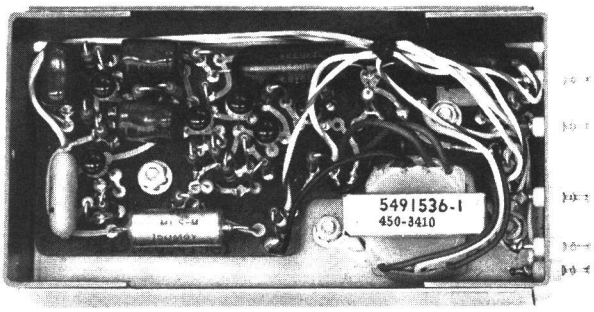
MOBILE RADIO

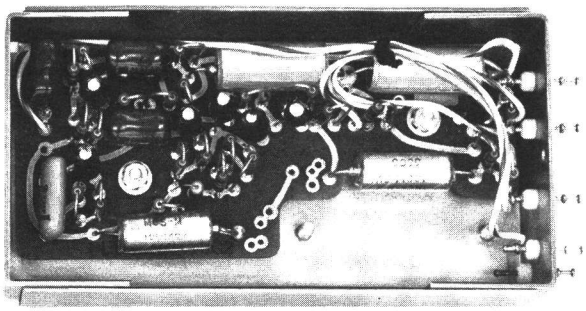
MAINTENANCE MANUAL

COMPRESSION AMPLIFIER
(Options 7088, 7720, 8419, & 8484)

Maintenance Manual LBI-3815B
DF-8397



MOBILE COMPRESSION AMPLIFIER
19C303881-G1



STATION COMPRESSION AMPLIFIER
19C303881-G2

COMPRESSION AMPLIFIER

SPECIFICATIONS *

THRESHOLD OF COMPRESSION	Less than 10 millivolts
COMPRESSION RANGE	With audio input increase of 30 dB beyond start of compression, output level increases less than 3 dB.
OUTPUT LEVEL	90 millivolts RMS minimum
DISTORTION	Less than 3%
FREQUENCY RESPONSE	±3 dB from 300 to 3000 Hz, reference 1000 Hz.
POWER REQUIREMENT	5 mA @ 10 volts

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

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OPTION INDEX

OPTION NUMBER	KIT NUMBER	USED WITH
7088	19A122276-G2, Includes: 19C303881-G1 Compression Amplifier	MASTR Professional Mobile Combinations.
7720	19A122276-G1, Includes: 19C303881-G2 Compression Amplifier	MASTR Desk Mate Local Control Station.
8419	19A122276-G3, Includes: 19C303881-G2 Compression Amplifier.	MASTR Desk Top & Wall Mount Stations. (Executive Series)
8484	19A122276-G4, Includes: 19C303881-G2 Compression Amplifier.	MASTR Desk Top & Wall Mount Stations. (Royal Executive)

DESCRIPTION

The General Electric Compression Amplifier Option provides a constant audio output for transmitter modulation from a wide range of audio input levels. This permits a radio operator to talk into a microphone from various distances or at different voice levels without causing a significant change in transmitter modulation level. Option numbers for the Compression Amplifier Kits, and their applications, are shown on the adjacent page.

In mobile combinations, the Compression Amplifier Assembly mounts on the back of the system frame. In station combinations, the assembly mounts on the control unit for the Desk Mate Station and the power supply for the Desk Top or Wall Mount Station. External connections to the Compression Amplifier are shown in Figure 1.

CIRCUIT ANALYSIS

Compression Amplifier Board A1501/A1502 consists of preamplifier Q1, gain control stage Q2, high gain audio amplifiers Q3-Q6, and DC amplifier Q7.

When audio from the microphone is applied to the Compression Amplifier, it is amplified by Q1. Resistor R5 and the AC

RADIO COMBINATION	TERMINAL CONNECTIONS				
	E1-2	E2-2	E3-2	E4-2	E5-2
MASTER MOBILE (PROFESSIONAL)	P101-6 (+10 VDC)	P703-1 (MIKE HI)	P101-13 (SYSTEM NEG) and P703-2 (MIKE LO)	P101-20 (AUDIO HI)	P101-19 (AUDIO LO)
DESK MATE LOCAL CONTROL STATION	TB501-7 (+10 VDC)	J901-2 (MIKE HI)	J901-1 (MIKE LO) and P902-1 (AUDIO LO)	P902-2 (AUDIO HI)	
WALL MOUNT & DESK TOP STATION WITHOUT REMOTE CONTROL (Executive Series)	TB3-6 (+10 VDC)	J502-2 (MIKE HI)	J502-1 (MIKE LO) and TB3-19 (AUDIO LO)	TB3-18 (AUDIO HI)	
WALL MOUNT & DESK TOP STATION WITH REMOTE CONTROL (Executive Series)	TB3-6 (+10 VDC)	H6 ON KC-18-A (MIKE HI)	H7 ON KC-18-A (MIKE LO) and TB3-19 (AUDIO LO)	TB3-18 (AUDIO HI)	
WALL MOUNT & DESK TOP STATION WITHOUT REMOTE CONTROL (Royal Executive)	TB3-9 (+10 VDC)	TB11-1 (MIKE HI)	TB11-3 (MIKE LO) and TB3-32 (AUDIO LO)	TB3-20 (AUDIO HI)	
WALL MOUNT & DESK TOP STATION WITH REMOTE CONTROL (Royal Executive)	TB3-9 (+10 VDC)	E1 ON KC-20-A (MIKE HI)	E2 ON KC-20-A (MIKE LO) and TB3-32 (AUDIO LO)	TB3-20 (AUDIO HI)	

Figure 1 - External Connections

impedance of Q2 act as a voltage divider for the outpur of Q1. The resulting signal is amplified by a four-stage, direct-coupled amplifier (Q3-Q6).

Outputs are provided by the four stage amplifier for the transmitter modulator and DC amplifier Q7. In A1501 (mobile component board) the outputs are transformer coupled for DC isolation while in A1502 (station component board) they are resistive coupled.

The signal for the DC amplifier is rectified by detector CR1, filtered by C8 and then amplified by Q7. This DC output is fed back to the base of gain control transistor Q2.

The amount of DC feedback to the gain control stage determines the AC impedance of Q2. When the input level rises, the AC amplifier output starts to increase. The output is detected, amplified, and fed back to the base of Q2. This increase in feedback reduces the AC impedance of Q2 which decreases the audio voltage to the AC amplifier, keeping the amplifier output constant. The release time is determined by R16 and C6 and is set for one second.

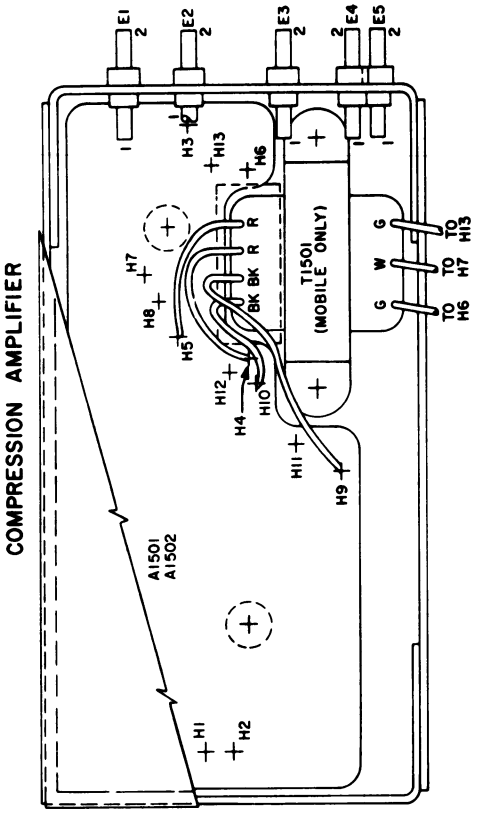
When the audio input decreases, the output of the AC amplifier starts to decrease, reducing the feedback to Q2. This raises the AC impedance of Q2 and increases the audio voltage to the AC amplifier, keeping the amplifier output constant.

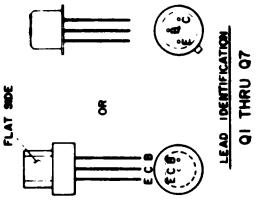
MAINTENANCE

Refer to the DC voltage readings on the Schematic Diagram and the following Troubleshooting Chart when servicing the Compression Amplifier.

TROUBLESHOOTING PROCEDURE

SYMPTOM	PROCEDURE
No audio to the transmitter modulation input	1. Check for audio at input of compression amplifier (E2-1 & E3-1) with an AC VTVM or oscilloscope. If no audio is present, check microphone and cables. 2. Check supply voltage at E1-1 (+10 volts). 3. Check DC voltages at transistor terminals (refer to the Schematic Diagram).





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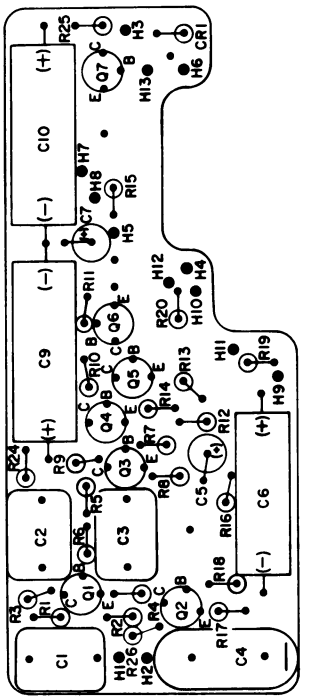
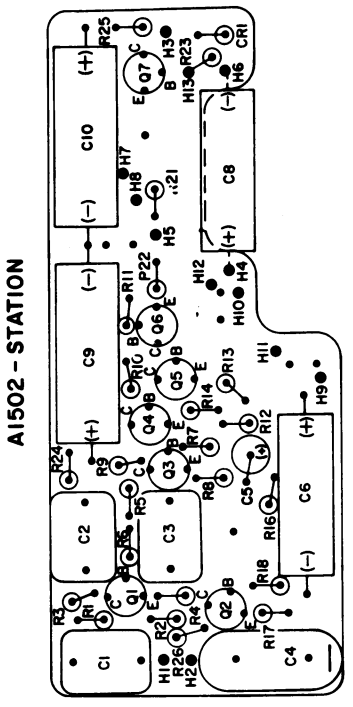




OUTLINE DIAGRAM

COMPRESSION AMPLIFIER
PL-19C303881-G1 & 2

PARTS LIST

LBI-3816A

COMPRESSION AMPLIFIER
19C303881-G1 - G2

SYMBOL	G-E PART NO.	DESCRIPTION
A1501 and A1502		COMPONENT BOARD A1501 19B205415-G1 (Used in 19C303881-G1) A1502 19B205415-G2 (Used in 19C303881-G2)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C3	19B209394-P3	Polyester: 0.22 µf ±20%, 50 VDCW; sim to Paktron Type MF.
C4	19A115028-P107	Polyester: .01 µf ±20%, 200 VDCW.
C5	5491674-P9	Tantalum: 22 µf ±20%, 4 VDCW; sim to Sprague 162D.
C6	5496267-P3	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C7	5491674-P9	Tantalum: 22 µf ±20%, 4 VDCW; sim to Sprague Type 162D. (Used in A1501 only).
C8	5496267-P7	Tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague Type 150D. (Used in A1502 only).
C9 and C10	5496267-P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115250-P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q4	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q5	19A115889-P1	Silicon, NPN; sim to Type 2N2712.
Q6 and Q7	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152-P304J	Composition: 0.30 megohm ±5%, 1/4 w.
R2	3R152-P823J	Composition: 82,000 ohms ±5%, 1/4 w.
R3	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R4	3R152-P302J	Composition: 3000 ohms ±5%, 1/4 w.
R5	3R152-P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R6	3R152-P332K	Composition: 3300 ohms ±10%, 1/4 w.
R7	3R152-P153K	Composition: 15,000 ohms ±10%, 1/4 w.
R8	3R152-P681J	Composition: 680 ohms ±5%, 1/4 w.
R9	3R152-P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R10	3R152-P273K	Composition: 27,000 ohms ±10%, 1/4 w.
R11	3R152-P153K	Composition: 15,000 ohms ±10%, 1/4 w.
R12	3R152-P243J	Composition: 24,000 ohms ±5%, 1/4 w.
R13	3R152-P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R14	3R152-P275K	Composition: 2.7 megohms ±10%, 1/4 w.
R15	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R16	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R17	3R152-P122K	Composition: 1200 ohms ±10%, 1/4 w.
R18	3R152-P150K	Composition: 15 ohms ±10%, 1/4 w.
R19	3R152-P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R20	3R152-P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R21	3R152-P121K	Composition: 120 ohms ±10%, 1/4 w.
R22	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R23	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R24	3R152-P221K	Composition: 220 ohms ±10%, 1/4 w.
R25	3R152-P820K	Composition: 82 ohms ±10%, 1/4 w.
R26*	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w. Added by Rev A.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1501	5491536-P1	Audio Frequency: 300-3000 Hz freq range, 12 VDC operating, Pri 1: 36 ohms ±10%, Pri 2: 20 ohms ±10%, Sec: 100 ohms ±10%.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B205245-P1	Cover. (Used with A1501 and A1502).
	19A122274-P1	Insulator. (Used with A1501 and A1502 cover).
	7150186-P3	Spacer. (Located between A1501, A1502 board and cover).

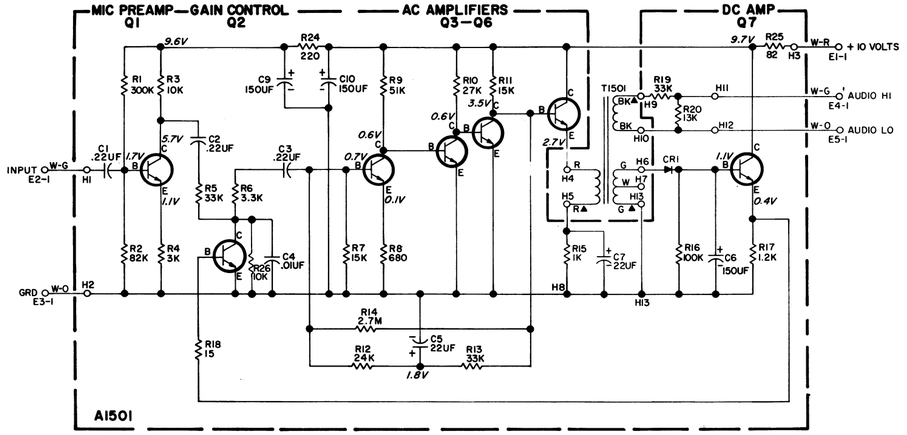
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To limit compression range. Added R26.

COMPRESSION AMPLIFIER PL-19C303881-G1



ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

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.

VOLTAGE READINGS

ALL READINGS ARE DC VOLTAGES TAKEN WITH A VTVM AND MEASURED FROM THE DESIGNATED POINT TO GROUND. NO SIGNAL IS APPLIED EXCEPT FOR EMITTER AND BASE READINGS AT Q7, WHICH IS MEASURED AT THRESHOLD OF COMPRESSION.

NOTE:
1. ALL WIRES ARE F24 EXCEPT AS NOTED.

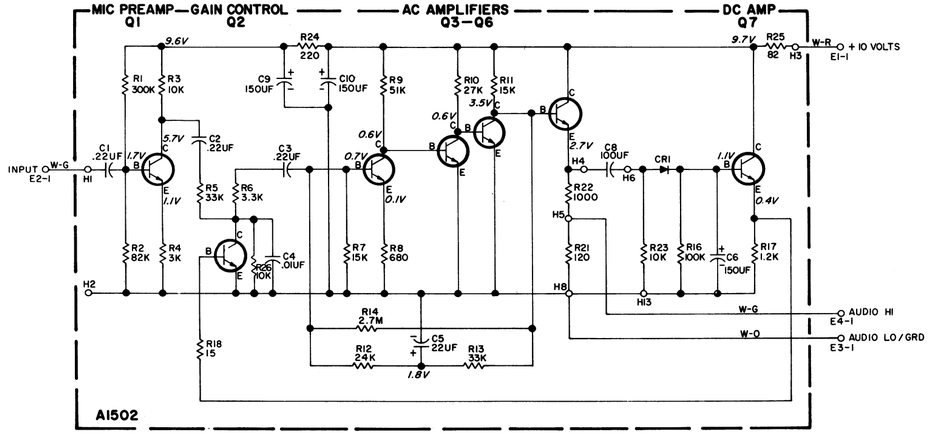
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19C303881G1	A

(19C303880, Rev. 4)

COMPRESSION AMPLIFIER PL-19C303881-G2



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

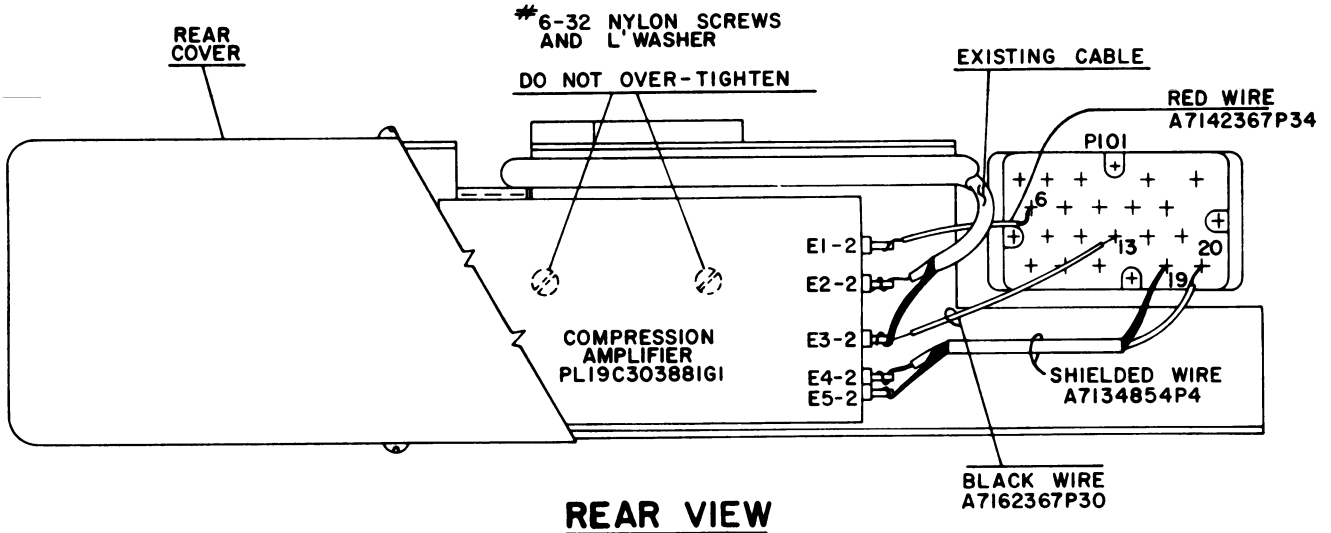
THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19C303881G2	A

(19C303900, Rev. 3)

SCHEMATIC DIAGRAM

COMPRESSION AMPLIFIER
PL-19C303881-G1 & -G2



REAR VIEW

INSTRUCTIONS:

STEP 1. REMOVE REAR COVER FROM UNIT.

STEP 2. REMOVE 2 #6-32 SCREWS (ONE FOR CABLE CLAMP) AND DISCARD CLAMP AND SCREWS.

STEP 3. WITH COVER OFF & COMPONENT BOARD REMOVED, ASSEMBLE COMPRESSION AMPLIFIER CAN IN POSITION SHOWN USING #6-32 NYLON SCREWS SUPPLIED. REASSEMBLE COMPRESSION AMPLIFIER.

STEP 4. MAKE FOLLOWING WIRING CHANGES AND CONNECTIONS. SOLDER ALL CONNECTIONS.

A. UNSOLDER EXISTING SHIELDED WIRE FROM P101-19 AND P101-20 AND SOLDER TO E2-1 AND E3-1 AS SHOWN. PULL WIRE BACK THRU LACING AS REQUIRED TO GAIN SUFFICIENT LEAD LENGTH.

B. USING SHIELDED WIRE SUPPLIED MAKE CONNECTIONS FROM E4-1 & E5-1 TO P101-19 AND P101-20 AS SHOWN.

C. USING RED WIRE SUPPLIED MAKE CONNECTION FROM E1-1 TO P101-6.

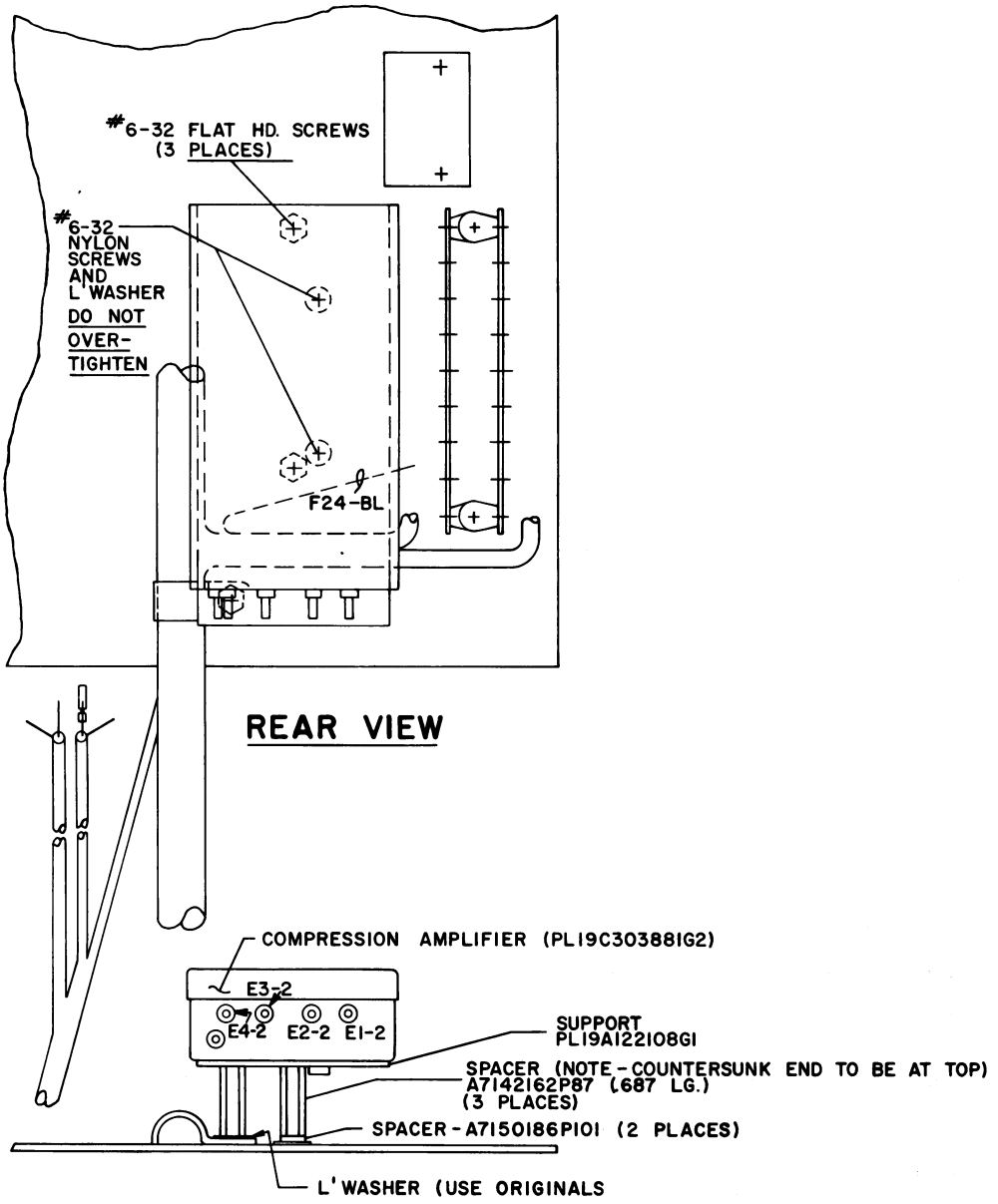
D. USING BLACK WIRE SUPPLIED MAKE CONNECTION FROM E3-1 TO P101-13.

STEP 5. REPLACE REAR COVER.

INSTALLATION INSTRUCTION

COMPRESSION AMPLIFIER MODIFICATION
PL-19A122276-G2 (Option 7088)

(19C303897, Rev. 2)



INSTALLATION INSTRUCTIONS:

REMOVE PRE-AMPLIFIER FROM CONTROL PANEL AND REMOVE TWO SHIELDED LEADS AND F24 BL LEAD FROM HARNESS AS SHOWN.

MOUNT COMPRESSION AMPLIFIER AS SHOWN. CONNECT F24 BL LEAD TO E1-2 ON COMPRESSION AMPLIFIER. REMOVE CONNECTOR FROM SHIELDED LEAD AND CONNECT AS FOLLOWS: CENTER CONDUCTOR TO E2-2 AND SHIELD TO E3-2 ON COMPRESSION AMPLIFIER (THIS LEAD FROM J901). CONNECT SECOND SHIELDED LEAD AS FOLLOWS: CENTER CONDUCTOR TO E4-2 AND SHIELD TO E3-2 ON COMPRESSION AMPLIFIER (THIS LEAD FROM P902).

INSTALLATION INSTRUCTION

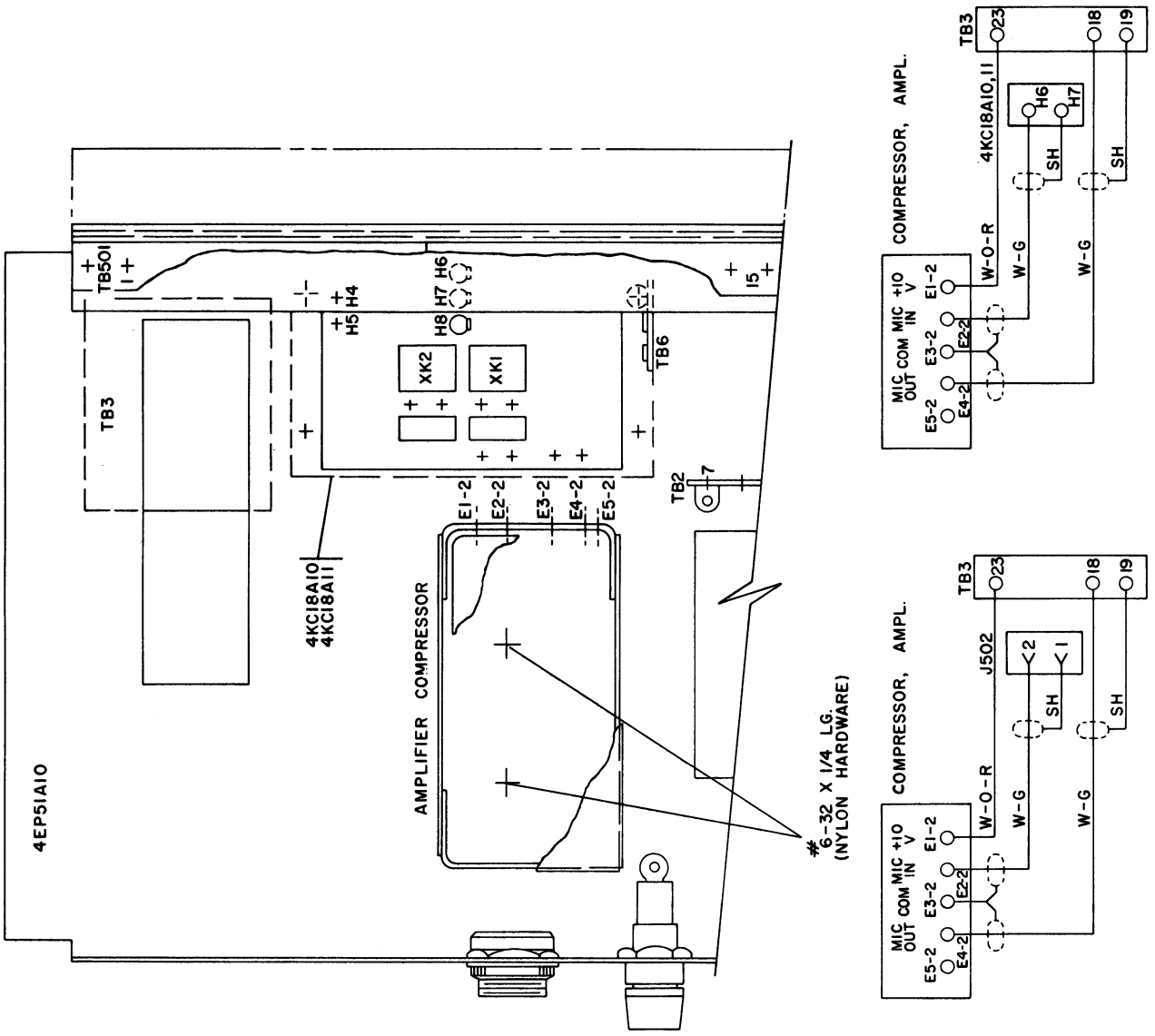
COMPRESSION AMPLIFIER MODIFICATION
PL-19A122276-G1 (Option 7720)

INSTRUCTIONS FOR INSTALLATION OF AMPLIFIER COMPRESSOR WITHOUT REMOTE CONTROL

1. REMOVE SCREWS HOLDING MIC PRE-AMP (PLI98204663G2) AND REMOVE W-O-R WIRE FROM H4.
2. UNSOLDER SHIELDED WIRES FROM TB6.
3. UNSOLDER SHIELDED WIRE FROM J502-2. SHIELD FROM J502-1 AND REMOVE PRE-AMP.
4. ASSEMBLE AMPLIFIER COMPRESSOR BY REMOVING BOARD FROM CAN, USING NYLON HARDWARE SUPPLIED. ASSEMBLE AMPLIFIER COMPRESSOR TO CHASSIS WITH SCREW HEAD ON INSIDE OF CAN. REASSEMBLE BOARD IN CAN.
5. PULL W-O-R WIRE (DISCONNECTED FROM MIC PRE-AMP) OUT OF HARNESS AS REQUIRED AND SOLDER TO E1-2 ON AMPLIFIER COMPRESSOR. MOVE THE OTHER END OF THIS W-O-R WIRE FROM TB3-6 TO TB3-23.
6. CONNECT PL-19A122H22-G3 CABLE (SUPPLIED) FROM J502 TO AMPLIFIER COMPRESSOR. CONNECT W-G WIRE BETWEEN J502-2 & E2-2 AND CONNECT SHIELD BETWEEN J502-1 & E3-2. SPOT TIE TO EXISTING HARNESS.
7. SOLDER SHIELDED WIRE FROM TB3 TO AMPLIFIER COMPRESSOR. W-G WIRE TO E4-2 AND SHIELD TO E3-2.

INSTRUCTIONS FOR INSTALLATION OF AMPLIFIER COMPRESSOR WITH REMOTE CONTROL.

1. REMOVE SCREWS HOLDING MIC PRE-AMP (PLI98204663G2) AND REMOVE W-O-R WIRE FROM H4.
2. UNSOLDER W-G WIRE FROM H8 AND SHIELD FROM H7 ON REMOTE CONTROL PANEL 4KC18A10,11.
3. UNSOLDER SHIELDED WIRE FROM J502-2, SHIELD FROM J502-1 AND REMOVE PRE-AMP.
4. ASSEMBLE AMPLIFIER COMPRESSOR BY REMOVING BOARD FROM CAN, USING NYLON HARDWARE SUPPLIED. ASSEMBLE AMPLIFIER COMPRESSOR TO CHASSIS WITH SCREW HEAD ON INSIDE OF CAN. REASSEMBLE BOARD IN CAN.
5. PULL W-O-R WIRE (DISCONNECTED FROM MIC PRE-AMP) OUT OF HARNESS AS REQUIRED AND SOLDER TO E1-2 ON AMPLIFIER COMPRESSOR. MOVE THE OTHER END OF THIS W-O-R WIRE FROM TB3-6 TO TB3-23.
6. UNSOLDER THE SHIELDED WIRE FROM 4KC18A10,11, H6 & H7 AND RECONNECT TO AMPLIFIER COMPRESSOR, W-G WIRE TO E4-2 AND SHIELD TO E3-2.
7. CONNECT PL-19A122H22-G3 CABLE (SUPPLIED) FROM J502 TO 4KC18A10,11. CONNECT W-G WIRE BETWEEN J502-2 & H8 AND CONNECT SHIELD BETWEEN J502-1 & H7.
8. CONNECT PL-19A122H22-G2 CABLE (SUPPLIED) FROM AMPLIFIER COMPRESSOR TO 4KC18A10,11. CONNECT W-G- WIRE BETWEEN E2-2 & H6 AND CONNECT SHIELD BETWEEN E3-2 & H7.

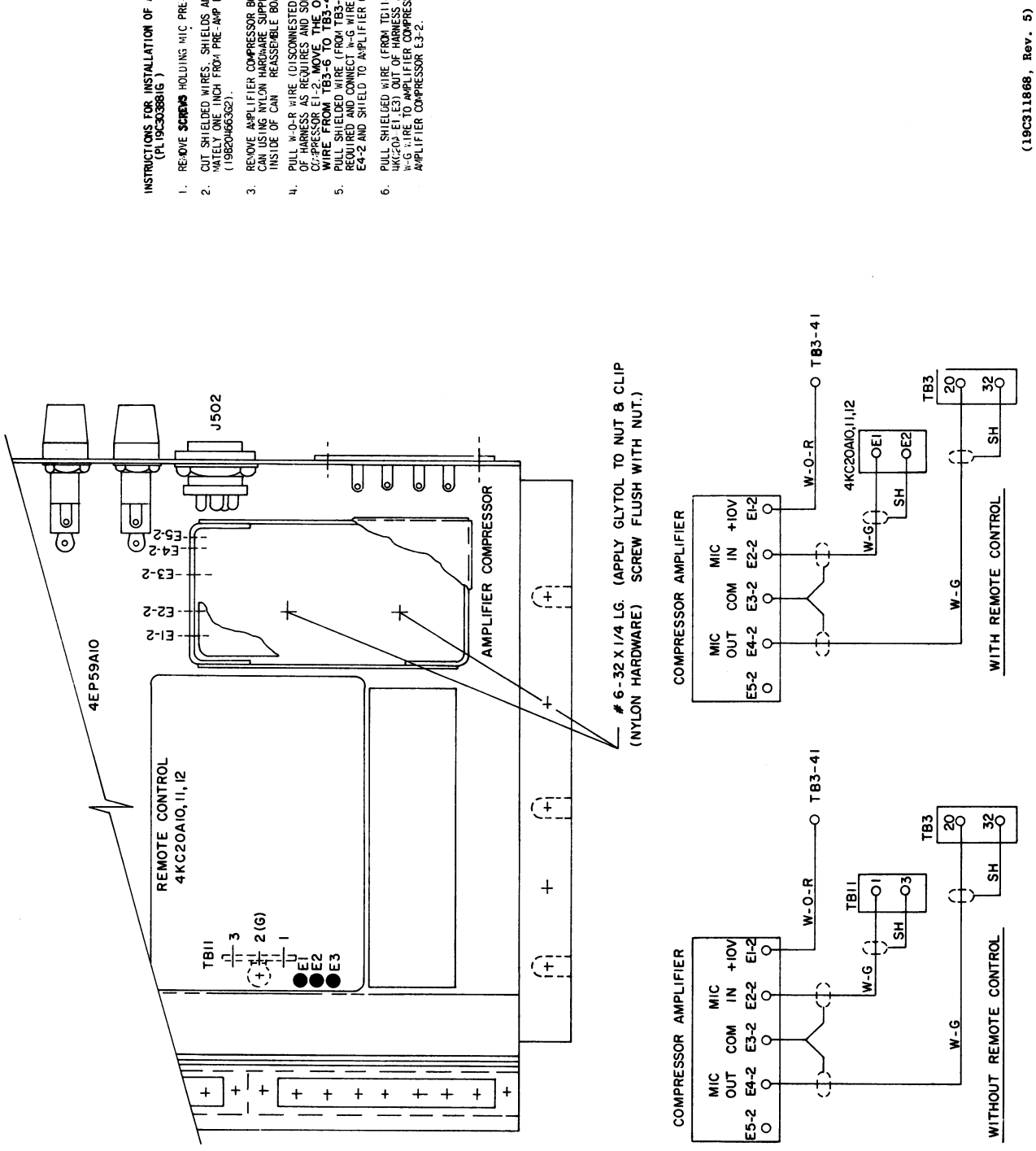


(DF-8397)

INSTALLATION INSTRUCTION

COMPRESSION AMPLIFIER MODIFICATION
19A122276G3 (OPTION 8419)

(19C311109, Rev. 6)



INSTALLATION INSTRUCTION

COMPRESSION AMPLIFIER MODIFICATION 19A122276G4 (OPTION 8484)

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

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, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-3815

DF-8397

Progress Is Our Most Important Product

GENERAL ELECTRIC

MOBILE RADIO DEPARTMENT LYNCHBURG, VIRGINIA 24502 CABLE GECOMPROD

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