MOBILE RADIO

MAINTENANCE MANUAL
FOR
General Electric
MPI TYPE 99 DECODER

LB131182A

GENERAL ELECTRIC

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SPECIFICATIONS

Tone Frequency Range	288 Hz to 1433 Hz
Tone Input	200 millivolts RMS ±10 millivolts
Automatic Reset	15 seconds ±2 seconds
Current Drain	
5.4 Volts	1.5 milliamps
7.5 Volts	12.0 milliamps

DESCRIPTION

General Electric Type 99 Decoder kit provides the components required for installation of the Type 99 module and code plugs. The Type 99 option provides both Individual Call and Group Call, and operate on tone frequencies from 288 to 1433 Hz.

The Decoder kit consists of a Type 99 option board and a top cover that includes MONITOR/RESET switch S1. Associated components consist of the Type 99 module and code plug modules A/B and C/D. These components are not part of the Decoder kit and must be ordered separately.

OPERATION

In this Type 99 Tone System, calls will not be heard from the receive circuit until the proper sequential tones have been applied to the decoder.

The first tone causes the decoder to switch to accept the second tone after the first tone ends. An alert tone will sound when the second tone is recognized by the decoder, and will continue to sound as long as the second tone is transmitted.

The receiver circuit audio opens and will remain open to receive calls until the decoder is reset manually by tone option RESET/MONITOR switch S1, or the automatic reset circuit that automatically resets the module after 15 seconds.

A block diagram of the Type 99 Decoder module and a simplified diagram of the Code Plug are provided in Figures 1 and 2. References to symbol numbers used in the following text are found on the Schematic Diagram, Outline Diagram and Parts List.

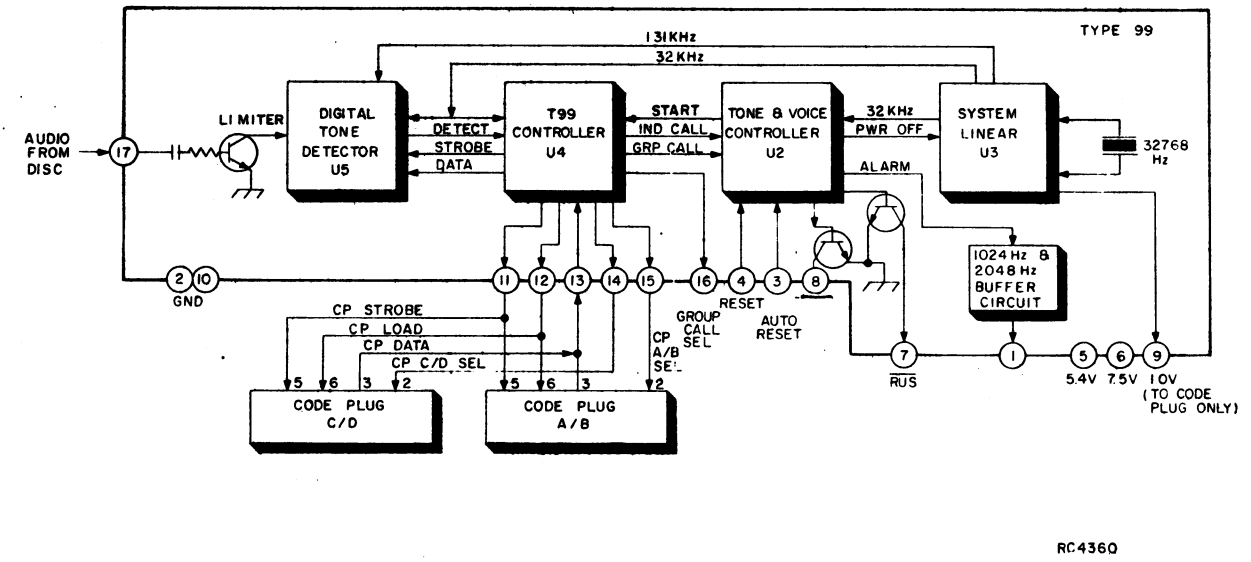


Figure 1 - Type 99 Decoder Module

CIRCUIT ANALYSIS

Type 99 module and associated Code Plugs A/B and C/D are mounted on the Type 99 option board. The module consists of four chips: Tone Voice Controller U2, System Linear U3, T99 Controller U4, and Low Threshold Detector U5 (See Figure 1).

Turning the radio on resets the Type 99 module. This causes the RUS control lead on Pin 7 to go low. The RUS lead going low indicates the conditions are true, the receive circuit is unsquelched. Also, the data for processing the first tone is loaded from code plug A/B into T99 Controller U4.

When a Type 99 tone is received by the receive circuit, it is applied to Pin 17 of the Type 99 module and to the input of Low Threshold Detector U5. If the tone is a correct A tone, U5 will cause U4 to switch to select tone B, and also load the data for processing the second Type 99 tone. If tone B is not received within 700 milliseconds, U4 will automatically reset the Type 99 module to receive tone A again.

If the unit is strapped for Group Call and Tone B is not received within 700 milliseconds, U4 will automatically select code plug C/D and load the data for processing Tone D (Group Call). If Tone D is not received in 700 milliseconds, U4 will automatically reset the Type 99 module to receive tone A.

NOTES

1. All tones must be present in the decoder for a minimum of 240 milliseconds before a valid detection occurs.
2. For Group Call applications, the C/D code plug must be used and the jumper from HL3 to HL4 must be removed.

CODE PLUG PROGRAMMING

Code plug U2 is essentially a 26-bit parallel-to-serial converter (See Figure 2). However, only 20 bits are used in Type 99 options. The plug has programmable diodes that can be shorted to permanently store the tone codes.

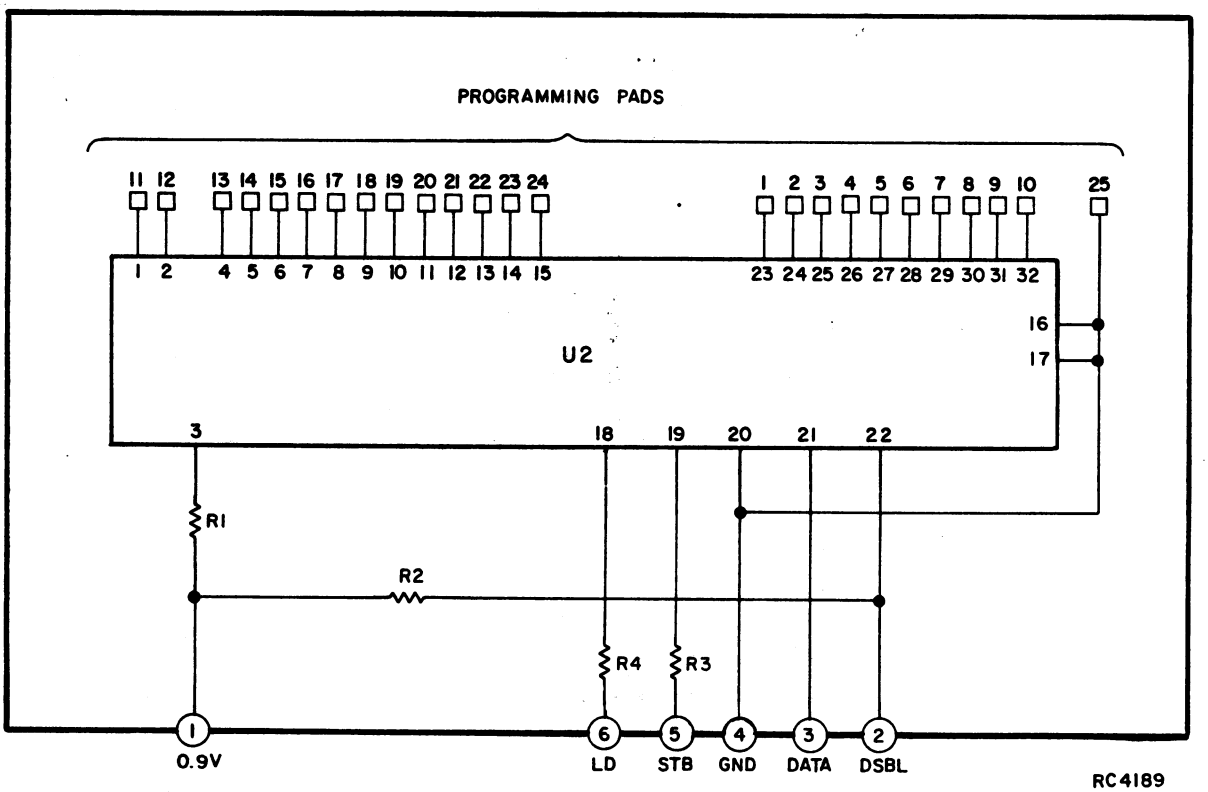
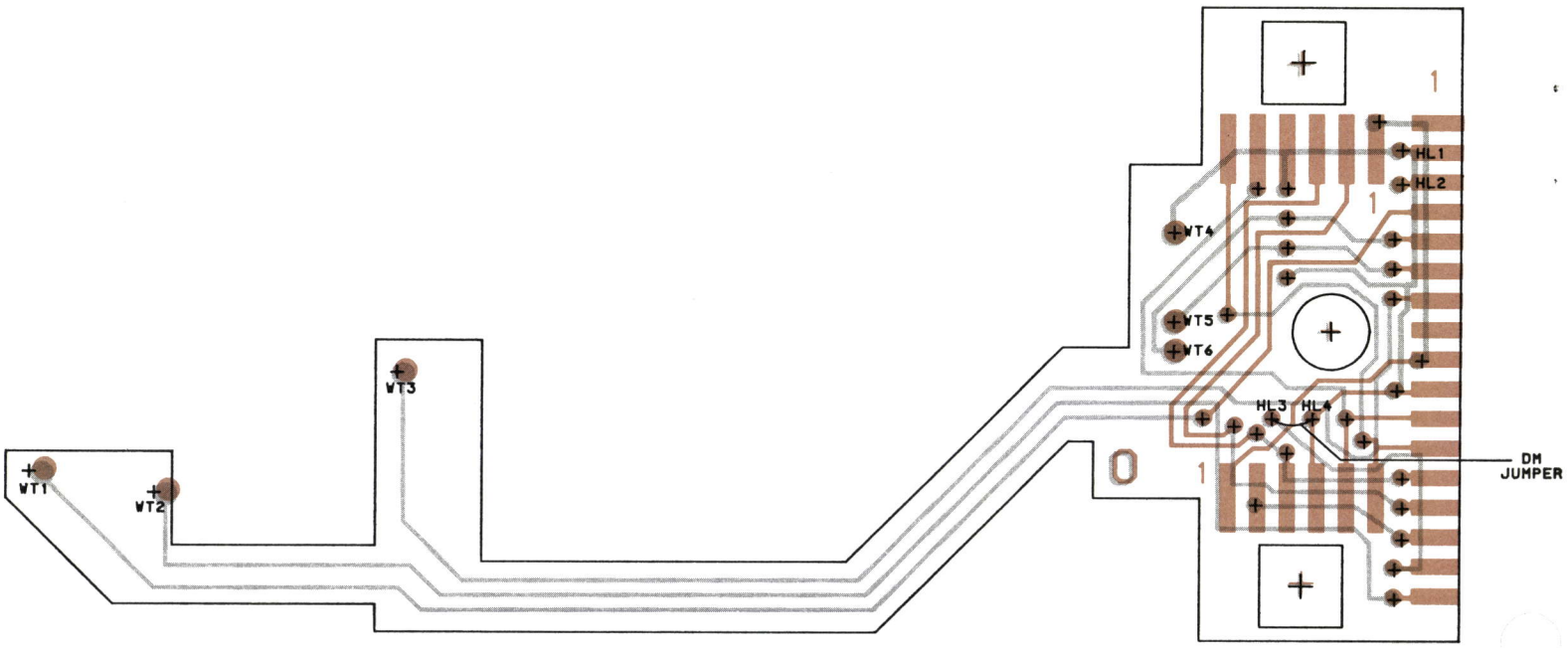
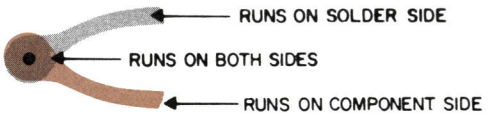


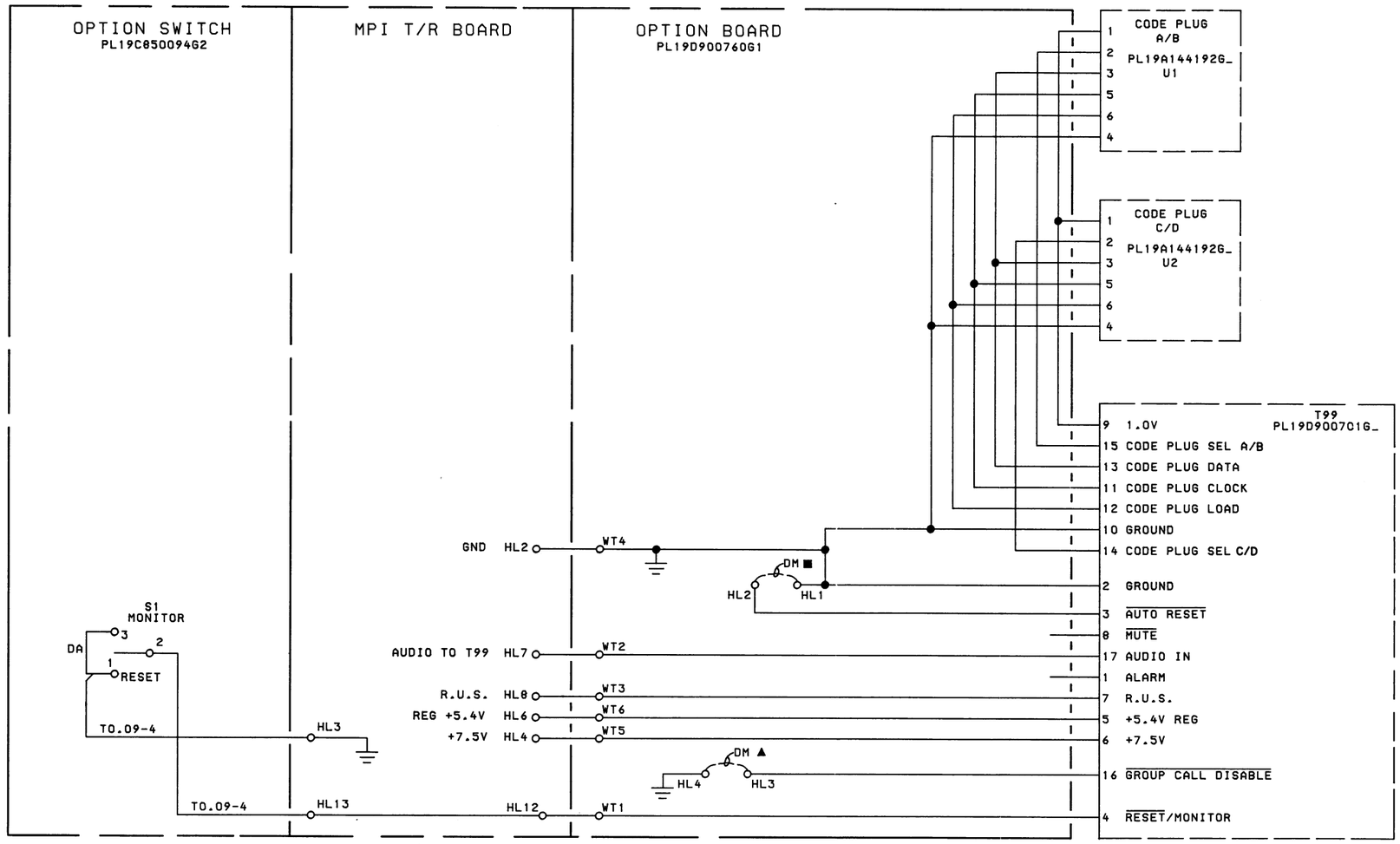
Figure 2 - Code Plug (RC4189)





(19D900762, Rev. 0)
(19A702654, Sh. 1, Rev. 0)
(19A702654, Sh. 2, Rev. 0)

OUTLINE DIAGRAM



MODEL NO.	REV. LETTER
19D900760G1	

■ JUMPER FOR AUTO RESET

▲ CUT JUMPER FOR GROUP CALL

(19D900763, Rev. 1)

SCHEMATIC DIAGRAM

PARTS LIST

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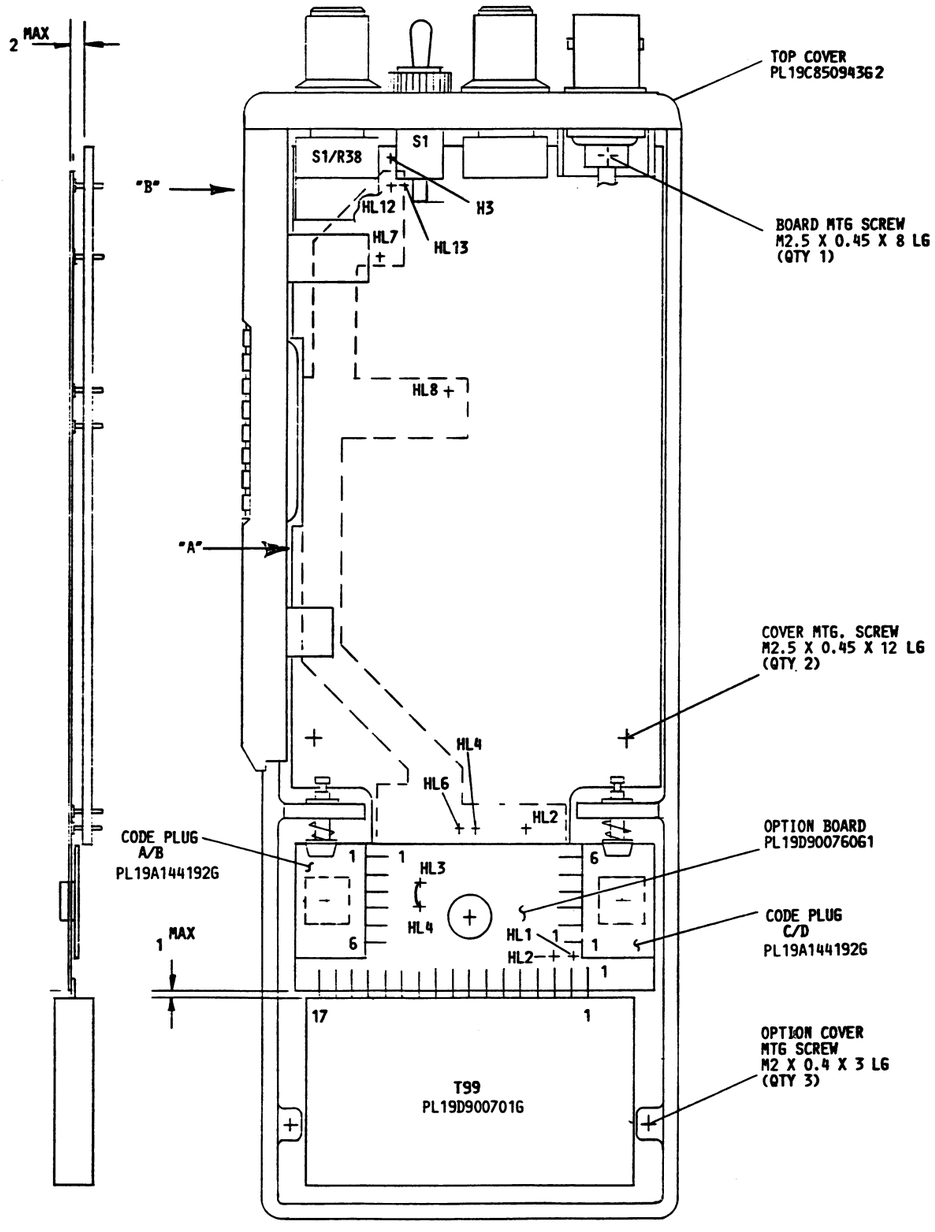
MPI TYPE 99 HARDWARE KIT
19A702805G1
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		TOP COVER 19C850943G2
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19C850845P19	Toggle: SPDT, contacts rated 1.5 amps @ 14 VDC; sim to C&K 7107MDG.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19D900760G1	T99 Component Board.
	19A702460P1	Contact, electrical. (Located on terminals of S1).
	19A702392P1	Nut, brass: No. 1/4-40. (Secures S1).
	NP280976PL	Nameplate: (T99 Code).
		ASSOCIATED PARTS (Not part of Hardware Kit)
	19D900701G2	Type 99 Module.
	19A144192G3	Plug Kit. (Factory Programmed).

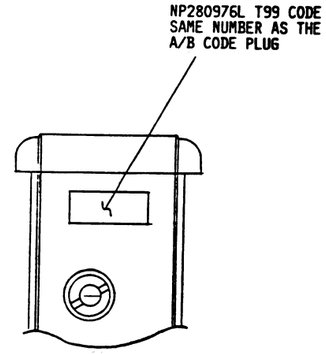
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



VIEW AT "A"

FRONT VIEW

WITH COVER REMOVED



VIEW AT "B"

(19D900800, Rev. 0)

① THESE INSTRUCTIONS COVER THE INSTALLATION OF OPTION KIT PL19A702805G1 FOR APPLICATION OF TYPE 99 TO MPI PERSONAL RADIO

*1. REMOVE BATTERY PACK, FRONT COVER AND OPTION COVER. REMOVE SCREW FROM ANTENNA MOUNTING BRACKET AND REMOVE TOP COVER AND TRANSMIT/RECEIVE BOARD AS AN ASSEMBLY.

*2. REMOVE KNOBS & NUTS SECURING TOP COVER TO TRANSMIT/RECEIVE BOARD POTS. REMOVE EXISTING TOP COVER, BEFORE ASSEMBLING NEW TOP COVER PL19C850943G2 MAKE THE FOLLOWING CONNECTIONS.

FROM	TO	WIRE
S1-1	HL3	BK
S1-2	HL13	Y

3. SOLDER T99 MODULE TO OPTION BOARD AS SHOWN.

4. SOLDER CODE PLUG OR PLUGS IN DESIRED POSITION. IF ONLY ONE CODE PLUG IS USED THEN IT MUST BE SOLDERED IN THE A/B POSITION.

5. IF PRODUCTION TAG SHOWS THAT THE RADIO SHOULD RESPOND TO GROUP CALL, REMOVE DA JUMPER FROM HL3 TO HL4, AND ADD C/D CODE PLUG.

6. ALIGN PINS ON OPTION BOARD WITH CORRESPONDING HOLES ON TRANSMIT/RECEIVE BOARD. SEAT FULLY AND SOLDER. MAX ASSEMBLED HEIGHT TO BE 2 BELOW TRANSMIT/RECEIVE BOARD.

7. REASSEMBLE TRANSMIT/RECEIVE BOARD TOP COVER, REAR COVER, OPTION COVER, AND BATTERY PACK.

* APPLIES ONLY IF OPTION IS INSTALLED IN AN ASSEMBLED RADIO.