

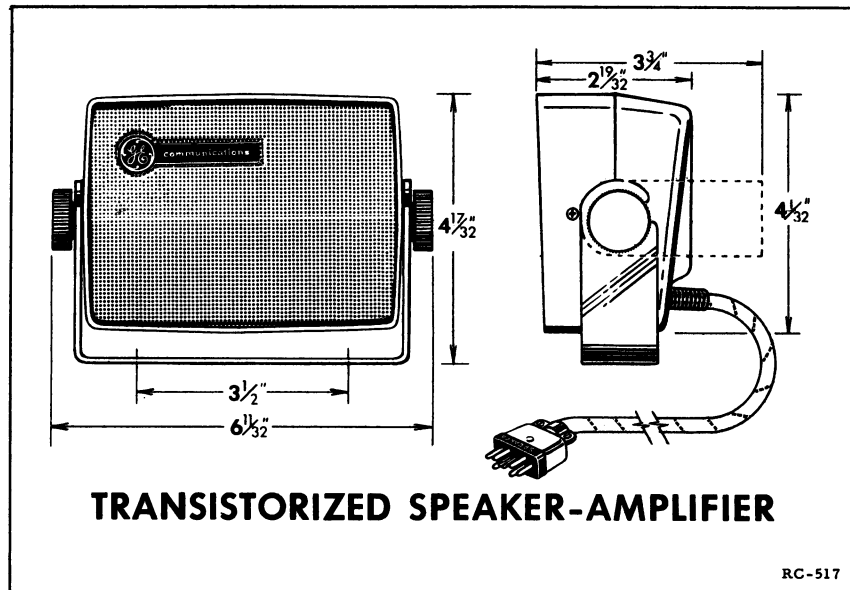


MAINTENANCE MANUAL
FOR
2-WATT TRANSISTORIZED SPEAKER/AMPLIFIER

LBI-3053F

Model

4EZ10A10



SPECIFICATIONS

Audio Power Output	2 watts at less than 10% distortion
Audio Input	less than 1/2-milliwatt
Rated Voltage	13.8 volts DC
Power Drain	less than 3 ma squelched, 0.5-amp unsquelched
Output Impedance	3.2 ohms
Transistor Complement	3
Used with	Transistorized Progress Line Mobile Combinations
Weight	3 lbs

30302

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ILLUSTRATIONS

Fig. 1 - Service Sheet RC-670

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the nearest General Electric District Sales Office.

GENERAL ELECTRIC
TRANSISTORIZED PROGRESS LINE
2-WATT SPEAKER/AMPLIFIER MODEL 4EZ10A10

DESCRIPTION

The transistorized Speaker/Amplifier is a compact unit designed to provide an audio output of 2 watts when used with a Transistorized Progress Line Receiver. Contained within the die cast housing is a three transistor audio amplifier and loudspeaker. The housing also serves as the heat sink for the output transistor.

In exposed locations or areas of high humidity, mount the speaker-amplifier so that moisture will not accumulate in the speaker cone.

CONNECTIONS

The Speaker/Amplifier is provided with a 3-foot cable which plugs into the SPEAKER jack J703 on the Front Section of the Two-Way Mobile Radio.

ADJUSTMENTS

Speaker Model 4EZ10A10, Revision A or earlier, will need the following adjustment for proper operation: R1 should be adjusted for a reading of 0.5 volts between J1 and J2 with the receiver unsquelched. See the Maintenance section for gaining access to R1, J1 and J2.

No adjustments are necessary on Speaker Model 4EZ10A10, Revision B, or later.

CIRCUIT ANALYSIS

The audio signal (unsquelched) from the receiver is coupled through P1-3 to the base of the audio amplifier transistor Q1. Q1 and Q2 are compound connected class A audio amplifiers. Compound connected transistors have load-sharing properties. The output current is the sum of the collector currents of the two transistors. The input impedance of a compound connected circuit is higher than that normally encountered in transistor amplifiers. Such a circuit has a more linear operation and consequently less distortion at near maximum power output.

Speaker Model 4EZ10A10, Rev. B, has a control circuit consisting of Q3, C1, R3, R4, R5, and R6 which regulates the bias of compound-connected audio-amplifier circuit Q1 and Q2. On models earlier than Rev. B --- the potentiometer R1 is used to adjust the collector current to a value of 0.5 amps (see Adjustment section), which is indicated by a reading of 0.5 volts DC between J1 and J2.

Output from Q2 is fed to the output transformer T1, the secondary of which is connected to the loudspeaker LS1. Two leads are brought out to P1, the speaker plug, from the secondary of T1 and the high side of LS1, to provide connections to an optional speaker muting switch. In

normal installations a jumper is provided in the receiver section, to complete the output circuit.

When the signal from the receiver is squelched, the amplifier draws less than 3 ma of current for battery savings.

MAINTENANCE

DISASSEMBLY

1. Remove the plug from the control unit.
2. Remove the two phillips head screws from the sides of the speaker housing.
3. Lift the speaker grille from the housing.
4. Remove the four phillips head screws located at each corner of the black mounting plate.
5. Slowly pull out the black mounting plate, taking care not to break the connecting wires attached to the cable and power transistor. The circuit components will now be accessible for servicing.
6. For access to the power transistor, pull out the nameplate on the outside back of the speaker housing. The nameplate is held to the housing by two snap fasteners. Removing the two nuts fastening the transistor will allow it to be lifted out for checking.
7. Refer to the Service Sheet in this instruction, for electrical maintenance of the Speaker/Amplifier.
8. For aid in servicing transistor circuits refer to Service Hints (listed in the main Table of Contents).

PARTS LIST
TRANSISTORIZED SPEAKER/AMPLIFIER
MODEL 4EZ10A10
REV. C

SYMBOL	DESCRIPTION	G-E DRAWING & PART NO.
<u>CAPACITOR</u>		
C1#	Electrolytic, (miniature for 85°C operation); hermetically sealed in aluminum tube, 200 mfd +100% -10% 6 v d-c w. Sprague Cat. No. 30D133A1. Added by Rev. B. Changed by Rev. C.	B-7489483-P15
J1#	Test point jack; stake-in, molded nylon. Alden Products Co. Type #110 BC1-black. Deleted by Rev. B.	A-7150763-P1
J2#	Test point jack; stake-in, molded nylon. Alden Products Co. Type #110BC1-red. Deleted by Rev. B.	A-7150763-P2
<u>SPEAKER</u>		
LS1	Speaker, 3 1/2-inch permanent magnet, voice coil impedance 3.2 ohms ± 10%, cone resonance 200 to 325 cps, 2 w.	B-7487536-P1
<u>PLUG</u>		
P1	Connector. (Part of W1).	C-5495345-P14
<u>TRANSISTORS</u>		
Q1	Type 2N188-A.	A-4029834-P2
Q2	Transistor. Type CTP1104.	
XQ3#	Transistor socket: 4 contacts, low loss mica-filled phenolic; contact resistance .03 ohms max. 1 amp. Elco Cat. No. 3303. Socket mates with Elco 757 mtg. ring. Added by Rev. B	
<u>TRANSISTOR HEAT SINK</u>		
	Transistor heat sink. Added by Rev. B.	A-4035439-P1
<u>RESISTORS</u>		
R1#	Potentiometer: composition, 1500 ohms ±20%, linear taper, 2.25 w. Allen Bradley Type J. Deleted by Rev. B.	M-2R73-P49
R2#	Wirewound, insulated; molded housing 1 ohm ±10%, 1 w. IRC Type BW-1. In receivers earlier than Rev. A; Wirewound insulated; molded housing, 1 ohm ±10%, 1/2 w. IRC Type BW.	P-3R19-P4 P-3R18-P8
R3#	Composition, 5600 ohms, ± 10%, 1/2 w. Added by Rev. B.	C3R77-P562K
R4#	Composition, 3900 ohms, ± 5% 1/2 w. Added by Rev. B.	C3R77-P392J
R5#	Composition, 68 ohms, ± 5% 1/2 w. Added by Rev. B.	C3R77-P680J
R6#	Composition, 47 ohms, ± 10% 1/2 w. Added by Rev. B. Changed by Rev. C.	C3R77-P271K
R7#	Composition, 100 ohms ±10% 1/2 w. Added by Rev. C.	C3R77-P101K
<u>THERMISTOR</u>		
RT3#	Thermal resistor; glyptol dipped body, 300 ohms at 25°C ±10%, max. input 0.3 w at 40°C, temp. coef 3,500P ±5%. Globar Type 416H. (Added by Rev. A). Deleted by Rev. B.	B-5490828-P10
<u>TRANSFORMER</u>		
T1	Audio output transistor transformer. Pri Imp. 22 ohms ±10%. Sec Imp. 3.5 ohms ±10%.	B-5491520-P1
<u>CABLE</u>		
W1	Cable Assembly: includes the following: (1) Connector: black phenolic; 6-male contacts (brass, 0.093 dia pins) 1,000 vdc, 5 amps. Mfg. Service Part No. 6601-M6A (P1) (1) Hood and Liner: black phenolic; insulated. (1) Pin: metal; 0.50 in. long, 0.06 in. dia. Cable: cotton braid cover; 0.281 in. dia, 36 in. long. (1) Spring Retainer: metal Mfg. Service Part No. P35.	PL-4031385-G1 C-5495345-P14 C-5495345-P21 C-5495345-P22 B-5491775-P1 C-5495345-P23

SYMBOL	DESCRIPTION	G-E DRAWING & PART NO.
<u>SOCKETS</u>		
XQ1	Transistor socket: 4 contacts, low loss mica-filled phenolic; contact resistance .03 ohm max. 1 amp. Elco Cat. #3303. Socket mates with Elco 757 mtg. ring.	B-5490277-P1
XQ2	Transistor socket: Similar to Industrial Hardware Co. Part #M7.	A-4029834-P1
XQ3#	Transistor socket. Added by Rev. B.	A-4029834-P2
<u>MISCELLANEOUS PARTS</u>		
	Speaker Housing.	C-5495274-P1
	Grille.	B-5491692-P1
	Mounting Bracket.	B-5491292-P1
	Thumb screw.	A-4032459-P1
	Transistor Socket Ring for XQ1.	A-7162414-P1
	Silicone Grease: Dow Corning #4.	A-4029974-P1
	Insulator.	

PRODUCTION CHANGES

(Refer to Parts List for description of parts affected by these revisions.)

REV. A - To improve stable operation at high temperature. RT3 added between pin 3 of R1 and TB1-3.

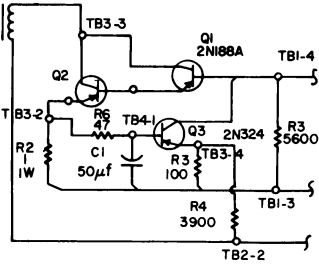
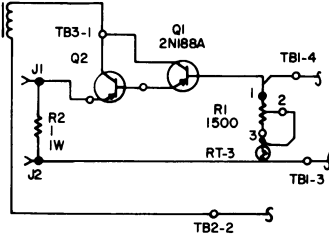
REV. B - To eliminate bias pot and metering jacks and to improve bias stability.

Delete R1, RT3, J1 and J2. Add R3, R4, R5, R6, C1 and Q3.

Elementary Diagram Changes

From

To



REV. C - To increase power output at low temperatures and to improve frequency response.

Change C1 and R6. Add R7.

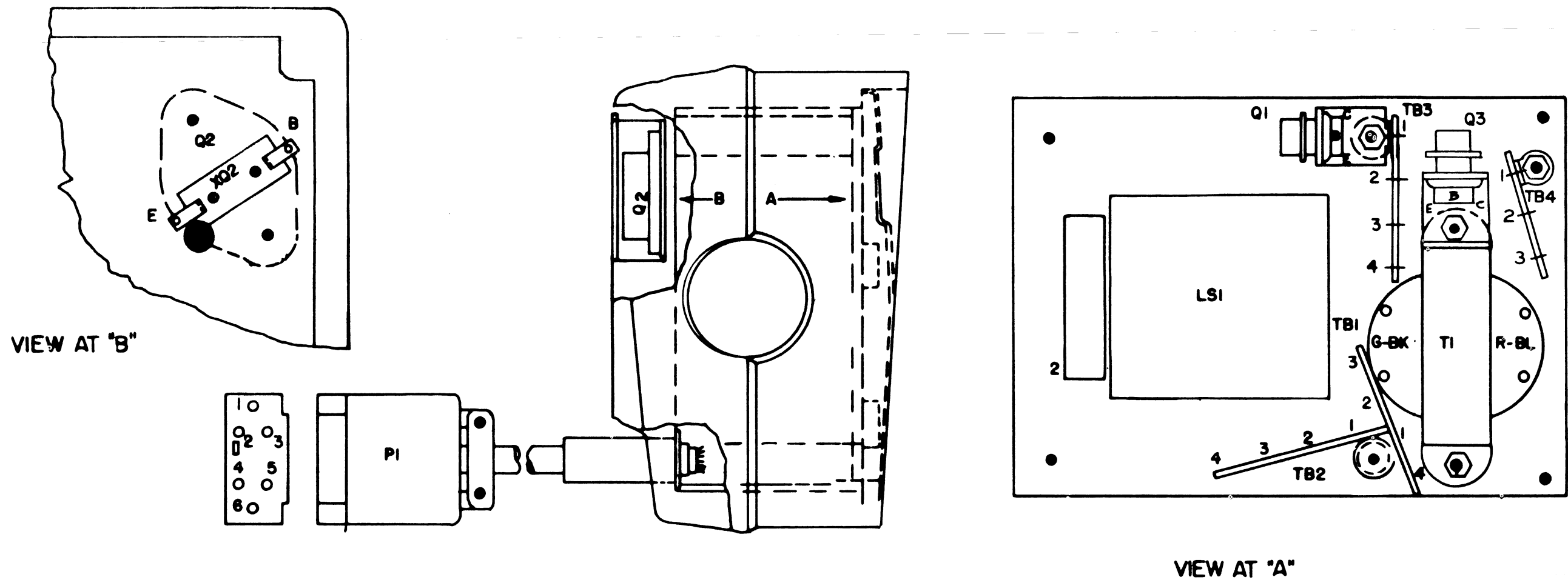
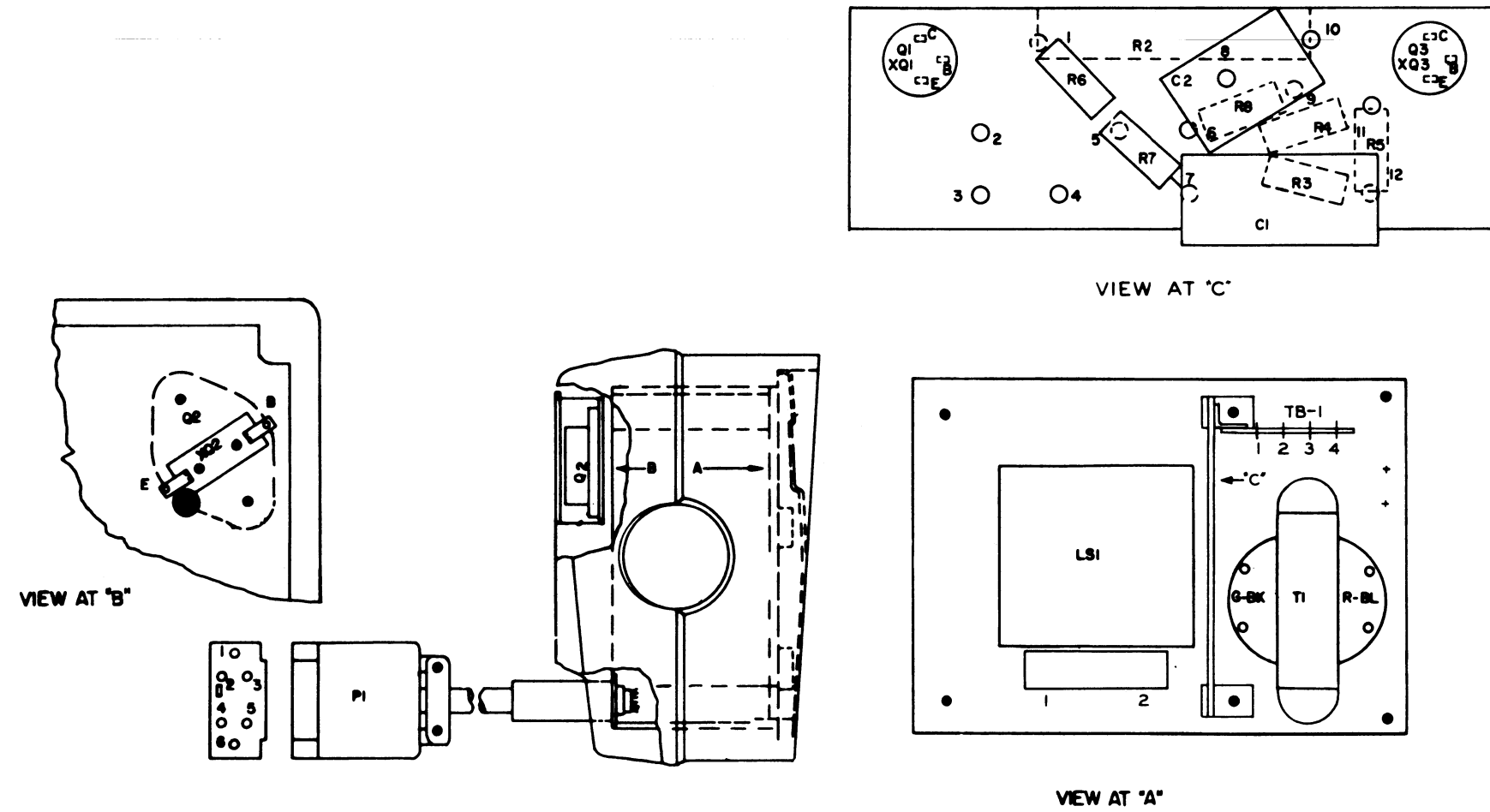


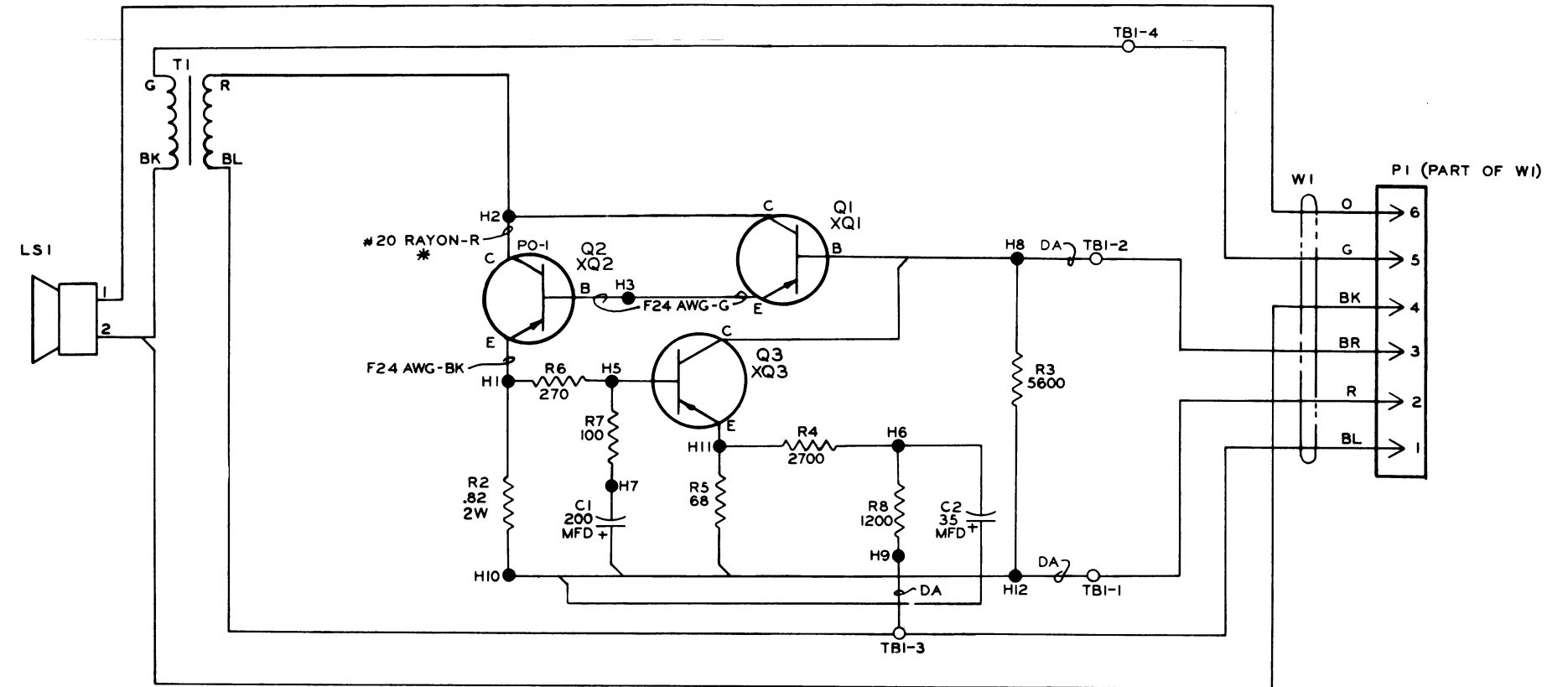
Fig. 1 - Outline Diagram

2-WATT TRANSISTORIZED SPEAKER/
AMPLIFIER MODEL 4EZ10A10

(C-5495687, Rev. 2)



(C-5495687, Rev. 4)



ALL RESISTORS ARE IN OHMS
AND ARE HALF WATT UNLESS
OTHERWISE SHOWN.
K - 1000 OHMS.

ALL CAPACITORS ARE IN
MICROMICROFARADS
MF = MICROFARADS

FOR WIRING INSTRUCTIONS
SEE A4031623.

* NOTES:

1. TERMINATE #20 RAYON R WIRE
ON PO-1 WITH B5490444P2.
2. CONNECTION BETWEEN Q2-C
AND PO-1 IS MECHANICAL.

SEE APPLICABLE PRODUCTION CHANGE
SHEETS IN INSTRUCTION BOOK SECTION
DEALING WITH THIS UNIT, FOR DES-
CRPTION OF CHANGES UNDER EACH
REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO 4EZ10A10	REV LETTER F
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(C-5495468, Rev. 17)

IN ORDER TO RETAIN RATED EQUIPMENT
PERFORMANCE, REPLACEMENT OF ANY
SERVICE PART SHOULD BE MADE ONLY WITH
A COMPONENT HAVING THE SPECIFICATIONS
SHOWN ON THE PARTS LIST FOR THAT PART.

Fig. 1 - Service Sheet

2-WATT TRANSISTORIZED
SPEAKER/AMPLIFIER
MODEL 4EZ10A10; REV. F

(RC-670C)

PARTS LIST			SYMBOL	G-E PART NO	DESCRIPTION
TRANSISTORIZED SPEAKER/AMPLIFIER					
MODEL 4EZ10A10 REV. F					
SYMBOL	G-E PART NO.	DESCRIPTION			
<u>CAPACITORS</u>					
C1#	7489483-P15	Electrolytic: (min stet for 85° operation), hermetically sealed in aluminum tube, 200 uf ±100% ±10%, 3 VDCW, Sprague Electric Mfg Co No. 30D116A1.	R8#	3R77-P122K	<u>RESISTORS</u> Fixed composition: 1,200 ohms ±5%, 1/2 w. (Added by REV. D.)
	7489483-P4	In Models of Rev. B: Electrolytic: (Min stet for 85°C operation) hermetically sealed in aluminum tube, 50 uf ±100% ±10%, 6 VDCW, Sprague Electric Mfg. Co No. 30D133A1. (Added by Rev. B.)	RT3#	5490828-P10	<u>THERMISTOR</u> Thermal resistor, 300 ohms (±10%) at 25°C, max input 0.30 w at 40°C, 3,500 temp coef ±5%-black. Globar Div Type 416H. (In Models of REV. A. only).
C2#	7489483-P10	Electrolytic: (Miniature for 85° operation), hermetically sealed in aluminum tube, 35 uf ±100% ±10%, 15 VDCW, Sprague Electric Mfg Co No. 30D169A1. (Added by Rev. D.)	T1	5491520-P1	<u>TRANSFORMER</u> Audio: Output transistor, Pri: Imp 22 ohms ±10% at 3 w. Sec: Imp 3.50 ohms ±10% at 3 w.
J1#	7150763-P1	<u>JACKS</u> Test Point: (Nylon, stake in), molded nylon body, berryllium copper contact, operating voltage 600 vrms, operating temp 105°C. Alden Products Co Part No. 110BCL-black. (Deleted by Rev. B.)	W1	PL-4031385-G1 5495345-P14 5495345-P21	<u>CABLE</u> Cable Assembly Includes the following components: Connector, Plug: (P1) Hood and Liner Assembly Includes the following: Hood, Metal: Nickel-plated, 1.12 inches long 1.20 inches tall, 0.50 inches wide. Line, Insulated: Black phenolic.
J2#	7150763-P2	Test point: (Nylon, stake in), molded nylon body, berryllium copper contact, operating voltage 600 vrms, operating temp 105°C. Alden Products Co Part No. 110BCL-red. (Deleted by Rev. B.)		5495345-P22 5491775-P1 5495345-P23	Pin, Metal: 0.50 inches long, 0.07 inches in diameter. (For assembling hood to plug). Cable: Cotton braid jacket, 0.28 inches max. diameter, 36-inches long. Retainer, Spring: Steel. Component Mfg. Service Inc. Cat. No. P-35.
LS1	7487536-P1	<u>LOUDSPEAKER</u> Speaker: 3-1/2 inch permanent magnet, cone resonance 200 to 325 cps at 2 w, voice coil imp. 3.2 ohms ±10%.	XQ1	5490277-P1	<u>SOCKETS</u> Transistor: 4-contacts, low-loss mica-filled phenolic, 1,000 megohms min, contact res 0.03 ohms max, 1 amp, 400 vrms. Elco Corp No. 3303. (Used with mounting ring. Elco Corp No. 757. (G-E Dwg and Part No. A-7162414-P1).
P1	5495345-P14	<u>PLUG</u> Black phenolic, 6-male contacts, (brass), max rating 1,000 VDC, max current 5 amps. Component Mfg Service Inc No. 6601-M6A. (Included in W1).	XQ2	4029834-P2	Transistor: 2-contacts for 0.062 diameter pins. Industrial Hardware Co Part No. M7.
Q1#	5496667-P2	<u>TRANSISTORS</u> Germanium, PNP. Changed by REV. E.	XQ3#	5490277-P1	Transistor; 4-contacts, low-loss mica-filled phenolic, 1,000 megohms min, contact res 0.03 ohms max, 1 amp, 400 vrms. Elco Corp No. 3303. (Used with mounting ring. Elco Corp No. 757. (G-E Dwg and Part No. A-7162414-P1). (Added by REV. B.)
Q2#	5496663-P2	Germanium, PNP. Changed by REV. F.		5495274-P1 5491692-P1	<u>MISCELLANEOUS</u> Housing, Speaker: Metal, 0.031 inches max, inside radii, 0.062 inches max, outside radii. Grille: Metal, perforated, anodized, 5.06 inches long, 3.70 inches wide.
Q3#	5496666-P5	Germanium, PNP. Added by REV. B. Changed by REV. E.	TB1 and TB2	7775500-P6	Board, Terminal: Laminated phenolic, Nema Grade XXXP-tan, 3-terminals (solder-plated).
		<u>RESISTORS</u>	TB3	7775500-P3	Board, Terminal: Laminated phenolic, Nema Grade XXXP-tan, 3-terminals (solder-plated).
R1#	2R73-P49	Potentiometer, Composition: (linear taper), 1,500 ohms ±20%, 2.25 w. Allen Bradley Co Type J. (Deleted by REV. B.)		7147178-P2	Ring, Squeeze: for speaker cable
R2#	3R19-P54 3R19-P4 3R18-P8	Wirewound: 0.82 ohms ±10%, 1 w. LRC type BW-1. In Models of REV. A, B, C, D: Wirewound: 1.0 ohm ±10%, 1 w. LRC Type BW-1. In Models earlier than REV. A: Wirewound; 1.0 ohm ±10%, 1/2 w. LRC Type BW.		5491292-P1 4032459-P1	Bracket, Mounting: Metal, polished finish, 5.68 inches long, 1.24 inches wide. Screw, Thumb: Steel, abrasive polished, 0.75 inches long.
R3#	3R77-P562K	Fixed composition: 5,600 ohms ±10%, 1/2 w. (Added by REV. B.)		4029974-P1	Insulator, Transistor: Aluminum, anodized.
R4#	3R77-P272K 3R77-P392J	Fixed composition: 2,700 ohms ±5%, 1/2 w. In Models of REV. B. and REV. C. Fixed composition: 3,900 ohms ±5%, 1/2 w. (Added by REV. B.)	TB4	7487424-P6	Strip, Terminal: (Miniature), insulated, Nema Grade XXXP phenolic-tan; bracket, brass (Cinch Mfg Co No. 4478); 3-terminals, brass (Cinch Mfg Co No.4409.)
R5#	3R77-P680J	Fixed composition: 68 ohms ±5%, 1/2 w. (Added by REV. B.)		4035439-P1	Sink, Heat for Q1: Transistor, aluminum alloy, red anodize. Birtcher Corp No. 3A1-635-2R.
R6#	3R77-P271K 3R77-P470K	Fixed composition: 270 ohms ±10%, 1/2 w. In Models of REV. B: Fixed composition: 47 ohms ±10%, 1/2 w. (Added by REV. B.)		4035471-P1	Insulator: Mylar, 0.137 inches inside diameter, 0.210 inches outside diameter.
R7#	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2w. (Added by REV. C.)		198201226	Component Board.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

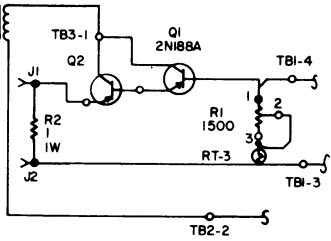
(Refer to Parts List for description of parts affected by these revisions).

REV. A - To improve stable operation at high temperature. RT3 added between pin 3 of R1 and TB1-3. Changed R2.

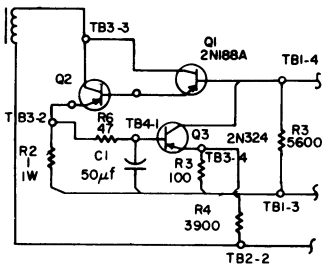
REV. B - To eliminate bias pot and metering jacks and to improve bias stability. Deleted R1, RT3, J1 and J2. Add R3, R4, R5, R6, C1 and Q3.

ELEMENTARY DIAGRAM CHANGES

FROM



TO

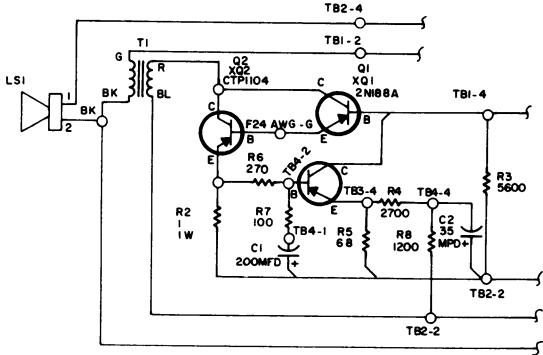


REV. C - To increase power output at low temperatures and to improve frequency response. Changed C1 and R6. Added R7.

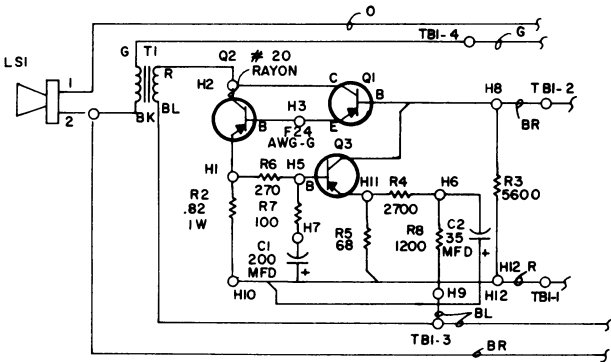
REV. D - To eliminate alternator and ignition interference from the TPL audio output. Added R8 and C2. Changed R4 and TB4.

REV. E - To improve mechanical layout, and to assure high quality transistors. Added component board, changed R2, and added G-E Drawing Numbers to Q1, Q2, and Q3.

WAS



CHANGED TO



REV. F - To provide increased thermal protection. Changed Q2 from 5496663-P1 to 5496663-P2.

ELEMENTARY DIAGRAM CHANGES - NONE.