MOBILE RADIO

INSTRUCTIONS FOR DC REMOTE CONTROL BOARD 19C330118G2

LBI30800C (DF4101)

TABLE OF CONTENTS

DESCRIPTION

The General Electric Remote Station Options provide Local/DC Remote Control to the station. A DC Remote Control Board is used to interface with a remote control console. The board provides remote single-frequency transmit and Channel Guard monitor functions. Two current levels may be applied to the telephone line at the remote control console: +6 mA and -2.5 mA. These control currents are provided by the General Electric MASTR® Controller or DESKON II. For functions provided by the TCC or DESKON units (6 mA for Channel Guard and 15 mA for transmit control), jumper changes are required on the control board.

The DC Remote Control Board is a printed wire board mounted to a sheet-metal plate. The plate has standoffs and press-in nuts are used to mount the plate to the Power Supply chassis. All connections to the Power Supply and the radio are made through a cable from the control board and the cable leads are terminated with spade lugs. These cable leads connect to a terminal board mounted on the Power Supply Assembly.

Table 1 - Control Current and Function

FUNCTION	Control Current in Milliamperes		
	-2.5	+6	0
1 Freq. Transmit 1 Freq. Receive		Transmit	Receive
1 Freq. Transmit 1 Freq. Receive CG Monitor	Receive with CG Disable	Transmit	Receive with CG

TELEPHONE LINE CHARACTERISTICS

The key link in a remote control installation is the telephone pair between the Controller and the base station. To obtain the most satisfactory service over this link, some general knowledge of the capabilities of such lines is required.

A telephone pair is simply a pair of wires, normally ranging from AWG #19 to AWG #26 in size. These wires, furnished by the local telephone company, pass through overhead cables, underground cables, through junction points, and switchboards. To the user, however, they may be considered a simple pair of wires. Equipment that is designed to operate with such a pair should have nominal impedance of 600 ohms. A telephone pair will normally have a maximum length of about 12 miles before amplification is added by the telephone company to make up for line losses. There is an inherent loss in any telephone line installation due to the series inductance and resistance and the shunt capacitance of the wires.

This loss is a direct function of the length of the line, and varies with the wire size used. As an example, with AWG #19 wire, a distance of six miles may be covered before one-half the input voltage of a 1,000 Hz tone is lost. With AWG #26 wire, only two and one-quarter miles may be covered before one-half the input voltage is lost. Line losses as high as 30 dB can be tolerated in operating the transmitter from the Remote but such high losses should be avoided whenever possible. Although the telephone pair is fairly well balanced, some noise will be induced into the line, especially if an unshielded run has to be made in a flourescent-lighted building.

TELEPHONE LINE CHARACTERISTICS

The DC resistance of any telephone pair will affect the control circuits between the Controller and the base station. Current regulators incorporated in the Remote Control minimize these variations after initial adjustment. The Remote operates with a total control line loop resistance as great as 11,000 ohms. There is a possibility however, that stray currents, due to leakage, noise, faults, earth currents, etc., may cause faulty operation.

Three types of telephone line connections are commonly used. Before choosing one of these types, consider the cost and performance of each, as one type may be available at a much lower rate. Also, some telephone companies offer no choice. The following chart contains information to assist in selecting the control method and type of telephone line to be used in DC control applications. Refer to Figure 1.

METHOD	DESCRIPTION	ADVANTAGES OR DISADVANTAGES
1.	One metallic pair: for both audio and control voltages with control voltage from line to line	Economical; dependable where earth currents may be large; slight keying clicks will be heard in paralleled Remote Control Units. In most applications, preferred over Method No. 2.
2.	One metallic pair: for both audio and control voltages with control voltages from line to ground.	Economical; earth ground currents may result in interference with control functions; keying click minimized. Good earth to ground required at station and all control points.
3.	Two telephone pairs; one for audio voltage and one for control voltage (metallic pair).	Provides best performance; keying clicks will not be heard. Requires 2 pair.

TELEPHONE LINE CONNECTIONS

The station is normally shipped with jumpers connected on the Remote Control Board as described in Method 1. If Method 2 or 3 is to be used, connect the jumpers as shown in the following chart.

CONTROL METHOD	TELEPHONE LINE CONNECTIONS	JUMPER CONNECTIONS
1	Connect telephone lines to TB1-4 and -5.	
2	Connect telephone lines to TB1-4 and -5. Connect good earth ground to TB1-1.	
3	Connect audio telephone lines to TB1-4 and -5 and control lines to TB1-1 and -2.	See Notes 1 and 2 on Schematic Diagram

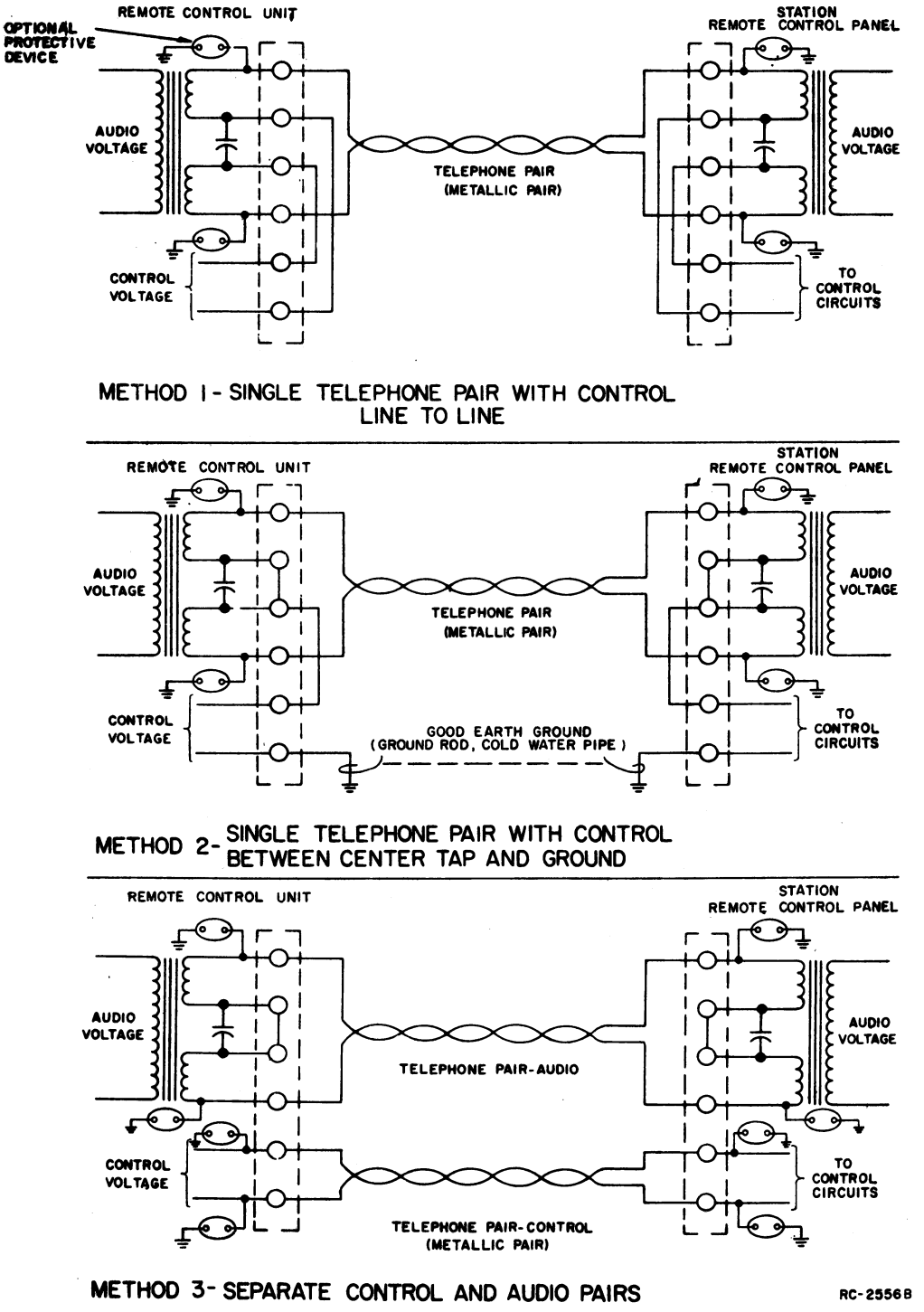

Figure 1 - Telephone Line Connections

Proper Grounding Practices (Method 2)

The telephone company specifies that their customer's equipment signal ground should be made using the proper connection to a ground electrode such as a metallic cold water pipe. The ground connection should be made with a single No. 14 AWG or larger copper conductor. The conductor should be short, straight and a continuous piece of wire. Attention should be given to providing the lowest possible resistance at the connection at each end of the ground wire.

When option line surge protection devices are provided in the customer equipment, it is imperative that the good earth ground be used. If the telephone company also provides protective devices, the customer provided device earth ground connections should be located close to the telephone company earth ground connections but should not use the same ground clamp that the telephone company uses.

If a good earth ground as described above cannot be obtained, Method 2 should not be used. Also, the addition of surge protective devices are of little value without the proper earth ground.

REMOTE CONTROL ADJUSTMENTS

When the station is equipped with a DC Remote Control board, REMOTE TX MOD LEVEL and REC LINE LEVEL controls must be adjusted before placing the station in operation.

A. REMOTE TX MOD LEVEL

1. Feed a 1000 Hertz tone at the required level into a microphone jack on the remote control console. Adjust the remote control console line output control for 2.7 Volts RMS as measured across the audio pair at the remote control console.

2. Key the station transmitter from the remote control console and adjust the REMOTE TX MOD LEVEL Control R34 on the DC Remote Control Board for 4.5 kHz system deviation as measured at the station transmitter.

B. REC LINE LEVEL

1. Connect a signal generator to the station receiver. Adjust the generator to the receiver frequency, modulated at 3 kHz deviation by a 1000 Hertz tone. Disable Channel Guard if present.

2. Adjust the REC LINE LEVEL control R24 on the DC Remote Control Board for a reading of 2.7 Volts RMS as measured at the station audio pairs (TB1-4 and -5.

CIRCUIT ANALYSIS

Single Frequency Transmit and Receive

The DC Remote Control Board contains two optocouplers (Q11 and Q12) used for current control and line isolation. Each coupler contains a Light Emitting Diode (LED) serving as a light source and a light-sensitive phototransistor serving as a light detector. The light source and detector are both housed in a single package, sealed from outside light. When a DC current of the correct polarity to forward bias the LED is applied to the input of the optocoupler, the LED conducts and emits light. This light is detected by a phototransistor, turning it on and coupling the input signal to the output of the optocoupler.

When zero current is present on the control pair, the LED in Q11 and Q12 is turned off. The phototransistor is not conducting, holding Q14 off. This is the receive mode of the control circuit. Applying +6 mA to the control pair will result in the voltage at the base of Q8 being clamped to 6 VDC. The voltage at the emitter of Q8 rises to 0.6 VDC above the base and the transistor is turned off, allowing the LED in Q11 to conduct. The phototransistor detects the light and turns on. The high at the emitter of the phototransistor turns on Q14-C. Conduction of Q14-C turns on emitter-follower Q14-D which, in turn, operates Q10. Conduction of Q10 applies ground to the PTT terminal TB802-6 on the Power Supply to key the station transmitter.

Audio Control

Audio circuits provided on the Remote Control Board include a high-pass filter, audio amplifier, a de-emphasis network and a line driver for feeding the receive audio to the telephone lines. A modulation amplifier and level control are provided for controlling the line audio feed to the transmitter modulator. Audio and RUS switches are included for switching the transmit and receive audio paths.

Audio from the station receiver is coupled to audio amplifier AR1 and de-emphasis network C23 and R65. The

de-emphasis network provides a 6 dB/octave rolloff. The signal is coupled to the CG Notch Filter which is composed of Q1, Q2 and associated circuitry. Negative feedback for the Notch Filter is connected from the collector of Q2 to the junction of C7 and R8. The Notch Filter output is applied to a 300 Hz High-Pass Filter consisting of Q3 and Q4. Negative feedback is developed across R16.

The output of the filter is coupled to audio amplifier Q5. The REC LINE LEVEL control R24 is connected in the emitter circuit of Q5 and allows feeding the audio to the line amplifier at the proper level.

The audio is coupled to the LINE AMPLIFIER by means of C14. Q6 and Q7 amplify the signal and pass the audio to the line transformer T1. Q13-A and Q13-B serve as audio switches controlled by the Receiver Unsquelched sensor (RUS) circuit. As long as the RUS switch Q13-E is turned off (receiver squelched), CR1 and CR2 are forward biased, allowing Q13-A and Q13-B to conduct. Conduction of Q13-A and Q13-B grounds the audio path, preventing the received audio from passing to the line. When the receiver is unsquelched the RUS lead goes high. This turns Q13-E on, turning off Q13-A and Q13-B. The audio is not allowed to pass to the line amplifier. VR1 is provided for line surge protection.

Audio from the remote control unit applied to the telephone pair is coupled to the input of the transmit audio amplifier Q13-C. The proper audio level for the transmitter modulator is adjusted by TX MOD LEVEL control R34.

Transistor Q13-D is controlled by the transmit PTT circuit. If Q14-D is conducting (the control circuit in the transmit mode), the base of Q13-D is high, allowing the transmit audio to pass to TB802-7 (TX AUDIO HI). When Q14-D is turned off (receive mode), Q13-D is held off and prevents the transmit audio from passing to the transmitter modulator.

Channel Guard Monitor

When the Channel Guard disable control current (-2.5 mA) is applied to the control pair, Q8 is allowed to conduct but Q9 is turned off. Thus optocoupler Q12 is operated and optocoupler Q11 is turned off. The high at the emitter of the Q12 phototransistor is connected to the base of Q14-B, turning the transistor on. Conduction of Q14-B operates Q14-E, applying ground to the CG MONITOR lead P802-5. With Channel Guard disabled, the station receiver now operates only on noise squelch so that all transmissions on the receiver frequency will be heard.

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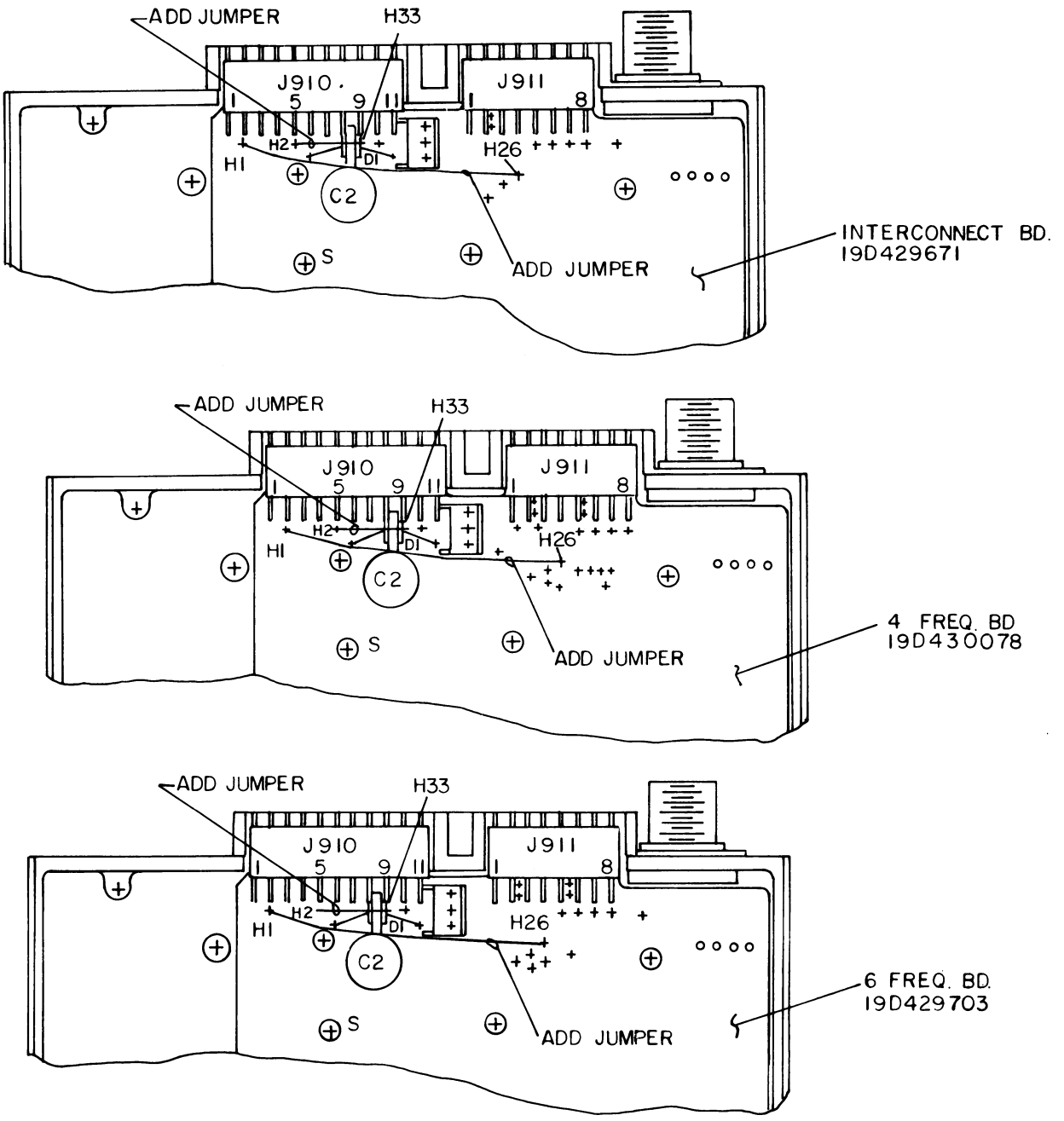
RADIO MODIFICATION (OPTION 2621)

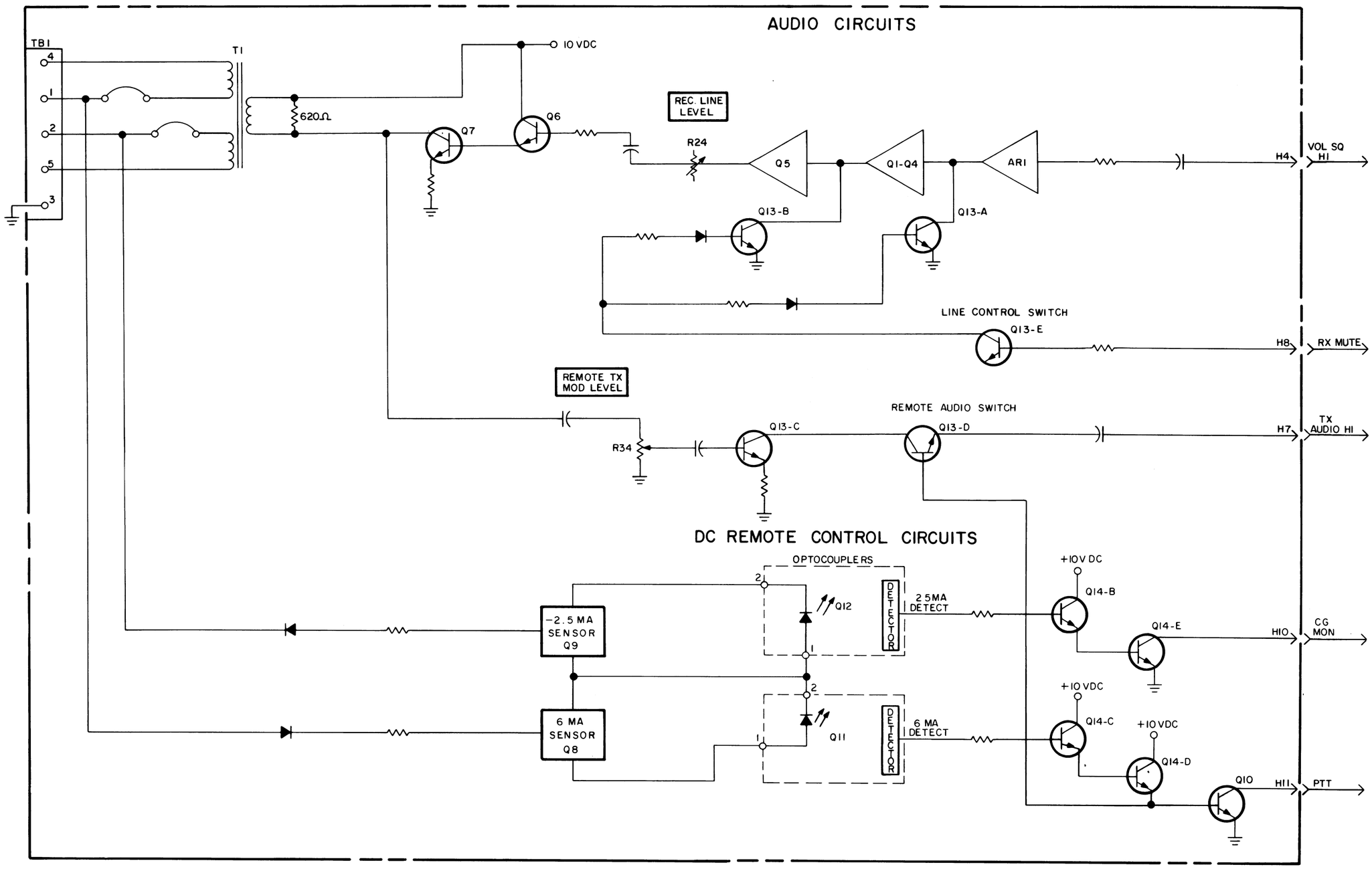
1. ADD JUMPER WIRE (SN22-W) ON INTERCONNECT/MULTI FREQ. BOARD FROM H1 TO H26.
2. ADD JUMPER WIRE (DA SLEEVED) ON INTERCONNECT/ MULTI FREQ. BOARD FROM H2 TO H33.



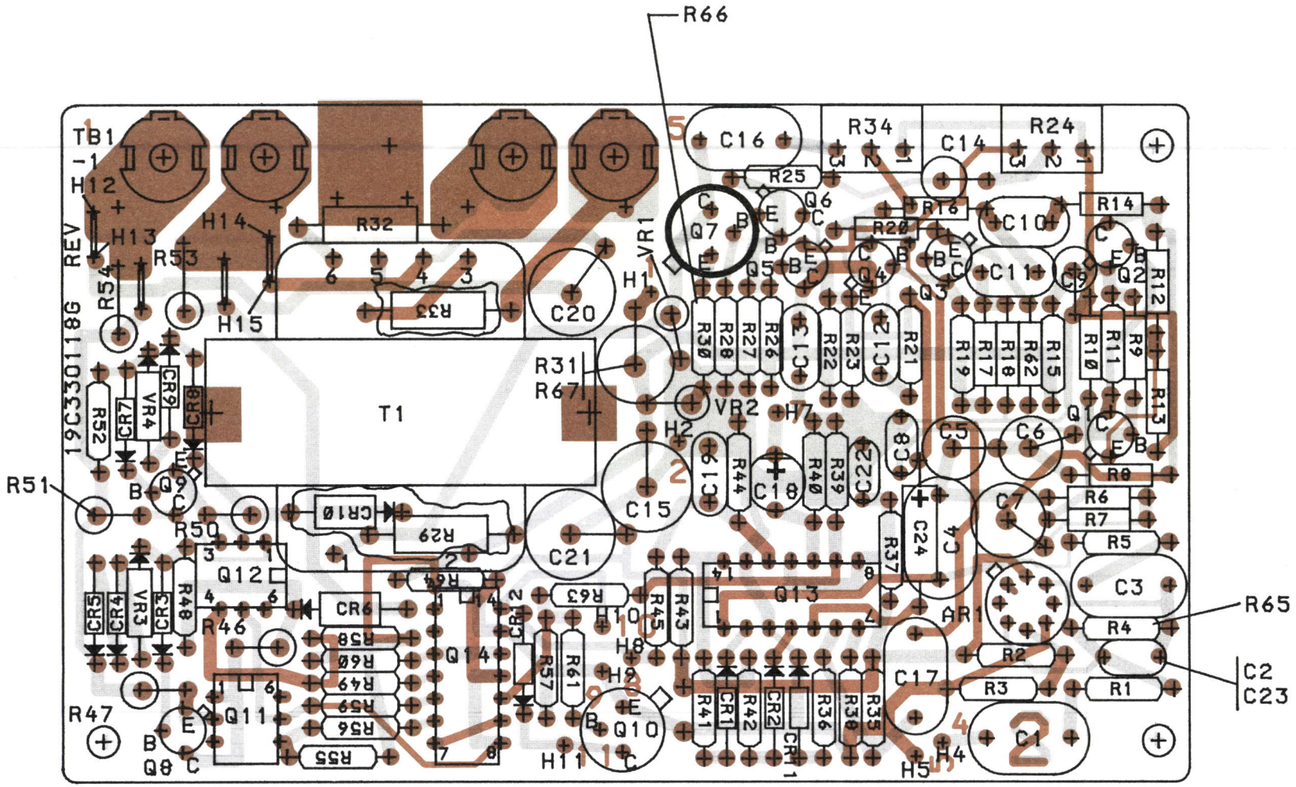
TOP VIEW RC-3815

INSTALLATION INSTRUCTIONS

RADIO MODIFICATION (OPTION 2621)

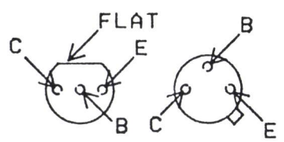

AUDIO CIRCUITS
TB1
4
1
2
5
3
T1
620Ω
10 VDC
Q7
Q6
REC. LINE LEVEL
R24
Q5
Q1-Q4
AR1
H4
VOL SQ HI
Q13-B
Q13-A
LINE CONTROL SWITCH
Q13-E
H8
RX MUTE
REMOTE TX MOD LEVEL
R34
REMOTE AUDIO SWITCH
Q13-C
Q13-D
H7
TX AUDIO HI
DC REMOTE CONTROL CIRCUITS
OPTOCOUPLERS
-2.5 MA SENSOR Q9
6 MA SENSOR Q8
Q12
Q11
DETECTOR
2.5MA DETECT
6 MA DETECT
+10V DC
Q14-B
Q14-E
H10
CG MON
+10 VDC
Q14-C
Q14-D
Q10
H11
PTT

RC-3814



(19C330124, Rev. 4)
(19A138403, Sh. 1, Rev. 2)
(19A138403, Sh. 2, Rev. 2)

LEAD IDENTIFICATION
FOR Q1 THRU Q10

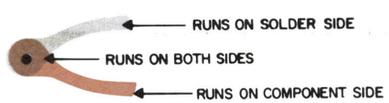


OR

IN-LINE TRIANGULAR

TOP VIEW

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.



OUTLINE DIAGRAM

DC REMOTE CONTROL BOARD
19C330118G2

DE-EMPHASIS

CG NOTCH FILTER

300 HZ HP FILTER

LINE AMPLIFIER

REMOTE MOD SWITCH

TX MOD LEVEL

LINE CONTROL SWITCH

REC LINE LEVEL

LINE OPTOCOUPLERS

FUNCTION SWITCH

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.

MODEL NO	REV LETTER
PL19C330118G2	B

(19D430327, Rev. 4)

NOTES:
1. REMOVE JUMPERS WHEN USING SEPERATE CONTROL AND AUDIO PAIRS.
2. REMOVE JUMPERS WHEN USING DESKON, T.C.C., OR OTHER VOLTAGE SOURCE CONTROL UNIT OR USING SEPERATE CONTROL AND AUDIO PAIRS.
3. H8-BK AND H4-R WIRES SHIELDED BY SAME SHIELD CONNECTED TO H5.
4. ALTERNATE FUNCTION FOR GE MARC V.

SCHEMATIC DIAGRAM

DC REMOTE CONTROL BOARD 19C330118G2

PARTS LIST

DC REMOTE CONTROL BOARD
19C330118G2 - REV. B
ISSUE 3

SYMBOL	GE PART NO.	DESCRIPTION
AR1	19A116297P2	Integrated circuit, linear: Operational Amplifier, with TO99 Package; sim to uA741C.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116080P108	Polyester: 0.155 uF ±10%, 50 VDCW.
C3	19A116080P7	Polyester: 0.1 uF ±20%, 50 VDCW.
C4	19A116080P8	Polyester: 0.15 uF ±20%, 50 VDCW.
C5 and C6	19C300075P47001G	Polyester: .047 uF ±2%, 100 VDCW; sim to GE Type 61F.
C7	19C300075P10002G	Polyester: .1 uF ±2%, 100 VDCW; sim to GE Type 61F.
C8	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.
C9	5496267P14	Tantalum: 15 uF ±20%, 20 VDCW; sim to Sprague Type 150D.
C10 and C11	19A116080P205	Polyester: 0.047 uF ±5%, 50 VDCW.
C12	19A116080P7	Polyester: 0.1 uF ±20%, 50 VDCW.
C13	19A116080P4	Polyester: 0.033 uF ±20%, 50 VDCW.
C14	5496267P10	Tantalum: 22 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C15	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C16 and C17	19A116080P108	Polyester: 0.155 uF ±10%, 50 VDCW.
C18	19A134202P14	Tantalum: 1 uF ±20%, 35 VDCW.
C19	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C20	19A134549P4	Electrolytic, non polarized: 4 uF +50%-10%, 150 VDC; sim to Sprague 30D.
C21	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C22	19A700005P4	Polyester: 3300 pF ±10%, 50 VDCW.
C23	19A116080P116	Polyester: .0068 uF ±10%, 50 VDCW.
C24	5496267P17	Tantalum: 1.0 uF ±20%, 35 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR5	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR6	4037822P2	Silicon, 1000 mA, 600 PIV.
CR7 thru CR9	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR10	4037822P2	Silicon, 1000 mA, 600 PIV.
CR11 and CR12	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116774P1	Silicon, NPN; sim to Type 2N5210.
Q2	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q3	19A116774P1	Silicon, NPN; sim to Type 2N5210.
Q4	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q5 and Q6	19A116774P1	Silicon, NPN; sim to Type 2N5210.
Q7	19A115300P4	Silicon, NPN.
Q8 and Q9	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q10	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q11 and Q12	19A116908P1	Coupler, optoelectronic: 6 pin, dual in line; sim to Fairchild FCD-5004.
Q13 and Q14	19A116623P1	Silicon, NPN (5 Transistor Array): 300 mW per transistor, 750 mW per package.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700019P48	Deposited carbon: 8.2K ohms ±5%, 1/4 w.
R2 and R3	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R5	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R6 and R7	19A701250P323	Metal film: 16.9K ohms ±1%, 1/4 w.
R8	19A701250P293	Metal film: 90.0K ohms ±1%, 1/4 w.
R9	19A701250P333	Metal film: 21.5K ohms ±1%, 250 VDCW, 1/4 w.
R10	19A701250P317	Metal film: 14.7K ohms ±1%, 250 VDCW, 1/4 w.
R11	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R12	19A701250P217	Metal film: 1.47K ohms ±1%, 1/4 w.
R13	19A701250P253	Metal film: 3.48K ohms ±1%, 1/4 w.
R14	19A701250P201	Metal film: 1K ohms ±1%, 1/4 w.
R15	19A143400P35	Deposited carbon: 750 ohms ±5%, 1/4 w.
R16	19A701250P232	Metal film: 2100 ohms ±1%, 250 VDCW, 1/4 w.
R17	19A701250P412	Metal film: 130K ohms ±1%, 1/4 w.
R18	19A701250P419	Metal film: 154K ohms ±1%, 1/4 w.
R19	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R20	19A701250P140	Metal film: 225 ohms ±1%, 1/4 w.
R21	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R22 and R23	19A143400P54	Deposited carbon: 30K ohms ±5%, 1/4 w.
R24	19A116559P202	Variable cermet: 5000 ohms ±20%, 1/2 w; sim to CTS Series 360.
R25	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R26	19A700019P60	Deposited carbon: 82K ohms ±5%, 1/4 w.
R27	19A700019P54	Deposited carbon: 27K ohms ±5%, 1/4 w.
R28	19A143400P41	Deposited carbon: 2.4K ohms ±5%, 1/4 w.
R29	3R77P621J	Composition: 620 ohms ±5%, 1/2 w.
R32 and R33	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R34	19A116559P222	Variable cermet: 10K ohms ±20%, 1/4 w; sim to CTS Series 360.
R35	19A700019P66	Deposited carbon: 0.27M ohms ±5%, 1/4 w.
R36	19A143400P53	Deposited carbon: 24K ohms ±5%, 1/4 w.
R37	19A700019P46	Deposited carbon: 5.6K ohms ±5%, 1/4 w.
R38	19A700019P27	Deposited carbon: 150 ohms ±5%, 1/4 w.
R39	19A700019P61	Deposited carbon: 0.1M ohms ±5%, 1/4 w.
R40 thru R42	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R43	19A700019P43	Deposited carbon: 3.3K ohms ±5%, 1/4 w.
R44	19A700019P52	Deposited carbon: 18K ohms ±5%, 1/4 w.
R45	19A700019P53	Deposited carbon: 22K ohms ±5%, 1/4 w.
R46 and R47	19A700113P67	Composition: 1.5K ohms ±5%, 1/2 w.
R48 and R49	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R50	3R77P242J	Composition: 2.4K ohms ±5%, 1/2 w.
R51	3R77P621J	Composition: 620 ohms ±5%, 1/2 w.
R52	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R53 and R54	19A700113P67	Composition: 1.5K ohms ±5%, 1/2 w.
R55	19A143400P64	Deposited carbon: 200K ohms ±5%, 1/4 w.
R56	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R57	19A143400P40	Deposited carbon: 2K ohms ±5%, 1/4 w.
R58	19A143400P64	Deposited carbon: 200K ohms ±5%, 1/4 w.
R59	19A143400P45	Deposited carbon: 5.1K ohms ±5%, 250 VDCW, 1/4 w.
R60	19A143400P64	Deposited carbon: 200K ohms ±5%, 1/4 w.
R61	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R62	19A701250P265	Metal film: 4.6K ohms ±1%, 1/4 w.
R63	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R64	19A700019P14	Deposited carbon: 12 ohms ±5%, 1/4 w.
R65	19A700019P64	Deposited carbon: 0.18M ohms ±5%, 1/4 w.
R66	19A700019P18	Deposited carbon: 27 ohms ±5%, 1/4 w.
R67	3R79P240J	Composition: 24 ohms ±5%, 2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19A134368P1	Audio: 300 to 6000 Hz freq range, DC resistance, 27 ohms primary, 16-1/2 ohms secondary, 1 & 2.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	19A116667P3	Nut, plate; sim to Malco XO-2879. (Quantity 4).
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1	19A116325P6	Zener: 5 w, 20 v.
VR2	19A116325P4	Zener: 5 w, 12 v; sim to Type 1N5349.
VR3 and VR4	4036887P5	Zener: 500 mW, 5.4 v. nominal.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A701332P4	Insulator, washer: nylon. (Used with Q7 & Q10).
	19B209260P103	Solderless terminal; sim to AMP 60495-1. (Wire terminations from H1, H4, H7-H11).
	19B209260P102	Solderless terminal; sim to AMP 40763. (Wire terminations from H2 & H5).
	19B232509G1	Support. (Mounts DC Remote Control Board).
	19A701887P1	Heat sink. (Used with Q7).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

REMOTE CONTROL INSTALLATION KIT
19A142545G1
ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
	19A701863P13	Cable clip. (Secures cable to 3 way connector 19B233220G1).
	N80P13008C6	Machine screw: No. 6-32 x 1/2. (Secures clip loop).
	N402P37C6	Flatwasher: No. 6. (Secures clip loop).
	N404P13C6	Lockwasher, internal tooth: No. 6. (Secures clip loop).
	7141225P3	Hex Nut: No. 6-32. (Secures clip loop).
	N84P9003C6	Screw, flathead: No. 4-40 x 3/16. (Secures Local Remote Control Board).
		INTERCONNECT CABLE ASSEMBLY 19C328932G1
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 7 - Used with 19A116659P20 Shell).
	19A116659P20	Shell. (Used with 19A116781P6 Contacts).
	19B209260P103	Solderless terminal; sim to AMP 60495-1. (Quantity 6).
	19B209260P102	Solderless terminal; sim to AMP 40763. (Quantity 1).
		INTERFACE CONNECTOR 19B233220G1
	19A116659P20	Shell. (Used with 19A116781P6 Contacts).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 8 - Used with 19A116659P20 Shell).
	19C328929P1	Shell. (Used with 19A116659P52 Contact).
	19A116659P52	Connector, printed wiring: 8 contacts rated at 5 amps; sim to Molex 09-65-1081. (Quantity 2 - Used with 19C328929P1 Shell).

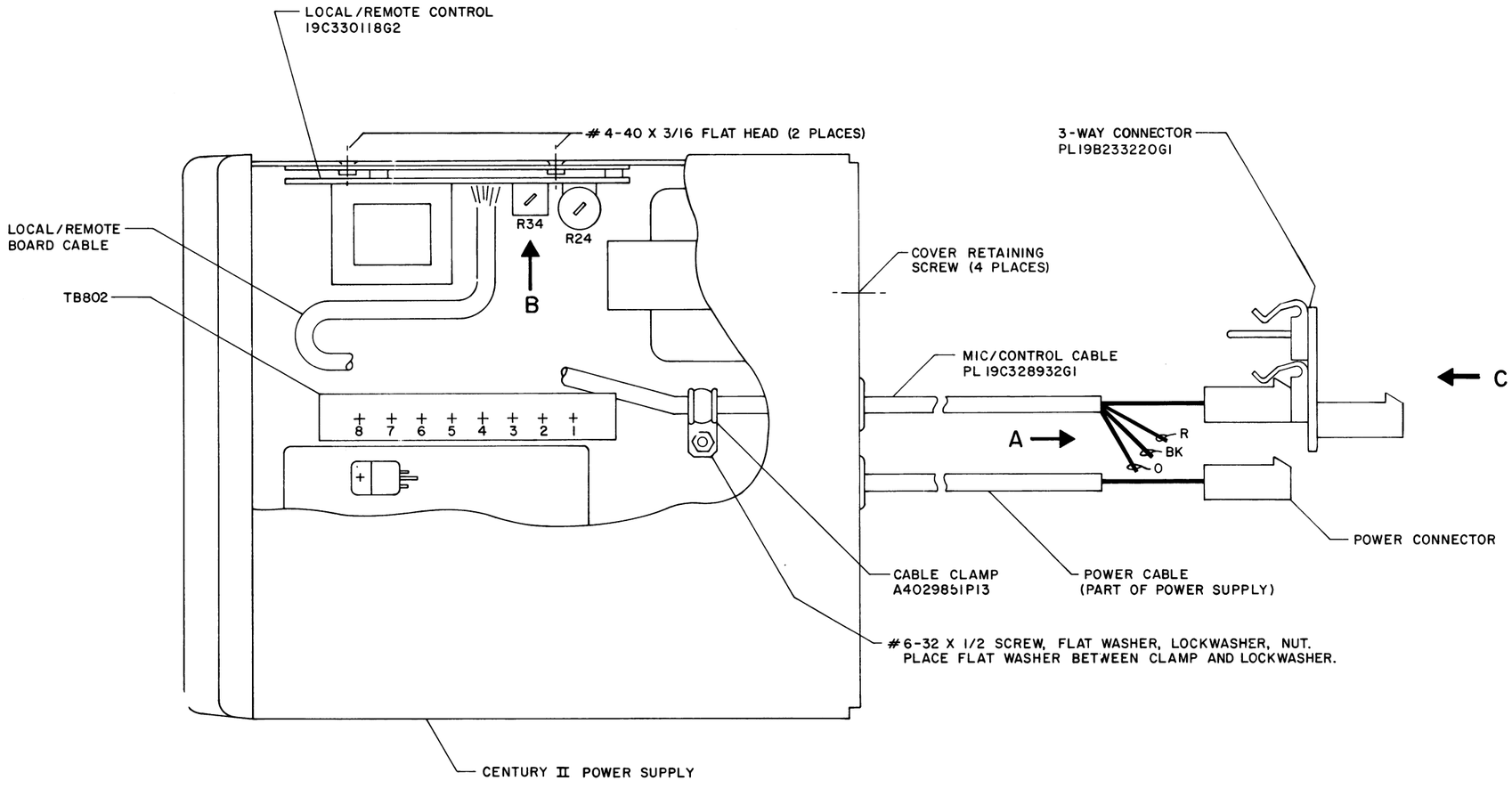
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

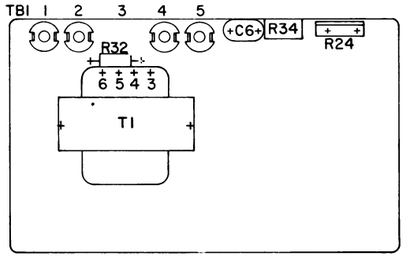
PRODUCTION CHANGES

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.

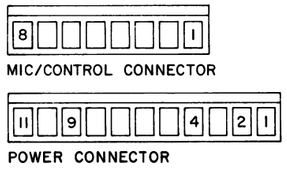
REV. A - Changed variable resistor R24 to allow adjustment below the maximum level specifications at low levels.
R24 was 19B209358P105: variable, carbon film; approx 200 to 5K ohms ±20%, 0.25 W.

REV. B - To correct CLEAR function reset in GE-MARC V applications.
Added C24 and changed R43.
R43 was 3R152P103J: Composition 10K ohms ±5%, 1/4 W.

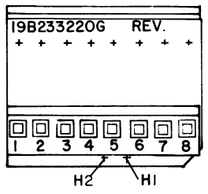




VIEW "B"



VIEW "A"



VIEW C

THIS INSTRUCTION ADDS LOCAL/REMOTE CONTROL OPTION TO THE POWER SUPPLY.

INSTALLATION INSTRUCTIONS:

1. REMOVE COVER RETAINING SCREWS (4 PLACES) AT REAR OF UNIT AND REMOVE COVER.

2. POSITION THE LOCAL/REMOTE CONTROL BOARD ASSEMBLY ON THE CHASSIS AS SHOWN AND FASTEN WITH TWO (2) 4-40 X 3/16 FLAT HEAD SCREWS SUPPLIED.

3. ROUTE MIC/CONTROL CABLE THRU REAR OF CHASSIS AND SECURE TO CHASSIS WITH CABLE CLAMP, SCREW, WASHER, LOCKWASHER AND NUT AS SHOWN. SPADE TERMINAL END OF CABLE TO EXTEND INTO TB802 AREA.

4. CONNECT LOCAL/REMOTE BOARD CABLE TO TB802 AS FOLLOWS:

CONNECT:	R	WIRE TO TERMINAL 1
	BK	WIRE TO TERMINAL 2
	SHIELD	WIRE TO TERMINAL 2
	R(SHIELDED)	TO TERMINAL 3*
	BK(SHIELDED)	TO TERMINAL 4*
	WGC	WIRE TO TERMINAL 5*
	BL	WIRE TO TERMINAL 6*
	BR	WIRE TO TERMINAL 7*
	W	WIRE TO TERMINAL 8*

*ADDITIONAL CONNECTION TO THIS TERMINAL PER INST. 5.

5. CONNECT MIC/CONTROL CABLE TO TB802 AS FOLLOWS:

CONNECT:	R	WIRE TO TERMINAL 3
	BK	WIRE TO TERMINAL 4
	C, G	WIRES TO TERMINAL 5
	BL	WIRE TO TERMINAL 6
	BR	WIRE TO TERMINAL 7
	W	WIRE TO TERMINAL 8

6. CONNECT MIC/CONTROL CABLE TO POWER CONNECTOR AS FOLLOWS:

ASSEMBLE:	BK	WIRE INTO POSITION 2 IN CONNECTOR BODY.
	R	WIRE INTO POSITION 4 IN CONNECTOR BODY.
⚠1	O	WIRE INTO POSITION 9 IN CONNECTOR BODY.

7. ASSEMBLE 3-WAY CONNECTOR TO MIC/CONTROL CONNECTOR AS SHOWN. ⚠2

8. REASSEMBLE COVER.

NOTES:

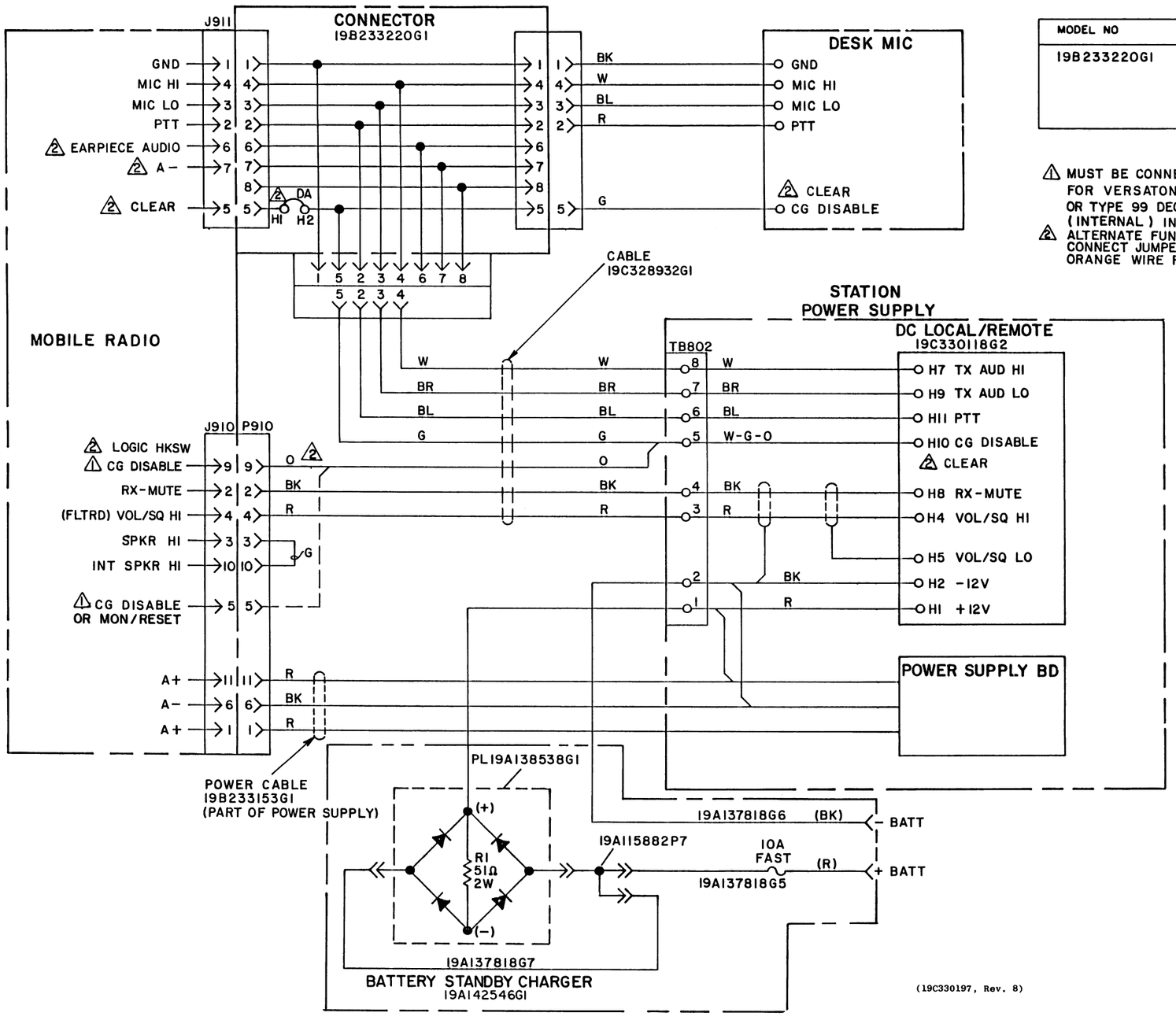
⚠1 FOR GE MARC V APPLICATIONS, OMIT ORANGE WIRE FROM POWER CONNECTOR PIN 9, FOLD BACK AND TAPE.

⚠2 FOR GE MARC V APPLICATIONS, ADD JUMPER WIRE H1 TO H2 ON 3 WAY CONNECTOR BD.

(19D430450, Rev. 4)

INSTALLATION INSTRUCTIONS

DC LOCAL/REMOTE OPTIONS



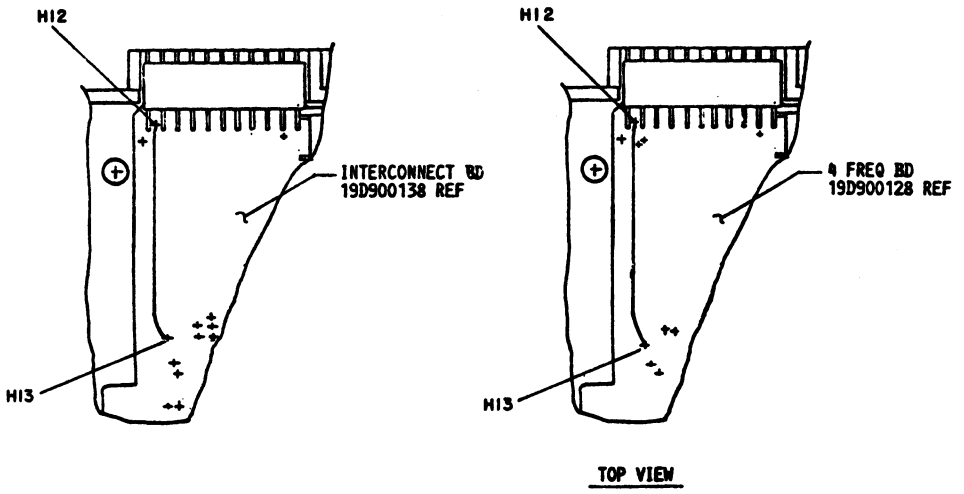
MODEL NO	REV LETTER
19B233220G1	B

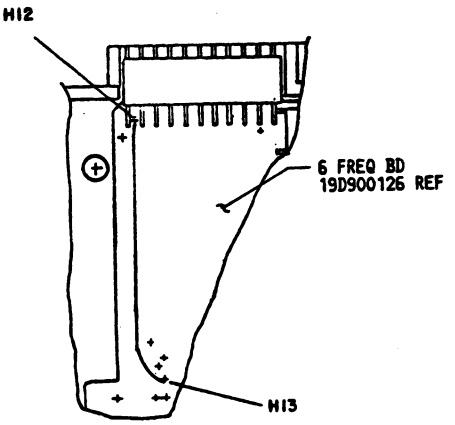
⚠1 MUST BE CONNECTED TO PIN 5 FOR VERSATONE CHANNEL GUARD OR TYPE 99 DECODER OPTION (INTERNAL) IN CENTURY II.

⚠2 ALTERNATE FUNCTIONS FOR GE MARC V. CONNECT JUMPER H1 TO H2. REMOVE ORANGE WIRE FROM P910-9 AND TAPE.

INTERCONNECTION DIAGRAM

DC LOCAL/REMOTE WITH DESK MICROPHONE





DC REMOTE MODIFICATION

NOTES:
1. ADD JUMPER WIRE ON INTERCONNECT/ MULTI-FREQ FROM H12 TO H13

(19D432543, Sh. 3, Rev. 0)

ADDENDUM NO. 1 TO LBI-30800
(PC80)

This addendum describes Revision Letter changes that are not yet included in this publication.

REV. C - DC REMOTE CONTROL BOARD 19C330118G2

To improve operation. Changed R38.

R38 is: H212CRP133C - Carbon: 330 ohms ±5%, 1/4 w.