T.O. 31P6-2FPS8-1

TECHNICAL MANUAL

OPERATION

RADAR SET AN/FPS-8 AND RADAR SET AN/MPS-11

(GENERAL ELECTRIC CO., SYRACUSE, NEW YORK)

CHANGE NOTICE

LATEST CHANGED PAGES SUPERSEDE THE SAME PAGES OF PREVIOUS DATE

Insert changed pages into basic publication. Destroy superseded pages.

THIS TITLE PAGE REPLACES TITLE PAGE DATED 30 DECEMBER 1954, CHANGED 15 APRIL 1969.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

30 DECEMBER 1954
CHANGED 15 APRIL 1969
REVIEWED AND CURRENT ON 2 FEBRUARY 1972

Technical orders are normally distributed promptly after printing. Date(s) shown on the title page (lower right) are for identification only. This is not a distribution date. Processing time sometimes causes distribution to only appear to have been delayed.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page.

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 134 CONSISTING OF THE FOLLOWING:

Page No.	Issue	Page No.	Issue
*Title	15 Apr 69	32A thru 32B	30 Apr 59
*A	15 Apr 69	33 thru 37	Original
*B Added	15 Apr 69	*38	15 Apr 69
*C Blank Added	15 Apr 69	*39 thru 40 Deleted	15 Apr 69
*i	15 Apr 69	41 thru 46	Original
ii	30 Nov 68	46A	30 Sep 59
iii	Original	46B Blank	30 Sep 59
iv	1 Dec 57	47	30 Sep 59
1 thru 3	Original	48 thru 54	Original
4	1 Dec 57	*55	15 Apr 69
5	Original	*56 Blank	15 Apr 69
6	30 Sep 59	*57 thru 58 Deleted	15 Apr 69
6A	1 Dec 57	*59	15 Apr 69
6B Blank	Original	*60 Blank	15 Apr 69
*7	15 Apr 69	61 thru 62	1 Dec 57
8	30 Sep 59	62A	1 Dec 57
9 thru 10	Original	62B Blank	Original
*11	15 Apr 69	63	1 Dec 57
12	25 Nov 66	64 thru 72	Original
13	30 Sep 59	72A	1 Dec 57
14 thru 15	Original	72B Blank	Original
16	1 Dec 57	73 thru 74	Original
16A	1 Dec 57	74A	30 Sep 59
16B Blank	Original	74B Blank	30 Sep 59
17	1 Dec 57	75	30 Sep 59
18	30 Sep 59	76 thru 77	Original
18A	1 Dec 57	*78 thru 79	15 Apr 69
18B Blank	Original	80 thru 81	Original
19 thru 20	30 Sep 59	*82	15 Apr 69
21 thru 23	Original	*83 thru 84 Deleted	15 Apr 69
24	1 Dec 57	85 thru 86	Original
25 thru 29	Original	*87	15 Apr 69
30	30 Apr 59	88 thru 89	Original
31	Original	*90	15 Apr 69
32	30 Apr 59	91	Original

Upon receipt of the second and subsequent changes to this technical order, personnel responsible for maintaining this publication in current status will ascertain that all previous changes have been received and incorporated. Action should be taken promptly if the publication is incomplete.

*** The asterisk indicates pages changed, added or deleted by the current change.**

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

USAF ACTIVITIES.—In accordance with T.O. 00-5-2. **USAF**

AFLC SMAMA MAR 72, 550

LIST OF EFFECTIVE PAGES

Page No.	Issue
*92	15 Apr 69
*93 thru 98 Deleted	15 Apr 69
*98A Deleted.	15 Apr 69
*98B Blank Deleted	15 Apr 69
99 thru 105	Original
106	30 Sep 59
107	Original
108 Blank	Original
109	30 Nov 68
110 Blank	30 Nov 68
111 thru 122.	30 Nov 68

*The asterisk indicates pages changed, added, or deleted by the current change.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont)

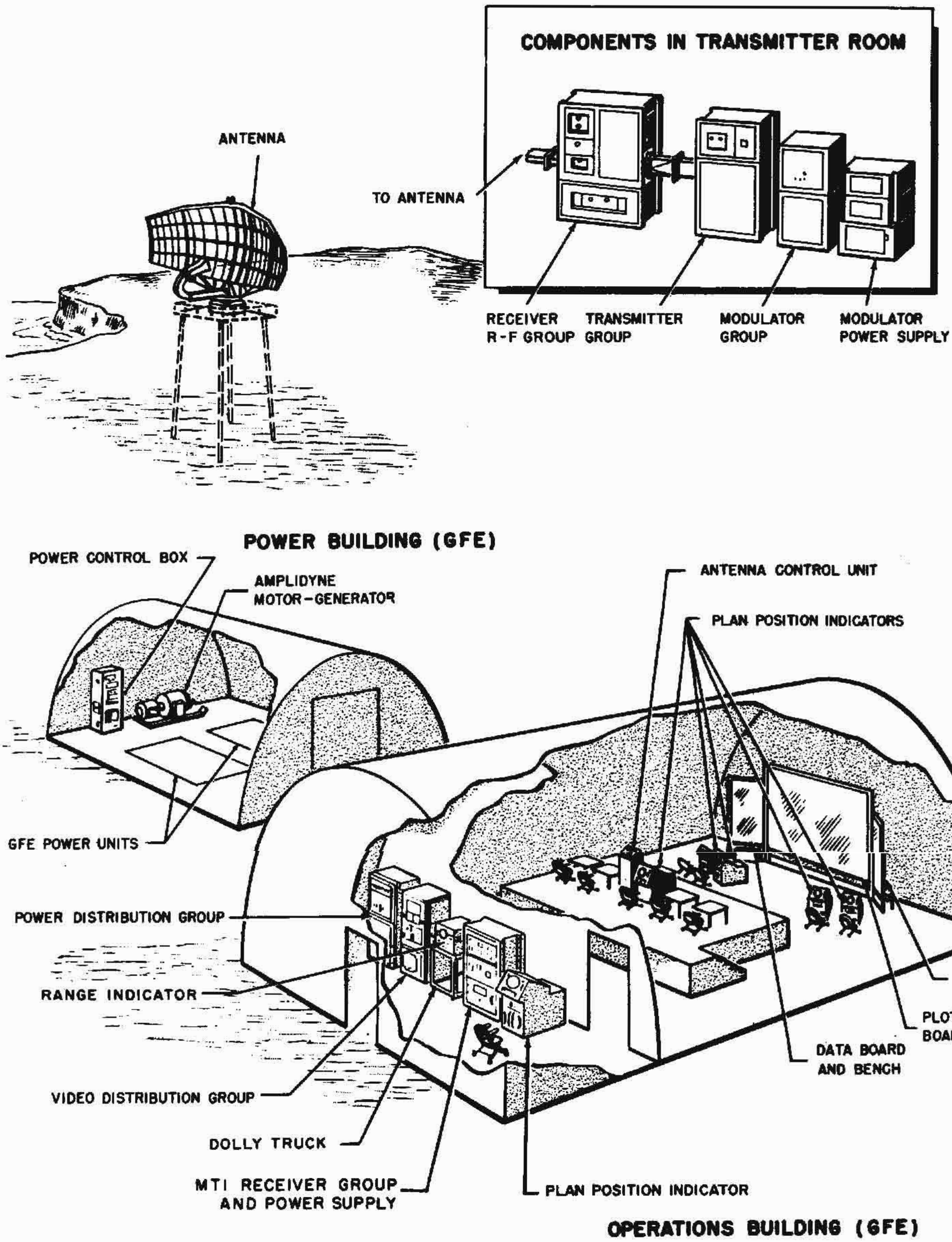


Figure 1—1. Radar Set AN/FPS-8

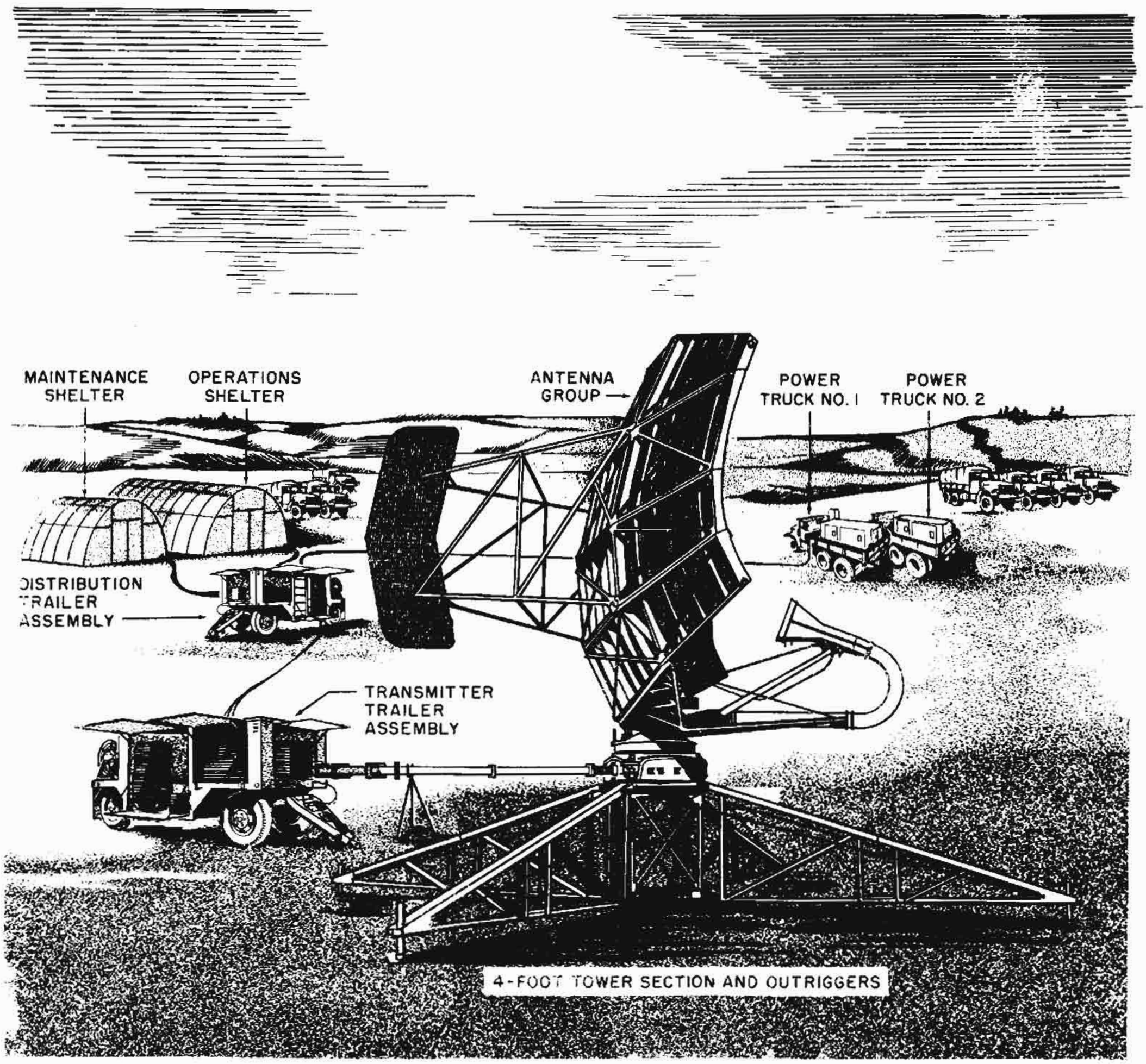


Figure 1—2. Radar Set AN/MPS-11

SECTION I
GENERAL DESCRIPTION

1–1. PURPOSE OF HANDBOOK.

1–2. This handbook provides a detailed description of Radar Sets AN/FPS-8, and AN/MPS-11. It includes operational instructions, and the functions of major systems of both radar sets.

CAUTION

Do not attempt to operate either Radar Set AN/FPS-8 or AN/MPS-11 without first becoming familiar with the instructions given in all sections of this handbook.

1–3. PURPOSE OF RADAR SET AN/FPS-8.

(See figure 1–1).

1–4. Radar Set AN/FPS-8 is a search system designed primarily for early warning and long range detection of aircraft. By means of six identical PPI (plan position indicator) displays, accurate target ranges can be determined.

1–5. Radar Set AN/FPS-8 has been designed for fixed installation in the field. The components are stack-mounted in cabinets so that, with the exception of the antenna which must be disassembled, the radar components may easily be transported by air without disassembly.

1–6. Radar Set AN/FPS-8 is manufactured by General Electric Company, Electronics Department, Electronics Park, Syracuse, New York.

1–7. CAPABILITIES AND LIMITATIONS OF RADAR SET AN/FPS-8.

1–8. Radar Set AN/FPS-8 operates in the frequency band of 1280-1350 megacycles (L-band). When set up for normal operation, the radar search areas can be extended to 360 degrees of continuous azimuth rotation of limited to scanning areas of approximately 40 to 120 degrees.

1–9. The vertical radiation pattern subtends an angle of 30 degrees between its upper and lower coverage limimts. The pattern is normally positioned so that the lower coverage limit is coincident with the horizon. Means are provided to position this limit from —2 degrees to +5 degrees with respect to the horizon.

1–10. Interference is minimized by the inclusion of the following circuits: MTI (moving target indicator) reduces ground clutter and fixed target echoes at ranges up to 150 nautical miles. (Beyond 150 nautical miles, fixed targets are generally not encountered.) Interference blanking circuits eliminate interference caused by as many as three nearby radar sets. Anti-clutter circuits minimize the effect of noise and c-w jamming.

1–11. OTHER CHARACTERISTICS. Mounting facilities are provided for the IFF equipment that is used in conjunction with Radar Set AN/FPS-8. In addition to these facilities, the radar set provides the IFF equipment with power, synchronizing pulses, video mixing circuitry, and the use of the radar antenna system for the simultaneous operation of radar search and IFF interrogation.

1–12. Radar Set AN/FPS-8 may be used for GCI (ground control interception) operation when operated with a height-finding radar of comparable range capability.

1–13. Facilities are provided for a video mapping unit (not supplied as part of Radar Set AN/FPS-8). If this unit is not used, it may be replaced by a seventh PPI oscilloscope.

1–14. PURPOSE OF RADAR SET AN/MPS-11.

(See figure 1–2).

1–15. Radar Set AN/MPS-11 is essentially a mobile version of Radar Set AN/FPS-8. As such it combines the electrical characteristics of the AN/FPS-8 system with the advantages of extreme mobility. Thus, with the exception of mounting facilities, the purpose, capabilities, and limitations of Radar Set AN/MPS-11 are identical to those of Radar Set AN/FPS-8.

1–16. DIFFERENCES BETWEEN MODELS.

1–17. The components of both radar models are essentially the same: differences between the sets, however, are the mounting facilities which have been provided to the AN/MPS-11 system. These facilities comprise an antenna tower, and trucks and trailers within which radar components are permanently mounted. This ensures greater mobility and the rapid transition between the travel and operate conditions.

1–18. In the operate condition, the AN/FPS-8 antenna is mounted upon a tower, which is not part of the radar set; the AN/MPS-11 antenna is mounted upon a tower which is part of the radar set.

1–19. Other differences between the radar models are the inclusion of transport facilities for the IFF equipment (GFE), and that additional equipment that is required to render the AN/MPS-11 mobile. This additional equipment is indicated in table II, Equipment Supplied With Radar Set AN/MPS-11.

1–20. TRAILER, VAN V-112/MPS-11.
(See figure 1–3).

1–21. Trailer, Van V-112/MPS-11 (transmitter trailer assembly) consists of a conventional four-wheel, two-wheel steerable trailer within which are mounted an intercable and transmitting and receiving components of Radar Set AN/MPS-11. The trailer assembly is an

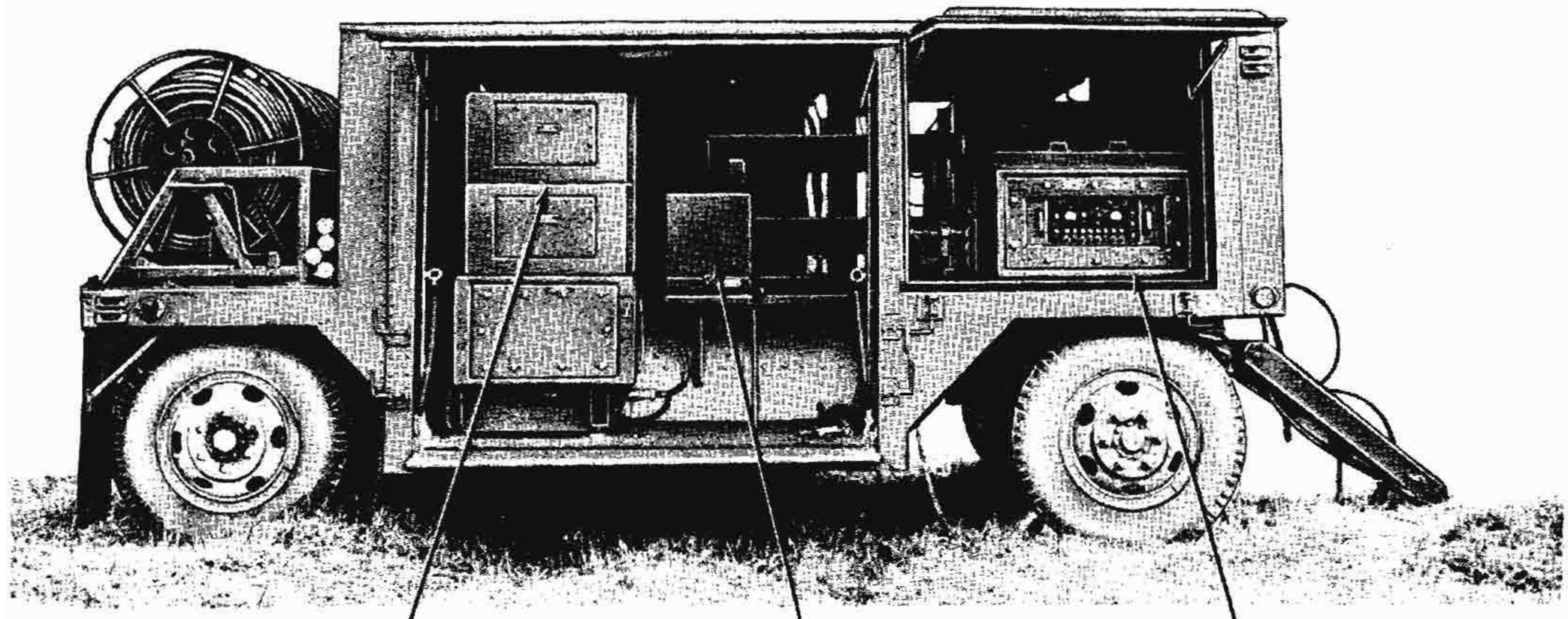
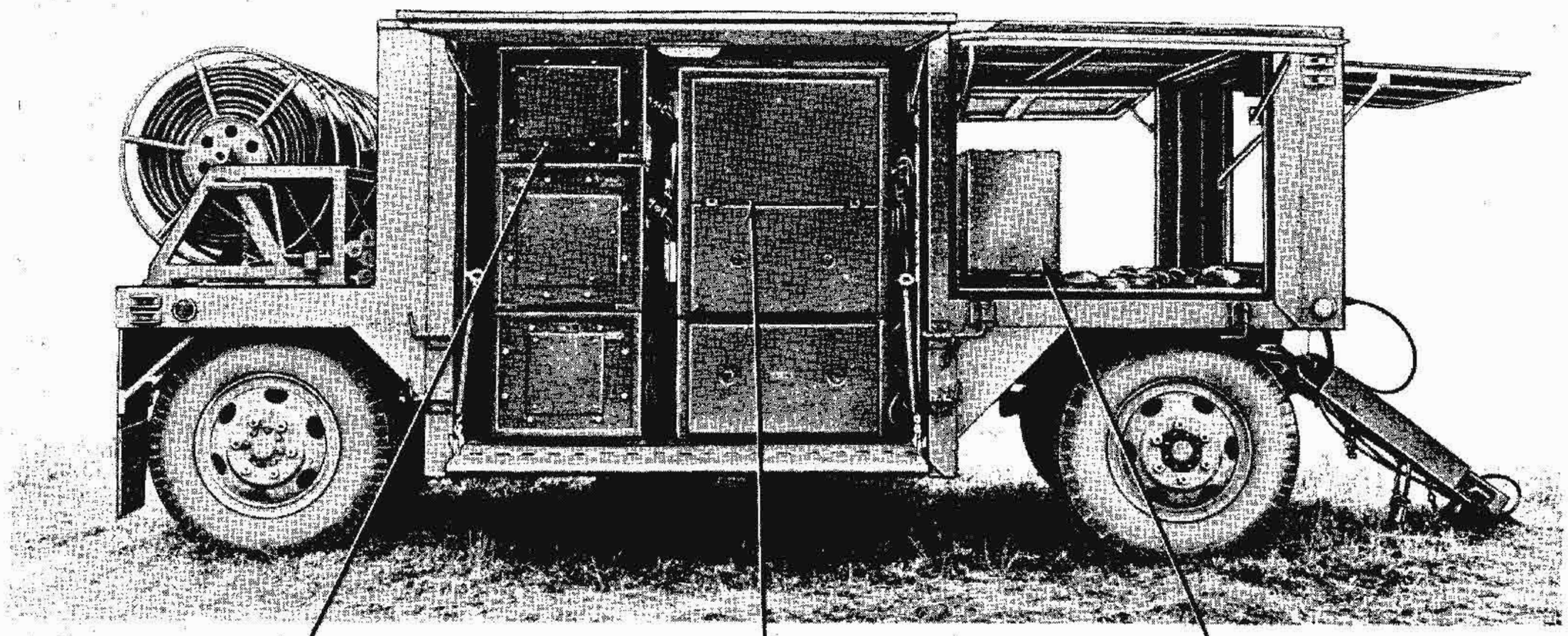


Figure 1—3. Trailer, Van V-112/MPS-11



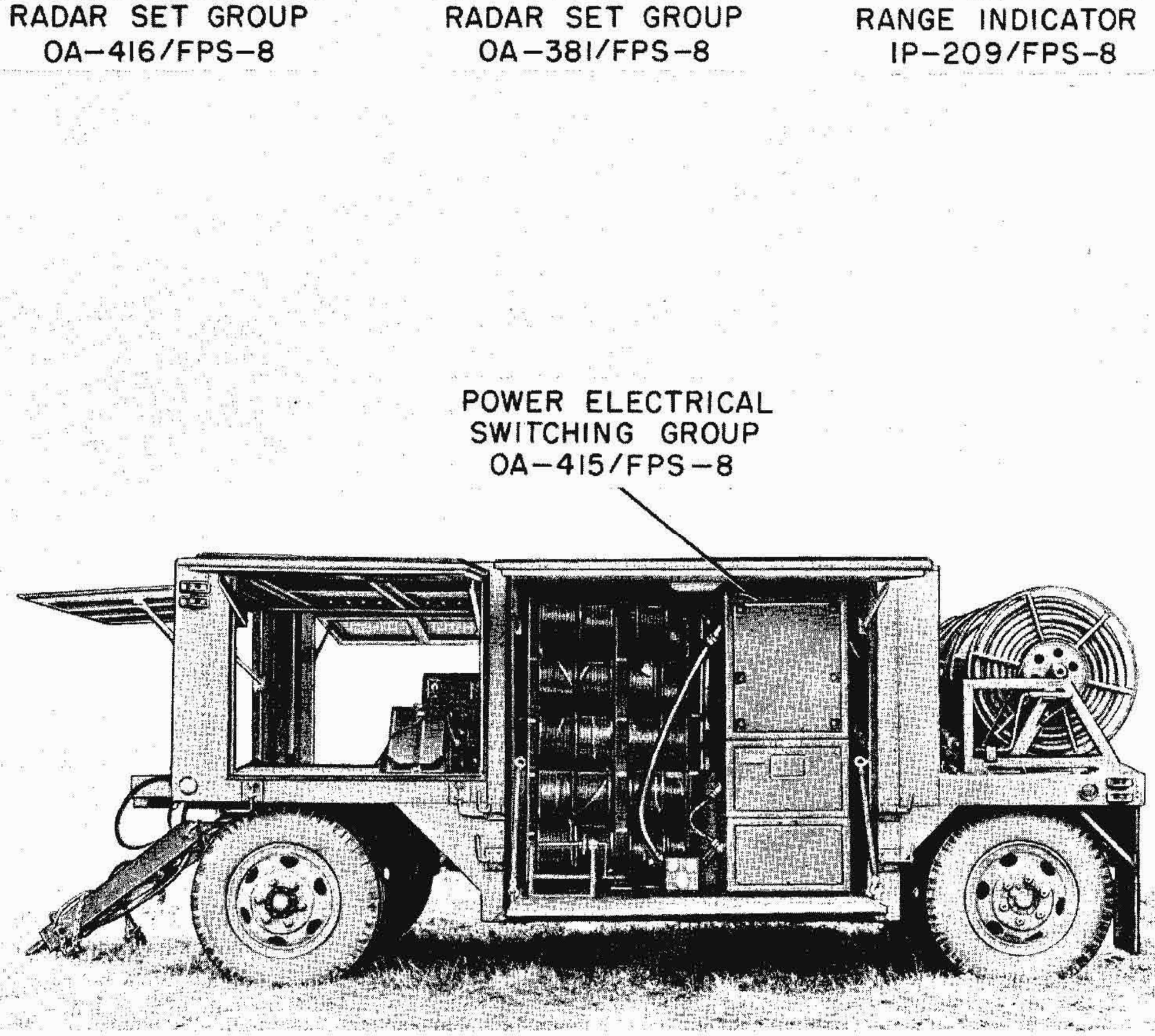


Figure 1–4. Trailer, Van V-113/MPS-11

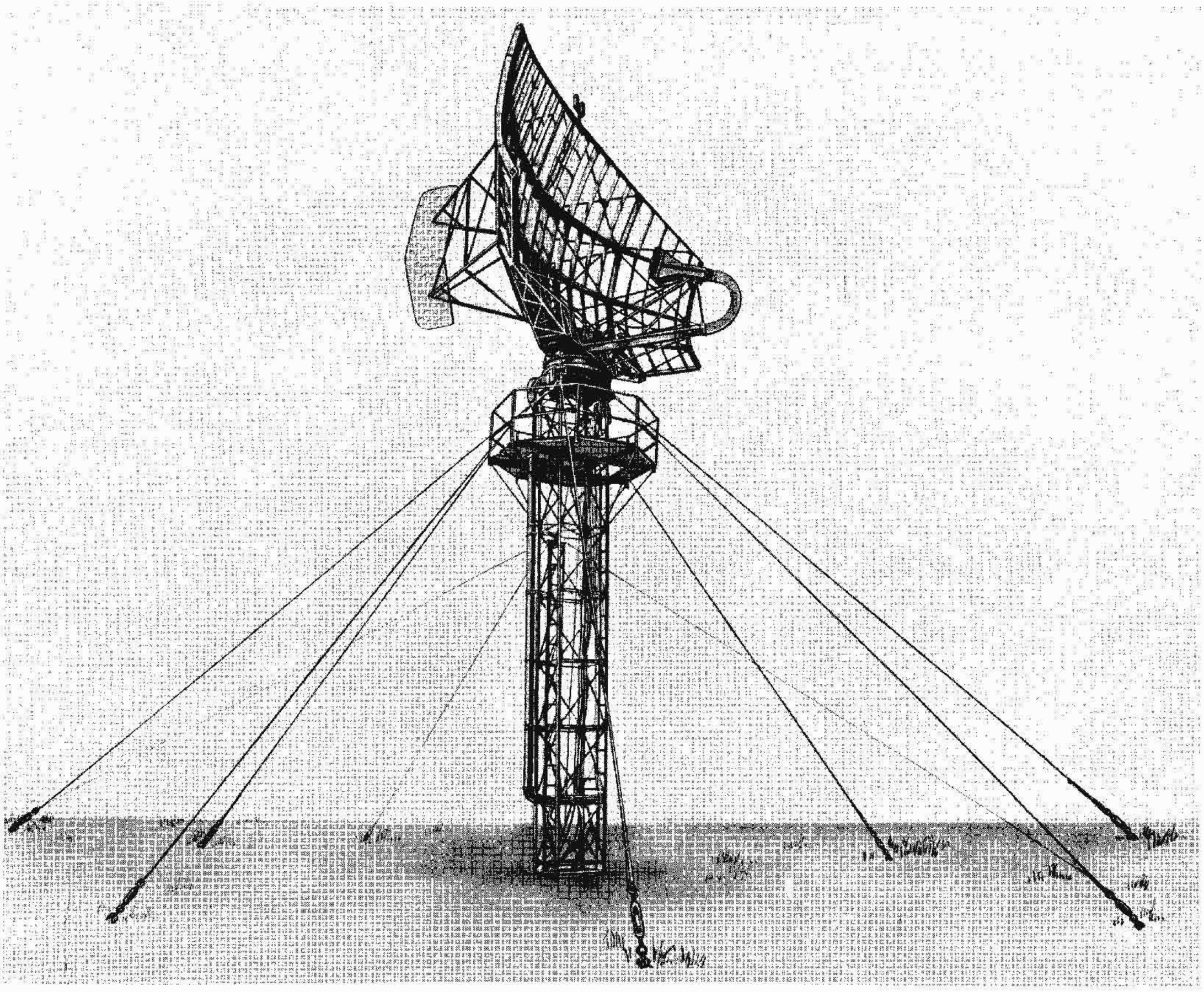


Figure 1—5. Tower AB-396/MPS

enclosed-body vehicle which is air-transportable without disassembly. Equipment that is permanently mounted within the transmitter trailer assembly is listed below; all other equipment mounted within the trailer is carried for transport purposes only.

Transmitter Group OA-413/FPS-8
Receiver Group OA-414/FPS-8, consisting of:
Radar Receiver R-524/FPS-8
Power Supply PP-862/FPS-8
Modulator Group OA-417/FPS-8
Power Supply Group OA-412/FPS-8
Radar Recognition Set AN/UPX-6
Modulator Subassembly MX-1460/FPS-8

1—22. TRAILER, VAN V-113/MPS-11.
(See figure 1—4).

1—23. Trailer Van V-113/MPS-11 (distribution trailer assembly) is similar to the transmitter trailer assembly and carries permanently installed and intercabled equipment, and equipment which has been loaded for transport purposes only. The permanently installed equipment is listed below:

Power Electrical Switching Group OA-415/FPS-8
Range Indicator IP-209/FPS-8
Radar Set Group OA-381/FPS-8
Radar Set Group OA-416/FPS-8

1—24. TOWER AB-396/MPS
(See figure 1—5).

1—25. Tower AB- 396/MPS (portable antenna tower) provides mounting facilities for the antenna group. The antenna tower consists of a stainless steel tower approximately 30 feet high, a gin pole, and the necessary anchors, guys, and grounding equipment. The tower is designed to support the antenna group under two inches of ice in a 60-mph wind, and, without ice, at wind velocities of 100 mph. The portable antenna tower is transported in a disassembled state. It is reassembled on

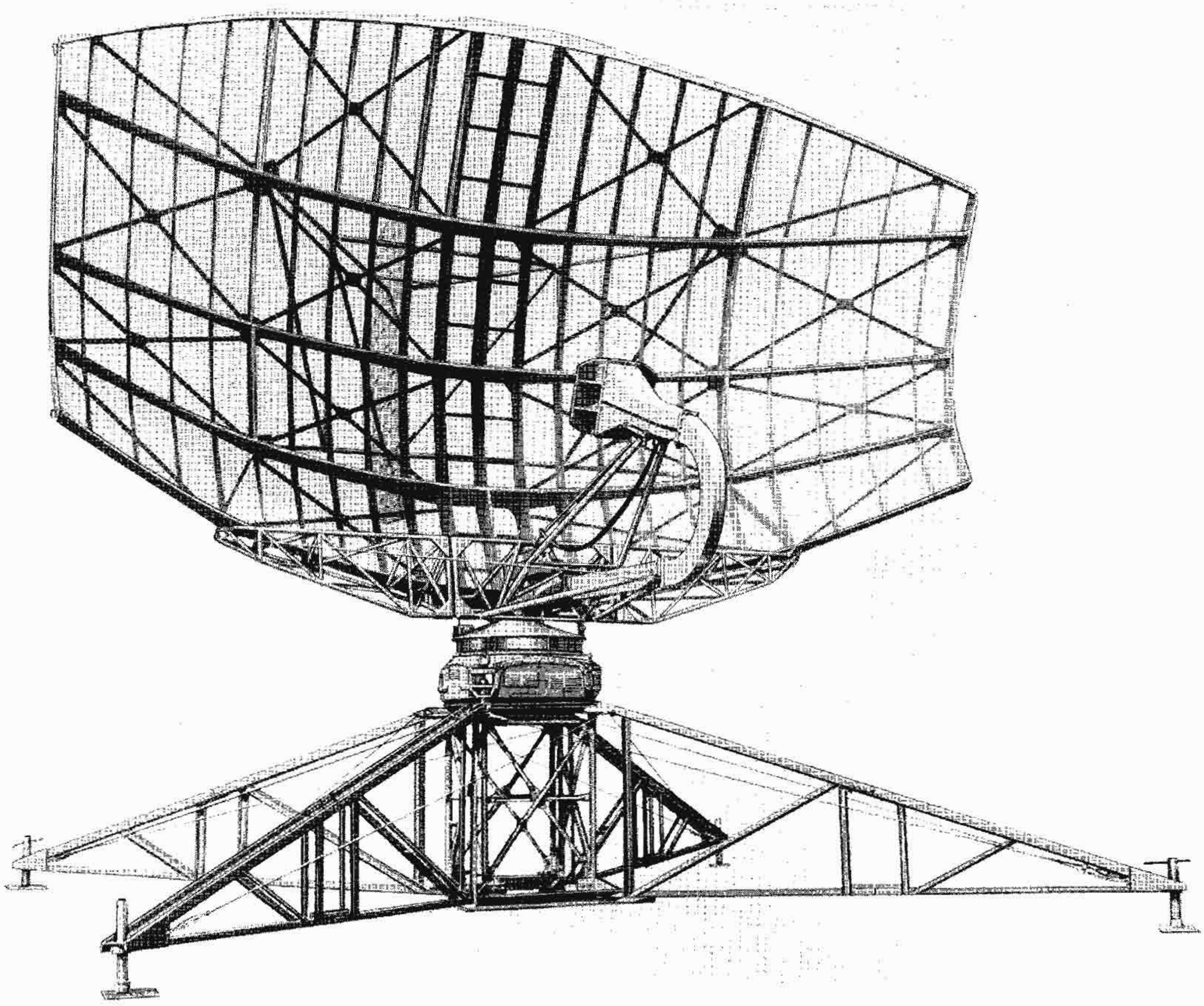


Figure 1—6. Tower Outrigger MX-1690/MPS-11

the ground from which position the entire tower and antenna assembly is raised into position.

1—26. TOWER OUTRIGGER MX-1690/MPS-11. (See figure 1—6).

1—27. Tower Outrigger, MX-1690/MPS-11 is provided as an alternative structure for the mounting of the antenna group. This tower uses components of Tower AN-396/MPS. Choice of the particular tower is determined by the existing tactical situation.

1—28. EQUIPMENT SUPPLIED.

1—29. The major groups comprising Radar Set AN/FPS-8 are listed in table I. Beneath each group heading are the main operating assemblies that make up the group. Dimensions and weights are given for each main assembly. Each item in the table is identified by its official name and nomenclature as well as by its common functional name.

1—30. The major groups comprising Radar Set AN/MPS-11 are listed in table II. Those components common to the AN/FPS-8 system are marked with an asterisk. A breakdown of those components marked with an asterisk are found in table I only.

1—31. INSTRUCTION BOOKS AND PARTS CATALOGS.

1—32. The instruction books and parts catalogs for Radar Sets AN/FPS-8, and AN/MPS-11 are listed in table III. If necessary, refer to table I to determine the major unit in which the specific unit is loated.

1—33. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1—34. When commercial power is not available, two diesel generator sets may be required for the use of the radar system. The generators, rated at 120/208 volts, 3-phase, 4-wire, 60 kw, 60 cps, are not supplied as part of the radar set.

TABLE I. EQUIPMENT SUPPLIED WITH RADAR SET AN/FPS-8

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions Inches Height	Width	Depth	Lbs. Weight
1	Antenna Group consisting of:	Antenna Group OA-405/FPS-8				2429
(1)	Reflector*	Reflector, Antenna AT-386/FPS-8	200	300	72 (length)	758
(1)	Wind Vane	None				
(1)	Support, Reflector*	Support, Antenna Reflector AB-292/FPS-8	38	33	217 (length)	302
(1)	Feed Horn	Horn, Antenna AT-396/FPS-8	24	28	50	70
(1)	Support, Feed Horn	Support, Antenna Horn AB-293/FPS-8	97	35	14	95
(1)	Pedestal	Pedestal, Antenna AB-294/FPS-8	52	52	52	1053
1	Receiver R-f Group consisting of:	Receiver Group OA-417/FPS-8	50½	33⅛	27	540
(1)	Receiver R-f Group Power Supply	Power Supply PP-862/FPS-8	18½	33⅛	27	177
(1)	Receiver R-f Unit consisting of:	Receiver, Radar R-524/FPS-8	32	33⅛	27	300
(1)	Cabinet	Cabinet, Electrical Equipment CY-1228/FPS-8				
(1)	Duplexer	Duplexer CU-321/FPS-8				
(1)	T-R Cavity	Duplexer CU-320/FPS-8				
(1)	R-f Amplifier	Amplifier, Radio Frequency AM-732/FPS-8				
(1)	Signal Frequency Mixer	Mixer Stage, Frequency CV-252/FPS-8				
(1)	Coho Frequency Mixer	Mixer Stage, Frequency CV-252/FPS-8				
(1)	AFC	Control, Receiver C-1092/FPS-8	6¼	6¾	15½	11
(1)	Keep-Alive Power Supply	Power Supply PP-863/FPS-8				
(1)	Noise Source Pulse Generator, p/o Noise Source	Generator, Signal SG-67/FPS-8 Generator, Pulse SG-68/FPS-8				
(1)	Signal I-f Preamplifier	Amplifier, Intermediate Frequency AM-733/FPS-8				
(1)	Coho AFC Preamplifier	Amplifier, Intermediate Frequency AM-734/FPS-8				
(1)	Stalo	Oscillator, Radio Frequency O-171/FPS-8	6½	6½	12½	10
(1)	Power Monitor	Monitor, Radio Frequency ID-340/FPS-8				
(1)	Coho Coupler	Attenuator, Variable CN-196/FPS-8				
1	Transmitter Group consisting of:	Transmitter Group OA-413/FPS-8	57⅝	32	24	578
(1)	Transmitter Unit	Transmitter, Radar T-370/FPS-8 or Transmitter, Radar T-370A/FPS-8	39½	32	24	515
(1)	Transmitter Control	Control, Transmitter C-1130/FPS-8	18⅛	32	24	165
(1)	Trigger Amplifier	Amplifier, Trigger AM-731/FPS-8				
1	Modulator Group consisting of:	Modulator Group OA-414/FPS-8	55⅓	24	24¼	578
(1)	Pulse Unit Tube Chassis, p/o Pulse Unit	Modulator Subassembly MX-1386/FPS-8 Modulator Subassembly MX-1388/FPS-8	28	24	24¼	266
(1)	Charging Unit	Modulator Subassembly MX-1387/FPS-8	27⅓	24	24¼	312
	or					
1	Modulator Group consisting of:	Modulator Group OA-414A/FPS-8				
(1)	Pulse Unit Tube Chassis, p/o Pulse Unit	Modulator Subassembly MX-1961/FPS-8 Modulator Subassembly MX-1962/FPS-8				
(1)	Charging Unit	Modulator Subassembly MX-1387/FPS-8				
1	Modulator High Voltage Power Supply consisting of:	Power Supply Group OA-412/FPS-8	54	30	28	1160
(1)	Power Supply	Power Supply PP-860/FPS-8	26	30	28	600
(1)	Filter Unit No. 1	Filter, Direct Current Power F-186/FPS-8	14	30	28	280
(1)	Filter Unit No. 2	Filter, Direct Current Power F-185/FPS-8	14	30	28	280
	or					
1	Modulator High Voltage Power Supply consisting of:	Power Supply Group OA-412A/FPS-8				
(1)	Power Supply	Power Supply PP-860/FPS-8				
(1)	Filter Unit	Filter, Direct Current F-308/FPS-8				
1	Power Control Box	Switchboard, Power SB-245/FPS-8	62	23	20	270

TABLE I. EQUIPMENT SUPPLIED WITH RADAR SET AN/FPS-8 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Depth	Weight
1	Power Distribution Group consisting of:	Switching Group, Power Electrical OA-415/FPS-8	61½	25	32	760
(1)	Regulator Unit	Transformer Assembly TF-164/FPS-8	15½	25	32	217
(1)	Filament Transformer Unit	Transformer Assembly TF-165/FPS-8	16	25	32	267
(1)	Power Distribution Unit	Switchboard, Power SB-254/FPS-8	30	25	32	276
	Filament Regulator Control, p/o Power Distribution Unit	Control, Voltage Regulator C-1131/FPS-8				
1	MTI Receiver Group consisting of:	Radar Set Group OA-381/FPS-8				
(1)	MTI Receiver Cabinet	Cabinet, Electrical Equipment CY-1183/FPS-8	40¾	33⅜	26⅝	150
(1)	Upper MTI drawer consisting of:	Radar Set Group OA-379/FPS-8	16	29⅞	24	56
(1)	Blanker and Video Mixer	Blanker-Video Mixer MX-1371/FPS-8	7¾	14⅛	21½	20
(1)	None**	Signal Comparator CM-45/FPS-8	9⅝	14⅛	21½	20
(1)	Delayed-Channel Amplifier	Amplifier, Intermediate Frequency AM-693/FPS-8	2½	4¼	8½	5
(1)	Undelayed-Channel Amplifier	Amplifier, Intermediate Frequency AM-694/FPS-8	2½	4¼	8½	5

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lb.
			Height	Width	Depth	Weight
(1)	Lower MTI drawer consisting of:	Radar Set Group OA-380/FPS-8	16	29 7/16	24	72
(1)	Line Driver	Converter, Frequency, Electronic CV-242/FPS-8	8	10	16	10
(1)	Mercury Delay Line	Delay Line MX-1372/FPS-8	2½ (dia)	26 (lg)		32
	or					
(1)	Quartz Delay Line	Delay Line MX-1860/MPS or MX-1860				
(1)	Comparator Pre-Amplifier	Amplifier, Intermediate Frequency AM-697/FPS-8	4¾	2	7¾	3
(1)	Limiting I-f Amplifier	Amplifier, Intermediate Frequency AM-696/FPS-8	6	2¼	8⅞	3
(1)	Coho	Amplifier-Oscillator AM-695/FPS-8	6	4	9	5
(1)	Phase Detector	Comparator, Signal CM-46/FPS-8	7⅞	3½	4⅞	3
(1)	Test Pulse Generator	Generator, Pulse O-177/FPS-8	15	16	23	10
(1)	Delay Line Attenuator***	None	3½	1¾	1¼	6 oz.
(1)	MTI Power Supply Cabinet	Cabinet, Electric Equipment CY-1182/FPS-8	19	33 3/8	26 5/8	115
(1)	MTI Power Supply	Power Supply PP-820/FPS-8	15	29 7/16	24½	160
1	Video Distribution Group consisting of:	Radar Set Group OA-416/FPS-8	63 9/16	24	29	570
(1)	Video Distribution Power Supply	Power Supply PP-861/FPS-8	20½	24	29	240
(1)	Video Distribution Unit consisting of:	Blanker-Video Mixer MX-1389/FPS-8	24 1/16	24	29	180
(1)	Cabinet	Cabinet, Electrical Equipment CY-1227/FPS-8				
(1)	Trigger Generator	Generator, Pulse O-176/FPS-8				
(1)	Range Mark Generator	Calibrator, Range TD-86/FPS-8				
(1)	Angle Mark Generator	Synchronizer, Electrical SN-111/FPS-8				
(1)	Interference Blanker	Blanker Interference MX-1392/FPS-8				
(1)	Receiver and Control Unit	Control, Radar Set C-1132/FPS-8	19	24	29	150
	Normal Receiver, p/o Receiver and Control	Amplifier, Intermediate Frequency AM-622/CPS-6B				
1	Antenna Control Unit	Control, Antenna C-1133/FPS-8	30	15	15	
1	Amplidyne	Motor-Generator PU-289/G				
1	Expanded A Indicator (A-Scope) consisting of:	Indicator, Range IP-209/FPS-8	21	28 11/16	15	150
(1)	LV Power Supply	Power Supply PP-864/FPS-8				
(1)	LV Power Supply Filter	Filter, Direct Current Power F-187/FPS-8				
(1)	HV Power Supply	Power Supply PP-865/FPS-8				
(1)	Vertical Amplifier	Amplifier, Video AM-735/FPS-8				
(1)	Sweep Generator	Generator, Sweep O-178/FPS-8				
1	Dolly for Expanded A Indicator	Truck, Dolly V-61/FPS-8	31½	32⅜	19	55
6 or less	Plan Position Indicator consisting of:	Indicator Group AN/GPA-126				419 ea.
	Cabinet	Cabinet, Electrical Equipment CY-1237/FPS-8				
	PPI Drainer	Range-Azimuth Indicator IP-56A/CPS-6B				
	LV Power Supply	Power Supply PP-412A/CPS-6B				
	HV Power Supply	Power Supply PP-413A/CPS-6B				
	Servo Amplifier	Amplifier, Electronic Control AM-267A/CPS-6B				
	Log Plate	None				

TABLE I. EQUIPMENT SUPPLIED WITH RADAR SET AN/FPS-8 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Depth	Weight
1	Plotting Equipment consisting of:	Display-Plotting Board Group OA-390/FPS-8				
(1)	Plotting Board	Plotting Board, Radar Data PT-183/FPS-8	95	90 (length)	49	
(2)	Data Board	Display Board, Radar Data PT-182/FPS-8	87	47¾ (length)	34¾	
(2)	Plexiglass Carrying Case	Case, Display Board CY-1194/FPS-8	44¾	3⅛	75⅜ (length)	
(1)	Accessories					
1 for each PPI	Chair, Operators	None				
1	Waveguide Assembly consisting of:					
(1)	Transition Unit	Adapter, Waveguide (0 ft. 3 in.)				
(1)	Flexible Waveguide	Waveguide Assembly CG (0 ft. 8 in.)				
(1)	Directional Coupler Section	Waveguide Assembly CG-961/U (0 ft. 11⅞ in.)				
(2)	Taper Section for Duplexer	Duplexer Subassembly MX-1393/FPS-8				
(1)	Directional Coupler Section	Waveguide Assembly CG-963/U (0 ft. 8 in.)				
(4)	Straight Waveguide	Waveguide Assembly CG-962/U (8 ft. 0 in.)				
(2)	Elbow, E-bend	Elbow, Waveguide UG-962				
(2)	Flexible Waveguide	Waveguide Assembly CG-537/U (2 ft. 0 in.)				
2	Directional Coupler	Coupler, Directional CU-319/FPS-8				
1	Air Duct Adapters and accessories	None				
1	Modulator Warm-Up Unit	Modulator Subassembly MX-1460/FPS-8				
1	Azimuth Pulse Generator Group, consisting of:	Azimuth Pulse Generator Group OA-1263/FPS-8****				
(1)	Azimuth Pulse Drive Assembly, consisting of:	(None)*****				
(1)	Azimuth Pulse Generator	Generator, Pulse SG-135/GPS				
(1)	Azimuth Speed Increaser	Gear Assembly, Speed Increaser MX-2080/FPS-8				
(1)	Azimuth Pulse Amplifier Assembly, consisting of:	Amplifier Assembly AM-1548/GPS				
(3)	Azimuth Pulse Amplifier******	Amplifier, Trigger Pulse AM-1547/GPS				
(1)	Azimuth Pulse Amplifier Cabinet	Cabinet, Electrical Equipment CY-2053/GPS				

NOTES:

*Overall dimensions represent the assembled unit.

**SIGNAL COMPARATOR CM-45/FPS-8 contains the delayed and the undelayed-channel amplifier and a comparator.

***The dimensions and weight are for each chassis (two chassis used). The chassis are connected by 20-inch cable.

****Azimuth Pulse Group OA-1263/FPS-8 is used only in those Radar Set AN/FPS-8 installations which are affected by SAGE sites.

*****This unit is mounted in the antenna pedestal.

******The three pulse ampliers are designated "AZIMUTH MARKER", "NORTH MARKER", and "SPARE".

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
	Note In this table, units marked with an asterisk (*) are also components of Radar Set AN/FPS-8, as listed in table I, Equipment Supplied with Radar Set AN/FPS-8.					
1	TRANSMITTER TRAILER ASSEMBLY consisting of:	None				12,000
(1)	Transmitter Trailer carrying:	Trailer, VanV-112/MPS-11	89	92	230	5,945
(1)	*Transmitter Group	*Transmitter Group OA-413/FPS-8				
(1)	*Receiver R-f Group	*Receiver Group OA-417/FPS-8				
(1)	*Modulator Group	*Modulator Group OA-414/FPS-8				
(1)	*Modulator High Voltage Power	*Power Supply Group OA-412/FPS-8				

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
(1)	*Modulator Warmp-up Unit	*Modulator Subassembly MX-1460/FPS-8				
(1)	IFF Transmitter-Receiver Assembly, part of IFF Equipment	Radar Recognition Set AN/UPX-6				
(1)	Set of Waveguides and Accessories including:	None				
(1)	Transition Plate, Magnetron to Waveguide[1]	Adapter, Waveguide UG-995/FPS-8 (0 ft 3 in.)				
(4)	Flexible Waveguide	Waveguide Assembly CG-537A/U (1 ft 4¾ in.)				
(1)	Flexible Waveguide[1]	Waveguide Assembly CG-537A/U (0 ft 8 in.)				
(1)	*Directional Coupler Section[2]	*Waveguide Assembly CG-961/U (0 ft 11⅞ in.)				
(1)	*Directional Coupler Section[2]	*Waveguide Assembly CG-963/U (0 ft 8 in.)				
(2)	Transition Unit[3]	Duplexer Subassembly MX-1393/FPS-8 (0 ft 10¼ in.)				
(2)	90-degree E-plane Waveguide Elbow	Elbow, Waveguide UG-962/FPS-8				
(2)	90-degree E-plane Waveguide Elbow	Elbow, Waveguide CG-994/FPS-8				
(4)	*Straight Waveguide	*Waveguide Assembly CG-962/U (8 ft 0 in.)				
(1)	Straight Waveguide	Waveguide Assembly CG-962/U (4 ft 6⅛ in.)				
(1)	Straight Waveguide	Waveguide Assembly CG-962/U (4 ft 0 in.)				
(1)	Straight Waveguide	Waveguide Assembly CG-962/U (3 ft 5⅞ in.)				
(1)	Set of Waveguide Hardware in Box	None				
(2)	*Directional Coupler[2]	*Coupler, Directional CU-319/FPS-8				
(1)	Set of 4 Waveguide Supports	None				
(1)	Waveguide Support for Tower Installation	None				
		None				
(1)	Instruction Book and Holder					
(1)	Extension Lamp	None				
(1)	Spare Gallon of Transformer Oil	Transformer Oil Type 10C				
(2)	Test Equipment including:	None				
(1)	IFF Test Set (GFE)	Test Set AN/UPM-6B				
(1)	Signal Generator	Generator, Signal AN/URM-64				

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
1	DISTRIBUTION TRAILER ASSEMBLY consisting of:	None				10,940
(1)	Distribution Trailer carrying:	Trailer, Van V-112/MPS-11	89	92	230	5,945
(1)	*Power Distribution Group	*Switching Group, Power Electrical OA-415/FPS-8				
(1)	Expanded A Indiator (A-scope)	*Indicator, Range IP-209/FPS-8				
(1)	*MTI Receiver Group	*Radar Set Group OA-381/FPS-6				
(1)	*Video Distribution Group	*Radar Set Group OA-416/FPS-8				
(1)	*Antenna Control Unit	*Control, Antenna C-1133/FPS-8				
(1)	Transit Case No. 20 containg:	None				
(1)	Multimeter (GFE)	Multimeter AN/PSM-6				
(1)	Crystal Rectifier Test Set (GFE)	Cyrstal Rectifier Test Set TS-268C/U				
(1)	R-f Vacuum Tube Voltmeter (GFE)	Vacuum Tube Voltmeter TS-375A/U				
(1)	Tube Tester (GFE) or substitute Tube Tester	Electron Tube Test Set TV-7/U Test Set I-177 Test Set MX-949/U‡				
(1)	Test Probe	Traveling Detector MX-925/U				
(1)	Dummy Crystal	None				
(1)	Set of Accessories	None				
(2)	Additional Test Equipment	None				
(1)	Oscilloscope (GFE)	Tektronix Model 524D				
(1)	3-in. Oscilloscope (GFE)	Oscilloscope OS-8B/U				
(1)	Cable Reel Winder	None				
(1)	Junction Box	None				
(1)	Set of Grounding Equipment	None				
(1)	Extension Lamp	None				
1	ANTENNA TRUCK ASSEMBLY consisting of:	None				16,080
(1)	Antenna Truck carrying:	M-35 Type Truck (GFE)	113	96	277	12,880
(1)	Antenna Rack	Case, Antenna CY-16633/MPS				
(1)	*Antenna Group, less Pedestal and Center Section of Reflection Support	*Antenna Group OA-405/FPS-8, less Pedestal, Antenna AB-294/FPS-8 and Center Section of Support, Antenna Reflector AB-292/FPS-8				

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
1	TOWER TRUCK ASSEMBLY consisting of:	None				19,300
(1)	Tower Truck carrying:	M-35 Type Truck (GFE)	113	96	277	12,880
(1)	Portable Antenna Tower	Tower AB-396/MPS				
(1)	Set of Tower Outriggers	Outrigger, Tower MX-1690/MPS-11				
(1)	Transit Case No. 21 containing:	None				
(1)	Erection Equipment Kit, less A-frames	None				
(2)	A-frames, p/o Erection Equip. Kit	None				
1	INDICATOR TRUCK ASSEMBLY consisting of:	None				18,400
(1)	Indicator Truck carrying:	M-35 Type Truck (GFE)	113	96	277	12,880
(1)	Indicator Rack mounting:	None				
(6)	*PPI, less Log Plate	*Indicator Group AN/GPA-126, less Log Plate				
(1)	Amplidyne	Motor-Generator PU-289/G				
(1)	Pedestal and Center Section of Reflection Support	Pedestal, Antenna AB-294/FPS-8 and Center Section of Support, Antenna Reflector AB-292/FPS-8				
1	POWER PLANT GROUP consisting of:	None				19,500 (No. 1) 19,400 (No. 2)
(1)	Power Truck No. 1 carrying:	M-35 Type Truck (GFE)	113	96	277	12,880
(1)	Power Unit No. 1	Generator Set, Diesel Engine Type				
(1)	*Power Control Box	*Switchboard, Power SB-245/FPS-8				
(1)	Power Truck No. 2 carrying:	M-35 Typo Truck	113	96	277	12,880
(1)	Power Unit No. 2	Generator Set, Diesel Engine Type MB-3				
1	SHELTER GROUP consisting of:	None				20,100 (No. 1) 18,600 (No. 2) 17,900 (No. 3)
(3)	Shelter Truck No. 1	M-35 Type Trucks (GFE)	125	96	277	12,880
	Shelter Truck No. 2, and		133	96	277	12,880
	Shelter Truck No. 3 carrying:		128	96	277	12,880

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
(1)	Operations Shelter, less Electrical System	Shelter, Electrical Equipment S-94/MPS-11, less Shelter Electrical System				
(1)	Maintenance Shelter, less Electrical System	Shelter, Electrical Equipment S-94/MPS-11, less Shelter Electrical System				
(1)	Mobile Plotting Equipment consisting of:	Display-Plotting Board Group OA-567/MPS-11				
(1)	Plotting Board	Plotting Board, PT-199/MPS-11 Radar Data	95	89½ (deep)	46	
(1)	Data Board	Display Board, PT-200/MPS-11 Radar Data	87	24 (deep)	47¼	
(1)	Plexiglas Carrying Case	Case, CY-1488/MPS-11 Plotting Set	45	5	92	*386
(1)	Transit Case	Case, CY-1489/MPS-11 Plotting Set	20	18	89	*295
(1)	Accessories	None				
(1)	Set of Shelter Furniture and Equipment, including:	None				
(1)	Supply Cabinet	None				
(4)	Folding Maintenance Stools	Stool, Folding Legs FN-76/MPS				
(16)	Folding Chairs	Chair, folding - (to be supplied by using activity/organization).				
(2)	Utility Blowers	None				
(3)	Space Heaters and Accessories	None				
(2)	15-pound CO_2 Fire Extinguishers	None				
1	SPARE PARTS TRUCK ASSEMBLY consisting of:	None				17,100
(1)	Spare Parts Truck carrying:	M-35-Type Truck (GFE)	113	96	277	12,880
(2)	Maintenance Bench	Table, Radar Maintenance FN-72/MPS-11				
(4)	Transit Cases No. 1 through No. 4, containing:	None				
(4)	Magnetron	Magnetron Type QK-358				
(13)	Transit Cases No. 5 through No. 17, containing:	None				
(1)	Set of Equipment Spares	None				
(1)	Transit Case No. 22 containing cables	None				
(3)	Transit Cases No. 23 through No. 25, containing:	None				
(2)	Electrical System for Operations and Maintenance Shelters	None				

* Gross weight

TABLE II. EQUIPMENT SUPPLIED WITH RADAR SET AN/MPS-11 (cont)

Qty. per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Length	Weight
(1)	Set of Shelter Grounding Equipment	None				
(1)	Transit Case No. 26 containing:	None				
(1)	IFF Coder (GFE)	Code Coordinator KY-54/GPX				
(6)	IFF Control Boxes (GFE)	Switch Box SA-239/GPX				
(1)	Transit Case No. 27 containing:	None				
(6)	Log Plate for PPI					

[1] Waveguide Adapter UG-995/FPS-8 and Waveguide Assembly CG-537A/U are connected for transit.
[2] A Direction Coupler CU-319/FPS-8 is installed on both Waveguide Assembly CG-961/U and Waveguide Assembly CG-936/U for transit.
[3] The two Duplexer Subassemblies MX-1393/FPS-8 are installed on the transmitter unit for transit.
‡MV-949/U used only if TV-7/U is used.

TABLE III. INSTRUCTION BOOKS AND PARTS CATALOGS

Publication Number	Title
T.O. 31P6-2FPS8-1	Handbook Operating Instructions, Radar Set AN/FPS-8 and Radar Set AN/MPS-11.
T.O. 31P6-2FPS8-2	Handbook Service Instructions, Radar Sets AN/FPS-8 and AN/MPS-11.
T.O. 31P6-2FPS8-3	Handbook Overhaul Instructions, Radar Set AN/FPS-8 and Radar Set AN/MPS-11.
T.O. 31P6-2FPS8-4	Illustrated Parts Breakdown, Radar Set AN/FPS-8 and Radar Set AN/MPS-11.
T.O. 31P6-2FPS8-61	Operation and Service Instructions, Radar Display Board, Type PT-182/FPS-8.
T.O. 31P6-2FPS8-64	Illustrated Parts Breakdown, Radar Data Display Board, Type PT-182/FPS-8.
T.O. 31P6-2FPS8-71	Operation and Service Instructions, Radar Data Plotting Board, Type PT-183/FPS-8.
T.O. 31P6-2FPS8-74	Illustrated Parts Breakdown, Radar Data Plotting Board, Type PT-183/FPS-8.
T.O. 31P6-2FPS8-94	Spare Parts List, Ground Radar Sets AN/FPS-8 and AN/MPS-11.

Publication Number	Title
T.O. 31P6-2FPS8-104	Illustrated Parts Breakdown, Arctic Tower Extension AB-316/FPS-8.
T.O. 31P6-2FPS8-125	Handbook Installation Instructions, Arctic Tower Extension AB-316/FPS-8.
T.O. 31P6-2FPS8-135	Handbook Installation Instructions, Tower AB-397/FPS-8 (Temperate)
T.O. 31P6-2FPS8-145	Handbook Installation Instructions, Tower AB-313/FPS-8 (Arctic).
T.O. 31P6-2MPS11-11	Handbook Operation and Service Instructions — Trailer, Van V-112/MPS-11; Trailer, Van V-85/MPS-11A; Trailer, Van V-113/MPS-11 and Trailer, Van V-106/MPS-11A.
T.O. 31P6-2MPS11-21	Handbook Operation, Service, and Repair Instructions — Shelter, Electrical Equipment S-94/MPS-11 and Shelter, Electrical Equipment S-95/MPS-11.
T.O. 31P6-2MPS11-57	Standard Installation Instructions, Radar Set AN/MPS-11 (Fixed Version with Tower AB-397/FPS-8).
TM 9-819	Operating Handbook for Trucks.
TM 9-1819	Maintenance Handbook for Trucks.
L.O. 9-819	Lubrication Order for Trucks.
SL-G742	Parts List for Trucks.

1—35. FUNCTIONS OF THE MAJOR SYSTEMS.

(See figure 1—7.)

1—36. Radar Sets AN/FPS-8 and AN/MPS-11 are identical with respect to electronic components and functions. Consequently, the following discussions are applicable to both. Each set is divided into six major systems: modulator, transmitter, antenna, receiver, video and power. Each system is considered in terms of its function to the radar set regardless of the physical location of its components.

1—37. The system trigger pulse of the radar system is usually generated by the trigger generator located within the MTI receiver group. An alternate trigger generator located within the video distribution unit is used when the radar set operates without the MTI receiver group, thus providing a "standby trigger". The outputs of both trigger generators are identical.

1—38. The outputs of the trigger generator in use provides two triggers whose characteristics are identical: pulse width, approximately 2 microseconds; pluse ampli-

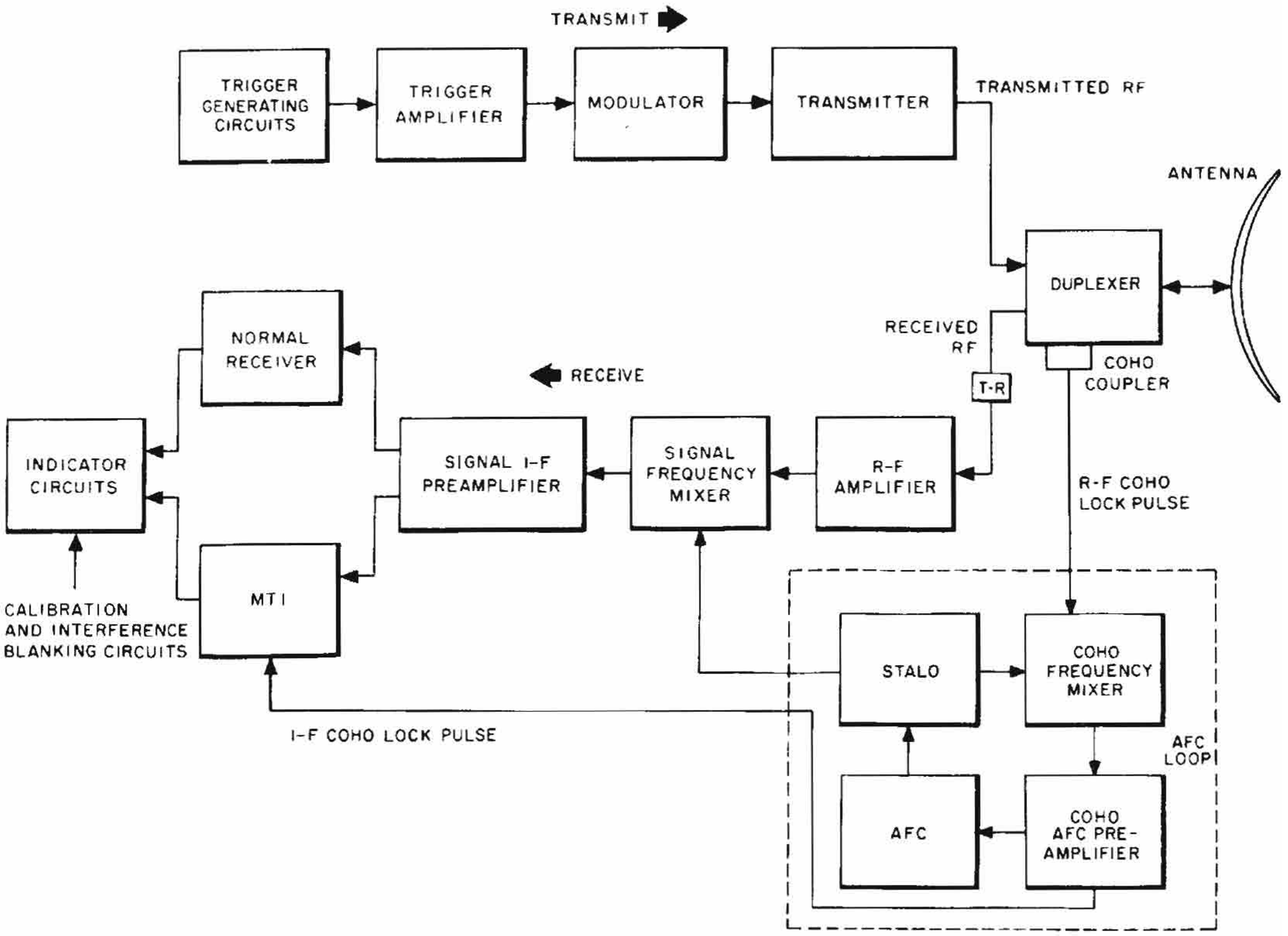


Figure 1–7. System Block Diagram

tude, approximately +50 volts; repetition rate, 360 pps. One trigger (pre-trigger) occurs 12.4 microseconds before the other (delayed trigger). If required, this time may be changed to 37 microseconds by means of a single circuit change. Either trigger may be selected for use as the radar system trigger. The selection of the trigger, however, is determined by IFF equipment operational requirements.

1–39. MODULATOR SYSTEM. The modulator system is actuated by the 360-pps system trigger, the amplitude of which is amplified to +550 volts. The modulator delivers to the transmitting system a 13.5-kv pulse which has a pulse width of 3 microseconds.

1–40. TRANSMITTER SYSTEM. The modulator pulse is delivered to the magnetron oscillator of the transmitter system to produce the required high-power transmitted signal. The r-f oscillations occur in the L-band (1280 to 1350 mc) and are continuous during the application of each 3-microsecond modulator pulse. The peak power generated by the transmitter system is one megawatt. The r-f signal is delivered via a waveguide, through r-f transmission components (power monitoring and duplexing) to the antenna system. The waveguide is kept warm and dry by means of a heater and blower in the antenna pedestal. This ensures satisfactory operation at the high power level required by this equipment.

1–41. ANTENNA SYSTEM. The antenna system consists of a parabolic reflector with associated waveguide feed elements and rotating joints. Drive mechanisms are provided to direct the reflector through its area of search. In actual operation, the drive mechanisms are remotely controlled by a servo system.

1–42. The output of the transmitter is applied to the antenna through a duplexer which permits the use of a single antenna for transmitted and received signals. The radiation pattern of the antenna beam is 2-$\frac{1}{2}$-degrees wide in azimuth and 9-degrees wide in elevation at half power points. The power distribution from +9 to +30 degrees follows a cosecant-squared function. Antenna rotation about the azimuth axis, either clockwise or counterclockwise, is controlled remotely from the operation center. Three principal types of operation are provided: manual rotation, 360-degree azimuth scanning, and automatic sector scanning. These operations are controlled from the antenna control unit. Manual rotation is accom-

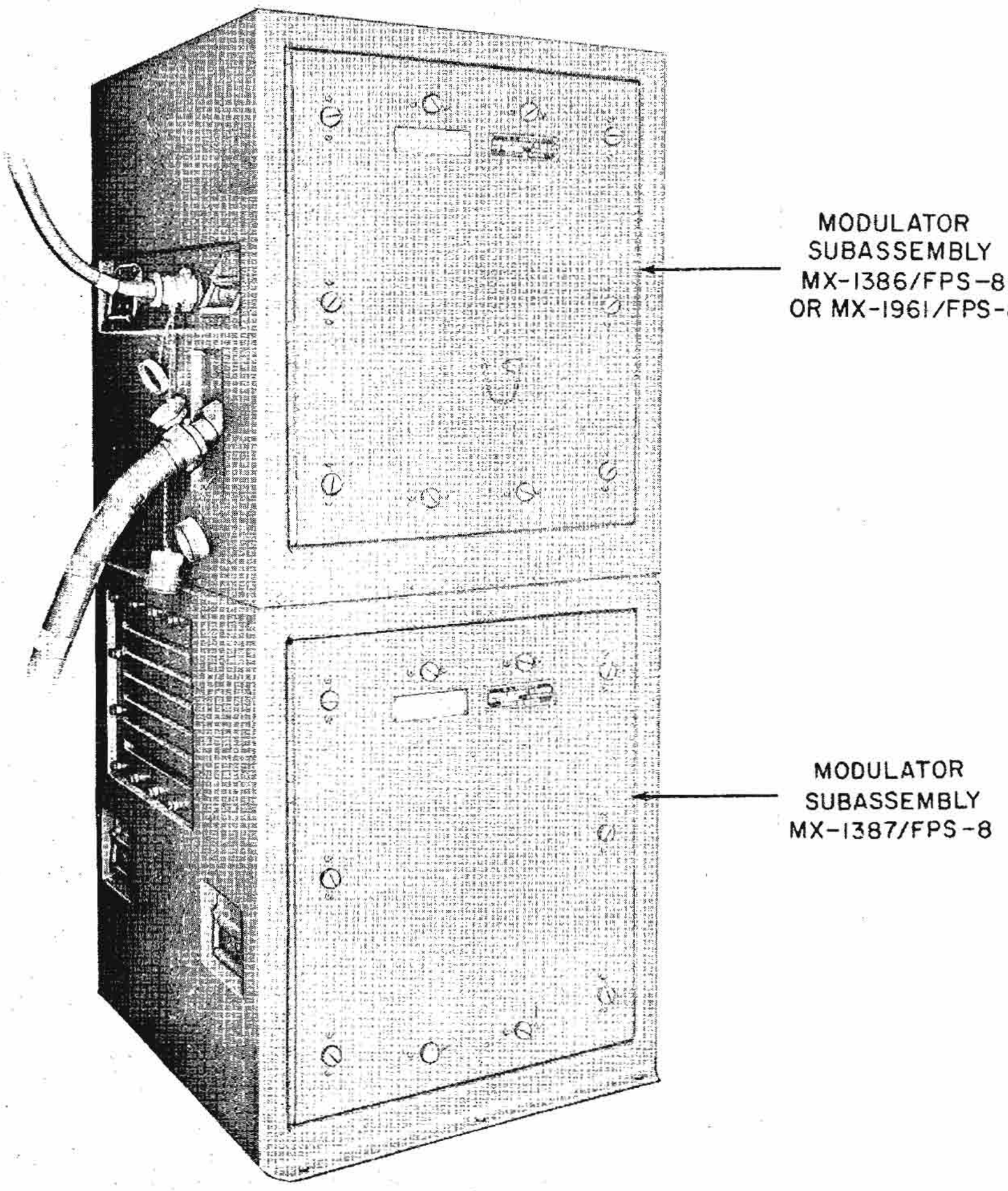


Figure 1—8. Modulator Group OA-414/FPS-8 or OA-414A/FPS-8

plished by a hand-wheel (located on the antenna control unit) causing synchronous rotation of the antenna.

1—43. RECEIVER SYSTEM.

1—44. The receiving system of Radar Sets AN/FPS-8 and AN/MPS-11 provides simultaneous operation of the normal (non-MTI) receiver system and the MTI receiver system. The echo signals received at the antenna are passed through waveguides and enter the receiver system via the duplexer. The local oscillator (stalo) and the echo signals are mixed in the signal mixer to provide 30-mc i-f (intermediate frequency) signals. The local oscillator and a sample of the transmitted pulse are mixed in the coho frequency mixer to provide a coho lock pulse to the MTI receiver, and an afc reference signal to the afc loop.

1—45. NORMAL RECEIVER SYSTEM. The i-f signals are amplified and detected in the normal receiver system and the resultant video signals are applied to the video

system for subsequent display on the plan position indicators.

1–46. MTI RECEIVER SYSTEM. The MTI (moving target indicator) system enables the radar set to discriminate between moving and fixed targets. Fixed-target (ground clutter) return signals are cancelled, while moving-target return signals are displayed on the plan position indicators. Before application to the PPI's, normal and MTI receiver signals are mixed by a video mixer circuit. This allows the operator to select MTI signal (moving target only) displays to any range up to 150 miles. Normal receiver signals (moving and fixed targets) appear beyond the selected range.

1–47. VIDEO SYSTEM. The video system provides an expanded type-A indicator and six identical PPI indicators for video presentation. In the actual tactical situation, however, the A-scope is used primarily as a test scope and, as such, is located near the MTI receiver group.

1–48. The PPI indicators display target echoes and IFF (beacon) signals on 12-inch cathode-ray tubes. Range marks appear as concentric circles at 10-mile intervals with every fifth mark (50 miles) intensified. Angle marks appear as radial lines at 10-degree intervals with every third mark (30 degrees) intensified. Controls are provided to delay the start of the oscilloscope sweep. Thus target ranges up to 225 nautical miles are presented under conditions similar to those of short target ranges.

1–49. POWER SYSTEM. Primary power supplied to the Radar Sets is 3 phase, 60 cycle, 120/208 volts. In normal operation, power may be obtained from a commercial source or diesel generator sets. Two bus networks are required to carry the system load between the radar power input at the power control box, normally located at the radar set power buildings; and the power distribution point at the power distribution unit, normally located at the radar set operations site.

1–50. DESCRIPTION OF COMPONENTS.

1–51. The functions of the major groups of the radar system are discussed in paragraphs 1–52 through 1–199.

Note

Each group and component is introduced by its official name and service designation. The common name of each group and component is placed in parentheses following the service designation. With the exception of the introductory paragraphs, common names only are used to designate the units.

1–52. MODULATOR SYSTEM.

1–53. The modulator system is composed of the following groups:

Modulator Group OA-414/FPS-8 or OA-414A/FPS-8

Power Supply Group OA-412/FPS-8 or OA-412A/FPS-8

1–54. MODULATOR GROUP OA-414/FPS-8 or OA-414A/FPS-8. *(See figure 1–8.)*

1–55. Modulator Group OA-414/FPS-8 or OA-414A/FPS-8 (modulator group) supplies a 13.5-kv, 3-microsecond modulating pulse to the pulse transformer in the transmitter unit. The modulator, in turn, is actuated by the 550-volt trigger applied from the trigger amplifier. The trigger amplifier is functionally a part of the modulator but is housed in the transmitter unit (paragraph 1–74).

1–56. Modulator Group OA-414/FPS-8 consists of Modulator Subassembly MX-1387/FPS-8 (charging unit), Modulator Subassembly MX-1386/FPS-8 (pulse unit) and Modulator Subassembly MX-1388/FPS-8 (modulator tube chassis). Ventilation for the modulator is provided by a blower located at the upper right side of the pulse unit (figure 1–9).

1–56A. Modulator Group OA-414A/FPS-8 is the same as Modulator Group OA-414/FPS-8 except that Modulator Subassembly MX-1386/FPS-8 (pulse unit) is replaced by Modulator Subassembly MX-1961/FPS-8 and Modulator Subassembly MX-1388/FPS-8 (modulator tube chassis) is replaced by Modulator Subassembly MX-1962/FPS-8. See paragraphs 1–59A and 1–60A.

1–57. The two cabinets (units) of the modulator group contain standard resonant charging and modulator tube circuits.

1–58. MODULATOR SUBASSEMBLY MX-1387/FPS-8. Modulator Subassembly MX-1387/FPS-8 (charging unit) receives the 13,000 volts (13,500 maximum) from the modulator power supply. The charging unit is deck-mounted and provides mounting facilities for the pulse unit.

1–59. MODULATOR SUBASSEMBLY MX-1386/FPS-8. Modulator Subassembly MX-1386/FPS-8 (pulse unit) houses the modulator tube chassis and pulse forming network. The output of the pulse forming network is a 13-kv, 3-microsecond flat-topped pulse which is applied to the pulse transformer of the transmitter unit. (See paragraph 1–72.) In normal operation, the pulse unit is mounted on the charging unit.

1–59A. MODULATOR SUBASSEMBLY MX-1961/FPS-8. Modulator Subassembly MX-1961/FPS-8 (pulse unit) is the same as Subassembly MX-1386/FPS-8 except that Modulator Subassembly MX-1388/FPS-8 (modulator tube chassis) is replaced by Modulator Subassembly MX-1962/FPS-8. See paragraph 1–60A.

1–60. Modulator Subassembly MX-1388/FPS-8. *(See figure 1–9.)* Modulator Subassembly MX-1388/FPS-8 (modulator tube chassis) is a part of the pulse unit used with modulator group OA-414/FPS-8. The modulator tube chassis is plugged into the pulse unit and may be replaced as a unit. A second modulator tube chassis is plugged into a modulator warm-up unit (Modulator Subassembly MX-1460/FPS-8, not part of the modulator group) and kept in standby condition: thus, when replacing a modulator tube, radar operation need not be discontinued during the modulator tube warm up period.

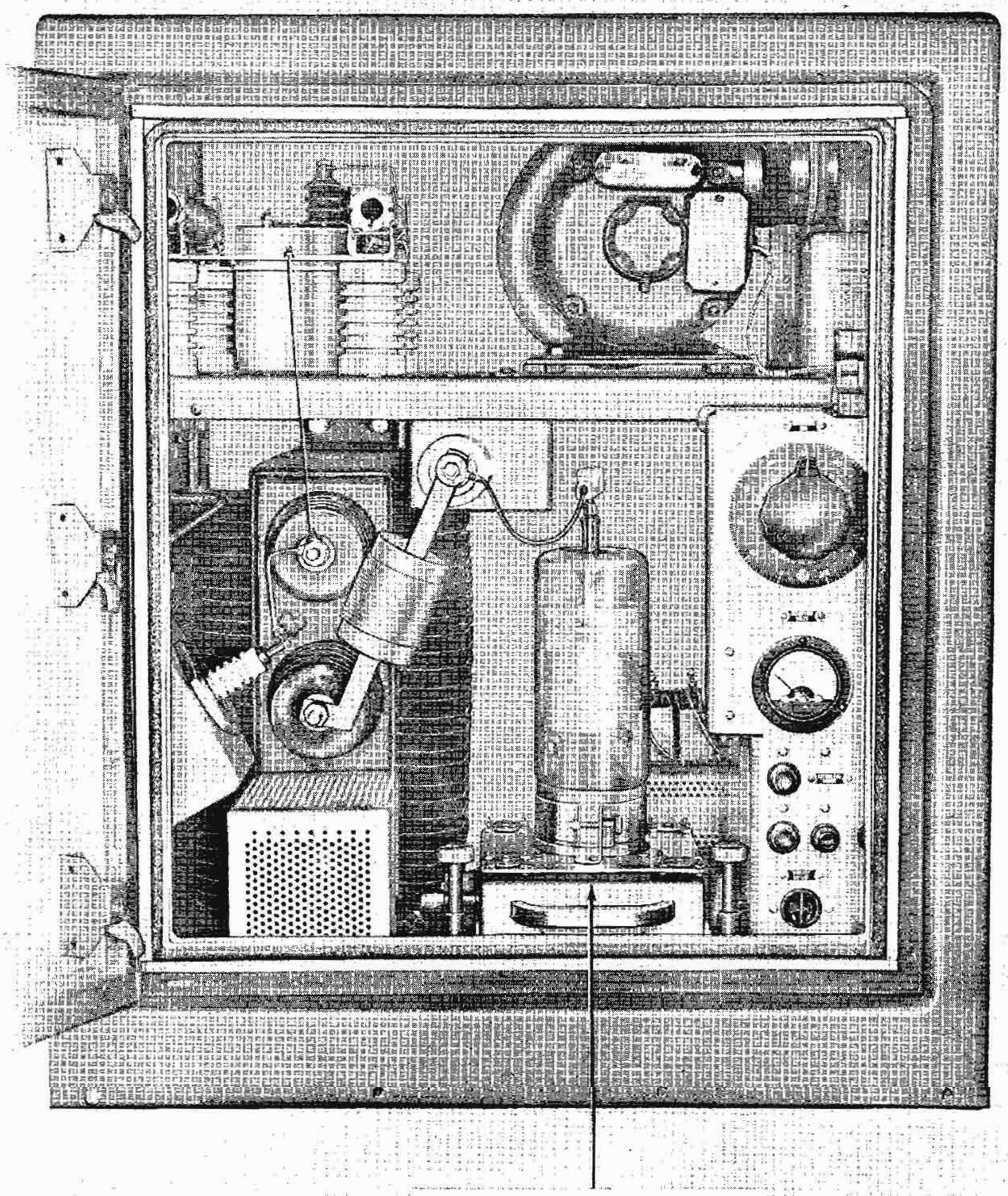


Figure 1–9. Modulator Group OA-414/FPS-8, Upper Section, Interior View

The modulator warm-up unit is not used when Modulator Group OA-414A/FPS-8 is used.

1–60A. MODULATOR SUBASSEMBLY MX-1962/FPS-8. *(See figure 1–9A.)* Modulator Subassembly MX-1962/FPS-8 (modulator tube chassis) is a part of the pulse unit used with Modulator Group OA-414A/FPS-8. The modulator tube chassis contains two modulator tubes, one of which is operating and the other in standby. In the event of modulator tube failure, the standby tube can be placed in operation by throwing a switch on the chassis.

1–61. POWER SUPPLY GROUP OA-412/FPS-8 or OA-412A/FPS-8. *(See figures 1–10 and 1–10A.)*

1–62. Power Supply Group OA-412/FPS-8 or OA-412A/FPS-8 (modulator power supply group) furnishes high-voltage dc to the modulator. Primary power supplied to the modulator power supply is a 3-phase, 60-cycle voltage, variable from 0 volts to 208 volts. The power is received from the filament transformer unit of the power distribution group.

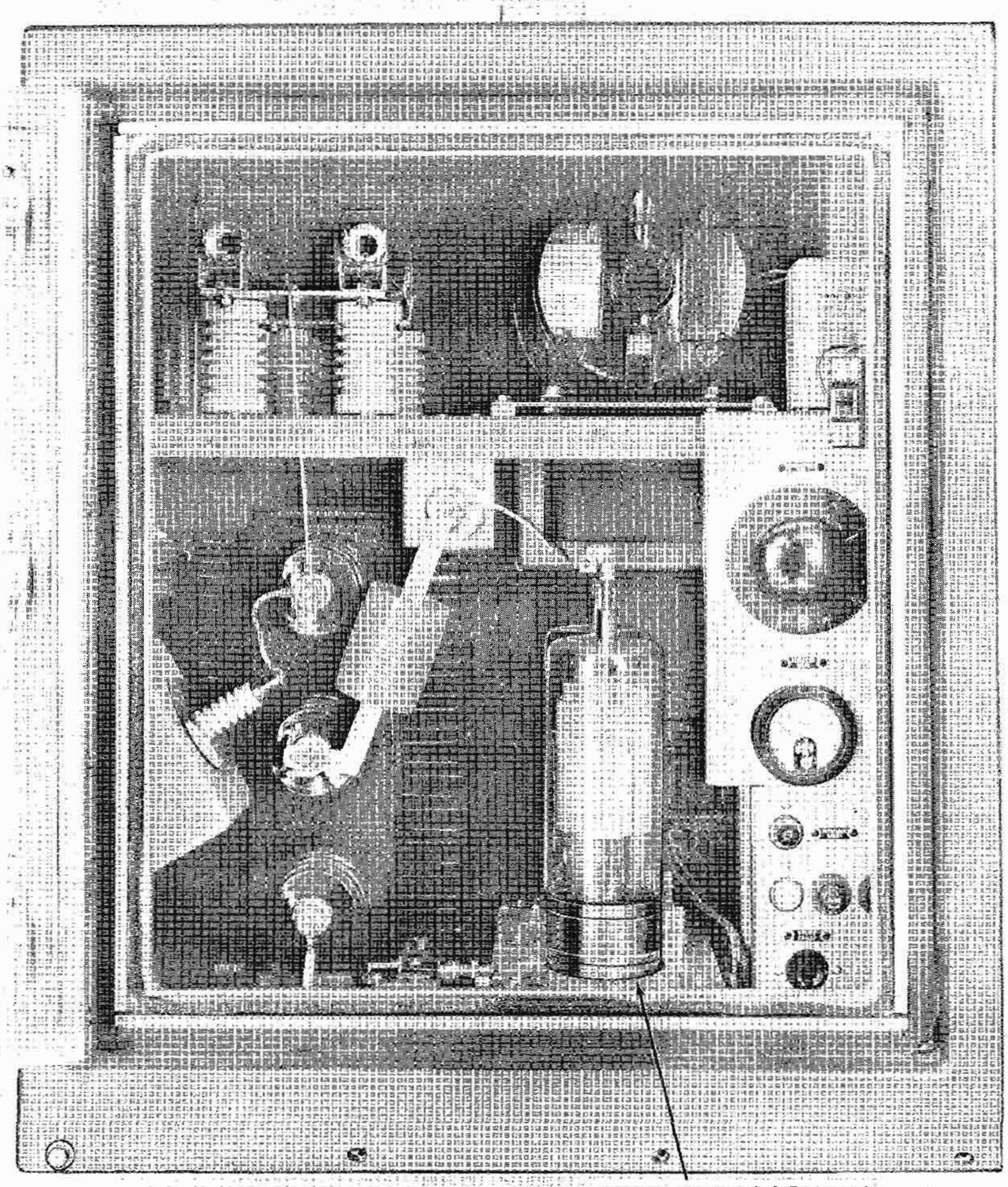


Figure 1–9A. Modulator Group OA-414A/FPS-8, Upper Section, Interior View

1–63. Power Supply Group OA-412/FPS-8 consists of Power Supply PP-860/FPS-8 (modulator power supply), Direct Current Power Filter F-186/FPS-8 (filter unit No. 1) and Direct Current Power Filter F-185/FPS-8 (filter unit No. 2). Ventilation is provided by a blower located at the front and in the center of the modulator power supply.

1–63A. Power Supply Group OA-412A/FPS-8 *(figure 1–10A)* consists of Power Supply PP-860/FPS-8 (modulator power supply) and Direct Current Filter F-308/FPS-8 (filter unit). Except for the use of a single filter unit instead of two separate units, this modulator power supply group is the same as Power Supply Group OA-412/FPS-8.

1–64. POWER SUPPLY PP-860/FPS-8. Power Supply PP-860/FPS-8 (modulator power supply) consists of full-wave rectifiers operating from a 3-phase, 60-cycle, a-c source. The output to the filter units is 13,000 volts (13,500 volts maximum), unregulated.

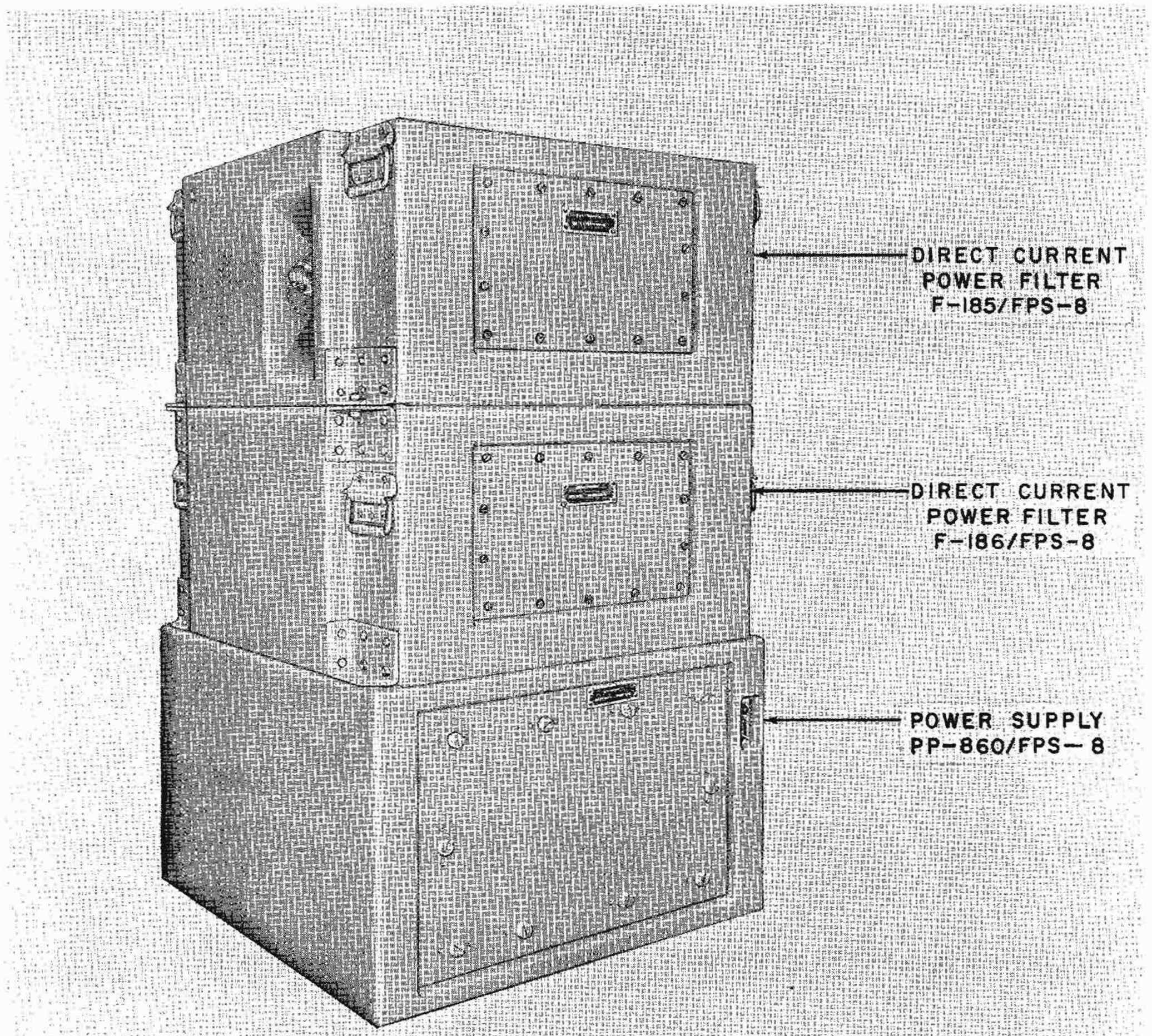


Figure 1–10. Power Supply Group OA-412/FPS-8

1–65. DIRECT CURRENT POWER FILTER F-186/FPS-8. Direct Current Power Filter F-186/FPS-8 (filter unit No. 1), used with Power Supply Group OA-412/FPS-8, filters the output of the modulator power supply and feeds it in series to filter unit No. 2. Filter unit No. 1 is mounted on the modulator supply.

1–66. DIRECT CURRENT POWER FILTER F-185/FPS-8. Direct Current Power Filter F-185/FPS-8 (filter unit No. 2), used with Power Supply OA-412/FPS-8, is identical to filter unit No. 1 with regard to function and dimensions. The output of the unit is fed to the modulator. Filter unit No. 2 in normal operation is mounted on filter unit No. 1.

1–66A. DIRECT CURRENT FILTER F-308/FPS-8. Direct Current Filter F-308/FPS-8 (filter unit), used with Power Supply Group OA-412A/FPS-8, filters the output of the modulator power supply and feeds it to the modulator group. The filter unit is mounted on the modulator power supply.

1–67. TRANSMITTER SYSTEM.

1–68. The transmitter system consists of transmitter Group OA-413/FPS-8.

1–69. TRANSMITTER GROUP OA-413/FPS-8. *(See figure 1–11.)*

1–70. Transmitter Group OA-413/FPS-8 or (transmitter group) generates high-power r-f pulses when modulated by the 13.5-kv modulator pulse.

1–71. Transmitter Group OA-413/FPS-8 consists of Radar Transmitter T-370/FPS-8 or Radar Transmitter T-370A/FPS-8 (transmitter unit), Transmitter Control

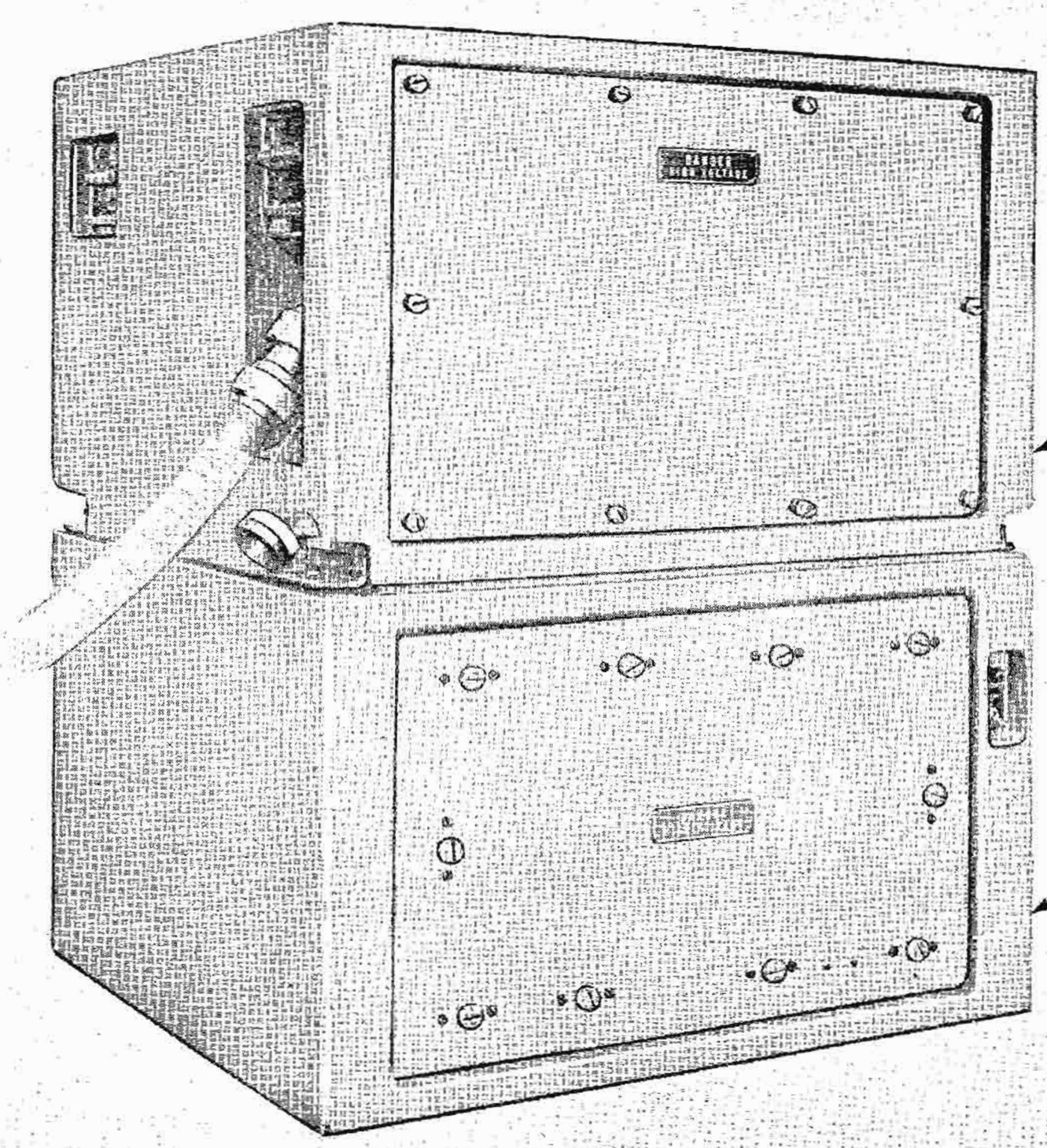


Figure 1—10A. Power Supply Group OA-412A/FPS-8

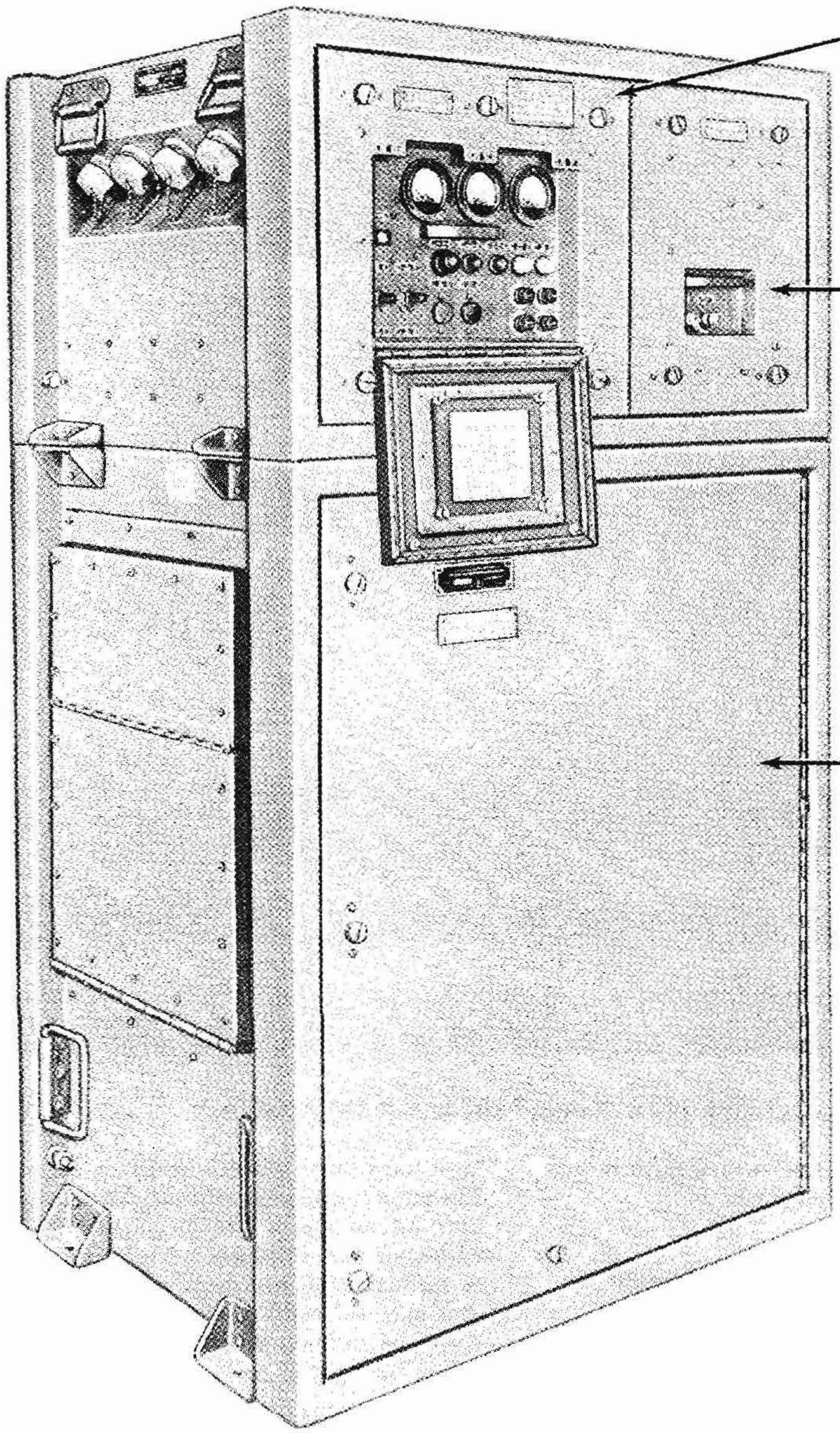


Figure 1—11. Transmitter Group OA-413/FPS-8

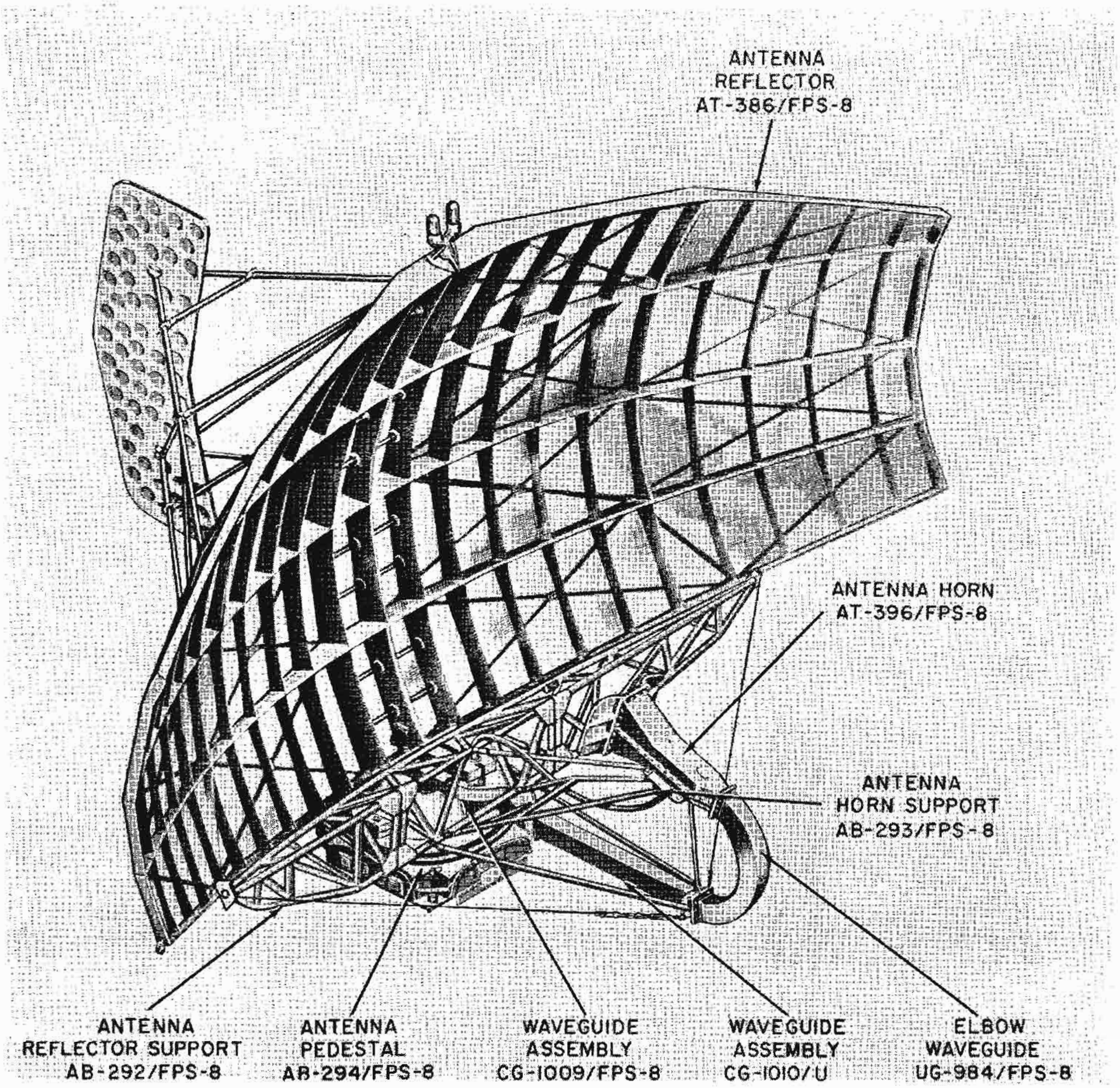


Figure 1—12. Antenna Group OA-405/FPS-8

C-1130/FPS-8 (transmitter control) and Trigger Amplifier AM-731/FPS-8 (trigger amplifier).

Note

Radar Transmitter, T-370/FPS-8 (transmitter unit) has been mechanically modified in later production to facilitate removal and replacement of the magnetron. Transmitter groups containing these improved transmitter units are designated Transmitter Group OA-413A/FPS-8.

1—72. RADAR TRANSMITTER T-370/FPS-8 or T-370A/FPS-8. Radar Transmitter T-370/FPS-8 or T-370A/FPS-8 (transmitter unit) produces oscillations in the 1280-1350-mc range when fired by the 3-microsecond modulator output. The modulator pulse is applied to the pulse transformer which is housed in the transmitter unit. The pulse transformer steps up the voltage from 13.5 kv to 53 kv and applies it to the magnetron. The magnetron r-f output to the antenna system has a peak power level of approximately one megawatt. The transmitter unit is deck-mounted within a metal cabinet. The magnetron is cooled by a blower which is located at the upper rear of and to the right of the transmitter unit cabinet.

1—73. TRANSMITTER CONTROL C-1130/FPS-8. Transmitter Control C-1130/FPS-8 (transmitter control) provides controls to tune the operating frequency of the magnetron, and adjust the high-voltage modulator output to the transmitter. The transmitter control is mounted within a drawer on the left side of the transmitter unit cabinet.

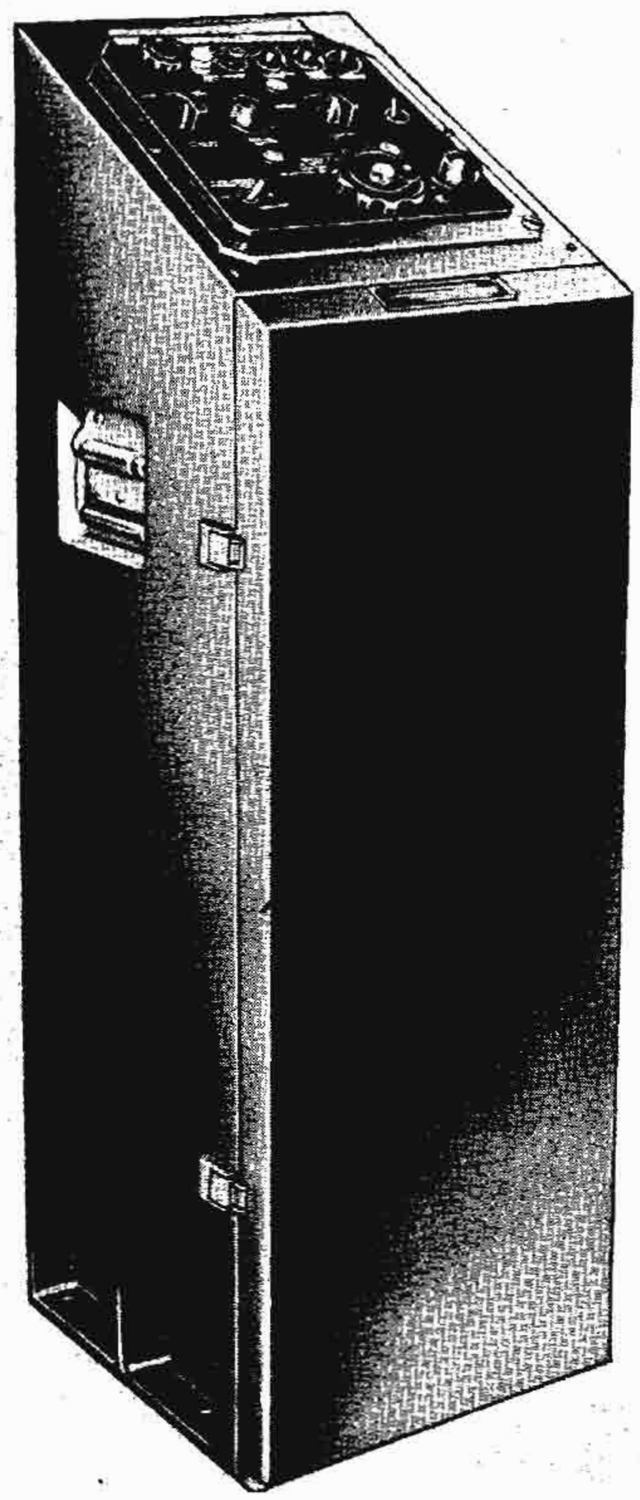


Figure 1–13. Antenna Control C-1133/FPS-8

1–74. TRIGGER AMPLIFIER AM-731/FPS-8. Trigger Amplifier AM-731/FPS-8 (trigger amplifier) provides the 550-volt driving pulse that triggers the modulator. The trigger amplifier receives the system trigger from the video distribution group, amplifies the trigger from 50 volts to 550 volts and applies it to the modulator group. The unit is located within the drawer at the right of the transmitter control.

1–75. ANTENNA SYSTEM.

1–76. The Antenna System consists of Antenna Group OA-405/FPS-8 (antenna), Antenna Control C-1133/FPS-8 (antenna control unit), and the amplidyne, Motor Generator PU-289/G.

1–77. ANTENNA GROUP OA-405/FPS-8.
(See figure 1–12.)

1–78. Antenna Group OA-405/FPS-8 (antenna) radiates the transmitter r-f output which is fed through the duplexers in the receiver rf group and through the waveguide assembly. The returned echo signal is fed to the receiver system through the duplexer and T-R cavity in the receiver rf group.

1–79. Antenna Group OA-405/FPS-8 consists of the following units which are illustrated in figure 1–12:

Antenna Reflector AT-386/FPS-8 (reflector)
Antenna Reflector Support AB-292/FPS-8 (reflector support)
Antenna Horn AT-396/FPS-8 (feed horn)
Waveguide Assembly CG-1009/FPS-8 (waveflex)
Waveguide Assembly CG-1010/U (straight waveguide)
Elbow Waveguide UG-984/FPS-8 (elbow waveguide)
Antenna Horn Support AB-293/FPS-8 (feed horn support)
Antenna Pedestal AB-294/FPS-8 (pedestal)

1–80. ANTENNA REFLECTOR AT-386/FPS-8. Antenna Reflector AT-386/FPS-8 (reflector) focuses the radar and IFF transmitted signals in a directional beam and directs target echoes to the antenna horn. The reflector is parabolic and designed for an effective frequency range of 900 to 1130 mc and 1280 to 1350 mc.

1–81. ANTENNA REFLECTOR SUPPORT AB-292/FPS-8. Antenna Reflector Support AB-292/FPS-8 (reflector support) is mounted on the antenna pedestal and provides the mounting facility for the reflector.

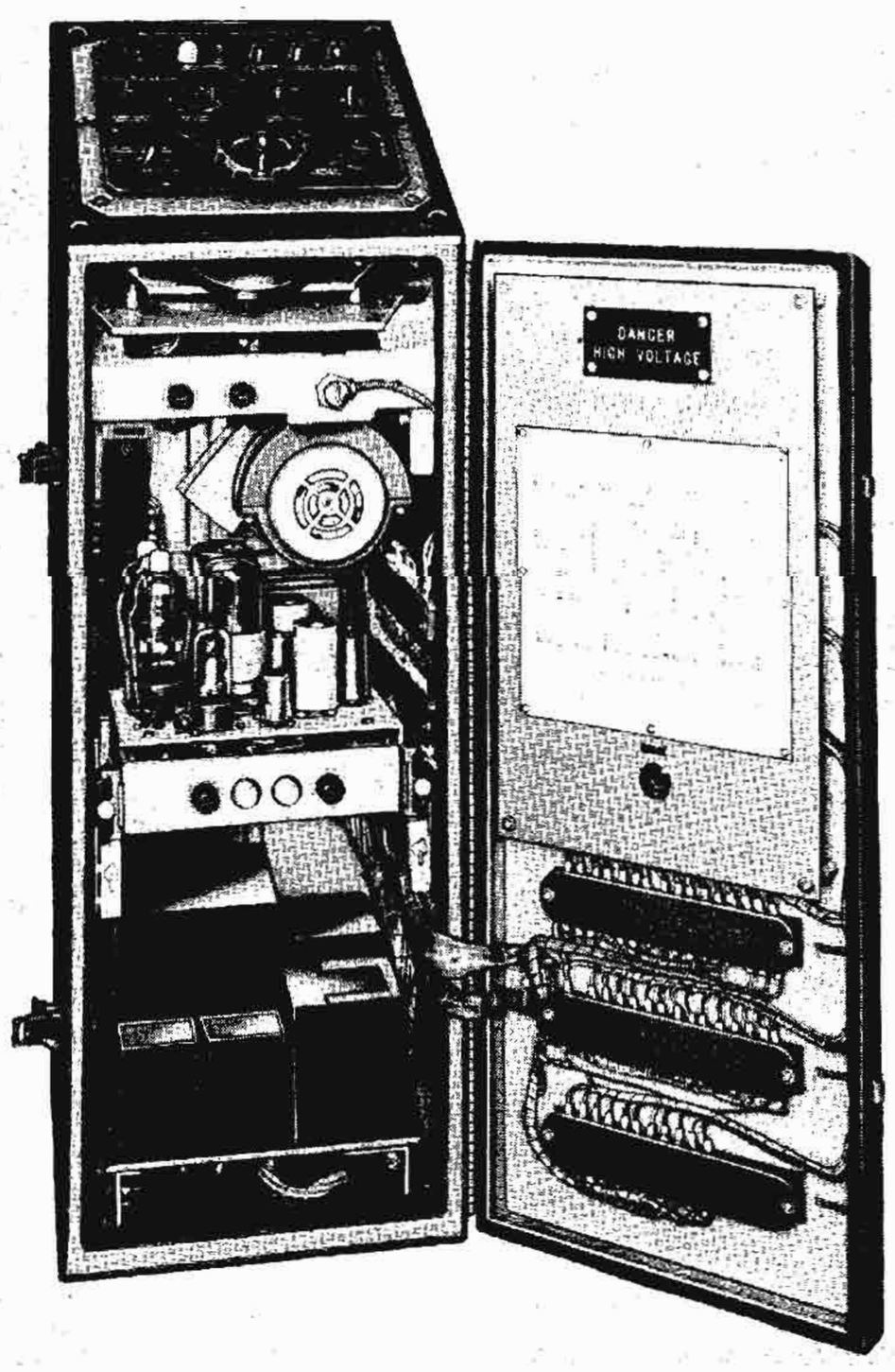


Figure 1–14. Antenna Control C-1133/FPS-8, Interior View

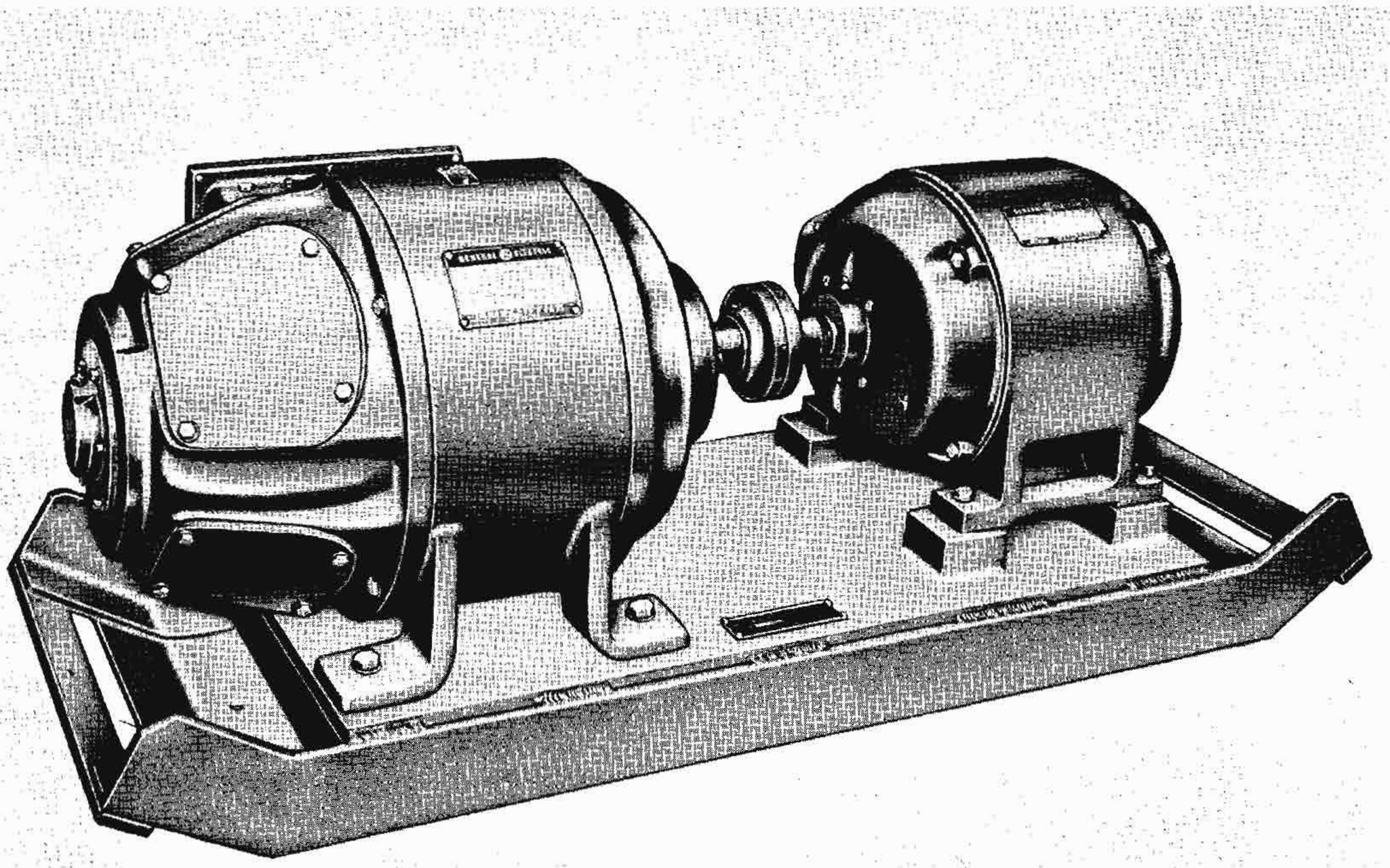


Figure 1–15. Amplidyne Motor-Generator

1–82. ANTENNA HORN AT-396/FPS-8. Antenna Horn AT-396/FPS-8 (feed horn) is a dual unit that independently radiates and receives radar and IFF signals. Both signals are applied independently to the antenna system and are terminated at the feed horn. Radar energy is horizontally polarized in the antenna horn and IFF energy is vertically polarized. The waveguide elements terminating at the feed horn comprise Waveguide Assembly CG-1009/FPS-8 (waveflex), Waveguide Assembly CG-1010/FPS-8 (straight waveguide), and Elbow Waveguide VG-984/FPS-8 (elbow waveguide).

1–83. ANTENNA HORN SUPPORT AB-293/FPS-8. Antenna Horn Support AB-293/FPS-8 (feed horn support) provides mounting facilities for the feed horn. The feed horn support consists of a tripod frame with adjustable legs.

1–84. ANTENNA PEDESTAL AB-294/FPS-8. Antenna Pedestal AB-294/FPS-8 (pedestal) provides mounting support for the rotating assembly of the antenna. The following units are mounted within the pedestal:

Antenna drive motor
Dual rotating joint
Main drive gear box
Driving ring gear
Selsyn gear box, containing two transmitting synchros and three azimuth mark commutators.
Main shaft and bearing assembly
Slip ring and brush assembly
Junction box

A heater is provided at the pedestal to supply warm air that is blown into the waveguides for drying purposes. Four studs are provided to mount the pedestal on a tower specifically designed for the radar set.

1–85. ANTENNA CONTROL C-1133/FPS-8
(See figure 1–13.)

1–86. Antenna Control C-1133/FPS-8 (antenna control unit) controls the azimuth position or rotation of the antenna reflector with respect to speed and direction of rotation in either manual, automatic rotation, or automatic sector scan operation. The antenna control houses the servo amplifier. A blower is located in the center and to the right of the unit. The antenna control is located near a PPI scope in the operating building.

1–87. AMPLIFIER POWER SUPPLY. *(See figure 1–14.)* The amplifier power supply (servo amplifier) has an error voltage input which is amplified by the servo amplifier and subsequently applied to the control field of the amplidyne.

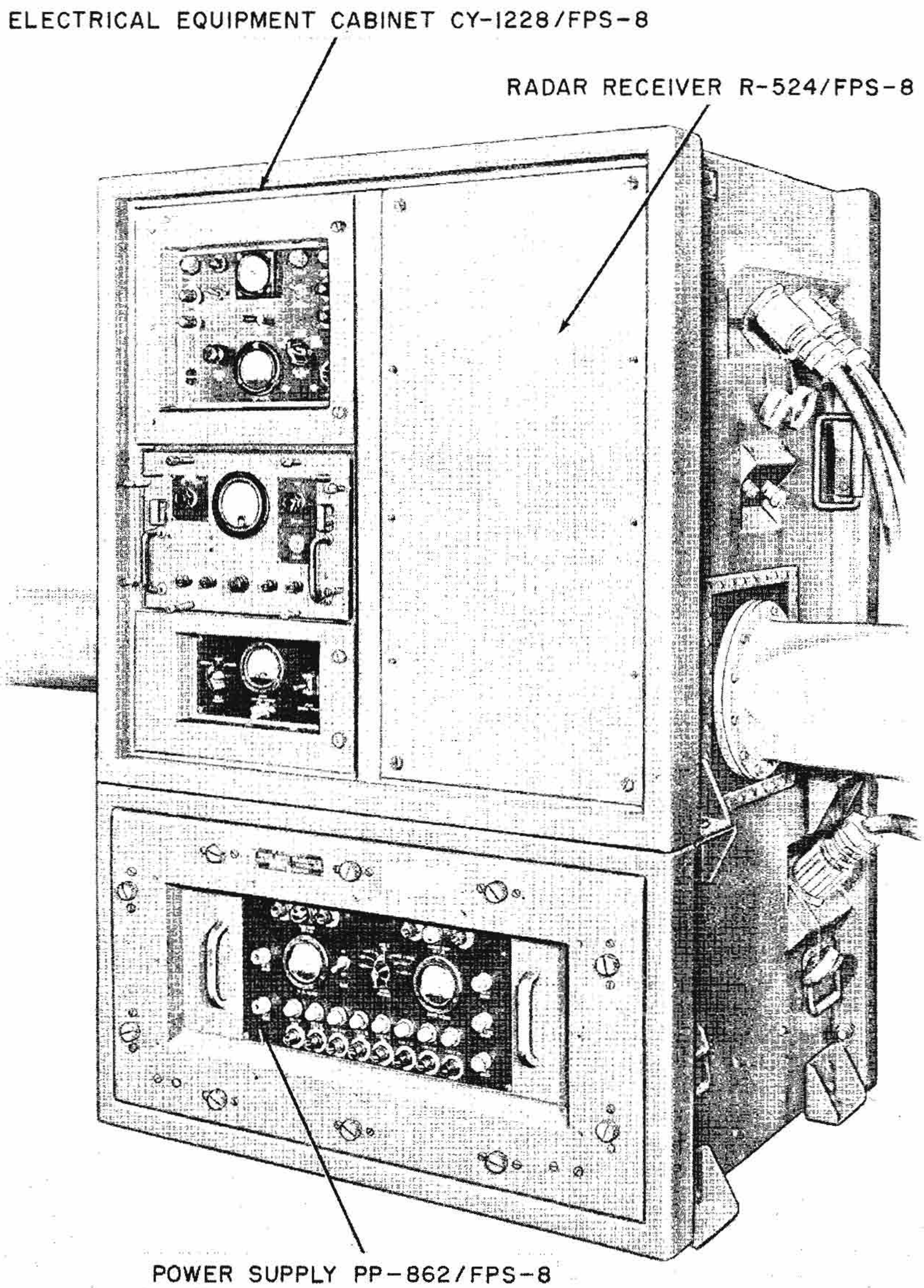


Figure 1—16. Receiver Group OA-417/FPS-8

1–88. AMPLIDYNE.
(See figure 1–15.)

1–89. Motor-Generator PU-289/G (amplidyne), in effect, amplifies the servo amplifier output and supplies a corresponding d-c input to the drive motor antenna pedestal. This causes the antenna to turn to the desired azimuth position. The amplidyne is driven by a 3-phase induction motor operating from a 208-volt, 3-phase, 60-cycle source.

1–90. RECEIVER SYSTEM.

1–91. The receiver system consists of the following groups:

Receiver Group OA-417/FPS-8 (receiver r-f group)
Radar Set Group OA-381/FPS-8 (MTI receiver group)

1–92. Receiver Group OA-417/FPS-8 (receiver r-f group) houses the r-f system components common to both the normal and MTI receiving systems. It contains duplexing circuits, an r-f amplifier, afc (automatic frequency control) and stalo (stable local oscillator) circuits to convert the received r-f signal into a 30-mc i-f (intermediate frequency) signal. The resulting i-f signal is amplified by a preamplifier prior to being coupled to the normal receiver located in the video distribution group, and the MTI receiver group. In addition, the receiver r-f group contains a power monitor circuit for maintenance power measurements and a noise source for maintenance receiver measurements.

1–93. Radar Set Group OA-381/FPS-8 (MTI receiver group) provides the radar sets with MTI receiver facilities.

1–94. RECEIVER GROUP OA-417/FPS-8
(See figure 1–16.)

1–95. Two paths *(figure 1–7)* are provided by the receiver r-f unit: the signal path, which supplies target echoes at an intermediate frequency to the normal and MTI receivers; and an afc loop which provides an i-f coho lock pulse for the MTI receiver and an afc lock pulse for the afc loop. The target echo signals are applied to the r-f amplifier and signal frequency mixer in series. The stalo output is also applied to the signal frequency mixer. The output of the signal frequency mixer is a 30-mc i-f signal which is amplified in the signal i-f preamplifier and then applied in parallel to the normal and MTI receivers. The coho lock pulse is obtained from the coho coupler and is mixed with the stalo output in the coho frequency mixer to provide a 30-mc intermediate frequency. The output of the afc mixer is applied through the coho afc preamplifier to the afc which maintains the stalo at its proper frequency, and to the MTI receiver.

1–96. Receiver Group OA-417/FPS-8 (receiver r-f group) consists of Radar Receiver R-524/FPS-8 (receiver r-f unit) and Power Supply PP-862/FPS-8 (receiver r-f group power supply). The power supply drawer is shock-mounted within the power supply cabinet which is mounted on the deck. The receiver r-f unit is mounted on top of the power supply cabinet.

1–97. RADAR RECEIVER R-524/FPS-8
(See figures 1–17, 1–18 and 1–19).

1–98. Radar Receiver R-524/FPS-8 (receiver r-f unit) consists of the following units which are illustrated in figures 1–17, 1–18 and 1–19.

Duplexer CU-321/FPS-8 (duplexer)
Duplexer CU-320/FPS-8 (T-R cavity)
Power Supply PP-863/FPS-8 (keep-alive power supply)
Radio Frequency Amplifier AM-732/FPS-8 (r-f amplifier)
Frequency Mixer Stage CV-252/FPS-8 (coho frequency mixer)
Frequency Mixer Stage CV-252/FPS-8 (signal frequency mixer)
Intermediate Frequency Amplifier AM-733/FPS-8 (signal i-f preamplifier)
Variable Attenuator CN-196/FPS-8 (coho coupler)
Radio Frequency Oscillator 0-171/FPS-8 (stalo)
Intermediate Frequency Amplifier AM-734/FPS-8 (coho afc preamplifier)
Receiver Control C-1092/FPS-8 (afc)
Signal Generator SG-67/FPS-8 (noise generator)
Pulse Generator SG-68/FPS-8 (pulse generator)
Radio Frequency Monitor ID-340/FPS-8 (power monitor)

1–99. Two local control panels are mounted on the left side of the receiver r-f unit (figure 1–17). The upper control panel provides controls to tune the magnetron, adjust the gain of the receiver, and actuate the noise generator. A meter and switch are available to measure T-R tube current and crystal current. A magnetron frequency meter is provided to monitor the magnetron frequency. A switch is provided on the panel to transfer control between the local and remote control panel. The lower control panel mounts stalo controls, a stalo cathode current meter, a video test jack, and switches that control the tuning of the r-f amplifier and the T-R tube. Alternate, or remote control panels are available at the video distribution group.

1–100. Duplexer CU-321/FPS-8. *(See figure 1–18.)* Duplexer CU-321/FPS-8 (duplexer) is a polarization-shift type duplexer which effectively switches the antenna to the transmitter during pulse transmission, and to the receiver during the interval between transmitted pulses. A sample of the transmitter output is taken from the duplexer by Variable Attenuator CN-196/FPS-8 (coho coupler) and coupled through the coho mixer. The sampled pulse supplies reference signals to the afc circuits and the MTI receiver. (See paragraphs 1–109 and 1–121.) The duplexer is located at the bottom of the receiver r-f cabinet extending along the center of the cabinet. Waveguide flanges are provided at both ends of the duplexer to permit its matching the adjoining r-f components.

1–101. DUPLEXER CU-320/FPS-8. *(See figure 1–18.)* Duplexer CU-320/FPS-8 (T-R cavity) operates in conjunction with the polarization-shift duplexer to attenu-

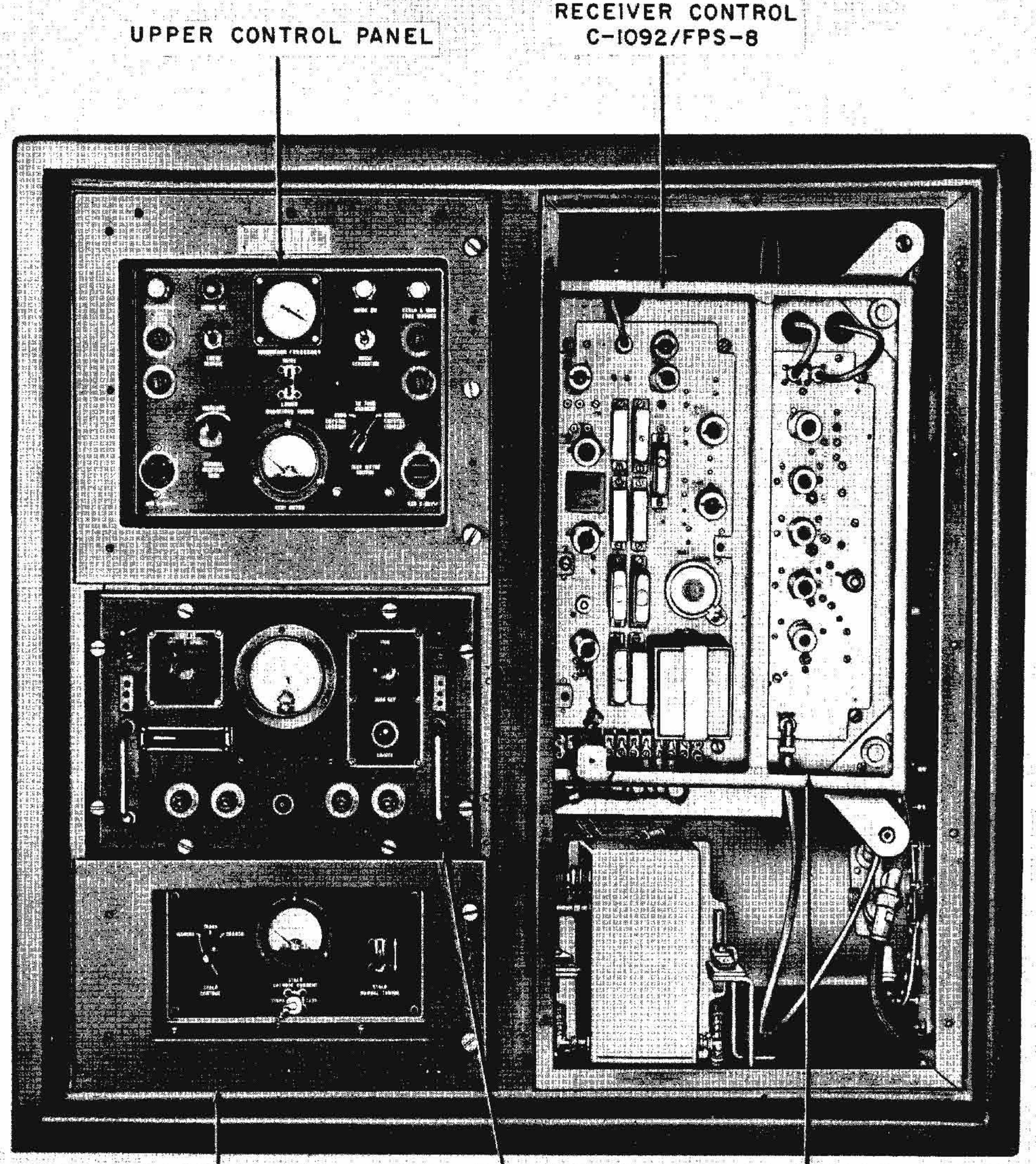


Figure 1—17. Radar Receiver R-524/FPS-8

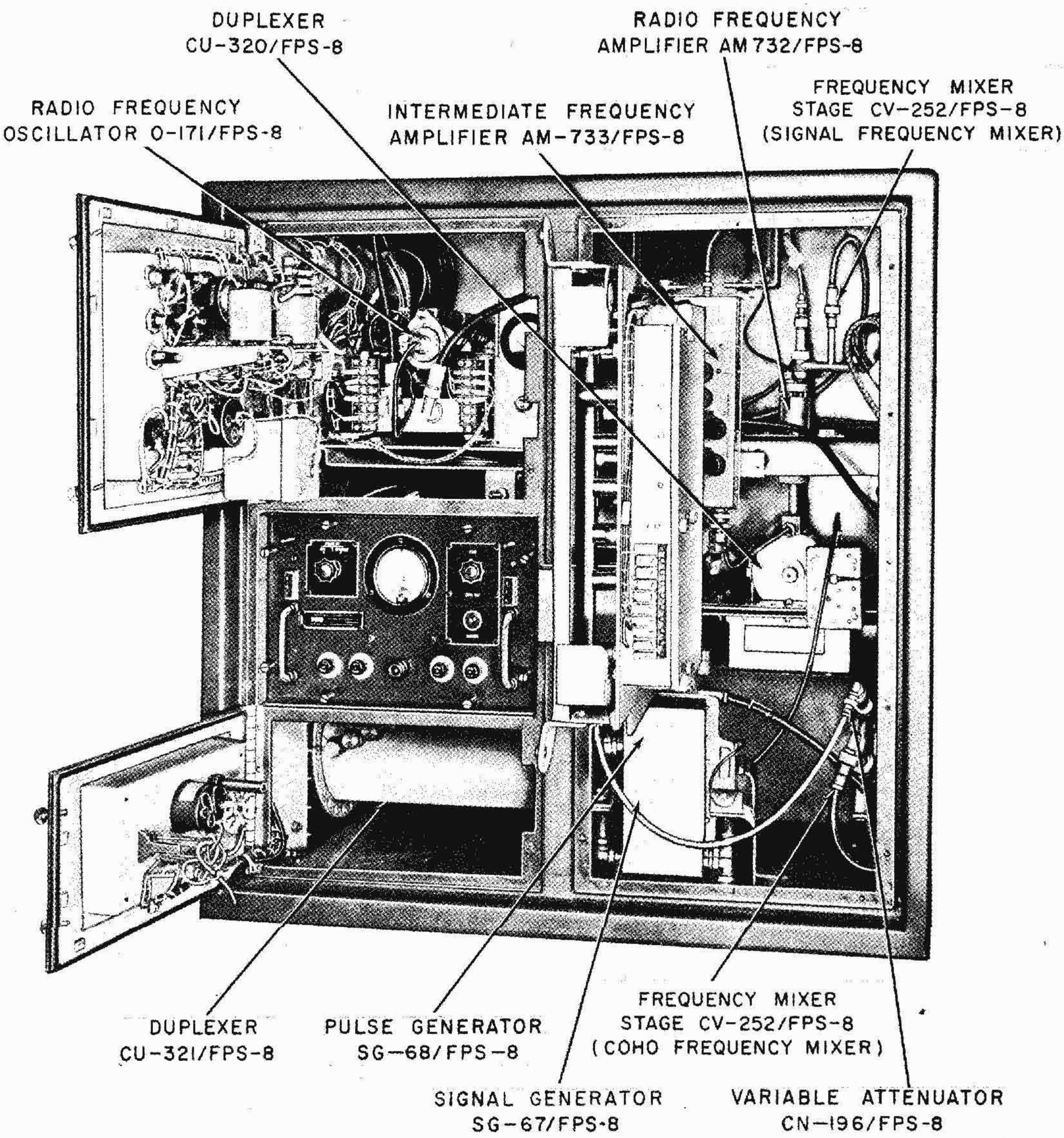


Figure 1–18. Radar Receiver R-524/FPS-8, Control Panels Open and Screen Removed

ate the transmitted pulse in the receiving arm of the duplexer. The cavity is on a plate mounted to the flange of the elbow waveguide at the right side and to the rear of the receiver rf cabinet.

1–102. POWER SUPPLY PP-863/FPS-8. *(See figure 1–19.)* Power supply PP-863/FPS-8 (keep-alive power supply) maintains a negative 650 to 700 volts across the T-R cavity. The keep-alive power supply keeps the T-R tube in the T-R cavity partially ionized so the tube conducts instantaneously upon the application of transmitted pulse. The power supply is located on the left side and to the rear of the receiver rf cabinet.

1–103. RADIO FREQUENCY AMPLIFIER AM-732/FPS-8. *(See figure 1–18.)* Radio Frequency Amplifier

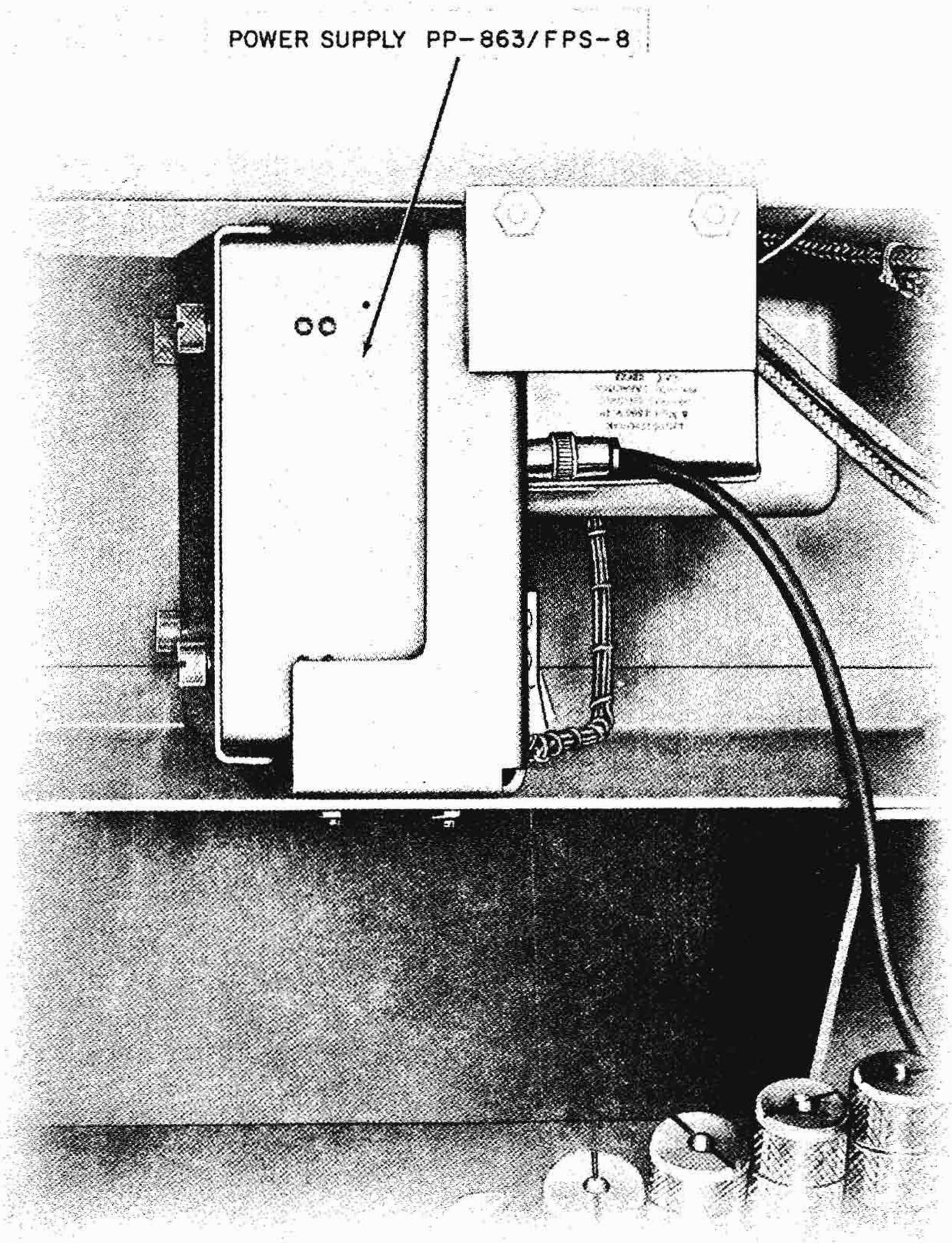


Figure 1—19. Radar Receiver R-524/FPS-8, Power Monitor Removed

AM-732/FPS-8 (rf amplifier) receives target echoes from the TR cavity, amplifies the echoes and applies them to the signal mixer. The rf amplifier is mounted on the upper-right side and at the rear of the cabinet.

1—104. FREQUENCY MIXER STAGE CV-252/FPS-8. *(See figure 1—18.)* Frequency Mixer Stage CV-252/FPS-8 (signal mixer) mixes the returned signal from the rf amplifier with the stalo output to obtain an intermediate frequency of 30 mc for the normal and MTI receiver circuits. The output of the signal mixer is applied to the signal if preamplifier. The signal mixer is located at the upper-right side of the receiver rf cabinet.

1—105. INTERMEDIATE FREQUENCY AMPLIFIER AM-733/FPS-8. *(See figure 1—18.)* Intermediate Frequency Amplifier AM-733/FPS-8 (signal if preampli-

fier) amplifies the 30-mc output of the signal mixer. The signal if preamplifier has a dual output: one output is applied to the normal receiver in the video distribution group, the other output is applied to the MTI receiver group. Brackets at each side of the signal if preamplifier mount it at the upper-right side and in the center of the receiver rf cabinet. The signal if preamplifier is completely shielded from r-f radiation.

1—106. VARIABLE ATTENUATOR CN-196/FPS-8. *(See figure 1—18.)* Variable Attenuator CN-196/FPS-8 (coho coupler) samples and attenuates the transmitted pulse to a level suitable for its application into the coho mixer. The input to the coho frequency mixer, applied from the duplexer, is attenuated about 86 db below the level of the transmitter pulse. The coupler is mounted on the polarization shift duplexer.

1—107. FREQUENCY MIXER STAGE CV-252/FPS-8 (coho frequnecy mixer). *(See figure 1—18.)* The coho frequnecy mixer is identical in construction to the signal mixer. It mixes the sampled transmitted pulse from the coho coupler with the stalo output to obtain an intermediate frequnecy of 30 mc for the MTI coho circuits and the afc circuits. The coho frequency mixer output is fed to the coho-afc preamplifier. The mixer is located at the lower-right side of the receiver rf cabinet.

1—108. INTERMEDIATE FREQUENCY AMPLIFIER AM-734/FPS-8. *(See figure 1—17.)* Intermediate Frequency Amplifier AM-734/FPS-8 (coho afc preamplifier) receives and amplifies the 30-mc signal from the coho mixer, derived from mixing the sampled transmitted pulse and the stalo output. The unit's dual output is fed to MTI receiver group to provide a lock pulse for MTI operation, and to the afc to provide a reference signal for the afc circuits. The coho afc preamplifier is mounted on a cut-out mounting plate at the upper-right side in the front of the receiver rf cabinet.

1—109. RECEIVER CONTROL C-1092/FPS-8. *(See figure 1—17.)* Receiver Control C-1092/FPS-8 (afc) maintains the stalo frequency within the range required by the i-f circuits. The afc receives a reference signal from the coho afc preamplifier and derives from it a servo output voltage. The servo output is applied to the stalo. drive motor. During afc action, the afc output voltage causes the stalo tuning motor to tune to the proper stalo cavity frequency. The unit is mounted in an aluminum case in the upper-right side and in the front of the cabinet.

1—110. RADIO FREQUENCY OSCILLATOR O-171/FPS-8. *(See figure 1—18.)* Radio Frequnecy Oscillator O-171/FPS-8 (stalo) supplies a signal to beat with the transmitter-pulse sample and with r-f return signals to furnish signals at the intermediate frequency (30 mc). The dual output of the stalo is tunable over the range of 1220 to 1400 mc with fine tuning (80 mc of the range) available either automatically by afc action or manually. Stalo controls are located at the lower control panel of the receiver rf unit and remote control panel of the video distribution unit. The fine tuning range is sufficient to cover the radar sets operating frequency band. The dual outputs of the salo are fed to the signal mixer and the coho mixer. The transmitter and stalo can be maintained at a constant difference frequency of 30 mc ±50 kc by the action of the afc. The stalo is located at the upper-left side and at the front of the receiver rf cabinet. The stalo is double shock-mounted to isolate it from any vibration in the main cabinet.

1—111. SIGNAL GENERATOR SG-67/FPS-8. *(See figure 1—18.)* Signal Generator SG-67/FPS-8 (noise generator) provides a calibrated noise level for the measurement of receiver noise figures. The noise is fed through the duplexer and the directional coupler. The noise generator is mounted in an aluminum case at the lower-right side in the front of the cabinet. Facilities are provided for mounting Pulse Generator SG-68/FPS-8 on the noise generator.

1—112. PULSE GENERATOR SG-68/FPS-8. *(See figure 1—18.)* Pulse Generator SG-68/FPS-8 (pulse generator) generates, with the system trigger, drive pulses for the noise generator.

1—113. RADIO FREQUENCY MONITOR ID-340/FPS-8. *(See figure 1—17.)* Radio Frequency Monitor ID-340/FPS-8 (power monitor) provides a continuous indication of the average peak transmitter power output. The power monitor is also used in conjunction with the directional coupler to monitor reflected power in the transmission line. The power monitor is a self-balancing, temperature-compensated bolometer bridge that monitors pulsed r-f power in the zero to 1.5-megawatts peak power range (zero to 1.62-kilowatts average power range). The bolometer mount, self-balancing bolometer bridge, vacuum tube voltmeter and power supply, which make up the power monitor, are housed in a single unit at the left side and in the front of the receiver rf cabinet.

1—114. POWER SUPPLY PP-862/FPS-8. *(See figure 1—17.)*

1—115. Power Supply PP-862/FPS-8 (receiver rf group power supply) furnishes d-c, and a-c power for the receiver rf group.

1—116. RADAR SET GROUP OA-381/FPS-8. *(See figure 1—20.)*

1—117. Radar Set Group OA-381/FPS-8 (MTI receiver group) comprises the equipment in two MTI cabinets (Electrical Equipment Cabinets CY-1183/FPS-8 and CY-1182/FPS-8). The upper cabinet (MTI receiver cabinet) contains Radar Set Groups OA-379/FPS-8 and OA-380/FPS-8, each mounted in a separate drawer that can be pulled out for servicing. Within each drawer, the units are mounted vertically. By removing the dust covers of each chassis, the wiring is accessible for maintenance. The second cabinet contains Power Supply PP-820/FPS-8. (See paragraph 1—135.) In normal operation, the MTI receiver cabinet is stacked on the power supply cabinet. The upper cabinet is provided with six bolts to fasten it to the lower cabinet. Each cabinet is provided with a blower.

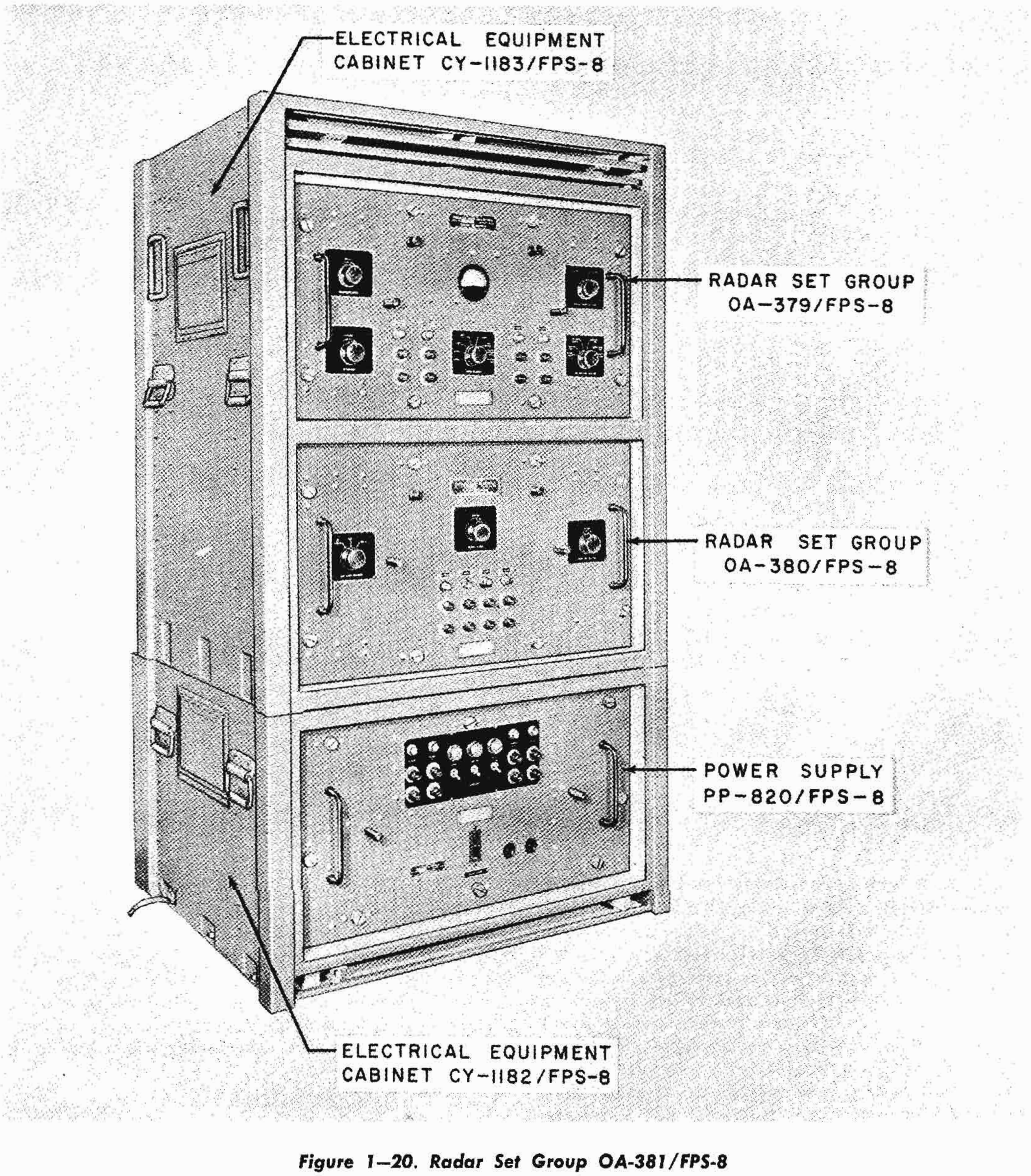


Figure 1—20. Radar Set Group OA-381/FPS-8

1—118. The MTI operation used in the MTI receiver group is the technique known as coherent MTI. Since the respective ranges of fixed targets relative to the radar set do not vary, the time required for the transmitted pulse to travel to these targets and back does not change from one pulse to the next. Thus, the return signals from a fixed target show the same phase relationship to a stable reference signal from one pulse period to another. As the range of a moving target and the travel time of the return signals do vary from pulse to pulse, the moving target echoes show a changing phase relationship to the reference signal from one pulse period to the next. The stable reference signal is generated by an oscillator (coho) which is synchronized with each trans-

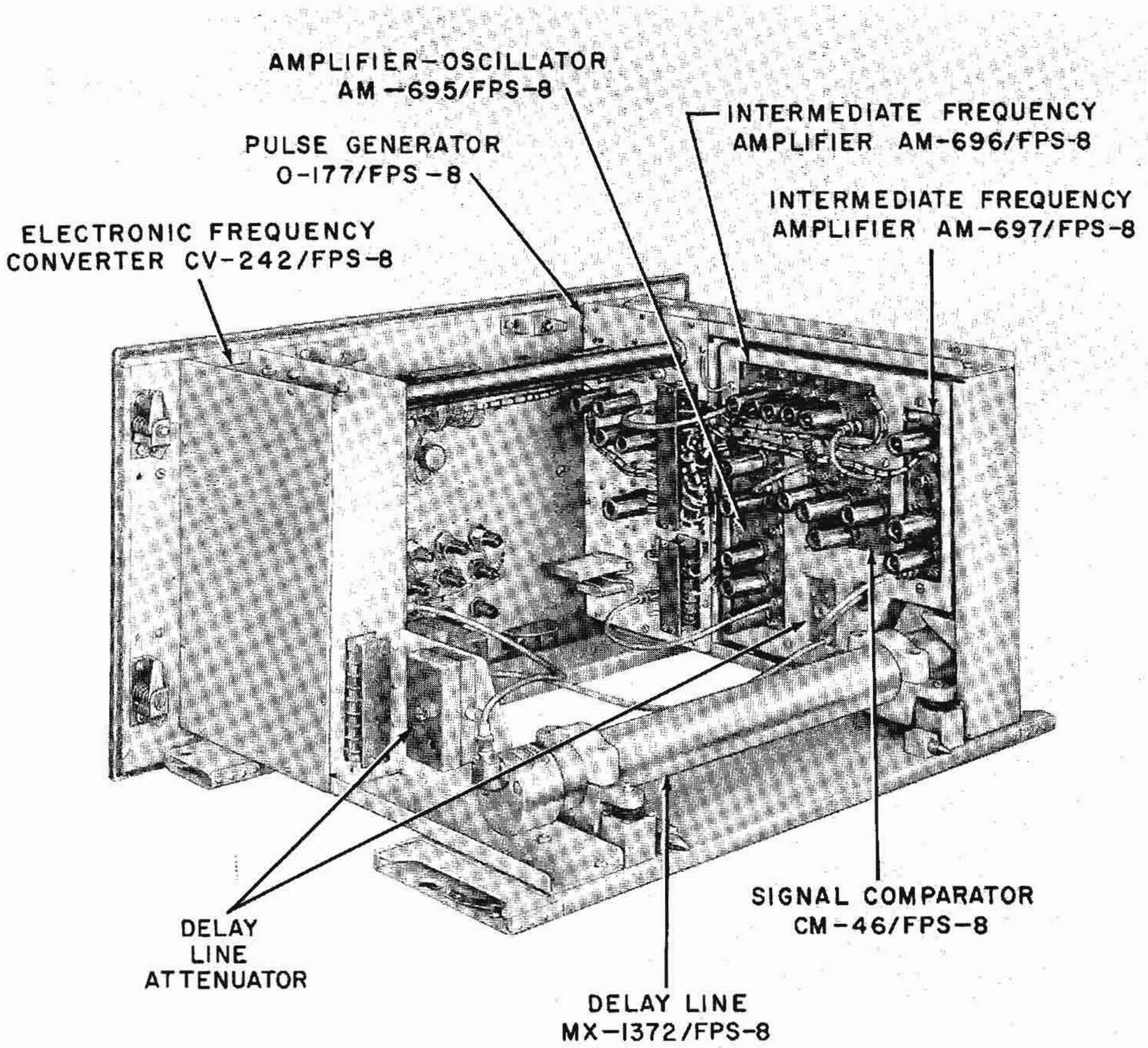


Figure 1–21. Radar Set Group OA-380/FPS-8

mitted pulse. This synchronization is achieved by heterodyning a sample of the transmitted pulse with the local oscillator (stalo) and using this signal as a synchronizing lock pulse. A phase detector is employed to give a video output voltage (termed coherent video) whose amplitude is proportional to the phase difference between the return signal and the coho reference signal. In the case of fixed target signals, the coherent video pulses repeat in polarity and amplitude from pulse to pulse. In the case of moving target signals, the coherent video pulses change continually in polarity and amplitude. The coherent video signals from the phase detector are passed through two parallel channels: one (delayed channel) contains a mercury or quartz delay line that stores them precisely one pulse period, the other (undelayed channel) transmits them instantaneously. The outputs of the two channels are applied to a cancellation circuit. By means of this cancellation circuit, the fixed target signals (those whose polarity and amplitude are the same from one pulse period to the next) are cancelled, leaving only the moving-target signals (cancelled MTI video). This cancelled MTI video is combined with the normal (non-MTI) video to permit simultaneous observation of MTI video up to a certain range and of normal video past that range. This combined video is referred to as gated video. Interfering signals picked up from nearby radars are blanked during the interval that the interference would have been presented on the PPI.

1-119. RADAR SET GROUP OA-380/FPS-8
(See figure 1-21.)

1-120. Radar Set Group OA-380/FPS-8 (lower MTI drawer) comprises the following units:

Amplifier-Oscillator AM-695/FPS-8 (coho)
Intermediate Frequency Amplifier AM-696/FPS-8 (limiting i-f amplifier)
Signal Comparator CM-46/FPS-8 (phase detector)
Electronic Frequency Converter CV-242/FPS-8 (line driver)

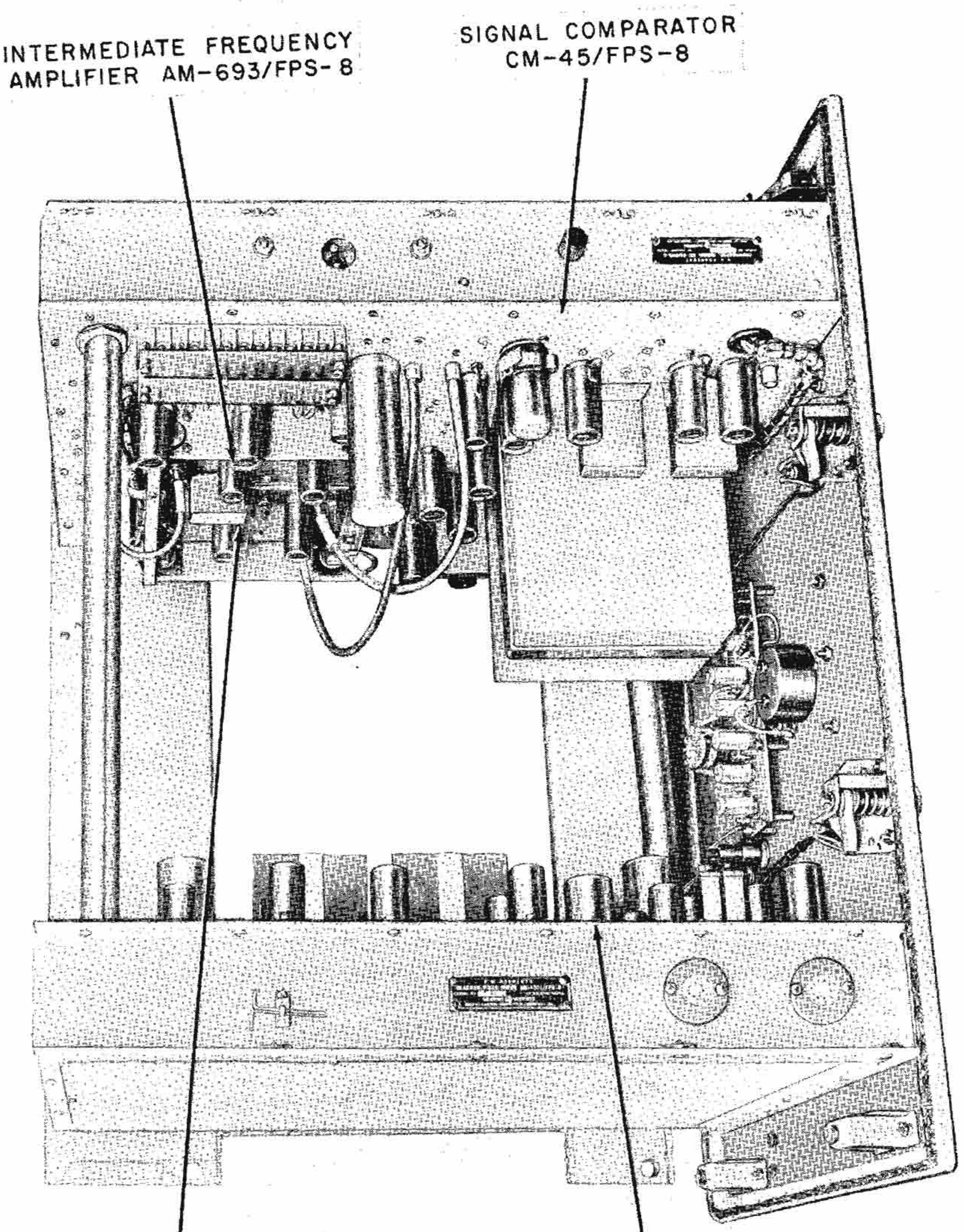


Figure 1–22. Radar Set Group OA-379/FPS-8

Delay Line MX-1372/FPS-8 (mercury delay line), Delay Line MX-1860/MPS (quartz delay line) or Delay Line MX-1860 (quartz delay line)
Intermediate Frequency Amplifier AM-697/FPS-8 (comparator pre-amplifier)
Pulse Generator 0-177/FPS-8 (test pulse generator)
Delay line attenuator

1-121. AMPLIFIER-OSCILLATOR AM-695/FPS-8. Amplifier-Oscillator AM-695/FPS-8 (coho) is an amplifier and oscillator that provides a reference against which the return signals (from targets) can be compared. This reference signal is synchronized in phase with the transmitted pulse. A lock pulse derived from the transmitted pulse is fed to the coho at intermediate frequency (30 megacycles). (See paragraph 1-106.) The output of the coho is applied to Signal Comparator CM-46/FPS-8 (pulse detector). The coho is located on the left side at the middle of the drawer.

1-122. INTERMEDIATE FREQUENCY AMPLIFIER AM-696/FPS-8. Intermediate Frequency Amplifier AM-696/FPS-8 (limiting i-f amplifier) amplifies the return signals from the signal i-f preamplifier. (See paragraph 1-105.) These signals arrive via the test-pulse generator. The limiting i-f amplifier limits signals, resulting in an i-f output not in excess of 15 volts. The output of the limiting i-f amplifier is sent to Signal Comparator CM-46/FPS-8 (phase detector). The limiting i-f amplifier is mounted on the left side at the middle of the drawer.

1-123. SIGNAL COMPARATOR CM-46/FPS-8. Signal Comparator CM-46/FPS-8 (phase detector) is a unit the output voltage of which is proportional to the difference of phase between the return signal and the reference coho signal. The output of the phase detector (coherent video) is fed to Electronic Frequency Converter CV-242/FPS-8 (line driver). The phase detector is mounted on the left-rear side of the drawer.

1-124. ELECTRONIC FREQUENCY CONVERTER CV-242/FPS-8. Electronic Frequency Converter CV-242/FPS-8 (line driver) combines the coherent video (from the phase detector), the circulating trigger (from the comparator), and the gated interference triggers from the blanker-video mixer (see paragraph 1-134) and uses the combination to modulate a 9-megacycle carrier generated in the unit. The modulated carrier is then sent through Delay Line MX-1372/FPS-8 or MX-1860/MPS or MX-1860. The line driver is located on the right side of the drawer.

1-125. DELAY LINE MX-1372/FPS-8. Delay Line MX-1372/FPS-8 (mercury delay line) delays the modulated the 9-megacycle carrier for the pulse period. The output of the delay line is fed to the comparator preamplifier. This output, which is delayed precisely one pulse period, is subsequently compared with the following cycle of return signals from the undelayed-channel. The delay line is mounted across the back of the drawer.

1-125A. DELAY LINE MX-1860/MPS. Delay Line MX-1860/MPS (quartz delay line) performs the same function as the mercury delay line (paragraph 1-125).

1-125B. DELAY LINE MX-1860. Delay Line MX-1860 (quartz delay line) performs the same function as the mercury delay line (paragraph 1-125).

1-126. INTERMEDIATE FREQUENCY AMPLIFIER AM-697/FPS-8. Intermediate Frequency Amplifier AM-697/FPS-8 (comparator pre-amplifier) amplifies the modulated 9-megacycle carrier output of the delay line to the amplitude level of the undelayed signals, and feeds the signal to the delayed-channel amplifier (paragraph 1-131). The comparator pre-amplifier is mounted on the left-rear side of the drawer.

1-127. PULSE GENERATOR O-177/FPS-8. Pulse Generator O-177/FPS-8 (test pulse generator) furnishes signals to test the MTI portion of the radar set two conditions of test and the operating condition are selected by the "TEST PULSE SELECTOR". Under one condition of test ("TEST 1"), the lock pulse derived from the transmitter pulse is used to lock the coho. Under the other condition of test ("TEST 2"), the coho lock pulse is generated within the test pulse generator. In both positions, simulated fixed-target return signals are generated to test MTI operation independently of the test of the radar set. When the test pulse generator is not used for testing ("OPERATE" position of "TEST PULSE SELECTOR" switch), the coho and return signals are fed straight through the unit to the coho and the limiting i-f amplifier, respectively. The test pulse generator is located on the left-front side of the drawer.

1-128. DUMMY DELAY LINE ATTENUATOR. The delay line attenuator is a passive element used by maintenance personnel to check the attenuation of the mercury delay line. The unit consists of two chassis connected by a cable (20 inches long). Each chassis is mounted on the side frame of the drawer, in front of the mercury delay line.

1-129. RADAR SET GROUP OA-379/FPS-8.
(See figure 1-22.)

1-130. Radar Set Group OA-379/FPS-8 (upper MTI drawer) comprises the following two main units:

Signal Comparator CM-45/FPS-8 including:
Intermediate Frequency Amplifier AM-693/FPS-8 (delayed-channel amplifier)
Intermediate Frequency Amplifier AM-694/FPS-8 (undelayed-channel amplifier)
Comparator — no nomenclature
Blanker-Video Mixer MX-1371/FPS-8 (blanker-video mixer)

1-131. INTERMEDIATE FREQUENCY AMPLIFIER AM-693/FPS-8. Intermediate Frequency Amplifier AM-693/FPS-8 (delayed-channel amplifier) is the upper of the two chassis mounted on the right side of the upper MTI drawer. The primary function of the delayed channel amplifier is the amplification and detection of the delayed video signals, which are sent to the comparator circuit for comparison with the undelayed video.

1-132. INTERMEDIATE FREQUENCY AMPLIFIER AM-694/FPS-8. Intermediate Frequency Amplifier AM-694/FPS-8 (undelayed-channel amplifier) is the lower of the two chassis mounted on the right side of the upper MTI drawer. The primary function of the undelayed channel amplifier is the amplification and detection of the undelayed video signals, which are sent to the comparator circuits.

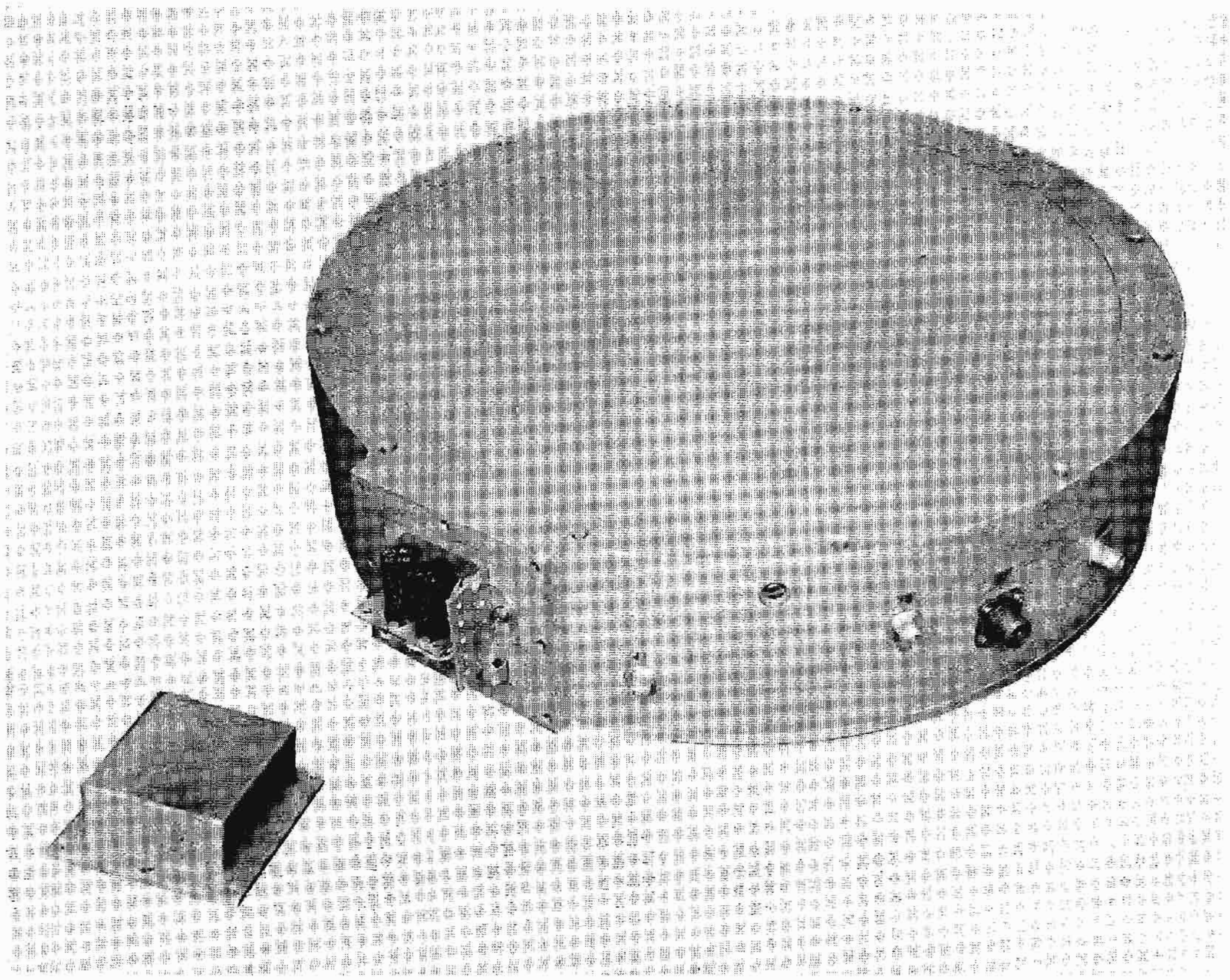


Figure 1-21A. Quartz Delay Line MX-1860 or MX-1860/MPS

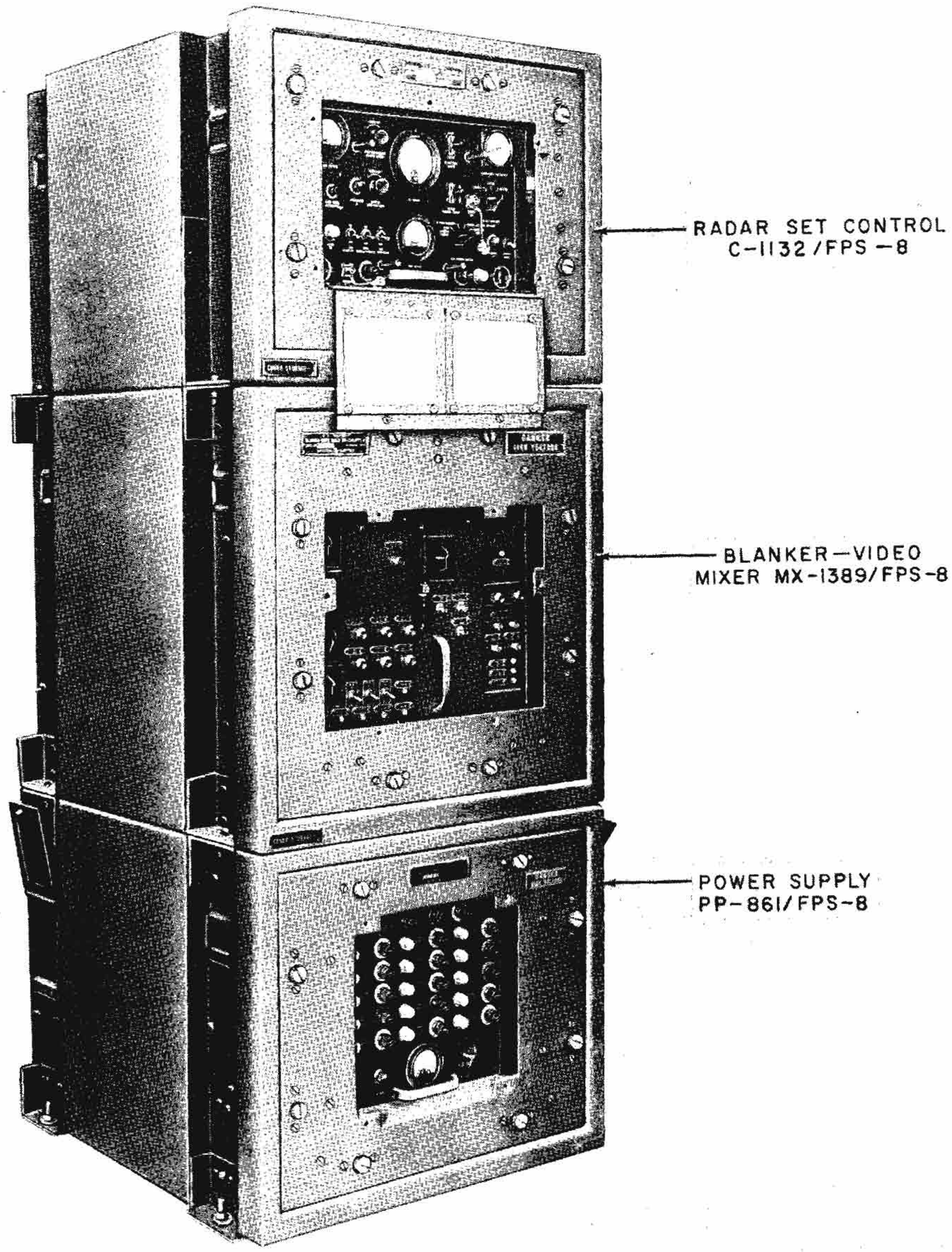


Figure 1—23. Radar Set Group OA-416/FPS-8

1—133. SIGNAL COMPARATOR CM-45/FPS-8. Signal Comparator CM-45/FPS-8 (the comparator) has several functions. It contains the comparison circuits for video cancellation, the trigger generator circuits, the delayed interference trigger selected circuits, the MTI test video circuits and several auxiliary circuits. The comparison circuit compares the delayed and undelayed video received from the delayed and undelayed-channel amplifiers. The output of the comparison circuit (MTI video) is fed to the Blanker-Video Mixer MX-17371/FPS-8 where it is combined with the normal video. The comparator also contains a trigger generator which generates 2-microsecond triggers. One trigger (system trigger) triggers the radar.The second trigger (pre-trigger) triggers

the associated IFF equipment (GFE). By use of the "SYSTEM TRIGGER SELECTOR" on the front panel, the IFF system can be made to fire coincidentally (IFF DELAY) with the radar or 12.4 microseconds in advance (IFF ZERO DELAY) of the radar. By a simple wiring change, the pre-trigger can be advanced to 37 microseconds.The use of trigger is governed by the IFF equipment requirements. Also contained in the comparator is the delayed interference trigger selector. This circuit separates the delayed interference trigger frim the circulating trigger and delayed video and feeds this selected delayed interference trigger to the blanker-video mixer. The comparator is located on the right hand side of the drawer.

1—134. BLANKER-VIDEO MIXER MX-1371/FPS-8. Blanker-Video Mixer MX-1371/FPS-8 (blanker-video mixer) combines MTI and normal video signals by means of an electronic switch. The range of MTI video in this composite presentation video may be adjusted by a control on the front panel. MTI video can be presented up to 150 nautical miles in range and normal video from the end of the MTI presentation to 220 nautical miles. In addition to the video switch selection, the unit incorporates an interference blanker that blanks interfering signals picked up from adjacent transmitting radar sets. The MTI equipment blanks only the interfering signals appearing in the MTI video; interfering signals appearing in the normal video are blanked in the interference blanker in the video distribution group. The blanker-video mixer is located on the left side of the drawer.

1—135. POWER SUPPLY PP-820/FPS-8.
(See figure 1—20.)

1—136. Power supply PP-820/FPS-8 (MTI power supply) is drawer-mounted in Electrical Equipment Cabinet CY-1182/FPS-8 (MTI power supply cabinet). The cabinet provides mounting facilities for the MTI receiver cabinet. The power supply provides the necessary a-c and d-c inputs to the MTI receiver cabinet.

1—137. VIDEO SYSTEM.

1—138. The video system comprises the following groups:

Radar Set Group OA-416/FPS-8
Indicator Group OA-99A/CPS-6B
Range Indicator IP-209/FPS-8
Plotting Equipment
Display – Plotting Board Group OA-390/FPS-8
Display – Plotting Board Group OA-567/FPS-8

1—139. Radar Set Group AO-416/FPS-8 is the video distribution center of the Radar set. It houses units that are functionally a part of the receiver system (paragraphs 1—145 through 1—151); and units that are functionally part of the video system (paragraphs 1—152 through 1—155).

1—140. Indicator Group OA-99A/CPS-6B is the nomenclature of each of the PPI oscilloscopes of the radar set.

1—141. Range Indicator IP-209/FPS-8 is the expanded A-scope for the radar sets.

1—142. Display-Plotting Board Group OA-390/FPS-8 is the primary plotting facility for Radar Set AN/FPS-8.

1—143. RADAR SET GROUP OA-416/FPS-8
(See figure 1—18.)

1—144. Radar Set Group OA-416/FPS-8 consists of Radar Set Control C-1132/FPS-8 (receiver and control unit), Blanker-Video Mixer MX-1389/FPS-8 (video distribution unit), and Power Supply PP-861/FPS-8 (video distribution power supply). In normal operation, the video distribution power supply is deck-mounted in a pull-out type drawer. The video-distribution unit, housed in Electrical Equipment Cabinet CY-1227/FPS-8 *(figure 1—26)*, is mounted upon the power supply. The video distribution cabinet is a totally enclosed noise-tight box which provides a shock-mounted drawer for housing the four video units. The drawer is connected by flexible cables to the cabinet so that the equipment may be operated while the drawer is pulled out. The receiver and control unit is mounted on the video distribution cabinet.

1—145. RADAR SET CONTROL C-1132/FPS-8.
(See figure 1—23.)

1—146. Radar Set Control C-1132/FPS-8 (receiver and control unit) remote control panel mounts the remote controls and metering circuits for the transmitter and receiver circuits that are identical to those on the receiver rf unit control panels. In addition, there are switches for normal receiver FTC, STC, and AVNL action. When the remote control panel is in use, complete transmitter and receiver operation can be maintained from the video distribution cabinet at the radar set operations site. The receiver and control unit includes Intermediate Frequency Amplifier AM-622/CPS-6B (normal receiver) which is mounted behind the front panel of the receiver and control unit.

1—147. INTERMEDIATE FREQUENCY AMPLIFIER AM-622/FPS-8. *(See figure 1—24.)* Intermediate Frequency Amplifier AM-622/FPS-8 (normal receiver) receives the returned signal from the signal if preamplifier of the receiver rf unit. (See paragraph 1—105.) The normal receiver amplifies and detects the signals and feeds them to the video distribution unit. (This unit is functionally part of the receiver system.)

1—148. BLANKER-VIDEO MIXER MX-1389/FPS-8.
(See figures 1—25 and 1—26.)

1—149. Blanker-Video Mixer MX-1389/FPS-8 (video distribution unit) consists of the following units:

Interference Blanker MX-1392 (interference blanker)
Pulse Generator O-176/FPS-8 (trigger generator)
Range Calibrator TD-86/FPS-8 (range mark generator)
Electrical Synchronizer SN-111/FPS-8 (angle mark generator)

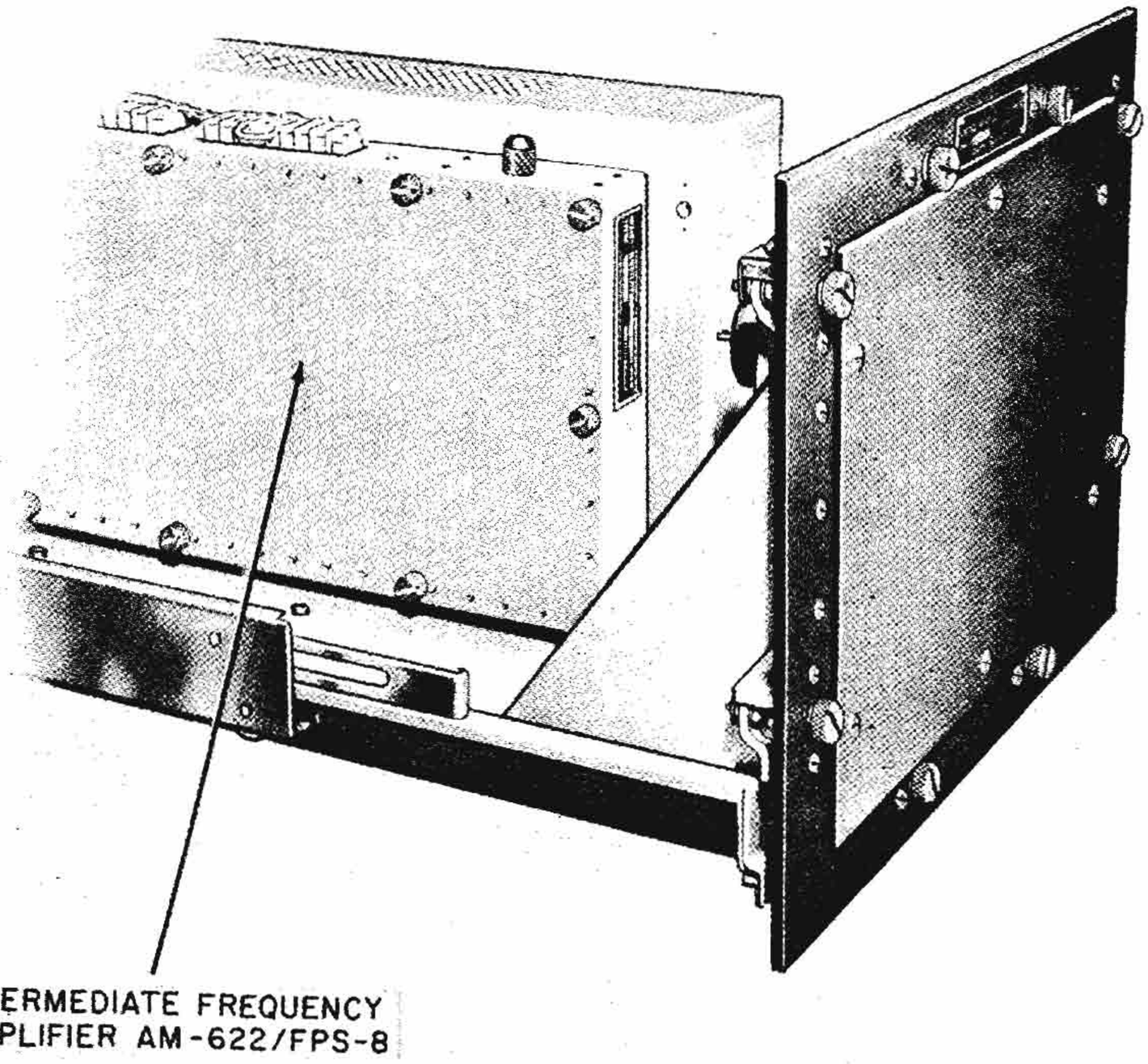


Figure 1—24. Radar Set Control C-1132/FPS-8, Drawer Extended

1—150. The four units of the video distribution unit are drawer-mounted within the video distribution cabinet. The tube sides of the units are shielded to confine r-f noise within the cabinet. However, the tubes are accessible through a top door of the drawer.

1—151. INTERFERENCE BLANKER MX-1392/FPS-8. *(See figure 1—25.)* Interference Blanker MX-1392/FPS-8 (interference blanker) eliminates interference caused by the transmitted pulses of adjacent radar sets. Blanking signals are applied via cable from as many as three adjacent radars to the interference blanker. The interference blanker blanks normal video whenever one of the adjacent radar transmitters fire. (MTI video blanking is a function of the MTI interference blanker. See paragraph 1—134.) The interference blanker is located at the bottom and at the left of the video distribution unit cabinet.

1—152. PULSE GENERATOR O-176/FPS-8. *(See figure 1—25.)* Pulse Generator O-176/FPS-8 (trigger generator) provides the radar and IFF equipment with the system trigger when the MTI system is inoperative. The trigger has an amplitude of 50 volts with a 2-micro-

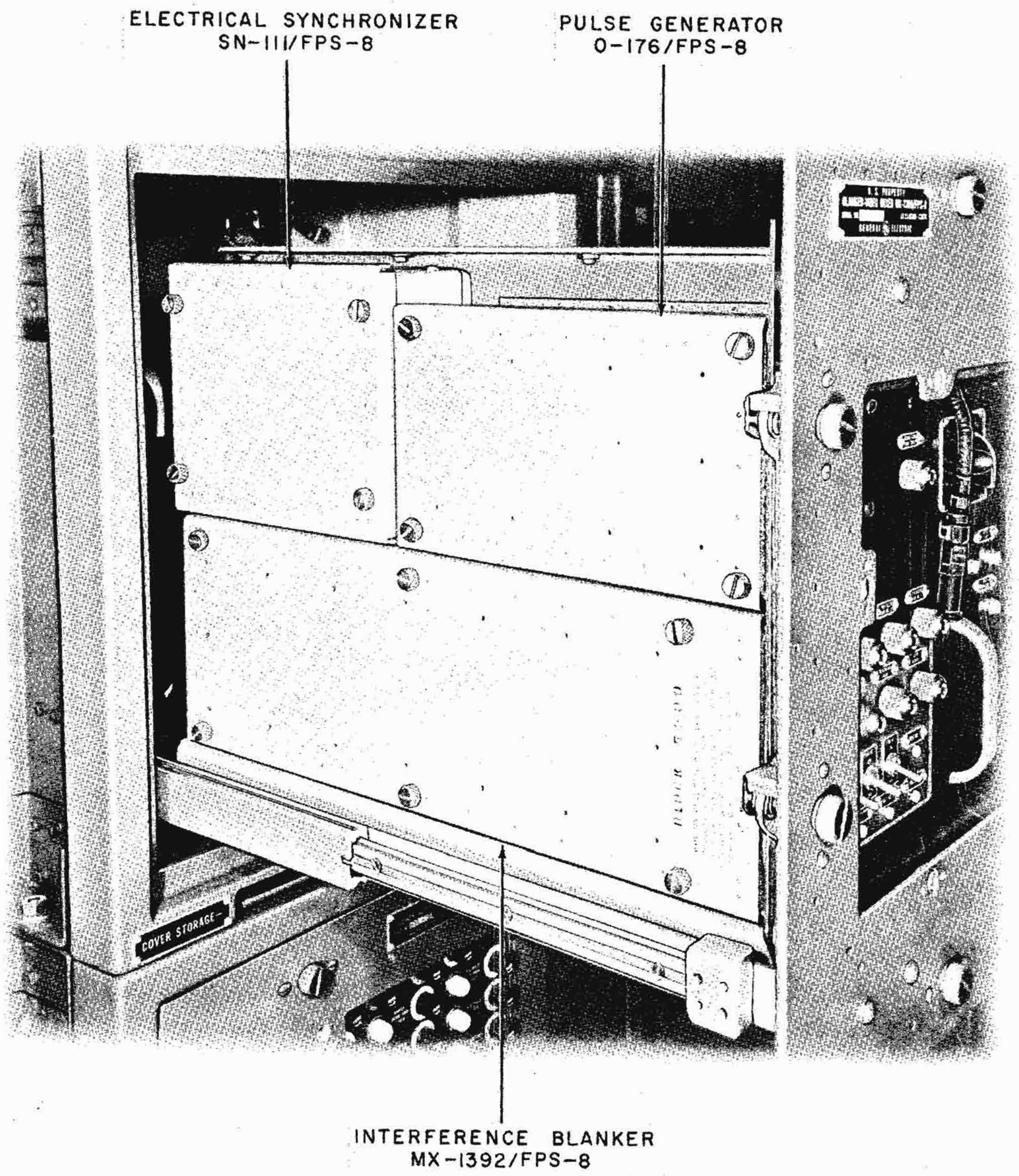


Figure 1—25. Blanker-Video Mixer MX-1389/FPS-8, Left Side of Extended Drawer

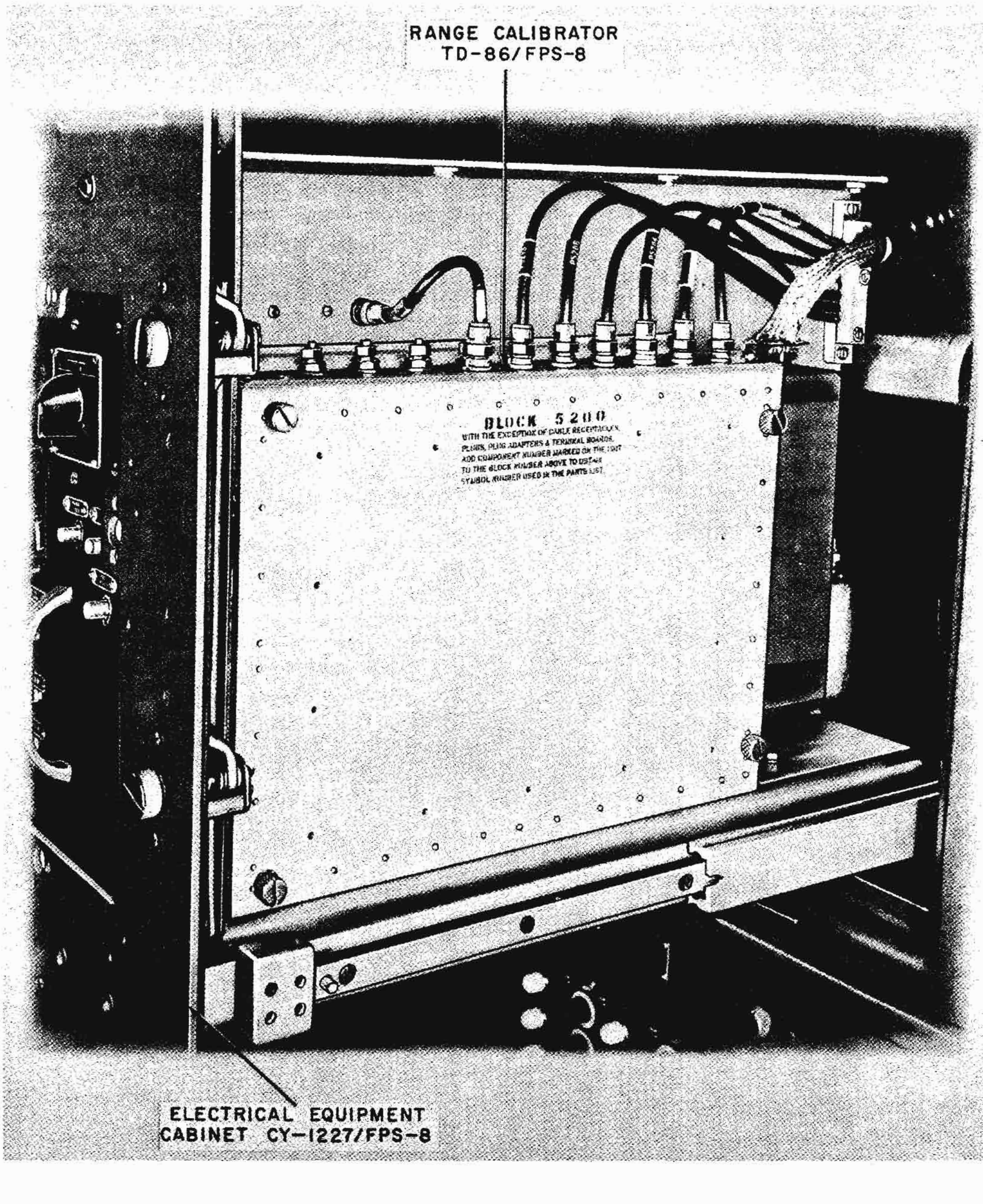


Figure 1—26. Blanker-Viedo Mixer MX-1389/FPS-8, Right Side of Extended Drawer

second pulse width. It is applied to the modulator and video systems. The function of the trigger generator are identical to those of the MTI system trigger generator discussed in paragraphs 1–118. The trigger generator is located at the top and in the front of the video distribution unit cabinet.

1–153. RANGE CALIBRATOR TD-86/FPS-8. *(See figure 1–26.)* Range Calibrator TD-86/FPS-8 (range mark generator) provides range marks that occur at intervals of 10 nautical miles. Marks occurring at 50-mile intervals (every fifth 10-mile mark) are intensified. The output of the range mark generator is fed to the PPI and range scopes. The range mark generator is located on the right side of the video distribution cabinet.

1–154. A crystal calibrator, controlled from the front panel of the range mark generator, permits range calibration.

1–155. ELECTRICAL SYNCHRONIZER SN-111/FPS-8. *(See figure 1–25.)* Electrical Synchronizer SN-111/FPS-8 (angle mark generator) brightens the PPI sweeps at every 10 degrees of antenna rotation. The output of the angle mark generator is applied to the PPI scopes. The angle mark generator is located at the left-rear and at the top of the video distribution cabinet.

1–156. POWER SUPPLY PP-861/ FPS-8.
(See figure 1–23.)

1–157. Power Supply PP-861/FPS-8 supplies operating voltages to the video distribution unit. The power supply cabinet is deck-mounted and provides mounting facilities for the video distribution unit. Ventilation for the unit is provided by a blower located at the upper left side and at the rear of the unit.

1–158. INDICATOR GROUP AN/GPA-126.

1–159. Indicator Group AN/GPA-126 (plan position indicator) provides facilities for viewing video signals and IFF responses. Calibration marks are presented which enable the PPI operator to determine the range and azimuth of targets viewed. Radar Set AN/FPS-8 has provisions for the simultaneous operation of up to seven plan position indicators. An alternate arrangement provides six PPI's and a video mapping unit (GFE).

1–160. Plan position indicator AN/GPA-126 is contained in T.O. 31P1-GPA126-2.

1–161. thru 1–165. Deleted

1–166. RANGE INDICATOR IP-209/FPS-8.
(See figures 1–29 and 1–30.)

1–167. Range Indicator IP-209/FPS-8 (A-scope) provides for the display of target echoes up to a range of 200 nautical miles. The unit is primarily used as a test oscilloscope employing either internal or external synchronization. The indicator comprises the following components which are illustrated in figures 1–29 and 1–30.

Power Supply PP-864/FPS-8 (low voltage power supply)
Direct Current Power Filter F-187/FPS-8 (low voltage power supply filter)
Power Supply PP-865/FPS-8 (high voltage power supply)
Video Amplifier AM-735/FPS-8 (vertical amplifier)
Sweep Generator O-178/FPS-8 (sweep generator)

1–168. The range indicator is mounted on Dolly Truck V-61/FPS-8, in normal operation. Ventilation is provided by a blower located at the front of the indicator. It employs a 5-inch, medium-persistance cathode-ray tube,

Pages 39 thru 40 deleted.

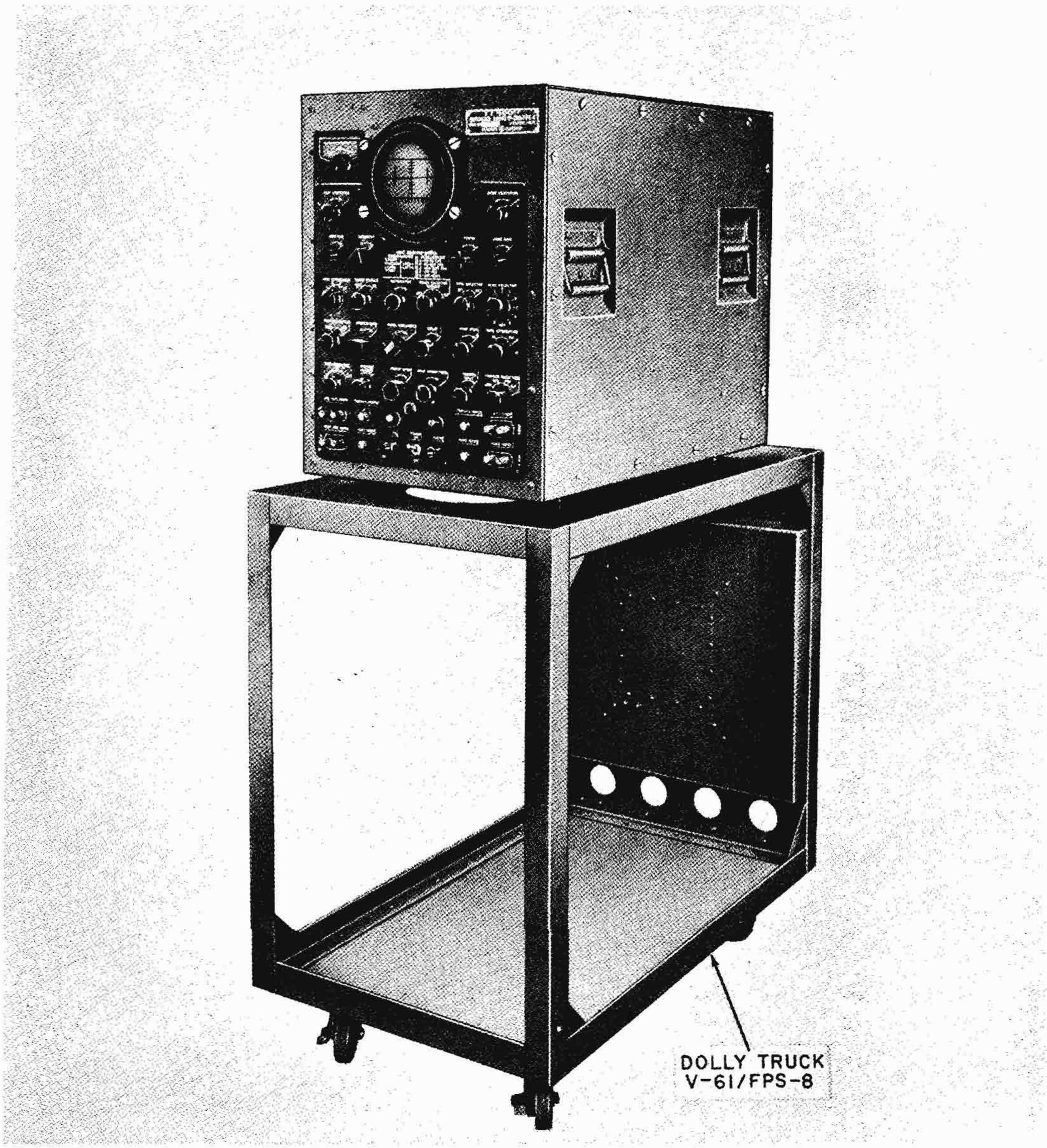


Figure 1—29. Range Indicator IP-209/FPS-8

and displays targets as vertical deflections along a horizontal sweep line.

1—169. POWER SUPPLY PP-864/FPS-8. *(See figure 1—30.)* Power Supply PP-864/FPS-8 (low voltage power supply) furnishes a low-voltage output for the indicator unit. The power supply is located at the rear and left side of the indicator.

1—170. DIRECT CURRENT POWER FILTER F-187/FPS-8. *(See figure 1—30.)* Direct Current Power Filter F-187/FPS-8 (low voltage power supply filter) filters the output of the low voltage power supply. It is located beneath the low voltage power supply at the rear of the indicator.

1—171. POWER SUPPLY PP-865/FPS-8. Power Supply PP-865/FPS-8 (high voltage power supply) furnishes

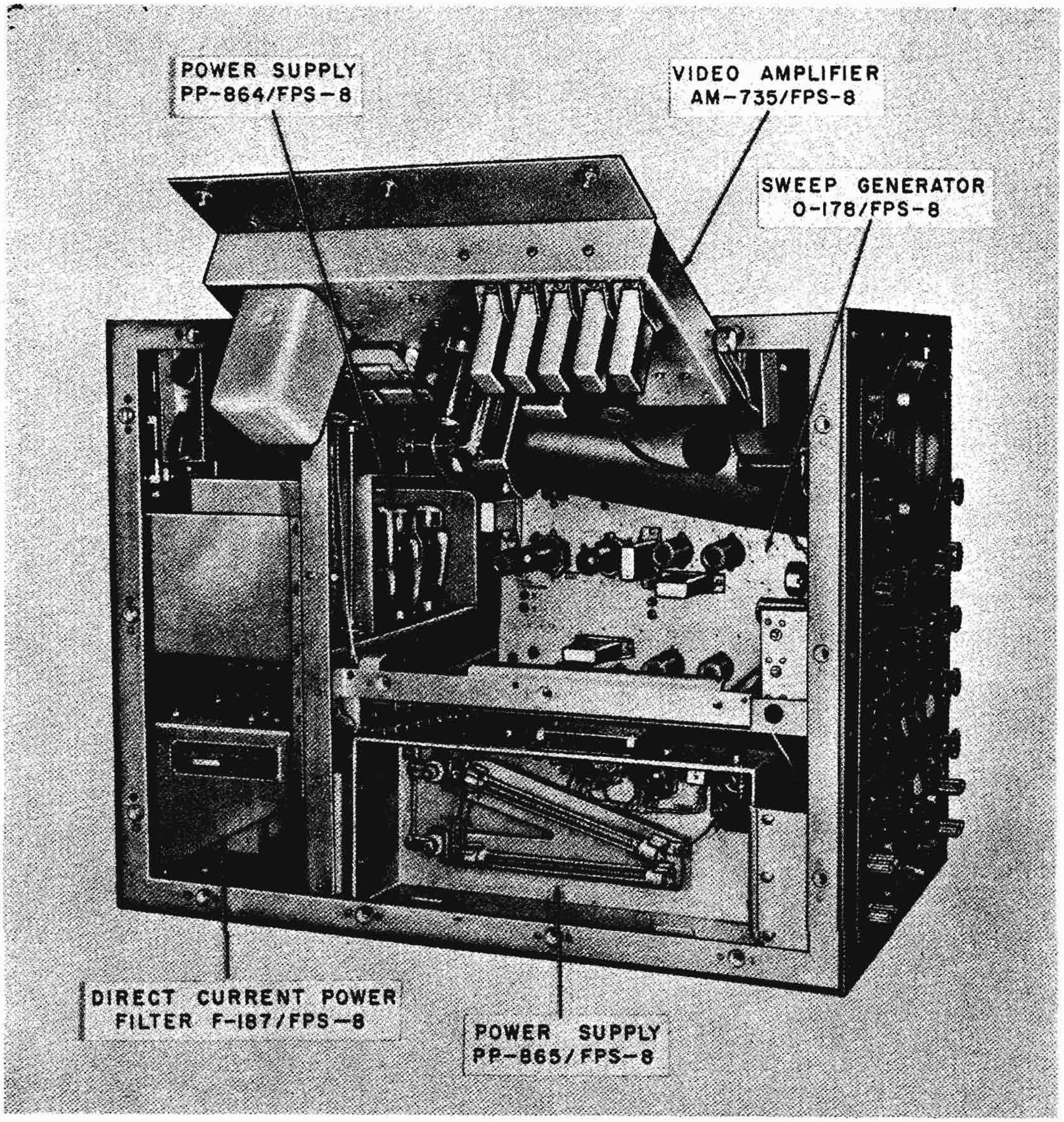


Figure 1–30. Range Indicator IP-209/FPS-8, Left Side

high voltage to the oscilloscope cathode-ray tube. The power supply is located in the lower-left side toward the front of the indicator. Access to the power supply tubes may be gained without the removal of the unit.

1–172. VIDEO AMPLIFIER AM-735/FPS-8. *(See figure 1–30.)* Video Amplifier AM-735/FPS-8 (vertical amplifier) amplifies the input video signals. The unit is hinge-mounted to the upper-left side of the main frame of the indicator to provide accessibility to all units.

1–173. SWEEP GENERATOR O-178/FPS-8. *(See figure 1–29.)* Sweep Generator O-178/FPS-8 provides horizontal deflection to the cathode-ray tube indicator. The generator is mounted on an aluminum chassis located at the upper-right at the front of the indicator. The unit is accessible by opening the hinged panel of the vertical amplifier.

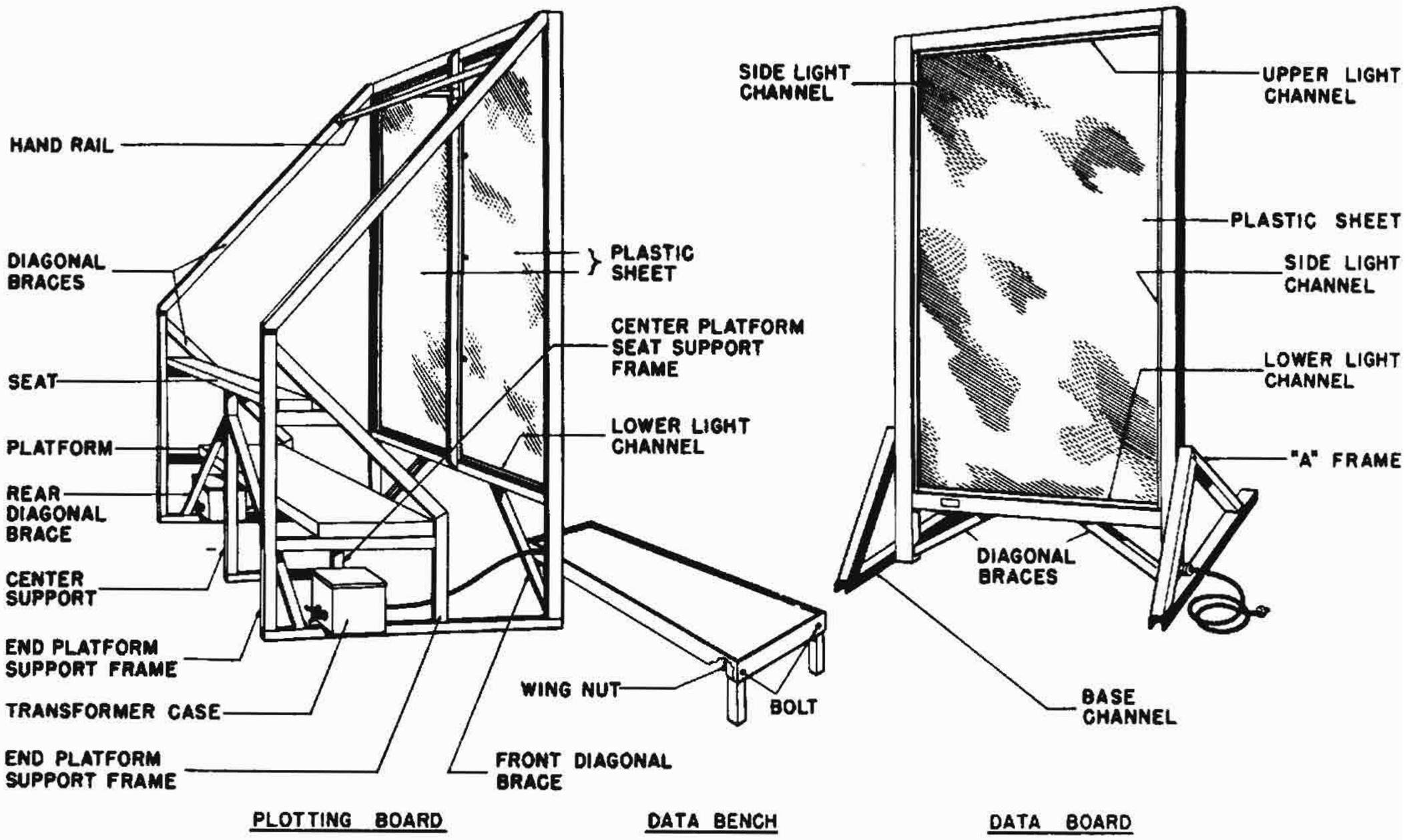


Figure 1—31. Display-Plotting Board Group OA-390/FPS-8

1—174. DOLLY TRUCK V-61/FPS-8. *(See figure 1—27.)*

1—175. Dolly Truck V-61/FPS-8 (dolly) provides mobility for the range indicator so that it may be used for test purposes. The range indicator mounted on the dolly truck is usually located near the MTI receiver group and video distribution group in the Radar Set Operations site.

1—176. PLOTTING EQUIPMENT.

1—177. DISPLAY-PLOTTING BOARD GROUP OA-390/FPS-8. *(See figure 1—31.)*

1—178. Display-Plotting Board Group OA-390/FPS-8 (plotting equipment) displays position and status data of targets detected by Radar Set AN/FPS-8. The plotting equipment comprises the following units which, with the exception of the brushes, paint, pencils and straight edge, are illustrated in figure 1—26:

Radar Data Plotting Board PT-183/FPS-8 (plotting board)
Radar Data Display Board PT-182/FPS-8 (data board)
Display Board Case CY-1194/FPS-8 (plexiglas carrying case)
Camel hair brushes
Paint
Chinagraph marking (grease) pencils
Straight edge

1—179. RADAR DATA PLOTTING BOARD PT-183/FPS-8. Radar Data Plotting Board PT-183/FPS-8 (plotting board) provides the primary plotting facilities for Radar Set AN/FPS-8. The plotting board stands vertically and uses an edge-lit plexiglas surface to show the plots and maps drawn on its surface. Concentric range circles are inscribed on the front of the board to enable the operator to map target information accurately. A platform is provided at the rear of the plotting board which enables the operators to reach all sections of the board. The plotting board is normally located at the front of the Radar Set Operations site.

1—180. RADAR DATA DISPLAY BOARD PT-182/FPS-8. Radar Data Display Board PT-182/FPS-8 (data board) is constructed similarly to the vertical plotting board except that it is smaller. Two data boards are used, both flanking the plotting board. The data boards display status of aircraft at airfields, height data, IFF data and similar information.

1—181. DISPLAY BOARD CASE CY-1194/FPS-8. Display Board Case CY-1194/FPS-8 protects two plexiglas sheets during storage and shipment. The plexiglas sheets are loaded through the hinged door at the end of the case (with the case in a vertical position).

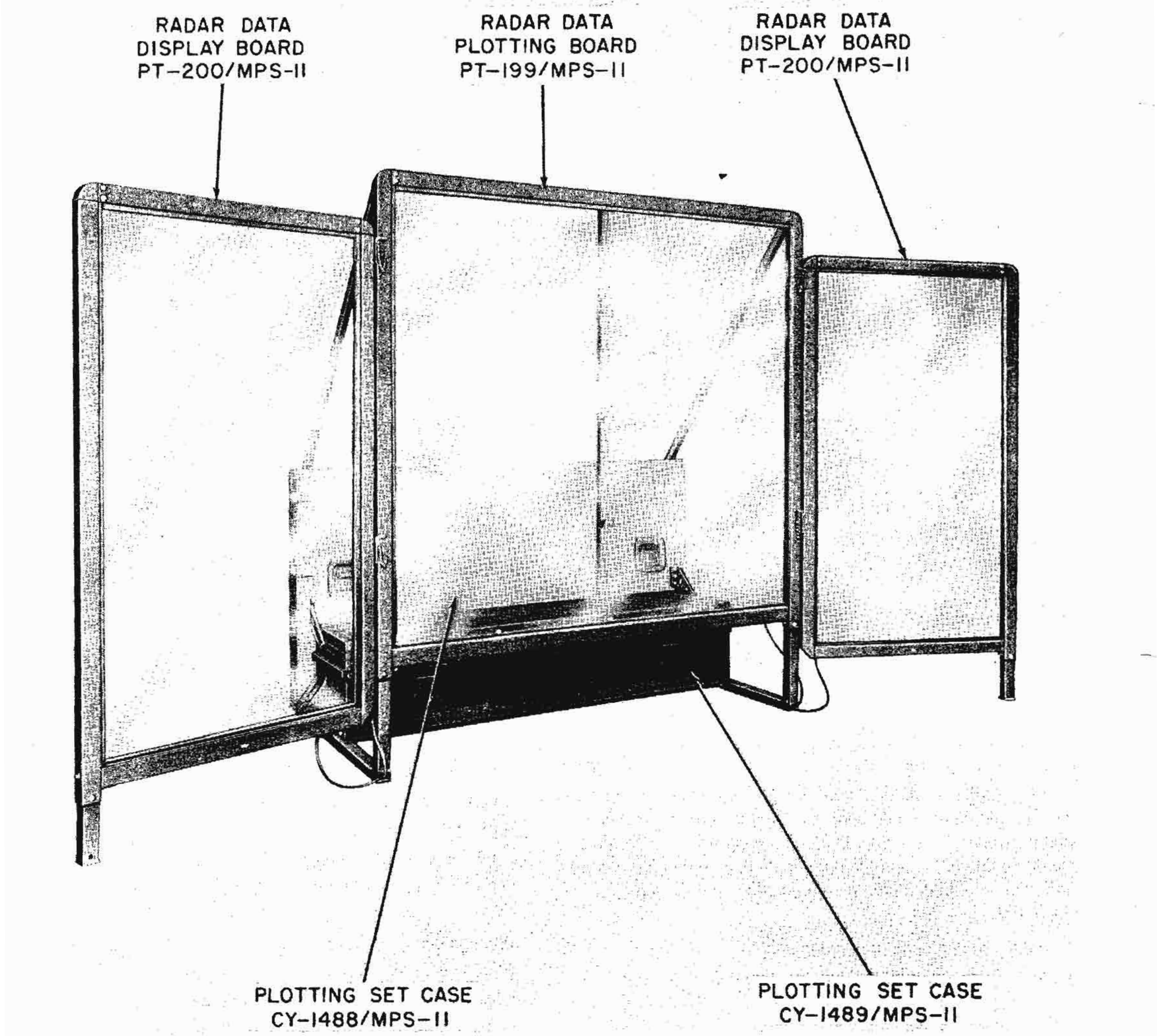


Figure 1—32. Display-Plotting Board Group OA-567/MPS-11

1—182. DISPLAY-PLOTTING BOARD GROUP AO-567/MPS-11.
(See figure 1—32.)

1—183. Display-Plotting Board Group OA-567/MPS-11 (mobile plotting equipment), like its counterpart in Radar Set AN/FPS-8, displays position and status data of targets detected by Radar Set AN/MPS-11. The mobile plotting equipment comprises the following units illustrated in figure 1—32:

Radar Data Plotting Board PT-199/MPS-11 (plotting board)
Radar Data Display Board PT-200/MPS-11 (data board)
Plotting Set Case CY-1488/MPS-11 (plexiglas carrying case)
Plotting Set Case CY-1489/MPS-11 (transit case)
Camel hair brushes
Paint
Chinagraph marking (grease) pencils
Straight edge

1—184. RADAR DATA PLOTTING BOARD PT-199/MPS-11. Radar Data Plotting Board PT-199/MPS-11 (plotting board) functions in a manner similar to that described for the plotting board used in Radar Set AN/FPS-8 (paragraph 1—178).

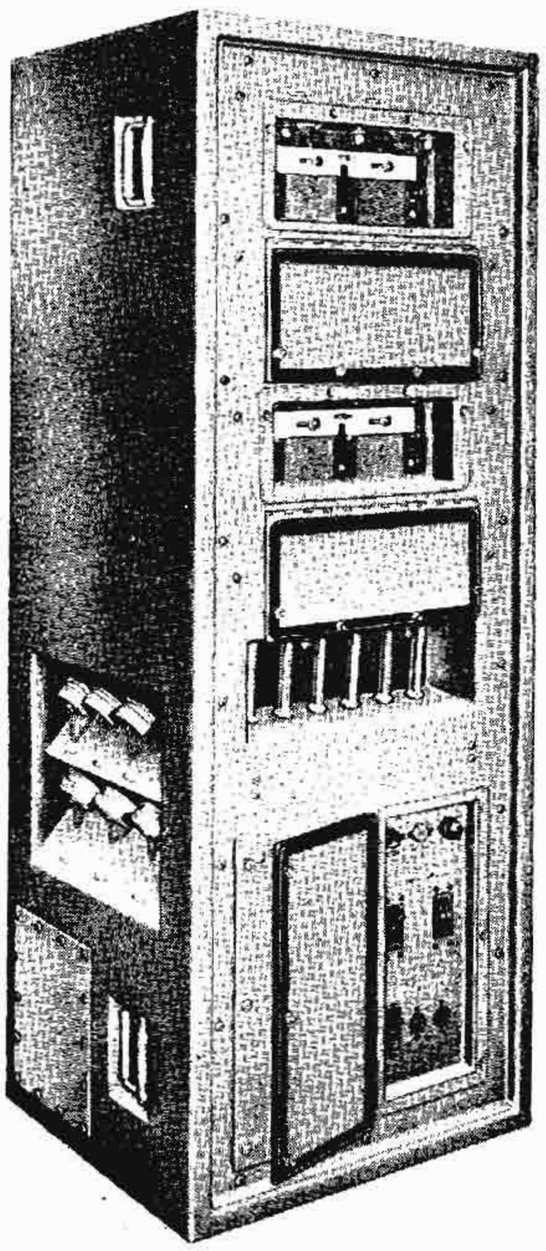


Figure 1–33. Power Switchboard SB-245/FPS-8

1–185. RADAR DATA DISPLAY BOARD PT-200/MPS-11. Radar Data Display Board PT-200/MPS-11 (data board) is constructed similarly to the plotting board except that it is smaller. A data board is hinged to each side of the plotting board. The data boards display status of aircraft at airfields, height data, IFF data and similar information.

1–186. PLOTTING SET CASE CY-1488/MPS-11. Plotting Set Case CY-1488/MPS-11 (plexiglas carrying case) serves the dual purposes of plexiglas carrying case and of seat and brace. In the first use, the plexiglas sheets for the plotting and data boards are placed within the case during storage and shipment. In the second use, the upper surface of the case can be used as a seat for personnel operating the plotting board, as well as a brace to help support the plotting board.

1–187. PLOTTING SET CASE CY-1489/MPS-11. Plotting Set Case CY-1489/MPS-11 (transit case) serves both as a platform and as a transit case. When used as an operating component of mobile plotting equipment, the case serves as a platform on which operating personnel at the plotting board can stand. As a transit case, it stores the structural sections of the plotting and data boards during shipment (or storage).

1–188. POWER SYSTEM.

1–189. The power system consists of Power Switchboard SB-245/FPS-8 and Electrical Power Switching Group OA-415/FPS-8.

1–190. POWER SWITCHBOARD SB-245/FPS-8. *(See figure 1–33.)*

1–191. Power Switchboard SB-245/FPS-8 (power control box) is connected directly to the 3-phase, 60-cycle, 120/208-volt output of two or three diesel generators or other power sources. The power control box applies the power to the power distribution group, associated radar height finder, and the antenna drive motor. Connecting facilities are provided for a third alternate diesel generator which is kept at standby operation. Power is applied to radar loads through circuit breakers located on the panel of the power control box.

1–192. The power control box is a signle unit located in a radar set power building, which may also contain GFE diesel generators.

1–193. ELECTRICAL POWER SWITCHING GROUP OA-415/FPS-8. *(See figures 1–34 and 1–35.)*

1–194. Electrical Power Switching Group OA-415/FPS-8 (power distribution group) houses the switching and protective power circuits, and the motor-driven voltage regulators of the radar set. It is normally located at the Radar Set Operations site. The power distribution group comprises the following units:

Power Switchboard SB-254/FPS-8 (power distribution unit)

Voltage Regulator Control C-1131/FPS-8 (regulator unit)

Transformer Assembly TF-165/FPS-8 (filament transformer unit)

Transformer Assembly TF-164/FPS-8 (regulator unit)

1–195. POWER SWITCHBOARD SB-254/FPS-8. *(See figure 1–34.)* Power Switchboard SB-254/FPS-8 (power distribution unit) receives power from the power control box and distributes the power to all parts of the radar set.

1–196. Controls are available on the front panel of the unit which govern the distribution of power and provide for the remote control operation of the radar modulator power supply. In normal operation the power distribution unit is the top assembly of the group. It is stacked on the filament transformer unit.

1–197. TRANSFORMER ASSEMBLY TF-165/FPS-8. *(See figure 1–34.)* Transformer Assembly TF-165/FPS-8 (filament transformer unit) furnishes 120 volts a-c to the modulator tube filaments and 180 volts a-c to the magnetron tube filaments. The filament transformer unit

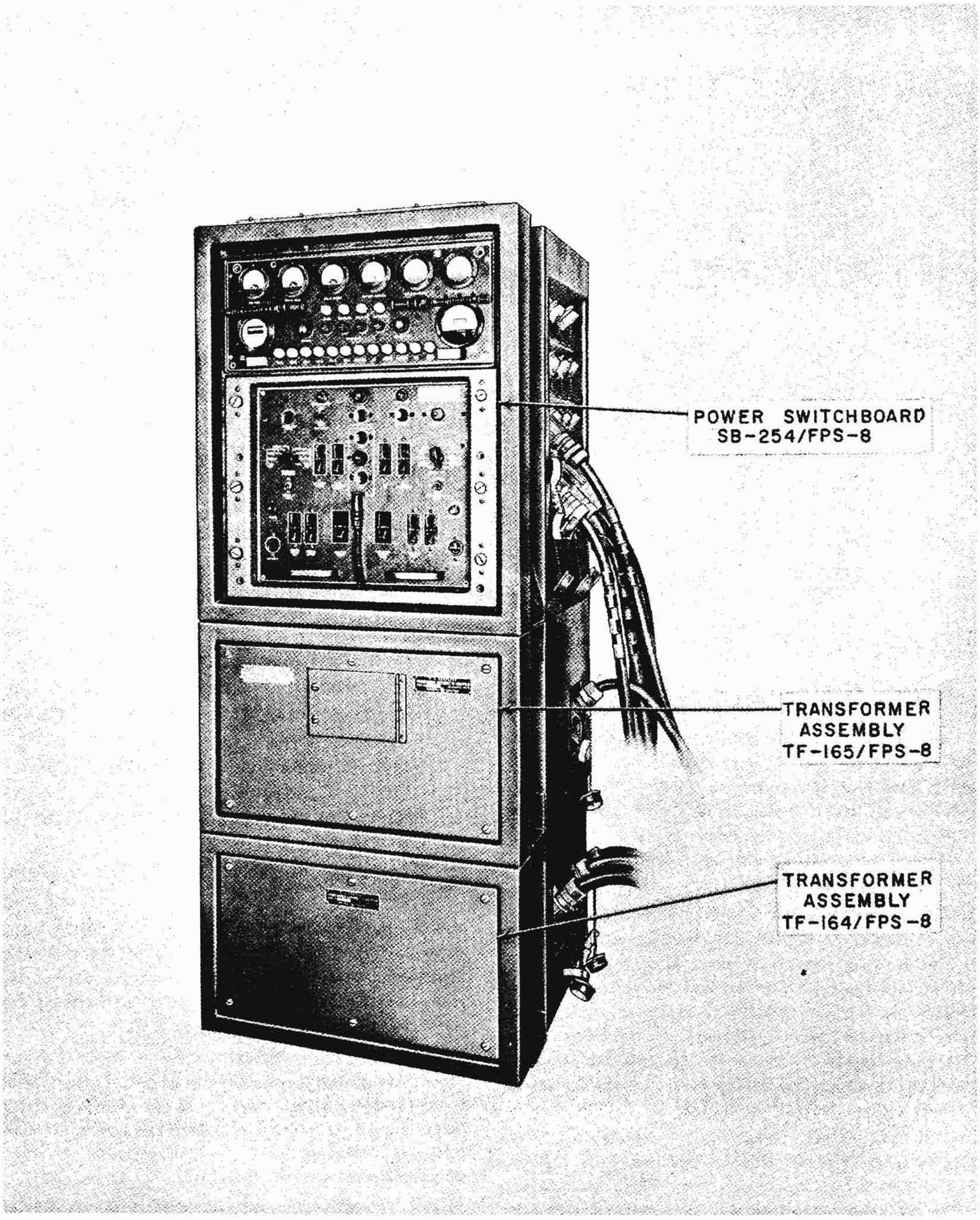


Figure 1—34. Power Electrical Switching Group OA-415/FPS-8

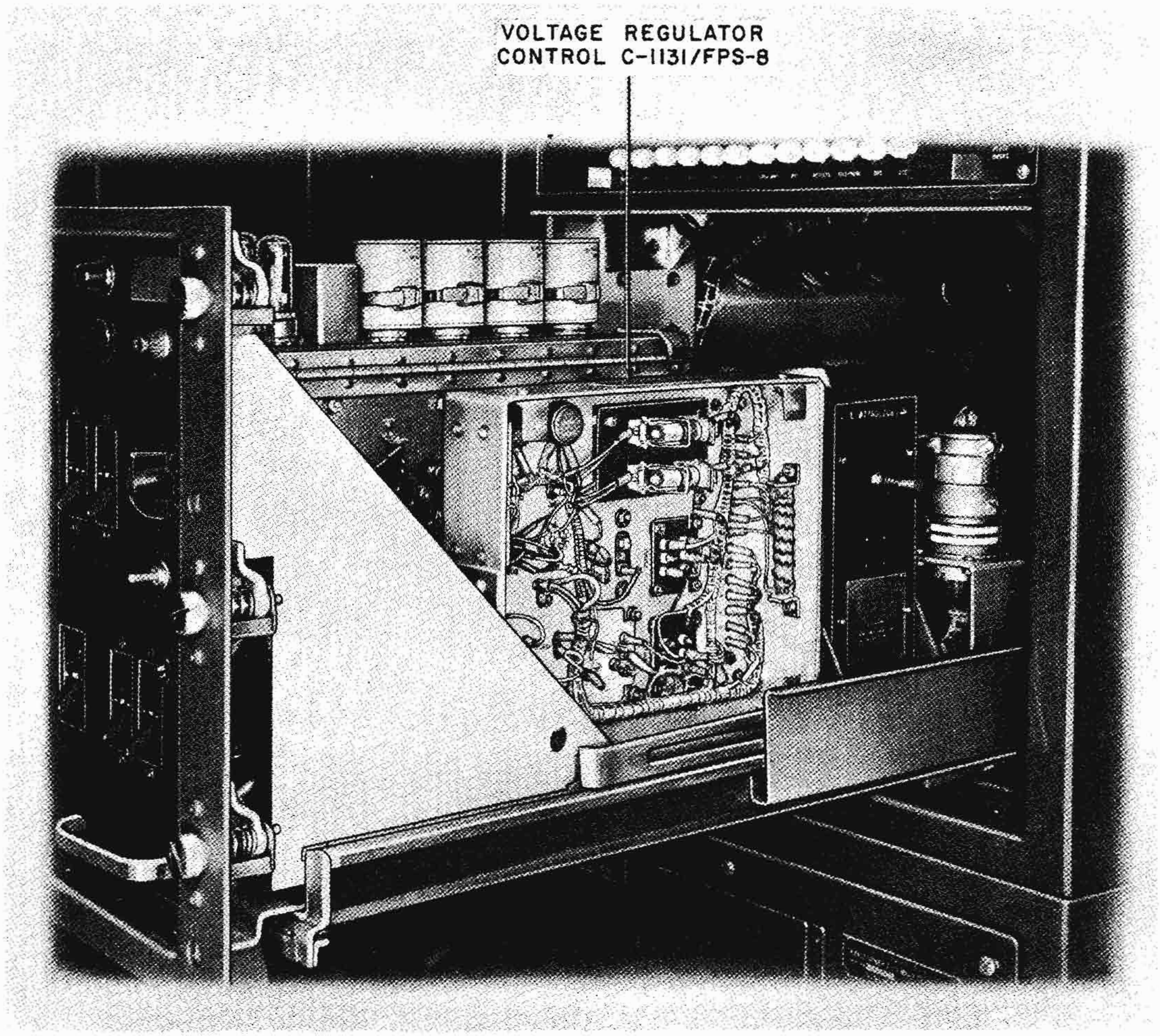


Figure 1–35. Power Distribution Unit, Right Side of Extended Drawer, with Cover Plate Removed

is mounted on the regulator unit and provides the mounting facilities for the power distribution unit.

1–198. VOLTAGE REGULATOR CONTROL C-1131/FPS-8. *(See figure 1–35.)* Voltage Regulator Control C-1131/FPS-8 (filament regulator unit) governs two independent motor-driven regulators in the filament transformer unit which supply a constant modulator filament voltage of 120 volts a-c, and a constant magnetron filament current of 4.25 amperes.

1–199. TRANSFORMER ASSEMBLY TF-164/FPS-8. *(See figure 1–34.)* Transformer Assembly TF-164/FPS-8 (regulator unit) furnishes 3-phase, primary plate voltage to the modulator power supply and the magnetron filament transformer in the filament transformer unit. The regulator unit is deck-mounted and provides mounting facilities for the filament transformer unit. Ventilation is provided by a blower located at the lower-left side and at the rear of the unit.

1–200. AZIMUTH PULSE GENERATOR GROUP OA-1263/FPS-8.

Note

Azimuth Pulse Generator Group OA-1263/FPS-8 is used only in those Radar Set AN/FPS-8 installations which are affected by SAGE sites.

1–201. The azimuth pulse generator group comprises two major components: the azimuth pulse drive assembly,

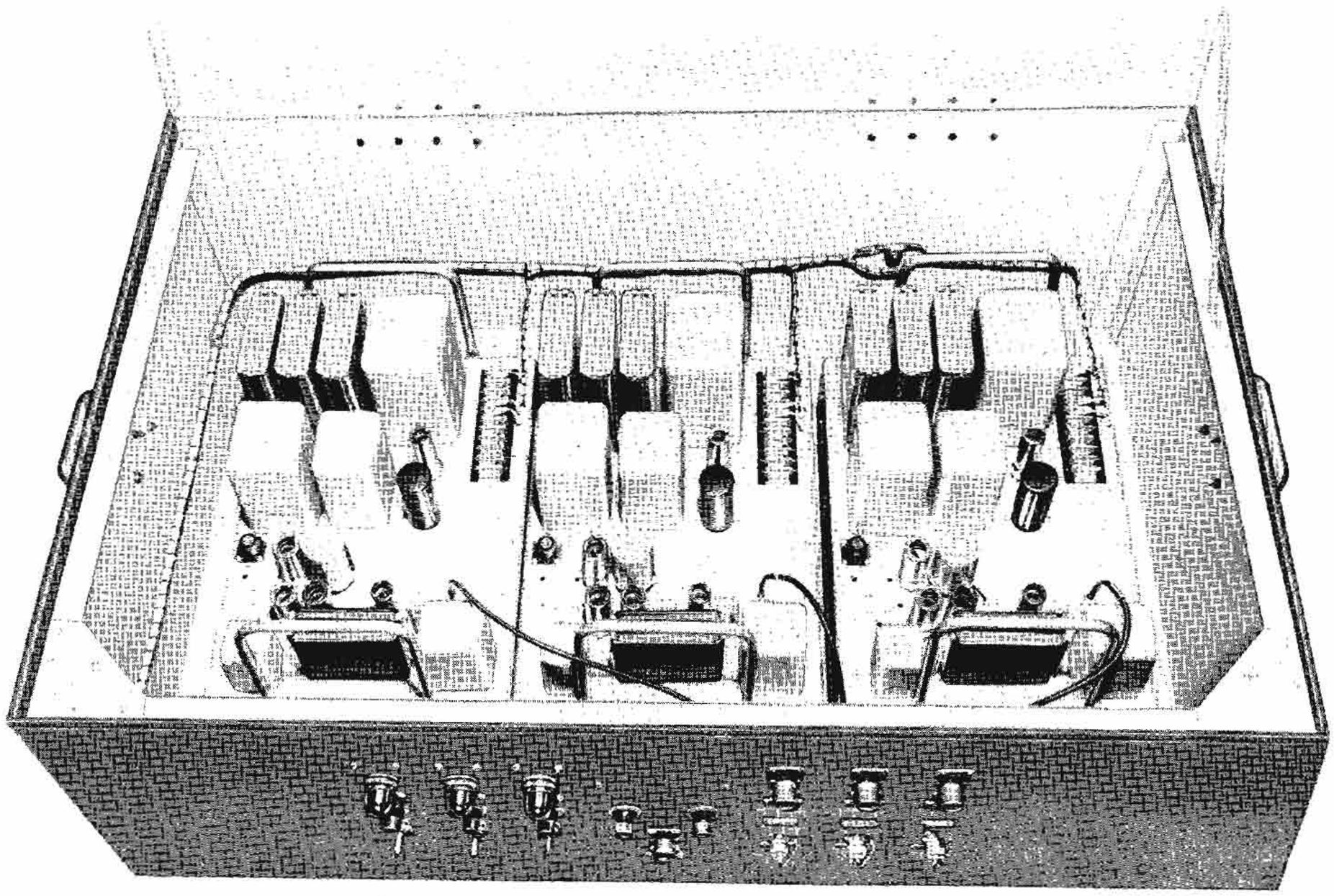


Figure 1—36. Amplifier Assembly AM-1548/GPS

mounted on the selsyn gear box in the antenna pedestal, and the azimuth pulse amplifier assembly (Amplifier Assembly AM-1548/GPS). The purpose of this equipment is to provide antenna position information which is used in remote computing equipment. This information consists of a North Marker pulse and an azimuth pulse, generated by the azimuth pulse drive assembly, which are amplified in the azimuth pulse amplifier for remote use. The outputs of Azimuth Pulse Generator Group OA-1263/FPS-8 are not used by Radar Set AN/FPS-8, nor has the equipment any function in normal radar operation.

1—202. AZIMUTH PULSE DRIVE ASSEMBLY.

1—203. The azimuth pulse drive assembly consists of Speed Increaser Gear Assembly MX-2080/FPS-8 (azimuth speed increaser) and Pulse Generator SG-135/GPS (azimuth pulse generator), both of which are mounted on the selsyn gear box at the bottom of the antenna pedestal.

1—204. SPEED INCREASER GEAR ASSEMBLY MX-2080/FPS-8. This azimuth speed increaser is gear-linked in the selsyn gear box and functions to provide an output shaft rotation which is 128 times the speed of the antenna rotation. The speed increaser drives a timing gear in the azimuth pulse generator.

1—205. PULSE GENERATOR SG-135/GPS. The azimuth pulse generator contains essentially a timing gear, driven by the azimuth speed increaser; two magnetic pickup cartridges; and a cam-operated switch. Each of the 32 teeth on the timing gear interrupts the magnetic field of one of the magnetic pickups, thereby generating an azimuth pulse. Since the timing gear is driven to rotate 128 times per single antenna rotation, the frequency of the output azimuth pulse is 4096 pulses per antenna rotation. The other magnetic pickup generates a marker pulse for each revolution of the timing gear; however the cam-operated switch blanks all but one of these 128 marker pulses, namely the one generated when the antenna is facing due North. This signal comprises the North Marker pulse.

1—206. AMPLIFIER ASSEMBLY AM-1548/GPS.

1—207. Amplifier Assembly AM-1548/GPS (azimuth pulse amplifier assembly) consists of three Trigger Pulse Amplifiers AM-1547/GPS housed in an Electrical Equipment Cabinet CY-2053/GPS. *(See figure 1—36.)* This assembly contains the only operating controls for the azimuth pulse generator group.

1—208. TRIGGER PULSE AMPLIFIERS AM-1547/GPS. The three amplifiers of the azimuth pulse amplifier assembly are identical in construction and operation. One is used to shape and amplify the azimuth pulses from the pulse generator, the second is used for the North Marker pulse, and the third is a spare. Input pulses of approximately 10 volts are amplified to about 40 volts and made available at output jacks for remote use.

SECTION II
OPERATING PROCEDURES

Note

The operator should be thoroughly familiar with the operating checks and adjustments described in section III and the emergency procedures described in section IV before attempting to operate the equipment as described in the present section.

WARNING

This equipment employs high voltages which are dangerous and may be fatal if contacted by personnel.

2–1. GENERAL.

2–2. This section contains instructions for the operation of Radar Sets AN/FPS-8 and AN/MPS-11 after the equipment has been fully installed and adjusted. All operating instructions in this section are applicable to both equipments and are based on the assumption that installation adjustments have been made correctly and that the equipment is in good working order. Operating personnel should report malfunctioning equipment to qualified maintenance personnel as soon as it is noticed. No attempt should be made to readjust any controls, except those provided for routine operation.

2–3. DESCRIPTION OF CONTROLS.

2–4. All routine operating controls are panel mounted in the form of manually operated toggle switches, knob operated rotary switches and knob operated controls. Front panel controls in these categories which should not be touched by the operator are indicated by an asterisk next to the listed control in tables IV through XXII. An asterisk next to a meter indicates that the adjustment for the meter should not be touched by the operator.

CAUTION

Under no circumstances should operating personnel attempt to unlock and/or adjust screwdriver operated controls located on or behind equipment front panels, unless otherwise specified.

The following tables list and discuss the functions of all controls that are within the scope of the radar operator.

TABLE IV. POWER CONTROL BOX, CONTROLS AND INSTRUMENTS
(See figure 2–1.)

Control	*Function*
Two "GENERATOR 1" circuit breakers Two "GENERATOR 2" circuit breakers Two "GENERATOR 3" circuit breakers	In "ON" position, connects radar loads to a-c power source or sources. Two of the six circuit breakers are used at a time.
"AMPLIDYNE MOTOR" circuit breaker	In "ON" position, connects amplidyne to a-c power source. However, the operation of the amplidyne is controlled by the "AMPLIDYNE MOTOR START-STOP" switches (magnetic contacts).
"AMPLIDYNE START-STOP" switches (magnetic contacts)	Consists of two push button switches: *Control* — *Function* "START" — Starts amplidyne "STOP" — Stops amplidyne Alternate "AMPLIDYNE START-STOP" switches are available at the power distribution unit. (See figure 2–2.)
"HEIGHT FINDER" circuit breaker	In "ON" position, connects height-finding radar equipment to a-c power source.
"SHELTER LIGHTS" circuit breaker	In "ON" position, connects convenience receptacles and shelter light terminal board to a-c power source.
Clip-on ammeter*	Measures the current through each phase of the "MAIN BUS" and the "AUXILIARY BUS".

*Incorrect readings to be corrected by maintenance personnel only.

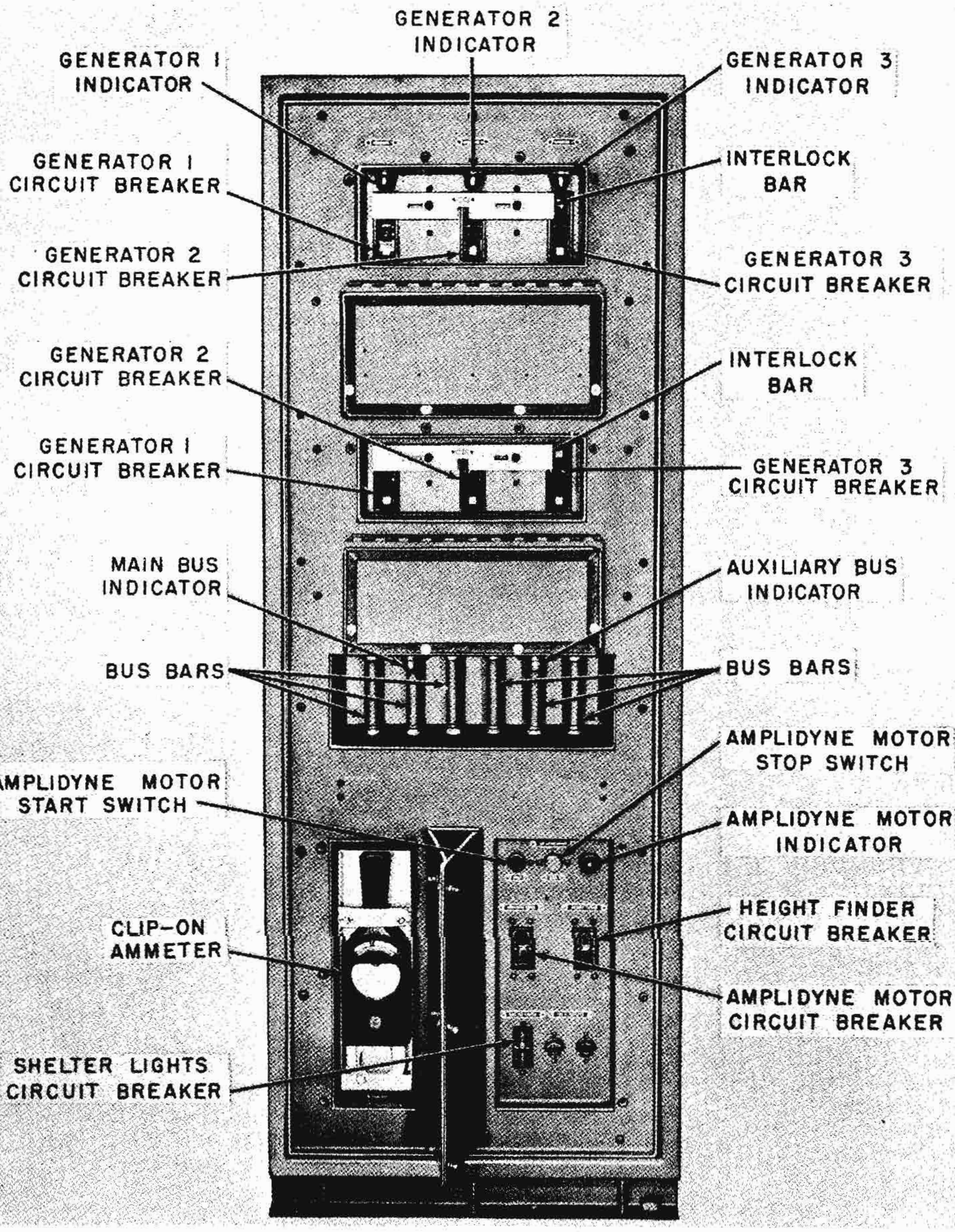


Figure 2–1. Power Control Box, Front Panel

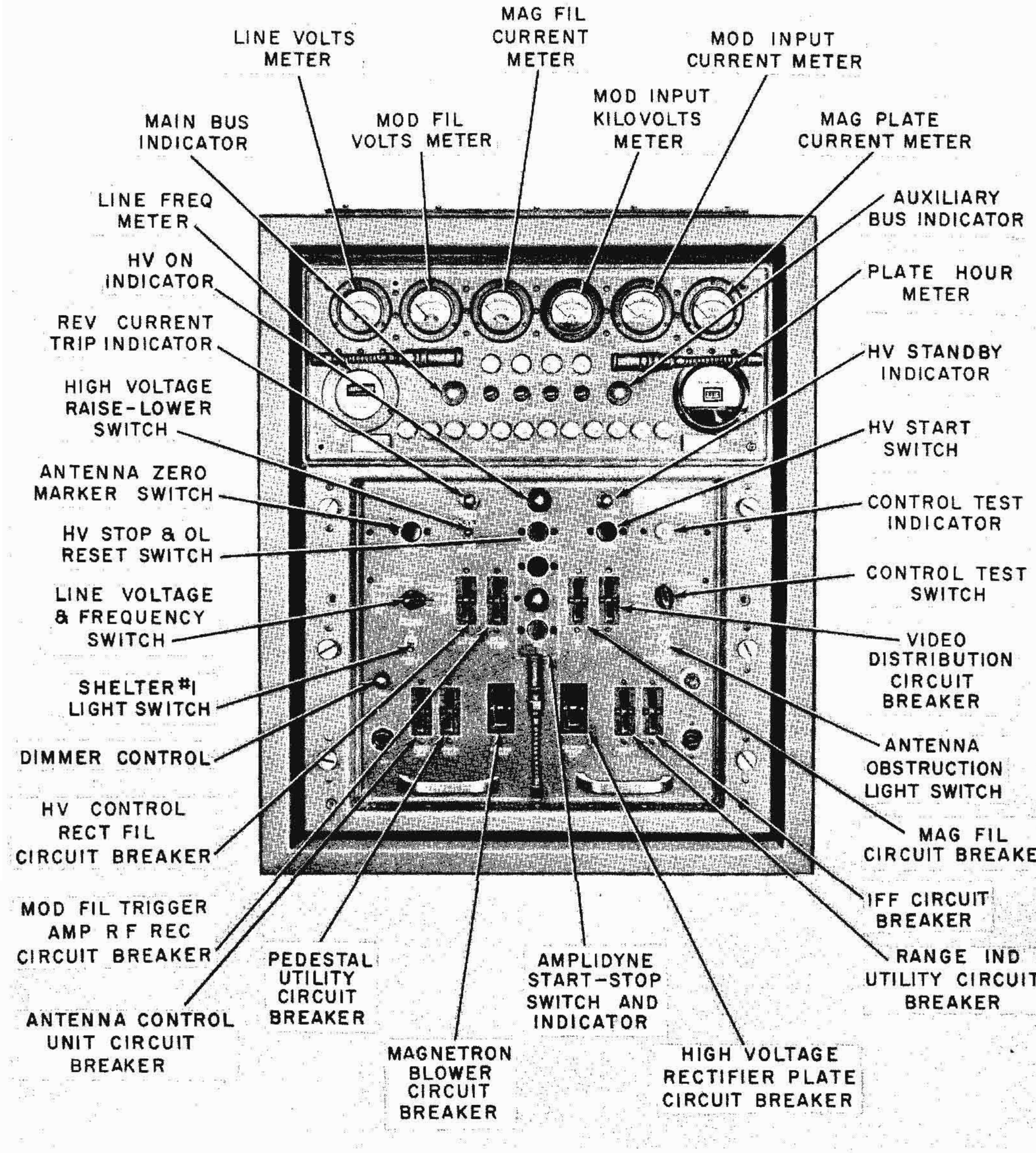


Figure 2–2. Power Distribution Unit, Front Panel

TABLE V. POWER DISTRIBUTION GROUP, POWER DISTRIBUTION UNIT, CONTROLS AND INSTRUMENTS

(See figure 2–2.)

Control	Function
"HV CONTROL RECT FIL" circuit breaker	In "ON" position, connects the following circuits to a-c power source: Modulator filament voltage regulator motor. Modulator power supply high voltage regulator motor. Modulator power supply filaments, and blower. Modulator blower.
Stalo and magnetron tuning motors	Keep-alive power supply.
"MAGNETRON BLOWER" circuit breaker	In "ON" position, connects magnetron blower to a-c power source.
"MOD FIL TRIG AMP RF REC" circuit breaker	In "ON" position, connects modulator, rf amplifier filaments, receiver power supply and trigger amplifier filaments to a-c power source provided all interlocks in the magnetron filament current are closed.
"MAG FIL" circuit breaker	In "ON" position, connects magnetron filament power regulator motor, and magnetron filaments to a-c power source.
"VIDEO DISTRIBUTION" circuit breaker	In "ON" position, connects the video distribution power supply to a-c power source.
"HIGH VOLTAGE RECTIFIER PLATE" circuit breaker	In "ON" position, connects modulator high-voltage transformer to a-c power source.
"ANTENNA CONTROL UNIT" circuit breaker	In "ON" position, connects the antenna control unit to a-c power source.
"PEDESTAL UTILITY" circuit breaker	In "ON" position, connects the following units to a-c power source: Pedestal utility outlets. Transmitter utility outlets and utility lights. Receiver rf unit utility outlets. Utility lights and rf power monitor. Receiver rf group. Pedestal gear box oil heater. Pedestal waveguide blower heater.
"RANGE IND UTILITY" circuit breaker	In "ON" position, connects receiver and control units, range indicator, and utility outlets at power distribution unit to a-c power source.
"IFF" circuit breaker	In "ON" position, connects "IFF" equipment to a-c power source.
"HV START" switch	Pressing the switch connects the modulator power supply to the modulator high-voltage supply regulator. An alternate "HV START" switch is available at the transmitter control unit. (See figure 2–4.)
"HIGH VOLTAGE RAISE-LOWER" switch	Consists of a 3-position switch that adjusts the modulator high voltage output. *Position* — *Function* "RAISE" — Increases the modulator high-voltage output. "LOWER" — Decreases the modulator high-voltage output. Mid-position — Switch is off. An alternate switch, "HV RAISE – HV LOWER," is available at the transmitter control. (See figure 2–4.)
"HV STOP & OL RESET" switch	Pressing the switch removes the modulator power supply from the modulator high-voltage supply regulator. Overload relays are reset by pressing the switch. An alternate switch, "HV STOP," is provided at the transmitter control. (See figure 2–4.)

TABLE V. POWER DISTRIBUTION GROUP, POWER DISTRIBUTION UNIT, CONTROLS AND INSTRUMENTS (cont)

Control	*Function*
"AMPLIDYNE START-STOP" switches (magnetic contactor)	Identical to "AMPLIDYNE MOTOR START STOP" switches at the power control box. (See figure 2—1.)
"SHELTER №1 LIGHTS ON-OFF" switch	In "ON" position, connects shelter №1 to a-c power source.
"ANTENNA ZERO MARKER" switch	When the switch is pressed in, the zero degree, or north angle mark is intensified on the PPI scopes. (Switch is used during testing procedures.)
"ANTENNA OBSTRUCTION LIGHTS ON-MAIN — ON-AUX — OFF" switch	Has two "ON" positions that connect antenna obstruction lights to a-c power source. *Position* — *Function* "ON — MAIN" — A-c power is applied from the main radar bus. "ON — AUX" — A-c power is applied from the auxiliary radar bus.
"CONTROL TEST" switch	Is a rotary switch that places "starting" control circuits across the "CONTROL TEST" indicator. The switch positions are as follows: *Positions* "ON" "MAG BLOWER" "MOD FIL" "MAG FIL REG" "MAG FIL" "FIL TIME DELAY" "AC OVERLOAD" "DC OVERLOAD" "DOOR INTERLOCKS" "ANTENNA INTERLOCK" "OFF"
"LINE VOLTAGE & FREQUENCY" switch	Is a rotary switch that places each phase of the "MAIN BUS" and "AUXILIARY BUS" across the "LINE FREQ" and "LINE VOLTS" meters.
"LINE FREQ" meter*	Indicates the frequency of the current through each phase of the radar buses.
"LINE VOLTS" meter*	Indicates the voltage across each phase of the radar buses.
"MOD FIL VOLTS" meter*	Indicates the voltage across the modulator tube filaments.
"MAG FIL CURRENT" meter*	Indicates the current through the magnetron filaments.
"MOD INPUT KILOVOLTS" meter	Indicates the high voltage applied to the modulator. An alternate "MOD INPUT KILOVOLTS" meter is provided at the transmitter control. (See figure 2—4.)
"MOD INPUT CURRENT" meter	Indicates the high voltage current applied to the modulator. Identical to "MOD OUTPUT CURRENT" meter located at the transmitter control. (See figure 2—4.)
"MAG PLATE CURRENT" meter	Indicates the current drawn by the magnetron plate. An alternate "MAG PLATE CURRENT" meter is provided at the transmitter control. (See figure 2—4.)
"PLATE HOURS" meter	Indicates the hours the radar set is in "full radar operation."

*Incorrect readings to be corrected by maintenance personnel only.

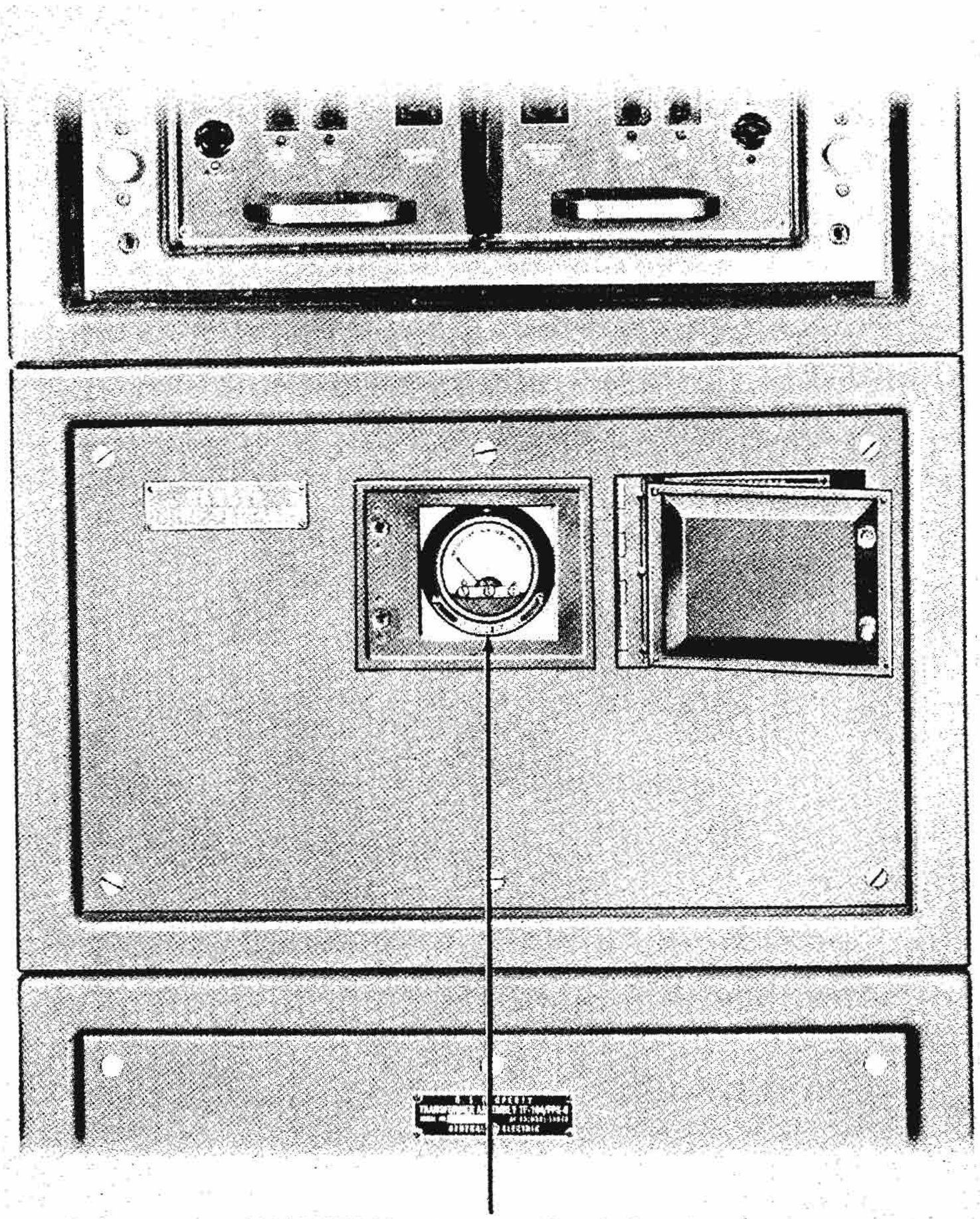


Figure 2–3. Filament Transformer Unit, Front Panel

TABLE VI. POWER DISTRIBUTION GROUP, FILAMENT TRANSFORMER UNIT, CONTROLS AND INSTRUMENTS
(See figure 2–3.)

Control	Function
"MAGNETRON FILAMENT" voltmeter*	Indicates the voltage applied to the magnetron filaments.

*Incorrect readings to be corrected by maintenance personnel only.

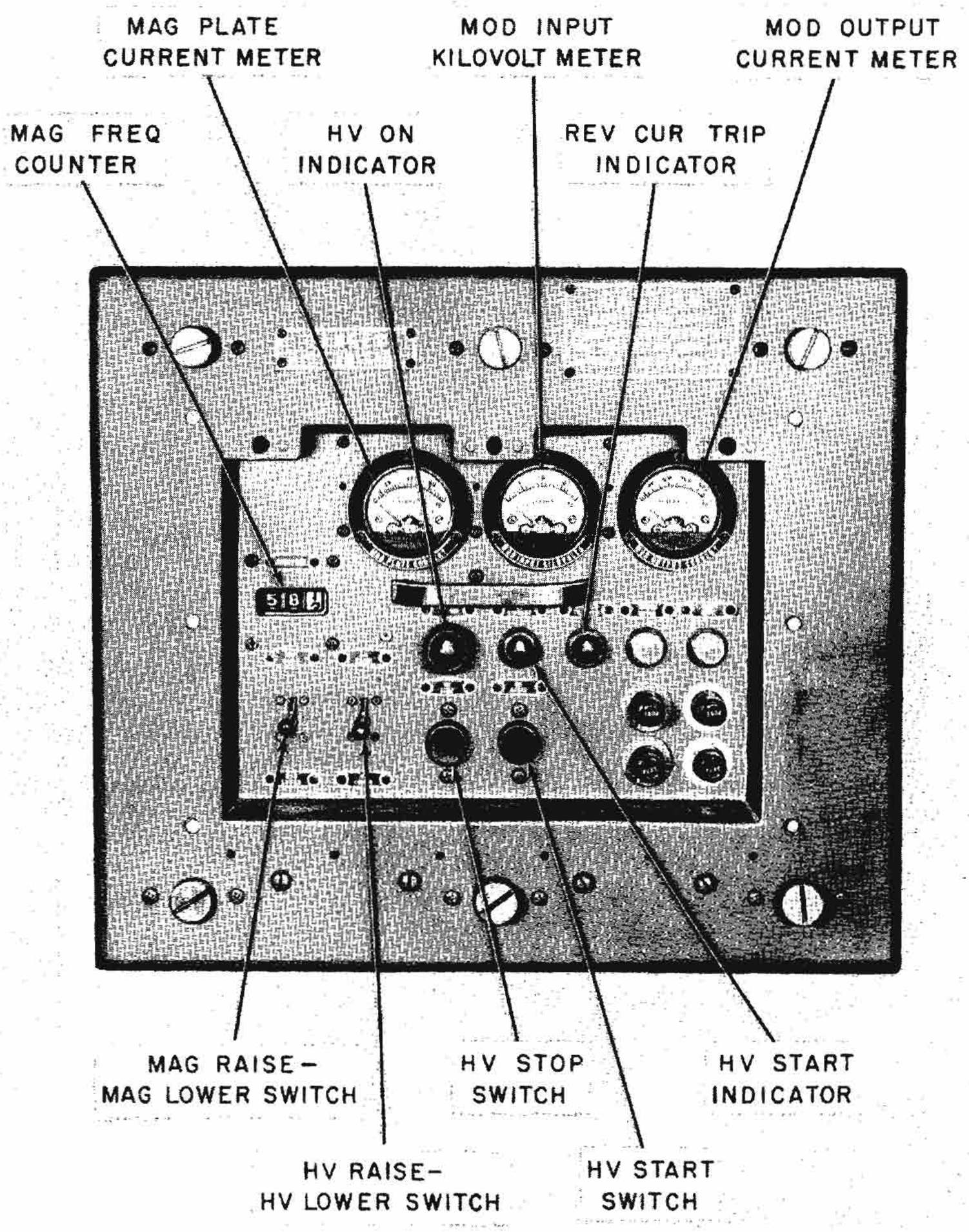


Figure 2–4. Transmitter Control, Front Panel

TABLE VII. TRANSMITTER GROUP, TRANSMITTER CONTROL, CONTROLS AND INSTRUMENTS

(See figure 2–4)

Control	Function
"HV START" switch	Connects the modulator power supply to the modulator high-voltage supply regulator. An alternate "HV START" switch is available at the power distribution unit. (See figure 2–2.)
"HV STOP" switch	Removes the modulator power supply from the modulator high-voltage supply regulator. Overload relays are reset by pressing the switch. An alternate switch, "HV STOP & OL RESET," is provided at the power distribution unit. (See figure 2–2.)
"HV RAISE – HV LOWER" switch	Consists of a 3-position switch that adjusts the modulator high-voltage output. *Position* — *Function* "HV RAISE" — Increases the modulator high-voltage output. "HV LOWER" — Decreases the modulator high-voltage output. Mid-position — Switch is off. An alternate "HIGH VOLTAGE RAISE – LOWER" switch is available at the power distribution unit. (See figure 2–2.)
"MAG RAISE – MAG LOWER" switch	Is a 3-position switch that adjusts the operating frequency of the magnetron. *Position* — *Function* "MAG RAISE" — Increases magnetron frequency. "MAG LOWER" — Decreases magnetron frequency. Mid-position — Switch is off. This switch is identical to the "MAGNETRON TUNING RAISE -- LOWER" switches located at the local control and remote control panels, figures 2–8 and 2–15, respectively.
"MAG PLATE CURRENT" meter	Indicates the current drawn by the magnetron plate. An alternate "MAG PLATE CURRENT" meter is provided at the power distribution unit. (See figure 2–2.)
"MOD INPUT KILOVOLTS" meter	Indicates the high voltage applied to the modulator. An alternate "MOD INPUT KILOVOLTS" meter is provided at the power distribution unit. (See figure 2–2.)
"MOD OUTPUT CURRENT" meter	Indicates the high-voltage current applied to the modulator. Identical to the "MOD INPUT CURRENT" meter available at the power distribution unit. (See figure 2–2.)
"MAG FREQ" counter	Is a revolution counter which when used with calibration chart, indicates operating frequency of the magnetron. GAIN" control circuit.

Pages 57 thru 58, deleted.

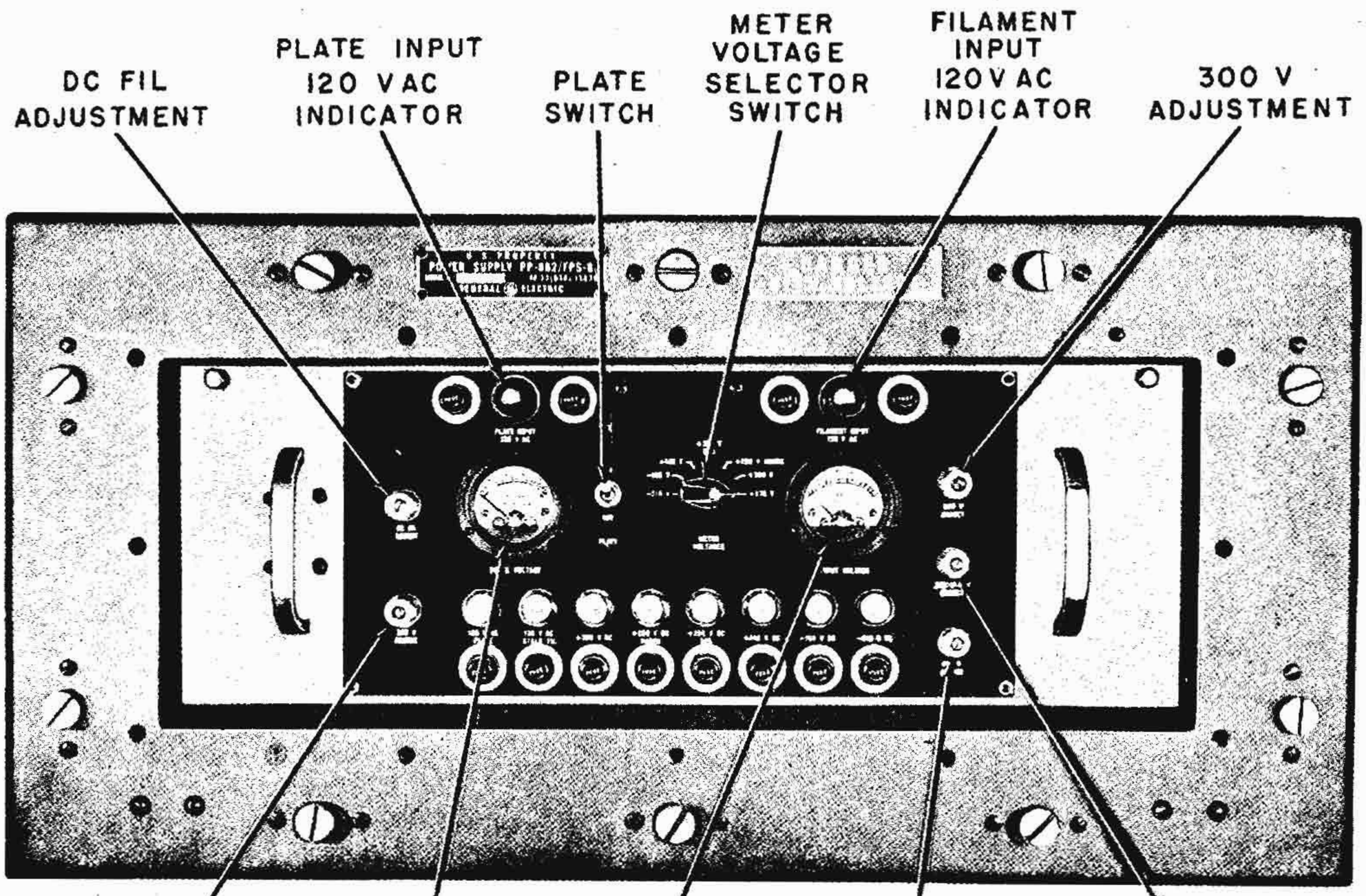


Figure 2–7. Receiver RF Group Power Supply, Front Panel

TABLE XI. RECEIVER RF GROUP, RECEIVER RF GROUP POWER SUPPLY, CONTROLS AND INSTRUMENTS

(See figure 2–7.)

Control	*Positions*
"PLATE ON-OFF" switch	In "ON" position, connects the plate power supply to a-c power source.
"METER VOLTAGES" switch	Selects voltages for monitoring on voltmeter. The switch positions are as follows: ***Positions*** "+375 V REG" "+300 V" "+250 V UNREG"* "+250 V REG" "+140 V REG" "−105 V REG"* "−210 V REG"*
"OUTPUT VOLTAGE" meter	Monitors the seven output voltages selected by "METER VOLTAGES" switch.
"DC FIL VOLTAGE" meter	Monitors the filament output voltages to the stalo.

*Incorrect readings to be corrected by maintenance personnel only.

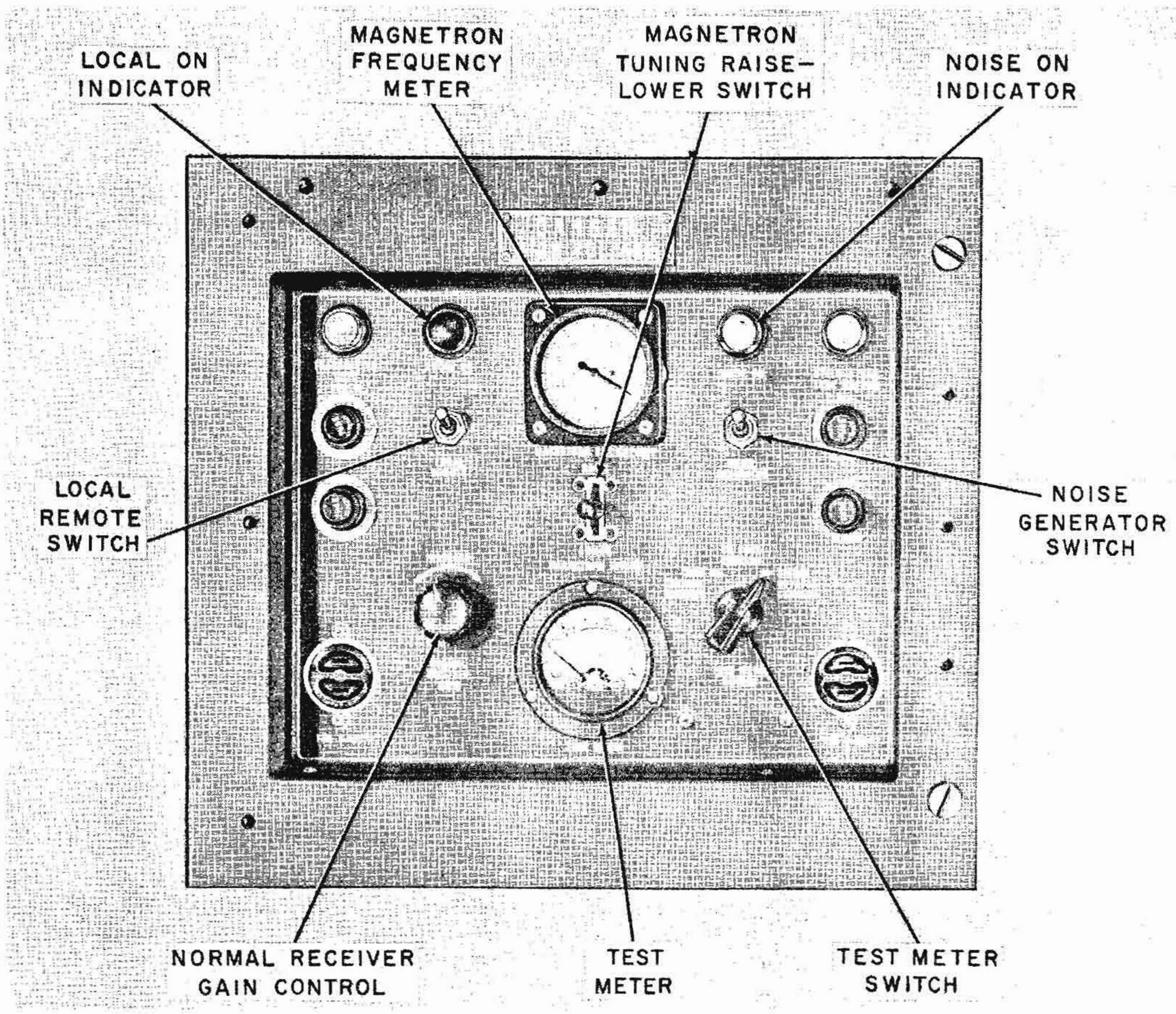


Figure 2–8. Receiver RF Group, Upper Control Panel

TABLE XII. RECEIVER RF GROUP, UPPER CONTROL PANEL, CONTROLS AND INSTRUMENTS

(See figure 2–8.)

Control	Function
"MAGNETRON TUNING RAISE-LOWER" switch	Is a 3-position switch that adjusts the operating frequency of the magnetron: *Position* — *Function* "RAISE" — Increases magnetron frequency. "LOWER" — Lowers magnetron frequency. Mid-position — Switch is off. This switch is identical to the "MAG RAISE – MAG LOWER" switch located at the transmitter control (figure 2–4) and the "MAGNETRON TUNING RAISE-LOWER" switch on the remote control panel (figure 2–15).

TABLE XII. RECEIVER RF GROUP, UPPER CONTROL PANEL, CONTROLS AND INSTRUMENTS (ont)

Control	Function
"MAGNETRON FREQUENCY" meter	Is a tuning indicator that, when used with the magnetron calibration chart, indicates the operating frequency of the magnetron. A similar indicator is provided at the remote control panel (figure 2–15).
"TEST METER SWITCH"*	Selects currents for monitoring on the "TEST METER". A similar "TEST METER SWITCH" is located at the remote control panel. (See figure 2–15.) *Positions* "COHO CRYSTAL CURRENT" "TR TUBE CURRENT" "SIGNAL CRYSTAL CURRENT"
TEST METER"*	Monitors the currents selected by the TEST METER SWITCH". A similar meter is located at the remote control panel. (See figure 2–15.)
"NOISE GENERATOR" switch	When the "NOISE ON" indicator is lit, B+, trigger and drive voltages are applied to the noise generator. An identical switch is located at the remote control panel. (See figure 2–15.)
"NORMAL RECEIVER GAIN" control	Adjusts the gain of the receiver. The control is effective when the "REMOTE LOCAL" switch is set for local control. An identical control is located at the remote control panel. (See figure 2–15.)
"LOCAL REMOTE" switch	Selects the center of receiver operation. An identical switch is located at the receiver and remote control panel. (See figure 2–15.) *Position* — *Function* Local control ("LOCAL ON" indicator lit) — Receiver rf unit is the center of receiver operation. Remote operation ("LOCAL ON" indicator is out) — Receiver and control unit is the center of receiver operation.

*Incorrect readings are to be corrected by maintenance personnel only.

Note

Power monitor operation is discussed in Section III.

TABLE XIII. RECEIVER RF GROUP, LOWER CONTROL PANEL, CONTROLS AND INSTRUMENTS

(See figure 2–9.)

Control	Function
"STALO MANUAL TUNING" switch*	Adjusts the frequency of the stalo. The control is effective when "STALO CONTROL" is set at "MANUAL". An identical switch is located at the remote control panel. (See figure 2–15.) *Position* — *Function* Up position or down position — Actuates the stalo motor that, in turn, varies the stalo frequency. Mid-position — Tuning control is at off.

TABLE XIII. RECEIVER RF, GROUP, LOWER CONTROL PANEL, CONTROLS AND INSTRUMENTS (cont)

Control	Function
"R.F. AMP TUNING" switch	Is a 3-position switch that adjusts the r-f amplifier for peak response at magnetron operating frequency: *Position* — *Function* Up position or down position — Actuates the r-f amplifier tuning motor that, in turn, varies the r-f amplifier peak response frequency. Mid position — Switch is off. This switch is identical to the "R.F. AMP TUNING" switch on the remote control panel (figure 2-15).
"T.R. TUBE TUNING" switch	Is a 3-position switch that adjusts the T-R tube for peak response at magnetron operating frequency. *Position* — *Function* Up position or down position — Actuates the T-R tube tuning motor that, in turn, varies the T-R tube peak response frequency. Mid-position — Switch is off. This switch is identical to the "T.R. TUBE TUNING" switch on the remote control panel (figure 2—15).

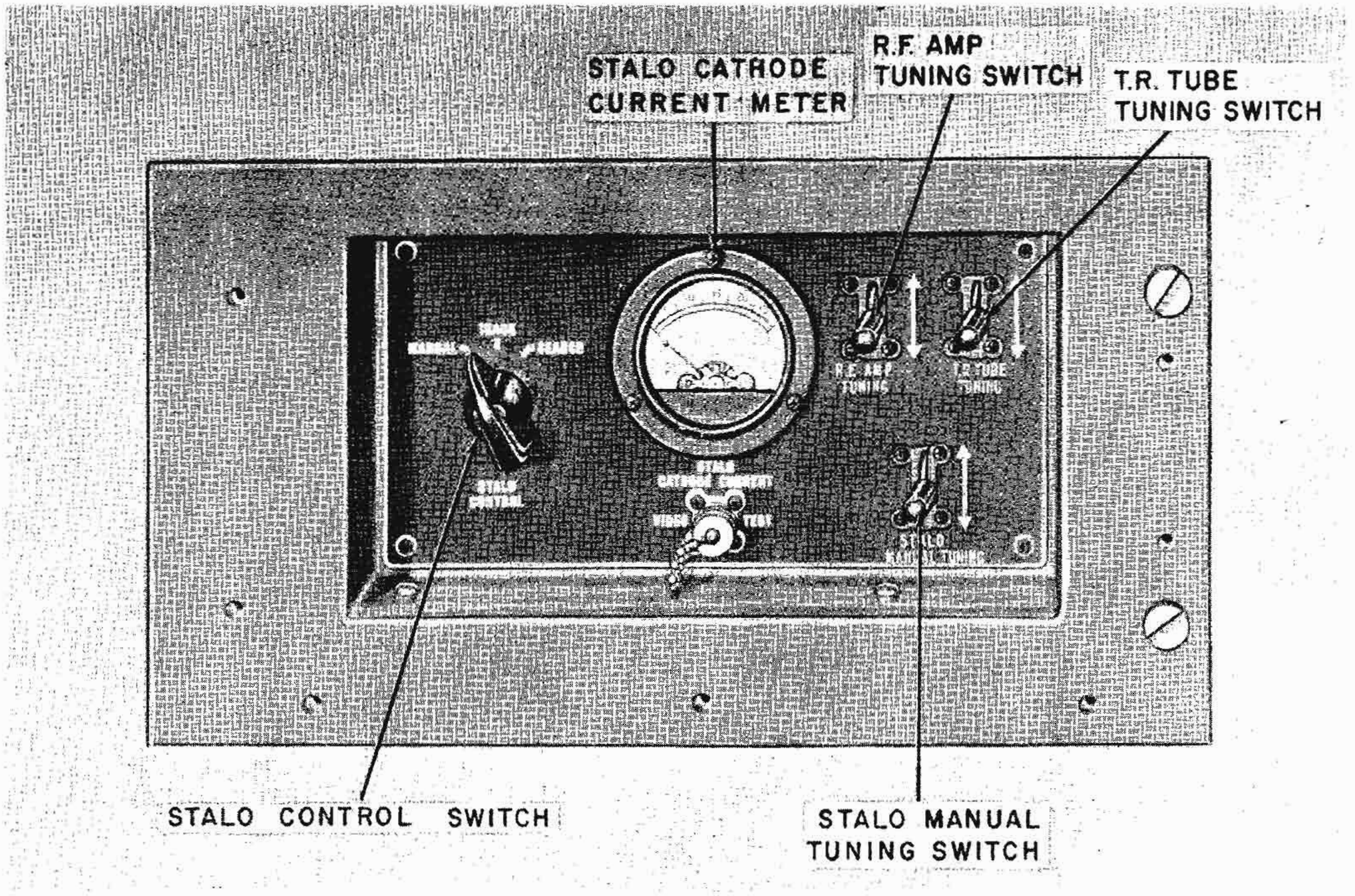


Figure 2–9. Receiver RF Group, Lower Control Panel

TABLE XIII. RECEIVER RF GROUP, LOWER CONTROL PANEL, CONTROLS AND INSTRUMENTS (cont)

Control	*Function*
"STALO CONTROL" switch	Permits either automatic or manual control of the local oscillator frequency. Control is operative when "LOCAL ON" indicator is lit. *Position* — *Function* "SEARCH" — Brings the intermediate frequency to the "TRACK" range (when in full radar operation). "TRACK" — Maintains the system within the limits of the proper intermediate frequency (when in full radar operation). "MANUAL" — Permits manual adjustment of the stalo frequency.
"STALO CATHODE CURRENT" meter*	Is a meter that monitors the stalo cathode current.

*Incorrect readings are to be corrected by maintenance personnel only.

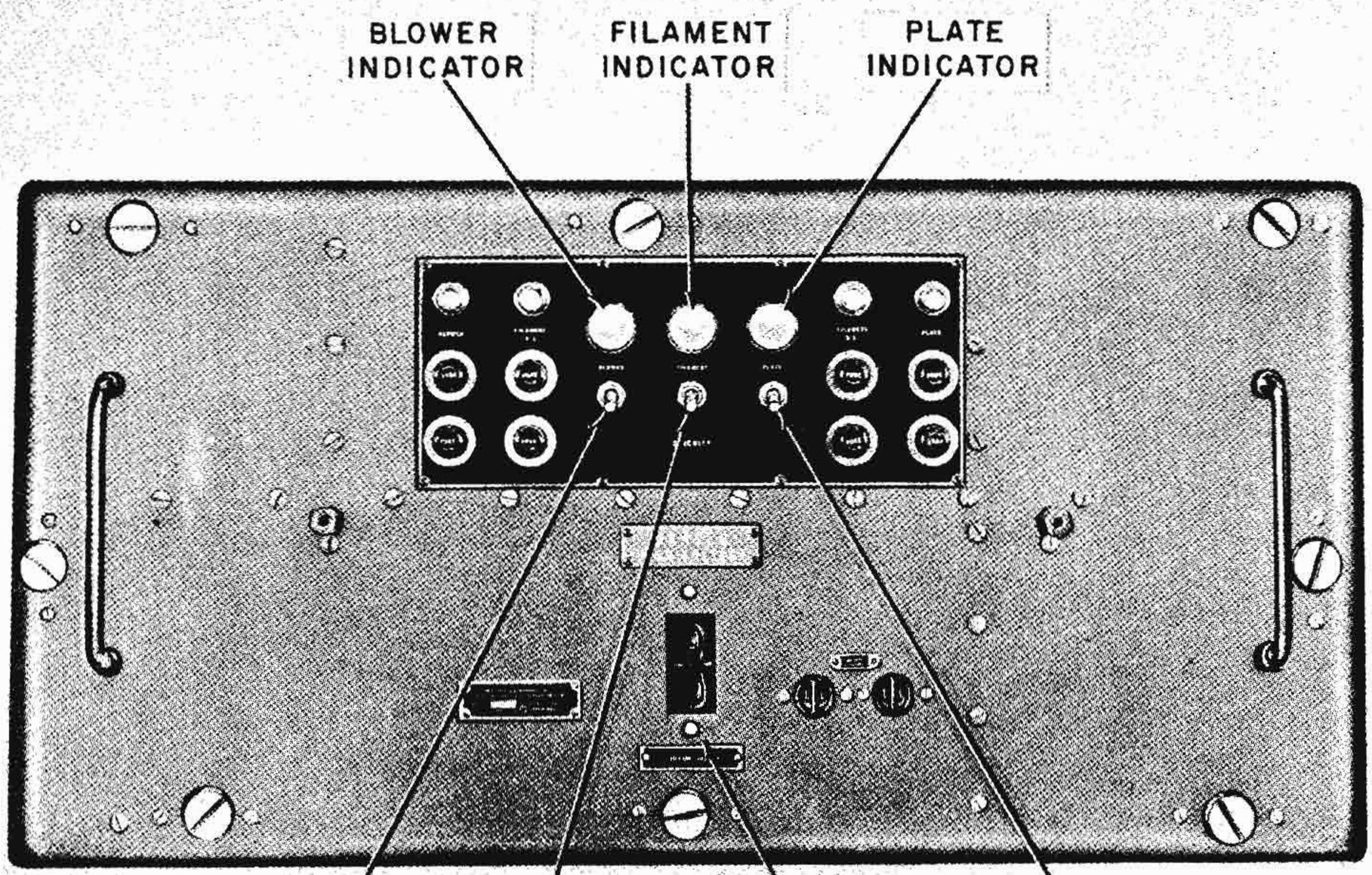


Figure 2—10. MTI Group, MTI Power Supply, Front Panel

TABLE XVI. MTI GROUP, MTI POWER SUPPLY, FRONT PANEL, CONTROLS
(See figure 2—10.)

Control	Function
"INPUT POWER" circuit breaker	In "ON" position, connects the power supply to 120-v, 60-cycle a-c power source. (Breaker removes power if overload occurs.)
"BLOWER" switch	In "ON" position, connects the blowers to 120-v, 60-cycle a-c power source.
"FILAMENT" switch	In "ON" position, connects the filament transformers to 120-v, 60-cycle a-c power source.
"PLATE" switch	In "ON" position, connects 120-v, 60-cycle a-c power to plate transformers 25 seconds after "FILAMENT" switch is turned on.

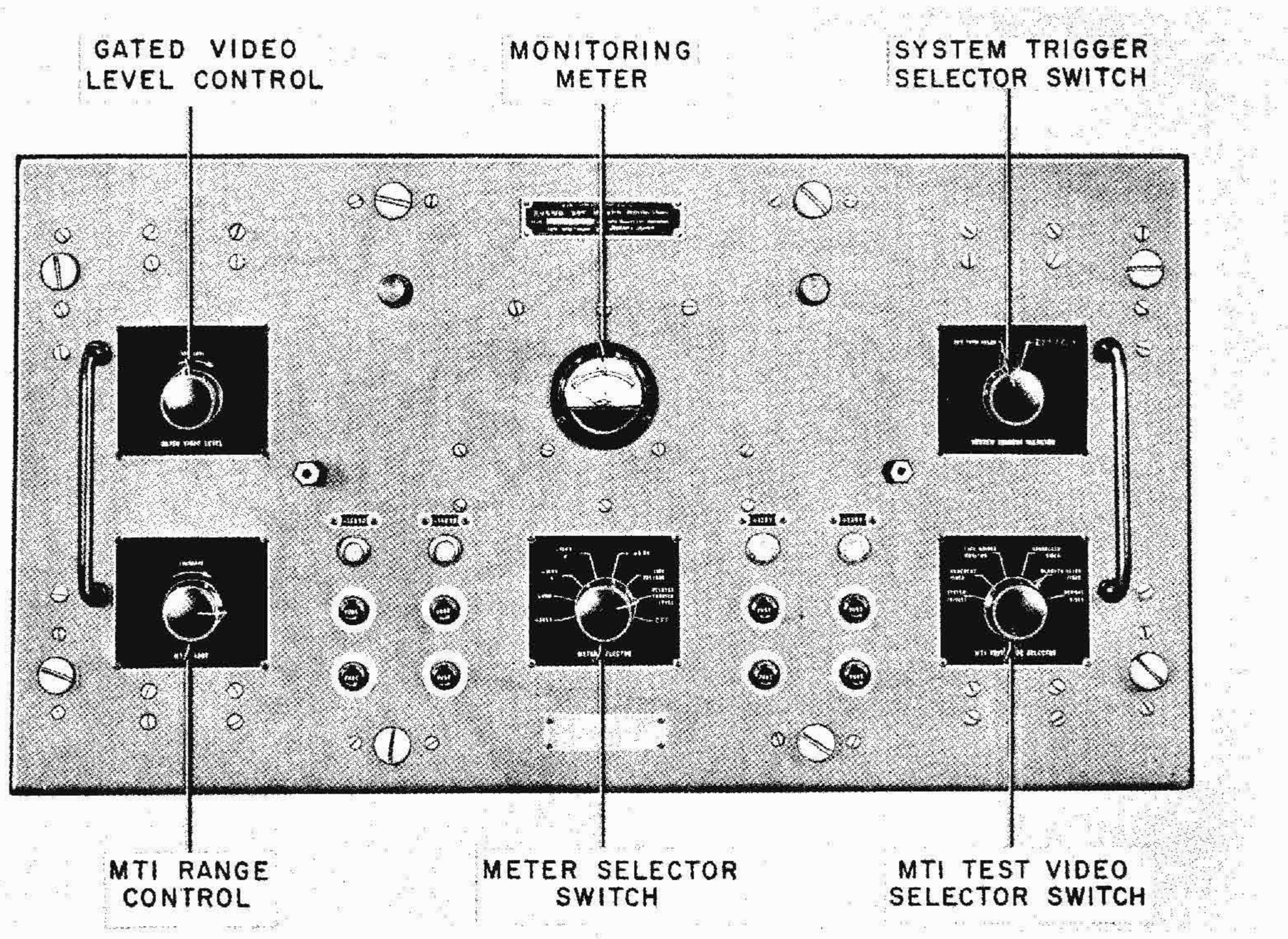


Figure 2–11. MTI Group, Upper MTI Drawer, Front Drawer, Front Panel

TABLE XV. MTI GROUP, UPPER MTI DRAWER, CONTROLS AND INSTRUMENTS

(See figure 2–11.)

Control	Function
"SYSTEM TRIGGER SELECTOR" switch	Is a 2-position rotary switch that selects the system trigger for the radar set. This switch is effective when the "TRIGGER SELECTOR" switch of the video distribution group (figure 2–14) is at "M.T.I. OPERATION". *Position* — *Function* "IFF DELAY" — Selects circulating trigger. Radar and IFF triggers occur at same time. "IFF ZERO DELAY" — Selects delayed trigger. Radar trigger delayed from IFF trigger.
"METER SELECTOR" switch	Is an 8-position rotary switch that selects voltages for the monitoring meter. *Positions* "+250 V" "+120 V" "−150 VA" "−150 VB" "+6.3 V" "LINE VOLTAGE"* "DELAYED CARRIER LEVEL"* "OFF"

TABLE XV. MTI GROUP, UPPER MTI DRAWER, CONTROLS AND INSTRUMENTS (cont)

Control	Function
"MTI RANGE" control	Variable control that adjusts the range of the MTI video display.
"GATED VIDEO LEVEL" control	Adjusts the amplitude of the mixed video fed from the MTI receiver group to PPI's.
Monitoring meter	Monitors the voltages selected by the "METER SELECTOR" switch.
"MTI TEST VIDEO SELECTOR" switch	Is a 6-position rotary switch that selects signals for presentation on the A-scope. The selector is effective when "TEST VIDEO OUT" switch of the video distribution cabinet is at the "PRE-TRIG" or "NORMAL VIDEO" positions. *Positions* "SYSTEM-TRIGGER" "COHERENT VIDEO" "LINE DRIVER MONITOR" "CANCELLED VIDEO" "BLANKED GATED VIDEO" "NORMAL VIDEO"

*Incorrect readings are corrected by maintenance personnel only.

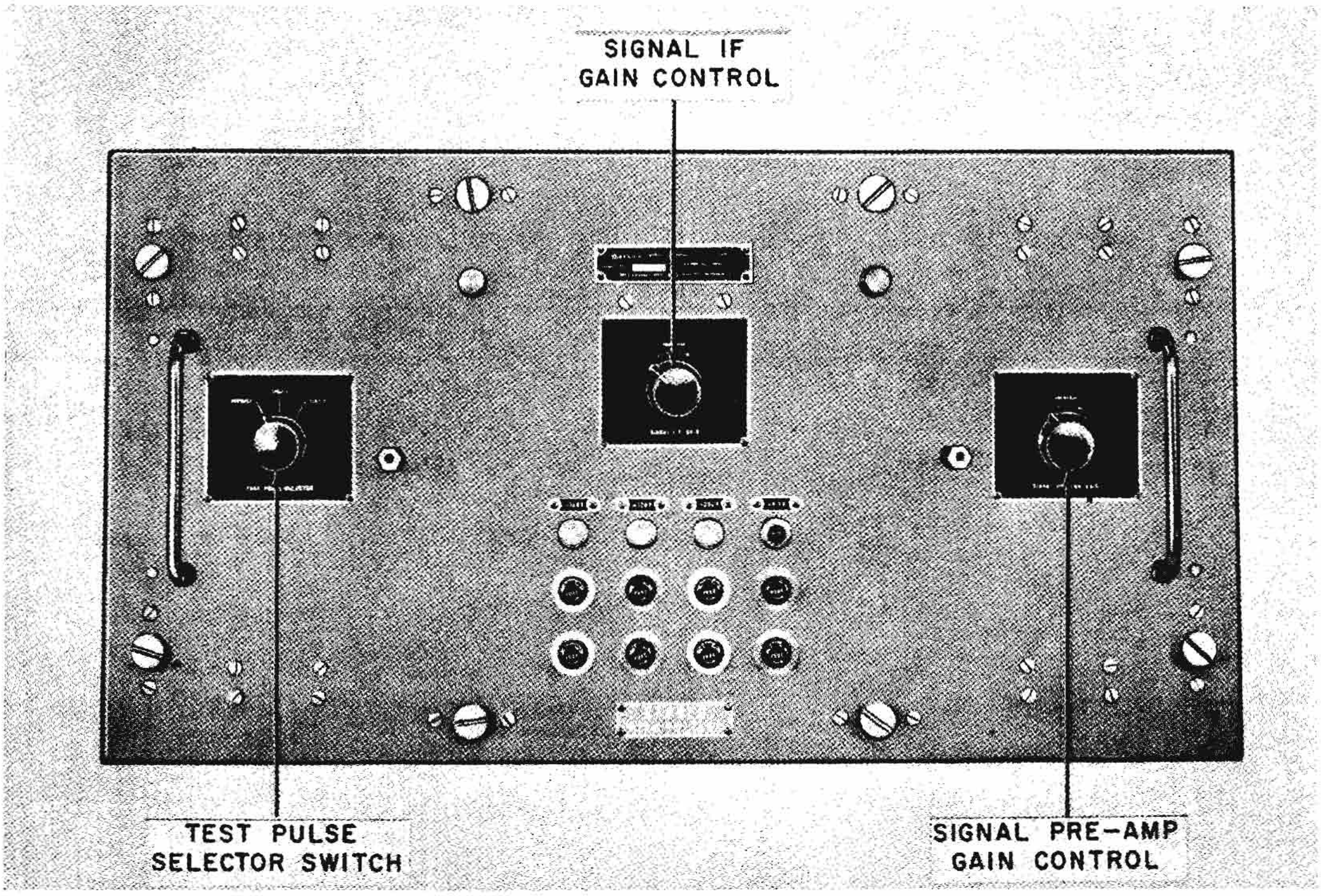


Figure 2—12. MTI Group, Lower MTI Drawer, Front Panel

TABLE XVI. MTI GROUP, LOWER MTI DRAWER, CONTROLS

(See figure 2–12.)

Control	Function
"SIGNAL PRE-AMP. GAIN" control*	Controls the gain of the MTI channel in the signal IF preamplifier (located in the receiver rf unit, paragraph 1–105).
"SIGNAL I.F. GAIN" control*	Controls the gain of the MTI limiting i-f amplifier.
"TEST PULSE SELECTOR" switch*	Is a 3-position rotary switch that selects simulated signals. *Position* — *Function* "OPERATE" — Test pulse generator is inoperative. "TEST 1" — Test pulse generator produces simulated fixed-target echoes and uses the transmitter pulse to lock coho. "TEST 2" — Test pulse generator produces simulated fixed-target echoes and coho lock pulse.

*Set by maintenance personnel only.

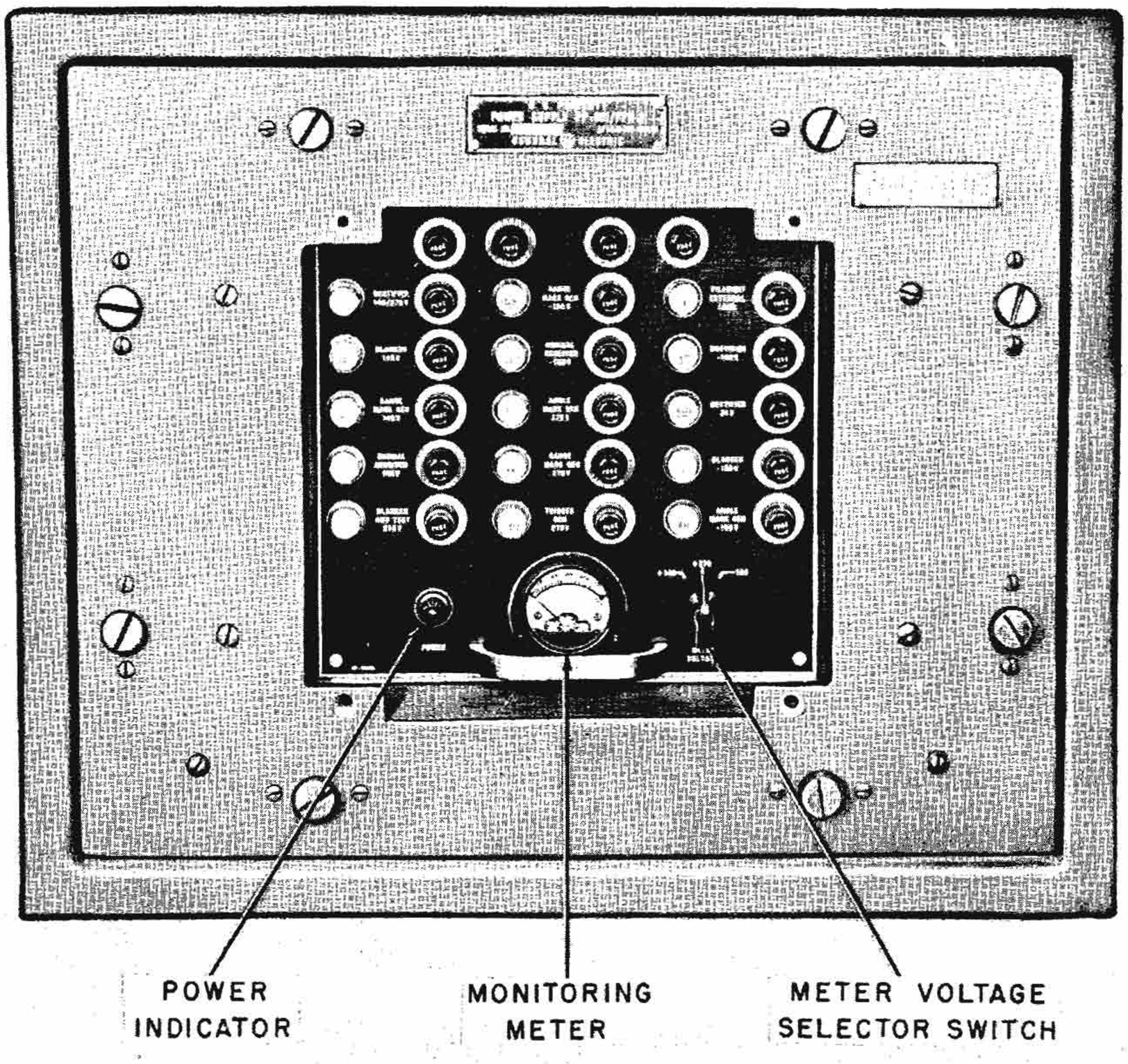


Figure 2–13. Video Distribution Power Supply, Front Panel

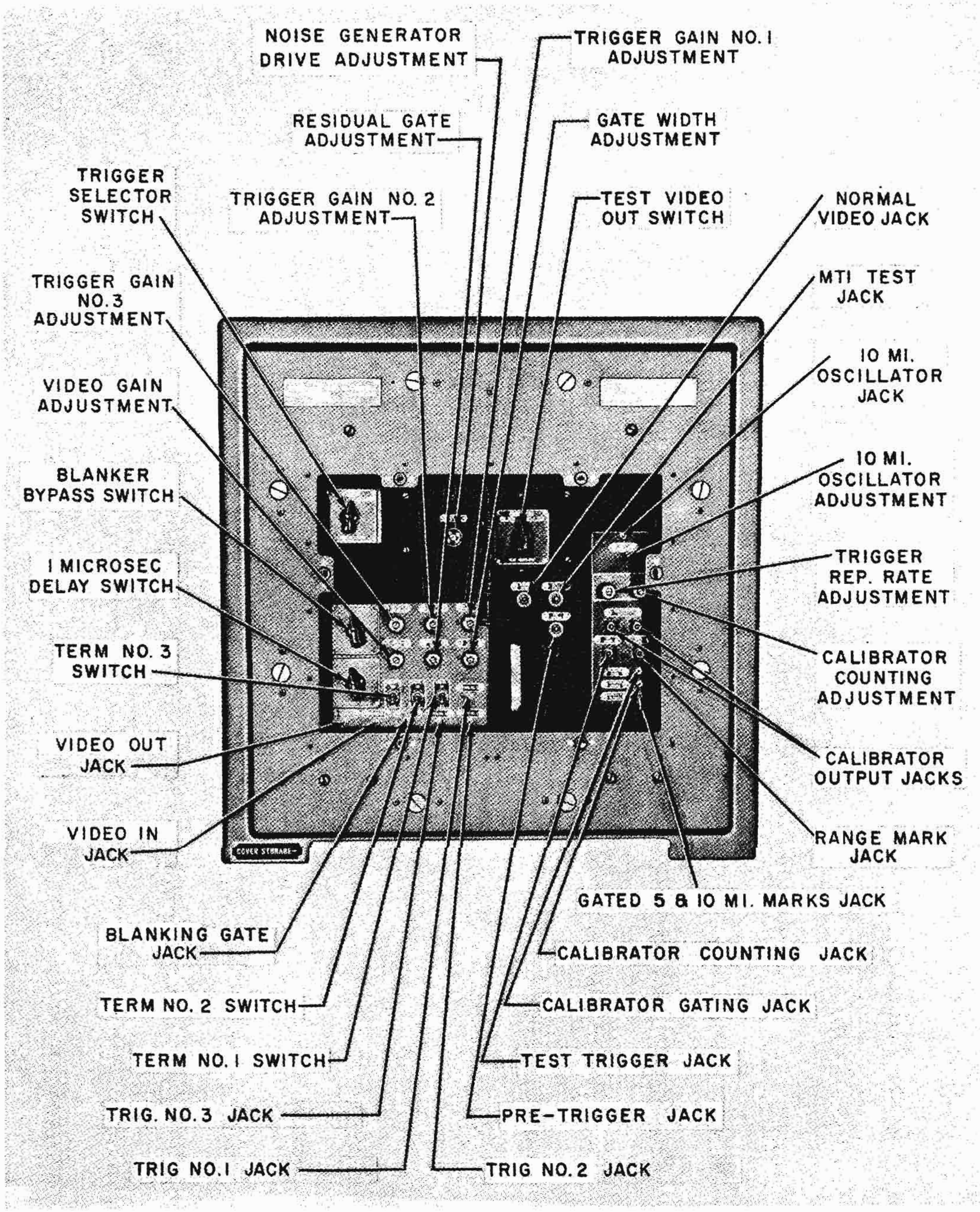


Figure 2–14. Video Distribution Unit, Front Panel

TABLE XVII. VIDEO DISTRIBUTION GROUP, POWER SUPPLY, CONTROLS AND INSTRUMENTS

(See figure 2—13.)

Control	Function
"METER VOLTAGE" switch	Is a 3-position rotary switch that selects voltages for the monitoring meter. *Positions* "−150 V" "+140 V" "+275 V"
Monitoring voltmeter	Monitors the voltages selected by the "METER VOLTAGE" switch.

TABLE XVIII. VIDEO DISTRIBUTION GROUP, CABINET, CONTROL

(See figure 2—14.)

Control	Function
"TEST VIDEO OUT" switch (to local position)	Selects test signals for presentation on the A-scope, normally located at the MTI group; and a test oscilloscope, normally located at the receiver rf group (local control panel). *Position* — *Function* "PRE TRIG" — The pre-trigger is monitored locally; normal video and MTI presentation are monitored at A-scope. "NORMAL VIDEO" — Normal video is monitored locally; the pre-trigger and MTI presentation are monitored at A-scope. "MTI TEST" — MTI presentation is monitored locally; the pre-trigger and normal video are monitored at A-scope.

TABLE XIX. VIDEO DISTRIBUTION GROUP, TRIGGER GENERATOR, CONTROL

(See figure 2—14.)

Control	Function
"TRIGGER SELECTOR" switch	Is a 3-position switch that selects the system trigger for the radar set. (Used without MTI. Triggers generated within the video distribution unit are standby triggers). *Position* — *Function* "M.T.I." — Permits the selection of the system trigger by the "SYSTEM TRIGGER SELECTOR" provided at the upper MTI drawer. (See figure 2—11.) "IFF DELAY" — The triggers applied to the radar transmitter and

TABLE XIX. VIDEO DISTRIBUTION GROUP, TRIGGER GENERATOR, CONTROL (cont)

Control	Function	
	"IFF DELAY" (cont)	IFF equipment have the same time relationship. IFF and radar displays are not coincident.
	"IFF "0" DELAY"	Selects delayed trigger for the system trigger. The trigger applied to the IFF equipment leads by 12.4 microseconds (or 33 microseconds) the trigger applied to the radar transmitter. IFF and radar displays are coincident.

TABLE XX. VIDEO DISTRIBUTION GROUP, INTERFERENCE BLANKER, CONTROLS AND INSTRUMENTS

(See figure 2–14.)

Control	Function
"TERM No. 1 ON-OFF" switch	In "ON" position, a sample trigger of interfering radar set connected to terminal one is terminated in 68 ohms; in "OFF" position, terminated in high impedance.
"TERM No. 2 ON-OFF" switch	In "ON" position, a sample trigger of interfering radar set connected to terminal two is terminated in 68 ohms, in "OFF" position, terminated in high impedance.
"TERM No. 3 ON-OFF" switch	In "ON" position, a sample trigger of interfering radar set connected to terminal three is terminated in 68 ohms. In "OFF" position, terminated in high impedance.
"BLANKER BYPASS" switch	Is a 2-position switch. *Position* — *Function* "BLANK" — The interfering signal from "TERM No. 1", "TERM No. 2" or "TERM No. 3" is mixed with the normal video in a gating circuit which blanks out both the interference signal and the video during the occurrence of the interference pulse. "BYPASS" — The entire interference blank circuit is bypassed.
"1 MICROSEC DELAY" switch	Is a 2-position switch that provides a one microsecond delay for the video signals received from the normal receiver. The switch compensates for the difference in travel time of the "main bang" and the blanking pulse, via air and cable, respectively, from the interfering radar to the radar being observed. *Position* — *Function* "OUT" — No time delay "IN" — 1-mile delay

TABLE XXI VIDEO DISTRIBUTION GROUP, RECEIVER AND CONTROL UNIT, CONTROLS AND INSTRUMENTS (Remote Control Panel)

(See figure 2–15)

Control	Function
"MAGNETRON TUNING" switch	Is a 3-position switch that adjusts the operating frequency of the magnetron. *Position* — *Function* "RAISE" — Increases magnetron frequency. "LOWER" — Lowers magnetron frequency. Mid-position — Switch is off.
"MAGNETRON FREQUENCY" meter	The switch is identical to the "MAGNETRON TUNING" and "MAG RAISE — MAG LOWER" switches located at the local control panel and the transmitter control, respectively. (See figures 2—8 and 2—4.) Is a tuning indicator that, when used with the magnetron calibration chart, indicates the operating frequency of the magnetron. This meter is similar to the "MAGNETRON FREQUENCY" meter located at the local control panel. (See figure 2—8.)
"STALO CONTROL" switch	Permits either automatic or manual control of the local oscillator frequency. The control is operative when "REMOTE ON" indicator is lit. *Position* — *Function* "SEARCH" — Brings the intermediate frequency to the track range (when in full radar operation). "TRACK" — Maintains the system within the limits of the proper intermediate frequency. "MANUAL" — Permits manual adjustment of the stalo frequency. This control is identical to the "STALO CONTROL" located at the local control panel. (See figure 2—9.)
"STALO MANUAL TUNING" switch*	Adjusts the frequency of the stalo. The control is effective when "STALO CONTROL" is set at "MANUAL". *Position* — *Function* Up position or down position — Actuates the stalo motor that, in turn, varies the stalo frequency. Mid-position — The switch is off. The switch is identical to the "STALO MANUAL TUNING" switch located at the local control panel. (See figure 2—9.)
"NORMAL RECEIVER GAIN" control	Adjusts the gain of the receiver. This control is effective when the "REMOTE-LOCAL" switch is set so that "REMOTE ON" indicator is lit. This control is identical to the "NORMAL RECEIVER GAIN" located at the local control panel. (See figure 2—8.)
"REMOTE LOCAL" switch	Selects the center of receiver operation. *Position* — *Function* Remote control ("REMOTE ON" indicator lit) — Receiver and control is the center of receiver operation. Local control ("REMOTE ON" indicator is out) — Receiver r-f unit is the center of receiver operation. This switch is identical to the "REMOTE LOCAL" switch located at the local control panel. (See figure 2—8.)

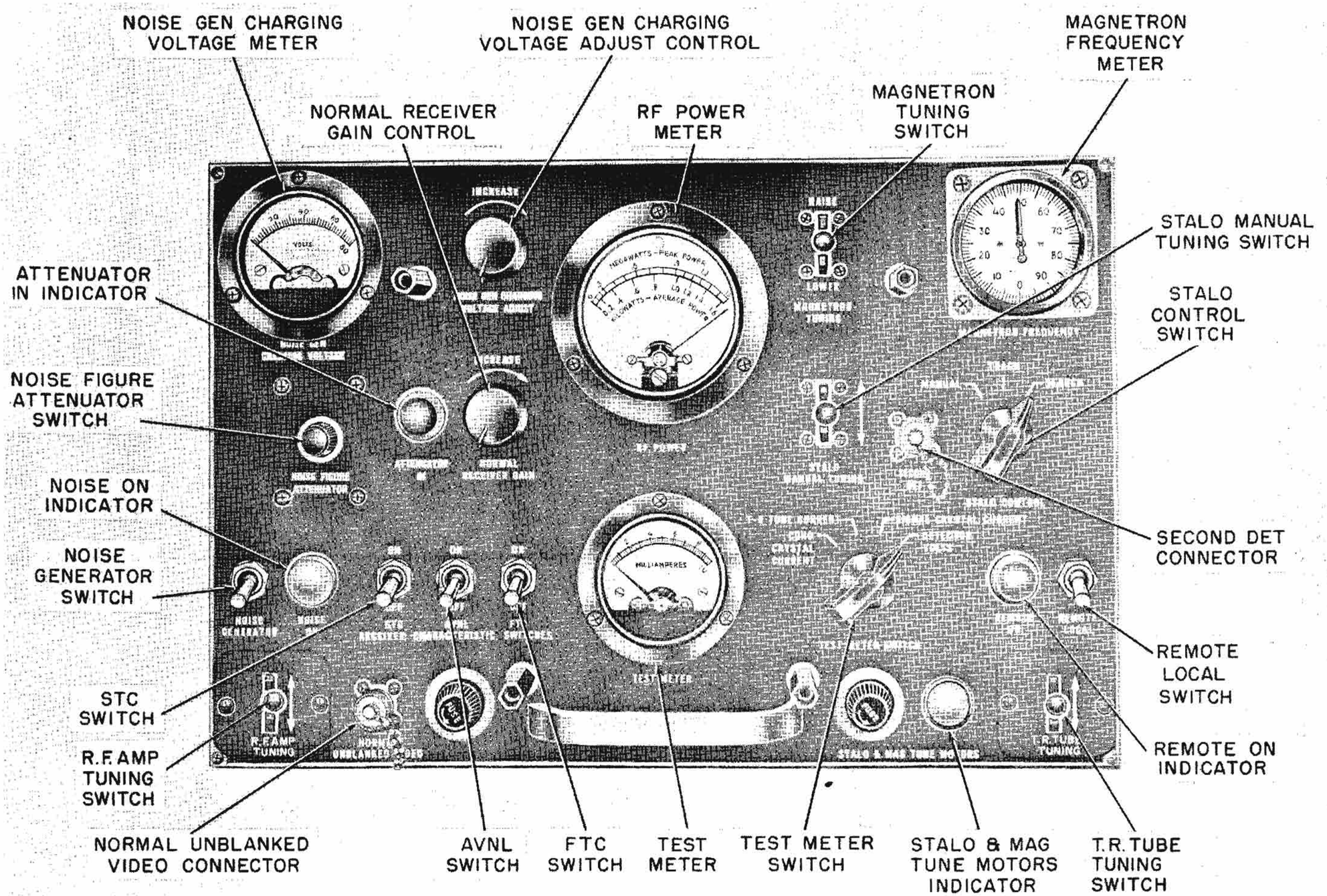


Figure 2–15. Receiver and Control Unit, Front Panel

TABLE XXI. VIDEO DISTRIBUTION GROUP, RECEIVER AND CONTROL UNIT, CONTROLS AND INSTRUMENTS (cont)

Control	*Function*
"R.F. AMP TUNING" switch	Is a 3-position switch that adjusts the r-f amplifier for peak response at magnetron operating frequency: *Position* — *Function* Up position or down position — Actuates the r-f amplifier tuning motor that, in turn, varies the r-f amplifier peak response frequency. Mid-position — Switch is off.
"T.R. TUBE TUNING" switch	This switch is identical to the "R.F. AMP TUNING" switch on the local control panel (figure 2–9). Is a 3-position switch that adjusts the T-R tube for peak response at magnetron operating frequency. *Position* — *Function* Up position or down position — Actuates the T-R tube tuning motor that, in turn, varies the T-R tube peak response frequency. Mid-position — Switch is off. This switch is identical to the "T.R. TUBE TUNING" switch on the local control panel (figure 2–9).

TABLE XXI. VIDEO DISTRIBUTION GROUP, RECEIVER AND CONTROL UNIT, CONTROLS AND INSTRUMENTS (cont)

Control	*Function*
"TEST METER SWITCH"*	Selects currents and voltage for monitoring on the "TEST METER". *Positions* "COHO CRYSTAL CURRENT" "T-R TUBE CURRENT" "SIGNAL CRYSTAL CURRENT" "DETECTOR VOLTS".
"TEST METER"*	Monitors currents and voltage selected by the "TEST METER SWITCH". The meter and switch (except for the "DETECTOR VOLTS" position) are identical to the "TEST METER" and "TEST METER SWITCH" located at the local control panel. (See figure 2—8.)
"NOISE GENERATOR" switch	When the "NOISE ON" indicator is lit, B+ trigger and drive voltages are applied to the noise generator. This switch is identical to the "NOISE GENERATOR" switch located at the local control panel. (See figure 2—8.)
"NOISE GEN CHARGING VOLTAGE ADJUST"	Adjusts the voltage on the "NOISE GEN CHARGING VOLTAGE" meter, when "ATTENUATOR IN" light is on.
"NOISE GEN CHARGING VOLTAGE" meter*	Is a meter that, when used with the calibration chart, indicates the level of noise insertion into the receiver system.
"NOISE FIGURE ATTENUATOR" switch*	Is a 2-position switch. *Position* — *Function* "ATTENUATOR IN" indicator is lit. — I-f signal is attenuated 20db and the noise generator charging voltage is adjustable. "ATTENUATOR IN" indicator is out. — A small fixed charging voltage is applied to meter and noise generator.
"RF POWER" meter*	Monitors the r-f power of the radar in parallel with the meter in the RF power monitor.
"RECEIVER CHARACTERISTIC SWITCHES": "STC ON-OFF"	In "ON" position, reduces the gain of relatively short-range target echoes.
"AVNL ON-OFF"	In "ON" position, provides automatic noise leveling.
"FTC ON-OFF"	In "ON" position, decrease interference caused by c-w jamming.

*Incorrect readings or controls that are reset by maintenance personnel only.

TABLE XXII. ANTENNA CONTROL UNIT, CONTROLS

(See figure 2—16)

Control	*Function*
"POWER ON-OFF" switch	In "ON" position, connects control unit to a-c power source.
"PANEL ILLUMINATION" control	Adjusts panel illumination.
"CONTROL SELECTOR" switch	Is a 3-position switch that selects the mode of antenna operation. *Position* — *Function* "VELOCITY" — The antenna automatically rotates at a speed and in the direction determined by the "SPEED CONTROL" control and "ANTENNA ROTATION" switch, respectively.

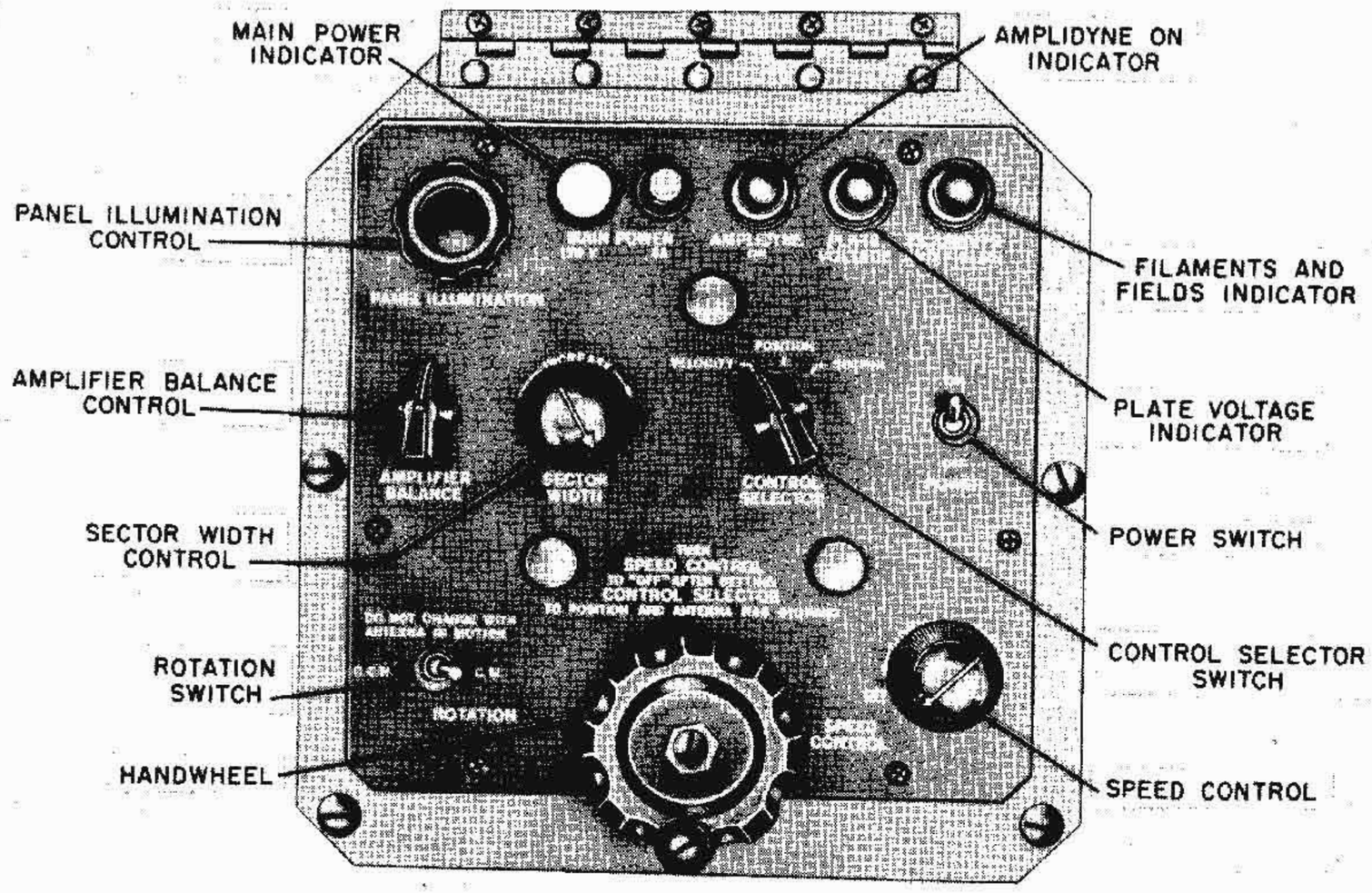


Figure 2–16. Antenna Control Unit, Front Panel

TABLE XXII. ANTENNA CONTROL UNIT, CONTROLS (cont)

Control	*Function*
Note Antenna "SPEED CONTROL" must be turned fully counterclockwise before switching "CONTROL SELECTOR" to "POSITION". If this is not done, an interlock prevents fast turning in "POSITION".	"POSITION" The antenna is manually controlled by the handwheel. The antenna follows the rotation of the handwheel in either a clockwise or counterclockwise direction. "SECTOR" The antenna automatically scans through a given sector, the area of which is determined by the "SECTOR WIDTH" control.
Position handwheel	Is a handwheel that manually controls the rotation of the antenna.
"SPEED CONTROL"	Adjusts the speed at which the antenna automatically rotates or scans. The control is continuously variable between 0 and 10 rpm.
"SECTOR WIDTH" control	Controls the area of the sector being scanned. The approximate limits of the scanning area are 0 to 120 degrees.
"ROTATION" switch	Is a 2-position switch that selects the direction of automatic rotation. *Position* — *Function* "CW" With the antenna set for automatic slewing, the direction of rotation is clockwise. "CCW" With the antenna set for automatic slewing, the direction of rotation is counterclockwise.
"AMPLIFIER BALANCE" control	Is an "anti-creep" control that prevents motion of the antenna when the "ANTENNA SPEED CONTROL" is fully counterclockwise.

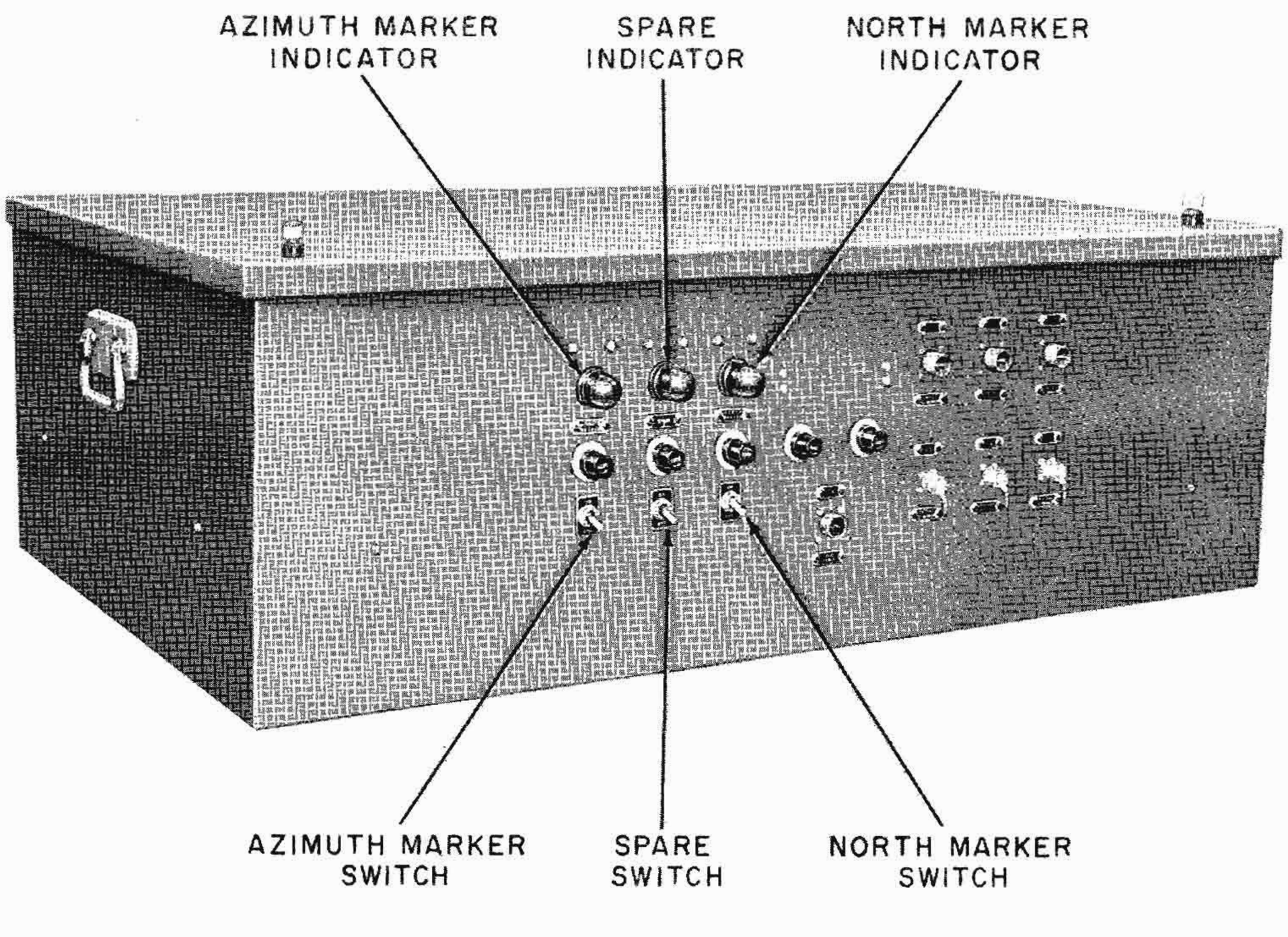


Figure 2–16A. Azimuth Pulse Amplifier, Front Panel

TABLE XXIIA. AZIMUTH PULSE AMPLIFIER, CONTROLS

(See figure 2–16A.)

Control	Function
"AZIMUTH MARKER" switch	In "ON" position, energizes azimuth pulse amplifier, connected with input at J1 and output at J5, which is normally used to amplify azimuth pulses.
"SPARE" switch	In "ON" position, energizes azimuth pulse amplifier, connected with input at J2 and output at J6, which is normally in "spare" status but sometimes used to amplify either azimuth or North Marker pulses.
"NORTH MARKER" switch	In "ON" position, energizes azimuth pulse amplifier, connected with input at J3 and output at J7, which is normally used to amplify North Marker pulses.

TABLE XXIII. PRELIMINARY SWITCH SETTINGS

Unit	Figure Reference	Control	Position
Power control box	2—1	All circuit breakers	"OFF"
Power distribution unit	2—2	All circuit breakers	"OFF"
		"HIGH VOLTAGE RAISE-LOWER" switch	Mid-position
		All "ON-OFF" switches	"OFF"
		"CONTROL TEST" switch	"OFF"
		"LINE VOLTAGE & FREQUENCY" switch	"OFF"
Transmitter control	2—4	"HV RAISE-HV LOWER" switch	Mid-position
		"MAG RAISE-MAG LOWER" switch	Mid-position
PPI low voltage power supply	2—5	"MAIN POWER" and "FILAMENTS" circuit breakers	"OFF"
		"HV POWER" switch	"OFF"
PPI drawer	2—5	All "ON-OFF" switches	"OFF"
		"PANEL BRILL" control	Approximately mid-position
		"FOCUS" control	Approximately mid-position
		All "GAIN" controls	Approximately mid-position
		"L RANGE EXPANSION" control	Fully counterclockwise
		"DELAY" control	Fully counterclockwise
		"O-C AMPLITUDE" control	Fully counterclockwise
		"VIDEO SELECTOR" switch	"M.T.I. 3"
		"ILLUMINATING LIGHT ON-OFF" switch	"OFF"
PPI servo amplifier	2—6	"POWER ON-OFF" switch	"OFF"
Receiver rf group power supply	2—7	"PLATE ON-OFF" switch	"OFF"
Upper control panel	2—8	"MAGNETRON TUNING RAISE-LOWER" switch	Mid-position
		"NORMAL RECEIVER GAIN" control	Approximately one-third clockwise.
Lower control panel	2—9	"STALO MANUAL TUNING" switch	Mid-position
		"STALO CONTROL" switch	"MANUAL"
Power Monitor	3—4	"OFF-STANDBY-ON" switch	"OFF"
MTI power supply	2—10	Circuit breaker and switches	"OFF" (down)
Upper MTI drawer	2—11	"GATED VIDEO LEVEL" control	Mid-position
		"MTI RANGE" control	Mid-position
		"SYSTEM TRIGGER SELECTOR" switch	Either "IFF ZERO Delay" or "IFF DELAY" depending upon requirements for IFF operation
Lower MTI drawer	2—12	"SIGNAL PRE-AMP. GAIN" control	Mid-position
		"SIGNAL I.F. GAIN" control	Mid-position
		"TEST PULSE SELECTOR" switch	"OPERATE"
Trigger generator	2—14	"TRIGGER SELECTOR" switch	"M.T.I."
Interference blanker	2—14	All "ON-OFF" switches	"OFF"
		"BLANKER BYPASS" switch	"BYPASS"
		"1 MICROSEC DELAY" switch	"OUT"
Receiver and control unit	2—15	"MAGNETRON TUNING" switch	Mid-position
		"STALO CONTROL" switch	"MANUAL"
		"STALO MANUAL TUNING" switch	Mid-position
		"NORMAL RECEIVER GAIN" control	Approximately one-third clockwise
		"STC ON-OFF" switch	"OFF"
		"ANVL ON-OFF" switch	"OFF"
		"FTC ON-OFF" switch	"OFF"
Video distribution unit	2—14	"TEST VIDEO OUT" switch	"PRETRIG"
Antenna control unit	2—16	"POWER ON-OFF" switch	"OFF"
		"CONTROL SELECTOR" switch	"VELOCITY"
		"SPEED CONTROL"	Fully counterclockwise
Azimuth pulse amplifier (where available)	2—16A	"AZIMUTH MARKER" switch	"ON"
		"SPARE" switch	"OFF"
		"NORTH MARKER" switch	"ON"

2–5. OPERATORS' CONTROLS.

2–6. The starting controls of the radar sets are available at the front panels of the power control box, power distribution unit and the transmitter control. The controls that maintain the radar in operation are located at the control panels of the antenna, video distribution unit and the PPI units. Once the necessary adjustments and alignments have been performed, the radar equipment is remotely controlled from the receiver and control unit of the video distribution group.

2–7. DESCRIPTION OF STANDBY. In "standby operation", the radar is connected to an a-c power source, line voltage is distributed to all radar loads and the time interlock relays are closed.

2–8. DESCRIPTION OF FULL RADAR OPERATION. In "full radar operation", power is applied to the high-voltage regulator and d-c voltage is applied from the modulator power supply to the modulator.

2–9. DESCRIPTION OF SHUTDOWN. "Shutdown" may be complete, with all power removed from the radar set; or partial with certain units taken out of operation (e.g., one PPI shutdown).

2–10. STANDBY OPERATION.

2–11. In starting the radar set, the condition obtained just before the application of high voltage to the modulator is called "standby operation". From this condition the radar may be placed in "full radar operation" ("radiate") or the radar may be maintained in "standby operation". "Standby operation" is used during relatively short periods in which no radar signals are needed. Since the time delay relays are closed during "standby", no time need be lost in going from "standby" to "radiate".

2–12. PRELIMINARY CONTROL SETTINGS.

2–13. Before using the detailed starting procedure given in paragraphs 2–14 through 2–34, place control panel switches and controls at the positions listed in Table XXIII. If a control is not listed, the control requires no preliminary setting.

2–14. STARTING PROCEDURE THROUGH STANDBY OPERATION.

2–15. Power from an external source is applied to the radar system. At the power control box, two of the three amber "GENERATOR" indicators light when two power sources are used. One indicator lights when one power source is used. The indicators that light depend on the power source connections at the power control box.

2–16. Power for Radar Set AN/FPS-8 or AN/MPS-11 may be derived from either a commercial source or diesel generators. When commercial power is used, close the external commercial power master switch. When diesel generators are used, start two of the three generators, leaving the third unit at standby. Adjust the output of the generators to read 120 volts at 60 cycles for each phase output. Close the diesel generators' circuit breakers to apply power to power control box.

2–17. Before energizing the equipment, check the MTI power supply drawer to see that it is completely closed. This drawer is equipped with an interlock that removes the primary power from the high-voltage transformer when the drawer is withdrawn. Check also to see that the ventilation doors on the upper and lower cabinets are open. These doors are equipped with interlocks that prevent the application of power to the high-voltage transformer while the doors are closed.

2–18. Table XXIV lists the steps necessary to place a shut-down radar in "standby operation". The first column of the table is entitled "step number": The sequence of these numbers indicates the order in which controls are switched or adjusted.

Note

Refer to section III for the adjustment procedure of those circuits indicating improper voltages or currents.

TABLE XXIV. STARTING PROCEDURE THROUGH STANDBY OPERATION

Step Number	Unit	Figure Reference	Control	Indication
			CAUTION Make certain that the antenna locking pin is unlocked (raised position).	
1	Power control box	2—1	When commercial power or one diesel generator is used, one "GENERATOR" amber indicator is lit. Close the two circuit breakers under the lit indicator. When two diesel generators are used, two "GENERATOR" amber indicators are lit. Close one circuit breaker under each lit indicator, but do not close two circuit breakers under one indicator.	Red "MAIN BUS" and "RED AUXILIARY" indicators light at the power control box and power distribution unit.

TABLE XXIV. STARTING PROCEDURE THROUGH STANDBY OPERATION (cont)

Step Number	Unit	Figure Reference	Control	Indication
	Power control box (cont.)		**Note** Normally Radar Set AN/FPS-8 receives power from a commercial power source. Thus only one indicator lights. An interlock bar prevents the closing of more than one circuit breaker in each row.	
2	Power control box	2—1	Close "SHELTER LIGHTS" circuit breaker.	Power applied to shelter.
3	Power control box	2—1	Close "AMPLIDYNE MOTOR" circuit breaker.	None.
4	Power control box	2—1	Close "HEIGHT FINDER" circuit breaker (if required by tactical situation).	Power applied to height finder.
5	Power distribution unit	2—2	Turn "SHELTER №1 LIGHTS ON-OFF" switch "ON".	Power applied to shelter №1.
6	Power distribution unit	2—2	Rotate "LINE VOLTAGE & FREQUENCY" switch.	At the three "MAIN BUS" positions and three "AUX BUS" positions, the "LINE VOLTS" and "LINE FREQ" meters indicate 120 v and 60 cycles, respectively.
7	Power distribution unit	2—2	Close "HV CONTROL-RECT FIL" circuit breaker.	Amber "CONTROL TEST" indicator lights at "ON" position of "CONTROL TEST" switch (but at no other switch position). Blue "REV CURRENT TRIP" indicator lights. Amber "REMOTE ON" indicator lights.
8	Power distribution unit	2—2	Close "MAGNETRON BLOWER" circuit breaker. **CAUTION** Check the vent at the left side of the transmitter cabinet. If there is no indication of the magnetron blower output, notify maintenance personnel.	"CONTROL TEST" indicator lights at "MAG BLOWER" position of "CONTROL TEST" switch (but at no switch position clockwise from "MAG BLOWER" position).
9	Power distribution unit	2—2	Close "MOD FIL TRIGGER AMP RF REC" circuit breaker.	"CONTROL TEST" indicator lights at "MOD FIL" position of "CONTROL TEST" switch (but at no switch position clockwise from "MOD FIL" position). "MOD FIL VOLTS" meter indicates 120 v. Amber "FILAMENT INPUT 120 V AC" indicator at receiver group power supply (fig. 2—7) lights "DC FIL VOLTAGE" meter at receiver group power supply indicates 6.5 v. (The "DC FIL VOLTAGE" adjust is discussed in table XXXI.)
10	Power distribution unit	2—2	Close "MAG FIL" circuit breaker.	"CONTROL TEST" indicator lights at "MAG FIL REG" and "MAG FIL" positions of "CONTROL TEST" switch (but at no switch positions clockwise from "MAG FIL" position). "MAG FIL CURRENT" meter indicates 2.25 to 2.3 amp. (See figure 2—3.) "MAG FIL VOLTS" meter indicates 150-190 volts after warm-up period.

TABLE XXIV. STARTING PROCEDURE THROUGH STANDBY OPERATION (cont)

Step Number	Unit	Figure Reference	Control	Indication
11	Power distribution unit	2—2	Turn "CONTROL TEST" switch to "FIL TIME DELAY".	Ten minutes after "MAG FIL" circuit breaker has been closed (step number 10), "CONTROL TEST" indicator lights.
			Note During the time interval required for the filament time delay circuits to close, proceed with steps 12 through 37.	
12	Power distribution unit	2—2	Close "ANTENNA CONTROL UNIT" circuit breaker.	None.
13	Power distribution unit	2—2	Close "PEDESTAL UTILITY" circuit breaker.	Pedestal waveguide heater is operative.
14	Power distribution unit	2—2	Close "RANGE IND UTILITY" circuit breaker.	None.
15	Power distribution unit	2—2	Close "IFF" circuit breaker (if required by tactical situation).	None.
16	Power control box Power distribution unit	2—1 2—2	Press "AMPLIDYNE START" switch at either of the two units.	Red "AMPLIDYNE ON" indicators light.
17	Power distribution unit	2—2	Adjust "DIMMER" control.	Proper panel illumination.
18	Power distribution unit	2—2	Turn "ANTENNA OBSTRUCTION LIGHTS" to either "ON" position as required.	Obstruction lights light.
19	Power distribution unit	2—2	Close "VIDEO DISTRIBUTION" circuit breaker.	Red "POWER" indicator at video distribution group power supply lights.
20	Video distribution power supply	2—13	Rotate "METER VOLTAGE" switch.	The +140, +275, and —150 voltages are indicated on the monitoring meter. (The adjustments for abnormal meter indications are discussed in table XXXI.)
21	Upper control panel	2—8	Place "NOISE GENERATOR" switch to position at which "NOISE ON" indicator is out.	"NOISE ON" indicator is out.
			Note For Step 22, the "LOCAL-REMOTE" switch is set so that the "LOCAL ON" indicator is lit.	
22	Receiver and control unit	2—15	Place "NOISE FIGURE ATTENUATOR" to position at which "ATTENUATOR IN" indicator is out.	"ATTENUATOR IN" indicator is out.
23	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	
24	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	
25	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	
26	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	

TABLE XXIV. STARTING PROCEDURE THROUGH STANDBY OPERATION (cont)

Step Number	Unit	Figure Reference	Control	Indication
27	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	
28	PPI low-voltage power supply		See T.O. 31P1-2GPA126-2.	
29	PPI servo amplifier		See T.O. 31P1-2GPA126-2.	
30	Receiver rf group power supply	2—7	Turn "PLATE ON-OFF" switch "ON".	Red "PLATE INPUT 120V AC" indicator lights.
31	Receiver rf group power supply	2—7	Rotate "METER VOLTAGES" selector switch.	Selected voltages indicated on "OUTPUT VOLTAGE" meter. (The power supply adjustments are discussed in table XXXI.)
32	MTI power supply	2—10	Turn on "INPUT POWER" circuit breaker.	None.
33	MTI power supply	2—10	Turn "BLOWER CIRCUIT" switch on (up position).	"BLOWER" indicator lights.
34	MTI power supply	2—10	Turn "FILAMENT CIRCUIT" switch on (up position).	"FILAMENT" indicator lights.
35	MTI power supply	2—10	Turn "PLATE CIRCUIT" switch on 25 seconds after "FILAMENT CIRCUIT" switch is turned on (up position).	"PLATE" indicator lights.
36	Upper MTI drawer	2—11	Rotate "METER SELECTOR" switch through all positions.	Meter needle rests on black band for all positions.
			Note If meter reading is abnormal, switch to standby trigger ("IFF DELAY" or "IFF "0" DELAY" of "TRIGGER SELECTOR" switch of video distribution unit). Summon maintenance personnel to locate and repair trouble.	
37	Antenna control unit	2—16	Turn "POWER ON-OFF" switch "ON".	Red "FILAMENT AND FIELDS" and red "AMPLIDYNE ON" indicators light. After 45 seconds, red "PLATE VOLTAGE" indicator lights.
38	Power distribution unit	2—2	Turn "CONTROL TEST" switch to "FIL TIME DELAY".	10 ±2 minutes after "MAG FIL" circuit breaker has been closed (step number 10) "CONTROL TEST" indicator lights.
			Turn "CONTROL TEST" switch to "AC OVERLOAD".	"CONTROL TEST" indicator lights. If indicator does not light, press the "HV STOP & OL RESET" switch.
			Turn "CONTROL TEST" switch to "DC OVERLOAD".	"CONTROL TEST" indicator lights. If indicator does not light, press the "HV STOP & OL RESET" switch.
			Turn "CONTROL TEST" switch to "DOOR INTERLOCKS".	"CONTROL TEST" indicator lights. Green "HV STANDBY" indicators at the power distribution unit and transmitter control light.

2–19. STANDBY THROUGH FULL RADAR OPERATION.

2–20. In "full radar operation", the transmitter radiates pulses which are returned to the receiver system from reflective objects and appear as targets on the indicators of the radar set.

2–21. Table XXIV lists the steps necessary to place a radar set in "full radar operation" from "standby operation".

TABLE XXV. STANDBY THROUGH FULL RADAR OPERATION

Step Number	*Unit*	*Figure Reference*	*Control*	*Indication*
39	Receiver and control unit	2—15	If the amber "REMOTE ON" indicator is off, reverse the position of the "REMOTE LOCAL" switch.	Amber "REMOTE ON" indicator lights.
40	Receiver and control unit	2—15	Turn "TEST METER SWITCH" to "COHO CRYSTAL CURRENT".	"TEST METER" indicates 0.4 to 0.5 ma.
41	Receiver and control unit	2—15	Turn "TEST METER SWITCH" to "T-R TUBE CURRENT".	"TEST METER" indicates 0.1 to 0.2 ma.
42	Receiver and control unit	2—15	Turn "TEST METER SWITCH" to "SIGNAL CRYSTAL CURRENT".	"TEST METER" indicates 0.4 to 0.5 ma.
43	Receiver and control unit	2—15	Turn "TEST METER SWITCH" to "DETECTOR VOLTS".	"TEST METER" indicates 0.25 ma. If the reading is not 0.25 ma, adjust for correct reading by varying the "NORMAL RECEIVER GAIN" control.
44	Lower control panel	2—9	Turn "STALO CONTROL" switch to "MANUAL". (Amber "LOCAL ON" indicator lit for this check.)	"STALO CATHODE CURRENT" meter reads between 14 and 20 ma.
45	Power distribution unit	2—2	Close "HIGH VOLTAGE RECTIFIER PLATE" circuit breaker.	None.
46	Power distribution unit Transmitter control	2—2 2—4	Press "HV STOP & OL RESET" switch at either of the two units.	None.
47	Power distribution unit Transmitter control	2—2 2—4	Press "HV START" switch at either of the two units.	"HV STANDBY" indicators go out. "HV ON" indicators light. "PLATE HOURS" meter is operative.
48	Power distribution unit Transmitter control	2—2 2—4	Using the "HIGH VOLTAGE" switch at either of the two units, raise high-voltage, in steps, until proper meter readings are obtained. Maintain high voltage just under the level that causes magnetron arcing.	"MOD INPUT KILOVOLTS" meters indicate 12 to 14 kv. "MAG PLATE CURRENT" meters indicate 38 to 52 ma. "MOD INPUT CURRENT" meter and "MOD OUTPUT CURRENT" of the power distribution unit and transmitter control, respectively, indicate 250 to 300 ma.
49	Power distribution unit	2—2	Rotate "LINE VOLTAGE & FREQUENCY" switch.	"LINE VOLTS" meter and "LINE FREQ" meter indicate 120 v and 60 cycles, respectively, for each of the "MAIN BUS" and "AUXILIARY BUS" positions.

2–22. ANTENNA CONTROL UNIT OPERATION.

2–23. The antenna is controlled in manual or automatic (i. e., slew or scan) operation from the antenna control unit. Prior to each of these operations, reset the controls of the unit, with the exception of the "POWER ON-OFF" switch, at the preliminary control settings given in table XXIII.

2–24. Tables XXVI through XXVIII list the control settings of the antenna control unit for automatic rotation, manual rotation, and automatic sector scan of the antenna.

TABLE XXVI. ANTENNA CONTROL UNIT, AUTOMATIC SLEWING
(See figure 2–16.)

Step Number	Control	Indication
50	Set "CONTROL SELECTOR" switch at "VELOCITY".	None.
51	Adjust "PANEL ILLUMINATION" control.	Control panel properly lighted.
52	Set "ROTATION" switch to "C.W." or "C.C.W.".	None.
53	Adjust "AMPLIFIER BALANCE" control.	Antenna stops creeping and remains stationary.
54	Adjust "SPEED CONTROL".	Antenna rotates at desired speed and direction of rotation

TABLE XXVII. ANTENNA CONTROL UNIT, MANUAL OPERATION
(See figure 2–16.)

Step Number	Control	Indication
55	Set "CONTROL SELECTOR" switch at "POSITION".	None.
56	Turn "SPEED CONTROL" fully counterclockwise.	None.
57	Rotate handwheel.	Antenna follows direction of handwheel rotation.

TABLE XXVIII. ANTENNA CONTROL UNIT, AUTOMATIC SCANNING
(See figure 2–16.)

Step Number	Control	Indication
58	Rotate handwheel until the antenna faces the azimuth center of the area to be scanned.	Antenna rotates.
59	Set "SELECTOR" switch at "SECTOR".	None.
60	Adjust "ANTENNA SPEED CONTROL".	Antenna scans at desired speed.
61	Adjust "SECTOR INCREASE" control for the desired area of coverage as indicated on the PPI.	Antenna scans through desired area.
62	Readjust handwheel position until desired azimuth center of rotation is obtained.	Antenna rotates.

2–25. RECEIVER CONTROLS.

2–26. During normal radar operation the receiver and control unit is the center of receiver operation. Its availability for operation is indicated by the "REMOTE ON" indicator; conversely, the "LOCAL ON" indicator of the upper control panel is off.

2–27. The "STALO CONTROL" switch, during normal operation, is the only control that requires a change of setting. Table XXIX discusses the sequence of "STALO CONTROL" switch settings.

TABLE XXIX. RECEIVER CONTROLS
(See figure 2–15.)

Step Number	Control	Indication
63	Set the "STALO CONTROL" switch at "SEARCH" when radar is first placed in operation. After approximately one minute of continual operation, set the switch at "TRACK".	None.

Figure 2–17. Deleted

2–28. PPI PRESENTATION (SEE T.O. 31P1-2GPA126-2).

2–29. thru 2–39. (Deleted)

Figure 2–18. Deleted

2–40. STOPPING PROCEDURE.

2–41. The radar sets have three stages of shut-down: partial shutdown, standby operation and coplete shut-down.

2–42. PARTIAL SHUTDOWN. In partial shutdown, the radar set is in "full radar operation", but individual units are shut down. Examples of partial shutdown are normal receiver operation (MTI shutdown), and operation with less than six PPI's.

2–43. SHUTDOWN TO STANDBY OPERATION. "Standby operation" is discussed in paragraph 2–11 of the radar starting procedure. To place the radar in "standby operation", press the "HV STOP & OL RESET" button available at either the power distribution unit or the transmitter control. (See figures 2–2 and/or 2–4.)

2–44. COMPLETE SHUTDOWN. For complete radar shutdown perform the following steps:

a. Return the radar to "standby operation" as directed in paragraph 2–43.

b. At the power distribution unit, open the distribution circuit breakers. If auxiliary equipment is receiving source power through the distribution unit, allow the auxiliary equipment to shut down before removing power.

CAUTION

Open the "MAGNETRON BLOWER" circuit breaker last.

c. At the power control box, open the circuit breakers. As in the preceding step, before throwing any circuit breaker, permit auxiliary equipment to shut down.

d. Remove source power by shutting down the diesel generator or opening the commercial power connections.

Pages 83 and 84 Deleted.

SECTION III

OPERATING CHECKS AND ADJUSTMENTS

3–1. GENERAL.

3–2. Section III contains the instructions for performing operating checks and adjustments on Radar Set AN/FPS-8 or AN/MPS-11. The instructions given in paragraphs 3–3 through 3–5 comprise checks and adjustments that are made during the starting procedure; the instructions of paragraphs 3–7 through 3–16 are made during "full radar operation". The latter adjustments ensure the optimum performance level of the radar set. The chassis adjustments that are performed by operating personnel are illustrated in figures 3–1 and 3–2.

3–3. CHECKS AND ADJUSTMENTS MADE DURING STARTING PROCEDURE.

3–4. Blowers are provided in the regulator unit, modulator, modulator power supply, transmitter, video distribution power supply, MTI receiver group, MTI power supply, PPI and antenna control unit. As each unit is energized, check the blower to ascertain whether it is operating correctly. Place a hand over the air vents (louvers) on the cabinet. If the blowers are inoperative, the passage of air through the vent will not be felt.

3–5. Table XXXI lists the monitoring circuits that are built into the radar equipment to permit the checking of individual power supplies. Any error reading in excess of five volts for regulated power supplies and 20 volts for unregulated power supplies indicates the need of an adjustment.

3–6. The indicating meter on the front panel of the upper MTI drawer (figure 2–11) provides a means for making a preliminary check of the MTI equipment. Set the "METER SELECTOR" control knob under the indicating meter to each of the eight positions and note the meter readings. If the meter reading for each selector position lies within the black "NORMAL" portion of the scale, the MTI equipment should be operating properly. If the meter readings are not "NORMAL," turn the equipment off and summon maintenance personnel.

Note

The checking of all monitoring meter circuits are within the scope of the operator. However, certain adjustments may be made by experienced maintenance personnel only. The adjustments that are set by maintenance personnel are identified by asterisks placed at the corresponding checks, table XXXI.

TABLE XXXI. POWER SUPPLY MONITORING CIRCUITS

Step Number (of table XXIV)	*Figure Reference*	*Meter Indication*	*Switch Position*	*Adjustment*
9	2—7	6.5 volts	—	Turn "DC FIL ADJUST" control on receiver of group power supply panel (figure 2—7) for correct reading on "DC FIL VOLTAGE" meter.
20	2—13	+140 volts +275 volts −150 volts	"+140" "+275" "−150"	Turn "+140 VOLT ADJUST", "+275 VOLT ADJUST", and "−150 VOLT ADJUST" controls on video distribution power supply chassis (figure 3—1) for correct reading on monitoring meter, as selected by "METER VOLTAGE" selector switch.
26	2—5	+300 volts −150 volts*	"+300VDC" "−150VDC"	Turn "+300 VOLT ADJUST" control on PPI power supply chassis (figure 3—2) for correct reading on monitoring meter. There is no adjustment for the −150 volt supply.
31	2—7	+375 volts +300 volts +250 volts** +250 volts* +140 volts −105 volts* −210 volts*	"+375V" "+300V" "+250V" UNREG" "+250V" REG" "+140V" "−105V" "−210V"	Turn "375V ADJUST", "300V ADJUST", "250V REG ADJUST" and "140V ADJUST" controls on receiver rf group power supply (figure 2—7) for correct reading on the "OUTPUT VOLTAGE" meter adjust. There are no adjustments for the +250 volt unregulated, −105 volt and −210 volt supplies.

*Adjustments made by maintenance personnel only.

**This reading may vary ±50 volts depending on load.

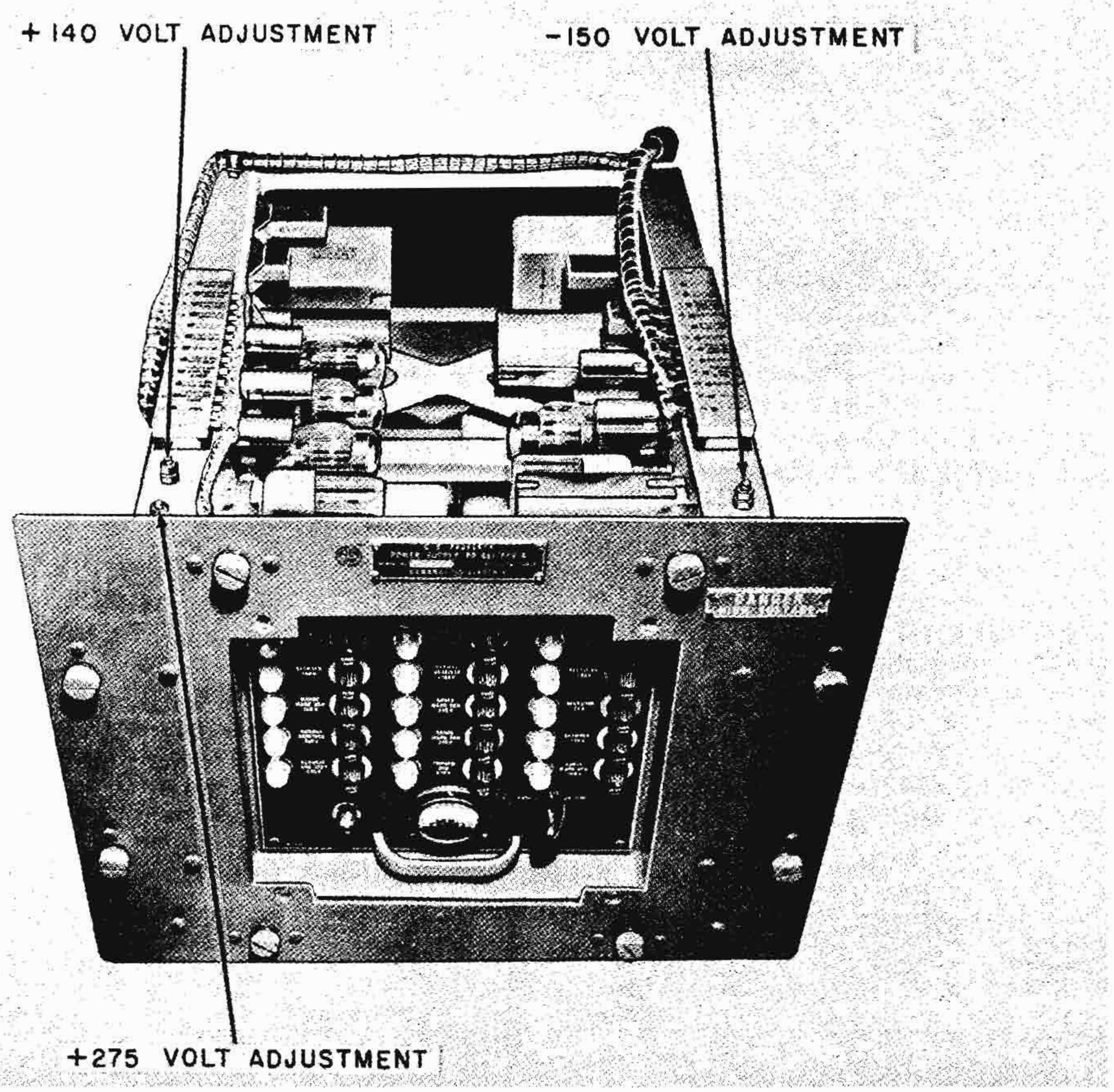


Figure 3–1. Video Distribution Power Supply Chassis

3–7. CHECKS AND ADJUSTMENTS MADE DURING FULL RADAR OPERATION.

3–8. The instructions covered in the following paragraphs of this section are normally made during "full radar operation". This procedure includes the periodic checking of those monitoring circuits outlined in the former part of this section, paragraphs 3–3 through 3–6.

3–9. MAGNETRON ARCING. *(See figures 2–2 and 2–4.)* If slight arcing occurs at the magnetron, depress the "HIGH VOLTAGE RAISE LOWER" switch at either the power distribution unit or transmitter control. Maintain the voltage at the level just before arcing recurs. Excess arcing of the magnetron causes the radar to return to "standby operation". This condition is indicated by the lighting of the "REV CURRENT TRIP" indicators. Restore the radar to "full radar operation" as discussed in Section II. If arcing is recurrent, notify maintenance personnel.

3–10. MTI OPERATING CHECKS AND ADJUSTMENTS. Figure 3–3 illustrates the difference in appearance of the PPI presentation without MTI (normal radar operation) and with MTI in operation. With normal radar operation, strong returns from large fixed targets will appear at various locations on the PPI, along with smaller returns from any moving targets which may be within radar range. With the MTI properly operating, there should be no visible returns from fixed targets within the range over which MTI is effective (as determined by the setting of the "MTI RANGE control"). With MTI operation, returns from only moving targets should appear on the PPI. If satisfactory presentation cannot be obtained with normal radar operation alone, summon maintenance personnel to locate and correct the trouble before proceeding further with MTI adjustment. If the PPI presentation is satisfactory with normal radar operation but unsatisfactory with MTI operation, and if previous preliminary operating checks have indicated "NORMAL" meter readings,

Figure 3–2. (Deleted)

adjust the MTI equipment as described in the following paragraphs.

3–11. If the operating checks above indicate adjustment of the MTI equipment is required, some of the front-panel controls may be adjusted to obtain improved MTI performance and to comply with IFF operational requirements. The operating adjustments are controlled by:

"MTI RANGE" control

"SYSTEM TRIGGER SELECTOR" switch

The "TEST PULSE SELECTOR" switch and the "MTI TEST VIDEO SELECTOR" switch are maintenance controls and are not to be used during operation. The "METER SELECTOR" control knob may be left in any position.

3–12. MTI RANGE ADJUSTMENT. The initial coverage of the "MTI RANGE" control at its mid-range

TABLE XXXII. RADAR SET MONITORING CIRCUITS

Unit	Figure Reference	Switch	Switch Position	Meter	Indication
Power control box	2—1	Clip-on ammeter around each of the "MAIN BUS" and "AUX BUS" bars	——	Clip-on ammeter*	15 amp
Power distribution unit	2—2	"LINE VOLTAGE & FREQUENCY"	"MAIN BUS"		
			"PHASE ※1"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
			"PHASE ※2"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
			"PHASE ※3"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
			"AUX BUS"		
			"PHASE ※1"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
			"PHASE ※2"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
			"PHASE ※3"	"LINE VOLTS"	120 v
				"LINE FREQ"	60 cps
				"MOD FIL VOLTS"	120 v
				"MAG FIL CURRENT"*	2.24 amp
				"MOD INPUT KILOVOLTS"	12 to 14 kv
				"MOD INPUT CURRENT"	265 to 300 ma
				"MAG PLATE CURRENT"	38 to 52 ma
Filament transformer unit	2—3			"MAGNETRON FILAMENT"*	150 to 180 v
Transmitter control	2—4			"MAG PLATE CURRENT"	38 to 52 ma
				"MOD INPUT KILOVOLTS"	12 to 14 ma
				"MOD OUTPUT CURRENT"	265 to 300 ma
				"MAG FREQ"	1280 to 1350 mc
PPI	2—5	"+300 v dc —150 v dc"	"+300 v dc"	Monitoring meter	+300 v
			"—150 v dc"	Monitoring meter*	—150 v
Receiver rf group power supply	2—7			"DC FIL VOLTAGE"*	6.6 v
		"METER VOLTAGES"	"+375 v"	"OUTPUT VOLTAGE"	+375 v
			"+300 v"	"OUTPUT VOLTAGE"	+300 v
			"+250 v UNREG"	"OUTPUT VOLTAGE"*	+250 v +50 v —25 v
			"+250 v REG"	"OUTPUT VOLTAGE"	+250 v
			"+140 v"	"OUTPUT VOLTAGE"	+140 v
			"—105 v"	"OUTPUT VOLTAGE"*	—105 v
			"—210 v"	"OUTPUT VOLTAGE"*	—210 v

Upper control panel	2—8			"MAGNETRON FREQUENCY"*	1280 to 1350 mc (read on calibration chart)
		"TEST METER SWITCH"	"COHO CRYSTAL CURRENT"	"TEST METER"*	0.4 to 0.5 ma
			"TR TUBE CURRENT"	"TEST METER"*	0.1 to 0.2 ma
			"SIGNAL CRYSTAL CURRENT"	"TEST METER"*	0.4 to 0.5 ma
Lower control panel	2—9		"MANUAL"	"STALO CATHODE CURRENT"*	14 to 20 ma
Upper MTI Drawer	2—11	"METER SELECTOR"	"OFF"	Monitoring meter*	None
			"DELAYED CARRIER LEVEL"	Monitoring meter*	"NORMAL"
			"LINE VOLTAGE"	Monitoring meter*	"NORMAL"
			"+6.3 V"	Monitoring meter	"NORMAL"
			"—150 VB"	Monitoring meter	"NORMAL"
			"—150 VA"	Monitoring meter	"NORMAL"
			"+120 V"	Monitoring meter	"NORMAL"
			"+250 V"	Monitoring meter	"NORMAL"
Video distribution power supply	2—13	"METER VOLTAGE"	"—150"	Monitoring meter	—150 v
			"+275"	Monitoring meter	+275 v
			"+140"	Monitoring meter	+140 v
Receiver and control unit	2—15			"MAGNETRON FREQUENCY"*	1280 to 1350 mc (read on calibration chart)
("REMOTE ON" indicator on)		"NOISE FIGURE ATTENUATOR"	"ATTENUATOR IN" Light out	"NOISE GEN CHARGING VOLTAGE"	11 v
		(See power monitor check below.)		"RF POWER"* (See paragraph 3—17.)	0.8 to 1.2 megawatts peak power
		"TEST METER SWITCH"	"COHO CRYSTAL CURRENT"	"TEST METER"*	0.4 to 0.5 ma
			"TR TUBE CURRENT"	"TEST METER"*	0.1 to 0.2 ma
			"SIGNAL CRYSTAL CURRENT"	"TEST METER"*	0.4 to 0.5 ma
			"DETECTOR VOLTS"	"TEST METER"	0.25 ma
Power monitor	3—4	"OFF-STANDBY-OPERATE"	"OPERATE"	Monitoring meter	0.8 to 1.2 megawatts peak power

Figure 3–3. Deleted

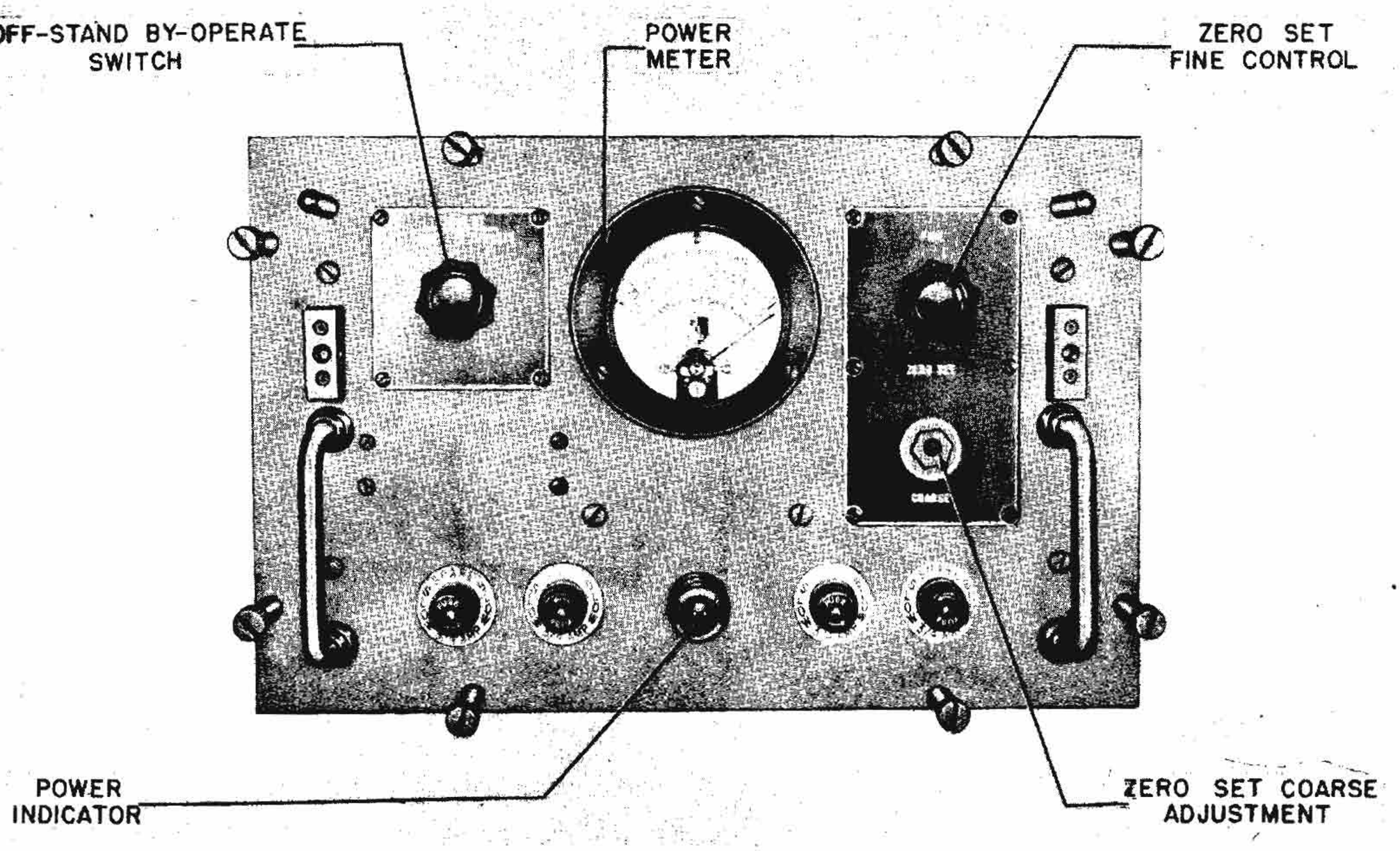


Figure 3–4. Power Monitor, Control Panel

position is approximately 75 miles. If the number of fixed target signals outside the MTI range is excessive, turn the control knob slowly clockwise, increasing the range until the undesired signals are within the cancellation region. If the initial range setting leaves no undesired signals, turn the control knob slowly counterclockwise, reducing the MTI range to the minimum setting that permits cancellation of undesired fixed-target signals.

CAUTION

During operation, check to be sure that the blowers are working properly. If the BLOWER switch on the MTI power supply is turned off inadvertently during operation, the equipment will continue to operate but will overheat and may be damaged.

3–13. RADAR SET MONITORING.

3–14. Table XXXII lists the meters the operator normally monitors. Improper readings of those meters marked with an asterisk indicate adjustments are to be performed by maintaining personnel only. Table XXXII includes those readings given in table XXXI. Thus a composite check sheet of all operator monitoring checks is provided.

Note

The power monitor meter reading is included in table XXXII. Refer to paragraph 3–15 for the discussion concerning power monitor operation.

3–15. POWER MONITOR. *(See figure 3–4.)* The controls of the power monitor are listed in table XXXII.

Note

When the power monitor is removed from its power source, the normal position for the meter pointer is off scale to the right beyond the 1.5 megawatts reading.

3–16. Set the "OFF-STANDBY-OPERATE" control at the "OPERATE" position. Permit the monitor a 5-minute warm-up period. Adjust the "ZERO SET" controls for a zero-reading on the power meter.

Note

When a stable zero set is required, allow a half to one hour warm-up period before making a final zero-setting adjustment.

Connect the r-f cable to the directional coupler of the antenna system, as outlined in the Handbook of Service instructions. Monitor the radar power output level. The proper reading is 0.8 to 1.2 megawatts, peak power.

CAUTION

When the r-f power is applied, the reading should not be off scale. A meter reading above 1.5 megawatts indicates excessive r-f power. Remove the r-f cable immediately to prevent damage to the monitor.

TABLE XXXIII. POWER MONITOR CONTROLS

Control	*Function*
"OFF-STANDBY-OPERATE" switch	Controls the application of source power. *Position* — *Function* "OFF" — Removes power from the unit (space heaters energized). "STANDBY" — Provides for initial warm-up for the unit. "OPERATE" — Energizes unit completely.
"ZERO SET COARSE" switch	Brings power meter within zero-set range of the "ZERO SET FINE" control.
"ZERO SET FINE" control	Zero set power meter.
Power meter	Monitors the output level of the radar set.

SECTION IV
EMERGENCY OPERATION AND REPAIR

4–1 Thru 4–54D, deleted. (See T.O. 31P1-2GPA126-2.)

4–55. EMERGENCY OPERATION AND REPAIR.

4–56. Radar Sets AN/FPS-8 and AN/MPS-11 will function properly after the operation checks and adjustments

Figures 4–1 thru 4–14, deleted.

Pages 93 thru 98A/(98B blank) deleted.

AFLC SMAMA JUN 69, 950

have been made as described in section III. (See table XXXII.) However, internal failure may occur; or combat, or other unpredictable events may result in damage to the equipment. This does not necessarily mean the radar set must be shut down: certain steps can be taken to maintain the radar set in emergency operation.

4–57. POWER FAILURE. If the equipment suddenly stops operating, and there has been no external cause, the trouble may be due to power supply failure. Monitoring meters and blown-fuse indicators are located throughout the radar set. Check for proper power supply voltages and make certain no fuses have been blown. (See table XXXVI.)

4–58. MTI RECEIVER GROUP. If the power-supply drawer cannot be closed and the emergency situation demands that the equipment be operated, it is possible to short out the power-supply interlock by raising the red interlock short guard inside the power-supply drawer and throwing the switch beneath.

WARNING

This should be done only in an emergency since under this condition high voltages are exposed.

If for any reason the blowers do not operate and emergency operation of the equipment is desired, the equipment can be operated with the drawers open and the blowers off. Summon maintenance personnel to repair the blowers as soon as possible.

4–59. POWER CONTROL BOX. *(See figure 2–1.)* Alternate "GENERATOR" circuit breakers are provided for the application of power to the radar bus loads. If one or both of the "GENERATOR" circuit breakers is defective, move the interlock circuit breaker bars and use an alternate pair of "GENERATOR" circuit breakers.

4–60. RECEIVER CONTROL. *(See figures 2–8, 2–9, and 2–15.)* Alternate controls of the receiver and control unit are provided at the local control panel. To substitute the local control panel for the remote control panel, reverse the "REMOTE LOCAL" switch at either of these two panels. The "LOCAL ON" indicator lights and the "REMOTE ON" indicator goes out, thus indicating the transference of receiver control.

4–61. TRIGGER GENERATION. *(See figures 2–11 and 2–14.)* The choice of one of two triggers are offered during either MTI or non-MTI operation. When the "IFF ZERO DELAY" trigger circuit is not operating properly, switch the "SYSTEM TRIGGER SELECTOR" switch to "IFF DELAY". It is sometimes possible to operate the radar set at the latter switch position, when the "IFF ZERO DELAY" circuit is defective.

4–62. RECEIVER. *(See figure 2–14.)* If the MTI system is defective, operate the normal receiver system only. At the video distribution unit, turn the "TRIGGER SELECTOR" switch from "MTI" to either "IFF DELAY" or "IFF ZERO DELAY." The switch position depends on the existing tactical situation.

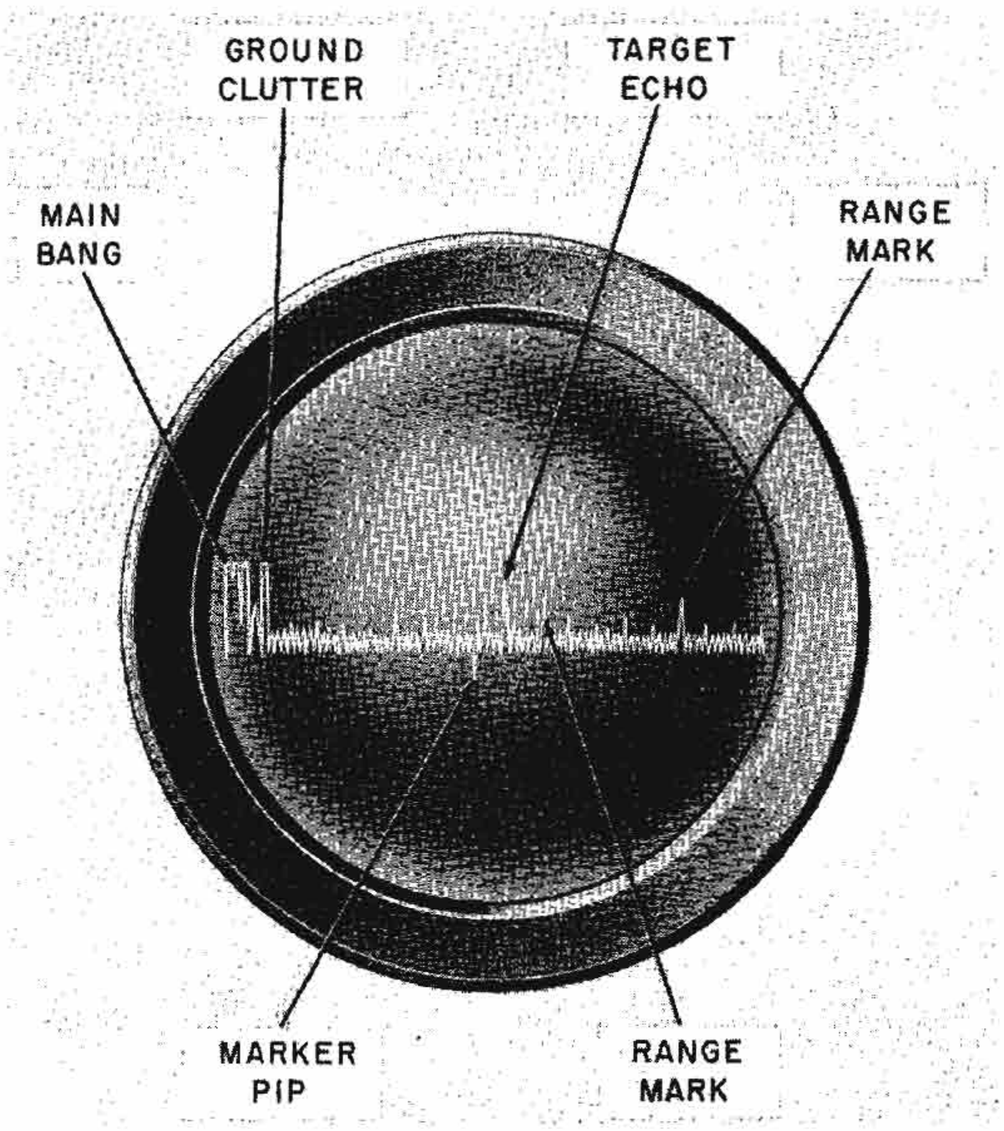


Figure 4–15. Typical A-scope Presentation

4–63. VIDEO PRESENTATION. The A-scope is normally used for maintenance purpose. However, in an emergency, the A-scope may serve as a replacement for a defective PPI oscilloscope.

4–64. A-SCOPE.
(See figures 4–15 and 4–16.)

4–65. The A-scope indicates the range ot the radar antenna to the observed target; no target azimuth is indicated. The A-scope presents a sweep trace the length of which represents range. Target echoes appear as pulses extending above the sweep trace.

4–66. RANGE INFORMATION. Range information is shown by the position of the target echo relative to the range marks. The range marks are indicated by a series of evenly spaced pulses along the sweep trace, every fifth marker being slightly larger than others. The separation between any two adjacent range marks represents 10 miles of range and the marks with increased amplitude represent 50-mile intervals. When the antenna is rotated, target echoes appear instantaneously as the antenna passes the target.

4–67. TARGET ECHOES. Target echoes received on the A-scope screen are pulses extending upward from the horizontal sweep trace. The size and shape of the echo pulses depend on the nature and number of targets which cause the echoes. Target echoes appear to the right of the main pulse (transmitted pulse), the distance depending upon the range of the target. Moving targets

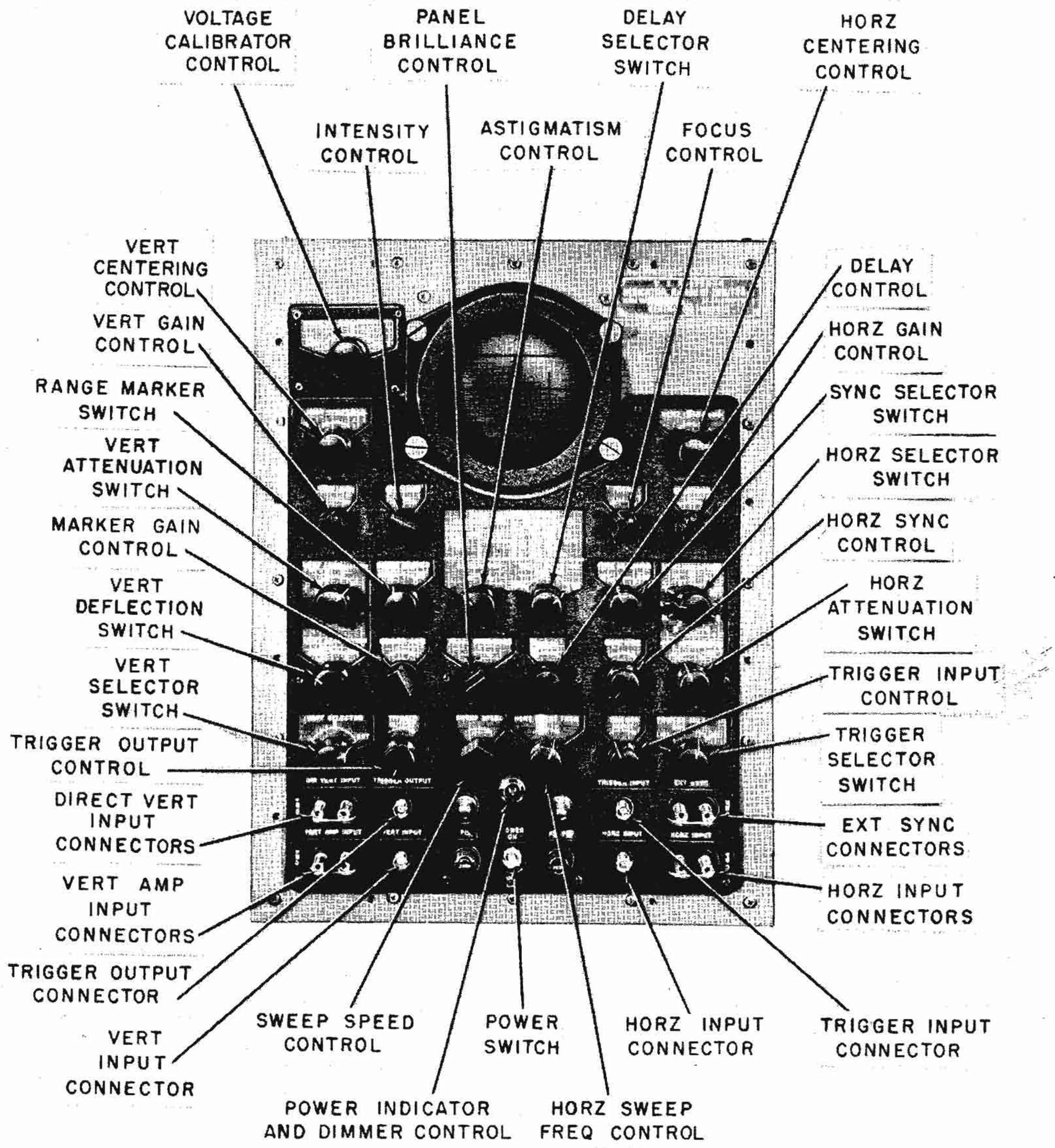


Figure 4–16. A-scope Control Panel

produce echoes that change position slowly along the sweep trace.

4–68. FALSE ECHOES. Electrical noise or atmospheric disturbance appears as pulses on the A-scope. However, these pulses appear and disappear momentarily without any regularity in pattern, form or position.

4–69. Table XXXIV lists the controls, functions and pre-operational control settings of the A-scope. Table XXXV lists the controls and gives the operational procedure for the A-scope. The data given in the tables is supplemented by information contained in paragraphs 4–70 through 4–73.

Note

There is no correlation between the step numbers of table XXXV and those of section II.

TABLE XXXIV. A-SCOPE, FUNCTION AND PREOPERATIONAL SETTING OF CONTROLS

Control	*Function*	*Preoperational Setting*
"POWER ON-OFF" switch	In "ON" position, connects A-scope to power source.	"OFF"
Dimmer control	Adjusts "POWER ON" indicator illumination.	Approximately mid-position
"PANEL BRILLIANCE" control	Adjusts panel illumination.	Approximately mid-position
"INTENSITY" control	Adjusts intensity of trace.	Approximately mid-position
"FOCUS" control	Adjusts presentation for sharpest signal definition.	Approximately mid-position
"ASTIGMATISM" control	Adjusts presentation for sharpest signal definition.	Approximately mid-position
"VERT CENTERING" control	Adjusts vertical centering of entire scope pattern.	Approximately mid-position
"HORZ CENTERING" control	Adjusts the horizontal centering of the entire scope pattern so that the sweep starts at the left side of the screen.	Approximately mid-position
"VERT SELECTOR" switch	Is a 3-position switch that selects the input signal. *Position* — *Function* "1" — Selects normal, blanked video signals. "2" — Selects MTI video signals. "EXT" — Selects test signals that are applied to the "VERT AMP INPUT" terminals.	"1" or "2"
"VERT DEFLECTION" switch	Is a 2-position switch that applies input signals to the A-scope. *Position* — *Function* "AMP" — Input signals are amplified for radar operation. "DIRECT" — Input test signals at the "DIR VERT INPUT" terminals are applied directly.	"AMP"
"VERT ATTENUATION" switch	Is a coarse-gain, 4-position switch that adjusts the amplitude of target echoes.	"3"
"VERT GAIN" control	Is a fine-gain control that adjusts the amplitude of target echoes.	
"RANGE MARKER ON-OFF" switch	In "ON" position, energizes the "MARKER GAIN" control circuit.	"OFF"
"MARKER GAIN" control	Adjusts the amplitude of the range marks. The control is effective when "RANGE MARKER ON-OFF" switch is at "ON".	Approximately mid-position
"HORZ SELECTOR" switch	Is a rotary switch that selects the desired range display for radar operation or frequencies for testing procedures. The "S", "M", "L" or "T" positions are used during radar operation. *Position* — *Function* — *Can Be Varied* "S" — Short range, 10 nautical miles. — 6-26 nautical miles "M" — Medium range, 50 nautical miles. — 10-90 nautical miles "L" — Long range, 200 nautical miles. — 80-250 nautical miles "T" — Very short range, 1.6 to 6.5 nautical miles continuously variable by the "SWEEP SPEED" control. The start of this very short sweep is dependent on the position of the "RANGE DELAY" control thereby making it possible to examine any 1.6 to 6.5 sector of a 200-mile range.	"S", "M", "L" or "T"

TABLE XXXIV. A-SCOPE, FUNCTION AND PREOPERATIONAL SETTING OF CONTROLS (cont)

Control	Function	Preoperational Setting
"HORZ SELECTOR" switch (cont)	"1" Testing position for MTI. Presents a 161.2 nautical mile range. "2" Testing position for MTI. Presents a 4.03 nautical mile range. "A" A-scope used as oscilloscope, 25-70-cps frequency range. "B" A-scope used as oscilloscope, 50-250-cps frequency range. "C" A-scope used as oscilloscope, 225-1200-cps frequency range. "D" A-scope used as oscilloscope, 1-kc-6-kc frequency range. "E" A-scope used as oscilloscope, 6-kc-30-kc frequency range. "EXT" Selects test signals that are applied to the "HORZ INPUT" terminals.	80.65-242 nautical miles
"HORZ GAIN" control	Adjusts the width of the entire scope pattern.	Approximately mid-position (or desired position)
"HORZ SWEEP FREQ" control	Adjusts the horizontal sweep frequency. Used during testing procedures.	Approximately mid-position
"SYNC SELECTOR" switch	Is a 2-position switch that selects the sync circuit for the A-scope during testing procedures. *Position* — *Function* "INT" Uses internal sync circuits. This setting is also used if the system trigger to the A-scope is lost during radar operation. (See paragraph 4—73.) "EXT" Uses external sync voltage that is applied to the "EXT SYNC" terminals.	"INT"
"HORZ SYNC" control	Adjusts amount of sync voltage used during testing procedures.	Fully counter-clockwise
"HORZ ATTENUATION" switch	Is a 2-position switch that places an attenuator in series with the input signals. *Position* — *Function* "1:1" Removes attenuator for radar operation. "10:1" Reduces the test signal input that is applied to the "HORZ INPUT" terminals.	"1:1"
"TRIGGER SELECTOR" switch	Is a 4-position switch that selects the desired trigger input for the A-scope. *Position* — *Function* "LINE" Receives system trigger for radar operation. "NEG" Used for testing procedures when negative trigger is available. "POS" Used for testing procedures when positive trigger is available. "INT" Used for testing procedures or when system trigger to A-scope is lost during radar operation. (See paragraph 4—73.)	"LINE"
"TRIGGER INPUT" control	Adjusts amplitude of input trigger. Used whenever "TRIGGER SELECTOR" switch is set at "LINE", "NEG", or "POS".	Fully counter-clockwise

TABLE XXXIV. A-SCOPE, FUNCTION AND PREOPERATIONAL SETTINGS OF CONTROLS (cont)

Control	Function	Preoperational Setting
"SWEEP SPEED" control	Continuously varies the range of the very short sweep from 1.6 to 6.5 nautical miles whenever the "HORZ SELECTOR" switch is set at the "T" position.	Fully counter-clockwise
"DELAY SELECTOR" control	Is a 3-position switch that places delay circuits in operation. *Position* — *Function* "OFF" — No range delay. "MARKER" — Presents a negative (downward) delay marker (pip) that indicates the position of the start of the delayed sweep when the "DELAY SELECTOR" control is set at "ON". (The marker may be used to reference the range of a target.) The range of the marker is controlled by the "RANGE DELAY" control. "ON" — Delays the start of the range sweep by an amount controlled by the "RANGE DELAY" control.	"OFF"
"RANGE DELAY" control	Delays the start of the range sweep, and controls the positioning of the delay marker. The amount of delay is determined by the delay marker (pip) when the "DELAY SELECTOR" switch is at the "MARKER" position.	Fully counter-clockwise
"TRIGGER OUTPUT" control	Adjusts amplitude of output trigger. Used during testing procedures.	Fully counter-clockwise
"VOLTAGE CALIBRATOR" switch	Is a 5-position switch that selects calibration signals for the vertical amplifier during testing procedures. *Position* "OFF" — No calibration signals used. ".05" — Calibration signal 0.05 volt peak-to-peak. ".5" — Calibration signal 0.5 volt peak-to-peak. "5" — Calibration signal 5 volts peak-to-peak. "50" — Calibration signal 50 volts peak-to-peak.	"OFF"

TABLE XXXV. A-SCOPE OPERATION

Step Number	Control	Indication
	Note Set all controls to the position indicated in table XXXIII, preoperational setting column.	
1	Turn the "POWER ON-OFF" switch to "ON".	Red "POWER ON" indicator lights.
2	Adjust dimmer control.	Red "POWER ON" indicator at proper intensity.
3	Adjust "PANEL BRILLIANCE" control.	Panel at proper light intensity.
4	Turn "RANGE MARKER ON-OFF" to "ON".	Range marks appear.
5	Adjust "MARKER GAIN" control.	Range marks are barely visible.
6	Set "HORZ SELECTOR" switch to "S", "M", "L" or "T" depending on the desired range-sector coverage.	The number of range marks presented on the range in use.
7	Adjust "VERT CENTERING" control.	Entire scope pattern is vertically centered.
8	Adjust "HORZ CENTERING" control.	Entire scope pattern is horizontally centered.
9	Adjust "VERT GAIN" control and "VERT ATTENUATION" switch.	The deflections are at the desired amplitude (usually between one and two inches high).
10	Adjust "HORZ GAIN" control.	Entire scope pattern appears at desired width.

TABLE XXXV. A-SCOPE OPERATION (cont)

Step Number	Control	Indication
11	Adjust "FOCUS" control for best overall presentation for various positions of the "ASTIGMATISM" control, thus determining the correct setting of that control.	A-scope display clearly focused.
	Note Do not adjust the "ASTIGMATISM" and "FOCUS" controls simultaneously.	
12	Adjust "INTENSITY" control.	Display appears at proper intensity.
13	Set "DELAY SELECTOR" switch at "ON" or "MARKER" as desired. (See paragraph 4—72.)	At "MARKER" position, pip indicates the start of the delayed sweep which will occur when "DELAY SELECTOR" switch is set at "ON".
14	Adjust "RANGE DELAY" control as desired. (See paragraph 4—72.)	When the "DELAY SELECTOR" switch is at "MARKER", the "RANGE DELAY" control determines the position of the marker pip. When the "DELAY SELECTOR" switch is at "ON", the "RANGE DELAY" control determines the amount of delay before the start of the sweep.

4–70. A-SCOPE OPERATOR'S NOTES.

4–71. The following paragraph supplements the data given in table XXXV.

4–72. RANGE DELAY OPERATION. Delayed starting of the sweep trace permits accurate range readings of long-range targets. The range at which the sweep starts corresponds to the settings of the "RANGE DELAY" control.

a. Throw the "DELAY SELECTOR" switch to the "MARKER" position. At this position, a vertical, downward pip appears on the A-scope screen. The range of the pip corresponds to the setting of the "RANGE DELAY" control (i.e., this indicates the start of the delayed sweep when the "DELAY SELECTOR" switch is set back on the "ON" position).

b. With the "HORZ SELECTOR" switch in the "L" position, rotate the "RANGE DELAY" control from its counter-clockwise position. The vertical pip moves toward the right: adjust the delay control so that the pip is immediately to the left of the target.

c. Set the "DELAY SELECTOR" switch to the "ON" position.

d. Set the "HORZ SELECTOR" switch to the "M", "S" or "T" position, as required. This provides the desirable expansion of that portion of the sector which is being observed. Vary the amount of delay to ascertain whether any targets are past the limits of the presented area.

e. When the "HORZ SELECTOR" switch is at the "T" position, the "SWEEP SPEED" control varies the presented sector-section between 1.6 and 6.5 nautical miles.

4–73. INTERNAL SYNCHRONIZATION OF A-SCOPE. Internal synchronization is used during radar operation when the system trigger to the scope is lost.

a. Set the "TRIGGER SELECTOR" switch at the "INT" position.

b. Set the "SYNC SELECTOR" switch at the "INT" position.

c. Vary "HORZ SWEEP FREQ" control until the proper rep rate is matched.

d. Advance the "HORZ SYNC" control slightly in the clockwise direction. This locks the internal trigger and provides for stable operation.

Note

Do not advance the "HORZ SYNC" control too much in the clockwise direction.

4–74. FUSE COMPLEMENT.

4–75. Table XXXVI lists the fuses of Radar Sets AN/FUS-8 and AN/MPS-11. All fuses are glass-cartridge types except fuses F1401 through F1412 of the power distribution unit. These fuses are fiber-cartridge types.

CAUTION

If the replacement fuse blows, do not reinsert another fuse; notify maintenance personnel.

4–76. INDICATOR COMPLEMENT.

5–77. Table XXVII lists the indicators of Radar Sets AN/FPS-8 and AN/MPS-11. Blown-fuse indicators may be checked by removing the fuse of each indicator circuit; other indicators may be checked by turning "ON" their corresponding switches.

TABLE XXXVI. FUSE COMPLEMENT

Unit	*Symbol*	*Rating*	*Blown-Fuse Indicator or Marking*
Power Distribution Unit	F1401	15 amp; 250 v	"PPI-1"
	F1402	15 amp; 250 v	"PPI-2"
	F1403	15 amp; 250 v	"PPI-3"
	F1404	15 amp; 250 v	"PPI-4"
	F1405	15 amp; 250 v	"PPI-5"
	F1406	15 amp; 250 v	"PPI-6"
	F1407	15 amp; 250 v	"VIDEO MAP"
	F1408	15 amp; 250 v	"MTI"
	F1409	15 amp; 250 v	"OUTLETS"
	F1410	15 amp; 250 v	"TELEPHONE"
	F1411	15 amp; 250 v	"OPS"
	F1412	15 amp; 250 v	"STORES"
	F1413	3 amp; 250 v	"HV REG"
	F1414	3 amp; 250 v	"MAG FIL REG"
	F1415	3 amp; 250 v	"MOD FIL REG"
	F1416	3 amp; 250 v	"REG BLOWER"
Modulator	F101	8 amp; 250 v	"UTILITY OUTLET"
Transmitter control	F801	3 amp; 250 v	"TRIG AMPL"
	F802	1 amp; 250 v	"TUNING MOTOR"
Receiver rf group power supply	F1101	1/4 amp; 250 v	"+140 V DC"
	F1102	1/16 amp; 250 v	"+300 V DC"
	F1103	1/16 amp; 250 v	"−210 V DC"
	F1104	1/16 amp; 250 v	"+250 V DC"
	F1105	1/4 amp; 250 v	"−105 V DC"
	F1106	1/4 amp; 250 v	"+250 V DC UNREG"
	F1107	1/4 amp; 250 v	"120 V AC STALO FIL"
	F1108	2 amp; 250 v	"120 V AC PLATE"
Upper control panel	F1001	1 amp; 250 v	"STALO & MAG TUNE MOTORS"
	F1002	8 amp; 250 v	"TRANSMITTER 120 V UNREG"
MTI power supply	F6701	5 amp; 250 v	"PLATE"
	F6702	5 amp; 250 v	"BLOWER"
	F6703	3 amp; 250 v (slo-blo)	"FILAMENT A.C."
	F6704	1/2 amp; 250 v	"FILAMENT D.C."
Upper MTI drawer	F7201	1/4 amp; 250 v	"−150 V A"
	F7202	1/4 amp; 250 v	"−150 V B"
	F7303	1/4 amp; 250 v	"+120 V"
	F7404	1/4 amp; 250 v	"+250 V"
Lower MTI drawer	F6001	1/4 amp; 250 v	"−150 V"
	F6002	1/2 amp; 250 v	"+120 V"
	F6003	1/16 amp; 250 v	"+250 V"
	F6004	1 amp; 250 v	"+6.3 V"
Video distribution power supply	F5601	3 amp; 250 v	"RECTIFIER 140/275 V"
	F5602	3 amp; 250 v	"FILAMENT EXTERNAL LOAD"
	F5603	1 amp; 250 v	"RECTIFIER −150 V"
	F5604	1 amp; 250 v	"RECTIFIER 24 V"
	F5605	1/16 amp; 250 v	"BLANKER AND TEST 275 V"
	F5606	1/16 amp; 250 v	"ANGLE MARK GEN 275 V"
	F5607	1/4 amp; 250 v	"RANGE MARK GEN 275 V"
	F5608	1/16 amp; 250 v	"TRIGGER GEN 275 V"
	F5609	1/16 amp; 250 v	"BLANKER 140 V"
	F5610	1/16 amp; 250 v	"RANGE MARK GEN 140 V"
	F5611	1/4 amp; 250 v	"NORMAL RECEIVER 140 V"
	F5612	1/16 amp; 250 v	"BLANKER −150 V"
	F5613	1/16 amp; 250 v	"ANGLE MARK GEN −150 V"
	F5614	1/16 amp; 250 v	"RANGE MARK GEN −150 V"
	F5615	1/16 amp; 250 v	"NORMAL RECEIVER −150 V"
Receiver and control unit	F4501	1 amp; 250 v	"STALO & MAG TUNE MOTORS"
Antenna control unit	F2603	1/4 amp; 250 v	"SERVO PLATE SUPPLY"
	F2602	1/4 amp; 250 v	"DRIVE MOTOR FIELD"
	F2601	5 amp; 250 v	"MAIN POWER"

TABLE XXXVI. FUSE COMPLEMENT (cont)

Unit	Symbol	Rating	Blown-Fuse Indicator or Marking
PPI cabinet	F9701	1 amp; 250 v	"ILLUMINATION"
	F9702	5 amp; 250 v	"FUSE"
	F9703	15 amp; 250 v	"POWER ON"
PPI low-voltage power supply	F8501	1/2 amp; 250 v	"+30V—40V—150V"
	F8502	3/4 amp; 250 v	"+300+150V"
	F8503	1/2 amp; 250 v	"HV POWER"
A-scope	F9301	2 amp; 250 v	"FIL"
	F9302	2 amp; 250 v	"PLATE"
Power monitor	F3201	3/4 amp; 250 v	"SLOW BLOW"
	F3202	3/4 amp; 250 v	"SLOW BLOW"
Azimuth pulse amplifier (where available)	F1	3 amp; 250 v	"AZIMUTH MARKER"
	F2	3 amp; 250 v	"SPARE"
	F3	3 amp; 250 v	"NORTH MARKER"

TABLE XXXVII. INDICATOR COMPLEMENT

Unit	Symbol	Type	Marking
Azimuth pulse amplifier (where available)	I1	NE48	"AZIMUTH MARKER"
	I2	NE48	"SPARE""
	I3	NE48	"NORTH MARKER"
Power control box	I1201	NE48	"GENERATOR 1"
	I1202	NE48	"GENERATOR 2"
	I1203	NE48	"GENERATOR 3"
	I1204	NE48	Main bus
	I1205	NE48	Auxiliary bus
	I1206	NE48	"AMPLIDYNE ON"
Power distribution unit	I1401	NE51	"PPI-1"
	I1402	NE51	"PPI-2"
	I1403	NE51	"PPI-3"
	I1404	NE51	"PPI-4"
	I1405	NE51	"PPI-5"
	I1406	NE51	"PPI-6"
	I1407	NE51	"VIDEO MAP"
	I1408	NE51	"MTI"
	I1409	NE51	"OUTLETS"
	I1410	NE51	"TELEPHONE"
	I1411	NE51	"OPS"
	I1412	NE51	"STORES"
	I1413	NE51	"HV REG"
	I1414	NE51	"MAG FIL REG"
	I1415	NE51	"MOD FIL REG"
	I1416	NE51	"REG BLOWER"
	I1417	NE48	"MAIN BUS"
	I1418	NE48	"AUXILIARY BUS"
	I1419	GE47	"REV CURRENT TRIP"
	I1420	NE48	"HV ON"
	I1421	NE51	"CONTROL TEST"
	I1422	NE48	"AMPLIDYNE ON"
	I1423	GE47	"HV STANDBY"
Modulator power supply	I201	NE51	"INTERLOCK SHORT"
Modulator	I101	NE51	"UTILITY OUTLET"
	I102	NE51	"INTERLOCK SHORT"
	I103	NE51	"INTERLOCK SHORT"
Transmitter control	I801	NE48	"HV ON"
	I802	MAZDA 47	"HV STANDBY"
	I803	MAZDA 47	"REV COR TRIP IND"
	I804	NE51	"TUNING MOTOR"
	I805	NE51	"TRIG AMPL"
Upper control panel	I1001	NE51	"STALO & MAG TUNING MOTORS"
	I1002	NE51	"TRANSMITTER 120 V UNREG"
	I1003	MAZDA 47	"NOISE ON"
	I1004	MAZDA 47	"LOCAL ON"

TABLE XXXVII. INDICATOR COMPLEMENT (cont)

Unit	Symbol	Type	Marking
Receiver rf group power supply	I1101	NE51	"+140 V DC"
	I1102	NE51	"+300 V DC"
	I1103	NE51	"−210 V DC"
	I1104	NE51	"+140 V DC"
	I1102	NE51	"+300 V DC"
	I1103	NE51	"−210 V DC"
	I1104	NE51	"+250 V DC REG"
	I1105	NE51	"−105 V DC"
	I1106	NE51	"+250 V DC UNREG"
	I1107	NE51	"120 V AC STALO FIL"
	I1108	NE51	"120 V AC PLATE"
	I1109	NE48	"PLATE INPUT 120 V AC"
	I1110	NE48	"FILAMENT INPUT 120 V AC"
MTI power supply	I6701		"PLATE"
	I6702		"PLATE CIRCUIT"
	I6703		"BLOWER"
	I6704		"BLOWER CIRCUIT"
	I6705		"FILAMENT A.C."
	I6706		"FILAMENT CIRCUIT"
	I6707		"FILAMENT D.C."
Upper MTI drawer	I7201		"−150 VA"
	I7202		"−150 VB"
	I7203		"+120 V"
	I7204		"+250 V"
Lower MTI drawer	I6003		"−150 V"
	I6004		"+120 V"
	I6005		"+250 V"
	I6006		"+6.3 V"
Video distribution power supply	I5601	NE51	"RECTIFIER 140/275 V"
	I5602	NE51	"FILAMENT EXTERNAL LOAD"
	I5603	NE51	"RECTIFIER −150 V"
	I5604	NE51	"RECTIFIER 24 V"
	I5605	NE51	"BLANKER AND TEST 275 V"
	I5606	NE51	"ANGLE MARK GEN 275 V"
	I5607	NE51	"RANGE MARK GEN 275 V"
	I5608	NE51	"TRIGGER GEN 275 V"
	I5609	NE51	"BLANKER 140 V"
	I5610	NE51	"RANGE MARK GEN 140 V"
	I5611	NE51	"NORMAL RECEIVER 140 V"
	I5612	NE51	"BLANKER −150 V"
	I5613	NE51	"ANGLE MARK GEN −150 V"
	I5614	NE51	"RANGE MARK GEN −150 V"
	I5615	NE51	"NORMAL RECEIVER −150 V"
	I5616	NE51	"POWER"
Receiver and control unit	I4501	MAZDA 47	"NOISE ON"
	I4502	MAZDA 47	"REMOTE ON"
	I4503	NE51	"ATTENUATOR IN"
	I4504	NE51	"STALO & MAG TUNE MOTORS"
Antenna control unit	I2607	NE51	"FILAMENTS AND FIELDS"
	I2606	NE51	"AMPLIDYNE ON"
	I2609	NE51	"PLATE VOLTAGE"
	I2608	NE51	"MAIN POWER"
	I2604	NE51	"−460V DRIVE MOTOR FIELD"
	I2605	NE51	"+410V SERVO PLATE SUPPLY"
	I1201		Panel illumination
	I1202		Panel illumination
	I1203		Panel illumination
PPI low-voltage power supply	I8501	NE16	"+30V−40V−150V"
	I8502	NE16	"+300 V +150 V"
	I8503	NE16	"FILAMENTS"
	I8504	NE16	"HV POWER"
Servo amplifier			"POWER ON"
A-scope	I9301	GE47	"POWER ON"
	I9311	NE51	"FIL"
	I9312	NE51	"PLATE"
Power monitor	I3201	To be supplied	To be supplied

AFLC SMAMA APR 69, 250 REPRINT

SECTION V
DIFFERENCE DATA SHEETS

5-1. EQUIPMENT COVERED.

5-2. A difference data sheet for Radar Sets AN/FPS-8 and AN/MPS-11 with Power Supply-Receiver OA-4923/FPS-88(V) is supplied in this section.

5-3. The general description and operational procedures for the equipment included in this section are the same as the general description and operational procedures for the original Radar Set AN/FPS-8 except for the specific differences noted in the Difference Data Sheet.

5-4. Sections I through IV contain complete instructions for Radar Sets AN/FPS-8 and AN/MPS-11.

POWER SUPPLY-RECEIVER GROUP OA-4923/FPS-88(V)

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

GENERAL DESCRIPTION. Contents of Section I apply except as follows:

a. Photograph at bottom of figure 1-3 applies except that nomenclature, Radar Receiver R-524/FPS-8 is replaced by Power Supply-Receiver Group OA-4923/FPS-88 (V).

b. Table XXXVII replaces the Receiver R-F Group data of table I.

c. The Receiver R-F Group, Receiver Group OA-417/FPS-8, listed in table II is replaced by Receiver Group, Power Supply-Receiver Group OA-4923/FPS-88(V).

d. Figure 5-1 replaces figure 1-7.

e. The text for Receiver System, paragraphs 1-90 through 1-136 applies with the following exceptions:

(1) All references to Receiver Group OA-417/FPS-8 are replaced with Power Supply-Receiver Group OA-4923/FPS-88(V).

(2) All references to an r-f amplifier are replaced with parametric amplifier.

(3) All references to Radar Receiver R-524/FPS-8 are replaced with Receiver Group OA-4923/FPS-88(V).

(4) All references to Power Supply PP-862/FPS-8 are replaced with Power Supply PP-862A/FPS-8.

(5) Figure 5-2 replaces figure 1-16.

(6) Figure 5-3 replaces figure 1-17.

(7) The following paragraph replaces paragraph 1-98.

Receiver Group OA-4923/FPS-88(V) consists of the following units .(See figures 1-19 and 5-3.)

Duplexer CU-321/FPS-8 (duplexer)

Power Supply PP-863/FPS-8 (keep-alive power supply)

Amplifier Group OA-4925/FPS-88(V) (Parametric assembly)

Variable Attenuator CN-196/FPS-8 (coho coupler)

Radio Frequency Oscillator O-171/FPS-8 (stalo)

Intermediate Frequency Amplifier AM-734/FPS-8 (coho afc preamplifier)

Frequency Mixer State CV-252/FPS-8 (coho frequency mixer)

Receiver Control C-1092/FPS-8 (afc)

Radio Frequency Monitor ID-340/FPS-8 (power monitor)

(8) Reference to figure 1-18 in paragraph 1-100 is replaced by figure 5-3.

(9) Paragraphs 1-101, 1-103, 1-104, 1-105, 1-111, and 1-112 are deleted.

(10) References to T-R cavity in paragraphs 1-90 through 1-114 are replaced by TR tube.

(11) The following paragraph replaces paragraphs 1-101, 1-103, 1-104 and 1-105.

AMPLIFIER GROUP OA-4925/FPS-88(V). (See figure 5-4.) Amplifier Group OA-4925/FPS-88(V) (parametric assembly) consists of a T-R tube, parametric amplifier, filter-mixer and i-f preamplifier. Received target signals from the duplexer are coupled through the T-R tube to the parametric amplifier. Here the echo signals are amplified and then supplied to the filter-mixer. In the filter-mixer these signals are heterodyned with a second input signal from the stalo to produce signals at an intermediate frequency. The i-f signals are amplified in i-f preamplifier and then supplied to the normal and MTI receivers.

OPERATING PROCEDURES. Contents of Section II apply except as follows:

a. The NOISE GENERATOR switch is deleted from table XII.

b. Figure 5-5 replaces figure 2-8.

c. The R.F. AMP TUNING and T.R. TUBE TUNING switches are deleted from table *XIII*.

d. Figure 5-6 replaces figure 2-9.

e. Table XXXVIII and figure 5-7 are added.

f. Table XL provides two additional preliminary switch settings to switch settings shown in table XXIII.

EMERGENCY OPERATION AND REPAIR. Contents of Section IV apply except as follows:

a. Table XLI provides two additional fuses to table XXXVI.

b. The NOISE ON indicator I1003 is deleted from XXXVII.

c. Table XLII provides one additional indicator to table XXXVII.

TABLE XXXVII. EQUIPMENT SUPPLIED FOR POWER SUPPLY-RECEIVER GROUP WITH PARAMETRIC AMPLIFIER

Qty. Per Equip.	Common Name	Official Nomenclature	Overall Dimensions			
			Inches			Lbs.
			Height	Width	Depth	Weight
1	Receiver group	Power Supply-Receiver Group, OA-4923/FPS-88(V)	51	34	27	477
(1)	RF receiver unit	Receiver Group, OA-4924/FPS-88(V)	–	–	–	–
(1)	Control panels	–		–	–	–
(1)	Coho-afc preamplifier	Amplifier, I-F AM-734/FPS-8	–	–	–	–
(1)	RF receiver unit cabinet	Cabinet, Electrical Equipment CY-4081/FPS-88(V)	–	–	–	–
(1)	Stalo	Oscillator, RF O-171/FPS-8	–	–	–	–
(1)	Afc	Control, Receiver C-1092/FPS-8	–	–	–	–
(1)	Coho frequency mixer	Mixer Stage, Frequency CV-252/FPS-8	–	–	–	–
(1)	Keep-Alive power supply	Power Supply PP-863/FPS-8	–	–	–	–
(1)	Duplexer	Duplexer CU-321/FPS-8	–	–	–	–
(1)	Power monitor	Monitor, RF ID-340/FPS-8	–	–	–	–
(1)	Coho coupler	Attenuator, Variable CN-196/FPS-8	–	–	–	–
(1)	Parametric Assembly	Amplifier Group OA-4925/FPS-88(V)	34	34	10	165
(1)	Parametric amplifier	Amplifier, Parametric AM-3742/FPS-88(V)	–	–	–	–
(1)	Voltage regulator	Regulator, Voltage CN-962/FPS-88(V)	–	–	–	–
(1)	I-f preamplifier	Amplifier, I-F AM-3743/FPS-88(V)	–	–	–	–
(1)	Control panel	Panel, Control C-4868/FPS-88(V)	–	–	–	–
1	Receiver power supply	Power Supply PP-862A/FPS-8	18½	33-1/8	27	177

TABLE XXXVIII. Parametric Assembly, Controls and Instruments

Fig. 5-7 Callouts	Control Or Indicator	Reference Designation	Function
1	PREAMP GAIN CONTROL switch	S2	Used to select i-f preamplifier high-gain or low-gain mode.
2	PARAMP-PREAMP DISABLED indicator lamp	DS1	Is lighted when parametric amplifier is locally disabled or when i-f preamplifier is locally switched to high-gain mode.
3	PARAMETRIC AMPL ON switch	S3	Used to locally enable or disable the parametric amplifier
4	Pump and crystal current meter	M1	Used to monitor pump and crystal currents.
5	PUMP MONITOR/XTAL NO. 1 MONITOR/XTAL NO. 2 MONITOR switch	S1	Used to select circuit to be monitored by meter M1.

TABLE XXXIX. POWER MONITOR, CONTROLS AND INSTRUMENTS

Fig. 5-8 Callouts	Control Or Indicator	Reference Designation	Function
1	OFF-STANDBY-OPERATE switch	S1	Used to control application of source power.
2	Power on indicator lamp	I1	Is lighted when source power is applied.
3	Power meter	M1	Used to monitor signal power output of radar set.
4	ZERO SET COARSE switch	S2	Used to make coarse selection of power meter range.
5	ZERO SET FINE control	R25	Used to zero set power meter.

TABLE XL. PRELIMINARY CONTROL SETTINGS FOR PARAMETRIC ASSEMBLY

Unit	Figure Reference	Control	Position
Parametric Assembly	5-7	PREAMP GAIN CONTROL	Down
Parametric Assembly	5-7	PARAMETRIC AMPL ON switch	ON

TABLE XLI. FUSE COMPLEMENT FOR VOLTAGE REGULATOR CN-962/FPS-88(V)

Unit	Symbol	Rating	Blown-Fuse Indicator Or Marking
Voltage Regulator on Parametric assembly	F1	1/16 amp, 250V	SLOW BLOW 1/16 AMP
	F2	1/16 amp, 250V	SLOW BLOW 1/16 AMP

TABLE XLII. INDICATOR COMPLEMENT FOR PARAMETRIC ASSEMBLY

Unit	Symbol	Type	Marking
Parametric Assembly	DS1	1829	PARAMP-PREAMP DISABLED

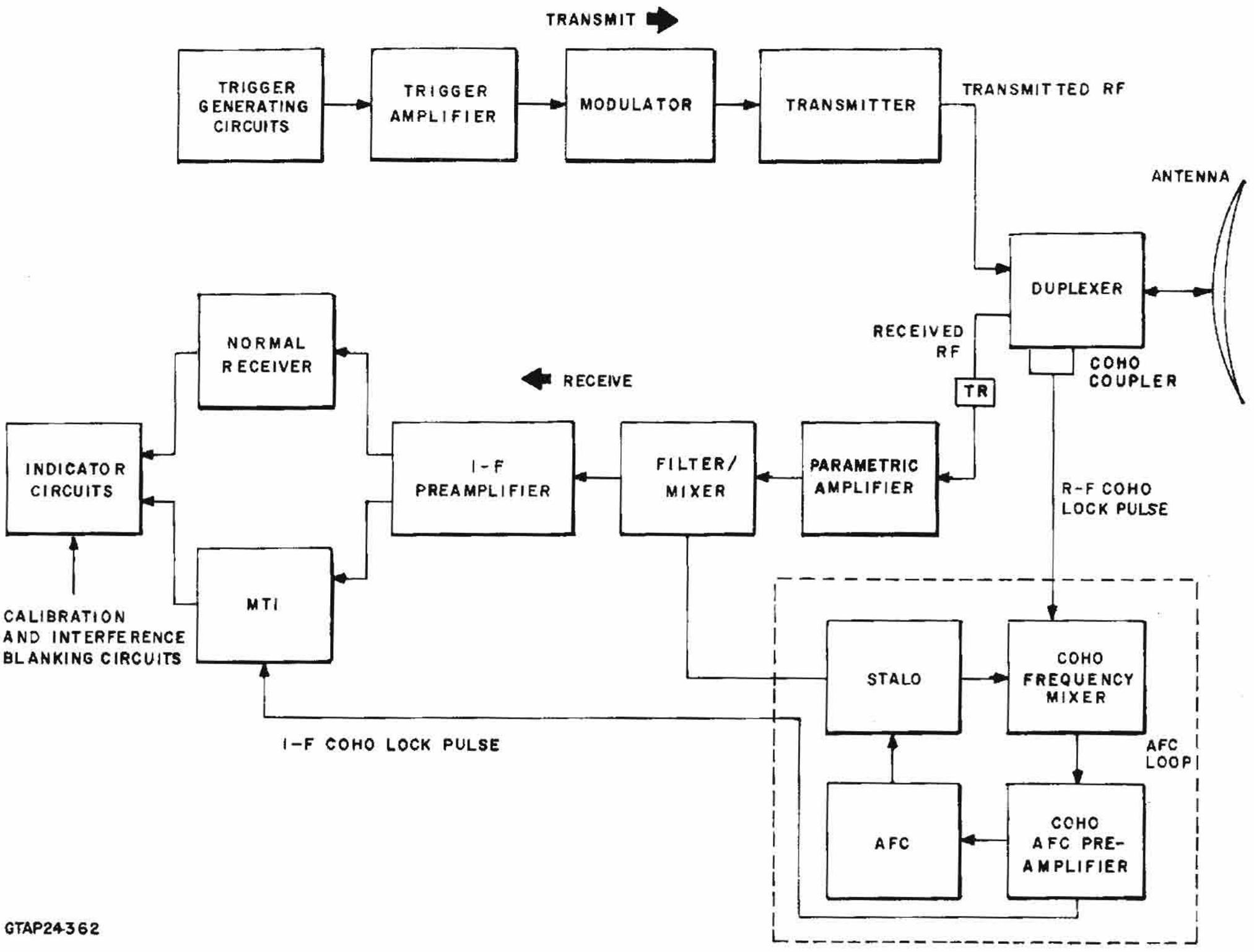


Figure 5-1. System Block Diagram for Radar Sets AN/FPS-8 and AN/MPS-11 With Power Supply-Receiver Group OA-4923/FPS-88(V)

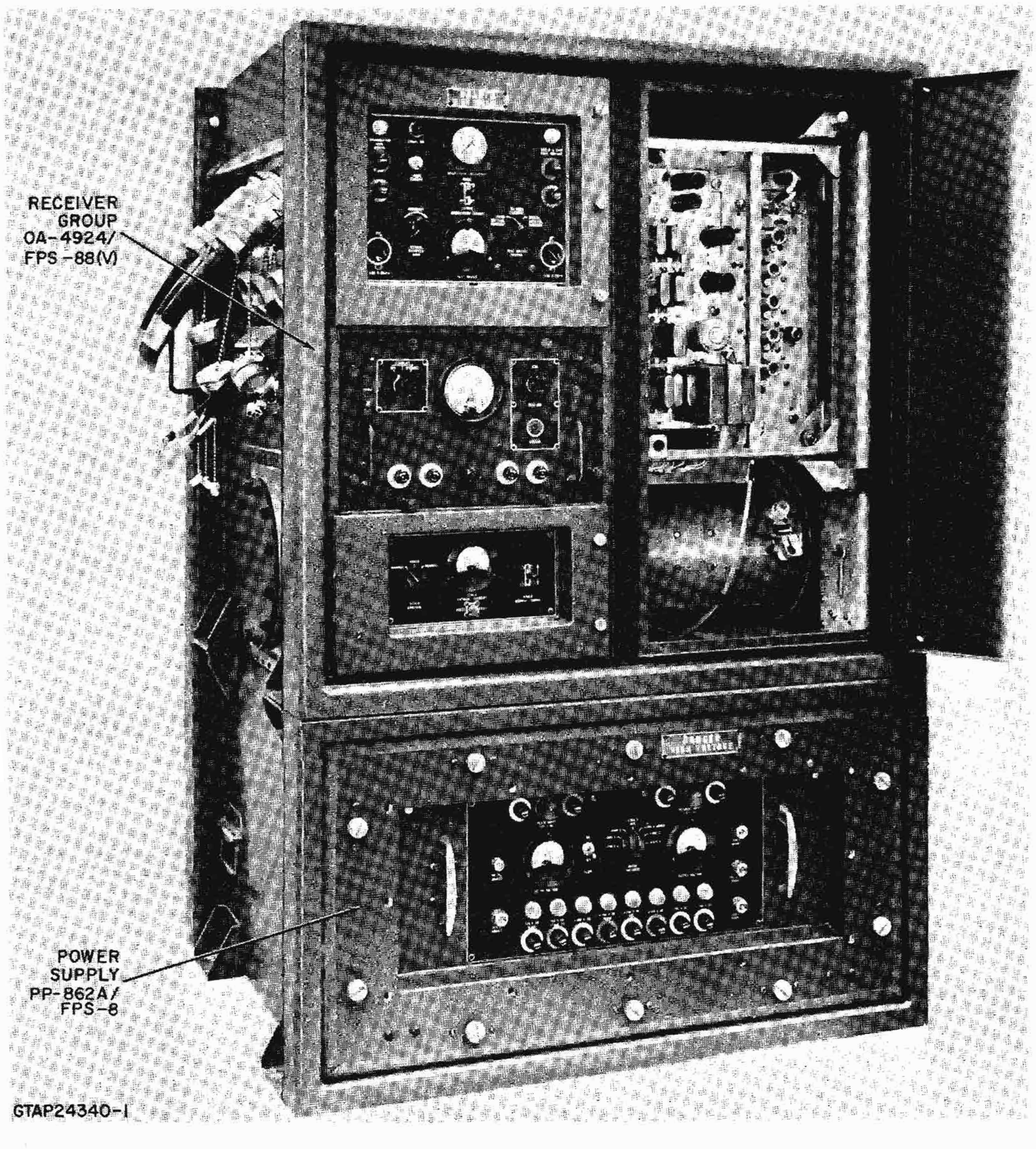


Figure 5-2. Power Supply-Receiver Group OA-4923/FPS-88(V)

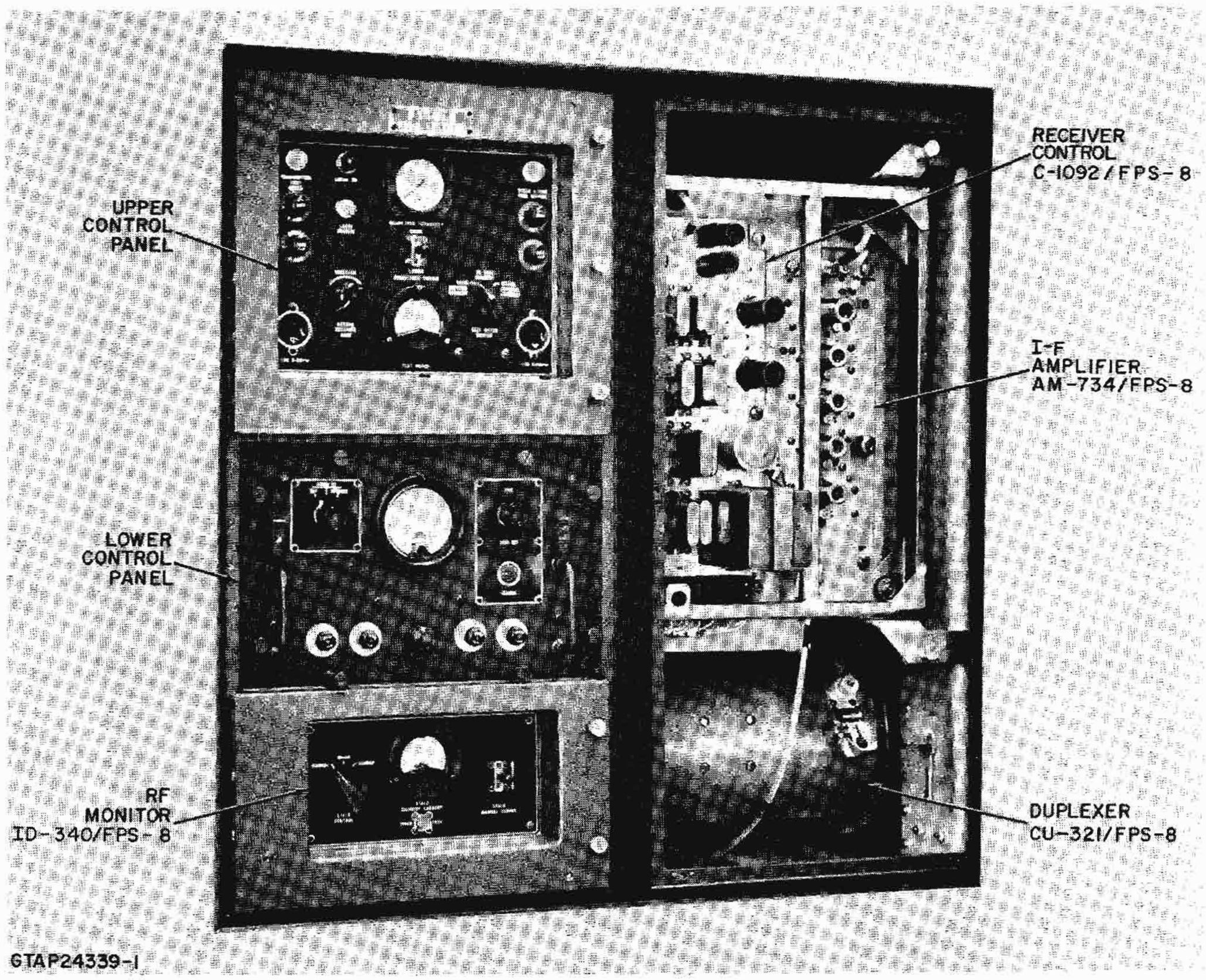


Figure 5-3. Receiver Group OA-4924/FPS-88(V)

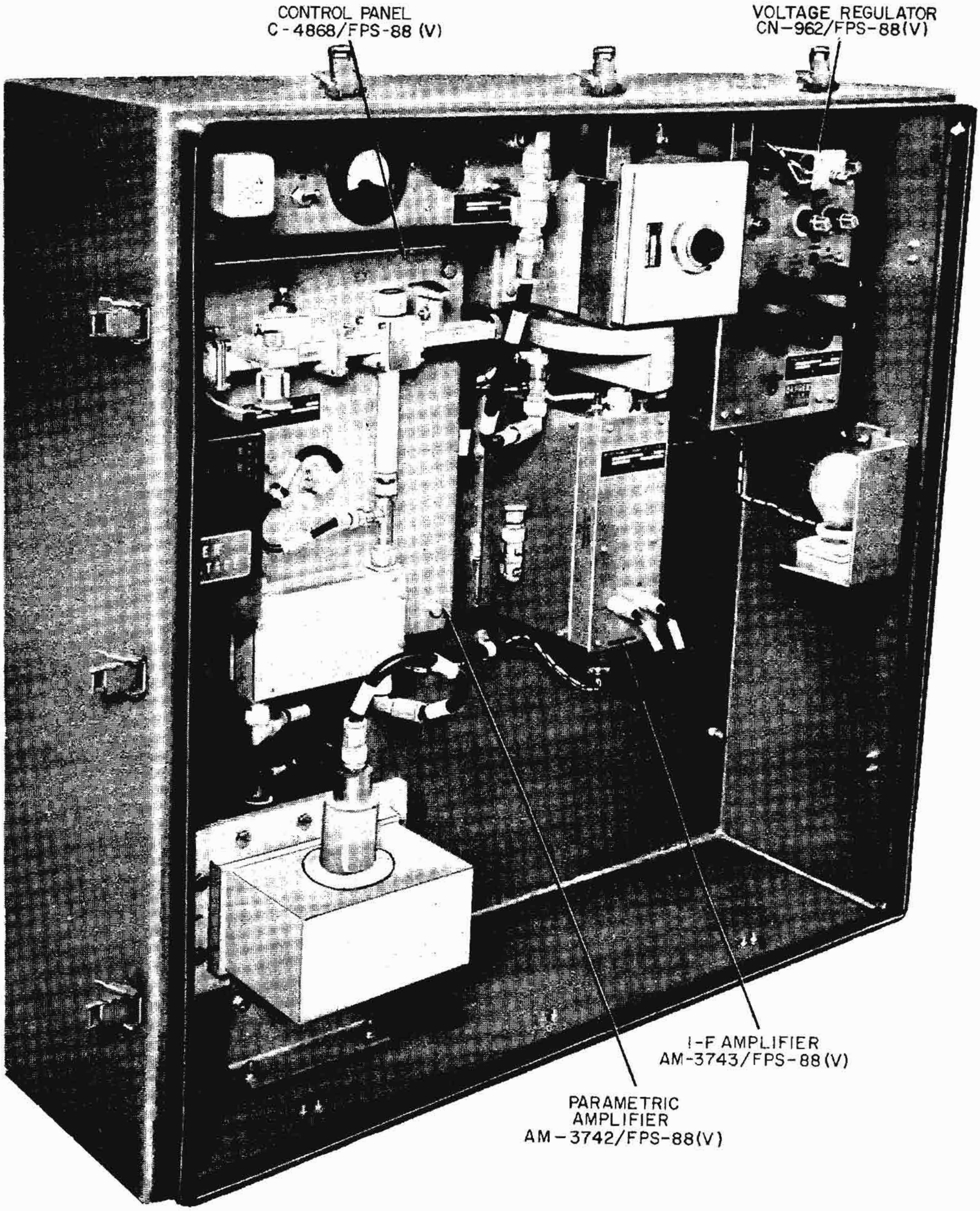


Figure 5-4. Amplifier Group OA-4925/FPS-88(V)

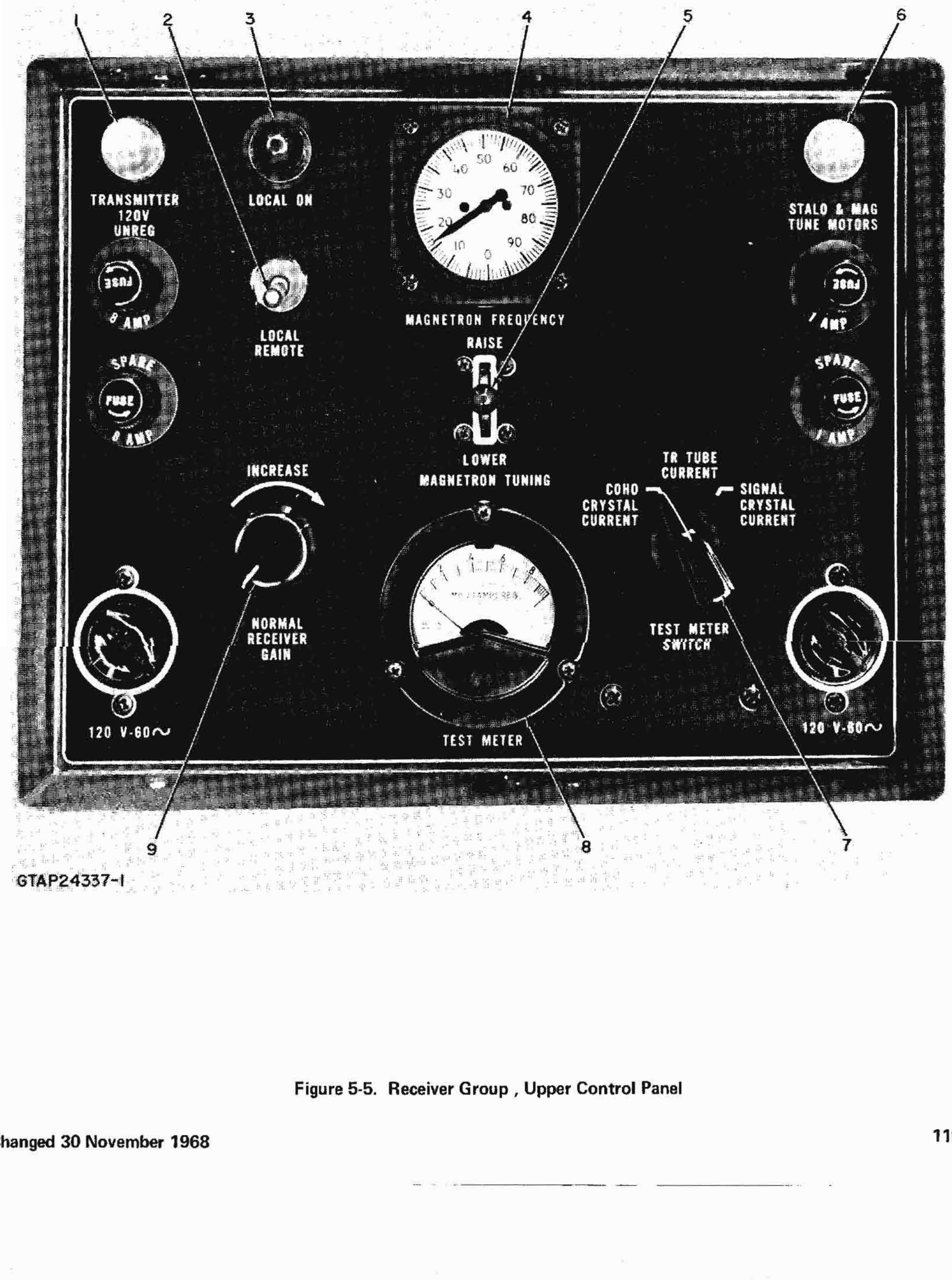


Figure 5-5. Receiver Group , Upper Control Panel

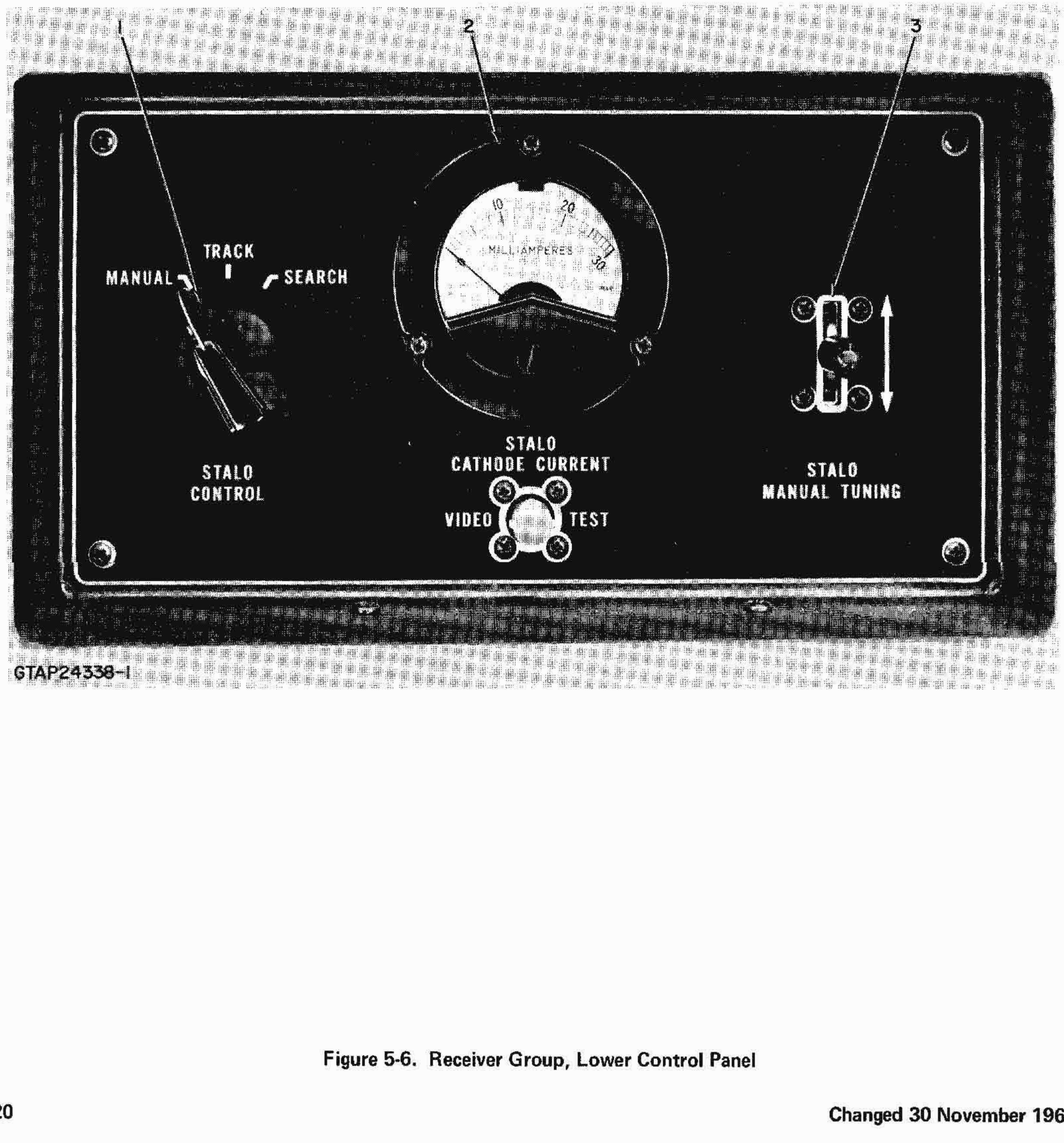


Figure 5-6. Receiver Group, Lower Control Panel

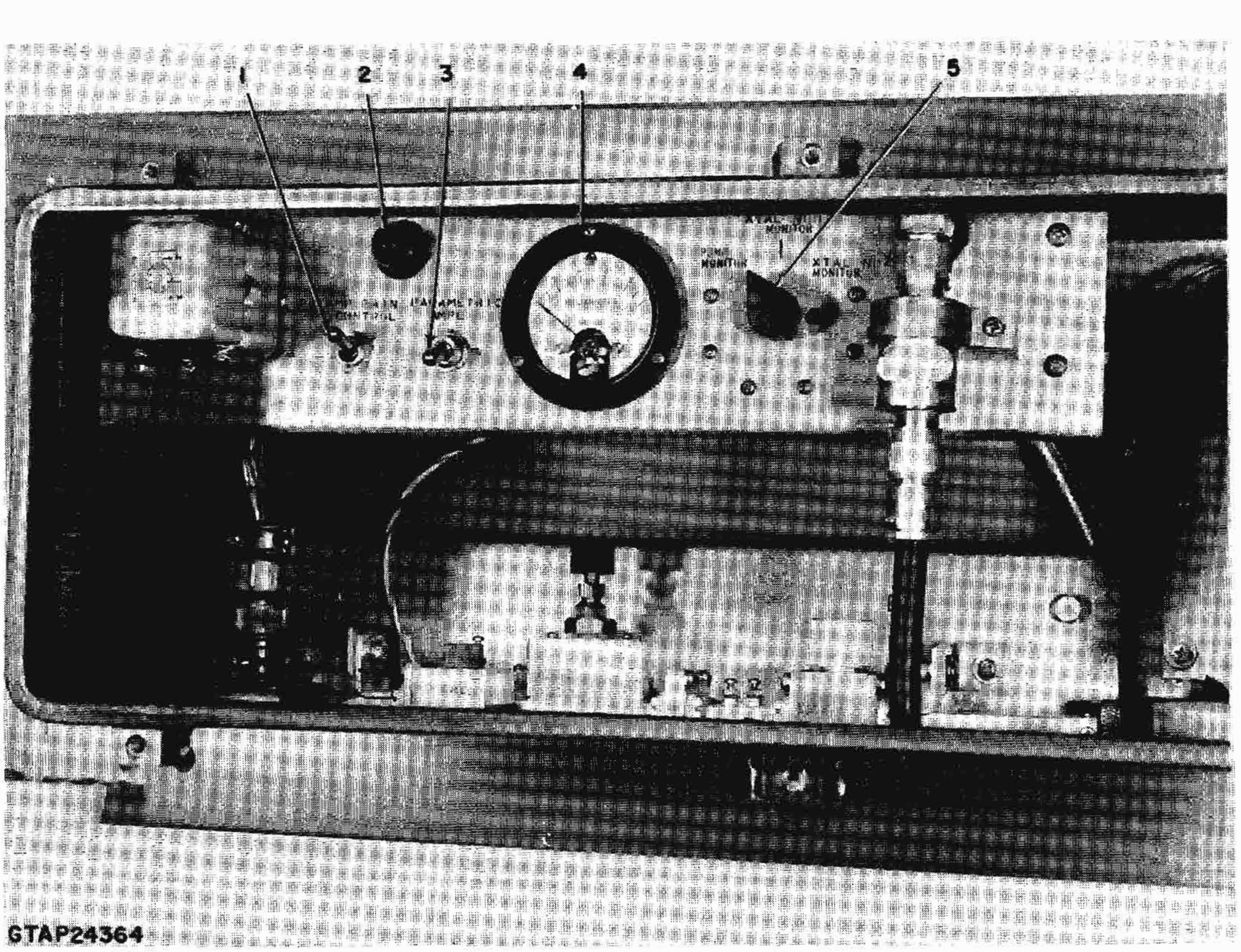
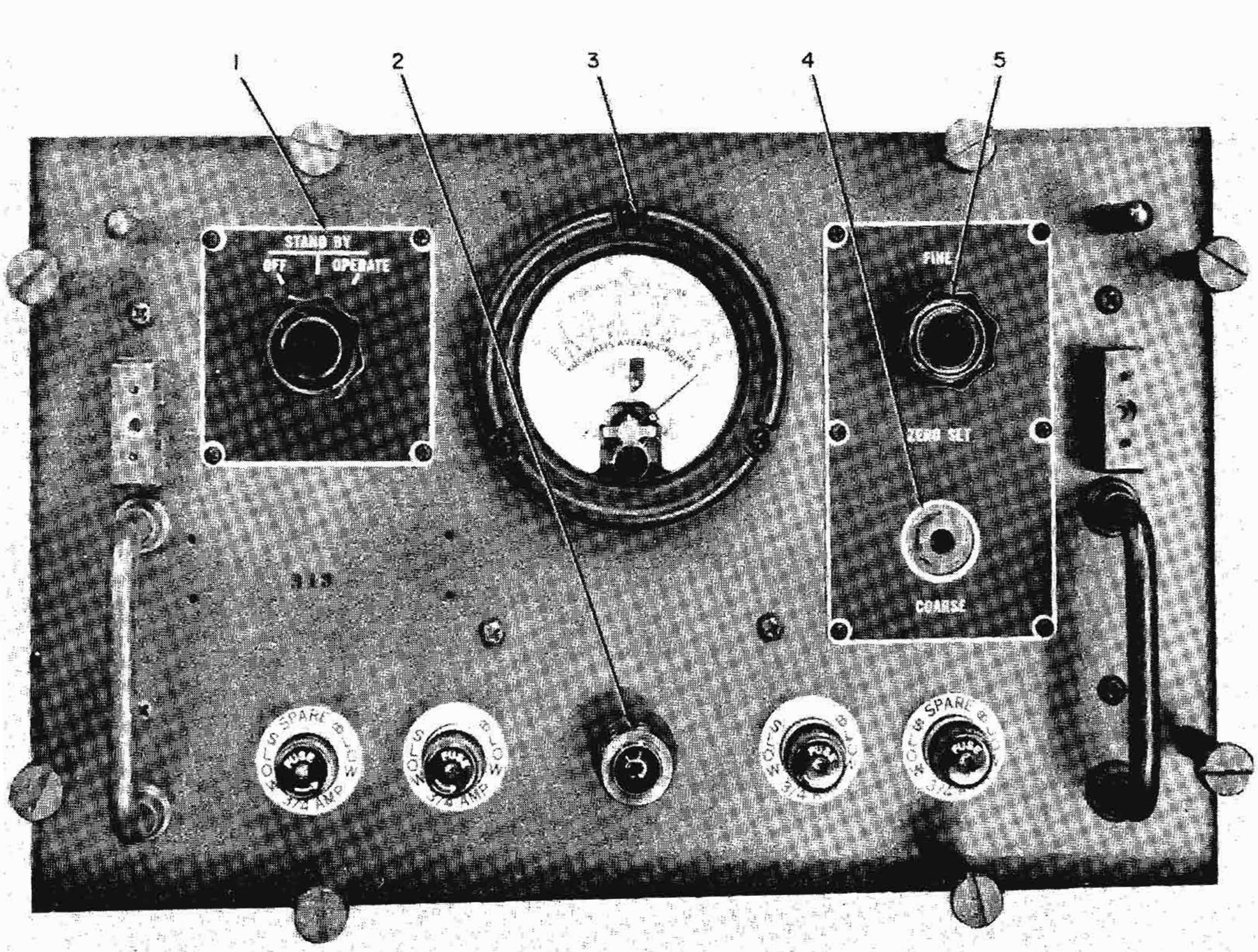


Figure 5-7. Receiver Group, Parametric Assembly Panel



GTAP24363

Figure 5-8. Receiver Group, Power Monitor Unit