

INSTRUCTIONS

FOR

REPEATER CONTROL BOARDS 19D417385G1 & G2

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DESCRIPTION

The 19D417385G1 Repeater Control Board is used in MASTR II repeater control applications without Channel Guard. The board consists of the transmit keying function, a drop-out delay timer and a 3-minute limit timer. The 19D417385G2 Repeater Control Board is used in repeater stations with Channel Guard. This board consists of the transmit keying function, a drop-out delay timer, a 3-minute limit timer and a Channel Guard control circuit.

CIRCUIT ANALYSIS

Repeater Control Board 19D417385G1

The Repeater Control Board receives its input from the station Receiver Unsilenced Sensor (RUS). When the receiver is un-squelched, the Receiver Unsilenced Sensor Operating Switch (RUSSOS) lead is grounded at the Audio Board. This ground forward biases CR11 on the Repeater Control Board, turning on Q4. Conduction of Q4 operates the 3-minute limit timer is used.

The 3-minute limit timer is required by the FCC in certain applications to automatically shut off the transmitter after a maximum of three minutes continuous operation. The timer prevents the transmitter from accidentally "locking on" and tying up the channel.

Transistors Q1 and Q2 operate as an astable multivibrator, pulsing Q3 on and off. The pulsing of Q3 charges C3 in stair-step fashion until the charge applied to U1, terminal 6, is equal to 2/3 of the Vcc voltage applied to U1-8. U1 is a monolithic timing circuit with a comparator between

the Vcc input (terminal 8) and the threshold input (terminal 6). When the compared voltage is equal to 2/3 of Vcc, the flip-flop in U1 is operated, providing a high at the output (terminal 3). At the end of the timing period, determined by the setting of R8, a discharge path for C3 is provided at terminal 7 of U1.

The drop-out delay timer decreases the number of transmitter "ON-OFF" cycles by keeping the transmitter keyed for a pre-determined delay period after the receiver squelches. The delay period can be set for 0.5 to 8 seconds. Unsilencing the receiver at any time during the delay period keeps the transmitter operating without interruption. After the delay time lapses, and no signal is applied to the receiver, the transmitter keying circuit is de-energized and the transmitter turns off.

When terminal 3 of U1 goes high, Q10 is turned on. Conduction of Q10 provides the threshold voltage to operate U2. This timer functions in the same manner as described for U1, with the timing period determined by the setting of R14. The high at terminal 3 of U1 forward biases CR2 and CR6, operating Q5. Conduction of Q5 applies ground through the REPEATER DISABLE service switch S1 to the REPEATER PTT lead D3 to key the transmitter. The high at terminal 3 of U2 forward biases CR3 and CR6, also keying the transmitter. When a remote REPEATER DISABLE function is provided in the system, a ground is applied to terminal A4 on the Repeater Control Board when the function is selected. This ground is applied to the base of Q5, preventing the transistor from conducting and preventing the transmitter from being keyed.

Repeater Control Board 19D417385G2

The 19D417385G2 Repeater Control Board is required in repeater stations with Channel Guard. The CG DET OUTPUT lead (A3) on the Repeater Control Board is connected to the Channel Guard Board in the station receiver. When the Channel Guard is squelched, ground is applied to A3 and to the base of Q7. The transistor is held off, permitting Q8 to conduct. Conduction of Q8 applies ground to the RX 1 MUTE lead (A6) to keep the receiver squelched. If a signal modulated with the correct Channel Guard tone is received, Q7 is allowed to conduct. Conduction of Q7 turns Q8 off, removing the ground from A6 and unsquelching the receiver.

The RUS lead (D12) on the Repeater Control Board is at ground potential when the receiver is squelched. CR12 is forward biased, as well as CR8, preventing Q6 from conducting. The high at the collector of Q6 prevents Q4 from conducting. When the receiver unsquelches, CR8 and CR12 are

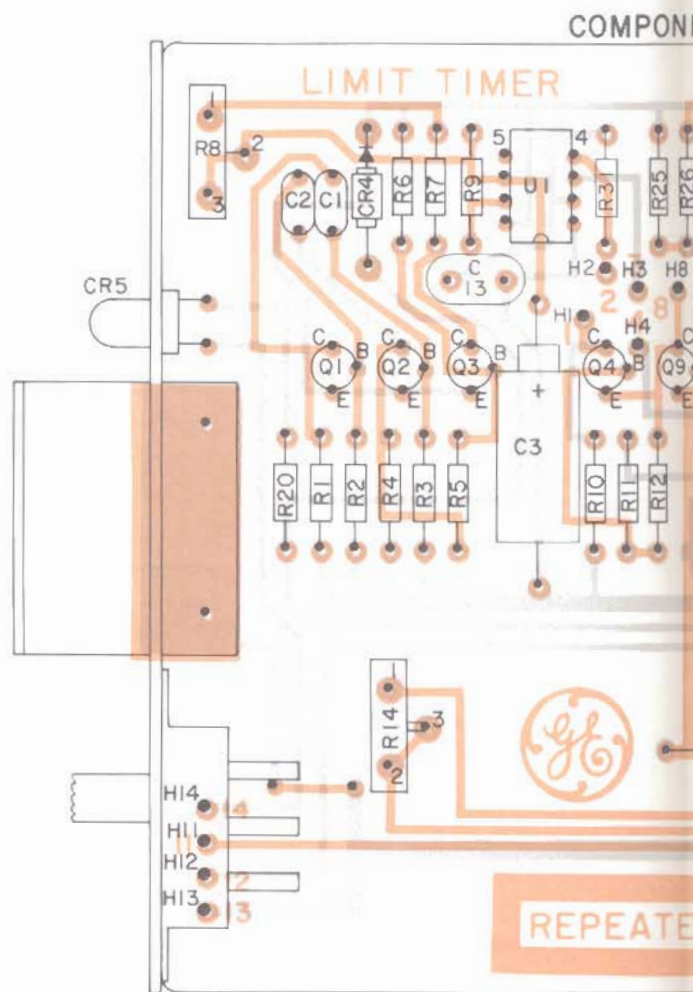
turned off. Q6 is turned on, allowing Q4 to conduct and operate the timing circuits.

When the Channel Guard modulated signal is no longer present, the CG DET OUTPUT lead (A3) goes low, forward biasing CR8 and turning off Q6. This eliminates the squelch tail. Q7 is also turned off, permitting Q8 to conduct and mute the receiver. The RUS lead (D12) now goes to ground, forward biasing CR12 to hold Q6 off.

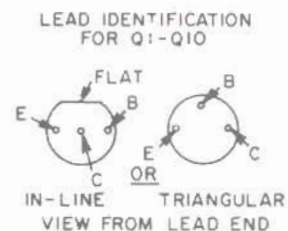
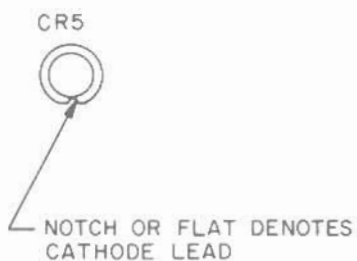
A ground applied to the CG MONITOR lead A7 will forward bias CR14 and turn Q8 off. This will allow the station receiver to operate only on noise squelch so that all transmissions will be monitored at the local or remote points. The repeater transmitter, however, will still be Channel Guard protected. This GC MONITOR ground may be originated at the MASTR Local Controller (in Local/Repeat Combinations) or at the Remote Control Board (in Remote/Repeat combinations).

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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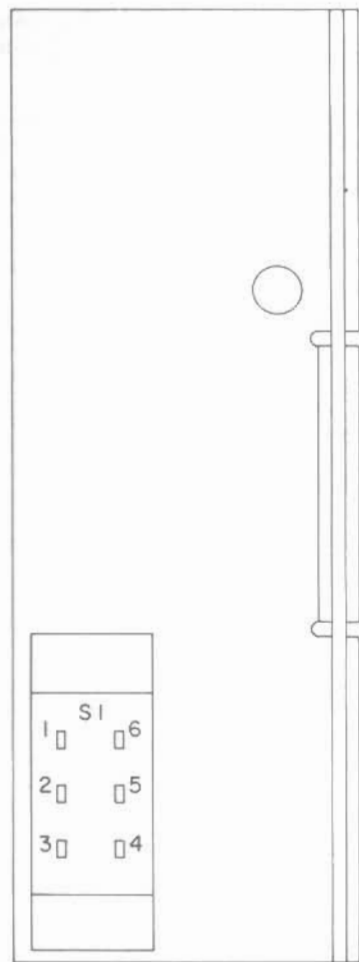
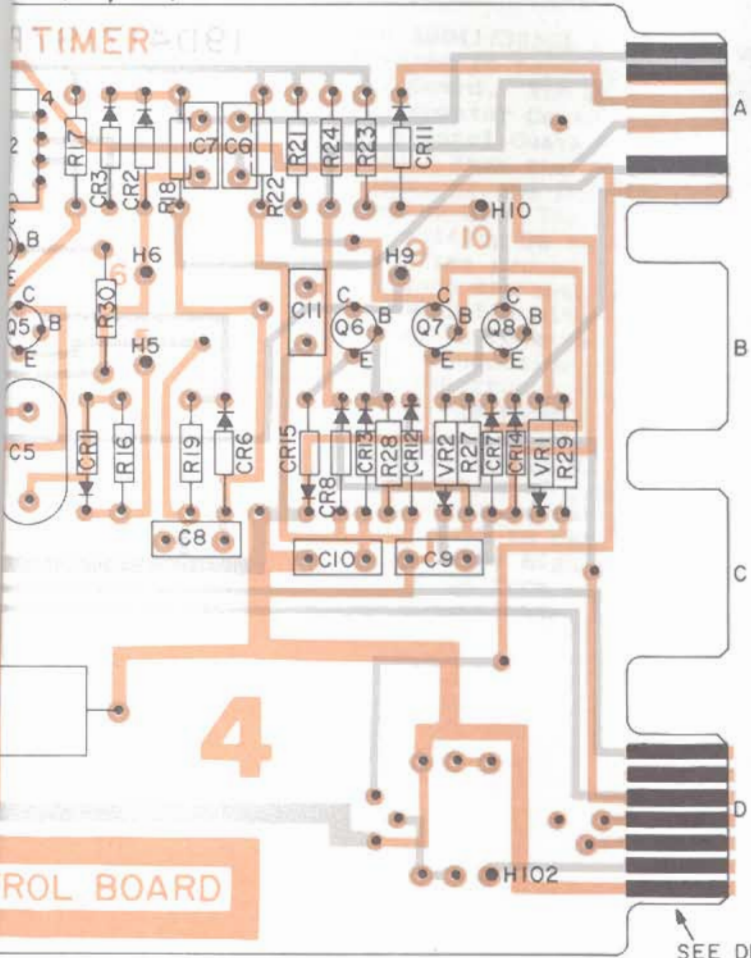
(19D423180, Rev. 1)
 (19D417197, Sh. 2)
 (19D417197, Sh. 3)



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



RD (A1, A2)



FRONT PANEL REAR VIEW

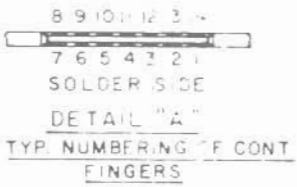
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CONTROL BOARD

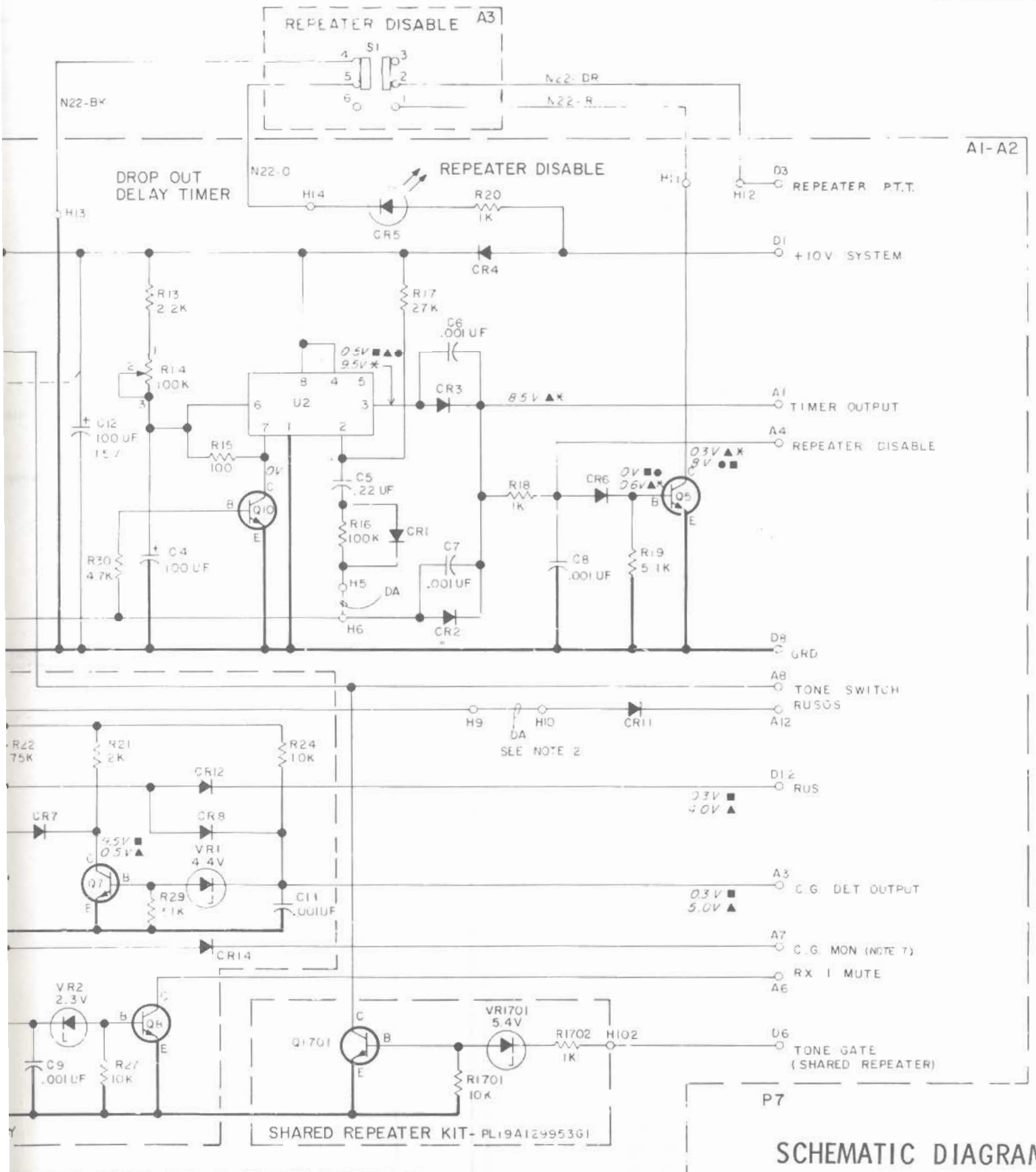
SEE DETAIL "A"



SEE WIRING DIAGRAM FOR THE FOLLOWING CONNECTIONS

FROM	TO	GROUP
H1	H2	1 & 2
H3	H4	1 & 2
H5	H6	1 & 2
H7	H8	1 & 2
H9	H10	1

OUTLINE DIAGRAM



SCHEMATIC DIAGRAM

**REPEATER CONTROL BOARD
19D417385G1 & G2**

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

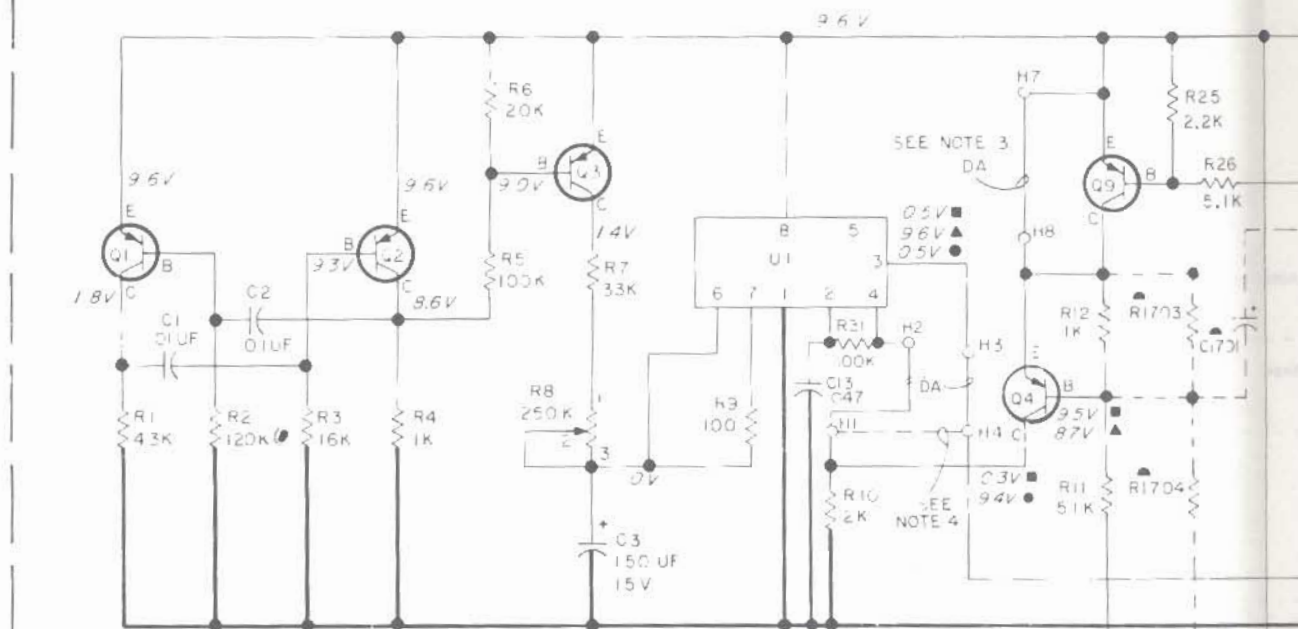
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART

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
PL19D417385G1	
PL19D417385G2	
PL19D417198G1	A
PL19D417198G2	B

3 MINUTE LIMIT TIMER



PRINTED WIRING - PL19D417198G1 F. G2

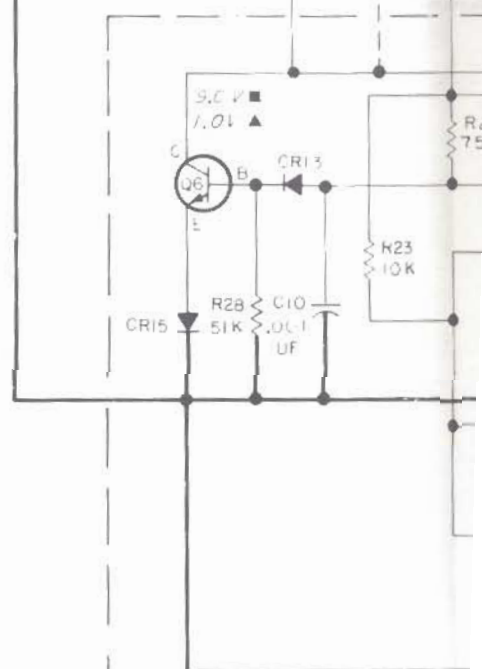
NOTES

- JUMPER FROM H1 TO H7, H3 TO H4, H5 TO H6 & H7 TO H8 PRESENT IN GROUP 1 & 2
- JUMPER FROM H9 TO H11 PRESENT IN GROUP 1 ONLY
- JUMPER BETWEEN H7 & H8 REMOVED FOR SHARED REPEATER, TYPE 90 & DIGITAL CONTROL
- FOR OPERATION WITH NO TIMER ACTION, REMOVE JUMPER BETWEEN H1 & H2, H3 & H4, AND H5 & H6. ADD JUMPER FROM H1 TO H4
- FOR OPERATION WITH DROP-OUT DELAY TIMER ONLY, REMOVE JUMPER BETWEEN H7 & H8 AND H7 & H4. ADD JUMPER FROM H1 TO H4
- FOR OPERATION WITH 3 MIN. LIMIT TIMER ONLY, REMOVE JUMPER BETWEEN H5 & H6
- IN REPEATER ONLY STATIONS, GROUND TB 1201-6 ON MOTHER BOARD TO DISABLE C.G. WHILE SERVICING.
- ▲ PART OF REMOTE KEYING KIT PL19A129953G2
R11 & R12 NOT PRESENT WHEN THIS KIT IS USED

VOLTAGE READINGS

ALL READINGS MADE WITH A 20,000 OHMS-PER-VOLT METER
ALL READINGS TYPICAL.

- NO INPUT SIGNAL
- ▲ RECEIVING SIGNAL
- TIMED OUT
- * DURING DROP-OUT DELAY



PRESENT IN GROUP 2 ONLY