ERICSSON

LBI30707E
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INSTRUCTIONS
FOR
DC REMOTE CONTROL BOARDS 19D417382G1-G6

TABLE OF CONTENTS

DESCRIPTION

The 19D417382 DC Remote Control Boards are used in MASTR® II Base Stations for two-frequency DC remote transmit and receive applications. The 19D417382G1 board is required for two-frequency transmit and single frequency receive control. In two-frequency transmit and two-frequency receive control applications, the 19D417382G3 board is required. Two-frequency transmit and two-frequency receive with Channel Guard Monitor requires the use of the 19D417382G2 board. Options 9524 and 9525 (Repeat Disable) require the use of the 19D417382G4 board. Two-frequency transmit with two separate receivers (Options 9536-9541) requires the 19D417382G5 board. Two-frequency transmit and two-frequency receive with PSLM (Option 9553) uses the 19D417382G6 board.

CIRCUIT ANALYSIS

Two-Frequency Transmit and Single Frequency Receive

DC Control Board 19D417382G1 is required for the two-frequency transmit and single frequency receive application. Two optocouplers are utilized on this board to derive the control functions. If zero current is present on the control pair (D4 and D5), neither LED in the photocouplers (U4 and U5) can conduct. Thus both phototransistors are turned off. Q4 and Q6 are both held off under this condition, allowing Q5 and Q7 to conduct.

The low at the collector of Q5 is connected to terminal 1 of NAND gate U1A. The low at the collector of Q7 is applied to terminal 2 of U1A. The resultant high at the output of U1A is inverted by amplifier-driver U2C, applying a low to the base of Q11. This prevents selection of the F1 transmitter oscillator.

The low from the collector of Q5 is also connected to terminal 1 of amplifier-driver U2A. The resultant high output of U2A is connected to terminal 4 of NAND gate U2B. The low from the collector of Q7 is connected to terminal 5 of U2B. The high output of U2B is inverted by amplifier-driver U2D and the resultant low is applied to the base of Q13. This prevents selection of the F2 oscillator. Diodes CR12 and CR13 are both turned off, preventing Q12 from operating to key the

transmitter. This is the receive mode of the control circuits.

When a DC control current is applied to the line, Q1 and Q2 emitter-to-base functions are forward biased, turning the transistors on. Optocouplers U4 and U5 are shorted out. As more current from the line is applied, the voltage at the base of Q2 will rise and be clamped to 4.4 VDC. When the voltage at the emitter of Q2 rises to within 0.6 VDC of the base (i.e., the voltage at the emitter is 3.8 VDC), the transistor will turn off and let current flow through the LED in U4.

As more current is applied to the line, the voltage at the base of Q1 will rise and be clamped to 5.4 VDC. When the voltage at the emitter of Q1 rises to within 0.6 VDC of the base (4.8 volts), the transistor turns off, allowing current to flow through the LED of U5.

With both U4 and U5 conducting, transistors Q4 and Q6 are turned on. Conduction of Q4 turns Q5 off. The high at the collector of Q5 is applied to terminal 1 of NAND gate U1A. Conduction of Q6 turns off Q7. The high at the collector of Q7 is applied to terminal 2 of NAND gate U1A. The resultant low at the output of U1A is inverted by amplifier-driver U2C. The high at the output of U2C turns on Q11. Conduction of Q11 applies ground to the TRANSMIT F1 terminal A5 to select the F1 transmitter oscillator. Diode CR12 is forward biased, turning on Q12 to key the transmitter.

The high from the collector of Q5 is also applied to amplifier-driver U2A. The low at the output of U2A is applied to terminal 4 of NAND gate U2B. The high from the collector of Q7 is applied to terminal 5 of U2B. The high at the output of U2B is inverted by amplifier-driver U2D and the resultant low is applied to the base of Q13. This prevents the selection of the F2 transmitter oscillator.

When +11 mA is applied to the control pair, the voltage on the emitter of Q3 will be higher than the 10.7 volts present on the base. Q3 will thus conduct. Below 11 mA, the voltage at the cathode of VR1 will be higher, than the emitter of Q3, preventing Q3 from conducting. When Q3 conducts, the LED in U4 is shorted out. Q5 is thus turned on, applying a low to terminal 1 of U1A. U5 is still operating, keeping Q7 off. The high from the collector of Q7 is applied to terminal 2 of U1A. The high at the output of U1A is inverted by U2C and the resultant low is applied to Q11, preventing selection of the F1 transmitter oscillator.

The low from the collector of Q5 is applied to U2A. The resultant high output of U2A is applied to terminal 4 of U2B. The high from the collector of Q7 is applied to terminal 5 of U2B. The low output of U2B is inverted by U2D and the resultant high turns on Q13, selecting the F2 transmitter oscillator. CR13 is forward biased, turning on Q12 and keying the transmitter.

Placing the REMOTE/LOCAL CONTROL service switch (A13-S1) in the LOCAL CONTROL position opens the operating voltage path to the logic gates. In this position, the switch also applies ground to the cathodes of CR19 and CR16. The LED conducts, turning on the light. CR19 is forward biased and, depending on the position of the F1-F2 service switch (A13-S3), selects the desired transmitter oscillator. Applying ground to the LOCAL PTT terminal D6 will forward bias CR13 and lock out the REMOTE PTT path.

Two-Frequency Transmit and Two-Frequency Receive

In two frequency transmit and receive applications, the 19D417382G3 Remote Control Board is required. The two-frequency transmit select circuits function in the same manner as described for the 19D417382G1 board. A control current polarity detector has been added to this board. This detector includes a diode bridge connected across the control pair, providing line transient protection. One leg of the bridge contains the polarity detector optocoupler U6.

When a DC control current is applied to the control pair, the diode bridge (CR1, CR2, CR3, CR4 and U6) directs the positive and negative line currents to the current detectors. U6 detects if the line current is positive. Applying +6 mA (TRANSMIT F1) to the control pair results in a high at terminals 1 and 2 of U1A. The resultant low output of U1A is applied to terminal 10 of U2C. Amplifier-driver U2C inverts the signal, resulting in a high at terminal 1 of U3A.

Since H6 is operated (the line current is positive), Q8 is turned on. Conduction of Q8 turns off Q9 and the resulting high at the collector of Q9 is applied to terminal 13 of NAND gate U3D and terminal 2 of U3A. A low is now present at the output of U3A. This low is inverted by U3B and the resulting high turns on Q11 to select transmit F1.

The high from the collector of Q5 is connected to terminal 1 of U2A. This high is inverted and applied to terminal 4 of U2B. The high from the collector of Q7 is connected to terminal 5 of U2B. The resultant high output of U2B is inverted by U2D and the low is applied to terminal 12 of NAND gate U3D. The high from the collector of Q9 is connected to terminal

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13 of U3D. The high output of U3D is inverted by U3C and the resultant low is applied to the base of Q13, preventing the selection of transmit F2.

When +11 mA (TRANSMIT F2) is applied to the control pair, optocoupler U4 is turned off. The low at the collector of Q5 is connected to terminal 1 of U1A. Since U5 is still operating, a high is connected from the collector of Q7 to terminal 2 of U1A. Optocoupler U6 is operating, applying a high to terminal 2 of U3A. A low is applied to terminal 1 of U3A. The resultant high output of U3A is inverted by U3B and the low prevents Q11 from conducting and selecting transmit F1.

The low from the collector of Q5 is connected to U2A, resulting in a high at terminal 4 of U2B. The high from the collector of Q7 is connected to terminal 5 of U2B. This results in a high to terminal 12 of U3D and a high to terminal 13 of U3D (from the collector of Q9). The low output of U3D is inverted by U3C and the resultant high operates Q13 to select the transmit F2 oscillator.

When -6 mA (RECEIVE F2) is applied to the control pair, U4 and U5 are operated but U6 is turned off. This results in a high at the output of U2C to operate Q10 and select the receiver F2 oscillator. This same high is applied to terminal 1 of U3A. The low from the collector of Q9 is connected to terminal 2 of U3A. The resultant high output of U3A is inverted by U3B, preventing Q11 from operating and selecting transmit F1. The low output of U1A is connected to the base of Q16, preventing Q16 from operating to select the receive F1 oscillator.

The low from the collector of Q9 is also applied to terminal 13 of U3D. The resulting high output of U3D is inverted by U3C and applied to the base of Q13, preventing the transistor from operating and selecting the transmit F2 oscillator. Service switches S1 and S3 function in the same manner as described for the 19D417382G1 board.

Channel Guard Monitor

Two-frequency transmit and two-frequency receive with Channel Guard Monitor requires the use of DC Remote Control Board 19D417382G2. This control board functions in the same manner as described for the 19D417382G3 board when selecting the transmit oscillators and receive oscillators.

When the Channel Guard disable control current of -2.5 mA is applied to the control pair, Q1 is allowed to conduct but Q2 is turned off. Thus optocoupler U4 is turned on and optocouplers U5 and U6 are turned off. Q5 is turned off under these conditions, providing a high to U1A-terminal 1, U2A-terminal 1 and U1D-terminal 13. Q7 is turned on, providing a low to U1A-2, U2B-5 and U1B-4. Q9 is turned on, providing a low to U3D-13 and U3A-2. This low is also connected to the base of Q18.

The high input at terminal 1 of U1A and low input at terminal 2 of U1A results in a high at the output, operating Q16 and grounding the RX F1 lead A6 to select the receive F1 oscillator. This high is inverted by U2C to prevent Q10 from operating and selecting the receive F2 oscillator. The two low inputs to U3A result in a high at the output which is then inverted by U3B to provide a low at the base of Q11, preventing selection of the transmit F1 oscillator. The two low inputs to NAND gate U3D results in a high at the output. This high is inverted by U3C and the resulting low prevents Q13 from operating and selecting the transmit F2 oscillator.

The low at terminal 4 of U1B is inverted, providing a high at terminal 12 of U1D. Since terminal 13 of U1D is also high, the output is low. Terminal 9 of the exclusive OR gate U1C is high and terminal 10 is low, resulting in a high at the output. This high turns on Q15, and since Q18 is turned off by the low on its base, Q15 supplies ground to the CG MONITOR lead A7. With Channel Guard disabled, the station receiver (RX F1) now operates only on noise squelch so that all transmissions on the receiver F1 frequency will be heard.

When -11 mA (RX F2 Channel Guard disable) is applied to the control pair, Q1 and Q2 are turned off and Q3 is turned on. Thus U5 is operating and U4 and U6 are turned off. The low at the collector of Q5 is applied to U1A-1. The high at the collector of Q7 is applied to U1A-2. The resulting high output of U1A is inverted by U2C, holding Q10 off. The low from the collector of Q5 is applied to U2A-1. The high output of U2A is connected to U2B-4. The high from the collector of Q7 is connected to U2B-5. The low output of U2B is inverted by U2D and the resulting high is connected to the base of Q17 and the base of Q14. These two transistors conduct. Conduction of Q17 grounds the base of Q16, preventing selection of RX F1. Conduction of Q14 grounds the RX F2 lead A3, selecting the receive F2 oscillator.

The high output of U2D is also connected to U3D-12. The low at the collector of Q9 is connected to U3D-13. The resulting high output of U3D is inverted by U3C, holding Q13 off and preventing selection of transmit F2 oscillator. The high from the collector of Q7 is connected

to U1B. The low output of U1B is connected to U1D-12. The low output of Q5 is connected to U1D-13. The high output of U1D is connected to terminal 10 of exclusive OR gate U1C. The low output of U2B is connected to U1C-9. The resulting high output of U1C operates Q15, applying ground to the CG MONITOR lead A7 to disable Channel Guard.

Moving the CG MONITOR service switch A14-S2 to the MONITOR position connects ground (when the REMOTE/LOCAL CONTROL switch is in the LOCAL position) to the CG MONITOR lead to disable Channel Guard. The position of A14-S3 determines which receive frequency is monitored.

Repeat Disable (Options 9524 and 9525)

In single frequency transmit and receive systems with repeat disable and Channel Guard monitor functions, a 19D417382G4 Remote Control Board is required. Applying -2.5 mA (CG MONITOR) to the control pair provides monitoring of the receiver signal as described for the 19D417382G2 board.

Applying -6 mA (REPEAT DISABLE) to the control pair allows optocouplers U4 and U5 to operate. U6 is turned off. The high at the collector of Q5 is connected to NAND gate U1A-1. The high at the collector of Q7 is connected to U1A-2. The resulting low at the output of U1A is inverted by U2C. The high output of U2C turns Q10 on. Conduction of Q10 applies ground through P4 and J3 to the REPEATER DISABLE lead A4. This ground connects to the base of the repeater keying transistor on the Repeater Control Board and prevents keying the transmitter.

When -11 mA (REPEAT DISABLE, CG MONITOR) is applied to the control pair, optocoupler U5 is operated and U4 and U6 are turned off. The low from the collector of Q5 is applied to U2A-1. The resulting high is applied to U2B-4. The high from the collector of Q7 is connected to U2B-5. The low output of U2B is inverted by U2D and the resulting high turns on Q14. Conduction of Q14 applies ground through P3 and J2 to the REPEATER DISABLE lead A4.

The low from the collector of Q5 is also applied to U1D-13. The high from the collector of Q7 is applied to U1B-4. The low output of U1B is connected to U1D-12. The high output of U1D is connected to the exclusive OR gate U1C-10. The low at the output of U2B is connected to U1C-9. The high output of U1C operates Q15, applying a ground to the CG MONITOR lead A7. The low from the collector of Q9 is applied to the base of Q18, holding this transistor off.

Placing the CG MONITOR service switch S2 in the CG MONITOR position applies ground (when the LOCAL/REMOTE CONTROL switch S1 is in the LOCAL position) to the CG MONITor lead A4.

Two-Frequency Transmit with Two Separate Receivers (Options 9536-9541

The 19D417382G5 Remote Control Board is required for these options. The transmit functions are selected in the same manner as described for the previous boards.

Applying -6 mA (RX-F1) to the control pair allows U4 and U5 to operate. U6 is turned off. The high from the collector of Q5 is applied to U1A-1. The high from the collector of Q7 is applied to U1A-2. The resulting low is inverted by U2C and this high turns on Q10. Conduction of Q10 applies a ground through P2 and J1 to the RX 2 MUTE lead A1 to mute the second receiver. The first receiver will be the only one monitored under these conditions.

Applying -11 mA (RX-F2) to the control pair allows U5 to conduct. U4 and U6 are turned off. The low from the collector of Q5 is applied to U2A-1. The resulting high is applied to U2B-4. The high from the collector of Q7 is connected to U2B-5. The low output of U2B is inverted by U2D, applying a high to the base of Q14, turning the transistor on. Conduction of Q14 applies ground through P3 and J4 to the RX 1 MUTE lead A13 to mute the first receiver. Now only the second receiver will be monitored.

When zero current (RX-F1 & F2) is present on the control pair, the optocouplers are all turned off. The muting circuits are not operating, therefore both receivers may be monitored simultaneously. If the service switch S2 is placed in the RCVR 1 position, ground is applied to the RX 2 MUTE lead to disable receiver 2. If the service switch is placed in the RCVR 2 position, this ground is applied to the RX 1 MUTE lead to disable receiver 1.

Two-Frequency Transmit, Two-Frequency Receive with PSLM (Option 9553)

The Priority Search Lock Monitor option provides two-channel monitoring by alternately searching a priority channel and a non-priority channel. The PSLM (when turned on) assures reception of all signals transmitted on the priority channel.

DC Remote Control Board 19D417382G6 is used for controlling this option. Individual selection of the F1 receive frequency and F2 receive frequency is accomplished in the same manner as described for the G5 board. Also, transmitter frequency selection is accomplished as previously described. When zero current is present on the control pair, none of the optocouplers are operating. A low is present at both input terminals of NAND gate U1A. The resultant high turns on Q16, applying ground to the PSLM lead A12.

Placing the PSLM OFF-ON switch S2 in the ON position applies ground (if the LOCAL/REMOTE CONTROL switch S1 is in the LOCAL position) to the PSLM lead A12. Moving the PSLM OFF-ON switch to the OFF position allows selection of the transmit F1 and receive F1 or transmit F2 and receive F2 frequencies individually, using service switch S3. Instructions for the PSLM board are provided in the maintenance manual for Option 9553.

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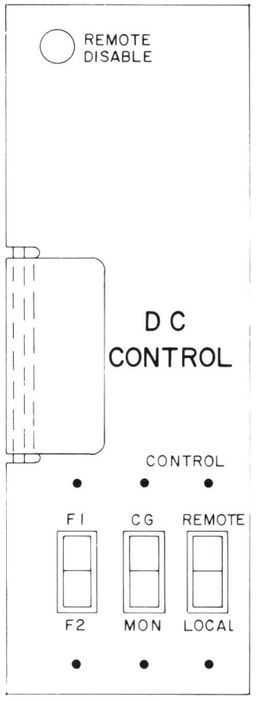
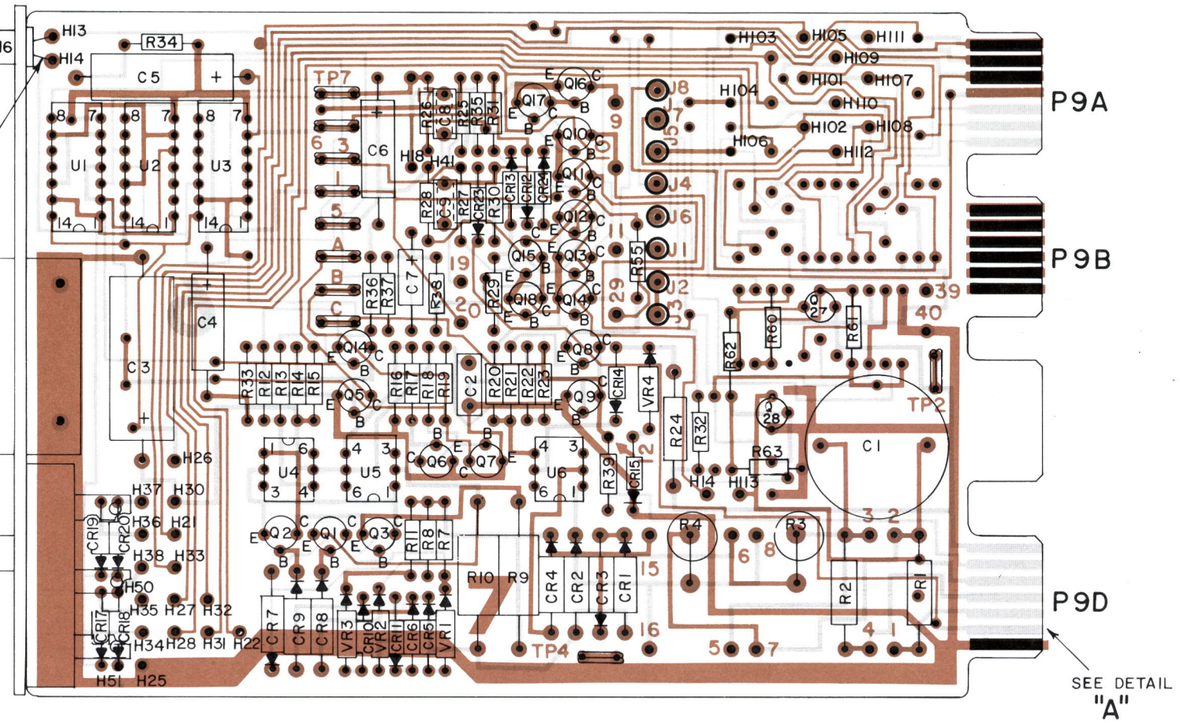
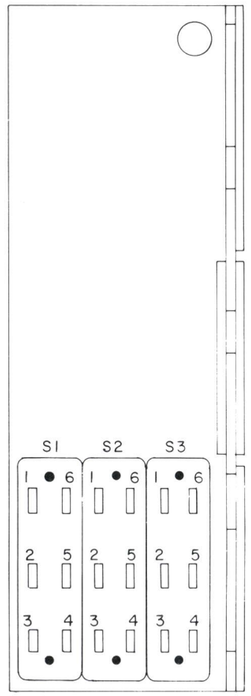
FRONT PANEL
A13 – A17



COMPONENT BOARD
A1 – A6





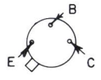
REAR VIEW OF FRONT PANEL

8 9 10 11 12 13 14
7 6 5 4 3 2 1
SOLDER SIDE

DETAIL "A"
TYP. NUMBERING OF CONT. FINGERS

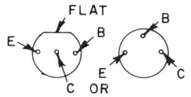
(19D423179, Rev. 2)
(19D417065, Sh. 3, Rev. 7)
(19D417065, Sh. 2, Rev. 6)

LEAD IDENTIFICATION FOR Q26



TRIANGULAR LEAD END

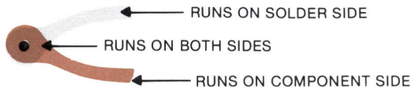
LEAD IDENTIFICATION FOR Q1 – Q25



IN-LINE TRIANGULAR
VIEW FROM LEAD END

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

REFER TO WIRING DIAGRAM FOR THE FOLLOWING CONNECTIONS								
FROM	TO							WIRE
A13-A17	A1-A6	G1	G2	G3	G4	G5	G6	COLOR
S1-2	H25	X	X	X	X	X	X	BL
S1-3	H34	X	X	X	X	X	X	WO
S1-6	H30	X	X	X	X	X	X	BR
S1-5	H26	X	X	X	X	X	X	WBK
S2-1	H21					X		BK
S2-2	H35					X		WBR
S2-3	H27					X		O
S2-5	H38		X		X		X	WR
S2-4	H22		X		X			WG
S3-1	H32	X	X	X		X	X	WBL
S3-2	H36	X	X	X		X	X	W
S3-3	H33	X	X	X		X	X	WV
S3-6	H31	X	X	X			X	R
S3-5	H37	X	X	X				WGBL
S3-4	H28	X	X	X			X	WOBK
S3-5	S2-2						X	DA
S2-3	H35						X	WBR
S2-6	H101						X	BL

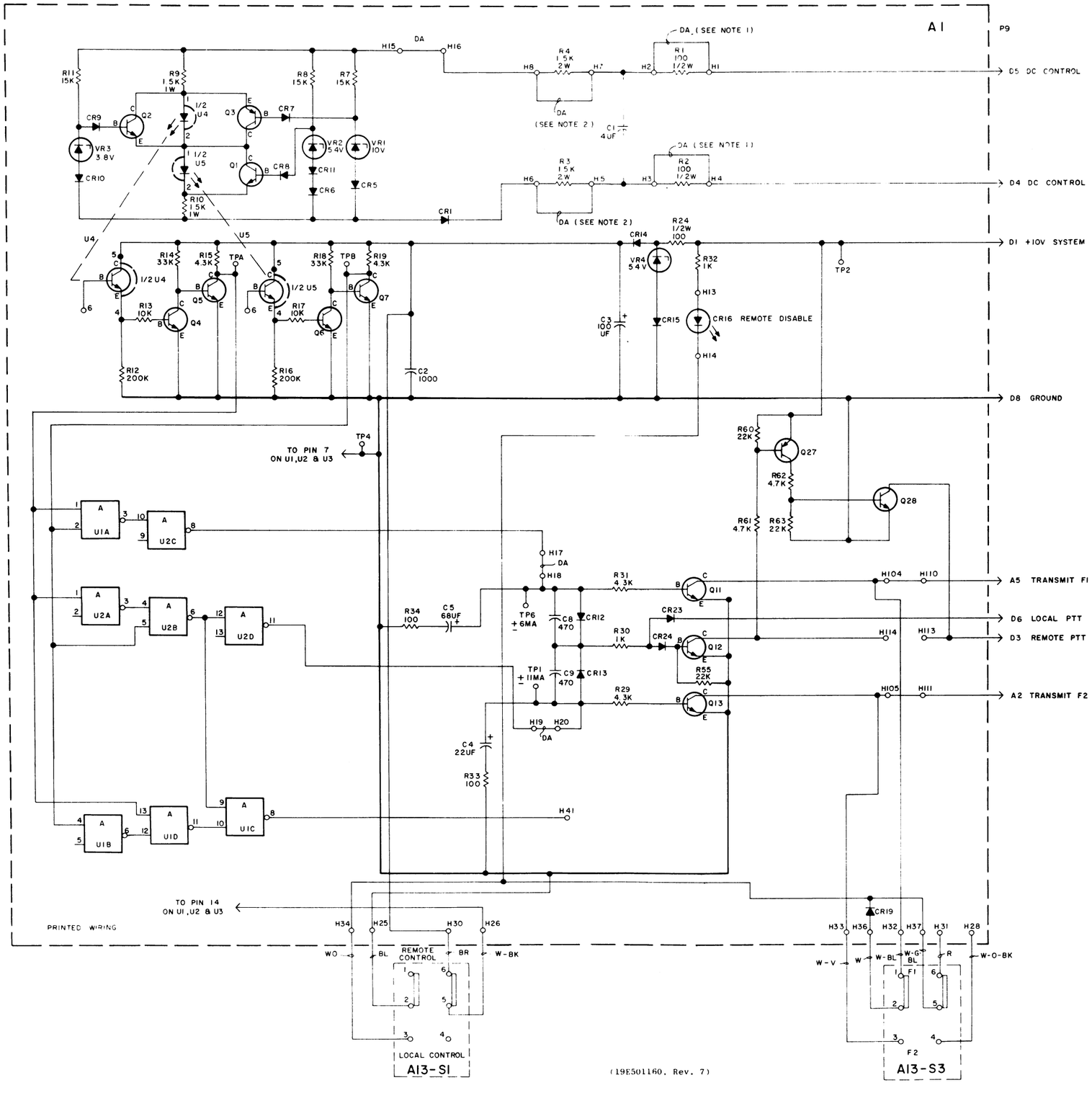


NOTE

THIS DIAGRAM IS INTENDED TO SHOW COMPONENT LOCATIONS FOR ALL GROUPS OF THE BOARD. REFER TO APPROPRIATE SCHEMATIC DIAGRAM OR PARTS LIST FOR COMPONENTS USED IN A SPECIFIC GROUP.

OUTLINE DIAGRAM

DC REMOTE CONTROL BOARD
19D417382G1-G6



(19E501160, Rev. 7)

FOR GR 1 2 FREQ TX 1 FREQ RX.

NOTES
1. FOR SEPERATE AUDIO AND CONTROL PAIRS, DA JUMPERS BETWEEN H1 & H2 AND H3 & H4 NOT PRESENT.
2. DA JUMPERS BETWEEN H7 & H8 AND H5 & H6 NOT PRESENT WHEN USED WITH TCC OR DESKON HAVING 6MA & 15MA CONTROL CURRENTS
3. UNLESS OTHERWISE SPECIFIED ALL WIRE IS SF24.

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.

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.

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
PLI9D417382G1	
PLI9D417230G1	

SCHEMATIC DIAGRAM

DC REMOTE CONTROL BOARD 19D417382G1

PARTS LIST

LBI-4807C

DC REMOTE CONTROL BOARD
19D417382G1

SYMBOL	GE PART NO.	DESCRIPTION
A1		DC MULTI-FREQUENCY BOARD 19D417230G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7486445P5	Electrolytic, non polarized: 4 uf -10 + 100%, 150 VDCW.
C2	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C4	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C5	5496267P11	Tantalum: 68 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C8 and C9	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1	T324ADP1051	Rectifier, silicon; general purpose.
CR5 and CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR7 thru CR9	T324ADP1051	Rectifier, silicon; general purpose.
CR10 thru CR15	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR16	162B3011P0002	Diode, optoelectronic: red; sim to Hew. Packard 5082-4650.
CR19	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR23 and CR24	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P9		Connector. (Part of printed board 19D417065P1).
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q3 thru Q7	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q11 thru Q13	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q27*	19A115779P1	Silicon, PNP; sim to Type 2N3251. Added by REV A.
Q28*	19A116755P1	Silicon, NPN; sim to Type 2N3947. Added by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R3 and R4	19A700111P67	Composition: 1.5K ohms ±5%, 2 w.
R7 and R8	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R9 and R10	19A700112P67	Composition: 1.5K ohms ±5%, 1 w.
R11	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R12	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R13	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R14	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R15	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R16	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R17	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R18	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R19	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R24	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R29	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R30	3R152P102J	Composition: 1K ohms ±5%, 1/4 w.
R31	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R32	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R33 and R34	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R55	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R60*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w. Added by REV A.
R61* and R62*	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w. Added by REV A.
R63*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w. Added by REV A.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1 and TP2	19B211379P1	Spring (Test Point).
TP4	19B211379P1	Spring (Test Point).
TP6	19B211379P1	Spring (Test Point).
TPA	19B211379P1	Spring (Test Point).
TPB	19B211379P1	Spring (Test Point).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1 and U2	19A700037P301	Digital: QUAD 2-INPUT POSITIVE-NAND GATE; 74LS00.
U4 and U5	19A116908P1	Coupler, optoelectronic: 6 pin, dual in line; sim to Fairchild FCD-5004.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P11	Silicon, zener.
VR2	4036887P5	Zener: 500 mW, 5.4 v. nominal.
VR3	4036887P3	Silicon, zener diode; sim to 1N5228B.
VR4	4036887P5	Zener: 500 mW, 5.4 v. nominal.
A13		FRONT PANEL 19C320778G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19B209261P8	Slide: DPDT, sim. to Switchcraft 11A1639.
S3	19B209261P8	Slide: DPDT, sim. to Switchcraft 11A1639.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B210690G1	Handle assembly.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

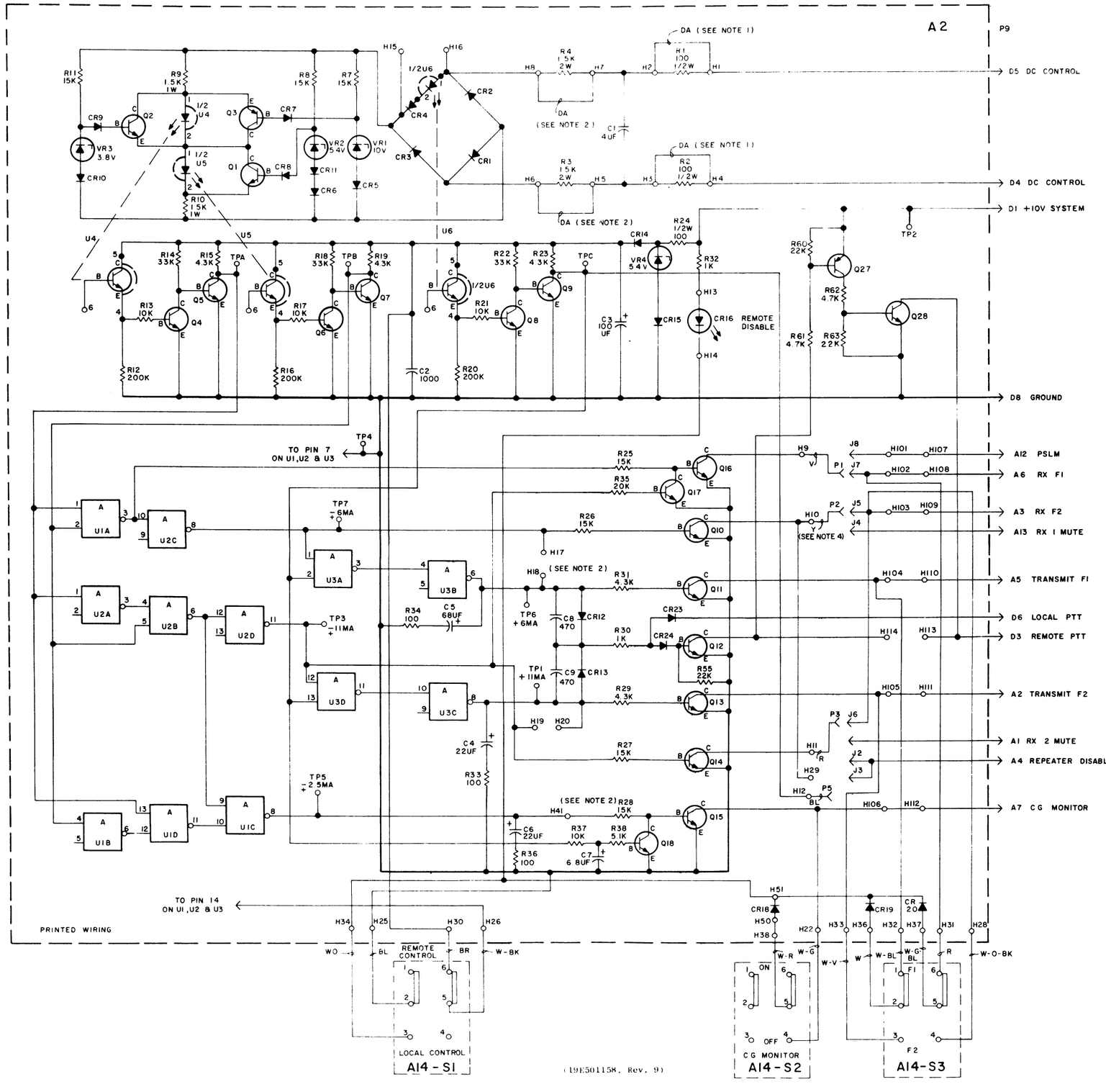
PRODUCTION CHANGES

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 - DC Multi-Frequency Board 19D417230G1

To improve Channel Guard Encode with Remote PTT. Added R60 thru R63, Q27 and Q28.

REV. B - To incorporate new LS-TTL Integrated circuits. Changed U1, U2, U3 from 19A115913P7 to 19A700037P1.



GR. 2 - 2 FREQ TX 2 FREQ RX/CG MONITOR

NOTES

1. FOR SEPERATE AUDIO AND CONTROL PAIRS, DA JUMPERS BETWEEN H1 & H2 AND H3 & H4 NOT PRESENT.
2. DA JUMPERS BETWEEN H7 & H8 AND H5 & H6 NOT PRESENT WHEN USED WITH TCC OR DESKON HAVING 6MA & 15MA CONTROL CURRENTS. REMOVE CR12 & R38 AND MOVE R28 FROM H41 TO H18.
3. UNLESS OTHERWISE SPECIFIED ALL WISE IS SF24
4. YELLOW JUMPER AT H10 AND BLUE JUMPER AT H12 ARE NOT PRESENT IN REMOTE / REPEATER COMBINATIONS WITH CHANNEL GUARD.

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.

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.

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
PLI9D417382G2	B
PLI9D417230G2	

SCHEMATIC DIAGRAM

DC REMOTE CONTROL BOARD 19D417382G2

PARTS LIST

LBI-4808C

DC REMOTE CONTROL BOARD
19D417382G2

SYMBOL	GE PART NO.	DESCRIPTION
A2		DC MULTI-FREQUENCY BOARD 19D417230G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7486445P5	Electrolytic, non polarized: 4 uf -10 + 100%, 150 VDCW.
C2	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C4	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C5	5496267P11	Tantalum: 68 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C6	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C7	5496267P201	Tantalum: 6.8 uf ±10%, 6 VDCW, sim. to Sprague Type 150D.
C8 and C9	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	T324ADP1051	Rectifier, silicon; general purpose.
CR5 and CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR7 thru CR9	T324ADP1051	Rectifier, silicon; general purpose.
CR10 thru CR15	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR16	162B3011P0002	Diode, optoelectronic: red; sim to Hew. Packard 5082-4650.
CR18 thru CR20	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR23 and CR24	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J8	4033513P15	Contact, electrical: sim to Bead Chain R40-1A.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1 thru P3	4029840P6	Contact, electrical: No. 22-24 AWG wire; sim to Malco 12080-0.
P5	4029840P6	Contact, electrical: No. 22-24 AWG wire; sim to Malco 12080-0.
P9		Connector. (Part of printed board 19D417065P1).
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q3	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q4 thru Q18	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q27*	19A115779P1	Silicon, PNP; sim to Type 2N3251. Added by REV A.
Q28*	19A116755P1	Silicon, NPN; sim to Type 2N3947. Added by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R3 and R4	19A700111P67	Composition: 1.5K ohms ±5%, 2 w.
R7 and R8	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R9 and R10	19A700112P67	Composition: 1.5K ohms ±5%, 1 w.
R11	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R12	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R13	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R14	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R15	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R16	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R17	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R18	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R19	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R20	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R21	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R22	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R23	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R24	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R25 thru R28	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R29	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R30	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R31	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R32	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R33 and R34	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R35	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R36	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R37	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R38	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R55	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R60*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w. Added by REV A.
R61* and R62*	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w. Added by REV A.
R63*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1 thru TP7	19B211379P1	Spring (Test Point).
TPA	19B211379P1	Spring (Test Point).
TPB	19B211379P1	Spring (Test Point).
TPC	19B211379P1	Spring (Test Point).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U1 thru U3	19A700037P301	Digital: QUAD 2-INPUT POSITIVE-NAND GATE; 74LS00.
U4 thru U6	19A116908P1	Coupler, optoelectronic: 6 pin, dual in line; sim to Fairchild FCD-5004.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P11	Silicon, zener.
VR2	4036887P5	Zener: 500 mW, 5.4 v. nominal.
VR3	4036887P3	Silicon, zener diode; sim to 1N5228B.
VR4	4036887P5	Zener: 500 mW, 5.4 v. nominal.
A14		FRONT PANEL 19C320778G2
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1 thru S3	19B209261P8	Slide: DPDT, sim. to Switchcraft 11A1639.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B219690G1	Handle assembly.

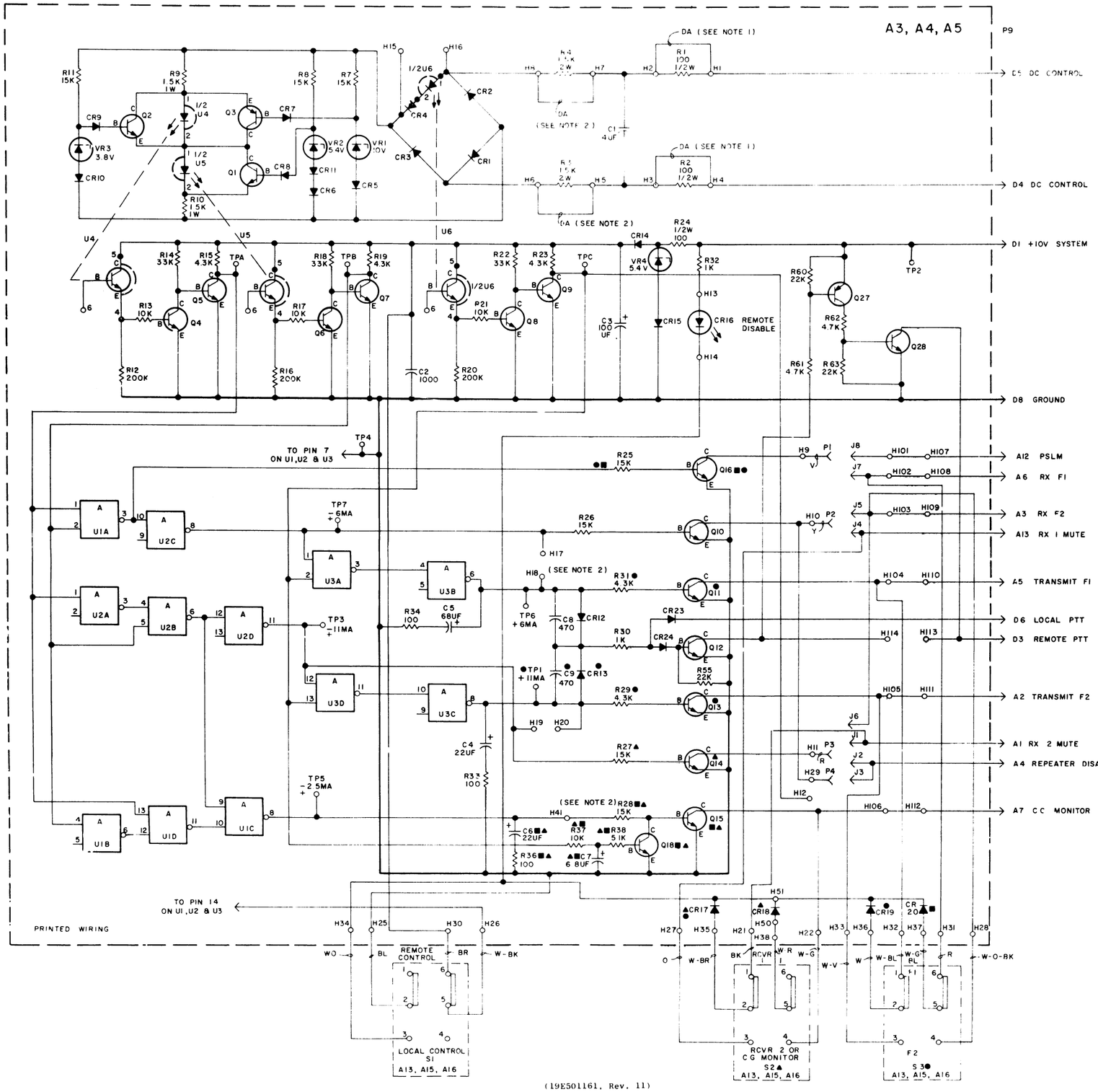
PRODUCTION CHANGES

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 - DC Multi-Frequency Board 19D417230G2
To improve Channel Guard Encode with Remote PTT. Added R60 thru R63, Q27 and Q28.

REV. B - To incorporate new LS-TTL Integrated Circuits. Changed U1, U2, U3 from 19A115913P7 to 19A700037P1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



(19E501161, Rev. 11)

GROUP 3 – 2 FREQ TX 2 FREQ RX

GROUP 4 – 1 FREQ TX & RX / REP DIS, C.G. MONITOR

GROUP 5 – 2 FREQ TX 2 SEPRATE RX

NOTES

1. FOR SEPERATE AUDIO AND CONTROL PAIRS, DA JUMPERS BETWEEN H1 & H2 AND H3 & H4 NOT PRESENT
2. DA JUMPERS BETWEEN H7 & H8 AND H5 & H6 NOT PRESENT WHEN USED WITH TCC OR DESKON HAVING 6MA & 15MA CONTROL CURRENTS. IN GROUP 4 BOARDS REMOVE R38 AND MOVE R28 FROM H41 TO H18. MOVE DIODE CR12 TO POSITION OF CR13, MOVE CAPACITOR C8 TO POSITION OF C9

UNLESS OTHERWISE SPECIFIED ALL WIRE IS SF24

GROUP 3 WIRING CONNECTIONS	
FROM	TO
H1	H2
H3	H4
H5	H6
H7	H8
H9	J7 ✱
H10	J5 ○
S1-2	H25
S1-3	H34
S1-6	H30
S1-5	H26
S3-1	H32
S3-2	H36
S3-3	H33
S3-6	H31
S3-5	H37
S3-4	H28

GROUP 4 WIRING CONNECTIONS	
FROM	TO
H1	H2
H3	H4
H5	H6
H7	H8
H29	J3 △
S1-2	H25
S1-3	H34
S1-6	H30
S1-5	H26
S2-5	H38
S2-4	H22
H11	J2 □

GROUP 5 WIRING CONNECTIONS	
FROM	TO
H1	H2
H3	H4
H5	H6
H7	H8
H10	J1 ○
H11	J4 □
S1-2	H25
S1-3	H34
S1-6	H30
S1-5	H26
S2-1	H21
S2-2	H35
S2-3	H27
S3-1	H32
S3-2	H36
S3-3	H33

✱ TERMINATE WITH P1
○ TERMINATE WITH P2
□ TERMINATE WITH P3
△ TERMINATE WITH P4

UNLESS OTHERWISE NOTED PRESENT IN GROUPS 3 4 & 5.

▲ NOT PRESENT IN GROUP 3
● NOT PRESENT IN GROUP 4
■ NOT PRESENT IN GROUP 5
♦ PRESENT IN GROUP 4 ONLY

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.

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

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
PLI9D417382G3	
PLI9D417382G4	
PLI9D417382G5	
PLI9D417230G4	C
PLI9D417230G3	B
PLI9D417230G5	B

SCHEMATIC DIAGRAM

DC REMOTE CONTROL BOARD 19D417382G3-G5

PARTS LIST

LBI-4809C

DC REMOTE CONTROL BOARD
19D417382G3-G5

SYMBOL	GE PART NO.	DESCRIPTION
A3		DC MULTI-FREQUENCY BOARD A3 19D417230G3 A4 19D417230G4 A5 19D417230G5
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7486445P5	Electrolytic, non polarized: 4 uf -10 + 100%, 150 VDCW.
C2	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C4	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C5	5496267P11	Tantalum: 68 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C6	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C7	5496267P201	Tantalum: 6.8 uf ±10%, 6 VDCW, sim. to Sprague Type 150D.
C8 and C9	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	T324ADP1051	Rectifier, silicon; general purpose.
CR5 and CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR7 thru CR9	T324ADP1051	Rectifier, silicon; general purpose.
CR10 thru CR15	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR16	162B3011P0002	Diode, optoelectronic: red; sim to Hew. Packard 5082-4650.
CR17 thru CR20	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR23 and CR24	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J8	4033513P15	Contact, electrical: sim to Bead Chain R40-1A.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P4	4029840P6	Contact, electrical: No. 22-24 AWG wire; sim to Malco 12080-0.
P9		Connector. (Part of printed board 19D417065P1).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q3	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q4 thru Q16	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q18	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q27*	19A115779P1	Silicon, PNP; sim to Type 2N3251. Added to G3, G5 by REV A. Added to G4 by REV B.
Q28*	19A116755P1	Silicon, NPN; sim to Type 2N3947. Added to G3, G5 by REV A. Added to G4 by REV B.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R3 and R4	19A700111P67	Composition: 1.5K ohms ±5%, 2 w.
R7 and R8	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R9 and R10	19A700112P67	Composition: 1.5K ohms ±5%, 1 w.
R11	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R12	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R13	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R14	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R15	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R16	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R17	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R18	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R19	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R20	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R21	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R22	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R23	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R24	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R25 thru R28	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R29	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R30	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R31	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R32	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R33 and R34	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R36	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R37	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R38	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R55	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R60*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w. Added to G3, G5 by REV A. Added to G4 by REV B.
R61* and R62*	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w. Added to G3, G5 by REV A. Added to G4 by REV B.
R63*	19A700106P95	Composition: 22K ohms ±5%, 1/4 w. Added to G3, G5 by REV A. Added to G4 by REV B.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1 thru TP7	19B211379P1	Spring (Test Point).
TPA	19B211379P1	Spring (Test Point).
TPB	19B211379P1	Spring (Test Point).
TPC	19B211379P1	Spring (Test Point).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1 thru U3	19A700037P301	Digital: QUAD 2-INPUT POSITIVE-NAND GATE; 74LS00.
U4 thru U6	19A116908P1	Coupler, optoelectronic: 6 pin, dual in line; sim to Fairchild FCD-5004.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P11	Silicon, zener.
VR2	4036887P5	Zener: 500 mW, 5.4 v. nominal.
VR3	4036887P3	Silicon, zener diode; sim to 1N5228B.
VR4	4036887P5	Zener: 300 mW, 5.4 v. nominal.
A13, A15, A16		FRONT PANEL A13 19C320778G1 A15 19C320778G3 A16 19C320778G4
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1 thru S3	19B209261P8	Slide: DPDT, sim. to Switchcraft 11A1639.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B219690G1	Handle assembly.

*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 - 19D417230G4

For proper operation using TCC, DESKON, or CONSOLE with Channel Guard and +15 mA. Added C4 and R33.

REV. B - 19D417230G4

REV. A - 19D417230G3, G5

To improve Channel Guard Encode with Remote PTT. Added R60 thru R63, Q27 and Q28.

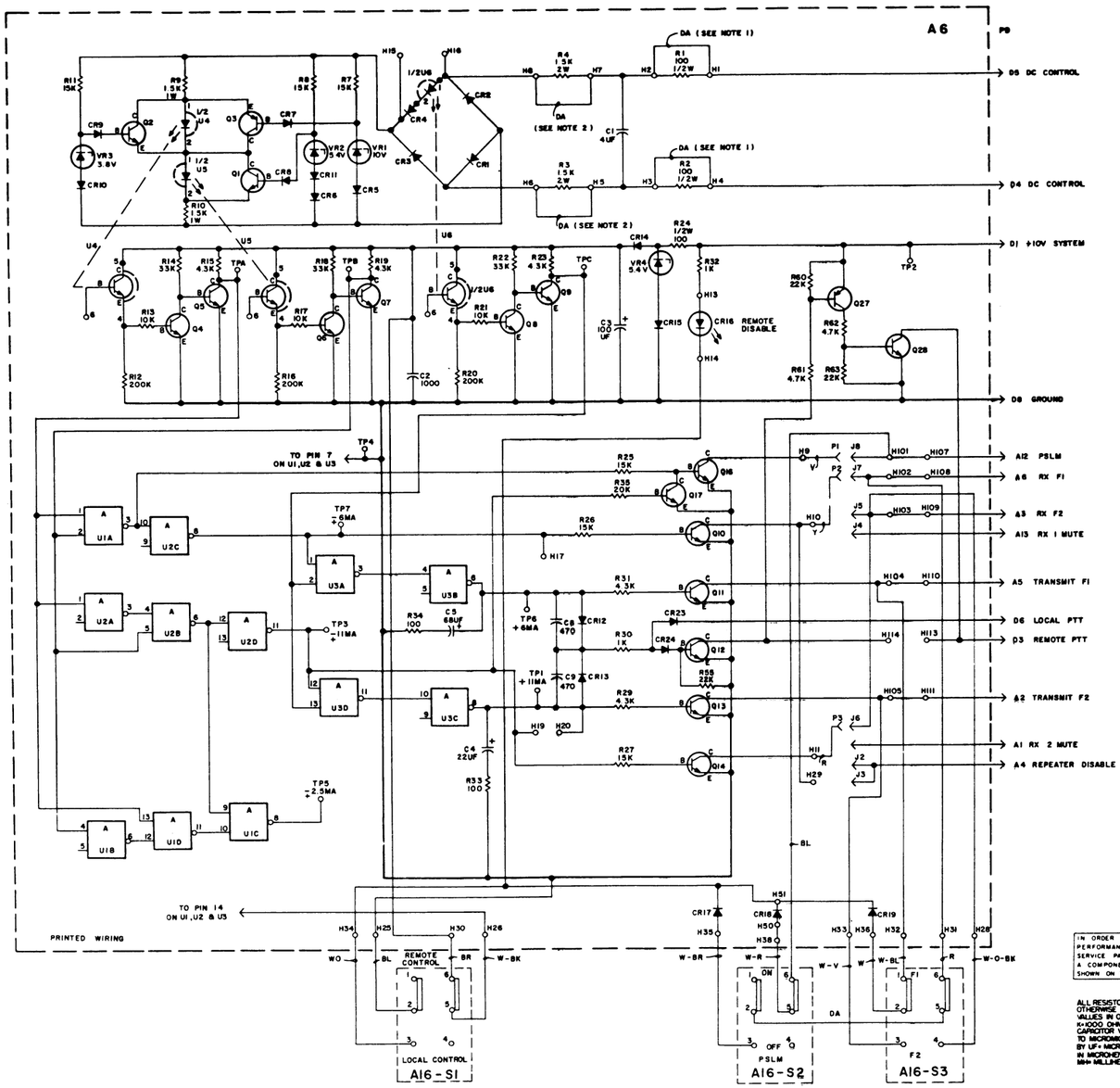
REV. C - 19D417230G4

REV. B - 19D417230G3, G5

To incorporate new LS-TTL Integrated circuits. Changed U1, U2, U3 from 19A115913P7 to 19A700037P1.

68.-8 PSLM 2 FREQ. TX

NOTES:
1. FOR SEPERATE AUDIO AND CONTROL PAIRS, DA JUMPERS BETWEEN H1 & H2 AND H3 & H4 NOT PRESENT.
2. DA JUMPERS BETWEEN H7 & H8 AND H5 & H6 NOT PRESENT WHEN USED WITH TCC OR DESKTOP HAVING 6MA & 15MA CONTROL CURRENTS.
3. UNLESS OTHERWISE SPECIFIED ALL WIRE IS SP24.



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

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 MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

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
PLI9D417382G6	
PLI9D417230G6	B

(19E501162, Rev. 8)

SCHEMATIC DIAGRAM

DC REMOTE CONTROL BOARD 19D417382G6

PARTS LIST

DC REMOTE CONTROL BOARD
19D417382G6

ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
A6		DC MULTI-FREQUENCY BOARD 19D417230G6
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	7486445P5	Electrolytic, NP: 4 uf -10 +100%, 150 VDCW.
C2	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3	19A115680P7	Electrolytic: 100 uF +150-10%, 15 VDCW; sim to Mallory Type TTX.
C4	5496267P210	Tantalum: 22 uF ±10%, 15 VDCW; sim to Sprague Type 150D.
C5	5496267P11	Tantalum: 68 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C8 and C9	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - DIODES - - - - - - - - - -
CR1 thru CR4	T324ADP1051	Silicon; 600 PRV, 1000 mA max; sim to 1N4005
CR5 and CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR7 thru CR9	T324ADP1051	Silicon; 600 PRV, 1000 mA max; sim to 1N4005
CR10 thru CR15	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR16	162B3011P0002	Light Emitting Diode: Red; sim to GE 22L-2.
CR17 thru CR19	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR23 and CR24	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - JACKS - - - - - - - - - -
J1 thru J8	4033513P15	Contact, electrical: sim to Bead Chain R40-1A.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P4	4029840P6	Contact, electrical: No. 22-24 AWG wire; sim to Malco 12080-0.
P9		(Part of Print Wire Board).
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A700023P1	Silicon, NPN: sim to 2N3904.
Q3	19A115768P1	Silicon, PNP: sim to 2N4702.
Q4 thru Q14	19A700023P1	Silicon, NPN: sim to 2N3904.
Q16 and Q17	19A700023P1	Silicon, NPN: sim to 2N3904.
Q27 *	19A115779P1	Silicon, PNP: sim to 2N3741.
Q28 *	19A116745P1	Silicon, NPN: sim to 2N3417.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	19A700113P39	Composition: 100 ohms ±5%, 1/2 w.
R4 and R4	19A700111P67	Composition: 1.5K ohms ±5%, 1 w.
R7 and R8	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R9 and R10	19A700112P67	Composition: 1.5K ohms ±5%, 1 w.
R11	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R12	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R13	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R14	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R15	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R16	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R17	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R18	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R19	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R20	3R152P204J	Composition: 200K ohms ±5%, 1/4 w.
R21	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R22	19A700106P99	Composition: 33K ohms ±5%, 1/4 w.
R23	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R24	19A700113P39	Composition: 100 ohms ±5%, 1/2 w.
R25 thru R27	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R29	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R30	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R31	3R152P432J	Composition: 4.3K ohms ±5%, 1/4 w.
R32	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R33 and R34	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R35	3R152P203J	Composition: 20K ohms ±5%, 1/4 w.
R55	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R60 *	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R61 * and R62 *	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R63 *	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP1 thru TP7	19B211379P1	Spring (Test Point).
TPA thru TPC	19B211379P1	Spring (Test Point).
		- - - - - - - - - - INTEGRATED CIRCUITS - - - - - - - - - -
U1 * thru U3 *	19A700037P301	Digital: Quad 2-Input NAND gate; sim to 74LS00.
U4 thru U6	19A116908P1	Optical Isolator: 6 pin DIP; sim to FCD-5004.
		- - - - - - - - - - VOLTAGE REGULATORS - - - - - - - - - -
VR1	4036887P11	Silicon, zener: 10 Volts.
VR2	4036887P5	Silicon, zener: 5.4 Volts.
VR3	4036887P3	Silicon, zener: 8.8 Volts; sim to 1N5228B.
VR4	4036887P5	Silicon, zener: 5.4 Volts.
A17		FRONT PANEL 19C320778G5
		SWITCHES
S1 thru S3	19B209267P2	Slide: DPDT, sim. to Switchcraft 11A1649.
		MISCELLANEOUS
	19B210668G1	Handle assembly.

*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 the descriptions of parts affected by these revisions.

REV. A - DC MULTI-FREQUENCY BOARD 19D417230G6
To improve Channel Guard encode with Remote PTT, added R60 thru R63, Q27 and Q28.

REV. B - DC MULTI-FREQUENCY BOARD 19D417230G6
To replace TTL IC's with new LS-TTL IC's, changed U1 thru U3 from 19A115913P7 to 19A700037P1 (54LS00).