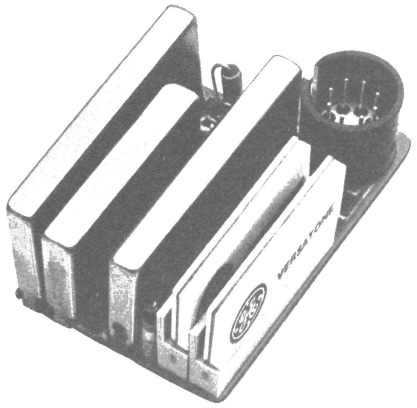
MOBILE RADIO

MASTR®

CHANNEL GUARD ENCODER/DECODER 19C321017G1 & G2
FOR
MPE, PE & PY MODELS
AND
Porta-Mobile II™



Maintenance Manual LBI4870J

DATAFILE FOLDER – DF5044

CHANNEL GUARD ENCODER/DECODER 19C321017G1, G2

SPECIFICATIONS *

Tone Frequencies	71.9 Hz to 203.5 Hz
Frequency Stability	±0.4%
Current Drain	
Standby	4.37 Milliamperes
Decoded	4.66 Milliamperes
Encode	4.66 Milliamperes
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Normal Input Voltage Requirements	+7.5 VDC

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

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

DESCRIPTION

Channel Guard 19C321017G1 and G2 is a continuous tone encoder/decoder for operation on tone frequencies in the 71.9 Hz to 203.5 Hz range. The encoder and the decoder operate on the same tone frequency, but can be modified to operate on two tone frequencies by adding connections to Pins 4 and 7 of P602, adding R604, R605 and XFL602, and using two Versatone Networks. The Encoder/Decoder assembly consists of descrete components and five thick film Integrated Circuits Modules. The Integrated Circuit Modules consist of Decode Module A601, Encode Module A602, Frequency Switchable Selective Amplifier (FSSA) A603 and two plug in Versatone Networks FL601 and FL602.

The Channel Guard is controlled by a switch on the control unit labeled CG "A"-"OFF"-"B" or CG "ON"-"OFF". Placing the switch labeled CG "A"-"OFF"-"B" in the "OFF" position disables the encoder and decoder circuits so that no tone is applied to the transmitter oscillator modules and all calls are monitored by the receiver. Placing the switch in an "A" or "B" position enables the decoder circuit so that calls will not be heard from the receiver until the proper Channel Guard tone is applied. Placing the switch labeled CG "ON"-"OFF" in the "OFF" position disables the decoder only.

For a functional diagram of the Channel Guard Encoder/Decoder refer to the troubleshoot procedures.

Typical diagrams of the Versatone Network, Phase Inverting Amplifier, Encode Limiter, Low Pass Filter, Decode Limiter, Amplifier and Threshold detector are provided in Figures 2 through 7. References to symbol numbers mentioned in the following text are found on the Schematic Diagram, Outline Diagram, and Parts List.

CIRCUIT ANALYSIS

Frequency Switchable Selective Amplifier

Frequency Switchable Selective Amplifier (FSSA) A603 is a highly stable active bandpass filter for the 71.9 Hz to 203.5 Hz frequency range. The selectivity of the filter is shifted across the bandpass frequency range by switching Versatone Networks in the filter circuit (see Figure 1).

In Figure 1, the gain of the FSSA is shown as a function of the tone frequency. The Tone Frequency is determined by the Tone Network connected in the FSSA circuit. When Tone Network A is in the circuit, the maximum gain occurs at FA. When Tone Network B is in the circuit, the maximum gain occurs at FB.

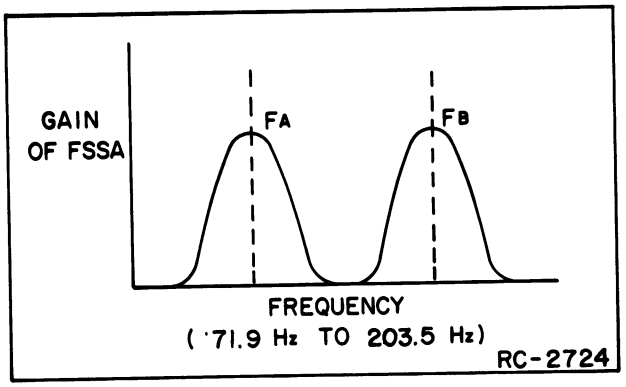


Figure 1 - Gain vs Frequency

Tone Networks

Versatone Networks FL601 and FL602 are parallel connected, precision resistor networks with associated switching transistors. A typical Versatone Network is shown in Figure 2. Pins 4 and 5 of the network are connected to ground. When a positive voltage is applied to Pin 3, Q1 will conduct. This disables Amplifier Q2 and feedback resistors R1, R2 and R3, effectively removing the network from the FSSA circuit.

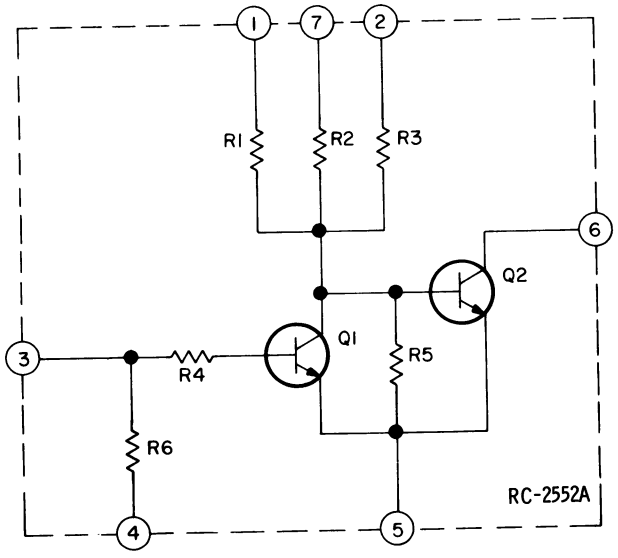


Figure 2 - Typical Versatone Network

Encode

The Channel Guard encode tone is generated by coupling the output of FSSA bandpass filter A603 back to its input through a phase inverting amplifier circuit and a

limiter circuit. The output of the FSSA is coupled from A603-1 to the input of the phase inverting amplifier at A602-9. A typical phase inverting amplifier circuit is shown in Figure 3.

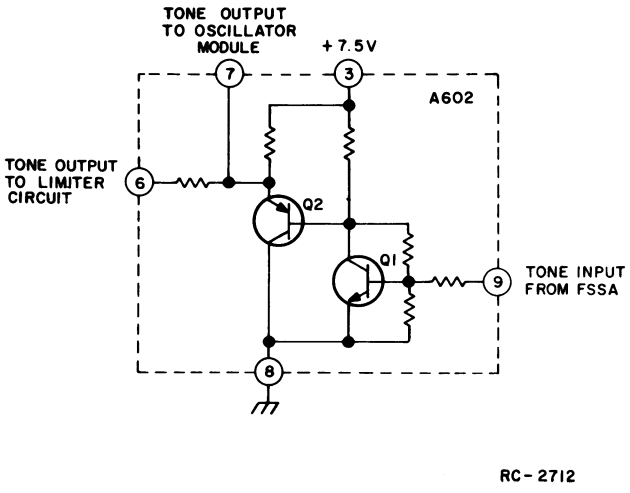


Figure 3 - Typical Phase Inverting Amplifier

Amplifier Q1 provides 180° phase shift of the tone frequency at the output of emitter follower Q2. The output of the phase inverting amplifier circuit is coupled from A602-6 to the input of the limiter circuit at A602-5. A typical limiter circuit is shown in Figure 4.

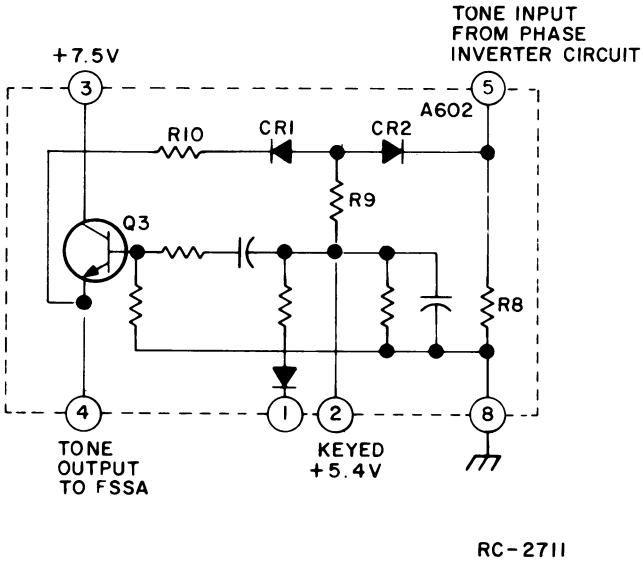


Figure 4 - Typical Encode Limiter Circuit

Limiting network CR1, CR2, R8, R9 and R10 sets the tone output coupled from A602-4 to the input of the FSSA (A603-12) at 53 milli-volts peak to peak.

The limiter circuit is also used as an encode switch. Keying the transmitter applies +5.4 Volts to A602-2. This forward biases Limiter diodes CR1 and CR2 and momentarily turns Q3 on. Forward biasing CR1 and CR2 allows the circuit to oscillate. Momentarily turning Q3 on starts the circuit oscillating. The tone frequency is determined by the tone network connected in the FSSA circuit.

The tone output of the encoder circuit is taken from A602-7 and coupled through modulation adjustment R601 to the transmitter oscillator modules.

Decode

Audio, containing the correct tone frequency from R707-3 (Volume Hi), is coupled to Pin 1 of Decode Module A601. Pin 1 of A601 is the input of an active, three stage, low pass filter. The low pass filter attenuates frequencies over 205 Hz. A typical low pass filter is shown in Figure 5. The output of the low pass filter at A601-15 is applied to A601-14. A601-14 is the input of a limiter circuit, limiting the output at A601-13 to 55 millivolts peak to peak. A typical limiter circuit is shown in Figure 6. The output from the limiter is coupled to Pin 12 of FSSA A603. Since the tone is the proper frequency the FSSA will allow it to pass. The output of the FSSA is coupled from A603-1 to A601-3. A601-3 is the input to an amplifier circuit. The output of the amplifier at A601-4 is coupled to the input of a threshold detector at A601-6. A typical amplifier and threshold detector circuit is shown in Figure 7. When a tone is present Q6 will conduct causing Q7 to conduct and +7.5 VDC to be on the output of the threshold detector circuit (A601-10). The +7.5 Volts is applied to the Squelch switching transistor on the receiver Audio PA module. The receiver now operates on noise squelch, permitting the call to be monitored.

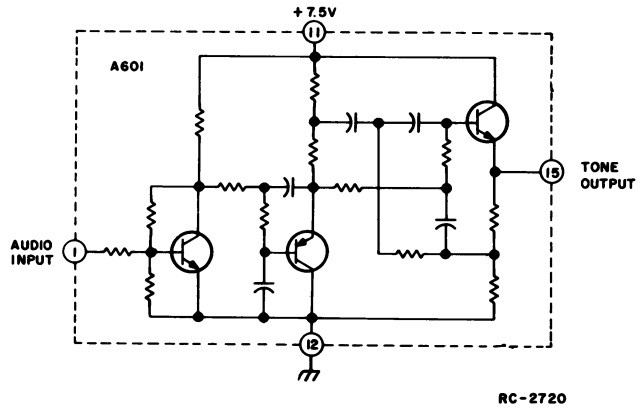


Figure 5 - Typical Low Pass Filter

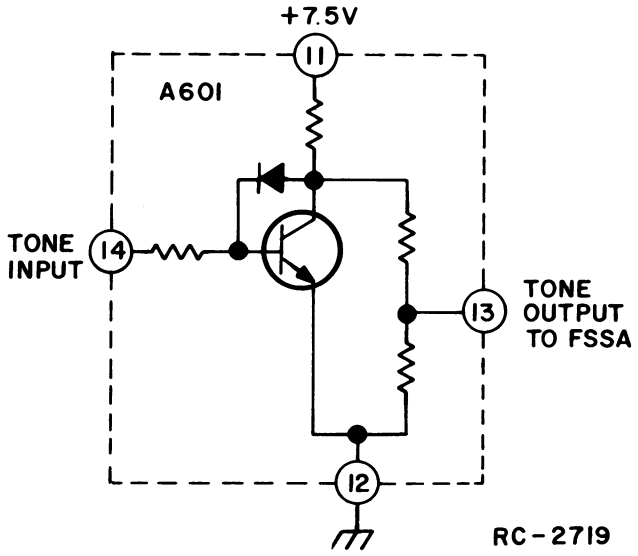


Figure 6 - Typical Decode Limiter Circuit

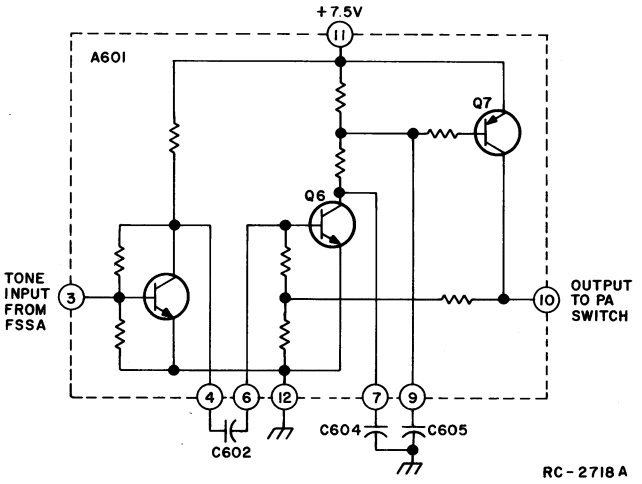


Figure 7 - Typical Amplifier & Threshold Detector Circuit

PE Tone Control

Tone Control Board 19B219505G2 is used with eight-frequency PE to disable undesired tones. For example, placing frequency select switch S1 in channel one position, where B tone is not desired, forward biases diode CR1 with 5.4 Volts. The output of CR1 is applied through TONE B DISABLE (P602/P603-7) to Pin 7 of Versatone Network FL602, holding FL602 OFF.

For assembly instructions of diodes on Tone Control Board 19B219505G2, refer to the Interconnection Diagram for eight-frequency PE, listed in the Table of Contents.

PM II Automatic Tone Select

Diodes CR1013 through CR1036 mounted on the system disable undesired tones. For example, placing frequency select switch S704 in channel four position, where no B tone is desired, forward biases CR1018 with 5.4 Volts. The output of CR1018 is applied through TONE B DISABLE (P1-7 and J601-7) to Pin 3 of Versatone Network FL602, holding FL602 off.

For assembly of diodes on the system board, refer to the Interconnection Diagrams for Automatic Tone Select listed in the Table of Contents. Also refer to Maintenance Manual LBI30100 for portable radios or Maintenance Manual LBI30285 for mobile, industrial or motorcycle radios.

PM II Automatic Monitor

Automatic Monitor Board 19B226856G1 and diodes CR1001 through CR1012, mounted on the system board, disable Channel Guard operation so a channel can automatically be monitored. For example, placing frequency select switch S704 in channel four, where it is desirable to monitor the channel without Channel Guard, forward biases CR1006 and applies a 5.4 Volts to P2 of Automatic Monitor Board 19B226856G1. The 5.4 Volts applied to P2 causes transistor Q1 to conduct. Transistor Q1 conducting causes transistor Q1 on the system board to conduct, activating the tone switch on the receiver board. Activating the Tone switch causes the receiver to operate on noise squelch.

For assembly of diodes and Automatic Monitor Board, refer to the Interconnection Diagrams for Automatic Monitor listed in the Table of Contents. Also refer to Maintenance Manual LBI30100 for portable radios and Maintenance manual LBI30285 for mobile, industrial or motorcycle radios.

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

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U.S.A.

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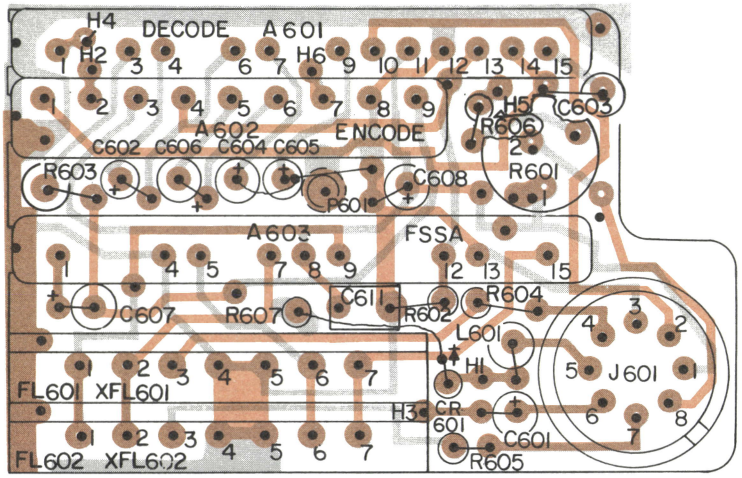
Printed in U.S.A.

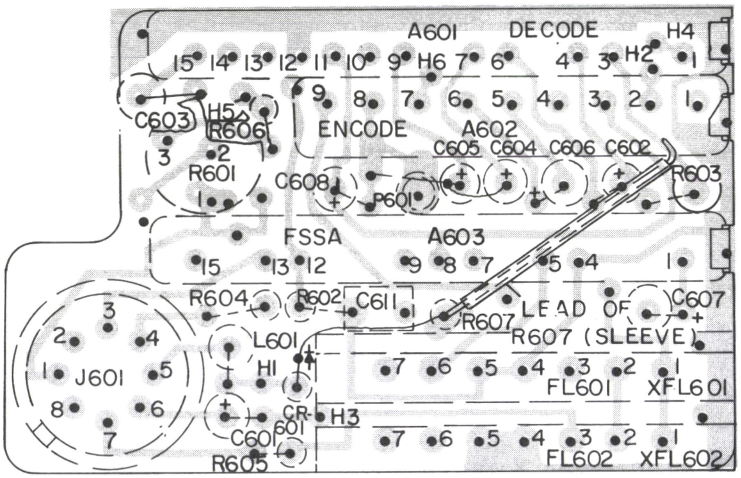
CHANNEL GUARD BOARD
(19C321017 G1)

COMPONENT SIDE



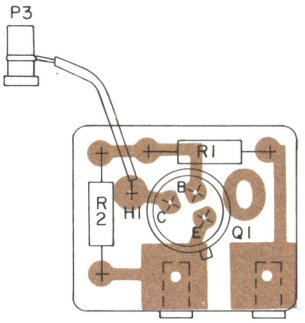
(19C321528, Rev. 1)
(19D417783, Sh. 2, Rev. 6)
(19D417783, Sh. 3, Rev. 5)

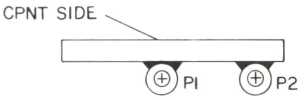
SOLDER SIDE



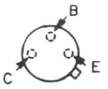
(19C321528, Rev. 1)
(19D417783, Sh. 2, Rev. 6)

AUTOMATIC MONITOR
19B226856





LEAD IDENTIFICATION FOR Q1

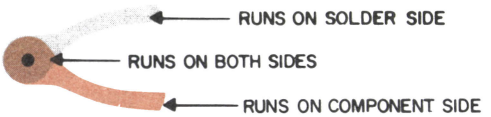


TRIANGULAR

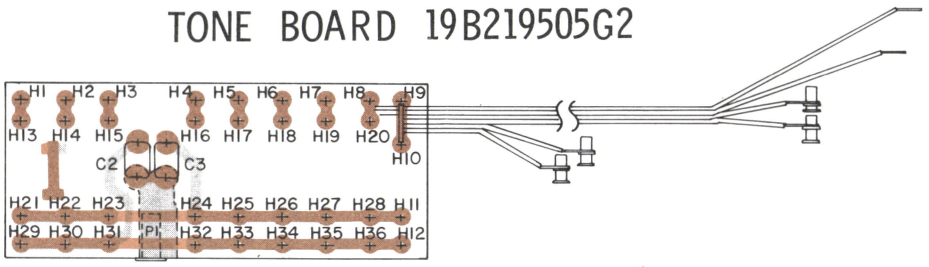
TOP VIEW

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

(19B232249, Rev. 0)
(19C321617, Sh. 2, Rev. 0)
(19C321617, Sh. 3, Rev. 0)



TONE BOARD 19B219505G2



(19B232259, Rev. 0)
(19B219488, Sh. 1, Rev. 1)
(19B219488, Sh. 2, Rev. 1)

OUTLINE DIAGRAM

CHANNEL GUARD ENCODE DECODE
19C321017G1

PARTS LIST

LBI4871C

CHANNEL GUARD
19C321017G1 ENCODE/DECODE - REV A
19C321017G2 ENCODE ONLY

SYMBOL	GE PART NO.	DESCRIPTION
A601	19D417763G1	Decoder.
A602	19C321133G1	Encoder.
A603	19D417833G1	Selective Amplifier.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C601	5491674P27	Tantalum: 0.47 uf + or - 20%, 35 VDCW; sim. to Sprague Type 162D.
C602	5491674P1	Tantalum: 1 uf +40-20%, 10 VDCW; sim. to Sprague Type 162D.
C603	5491674P36	Tantalum: 3.3 uf + or - 20%, 10 VDCW; sim. to Sprague Type 162D.
C604	5491674P27	Tantalum: 0.47 uf + or - 20%, 35 VDCW; sim. to Sprague Type 162D.
C605	5491674P1	Tantalum: 1 uf +40-20%, 10 VDCW; sim. to Sprague Type 162D.
C606 thru C608	5491674P36	Tantalum: 3.3 uf + or - 20%, 10 VDCW; sim. to Sprague Type 162D.
C611	19A700226P68	Ceramic: 120 pF + or -5%, 100 VDCW, -750 PPM temp coef.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR601	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J601	19C331182P1	Terminal, feed-thru: sim to Warren 1-B-2994-4.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L601	19B209420P105	Coil, RF: .22 uH + or - 10%, .14 ohms DC res max; sim to Jeffers 4416-5K.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P601	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R601	19A116412P6	Variable, cermet: 20K ohms + or - 10%, 1/2 w; sim to Helipot Model 62 PR.
R602	19A701250P253	Metal film: 3.48K ohms + or - 1%, 1/4 w.
R603	19A701250P341	Metal film: 26.1K ohms + or - 1%, 1/4 w.
R606	3R151P183J	Composition: 18K ohms + or - 5%, 1/8 w.
R607	3R151P104K	Composition: 100K ohms + or - 10%, 1/8 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL601 and XFL602		Socket. Includes:
	19D416714P1	Shell.
	19B219681P1	Contact, electrical.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A129811P1	Insulator. (Located between A602 and printed board).
		ASSOCIATED PARTS
		- - - - - - - - - TONE NETWORKS - - - - - - - - -
		NOTE: When reordering give GE Part Number and specify frequency needed.
FL601 and FL602	19C320291G1	Versatone Network: 71.9-203.5 Hz.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

CHANNEL GUARD TONE FREQUENCIES

71.9 Hz
77.0
82.5
88.5
94.8
100.0
103.5
107.2
110.9
114.8
118.8
123.0
127.3
131.8
136.5
141.3
146.2
151.4
156.7
162.2
167.9
173.8
179.9
186.2
192.8
203.5

PRODUCTION CHANGES

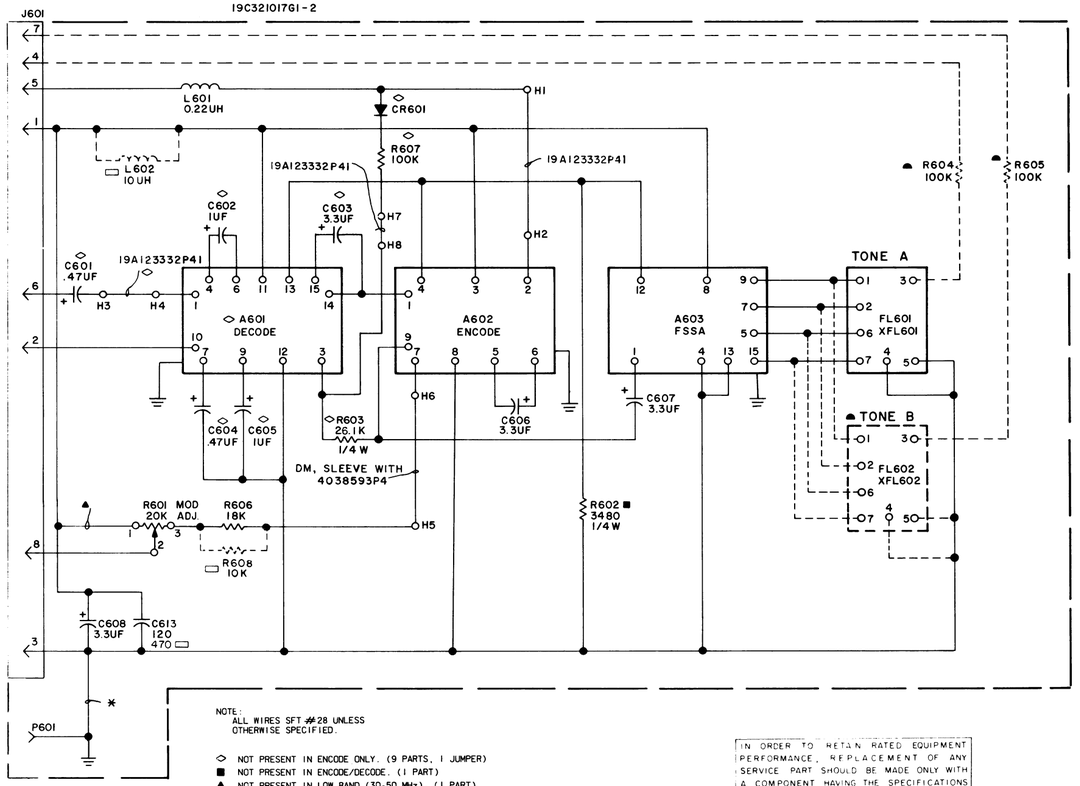
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - CG Encode/Decode 19C321017G1

To reduce falsing at the high end of the CG band.
Changed R603.

R603 was: 19C314256P22262-
Metal film: 22,600 ∧ ± 1%, 1/4 W.

CHANNEL GUARD ENCODE/DECODE OR ENCODE ONLY
19C321017G1-2



NOTE:
ALL WIRES SFT #28 UNLESS OTHERWISE SPECIFIED.

◇ NOT PRESENT IN ENCODE ONLY. (9 PARTS, 1 JUMPER)
■ NOT PRESENT IN ENCODE/DECODE. (1 PART)
▲ NOT PRESENT IN LOW BAND (30-50 MHz). (1 PART)

* NOT PRESENT IN 450 (406-512 MHz). (1 PART)
◓ NOT PRESENT IN SINGLE TONE ENCODE/DECODE OR ENCODE ONLY. (3 PARTS)
▭ PRESENT IN 66-88 MHZ ONLY. PART OF KIT 19A130285G7

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

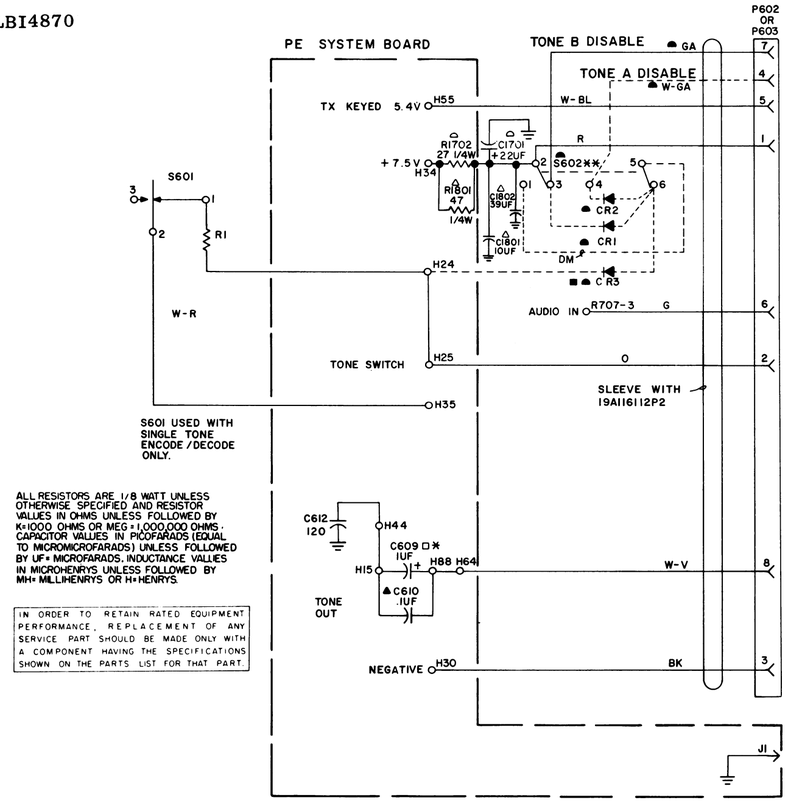
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
19C321017G1	A

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

(19D423936, Rev. 5)

SCHEMATIC DIAGRAM

CHANNEL GUARD ENCODER/DECODER
19C321017G1 & G2



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 PICOFARADS (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.

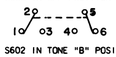
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PLI9AI302856I	B
PLI9AI302856Z	B
PLI9AI302856J	C
PLI9AI37882GI	

NOTE:
ALL WIRES SFT #28 UNLESS OTHERWISE SPECIFIED.

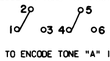
△ PRESENT ONLY WITH OPTION 4422 OR 4424 AND CHANNEL GUARD
■ CR3 NOT PRESENT IN 2 TONE ENCODE ONLY APPLICATIONS.
▲ NOT PRESENT IN LOW BAND (30-50 MHz), OR HIGH BAND PY (150-174 MHz) (1 PART)
□ NOT PRESENT IN HIGH BAND PE (132-174 MHz) (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)
◓ NOT PRESENT IN SINGLE TONE ENCODE/DECODE OR ENCODE ONLY. (7 PARTS, 2 WIRES)
⌓ USED ONLY WITH INTRINSICALLY SAFE RADIO.

✱✱ S602 SHOWN IN TONE "A" POSITION

S602 IN OFF POSITION



S602 IN TONE "B" POSITION



TO ENCODE TONE "A" IN OFF POSITION CLIP CR2.
TO ENCODE TONE "B" IN OFF POSITION CLIP CR1.

(19D417799, Rev. 9)

INTERCONNECTION DIAGRAM

MPE/PY RADIO

PARTS LIST

LBI30524B

PE/PY CHANNEL GUARD MOD KIT
19A130285G1 1 TONE W MONITOR SWITCH
19A130285G2 1 TONE WITHOUT MONITOR SWITCH
19A130285G3 2 TONE W A-OFF-B SWITCH

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C609	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C610	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW120C104-M2.
C611*	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-M5R-471M. Added by REV B.
C612*	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM. Added by REV A.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L601*	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K. Added by REV B.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P602	19B226481G2	Plug: 8 contacts.
P603	19B226481G1	Plug: 8 contacts.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R604 and R605	3R151P104K	Composition: 100K ohms ±10%, 1/8 w.
R606*	3R151P103J	Composition: 10K ohms ±5%, 1/8 w. Added by REV B.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S601		SWITCH ASSEMBLY 19A127833G1
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P201J	Composition: 200 ohms ±5%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S602	19A116648P6	Toggle: SPDT; sim to C and K Components 7101SDG.
		SWITCH ASSEMBLY 19A130252G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR3	19A116052P2	Silicon.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A116648P2	Toggle: DPDT; sim to C and K Components 7211SDG.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL602		Socket. Includes:
	19D416714P1	Socket.
	19B219681P1	Contact, electrical.
		MODIFICATION KIT 19A137882G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1801	5491674P37	Tantalum: 10 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C1802	5491674P30	Tantalum: 39 µf ±20%, 10 VDCW; sim to Sprague Type 162D.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1901	3R152P470J	Composition: 47 ohms ±5%, 1/4 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B216926G1	Decorative cap. (Used with S601).
	19B216926P2	Decorative cap. (Used with S602).
	19C320721P1	Seal. (Used with S601, S602).
	4035306P2	Washer, fiber. (Used with S601, S602).
	19A130289P1	Shield. (Located by antenna tube).
	19A136802P1	Insulator. (Used with Channel Guard Board).

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 - Channel Guard Mod Kit 19A130285G1, 2 & 3
To improve RF filtering. Added C612.

REV. B - To improve RF filtering. Added R606, C611 and L601.

REV. C - Channel Guard Mod Kit 19A130285G3
To improve operation. Changed wiring diagram 19D417799 to:

■CR3 not present in 2 tone encode only applications.

PARTS LIST

LBI30525B

PE CHANNEL GUARD MOD KIT
19A130285G4 2 TONE W TONE CONTROL AND MONITOR SWITCH
19A130285G5 2 TONE WITH TONE CONTROL

SYMBOL	GE PART NO.	DESCRIPTION
		---------- CAPACITORS ----------
C609	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C610	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW120C104-M2.
C611*	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M. Added by REV C.
C612*	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM. Added by REV B.
		--------- DIODES AND RECTIFIERS -------
CR1* thru CR8*	5494922P1	Silicon; sim to Type 1N456. Added by REV A.
		---------- INDUCTORS ----------
L601*	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K. Added by REV C.
		---------- PLUGS ----------
P603	19B226481G1	Plug: 8 contacts.
		---------- RESISTORS ----------
R604 and R605	3R151P104K	Composition: 100K ohms ±10%, 1/8 w.
R606*	3R151P103J	Composition: 10K ohms ±5%, 1/8 w. Added by REV C.
		---------- SWITCHES ----------
S601		SWITCH ASSEMBLY 19A127833G1
		---------- RESISTORS ----------
R1	R151P201J	Composition: 200 ohms ±5%, 1/8 w.
		---------- SWITCHES ----------
	19A116648P6	Toggle: SPDT; sim to C and K Components 7101SDG.
		---------- SOCKETS ----------
XFL602		Socket. Includes shell and contacts. (Order separarely).
	19D416714P1	Socket.
	19B219681P1	Contact, electrical.
		TONE BOARD FOR 8 FREQUENCY PE 19B219505G1 (Deleted by REV A)
		---------- PLUGS ----------
P1	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		TONE BOARD FOR 8 FREQUENCY PE 19B219505G2 (Added by REV A)
		---------- CAPACITORS ----------
C2 and C3	19A116114P10074	Ceramic: 180 pf ±5%, 100 VDCW; temp coef -3300 PPM.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
		---------- PLUGS ----------
P1	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		MODIFICATION KIT 19A137882G1
		---------- CAPACITORS ----------
C1801	5491674P37	Tantalum: 10 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C1802	5491674P30	Tantalum: 39 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
		---------- RESISTORS ----------
R1901	3R152P470J	Composition: 47 ohms ±5%, 1/4 w.
		---------- MISCELLANEOUS ----------
	19A115834P4	Contact, electrical: sim to AMP 2-332070-9. (Quantity 4- Used with 8 frequency Tone Board).
	19B219532G1	Cable. (Used with 8 frequency Tone Board).
	19B216926G1	Decorative cap. (Used with S601).
	19C320721P1	Seal. (Used with S601).
	4035306P2	Washer, fiber. (Used with S601).
	19A130289P1	Shield. (Located by antenna tube).
	19A136802P1	Insulator. (Used with Channel Guard Board).

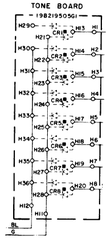
PRODUCTION CHANGES

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.

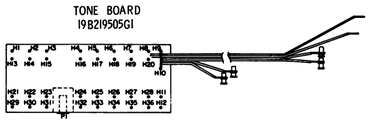
REV. A - Channel Guard Mod Kit 19A130285G4 & G5

To improve RF filtering. Added C2 and C3 to Tone Board 19B219505G1 making a 19B219505G2.

Schematic Diagram Was:



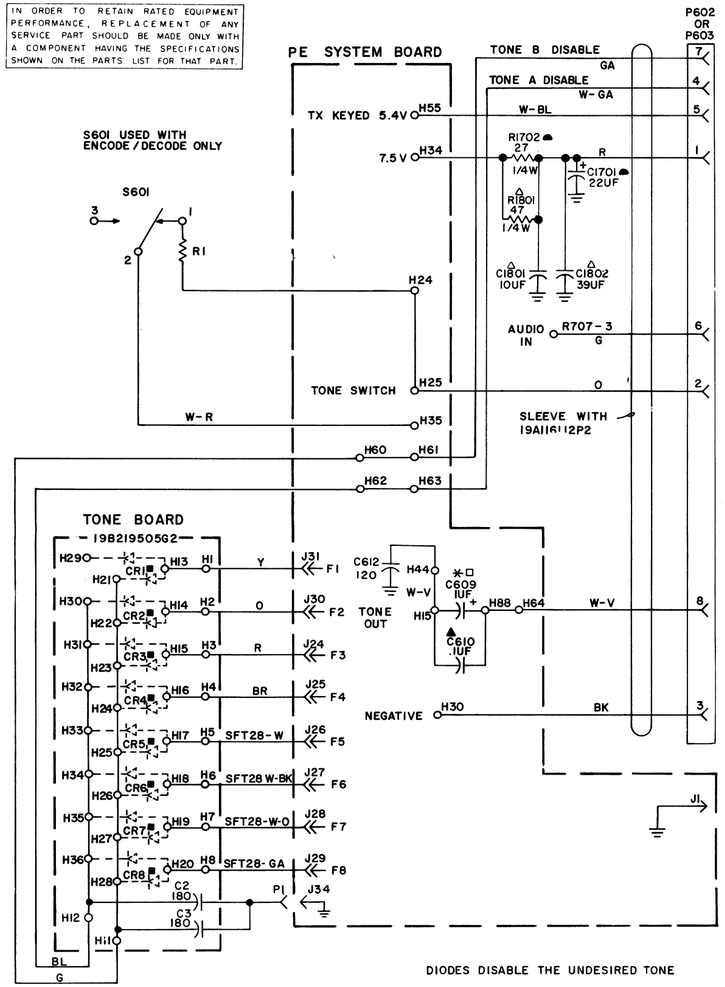
Outline Diagram Was:



REV. B - To improve RF filtering. Added C612.

REV. C - To improve RF filtering. Added R606, C611 and L601.

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.



DIODES DISABLE THE UNDESIRED TONE

■ NOT PRESENT IN ENCODE/DECODE. (1 PART)
▲ NOT PRESENT IN LOW BAND (30-50 MHz), OR HIGH BAND PE (150-174 MHz) (1 PART)
□ NOT PRESENT IN HI-BAND PE (132-174 MHz) (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)
● USED ONLY WITH INTRINSICALLY SAFE RADIO
△ PRESENT ONLY WITH OPTION 4422 OR 4424 AND CHANNEL GUARD

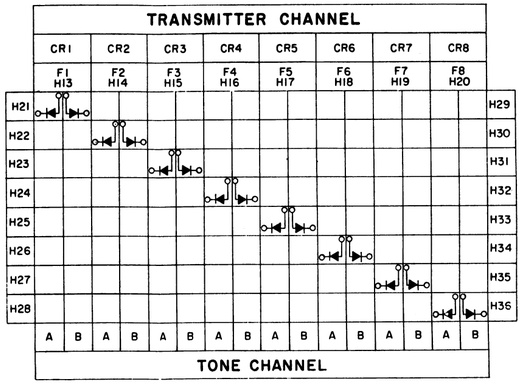
NOTE:

ALL WIRES SFT #28 UNLESS OTHERWISE SPECIFIED.

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

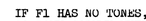
(19D417836, Rev. 8)

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PLI9AI30285G4	C
PLI9AI30285G5	C
PLI9AI37882G1	



USE THE ABOVE CHART FOR ASSEMBLING DIODES IN THE TWO TONE SELECTOR BOARD 19B219505G1 OR G2. THE DIODES DISABLES THE UNDESIRED TONE.

SAMPLE 1 IF TONE B IS TO BE USED ON F3, THEN FIND F3 ON CHART. GO DOWN COLUMN UNTIL YOU FIND A DIODE. THE DIODE IN COLUMN B GIVES THE HOLE NUMBER AND DIRECTION THE DIODE SHOULD BE ASSEMBLED. DIODE IN SAMPLE IS CONNECTED FROM H15 TO H31



SAMPLE 2 IF F1 HAS NO TONES, THEN FIND F1 ON CHART GO DOWN COLUMN UNTIL YOU FIND A DIODE. THE DIODES IN COLUMN A & B GIVES THE HOLE NUMBER AND DIRECTION THE DIODES SHOULD BE ASSEMBLED TO GIVE YOU NO TONE. DIODES IN SAMPLE IS CONNECTED FROM H13 TO H21 AND H13 TO H29.

(19C321209, Rev. 0)

INTERCONNECTION DIAGRAM

EIGHT-FREQUENCY MPE/PE RADIO

PARTS LIST

LBI-30526

PM II CHANNEL GUARD MOD KIT
1 TONE ENCODE/DECODE
19A13097G1

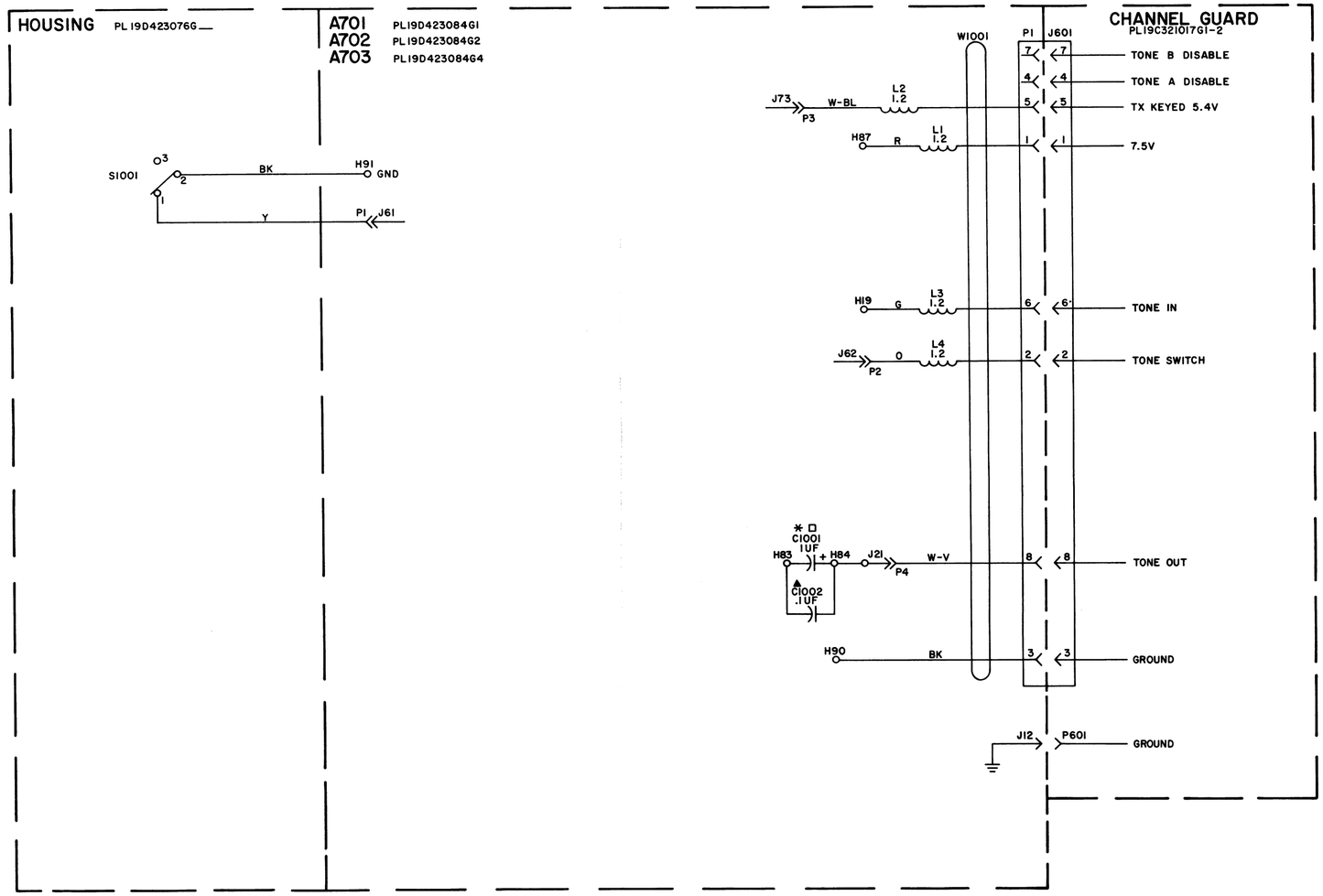
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1001	19B226809G12	Toggle: SPDT; sim to C and K Component 7107SDG.
		- - - - - - - - - - - CABLES - - - - - - - - - -
W1001		CABLE, RELAY ASSEMBLY 19B226806G7
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 thru L4	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).
	19C320975P1	Seal. (Used with S1001).
	19B226358G10	Faceplate (FOR S1001).

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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 1/2 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.

NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHZ). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)



INTERCONNECTION DIAGRAM

ONE-TONE ENCODE DECODE
Porta ● Mobile II RADIO

(19D423943, Rev. 1)

PARTS LIST

LBI-30527

PM II CHANNEL GUARD MOD KIT
2 TONE ENCODER/DECODER
19A13097G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R604 and R605	3R151P104K	Composition: 100,000 ohms ±10%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1002		SWITCH ASSEMBLY 19B226809G13
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR3	19A115250P1	Silicon.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
	19A116648P2	Switch, toggle: DPDT; sim to C and K Components.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1002		CABLE, RELAY ASSEMBLY 19B226806G8
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 thru L4	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL602		Socket. Includes shell and contacts. (Order separately).
	19D416714P1	Shell.
	19B219681P1	Contact, electrical. (Quantity 7).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).
	19C320975P1	Seal. (Used with S1002).
	19B226358G9	Faceplate (For S1002).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

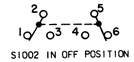
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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.

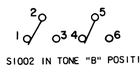
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHZ). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)

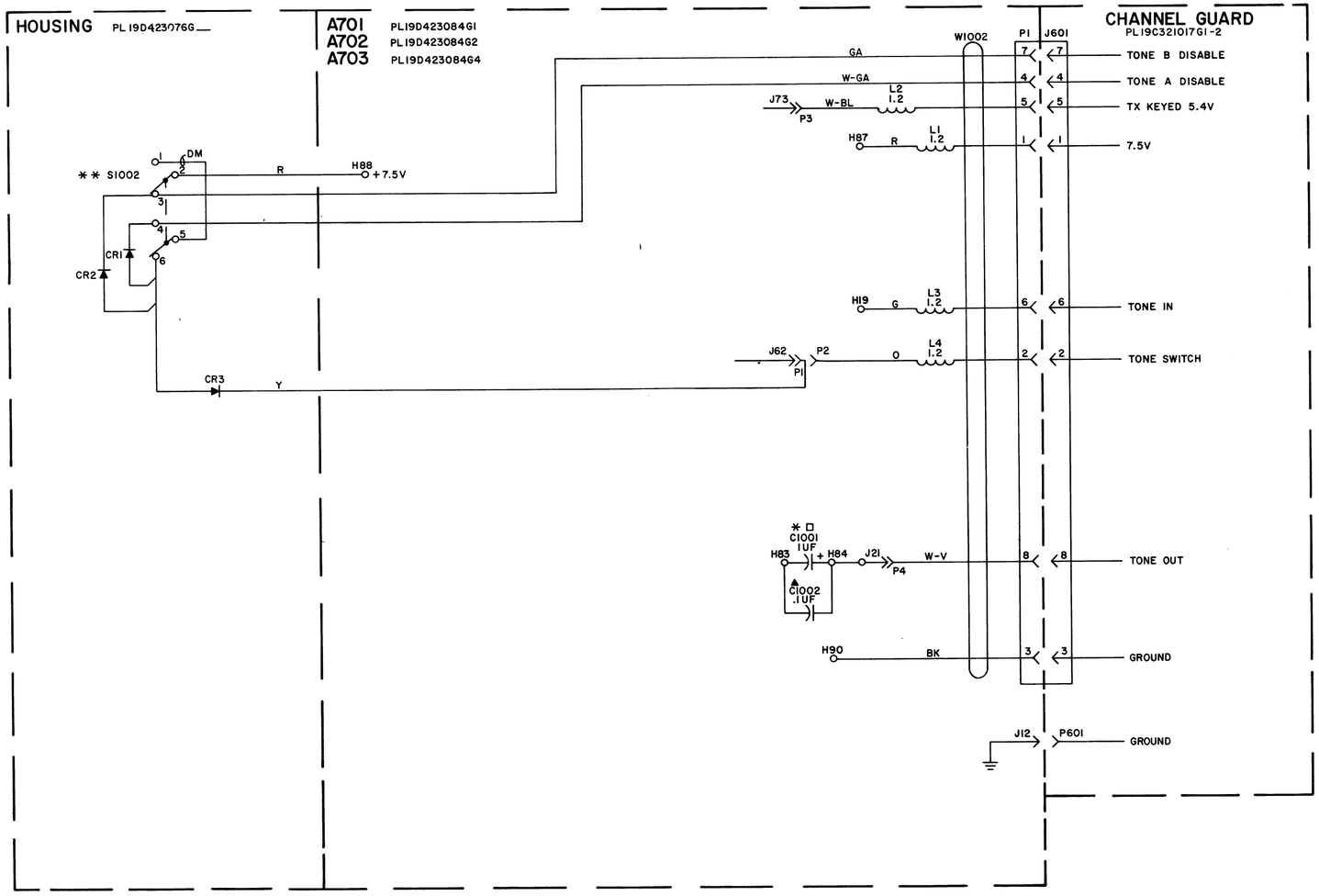
✱✱ S1002 SHOWN IN TONE "A" POSITION (FOR OTHER POSITIONS SEE BELOW)



S1002 IN OFF POSITION



S1002 IN TONE "B" POSITION



(19D423946, Rev. 2)

INTERCONNECTION DIAGRAM

TWO-TONE ENCODE DECODE
Porta ● Mobile II RADIO

PARTS LIST

LBI-30532

PM II CHANNEL GUARD MOD KIT
1 TONE ENCODER W AUTO SELECT
19A130977G7

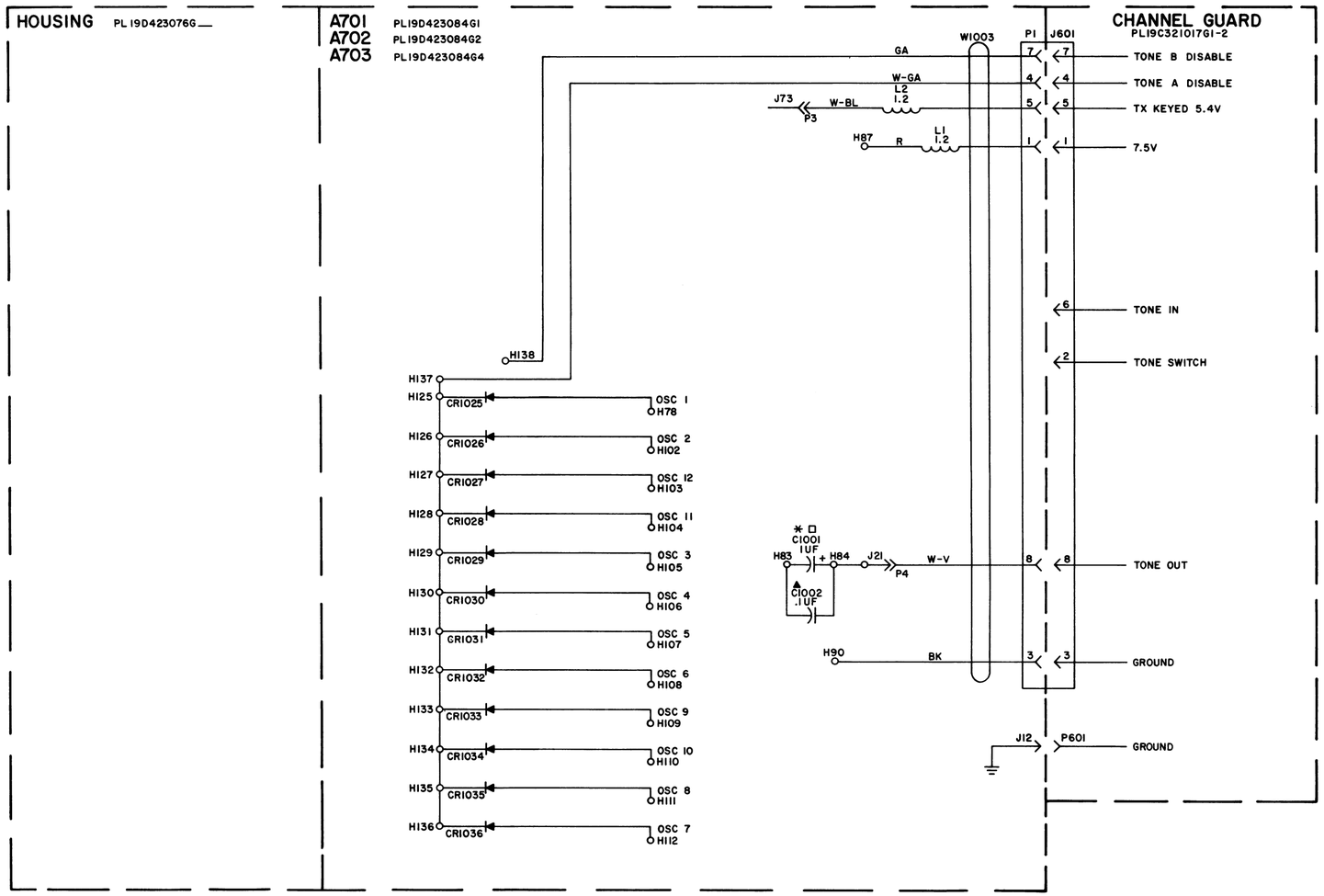
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1025 thru CR1036	19A115100P1	Silicon; sim to Type 1N458A.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R604	3R151P104K	Composition: 100,000 ohms ±10%, 1/8 w.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1003		CABLE, RELAY ASSEMBLY 19B226806G9
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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 1/2 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.

NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHZ). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)



INTERCONNECTION DIAGRAM

ONE-TONE ENCODE AUTOMATIC TONE SELECT
Porta ● Mobile II RADIO

(19D423960, Rev. 1)

PARTS LIST

LBI-30533

PM II CHANNEL GUARD MOD KIT
2 TONE ENCODER W AUTO SELECT
19A130977G6

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1013 thru CR1036	19A115100P1	Silicon; sim to Type 1N458A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R604 and R605	3R151P104K	Composition: 100,000 ohms ±10%, 1/8 w.
		- - - - - - - - - - - CABLES - - - - - - - - - -
W1003		CABLE, RELAY ASSEMBLY 19B226806G9
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL602		Socket. Includes shell and contacts. (Order separately).
	19D416714P1	Shell.
	19B219681P1	Contact, electrical. (Quantity 7).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).

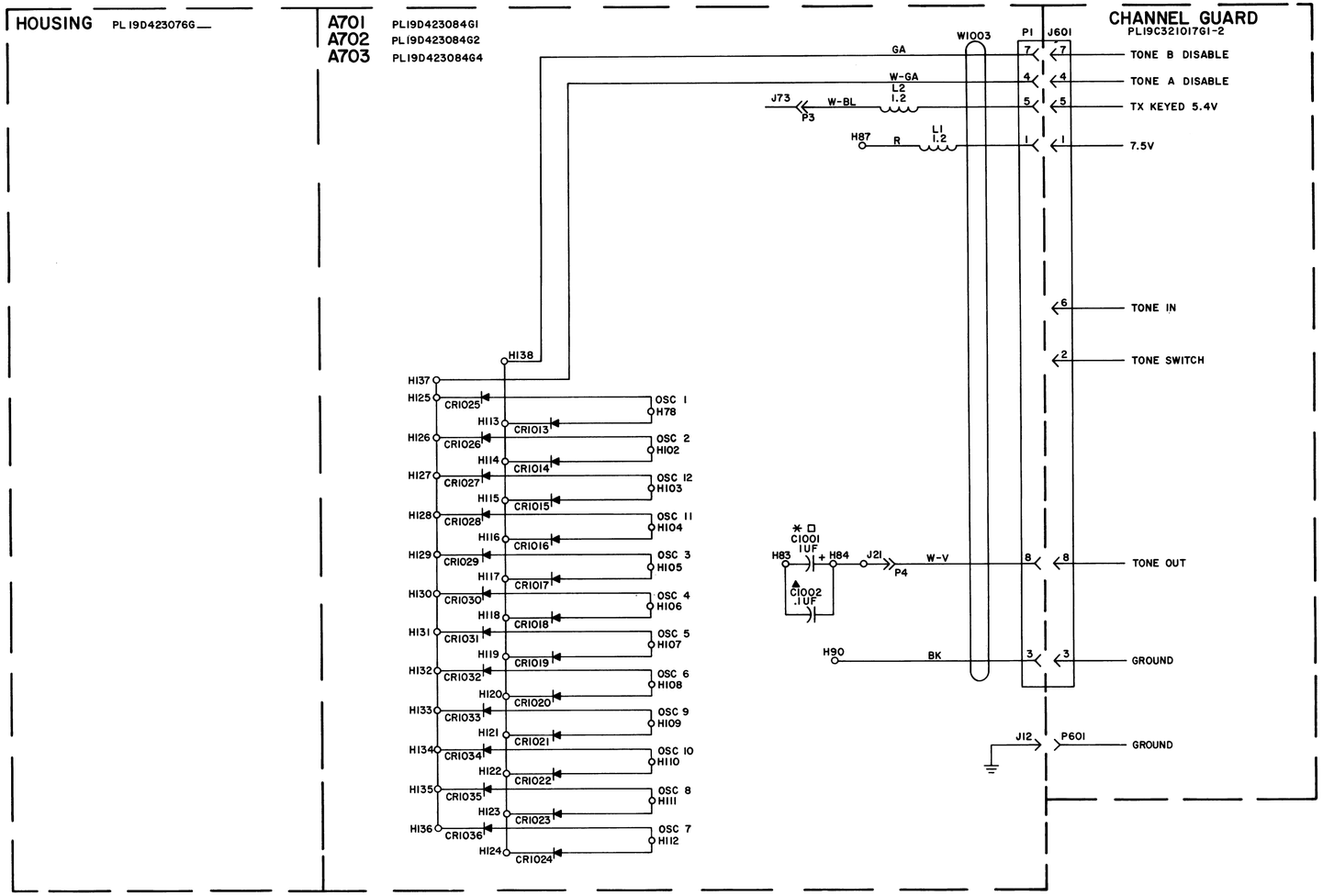
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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 1/2 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.

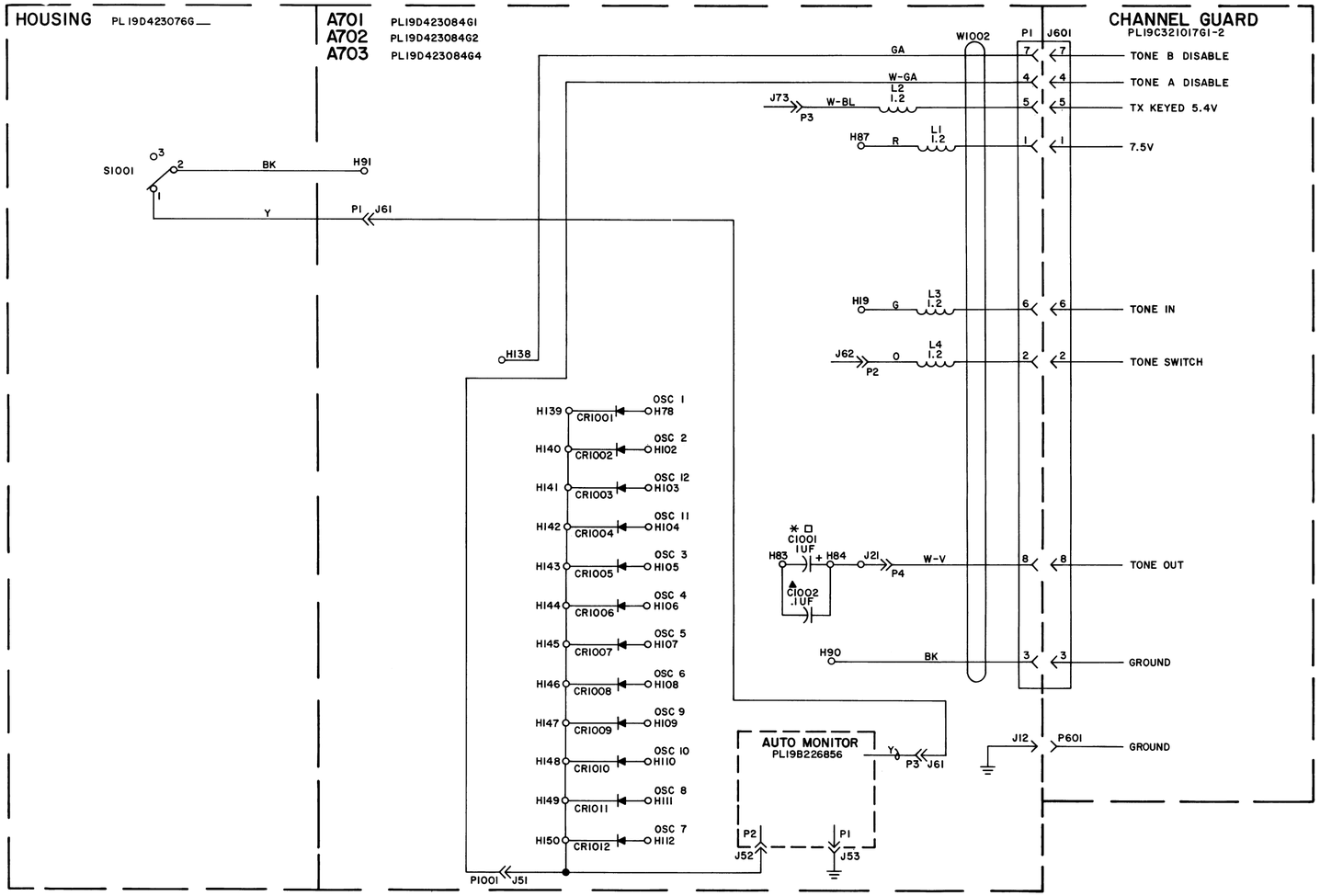
NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHZ). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)



(19D423958, Rev. 1)

INTERCONNECTION DIAGRAM

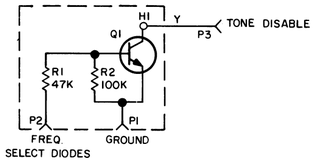
TWO-TONE ENCODE
AUTOMATIC TONE SELECT
Porta ● Mobile II RADIO



INTERCONNECTION DIAGRAM

ONE-TONE ENCODE DECODE
AUTOMATIC MONITOR
Porta ● Mobile II RADIO

(19D423951, Rev. 1)



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.

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.

(19B227361, Rev.1)

SCHEMATIC DIAGRAM

PARTS LIST

LBI30528A

PM II CHANNEL GUARD MOD KIT
1 TONE ENCODE/DECODE W AUTO MONITOR
19A13097G3

SYMBOL	GE PART NO.	DESCRIPTION
		---------- CAPACITORS ----------
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		--------- DIODES AND RECTIFIERS -----
CR1001 thru CR1012	19A115100P1	Silicon; sim to Type 1N458A.
		---------- PLUGS ----------
P1001	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		---------- RESISTORS ----------
R604	3R151P104K	Composition: 100K ohms ±10%, 1/8 w.
		---------- SWITCHES ----------
S1001	19B226809G12	Toggle: SPDT; sim to C and K Component 7107SDG.
		---------- CABLES ----------
W1002		CABLE, RELAY ASSEMBLY 19B226806G8
		---------- INDUCTORS ----------
L1 thru L4	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1K.
		---------- PLUGS ----------
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		--------- MISCELLANEOUS ---------
	19B227357G1	Insulator. (Used with Channel Guard Board).
	19C323975P1	Seal. (Used with S1001).
	19B226358G10	Faceplate. (For S1001).
		ASSOCIATED ASSEMBLIES
		AUTOMATIC MONITOR 19B226856G1
		---------- PLUGS ----------
P1 thru P3	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		---------- TRANSISTORS ----------
Q1	19A129184P1	Silicon, NPN.
		---------- RESISTORS ----------
R1	3R152P473K	Composition: 47K ohms ±10%, 1/4 w.
R2	3R152P104K	Composition: 100K ohms ±10%, 1/4 w.
		---------- MISCELLANEOUS ---------
	4035306P11	Insulator, fiber. (Used with Q1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

LBI30529A

PM II CHANNEL GUARD MOD KIT
2 TONE ENCODE/DECODE W AUTO MONITOR
19A130977G4

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1001 thru CR1036	19A115100P1	Silicon; sim to Type 1N458A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R604 and R605	3R151P104K	Composition: 100K ohms ±10%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1001	19B226809G12	Toggle: SPDT; sim to C and K Component 7107SDG.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1002		CABLE, RELAY ASSEMBLY 19B226806G8
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 thru L4	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1K.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-32070-9.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL602		Socket. Includes shell and contacts. (Order separately).
	19D416714P1	Shell.
	19B219681P1	Contact, electrical. (Quantity 7).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).
	19C320975P1	Seal. (Used with S1001).
	19B226358G10	Faceplate. (For S1001).
		ASSOCIATED ASSEMBLIES
		AUTOMATIC MONITOR 19B226856G1
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1 thru P3	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A129184P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P473K	Composition: 47K ohms ±10%, 1/4 w.
R2	3R152P104K	Composition: 100K ohms ±10%, 1/4 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4035306P11	Insulator, fiber. (Used with Q1).

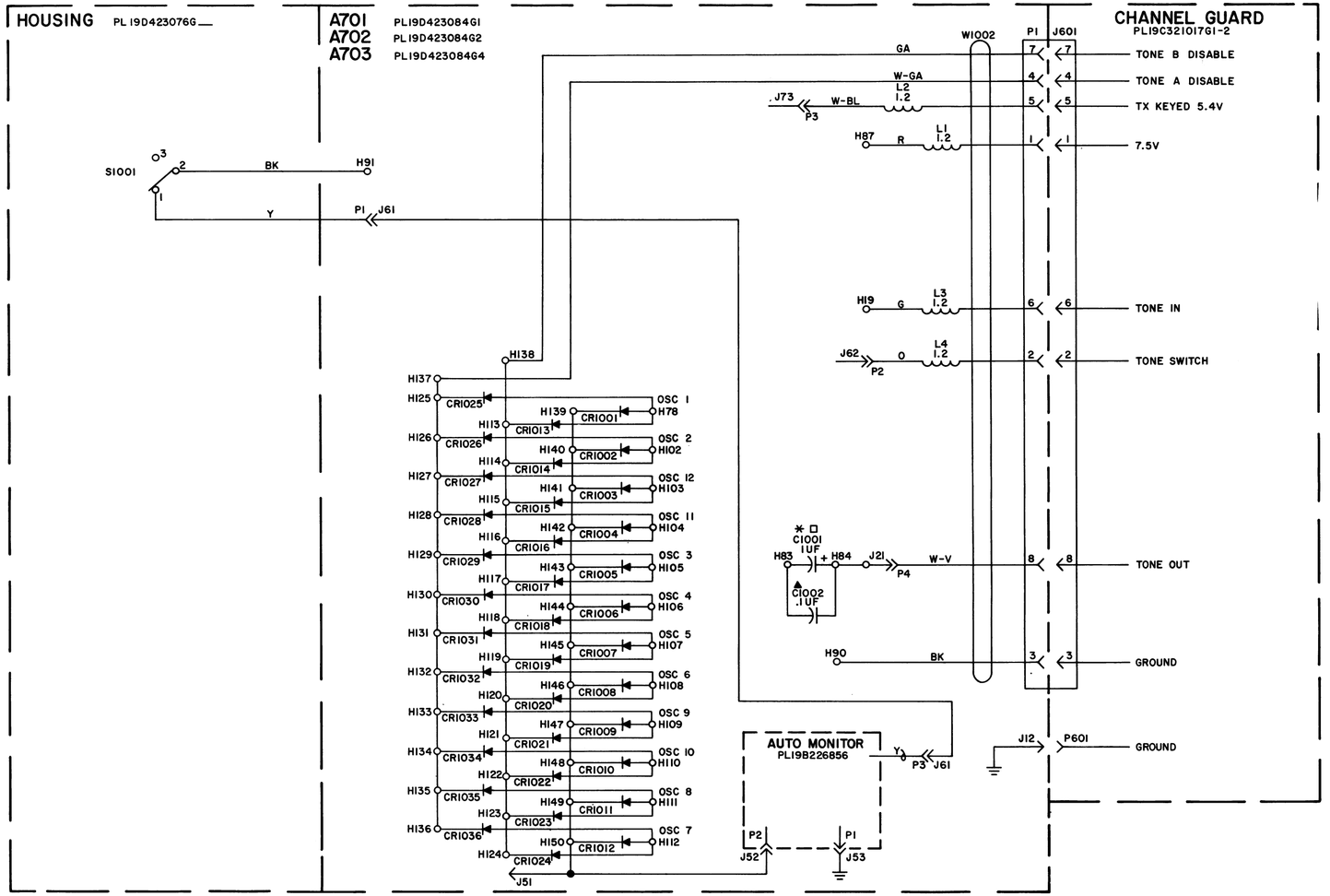
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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 1/2 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.

NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHz). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)



SEE PAGE 4 FOR OUTLINE DIAGRAM AND SEE PAGE 12 FOR SCHEMATIC DIAGRAM & PARTS LIST OF AUTOMATIC MONITOR 19B226856.

(19D423954, Rev. 1)

INTERCONNECTION DIAGRAM

TWO-TONE ENCODE DECODE
AUTOMATIC MONITOR
Porta ● Mobile II RADIO

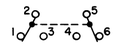
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER

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.

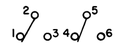
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

NOTE:
ALL WIRES T-28 UNLESS OTHERWISE SPECIFIED.
▲ NOT PRESENT IN LOW BAND (30-50 MHZ). (1 PART)
□ NOT PRESENT IN HI-BAND (132-174 MHz). (1 PART)
✱ NOT PRESENT IN 450 (406-512 MHz). (1 PART)

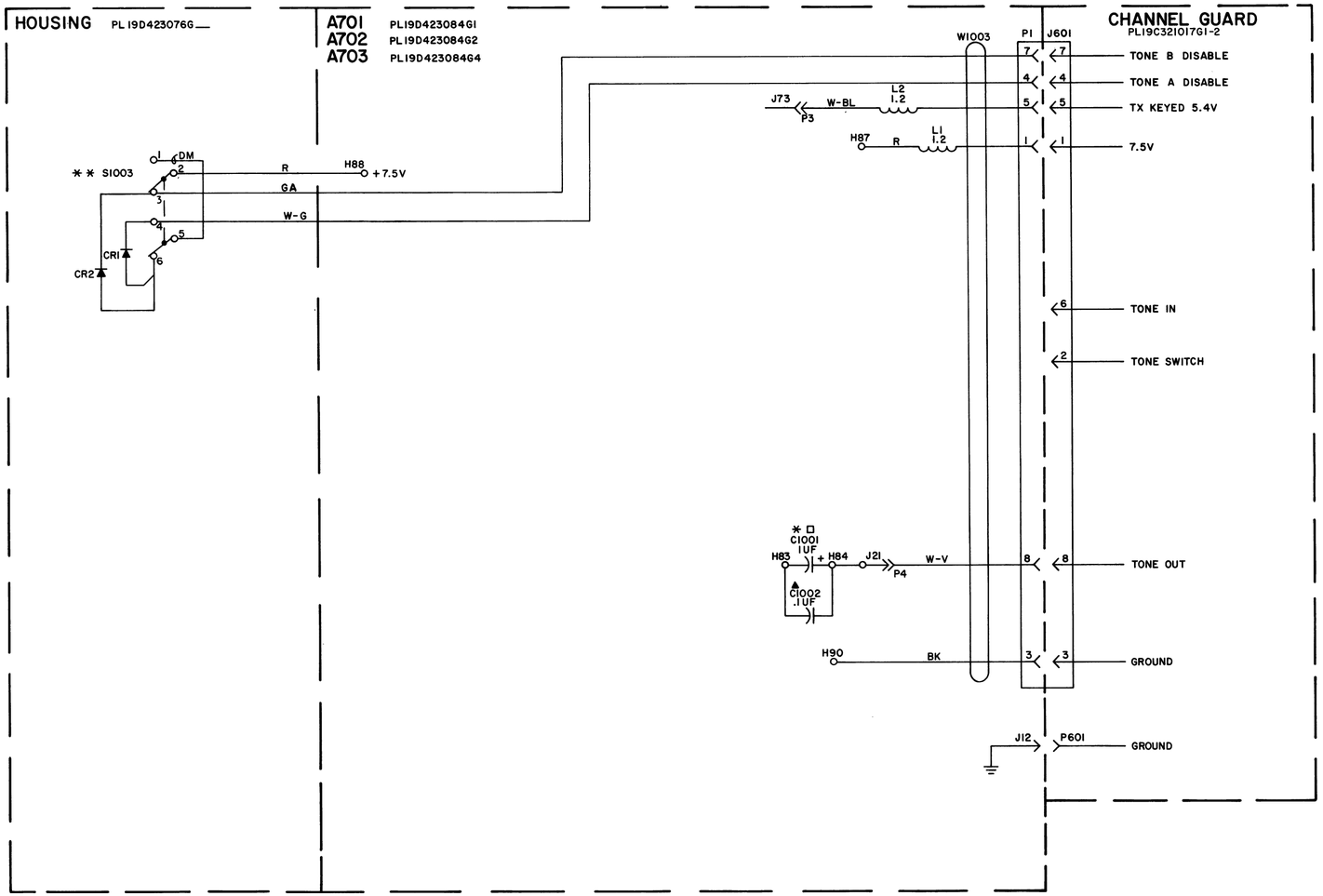
✱✱ S1003 SHOWN IN TONE "A" POSITION (FOR OTHER POSITIONS SEE BELOW)



S1003 IN OFF POSITION



S1003 IN TONE "B" POSITION



(19D423957, Rev.3)

INTERCONNECTION DIAGRAM

TWO-TONE ENCODE
Porta ● Mobile II RADIO

PARTS LIST

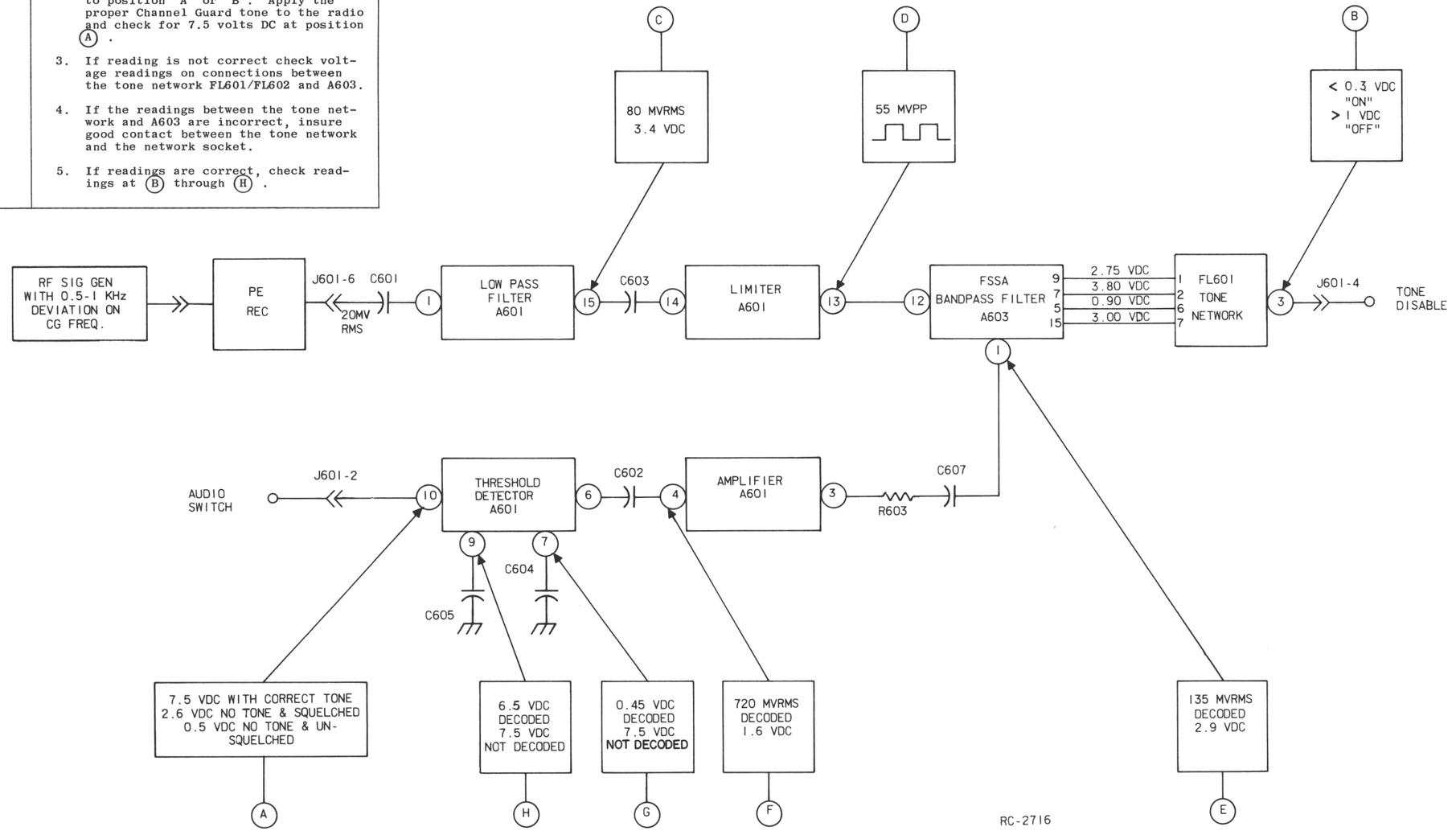
LBI-30530

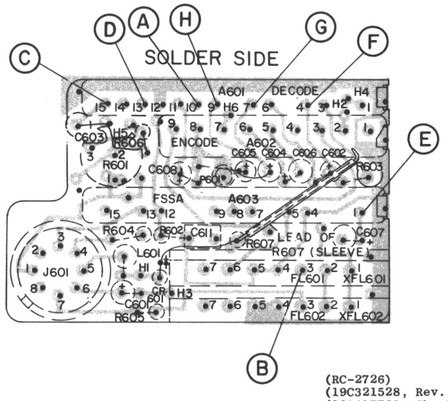
PM II CHANNEL GUARD MOD KIT
2 TONE ENCODE
19A130977G5

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: .1 µf ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R604 and R605	3R151P104K	Composition: 100,000 ohms ±10%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1003		SWITCH ASSEMBLY 19B226809G14
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115250P1	Silicon.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
	19A116648P2	Switch, toggle: DPDT; sim to C and K Components.
		- - - - - - - - - - - - CABLES - - - - - - - - - -
W1003		CABLE, RELAY ASSEMBLY 19B226806G9
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A127569G1	Plug: 8 contacts.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL602		Socket. Includes shell and contacts. (Order separately).
	19D416714P1	Shell.
	19B219681P1	Contact, electrical. (Quantity 7).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B227357G1	Insulator. (Used with Channel Guard Board).
	19C320975P1	Seal. (Used with S1003).
	19B226358G9	Faceplate (For S1003).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMPTOM	PROCEDURE
Unit will not decode.	1. Place Channel Guard switch S601/S602 in the "OFF" position and check for proper receiver operation. 2. If the receiver operates properly, set S601 to the "ON" position or S602 to position "A" or "B". Apply the proper Channel Guard tone to the radio and check for 7.5 volts DC at position (A) . 3. If reading is not correct check voltage readings on connections between the tone network FL601/FL602 and A603. 4. If the readings between the tone network and A603 are incorrect, insure good contact between the tone network and the network socket. 5. If readings are correct, check readings at (B) through (H) .

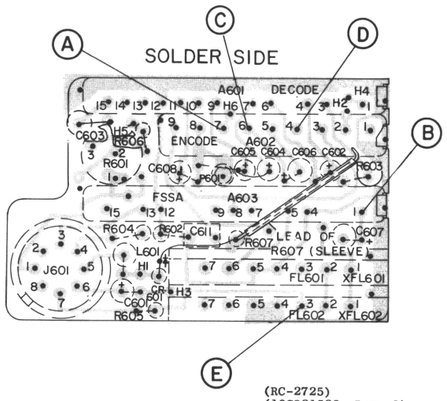




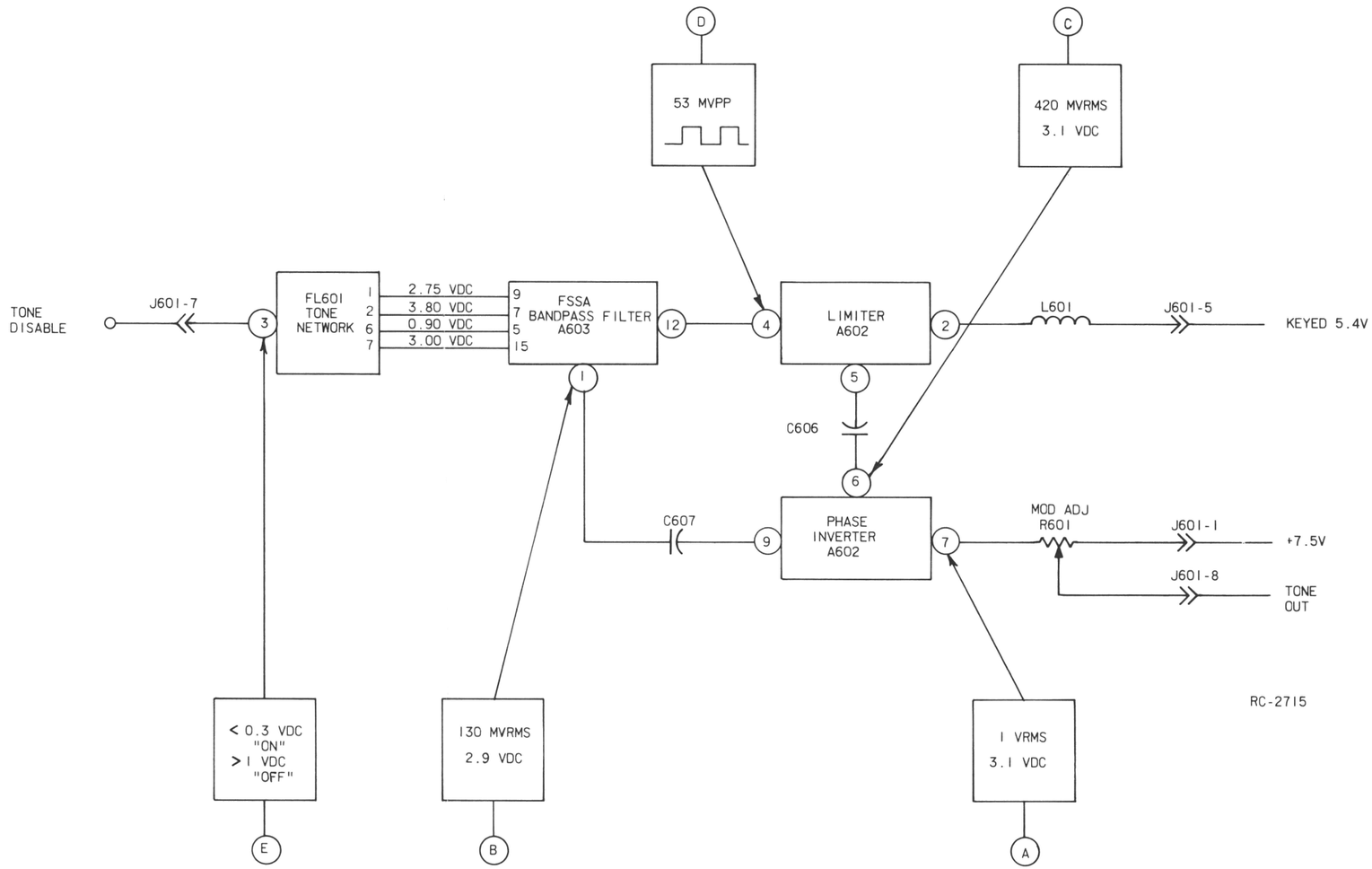
(RC-2726)
(19C321528, Rev. 1)
(19D417783, Sh. 2, Rev. 6)

TROUBLESHOOTING

SYMPTOM	PROCEDURE
Unit will not encode	1. Place Channel Guard switch S602 in tone "A" or "B" position and check for 3.1 volts DC at (A) . S601 can be in any position. 2. If reading is correct, check Mod. Adj. R601 then check the transmitter oscillator module. 3. If reading is not correct check voltage readings on connections between the tone network FL601 and A603. 4. If the readings between the tone network and A603 are incorrect, insure good contact between the tone network and the network socket. 5. If readings are correct check readings at (B) through (E) .



(RC-2725)
(19C321528, Rev. 1)
(19D417783, Sh. 2, Rev. 6)



ADDENDUM TO LBI4870J

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

REV.A-CHANNEL GUARD 19A130285G1-5

TO INCREASE CHANNEL GUARD MODULATION ON MID-BAND MPE RADIOS. CHANGED R608 TO; RESISTOR, COMPOSITION, 6.8K OHMS ±5%,1/8W.