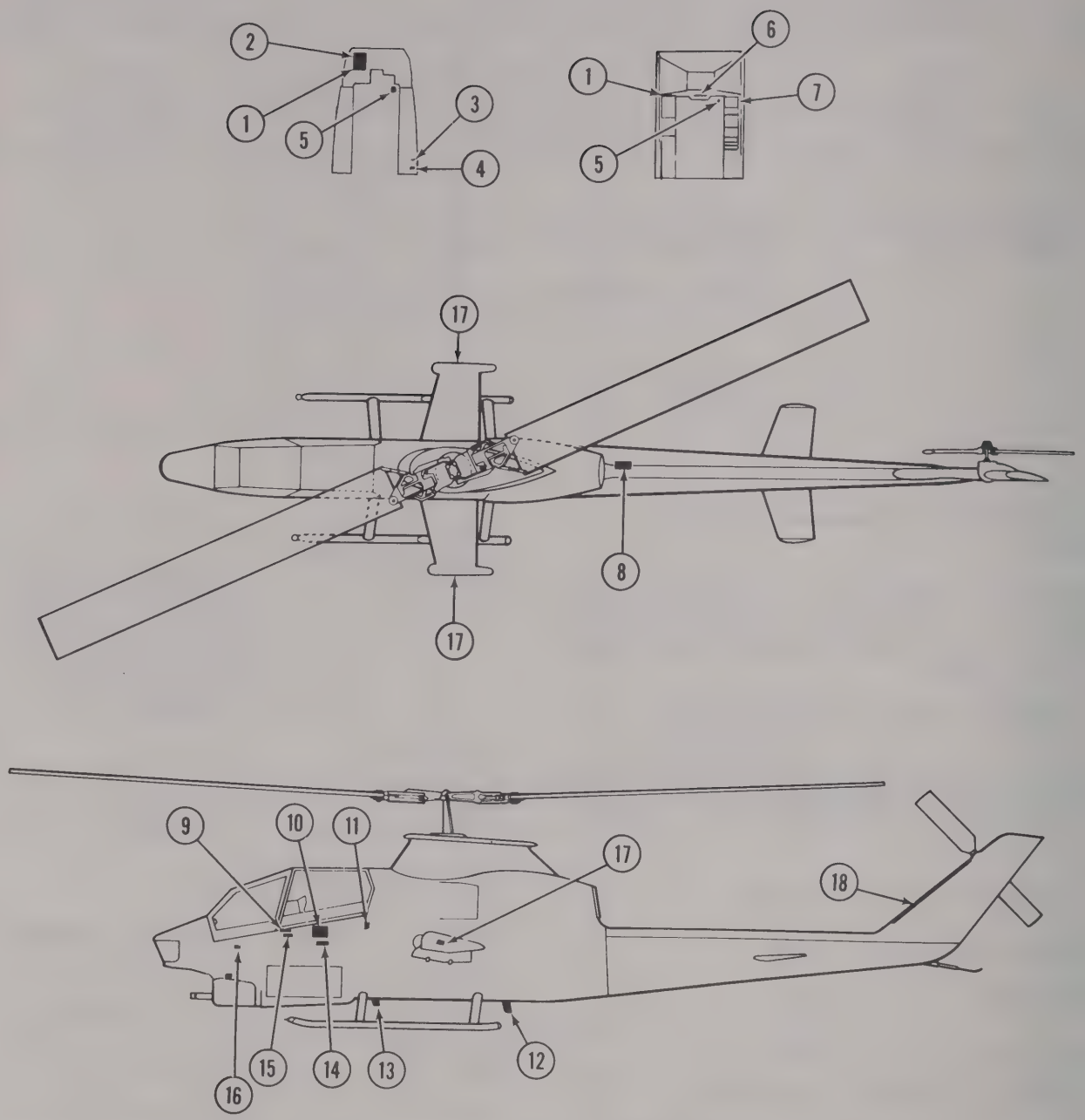
Type	Band pass, bidirectional
Impedance	50 ohms
Power	15 watts max.
Attenuation	80 db min. 30 MHz 65 db min.—45 MHz 60 db min.—60 MHz 55 db min—76 MHz 35 db min.—195 to 400 MHz
Insertion loss	0.5 db max.
Vswr	1.5:1 max.—116 to 150 MHz

d. Antenna, Vhf 209-075-550.

Type	Vertically polarized monopole
Frequency	116 to 150 MHz
Impedance	50 ohms
Power	100 watts max.
Antenna Gain	2 db min.—127 MHz
Vswr	2.5:1 max.—116 to 150 MHz

e. Filter, Uhf 205-075-381.

Type	High pass, bidirectional
Impedance	50 ohms
Power	15 watts max.

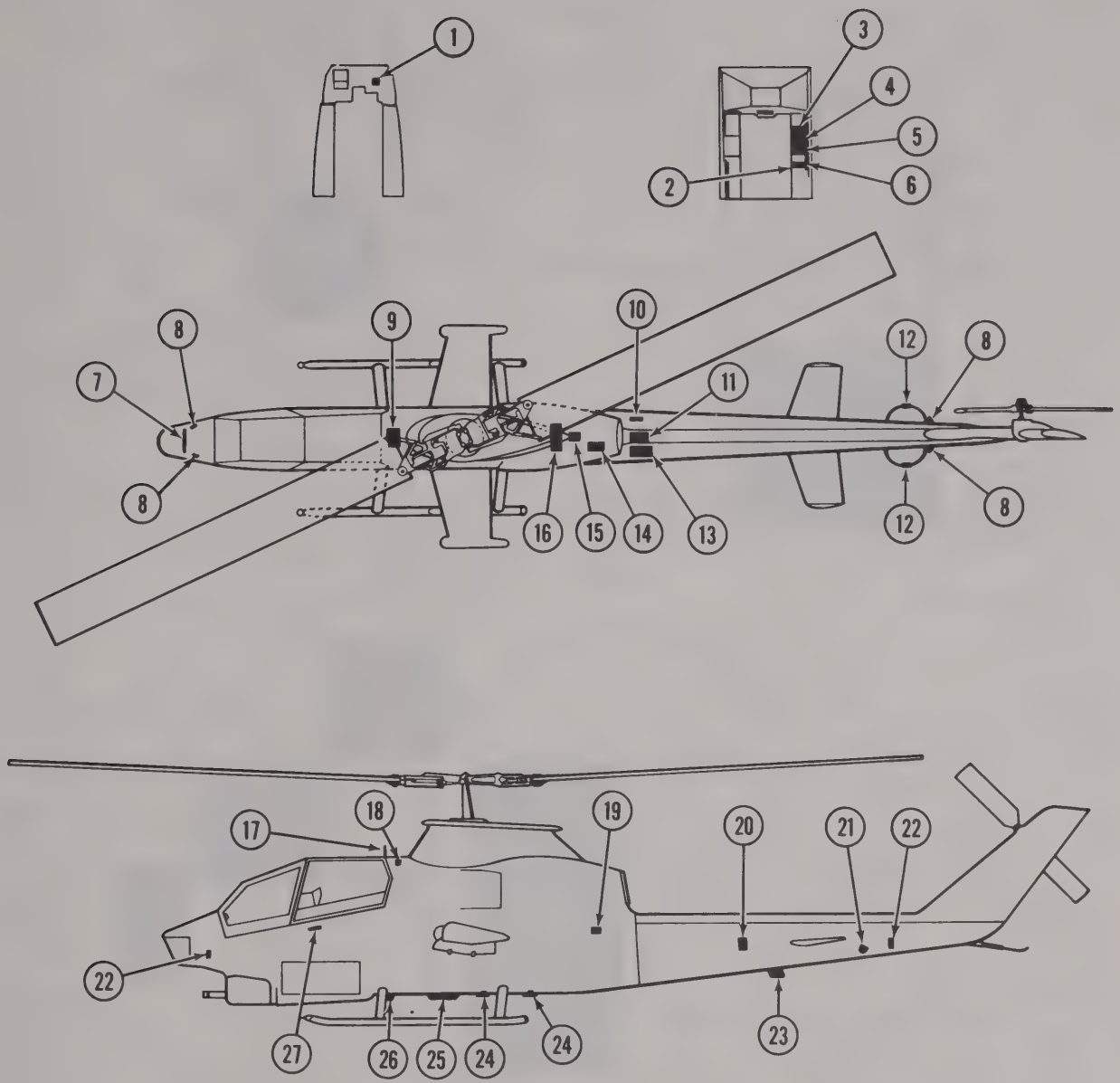


1. ICS Control panel
2. VHF Control panel
*3. 2301K2
*4. 2301TB2
5. ICS Foot switch
6. FM Control panel
*7. UHF Control panel
8. KY-28 Security set
*9. 2301TB3
*10. Audio threshold
11. 2301TB1, 2301K1
12. UHF Antenna
13. VHF Antenna
*14. UHF and FM Comm filters
*15. 3400TB1
16. VHF Filter
17. Hot mike switch (crew)
18. FM Antenna

* Right Side

209077-2A
ELIXP-043C1

Figure 1-1. Model AH-1S helicopter communications system



1. Course indicator
2. Radar warning control panel
3. VOR Control panel
4. Transponder control panel
5. DF Control panel
6. Compass control panel
7. Glideslope antenna
8. Radar warning spiral antenna
9. ADF Loop antenna
10. Transponder test set
11. Mark XII computer
12. VOR Antenna
13. Transponder
14. Directional gyro
15. ADF Amplifier
16. ADF Receiver
17. FM Homing antenna
18. FM Homing filters
19. Radar warning comparator
20. VOR Receiver
21. Gyro compass transmitter compensator
22. Radar warning receiver
23. Transponder antenna
24. Radar altimeter antenna
25. Marker beacon antenna
26. Radar warning blade antenna
27. Turn rate gyro and gyroscope

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Figure 1-2. Model AH-1S helicopter navigation system

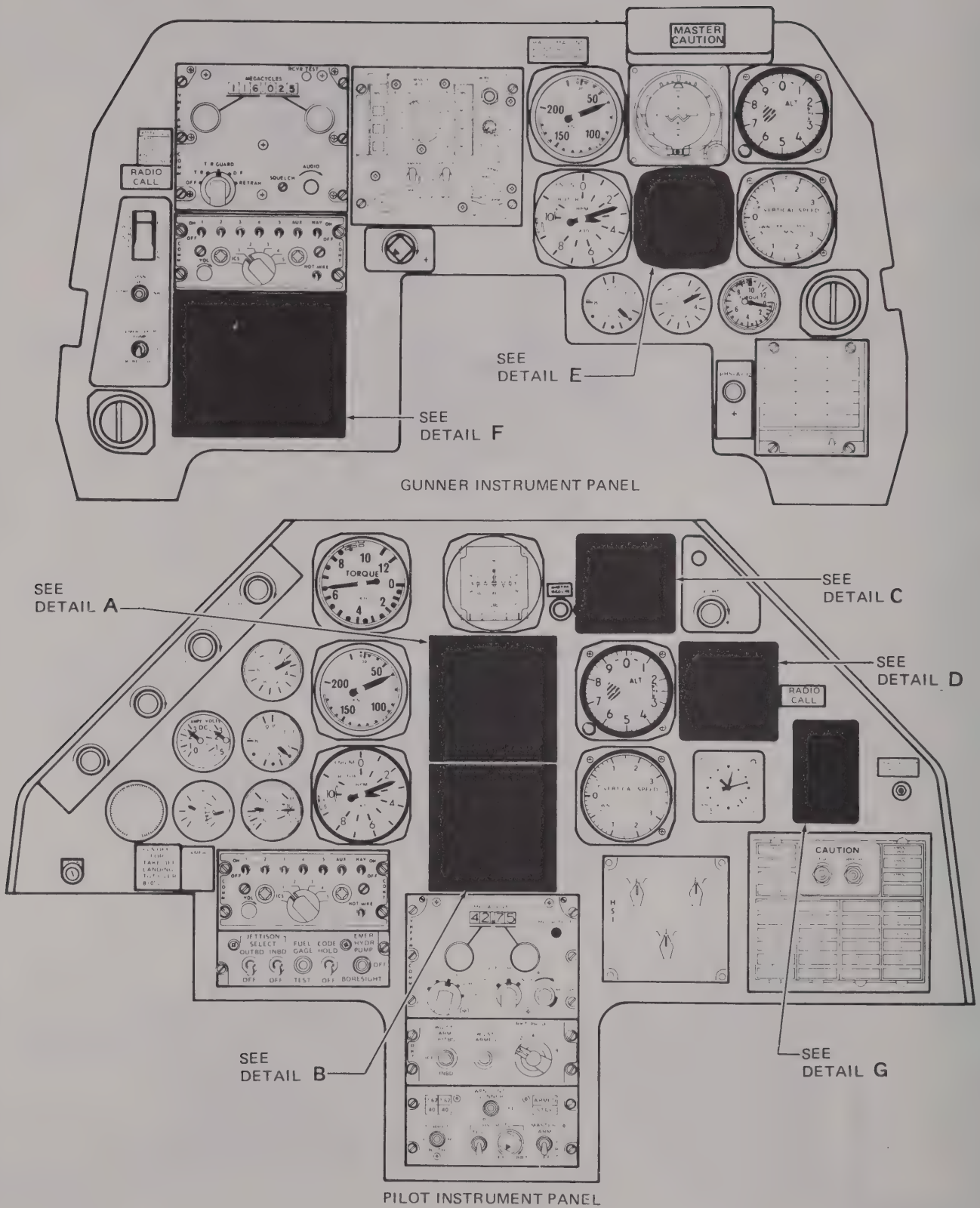
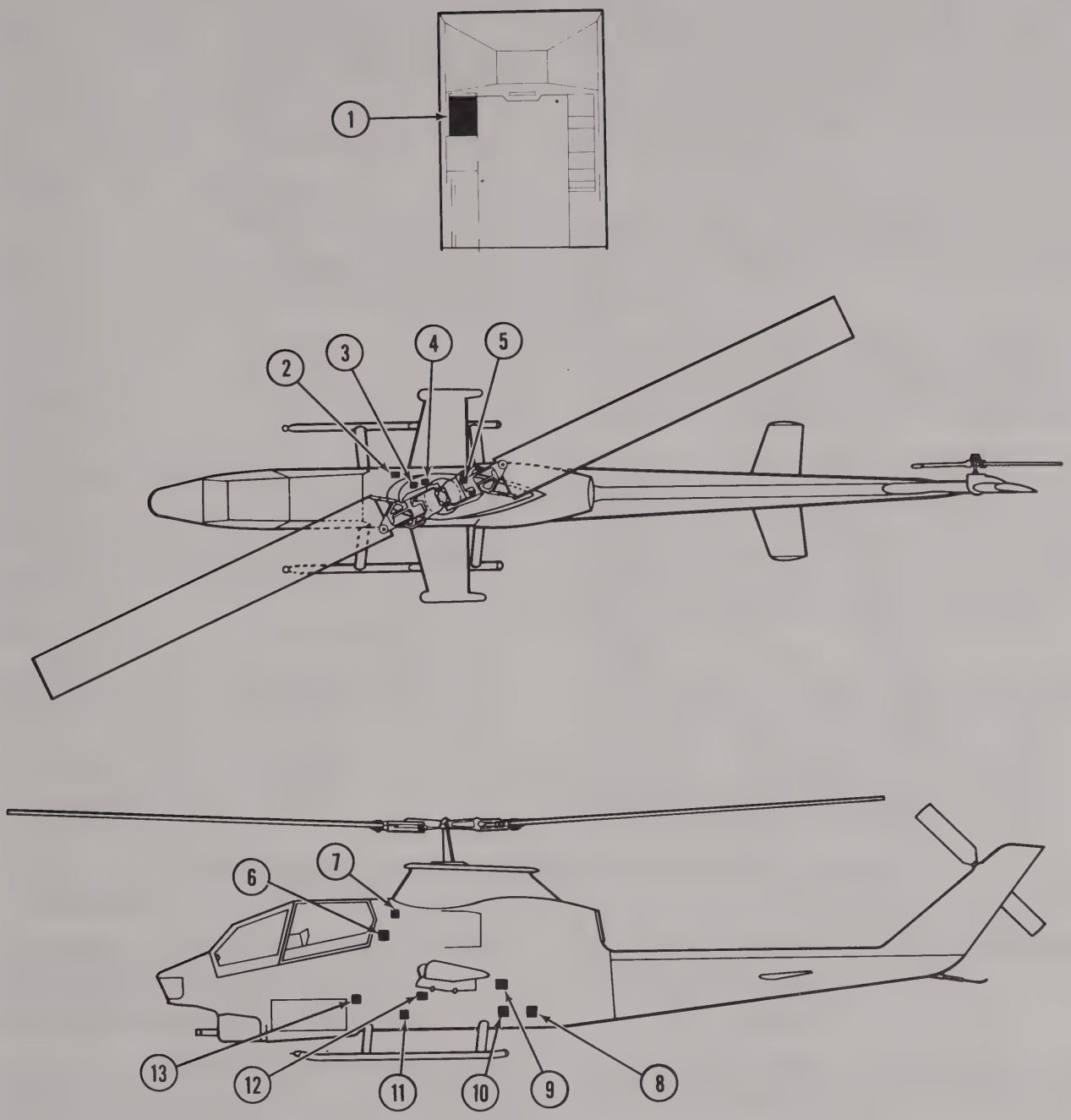


Figure 1-3. Indicators (Sheet 1 of 5)



1. Control panel (9A1)
2. Control tube assembly (9L4)
3. Hydraulic control solenoid (1L2)
4. Hydraulic control solenoid (1L1)
5. Control motion transducer (9MT4)
6. Sensor amplifier unit (9A2)
7. Pylon compensation unit(9A3)
8. Control tube assembly (9L6)
9. Hydraulic control solenoid (9L9)
10. Control motion transducer (9MT3)
11. Control tube assembly (9L5)
12. Hydraulic control solenoid (9L7, 9L8)
13. Control motion transducer (9MT1, 9MT2)

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Figure 1-4. Model AH-1S helicopter stability and control augmentation system

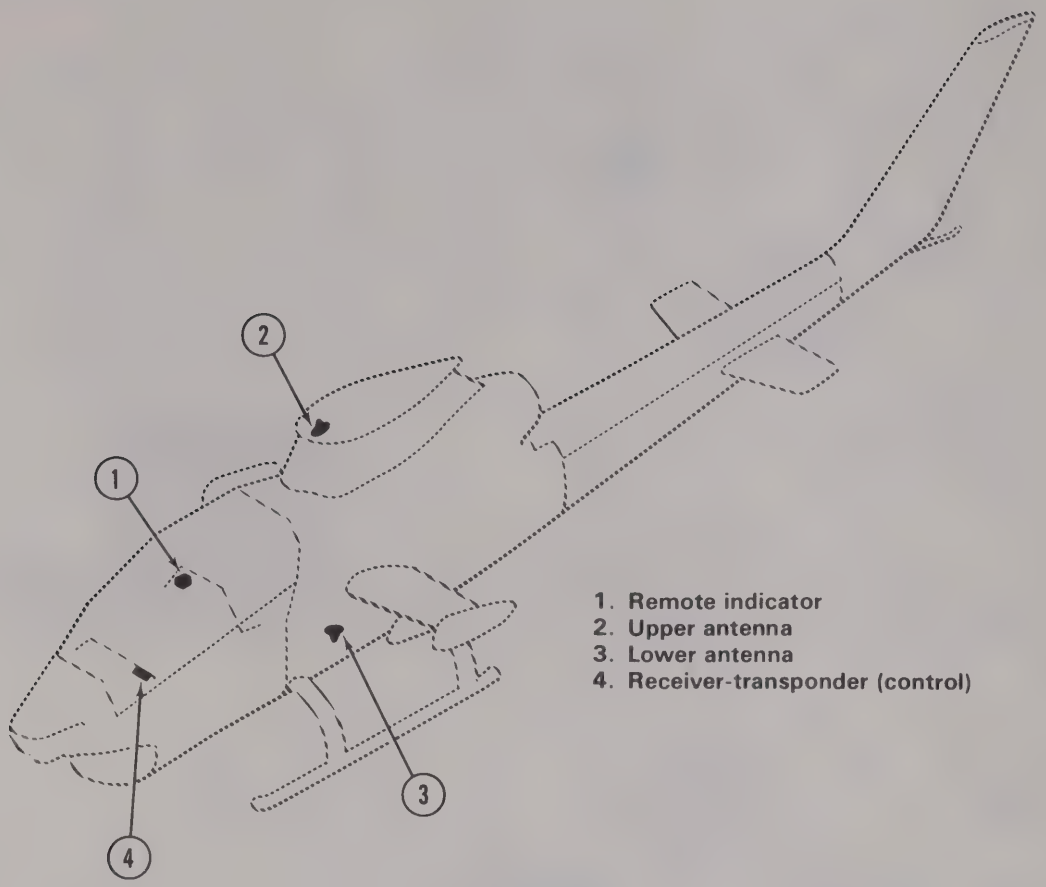


Figure 1-5. Model AH-1S helicopter proximity warning system

Attenuation	70db min.—0 to 76 MHz
	65 db min.—76 to 136 MHz
	50 db min.—136 to 150 MHz
Insertion loss	0.5 db max.—225 to 400 MHz
Vswr	1.5:1 max

f. Antenna, Sense 209-030-133.

Type	0.35 meter
Frequency	100 to 3000 KHz
Impedance	50 ohms
Power	0.042 amperes at 15 ± 0.5 Vdc

g. Control Panel, HSI Display 209-077-081.

Voltage requirements	28 Vdc
Output	To HSI and ADI
Lighting	Integrally illuminated

h. Indicator, HSI 209-075-660.

Voltage	115 Vac 400 Hz input
Flags	Heading (HDG) Glideslope (GS) (or FM Homing Warning) Nav Warning (NAV) (or FM Homing Warning)

Pointers	Vertical Deviation (Glideslope or FM Homing Signal Strength) Course Bearing No. 1 Bearing No. 2
Readouts	COURSE RANGE (Not Used)
Knobs	Heading Select (HDG SEL) Course Select (CRS SEL)
Card Dial	Compass
Lighting	Integrally illuminated

i. Filter, FM 205-075-380-1.

Type	Low pass, bidirectional
Impedance	50 ohms
Power	25 watts max.
Attenuation	55 db min. — 116 to 135 MHz 70 db min. — 135 to 400 MHz

1-8. Description.

Description of electronic components within the scope of this manual not covered in separate Department of the Army technical manuals include the following:

a. Audio Threshold 206-075-597. The audio threshold operates with each communications radio to ensure adequate audio crosstalk isolation in the helicopter interphone system.

b. Antenna, FM Homing 209-075-345. The homing antenna is an encapsulated loop resembling a streamlined horizontal towel rack. The antenna is attached to the helicopter by four screws through each of the two flanges.

c. Filter, Vhf Band Pass 205-075-382. The vhf band pass filter reduces spurious signals to and from the vhf command radio set. It will pass signals between 116 and 150 MHz in either direction.

d. Antenna, Vhf 209-075-550. The vhf antenna is a communication antenna mounted to underside of the helicopter by four mounting screws. One coax cable connector is attached to the centerline of the antenna. The vhf antenna weighs 1.3 pounds and is 16.15 inches long, 3.25 inches wide, and 8.25 inches high.

e. Filter, Uhf High Pass, 205-075-381. The uhf high pass filter reduces spurious signals to and from the uhf command radio set. It will pass signals between 225 and 400 MHz in either direction.

f. Antenna, Sense 209-030-133. The sense antenna is a navigation antenna mounted on underside of aft fuselage section by forty screws. One coaxial connector is attached to the antenna.

g. Control Panel, HSI Display 209-077-081. The HSI display control panel is instrument panel mounted and controls the system to supply information to bearing and course pointers. Bearing pointers No. 1 and No. 2 may be controlled either by the VOR or ADF systems while the course pointer can be controlled by the VOR or FM system.

h. Indicator, HSI 209-075-660. The horizontal situation indicator (HSI) is located in the pilot instrument panel. This indicator is used in conjunction with the VOR/ILS, VHF FM operating in the homing mode, gyro compass, and the ADF facilities. Part of the information to the HSI is controlled by the HSI display control panel.

i. Filter, FM Low Pass, 205-075-380-1. The FM low pass filter reduces spurious signals to and from the FM radio set. It will pass signals between 30 and 76 MHz in either direction.

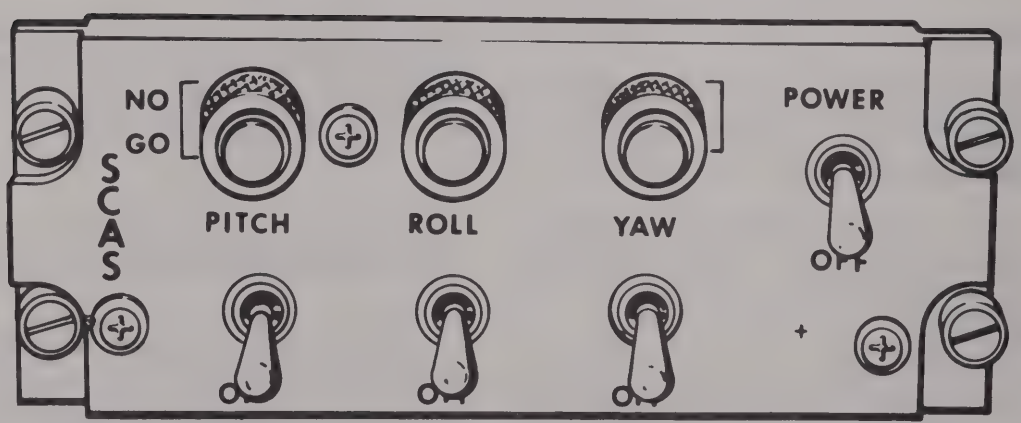
1-9. Description of Model 570A Stability and Control Augmentation System (SCAS)

The SCAS is a three-axis stability and control augmentation system. It is integrated into fore and aft, lateral, and directional flight controls to improve the stability and handling qualities of the helicopter. The system provides a highly damped airframe for external disturbance, yet maintains high quality control-response characteristics for pilot inputs. The SCAS consists of two circuit breakers, a control panel, a sensor amplifier unit, three servo actuators, three solenoid-controlled hydraulic valves, and three control motion

transducers. All the equipment is interconnected with multiconductor cable assemblies for transferring signal data and power within the system.

a. Control Panel. The control panel (figure 1-6) consists of a mounting plate, an integral-lit panel, one POWER switch, three engage switches, spring-lock, three press-to-test NO GO indicator lights, four fasteners to provide for console mounting, and one cable assembly with one 26-pin connector for electrical connection in the system. The functions of the controls on the panel are listed below:

Controls	*Function*
POWER switch	Applies 28 Vdc and 115 Vac to the SCAS components when set to up (on) position. Disconnects power when set to OFF.
PITCH, ROLL, and YAW switches	Switches engage pitch, roll, and yaw channels when set to the up (on) position. The channels are disengaged when the switches are set to OFF.
PITCH, ROLL, and YAW NO GO indicator lights	When the lamps are lighted, they indicate an out-of-tolerance system condition, or an unexpired warmup period. The system should not be operated in this condition.



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Figure 1-6. SCAS control panel

b. Sensor Amplifier Unit. (Figure 1-7). The sensor amplifier unit is housed in a metal case with four holddown attach points. The front of the case contains two pushbutton switches, labeled GYRO TEST and ACTR TEST, and a hinged access door held in place by two captive screws. The switches test the rate gyros and servo actuators in conjunction with the built-in test equipment (BITE). If a NO GO lamp is lighted and the light extinguishes when the GYRO TEST switch is depressed, a rate gyro is defective. Similarly, if a NO GO lamp is lighted, and depressing the ACTR TEST switch causes the lamp to extinguish, a servo actuator is defective. The right side of the case contains one fuse and one spare fuse, and a 41-pin connector for transferring signal data and power within the system. The aft wall of the case is used as a common mount for the three rate tyros within the case. The unit is labeled on the same side as the connector to assure proper orientation in the helicopter.

c. Servo Actuator Assemblies. The three servo actuator assemblies include one control tube attached to one end of each servo actuator and a clevis attached to the other end. The control tube and clevis provide for the mounting of the servo actuator in series in the helicopter mechanical control systems. The internal piston and shaft of the actuator is hydraulically moved in and out of the actuator case to provide for mechanical displacement of helicopter controls. The internal centering and locking feature provides a solid link in the helicopter control linkage if hydraulic pressure to the actuator is lost or the channel is disengaged. An internal servo hydraulic valve provides for controlling hydraulic pressure to the piston in the proper direction of displacement. One 6-pin connector is attached to the case to provide for the transference of signal data and power.

d. Solenoid Valve. The solenoid valve consists of a metal case, three hydraulic ports (labeled CYL, RET, and PRESS) to provide for hydraulic connection to the helicopter hydraulic system and the servo actuators in the SCAS. Two attachment points are provided for installation on the helicopter structure. One 6-pin electrical connector is attached to the case to provide electrical connection to the system.

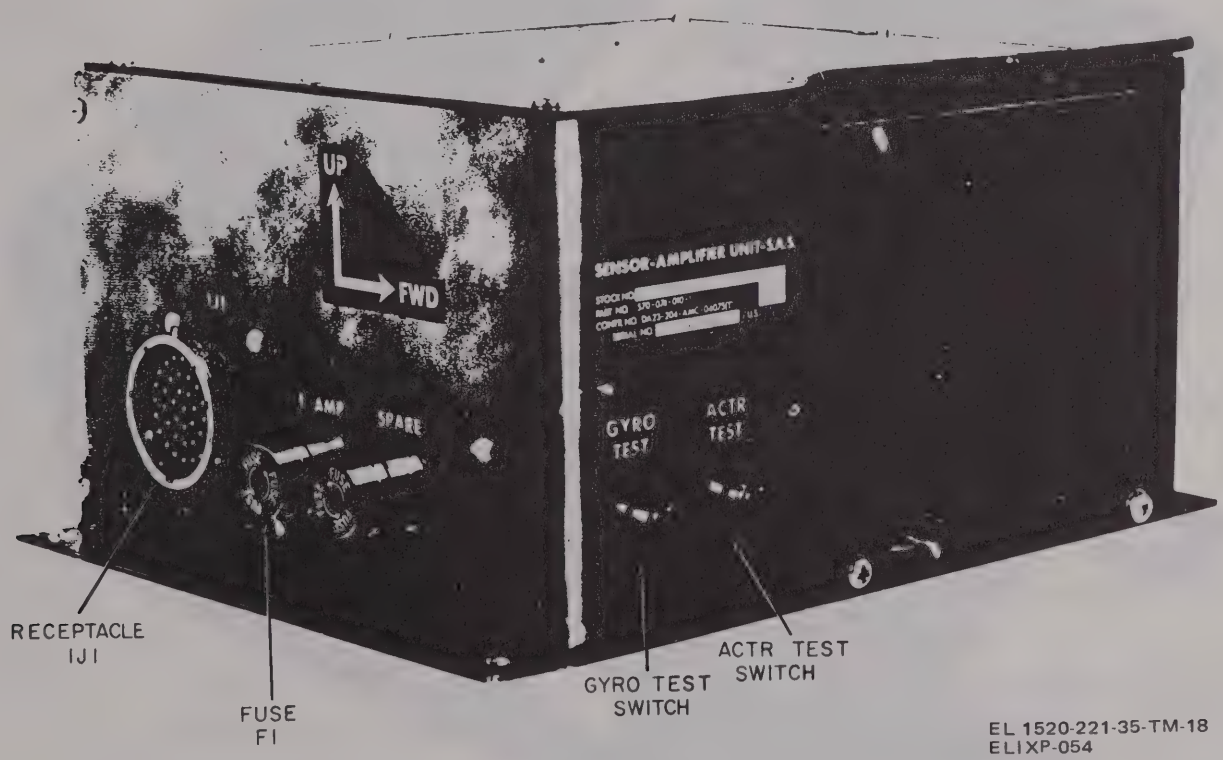


Figure 1-7. SCAS sensor amplifier unit

e. Control Motion Transducer. The control motion transducer consists of an internal linear potentiometer, a cylindrical case, a movable shaft, two attachment points (one on the case and one on the shaft) and a 6-pin connector for transferring signal data and power.

f. Pylon Compensation Unit. (Figure 1-8). The pylon compensation unit (P.C.U.) is located aft and above the SCAS sensor amplifier unit. Only 28 Vdc is supplied to this unit from the SAS (SCAS) control panel. For pylon position information, the P.C.U. relies on a pylon transducer of the same type as used for pilot control information. Pitch pylon motion is applied through the PCU into the roll channel of the SCAS for damping.

g. Pylon Transducer. The transducer is located between pylon fifth mount and the transmission tail rotor driveshaft quill. The transducer senses pitch motion of the pylon. Output signals of the transducer are inserted into the pylon compensator unit where the signals are summed, shaped, attenuated and inserted into the roll channel of the sensor amplifier for retardation of the pylon oscillation.

1-10. Description of Proximity Warning System YG1054.

The Proximity Warning System, consisting of receiver-transponder, two antennas, and remote indicator.

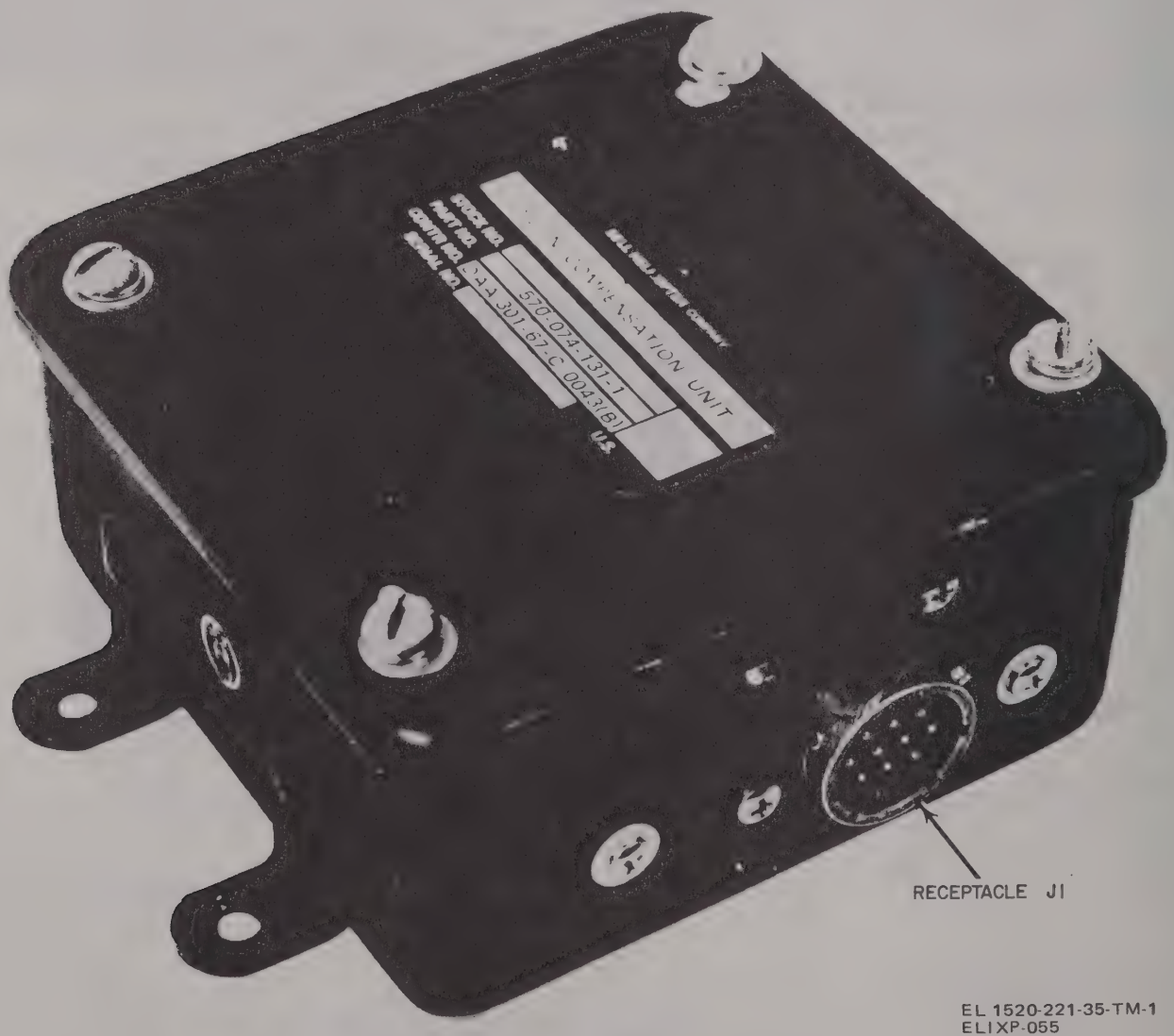


Figure 1-8. SCAS pylon compensation unit

CHAPTER 2

MAINTENANCE INSTRUCTIONS

Section I. GENERAL REQUIREMENTS

2-1. Scope of Organizational (AVIM) Maintenance

The maintenance duties assigned to the organizational maintenance repairman of the helicopter electronic equipment configuration are listed below, together with references to the applicable paragraphs covering the specific maintenance functions. These maintenance duties supplement the daily, intermediate, and periodic preventive maintenance checks and services contained in the organizational maintenance manual on the helicopter (TM 55-1520-236-23). The procedures covered in this manual will be performed concurrently with the aircraft periodic preventive maintenance checks and services. The results of the preventive maintenance checks and services will be recorded on applicable maintenance forms in accordance with instructions in TM 38-750.

a. Periodic preventive maintenance checks and services (para 2-6).

b. Cleaning and repainting (para 2-8).

c. Troubleshooting (para 2-10).

2-2. Tools, Test Equipment, and Materials Required

A list of parts authorized for organizational maintenance of the electronic equipment configuration appears in TM 11-1520-236-20P. Major electronic equipment components, when removed from the helicopter for higher category maintenance, are replaced by serviceable components from maintenance float stock, or on a direct exchange (DX) basis from higher category maintenance organizations (direct support maintenance). Tools, materials, and test equipment required for organizational maintenance are listed below.

a. Tools. All tools required are contained in:

(1) Tool Kit, Radio Repairman TK-101/G

(2) Maintenance Kit, Electronic Equipment MK-693A.

b. Test Equipment. Multimeter AN/USM-223, signal simulator SM-674( ) UPM, and ground transponder tester UG2330AA01 are the only test equipment required.

c. Materials.

(1) Trichloroethane.

(2) Sandpaper, fine, No. 000.

(3) Cleaning cloth (lint free).

(4) Soft bristle brush.

(5) Lubricating oil, general purpose preservative.

(6) The following safety wire can be requisitioned:

FSN	*Description*	*Diameter (inch)*	*Unit of issue*
9505-554-1421	Safety wire, steel corrosion-resistant annealed.	0.032	Spool
9505-242-7527	Safety wire, steel corrosion-resistant annealed.	0.047	Spool
9505-554-1420	Safety wire, steel corrosion-resistant annealed.	0.063	Spool

2-3. Fuse and Circuit Protective Device Locations (figure 2-1).

The chart below lists the locations and ratings of all accessible fuses and circuit breakers that provide circuit protection for the electronic equipment. Be sure that fuses of the proper value are inserted in the fuseholders of all the components indicated. Depress all press-to-set circuit breakers that have tripped.

Equipment	Rating	Placard
	The following circuit breakers are located on the dc circuit breaker panel, and fuses are located on the equipment as indicated:	
Interphone C-6533( )/ARC	28 VDC 5 amp 28 VDC 5 amp	ICS PILOT ICS GNR
Radio Set AN/ARC-114A (On rear of radio set)	28 VDC 5 amp 28 VDC 5 amp Fuse 28 VDC F1	FM RCVR KY-28 CODER
Radio Set AN/ARC-115 (On rear of radio set)	28 VDC 5 amp Fuse 28 VDC F1	VHF RCVR
Radio Set AN/ARC-116 (On rear of radio set)	28 VDC 5 amp Fuse 28 VDC F1	UHF RCVR
Receiver-Transmitter, Radio RT-1167/ARC-164(V) (On rear of radio set)	28 VDC 5 amp Fuse F1 5 amp Fuse F2 1 amp	UHF RCVR
Automatic Direction Finder Set AN/ARN-89B	28 VDC 5 amp	ADF RCVR
Proximity Warning	28 VDC 5 amp	PROX WARN
VOR/ILS AN/ARN-123	28 VDC 5 amp	VOR/ILS
Radar Detection AN/APR-39	28 VDC 5 amp	RADAR WRN
Radar Altimeter AN/APN-209	28 VDC 5 amp	RADAR ALTM
Transponder Set AN/APX-72 (On receiver-transmitter)	28 VDC 7½ amp Fuse 28 VDC 5 amp	IFF XPNDR
Transponder Test Set TS-1843( )/APX	28 VDC 5 amp	IFF TEST SET
Stability and Control Augmentation System (On sensor amplifier unit)	28 VDC 5 amp Fuse 28 VDC 1 amp	SCAS PWR 1 AMP
	The following circuit breakers are located on the ac and armament circuit breaker panel, and fuses are located on the equipment as indicated:	
Gyromagnetic Compass Set AN/ASN-43	28 VAC 1 amp 115 VAC 1 amp	COURSE IND GYRO CMPS
Automatic Direction Finder Set AN/ARN-89A	26 VAC 1amp	ADF RCVR
VOR/ILS AN/ARN-123	26 VAC 1 amp	VOR/ILS
Stability and Control Augmentation System	115 VAC 1 amp	SCAS PWR
Transponder Set AN/APX-72 (On receiver-transmitter)	Fuse 115 VAC 5 amp	115V 5A

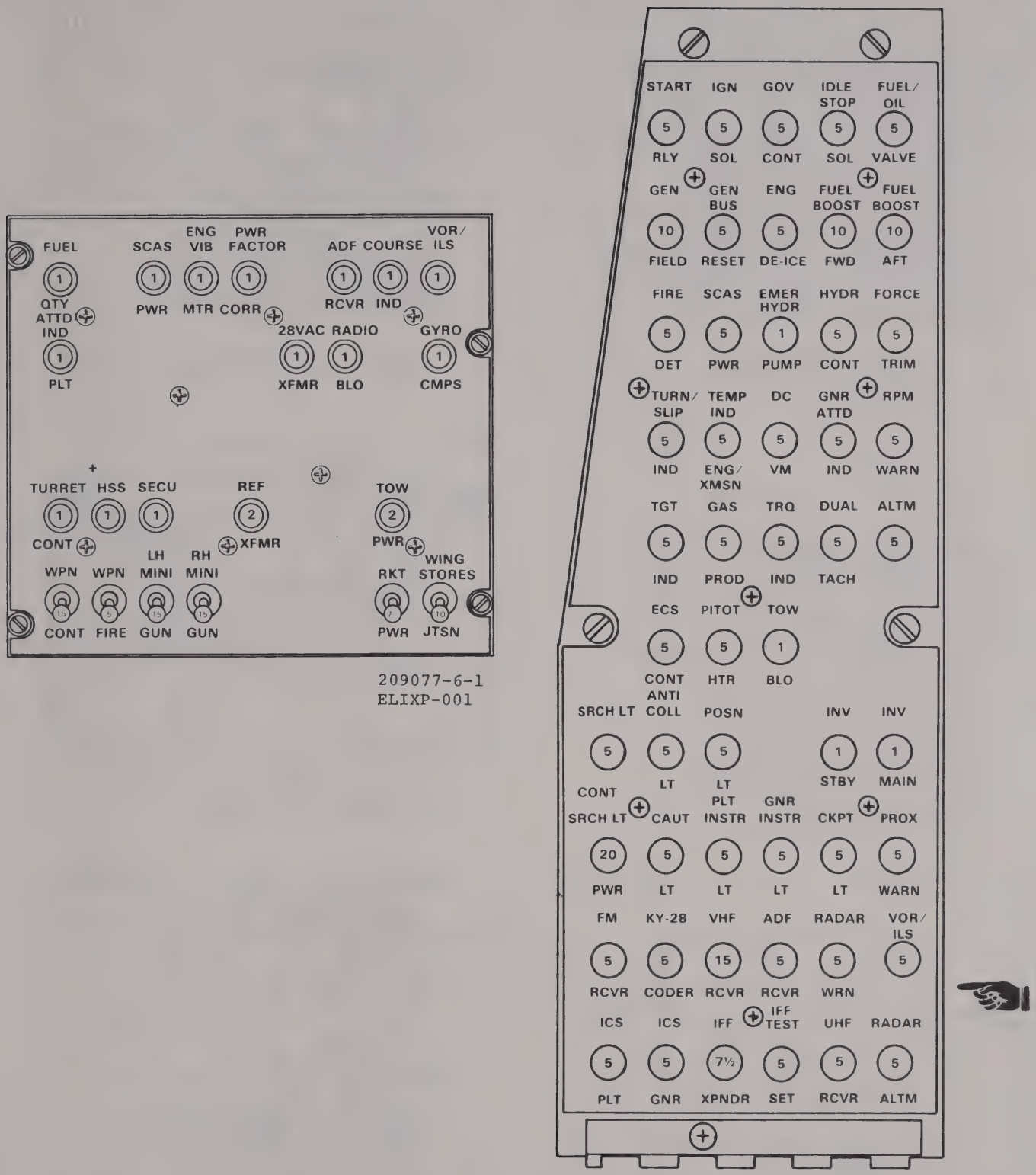
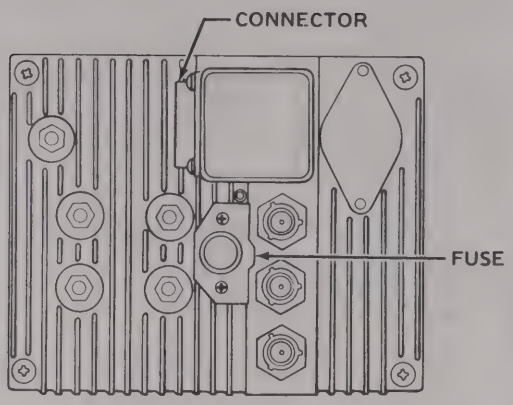
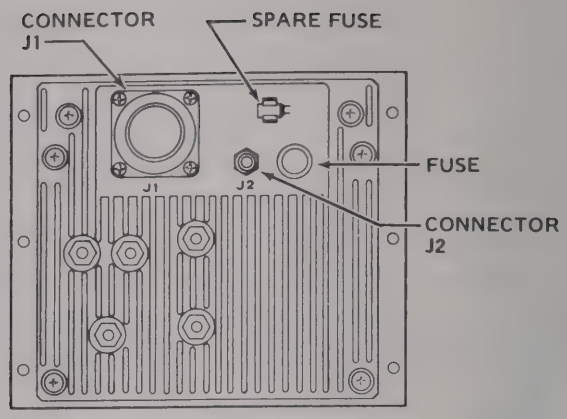


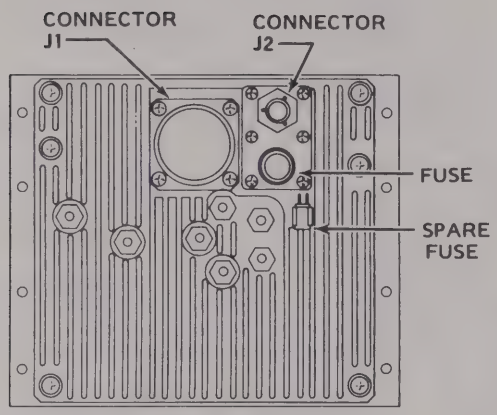
Figure 2-1. Circuit breaker panels and fuse location (Sheet 1 of 2)



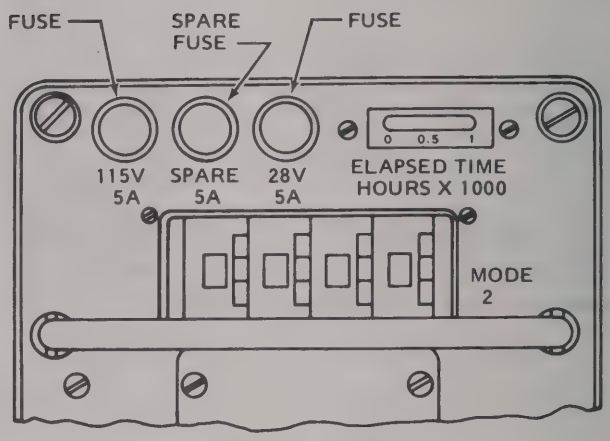
AN/ARC-114A RADIO SET
(REAR VIEW) FUSE LOCATION



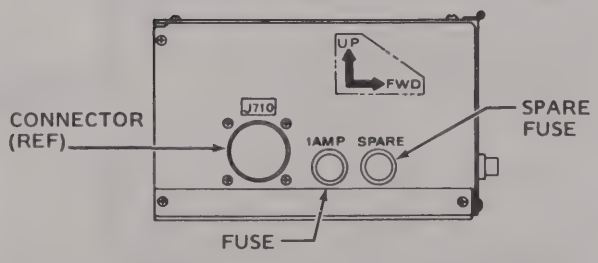
AN/ARC-115 RADIO SET
(REAR VIEW) FUSE LOCATION



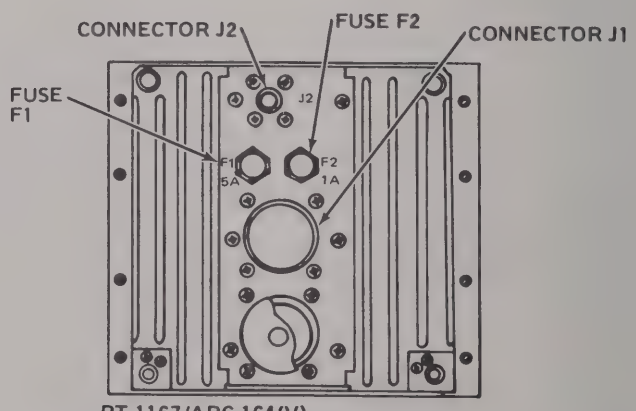
AN/ARC-116 RADIO SET
(REAR VIEW) FUSE LOCATION



RT-859/APX-72 RECEIVER-TRANSMITTER
FUSE LOCATION (FRONT VIEW)



SCAS SENSOR AMPLIFIER
UNIT (SIDE VIEW)



RT-1167/ARC-164(V)
RECEIVER-TRANSMITTER; RADIO
(REAR VIEW) FUSE LOCATION

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Figure 2-1. Circuit breaker panels and fuse location (Sheet 2 of 2)

from the helicopter, they are replaced by equivalent serviceable components from maintenance float stock or (on a direct exchange basis) from the direct support maintenance organization.

c. Pullout Intervals. The chart below lists electronic equipment components in the helicopter electronic equipment configuration, and indicates the interval (specified in hours of flying time) at which each component should be removed from the helicopter for bench check interval preventive maintenance by direct support maintenance personnel. The chart also references the paragraph that provides removal and replacement instructions for that component.

Component	Pullout Interval (Flying Hours)	Procedure (References)
Intercommunications		
C-6533()/ARC	300	Para. 2-15
1021-D001 (206-075-597)	300	Para. 2-16
Foot switch	NR	Para. 2-17
Cyclic radio-ics switch	NR	Para. 2-18
Hot mike switch (wing stations)	NR	Para. 2-19
Radio Set AN/ARC-114A	300	Para. 2-20
C-8157/ARC	300	Para. 2-21
TSEC/KY-28	300	Para. 2-22
P/O 209-077-203 (antenna)	NR	Para. 2-23
AS-3205/ARC (209-075-345) (antenna)	NR	Para. 2-24
209-077-062-1 (fm filter)	NR	Para. 2-24.1
205-075-380-1 (fm communication filter)	NR	Para. 2-27
Radio Set AN/ARC-115	300	Para. 2-25
AS-3204/ARC (209-075-550) (antenna)	NR	Para. 2-26
BPF40-03P (205-075-382) (vhf filter)	NR	Para. 2-27
Radio Set AN/ARC-116 or AN/ARC-164 (RT-1167/ARC-164)	300	Para. 2-28
AT-256A	NR	Para. 2-29
HPF40-01T (205-075-381) (uhf filter)	NR	Para. 2-30
Gyromagnetic Compass AN/ASN-43		
C-6347/ASN	300	Para. 2-31
T-611/ASN	NR	Para. 2-32
CN-998( )/ASN	600	Para. 2-33
CN-405/ASN		
Automatic Direction Finder AN/ARN-89B		
AM-4859 A/ARN-89	300	Para. 2-34
C-7392A/ARN-89B	300	Para. 2-35
R-1496A/ARN-89B	NR	Para. 2-36
AS-2108A/ARN-89A (antenna)	NR	Para. 2-37
209-030-133-3 (antenna) (212-070-180)	300	Para. 2-58

Component	Pullout Interval (Flying Hours)	Procedure (References)
VOR/ILS Navigation Facility AN/ARN-123		
C-10048/ARN-123(V)	NR	Para. 2-38
209-077-081 (HSI display control)	NR	Para. 2-39
209-075-660	NR	Para. 2-40
R-2023/ARN-123(V)	NR	Para. 2-41
AT-640/ARN-123(V) (antenna)	NR	Para. 2-42
AS-3188/ARN (214-077-092) (antenna)	NR	Para. 2-43
AS1304/ARN (antenna)	NR	Para. 2-44
Radar Altimeter Facility AN/APN-209		
RT-1115( )/APN-209	300	Para. 2-45
AS-2595( )/APN-194 (antenna)	NR	Para. 2-46
Radar Warning Facility AN/APR-39		
C-9326( )/APR-39	300	Para. 2-47
ID-1150( )/APR-39	300	Para. 2-48
CM440( )/APR-39	300	Para. 2-49
R-1838( )/APR-39	300	Para. 2-50
AS2890( )/APR-39	NR	Para. 2-52
AS2891( )/APR-39	NR	Para. 2-51
AS2892( )/APR-39 (antenna)	NR	Para. 2-51
Transponder Set AN/APX-72		
C-6280/APX-72	300	Para. 2-53
RT-859A/APX	300	Para. 2-54
KIT-1A/TSEC	300	Para. 2-55
TS-1843A/APX	300	Para. 2-56
AT-884/APX-44 (antenna)	NR	Para. 2-57
AC Power Source		
PP-7274/A (inverter)	200	Para. 2-59
PU-543/A (inverter)	200	Para. 2-59
DC Power Source		
BB-649/A	50	Para. 2-60
Stability and Control Augmentation System		
209-074-084	300	Para. 2-62
570-074-010	300	Para. 2-63
570-074-131	300	Para. 2-64
Attitude Indicator		
209-075-661	NR	Para. 2-58
209-075-698	NR	Para. 2-65
TRU-2A/A	NR	Para. 2-66
Proximity Warning		
HG1001AD01	NR	Para. 2-67
10027834-101	NR	Para. 2-68
JG1054AA	NR	Para. 2-69

Item No.	Item to be Inspected	Procedure	References
16	Gunner microphone switch (cyclic).	Press the gunner microphone switch, and speak into the H-101/U microphone. Sidetone is heard in the gunner headset, and interphone signals are heard in pilot headset.	Figure 2-5, Para. 2-11, Item No. 16
17	Microphone switch (foot).	Press the microphone footswitch (pilot or gunner) and speak into the H-101/U microphone. Sidetone is heard in headset, and interphone signals are heard in other headset.	Figure 2-5, Para. 2-11, Item No. 17
18	ICS control	Place HOT MIKE switch to on (up) position and speak into the H-101/U microphone. Sidetone is heard in headset, and interphone signals are heard in other headset.	Figure 2-3, Para. 2-11, Item No. 18
		POWER-OFF, RADIO SET AN/ARC-114A	
19	Exterior surfaces	a. Clean the exterior surfaces. Check the MEGAHERTZ indicator glass for cracks. b. Observe that the mechanical action of each knob and switch is smooth and free of external or internal binding, and that there is no excessive looseness. c. Check for positive indication of detents. Replace defective knobs.	
20	Fasteners	Inspect front panel fasteners for looseness. Replace or tighten as necessary.	
21	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required.	
		POWER-ON, RADIO SET AN/ARC-114A	
		NOTE Allow mandatory 1 minute warmup time prior to keying transmitter.	
22	FM RCVR circuit breaker	Verify that FM RCVR circuit breaker is in.	Figure 2-1, Para. 2-11, Item No. 22.

Item No.	Item to be Inspected	Procedure	References
23	ICS control panel	Perform steps in Item No. 15 through 17 with ICS control rotary selector in the No. 1 position.	Figure 2-3
24	Receiver-transmitter and function selector switch	a. Set function selector switch to T/R position. b. Rotate the megahertz control to 30.05 MHz on the MEGAHERTZ indicator. c. Depress and hold the RCVR TEST push button and listen for a tone in the headset. Release pushbutton. d. Repeat step c. for three additional frequencies across the band. **WARNING** Do not use the guard channel frequency setting. Transmission on this frequency should only occur when emergency conditions exist. e. Rotate the frequency controls to frequency of a local vhf-fm station. f. Position ICS control panel rotary selector to No. 1 and position No. 1 mixing switch to ON. Establish communciations with the station by keying transmitter and speaking into microphone. Adjust AUDIO control to a suitable level.	Figure 2-6, Para. 2-11, Item No. 24.
25	Guard receiver and function selector switch	a. Place function selector switch T/R GUARD. b. Arrange for communications check on guard receiver frequency. Listen for clear, intelligible audio in headset.	Para. 2-11, Item No. 25.

Item No.	Item to be Inspected	Procedure	References
	NOTE Guard channel reception is not affected by the settings of the megahertz or kilohertz control. If guard channel signals are heard while receiving signals on a main receiver communication channel, detune the main receiver by rotating the megaherts control to an open channel. This will permit only the priority guard channel signal to be monitored.		
26	Homing output function selector switch.	a. Place radio set function selector switch on HOMING. b. Rotate the frequency controls to a known fm homing station. c. Observe homing information on pilot HSI and ADI, and also the gunner ADI.	Para. 2-11, Item No. 26.
	POWER-OFF, RADIO SET AN/ARC-115		
27	Exterior surfaces	a. Clean the exterior surfaces. Check the MEGACYCLES indicator glass for cracks. b. Observe that the mechanical action of each knob and switch is smooth and free of external or internal binding, and that there is no excessive looseness. c. Check for positive indication of detents. Replace defective knobs.	
28	Fasteners	Inspect front panel fasteners for looseness. Replace or tighten as necessary.	
29	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required.	

Item No.	Item to be Inspected	Procedure	References
		POWER-ON, RADIO SET AN/ARC-115	
		NOTE Allow mandatory 1 minute warmup time prior to	
30	VHF RCVR circuit breaker	Verify that VHF RCVR circuit breaker is in.	Figure 2-1, Para. 2-11, Item No. 30.
31	ICS control panel	Perform sequences 15 through 17 with ICS control rotary selector in the No. 3 position.	Figure 2-3
32	Receiver-transmitter function selector switch.	a. Set function selector switch to T/R position. b. Rotate the frequency controls to 116.050 MHz on the MEGACYCLES indicator. c. Depress and hold the RCVR TEST push button and listen for a tone in the headset. Release pushbutton. d. Repeat step c. for three additional frequencies across the band. **WARNING** Do not use the guard channel frequency setting. Transmission on this frequency should only occur when emergency conditions exist. e. Rotate the frequency controls to frequency of a local vhf-am station. f. Position ICS control panel mixing switch No. 3 to ON and establish communications with the station by keying transmitter and speaking into microphone. Adjust AUDIO control to a suitable level.	Figure 2-8, Para. 2-11, Item No. 32
33	Guard receiver and function selector switch.	Place radio set function selector switch on T/R GUARD. Arrange for communications check on guard receiver frequency. Listen for clear, intelligible audio in headset.	Para. 2-11, Item No. 33

Item No.	Item to be Inspected	Procedure	References
	NOTE Guard channel reception is not affected by the settings of the megahertz or kiloherts control. If guard channel signals are heard while receiving signals on a main receiver communication channel, detune the main receiver by rotating the megahertz controls to an open channel. This will permit only the priority guard channel signal to be monitored.		
	POWER-OFF, RADIO SET AN/ARC-116 OR AN/ARC-164		
34	Exterior surfaces	Clean the exterior surfaces. Check the MEGACYCLES indicator glass for cracks.	
35	Controls	Observe that the mechanical action of each knob and switch is smooth and free of external or internal binding, and that there is no excessive looseness. Check for positive indication of detents. Replace defective knobs.	
36	Fasteners	Inspect front panel fasteners for looseness. Replace or tighten as necessary.	
37	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required.	
	POWER-ON RADIO SET AN/ARC-116 OR AN/ARC-164		
		NOTE Allow mandatory 1 minute warmup time prior to keying transmission.	

Item No.	Item to be Inspected	Procedure	References
38	UHF RCVR circuit breaker	Verify that UHF RCVR circuit breaker is in.	Figure 2-1, Para. 2-11, Item No. 38.
39	ICS control panel	Perform sequences 15 through 17 with ICS control rotary selector switch in the No. 2 position.	Figure 2-3
40	a. Radio set control AN/ARC-116	a. Set function selector switch to T/R position. b. Rotate the frequency controls to 225.05 MHz on the MEGACYCLES indicator. c. Depress and hold the RCVR TEST push button and listen for a tone in the headset. Release pushbutton. d. Repeat step c. at frequency settings for three additional frequencies across the band. **WARNING** Do not use the guard channel frequency setting. Transmission on this frequency should only occur when emergency conditions exist. e. Rotate the frequency controls to frequency of a local uhf-am station. f. Position ICS control panel mixing switch No. 2 to ON and establish communications with the station by keying transmitter and speaking into microphone. Adjust AUDIO control for a suitable level.	Figure 2-10, Para. 2-11, Item No. 40.
	b. Radio set control RT-1167/ARC-164(V)	a. Set mode selector to MANUAL, VOL control to midrange, SQUELCH to ON, and function selector to MAIN. **NOTE** Depressing the TONE switch key the transmitter causing a tone modulated carrier to be transmitted.	Figure 2-10, Para. 2-11, Item No. 40.

Item No.	Item to be Inspected	Procedure	References
		b. Rotate the frequency controls to 225.05 MHz. Listen for clear, intelligible audio in headset. c. Rotate the frequency controls to an inactive frequency. Position SQUELCH switch to OFF. Receiver background noise should be heard in headset. Position SQUELCH to ON. d. Repeat step b. at three additional frequencies. **WARNING** Do not use the guard channel frequency setting. Transmission on this frequency should only occur when emergency conditions exist. e. Rotate the frequency controls to frequency of a local uhf-am station. f. Position ICS control panel mixing switch No. 2 to ON and establish communications with the station by keying transmitter and speaking into microphone. Adjust VOL control for a suitable level.	
41	Guard receiver and function selector switch.	Place AN/ARC-116 radio set function select switch on T/R GUARD, or RT-1167/ARC-164(V) radio set function selector switch on BOTH and mode selector to GUARD. Arrange for communications check on guard receiver frequency of 243.0 MHz. Listen for clear, intelligible audio in headset.	Para. 2-11, Item No. 41.

Item No.	Item to be Inspected	Procedure	References
		h. Repeat step e for signal generator VOR bearings of 45, 90, 135, 180, 225, 270, and 315 degrees. i. Rotate CRS SEL knob through 360 degrees and check for proper to/ from indications. j. Rotate CRS SEL knob for full scale left and right course deviations on HSI and ADI. Verify that course indications read 10 ± 2 degrees from center course (0 degrees). k. Adjust signal generator for an audio modulated signal. With appropriate mixer switches on monitor headset audio audio for a tone, and determine that rotating the NAV VOL control on the VOR/ILS control will vary the audio level. Leave the volume control at a comfortable listening level.	
74	Signal generator	Select a frequency of 117.90 MHz and a bearing of 0 degrees on the signal generator.	
75	VOR/ILS control	Select a frequency of 117.90 MHz on the VOR/ILS control.	Figure 2-16
76	HSI	Adjust the CRS SEL knob on the HSI until the course deviation bar is centered. With the deviation bar centered and the ambiguity indicator indicating to verify that the bearing pointer is also indicating a bearing of approximately 0 degrees.	Figure 1-3, Para. 2-11, Item No. 76.
77	Signal generator	Set signal generator for localizer operation and tune to 108.10 MHz.	
78	VOR/ILS control	Set to 108.10 MHz.	Figure 2-16
79	Signal generator, HSI, and ADI.	a. If necessary, increase signal generator output level until NAV flag on the HSI is out of view. **NOTE** The course pointer on the HSI must be pointing towards top of indicator for proper L/R localizer indications.	Para. 2-11, Item No. 79.

Item No.	Item to be Inspected	Procedure	References
		b. Adjust signal generator for right deflection (90 Hz). Observe that the horizontal deviation pointer on the ADI and the course deviation bar on the HSI are deflected to the right. c. Adjust signal generator for left deviation (150 Hz). Observe that the horizontal deviation pointer on the ADI and the course deviation bar on the HSI are deflected to the left. d. Adjust signal generator for centered indication. Observe that the horizontal deviation pointer on the ADI and the course deviation bar on the HSI are centered.	
80	Signal generator	Set signal generator for glideslope operation and tune to 334.7 MHz.	
81	VOR/ILS control	Set to 108.10 MHz.	Figure 2-16
82	Signal generator, HSI, and ADI	a. If necessary, increase signal generator output level until GS flags on HSI and ADI are out of view. b. Adjust signal generator for a centered glideslope output. Observe that the vertical deviation pointer on the HSI and ADI are centered. c. Adjust signal generator for a downward deflection (90 Hz). Observe that the vertical deviation pointers are deflected downward. d. Adjust signal generator for an upward deflection (150 Hz). Observe that the vertical deviation pointers are deflected upward.	Para. 2-11, Item No. 82.
83	Signal generator, VOR/ILS control, marker beacon lights, and audio	a. Set the signal generator for outer (400 Hz) marker operation. Observe that the marker beacon light illuminates and a 400 Hz tone is audible in the pilot and gunner headsets. b. Actuate the MB SENS HI LO switch on the VOR/ILS control and determine that HI position results in more sensitivity than the LO position. c. Set the signal generator for middle (1300 Hz) marker operation. Observe that the marker beacon light illuminates and a 1300 Hz tone is audible in the pilot and gunner headsets.	Para. 2-11, Item No. 83.

Item No.	Item to be Inspected	Procedure	References
		d. Set the signal generator for airways (3000 Hz) marker operation. Observe that the marker beacon light illuminates and a 3000 Hz tone is audible in the pilot and gunner headsets.	
		POWER-OFF, RADAR ALTIMETER FACILITY AN/APN-209	
84	Exterior surfaces	a. Clean the exterior surfaces. Check the indicator glass for cracks. b. Observe that the mechanical action of each knob and switch is smooth and free of external or internal binding, and that there is no excessive looseness. c. Check for positive indication of detents. Replace defective knobs.	
85	Fasteners	Inspect front panel fasteners for looseness. Replace or tighten as necessary.	
86	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required.	
		POWER-ON, RADAR ALTIMETER FACILITY AN/APN-209	
87	RADAR ALTM circuit breaker	Verify that the RADAR ALTM circuit breaker is in.	Figure 2-1, Para. 2-11. Item No. 87.
88	Radar altitude indicator	a. Turn LO SET control knob clockwise from OFF position. b. Set HI warning bug to 800 feet. c. After approximately two minutes warmup observe OFF flag disappears, pointer indicates 0 ± 5 feet, digital display reads -0, or 0 to 3 feet. d. Turn LO SET control clockwise until LO warning bug reads between 10 and 80 feet. Verify that LO warning light illuminates. e. Push and hold HI SET control knob to actuate PUSH TO TEST condition.	Figure 1-3, Para. 2-11, Item No. 88.

Item No.	Item to be Inspected	Procedure	References
		f. Verify that pointer indicates 1000 ± 175 feet, digital display reads 1000 ± 100 feet, LO warning light is extinguished, and HI warning light is illuminated. g. Release HI SET control knob. h. Verify that pointer indicates 0 ± 5 feet, digital display reads -0 or 0 to 3 feet, LO warning light illuminates, and HI warning light extinguishes.	
		POWER-OFF, RADAR WARNING FACILITY AN/APR-39	
89	Exterior surfaces	a. Clean the exterior surfaces. Check the indicator glass for cracks. b. Observe that the mechanical action of each knob and switch is smooth and free of external or internal binding, and that there is no excessive looseness. c. Check for positive indication of detents. Replace defective knobs.	
90	Fasteners	Inspect front panel fasteners for looseness. Replace or tighten as necessary.	
91	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required.	
		POWER-ON, RADAR WARNING FACILITY AN/APR-39	
92	RADAR WRN circuit breaker	Verify RADAR WRN circuit breakers are in.	Figure 2-1, Para. 2-11, Item No. 92
93	Radar warning control panel	Position PWR switch to ON and adjust AUDIO as desired. **NOTE** This test is performed in two modes; DISCRM ON and DISCRM OFF.	Figure 2-19

Item No.	Item to be Inspected	Procedure	References
94	Radar warning control panel, and radar warning indicator	Depress SELF TEST switch. Verify that within approximately 3 seconds the indicator displays a forward (0°) or aft (180°) strobe and a 1.2 KHz audio tone is heard. Check that approximately 3 seconds later the opposite strobe appears and the audio tone changes to 2.4 KHz. **NOTE** In the DISCRM OFF mode both strobes will appear simultaneously.	Figure 2-19, and 1-3, Para. 2-11, Item No. 94.

For additional operational checks using a signal simulator (SM-674() UPM) refer to the following steps and charts.

95 Position switches as indicated below and point the radar simulator into the aft antenna group at a relative bearing of 180° aft. Squeeze the trigger switch and check for specified indications.

AN/APR-39 CONTROL	SIGNAL SIMULATOR CONTROLS			AN/APR-39
DSCRM SWITCH	TRK/SCAN SWITCH	PW SWITCH	PRF SWITCH	INDICATIONS
OFF	TRK	WIDE	LO	A strobe at approximately 180° and PRI tone.

NOTE

If no indications are obtained in item No. 95 approach the antennas until close enough to obtain indication. The radar simulator may have to be within 3 feet (approximately).

96 Position switches as indicated below and point the radar simulator into the forward antenna group at a relative bearing of 0°. Squeeze the trigger switch and check for specified indications.

Item No.	Item to be Inspected	Procedure	References

	AN/APR-39 Control	Radar Signal Simulator Controls			AN/APR-39
	DSCRM Switch	TRK/SCAN Switch	PW Switch	PRF Switch	INDICATIONS
a	ON	TRK	WIDE	LO	No display.
b	ON	TRK	NAR	LO	No display.
c	ON	TRK	NAR	HI	A strobe at approximately 0° and a PRI tone with frequency higher than in item No. 95.
d	ON	(SCAN)	NAR	HI	A flashing strobe at approximately 0°, MA lamp flashes, warning tone.
e	ON	SCAN	NAR	HI	A flashing strobe and PRI tone.
f	ON	(TRK)	NAR	HI	After few seconds a flashing strobe, MA lamp flashes and audio warning tone.
g	OFF	GDNC	NAR	HI	MA lamp flashes and warning tone is heard.

NOTE

If no indications are obtained in item No. 96, approach the antennas until close enough to obtain indication. The radar simulator may have to be within 3 feet (approximately).

POWER-OFF, TRANSPONDER SET AN/APX-72

97	Control unit	Knobs should be properly secured to shafts and should not bind. Tighten loose knobs, and be sure that knobs do not rub against panels. Replace defective or broken knobs.	

2-8. General Cleaning and Repainting Instructions.

Inspect all items of each configuration for dirt and corrosion. The surfaces should be free of dirt, grease, lint, and fungus.

a. Remove moisture, dust, and loose dirt with a clean, soft cloth.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. Do NOT use near an open flame. Trichloroethane is not flammable, but exposure of fumes to an open flame converts fumes to highly toxic, dangerous gases.

b. Remove grease, fungus, and ground-in dirt with a cloth dampened (not wet) with trichloroethane.

c. Remove dust and lint from the exposed connectors with a soft, bristle brush; remove moisture with a dry cloth.

d. Remove rust and corrosion from metal surfaces by lightly sanding them with a fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. For painting instructions and materials, refer to SB 11-573, and to the applicable cleaning and refinishing particles specified in TB 746-10. Use lacquer for all items originally painted with lacquer. Use enamel base paint for all items originally painted with enamel base paint. Use urethane, aliphatic isocyanate for all items originally painted with urethane.

CAUTION

Do not apply lacquer to enamel painted surfaces. Lacquer will loosen the existing enamel. Apply urethane only to urethane.

e. Clean battery as follows:

CAUTION

Do not use wire brush. Check to see that vent plugs are closed before cleaning and that battery is completely dry before returning to use.

(1) Clean battery with a dry, stiff fiber brush, or wash with water.

(2) Check to see that battery compartment is clean and free from alkaline deposits. If corrosion is present, remove with dilute boric acid solution. Retouch painted surfaces, if necessary, with epoxy primer (MIL-P-23377) and topcoat with P-95 acrylic lacquer (MIL-L-81352) to match surrounding area.

2-9. Battery Inspection and Servicing.

Inspect battery for the following conditions:

a. Loose connections at disconnect or between cells.

b. Electrolyte for proper level.

c. Clogged vent plug or vent tubes.

d. Damage to individual cell cases (distortion due to overcharge, cracks, or leaks).

e. No other maintenance, servicing, or inspection of the battery is authorized at organization maintenance.

NOTE

Nickel-cadmium batteries shall not be serviced while installed in the helicopter. The battery shall be removed and serviced every 50 hours by authorized battery shop personnel only.

Section III. TROUBLESHOOTING

2-10. General Troubleshooting Information

Troubleshooting of the helicopter electronic equipment configuration supplements the checks in the preventive maintenance checks and services chart (paragraph 2-7). Item numbers in the troubleshooting chart are not in numerical sequence as they are keyed to the same item numbers in the preventive maintenance checks and services chart. To troubleshoot the equipment, perform all functions starting with item No. 14 in the preventive maintenance checks and services chart, and proceed through the items until an abnormal condition or result is observed. When an abnormal condition or result is observed, note the sequence number and turn to the corresponding sequence number in the troubleshooting chart (paragraph 2-11). If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required. Paragraphs 2-15 through 2-70 contains step-by-step instructions for performing equipment removal and replacement.

2-11. Troubleshooting Chart.

Item No.	Symptom	Probable Trouble	Correction
	NOTE In the following steps refer to figure FO-1 to continuity check wiring.		
14	No headset noise at one station (pilot or gunner.)	a. Circuit breaker open or defective. b. Defective headset. c. Defective ICS control panel.	a. Check and replace circuit breaker. b. Replace headset/microphone. c. Replace ICS control panel (para. 2-15).
15	No sidetone or interphone signals heard when pilot cyclic stick ICS switch is operated.	a. Defective pilot headset/ microphone or ICS control panel.	a. Actuate pilot foot and/or position pilot HOT MIKE switch up. If no sidetone or interphone signals heard replace pilot headset/microphone. If audio signals are not heard after replacing pilot headset/microphone replace pilot ICS control panel (para. 2-15). If audio signals are heard proceed to next step.
		b. Defective ICS switch.	b. If sidetone or interphone signals are heard when footswitch or HOT MIKE switch is operated, replace pilot cyclic stick ICS switch (para 2-18).

Item No.	Symptom	Probable Trouble	Correction
33	With function selector switch in T/R GUARD position, guard channel signal is not audible. **NOTE** Guard channel reception is not affected by the settings of the megahertz or kilohertz control. If guard channel signals are heard while receiving signals on a main receiver communication channel, detune the main receiver by rotating the megahertz control to an open channel. This will permit only the priority guard channel signal to be monitored.	Defective radio set.	Replace radio set (para. 2-25).
38	Circuit breaker will not stay closed (in).	a. Defective circuit breaker. b. Defective radio set.	a. Check and replace circuit breaker. b. Replace radio set (para. 2-28).
40	a. No tone heard in headset when RCVR TEST or TONE pushbutton is depressed.	a. Defective fuse. b. Defective radio set.	a. Replace fuse (fig. 2-1). b. Replace radio set (para. 2-28).
	b. No sidetone heard during transmission.	a. Defective fuse. b. Defective radio set. c. Defective coax cable. d. Defective antenna.	a. Replace fuse (fig. 2-1). b. Replace radio set (para. 2-28). c. Check and repair coax cable. d. Replace antenna (para. 2-29).
41	With function selector switch in T/R GUARD position, guard channel signal is not audible.	a. Loose or dirty connector on radio set. b. Defective radio set.	a. Check tightness and cleanliness of connector. Tighten or clean as necessary. b. Replace radio set (para. 2-28).

Item No.	Symptom	Probable Trouble	Correction
48	Circuit breaker will not stay closed (in)	Defective circuit breaker.	Check and replace circuit breaker.
50	a. Annunciator and course indicator dial do not move.	Defective circuit in directional gyro.	Replace directional gyro (para. 2-33).
	b. Annunciator will not move (course indicator dial moves).	Defective annunicator in compass control panel.	Replace control panel (para. 2-31).
	c. Scale dial does not move, but annunciator does move.	a. Defective course indicator and/or compass control panel.	a. Replace course indicator and/or compass control panel (para 2-58 or 2-31).
		b. Defective circuit in directional gyro	b. Replace directional gyro (para 2-33).
	d. Annunciator and scale dial move, but final heading shown on scale dial is incorrect.	a. Compass is synchronized to reciprocal null.	a. Turn synchronizing knob clockwise until scale dial heading changes by 180° and until annunciator is centered (nulls.)
		b. Defective circuit in directional gyro.	b. Replace directional gyro (para 2-33).
		c. Defective course indicator.	c. Replace course indicator (para 2-58).
		d. Defective flux valve or compensator.	d. Refer to trouble to next high category of maintenance.
		e. Compass requires alignment.	e. Calibration of system on compass rose by higher maintenance personnel required.
58	Circuit breaker will not stay closed.	a. Defective circuit breaker.	a. Check and replace circuit breaker.
		b. Defective ADF receiver.	b. Replace ADF receiver (para 2-35).
		c. Defective course indicator.	c. Replace course indicator (para 2-58).
60	Tune meter fails to operate properly.	a. Defective ADF receiver.	a. Replace ADF receiver (para 2-35).
		b. Defective loop antenna.	b. Replace loop antenna (para. 2-36).
		c. Defective ADF control unit.	c. Replace ADF control unit (para. 2-34).

Item No.	Symptom	Probable Trouble	Correction
		b. Defective radar warning control panel.	b. Replace control panel (para 2-47).
94	System fails to SELF TEST properly.	a. Defective radar warning control panel.	a. Replace control panel (para. 2-47).
		b. Defective azimuth indicator.	b. Replace indicator (para 2-48).
		c. Defective comparator.	c. Replace comparator (para. 2-49).
		d. Defective dual receiver.	d. Replace dual receiver (para. 2-50).
100	No output in any mode of operation.	Circuit breaker open or defective.	Check and replace circuit breaker.
101	No output in any mode of operation.	a. MASTER switch on APX control panel set to OFF or STBY.	a. Check MASTER control position. Place in LOW or NORM.
		b. Defective cable or loose connections.	b. Check cable and connections. Replace or tighten as applicable.
		c. Defective fuse in receiver-transmitter.	c. Check and replace fuse.
		d. Defective receiver-transmitter.	d. Replace receiver-transmitter (para. 2-54).
102	a. Indication low or intermittent in any or all modes of operation.	a. Power supply in receiver-transmitter abnormal.	a. Replace receiver-transmitter (para. 2-54).
		b. Receiver-transmitter coder operations abnormal.	b. Replace receiver-transmitter (para. 2-54).
	b. No output from one mode. All other normal.	a. Applicable mode enable switch on APX control panel in OUT or TEST position.	a. Verify applicable mode enable switch is in ON position.
		b. Improper code setting in applicable mode switch.	b. Check for proper code setting.
		c. Defective receiver-transmitter.	c. Replace receiver-transmitter (para. 2-54).
107	Circuit breaker will not stay closed (in).	a. Defective circuit breaker.	a. Check and replace circuit breaker.
		b. Defective turn rate gyro (Pilot only).	b. Replace turn rate gyro (para. 2-66).
		c. Defective gyroscope	c. Replace gyroscope (para. 2-65).

Item No.	Symptom	Probable Trouble	Correction
		d. Defective attitude indicator.	d. Replace attitude indicator (para. 2-58).
108	a. Power failure flags remains in view after power is on.	a. Defective circuit breaker. b. Defective attitude indicator.	a. Replace circuit breaker. b. Replace attitude indicator (para. 2-58).
	b. Pitch or roll displays false position of helicopter.	a. Defective gyroscope. b. Defective attitude indicator.	a. Replace gyroscope (para. 2-65). b. Replace attitude indicator (para 2-58).
	c. Cannot get roll trim in one or either direction.	a. Defective attitude indicator b. Defective gyroscope.	a. Replace attitude indicator (para. 2-58). b. Replace gyroscope (para. 2-65).
	d. Cannot get pitch trim in one or either direction.	a. Defective attitude indicator. b. Defective gyroscope.	a. Replace attitude indicator (para. 2-58). Replace gyroscope (para. 2-65).
111	Circuit breaker will not stay in.	a. Defective circuit breaker b. Defective SCAS control panel.	a. Check and replace circuit breaker. b. Replace SCAS control panel (para. 2-62).
	NOTE In the following steps refer to figure FO-2 to continuity check wiring.		
112	a. NO GO indicator lights do not illuminate.	a. Faulty bulbs.	a. Check bulbs by press-to-test and replace as required.
		b. SCAS PWR 28 Vdc circuit breaker inoperative.	b. Replace circuit breaker. circuit breaker.
		c. SCAS PWR 115 Vac circuit breaker inoperative.	c. Replace circuit breaker.
		d. POWER switch inoperative.	d. Replace control panel (para. 2-62).
		e. 28 Vdc fuse on SCAS amplifier open.	e. Replace 28 Vdc fuse.

b. Replacement.

(1) Position receiver in mount.

(2) Tighten and safety wire hold-down nuts.

(3) Connect electrical and rf cable connectors to front of receiver unit.

2-23. Removal and Replacement of FM Antenna (Communications).

(Figure 1-1).

a. Removal.

CAUTION

Extreme care must be exercised while removing hinge pin from antenna. In the event the antenna is dropped, severe damage could result.

(1) Open tail driveshaft inspection cover.

(2) Disconnect rf cable connector from antenna.

(3) Remove and retain screws securing bonding straps to the antenna.

(4) Grasp antenna firmly and remove hinge pin.

b. Replacement.

NOTE

Remove protective finish locally (4 places) to ensure good electrical bond when installing bonding straps.

(1) Mate antenna hinge portion with helicopter hinge portion and install hinge pin.

(2) Attach bonding straps with retained screws.

(3) Connect rf cable connector.

(4) Close tail driveshaft inspection cover.

2-24. Removal and Replacement of FM Antenna (Homing).

(Figure 1-1).

a. Removal.

(1) Remove and retain screws securing antenna to skin of helicopter.

(2) Disconnect rf cable connector from antenna.

b. Replacement.

(1) Connect rf cable connector to antenna.

(2) Secure antenna to helicopter using retained screws. Apply MIL-S-8802 sealant.

NOTE

Remove protective finish from antenna mounting surface for electrical bond before mounting. Do not apply sealant between antenna and airframe mounting surface. Add bead of sealant around edges of antenna base after installation.

2-24.1. Removal and Replacement of VHF FM Filter (Homing).

(Figure 2-6A).

Removal.

(1) Disconnect rf cable connectors from filter.

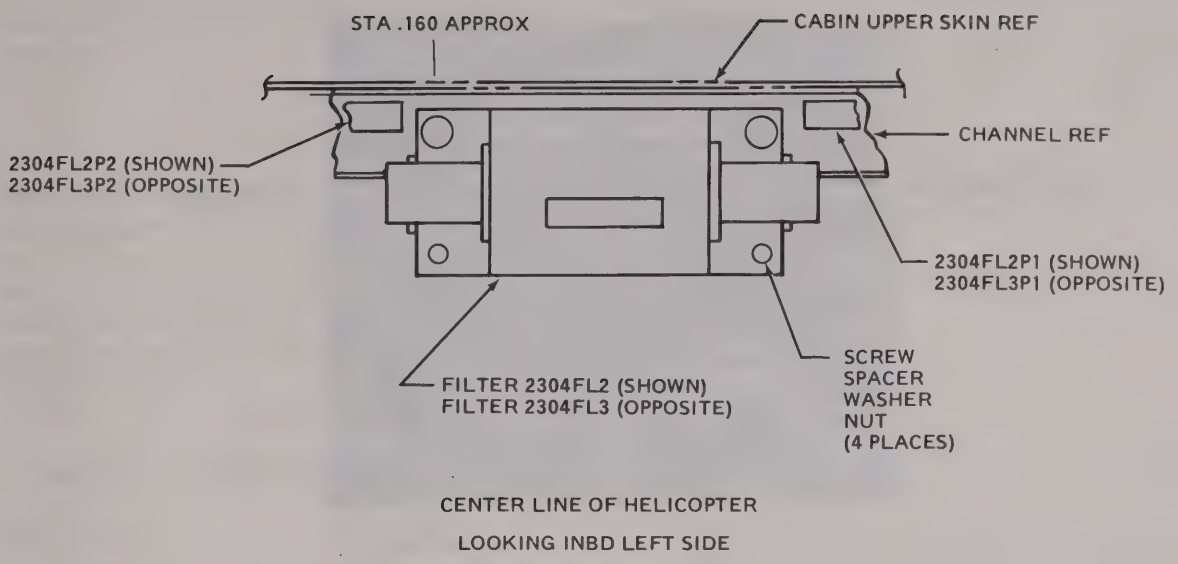


Figure 2-6A. FM homing antenna filters

(2) Remove and retain screws, washers, spacers, and nuts securing filter to channel.

b. Replacement.

(1) Position and secure filter to channel using retained screws, washers, spacers, and nuts.

(2) Connect rf cable connectors to filter.

2-25. Removal and Replacement of Radio Set, VHF AM.

(Figure 2-8).

Procedures for removal and replacement of the VHF-AM radio set are the same as for the VHF-FM radio set (paragraph 2-20).

2-26. Removal and Replacement of VHF Antenna.

(Figure 1-1).

a. Removal.

(1) Remove and retain screws and washers securing antenna to underside of helicopter.

(2) Disconnect rf cable connector from antenna.

b. Replacement.

(1) Connect rf cable connector to antenna.

(2) Secure antenna to helicopter using retained screws and washers. Apply MIL-S-8802 sealant.

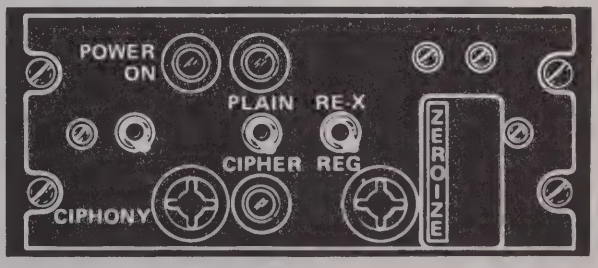


Figure 2-7. KY-28 control

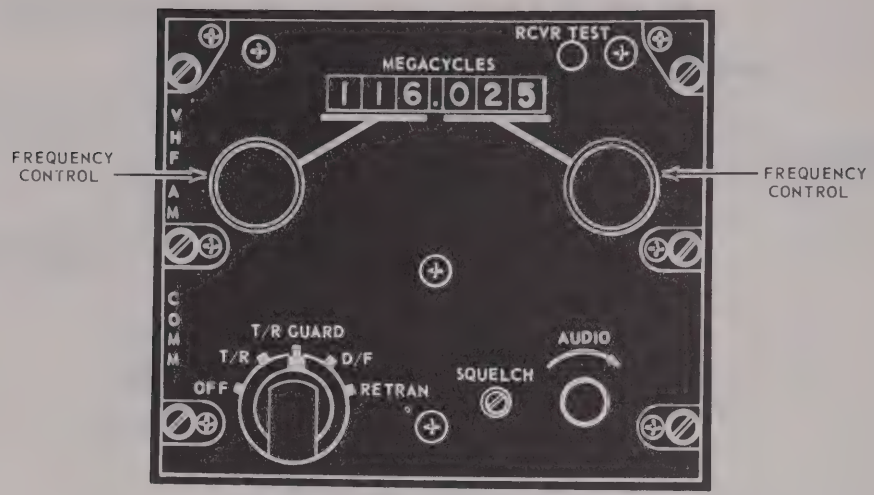


Figure 2-8. VHF AM radio set

NOTE

Remove protective finish from antenna mounting surface for electrical bond before mounting. Do not apply sealant between antenna and airframe mounting surface. Add bead of sealant around edges of antenna base after installation.

2-27. Removal and Replacement of VHF or FM Comm Filter.

(Figure 2-9).

a. Removal.

(1) Disconnect rf cable connectors from filter.

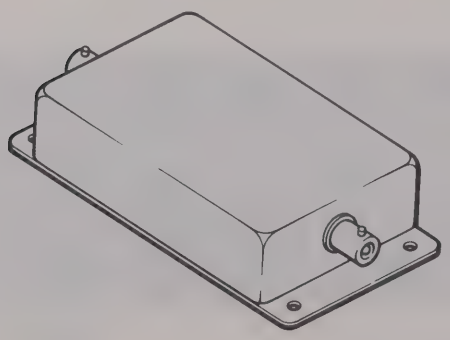


Figure 2-9. Filter

(2) Remove and retain screws, washers, and nuts securing filters to helicopter.

b. Replacement.

(1) Secure filters to helicopter with retained screws, washers, and nuts.

(2) Connect rf cable connectors.

2-28. Removal and Replacement of Radio Set, UHF AM.

(Figure 2-10).

Procedures for removal and replacement of the UHF AM radio set are the same as for the VHF FM radio set (paragraphs 2-20).

2-29. Removal and Replacement of UHF Antenna.

(Figure 1-1).

a. Removal.

(1) Remove and retain screws, washers, and nuts securing antenna to underside of helicopter.

(2) Disconnect rf cable connector from antenna.

b. Replacement.

(1) Connect rf cable connect to antenna.

(2) Secure antenna to helicopter using retained nuts, screws, and washers. Apply MIL-S-8802 sealant.

NOTE

Remove protective finish from antenna mounting surface for electrical bond before mounting. Do not apply sealant between antenna and airframe mounting surface. Add bead of sealant around edges of antenna base after installation.

2-30. Removal and Replacement of UHF Filter.

(Figure 2-9).

a. Removal.

(1) Disconnect rf cable connectors from filter.

(2) Remove and retain screws, washers, and nuts securing filter to helicopter.

b. Replacement.

(1) Secure filter to helicopter with retained nuts, screws, and washers.

(2) Connect rf cable connectors.

2-31. Removal and Replacement of Control Panel, Compass.

(Figure 2-11).

a. Removal.

(1) Loosen spring-lock fasteners securing control panel to bracket assembly.

(2) Disconnect electrical connector from rear of control panel.

b. Replacement.

(1) Connect electrical connector to rear of control panel.

(2) Position and secure control panel to bracket assembly with spring-lock fasteners.

2-32. Removal and Replacement of Transmitter, Induction Compass and Compensator, Magnetic Flux.

(Figure 2-12).

Remove and replace the induction compass transmitter and the magnetic flux compensator as one unit.

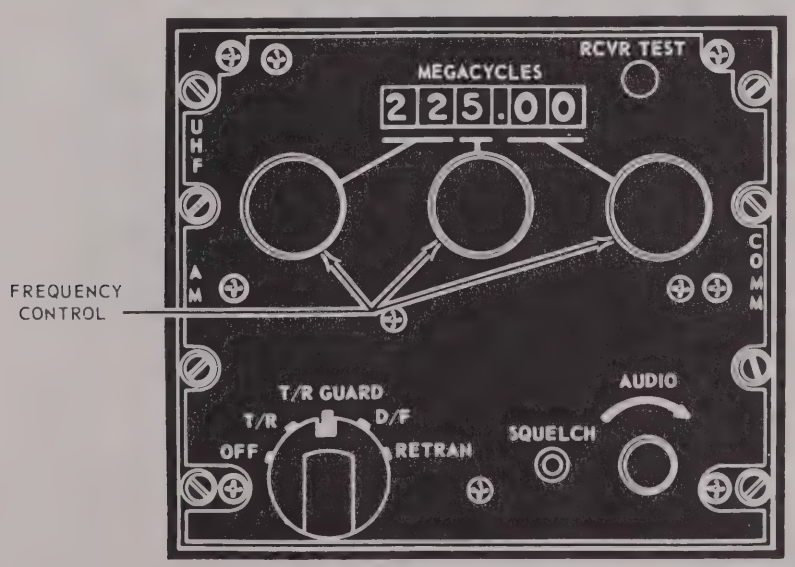
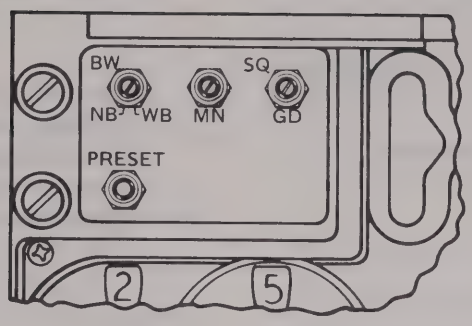
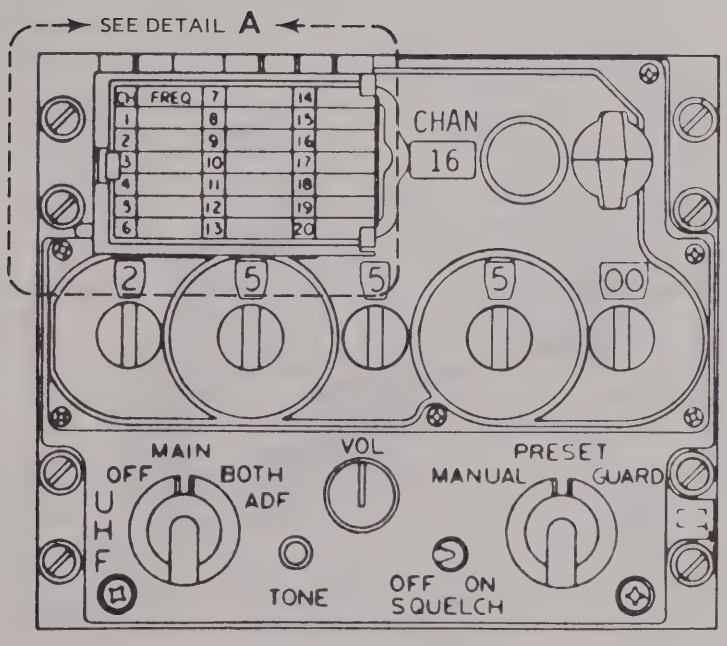


Figure 2-10. UHF AM radio set (Sheet 1 of 2)



DETAIL A



(RT-1167/ARC-164(V))

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Figure 2-10. UHF AM radio set (Sheet 2 of 2)



Figure 2-11. Compass control panel

a. Removal.

(1) Remove and retain mounting screws and washers securing transmitter to mounting bracket.

(2) Remove and retain screws securing magnetic flux compensator to the top of transmitter and expose electrical wires.

(3) Disconnect and tag electrical wires.

b. Replacement.

NOTE

After replacement of induction compass transmitter and magnetic flux compensator alignment procedures must be performed. Refer to next higher maintenance level.

(1) Connect tagged electrical wires to transmitter.

(2) Position and secure compensator to transmitter using retained screws.

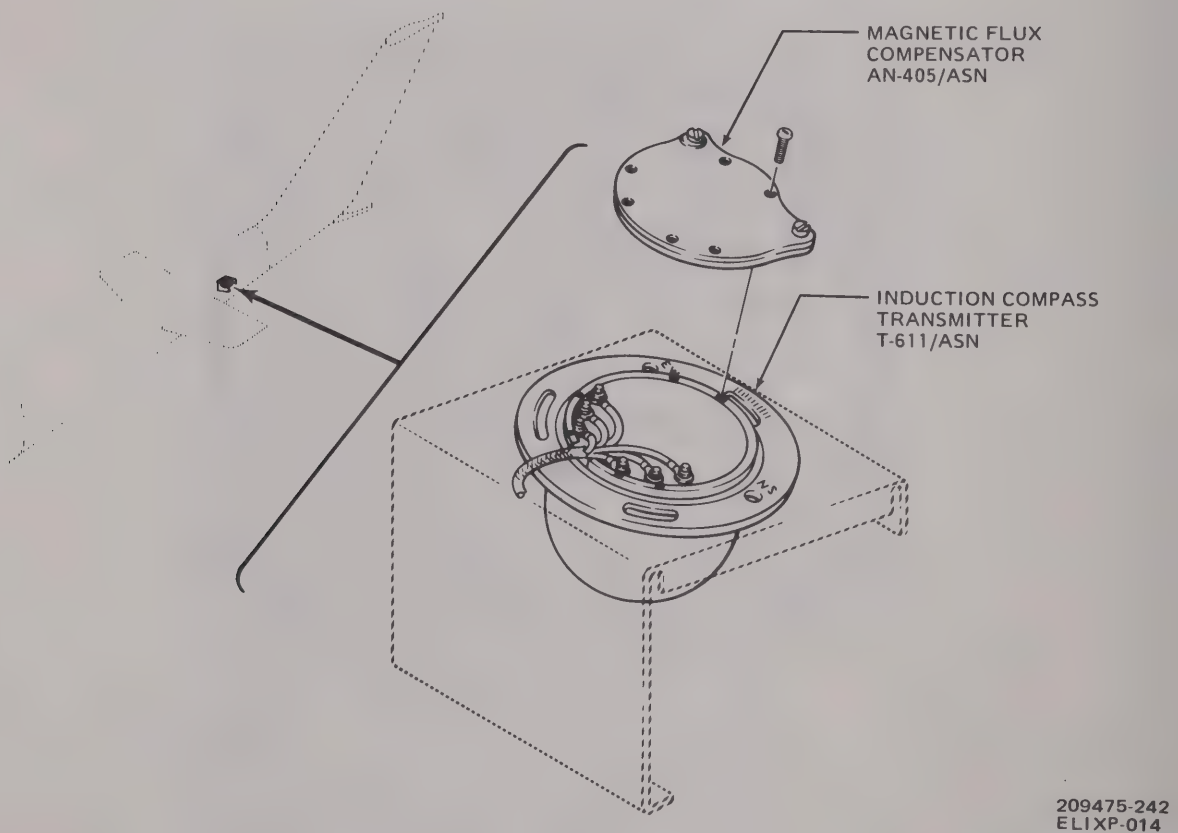


Figure 2-12. Compass system transmitter and compensator

(3) Position transmitter in mounting bracket with mounting flange graduations facing forward.

(4) Secure transmitter to mountg bracket using retained screws and washers.

2-33. Removal and Replacement of Gyro, Directional.

(Figure 2-13).

a. Removal.

(1) Disconnect electrical connector from directional gyro.

(2) Remove and retain mounting screws and washers securing directional gyro to floor.

b. Replacement.

(1) Position and secure directional gyro to floor using retained screws and washers.

(2) Connect electrical connector to directional gyro.

2-34. Removal and Replacement of ADF Control Unit.

(Figure 2-14).

a. Removal.

(1) Disconnect the electrical connectors on the back of the control unit.

(2) Loosen the quarter-turn spring-lock fasteners that secure the control unit.

(3) Lift control unit from console.

b. Replacement.

(1) Place control unit into console.

(2) Secure the control unit to the mounting with the quarter-turn spring-lock fasteners.

(3) Connect the electrical connectors to the back of the control unit.

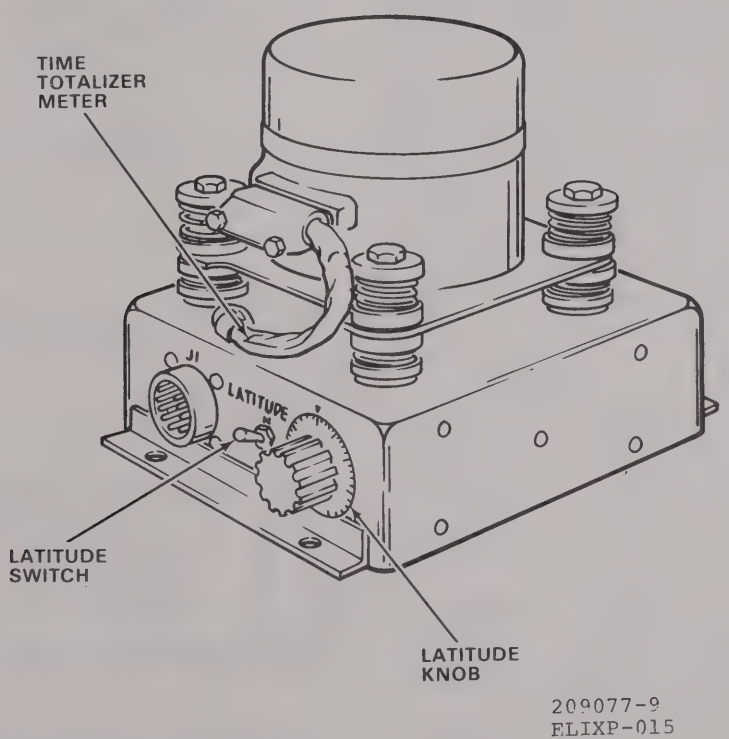


Figure 2-13. Directional gyro

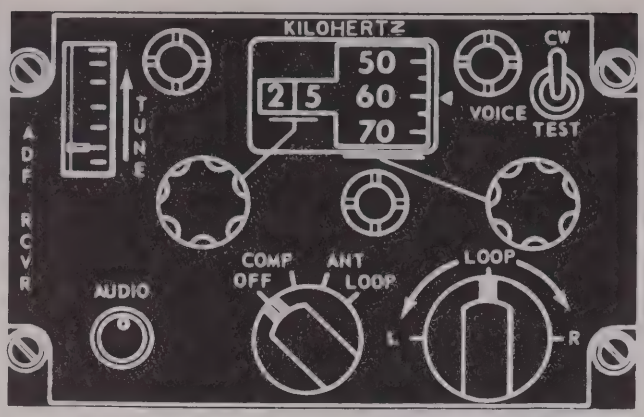


Figure 2-14. ADF control panel

2-35. Removal and Replacement of ADF Receiver.

(Figure 2-15).

a. Removal.

(1) Disconnect interconnecting cables from the front of the receiver.

(2) Remove and retain the mounting screws and washers from mounting brackets.

(3) Remove the receiver from the mounting surface.

b. Replacement.

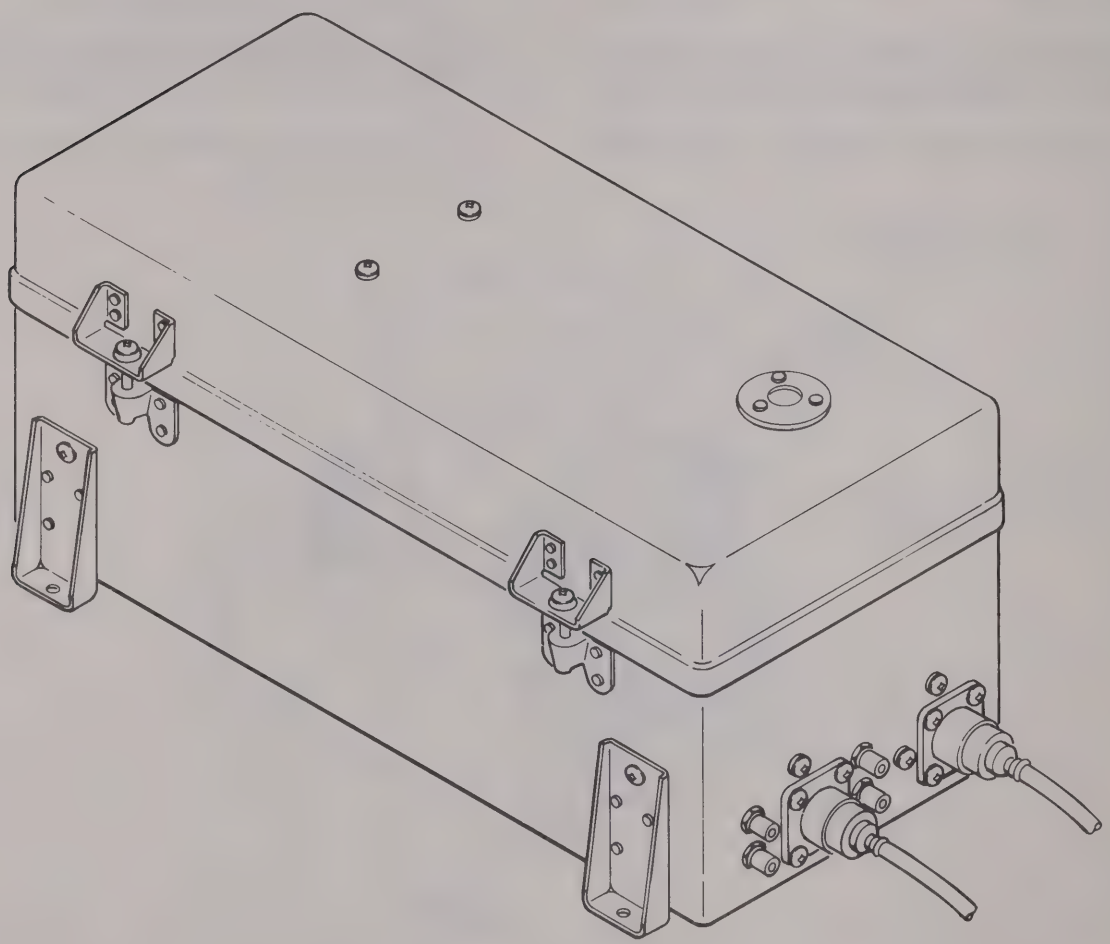


Figure 2-15. ADF receiver

NOTE

Remove protective finish from antenna mounting surface for electrical bond before mounting. Do not apply sealant between antenna and airframe mounting surface. Add bead of sealant around edges of antenna base after installation.

2-69. Removal and Replacement of Proximity Warning Remote Indicator.

(Figure 1-3).

a. Removal.

(1) Remove and retain mounting screws securing indicator in instrument panel assembly.

(2) Carefully pull indicator out of panel and disconnect.

b. Replacement.

(1) Connect electrical connector to indicator.

(2) Position and secure indicator in instrument panel assembly with retained mounting screws.

2-70. Removal and Replacement of Integral Lighted Panels.

a. Removal.

(1) Remove and retain knobs and switches that interfere with removing integral lighted panel.

(2) Remove and retain mounting screws.

(3) Carefully pull integral lighted panel apart from unit.

b. Replacement.

(1) Carefully mate integral lighted panel to unit.

(2) Secure integral lighted panel to unit with mounting screws.

(3) Replace knobs and switches that were removed.

2-71. Safety Wiring.

Attaching hardware and electrical connectors for components of the electronic configuration is secured with safety wire to prevent loosening during service. Electrical or rf cable connectors, which have a mechanical lock, are not safety wired since safety wiring will act against the locking feature. Refer to TM 55-1520-236-23 for safety wiring instructions.

2-72. Wiring Repairs

a. General. When removal and replacement of major components have not corrected a trouble within a facility of the electronic configuration, troubles in the electronic equipment configuration wiring may be the cause. Refer to the facilities or systems wiring diagrams for interunit wiring details. For general instructions in repairing the helicopter electronic configuration, refer to TM 55-1520-236-23.

b. Wire Identification Code. The electronic configuration wires are identified by wire numbers, as described below:

Specific identification, for example, 1C6533-42B20N. The symbol 1C6533 designates station 1 of the C6533 intercommunications system. The second symbol 42 is the cable number and differentiates between cables in a particular system or facility. The third symbol B identifies the cable segment, the cable run between terminals or connections. The next symbol 20 indicates the wire size. The last symbol N, commonly called the ground letter, identifies a cable which completes a circuit to ground.

Code Letters	Functions
C6533	Interphone (communication)
ARC114	VHF FM (communication)
ARC115	VHF AM (communication)
ARC116	UHF AM (communication)
ASN43	Gyromagnetic compass (navigation)
ARN89	ADF (navigation)
ARN123	VOR (navigation)
APN209	Radar altimeter (navigation)
APR39	Radar detection (radar warning)
APX72	IFF transponder (identification)
PWD	Proximity warning

c. Connector Replacement. The chart below lists all the electronic configuration wiring connectors that can be replaced at the organizational maintenance level.

Facility	Connector
Interphone	2301CP1P1
	2301CP2P1
	2301J1
	2301J2
	2301J3
	2301J4
	2301J5L
	2301J5R
	2301P1
	2301P2
	2301Z1J1
	2301Z1J2
FM	2304E1P1
	2304E1P2
	2304E2P1L
	2304E2P1R
	2304TR1P1
	2304TR1P2
	2304TR1P3
	2304TR1P4
	2319CP1P1
	2319J1
	2319P1
	2319Z1J1A
	2319Z1J2A
	2319Z1P1
	2319Z1P2
VHF	2303E1P1
	2303F1P1
	2303F1P2
	2303TR1P1
	2303TR1P2
UHF	2302E1P1
	2302FL1P1
	2302FL1P2
	2302TR1P1
	2302TR1P2
Gyromagnetic Compass	3407CP1P1
	3407DS1P1
	3407J1
	3407MP1P1
	3407P1
Adf	3406AR1P2
	3406CP1P1
	3406CP1P2
	3406E1P1
	3406E1P2
	3406E2P1
	3406R1P1
	3406R1P2
	3406R1P3
	3406R1P4
	3406R1P5
	3406R1P6
VOR/ILS	3400CP1P1
	3400CP1P2
	3400DS1P1
	3400DS2P1
	3405CP1P1
	3405E1P1
	3405E2P1
	3405E3P1
	3405J1
	3405J2
	3405J3
	3405P1
	3405P2
	3405P3
	3405RE1P11001
	3405RE1P11003
	3405RE1P12002
	3405RE1P12004
	3405RE1P12005
Radar Altimeter	3408DS1P3
	3408DS1P4
	3408E1P1
	3408E2P1
Radar Warning	3422CP1P1
	3422DS1P1
	3422E1P1
	3422J1
	3422P1
	3422RE1P3
	3422RE1P4
	3422RE1P5
	3422RE2P3
	3422RE2P4
	3422RE2P5
	3422Z1P1
	3422Z1P2

CHAPTER 3

BLOCK DIAGRAM ANALYSIS

3-1. Configuration System and Facilities.

The electronic equipment configuration in the AH-1S provides the pilot and gunner with the following functional systems: interphone, communications, navigations, radar detection, identification, stability and control augmentation, and proximity warning.

a. Interphone (figure 3-1). The interphone control provides pilot and gunner with interphone communications and selection of a radio set for communications.

b. Communications.

(1) *Vhf Fm communications* (figure 3-2). The vhf fm facility (AN/ARC-114A) provides pilot and gunner with two-way, frequency modulated, communication. The Fm set is also used for homing operation.

(2) *Vhf Am communications* (figure 3-3). The vhf am facility (AN/ARC-115) provides pilot and gunner with two-way, amplitude modulated, air-to-air and air-to-ground communication.

(3) *Uhf Am communications* (figure 3-4). The uhf am facility (AN/ARC-116 or AN/ARC-164) provides pilot and gunner with two-way, amplitude modulated, short range communication.

c. Navigation.

(1) *Gyromagnetic compass* (figure 3-5). The gyromagnetic compass facility (AN/ASN-43) provides pilot and gunner with accurate heading information.

(2) *Automatic direction finder* (figure 3-6). The automatic direction finder facility (AN/ARN-89B) is used to provide the pilot and gunner with adf bearings to stations between 1.0 and 3.0 MHz.

(3) *Vhf omnirange* (figure 3-7). The vhf omnirange (VOR) facility (AN/ARN-123) provides the pilot with VOR, localizer, glideslope, and marker beacon information.

(4) *Radar altimeter* (figure 3-8). The radar altimeter facility (AN/APN-209) provides the pilot with accurate altitude readings above ground level.

d. Radar Detection (figure 3-9). The radar detection system (AN/APR-39) provides pilot with enemy radar detection information.

e. Identification (figure 3-10). The IFF transponder (AN/APX-72) provides pilot identification of position reply codes, emergency reply codes, and personal identification (mode 2).

f. Stability and control augmentation (figure 3-11). The SCAS system is used by the pilot and gunner to assist in correcting the stability of the helicopter by providing a dampened airframe from external disturbances.

g. Proximity Warning (figure 3-12). The proximity warning system is to inform the pilot and gunner whenever one or more similarly equipped helicopters are within a protected airspace surrounding his helicopter.

3-2. Interphone — Audio C-6533( )/ARC System Block Diagram.

(Figure 3-1).

a. Interphone Operation. Interphone operation between the pilot, gunner and two maintenance ground crewmembers is possible when any or all ICS control panel transmitter selector switches are set to the ICS position, and the pilot or gunner cyclic-stick ICS/RADIO switch or the crew HOT MIKE switch or microphone switch or the gunner foot switch is depressed. Interphone operation is also possible from the pilot and gunner positions by pushing the cyclic stick ICS switches regardless of selector switch position. A HOT MIKE switch is provided at each ICS control panel to allow handfree interphone operation. The HOT MIKE switch circuit configuration is such that the microphone audio will be applied to the interphone circuit only, regardless of transmitter-selector switch position. Microphone output is routed from

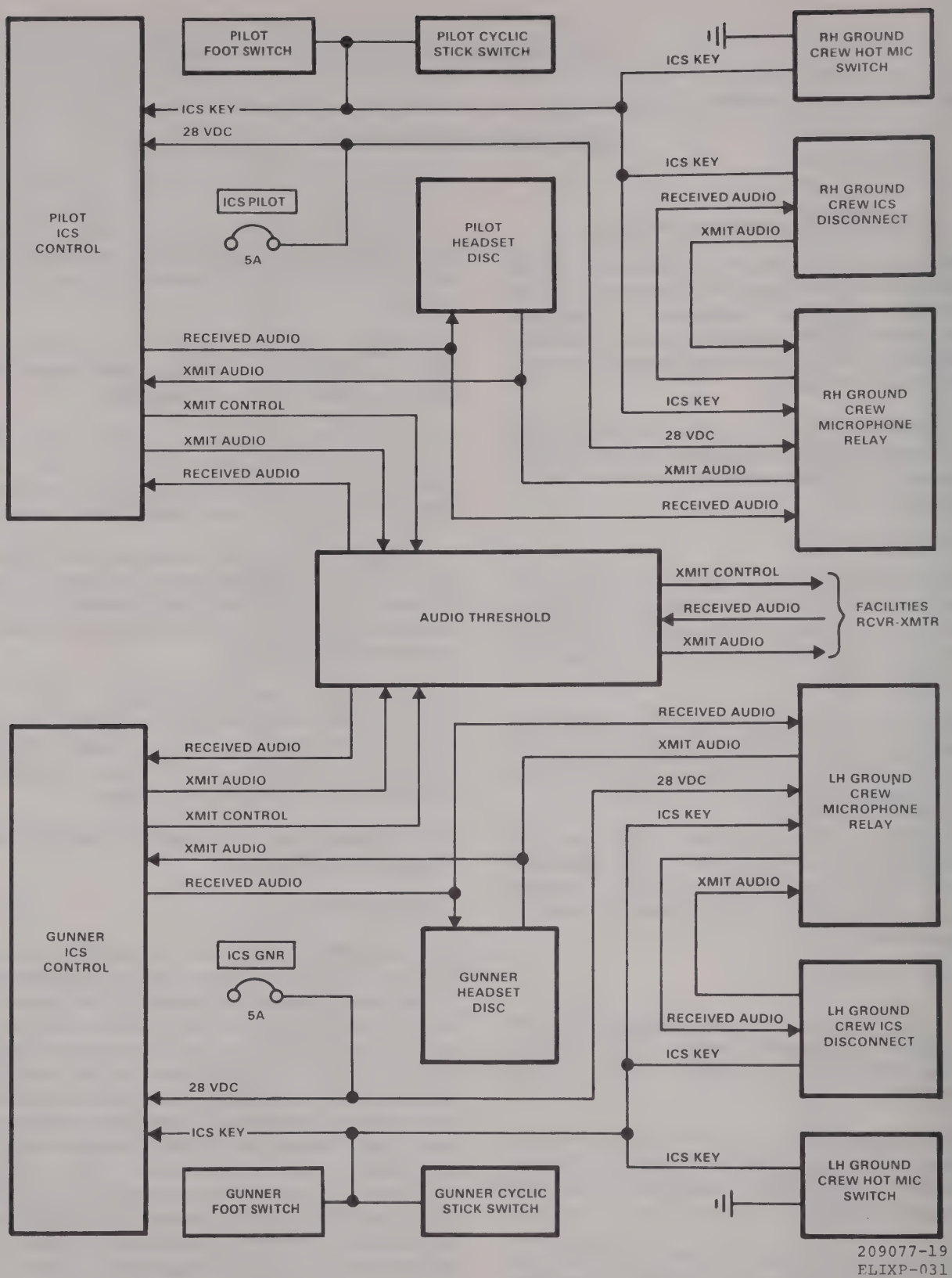


Figure 3-1. Interphone-audio C-6533( )/ARC system block diagram

the headset/microphone to each ICS control panel. The received audio is amplified in the ICS control panels. The VOL control on the ICS control panels is used to adjust the level of the audio which is then routed to the headset. The (transmit) rotary selector switch has six positions which are connected at each interphone station as follows:

Position	Function
ICS	Audio Intercommunications
1	Vhf-fm AN/ARC-114A
2	Uhf-am AN/ARC-116 or AN/ARC-164
3	Vhf-am AN/ARC-115
4	Not Used
5	Not Used

The seven (receiver) mixing switches are connected as follows at each interphone station:

Switch	Function
1	Vhf-fm AN/ARC-114A
2	Uhf-am AN/ARC-116 or AN/ARC-164
3	Vhf-am AN/ARC-115
4	Not Used
5	Not Used
AUX	VOR AN/ARN-123
NAV	Adf AN/ARN-89B

b. Receiver Monitoring. Audio output from the communication receivers is applied to the audio threshold for loading and distribution to the ICS control panels. Toggle switches on the ICS control panels select and apply the receiver audio outputs to the ICS control panel amplifiers. The communications receiver outputs are selected by the numbered toggle switches on the ICS control panels. The adf receiver radio is selected by the NAV toggle switch and the VOR receiver radio is selected by the AUX toggle switch. After amplification, the audio signal is distributed to the headsets.

c. Transmitter Modulation. The radio transmitters may be keyed and modulated from each station. Any communications transmitter may be keyed and modulated when the transmitter-selector switch on any ICS control panel is set to select the desired transmitter, and the microphone switch on that respective ICS control panel is pushed. Microphone output is routed from the microphone to the ICS control panel and then to the selected radio transmitter. The transmitter-keying circuit is routed from the microphone switches to the ICS control panels. The transmitter selector switch in each ICS control panel connects the respective keying circuit to the selected radio transmitter. The crew microphone relays are to allow interphone operation for the maintenance crewmen. When the HOT MIKE switch on pylon wing is positioned to ON, the crewmen has handfree interphone operation.

d. Power Distribution and Control. Power is applied to the interphone audio system from the ICS PILOT and ICS GNR circuit breakers. When the ICS PILOT circuit breaker is pushed, 28 volts dc is applied to the pilot ICS control and to the right crew microphone relay. When the ICS GNR circuit breaker is pushed, 28 volts dc is applied to the gunner ICS control and to the left crew microphone relay.

3-3. VHF FM Facility AN/ARC-114A Block Diagram.

(Figure 3-2).

a. The vhf fm facility, consisting of a 920 channel radio set, communication antenna and a homing antenna, is used for point-to-point frequency modulated (fm) voice communication and station homing. The facility operates in the very-high range frequency of 30.00 to 75.95 megahertz (MHz). The radio set contains a multichannel, electronically tunable main receiver and transmitter, and a fixed tuned guard receiver, and has homing capabilities.

b. Reception. Signals picked up by the communication antenna are applied to the main and guard receivers where the signals are selected, amplified, and converted to audio signals. The audio signal level is adjusted by the volume control on the radio set front panel and the signal is then routed through the security set and to the audio threshold and the signal is then routed to the pilot and gunner ICS control panels for selection. When the appropriate mixing switch is selected, the audio signal level is further adjusted by the ICS control panel (VOL) control. Selected audio signal is then routed to the headset(s).

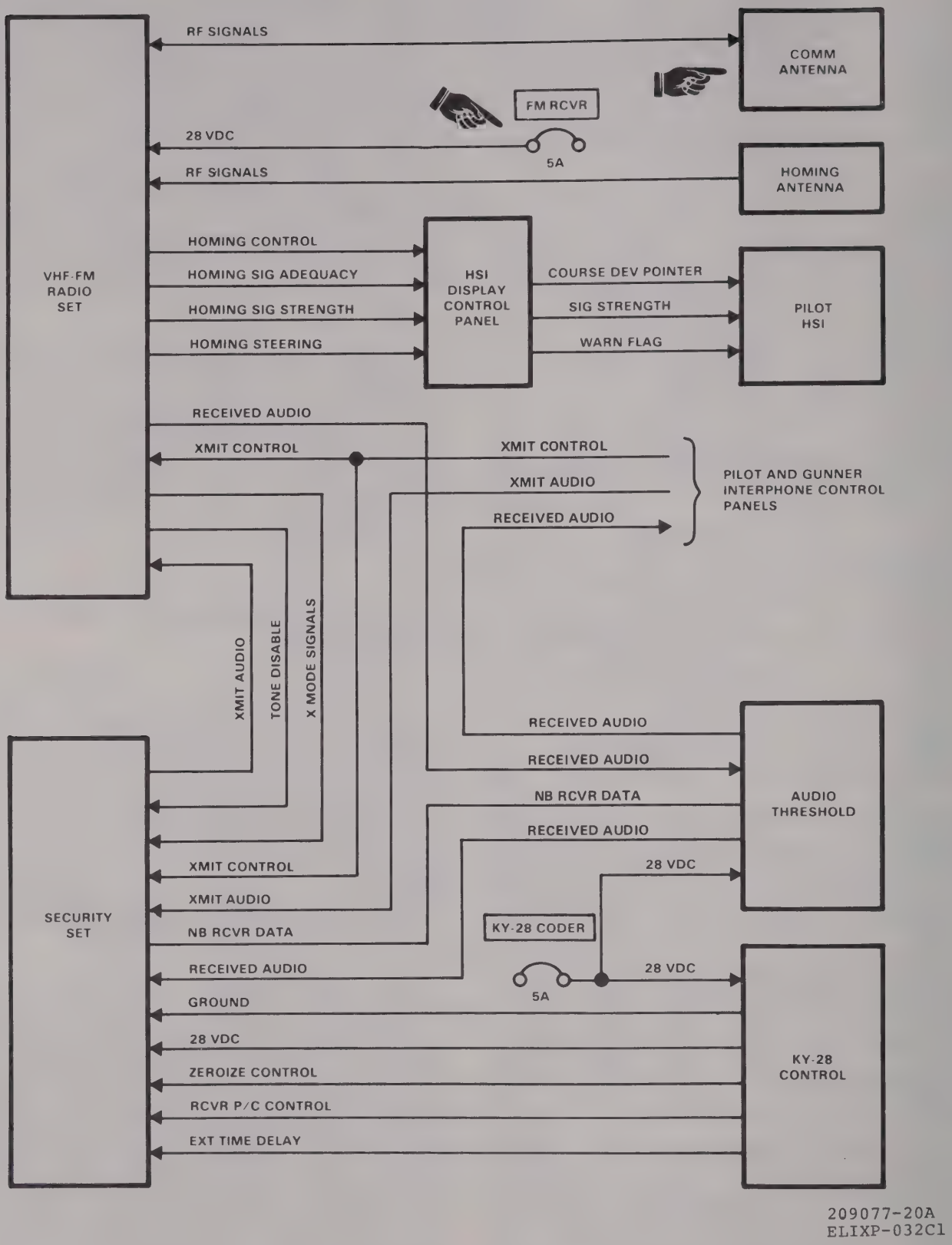


Figure 3-2. VHF FM facility AN/ARC-114A block diagram

c. Homing. Homing audio signals are routed the same as in the reception paragraph above. Homing indications are presented on the pilot HSI. When homing signals received by the homing antenna are of insufficient strength a warning indicator will be activated and station approach pointer will deflect downward. The received signal is compared for course deviation inputs in the radio set, then routed to the HSI as on-course, right or left deviation.

d. Transmission. Signals from the pilot and gunner microphone are applied to the pilot and gunner ICS control panel for selection by the rotary selector switch. When the appropriate selection settings are made, and the associated microphone switch is depressed, the microphone audio is amplified in the ICS control panel and applied to the vhf fm facility security set, through the security set to the radio set. Sidetone audio will be heard in the headset(s). The modulated rf signals from the radio set are applied to the antenna for radiation to the receiving stations.

e. Power Distribution and Control. Power is applied to the vhf fm facility from the FM RCVR and KY-28 CODER circuit breakers. When the FM RCVR circuit breaker is pushed, 28 Vdc is applied to the radio set. When the KY-28 CODER circuit breaker is pushed, 28 Vdc is applied to the audio threshold and to the KY-28 control. Power is also applied to the security set through the KY-28 control.

3-4. VHF AM Facility AN/ARC-115 Block Diagram.

(Figure 3-3).

a. The vhf am facility consists of a 1,360 channel radio set and a communication antenna. The set is used for point-to-point amplitude modulated (am) voice communication, and operates in the very-high frequency (vhf) range of 116.000 to 149.975 megahertz (MHz). The radio set contains a multichannel, electronically tunable main receiver and transmitter and a fixed tuned guard receiver.

b. Reception. Signals picked up by the communication antenna are applied to the main and guard receivers where the signals are selected, amplified, and converted to audio signals. The audio signal level is adjusted by the volume control on the radio set front panel and the signal is then routed to a 150 ohm load resistor, and then to the pilot and gunner ICS control panels for selection. When the appropriate mixing switch is selected, the audio signal level is further adjusted by the ICS control panel volume (VOL) control. Selected audio is then routed to the headset(s).

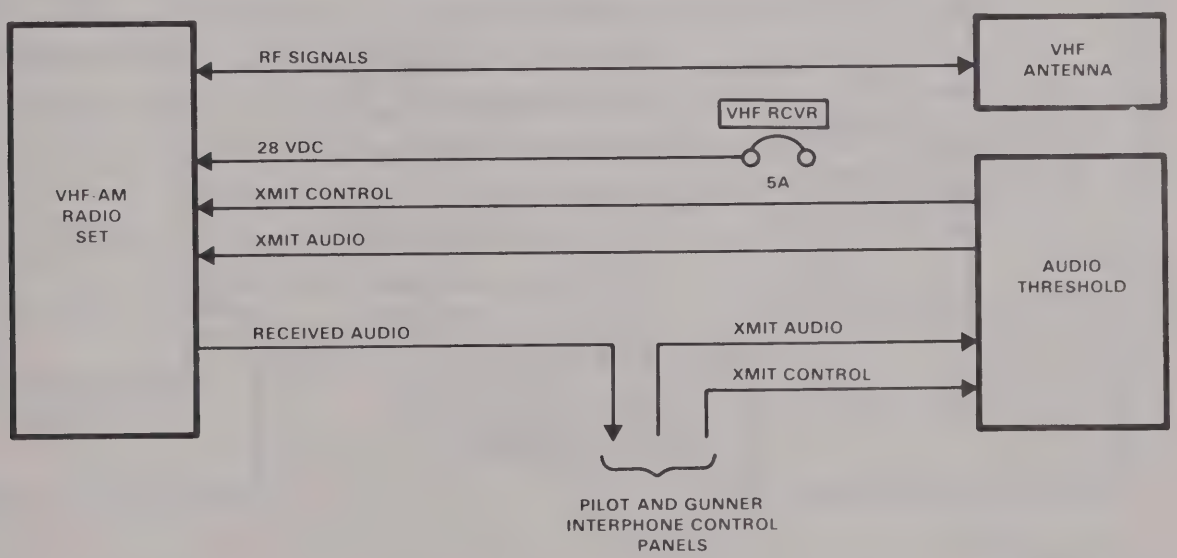


Figure 3-3. VHF AM facility AN/ARC-115 block diagram

c. Transmission. Signals from the pilot and gunner microphone are applied to the pilot and gunner ICS control panel for selection by the rotary selector switch. When the appropriate selection settings are made, and the associated microphone switch is depressed, the microphone audio is amplified in the ICS control panel and applied through the audio threshold to the vhf am facility. Sidetone audio will be heard in the headset(s). The modulated rf signals from the transmitter are applied to the antenna for radiation to the receiving stations.

d. Power Distribution and Control. Power is applied to the vhf am facility from the VHF RCVR circuit breaker. When the VHF RCVR circuit breaker is pushed, 28 Vdc is applied to the radio set.

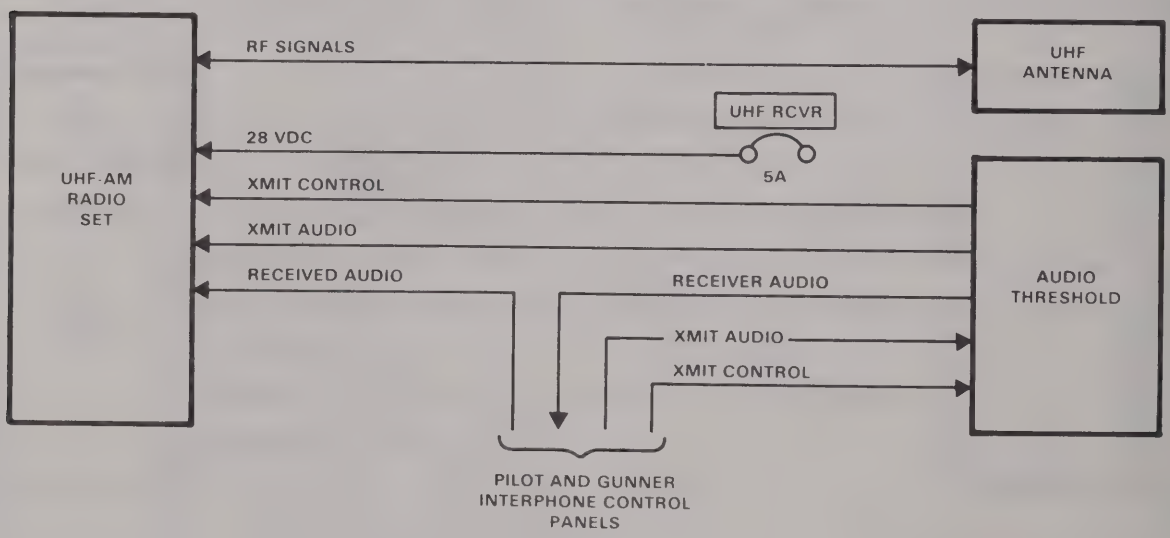
3-5. UHF AM Facility AN/ARC-116 or AN/ARC-164 Block Diagram.

(Figure 3-4).

a. The uhf am facility consists of a 3,500 channel radio set and a communication antenna, is used for point-to-point amplitude modulated (am) voice communication and operates in ultra-high frequency (uhf) range of 225.00 to 399.95 megahertz (MHz). The radio set contains a multichannel, electronically tunable main receiver and transmitter and a fixed tuned guard receiver.

b. Reception. Signals picked up by the communication antenna are applied to the main and guard receivers where the signals are selected, amplified, and converted to audio signals. The audio signal level is adjusted by the volume control on the radio set front panel. The signal is then routed to a 150 ohm load resistor, and then to the pilot and gunner ICS control panels for selection. When the appropriate mixing switch is selected, the audio signal level is further adjusted by the ICS control panel volume (VOL) control. Selected audio signal is then routed to the headset(s).

c. Transmission. Signals from the pilot and gunner microphone are applied to the pilot and gunner ICS control panel for selection by rotary seclector switch. When the appropriate selection settings are made, and the associated microphone switch is depressed, the microphone audio is amplified in the ICS control panel and applied to



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Figure 3-4. UHF AM facility AN/ARC-116 or AN/ARC-164 block diagram

the uhf am facility radio set. Sidetone audio will be heard in the headset(s). The modulated rf signals from the transmitter are applied to the antenna for radiation to the receiving stations.

d. Power Distribution and Control. Power is applied to the uhf am facility from the UHF RCVR circuit breaker. When the UHF RCVR circuit breaker is pushed, 28 Vdc is applied to the radio set.

3-6. Gyromagnetic Compass Facility AN/ASN-43 Block Diagram.

(Figure 3-5).

a. The gyromagnetic compass facility consists of a remote compass transmitter with a single-cycle error compensator, a directional gyro, HSI, course indicator, and a compass controller. The gyromagnetic compass facility is a directional indicating system in which the indication of a magnetic compass is stabilized by a gyro. The gyro provides a stable magnetic reference from which the heading of the helicopter may be determined. The remote compass transmitter slaves the spin axis of the gyro to the magnetic heading of the helicopter. The remote compass transmitter is a direction sensing unit and is provided with a single-cycle error compensator to reduce distortion caused by magnetic parts and electrical equipment in the vicinity of the remote compass transmitter. The COMPASS MAG-DG switch on the compass controller is used to start and stop gyro slaving. The output signals of the directional gyro are

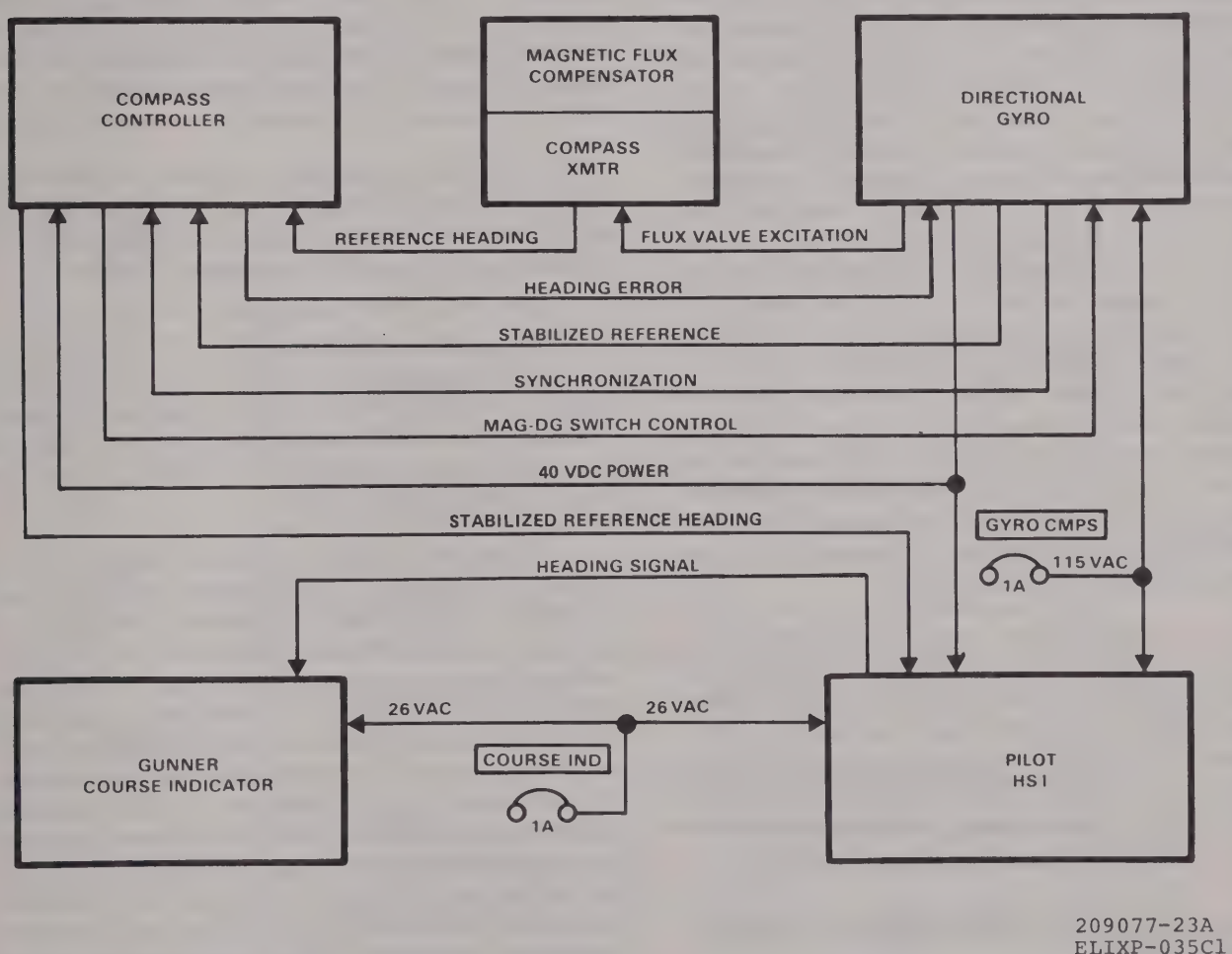


Figure 3-5. Gyromagnetic compass facility AN/ASN-43 block diagram

displayed on the pilot HSI and gunner course indicator. The indication represents the magnetic heading of the helicopter in degrees.

b. The remote compass transmitter contains a flux valve that is suspended in the horizontal plane. The remote compass transmitter develops three synchro stator voltages that represent the sensed direction of the helicopter. The single-cycle error compensator provides a magnetic-quadrant error correction for the flux valve directional signal to compensate for any error introduced by the airframe or any magnetic material or electrical equipment in the vicinity. The compensator flux valve directional signal (reference heading) is applied to the compass controller. A heading error signal is developed and applied directly to the directional gyro. If the directional gyro is misaligned with the sensed direction, a synchro heading error signal is developed that is amplified in the directional gyro. The amplified signal is a gyro slaving drive signal. The drive signal controls a torque motor that drives the gyro into alignment with the remote compass transmitter. This action slaves the gyro to the earth magnetic meridian. The COMPASS MAG-DG switch allows the operator to slave or free the gyro. The gyro can be slaved only when the COMPASS MAG-DG switch is placed to MAG. When the switch is placed to DG, a relay in the directional gyro cuts off the drive signal to the control field of the slaving torque motor in the directional gyro. The gyro is no longer slaved to the remote compass transmitter, and the heading will be determined by the directional gyro only. The output (stabilized reference) of the directional gyro is applied to the pilot HSI and gunner course indicator scale dial as magnetic heading synchro data.

c. Power Distribution and Control. Power is applied to the gyromagnetic compass facility from the GYRO CMPS and COURSE IND circuit breakers. When the GYRO CMPS circuit breaker is depressed, 115 Vac is applied to the directional gyro and pilot HSI. When the COURSE IND circuit breaker is depressed, 26 Vac is applied to the pilot HSI and gunner course indicator.

3-7. ADF Facility AN/ARN-89B Block Diagram.

(Figure 3-6).

a. Modes of Operation. The adf has three operating modes selected by the function switch on the adf control panel. When operating in the COMP mode, the set may be used for homing or automatic direction finding. The ANT mode permits reception of radio range navigation or radio broadcast stations. The LOOP mode is used for aural null homing and manual direction finding. Paragraphs *b* through *g* below, describe signal and power distribution in the adf. Unless otherwise noted, signal and power distribution is the same for all three operating modes.

b. Rf Signals. Rf signals are applied to the adf receiver from the sense antenna and/or the loop antenna.

(1) The sense antenna receives the incoming signal and applies it through an impedance matching amplifier to the adf receiver in the ANT or COMP modes. In the ANT mode, the sense antenna is used for tuning purposes and for reception of radio range navigation and broadcast stations. In the COMP mode, the signal from the sense antenna is compared with the signal from the loop antenna for automatic direction finding.

(2) The loop antenna receives the incoming signal and applies it to the receiver in COMP and LOOP modes. The loop antenna is used for homing and manual or automatic direction finding.

c. Antenna Control Signals.

(1) *Antenna switching.* The mode switch on the adf control panel selects the antenna to be used. In the ANT mode, the sense antenna is used alone. In the COMP mode, both the sense and the loop antennas are used. In the LOOP mode, the loop antenna is used alone.

(2) *Antenna phasing signals.* Signals from the loop are applied to the adf receiver in the adf (COMP) and loop modes. In the adf mode, the loop signals are processed automatically by a null-seeking servo loop. A resolver in the adf receiver electrically simulates rotation of the loop antenna until the incoming rf signal is at a minimum level. At this point, rotation stops and the loop position is processed in the receiver for adf bearing information (*f* below). The signal from the sense antenna is used to cancel out ambiguous nulls in the servo loop. In the loop mode, the antenna signals are processed manually by the L-R control on the adf control panel. The loop antenna control effectively rotates the loop fast or slow in either direction. The sense antenna is not used in the loop mode and two nulls are present for each signal received.

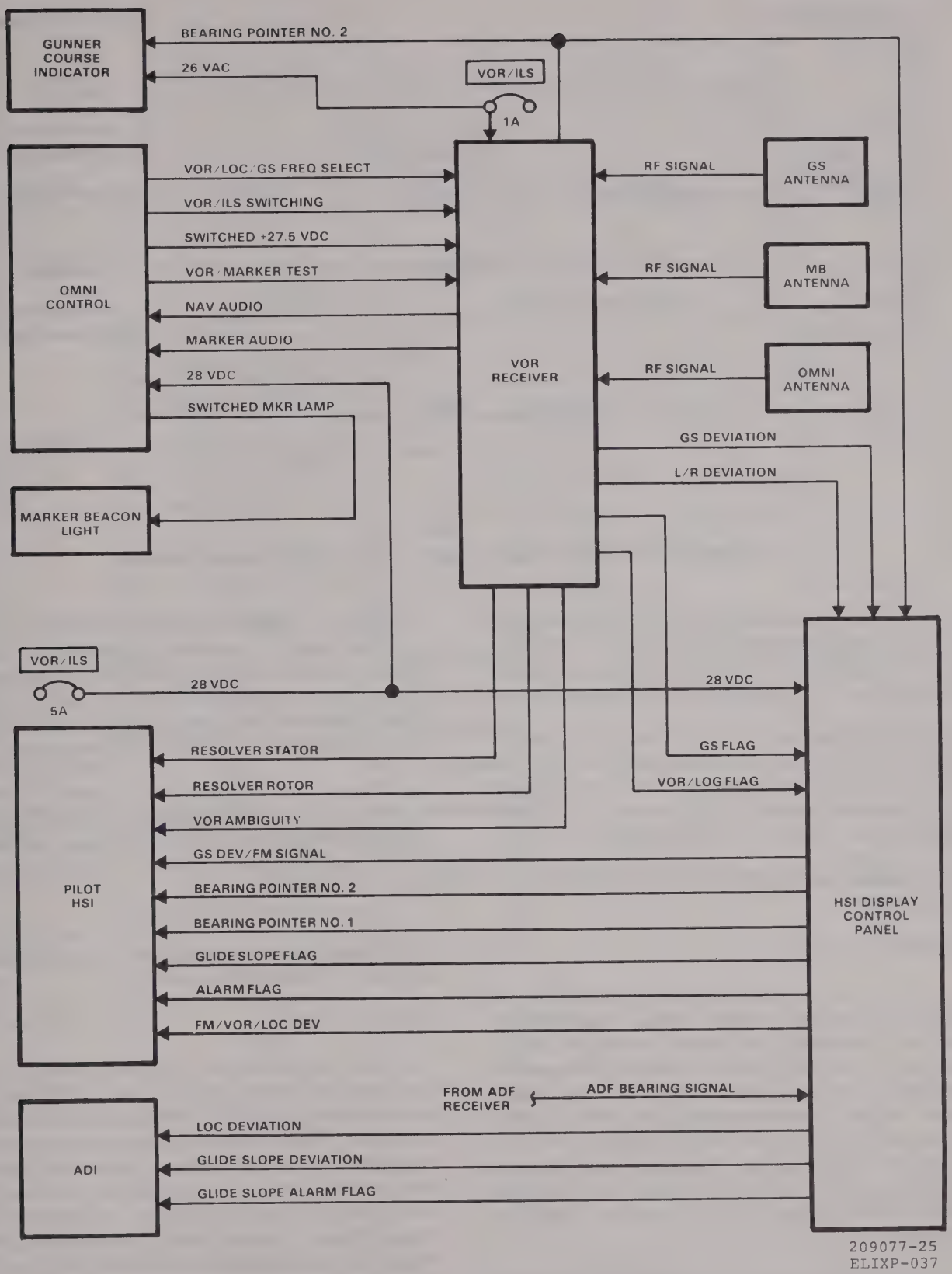


Figure 3-7. VOR/ILS facility AN/ARN-123 block diagram

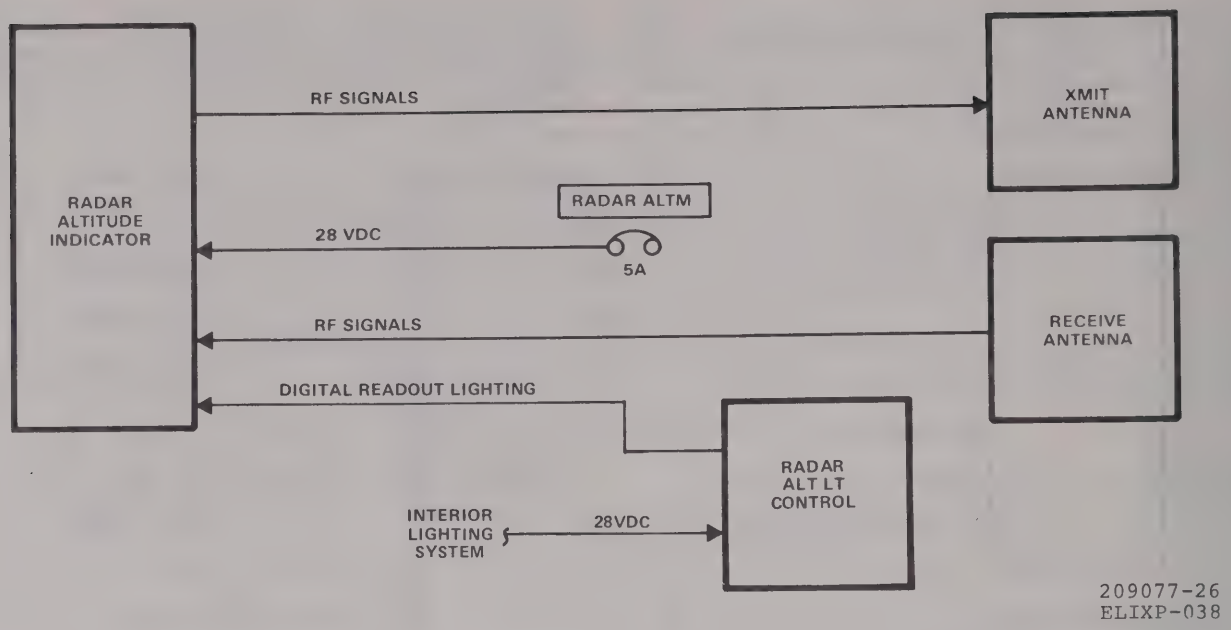


Figure 3-8. Radar altimeter facility AN/APN-209 block diagram

by the receiving antenna. The indicator tracks the leading edge of the reflected rf signal so that the altitude signal provided to the indicator is always the altitude of the helicopter to the nearest terrain.

c. Power Distribution and Control. Power is applied to the radar altimeter facility from the RADAR ALTM circuit breaker. When the RADAR ALTM circuit breaker is depressed, 28 Vdc is applied to the radar altitude indicator.

3-10. Radar Warning System AN/APR-39 Block Diagram.

(Figure 3-9).

a. The radar warning system consist of an azimuth indicator, control panel, comparator, two dual receivers, four spiral antennas, and a blade antenna. The system provides the operator with both visual and audible warning when a high radar threat environment is encountered, whenever an operator requires sufficient warning to aid in the evasion necessary for mission completion. The system can sort out, identify threat radar signals, and display identified threats.

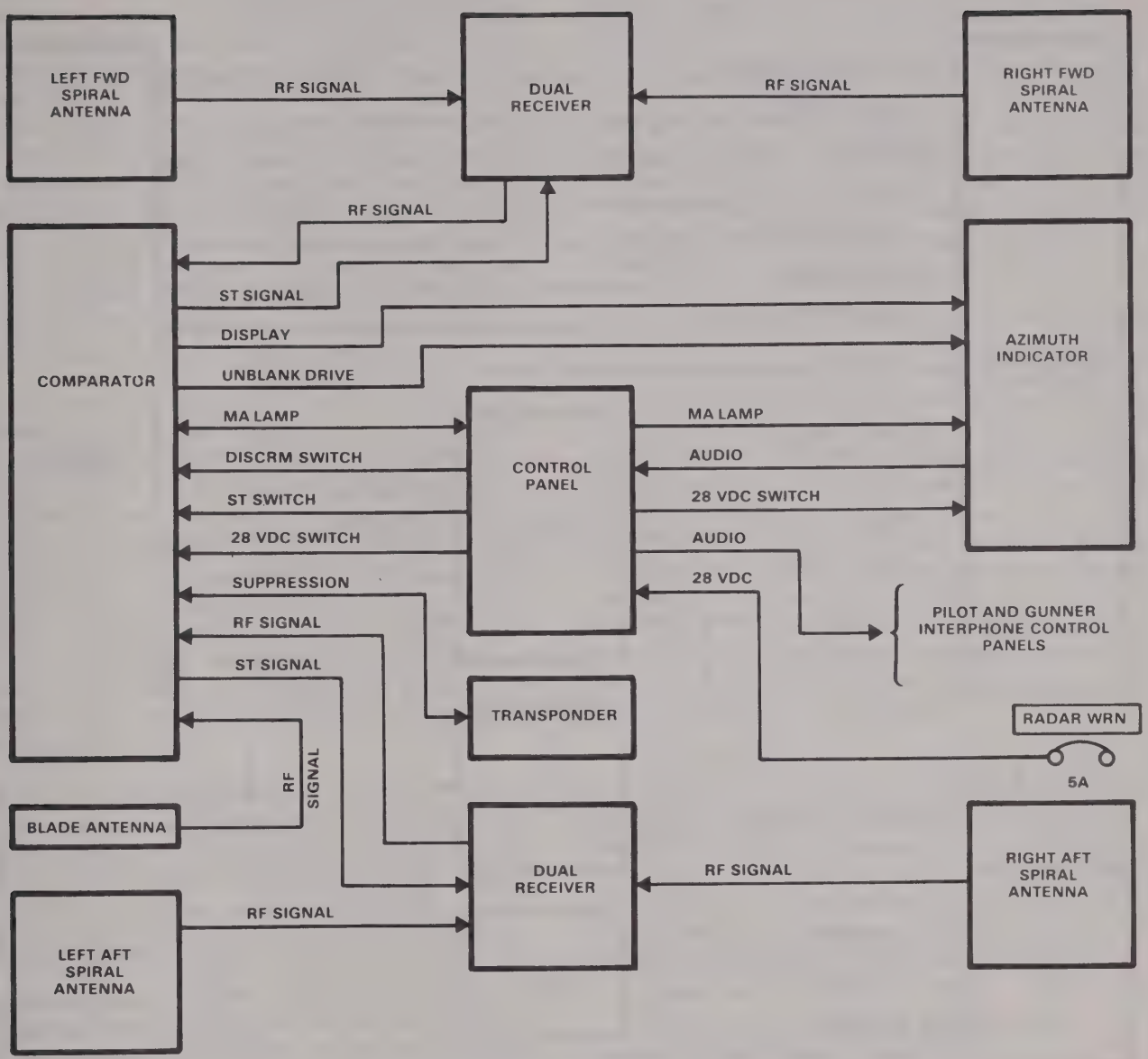
b. Receiving. Signals picked up by the antennas are passed through the dual receivers to the comparator. Display and unblank drive signals are then routed from the comparator to the azimuth indicator. All controls for the system are located on and performed by the control panel. Control signals are routed from the control panel to the comparator and azimuth indicator.

c. Power Distribution and Control. Power is applied to the radar warning system from the RADAR WRN circuit breaker. When the RADAR WRN circuit breaker is pushed, 28 Vdc is applied to the control panel.

3-11. Identification System (IFF Transponder) AN/APX-72 Block Diagram.

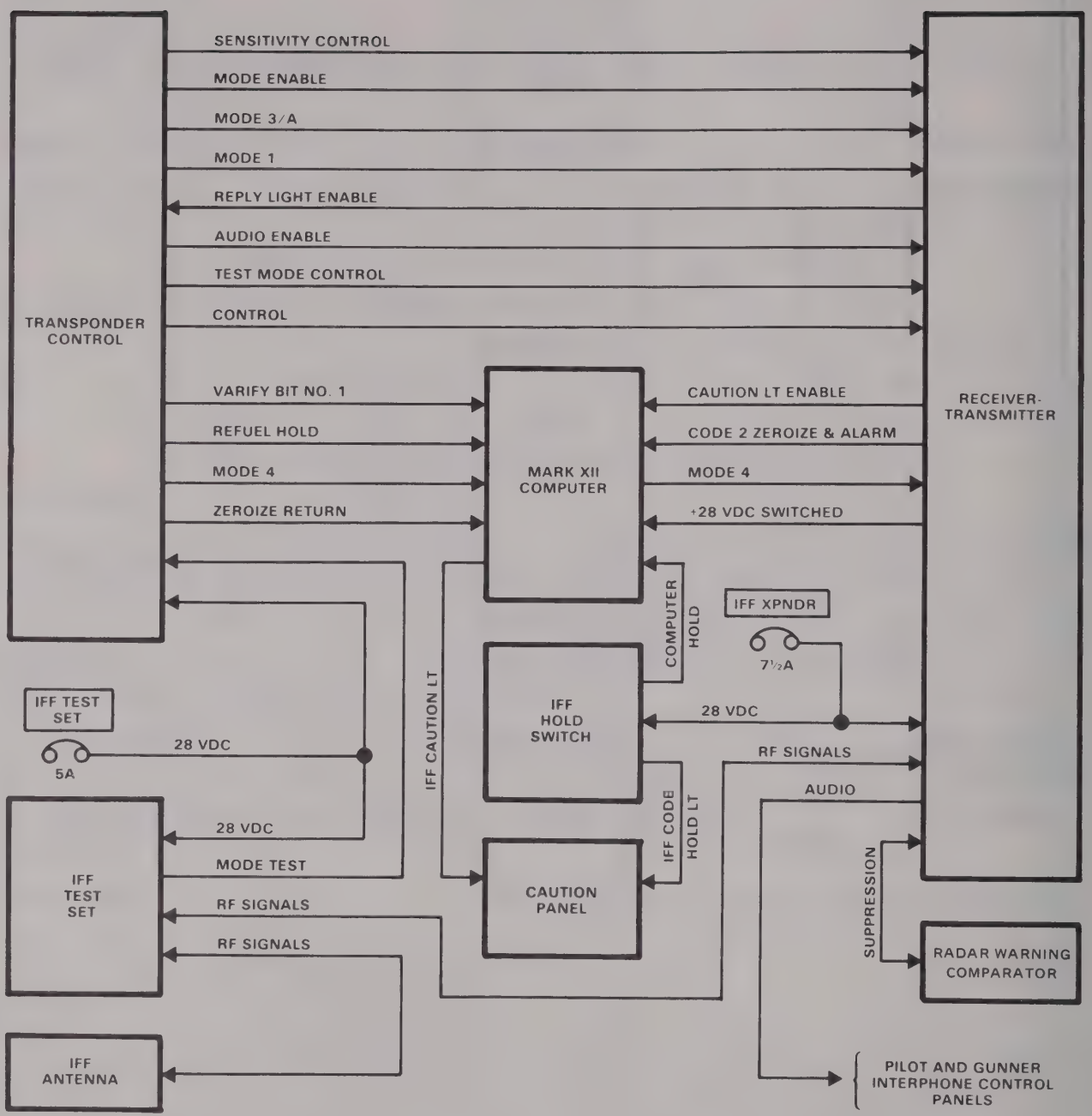
(Figure 3-10).

a. The identification system consists of a transponder receiver-transmitter, IFF test set, transponder control, IFF antenna, and a Mark XII computer. This facility identifies the aircraft as friendly to suitably equipped challenging aircraft and ground radar interrogating stations. The transponder receives, decodes, and responds to characteristic interrogation pulses from ground stations equipped with IFF, or supplemented with the selective identification feature (SIF), and to civil ground radar systems.



209077-27
ELIXP-039

Figure 3-9. Radar warning system AN/APR-39 block diagram



209077-28A
ELIXP-040C1

Figure 3-10. Identification system (IFF transponder) AN/APX-72 block diagram

b. Receive Transmit Path and Control.

(1) The receiver section operates on a single preset frequency of 1030 MHz, and the transmitter operates on a single preset frequency of 1090 MHz. The equipment can also be used to transmit specially coded emergency signals or position identifying signals. In Mode 4 only, the transmitted pulses are supplied as audio pulses to the audio control panel. The audio signal from the identification facility is connected directly to the audio amplifiers in the interphone-audio system and will be heard on the headsets regardless of audio control panel switch setting. An in-flight test set is used to indicate either satisfactory or unsatisfactory performance of the over-all transponder system on a go, no-go basis.

(2) The transponder receives a coded interrogation rf signal in a line of sight range. The transponder antenna will detect rf signals of 1030 MHz. The rf signal is routed through the transponder test set to the transponder. With the MASTER switch on the transponder control in the NORM position, complete power with maximum sensitivity control is provided. With the MASTER switch in LOW position, complete power with reduced sensitivity control is provided. The rf signal is detected and the video pulses are extracted and routed through the decoder in the transponder.

(3) The decoder also receives a mode enable control from the transponder control. Mode sensing gate pulses are generated by the decoder and routed to the encoder .The transponder control MASTER switch determines whether the encoder produces a coded reply for normal or emergency purposes. The IDENT-MIC switch on the transponder control provides identification of position if desired. The mode selector switches and mode code control switches on the transponder control, select and control the desired reply code. The encoder in the transponder, is triggered to assemble the correct reply code as determined by the interrogation mode. The coded pulses are routed to the transmitter to modulate a 1090 MHz rf signal, which is then fed to the transponder antenna and radiated to the interrogating station. Transmitter replies can be monitored in Mode 4 operation by the pilot, and gunner since the transponder develops an audio output signal. This signal is routed from the transponder to the impedance matching network and then to each audio control panel when the AUDIO-LIGHT switch is in the AUDIO position.

(4) Emergency signals are enabled from the EMER position of the MASTER switch on the transponder control. The emergency signal (ground) is routed through the transponder control to the encoder of the transponder. The encoder, enabled by the emergency control, assembles emergency coded reply video pulses in a format corresponding to interrogation mode. Coded reply pulses are routed to the transmitter to modulate an rf signal fed to the transponder antenna and radiated to the ground interrogation station.

(5) The RAD-TEST-MON-OUT switch, on the transponder control, in MON position enables transponder control monitor circuits and permits the operator to monitor the transmitted code reply set up by the mode switches. The TEST lamp lights if the reply is of the proper level and the antenna VSWR is within limits. If not, the TEST lamp goes out. When the mode switches are set to the TEST position, the transponder test set generates an interrogation pulse for the desired mode. The self-test pulse is routed through the transponder. The transponder test set analyzes the resulting coded reply and indicates proper transponder operation. The TEST lamp functions as previously stated when proper replies are formed.

c. Power Distribution and Control. Power is applied to the identification system from the IFF XPDR and IFF TEST SET circuit breakers. When the IFF XPDR circuit breaker is depressed, 28 Vdc is applied to the transponder receiver-transmitter and the IFF hold switch. When the IFF TEST SET circuit breaker is depressed, 28 Vdc is applied to the transponder control and the IFF test set.

3-12. Stability and Control Augmentation System (SCAS) Block Diagram.

(Figure 3-11).

The AH-1S Stability and Control Augmentation System is a multi-loop type augmentation system to cover both of the major requirements for a stable weapons delivery platform. It augments the control system to provide an airframe that not only has the desired damping characteristics for disturbing functions, but has desired response characteristics for pilot inputs and a preset rate of control reponse. This feature has been acheived by

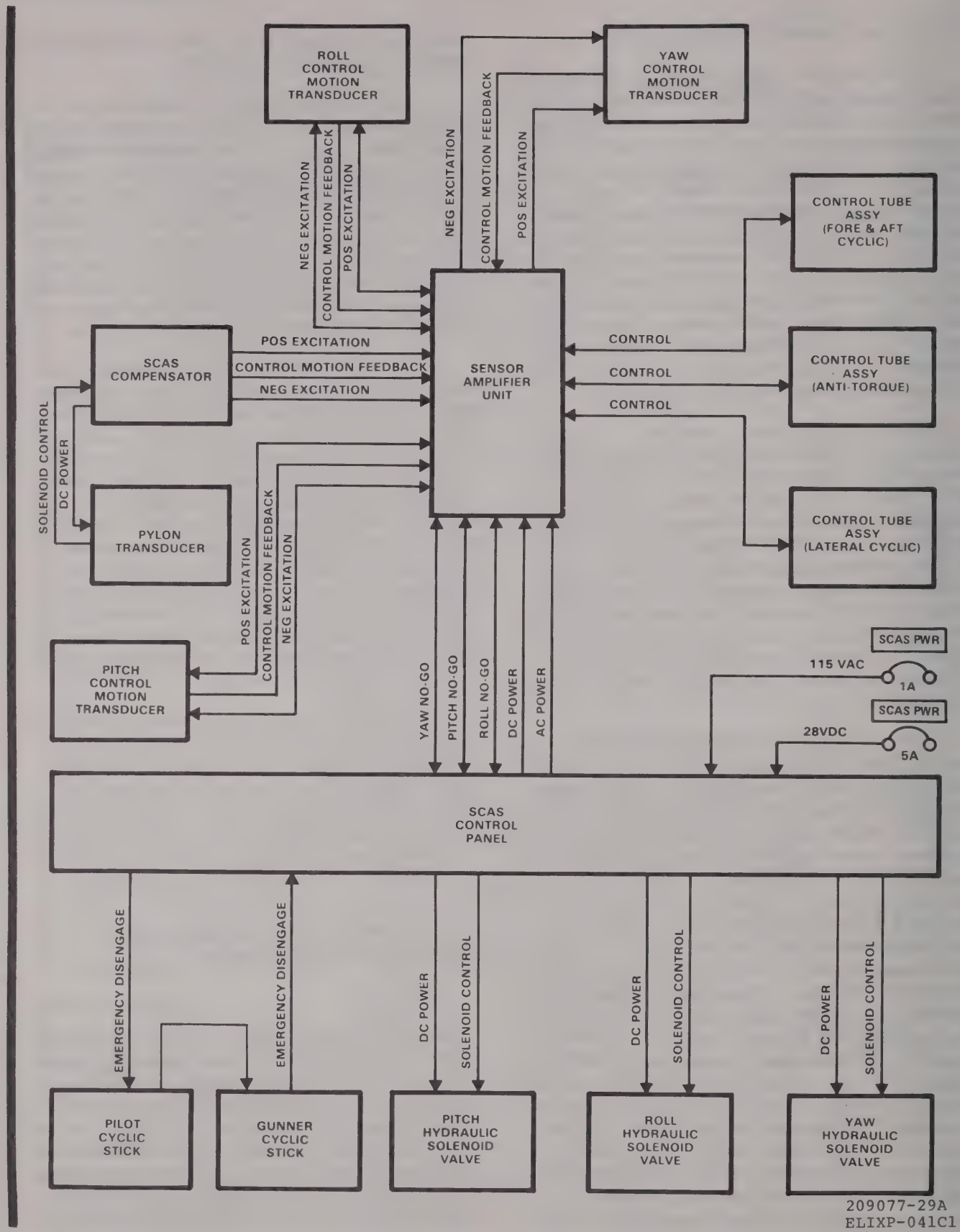


Figure 3-11. Stability and control augmentation system block diagram

the addition of an electrical signal network that reponds each time the pilot makes a control system input. AH-1S SCAS is described as a three-axis stability and control augmentation system, integrated into the conventional helicopter fore-and-aft, lateral and directional flight controls. Rate gyros provide the electrical signals for airframe damping against external disturbances. Control motion transducers associated with the pedal and stick provide a compensating electrical signal during pilot control inputs to prevent the SCAS from opposing the pilot inputs. The system consists of two circuit breakers for protection and power, a control panel, the sensor amplifier unit, three electrohydraulic servo actuators, three control motion transducers, three solenoid controlled hydraulic valves, pylon transducer, a pylon compensation unit, and the associated electrical network.

a. Power is furnished to the SCAS system by two circuit breakers: a 5-ampere dc SCAS PWR for SCAS control is on the dc circuit breaker panel, aft section of the pilot right console. A 1-ampere SCAS PWR ac circuit breaker for SCAS power is on the ac circuit breaker panel, left console. Closing these circuit breakers applies ac and dc power to the SCAS control panel where it is, in turn, distributed to the other components of the system.

b. The SCAS control panel has a two-position POWER switch which controls both the 115 Vac and 28 Vdc power to the SCAS. The three channel engage switches, labeled PITCH, ROLL, and YAW, are solenoid hold switches which control selective engagement of the three channels. Any single channel or combination of channels may be engaged. The three indicator lights, labeled PITCH, ROLL, and YAW NO GO, indicate an out-of-tolerance system condition, or an unexpired warmup period. Engagement of a channel should not be attempted if the appropriate NO GO light is lighted. All channels will disengage upon failure of either ac or dc power failure to prevent erratic operation. The panel provides the entire operational control of the SCAS, except that both the pilot and gunner have emergency disengage switches on the cyclic stick grips.

c. The sensor amplifier unit is operationally the center of the AH-1S SCAS and contains the components and circuitry to implement the stabilization of the helicopter. It connects the components of the system, receives and sums input signals, and produces the electrical inputs to the servo actuators for airframe damping. In the sensor amplifier unit, the rate signal from the rate gyro, the control position signal, and the actuator feedback signal are summed and shaped in the compensating network to provide the desired helicopter control response.

d. Actuators are installed in series in the control tubes of each axis of the flight control system (fore and aft cyclic, lateral cyclic, and anti-torque). They are an integral part of the aircraft control system. The pitch and roll actuators control movement of the swashplate without pilot cyclic stick movement. The yaw actuator changes the tail rotor pitch without pilot pedal movement. These actuators extend or retract by signals from the sensor amplifier unit to give the limited authority for airframe damping against external disturbances.

e. Control motion transducers (linear motion potentiometers) are installed on bellcranks between the pilot control stick or pedals and the actuator. As the control moves, the bellcrank moves and the movement is induced into the transducer. The transducer movement resulting from control inputs by the pilot gives a signal to the sensor amplifier unit. These signals are summed with the rate gyro signals to provide the correction signals to the servo valve for the desired helicopter movement. These transducers allow the pilot to override the stability augmentation systems attempt to dampen any disturbances.

f. A hydraulic solenoid valve is installed in the hydraulic line to each of the three series actuators to control the hydraulic pressure to the actuators. These valves are 28 Vdc operated valves; when energized, they are open to port pressure to the actuator servo, and when deenergized, the pressure is shut off.

g. The pylon compensation unit relies on right mounted pylon transducer for position information. The pylon transducer is linear potentimeter, mounted between the pylon mount and permanent airframe structure to sense pitch motion of the pylon. Output signal of the linear transducer is inserted into the pylon compensation unit, where the signal is summed, shaped, attenuated, and inserted into the roll channel of the sensor amplifier for retardation of the pylon oscillation.

3-13. Proximity Warning System Block Diagram.

(Figure 3-12).

The proximity warning system regards any similarly equipped helicopter coming within a selective range of one, two, or three thousand feet, and within an altitude band of plus or minus three hundred feet, as an intruder. Whenever an intruder enters the protected airspace surrounding the helicopter, the system automatically compares the two altitudes and activates an audio and a visual alarm system. The audio alarm is a beeping tone in the pilot and gunner headset. The visual alarm is a flashing arrow segment on the receiver-transponder panel and the remote indicator, indicating that the intruding helicopter is either at a higher, lower, or the same altitude as the interrogating helicopter. These warnings alert the pilot to the presence of helicopter within a set range in order to avoid a mid-air collision.

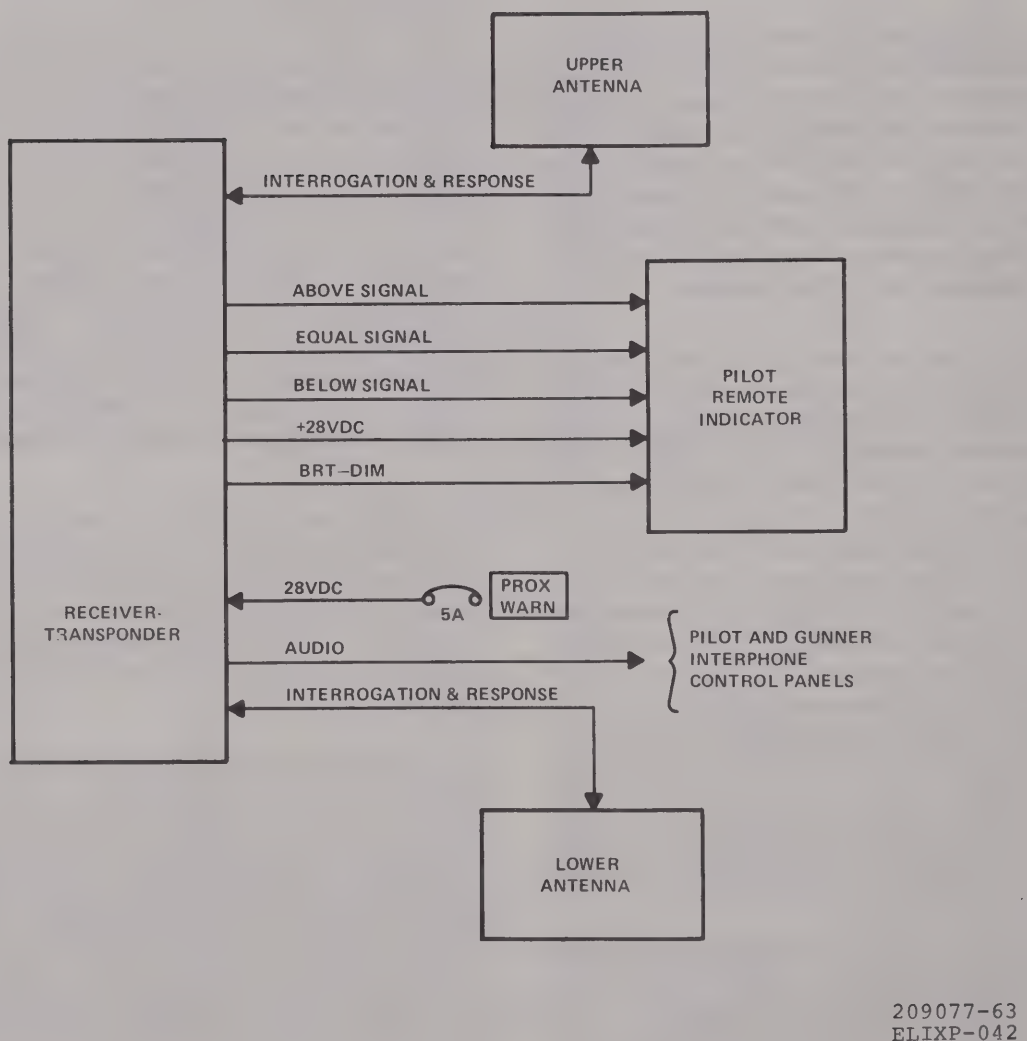


Figure 3-12. Proximity warning system YG 1054 block diagram

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. Maintenance Allocation Chart.

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

(1) Skills available.

(2) Time 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.

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 organization. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the appropriate commander.

e. The assignment of a maintenance function will not be construed as authority to carry the associated repair parts in stock. Authority to requisition, stock, or otherwise secure necessary repair parts will be as specified in the repair parts appendix.

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 of the function. The higher level of maintenance will provide technical supervision and inspection of the function being performed at the lower level.

g. Maintenance of Army aircraft is transitioning to three categories of maintenance. These maintenance categories are Aviation Unit Maintenance (AVUM); Aviation Intermediate Maintenance (AVIM); and Depot Maintenance. AVUM and AVIM will replace organizational, direct support and general support maintenance. In the interim, as maintenance units are reorganized into three category of maintenance activities, this publication will be used by AVUM or organizational maintenance personnel for the maintenance of the electronic equipment configuration. The maintenance allocation chart (MAC) in appendix B is configured to the three-category maintenance concept where the code O represents AVUM; the code F represents AVUM and D represents depot maintenance. Those organizations not yet assigned complete AVUM responsibilities should use caution in utilization of this publication. Whatever maintenance is performed must consider available skills, tools, test equipment, and time required to perform the maintenance.

h. Changes to the Maintenance Allocation Chart will be based on continuing evaluation and analysis by responsible technical personnel and on reports received from field activities.

B-2. Definitions.

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical and electrical characteristics with established standards.

b. Test. To verify serviceability and to detect electrical or mechanical failure by the use of test equipment.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents and air.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

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

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument or test equipment being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an emplacement, site or vehicle.

h. Replace. To replace unserviceable items with serviceable assemblies, subassemblies or parts.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

j. Overhaul. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards prepared and published for the specific item to be overhauled.

k. Rebuild. To restore an item to a standard as nearly as possible to the original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item; inspection of all parts or components; repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications; and subsequent reassembly of the item.

B-3. Symbols.

The letters "O, F, and D" represent Organization (O), Field (F), and Depot (D) and when placed on the Maintenance Allocation Chart indicate the lowest level of maintenance responsible for performing the particular maintenance function. Maintenance levels higher than the level of maintenance marked by the symbol are authorized to perform the indicated function.

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	Avionics Configuration Army Model AH-1S							
01	Stability Augmentation System							
0101	Connecting Cables	Inspect Test Repair		.1 .2	 .5			None 3 1, 6
0102	Sensor Amplifier 570-074-010	Inspect Replace Repair		.1 .2	 1.0			None 1 2

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
010201	AC Power Module	Inspect			.1			None
		Test			.2			2,4,5,7
		Replace			.2			2
010202	Pulse Generator Module	Inspect			.1			None
		Test			.2			2,4,5,7
		Replace			.2			2
010203	Three Axis Gyro	Inspect		.1				None
		Test		.2				2,4,5,7
		Replace		.1				2
		Repair (1)			.2			2
		Repair (2)					10.0	
010204	Module, Pitch Control	Inspect			.1			None
		Test			.2			2,4,5,7
		Replace			.1			2
		Repair				.5		2
01020401	Module, Bite	Inspect			.1			
		Test			.1			
		Replace			.1			
01020402	Module, Valve Drive	Inspect			1			
		Test			.1			
		Replace			.1			
010205	Module, Roll Control	Inspect			.1			None
		Test			.2			2,4,5,7
		Replace			.1			2
		Repair				.5		2
01020501	Module, Bite	Inspect			.1			
		Test			.1			
		Replace			.1			
01020502	Module, Valve Drive	Inspect			.1			
		Test			.1			
		Replace			.1			

(1) Repair by Replacing Individual Gyros.
(2) Individual Gyros Are Depot Repaired Only (See DMWR 11-5821-296).

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
010206	Module, YAW Control	Inspect			.1			None
		Test			.2			2,4,5,7
		Replace			.1			2
		Repair				.5		2
01020601	Module, Bite	Inspect			.1			
		Test			.1			
		Replace			.1			
01020602	Module, Valve Drive	Inspect			.1			
		Test			.1			
		Replace			.1			
010207	Chassis Mounted Parts	Inspect			.1			None
		Test			.2			2,4,5,7
		Repair				.5		2
0103	Pylon Compensation	Inspect		.1				None
	570-074-131	Test		.2				2,4,5;7
		Replace		.2				1
		Repair				.5		1
0104	Control Panel	Inspect		.1				None
	209-074-084	Test		.2				2,4,5
		Replace		.1				1
		Repair				.5		1
02	FM Liaison Communication System							
0201	Connecting Cables	Inspect		.1				None
		Test		.2				3
		Repair			.5			1,6
0202	Radio Set, AN/ARC-114A	Inspect		.1				None
		Replace		.1				1
		Repair		See TM 11-5821-259 Series				
0203	Antenna P/O 209-077-203	Inspect		.1				None
		Test		.2				3
		Replace		.1				1
		Repair		See TM 11-5821-284 Series				
0204	Antenna, FM Homing AS-3205/ARC	Inspect		.1				None
		Test		.2				3
		Replace		.3				1
	Filter, FM 209-077-062-1							
	Filter, FM 205-075-380-1							

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
0602	Receiver R-1496A/ARN-89B	Inspect		.1				None
		Replace		.2				1
		Repair		See TM 11-5826-227 Series				
0603	Control C-7392A/ARN-89B	Inspect		.1				None
		Replace		.2				1
		Repair		See TM 11-5826-227 Series				
0604	Impedance Matching Amplifier AM-4859A/ARN-89	Inspect		.1				None
		Replace		.2				1
		Repair		See TM 11-5826-227 Series				
0605	Antenna Loop AS-2108A/ARN-89A	Inspect		.1				None
		Replace		.2				1
0606	Antenna ADF Sense Panel 209-030-133-3	Inspect		.1				None
		Repair		.2				1
07	Gyromagnetic Compass System AN/ASN-43							
0701	Connecting Cables	Inspect		.1				None
		Test		.2				3
		Repair			.5			1,6
0702	Directional Gyroscope CN-998( )/ ASN	Inspect		.1				None
		Test		.3				3
		Replace		.3				1
		Repair		See TM 11-6605-202 Series				
0703	Transmitter, Induction Compass T-611/ASN	Inspect		.3				None
		Replace			.5			1
		Align			.5			1
		Repair		See TM 11-6605-202 Series				
0704	Compensator, Magnetic Flux CN-405/ASN	Inspect		.3				None
		Replace				.3		1
		Repair		See TM 11-6605-202 Series				
0705	Control, Compass C-6347/ASN	Inspect		.1				None
		Replace		.2				1
		Repair		See TM 11-6605-202 Series				

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
08	Radar Altimeter System AN/APN-209	Inspect Test Replace Repair (4)		See TM 11-5895-897 Series				
0801	Connecting Cables	Inspect Test REpair		.1 .2	 .5			None 3 1,6
0802	Indicator, Receiver Transmitter RT-1115/APN-209	Inspect Replace Repair (4)		.1 .1 See TM 11-5895-897 Series				None 1
0803	Antenna AS-2595/APN-194	Inspect Replace		.1 .2				None 1
09	Radar Warning Set AN/APR-39(V)1							
0901	Connecting Cables	Inspect Test Repair		.1 .2	 .5			None 3 1,6
0902	Receiver R-1838( )/APR-39	Inspect Replace Repair		.1 .2 See TM 11-5895-957 Series				None 1
0903	Antenna L Band Blade AS-2890( )/APR-39	Inspect Replace		.1 .2				None 1
0904	Antenna Right Spiral AS-2891( )/APR-39	Inspect Replace		.1 .2				None 1
0905	Antenna Left Spiral AS-2892( )/APR-39	Inspect Replace		.1 .2				None 1
0906	Indicator, ID-1150( )/APR-39	Inspect Replace Repair		.1 .2 See TM 11-5895-957 Series				None 1
0907	Control C-9326( )/APR-39	Inspect Replace Repair		.1 .2 See TM 55-5895-957 Series				None 1

(4) Contractor Repair Only (4 yr warranty)

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
0908	Comparator CM-440( )/APR-39	Inspect		.1				None
		Replace		.2				1
		Repair		See TM 11-5895-957 Series				
10	Receiving Set Radio AN/ARN-123							
1001	Connecting Cables	Inspect		.1				None
		Test		.2				3
		Repair			.5			1,6
1002	Receiver, R-2023/ARN-123(V)	Inspect		.1				None
		Replace		.2				1
		Repair (4)		See TM 11-5826-258 Series				
1003	Mount MT-4834/ARN-123(V)	Inspect		.1				None
		Replace		.2				1
		Repair (4)		See TM 11-5826-258 Series				
1004	Control C-10048/ARN-123(V)	Inspect		.1				None
		Replace		.2				1
		Repair (4)		See TM 11-5826-258 Series				
1005	Antenna Marker Beacon AT-640/ARN-123(V)	Inspect		.1				None
		Replace		.2				1
		Repair (4)		See TM 11-5826-258 Series				
1006	Antenna VOR/LOC AS-1304/ARN	Inspect		.1				None
		Replace		.2				1
1007	Antenna Glideslope AS-3188/ARN	Inspect		.1				None
		Replace		.2				1
1008	Control Navigation Select 209-077-081	Inspect		.1				None
		Test		.2				1
		Replace			.2			4
		Repair			.3			2
1009	Indicator, Horizontal Situation ID-2103/A and 209-075-660	Inspect		.1				None
		Replace		.1				1
		Repair (5)						
1010	Indicator, Attitude Direction ID-2104/A and 209-075-661	Inspect		.1				None
		Replace		.2				1

Section II. MAINTENANCE ALLOCATION CHART FOR AH-1S

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTE-NANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
1011	Indicator, Radio Magnetic Compass ID-2105/A and 212-070-180	Inspect Replace Repair (5)		.1 .1				None 1
11	Electrical Equipment Installation							
1101	Connecting Cables	Inspect Test Repair		.1 .2	 .5			None 3 1,6
1102	Battery, Nicad BB-649/A	Inspect Replace Repair		.1 .1 See TM 11-6140-203 Series				
1103	Inverter, Static PP-7274/A	Inspect Test Replace Repair		.1 .2 .2 See TM 66-6130-385 Series				None 3 1
1104	Inverter, PU-543/A	Inspect Test Replace Repair		.1 .2 .2 See TM 11-6125-220 Series				None 3 1
1105	Gyroscope, Displacement CN-1497/A (209-075-698)	Inspect Test Repair (5)		.1 .2				None 1
1106	Gyro, Rate of Turn TRU-2A/A	Inspect Replace Repair (6)		.1 .2				None 1
12	Avionics System Installation							
1201	Connecting Cables	Inspect Test Repair		.1 .2	 .5			None 3 1,6
1202	Control, Intercommunication System C-6533	Inspect Replace Repair		.1 .1 See TM 11-5821-262 Series				None 1

(5) Contractor Repair

(6) Depot Maintenance Interservice Support Agreement (Air Force)

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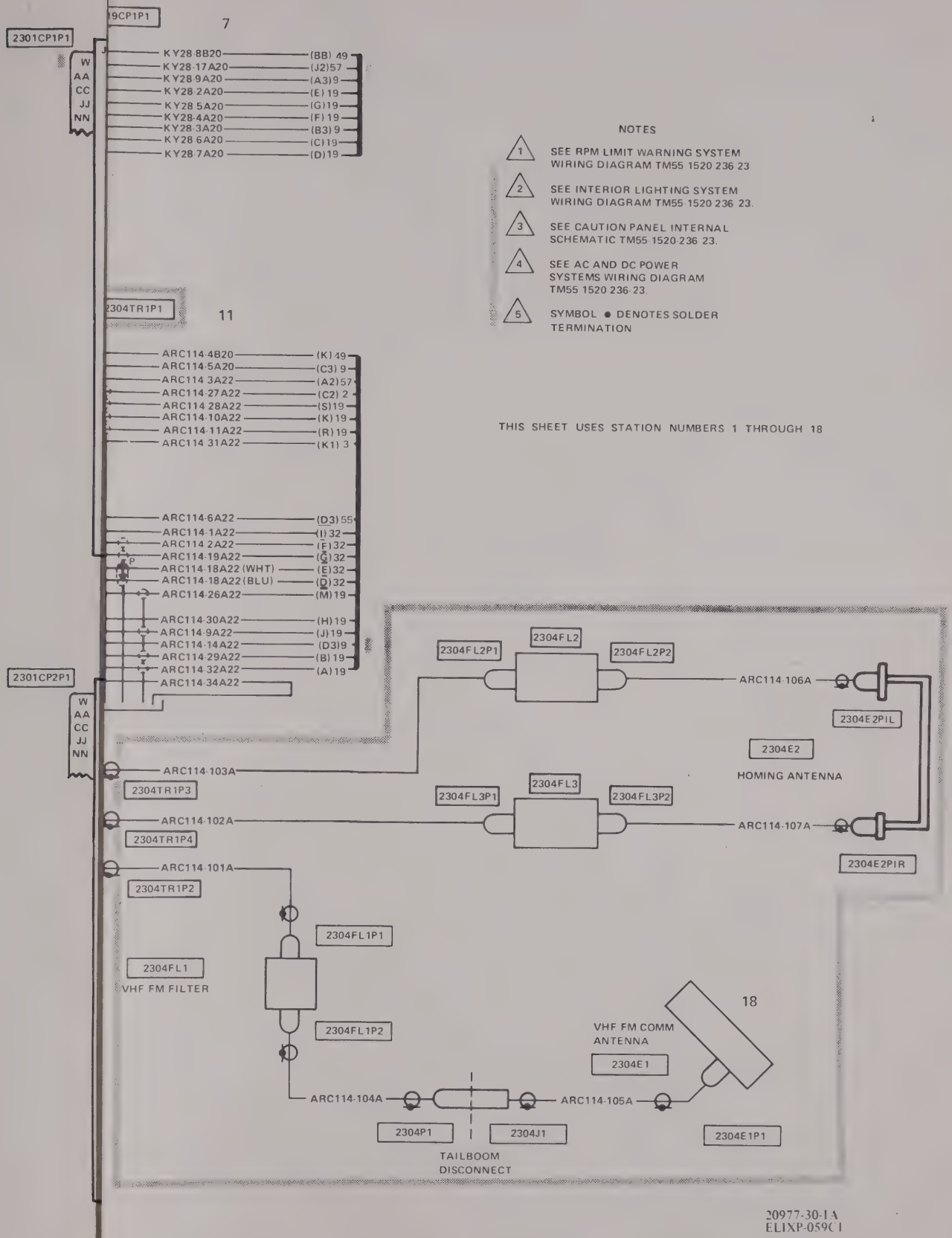


Figure FO-1. Master avionics wiring diagram (Sheet 1 of 6)

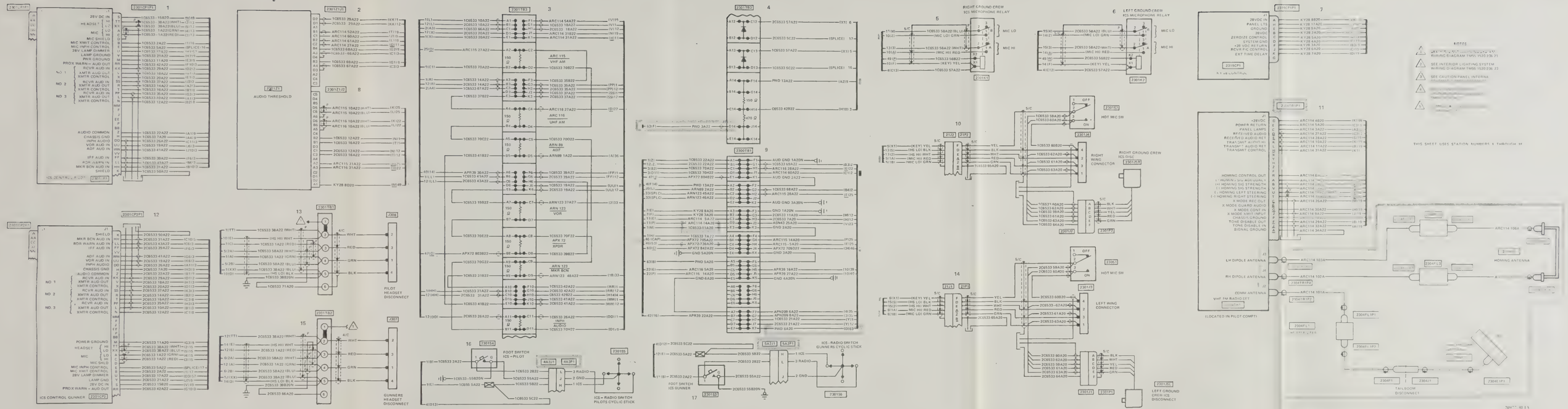
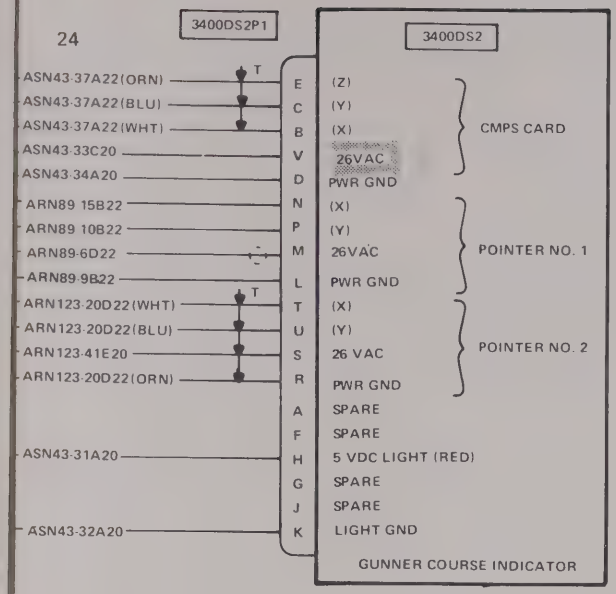


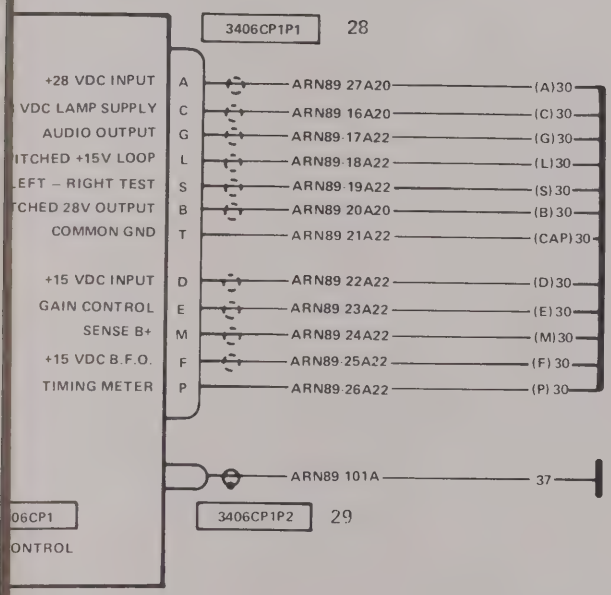
Figure FO-1. Master avionics wiring diagram (Sheet 1 of 6)



NOTES

1. SEE RPM LIMIT WARNING SYSTEM WIRING DIAGRAM TM55 1520-236 23
2. SEE INTERIOR LIGHTING SYSTEM WIRING DIAGRAM TM55 1520 236 23
3. SEE CAUTION PANEL INTERNAL SCHEMATIC TM55 1520 236 23.
4. SEE AC AND DC POWER SYSTEMS WIRING DIAGRAM TM55 1520 236 23.
5. SYMBOL ● DENOTES SOLDER TERMINATION
6. WHEN SECURITY SET IS NOT INSTALLLED, JUMPER CABLE MUST BE INSTALLED.

THIS SHEET USES STATION NUMBERS 19 THROUGH 29



209077-30-2A
ELIXP-060C1

Figure FO-1. Master avionics wiring diagram (Sheet 2 of 6)

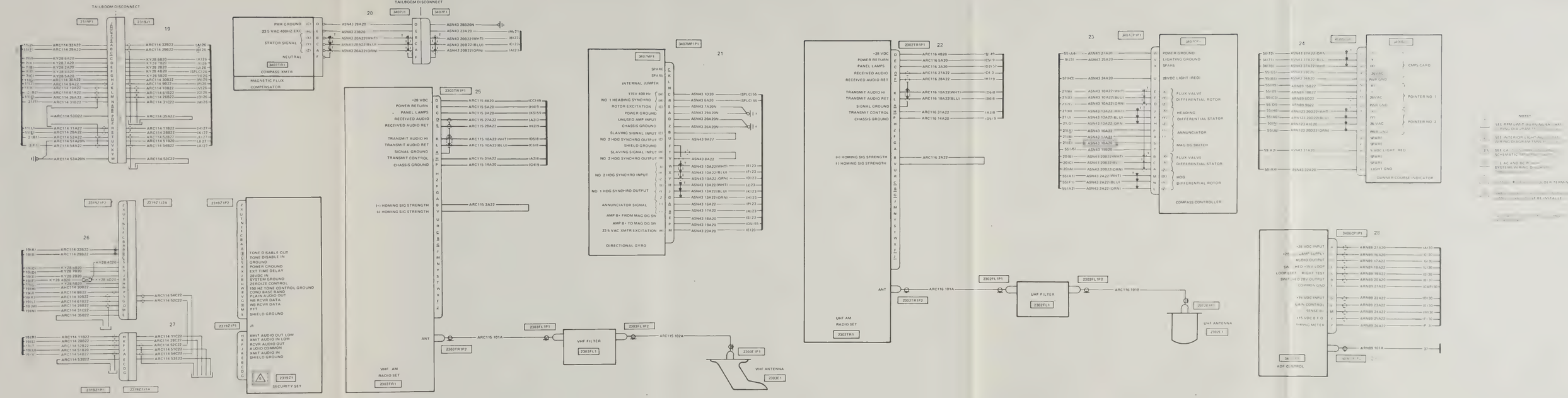
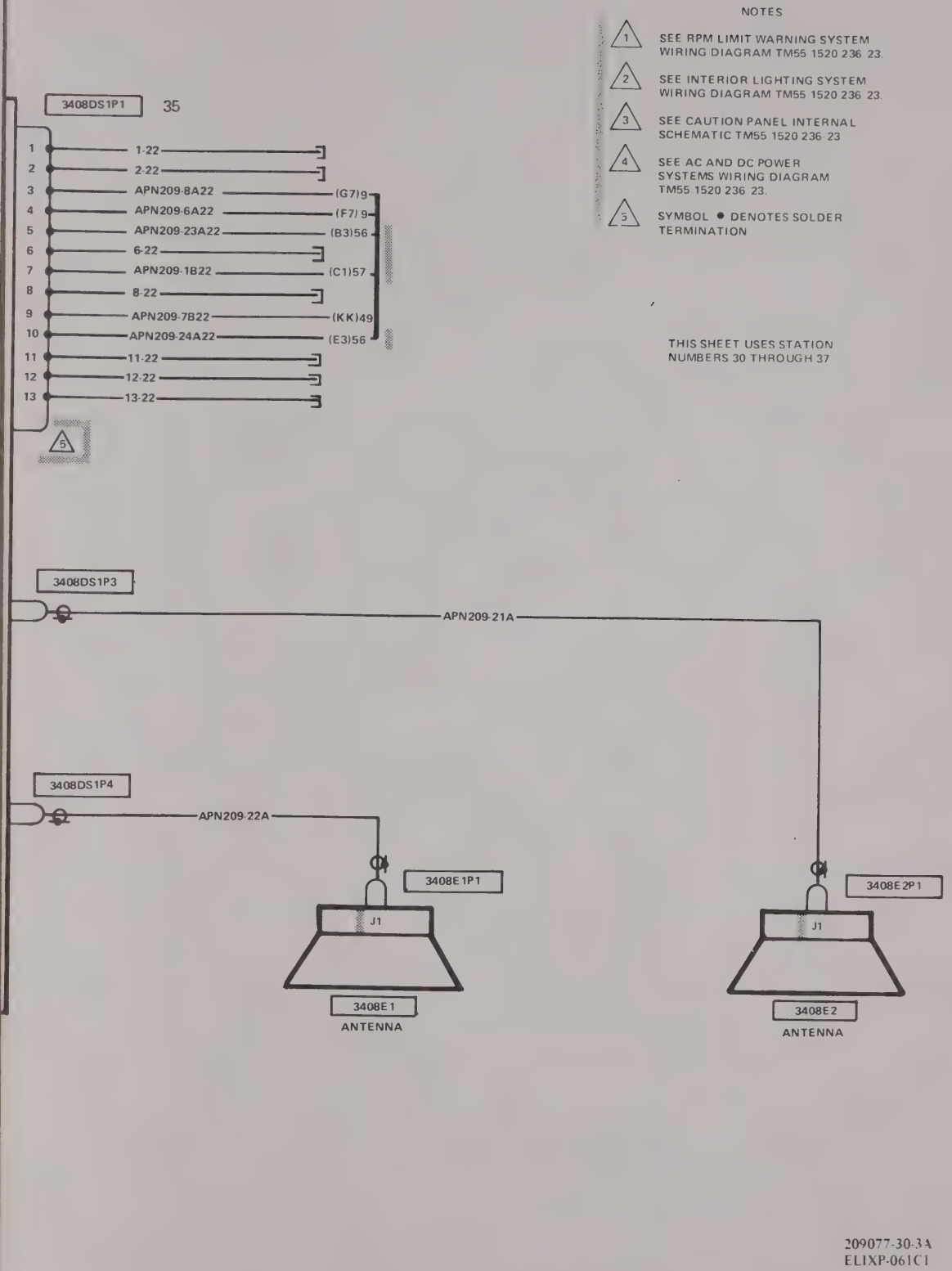


Figure FO-1. Master avionics wiring diagram (Sheet 2 of 6)



209077-30-3A
ELIXP-061C1

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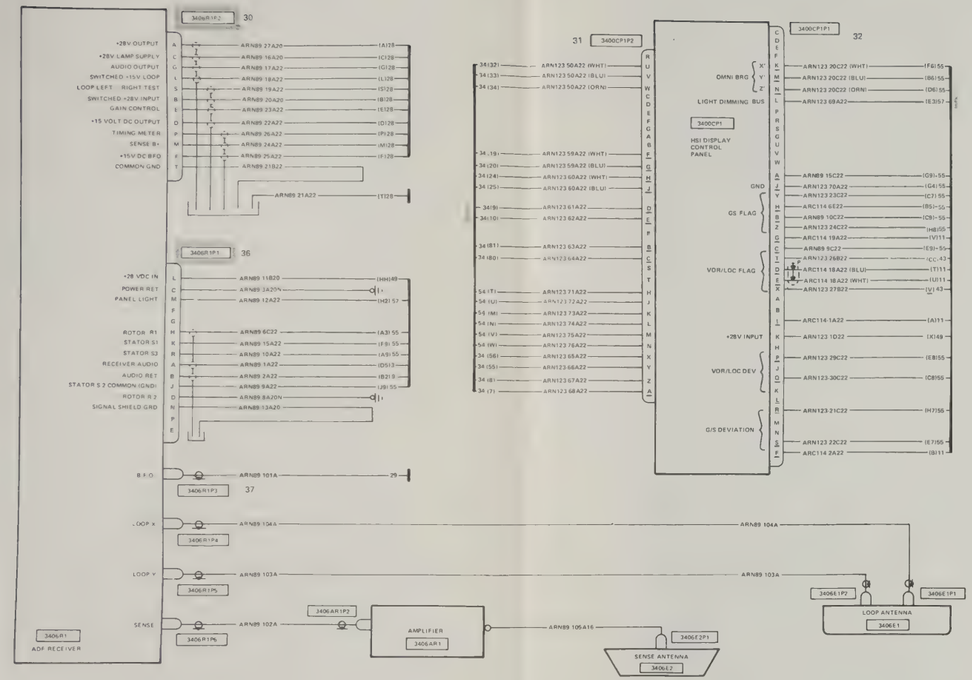
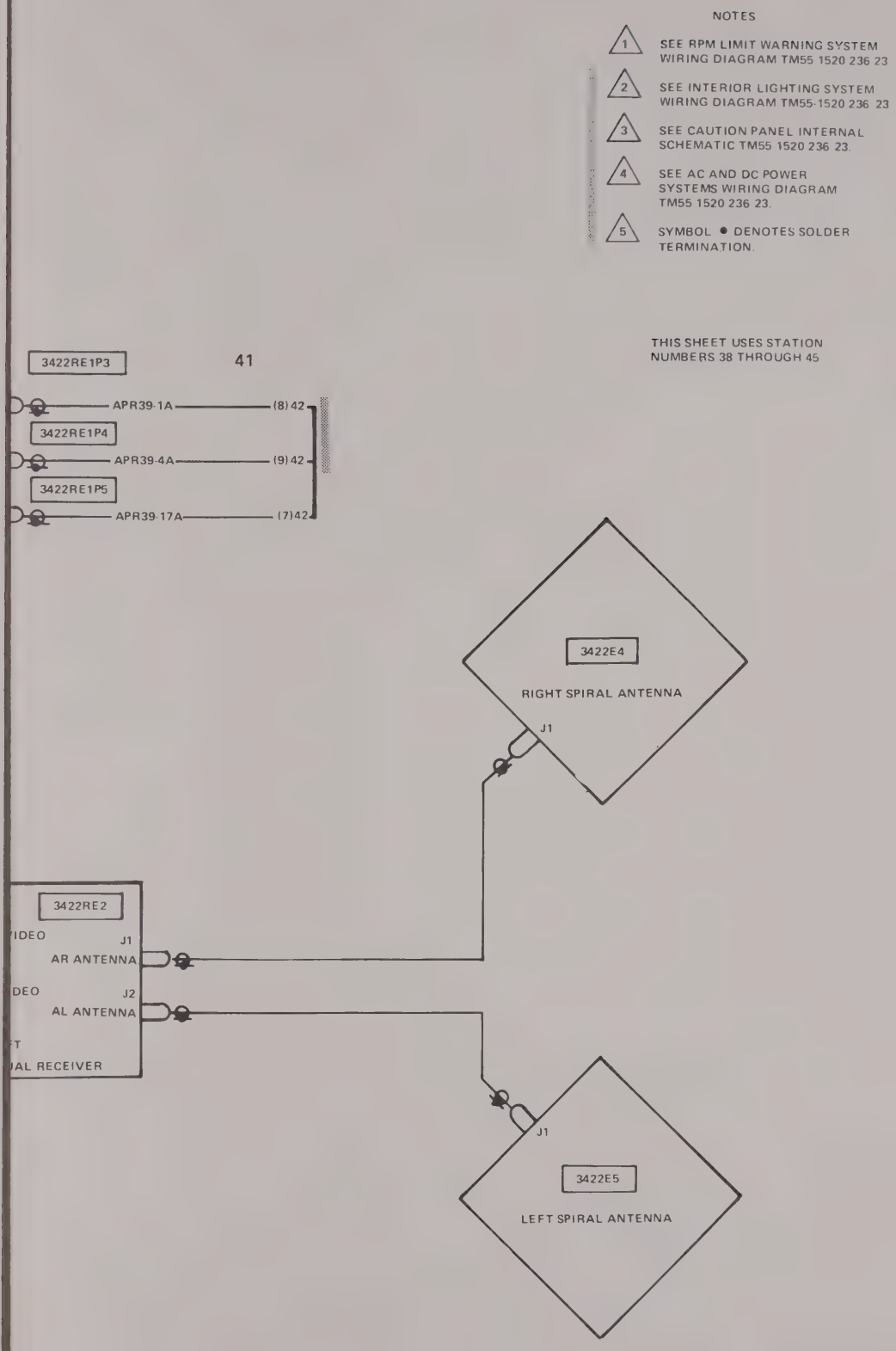
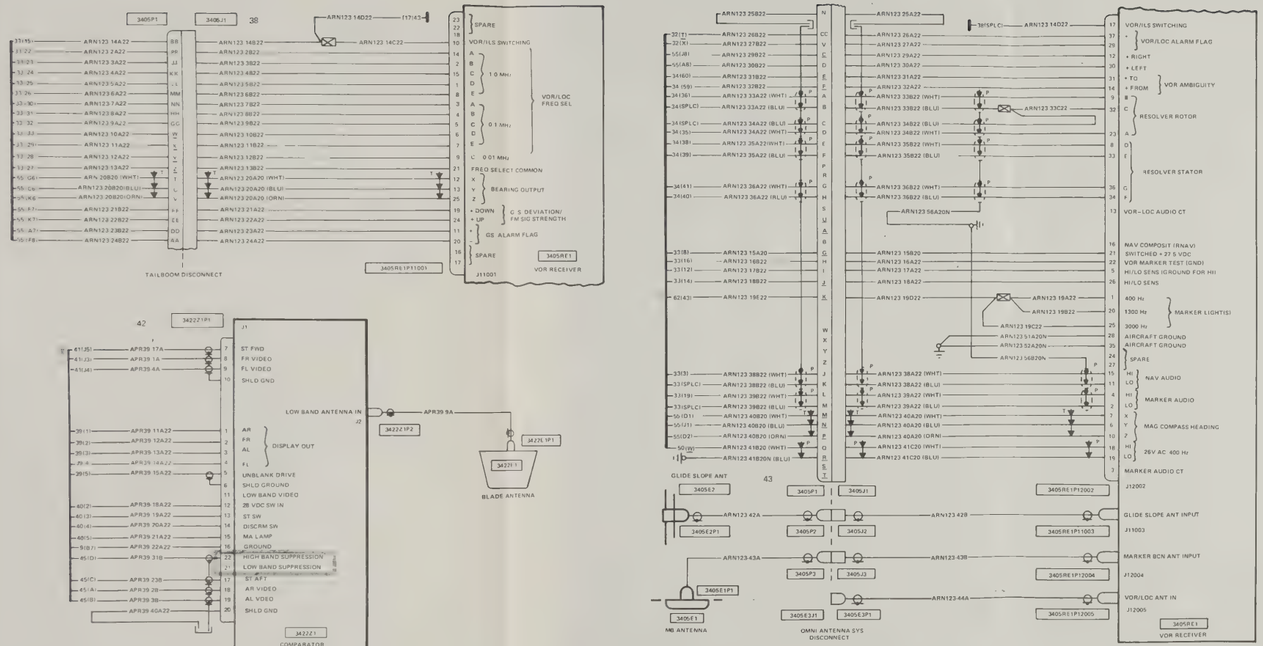


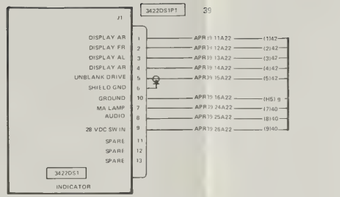
Figure FO-1. Master avionics wiring diagram (Sheet 3 of 6)

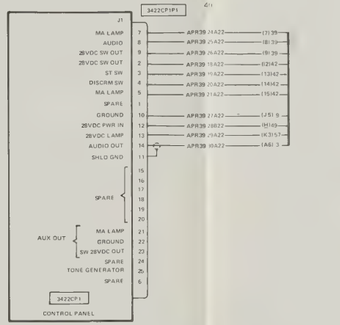


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ELIXP-062C1

Figure FO-1. Master avionics wiring diagram (Sheet 4 of 6)







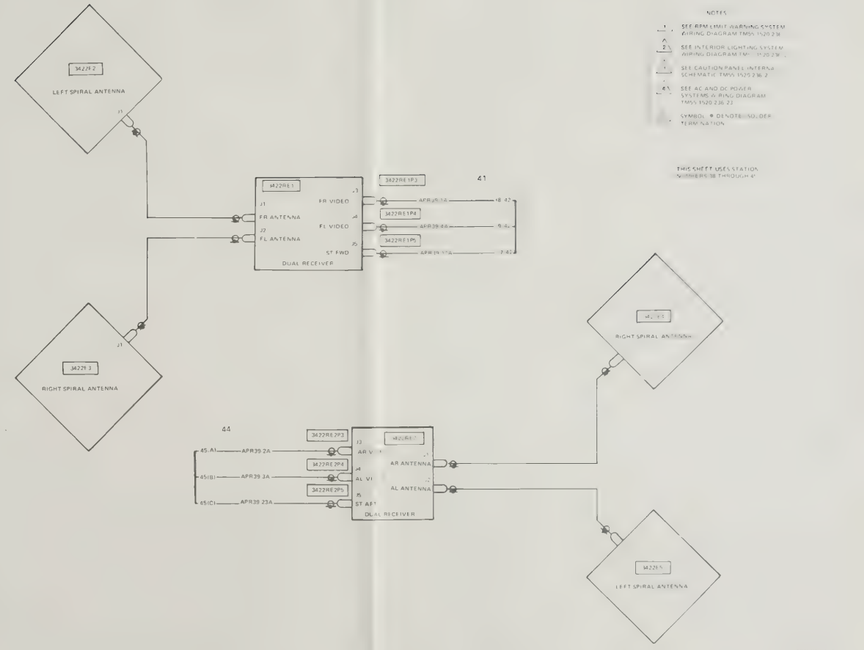
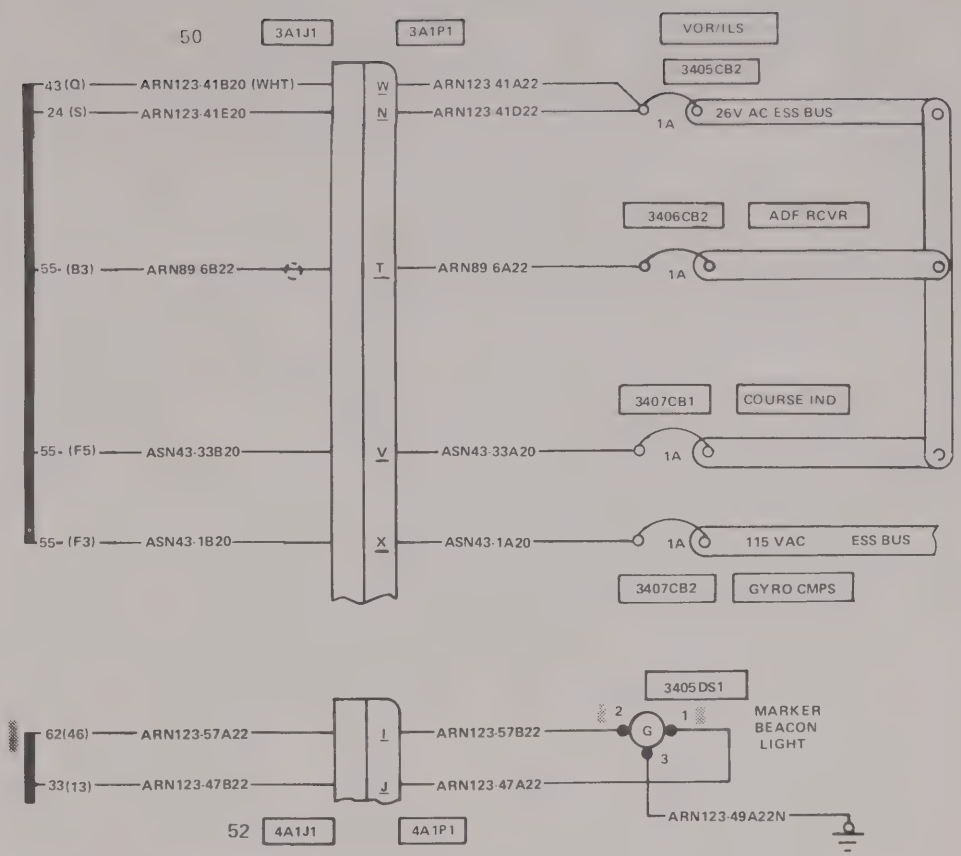


Figure FO-1. Master avionics wiring diagram (Sheet 4 of 6)



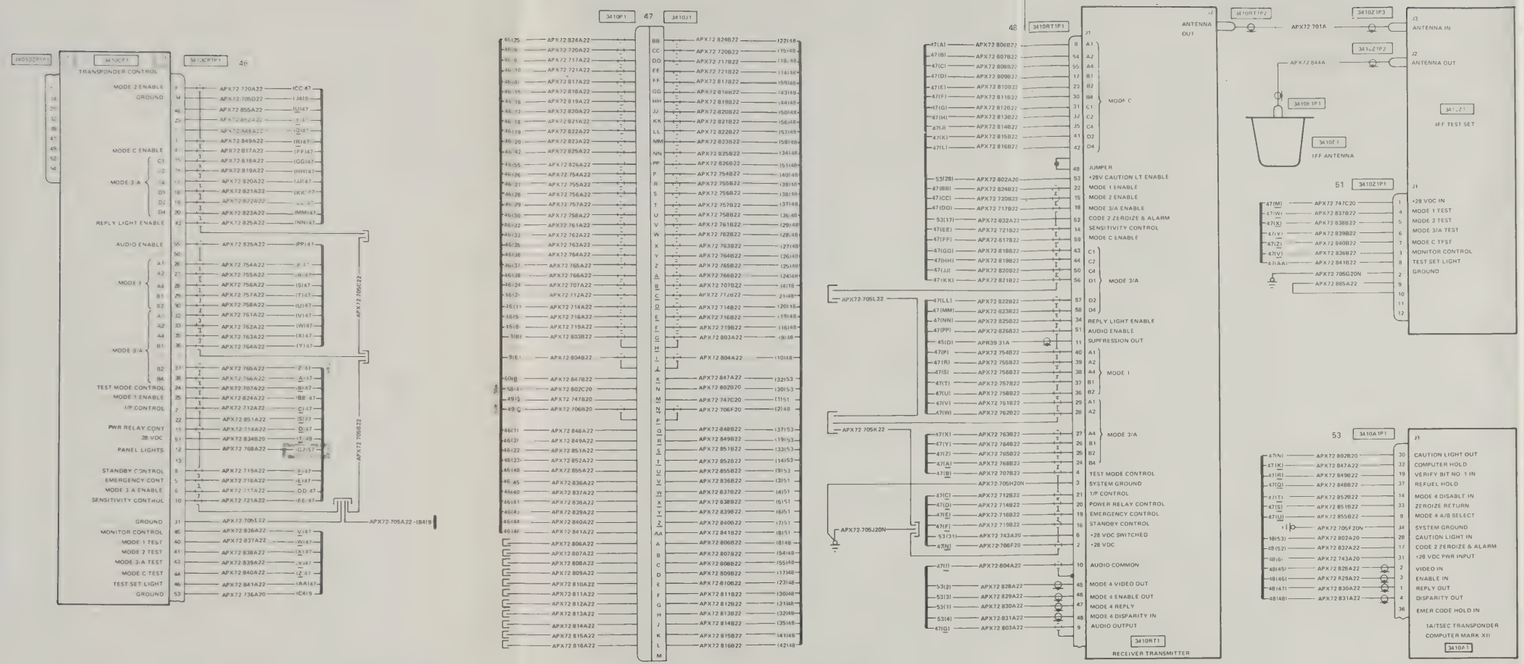
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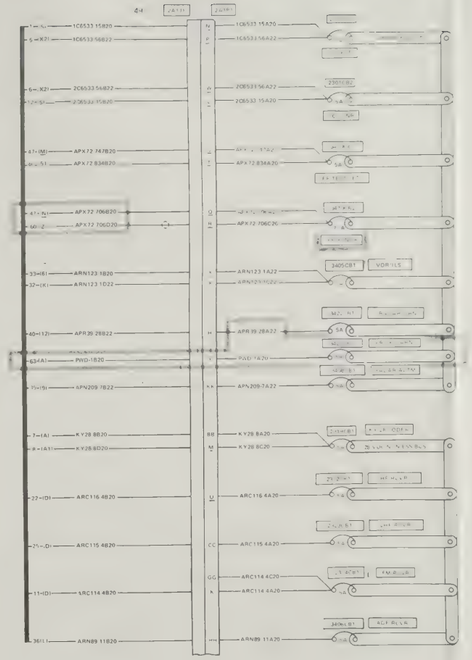
1. SEE RPM LIMIT WARNING SYSTEM WIRING DIAGRAM TM55 1520 236 23
2. SEE INTERIOR LIGHTING SYSTEM WIRING DIAGRAM TM55 1520 236 23
3. SEE CAUTION PANEL INTERNAL SCHEMATIC TM55 1520 236 23.
4. SEE AC AND DC POWER SYSTEMS WIRING DIAGRAM TM55 1520 236 23.
5. SYMBOL ● DENOTES SOLDER TERMINATION

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209077-30-5A
ELIXP-063C1

Figure FO-1. Master avionics wiring diagram (Sheet 5 of 6)





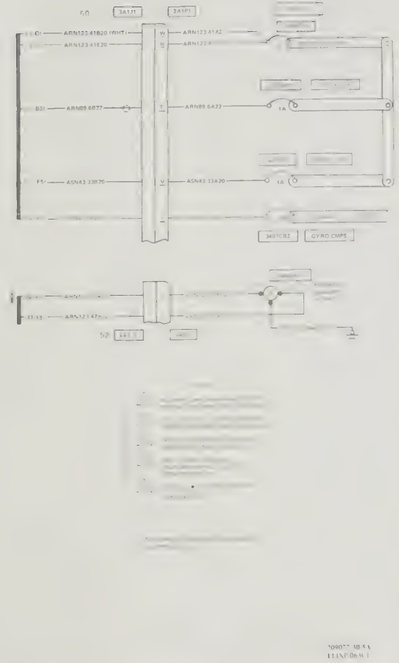
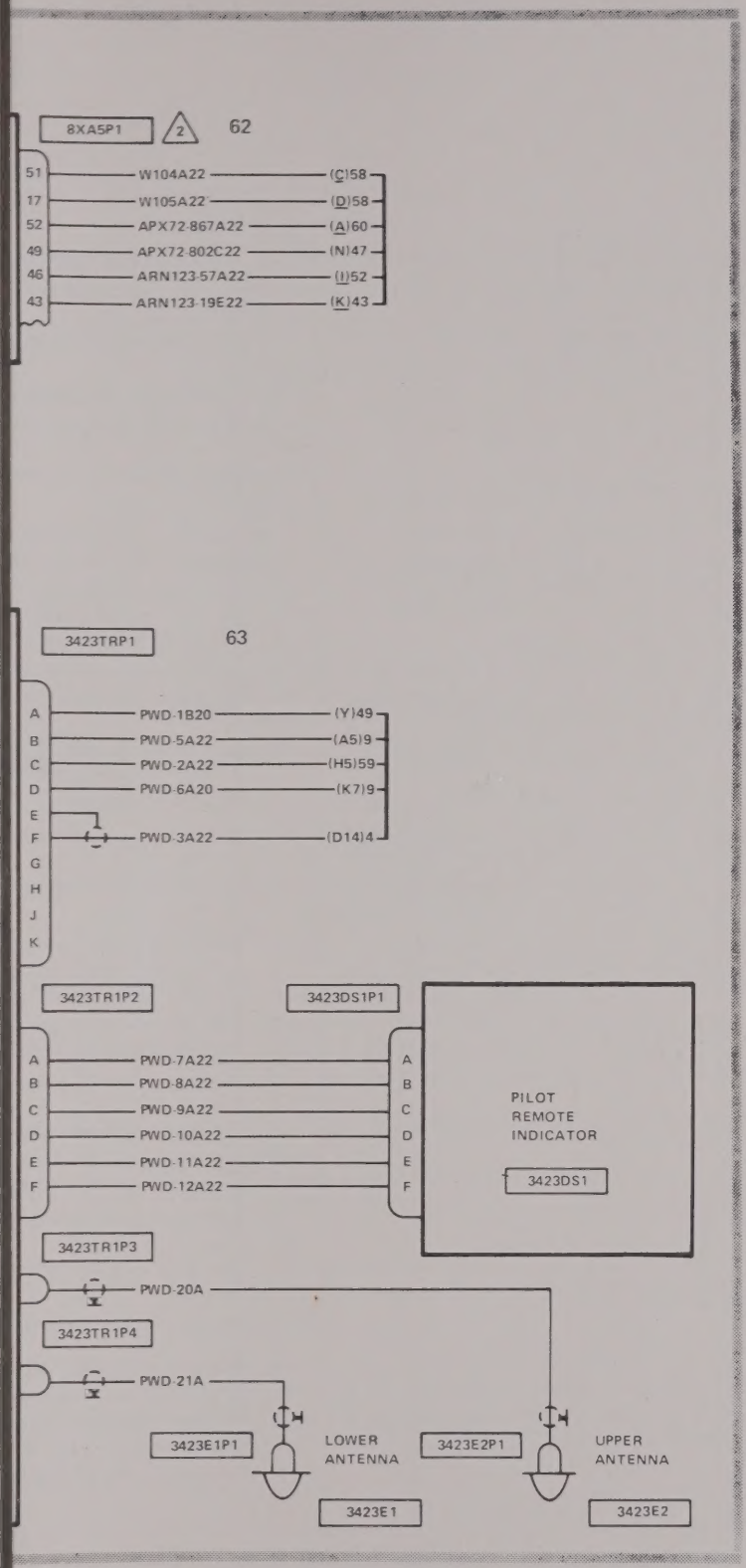


Figure FO-1. Master avionics wiring diagram (Sheet 5 of 6)



NOTES

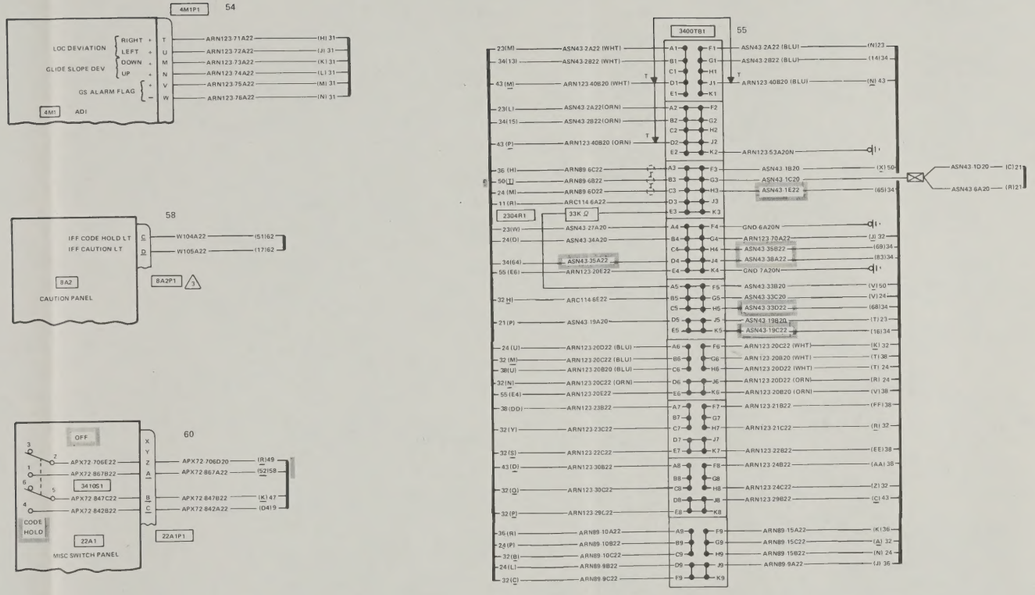
1. SEE RPM LIMIT WARNING SYSTEM WIRING DIAGRAM TM55-1520-236-23.
2. SEE INTERIOR LIGHTING SYSTEM WIRING DIAGRAM TM55-1520-236-23.
3. SEE CAUTION PANEL INTERNAL SCHEMATIC TM55-1520-236-23.
4. SEE AC AND DC POWER SYSTEMS WIRING DIAGRAM TM55-1520-236-23.
5. SYMBOL ● DENOTES SOLDER TERMINATION.

THIS SHEET USES STATION NUMBERS 54 THROUGH 63.

209077-30-6A
ELIXP-064C1

Figure FO-1. Master avionics wiring diagram (Sheet 6 of 6)





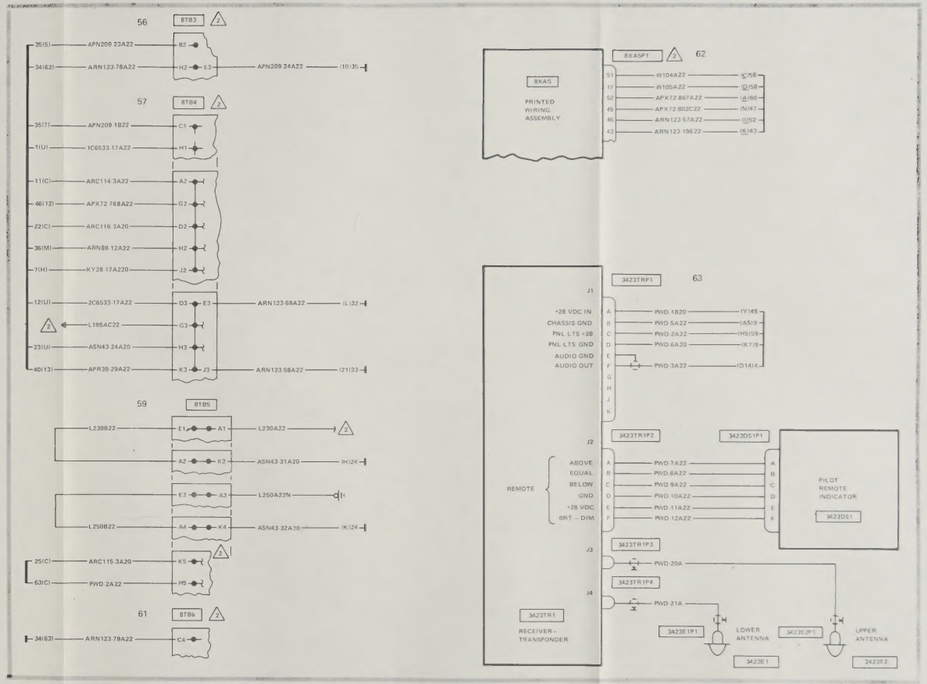


Figure FO-1. Master avionics wiring diagram (Sheet 6 of 6)