TM 11-5820-554-34-8

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

FILTER, RADIO AND INTERFERENCE F-1139/GRC-159(V)
(NSN 5820-00-960-8526)

H E A D Q U A R T E R S , D E P A R T M E N T O F T H E A R M Y
AUGUST 1976

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***TM 11-5820-554-34-8**

TECHNICAL MANUAL
NO.11-5820-554-34-8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *30 August 1976*

Direct Support and General Support Maintenance Manual FILTER, RADIO, INTERFERENCE F-1139/GRC-159(V) (NSN 5820-00-960-8526)

REPORTING OF ERRORS

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 310-3. This technical manual does, however contain information that is essential to the operation and maintenance of the equipment.

***This manual supersedes so much of TM 11-5820-529-14, 21 March 1975, as pertains to direct support and general support maintenance of Filter, Radio Interference F-1139/FRC-159 (V).**

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual covers direct support and general support maintenance for Filter, Radio Interference F-1139/GRC-159(V) (Collins Noise Blanker, Model 136B-2). This manual includes direct and general support for calibration and adjustment of the equipment. The manual also lists tools and test equipment for direct and general support maintenance. The complete manual includes TM 11-5820-554-12.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine if there are current, applicable modification work orders (MWO's) pertaining to this equipment.

1-3. Administrative Storage

Administrative storage of equipment issued to and by Army activities shall be in accordance with TM 740-90-1.

1-4. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-5. Description

A general description of Filter, Radio Interference F-1139/GRC-159(V) is contained in TM 11-5820-554-12.

1-6. Tabulated Data

A list of tabulated data for Filter, Radio Interference F-1139/GRC-159(V) is contained in TM 11-5820-554-12.

CHAPTER 2

INSTALLATION, CIRCUIT FUNCTIONING, AND ALIGNMENT

2-1. Installation

a. Remove the KWM-2/2A from its case as follows:

(1) Remove all external connections at the rear of the transceiver.

(2) Lift the cabinet lid and remove the two Phillips-head screws (between the lid fasteners) that secure the chassis to the case.

(3) Turn the transceiver on one side. Remove the Phillips-head screw and flat washer located at the center between the rear feet. (This screw is not in some transceivers.).

(4) Remove the four Phillips-head screws which secure the mounting feet.

(5) Place the transceiver on its bottom. Gently pull the chassis forward and out of the case.

b. Remove the knob from the RF GAIN control. Unsolder the leads from the RF GAIN control terminals, noting the location of each lead. Remove the control from the front panel.

c. Install the dual control in the RF GAIN control mounting hole, using the nut and lockwasher from the discarded control.

d. Resolder the RF GAIN control leads to the rear section of the dual control, as shown in A, figure FO-2.

e. Solder the two wires, which come out of the existing cable near the RF GAIN control, to the front section of the dual control (fig. FO-2). Install a jumper between wiper and end terminal of the RF GAIN control.

f. Install the clear plastic knob on the large pointer knob on the small diameter shaft of the dual control diameter shaft of the dual control. Install the black. Make sure the bushing is placed over the shaft end before the knob is installed.

g. Connect the 50-ohm RF cable from J26 to the NB ANT connector on the rear wall of the chassis. Solder the shielding to the ground lugs on the connectors. Remove the bus jumper between J22 and J23 (under the chassis).

h. Replace the KWM-2/2A in its case, but do not secure.

i. Mount Filter, Radio Interference F-1139/GRC-159(V) unit inside the top cover as shown in figure FO-2. Use existing holes in the perforated top as mounting holes. After the filter is mounted, check clearance by closing the cover and noting if any part of the filter rubs on the meter shield, C106, PA cage, PA tuning shaft, or vfo tube. If any interference is found, the location of the filter can be adjusted by loosening mounting screws and repositioning.

j. Remove the KWM-2/2A from its case, and insert filter plugs P22, P23, P24, and P26 in the proper jacks as marked on the KWM-2/2A chassis. Connect the KWM-2/2A for operation outside its case.

k. Turn the KWM-2/2A on. Set the EMISSION switch to TUNE. Tune and load the KWM-2/2A into a dummy load at 14.3 MHz. Switch the meter to the GRID position.

l. Make a swamping tool by connecting a 1,000-ohm resistor and a 0.01-uf capacitor in series and connecting clips to their free pigtails. Connect this swamping tool between terminal 3 (secondary winding) of T2 and ground. This terminal is connected to the T2 end of coupling capacitor C25.

m. Keep grid current at approximately midscale or lower by adjusting the MIC GAIN control, and peak the primary of T2 with a tuning tool such as a Walsco 2543. The primary slug of T2 is at the bottom of the can. Use grid current as peak indication.

n. Remove the swamping tool from the secondary of T2, and connect it across the primary of T2 (between pins 1 and 6 of first mixer V5). Peak the secondary of T2 (slug at the top of the shield can). Remove the swamping tool.

o. Retune and reload the KWM-2/2A to 14.255 MHz. Without swamping any of the tuned circuits, peak L4 for maximum grid current indication, keeping grid current at approximately midscale with the MIC GAIN control.

p. Connect an antenna to the NB ANT connector. In a mobile installation, the broadcast receiver antenna may be used (with reduction of filter performance). If the broadcast antenna is used, connect it as shown in figure 6-1, TM 11-5820-554-12. Connect the choke and capacitor as closely as possible to the antenna. These components are not supplied with the filter.

q. After alignment, disconnect the filter plugs from the KWM-2/2A chassis, and secure the KWM-2/2A in its case by reversing the procedures given in *a* above. Reconnect filter plugs P22, P23, P24, and P26 in the proper jacks in the KWM-2/2A chassis.

r. Secure the filter cable to the cover of the KWM-2/2A with nylon clamps (fig. FO-2). Dress the cable across the hinge and down the rear wall of the cabinet. The cable should lie near the chassis between the slug rack and the PA cage (fig. FO-2). This completes the installation.

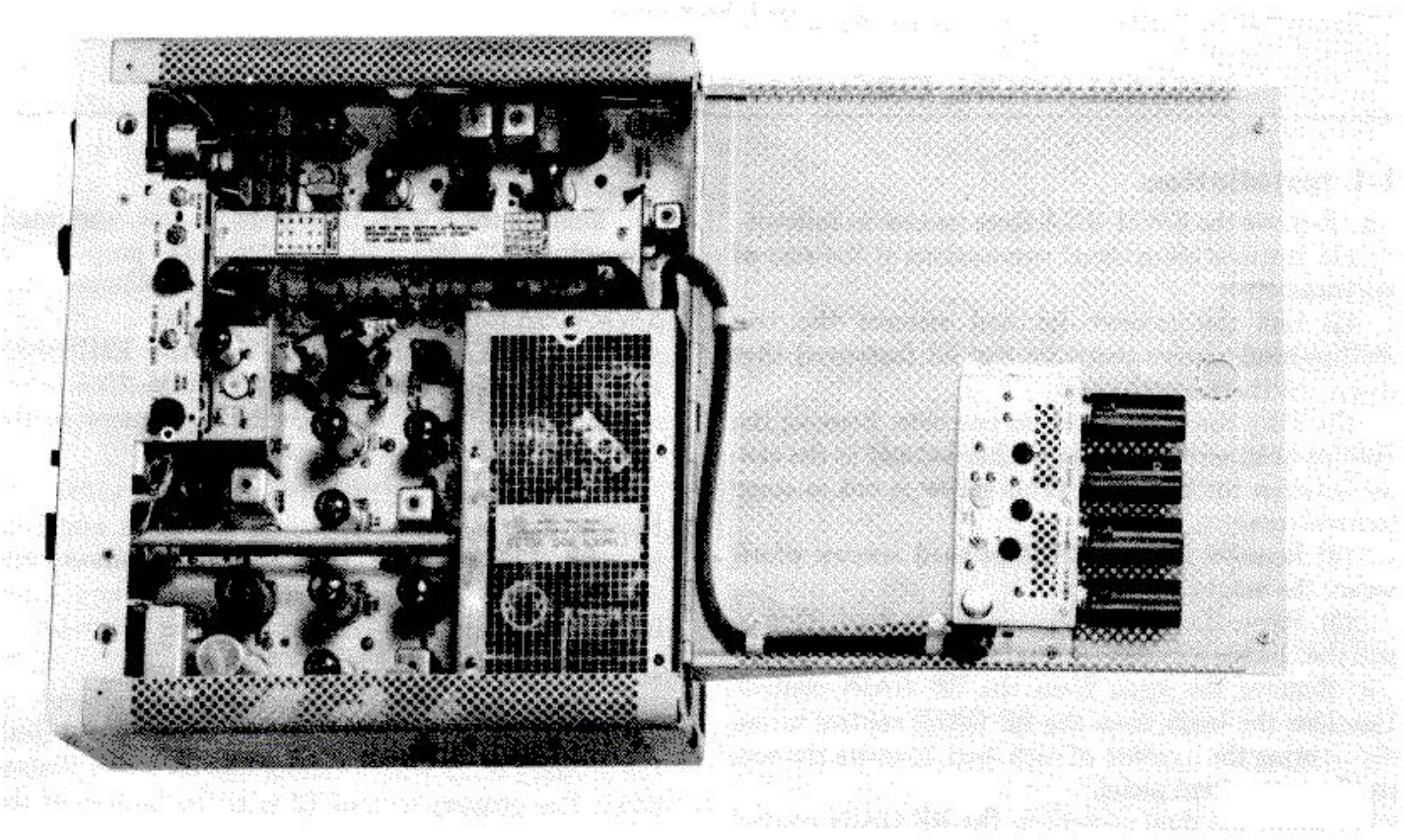

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Figure 2-1. Filter, Radio Interference F-1139/GRC- 159(V).

2-2. Circuit Functioning

(fig. FO-3)

Tube sections V1A, V2A, and V3A are connected as a 40-MHz tuned RF amplifier. The gain of the RF amplifier is controlled by potentiometer R25 in the cathode circuit of V2A. The output of V3A is limited by the action of diode CR8 and tube V3A. The positive component of the signal is clamped to the cathode of V3A. The signal is detected by CR1 and filtered by C15. The combination of C15 and R5 determines the length of the blanking pulse. The audio component of the noise is limited by CR2 and applied to the grid of first pulse amplifier V3B. Any negative portion of the waveform is clipped by CR4. Positive-going square wave pulses from V1B plate are applied through CR7 to the center tap of T1. The bias of CR7 keeps it cut off and at a high impedance to the low level pulses, but high level pulses overcome the bias and pass into the gate circuit. Gating diodes CR5 and CR6 are biased to conduction for normal noise-free operation. However, when a high amplitude noise burst occurs, the positive going pulse passes through CR7 and cuts off both CR5 and CR6. This action effectively disconnects the variable IF signal for the period of the blanking pulse. The length of the blanking pulse varies from a few microseconds to a maximum of 30 microseconds. Blanking pulse length is governed by the magnitude of the noise pulse appearing at the filter antenna. For short duration noise disturbances in the variable IF, the blanking pulses are short, while greater noise bursts develop longer blanking pulses. Transformers T1 and T2 and the gating diodes are arranged in a balanced modulator configuration so that any noise which results from the gating action is canceled and prevented from entering the receiver circuits. Any discontinuity of signal resulting from the gating action is compensated by tuned circuit restoration in the following stages of the receiver. Both sections of V4 serve to isolate the noise-operated gate circuit from the receiver circuits. Variable IF amplifier V4A provides only enough gain to compensate for the small loss in the gate circuit, so that overall gain through the filter is approximately unity. Filament power, B+ power, and bias voltage are taken from the KWM-2/2A power supply.

2-3. Alignment

The filter is factory-aligned and will not need realign-

ment when installed in the KWM-2/2A. Tubes may be replaced in the filter without necessity of realignment or readjustment. If major repairs are made to the filter, it should be realigned. Test equipment necessary for RF alignment and gate balance adjustments of the filter consist of Signal Generator AN/GRM-50C, Multimeter AN/USM-223, and a noise source. An ordinary doorbell buzzer or electric razor makes an excellent noise source for adjusting the filter. If the filter is to be used for mobile operation, use the idling engine as a noise source. Couple to the filter by winding an insulated wire around the voltage regulator and spark plug leads.

NOTE

Broadband operation of the filter is necessary for proper operation. DO NOT attempt front end alignment for sharp response.

a. RF Alignment.

(1) Connect the signal generator (50-ohm output impedance) to the coaxial lead marked J26 (filter RF input). Set the generator output to 200 microvolts.

(2) Set the multimeter to a low scale and zero the meter. Connect the probe between the detector test point and ground.

(3) Set the signal generator output to 40.0 MHz (unmodulated), and increase the generator output until an indication is obtained on the multimeter. If a full scale indication results on a -1-volt scale with less than 200-microvolt input signal, the filter may be oscillating. The filter receiver is designed for broadband operation. If the coils are sharply peaked, oscillation can result. If this happens, detune L3 or L4 until oscillation ceases.

(4) Adjust L1 and L4 for maximum indication on the multimeter. Reduce generator output as necessary to keep the multimeter indication between 0 and 1 volt d.c.

(5) Set the signal generator to 40.3 MHz and peak L3.

(6) Set the signal generator to 39.7 MHz and peak L2.

(7) Repeat the alignment of L1 through L4 to assure optimum bandpass. When the generator frequency is moved from 41 MHz to 39 MHz, the detector output voltage, indicated on the multimeter should vary smoothly from maximum at 40 MHz to a smaller value on either side. Any peaks between 40 and 39 or 40 and 41 MHz indicate oscillations. If this occurs, repeak L2 at 39.5 MHz and L3 at 40.5 MHz.

b. Gate Balance.

(1) Disconnect the KWM-2/2A antenna and leave the filter antenna connected. Leave the KWM-2/2A turned on.

(2) Turn on the noise source and loosely couple it to the filter antenna.

(3) Adjust gate balance potentiometer R32 and variable capacitor C28 for minimum noise output from the KWM-2/2A speaker. These two adjustments are interactive. First adjust one and then the other until neither produces any appreciable reduction in output noise.

CHAPTER 3

DIRECT SUPPORT TROUBLESHOOTING PROCEDURES

3-1. General Instructions

a. Troubleshooting at direct support maintenance category includes all techniques outlined for organizational maintenance and special techniques required to isolate a defective part. The direct support maintenance procedures are not complete in themselves, but supplement the procedures described in operator and organizational maintenance (TM 11-5820-554-12). The systematic troubleshooting procedure, which begins with operational checks performed at an organizational category, must be completed by further localizing techniques.

b. Some troubleshooting procedures may be performed while the filter is operating as part of a system or, if necessary, after it has been removed from service. When trouble occurs, certain observations and measurements can be made which will help in determining whether the local equipment is at fault or if trouble exists elsewhere in the system.

3-2. Organization of Troubleshooting Procedures

a. General. The first step in servicing a defective equipment is to sectionalize the fault to a major component. The second step is to isolate the fault to a defective stage. The third step is to isolate the fault by tracing it to the defective part. Some faults, such as burned-out resistors and, leaking capacitors, can often be isolated by sight or smell. The majority of faults, however, must be isolated by checking voltages and resistances.

b. Sectionalization Check. After the trouble has been isolated to the filter by an operational check, perform the transmitter and receiver tuning procedures listed in TM 11 - 5820-554-12.

c. Isolation.

(1) *Voltage and resistance measurements.* Table 3-2 contains voltage and resistance information. Refer to figure FO-1 for resistor, capacitor and inductor color codes.

(2) *Intermittent troubles.* In all tests, the possibility of intermittent trouble should not be overlooked. If present, this type of trouble may be made to appear by tapping or jarring the unit under test. Circuit components are shown in figures 3-1, 3-2, and 3-3.

3-3. Tools, Test Equipment, and Materials Required

Table 3-1 contains a list of the tools and test equipment required for direct support maintenance of Filter, Radio Interference F-1139/GRC-159(V). In addition, the associated technical manual is listed, where applicable. No special materials are required for direct support maintenance.

Table 3-1. Tools and Test Equipment Required

Equipment item	*NSN*	*Qty*	*Applicable literature*
Tool Kit, Electronic Equipment TK -105/G	5180-00-610-8177		
Multimeter ME-26(*)/U	6625-00-913-9781	1	TM 11-6625-200-15
Generator, Signal AN/GRM-50C	6625-00-003-3238	1	TM 11-6625-573 14
Power Supply PP-4151/FRC-93	5820-00-034-4239	1	TM 11-5820-554-12
Test Set, Electron TubeTV-7D/U	6625-00-820-0064	1	TM 11-6625-274-12
Receiver-Transmitter RT -718/FRC-93	5820-00-082-4080	1	TM 11-5820-554-12
Counter, Digital Readout Electronic AN/USM-207A	6625-00-044-3228	1	TM 11-6625-700-10
Dummy Load, Electrical DA-75/U	6625-00-177-1639	1	

3-4. Troubleshooting Procedure

Troubleshooting the F-1139/GRC-159(V) consists of voltage and resistance measurements.

a. Table 3-2 lists the dc voltage and resistance measurements on all tube sockets of the F-1139/GRC159(V).

b. All measurements are made with a vtvm with all tubes in sockets.

c. Resistances of less than 1 ohm are listed as zero.

d. All measurements are made from socket pin to ground.

e. Double values of resistance on pins 1 and 9 of V2 and V3 are caused by diodes in the circuit and the polarity of the ohmmeter used.

Table 3-2. Dc Voltage and Resistance Measurements

Tube		Pin number								
		1	2	3	4	5	6	7	8	9
V1	Dcv Ohms	100 50k	0 0	110 110K	0 0	 0	.195 30K	2.2 500	2.6 500	0 1.0Meg
V2	Dcv Ohms	135 45K/70K	0 4.7K	*110 **210 105K	0 0	0 0	205 25K	*2.2 **15.0 *500 **35K	4.5 3.0K	0 500/200K
V3	Dcv Ohms	40 60K	0 10K	115 100K	0 0	0 0	220 25K	2.6 100/500	0 0	-.5 10K/16K
V4	*Dcv* Ohms	135 45K	0 0	130 90K	0 0	0 0	225 25K	3.0 500	14 3.0K	11 100K

*Maximum RF gain
**Minimum RF gain

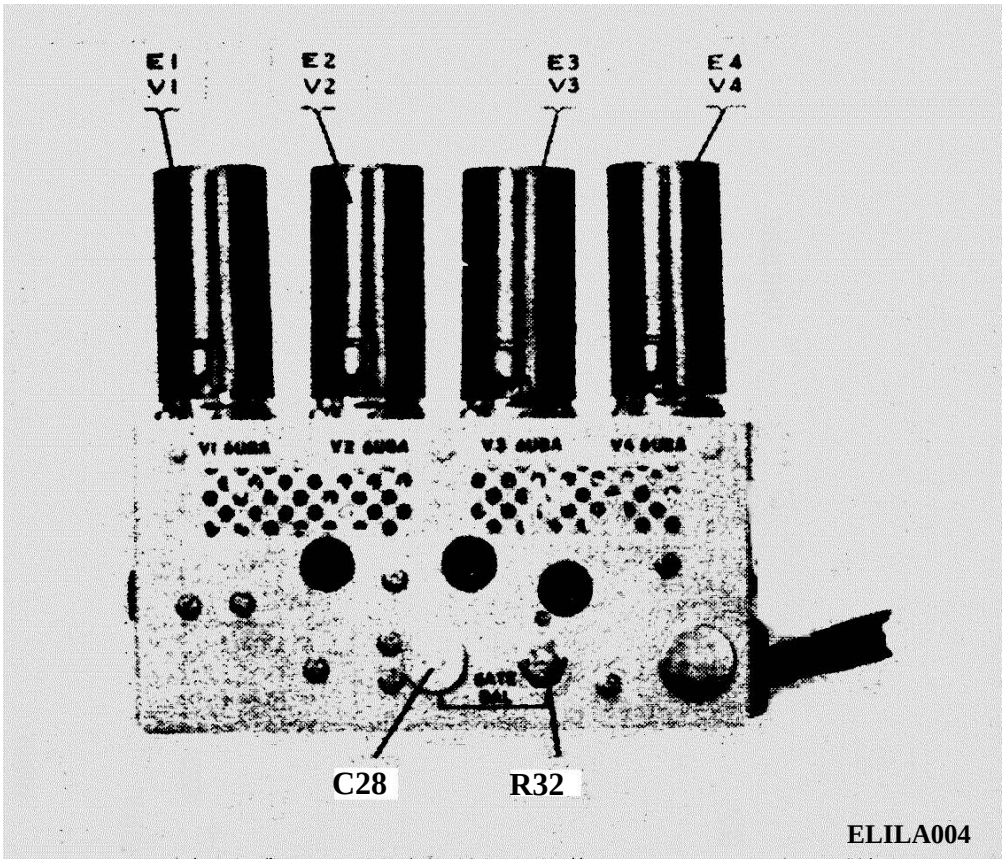

Figure 3-1. Filter, Radio Interference F-1139/GRC-159(v), top view parts location.

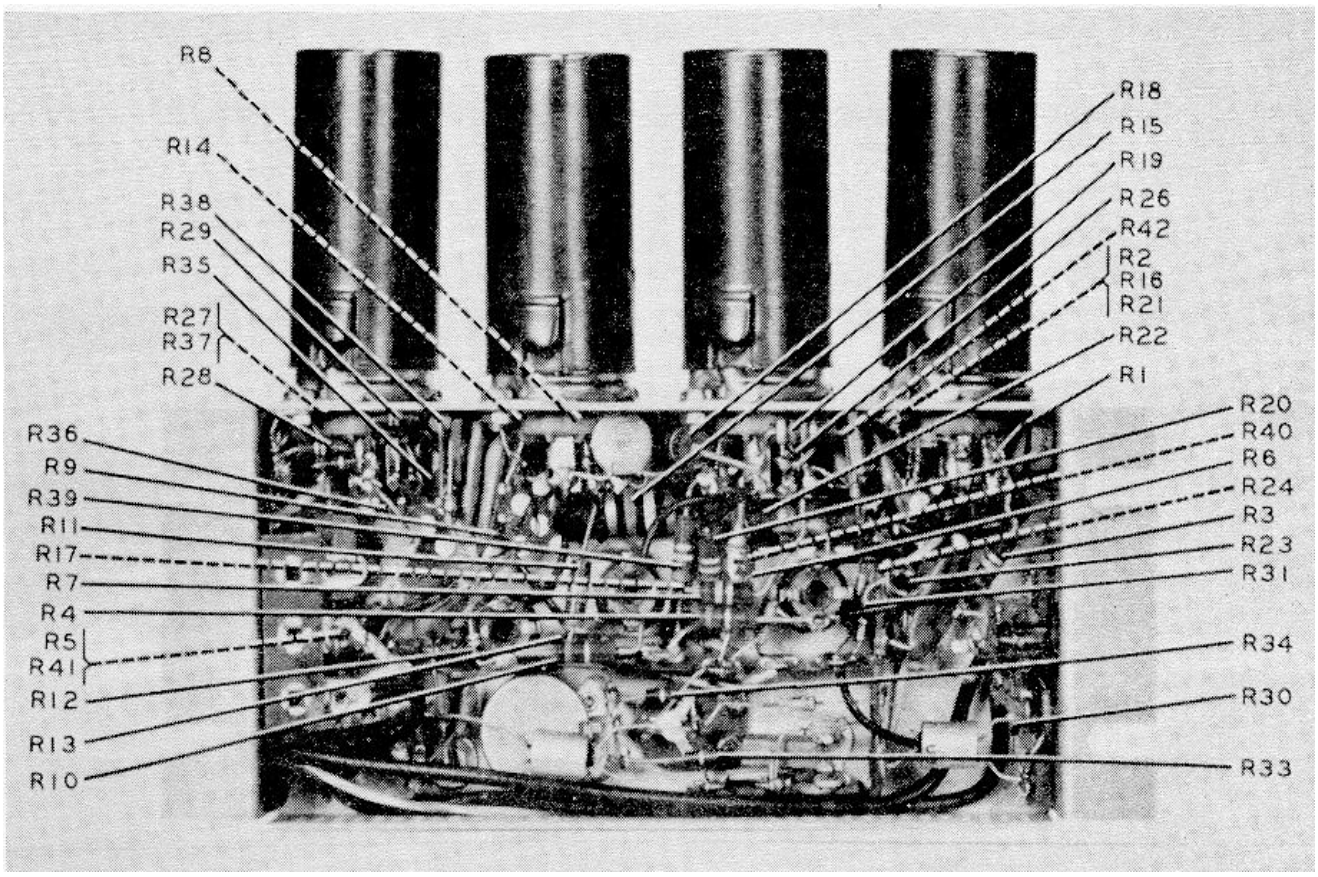

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Figure 3-2. Bottom view, resistor location.

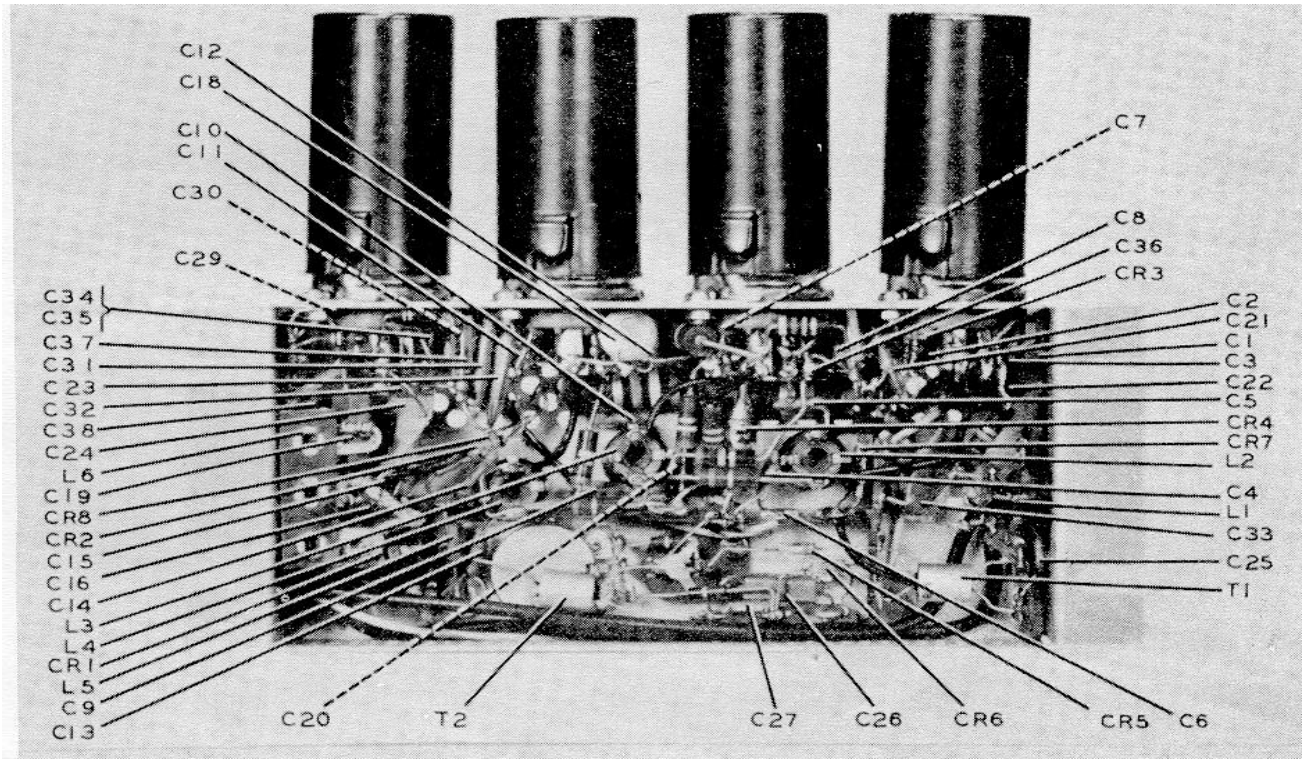

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Figure 3-3. Bottom view, location of capacitors, transformers, coils, and diodes.

APPENDIX A

REFERENCES

DA Pam 310-4	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 Index of Current Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TB SIG 222	Solder and Soldering.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 11-5820-554-12	Operator's and Organizational Maintenance Manual for Radio Set AN/FRC-93 (NSN 5820-00-082-4276).
TM 11-6625-200-15	Operator's, Organizational, DS, GS, and Depot Maintenance Manual: Multimeters ME-26A/U, ME-26B/U, ME-26-C/U, and ME-26D/U.
TM 11-6625-274-12	Operator's and Organizational Maintenance Manual: Test Sets, Electron Tube TV-7/U, TV-7A/U, TV-7B/U, and TV-7D/U.
TM 11-6625-654-14	Operator's, Organizational, Direct Support, and G eneral Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for Multimeter AN/USM-223.
TM 11-6625-700-10	Operator's Manual: Digital Readout, Electronic Counter AN/USM-207.
TM 38-750	The Army Maintenance Management System (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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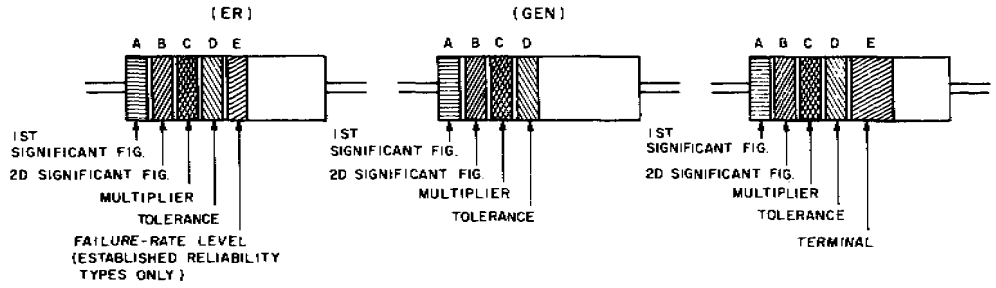


COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

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		SOLDERABLE
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	0.01					
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.

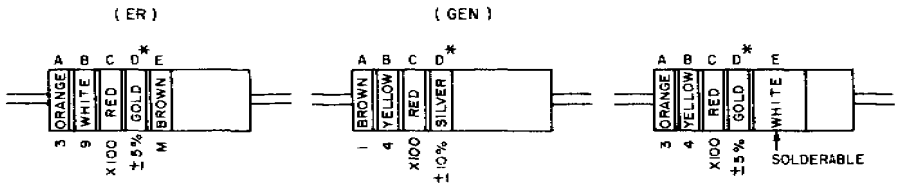
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS
(THESE ARE NOT COLOR CODED)

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

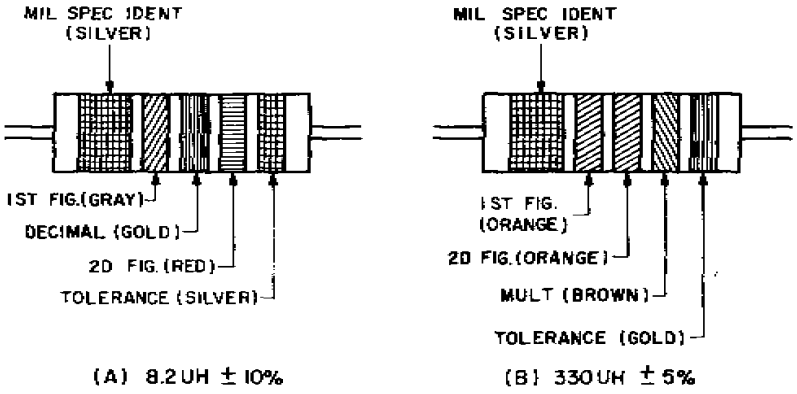
COMPOSITION-TYPE RESISTORS

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.

Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.



COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8.2 UH 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	SIGNI-FICANT 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.

Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.

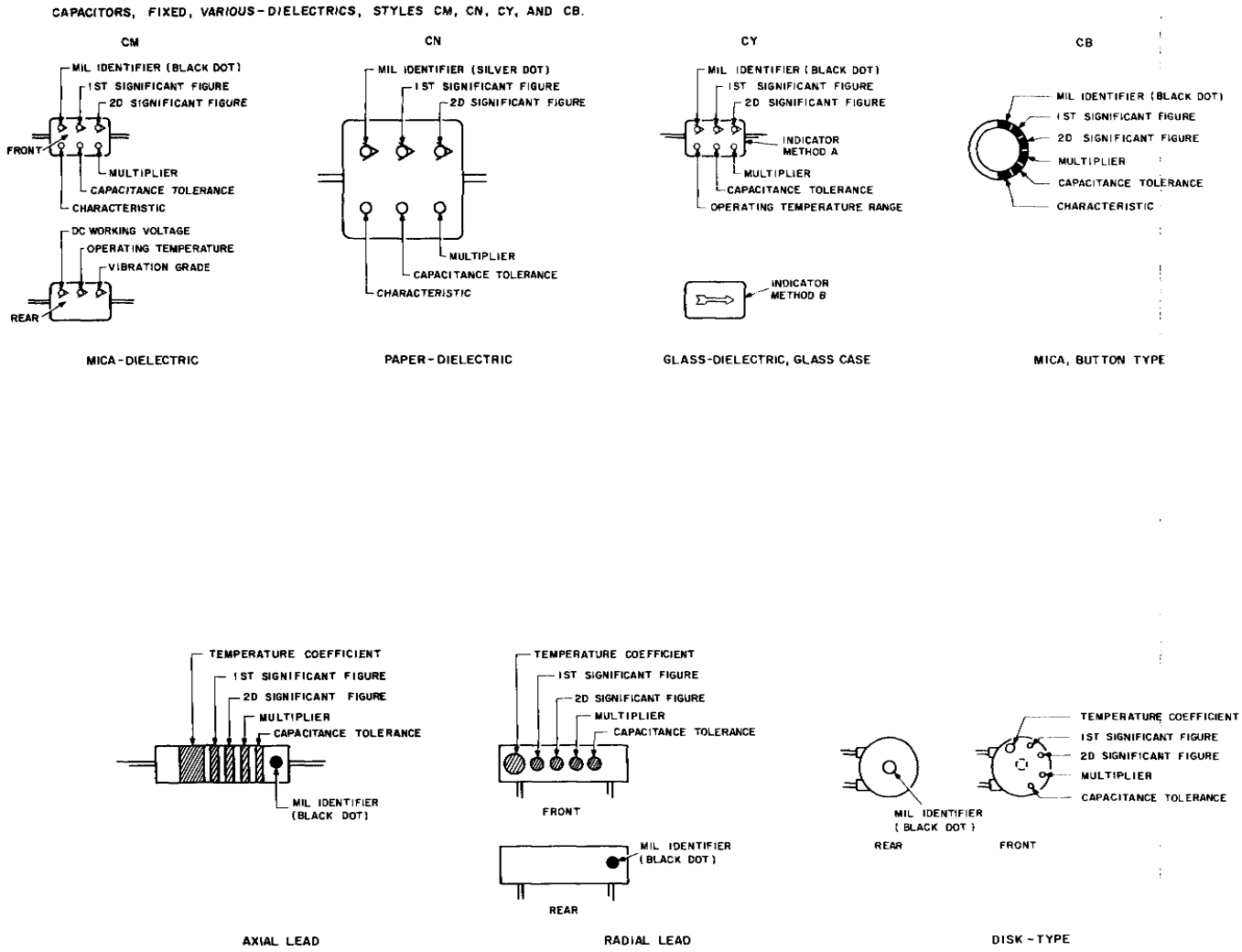


Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.

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											
GRAY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN			0.01	±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				
GRAY		8	8	0.01*			
WHITE		9	9	0.1*	±10%		
GOLD	+100			0.1		±1.0 UUF	
SILVER				0.01			

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.

* OPTIONAL CODING WHERE METALLIC PIGMENTS ARE UNDESIRABLE.

ESC-FM 913-73

C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS.

Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.

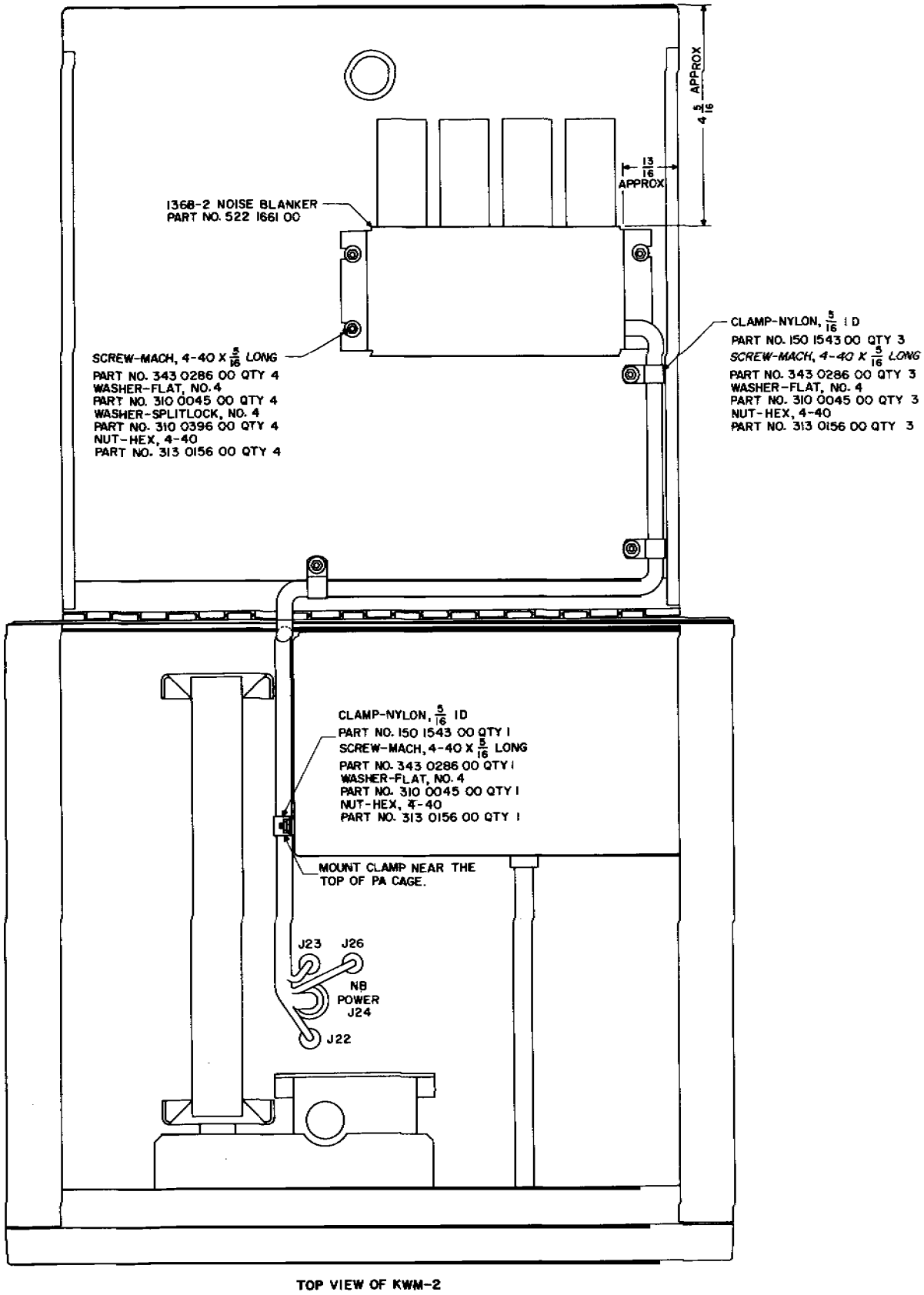


Figure FO-2. Filter, Radio Interference F-1139/GRC-159(V), installation diagram

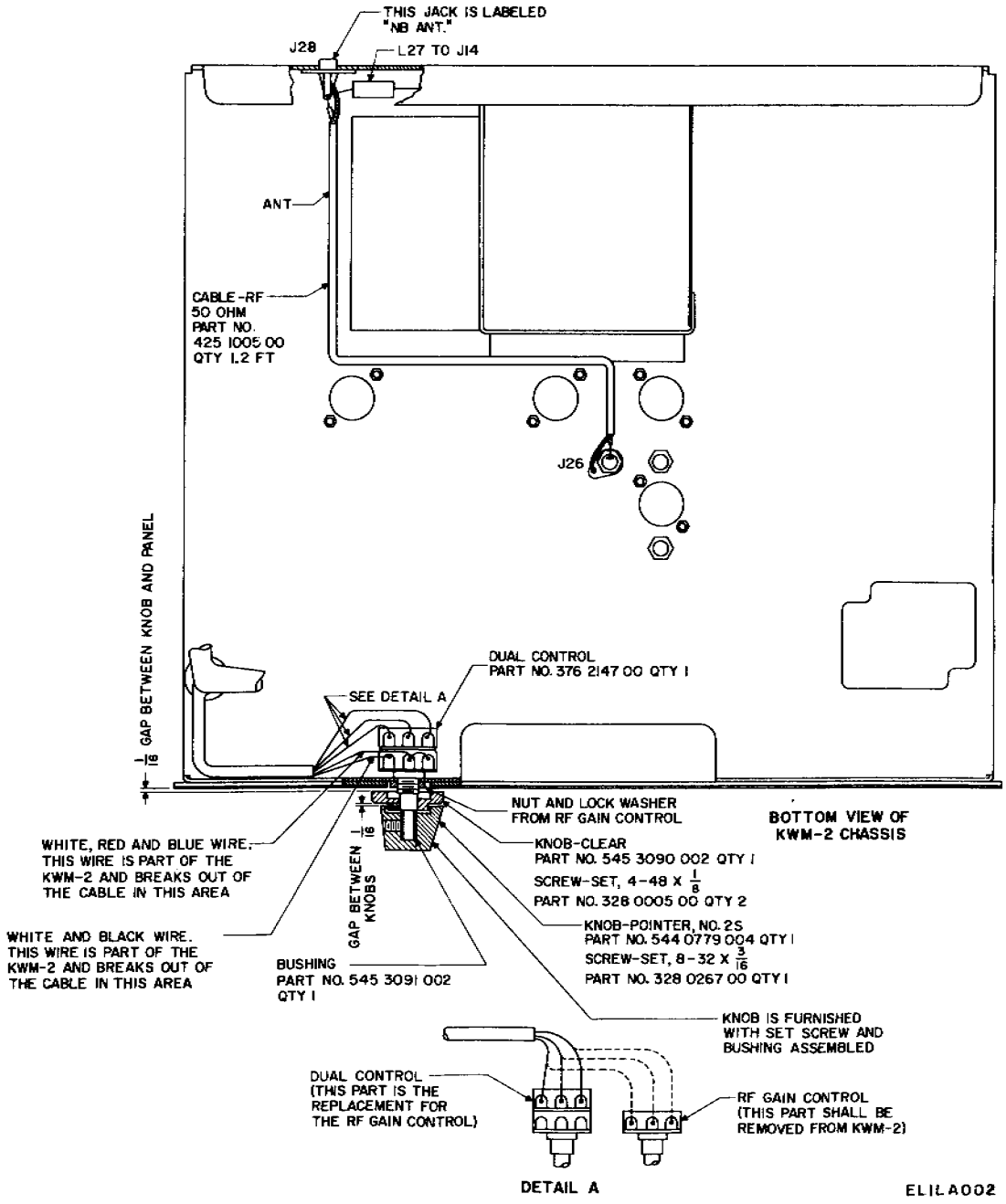


Figure FO-2. Filter, Radio Interference F-1139/GRC-159(V), installation diagram

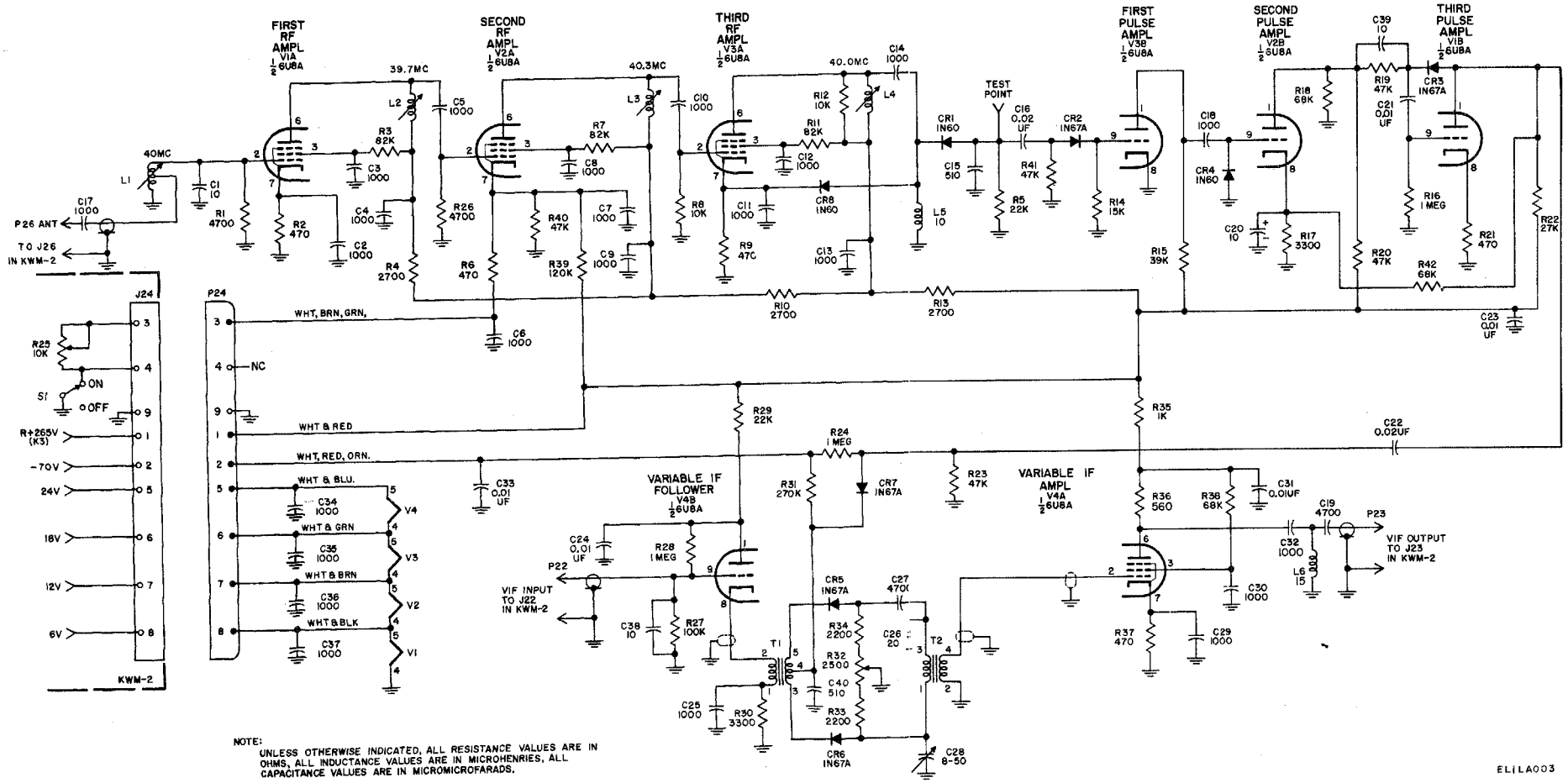


Figure FO-3. Filter, Radio Interference F-1139/GRC-159(V), schematic diagram

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