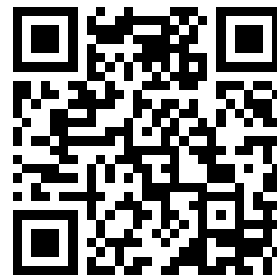


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D101.11:11-487C

# TM 11-487C

DEPARTMENT OF THE ARMY TECHNICAL MANUAL



DIRECTORY OF  
SIGNAL CORPS EQUIPMENTS  
GROUND RADAR  
AND  
RECOGNITION  
EQUIPMENT

DEPARTMENT OF THE ARMY • JANUARY 1951



DEPARTMENT OF THE ARMY TECHNICAL MANUAL  
TM 11-487C

*This manual supersedes so much of TM 11-487, 2 October 1944, as pertains  
to Ground Radar and Recognition Equipment*

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SIGNAL CORPS EQUIPMENTS  
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*The Adjutant General*

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## FOREWORD

This is the second of a series of nine separate manuals, each covering the standard, substitute standard, and limited standard Signal Corps equipments in a particular field. The nine manuals cover, respectively, radio communication equipment, wire communication equipment, ground radar and recognition equipment, radio direction finding equipment, power equipment, photographic equipment, meteorological equipment, test equipment, and sound, light, and miscellaneous equipment.

Items of equipment are presented in this manual in alpha-numerical sequence by type numbers (see Contents). An illustration and the following information, as applicable, are given for each item of equipment: Nomenclature, status, Signal Corps stock number, technical manual reference, description and application, technical characteristics, principal components, and weight and volume.

The following abbreviations are used in this manual:

ac.....	alternating current	kva.....	kilovolt-ampere
amp.....	ampere	kw.....	kilowatt
avg.....	average	max....	maximum
CRT.....	cathode-ray tube	mc.....	megacycle
C.....	centigrade	m.....	meter
cm.....	centimeter	$\mu$ sec....	microsecond
cu ft....	cubic foot	$\mu$ v.....	microvolt
cyc.....	cycle	mi.....	mile
cps.....	cycles per second	ma.....	milliampere
cyl.....	cylinder	mw.....	milliwatt
db.....	decibel	min.....	minimum
dbm.....	decibels relative to 1 milliwatt	min.....	minute
diam.....	diameter	OD.....	outside diameter
dc.....	direct current	PPI.....	plan-position indicator
ea.....	each	lb.....	pound
per sec..	each second	pps.....	pulse per second
F.....	Fahrenheit	P. R. R..	pulse recurrence rate
ft.....	foot	r-f.....	radio-frequency
gal.....	gallon	rpm....	revolutions per minute
h.....	high	SAE....	Society of Automotive Engineers
h-v.....	high-voltage	T/R....	transmit-receive
hr.....	hour	v.....	volt
IFF.....	identification, friend or foe	va.....	volt-ampere
in.....	inch	w.....	watt
kc.....	kilocycle	yd.....	yard



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*This manual supersedes so much of TM 11-487, 2 October 1944, as pertains to Ground Radar and Recognition Equipment.*

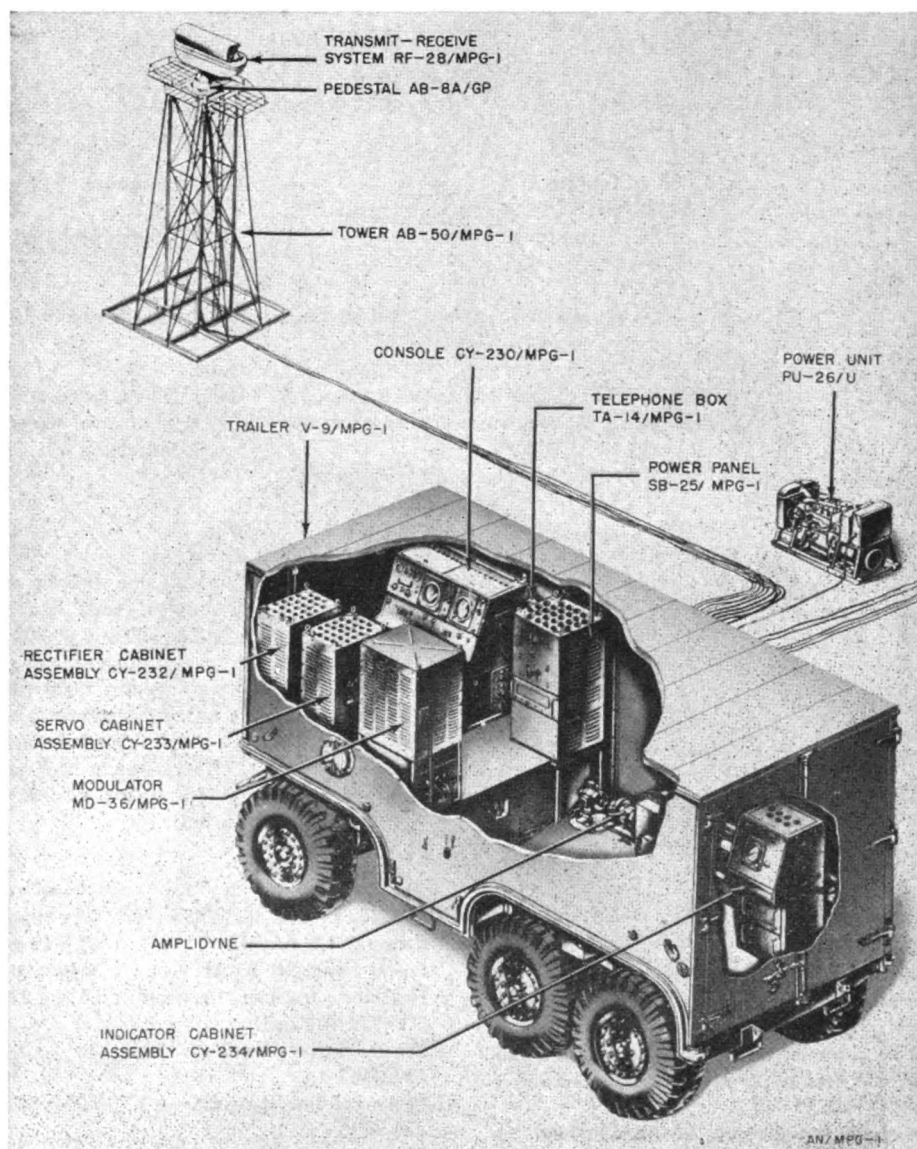


Figure 1. Radar Set AN/MPG-1.

*Status:* Standard. *Stock No.:* 2S3005-1. *Reference:* TM 11-1366, TM 11-1466, TM 11-1566. Radar Set AN/MPG-1 is a mobile, medium-range radar unit designed for use with seacoast artillery. All components are shipped in Trailer V-9/MPG-1. During operation, all major components except Tower AB-50/MPG-1, Pedestal AB-8A/GP, and Transmit-Receive System RF-28/MPG-1 are located within the trailer. Power Unit PU-26/U may be used with, but is not part of, Radar Set AN/MPG-1.

Radar Set AN/MPG-1 can be used to supply range and azimuth data on targets within 28,000 yards to gun-positioning apparatus and splash-plotting data for artillery fire correction. The equipment can be used to search for approaching surface craft and to supply range and azimuth data on detected targets within a maximum operating range of 80,000 yards. It can be used also in conjunction with a remote radar set. When so used, scanning data are obtained from the remote radar set; tracking data are obtained from the local set.

# AN/MPG-1

## TECHNICAL CHARACTERISTICS

	<i>PPI (search)</i>	<i>B-scope (tracking)</i>
FREQUENCY.....	9,090 mc.	9,090 mc.
PULSE REPETITION		
FREQUENCY.....	1,024 cps.	4,097 cps.
PULSE WIDTH.....	1 $\mu$ sec.	.25 $\mu$ sec.
RANGE:		
Minimum.....	500 yd (approx).	500 yd (approx).
Maximum.....	80,000 yd; 30,000 yd for short range PPI.	28,000 yd.
Accuracy.....	$\pm 3\%$ of max range.	At 28,000 yd. probable error not over 20 yd.
AZIMUTH:		
Limit.....	360° or selected sector. Automatic or manual control.	360°. (Beam sweeps 10° angle.)
Accuracy.....	$\pm 2^\circ$ .	$\pm .05^\circ$ .
RESOLUTION.....	At 20,000 yd, two destroyers separated by 500 yd of open water appear as separate targets.	At 20,000 yd, two destroyers separated by 300 yd of open water appear as separate targets.
ELEVATION OF BEAM.....	-12° to 0° by adjustment of the reflector.	-12° to 0°.
BEAM WIDTH (at half-power point):		
Horizontal.....	.6°.	.6°.
Vertical.....	3°.	3°.
PRESENTATION.....	7-in. PPI with 10,000-yd marks on 80,000-yd range and variable range mark on 30,000-yd range.	7-in. B-scope showing area 2,000 yd long and 10° wide located anywhere between 500 and 28,000 yd. Three range marks; range, range plus 1,000 yd, and range minus 1,000 yd. Three azimuth marks; antenna azimuth, azimuth plus 1°, and azimuth minus 1°. 7-in. remote B-scope, same as B-scope.
ANTENNA OPERATION.....	Slewing and scanning rate is 20° per sec (3.3 rpm).	Max tracking rate is 1.5° per sec (.25 rpm).

### RECEIVER:

Intermediate frequency: 30 mc.

### POWER SOURCES:

Commercial; 60-cyc; 115-v single-phase or 3-phase.

Transportable; 60-cyc, 3-phase, 115-v power unit (Power Unit PU-26/U).

TRAILER: Special drop-frame, tandem rear wheel van, full trailer with removable gear to permit operation as a semi-trailer.

TOWER: Steel tower 25 ft high (can be disassembled for stowing).

IFF: Triggers and marks provided for IFF equipment (not part of Radar Set AN/MPG-1).

### PRINCIPAL COMPONENTS

<i>Name</i>	<i>Dimensions (in.)</i>	<i>Weight (lb)</i>
1 Console CY-230/MPG-1	53½ x 52 x 34	735
1 Indicator Cabinet Assembly CY-234/MPG-1.	50½ x 30 x 19½	276

<i>Name</i>	<i>Dimensions (in.)</i>	<i>Weight (lb)</i>
-------------	-------------------------	--------------------

1 Modulator MD-36/MPG-1	59 x 30½ x 24½	985
1 Pedestal AB-8A/GP	48 x 48 x 33	1,000
1 Power Panel SB-25/MPG-1	56¼ x 24 x 18¼	500
1 Rectifier Cabinet Assembly CY-232/MPG-1.	50½ x 21¼ x 19	312
1 Servo Motor Generator PU-52/MPG-1.	33½ x 13¼ x 13	178
1 Servo Cabinet Assembly CY-233/MPG-1.	50½ x 21¼ x 19	310
1 Telephone Box TA-14/MPG-1	26 x 13½ x 6	30
1 Tower AB-50/MPG-1	315 x 224½ x 224½	6,200
1 Trailer V-9/MPG-1	240 x 130 x 98	12,175
1 Transmit-Receive System RF-28/MPG-1.	143 x 57 x 55½	1,288

### WEIGHT AND VOLUME

Total weight (lb): 25,000  
 Total volume (cu ft): 1,680  
 Ship tons: 42

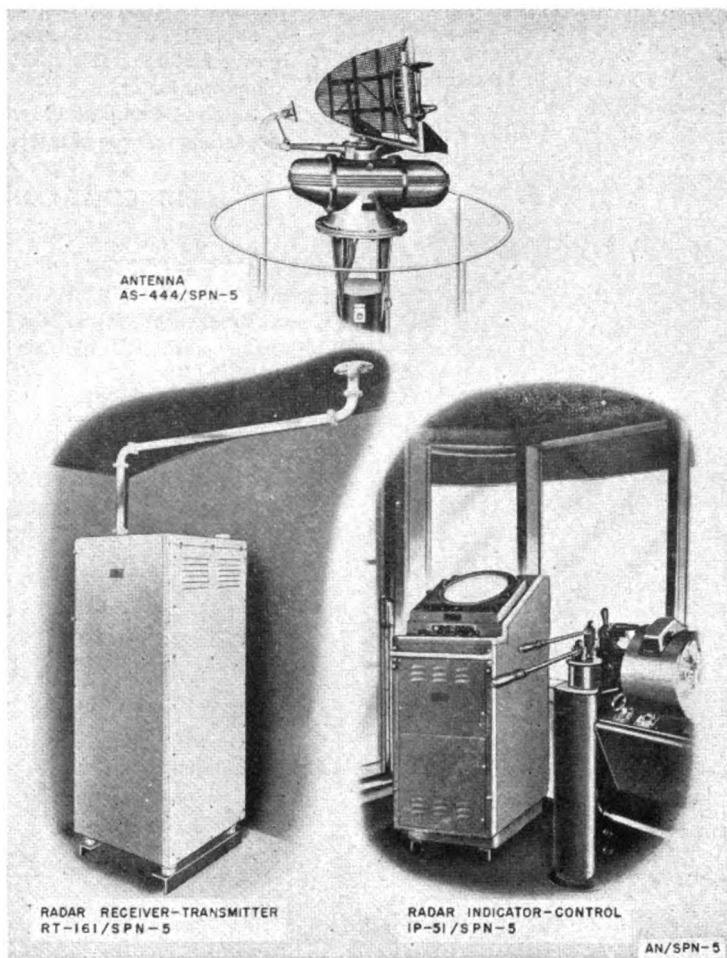


Figure 2. Radar Set AN/SPN-5.

*Status:* Standard. *Stock No.:* 2S4010-5. *Reference:* TM 11-1301, TM 11-1501.

Radar Set AN/SPN-5 is a medium-range radar set designed for use on a ship as a navigational aid. The set consists principally of Antenna AS-444/SPN-5, Radar Receiver-Transmitter RT-161/SPN-5, and Radar Indicator-Control IP-51/SPN-5. The antenna, located so as to be as free as possible from obstruction by shipboard structures, consists of a fixed pedestal and a motor-driven rotating assembly. The transmitter-receiver unit, located under cover and close to the antenna base, contains the transmitter components, receiver, their associated power supplies, transmitter test panel, tuned cavity, duplexer, and termination for the waveguide leading to the antenna. The indicator unit, located in the wheelhouse, contains the synchronizer, synchronizer power supply, test panel,

range azimuth indicator, cathode-ray tube power supply, PPI cover assembly, operating controls of the radar set, and other miscellaneous elements. Electrical power is derived from the ship's power line. Power components supplied with Radar Set AN/SPN-5 differ according to the ship's power supply.

Radar Set AN/SPN-5 is used to observe the position and course of vessels on the open sea especially to provide anticollision data, to observe buoys or other markers for purposes of piloting, to plot the position of the radar-equipped vessel based on bearing and range of known landmarks identifiable on charts and on the radar indicator, and to provide storm warning data in cases where heavy rain squalls can be observed and their distance and movement plotted. The equipment presents position data on targets within 40 nautical miles.

# AN/SPN-5

## TECHNICAL CHARACTERISTICS

**FREQUENCY:** 9,320 mc to 9,430 mc.  
**PULSE RECURRENCE FREQUENCY:** 1½-, 4-, and 8-mi ranges: 3,000 cps; 20- and 40-mi ranges: 750 cps.  
**PULSE LENGTH:** 1½-, 4-, and 8-mi ranges: 0.25 μsec; 20- and 40-mi ranges: 1 μsec.  
**RANGE:**  
Minimum: 80 yd.  
Maximum: 81,070 yd.  
Accuracy: ±1%.  
**AZIMUTH:**  
Accuracy: ±2%.  
Scanning: Continuous 360°.  
**OPERATING RANGES:**  
0 to 1½ mi.  
0 to 4 mi.  
0 to 8 mi.  
0 to 20 mi.  
0 to 40 mi.  
**RANGE RESOLUTION:** 80 yd on ranges using .25-μsec pulse.  
**BEARING RESOLUTION:** 2°.  
**TYPE OF PRESENTATION:** 12-in. cathode-ray tube for presentation of azimuth and range.  
**BEAM WIDTH:** 1.8° at half-power point.  
**BEAM DEPTH:** 19° at half-power point.  
**ANTENNA OPERATION:** Scanning rate is 60° per sec or 10 rpm.  
**RECEIVER:**  
Intermediate frequency 30 mc

## POWER REQUIREMENTS:

A-c supply: 115 v, 12 amp, 60 cyc, single-phase, .85 power factor; or 230 v, 6.5 amp, 60 cyc, single-phase, .65 power factor.  
D-c supply: 20 amp at 115 v dc, or 10 amp at 230 v dc depending on type of motor generator used.

## PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna AS-444/SPN-5	32 x 18 x 17	225
1 Circuit Breaker SA-172/SPN-5	8 <sup>5</sup> / <sub>8</sub> x 6 <sup>1</sup> / <sub>8</sub> x 4 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>
1 Circuit Breaker SA-173/SPN-5	8 <sup>5</sup> / <sub>8</sub> x 6 <sup>1</sup> / <sub>8</sub> x 4 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>
1 Motor Generator PU-163U or PU-164/U.	35 <sup>7</sup> / <sub>8</sub> x 18 <sup>1</sup> / <sub>8</sub> x 14 <sup>1</sup> / <sub>2</sub>	325
1 Motor Starter SA-166/U	9 <sup>1</sup> / <sub>2</sub> x 6 <sup>29</sup> / <sub>32</sub> x 6 <sup>13</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>2</sub>
1 Motor Starter SA-167/U	11 <sup>3</sup> / <sub>4</sub> x 8 <sup>5</sup> / <sub>8</sub> x 7 <sup>1</sup> / <sub>8</sub>	18
1 Power Transformer TF-120/U	9 <sup>3</sup> / <sub>4</sub> x 9 <sup>1</sup> / <sub>8</sub> x 4 <sup>1</sup> / <sub>16</sub>	136 <sup>1</sup> / <sub>2</sub>
1 Radar Indicator-Control IP-51/SPN-5.	47 x 28 <sup>1</sup> / <sub>2</sub> x 18	230
1 Radar Receiver - Transmitter RT-161/SPN-5.	53 <sup>3</sup> / <sub>4</sub> x 20 <sup>1</sup> / <sub>2</sub> x 19 <sup>3</sup> / <sub>8</sub>	326
1 Switch Box SA-174/SPN-5	7 <sup>1</sup> / <sub>4</sub> x 6 <sup>1</sup> / <sub>2</sub> x 4	4 <sup>1</sup> / <sub>4</sub>
1 Switch Box SA-175/SPN-5	11 <sup>3</sup> / <sub>4</sub> x 9 <sup>5</sup> / <sub>8</sub> x 5 <sup>1</sup> / <sub>4</sub>	9

## WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	1,574	1,888	2,265
Total volume (cu ft).....		50	60
Ship tons.....			1.5

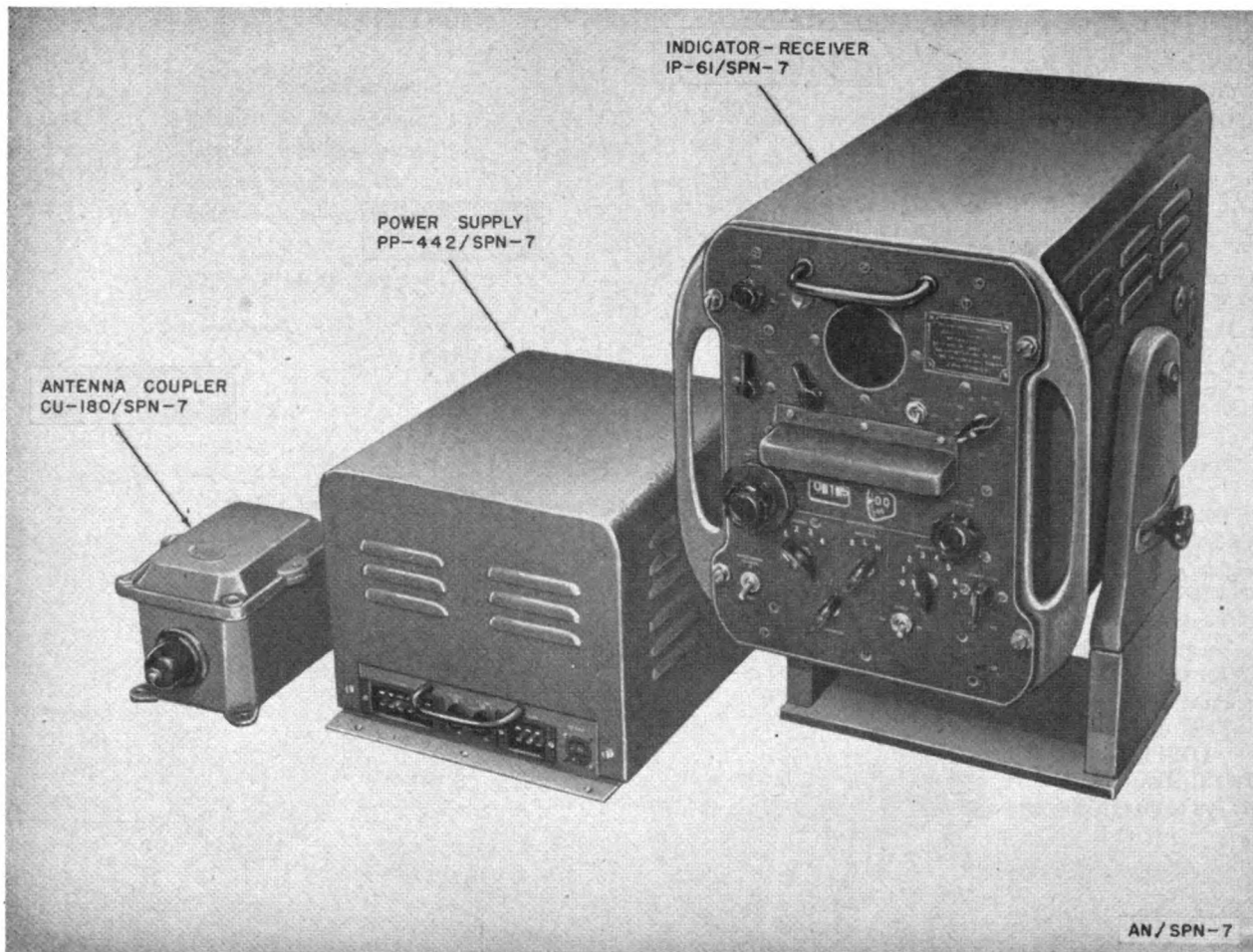


Figure 3. Radar Receiving Set AN/SPN-7.

*Status:* Standard. *Stock No.:* 2S4010-7. *Reference:* TM 11-1302, TM 11-1502.

Radar Receiving Set AN/SPN-7 is a shipborne loran receiver. Indicator-Receiver IP-61/SPN-7 may be mounted on the chart table, next to the chart table on a suitable mount, or on the bulkhead over the chart table. When mounted, the indicator-receiver may be tilted to any convenient position to facilitate operation. Power Supply PP-442/SPN-7 may be located at some convenient remote location. Antenna Coupler CU-180/SPN-7 is mounted on the exterior side of the bulkhead near the indicator-receiver unit. No antenna is supplied with Radar Receiving Set AN/SPN-7; however, a 35-to 100-foot length of straight an-

tenna wire, placed conveniently not over 45° from vertical and connected to the antenna coupler, is required. No motor-generator is supplied with the radar set, but in ships using a d-c source of power it is necessary to convert this power to the proper a-c input voltage to the power supply of Radar Receiving Set AN/SPN-7.

Radar Receiving Set AN/SPN-7 is used to receive and indicate loran signals which aid the navigation officer to determine his position at sea under all conditions of weather. The receiver may be used to obtain either a single loran line of position or a fix. The range of the loran system is approximately 650 miles during daylight hours and approximately 1300 miles at night.

# AN/SPN-7

## TECHNICAL CHARACTERISTICS

### FREQUENCY RANGE:

- Over-all: 1,750 kc to 1,950 kc.
- Crystal-controlled frequency selected by CHANNEL selector switch as follows:
  - Channel 1: 1,950 kc.
  - Channel 2: 1,850 kc.
  - Channel 3: 1,900 kc.
  - Channel 4: 1,750 kc.

### TYPES OF SIGNALS RECEIVED: Pulsed.

### PULSE RECURRENCE RATES:

Basic recurrence rates, selected by BASIC P.R.R. switch as follows:

- Position S: 20 pps.
- Position L: 25 pps.
- Position H: 33 $\frac{1}{3}$  pps.

Specific recurrent rates, selected by SPECIFIC P.R.R. switch: 8 different specific rates for each basic rate.

Total different pulse recurrence rates: 24.

RANGE: Approx 700 mi during day; approx 1,400 mi at night.

### ANTENNA:

- Type: Vertical wire.
- Length: 35 ft to 100 ft.

### TYPES OF INDICATORS:

- Pulse matching: 3-in. cathode-ray tube (CRT).
- Time difference measurement: Read directly on TIME DIFFERENCE indicator.

POWER REQUIREMENT: 250 w at 105, 115, or 125 v ac, 50 cyc to 60 cyc, single-phase.

## CRYSTAL COMPLEMENT:

Frequency (kc)	Use	Quantity
100	Timing oscillator	1
2,500	Receiver oscillator, channel 1	1
2,400	Receiver oscillator, channel 2	1
2,450	Receiver oscillator, channel 3	1
2,300	Receiver oscillator, channel 4	1

## PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna Coupler CU-180/SPN-7.	12 x 6 x 6	6
1 Indicator-Receiver IP-61/SPN-7.	22 x 22 x 4	82
1 Input power plug	2 x 1 $\frac{1}{2}$ x 1	$\frac{1}{4}$
1 Interconnecting cable and plug	182 lg	4
1 Interconnecting cable plug	3 x 2 x 1	$\frac{1}{2}$
1 Plug PL-259	1 $\frac{1}{2}$ x $\frac{3}{4}$	$\frac{1}{8}$
1 Power Supply PP-442/SPN-7	16 x 15 x 11	55

## WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb)-----	223	379	465
Total volume (cu ft)-----			27.4
Ship tons-----			.685

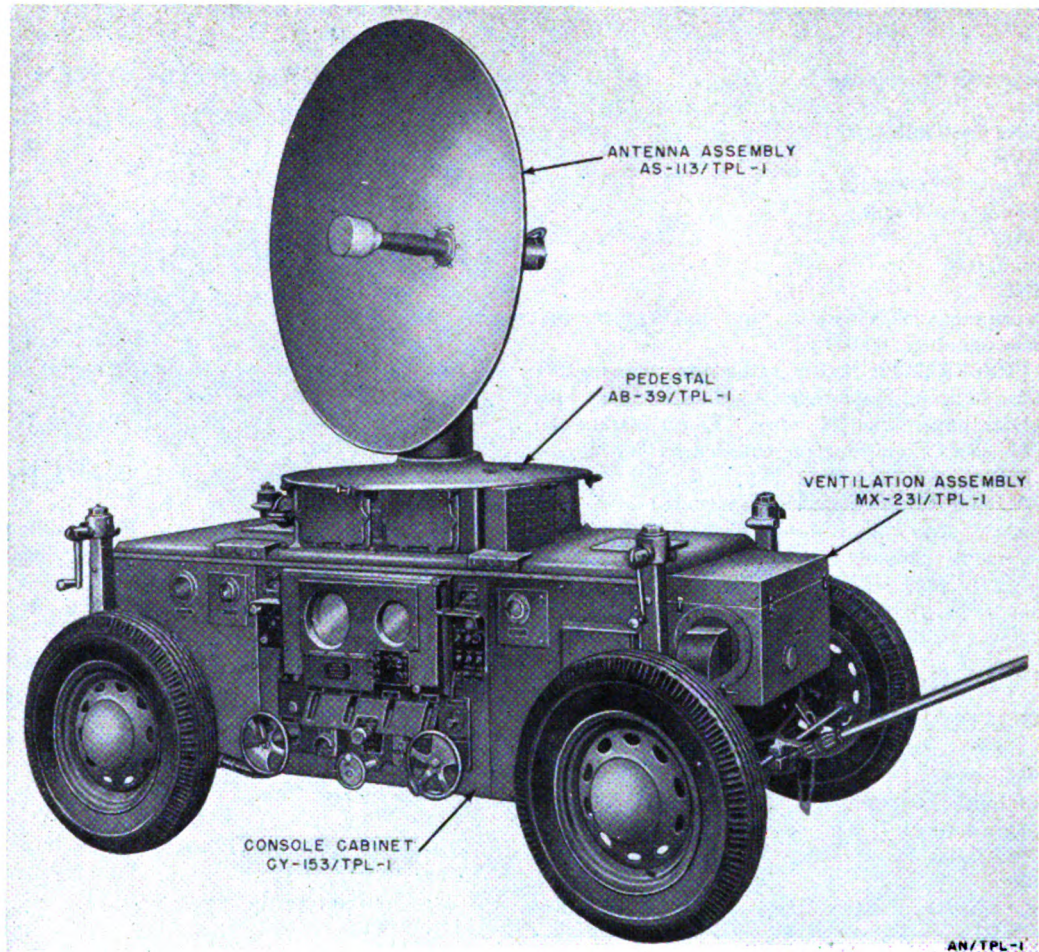


Figure 4. Radar Set AN/TPL-1.

*Status:* Standard. *Stock No.:* 2S5011-1. *Reference:* TM 11-1352, TM 11-1452.

Radar Set AN/TPL-1 is a mobile, compact, lightweight radar unit designed for use with an anti-aircraft searchlight. Console Cabinet CY-153/TPL-1 is the main unit and all other components are contained in it or mounted on it. The cabinet is mounted on four wheels, which are removed when the set is in an operating position. These wheels permit rolling the set out of and into the transporting trailer. The cabinet is not spring-supported on the wheels and, therefore, must NOT be towed on its own wheels by another vehicle. Power Unit PU-35/U is used with, but is not part of, Radar Set AN/TPL-1. Radar Set AN/TPX-4 is the IFF equipment used with, but not part of, Radar Set AN/TPL-1.

Radar Set AN/TPL-1 is used to search the sky for enemy aircraft and, when detected, to indicate their position. Position data are furnished as slant range (distance in yards) and as azimuth and elevation (angular direction in mils). The radar set also computes target altitude in feet. The maximum slant range of the equipment is 60,000 yards.

The radar set is used also to furnish target-position data to an anti-aircraft searchlight so that the searchlight beam, when turned on, will strike the target. The equipment may be used to search for a second target while the searchlight follows the original target.

In all conditions of normal operation the unit will be carefully sited and accurately oriented. If desired, however, the unit may be used to give indications of approaching aircraft when the equipment is being transported in convoy.



# AN/TPL-1

## TECHNICAL CHARACTERISTICS

### RANGE:

Maximum: 35 mi (approx).

### AZIMUTH:

Coverage: 6,400 mils (360°).

### ELEVATION:

Upper limit: M1,600 mils.

Lower limit: -100 mils.

### ALTITUDE:

Minimum: 0 ft.

### SEARCHING:

PPI sweep range: 60,000 yd.

A-scan sweep range: 60,000 yd.

**TYPE OF PRESENTATION:** 7-in. cathode-ray tube for PPI presentation of azimuth and range. 5-in. cathode-ray tube (A-scope) for presentation of range. Range markers on both oscilloscopes. Tracking presentation on two A-type scopes.

**ANTI-JAMMING:** Antijamming switch mounted on receiver front panel. When switch is thrown to ON position, interference caused by jamming is reduced.

**VEHICULAR COMPONENTS:** 2½-ton truck and M-1 searchlight trailer.

**DIMENSIONS OF SITE:** Flat terrain 28 ft in diam (approx).

## RECEIVER AND PRESENTATION SYSTEMS

### TYPES OF INDICATORS:

Range oscilloscope: 5-in. cathode-ray tube.

PPI oscilloscope: 7-in. cathode-ray tube equipped with long-persistence screen.

Tracking oscilloscope: 2-in. cathode-ray tubes.

**OPERATING RANGES:** 2 ranges: 0 yd to 30,000 yd; 0 yd to 60,000 yd.

**RANGE MARKERS:** Range markers appear on the 30,000- and 60,000-yd ranges at 10,000-yd intervals.

**IFF:** IFF video signal received from IFF equipment and displayed on range oscilloscope.

**ANTI-JAMMING:** Antijamming switch mounted on receiver front panel. When switch is thrown to ON position, interference caused by jamming is reduced.

## R-F SYSTEM

**TRANSMISSION LINE:** ¼-in. coaxial line.

**RECEIVING ANTENNA:** Same antenna used for receiving and transmitting.

## POWER SUPPLY SYSTEM

**TYPE OF POWER UNIT:** 4-cyl gasoline-engine-driven generator.

### RATING:

115 v, 400 cyc, 2½ kw.

115 v, 60 cyc, 2½ kw.

**FUEL CONSUMPTION:** 1 gal per hr.

## PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna Assembly AS-113/TPL-1.	34 x 48 diam	65
1 Console Cabinet CY-153/TPL-1.	80 x 33 x 25	600
1 Main Drive Assembly MX-186/TPL-1.	31 x 31 x 11	275
1 Modulator MD-31/TPL-1	19 <sup>3</sup> / <sub>8</sub> x 10 <sup>3</sup> / <sub>16</sub> x 8 <sup>3</sup> / <sub>4</sub>	30
1 Pedestal AB-39/TPL-1	40 x 40 diam	300
1 Pre-Amplifier AM-42/TPL-1	8 <sup>7</sup> / <sub>16</sub> x 6 <sup>1</sup> / <sub>16</sub> x 5 <sup>5</sup> / <sub>8</sub>	6
1 Pulse Transformer MX-187/TPL-1.	8 <sup>1</sup> / <sub>2</sub> x 6 x 4	12
1 Range Indicator Unit ID-81/TPL-1.	28 <sup>1</sup> / <sub>2</sub> x 16 x 9 <sup>3</sup> / <sub>16</sub>	65
1 Receiver R-85/TPL-1	24 <sup>1</sup> / <sub>8</sub> x 10 <sup>1</sup> / <sub>4</sub> x 7 <sup>3</sup> / <sub>8</sub>	45
1 Rectifier Power Unit PP-88/TPL-1.	19 <sup>1</sup> / <sub>2</sub> x 13 <sup>1</sup> / <sub>2</sub> x 10 <sup>1</sup> / <sub>4</sub>	75
1 Rectifier Power Unit PP-89/TPL-1.	9 x 9 x 9	30
1 Synchronizer SN-14/TPL-1	26 <sup>3</sup> / <sub>8</sub> x 15 <sup>3</sup> / <sub>16</sub> x 7 <sup>5</sup> / <sub>16</sub>	65
1 Tent S-14/TPL-1	40 x 168 diam	125
2 Tracking Indicator ID-82/TPL-1.	9 <sup>7</sup> / <sub>8</sub> x 6 x 6	8
1 Ventilation Assembly MX-231/TPL-1.	38 x 15 <sup>1</sup> / <sub>2</sub> x 12 <sup>1</sup> / <sub>4</sub>	45

## WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	2,899	4,588	4,588
Total volume (cu ft).....		445	445
Ship tons.....			11.125

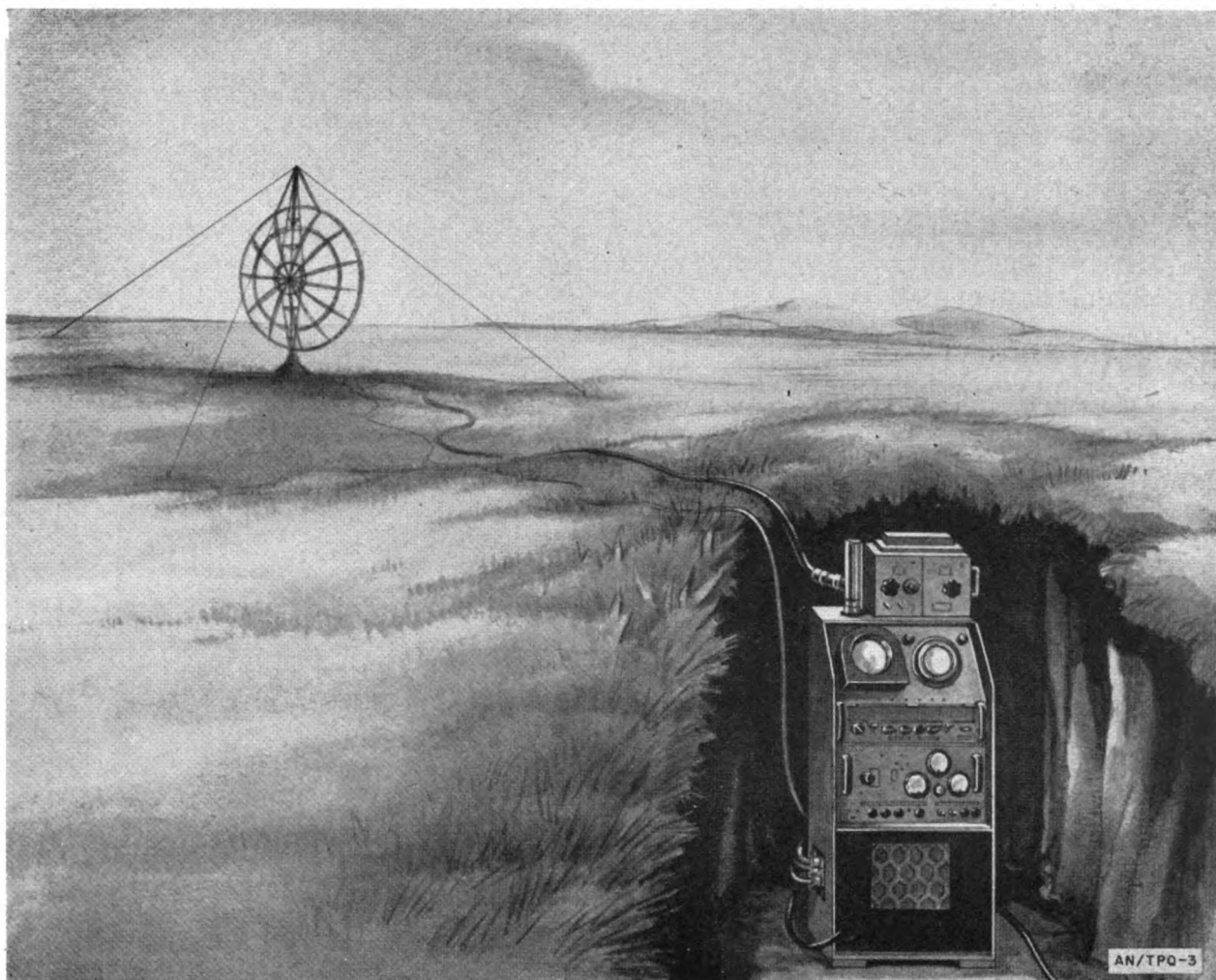


Figure 5. Radar Set AN/TPQ-3.

*Status:* Standard. *Stock No.:* 2S5008-3. *Reference:* MWO SIG 11-1540-2, TB 11-1540-6.

Radar Set AN/TPQ-3 is a modification of Radio Set AN/TPS-3 to permit accurate location of mortar shells in range and azimuth. The modification is accomplished by the installation of Modification Kit MX-423/TPS-3. Control Unit C-261/TPQ-3 is designed for operation on top of the console of Radio Set AN/TPS-3. Adapter UG-151/TPS-3 provides for the use of Antenna Assembly AS-175/TPS-3 which is mounted on Remote Control Pedestal AB-59A/TPS-3. Necessary parts to modify Radio Set AN/TPS-3 are a part of Modification Kit MX-423/TPS-3. With modified Indicator ID-182/TPQ-3, the PPI ranges will be 10,000 yards (on the 20-mile position), 60 miles, and 120 miles. Operation on the 60- and 120-mile ranges

remains identical to that of Radio Set AN/TPS-3. Power Unit PU-6/TPS-1 is part of the equipment. Radar Set AN/TPX-3 is the IFF equipment used with, but not part of, Radar Set AN/TPQ-3 for the PPI 60- and 120-mile ranges.

Radar Set AN/TPQ-3 provides a means of locating mortar shells within  $\pm 50$  yards in range and  $\pm 5$  mils in azimuth up to a maximum range of 10,000 yards (modification of the PPI 20-mile sweep of Radio Set AN/TPS-3). By separating the antenna system from the console, it is possible to protect and conceal the operators and, at the same time, to locate the antenna in a relatively exposed position. Radar Set AN/TPQ-3 is used also to search for approaching aircraft (PPI 60- and 120-mile sweeps) and to provide range and azimuth information on detected targets up to a maximum range of 100 miles.

# AN/TPQ-3

## TECHNICAL CHARACTERISTICS

### *Radar Set AN/TPQ-3*

FREQUENCY: 590 mc to 610 mc.  
AZIMUTH COVERAGE: 360°.  
ALTITUDE COVERAGE: None on 10,000-yd range; up to 30,000 ft on 60-mi and 120-mi ranges.  
RANGE: Up to 10,000 yd on 20-mi position; up to 60 mi or 120 mi on the 60-mi or 120-mi positions, respectively.  
POWER CONSUMPTION: 1,900 w.

### *Receiver R-59/TPS-3*

INTERMEDIATE FREQUENCY: 30 mc.

### *Indicator IE-51/TPS-3 (modified)*

PRESENTATION: 5-in. A-scope; 7-in. PPI scope.  
RANGES: 10,000 yd on 20-mi position; 60 mi or 120 mi on 60-mi or 120-mi positions, respectively.  
RANGE ACCURACY: ±50 yd on 10,000-yd range; 2 mi on 60-mi and 120-mi ranges, respectively.  
AZIMUTH ACCURACY: ±5 mils on 10,000-yd range; 2° on 60-mi and 120-mi ranges, respectively.

### *Transmitter T-52/TPS-3*

FREQUENCY: 590 mc to 610 mc.

### *Modulator MD-16/TPS-3*

REPETITION RATE: 200 cps.

PULSE DURATION: 1½ µsec.

### *Power Unit PU-6/TPS-1*

OUTPUT (rated): 115 v, 400 cyc, 1,000 w; 24 v dc, 400 w.  
FUEL: 80 to 100 octane gasoline.  
OPERATION: Gasoline-engine-driven, 1 cyl, 2 cyc.

LUBRICATION: SAE No. 10 oil mixed with gasoline (SAE No. 30 or No. 50 oil must be used in confined areas with limited air circulation).

### *Control Unit C-261/TPQ-3*

#### AZIMUTH:

PPI: Either normal PPI sweep rotation or automatic sector sweeps of 400, 700, or 1,000 mils (22.5°, 39°, or 58°, respectively).

## PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Radio Set AN/TPS-3		
1 Modification Kit MX-423/TPS-3:		
1 Antenna Assembly	160 x 120 x 42	
AS-175/TPS-3.		
1 Control Unit C-261/TPQ-3.	24 x 18½ x 10½	152
2 Cord CG-319/TPQ-3.....	600	
1 Cord CX-733/TPQ-3.....	1,200	
1 Cord CX-734/TPQ-3.....	78	
1 Orientation Oscillator	6 x 6 x 6	
TS-423/TPQ-3.		
1 Remote Control Pedestal AB-	24 x 24 x 18	80
59A/TPS-3.		
1 set parts to modify Radio Set AN/TPS-3.		

## WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	1,100	1,320	1,584
Total volume (cu ft).....		510	612
Ship tons.....			15.3



Figure 6. Radio Set AN/TPS-3.

*Status:* Standard. *Stock No.:* 2S5003-3. *Reference:* TM 11-1340, TM 11-1440, TM 11-1540.

Radio Set AN/TPS-3 is a portable, medium-long range, radar unit designed for early warning against aircraft. The radio set consists of a main console, an r-f system, and a dipole antenna using a parabolic reflector. The entire system with the exception of the antenna is housed in a lightproof wall tent equipped for proper ventilating. The antenna assembly is supported by a tripod, one leg of which is the console with its feeder system, the other legs

being wooden members. When delivered, the radio set comes packed in heavy export shipping crates, within which are lightweight air-transit crates equipped with carrying handles. Power Unit PU-6/TPS-1 is part of the equipment. Radar Set AN/TPX-3 is the IFF equipment used with, but not part of, Radio Set AN/TPS-3.

Radio Set AN/TPS-3 is used to search for approaching aircraft and to provide range and azimuth information on detected targets. The maximum range of the equipment is 100 miles.

## AN/TPS-3

### TECHNICAL CHARACTERISTICS

#### *Radio Set AN/TPS-3*

FREQUENCY: 590 mc to 610 mc.  
 AZIMUTH COVERAGE: 360°.  
 ALTITUDE COVERAGE: Up to 30,000 ft.  
 RANGE: Up to 120 mi.  
 POWER CONSUMPTION: 1,900 w.

#### *Receiver R-59/TPS-3*

INTERMEDIATE FREQUENCY: 30 mc.

#### *Indicator ID-51/TPS-3*

PRESENTATION: 5-in. A-scope; 7-in. PPI scope.  
 RANGES: 20-mi, 60-mi, and 120-mi.  
 RANGE ACCURACY: 2 mi.  
 AZIMUTH ACCURACY: 2°.

#### *Transmitter T-52/TPS-3*

FREQUENCY: 590 mc to 610 mc.

#### *Modulator MD-16/TPS-3*

REPETITION RATE: 200 cps.  
 PULSE DURATION: 1½ μsec.

#### *Power Unit PU-6/TPS-1*

OUTPUT (rated): 115 v, 400 cyc, 1,000 w; 24 v dc, 400 w.  
 FUEL: 80 to 100 octane gasoline.  
 OPERATION: Gasoline-engine-driven, 1 cyl, 2 cyc.

LUBRICATION: SAE No. 10 oil mixed with gasoline (SAE No. 30 or No. 50 oil must be used in confined areas with limited air circulation).

### PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna AS-74/TPS-3.....	144 x 120 diam	125
1 Cable CG-49/TPS-3.....	600	
1 Cable CG-50/TPS-3.....	48	
1 Cable CX-101/TPS-3.....	600 x .61 diam	
1 Cable CX-102/TPS-3.....	48 x .61 diam	
1 Console Unit CY-69/TPS-3.....	42 x 23 x 21	110
1 Indicator Unit ID-51/TPS-3.....	19 <sup>3</sup> / <sub>8</sub> x 19 x 14 <sup>5</sup> / <sub>8</sub>	50
1 Modulator Unit MD-16/TPS-3.....	14 <sup>1</sup> / <sub>2</sub> x 12 <sup>1</sup> / <sub>2</sub> x 11	75
1 Power Unit PU-6/TPS-1.....	24 x 21 x 17	128
1 Radar Receiver R-59/TPS-3.....	19 <sup>5</sup> / <sub>8</sub> x 19 x 8	50
1 Radar Transmitter T-52/TPS-3.....	19 x 12 <sup>1</sup> / <sub>8</sub> x 4 <sup>3</sup> / <sub>4</sub>	
1 Tent S-4/TPS-3.....	108 x 108 x 84	185

### WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	813	976	1,171
Total volume (cu ft).....		504	605
Ship tons.....			15.125

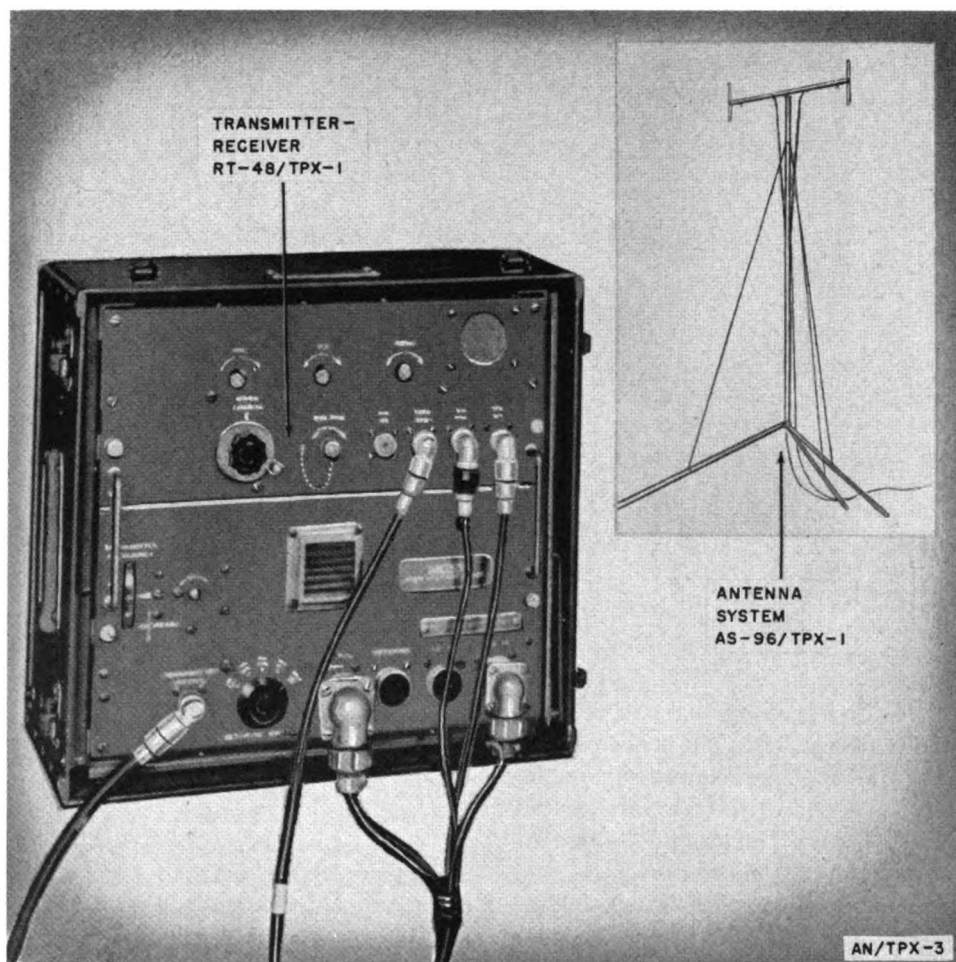


Figure 7. Radar Set AN/TPX-3.

*Status:* Standard. *Stock No.:* 2S5009-3. *Reference:* TM 11-1159.

Radar Set AN/TPX-3 is an auxiliary equipment designed specifically for use with, but is not part of, Radio Set AN/TPS-3 or Radar Set AN/TPQ-3. The equipment is designed to identify, as friend or foe, aircraft located by Radio Set AN/TPS-3 or Radar Set AN/TPQ-3. The ground equipment consists of interrogator and respositor units and associated antenna and power units. Power for operation of Radar Set AN/TPX-3 is drawn directly from Radio Set AN/TPS-3 or Radar Set AN/TPQ-3. The compactness and simplicity of the equipment make it easy to transport, set up, and operate under field conditions where speed is essential.

#### TECHNICAL CHARACTERISTICS

**FREQUENCY RANGE:** 157 mc to 187 mc.  
**SYNCHRONIZED PULSE FREQUENCY:** 200 to 750 per sec.  
**PULSE WIDTH:** 5  $\mu$ sec to 8  $\mu$ sec.  
**RECEIVER BANDWIDTH:** 4 mc.  
**RECEIVER I-F FREQUENCY:** 30 mc.  
**PRIMARY POWER REQUIRED:** 175 va at 115 v or 80 v, 400 cps or 1,200 cps.

#### PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna System AS-96/TPX-1	.258 h; triangular base, 150 ea side	40
2 Transmitter Receiver RT-48/TPX-1 (1 in use; 1 spare).	15 $\frac{1}{2}$ x 14 $\frac{1}{8}$ x 10 $\frac{11}{16}$	45

#### WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	260	260	312
Total volume (cu ft).....		13.8	17

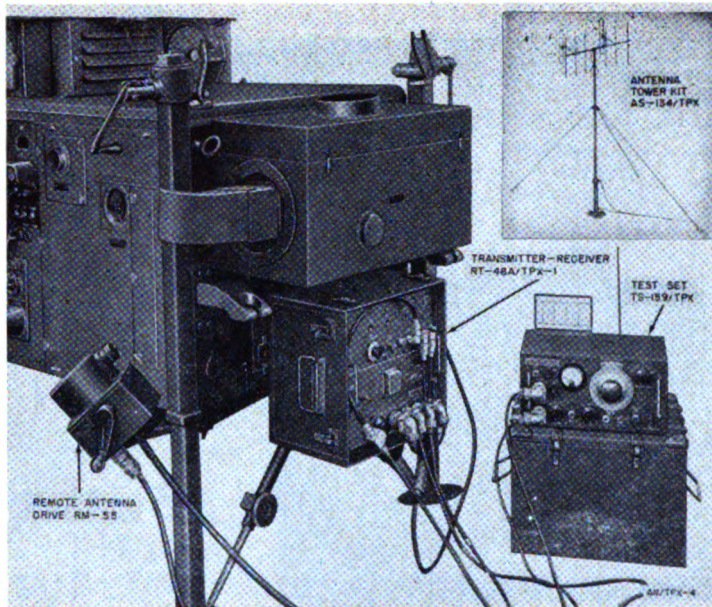


Figure 8. Radar Set AN/TPX-4.

Status: Standard. Stock No.: 2S5009-4. Reference: TM 11-1160.

Radar Set AN/TPX-4 is an auxiliary equipment designed specifically for use with, but is not part of, Radar Set AN/TPX-1. The equipment is designed to identify, as friend or foe, aircraft located by Radar Set AN/TPL-1. The ground equipment consists of interrogator and responsor units and associated antenna and power units.

Antenna System AS-134/TPX consists principally of Antenna Assembly AS-109/TPX, Tower TR-29, and Remote Antenna Drive RM-55. Rotation of Tower TR-29 is controlled remotely by Remote Antenna Drive RM-55. Some models of the equipment may be supplied with Antenna System AS-96/TPX-1 instead of Antenna System AS-134/TPX. Power for operation of Radar Set AN/TPX-4 is drawn directly from Radar Set AN/TPL-1.

**TECHNICAL CHARACTERISTICS**

**GENERAL**

**RANGE:**

Maximum: 120 mi (approx) with aircraft at 10,000 ft.  
When used with Radar Set AN/TPL-1, the max range is limited to the max radar A-scope sweep, which is 60,000 yd.

TYPE OF PRESENTATION: Uses A-scope of radar set.

OPERATING RANGES: Depend on radar A-scope sweeps.

The A-scope of Radar Set AN/TPL-1 has two ranges; 30,000 yd and 60,000 yd.

FREQUENCY: 157 mc to 187 mc.

BUILDING AND TOWERS: All components except antenna system are housed in the radar tent. Antenna is mounted on mast outside the tent.

PACKING BOXES: Four transit cases and one transit bag.  
DIMENSIONS OF SITE: Dimensions of tent depend on the radar set.

ASSEMBLY TIME: Approx 15 min with trained crew.

**SYNCHRONIZING SYSTEM**

**PULSE RECURRENCE FREQUENCY:**

Synchronized by Radar Set AN/TPL-1: 400 pps.

**TRANSMITTING SYSTEM**

PULSE WIDTH: 5-8  $\mu$ sec.

**ANTENNA SYSTEM**

**TRANSMISSION LINE TO:**

ANTENNA: .410-in. (approx  $1\frac{1}{2}$ -in.) coaxial cable, 52-ohm, AN type RG-8/U.

**RECEIVING SYSTEM**

BANDWIDTH: 4 mc at half-voltage points.

INTERMEDIATE FREQUENCY: 30 mc.

**POWER SUPPLY SYSTEM**

PRIMARY POWER REQUIRED: 175 va (approx 175 w) at 115 v, 400 cyc.

**PRINCIPAL COMPONENTS**

Name	Dimensions (in.)	Weight (lb)
1 Antenna Tower Kit AS-134/TPX	192	150
or		
1 Antenna System AS-96/TPX-1 .258 h; triangular base, 150 ea side		40
1 Test Set TS-159/TPX	$13\frac{3}{16} \times 8\frac{7}{16} \times 6\frac{19}{32}$	14
2 Transmitter Receiver RT-48A/TPX-1 (1 in use; 1 spare).	$15\frac{5}{8} \times 14\frac{1}{8} \times 10\frac{1}{16}$	45

**WEIGHT AND VOLUME**

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	281	337	405
Total volume (cu ft).....		19.3	23
Ship tons.....			.575

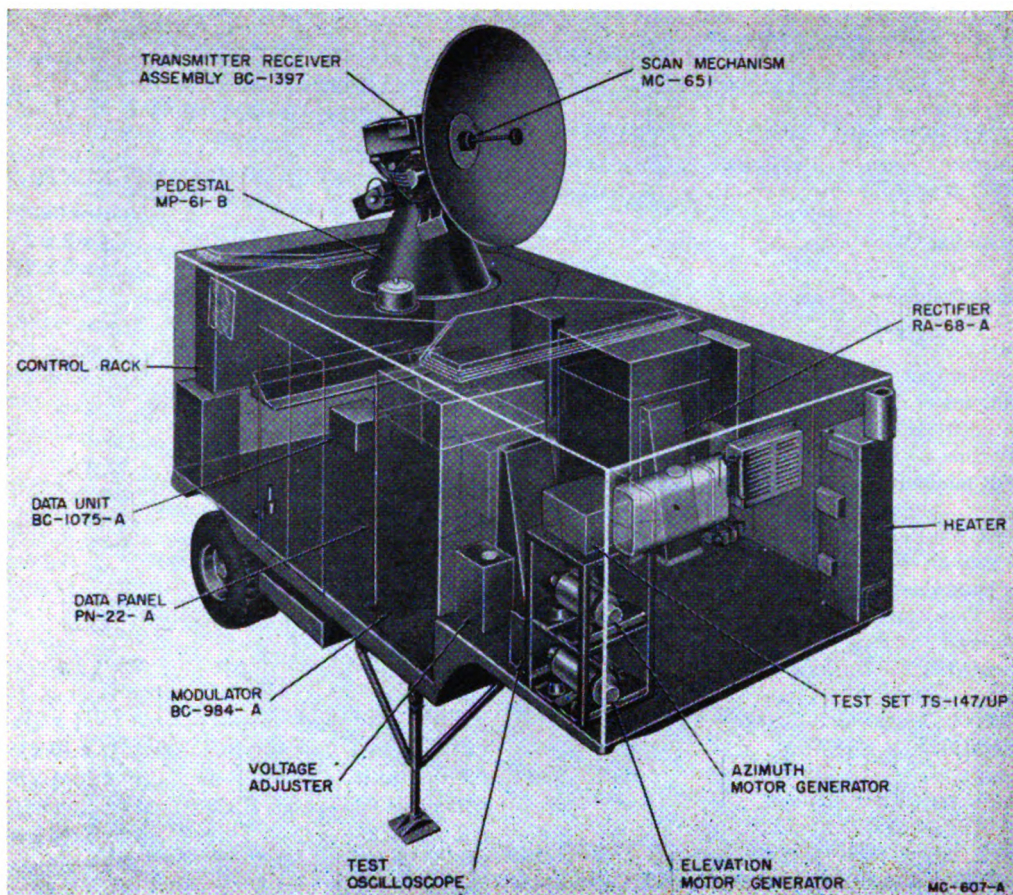


Figure 9. Radio Set SCR-584-A modified by Transmitter-Receiver Modification Kit MC-607-A.

*Status:* Standard. *Stock No.:* 2Z5725-607A.  
*Reference:* MWO SIG 11-1524-17, TM 11-1363, TM 11-1463, TM 11-1563.

Transmitter-Receiver Modification Kit MC-607-A is used to modify Radio Set SCR-584-A or -B (see SCR-584-(\*)) to provide a means whereby the frequency of the radar transmitter is changed from S-band to a variable frequency within the X-band. The kit also provides a 0.5-microsecond pulse for searching (palmer scan) and a 0.2-microsecond pulse for tracking (conical scan). The scan system is changed to furnish a wider beam for searching. A narrower beam for tracking is also provided. This modification offers greater range discrimination because a decreased pulse width is used. Improved circuits are incorporated in the receiving and tracking systems. The radar set, as modified, is a mobile, medium-weight, medium-range radar unit for use with antiaircraft artillery. It is mounted in Trailer K-78-A or -B.

The radar set is used as a search for early warn-

ing of approaching enemy aircraft. Targets are detected and their range and azimuth are noted on a PPI scope. Usually the radar set can track a selected target under all conditions of weather. It is used also to automatically follow a target and provide accurate range, azimuth, and elevation information. When first detected the target is well beyond the range of the antiaircraft battery. Exact present position data are developed on targets and transmitted to the gun directors. Such data are used for gun positioning and fire control.

PPI ranges are 10,000, 35,000, and 70,000 yards, respectively. The maximum range for automatic tracking is 32,000 yards and for potentiometer data is 28,000 yards.

Gun directors M4, M7, M9, and M10 may be used with, but are not part of, the radar set. Radio Equipment RC-184 is the IFF equipment used with, but not part of, Radio Set SCR-584-A or -B as modified by Transmitter-Receiver Modification Kit MC-607-A. The power source is not part of the radar set.



TECHNICAL CHARACTERISTICS

Note. The following technical characteristics apply to Radio Set SCR-584-(\*) as modified by Transmitter-Receiver Modification Kit MC-607-A.

FREQUENCY: 8,500 mc to 9,600 mc.

TRANSMITTING SYSTEM:

Pulse recurrence frequency: 1,707 pps.

Pulse width: .5  $\mu$ sec for searching; .2  $\mu$ sec for tracking.

R-F SYSTEM:

Transmission line: Waveguide.

RECEIVING SYSTEM:

Intermediate frequency: 60 mc.

RANGE SYSTEM:

Maximum:

Automatic tracking: 32,000 yd.

Potentiometer data: 28,000 yd.

Minimum: 350 yd to 800 yd depending on receiver recovery time.

Accuracy at minimum range:  $\pm 25$  yd.

Tracking:

Manual: Positioning the range-scope hairlines and N<sup>2</sup> gate on the target echo by means of the slewing handwheel.

Aided: Positioning the range-scope hairlines and N<sup>2</sup> gate over the target echo by motors whose speed is varied by the tracking handwheel.

PPI SYSTEM:

Ranges: 10,000, 35,000, and 70,000 yd.

DATA TRANSMISSION SYSTEM:

Selsyn data:

Azimuth: 0 mils to 6,400 mils.

Elevation: -175 mils to -1,580 mils.

Altitude: 300 yd to 10,000 yd.

Range: 300 yd to 10,000 yd or 0 yd to 50,000 yd.

Potentiometer data:

Slant range: 0 yd to 28,000 yd.

Horizontal range: 0 yd to 28,000 yd.

Altitude: 0 yd to 28,000 yd.

East-west and north-south components of horizontal range: 0 yd to 28,000 yd.

Remote selsyn data:

Azimuth: 0 mils to 6,400 mils.

Elevation: -175 mils to +1,600 mils.

IFF: Use of Radio Equipment RC-184.

POWER SOURCE: Use of an M-7, M-15, or M-18 power unit or commercial power.

PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
2 Antenna Assembly AN-193	13 1/2 x 2 x 2	1 1/2
2 Antenna Assembly AN-194	13 1/2 x 2 x 2	1 1/2
1 Conversion kit for Control Panel PN-24-A, -B.		
1 Conversion kit for Driver Unit BC-1080-A, -B.		
1 Conversion kit for Gate Modification Kit MC-581.		
1 Conversion kit for Indicator BC-1088-A, -B.		
1 Conversion kit for Modulator BC-984-A, -B.		
1 Conversion kit for Rectifier RA-66-A, -B.		
1 Conversion kit for Tracking Unit BC-1086-A, -B.		
1 Crystal Rectifier Test Set TS-268/U.	7 x 4 x 4	
1 Directional Coupler M-452	5 x 2 1/2 x 2 1/2	1
1 Plan Position Indicator BC-1400	15 1/2 x 10 x 9	50
1 Plan Position Unit BC-1401	19 x 13 1/8 x 8 3/4	40
1 Rectifier Power Unit RA-141	19 x 13 x 8 3/4	63
1 Rectifier Power Unit RA-142	19 x 13 1/8 x 8 3/4	65
1 Scan Mechanism MC-651	23 x 9 x 9	100
1 Slip Ring Unit M-451	10 x 7 x 6	40
1 Test Set TS-147/UP		
1 Transmitter-Receiver Assembly BC-1397.	22 1/2 x 18 x 16 1/2	90
1 Video Amplifier BC-1399	19 x 13 x 8 3/4	40

<sup>1</sup> One in use; one is spare.

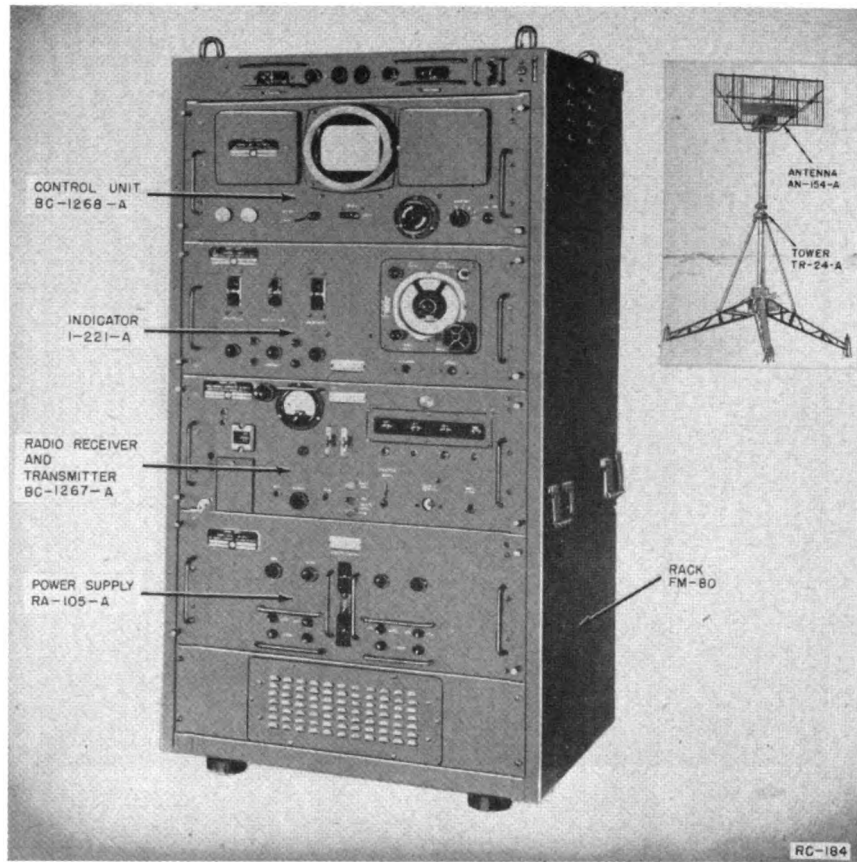


Figure 10. Radio Equipment RC-184.

Status: Standard. Stock No.: 2C3684. Reference: TM 11-1332, TM 11-1432, TM 11-1532.

Radio Equipment RC-184 is the IFF interrogator-responder operated in conjunction with Radio Set SCR-584-(\*) or with Radio Set SCR-584-(\*) modified by Transmitter-Receiver Modification Kit MC-607-A. Radio Equipment RC-184, with the exception of the antenna and its supporting tower, has been designed to fit into Trailer K-78-(\*) with the associated radar set. Rack FM-80 contains all components except the antenna and its supporting tower. Power for operating Radio Equipment RC-184 is drawn directly from the associated radar set.

Radio Equipment RC-184 is used to identify, as friend or foe, aircraft detected by the associated radar set. In an emergency the identification equipment can be used with other radar sets and several of its components can be used with other identification equipments.

**TECHNICAL CHARACTERISTICS**

FREQUENCY: 157 mc to 187 mc.  
PULSE WIDTH: 4  $\mu$ sec to 7  $\mu$ sec.

RECURRENCE FREQUENCY: 240 cps.  
MAXIMUM RANGE: 100,000 yd.  
AZIMUTH COVERAGE: 360°.  
VOLTAGE REQUIREMENTS: 115 v, 60 cyc, single-phase.

**PRINCIPAL COMPONENTS**

Name	Dimensions (in.)	Weight (lb)
1 Antenna AN-154-A	90 x 40 x 18	110
1 2 Control Unit BC-1268-A	23 <sup>3</sup> / <sub>8</sub> x 18 <sup>13</sup> / <sub>32</sub> x 10 <sup>1</sup> / <sub>2</sub>	59 <sup>1</sup> / <sub>2</sub>
1 2 Indicator I-221-A	23 <sup>3</sup> / <sub>8</sub> x 18 <sup>13</sup> / <sub>32</sub> x 10	108
1 2 Power Supply RA-105-A	23 <sup>3</sup> / <sub>8</sub> x 18 <sup>13</sup> / <sub>32</sub> x 10	118 <sup>1</sup> / <sub>2</sub>
1 Rack FM-80	55 x 28 x 20 <sup>1</sup> / <sub>2</sub>	205
1 2 Radio Receiver and Transmitter BC-1267-A	23 <sup>3</sup> / <sub>8</sub> x 18 <sup>13</sup> / <sub>32</sub> x 10	64 <sup>1</sup> / <sub>2</sub>
1 Range Calibrator I-223-A	12 <sup>1</sup> / <sub>4</sub> x 11 <sup>11</sup> / <sub>16</sub> x 9 <sup>3</sup> / <sub>4</sub>	31
1 Signal Generator I-222-A	19 <sup>1</sup> / <sub>2</sub> x 12 x 7 <sup>1</sup> / <sub>2</sub>	50
1 Tower TR-24-A	200 h (approx); rests on circle 216 diam	800

<sup>1</sup> One in use; one is spare.

**WEIGHT AND VOLUME**

	Unpacked	Domestic pack	Export pack
Total weight (lb)	1,572.5	1,887	2,265
Total volume (cu ft)		63.5	76.2
Ship tons			1.91

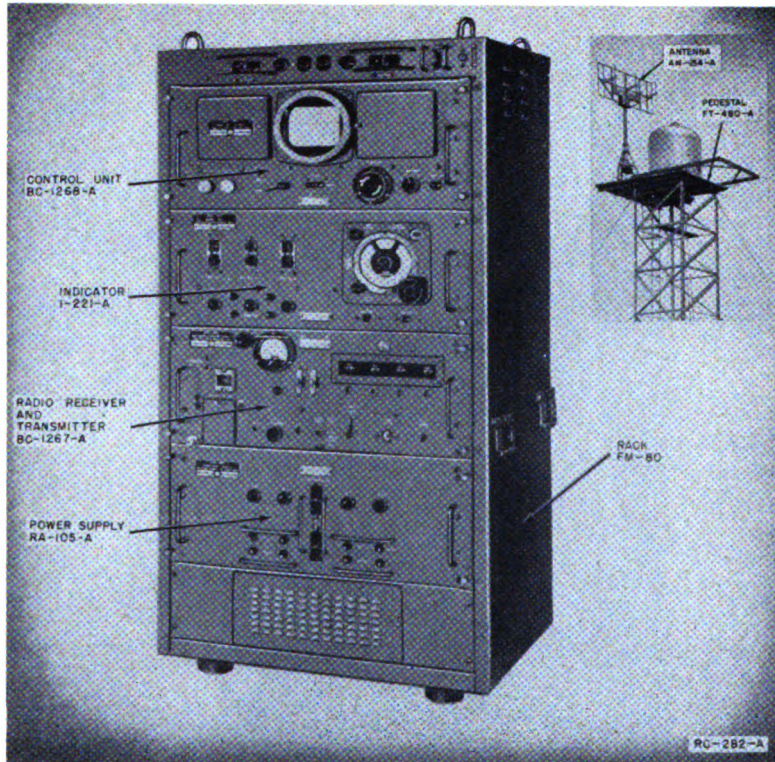


Figure 11. Radio Equipment RC-282-A.

Status: Standard. Stock No.: 2C3690-282A.  
Reference: TM 11-1308, TM 11-1408, TM 11-1508.

Radio Equipment RC-282-A is the IFF interrogator-responder operated in conjunction with Radio Set SCR-682-A. Radio Equipment RC-282-A, with the exception of the antenna and its supporting Pedestal FT-480-A, has been designed to fit into Shelter HO-23 with the associated radar set. Rack FM-80 contains all components except the antenna and its supporting pedestal. The pedestal and antenna are positioned on top of Tower 301 which is modified by an extension platform. Tower 301 is not part of Radio Equipment RC-282-A. The power source for Radio Equipment RC-282-A is the same as that of the associated radar set.

Radio Equipment RC-282-A is used primarily to identify, as friend or foe, surface-craft but can be used also for aircraft identification. The equipment is used to challenge craft that have been located by the radar search equipment, to display an identifying coded signal from a friendly craft, and to localize the source of the signal by indicating the azimuth and range. In an emergency, the

identification equipment can be used with other radar sets and several of the components can be used with other identification equipments.

TECHNICAL CHARACTERISTICS

FREQUENCY: 157 mc to 187 mc.  
PULSE WIDTH: 4  $\mu$ sec to 10  $\mu$ sec.  
RECURRENCE FREQUENCY: 240 cps.  
MAXIMUM RANGE: 100,000 yd.  
AZIMUTH COVERAGE: 360°.  
VOLTAGE REQUIREMENTS: 115 v, 60 cyc, single-phase.  
POWER REQUIREMENTS: 1,500 w.

PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Antenna AN-154-A	.90 x 40 x 18	110
1 2 Control Unit BC-1268-A	23 7/8 x 18 1/2 x 10 1/2	59 1/2
1 2 Indicator I-221-A	23 7/8 x 18 1/2 x 10	108
1 Pedestal FT-480-A	120 x 34 diam	500
1 2 Power Supply RA-105-A	23 7/8 x 18 1/2 x 10	118 1/2
1 Rack FM-80	55 x 28 x 20 1/2	205
1 2 Radio Receiver and Transmitter BC-1267-A	23 7/8 x 18 1/2 x 10	64 1/2

1 One in use; one is spare.

WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb)	1,246.5	1,495.8	1,795
Total volume (cu ft)		47.5	57
Ship tons			1.425

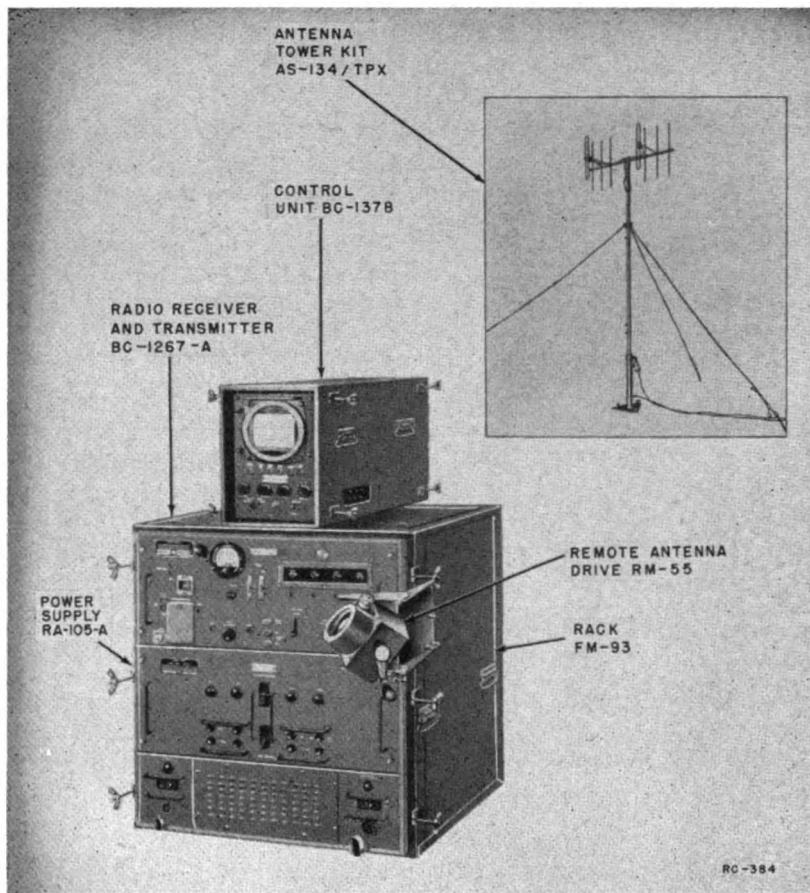


Figure 12. Radio Equipment RC-384.

*Status:* Standard. *Stock No.:* 2C3690-384. *Reference:* TM 11-1362, TM 11-1462, TM 11-1562.

Radio Equipment RC-384 is a transportable IFF interrogator-responder designed for operation with Radio Set SCR-784 to identify aircraft detected by the radar set. Rack FM-93 is set up on the ground under the canvas shelter at the rear of Trailer K-84 which contains Radio Set SCR-784. Control Unit BC-1378 is positioned on top of Rack FM-93, and Remote Antenna Drive RM-55 is attached to Rack FM-93. Antenna Assembly AS-109/TPX, at-

tached to the top of Tower TR-29, is installed on a level site not more than 50 feet away from the radar shelter. Radio Equipment RC-384 obtains its operating power from Radio Set SCR-784.

Radio Equipment RC-384 is used to localize the target, using azimuth and range data obtained from the radar set operator. The equipment is used also to challenge the unidentified target and to display the coded reply of the target is a friendly aircraft. The maximum effective range of Radio Equipment RC-384 is 75,000 yards.

**RC-384****TECHNICAL CHARACTERISTICS****FREQUENCY:** 157 mc to 187 mc.**PULSE RECURRENCE FREQUENCY:**

Synchronized by Radio Set SCR-784: 213 pps.

Allowable recurrence frequencies: 200 pps through 240 pps.

**POWER REQUIREMENTS:** 113 v to 117 v, 60 cyc, single-phase.**POWER CONSUMPTION:** 1,228 w.**TYPE OF PRESENTATION:** A-scope.**RANGE:**

Maximum: 75,000 yd.

Minimum: Approx 800 yd to 1,700 yd depending on pulse width.

**ANTENNA:** Two folded vertical dipoles with three parasitic reflector elements behind each dipole. Antenna is mounted on a 16-ft rotatable mast.**TRANSMISSION LINE RG-8/U:** Flexible coaxial cable.**ASSEMBLY TIME:** Approx 15 min with trained crew.**R-F PULSE WIDTH:** 4  $\mu$ sec to 10  $\mu$ sec.**RECEIVER:**

Over-all bandwidth: 4 mc at half-voltage points.

Intermediate frequency: Staggered above and below 11 mc.

**PRINCIPAL COMPONENTS**

<i>Name</i>	<i>Dimensions (in.)</i>	<i>Weight (lb)</i>
1 Antenna Tower Kit AS-134/TPX.	192	150
<sup>1</sup> 2 Control Unit BC-1378.....	2 1 $\frac{1}{2}$ x 15 $\frac{1}{8}$ x 10 $\frac{1}{4}$	71 $\frac{1}{2}$
<sup>1</sup> 2 Power Supply RA-105-A.....	2 1 $\frac{7}{8}$ x 18 $\frac{13}{32}$ x 10	118 $\frac{1}{2}$
1 Rack FM-93 (Without components.)	29 $\frac{9}{16}$ x 24 $\frac{9}{16}$ x 23	83
<sup>1</sup> 2 Radio Receiver and Transmitter BC-1267-A.	23 $\frac{7}{8}$ x 18 $\frac{13}{32}$ x 10	64 $\frac{1}{2}$

<sup>1</sup> One in use; one is spare.**WEIGHT AND VOLUME**

	<i>Unpacked</i>	<i>Domestic pack</i>	<i>Export pack</i>
Total weight (lb).....	537.5	645	774
Total volume (cu ft).....		19	23
Ship tons.....			.575

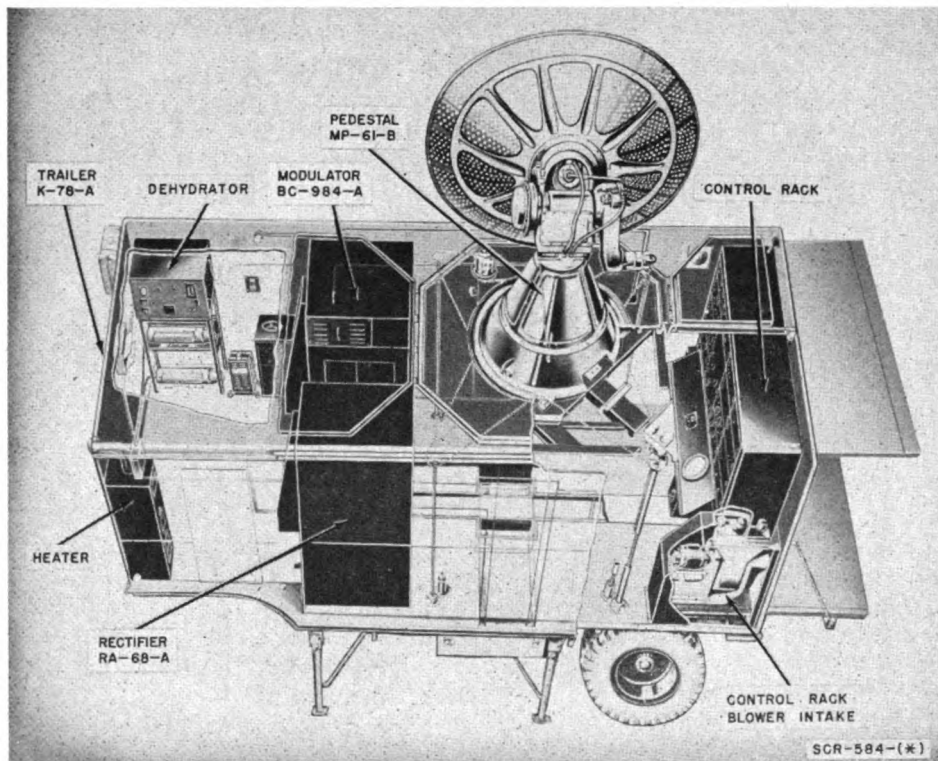


Figure 13. Radio Set SCR-584-A.

*Status:* Standard. *Stock No.:* 2S584. *Reference:* TM 11-1324, TM 11-1424, TM 11-1524.

Radio Set SCR-584- (\*) represents Radio Sets SCR-584-A and -B. Radio Set SCR-584- (\*) is a mobile, medium-range, radar unit, mounted in Trailer K-78-A or -B, designed for use with anti-aircraft artillery. All components are shipped in the trailer. Pedestal MP-61-B is mounted on a platform attached to four elevator screws. It can be raised and lowered by a motor-driven chain and sprocket mechanism when the two hatch doors in the trailer roof are open. Gun directors M4, M7, M9, and M10 may be used with, but are not part of, Radio Set SCR-584- (\*).

Radio Equipment RC-184 is the IFF equipment used with, but not part of, Radio Set SCR-584- (\*). The power source is not a part of Radio Set SCR-584- (\*).

Radio Set SCR-584- (\*) may be used for anti-aircraft operations, for surface-craft detection, or, when properly modified, for locating enemy mortars. The radar set searches for and detects aircraft within a maximum range of 70,000 yards. The equipment automatically tracks a selected

target when the target is within 32,000 yards of the radar set. It determines the position of the target within narrow margins of error and generates voltages which represent the azimuth, elevation, range, and altitude of the target. The radar set supplies present position data to the gun director provided the target is within 28,000 yards. When modified by Remote Data Indicator Kit MC-546, the radar set is used to control coastal battery gun-fire against surface craft by supplying azimuth and range data to a plotting room and provides corrective fire control information by indicating the position of shell splashes with respect to the position of the target. The maximum range of the equipment during search is approximately 40 miles.

Radio Set SCR-584- (\*), when modified by the installation of Transmitter-Receiver Modification Kit MC-607-A, provides a means whereby the frequency of the radar transmitter is changed from S-band to a variable frequency within the X-band. The kit also provides a 0.5-microsecond pulse for searching and a 0.2-microsecond pulse for tracking. The scan system is changed to furnish a wider beam for searching. (See MC-607-A.)

TECHNICAL CHARACTERISTICS

FREQUENCY: 2,700 mc to 2,900 mc.  
 PULSE WIDTH: .8  $\mu$ sec.  
 PULSE RECURRENCE FREQUENCY: 1,707 pps.  
 BEAM WIDTH: 4° at half-power points.  
 INTERMEDIATE FREQUENCY: 30 mc.  
 IFF: Use of Radio Equipment RC-184.  
 POWER REQUIREMENTS: 115 v (2% regulation), 60 cyc  $\pm$ 2 cyc, 3-phase, 12 kva max.  
 PPI SEARCH: Out to 70,000 yd.  
 AUTOMATIC TRACKING IN AZIMUTH AND ELEVATION WITH AIDED TRACKING IN RANGE: Out to 32,000 yd.  
 ACCURACY AT MAXIMUM RANGE:  $\pm$ 25 yd.  
 MINIMUM RANGE: 500 yd at large elevation angles; 1,000 yd at small elevation angles.  
 AZIMUTH COVERAGE: 360° or any part thereof.  
 ELEVATION COVERAGE: From 175 mils below to 1,580 mils above horizontal.  
 AZIMUTH ELEVATION ACCURACY:  $\pm$ 1 mil.  
 ALTITUDE COVERAGE: 300 yd to 10,000 yd.  
 ALTITUDE ACCURACY:  $\pm$ 10 yd.  
 DATA TRANSMISSION: M4 or M7 director receives selsyn data on azimuth, elevation, and either altitude (10,000 yd) or slant range (28,000 yd). M9 or M10 director receives potentiometer data on slant range, horizontal range, altitude, and east-west and north-south components of horizontal range. Selsyn data are transmitted to tracker on azimuth and elevation.

PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Amplifier BC-1074-A, -B	12 $\frac{3}{4}$ x 7 $\frac{3}{4}$ x 6 $\frac{1}{2}$	15
1 Amplifier BC-1078-A, -B	8 x 6 $\frac{1}{2}$ x 6	5
1 2 Antenna AN-101-A, -B	15 $\frac{3}{64}$ x 4 $\frac{7}{16}$ OD	2 $\frac{5}{8}$
1 Antenna Switching Box BC-1132-A, -B	7 $\frac{1}{2}$ x 5 $\frac{1}{2}$ x 4 $\frac{3}{8}$	
1 Control Panel PN-24-A, -B	6 x 6 x 4	10

1 Control Unit BC-1085-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	120
1 Control Unit BC-1094-A, -B	19 x 14 x 8 $\frac{3}{4}$	50
1 One in use; one is spare.		
1 Crystal Mixer BC-1130-A, -B		
1 Data Panel PN-22-A, -B	22 $\frac{1}{2}$ x 12 $\frac{1}{2}$ x 7 $\frac{1}{2}$	30
1 Data Unit BC-1075-A, -B	11 $\frac{1}{2}$ x 11 $\frac{1}{2}$ x 10 $\frac{3}{4}$	100
1 Dehydrator (Sig C stock No. 2Z3602-4)	23 $\frac{1}{2}$ x 19 x 14 $\frac{1}{2}$	
1 Driver Unit BC-1080-A, -B	21 $\frac{3}{4}$ x 14 $\frac{1}{8}$ x 12 $\frac{1}{4}$	75
2 Generator (Sig C stock No. 3H-2411-4)	29 $\frac{1}{16}$ x 12 x 8 $\frac{1}{2}$	132
1 Indicator BC-1076-A, -B	19 x 14 x 8 $\frac{3}{4}$	73 $\frac{1}{2}$
1 Indicator BC-1088-A, -B	26 $\frac{1}{4}$ x 19 x 14	254
1 Indicator BC-1092-A, -B	15 $\frac{3}{4}$ x 9 $\frac{1}{2}$ diam	20
1 Junction Box JB-71-A, -B	26 $\frac{1}{2}$ x 12 x 2	70
1 Modulator BC-984-A, -B	59 x 34 x 26	1,200
1 Oscillator BC-1096-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Pedestal MP-61-B	89 x 74 x 74	2,000
1 Plan Position Unit BC-1058-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Radio Receiver BC-1056-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Range Unit BC-1062-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Rectifier RA-66-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	75
1 Rectifier RA-68-A, -B	59 x 34 x 26	1,200
1 Rectifier RA-69-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	79
1 Rectifier RA-70-A, -B	19 x 14 x 8 $\frac{3}{4}$	75
1 Rectifier RA-71-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Rectifier RA-72-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	75
1 Switch Box SW-214-A, -B	31 $\frac{1}{4}$ x 16 $\frac{1}{8}$ x 4 $\frac{3}{4}$	60
1 Tracking Unit BC-1086-A, -B	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Tracking Unit BC-1090-A, -B	19 x 13 $\frac{7}{8}$ x 8 $\frac{3}{4}$	50
1 Trailer K-78-A, -B	238 x 124 x 96	9,000 (approx)

WEIGHT AND VOLUME

Total weight (lb)	20,000
Total volume (cu ft)	785
Ship tons	19.625

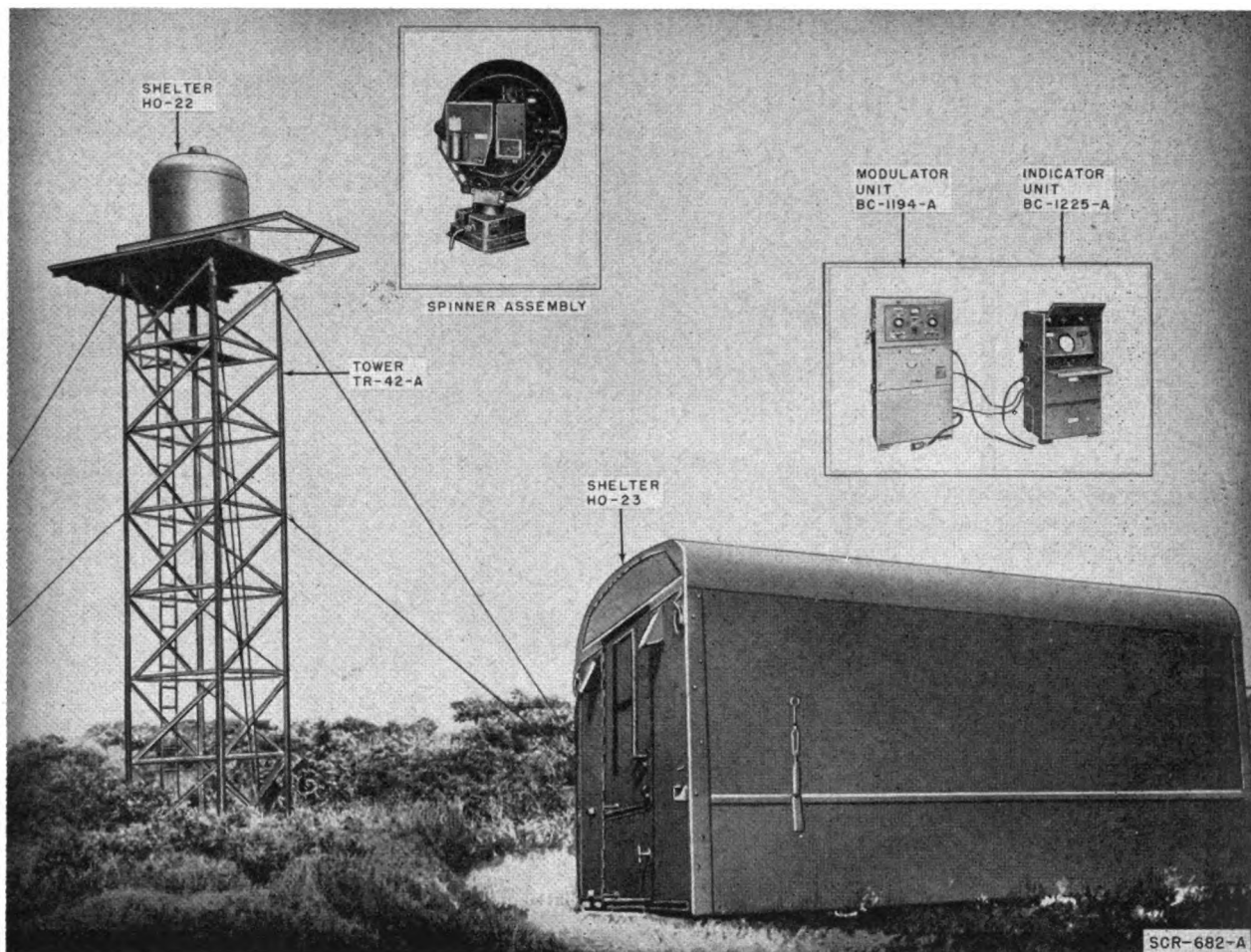


Figure 14. Radio Set SCR-682-A.

*Status:* Standard. *Stock No.:* 2S682A. *Reference:* TM 11-1361, TM 11-1461, TM 11-1561.

Radio Set SCR-682-A is a transportable, long-range, general-surveillance radar unit designed for use with harbor and coastal defense installations. The equipment is designed so that it may be disassembled and moved from one location to another with a minimum of difficulty. All components of Radio Set SCR-682-A are shipped packed in Shelter HO-23.

During operation all the major components of the radar set are located in Shelter HO-23 except Power Unit PE-183-A, and the spinner assembly which is located in Shelter HO-22 on top of Tower TR-42-A. Tower TR-42-A is used with, but is

not a part of, Radio Set SCR-682-A. Radio Equipment RC-282-A is the IFF equipment used with, but not a part of, Radio Set SCR-682-A.

Radio Set SCR-682-A is used to maintain surveillance and to afford early detection of surface craft or low-flying aircraft under any conditions of weather or light. The radar set may be adjusted to search for high-flying aircraft but it then loses much of its effectiveness in detecting surface craft. The radar set is used also to furnish continuous azimuth and range data on the position, relative to the radar set, of all targets previously detected. The minimum range is from 500 to 2,000 yards depending upon ground clutter. The maximum range is approximately 240,000 yards.



**SCR-682-A**

**TECHNICAL CHARACTERISTICS**

**RANGE:**

- Maximum: 240,000 yd (approx).
- Minimum: 500 yd to 2,000 yd (approx) depending upon ground clutter.
- Accuracy of range:
  - 10,000-yd range scale:  $\pm 100$  yd.
  - 40,000-yd range scale:  $\pm 500$  yd.
  - 160,000-yd range scale:  $\pm 2,500$  yd.
  - 240,000-yd range scale:  $\pm 5,000$  yd.

**AZIMUTH:**

- Coverage: 360°
- Accuracy:  $\pm 1^\circ$
- Scanning: Continuous rotation of spinner assembly at 10 rpm (6 rpm for units serially numbered 1 to 6).

**ELEVATION:** Manually adjustable from  $-5^\circ$  to  $+25^\circ$ .

**TYPE OF PRESENTATION:** 7-in. cathode-ray tube for PPI presentation of azimuth and range.

**FREQUENCY:** 2,800 mc (approx).

**TRANSPORTATION:** Three 2½-ton, 6 x 6, cargo trucks or two 2½-ton, 6 x 6, cargo trucks and two 1-ton trailers are necessary to transport the radar set in one trip.

**SHELTERS AND TOWER:** Two shelters provided for radar set. Antenna Shelter HO-22, is a prefabricated pressed canvas and plastic shelter. Shelter HO-23 is a complete house. Tower TR-42-A, a portable, adjustable-height, steel tower is 30 ft h x 6 ft sq with an 8-ft sq platform and a hoist assembly.

**ASSEMBLY TIME:** 6 hr (approx) with trained crew.

**TRANSMITTER SYSTEM**

- PEAK POWER OUTPUT: 225 kw.
- AVERAGE POWER OUTPUT: 90 w.
- PULSE RECURRENCE FREQUENCY: 402 cps.
- PULSE WIDTH: 1  $\mu$ sec.

**RECEIVER AND INDICATOR SYSTEMS**

**TYPE OF INDICATOR:**

PPI scan oscilloscope: 7-in. type-7BP7 cathode-ray tube with suitable color filter.

**OPERATING RANGES:** 0 yd to 240,000 yd, divided into four ranges:

- 0 yd to 10,000 yd.
- 0 yd to 40,000 yd.
- 0 yd to 160,000 yd.
- 0 yd to 240,000 yd.

**R-F SYSTEM**

**TRANSMISSION LINE:** ⅜-in. coaxial cable.

**ANTENNA:** One dipole antenna mounted at focal point of parabolic reflector used for transmitting and receiving.

**BEAM WIDTH:** 6° at half-power points.

**POWER SUPPLY SYSTEM**

**TYPE OF POWER UNIT:** Gasoline-engine-driven generator.

**RATING:** 63 kva, .8 power factor, 120 v, single-phase, 52.5 amp, 60 cyc.

**PRINCIPAL COMPONENTS**

Name	Dimensions (in.)	Weight (lb)
1 Antenna AN-134-A.....	49¼ x 48½ x 28¾	111
1 Indicator Unit BC-1225-A.....	49¼ x 30 x 25¾	465
1 Modulator Unit BC-1194-A.....	49¼ x 30½ x 19¾	538
1 Pedestal FT-458-A.....	25 x 25 x 18½	242
1 Power Unit PE-183-A.....	59 x 38 x 24	1,115
1 Radio Frequency Unit BC-1224-A.....	27¾ x 17¾ x 3	135
1 Radio Receiver BC-1223-A.....	20½ x 10 x 7½	49
1 Shelter HO-22.....	77 h x 68 diam	105
1 Shelter HO-23.....	138 x 75 x 66	1,890

**WEIGHT AND VOLUME**

	Unpacked	Domestic pack	Export pack
Total weight (lb).....	5,000	6,000	7,200
Total volume (cu ft).....		1,014.8	1,217.7
Ship tons.....			30.44

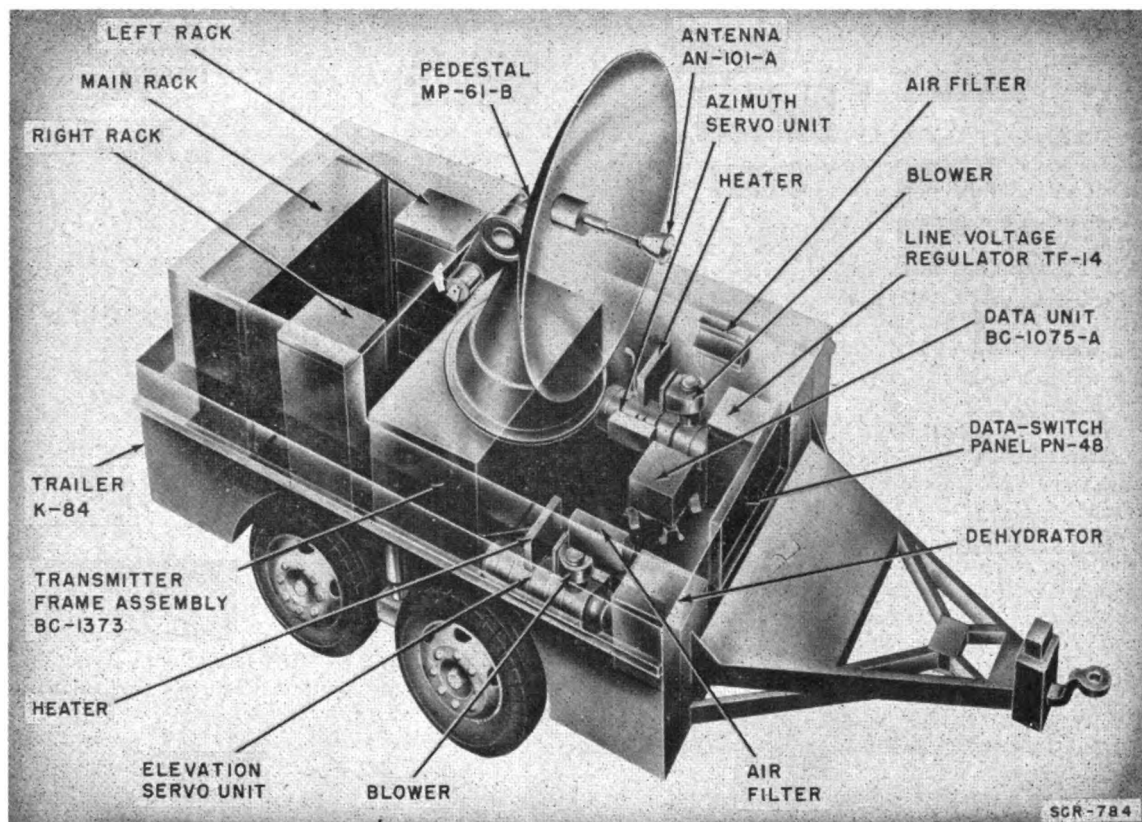


Figure 15. Radio Set SCR-784.

*Status:* Standard. *Stock No.:* 2S784. *Reference:* TM 11-1354, TM 11-1454, TM 11-1554.

Radio Set SCR-784 is a mobile, medium-weight, medium-range, radar unit designed for use with antiaircraft artillery. All components of the radar set are mounted in Trailer K-84. The main rack, accessible by lifting a hinged door at the rear of the trailer body, contains all of the operating controls and components which must be kept under observation during operation. A small door at the front of the trailer body covers the switch and data panel. Other components are not readily accessible during operation. The antenna is mounted permanently on top of the trailer.

Gun directors M4, M7, M9, and M10 may be used with, but are not part of, Radio Set SCR-784. Radio Equipment RC-384 is the IFF equipment used with, but not part of, Radio Set SCR-784. The power source is not part of the radar set.

Radio Set SCR-784 is used as a search for early warning of enemy aircraft. Not only does the equipment present exact information on the location of targets, but it also uses this information to

control the equipment in automatically tracking the target and in providing accurate range, azimuth, and elevation information.

Radio Set SCR-784 is used to develop exact position data on targets and to transmit this information to the gun directors for positioning and fire control. The maximum range for PPI search is 70,000 yards, for automatic tracking is 32,000 yards, and for potentiometer data is 28,000 yards. The minimum range is from 500 yards to 1,000 yards.

#### TECHNICAL CHARACTERISTICS

##### RANGE:

###### Maximum:

PPI search: 70,000 yd.

Automatic tracking: 32,000 yd.

Potentiometer data: 28,000 yd.

Minimum: 500 yd to 1,000 yd.

Accuracy at maximum range:  $\pm 25$  yd.

##### AZIMUTH:

Coverage: 360° or any sector of 360°.

Accuracy:  $\pm 1$  mil.

##### ELEVATION:

Upper limit: +1,600 mils.

Lower limit: -175 mils.

Accuracy:  $\pm 1$  mil.

# SCR-784

## HEIGHT:

Coverage: 300 yd to 10,000 yd.  
 Maximum: 10,000 yd.  
 Minimum: 300 yd.  
 Accuracy:  $\pm 10$  yd.

TYPE OF PRESENTATION: PPI presentation on a 7-in. cathode-ray tube. Range determined on two 3-in. cathode-ray tubes with circular timebase.

IFF: Use of Radio Equipment RC-384.

FREQUENCY: 2,800 mc.

PACKING OF EQUIPMENT: See TM 11-1354.

DIMENSIONS OF SITE: 20 ft x 25 ft (minimum).

## TRANSMITTER SYSTEM:

Pulse recurrence frequency: 1,707 pps.

Pulse width: .8  $\mu$ sec.

## RECEIVER SYSTEM:

Intermediate frequency: 30 mc.

## R-F SYSTEM:

Transmission line: Coaxial.

## DATA TRANSMISSION:

M4 or M7 directors: Transmits selsyn data on azimuth, elevation, and either altitude or slant range.

M9 or M10 directors: Transmits potentiometer data on slant range, horizontal range, altitude, and east-west and north-south components of horizontal range. Transmits selsyn data to tracker on azimuth and elevation.

POWER REQUIREMENTS: 10 kva, three-phase, three-wire, 115-v, 60-cyc ( $\pm 2$  cyc) voltage regulation of power unit within 2%.

## PRINCIPAL COMPONENTS

Name	Dimensions (in.)	Weight (lb)
1 Amplifier BC-1078-A	8 x 6 $\frac{1}{2}$ x 6	15
1 Antenna AN-101-A	15 $\frac{3}{4}$ x 4 $\frac{1}{16}$ OD	
1 Antenna Switching Box BC-1132-A	7 $\frac{1}{2}$ x 5 $\frac{1}{16}$ x 4 $\frac{3}{8}$	
1 Crystal Mixer BC-1130-A		
1 Data-Switch Panel PN-48	39 $\frac{1}{4}$ x 31 x 6 $\frac{1}{2}$	75
1 Data Unit BC-1075-A	11 $\frac{1}{2}$ x 11 $\frac{1}{2}$ x 10 $\frac{3}{4}$	100
1 Driver Unit BC-1080-C	21 $\frac{3}{4}$ x 14 $\frac{1}{8}$ x 12 $\frac{1}{4}$	75
1 Indicator BC-1092-C	15 $\frac{3}{4}$ x 9 $\frac{1}{8}$ diam	20
1 Line-Voltage Regulator TF-14	22 x 18 x 14	192

Name	Dimensions (in.)	Weight (lb)
1 Oscillator BC-1374	19 x 13 $\frac{1}{8}$ x 8 $\frac{3}{4}$	43 $\frac{1}{2}$
1 Pedestal MP-61-B	89 x 74 x 74	2,000
1 Remote Video Amplifier BC-1074-A	12 $\frac{3}{4}$ x 7 $\frac{3}{4}$ x 6 $\frac{1}{2}$	15
1 Trailer K-84	218 x 96 x 79	13,000
1 Transmitter Frame Assembly BC-1373	56 x 30 x 29	863
1 Dehydrator model 22 J (Sig C stock No. 2Z3602-14)	16 $\frac{7}{8}$ x 17 $\frac{1}{4}$ x 15 $\frac{1}{16}$	100
2 Generator (Sig C stock No. H2411-4)	29 $\frac{5}{16}$ x 12 x 8 $\frac{1}{2}$	132
3 H2411-4		
1 Main rack:	62 $\frac{1}{4}$ x 41 $\frac{1}{2}$ x 14	253
1 Control Unit BC-1085-C	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	120
1 Indicator BC-1076-A	19 x 14 x 8 $\frac{3}{4}$	73 $\frac{1}{2}$
1 Indicator-Control Unit BC-1370	19 x 17 $\frac{1}{2}$ x 14	51
1 Plan-Position Unit BC-1058-C	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Range Indicator BC-1371	26 $\frac{1}{4}$ x 19 x 14	254
1 Range Unit BC-1062-C	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Receiver BC-1056-C	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Tracking Unit BC-1086-C	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Tracking Unit BC-1090-C	19 x 13 $\frac{7}{8}$ x 8 $\frac{3}{4}$	50
1 Left rack:	44 x 19 $\frac{3}{16}$ x 17 $\frac{1}{4}$	80
1 Control Unit BC-1094-C	19 x 14 x 8 $\frac{3}{4}$	50
1 Range-Tracking Unit BC-1372	19 x 13 $\frac{1}{8}$ x 8 $\frac{3}{4}$	35
1 Rectifier RA-70-A	19 x 14 x 8 $\frac{3}{4}$	75
1 Rectifier RA-71-A	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	50
1 Right rack:	44 x 19 $\frac{3}{16}$ x 17 $\frac{1}{4}$	80
1 Power-Supply Unit RA-132	19 x 13 $\frac{1}{8}$ x 8 $\frac{3}{4}$	64
1 Rectifier RA-66-A	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	75
1 Rectifier RA-69-A	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	79
1 Rectifier RA-72-A	19 x 13 $\frac{1}{4}$ x 8 $\frac{3}{4}$	75

## WEIGHT AND VOLUME

	Unpacked	Domestic pack	Export pack
Total weight (lb)	2,810	3,372	4,046.4
Total volume (cu ft)		1,402	1,682.4
Ship tons			42.06

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