TECHNICAL MANUAL

GENERAL SUPPORT MAINTENANCE MANUAL

TEST HARNESS, RADIO SET
AN/URM-157 AND AN/URM-157A

HEADQUARTERS, DEPARTMENT OF THE ARMY
JULY 1973

WARNING

DEATH OR SERIOUS INJURY may result from hazards in this equipment unless proper safety measures are observed when operating and maintaining the equipment. 117 VAC exists when the equipment is energized.

CHANGE No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 28 *December 1976*

General Support Maintenance Manual
TEST HARNESS, RADIO SET AN/URM-157 (NSN 6625-00-766-4685) AND AN/URM-157A (NSN 6625-00-236-1557)

TM 11-6625-622-40, 2 July 1973, is changed as follows:

1. The title is changed as shown above.
2. New or changed material is indicated by a vertical bar.
3. Remove and insert pages as indicated below.

Remove	*Insert*
1-1	1-1/(1-2 blank)
2-1 and 2-2	2-1 and 2-2
3-1 and 3-2	3-1 and 3-2
3-13 and 3-14	3-13
3-17 and 3-18	3-17 and 3-18
A-1	A-1/(A-2 blank)

4. File this change sheet in front of the publication for reference purposes.

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To be distributed in accordance with DA Form 12-36A, Direct and General Support maintenance requirements for AN/URM-157.

TECHNICAL MANUAL
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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 2 July 1979

GENERAL SUPPORT MAINTENANCE MANUAL

TEST HARNESS, RADIO SET AN/URM-157 AND AN/URM-157A

*This manual suspersedes TM 11-6625-622-45, 27 May 1965, Including all changes

LIST OF ILLUSTRATIONS

CHAPTER 1
INTRODUCTION

Section 1. GENERAL

1-1. Scope

a. This manual covers general support maintenance for Test Harness, Radio Set AN/URM-157 and AN/URM-157A. It includes instructions appropriate to general support maintenance for troubleshooting, testing, aligning, and replacing maintenance parts. It also lists tools, materials, and test equipment for general support maintenance.

b. The purpose, operation, and interoperation of the various circuits (electrical and electromechanical) in the AN/URM-157 and AN/URM-157A are explained in paragraphs 2-1 through 2-9. Familiarity with the equipment, how it works, and why it works the way it does are valuable tools in troubleshooting the equipment rapidly and effectively.

1-2. Maintenance Forms and Records

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750.

1-3. Destruction of Equipment to Prevent Enemy Use

Refer to TM 750-2442 for proper procedures for destruction of this equipment to prevent enemy use.

1-4. Administrative Storage

Refer to TM 740-90-1 for administrative storage requirements.

1-5. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA

1-6. Description

Refer to TM 11-6625-622-12 for description of the AN/URM-157 and AN/URM-157A.

1-7. Tabulated Data

Refer to TM 11-6625-622-12 for operator and organizational maintenance of the AN/URM-157 and AN/URM-157A.

CHAPTER 2
FUNCTIONING OF EQUIPMENT

2-1. General

The test unit (main component of Test Harness, Radio Set AN/URM-157 or AN/URM-157A) is used in the testing and troubleshooting of Receiver-Transmitter, Radio RT-698/ARC-102. It has both alternating-current (ac) and direct-current (dc) power distribution circuits. The control unit controls frequency, radiofrequency, radiofrequency (rf) sensitivity, and mode of operation of the receiver-transmitter. The directional wattmeter provides for the measurement of foward and reflected transmitter output power. The 50-ohm load is used as matched load for the receiver-transmitter. A dummy antenna is provided when a resistive-capacitive load is needed. Audio jacks in the test unit can be used in place of audio jacks in the receiver-transmitter.

2-2. Ac Distribution Circuit

(fig. 3-11)

The 115-volt, 3-phase,400-Hertz(Hz) input poweris applied to switch S3 of the test unit through AC IN connector J7, ø 1 FUSE F1, ø 2 FUSE F2, and ø 3 FUSE F3. The ø 1, ø2, ø 3 fuses are rated at 5 amperes each, and protect both the receiver-transmitter under test and the test unit. When at ON, AC switch S3 applies power to 618T-2-OFF-618T-3 switch S1. When switch S1 is at 618T-3 (center position OFF), phases 1 and 2 are open. (Three-phase power is not used by the RT-698/ARC-102.) Phase 3 is fed around switch S1 to 516H-1 connector J5 pin 16, where it is tied to 115 V, 400 CPS OUT outlet J18. Three-phase, 115-volt, 400-Hz ac power is applied to the receiver transmitter under test through 618T- 2/3 connector J1 pin 12. Ac power is returned from the receiver-transmitter, through connector J1 pin 11 and through the test unit, to ANT. CPLR connector J6 pin S, where it is applied to the antenna coupler being used.

2-3. Dc Distribution Circuit

(fig. 3-11)

The 27.5 volts dc is applied to the test unit, through DC IN connector J4, to the DC POWER switch and circuit breaker CB1. Circuit breaker CB1 is rated at 45 amperes. When DC POWER circuit breaker CB1 is at ON, dc is applied to 516H-1 connector J5 pin 23 and to 618T-2-OFF-618T-3 switch S1. When switch S1 is at 618T-3, seven branches from switch S1, pins 11,8,5, and 2 conduct dc power, through 618T- 2/3 connector J1, pins 1,13,2, 14, 3, 15, and 17, to the high-voltage power supply module of the receiver-transmitter under test. DC power, available at the input of S1, is connected through fuse F4 to connector J1, pins 4 and 16. Fuse F4 is rated at 10 amperes, and protects the 27.5-volt dc control circuitry of the receiver-transmitter. The 27.5 volts dc is fed back to the test unit from the receiver-transmitter, through connector J1 pin 56. One line connects to ANT. CPLR connector J6, pins, r, s, and t; another branch connects to KEY INTLK switch S7, pin 1, and another branch connects to J2 pin 56. If switch S7 is at BY PASS, 27.5 volts dc is connected to connector J6 pin X, and one branch is fed back to the receiver-transmitter key interlock circuit, through connector J1 pin 5.

2-4. Rf Load

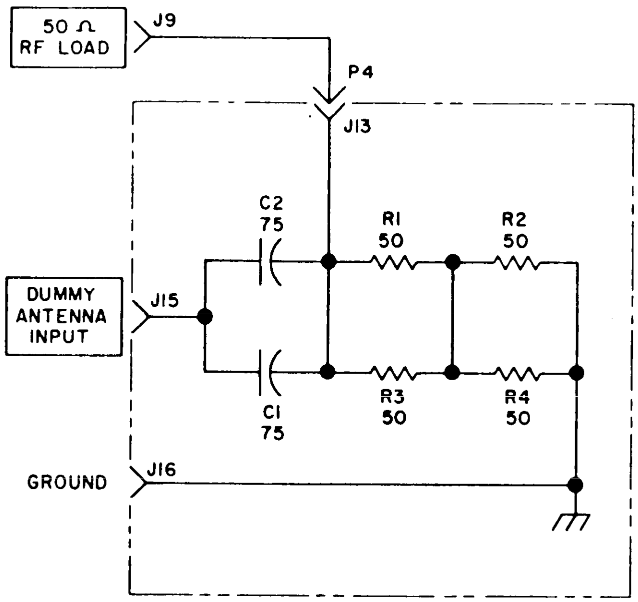
(fig. 2-1)

The 50-ohm resistive rf load is available at 50Ω RF LOAD connector J9 on the test unit top panel. The 50-ohm load is provided by a series-parallel connection of 50-ohm resistors R1 through R4.

2-5. Resistive-Capacitive Load

(fig. 2-1)

A resistive-capacitive load is available between DUMMY ANTENNA INPUT jack J15 and ground jack J16. It consists of a parallel combination of 75-micromicrofarad (µµf) capacitors C1 and C2 in series with the 50-ohm rf load.



NOTES:
1. ▭ INDICATES EQUIPMENT MARKINGS.
2. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN UUF.

TM6625-622-45-11

Figure 2-1. Dummy antenna, schematic diagram.

2-6. Audio Circuits
(fig. 3-11)

a. *Audio Inputs to Receiver-Transmitter.* A balanced audio input is supplied to the receiver-transmitter from 600Ω BAL AUDIO IN jack J8. The audio goes from jack J8, through 618T2/3 connector J1 pins 53 and 37, to the AM/audio amplifier module of the receiver-transmitter. An unbalanced audio input is supplied to the receiver-transmitter from MIKE jack J12. The audio goes from terminal 1 of J12, through 618T2/3 connector J1 pin 54, to the AM/audio amplifier module of the receiver-transmitter. MIKE jack J12 on the test unit can be used instead of MIC jack J2 of the receiver-transmitter.

b. *Audio Outputs from Receiver-Transmitter.* The audio output of the receiver-transmitter may be monitored at HEADSET jack J11. The audio is supplied through connector J1, pins 57 and 58. From connector J1 pin 58, audio goes to jack J19 pin a, which is jumpered to jack J19 pin c through the control unit. Pin c of jack J19 is connected to jack J11 terminal 1. From pin 57 of connector J1, the audio is connected to jack J11, terminal 2,300Ω AUDIO LOAD switch *S5,* terminal 2 and jack J19, pin b. Jack J11 on the test unit is used instead of PHONE jack J1 of the receiver-transmitter. A 300-ohm load may be placed in the audio output circuitry of the receiver-transmitter by switch S5.

c. *Key Line Circuit.* The key line circuit which is used for remote keying of the receiver-transmitter passes through the test unit as follows: From jack J12, terminal 2, to switch S6 terminal 3. If S6 is at 714E–2/3, connection is made to S6 terminal 2 which is connected to ANT. CPLR jack J6 pins N, P, and R, 516H–1, connector J5 pin 1, and to the receiver-transmitter, through 618T–2/3 connector J1 pin 55. Connection is also made from jack J12 terminal 2 to jack J19 pin m. If switch S5 of the control unit is at AM, USB, or LSB, the key line is returned through jack J19 pin q to switch S6 terminal 1. When S6 is at 714E–2/3, connection is again made to terminal 2 of S6, completing the key line circuit. KEY switch S9 is connected to jack J12 terminal 2 and places a ground on the key line circuit in either the up or down position.

2-7. TUNE POWER Switch
(fig. 3-11)

TUNE POWER switch S4 connects to J1 pin 10 and, when depressed, grounds the receiver-transmitter tune powerline to check the functioning of the tune circuitry within the receiver-transmitter. Switch S4 is not used with antenna couplers. To avoid damage to the receiver-transmitter, it should not be depressed for more than 15 seconds.

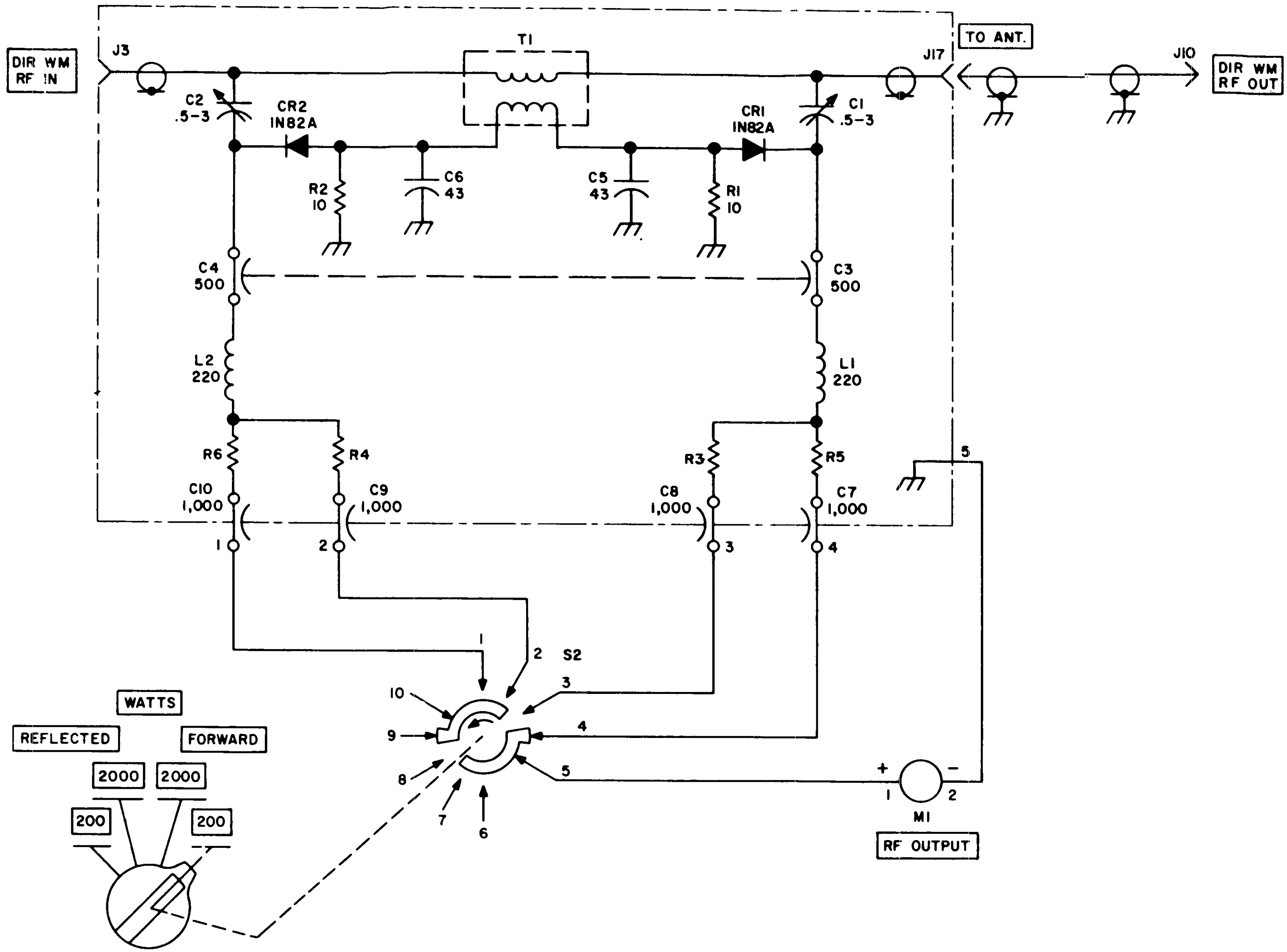
2–8. Control, Radio Set C–3940/ARC–94
(figs. 3-10 and 3-11)

The radio set control (mounted on the front panel of the test unit) is connected to the test unit through jack J19. The l-MHz control, SIA, selects a portion of the receiver-transmitter operating frequency in l-MHz steps. The 1-MHz control is connected to the receiver-transmitter by way of pins A through E of jack J19, and pins 32 through 36 of 618 T–2/3 connector J1. The 0.1-MHZ control, S2, selects a portion of the receiver-transmitter operating frequency in 0.1-MHZ steps. The 0.1-MHZ control is connected to the receiver-transmitter by way of pins K through N of jack J19, and pins 45 through 48 of connector J1. The 0.01-MHZ control, S3, selects a portion of the receiver-transmitter operating frequency in 0.01-MHZ steps. The 0.01-MHZ control is connected to the receiver-transmitter by way of pins P, R, S, and T of jack J19, and pins 49 through 52 of connector J1. The 0.001-MHz control, S4, selects aportion of the receiver-transmitter operating frequency in 0.001-MHZ steps. The 0.001-MHZ control is connected to the receiver-transmitter byway of pins F, G, H, and J of jack J19, and pins 38 through 41 of connector J1. All frequency control signals go to the rf translator module of the receiver-transmitter. The rf sensitivity of the receiver-transmitter is controlled from the control unit by RF SENS potentiometer R1. Potentiometer R1 is connected from jack J19 pin Z, to the receiver-transmitter rf translator module, through connector J1 pin 30. Frequency band information is sent to the antenna coupler from the control unit. The connections are as follows: jack J19 pins f, g, and h, to ANT. CPLR connector J6 pins B, C, and D, respectively. The sideband selection line from mode selector switch S5A in the control unit to the sideband selection relay of the receiver-transmitter passes through the test unit as follows: from jack J19 pin j, to switch S6 terminal 12; and from switch S6 terminal 11, the signal is passed to the receiver-transmitter through connector J1 pin 24. The AM relay line from mode selector switch S5A in the control unit to the AM relay of the receiver-transmitter passes through the test unit as follows: from jack J19 pin i, to switch S6 terminals 9 and 10; from switch S6, terminal 8 to the receiver-transmitter through connector J1 pin 25. The continuous-wave (cw) key line circuit from mode selector switch S5B to the cw relay of the receiver-transmitter passes through the test unit as follows: from jack J19 pin p to the receiver-transmitter, through connector J1 pin 31. Another branch of the cw key line circuit goes from mode selector switch S5A, through jack J19 pin k, to CW KEY switch S8. If switch S8 is not in the center position, the cw key line circuit is grounded. The on-off control line circuit from the receiver-transmitter to the control unit passes through the test unit as follows: from interlock relay K9 of the receiver-transmitter, through connector J1 pin 59, to switch S6 terminal 5; from switch S6 terminal 6, through jack J19 pin q, to switch S5B. The wire which would normally be used to supply power to the panel lights in the control unit passes through jack J19 pin d and terminates in the test unit.

2-9. Directional Wattmeter
(fig. 2-2)

a. The rf input is applied to DIR WM RF IN connector J3. The transmission line passes through the center of, and serves as the primary for, toroidal transformer T1. The rf current induced in transformer T1 produces a voltage that divides equally across resistors R1 and R2. The voltages developed across resistors R1 and R2 with respect to ground are 180° out of phase. Capacitors C5 and C6 serve as bypass capacitors. The rf voltage on the transmission line is coupled by variable capacitors C1 and C2 to the cathodes of diodes CR1 and CR2, respectively. As a result, when the rf load is 50 ohms resistive, equal voltages of the same phase are applied to the diode cathodes and equal voltages of opposite phase are applied to the diode anodes. When a mismatch occurs at the 50-ohm transmission line output, power is reflected back; then the voltages developed across R1 and R2 represent the vector sum of two components, one of which is proportional to the forward wave rf current and the other proportional to the reflected wave rf current. Similarity, the capacitively coupled voltages at diode cathodes represent the vector sum of the forward wave and reflected wave voltage components. Variable capacitors C1 and C2 are factory-adjusted so that the magnitude of the forward wave voltage and forward wave current components is equal for a 50-ohm resistive load. As a result, the magnitude of the reflected wave voltage and reflected wave current components also is equal.

b. When variable capacitors C1 and C2 are adjusted properly, the phase relationship between the various components is such that the voltage across diode CR1 is equal to the resultant of the forward wave components. The voltage across diode CR2 is equal to the resultant of the reflected wave components. When the transmission line is terminated in a 50-ohm resistive load, the voltages at the anode and cathode of diode CR1 are equal in magnitude and opposite in phase. The voltage drop across diode CR1 is the sum of those voltages or twice the value of each. Therefore, diode CR1 acts as a detector and produces a resultant dc voltage which is proportional to the amplitude of the forward voltage and current phase or sum. The dc voltage is applied to the RF OUTPUT meter circuits to provide an indication of rf forward power on the transmission line. At the same time, the inductively and capacitively coupled voltages across diode CR2 are of equal magnitude and in phase. Therefore, zero dc output voltage is obtained from diode CR2. When a mismatch on the transmission line causes reflected power waves, the voltages are no



NOTES:

1. ▭ INDICATES EQUIPMENT MARKINGS.
2. SWITCH VIEWED FROM KNOB OR DRIVEN END.
3. ALL RESISTANCE VALUES ARE IN OHMS, ALL CAPACITANCE VALUES ARE IN UF, ALL INDUCTANCE VALUES ARE IN UH.

TM6625-622-45-10

Figure 2–2. Directional wa er, schematic diagram longer of equal magnitude and in phase, so that a resultant dc voltage is produced at diode CR2. The dc voltage is applied to the RF OUTPUT meter circuits to provide an indication of rf reflected power on the transmission line. Resistors R3 and R4 are of equal value, as are resistors R5 and R6. Their values are selected by the manufacturer to calibrate the meter. Resistors R3 and R4 calibrate the 2,000-watt ranges, and resistors R5 and R6 calibrate the 200-watt ranges. Capacitors C3, C7, and C8, and rf choke L1 provide filtering action to keep stray rf from getting into the forward power wattmeter circuit. Similarly, capacitors C4, C9, and C10, and rf choke L2 keep stray rf out of the reverse power wattmeter circuit.

c. The WATTS REFLECTED FORWARD switch connects the desired directional coupler output to the wattmeter. The wattmeter indicates the rf power on the line.

d. The rf output of the receiver-transmitter, after passing through transformer T1, is connected from J17 to the top panel DIR WM RF OUT J10 connector.

CHAPTER 3
GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

WARNING

During servicing of the test unit, be careful when working with the 115-volt ac line voltage. Disconnect the power cord from the power source when making internal resistance measurements.

3-1. General Instructions

Troubleshooting at general support includes all the techniques outlined for organizational maintenance and any special or additional techniques required to isolate a defective part. The general support maintenance procedures are not complete in themselves but supplement the maintenance and repair procedures described in TM 11-6625-622-12. The systematic troubleshooting procedure, which begins with the maintenance and repair procedures that can be prformed at an organizational category must be completed by additional localizing and isolating techniques. (Figs. 3-9 through 3-16 are foldouts and located in back of the manual.)

3-2. Organization of Troubleshooting Procedures

a. General. The first step in servicing a defective test unit is to localize the fault. Localizing means tracing the fault to a circuit. The second step is to isolate the fault. Isolation means tracing the fault to a defective part responsible for the abnormal condition.

b. Localization The first step in tracing trouble is to locate the circuit at fault by the following methods:

(1) *Visual inspectiion.* The purpose of visual inspection is to locate faults without performing tests or measurements. Some faults, such as burned-out resistors, can be located by sight. The trouble, therefore, can be immediately isolated.

(2) *Intermittent troubles.* In all tests, the possibility of intermittent trouble should not be overlooked. If present, this type of trouble often may be made to appear by tapping or jarring the equipment. Check the wiring and cable connections.

c. *Isolation.* When the faulty stage or section of the current has been located, the faulty component is located by voltage and/or resistance measurements. Use the resistor and capacitor color codes (fig. 3-9) to find the values of components.

3-3. Tools and Test Equipment Required

The following tools and test equipment are required for troubleshooting the test unit.

Tool or test equipment	*Publication*	*Common name*
Multimeter ME-26B/U.	TM 11-6625-200-15	Multimeter
Probe T-connector HP-455A.		
Dummy Load Electrical DA-340/UR.		
Receiver-Transmitter, Radio RT-698/ARC-102.	TM 11-5821-248-12	Receiver-transmitter.
Wattmeter AN/URM-120	TM 11-6625-446-15	Wattmeter

Section II. TROUBLESHOOTING

3-4. Localizing Troubles

a *When to Check.* When any of the following conditions exist, perform the checks indicated and clear the troubles before returning to operation.

(1) When the nature of the abnormal symptoms is not known.

(2) When abnormal symptoms reported by the operator indicate possible trouble in the power distribution circuits, switches, or wiring.

b. Conditions for Test. Remove the test unit from the transit case and remove the control unit from the test unit; leave cable W5 connected to jack J19.

c. *Measurements.* Make the voltage and resistance measurements indicated in the charts in d through g below. If abnormal results are obtained, replace the defective component or wire in. the case of the resistance measurements. Parts location are indicated in figures 3-1, 3-2, and 3–3. Use the schematic diagram (fig. 3-11) and the wiring diagram (fig. 3-15) to trace the circuits and to isolate the faulty component.

d. Test Harness, Radio Set AN/URM-157 Voltage Measurements. Prepare for voltage measurements as follows:

(1) Connect 27.5 volts dc to the DC IN connector, and 115-volt, 3-phase, 400-MHz ac to the AC IN connector on the test unit.

(2) Set AC switch S3 to ON, DC POWER circuit breaker CB1 to ON, and 618T–2—OFF—618T-3 switch S1 to 618T-3.

(3) Make the measurements as indicated in the chart below.

Point of measurement	*Normal indication*	*Isolating procedure*
Between the following pins of 618T-2/3 connector J1 and ground:		No voltage at any of the pins indicates a faulty circuit breaker CB1, or 618T-2-OFF-618T-3 switch S1. Check continuity of wiring to components listed above. Check continuity of components.
1		
2		
3		
4		
13	27.5 volts dc ±5	No voltage at pins 4 and 16, but voltage It the other pins indicates a faulty fuse *or* fuseholder.
14		
15		
16		
17		
Between pin 12 of J1 and ground.	115 volts ac ±10	No voltage at pin 12 indicates faulty AC switch S3 or fuseholder for #3 fuse f3. Check continuity of wiring to components listed above. Check continuity of components.

e. Test Harness, Radio Set AN/URM–157A *Voltage Measurements.* Prepare for voltage measurements as follows:

(1) Connect 27.5 volts dc to the DC IN connector, and 115-volt, 3-phase, 400-MHz ac to the AC IN connector on the test unit.

(2) Set AC switch S3 to ON, DC POWER circuit breaker CB1 to ON, and 618T–2/2B—OFF—618T-3/3B switch S1 to 618T-3/3B.

(3) Make the measurements as indicated in the chart below.

f. Test Harness, Radio Set AN/URM-157 Switches and Jacks. The following resistance measurements are to be made with no power applied to the test unit.

Point of measurement	*Normal indication*	*Isolating procedure*
Between the following pins of 618T-2/2B/ 3/3B connector J1 and ground:		No voltage at any of the pins indicates a faulty circuit breaker CB1, or 618-2/2B-OFF-618 T-3/3B switch S1. Check continuity of wiring to components listed above. Check continuity of components.
1		
2		
3		
4		
13	27.5 volts dc ±5	No voltage at pins 4 and 16, but voltage at the other pins indicates a faulty fuse or fuaeholder.
14		
16		
16		
17		
Between pin 12 of J1 and ground.	115 volts ac ±10	No voltage at pin 12 indicates faulty AC switch S3 or fuseholder for ø3 fuse f3. Check continuity of wiring to components listed above. Check continuity of components.

Switch or jack	Ohmmeter connection From	To	Switch pos	Normal reading
TUNE POWER switch S4 . .	J1 pin 10----	Grd ---------	Normal ---------------- Down	Infinite resistance. O ohm.
KEY switch S9 (714E-1—714E- 2/3 switch S6 in 714E-1 position).	J1 pin 55 ----	Grd ---------	Center ------------------ u p Down	Infinite resistance. O ohm. O ohm.
KEY INTLK switch S7 ----	J1pin 5 -----	J1 pin 56----	Normal ---------------- BY PASS	Infinite resistance. O ohm.
CW KEYswitch S8 --------	W5 pin k----	Grd ---------	Mode selector switch in Cw pos Center u p Down	 Infinite resistance. 0 ohm, 0 ohm.
300 AUDIO LOAD switch S5.	Terminal 1 of J11.	Terminal 2 of J11.	OUT ----------..---- IN --------------------	Infinite resistance. 900 ohms *40.
714E-1—714-2/3 switch S6 -	J1 pin 24----	W5 pin *i* ----- ----- ----- ----- ----- ---		o ohm.
	J1 pin 25-----	W5 pin V . . . . . ------ ------ ------ -----		o ohm.
	J1 pin 59----	W5 pin U ---- ---- ---- ---- ---- ---- ----		0 ohm.
	J1 pin 55-----	W5 pin q ----	714E-2/3 -----------	o ohm.
	J1 pin 24----	W5 pin *J*		Infinite resistance.
	J1 pin 25----	W5 pin i		Infinite resistance.
	J1 pin 54----	W5 pin q		Infinite resistance.
	J1 pin 55----	W5 pin m ----- ----- ----- ----- ----- ---		Infinite resistance.
MIKE jack J12 -----------	Terminal 1 of J12.	Terminal 2 of J12.	---- --------------------	Infinite resistance.
6000Ω BAL AUDIO IN jack J8.	Terminal 1 of J8.	Terminal 3 of J8.	----------------------	Infinite resistance.

g. Test Harness, Radio Set AN/URM-157A Switches and Jacks. The following resistance measurements are to be made with no power applied to the test unit.

h. Test Harness, Radio Set AN/URM-157, Wiring continuity Checks. Prepare for wiring continuity checks as follows:

(1) Remove all power from the test unit.

Switch or jack	Ohmmeter connection From	To	Switoh pos	Normal reading
TUNE POWER switch S4 --	J1 pin 10 ----	Grd ----------	Normal ----------------- Down	Infinite resistance. 0 ohm.
KEY switch S9 (714E-1—714E-2/3—714E-6 switch S6 in 714E-1 position).	J19p in m-----	Grd -----.---	Center --------------- . u p Down	Infinite resistance. 0 ohm. 0 ohm.
KEY INTLK switch S7 ----	J1 pin 5 ----	J1 pin 56----	NORMAL --------------- BY PASS	Infinite resistance. 0 ohm.
CW stitch S8 ------------	S6B-10 ------	Grd --------	Center ----------------- u p Down	Infinite resistance. 0 ohm. 0 ohm.
AUDIO LOAD switch S5 --	Terminal 1 of J11.	Terminal 2 of J11,	OUT------------------- IN --------------------	Infinite resistance. 300 ohms ±40.
714E-1—714E-2/3-714E-6 switch S6.	J1 pin 24 ----	W5pin j ----		0 ohm.
	J1 pin 25 ----	W5 pin *i* ----		0 ohm.
	J1 pin 59 ----	W5 pin q ----	------ ------ ------ ------	0 ohm.
	J1 pin 55 ----	J12 pin 2 ----	714E-2/8 -------------	0 ohm.
	J1 pin 24 ----	W6 pin q ----	----- ----- ----- ----- ----	Infinite resistance.
	J1 pin 25 ----	W5 pin U ----	----- ---- ----- ----- ----	Infinite resistance.
	J1 pin 54 ----	J12 pin 2 ----	----- ----- ----- ----- ----	Infinite resistance.
	J1 pin 55 ----	W5 pin V ----		Infinite resistance.
MIKE jack J12 -------.---	Terminal 1 of J12.	Terminal 2 of J12.	------ ------ ------ ------	Infinite resistance.
600 Ω BAL AUDIO IN jack J8.	Terminal 1 of J8.	Terminal 3 of J8.		Infinite resistance.

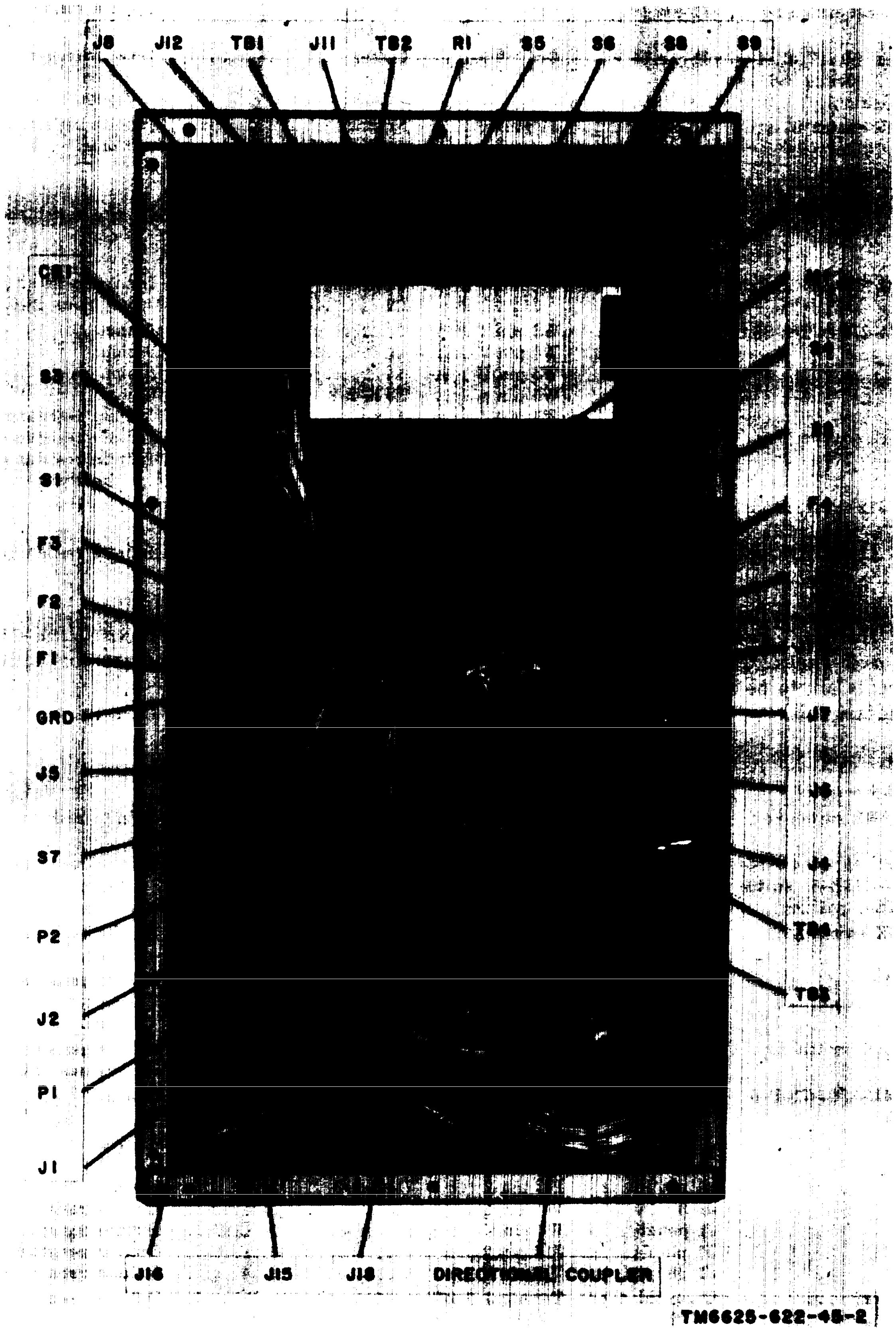


Figure 8-1. Test unit chassis, less dummy antenna, parts location.

(2) Remove the control unit from the test unit and disconnect cable W5 from the control unit. Make the resistance measurements at the free end of cable W5,

(3) Set the test unit switches to the positions given in the following chart.

Switch	Position
714E-1—714E-2/3	714E-2/3
300 Ω AUDI0 LOAD switch S5	OUT
KEYswitch S9	Center
KEY INTLK switch S7 -----------------	NORMAL
TUNE POWER switch S4	Normal

(4) Make the continuity checks as indicated in the following chart:

Check	From	To
1	W5-pin A	J1-pin 32
2	B	33
3	c	34
4	D	36
6	E	36
6	F	38
7	G	39
8	H	40
9	W5-pin J	J1-pin 41
10	K	46
11	L	46
12	M	47
13	N	48
14	P	49
15	R	50
16	S	51
17	T	52
18	V	25
19	i	24
20	q	55
21	P	31
22	u	59
23	z	30
24	a	58
25	b	57
26	J6-pin B	W5-pin f
27	J6-pin C	W5-pin g
28	J6-pin D	W5-pin h
29	J6-pin F	W5-pin Y
30	J6-pin Z	W5-pin W
31	J6-pin A	J1-pin 7
32	J6-pin K	J1-pin 26
33	J6-pin N	J1-pin 55
34	J6-pin P	J1-pin 55
36	J6-pin R	W5-pin q
36	J6-pin S	J1-pin 11
37	J6-pin T	J1-pin 11
38	J6-pin U	J1-pin 11
39	J6-pin V	J1-pin 11
40	J6-pin X	J1-pin 5
41	J&pin i	J1-pin 9
42	J6-pin k	J1-pin 10
43	J6-pin r	J1-pin 66
44	J6-pin s	J1-pin 56
46	J6-pin t	J1-pin 66
46	J1-pin 18	Ground pin P1
47	J1-pin 27	Ground pin P1
48	J1-pin 60	J2-pin 60

i. Test Harness, Radio Set AN/URM-157A Wiring Continuity Checks. Prepare for wiring continuity checks as follows:

(1) Remove all power from the test unit,

(2) Remove the control unit from the test unit and disconnect cable W5 from the control unit, Make the resistance measurements at the free end of cable W5,

(3) Set the test unit switches to the positions given in the following chart.

Switch	Position
714E-1—714E-2/3—714E-6 ------------	714E-2/3
AUDIO LOAD switch S5----- ------------	OUT
KEY switch So ------------- -----	Center
KEY INTLK switch S7 ---- -------------	NORMAL
TUNE POWER switch S4-----	Normal

(4) Make the continuity checks as indicated in the following chart:

Cheek	From	To
1	W6-pin A	J1-pin 32
2	B	33
3	c	34
4	D	36
6	E	36
6	F	38
7	G	39
8	H	40
9	W5-pin J	J1-pin 41
10	K	45
11	L	46
12	M	47
13	N	48
14	P	49
16	R	50
16	s	51
17	T	52
18	v	25
19	i	24
20	q	55
21	P	31
22	u	59
23	z	30
24	a	58
25	b	57
26	J6-pin B	W5–pin f
27	J6-pin C	W5-pin g
28	P6-pin D	W5-pin h
29	J6-pin F	W5-pin Y
30	J6-pin Z	W5-pin W
31	J6-pin A	J1-pin 7
32	J6-pin K	J1-pin 26
33	J6-pin N	J1-pin 55
34	J6-pin P	J1-pin 55
36	J6-pin R	W5-pin q
36	J6-pin S	J1-pin 11
37	J6-pin T	J1-pin 11
38	J6-pin U	J1-pin 11
39	J6-pin V	J1-pin 11
40	J6-pin X	J1-pin 5
41	J6-pin i	J1-pin 9
42	J6-pin k	J1-pin 10

Check	*From*	*To*
43	J6-pin r	J1-pin 56
44	J6-pin s	J1-pin 56
45	J6-pin t	J1-pin 56
46	J1-pin 18	Ground pin P1
47	J1-pin 27	Ground pin P1
48	J1-pin 60	J2-pin 60

3-5. Troubleshooting Directional Wattmeter

a. Connect the equipment as shown in the block diagram (fig. 3-4). Key the receiver-transmitter in the AM mode with the test unit KEY switch, and adjust the receiver-transmitter for an unmodulated rf output of 72 volts across the 52-ohm load. Check the indication on the RF OUTPUT meter for each position of the meter switch.

Position	*Meter indication*
FORWARD 200 watts ------	100 watts ±25
FORWARD 2000 watts ------	Approx 100 watts
REFLECTED 2000 watts ---	No indication
REFLECTED 200 watts ----	Not more than 1.5 watts

b. If the above indications are not obtained, the directional wattmeter must be replaced.

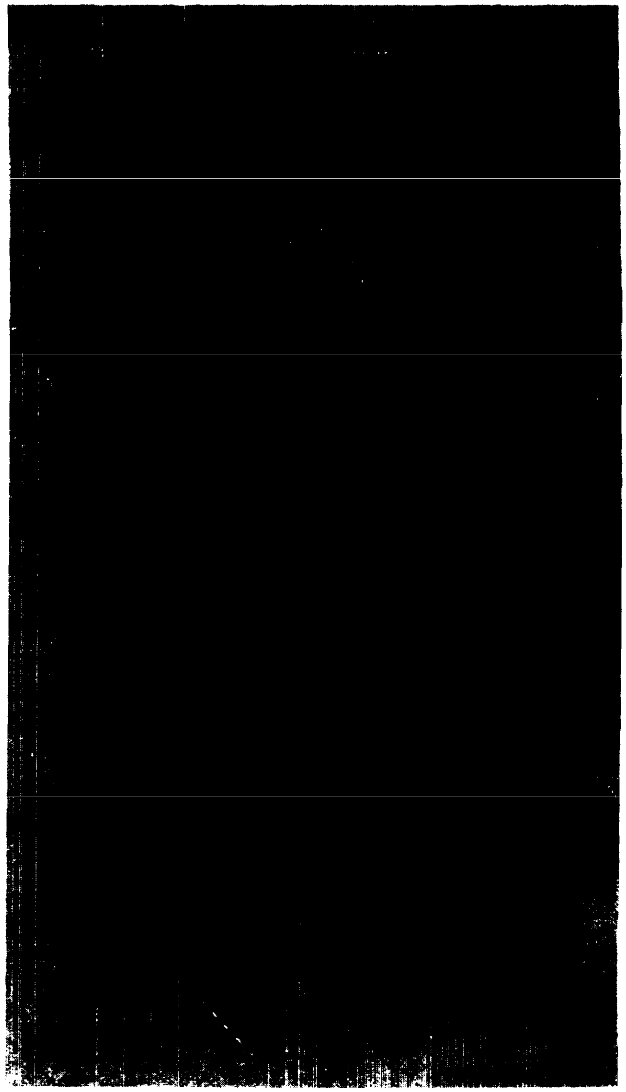
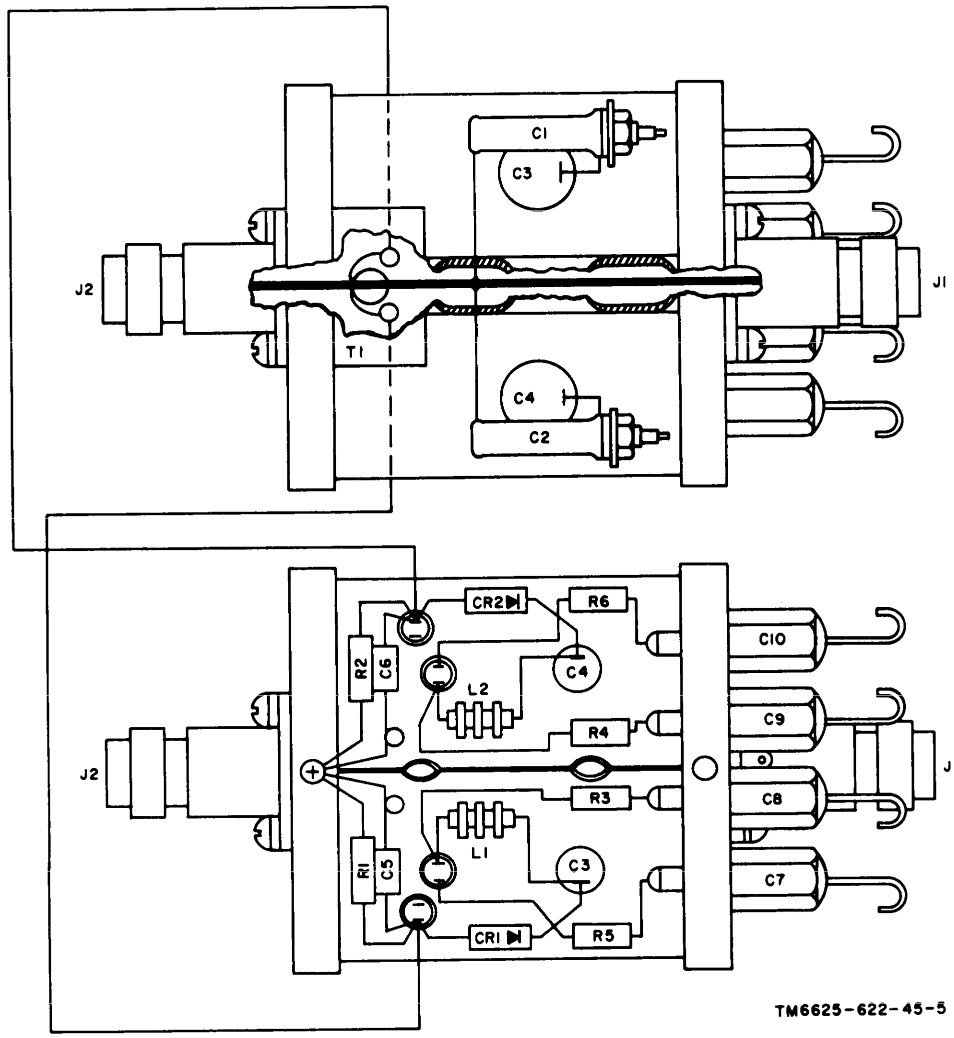
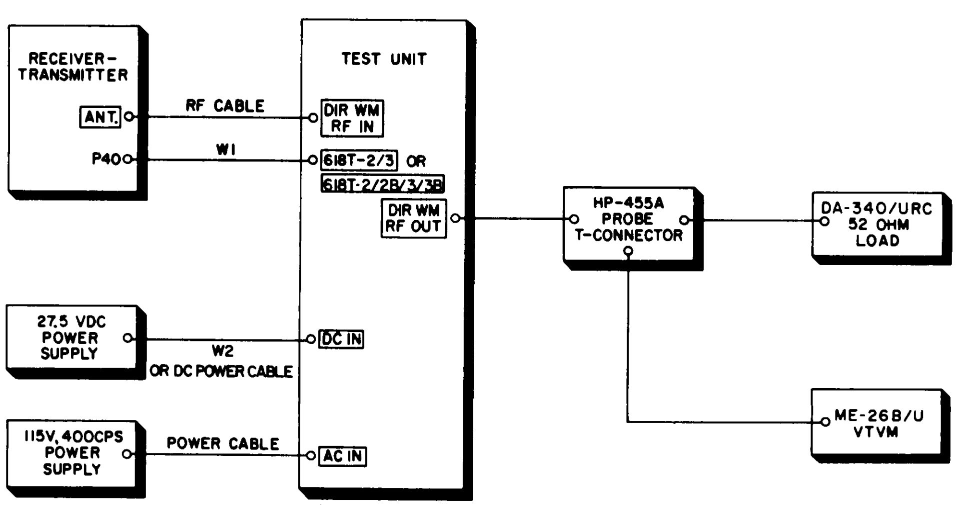


Figure 3-2. Test unit chassis, including dummy antenna, parts location



TM6625-622-45-5



NOTE:
▭ INDICATES EQUIPMENT MARKINGS.

EL6625-622-45-C2-TM-1

Section III. MAINTENANCE OF AN/URM-157

3-6. General Parts Replacement Techniques

Most of the parts of the test unit can be reached and replaced easily without special procedures after removal of the bottom cover. In some cases, it is necessary to remove the dummy antenna assembly to make parts accessible.

a. Before a part is removed, note the position of the part and its leads, and label all leads where necessary. Install the replacement parts in the same position as the original parts.

b. When repairing cables, refer to the schematic diagram of the cables (fig. 3–13) to insure proper connection between jacks. Use the schematic diagram (fig. 3–10) and the wiring diagram (fig. 3–15) to trace the circuits when re pairing the control unit.

3-7. Replacement Data

After replacing RF OUTPUT meter Ml, check the calibration (para 3–14).

Section IV. GENERAL SUPPORT TESTING PROCEDURES

3-8. General

a. Testing procedures are prepared for use by Signal Field Maintenance Shops and Signal Service Organizations responsible for general support maintenance of electronic equipment to determine the acceptability of repaired equipment. These procedures set forth specific requirements that repaired electronic equipment *must* meet before it is returned to the using organization. Equipment that meets the minimum standards stated in the tests will furnish satisfactory operation equivalent to that of new equipment. The testing procedures may also be used as a guide to test equipment repaired by direct support maintenance personnel if the proper tools and test equipment are available. A summary of the performance standards is given in paragraph 3–15.

b. Comply with the instructions preceding the body of each chart before proceeding to the chart. Perform each test in sequence. Do not vary the sequence. For each step, perform all the actions required in the *Control settings* columns; then perform each specific test procedure and verify it against its performance standard.

3-9. Test Equipment and Materials Required

a. All test equipment and materials required to perform the testing procedures given in paragraphs 3-11, 3–12, and 3–13 are listed in the following charts.

b. The only test equipment required for the general support testing procedure is Multimeter Meter ME-26B/U.

3-10. Modification Work Orders

The performance standards listed in the tests (para 3–11, 3-12, and 3-13) are based on the assumption that applicable modification work orders have been performed. A listing of current modification work orders will be found in DA Pam 310–7.

3-11. Physical Tests and Inspections

a. Test Equipment and Materials. None.

b. Test Connection and Conditions.

(1) No connections necessary.

(2) Remove the control unit from the test unit.

(3) Remove the bottom cover from the test unit.

c. *Procedure.*

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	Not applicable . . . _	Controls and switches may be in any position.	*a.* Inspect case and chassis for damage or missing parts, and for condition of paint. **NOTE** Touchup painting is recommended instead of refinishing whenever practical; screwheads, binding posts, receptacles, and other plated parts	*a. No* damage evident or parts missing. External surfac- intended to be painted will not show -bare metal. Panel lettering will be legible.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
			will be painted or polished with abrasives.	
			b. Inspect all controls and mechanical assemblies for loose or missing screws, bolts, and nuts.	*b.* Screws, bolts, and nuts will be tight; none missing.
			c. Inspect all jacks, receptacles, fuseholders, and meter for looseness, damage, or missing parts.	*c.* No loose parts or damage. No missing parts.
2	None	____ Controls and switches may be in any position.	a. Rotate all rotary switches and controls throughout limits of travel.	*a.* Controls and switches will rotate freely, without binding or excessive looseness
			b. Operate all toggle switches.	*b.* Switches will operate properly. NOTE CW KEY and KEY switches are spring-loaded in down position and should return to center positions when released.

3-12. Test Harness, Radio Set AN/URM-157 Continuity and Short-Circuit Tests

a. Test Equipment and Materials. Multimeter ME-26B/U.

b. Test Connections and Conditions.

(1) Make test connections as specified in *Test procedure* column of c below and illustrated in *figure 3–5.*

(2) The test unit is tested with no power applied.

(3) Remove the control unit from the test unit and disconnect cable W5 from the control unit. Make applicable resistance measurements at the free end of cable W5.

c. *Procedure.*

Step	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	a. FUNCTION switch : OHMS. *b.* RANGE switch: RX1.	*a.* 714E-1—714E-2/3 switch: 714E-2/3. *b.* 300Ω AUDIO LOAD switch : OUT. KEY switch: center. c. KEY INTLK switch: NORMAL. *e.* TUNE POWER switch : normal. *f.* CW KEY switch: center. 9. AC switch: ON. *h.* 618T-2—OFF—618T-3 switch : 618T-3. *i.* DC POWER circuit breaker: ON.	Connect test leads of ME-26B/U, in turn, to each of the following points: *From* — *To* W5-A — J1-32 W5-B — J1-33 W5-C — J1-34 W5-D — J1-35 W5-E — J1-36 W5-F — J1-38 W5-G — J1-39 W5-H — J1-40 W5-J — J1-41 W5-K — J1-45 W5-L — J1-46 W5-M — J1-47 W5-N — J1-48 W5-P — J1-49 W5-R — J1-50 W5-S — J1-51 W5-T — J1-52 W5-V — J1-25 W5-i — J1-24 W5-q — J1-55	ME-26B/U must indicate zero resistance for all points listed in this step.

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			From — *To* W5-p — J1-31 W6-U — J1-59 W6-Z — J1-30 W6-a — J1-58 W5-b — J1-57 W5-f — J6-B W6-g — J6-C W6-h — J6-D W6-Y — J6-F W5-W — J6-Z J1-7 — J6-A J1-26 — J6-K J1-55 — J6-N, P, and R W5-q — J6-N, P, and R J1-11 — J6-S, T, U, and V J1-5 — J6-X J1-9 — J6-i J1-10 — J6-k J1-56 — J6-r, s, and t J1-18 — Ground J1-27 — Ground J1-60 — J2-60 J7-C — J1-12 J4-C — J1-18, 1, 2, 14, 8, 15, 16, and 4	
2	Same as step 1 ..-	a. KEY switch: up. *b.* KEY switch: down.	Connect test leads of ME-26 B/U to following point: *To* W5-m — GRD	ME-26B/U must indicate zero resistance for both positions of KEY switch.
3	Same as step 1 ---	TUNE POWER switch : down.	Connect test leads to ME-26 B/U to following point: *From* — *To* J1-10 — GRD	MS-26B/U must indicate zero resistance.
4	Same as step 1 ---	a. CW KEY switch: *b.* CW KEY switch: down.	Connect teat leads of ME-26B/U to following point: *From* — *To* W5-K — Ground	ME-26B/U must indicate zero resistance for both positions of CW key switch.
5	Same as step 1 ---	KEY INTLK switch: BY PASS.	Connect test leads of ME-26B/U to following point: *From* — *To* J1-56 — J1-5	ME-26B/U must indicate resistance.
6	Same as step 1 ---	714E-1—714E-2/8 switch S6 : 714S-2/8.	Connect test leads of ME-26 B/U to following points: *From* — *To* J1-24 — W5-i J1-26 — W5-V J1-69 — W5-U J1-55 — W5-q	MS-26B/U must indicate zero resistance for all points listed in this step.
7	a. FUNCTION switch : OHMS. *b.* RANGE switch : RXIM.	TUNE POWER switch : normal.	Connect test leads of ME-26 B/U to following point: *From* — *To* J1-10 — Ground	ME-26B/U must indicate infinite resistance.
8	Same as step 7 ---	KEY switch: center.	Connect test leads of ME-26 B/U to following point: *From* — *To* J1-55 — Ground	ME-26 B/U must indicate infinite resistance.

Step No.	Test equipment	Control settings: Equipment under test	Teat procedure	Performance standard
9	Same as step 7 _ _	KEY INTLK switch: NORMAL.	Connect test leads of ME-26 B/U to following point: *From* *To* J1-5 J1-56	ME–26B/U must indicate infinite resistance.
10	Same as step 7 . . .	CW KEY switch: center.	Connect test leads of ME-26 B/U to following point: *From* *To* W5-k Ground	ME–26B/U must indicate infinite resistance.
11	Same as step 7 ___	300Ω AUDIO LOAD switch: OUT.	Connect test leads of ME-26 B/U to following point: *From* *To* J11-1 J11-2	ME-26B/U must indicate infinite resistance.
12	Same as step 7 ___	714E-1—714E-2/3 switch S6 : 714E-2/3	Connect test leads of ME-26B/U to following points: *From* *To* J1-24 W5-j J1-25 W5-i J1-59 W5-q J1-55 *W5-m*	ME-26B/U must indicate infinite resistance for all points listed in this step.

3-13. Test Harness, Radio Set AN/URM-157A Continuity and Short-Circuit Tests

a. Test Equipment and Materials. Multimeter ME-26B/U.

b. Test Connections and Conditions

(1) Make test connections as specified in *Test procedure* column of c below and illustrated in figure 3–6.

(2) The test unit is tested with no power applied.

(3) Remove the control unit from the test unit and disconnect cable W5 from the control unit. Make applicable resistance measurements at the free end of cable W5.

c. *Procedure.*

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	a. FUNCTION switch: OHMS. *b.* RANGE switch: RX1.	a. 714E-1—714E-2/3-714E-6 switch: 714 E-2/3. *b.* AUDIO LOAD switch : OUT. c. KEY switch: center. *d.* KEY INTLK switch: NORMAL. *e.* TUNE POWER switch : normal. *f.* CW switch: center. 9. AC switch: ON. *h.* 618T-2/2B—OFF—618T-3/3B switch: 618T-3/3B. i. DC POWER circuit breaker: ON.	Connect test leads of ME-26B/U, in turn, to each of the following points: From To W5-A J1-32 W5-B J1-33 W5-C J1-34 W6-D J1-35 W5-E J1-36 W5-F J1-38 W5-G J1-39 W5-H J1-40 W5-J J1-41 W5-K J1-45 W5-L J1-46 W5-M J1-47 W5-N J1-48 W5-P J1-49 W5-R J1-50 W5-S J1-51 W5-T J1-52 W5-V J1-25 W5-i J1-24 W5-q J1-55 W5-p J1-31 W5-U J1-59 W5-Z J1-30 W5-a J1-58	ME-26B/U must indicate zero resistance for all points listed in this step.

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			From *To* W5-b J1-57 W5-f J6-B W5-g J6-C W5-h J6-D W5-Y J6-F W5-W J6-Z J1-7 J6-A J1-26* J6-K J1-55 J6-N, P, and R W5-q J6-N, P, and R J1-11 J6-S, T, U, and V J1-5 J6-X J1-9 J6-i J1-10 J6-k J1-56 J6–r, s, and t J1-18 Ground J1-27 Ground J1-60 J2-60 J7-C J1-12 J4-C J1-13, 1, 2, 14, 9, 16, 16, and 4	
2	Same as step 1 _ _ _	*a.* KEY switch: up. b. KEY switch: down.	Connect test leads of ME-26 B/U to following point: *From* *To* W 5 = GRD	ME-26B/U must indicate zero resistance for both positions of KEY switch.
3	Same as step 1 ---	TUNE POWER switch : down.	Connect test leads of ME-26 B/U to following point: *From* *To* J1-10 GRD	MS-26 B/U must indicate zero resistance.
4	Same as step 1 ___	a. CW switch: up. b. CW switch: down.	Connect test leads of ME–26 B/U to following point: *From* *To* W5-k Ground	ME-26B/U must indicate zero resistance for both positions of CW key switch.
5	Same as step 1 ___	KEY INTLK switch: BY PASS.	Connect test leads of ME–26 B/U to following point: *From* *To* J1-56 J1-5	ME–26B/U must indicate zero resistance.
6	Same as step 1 --	714E-1—714E-2/3-714E-6 switch S6: 714S-2/3.	Connect test leads of ME-26B/U to following points: *From* *To* J1-24 W5-i J1-25 W5-V J1-59 W5-U J1-55 W5-q	MS-26 B/U must indicate zero resistance for all points listed in this step.
7	a. FUNCTION switch: OHMS. *b.* RANGE switch RXIM.	TUNE POWER switch : normal.	Connect test leads of ME-26 B/U to following point: *To* J1-10 Ground	ME-26B/U must indicate infinite resistance.
8	Same as step 7 --	KEY switch: center.	Connect test leads of ME-26 B/U to following point: *To* J1-55 Ground	ME-26B/U must indicate infinite resistance.

See footnote at end of table.

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
9	Same as step 7 . . .	KEY INTLK switch: NORMAL.	Connect test leads of ME-26B/U to following point: *From* J1-5 *To* j-56	ME-26B/U must indicate infinite resistance.
10	Same as step 7...	CW switch: center.	Connect test leads of ME-Z5B/'U to following point: *From* W5-k *To* Ground	ME-26B/U must indicate infinite resistance.
11	Same as step 7...	AUDIO LOAD switch: OUT.	Connect test leads of MS-26B/U to following point J11-1 J11-2	ME-26B/U must indicate infinite resistance.
12	Same as step 7...	714E-1—714E-2/3-714E-6 switch S6: 714E-2/3.	Connect test leads of ME-26B/U to following points *To*: *J1-24* W5-j; J1-25 W5-i; J1-59 W5-q; J1-55 W5-m	ME-26B/U must indicate infinite resistance for all points listed in this step.

CAUTION

•Improper connection of test set can damage diode. Connect positive lead to J6, and negative lead to J1.

3-14. Directional Wattmeter Calibration Test

a. Test Equipment and Materials. Receiver-transmitter, and Wattmeter.

b. Test Connections and Conditions.

(1) Connect the equipment as shown in figure 3-7 or 3-8 and apply power, allowing the receiver-transmitter to warm up.

(2) No conditions necessary.

c. Procedure.

Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	None	WATTS switch: FORWARD 200. Mode selector AM.	Key receiver-transmitter in AM mode at 3.5 MHz, 14.0 MHz, and 29.5 MHz.	RF OUTPUT meter M1 will indicate ±25 watts of the power measured on Wattmeter AN/URM -120. NOTE The AN/URM-120 must indicate NLT 100 watts.
2	None	WATTS switch: FORWARD 2000. Mode selector AM.	Key receiver-transmitter in AM mode at 3.5 MHz, 14.0 MHz, and 29.5 MHz.	RF OUTPUT meter M1 will indicate ±35 watts (on bottom scale) of the power measured on Wattmeter AN/URM-120.
3	None	WATTS switch: REFLECTED 200. Mode selector AM.	Key receiver-transmitter in AM mode at 8.5 MHz, 14.0 MHz, and 29.5 MHz.	RF OUTPUT meter M1 will indicate not more than 1.5 watts.
4	None	WATTS switch: REFLECTED 2000. Mode selector AM.	Key receiver-transmitter in AM mode at 3.5 MHz, 14.0 MHz, and 29.5 MHz.	RF OUTPUT meter M1 will not indicate

3-15. Test Data Summary

Maintenance personnel may find it convenient to arrange the checklist in a manner similar to that below:

1. CONTINUITY AND SHORT-CIRCUIT TESTS

NOTE

The numbers in the *Step No.* column below are references to numbers in the *Step No.* column in paragraph 3-12c.

Step No.	Indication
1	All checkpoints measure 0 ohm.
2	0 ohm for both positions of the KEY switch.
3	0 ohm.
4	0 ohm for both positions of the CW KEY or CW switch.
5	0 ohm.
6	All checkpoints measure 0 ohm.
7	Infinite resistance.
8	Infinite resistance.
9	Infinite resistance.
10	Infinite resistance.
11	Infinite resistance.
12	All checkpoints measure infinite resistance.

2. DIRECTIONAL WATTMETER CALIBRATION TEST

NOTE

The numbers in the *Step No.* column below are references to numbers in the *Step No.* column in paragraph 3-14C.

Step No	Indication
1	100 watts 25.
2	Approximately 100 watts.
3	Not more than 1.5 watts.
4	No indication.

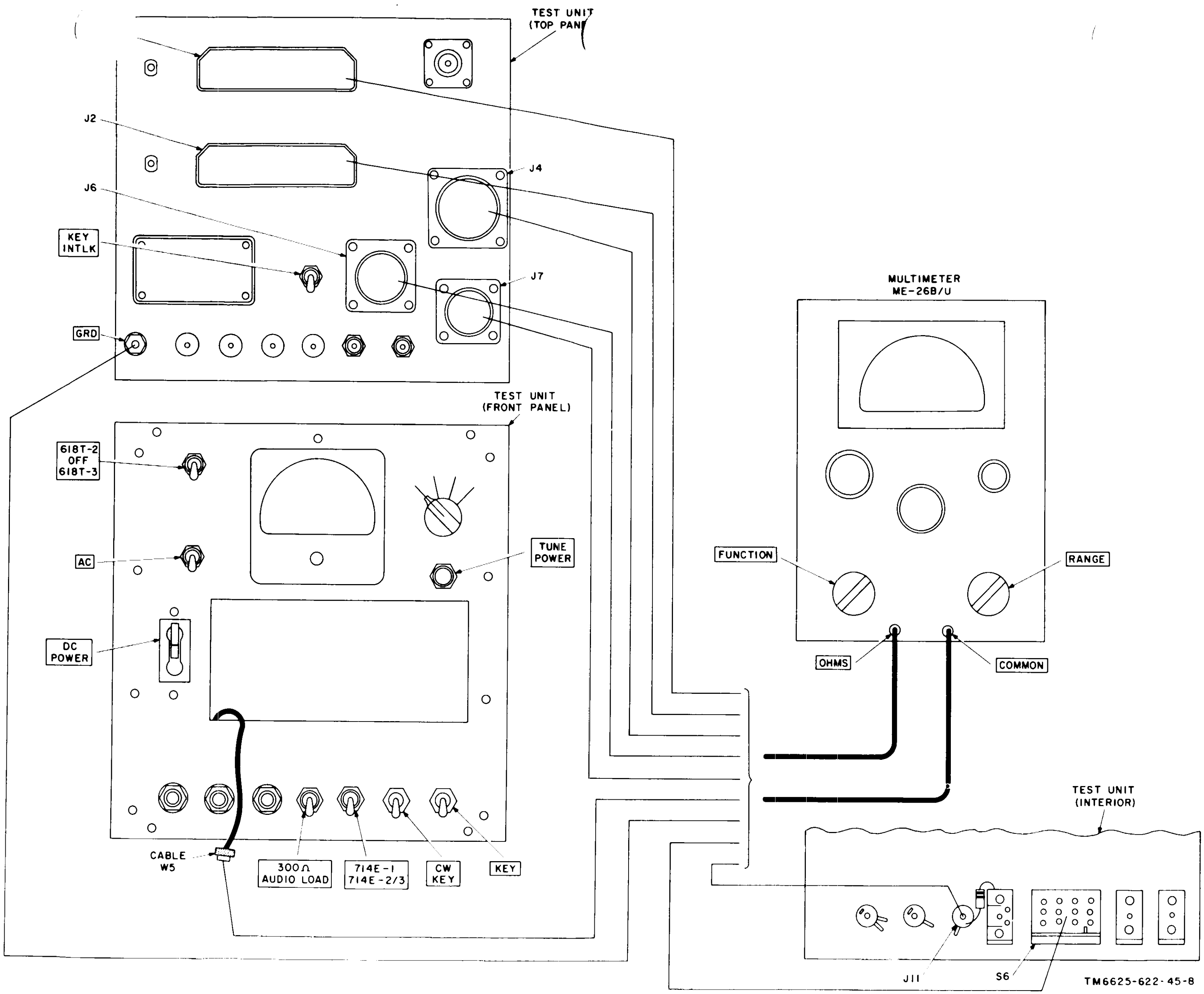


Figure 3-5. Test Harness, Radio Set AN/URM-157 continuity and short-circuit test connections.

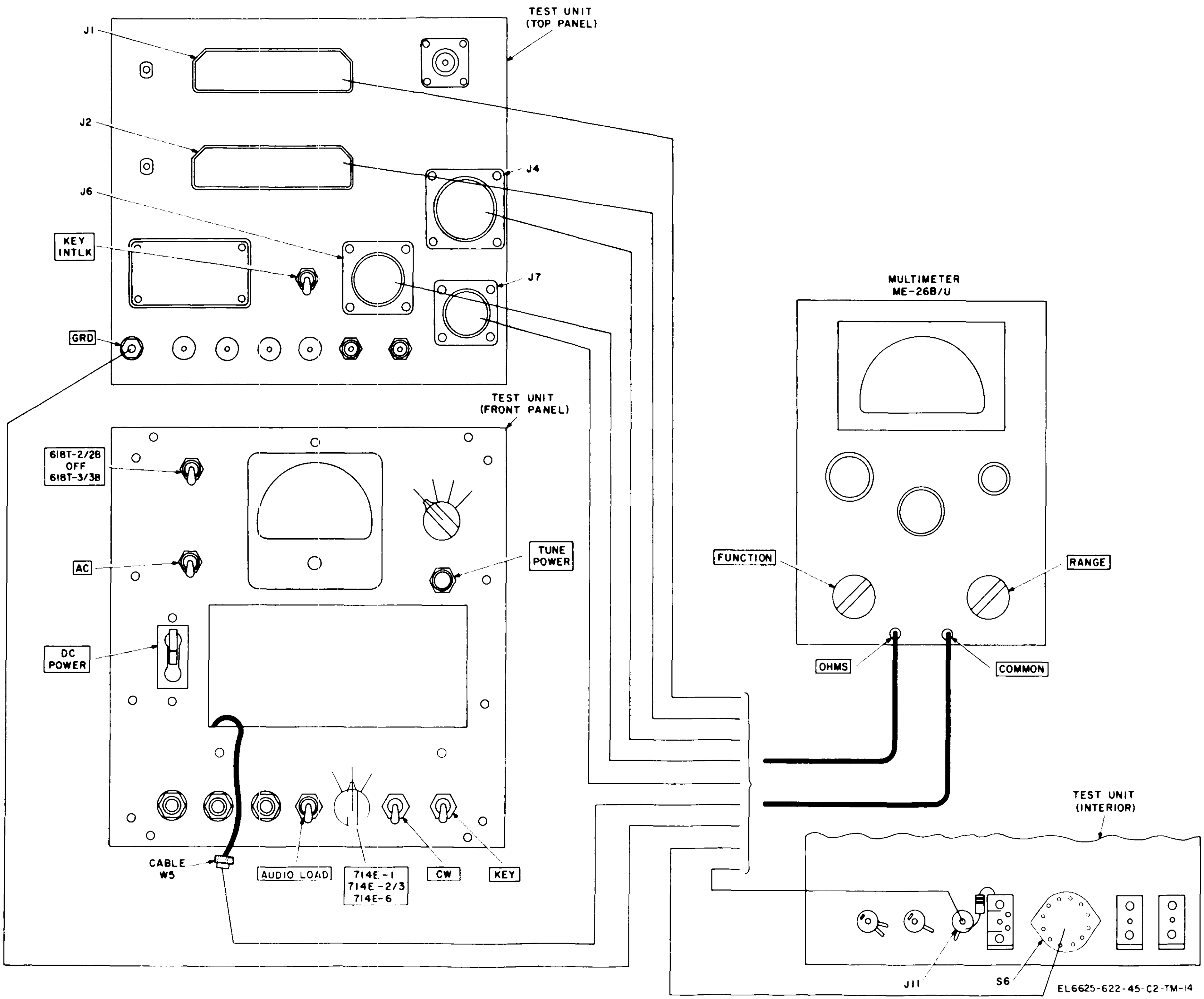


Figure 3-6. Test Harness, Radio Set A… …-157A continuity and short-circuit test co… …s.

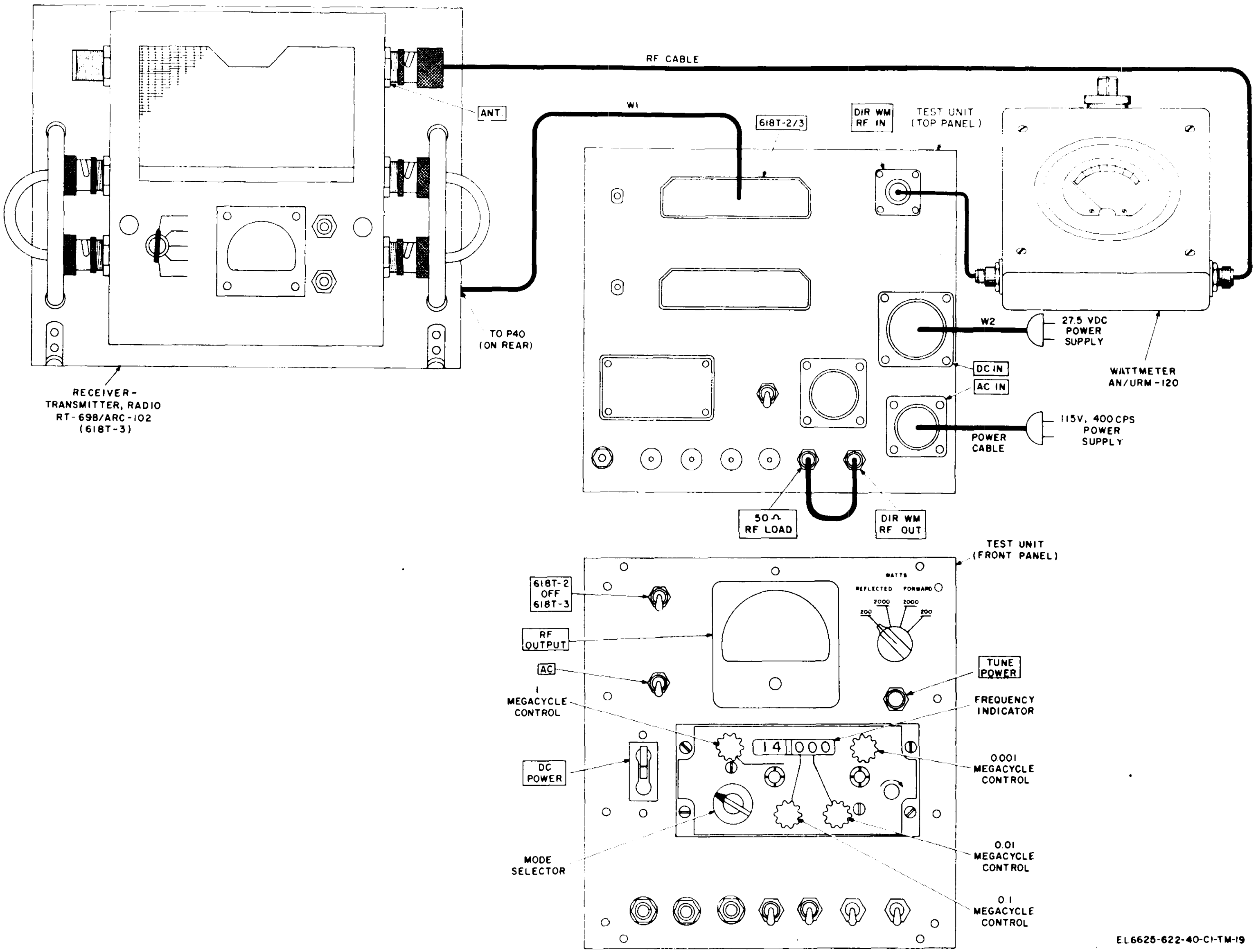


Figure 3-7. Test Harness, Radio Set AN/URM-157 directional wattmeter, calibration test connection.

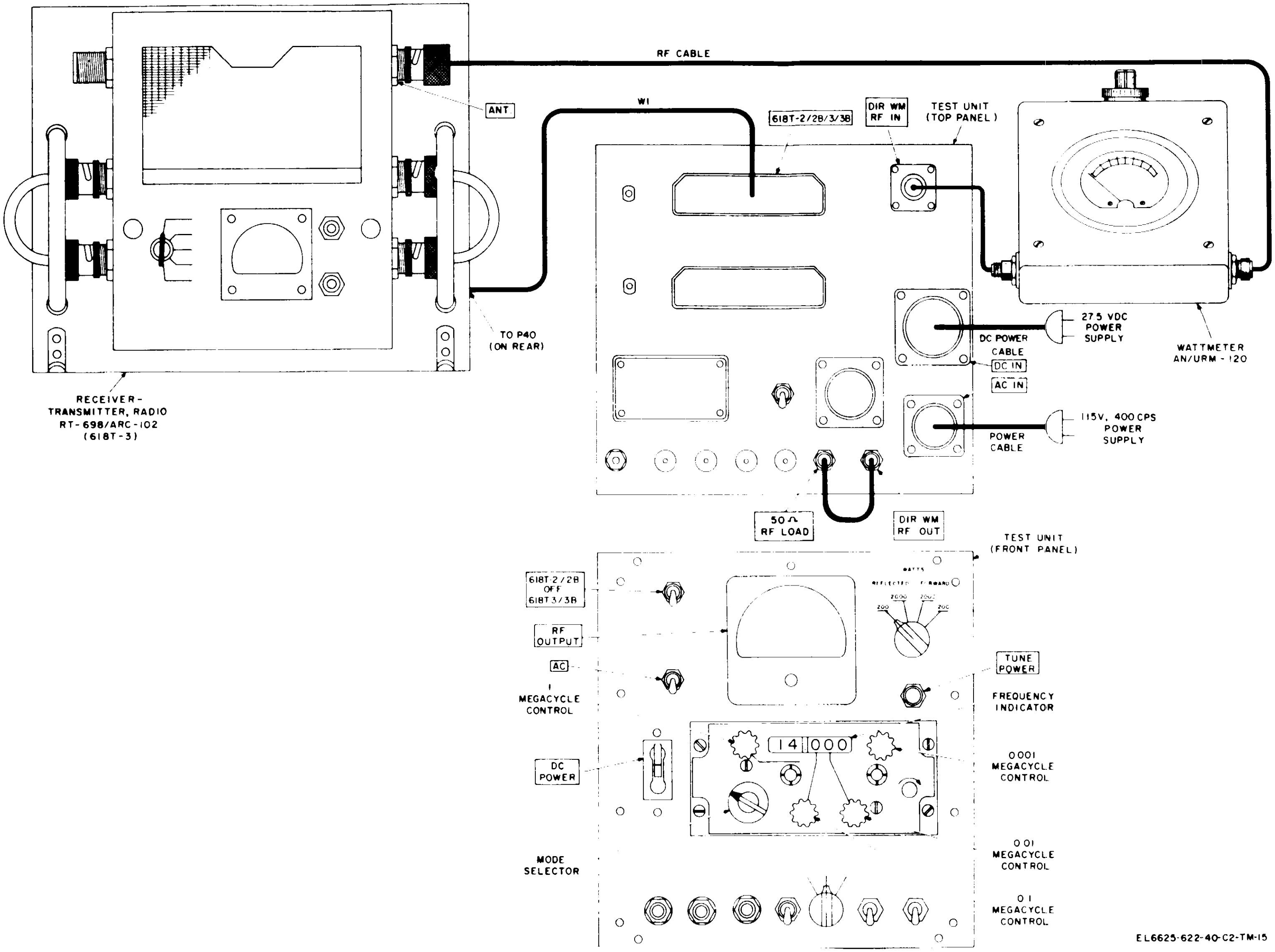


Figure 3-8. Test Harness, Radio Set AN/URM-157A directional wattmeter, calibration test connection.

APPENDIX A
REFERENCES

Following is a list of applicable references available to the general support maintenance personnel of Test Harness, Radio Set AN/URM-157 and AN/URM-157A.

DA Pam 3104	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7,8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U. S. Army Equipment Index of Modification Work Orders.
TM 11-5821-248-12	Operator's and Organizational Maintenance Manual: Radio Set AN/ARC-102.
TM 11-5821-248-35	DS, GS, and Depot Maintenance Manual: Radio Set ANIARC-102.
TM 11-6625-200-15	Operator's and Organizational DS, GS, and Depot Maintenance Manual: Multimeters ME-XUUU, ME-26B/U, ME-26C/U and ME-26D/U.
TM 11-6625-446-15	Operator, Organizational, Field And Depot Maintenance Manual: Wattmeter AN/URM-120.
TM 11-6625-622-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Test Harness, Radio Set AN/URM-157 and AN/URM-157A.
TM 38-750	The Army Maintenance Management Systems (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

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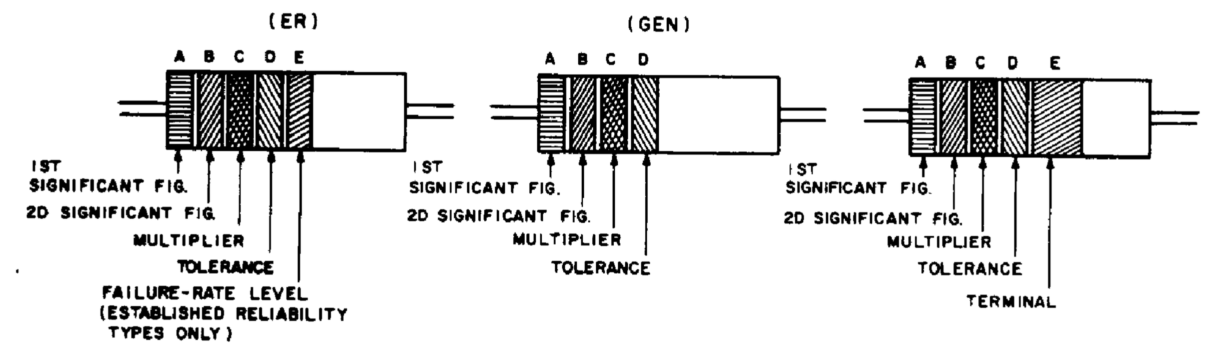


COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS.

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM.
BLACK.....	0	BLACK.....	0	BLACK.....	1			BROWN...	M=1.0	
BROWN.....	1	BROWN.....	1	BROWN....	10			RED......	P=0.1	
RED.......	2	RED.......	2	RED.......	100			ORANGE..	R=0.01	
ORANGE....	3	ORANGE....	3	ORANGE...	1,000			YELLOW..	S=0.001	
YELLOW....	4	YELLOW....	4	YELLOW...	10,000	SILVER.	±10 (COMP. TYPE ONLY)	WHITE...	....	SOLD-ERABLE
GREEN.....	5	GREEN.....	5	GREEN....	100,000	GOLD...	±5			
BLUE......	6	BLUE......	6	BLUE.....	1,000,000	RED....	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY).			
PURPLE.... (VIOLET)	7	PURPLE.... (VIOLET)	7							
GRAY......	8	GRAY......	8	SILVER...	1.01					
WHITE....	9	WHITE.....	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL (PERCENT FAILURE PER 1,000 HOURS). ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

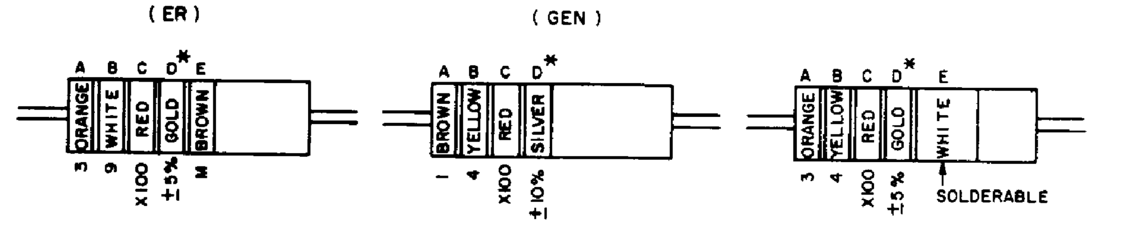
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS
(THESE ARE NOT COLOR CODED)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS   10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±10%

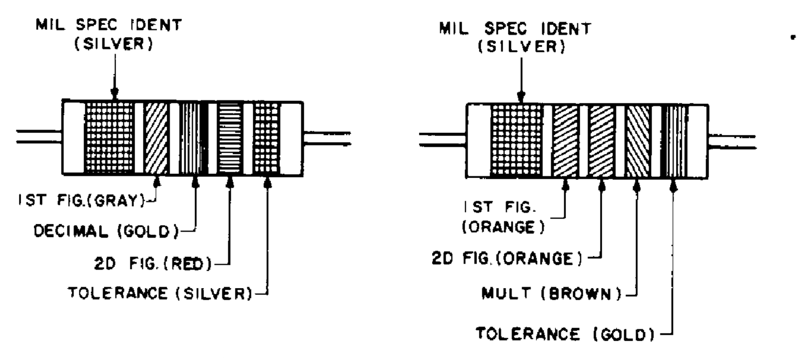
NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS.



(A) 8.2UH ± 10%   (B) 330UH ± 5%

COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8.2UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED.

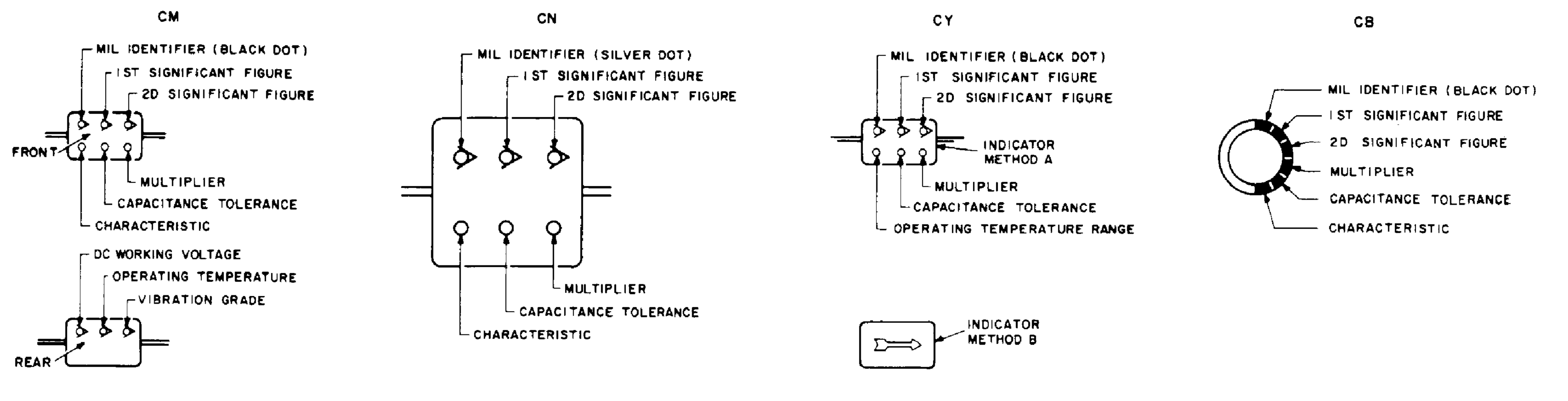
TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

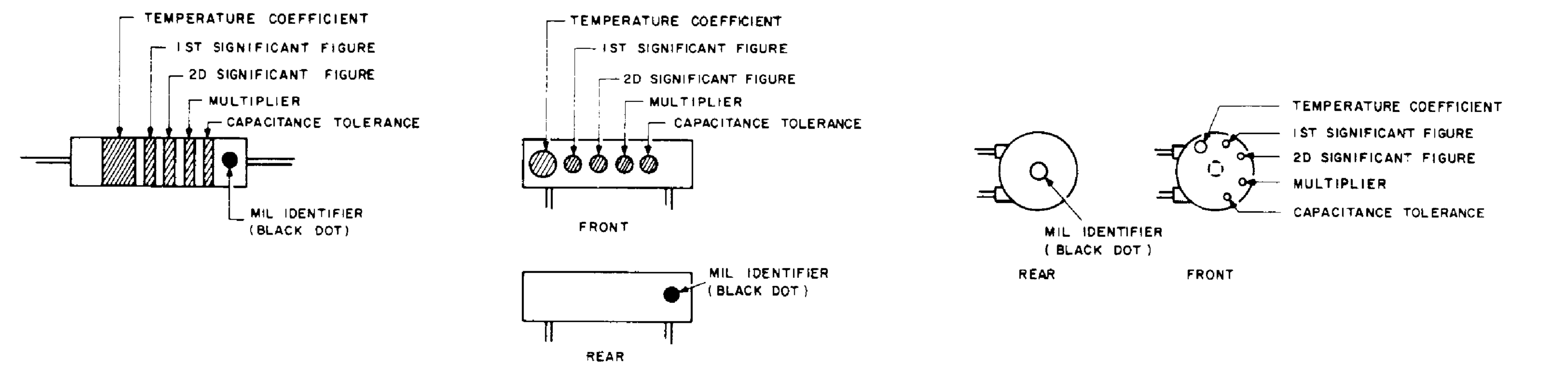
MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB.



MICA-DIELECTRIC   PAPER-DIELECTRIC   GLASS-DIELECTRIC, GLASS CASE   MICA, BUTTON TYPE



AXIAL LEAD   RADIAL LEAD   DISK-TYPE

TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL ID	1ST SIG FIG.	2D SIG FIG.	MULTIPLIER[1]	CAPACITANCE TOLERANCE				CHARACTERISTIC[2]			DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CY, CM	CM
BLACK	CM, CY CB	0	0	1			±20%	±20%		A			$-55°$ TO $+70°C$	10-55 HZ
BROWN		1	1	10					B	E	B			
RED		2	2	100	±2%		±2%	±2%	C				$-55°$ TO $+85°C$	
ORANGE		3	3	1,000		±30%			D		D	300		
YELLOW		4	4	10,000					E				$-55°$ TO $+125°C$	10-2,000Hz
GREEN		5	5		±5%				F			500		
BLUE		6	6										$-55°$ TO $+150°C$	
PURPLE (VIOLET)		7	7											
GREY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN				±10%	±10%	±10%	±10%						

TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC.

COLOR	TEMPERATURE COEFFICIENT[4]	1ST SIG FIG.	2D SIG FIG.	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		± 2.0 UUF	CC
BROWN	−30	1	1	10	±1%		
RED	−80	2	2	100	±2 %	±0.25 UUF	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		±5 %	±0.5 UUF	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	±10%		
GOLD	+100					±1.0 UUF	
SILVER							

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF.
2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS: MIL-C-5, MIL-C-25D, MIL-C-11272B, AND MIL-C-10950C RESPECTIVELY.
3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.
4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.

C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS.

ESC-FM 1794-71

Figure 3-9. Resistors, inductors, and capacitors color code marking for MIL-STD resistors, inductors, and capacitors.

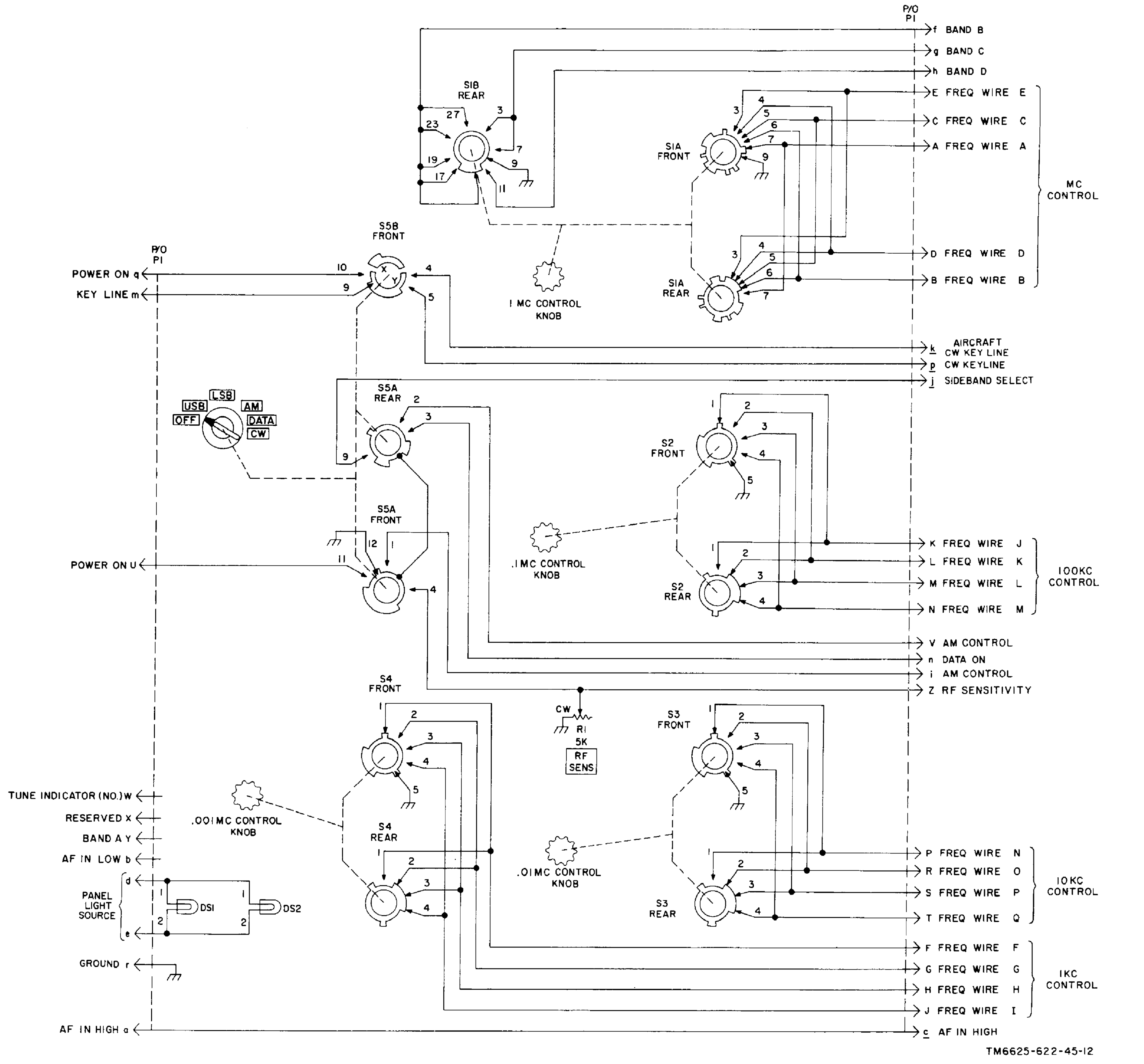


Figure 3–10. Control, Radio Set C–3940/ARC–94, schematic diagram.

Figure 3-11. Test Harness Subassembly, TS-1949/URM-157, schematic diagram.

Figure 3-12. Test Harness Subassembly, TS-1949A/URM-157 schematic diagram.

Figure 3-13. Cables W1 through W13, power cables, and rf cable, schematic diagram.

NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS. THE NUMBER OR LETTER IN PARENTHESES INDICATES THE TERMINAL NUMBER.
2. TO LOCATE CONNECTING POINTS OF WIRES, USE THE METHOD ILLUSTRATED IN THE FOLLOWING EXAMPLE: TO LOCATE THE CONNECTING POINT OF A WIRE MARKED (1) 6, FIND STATION 6; THEN LOOK FOR TERMINAL 1. A WIRE TO TERMINAL 1 WILL BEAR THE SAME COLOR CODE AS THE WIRE THAT IS MARKED (F) 13.
3. WIRES NOT OTHERWISE SPECIFIED ARE UNSHIELDED WIRES, TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED (SOLID IN SOME CASES), 26 GAGE.
4. TA DENOTES UNSHIELDED WIRE, TEFLON (TEF), MIL-W-16878, TYPE E (600 VOLTS) STRANDED (SOLID IN SOME CASES), 22AWG GAGE.
5. BV DENOTES 26 GAGE, UNSHIELDED BUSWIRE, ROUND TINED.
6. BA DENOTES 22 GAGE, UNSHIELDED BUSWIRE, ROUND TINED.
7. SWITCHES VIEWED FROM THE KNOB OR DRIVEN END.
   ○ DENOTES FRONT CONNECTION.
   ● DENOTES REAR CONNECTION.
   ◉ DENOTES FRONT AND REAR CONNECTION.

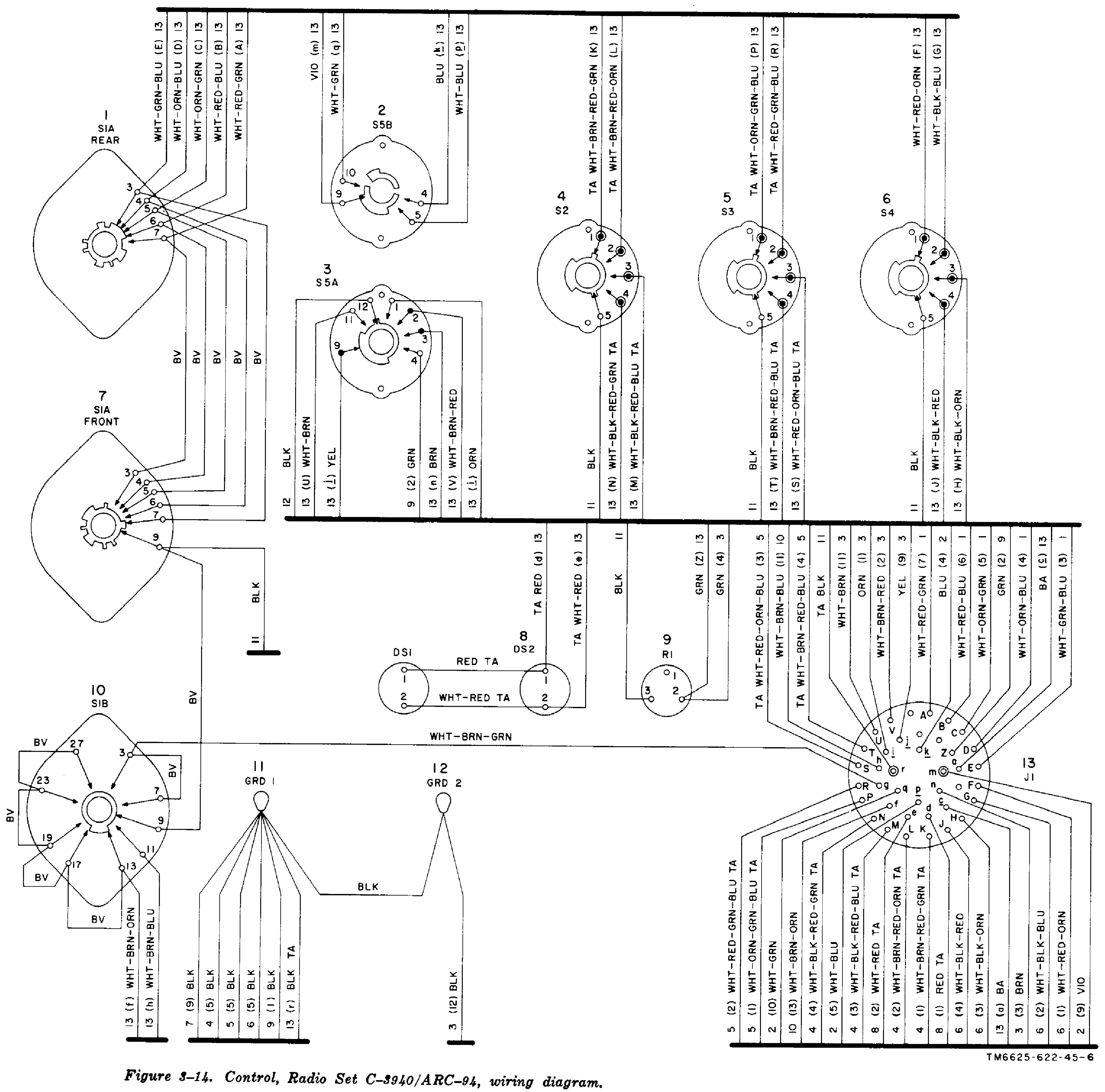


Figure 3-14. Control, Radio Set C-3940/ARC-94, wiring diagram.

NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS. THE NUMBER OR LETTER IN PARENTHESES INDICATES THE TERMINAL NUMBER.
2. TO LOCATE CONNECTING POINTS OF WIRES, USE THE METHOD ILLUSTRATED IN THE FOLLOWING EXAMPLE: TO LOCATE THE CONNECTING POINT OF A WIRE MARKED (1) 13, FIND STATION 13; THEN LOOK FOR TERMINAL 1. A WIRE TO TERMINAL 1 WILL BEAR THE SAME COLOR CODE AS THE WIRE THAT IS MARKED (1) 13.
3. UNLESS OTHERWISE INDICATED ALL WIRES ARE TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 22 AWG.
4. TB INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 20 AWG.
5. TV INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 26 AWG.
6. BA INDICATES BUSWIRE, ROUND TINNED NO. 22 AWG.
7. BG INDICATES BUSWIRE, ROUND TINNED NO. 10 AWG.
8. WG INDICATES TEFLON (TFE), MIL-W-16878, TYPE EE (1000 VOLTS) NO. 10 AWG.
9. ○ INDICATES 22 GAGE TEFLON (TFE) SLEEVING.
10. TD INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 16 AWG.

EL6625-622-45-C2-TM-17

Figure 3-16. Test Harness Subassembly, TS-1949A/URM-157, wiring diagram.

NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS. THE NUMBER OR LETTER IN PARENTHESES INDICATES THE TERMINAL NUMBER.
2. TO LOCATE CONNECTING POINTS OF WIRES, USE THE METHOD ILLUSTRATED IN THE FOLLOWING EXAMPLE: TO LOCATE THE CONNECTING POINT OF A WIRE MARKED (1) 13, FIND STATION 13, THEN LOOK FOR TERMINAL 1. A WIRE TO TERMINAL 1 WILL BEAR THE SAME COLOR CODE AS THE WIRE THAT IS MARKED (1) 13.
3. UNLESS OTHERWISE INDICATED ALL WIRES ARE TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 22 AWG.
4. TB INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 20 AWG.
5. TV INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 26 AWG.
6. BA INDICATES BUSWIRE, ROUND TINNED NO. 22 AWG.
7. BG INDICATES BUSWIRE, ROUND TINNED NO. 10 AWG.
8. WG INDICATES TEFLON (TFE), MIL-W-16878, TYPE EE (1000 VOLTS) NO. 10 AWG.
9. ⊂⊃ INDICATES 22 GAGE TEFLON (TFE) SLEEVING.
10. TD INDICATES TEFLON (TFE), MIL-W-16878, TYPE E (600 VOLTS) STRANDED NO. 16 AWG.

TM6625-622-45-7

Figure 3-15. Test Harness Subassembly, TS-1949/URM-157, wiring diagram.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutunt General

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