T.O. 12P3-2ALA6-2

TECHNICAL MANUAL

SERVICE INSTRUCTIONS

DIRECTION FINDER GROUP

AN/ALA-6

(HOFFMAN)

Basic And All Changes Have Been Merged To Make This A Complete Publication.

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INTRODUCTION

This Handbook of Service Instructions covers Direction Finder Group AN/ALA-6 and is prepared and furnished for the instruction, aid, and guidance of maintenance personnel of two classifications, namely, Organizational Maintenance and Field Maintenance. Sections I, II, III and IV contain general technical information and data about the equipment supplied, including a discussion of its functions and of the function of each circuit. Section V is particularly for Organizational Maintenance personnel and Section VI for Field Maintenance personnel. Section VII provides diagrams and illustrations essential for maintenance of AN/ALA-6 equipment.

Basic text coverage is provided for equipment produced under Contract No. AF 33(600)-19767. Special service instructions for equipment produced under Contract No. AF 33(600)-31638 appear in the form of Difference Data Sheets in Section VIII. Under the latter contract, due to electrical and/or mechanical modifications, the nomenclature of the 65-250 mc antenna assembly has been changed to AS-654A/ALA-6, and the nomenclature of the antenna drive unit has been changed to TG-23A/ALA-6. Except as specifically noted in the applicable Difference Data Sheets, service instructions for these units correspond to instructions in the following text.

The specifications governing the preparation of this handbook are MIL-H-6757A, MIL-H-5474A and ANA Bulletin #261.

In addition to this handbook, there are three other publications pertaining to Direction Finder Group AN/ALA-6. They are: Handbook Operating Instructions, T.O. 12P3-2ALA6-1 (formerly AN 16-30ALA6-1), 1 May 1954; Handbook Overhaul Instructions, T.O. 12P3-2ALA6-3 (formerly AN 16-30ALA6-3), revised 15 Sept 1957; and Illustrated Parts Breakdown, T.O. 12P3-2ALA6-4 (formerly AN 16-30ALA6-4).

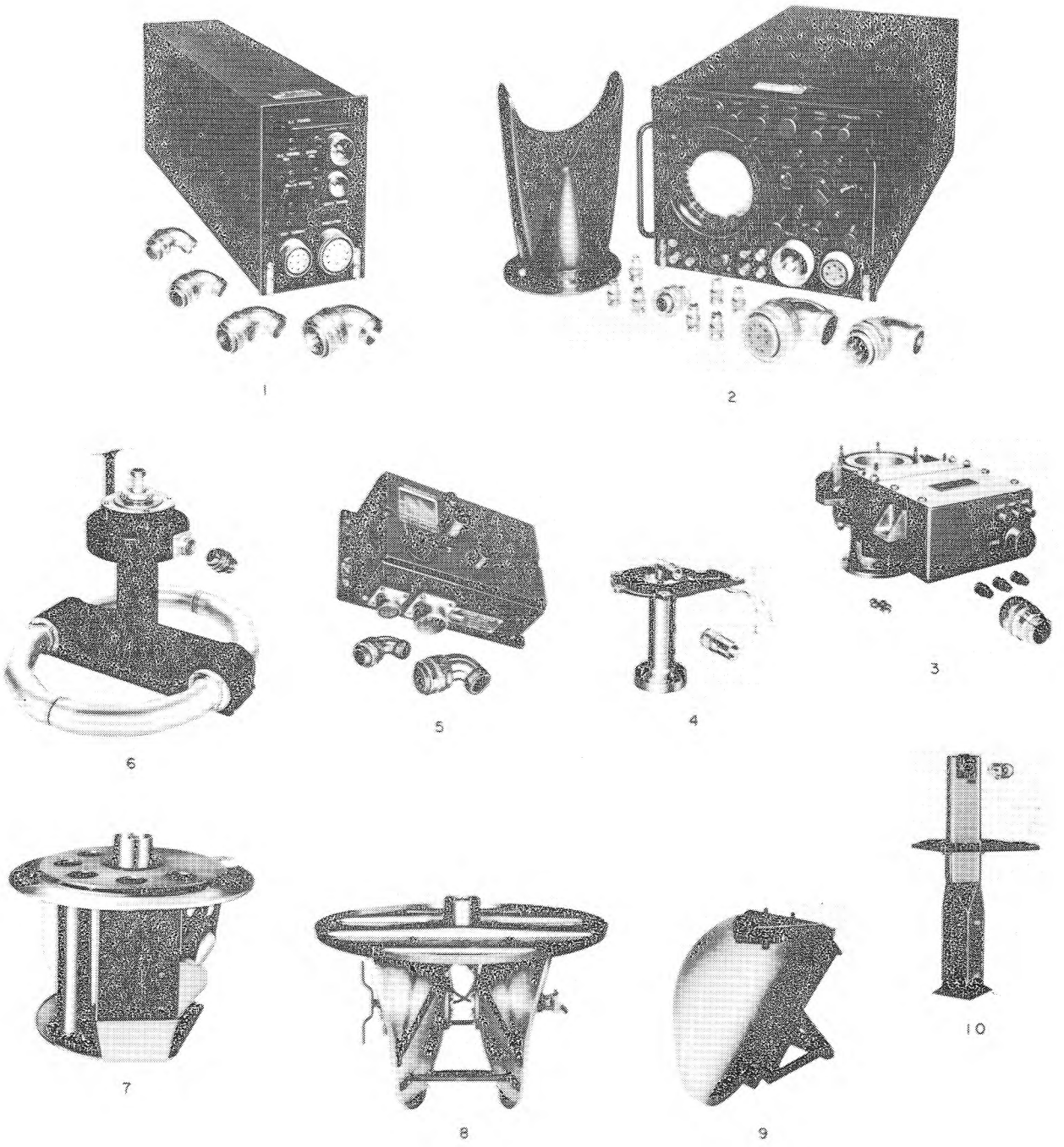

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Figure 1-1. Direction Finder Group AN/ALA-6

SECTION I
DESCRIPTION AND LEADING PARTICULARS

1-1. PURPOSE OF HANDBOOK.

1–2. This publication comprises service instructions for Direction Finder Group AN/ALA–6 manufactured by Hoffman Laboratories, Inc., Los Angeles 7, California under Contract No. AF 33(600)–19767.

1–3. The information in this handbook applies to the one existing model of AN/ALA–6 equipment.

1-4. DESCRIPTION OF EQUIPMENT (Figure 1-1).

1–5. Direction Finder Group AN/ALA–6 is an airborne electronic equipment consisting of separate, but interconnected units. The equipment comprises an indicating unit, an antenna rotating unit, four antenna assemblies and certain auxiliary units. When used with an associated radio or radar receiver, it provides visual indication on a cathode-ray tube screen of relative bearing of intercepted radio signals; and with an associated gyro flux-gate compass, it provides indication of magnetic heading of the aircraft. From these indications, the magnetic bearing of the signal source can be determined (see figure 1–2). The four AN/ALA–6 antennas each cover one part of the total frequency range of 65 to 10,750 mc. The range of each antenna and the combination of units used with each one is given in table 1–1, along with other general characteristics of the equipment. AN/ALA–6 equipment supplied is shown in figure 1–1 and listed in table 1–7. A brief description of each major unit is given in paragraphs 1–6 through 1–16.

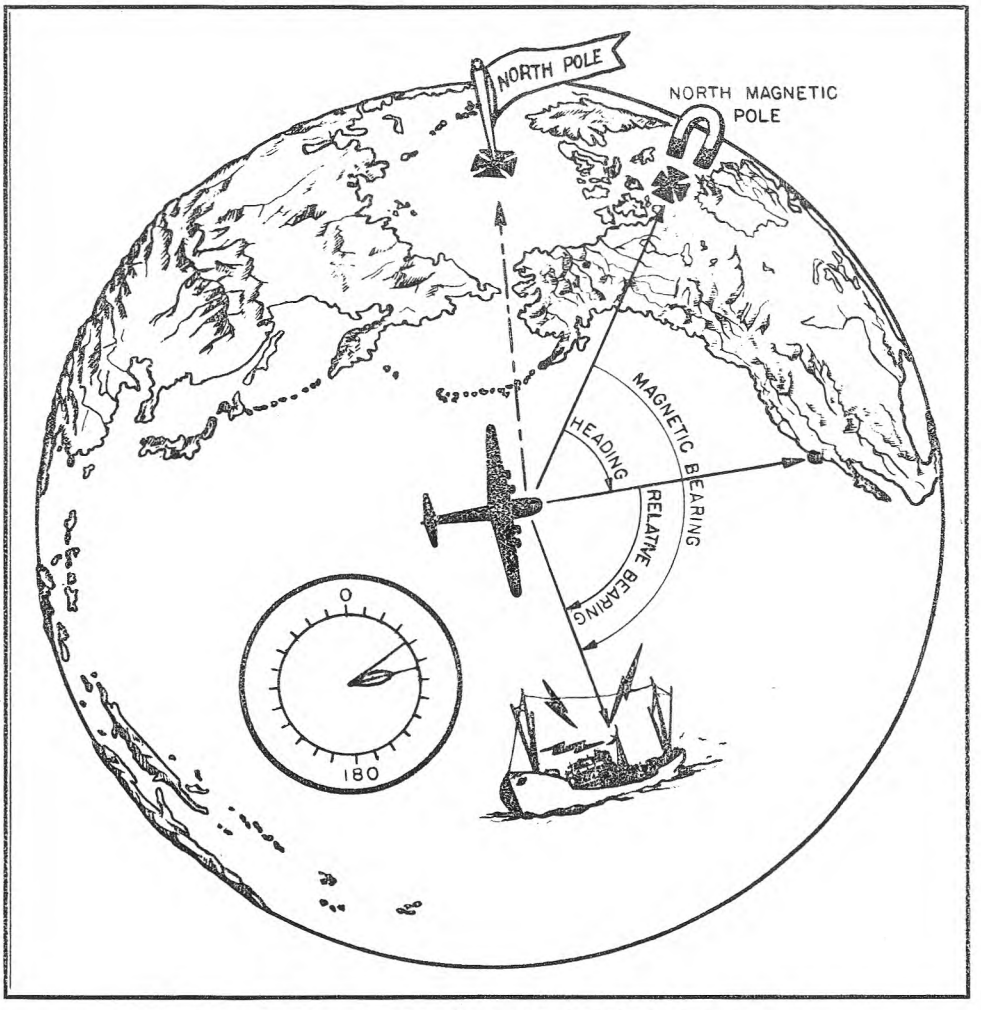


Figure 1-2. Direction Finding with AN/ALA-6 Equipment

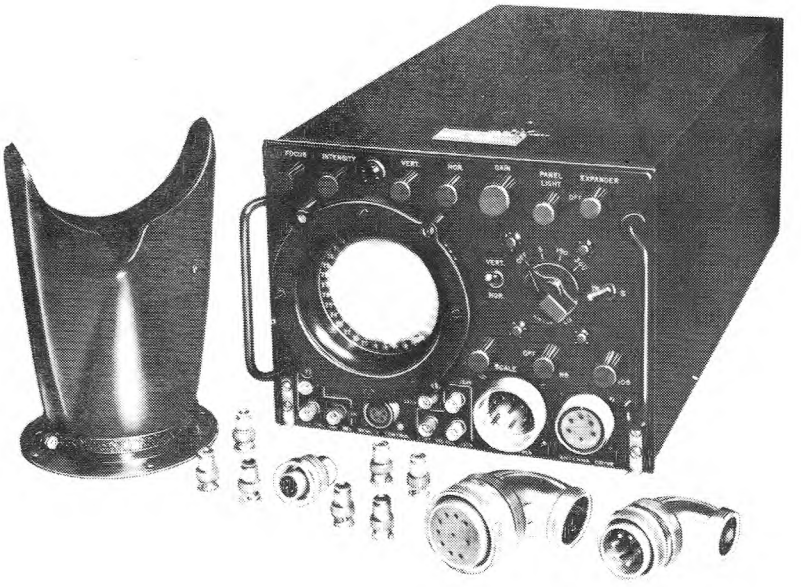


Figure 1-3. Azimuth Indicator IP-243/ALA-6

1–6. AZIMUTH INDICATOR IP–243/ALA–6. (Figure 1–3.) This unit displays the received signal on a screen having a calibration from which the signal's relative bearing can be read, and displays the aircraft heading as a repeat of the flux-gate compass reading. IP–243/-ALA–6 consists essentially of a video amplifier, deflection amplifiers, a cathode-ray tube, CRT high-voltage power supply, and other related circuitry. The chassis, panel, and dust cover of the Indicator are aluminum. All outside surfaces of the front panel and the dust cover have a black finish. The unit is designed to be shockmounted on a type MT-B1D1 mounting base.

1–7. POWER SUPPLY PP–974/ALA–6. (Figure 1–4.) This unit contains a power transformer, a rectifier and filter circuit, and other components needed to supply the operating voltages for the Direction Finder Group. It is energized from the aircraft's electrical power system. All fuses are located on the front panel of the Power Supply unit. The chassis, panel and dust cover of the Power Supply are aluminum. All outside surfaces of the front panel and the dust cover have a black finish. PP–974/ALA–6 is designed to be shockmounted on a type MT–1227/U mounting base.

1–8. ANTENNA DRIVE TG–23/ALA–6. (Figure 1–5.) This unit mounts and rotates the antenna used by the Direction Finder Group in scanning the horizon for signals. It is a mechanical and electrical assembly contained in a cast aluminum housing with mounting flanges and enclosed by cover plates. It contains a drive motor, a gear train, a drive shaft, a shaft hub for coup-

Figure 1-4. Power Supply PP-974/ALA-6

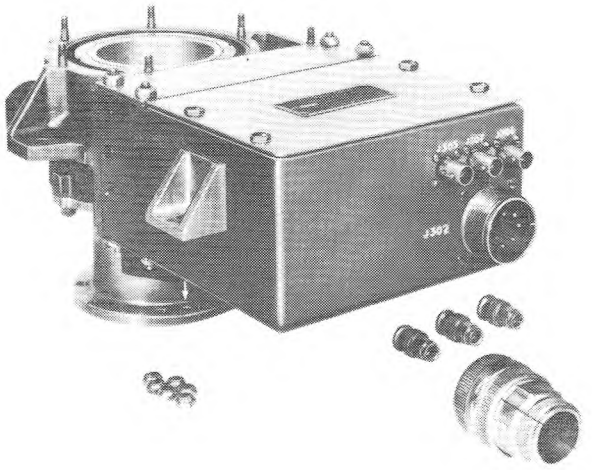


Figure 1-5. Antenna Drive TG-23/ALA-6

ling the unit to the antenna assembly, a resolver, two cam-actuated switches, a thermostat, and a heating element. Antenna Drive TG–23/ALA–6 is used with Antenna Coupler CU–398/ALA–6 (65–5000 mc) for Antenna Assemblies AS–654/ALA–6, AS–655/ALA–6 or AS–656/ALA–6. For Antenna Assembly AS–657/-ALA–6, the drive unit is used with Antenna Coupler CU–397/ALA–6 (5000–10,750 mc).

1–9. ANTENNA COUPLER CU–398/ALA–6 (65–5000 MC). (Figure 1–6.) This assembly is a coupling unit that is used with Antenna Drive TG–23/ALA–6 to mount and connect Antenna Assembly AS–654/ALA–6, AS–655/ALA–6 or AS–656/ALA–6. It is roughly pedestal-shaped. At one end is a coaxial receptacle and the antenna drive-unit cover plate that mounts the assembly to that unit. The other end has the stationary member of a rotating coaxial connector and two slip rings.

1–10. ANTENNA CONTROL C–1246/ALA–6. (Figure 1–7.) This unit provides a means of remote control of the tuning of Antenna Assembly AS–654/ALA–6 through a simple servo system. It contains a band switch, a calibrated dial, a tuning-control servo potentiometer, and a three-stage servo amplifier. Fasteners located on the base of the unit secure the base to four studs on Mounting MT–1428/ALA–6.

1–11. MOUNTING MT–1428/ALA–6. (Figure 1–7.) This is a plate used to mount Antenna Control C–1246/-ALA–6. Snap fasteners located on the base of the Antenna Control secure it to four studs on the Mounting. The plate is used with shockmounts which are not supplied as part of Direction Finder Group AN/ALA–6 equipment.

1–12. ANTENNA ASSEMBLY AS–654/ALA–6. (Figure 1–8.) This unit is a horizontally-polarized, direc-

Figure 1-6. Antenna Coupler CU-398/ALA-6 (65-5000 mc)

Figure 1-7. Antenna Control C-1246/ALA-6 with Mounting MT-1428/ALA-6

tional antenna, tuneable from 65 to 250 mc. The elements of the antenna incorporate a tuneable circuit which is remote-controlled from Antenna Control C–1246/ALA–6. The Antenna Assembly with Antenna Coupler CU–398/ALA–6 (65–5000 mc) mounts on Antenna Drive TG–23/ALA–6.

1–13. ANTENNA ASSEMBLY AS–655/ALA–6. (Figure 1–9.) This unit is a vertically- or horizontally-polarized, wide-band, directional antenna, covering the

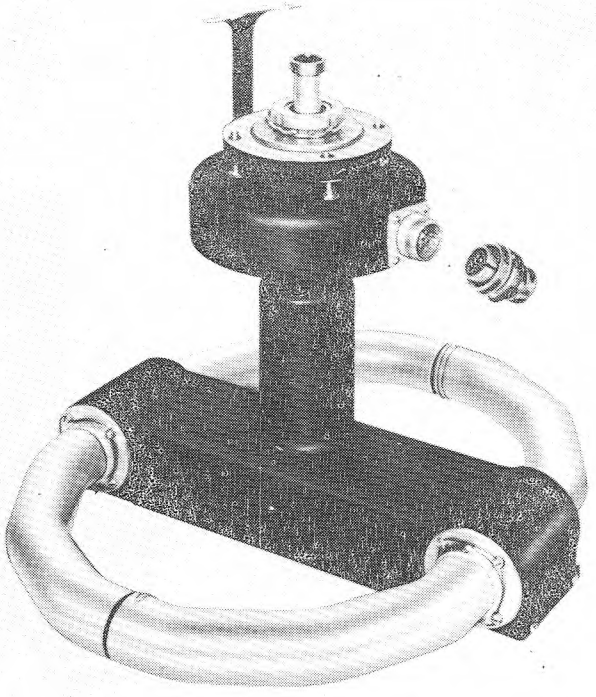


Figure 1-8. Antenna Assembly AS-654/ALA-6

range of 140 to 1200 mc. It consists of a vertical sleeve, monopole-type antenna element placed in front of and at the focal point of a reflector consisting of aluminum sheets of approximately parabolic contour, and a horizontal dipole antenna made up of two horizontal elements arranged in a 100-degree "V" also backed up by reflecting sheets. Mounted between the reflectors is a relay-operated antenna-selecting switch. Essentially unidirectional reception of vertically or horizontally polarized signals is provided by the Antenna Assembly. The Antenna Assembly with Antenna Coupler CU–398/-ALA–6 (65–5000 mc) mounts on Antenna Drive TG–23/ALA–6.

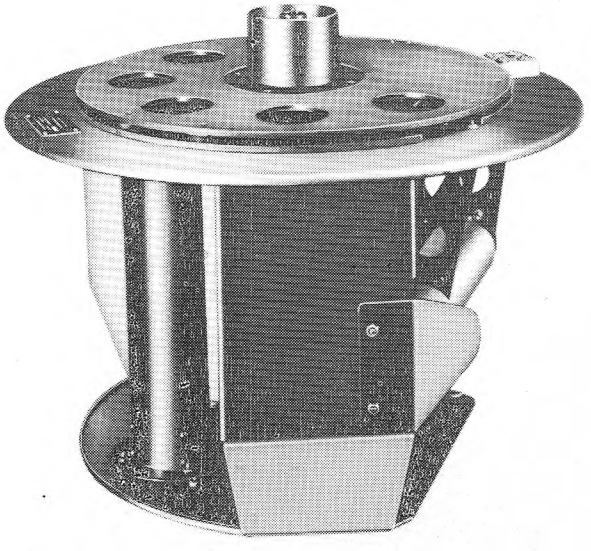


Figure 1-9. Antenna Assembly AS-655/ALA-6

1–14. ANTENNA ASSEMBLY AS–656/ALA–6. (Figure 1–10.) This unit is a vertically- or horizontally-polarized, wide-band, directional antenna, covering the range of 1000 to 5000 mc. It consists of two identical dipole antennas with stub reflectors, one mounted vertically and one horizontally, at the focal points of two parabolic reflectors which are placed back-to-back below a circular plate. One dipole is oriented for the reception of horizontally polarized signals, and the other for vertically polarized signals. Mounted between the reflectors is a relay-operated, antenna-selector switch. Essentially unidirectional reception of vertically or horizontally polarized signals is provided by the Antenna Assembly. The Antenna Assembly with Antenna Coupler CU–398/-ALA–6 (65–5000 mc) mounts on Antenna Drive TG–23/ALA–6.

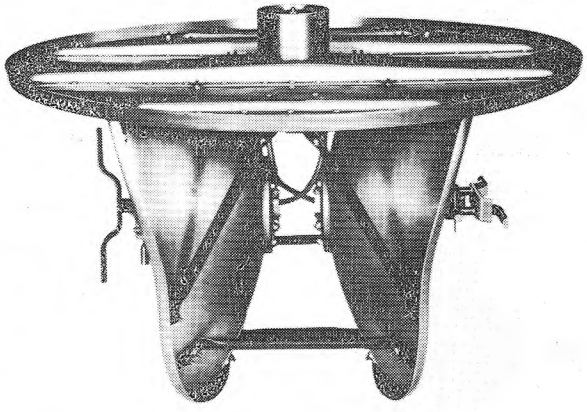


Figure 1-10. Antenna Assembly AS-656/ALA-6

1–15. ANTENNA ASSEMBLY AS–657/ALA–6. (Figure 1–11.) This unit is a wide-band, directional antenna, covering the range of 5000 to 10,750 mc. It consists of a spade-shaped, semi-parabolic reflector with supporting structure and counter weights. With Antenna Coupler CU–397/ALA–6 (5000–10,750 mc). It forms a unidirectional, open-ended waveguide antenna in which the reflector rotates in front of the open end of the non-rotating waveguide. It responds equally to vertically- and horizontally-polarized waves, and will also receive circularly-polarized waves. The Antenna Assembly with its Coupler mounts on Antenna Drive TG–23/ALA–6.

1–16. ANTENNA COUPLER CU–397/ALA–6 (5000–10,750 MC). (Figure 1–12.) This is a coupling unit that is used with Antenna Drive TG–23/ALA–6 for Antenna Assembly AS–657/ALA–6. It is a horn-shaped

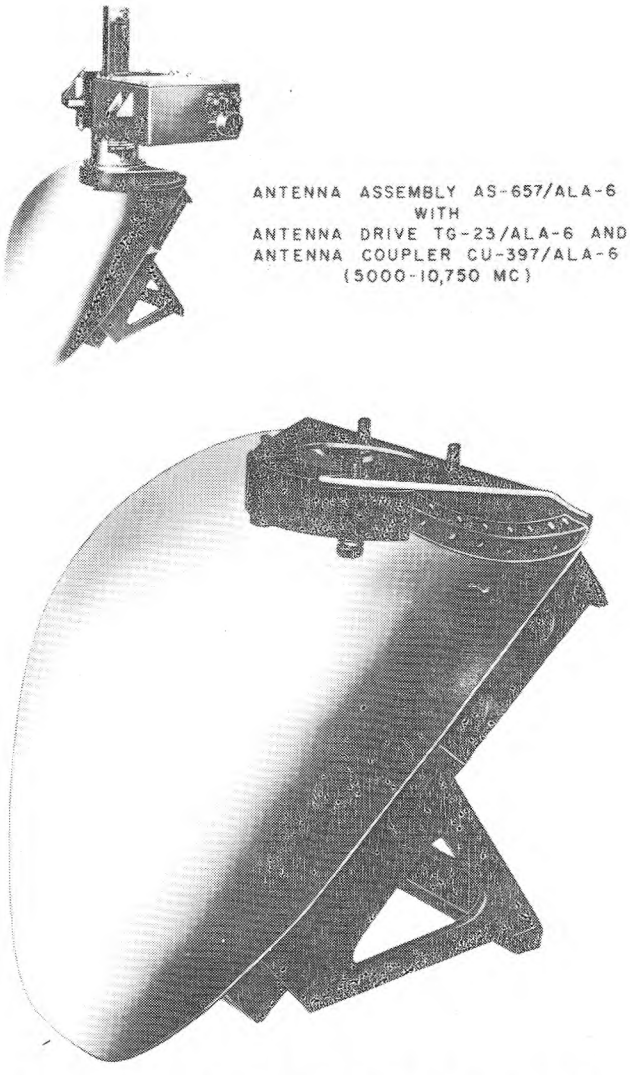


Figure 1-11. Antenna Assembly AS-657/ALA-6

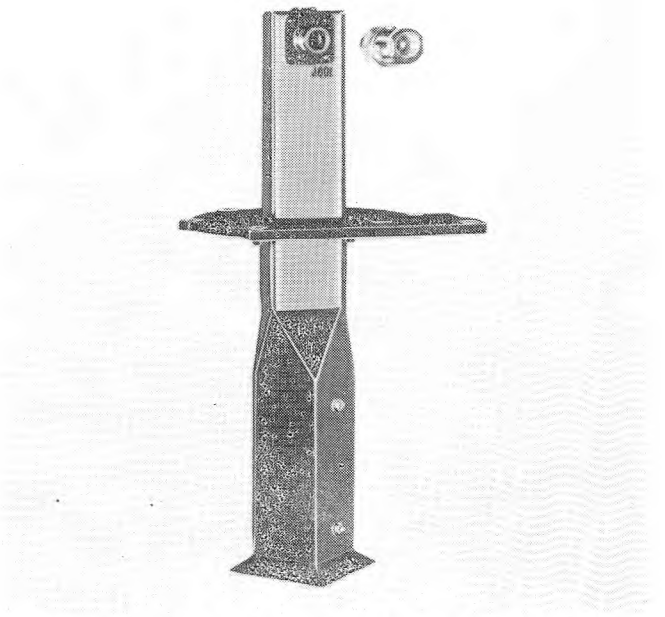


Figure 1-12. Antenna Coupler CU-397/ALA-6 (5000-10,750 mc)

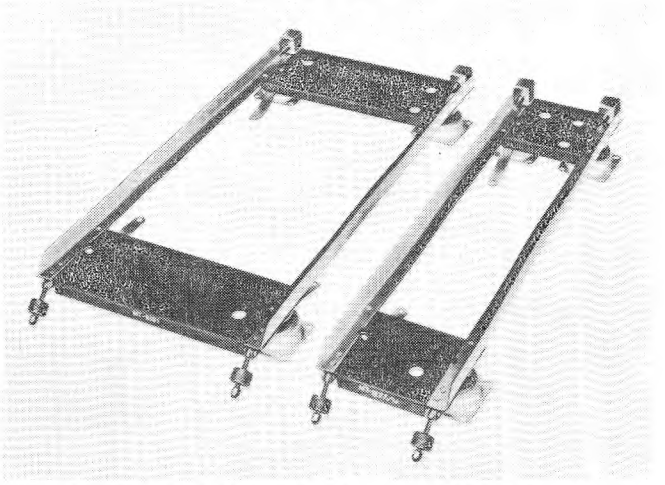


Figure 1-13. Mounting Bases MT-B1D1 and MT-1227/U

metallic structure with a square wave-guide opening at one end and a coaxial receptacle at the other end for connecting the coaxial cable to the receiver. Fastened to the horn proper is the antenna drive unit cover plate that mounts the horn to that drive unit. The Antenna Coupler remains stationary while the Antenna Assembly is rotating.

1–17. MOUNTING BASES MT–B1D1 and MT–1227/U. (Figure 1–13.) These bases are used to mount the Azimuth Indicator and the Power Supply, respectively. Each base consists of an aluminum frame equipped with four shockmounts. Ground straps are provided for obtaining electrical contact between the units and the mounting surface. Two pins in the rear of the mounting base fit into holes in the rear of the unit, and two clamp assemblies on the front of the base lock the unit in place. These bases are not supplied as part of Direction Finder Group AN/ALA–6. (See table 1–3.)

1–18. CABLES AND PLUGS. Five cables are required for inter-connecting the units of Direction Finder Group AN/ALA–6 except when Antenna Assembly AS–654/ALA–6 is used, in which case seven cables are required. Additional cables are needed to connect the AN/ALA–6 equipment to its associated receiver, compass junction box, and power sources. One plug is included for each receptacle on the AN/ALA–6 units supplied, but no cable is furnished because the cable lengths vary widely with installations in different aircraft. The plugs packaged with each unit are shown in figure 1–1 and listed in table 1–7. A more detailed view of each type of plug is given in figure 1–14. Their use is illustrated in figure 7–15 and they are listed with their corresponding cables in table 2–2 and 2–3.

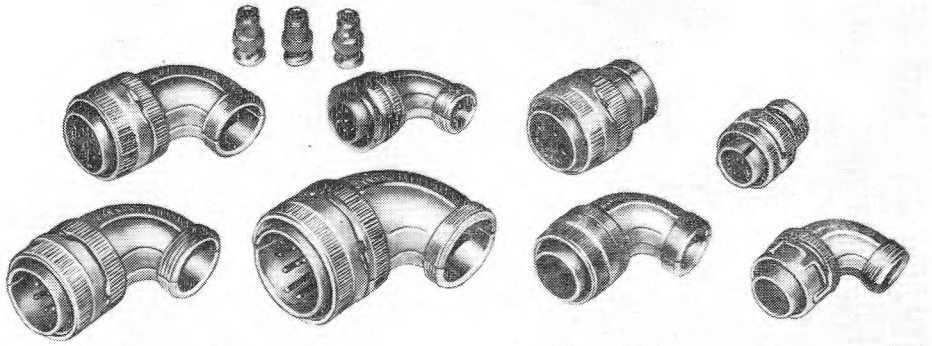


Figure 1-14. Types of Plugs Used with AN/ALA-6 Equipment

1–19. CAMERA ASSEMBLY USAF TYPE 0–20. (Figure 1–15.) This unit, which is not supplied as part of Direction Finder Group AN/ALA–6, is used with the Azimuth Indicator IP–243/ALA–6 to make photographic records of the direction-finding displays. The camera and a periscope-type adapter, for viewing, are mounted over the bezel ring of the cathode-ray tube for this use, as indicated in figure 1–15.

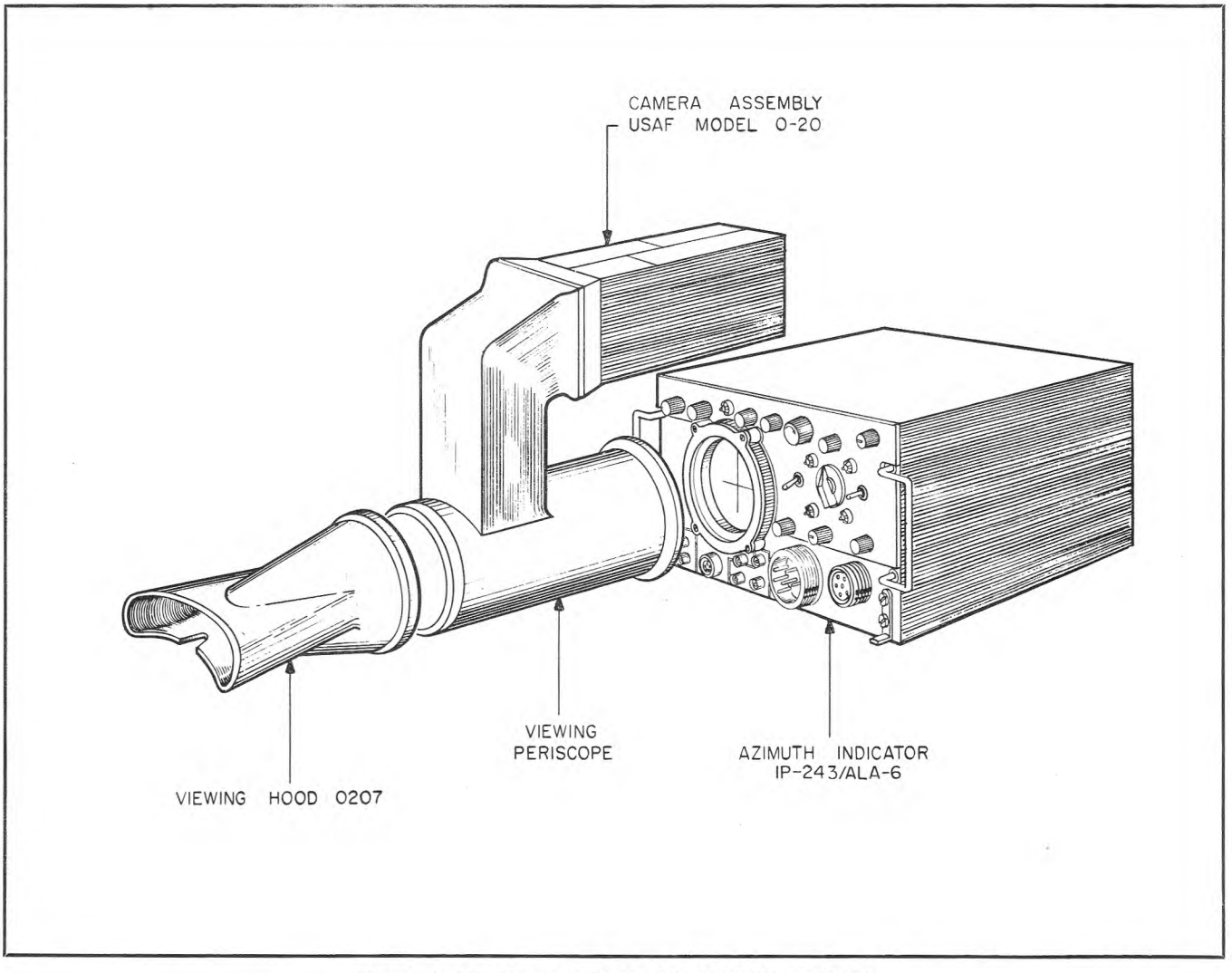


Figure 1-15. Camera Assembly USAF Type 0-20

1–20. REMOTE CONTROL BOX. A five-contact receptacle is provided on Azimuth Indicator IP–243/-ALA–6 to extend conti VERT.-HOR. switch, and EXPANDER and tols to a point more convenient to the opera .

1–21. COMPASS JUN ON BOX. This unit is used to enable Direction F...er Group AN/ALA–6 to repeat its associated gyro flux-gate compass reading. In the compass junction box is located a resolver which is controlled by, and related to, the compass indication. It is this resolver which furnishes aircraft-heading data to the Azimuth Indicator, where the heading is displayed as a radial line repeating the compass reading in degrees.

1-22. GENERAL CHARACTERISTICS.

1–23. General characteristics of Direction Finder Group AN/ALA–6 installations with each of the four antenna assemblies are given in table 1–1.

1-24. OPERATING CONTROLS.

1–25. The operating controls of Direction Finder Group AN/ALA–6 are located on the front panel of Azimuth Indicator IP–243/ALA–6 (figure 1–16) and on the panel of Antenna Control C–1246/ALA–6 (figure 1–17). The controls on the Azimuth Indicator are listed in table 1–2. The controls on the Antenna Control are listed in table 1–3.

1-26. ELECTRON TUBE COMPLEMENT.

1–27. The electron tubes used in Direction Finder Group AN/ALA–6 are listed in table 1–4.

1-28. PILOT LIGHT COMPLEMENT.

1–29. Table 1–5 lists the pilot lights used in Direction Find. Group AN/ALA–6.

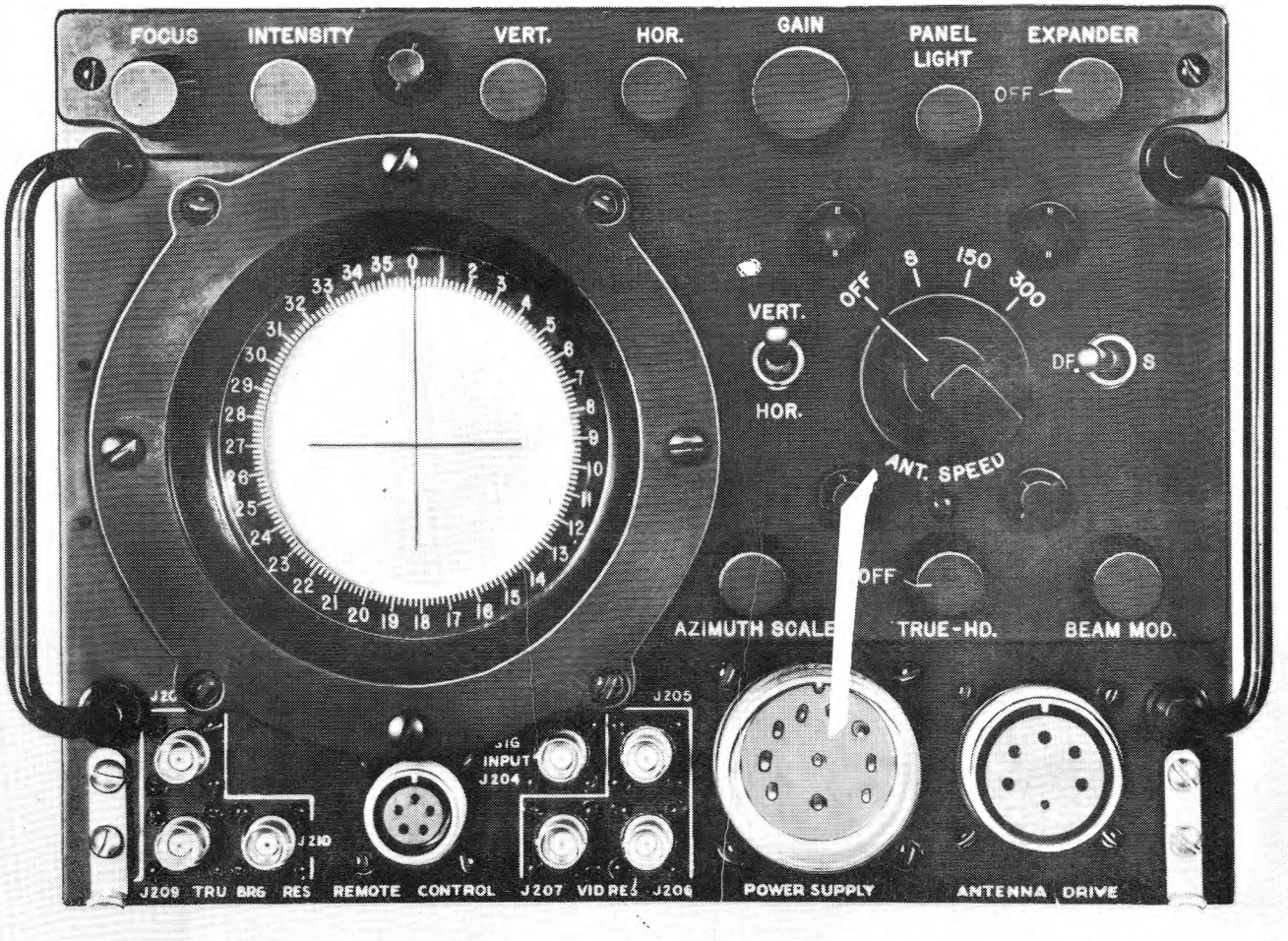


Figure 1-16. Azimuth Indicator IP-243/ALA-6 Operating Controls

TABLE 1-1

DIRECTION FINDER GROUP AN/ALA-6 GENERAL CHARACTERISTICS

Frequency Range	*Polarization of Signals Directional Reception is Provided For*	*Units Comprising Installation*	*Power Requirements*					
			115 vac 380-1000 cps 1 ph 96% PF		*115 vac 380-420 cps 1 ph 96% PF*		*27.5 vdc*	
			Amp	*Watts*	Amp	*Watts*	*Amp*	*Watts*
65 to 250 mc	Horizontal	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-654/ALA-6 Antenna Control C-1246/ALA-6 (with Mounting MT-1428/ALA-6)	1.14	126.0	0.20	21.6	5.23	144.0
140 to 1200 mc	Vertical or Horizontal†	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-655/ALA-6	1.14	126.0	—	—	5.17	142.1
1000 to 5000 mc	Vertical or Horizontal†	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-656/ALA-6	1.14	126.0	—	—	5.17	142.1
5000 to 10,750 mc	Vertical, Horizontal, Circular	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-397/ALA-6 (5000-10,750 mc) Antenna Assembly AS-657/ALA-6	1.14	126.0	—	—	5.08	139.9

† Means are provided for distinguishing between vertical and horizontal waves.

TABLE 1-2

AZIMUTH INDICATOR IP-243/ALA-6 OPERATING CONTROLS

Control	*Function*
FOCUS	Adjusts trace on cathode-ray tube for greatest sharpness of presentation.
INTENSITY	Adjusts brightness of indication on cathode-ray tube screen.
VERT.	Adjusts vertical centering of display on cathode-ray tube screen.
HOR.	Adjusts horizontal centering of display on cathode-ray tube screen.
GAIN	Adjusts gain of video amplifier of Azimuth Indicator, and thereby the radial size of a received signal pattern on cathode-ray tube screen.
PANEL LIGHT	Adjusts illumination of panel by the panel lights.
EXPANDER	Acts to enlarge radially the outer portion of signal pattern nearest the azimuth scale for the purpose of more accurately determining signal bearing.
VERT.-HOR.	Selects either vertically-polarized or horizontally-polarized antenna of Antenna Assembly AS-655/ALA-6 or AS-656/ALA-6 when one of them is being used. Has no effect with AS-654/ALA-6 or AS-657/ALA-6.
ANT. SPEED	This control incorporates the master power switch for operation of the equipment and has four positions: 1) S or standby position that turns on all the equipment except that the antenna is not rotating, 2) 150 RPM position for slow antenna rotation, 3) 300 RPM position for fast antenna rotation, and 4) OFF position which completely shuts down the equipment.
DF-S.	Provides for DF, normal operation of the Direction Finder Group as described in this handbook; or for S operation, that is operation with an auxiliary search unit (not supplied).
Azimuth Index	The longer of the crossed lines on the rotatable window in front of the cathode-ray screen is used as a pointer to more accurately read relative bearings of a displayed signal on the azimuth scale. The crossed lines help in centering the pattern and judging its proportions.
AZIMUTH SCALE	Adjusts illumination of azimuth scale around cathode-ray tube screen.
TRUE-HD.	Adjusts length of the line on the indicator screen that indicates aircraft heading. This line disappears in the OFF position of the control.
BEAM MOD.	Controls the amount of beam modulation, which acts to modulate the intensity of the electron beam on the cathode-ray tube in accordance with signal strength, in order to avoid excessive brightness at the center of the tube in the absence of signals.
PULSE POLARITY	Matches indicator video amplifier to the pulse polarity output of the associated receiver. Adjusted and set at time of installation only.

TABLE 1-3

ANTENNA CONTROL C-1246/ALA-6 CONTROLS

Control	*Function*
RANGE SELECTOR	Selects for tuning, a sector of the total tuning range of Antenna Assembly AS-654/ALA-6. Has four positions: 60-86, 77-105, 105-240, and 120-300 mc.
TUNING	Fine tunes Antenna Assembly AS-654/ALA-6 to frequency as calibrated on its dial.
—BRIGHTER→	Adjusts the illumination of calibrated tuning dial.

TABLE 1-4

DIRECTION FINDER GROUP AN/ALA-6 ELECTRON TUBE COMPLEMENT

Component	*Symbol*	*Type*	*Function*	*Location*
Azimuth Indicator IP-243/ALA-6	V201A V201B	5814A	Inverter Expander Diode	Figure 5-3
	V202	5654/6AK5W/ 6096	Video Amplifier	
	V203	5725/6AS6W	Summing Amplifier	
	V204	6005/6AQ5W/ 6095	Video Cathode Follower	
	V205	5654/6AK5W/ 6096	Beam Modulator	
	V206A V206B	5814A	Blocking Oscillator (V206B not used)	
	V207	6005/6AQ5W/ 6095	Cathode Follower	
	V208A V208B	5814A	Isolation Amplifier	
	V209A V209B	5814A	Isolation Amplifier	
	V210A V210B	5814A	Two-Channel Phase Inverter	
	V211A V211B	5670	Vertical Deflection Amplifier	
	V212A V212B	5670	Horizontal Deflection Amplifier	
	V213	1Z2	High Voltage Rectifier	
	V214	3WP1	Cathode-Ray Tube	
Power Supply PP-974/ALA-6	V101	5Y3WGT	Rectifier	Figure 5-5
	V102	5726/6AL5W	Bias Rectifier	
	V103	6080	Voltage Regulator	
	V104	5654/6AK5W/ 6096	D-C Voltage Amplifier	
	V105	5651	Voltage Reference	
Antenna Control C-1246/ALA-6	V401A V401B	5751	Amplifier Phase Inverter	Figure 5-7
	V402A V402B	5814A	Power Amplifier	

1-36. SHIPPING DATA. Contents and data for each shipping box are given in table 1-9. As indicated, some items are assembled together and shipped in one box. Revised shipping data for Contract No. AF 33(600)-31638 appears in table 1-9A.

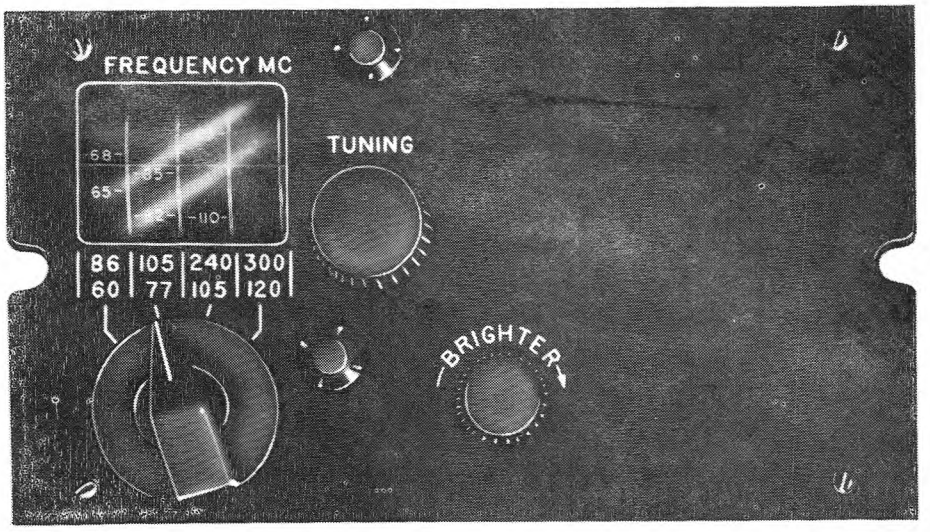


Figure 1-17. Antenna Control C-1246/ALA-6 Operating Controls

TABLE 1-5

DIRECTION FINDER GROUP AN/ALA-6 PILOT LAMP COMPLEMENT

Component	*Symbol*	*Type*	*Function*	*Location*
Azimuth Indicator IP-243/ALA-6	I201 I202 I203 I204 I205	28 V 0.40 amp AN3140-327	Illuminate front panel	Accessible on front panel assembly
	I206		Illuminates azimuth scale	Accessible on front panel assembly
Antenna Control C-1246/ALA-6	I401 I402	28 V 0.40 amp AN3140-327	Illuminate calibrated tuning dial	Accessible on front panel assembly

1-30. FUSE COMPLEMENT.

1–31. All fuses of Direction Finder Group AN/ALA–6 are located on the panel of Power Supply PP–974/-ALA–6. The fuses are listed in table 1–6.

TABLE 1-6

DIRECTION FINDER GROUP AN/ALA-6 FUSE COMPLEMENT

Symbol	*Type*	*Function*	*Location*
F101	Fuse, 4AG 3 Amp	AC Power Line	Fig. 1–4
F102	Fuse, 4AG 3 Amp	AC Power Line	
F103*	Fuse, 4AG 10 Amp	DC Power Line	
F104	Fuse, 4AG1 1 Amp	Servo Power Line	
F105	Fuse, 4AG1 1 Amp	Servo Power Line	

* Spare fuse for F103 is in fuseholder labeled "Spare".

1-32. EQUIPMENT SUPPLIED.

1–33. All the equipment supplied is illustrated in figure 1–1 and listed in table 1–7.

1-34. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1–35. Table 1–8 is a list of equipment required but not supplied.

TABLE 1-7

EQUIPMENT SUPPLIED

Quantity per Equipment	*Name of Unit*	*Army-Navy Type Designation*
1	Azimuth Indicator, including:	IP-243/ALA-6
1	Viewing Hood, Adapter and Clamp	
7	Plugs P204 through P210	UG-260/U
1	Plug P201	AN3108B-28-19S
1	Plug P202	AN3108B-22-15P
1	Plug P203	AN3106B-14S-5P
1	Power Supply, including:	PP-974/ALA-6
1	Plug P101	AN3108B-28-19P
1	Plug P102	AN3108B-22-17P
1	Plug P103	AN3108B-16S-4S
1	Plug P104	AN3108B-18-11S
1	Fuse, Spare, Type 4AG, 10 amp	
1	Antenna Drive, including:	TG-23/ALA-6
1	Plug P302	AN3106B-22-15S
3	Plugs P304, P306, P307	UG-260/U
1	Antenna Coupler, including:	CU-398/ALA-6 (65-5000 mc)
1	Plug P301	UG-21B/U
1	Antenna Control, including:	C-1246/ALA-6
1	Plug P401	AN3108B-16-1P
1	Plug P402	AN3108B-22-17S
1	Allen Wrench, 1/16 inch (mounted in antenna control unit)	
1	Mounting (less shock-mounts)	MT-1428/ALA-6
1	Antenna Assembly, including:	AS-654/ALA-6
1	Plug P501	AN3106B-16S-1S
1	Antenna Assembly	AS-655/ALA-6
1	Antenna Assembly	AS-656/ALA-6
1	Antenna Assembly	AS-657/ALA-6
1	Antenna Coupler, including:	CU-397/ALA-6 (5000-10,750 mc)
1	Plug P801	UG-21B/U
1	Operating Instructions Handbook	AN16-30ALA6-1
1	Service Instructions Handbook	AN16-30ALA6-2
1	Overhaul Instructions Handbook	AN16-30ALA6-3
1	Illustrated Parts Breakdown	AN16-30ALA6-4

NOTE: All plugs are identified in figures 1-14, 5-28 and 7-15.

TABLE 1-8

EQUIPMENT REQUIRED BUT NOT SUPPLIED

Quantity per Equipment	*Name of Unit*	*Army-Navy Type Designation*
1	Mounting Base (for Azimuth Indicator IP-243/ALA-6)	MT-B1D1
1	Mounting Base (for Power Supply PP-974/ALA-6)	MT-1227/U
1	Radio Receiver	AN/APR-1 AN/APR-4 AN/APR-5A or similar
*1 ea	Cables A through G, Coaxial	RG-62/U
*1	Cable H, Coaxial	**
*1	Cable I, Single Conductor	**
*1	Cable J, Two Conductor	**
1	Clamp, Cable	AN3057-8 or AN3057-8A
*1	Cable K, Four Conductor	**
1	Clamp, Cable	AN3057-10 or AN3057-10A
*1	Cable L, Four Conductor	**
2	Clamp, Cable	AN3057-12 or AN3057-12A
*1	Cable M, Five Conductor	**
1	Clamp, Cable	AN3057-6 or AN3057-6A
*1	Cable N, Seven Conductor	**
2	Clamp, Cable	AN3057-16 or AN3057-16A
*1	†Cable O, Seven Conductor	**
2	Clamp, Cable	AN3057-8 or AN3057-8A
*1	†Cable P, Eight Conductor	**
2	Clamp, Cable	AN3057-12 or AN3057-12A
1	Gyro Flux Gate Compass	
1	Compass Junction Box	
1	Camera Assembly	USAF Type 0-20
1	Viewing Periscope	

* The length of the cable varies with the particular installation requirements.

** The particular type of cable is determined by the installing activity.

† Used only with Antenna Assembly AS-654/ALA-6 installation.

NOTE: Cables A through P are identified in figures 5-2 and 7-15.

TABLE 1-9
SHIPPING DATA, CONTRACT NO. AF 33(600)-19767

Contents		Over-all Dimensions (Inches)			Volume (CuFt)	Weight (Pounds)
Name	Nomenclature	Length	Width	Depth		
Azimuth Indicator	IP-243/ALA-6	24-3/8	17-1/2	15-3/4	3.9	45
Power Supply	PP-974/ALA-6	28-1/2	11-1/8	12-3/8	2.3	27
Antenna Drive	TG-23/ALA-6	20-1/4	16-3/8	12-5/8	2.4	44
Antenna Coupler (Assembled and shipped together. See figure 1-6.)	CU-398/ALA-6					
Antenna Control Mounting (Assembled and shipped together. See figure 1-7.)	C-1246/ALA-6 MT-1428/ALA-6	17-7/8	11-3/4	22	2.6	7
Antenna Assembly	AS-654/ALA-6	19-3/8	17-1/8	15-3/4	3.0	
Antenna Assembly	AS-655/ALA-6	19-3/4	19-3/4	17-1/4	2.25	25
Antenna Assembly	AS-656/ALA-6	23-1/2	23-1/2	19-1/2	6.15	35
Antenna Drive	TG-23/ALA-6	19-3/4	16-1/8	28	5.16	51
Antenna Assembly	AS-657/ALA-6					
Antenna Coupler (Assembled and shipped together. See figure 1-11.)	CU-397/ALA-6					

TABLE 1-9A
SHIPPING DATA, CONTRACT NO. AF 33(600)-31638

Contents		Over-all Dimensions (Inches)			Volume (CuFt)	Weight (Pounds)
Name	Nomenclature	Length	Width	Depth		
Azimuth Indicator	IP-243/ALA-6	24-3/8	17-1/2	15-3/4	3.9	45
Power Supply	PP-974/ALA-6	28-1/2	11-1/8	12-3/8	2.3	27
Antenna Drive	TG-23A/ALA-6	23-7/8	14-1/4	10-1/4	2.0	38*
Antenna Coupler	CU-398/ALA-6	19-3/4	12-7/8	7-5/8	1.1	10**
Antenna Control	C-1246/ALA-6	15-3/8	9-5/8	18-3/4	1.6	29***
Mounting	MT-1428/ALA-6	9-3/8	6-3/8	2-3/4	0.9	1****
Antenna Assembly	AS-654A/ALA-6	20-1/4	15	15-1/4	2.8	———
Antenna Assembly	AS-655/ALA-6	19-3/4	19-3/4	17-1/4	2.25	25
Antenna Assembly	AS-656/ALA-6	23-1/2	23-1/2	19-1/2	6.15	35
Antenna Assembly	AS-657/ALA-6	13-1/8	13-1/8	13-1/2	1.5	13
Antenna Coupler	CU-397/ALA-6	19-3/4	12-7/8	7-5/8	1.1	10**

*Weights and dimensions are for two units in a shipper.
**Weights and dimensions are for three units in a shipper.
***Weights and dimensions are for six units in a shipper.
****Weights and dimensions are for unit pack. Up to 50 units are assembled in a shipper.

1-37. PHYSICAL DIMENSIONS. The dimensions and weights of the units of the equipment are given in table 1–10.

TABLE 1-10
DIRECTION FINDER GROUP AN/ALA-6
PHYSICAL DIMENSIONS & WEIGHT

Unit	Over-all Dimensions (Inches)			Weight (Pounds)
	Length	Width	Height	
Azimuth Indicator IP-243/ALA-6	21-1/8	10-9/16	7-27/32	23-1/2
Power Supply PP-974/ALA-6	21	5-7/16	7-3/4	13
Antenna Drive TG-23/ALA-6	11-5/16	7-7/8	6-1/8	12-3/4
Antenna Coupler CU-398/ALA-6 (65-5000 mc)	Assembled as part of Antenna Drive TG-23/ALA-6			
Antenna Control C-1246/ALA-6	7-9/32	5-9/32	3-5/16	1-1/2
Mounting MT-1428/ALA-6	8-25/32	4-13/32	2-9/16	1/2
Antenna Assembly AS-654/ALA-6	16	13-1/2	12	12-1/2
Antenna Assembly AS-655/ALA-6	16-1/8	16-1/8	12-3/4	13-1/2
Antenna Assembly AS-656/ALA-6	20	20	13-1/2	9-1/2
Antenna Assembly AS-657/ALA-6	12-1/8	11	13-3/8	2-1/2
Antenna Coupler CU-297/ALA-6 (5000-10,750 mc)	2-1/2	2-1/2	11-1/2	2-1/4

SECTION II
SPECIAL TEST EQUIPMENT AND SPECIAL TOOLS

2-1. TEST EQUIPMENT.

2–2. Table 2–1 lists the type of test equipment to be used in the servicing of Direction Finder Group AN/ALA–6.

TABLE 2-1

TEST EQUIPMENT REQUIRED FOR MAINTENANCE

Name	*Designation*	*Alternate*	*Application*
Test Oscillator or Signal Generator	*Test Unit* / *For Testing* Hewlett-Packard Model 608-A — Antenna Assembly: AS-654/ALA-6 614-A — AS-655/ALA-6 616-A — AS-656/ALA-6 624-B — AS-657/ALA-6	TS-189/U	To generate radio-frequency signals.
Associated Intercept Receiver	Any suitable receiver operating within the frequency range of the antenna being used or tested. Examples: AN/APR-4 AN/APR-9	Any equivalent	To receive rf signals and supply video signals to Direction Finder Group AN/ALA-6.
Power Supply	115 vac at 400 cps, 1 amp 28 vdc, 10 amp	None	To supply operating power to Direction Finder Group AN/ALA-6.
Oscilloscope	Tektronix 511-AD	Dumont Model No. 241	To check waveforms in video circuits.
Vacuum Tube Voltmeter	Radio City Model No. 662	Or equivalent	To check a-c and d-c voltages and resistances.
Electron Tube Tester	Hickok Model 539A	Hickok 538	To test electron tubes.
Pulse Voltage Divider	TS-89/AP	Or equivalent.	To reduce pulse voltage level.
Pulse Generator	Hewlett-Packard Model 212A	Or equivalent.	To generate test pulses.
Capacitor Tester	Oxford-Tartac Model CT-400	Or equivalent.	To test condensers.

2-3. SPECIAL TOOLS NOT REQUIRED.

2–4. There are no special tools required for servicing Direction Finder Group AN/ALA–6.

2-5. CABLE FABRICATION.

2–6. Complete information for the fabrication of coaxial cables is listed in table 2–2. For the installation of plugs on coaxial cables A, B, C, D, E, F, G, and H, refer to the illustration of figure 2–1.

2–7. The interconnecting cables required for an AN/ALA–6 installation are illustrated in figure 7–15. Plugs for these cables are supplied, as listed in table 7–1 and shown in figure 1–14. Bulk cable for making up the required lengths of interconnecting cables for the particular installation is to be obtained from general supply.

2–8. Fabrication data for the coaxial cables, A through H, is given in figure 2–1 and table 2–2.

2–9. Fabrication data for the multi-conductor cables, I through P, is given in table 2–3; and details of an AN plug, typical of those listed in table 2–2, are illustrated in figure 2–2.

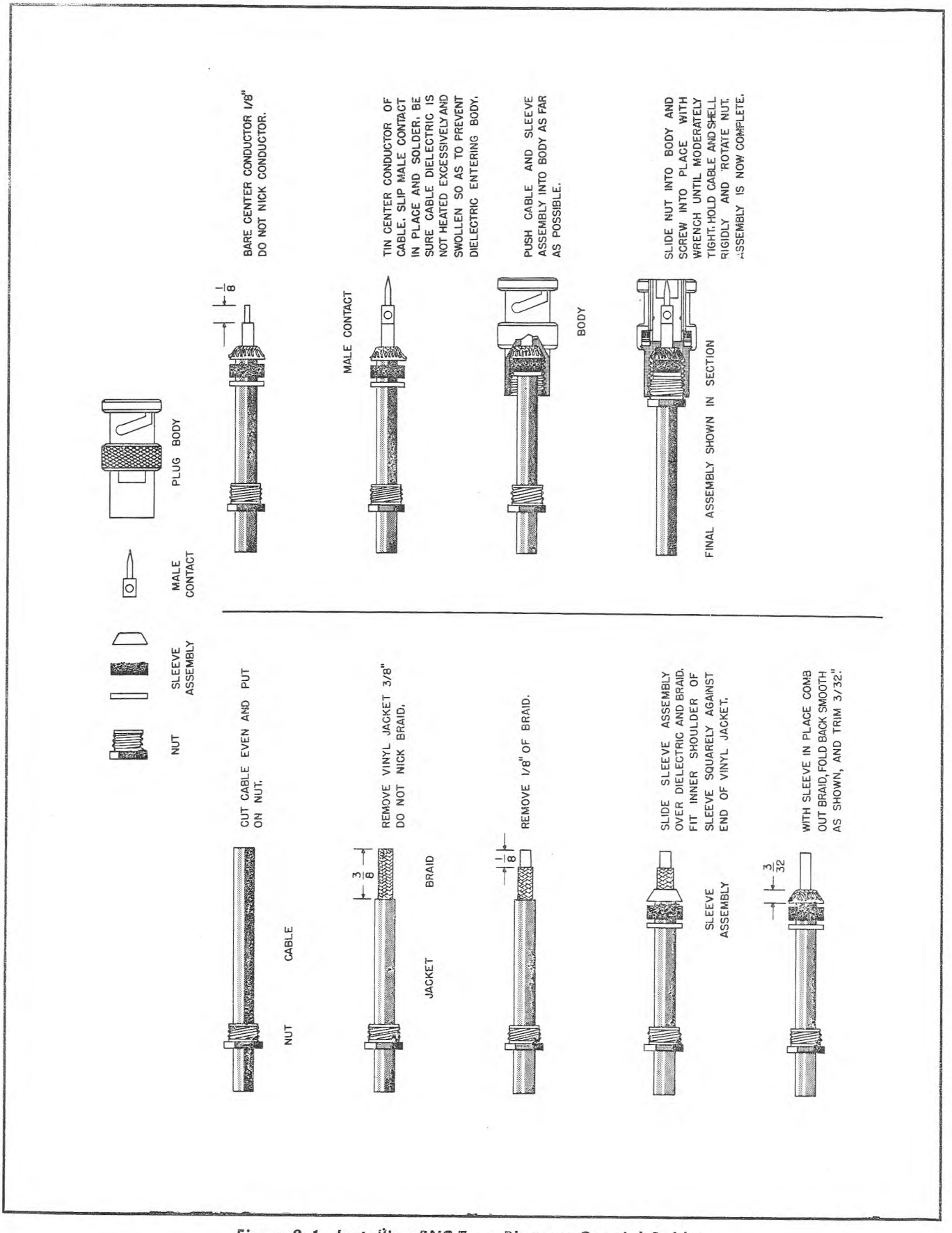


Figure 2-1. Installing BNC Type Plugs on Coaxial Cables

TABLE 2-2

COAXIAL CABLES, PLUGS AND JACKS

*Cable**	*From*		*To*		*Type of Cable*	*Plug*	*Type of Plug*
	Equipment	*Jack*	*Equipment*	*Jack*			
A	Azimuth Indicator IP-243/ALA-6	J208	Compass Junction Box**		RG-59/U	P208	UG-260/U
B	IP-243/ALA-6	J209	Compass Junction Box**		RG-59/U	P209	UG-260/U
C	IP-243/ALA-6	J210	Compass Junction Box**		RG-59/U	P210	UG-260/U
D	IP-243/ALA-6	J204	Receiver Output**		RG-59/U	P204	UG-260/U
E	IP-243/ALA-6	J207	Antenna Drive	J307	RG-59/U	P207	UG-260/U
			TG-23/ALA-6		RG-59/U	P307	UG-260/U
F	IP-243/ALA-6	J206	TG-23/ALA-6	J306	RG-59/U	P206	UG-260/U
					RG-59/U	P306	UG-260/U
G	IP-243/ALA-6	J205	TG-23/ALA-6	J305	RG-59/U	P205	UG-260/U
					RG-59/U	P305	UG-260/U
H	Antenna Coupler CU-398/ALA-6 For: Antenna Assemblies AS-654/ALA-6 AS-655/ALA-6 AS-656/ALA-6	J301	Receiver Antenna Input**		RG-9/U	P301	UG-21B/U
	Also Antenna Coupler CU-397/ALA-6 For: Antenna Assembly AS-657/ALA-6	J801	Receiver Antenna Input**		RG-9/U	P801	

* See figure 7-15 for use of each cable.
** Not supplied.

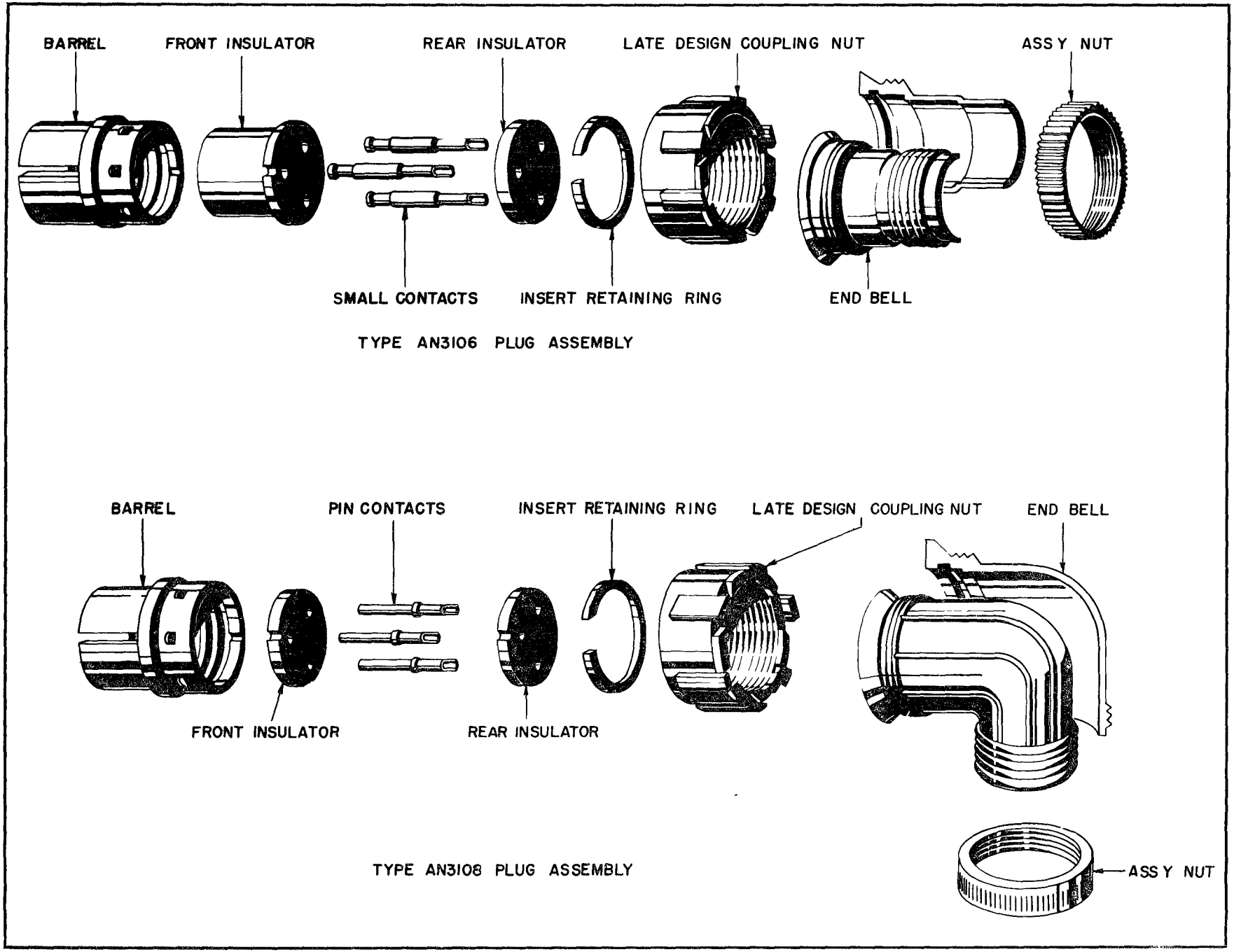


Figure 2-2. Exploded View of Type AN Plugs (Typical) Showing Assembly Sequence

TABLE 2-3

MULTI-CONDUCTOR CABLE FABRICATION

Cable	From		To		From		Via Wire	To	
	Unit	Jack	Unit	Jack	Type of Plug	Pin		Plug	Pin
I	Antenna Drive TG-23/ALA-6	J302	Compass*	——	AN3106-22-15S (P302)	——	See Camera requirements	——	——
J	Aircraft electrical power supply	——	Power Supply PP-974/ALA-6	J103	See power requirements	——	No. 18, AWG	AN3108B-16S-4S (P103)	A
							No. 18, AWG	AN3108B-16S-4S (P103)	B
K	Aircraft electrical power supply	——	Power Supply PP-974/ALA-6	J104	See power requirements	——	No. 18, AWG	AN3108B-18-11A (P104)	A
						——	No. 14, AWG	AN3108B-18-11A (P104)	B
						——	No. 18, AWG	AN3108B-18-11A (P104)	C
						——	No. 14, AWG	AN3108B-18-11A (P104)	D
L	Azimuth Indicator IP-243/ALA-6	J202	Antenna Drive TG-23/ALA-6	J302	AN3108B-22-15P (P202)	A	No. 14, AWG	AN3106-22-15S (P104)	A
					AN3108B-22-15P (P202)	B	No. 14, AWG	AN3106-22-15S (P104)	B
					AN3108B-22-15P (P202)	C	No. 14, AWG	AN3106-22-15S (P104)	C
					AN3108B-22-15P (P202)	D	No. 14, AWG	AN3106-22-15S (P104)	D
M	Azimuth Indicator IP-243/ALA-6	J203	Remote Control Box*	——	AN3106B-14S-5P (P203)	——	See Remote Control Box* requirements	——	——
N	Power Supply PP-974/ALA-6	J101	Azimuth Indicator IP-243/ALA-6	J201	AN3108B-28-19P (P101)	A	No. 18, AWG	AN3108B-28-19S (P201)	A
					AN3108B-28-19P (P101)	B	No. 18, AWG	AN3108B-28-19S (P201)	B
					AN3108B-28-19P (P101)	C	No. 14, AWG	AN3108B-28-19S (P201)	C
					AN3108B-28-19P (P101)	H	No. 20, AWG	AN3108B-28-19S (P201)	H
					AN3108B-28-19P (P101)	J	No. 14, AWG	AN3108B-28-19S (P201)	J
					AN3108B-28-19P (P101)	K	No. 14, AWG	AN3108B-28-19S (P201)	K
					AN3108B-28-19P (P101)	L	No. 20, AWG	AN3108B-28-19S (P201)	L
O	Antenna Control C-1246/ALA-6	J401	Antenna Assembly AS-654/ALA-6	J501	AN3108B-16S-1P (P401)	A	No. 18, AWG	AN3106B-16S-1S (P501)	A
					AN3108B-16S-1P (P401)	B	No. 20, AWG	AN3106B-16S-1S (P501)	B
					AN3108B-16S-1P (P401)	C	No. 20, AWG	AN3106B-16S-1S (P501)	C
					AN3108B-16S-1P (P401)	D	No. 20, AWG	AN3106B-16S-1S (P501)	D
					AN3108B-16S-1P (P401)	E	No. 14, AWG	AN3106B-16S-1S (P501)	E
					AN3108B-16S-1P (P401)	F	No. 20, AWG	AN3106B-16S-1S (P501)	F
					AN3108B-16S-1P (P401)	G	No. 14, AWG	AN3106B-16S-1S (P501)	G
P	Power Supply PP-974/ALA-6	J102	Antenna Control C-1246/ALA-6	J402	AN3108B-22-17P (P102)	A	No. 18, AWG	AN3108B-22-17S (P402)	A
					AN3108B-22-17P (P102)	B	No. 18, AWG	AN3108B-22-17S (P402)	B
					AN3108B-22-17P (P102)	C	No. 16, AWG	AN3108B-22-17S (P402)	C
					AN3108B-22-17P (P102)	D	No. 20, AWG	AN3108B-22-17S (P402)	D
					AN3108B-22-17P (P102)	E	No. 20, AWG	AN3108B-22-17S (P402)	E
					AN3108B-22-17P (P102)	F	No. 20, AWG	AN3108B-22-17S (P402)	F
					AN3108B-22-17P (P102)	G	No. 14, AWG	AN3108B-22-17S (P402)	G
					AN3108B-22-17P (P102)	H	No. 14, AWG	AN3108B-22-17S (P402)	H

* Not supplied.

SECTION III
PREPARATION FOR USE AND RESHIPMENT

3-1. PACKING.

3–2. The units of Direction Finder Group AN/ALA–6 are packed three different ways; namely, (1) for export shipment, (2) for domestic shipment, and (3) for commercial shipment.

3–3. EXPORT PACKAGING AND PACKING. A wood box is used as the shipping container for export shipments. Typical examples are shown in figure 3–1. This box is lined with a waterproof paper and sealed water-tight when closed. Inside the shipping box is packed one package of equipment (except for the Antenna Control C–1246/ALA–6, which is generally packed six packages to the wooden shipping box). The units of the equipment are packaged in double fiberboard cartons with a waterproof, vaporproof barrier between the inner carton and the outer carton. With the equipment inside the inner carton are placed bags of a desiccant, which absorbs moisture and keeps the equipment dry inside the vaporproof barrier. Various corrugated fiberboard fillers, trays, plates, etc., and wooden cradles are used to fit the particular unit into the inner carton and protect from damage, as illustrated in figures 3–2 through 3–6.

3–4. DOMESTIC PACKAGING AND PACKING. Equipment for domestic shipment is packaged the same as for export, but is not packed in a wood shipping container. The outer carton of the double-carton package serves as the shipping container. See figure 3–1. The vaporproof barrier, humidity indicator, and desiccant are included and the other details of each package are the same. See figures 3–2 through 3–6.

3–5. COMMERCIAL PACKAGING AND PACKING. Equipment for commercial shipment is packaged and packed in the same manner as equipment intended for domestic shipment except that no vaporproof barrier, humidity indicator, or desiccant is included. The details inside each package are illustrated in figures 3–2 through 3–6, except that the desiccant is omitted. An outer fiberboard carton is used as the shipping container without a barrier or humidity indicator; see figure 3–1.

3-6. GENERAL UNPACKING PROCEDURE. To unpack a unit of AN/ALA–6 equipment proceed as follows. Use care to preserve the shipping containers, packages and packaging materials as much as possible for future use in reshipment or storage of the equipment.

Step 1. If the shipping container is a wood box, break the steel binding straps, remove the nails from the top cover with a nail puller, and lift off the cover.

Step 2. Turn the box over carefully and lift it off the fiberboard carton(s).

Step 3. Open the outer fiberboard carton by tearing open the flaps or cutting off the top with a guarded-blade type opener. (This carton is the shipping container for domestic or commercial shipments.)

Step 4. Open the barrier bag (not in domestic) by cutting it off right next to the closing seam, so it can later be resealed; and inspect the humidity indicator. A blue color on the indicator shows that it has remained dry inside the barrier; a pink color indicates that the moisture content of the air inside the package is above the prescribed limit. If the equipment has been stored for a long time under high humidity conditions, its performance may be affected.

Step 5. Open the inner carton and remove the contents. See figures 3–2 through 3–6 for details. Remove all packaging materials. Dismount items from wood cradles by removing the mounting bolts.

Step 6. Check the items of each package against the packing list (if any) and against the items listed in table 1–7.

Step 7. Inspect all items carefully for any damage incurred during shipment or long-time storage. Look for scratches, dents, bent handles, broken or bent receptacles, loose screws or nuts, and rust or corrosion. Turn each control to see that it rotates freely and smoothly. Report any apparent damage to the Officer-in-Charge. If the units appear normal, they are ready for installation and use.

Step 8. Store all packaging and packing materials, except the humidity indicator and desiccant, in the shipping container for future use.

3-7. INTERCOMPONENT CABLING.

3–8. The cabling required to interconnect the units of Direction Finder Group AN/ALA–6 for regular use is illustrated in figure 7–15 and their fabrication is described in paragraph 2–5.

3-9. REPACKAGING AND PACKING FOR RESHIPMENT OR STORAGE.

3–10. Whenever it becomes necessary to reship or store the equipment, repackage and repack it as follows:

Step 1. Reassemble the packaging material and unit, with its plugs, in the inner carton as indicated in the corresponding figure of 3–2 through 3–6. Insert the proper amount of fresh desiccant for domestic or export shipment or long-time storage.

Step 2. Seal the inner carton with approved tape.

Step 3. Insert the inner carton into the barrier bag and insert both into the outer carton. Place a fresh humidity indicator on top of the inner carton. Barrier and indicator are not used for commercial shipment or temporary storage under good conditions.

Step 4. Remove excess air from the barrier bag with a suction exhaust or by folding it to conform closely to the shape of the inner carton, and seal the barrier (vaporproof) in an approved manner.

Step 5. Close and seal the outer carton with an approved tape over each seam and crack. This carton is the shipping container for domestic or commercial shipment.

Step 6. For export shipment, place the package(s) in the wood shipping box, nail on the cover, and strap the box with steel straps according to the approved method.

Step 7. Label the shipping container to indicate the contents, etc.

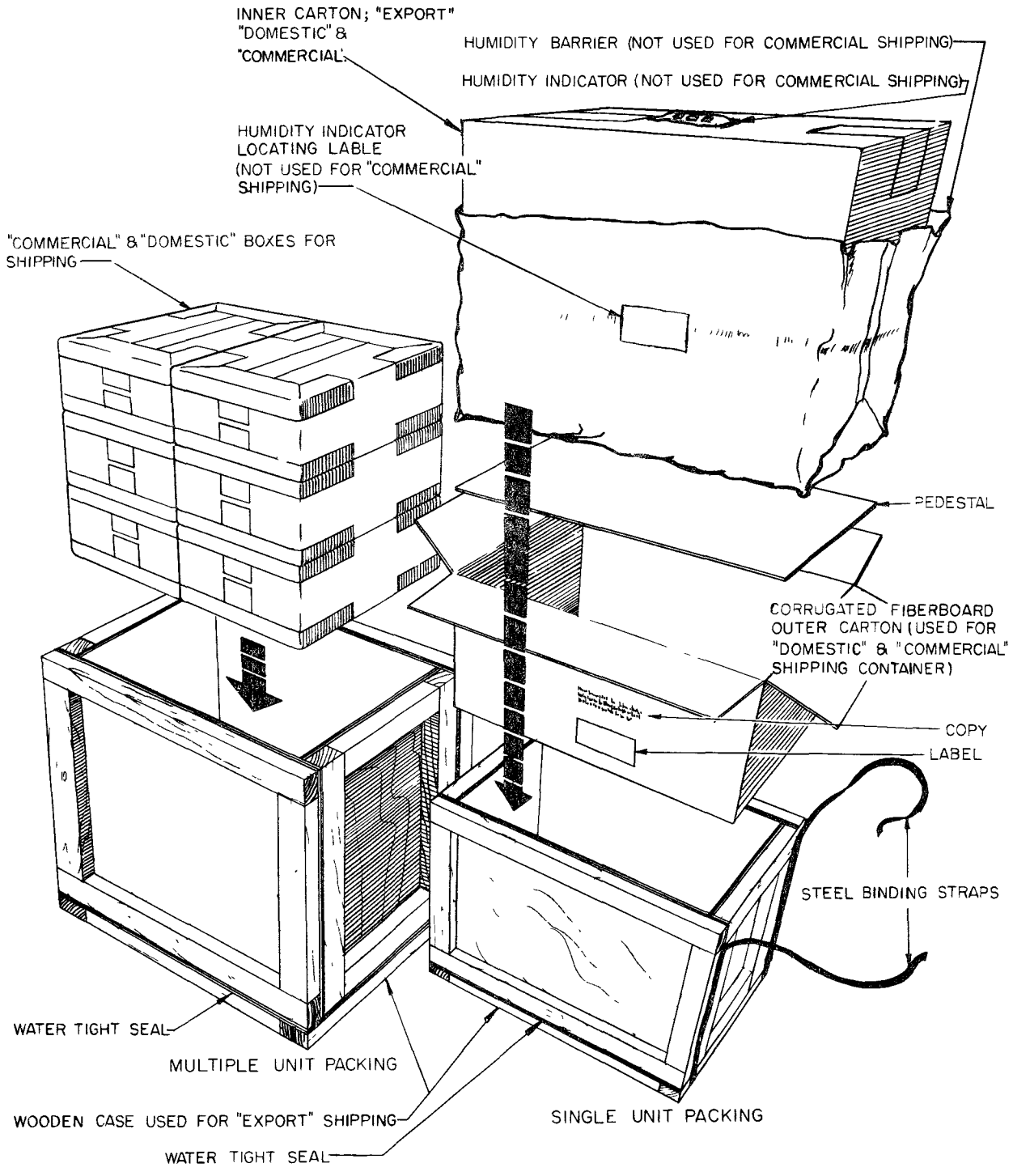


Figure 3-1. Shipping Containers (Typical)

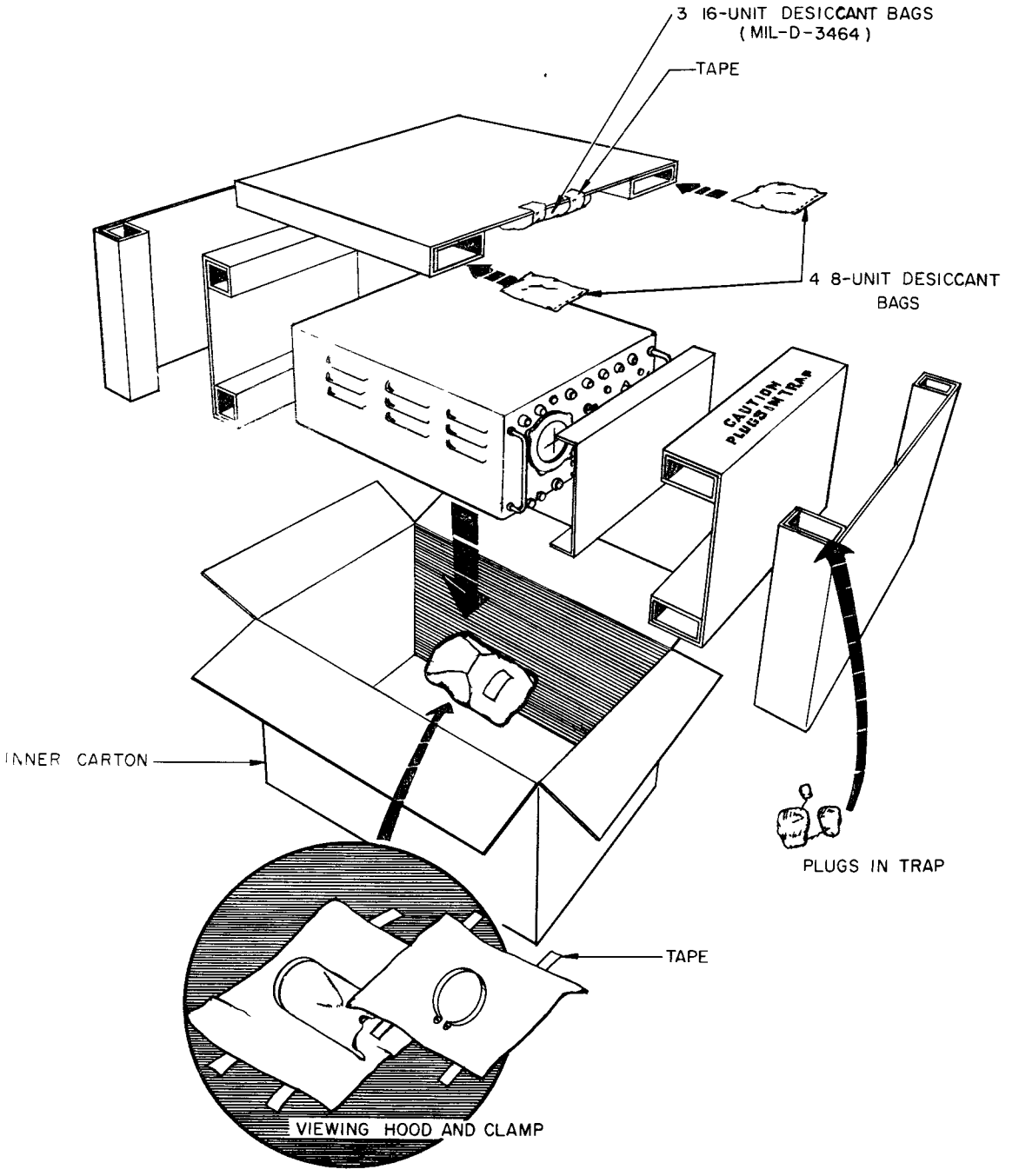
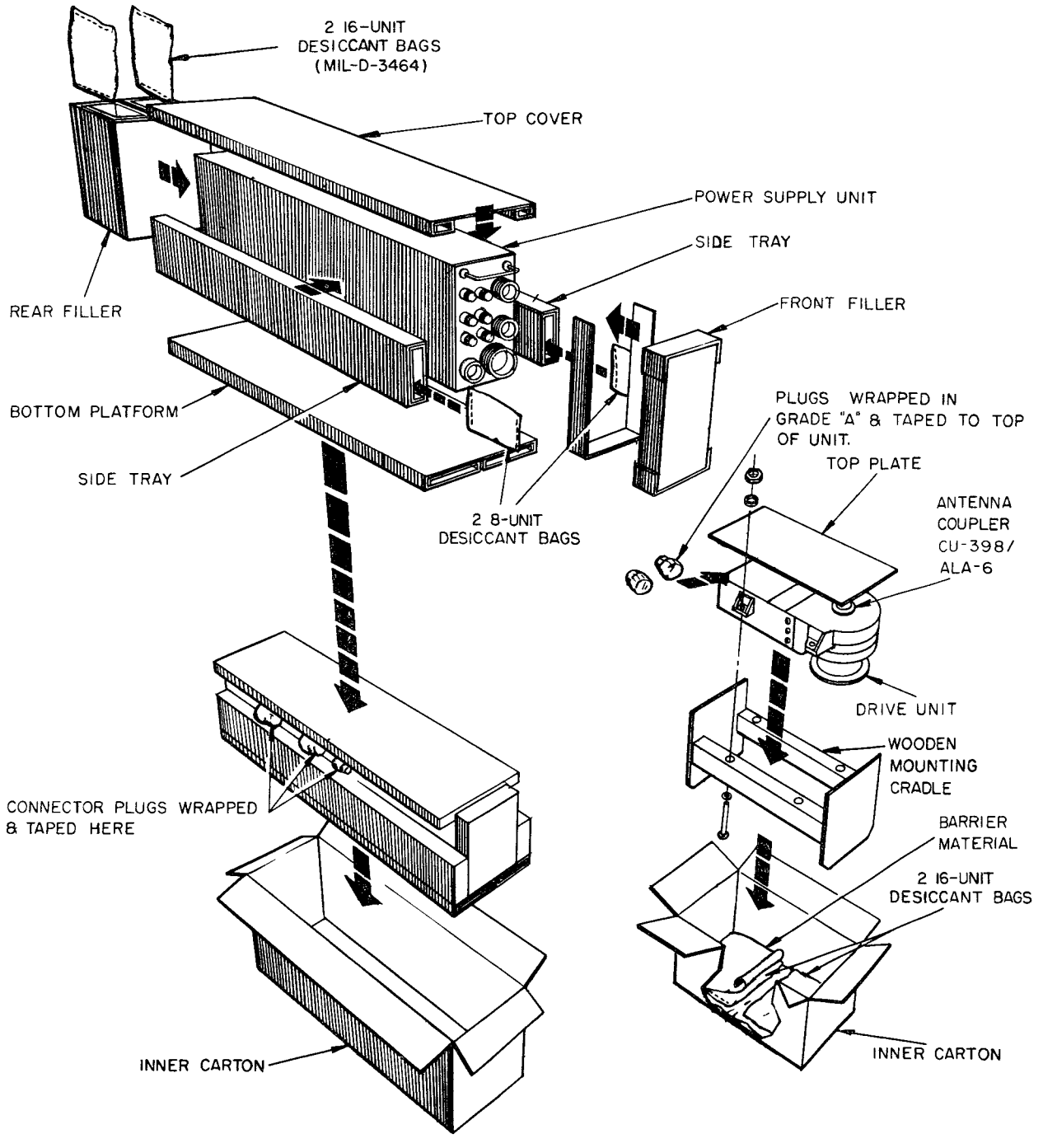


Figure 3-2. Packaging of Azimuth Indicator IP-243/ALA-6



POWER SUPPLY PP-974/ALA-6

ANTENNA DRIVE TG-23/ALA-6
(WITH ANTENNA COUPLER CU-398/ALA-6 MOUNTED IN POSITION)

Figure 3-3. Packaging of Power Supply PP-974/ALA-6 and Antenna Drive TG-23/ALA-6

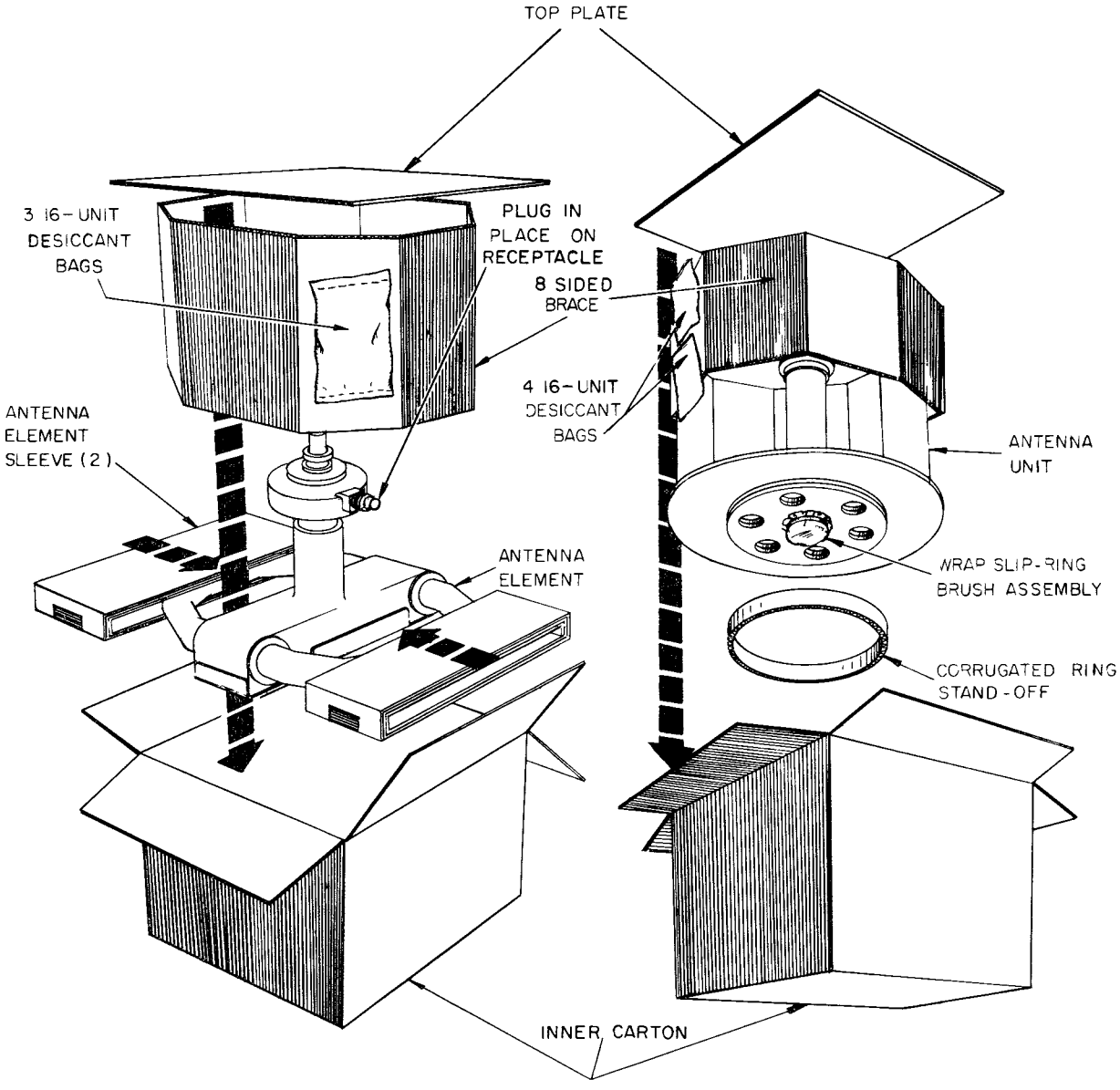


Figure 3-4. Packaging of Antenna Assembly AS-654/ALA-6 and AS-655/ALA-6

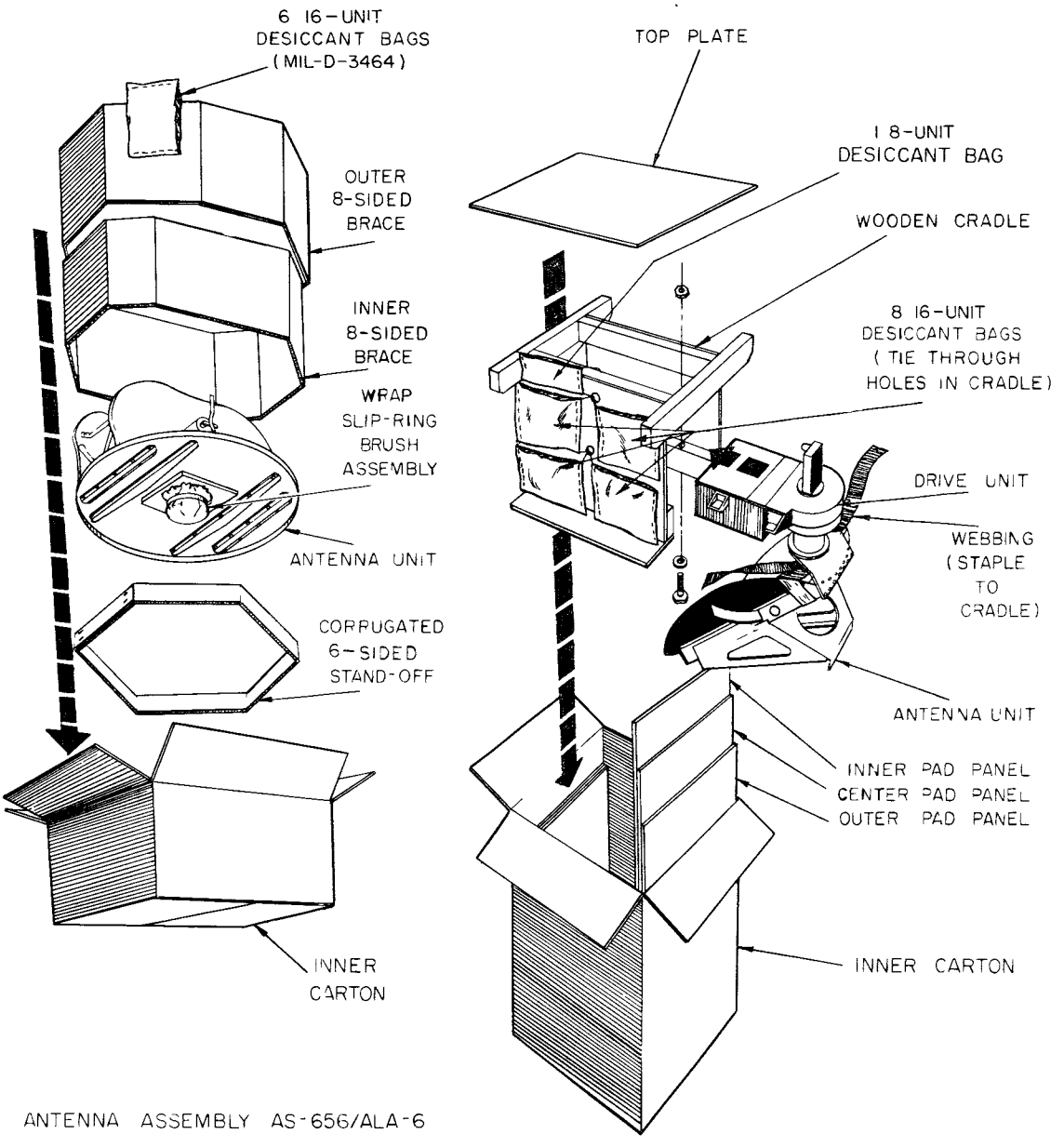


Figure 3-5. Packaging of Antenna Assembly AS-656/ALA-6 and AS-657/ALA-6

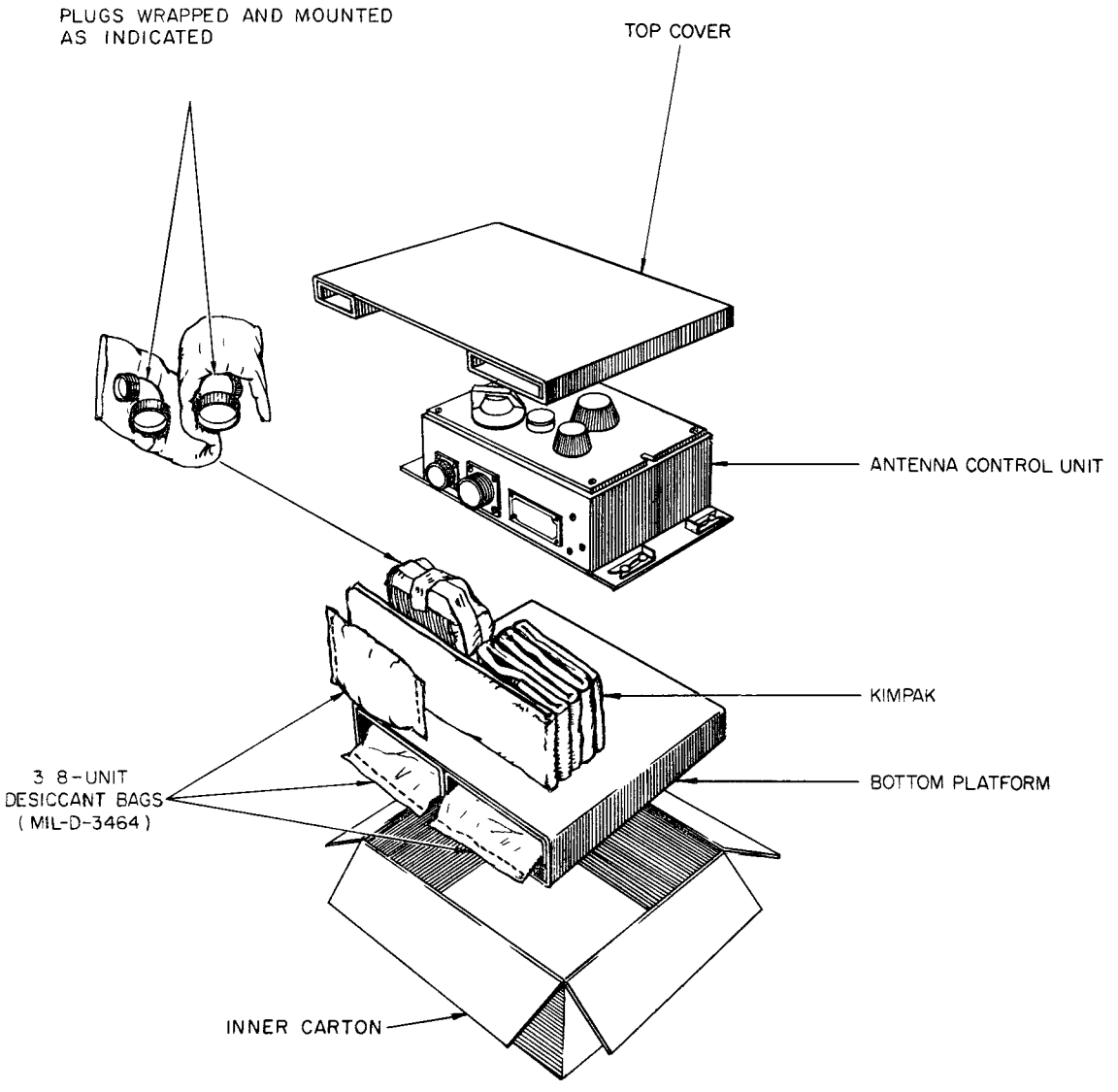


Figure 3-6. Packaging of Antenna Control C-1246/ALA-6

SECTION IV
THEORY OF OPERATION

4-1. GENERAL SYSTEM AND FUNCTIONAL OPERATION.

4–2. PURPOSE. Direction Finder Group AN/ALA–6 is an airborne electronic equipment which displays received radar (or radio) signals on a cathode-ray screen having a calibrated scale from which the relative bearing of the received signal can be read in degrees. It will also display a line on the screen which is a repeat of the aircraft's gyro flux-gate compass reading and which thus indicates the aircraft heading in degrees. When these two readings are added they give the magnetic bearing of the received signal. See figure 1–2. AN/–ALA–6 operates in the radio frequency range of 65 through 10,750 megacycles.

4–3. ASSOCIATED RECEIVER. A radar or radio receiver (not supplied) is used in conjunction with AN/-ALA–6 units to tune in the signal to be observed and to deliver the signal's video component as output to the AN/ALA–6 equipment.

4–4. DIRECTIONAL ANTENNAS. The direction finding function of the AN/ALA–6 equipment is dependent upon using directional antennas, four of which are required to cover the complete frequency range. These are described in paragraphs 1–12 through 1–15 and listed in table 1–1. Only one antenna is used at a time. As the antenna is rotated by the Antenna Drive, the strength of any given signal received will be directly related to the direction of the antenna, rising to a peak when the antenna points directly toward the signal and falling off relatively as the antenna moves away from the signal.

4–5. RESOLVER. A resolver is used to produce a display on the cathode-ray tube screen of the equipment which indicates direction. The resolver is mounted in the Antenna Drive and mechanically coupled so that its rotor follows the rotation of the antenna. Amplified received video signal is fed to the rotor. Outputs from the two stator windings of the resolver are used respectively to produce vertical and horizontal deflection on the screen of the cathode-ray tube. The sweep of the CRT is radial, from the center out, in any direction. With the Direction Finder Group properly installed in an aircraft, the antenna, resolver, and circuits are arranged so that when the antenna is pointed straight ahead, signal is displayed as a line from center screen toward zero degrees. When the antenna points straight to the right, signal is displayed as a line from center screen toward 90 degrees. When pointed straight back the line is toward 180 degrees; to the left, 270 degrees; and so on. See figure 4–1.

4–6. DIRECTIONAL PATTERN. Since the length of the line on the display screen is proportional to the strength of signal received, the longest line will occur when the antenna points directly toward the signal. Radar signals are pulsed; and as the antenna rotates, a

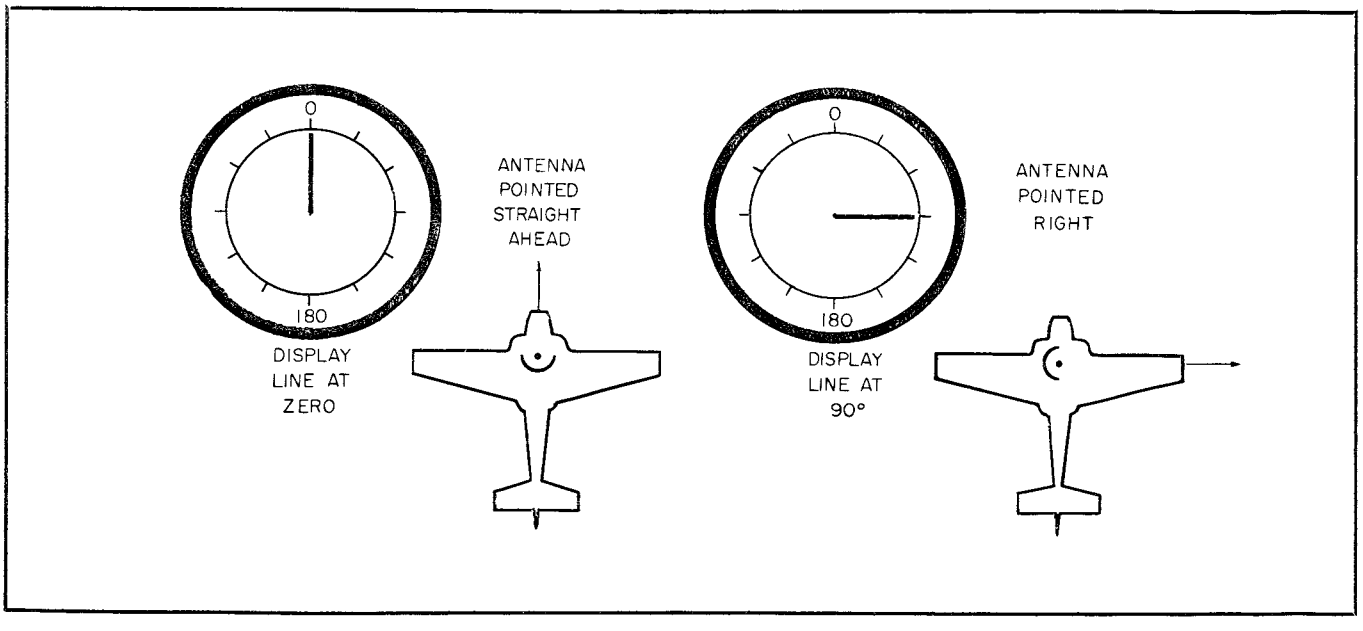


Figure 4-1. Directional Relationship of Antenna to Azimuth Scale

radial line is displayed for each pulse, the length being a direct function of the relative strength received from that direction. See figure 4–2. Thus Azimuth Indicator IP–243/ALA–6 displays a pattern from which relative bearing of a received signal can be read with reasonable accuracy. This is read in degrees of relative bearing referenced to the aircraft heading. Many patterns and interpretations of patterns are illustrated and discussed in Handbook of Operating Instructions AN16–30ALA6–1. The long retentivity of the cathode-ray screen and the repetition of the pattern for each rotation of the antenna cause the patterns to remain continuous on the screen.

4–7. COMPASS-BOX RESOLVER. A second resolver (not supplied), used to give an indication of aircraft heading on the CRT screen, is located in the compass junction box. Its rotor is made to follow the compass so that a display of signal from its stator windings produces a straight radial line on the CRT which repeats the flux-gate compass reading in degrees. This is the aircraft heading as referenced to magnetic north. The Azimuth Indicator uses a blocking oscillator to produce a pulsed signal to feed to the rotor of this resolver.

4–8. BLOCK DIAGRAM. Figure 4–3 is a block diagram of the AN/ALA–6 system. The r-f signal collected by the antenna is fed to the receiver. The receiver selects one desired signal through tuning and demodulates the video component, which is fed to the Azimuth Indicator. An amplifier system in the Indicator feeds video signal to the resolver rotor. Voltages induced into the resolver's two stator windings are fed respectively to the vertical and horizontal deflection amplifiers of the Azimuth Indicator causing it to deflect the spot at an angle related to the rotor position and thus display the relative bearing of the received signal.

4–9. The Azimuth Indicator controls the rate of rotation of the Antenna Drive by controlling the drive motor voltages. Two speeds are provided, nominally 150 rpm and 300 rpm.

4–10. Two of the Antenna Assemblies, AS–655/ALA–6 and AS–656/ALA–6, each have a vertical and a horizontal antenna. The Azimuth Indicator has a vertical-horizontal switch which enables the operator to select the antenna polarization which gives the best signal display. This switch has no effect on the other two antennas.

4–11. Low-frequency Antenna Assembly AS–654/-ALA–6 must be tuned to the frequency of the signal. This tuning is done remotely by Antenna Control C–1246/ALA–6, which is used only when the AS–654/ALA–6 is installed with the Group.

4–12. As indicated in the block diagram, there is a power supply for the Azimuth Indicator and the Antenna Control, which is energized from the aircraft power system. Voltages from the flux-gate compass resolver are fed to the Azimuth Indicator for display of aircraft heading, and a circuit is provided for remote control of the VERT.-HOR. switch, and EXPANDER and GAIN controls.

4–13. ANTENNA LOCATION ON THE AIRCRAFT. The Antenna Assembly is usually suspended below the aircraft at the lowest point available and covered by a radome (not supplied). The Antenna Drive is normally located inside the aircraft with its drive shaft extending through the "skin" of the aircraft to engage and mount the Antenna Assembly.

4–14. The directional accuracy of an antenna assembly may be affected by reflections from adjacent metal sur-

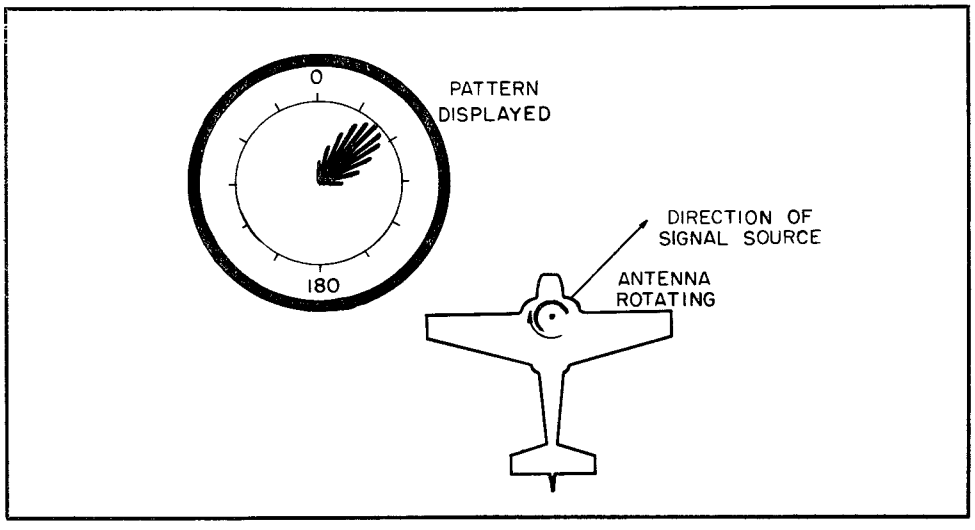


Figure 4-2. Typical Signal Pattern with Rotating Antenna

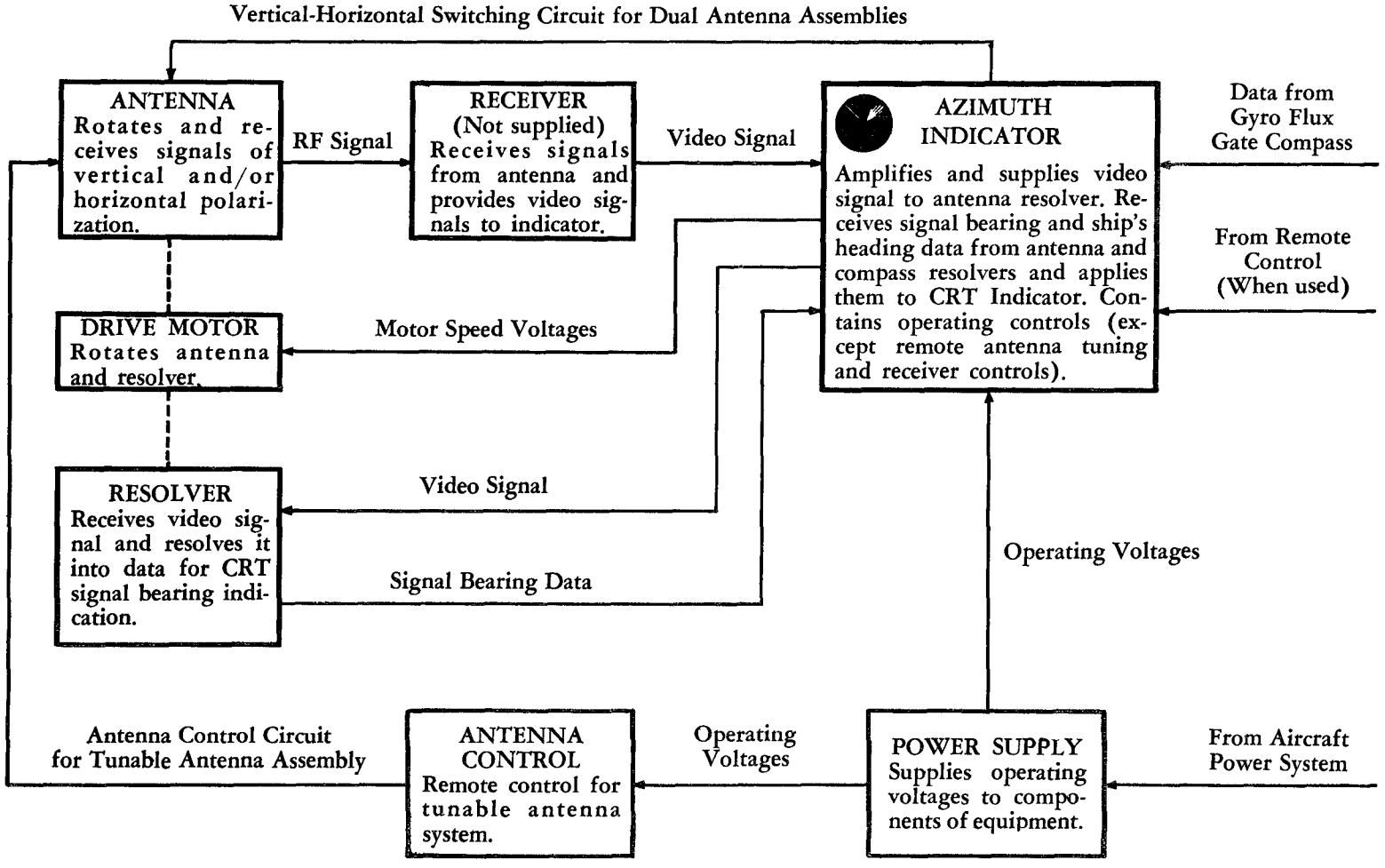


Figure 4-3. Direction Finder Group AN/ALA-6, Functional Block Diagram

faces of the aircraft body and by other effects of the installation. These effects may cause deviation errors in the relative bearings read on the Azimuth Indicator. For dependable accuracy from any installation the relative-bearing indications must be flight checked and a chart of deviations made for use by the operator to correct his readings.

4-15. DETAILED CIRCUIT ANALYSIS: AZIMUTH INDICATOR IP-243/ALA-6.

4–16. GENERAL. (Figure 4–4.) The function of the Azimuth Indicator unit is to display the intelligence received and developed by the equipment. The Azimuth Indicator amplifies the signal received from the associated radio receiver and supplies it to the resolver in the Antenna Drive unit. It also generates and supplies a pulsed signal to the resolver in the associated gyro flux-gate compass. The resolvers are two-phase rotary, synchro transformers that have two stator windings having a fixed 90-degree phase relationship with each other, but variable with respect to a rotor winding. When a pulsed or ac voltage is applied to the rotor, the output of each stator will vary in voltage with the angular relationship between the stators and the rotor, according to the sine and the cosine functions, respectively. The rotors of the two resolvers are mechanically connected respectively to the Antenna Assembly and to the compass. The Azimuth Indicator receives returned voltages from both resolvers, amplifies them, and applies the stator "sine" and "cosine" voltages respectively to vertical and horizontal deflection plates of the cathode-ray tube. Simultaneously, separate deflections result, indicating relative bearing of received signal and aircraft heading; or these can be displayed separately, as desired by the operator. Azimuth bearings are read on an illuminated 360° dial within the bezel on the front panel of the Azimuth Indicator. All operating controls of the equipment (except those of Antenna Control C–1246/ALA–6) are also on the front panel of this unit. The associated equipments, (not supplied) the receiver and the flux-gate compass, have their own operating controls. For convenience in describing in detail the circuitry and theory of operation of the Azimuth Indicator, it is divided into the following sections:

a. Inverter and Video Amplifier (Figure 4–6).

b. Expander Diode and Summing Amplifier (Figure 4–7).

c. Video Cathode Follower and Beam Modulator (Figure 4–8).

d. Blocking Oscillator and Cathode Follower (Figure 4–9).

e. Isolation Amplifiers (Figure 4–10).

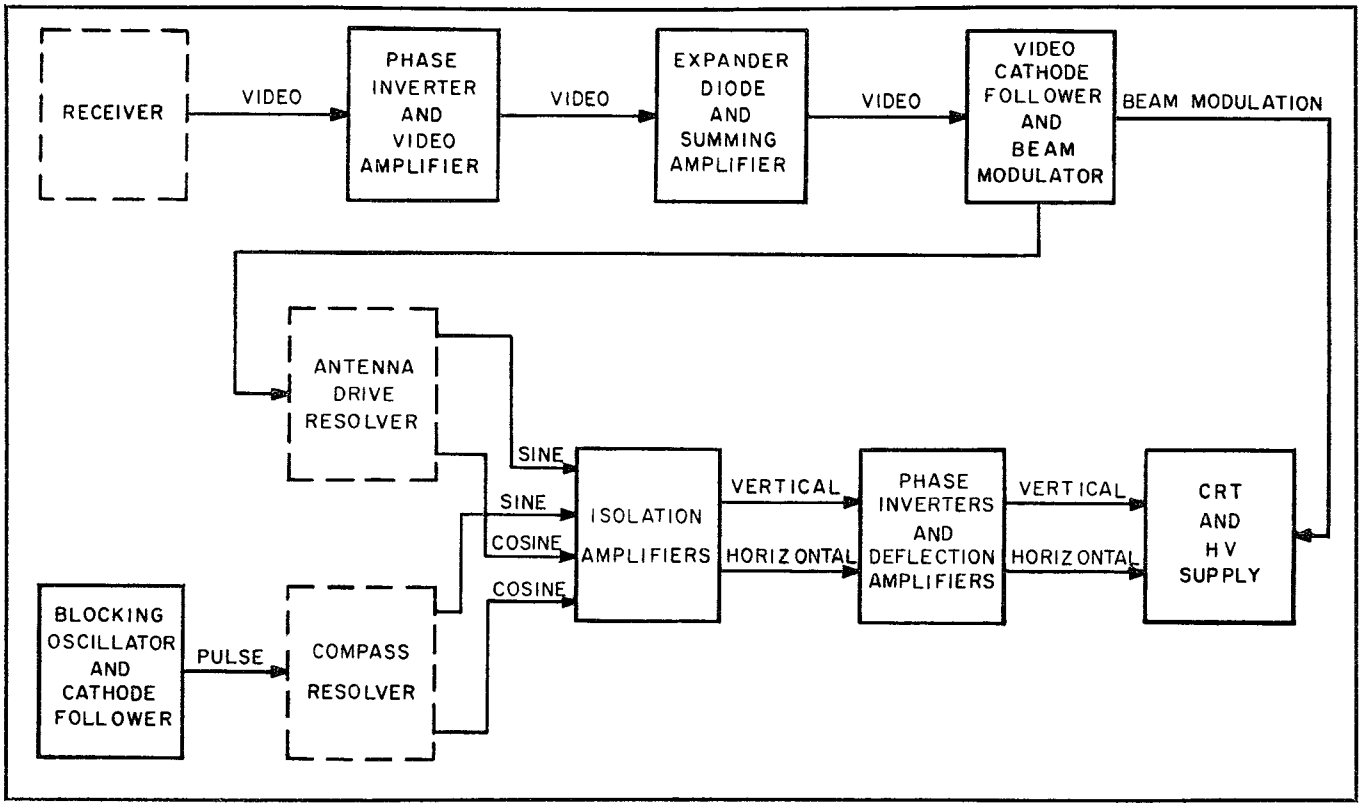


Figure 4-4. Azimuth Indicator IP-243/ALA-6, Simplified Functional Block Diagram

f. Two-Channel Phase Inverter and Deflection Amplifiers (Figure 4–11).

g. Cathode-Ray Tube and High Voltage Supply (Figure 4–12).

h. Operational Switching and Power Circuitry (Figure 4–13).

A functional block diagram showing the functions and relationship of the vacuum tubes is shown in figure 4–5, Azimuth Indicator IP–243/ALA–6, Vacuum Tube Functional Block Design. A complete schematic of Azimuth Indicator IP–243/ALA–6 is given in figure 7–1.

4–17. INVERTER AND VIDEO AMPLIFIER (Figure 4–6.)

4–18. This section of the unit receives the video signal from the associated receiver, amplifies it, and provides signals of proper polarity for the stages that follow. The inverter V201A is used only when the receiver delivers negatively-polarized pulses, and it has only nominal gain. Video-amplifier stage V202 amplifies the signal and passes it on to the summing amplifier and the expander diode. Video gain control in the Azimuth Indicator is accomplished by varying the grid bias, and hence the gain, of V202. The GAIN control adjusts the radial size of the received signal display on the cathode-ray screen.

4–19. The pulses in the associated receiver's output may be either negatively or positively polarized. The pulse polarity switch S201 is set to match the receiver output at the time of installation. The receiver output is fed to J204 where R201 serves as a load resistor. C201 couples the signal to the pulse polarity switch S201, which has two positions. In the negative position, as shown, the signal is fed to the grid of V201A and the plate of V201A is connected to the grid of V202 through coupling capacitor C205 and anti-parasitics resistor R284. When S201 is in the positive position, the signal is bypassed around V201A to the coupling capacitor C205. In this way, by the addition or omission of a phase inverting stage, the signal pulses can always be of the desired positive polarity at the grid of V202.

4–20. The purpose of inverter V201A is to reverse the pulse polarity when necessary, without added gain. R206

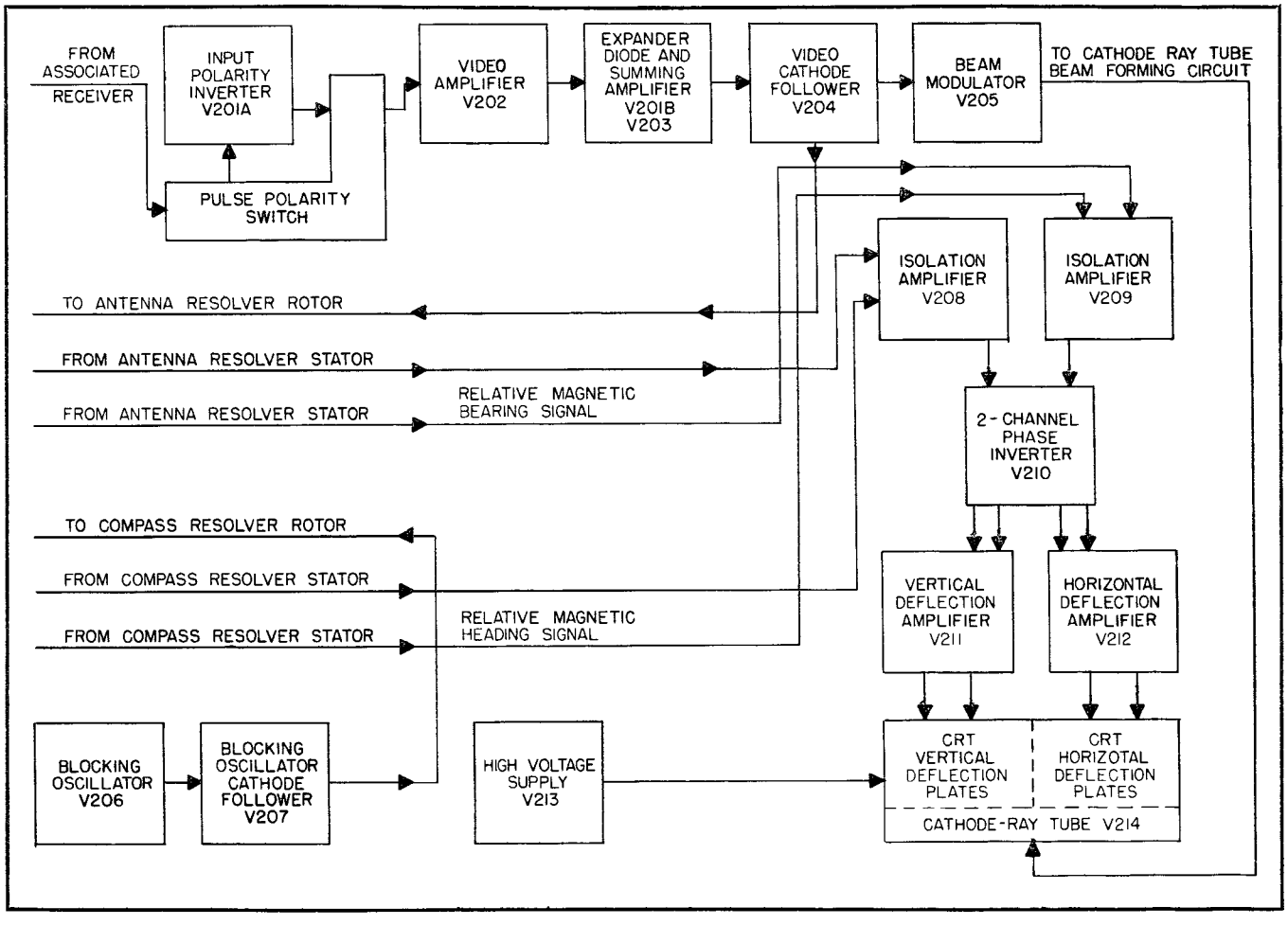


Figure 4-5. Azimuth Indicator IP-243/ALA-6, Electron Tube Functional Block Diagram

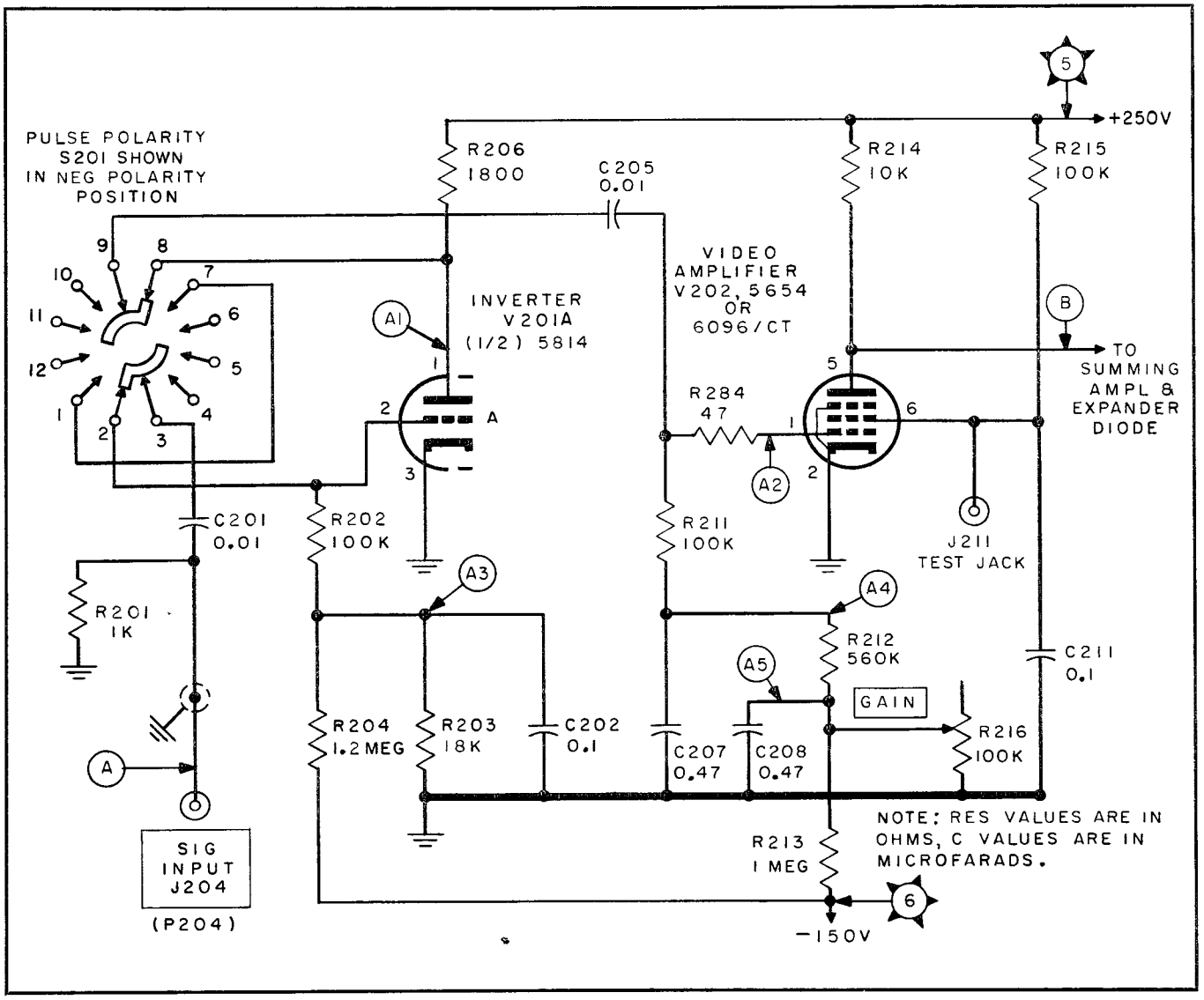


Figure 4-6. Azimuth Indicator Partial Schematic, Inverter and Video Amplifier

is the plate-loading resistor for V201A; its value is low and the gain of the stage is thus kept low. R202 provides grid return, bypassed to ground by C202 which also filters the bias voltage.

4–21. The plate load resistor of video amplifier pentode V202 is R214. R215 and C211 are its screen dropping resistor and bypass capacitor. The gain of the stage is varied by adjusting the gain control R216, which with R213 forms a variable voltage divider for bias. C207, R212 and C208 form a decoupling network between the grid return resistor R211 and the bias voltage. The output of V202 is negatively pulse polarized and is applied to the summing amplifier V203 and its controlling expander diode, V201B.

4–22. EXPANDER DIODE AND SUMMING AMPLIFIER. (Figure 4–7.)

4–23. In this section of the unit, the signal is further amplified. Also, at the control of the operator, signals of greater than a set value of amplitude are amplified more than signals of lesser amplitude. This signal voltage expansion affects the signal bearing indication on the cathode-ray tube; causing the center trace of the pattern to be amplified more than the weaker side traces, thereby causing the indication to be more definite.

4–24. The output of summing amplifier V203 is the sum of amplitudes resulting from gains for the separate inputs to its two control grids. From the plate of V202, (figure 4–6) the signal is supplied in two parallel paths: One path is direct to grid 3 of V203 through coupling capacitor C210 and anti-parasitics resistor R217. The other path is through the expander diode V201B to grid 1 of V203. C206 and C209 provide a

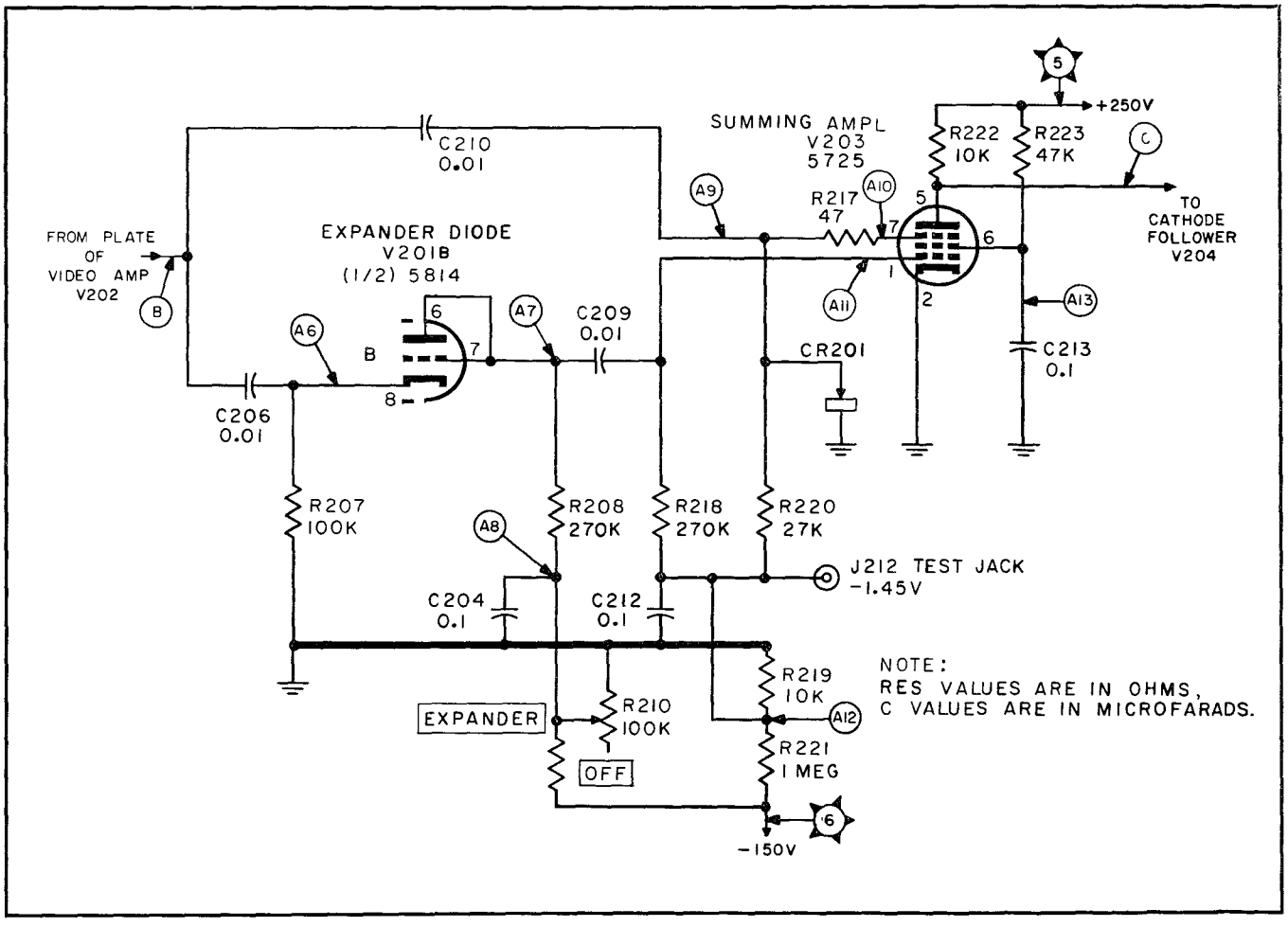


Figure 4-7. Azimuth Indicator Partial Schematic, Expander Diode and Summing Amplifier

path for the signal while isolating the d-c paths through R207 and R208 which, with the adjustable voltage divider formed by R209 and the expander control R210, establish the bias conditions of operation of the diode. C204 provides signal return to ground as well as some filtering of bias voltage.

4-25. The output of V203 is controlled by the signal pulses to both of its control grids. The signal in the path through to grid 3 is directly amplified by the pentode. Whereas, the signal that is applied to grid 1 through the expander diode V201B is dependent on the bias operating point of the diode. When R210 is at the extreme counterclockwise, or OFF position, the diode anode (formed by grid and plate tied together) is biased some 14 volts negatively. In this position, only signal pulses of amplitude large enough to overcome this value will be conducted through the diode to grid 1 of V203. For signals of less than the bias voltage of the diode, grid 1 of V203 will receive no signal, and no gain is achieved. At the control of the operator, the delay bias can be reduced to the operating range of signal amplitudes so that the portion of the signal that is greater than the diode bias can be conducted through to grid 1 of V203 to be amplified thereby. As grid 1 has much more effect on gain than grid 3, the output of V203 is considerably affected by control of bias of the expander diode. At the proper value of control, depending on signal strength and interdependent with V202 gain control setting, the required amount of expansion for the most definite indication will be obtained.

4-26. The plate load resistor of summing amplifier pentode V203 is R222. R223 and C213 are its screen dropping resistor and bypass capacitor. The grid returns, R218 and R220, of grids 3 and 1 are both connected to the junction of R221 and R219 which form a voltage divider for bias. C212 provides common signal return to ground as well as some filtering of bias voltage. The function of CR201 is to clamp the zero level of negatively polarized pulses at ground potential and to limit any positive signal voltage surges that may come through the amplifier at this point by shorting the grid to ground for positive voltages. The output of V203 is positively pulse polarized and is applied to the video cathode follower, V204.

4–27. VIDEO CATHODE FOLLOWER AND BEAM MODULATOR. (Figure 4–8.)

4–28. One stage of this section of the unit supplies the video signal voltage developed in the Indicator unit to the resolver in Antenna Drive TG–23/ALA–6, and the other stage provides a means of applying signal voltage to the CRT for modulating its electron beam proportional to signal level. This is to maintain equal intensity of the signal bearing indication, despite the wide range of signal amplitudes that are received.

4–29. From the plate of V203, (figure 4–7) the video signal is applied to the grid of the video cathode follower V204 through coupling capacitor C214. R225 and R224 provide grid return for the stage, with C215 bypassing R224, for decoupling. R224 and R226 form a voltage divider for bias. R227 is the output load resistor of the cathode follower stage. C234 acts to set the limits of high frequency response of the video system as well as bypasses any r-f that may have gotten through to this point. From the cathode of V204, the signal is supplied, positively pulse polarized, to J205 which feeds the rotor of the resolver in the Antenna Drive unit.

4–30. The beam modulator V205 is fed from the cathode of V204. The signal is applied to the series network of R228, diode CR202, and the variable arm of the beam modulation control. The top end of R230 is at some 21 volts positive through dropping (and signal isolating) resistor R229. Adjusting R230 will place potentials of from 0 to +21 volts at the cathode of diode CR202.

4–31. From the anode of diode CR202, the signal is applied to the grid of V205 through coupling capacitor C216. When the variable arm of R230 is at its grounded end, diode CR202 shorts the signal positive pulses to ground, and no signal for beam modulation will be supplied to the beam modulator. As R230 is progressively adjusted toward its 21-volt end, signal voltages, if present, in amplitude to the amount of the bias adjustment, are available to the grid of the beam

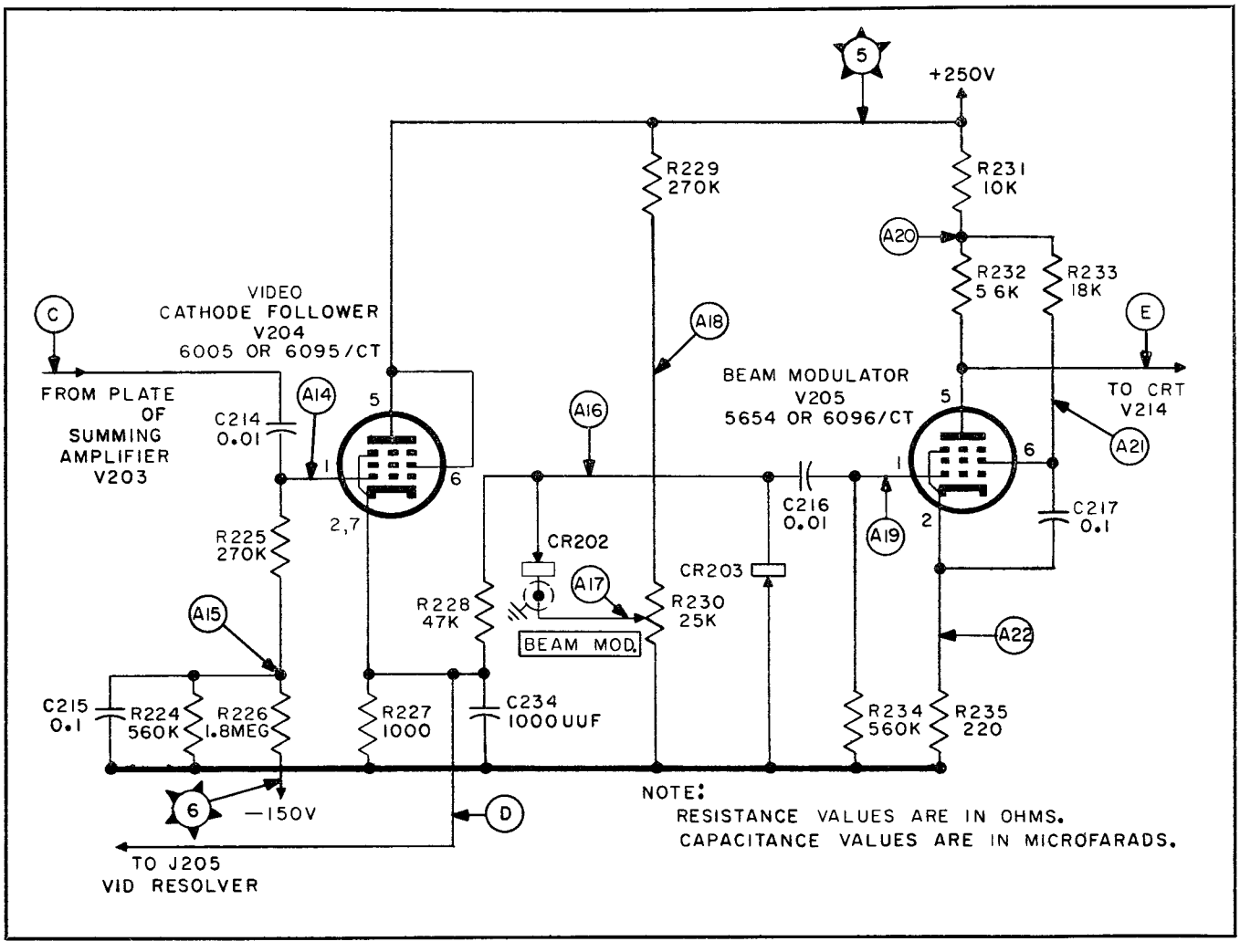


Figure 4-8. Azimuth Indicator Partial Schematic, Video Cathode Follower and Beam Modulator

modulator for amplification into beam modulation voltages, for application to the CRT cathode circuit. At the control of the operator and interdependent with V202 gain, diode V201B expansion, and CRT INTENSITY control, the amount of beam modulation is adjusted so that the intensity of CRT indications is equal for nearly all values of signal amplitude.

4–32. The normal pulse polarity of signal voltages from the cathode follower is positive. Diode CR203 will effectively short to ground any negative pulse surges that may have come through the amplifier.

4–33. Beam modulator V205 is operated between triode and pentode conditions. R231, which is the largest part of the plate load, is common to both plate and screen circuits. There is an additional plate-load resistor, R232, in series with R231. The screen resistor, R233 is connected to the unbypassed mid-point of R231 and R232, causing the stage to have less gain than a pentode and more gain than a triode. This is further made possible by the connection of the screen bypass C217 to the cathode instead of to ground. R235 is the cathode resistor, and R234 is the grid return. From the plate of V205, the beam modulation voltage is supplied negatively pulse polarized to the cathode-ray tube.

4–34. BLOCKING OSCILLATOR AND CATHODE FOLLOWER. (Figure 4–9.)

4–35. This section of the unit produces a pulsed voltage and supplies it to the rotor of the resolver that follows

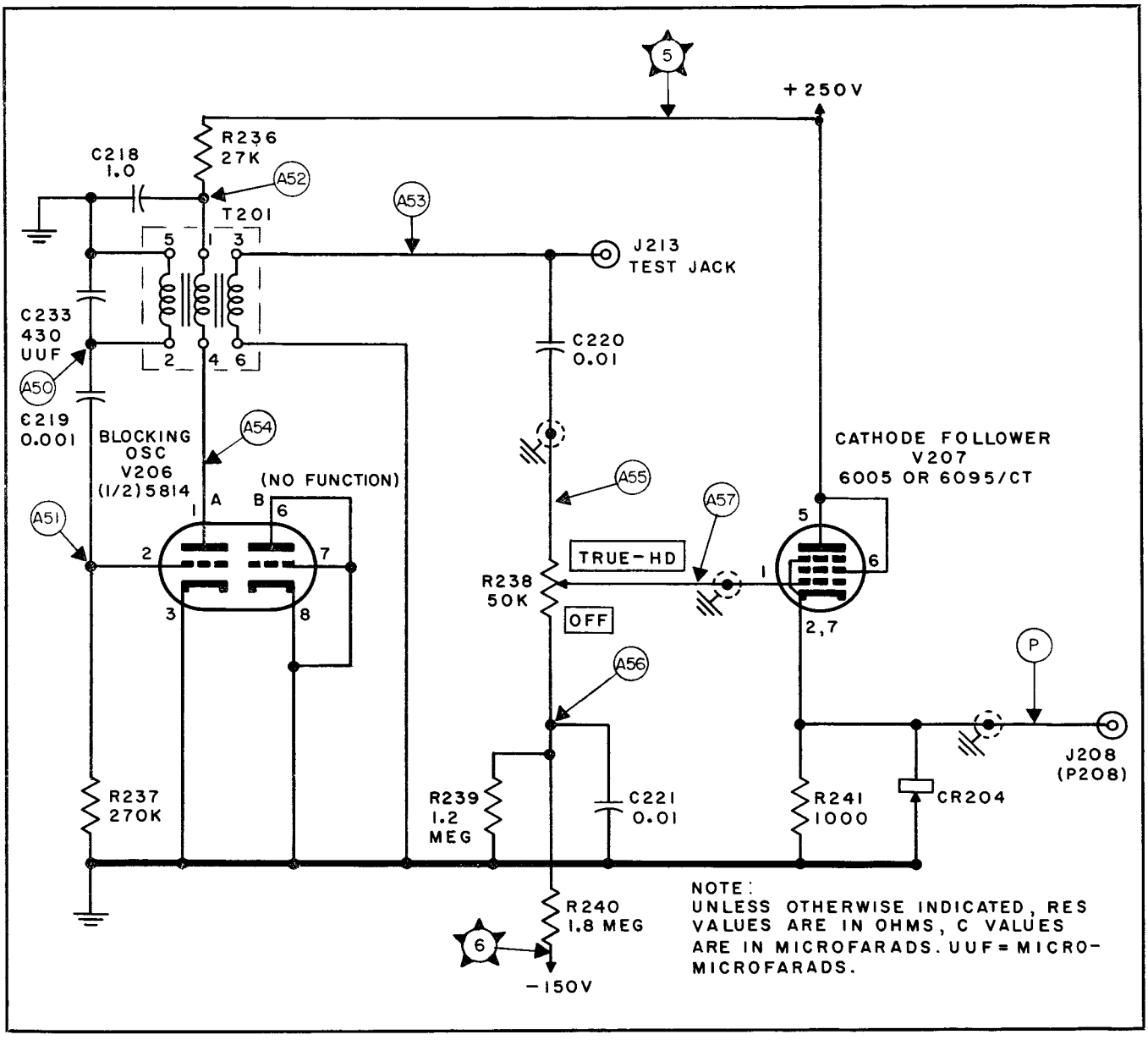


Figure 4-9. Azimuth Indicator Partial Schematic, Blocking Oscillator and Cathode Follower

the rotation of the Direction Finder Group's associated gyro flux-gate compass. The separate voltages induced in the stator windings of this resolver are returned to the Azimuth Indicator to indicate aircraft heading. This indication is in the form of an angularly displaced radial line on the cathode-ray tube screen. The length of the line is controlled by the operator by the TRUE HD. control.

4–36. V206A is a 1500–1600 cps sine-wave oscillator in which the grid is driven positive during half of the cycle. Sufficient grid current flows into C219 during this half cycle to block further oscillation. The grid leaks off through R237 and the tube again conducts. Thus the output is a series of narrow pulses separated by the grid recovery time. The terminals between 1–4 and 5–2 of transformer T201 provide the plate to grid feedback. A tertiary winding, terminals 3–6, supplies the output pulse that is fed to the cathode follower through coupling capacitor C220. R236 and C218 are used to decouple the circuit from the power supply. All the elements of V206B are connected to ground and it has no function.

4–37. The cathode follower stage, V207, provides isolation and an impedance match to the rotor of the gyro flux-gate compass resolver. Also in this stage, the amplitude of the pulse, and thereby the length of the indicating line, is controlled by the operator by varying the arm of TRUE HD. control R238. R240 and R239 form a voltage divider for bias with C221 providing signal (pulse voltage) return to ground and bias decoupling. V207 operates as a triode with plate and grid number 2 tied together. The output of the cathode follower is across R241 and is connected to J208 for supply to the compass resolver rotor. Diode CR204 shorts out any negative pulse component of the waveform and the output is positively pulse polarized.

4–38. ISOLATION AMPLIFIERS. (Figure 4–10.)

4–39. Isolation amplifiers, V208A–V208B and V209A–V209B separately amplify the voltages returned from the stators of the Antenna Drive and the compass resolvers. V208A and V208B amplify the voltages used for vertical deflection of the cathode-ray tube indicating beam. V209A and V209B amplify the voltages used for

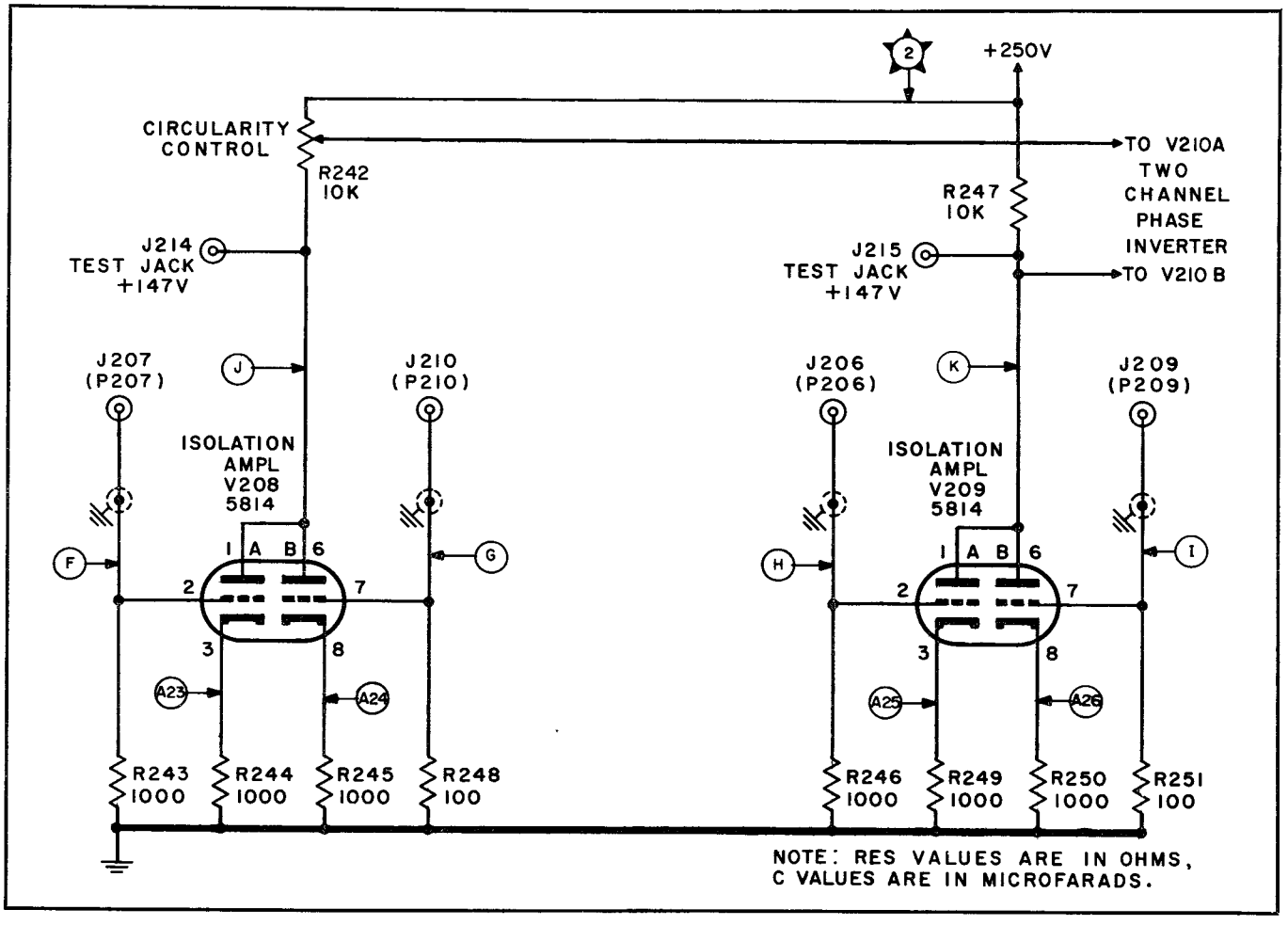


Figure 4-10. Azimuth Indicator Partial Schematic, Isolation Amplifiers

horizontal deflection. As signal bearing and aircraft heading are indicated simultaneously in the presence of a detected signal, the vertical voltages from the resolvers, while applied for amplication and isolation to the separate grids of V208, are paralleled at the plates and fed to the following stages. Likewise, the horizontal voltages from the two resolvers are separately applied to the grids of V209, paralleled at the plates and fed to the following stages. A circularity control is included in this section of the Azimuth Indicator to set the gain of the vertical amplifier so that the vertical and horizontal deflections are equally proportionate to signal voltages from the resolvers, despite differences between the vertical and horizontal deflection systems.

4–40. The vertical and the horizontal voltages from the stators of the Antenna Drive unit resolver are returned respectively to J207 and J206 which feed the grids of V208A and V209A. R243 and R246 load the stator windings as well as provide grid returns. The vertical and horizontal voltages from the stators of the compass resolver are returned respectively to J210 and J209 which feed the grids of V208B and V209B. R248 and R251 load the stator windings of this second resolver as well as provide grid returns for the tubes. R244, R245, R249, and R250 are the separate cathode resistors for the four triodes.

4–41. The vertical voltages are amplified by the two triode sections of V208. The common load resistor of V208A and V208B is the circularity adjustment, R242. The gain of these triodes is varied by adjusting the variable arm of R242 and set so that the gain is made less than the gain of the horizontal voltage amplifiers V209A and V209B by the amount necessary to offset the greater sensitivity of the vertical deflection plates of the CRT compared to the sensitivity of the horizontal deflection plates. This is so that sensitivities of the vertical and the horizontal deflection systems shall be made equal. From the variable arm of R242, the vertical deflection voltages from both resolvers are fed to the stages described below. The output is negatively pulse polarized.

4–42. The horizontal voltages are amplified by the two triode sections of V209. The common load resistor of V209A and V209B is R247. From the plates, horizontal deflection voltages from both resolvers are fed to the horizontal voltage phase inverter V210B. The output is negatively pulse polarized.

4–43. TWO-CHANNEL PHASE INVERTER AND DEFLECTION AMPLIFIERS. (Figure 4–11.)

4–44. In this part of the Azimuth Indicator, the vertical deflection voltages and the horizontal deflection voltages are further amplified in two separate amplifiers before being applied to the vertical and horizontal deflection plates of the cathode-ray tube. Each amplifier consists of a phase inverter and a push-pull output stage. Adjustment of centering of the CRT beam is also provided by the circuitry of this section.

4–45. Triodes V210A and V210B are used as separate phase inverters. V210A handles the vertical voltages, while V210B handles the horizontal voltages. The output deflection amplifiers, V211 and V212, are operated in push-pull and direct-coupled to the vertical and horizontal deflection plates of the CRT; V211 to the vertical and V212 to the horizontal plates.

4–46. From the arm of R242, the variable plate load resistor for V208, and from the plates of V209, (figure 4–10) the vertical and horizontal voltages are fed respectively through coupling capacitors C223 and C222 to the grids of V210A and V210B. R252 and R257 provide the grid returns. R253 and R254 are the plate load resistors, while R255 and R256 are the cathode load resistors of the two phase-inverter circuits. The push-pull outputs of the two phase-inverter channels are from the plates and the cathodes.

4–47. The grids of the vertical push-pull deflection amplifier V211 are fed through coupling capacitors C226 and C227. The grid returns, R260 and R261, are connected to opposite ends of R262 which is the vertical beam centering control. R264 and R263 are voltage dropping resistors from the −150 volt bias supply. When the variable arm of R262 is in the middle, the grid return resistors, R260 and R261, connect to equal potential points. The grid biases of V211A and V211B will be equal, the plate currents will be equal, and there will be no difference in plate currents through the plate load resistors, and no d-c potential difference between the plates. R258 and R259 are the plate load resistors. The deflection plates of the CRT are direct-coupled to the plates of V211. The CRT deflection plates, being directly connected, will have no d-c potential between them and the beam should center vertically in the middle. However, because of slight differences, either in any of the corresponding components of both halves of the push-pull amplifier or in the mechanical construction of the CRT, the beam may be vertically displaced from the center. The operator may then center the beam by moving the variable arm of R262 toward one or the other of its ends. This will cause a potential unbalance between the ends of R262, which will oppositely affect the tube biases and the plate currents. A proper adjustment in the required direction will counteract for the sum of effects due to all stray unbalances in the push-pull systems.

4–48. The signal output of the vertical deflection amplifier is taken from the plates of V211A and V211B and

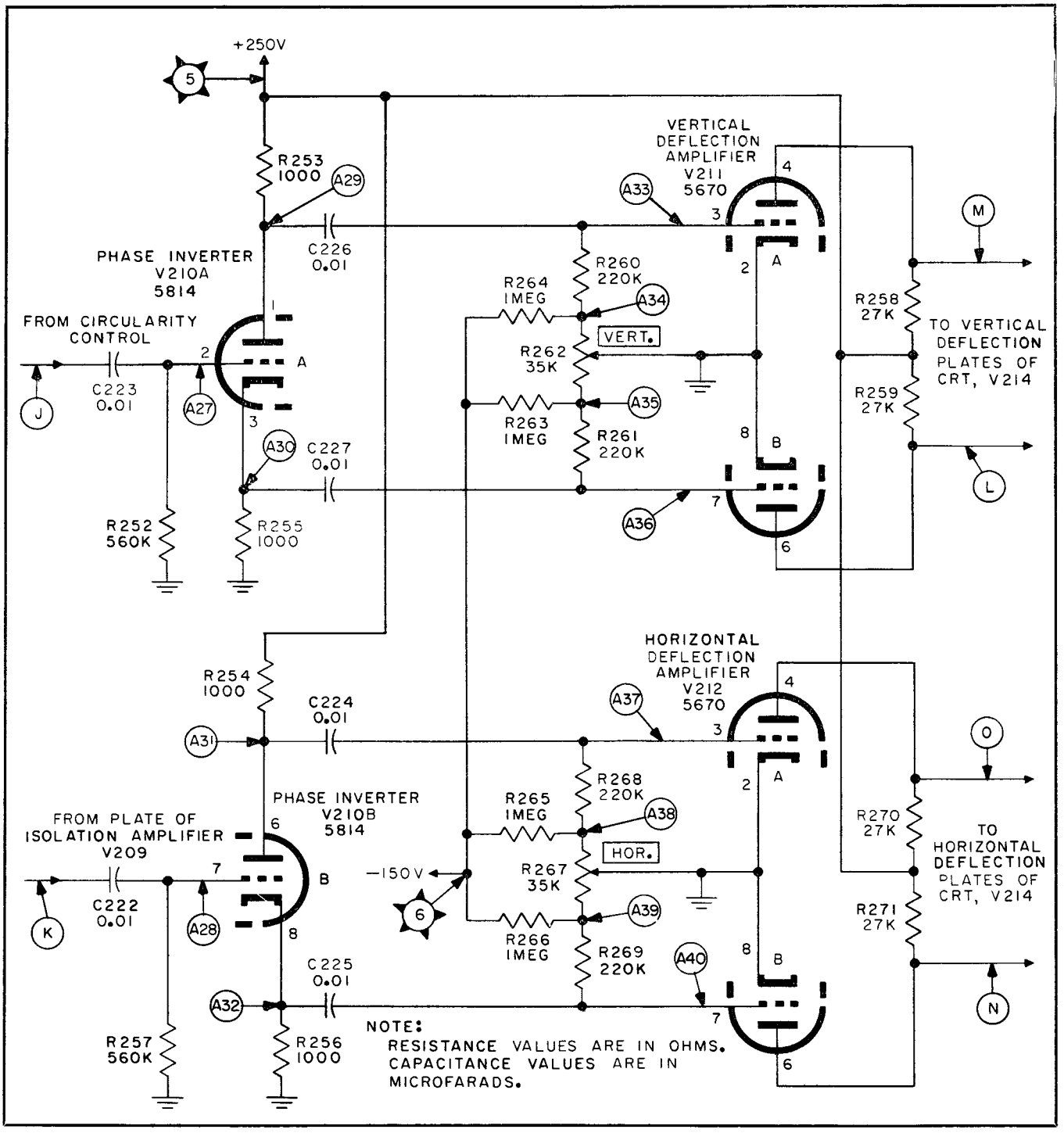


Figure 4-11. Azimuth Indicator Partial Schematic, Two-Channel Phase Inverter and Deflection Amplifiers

is applied to the vertical deflection plates of the CRT in positive and negative phase.

4–49. The horizontal push-pull deflection amplifier and its phase inverter are operated in an identical manner to that of the vertical deflection circuit above.

4–50. CATHODE-RAY TUBE AND HIGH VOLTAGE SUPPLY. (Figure 4–12.)

4–51. The cathode-ray tube displays the detected signal pattern and the plane's heading line. The circuitry of the CRT includes the operator's FOCUS and INTEN-

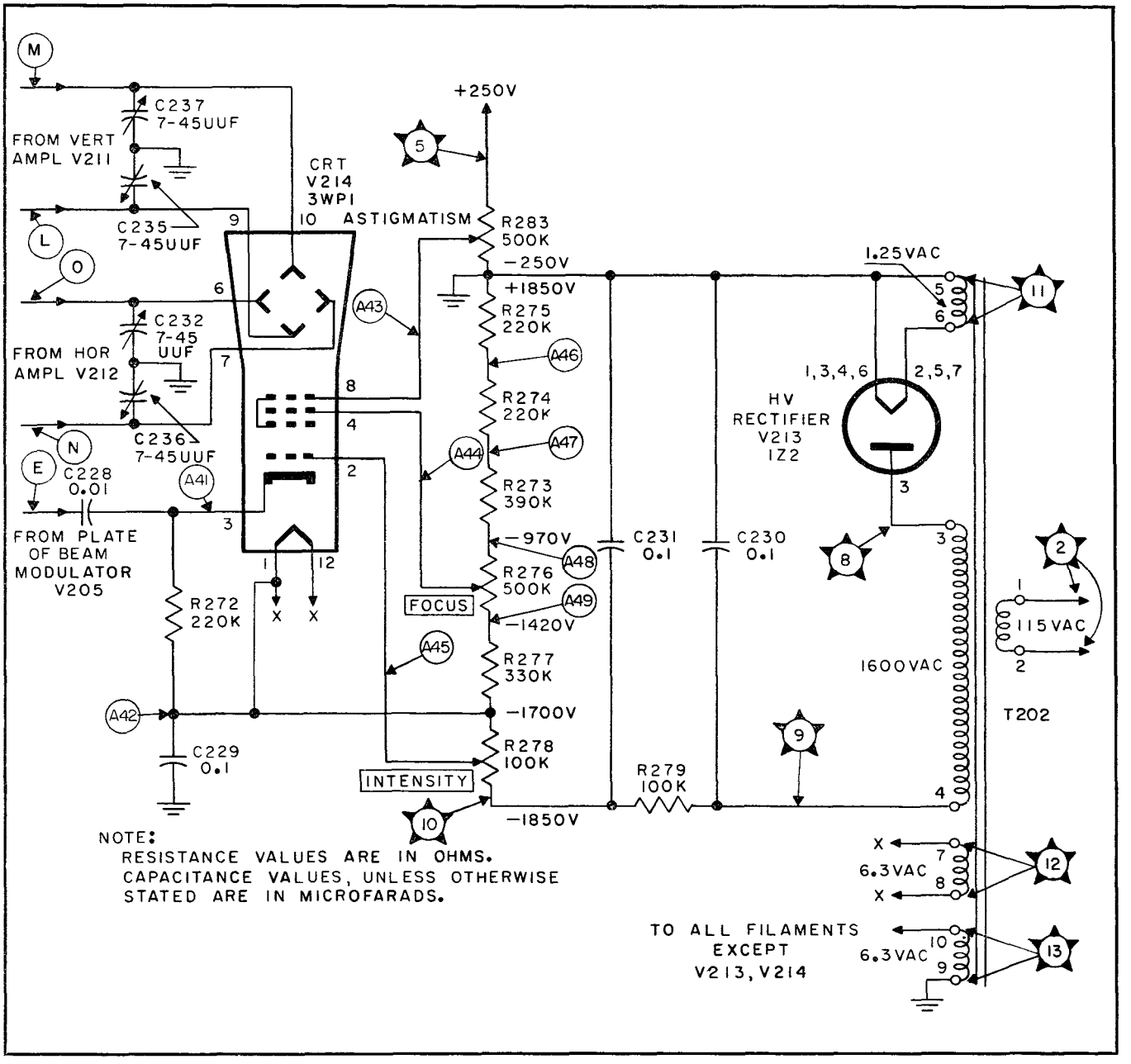


Figure 4-12. Azimuth Indicator Partial Schematic, Cathode-Ray Tube and High Voltage Supply

SITY controls, and adjustment of CRT astigmatism and phasing balance between vertical and horizontal amplifiers. This section also includes the high voltage supply of the CRT. The power transformer of the high voltage supply provides filament voltage for all tubes and pilot lights of the Azimuth Indicator unit except the high voltage rectifier, V213.

4-52. The cathode-ray tube, V214, is a three-inch tetrode-type tube, using electrostatic focusing and deflection. A voltage of approximately 2000 volts and various lower anode voltages are required for its operation.

4-53. High voltage for the operation of the CRT is supplied from a step-up transformer, rectifier tube and filter network. A voltage divider provides the various voltages required by the anodes of the CRT. High voltage power transformer T202 has three secondary windings. Winding 3-4 is the high voltage winding that is rectified by V213. The filament of V213 is supplied by winding 6-5 and is grounded, making the negative side of the high voltage supply the 'high' side. Capacitors C231 and C230 with filter resistor R279 in the negative side comprise the d-c high voltage supply filter. The high voltage output is connected across the

series of: the INTENSITY control R278, R277, the FOCUS control R276, R273, R274 and R275. Winding 7-8 supplies the heater of the CRT. T202, as well as supplying power for the CRT, also provides filament voltage for all other tubes and the pilot lights of the Azimuth Indicator unit.

4–54. Control of the brightness of the CRT, V214, is effected by varying the bias at the intensity grid with respect to its cathode. The cathode, through R272, is connected to the positive end of the INTENSITY control, R278. The intensity grid is connected directly to the variable arm of R278, which can be adjusted from 0 to −150v with respect to cathode. With the arm at the cathode end, the brightness is limited only by the biasing drop of CRT cathode current through R272. With the arm at the negative end of R278, any indication on the CRT is effectively cut off. The operator adjusts R278 for minimum satisfactory intensity of indication.

4–55. Focusing of the CRT is effected by adjusting the FOCUS control, R276, which varies the voltages of the focusing anode and the second anode with respect to cathode. The second anode is taken off the variable arm of the astigmatism adjustment, R283, at approximately 2000 volts positive with respect to the CRT cathode. The focusing anode is taken off the variable arm of R276 of the high voltage divider-network at approximately 500 volts positive with respect to the CRT cathode. At the correct ratio of voltages, which is interdependent with the INTENSITY control and with the correct setting of the astigmatism adjustment, the CRT beam focuses on the CRT screen.

4–56. The astigmatism adjustment varies the d-c voltage potential between the second anode and the pairs of deflection plates so that focusing will be the same in both vertical and horizontal planes. The average d-c voltage at the vertical and horizontal plates is less than the amplifier plate supply voltage by the drop in the V211 and V212 plate loading resistances R258-R259, R270-R271 respectively (figure 4–11). The voltage for the second anode is adjusted by varying the arm of the astigmatism adjustment R283, which is across the amplifier plate supply voltage, to a voltage close to, or slightly higher than, that of the average value of the voltages at the vertical and horizontal deflection plates. At the correct value, which is interdependent with the FOCUS control adjustment, focusing will be the same in both vertical and horizontal planes. When the astigmatism adjustment is once set, the FOCUS control will be the only control necessary for the operator to adjust to obtain the sharpest CRT indication.

4–57. The vertical and the horizontal deflection plates of the CRT are fed directly from the signal outputs of the vertical and horizontal deflection amplifiers. The signals from the amplifiers are polarized; that is, they consist of either positive or negative pulses. The CRT beam deflections resulting from these pulses cause two visual lines to extend radially from a base point at the center of the CRT screen. One line is the result of signal from the Antenna Drive resolver. The other line is the result of signal from the compass resolver. The length of the line is proportionate to signal strength. Either one or both of these lines are shown, depending on the presence or absence of radio signals or pulse signal from the compass resolver. The two lines, while the result of pulse voltages from separate resolvers being amplified and applied to the CRT together, nevertheless show separately because the voltages have separate waveforms.

4–58. As the vertical and horizontal deflection plates of the CRT are at right angles, the angular displacement of each visual line is in the direction of the vector sum of the "sine" and "cosine" voltages as amplified by the separate vertical and horizontal amplifiers of figure 4–11.

4–59. A visual line on the CRT in the direction of the vector sum of the "sine" and "cosine" voltages has exactly the same angular displacement as the stators have with respect to each other, as induced by the rotor of the resolver supplying the signal. As the antenna is rotated by the drive unit, and as it approaches the direction of the signal source, a short line will appear that corresponds in length to the strength of the signal at that "off direction" position. As it rotates still further toward the direction of the signal, a second line will appear, separated slightly from the first line, but longer, due to the increased signal strength as the antenna approaches the correct direction. When the antenna is pointing exactly at the signal source, the line appearing at that point will be the longest, then successively shorter as it passes that point. Thus, a pattern is obtained that consists of radial lines emanating from the center of the screen, the center one being the longest and the ones at each side being shorter. (See figure 4–2.) This longest line will indicate on the azimuth scale the direction of the detected signal. (See figures 2–9 through 2–16 in Handbook, Operating Instructions, AN16-30ALA6-1.)

4–60. The signal phase-shift through the vertical and horizontal amplifiers of figure 4–11 must be exactly equal. Phase unbalance causes the CRT line indication in the direction of vector sum of "sine" and "cosine" voltages to appear as a narrow ellipse. This will make the indication corresponding to aircraft heading less accurate and also will fog the indication of individual radio signal pulses from the rotating antenna. Capacitors C235, C237, C232, and C236 are adjusted and set to

phase-balance the outputs of the vertical and horizontal amplifiers to counter for phasing differences caused by stray component and capacitive differences in and between the amplifiers.

4–61. The cathode of the CRT is fed through C228 with beam modulation voltage derived from the beam modulator stage in the video amplifier section (figure 4–8). This is to compensate, in brightness, for the range of signal amplitudes from zero signal to signals with large amplitudes. The beam modulation voltage swings the cathode current in accordance with the strength of the signal, thereby actually changing the bias point of the CRT. An average setting of the INTENSITY control may not give a presentation bright enough for a large pattern, and would be far too bright for the center trace spot when there is no incoming signal. This variation can occur as the associated receiver is tuned, or as the antenna rotates. Too bright a spot indication can permanently damage the CRT.

4–62. The beam modulation voltage applied to the cathode is negatively pulse polarized and makes the cathode of the CRT more negative and closer to the bias of the intensity grid. The net effect is a decrease in the intensity grid bias for the duration of the modulating pulse. The beam modulation voltage is present only with video signal, and to the degree controlled by the operator, for the most equal brightness of the indication on the CRT screen representing varying signal amplitudes being received. The operation of the beam modulation stage is described in paragraphs 4–30 through 4–33 (figure 4–8).

4–63. OPERATIONAL SWITCHING AND POWER CIRCUITRY. (Figure 4–13.)

4–64. All operational switching controls of Direction Finder Group AN/ALA-6, except those of Antenna Control C-1246/ALA-6 for Antenna Assembly AS-654/-ALA-6, are located on the front panel of the Azimuth Indicator unit and all are clearly marked; the one exception being a subsidiary control that rotates the crossed-line pointer appearing in the center of the CRT screen. This pointer is rotated by means of a knurled ring surrounding the azimuth scale and is located just beneath the outer lip of the metal ring that surrounds the entire bezel. The purpose of this pointer is to more

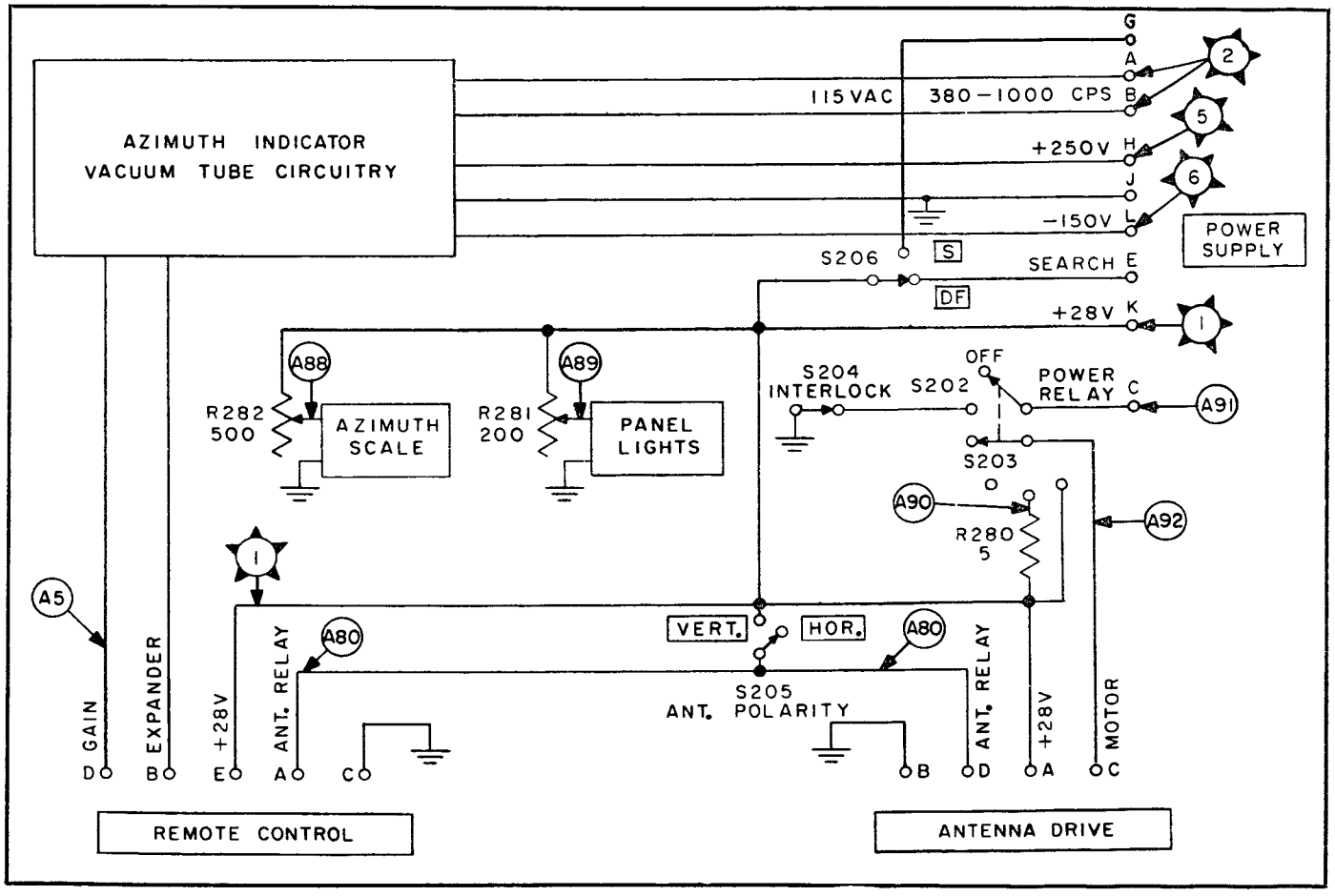


Figure 4-13. Azimuth Indicator Partial Schematic, Operational Switching and Power Circuitry

accurately located the longest, or center portion of the signal pattern that indicates relative bearing on the azimuth scale.

4–65. The Azimuth Indicator unit receives power from Power Supply PP-974/ALA-6 via cable N (figure 7–15), which terminates at receptacle J201 on the Azimuth Indicator unit front panel (figure 6–3). The ANT. SPEED switch as seen on the front panel actuates two switches, S202 and S203 (figure 7–1), which are ganged together mechanically. S202, a microswitch, and S203, a multiposition switch, are both open at the "OFF" position of the ANT. SPEED switch. At the "S" position, S202 is closed and supplies +28 vdc to the coil of the power relay in the Power Supply unit, and remains closed throughout the other two positions, "150" and "300," allowing all units to become completely operative except for the antenna rotation.

4–66. The Azimuth Indicator unit supplies power via connector J202 and cable L to Antenna Drive TG-23/-ALA-6 (Figure 7–15); at pin A of J202, +28 volts is supplied. At pin C, power is supplied for the Antenna Drive motor. The operator has a choice of two speeds of Antenna Assembly rotation. At the third position (150) of S203, the antenna speed switch, +28 volts is reduced through R280 to pin C of J202. At the fourth position, (300), +28 volts is connected directly.

4–67. The +28 volts supplies power to the panel light bulbs and to the azimuth scale light bulb. The operator adjusts illumination of Azimuth Indicator controls to the desired amount by varying the series resistances of panel light control R281 and of azimuth scale control R282.

4–68. The DF-S switch, S206, is shown in figures 4–13 and 7–1 in the DF position. This is for normal operation of the Direction Finder Group, as described in Operating Instructions, AN16-30ALA6-1. When the switch is thrown to S, search position, +28 volts is disconnected from pin E and is connected to pin G of J201. This voltage is used to actuate auxiliary search equipment (not supplied with Direction Finder Group AN/ALA-6).

4–69. The VERT.-HOR. switch, S205, provides the operator's control of antenna polarity only when either Antenna Assembly AS-655/ALA-6 or Antenna Assembly AS-656/ALA-6 is used. In the vertical position, +28 volts is placed at pin D of J202. This operates the antenna relay of those assemblies and connects their vertical antenna element to the receiver input. For the horizontal position of the VERT.-HOR. switch, S205, the antenna relay is unenergized and the horizontal antenna element is connected in a like manner.

4–70. Remote operation of the most significant controls of the Azimuth Indicator unit is provided through connector J203. The "high" sides of EXPANDER control R210 and GAIN control R216 are brought out to pins B and D respectively of J203. Ground is brought out to pin C. The +28 volts supplied to pin E permits remote operation of the antenna polarity relay which is connected at pin A of J203.

4–71. In the remote control box, counterparts of the EXPANDER and GAIN controls and the antenna polarity switch are provided. They are wired and connected by cable to J203 so as to be in parallel with their corresponding controls in the Azimuth Indicator. When the remote control box is connected to the unit, cognizance must be taken of these parallel connections in the action of the controls. For operation at the Azimuth Indicator with the remote control box connected, the remote controls for expansion and gain are left at minimum and the remote antenna polarity switch is left at horizontal position. For remote operation, the Azimuth Indicator EXPANDER and GAIN controls are left at minimum and the Azimuth Indicator antenna polarity switch is left at horizontal.

4–72. DETAILED CIRCUIT ANALYSIS: POWER SUPPLY PP-974/ALA-6.

4–73. GENERAL. (Figure 4–14.) The function of the power supply unit is to provide the a-c and d-c voltages required for operation of Azimuth Indicator IP-243/ALA-6, Antenna Drive TG-23/ALA-6, and Antenna Assembly AS-654/ALA-6. When Antenna Assembly AS-654/ALA-6 is used, the a-c and d-c operating voltages for Antenna Control C-1246/ALA-6 are provided. The Power Supply unit's source of power is the aircraft's electrical supply system. Figure 4–14 shows a functional block diagram of the unit. For convenience in describing in detail the circuitry and theory of operation of the power supply unit, it is divided into the following:

a. Plate and Bias Supply (Figure 4–15.)

b. Plate Voltage Regulator (Figure 4–16.)

c. Power Circuitry (Figure 4–17.)

(A complete schematic of Power Supply PP-974/ALA-6 is shown in figure 7–2.)

4–74. PLATE AND BIAS VOLTAGE SUPPLY. (Figure 4–15.)

4–75. A voltage step-up transformer, a full-wave vacuum tube rectifier and a capacitance-inductance "pi" filter comprise the plate voltage supply. The same transformer has a tap for a shunt bias supply using a second rectifier tube. A filter capacitor and load resistor complete the bias voltage supply.

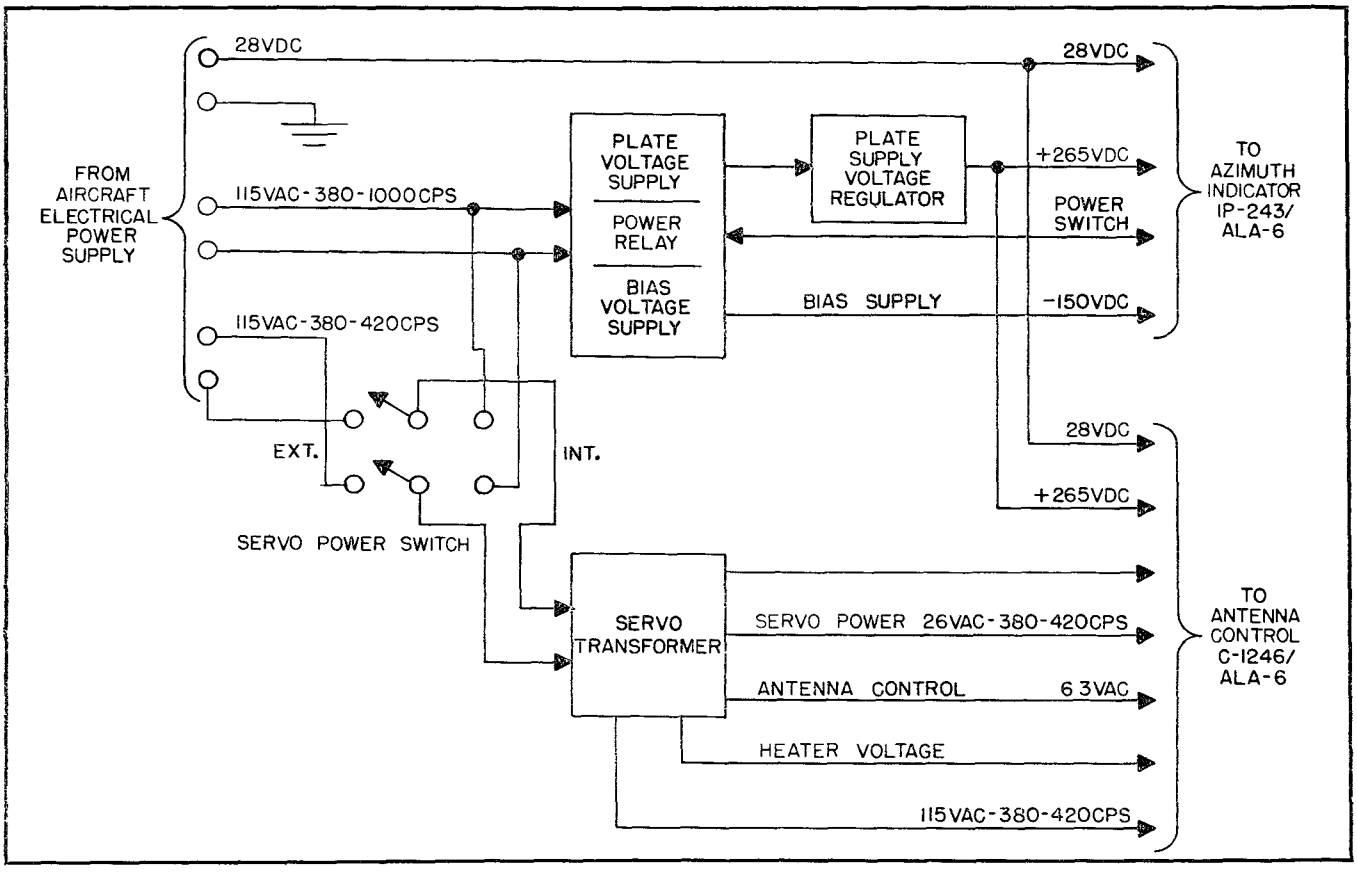


Figure 4-14. Power Supply PP-974/ALA-6, Functional Block Diagram

4–76. The two ends of the plate voltage supply winding, terminals 3-5-6 of T101 is applied to the plates of rectifier V101 in a typical full-wave circuit. The d-c output is taken between the filament of V101, which is the positive side, and the center tap of the transformer, which is the negative and grounded side. C101, L101 and C102 provide one section of filtering before the plate supply d-c output is applied to the voltage regulator.

4–77. The voltage at tap 4 of T101 is applied to the paralleled cathodes of duo-diode rectifier V102. The paralleled plates of V102 will then be negative with respect to the ground. The part of winding 3-5-6 between terminals 4 and 5 of T101, and V102 form a half-wave rectifier circuit, the d-c output voltage of which is additive to the full-wave d-c plate supply output of V101. The ground is common to both outputs. The ground is negative for plate supply output but positive for the bias supply output. C106 is the only bias supply filter. R112 is a loading resistor for the bias rectifier.

4–78. PLATE VOLTAGE REGULATOR. (Figure 4–16.)

4–79. Plate supply voltage for the Azimuth Indicator and the Antenna Control (when used) is regulated; therefore, changes in plate supply voltage caused by changes or surges in power source do not change or modulate amplifier gain, and thereby adversely affect the size and stability of the presentations. Plate supply voltage is also held constant so that one amplifier's changing plate power requirements, due to signal or control changes, will not affect another amplifier. This also contributes to indication stability. The voltage regulator also provides means for adjusting plate supply voltage to the prescribed value despite variation in circuit components.

4–80. The voltage regulator circuitry comprises a voltage regulator tube, a control amplifier tube and a voltage reference tube. The control tube, which is a high gain pentode amplifier, is connected in such a way that a small change in the output of the power supply causes a change in its grid bias, and thereby a corresponding change in plate current. Its plate current flows through a resistor, the voltage drop across which is used to bias the regulator tube. The plate-cathode circuit of the regulator tube is connected in series with the plate voltage supply load. The regulator tube, therefore, functions as an automatically-variable series resistor. Should the output voltage increase slightly, the control tube bias will become less negative causing the plate current

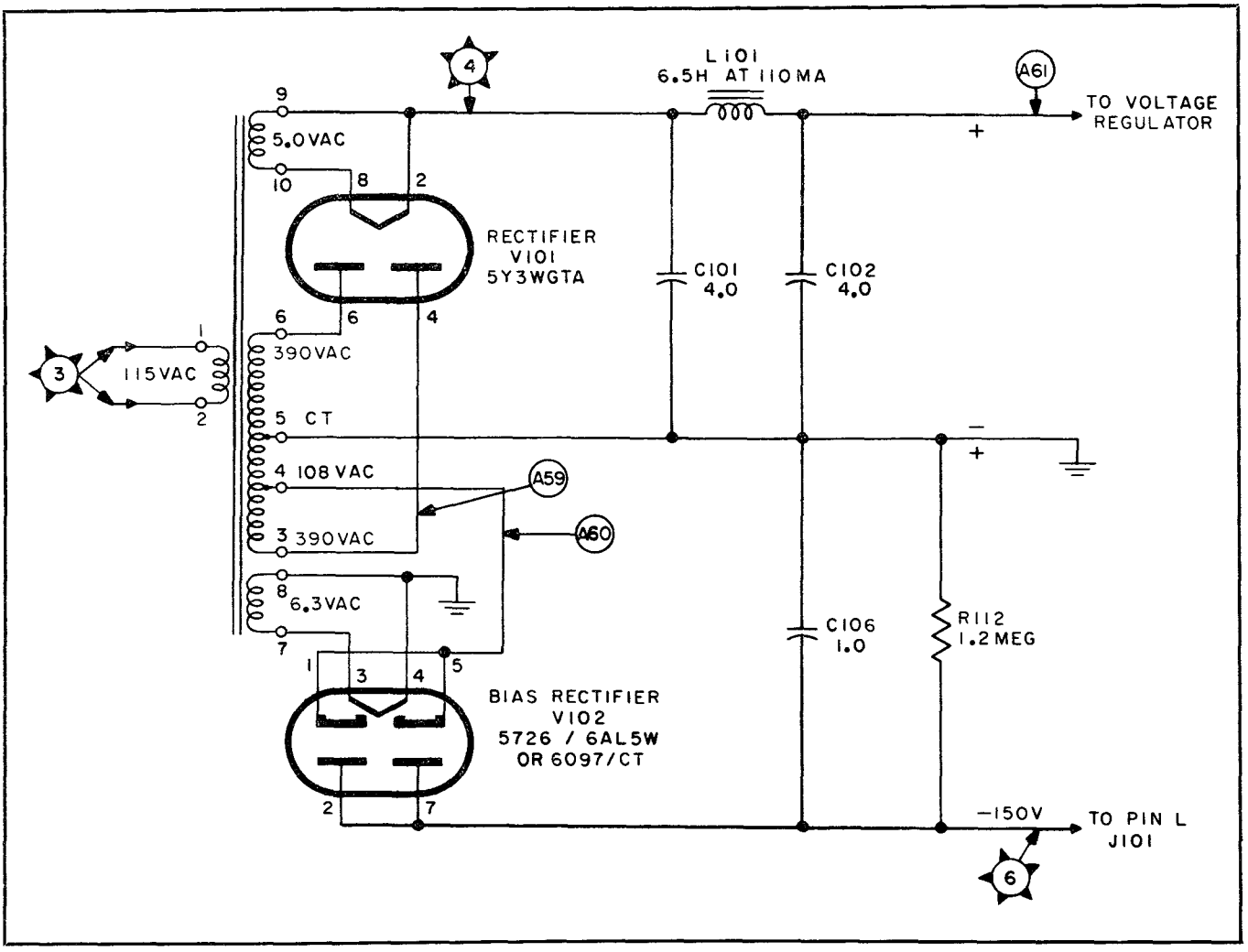


Figure 4-15. Power Supply Partial Schematic, Plate and Bias Supply

of the control tube to increase, and the drop across the resistor common to the control tube plate circuit and the regulator tube grid circuit to increase accordingly. The bias on the regulator tube therefore becomes more negative and the effective resistance of the plate-cathode circuit of the regulator tube increases. This causes the output voltage to drop. A decrease in output voltage causes the reverse of the action and the output voltage is increased by the action of the regulator system. The time lag in the action of the system is negligible. The over-all result is that output voltage is held constant to a fraction of a percent throughout the range of load current and over a wide range of a-c power supply voltage.

4-81. An essential in the voltage regulator system is the use of a constant voltage as a reference to the change in output voltage that the control amplifier operates on. Use is made of the constant voltage discharge characteristic of a gaseous regulator tube to provide the reference voltage. It is the difference between the constant voltage of discharge of the reference tube and the change in voltage across an output voltage divider that provides the control for the operation of the system.

4-82. The regulator, V103, is a dual triode that will carry the load current with ease. Its sections are paralleled. R101 and R102 are small resistors that act as fuses to protect the plate supply components in the event of shorts occuring in the load. The plate-cathode circuit of V103 is in series with the load and acts like a variable resistor. The grids are returned to paralleled cathodes through R105 and R106. R106 is common to both the grid circuit of regulator V103 and the control amplifier V104.

4-83. The voltage reference tube V105, is connected in series with a resistor across a supply voltage large enough to initiate its discharge. The voltage across the tube will remain constant despite relatively large or small variations in supply voltage. R111 is the refer-

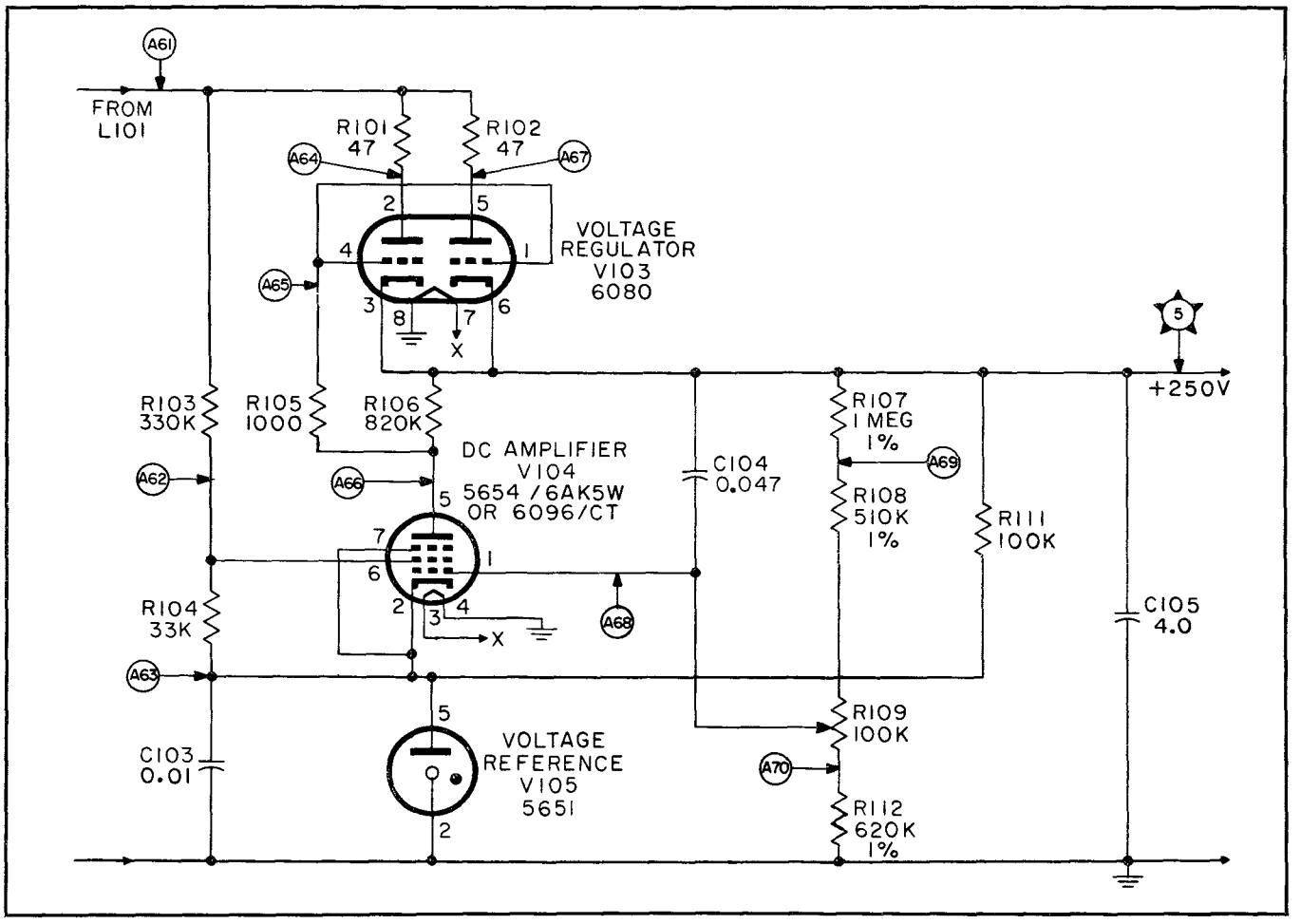


Figure 4-16. Power Supply Partial Schematic, Plate Voltage Regulator

ence tube series resistor and to further assure constancy of voltage across the reference tube, it is connected at the cathode or output side of the regulator tube, V103. C103 damps any possible negative resistance oscillations that may occur.

4-84. The control amplifier, V104, is a pentode and is used as a high gain amplifier of small d-c voltage changes. Its input is directly connected to its source of voltage change. Its output is directly connected to the grid circuit of the regulator tube that it controls.

4-85. The cathode of V104 is connected to the "high" side of V105 and is maintained at a constant voltage (with respect to negative and ground), which is the rated discharge voltage of V105. The grid is connected to the variable arm of R109, which, with R110, R108 and R107, forms a voltage divider across the power supply output. R103 and R104 form a voltage divider supplying the screen of V104.

4-86. The power supply voltage output at pin H of J101 can be varied by adjusting the slotted shaft of R109 which is located on the chassis of the Power Supply unit. R109 is adjusted and set for 265 volts, which is the actual operating voltage of the plate power supply (250 volts is the stated nominal value).

4-87. The mechanism by which the voltage is varied is as follows: The arm of R109, to which the control grid of V104 is connected, can be varied from approximately 75 to 85 volts (measured from negative or grounded side of the Power Supply.) The cathode of V104 is held constant at +86 volts. The difference voltage affects the plate current drop through R106, which in turn affects the bias of regulator V103. This varies its current from its plate to cathode, varying its effective series d-c resistance and the output voltage is adjustable up or down from a mean of 250 volts.

4-88. The mechanism by which the voltage is kept constant at 265 volts, after once having been set, is as follows: Should there be an increase in voltage across the plate supply output, the voltage (with respect to negative and ground) at the variable arm of R109 and at the grid of V104, will increase with it. But the voltage at the cathode of V104 will remain constant. The

difference of conditions will result in a net drop of bias of V104, which will be amplified, resulting in more V104 plate current and an increase in bias for regulator V103. This will result in enough increased series resistance of V103 to remove the initial increase of voltage. Should the voltage across the output of the power supply decrease, the difference of conditions will result in a net increase in bias on V104, less V104 plate current, less series resistance effect of V104, and the decrease of output voltage will nearly disappear.

4-89. C104 performs the further function of applying the whole of the variation of output voltage due to unfiltered ripple to the control grid of the d-c amplifier for the purpose of further smoothing the output. C105, along with the voltage regulator system, comprises a second section of a-c filtering.

4-90. POWER CIRCUITRY. (Figure 4-17.)

4-91. The power circuitry of the Power Supply unit comprises the electrical connections between the power input receptacles, the plate and bias supply sections of the unit, and the receptacles that provide the operating voltages for the Azimuth Indicator and the Antenna Control unit (the latter used only with Antenna Assembly AS-654/ALA-6). The power circuitry includes two power relays and their control circuits.

4-92. As shown in figure 4-17, there are three separate electrical power inputs: 115 vac at 380 to 1000 cps, supplied at J104; 28 vdc also supplied at J104; and 115

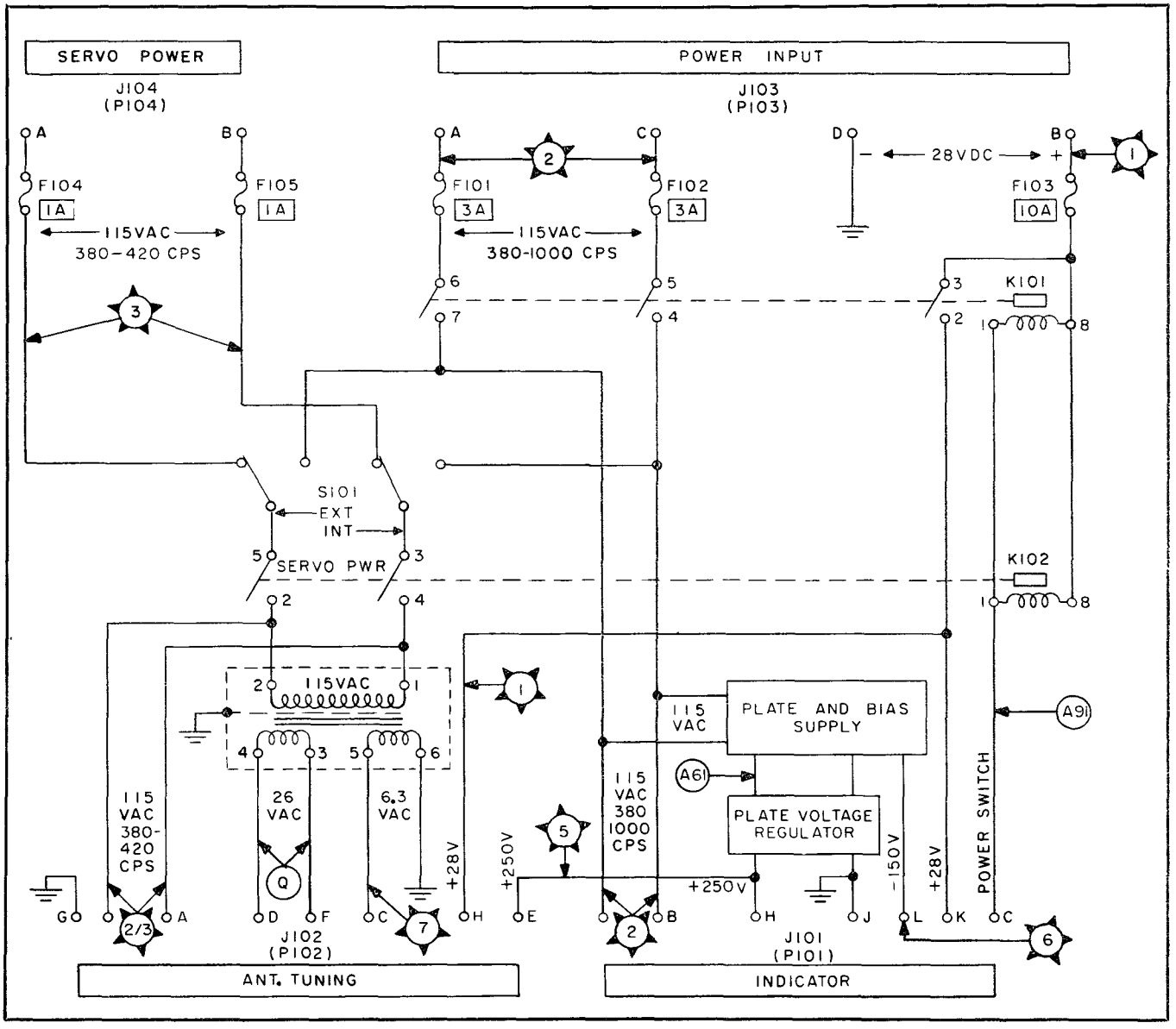


Figure 4-17. Power Supply Partial Schematic, Power Circuitry

vac at 380 to 420 cps, supplied at J103. 115 volts at 380 to 420 cps is used only for servo power for installations using Antenna Assembly AS-654/ALA-6 and its Antenna Control unit. If the 115 vac input to J104 is within the frequency range of 380 to 420 cps, it is also used for servo power for antenna tuning and the additional 115 vac at 380-420 cps input to J103 is not needed.

4–93. All three power inputs are fused. The a-c inputs are fused on each side. F101 and F102 fuse the 115 vac 380-1000 cps supply. F104 and F105 fuse the servo control 115 vac 380-420 cps supply. The d-c supply is fused only on its positive side, by F103.

4–94. The +28 volts is connected to one side of the paralleled relay coils of K101 and K102. The other side of the relay coils is connected to pin C of J101, the receptacle that connects to Azimuth Indicator unit. The master power switch of the Azimuth Indicator unit grounds this circuit for operation of the equipment. This completes the 28-volt circuit through the relay coils, energizing them. Relay K101 contacts 5 and 6 are made to 4 and 7 respectively, connecting the 115 vac 380-1000 cps supply to the plate and bias voltage supply section of the unit. The 115 vac 380-1000 cps is also connected to the Azimuth Indicator receptacle J103 and through it to the servo power switch, S101. Contacts 2 and 3 of relay K101 connect the +28 vdc to the Azimuth Indicator and the Antenna Control receptacles. At the same time, relay K102 contacts 5 and 3 are made to 4 and 7 respectively, connecting servo power to the antenna tuning receptacle and to the servo power transformer.

4–95. Servo power switch S101 provides switching of servo power for antenna tuning, to either the 115 vac 380-1000 cps power source, or to the separate servo power source of 115 vac 380-420 cps. When S101 is in the INT position, servo power is supplied from the 115 vac 380-1000 cps source. This can only be used if this source has a frequency between 380 and 420 cps. If the 115 vac 380-1000 cps supply is outside of this range, S101 is thrown to EXT for supply of servo power at 115 vac 380-420 cps from a separate source at J103.

4–96. DETAILED CIRCUIT ANALYSIS: ANTENNA DRIVE TG-23/ALA-6.

4–97. GENERAL. (Figure 4–18.) The function of the Antenna Drive unit is to rotate the Antenna Assembly being used, and to provide the "sine" and "cosine" components of the video signal in the proper relation with respect to orientation of the antenna. The drive unit motor rotates the antenna and also rotates a rotary synchro transformer, the resolver, at the same speed. The resolver rotor receives video signal voltages from the Azimuth Indicator and the stators return the "sine" and "cosine" voltages to the deflection plates of the CRT. The drive unit also provides an automatic switching circuit that will actuate the shutter of an auxiliary camera unit with each revolution of the Antenna Assembly. The drive unit incorporates means for heating its mechanism in cold ambient temperatures, and a thermostat is provided to control the heater. For convenience in describing in detail the circuitry and theory of operation of the Antenna Drive unit, it is divided into the following sections:

a. Drive motor circuitry (Figure 4–19).

b. Resolver circuitry (Figure 4–20).

c. Mechanical system (Figure 4–21).

A complete schematic of Antenna Drive TG-23/ALA-6 is shown in figure 7–3.

4–98. DRIVE MOTOR CIRCUITRY. (Figure 4–19.)

4–99. The drive motor circuitry comprises the drive motor, means for cyclic speed variation, and an r-f interference filter. Also included with the motor circuitry is the camera switching circuit and the heater circuit.

4–100. The drive motor, B302, is a 1/20 horsepower compound-wound d-c motor. When rotating the antenna at 300 rpm, the motor revolves 4800 rpm. It has a separate lead to its shunt field and two equal series fields, one on each side of the armature. Within the motor there is a capacitor across the commutator that attenuates r-f interference caused by the brush assembly.

4–101. The Antenna Drive unit rotates the antenna at 150 or 300 rpm, (nominal) depending on the position of the ANT. SPEED control (master power switch) of the Azimuth Indicator unit. See figure 4–13 and paragraph 4–66 for details of antenna speed switch circuitry. Within the drive unit, means are provided to vary the rotational speed over a variation cycle of 100 antenna revolutions. The speed of rotation over the cycle varies from the set speed (150 or 300 rpm) to a speed of rotation approximately 15 percent less.

4–102. The purpose of varying the speed of rotation of the antenna is to avoid the possibility of becoming syncronized with the transmitting antenna whose signals the Direction Finder is trying to detect. If the two antennas become synchronized, the received signal may be very weak or the signal may not be received at all, due to the possibility of their being pointed away from each other. If the antennas are close in speed of rotation, signals may be received only occasionally, corresponding to the beat frequency created by their rotational speed difference. Signal-change may be too slow to show continuous indication at this beat frequency, and there-

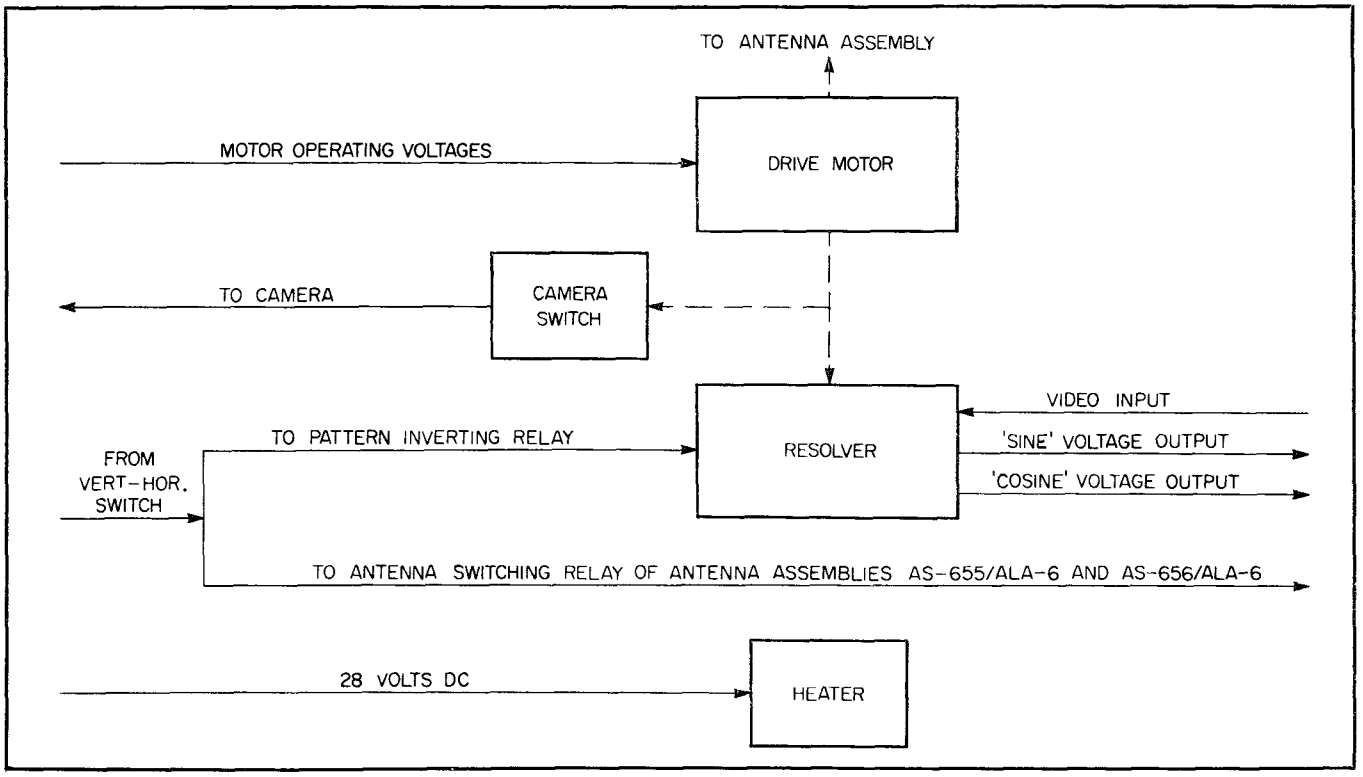


Figure 4-18. Antenna Drive TG-23/ALA-6, Functional Block Diagram

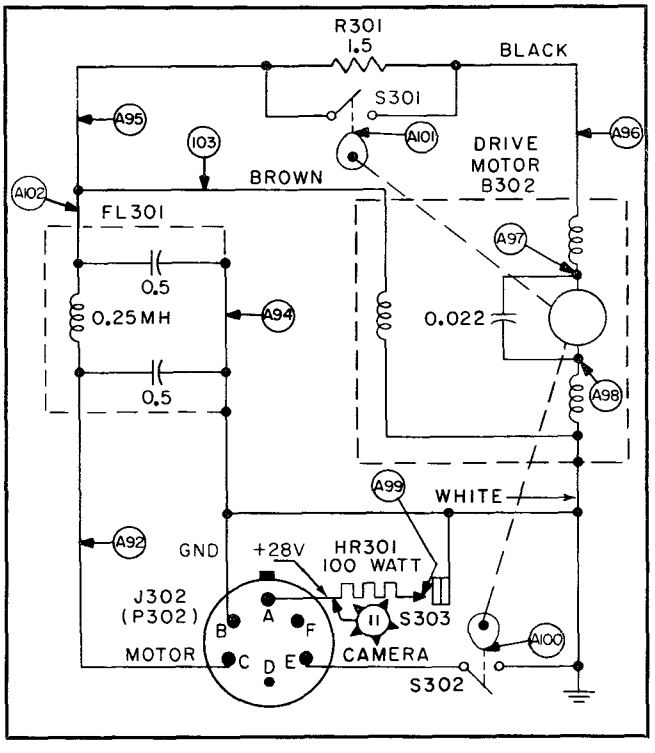


Figure 4-19. Antenna Drive Partial Schematic, Drive Motor Circuitry

fore detection may not occur. The 15 percent variation of speed of the Direction Finder Group's antenna then insures detection of signals because the frequency of intersection of the receiving and transmitting antenna beams is thereby increased enough to where the cathode-ray tube's screen persistence will cause continuous indication of signals. Under conditions of narrowest beam width of receiving antenna, and toward the high end of the frequency range of the equipment, the varying speed of antenna rotation also helps to avoid missing signals of low pulse repetition frequencies.

4–103. The variation of speed of the drive motor is accomplished by alternately inserting and removing R301 which is in series with the series fields of drive motor B302. S301 is cam-operated through a gear reduction drive by the motor, and shorts out R301 for approximately half of the speed variation cycle of 100 antenna revolutions.

4–104. The sparking across the drive motor commutator and the operation of S301 causes r-f interference that would be conducted along the motor supply lead. FL301 filters this lead and confines r-f interference to within the drive motor unit. FL301 is a conventional pi-type motor hash filter unit consisting of a series inductor and two bypass capacitors.

4–105. A circuit is provided in the Antenna Drive unit to automatically actuate the shutter of an auxiliary camera unit, Camera Assembly USAF type 0-20. The camera is actuated to photograph the Azimuth Indicator CRT screen once for each antenna revolution. The camera-

actuating circuit is connected to pin E of J302. The circuit consists of S302 that makes to ground once for each antenna revolution. S302 is operated by a cam on the same shaft that rotates the resolver.

4–106. The function of the heating system is to bring the mechanism to a temperature permitting the proper operation of the gears and bearings containing lubricants. Lubricants at cold ambient temperatures become stiff and will not permit proper antenna speed. This is a common occurance for the drive unit in airborne operation at high altitudes. +28 volts dc is supplied to heating element HR301 with thermostat S303 in series. S303 opens at O°C and will close at −20°C. This circuit is potentially operative at all times that the Azimuth Indicator ANT. SPEED switch is not in OFF position.

4–107. RESOLVER CIRCUITRY. (Figure 4–20.)

4–108. This section of the Antenna Drive unit comprises the resolver, the connections to its windings, and a relay operating circuit that connects through Antenna Coupler CU-398/ALA-6 to Antenna Assembly AS-655/ALA-6 or AS-656/ALA-6. This circuit operates a relay that reverses the resolver rotor winding in polarity so as to correspond to the receiving directions of the vertical and horizontal antennas of those Antenna Assemblies above.

4–109. The resolver is a two-phase rotary synchro transformer. It has two stator windings that have a fixed 90-degree phase relationship with each other. Their relationship to the rotary winding is continuously variable through 360 degrees. The rotor is driven by the motor through a gear reduction drive at the same speed of rotation as the Antenna Assembly. When received signal video voltage is applied to the rotor, the outputs of the stators will vary with the angular relationships between the respective stators and the rotor, according to the "sine" and the "cosine" functions.

4–110. The Azimuth Indicator receives the "sine" and "cosine" voltages, amplifies them, and applies them to the vertical and horizontal deflection plates of its cathode-ray tube. As these deflection plates are also phased 90 degrees with respect to each other, there will be a resultant deflection in the direction of the vector sum of the "sine" and "cosine" voltages. The direction of the resultant deflection relates exactly to the angular displacement of the stators from the rotor in the resolver.

4–111. Resolver B301 is driven through a gear reduction system at the same speed as the Antenna Assembly. Provision is made to align it with the antenna for a common reference direction (see paragraph 6-43d). One side of each stator winding is grounded and the other sides are connected to J307 and J306 which feed "sine" and "co-

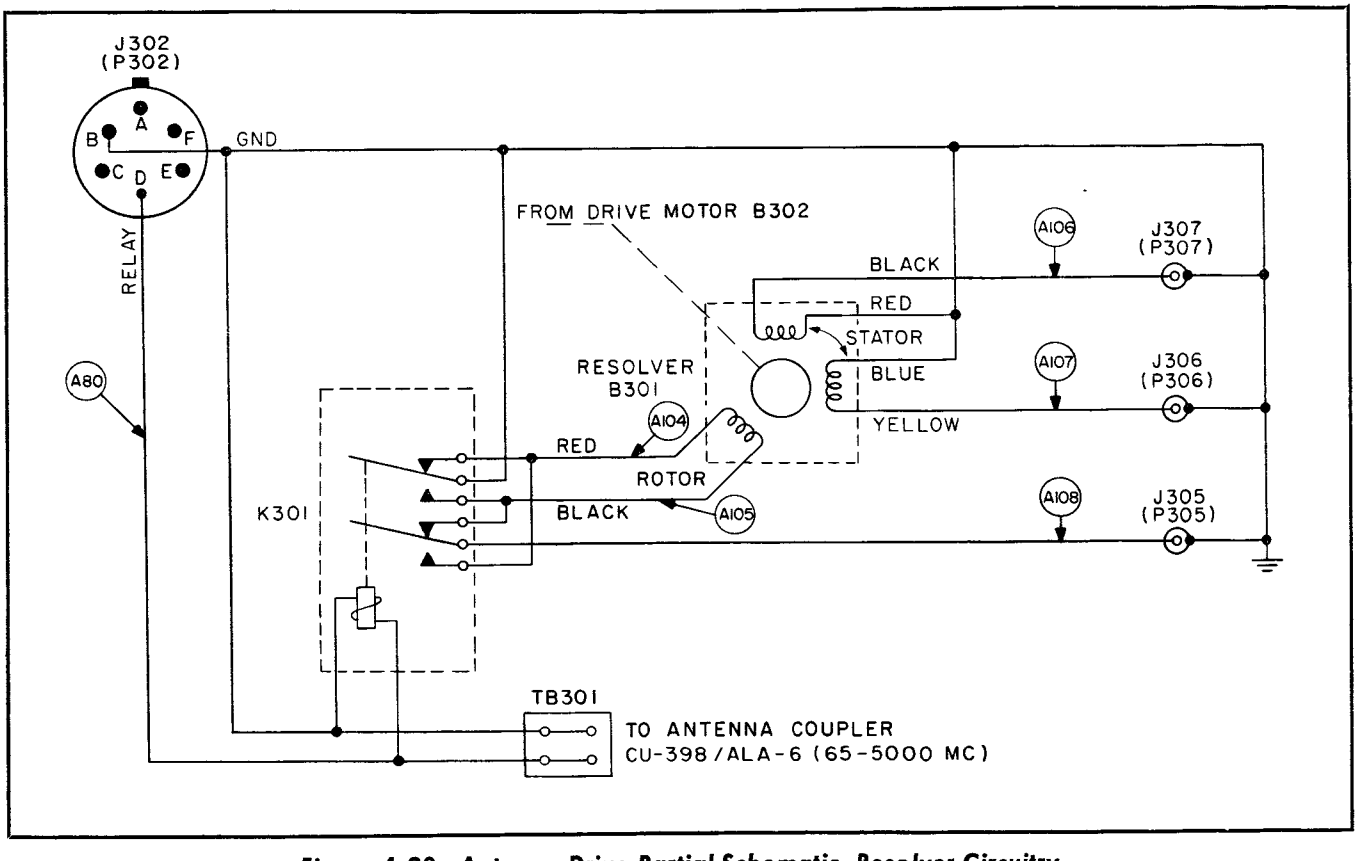


Figure 4-20. Antenna Drive Partial Schematic, Resolver Circuitry

sine" voltages respectively to the Azimuth Indicator. J305 receives the video, and it is connected to the DPDT points of relay K301. At the control of the operator and for the purpose of switching from vertical to horizontal receiving antennas, K301 is energized for vertical antenna reception and unenergized for horizontal reception. This reverses the connections to the rotor winding of the resolver. A parallel relay operating circuit is connected to TB301 for the concurrent operation of the antenna polarity switching relay of Antenna Assembly AS-655/ALA-6 or of Antenna Assembly AS-656/ALA-6.

4–112. Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6 each have two antennas. One is vertically and the other is horizontally polarized. They are mounted so as to face in opposite directions. When switching from one to the other, it is necessary to reverse the polarity of the rotor winding of resolver B301. By reversing polarity the resultant direction of the vector sum of the "sine" and "cosine" voltages is reversed (shifted 180°) to correspond with the 180° switch of antenna directions.

4–113. ANTENNA DRIVE MECHANICAL SYSTEM. (Figure 4–21.)

The drive motor rotates the Antenna Assembly and the resolver through two speed-reduction gear sequences. One gear sequence rotates the Antenna Assembly alone. The other gear sequence rotates the resolver and also operates the camera-actuating switch and the motor-speed cyclic switch.

4–114. Drive motor B301 directly rotates two spur gears each of which initiates a gear sequence. The larger spur gear drives the output-shaft worm and worm-gear assembly by meshing with an additional spur gear mounted at the end of the worm shaft. The worm and worm-gear assembly drives the antenna. The over-all speed reduction between the motor shaft and the Antenna Assembly is 16 to 1. The smaller spur gear directly rotated by the motor, drives resolver B301 through an intermediate pair of speed-reducing spur gears. The over-all speed reduction between the motor shaft and the resolver is also 16 to 1.

4–115. On the same shaft that turns the resolver is a cam upon which rides the button of camera-actuating switch S302. The cam is shaped to operate the camera switch once for each resolver (or antenna) revolution. The switch's position can be adjusted so as to vary the instant of make of the switch to the desired angle of the antenna revolution cycle.

4–116. Motor-speed cyclic switch S301 is operated by a plunger and a second cam. This cam is on a shaft driven

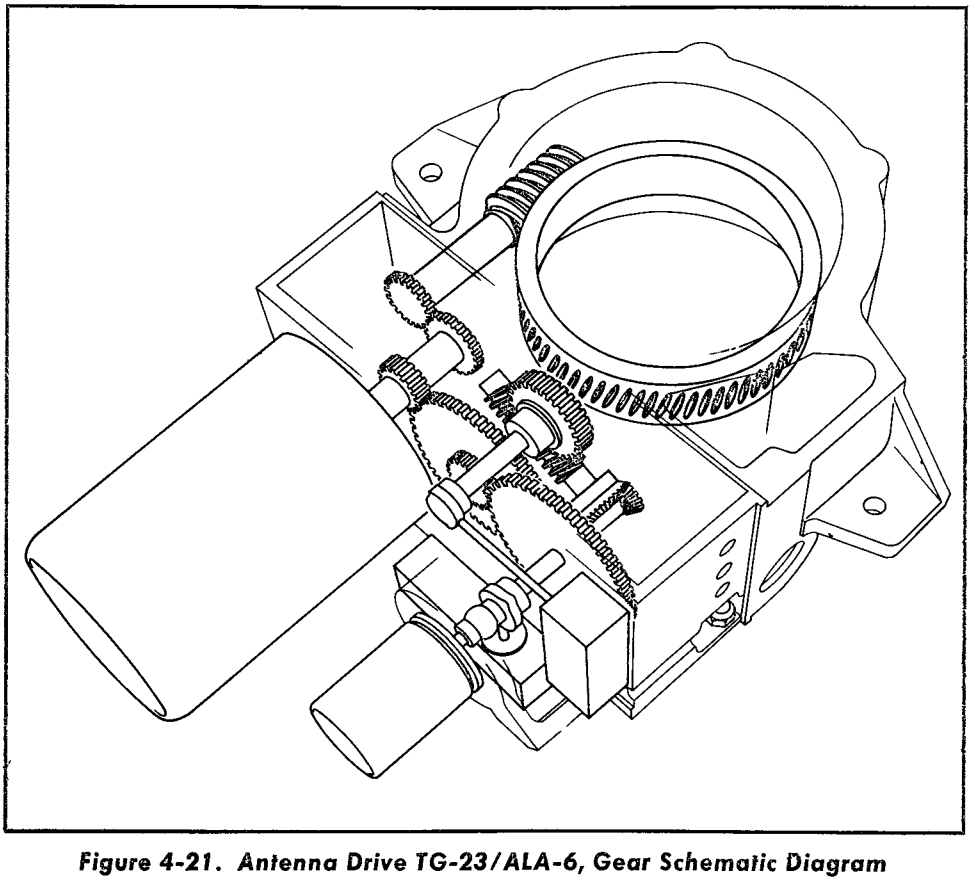


Figure 4-21. Antenna Drive TG-23/ALA-6, Gear Schematic Diagram

through a speed-reduction gear sequence from the resolver shaft. The gear sequence is a pair of bevel gears and a worm drive. There is a speed reduction of 100 to 1 from the resolver shaft. The cam is shaped to make the motor-speed cyclic switch contacts for approximately one-half of each revolution, making the motor-speed variation period once for each 100 resolver (or antenna) revolutions.

4–117. ANTENNA COUPLER CU-398/ALA-6 (65-5000 MC). (Figure 7–4.)

4–118. The Antenna Coupler adapts the Antenna Drive unit to Antenna Assemblies AS-654/ALA-6, AS-655/-ALA-6 or AS-656/ALA-6. It provides the stationary member of a rotating antenna connector for feeding signals to the receiver when picked up by the rotating antenna. When used with Antenna Assemblies AS-655/-ALA-6 or AS-656/ALA-6, it also provides facilities for an electrical connection to their vertical-horizontal antenna switching relays by a set of slip-rings and slip-ring brushes, which conduct the relay-operating current to the relay coil.

4–119. DETAILED CIRCUIT ANALYSIS: ANTENNA CONTROL C-1246/ALA-6.

4–120. GENERAL. The function of the Antenna Control unit is to provide facilities for remotely tuning the antenna element of Antenna Assembly AS-654/ALA-6. The tuning range of this assembly is covered in four frequency ranges. For each frequency range the antenna element must be fine-tuned to the exact frequency. In describing the circuitry and theory of operation of the Antenna Control unit, the discussion includes that portion of the servo system in Antenna Assembly AS-654/-ALA-6 that complements and functions with the Antenna Control as a single system. For convenience, the detailed discussion of the circuitry and theory of operation of the Antenna Control has been divided into the following:

a. Theory of Antenna Tuning Servo Control System (Figure 4–22).

b. Servo Control Amplifier (Figure 4–23).

c. Antenna Control Circuitry (Figure 4–24).

A complete schematic of Antenna Control C-1246/-ALA-6 is shown in figure 7–5.

4–121. THEORY OF ANTENNA TUNING SERVO CONTROL SYSTEM. (Figure 4–22.)

4–122. Fine tuning of the antenna element of Antenna Assembly AS-654/ALA-6 to exact frequency is accomplished by a servo control system. It includes a "command" potentiometer, the variable tap of which is controlled by the tuning knob of the Antenna Control unit, and a "follow-up" potentiometer, the variable tap of which is affixed to the tuning capacitor in the Antenna Assembly. These two potentiometers are paralleled with a 26-volt power source to form a servo bridge circuit. The arrangement produces an "error voltage" for angular position differences between the "command" potentiometer and the "follow-up" potentiometer. This error voltage is amplified by the control amplifier and applied to one winding of a two-phase induction motor that is geared to the "follow-up" potentiometer. The two fields of this motor are 90° opposed, therefore the other winding receives continuous power from a 115 vac source whose phase is rotated 90° by a series capacitor. Voltage at the output of the amplifier causes the motor to move the variable tap of the "follow-up" potentiometer in the direction of reducing the error voltage. The motor will drive the "follow-up" potentiometer until a position is reached where there is too little voltage to be amplified to operate the motor. Because of the bridge circuit, this position will correspond to the angular position of the "command" potentiometer variable tap. Very small error voltages are amplified to produce sufficient

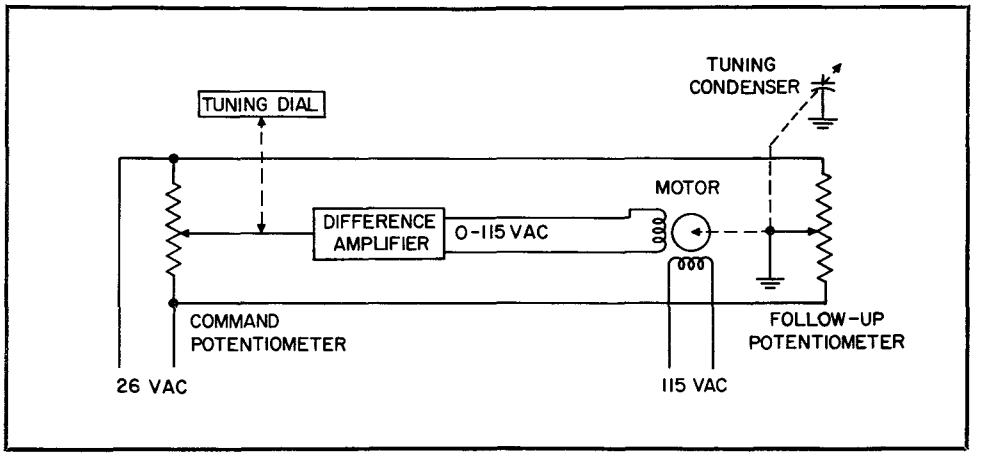


Figure 4-22. Antenna Tuning Servo Mechanism, Simplified Diagram

motor torque to position the tuning capacitor almost precisely as set by the tuning control.

4–123. SERVO CONTROL AMPLIFIER. (Figures 4–23 and 7–5).

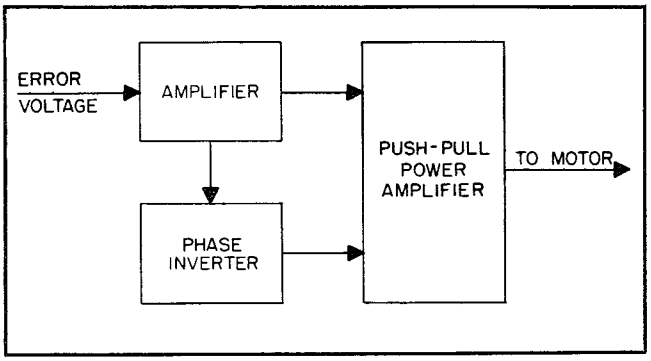


Figure 4-23. Antenna Control C-1246/ALA-6, Electron Tube Functional Block Diagram

4–124. The servo amplifier is designed to sufficiently amplify the "error" voltages that represent position difference between "command" and "follow-up" potentiometers. These error voltages are of the frequency of the 26 vac power supply, 380-420 cps only. The servo control amplifier consists of an input triode stage, a phase inverter and a push-pull output stage. The output stage works into a push-pull transformer. The maximum output voltage to the motor load is approximately 115 vac. The voltage gain from the input of the amplifier to the motor winding is approximately 450.

4–125. The "error" voltage is applied between grid and ground of V401A (see figure 7–5). R402 provides grid return. C405 loads and bypasses the input for any noise or undesired frequencies. The ground return for input signal is actually the arm of the "follow-up" potentiometer in the tuning circuit of Antenna Assembly AS-654/ALA-6. V401 is a cathode-coupled amplifier-phase inverter. V401B grid is grounded and signal across R404 is applied equally to both cathodes. Degenerative feedback through R404 helps make this a well-balanced phase inverter circuit. R403 and R405 are the equal plate loads of V401A and V401B. The signal is fed in equal and opposite phase from the plates of V401 to the power amplifier stage.

4–126. This is a dual triode in a push-pull output circuit. It receives its signal from the plates of V401 through coupling capacitors C401 and C402. R407 and R406 provide grid returns and R408 is common cathode bias resistor. T401 is the power output transformer, and it provides a maximum of approximately 115 vac to its motor load. C404 peaks the transformer's efficiency to the signal frequency of 380 to 420 cps.

4–127. ANTENNA CONTROL CIRCUITRY. (Figures 4–24 and 7–5.)

4–128. Power is supplied at various voltages to the Antenna Control unit at J402. 26-vac for operation of the servo bridge is supplied at pins D and F of J402 and in turn is forwarded to the Antenna Assembly through pins D and F of J401. (All a-c voltages in the Antenna Control unit are 380-420 cps.) The servo control amplifier requires 6.3 vac for filaments and 250 vdc for plates which are supplied by pins C and E respectively of J402. The tuning motor in the Antenna Assembly is a two-phase induction motor with two 90° opposed stator windings. These windings connect to pins A, B and C of J401. A and B connect to the fixed phase stator, which is supplied with 115 vac. C403 is the series capacitor required for the 90° phase shift for operation of the two-phase tuning motor. Pins B and C of J401 connect to the control phase stator, which is supplied with amplified "error" voltage from the control amplifier. The direction the motor turns depends on the relative polarities of the voltages through the stators. The polarity of the controlling voltage output of the amplifier depends on the position of "follow-up" the potentiometer R501 in the Antenna Assembly as related to the position of "command" potentiometer R401 of the Antenna Control.

4–129. S401 is a four position switch for controlling the position of the antenna band switch relay. The positions correspond to the four frequency ranges, 65 to 89 mc, 80 to 110 mc, 110 to 180 mc, and 160 to 270 mc. The antenna element of the Antenna Assembly resonates to two frequencies widely separated at the same time. To cover the four frequency ranges, only two coarse changes of antenna tuning need be accomplished. The antenna band switch relay is energized by S401 to switch to the antenna circuit values for the first and third ranges, and unenergized for the antenna circuit values for the second and fourth ranges. The antenna band switch relay operates on +28 vdc which is supplied at pin H of J402. This 28-volt supply also lights the panel lamps through adjustable series resistor illumination control R409.

4–130. DETAILED CIRCUIT ANALYSIS: ANTENNA ASSEMBLY AS-654/ALA-6.

4–131. GENERAL. This Antenna Assembly, when used as part of Direction Finder Group AN/ALA-6, provides directional pickup facilities for horizontally polarized signals in the frequency range from 65 to 250 mc. The Antenna Assembly is remotely tuned by Antenna Control C-1246/ALA-6. The assembly comprises the antenna structure proper and its tuning elements. These form the rf portion of the assembly. The assembly also includes the tuning motor and gear train, "follow-up" potentiometer, and the band-switch relay, which with a seven-conductor slip-ring assembly, provide the electrical

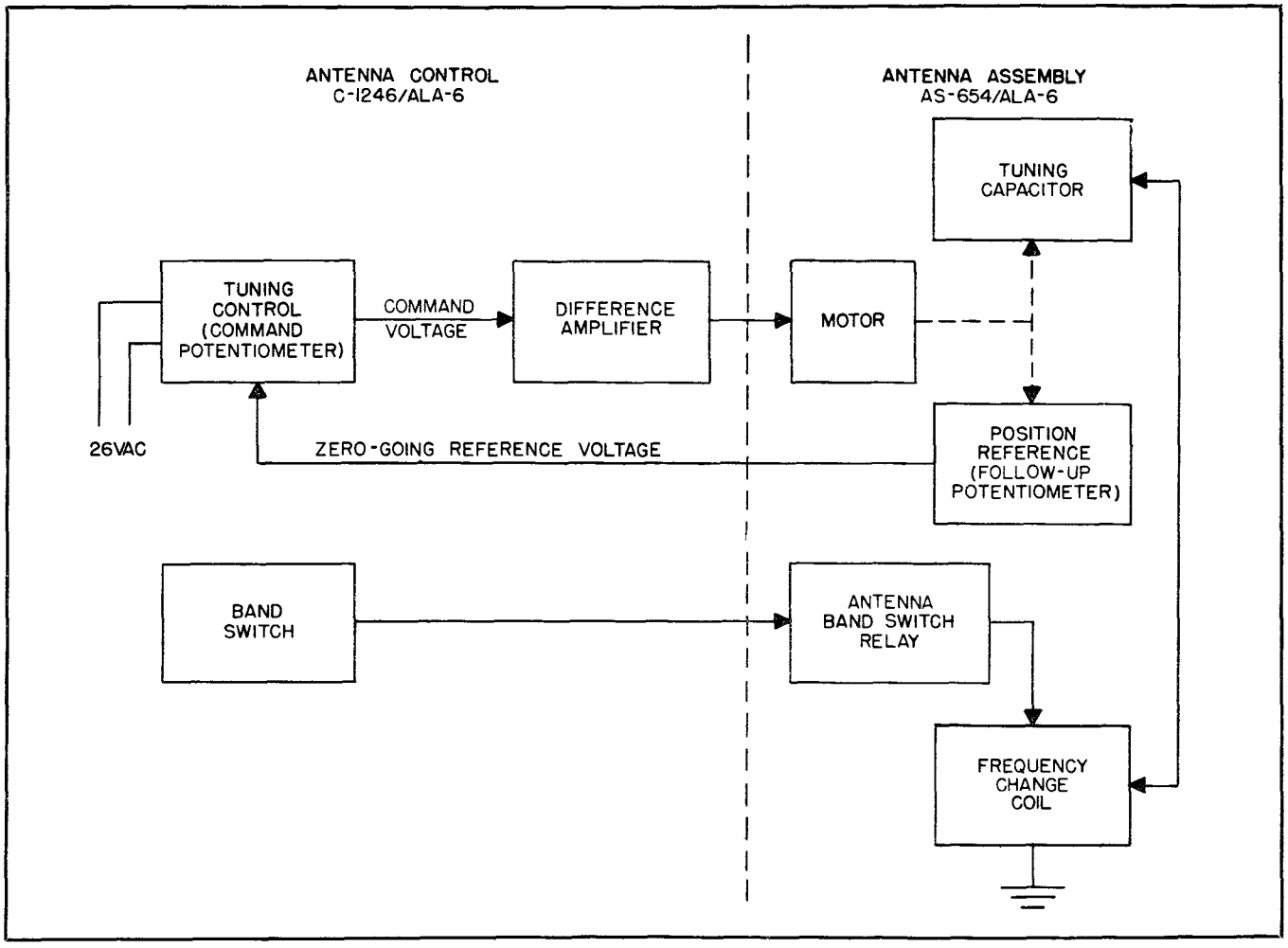


Figure 4-24. Antenna Tuning Servo Control System, Functional Block Diagram

and mechanical means of remotely tuning the antenna through its frequency range from the Antenna Control unit. A complete schematic of the Antenna Assembly is shown in figure 7–6.

4–132. The antenna proper of the Antenna Assembly is a configuration of two shielded single-turn loops in a horizontal plane. They are mounted and connected in a position so that the receiving pattern of the structure is a figure-eight with nulls in the direction of the ends of the common central member and lobes out from the ends of the loops. L502, which is essentially a loading coil, connects from the loops to L503, which is an impedance transformer to the coaxial line that connects to the receiver through the rotating coaxial connector. L502 is in two sections. The lead from the loops is considered to be an inductance and part of L502. At the junction between the lead and the remainder of L502, a lead runs to one contact of antenna band relay K501. The other contact goes to ground. This lead from L502 to the relay is considered to be L501. C501 is the tuning capacitor and is remotely controlled from the Antenna Control. The antenna loops, L502, and L503, together with the tuning capacitor, form a complex network that resonates at more than one frequency simultaneously. These frequencies are widely separated. This effect is used to advantage to cover the complete range from 60 to 300 mc in only two circuit arrangements for four frequency ranges. For the first and third ranges the relay is unenergized and its contacts are open. For the second and fourth ranges L501 is injected to load the inductances down and increase the resonant frequencies of the network.

4–133. Although the antenna is resonant to more than one frequency, this does not impair operation, as the selectivity of the radio receiver excludes reception from other than the desired frequency.

4–134. Tuning control is accomplished by the tuning motor, the "follow-up" potentiometer and the band change relay. These components together with the servo elements of Antenna Control C-1246/ALA-6 comprise a complete tuning control system. See paragraphs 4-120

through 4-130 for a description of the system as a whole. The control cable from the Antenna Control unit brings seven leads in at J501. As tuning is accomplished while the antenna is rotating, these seven control leads are fed into the rotating structure by means of a slip-ring and brush assembly. To make sure of positive contact each of the seven slip-rings have two paralleled brushes riding on them. Three leads supply power to the tuning motor B501. Two leads bring in 26 vac to the terminals of the "follow-up" potentiometer. This is to form one side of the servo control bridge circuit. A ground lead connects to the variable tap of R501 and to one side of the coil of antenna band relay K501. Another lead brings in dc for energizing this relay when the operator desires to switch to second or fourth frequency ranges.

4–135. Servo control tuning motor B501 turns C501 through a gear train in the desired direction. At the same time, the shaft of R501 is geared in with the shaft of C501 and turns with it. Thus, the action of the servo bridge circuit of which R501 is a part, is directly related to the angular position of the tuning capacitor.

4–136. DETAILED CIRCUIT ANALYSIS: ANTENNA ASSEMBLY AS-655/ALA-6.

4–137. This Antenna Assembly, (figure 7–7) operating in the frequency range of 140 to 1200 mc, incorporates single-pole, double-throw relay K601 which selects either the vertical or the horizontal element to be connected to the associated receiver's input. When de-energized, this relay activates the horizontal element and when energized, activates the vertical element. The relay coil is energized when switch S205 on the Azimuth Indicator panel (VERT.-HOR.) is thrown to VERT. position. This action takes 28 vdc from the Power Supply through the Azimuth Indicator and also through Antenna Drive TG-23/ALA-6 to slip rings on Antenna Coupler CU-398/ALA-6. The slip-rings are contacted by two sets of two brushes each, E602A-E602B and E603A-E603B, which conduct the current to the relay coil. Brushes E602A and E602B are paralleled, as are E603A and E603B. This is to assure good contact at all times with the slip-rings on the Antenna Coupler. Simultaneous with the energizing of relay K601, and by the same switch on the indicator panel (VERT.-HOR.), relay K301 in the Antenna Drive unit is energized, which reverses the polarity of the rotor winding in the antenna resolver, thereby reversing the signal pattern on the CRT screen and indicating a vertically-polarized signal. In this way, the operator is able to determine whether the incoming signal is being transmitted by a vertically or by a horizontally-polarized antenna.

4–138. DETAILED CIRCUIT ANALYSIS: ANTENNA ASSEMBLY AS-656/ALA-6.

4–139. This Antenna Assembly, (figure 7–8) operating in the frequency range of 1000 to 5000 mc, incorporates single-pole, double-throw relay K701 which selects either the vertical or the horizontal element to be connected to the associated receiver's input. When de-energized, this relay activates the horizontal element and when energized, activates the vertical element. The relay coil is energized when switch S205 on the Azimuth Indicator panel (VERT.-HOR.) is thrown to VERT. position. This action takes 28 vdc from the power supply through the Azimuth Indicator and also through Antenna Drive TG-23/ALA-6 to slip-rings on Antenna Coupler CU-398/ALA-6. The slip-rings are contacted by two sets of two brushes each, E702A-E702B and E703A-E703B, which conduct the current to the relay coil. Brushes E702A and E702B are paralleled, as are E703A and E703B. This is to assure good contact at all times with the slip-rings on the Antenna Coupler. Simultaneous with the energizing of relay K701, and by the same switch on the indicator panel (VERT.-HOR.), relay K301 in the Antenna Drive unit is energized, which reverses the polarity of the rotor winding in the antenna resolver, thereby reversing the signal pattern on the CRT screen and indicating a vertically-polarized signal. In this way, the operator is able to determine whether the incoming signal is being transmitted by a vertically or by a horizontally-polarized antenna.

4–140. DETAILED CIRCUIT ANALYSIS: ANTENNA ASSEMBLY AS-657/ALA-6 AND ANTENNA COUPLER CU-397/ALA-6.

4–141. This Antenna Assembly, (figure 7–9) used exclusively with Antenna Coupler CU-397/ALA-6 (5000-10,750 mc), operates in the frequency range of 5000 to 10,750 mc. It incorporates no switching relay or wiring other than the coaxixal connector J801 that establishes electrical contact to the coaxial cable that feeds signal to the associated receiver. This antenna will receive horizontally, vertically, and also circularly polarized signals by means incorporated into its open waveguide-parabolic reflector design features.

SECTION V
ORGANIZATIONAL MAINTENANCE

5-1. MINIMUM PERFORMANCE STANDARDS.

5–2. GENERAL. The information presented in this section is intended for the guidance of personnel whose technical relationship to Direction Finder Group AN/-ALA-6 is of an organizational or operational nature. Personnel who are members of the using organization should follow the procedures outlined in the following paragraphs to determine whether or not the equipment is operating within the minimum standards of performance for which it was designed.

WARNING

Direction Finder Group AN/ALA-6 equipment employs high voltages which may be dangerous to life. Operating personnel must be alert at all times to avoid coming into contact with these voltages.

5–3. The following paragraphs provide a check chart which contains useful data to be used in the determination of minimum acceptable results for this equipment.

5–4. CONTROLS. All controls on the front panel of Azimuth Indicator IP-243/ALA-6 should operate normally as described in table 1-2; these are illustrated in figure 1–16. The controls on Antenna Control C-1246/-ALA-6 should perform the functions described in table 1-3; these are illustrated in figure 1-17.

5–5. INDICATOR RESPONSE. The cathode-ray screen on Indicator IP-243/ALA-6 should reproduce a signal pattern of sufficient brightness to be clearly visible in a brightly illuminated room, with the setting of the INTENSITY control in a nominal position. The FOCUS control should operate normally at a position somewhere near its center of rotation. The vertical and horizontal positioning controls should center a small spot in the cathode-ray tube screen without reaching their limits of rotation. The TRUE HD. control should produce a heading line on the screen that will reach to the edge of the azimuth scale without reaching the control's limit of rotation.

5–6. CHECK OF RECEIVER OUTPUT. Since the receiver is not supplied with AN/ALA-6 equipment, the handbook(s) for the receiver used must be consulted for receiver performance standards. In addition to the test outlined below, a sensitivity and frequency-calibration test of the receiver should be made using the applicable handbook procedure and data. The following steps will, however, give an indication of the output of the receiver, and whether the output is sufficient to give a proper presentation on the screen of Azimuth Indicator IP-243/ALA-6. For this test, choose two antennas of the same type (as supplied with this equipment) and a signal generator of the correct frequency. See table 1-1 for the frequency range of each antenna and the Antenna Coupler to use with it, and see table 2-1 for the signal generator.

Step 1. Connect one of the antennas as shown in figure 5–2 as a receiving antenna connected to the input of the receiver. (When using any antenna other than AS-654/ALA-6, omit cables O and P and the Antenna Control C-1246/-ALA-6.)

Step 2. Connect the second antenna to the output of of the signal generator as shown, for use as a transmitting antenna.

Step 3. Separate the transmitting antenna and the receiving antenna by a distance of between 15 to 25 feet, with no intervening objects.

Step 4. Set the signal generator to a frequency within the range of the antennas being used, and adjust its output to 0.5 volts for Antenna Assembly AS-654/ALA-6, or to 0.35 volts for any of the higher frequency antennas.

Step 5. Modulate the signal generator with a 3-microsecond, 1000 pps signal. See table 2-1 for a pulse generator.

Step 6. Set the receiver gain control at its extreme clockwise position and the avc control to "avc off."

Step 7. Disconnect cable D from the Indicator unit at J204.

Step 8. Attach an a-c vacuum-tube voltmeter to the disconnected end of cable D, with a 1000-ohm load resistor in parallel with the meter leads.

Step 9. Align the transmitting and receiving antennas to obtain the maximum signal strength as indicated on the meter.

Step 10. Turn the receiver gain control to extreme counterclockwise position.

Step 11. Turn the receiver gain control slowly clockwise and then back and forth, stopping at the point that gives maximum reading on the meter.

Step 12. If the meter reading is 0.2 volts peak or better, the receiver is operating within the requirements of the Direction Finder Group.

Step 13. If a meter or other indicating instrument is not available, a rough approximation of the receiver's output may be determined using a pair of headphones, connected to the end of cable D in place of the meter and load resistor of step 7 above. With this method, a loud signal should be present in the phones that presents a low signal-to-noise ratio.

5–7. SENSITIVITY OF AZIMUTH INDICATOR IP-243/ALA-6. Determine the sensitivity or acceptable pulse gain by following these steps:

Step 1. With the a-c vacuum tube voltmeter (see table 2-1), set the receiver gain control to deliver 0.1 volts peak to the Indicator unit at jack J204 via cable D. See figure 5-2. Measure this with the cable disconnected from J204 and with a 1000-ohm resistor as a load. Then connect the cable to J204.

Step 2. Advance indicator GAIN control until a deflection of 1-⅛ inches on the cathode-ray tube is obtained in any direction.

Step 3. If the above amount of deflection is obtained previous to, or at the maximum clockwise position of the GAIN control, the sensitivity of the unit is acceptable.

5–8. FREQUENCY ACCURACY OF ANTENNA CONTROL. When using Antenna Assembly AS-654/-ALA-6 and Antenna Control C-1246/ALA-6, the frequency accuracy should be determined by making certain that the tuning potentiometer R401 in the control unit (see figure 5–8), when turned, causes the tuning capacitor C501 in the antenna base assembly (figure 5–1) to turn accordingly; and that when the tuning potentiometer is in either the extreme clockwise or counterclockwise position, the tuning capacitor is also in the corresponding position.

5–9. DIRECTIONAL ACCURACY AT ZERO, GROUND CHECK. The directional accuracy of the indication on Azimuth Indicator IP-243/ALA-6 may be checked on the ground by the following procedure:

Step 1. See figure 5–2 and set up the equipment accordingly. Set up one of the signal generators described in table 2-1 (one whose frequency range is in the receiving range of the antenna being used) approximately 15 to 25 feet in front of the aircraft. Connect to it, by means of a coaxial cable, a duplicate of the antenna being used to receive. (For any antenna other than AS-654/-ALA-6 omit cables O and P and Antenna Control C-1246/ALA-6.) Make certain that the signal generator antenna is on a line paralleling the length of the plane and pointing directly towards the receiving antenna with no intervening objects between one antenna and the other. Make certain also that the set-up is installed in a flat open space at least 100 feet in diameter.

Step 2. Adjust the Direction Finder Group for normal operation with the antenna rotating. Advance the rf output control of the signal generator until a signal pattern of good definition appears on the cathode-ray tube screen.

Step 3. Carefully determine the azimuth indication of the pattern. The pattern must point to zero on the azimuth scale. If it does not, first check the orientation of the antenna drive in its mounting, and turn it to correct the error. If this does not give a satisfactory indication, then procedures must be undertaken to adjust the setting of the antenna resolver in the antenna drive unit. These procedures are described in detail in paragraph 6-48d. When the zero indication is satisfactory the equipment should then be flight checked and a deviation chart filled out for the complete 360 degrees of relative bearing, according to the approved ECN method.

5–10. RECEIVED SIGNAL PATTERNS. When the AN/ALA-6 equipment is operating normally, directional patterns of received signals will be displayed on the Azimuth Indicator screen which indicate the relative bearing of the signal source. Many examples of these presentations are given and discussed in the Handbook of Operating Instructions AN16-30ALA6-1.

5-11. PRELIMINARY INSPECTION.

5–12. AZIMUTH INDICATOR IP-243/ALA-6. To inspect the Azimuth Indicator unit, remove its dust cover by first turning the fastener screw at the back counterclockwise to release it and then sliding the chassis out. See figure 5–3. Make certain that all tube shields and spring type tube retainers are in place and solidly fastened; push each tube down firmly into its socket. See that all control shaft couplings are tightly secured. Make certain that the cathode-ray tube socket is firmly in place on the end of the tube itself, and that the plate cap to the high voltage rectifier tube (V213) is properly fixed to the cap.

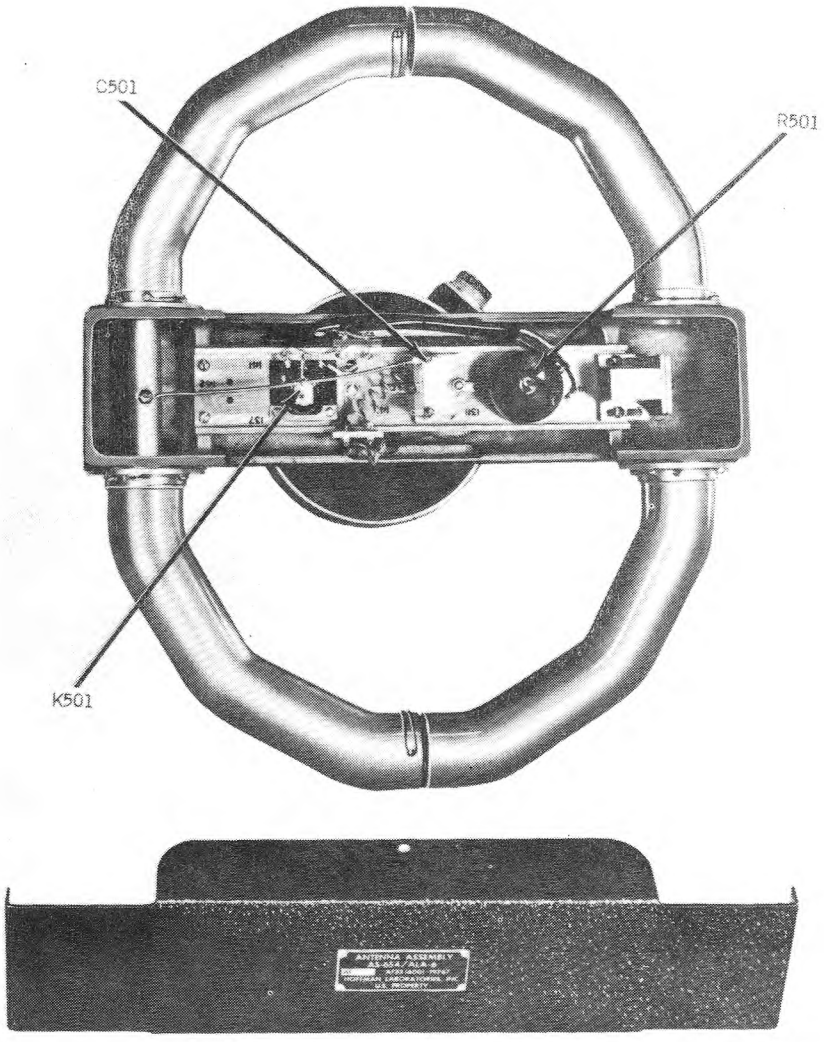


Figure 5-1. Antenna Assembly AS-654/ALA-6, Base Subassembly

CAUTION

Do not touch the plate cap of high voltage rectifier tube V213 unless the power is disconnected from the unit. Even though it is insulated, a-c corona effect can shock you.

5–13. Now turn the chassis over and inspect the wiring of the underside of the chassis (see figure 5–4). With the eraser end of a pencil or with a plastic aligning tool, gently move the wires a little in each direction and inspect the solder joint to which each is attached. If a wire or component is broken free, resolder it to its proper terminal, consulting (if necessary) the schematic diagram, figure 7–1. If the wire or connection is found to have insufficient solder to hold it firmly in place and make good electrical bonding, merely touch a hot soldering iron and a little good quality solder to the terminal and re-melt. (Do not use soldering flux on this equipment, only resin-filled solder.)

5–14. POWER SUPPLY PP-974/ALA-6. To inspect the Power Supply unit remove the dust cover by releasing the fastener at the back end with a counterclockwise turn and removing the two screws behind the top edge of the front panel. See figure 5–5. Inspect the clamps securing rectifier tube V101 and voltage regulator tube V103 to determine if they are properly holding the tubes in their sockets. Also see that the spring-type tube retainers on the other tubes are properly in place.

5–15. Now turn the unit over and inspect the wiring of the underside of the chassis (figure 5–6). With the eraser end of a pencil or with a plastic aligning tool, gently move the wires a little in each direction and inspect each solder joint. If not secure, remedy as instructed in paragraph 5-13, above.

5–16. ANTENNA CONTROL C-1246/ALA-6 AND ANTENNA ASSEMBLY AS-654/ALA-6. To inspect the Antenna Control, first take off the bottom cover by removing the six screws which hold it, one at each side of the control panel and one at each lower corner of the unit. See figures 5–7 and 5–8. Press the tubes firmly in place, check the tube spring-retainers, inspect the soldering and give the unit a thorough inspection like that for the Indicator and Power Supply, as described above. Remove the cover from Antenna Assembly AS-654/ALA-6 by removing six screws, two at each end of the cover and one at each side. Give the wiring and components a similar inspection.

5–17. OTHER UNITS AND INTERCONNECTIONS. Give each of the three other Antenna Assemblies a careful, complete visual inspection. Look for defective solder joints, loose screws or nuts, rust, corrosion, or dirt, damaged or defective receptacles, or anything that might cause malfunctioning of the unit. Also thoroughly inspect each interconnecting cable and its plugs in a similar manner.

5–18. SYSTEM TEST-JACK MEASUREMENTS. Table 5-1, which follows this paragraph, furnishes a cross-reference between test-jack points located on the equipment units and the table of minor repair procedures, table 2-2. It will also show which units of the Direction Finder Group should be replaced in the event of failure to locate a specific trouble.

5-19. SYSTEM (TROUBLE) ANALYSIS.

5–20. The following is a series of checks to determine which unit is faulty when the AN/ALA-6 system is not operating properly. The check of Power Supply PP-974/ALA-6 is covered in table 5-1.

5–21. CHECK OF ANTENNA ROTATION. Determine the following:

Step 1. Turn the ANT. SPEED control to rotate the antenna first on "150" rpm and then on "300" rpm.

Step 2. If it will rotate on "300" rpm only, the speed-reducing series resistor, R280, is probably open and may be replaced in the field, since it is readily accessible on top of the Azimuth Indicator chassis (figure 5–3).

Step 3. If the antenna will rotate on "150" rpm only, check the ANT. SPEED switch, S203 (figure 5–3), and its associated wiring for open circuits or contacts.

Step 4. If the antenna will not rotate on either of the

TABLE 5-1

SYSTEM TEST JACK MEASUREMENTS

Figure Number	*Test Jack*	*On Equipment Unit*	*Reading*	*If Not Within 10 Percent, Refer to Applicable Checks In*	*If Repairs Are Not Effected, Replace Unit*
5–5	J105	Power Supply PP-974/ALA-6	—150 vdc	Table 5-2, Item 11	Power Supply or Azimuth Indicator
5–5	J106	Power Supply PP-974/ALA-6	+250 vdc	Table 5-2, Items 1 and 13	Azimuth Indicator
5–3	J211	Azimuth Indicator IP-243/ALA-6	+250 vdc*	Table 5-2, Items 2 and 10	Azimuth Indicator
5–3	J212	Azimuth Indicator IP-243/ALA-6	—1.45 vdc	Table 5-2, Items 2, 7, 8 and 11	Azimuth Indicator
5–3	J213	Azimuth Indicator IP-243/ALA-6	0 vdc	Table 5-2, Items 9 and 11	Power Supply
5–3	J214	Azimuth Indicator IP-243/ALA-6	+147 vdc	Table 5-2, Items 1, 2, 4, 9 and 13	Azimuth Indicator
5–3	J215	Azimuth Indicator IP-243/ALA-6	+147 vdc	Table 5-2, Items 1, 2, 3, 9 and 13	Azimuth Indicator
5–3	J216	Azimuth Indicator IP-243/ALA-6	—3.2 vdc	Table 5-2, Items 2, 3, 10 and 11	Azimuth Indicator or Power Supply
5–3	J217	Azimuth Indicator IP-243/ALA-6	—3.2 vdc	Table 5-2, Items 2, 4, 10 and 11	Azimuth Indicator or Power Supply
5–3	J218	Azimuth Indicator IP-243/ALA-6	—220 vdc	Table 5-2, Items 1 and 6	Azimuth Indicator

NOTE: Voltages read between test jack and chassis with vacuum tube voltmeter (table 2-1).
* No signal input; GAIN control fully counterclockwise.

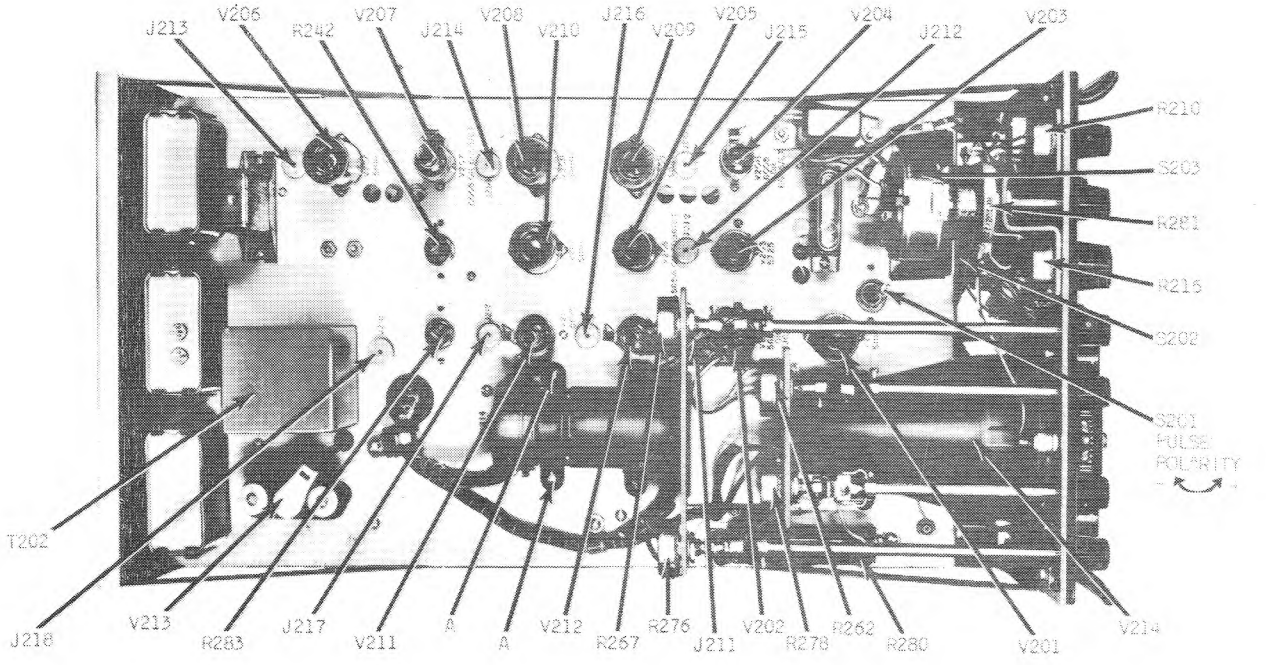


Figure 5-3. Azimuth Indicator IP-243/ALA-6, Top View of Chassis

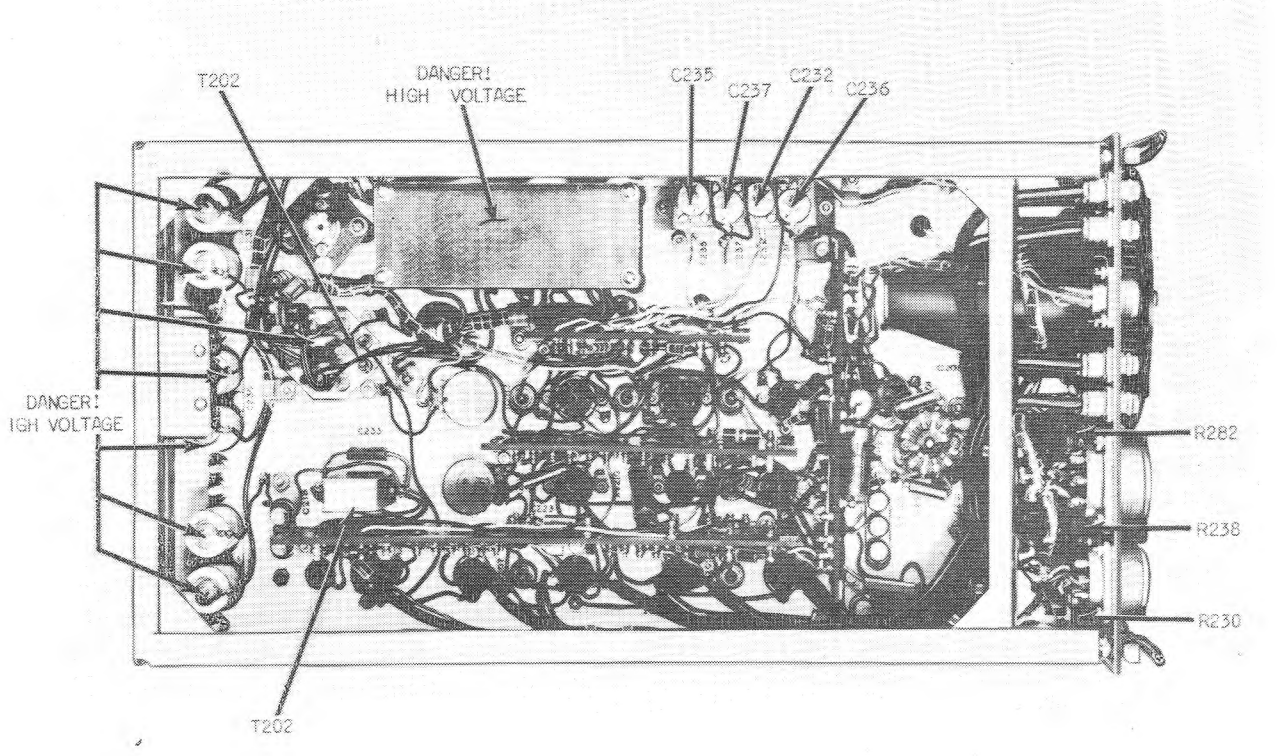


Figure 5-4. Azimuth Indicator IP-243/ALA-6, Bottom View of Chassis

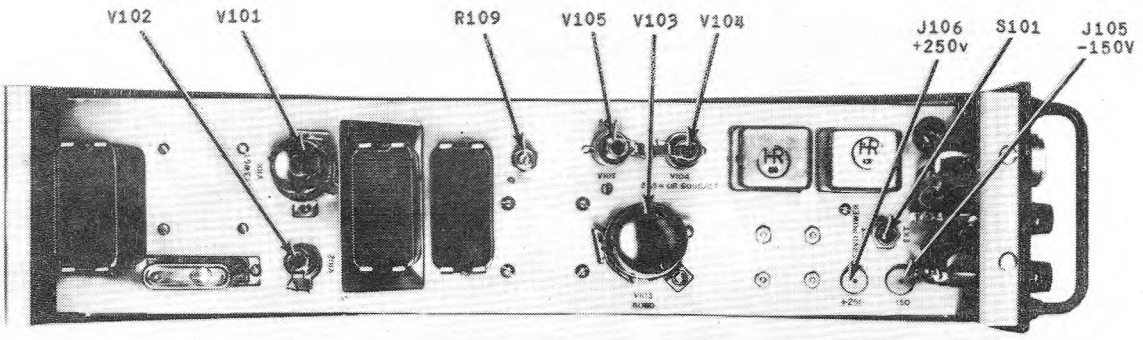


Figure 5-5. Power Supply PP-974/ALA-6, Top View of Chassis

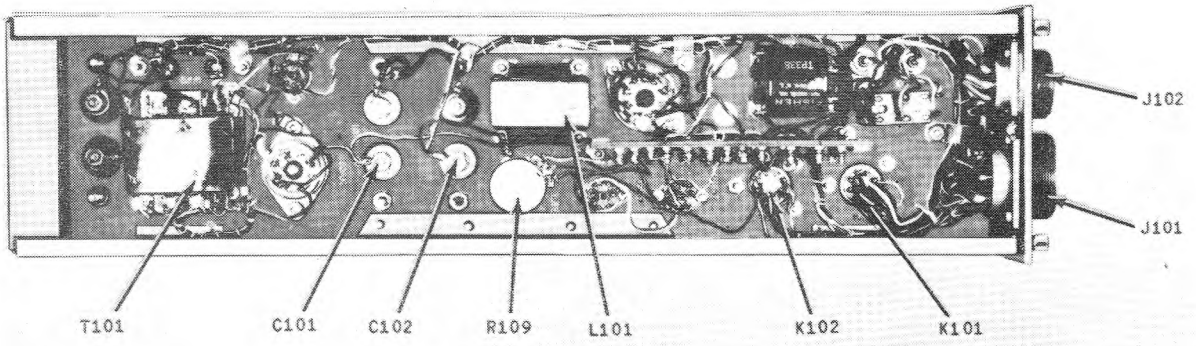


Figure 5-6. Power Supply PP-974/ALA-6, Bottom View of Chassis

two speed positions, "150" or "300", check for 27.5 vdc at pin A of jack J202 (figure 6–3) on the Indicator unit, and also at pin C of jack J302 (figure 5–2) on the Drive unit.

Step 5. If the preceding steps fail to correct or localize the trouble, replace unit Antenna Drive TG-23/ALA-6.

5–21. CHECK OF AZIMUTH INDICATOR. If no signal pattern presentation can be obtained on the Azimuth Indicator screen under normal operating conditions, make the tests of table 5-1 and/or check the Azimuth Indicator as follows:

Step 1. With the pulse generator listed in table 2-1, inject a 0.1 volt, 3-microsecond, 1000 pps signal into the Indicator signal input jack, J204 (see figures 5–9 and 6–3). Set the pulse polarity of the generator, positive or negative, to be the same as the setting of the Azimuth Indicator pulse-polarity switch S201.

Step 2. If a signal line now becomes apparent on the Indicator screen, which will vary directly with variations of the pulse generator's output control the Indicator is functioning. If the pattern revolves when the antenna is rotated, it indicates the resolver and deflection circuits are working. If the Indicator does not show a pattern for the pulse generator signal, first try connecting to another Antenna Drive to see if the trouble is there, and then, if necessary, replace the Indicator.

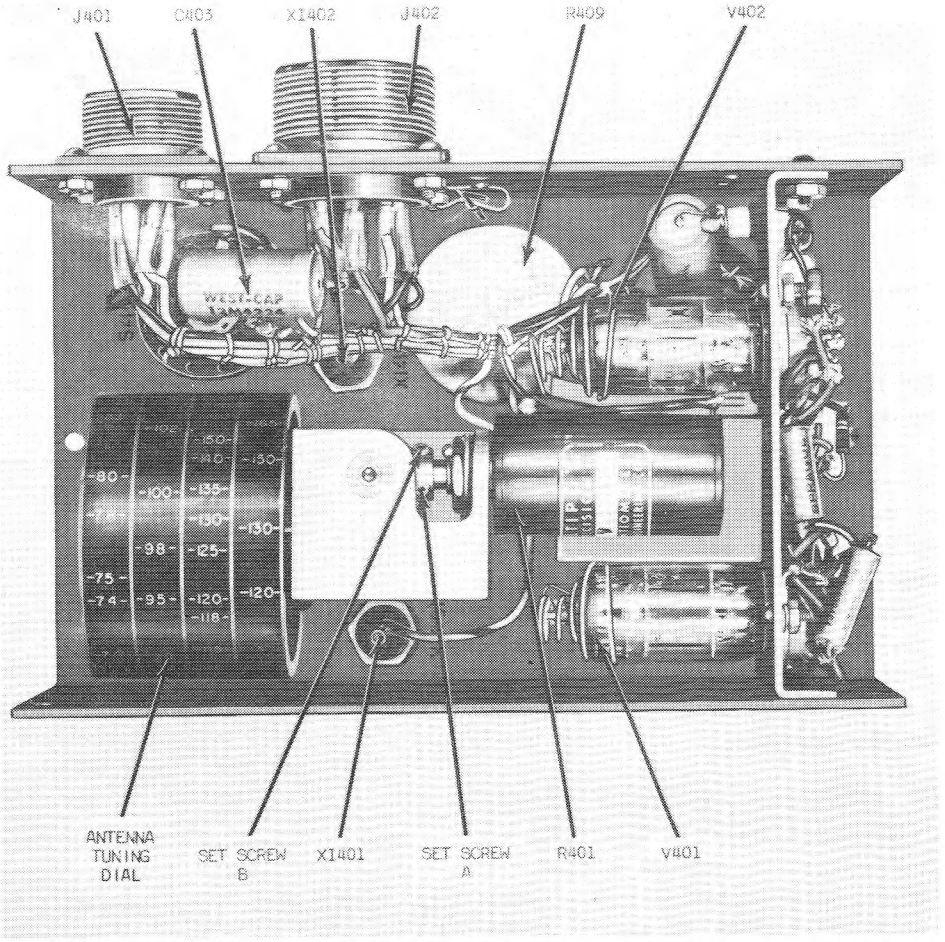


Figure 5-7. Antenna Control C-1246/ALA-6, Tube and Pilot Lamp Location

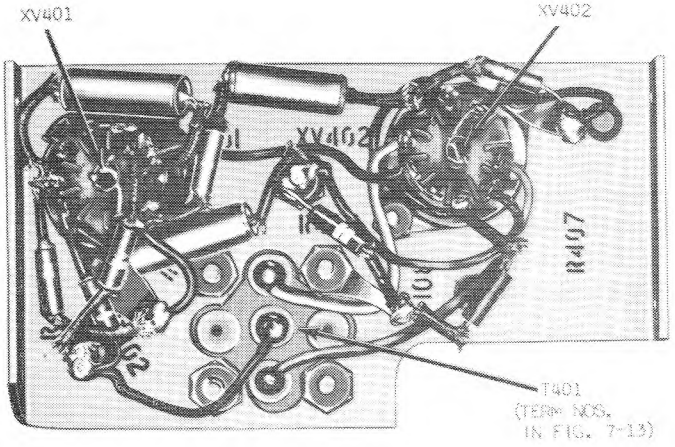


Figure 5-8. Antenna Control C-1246/ALA-6, Tube Socket View

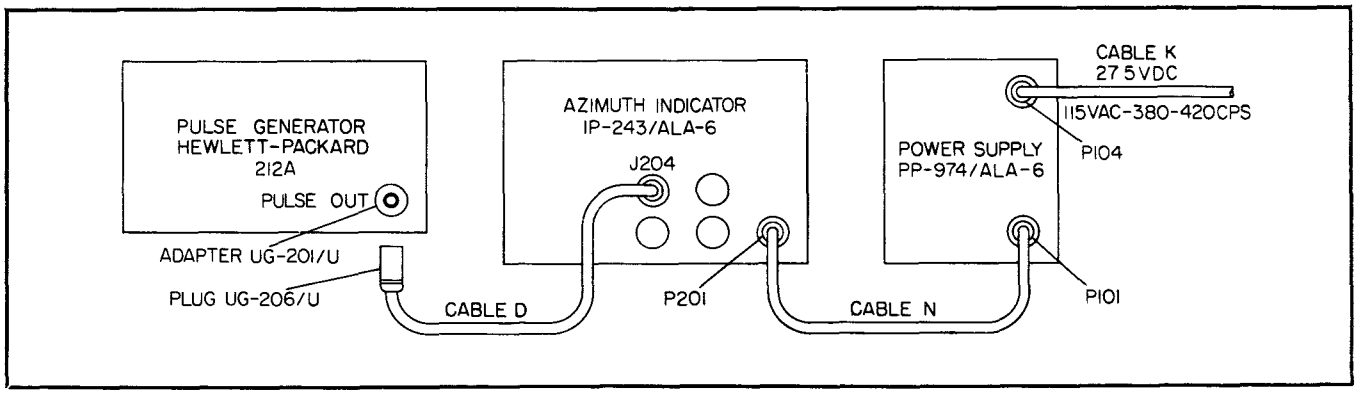


Figure 5-9. Bench-Test Setup for Check of Azimuth Indicator

5–22. CHECK OF RECEIVER. The output of the receiver can be checked simply by listening to the video output with a headset or measuring the output with the ac vacuum tube voltmeter listed in table 2-1 while tuning for stations over its whole range. The signal output should be checked at the output end of cable D, shown in figure 5–2, with a 1000 ohm load resistor connected to the output for the meter reading. The output must be at least 0.2 volt peak for normal operation of the Indicator. If the receiver does not function, try a temporary antenna to check the regular antenna circuits, and then, if necessary, replace the receiver.

5–23. CHECK OF ANTENNA ASSEMBLY AS-654/ALA-6 AND ANTENNA CONTROL C-1246/ALA-6. Check out the functions of the Antenna Control unit and the ability of the servo controlled tuning system in the Antenna to follow properly. To do this, follow the steps given below and refer to the illustrations of signal generator, radiating antenna and receiving antenna given in figure 5–2.

Step 1. Turn the Antenna Control band switch to the 60-86 mc position and set the tuning dial to 66 mc (figure 5–10).

Step 2. Turn ANT. SPEED control on the Azimuth Indicator unit to S position (standby, power on) and adjust the Direction Finder Group for normal operation.

Step 3. Connect the signal generator to Antenna Coupler CU-398/ALA-6 by a length of RG-9/U coaxial cable, using a UG-21B/U connector to mate the Coupler jack J301, according to figure 5–2.

Step 4. Mount one Antenna Assembly AS-654/ALA-6 (that has been tested and known to be in good condition) in a position with the rotating rf connector-joint pointing upward. Then lower the Antenna Coupler, with its mating rotating rf connector-joint over the antenna's connector until it rests upon it and makes sound contact (figure 5–2).

Step 5. Align the antenna connected to the signal generator so that it will radiate rf to the receiving antenna on the Direction Finder Group. Separate the antennas by 15 to 25 feet, with no intervening objects and in a cleared area at least 100 feet in diameter.

Step 6. To one end of a length of seven-conductor cable (cable N, table 2-3), attach a plug type AN3106B-16S-1S; this is marked PE-1 in figure 5–2. To the other end, attach a receptacle AN3101-16S-1P; this is marked SE-1.

Step 7. Disconnect plug P501 from jack J501 on the receiving Antenna Assembly. Connect plug P501 to receptacle SE-1, and connect plug PE-1 to jack J501 on the radiating Antenna. When these connections are made, the temporary radiating Antenna will automatically adjust its tuning to 66 mc, which is the same frequency set on the receiving Antenna by step 1.

Step 8. Put plug P501 back to its former position on jack J501 on the receiving antenna.

Step 9. Tune the signal generator to 66 mc. Turn the Indicator GAIN control to a point that is three-fourths of its full clockwise rotation. Turn ANT. SPEED control to 300 rpm. While watching the Indicator screen, turn the signal generator output control and receiver gain clockwise until a normal-size signal pattern is visible.

Step 10. Rock the tuning dial of the control unit up and down across 66 mc while watching the pattern on the Indicator screen. The pattern should be the longest at 66 mc rather than a little below or a little above that frequency. If this is so, the frequency tracking between antenna control and antenna tuning is satisfactory.

Step 11. If not, adjust the helipot R401 (figure 5–7) to compensate for the difference by loosening the setscrews on its shaft (figure 5–7, set screws A and B), and then retightening them securely at the position which is correct.

Step 12. First set the Tuning Control to the frequency and then repeat steps 7 through 10 for each of the following frequencies: 88 mc (60-89 mc band), 81 mc (80-110 mc band), 109 mc (80-110 mc band), 111 mc (110-180 mc band), 179 mc (110-180 mc band), 161 mc (160-270 mc band), and 268 mc (160-270 mc band).

Step 13. If roughly accurate tracking can be obtained on all checks, the tuning system is OK. If not, refer to table 5-2, item 14, for possible remedy; or replace Antenna Control C-1246/ALA-6 and/or Antenna Assembly AS-654/ALA-6.

5–24. CHECK OF ANTENNA COUPLER CU-398/-ALA-6. If with the AN/ALA-6 system operating, the VERT.-HOR. switch (antenna polarity) on the Azimuth Indicator does not trip the polarity-reversing relays in Antenna Assembly AS-655/ALA-6 or AS-656/ALA-6 as normally evidenced by a 180 degree shift of pattern on the screen, check the following:

Step 1. Check the slip-ring brush assembly at the top of the Antenna Assembly in question (figure 6–7) for broken-off or worn brushes.

Step 2. Check the slip-rings (figure 5–13) for corrosion, film or damage.

Step 3. Check Antenna Assembly as per paragraph 5-25, below.

Step 4. Check continuity of VERT.-HOR. switch S205 by placing the leads of an ohmmeter between pins A and D of jack J202 on the Azimuth Indicator unit, flipping the switch from VERT. to HOR. several times (figure 6–3).

Step 5. Check cable L from J202 on the Indicator unit to J302 on the Antenna Drive unit (figure 5–2).

Step 6. If step 1 reveals damage, refer to paragraph 6-31 for replacement of brushes.

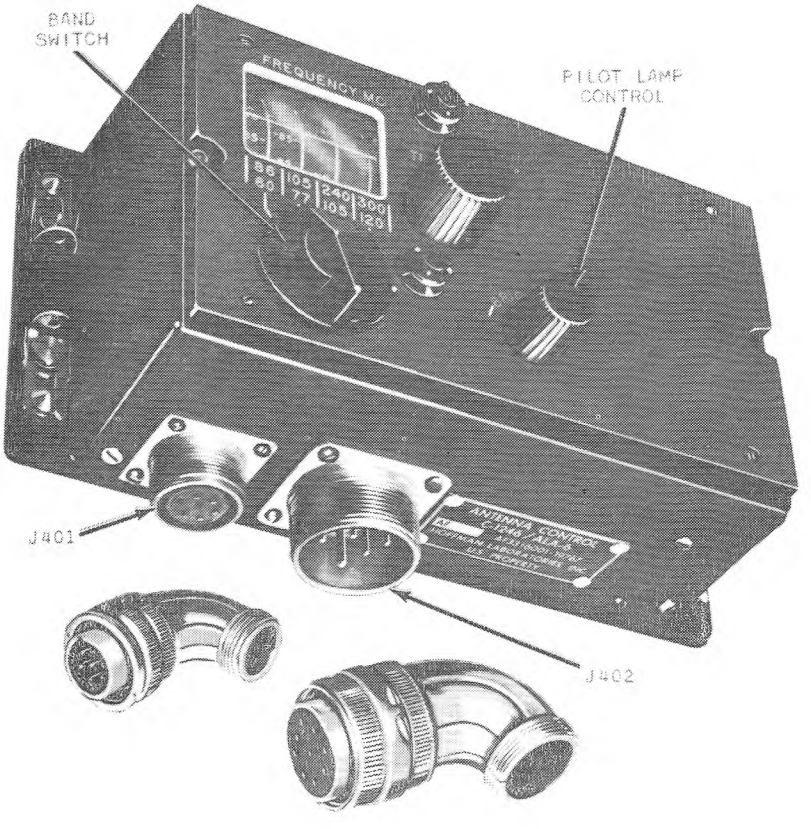


Figure 5-10. Antenna Control C-1246/ALA-6, Tuning Controls

Step 7. If step 2 reveals a cause for trouble, clean as per paragraph 5-34.

Step 8. In the event of excessive damage not correctable by the above steps, replace Antenna Coupler CU-398/ALA-6. See figures 5–12 and 5–13.

5–25. CHECK OF ANTENNA. If, in the checks of paragraphs 5-19 through 5-24 above, it is believed that the antenna assembly in use is causing subnormal or abnormal operation of the AN/ALA-6 equipment, first replace cable D which connects the antenna output to receiver input (figure 5-2), and then replace the antenna itself. In some cases substituting another cable and antenna temporarily without installing them may be the quickest most practicable check of whether there is trouble in the installed antenna.

5-26. REMOVAL AND REPLACEMENT.

5–27. SUBASSEMBLIES. There are no subassemblies in Direction Finder Group AN/ALA-6 whose replacement lies within the technical jurisdiction of operational personnel except tubes, pilot lamps and fuses.

5–28. MAJOR ASSEMBLIES. The removal of units of the equipment will be in reverse order of that procedure followed by the installing activity and their replacement will be a repeat of applicable steps of installation.

5-29. MINOR REPAIR AND ADJUSTMENT.

5–30. MINOR REPAIR. Minor repairs of the equipment within the technical jurisdiction of operational personnel are outlined in tabular form in the following table (Table 5-2).

TABLE 5-2

MINOR REPAIR PROCEDURE

Item	*Effect of Trouble*	*Check*	*For*	*Reference Figure*
1.	No spot, trace or light on Indicator screen.	Power switch setting	"S" position is "ON"	Fig. 6–3
		INTENSITY control	Setting too low	Fig. 6–3
		Aircraft electrical power supply	27.5 vdc and 115 vac 380-420 cps	——
		Fuses F101 or F102	Open	Fig. 5–11
		Plug P103 and cable J to Power Supply PP-974/ALA-6	Open or shorted wires, pins or receptacles	Fig. 5–2
		Plug P101, Plug P201 and Cable N	Open or shorted wires, pins or receptacle	Fig. 5–2
		Socket XV214 to cathode-ray tube	Solid connection to CRT; cracked shell; open wire connection, etc.	Fig. 5–3
		Rectifier tube V101 in power supply	Weak or burned-out filament; shorted	Fig. 5–5
		High voltage rectifier tube V213	Weak or shorted or open filament	Fig. 5–3
2.	A spot of very bright light appears on the indicator screen, but no signal pattern appears, even though it is suspected that an incoming signal is present at the output of the receiver.	Horizontal deflection amplifier V212	Weak or burned-out condition	Fig. 5–3
		Vertical deflection amplifier V211	Weak or burned-out condition	Fig. 5–3
		Phase inverter V210	Weak or burned-out condition	Fig. 5–3
		Isolation amplifiers V208 and V209	Weak or burned-out condition	Fig. 5–3
		Video cathode follower V204	Weak or burned-out condition	Fig. 5–3
		Summing amplifier V203	Weak or burned-out condition	Fig. 5–3
		Video amplifier V202	Weak or burned-out condition	Fig. 5–3
		Throw pulse polarity switch	If a pattern becomes apparent, replace inverter tube V201	Fig. 5–3

TABLE 5-2 (cont)

MINOR REPAIR PROCEDURE

Item	*Effect of Trouble*	*Check*	*For*	*Reference Figure*
3.	A distorted signal pattern is visible, which presents a vertical characteristic only.	Horizontal deflection amplifier V212	Weak or burned-out condition	Fig. 5-3
		Phase inverter V210	Weak or burned-out condition	Fig. 5-3
		Isolation amplifier V209	Weak or burned-out condition	Fig. 5-3
4.	A distorted signal pattern is visible, which presents a horizontal characteristic only.	Vertical deflection amplifier V211	Weak or burned-out condition	Fig. 5-3
		Phase inverter V210	Weak or burned-out condition	Fig. 5-3
		Isolation amplifier V208	Weak or burned-out condition	Fig. 5-3
5.	Beam modulator control has no effect.	Beam modulator V205	Weak or burned-out condition	Fig. 5-3
6.	A signal pattern is visible, but cannot be focused.	High voltage rectifier tube V213	Weak or burned-out condition	Fig. 5-3
		Cathode-ray tube V214	(See Note 1.)	Fig. 5-3
7.	A signal pattern is visible, but the EXPANDER control has no effect.	Expander diode V201	Weak or burned-out condition	Fig. 5-3
		Summing amplifier V203	Weak or burned-out condition	Fig. 5-3
8.	A signal pattern is visible, but the EXPANDER control does not have sufficient effect.	Expander diode V201	Weak or burned-out condition	Fig. 5-3
		Summing amplifier V203	Weak or burned-out condition	Fig. 5-3
		Rectifier tube V201	Weak or burned-out condition	Fig. 5-5
		Aircraft electrical power supply	Low voltage	—
9.	A signal pattern is present, but the heading line is absent (or the line deflects in a vertical or horizontal position only).	Isolation amplifier V208	Weak or burned-out condition	Fig. 5-3
		Isolation amplifier V209	Weak or burned-out condition	Fig. 5-3
		Cathode follower V207	Weak or burned-out condition	Fig. 5-3
		Blocking oscillator V206	Weak or burned-out condition	Fig. 5-3
		Flux gate compass resolver	Open winding	—
		Plug P208 and cable A to compass junction box	Open or shorted wires, pins, or receptacles	Fig. 5-2
		Plug P209 and cable B to compass junction box	Open or shorted wires, pins, or receptacles	Fig. 5-2
		Plug P210 and cable C to compass junction box	Open or shorted wires, pins, or receptacles	Fig. 5-2
10.	Light will appear on the screen, and the heading line is present (if compass is used), but no signal pattern of relative bearing will appear.	All tubes in Azimuth Indicator except high voltage rectifier V213, blocking oscillator V206 and cathode follower V207	Weak or burned-out condition	Fig. 5-3

TABLE 5-2 (cont)

MINOR REPAIR PROCEDURE

Item	*Effect of Trouble*	*Check*	*For*	*Reference Figure*
		Associated receiver	Video output	——
		Plug P204 and cable D	Open or shorted wires or connections	Fig. 5–2
		Plug P301 or P801 and cable H	Open or shorted wires or connections	Fig. 5–2
11.	GAIN control does not function.	Bias rectifier V102	Weak or burned-out condition (See Note 2)	Fig. 5–5
		V201, V202, V203, V204, V207, V211, V212 in Azimuth Indicator IP-243/ALA-6	Gassy or shorted condition	Fig. 5–3
12.	Signal pattern and bearing line are present on the screen, but both vary in size (length) at periodic intervals.	Voltage regulator V103	Weak or burned-out condition	Fig. 5–5
		DC amplifier V104	Weak or burned-out condition	Fig. 5–5
		Voltage reference tube V105	Weak or burned-out condition	Fig. 5–5
		Aircraft electrical power supply	27.5 vdc and 115 vac—380-420 cps	——
13.	A fuse has blown on Power Supply PP-974/ALA-6 and every time a new one is installed, it too blows immediately.	Rectifier tube V101	Shorted condition	Fig. 5–5
		Throw Servo Power switch to EXT. position	If the fuse does not blow, check V401 and V402 in Antenna Control C-1246/ALA-6; or check plugs P102 and P402, and cable P for shorts	Fig. 5–5 Fig. 5–7
		Plug P101 and P201, and cable N	Short circuits	Fig. 5–2
14.	When using Antenna Assembly AS-654/ALA-6 and Antenna Control C-1246/ALA-6, it is possible to receive only a very narrow range of frequency instead of over the entire range of this antenna.	Servo amplifiers V401 and V402 in Antenna Control C-1246/ALA-6	Weak, shorted, or burned-out condition	Fig. 5–7
		Plugs P401 and P501, and cable O	Open or shorted wires, pins, or receptacles	Fig. 5–2
		Plugs P102 and P402, and cable P	Open or shorted wires, pins, or receptacles	Fig. 5–2
		Fuses F104 and F105	Open condition (for EXT. servo power)	Fig. 1–4
15.	Heading line is present, but signal pattern for relative bearing is distorted to a single line radiating from the center of the screen and appears on only one compass point of the azimuth scale.	Antenna is not rotating; check plugs P202 and P302, and cable L	Open or shorted wires, pins, or receptacles	Fig. 5–2
		Plugs P101 and P201, and cable N	Open or shorted wires, pins, or receptacles	Fig. 5–2
		Fuse F103	Open condition (d-c power)	Fig. 1–4
		Plug P104	Open wires	Fig. 5–2
		Aircraft electrical power supply	27.5 vdc	——
		Switch S203 ANT. SPEED	Open wires or contacts	Fig. 6–3

NOTE 1: Refer cathode-ray tube replacement to qualified Field and FASRON maintenance personnel.

NOTE 2: It is advisable to check bias rectifier V102 at regular intervals (200 hours). When this tube weakens, negative bias voltage on the grids of the amplifier tubes in Azimuth Indicator IP-243/ALA-6 will drop, causing these tubes to draw more current, and thereby shorten their life.

CAUTION

Never allow a spot of high brightness to remain stationary on the screen more than momentarily. To do so may permanently damage the phosphor on the screen. Turn the INTENSITY control to produce only a faint spot when it is stationary or has a small excursion.

5–31. If the foregoing table fails to reveal the location of trouble, or if the suggested remedy fails to return the equipment to operable condition, refer the unit or units to Field and FASRON maintenance personnel for more technical analysis and repairs.

5–32. ADJUSTMENT. In addition to those adjustments appearing on the front panel of Azimuth Indicator IP-243/ALA-6, and described in the Operating Instruction Handbook, there are three potentiometers and four variable capacitors located in various parts of the equipment. These adjustments are quite critical in nature and should be left to the better-equipped facilities of Field and FASRON maintenance depots (Section VI).

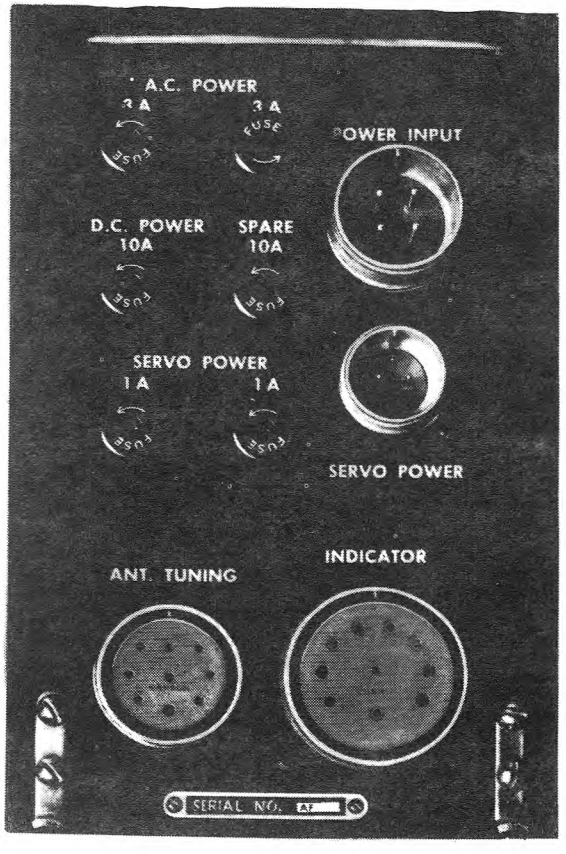


Figure 5-11. Power Supply PP-974/ALA-6, Fuse Locations

5-33. LUBRICATION. The only lubrication required on Direction Finder Group AN/ALA-6 for proper maintenance is that of the gear box in the Antenna Drive TG-23/ALA-6. Remove the cover of the gear box (figure 5–12) and apply MIL-G-3278 low-temperature aircraft grease to gears. Apply the grease in amounts sufficient to coat teeth lightly, but not in amounts that will drop off in the pan below the gears or that will tend to slow down their interaction. This should be done every 500 hours. Other lubrication procedures may be found in Handbook of Overhaul Instructions AN16-30ALA-3.

5-34. CLEANING SLIP RINGS, BRUSHES, AND ROTATING COAXIAL CONNECTORS. Antenna Coupler CU-398/ALA-6 contains a set of slip rings which mate with brushes in Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6 to carry control voltages for the antenna-polarity relay in the Antennas. The Antenna Coupler also contains a coaxial connector which mates with a rotating coaxial receptacle on Antenna Assemblies AS-654/ALA-6, AS-655/ALA-6, and AS-656/-ALA-6 to carry the rf signal from the antenna. The method of cleaning these contact surfaces and brushes is described in the steps below. There are a set of slip rings and brushes internal to Antenna Assembly AS-654/ALA-6 for the tuning servo system which are only accessible through disassembly of the unit. This is not done in Organizational maintenance but covered in the Handbook of Overhaul Instructions, AN16-30ALA6-3.

Step 1. Clean the slip-rings of Antenna Coupler CU-398/ALA-6, using solvent MIL-S-16067, type 140F, applied with a soft brush or soft, clean cloth. See figure 5–13. Remove all excess solvent.

Step 2. Clean the slip-ring brushes of Antenna Assembly AS-655/ALA-6 and AS-656/ALA-6 as in step 1, above. See figure 6–7.

Step 3. Clean the rotating coaxial connectors of Antenna Assembly AS-654/ALA-6, AS-655/ALA-6, AS-656/ALA-6 and Antenna Coupler CU-398/-ALA-6 with the solvent and method described in step 1, above. See figures 5–13, 5–14 and 6–7.

5-35. INSPECTION. The recommended inspection for AN/ALA-6 equipment is listed in table 5-3. Inspections will be performed in accordance with schedule in applicable -6 technical manuals, or when visual or functional defects are apparent.

TABLE 5-3

INSPECTION

Inspection To Be Made	*Reference Instructions*
Test all electron tubes	Tube tester of table 2-1
System test-jack measurements	Paragraph 5-18 and table 5-1
Lubrication	Paragraph 5-33
Cleaning of slip rings, brushes and rotating coax connectors	Paragraph 5-34
Minimum performance standards	Paragraphs 5-1 through 5-10

5–36. BENCH TEST SET-UP. Refer to Section VI.

5–37. TEST EQUIPMENT. A complete list of test equipment for this handbook is found in table 2-1. For usage instructions pertaining to bench tests, refer to Section VI, paragraphs 6–16 through 6–19.

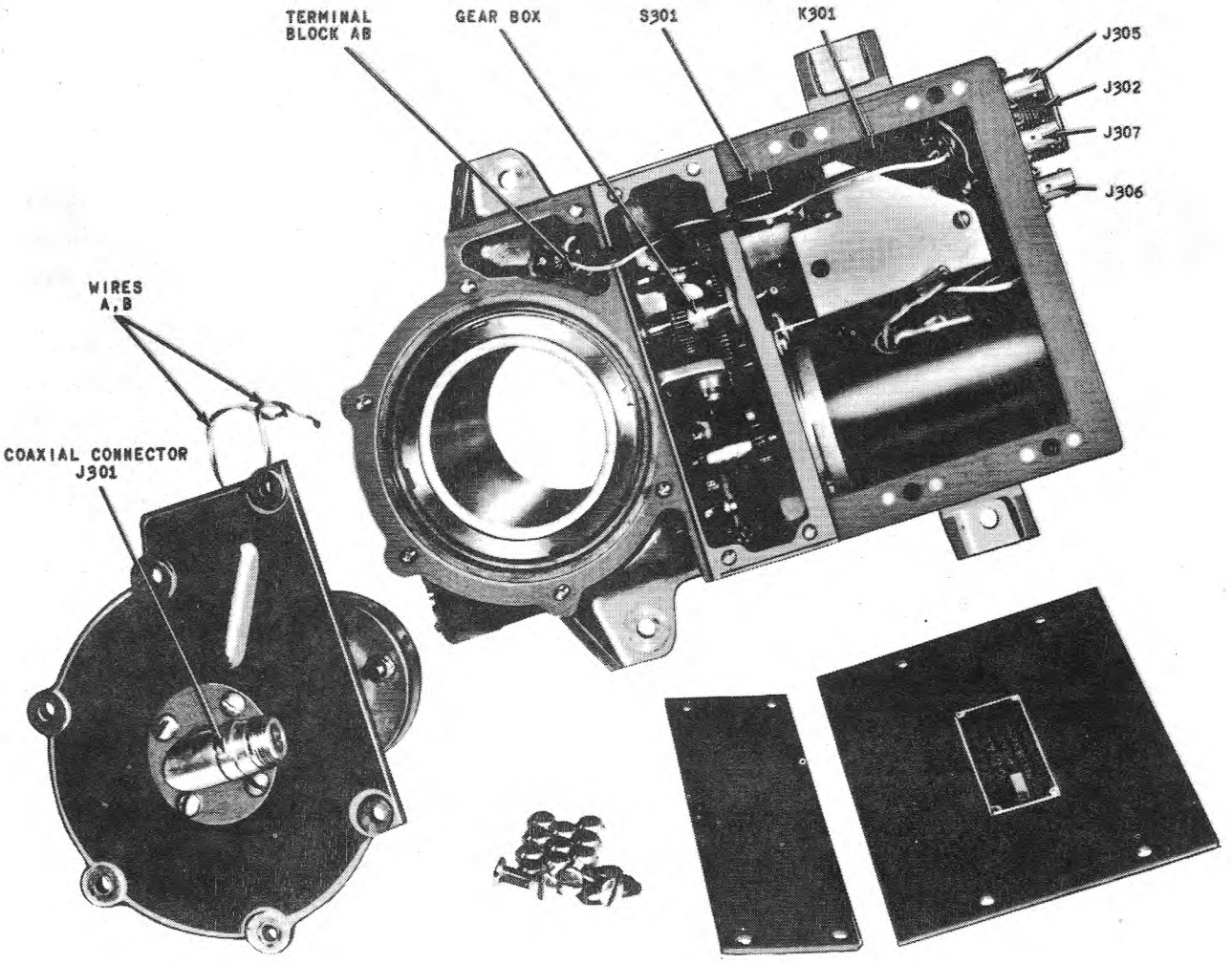


Figure 5-12. Antenna Drive TG-23/ALA-6, Gear Box, Antenna Coupler CU-398/ALA-6 and Plug P301

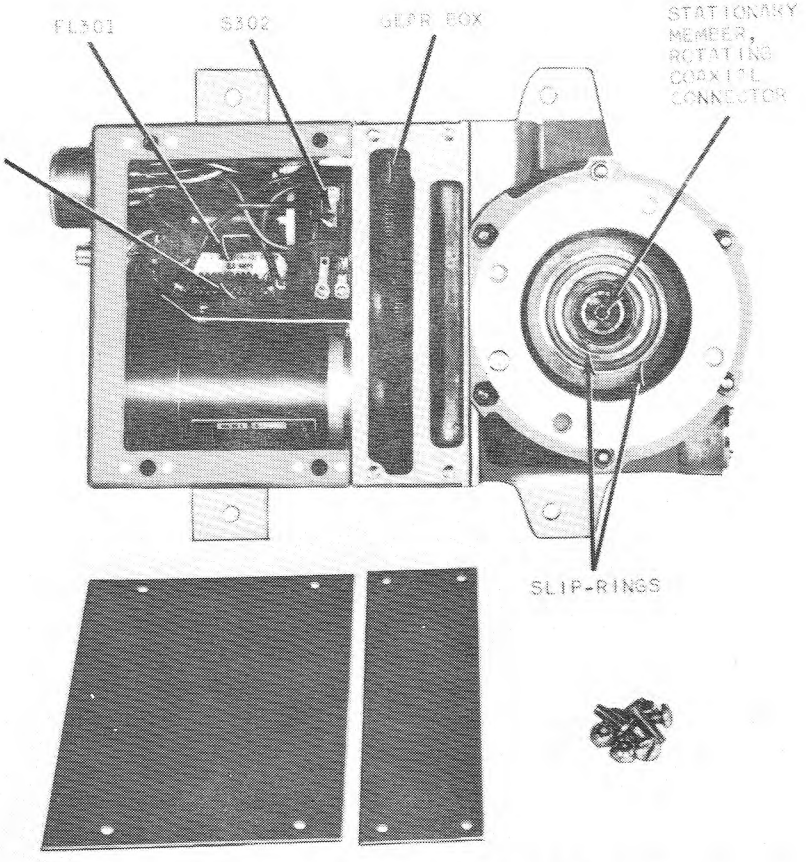


Figure 5-13. Antenna Drive TG-23/ALA-6, Antenna Coupler CU-398/ALA-6 in Place

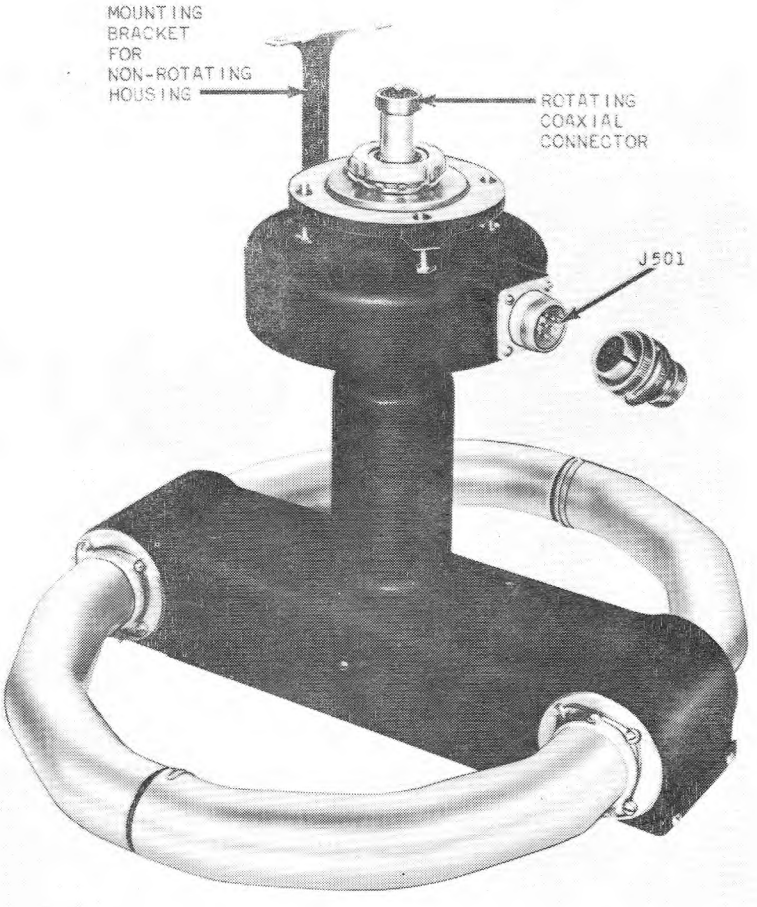


Figure 5-14. Antenna Assembly AS-654/ALA-6, Rotating Coaxial Connector

SECTION VI
FIELD MAINTENANCE

6-1. MINIMUM PERFORMANCE STANDARDS.

6–2. GENERAL. The information in this section is presented for the guidance of personnel whose technical capabilities fall within the classification of Field Maintenance. This section presupposes that the maintenance specialists have been thoroughly trained in maintenance practices, and that they have had previous experience in performance testing, alignment and adjustment on similar types of equipment. For maintenance procedures classed as major overhaul, personnel are referred to Handbook of Overhaul Instructions AN16-30ALA6-3.

6–3. MINIMUM PERFORMANCE DATA. The following tables, 6-1 and 6-2, list the standards of minimum performance for the individual units of Direction Finder Group AN/ALA-6, and the accompanying paragraphs are explanatory supplements to the tables. See table 2-1 for a list of test equipment.

6–4. AZIMUTH INDICATOR IP-243/ALA-6. See table 6-1.

6–5. PULSE-GAIN TEST. Connect test equipment and units of Direction Finder Group AN/ALA-6 as shown in figure 6–1. Inject a negative pulse of 0.1 volt, 3-microseconds, 1000 pps into J-204 via cable D. Periodically check the input pulse voltage to keep it at the level specified. Set the pulse-polarity switch S201 (figure 5-3) in the negative position, clockwise.

TABLE 6-1

MINIMUM PERFORMANCE DATA: AZIMUTH INDICATOR IP-243/ALA-6

Characteristic	*Specifications*	*Conditions*	*Reference*
Negative pulse gain	Minimum of 1-1/16 inch deflection on screen	S201 in negative position. 0.1 volt, 3-microsecond, 1000 pps, negative input	Paragraph 6-5
Positive pulse gain	Minimum of 1-1/16 inch deflection on screen	S201 in positive position. 0.1 volt, 3-microsecond, 1000 pps, positive input.	Paragraph 6-5
Linearity	0.1V signal input voltage for 1 inch deflection between 0.119V and 0.129V total signal input voltage to produce an increase to 1-1/4 inch	S201 in negative position. 0.1 volt, 3-microsecond, 1000 pps, negative input. Initially set GAIN control for 1-inch deflection.	Paragraph 6-6
Expansion	Rotate EXPANDER control fully cw and obtain minimum of 3/4-inch deflection	S201 in negative position. 0.1 volt, 3-microsecond, 1000 pps, negative input. Initially set GAIN control for 3/8-inch deflection, with EXPANDER control fully ccw.	Paragraph 6-7
True Heading Line	Line must reach the edge of the indicator screen at, or before the full cw rotation of TRUE-HD. control is reached	Equipment connected per paragraph 6-8.	Paragraph 6-8
Frequency response	300 kilocycles or more	S201 in negative position. 0.1 volt, 3-microsecond, 1000 pps, negative input. (See par. 6-9).	Paragraph 6-9
Beam modulator control	(See par, 6-10)	(See par. 6-10)	Paragraph 6-10
Ac power consumption	35 watts normal 0.31 amps normal	Indicator adjusted for normal operation.	

Adjust the Indicator GAIN control and manually rotate the Antenna Drive for the highest response. Pulse gain is satisfactory if a minimum of 1-1/16 inches deflection on the cathode-ray tube can be obtained. For a positive-pulse gain test, repeat the steps above except inject a positive pulse instead of a negative pulse, and set the pulse-polarity switch in the positive position, counterclockwise.

6–6. LINEARITY CHECK. With the same test set-up (figure 6–1), and the pulse-polarity switch S201 (figure 5–3) in negative position, (clockwise), inject a 0.1 volt, 3-microsecond, 1000 pps negative signal into the Azimuth Indicator via the cable from the pulse generator, into J204. Set the Indicator GAIN control to produce a one-inch deflection on the Indicator screen. Now increase the signal input until a 1-1/4 inch deflection is obtained. The test is satisfactory if the total signal input after increase to 1-1/4 inch deflection is between the limits of 0.119 volts to 0.129 volts. Ideal linearity would be a total of 0.125 volts.

6–7. EXPANDER TEST. Retain the bench-test set-up of figure 6–1. Set the Indicator pulse-polarity switch S201 in negative position (clockwise) and inject a pulse of 3-microseconds, 1000 pps, 0.1 volt and of negative polarity into the Azimuth Indicator via the cable from the pulse generator to J204 on the Azimuth Indicator. Rotate the Drive unit manually for highest output and adjust the Indicator GAIN control for one-centimeter deflection on the cathode-ray tube, with EXPANDER control in extreme counterclockwise position. Turn EXPANDER control from the extreme counterclockwise to the extreme clockwise position. If this action produces at least a two-centimeter deflection, the expander test is satisfactory.

6–8. HEADING-LINE TEST. Retain the bench test set-up of figure 6–1, except change cable E and plug P207 from jack J207 to jack J209, and change cable F and plug P206 from jack J206 to jack J210. The changed connections are indicated by dotted lines and symbols in parenthesis. Disconnect P204 of cable D from the pulse generator and attach it to jack J208 on the Indicator panel. This will take pulses from the blocking oscillator of the Indicator unit and deliver them to the antenna resolver. Rotate the Drive unit manually for the highest output when TRUE HD. control on the Indicator is advanced. If a deflection line reaches the edge of the cathode-ray screen with the TRUE HD. control anywhere below its maximum position, the magnetic heading line test is satisfactory.

6–9. AMPLIFIER FREQUENCY RESPONSE TEST. Arrange the equipment units and test equipment as illustrated in figure 6–2. Set the pulse generator for 3-microsecond, 1000 pps, 0.1-volt pulse of negative polarity. Set the pulse-polarity switch S201 on the Indi-

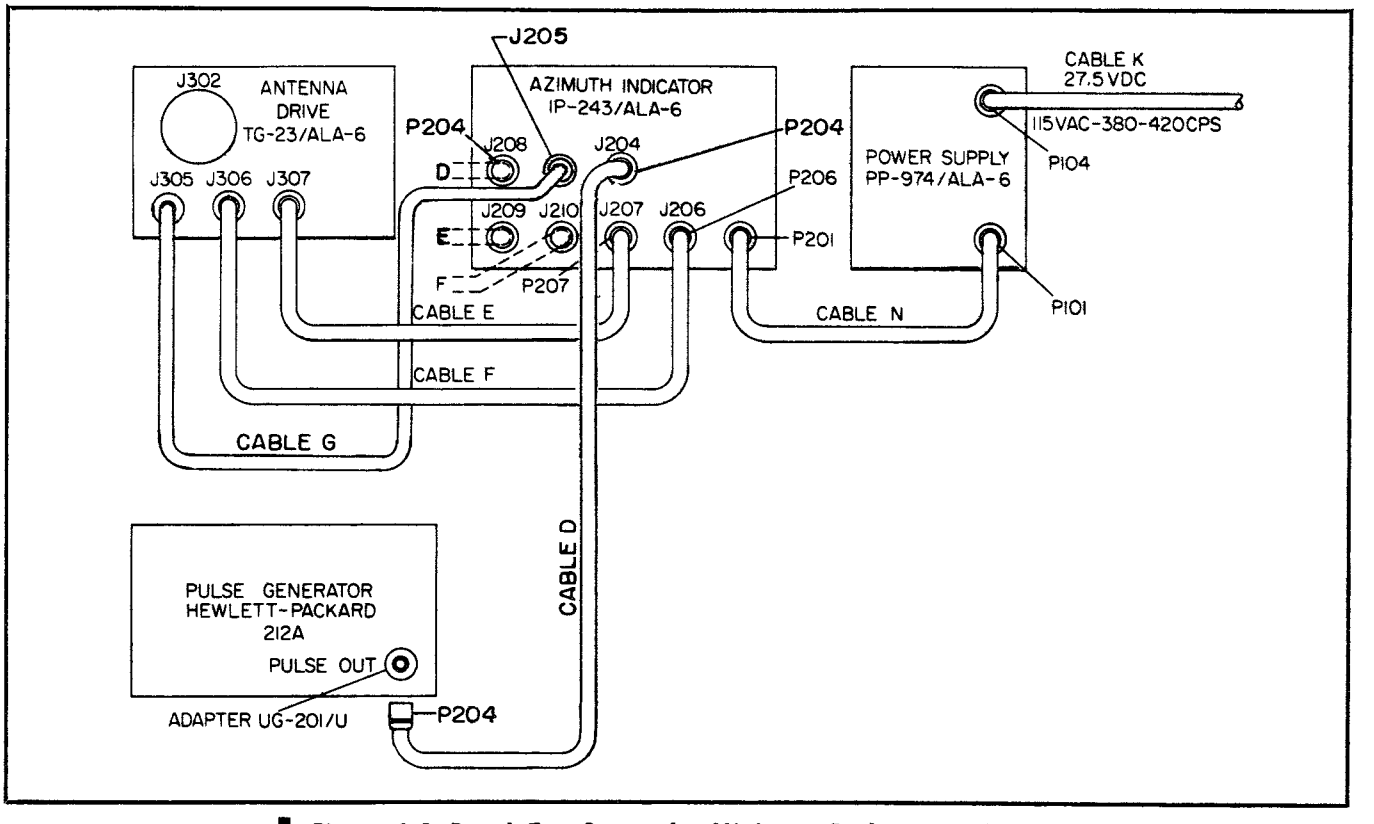


Figure 6-1. Bench Test Set-up for Minimum Performance Tests

cator unit to negative (clockwise) position (figure 5–3). Connect the vertical input of the oscilloscope temporarily to the output of the pulse generator and check the rise time (1.2 microseconds or less). Now reconnect the oscilloscope and pulse generator as per figure 6-2. With the pulse voltage-divider on the 10:1 range, attach its probe to a plate of one of the deflection amplifiers, V211 or V212. See figure 5–3 for tube location and 5–4 for the sockets. Rotate the Drive unit manually for the highest indication, and measure the rise time of the pulse upon issuing from the amplifier. If the rise time is 1.3 microseconds or less, the amplifier frequency response is 300 kilocycles or better; according to the formula $f_r = \frac{0.39}{t_r}$ (f_r = frequency in megacycles where response is down 6db, t_r = time of rise of pulse from zero to max.) A 300 kc response or better is required.

6–10. BEAM MODULATOR CONTROL TEST. With the Direction Finder Group under normal operating conditions and with BEAM MOD. fully counterclockwise, turn the INTENSITY control counterclockwise until the trace just disappears. Then turn the BEAM MOD. control in a clockwise direction. The line should now reappear, but with the end near the center of the screen missing. Turning the control further clockwise should increase the intensity of the line. As a precaution, conclude by turning the BEAM MOD. control back to the extreme counterclockwise position.

6–11. POWER SUPPLY PP-974/ALA-6. See table 6–2.

TABLE 6-2

MINIMUM PERFORMANCE DATA: POWER SUPPLY PP-974/ALA-6

Item	*DC*	*AC*	*Relay-Holding Data*
Power Requirements	27.5 vdc	115 vac, 380-420 cps 115 vac, 380-1000 cps	Relays shall hold with a minimum of 18 vdc on their coils. Factory tests record a minimum of 14 vdc.
Output	+27.5 vdc +265 vdc −150 vdc	115 vac, 380-1000 cps 26 vac, 380-420 cps 6.3 vac	
B+ Regulation	+265 vdc ±2.65 v with load 20% above or below normal	———	
Output Ripple	+265 vdc supply: 18 millivolts rms normal; 50 millivolts rms max limit	———	
	−150 vdc supply: 800 millivolts rms normal; 1.5 v rms max limit	———	
Power Consumption	Current: 5.2 amp dc	150 watts Max limit: 200 watts Current: 1.27 amp ac	

6–12. ANTENNA CONTROL C-1246/ALA-6, GAIN MEASUREMENTS. To measure the gain of the servo amplifier in C-1246/ALA-6:

a. With C-1246/ALA-6 connected to an operating AN/ALA-6 system, disconnect plug P401 (figure 5–2).

b. Remove the cover from the C-1246/ALA-6 by taking out the six screws and ground one side of tuning potentiometer R401 to chassis and move R401 by turning the dial so that 0.05 volts rms exist between V401 pin 2 and chassis (figure 5–7).

c. Measure plate-to-plate output of V401 (pins 1 and 6) on an a-c VTVM (table 2–1). Record this value (it should be approximately 2.5 volts rms).

d. Note the gain of V401. This equals output-voltage/input-voltage. It should be 2.5/0.05 or 50, approximately.

e. Measure plate-to-plate output of V402 (pins 1 and 6). Record this value (it should be about 90 volts rms). Note the gain of V402, which is equal to output-voltage/input-voltage. It should be 90/2.5 or 36, approximately.

f. Measure voltage across secondary of T401 (figure 5–8) at terminals 4 and 5 (step-down ratio 4:1). Record this value, which should be 90/4 or 22.5, approximately.

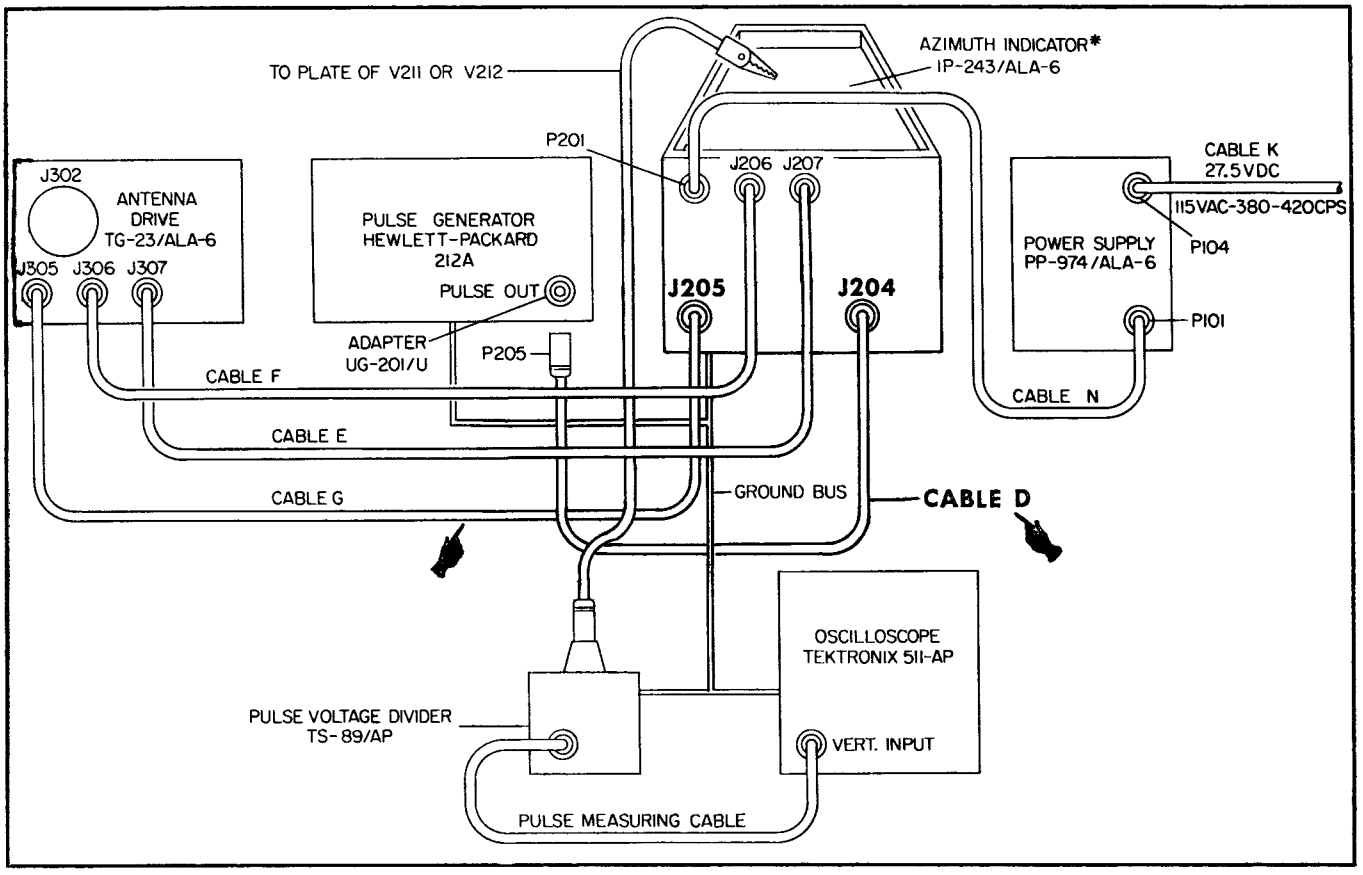


Figure 6-2. Bench Test Set-up for Amplifier Frequency Response Test

6-13. ELECTRONIC AND MECHANICAL TROUBLE ANALYSIS.

6-14. AZIMUTH INDICATOR IP-243/ALA-6. The instructions and data furnished in table 6–3, will be an aid in diagnosing and correcting troubles which may occur in the Azimuth Indicator. The information and suggestions are presented in tabular form to facilitate the rapid location of a specific trouble at hand. In using this table, first consult the left-hand column for the description of the trouble encountered. Then look in the next column to the right for the most probable cause of the trouble. In the third and fourth columns are suggestions on the most direct test and remedy for the trouble. Illustrations appear in sections IV and VII, which are marked with star and circle test points; these and others are referred to by figure number in the extreme right-hand column of the table. Test points are referenced, where applicable, for convenience in denoting specific circuits and points where tests are to be made. The symptoms are listed in progressive order, each step depending, at least in part, on the previous tests having been made, or considered.

6–15. CHECK OF DIODE CRYSTALS. A simple direct test of a crystal diode, such as the type 1N70 used for CR201, CR202, and CR203 can be made by measuring the forward resistance and the back resistance of the crystal with an ohmmeter. The back resistance should be at least 160,000 ohms for an ohmmeter with a 50-volt battery, 400,000 ohms for an ohmmeter with a 10-volt battery, etc. The forward resistance must not be over 330 ohms, and the ratio of back resistance to front resistance must be at least 450 to 1. CR201 can be checked in the Azimuth Indicator as follows. With pulse-polarity switch S201 counterclockwise at positive, feed a pulse signal (0.1 volt, 3 microsecond, 1000 pps) from a pulse generator (table 2–1) into SIG INPUT J204. Adjust the Indicator for a presentation line that reaches to the edge of the screen. When the polarity of the pulse input is reversed, the line on the screen should shorten to practically a spot, indicating high attenuation of reverse polarity signals by CR201. CR202 and CR203 can be checked by feeding the same pulse signal into J205 through a 0.1 mfd capacitor and increasing the output to 10v. Connect a test oscilloscope to the grid, pin 1, of V205. With the BEAM MOD. control fully clockwise, adjust for a full screen pattern on the oscilloscope with positively-polarized pulses. Turning BEAM MOD. counterclockwise should reduce the pattern practically to zero, grounded through CR202; reversing the pulse polarity to negative should reduce the pattern practically to zero, grounded through CR203. Disconnecting and

TABLE 6-3

TROUBLE ANALYSIS: AZIMUTH INDICATOR IP-243/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
1. Tubes and pilot lamps do not light	A. Power switch not on	Power switch position	Turn ANT. SPEED control to "S" position. (Standby with power on)	Figure 6-3
	B. Aircraft not supplying power to Power Supply PP-974/ALA-6	Aircraft power supply	Restore power source	——
	C. Fuses F101 and/or F102 open (Table 6-4)	Inspect fuses	Replace burned out fuses	Figure 5-11
	D. Cables J, K, or N and their associated connectors and wires	For shorts or broken wires	Repair or replace cable	Figure 5-2
	E. Power microswitch defective	For switch circuit continuity	Replace switch S202	Figure 5–3
	F. Power relay (K101) open coil or bad contacts (Table 6–4)	Continuity of coil, term. 1 to 8	Replace relay	Figures 5–6 and 7–2
	G. Open primary circuit in transformer T202	Primary circuit continuity; test point 2	Repair connections, or replace transformer T202	Figures 5–4, 7–1, and 7–2
	H. Broken wire or bad solder connection in heater circuit	Heater circuit continuity; test point 8	Repair as needed	Figures 5-4, 7-1, and 7-2
2. +265 vdc does not appear at any point in Indicator chassis	A. Power Supply PP-974/ALA-6	Test point 8	(See item 2, Table 6-4)	Figures 7-1 and 7-2
3. Heading line is present, but no received-signal pattern can be detected on the screen	A. Associated receiver	Receiver output	Repair per receiver Handbook	——
	B. Amplifier tube	V201, V202, V203, V204, V205, V208, V209	Replace defective tube(s)	Figures 5-3 and 7-1
	C. Circuit component	a. Test for signal at test points A, A1, A2, A10, A14, D, H, F, A23, A25, J & K	Make voltage tests on stage which will not pass signal	Par. 6-16; figures 5-4 and 7-1
		b. Test for dc volts at tube socket pins and other points of stage which won't pass signal	Measure values of all resistors in circuits with incorrect voltages; check continuity of switches and wiring; measure capacitance and leakage of capacitors in suspected circuits	Par. 6-17, 6-18 & 6-19; figures 5-5, 7-1, & 7-10; table 6-8
			Replace all defective components	
	D. Heater circuits	Heater voltage at socket pins	Repair and resolder heater wiring	Figures 7–1 and 5–4
	E. Antenna-drive resolver	For signal at test points for D, F and H; and continuity between center contact of disconnected plugs P205, P206, P207 and chassis. Try substitute resolver	Replace defective cables or defective antenna resolver	Figures 6–5, 7–1 and par 6–26, sub-section C

TABLE 6-3 (cont)

TROUBLE ANALYSIS: AZIMUTH INDICATOR IP-243/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
4. Received-signal pattern is present on screen, but heading line cannot be obtained	A. Blocking oscillator and/or cathode follower tubes	V206, V207	Replace defective tube(s)	Figures 5–3 and 7–1
	B. Circuit component	a. Test for signal at test points J213, A51, A54, A53, A57, P, I, G, A24, A26, J and K	Make voltage tests on blocking oscillator stage, if it has no signal or on any succeeding stage that will not pass signal	Par. 6–16; figures 5–4 and 7–1
		b. Test for dc volts at tube socket of stage not handling signal	Measure values of all resistors in circuits with incorrect voltages; check continuity of switches and wiring; measure capacitance and leakage of capacitors in suspected circuits Replace all defective components	Par. 6–17, 6–18 & 6–19; figures 5–5, 7–1 and 7–10; table 6–8
	C. Heater circuits	Heater voltage at socket pins	Repair and resolder heater wiring	Figures 7–1 and 5–4
	D. Blocking oscillator transformer T201	For open windings and/or chassis shorts	Replace defective T201	Figure 5–4
	E. Flux-gate compass resolver	For signal at test points P, I & G and continuity between center contacts of disconected plugs P208, P209, P210 and chassis. Try substitute resolver	Replace defective cable or defective compass resolver	——
	F. TRUE HD. control R238 open	Resistance of TRUE HD. control	Replace defective R238	Figures 7–1 and 5–4
5. Cathode-ray tube dark—no intensity	A. High voltage rectifier tube V213	V213	Replace defective tube	Figure 5–3
	B. Cathode-ray tube	V214	Replace defective tube	Figure 5–3 & par. 6–26, subsection a
	C. INTENSITY control R278 open near V214 cathode side	R278	Replace defective R278	Figures 5–3 and 7–1
	D. Heater circuits	Heater voltage at socket pins	Repair and resolder heater wiring	Figures 7–1 and 5–4
	E. High voltage transformer T202 open or shorted	Ac volts of T202 at test point 2 and between 8 and 9	Replace defective T202	Figures 7–1 5–3, & 5–4
	F. Circuit component	Measure all voltages listed in table 6–9, check all resistors, check leakage and value of capacitors	Replace defective components	Figure 7–1; table 6–9; par. 6–17, 6–18 & 6–19

TABLE 6-3 (cont)

TROUBLE ANALYSIS: AZIMUTH INDICATOR IP-243/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
6. INTENSITY control will not dim the trace on CRT screen	A. Cathode-ray tube V214 shorted	V214	Replace defective V214	Figures 7–1 & 5–3; par. 6–26, a
	B. INTENSITY control R278 shorted	Dc volts at test points 10, A42, A45; resistance of INTENSITY control R278	Replace defective R278	Figures 7–1 and 5–3; par. 6–17 & 6–18
	C. Circuit component	Measure all voltages listed in table 6–9, check all resistors, check leakage and value of capacitors	Replace defective components	Figure 7–1; table 6–9; par. 6–17, 6–18 & 6–19
7. FOCUS control does not operate	A. Cathode-ray tube V214 shorted	Dc volts at test points A44, A48, and A49, resistance of FOCUS control R276	Replace defective R276	Figures 7–1 & 5–3; par. 6–17 & 6–18
	B. FOCUS control open or shorted			
	C. Circuit component	Measure all voltages listed in table 6–9, check all resistors, check leakage and value of capacitors	Replace defective components	Figure 7–1; table 6–9; par. 6–17, 6–18 & 6–19
8. BEAM MOD. control does not operate	A. Beam modulator tube V205	V205	Replace defective V205	Figures 7–1 and 5–3
	B. Circuit components of V205 stage	Test for signal at test points D, A19, E, and A41; test for dc volts at tube socket terminals, etc.; measure values of resistors; measure capacitance and leakage of capacitors; check CR202 & CR203	Replace defective components	Figures 7–1 & 5–4; par. 6–15 thru 6–19; table 6–8
9. EXPANDER control has no effect	A. Expander diode V201B	V201	Replace defective V201	Figures 7–1 and 5–3
	B. EXPANDER control R210 open or shorted	R210 resistance	Replace defective R210	Figures 7–1 and 5–3
	C. Circuit components of V201B circuit	Test for signal at test points A6, A7 & A11 with R210 turned up and down; test dc bias voltages in V201B circuits; measure values of circuit components	Replace defective components	Figures 7–1 & 5–4; par. 6–16 thru 6–19; table 6–8
10. GAIN control will not reduce size of trace, and pattern blurry	A. Video amplifier V202 gassy or leaky	V202	Replace V202	Figures 7–1 and 5–3
	B. GAIN control R216 shorted	R216 resistance	Replace defective R216	Figures 5–3 & 7–1; par. 6–18
	C. Circuit components of V202 circuits	Test dc voltages in V202 circuits; measure values of circuit components	Replace defective components	Figures 7–1 & 5–4; par. 6–17 thru 6–19; table 6–8

TABLE 6-3 (cont)
TROUBLE ANALYSIS: AZIMUTH INDICATOR IP-243/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
11. Signal pattern presentation gives vertical characteristic only. (HOR. control does not operate)	A. Horizontal deflection amplifier V212, phase inverter V210B, isolation amplifier V209	V212, V210, V209	Replace V212, V210 and/or V209	Figure 5–3
		a. Test for signal at test points J206, H, J209, I, J215, A37, A40, N, and O	Make voltage tests at stage which will not pass signal	Par. 6–16; figures 5–4 and 7–1
	B. Circuit components	b. Test for dc volts at tube socket pins and other points of stage that won't pass signal	Measure values of all resistors, and check capacity and leakage of capacitors in suspected circuits. Replace defective components	Figures 7–1, 5–3 and 5–4; par. 6–17, 6–18 & 6–19; table 6–8
		c. Check respective resolver and cable, if there is no signal at J206 or J210	Measure continuity of resolver stator winding and of cable. Replace defective resolver or cable	Figures 7–1 & 6–5; par. 6–18 & 6–26c
12. Signal pattern gives horizontal characteristic only. (VERT. control does not operate)	A. Vertical deflection amplifier V211, phase inverter V210A, isolation amplifier V208	V211, V210, V208	Replace V211, V210 and/or V208	Figure 5–3
	B. Circuit components	a. Test for signal at test points J207, F, J210, J214, A33, A36, L, and M	Make voltage tests at stage which will not pass signal	Par. 6–16; figures 5–4 and 7–1
		b. Test for dc volts at tube socket pins and other points of stage that will not pass signal	Measure values of all resistors and check capacity and leakage of capacitors in suspected circuits. Replace defective components	Figures 7–1, 5–3 and 5–4; par. 6–17, 6–18 & 6–19; table 6–8
		c. Check respective resolver and cable if there is no signal at J207 or J210	Measure continuity of resolver stator windings and of cable. Replace defective resolver or cable	Figures 7–1 & 6–5; par. 6–18 & 6–26c

reconnecting a crystal while it appears to be having an effect on the observed signal will prove whether or not the crystal is actually producing the effect.

6–16. USE OF TEST OSCILLOSCOPE. In trouble analysis, the oscilloscope (table 2–1) is used to trace a signal path through a circuit and find a point at which the signal no longer is present. For example: in figure 7–1, a pulse is indicated by the oscilloscope to be present at test point A1. However, when the oscilloscope probe is moved to point A2, the indication is gone. This means that (1) either the switch contacts of S201 are open, (2) capacitor C205 is open, (3) C205 is shorted, causing the grid of V202 to go positive and short the signal to ground via its cathode, or (4) resistor R284 is open.

6–17. USE OF VOLTMETER. The d-c vacuum tube voltmeter (table 2–1) is used to trace a dc voltage from its source through its path to a tube or component. Example: +265 volts is present at test point 2 in figure 7–1, but is absent at point A1. This means that (1) either resistor R206 is open, (2) R205 is open, (3) C203 is shorted, (4) contact 8 or 9 of S201 is grounded or (5) tube V201A is shorted plate to cathode, which is grounded to chassis. The ac voltmeter is used for measuring power voltages, checking at transformer

windings and tube socket heater terminals. It may also be used to measure video signal levels.

WARNING

High voltages occur in AN/ALA-6 circuits which are dangerous to human life. Be careful not to contact. Measure voltages over 500 volts by connecting and disconnecting the voltmeter with power off and not contacting meter or leads while power is on.

6–18. USE OF OHMMETER. The ohmmeter, which is incorporated in the instrument described as vacuum tube voltmeter in table 2–1, is used to check the resistance of resistors, diode crystals, transformer windings, etc; to check continuity of wiring and circuits, and to check for short circuits, such as a grounded wire or a shorted capacitor. Example: One end of resistor R206 in figure 7–1 is disconnected and its resistance is read (with power off). If not the value stated in the diagram within 10 percent, it must be replaced. Also in the same figure, from test jack J211 to ground should read at least 200,000 ohms (power off) to ground. If it reads low, C211 is probably leaky or shorted.

CAUTION

Always turn all power off and short out capacitors that may be holding a heavy charge before making measurements with an ohmmeter. Power in circuits being tested may damage or destroy the ohmmeter.

6–19. USE OF CAPACITANCE BRIDGE. The capacitance bridge is used to measure the capacitance and leakage factor of a capacitor. Example: In figure 7–1, capacitor C205 carries video signal from S201 to V202 (through R284). If its capacitance is low or it is open it will reduce or stop the signal. Also, the capacitor C205 may have leakage, which is equivalent to placing a resistor in parallel with it. The grid of V202 would then have an abnormal positive voltage fed to it, causing it to be improperly biased and even to partially or wholly short the signal to ground.

6–20. POWER SUPPLY PP-974/ALA-6. The data and instructions in table 6–4 are furnished to aid in diagnosing and correcting troubles which may occur in the Power Supply.

TABLE 6-4

TROUBLE ANALYSIS: POWER SUPPLY PP-974/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
1. No ac or dc power of any kind from Power Supply	A. 115 vac power source	Line voltage at source	Connect to source which has proper power	Table 1–1 power requirements; figure 5–2; par. 6–17
	B. Fuses F101, F102	Line voltage at fuse caps	Replace fuses	Figures 7–2 and 5–11; par. 6–17
	C. 28 vdc power source	Dc voltage at source	See that source has power	Figures 7–2 and 5–6; par. 6–17
	D. Fuse F103	Dc voltage at fuse cap	Replace fuse	Figures 7–2 and 5–11; par. 6–17
	E. Relay K101 not energized	a. Continuity of S202 in Azimuth Indicator and cables between units (test point A91 is grounded by S202)	Replace defective switch of cables	Figures 7–2, 7–1, 5–3 & 5–6; par. 6–18
		b. Continuity of K101 coil, test points 1 to A91 (disconnect from K102)	Replace defective relay	Figures 7–2, 7–1, 5–3 & 5–6; par. 6–18
	F. Power transformer T101 or bad contacts on K101	Primary and secondary voltages at transformer; continuity of windings	Replace defective transformer or relay	Figures 7–2 and 5–6

TABLE 6-4 (cont)
TROUBLE ANALYSIS: POWER SUPPLY PP-974/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
2. No +265 volts at plate supply (test jack J106)	A. Plate supply rectifier V101, or voltage regulator V103	V101, V103	Replace defective tubes	Figures 5–5 and 7–2
	B. Filter capacitor C101 or C102 shorted	Voltage at test points 4 and A61	Replace defective capacitor	Figures 7–2 and 5–6; par. 6–17
	C. Filter choke L101 open	Continuity of L101	Replace defective L101	Figures 7–2 and 5–6; par. 6–18
	D. Protective resistors R101 and/or R102	Resistance of R101, R102 at test points A61, A64 and A67; or dc voltages at same points	Replace defective resistors	Figure 7–2; par. 6–18 or 6–17
3. Lack of regulation in plate supply	A. Voltage regulator V103, DC amplifier V104, voltage reference tube V105	V103, V104, V105	Replace defective tubes	Figures 5–5 and 7–2
	B. Circuit component	Test voltages at V103, V104 and V105 tube sockets; measure all resistors and test capacity and leakage of capacitors in their circuits	Replace defective components	Figures 7–2, 5–5 and 5–6; par. 6–17, 6–18 & 6–19
4. No —150v at bias supply test jack J105	A. Bias rectifier V102	V102	Replace defective tube	Figures 5–5 and 7–2
	B. Circuit component	Test voltage at test point A60; test C106; check test point 6 for short to ground	Replace defective components, clear short	Figures 7–2 & 5–6; par. 6–17, 6–18 & 6–19
5. No 26 vac or 6.3 vac to antenna tuning unit	A. Power source to SERVO POWER, J103	Power source and connections	See that source has power and connections carry it to test point 3	Figures 7–2 & 5–11, par. 6–17 & 6–18
	B. Fuses F104 and F105	Line voltage at fuse caps	Replace fuses	Figures 7–2 & 5–11; par. 6–18
	C. Switch S101	Continuity of S101	Replace defective switch	Figures 7–2 & 5–5; par. 6–18
	D. Relay K102 coil	Continuity of coil	Replace defective relay	Figures 7–2 & 5–6; par. 6–18
	E. Power transformer T102 or bad contacts on relay K102	Voltages at primary and secondaries of T102	Replace defective transformer or relay	Figures 7–2 & 5–6; par. 6–17

6–21. ANTENNA CONTROL C-1246/ALA-6 AND ANTENNA ASSEMBLY AS-654/ALA-6. Trouble-shooting data for these two units is given in table 6–5. Although they are separate pieces of equipment, their function more or less ties them together, because a "command" and "follow-up" type of servo mechanism is incorporated into their design. See paragraph 5–23 for a check of their tuning functions and paragraph 4–121 for a discussion of the theory of their operation. It will often be inconvenient for the servicing personnel to observe the reactions of the Antenna unit, due to its location. Therefore, whenever possible, servicing data in the table will be referenced to a point on the Control unit.

TABLE 6-5

TROUBLE ANALYSIS: ANTENNA CONTROL C-1246/ALA-6 AND ANTENNA ASSEMBLY AS-654/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
1. Movement of TUNING dial (R401) fails to produce ac output voltage at pins B & C of J401 test point R	A. Amplifier tubes V401, V402	V401, V402	Replace defective tubes	Figures 5–7, 5–10 & 7–5; par. 6–17
	B. Component or bridge circuit formed by R501 in Antenna and R401 in Control	Ac voltage at test point A71 to ground while moving R401; ac voltage at test point Q in both units; check resistance of R401 & R501 through whole range; check continuity between units, cables O & P; measure capacitance and leakage of C405	Repair defective circuits and/or replace defective parts	Figures 4–22, 7–5, 7–6, 5–7, 5–8 & 5–2; par. 5–17 & 5–18
	C. Circuit components of V401 & V402 stages	a. Ac volts at test points A71, A75, A76, A77, A78 and R while moving R401	Measure dc volts at stages which do not pass ac signal	Figures 7–5, 7–13, 5–7 & 5–8; par. 5–17
		b. Test for dc volts at pins of sockets and other points of stage which won't pass signal	Measure values of all resistors in circuits with incorrect voltages; measure capacitance and leakage of capacitors; test continuity of T401. Replace defective components	Figures 7–5, 5–7 & 5–8; par. 5–17, 5–18 & 5–19; table 6–14
	D. Heater circuits	Heater voltage at socket pins, and at test point 7; check continuity of cable P	Repair and resolder heater wiring, repair or replace cable P	Figures 7–5, 5–7 & 5–8; par. 5–17 and 5–18
2. Voltage is indicated at pins B & C of J401 & J501 (test point R) when R401 is moved, but motor will not turn	A. Open motor capacitor, C403, from pin A of J402 to pin A of J401	Check capacity of C403	Replace defective C403	Figures 7–5 & 5–7; par. 6–19
	B. Servo motor B501	Check ac volts at test points R & S, pins A, B & C of J501; check continuity of motor windings from same points	Replace defective motor (clean, or replace slip-ring brushes. See Overhaul Handbook)	Figures 7–6 & 5–14; par. 6–17, 6–18 and 6–31
	C. Gear train of motor; R501; C501, jammed	Inspect gear train for cause of jamming; loosen motor-shaft set screws; R501 set screws; C501 set screws	Remove obstruction, or replace offending component	Figure 5–1
3. Bandswitch S401 will not change tuning ranges	A. Relay K501 in antenna unit	28 vdc at test points 1 & 93 in Control and 93 in Antenna; check continuity of S401 & cables O & P	Repair or replace cables; replace defective relay K501 or switch S401	Figures 7–5, 7–6, 5–1, & 5–2; par. 6–17 & 6–18

TABLE 6-5 (cont)

TROUBLE ANALYSIS: ANTENNA CONTROL C-124€ /ALA-6 AND ANTENNA ASSEMBLY AS-654/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
4. Low or zero output from antenna	A. Bad soldered connections on antenna tuning elements L501, L502, L503, RG-55/U, C501	Visually and mechanically at test points A81, A82, A83, A84, A85, A86, A87; check continuity with ohmmeter	Clean, resolder, or replace defective part	Figures 7–6 & 5–1; par. 5–34
5. Noise in output from antenna	B. Rotating coaxial connector	Visually	Clean as per paragraph 5–34	Figure 5–14

6–22. ANTENNA DRIVE TG-23/ALA-6. See figure 7–3 and table 6–6 for electrical and mechanical possible failures for this unit. Be reminded that for major repair involving disassembly, the unit should be referred to official overhaul depot. (See Overhaul Instructions Handbook AN16-30ALA6-3.)

TABLE 6-6

TROUBLE ANALYSIS: ANTENNA DRIVE TG-23/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
1. Motor will not run at 300 rpm or at 150 rpm (see also trouble 11)	A. Worn motor brushes	Inspect visually	Replace worn brushes	Figure 6–5; par. 6–26d
	B. No 28 vdc at pin C of J302	Contacts of ANT. SPEED switch S203; continuity of cable L	Clean or replace S203; repair or replace cable	Figures 7–3, 5–2, 5–3, & 7–1; par. 6–18
	C. Open filter FL301	Test-points A92 to A95 for continuity	Replace defective FL301	Figures 7–3 & 5–13; par. 6–18
	D. Open speed-change resistor R301	Test-points A95 to A96 for 1.5 ohms (with speed-change switch S301 open)	Replace open R301	Figures 7–3 & 5–13; par. 6–18
	E. Shorted condenser or open windings in motor	Remove brushes, check motor capacitor, & continuity of each field coil; replace brushes and test continuity through armature	Replace defective capacitor or motor	Figures 7–3, 6–5, 5–12, & 5–13; par. 6–18 & 6–19
2. Motor runs at 300 rpm only	A. Speed-dropping resistor R280 open, in Indicator unit	With ANT. SPEED switch on "150," disconnect plug P202 from jack J202 and measure between pins A and C of J202 for 5 ohms	Replace R280	Figures 1–16, 5–2, 5–3, 7–1 & 7–3; par. 6–18
3. Motor runs at constant speed with ANT. SPEED switch on "300"	A. Speed-changing switch S301 defective	Attach low-scale d-c meter between test points A95 & A96 while drive is running	Repair or replace S301 if voltage does not fluctuate with motor running	Figures 7–3 & 5–13; par. 6–17
4. Motor runs at constant speed with ANT. SPEED switch on "150"	A. Speed-changing switch S301 defective	Attach low-scale d-c meter between test points A95 & A96 while drive is running	Repair or replace S301 if voltage does not fluctuate with motor running	Figures 7–3 & 5–13; par. 6–17

TABLE 6-6 (cont)

TROUBLE ANALYSIS: ANTENNA DRIVE TG-23/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
5. Camera shutter fails to trip	A. Camera switch S302 defective	Test for continuity from pin E of J302 to ground when switch should be closed	Repair or replace defective S302	Figures 7–3, 6–5 & 5–13; par. 6–18
6. Drive unit heater will not function	A. Heater element HR301 open or thermostat S303 defective (S303 closes at —20°C and opens at 0°C)	Continuity to ground from pin A of jack J302, at —20°C or lower	Replace heater or thermostat	Figures 7–3 & 6–5; par. 6–18
7. Motor produces noise which is visible on Indicator screen	A. Hash-filter FL301; shorted turns in inductor or open condenser	Capacitance from A92 to ground and A95 to ground. (Both should read 1 mfd ± 10%.) Substitute FL301 to check for bad inductor	Replace defective FL301	Figures 7–3 & 5–13; par. 6–19
	B. Hash-filter motor capacitor	Disconnect motor capacitor and check capacitance	Replace defective motor capacitor	Figures 7–3, 5–13 & 6–5; par. 6–19 & 6–26e
8. Fuse F103 on Power Supply PP-974/ALA-6 blows repeatedly	A. Hash filter FL301 shorted	Disconnect A95 & A103 from A102 and measure for low-resistance short from A102 to ground. (Plug P302 disconnected.)	Replace shorted FL301	Figures 5–11, 7–3 & 5–2; par. 6–18
9. Video signal is present at plug P305 on cable G but absent at jacks J306 and J307	A. Contacts of relay K301	Continuity from test points A105 to A108 and A104 to ground (VERT.-HOR. switch in HOR. position) from A104 to A108 and A105 to ground (VERT.-HOR. switch in VERT. position)	Replace defective K301	Figures 7–3, 5–2 & 5–12; par. 6–18
	B. Antenna resolver B301 open	Continuity between test points A104 and A105; A106, A107, A108 to ground. (Plugs P305, P306, P307 disconnected)	Replace defective B301	Figures 7–3, 5–2, 5–12 & 6–5; par. 6–18 & 6–26c
10. VERT-HOR. switch S205 will increase or decrease size of signal pattern, but will not rotate its position for Antenna AS-655/ALA-6 or AS-656/ALA-6	A. Antenna resolver Relay K301 not operating, coil open (antenna relay operating normally). (See trouble 3 of table 6–7.)	Disconnect plug P302 and measure continuity between pins D and B of J302	Replace open K301	Figures 7–3, & 5–12; par. 6–18
11. Motor and antenna revolve slowly and sluggishly at temperatures below freezing	See trouble 6	———	———	——

6–23. ANTENNA ASSEMBLIES AS-655/ALA-6 AND AS-656/ALA-6; ANTENNA COUPLER CU-398/ALA-6. Electronically, and to a great extent mechanically, these two Antenna Assemblies are similar. They both are used with the CU-398/ALA-6 Antenna Coupler, which is mounted within the mouth of the barrel of Antenna Drive TG-23/ALA-6. Data is presented in table 6–7 which will be useful in determining possible causes and remedies for troubles which may occur in these units.

6–24. ANTENNA ASSEMBLY AS-657/ALA-6 AND ANTENNA COUPLER CU-397/ALA-6. Due to the simplified reflector and waveguide construction of this Antenna Assembly and its Coupler, the troubles that might occur in them are necessarily limited in number. A periodic visual and mechanical check of the reflector-waveguide assembly for fractures, breaks or corrosion, and a similar periodic electrical check of the coaxial cables and connectors that couple the units to the associated receiver should suffice to keep them in good working condition.

TABLE 6-7

TROUBLE ANALYSIS: ANTENNA ASSEMBLIES AS-655/ALA-6 AND AS-656/ALA-6; ANTENNA COUPLER CU-398/ALA-6

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
1. Low or zero output from antenna	A. Rotating coaxial connector	Inspect for dirt, corrosion, or excessive wear	Clean per paragraph 5–34, or replace worn item	Figures 5–13, 6–7, 7–4, 7–7 & 7–8
2. Noise in output from antenna	A. Rotating coaxial connector	Same as test 1	Same as remedy 1	——
	B. Slip-rings or slip-ring brushes	Same as test 1	Same as remedy 1	Figures 5–13, 6–7, 7–4, 7–7 & 7–8; par. 6–31a
	C. Antenna drive motor hash filter	See table 6–6, trouble 7A and 7B	———	——
3. Antenna polarity switch VERT.-HOR. is thrown; pattern on screen rotates 180° in bearing, but does not change in size	A. Antenna polarity-reversing relay (K601 or K701) not operating. (See trouble 10 of table 6–6)	Test for corrosion or breakdown of slip-rings or worn or broken brushes; test for open relay coil; test for bad relay contacts	Clean as per paragraph 5–34, or replace brushes, slip-ring or relay	Figures 5–13, 6–7, 7–4, 7–7 & 7–8; par. 6–31a & 6–18

6-25. REMOVAL.

6–26. SUBASSEMBLIES.

a. Cathode-Ray Tube.

Step 1. Referring to figure 6–3, remove plate in front of bezel by removing screws "C".

Step 2. A projection of the pilot lamp mounting (M, figure 6–4) projects under the lip of the plate behind the bezel, and is held there by screws "B" (figure 6–4). Loosen these screws slightly and withdraw the pilot lamp bracket.

Step 3. Remove bezel by removing screws "D" (figure 6–3). Bezel will now slip away from the pilot lamp mounting projection "M", and come away from the front of the panel.

Step 4. Remove socket from the end of the CRT.

Step 5. Remove screws "A" and clamp (figure 6–4) from neck of CRT.

Step 6. Gently free the rubber gasket around the base of the CRT from sticking to the metal holder beneath.

Step 7. Place one hand over the face of the CRT as a precautionary bumper with the other hand, carefully push the CRT out towards the front of the panel and remove.

Step 8. To reinstall CRT, follow the above procedure in reverse and consult paragraph 6–48 for alignment procedure.

b. Antenna Coupler CU-398/ALA-6.

Step 1. Remove Coupler mounting nuts (figure 5–12) and raise Coupler up free of its mounting bolts.

Step 2. Turn the Coupler until the terminal block AB is exposed, rest it down again upon the bolts and remove wires A, B from the terminal block (figure 7–14).

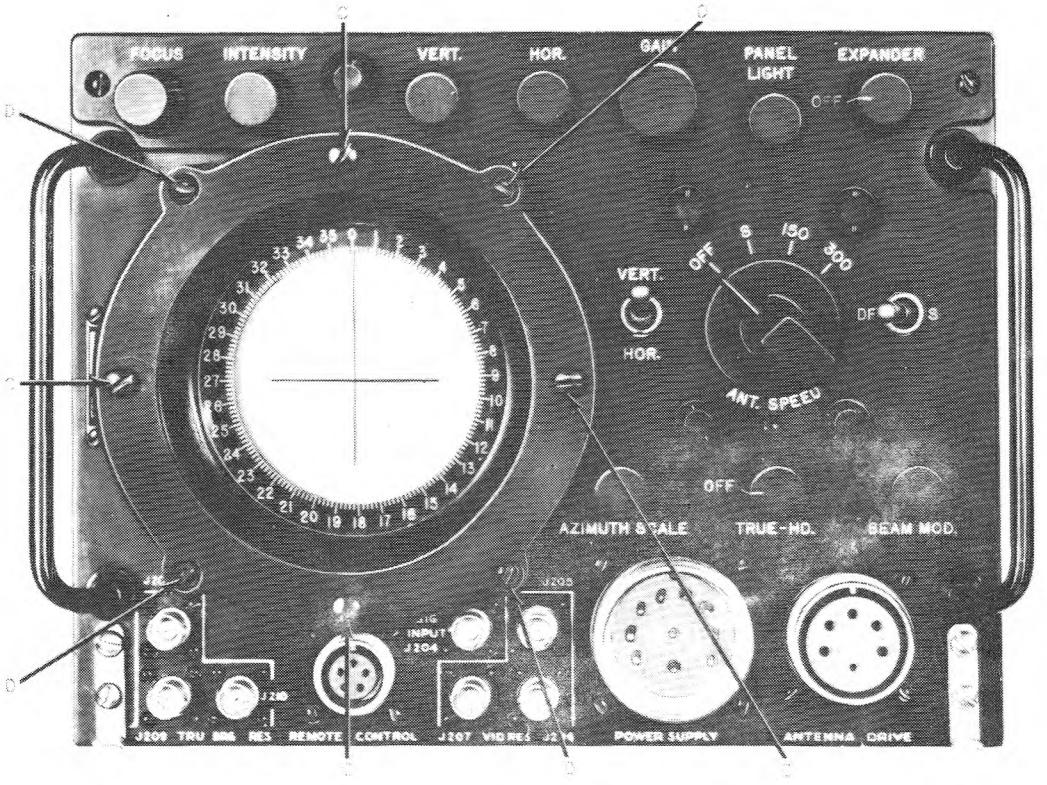


Figure 6-3. Azimuth Indicator IP-243/ALA-6, Control Panel

Step 3. Now remove the Antenna Coupler from the Antenna Drive by lifting it free of the drive barrel.

c. Antenna Drive-Unit Resolver.

Step 1. Remove top and bottom plates of Antenna Drive TG-23/ALA-6 as illustrated in figures 5–12 and 5–13.

Step 2. Remove screws holding the four receptacles, J302, J305, J306 & J307, and take out the six screws which hold the sheet-metal frame to the cast housing.

Step 3. Remove the sheet-metal frame, exposing the motor, resolver, etc., as shown in figure 6–5.

Step 4. Remove camera switch S302 by removing the screws at 1, of figure 6–5.

Step 5. Remove resolver-holding brackets and screws and loosen two setscrews (item 2) in resolver shaft coupling (item 3) and remove resolver (after detaching wires).

Step 6. To reinstall resolver, follow the above steps in reverse and consult paragraph 6–48 for alignment procedure.

d. Drive Unit Motor Brushes.

Step 1. Remove covers and sheet-metal frame per steps 1 and 2 of c, above.

Step 2. Remove motor brush housing by unscrewing screws A of figure 6–5.

Step 3. Unscrew each brushholder cap, B of figure 6–5, take hold of the contact, and slide the brush out of its holder.

Step 4. Reinsert the brush or insert a new brush in the holder, guiding the flat lips on the contact into the rectangular hole, and replace the cap.

Step 5. If the brush supplied consists of only a carbon brush and wire without the spring and contact, unsolder the cap from the wire on the old brush and place the spring and cap on the new brush, soldering the contact to the new wire. Then insert per step 4.

Step 6. Reverse the procedures of steps 1 and 2 to reassemble the unit.

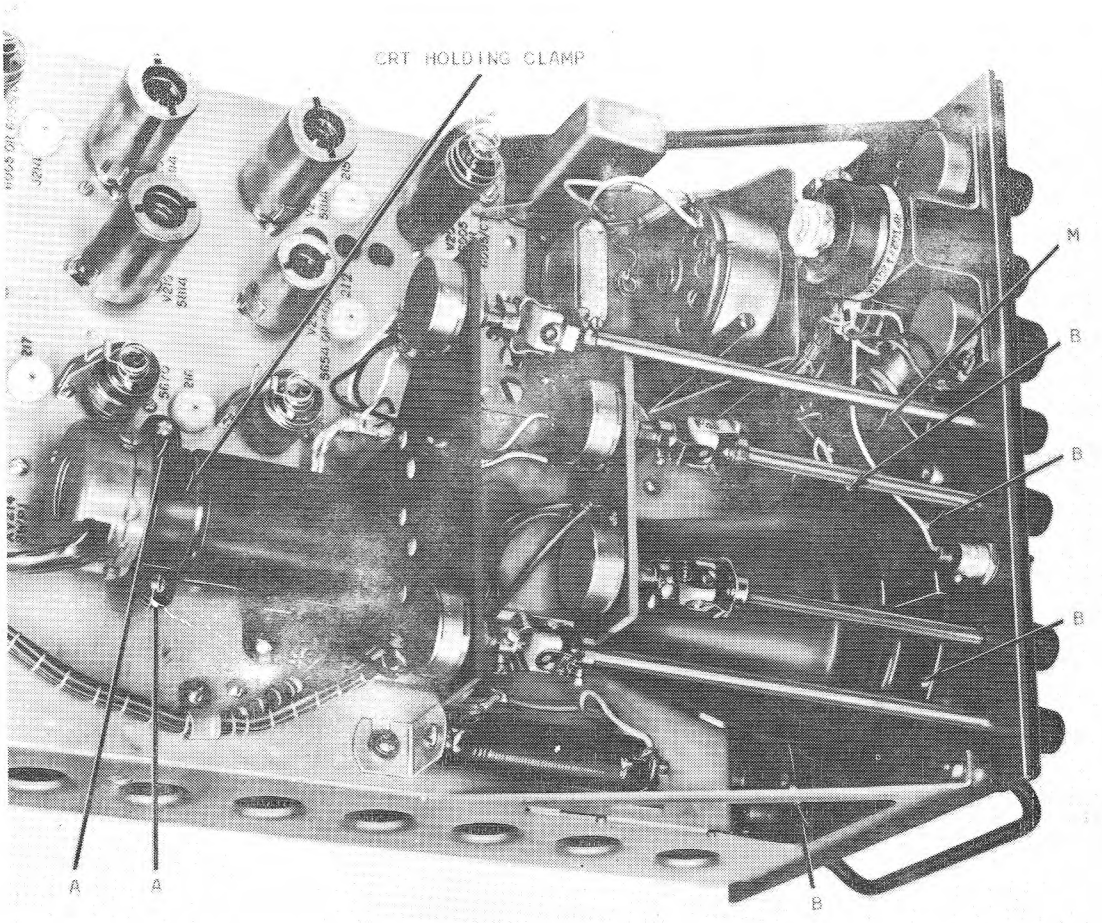


Figure 6-4. Azimuth Indicator IP-243/ALA-6, Cathode-Ray Tube Mounting Detail

e. Drive Unit Motor Condenser.

Step 1. Follow steps 1 and 2 of paragraph d, above.

Step 2. Unsolder and replace the motor condenser (figure 6–5).

Step 3. Reassemble the unit by reversing the disassembly steps.

6–27. The removal of subassemblies classed as circuit components is covered in detail in paragraphs 6–15 through 6–19.

6–28. The removal procedures for other subassemblies not described in the preceding paragraphs are very simple and self evident.

6–29. MAJOR ASSEMBLIES. The removal of unit packages of the equipment will be in reverse order of that procedure followed upon installation. (See paragraphs 5–1 through 5–17 for minimum performance standards.)

6-30. REPLACEMENT OF MAJOR COMPONENTS.

The procedures outlined below present the proper method of replacing the major units of the equipment.

a. Azimuth Indicator IP-243/ALA-6.

Step 1. Disconnect all cables from the unit by removing plugs P201 thru P210 (figure 7–15). Remove the coaxial plugs by turning the knurled outer ring a quarter turn counterclockwise. Remove the other larger plugs by unscrewing the knurled ring which is threaded over the receptacle shell.

Step 2. Remove the unit from its mounting base (MT-B1D1, not supplied) by releasing the two holding clamps at the front of the mounting, and disengaging the two locating studs, at the rear, from their locating holes in the Indicator unit.

Step 3. To install the new unit, follow the above procedure in reverse order, inspecting the cables, plugs and the shock-mounts on the mounting base as a precaution against future breakdown. See paragraphs 6–3 through 6–10 and table 6–1 for testing procedures.

b. Power Supply PP-974/ALA-6.

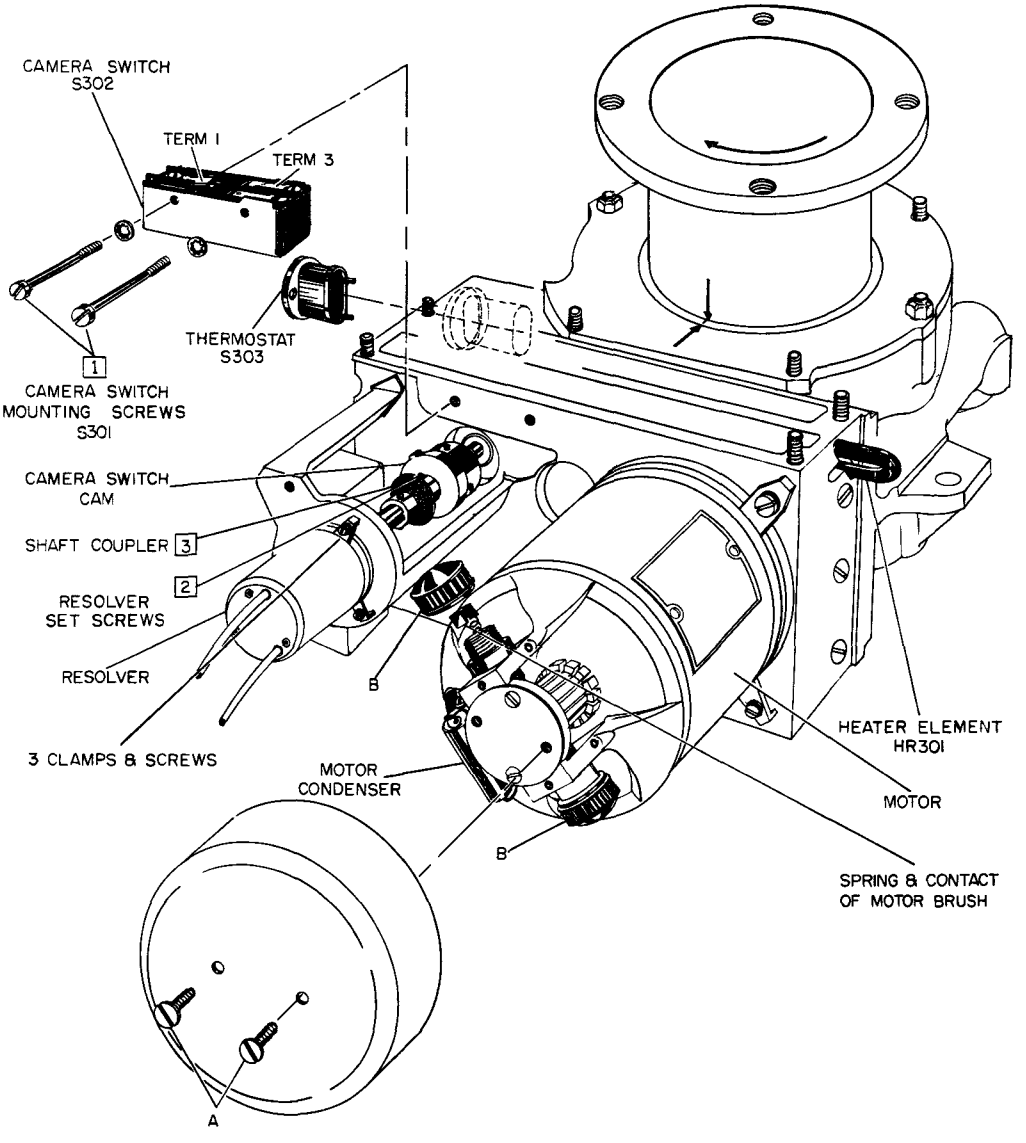


Figure 6-5. Antenna Drive TG-23/ALA-6, Partial Disassembly

Disconnect all cables from the unit and follow the same procedure as that of paragraph 6–30a, above (figure 7–15). Also see table 6–2.

c. Antenna Drive TG-23/ALA-6, Antenna Assemblies and Antenna Couplers.

Step 1. To replace an installed Antenna Drive, Antenna Assembly or Antenna Coupler, first remove the complete assembly of the three units from the aircraft by reversing the installation procedure. Disconnect the cables (see 6–30a step 1) from the Drive unit and the antenna (figure 7–15).

Step 2. Remove the Antenna Assembly from the Antenna Drive as follows. For AS-656/ALA-6 and AS-657/ALA-6, take out the four screws which hold the Antenna Assembly to the Drive. For AS-654/ALA-6, take out these same screws and

remove the stop nuts which hold the mounting bracket (figure 5–14) to the housing of the Drive unit. For Antenna AS-655/ALA-6, remove the eight hex-headed screws, marked c in figure 6–7, which hold the antenna to its disc-shaped mounting plate. Be careful to save the spacing washers between the two disc plates. Then, take out the four screws which hold the mounting plate to the drive. When replacing the mounting plate later be sure to place it with the counter-bored side toward the Drive unit.

Step 3. Disassemble the Antenna Coupler, either C-397/ALA-6 or C-398/ALA-6, from the Antenna Drive by following the procedure of paragraph 6–26b.

Step 4. To reassemble the above items, reverse the disassembly procedure. Run a wire through the hole in the hex head of each Antenna mounting screw and twist the ends together, to lock these screws in place.

Step 5. To reinstall the assembled group of units, follow the regular installation procedure.

d. Antenna Control C-1246/ALA-6.

Step 1. Disconnect cables O and P from the Control unit by removing plugs P401 and P402. Unscrew the knurled ring which threads over the receptacle shell to release each plug. Remove the unit from Mounting MT-1428/ALA-6 by disengaging the fasteners at each end (figure 7–15).

Step 2. Re-install in the reverse order of the above step, and test unit according to paragraphs 5–23 and 6–12, as necessary.

6–31. REPLACEMENT OF ANTENNA SLIP-RING BRUSHES. This paragraph describes the replacement procedure for the brushes in AS-655/ALA-6 and AS-656/ALA-6 which contact the slip rings in the Antenna Coupler to carry the dc control voltage to the antenna-polarity relay. Both Antenna Assemblies have the same brush assembly, relay, and coaxial switch. These are illustrated in figures 6–6 and 6–7 for AS-655/ALA-6 which is typical for both, except that the AS-656/ALA-6 is of more open construction and has no cover plate. When the brushes are worn or damaged they should be replaced according to the following steps.

a. Slip-ring Brushes of Antenna Assembly AS-655/ALA-6.

Step 1. Remove the inspection plate as shown in figure 6–6.

Step 2. Disconnect the two short pieces of coaxial cable from the coaxial switch (figure 6–7), noting that the cables are not crossed.

Step 3. Release the four screws marked A in figures 6–6 and 6–7 and remove the entire relay-switch-brush assembly mounted on the base plate.

Step 4. Unsolder from the tie points the four white leads which run to brushes E602 and E603, noting that the wires from the two brushes E602 nearest the center of the hub are paralleled, as are the wires from the two brushes E603 farthest from the hub.

Step 5. Release the four screws marked B in figure 6–6 which hold the brush assembly to the hub, and remove the brush assembly.

Step 6. If the individual brushes are to be replaced, remove the "C" washer holding the brush to the wafer and remove the brush.

Step 7. Re-install the new brush, following the above procedure in reverse order.

Step 8. Insert the brush assembly plate into the hub and replace the four screws which hold it. Tighten securely.

Step 9. Solder both E602 wires to one terminal and both E603 wires to the other. Do not cross the coaxial cables when reconnecting them.

b. Slip-Ring Brushes of Antenna Assembly AS-656/ALA-6.

Step 1. Unsolder from the tie points the four white wires which run to brushes E602 and E603, noting that the wires from the two brushes E602 nearest the center of the hub are paralleled, as are the two wires from the two brushes E603 farthest from the center of the hub.

Step 2. Release the four screws marked B in figure 6–6 which hold the brush assembly to the hub, and remove the assembly.

Step 3. If the individual brushes are to be replaced, remove the "C" washer holding the brush to the wafer and remove the brush.

Step 4. Re-install the new brush, following the above procedure in reverse order.

Step 5. Insert the brush assembly plate into the hub and replace the four screws which hold it. Tighten securely.

Step 6. Solder both E602 wires to one terminal and both E603 wires to the other.

6–32. CIRCUIT BREAKDOWN AND SUPPLY VOLTAGE CHART. For complete circuit breakdown and simplified partial schematic diagrams marked with test-point references, refer to Section IV and figures 4–4 through 4–18.

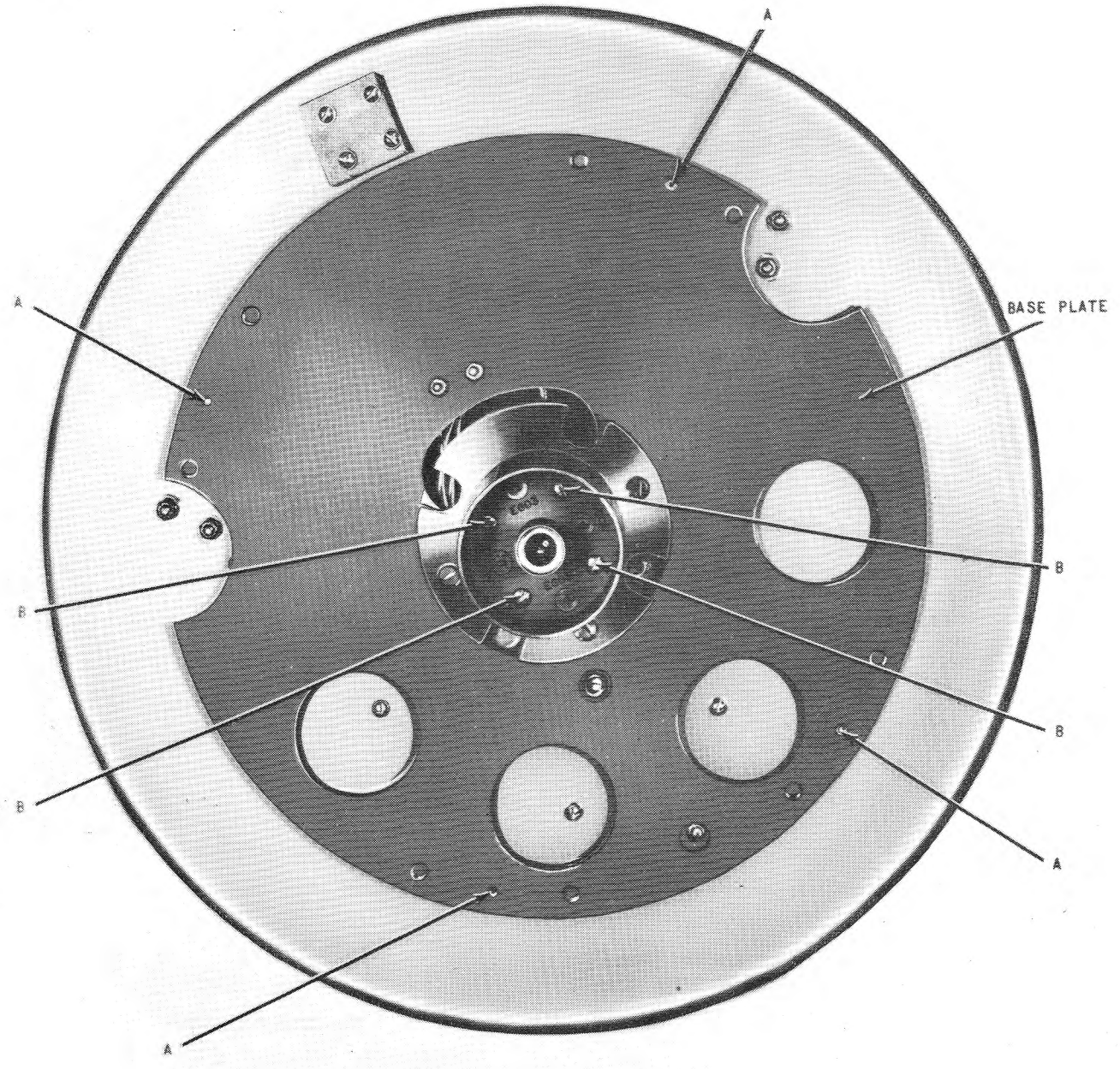


Figure 6-6. Antenna Assembly AS-655/ALA-6, Slip-Ring Brushes (Typical)

6-33. TUBE SOCKET VOLTAGE AND RESISTANCE DATA. The following paragraphs and tables provide voltage and resistance data for measurements between each vacuum-tube socket terminal and chassis.

6–34. AZIMUTH INDICATOR IP-243/ALA-6. Tables 6–8 and 6–9 provide voltage data and table 6–10 provides resistance data for this unit. Conditions and notes for the correct reading of these tests appear at the bottom of the table.

6–35. Receptacle continuity measurements for this unit are given in table 7–1.

6–36. Remove the dust cover from the unit and place the chassis bottom-up as shown in figure 5–4. Connect all plugs and cables of the equipment as illustrated in figure 5–2 or 7–15. Attach the negative lead of the dc vacuum-tube-voltmeter (table 1–2) to any convenient point on the chassis where a good electrical contact can be established. With the positive lead of the meter, read the voltages from the terminals of each tube socket, reversing the meter when necessary. Correct values are listed in table 6–8. (See schematic, figure 7–1.)

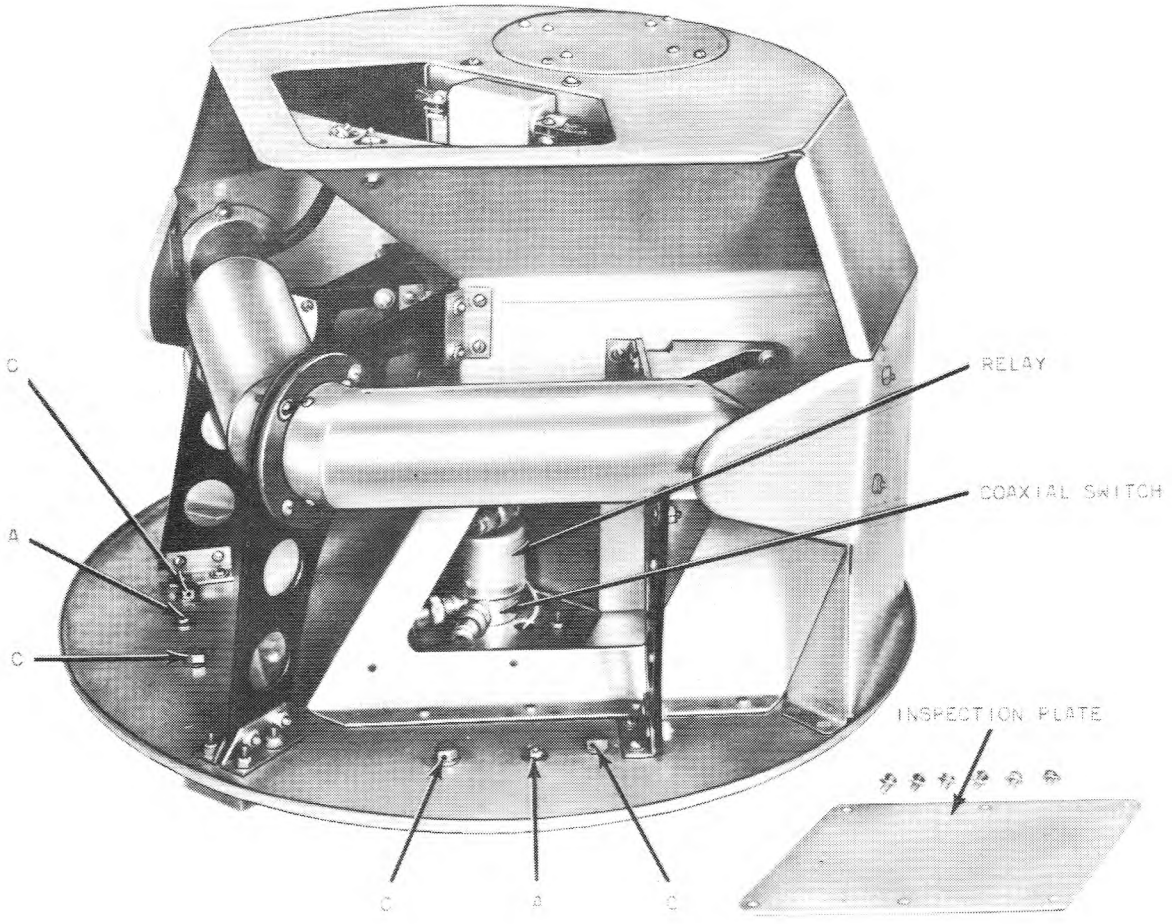


Figure 6-7. Antenna Assembly AS-655/ALA-6, Coaxial Switch Detail (Typical)

6–37. Let the unit remain in the position described in paragraph 6–31, and TURN OFF ALL POWER. Now remove the cover over the high voltage terminal board (figure 5–4).

WARNING

Direction Finder Group AN/ALA-6 equipment employs high voltages which may be dangerous to life. All personnel must be alert at all times to avoid coming into contact with these voltages.

With the meter on its 6,000-volt range, turn on the power to the Indicator unit, and measure the high voltage bleeder section and compare with table 6–9. A layout diagram of the high voltage terminal board appears in figure 7–11.

WARNING

The voltages listed in table 6–9 are high enough to be dangerous to human life. Use every precaution not to contact. Measure them only by connecting the voltmeter with power off and not contacting meter or leads while power is on.

6–38. Disconnect cables and plugs from the unit and leave it bottom-up. With the ohmmeter, read the resistance values between each tube socket terminal and chassis. Compare the readings with those listed in table 6–10; they should be within approximately 10 percent. (See figures 5–4 and 7–1.)

6–39. POWER SUPPLY PP-974/ALA-6. Receptacle continuity measurements for this unit are given in table 7–2.

TABLE 6-8

TUBE SOCKET VOLTAGE MEASUREMENTS* FOR AZIMUTH INDICATOR IP-243/ALA-6

Tube (Type)	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*	*Pin 9*
V201 (5814)	+69 vdc	−2.2 vdc	0. vdc	0. vac	0. vac	−11.5 vdc	−11.5 vdc	0. vdc	6.3 vac
V202 (5654)	−11.2 vdc	0. vdc	6.3 vac	0. vac	+260 vdc	+265 vdc	—	—	—
V203 (5725)	−1.5 vdc	0. vdc	0. vac	6.3 vac	+195 vdc	+100 vdc	−0.24 vdc	—	—
V204 (6005)	−37 vdc	0. vdc	6.3 vac	0. vac	+265 vdc	+265 vdc	—	—	—
V205 (5654)	0. vdc	−2.3 vdc	0. vac	6.3 vac	+120 vdc	+120 vdc	—	—	—
V206 (5814)	+240 vdc	−60 vdc	0. vdc	6.3 vac	0. vac	0. vdc	0. vdc	0. vdc	0. vac
V207 (6005)	−57 vdc	0. vdc	6.3 vac	0. vac	+260 vdc	+260 vdc	—	—	—
V208 (5814)	+65 vdc	0. vdc	+5.7 vdc	6.3 vac	6.3 vac	+165 vdc	0. vdc	+5.2 vdc	0. vac
V209 (5814)	+155 vdc	0. vdc	+4.8 vdc	6.3 vac	6.3 vac	+150 vdc	0. vdc	+4.9 vdc	0. vac
V210 (5814)	+265 vdc	0. vdc	+8.5 vdc	0. vac	0. vac	+265 vdc	0. vdc	+8.9 vdc	6.3 vac
V211 (5670)	0. vac	0. vdc	−2.1 vdc	+145 vdc	0. vac	+140 vdc	−2.5 vdc	0. vdc	6.3 vac
V212 (5670)	6.3 vac	0. vdc	−1.7 vdc	+130 vdc	0. vac	+135 vdc	−2.3 vdc	0. vdc	0. vac

*All voltages measured with meter designated in table 2–1 and measured between designated pin number and chassis.

TABLE 6-9

HIGH VOLTAGE BLEEDER MEASUREMENTS

From	*To*	*Reading*
T202 Terminal 4	Chassis	−1850 vdc
T202 Terminal 3	Chassis	−1850 vdc
Junction of C231 R279	Chassis	−1850 vdc
Junction of R279 C230	Chassis	−1800 vdc
Junction of R278 R277	Chassis	−1700 vdc
Junction of R277 R276	Chassis	−1300 vdc
Junction of R276 R273	Chassis	−850 vdc
Junction of R273 R274	Chassis	−500 vdc
J218	Chassis	−220 vdc

NOTES: (1) See table 2–1 for designated test equipment.
(2) See figure 7–11 for terminal location.

6–40. Remove the dust cover from the unit and place the chassis with the bottom up (figure 5–7). Connect cables and plugs to the other units of the equipment and adjust for normal operation (figure 5–2 or 7–15). Attach the negative lead of the meter to any convenient point on the chassis where a good contact can be established. With the positive lead of the meter, read the voltages from the terminals of each tube socket and compare with the correct values listed in table 6–11, reversing the meter when necessary. (See schematic, figure 7–2.)

6–41. Let the unit remain in same position. Disconnect cables and plugs, and read the resistance values between the terminals of each tube socket and chassis. Compare with the correct values listed in table 6–12. The values read should be approximately within 10 percent of the table listings. (See figures 5–6 and 7–2.)

6–42. ANTENNA CONTROL C-1246/ALA-6. Receptacle continuity measurements for this unit will be found in table 7–3.

TABLE 6-10

TUBE SOCKET RESISTANCE MEASUREMENTS FOR AZIMUTH INDICATOR IP-243/ALA-6

Tube	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*	*Pin 9*
V201	300K	120K	0	0	0	350K	350K	110K	0
V202	800K	0	0	0	200K	300K	0	—	—
V203	40K	0	0	0	200K	240K	200	—	—
V204	700K	1K	0	0	190K	190K	700K	—	—
V205	600K	220	0	0	200K	210K	220	—	—
V206	210K	300K	0	0	0	0	0	—	—
V207	800K	1K	0	0	190	190	800	—	—
V208	190K	1K	1K	0	0	180K	100	1K	0
V209	200K	1K	1K	0	0	200K	100	1K	0
V210	190K	600K	1K	0	0	190K	600K	1K	0
V211	0	0	280K	200K	0	200K	265K	0	0
V212	0	0	300K	210K	0	210K	220K	0	0
V213	0	0	0	0	0	0	0	—	—

NOTE: Tube in socket; *all* front panel controls counterclockwise position. All values in ohms.

TABLE 6-11

TUBE SOCKET VOLTAGE MEASUREMENTS FOR POWER SUPPLY PP-974/ALA-6

Tube	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*	*Pin 9*
V101	—	+435 vdc	—	410 vac	—	410 vac	—	+435 vdc	—
V101	—	To Pin 8 5 vac	—	—	—	—	—	To Pin 2 5 vac	—
V102	115 vac	−150 vdc	6.3 vac	—	115 vac	—	−150 vdc	—	—
V103	+188 vdc	+410 vdc	+265 vdc	+188 vdc	+410 vdc	+265 vdc	—	—	—
V104	+84 vdc	+87 vdc	—	—	+188 vdc	+115 vdc	—	—	—
V105	—	—	—	—	+87 vdc	—	—	—	—

NOTE: All voltages measured with meter designated in table 2–1 and measured between designated pin number and chassis.

TABLE 6-12

TUBE SOCKET RESISTANCE MEASUREMENTS FOR POWER SUPPLY PP-974/ALA-6

Tube	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*
V101	NC	2.6 M	NC	56	NC	56	NC	2.6 M
V102	15	1.2 M	0	0	15	NC	1.2 M	—
V103	3.3 M	2.6 M	2.2 M	3.3 M	2.6 M	2.2 M	0	0
V104	700K	2.3 M	0	0	3.3 M	2.3 M	NC	—
V105	NC	0	NC	NC	2.3 M	—	—	—

NOTE: Tube in socket; all values in ohms.

6-43. Remove the unit from its mounting plate (MT-1428/ALA-6) and set it to expose the underside of the tube sockets (figures 5-7 and 5-8). Connect plugs and cables to the unit (figure 5-2 or 7-15), and adjust for normal operation. Attach the negative lead of the vacuum tube voltmeter to any convenient point on the chassis where a good contact can be established. With the positive lead of the meter, read the voltages from the terminals of each tube socket and compare with those listed in table 6-13. (See schematic, figure 7-5.)

TABLE 6-13

TUBE SOCKET VOLTAGE MEASUREMENTS FOR ANTENNA CONTROL C-1246/ALA-6

Tube	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*	*Pin 9*
V401	+138 vdc	0 vdc	+1.6 vdc	6.3 vac	6.3 vac	+127 vdc	0 vdc	+1.6 vdc	—
V402	+265 vdc	0 vdc	+3.0 vdc	6.3 vac	6.3 vac	+265 vdc	0 vdc	+3.0 vdc	—

NOTE: All voltages measured with meter designated in table 2-1 and measured between designated pin number and chassis.

6-44. Let the unit remain in the same position, and measure the resistance between the terminals of each tube socket and chassis. See table 6-14. Values should be within 10 percent.

TABLE 6-14

TUBE SOCKET RESISTANCE MEASUREMENTS FOR ANTENNA CONTROL C-1246/ALA-6

Tube	*Pin 1*	*Pin 2*	*Pin 3*	*Pin 4*	*Pin 5*	*Pin 6*	*Pin 7*	*Pin 8*	*Pin 9*
V401	INF	560K	1500	1.4	1.4	INF	0	1500	0
V402	INF	560K	220	1.4	1.4	INF	560K	220	0

NOTES: Tube in socket. All values in ohms.

6-45. ANTENNA DRIVE TG-23/ALA-6. There are no tubes in this unit. However, receptacle continuity measurements for it may be found in table 7-4. The schematic diagram is figure 7-3.

6-46. ANTENNA ASSEMBLY AS-654/ALA-6. Receptacle continuity measurements for this unit are in table 7-5. The schematic diagram is figure 7-6.

6-47. ALIGNMENT AND ADJUSTMENTS.

6-48. AZIMUTH INDICATOR IP-243/ALA-6. The following alignment and adjustment procedures should be performed at the conclusion of any repairs which might affect the circuits involved, such as the replacement of a critical component.

a. Cathode-Ray Tube Physical Alignment.

Step 1. With the astigmatism control R283 (figures 5-3 and 7-1) set for approximately 150 volts at the variable tap, advance the INTENSITY control until a small spot is obtained on the Indicator screen. Center the spot on the screen with the VERT. and HOR. controls.

Step 2. Adjust FOCUS and astigmatism controls alternately until the spot has been reduced to the smallest possible size.

Step 3. Using the VERT. control, move the spot from the top to the bottom of the screen, back and forth. When the cathode-ray tube is positioned correctly and the pattern is centered, this should produce a vertical line that runs exactly from 0 to 180 degrees on the azimuth scale.

Step 4. If this is not the case, loosen the two screws in the clamp at the base of the cathode-ray tube, marked "A" in figure 6-4, and rotate the tube by grasping its socket, to the correct position. Retighten the screws; recenter the spot.

Step 5. Turn the HOR. control from the extreme counterclockwise to the extreme clockwise position back and forth. The spot should now move in a horizontal direction between 270 and 90 degrees (plus or minus 3 degrees) on the azimuth scale. Adjust VERT. slightly if necessary to raise or lower the line. If the horizontal travel is not correct after the cathode-ray tube has been correctly aligned, the deflection plates of the CRT are misaligned and the tube must be replaced.

Step 6. After both vertical and horizontal deflection show satisfactory alignment, locate the spot in the exact center of the screen with the HOR.

and VERT. controls, refocus, and reduce INTENSITY.

b. CRT Deflection Plate Phasing Adjustments.

Step 1. Set up Direction Finder units and test equipment as illustrated in figure 6-8.

Step 2. Set the controls on the Indicator panel (figure 6-3) for normal operation. Energize the Indicator unit by turning ANT. SPEED switch to "S" position and turn on the test equipment, and allow all equipments a five-minute warm-up period.

Step 3. Using the pulse generator designated in table 2-1, set it to produce pulses of 1-volt, 3-microseconds at 1000 pps of negative polarity.

Step 4. Connect the pulse output of the generator through RG-59/U coaxial cable (or equivalent) and a coaxial cable plug, UG-260/U, to input jack J210 (figure 6-3) on the front panel of the Azimuth Indicator (vertical deflection input).

Step 5. Connect the pulse voltage divider TS-89/AP (on 10:1 range) to first one plate (pin 4) and then the other plate (pin 6) of the Indicator vertical deflection amplifier V211. See figures 5-4, 7-1, and 7-10. (The oscilloscope's vertical input is attached to the pulse voltage divider output.)

Step 6. The plates of V211 should produce two voltages that are opposite in phase. With the pulse voltage divider on the first plate (pin 4), adjust phasing capacitor C235 (figure 5-4) for maximum output as indicated by the representation on the screen of the oscilloscope.

Step 7. Move the voltage divider probe now to the second plate (pin 6) of V211 and adjust phasing capacitor C237 for maximum output.

Step 8. Since interaction may exist between these adjustments, the procedures of steps 6 and 7 should be repeated until further adjustment shows no increase in the amplitude of the pictured signal.

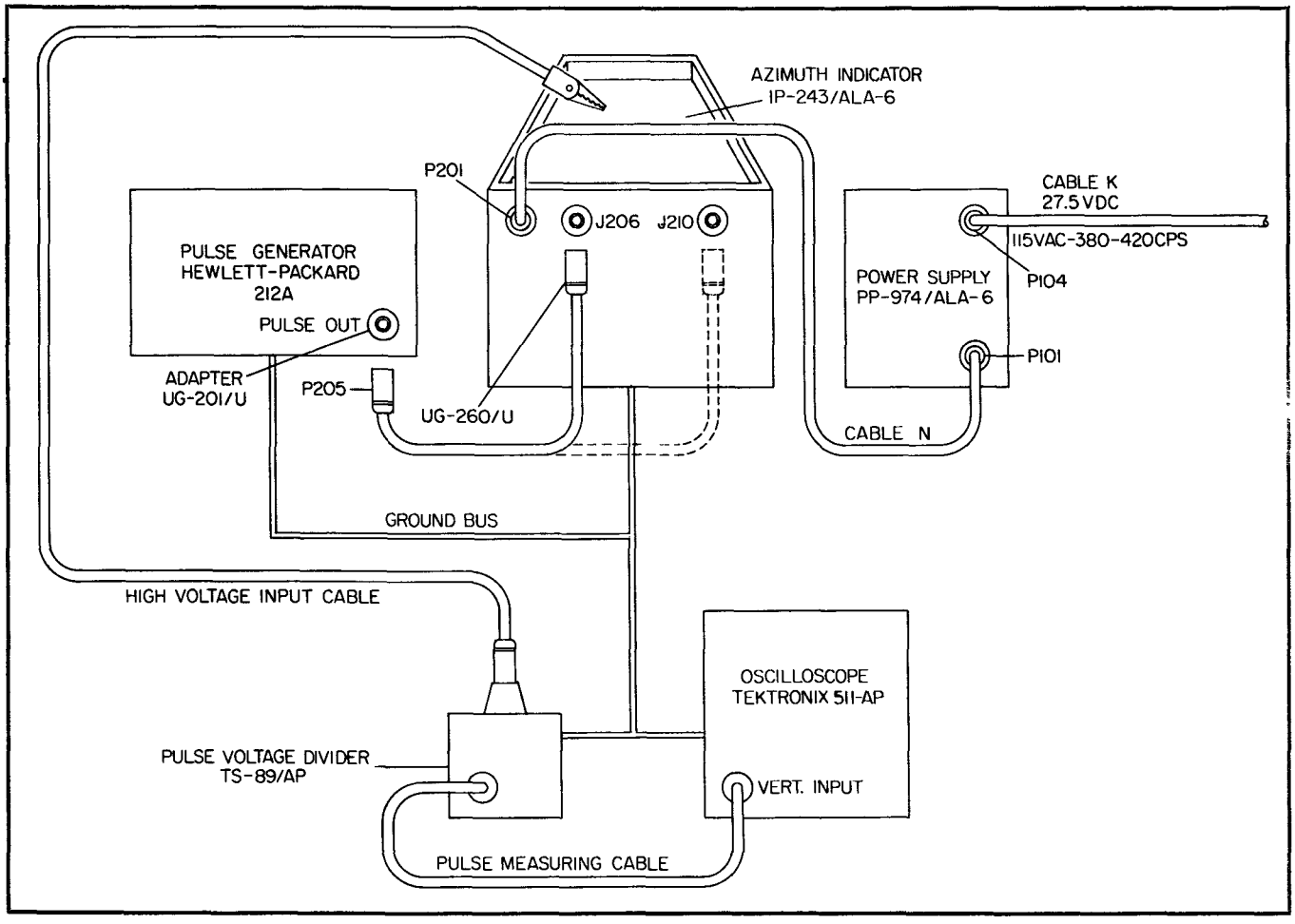


Figure 6-8. Bench-Test Setup, Cathode-Ray Tube Deflection Plate Phasing Adjustments

Step 9. Now connect the pulse generator output to (horizontal deflection) input jack J206 on the front panel of the Azimuth Indicator unit (figure 6-3).

Step 10. Connect the pulse voltage divider probe to the first plate (pin 4) of horizontal deflection amplifier V212 (figure 5-5).

Step 11. Adjust phasing capacitor C232 for maximum indication on the oscilloscope screen (figure 5-5).

Step 12. Move the voltage divider probe to the second plate (pin 6) of V212 and adjust phasing capacitor C236 for maximum indication.

Step 13. Since interaction exists between the two latter adjustments, repeat steps 11 and 12 until further adjustment shows no increase in the amplitude of the signal presentation on the oscilloscope.

Step 14. Check, in actual operation of the AN/ALA-6 equipment, for evidence of incorrect phasing adjustment, which can be seen as a loop in the individual trace lines of the pattern in some parts of the screen. This is caused by phase difference in deflection between the out-sweep and return-sweep of the spot, which makes the line curve slightly when traced in the out direction and curve the other way when traced back. The above adjustment procedure will normally correct this phenomenon. The phasing controls also have an effect on circularity of the pattern and in some cases a compromise between phasing and optimum circularity must be made in the overall adjustments.

c. Circularity Adjustment.

Step 1. Set up Direction Finder equipment and test equipment as illustrated in figure 6-1.

Step 2. Connect the pulse generator to J-204 on IP-243 Indicator. Connect cable F from J306 of the Drive unit to J206 of the Indicator unit, and connect cable E from J307 of the Drive unit to J207 of the Indicator unit, as shown.

Step 3. Connect Power Supply PP-974/ALA-6 to the Indicator unit via cable N as shown.

Step 4. Turn on the AN/ALA-6 equipment and, with GAIN off (counterclockwise), adjust VERT. and HOR. to place the spot (keep it faint) at the exact center, as marked by the crossed lines on the Azimuth Index window.

Step 5. Apply a signal of 0.1 volt, 3 microseconds at 1000 pps, negative polarity, to J-204 via cable G from the pulse generator.

Step 6. Set the pulse-polarity switch S201 (figure 5-3) clockwise for negative pulses, and slowly advance the GAIN control until the sweep on the Indicator screen is approximately 1/4 inch from the edge of the CRT screen.

Step 7. Start rotation of the Antenna Drive by turning ANT. SPEED switch to "150", and adjust the circularity control R242 (figure 5-3) to make the outer edge of the pattern as nearly a perfect circle as possible. Readjust INTENSITY and GAIN as necessary but do not readjust VERT. or HOR.

Step 8. If nearly perfect circularity cannot be obtained, it may be found that a slight adjustment of the phasing controls, C232, C235, C236 and C237, may improve the results, by trial and error (figure 5-4). If these are turned at all, see step 14 of paragraph 6-48b. If the phasing adjustments are turned more than a very slight amount, repeat the phasing adjustment procedure of paragraph 6-48b and then readjust the circularity by the above steps. This repeat of both procedures should compensate for the normal interaction which exists between the phasing circularity circuits.

d. Alignement of Antenna Resolver for Directional Accuracy of Signal Presentation. (See paragraph 5-9 for ground check of directional accuracy.)

Step 1. Remove top and bottom plates of Antenna Drive TG-23/ALA-6, as illustrated in figures 5-12 and 5-13.

Step 2. Remove screws holding the four receptacles, J302, J305, J306 and J307, and take out the six screws which hold the sheet-metal frame to the cast housing.

Step 3. Remove the sheet metal frame exposing the motor, resolver, etc., as shown in figure 6-5.

Step 4. Remove the two screws holding camera switch S302 in place (these are marked 1 in figure 6-5), and remove S302.

Step 5. Loosen the two screws (marked 2) in the shaft coupler (marked 3).

Step 6. Slowly rotate the barrel shaft of Drive unit by hand in the clockwise direction until the engraved arrow on the shaft is exactly aligned with the arrow on the drive-unit housing. (In many cases, there is a small notch on the edge of the shaft opposite the arrow that will give a more perfect alignment; if so, use the notch instead of the shaft arrow.) See figure 6-5.

Step 7. Interconnect the Antenna Drive by cables L and N with the Power Supply and Azimuth Indicator (only) as shown in figure 5–2 or 7–15 and set the ANT. SPEED switch to S, standby. Connect power to the Power Supply unit.

Step 8. With the VERT.-HOR. switch in the HOR. position, apply 26.5 volts ac at 400 cps to J305 on the Drive unit.

Step 9. Connect an ac vacuum tube voltmeter (table 2–1) to J307 and rotate the shaft of the resolver by its shaft coupler (marked 3 in figure 6–5) until minimum voltage is obtained (less than 0.01 volts).

Step 10. Measure the voltage between J306 and J305 with the VTVM ungrounded; it should read approximately 23 volts. If it reads 30 volts, rotate the shaft of the resolver approximately 180 degrees and repeat step 6. The voltage on the ungrounded meter should now read the required 23 volts.

Step 11. Tighten the two setscrews on the resolver shaft coupling and rotate the Drive unit shaft 360 degrees in the clockwise direction until the arrows (or notch) are realigned and check the null voltage as per step 6 above.

Step 12. Make any slight adjustment of resolver shaft position as required until the lowest null is obtained.

Step 13. Replace camera switch S302.

Step 14. Before reconnecting the wires to S302, connect an ohmmeter between terminals 1 and 3 of the switch. Put the Drive unit in rotation, and with the switch-holding screws slightly loosened, adjust the positioning of the switch so that a positive action exists between the cam and the cam lever. This lever should close the switch each time the cam projection passes it.

Step 15. Disconnect the cables from the Drive unit receptacles and reassemble it, reversing the procedures of steps 1, 2 and 3.

Step 16. Connect the Antenna Drive in a complete system and check it for normal operation.

e. Astigmatism Adjustment.

Step 1. Set up units and test equipment as illustrated in figure 6–1.

Step 2. Disconnect cable E and cable F from J206 and J207, respectively.

Step 3. Connect cable E and cable F to J209 and J210, respectively.

Step 4. Apply a 0.1-volt, 3-microsecond, 1000 pps, negative polarity, to J-204 on IP-243 via cable D from the pulse generator.

Step 5. Set the pulse-polarity switch S201 (figure 5–3) on the Indicator unit for negative input, clockwise, and advance the GAIN control until a line extends from the center of the screen to the edge, at the azimuth scale.

Step 6. Manually rotate the Antenna Drive to where the indication line is pointing at "0" (if this is not convenient, snap ANT. SPEED from "S" to "150" and back again quickly, until desired amount of rotation is obtained).

Step 7. Adjust the FOCUS control (and INTENSITY) for the sharpest definition of the line.

Step 8. Rotate the antenna again until the line is 90° away from the vertical (one-quarter turn).

Step 9. The line should now be in a horizontal position. If the focusing is not as sharp at this point, adjust the astigmatism control R283 (figure 5–3) until it is at its sharpest focus.

Step 10. Rotate the Drive unit until the line is again vertical and adjust FOCUS for sharpest definition.

Step 11. Repeat steps 8, 9 and 10 until the focusing of the line is equally as sharp at both vertical and horizontal positions or rotation.

6–49. POWER SUPPLY PP-974/ALA-6. There is but one adjustment on this unit, and that is the plate-supply voltage adjustment R109 (figure 5–5). With the Power Supply operating under the normal load of the Azimuth Indicator, connect the positive lead of a vacuum tube voltmeter (table 2–1) or a 20,000 ohm-per-volt meter to test point J106 (figure 5–5) and the negative lead to chassis. Adjust R109 for +265 vdc.

6–50. LUBRICATION. Lubrication for field maintenance on AN/ALA-6 is the same as for organizational maintenance, covered in paragraph 5–33.

6–51. MAINTENANCE AND INSPECTION SCHEDULE. See paragraph 5–35, and table 5–3.

6-52. OVERHAUL SCHEDULE. Antenna Drive TG-23/ALA-6 and Antenna Assembly AS-654/ALA-6 are the only units of AN/ALA-6 equipment which require regular overhaul. This should be scheduled for every 500 to 1000 hours of operation.

SECTION VII
DIAGRAMS

7-1. EXPLANATORY TEXT.

7-2. PROPER USE OF DIAGRAMS. The diagrams in this section are provided for reference in the maintenance of Direction Finder Group AN/ALA-6. The schematic diagrams of the individual components (figures 7–1 through 7–9) contain test points of three different classifications. A star-encircled Arabic numeral is a major test point and refers to voltage supply sources. An encircled capital letter is a secondary test point and refers to signal paths through the circuit. An encircled letter *and* Arabic numeral is a minor test point and refers to junction points of detail electronic parts for purposes of testing and locating a faulty part and replacing it. Following the schematic diagrams are found tube socket and key-terminal voltage and resistance diagrams, and diagrams showing the arrangement of detail parts on their terminal boards. Included is a system cabling diagram to give details of the interconnections between major components of the system. Receptacle resistance-measurement values appear in tabular form for use in localizing troubles. Diagrams may be located by consulting the Index of Diagrams which appears following this paragraph.

7-3. INDEX OF DIAGRAMS. The following is an index listing diagrams in their order of appearance.

INDEX OF DIAGRAMS

7-4. RECEPTACLE RESISTANCE MEASUREMENTS.

7–5. AZIMUTH INDICATOR IP-243/ALA-6. Disconnect all plugs and cables from the unit and check the resistance to ground of all receptacle contacts, transformer terminals and coaxial jacks according to table 7–1. Use the VTVM-ohmmeter listed in table 2–1. Pretesting conditions are stated at the end of the table. See figure 6–3 for a view of the receptacles, and figures 5–3 and 5–4 for views of the transformers and inner detail parts. Values should be approximately within 10% of the listed resistance.

7–6. POWER SUPPLY PP-974/ALA-6. With all tubes and fuses in place, set servo switch (S101) to "EXT" position (figure 5–5), and check the resistance to ground for all receptacle contacts and points listed in table 7–2. See table 2–1. Values should be approximately within ten percent.

TABLE 7-1

RECEPTACLE RESISTANCE MEASUREMENTS FOR AZIMUTH INDICATOR IP-243/ALA-6

Jack or Transformer	*From*	*To*	*Resistance*	*Remarks*
J201	Pin A	Chassis	Infinite	
J201	Pin B	Chassis	Infinite	
J201	Pin C	Chassis	0 ohms	ANT. SPEED control in "S" position
J201	Pin C	Chassis	Infinite	ANT. SPEED control in "OFF" position
J201	Pin E	Chassis	Infinite	S-DF switch in "S" position
J201	Pin E	Chassis	35 ohms	S-DF switch in "DF" position
J201	Pin H	Chassis	170,000 ohms	
J201	Pin J	Chassis	0 ohms	
J201	Pin K	Chassis	35 ohms	
J201	Pin L	Chassis	120,000 ohms	
J202	Pin A	Chassis	35 ohms	
J202	Pin B	Chassis	0 ohms	
J202	Pin C	Chassis	Infinite	ANT. SPEED control in "OFF" position
J202	Pin C	Chassis	Infinite	ANT. SPEED control is "S" position
J202	Pin C	Chassis	37 ohms	ANT. SPEED control is "150" position
J202	Pin C	Chassis	34 ohms	ANT. SPEED control is "300" position
J202	Pin D	Chassis	35 ohms	VERT.-HOR. switch in "VERT" position
J202	Pin D	Chassis	Infinite	VERT.-HOR. switch in "HOR" position
J203	Pin A	Chassis	35 ohms	VERT.-HOR. switch in "VERT" position
J203	Pin A	Chassis	Infinite	VERT.-HOR. switch in "HOR" position
J203	Pin B	Chassis	90,000 ohms to 7 ohms	Rotate EXPANDER control counterclockwise to clockwise
J203	Pin C	Chassis	0 ohms	
J203	Pin D	Chassis	85,000 ohms to 6 ohms	Rotate GAIN control counterclockwise to clockwise
J203	Pin E	Chassis	34 ohms	
J201	Pin A	Pin B	9 ohms	
J201	Pin H	Arm of R283	170,000 ohms to 15 ohms	Rotate astigmatism control counterclockwise to clockwise
T202	Terminal 7	Terminal 8	0.25 ohms	
T202	Terminal 3	Terminal 4	1500 ohms	
T202	Terminal 5	Terminal 6	0.1 ohm	
T202	Terminal 9	Terminal 10	0.1 ohm	
T202	Terminal 4	Chassis	Approx. 1,750,000 ohms	
T202	Intersection of R278 and R279	Chassis	Approx. 1,750,000 ohms	
T202	Intersection of R277 and R278	Chassis	Approx. 1,750,000 ohms	
—	J217	Chassis	28,000 ohms to 2.8 ohms	Rotate VERT. control counterclockwise to clockwise
—	J216	Chassis	28,000 ohms to 2.8 ohms	Rotate HOR. control counterclockwise to clockwise
—	J211	Chassis	280,000 ohms	After the charging of C211
—	J212	Chassis	10,000 ohms	
—	J215	Chassis	180,000 ohms	
—	J214	Arm of R242	8500 ohms to 10 ohms	Rotate circularity control counterclockwise to clockwise
—	J213	Chassis	4.5 ohms	
T202	Terminal 8	Arm of R276	330,000 ohms to 830,000 ohms	Rotate FOCUS control counterclockwise to clockwise
T202	Terminal 8	Arm of R278	100,000 ohms to 5 ohms	Rotate INTENSITY control counterclockwise to clockwise
Pin 1 of V207		Junction of R239, R240, and C221	3 ohms to 50,000 ohms	Rotate TRUE HD. control counterclockwise to clockwise
J208 of True Bearing Resolver		Chassis	1000 ohms	

TABLE 7-1 (cont)

RECEPTACLE RESISTANCE MEASUREMENTS FOR AZIMUTH INDICATOR IP-243/ALA-6

Jack or Transformer	*From*	*To*	*Resistance*	*Remarks*
J209 of True Bearing Resolver		Chassis	100 ohms	
J210 of True Bearing Resolver		Chassis	100 ohms	
J205	Video Resolver	Chassis	1000 ohms	
J206	Video Resolver	Chassis	1000 ohms	
J207	Video Resolver	Chassis	1000 ohms	
J204	Signal Input	Chassis	1000 ohms	
—	J218	Chassis	210,000 ohms	

NOTES: 1. All power disconnected.
2. Measurements made with test meter designated in table 2–1.

CONDITIONS:

1. Interlock closed
2. Panel lights (R281) cw pos.
3. Azimuth scale (R282) cw pos.
4. Motor speed (S202/S203) "OFF" pos.
5. VERT.-HOR. (S205) HOR. pos.
6. S-DF (S206) "S" pos.
7. EXPANDER, ccw pos.
8. GAIN, ccw pos.
9. FOCUS, ccw pos.
10. INTENSITY, ccw pos.
11. VERT., ccw pos.
12. HOR., ccw pos.
13. TRUE HD., ccw pos.
14. BEAM MOD., ccw pos.

TABLE 7-2

RECEPTACLE RESISTANCE MEASUREMENTS FOR POWER SUPPLY PP-974/ALA-6

Major Point	*From*	*To*	*Resistance*	*Remarks*
J101	Pin A	Chassis	Infinite	
J101	Pin B	Chassis	Infinite	
J101	Pin C	Chassis	Infinite	
J101	Pin H	Chassis	2,000,000 ohms	
J101	Pin J	Chassis	0 ohms	
J101	Pin K	Chassis	Infinite	
J101	Pin L	Chassis	1,000,000 ohms	After charge of associated capacitors
J102	Pin A	Chassis	Infinite	
J102	Pin B	Chassis	Infinite	
J102	Pin C	Chassis	0.4 ohms	
J102	Pin D	Chassis	Infinite	
J102	Pin E	Chassis	2,000,000 ohms	After charge of associated capacitors
J102	Pin F	Chassis	Infinite	
J102	Pin G	Chassis	0 ohms	
J102	Pin H	Chassis	Infinite	
J103	Pin A	Chassis	Infinite	
J103	Pin B	Chassis	Infinite	
J104	Pin A	Chassis	Infinite	
J104	Pin B	Chassis	Infinite	
J104	Pin C	Chassis	Infinite	
J104	Pin D	Chassis	0 ohms	

TABLE 7-2 (cont)

RECEPTACLE RESISTANCE MEASUREMENTS FOR POWER SUPPLY PP-974/ALA-6

Major Point	*From*	*To*	*Resistance*	*Remarks*
J101	Pin A	Pin B	1.8 ohms	(T101 primary)
J102	Pin A	Pin B	25 ohms	(T102 primary)
J102	Pin D	Pin F	9.5 ohms	(T102 secondary No.1)
J102	Pin C	Pin G	0.4 ohms	(T102 secondary No. 2)
J101	Pin C	J104 Pin B	150 ohms	
J101	Pin H	J102 Pin E	0 ohms	
J101	Pin K	J102 Pin H	0 ohms	
Relay K101	Pin 7	Pin 4	1.8 ohms	
Relay K101	Pin 7	Pin 6	Infinite	
Relay K101	Pin 5	Pin 4	Infinite	
Relay K101	Pin 3	Pin 2	Infinite	
Relay K101	Pin 3	Pin 1	150 ohms	
Relay K102	Pin 1	Pin 8	150 ohms	
Relay K102	Pin 2	Pin 3	Infinite	
Relay K102	Pin 4	Pin 5	Infinite	
Relay K102	Pin 6	Pin 7	Infinite	
Relay K102	Pin 2	Pin 4	25 ohms	
V101	Pins 8 and 2	Chassis	2,500,000 ohms	After charge of associated capacitors
V102	Pins 2 and 7	Chassis	1,200,000 ohms	After charge of associated capacitors
V103	Pins 3 and 6	Chassis	2,000,000 ohms	After charge of associated capacitors
—	Junction of L101 and R101	Chassis	2,500,000 ohms	After charge of associated capacitors

7–7. ANTENNA CONTROL C-1246/ALA-6. Disconnect all plugs and cables from the unit (figure 5–10) and check the resistance to ground for all receptacle contacts and major points according to table 7–3. Conditions are noted at the end of the table. See table 2–1 for test equipment.

7–8. ANTENNA DRIVE TG-23/ALA-6. Disconnect the Drive unit from the equipment assembly and check the resistance to ground for its receptacle contacts according to table 7–4. Values should be within 10 percent. See table 2–1 for test equipment.

7–9. ANTENNA ASSEMBLY AS-654/ALA-6. Disconnect the cables and plugs from the Antenna Assembly and check the resistance to ground for its receptacle contacts according to table 7–5. Values should be within 10 per cent.

TABLE 7-3

RECEPTACLE RESISTANCE MEASUREMENTS FOR ANTENNA CONTROL C-1246/ALA-6

Major Point	*From*	*To*	*Resistance*
J401	Pin A	Chassis	Infinite
J401	Pin B	Chassis	Infinite
J401	Pin C	Chassis	Infinite
J401	Pin D	Chassis	560,000 ohms
J401	Pin E	Chassis	100 ohms
J401	Pin F	Chassis	560,000 ohms
J401	Pin G	Chassis	0 ohms
J402	Pin A	Chassis	Infinite
J402	Pin B	Chassis	Infinite
J402	Pin C	Chassis	1.9 ohms
J402	Pin D	Chassis	560,000 ohms
J402	Pin E	Chassis	Infinite
J402	Pin F	Chassis	560,000 ohms
J402	Pin G	Chassis	0 ohms
J402	Pin H	Chassis	100 ohms
J401	Pin A	J402 Pin A	Infinite
J401	Pin B	J402 Pin B	0 ohms
J402	Pin B	J401 Pin C	96 ohms
J401	Pin F	J401 Pin D	1000 ohms
J402	Pin H	J401 Pin E	0 ohms
V401	Pin 1	Center-tap T401	270,000 ohms
V401	Pin 6	Center-tap T401	270,000 ohms
V402	Pin 1	Center-tap T401	370 ohms
V402	Pin 6	Center-tap T401	290 ohms
V401	Pin 7	Chassis	0 ohms
V401	Pin 8	Chassis	1500 ohms
V402	Pin 2	Chassis	560,000 ohms
V402	Pin 7	Chassis	560,000 ohms
V402	Pins 3 & 8	Chassis	220 ohms

NOTE: Bandswitch in position No. 2; all other controls counterclockwise.

TABLE 7-4

RECEPTACLE RESISTANCE MEASUREMENTS FOR ANTENNA DRIVE TG-23/ALA-6

Jack	*From*	*To*	*Resistance*	*Remarks*
J302	Pin A	Chassis	Infinite	
J302	Pin B	Chassis	0 ohms	
J302	Pin C	Chassis	30 ohms	Depending upon contact resistance of motor brushes
J302	Pin D	Chassis	300 ohms	
J302	Pin E	Chassis	0 ohms	Camera switch closed
J302	Pin E	Chassis	Infinite	Camera switch open
J302	Pin F	Chassis	Infinite	
J305	Center Pin	Chassis	30.5 ohms	
J306	Center Pin	Chassis	1 ohm	
J307	Center Pin	Chassis	1 ohm	

TABLE 7-5

RECEPTACLE RESISTANCE MEASUREMENTS FOR ANTENNA ASSEMBLY AS-654/ALA-6

Test No.	*Jack*	*From*	*To*	*Resistance*	*Remarks*
1	J501	Pin A	Pin G	Infinite	
2	J501	Pin B	Pin G	Infinite	
3	J501	Pin C	Pin G	Infinite	
4	J501	Pin E	Pin G	375 ohms	
5	J501	Pin G	Chassis	Infinite	
6	J501	Pin D	Pin F	1000 ohms	
7	J501	Pin D	Pin G	—	Depends upon tuning potentiometer setting in Antenna Control C-1246/ALA-6
8	J501	Pin F	Pin G	—	Depends upon tuning potentiometer setting in Antenna Control C-1246/ALA-6
9	J501			1000 ohms	Combine readings of tests 7 and 8
10	J501	Pin A	Pin B	450 ohms	
11	J501	Pin B	Pin C	450 ohms	

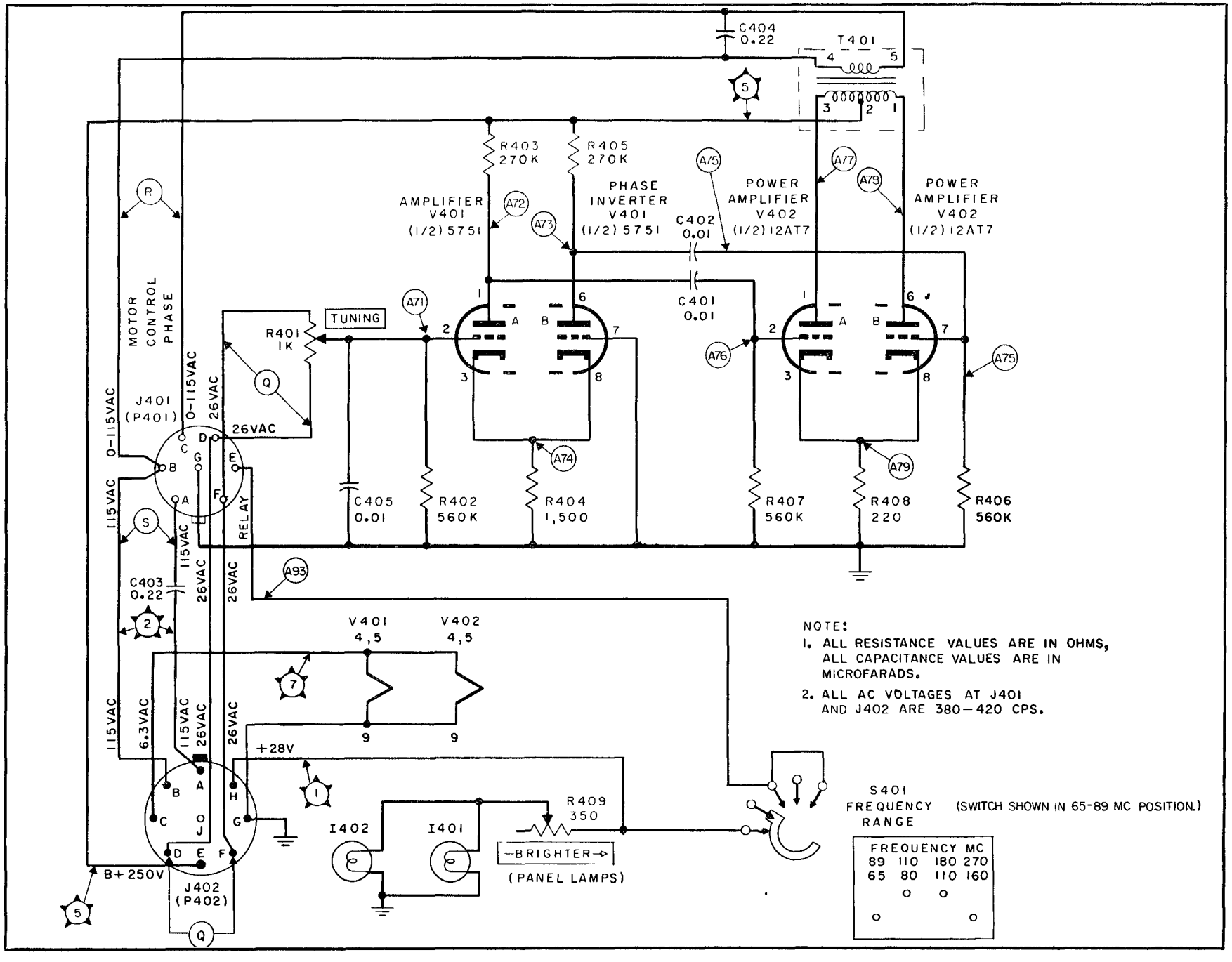


Figure 7-5. Antenna Control C-1246/ALA-6, Schematic Diagram

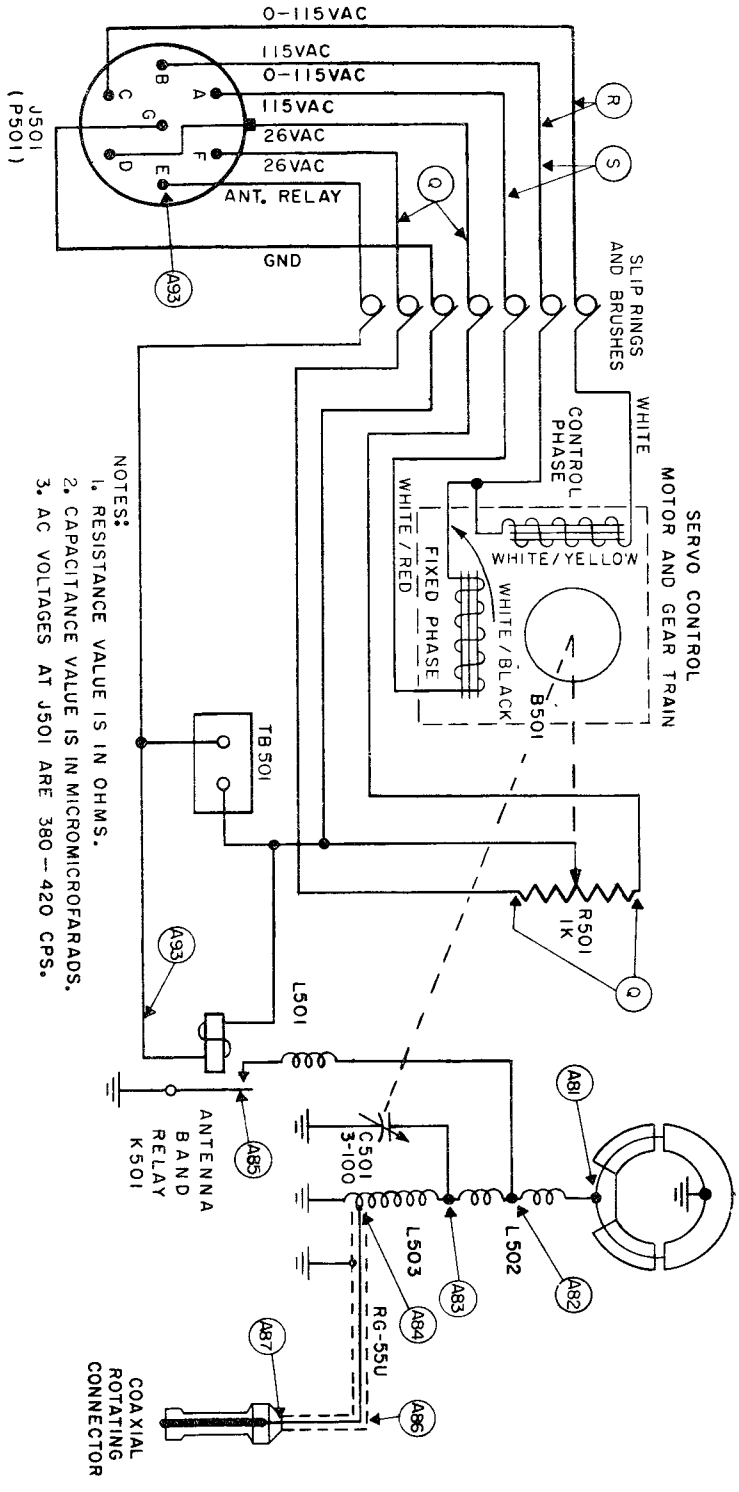


Figure 7-6. Antenna Assembly AS-654/ALA-6, Schematic Diagram

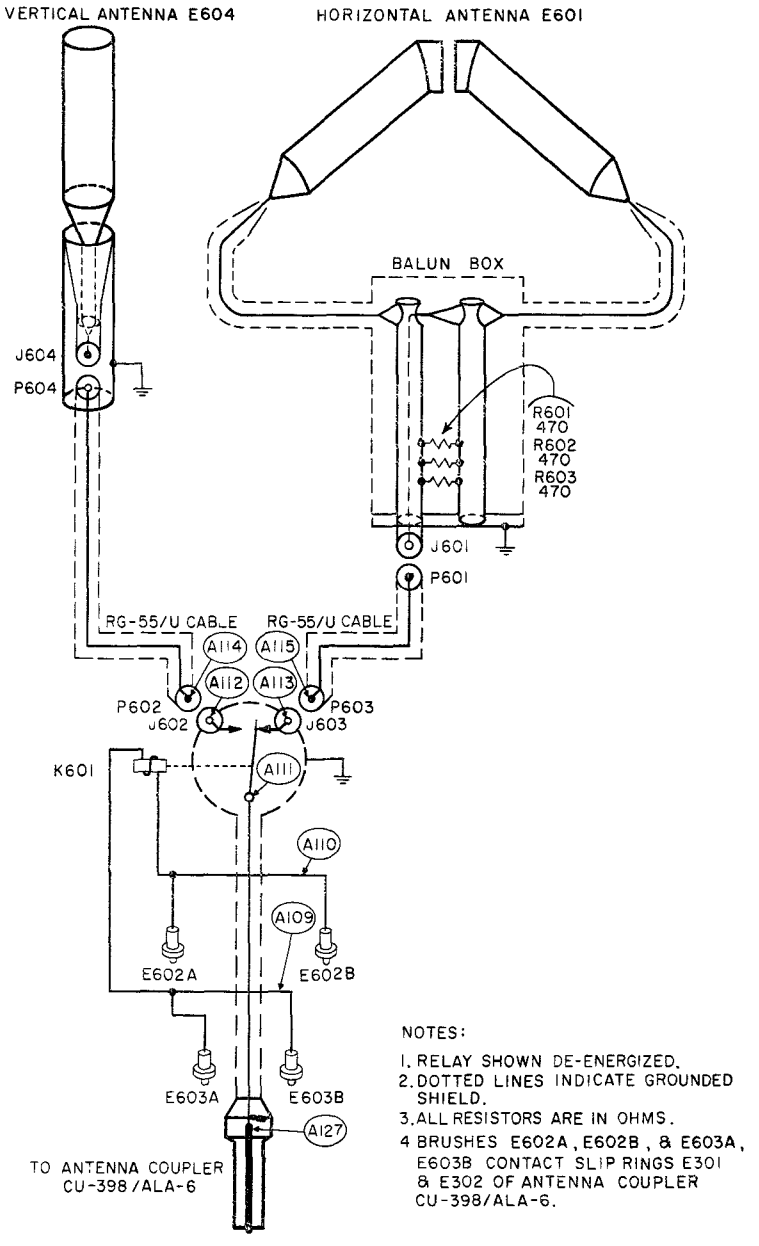


Figure 7-7. Antenna Assembly AS-655/ALA-6, Schematic Diagram

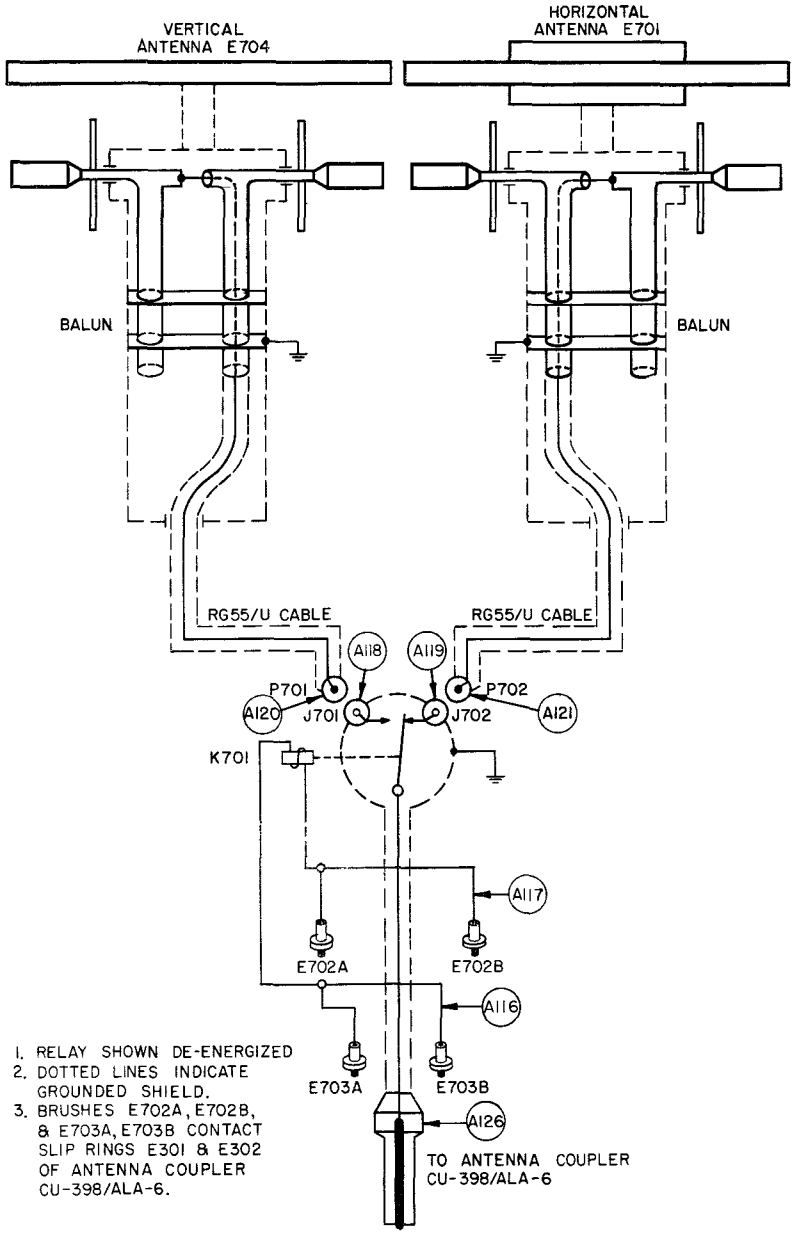


Figure 7-8. Antenna Assembly AS-656/ALA-6, Schematic Diagram

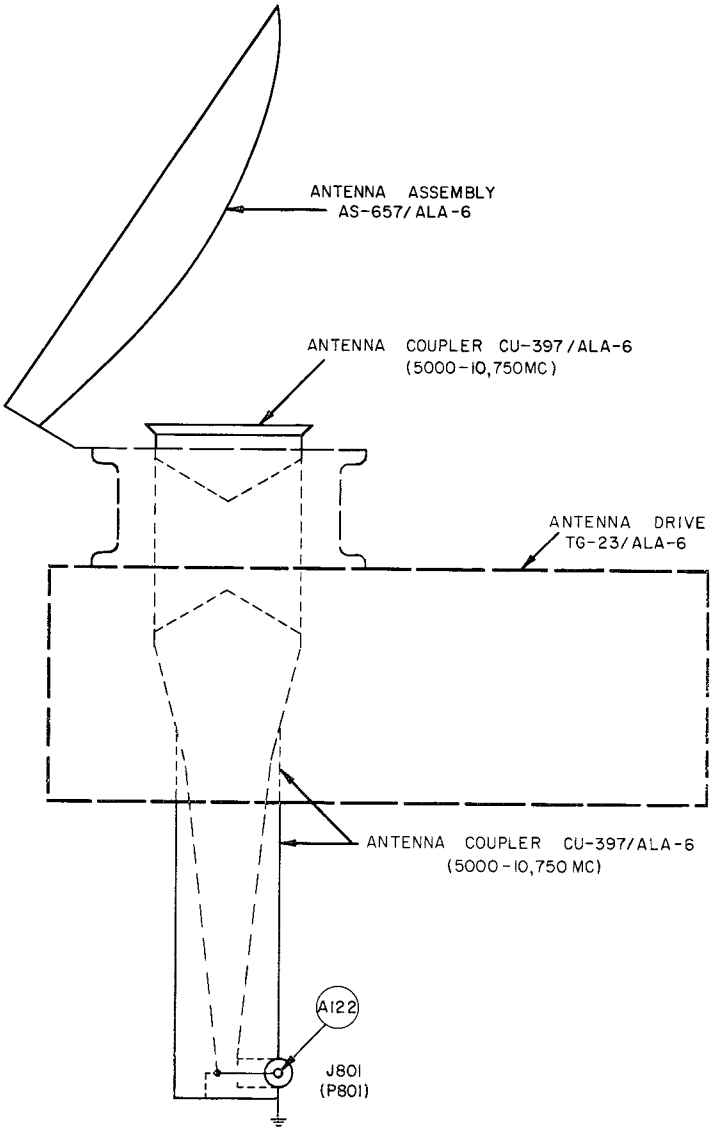


Figure 7-9. Antenna Assembly AS-657/ALA-6, Schematic Diagram

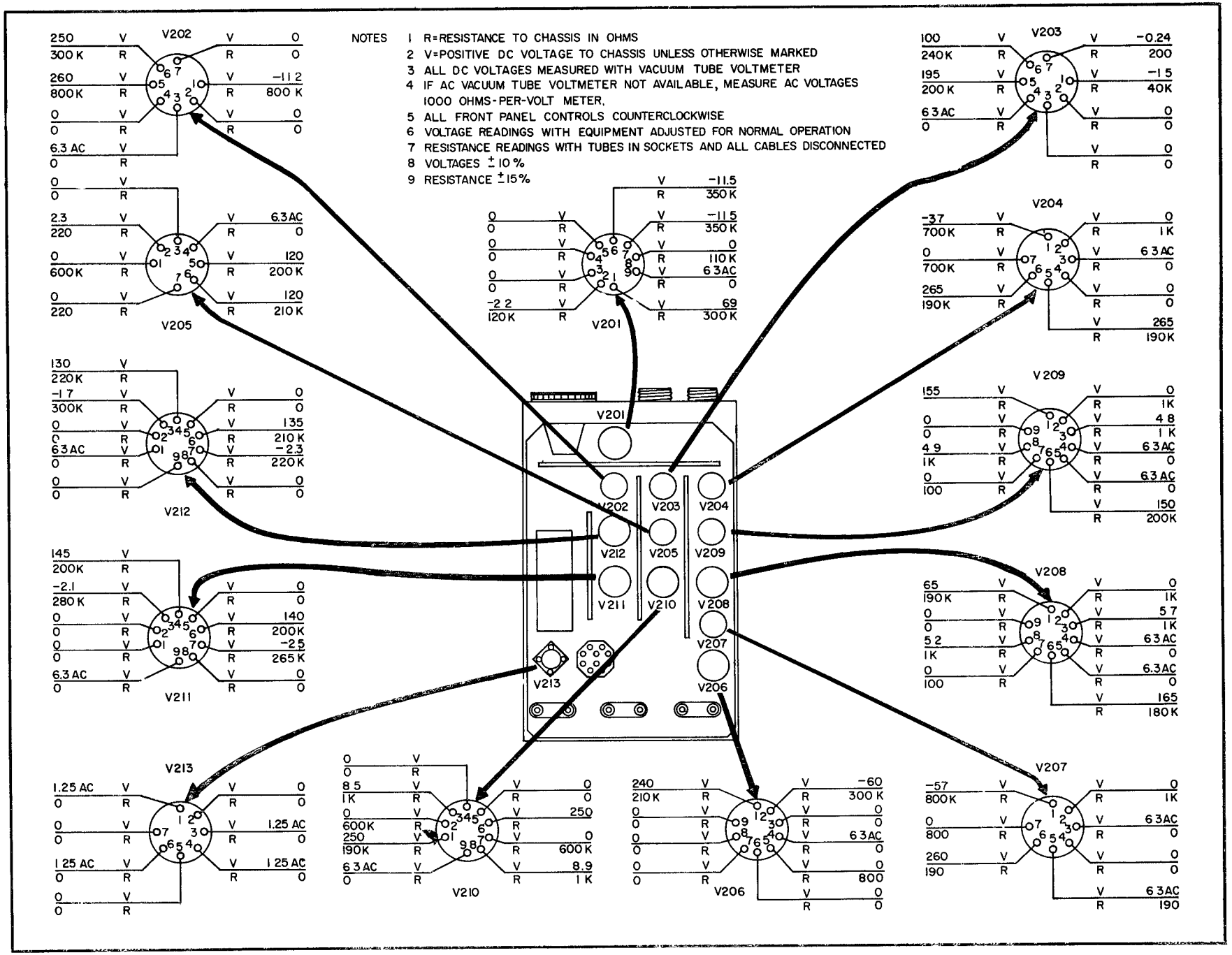


Figure 7-10. Azimuth Indicator IP-243/ALA-6, Tube Socket Voltage and Resistance Diagram

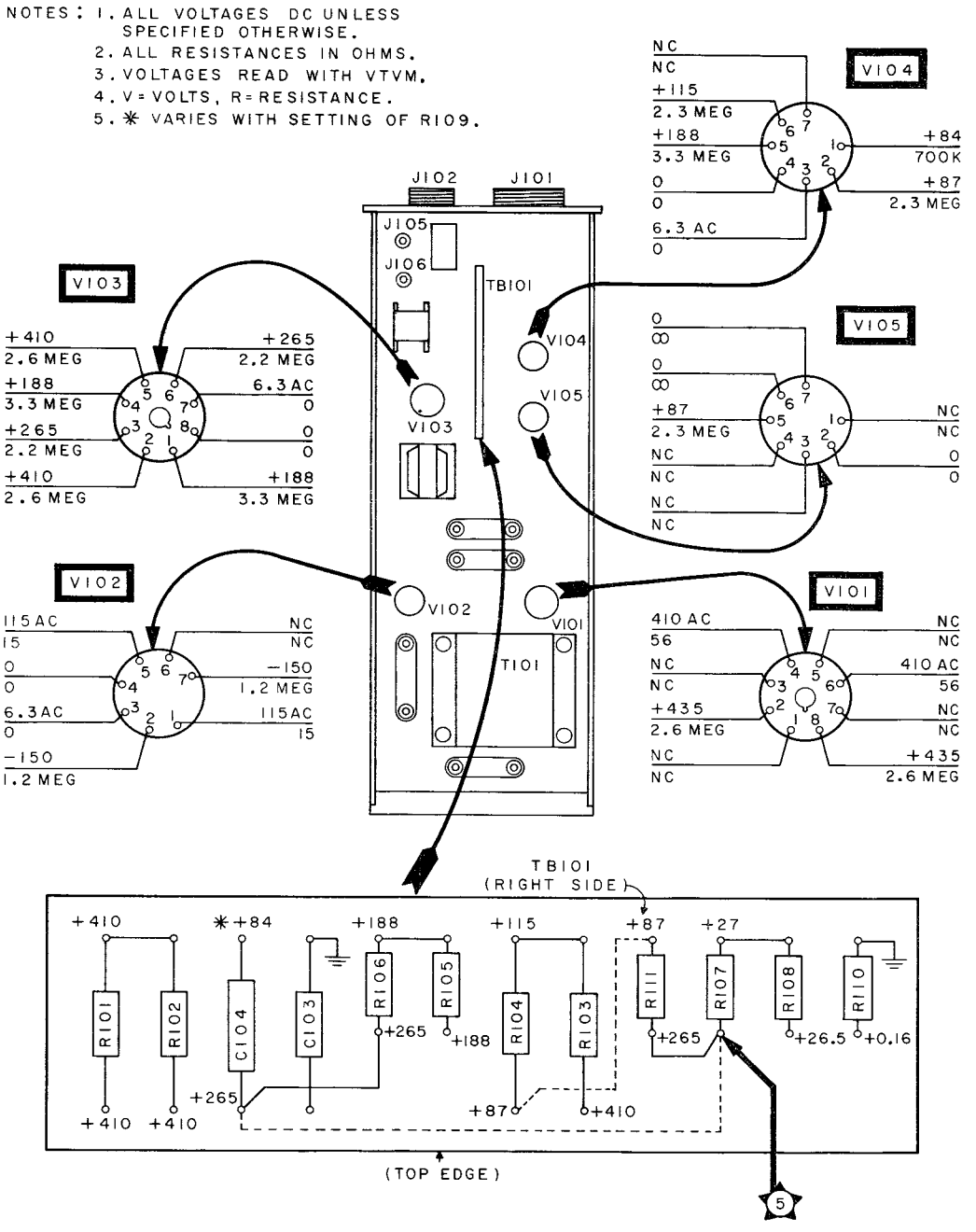


Figure 7-12. Power Supply PP-974/ALA-6, Voltage, Resistance and Terminal Board Diagram

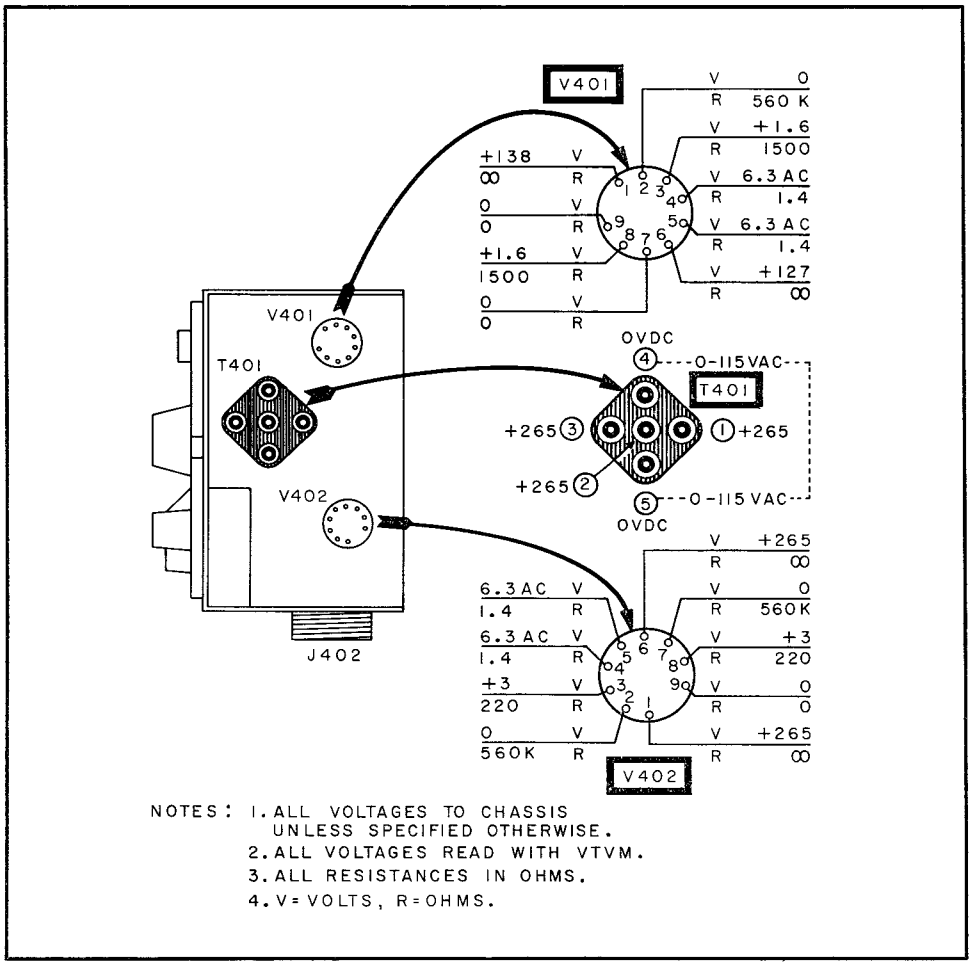


Figure 7-13. Antenna Control C-1246/ALA-6, Voltage, Resistance and Transformer Terminal Arrangement

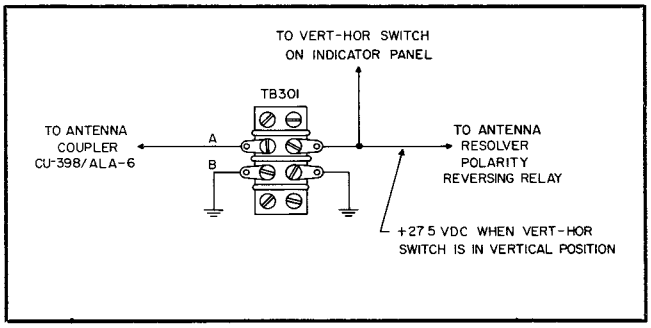


Figure 7-14. Antenna Drive TG-23/ALA-6, Terminal Board

SECTION VIII

DIFFERENCE DATA SHEETS

8-1. INTRODUCTION.

8-2. Preceding sections of this handbook provide basic coverage for all models of Direction Finder Group AN/ALA-6, based on those units produced under Contract number AF 33(600)-19767. Service procedures for major units produced under Contract number AF 33(600)-31638 are identical to those described in the text of the handbook except for differences covered here by means of Difference data sheets.

8-3. DIFFERENCE DATA SHEET INDEX.

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA ASSEMBLY AS-654A/ALA-6
SERIAL NOS. 636-878

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

Note

Under Contract No. AF 33(600)-31638 the 65-250 mc antenna assembly has been modified sufficiently to require "A" model nomenclature designation. The changes involved are: (a) the replacement of servo control motor B501 with a unit different in electrical characteristics, and (b) the addition of a terminal mounting board, additional phase-shifting capacitor (C502) and attaching parts. The new model servo motor and gearbox are mechanically but not electrically interchangeable with units supplied under Contract No. AF 33(600)-19767.

INTERCHANGEABILITY. B501 servo motors supplied as replacement parts for AS-654A/ALA-6 may be used in AS-654/ALA-6 provided an additional phase-shift capacitor (C502, 0.22 uf, 200 wvdc) is wired in series with the original capacitor to reduce the motor phase-shifting capacitance to the required value of 0.11 uf. Servo motors supplied for AS-654/ALA-6 may be used for replacement in AS-654A/ALA-6 provided a jumper wire is added to short out the extra capacitor. For part numbers and additional information, see the Illustrated Parts Breakdown AN-12P3-2ALA6-4.

CHANGES TO SERVICE INSTRUCTIONS.

SECTION I No change

SECTION II No change

SECTION III No change

SECTION IV Add the following statement to paragraph 4-122:

For units produced under Contract AF 33(600)-19767 a single 0.22 uf phase shift capacitor is used (C403 in Antenna Control C-1246/ALA-6). Due to a change in electrical characteristics of servo motors supplied under Contract AF 33(600)-31638, a second 0.22 uf capacitor (C502) is added to the AS-654A/ALA-6 antenna assembly to reduce the capacitance to the 0.11 uf value required to obtain a phase shift of 90°.

SECTION V No change

SECTION VI Substitute the following for step 2A of table 6-5:

Trouble	*Probable Cause*	*Test*	*Remedy*	*Reference*
2. Voltage is indicated at pins B & C of J401 & J501 (test point R) when R401 is moved, but motor will not turn	A. Open motor capacitors, C403 or C502	Check capacitance of C403 & C502	Replace defective C403 or C502	Fig. 5-7, 7-5, 5-8, 7-6A; par. 6-19

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION VII Replace figure 7-6 with figure 7-6A included here.

Replace table 7-5 with table 7-5A included here.

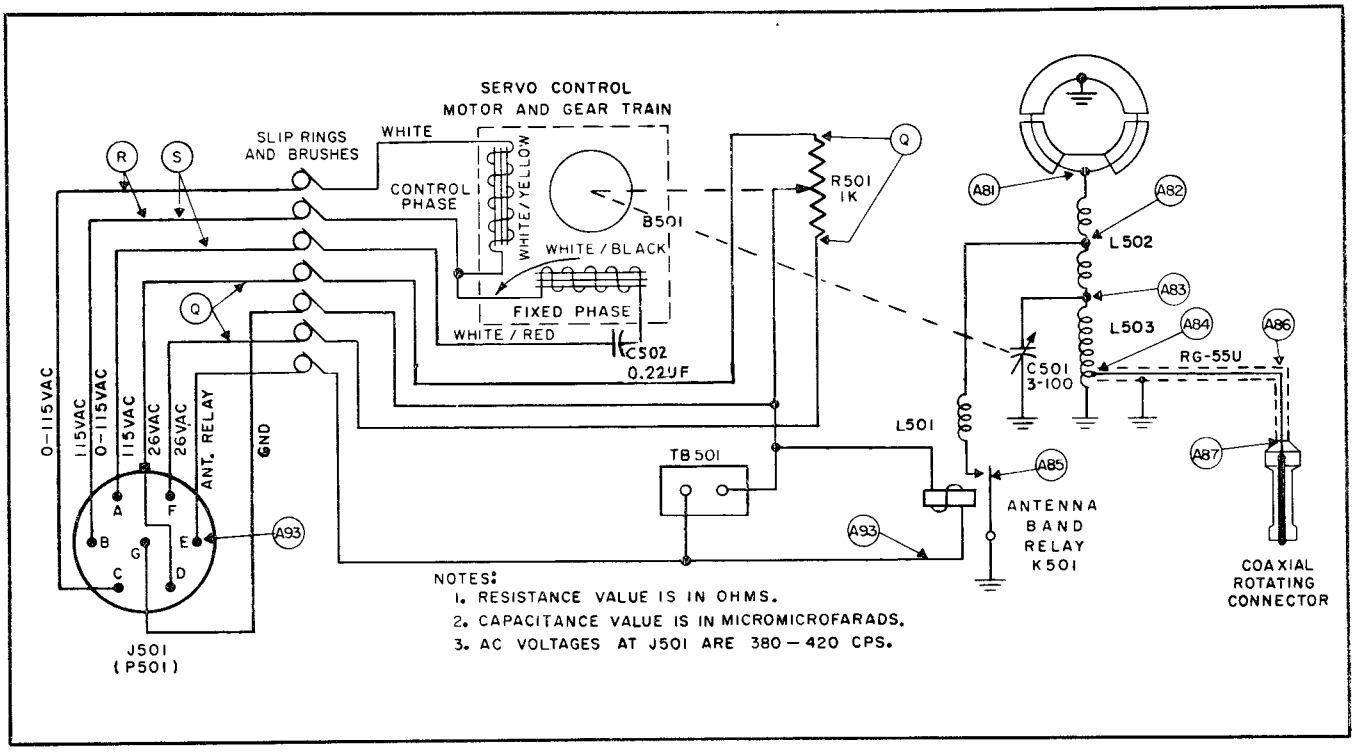


Figure 7-6A. AS-654A/ALA-6 Schematic Diagram

TABLE 7-5A

RECEPTACLE RESISTANCE MEASUREMENTS FOR ANTENNA ASSEMBLY AS-654A/ALA-6

Test No.	*Jack*	*From*	*To*	*Resistance*	*Remarks*
1	J501	Pin A	Pin G	Infinite	
2	J501	Pin B	Pin G	Infinite	
3	J501	Pin C	Pin G	Infinite	
4	J501	Pin E	Pin G	630 ohms	
5	J501	Pin G	Chassis	Infinite	
6	J501	Pin D	Pin F	1000 ohms	
7	J501	Pin D	Pin G	—	Depends upon tuning potentiometer setting in Antenna Control C-1246/ALA-6
8	J501	Pin F	Pin G	—	Depends upon tuning potentiometer setting in Antenna Control C-1246/ALA-6
9	J501			1000 ohms	Combine readings of tests 7 and 8
10	J501	Pin A	Pin B	Infinite	
11	J501	Pin B	Pin C	450 ohms	

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA ASSEMBLY AS-655/ALA-6
SERIAL NOS. 529-959

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I No change

SECTION II No change

SECTION III No change

SECTION IV No change

SECTION V No change

SECTION VI Add the following to step 2 of paragraph 6-30c:

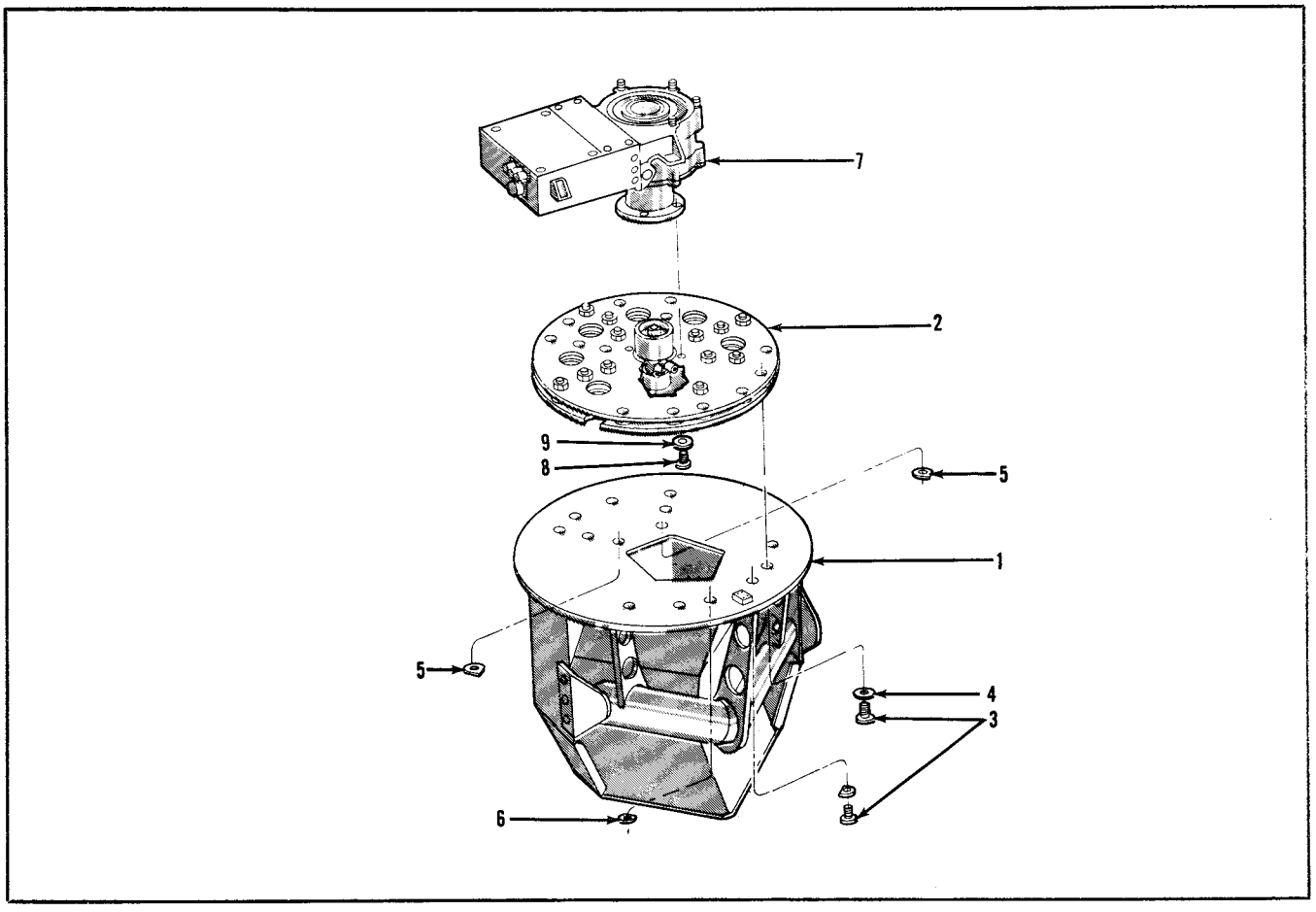
For Antenna AS-655/ALA-6 supplied under Contract No. AF 33(600)-31638, mechanical modifications require a different procedure for separating the antenna from the drive unit. See figure 6-7A, which augments but does not supersede the existing figure 6-7. First remove the access hole cover and disconnect the cables from the coaxial switch connectors. Drop the antenna (1) away from the mounting plate assembly (2) by removing the bolts (3) and washers (4), (5), and (6). Separate the plate assembly from the drive unit hub (7) by removing the four bolts (8) and washers (9). For storage, attach the plate assembly to the antenna with mounting bolts (3) and washers (4), (5), and (6). During installation, washers with single flat (6) attach next to the antenna framework above the horizontal antenna element. Washers with double flat (5) attach next to the framework above the vertical element. Place the concave side of all washers toward the metal.

SECTION VII No change

DIRECTION FINDER GROUP AN/ALA-6 (continued)
CONTRACT NO. AF 33(600)-31638

ANTENNA ASSEMBLY AS-655/ALA-6
SERIAL NOS. 529-959

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.



Index No.	*Description*	*Previous Part No.*	*Units per Assembly*	*New Part No.*	*Units per Assembly*
-1	Antenna Assembly	AU58-1		AU58-2	
-2	Upper and Lower Plate Assembly	——	—	8031001893	1
-3	Bolt	OM-1528	8	OM-1528	14
-4	Washer	HM726	8	HM726	10
-5	Washer	——	—	8045000775	2
-6	Washer	——	—	8045000776	2
-7	Antenna Drive TG-23A/ALA-6				
-8	Bolt	HB13	4	No change	
-9	Washer	AN960C416L	4	No change	

Figure 6-7A. Mounting Antenna AS-655/ALA-6 to Drive Unit (Contract No. AF 33(600)-31638)

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA DRIVE TG-23A/ALA-6
SERIAL NOS. 1318-1729

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

Note

Modifications in the electrical design of antenna drive motor B302 and resolver B301 have resulted in "A" model nomenclature designation for units produced under this contract. Both items are electrically and mechanically interchangeable with previous models. For part numbers, see the Illustrated Parts Breakdown, AN 12P3-2ALA6-4.

SECTION I No change

SECTION II No change

SECTION III TG-23A/ALA-6 is packaged separate from other assemblies under this contract. The packaging method is identical to that shown in the right-hand portion of figure 3-3, except that Antenna Coupler CU-398/ALA-6 is not included. Two of the drive units, thus packaged, are assembled in a shipper resembling those shown in figure 3-1. The general packaging procedure of paragraph 3-6 applies. The right-hand portion of figure 3-5, showing the drive unit packed with Antenna Assembly AS-657/ALA-6, is not applicable.

SECTION IV No change

SECTION V No change

SECTION VI No change

SECTION VII Replace table 7-4 with table 7-4A included here.

TABLE 7-4A

RECEPTACLE MEASUREMENTS FOR ANTENNA DRIVE TG-23A/ALA-6

Jack	*From*	*To*	*Resistance*	*Remarks*
J302	Pin A	Chassis	Infinite	
J302	Pin B	Chassis	0 ohms	
J302	Pin C	Chassis	30 ohms	Depending upon contact resistance of motor brushes
J302	Pin D	Chassis	440 ohms	
J302	Pin E	Chassis	0 ohms	Camera switch closed
J302	Pin E	Chassis	Infinite	Camera switch open
J302	Pin F	Chassis	Infinite	
J305	Center Pin	Chassis	16 ohms	
J306	Center Pin	Chassis	0.6 ohm	
J307	Center Pin	Chassis	0.4 ohm	

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA COUPLER CU-398/ALA-6
SERIAL NOS. 1318-1557

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I No change

SECTION II No change

SECTION III Under this contract, Antenna Coupler CU-398/ALA-6 is packaged separate from other units. Individual antenna couplers are Kimpac-wrapped and taped into a cardboard inner carton. Three units, thus packaged, are assembled in a shipper resembling those shown in figure 3-1. The general packaging procedure of paragraph 3-6 applies. The right-hand portion of figure 3-3, showing CU-398/ALA-6 installed in a TG-23/ALA-6 drive unit, is not applicable.

SECTION IV No change

SECTION V No change

SECTION VI No change

SECTION VII No change

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA COUPLER CU-397/ALA-6
SERIAL NOS. 686-889

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I — No change

SECTION II — No change

SECTION III — Under this contract, Antenna Coupler CU-397/ALA-6 is packaged separate from other units. Individual antenna couplers are Kimpac-wrapped and taped into a cardboard inner carton. Three units, thus packaged, are assembled in a shipper resembling those shown in figure 3-1. The general unpackaging procedure of paragraph 3-6 applies. The right-hand portion of figure 3-5, showing CU-397/ALA-6, AS-657/ALA-6, and TG-23/ALA-6 packaged together, is not applicable.

SECTION IV — No change

SECTION V — No change

SECTION VI — No change

SECTION VII — No change

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

ANTENNA ASSEMBLY AS-657/ALA-6
SERIAL NOS. 686-1067

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I No change

SECTION II No change

SECTION III Under this contract, Antenna Assembly AS-657/ALA-6 is packaged separate from other units. Consult figure 3-7, included here, for details. The general unpackaging procedure of paragraph 3-6 applies. The right-hand portion of figure 3-5, showing CU-397/ALA-6, AS-657/ALA-6, and TG-23/ALA-6 packaged together, is not applicable.

SECTION IV No change

SECTION V No change

SECTION VI No change

SECTION VII No change

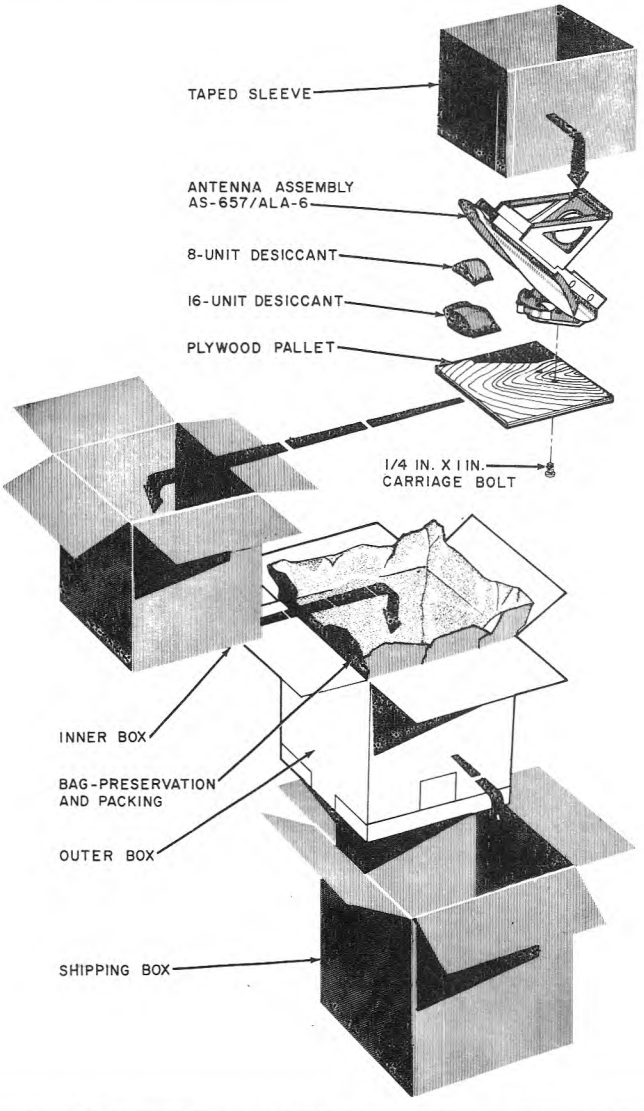


Figure 3-7. Unpacking Antenna Assembly AS-657/ALA-6

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

MOUNTING MT-1428/ALA-6
(UNSERIALIZED)

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I No change

SECTION II No change

SECTION III Under this contract, Mounting MT-1428/ALA-6 is packaged separate from Antenna Control C-1246/ALA-6. Individual mountings are Kimpac-wrapped and taped into a cardboard inner carton. Up to 50 units, thus packaged, are assembled in a shipper resembling those shown in figure 3-1. The general unpackaging procedure of paragraph 3-6 applies. Figure 3-6, showing antenna control and mounting packaged together, is not applicable.

SECTION IV No change

SECTION V No change

SECTION VI No change

SECTION VII No change

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

AZIMUTH INDICATOR IP-243/ALA-6
SERIAL NOS. 1368-1787

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

SECTION I — Add I207 to Table 1-5, Pilot Lamp Complement. Same type and function as I206. Change the Location of I206 and I207 to:
Accessible on Azimuth
Dial Assembly

SECTION II — No change

SECTION III — No change

SECTION IV — Change the first sentence of paragraph 4-67 to read:
The +28 volts supplies power to the panel light bulbs and to the azimuth scale light bulbs.

SECTION V — No change

SECTION VI — Replace figure 6-3 with figure 6-3A, included here.
Change steps 2 and 3 of paragraph 6-26a as follows:

Step 2. Disconnect the +28 vdc wire from one of the azimuth scale pilot lamp socket terminals by removing the screw.

Step 3. Remove the bezel by removing screws "D" (figure 6-3A). Bezel and azimuth scale assembly may be removed from the panel.

SECTION VII — Add I207 (XI207) in parallel with I206 (XI206) in figure 7-1.

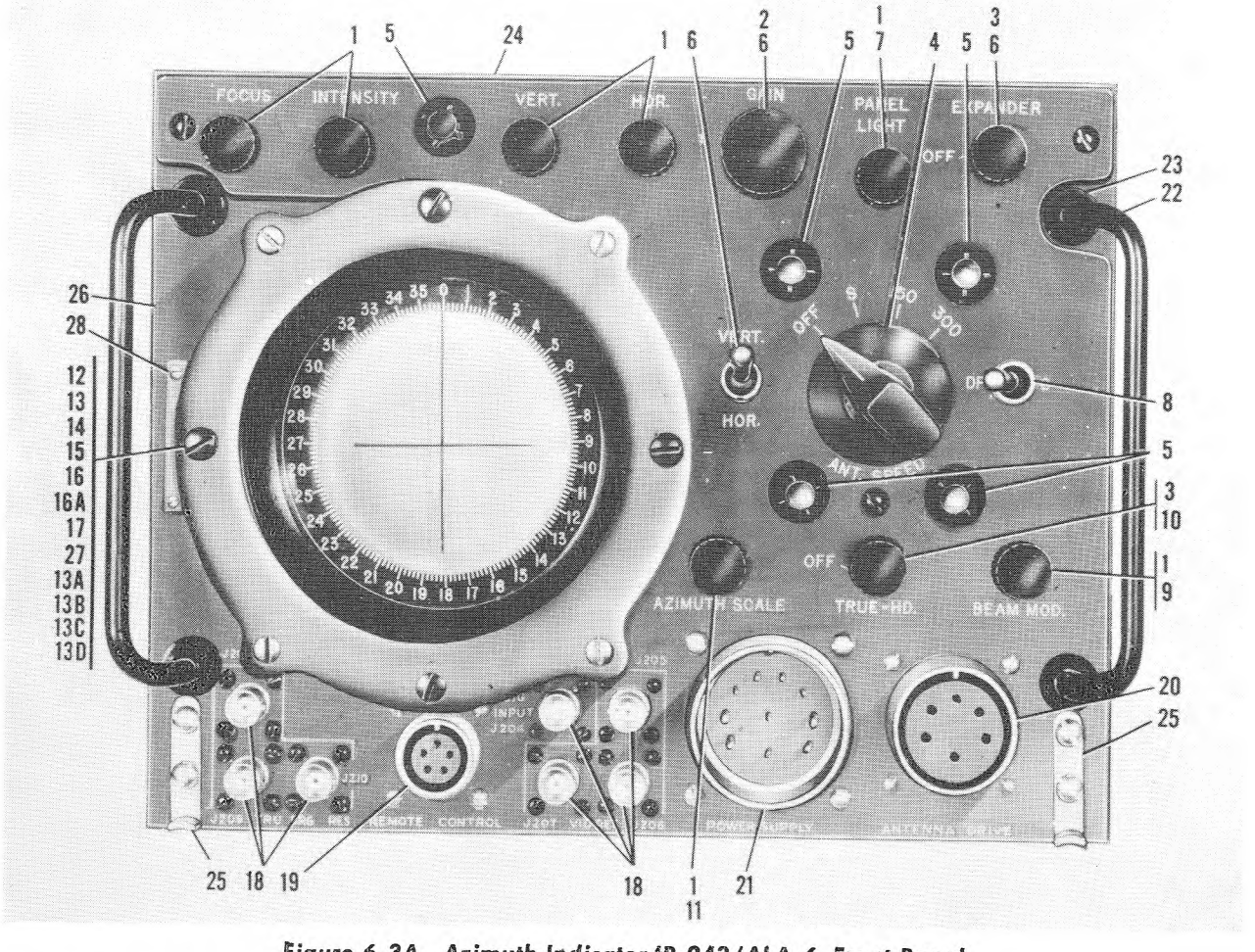


Figure 6-3A. Azimuth Indicator IP-243/ALA-6, Front Panel

DIRECTION FINDER GROUP AN/ALA-6
CONTRACT NO. AF 33(600)-31638

POWER SUPPLY PP-974/ALA-6
SERIAL NOS. 1226-1637

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

Note

R113 has been added in parallel with R108 in the +250 vdc control voltage divider to place the correct setting of R109 (+250 ADJ) near the center of the adjustment range.

SECTION I No change

SECTION II No change

SECTION III No change

SECTION IV Add R113 across R108 in figure 4-16, as shown in figure 4-16A, included here.

Substitute the following for the second sentence of paragraph 4-85:
The grid is connected to the variable arm of R109, which with R107, R108, R110, and R113 forms a voltage divider across the power supply output.

SECTION V No change

SECTION VI No change

SECTION VII In figure 7-2, add R113 across R108 as shown in figure 4-16A.

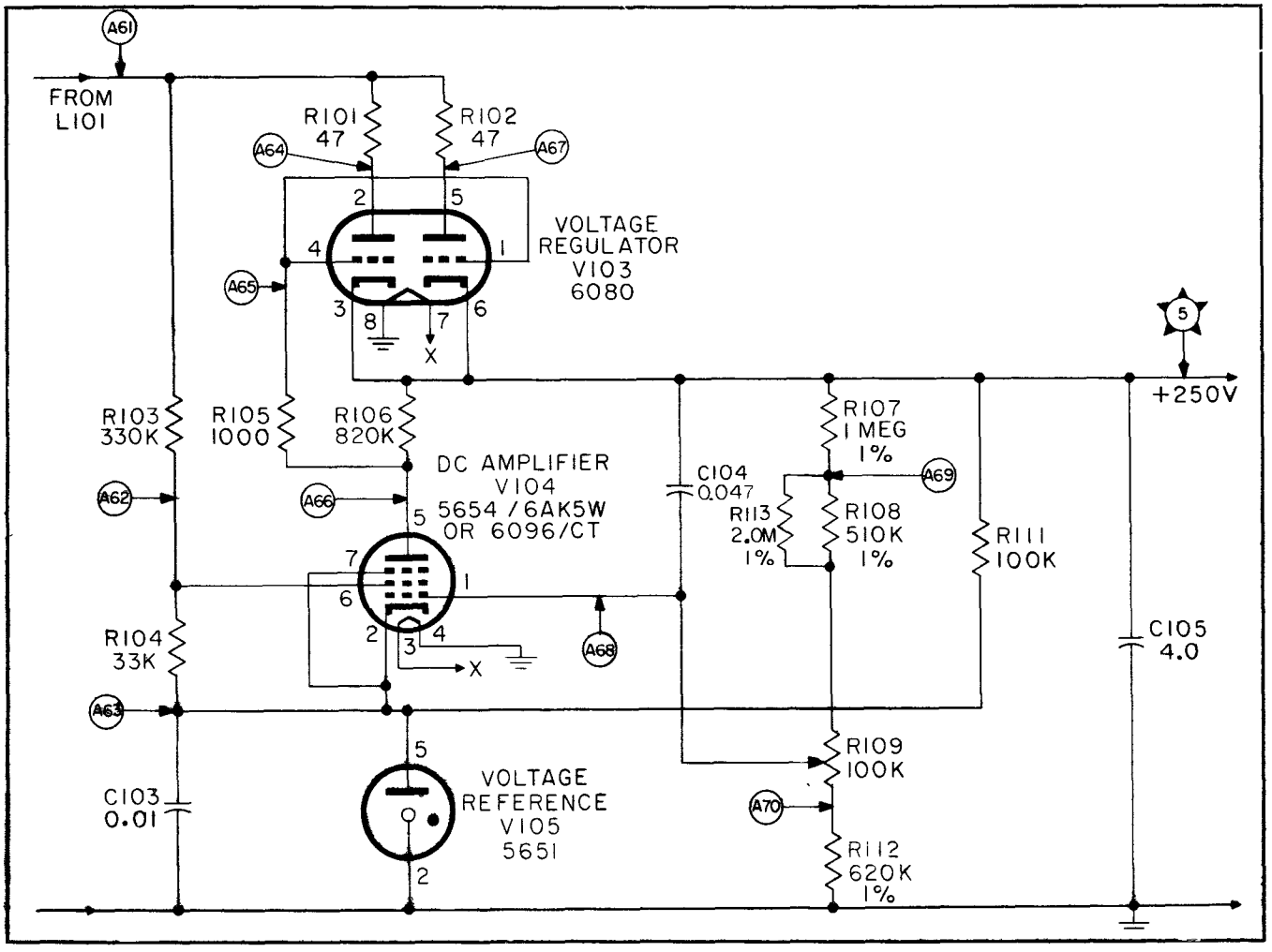


Figure 4-16A. Power Supply Partial Schematic, Plate Voltage Regulator

ALPHABETICAL INDEX

* U.S. GOVERNMENT PRINTING OFFICE: 1969-346-593/WR 2125

T.O. 12P3-2ALA6-4
FORMERLY AN 16-30ALA6-4

ILLUSTRATED

PARTS BREAKDOWN

DIRECTION FINDER GROUP

AN/ALA6

(HOFFMAN)

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*44	13 March 1961
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*46	13 March 1961
*47	13 March 1961
*48	13 March 1961
*49	13 March 1961
*50	13 March 1961
*51	13 March 1961
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T.O. 12P3-2ALA6-4
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ILLUSTRATED

PARTS BREAKDOWN

DIRECTION FINDER GROUP

AN/ALA6

(HOFFMAN)

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15 MAY 1958

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Page No.	# Change No.
Title	2
A	2
i	1
ii	0
1	0
2	2
2A	1
2B Blank	1
3 - 12	0
12A	0
12B Blank	0
13	0
14	2
15 - 16	0
16A	0
16B Blank	0
17 - 20	0
20A - 20B	0
21 - 28	0
28A	0
28B Blank	0
29 - 30	0
30A	0
30B Blank	0
31 - 42	0
43 - 45	1
46	2
47 - 56	1

Zero in this column indicates an original page.

SECTION I
INTRODUCTION

1-1. GENERAL

a. This Illustrated Parts Breakdown lists and illustrates all parts and assemblies necessary for the support of Direction Finder Group AN/ALA-6 manufactured by Hoffman Laboratories, Inc., Los Angeles 7, California. It is divided into four sections as shown in the Table of Contents.

b. This breakdown is to be used for the identification, requisitioning, issuing and for storing of parts, and for illustrating assembly and disassembly procedures to be followed whenever the Direction Finder Group requires service or repair. This breakdown is to be used in conjunction with T.O. 12P3-2ALA6-2, Handbook of Service Instructions and T.O. 12P3-2ALA6-3, Handbook of Overhaul Instructions for Direction Finder Group AN/ALA-6. A Numerical Index and a Reference Designation Index located in Sections III and IV respectively, permit rapid location of any part, component, or subassembly.

c. The Group Assembly Parts List (Section II) contains a list of parts in sequence of disassembly, beginning with the first major unit, and breaking down into the subassemblies and detailed parts. Each item is arranged and indexed to show its proper relationship to the major unit or subassembly of which it is a part. Each detail part is keyed to its respective illustration by a figure and index number. Attaching parts are listed immediately following the part they attach, and have the same indentation. They are preceded by the words "ATTACHING PARTS" and are separated from the following parts by an "- - - * - - -" symbol. Not listed are the structural parts such as gussets, braces, rivets, etc., nor wiring components that are normally procured in bulk quantities, such as cable and terminal lugs, etc.

1-2. ILLUSTRATION INDEX

a. Application of indexes falls into two major groups as follows:

(1) Line art which carries an index number for each item including hardware.

(2) Photographic illustrations which have index numbers on all items, other than hardware used as attaching parts.

(3) Electronic components which are mounted on terminal boards are shown as follows: The board assemblies are separately illustrated and listed in groups which are referenced in the major illustration. Since all components mounted on terminal boards are clearly marked by reference designation numbers, proper orientation of each board is obvious.

(4) The "Group Assembly Parts List", is divided into five columns in the manner shown as follows:

Col. No.	*Col. Title*	*Material Included*
1.	FIG. & INDEX NO.	Figure and Index number keys to illustration.
2.	PART NUMBER	One of the following: a. Hoffman part number (material manufactured by, or for Hoffman, or commercial items altered by Hoffman.) b. Number of commercially manufactured part (manufacturer's code symbol is listed parenthetically in Column III.) c. Government standard part number, such as AN and USAF. d. The abbreviation "COMM" for parts that are standard and are procurable through various sources. (Complete identification is provided in Column III.) e. The term "NO NUMBER" for an assembly, or for a portion of an assembly that is only partially shown because of illustration limitations.
3.	DESCRIPTION	Identification by one or more of the following means: a. Description or government nomenclature (if such exists). b. Manufacturer's code symbol as identified in a table on Page 2. c. Government Spec. Number.
4.	UNITS PER ASSEMBLY	One of the following: a. The exact quantity of the item as required for its next high assembly. b. "NP" symbol for "not procurable." (These items cannot be procured at this stage assembly. Next higher assembly must be ordered.) c. "Ref" symbol for "reference." (These items are listed for reference purposes only and are called out elsewhere in the "Group Assembly Parts List", as indicated in the description column.)

5. APPL. CODE

a. Letter appearing in column indicates equipment series using part.

b. Letter "A" indicates part is used on Units produced under Contract AF-33(600)-19767. Letters "B" or "C" indicate part is used on Units produced under Contract AF-33(600)-31638.

c. Absence of code indicates part is used on all Units of identical nomenclature.

d. The following table lists serial numbers of Units, corresponding to code A, B, and C.

Usable on Code	*Unit*	*Unit Serial Nos.*
A	PP-974/ALA-6	1 thru 1225
	IP-243/ALA-6	1 thru 1166
	TG-23/ALA-6	1 thru 1317
	CU-398/ALA-6	1 thru 685
	C-1246/ALA-6	1 thru 691
	AS-654/ALA-6	1 thru 635
	AS-655/ALA-6	1 thru 528
	AS-656/ALA-6	1 thru 711
	AS-657/ALA-6	1 thru 685
	CU-397/ALA-6	1 thru 685
B	PP-974/ALA-6	1226 thru 1637
	IP-243/ALA-6	1167 thru 1366
	TG-23A/ALA-6	1318 thru 1729
	CU-398/ALA-6	1318 thru 1557
	AS-654A/ALA-6	636 thru 878
	AS-655/ALA-6	529 thru 959
	AS-656/ALA-6	712 thru 1011
	AS-657/ALA-6	686 thru 1067
	CU-397/ALA-6	686 thru 888
C	IP-243/ALA-6	1367 thru 1787

1-3. NUMERICAL INDEX LIST

a. The "Numerical Index List" (Section III) provides a complete cross-reference by means of the part number. In determining the numerical sequence of the list, the first digits of the part numbers are arranged as follows: first, letters A through Z and then numerals 0 through 9. The second and succeeding digits of the part numbers are arranged in the following order: space (blank column), diagonal (slant)/, point (period)., dash (-), then letters A through Z and finally numerals 0 through 9. All alphabetical "O"s are treated as numerical zeros. The following example illustrates the sequence used:

AA-850	D-D2	T-FX-2
B-16A	DA719	Z333
CV11C450	DB615	OM-842
D Y110	DX1319	13716
D/T317	DOF23	138
D.R18	D116	14

b. Stock Number Column. The policy of including and updating stock number information in IPB manuals will be discontinued. Purging of stock numbers will be accomplished on a phased basis as changes are made to IPB pages to add or change other required information. See C-RL-1-AF, USAF Master Cross-Reference Index for converted part number to stock number information.

1-4. REFERENCE DESIGNATION INDEX

a. Reference designation numbers are arranged in alphabetical-numerical sequence to permit rapid cross-reference to the figure-index number of the unit or subassembly in which the designated part appears.

1-5. EXPLANATION OF TERMS, ABBREVIATIONS, AND SYMBOLS

a. "Ref" in the quantity column means that the part is listed for reference only, and the quantity is given elsewhere in the "Group Assembly Parts List." "No Number" appears in the part number column for an assembly that is not procurable, or for an assembly that is only partially shown because of illustration limitations. To procure "No Number" parts the next higher assembly must be ordered. The symbol "- - -*- - -" is used to indicate the end of an "ATTACHING PARTS" list and separates it from the parts that follow. The symbol "NP" in the quantity column means that the item is not procurable and the next higher assembly must be ordered.

1-6. PURCHASED PARTS

a. Purchased parts that are used on this equipment without alteration are listed under the manufacturer's number and are procurable through commercial sources Purchased parts that are made to Hoffman specifications are listed under the Hoffman number. When purchased parts are altered by Hoffman, they are assigned a Hoffman part number and are procurable only under that number. The manufacturer's code list follows:

Code or Abbrev.	*Name*	*Address*
AP	Adel Div., General Motors Corp.	Burbank, Calif.
ADE	Advance Elec. and Relay Co.	Los Angeles, Calif.
ARP	Aircraft-Marine Products, Inc.	Harrisburg, Pa.
AB	Allen-Bradley Co.	Milwaukee, Wis.
ALL	Allied Control Co.	New York, N.Y.
AMP	American Phenolic Corp.	Chicago, Ill.
BARB	Bendix Aviation Corp.	Red Bank, N.J.
BHE	Birtcher Corp.	Los Angeles, Calif.
BE	Burndy Engineering Co., Inc.	New York, N.Y.
BUS	Bussmann Mfg. Co.	St. Louis, Mo.
CGT	Cambridge Thermionic Corp.	Cambridge, Mass.
CHSS	Chase Steel and Mfg. Co.	Los Angeles, Calif.
CHT	Chicago Transformer Div., Essex Wire Corp.	Chicago, Ill.
CLIP	Clifton Precision Products Co.	Clifton Heights, Pa.
CN	Centralab Div., Globe Union, Inc.	Milwaukee, Wis.
CPW	Commercial Plastics Co.	Chicago, Ill.

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
7	AN364-832A	. NUT, Hexagon elastic lock	2	
	AN960-8	. WASHER, Flat	2	
		- - - * - - -		
-76	HP-7N	. CLAMP, Cable (BE)	1	
		(ATTACHING PARTS)		
	AN515PB6-6	. SCREW, Machine	1	
	AN364-632A	. NUT, Hexagon elastic lock	1	
	AN960-6	. WASHER, Flat	1	
		- - - * - - -		
-77	TA-798-8	. CLAMP, Cable (THAS)	3	
		(ATTACHING PARTS)		
	AN505-8-8	. SCREW, Machine	1	
	AN515-8-8	. SCREW, Machine	2	
	AN364-832A	. NUT, Hexagon elastic lock	3	
		- - - * - - -		
-78	AN931-10-14	. GROMMET, Rubber	4	
-79	SDH-88	. GROMMET, Rubber	5	
-80	No Number	. FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 8)	NP	
-81	AA-812A-1	. CHASSIS, Azimuth Indicator	1	

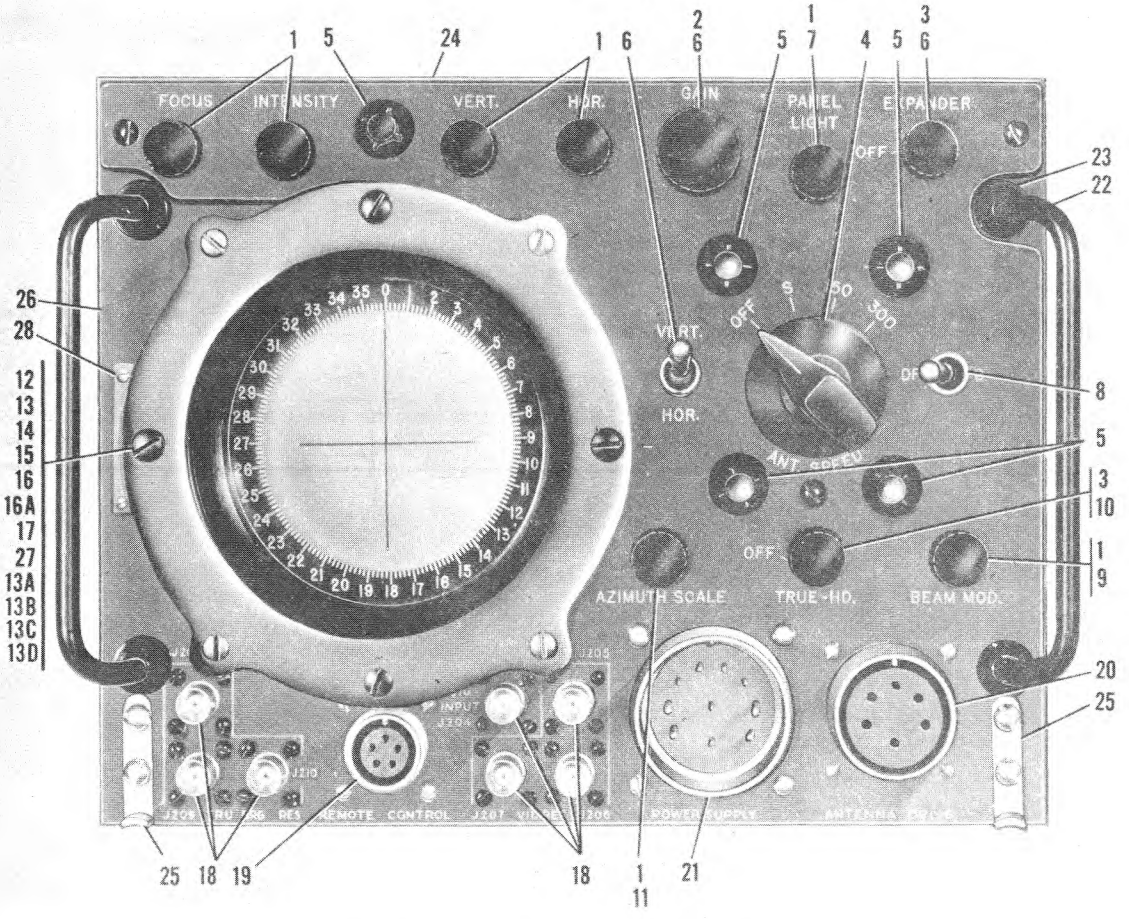

Figure 8. Front Panel Assembly, Azimuth Indicator

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
8-	AA-831-1	FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 7)	Ref	A B
	AA-831-2	FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 7)	Ref	C
-1	EK-41-1	. KNOB, Control	7	
-2	EK-42-1	. KNOB, Control	1	
-3	EK-40-1	. KNOB, Control	2	
-4	EK-39-1	. KNOB, Control	1	
-5	TT-51A	. LAMPHOLDER (includes 28v lamp) (DLC)	5	
		(ATTACHING PARTS)		
	SDH-37	. NUT, Hexagon (Furnished with TT-51A)	5	
	SDH-15	. WASHER, Internal lock (Furnished with TT-51A)	5	
		- - - * - - -		
-6	RV4ATSD104A	. RESISTOR, Variable (JAN-R-19)	1	
-7	RP102FJ201KK	. RESISTOR, Variable	1	
		(ATTACHING PARTS)		
	SDH-167	. WASHER	1	
		- - - * - - -		
-8	ST-42D	. SWITCH, Toggle	2	
-9	RV4ATSD253A	. RESISTOR, Variable	2	
-10	RV4ATSD503A	. RESISTOR, Variable	1	
-11	RA20NASD501A	. RESISTOR, Variable	1	
-12	AC-185	. RING, Crash	1	A**
	8071100025	. RING, Crash	1	C
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, fillister recessed head, no. 10-32, 1 in. lg, brass, black oxide finish	4	A B
	COMM	. SCREW, Machine, fillister recessed head, no. 10-32, 1¼ in. lg, brass, black oxide finish	4	C
	8071100059	. SUPPORT, Crash ring (HLI)	4	B**
	COMM	. FASTENER, Pem. no. 10-32, cadmium plated	4	
		- - - * - - -		

**Parts apply to A and B equipments after azimuth indicator modification has been made.

PART NO.	STOCK NO.	FIGURE AND INDEX NO.	SOURCE CODE
AS176A1		21- 73	
AS1920		23- 1	M1
AU50-1	5826 327-4616	2-	
AU50-2		2-	
AU51		33-	
AU53	5826 026-8667	18-	
AU54-1	5826 505-1887	6-	
AU54-2		6-	
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AU57-2		28-	
AU58-1	5895 217-1583	23-	
AU58-2		23-	
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AU60-1	5826 284-7432	21-	
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BA24-1		21- 81	
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BM22	5990 501-2659	15- 33	P1
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CA8-1	5910 702-0183	21- 48	P1
CA9-1	5910 667-6737	21- 48	P1
CM20B431J	5910 101-4907	7- 52	P1
CM25B102J	5910 100-8126	7- 57	P1
CM60B103K	5910 101-5126	10- 1	P1
CPC742-3	5340 257-0039	28- 17	P1
CPC743	5340	27- 21	
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CP65B1EF105K	5910 171-3214	7- 17	P1
CP69B1EF105V	5910 188-1372	3- 7	P1
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CP70E1EK104K	5910 668-1886	7- 16	P1
CP70E1FF405V	5910 120-1679	3- 6	P1
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DCC1-2105F	5905	5- 9	P1
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EA498-1		11-	A
EA498-1		12-	A
EA499-1		7- 43	A
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EA602-1		27- 4	A1

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HB11-1		31- 1	M1
HB9		21- 8	M1
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HM679		8- 23	P1
HM685		4- 11	P1
HM685		8- 25	P1
HM689		21- 27	P1
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HP3N		7- 71	
HP34		7- 71	
HP4N		7- 70	P1
HP5N		7- 75	P1
HP6N		7- 72	
HP7N		7- 76	
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IKL25B		21- 45	P1
KHA2B		19- 28	
KP21B		21- 11	P1
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K39001		7- 28	P1
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K49BK		16- 8	P1
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NM19-1		8- 13	P1
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NP227		8- 28	M
NP296		32- 17	M
NP297		17- 15	M
PK2543		16- 9	P1
PK2584		21- 33	P1
PK3515		6- 2	P1
RA20NASD501A		8- 11	P1
RA30AIRB351AK		19- 29	P1
RC20BF102K		5- 5	P1
RC20BF102K		9- 6	P1

AN 16-30ALA6-1

HANDBOOK
OPERATING INSTRUCTIONS

DIRECTION FINDER GROUP

AN/ALA-6

(HOFFMAN)

"COMMANDERS ARE RESPONSIBLE FOR BRINGING THIS TECHNICAL ORDER TO THE ATTENTION OF ALL AIR FORCE PERSONNEL CLEARED FOR OPERATION OF AFFECTED AIRCRAFT EQUIPMENT."

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE
AND THE CHIEF OF THE BUREAU OF AERONAUTICS

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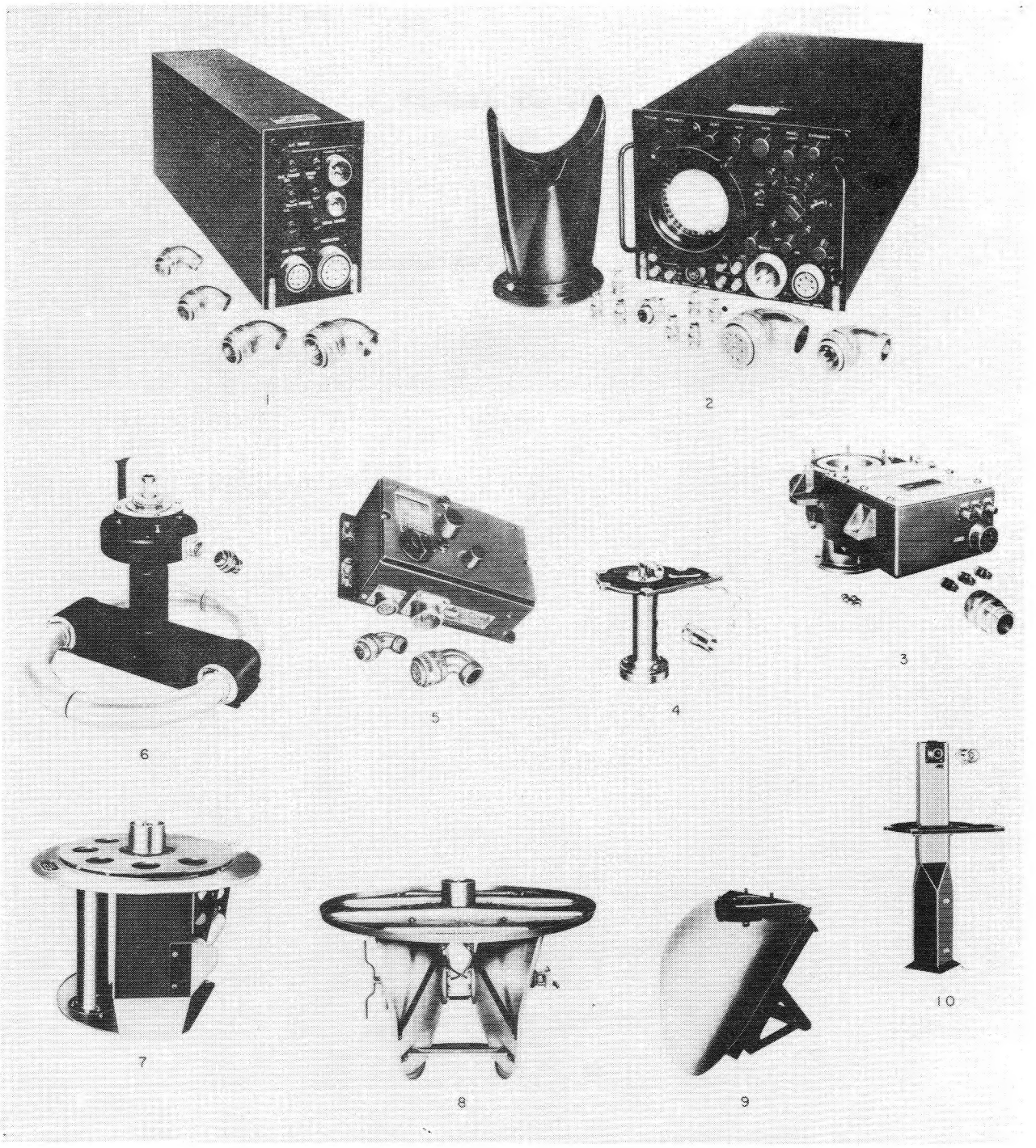

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4.	Antenna Coupler CU-398/ALA-6 (65-5000 mc)	1-6
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Figure 1-1. Direction Finder Group AN/ALA-6

SECTION I
GENERAL DESCRIPTION

1-1. PURPOSE OF HANDBOOK.

1-2. This handbook describes Direction Finder Group AN/ALA-6, manufactured by Hoffman Laboratories, Inc., Los Angeles 7, California, and includes information concerning the general description, operating procedures, operating checks and adjustments, and emergency operation of the equipment.

1-3. DESCRIPTION OF EQUIPMENT. (Figure 1-1.)

1-4. Direction Finder Group AN/ALA-6 is an airborne electronic equipment consisting of separate, but interconnected units. The equipment comprises an indicating unit, an antenna rotating unit, four antenna assemblies and certain auxiliary units. When used with an associated radio or radar receiver, it provides visual indication on a cathode-ray tube screen of relative bearing of intercepted radio signals, and with an associated gyro flux gate compass, it provides indication of magnetic bearing of the aircraft heading. From these simultaneous indications, the magnetic bearing of the signal source can be determined. (Figure 1-2.) Different units of the equipment are combined to operate for each of four separate ranges in the total frequency range of from 65 to 10,750 mc. For general characteristics of the equipment for each of the frequency ranges, see Table I of this section. The units of the equipment are shown in figure 1-1. A brief description of each of the units is given in paragraphs 1-5 through 1-15.

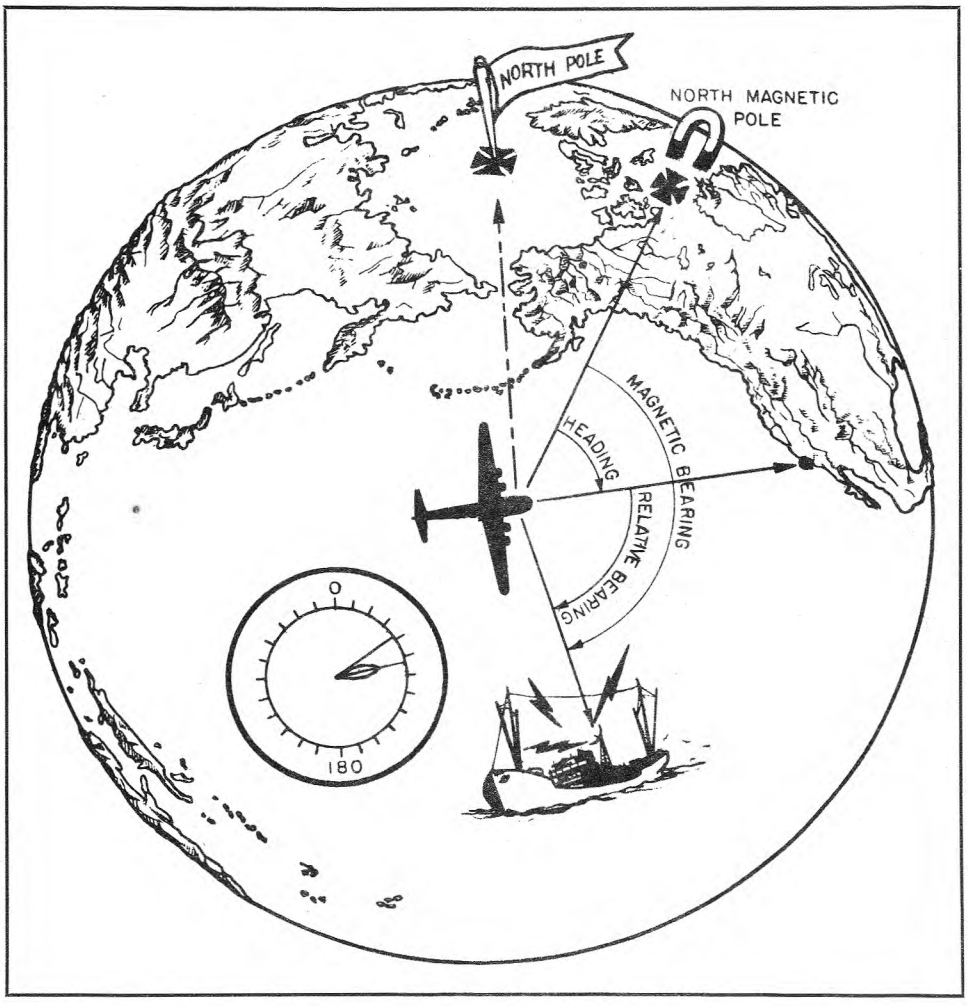


Figure 1-2. Direction Finding with AN/ALA-6 Equipment

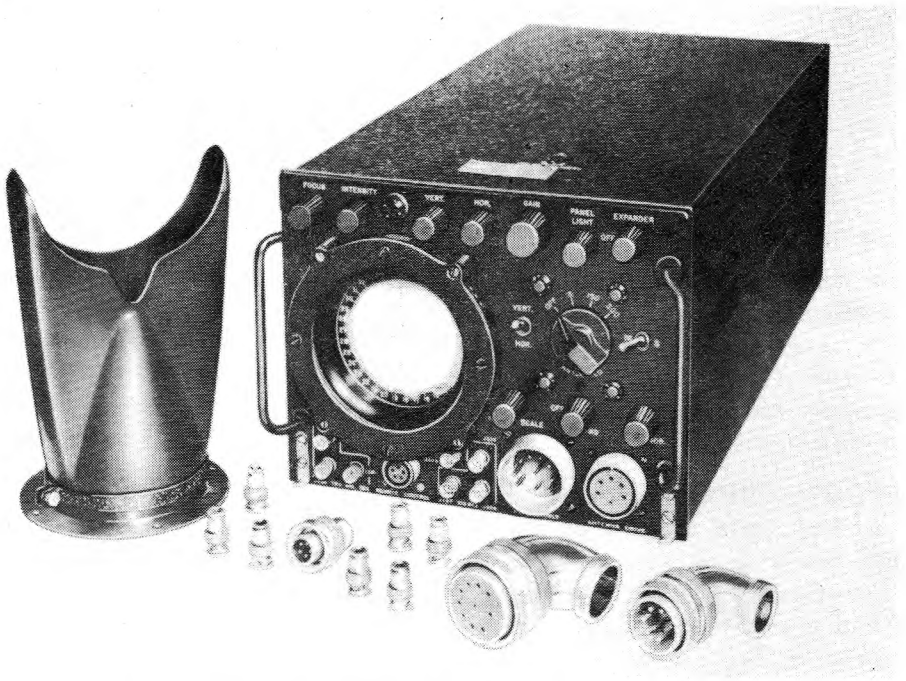


Figure 1-3. Azimuth Indicator IP-243/ALA-6

Figure 1-4. Power Supply PP-974/ALA-6

1-5. AZIMUTH INDICATOR IP-243/ALA-6. (Figure 1-3.) This unit displays the intelligence developed by the equipment. It consists essentially of a video amplifier, a cathode-ray tube, and associated circuits. The chassis, panel, and dust cover of the indicator are aluminum. All outside surfaces of the front panel and the dust cover have a black finish. The unit is designed to be shockmounted on a type MT-B1D1 mounting base.

1-6. POWER SUPPLY PP-974/ALA-6. (Figure 1-4.) This unit contains a power transformer, a rectifier and filter circuit, and other components needed to supply the operating voltages for the Direction Finder Group equipment. It is energized from the aircraft's electrical power system. All fuses are located on the front panel of the power supply unit. The chassis, panel, and dust cover of the power supply unit are aluminum. All outside surfaces of the front panel and the dust cover have a black finish. The unit is designed to be shockmounted on a type MT-1227/U mounting base.

1-7. ANTENNA DRIVE TG-23/ALA-6. (Figure 1-5.) This unit rotates an antenna assembly of the equipment in scanning the horizon for signals. It is a mechanical and electrical assembly contained in a metallic housing with mounting flanges. It contains a drive motor, a gear train, a drive shaft, a shaft hub for coupling the unit to the antenna assembly, a resolver, two cam-actuated switches, a thermostat, and a heating element. Antenna

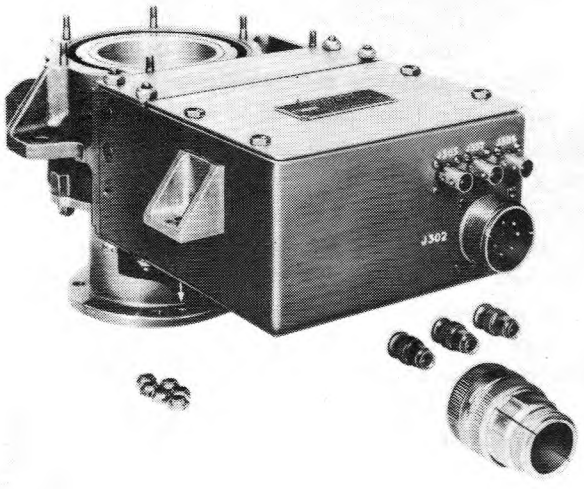


Figure 1-5. Antenna Drive TG-23/ALA-6

Drive TG-23/ALA-6 is used with Antenna Coupler CU-398/ALA-6 (65-5000 mc) for Antenna Assemblies AS-654/ALA-6, AS-655/ALA-6 or AS-656/ALA-6. For Antenna Assembly AS-657/ALA-6, the drive unit is used with Antenna Coupler CU-397/ALA-6 (5000-10,750 mc).

Figure 1-6. Antenna Coupler CU-398/ALA-6 (65-5000 mc)

Figure 1-7. Antenna Control C-1246/ALA-6 with Mounting MT-1428/ALA-6

1-8. ANTENNA COUPLER CU-398/ALA-6 (65-5000 MC). (Figure 1-6). This assembly is a coupling unit that is used with Antenna Drive TG-23/ALA-6 to mount and connect Antenna Assemblies AS-654/ALA-6, AS-655/ALA-6 or AS-656/ALA-6. It is roughly pedestal-shaped. At one end is a receptacle, coaxial connector plug and the antenna drive unit cover plate that mounts the assembly to that unit. The other end has the stationary member of a rotating coaxial connector and two slip rings.

1-9. ANTENNA CONTROL C-1246/ALA-6. (Figure 1-7.) This unit provides means of control of tuning of Antenna Assembly AS-654/ALA-6. It contains a band switch, a tuning control potentiometer, a calibrated dial and a two-tube servo amplifier. Fasteners located on the base of the unit secure the base to four studs on Mounting MT-1428/ALA-6.

1-10. MOUNTING MT-1428/ALA-6. (Figure 1-7.) This is a plate used to mount Antenna Control C-1246/ALA-6. Snap fasteners located on the base of the antenna control unit secure the base to four studs on the mounting. The plate is used with shockmounts which are not supplied as part of Direction Finder Group AN/ALA-6 equipment.

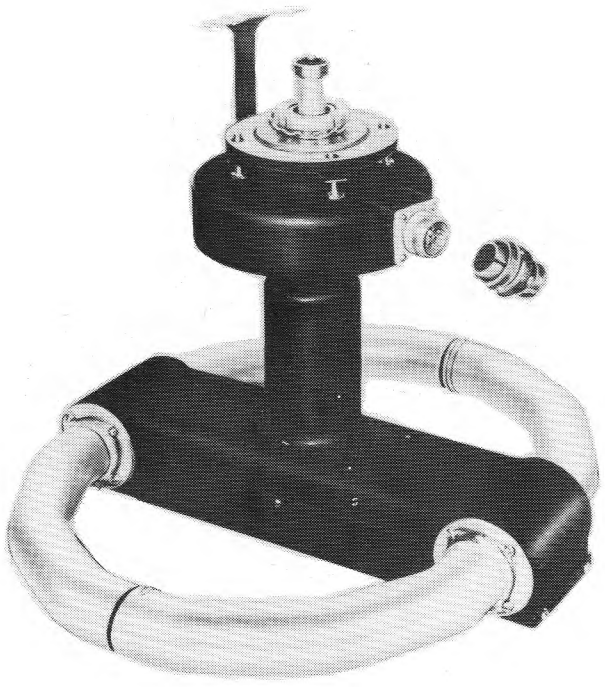


Figure 1-8. Antenna Assembly AS-654/ALA-6

1-11. ANTENNA ASSEMBLY AS-654/ALA-6. (Figure 1-8.) This unit is a horizontally polarized tunable directional antenna. The elements of the antenna incorporate a tuned circuit which is controlled from Antenna Control C-1246/ALA-6. The antenna assembly with Antenna Coupler CU-398/ALA-6 (65-5000 mc) mounts on Antenna Drive TG-23/ALA-6.

Figure 1-9. Antenna Assembly AS-655/ALA-6

1-12. ANTENNA ASSEMBLY AS-655/ALA-6. (Figure 1-9.) This unit is a vertically or horizontally polarized directional antenna. It consists of a vertical sleeve, monopole-type antenna element placed in front of and at the focal point of a reflector consisting of aluminum sheets of approximately parabolic contour, and a horizontal dipole antenna made up of two horizontal elements arranged in a 100-degree "V" also backed up by reflecting sheets. Mounted between the reflectors is a relay-operated antenna-selecting switch. Essentially unidirectional reception of vertically or horizontally polarized signals is provided by the antenna assembly. The antenna assembly with Antenna Coupler CU-398/ALA-6 (65-5000 mc) mounts on Antenna Drive TG-23/ALA-6.

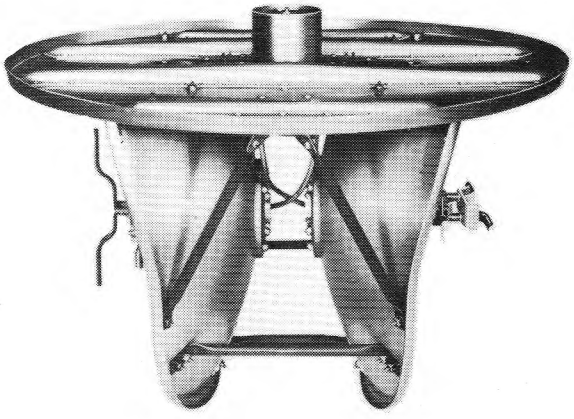


Figure 1-10. Antenna Assembly AS-656/ALA-6

1-13. ANTENNA ASSEMBLY AS-656/ALA-6. (Figure 1-10.) This unit is a vertically or horizontally polarized directional antenna. It consists of two identical dipole antennas with stub reflectors, one mounted vertically and one horizontally, at the focal points of two parabolic reflectors which are placed back-to-back on a circular plate. One dipole is oriented for the reception of horizontally polarized signals, and the other for vertically polarized signals. Mounted between the reflectors is a relay-operated antenna selector switch. Essentially unidirectional reception of vertically or horizontally polarized signals is provided by the antenna assembly. The antenna assembly with Antenna Coupler CU-398/ALA-6 (65-5000 mc) mounts on Antenna Drive TG-23/ALA-6.

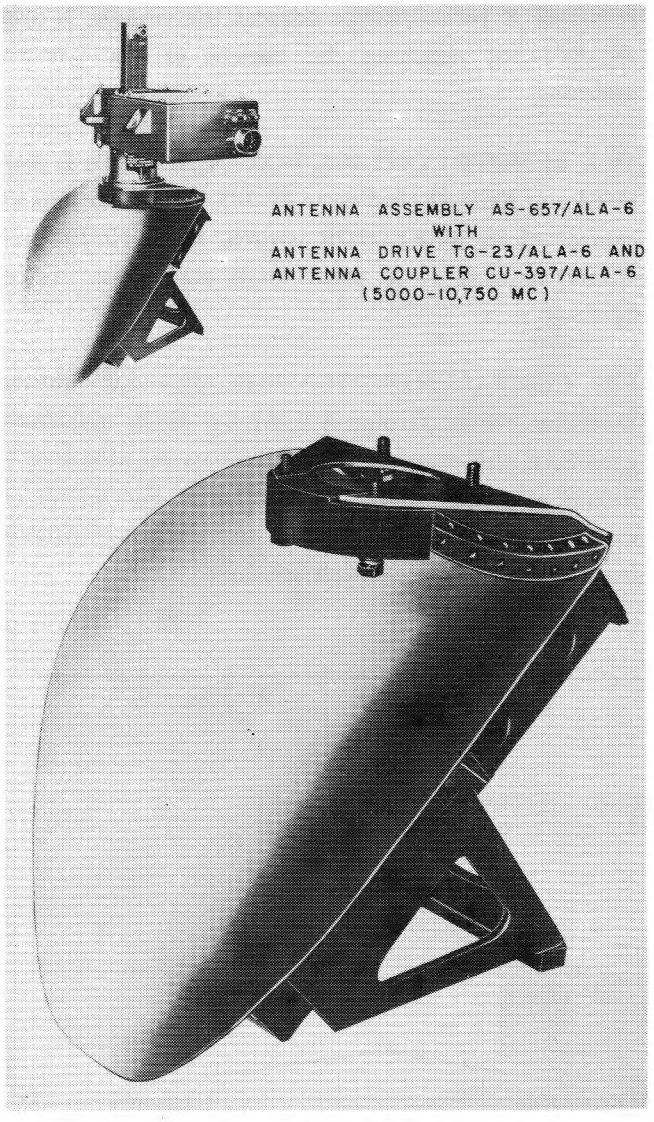


Figure 1-11. Antenna Assembly AS-657/ALA-6

1-14. ANTENNA ASSEMBLY AS-657/ALA-6. (Figure 1-11.) This unit is a vertically, horizontally, and circularly polarized directional antenna. It consists of a paraboloidal reflector with supporting structure and counter weights. With Antenna Coupler CU-397/ALA-6 (5000-10,750 mc), it forms an open-ended waveguide antenna which will receive vertically, horizontally and circularly polarized waves. The antenna assembly with its coupler mounts on Antenna Drive TG-23/ALA-6.

1-15. ANTENNA COUPLER CU-397/ALA-6 (5000-10,750 MC). (Figure 1-12.) This is a coupling unit that is used with Antenna Drive TG-23/ALA-6 for Antenna Assembly AS-657/ALA-6. It is a horn-shaped metallic structure with a square opening at one end and a receptacle and coaxial connector plug at the other end. Fastened to the horn proper is the antenna drive unit cover plate that mounts the horn to that unit.

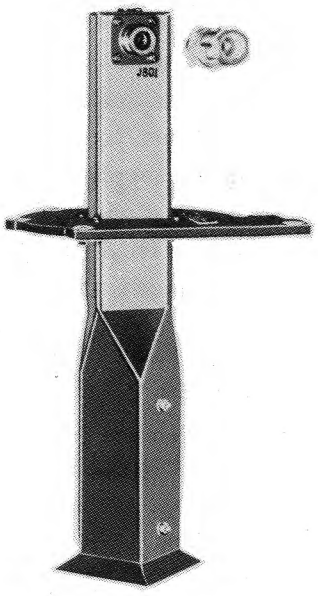


Figure 1-12. Antenna Coupler CU-397/ALA-6 (5000-10,750 mc)

1-16. MOUNTING BASES MT-B1D1 AND MT-1227/U. (Figure 1-13.) These bases are used to mount the azimuth indicator and the power supply respectively. Each base consists of an aluminum frame equipped with four shockmounts. Ground straps are provided for obtaining electrical contact between the units and the mounting surface. Two pins in the rear of the mounting base fit into holes in the rear of the unit, and two clamp assemblies on the front of the base lock the unit in place. These bases are not supplied as part of Direction Finder Group AN/ALA-6.

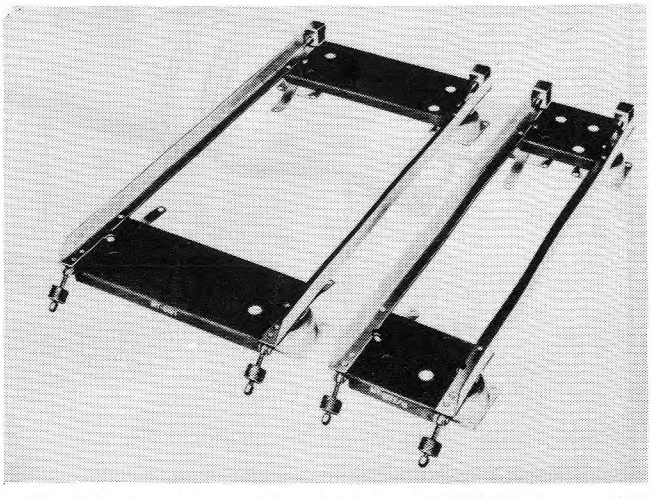


Figure 1-13. Mounting Bases MT-B1D1 and MT-1227/U

1-17. CABLES AND PLUGS. Five cables are required for interconnecting the units of Direction Finder Group AN/ALA-6 except when Antenna Assembly AS-654/ALA-6 is used, in which case seven cables are required. Additional cables connect the equipment to its associated equipments and power sources as required. Only the cable plugs are supplied with the equipment as cabling requirements vary with the particular installation. (See tables II and III of this section.) An interconnecting cabling diagram is shown in figure 1-15.

1-18. CAMERA ASSEMBLY USAF TYPE O-20. (Figure 1-14.) This unit, which is not supplied as part of Direction Finder Group AN/ALA-6, is designed for mounting on the azimuth indicator. Mounting holes are provided on the front panel bezel ring for its use when required. A periscope-type adapter for viewing is also required for attaching the camera to the azimuth indicator.

1-19. REMOTE CONTROL BOX. A receptable is provided on Azimuth Indicator IP-243/ALA-6 to extend control of its VERT.-HOR. switch, EXPANDER and GAIN controls to a point more convenient to the operator.

1-20. COMPASS JUNCTION BOX. This unit connects Direction Finder Group AN/ALA-6 to its associated gyro flux gate compass. In the compass junction box is located a resolver which is controlled by and related to the compass. It is this resolver that furnishes aircraft heading data to the azimuth indicator.

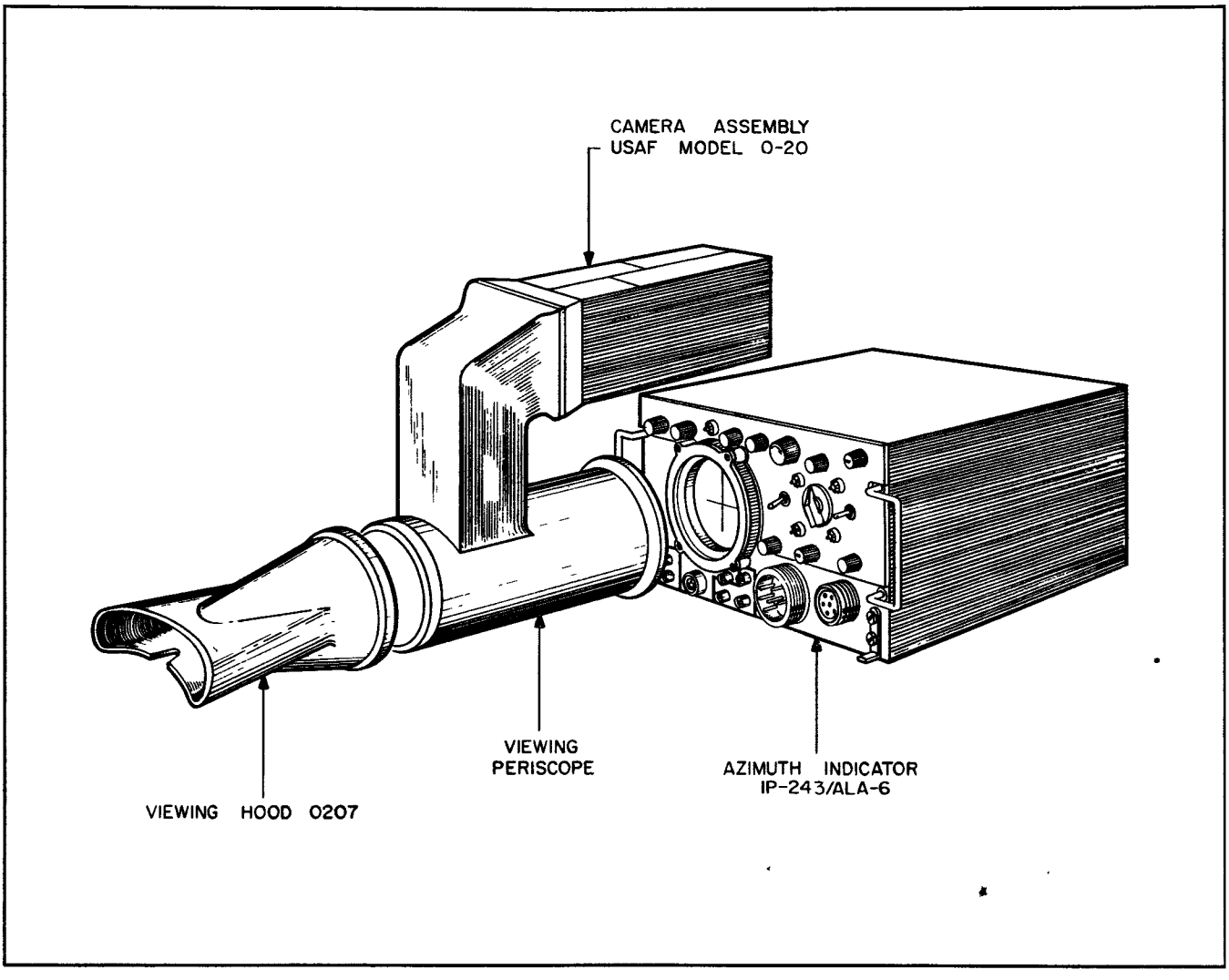


Figure 1-14. Camera Assembly USAF Type O-20

TABLE I

DIRECTION FINDER GROUP AN/ALA-6 GENERAL CHARACTERISTICS

Frequency Range	*Polarization of Signals Directional Reception Is Provided For*	*Units Comprising Installation*	*Power Requirements**					
			115 vac 380-1000 cps 1 ph 96% PF		*115 vac 380-420 cps 1 ph 96% PF*		*27.5 vdc*	
			Amp	*Watts*	*Amp*	*Watts*	*Amp*	*Watts*
65 to 250 mc	Horizontal	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-654/ALA-6 Antenna Control C-1246/ALA-6 (with mounting MT-1428/ALA-6)	1.14	126.0	0.20	21.6	5.23	144.0
140 to 1200 mc	Vertical or Horizontal†	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-655/ALA-6	1.14	126.0	—	—	5.17	142.1
1000 to 5000 mc	Vertical or Horizontal†	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-398/ALA-6 (65-5000 mc) Antenna Assembly AS-656/ALA-6	1.14	126.0	—	—	5.17	142.1
5000 to 10,750 mc	Vertical, Horizontal, Circular	Azimuth Indicator IP-243/ALA-6 Power Supply PP-974/ALA-6 Antenna Drive TG-23/ALA-6 Antenna Coupler CU-397/ALA-6 (5000-10,750 mc) Antenna Assembly AS-657/ALA-6	1.14	126.0	—	—	5.08	139.9

* As shipped from factory, the equipment is wired for a-c voltages of 380 to 1000 cps. If other a-c frequency is to be used, certain wiring changes are required. Only qualified maintenance personnel will make such changes.

† Means are provided for distinguishing between vertical and horizontal waves.

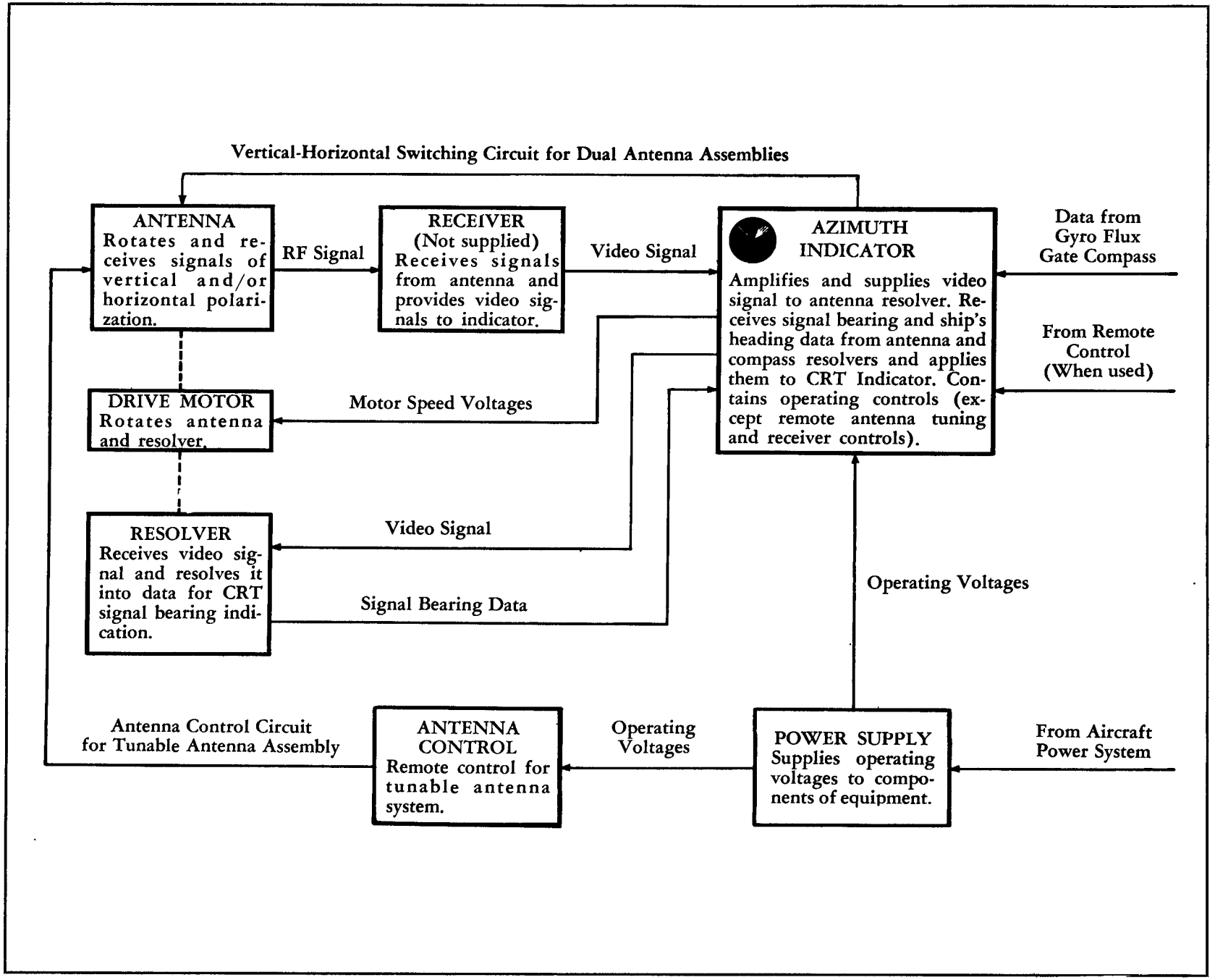


Figure 1-16. Direction Finder Group AN/ALA-6, Functional Diagram

1-21. FUNCTION OF EQUIPMENT. (Figure 1-16.)

1-22. Direction Finder Group AN/ALA-6, when used with an associated radio receiver and an associated gyro flux gate compass, provides visual indication on a cathode-ray tube screen of magnetic bearing of intercepted radio signals. This is accomplished by rotating a directional antenna which controls the concurrent rotation of a radial indicating line on the CRT. The length of the line is proportioned to signal strength, making the line form a characteristic pattern as it rotates. The angular radial direction of the pattern displayed is referenced to the ship's heading and therefore indicates relative bearing of the signal source. At the same time, another line on the CRT screen is actuated from data received from the flux gate compass. This line indicates the bearing of the aircraft heading referenced to magnetic north. The magnetic bearing of the signal source is determined from the two line readings on the azimuth scale: the line of maximum radial extent of the pattern and the line of aircraft heading.

1-23. AZIMUTH INDICATOR IP-243/ALA-6. The function of this unit is to display the intelligence developed by the equipment. The azimuth indicator amplifies the signal received from the associated radio receiver and supplies it to the resolver in the antenna drive. It also supplies a pulse to the resolver in the associated gyro flux gate compass. It receives returned bearing data from both resolvers, and presents relative and magnetic bearing information visually on its cathode-ray tube screen. Azimuth bearings are read on an illuminated dial within the bezel on the front panel of the azimuth indicator. All operating controls of the equipment (except those of Antenna Control C-1246/ALA-6) are also on the front panel of this unit. The associated equipments, the receiver and the flux gate compass have their own operating controls.

1-24. POWER SUPPLY PP-974/ALA-6. This unit supplies the necessary a-c and d-c voltages (except the high voltage supply for the cathode-ray tube).

1-25. ANTENNA DRIVE TG-23/ALA-6. The function of the antenna drive unit is to rotate the antenna assemblies in scanning the horizon for signals. The antenna drive contains the resolver which also is rotated with the antenna assembly. The resolver receives video signal from the azimuth indicator and returns it related to antenna direction in such form that it indicates signal bearing information visually on the azimuth indicator cathode-ray tube screen.

1-26. ANTENNA COUPLER CU-398/ALA-6 (65-5000 MC). This assembly is a coupling unit that adapts the antenna drive unit to Antenna Assemblies AS-654/ALA-6, AS-655/ALA-6 or AS-656/ALA-6. It provides the stationary member of a rotating antenna connector for feeding signals picked up by the rotating antenna. When used with Antenna Assemblies AS-655/ALA-6 or AS-656/ALA-6, it also provides facilities for electrical connection to their vertical-horizontal antenna switching relays.

1-27. ANTENNA CONTROL C-1246/ALA-6. This control unit is used only with Antenna Assembly AS-654/ALA-6. The antenna element of this antenna assembly must be tuned over its frequency range. The antenna control provides facilities for remotely tuning this antenna assembly.

1-28. ANTENNA ASSEMBLY AS-654/ALA-6. This antenna assembly, when used as part of Direction Finder Group AN/ALA-6, provides directional pickup facilities for horizontally polarized signals in the frequency range from 65 to 250 mc. This antenna assembly is remotely tuned by Antenna Control C-1246/ALA-6.

1-29. ANTENNA ASSEMBLY AS-655/ALA-6. This antenna assembly, when used as part of Direction Finder Group AN/ALA-6, provides directional pickup facilities for vertically and horizontally polarized signals in the frequency range from 140 to 1200 mc.

1-30. ANTENNA ASSEMBLY AS-656/ALA-6. This antenna assembly, when used as part of Direction Finder Group AN/ALA-6, provides directional pickup facilities for vertically and horizontally polarized signals in the frequency range from 1000 to 5000 mc.

1-31. ANTENNA ASSEMBLY AS-657/ALA-6. This antenna assembly with Antenna Coupler CU-397/ALA-6 (5000-10,750 mc), when used as part of Direction Finder Group AN/ALA-6, provides directional pickup facilities for vertically, horizontally, and circularly polarized signals in the frequency range from 5000 to 10,750 mc.

1-32. ANTENNA COUPLER CU-397/ALA-6 (5000-10,750 MC). This assembly is a coupling unit that adapts the antenna drive unit to Antenna Assembly AS-657/ALA-6 only. It provides the signal receiving aperture for signals from the reflector pickup surface of the rotating antenna assembly, and it provides the coupling element to the receiver feedline.

1-33. CAMERA ASSEMBLY USAF O-20. This unit is used to provide a photographic record of Azimuth Indicator IP-243/ALA-6 cathode-ray tube patterns when desired.

1-34. GENERAL CHARACTERISTICS.

1-35. General characteristics of Direction Finder Group AN/ALA-6 installations are given in Table I.

1-36. OPERATION.

1-37. Direction Finder Group AN/ALA-6 consists of eight principal units. They are: an azimuth indicator, a power supply unit, an antenna drive unit, an antenna control unit, and four antenna assemblies. Only one antenna assembly is used at a time. Antenna Control C-1246/ALA-6 is used only with Antenna Assembly AS-654/ALA-6. Figure 1-16 indicates the functions of the units of the equipment.

1-38. The antenna assembly is usually suspended below the aircraft just behind the bombardier's window and is covered by a radome (not supplied with Direction Finder Group AN/ALA-6). The antenna drive unit is normally located inside the aircraft, and the antenna assembly is fastened to its drive shaft which extends through the "skin" of the aircraft.

1-39. Two antennas each are provided in Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6, the antenna in use being selected by the operator. One is vertically polarized, providing maximum received signal strength from vertically polarized transmitted signals. The other antenna is horizontally polarized. Both antennas are provided with directional reflectors so that reception is maximized when the antenna assembly is pointing directly to the transmitting source. Reception falls off rapidly when the antenna is pointing away from the source. Antenna Assembly AS-654/ALA-6 has only one antenna; it is directional and horizontally polarized. Antenna Assembly AS-657/ALA-6 has a single reflector surface antenna. With its waveguide horn, Antenna Coupler CU-397/ALA-6 (5000-10,750 mc), it receives equally both vertically and horizontally polarized signals. It also can receive circularly polarized signals.

1-40. With Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6, by switching between vertically and horizontally polarized antennas and observing the amplitude and sharpness of the pattern, the observer can tell whether the intercepted signal is vertically or horizontally polarized. Selection of either the vertical or horizontal antenna is by means of the VERT.-HOR. switch on the azimuth indicator.

1-41. The signal output of the antenna assembly is connected to the Direction Finder Group's associated radio receiver; the video output of the receiver is connected to the azimuth indicator unit. The azimuth indicator unit amplifies the video signals and they are then supplied to the drive unit.

1-42. In the drive unit is a resolver which is rotated concurrently with the antenna assembly by the drive motor. The resolver receives the amplified video signal voltages from the azimuth indicator and returns two voltages, the values of which depend upon the position of the antenna.

1-43. The azimuth indicator unit receives the returned voltages from the antenna drive resolver and applies them to its cathode-ray tube. The two voltages combine in deflecting the electron beam of the CRT so that visually there is presented a characteristic pattern that relates directly to the signal received by the antenna, as it is scanned around the horizon.

1-44. The azimuth indicator unit also supplies a pulsed voltage to the compass junction box resolver which is controlled by the gyro flux gate compass. It receives, in return, two pulsed voltages, the values of which depend upon the direction of magnetic north. The two voltages are applied to the cathode-ray tube and combine in deflecting the electron beam of the CRT so that visually there is presented, along with the received radio signal pattern, a line that indicates magnetic bearing of the ship's heading.

1-45. Each pulse (or other form of signal) received by the antenna (and to which the receiver is tuned) results in a deflection of the indicator cathode-ray tube electron beam. The magnitude of this deflection is proportional to the signal strength, and the angle on the screen is determined by the position of the antenna in azimuth. Successive pulses (or other forms of signal) received by the antenna, produce characteristic patterns on the indicator screen as the antenna rotates. The orientation of the pattern is a direct indication of the relative direction of the signal source with respect to some axis, normally the heading line of the aircraft. The retentivity of the screen and the repetition of the pattern at a rapid rate due to the scanning speed of the antenna causes the pattern to remain continuously on the screen. The observer reads relative bearing on the azimuth scale around the rim of the tube. Photographs of the indicator screen presentation of antenna patterns for signals of various frequencies are shown in figures 2-8 through 2-12 of Section II. Other information about the signal also can be obtained from a study of the peculiarities of the pattern as shown in figures 2-13 through 2-16.

1-46. All the controls of Direction Finder Group AN/ALA-6 are located on the front panel of the azimuth indicator except when Antenna Assembly AS-654/ALA-6 and its Antenna Control C-1246/ALA-6 are used. Bearings are read on an illuminated calibrated dial mounted inside the bearing indicator bezel of the azimuth indicator unit, or through the periscope when Camera Assembly USAF type 0-20 is employed.

1-47. EQUIPMENT SUPPLIED.

1-48. All the equipment supplied is shown in Table II.

1-49. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1-50. Equipment required but not supplied is shown in Table III.

TABLE II

EQUIPMENT SUPPLIED

Quantity per Equipment	*Name of Unit*	*Army-Navy Type Designation*
1	Azimuth Indicator, including:	IP-243/ALA-6
1	Viewing Hood, Adapter and Clamp	
7	Plugs P204 through P210	UG-260/U
1	Plug P201	AN3108B-28-19S
1	Plug P202	AN3108B-22-15P
1	Plug P203	AN3106B-14S-5P
1	Power Supply, including:	PP-974/ALA-6
1	Plug P101	AN3108B-28-19P
1	Plug P102	AN3108B-22-17P
1	Plug P103	AN3108B-16S-4S
1	Plug P104	AN3108B-18-11S
1	Fuse, Spare, Type 4AG, 10 amp	
1	Antenna Drive, including:	TG-23/ALA-6
1	Plug P302	AN3106B-22-15S
3	Plugs P304, P306, P307	UG-260/U
1	Antenna Coupler, including:	CU-398/ALA-6 (65-5000 mc)
1	Plug P301	UG-21B/U
1	Antenna Control, including:	C-1246/ALA-6
1	Plug P401	AN3108B-16S-1P
1	Plug P402	AN3108B-22-17S
1	Allen Wrench, 1/16 inch (mounted in antenna control unit)	
1	Mounting (less shock-mounts)	MT-1428/ALA-6
1	Antenna Assembly, including:	AS-654/ALA-6
1	Plug P501	AN3106B-16S-1S
1	Antenna Assembly	AS-655/ALA-6
1	Antenna Assembly	AS-656/ALA-6
1	Antenna Assembly	AS-657/ALA-6
1	Antenna Coupler, including:	CU-397/ALA-6 (5000-10,750 mc)
1	Plug P801	UG-21B/U
1	Operating Instructions Handbook	AN16-30ALA6-1
1	Service Instructions Handbook	AN16-30ALA6-2
1	Overhaul Instructions Handbook	AN16-30ALA6-3
1	Illustrated Parts Breakdown	AN16-30ALA6-4

NOTE: All plugs are identified in figure 1-15.

TABLE III

EQUIPMENT REQUIRED BUT NOT SUPPLIED

Quantity per Equipment	*Name of Unit*	*Army-Navy Type Designation*
1	Mounting Base (for Azimuth Indicator IP-243/ALA-6)	MT-B1D1
1	Mounting Base (for Power Supply PP-974/ALA-6)	MT-1227/U
1	Radio Receiver	AN/APR-1 AN/APR-4 AN/APR-5A or similar
*1 ea	Cables A through G, Coaxial	RG-62/U
*1	Cable H, Coaxial	**
*1	Cable I, Single Conductor	**
*1	Cable J, Two Conductor	**
1	Clamp, Cable	AN3057-8 or AN3057-8A
*1	Cable K, Four Conductor	**
1	Clamp, Cable	AN3057-10 or AN3057-10A
*1	Cable L, Four Conductor	**
2	Clamp, Cable	AN3057-12 or AN3057-12A
*1	Cable M, Five Conductor	**
1	Clamp, Cable	AN3057-6 or AN3057-6A
*1	Cable N, Seven Conductor	**
2	Clamp, Cable	AN3057-16 or AN3057-16A
*1	†Cable O, Seven Conductor	**
2	Clamp, Cable	AN3057-8 or AN3057-8A
*1	†Cable P, Eight Conductor	**
2	Clamp, Cable	AN3057-12 or AN3057-12A
1	Gyro Flux Gate Compass	
1	Compass Junction Box	
1	Camera Assembly	USAF Type 0-20
1	Viewing Periscope	

* The length of the cable varies with the particular installation requirements.

** The particular type of cable is determined by the installing activity.

† Used only with Antenna Assembly AS-654/ALA-6 installation.

NOTE: Cables A through P are identified in figure 1-15.

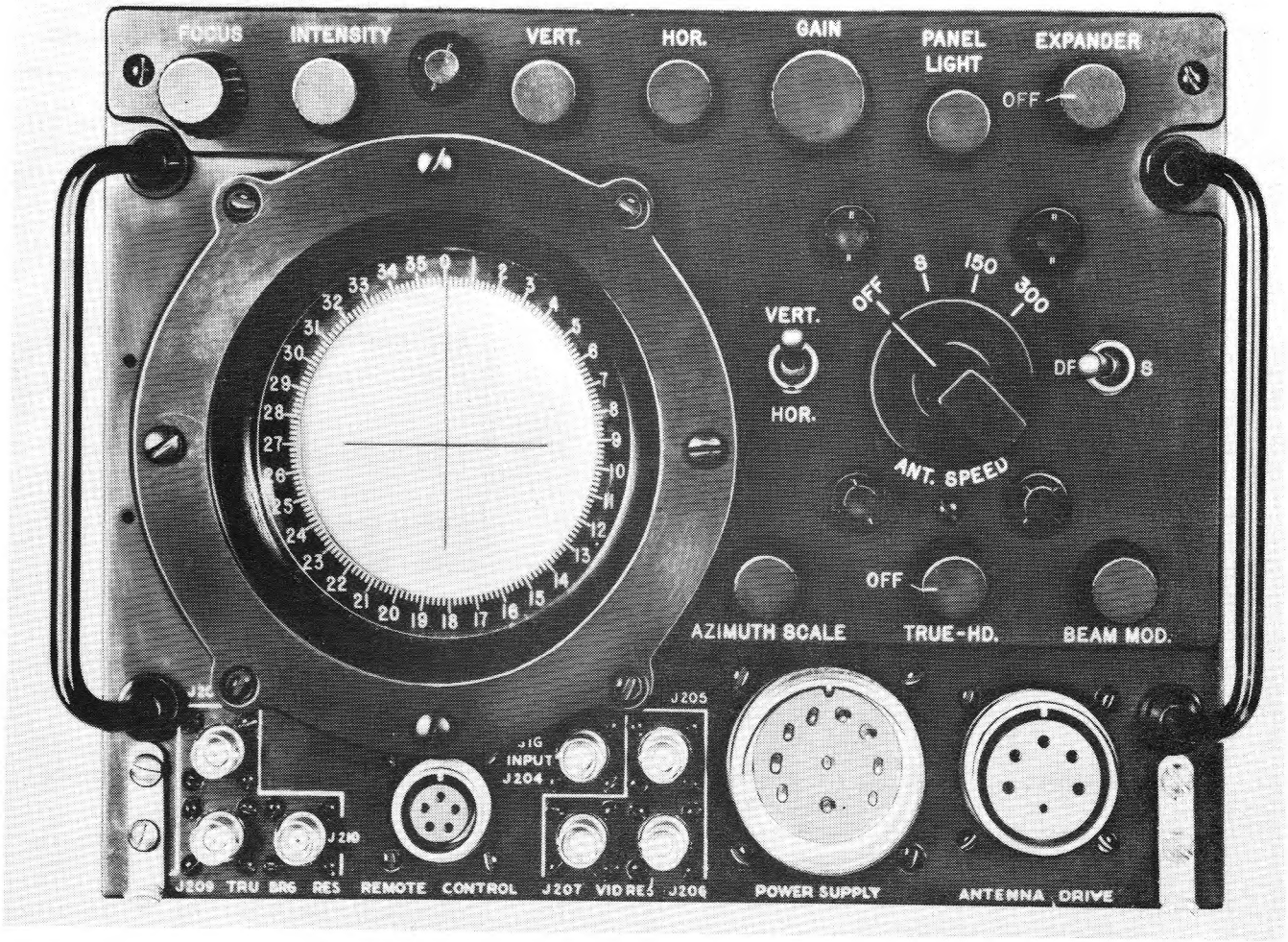


Figure 2-1. Azimuth Indicator IP-243/ALA-6, Controls

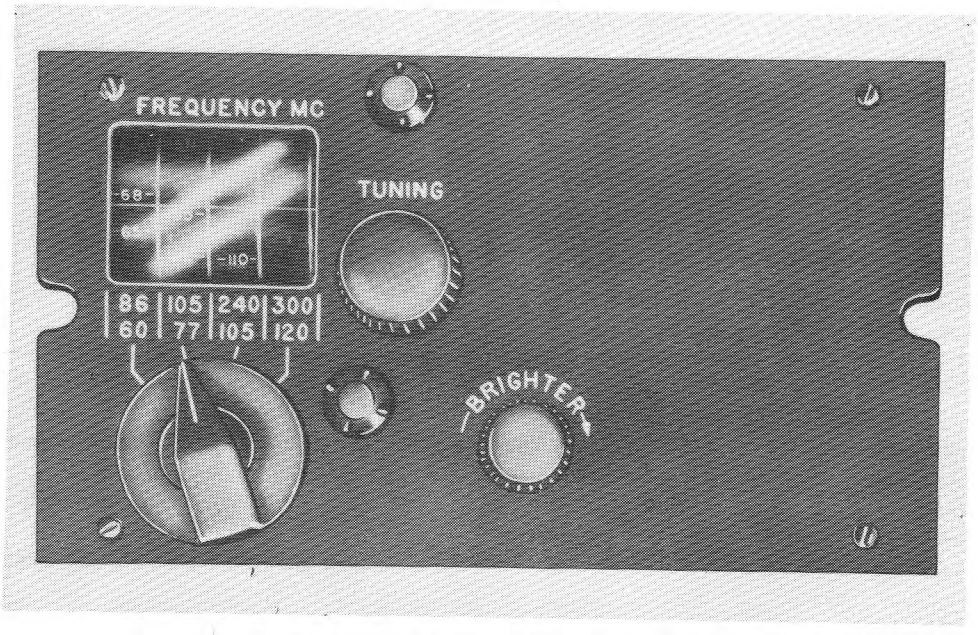


Figure 2-2. Antenna Control C-1246/ALA-6, Controls

SECTION II
OPERATING PROCEDURES

WARNING

Operation of this equipment involves the use of high voltages which are dangerous to life. Operating personnel must at all times observe all safety precautions.

2-1. DESCRIPTION OF CONTROLS.

2-2. AZIMUTH INDICATOR IP-243/ALA-6 CONTROLS. (Figure 2-1.)

2-3. FOCUS. This control adjusts the indication on the cathode-ray tube for the greatest sharpness of presentation.

2-4. INTENSITY. This control adjusts the brightness of the indication on the cathode-ray tube screen.

2-5. VERT. This control adjusts the vertical centering of the indication on the cathode-ray tube screen.

2-6. HOR. This control adjusts the horizontal centering of the indication on the cathode-ray tube screen.

2-7. GAIN. This control adjusts the gain of the video amplifier of the azimuth indicator, and thereby the radial size of a received signal pattern on the cathode-ray tube screen.

2-8. PANEL LIGHT. This control adjusts the illumination of the panel by the panel lights.

2-9. EXPANDER. This control acts to enlarge radially the portion of the signal pattern that is nearest the azimuth scale for the purpose of more accurately determining signal bearing.

2-10. VERT.-HOR. This switch selects for operation either the vertically polarized or the horizontally polarized antenna of an antenna assembly. This switch operates only with Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6. Each of these antenna assemblies has a vertically and a horizontally polarized antenna.

2-11. ANT. SPEED. This is the master power switch for operation of the equipment. It has four positions: it has an OFF position; it has an S position for standby operation, that is, all units in operation except that the antenna assembly is not rotating; it has positions for two speeds of antenna rotation, 150 and 300 rpm.

2-12. DF-S. This switch provides for DF, normal operation of the Direction Finder Group as described in this handbook, or for S operation, that is operation with an auxiliary search unit (not supplied).

2-13. AZIMUTH INDEX. This pointer is used with the indicating pattern on the cathode-ray tube screen to accurately read relative bearings of a signal on the azimuth scale.

2-14. AZIMUTH SCALE. This control adjusts the illumination of the azimuth scale around the cathode-ray tube screen.

2-15. TRUE-HD. This control adjusts the length of the magnetic heading indicating line on the cathode-ray tube screen. It also has an OFF, that is a non-operative position.

2-16. BEAM MOD. This control acts to modulate the intensity of the electron beam on the cathode-ray tube in accordance with signal strength. This brightens the pattern indication whenever signal is delivered to the cathode-ray tube and avoids excessive brightness at the center of the tube in the absence of signals.

2-17. ANTENNA CONTROL C-1246/ALA-6 CONTROLS. (Figure 2-2.)

2-18. RANGE SELECTOR. This switch has four positions. Each position selects for tuning, a sector of the total tuning range of Antenna Assembly AS-654/ALA-6. These sectors are 65 to 89 mc, 80 to 110 mc, 110 to 180 mc, and 160 to 270 mc.

2-19. TUNING. This control fine tunes Antenna Assembly AS-654/ALA-6 to exact frequency as calibrated on its dial.

2-20. —BRIGHTER→. This control adjusts the illumination of the calibrated tuning dial.

2-21. OPERATION.

2-22. GENERAL. Direction Finder Group AN/ALA-6 can be operated either when the aircraft is airborne or is on the ground. It requires only that its associated radio receiver and/or gyro flux gate compass are functioning, and that its required power supply voltages are available. The operation of the Direction Finder Group is given in paragraphs 2-23 through 2-34 below; the related requirements and operation of the associated radio receiver are included.

2-23. RADIO RECEIVER. The receiver used with Direction Finder Group AN/ALA-6 is not supplied with the equipment. It should be capable of tuning through the rf spectrum range of the Direction Finder Group installation. It should provide means of switching from automatic volume control to manual rf-if. gain control and should provide a video output impedance of approxi-

mately 50 ohms. The polarity of the video output signal is not important since polarity can be switched in Azimuth Indicator IP-243/ALA-6. The azimuth indicator is matched to the pulse polarity output of the receiver by setting its pulse polarity switch to negative or positive at the time of installation. (This switch is accessible through a hole in the top of the azimuth indicator cover just behind the nameplate. Figure 1-3). Use of a receiver which has automatic spectrum scanning facilities is advantageous. The receiver is connected to the antenna assembly and the azimuth indicator with coaxial cables as shown in figure 1-15. The receiver should be capable of supplying pulsed outputs of approximately 0.2 volts when receiving 3-microsecond 1000 pulse-per-second signals.

2-24. RECEIVER TUNING.

2-25. The operator should follow the operating instructions provided with the radio receiver in use. However, he should exercise several special procedures in using the receiver in conjunction with Direction Finder Group AN/ALA-6. This is particularly important if identification and analysis of the signal source is to be made with the aid of knowledge of its frequency. Make certain the signal is not tuned at image frequency of the receiver. This can be checked by searching for a stronger signal at twice the intermediate frequency of the receiver on each side of the frequency tuned. The stronger signal will be at the correct frequency.

2-26. Make certain that some harmonic of the signal source is not being received by searching for a stronger signal at one-half, one-third, or one-fourth of the frequency originally tuned. However, sometimes there are advantages in using a harmonic of the signal source for signal analysis once the proper frequency has been determined: the fundamental frequency may not be within the range of the equipment; the antenna pattern at the harmonic frequency will be sharper and hence the relative bearing determination will be more accurate.

2-27. Make certain the signal is not being received at an incorrect frequency using a harmonic of the oscillator of the receiver. This can be checked by searching for a stronger signal at approximately a multiple of the original frequency tuned. When the receiver ordinarily uses oscillator harmonics, make sure the signal is being received at the correct frequency, by searching widely for a stronger signal both above and below the original frequency tuned.

2-28. With the receiver automatic volume control (A.V.C.) switch in off-position, the heterodyne switch in on-position, and rf-if. gain turned up as far as possible, tune the receiver over its frequency range until a signal is received which is to be investigated, as indicated by an audible signal in the headphones. (If the audio signal is too loud for comfort, the rf-if. gain may be turned down.) Throw the heterodyne switch to off position. If the audio signal still persists (indicating that a modulated signal has been received), leave the heterodyne switch in the off-position. If the audio signal disappears, throw the heterodyne switch back to the on-position.

Note

It is entirely possible that there will be no audible note heard in the headphones because of external noise, and yet a pattern may be obtained on the cathode-ray tube screen.

Adjust the receiver output to a suitable level or as further described below in paragraph 2-33, Operation Sequence of Controls.

2-29. AZIMUTH INDICATOR IP-243/ALA-6, INITIAL POSITIONS OF CONTROLS.

2-30. The controls and their initial positions are as follows.

Note

It is assumed that the ANT. SPEED control, the master power switch, is in OFF position. If not, turn to OFF.

a. FOCUS. Approximate midposition.

b. INTENSITY. Extreme counterclockwise position

c. VERT. Approximate midposition.

d. HOR. Approximate midposition.

e. GAIN. Extreme counterclockwise position.

f. PANEL LIGHT. Extreme counterclockwise position.

g. EXPANDER. Extreme counterclockwise or OFF position.

h. VERT.-HOR. Leave either at VERT. or HOR position.

i. DF-S. Switch to DF position.

j. AZIMUTH INDEX. Leave pointer at any position

k. AZIMUTH SCALE. Extreme counterclockwise position.

l. TRUE-HD. Extreme counterclockwise or OFF position.

m. BEAM MOD. Extreme counterclockwise position

n. PULSE POLARITY (Accessible through hole in top of cover. Figure 1-3). This switch is set to match the pulse polarity output of the associated receiver at time of installation. Do not change its setting.

2-31. ANTENNA CONTROL C-1246/ALA-6, INITIAL POSITIONS OF CONTROLS.

2-32. This unit is used only with AS-654/ALA-6 Direction Finder Group installations. The controls and their initial positions are as follows:

a. RANGE SELECTOR. Leave at any position.

b. TUNING. Leave at any position.

c. —BRIGHTER→. Extreme counterclockwise position.

2-33. OPERATION SEQUENCE OF CONTROLS.

2-34. Operate the controls of Direction Finder Group AN/ALA-6 in the following order after setting them initially as described above in paragraphs 2-29 through 2-32.

a. Turn the ANT. SPEED control on the azimuth indicator panel to S, standby position.

b. Turn PANEL LIGHT control clockwise until the azimuth indicator panel is suitably illuminated.

c. Turn AZIMUTH SCALE control clockwise until the azimuth scale is suitably illuminated.

d. The following operations are performed only with Antenna Assembly AS-654/ALA-6 installations.

1. Turn the control marked —BRIGHTER→ on Antenna Control C-1246/ALA-6 in the direction of the arrow until the calibrated dial is suitably illuminated.

2. Turn the RANGE SELECTOR of Antenna Control C-1246/ALA-6 to the range position including the frequency that the radio receiver is tuned to.

3. Turn TUNING control of Antenna Control C-1246/ALA-6 until the frequency being received is indicated on the calibrated tuning dial. Further peak tune the TUNING control for maximum signal, or best signal-to-noise ratio of received signal, as indicated by the radio receiver's output meter or earphones.

4. Readjust the radio receiver to suitable output, if necessary.

e. Turn the ANT. SPEED control to 150 rpm. When using Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6, throw the VERT.-HOR. switch to position of stronger signal strength. See paragraphs 2-35 through 2-40 below on signal polarization.

CAUTION

Under conditions of extremely cold ambient temperature, leave the ANT. SPEED control on S, standby position, for 20 minutes before advancing the ANT. SPEED control to a position of antenna rotation. This allows the drive unit gear system to reach operating temperature.

f. Readjust the radio receiver output, if necessary.

g. Turn the GAIN control clockwise to approximate mid-position.

h. Turn the INTENSITY control slowly clockwise until an indication is just perceived on the cathode-ray tube screen.

CAUTION

Always wait for the equipment to reach operating temperature before turning up the INTENSITY control. At all times, the INTENSITY control should be operated so that the indication is at the lowest satisfactory level of intensity. While making adjustments, before turning any other control, temporarily bring the INTENSITY down somewhat. Operating the equipment at excessive intensity of the indication will permanently damage the cathode-ray tube.

i. Turn the FOCUS control both ways until there is found a peak point of sharpest and most precise presentation of the indication on the cathode-ray tube screen.

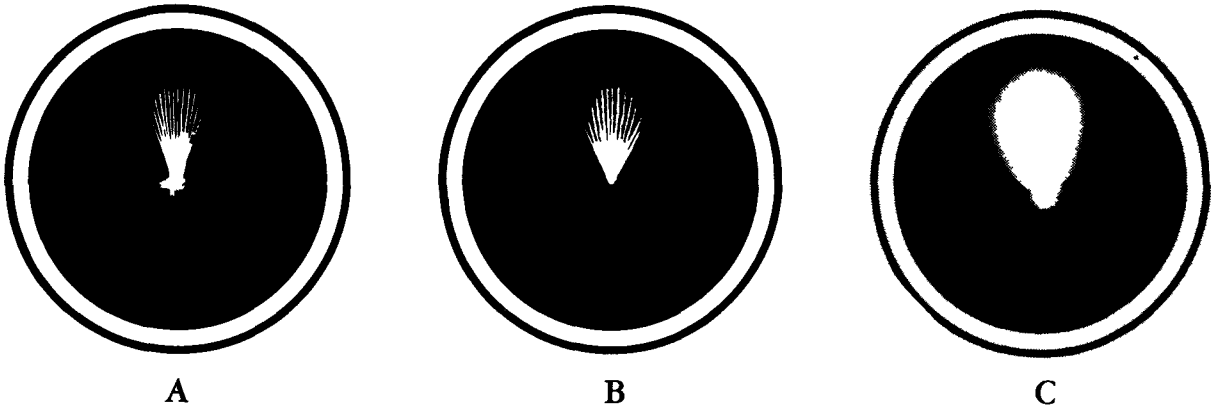
CAUTION

At this time, operate the FOCUS control and the INTENSITY control alternately. This will avoid damage to the cathode-ray tube, by too brilliant an indication when the focus control is accurately peaked.

j. Turn the GAIN control clockwise to increase the indication area if the indication is small. There is less likelihood of operating the cathode-ray tube too brightly with a large indication area, than with a small or point indication. If turning GAIN control to maximum clockwise does not increase the indication area sufficiently, the necessity of more output from the radio receiver is indicated.

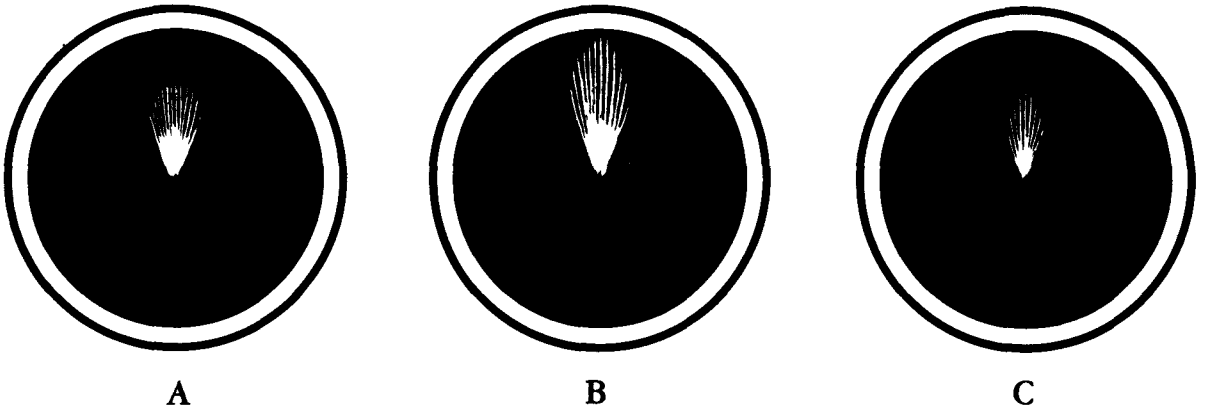
k. The indication forms a characteristic pattern (see paragraphs 2-53 through 2-75 below) expanding from a point-center as the GAIN control is increased. Adjust VERT. and HOR. controls to move this point-center to the middle of the cathode-ray tube screen and at the junction of the long and short lines of the Azimuth Index pointer.

l. Turn the GAIN control back to approximately mid-position and readjust the radio receiver output so that the outward end of the pattern is roughly two-thirds of the way to the rim of the cathode-ray tube. The output level of the receiver is now correct for the signal being received. If the signal changes in level or



A. No beam modulation. BEAM MOD. control at extreme counterclockwise position.
B. BEAM MOD. control at optimum position.
C. BEAM MOD. control advanced too far.

Figure 2-3. Effect of Beam Modulation Control on Cathode-Ray Tube Screen Pattern



A. No expansion. EXPANDER control at off-position.
B. EXPANDER control advanced expanding nose of pattern.
C. EXPANDER control advanced to optimum expansion of nose of pattern. GAIN control reduced to bring radial size back to as in "A."

Figure 2-4. Effect of Expander Control on Cathode-Ray Tube Screen Pattern

another signal is tuned to, only the rf-if. gain control of the receiver should now be readjusted to bring the pattern to this size on the cathode-ray tube screen. Although the operator may make further adjustment in the size of the pattern by means of the GAIN control, it is usually advisable to make all gain adjustments by means of the receiver rf-if. gain.

Note

If there is too much hum from the receiver, the setting of GAIN control on the azimuth indicator should be reduced somewhat and the receiver rf-if. gain control correspondingly increased.

m. Turn the BEAM MOD. control clockwise. This will increase the brightness of the indication of signal pulse lines without, at the same time, increasing the brightness in the center of the CRT in the absence of signals. The INTENSITY control is then readjusted. The BEAM MOD. control should be operated in conjunction with the INTENSITY control. These controls are alternately adjusted. The object of adjustment is a clear pattern indication of the signal being investigated, while at the same time placing the controls in such position that for weak or no signal, a bright spot will not be left in the center which might damage the CRT. Note that at about mid-position of the BEAM MOD. control, the indication will begin to appear out of focus and will bloom in size. The optimum position of the BEAM MOD. control is in the range preceding this point. (Figure 2-3.)

n. Turn the EXPANDER control clockwise while turning the GAIN control counterclockwise, keeping the over-all radial size of the pattern about the same. A point of optimum expansion of the nose of the pattern will be reached and exceeded. Turn the controls back to position of optimum expansion of the nose. (Figure 2-4.)

o. Turn the GAIN control to increase the pattern size but stay within the radius of the cathode-ray tube. Turn the Azimuth Index pointer to the direction of greatest radial extent of the pattern. Read relative bearing on the azimuth scale. (See paragraphs 2-41 through 2-44 below.)

p. Turn the TRUE-HD. control clockwise. A heading line will appear and lengthen on the cathode-ray tube. Read magnetic bearing of the aircraft heading where the line intersects the azimuth scale (see paragraphs 2-45 through 2-47 below). To determine magnetic bearing of the signal source, see paragraphs 2-48 and 2-49 below.

q. TURNING EQUIPMENT OFF. After operation is completed, the Direction Finder Group is turned off by returning the INTENSITY control to extreme counterclockwise position, and the ANT. SPEED control to OFF position.

Note

The equipment can be turned off in an emergency by removing power cable connector plugs P103 and P104 from their receptacles on Power Supply PP-974/ALA-6.

r. RESUMING OPERATION.

Note

After operation has once been completed, to resume operation, it is *not* necessary to return all controls to initial settings as given in paragraphs 2-29 through 2-32. Operation is resumed by merely turning ANT. SPEED to the desired position, waiting for the equipment to reach operating temperature, and turning the INTENSITY control to the desired brightness of indication. All other controls are then adjusted as required.

CAUTION

Always wait for the equipment to reach operating temperature before turning up the INTENSITY control. Under conditions of extremely cold ambient temperature, leave the ANT. SPEED control on S, standby position, for 20 minutes before advancing the ANT. SPEED control to a position of antenna rotation. This allows the drive gear system to reach operating temperature.

2-35. SIGNAL POLARIZATION.

2-36. For bearing determination with Direction Finder Group AN/ALA-6, the signal being investigated is received with an antenna of corresponding polarization. Antenna Assemblies AS-655/ALA-6 and AS-656/ALA-6 each consist of two separate elements: one, a vertical antenna for reception of vertically polarized signals; the other, a horizontal antenna for reception of horizontally polarized signals. The correspondingly polarized antenna will receive much stronger signals. However, each antenna is more or less responsive to opposite- or cross-polarization signals. Therefore, two patterns will be obtained on the indicator screen, one for each position on the VERT.-HOR. switch. Before the relative bearing determination can be made, it is necessary to select the correct polarization, which will be the one for the antenna corresponding to the polarization of the signal. There are two criteria for determining the signal polarization: pattern size and pattern symmetry.

2-37. When the operator throws the VERT.-HOR. switch from one position to the other (leaving all gain control settings the same), he will usually find that the two patterns obtained will be much different in size. In some cases, there will be no pattern at all in one position of the switch. The larger pattern will be the correct one. The exception to this rule regarding the size of the antenna patterns is that of the response of the vertical antenna of Antenna Assembly AS-655/ALA-6 to horizontally polarized signals in the middle of its frequency range. This condition is discussed in paragraph 2-61 below.

2-38. The pattern of the antenna corresponding to the polarization of the signals received has a single major lobe; there may or may not be smaller back and side lobes. The pattern is symmetrical with respect to the center line of the major lobe. The pattern of the antenna corresponding to the polarization opposite to that of the signal received is usually unsymmetrical and has a number of lobes. The response of the horizontal antenna of Antenna Assembly AS-655/ALA-6 to vertically polarized signals at the low end of its frequency range is an exception to this rule. This condition is discussed in paragraph 2-59 below.

2-39. Antenna Assembly AS-654/ALA-6 is generally directionally responsive to signals of horizontal polarization only. Therefore, there is no provision for determining polarization.

2-40. Antenna Assembly AS-657/ALA-6 is directionally responsive to signals either vertically or horizontally polarized. Therefore, there is no provision for determining polarization. This antenna is also directionally responsive to signals of circular polarization.

2-41. TO DETERMINE RELATIVE BEARING OF SIGNAL SOURCE. (Figure 1-2.)

2-42. Relative bearing is the bearing as referenced to an imaginary fore and aft line bisecting the fusilage of the aircraft. This line is the aircraft heading or heading line.

2-43. To determine relative bearing, rotate the Azimuth Index until the longer pointer line of the transparent disc in front of the cathode-ray tube screen bisects the pattern. The pointer line should be on the major lobe of the pattern. Operate the EXPANDER and GAIN controls alternately, expanding the nose of the pattern to the optimum, while staying within the radius of the CRT. Coincide the pointer with the greatest radial extent of the pattern. This is the position of greatest accuracy of bearing determination.

2-44. Read relative bearing of the signal source being investigated where the Azimuth Index pointer intersects the Azimuth Scale (figure 2-5).

Note

The relative bearing determination should be made only when the aircraft is in horizontal flight and traveling in a straight line.

2-45. AIRCRAFT HEADING. (Figure 1-2.)

2-46. Aircraft heading for purposes of operation of Direction Finder Group AN/ALA-6 is the direction the aircraft is pointed to, as referenced to magnetic north. It is given in degrees heading. Zero degrees is regarded as in the direction of magnetic north.

2-47. To read the aircraft heading, turn the TRUE-HD. control clockwise from the OFF position. As the control is advanced, a line will appear and lengthen on the face of the cathode-ray tube screen. Read the aircraft heading where the line intersects the azimuth scale. (Figure 2-5.)

2-48. TO DETERMINE BEARING OF SIGNAL SOURCE. (Figure 1-2.)

2-49. To determine magnetic bearing of the signal source being investigated, add the relative bearing figure read, as described above in paragraph 2-44, to the figure of magnetic bearing of the aircraft heading read, as described above in paragraph 2-47. The sum of the two figures, if less than 360 degrees, is the bearing of the signal source. If the sum of the two figures is greater than 360 degrees, the magnetic bearing is the sum decreased by 360 degrees. (Figure 2-5.)

2-50. BEARING CORRECTIONS.

2-51. BEARING REFERENCES. With Direction Finder Group AN/ALA-6, signal source bearing figures determined are referenced to magnetic north. The operator should not fail to distinguish the bearing figure as determined in paragraph 2-49 above, from bearing referenced to true north. See figure 1-2. For different points on the earth, the relation between magnetic bearings and true bearings will vary.

2-52. BEARING DEVIATIONS. Relative bearing figures read with Direction Finder Group AN/ALA-6 are subject to corrections for deviation errors. Deviations are dependent on many factors including, in part, the particular type of aircraft in which the equipment is installed. The accuracy of the signal source bearing determination for various frequencies, different polarities, and for different directions incident to the body of the aircraft is determined by check flights of each installation. If the deviations are significant, a table of actual bearings versus bearings read on the equipment is compiled by installation personnel. For greatest accuracy of bearing determination, the operator corrects his relative bearing reading according to the correction chart furnished by the installation personnel. (Figure 2-6.)

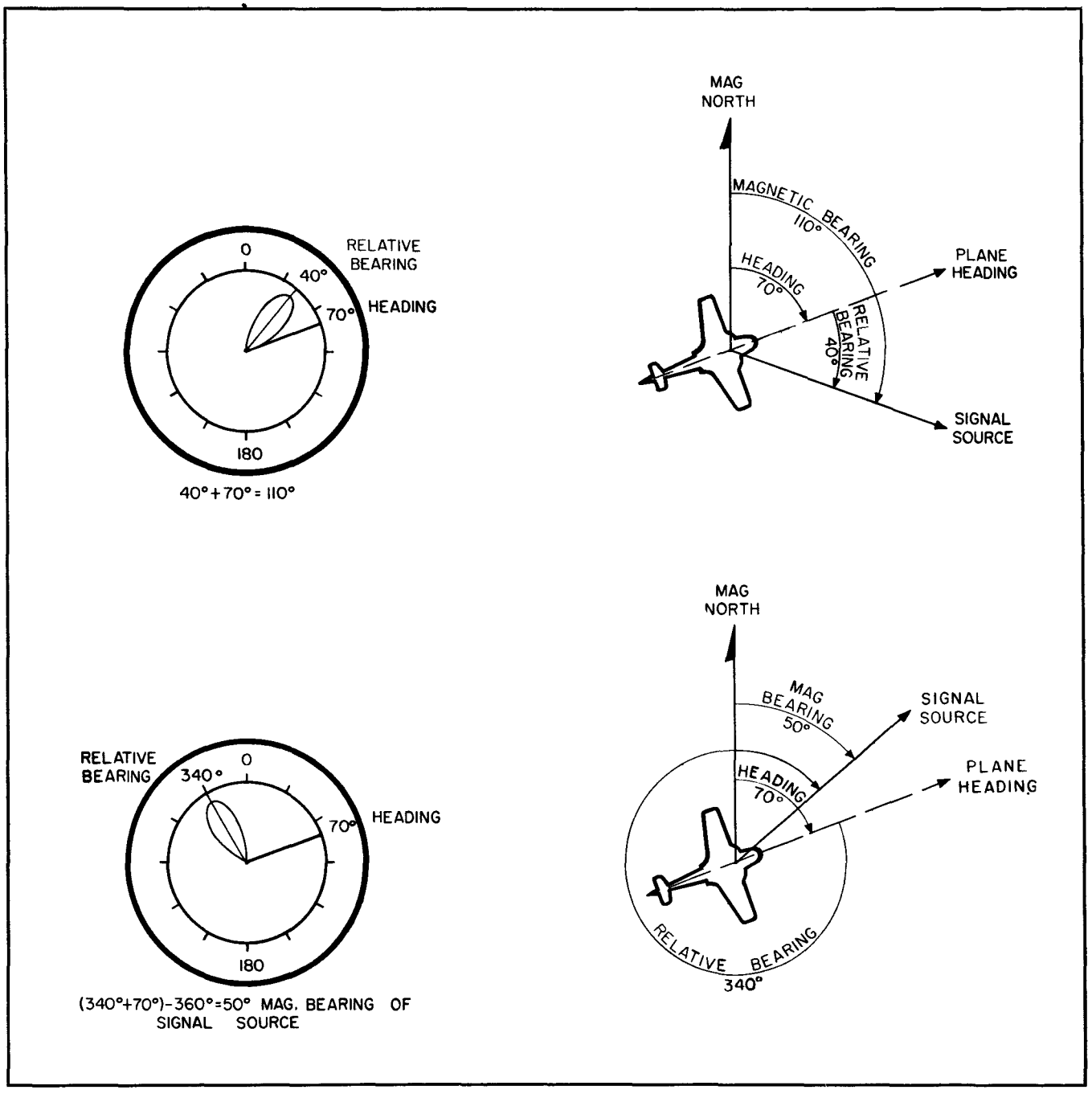


Figure 2-5. Typical Azimuth Indicator Readings

2-53. CATHODE-RAY INDICATOR SCREEN PATTERNS.

2-54. GENERAL. The pattern appearing on the cathode-ray indicator screen depends upon the directional characteristics of the antenna being used, and upon the frequency and polarization of the radiated signals being received. The illustrations in figures 2-8 through 2-12 show the cathode-ray tube screen presentations for signals of various frequencies of vertical and horizontal polarization, as received by Antenna Assemblies AS-654/ALA-6, AS-655/ALA-6, AS-656/ALA-6 and AS-657/ALA-6. Deviation from these patterns will differ for different types of aircraft due to reflected signals from engine nacelles, wings, and other structural parts. However, they give a good indication of the sort of pattern to be expected at various frequencies for signals of pure polarization. During flight, the up and down motion of the aircraft in turbulent air may cause the receiver output to fluctuate to some extent.

DIRECTION FINDER GROUP AN/ALA-6

RELATIVE BEARING CORRECTION CHART 1000 MC TO 5000 MC

Add applicable figure below to correct for bearing deviations.

	1000 Mc		*1220 Mc*		*1490 Mc*		*1830 Mc*		*2240 Mc*		*2740 Mc*		*3350 Mc*		*4100 Mc*		*5000 Mc*	
	Vert	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*	*Vert*	*Hor*
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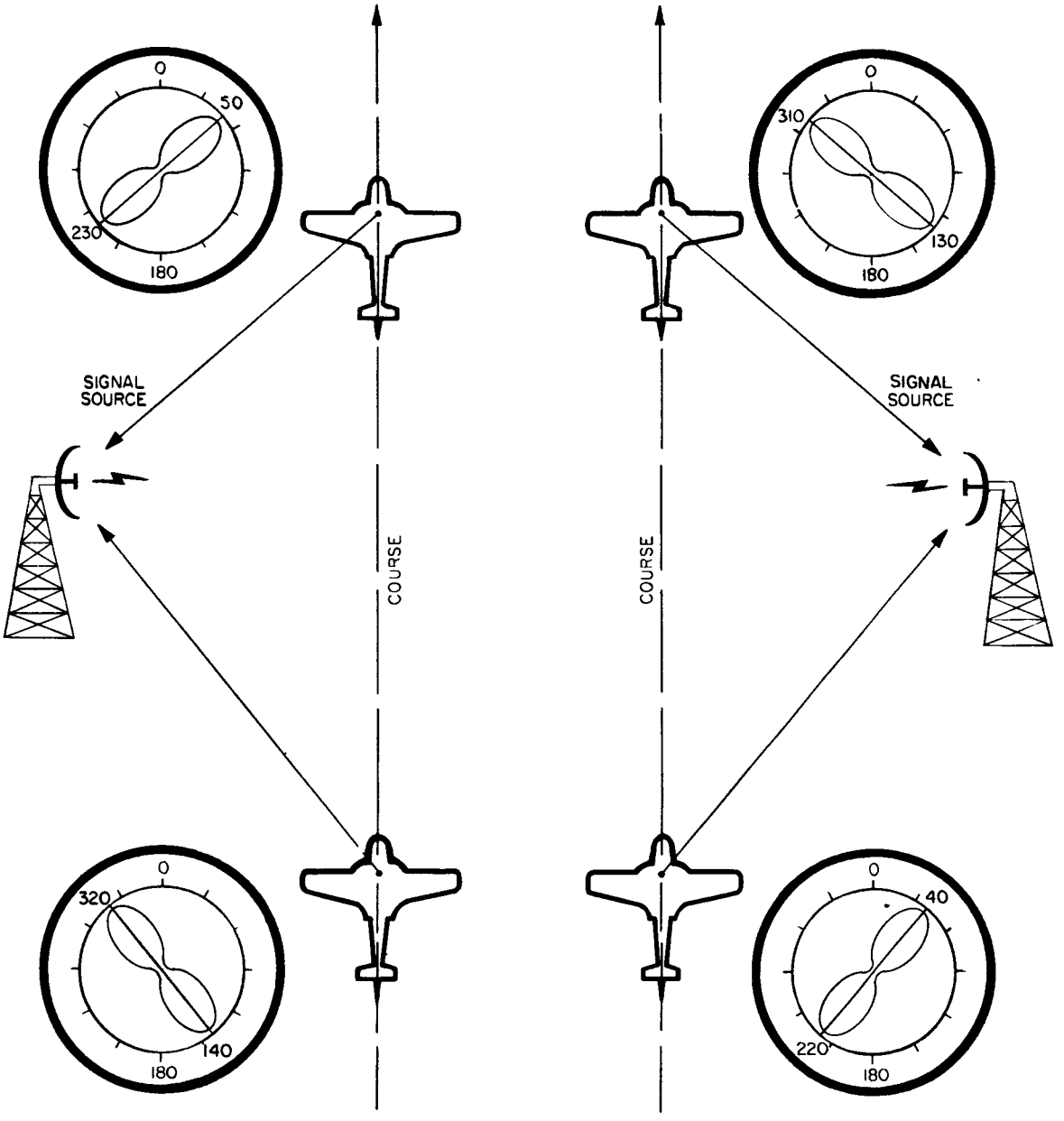
225																		
240																		
255																		
270																		
285																		
300																		
315																		
330																		
345																		
360																		

(To be filled in by installation personnel at check flight of Direction Finder Group AN/ALA-6 installation, if measured bearing deviations are significant.)

Figure 2-6. Typical Relative Bearing Deviation Correction Chart



Relative Bearing Readings Decrease, Signal Source is to Left of Course.

Relative Bearing Readings. Increase, Signal Source is to Right of Course.

Figure 2-7. Direction Sense with Bi-Directional Antenna Assembly AS-654/ALA-6

2-55. ANTENNA ASSEMBLY AS-654/ALA-6.

2-56. This antenna assembly is designed for directional reception of horizontally polarized signals only. No provision is made for switching between vertical and horizontal polarizations, and the azimuth indicator VERT.-HOR. switch will have no effect. Patterns that are obtained from vertically polarized signals are generally unsymmetrical. Because in some cases patterns from vertically polarized signals may also be symmetrical, but nevertheless incorrect, the operator should corroborate signal bearing determinations with this antenna assembly with information from other sources outside of the equipment. The illustration of figure 2-8 shows the cathode-ray tube screen presentation that is typical of horizontally polarized signals of all frequencies within the range. The pattern is bi-directional. To obtain direction sense, two successive bearings are read while the aircraft is continuing on a course. If the second bearing figures read are the larger, the source of the signal is to the right of the course. If the second bearing figures read are the smaller, the source of the signal is to the left of the course. (Figure 2-7.)

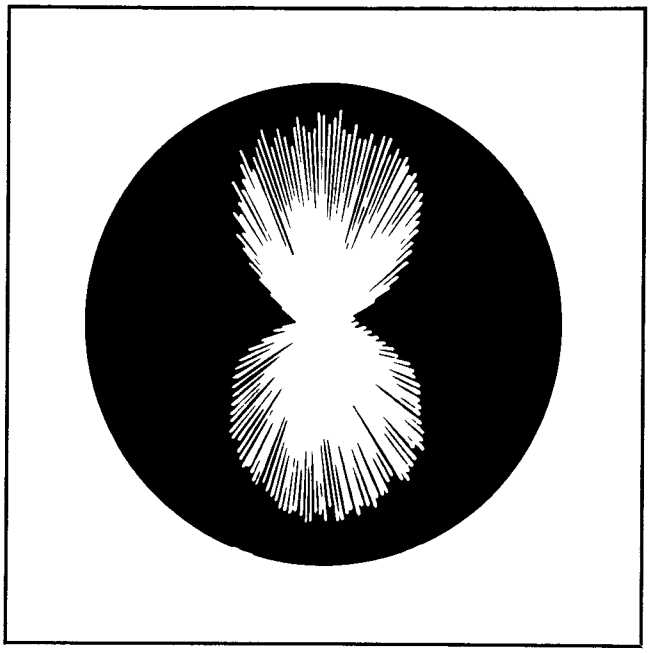


Figure 2-8. Antenna Assembly AS-654/ALA-6, Typical Cathode-Ray Indicator Screen Pattern

2-57. ANTENNA ASSEMBLY AS-655/ALA-6.

2-58. This antenna assembly is designed for directional reception of vertically or horizontally polarized signals. The VERT.-HOR. switch of the azimuth indicator switches between the vertical and horizontal antenna of the assembly.

2-59. VERTICALLY POLARIZED SIGNALS. (Figure 2-9.) At the low end of the frequency range, with the vertically polarized antenna being used, the pattern is double-lobed (a modified figure eight); the larger lobe indicates the correct direction. With the horizontal antenna, the pattern at some frequencies may also be a modified figure eight but the indicated direction will be displaced approximately 90 degrees from the bearing indication that was obtained with the vertical antenna, and the pattern will usually be smaller, identifying the received signal as being vertically polarized. Consequently, the pattern obtained with the switch in the VERT. position is the correct one to be used. In the rest of the range the correct pattern has a single lobe; most cross-polarization patterns are double-lobed or are non-existent. Antenna Assembly AS-655/ALA-6 should not be used to receive vertically polarized signals above 1300 mc.

2-60. HORIZONTALLY POLARIZED SIGNALS. (Figure 2-9.) At the low end of the frequency range, when the horizontally polarized antenna is in use, the pattern is a modified oval with its center displaced on the major axis, the direction of greatest deflection being the correct bearing. Horizontally polarized signals received with the vertically polarized antenna will present a circular pattern.

2-61. In the center of the frequency range (650 to 1000 mc), the correct pattern will have a single major lobe, usually quite narrow. The incorrect pattern resulting from reception of cross-polarization signals is usually double- or multi-lobed and unsymmetrical, and it may be larger than the correct pattern.

2-62. At the high end of the frequency range (1000 to 1300 mc), the correct pattern is characteristically three-lobed; the center lobe should be used for bearing determination. At these frequencies cross-polarization response is non-existent.

2-63. ANTENNA ASSEMBLY AS-656/ALA-6.

2-64. This antenna assembly is designed for directional reception of vertically or horizontally polarized signals. The VERT.-HOR. switch of the azimuth indicator switches between the vertical and horizontal antennas of the assembly.

2-65. Both the vertical and horizontal antennas of this antenna assembly may be used over its entire frequency range, 1000 to 5000 mc. The pattern for vertical polarization is usable to a somewhat higher frequency than the upper limit specified, while the pattern for the horizontal polarization, at frequencies above the upper limit specified, is still usable although it consists of three lobes. Because of extremely sharp patterns to be expected when using Antenna Assembly AS-656/ALA-6 (except at the very low frequency end of the range), it is advisable to operate the antenna at the 300-rpm rate of rotation.

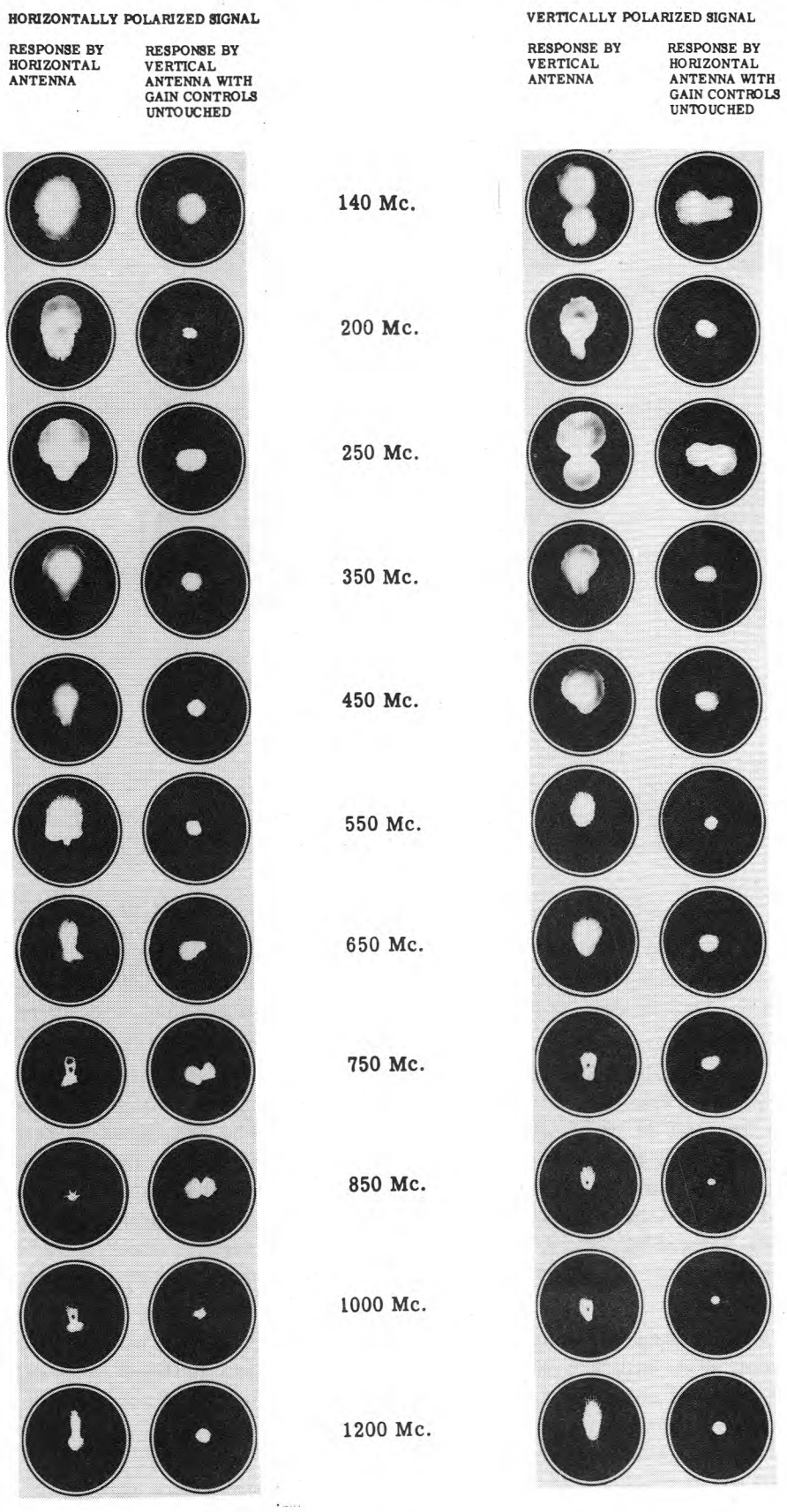


Figure 2-9. Antenna Assembly AS-655/ALA-6, Cathode-Ray Indicator Screen Patterns

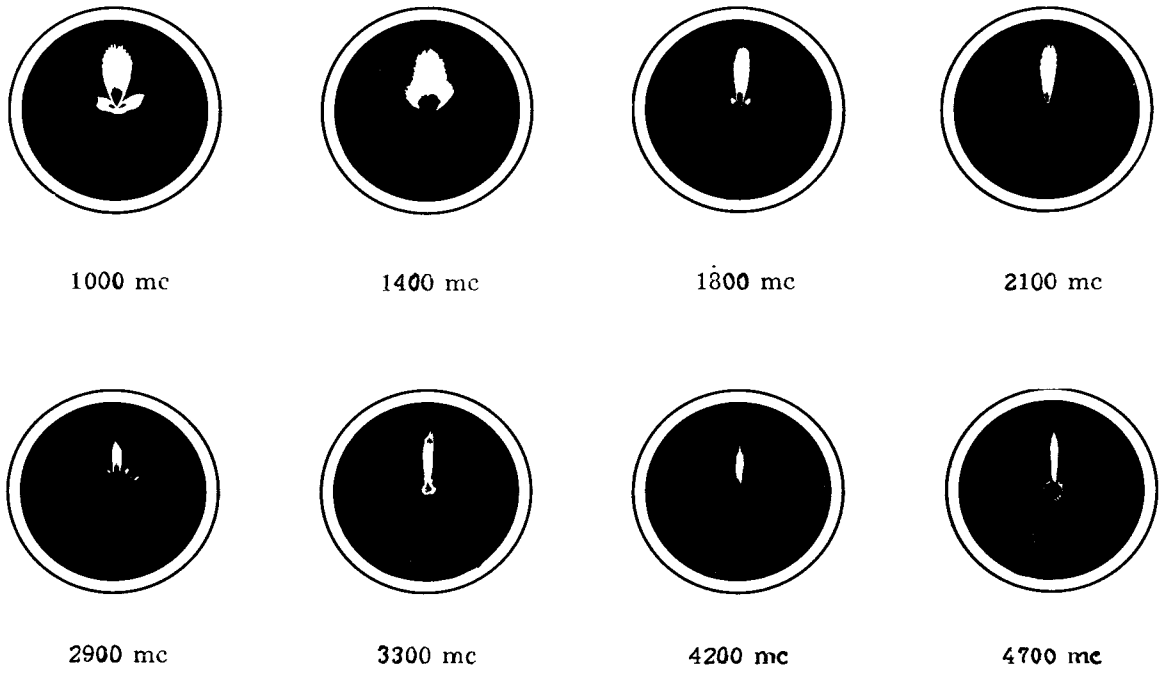


Figure 2-10. Antenna Assembly AS-656/ALA-6, Cathode-Ray Indicator Screen Patterns, Vertical Polarized Signals Received by Vertical Antenna

2-66. Cross-polarization response is poor when using Antenna Assembly AS-656/ALA-6; the pattern under this condition is a small-diameter circle at the center of the cathode-ray tube screen.

2-67. VERTICALLY POLARIZED SIGNALS. Figure 2-10 shows patterns received with the vertical antenna. The pattern, at the low end of the frequency range (1000 to 1600 mc), is roughly oval in shape and the part near the center of the cathode-ray tube screen is tapered. It consists of a single lobe with two minor side lobes of shorter length. These side lobes are not of sufficient size to interfere with proper interpretation of the pattern.

2-68. In the center of the frequency range (1800 to 2700 mc), the pattern, while still somewhat oval in shape, becomes more flattened and tapered at the ends. In this range, it consists essentially of a single lobe; when multi-lobed patterns appear (1800 mc, for example), the side lobes are of relatively minor length.

2-69. The pattern, at the high end of the frequency range (2900 to 4700 mc) becomes flattened and almost of pencil width. It may or may not have side lobes, depending upon the frequency. The side lobes, when they appear, are not of sufficient size to interfere with the proper interpretation of the pattern. It is still usable at frequencies a little above 5000 mc.

2-70. HORIZONTALLY POLARIZED SIGNALS. Figure 2-11 shows patterns received with the horizontal antenna. The pattern, at the low end of the frequency range (1000 to 1700 mc), is roughly oval in shape, and the part near the center of the screen is tapered. In most cases, the pattern consists of a single lobe; when multi-lobe type patterns appear (1700 mc, for example), side lobes are small and inconspicuous.

2-71. The pattern, in the center of the frequency range (1800 to 3530 mc), while still somewhat oval in shape, becomes more flattened and tapered at the ends. In this range it consists of a single lobe, side lobes being non-existent.

2-72. The pattern at the high end of the frequency range (4000 to 4800 mc) becomes flattened and almost of pencil width, and consists of a single lobe only. No side lobes are visible until the signal frequency becomes greater than 5000 mc.

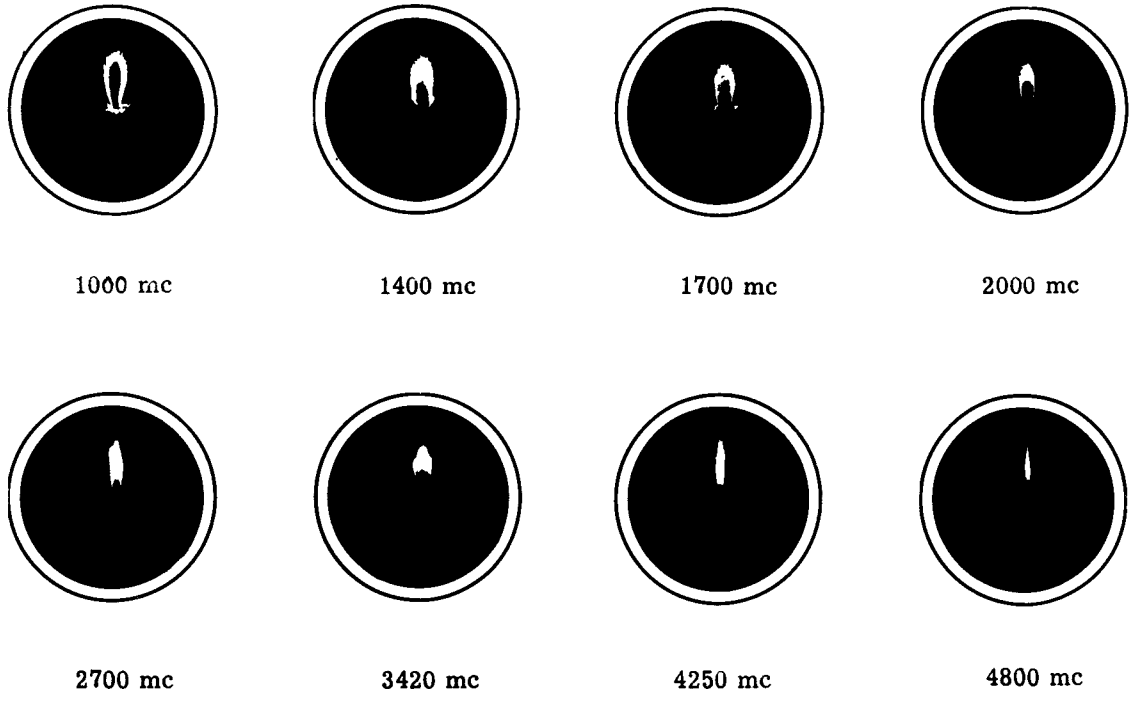


Figure 2-11. Antenna Assembly AS-656/ALA-6, Cathode-Ray Indicator Screen Patterns, Horizontally Polarized Signals Received by Horizontal Antenna

2-73. ANTENNA ASSEMBLY AS-657/ALA-6.

2-74. This antenna assembly incorporates only one antenna; it is designed to receive both vertically and horizontally polarized signals between 5000 and 10,750 mc. It will also receive circularly polarized signals. No antenna switching is incorporated in the unit and the azimuth indicator VERT.-HOR. switch will have no effect. The patterns of vertically, horizontally, or circularly polarized signals will appear as thin lines with very small side lobes as shown in figure 2-12. Because of the extremely sharp patterns, it is advisable to operate the antenna at the 300-rpm rate of rotation.

2-75. TYPICAL OPERATIONAL PATTERNS. Some typical operational patterns and their significance are shown in figures 2-13 through 2-16.

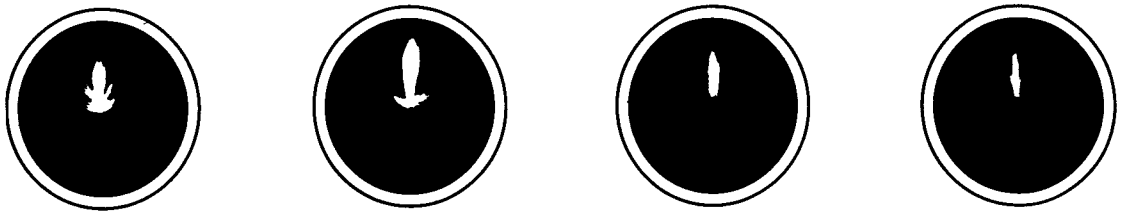
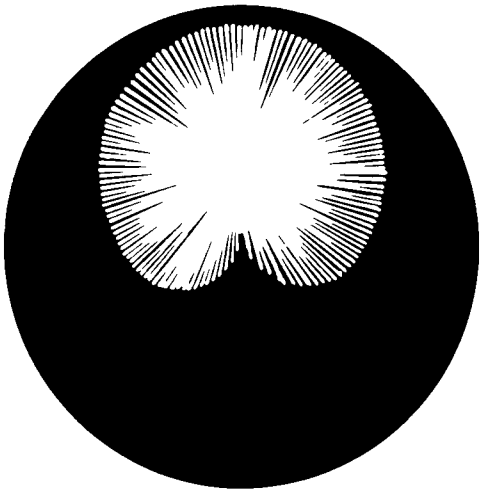


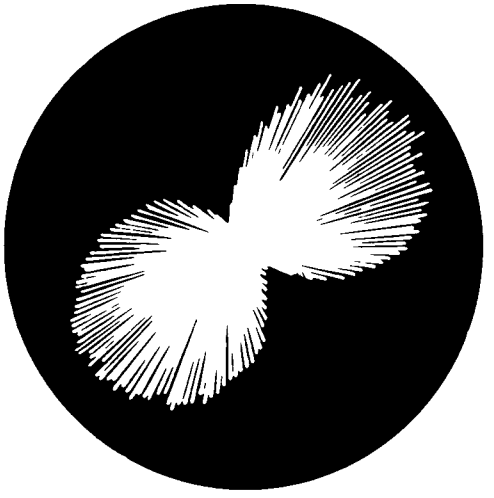
Figure 2-12. Antenna Assembly AS-657/ALA-6, Cathode-Ray Indicator Screen Patterns



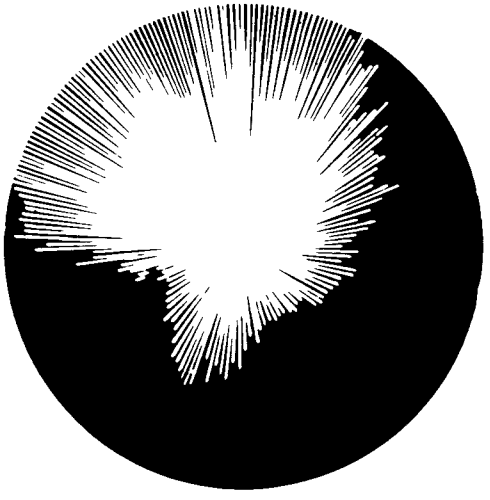
1

Pattern 1 is not sharply pointed but it is clearly directional because of its symmetry and the definiteness of its maximum deflection.

In pattern 2, symmetry is achieved, but the direction is indefinite. Often this pattern represents two symmetrical minor lobes characteristic of the wrong choice of antenna polarization.



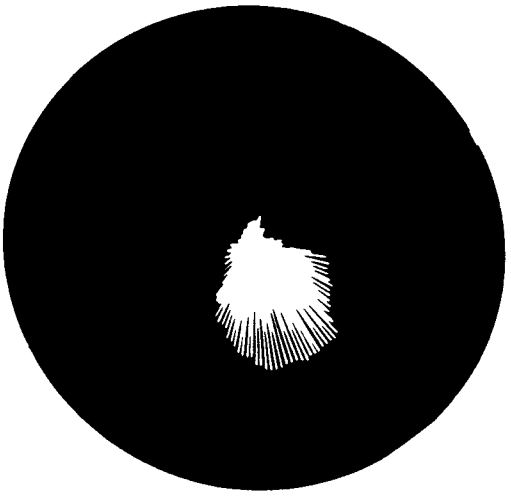
2



3

Too strong a signal may give the outline shown in pattern 3. Receiver gain should, in this case, be reduced to bring the pattern well within the screen boundary, as is pattern 4.

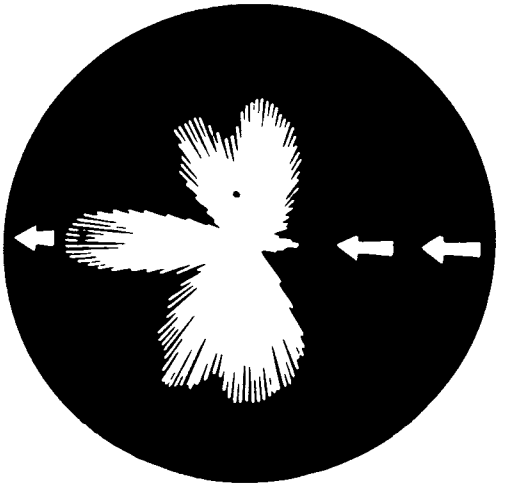
Figure 2-13. Direction Deduced from Pattern Shape (Sheet 1 of 2)



4

During a single sweep through 360 degrees, the pattern may be lacking in complete symmetry, as shown in 4. This may be due to voice modulation of the signal, noise, or to reflection of the signals from surrounding objects. Auxiliary use of phones is recommended.

By their symmetry about a single lobe, two of the large lobes of pattern 5 are seen to be minors. The small single major lobe points in the true direction.

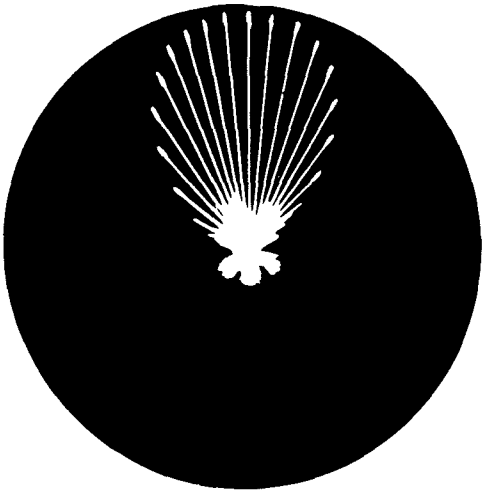


5

6

There is no large deflection about which pattern 6 is symmetrical. This usually signifies the wrong choice of antenna polarization. It is less likely to be a complex combination of reflections.

Figure 2-13. Direction Deduced from Pattern Shape (Sheet 2 of 2)



1

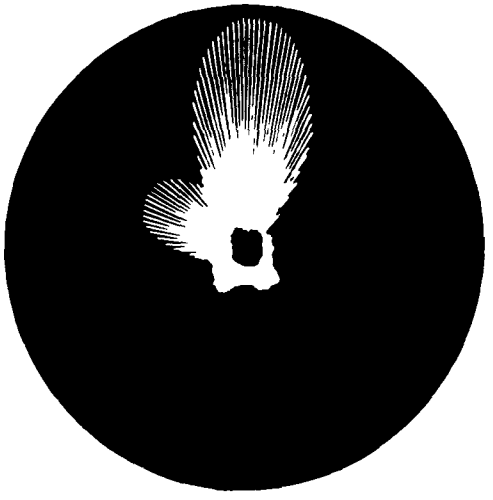
By habitual analysis of patterns in terms of the conditions which form them, the operator may derive information about transmitters which are on the air for too brief a time to be studied by any other means.

For example, the wide spacing between the pulses in pattern 1 suggest the low P.R.F. normally employed by air search radars.

In pattern 2, the minor lobes are not symmetrical. This may be due to a reflection from some nearby object to the left of the true signal direction.

Such a pattern is also characteristic of transmitters whose antennas are polarized at 45 degrees. If the sending dipole is constantly rotating, the asymmetric minor lobe will alternately swing from left to right. The shape, but not the direction, of the major lobe will vary with rotation of the sending dipole.

2



3

Pattern 3 must be carefully distinguished from pattern 2. It is due to simultaneous reception from two separate transmitters. Here the greater and smaller lobes have the same shape, are fairly well defined where they overlap, and may, as in this case, have a detectably different P.R.F.

Assuming the same setting of "Antenna Speed", the close spacing of pulses in pattern 3, compared with pattern 1, implies a radar with high P.R.F., possibly a sea search type.

Figure 2-14. Information Deduced from Pattern Shape (Sheet 1 of 2)

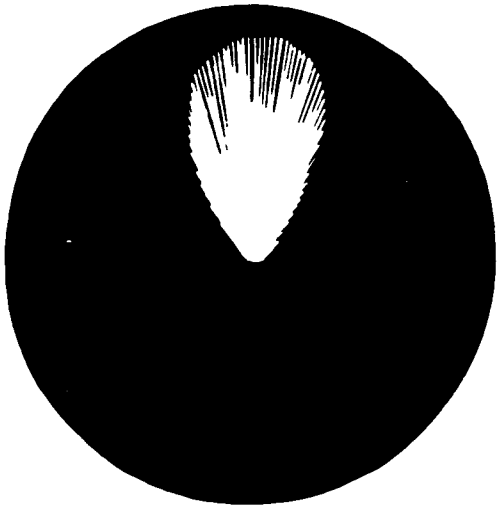
4

Pulses grouped in sets suggest a lobe switching radar, possibly in a fire control system. When the tips of all pulse groups form a smooth pattern, his guns may be trained on you.

The shape of the complete pattern, in any case, is the graphic representation of your own antenna's radiation pattern at the carrier frequency tuned in. Thus pattern 4 is characteristic of a 4 lobe radar whose P.R.F. is about 500 and whose carrier is about 900 M.C. horizontally polarized.

When sine wave modulation is used, the rate at which the cathode ray spot moves out and back along a single radial line to the screen center is more uniform than with pulse modulation. Therefore, the radial lines do not have bright tips.

A phone modulated communication signal will show variations in the sine frequencies, and the complete pattern will have irregular boundaries.

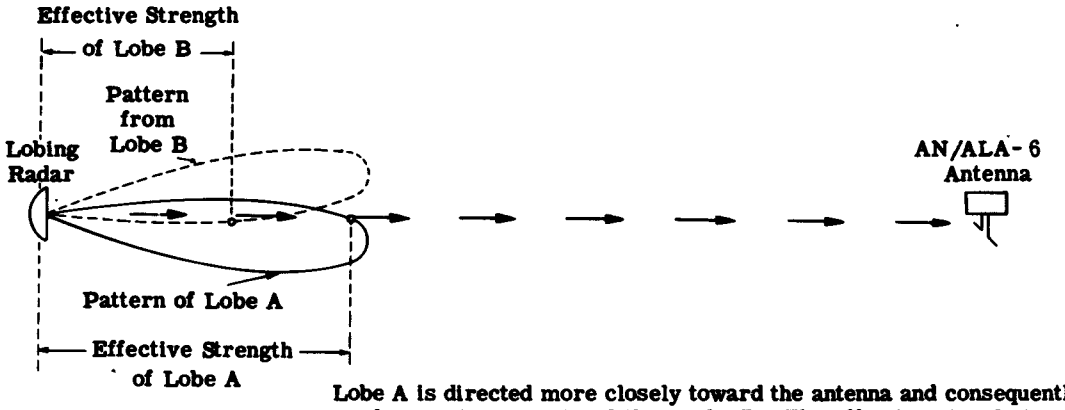


5

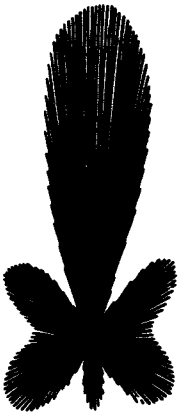
6

When no definite major lobe is present, and the minors are symmetrical, the polarization of the antenna is possibly 90 degrees different from that of the transmitter. The switch marked "ANT. POLARIZATION" should be thrown to the opposite polarization.

Figure 2-14. Information Deduced from Pattern Shape (Sheet 2 of 2)

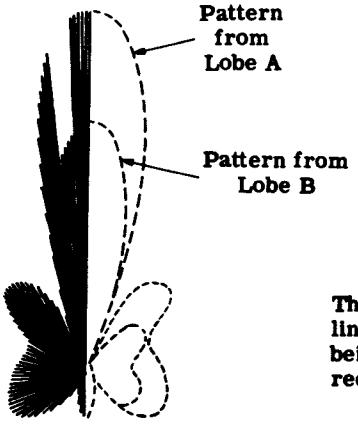


Lobe A is directed more closely toward the antenna and consequently will produce a stronger signal than Lobe B. The effective signal strength of the two lobes will be approximately as shown.



Lobe A would produce a pattern of the above formation if it were received continuously and the pattern from Lobe B could be eliminated. This is the standard pattern of the horizontal antenna with a 900 megacycle horizontally polarized signal.

Lobe B would produce a pattern of similar shape but of smaller size due to the lower signal strength received from the transmitter when Lobe B is in use.



The pattern as seen on the indicator would show alternate lines from each lobe pattern, the difference in length being proportional to the difference in strength of the received signals from the two lobes.

Figure 2-15. Pattern Developed by a Horizontally Polarized, Two-Lobed 900-Mc Radar Signal

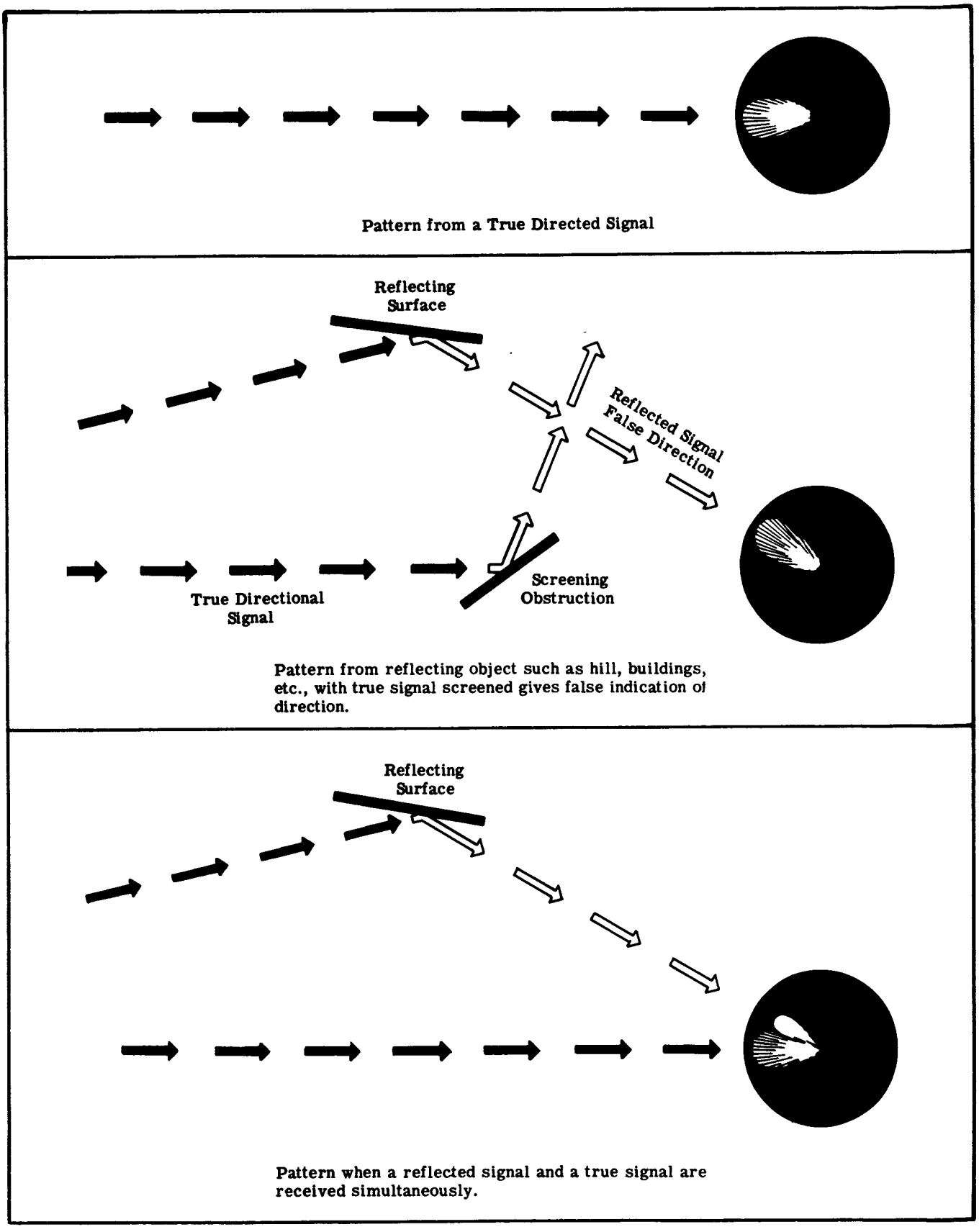


Figure 2-16. Effect of Neighboring Objects on Pattern Direction

SECTION III
OPERATING CHECKS AND ADJUSTMENTS

3-1. GENERAL.

3-2. There are no operating checks and adjustments required in connection with the operation of Direction Finder Group AN/ALA-6 other than the preflight checks described below.

3-3. PREFLIGHT CHECKS.

a. Prior to take-off, check the operation of the equipment on the ground. The procedures are the same as described for operation in Operation Procedures, Section II.

b. Visually check to see that the connectors and cables interconnecting the units are secure. Connector clamping rings should be threaded on receptacles completely. Bayonet connectors should be completely seated.

SECTION IV
EMERGENCY OPERATION

4-1. GENERAL.

4-2. In the event of failure of electronic circuits or the improper functioning of components, operating personnel shall not attempt repairs. Only qualified maintenance personnel are authorized to disassemble major components and their associated units.

4-3. Exception to paragraph 4-2 shall cover only replacement of fuses.

4-4. LOCATION OF FUSES.

4-5. All fuses in Direction Finder Group AN/ALA-6 are accessible from the front panel of Power Supply PP-974/ALA-6 (Figure 1-4). The fuseholder is the extractor post type. To replace a fuse, twist the fuseholder cap in the direction indicated by the arrow and withdraw the cap from the holder. The fuse may then be replaced in the cap and the cap reinserted in the holder, this time twisting to the right in order to lock the fuseholder in place.

4-6. FUSE COMPLEMENT. The fuse complement is shown in Table IV.

TABLE IV

DIRECTION FINDER GROUP AN/ALA-6, FUSE COMPLEMENT

Symbol	*Type*	*Function*
F101	Fuse, 4AG 3 Amp	AC Power Line
F102	Fuse, 4AG 3 Amp	AC Power Line
F103	Fuse, 4AG 10 Amp	DC Power Line
F104	Fuse, 4AG1 1 Amp	Servo Power Line
F105	Fuse, 4AG1 1 Amp	Servo Power Line

4-7. SPARE FUSE. A spare fuse for F103 is located on the panel of Power Supply PP-974/ALA-6.

CAUTION

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

4-8. LIMITED OPERATION: WITH RECEIVER OR COMPASS ONLY.

4-9. Direction Finder Group AN/ALA-6 equipment can be used with only one of its associated equipments, either the radio receiver or the gyro flux gate compass. In the event of failure, malfunction or absence of either associated equipment, Direction Finder Group AN/ALA-6 can continue to function in limited operation: If the associated radio receiver fails, the equipment can still be operated to display aircraft heading on its azimuth indicator. If the aircraft's gyro flux gate compass is malfunctioning, is absent, or is not connected to the Direction Finder Group, the equipment's display of relative bearing of intercepted radio signals is not affected. The operator can determine magnetic bearing of signals from the equipment's relative bearing indication when this information is combined with information of aircraft heading furnished by the pilot or from another source outside of the equipment.

4-10. LIMITED OPERATION: DUE TO EQUIPMENT MALFUNCTION.

4-11. Either of the Direction Finder Group's two displays, the indication of intercepted signal relative bearing or the indication of aircraft heading, can fail or malfunction separately without affecting the other. Limited operation of the equipment for only one of these indications is then still possible.

T.O. 12P3-2ALA6-1C

SUPPLEMENT

TECHNICAL MANUAL

OPERATING INSTRUCTIONS

DIRECTION FINDER GROUP

AN/ALA-6

(HOFFMAN)

This publication supplements T.O. 12P3-2ALA6-1 dated 1 May 1954. A SUITABLE REFERENCE TO THIS SUPPLEMENT WILL BE MADE ON THE TITLE PAGE OF THE BASIC PUBLICATION.

4 APRIL 1966

1. PURPOSE.

a. The purpose of this supplement is to nullify all repair restrictions contained in the basic manual.

2. INSTRUCTIONS.

a. All phrases or statements contained in this T.O. which tend to limit or restrict repair are to be disregarded. Valid Base Repair Restrictions are contained in Section VIII of the appropriate aircraft -6 Inspection Manual.

END

AFLC RAFB,GA APR 66 - 475

T. O. 12P3-2ALA6-5

CALIBRATION OF AN/ALA-6 ANTENNA INSTALLED IN AIRCRAFT

NOTE This technical order is in addition to, and should be accomplished after the alignment procedures specified in the technical orders for AN/ALA-6 equipment have been completed. This technical order is accomplished with the equipment installed in the aircraft.

This title page replaces title page dated 6 March 1956.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

6 MARCH 1956
Reviewed and Current on 7 April 1971

1. PURPOSE.

This technical order is published to prescribe a method of antenna calibration, compensating for errors inherent in equipment installation; to authorize the use of special fabricated items necessary in the accomplishment of this technical order.

2. PARTS REQUIRED TO ACCOMPLISH THIS ADDITIONAL PROCEDURE.

a. One fabricated plate.

(1) Providing the following specifications are met, the material, diameter and thickness of the plate is relatively unimportant. The material should be metal, with a diameter of at least six inches and a thickness of approximately 1/4-inch. The primary consideration must be given to the holes used for attaching the plate to the CU-398/ALA-6 and TG-23/ALA-6 assembly. Four holes are used for attaching the bolts and one hole is used for locating the antenna guide pin. The size and location of these five holes is quickly and accurately determined by using the upper plate of the AS-655/ALA-6 antenna as a model. (Figure 23 - Index No. 1 - T.O. 12P3-2ALA6-4.)

(2) After the holes are located, the next step is to attach the plate to a TG-23/ALA-6 and CU-398/ALA-6 assembly. Align the two arrows located on the drive unit. When the arrows are aligned, extend the arrows on the rotating hub to the drive unit where it reaches the attached plate. The location of the zero degree azimuth line will be at the point where the arrow meets the plate. From this line all other lines can be inscribed in five degree increments. (See figure 1.)

b. One locally fabricated pointer.

(1) The pointer can be of any metallic material that is rigid, yet capable of being bent. The length will depend on the type of aircraft installation. The diameter can be of any convenient size but must be uniform throughout the length of the pointer. Inscribe a mark in the exact center on both ends of the pointer. (See figure 2.)

c. One small suction cup.

d. One short RG-62 coaxial cable (approximately 12 inches) with proper connections.

3. CALIBRATION PROCEDURE.

a. Attach the plate to the TG-23/ALA-6 drive unit.

b. Attach the center of one end of the pointer to the center line of the aircraft with the suction cup. Bend the pointer until the free end just touches the plate.

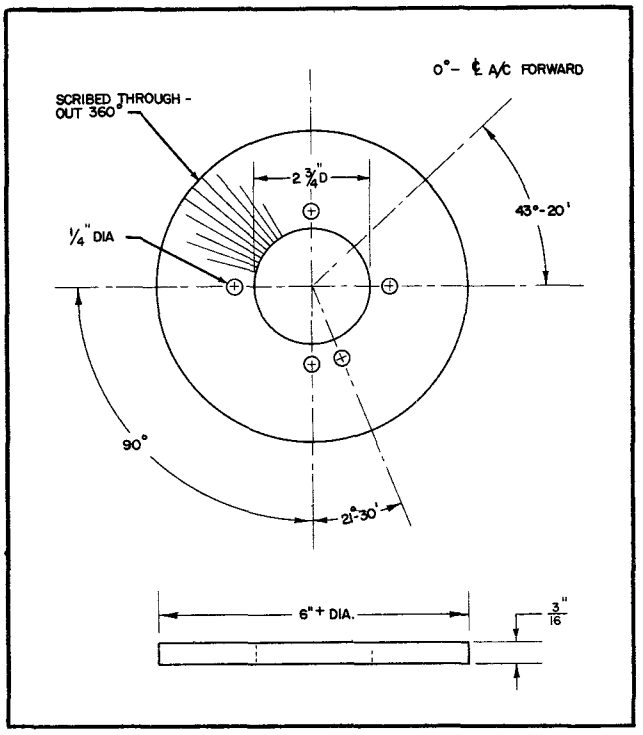


Figure 1

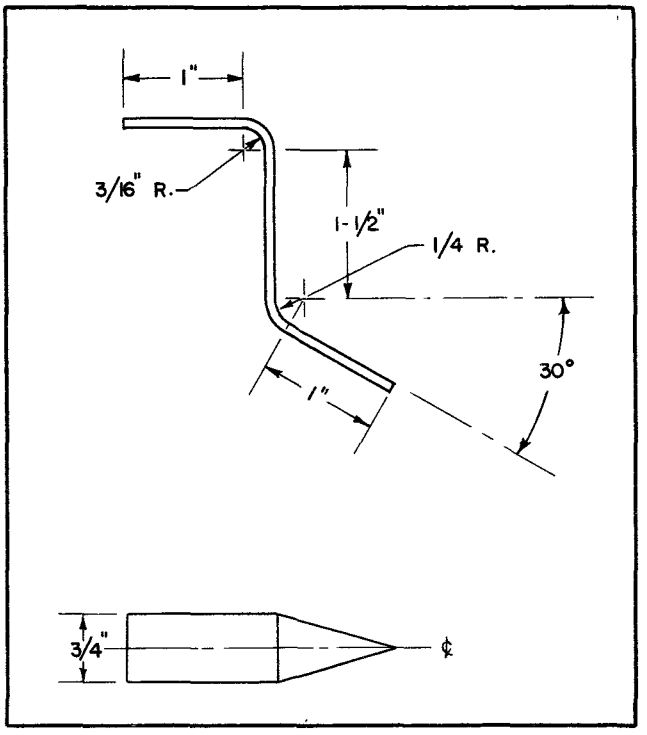


Figure 2

c. Align the arrows on the TG-23/ALA-6. The face end of the pointer will then indicate the zero degree azimuth heading line.

d. Turn on the AN/ALA-6 equipment.

e. Feed the output of J-208 into J-204 of the indicator IP-243/ALA-6, by means of the short coaxial cable.

f. Using the gain control, expander control, and true heading control, adjust the length of the line that radiates from the center of the CRT until it just reaches the azimuth scale of the indicator.

g. Have a second person rotate the plate by five degree increments, using the pointer and azimuth lines inscribed on the plate.

h. After every five degree change on the plate, read the azimuth indicator on the azimuth scale of the IP-243/ALA-6.

i. The correction factor will be the difference in degrees between the plate and the azimuth scale readings.

j. The preceding instructions take into account both installation and alignment error. In the event the center line of the aircraft cannot be determined alignment error can be compensated for by following the same procedure, with the exception of instructions set forth in paragraph 3.b. Use the positioning clamp from an AS-654/ALA-6 Antenna Assembly as a pointer. (Figure 21 - Index No. 15 - T.O. 12P3-2ALA6-4.) Attach the end with the two holes to the antenna drive unit. Mark the exact center of the free end. In using this alternate procedure, by attaching the clamp to the drive unit for use as a pointer, no account can be made for installation error.

END

T.O. 12P3-2ALA6-4
FORMERLY AN 16-30ALA6-4

ILLUSTRATED

PARTS BREAKDOWN

DIRECTION FINDER GROUP

AN/ALA6

(HOFFMAN)

REVISION NOTICE

LATEST REVISED PAGES SUPERSEDE THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic publication. Destroy superseded pages.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

AF-RAFB AUG 63 - 800

15 MAY 1958
REVISED 13 MARCH 1961

LIST OF REVISED PAGES ISSUED

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NOTE: The portion of the text affected by the current revision is indicated by a vertical line in the outer margins of the page.

Page No.	Date of Latest Revision
*i	13 March 1961
*43	13 March 1961
*44	13 March 1961
*45	13 March 1961
*46	13 March 1961
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*48	13 March 1961
*49	13 March 1961
*50	13 March 1961
*51	13 March 1961
*52	13 March 1961
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For listing of available publications see Naval Aeronautic Publications Index (NavAer 00-500).

USAF

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Figure 1. Direction Finder Group AN/ALA-6

SECTION I
INTRODUCTION

1-1. GENERAL

a. This Illustrated Parts Breakdown lists and illustrates all parts and assemblies necessary for the support of Direction Finder Group AN/ALA-6 manufactured by Hoffman Laboratories, Inc., Los Angeles 7, California. It is divided into four sections as shown in the Table of Contents.

b. This breakdown is to be used for the identification, requisitioning, issuing and for storing of parts, and for illustrating assembly and disassembly procedures to be followed whenever the Direction Finder Group requires service or repair. This breakdown is to be used in conjunction with T.O. 12P3-2ALA6-2, Handbook of Service Instructions and T.O. 12P3-2ALA6-3, Handbook of Overhaul Instructions for Direction Finder Group AN/ALA-6. A Numerical Index and a Reference Designation Index located in Sections III and IV respectively, permit rapid location of any part, component, or subassembly.

c. The Group Assembly Parts List (Section II) contains a list of parts in sequence of disassembly, beginning with the first major unit, and breaking down into the subassemblies and detailed parts. Each item is arranged and indexed to show its proper relationship to the major unit or subassembly of which it is a part. Each detail part is keyed to its respective illustration by a figure and index number. Attaching parts are listed immediately following the part they attach, and have the same indentation. They are preceded by the words "ATTACHING PARTS" and are separated from the following parts by an "- - - * - - -" symbol. Not listed are the structural parts such as gussets, braces, rivets, etc., nor wiring components that are normally procured in bulk quantities, such as cable and terminal lugs, etc.

1-2. ILLUSTRATION INDEX

a. Application of indexes falls into two major groups as follows:

(1) Line art which carries an index number for each item including hardware.

(2) Photographic illustrations which have index numbers on all items, other than hardware used as attaching parts.

(3) Electronic components which are mounted on terminal boards are shown as follows: The board assemblies are separately illustrated and listed in groups which are referenced in the major illustration. Since all components mounted on terminal boards are clearly marked by reference designation numbers, proper orientation of each board is obvious.

(4) The "Group Assembly Parts List", is divided into five columns in the manner shown as follows:

Col. No.	*Col. Title*	*Material Included*
1.	FIG. & INDEX NO.	Figure and Index number keys to illustration.
2.	PART NUMBER	One of the following: a. Hoffman part number (material manufactured by, or for Hoffman, or commercial items altered by Hoffman.) b. Number of commercially manufactured part (manufacturer's code symbol is listed parenthetically in Column III.) c. Government standard part number, such as AN and USAF. d. The abbreviation "COMM" for parts that are standard and are procurable through various sources. (Complete identification is provided in Column III.) e. The term "NO NUMBER" for an assembly, or for a portion of an assembly that is only partially shown because of illustration limitations.
3.	DESCRIPTION	Identification by one or more of the following means: a. Description or government nomenclature (if such exists). b. Manufacturer's code symbol as identified in a table on Page 2. c. Government Spec. Number.
4.	UNITS PER ASSEMBLY	One of the following: a. The exact quantity of the item as required for its next high assembly. b. "NP" symbol for "not procurable." (These items cannot be procured at this stage assembly. Next higher assembly must be ordered.) c. "Ref" symbol for "reference." (These items are listed for reference purposes only and are called out elsewhere in the "Group Assembly Parts List", as indicated in the description column.)

5. APPL. CODE

a. Letter appearing in column indicates equipment series using part.

b. Letter "A" indicates part is used on Units produced under Contract AF-33(600)-19767. Letters "B" or "C" indicate part is used on Units produced under Contract AF-33(600)-31638.

c. Absence of code indicates part is used on all Units of identical nomenclature.

d. The following table lists serial numbers of Units, corresponding to code A, B, and C.

Usable on Code	*Unit*	*Unit Serial Nos.*
A	PP-974/ALA-6	1 thru 1225
	IP-243/ALA-6	1 thru 1166
	TG-23/ALA-6	1 thru 1317
	CU-398/ALA-6	1 thru 685
	C-1246/ALA-6	1 thru 691
	AS-654/ALA-6	1 thru 635
	AS-655/ALA-6	1 thru 528
	AS-656/ALA-6	1 thru 711
	AS-657/ALA-6	1 thru 685
	CU-397/ALA-6	1 thru 685
B	PP-974/ALA-6	1226 thru 1637
	IP-243/ALA-6	1167 thru 1366
	TG-23A/ALA-6	1318 thru 1729
	CU-398/ALA-6	1318 thru 1557
	AS-654A/ALA-6	636 thru 878
	AS-655/ALA-6	529 thru 959
	AS-656/ALA-6	712 thru 1011
	AS-657/ALA-6	686 thru 1067
	CU-397/ALA-6	686 thru 888
C	IP-243/ALA-6	1367 thru 1787

1-3. NUMERICAL INDEX LIST

a. The "Numerical Index List" (Section III) provides a complete cross-reference by means of the part number. In determining the numerical sequence of the list, the first digits of the part numbers are arranged as follows: first, letters A through Z and then numerals 0 through 9. The second and succeeding digits of the part numbers are arranged in the following order: space (blank column), diagonal (slant)/, point (period)., dash (-), then letters A through Z and finally numerals 0 through 9. All alphabetical "O"s are treated as numerical zeros. The following example illustrates the sequence used:

AA-850	D-D2	T-FX-2
B-16A	DA719	Z333
CV11C450	DB615	OM-842
D Y110	DX1319	13716
D/T317	DOF23	138
D.R18	D116	14

b. All available stock numbers are listed in Section III. When a stock number does not appear, reference should be made to S-00-1 Master Numerical Index.

1-4. REFERENCE DESIGNATION INDEX

a. Reference designation numbers are arranged in alphabetical-numerical sequence to permit rapid cross-reference to the figure-index number of the unit or subassembly in which the designated part appears.

1-5. EXPLANATION OF TERMS, ABBREVIATIONS, AND SYMBOLS

a. "Ref" in the quantity column means that the part is listed for reference only, and the quantity is given elsewhere in the "Group Assembly Parts List." "No Number" appears in the part number column for an assembly that is not procurable, or for an assembly that is only partially shown because of illustration limitations. To procure "No Number" parts the next higher assembly must be ordered. The symbol "- - - * - - -" is used to indicate the end of an "ATTACHING PARTS" list and separates it from the parts that follow. The symbol "NP" in the quantity column means that the item is not procurable and the next higher assembly must be ordered.

1-6. PURCHASED PARTS

a. Purchased parts that are used on this equipment without alteration are listed under the manufacturer's number and are procurable through commercial sources. Purchased parts that are made to Hoffman specifications are listed under the Hoffman number. When purchased parts are altered by Hoffman, they are assigned a Hoffman part number and are procurable only under that number. The manufacturer's code list follows:

Code or Abbrev.	*Name*	*Address*
AP	Adel Div., General Motors Corp.	Burbank, Calif.
ADE	Advance Elec. and Relay Co.	Los Angeles, Calif.
ARP	Aircraft-Marine Products, Inc.	Harrisburg, Pa.
AB	Allen-Bradley Co.	Milwaukee, Wis.
ALL	Allied Control Co.	New York, N.Y.
AMP	American Phenolic Corp.	Chicago, Ill.
BARB	Bendix Aviation Corp.	Red Bank, N.J.
BHE	Birtcher Corp.	Los Angeles, Calif.
BE	Burndy Engineering Co., Inc.	New York, N.Y.
BUS	Bussmann Mfg. Co.	St. Louis, Mo.
CGT	Cambridge Thermionic Corp.	Cambridge, Mass.
CHSS	Chase Steel and Mfg. Co.	Los Angeles, Calif.
CHT	Chicago Transformer Div., Essex Wire Corp.	Chicago, Ill.
CLIP	Clifton Precision Products Co.	Clifton Heights, Pa.
CN	Centralab Div., Globe Union, Inc.	Milwaukee, Wis.
CPW	Commercial Plastics Co.	Chicago, Ill.

Code or Abbrev.	*Name*	*Address*
DABU	Dale Products	Columbus, Nebr.
DLC	Dialight Corp.	Brooklyn, N.Y.
DUMT	Dumont Corp.	Greenfield, Mass.
EIC	Eicor Inc.	Chicago, Ill.
ELCL	Elco Corp.	Philadelphia, Pa.
EN	Elastic Stop Nut Corp.	Union, N.J.
FAF	Fafnir Bearing Co.	New Britain, Conn.
FILT	Filtron Co., Inc.	Flushing, N.Y.
FACM	Fisher Co.	Charles City, Iowa
FOEN	Ford Engineering Co.	Upland, Calif.
GCE	General Cement Mfg. Co.	Rockford, Ill.
GE	General Electric Co.	Schenectady, N.Y.
GLI	Globe Ind., Inc.	Dayton, Ohio
GN	Guardian Electric Mfg. Co.	Chicago, Ill.
HLI	Hoffman Laboratories, Inc.	Los Angeles, Calif.
JNS	Howard B. Jones Div., Cinch Mfg. Corp.	Chicago, Ill.
IRC	International Resistance Co.	New York, N.Y.
MLL	James Millen Mfg. Co.	Malden, Mass.
KER	Kearfott Co., Inc.	Little Falls, N.J.
ND	New Departure Div., General Motors Corp.	Bristol, Conn.
OAK	Oak Mfg. Co.	Chicago, Ill.
OM	Ohmite Mfg. Co.	Chicago, Ill.
PTN	Patton-MacGuyer Co.	Providence, R.I.
RMS	Ramsey Corp.	St. Louis, Mo.
SH	Shakeproof Inc. Div., Illinois Tool Works	Chicago, Ill.
SPR	Sprague Electric Co.	North Adams, Mass.
SPS	Standard Pressed Steel Co.	Jenkintown, Pa.
STAV	The Staver Co., Inc.	Brooklyn, N.Y.
THAS	Thomas Associates	Burbank, Calif.
STMF	Stevens Mfg. Co.	Chicago, Ill.
TCIL	Transicoil Corp., Spirolox Div.	New York, N.Y.
TNIC	Transonic, Inc.	Bakersfield, Calif.
WKI	Waldes Kohinoor, Inc.	Long Island City, N.Y.
WECK	Weckesser Co.	Chicago, Ill.
WG	Edwin L. Wiegand Co.	Pittsburgh, Pa.
ZE	Zierick Mfg. Co.	New Rochelle, N.Y.

1-7. HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN

You Want to Find	*You Have*	*What To Do*
ILLUSTRATION	PART NUMBER	1. (a) Find part number in numerical index list. (b) Note figure and index number for part in column 3. (c) Locate illustration (by this figure number) in Group Assembly Parts List section.
DESCRIPTION	PART NUMBER	2. (a) Find illustration as indicated above and locate part. (b) Find parts listing by the figure number (shown at top of the page) on facing or nearby page. (c) Locate index number in column 1. Description is on same line in column 3.
PART NUMBER	PART	3. (a) Locate page number of major assembly in Section II of the Table of Contents. (b) The illustration for the major assembly precedes list of its parts. Locate part on illustration and determine its index number. (c) Find index number in column 1 in parts list. Part number is in column 2.
DESCRIPTION OR PART NUMBER	REFERENCE DESIGNATION	4. (a) Find reference designation in Reference Designation Index (Section IV). Column 2 gives figure and index number. (b) Locate figure in Table of Contents. The parts list is on adjoining or nearby page. (c) Find figure and index number in parts list in column 1. Part number appears in column 2, and description in column 3.

SECTION II
GROUP ASSEMBLY PARTS LIST

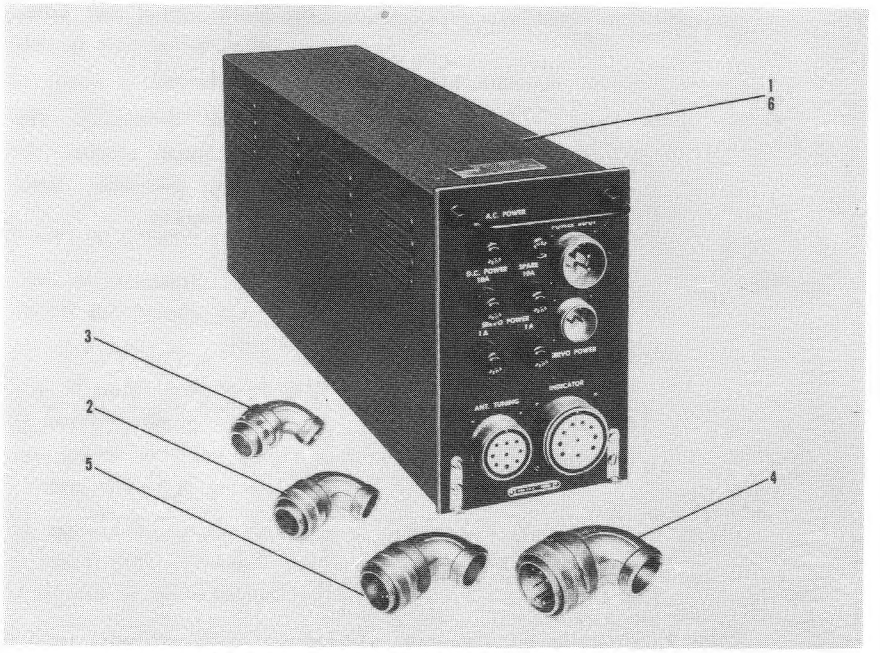

Figure 2. Power Supply PP-974/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
2-	AU-50-1	POWER SUPPLY PP-974/ALA-6	1	A
	AU-50-2	POWER SUPPLY PP-974/ALA-6	1	B
-1	AA-805-1	. COVER ASSEMBLY, Dust	1	A
	AA-805-2	. COVER ASSEMBLY, Dust	1	B
-2	AN3108B-22-17P	. CONNECTOR, Plug	1	
-3	AN3108B-28-19P	. CONNECTOR, Plug	1	
-4	AN3108B-16S-4S	. CONNECTOR, Plug (MIL-C-5015)	1	
-5	AN3108B-18-11S	. CONNECTOR, Plug	1	
-6	No Number	. CHASSIS ASSEMBLY, Power Supply (See figure 3)	1	

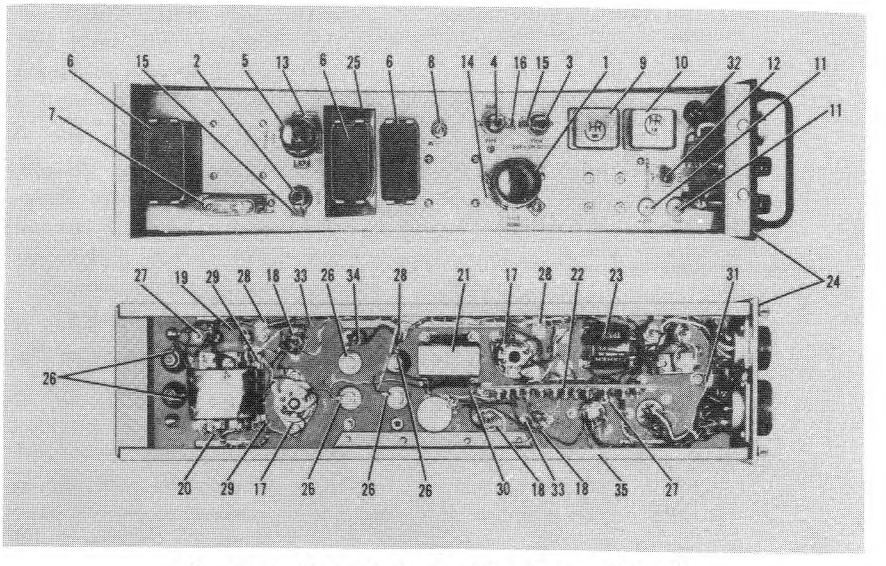

Figure 3. Chassis Assembly, Power Supply

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
3-	No Number	CHASSIS ASSEMBLY, Power Supply (See figure 2)	Ref	
-1	6080	. TUBE, Electron (MIL-E-1B)	1	
-2	5726/6AL5W	. TUBE, Electron (MIL-E-1B)	1	
-3	5654/6AK5W/6096	. TUBE, Electron (MIL-E-1B)	1	
-4	5651	. TUBE, Electron (MIL-E-1B)	1	
-5	5Y3WGT	. TUBE, Electron (MIL-E-1B)	1	
-6	CP70E1FF405V	. CAPACITOR, Fixed, paper dielectric (JAN-C-25)	3	
		(ATTACHING PARTS)		
	CP07SB3	. BRACKET, Capacitor (MIL-C-25)	6	
	COMM	. NUT, Hexagon, machine, no. 10-24, brass cadmium plated w/chromate dip finish	6	
	AN935B10	. WASHER, Lock	6	
		- - - * - - -		
-7	CP69B1EF105V	. CAPACITOR, Fixed, paper dielectric (JAN-C-25)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	2	
	AN515PB6-6	. SCREW, Machine	2	
		- - - * - - -		
-8	RV4ATSD104A	. RESISTOR, Variable (JAN-R-94)	1	
		(ATTACHING PARTS)		
	L-SM	. LOCK, Shaft	1	
	COMM	. NUT, Hexagon, machine no. ⅜-32, brass, cadmium plated w/chromate dip finish (Supplied with RV4ATSD104A)	1	
	COMM	. WASHER, Internal lock, for ⅜ in. screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-9	C8777-3	. RELAY, Armature (ADE)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	3	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-10	E8741-1	. RELAY, Armature (ADE)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	3	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-11	SDJ-1	. CONNECTOR, Receptacle	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ¼-32, cadmium plated w/chromate dip finish (Supplied with SDJ-1)	2	
	COMM	. WASHER, Internal lock, for ¼ in. screw, phosphor bronze, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-12	ST52-N	. SWITCH, Toggle (JAN-S-23).	1	
		(ATTACHING PARTS)		
	SDH-37	. NUT, Machine (Supplied with ST52-N)	2	
	SDH-15-N	. WASHER, Lock (Supplied with ST52-N)	1	
		- - - * - - -		
-13	926B	. CLAMP, Electron Tube (BHE)	1	
-14	926H22	. CLAMP, Electron Tube (BHE)	1	
-15	23B	. CLAMP, Electron tube (STAV)	2	
-16	21B	. CLAMP, Electron tube (STAV)	1	
-17	TS101C01	. SOCKET, Electron Tube (JAN-S-28A)	2	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	4	
	AN515PB6-7	. SCREW, Machine	4	
		- - - * - - -		
-18	105BC	. SOCKET, Electron Tube (ELCL)	3	
		(ATTACHING PARTS)		
	AN935-B4	. WASHER, Lock	6	
	COMM	. NUT, Hexagon, machine, no. 4-40, cadmium plated w/chromate dip finish	6	
	AN515PB4-4	. SCREW, Machine	3	
	AN515PB4-5	. SCREW, Machine	3	
		- - - * - - -		
-19	RC20BF125K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-20	99G142	. TRANSFORMER, Power (GE)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	4	
	AN515PB6-6	. SCREW, Machine	2	
	AN960B6	. WASHER, Flat	3	
	AN515PB6-8	. SCREW, Machine	2	
	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-21	16975-A	. CHOKE, Radio frequency (CHT)	1	
		(ATTACHING PARTS)		
	AN935-B8	. WASHER, Lock	4	

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7* *Description*	*Units per Assy.*	*Appl. Code*
3-	COMM	. NUT, Hexagon, machine, no. 8-32, cadmium plated w/chromate dip finish	4	
	AN515PB8-6	. SCREW, Machine	4	
	AN960B8	. WASHER, Flat	4	
		- - - * - - -		
-22	EA-478-1	. BOARD ASSEMBLY, Terminal (See figure 5)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	2	
	AN515PB6-6	. SCREW, Machine	2	
		- - - * - - -		
-23	TP-338-A	. TRANSFORMER, Power (FACM)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	4	
	AN515PB6-5	. SCREW, Machine	4	
		- - - * - - -		
-24	No Number	. FRONT PANEL ASSEMBLY (See figure 4)	1	
		(ATTACHING PARTS)		
	AN515B6-6	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	2	
	AN936A8B	. WASHER, Lock	2	
	COMM	. SCREW, Pan head, machine, no 8-32, brass, ¼ in. lg, nickel finish	2	
-25	AS-1750	. SHIELD, Capacitor	1	
-26	2124-10-00	. LUG, Terminal solder, tin dipped (SH)	6	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon machine, no. 10-32, brass, cadmium plated w/chromate dip finish	6	
	AN936A10B	. WASHER, Lock	6	
		- - - * - - -		
-27	2104-06-00	. LUG, Terminal solder, tin dipped (SH)	2	
-28	3/16-3	. CLAMP, Cable (WECK)	3	
		(ATTACHING PARTS)		
	COMM	. WASHER, Flat, for no. 10 size screw, brass, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-29	HP-3N	. CLAMP, Cable (BE)	2	
-30	2104-08-00	. LUG, Terminal solder, tin dipped (SH)	1	
-31	7/16-3	. CLAMP, Cable (WECK)	1	
		(ATTACHING PARTS)		
	AN515PB6-6	. SCREW, Machine	1	
	AN960B6	. WASHER, Flat	1	
	AN935B6	. WASHER, Lock	1	
	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-32	AN931-6-10	. GROMMET, Rubber	1	
-33	333	. TERMINAL, Solder (ZE)	2	
-34	2124-10-00	. LUG, Terminal solder, tin dipped (SH)	1	
-35	AA-804A-1	. CHASSIS, Power Supply	1	
4-	No Number	FRONT PANEL ASSEMBLY, Power Supply (See figure 3)	Ref	
-1	HCM-EHJ	. FUSEHOLDER, Extractor Post (BUS)	6	
		(ATTACHING PARTS)		
	9351	. NUT, Hexagon (Supplied with HCM-EHJ)	6	
	9350	. WASHER, Neoprene rubber (Supplied with HCM-EHJ)	6	
	192-02	. WASHER, Lock (SH)	6	
	9435H	. . CAP, Fuseholder	6	
-2	AGS-3	. FUSE, Cartridge (BUS)	2	
-3	AGS-10	. FUSE, Cartridge (BUS)	2	
-4	AGS-1	. FUSE, Cartridge (BUS)	2	
-5	AN3102A-18-11P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN-515B4-7	. SCREW, Machine	4	
	AN-935B4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, cadmium plated w/chromate dip finish	4	
	2104-04-00	. LUG, Terminal solder, tin dipped (SH)	1	
		- - - * - - -		
-6	AN3102A-16S-4P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN935B6-7	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, cadmium plated w/chromate dip finish	4	
	AN515B4-7	. SCREW, Machine	4	
		- - - * - - -		
-7	AN3102A-28-19S	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	4	
	AN515B6-7	. SCREW, Machine	4	
		- - - * - - -		

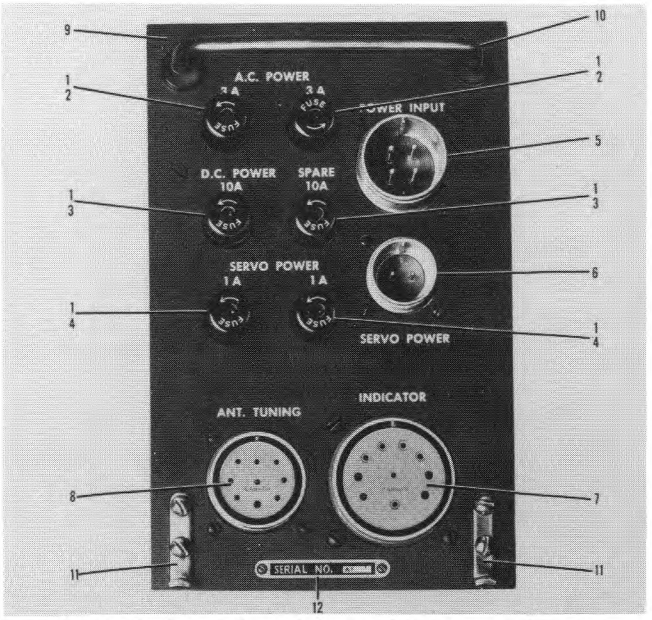

Figure 4. Front Panel Assembly, Power Supply

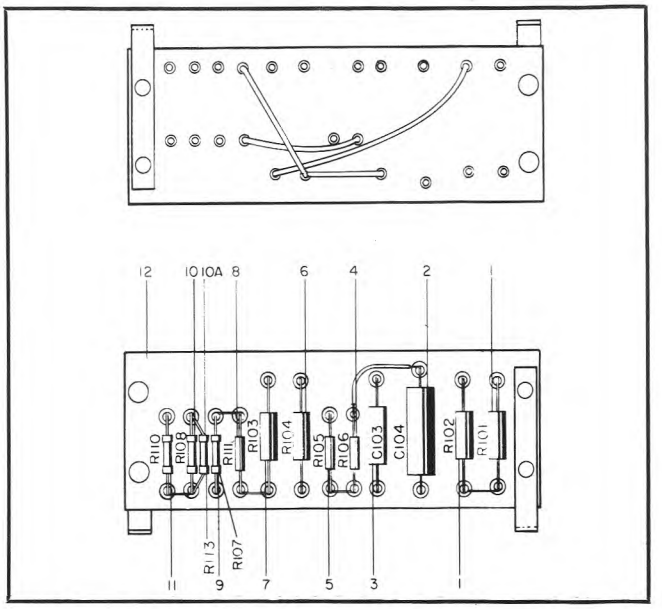

Figure 5. Board Assembly, Terminal

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
4-8	AN3102A-22-17S	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515B4-7	. SCREW, Machine	4	
	AN935-B4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-9	AP-47A-1	. FRONT PANEL, Power Supply	1	
		(ATTACHING PARTS)		
	AN515B6-6	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	2	A
	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-10	OM-1369-1	. HANDLE	1	
		(ATTACHING PARTS)		
	HM-679	. HUB, Handle	2	
	AS-1436-1	. BRACKET, Support	1	
	AN935B10	. WASHER, Lock	2	
	COMM	. NUT, Hexagon machine, no. 10-32, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-11	HM-685	. HOOK, Hold down	2	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 8-32, brass, ½ in. lg, nickel plate finish	4	
	AN935B8	. WASHER, Lock	4	
	COMM	. NUT, Hexagon machine, no. 8-32, brass, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-12	NP-227	. NAMEPLATE, Serial number	1	A
	8111100034	. NAMEPLATE, Serial number	1	B
		(ATTACHING PARTS)		
	AN515B4-3	. SCREW, Machine	2	

5-	EA-478-1	BOARD ASSEMBLY, Terminal (See figure 3)	Ref	
-1	RC30BF470K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-2	91P47304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	1	
-3	91P10304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	1	
-4	RC20BF824K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-5	RC20BF102K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-6	RC20BF333K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-7	RC30BF334K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-8	RC20BF104K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-9	DCC,1Meg±1%,½W	. RESISTOR, Fixed (IRC)	1	
-10	DCC,510K±1%,½W	. RESISTOR, Fixed (IRC)	1	
-10A	RN20R2004F	. RESISTOR, Fixed (MIL-R-10509A)	1	B
-11	DCC,620K±1%,½W	. RESISTOR, Fixed (IRC)	1	
-12	EA-479-1	. BOARD, Terminal	1	

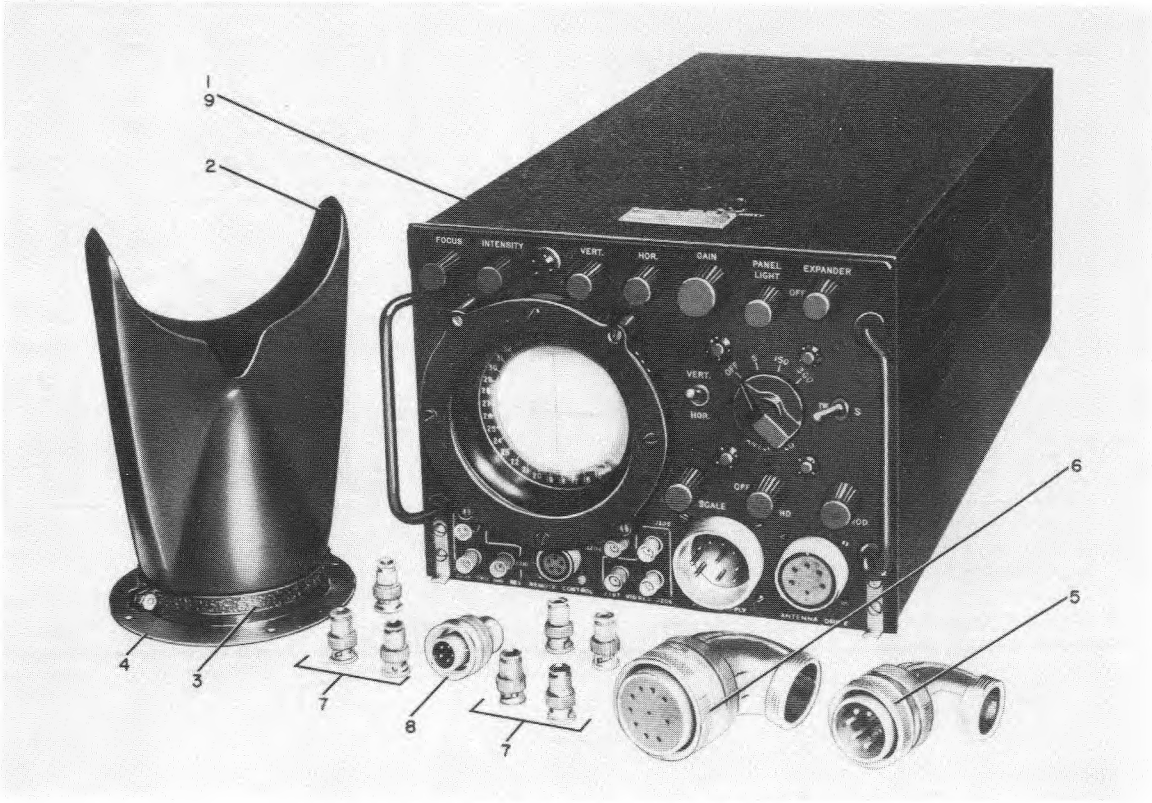

Figure 6. Azimuth Indicator IP-243/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
6-	AU-54-1	AZIMUTH INDICATOR IP-243/ALA-6	1	A
	AU-54-2	AZIMUTH INDICATOR IP-243/ALA-6	1	B
-1	AA-806-1	. COVER, Dust	1	A
	AA-806-2	. COVER, Dust	1	B
-2	PK-3515	. HOOD, Viewing	1	
-3	AS-1648-1	. CLAMP, Viewing Hood	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Binding head machine, no. 8-32, brass, ½ in. lg, black oxide finish	1	
	COMM	. NUT, Hexagon machine, no. 8-32, brass, black oxide finish	1	
	COMM	. WASHER, Split lock, for no. 8 size screw, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-4	OM-1586-1	. ADAPTER, Viewing Hood	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Binding head machine, no. 8-32, brass, ½ in. lg, black oxide finish	4	
	COMM	. WASHER, Split lock, for no. 8 size screw, brass, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-5	AN3108B-22-15P	. CONNECTOR, Plug (MIL-C-5015)	1	
-6	AN3108B-28-19S	. CONNECTOR, Plug (MIL-C-5015)	1	
-7	UG-260/U	. CONNECTOR, Plug (MIL-C-3608)	7	
-8	AN3106B-14S-5P	. CONNECTOR, Plug (MIL-C-5015)	1	
-9	AA-832-1	. CHASSIS ASSEMBLY, Azimuth Indicator (See figure 7)	1	
7-	AA-832-1	CHASSIS ASSEMBLY, Azimuth Indicator (See figure 6)	Ref	
-1	TS103U02	. SHIELD, Electron Tube (JAN-S-28A)	5	
-2	TSFOT101	. SHIELD, Electron Tube (JAN-S-28A)	3	
-3	5814A	. TUBE, Electron (MIL-E-1B)	5	
-4	5654/6AK5W/6096	. TUBE, Electron (MIL-E-1B)	2	
-5	5725/6AS6W	. TUBE, Electron (MIL-E-1B)	1	
-6	6005/6AQ5W/6095	. TUBE, Electron (MIL-E-1B)	2	
-7	5670	. TUBE, Electron (MIL-E-1B)	2	
-8	K36004	. CAP, Anode (MLL)	1	
-9	XA-44	. TUBE ASSEMBLY, High Voltage	1	
		(ATTACHING PARTS)		
	OS-136	. SPACER	2	
	AN515PB6-15	. SCREW, Machine	2	
	AN960-6	. WASHER, Flat	2	

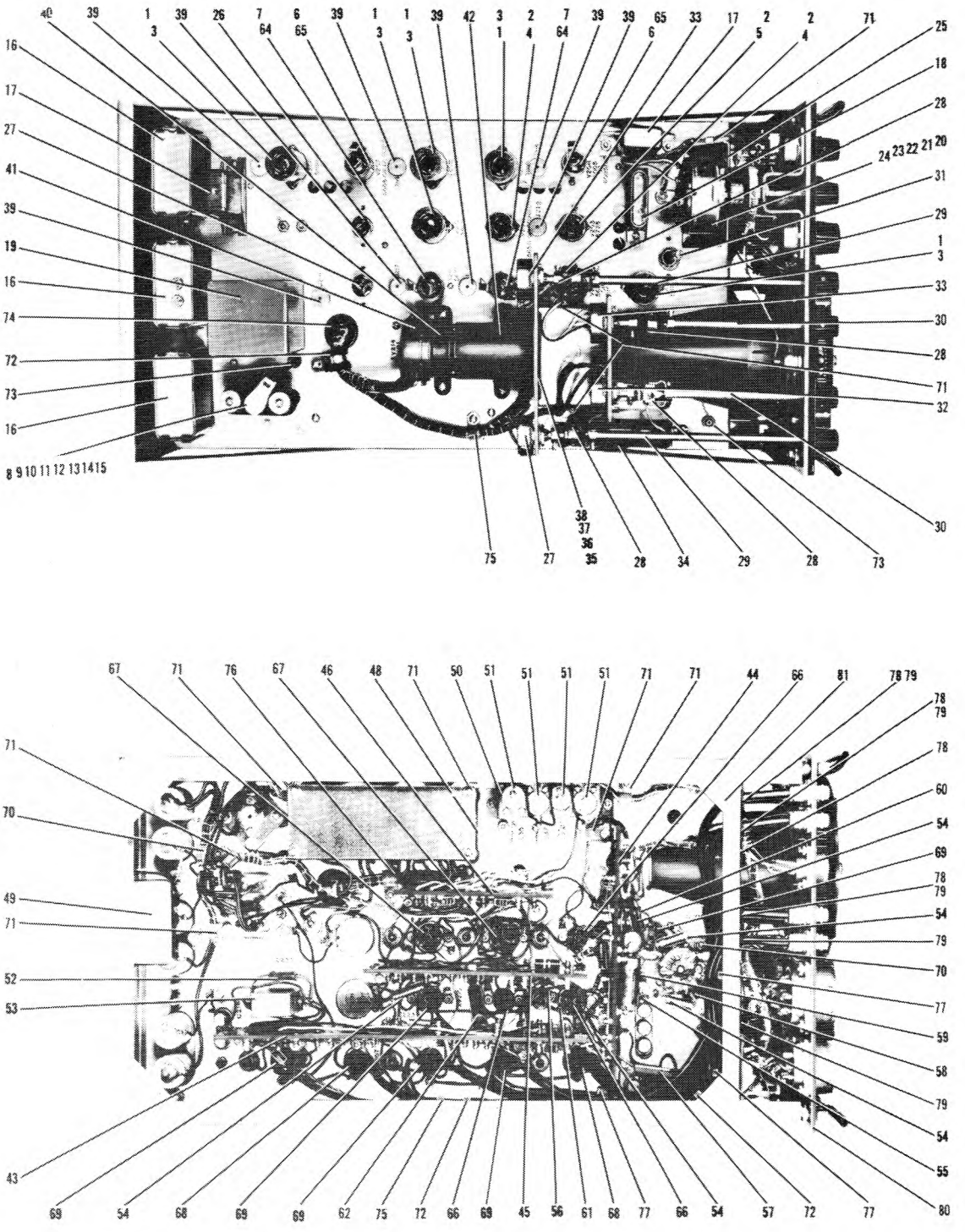

Figure 7. Chassis Assembly, Azimuth Indicator

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7* *Description*	*Units per Assy.*	*Appl. Code*
7-	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-10	OM-1546	. . SPRING, Tube	2	
		(ATTACHING PARTS)		
	AN515PB6-6	. . SCREW, Machine	2	
	SDH-91	. . WASHER, Flat	2	
	AN935B6	. . WASHER, Lock	2	
		- - - * - - -		
-11	EL-285	. . SHIELD, Electron Tube	1	
-12	1Z2	. TUBE, Electron (MIL-E-1B)	1	
-13	OM-1460	. . INSULATOR	2	
		(ATTACHING PARTS)		
	AN515PB6-6	. . SCREW, Machine	2	
	AN935B6	. . WASHER, Lock	2	
	COMM	. . WASHER, Flat, for no. 6 size screw, carbon steel, cadmium plated w/ chromate dip finish	2	
		- - - * - - -		
-14	119B6	. . SOCKET, Electron tube (ELCL)	1	
		(ATTACHING PARTS)		
	AN515-PB4-5	. . SCREW, Machine	2	
	AN935-B4	. . WASHER, Lock	2	
	COMM	. . NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-15	EL-284	. . BASE, Tube Socket	1	
-16	CP70E1EK104K	. CAPACITOR, Fixed, paper dielectric (JAN-C-25)	3	
		(ATTACHING PARTS)		
	CP07SB2	. BRACKET, Capacitor (JAN-C-25)	6	
	AN345C10	. NUT, Hexagon	6	
	AN935-10	. WASHER, Lock	6	
	29A	. LUG, Solder (Furnished with CP70E1EK104K) (ZE)	6	
		- - - * - - -		
-17	CP65B1EF105K	. CAPACITOR, Fixed, paper dielectric (JAN-C-25)	2	
		(ATTACHING PARTS)		
	AN515PB6-7	. SCREW, Machine	2	
	AN515PB6-8	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	4	
	2104-06-00	. LUG, Solder, cadmium plated (SH)	2	
		- - - * - - -		
-18	CP69B5FF104V	. CAPACITOR, Fixed, paper dielectric (JAN-C-25)	1	
		(ATTACHING PARTS)		
	AN515PB6-7	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
	2104-06-00	. LUG, Solder, cadmium plated (SH)	2	
		- - - * - - -		
-19	TS-243	. TRANSFORMER, Power (TNIC)	1	A
	TP-34	. TRANSFORMER. Power (HLI)	1	B
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	4	
	2014-08-00	. LUG, Solder, cadmium plated (SH)	3	A
		- - - * - - -		
-20	AA-841-1	. SWITCH ASSEMBLY	1	
		(ATTACHING PARTS)		
	AN515PB6-7	. SCREW, Machine	2	
	AN515PB6-6	. SCREW, Machine	1	
	AN935B6	. WASHER, Lock	3	
		- - - * - - -		
-21	OM-1414	. . CAM, Coupling	1	
		(ATTACHING PARTS)		
	AN565B6-3HS	. . SCREW, Set	4	
		- - - * - - -		
-22	OM-1405	. . SHAFT, Control	1	
23	SS01A20	. . SWITCH, Sensitive (JAN-S-63)	1	
		(ATTACHING PARTS)		
	AN515PB6-15	. . SCREW, Machine	1	
	AN935B6	. . WASHER, Lock	2	
	AN960-6	. . WASHER, Flat	4	
	HM-713	. . SCREW, Machine	1	
		- - - * - - -		
-24	212A	. . SWITCH, Rotary (OM)	1	
		(ATTACHING PARTS)		
	COMM	. . NUT, Hexagon, machine, no. 5/8-32, brass, cadmium plated w/chromate dip finish	1	

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
7-	COMM	. . WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
	AN960-616L	. . WASHER, Flat	1	
		---*---		
-25	AA-847-1	. . BRACKET, Switch Mounting	1	
-26	RV4ATSD103A	. RESISTOR, Variable (MIL-R-94A)	1	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
	L-SM	. LOCK, Shaft	1	
		---*---		
-27	RV4ATSD504A	. RESISTOR, Variable (MIL-R-94A)	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	2	
	COMM	. WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	2	
	L-SM	. LOCK, Shaft	2	A
	L-SM	. LOCK, Shaft	1	B
		---*---		
-28	K39001	. COUPLING, Flexible (MLL)	4	
-29	OM-1406	. SHAFT, Control	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Light machine, no. 6-32, brass, cadmium plated, chromate finish	2	B
	AN515PB6-5	. SCREW	2	B
	AN935B6	. WASHER, Lock	2	B
	8045000401	. PLATE, Shaft	1	B
	8045000400	. CLAMP, Shaft	1	B
		---*---		
-30	OM-1407	. SHAFT, Control	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Light machine, no. 6-32, brass, cadmium plated, chromate finish	2	B
	AN515PB6-5	. SCREW, Machine	2	B
	AN935B6	. WASHER, Lock	2	B
	8045000401	. PLATE, Shaft	1	B
	8045000400	. CLAMP, Shaft	1	B
		---*---		
-31	SW-111-1	. SWITCH, Rotary	1	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
		---*---		
-32	RV4ATSD104A	. RESISTOR, Variable (MIL-R-94A)	1	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
		---*---		
-33	RV4ATSD353A	. RESISTOR, Variable (MIL-R-94A)	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	2	
	COMM	. WASHER, Internal lock, for ⅜ in. size screw, phosphor bronze, cadmium plated w/chromate dip finish	2	
		---*---		
-34	RW34G5R0	. RESISTOR, Fixed, wirewound (JAN-R-26A)	1	
		(ATTACHING PARTS)		
	6101	. BRACKET, Resistor mounting (pair) (OM)	1	
	COMM	. SCREW, Round head machine, no. 8-32, brass, 3½ in. lg, cadmium plated	1	
	COMM	. WASHER, Resistor insulating, mica, washer dia 1 in., hole dia ½ in.	2	
	COMM	. WASHER, Resistor centering, metal, washer dia ¾ in., hole dia 3/16 in.	2	
	COMM	. WASHER, External lock, for no. 8 size screw, phosphor bronze, cadmium plated finish	1	
	COMM	. NUT, Hexagon machine, no. 8-32, brass, cadmium plated w/chromate dip finish	1	
	AN520C10-8	. SCREW, Machine	2	
	AN345C10	. NUT, Hexagon	2	
	AN935-10	. WASHER, Lock	2	
	AN960C10	. WASHER, Flat	2	
		---*---		
-35	AA-837-1	. BRACKET ASSEMBLY	1	
		(ATTACHING PARTS)		
	AN515PB6-4	. SCREW, Machine	2	

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
7-	AN515PB6-5	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	4	
	COMM •	. FASTENER, Pem, no. 6-32, steel, cadmium plated	4	
		- - - * - - -		
-36	AS-1462	. . BRACKET	1	
-37	EL-288	. . BOARD, Mounting	1	
-38	EL-289	. . BOARD, Mounting	1	
-39	SDJ-1	. CONNECTOR, Receptacle	9	
-40	3WP1	. TUBE, Cathode Ray (DUMT)	1	
		(ATTACHING PARTS)		
-41	59-402	. SOCKET, Cathode Ray Tube (AMP)	1	
		- - - * - - -		
-42	AA-823-1	. SHIELD, Cathode Ray Tube	1	
		(ATTACHING PARTS)		
	AN515PB4-3	. SCREW, Machine	3	
	AN935B-4L	. WASHER, Lock	3	
	AN515PB6-5	. SCREW, Machine	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
	AN935B6	. WASHER, Lock	2	
		- - - * - - -		
-43	EA-499-1	. BOARD ASSEMBLY, Terminal (See figure 13)	1	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	3	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	3	
	AN935B4	. WASHER, Lock	3	
		- - - * - - -		
-44	EA-498-1	. BOARD ASSEMBLY, Terminal (See figure 12)	1	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	1	
	AN515PB4-7	. SCREW, Machine	1	
	AN960-4	. WASHER, Flat	1	
	AN935B4	. WASHER, Lock	2	
	COMM	. NUT, Hexagon machine, no. 4-32, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-45	EA-495-1	. BOARD ASSEMBLY, Terminal (See figure 9)	1	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	2	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	2	
	AN935B4	. WASHER, Lock	2	
		- - - * - - -		
-46	EA-497-1	. BOARD ASSEMBLY, Terminal (See figure 11)	1	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	2	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	2	
	AN935B4	. WASHER, Lock	2	
		- - - * - - -		
-47	EL-295	. COVER, Terminal Board Assembly	1	
		(ATTACHING PARTS)		
	AN960-6	. WASHER, Flat	4	
	NS-3-U-0110	. INSULATOR (JAN-I-8)	4	
	AN515PB6-6	. SCREW, Machine	4	
	AN935B6	. WASHER, Lock	4	
		- - - * - - -		
-48	EA-496-1	. BOARD ASSEMBLY, Terminal (See figure 10)	1	
		(ATTACHING PARTS)		
	AN515PB6-20	. SCREW, Machine	4	
	AN935B6	. WASHER, Lock	4	
	OS-144	. SPACER, Deck fitting	4	
		- - - * - - -		
-49	SS03A20	. SWITCH, Interlock (JAN-S-63)	1	
		(ATTACHING PARTS)		
	AS-1468	. BRACKET, Mounting	1	
	AN515-6-16	. SCREW, Machine	2	
	AN365-632A	. NUT, Hexagon elastic lock	2	
	AN505PB4-4	. SCREW, Machine	3	
		- - - * - - -		
-50	AA-845-1	. CAPACITOR and BRACKET ASSEMBLY	1	
		(ATTACHING PARTS)		
	AN515PB6-6	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	2	
	COMM	. FASTENER, Pem, no. 6-32, steel, cadmium plated	2	
		- - - * - - -		
-51	822BC	. . CAPACITOR, Variable (CN)	4	
		(ATTACHING PARTS)		
	AN515PB4-8	. . SCREW, Machine	8	

Fig. and Index No.	Part Number	Description (1 2 3 4 5 6 7)	Units per Assy.	Appl. Code
7-	AN340B-4	. . NUT, Hexagon	8	
	AN935B-4	. . WASHER, Lock	8	
	SDH-113	. . WASHER, Fibre	8	
		- - - * - - -		
-52	CM20B431J	. CAPACITOR, Fixed, mica dielectric (JAN-C-5)	1	
-53	TA-70	. TRANSFORMER, Oscillator Blocking	1	
		(ATTACHING PARTS)		
	AN935B6	. WASHER, Lock	2	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-54	91P10304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	7	
-55	1N70	. RECTIFIER, Crystal (MIL-E-1B)	1	
-56	RC42GF103K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-57	CM25B102J	. CAPACITOR, Fixed, mica dielectric (JAN-C-5)	1	
-58	RC20BF102K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-59	RC20BF104K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-60	RC20BF274K	. RESISTOR, Fixed, composition (JAN-R-11)	3	
-61	RC20BF273K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-62	91P10404S2	. CAPACITOR, Fixed, paper dielectric (SPR)	1	
-63	RC20BF470K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-64	2900	. CLAMP, Electron Tube (STAV)	2	
-65	20B	. CLAMP, Electron Tube (STAV)	2	
-66	TS102P01	. SOCKET, Electron Tube (JAN-S-28A)	3	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	6	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	6	
	AN935B-4	. WASHER, Lock	6	
	2104-04-00	. LUG, Terminal solder, cadmium plated (SH)	6	
		- - - * - - -		
-67	271BC	. SOCKET, Electron Tube (ELCL)	2	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	2	
	2104-04-00	. LUG, Terminal solder, cadmium plated (SH)	3	
	AN515PB4-4	. SCREW, Machine	2	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	AN935B-4	. WASHER, Lock	4	
		- - - * - - -		
-68	105BC	. SOCKET, Electron Tube (ELCL)	2	
		(ATTACHING PARTS)		
	AN515PB4-5	. SCREW, Machine	3	
	2104-04-00	. LUG, Terminal solder, cadmium plated (SH)	3	
	AN515PB4-4	. SCREW, Machine	1	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	AN935B-4	. WASHER, Lock	4	
		- - - * - - -		
-69	TS103P01	. SOCKET, Electron Tube (JAN-S-28A)	5	
		(ATTACHING PARTS)		
	AN515PB4-4	. SCREW, Machine	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	10	
	AN935B-4	. WASHER, Lock	10	
	AN515PB4-5	. SCREW, Machine	6	
	2104-04-00	. LUG, Terminal solder, cadmium plated (SH)	6	
		- - - * - - -		
-70	HP-4N	. CLAMP, Cable (BE)	2	
-71	HP-3N	. CLAMP, Cable (BE)	8	A
	HP-34	. CLAMP, Cable (BE)	9	B
		(ATTACHING PARTS)		
	AN505PB6-8	. SCREW, Machine	1	
	AN515PB6-6	. SCREW, Machine	1	
	AN515-6-8	. SCREW, Machine	6	
	AN364-632A	. NUT, Hexagon elastic lock	6	
	AN960-6	. WASHER, Flat	9	
		- - - * - - -		
-72	HP-6N	. CLAMP, Cable (BE)	3	
		(ATTACHING PARTS)		
	AN505-8-8	. SCREW, Machine	2	
	AN364-832A	. NUT, Hexagon elastic lock	2	
	AN960-8	. WASHER, Flat	2	
		- - - * - - -		
-73	AN931-3-S	. GROMMET, Rubber	3	
-74	AN931-8-13	. GROMMET, Rubber	1	
-75	HP-5N	. CLAMP, Cable (BE)	2	
		(ATTACHING PARTS)		
	AN505-8-8	. SCREW, Machine	2	

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
7	AN364-832A	. NUT, Hexagon elastic lock	2	
	AN960-8	. WASHER, Flat	2	
		- - - * - - -		
-76	HP-7N	. CLAMP, Cable (BE)	1	
		(ATTACHING PARTS)		
	AN515PB6-6	. SCREW, Machine	1	
	AN364-632A	. NUT, Hexagon elastic lock	1	
	AN960-6	. WASHER, Flat	1	
		- - - * - - -		
-77	TA-798-8	. CLAMP, Cable (THAS)	3	
		(ATTACHING PARTS)		
	AN505-8-8	. SCREW, Machine	1	
	AN515-8-8	. SCREW, Machine	2	
	AN364-832A	. NUT, Hexagon elastic lock	3	
		- - - * - - -		
-78	AN931-10-14	. GROMMET, Rubber	4	
-79	SDH-88	. GROMMET, Rubber	5	
-80	No Number	. FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 8)	NP	
-81	AA-812A-1	. CHASSIS, Azimuth Indicator	1	

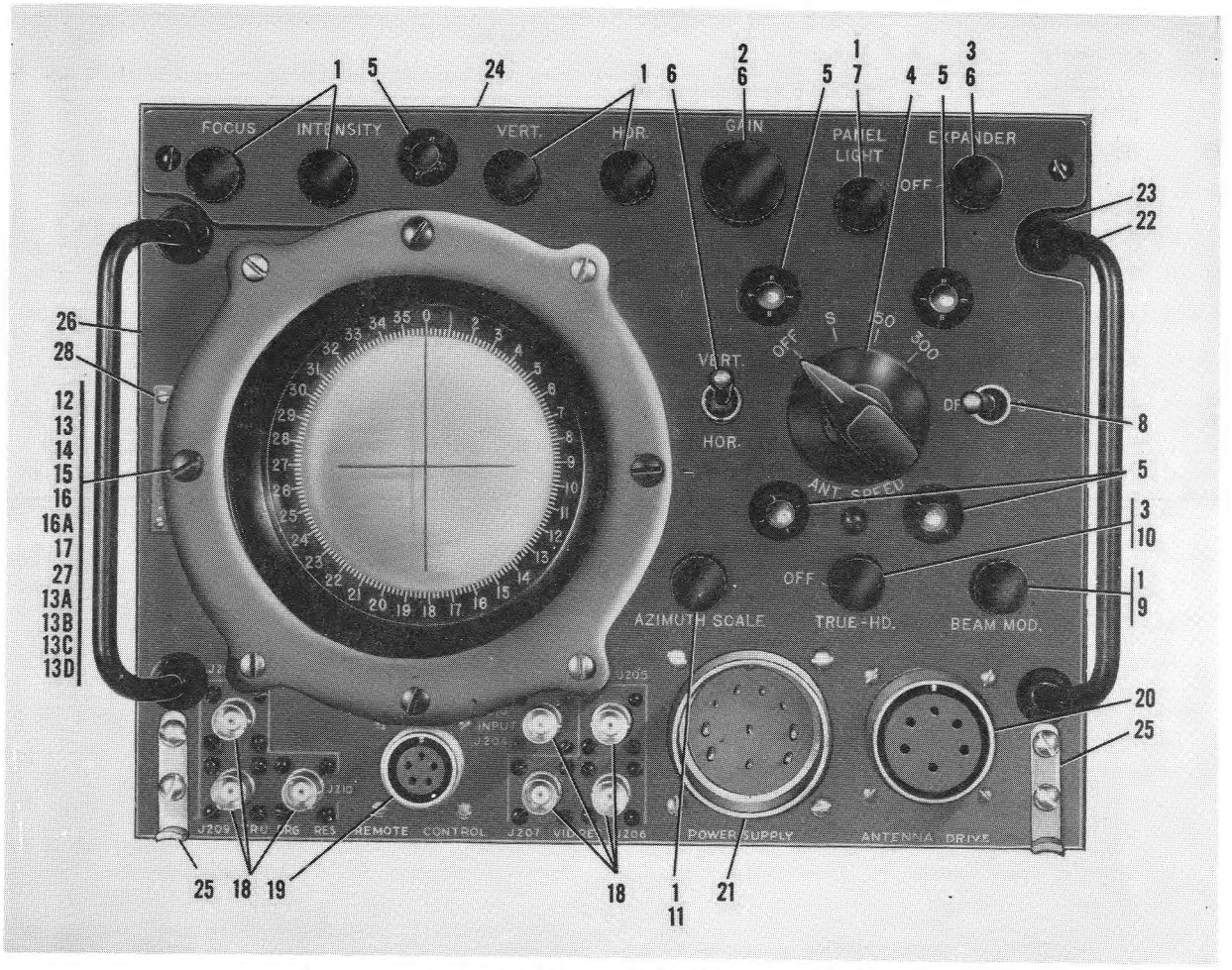

Figure 8. Front Panel Assembly, Azimuth Indicator

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
8-	AA-831-1	FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 7)	Ref	A B
	AA-831-2	FRONT PANEL ASSEMBLY, Azimuth Indicator (See figure 7)	Ref	C
-1	EK-41-1	. KNOB, Control	7	
-2	EK-42-1	. KNOB, Control	1	
-3	EK-40-1	. KNOB, Control	2	
-4	EK-39-1	. KNOB, Control	1	
-5	TT-51A	. LAMPHOLDER (includes 28v lamp) (DLC)	5	
		(ATTACHING PARTS)		
	SDH-37	. NUT, Hexagon (Furnished with TT-51A)	5	
	SDH-15	. WASHER, Internal lock (Furnished with TT-51A)	5	
		- - - * - - -		
-6	RV4ATSD104A	. RESISTOR, Variable (JAN-R-19)	1	
-7	RP102FJ201KK	. RESISTOR, Variable	1	
		(ATTACHING PARTS)		
	SDH-167	. WASHER	1	
		- - - * - - -		
-8	ST-42D	. SWITCH, Toggle	2	
-9	RV4ATSD253A	. RESISTOR, Variable	2	
-10	RV4ATSD503A	. RESISTOR, Variable	1	
-11	RA20A1FD501AK	. RESISTOR, Variable	1	
-12	AC-185	. RING, Crash	1	A**
	8071100025	. RING, Crash	1	C
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, fillister recessed head, no. 10-32, 1 in. lg, brass, black oxide finish	4	A B
	COMM	. SCREW, Machine, fillister recessed head, no. 10-32, 1¼ in. lg, brass, black oxide finish	4	C
	8071100059	. SUPPORT, Crash ring (HLI)	4	B**
	COMM	. FASTENER, Pem. no. 10-32, cadmium plated	4	
		- - - * - - -		

**Parts apply to A and B equipments after azimuth indicator modification has been made.

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
8-13	OA-319	. RING ASSEMBLY, CRT display	1	A B
	8021000008	. RING ASSEMBLY, CRT display	1	C
-13A	OM-1373	. . RETAINER, Packing	1	A B
	8045000343	. . RETAINER and lamp mounting	1	C
		(ATTACHING PARTS)		
	COMM	. . SCREW, Round head machine, no. 4-40, brass, 1/4 in. lg, nickel finish	6	A B
	COMM	. . SCREW, Round head machine, no. 4-40, brass, 5/16 in. lg, nickel finish	6	C
	8065001174	. . SPACER	6	A B
	8065001169	. . SPACER	6	C
		- - - * - - -		
-13B	8031100036	. . LIGHT ASSEMBLY	2	C
		(ATTACHING PARTS)		
	1589900036	. . NUT, Hexagon, 15/32-32 thread, brass, nickel finish, supplied w/item 8-12B	2	C
	AN936A716S	. . WASHER, supplied w/item 8-12B	2	C
		- - - * - - -		
-13C	NM-18-1	. . DIAL CONTROL	1	A B
	8081100246	. . DIAL CONTROL	1	C
		(ATTACHING PARTS)		
	AS-1445	. . SPRING, Dial control	3	
		- - - * - - -		
-13D	NM-19-1	. . WINDOW DIAL	1	A B
	8081100247	. . WINDOW DIAL	1	C
		(ATTACHING PARTS)		
	AS-1444	. . SPRING, Window dial	1	
-14	OM-1374	. . RETAINER, Packing, window dial	1	
	1881000855	. . SCREW, Countersunk head, no. 4-40, ¼ in. lg, brass, nickel plated, w/chromate dip finish	6	
		- - - * - - -		
-15	OM-1370	. . RETAINER, Stationary	1	A B
	8065000857	. . RETAINER, Stationary	1	C
-16	AC-186	. . RING, Revolving	1	
-16A	PK-2581	. . WASHER, Revolving ring	1	
-17	7-R-2	. . BEARING (ND)	3	
		(ATTACHING PARTS)		
	R-RE-12C-C10	. . RETAINING RING, Truarc	4	
	OM-1375	. . PIN, Bearing	1	
	OM-1372	. . PIN, Bearing	2	
	OM-1446	. . SPRING, Bearing support	1	
	COMM	. . SCREW, Machine, slotted fillister head, no. 5-56, 3/16 in. lg, cadmium plated, w/chromate dip finish	2	
	COMM	. . WASHER, Split lock, size 2, steel, cadmium plated, w/chromate dip finish	2	
-18	UG-262B/U	. CONNECTOR, Receptacle (MIL-C-71A)	7	
		(ATTACHING PARTS)		
	AN520B3-4	. SCREW, Machine	28	
		- - - * - - -		
-19	AN3102A-14S-5S	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515PB4-6	. SCREW, Machine	4	
	AN935-B4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	2104-04-00	. LUG, Solder, tin dipped (SH)	1	
		- - - * - - -		
-20	AN3102A-22-15S	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515PB4-7	. SCREW, Machine	4	
	AN935-B4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	2104-04-00	. LUG, Solder, tin dipped (SH)	1	
		- - - * - - -		
-21	AN3102A-28-19P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515PB6-7	. SCREW, Machine	4	
	AN935B6	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	4	
	2104-06-00	. LUG, Solder, tin dipped (SH)	1	
		- - - * - - -		
-22	OM-1415	. HANDLE, Panel	2	
-23	HM-679	. HUB, Handle	4	
		(ATTACHING PARTS)		
	AN340C-10	. NUT, Hexagon	4	
	AN935-10	. WASHER, Lock	4	
		- - - * - - -		
-24	ND-6A-1	. PANEL, Edge-lighting	1	
		(ATTACHING PARTS)		
	AN515B6-5	. SCREW, Machine	3	
		- - - * - - -		
-25	HM-685	. HOOK, Hold-down	2	

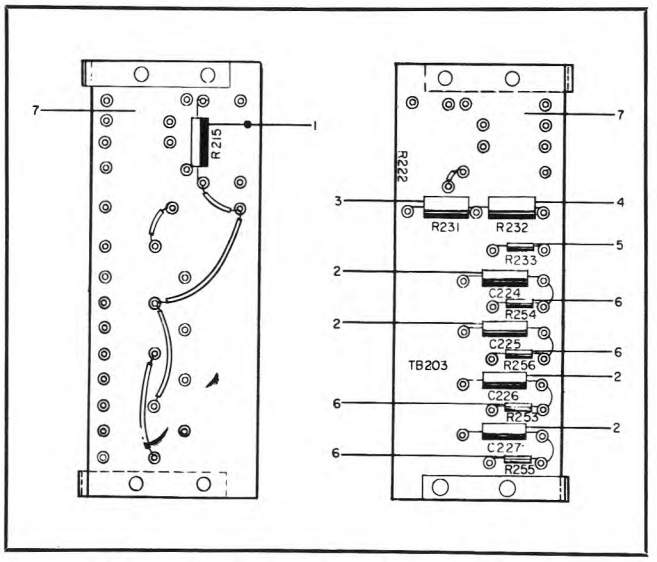

Figure 9. Board Assembly, Terminal

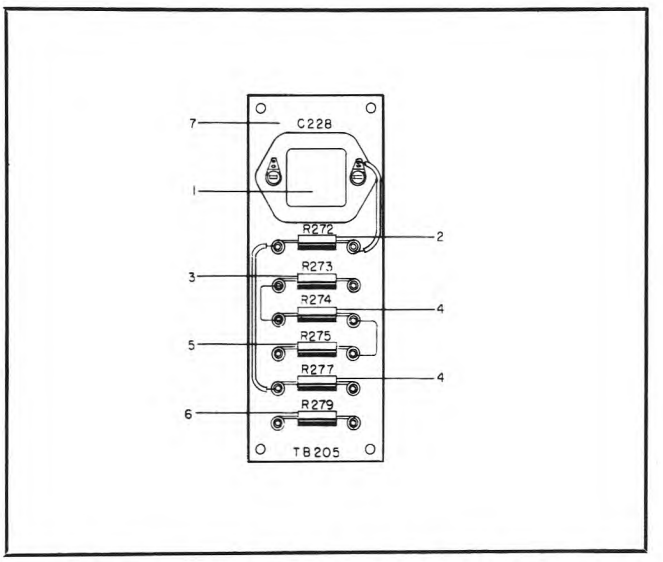

Figure 10. Board Assembly, Terminal

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7* *Description*	*Units per Assy.*	*Appl. Code*
8-				
		(ATTACHING PARTS)		
	AN515B8-8	. SCREW, Machine	4	
	AN340B8	. NUT, Hexagon machine	4	
	AN935-8	. WASHER, Lock	4	
		- - - * - - -		
-26	AA-851-1	. PANEL SUBASSEMBLY, Front	1	
-27	IA-11-1	. GUIDE ASSEMBLY, Light	1	A B
-28	NP-227	. NAMEPLATE, Serial number	1	A
	8111100035	. NAMEPLATE, Serial Number	1	B C
		(ATTACHING PARTS)		
	AN515B4-3	. SCREW, Machine	2	
9-	EA-495-1	BOARD ASSEMBLY, Terminal (See figure 7)	Ref	
-1	RC42GF104K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-2	91P10304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	4	
-3	RC42GF103K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-4	RC42GF562K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-5	RC20BF183K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-6	RC20BF102K	. RESISTOR, Fixed, composition (JAN-R-11)	4	
-7	EA-490-1	. BOARD, Terminal	1	
10-	EA-496-1	BOARD ASSEMBLY, Terminal (See figure 7)	Ref	
-1	CM60B103K	. CAPACITOR, Fixed, mica dielectric (JAN-C-5)	1	
		(ATTACHING PARTS)		
	AN515PB6-5	. SCREW, Machine	4	
	AN936A6	. WASHER, Lock	4	
	2104-06-00	. LUG, Terminal solder	2	
		- - - * - - -		
-2	RC20BF224K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-3	RC30BF394K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-4	RC30BF334K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-5	RC30BF224K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-6	RC30BF104K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-7	EA-491-1	. BOARD, Terminal	1	
11-	EA-497-1	BOARD ASSEMBLY, Terminal (See figure 7)	Ref	
-1	RC20BF224K	. RESISTOR, Fixed, composition (JAN-R-11)	4	
-2	RC20BF105K	. RESISTOR, Fixed, composition (JAN-R-11)	4	
-3	RC42GF273K	. RESISTOR, Fixed, composition (JAN-R-11)	4	
-4	EA-492-1	. BOARD, Terminal	1	
12-	EA-498-1	BOARD ASSEMBLY, Terminal (See figure 7)	Ref	
-1	181P47401S1	. CAPACITOR, Fixed, paper dielectric (SPR)	2	
-2	181P10401S1	. CAPACITOR, Fixed, paper dielectric (SPR)	3	

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
12-3	RC20BF102K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-4	RC20BF185K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-5	RC20BF274K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-6	RC20BF564K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-7	RC20BF182K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-8	RC42GF104K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-9	RC20BF125K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-10	RC20BF105K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-11	RC20BF104K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-12	RC20BF183K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-13	EA-493-1	. BOARD, Terminal	1	
13-	EA-499-1	BOARD ASSEMBLY, Terminal (See figure 7)	Ref	
-1	1N70	. RECTIFIER, Crystal (MIL-E-1B)	3	
-2	191P10202S2	. CAPACITOR, Fixed, paper dielectric (SPR)	1	

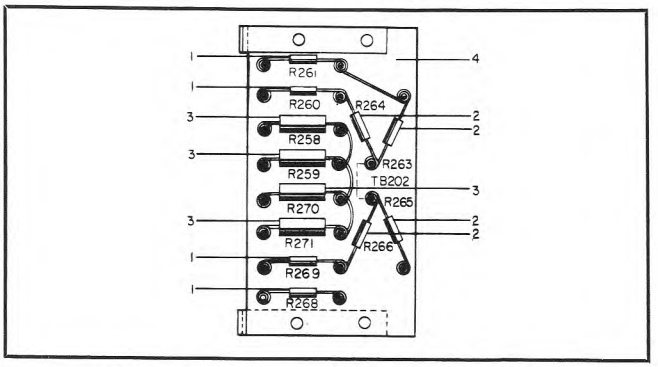

Figure 11. Board Assembly, Terminal

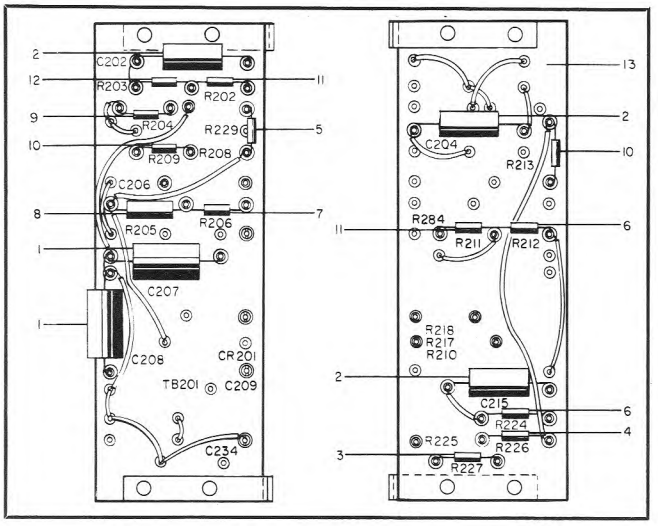

Figure 12. Board Assembly, Terminal

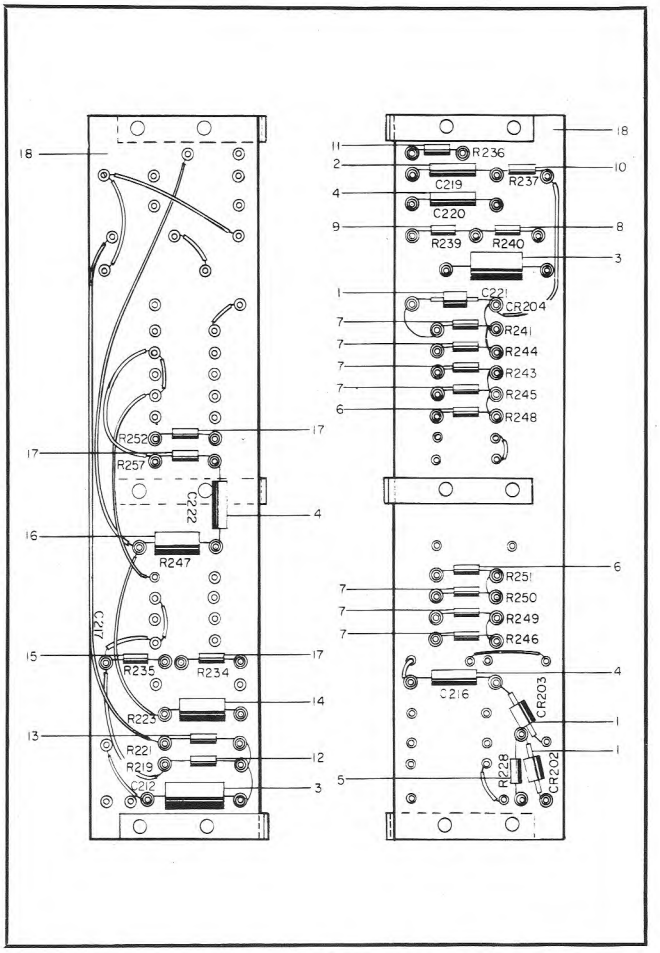

Figure 13. Board Assembly, Terminal

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7* *Description*	*Units per Assy.*	*Appl. Code*
13-3	181P10401S1	. CAPACITOR, Fixed, paper dielectric (SPR)	2	
-4	91P10304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	3	
-5	RC20BF473K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-6	RC20BF101K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-7	RC20BF102K	. RESISTOR, Fixed, composition (JAN-R-11)	7	
-8	RC20BF185K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-9	RC20BF125K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-10	RC20BF274K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-11	RC20BF273K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-12	RC20BF103K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-13	RC20BF105K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-14	RC42GF473K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-15	RC20BF221K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-16	RC42GF103K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-17	RC20BF564K	. RESISTOR, Fixed, composition (JAN-R-11)	3	
-18	EA-494-1	. BOARD, Terminal	1	
14-	OA-322	ANTENNA DRIVE TG-23/ALA-6	1	
-1	AA-798-1	. PLATE, Cover	1	
		(ATTACHING PARTS)		
-2	AN3-C4A	. BOLT, Machine	4	
		- - - * - - -		
-3	AS-1412	. PLATE, Cover	1	
		(ATTACHING PARTS)		
-4	AN3-C4A	. BOLT, Machine	4	
		- - - * - - -		
-5	AN3102A-22-15P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
-6	COMM	. SCREW, Machine, round head, no. 4-40, steel, 5/16 in. lg, cadmium plated w/chromate dip finish	4	
-7	AN936A-4	. WASHER, Lock	4	

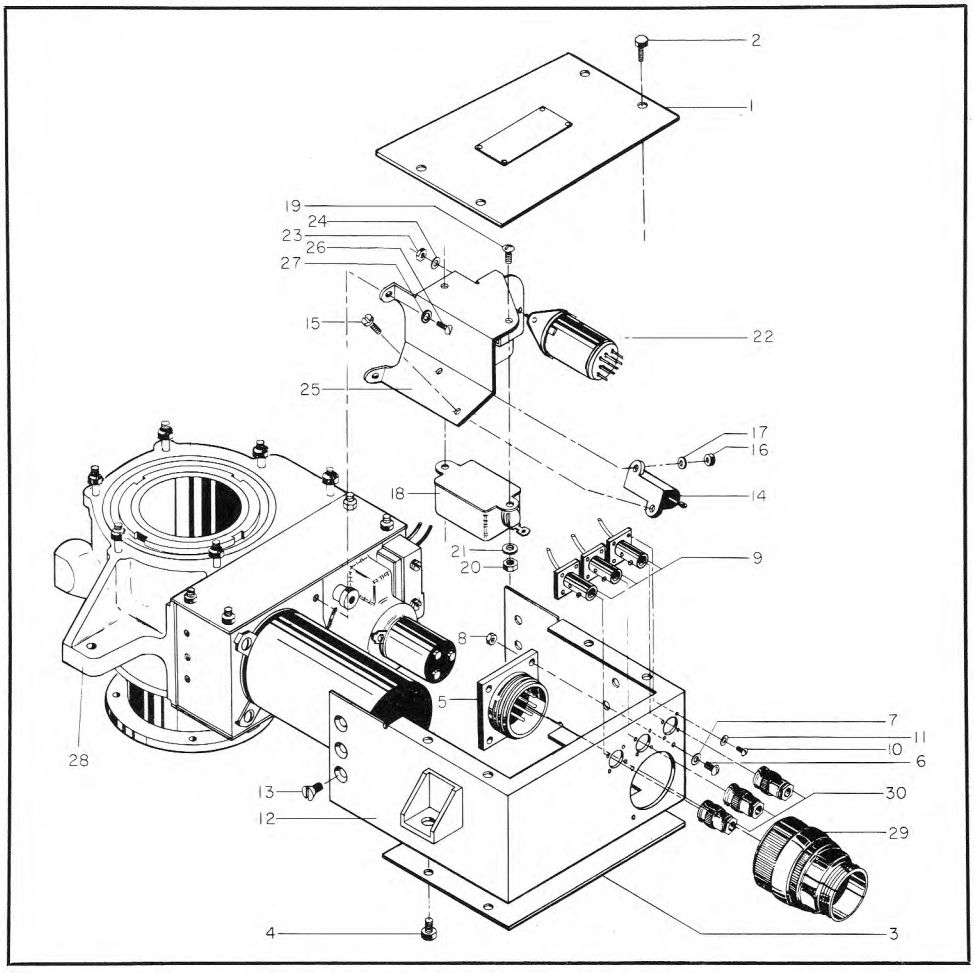

Figure 14. Antenna Drive TG-23/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
14-8	COMM	. NUT, Hexagon, machine, no. 4-40, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-9	UG-290/U	. CONNECTOR, Receptacle (MIL-C-3608)	3	
		(ATTACHING PARTS)		
-10	COMM	. SCREW, Machine, round head, no. 3-48, steel, ¼ in. lg, cadmium plated w/ chromate dip finish	12	
-11	AN936A-3	. WASHER, Lock	12	
		- - - * - - -		
-12	AA-791-1	. HOUSING, Antenna Drive	1	
		(ATTACHING PARTS)		
-13	AN510-10-4	. SCREW, Machine	6	
		- - - * - - -		
-14	RH-25	. RESISTOR, Fixed, Wirewound (DABU)	1	
		(ATTACHING PARTS)		
-15	AN500-4-6	. SCREW, Machine	2	
-16	AN340-4	. NUT, Hexagon	2	
-17	AN935-4	. WASHER, Lock	2	
		- - - * - - -		
-18	FA-204	. FILTER, Radio Frequency (FILT)	1	
		(ATTACHING PARTS)		
-19	AN500-6-6	. SCREW, Machine	2	
-20	AN340-6	. NUT, Hexagon	2	
-21	AN935-6	. WASHER, Lock	2	
		- - - * - - -		
-22	MH-12	. RELAY, (ALL)	1	
		(ATTACHING PARTS)		
-23	AN340-6	. NUT, Hexagon	2	
-24	AN935-6	. WASHER, Lock	2	
		- - - * - - -		

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
14-25	AS-1411A-1	. BRACKET, Component mounting	1	
		(ATTACHING PARTS)		
-26	COMM	. SCREW, Machine, fillister head, no. 6-32, steel, ¼ in. lg, cadmium plated w/chromate dip finish	3	
-27	AN936A-6	. WASHER, Lock	3	
		- - - * - - -		
-28	OA-318-1	. DRIVE, Antenna (See figure 15)	1	
-29	AN3106-22-15S	. CONNECTOR, Plug (MIL-C-5015)	1	
-30	UG-260/U	. CONNECTOR, Plug (MIL-C-3608)	3	
14A-	OA-322-2	ANTENNA DRIVE TG-23A/ALA-6	1	B
-1	AA-798-2	. PLATE, Cover, w/nameplate 8111100026	1	B
		(ATTACHING PARTS)		
-2	AN3-C4A	. BOLT, Machine	4	
-2A	AN364-1032A	. NUT, Machine	4	
		- - - * - - -		
-3	AS-1412	. PLATE, Cover	1	B
		(ATTACHING PARTS)		
-4	AN3-C4A	. BOLT, Machine	4	
-4A	AN364-1032A	. NUT, Machine	4	
-5	AN3102A-22-15P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
-6	COMM	. SCREW, Machine, round head, no. 4-40, steel, 5/16 in. lg, cadmium plated, chromate finish	4	
-7	AN936A-4	. WASHER, Lock	4	

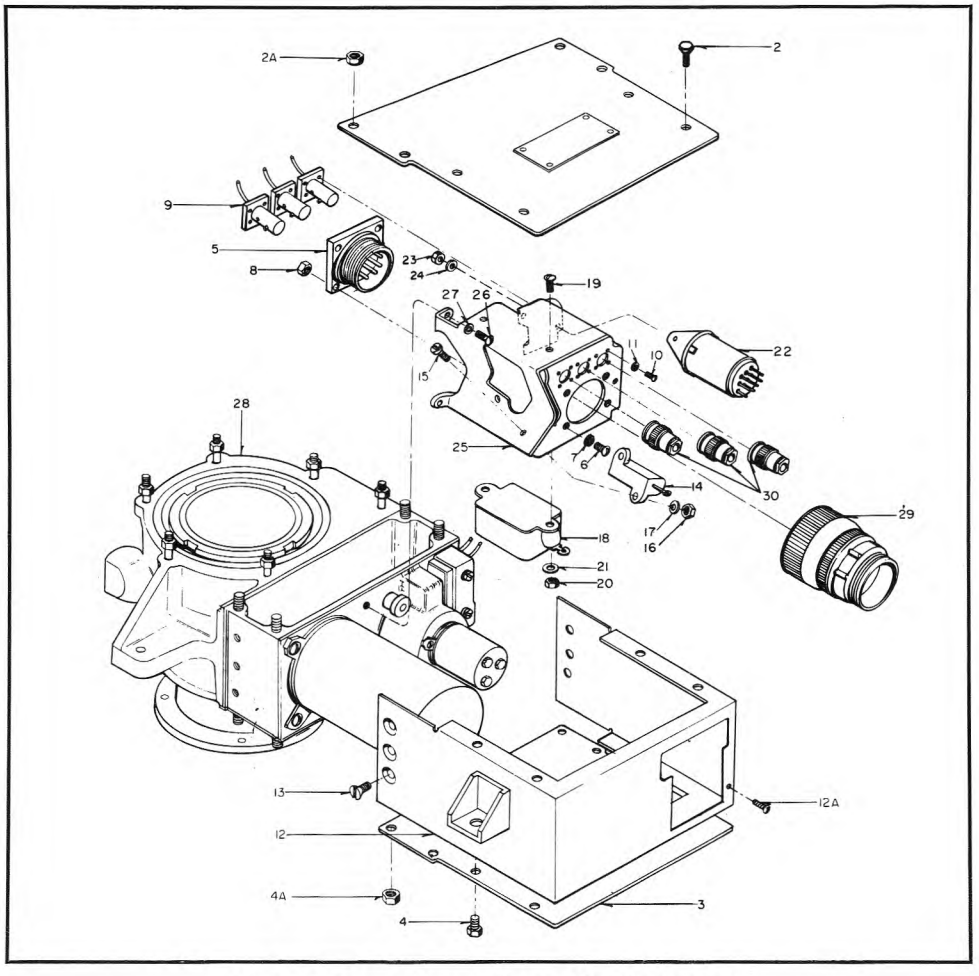

Figure 14A. Antenna Drive TG-23A/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
14A-8	COMM	. NUT, Machine, no. 4-40, cadmium plated, chromate finish	4	
		- - - * - - -		
-9	UG-290/U•	. CONNECTOR, Receptacle (MIL-C-3608)	3	
		(ATTACHING PARTS)		
-10	COMM	. SCREW, Machine, round head, no. 3-48, steel, ¼ in. lg, cadmium plated, chromate finish	12	
-11	AN936A-3	. WASHER, Lock	12	
		- - - * - - -		
-12	AA-791-2	. FRAME ASSEMBLY, Antenna drive	1	B
		(ATTACHING PARTS)		
-12A	AN520-10-7	. SCREW, Machine	1	B
-13	AN510-10-4	. SCREW, Machine	6	
		- - - * - - -		
-14	R-DM25-15	. RESISTOR, Fixed, wirewound	1	B
		(ATTACHING PARTS)		
-15	AN500-4-6	. SCREW, Machine	2	
-16	AN340-4	. NUT, Machine	2	
-17	AN935-4	. WASHER, Lock	2	
		- - - * - - -		
-18	ZA-7	. FILTER, Radio-Frequency (FILT)	1	B
		(ATTACHING PARTS)		
-19	AN500-6-6	. SCREW, Machine	2	
-20	AN340-6	. NUT, Machine	2	
-21	AN935-6	. WASHER, Lock	2	
		- - - * - - -		
-22	MH-12	. RELAY (ALL)	1	
		(ATTACHING PARTS)		
-23	AN340-6	. NUT, Machine	2	
-24	AN935-6	. WASHER, Lock	2	
		- - - * - - -		
-25	AS-1411A-2	. BRACKET, Component mounting	1	B
		(ATTACHING PARTS)		
-26	COMM	. SCREW, Machine, fillister head, no. 6-32, steel, ¼ in. lg, cadmium plated, chromate finish	3	
-27	AN936A-6	. WASHER, Lock	3	
		- - - * - - -		
-28	OA-318-1	. DRIVE, Antenna (See figure 15)	1	
-29	AN3106-22-15S	. CONNECTOR, Plug (MIL-C-5015)	1	
-30	UG-260/U	. CONNECTOR, Plug (MIL-C-3608)	3	
15-	OA-318-1	ANTENNA DRIVE SUBASSEMBLY (See figure 14)	Ref	
-1	AS-1413	. COVER, Gear Box	2	
		(ATTACHING PARTS)		
-2	AN364-1032A	. NUT, Hexagon	8	
		- - - * - - -		
-3	2715-2	. MOTOR, Direct Current (EIC)	1	
		(ATTACHING PARTS)		
-4	OM-1313	. CLAMP, Motor	3	
-5	AN500AC6-10	. SCREW, Machine	3	
-6	AN935-6	. WASHER, Lock	3	
		- - - * - - -		
-7	OM-1320	. GEAR, Spur	1	
		(ATTACHING PARTS)		
-8	AN500C6-5	. SCREW, Machine	1	
-9	AN960-C6	. WASHER, Flat	1	
-10	OM-1310	. KEY, Machine	1	
		- - - * - - -		
-11	OM-1306	. COVER, Worm bearing	1	
		(ATTACHING PARTS)		
-12	AN515C3-4	. SCREW, Machine	4	
-13	AN935-3L	. WASHER, Lock	4	
		- - - * - - -		
-14	HM-673	. NUT, Hexagon	1	
-15	AN381-2-14	. PIN, Cotter	1	
-16	97038X1	. BEARING, Ball (ND)	1	
-17	OM-1316	. GEAR, Worm	1	
-18	R4AXR1	. BEARING, Ball (ND)	1	
-19	2-172	. TERMINAL, Strip (JNS)	1	
		(ATTACHING PARTS)		
-20	AN515C4-7	. SCREW, Machine	4	
-21	AN935-4L	. WASHER, Lock	4	
		- - - * - - -		
-22	OA-295-1	. CONTROL SHAFT ASSEMBLY (See figure 16)	1	
		(ATTACHING PARTS)		
-22A	AN364-1032A	. NUT	6	
-22B	OM-1550	. SHIM	1	
		- - - * - - -		
-23	TSSM-10	. HEATER, Element (WG)	1	

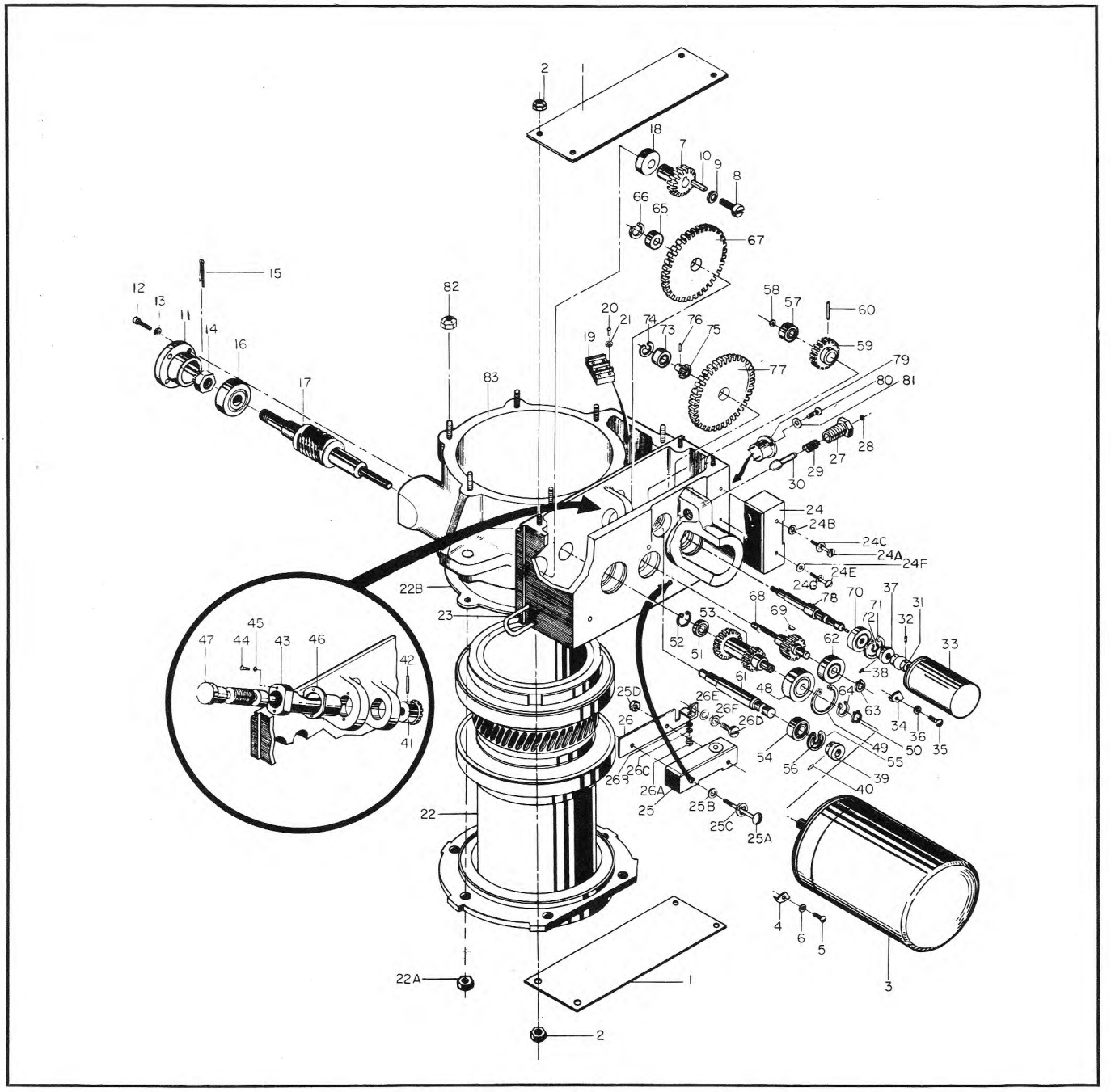

Figure 15. Antenna Drive Subassembly

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
15-24	BZ-2R104	. SWITCH, Sensitive (MCS)	1	
		(ATTACHING PARTS)		
-24A	HM-696	. SCREW, Captive (HLI)	1	
-24B	COMM	. WASHER, Machine, od 0.370 in., id 0.149 in., 0.016 in. thick, for no. 6 screw, cadmium plated, chromate finish	1	
-24C	AN936-A6	. WASHER	1	
-24E	2151000109	. SCREW, Binding head, no. 6-32, 1 in. lg, steel, cadmium plated, chromate finish (HLI)	1	
-24F	COMM	. WASHER, Machine, od 0.370 in., id 0.149 in., 0.016 in. thick, for no. 6 screw, cadmium plated, chromate finish	1	
-24G	AN936-6L	. WASHER	1	
		---*---		

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
15-25	BZ-2R104	. SWITCH, Sensitive (MCS)	1	
		(ATTACHING PARTS)		
-25A	2151000109	. SCREW, Binding head, no. 6-32, 1 in. lg, steel, cadmium plated, chromate finish (HLI)	2	
-25B	COMM	. WASHER, Machine, od 0.370 in., id 0.149 in., 0.016 in. thk, for no. 6 screw, cadmium plated, chromate finish	2	
-25C	AN936-A6	. WASHER	2	
-25D	AN340-6	. NUT	1	
-26	8041200127	. BRACKET, Switch	1	
-26A	COMM	. SCREW, Machine, fillister head, no. 4-40, ⅜ in. lg, steel, nickel finish	1	
-26B	3530-05-00	. WASHER, Spring locking (SH)	1	
-26C	COMM	. WASHER, Split lock, steel, od 0.202 in., id 0.124 in., 0.020 in. thick, cadmium plated, chromate finish	1	
-26D	AN500C6-4	. SCREW	1	
-26E	2151000044	. WASHER, Flat, brass, for no. 6 screw, 0.016 in. thick, cadmium plated, chromate finish	1	
-26F	AN935-6	. WASHER	1	
		- - - * - - -		
-27	OM-1311	. BUSHING, Actuator	1	
-28	5133-9	. RING, Retaining (WKI)	1	
-29	OM-1309	. SPRING, Actuator	1	
-30	OM-1312	. PLUNGER, Actuator	1	
-31	OA-357-1	. COUPLING, Gear Box	1	
		(ATTACHING PARTS)		
-32	AN565D4-H2	. SCREW, Set	4	
		- - - * - - -		
-33	BM-22	. RESOLVER, Synchro	1	
		(ATTACHING PARTS)		
-34	OM-1314	. CLAMP, Resolver	3	
-35	AN500C3-5	. SCREW, Machine	3	
-36	AN935-3L	. WASHER, Lock	3	
		- - - * - - -		
-37	OM-1331	. CAM, Camera	1	
		(ATTACHING PARTS)		
-38	AN565D4H3	. SCREW, Machine	2	
		- - - * - - -		
-39	OM-1329	. CAM, Cyclic	1	
		(ATTACHING PARTS)		
-40	AN565D4H3	. SCREW, Machine	2	
		- - - * - - -		
-41	OM-1307	. GEAR, Bevel	1	
		(ATTACHING PARTS)		
-42	R-E-5-10CS	. ROLLPIN	1	A
-42A	COMM	. SCREW, Set, hexagon socket, cup point, steel, no. 4-40, 3/16 in. lg, cadmium plated, chromate finish	1	B
		- - - * - - -		
-43	OM-1319	. BUSHING	1	
		(ATTACHING PARTS)		
-44	AN500C3-6	. SCREW, Machine	2	
-45	AN935-3L	. WASHER, Lock	2	
		- - - * - - -		
-46	AS-1417	. SHIM	1	
-47	OM-1324	. GEAR	1	
-48	R-6-X1	. BEARING, Ball (ND)	1	
-49	R-RE-37SS	. RING, Retaining (CLIP)	1	
-50	5100-37	. RING, Retaining (RMS)	1	
-51	R-3-XR1	. BEARING, Ball (ND)	1	
-52	5100-18	. RING, Retaining (WKI)	1	
-53	OA-292-1	. MOTOR SHAFT	1	
-54	7036	. BEARING, Ball (ND)	1	
-55	5100-23	. RING, Retaining (RMS)	1	
-56	5000-75	. RING, Retaining (RMS)	1	
-57	R-3-XR1	. BEARING, Ball (ND)	1	
-58	5100-18	. RING, Retaining (RMS)	1	

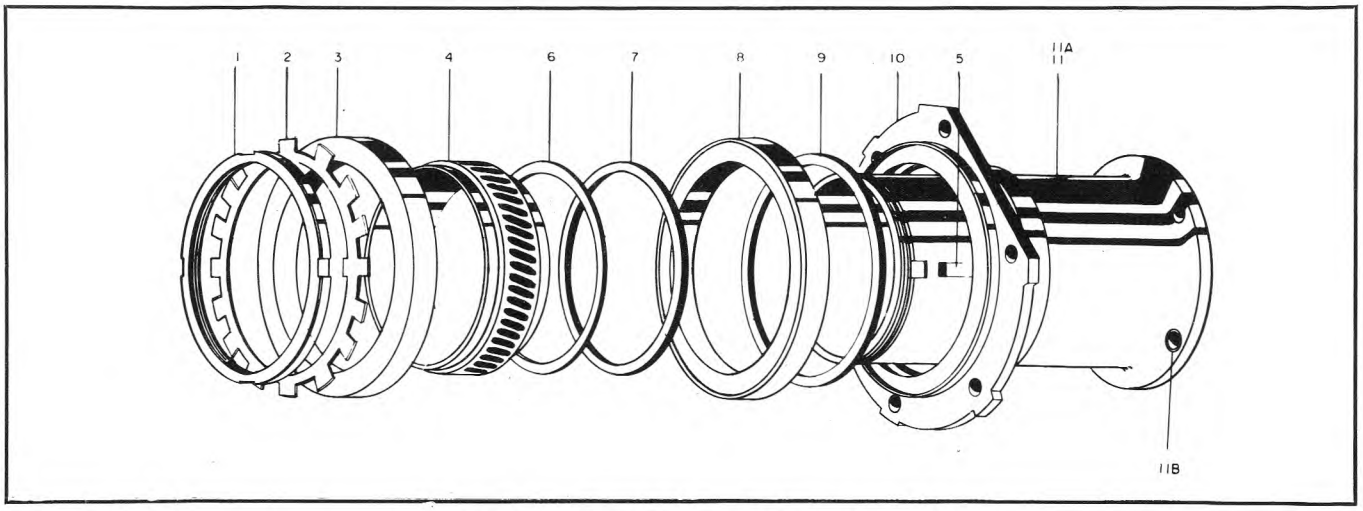

Figure 16. Control Shaft Assembly, Antenna Drive

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
15-59	OM-1318	. WORM, Cam	1	
		(ATTACHING PARTS)		
-60	R-E-5-8CS	. ROLLPIN (EN)	1	
		- - - * - - -		
-61	OM-1315	. SHAFT, Gear	1	
-62	7036	. BEARING, Ball (ND)	1	
-63	5100-23	. RING, Retaining (RMS)	1	
-64	5000-75	. RING, Retaining (RMS)	1	
-65	R-3XR1	. BEARING, Ball (ND)	1	
-66	5100-18	. RING, Retaining (RMS)	1	
-67	OM-1302	. GEAR	1	
-68	OM-1322	. PINION, Idler	1	
-69	AN280-202	. KEY, Shaft	1	
-70	7036	. BEARING, Ball (ND)	1	
-71	5100-23	. RING, Retaining (RMS)	1	
-72	5000-75	. RING, Retaining (RMS)	1	
-73	R-2AXR1	. BEARING, Ball (ND)	1	
-74	5100-12	. RING, Retaining (RMS)	1	
-75	OM-1304	. PINION, Bevel	1	
		(ATTACHING PARTS)		
-76	R-E-4-5CS	. ROLLPIN (EN)	1	
		- - - * - - -		
-77	OM-1297	. GEAR	1	
-78	OM-1323	. SHAFT, Gear	1	
-79	M-201	. THERMOSTAT, Antenna Drive (STMF)	1	
		(ATTACHING PARTS)		
-80	COMM	. SCREW, Fillister head machine, no. 4-40, steel, 3/8 in. lg, cadmium plated w/chromate dip finish	2	
-81	AN936A4	. WASHER, Lock	2	
		- - - * - - -		
-82	AN364-1032A	. NUT, Hexagon	6	
-83	OA-290A	. HOUSING, Gear Box	1	
16-	OA-295-1	SHAFT ASSEMBLY, Output (See figure 15)	Ref	
-1	OM-1305	. NUT, Lock	1	
-2	OM-1548	. WASHER, Lock	1	
-3	K47BK	. BEARING, Ball (FAF)	1	
-4	OM-1327	. GEAR, Worm	1	
-5	OM-1303	. KEY, Output Shaft	1	
-6	AS-1418	. SHIM, Output Shaft	1	
-7	OM-1326	. SPACER, Output Shaft	1	
-8	K49BK	. BEARING, Ball (FAF)	1	
-9	PK-2543	. SEAL, Output Shaft	1	
-10	AC-182	. RETAINER, Output Shaft	1	
-11	OA-326-1	. SHAFT SUBASSEMBLY, Output	1	
-11A	OM-1325	. . SHAFT, Output	1	
-11B	IH1-416-1SN	. . INSERT, Screw thread	4	

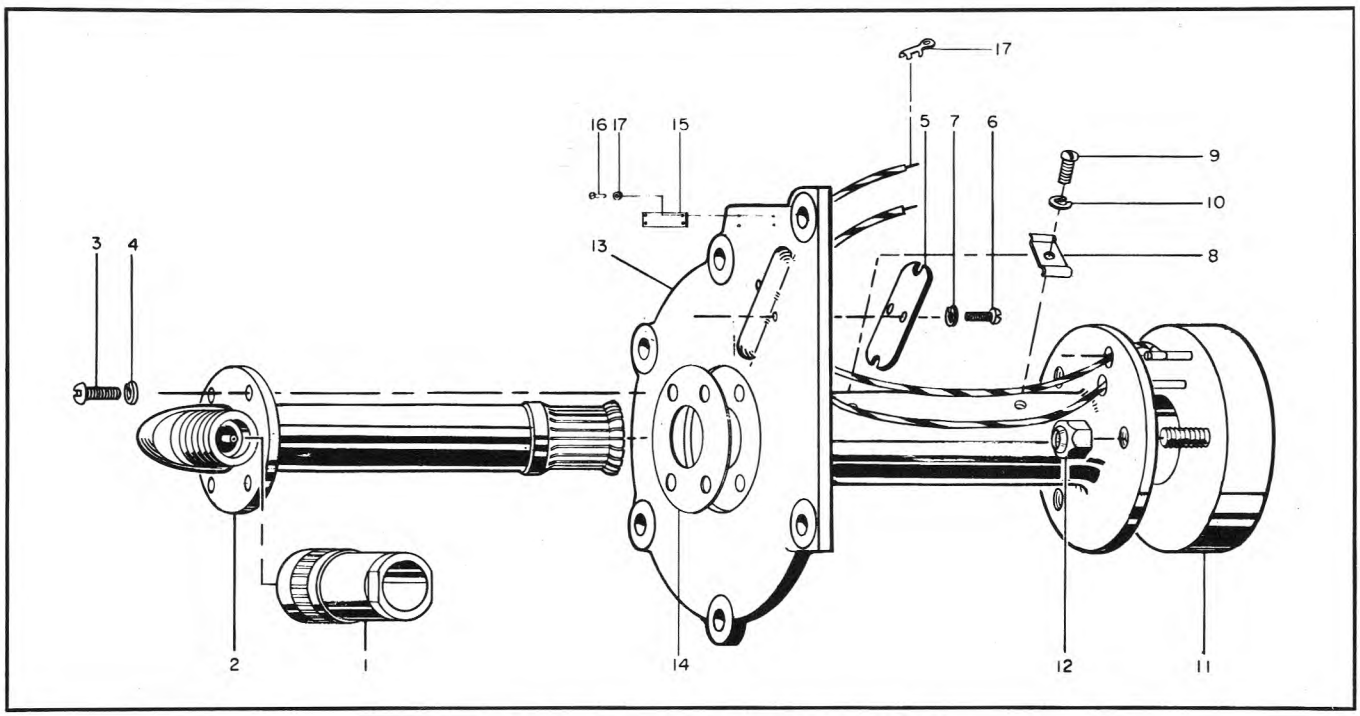

Figure 17. Antenna Coupler CU-398/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
17-	OA-350	ANTENNA COUPLER CU-398/ALA-6	1	
-1	UG-21B/U	. CONNECTOR, Plug (MIL-C-71A)	1	
-2	OA-337-1	. CONDUCTOR, Coaxial	1	
		(ATTACHING PARTS)		
-3	COMM	. SCREW, Machine, fillister head, no. 8-32, 5/16 in. lg, cadmium plated w/ chromate dip finish	4	
-4	COMM	. WASHER, Lock, extend teeth, for no. 8 size screw, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-5	AS-1469	. CLAMP, Electrical	1	
		(ATTACHING PARTS)		
-6	AN515PB3-3	. SCREW, Machine	2	
-7	COMM	. WASHER, Internal lock, for no. 3 size screw, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-8	AS-1509	. CLAMP, Electrical	2	
		(ATTACHING PARTS)		
-9	AN515PB3-3	. SCREW, Machine	2	
-10	COMM	. WASHER, Internal lock, for no. 3 size screw, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-11	EA-477	. CONTACT	1	
		(ATTACHING PARTS)		
-12	AN363B832	. NUT, Lock	3	
		- - - * - - -		
-13	AC-188M	. COVER, Antenna Coupler	1	
-14	OM-1459	. SHIM	1	
-15	NP-297	. NAMEPLATE	1	A
	8111100038	. NAMEPLATE	1	B
		(ATTACHING PARTS)		
-16	COMM	. SCREW, Round head machine, no. 2-56, brass, 3/16 in. lg, cadmium plated w/chromate dip finish	4	
-17	COMM	. WASHER, Split lock, for no. 2 size screw, phosphor bronze, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-18	101	. TERMINAL (ZE)	2	
18-	AU-53	ANTENNA CONTROL C-1246/ALA-6	1	
-1	AA-822-1	. MOUNTING MT-1428/ALA-6	1	
-2	AA-821	. PLATE ASSEMBLY, Base	1	
		(ATTACHING PARTS)		
	AN515PB6-5	. SCREW, Machine	4	
	AN935B6-1	. WASHER, Lock	4	
		- - - * - - -		

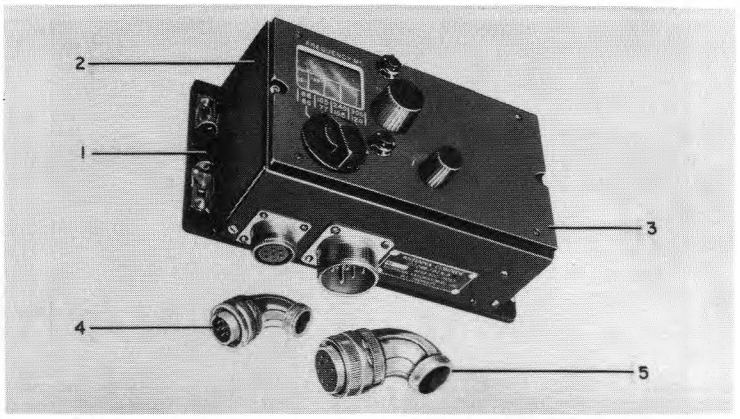

Figure 18. Antenna Control C-1246/ALA-6

Fig. and Index No	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
18-3	AA-840-1	. CHASSIS ASSEMBLY, Antenna Control (See figure 19)	1	A
	AA-840-2	. CHASSIS ASSEMBLY, Antenna control (See figure 19)	1	B
		(ATTACHING PARTS)		
	AN515PB6-5	. SCREW, Machine	2	
	AN935B6	. WASHER, Lock	2	
		- - - * - - -		
-4	AN3108B-16S-1P	. CONNECTOR, Plug	1	
-5	AN3108B-22-17S	. CONNECTOR, Plug	1	
19-	AA-840-1	CHASSIS ASSEMBLY, Antenna Control (See figure 18)	Ref	A
	AA-840-2	CHASSIS ASSEMBLY, Antenna control (See figure 19)☐	Ref	B
-1	TT-51A	. LAMPHOLDER (includes 28V lamp) (DLC)	2	
		(ATTACHING PARTS)		
	SDH-37	. NUT, Hexagon (Furnished with TT-51A)	2	
	SDH-15	. WASHER, Neoprene (Furnished with TT-51A)	2	
		- - - * - - -		
-2	EK-39-1	. KNOB, Control (Air Mark Plastic Co., N. Hollywood, Calif.)	1	
-3	EK-41-1	. KNOB, Control (Air Mark Plastic Co., N. Hollywood, Calif.)	1	
-4	EK-42-1	. KNOB, Control (Air Mark Plastic Co., N. Hollywood, Calif.)	1	
-5	ND-9	. PLATE, Chassis Lighting	1	
		(ATTACHING PARTS)		
	AN515B4-6	. SCREW, Machine	4	
		- - - * - - -		
-6	IK-L.1-A	. RESISTOR, Variable (FOEN)	1	
		(ATTACHING PARTS)		
	COMM	. WASHER, Internal lock, for ⅜ in. screw, phosphor bronze, nickel plated finish (Furnished with IK-L.1-A)	1	
	COMM	. NUT, 32 pitch hexagon, no. ⅜-32, brass w/nickel plated finish (Furnished with IK-L.1-A)	1	
		- - - * - - -		
-7	OM-1385	. GEAR, Miter	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Set, cup point, no. 6-32, ⅛ in. lg, carbon steel, cadmium plated finish	2	
		- - - * - - -		
-8	AA-817-1	. CASE ASSEMBLY, Remote control	1	
		(ATTACHING PARTS)		
	AN515PB6-5	. SCREW, Machine	3	
	AN935B6	. WASHER, Spring lock	3	
-8A	OM-1859-6	. . BUSHING	1	
-8B	OM-1859-7	. . BUSHING	1	
-8C	OM-1382	. . BUSHING	1	
-8D	OM-1379	. . BUSHING	2	
-8E	AC-190A	. . CASE, Remote control	1	
		- - - * - - -		
-9	OM-1378	. SHAFT, Worm	1	
-10	OM-1391	. COLLAR, Shaft	1	
		(ATTACHING PARTS)		
	R-E-4-8-C	. ROLLPIN (EN)	1	
		- - - * - - -		
-11	OM-1383	. WORM	1	
		(ATTACHING PARTS)		
	R-E-4-5-C	. ROLLPIN (EN)	1	
		- - - * - - -		
-12	OM-1381	. GEAR, Miter	1	
		(ATTACHING PARTS)		
	R-E-4-7-C	. ROLLPIN (EN)	1	
		- - - * - - -		

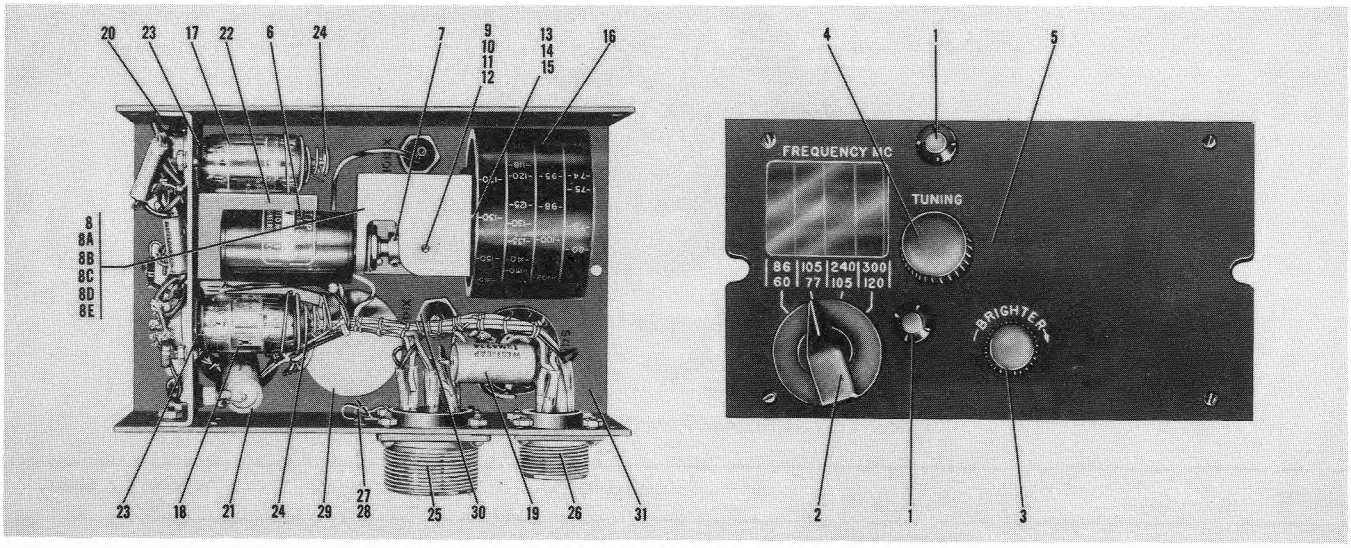

Figure 19. Chassis Assembly, Antenna Control

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
19-13	OM-1377	. SHAFT, Dial case	1	
-14	OM-1384	. GEAR, Helical	1	
		(ATTACHING PARTS)		
	R-E-4-8-C	. ROLLPIN (EN)	1	
		- - - * - - -		
-15	OM-1609	. SPRING, Dial shaft	1	
		(ATTACHING PARTS)		
	COMM	. WASHER, Flat, ¼ in.	1	
		- - - * - - -		
-16	AC-189A-1	. DRUM, Dial calibrated	1	
		(ATTACHING PARTS)		
	AN515PB6-6	. SCREW, Machine	1	
	AN960-6	. WASHER, Flat	1	
	AN935B6	. WASHER, Lock	1	
	AN280-202	. KEY, Woodruff	1	
		- - - * - - -		
-17	5751	. TUBE, Electron (MIL-E-1B)	1	
-18	5814A	. TUBE, Electron (MIL-E-1B)	1	
-19	91P22404S2	CAPACITOR, Fixed, paper dielectric (SPR)	2	
		(ATTACHING PARTS)		
	AS-1740	. HANGER, Capacitor	1	
	AN515PB6-5	. SCREW, Machine	1	
	AN935B6	. WASHER, Lock	1	
	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-20	AA-872-1	. SHELF ASSEMBLY, Chassis (For bottom view see figure 20)	1	
		(ATTACHING PARTS)		
	AN515B6-5	. SCREW, Machine	3	
	AN935B6	. WASHER, Lock	3	
	COMM	. NUT, Hexagon, machine, no. 6-32, brass, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-21	91P22404S2	. . CAPACITOR, Fixed paper dielectric (SPR)	1	
		(ATTACHING PARTS)		
	AS-1816	. . HANGER, Capacitor	1	
	COMM	. . SCREW, Round head machine, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	2	
	COMM	. . NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
	COMM	. . WASHER, Split lock, no. 6, phosphor bronze, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-22	TS-230	. . TRANSFORMER, Servo (TNIC)	1	
		(ATTACHING PARTS)		
	COMM	. . NUT, Hexagon machine, no. 6-32, brass, cadmium plated finish	4	
	AN935B6	. . WASHER, Lock	4	
	2104-06-00	. . LUG, Terminal solder	1	
		- - - * - - -		

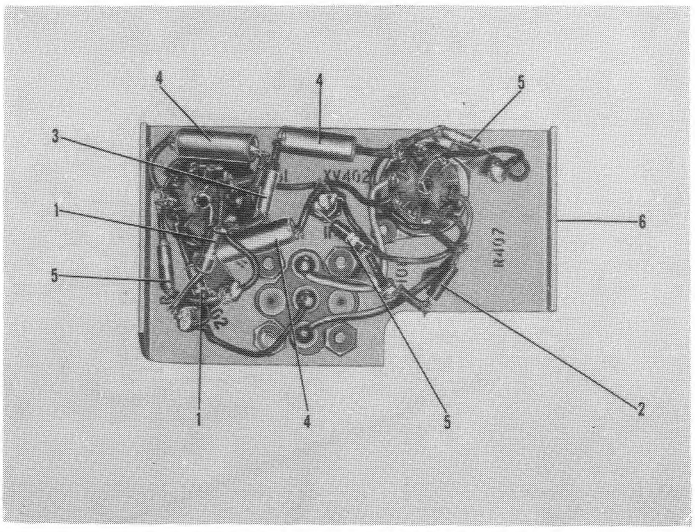

Figure 20. Shelf Assembly, Chassis (Bottom View)

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
19-23	271BC	. . SOCKET, Electron tube (ELCL)	2	
		(ATTACHING PARTS)		
	AN515PB4-4	. . SCREW, Machine	4	
	COMM	. . NUT, Hexagon machine, no. 4-40, brass, cadmium plated finish	4	
	AN935B4	. . WASHER, Lock	4	
	333	. . LUG, Terminal solder (ZE)	3	
		- - - * - - -		
-24	24D	. . SPRING, Electron tube (STAV)	2	
-25	AN3102A-22-17P	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515PB4-6	. SCREW, Machine	4	
	AN935B-4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	333	. LUG, Solder (ZE)	1	
		- - - * - - -		
-26	AN3102A-16S-1S	. CONNECTOR, Receptacle (MIL-C-5015)	1	
		(ATTACHING PARTS)		
	AN515PB4-6	. SCREW, Machine	4	
	AN935B-4	. WASHER, Lock	4	
	COMM	. NUT, Hexagon, machine, no. 4-40, brass, cadmium plated w/chromate dip finish	4	
	333	. LUG, Solder (ZE)	1	
		- - - * - - -		
-27	6302	. CLIP, Electrical (GCE)	1	
-28	K-HA-2-B	. KEY, Hexagon, Allen code no. 116 (Chase Steel & Mfg. Co., Los Angeles, Calif.)	1	
-29	RA30AIRB351AK	. RESISTOR, Variable (JAN-R-19)	1	
		(ATTACHING PARTS)		
	AS-1459	. LOCK, Shaft	1	
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Internal lock, for ⅜ in. screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-30	SW-118	. SWITCH, Rotary	1	
		(ATTACHING PARTS)		
	COMM	. NUT, Hexagon, machine, no. ⅜-32, brass, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Internal lock, for ⅜ in. screw, phosphor bronze, cadmium plated w/chromate dip finish	1	
		- - - * - - -		
-31	AA-824-1	. CHASSIS, Antenna control w/nameplate NP-225	1	A
	AA-824-2	. CHASSIS, Antenna control w/nameplate 8111100032	1	B
20-	No Number	SHELF ASSEMBLY, Chassis	Ref	
-1	RC20BF274K	. RESISTOR, Fixed, composition (JAN-R-11)	2	
-2	RC20BF221K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-3	RC20BF152K	. RESISTOR, Fixed, composition (JAN-R-11)	1	
-4	91P10304S2	. CAPACITOR, Fixed, paper dielectric (SPR)	3	
-5	RC20BF564K	. RESISTOR, Fixed, composition (JAN-R-11)	3	
-6	AA-843-1	. CHASSIS, Shelf	1	

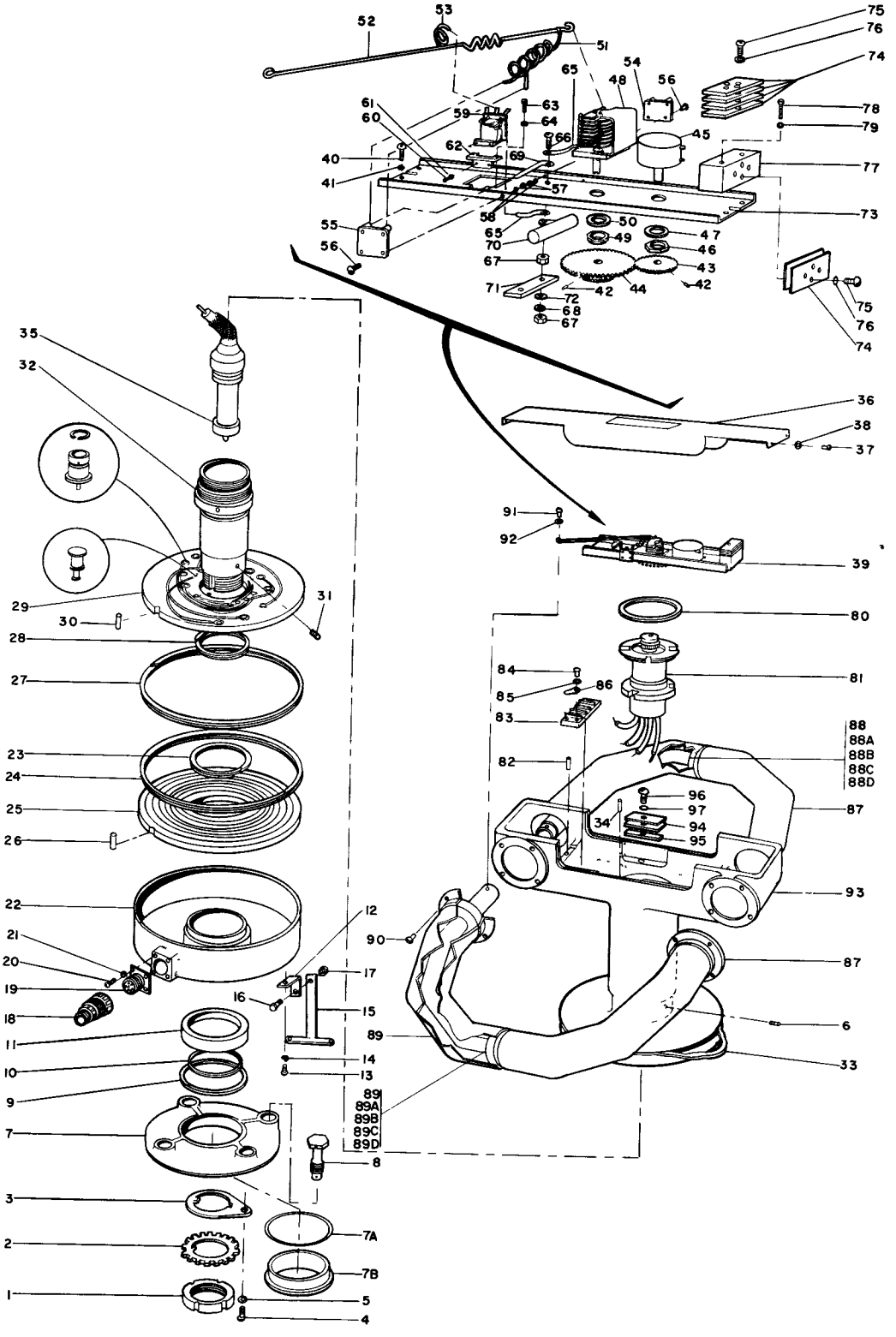

Figure 21. Antenna Assemblies AS-654/ALA-6 and AS-654A/ALA-6

Fig. and Index No.	Part Number	Description 1 2 3 4 5 6 7	Units per Assy.	Appl. Code
21-	AU-60-1	ANTENNA ASSEMBLY AS-654/ALA-6	1	A
	AU-60-1	ANTENNA ASSEMBLY AS-644A/ALA-6	1	B
-1	N-06	. NUT, Lock (ND)	1	
-2	W-06	. WASHER, Lock (ND)	1	
-3	AS-1475	. WASHER, Alignment	1	
-4	COMM	. SCREW, Round head machine, no. 8-32, 5/16 in. lg, steel, cadmium plated, chromate finish	1	
-5	AN935-8	. WASHER, Lock	1	
-6	AN565B8H5	. SCREW	3	
-7	8065000695	. FLANGE, Mounting	1	
-7A	8031001417-6	. SHIM, Bushing	1	B
-7B	8065000686	. BUSHING, Flange	1	
-8	HB-9	. BOLT, Flange mounting	4	
-9	RR-206	. RING, Retaining (RMS)	1	
-10	OM-1465	. SPACER	1	A
-11	KP21B	. BEARING, Ball (FAF)	1	
-12	AS-1507	. CLAMP, Bracket strap	1	
		(ATTACHING PARTS)		
-13	1889900179	. SCREW, Binding head, no. 8-32, ¼ in. lg (HLI)	1	
-14	AN935-10	. WASHER, Lock	1	
		---*---		
-15	AS-1506	. STRAP, Positioning	1	
		(ATTACHING PARTS)		
-16	AN-73-2	. BOLT, Machine	1	
-17	AN365-1032	. NUT, Self locking	1	
		---*---		
-18	AN3106B-16S-1S	. CONNECTOR, Plug	1	
-19	AN3102A-16S-1P	. CONNECTOR, Receptacle	1	
		(ATTACHING PARTS)		
-20	AN500A4-6	. SCREW, Machine	4	
-21	AN935-4	. WASHER, Lock	4	
		---*---		
-22	AC-180M-1	. HOUSING, Slip ring	1	
-23	RS-168	. RING, Retaining (RMS)	1	
-24	RR-525	. RING, Retaining (RMS)	1	
-25	EA-466-1	. RING ASSEMBLY	1	
-26	3-S-062-0375	. PIN, Spring (SPS)	1	
-27	HM-689	. RING, Retaining	1	
-28	RS-143	. RING, Retaining (RMS)	1	
-29	EA-470-1	. BRUSH ASSEMBLY, Antenna	1	
-30	3-S-062-0375	. PIN, Spring (SPS)	1	
-31	AN565D4H4	. SCREW, Set	3	
-32	OM-1376	. ADAPTER, Slip ring housing	1	
-33	PK-2584	. RING, Felt	1	
-34	3-S-062-0250	. PIN, Spring (SPS)	1	
-35	OA-346-1	. CONNECTOR, Receptacle	1	
-36	AA-811-1	. COVER, Antenna housing, w/nameplate NP-226	1	A
	AA-811-2	. COVER, Antenna housing, w/nameplate 8111100033	1	B
-37	AN515B6-5	. SCREW, Machine	4	
-38	AN935-6	. WASHER, Lock	4	
-39	OA-310-1	. TUNER ASSEMBLY	1	
		(ATTACHING PARTS)		
-40	AN515B6-5	. SCREW, Machine	2	
-41	AN935-6	. WASHER, Lock	2	
		---*---		
-42	AN565D4H3	. . SCREW, Set	4	
-43	OM-1346	. . GEAR	1	
-44	OM-1347	. . GEAR	1	
-45	IK-L25-B	. . RESISTOR, Variable (FOEN)	1	
-46	COMM	. . NUT, Machine, no. 3/8-32, brass, cadmium plated w/chromate finish (Supplied with item 21A-45)	1	
-47	COMM	. . WASHER, Internal lock, for ⅜ in. screw, phosphor bronze, cadmium plated, chromate finish (Supplied with item 21A-45)	1	
-48	CA-9-1	. . CAPACITOR, Variable (HLI)	1	A
	CA-8-1	. . CAPACITOR, Variable (HLI)	1	B
-49	COMM	. . NUT, Machine, no. 3/8-32, brass, cadmium plated, chromate finish	1	
-50	AN936A616	. . WASHER, Lock	1	
-51	OM-1438	. . COIL, Inductance	1	
-52	OM-1441-1	. . INDUCTANCE, Tuner	1	
-53	OM-1442	. . INDUCTANCE, Tuner	1	
-54	EA-465-2	. . TERMINAL BOARD	1	A
	8031001094	. . TERMINAL BOARD	1	B
-55	EA-465-1	. . TERMINAL BOARD	1	
-56	AN515-2-6	. . SCREW, Machine	4	
-57	AN340-2	. . NUT, Hexagon	4	
-58	AN935-2	. . WASHER, Lock	4	
-59	1A4R424	. . RELAY, Armature (Globe Electrical Mfg. Co., Gardena, Calif.)	1	
-60	AN515-4-4	. . SCREW, Machine	2	

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7 Description*	*Units per Assy.*	*Appl. Code*
21-61	AN935-4	. . WASHER, Lock	2	
-62	AS-1473	. . BRACKET, Relay	1	
-63	AN515-4-3	. . SCREW, Machine	2	
-64	AN935-4	. . WASHER, Lock	2	
-65	AS-1596	. . TERMINAL, Tuner	2	
-66	AN515-6-6	. . SCREW, Machine	1	
-67	AN340-6	. . NUT, Hexagon machine	1	
-68	AN935-6	. . WASHER, Lock	1	
-69	20	. . TERMINAL, Tuner, 0.144 in. dia hole (ZE)	1	
-70	CP10A1KC224K	. . CAPACITOR, Fixed (MIL-C-25A)	1	B
-71	8031001809	. . BOARD, Terminal mounting	1	B
-72	COMM	. . WASHER, Flat, machine, no. 6, steel, cadmium plated, chromate finish	1	B
-73	AS-1476A-1	. . CHASSIS, Tuner	1	
-74	OM-1554	. COUNTERWEIGHT	AR	
		(ATTACHING PARTS)		
-75	AN515-4-10	. SCREW, Machine	2	A
	COMM	. SCREW, Machine, round head, no. 4-40, lengths ⅜ to ⅞ in. (as required by quantity of counterweights used), steel, cadmium plated, chromate finish	4	B
-76	AN935-4	. WASHER, Lock	4	
		- - - * - - -		
-77	OM-1392	. BLOCK, Counterweight	1	
		(ATTACHING PARTS)		
-78	COMM	. SCREW, Machine, round head, brass, no. 8-32, ½ to 1¾ in. lg (as required by quantity of item 21A-77)	2	
-79	AN935-8	. WASHER, Lock	2	
		- - - * - - -		
-80	RR-200	. RING, Retaining (RMS)	1	
-81	BA-24-1	. MOTOR AND GEAR ASSEMBLY (See figure 22)	Ref	
-82	3-S-062-0375	. PIN, Spring (SPS)	2	
-83	3-172	. BOARD, Terminal (JNS)	1	
		(ATTACHING PARTS)		
-84	AN515-4-6	. SCREW, Machine	4	
-85	AN935-4	. WASHER, Lock	4	
-86	4040	. LUG, Terminal solder, size 2 (PTN)	6	
		- - - * - - -		
-87	OA-298-1	. COLLECTOR, Element	2	
›-88	OA-301	. ANTENNA LOOP ASSEMBLY, Male	1	
-88A	OA-302-1	. . WAVEGUIDE, Inside, male	1	
-88B	EM-362	. . BUSHING, Insulator	2	
-88C	AN500AC4-5	. . SCREW, Machine	4	
-88D	OA-320-1	. . WAVEGUIDE, Outside	1	
-89	OA-300	. ANTENNA LOOP ASSEMBLY, Female	1	
-89A	OA-303	. . WAVEGUIDE, Inside, male	1	
-89B	EM-362	. . INSULATOR	2	
-89C	AN500AC4-5	. . SCREW, Machine	4	
-89D	OA-320	. . WAVEGUIDE, Outside	1	
-90	AN5005A8-6	. SCREW, Machine	16	
-91	AN500A8-12	. SCREW, Machine	1	
-92	AN935-8	. WASHER, Lock	1	
-93	AC-179M	. HOUSING, Antenna	1	
-94	8065001302	. COUNTERWEIGHT	AR	
-95	8065001303	. COUNTERWEIGHT	AR	
		(ATTACHING PARTS)		
-96	COMM	. SCREW, Machine, round head, brass, no. 8-32, ½ to 1¾ in. lg (as required by quantity of items 94 and 95), nickel plated finish	Ref	
-97	AN935-8	. WASHER, Lock	1	
		- - - * - - -		

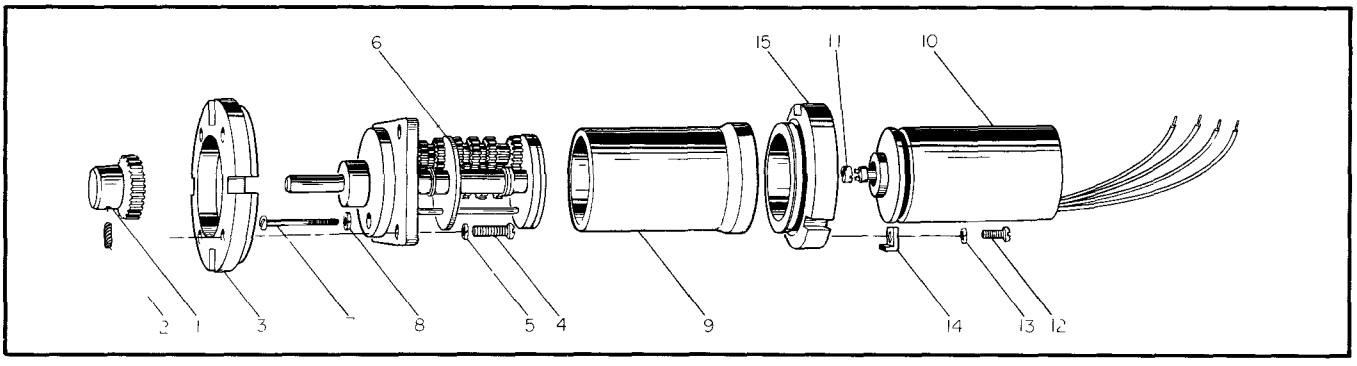

Figure 22. Motor and Gear Assembly, Antenna

Fig. and Index No.	Part Number	Description 1 2 3 4 5 6 7	Units per Assy.	Appl. Code
22-	BA-24-1	MOTOR AND GEAR ASSEMBLY (See figure 21)	Ref	
-1	95F	. GEAR, Motor (GLI)	1	A
	OM-1387	. GEAR, Motor	1	B
		(ATTACHING PARTS)		
-2	AN565-D-4H4	. SCREW, Machine	2	
		- - - * - - -		
-3	OM-1386	. ADAPTER, Motor Tuner	1	
		(ATTACHING PARTS)		
-4	AN515-4-5	. SCREW, Machine	4	
-5	AN935-4	. WASHER, Lock	4	
		- - - * - - -		
-6	OA-341	. TRAIN, Gear	1	
		(ATTACHING PARTS)		
-7	AN515-4-28	. SCREW, Machine	2	
-8	AN935-4	. WASHER, Lock	2	
		- - - * - - -		
-9	No Number	. HOUSING, Gear Train (p/o OA-341, figure 22-6)	NP	
-10	4900	. MOTOR, Antenna Tuning, Series 20, Spec 57 (TCIL)	1	A
	1-2422	. MOTOR, Tuning (Motordyne)	1	B
		(ATTACHING PARTS)		
-11	OM-1393	. COUPLING, Motor and Gear Train	1	
-12	AN515-4-6	. SCREW, Machine	3	
-13	AN-935-4	. WASHER, Lock	3	
-14	OM-1395	. PLATE, Gear train clamp	3	
		- - - * - - -		
-15	OM-1394	. SPACER, Motor and Gear Train	1	
23-	AU-58-1	ANTENNA ASSEMBLY AS-655/ALA-6	1	A
-1	AS-1920	. UPPER PLATE, Antenna	1	
		(ATTACHING PARTS)		
	OS-171	. SPACER	8	
	OM-1528	. BOLT, Machine	8	
	HM-726	. WASHER	2	
	AN960C416L	. WASHER, Flat	4	
		- - - * - - -		
-2	AS-1499	. COVER, Access Hole	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	6	
		- - - * - - -		
-3	No Number	. SWITCH ASSEMBLY, Coaxial (See figure 27)	NP	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, 100 deg flat head, no. 8-32, brass, 5/8 in. lg, cadmium plated w/chromate dip finish	2	
	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, cadmium plated w/chromate dip finish	3	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-4	AS-1498-1	. LOWER PLATE, Antenna	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 10-32, brass, 5/16 in. lg, cadmium plated finish	4	
	COMM	. WASHER, Flat, for no. 10S size screw, brass, cadmium plated finish	4	
		- - - * - - -		
-5	No Number	. ANTENNA ASSEMBLY, Vertical (See figure 24)	NP	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	12	
	COMM	. SCREW, Machine, round head, no. 6-32, brass, 1/2 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. SCREW, Round head machine, no. 6-32, brass, 7/16 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated finish	8	
		- - - * - - -		
-6	OM-1551	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 6-32, 7/8 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		

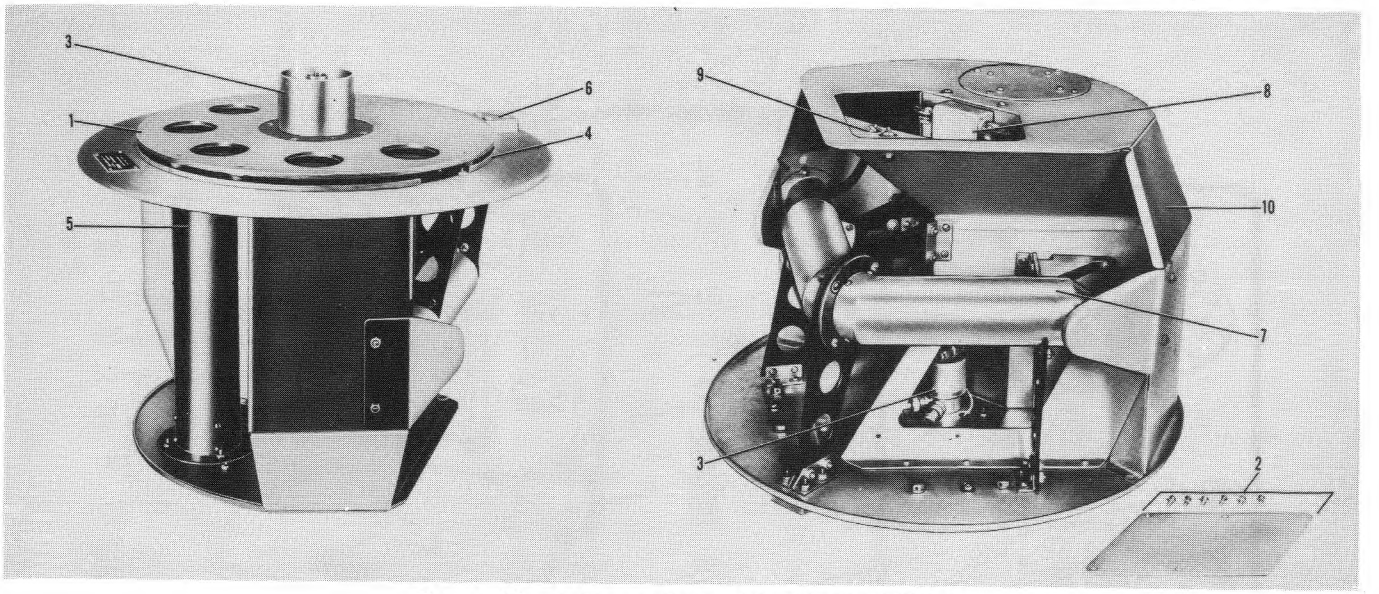

Figure 23. Antenna Assembly AS-655/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
23-7	No Number	. ANTENNA ASSEMBLY, Horizontal (See figure 25)	NP	
-8	No Number	. BOX ASSEMBLY, Balun (See figure 26)	NP	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	10	
	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	12	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	8	
	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
	COMM	. SCREW, Machine, 82 deg flat head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-9	OM-1549	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 8-32, brass, 1 in. lg, cadmium plated w/chromate dip finish	2	
	COMM	. WASHER, Flat, for no. 8S size screw, brass, cadmium plated w/chromate dip finish	2	
	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, steel, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-10	AA-862	. SUBASSEMBLY, Antenna	1	
-11	759-5	. CLAMP, Cable (AP)	2	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
	COMM	. WASHER, Split lock, for no. 6 size screw, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-12	SDH-74	. GROMMET, Rubber	2	
23A-	AU-58-2	ANTENNA ASSEMBLY AS-655/ALA-6	1	B
-1	8031001893	. ANTENNA MOUNTING ASSEMBLY	1	B
		(ATTACHING PARTS)		
-2	OM-1528	. BOLT, Machine	14	
-3	HM-726	. WASHER	10	
-4	8045000775	. WASHER	2	B
-5	8045000776	. WASHER	2	B
		- - - * - - -		
-6	8045000747	. . UPPER PLATE, Antenna	1	B
-7	8045000748	. . LOWER PLATE, Antenna	1	B
		(ATTACHING PARTS)		
-8	1889900176	. . SCREW, Flat head (HLI)	17	B

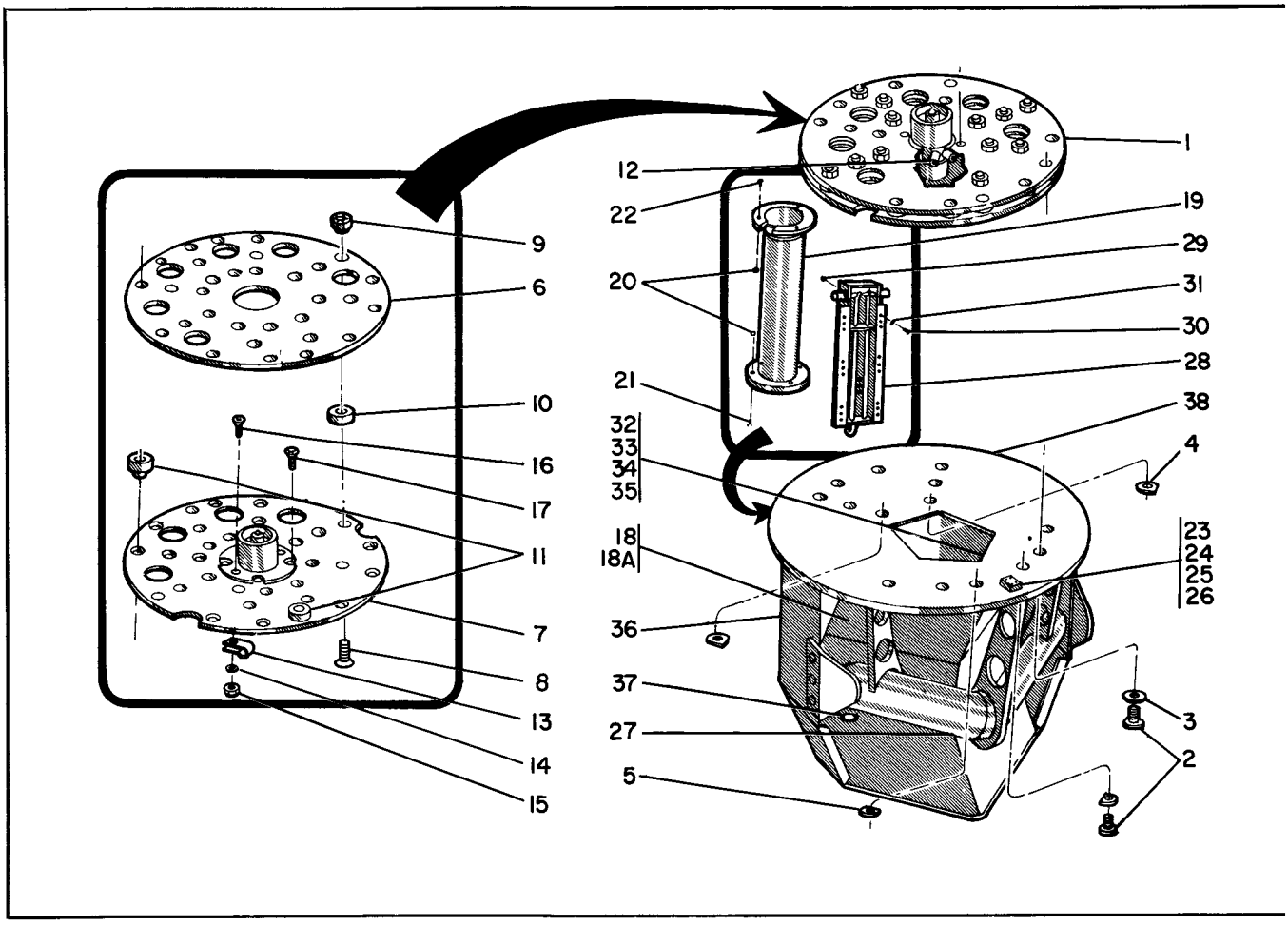

Figure 23A. Antenna Assembly AS-655/ALA-6 (Ser. Nos. 529 thru 959)

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
-9	F42NE-048	. . NUT, Hexagon, no. 1/4-28, steel, cadmium plated, cnromate finisn (ESNA)	17	B
-10	8065001248	. . SPACER	17	B
		- - - * - - -		
-11	8065001209	. . SPACER, Locating	14	B
-12	OA-335-1	. . SWITCH (See figure 27)	1	
		(ATTACHING PARTS)		
-13	C-CP1-6	. . CLAMP, Electrical (CPW)	1	B
-14	COMM	. . WASHER, Flat, no. 8, brass, cadmium plated, chromate finish	1	
-15	AN365-832	. . NUT, Hexagon	3	B
-16	COMM	. . SCREW, Flat head, no. 8-26, 13/16 in. lg, brass, cadmium plated	1	
-17	COMM	. . SCREW, Flat head, no. 8-20, 5/8 in. lg, brass, cadmium plated	2	
		- - - * - - -		
-18	AS-1499	. COVER, Access	1	
		(ATTACHING PARTS)		
-18A	COMM	. SCREW, Machine, round head, no. 6-10, carbon steel, 5/16 in. lg, cadmium plated.	6	B
		- - - * - - -		
-19	AA-866	. ANTENNA ASSEMBLY, Vertical (See figure 24)	1	
		(ATTACHING PARTS)		
-20	COMM	. NUT, Hexagon, self-locking, no. 6-32, steel, cadmium plated w/chromate finish	7	
-21	COMM	. SCREW, Machine, round head, no. 6-32, 7/16 in. lg, brass, cadmium plated w/chromate finish	4	
-22	COMM	. SCREW, Machine, 82 deg, flat head, no. 6-32, 3/8 in. lg, cadmium plated w/chromate finish	3	
		- - - * - - -		
-23	OM-1551	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
-24	COMM	. SCREW, Machine, no. 6-32, 7/8 in. lg, cadmium plated w/chromate finish	4	
-25	COMM	. WASHER, Flat, brass, cadmium plated w/chromate finish, for no. 6 screw	4	

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
23A-26	COMM	. NUT, Machine, self-locking, no. 6-32, steel, cadmium plated w/chromate finish	4	
		- - - * - - -		
-27	No Number	. ANTENNA ASSEMBLY, Horizontal (See figure 25)	NP	
-28	AA-865-2	. BOX ASSEMBLY, Balun (See figure 26)	1	
		(ATTACHING PARTS)		
-29	COMM	. NUT, Machine, self-locking, no. 6-32, steel, cadmium plated w/chromate finish	6	
-30	COMM	. SCREW, Machine, round head, no. 6-32, 5/16 in. lg, cadmium plated w/chromate finish	6	
-31	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate finish	6	
		- - - * - - -		
-32	OM-1549	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
-33	COMM	. NUT, Machine, self-locking, no. 8-32, steel, cadmium plated w/chromate finish	2	
-34	COMM	. SCREW, Machine, no. 8-32, brass, 1 in. lg, cadmium plated w/chromate finish	2	
-35	COMM	. WASHER, Flat, brass, cadmium plated w/chromate finish, for no. 8 screw	2	
		- - - * - - -		
-36	AA-862-2	. SUBASSEMBLY, Antenna	1	B
-37	SDH-74	. GROMMET, Rubber	2	
-38	8111100029	. NAMEPLATE	1	B
24-	No Number	ANTENNA ASSEMBLY, Vertical (See figure 23)	Ref	
-1	OA-364	. CABLE MOUNTING ASSEMBLY	1	
-2	OM-1510	. . PLATE, Vertical antenna upper	1	
		(ATTACHING PARTS)		
-3	COMM	. . SCREW, Machine, 82 deg flat head, no. 6-32, brass, ¼ in. lg, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-4	UG-58/U	. . CONNECTOR, Receptacle (MIL-C-3608)	1	
		(ATTACHING PARTS)		
-5	COMM	. . SCREW, Machine, round head, no. 4-40, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	4	
-6	COMM	. . WASHER, Split lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-7	OM-1507	. . BASE, Plug	1	
-8	OA-361-1	. . BASE ASSEMBLY, Receptacle	1	
-9	OM-1508	. . . BASE, Receptacle	1	
-10	OM-1503	. . . CONNECTOR, Receptacle cable	1	
-11	COMM	. . SCREW, Machine, round head, no. 6-32, brass, ¾ in. lg, cadmium plated w/chromate dip finish	2	
-12	COMM	. . WASHER, Split lock, for no. 6 size screw, phosphor bronze, cadmium plated w/chromate dip finish	2	
-13	UG-88C/U	. . CONNECTOR, Plug (MIL-C-3608)	1	
-14	W1-426	. . CABLE, Vertical antenna	1	
-15	AS-1521	. FLANGE, Vertical antenna	1	
		(ATTACHING PARTS)		
-16	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	3	
-17	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	3	
-18	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-19	OA-358-1	. CONDUCTOR, Upper	1	
-20	OA-359	. CONDUCTOR, Lower	1	
-21	EM-359-1	. CAP, Vertical antenna	1	
-22	COMM	. SCREW, Machine, round head, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	4	
-23	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	4	
-24	EM-366	. INSULATOR, Disc	1	
-25	EM-361	. PLUG, Vertical antenna	1	
		(ATTACHING PARTS)		
-26	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	1	
-27	COMM	. WASHER, Split lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	1	

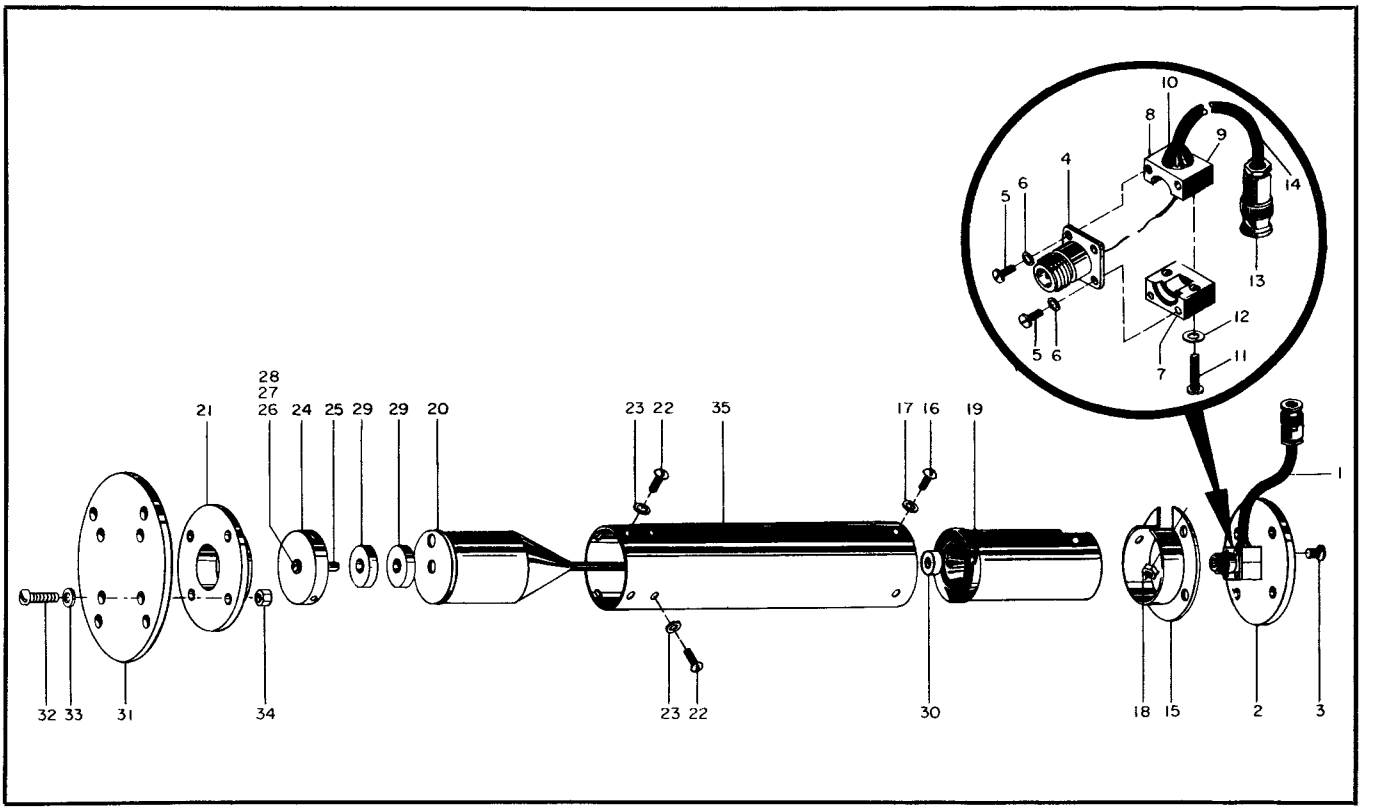

Figure 24. Antenna Assembly, Vertical

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
24-28	COMM	. WASHER, Flat, for no. 4S size screw, brass, cadmium plated w/chromate dip finish	1	
		---*---		
-29	EM-357	. PAD, Vertical Antenna	2	
-30	EM-358	. INSULATOR	1	
-31	AS-1530	. COVER, Antenna	1	
		(ATTACHING PARTS)		
-32	COMM	. SCREW, Machine, round head, no. 6-32, brass, 7/16 in. lg, cadmium plated w/chromate dip finish	4	
-33	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	4	
-34	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
		---*---		
-35	EM-360-1	. COVER, Vertical Antenna	1	
25-	No Number	ANTENNA ASSEMBLY, Horizontal (See figure 23)	Ref	
-1	AA-864-1	. TUBE ASSEMBLY, Right hand	1	
		(ATTACHING PARTS)		
-2	COMM	. SCREW, Machine, round head, no. 4-40, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	5	
-3	COMM	. WASHER, Internal lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	5	
-4	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	3	
-5	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	3	
-6	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	3	
		---*---		
-7	OM-1513-1	. BRACE, Tube, right hand	1	
		(ATTACHING PARTS)		
-8	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
-9	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	

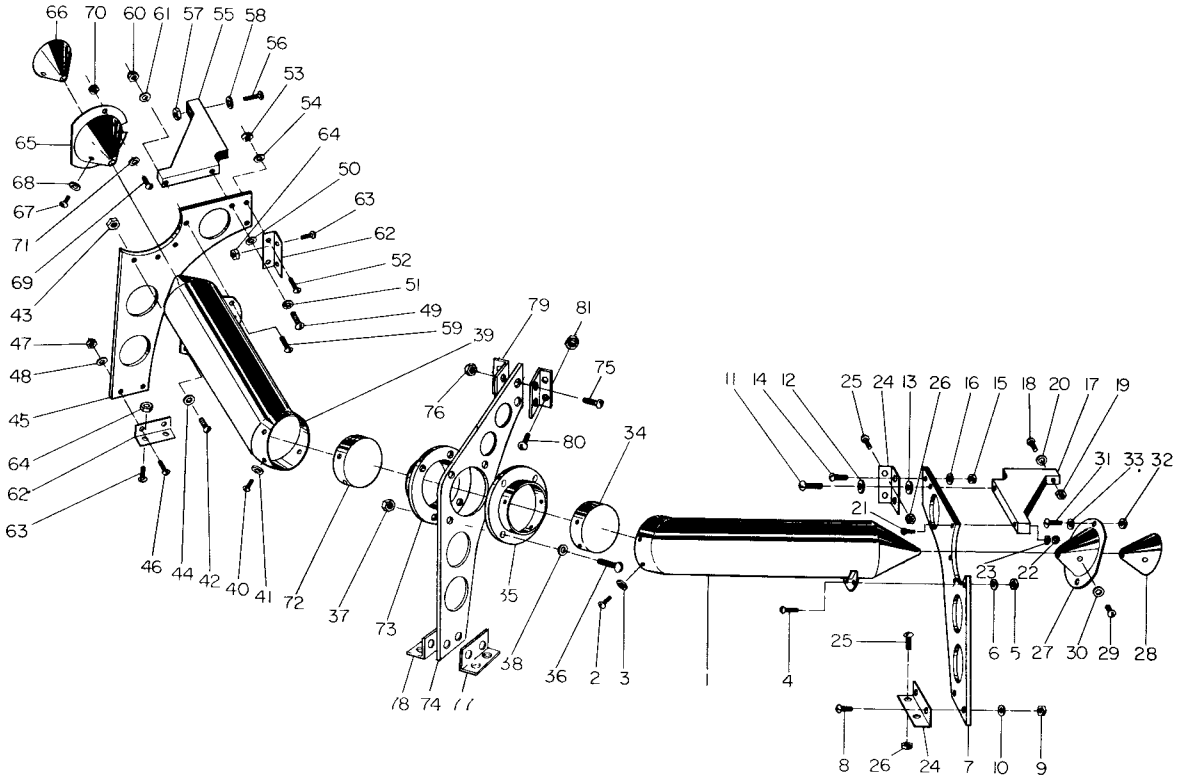

Figure 25. Antenna Assembly, Horizontal

Fig. and Index No.	*Part Number*	*1 2 3 4 5 6 7* *Description*	*Units per Assy.*	*Appl. Code*
25-10	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
-11	COMM	. SCREW, Machine, round head, no. 8-32, brass, ½ in. lg, cadmium plated w/chromate dip finish	1	
-12	COMM	. WASHER, Split lock, for no. 8 size screw, steel, cadmium plated w/chromate dip finish	1	
-13	COMM	. WASHER, Flat, for no. 8 size screw, brass, cadmium plated w/chromate dip finish	1	
-14	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
-15	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-16	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
		---*---		
-17	OM-1514-1	. BRACE, Horizontal antenna reinforcing	1	
		(ATTACHING PARTS)		
-18	COMM	. SCREW, Machine, round head, no. 6-32, brass, ¾ in. lg, cadmium plated w/chromate dip finish	1	
-19	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	1	
-20	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	1	
-21	COMM	. SCREW, Machine, round head, no. 6-32, brass, cadmium plated finish	1	
-22	COMM	. NUT, Machine, self locking, hexagon, no. 6-32, steel, cadmium plated w/chromate dip finish	1	
-23	COMM	. WASHER, Flat, for no. 6S screw, brass, cadmium plated finish	1	
		---*---		

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
25-24	AS-1531	. BRACKET, Angle	2	
		(ATTACHING PARTS)		
-25	COMM	. SCREW, Machine, round head, no. 6-32, brass, ¾ in. lg, cadmium plated w/chromate dip finish	4	
-26	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-27	AS-1529	CONE, Cable	1	
-28	OM-1516	CONE, Cable	1	
		(ATTACHING PARTS)		
-29	COMM	. SCREW, Machine, round head, no. 4-40, brass, ⅛ in. lg, cadmium plated w/chromate dip finish	2	
-30	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	2	
-31	COMM	. SCREW, Machine, round head, no. 6-32, brass, 7/16 in. lg, cadmium plated w/chromate dip finish	2	
-32	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-33	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-34	AS-1533	. CAP, Tube	1	
-35	AS-1555	. CAP, Horizontal antenna	1	
		(ATTACHING PARTS)		
-36	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅝ in. lg, cadmium plated w/chromate dip finish	4	
-37	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
-38	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-39	AA-863-1	. TUBE, Left Hand	1	
		(ATTACHING PARTS)		
-40	COMM	. SCREW, Machine, round head, no. 4-40, brass, ⅝ in. lg, cadmium plated w/chromate dip finish	5	
-41	COMM	. WASHER, Internal lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	5	
-42	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅝ in. lg, cadmium plated w/chromate dip finish	3	
-43	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	3	
-44	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-45	OM-1513-1	. BRACE, Tube, left hand	1	
		(ATTACHING PARTS)		
-46	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅝ in. lg, cadmium plated w/chromate dip finish	2	
-47	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-48	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
-49	COMM	. SCREW, Machine, round head, no. 8-32, brass, ½ in. lg, cadmium plated w/chromate dip finish	1	
-50	COMM	. WASHER, Split lock, for no. 8 size screw, carbon steel, cadmium plated w/chromate dip finish	1	
-51	COMM	. WASHER, Flat, for no. 8 size screw, light series, brass, cadmium plated w/chromate dip finish	1	
-52	COMM	. SCREW, Machine, round head, no. 6-32, brass, 7/16 in. lg, cadmium plated w/chromate dip finish	2	
-53	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-54	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-55	OM-1514-1	. BRACE, Tube reinforcing	1	
		(ATTACHING PARTS)		
-56	COMM	. SCREW, Machine, round head, no. 6-32, brass, ¾ in. lg, cadmium plated w/chromate dip finish	1	
-57	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	1	
-58	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	1	
-59	COMM	. SCREW, Round head machine, no. 6-32, brass, ⅞ in. lg, cadmium plated w/chromate dip finish	1	
-60	COMM	. NUT, Self locking hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	1	
-61	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	1	
		- - - * - - -		

Fig. and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units per Assy.	Appl. Code
25-62	AS-1531	. BRACKET, Angle	2	
		(ATTACHING PARTS)		
-63	COMM	. SCREW, Machine, round head, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	4	
-64	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-65	AS-1529	. CONE, Cable	1	
-66	OM-1516	. CONE, Cable	1	
		(ATTACHING PARTS)		
-67	COMM	. SCREW, Machine, round head, no. 4-40, brass, ⅛ in. lg, cadmium plated w/chromate dip finish	2	
-68	COMM	. WASHER, Split lock, for no. 4 size screw, light series carbon steel, cadmium plated w/chromate dip finish	2	
-69	COMM	. SCREW, Machine, round head, no. 6-32, brass, 7/16 in. lg, cadmium plated w/chromate dip finish	2	
-70	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-71	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-72	AS-1533	. CAP, Tube	1	
-73	AS-1555	. CAP, Horizontal antenna	1	
-74	OM-1512	. BRACE, Tube, center	1	
		(ATTACHING PARTS)		
-75	COMM	. SCREW, Machine, round head, no. 6-32, brass, ½ in. lg, cadmium plated w/chromate dip finish	4	
-76	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-77	AS-1503	. BRACKET, Center, right	1	
-78	AS-1504	. BRACKET, Center, left	1	
-79	AS-1532	. BRACKET, Center	2	
		(ATTACHING PARTS)		
-80	COMM	. SCREW, Round head machine, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	4	
-81	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
26-	AA-865-1	BOX ASSEMBLY, Balun (See figure 23)	Ref	A
	AA-865-2	BOX ASSEMBLY, Balun (See figure 23A)	Ref	B
-1	AS-1517	. PLATE, Balun Mounting	1	
		(ATTACHING PARTS)		
-2	COMM	. SCREW, Machine, round head, no. 6-32, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	6	
-3	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
-4	COMM	. WASHER, Flat, for no. 6S size screw, brass, cadmium plated w/chromate dip finish	6	
		- - - * - - -		
-5	UG-535/U	. CONNECTOR, Receptacle (MIL-C-3608)	1	
		(ATTACHING PARTS)		
-6	COMM	. SCREW, Machine, round head, no. 4-40, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	4	A
	COMM	. SCREW, Machine, round head, no. 4-40, brass, 3/16 in. lg, cadmium plated, chromate finish	4	B
-7	COMM	. WASHER, Split lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-8	OS-145	. SPACER, Balun	2	
-9	OA-360-1	. BASE AND TUBE ASSEMBLY, Balun	1	
		(ATTACHING PARTS)		
-10	COMM	. SCREW, Machine, round head, no. 4-40, brass, 5/16 in. lg, cadmium plated w/chromate dip finish	4	
-11	COMM	. WASHER, Split lock, for no. 4 size screw, phosphor bronze, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-12	RC20BF471J	. . RESISTOR, Fixed, Composition (JAN-R-11)	3	
-13	OM-1500	. . BRACKET, Resistor Mounting	2	
-14	OA-363-1	. . TUBE, Balun	1	
-15	OA-362	. . TUBE, Balun	1	
-16	OM-1466	. . BASE, Balun	1	
-17	AA-906-1	. BOX, Balun	1	
-18	759-22	. CLAMP, Cable (AP)	2	
		(ATTACHING PARTS)		
-19	COMM	. SCREW, Round head machine, no. 6-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	2	
-20	COMM	. NUT, Hexagon machine, no. 6-32, brass, cadmium plated w/chromate dip finish	2	
-21	COMM	. WASHER, Split lock, light series, for no. 6 size screw, carbon steel, cadmium plated w/chromate dip finish	2	

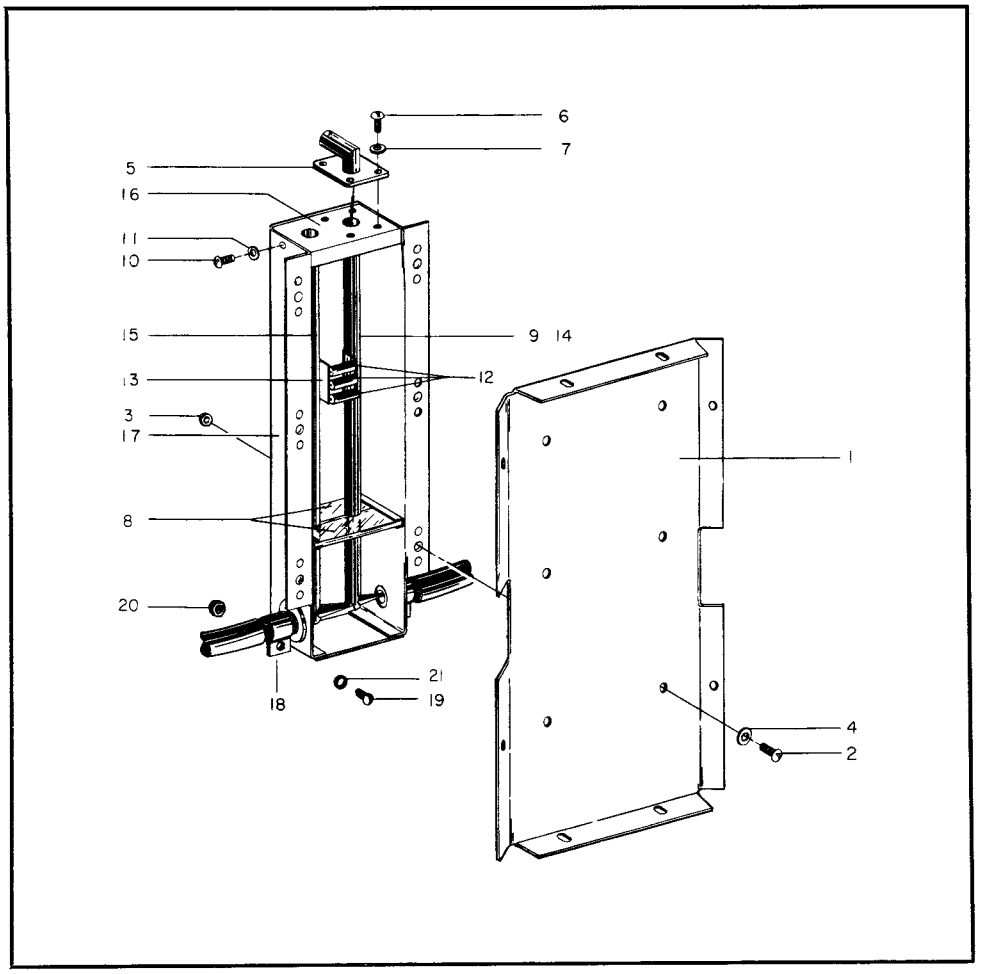

Figure 26. Box Assembly, Balun

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
27-	OA-335-1	SWITCH ASSEMBLY, Coaxial (See figure 23)	Ref	
-1	X-1942-X3	. TERMINAL LUG (CGT)	2	
		(ATTACHING PARTS)		
-2	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	2	
-3	OM-1515	. HUB, Brush-holder	1	
-4	EA-602-1	. BRUSH, Disc	1	
-5	COMM	. SCREW, Machine, fillister head, no. 8-32, brass, 5/8 in. lg, cadmium plated w/chromate dip finish	4	
-6	COMM	. WASHER, Split lock, for no. 8 size screw, light series carbon steel, cadmium plated w/chromate dip finish	4	
-7	OA-332-1	. COAXIAL ASSEMBLY, Switch	1	
-8	COMM	. SCREW, Machine, round head, no. 6-32, brass, ½ in. lg, cadmium plated w/chromate dip finish	3	
-9	AN935-6L	. WASHER, Lock	3	
-10	1M1-G3	. SWITCH ASSEMBLY, Coaxial (Farrel Engineering Co., San Gabriel, Calif.)	1	
-11	No Number	. . HOUSING, Switch	NP	
-12	No Number	. . SCREW, Machine	NP	
-13	No Number	. . WASHER, Lock	NP	
-14	No Number	. . CONNECTOR, Receptacle	NP	
-15	No Number	. . SCREW, Machine	NP	
-16	No Number	. . WASHER, Lock	NP	
-17	No Number	. . CONTACT, Electrical	NP	
-18	No Number	. . SWITCH, Coaxial	NP	
-19	OM-1418	. PLATE, Conductor	1	
-20	OM-1411	. PLATE, Conductor	1	B
-21	CPC743	. CLAMP, Cable (CPW)	1	

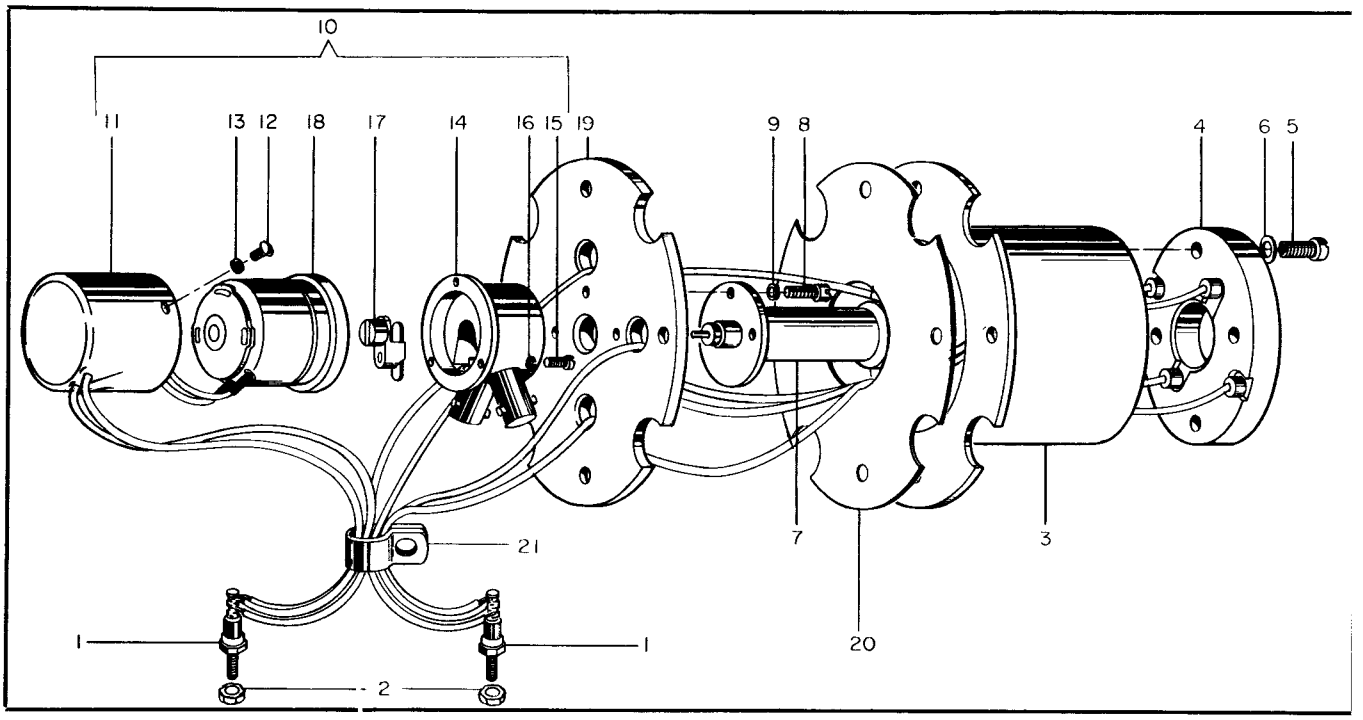

Figure 27. Switch Assembly, Coaxial

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
28-	AU-57-1	ANTENNA ASSEMBLY AS-656/ALA-6	1	A
	AU-57-2	ANTENNA ASSEMBLY AS-656/ALA-6	1	B
-1	8041200299	. BRACE, Antenna dish	2	B
		(ATTACHING PARTS)		
-1A	8045000704	. PAD, Cross brace	2	B
-1B	F22NM-82	. NUT, Machine, self-locking (ESNA)	4	B
-1C	COMM	. SCREW, Round head, no. 8-32, 5/8 in. lg, steel, cadmium plated, chromate finish	4	B
-2A	OA-355-2	. DIPOLE ASSEMBLY, Vertical (See figure 30)	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 8-32, steel, 9/16 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-2B	OA-355-1	. DIPOLE ASSEMBLY, Horizontal (See figure 29)	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, round head, no. 8-32, steel, 9/16 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-3	AA-848-1	. REFLECTOR, Antenna	2	
		(ATTACHING PARTS)		
	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, steel, cadmium plated w/chromate dip finish	18	
		- - - * - - -		
-4	OA-331	. SWITCH, Coaxial	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Fillister head machine, no. 10-24, steel, 13/16 in. lg, cadmium plated w/chromate finish	4	A
	COMM	. SCREW, Fillister head machine, no. 10-24, steel, 1 in. lg, cadmium plated w/chromate finish	2	B
	COMM	. WASHER, Flat machine, no. 10, cadmium plated w/chromate finish	2	B
	COMM	. NUT, Self locking hexagon machine, no. 10-24, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-5	1M1-G3	. . SWITCH, Coaxial (Farrel Engineering Co., San Gabriel, Calif.)	1	
-6	OM-1411	. . PLATE, Conductor	1	

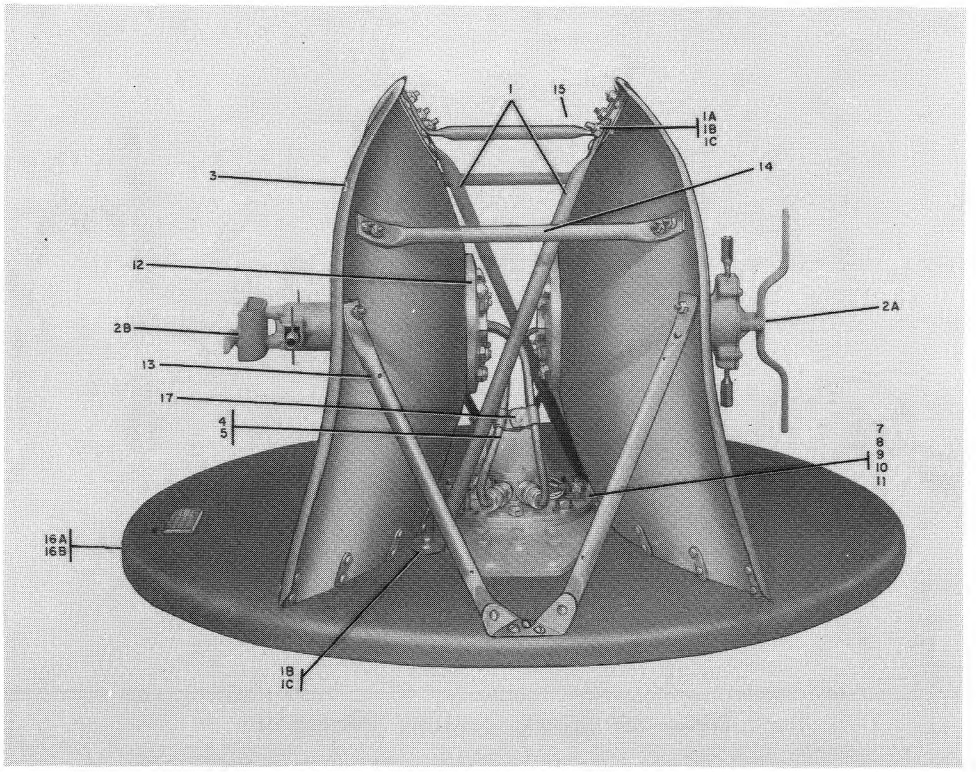

Figure 28. Antenna Assembly AS-656/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
28-7	OA-332-2	. . COAXIAL ASSEMBLY, Switch	1	
		(ATTACHING PARTS)		
	COMM	. . SCREW, Round head machine, no. 6-32, brass, ½ in. lg, abuloy finish	3	
	AN935-6L	. . WASHER, Lock	3	
		- - - * - - -		
-8	EA-501-1	. DISC ASSEMBLY, Brush	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Machine, fillister head, no. 8-32, brass, ⅜ in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. WASHER, Split lock, for no. 8 size screw, carbon steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-9	EM-363	. . DISC, Brush holder	1	
-10	OA-345-1	. . BRUSH AND HOLDER ASSEMBLY	3	
		(ATTACHING PARTS)		
	25	. . RING, Retaining (WKI)	3	
		- - - * - - -		
-11	OM-1413	. HUB, Antenna	1	
		(ATTACHING PARTS)		
	OM-1544	. BOLT, Machine mounting	4	
	COMM	. WASHER, Flat, for no. ¼S size screw, stainless steel, passivate finish	4	
		- - - * - - -		
-12	OA-356-1	. FLANGE ASSEMBLY	2	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 8-32, steel, 9/16 in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon machine, no. 8-32, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-13	AS-1491	. BRACE, Antenna dish	4	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 6-32, steel, ⅜ in. lg, cadmium plated w/chromate dip finish	8	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	8	
	AS-1515	. PAD, Dish brace	4	
	SDH-195	. WASHER, Flat	AR	
	SDH-196	. WASHER, Flat	AR	
		- - - * - - -		

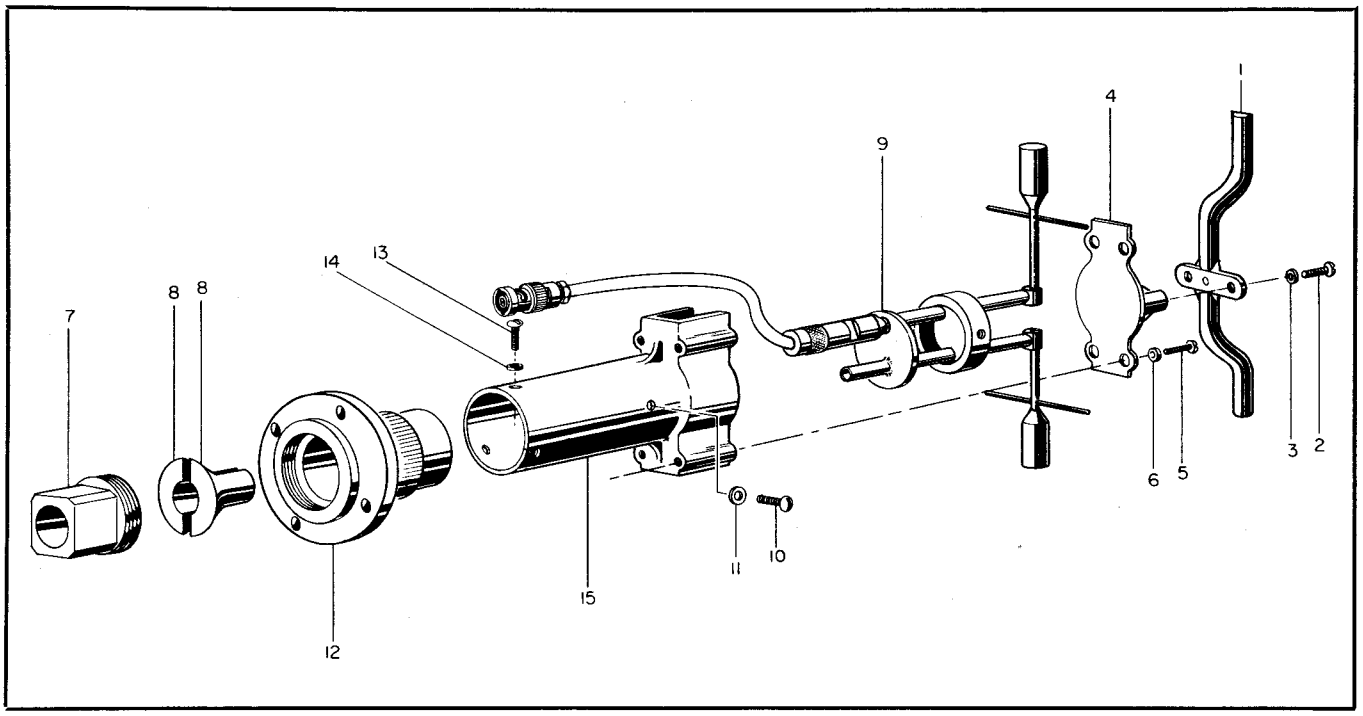

Figure 29. Dipole Assembly, Horizontal

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
28-14	AS-1492	. BRACE, Antenna dish side	2	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 6-32, steel, ½ in. lg, cadmium plated w/chromate dip finish	8	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	8	
	AS-1513	. PAD, Side brace	4	
		- - - * - - -		
-15	AS-1488	. BRACE, Antenna dish lower	1	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 6-32, steel, ½ in. lg, cadmium plated w/chromate dip finish	4	
	COMM	. NUT, Self locking, hexagon, machine, no. 6-32, steel, cadmium plated w/chromate dip finish	4	
	AS-1514	. PAD, Center brace	2	
		- - - * - - -		
-16A	AA-846-1	. PLATE, Antenna base	1	A
-16B	AA-846-2	. PLATE, Antenna base	1	B
-17	CPC-742-3	. CLAMP, Cable (CPW)	4	
		(ATTACHING PARTS)		
	COMM	. SCREW, Round head machine, no. 6-32, steel, ½ in. lg, cadmium plated w/chromate dip finish	1	
	COMM	. WASHER, Flat, for no. 6 size screw, brass, cadmium plated w/chromate dip finish	1	
	AN365-632A	. NUT, Hexagon elastic lock	1	
29-	OA-355-1	DIPOLE ASSEMBLY, Horizontal (See figure 28)	Ref	
-1	AC-195-1	. REFLECTOR, Dipole, Horizontal	1	
		(ATTACHING PARTS)		
-2	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	2	
-3	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-4	AC-196	. SHIELD, Dipole	1	
		(ATTACHING PARTS)		
-5	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	4	
-6	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-7	OM-1472	. NUT, Clamp	1	

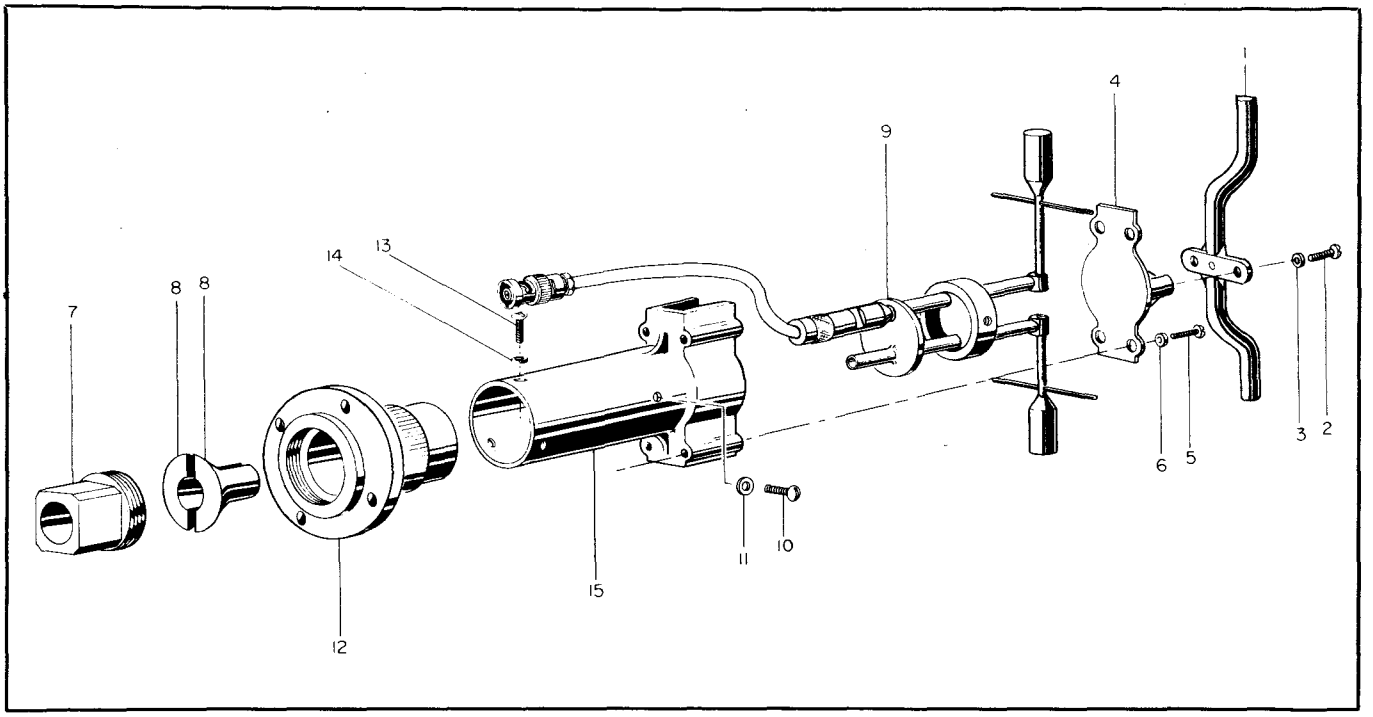

Figure 30. Dipole Assembly, Vertical

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
29-8	OM-1471	. CLAMP, Cable	1	
-9	EA-500-1	. CABLE ASSEMBLY, Dipole	1	
		(ATTACHING PARTS)		
-10	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	3	
-11	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-12	OM-1484	. SUPPORT, Base	1	
		(ATTACHING PARTS)		
-13	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	3	
-14	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	3	
		- - - * - - -		
-15	AC-194	. SUPPORT, Dipole	1	
30-	OA-355-2	DIPOLE ASSEMBLY, Vertical (See figure 28)	Ref	
-1	AC-203-1	. REFLECTOR, Dipole, Vertical	1	
		(ATTACHING PARTS)		
-2	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	2	
-3	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	2	
		- - - * - - -		
-4	AC-196	. SHIELD, Dipole	1	
		(ATTACHING PARTS)		
-5	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	4	
-6	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-7	OM-1472	. NUT, Clamp	1	
-8	OM-1471	. CLAMP, Cable	2	
-9	EA-500-2	. CABLE ASSEMBLY, Dipole	1	
		(ATTACHING PARTS)		
-10	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	4	
-11	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-12	OM-1484	. SUPPORT, Base	1	

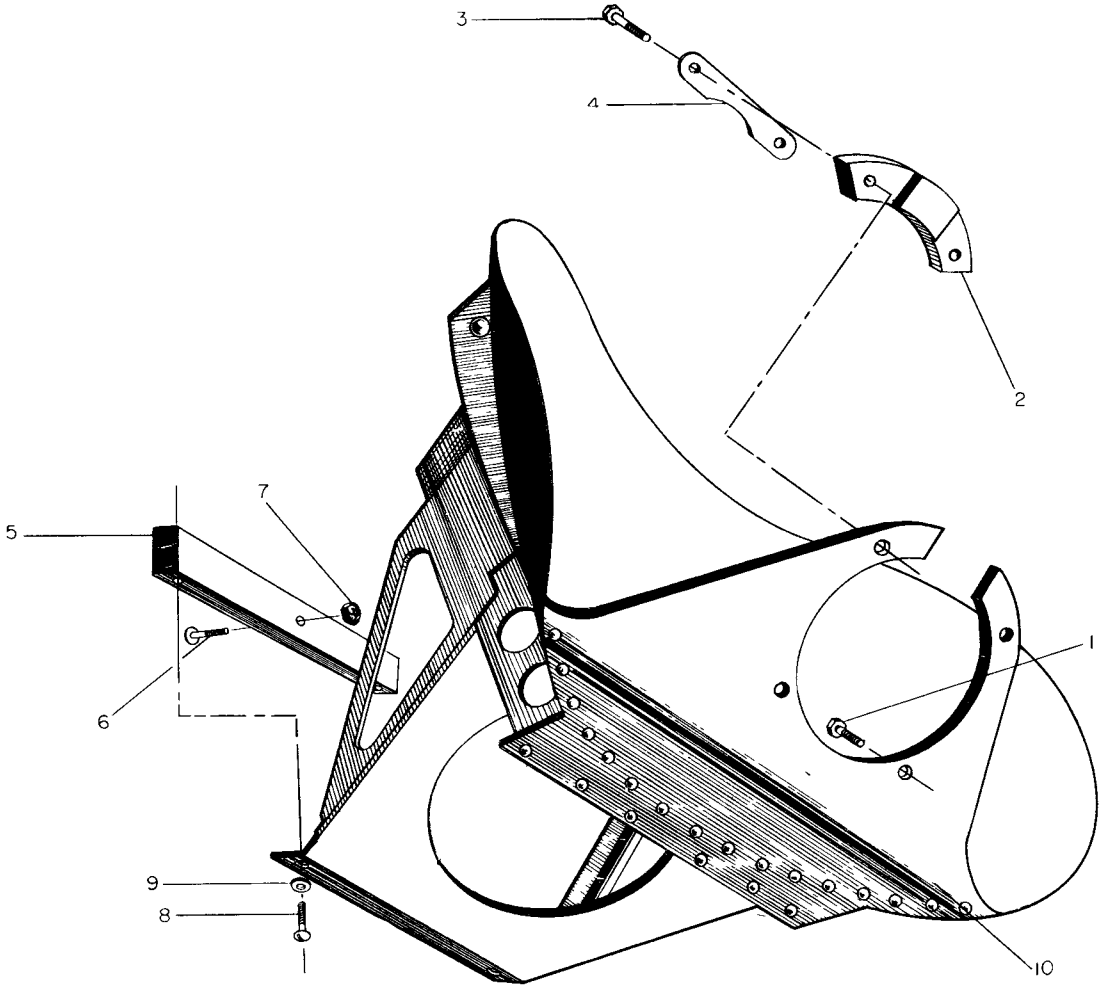

Figure 31. Antenna Assembly AS-657/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
30-		(ATTACHING PARTS)		
-13	COMM	. SCREW, Machine, round head, no. 4-40, brass, ¼ in. lg, cadmium plated w/chromate dip finish	4	
-14	COMM	. WASHER, Split lock, for no. 4 size screw, steel, cadmium plated w/chromate dip finish	4	
		- - - * - - -		
-15	AC-194	. SUPPORT, Dipole	1	
31-	AA-859-1	ANTENNA ASSEMBLY AS-657/ALA-6 w/nameplate NP-224	1	A
	AA-859-2	ANTENNA ASSEMBLY AS-657/ALA-6 w/nameplate 8111100031	1	B
-1	HB-11-1	. BOLT, Machine	2	
-2	OM-1463-1	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
-3	HB-12-1	. BOLT, Machine	2	
-4	AS-1519	. WASHER, Counterweight	1	
		- - - * - - -		

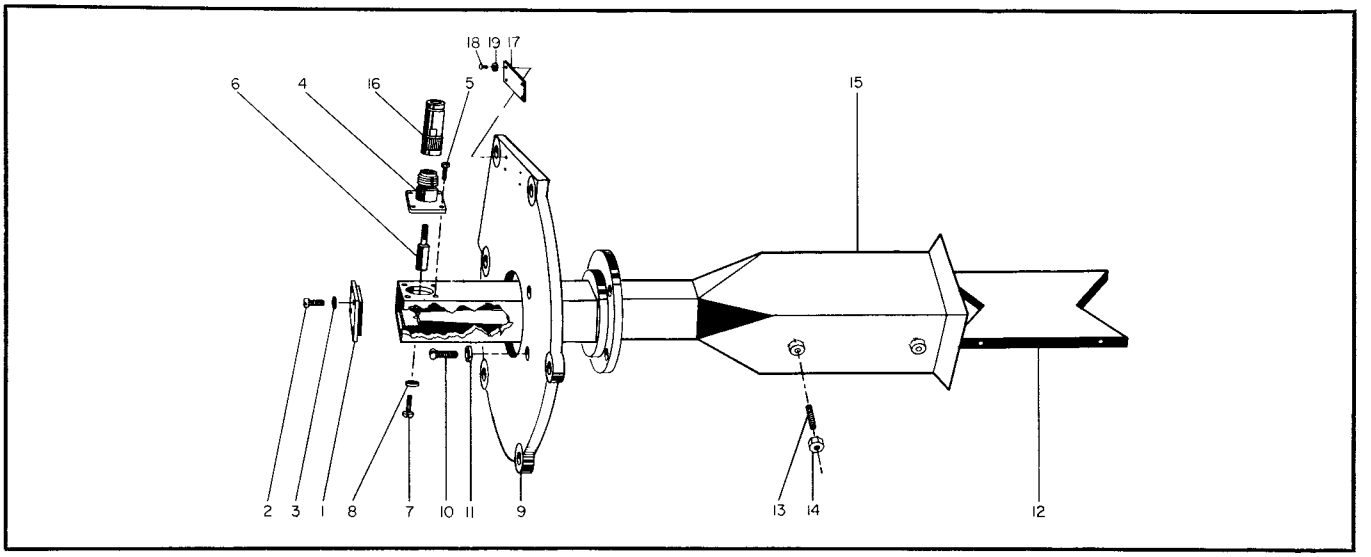

Figure 32. Antenna Coupler CU-397/ALA-6

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
31-5	OM-1488	. COUNTERWEIGHT, Antenna	1	
		(ATTACHING PARTS)		
-6	COMM	. SCREW, Machine, round head, no. 8-32, steel, 13/16 in. lg, cadmium plated w/chromate dip finish	1	
-7	COMM	. NUT, Self locking, hexagon, machine, no. 8-32, steel, cadmium plated w/chromate dip finish	1	
-8	AN515-8-6	. SCREW, Machine	4	
-9	AN935-8	. WASHER, Lock	4	
		- - - * - - -		
-10	AA-854-1	. ANTENNA SUBASSEMBLY	1	
32-	AA-1026-1	ANTENNA COUPLER CU-397/ALA-6	1	A
	AA-1026-2	ANTENNA COUPLER CU-397/ALA-6	1	B
-1	OM-1400	. CAP, Waveguide	1	
		(ATTACHING PARTS)		
-2	COMM	. SCREW, Machine, truss head, no. 2-56, carbon steel, 11/32 in. lg, cadmium plated w/chromate dip finish	4	
-3	AN936A2	. WASHER, Lock	4	
		- - - * - - -		
-4	OM-1403	. CONNECTOR, Receptacle	1	
		(ATTACHING PARTS)		
-5	HM-714	. SCREW, Machine	4	
		- - - * - - -		
-6	OM-1404	. CONTACT, Electrical	1	
		(ATTACHING PARTS)		
-7	AN515-4-6	. SCREW, Machine	1	
-8	AN936-A4	. WASHER, Lock	1	
		- - - * - - -		
-9	AC-191M-1	. COVER, Waveguide	1	
		(ATTACHING PARTS)		
-10	AN501A10-6	. SCREW, Machine	4	
-11	AN-935-10	. WASHER, Lock	4	
		- - - * - - -		
-12	OM-1401	. PHASING UNIT, Waveguide	1	
		(ATTACHING PARTS)		
-13	COMM	. SCREW, Set, no. 4-40, steel, 11/32 in. lg, cadmium plated w/chromate dip finish	4	
-14	AN340-4	. NUT, Hexagon	4	
		- - - * - - -		
-15	AO-325A-1	. HORN, Waveguide	1	
-16	UG-21B/U	. CONNECTOR, Plug (MIL-C-71A)	1	
-17	NP-296	. NAMEPLATE	1	A
	8111100037	. NAMEPLATE	1	B
		(ATTACHING PARTS)		
-18	COMM	. SCREW, Round head machine, no. 2-56, brass, 3/16 in. lg, cadmium plated w/chromate dip finish	4	
-19	COMM	. WASHER, Split lock, light series for no. 2 size screw, phosphor bronze, cadmium plated w/chromate dip finish	4	

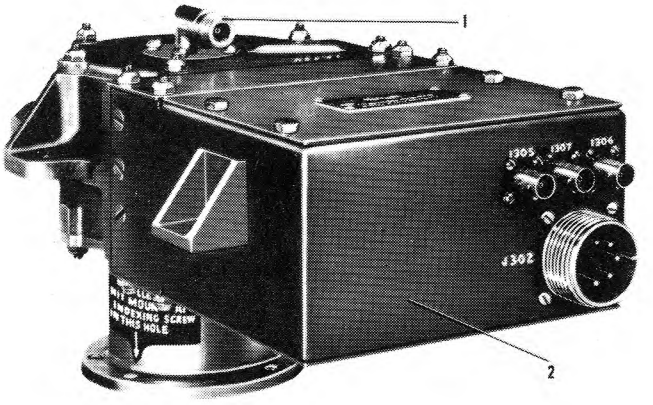

Figure 33. Special Assembly, Direction Finder Group

Fig. and Index No.	*Part Number*	*Description* 1 2 3 4 5 6 7	*Units per Assy.*	*Appl. Code*
33-	AU-51	SPECIAL ASSEMBLY, Direction Finder Group	Ref	
-1	OA-350	. ANTENNA COUPLER CU-398/ALA-6 (See figure 17)	1	
-2	OA-322	. ANTENNA DRIVE TG-23/ALA-6 (See figure 14)	1	
34-	AU-52	ANTENNA ASSEMBLY, Special	Ref	
-1	AA-859	. ANTENNA ASSEMBLY AS-657/ALA-6 (See figure 31)	1	
-2	OA-322	. ANTENNA DRIVE TG-23/ALA-6 (See figure 14)	1	
-3	AA-1026	. ANTENNA COUPLER CU-397/ALA-6 (See figure 32)	1	

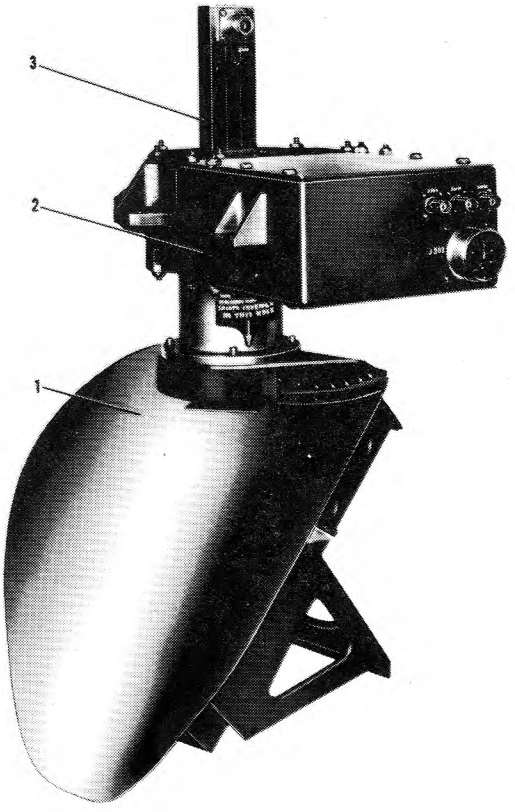

Figure 34. Antenna Assembly, Special

SECTION III
NUMERICAL INDEX

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
AA791-1			14- 12	X2
AA791-2			14- 12	
AA798-1			14- 1	M1
AA798-2			14- 1	
AA804A1			3- 35	
AA805-1			2- 1	
AA805-2			2- 1	P
AA806-1			6- 1	
AA806-2			6- 1	X2
AA811-1			21- 36	A1
AA811-2			21- 36	
AA812A1			7- 81	
AA817-1			19- 8	
AA821			18- 2	
AA822-1	5826	338-6241	18- 1	
AA823-1	5826	672-7665	7- 42	
AA824-1			19- 31	
AA824-2			19- 31	
AA831-1			8-	
AA831-2			8-	A
AA832-1			6- 9	A
AA832-1			7-	A
AA837-1			7- 35	A
AA840-1			18- 3	
AA841-1			7- 20	A
AA843-1			20- 6	A1
AA845-1			7- 50	A
AA846-1			28- 16	A1
AA846-2			28- 16	
AA847-1			7- 25	M
AA848-1			28- 3	A1
AA851-1			8- 26	
AA854-1			31- 10	A1
AA859	5826	284-6777	31- 1	
AA859-1			31-	
AA859-2			31-	
AA862			23- 10	
AA862-2			23- 36	
AA863-1	5895	591-4932A	25- 39	P2
AA864-1	5895	593-4703A	25- 1	P2
AA865-1			26-	A1
AA865-2			23- 28	
AA865-2			26-	
AA866-1			23- 19	A
AA872-1			19- 20	A1
AA906-1			26- 17	A1
AC179M			21- 93	X2
AC180M1			21- 22	X2
AC182	5826	320-7391	16- 10	P1
AC185	5895	591-4926A	8- 12	P1
AC186	5826	611-3880	8- 16	P1
AC188M			17- 13	M1
AC189A1			19- 16	P1
AC191M1	5895	544-4861A	32- 9	P2
AC194	5826	028-9626	29- 15	P2
AC195-1	5826	038-1510	29- 1	P1
AC196	5826	322-6975	29- 4	P2
AC196	5826	322-6975	30- 4	P2
AC203-1	5826	038-1509	30- 1	P1
AGS1	5920	284-4153	4- 4	P1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
AGS10	5920	142-4845	4- 3	P1
AGS3	5920	646-5430	4- 2	P1
AN280-202	5315		15- 69	P1
AN3102A14S5S	5935	280-2262	8- 19	P1
AN3102A16S1P	5935		21- 19	P1
AN3102A16S1S	5935		19- 26	P1
AN3102A16S4P	5935		4- 6	P1
AN3102A18-11P	5935	280-2087	4- 5	P1
AN3102A22-15P	5935	280-1891	14- 5	P1
AN3102A22-15P	5935	280-1891	14- 5	P1
AN3102A22-15S	5935	149-3247	8- 20	P1
AN3102A22-17P	5935		19- 25	P1
AN3102A22-17S	5935	221-9247	4- 8	P1
AN3102A28-19P	5935	259-0609	8- 21	P1
AN3102A28-19S	5935		4- 7	P1
AN3106-22-15S	5935		14- 29	P1
AN3106B14S5P	5935	500-9871	6- 8	P1
AN3106B16S1S	5935	262-7853	21- 18	P1
AN3108B16S1P	5935	274-7271	18- 4	P1
AN3108B16S4S	5935	259-5988	2- 4	P1
AN3108B18-11S	5935	643-5379	2- 5	P1
AN3108B22-15P	5935	500-9860	6- 5	P1
AN3108B22-17P	5935	262-7901	2- 2	P1
AN3108B22-17S	5935	274-7207	18- 5	P1
AN3108B28-19P	5935	149-3300	2- 3	P1
AN3108B28-19S	5935		6- 6	P1
AP47A1			4- 9	A1
AS1411A1			14- 25	M1
AS1411A2			14- 25	
AS1412			14- 3	M1
AS1412			14- 3	M1
AS1413			15- 1	
AS1417	5826	332-7304	15- 46	P1
AS1418	5826	320-7428	16- 6	P1
AS1462			7- 36	M
AS1469			17- 5	P1
AS1473			21- 62	
AS1488			28- 15	M1
AS1491			28- 13	M1
AS1492			28- 14	M1
AS1498-1			23- 4	M1
AS1499			23- 2	M1
AS1499			23- 18	M1
AS1503			25- 77	M1
AS1504			25- 78	M1
AS1506	5985	593-4679A	21- 15	P2
AS1507			21- 12	M1
AS1509	5826	611-3772	17- 8	P1
AS1521	5985	556-2910	24- 15	P2
AS1529	5826	706-8481	25- 27	P1
AS1529	5826	706-8481	25- 65	P1
AS1530			24- 31	M1
AS1531			25- 24	M1
AS1531			25- 62	M1
AS1532			25- 79	M1
AS1533	5826	632-0425	25- 34	P1
AS1533	5826	632-0425	25- 72	P1
AS1555			25- 35	
AS1555			25- 73	
AS1596			21- 65	
AS1648-1			6- 3	P1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
AS176A1			21- 73	
AS1920			23- 1	M1
AU50-1	5826	327-4616	2-	
AU50-2			2-	
AU51			33-	
AU53	5826	026-8667	18-	
AU54-1	5826	505-1887	6-	
AU54-2			6-	
AU57-1			28-	
AU57-2			28-	
AU58-1	5895	217-1583	23-	
AU58-2			23-	
AU60-1	5826	284-7432	21-	
AU60-1	5826	284-7432	21-	
A0325A1			32- 15	
BA24-1			21- 81	
BA24-1			22-	
BM22	5990	501-2659	15- 33	P1
BZ2R104	5930	188-4043	15- 25	P1
CA8-1	5910	702-0183	21- 48	P1
CA9-1	5910	667-6737	21- 48	P1
CM20B431J	5910	101-4907	7- 52	P1
CM25B102J	5910	100-8126	7- 57	P1
CM60B103K	5910	101-5126	10- 1	P1
CPC742-3	5340	257-0039	28- 17	P1
CPC743	5340		27- 21	
CP10A1KC224K	5910		21- 70	P1
CP65B1EF105K	5910	171-3214	7- 17	P1
CP69B1EF105V	5910	188-1372	3- 7	P1
CP69B5FF104V	5910	280-7386	7- 18	P1
CP70E1EK104K	5910	668-1886	7- 16	P1
CP70E1FF405V	5910	120-1679	3- 6	P1
C8777-3	5945	295-4486	3- 9	P1
DCC1-2105F	5905		5- 9	P1
DCC1-2514F	5905		5- 10	P1
DCC1-2624F	5905		5- 11	P1
EA465-1	5826	672-7664	21- 55	P1
EA465-2			21- 54	P1
EA466-1	5977	204-5900	21- 25	P1
EA470-1	5977	632-1501	21- 29	P1
EA477	5895	557-4327	17- 11	P1
EA478-1			3- 22	A
EA478-1			5-	P1
EA479-1	5826	672-7659	5- 12	P1
EA490-1	5826	672-7660	9- 7	P1
EA491-1	5826	672-7700	10- 7	P1
EA492-1	5826	673-0961	11- 4	P1
EA494-1	5826	672-7662	13- 18	P1
EA495-1			7- 45	A
EA495-1			9-	A
EA496-1			7- 48	A
EA496-1			10-	A
EA497-1			7- 46	A
EA498-1			7- 44	A
EA498-1			11-	A
EA498-1			12-	A
EA499-1			7- 43	A
EA499-1			13-	A
EA500-2	5826	538-0663	30- 9	P1
EA501-1			28- 8	A1
EA602-1			27- 4	A1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
EK39-1	5355	667-6660	8- 4	P1
EK40-1	5355	667-5521	8- 3	P1
EK41-1	5355	519-3124	8- 1	P1
EK42-1	5355	519-3117	8- 2	P1
EL284			7- 15	M
EL285	5935	685-9451	7- 11	P1
EL288	5826	672-7663	7- 37	P1
EL289	5826	672-7661	7- 38	P1
EL295			7- 47	
EM357	5330	559-8300	24- 29	P1
EM358	5970	552-9527	24- 30	P1
EM359-1	5826	686-3164	24- 21	P2
EM361	5895	593-4677	24- 25	P1
EM362	5970	556-2686	21- 88	P1
EM362	5970	556-2686	21- 89	P1
EM363	5977	552-9519	28- 9	P1
EM366	5970	538-4863	24- 24	P1
E8741-1	5945	2582809	3- 10	P1
FA204	5915	503-0390	14- 18	P1
HB11-1			31- 1	M1
HB9			21- 8	M1
HCMEHJ	5920	156-4477	4- 1	P1
HM12			14- 22	
HM679	5340	592-6336	8- 23	P1
HM685	5895	558-5600A	4- 11	P1
HM685	5895	558-5600A	8- 25	P1
HM689	5340	698-1655	21- 27	P1
HP3N	5340		3- 29	
HP3N	5340		7- 71	
HP34	5340		7- 71	
HP4N	5340	598-0383	7- 70	P1
HP5N	5340	644-3124	7- 75	P1
HP6N	5340		7- 72	
HP7N	5340		7- 76	
IA11-1			8- 27	X2
IH1-416-1SN			16- 11	P1
IKL1A	5905	691-8974	19- 6	P1
IKL25B	5905	284-3328	21- 45	P1
KHA2B			19- 28	
KP21B	3110	142-4485	21- 11	P1
K36004	5940	636-6512	7- 8	P1
K39001	5910	204-2564	7- 28	P1
K47BK	3110	142-4305	16- 3	P1
K49BK	3110	293-8171	16- 8	P1
MH12	5945	283-8736	14- 22	P1
M201	5930	549-0350	15- 79	P1
ND6A1			8- 24	X2
ND9	5826	672-7670	19- 5	
NM18-1	5826	519-7347	8- 13	P1
NM19-1	5355	668-4498	8- 13	P1
NP227			4- 12	M
NP227			8- 28	M
NP296			32- 17	M
NP297			17- 15	M
PK2543	5330	141-3507	16- 9	P1
PK2584	5330		21- 33	P1
PK3515	5826	338-1693	6- 2	P1
RA20A1FD501AK	5905	502-6068	8- 11	P1
RA30AIRB351AK	5905		19- 29	P1
RC20BF102K	5905	817-5636	5- 5	P1
RC20BF102K	5905	817-5636	9- 6	P1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
RC20BF104K	5905	120-0894	5- 8	P1
RC20BF125K	5905	190-8874	3- 19	P1
RC20BF152K	5905	279-1757	20- 3	P1
RC20BF224K	5905	192-0667	10- 2	P1
RC20BF273K	5905	158-5751	7- 61	P1
RC20BF274K	5905	190-8865	20- 1	P1
RC20BF333K	5905	171-1998	5- 6	P1
RC20BF470K	5905	252-4018	7- 63	P1
RC20BF471J	5905	192-3973	26- 12	P1
RC20BF473K	5905	254-9201	13- 5	P1
RC20BF564K	5905	279-2514	13- 17	P1
RC20BF564K	5905	279-2514	20- 5	P1
RC20BF824K	5905	107-3215	5- 4	P1
RC30BF104K	5905	109-0532	10- 3	P1
RC30BF334K	5905	299-1995	5- 7	P1
RC30BF470K	5905	101-9332	5- 1	P1
RC42GF103K	5905	185-8521	7- 56	P1
RC42GF104K	5905	171-1978	9- 1	P1
RC42GF273K	5905	195-6758	11- 3	P1
RDM25-15	5905	702-7525	14- 14	P1
RH25	5905	702-7525	14- 14	P1
RN20R2004F	5905	173-9910	5- 10	P1
RP102FJ201KK	5905	549-5685	8- 7	P1
RRE37SSCIP	5340	263-5869	15- 49	P1
RR200	5340	285-6954	21- 80	P1
RR206	5340	285-7934	21- 9	P1
RR525	5340	200-7393	21- 24	P1
RS143	5340	200-2551	21- 28	P1
RS168	5340	200-7489	21- 23	P1
RV4ATSD103A	5905	502-4827	7- 26	P1
RV4ATSD104A	5905	248-3340	3- 8	P1
RV4ATSD104A	5905	248-3340	7- 32	P1
RV4ATSD104A	5905	248-3340	8- 6	P1
RV4ATSD504A	5905	263-2330	7- 27	P1
RW34G5R0	5905	173-9124	7- 24	P1
R2AXR1	3110	516-5526	15- 73	P1
R3XR1	3110	289-8084	15- 51	P1
R3XR1	3110	289-8084	15- 57	P1
R3XR1	3110	289-8084	15- 65	P1
R6X1	3110	516-5413	15- 48	P1
SDJ1	5935	257-9557	3- 11	P1
SDJ1	5935	257-9557	7- 39	P1
SS01A20	5930	188-4043	7- 23	P1
SS03A20	5930	230-2561	7- 49	P1
ST42D	5930	259-8420	8- 8	P1
ST52N	5930	050-2707	3- 12	P1
SW111-1	5930	548-5202	7- 31	P1
SW118	5930	327-8225	19- 30	P1
TA70	5950	345-8541	7- 53	P1
TA798-8	5340		7- 77	
TP338A	5950	090-0252	3- 23	P1
TP34	5950	646-3400	7- 19	P1
TSF0T101	5960	262-0015	7- 2	P1
TS101C01	5935	160-1364	3- 17	P1
TS102P01	5935	260-0516	7- 66	P1
TS103P01	5935	160-1365	7- 69	P1
TS103U02	5960	264-3004	7- 1	P1
TS230	5950	646-0432	19- 22	P1
TS243	5950	646-3400	7- 19	P1
TT51A	6220	299-4069B	8- 5	P1
UG21BU	5935	500-8509	17- 1	P1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
UG21BU	5935	500-8509	32- 16	P1
UG260U	5935	258-7883	14- 30	P1
UG260U	5935	258-7883	14- 30	P1
UG262BU	5935	259-3346	8- 18	P1
UG290U	5935	665-8662	14- 8	P1
UG290U	5935	665-8662	14- 9	P1
UG535U	5935	295-3345	26- 5	P1
UG58U	5935	295-5379	24- 4	P1
UG88CU	5935	539-0194	24- 13	P1
W1-426			24- 14	M1
XA44			7- 9	A
X1942X3	5940	666-3873	27- 1	P1
ZA7	5915	503-0390	14- 18	P1
0A290A			15- 83	X2
0A292-1			15- 53	A1
0A295-1			16-	M1
0A298-1			21- 87	A1
0A300			21- 89	A1
0A301			21- 88	A1
0A302-1	5826	588-9487	21- 88	P1
0A303	5826	588-9486	21- 89	
0A310-1	3110	158-8542	21- 39	A1
0A318-1			14- 28	A1
0A318-1			14- 28	A1
0A318-1			15-	A1
0A319			8- 13	
0A320			21- 89	
0A320-1			21- 88	
0A322	5826	032-1707	14-	
0A322	5826	032-1707	33- 2	
0A322	5826	032-1707	34- 2	
0A322-2			14-	
0A326-1			16- 11	M1
0A331	5985	538-4305	28- 4	
0A332-1	5826	691-3262	27- 7	P1
0A332-2			28- 7	X1
0A335-1	5985	538-4648	23- 12	P1
0A335-1	5985	538-4648	27-	P1
0A337-1	5895	519-6731	17- 2	P1
0A341	5826	330-3565	22- 6	X2
0A345-1	5977	302-9124	28- 10	A1
0A346-1	5935	573-7212	21- 35	P2
0A350	5826	538-0857	17-	
0A350	5826	538-0857	33- 1	
0A355-1			28- 2	
0A355-1			29-	
0A355-2			28- 2	A1
0A355-2			30-	A1
0A356-1			28- 12	A1
0A357-1	5895	611-2395	15- 31	P1
0A358-1	5895	591-1318	24- 19	P2
0A360-1			26- 9	A1
0A361-1			24- 8	A1
0A362-1	5826	673-0983	26- 15	P2
0A363-1	5826	611-3887	26- 14	P2
0A364-1			24- 1	A1
0M1297	5826	288-0690	15- 77	P1
0M1302	5985	289-7240	15- 67	P2
0M1303	5315	558-4438	16- 5	P1
0M1304	5826	288-2854	15- 75	P1
0M1306			15- 11	M1

Part No.	Stock No.		Figure and Index No.	Source Code
	Class Code	Federal Item Identification No.		
0M1307	5826	200-1728	15- 41	P2
0M1309	5826	333-2707	15- 29	P1
0M1311			15- 27	
0M1312			15- 30	P1
0M1315	5826	098-9989	15- 61	M1
0M1318	5826	528-1565	15- 59	P2
0M1319	5826	588-9447	15- 43	P1
0M1320	5826	517-4666	15- 7	P2
0M1322	5826	332-4803	15- 68	P1
0M1323	5826	520-9296	15- 78	M1
0M1324	5826	098-9418	15- 47	P2
0M1325	5826	306-4498	16- 11	P1
0M1327	5826	341-1008	16- 4	P2
0M1329	5826	302-9125	15- 39	P2
0M1331	5826	035-4507	15- 37	P2
0M1346	5826	288-2858	21- 43	P2
0M1347	5826	216-4876	21- 44	P2
0M1369-1			4- 10	P1
0M1370	5895	559-1925A	8- 15	P1
0M1373	5330	558-0641	8- 13	P1
0M1376	5895	593-4633	21- 32	P1
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0M1378			19- 9	M1
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5670	5960	188-6584	7- 7	P1
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A609	23-2		AS-1499
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C202	12-2		1S1P10401S1
C203	7-17		CP65B1EF105K
C204	12-2		181P10401S1
C205	7-54		91P10304S2
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C212	12-2		181P10401S1
C213	7-18		CP69B5FF104V
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C215	13-3		181P10401S1
C216	7-54		91P10304S2
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E401	19-2		EK-39-1
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E703	28-1		OA-345-1
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J211	7-39		SDJ-1
J212	7-39		SDJ-1
J213	7-39		SDJ-1
J214	7-39		SDJ-1
J215	7-39		SDJ-1
J216	7-39		SDJ-1
J217	7-39		SDJ-1
J218	7-39		SDJ-1
J219	7-39		SDJ-1
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J402	19-25		AN3102A-22-17P
J501	21-19		AN3102A-16S-1P
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K102	3-10		E8741-1
K301	14-22		MH-12
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O202	8-22		OM-1405
O203	7-29		OM-1406
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O302	15-41		OM-1307
O303	15-7		OM-1320
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O328	15-43		OM-1319
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O337	16-9		PK-2543
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O341	15-53		OA-292-1
O342	15-17		OM-1316
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O347	16-11		OA-326-1
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O503	22-6		OA-341
O504	22-1		95F
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O510	21-28		RS-143
O511	21-27		HM-689
O604	25-7		OM-1513-1
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O606	25-17		OM-1514
	25-55		
O607	25-34		AS-1533
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O712	28-11		OM-1413
O801	15-37		OM-1331
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P207	6-7		UG-260/U
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P209	6-7		UG-260/U
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P301	32-16		UG-21B/U
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P306	14-30		UG-260/U
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P602	24-13		UG-88C/U
P801	17-1		UG-21B/U
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R102	5-1		RC30BF470K
R103	5-7		RC30BF334K
R104	5-6		RC20BF333K
R105	5-5		RC20BF102K
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R107	5-9		DCC,1meg±1%,½W
R108	5-10		DCC,510k±1%,½W
R109	3-8		RV4ATSD104A
R110	5-11		DCC,620k±1%,½W
R111	5-8		RC20BF104K
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R209	11-2		RC20BF105K
R210	7-32		RV4ATSD104A
R211	12-11		RC20BF104K
R212	12-6		RC20BF564K
R213	11-2		RC20BF105K
R214	7-56		RC42GF103K
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R217	7-63		RC20BF470K
R218	20-1		RC20BF274K
R219	13-12		RC20BF103K
R220	13-11		RC20BF273K
R221	11-2		RC20BF105K
R222	7-56		RC42GF103K
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R224	12-6		RC20BF564K
R225	7-60		RC20BF274K
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R243	9-6		RC20BF102K
R244	9-6		RC20BF102K
R245	9-6		RC20BF102K
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R247	13-16		RC42GF103K
R248	13-6		RC20BF101K
R249	13-7		RC20BF102K
R250	13-7		RC20BF102K
R251	13-6		RC20BF101K
R252	13-17		RC20BF564K
R253	13-7		RC20BF102K
R254	13-7		RC20BF102K
R255	13-7		RC20BF102K
R256	13-7		RC20BF102K
R257	13-17		RC20BF564K
R258	11-3		RC42GF273K
R259	11-3		RC42GF273K
R260	10-2		RC20BF224K
R261	11-1		RC20BF224K
R262	7-33		RV4ATSD353A
R263	11-2		RC20BF105K
R264	12-10		RC20BF105K
R265	12-10		RC20BF105K
R266	13-13		RC20BF105K
R267	7-33		RV4ATSD353A
R268	11-1		RC20BF224K
R269	11-1		RC20BF224K
R270	11-3		RC42GF273K
R271	11-3		RC42GF273K
R272	11-1		RC20BF224K
R273	10-3		RC30BF394K
R274	10-4		RC30BF334K
R275	10-5		RC30BF224K
R276	7-27		RV4ATSD504A
R277	10-4		RC30BF334K
R278	8-6		RV4ATSD104A
R279	10-6		RC30BF104K
R280	7-34		RW34G5R0
R281	8-7		RP102FJ201KK
R282	8-11		RA20A1FD501AK
R283	7-27		RV4ATSD504A
R284	7-63		RC20BF470K
R301	14-14		RH25
	14A-14		R-DM25-15
R401	19-6		IK-L.1-A
R402	20-5		RC20BF564K
R403	13-10		RC20BF274K
R404	20-3		RC20BF152K
R405	20-1		RC20BF274K
R406	20-5		RC20BF564K
R407	20-5		RC20BF564K
R408	20-2		RC20BF221K
R409	19-29		RA30A1RD351AK
R501	21-45		IK-L.25-B
R601	26-12		RC20BF471J
R602	26-12		RC20BF471J
R603	26-12		RC20BF471J
S101	3-12		ST52-N
S201	7-31		SW-111-1
S202	7-23		SS01A20
S203	7-24		212A
S204	7-49		SS03A20
S205	8-8		ST-42D
S206	8-8		ST-42D
S301	15-24		BZ-2R104
S302	15-25		BZ-2R104
S303	7-59		M-201
S401	19-30		SW-118
T101	3-20		99G142
T102	3-23		TP-338-A
T201	7-53		TA-70
T202	7-19		TS-243
T401	19-22		TS-230
TB101	5-12		EA-479-1
TB201	12-13		EA-493-1
TB202	11-4		EA-492-1
TB203	9-7		EA-490-1
TB204	13-18		EA-494-1
TB205	10-7		EA-491
TB301	15-19		2-172
V101	3-5		5Y3WGT
V102	3-2		5726/6AL5W
V103	3-1		6080
V104	3-3		5654/6AK5W/6096
V105	3-4		5651
V201	7-3		5814A
V202	7-4		5654/6AK5W/6096
V203	7-5		5725/6AS6W
V204	7-6		6005/6AQ5W/6095
V205	7-4		5654/6AK5W/6096
V206	7-3		5814A
V207	7-6		6005/6AQ5W/6095
V208	7-3		5814A
V209	7-3		5814A
V210	7-3		5814A
V211	7-7		5670
V212	7-7		5670
V213	7-12		1Z2
V214	7-40		3WP1
V401	19-17		5751
V402	19-18		5814A
X101	4-1		HCM-EHJ
XF101	4-1		HCM-EHJ
XF102	4-1		HCM-EHJ
XF103	4-1		HCM-EHJ
XF104	4-1		HCM-EHJ
XF105	4-1		HCM-EHJ
XI201	8-5		TT-51A
XI202	8-5		TT-51A
XI203	8-5		TT-51A
XI204	8-5		TT-51A
XI206	8-5		TT-51A
XI401	19-1		TT-51A
XI402	19-1		TT-51A
XV102	3-18		105BC
XV104	3-18		105BC
XV105	3-18		105BC
XV201	7-69		TS103P01
XV202	7-66		TS102P01

Reference Designation	*Figure Index*	*Class Code and/or Stock No.*	*Part Number*
XV203	7-66	8850-882880	TS102P01
XV204	7-68	8850-	105BC
XV205	7-66	8850-882880	TS102P01
XV206	7-69	8850-896590	TS103P01
XV207	7-68	8850-	105BC
XV208	7-69	8850-896590	TS103P01
XV209	7-69	8850-896590	TS103P01
XV210	7-69	8850-896590	TS103P01
XV211	7-67	8850-	271BC
XV212	7-67	8850-	271BC
XV213	7-14	8850-	119BC
XV214	7-41	8850-	59-402
XV401	19-23	8850-	271BC
XV402	19-23	8850-	271BC

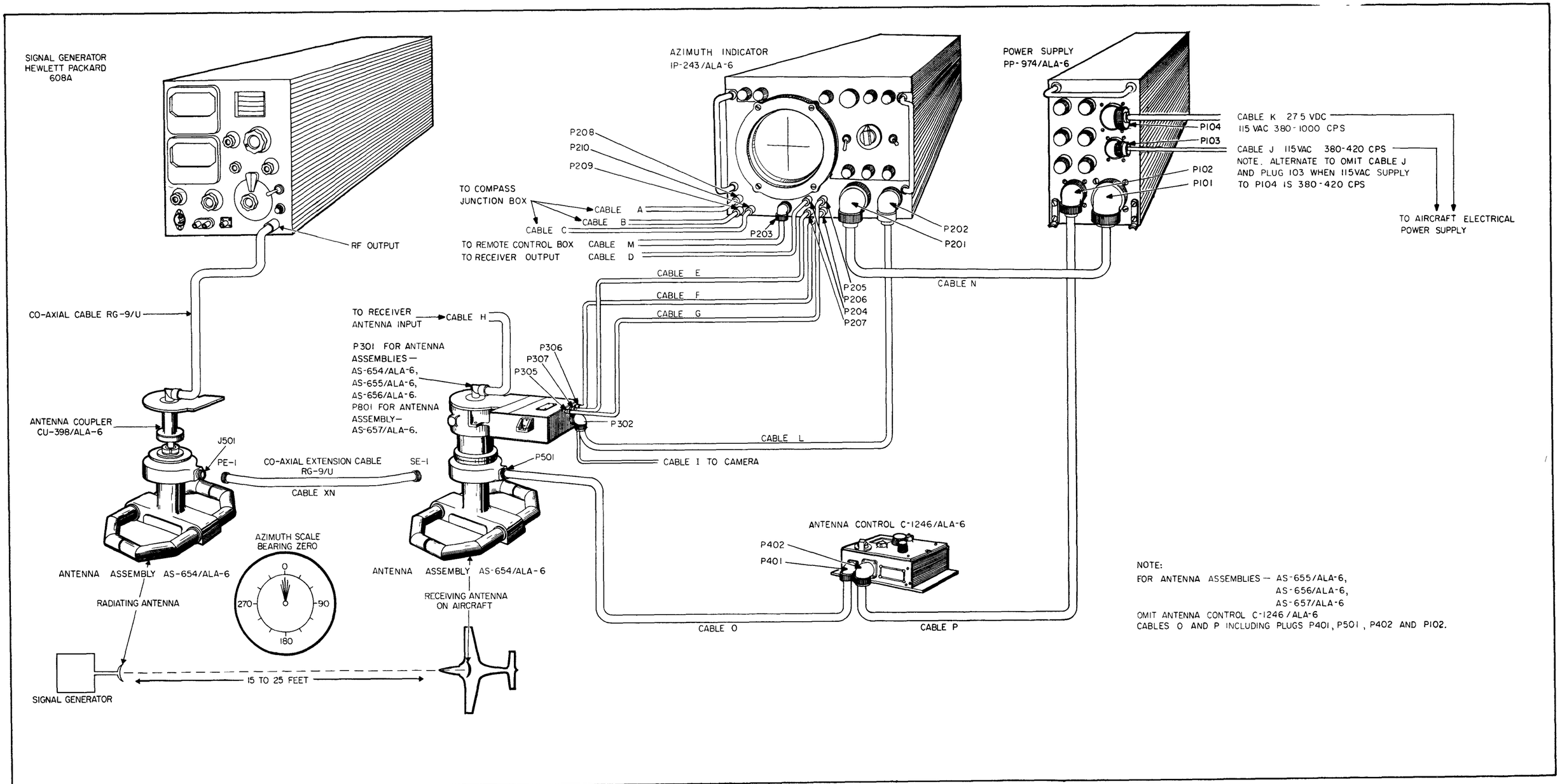
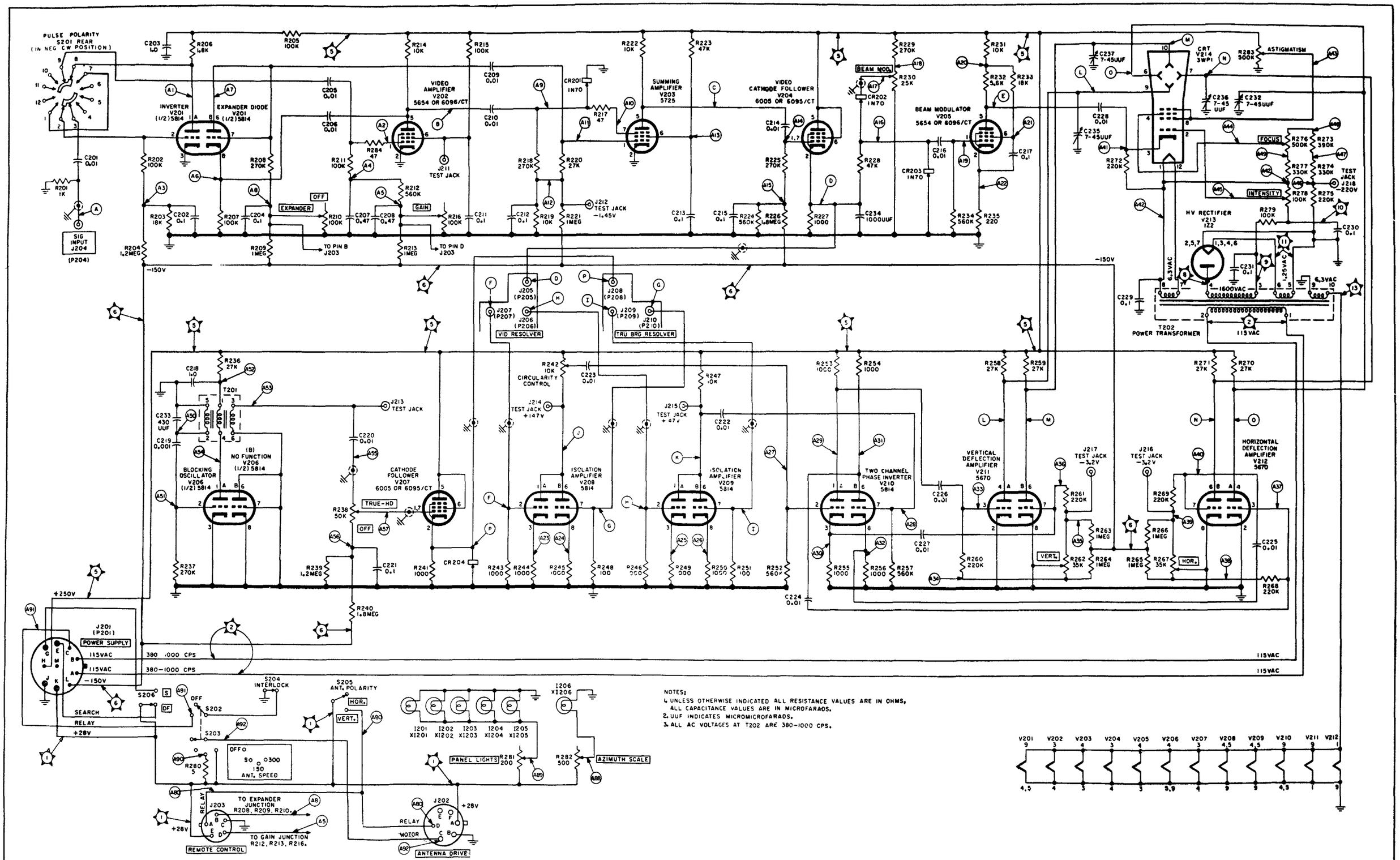


Figure 5-2. Directional Accuracy and Frequency Tracking Test Setup



NOTES:
1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN MICROFARADS.
2. UUF INDICATES MICROMICROFARADS.
3. ALL AC VOLTAGES AT T202 ARE 380-1000 CPS.

Figure 7-1. Azimuth Indicator IP-243/ALA-6, Schematic Diagram

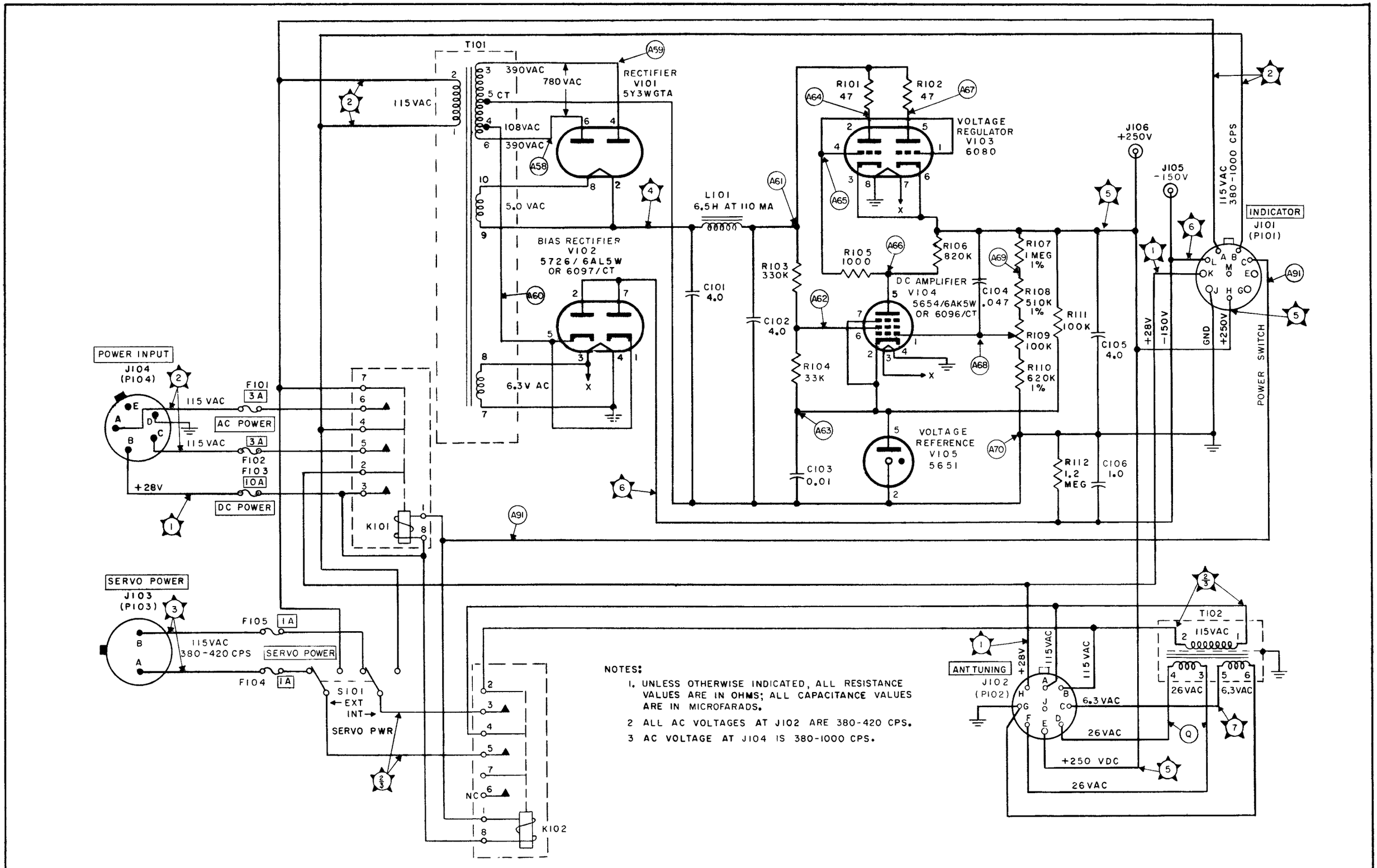


Figure 7-2. Power Supply PP-974/ALA-6, Schematic Diagram

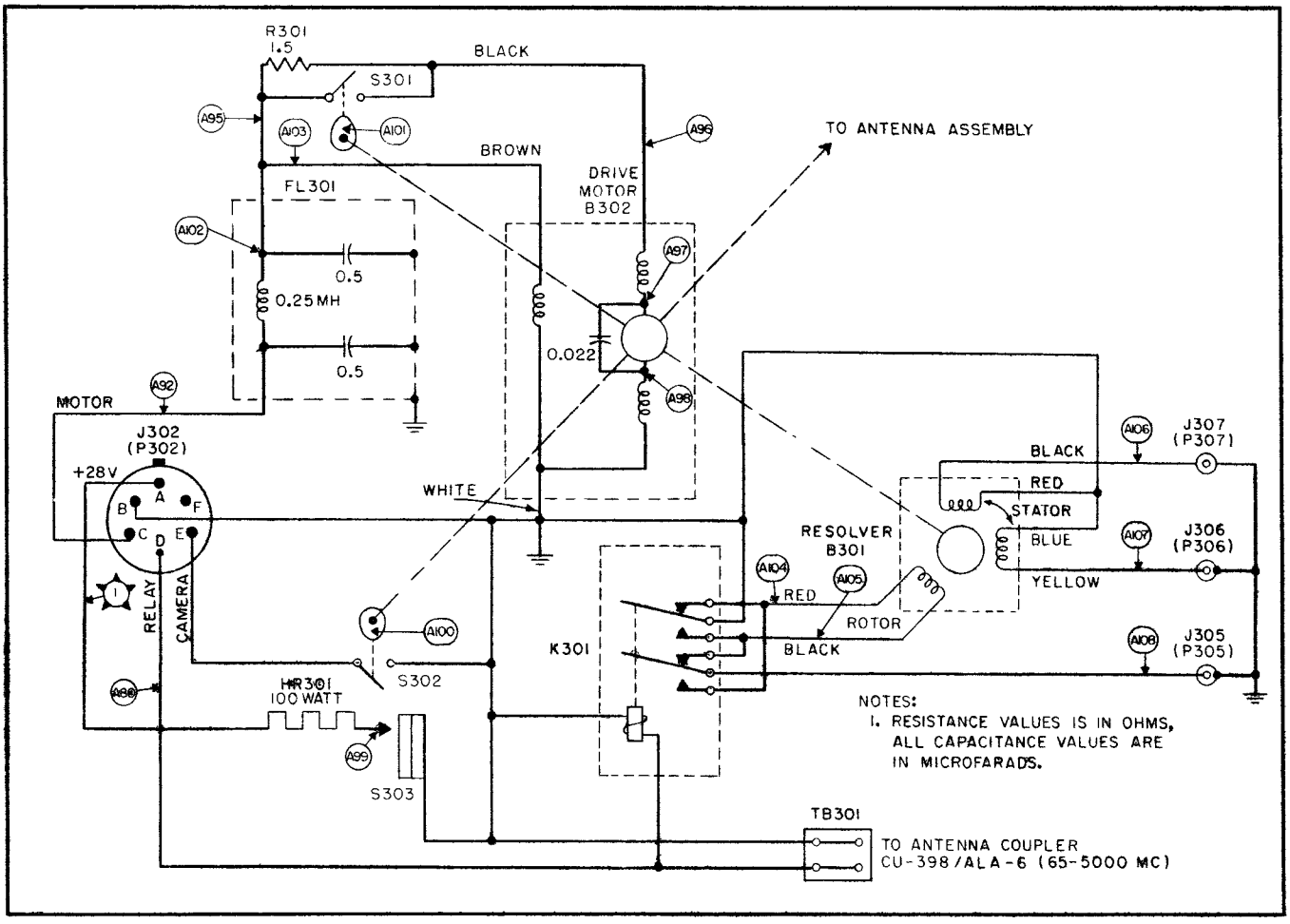


Figure 7-3. Antenna Drive TG-23/ALA-6, Schematic Diagram

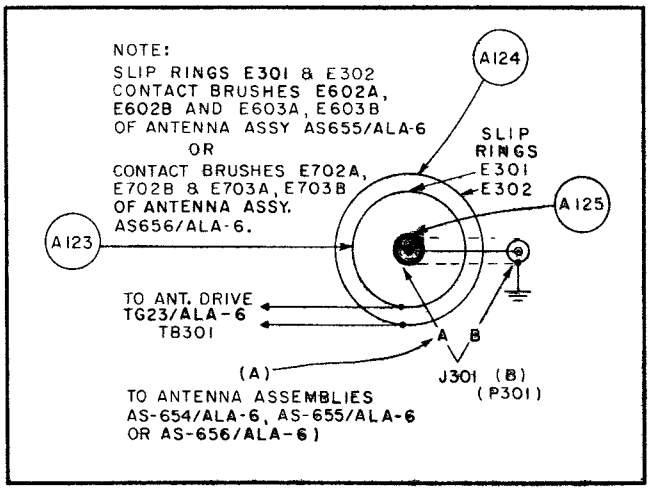
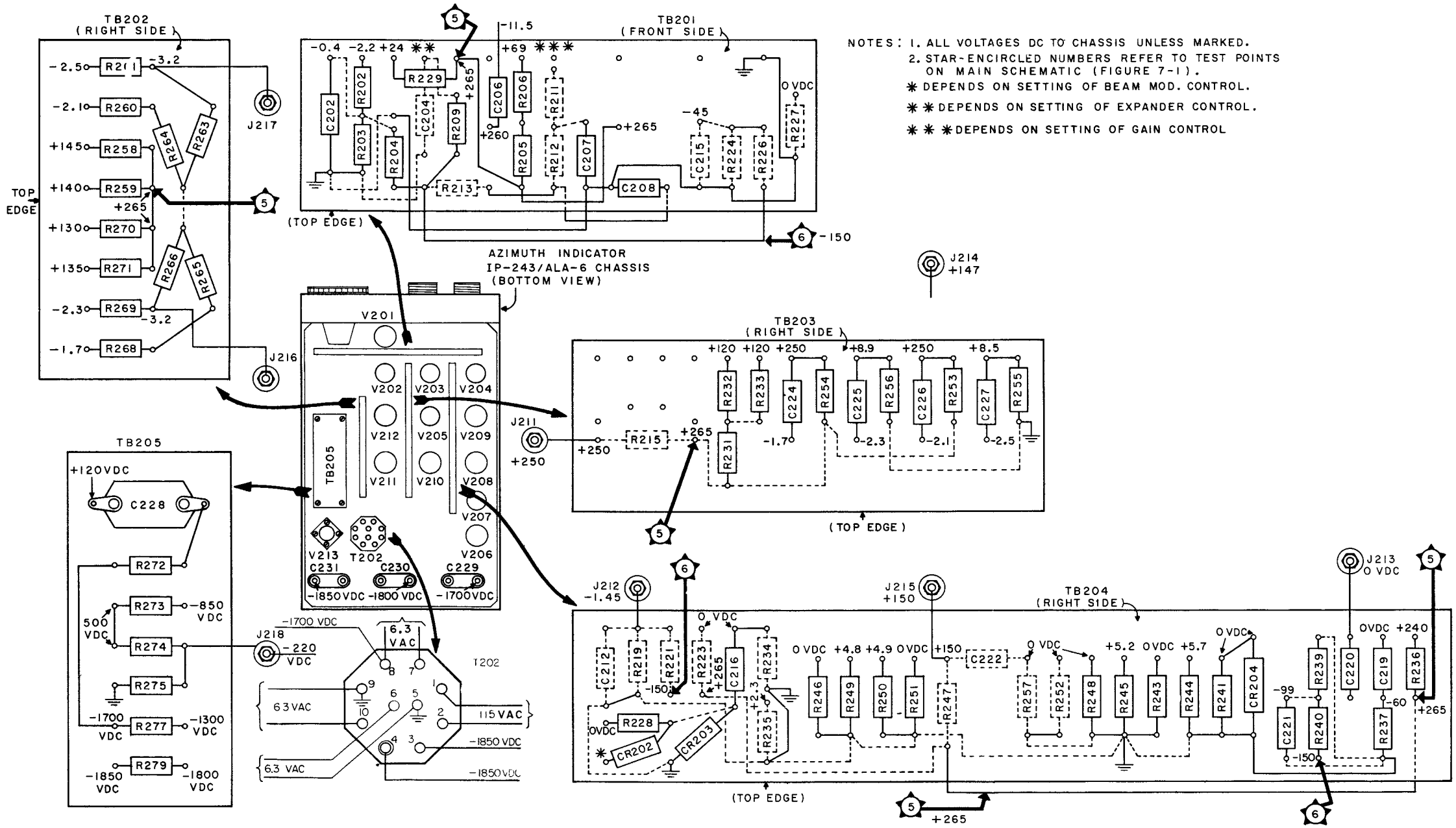
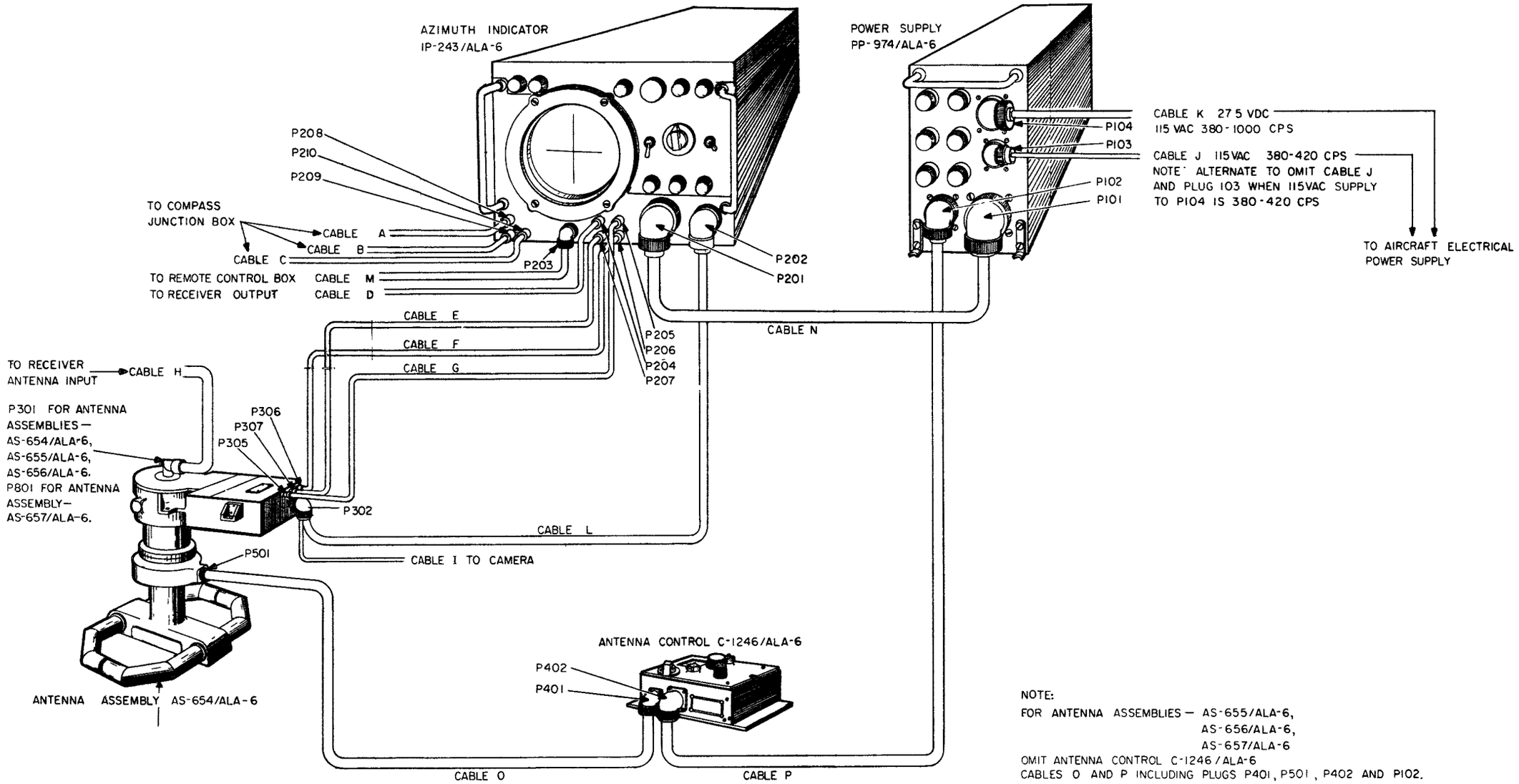


Figure 7-4. Antenna Coupler CU-398/ALA-6, Schematic Diagram



NOTES: 1. ALL VOLTAGES DC TO CHASSIS UNLESS MARKED.
2. STAR-ENCIRCLED NUMBERS REFER TO TEST POINTS ON MAIN SCHEMATIC (FIGURE 7-1).
* DEPENDS ON SETTING OF BEAM MOD. CONTROL.
** DEPENDS ON SETTING OF EXPANDER CONTROL.
*** DEPENDS ON SETTING OF GAIN CONTROL

Figure 7-11. Azimuth Indicator IP-243/ALA-6, Terminal Board Arrangement



NOTE:
FOR ANTENNA ASSEMBLIES — AS-655/ALA-6,
AS-656/ALA-6,
AS-657/ALA-6
OMIT ANTENNA CONTROL C-1246/ALA-6
CABLES O AND P INCLUDING PLUGS P401, P501, P402 AND P102.

Figure 7-15. Direction Finder Group AN/ALA-6, Inter-Component Cabling Diagram