

National Security Agency
Fort George G. Meade, Maryland

MX-2840/URR



MX-2840/URR

AUDIO FREQUENCY DETECTOR

OCTOBER 1962

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NATIONAL SECURITY AGENCY
Fort George G. Meade, Maryland

October 1962

The instruction manual for the MX-2840/URR is published for the information and guidance of all concerned.

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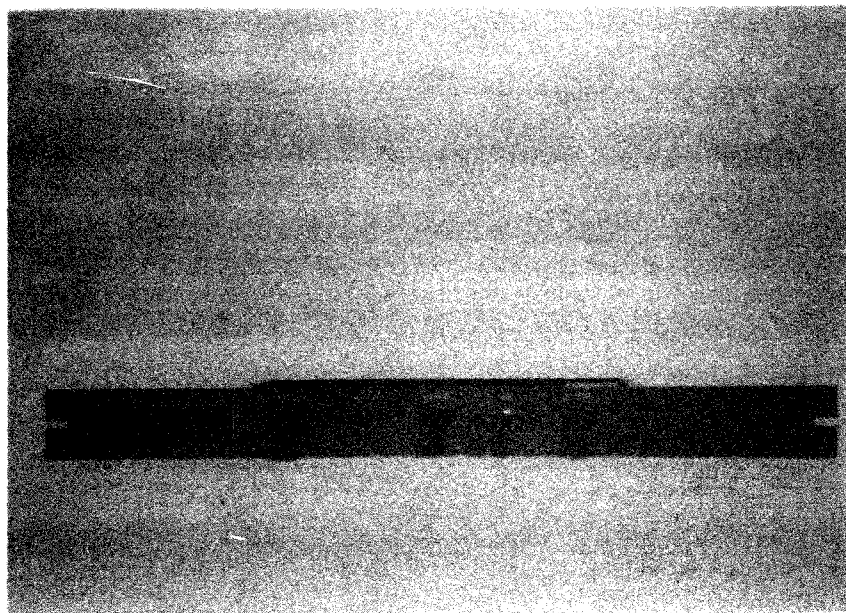


Figure 1 - Front View, MX-2840/URR

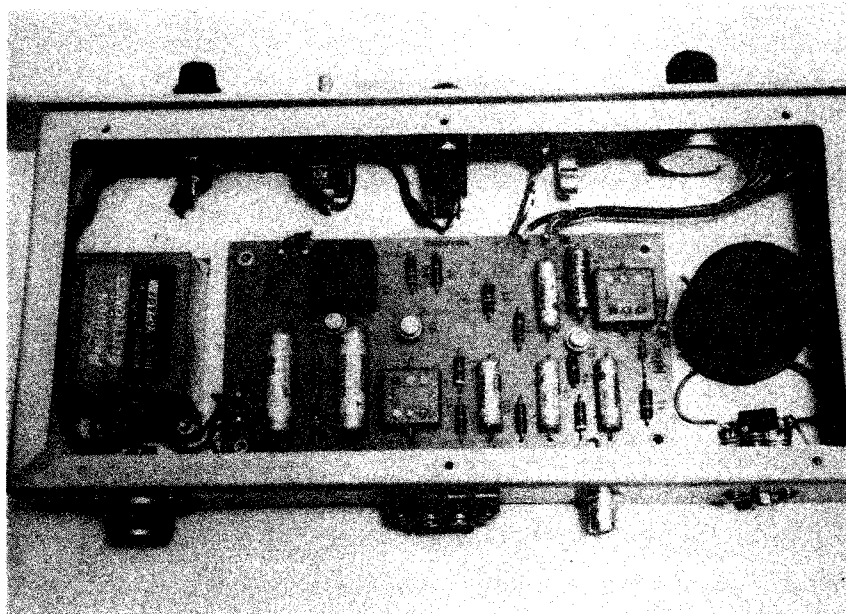


Figure 2 - Topview, MX-2840/URR

CHAPTER I

INTRODUCTION

SECTION 1000 - GENERAL

1001. SCOPE

- a. This Technical Manual contains instructions for the installation, operation, maintenance, and repair of the MX-2840/URR Audio Frequency Detector. The equipment is shown in Figure 1 and 2.
- b. This manual covers the operation of Audio Frequency Detectors having the designation MX-2840/URR, Serial Nos. 15 through 39. The Detectors are used to convert the I.F. Output (455KC), of Receiver R 390A/URR, to an audio output.
- c. Unless otherwise specified, all references to the left, right, front, and back apply to the Detector in operating position, with the observer facing the Detector.

1002. CLASSIFICATION - This manual and the equipment to which it refers is unclassified.

SECTION 1100 - DESCRIPTION AND DATA

1101. PURPOSE AND USE -The MX-2840/URR operates from the I.F. output of the R 390A/URR Receiver; it detects the Audio Frequency contained in the modulated carrier and transposes this to an intelligible audio output. The VOLUME CONTROL, front panel left, enables the operator to obtain a desired audio level output to the head set or to a utility speaker which may be connected to TB2, located at the rear center of the MX-2840/URR.

1102. TECHNICAL CHARACTERISTICS

- (1) Input connector: BNC connector (J1)
- (2) Output connectors: Headphone Jack (J2) and Terminal Board (TB2)
- (3) Input signal: 455 KC
- (4) Output signal: Audio frequency
- (5) Power input: 110 - 125 VAC
- (6) Power consumption: 50 ma.at 117 VAC

1103. PACKAGING DATA -When packed for export shipment, the components of the MX-2840/URR are contained in one cardboard box which is then enclosed with several other MX-2840/URR and enclosed in one wooden box. Each cardboard box contains the following:

- 1 - MX-2840/URR
- 1 - Signal input cable
- 1 - Power cable
- 2 - Technical manuals
- 1 - Equipment spare parts kit

1104. DESCRIPTION - The MX-2840/URR Audio Frequency Detector Unit consists of one chassis as shown in Figure 2. The MX-2840/URR is a rack-mounted unit consisting of a front panel fastened to a box type chassis and dust cover top. This unit may be used in conjunction with any Receiver having a 455 KC I.F. output, 50 ohms impedance.

The enclosed chassis contains a printed circuit board, I.F. and Power Transformers with their associated components and wiring.

CHAPTER II

OPERATING INSTRUCTIONS

SECTION 2000 - SERVICE UPON RECEIPT

2001. GENERAL - When the MX-2840/URR is received, select a location where it may be unpacked without exposure to the elements, and which is convenient to the permanent or semi-permanent installation.

2002. UNCRATING AND UNPACKING NEW EQUIPMENT.

- a. General. The equipment may be shipped in overseas packing cases or in domestic packing cases.

NOTE: Because of the small size of the MX-2840/URR equipment, in general, more than one equipment will be shipped in each wooden box.

Step-by-Step Instructions for Uncrating and Unpacking Equipment

- (1) Place the packing case as near the operating position as convenient.
- (2) Cut and fold back steel straps.
- (3) Remove nails with a nail puller. Remove the top and one side of the packing case. Do not attempt to pry off the top and sides; the equipment may be damaged by the lever.
- (4) Remove the moisture proof barrier covering the equipment inside the container.
- (5) Open the moisture-proof-vapor-proof cloth bag.
- (6) Lift the equipment out and place on the work bench or near its final location.

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(7) Inspect the equipment for possible damage incurred during shipment.

NOTE: Save the original packing case and containers for both domestic and export. They can be used again when the equipment is repacked for storage or shipment.

2003. INSPECTION OF NEW EQUIPMENT.

- a. Visually inspect each unit of the equipment as it is unpacked, for any apparent damage. Check for loose parts and for mechanical operation.
- b. Check each unit against the packing list included with the equipment.

2004. PRE-INSTALLATION CHECK - No pre-installation check is required for the MX-2840/URR with the exception of a visual examination.

2005. CONNECTIONS AND INSTALLATION - Interconnect and install the MX-2840/URR as follows:

a. Connections

At the rear of the chassis are located two input connectors, J1 signal input, J3 power input. See Figure 4.

b. Installation

- (1) Mount the MX-2840/URR in the space allocated in the system rack.
- (2) Connect the Receiver R 390A/URR I.F. output (J116) to the signal input, located at the rear of the MX-2840/URR (J1).
- (3) Connect J3 power input cable to 117 VAC power source.

SECTION 2100 - CONTROLS

2101. CONTROLS. -The following controls are provided, See Figure 1:

a. Front Panel Controls

1 - Power ON switch

1 - VOLUME control knob

SECTION 2200 - OPERATION OF EQUIPMENT

2201. OPERATION INSTRUCTION - The MX-2840/URR Audio Frequency Detector is used in conjunction with the R 390A/URR Receiver. The Detector has just two controls; (1) Power ON Switch, and (2) Volume Control Knob, so the operator can set the audio to any desired level.

2202. STARTING PROCEDURE - The following is the procedure for setting up the MX-2840 equipment in operation with the R 390A Receiver:

- a. Ascertain that the I.F. input cable W1 is connected between the Receiver I.F. output (J116), and the MX-2840 I.F. input (J1), and that power cable W2 is connected to 117 VAC power line.
- b. Rotate the VOLUME CONTROL knob on the front panel of the detector counterclockwise as far as it will go.
- c. Tune the R 390A until an AM signal is properly centered in the I.F. passband.

NOTE: For proper operation and tuning of the R 390A, see TM11-856A,-
Radio Receiver R-390A/URR.

- d. With the Audio Detector connected to either headphones via J2 or to a speaker through TB2, rotate VOLUME CONTROL (R4) for the desired audio level.

CHAPTER III

THEORY

SECTION 3000 - FUNCTION THEORY

3001. GENERAL -The MX-2840/URR Audio Frequency Detector equipment contains three basic sections. (1) Power Supply, (2) I.F. Detector circuitry, and (3) The Audio Amplifier Section. The basic functional theory is as follows: The Power Supply section, containing Q1, supplies a regulated -8 VDC to drive the active circuitry. The I.F. Detector network blocks the Intermediate Frequencies and passes the Audio Frequencies. The Audio Amplifier section, amplifies the audio signals and drives either a speaker or a pair of headphones.

SECTION 3100 - CIRCUIT ANALYSIS

3101. POWER SUPPLY - (See Figure 6, Schematic Diagram) The -8 volt power supply utilizes a conventional half wave rectifier (CR1). The rectifier is followed by a capacitor input filter C1. The unregulated D. C. voltage is coupled to the collector of series regulating transistor (Q1). R1 and R2 form a voltage divide and a source of base drive. Values were selected so that the base of Q1 sits about -8.2 volts, allowing for the base to emitter drop, the output is -8 volts as required. C2 provides additional filtering for the base, keeping the voltage to the base more constant for input variations. The regulator is designed to provide ripple reduction, low output impedance, and stability against changes in input and output load.

3102. I.F. INPUT -(See Figures 5 and 6)

The signal input to the Audio Detector is coupled through a BNC connector (J1), directly to the I.F. transformer (T2). The output signal developed across the secondary winding of T2 is connected to detector CR2. The tank circuit composed of the secondary winding of T2, C3, and C4 is tuned to 455 KC. The Q of this circuit limits the bandwidth by attenuating all signals outside the band $455 \text{ KC} \pm 6 \text{ KC}$. When the 455 KC I.F. signals developed across the secondary winding of T2 are negative, the diode is an open circuit to the signal. When the polarity reverses and the positive peaks are applied to the anode of CR2, the diode will conduct, and current will flow through the secondary windings of T2, through the diode, and through R3 to ground. C5 filters the I.F. signals from the detected audio by shorting them to ground. The audio signals are coupled to the base of Q2 through C6 and volume control R4.

3103. AUDIO AMPLIFIER -(See Figure 6, Schematic Diagram)

The purpose of these two stages is to amplify the audio signals and be capable of

driving one mw into 600 ohms. Volume Control R4 limits the amount of base drive to Q2, and thus controls the output drive to T3. Voltage divider R5 and R6 biases one end of the potentiometer to -0.67 volts, keeping transistor Q2 in its conducting region. The amplifier signal is developed across R7, and is coupled directly to the base of Q3 through C9. R10 and R11 bias the base of Q3 to approximately -one volt. The collector load for Q3 is the primary of T3. Signals are inductively coupled to the secondary to drive either a 600 ohm load connected to TB2, or headphones via J2. The emitters of Q2 and Q3 are biased by R8 - R9 and R12 - R13 respectively. C8 and C10 are the respective by-pass capacitors.

AUXILIARY EQUIPMENT

SECTION 4000 - INPUT AND OUTPUT EQUIPMENTS

4001. INPUT EQUIPMENT. -The R390/URR or R390A/URR Radio Receiver equipment supplies the input signal to the MX-2840/URR. The 455 KC I.F. output (J116) is located on the rear apron of the R390/URR and R390A/URR Receivers.

4002. OUTPUT EQUIPMENT. -The output of the MX-2840/URR is audio to drive either a 600 ohm load via TB2 or headphones - J2.

CHAPTER V

GENERAL MAINTENANCE

SECTION 5000 - FIELD MAINTENANCE INSTRUCTIONS

5001. SCOPE

- a. The troubleshooting and repair work that can normally be performed in the field is necessarily limited in scope by the tools, test equipment, and replacement parts available. Because of the construction used in the MX-2840/URR, and its relative simplicity, any and all repairs can be made in the field, providing the replacement parts are available.
- b. The paragraphs which follow will help in determining which section or sections of the circuitry are at fault and in localizing the fault of that component to the defective item; such as a fuse, a diode, or a transistor.

5002. VISUAL INSPECTION - Failure of this equipment to operate properly will usually be caused by one or more of the following faults:

- a. Improperly connected line cord.
- b. Worn, broken, or disconnected cords or plugs.
- c. Burned out fuse.

When failure is encountered and the cause is not immediately apparent, check the above items before starting a detailed examination of the components of the equipment.

5003. TROUBLESHOOTING PROCEDURES - The first step in servicing electronic equipment is to sectionalize the fault. Sectionalizing means tracing the fault to the major unit or circuit responsible for the abnormal operation. The second step is to localize the fault. Localization means tracing the fault to be defective part

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responsible for the abnormal condition. Some faults, such as burned out resistors, can be located by sight or smell. The majority of faults, however, must be localized by checking voltage and/or resistance.

5004. TEST EQUIPMENT - Test equipment required to check and service the MX-2840/URR consists of an Oscilloscope, and AC VTVM, a DC VTVM, and a R390/URR Receiver.

5005. GENERAL PRECAUTIONS - Whenever the MX-2840/URR is serviced, observe the following precautions in the replacement of components. Careless replacement of components makes new faults inevitable.

- a. When removing electrical connections, be sure to tag the leads for correct reassembly. Be careful not to damage connections when working on adjacent parts.
- b. Be careful when soldering electrical connections, since a poorly soldered joint is one of the most difficult faults to locate.
- c. While making repairs do not allow drops of solder to fall on any part of the chassis.
- d. Always replace top cover after servicing to prevent foreign material from falling into the chassis.

5006. POWER SUPPLY TEST.

- a. Connect the MX-2840 to a line voltage of 117 V RMS.
- b. Switch the power toggle switch to the ON or up position.
- c. Check for a -8 volts at the emitter of Q1.

5007. I.F. TRANSFORMER TEST.

- a. Connect the 455 KC I.F. output of the R390/URR Receiver to input J1 on MX-2840.
- b. Move the BANDWIDTH KC knob on the R390/URR Receiver to the 0.1 KC position.
- c. With the AC VTVM (response of this meter must include frequencies of 455 KC or higher) connected between point E1 on the printed wiring board and ground, adjust C4 for maximum reading on the VTVM. This centers the passband of the input transformer around 455 KC. If a maximum can be seen on the meter by tuning C4, the input circuitry is working properly.

5008. AUDIO AMPLIFIER TEST.

- a. Connect the LOCAL AUDIO output, terminal, 6, on the rear apron of the R390/URR, through a 47K ohm, 1/2w resistor to terminal E2 on the MX-2840 printer circuit board. Rotate VOLUME CONTROL (R4) of the MX-2840 to the extreme counterclockwise position. Connect terminal 7 on the rear of the R390/URR to ground of MX-2840 chassis.
- b. While monitoring the audio output of the R390/URR, tune for an intelligible signal. Adjust GAIN controls for desired audio level.
- c. To verify the audio portion of the MX-2840 is working correctly, connect headphones to J2. Rotate R4 clockwise until desired audio is obtained. If when rotated fully clockwise signal cannot be heard, trouble is in audio portion of MX-2840.

5009. TROUBLESHOOTING VOLTAGE CHART (TABLE 5-1).

This chart is supplied as an aid in locating trouble in the equipment. It gives the voltage to ground of all transistor leads and bias levels. After tracing the trouble to a particular circuit as outlined in the previous paragraphs, comparison of the chart values with the actual values at the time of trouble will quickly localize the trouble to the faulty component(s).

TABLE 5 - 1

TROUBLESHOOTING VOLTAGE CHART

NOTE: The following measurements were made with no signal input, 600 ohm load on T3, R4 rotated fully clockwise, 117 VAC input to J3 with a VTVM.

Item	Pin	Voltage	Function
Q1	C	-9.4 DC	Collector
	B	-8.4 DC	Base
	E	-8.2 DC	Emitter
Q2	C	-6.1 DC	Collector
	B	-0.48 DC	Base
	E	-0.4 DC	Emitter
Q3	C	-8.0 DC	Collector
	B	-1.1 DC	Base
	E	-0.9 DC	Emitter

APPENDIX 1
REFERENCES

LIST OF REFERENCES

TB SIG 66	Winter Maintenance of Signal Equipment
TB SIG 72	Tropical Maintenance of Ground Signal Equipment
TB SIG 75	Desert Maintenance of Ground Signal Equipment
TB SIG 178	Preventive Maintenance Guide for Radio Communications Equipment
TM 1-455	Electrical Fundamentals
TM 11-455	Radio Fundamentals
TM 11-486	Electrical Communication Systems Engineering
TM 11-660	Introduction to Electronics
TM 11-4000	Troubleshooting and Repair of Radio Equipment
TM 38-650	Basic Maintenance Manual

APPENDIX II
IDENTIFICATION TABLE OF PARTS

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IDENTIFICATION TABLE OF PARTS FOR				CONTRACTOR Contronics, Inc., Boston, Massachusetts		CONTRACT NO. DA18-119-sc-2626					
REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	NSA	NAVY	OTHER		
	DETECTOR AUDIO FREQUENCY, MX-2840/URR: aluminum chassis, steel front panel; anodize finished chassis; gray enamel finished front panel; 19 in. lg. by 6 in. wd. by 1 3/4 in. high over all dimensions; input impedance 3.5 ohms at 455 KC; input from Receiver R390A/URR I.F.; requires 110 to 125 volt AC, 60 cycles, single phase power source.	Detects amplitude modulation of receiver IF output and amplifies audio portion									
A1	Assembly, Printed Wiring Board, Dwg. #ONO34294	Audio Frequency Detector circuitry	A1								1
C1	CAPACITOR, fixed, electrolytic: 55 mf, ± 10%, 15v dcw; Tantalum, case style No. 35, 1 7/16 in. lg, 3/8 in. dia; wire lead type, located one on each end, per specification Mil-C-3965.	Power supply filter capacitor	C1,C2	CL35BE55OMP3						5910-812-5047	2
C2	CAPACITOR, same as C1	Power supply filter capacitor									
C3	CAPACITOR, fixed, molded silvered mica: 120 mmf, ± 5%, 500v dcw; case style No. 15, 1/2 in. lg., 9/32 in. wd. by 3/16 in. high; wire lead type, located one on each end; per specification Mil-C-5.	Part of frequency selective network	C3	CM15E121J						5910-666-0494	1
C4	CAPACITOR, variable, air dielectric: 3 mmf to 25 mmf, 600v rms, Hammalund, Type APC-25,	Trimmer capacitor for frequency selective network	C4							5910-889-4520	1
C5	CAPACITOR, fixed, molded silvered mica: 10,000 mmf, 300v dcw: case style No. 35, 13/16 in. lg, 13/16 wd. by 11/32 in. high; wire lead type, located one on each end; per Specification Mil-C-5.	I.F. by-pass	C5	CM35E103J						5910-284-4024	1
C6	CAPACITOR, fixed, paper dielectric: .1mf, ± 10%, 100v dcw; Case style No. 04, 7/8 in. lg, .312 in. dia; wire lead type, located one on each end; per specification Mil-C-25	Coupling capacitor to transistor Q2	C6	CP04A1EB104K						5910-569-6087	1
C7	CAPACITOR, fixed, electrolytic: 25 mf, ± 10% 10v dcw, Tantalum, case style No. 35, 7/8 in. lg, 9/32 in. dia; wire lead type, located one on each end; per specification Mil-C-3965.	Filter capacitor base of transistor Q2	C7,C8,C9,C10	CL35BD25OMP3						5910-841-8751	4
C8	CAPACITOR, same as C7	Filter capacitor emitter of transistor Q2									

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IDENTIFICATION TABLE OF PARTS FOR MX-2840/URR

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	CONTRACTOR		EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
				Contronics, Inc., Boston, Massachusetts		DA18-119-sc-2626						
				JAN OR MIL TYPE NUMBER (5)	ARMY	AF	NSA	NAVY	OTHER			
C9	CAPACITOR, same as C7	Coupling capacitor to transistor Q3										
C10	CAPACITOR, same as C7	Filter capacitor for emitter of transistor Q3										
C11	CAPACITOR, fixed, molded silvered mica: 3300 mf, 500v dcw; case style No. 30, 13/16 in. lg., 13/16 in. wd, by 9/32 in. high; wire lead type, located one on each end; per specification Mil-C-5.	Filter capacitor collector of transistor Q3	C11	CM30E332J						5910-184-0784	1	
CR1	SEMICONDUCTOR DEVICE, DIODE, silicon; 60 volt, 30 ma dc, per specification Mil-S-19500E.	Rectifier low voltage power supply	CR1, CR2	JAN1N198						5960-284-6516	2	
CR2	SEMICONDUCTOR DEVICE, same as CR1	Part of audio detector circuit										
DS1	LAMP, glow, neon; T-3-1/4 bulb, miniature bayonet base, per specification Mil-L-15098.	Power on indicator	DS1	NE51						6240-223-9100	1	
F1	FUSE CARTRIDGE: 1/8 amp, 125v	Primary power fuse	F1	F02A250V1/BAS						5920-284-9493	1	
J1	CONNECTOR, RECEPTACLE, one contact female; protruded mtg.	I.F. input receptacle	J1	UG625/U						5935-552-7660	1	
J2	CONNECTOR, RECEPTACLE, PHONE, recessed mtg., Switchcraft, Type C-11	Audio output receptacle	J2							5935-683-2746	1	
J3	CONNECTOR, RECEPTACLE, Power, 3 contact female, protruded mtg.	Power input	J3	MS3106A14S1S						5935-552-6961	1	
Q1	TRANSISTOR, germanium, P-N-P,	Low voltage power supply regulator	Q1, Q2, Q3	2N331						5960-617-4217	3	
Q2	TRANSISTOR, same as Q1	Amplifier audio										
Q3	TRANSISTOR, same as Q1	Amplifier audio										
R1	RESISTOR, fixed composition, 2200 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for transistor Q1	R1	RC20GF222J						5905-279-1876	1	
R2	RESISTOR, fixed composition, 20,000 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for transistor Q1	R2	RC20GF203J						5905-192-0649	1	

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IDENTIFICATION TABLE OF PARTS FOR MX-2840/URR

CONTRACTOR
Contronics, Inc., Boston, Massachusetts
CONTRACT NO.
DA18-119-sc-2626

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	NSA	NAVY	OTHER		
R3	RESISTOR, fixed composition, 10,000 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of RC frequency selective network	R3, R5	RC20GF103J						5905-185-8510	2
R4	RESISTOR, variable, carbon, slotted shaft W/locking bushing; 50,000 ohms, $\pm 10\%$, 2 watts, per specification Mil-R-94	Audio gain adjust	R4	RV4NAYS503A						5905-539-4900	1
R5	RESISTOR, same as R3	Part of audio gain voltage divider network									
R6	RESISTOR, fixed composition, 910 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of audio gain voltage divider network	R6	RC20GF911J						5905-279-3509	1
R7	RESISTOR, fixed composition, 7500 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Collector resistor for transistor Q2	R7, R11	RC20GF752J						5905-249-4195	2
R8	RESISTOR, fixed composition, 22 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for emitter of transistor Q2	R8	RC20GF220J						5905-279-3519	1
R9	RESISTOR, fixed composition, 1500 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for emitter of transistor Q2	R9	RC20GF152J						5905-279-1757	1
R10	RESISTOR, fixed composition, 47,000 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for transistor Q3	R10	RC20GF473J						5905-254-9201	1
R11	RESISTOR, same as R7	Part of bias network for emitter of transistor Q3									
R12	RESISTOR, fixed composition, 47 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for emitter of transistor Q3	R12	RC20GF470J						5905-252-4018	1
R13	RESISTOR, fixed composition, 1000 ohms, $\pm 5\%$, 1/2 watt, per specification Mil-R-11	Part of bias network for emitter of transistor Q3	R13	RC20GF102J						5905-195-6806	1
TB1	BOARD, Printed: Epoxy laminate, Dwg. ONO34284	Component mounting and wiring board	TB1							5999-979-4866	1
S1	SWITCH, TOGGLE: DPST, rated 2 amp, 125 v ac, bakelite body, 4 solder lug terminals, per specification JAN-23	ON/OFF Switch	S1	ST42A						5930-682-0509	1
T1	TRANSFORMER, POWER, STEPDOWN: single phase, 115 vac input voltage, 6.3 vac output voltage, dwg. B-ONO34285	Input power transformer	T1							5950-979-4863	1
T2	TRANSFORMER, I. F. FREQUENCY: 455 KC, 12 turn primary, 225 turn secondary, 23 turn tap, dwg. B-ONO34287	Input frequency transformer	T2							5950-981-6580	1

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REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	NSA	NAVY	OTHER		
T3	TRANSFORMER, AUDIO FREQUENCY: primary 4000 ohms, secondary 600 ohms C.T. freq. response ± 2 db, 200 cps to 15,000 cps, Microtran, Type MMT-11M	Audio output transformer	T3							5950-855-9413	1
TB2	TERMINAL BOARD: Barrier type, 2 double screw feed through type terminals, Cinch Mfg. Co., Type 2-140Y	Utility audio output	TB1							5940-224-5629	1
W1	CABLE ASSEMBLY: coaxial, I.F. interconnection, Type RG-58c/U cable with connector on each end, dwg. B-ON034296	Interconnection I.F.	W2							5995-979-4865	1
W2	CABLE ASSEMBLY: Primary Power, dwg. B-ON034297	Power cord	W1							5995-979-4864	1
XDS1	LIGHT, indicator, red: contains 100,000 ohm resistor; for NE-51 neon lamp, Mil Std. Dwg. MS90287-23	Power on/off indicator lamp holder	XDS1	95408931						6210-899-1523	1
XF1	FUSE HOLDER: nonindicating type, 250v, 15 amp, unsealed, Littlefuse, Inc., Type 342012 KNOB, circular shape; black mattle w/brass insert and two hex socket type setscrews. Raytheon Co., Part No. 70-1-2G	Primary power fuse holder	XF1							5920-280-8338 5355-644-1716	1 1

APPENDIX III
ILLUSTRATIONS

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FOR OFFICIAL USE ONLY

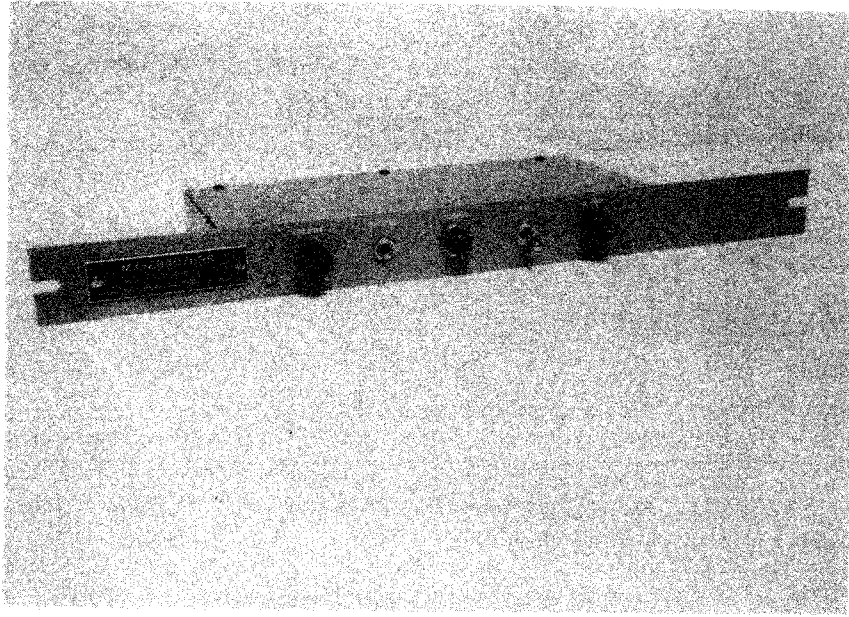


Figure 3 - Left Oblique View, MX-2840/URR

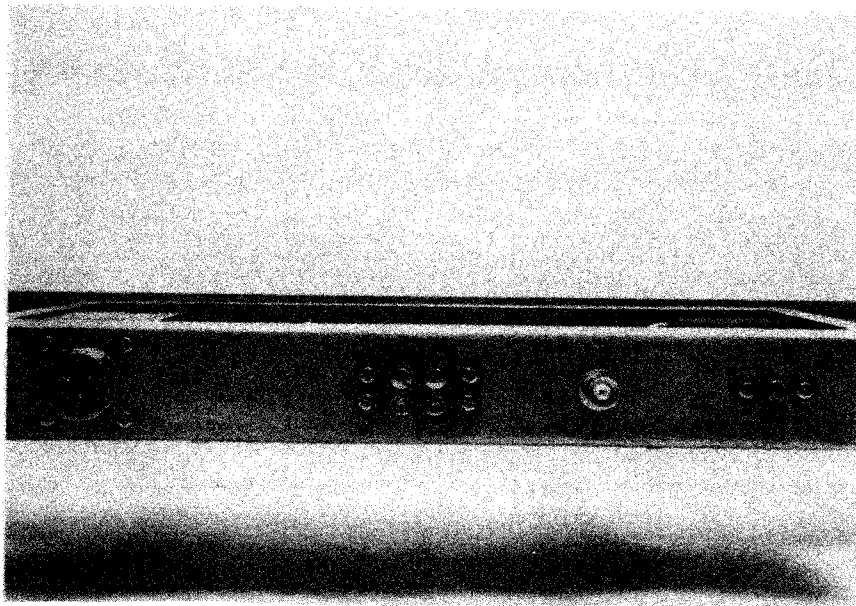


Figure 4 - Rearview, MX-2840/URR

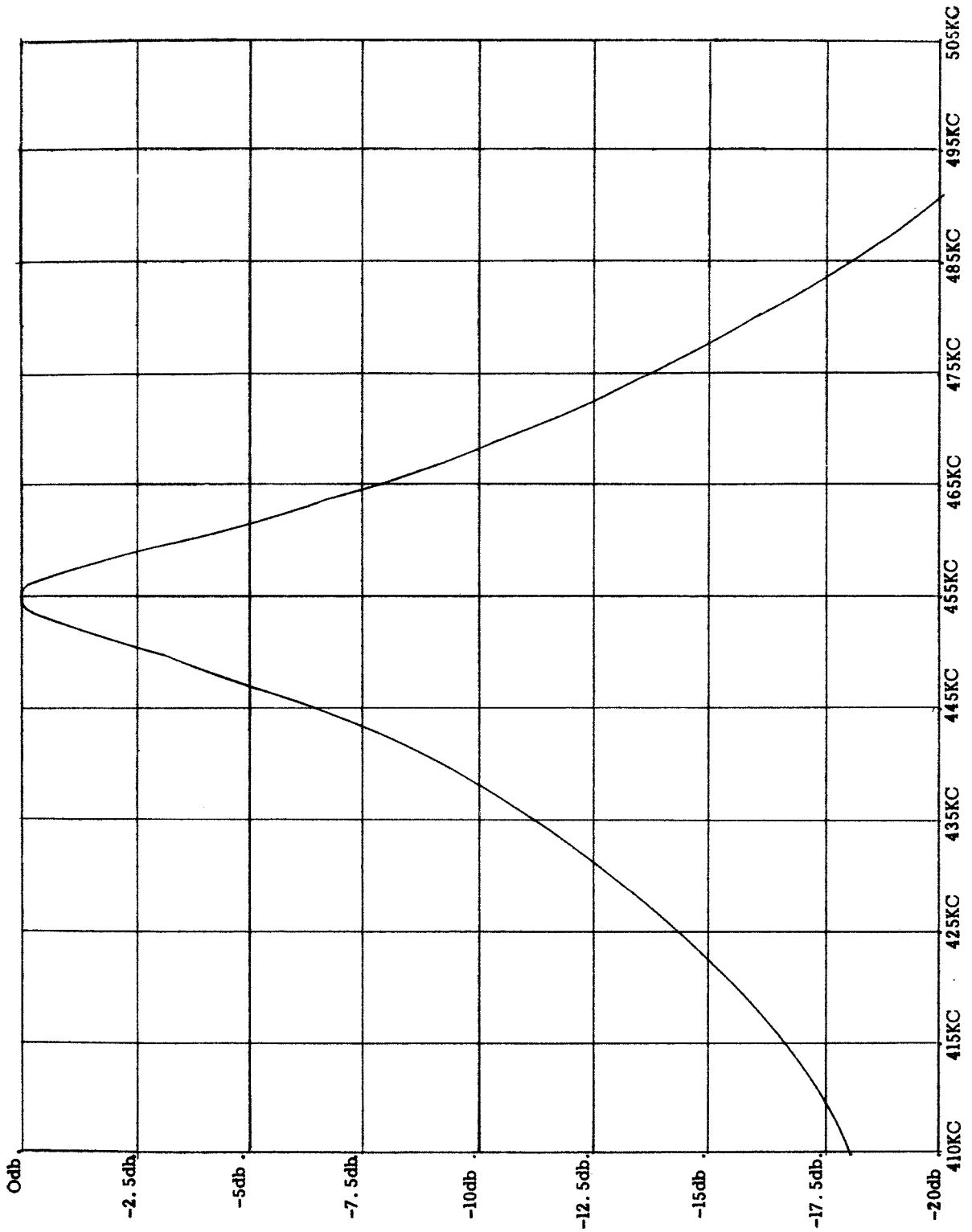


Figure 5 - Response Curve of XMFR (455 KC) MX-2840/URR Prototype

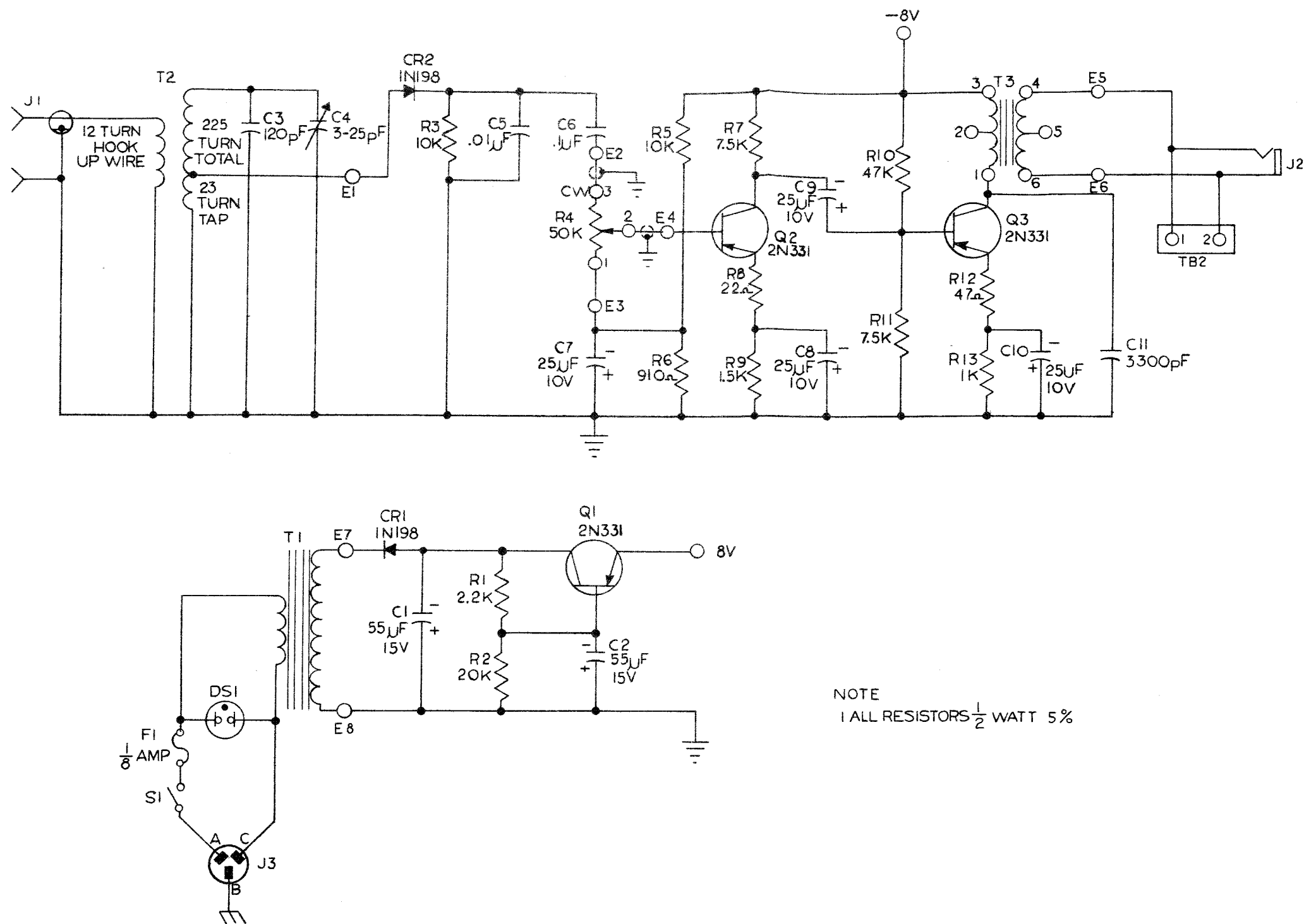


Figure 6 - Schematic, Audio Frequency Detector

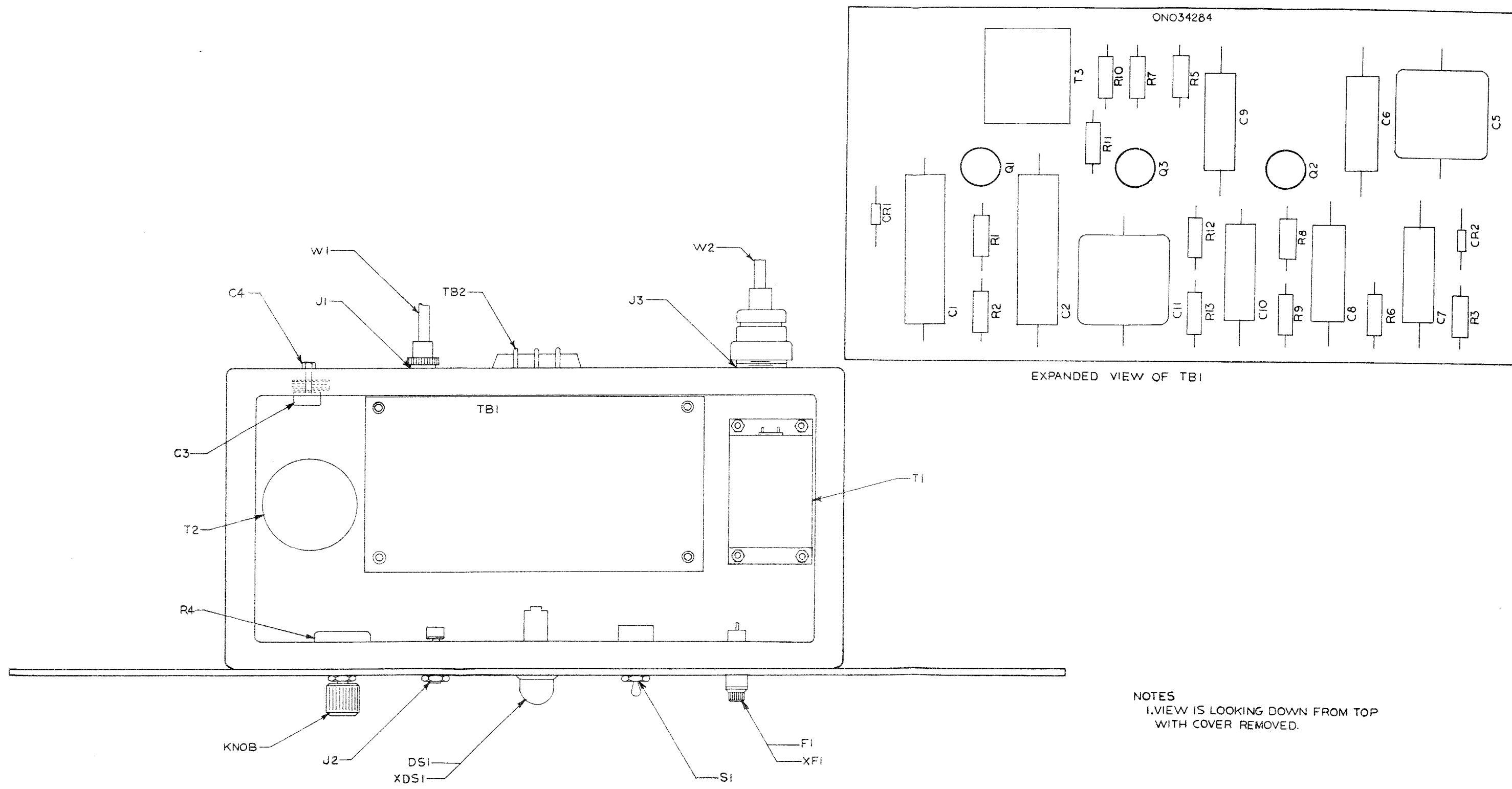


Figure 7 - Physical Location Reference