TECHNICAL MANUAL

RADAR SETS AN/SPN–11X, AN/SPN–11Y AND AN/SPN–11Z INSTALLATION AND OPERATION

CHANGES
No. 1

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *27 July 1954*

TM 11–1335, 20 October 1952, is changed as follows:

In the following places, **"or PU–243A/SPN–11"** is added after Motor-Generator PU–243/SPN–11:

Paragraph 6. Chart. Line 11.
Paragraph 7*a*. Chart. Line 7.
Figure 11.
Paragraph 17*b*. Chart. Line 2.
Figure 21A.

In the following places, **"or PU–245A/SPN–11"** is added after Motor-Generator PU–245/SPN–11:

Paragraph 6. Chart. Line 13.
Paragraph 7*b*. Chart. Line 7.
Paragraph 17*b*. Chart. Line 2.
Figure 21C.

In the following places, **"or PU–244A/SPN–11"** is added after Motor-Generator PU–244/SPN–11:

Paragraph 6. Chart. Line 12.
Paragraph 7*c*. Chart. Line 7.
Paragraph 17*b*. Chart. Line 2.
Figure 21B.

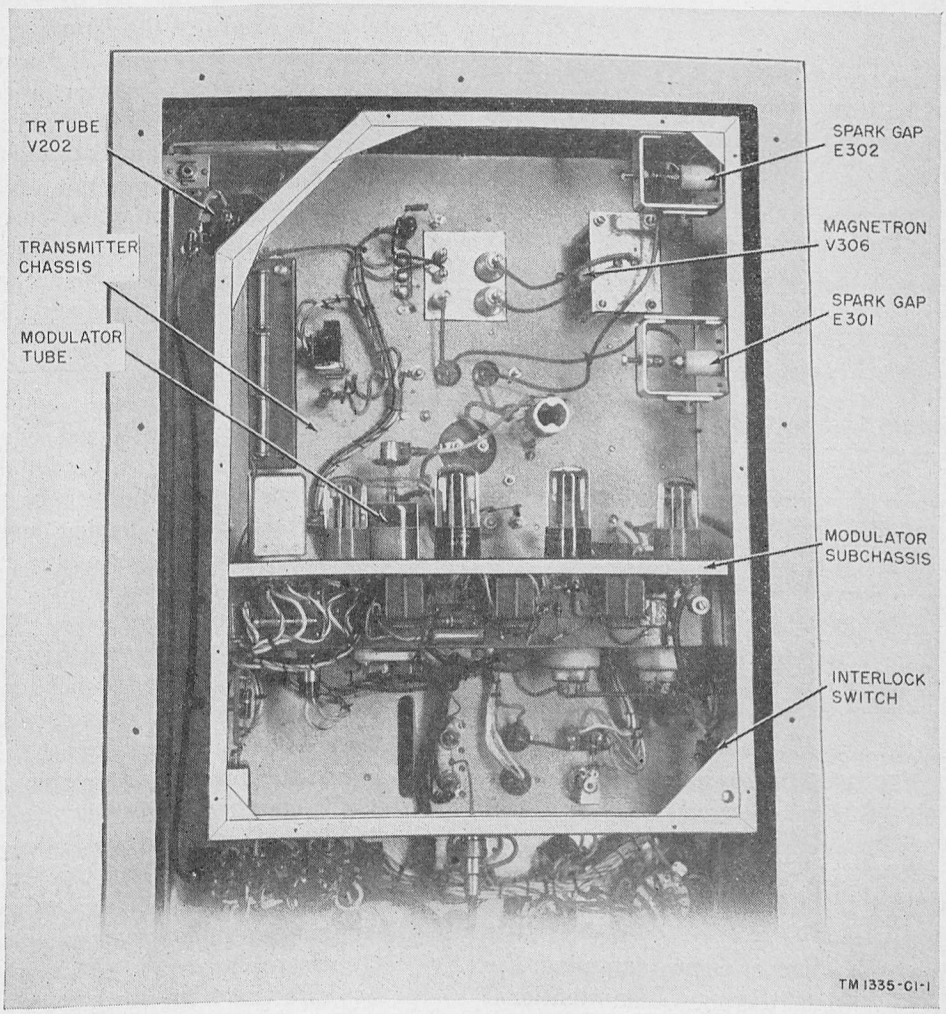

Figure 7. (Superseded) *Receiver-transmitter, back cover and shield cover removed.*

15. Running Spares

The following items are supplied as running spares for Radar Set AN/SPN–11(*).

* * * * *

1 tube, type ~~1B35~~ **1B35A.**

* * * * *

1 tube, type **6005/6AQ5W.**

* * * * *

2 tubes, type ~~6SN7GT~~ **6SN7WGT.**

* * * * *

35. Antenna

Mount the antenna * * * should provide one.

* * * * *

c. Antenna Feed Horn and Reflector Adjustments. The spacing between * * * of the reflector.

* * * * *

(2) *Steel rule check.* When an antenna * * * the reflector spacing.

* * * * *

(*b*) Measure ~~12/15/16~~ **125/16** inches, ±1/32 inch, from the center pips of the reflector to the bottom center of the flat flange of the horn.

* * * * *

Figure 29. Capacitor "C503 .01UF, shunted across antenna drive motor B502 is removed and is inserted between terminal 5 on terminal board TB501 and ground.

* * * * *

44. Fuse Rating and Location Chart

Fuse			Location	
Ref. symbol	Ratin		Component	Circuit
	Volts	Amp.		
*	*	*	*	*
F301-------	250	~~2~~ 1	Receiver-transmitter.	Transformer T302.
*	*	*	*	*

Figure 47. V201 1B35 is changed to read: **V201 1B35A.** V202 1B24 is changed to read: **V202 1B24A.**

55.1. Antijamming Procedures

(Added)

To minimize the effect of enemy jamming, the radar operator first must distinguish unintentional interference from the intentional interference caused by deliberate enemy jamming.

a. Unintentional Interference. This type of interference may result from the operation of nearby electrical equipment such as power generators, communications transmitters, and various components of the radar set. The interference may also be caused by natural external sources such as heavy seas or rain squalls interfering with shipborne radar equipment. The patterns formed by these types of interference may be similar to those caused by enemy jamming. It is important that the operator become familiar with the effect of the unintentional interferences and learn how to minimize their effect.

b. Intentional Interference Caused by Enemy Jamming. This type of interference is indicated when the interference patterns remain on the radar scope after interference from all unintentional sources have been minimized or eliminated. The operator must take all possible action to minimize the effects of the jamming actions, and continue effective operation. If, because of enemy jamming, an untrained operator proceeds to shut down the radar set with the mistaken idea that it is defective, he will accomplish what the enemy desires. Training and practice will teach the operator to distinguish between the various types of interference and jamming processes, by observing the patterns produced on the scope. Then the operator may take the necessary counteractions indicated in *f* through *h* below.

c. Types of Jamming. Jamming signals are divided into two categories. One category is transmission jamming, produced by a transmitter radiating a modulated, or unmodulated, radio-frequency signal. The other is reflected (window) jamming, produced by reflecting devices intended to produce false targets, or to obscure real target signals on the radar scope.

(1) *Transmission jamming.* This type of jamming usually will have a directional characteristic and, depending on the type of transmission jamming used, will produce either strobe lines or sector blanking in the direction from which the jamming is arriving. However, when the enemy jamming transmitter is close to the radar being jammed, and the jamming signals are extremely strong, transmission jamming can obscure or completely saturate the radar scope. It is then that the direction from which the jamming signals

are being received cannot be determined. It is important from the countermeasures viewpoint to note the direction when the jamming *does* have discernible directional characteristics so that the jammer may be located, and to take steps to reduce the effectiveness of the jamming signals. Transmission jamming is divided into two categories which follow:

(*a*) *Continuous wave jamming.* This constitutes the transmission of unmodulated rf signals at or very close to the frequency used by the radar equipment being jammed. The primary purpose of a cw jamming signal is to overload or block the radar receiver. Weak cw signals appear on the PPI scope as a moderately bright narrow sector in the direction of the jammer, and target echoes sometimes may be seen through the jamming. With stronger jamming signals, other bright sectors appear because of the energy being picked up by the side lobes of the antenna, and the main sector is wider and brighter. Echoes with an azimuth that corresponds to these sectors are thus hidden. Very strong cw jamming signals can block the receiver and remove all video signals from the scope.

(*b*) *Modulated jamming.* This consists of the transmission of radio frequency signals, at the radar frequency, modulated to produce interfering patterns on the scope of the radar being jammed. Both frequency modulation and amplitude modulation are used and cause similar effects except that fm usually causes a more weaving pattern. The PPI scope, when jammed by a modulated signal, shows strobe lines (thin lines, straight or curved, running from the center to the edge of the scope). The strobe lines in the direction of the jammer may be so close together that they appear as a sector. Noise jamming is a very commonly used type of modulated jamming. The effect of noise jamming on the PPI scope is similar to that of ordinary amplitude modulated jamming, but it is more effective.

(2) *Barrage and spot jamming.* Transmission jamming can be classified according to the band width occupied by the jamming signal. Barrage jamming operates over a wide band of frequencies. All radar sets operating within this band are jammed. A barrage jamming operation normally will employ a number of broad band, modulated jammers tuned to adjacent frequencies. Because the total individual jammer power is used over a wide band, the power per channel is smaller than that of a spot jammer. Spot jammers produce a jamming signal on one frequency only, or over a narrow band of frequencies. They require a good monitoring system to enable the jammer to operate at the same frequency as the radar set being jammed. Because the power is concentrated in a narrow frequency band, smaller transmitters can be used. In general, noise-modulated, and fm jammers are used for barrage jamming, while cw and ordinary am jammers are used for spot jammers.

d. Reflected Jamming. Reflected jamming may be divided into two or more categories such as window, and miscellaneous. Both are very effective.

(1) *Window jamming.* Reflected (window) jamming is produced by the reflection of the energy transmitted from the radar set by a great quantity of metallic material called *window* or chaff. *Window* is usually dropped from aircraft. It is used to create false echoes or to produce large echoes intended to obscure target echoes. *Window* may also be sown (dispensed) from artillery shells and guided missiles. Depending upon the intensity of the window dropped, the false echoes may have the appearance of indications caused by adverse weather conditions (dense clouds and rain squalls), and may be identified as a trail behind the airplane dropping the *window.* The echoes usually beat violently while they are visible, and the pattern on the scope becomes wider and more ragged as the *window* floats toward the ground.

(2) *Miscellaneous materials.* Reflected jamming may be produced also by rope, corner reflectors, metallized mesh, and either stable, rotating, or oscillating

dipoles. Such types of devices produce strong false echoes which are intended to capture tracking radars or to draw attention away from real target echoes. This tactic usually is called *deception* rather than jamming.

e. Location of Jamming Source. When interference is received and it appears to the radar operator as deliberate enemy jamming, the operator must immediately report the incident, record the time and type of jamming, and record the direction from which the jamming signals are being received. When this information is received from two radar sources, the exact location of the jammer can be determined. The information will make it possible also to determine the movement of the jammer if the jamming is emanating from a moving source. The information can be used to relocate the vessel upon which the ship-borne radar is installed, at the command of a superior officer. The information will also serve to place the jamming transmitter under active fire with gun, missile, or aircraft. Readings and reports on the jamming should continue as long as jamming is observed.

f. Procedure for Operation Against Radar Jamming. After the type and direction of the interference has been determined, the operator of the radar set should use the following procedures to reduce the effectiveness of the jamming. Some of the procedures are especially applicable to certain types of jamming signals, but, if feasible, they should all be tried, to obtain the best performance of the equipment.

(1) Vary the GAIN control over the entire range to get an optimum setting. If the receiver is overloaded or blocked by jamming signals, reducing the gain will often help to overcome this trouble.

(2) Vary the FOCUS and CONTRAST controls for maximum definition.

(3) Vary the SUPPRESSOR control over its entire range for the most readable scope presentation. This gain control enables the operator to adjust for either an increasing or decreasing intensity from the center to the edge of the scope. It is especially useful for viewing echoes which appear near the center of the scope.

(4) Change the range of the radar, by means of the RANGE control, for the optimum condition. Depending on the type of jamming and the range of the target to be observed, either increasing, or decreasing the range of the radar set will aid in minimizing the effect of the jamming.

(5) The range observed on the scope can be changed without changing the sweep rate by means of the CENTER EXPAND SWITCH. This control may be used in conjunction with the RANGE control to reduce the effects of jamming without sacrificing accuracy.

g. Transmission Jamming.

(1) Always reduce the receiver gain if the jamming signal overloads or blocks the receiver. However, if the jamming signal is not strong enough to overload the receiver, increasing the gain may not improve the operation. The other methods also (*f* above and (2) and (3) below) should be applied to yield optimum performance.

(2) Radars are difficult to jam unless line-of-sight orientation exists between the jammer and the radar. Therefore, whenever possible, the ship upon which the radar set is installed, should take advantage of any artificial or natural barrier. For example, if a land-based jammer is operating against the ship-borne radar and an island lies between the jammer and the ship, it may be possible for the ship to navigate so that the island is always between the ship and the jamming transmitter.

(3) If the jammer is located outside a sector of particular interest, and is jamming through the side lobes of the radar, the effectiveness of the jamming signals may be decreased by erecting a shield of metal screening, backed with a signal absorbing material, between the radar and the jammer. The metal side should face the jammer so that the jamming signal will be reflected and the radar signal, when striking the screen, will not be reflected back into the receiver.

h. Reflected Jamming. Adjust the FOCUS control for optimum focusing, and reduce the CONTRAST control to obtain maximum definition. Since window usually appears as many closed spaced targets (clutter), good definition will help to separate targets from the window. Search for targets outside the area filled with chaff. Special attention should be paid to the speed of a moving target entering a window-jammed area. This will

enable the moving target to be located when it passes through a hole or break in the window, or if it leaves the jammed area.

i. References. For further information on anti-jamming procedures, refer to the following:

TM 11–750.
TM 11–751.

83. Tube and Crystal Troubleshooting Charts

* * * * *

b. Tube Troubleshooting Chart.

Picture symptom	Test meter (M401)	Additional indication	Tube		Tube location
			Symbol	Type	
Blank			V101	6SN7WGT	Indicator (fig. 65).
			V106	2X2A	
			V105	7MP7	
Blank		Bright spot in center.	V102	5726/6AL5W	
			V103	6SN7WGT	
			V104	6BG6G	
Blank	No * * * I. position.		V307	6SN7WGT	Transmitter (fig. 66).
Blank	No * * * REG. position.	Fuse F401 blown	V403	5R4WGY	Power supply (fig. 67).
Blank	−300V REG. reads high.		V407	OD3W/VR150	
			V408	OD3W/VR150	
No range rings			V107	6SN7WGT	Indicator (fig. 65).
			V108	6SN7WGT	
No range rings		No * * * echoes	V109	6J6	
			V110	6005/6AQ5W	
First * * * ranges			V102	5726/6AL5W	
*	*	* *	*	*	*
Weak echoes			V204 through V112.	1B35A	Receiver (fig. 69).
			V201 (not likely).		Duplexer (fig. 47).
*	*	* *	*	*	*
Weak echoes		Defective * * * scope.	V202	1B24A	Duplexer (fig. 47).
			V409	1V2	Keep-alive (figs. 68 and 6).
			V410	1V2	
Weak echoes	+300V * * * high	Bright * * * focus	V404	OD3W/VR150	Power supply (fig. 67).
			V405	OD3W/VR150	
*	*	* *	*	*	*
No echoes	No MAG 1		V305	4C35	Transmitter (fig. 66).
			V308	6V6GT	
*	*	* *	*	*	*
Normal	Normal	Transmitter * * * 3 minutes.	V301	6SN7WGT	Transmitter (fig. 66).
			V302	NE–32	
Alternate * * * crt.	Meter M201 sweeps.		V203	725AB/2K25	Receiver (fig. 69).
			V213 through V218.		
No echoes	No * * * MOD. HV.		V309	6V6GT	Transmitter (fig. 66).
			V306	725A	
			V301	6SN7WGT	
			V303	3B24W	
			V304	3B24W	
No echoes	No voltage at +140V position.		V401	5R4WGY	Power supply (fig. 67).
No echoes	No voltage at −300V REG. position.	Bright * * * blown	V406	5R4WGY	
No echoes	No * * * MOD. HV.	Fuse F401 blown	V402	5R4WGY	
No echoes	No * * * zero		V303	3B24W	Transmitter (fig. 66).
			V304	3B24W	

c. Crystal Diode Troubleshooting Chart.

Picture symptom	Remarks	Crystal diode		Crystal diode location
		Symbol	Type	
Blank	No * * * markers	CR101	**1N34A**	Indicator.
Sweep line only	No * * * flash	CR104	**1N34A**	**Indicator.**
* *	* *	*	*	*
Abnormal picture	Picture * * * advanced	CR101	**1N34A**	Indicator.
Abnormal picture	Range * * * echoes	CR103	**1N34A**	**Indicator.**
No range rings		CR103	**1N34A**	**Indicator.**
* *	* *	*	*	*
Abnormal heading flash	Heading * * * flash	CR104	**1N34A**	Indicator.
Poor * * * action		CR204	**1N34A**	Receiver.
Bright * * * rotated		CR203	**1N34A**	Receiver.

*Refer to paragraph 49 for information on alinement.

85. Indicator Tube Replacement

(fig. 65)

a. Tube Complement.

Symbol	Tube	Function
V101	**6SN7WGT**	One-shot multivibrator.
V102	**5726/6AL5W**	Sweep * * * restorer.
V103	**6SN7WGT**	Sweep-voltage amplifier.
*	* *	* *
V107	**6SN7WGT**	Ringing * * * amplifier.
V108	**6SN7WGT**	Range * * * inverter amplifier.
*	* *	* *
V110	**6005/6AQ5W**	Video output amplifier.

* * * * *

Figure 65. The tube type call-outs for the following are changed as indicated:

V101: **6SN7WGT**
V102: **5726/6AL5W**
V103: **6SN7WGT**
V104: **6BG6G**
V107: **6SN7WGT**
V108: **6SN7WGT**
V110: **6005/6AQ5W**

86. Transmitter Tube Replacement

(fig. 66)

a. Tube Complement.

Symbol	Type	Function
V301	**6SN7WGT**	Three-minute time delay.
*	*	* * *
V303	**3B24W**	H-v rectifier.
V304	**3B24W**	H-v rectifier.
*	*	* * *
V307	**6SN7WGT**	Blocking * * * amplifier.
V308	**6V6GT**	Blocking oscillator.
V309	**6V6GT**	Cathode follower.

* * * * *

e. Power Supply Tube Complement (fig. 67).

Caution: Shut off power to unit before removing tubes.

Symbol	Type	Function
V401	**5R4WGY**	Rectifier.
V402	**5R4WGY**	Rectifier.
V403	**5R4WGY**	Rectifier.
V404	**OD3W/VR150**	Regulator
V405	**OD3W/VR150**	Regulator.
V406	**5R4WGY**	Rectifier.
V407	**OD3W/VR150**	Regulator.
V408	**OD3W/VR150**	Regulator.
*	* *	* *

Figure 66. The tube types for the following are changed as indicated:

V304: **3B24W**
V303: **3B24W**
V301: **6SN7WGT**
V309: **6V6GT**
V308: **6V6GT**
V307: **6SN7WGT**

Figure 67. Each tube type call-out for V404, V405, V407, and V408 is changed to read: **OD3W/-VR150.**

Each tube type call-out for V401, V402, V403, and V406 is changed to read: **5R4WGY.**

87. Receiver Tube Complement
(fig. 69)

a. Tube Complement.

Symbol	Type	Function
*	* *	* *
V215	**5726/6AL5W**	Discriminator.
*	* *	* *
V217	**5726/6AL5W**	Charging diode.
*	* *	* *
*	* *	* *

88. Mixer and Duplexer Tube Replacement
(fig. 47)

a. Tube Complement.

Symbol	Type	Function
V201	**1B35A** (duplexer)	ANTI-T/R.
V202	**1B24A** (duplexer)	T/R.
*	* *	* *
*	* *	* *

Figure 69. The tube types for the following are changed as indicated:

V211: **5726/6AL5W**
V217: **5726/6AL5W**
V215: **5726/6AL5W**

[AG 413.44 (12 Jul 54)]

Figure 72. **MOTOR GENERATOR PU-243A/SPN-11 (115V DC)** is added after—

MOTOR GENERATOR PU-243/SPN-11 (115V DC)

MOTOR GENERATOR PU-254A/SPN-11 (32V DC) is added after MOTOR GENERATOR PU-245/SPN-11 (32V DC).

MOTOR GENERATOR PU-244A/SPN-11 (24V DC) is added after MOTOR GENERATOR PU-244/SPN-11 (24V DC).

Figure 73. The tube types for the following tubes are changed as indicated:

V211: **5726/6AL5W**
V215: **5726/6AL5W**
V217: **5726/6AL5W**

*Figure 74. Radar **Receiver-Transmitter RT-258/SPN-11**, schematic diagram.*

Figure 74. The tube types for the following tubes are changed as indicated:

V301: **6SN7WGT**
V303: **3B24W**
V304: **3B24W**
V201: **1B35A**
V202: **1B24A**
V307: **6SN7WGT**
V308: **6V6GT**
V309: **6V6GT**
V401: **5R4WGT**
V402: **5R4WGT**
V403: **5R4WGT**
V404: **OD3W/VR150**
V405: **OD3W/VR150**
V406: **5R4WGY**
V407: **OD3W/VR150**
V408: **OD3W/VR150**

Protective Spark Gap E301 is added and connected between terminal 1 of T302 and ground.

Protective Spark Gap E302 is added and connected between the junction of L303, L302, and Z301 and ground.

Fuse F301 2A is changed to read Fuse F301 1A.

Figure 75. The tube types for the following tubes are changed as indicated:

V101: **6SN7WGT**
V102: **5726/6AL5W**
V103: **6SN7WGT**
V104: **6BG6G**
V107: **6SN7WGT**
V108: **6SN7WGT**
V110: **6005/6AQ5W**

By order of the Secretary of the Army:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

Official:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

Tec Svc, DA (1)
Tec Svc Bd (1)
AFF (5)
AFF Bd (incl ea Test Sec) (1)
Army AA Comd (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Tng Div (2)
Ft & Cp (2)
Gen & Br Svc Sch (5)
SigC Sch (25)
Gen Depots (2)
SigC Sec, Gen Depots (10)
SigC Depots (20)
POE (2)
OS Sup Agencies (2)
SigC Fld Maint Shops (3)
SigC Lab (5)
Mil Dist (1)
Units organized under following T/O & E:
11–127, Sig Rep Co (2)
11–128A, Sig Depot Co (2)
11–500A (AA through AE), Sig Admin Team (2)
11–587, Sig Base Maint Co (2)
11–592, Hq & Hq Co, Sig Base Depot (2)
11–597, Sig Base Depot Co (2)

NG: Same as Active Army except allowance is one copy for each unit.
USAR: None.
Unless otherwise noted, distribution applies to ConUS and overseas.
For explanation of abbreviations used, see SR 320–50–1.

U. S. GOVERNMENT PRINTING OFFICE: 1954

TECHNICAL MANUAL

RADAR SETS AN/SPN–11X, AN/SPN–11Y AND AN/SPN–11Z, INSTALLATION AND OPERATION

TM 11–1335
CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *30 August 1955*

TM 11–1335, 20 October 1952, is changed as follows:

The following information changes this manual so that the manual also applies to the following equipment:

Nomenclature	*Order No.*
Radar Set AN/SPN–11X	28468-Phila-55

Page 1, chapter 1. Add the following note at the beginning of chapter 1.

Note. Radar Set AN/SPN–11X, furnished on Order No. 28468-Phila-55 is similar to Radar Set AN/SPN–11X, covered in TM 11–1335. All information in TM 11–1335 applies equally to Radar Set AN/SPN–11X, furnished on Order No. 28468-Phila-55, except as otherwise indicated in this change.

In the following places in the manual, change "(fig. 6)" to read: (**fig. 6 and 6.1**).

Page 24, paragraph 28b. Line 2.

Page 53, paragraph 47b(3). Line 2.

In the following places in the manual, change "(fig. 50)" to read: (**fig. 50 and 50.1**).

Page 55, paragraph 49b(*16*). Line 2.

Page 60, paragraph 53a. Heading.

Page 62, paragraph 53c. First column. Lines 7 and 8.

Page 64, paragraph 54b(*3*). Line 3.

Page 2, paragraph 4b. Change column 2 for "Blower motor (input)" to read:

115, 32, or 24 volts dc, from shipboard supply; **or 115 volts, 400 cycles ac, from motor generator for receiver-transmitters bearing Order No. 28468-Phila-55.**

Page 2, paragraph 4e. Add the following after the last sentence: On receiver-transmitters bearing Order No. 28468-Phila-55, the blower motor power is also supplied by this output.

Page 2, paragraph 5b. In the "Contents" column, add the following opposite "Crate No. 1" and "Crate No. 8". On receiver-transmitters bearing Order No. 28468-Phila-55, the blower motor is installed in the receiver-transmitter.

Page 3, paragraph 7. Make the following changes:

In *a*, line 5, change "Blower motor (115 v dc)" to read: Blower motor (115 v dc, **on Order No. 28468-Phila-55, 115 v, 400-cycle ac**).

In *b*, line 5, change "Blower motor (32 v dc)" to read: Blower motor (32 v dc, **on Order No. 28468-Phila-55, 115 v, 400-cycle ac**).

In *c*, line 5, change "Blower motor (24 v dc)" to read: Blower motor (24 v dc, **on Order No. 28468-Phila-55, 115 v, 400-cycle ac.**)

Page 7, paragraph 9a. Line 4. Change "(figs. 5 and 6)" to read: (figs. 5, 6, and **6.1**).

Page 8. Add figure 6.1 after figure 6.

Page 14. Add paragraph 15.1 after paragraph 15.

15.1. Running Spares (Order No. 28468-Phila-55)

The following items are supplied as running spares for Radar Set AN/SPN–11X procured on Order No. 28468-Phila-55.

1 tube, type 1B24A.
1 tube, type 1B35A.
1 tube, type 1V2.
1 tube, type 2X2A.
1 tube, type 3B24W.
1 tube, type 4C35.
2 tubes, type 5R4WGA.
3 tubes, type 5654/6AK5W.
2 tubes, type 5726/6AL5W.
1 tube, type 6005/6AQ5W.
1 tube, type 5725/6AS6W.
1 tube, type 6BG6G.
2 tubes, type 6J6W.
3 tubes, type 6SN7WGT.
1 tube, type 6V6GTY.
1 tube, type 7MP7.
1 tube, type 12AU7.
1 tube, type 2K25.
1 tube, type 725A.
2 tubes, type [illegible]
2 crystals, type 1N23B.

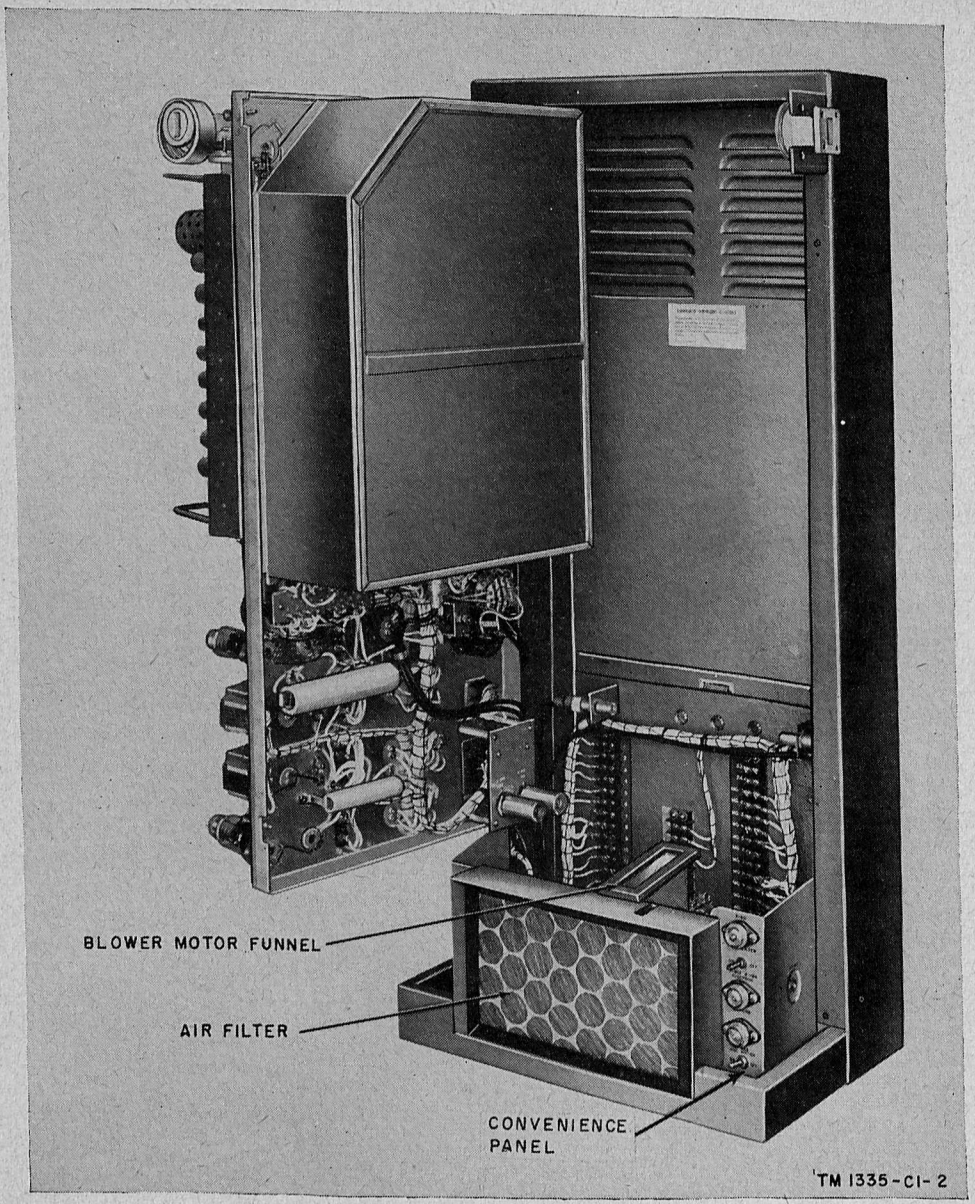

Figure 6.1. Receiver-transmitter (units bearing Order No. 28468-Phila-55), hinged panel open.

15 fuses, cartridge type, 1 ampere, 250 volts slow blow.
5 fuses, cartridge type, 1/4 ampere, 250 volts.
5 fuses, cartridge type, 3 ampere, 250 volts.
2 fuses, cartridge type, 25 ampere, 250 volts.
5 fuses, cartridge type, 2½ ampere, 250 volts.
5 fuses, cartridge type, 10 ampere, 250 volts.
10 fuses, cartridge type, 2 ampere, 250 volts.
10 fuse links, 25 amperes, 250 volts.
2 lamps, Mazda #323.
2 lamps, Mazda #47.
1 lamp, glow type, NE–32.
2 brushes, for antenna drive motor.
2 brushes, for deflection coil.
4 brushes, for motor generator.

Page 17, paragraph 17. Make the following changes in *b:*

In the "AN/SPN–11X" column, change the fifth line to read: 115 v dc (**115 v, 400-cycle ac in receiver-transmitters bearing Order No. 28468-Phila-55**).

In the "AN/SPN–11Y" column, change the fifth line to read: 32 v dc (**115 v, 400-cycle ac in receiver-transmitters bearing Order No. 28468-Phila-55**).

In the "AN/SPN–11Z" column, change the

fifth line to read: 24 v dc (**115 v, 400-cycle ac in receiver-transmitters bearing Order No. 28468-Phila-55**).

Page 18. Add paragraph 17*d* after paragraph 17*c*.

d. Changes and Additions (Order No. 28468–Phila–55). The following changes or additions have been made in Radar Set AN/SPN–11X procured on Order No. 28468-Phila-55:

(1) Blower motor B801 operates from the 115-volt, 400-cycle motor generator output.

(2) Terminal board TB805, fuse F805, and starting capacitors C802 and C803 have been added for the connections and operation of the blower motor.

(3) The convenience panel has been physically altered to accommodate a larger air filter.

(4) Spare brushes are supplied for the motor generator, the antenna drive motor, and the deflection coil.

(5) Fuse F301 in the modulator power supply has been changed from 2 amperes to a 1 ampere, slow blow type.

Page 25, figure 21. Add the following to the legend of figure 21:

(The blower motor of Radar Receiver-Transmitter RT–268/SPN–11 bearing Order No. 28468-Phila-55 is energized by the 115-volt, 400-cycle motor generator output.)

Page 30, paragraph 33h. Add the following "note" after the introductory statement:

Note. This procedure is not applicable to receiver-transmitters bearing Order No. 28468-Phila-55, since their blowers have been installed at the factory.

Page 53, paragraph 44. Change paragraph 44 as follows: Opposite F301 in the chart change the entry in the amp. column to read: 2 (or 1 ampere, slow blow, in receiver-transmitters bearing Order No. 28468-Phila-55).

Add the following to the chart:

Fuse			Location	
Ref symbol	Rating		Component	Circuit
	Volts	Amp.		
F805 (in receiver-transmitters bearing Order No. 28468-Phila-55, only).	250	1	Receiver-transmitter	Blower motor

Page 54, paragraph 47d(3). Add the following sentence at the end of the subparagraph: The blower motor of receiver-transmitters bearing Order No. 28468-Phila-55 does not require lubrication.

Page 60, paragraph 52b. Line 3. Change "(figs. 5 and 50)" to read: (figs. 5, 50 and **50.1**).

Page 63, figure 50. Add the following note to figure 50.

NOTE

FUSE F301 IS A 1 AMPERE, SLOW BLOW, IN RECEIVER-TRANSMITTERS BEARING ORDER NO. 28468-PHILA-55.

Add figure 50.1 after figure 50.

Page 78, paragraph 75 and figure 63. Add the following "note" after the heading of *a* and the legend for figure 63.

Note. No lubrication is required for the blower motor in receiver-transmitters procured on Order No. 28468-Phila-55.

Page 81. Add paragraph 81.1 after paragraph 81.

81.1. Interchangeable Tubes

Refer to the chart below. The older type tube listed in the first column can be used interchangeably with the corresponding preferred type listed in the third column. The second column lists the stage or stages in which the tubes can be used interchangeably in Radar Sets AN/SPN–11X, AN/SPN–11Y, and AN/SPN–11Z. The older type tube should be used until stocks are exhausted.

Older type tube	Application	Preferred tube
	Indicator	
6SN7G/T	V101, one-shot multivibrator, V103, sweep-voltage amplifier, V107, ringing oscillator, and V108, range mark amplifier.	6SN7WGT
6AL5	V102, sweep generator and dc restorer.	5726/6AL5W
6J6	V109, video mixing amplifier.	6J6W
6AQ5	V110, video output amplifier.	6005/6AQ5W

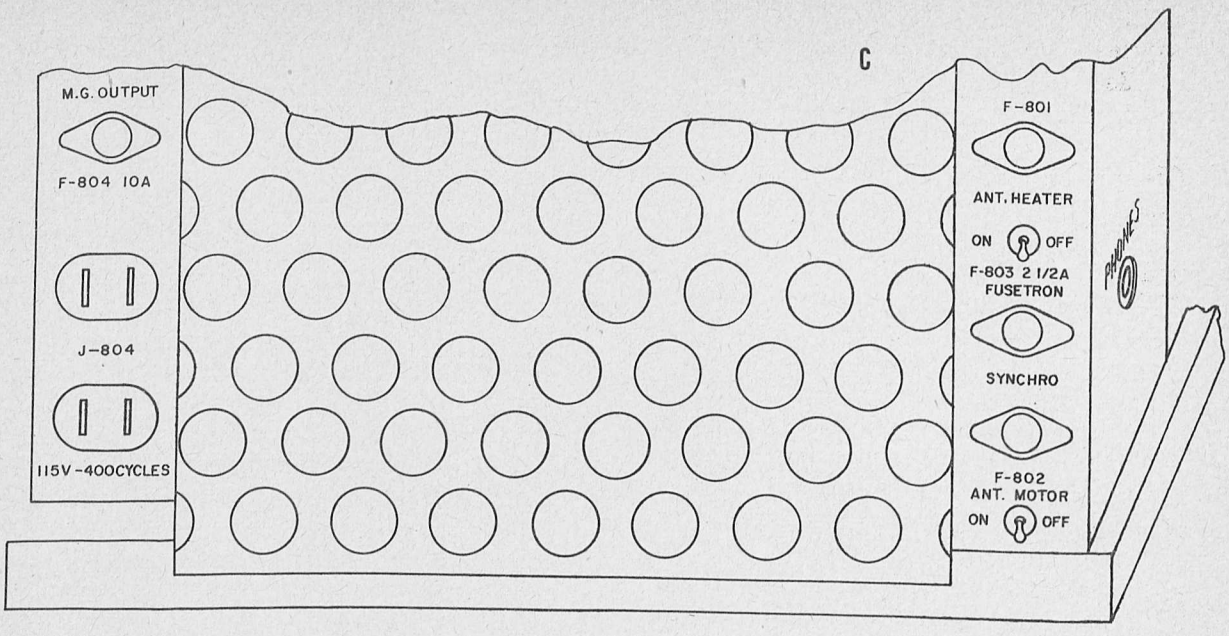

Figure 50.1. Receiver-transmitter convenience panel on units bearing Order No. 28468-Phila-55.

Older type tube	Application	Preferred tube
	Transmitter	
3B24	V303 and V304, h-v rectifier.	3B24W
6SN7	V307, blocking oscillator and amplifier.	6SN7WGT
6V6	V308, blocking oscillator and V309, cathode follower.	6V6GTY
	Mixer and Duplexer	
1B24	V202, tr tube	1B24A
1B35	V201, atr tube	1B35A
	Power Supply	
5R4GY	V401, V402, V403, and V406, rectifiers.	5R4WGA
OD3/VR-150	V404, V405, V407, and V408, regulators.	OD3W

Older type tube	Application	Preferred tube
	Receiver	
6AK5	V204, V206 through V210, V213 and V214, if amplifiers, and V211, second detector.	5654/6AK5W
6J6	V205, if amplifier, V212, cathode follower-limiter, and V216, video amplifier.	6J6W
6AL5	V215, discriminator and V217, charging diode.	5726/6AL5W
6AS6	V218, sweep generator and dc amplifier.	5725/6AS6W

Figure 74. Add the following note to figure 74.

NOTE

FUSE F301 IS A 1 AMPERE, SLOW BLOW, IN RECEIVER-TRANSMITTERS BEARING ORDER NO. 28468-PHILA-55.

Page 97. Add figure 76.1 after figure 76.

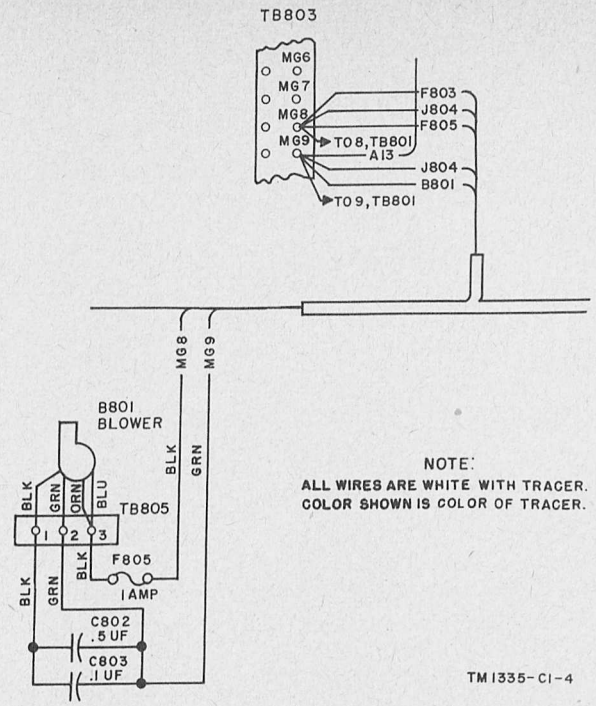

Figure 76.1. Receiver-transmitter (units bearing Order No. 28468-Phila-55), blower circuit wiring.

[AG 413.44 (26 Aug 55)]

BY ORDER OF THE SECRETARY OF THE ARMY:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

OFFICIAL:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

DISTRIBUTION:

Active Army:

CNGB (1)
Tec Svc, DA (1)
Tec Svc Bd (1)
CONARC (5)
CONARC Bd (Incl ea Test Sec) (1)
Army AA Comd (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Tng Div (2)
Ft & Cp (2)
Gen & Br Svc Sch (5)
SigC Sch (25)
Gen Depots (2) except Atlanta Gen Depot (None)
SigC Sec, Gen Depots (10)
SigC Depots (20)
POE (2)
OS Sup Agencies (2)
SigC Fld Maint Shops (3)
SigC Lab (5)
Mil Dist (1)
Units organized under following TOE's:
11–7, R Sig Co Inf Div (2)
11–16R, Hq & Hq Co, Sig Bn, Corps or Abn Corps (2)
11–57R, Armd Sig Co (2)
11–127R, Sig Rep Co (2)
11–128R, Sig Depot Co (2)
11–500R (AA–AE), Sig Svc Org (2)
11–557R, Abn Sig Co (2)
11–587R, Sig Base Maint Co (2)
11–592R, Hq & Hq Co, Sig Base Depot (2)
11–597R, Sig Base Depot Co (2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see SR 320–50–1.

U. S. GOVERNMENT PRINTING OFFICE: 1955