

MPS (SYNTHESIZED) RADIO

DTMF ENCODER KIT
19A148546G1

SPECIFICATIONS *

Operating Voltage	6-9 VDC (battery supply)
Current	
Standby (no key pressed)	630 uA
Operating (key pressed)	15 mA
Tone levels	
Adjustable	0-1.6 VPP
Typical for 3 kHz deviation	0.8 VPP
Frequency Accuracy	+1%
Speaker SideTone Level	+58 dB at 8"

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

TABLE OF CONTENTS

SPECIFICATIONS	Cover
DESCRIPTION	1
CIRCUIT ANALYSIS	1
DTMF MODULATION ADJUSTMENT	1
TROUBLESHOOTING	1
OUTLINE DIAGRAM	2
SCHEMATIC DIAGRAM	3
PARTS LIST	4
INSTALLATION INSTRUCTIONS	5

DESCRIPTION

General Electric Dual Tone DTMF Encoder kit 19A148546G1 is used for encoding the MPS (synthesized) personal radio with standard DTMF tones. The encoder consists of two parts: printed circuit board A1 and matrix type keyboard S1. Circuit board A1 plugs into the system board just below the frequency synthesizer module and connects to the front cover and keyboard through cable and nine pin connector A2. Keyboard S1 is assembled into a plastic frame with a rubber gasket to provide a seal between keyboard and front cover.

CIRCUIT ANALYSIS

DTMF tones are generated by CMOS Tone Encoder U1 on circuit board A1. U1 provides eight audio sinusoidal frequencies which are mixed to provide tones suitable for DTMF telephone dialing. Pressing a key on keyboard S1 selects the proper divide ratio to obtain the desired two audio frequencies. These frequencies

are derived from a 3.58 MHz reference oscillator. The oscillator runs only when a key is pressed. The output sidetones are applied to speaker LS1 through Pin 9 of A1, for feedback to the operator. The sidetones are muted at U1-6 when the PTT bar switch is NOT pressed. Also, when a key on the DTMF keyboard is pressed, microphone MK1 is muted through Pin 10 of A1. The tone output on Pin 7 of A1 is connected through modulation adjust R1 to E908 on the system board. E908 is the tone input to the TX-AA module.

DTMF MODULATION ADJUSTMENT

To adjust the DTMF modulation:

1. Apply 7.5 VDC, or connect a battery to the radio.
2. Set deviation monitor to transmit frequency.
3. Press PTT and key 1 and set deviation, using R2102, to 3 kHz ± 2 kHz.

TROUBLESHOOTING

Before beginning type following procedure, refer to the MPS Troubleshooting Procedure in the Table of Contents of Maintenance Manual LBI31413(HB) or LBI31461(UHF).

QUICK CHECKS

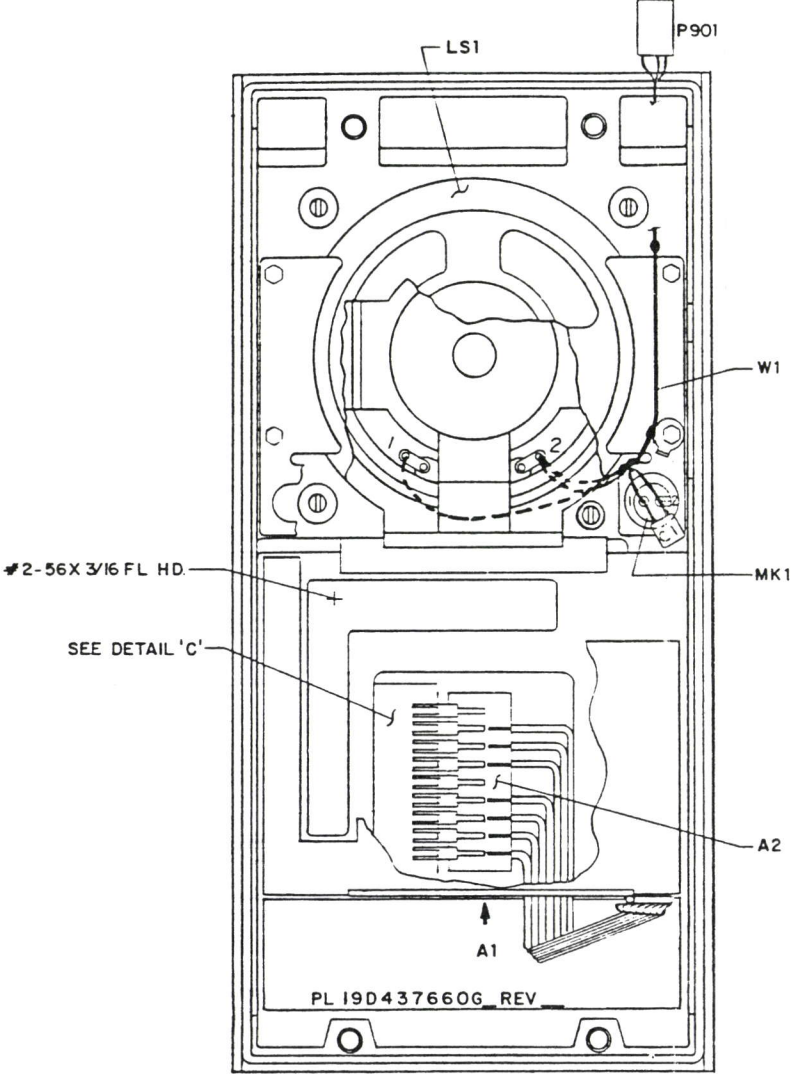
<u>SYMPTOMS</u>	<u>CHECK</u>
No sidetones but have TX tones	Q1
No sidetones and no TX tones	U1 & Q1
Does not encode at all	S1
Sidetone present when PTT bar is NOT pressed	Q2
Microphone does not mute when sending tones	U1

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WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

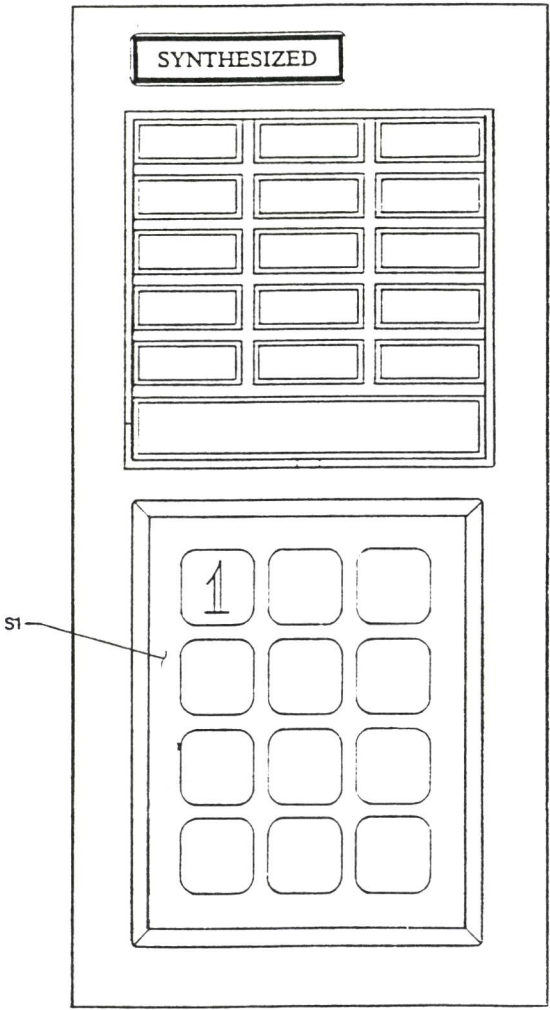
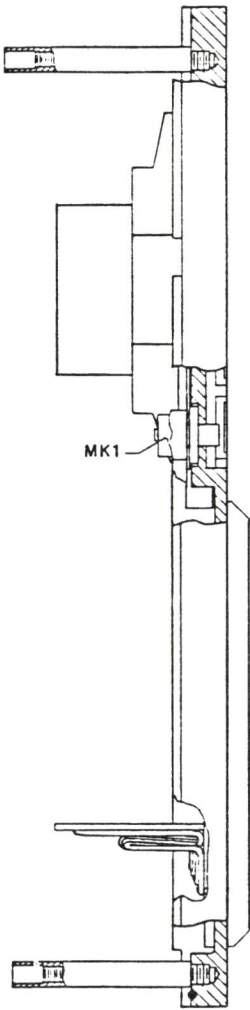
GENERAL  ELECTRIC*

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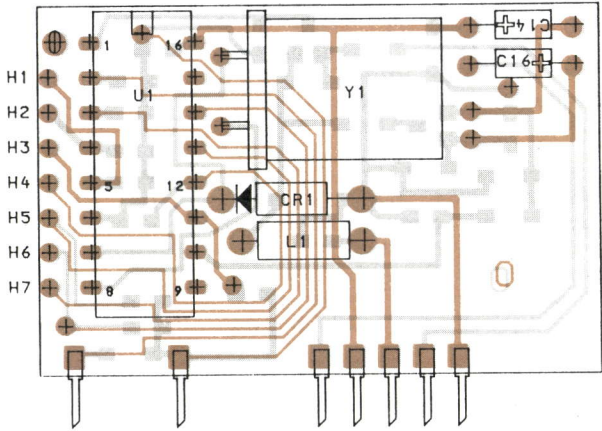
DETAIL 'C'
TERMINAL IDENTIFICATION
FOR S1



CONNECTION CHART		
FROM	TO	WIRE
P901	LS1-1	W
	MK1-1	O
LS1-2	LS1-2	BK
	MK1-2	T28-BK
A2	A1-H1	V
	A1-H2	BL
	A1-H3	G
	A1-H4	Y
	A1-H5	C
	A1-H6	R
	A1-H7	BR
MK1	MK1-2	C1

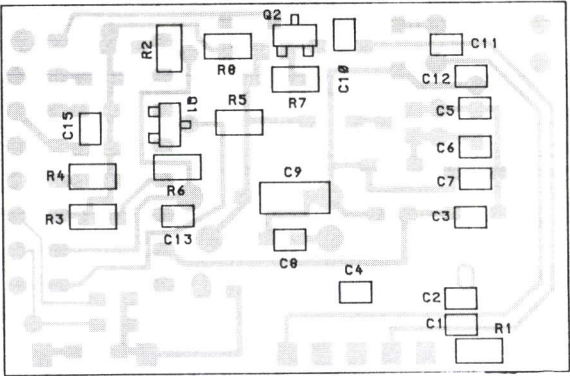
RC 5069
(MADE FROM I9D437660, REV. 3)

DTMF COMPONENT BOARD
A1
(Component Side)



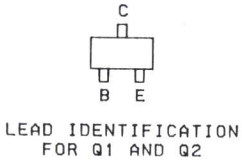
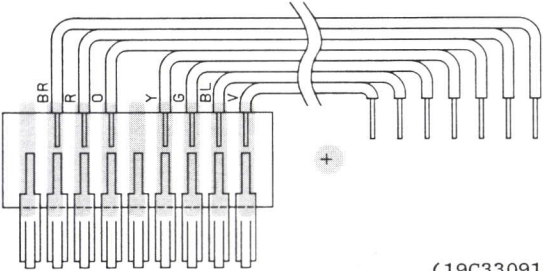
(19C336393)
(19A148385, Sheet 1, Rev. 0)
(19A148385, Sheet 2, Rev. 0)

(Solder Side)



(19C336392)
(19A148385, Sheet 2, Rev. 0)

(DTMF INTERCONNECT BOARD)
A2

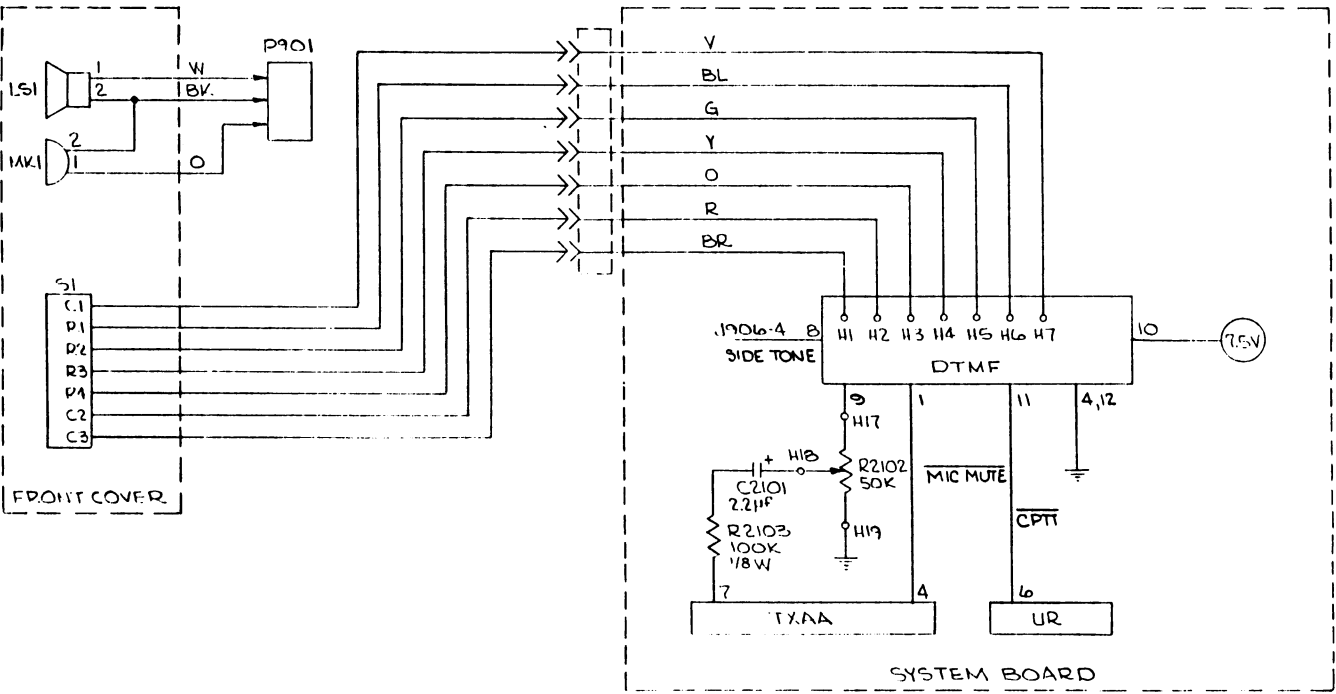


(19C330916, Rev. 1)
(19A142752, Sheet 1, Rev. 0)

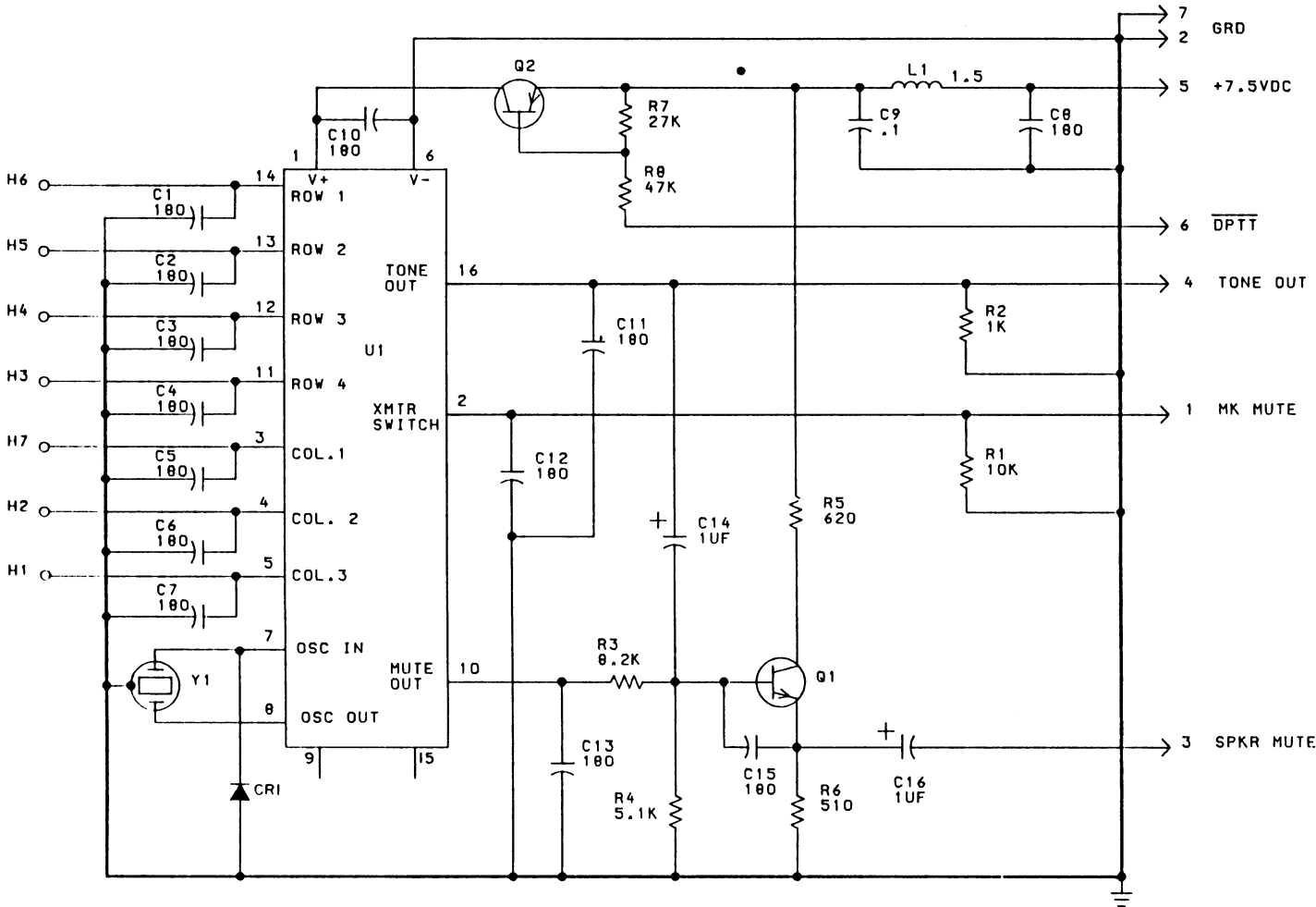
OUTLINE DIAGRAM

DTMF ENCODER KIT
19A148546G1

DTMF ENCODER KIT
(19A148546G1)



(19C336428, Rev. 0)



ALL RESISTORS ARE 1/8 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.

(19C336394, Rev. 0)

SCHEMATIC DIAGRAM

DTMF ENCODER KIT
19A148546G1
DTMF ENCODER BOARD
19C336392G1

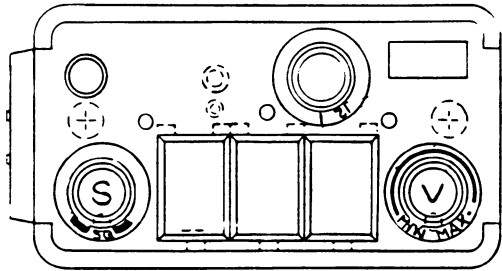
PARTS LIST

DTMF HARDWARE KIT
19A148546G1
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
C2101	19A701779P13	----- CAPACITORS ----- Tantalum: 2.2 uF ±20%, 10 VDCW.
R2102	19A134512P8	----- RESISTORS ----- Variable: 50K ohms ±5%, 1/2 w.
R2103	19B800607P104	Metal film: 100K ohms ±5%, 200 VDCW, 1/8 w.
		FRONT COVER 19D437660G2
A1		DTMF COMPONENT BOARD 19C336392G1
C1 thru C8	19A702061P69	----- CAPACITORS ----- Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C9	19A702052P26	Ceramic: 0.1 uF ±10%, 50 VDCW.
C10 thru C13	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C14	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C15	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C16	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
CR1	19A700025P10	----- DIODES AND RECTIFIERS ----- Silicon, zener: 400 mA max; sim to BZX55-C10.
L1	19A700024P15	----- COILS ----- Coil, RF: 1.5 uH ±10%.
Q1	19A700076P2	----- TRANSISTORS ----- Silicon, NPN.
Q2	19A700059P2	Silicon, PNP.
R1	19B800607P103	----- RESISTORS ----- Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R2	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R3	19B800607P822	Metal film: 8.2K ohms ±5%, 200 VDCW, 1/8 w.
R4	19B800607P472	Metal film: 4.7K ohms ±5%, 200 VDCW, 1/8 w.
R5	19B800607P561	Metal film: 560 ohms ±5%, 200 VDCW, 1/8 w.
R6	19B800607P562	Metal film: 5.6K ohms ±5%, 200 VDCW, 1/8 w.
R7	19B800607P273	Metal film: 27K ohms ±5%, 200 VDCW, 1/8 w.
R8	19B800607P473	Metal film: 47K ohms ±5%, 200 VDCW, 1/8 w.
U1	19A134958P1	----- INTEGRATED CIRCUITS ----- Integrated circuit: Linear/Digital CMOS TONE ENCODER.
Y1	19A702511G1	----- CRYSTALS ----- Quartz: Frequency 3.579545 MHz.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

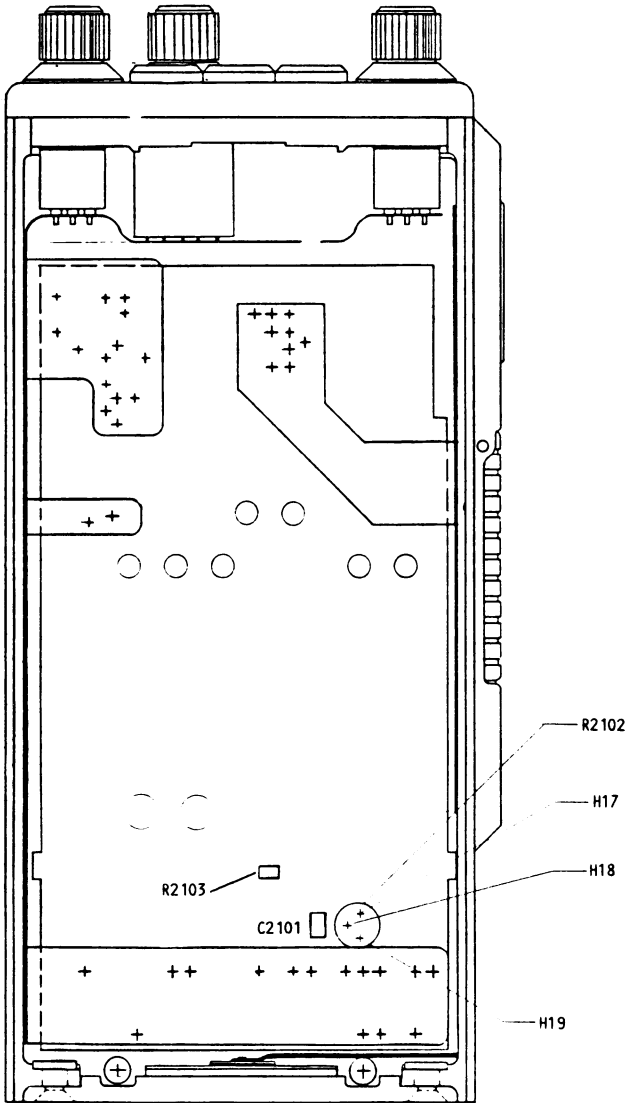
SYMBOL	GE PART NO.	DESCRIPTION
A2	19A134938P1 19C328267G1	DTMF INTERCONNECT BOARD 19C328207G1 Connector, plug. Cable.
C1	19A700226P53	----- CAPACITORS ----- Ceramic: 47 pF ±5%, 100 VDCW, temp coef -750 PPM.
LS1	19A134460P1	----- SPEAKERS ----- Permanent magnet: 2 inches, 8 ohms ±10%, imp 500 mW, 450 ±100 Hz resonant freq; sim to Pioneer A50AP13-01F.
MK1	19A701301P2	----- MICROPHONES ----- Microphone cartridge: 1800 ±30% ohms imp, 1.1 - 10 VDC; sim to Primo EM-78.
P901		----- PLUGS ----- (Part of W1).
S1	19C851212P2	----- SWITCHES ----- Pushbutton; sim to Amp Keyword Technology CP83-41190.
W1		----- CABLES ----- MPS CABLE 19B233023G3
P901	19A702405P4 19A702405P27	Connector. Includes: Shell. Contact, electrical.
	19A142819P3 19B234460P1 19A134793P1804 19A121175P15 19A143679P2 19D429314P1 19A148345P1 19A234459P1 19B232816P6 19D429300P1 19A137709P1 19C328382G13 19A134583P2 4033714P14 19A116543P1 19A703814P1 19C328104P1 19C328103P1 19A701622P1	----- MISCELLANEOUS ----- Insulator. Speaker, clip. (Secures speaker). Screw, thd. forming: No. 1-64 x 5/32. (Secures speaker). Insulator, plate. Insulator. Speaker boot. Nameplate. (SYNTHESIZED). Mike boot. Pad. Grille. Spacer. Front cover. Cover seal, rubber, B Case. Solderless terminal. Screw, socket head: No. 2-56 UNC. Tab, polarizing. Contact, clip. Lead frame. Cotter pin.



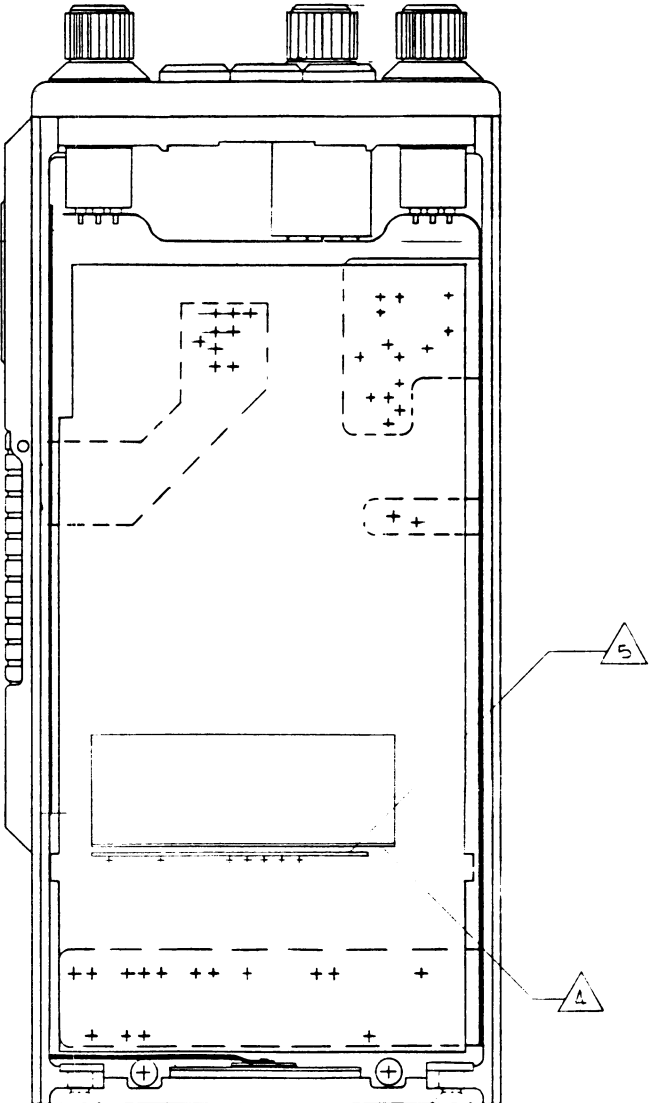
1

THESE INSTRUCTIONS COVER THE INSTALLATION OF HARDWARE KIT 19A148546G1 FOR THE APPLICATION OF DTMF ENC INTO MPS

1. REMOVE FRONT AND BACK COVERS IF PRESENT.
2. INSTALL R2102 ON SOLDER SIDE OF SYSTEM BOARD IN H17, H18 AND H19 ALSO INSTALL R2103 AND C2101 IN POSITION AS SHOWN.
3. SOLDER ALL ELECTRICAL CONNECTIONS, AND TRIM LEADS FLUSH TO .020.
4. INSTALL INSULATOR ITEM 2 TO FREQUENCY SYNTHESIZER MODULE AS SHOWN.
5. INSTALL THE DTMF THAT COMES WITH FRONT COVER 19D43766062
6. IF ALL OTHER OPTIONS THAT REQUIRE REMOVAL OF THE FRONT AND BACK COVERS HAVE BEEN INSTALLED, REPLACE THE COVERS.



REAR VIEW
COVER REMOVED



FRONT VIEW
COVER REMOVED

INSTALLATION INSTRUCTIONS

DTMF ENCODER KIT
19A148546G1