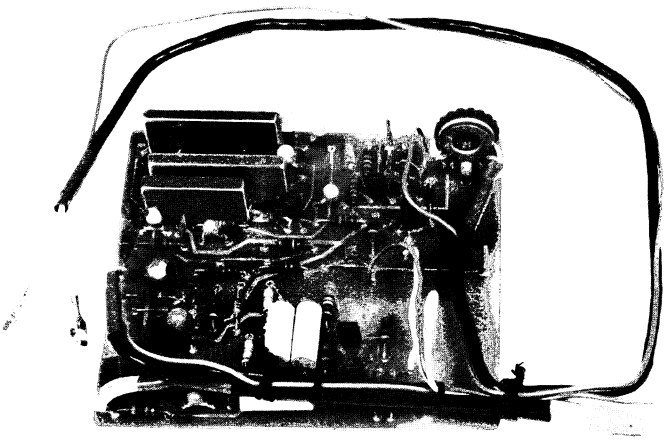
MOBILE RADIO

MAINTENANCE MANUAL

CHANNEL GUARD ENCODER/DECODER 19C327577G1
CHANNEL GUARD ENCODE ONLY 19C327577G2
CHANNEL GUARD DECODE ONLY 19C327577G3



SPECIFICATIONS *

Tone Frequencies	71.9 Hz to 203.5 Hz
Frequency Stability	±0.5%
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Power Requirements	+10.0 VDC, 35 mA

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

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

Although the highest DC voltage in the unit is supplied by the vehicle battery, high current may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc. enough to cause burns. Be careful when working near energized circuits.

DESCRIPTION

Channel Guard 19C327577 is a continuous tone encoder/decoder for operation on tone frequencies in the 71.9 Hz to 203.5 Hz range. The encoder provides tone-coded modulation to the transmitter. The decoder operates in conjunction with the receiver to inhibit all calls that are not tone coded with the proper Channel Guard frequency.

The Channel Guard circuit consists of discrete components providing PTT switch and receiver mute switch; and four thick-film integrated circuit modules consisting of Decode Module U1001, Encode Module U1002, Frequency Switchable Selective Amplifier (FSSA) AR1001 and plug-in Versatone Network FL1001.

Three models of the Channel Guard board are available. The 19C327577G1 board provides single-tone encode/decode capability. The 19C327577G2 board (Option 1918) is for single-tone encode only applications. The 19C327577G3 board (Option 1919) is for single-tone decode only applications.

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

OPERATION

A Channel Guard MONITOR switch (S702), located on the control panel of the radio, controls the operation of the Channel Guard decode circuitry. When the switch is moved to the MON position, the Channel Guard decode function is disabled, allowing all calls to be heard. The encode function is controlled by the PTT switch and is enabled only when the PTT switch is operated. All transmitted calls are tone coded with the Channel Guard frequency.

CIRCUIT ANALYSIS

Frequency Switchable Selective Amplifier

Frequency Switchable Selective Amplifier (FSSA) AR1001 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).

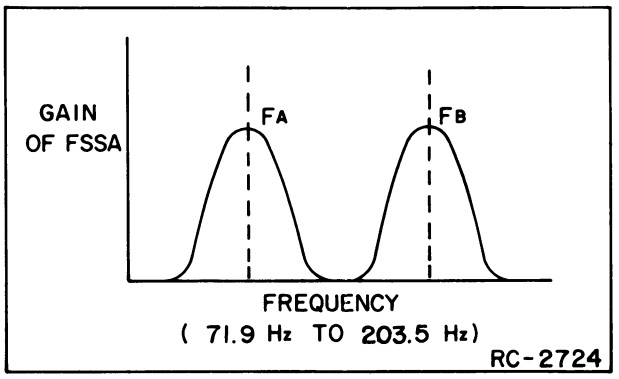


Figure 1 - Gain vs Frequency

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 maximun gain occurs at FA. When Tone Network B is in the circuit, the maximum gain occurs in FB.

Tone Network

Versatone Network FL1001 is a precision resistor network with associated switching transistors. A typical Versatone Network is shown in Figure 2. Pins 3, 4 and 5 of the network are connected to ground.

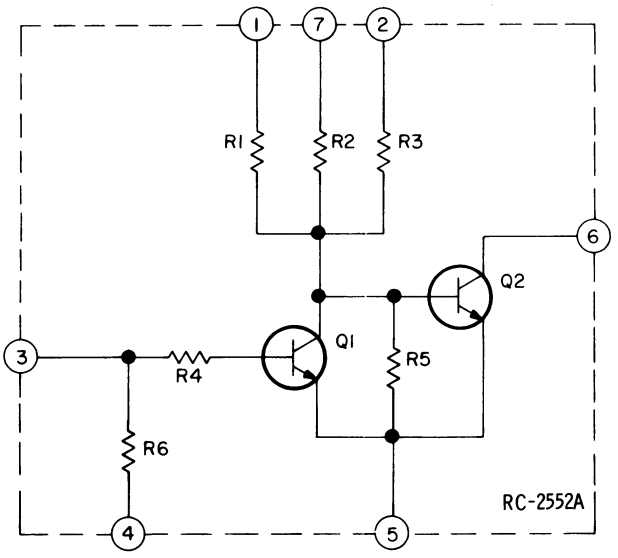


Figure 2 - Typical Versatone Network

Encode

When PTT switch is operated the Channel Guard encode tone is generated by

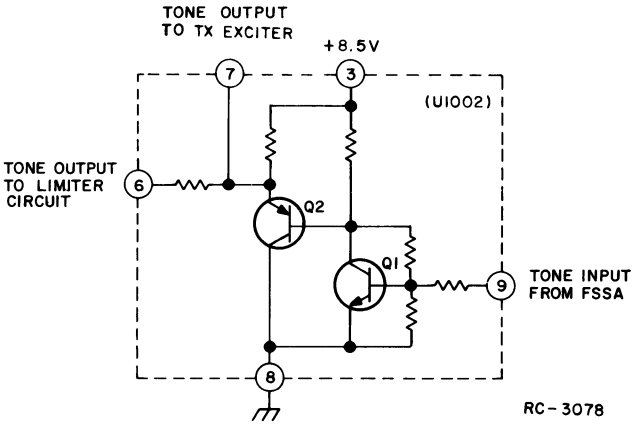


Figure 3 - Typical Phase Inverting Amplifier

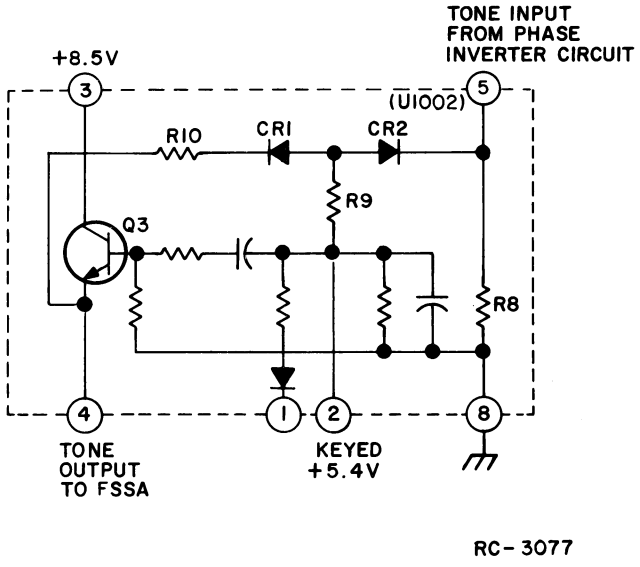


Figure 4 - Typical Encode Limiter Circuit

coupling the output of FSSA bandpass filter AR1001 back to its input through a phase inverting amplifier circuit and a limiter circuit. The output of the FSSA is coupled from AR1001-1 to the input of the phase inverting amplifier at U1002-9. A typical phase inverting amplifier circuit is shown in Figure 3.

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 U1002-6 to the input of the limiter circuit at U1002-5. A typical limiter circuit is shown in Figure 4.

Limiting network CR1, CR2, R8, R9 and R10 sets the tone output coupled from U1002-4 to the input of the FSSA (AR1001-12) 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 U1002-2. 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 U1002-7 and coupled through tone output amplifier Q1002 and modulation adjustment R1015 to the transmitter exciter.

Decode

Audio, containing the correct tone frequency from P1006-4 (Volume Hi), is coupled to Pin 1 of Decode Module J1001. Pin 1 of U1001 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 U1001-15 is applied to U1001-14. U1001-14 is the input of a limiter circuit, limiting the output at U1001-13 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 AR1001. Since the tone is the proper frequency the FSSA will allow it to pass. The output of the FSSA is coupled from AR1001-1 to U1001-3. U1001-3 is the input to an amplifier circuit. The output of the amplifier at U1001-4 is coupled to the input of a threshold detector at U1001-6. 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 +8.5 VDC to appear on the output of the threshold detector circuit (U1001-10).

In the decode mode, when the tone decoder in U1001 detects the channel guard

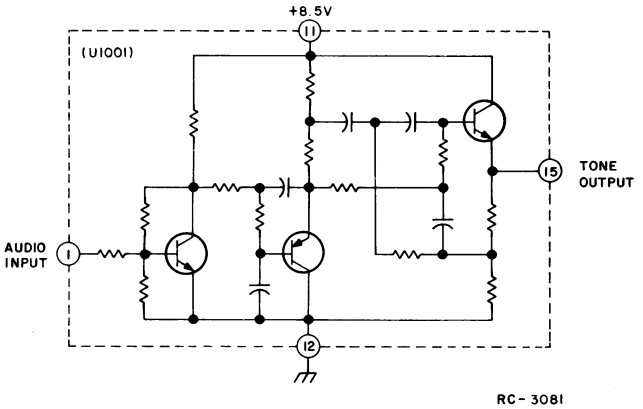


Figure 5 - Typical Low Pass Filter

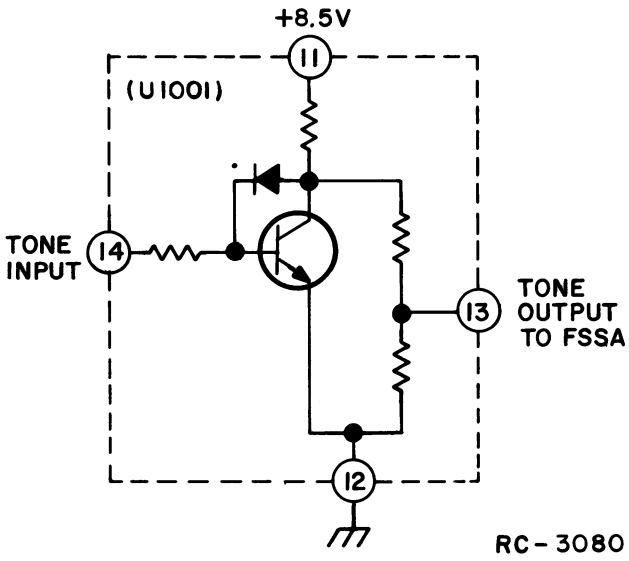


Figure 6 - Typical Decode Limiter Circuit

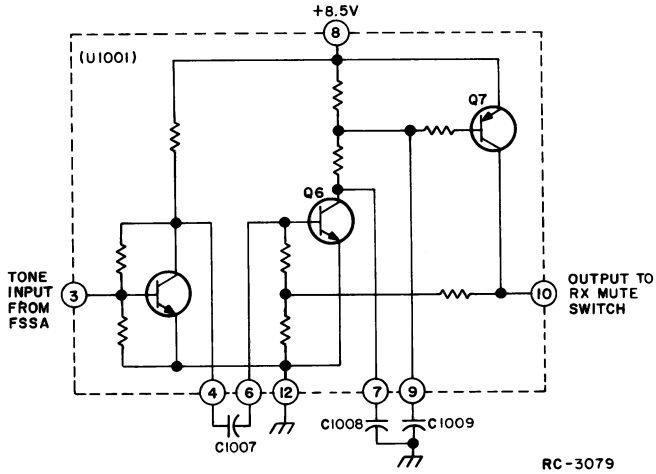
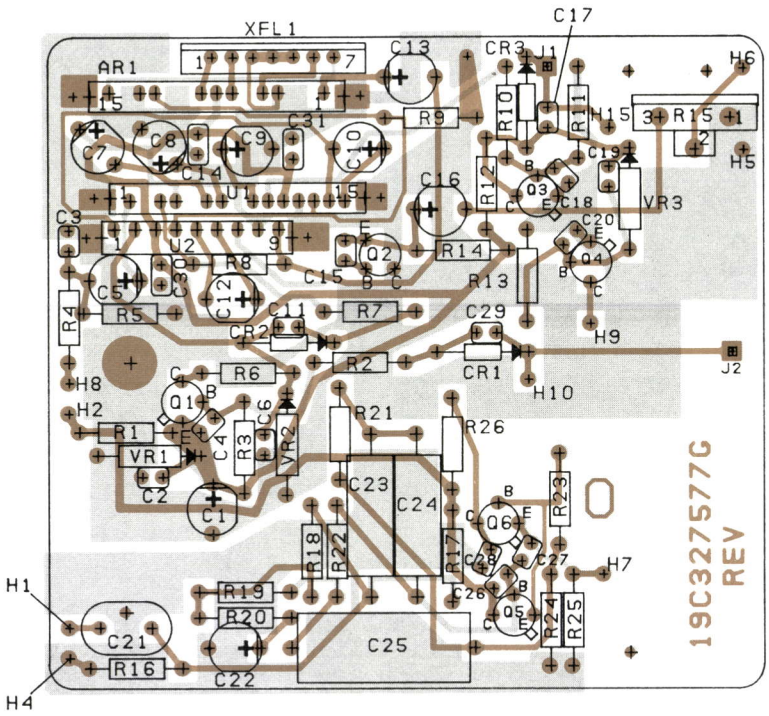


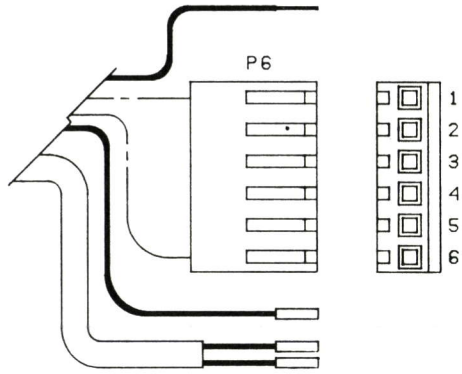
Figure 7 - Typical Amplifier & Threshold Detector Circuit

frequency, Q1003 turns Q1004 off. This unmutes the receiver audio. In the squelch mode, Q1004 is operating, grounding the RX MUTE lead and muting the receiver audio.

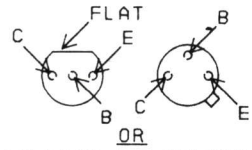
Audio from the SAS board is connected to the tone reject filter via P1006-3. The tone reject filter is an active filter composed of Q1005 and Q1006. All frequencies from 70 to 204 Hz are rejected by the filter, while passing all other audio frequencies via P1006-2 back to the SAS audio circuits.



(19C327581, Rev. 0)
(19B227790, Sh. 1, Rev. 0)
(19B227790, Sh. 2, Rev. 0)



LEAD IDENTIFICATION
FOR Q1-Q6



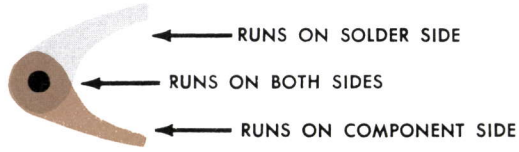
IN-LINE TRIANGULAR

TOP VIEW

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

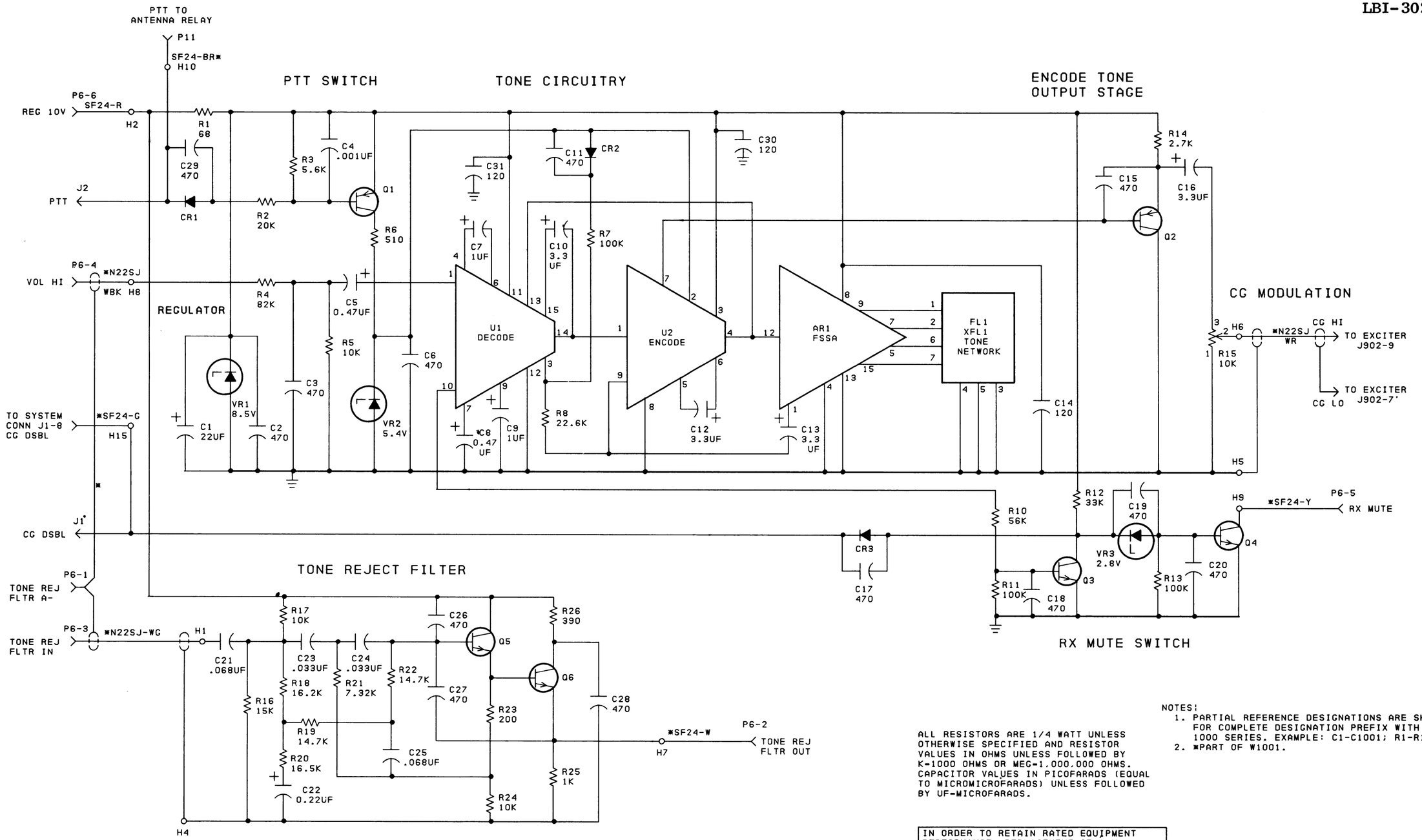
NOTE:
PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH 1000 SERIES.
EXAMPLE: C1-C1001, R1-R1001....ETC.

CONNECTION CHART						
FROM	TO	WIRE	TERMINATION	GR.4	GR.5	GR.6
H2	P6-6	SF24-R		1	1	1
H1	P6-3	N22SJ-WG		1		1
H4	P6-1	SHIELD		1		1
H8	P6-4	N22SJ-WBK		1		1
	P6-1	SHIELD		1		1
H7	P6-2	SF24-W		1		1
H9	P6-5	SF24-Y		1		1
H15	LET HANG	SF24-G		1		
H10	LET HANG	SF24-BR	P11	1	1	
H6	LET HANG	N22SJ-WR		1	1	
H5		SHIELD		1	1	



OUTLINE DIAGRAM

CHANNEL GUARD 19C327577G1-G3



(19D424551, Rev. 1)

NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH 1000 SERIES. EXAMPLE: C1-C1001; R1-R1001.
2. *PART OF W1001.

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.

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.

SCHEMATIC DIAGRAM

CHANNEL GUARD ENCODER/DECODER
19C327577G1

Issue 1

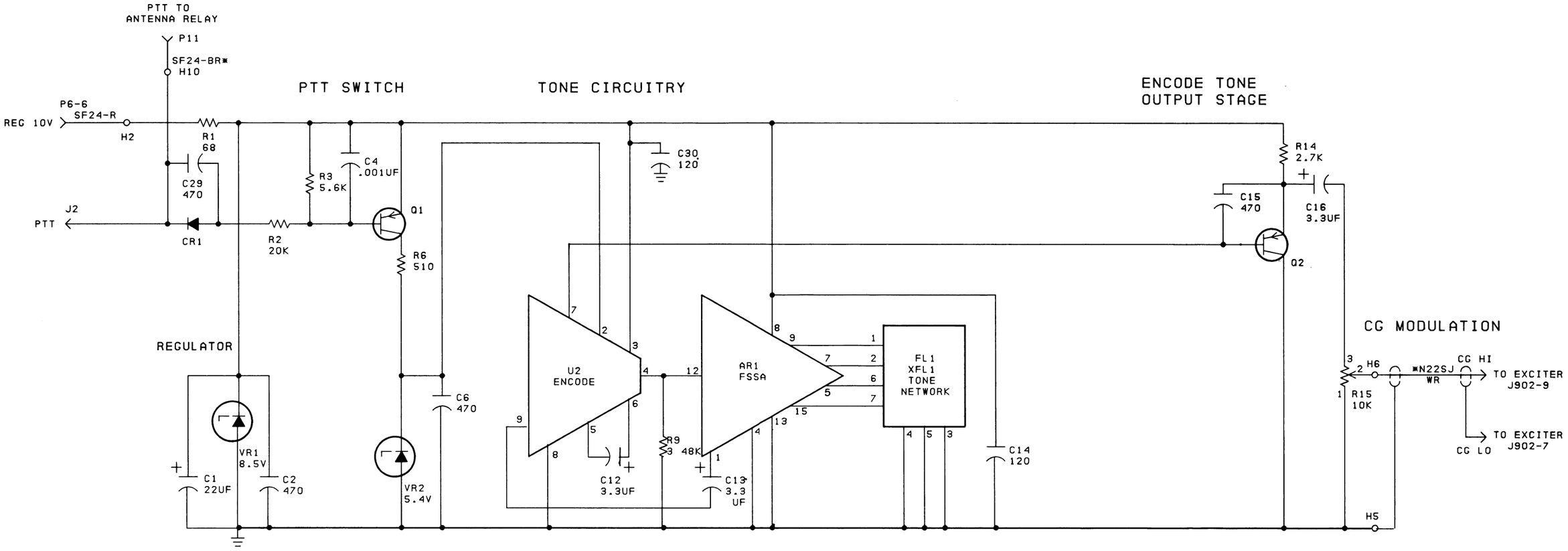
PARTS LIST

LBI-30296

CHANNEL GUARD
SINGLE TONE ENCODE/DECODE
19C327577G1

SYMBOL	GE PART NO.	DESCRIPTION
AR1001	19D417833G1	Selective Amplifier. Thick film hybrid.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	19A134202P6	Tantalum: 22 µf ±20%, 15 VDCW.
C1002 and C1003	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1004	19A116192P13	Ceramic: 1000 pf ±10%, 50 VDCW; sim to Erie 8121-A050-W5R-102K.
C1005	19A134202P12	Tantalum: 0.47 µf ±20%, 35 VDCW.
C1006	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1007	19A134202P14	Tantalum: 1 µf ±20%, 35 VDCW.
C1008	19A134202P12	Tantalum: 0.47 µf ±20%, 35 VDCW.
C1009	19A134202P14	Tantalum: 1 µf ±20%, 35 VDCW.
C1010	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1011	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1012 and C1013	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1014	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
C1015	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1016	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1017 thru C1020	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1021	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW.
C1022	19A134202P10	Tantalum: 0.22 µf ±20%, 35 VDCW
C1023 and C1024	19C300075P33001G	Polyester: 33,000 pf ±2%, 100 VDCW; sim to GE Type 61F.
C1025	19C300075P68001G	Polyester: 68,000 pf ±2%, 100 VDCW; sim to GE Type 61F.
C1026 thru C1029	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1030 and C1031	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1001 thru CR1003	19A115250P1	Silicon.
		- - - - - - - - - TONE NETWORKS - - - - - - - - -
		NOTE: When reordering give GE Part Number and specify exact frequency needed.
FL1001	19C320291G1	Thick film hybrid: 71.9-203.5 Hz.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1001 and J1002	19A116779P5	Contact, electrical: sim to Molex 08-50-0414.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1006		Connector. Includes:
	19A116659P80	Printed board: sim to Molex 09-50-7061.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 6).
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 3).
P1011	19A127042P2	Terminal, solderless: sim to Malco 12093-10.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1001 and Q1002	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q1003 thru Q1006	19A115910P1	Silicon, NPN; sim to Type 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1001	3R152P680J	Composition: 68 ohms ±5%, 1/4 w.
R1002	3R152P203K	Composition: 20,000 ohms ±10%, 1/4 w.
R1003	3R152P562K	Composition: 5600 ohms ±10%, 1/4 w.
R1004	3R152P823J	Composition: 82,000 ohms ±5%, 1/4 w.
R1005	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1006	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R1007	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R1008	19C314256P22262	Metal film: 22,600 ohms ±1%, 1/4 w.
R1010	3R152P563K	Composition: 56,000 ohms ±10%, 1/4 w.
R1011	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R1012	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R1013	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R1014	3R152P272J	Composition: 2700 ohms ±5%, 1/4 w.
R1015	19B209358P106	Variable, carbon film: approx 300 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
R1016	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R1017	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1018	19C314256P21622	Metal film: 16,200 ohms ±1%, 1/4 w.
R1019	19C314256P21472	Metal film: 14,700 ohms ±1%, 1/4 w.
R1020	19C314256P21652	Metal film: 16,500 ohms ±1%, 1/4 w.
R1021	19C314256P27321	Metal film: 7320 ohms ±1%, 1/4 w.
R1022	19C314256P21472	Metal film: 14,700 ohms ±1%, 1/4 w.
R1023	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R1024	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1025	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R1026	3R152P391J	Composition: 390 ohms ±5%, 1/4 w.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U1001	19D417763G1	Decoder. Thick film hybrid.
U1002	19C321133G1	Encoder. Thick film hybrid.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1001	4036887P9	Diode, silicon, zener.
VR1002	4036887P5	Diode, silicon, zener.
VR1003	4036887P2	Diode, silicon, zener.
		- - - - - - - - - - - CABLES - - - - - - - - -
W1001		HARNESS ASSEMBLY 19C327577G4 (Includes P1006, P1011)
		- - - - - - - - - - SOCKETS - - - - - - - - -
XFL1001	19C320299G1	Socket: 7 contacts.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A129811P1	Insulator. (Used with Q1002).
	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Panel mounting screws- Quantity 3).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



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2. *PART OF W1002.

(19D424552, Rev. 1)

SCHEMATIC DIAGRAM

CHANNEL GUARD ENCODE ONLY
19C327577G2

Issue 1

PARTS LIST

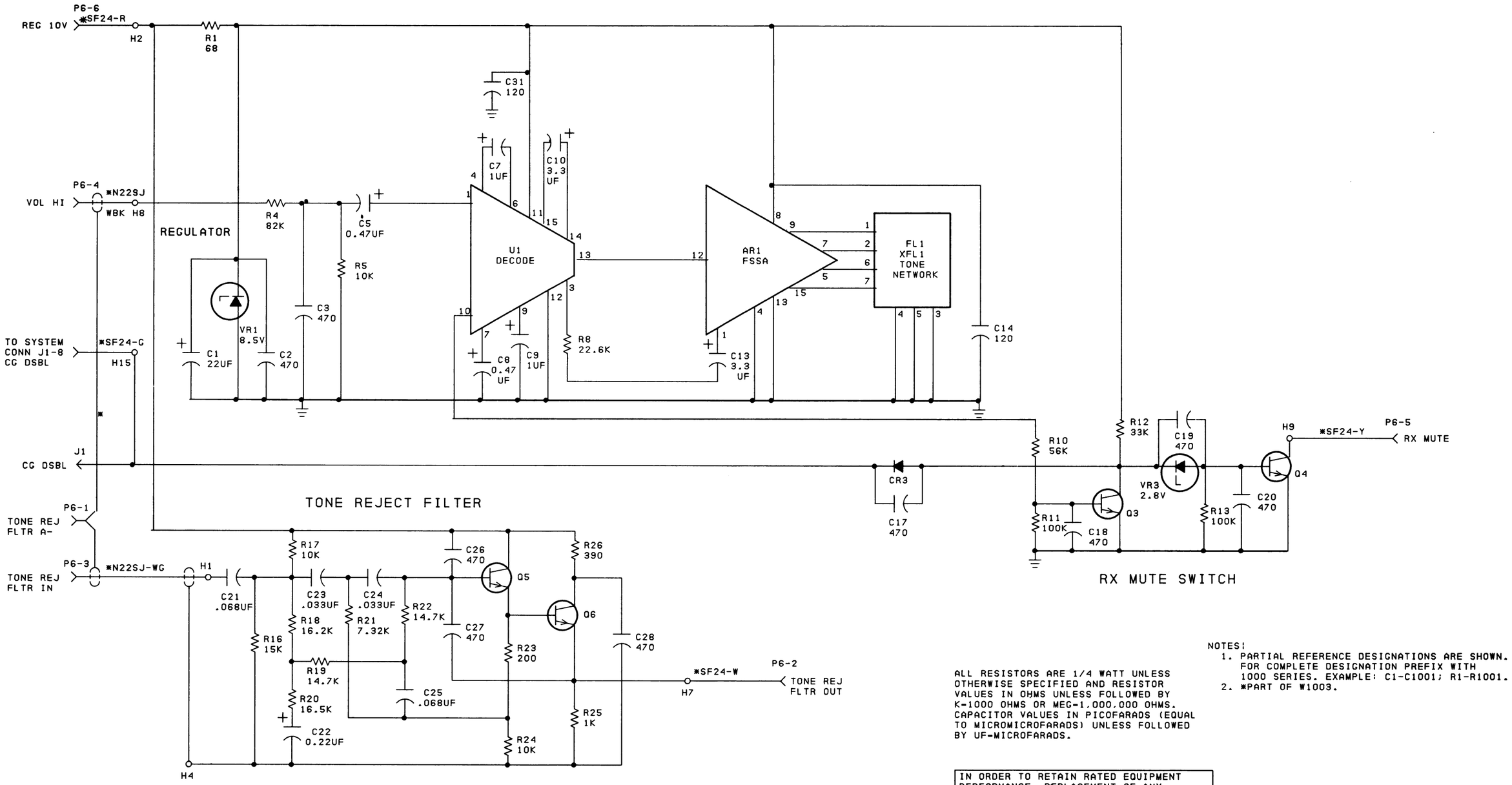
LBI-30297

CHANNEL GUARD
SINGLE TONE ENCODE
19C327577G2

SYMBOL	GE PART NO.	DESCRIPTION
AR1001	19D417833G1	Selective Amplifier. Thick film hybrid.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1001	19A134202P6	Tantalum: 22 µf ±20%, 15 VDCW.
C1002	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1004	19A116192P13	Ceramic: 1000 pf ±10%, 50 VDCW; sim to Erie 8121-A050-W5R-102K.
C1006	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1012 and C1013	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1014	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
C1015	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1016	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1029	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1030	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1001	19A115250P1	Silicon.
		- - - - - - - - - TONE NETWORKS - - - - - - - - -
		NOTE: When reordering give GE Part Number and specify exact frequency needed.
FL1001	19C320291G1	Thick film hybrid: 71.9-203.5 Hz.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1002	19A116779P5	Contact, electrical: sim to Molex 08-50-0414.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1006		Connector. Includes:
	19A116659P80	Printed board: sim to Molex 09-50-7061.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 2).
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 1).
P1011	19A127042P2	Terminal, solderless: sim to Malco 12093-10.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1001 and Q1002	19A115852P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1001	3R152P680J	Composition: 68 ohms ±5%, 1/4 w.
R1002	3R152P203K	Composition: 20,000 ohms ±10%, 1/4 w.
R1003	3R152P562K	Composition: 5600 ohms ±10%, 1/4 w.
R1006	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R1014	3R152P272J	Composition: 2700 ohms ±5%, 1/4 w.
R1015	19B209358P106	Variable, carbon film: approx 300 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - -
U1002	19C321133G1	Encoder. Thick film hybrid.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1001	4036887P9	Diode, silicon, zener.
VR1002	4036887P5	Diode, silicon, zener.
		- - - - - - - - - - - CABLES - - - - - - - - - -
W1002		HARNESS ASSEMBLY 19C327577G5 (Includes P1006, P1011)
		- - - - - - - - - - SOCKETS - - - - - - - - -
XFL1001	19C320299G1	Socket: 7 contacts.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A129811P1	Insulator. (Used with Q1002).
	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Panel mounting screws- Quantity 3).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



(19D424553, 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.

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.

NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH 1000 SERIES. EXAMPLE: C1-C1001; R1-R1001.
2. *PART OF W1003.

SCHEMATIC DIAGRAM

CHANNEL GUARD DECODE ONLY
19C327577G3

PARTS LIST

LBI-30298

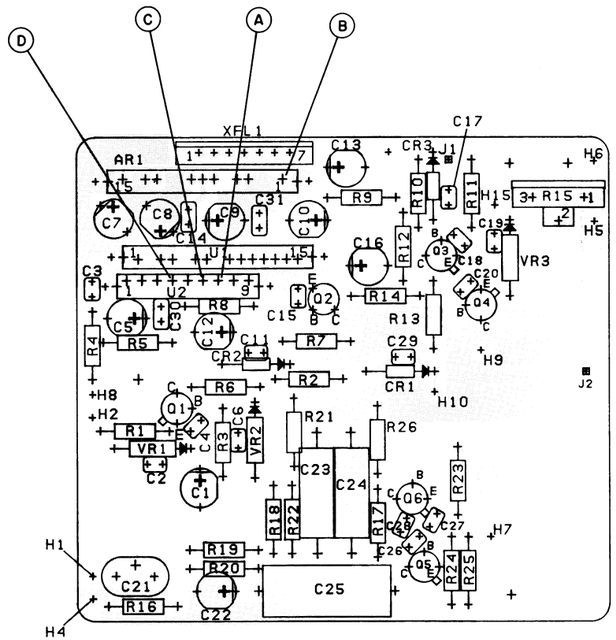
CHANNEL GUARD
SINGLE TONE DECODE
19C327577G3

SYMBOL	GE PART NO.	DESCRIPTION
AR1001	19D417833G1	Selective Amplifier. Thick film hybrid.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1001	19A134202P6	Tantalum: 22 µf ±20%, 15 VDCW.
C1002 and C1003	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1005	19A134202P12	Tantalum: 0.47 µf ±20%, 35 VDCW.
C1007	19A134202P14	Tantalum: 1 µf ±20%, 35 VDCW.
C1008	19A134202P12	Tantalum: 0.47 µf ±20%, 35 VDCW.
C1009	19A134202P14	Tantalum: 1 µf ±20%, 35 VDCW.
C1010	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1013	19A134202P5	Tantalum: 3.3 µf ±20%, 15 VDCW.
C1014	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
C1017 thru C1020	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1021	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW.
C1022	19A134202P10	Tantalum: 0.22 µf ±20%, 35 VDCW.
C1023 and C1024	19C300075P33001G	Polyester: 33,000 pf ±2%, 100 VDCW; sim to GE Type 61F.
C1025	19C300075P68001G	Polyester: 68,000 pf ±2%, 100 VDCW; sim to GE Type 61F.
C1026 thru C1028	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
C1031	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1003	19A115250P1	Silicon.
		- - - - - - - - - TONE NETWORKS - - - - - - - - -
		NOTE: When reordering give GE Part Number and specify exact frequency needed.
FL1001	19C320291G1	Thick film hybrid: 71.9-203.5 Hz.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1001	19A116779P5	Contact, electrical: sim to Molex 08-50-0414.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1006		Connector. Includes:
	19A116659P80	Printed board: sim to Molex 09-50-7061.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 5).
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 2).
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1003 thru Q1006	19A115910P1	Silicon, NPN; sim to Type 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1001	3R152P680J	Composition: 68 ohms ±5%, 1/4 w.
R1004	3R152P823J	Composition: 82,000 ohms ±5%, 1/4 w.
R1005	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1008	19C314256P22262	Metal film: 22,600 ohms ±1%, 1/4 w.
R1010	3R152P563K	Composition: 56,000 ohms ±10%, 1/4 w.
R1011	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R1012	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R1013	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R1016	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R1017	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1018	19C314256P21622	Metal film: 16,200 ohms ±1%, 1/4 w.
R1019	19C314256P21472	Metal film: 14,700 ohms ±1%, 1/4 w.
R1020	19C314256P21652	Metal film: 16,500 ohms ±1%, 1/4 w.
R1021	19C314256P27321	Metal film: 7320 ohms ±1%, 1/4 w.
R1022	19C314256P21472	Metal film: 14,700 ohms ±1%, 1/4 w.
R1023	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R1024	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R1025	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R1026	3R152P391J	Composition: 390 ohms ±5%, 1/4 w.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1001	19D417763G1	Decoder. Thick film hybrid.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1001	4036887P9	Diode, silicon, zener.
VR1003	4036887P2	Diode, silicon, zener.
		- - - - - - - - - - - CABLES - - - - - - - - -
W1003		HARNESS ASSEMBLY 19C327577G6 (Includes P1006)
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1001	19C320299G1	Socket: 7 contacts.
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Panel mounting screws- Quantity 3).

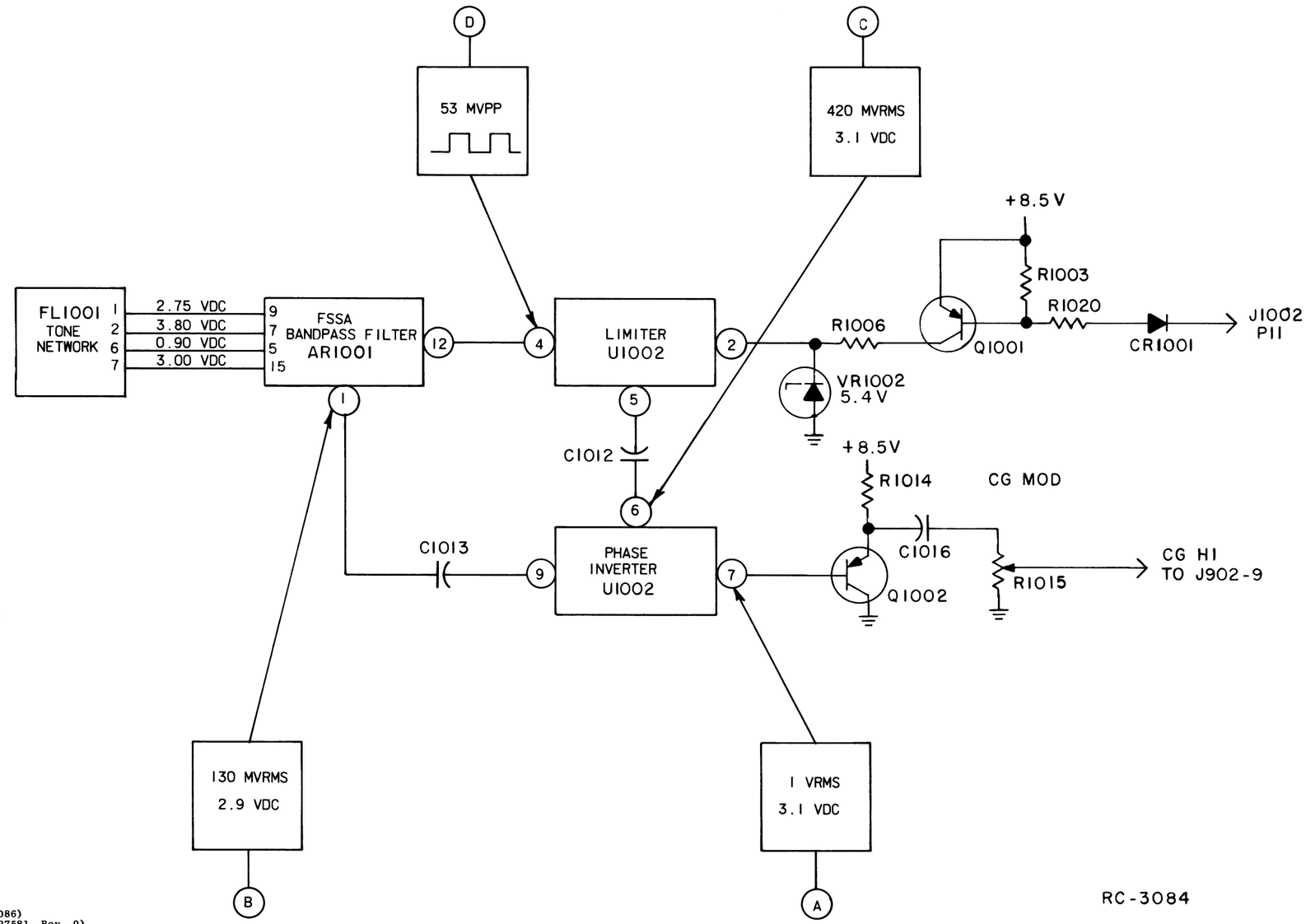
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

TROUBLESHOOTING

SYMPTOM	PROCEDURE
Unit will not encode.	1. Check for 3.1 VDC at (A). 2. If reading is correct, check Mod. Adj. R1015 then check the transmitter oscillator module. 3. If reading is not correct check voltage readings on connections between the tone network FL1001 and AR1001. 4. If the readings between the tone network and AR1001 are incorrect, insure good contact between the tone network and the network socket. 5. If readings are correct check readings at (B) through (D).



(RC-3086)
(19C327581, Rev. 0)
(19B227790, Sh. 2, Rev. 0)



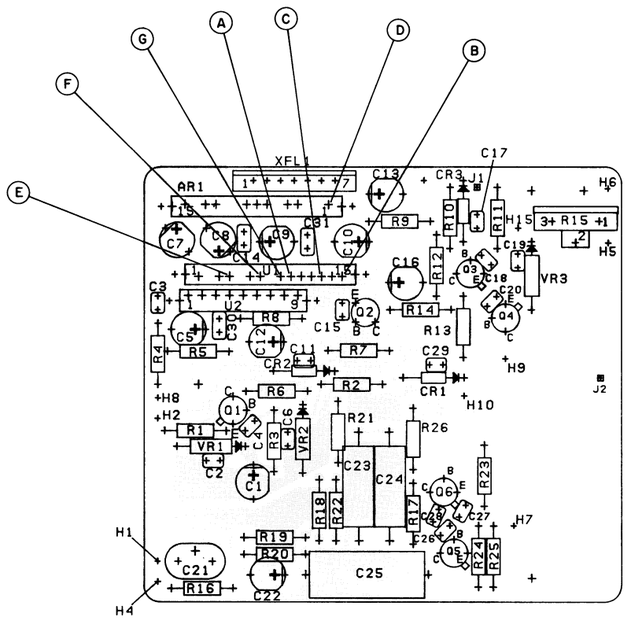
RC-3084

TROUBLESHOOTING PROCEDURE

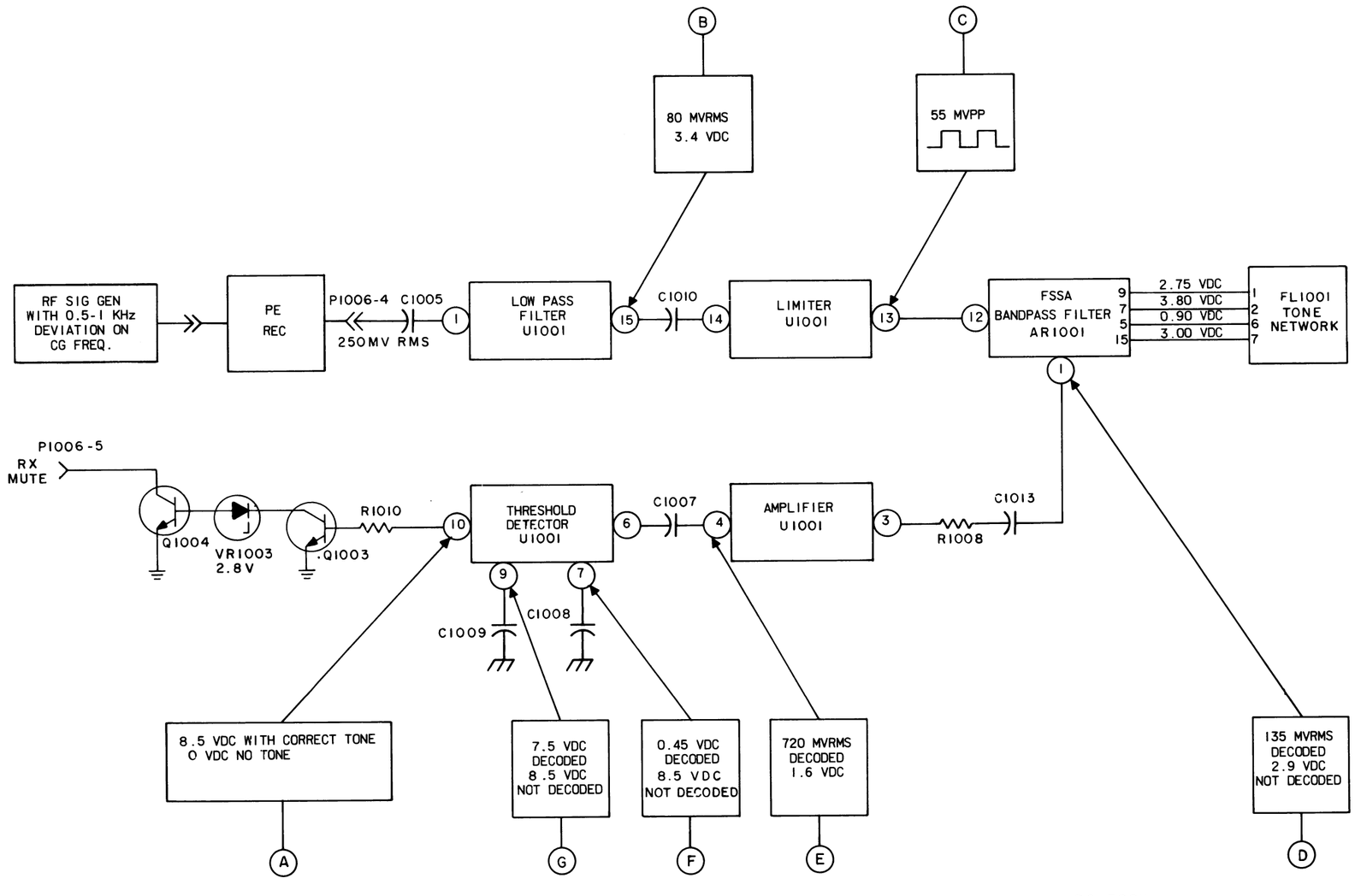
ENCODER CHANNEL GUARD 19C327577

TROUBLESHOOTING

SYMPTOM	PROCEDURE
Unit will not decode.	1. Place switch S702 in the "MON" position and check for proper receiver operation. 2. If the receiver operates properly, set S702 to the center position. Apply the proper Channel Guard tone to the radio and check for 8.5 VDC at position (A). 3. If reading is not correct check voltage readings on connections between the tone network FL1001 and AR1001. 4. If the readings between the tone network and AR1001 are incorrect, insure good contact between the tone network and the network socket. 5. If readings are correct, check readings at (B) through (G).

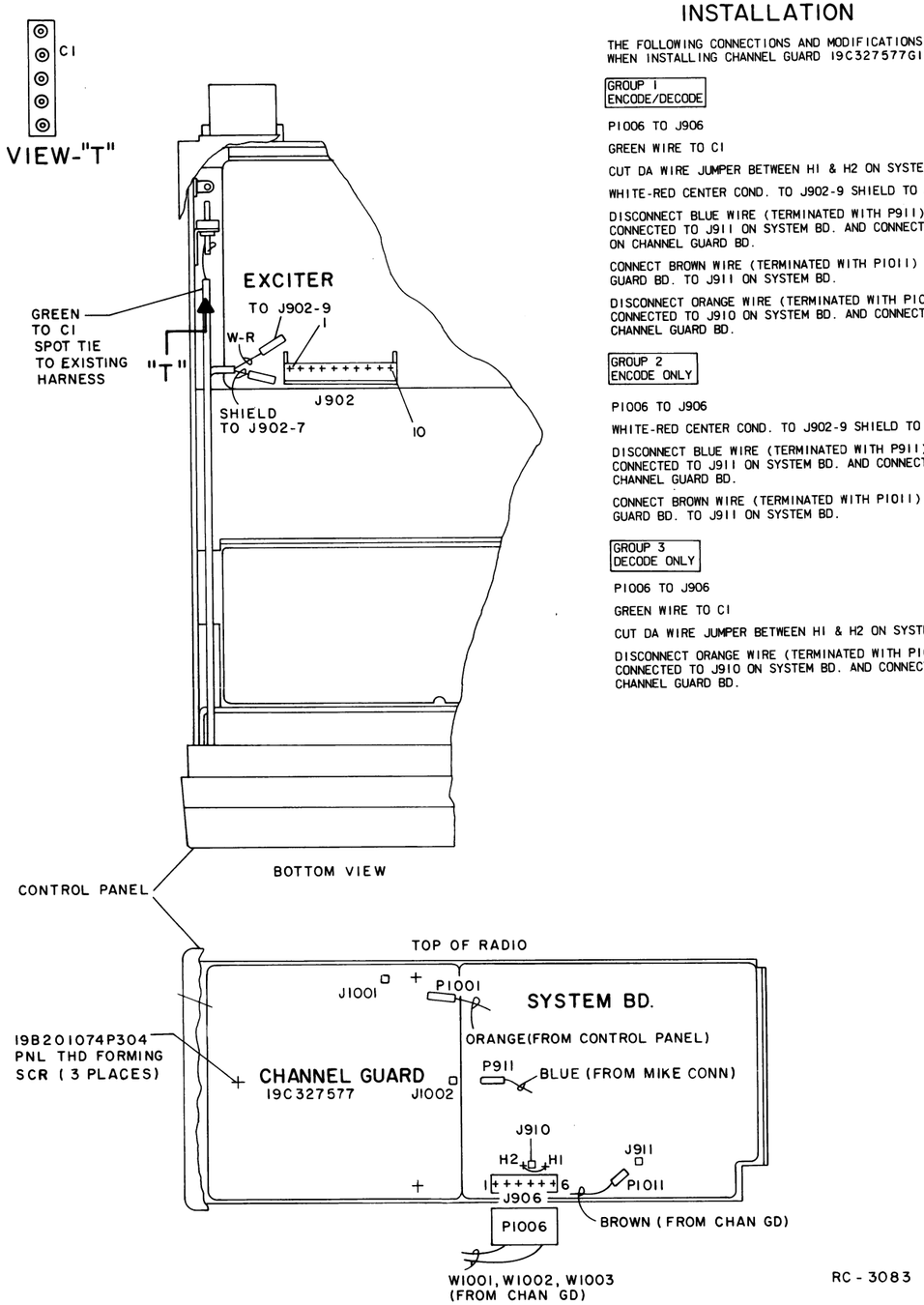


(RC-3087)
(19C327581, Rev. 0)
(19B227790, Sh. 2, Rev. 0)



RC-3085

CHANNEL GUARD INSTALLATION



RC - 3083

THE FOLLOWING CONNECTIONS AND MODIFICATIONS MUST BE MADE WHEN INSTALLING CHANNEL GUARD 19C327577G1-G3

GROUP 1
ENCODE/DECODE

P1006 TO J906

GREEN WIRE TO C1

CUT DA WIRE JUMPER BETWEEN H1 & H2 ON SYSTEM BD.

WHITE-RED CENTER COND. TO J902-9 SHIELD TO J902-7

DISCONNECT BLUE WIRE (TERMINATED WITH P911) WHICH IS CONNECTED TO J911 ON SYSTEM BD. AND CONNECT TO J1002 ON CHANNEL GUARD BD.

CONNECT BROWN WIRE (TERMINATED WITH P1011) FROM CHANNEL GUARD BD. TO J911 ON SYSTEM BD.

DISCONNECT ORANGE WIRE (TERMINATED WITH P1001) WHICH IS CONNECTED TO J910 ON SYSTEM BD. AND CONNECT TO J1001 ON CHANNEL GUARD BD.

GROUP 2
ENCODE ONLY

P1006 TO J906

WHITE-RED CENTER COND. TO J902-9 SHIELD TO J902-7.

DISCONNECT BLUE WIRE (TERMINATED WITH P911) WHICH IS CONNECTED TO J911 ON SYSTEM BD. AND CONNECT TO J1002 ON CHANNEL GUARD BD.

CONNECT BROWN WIRE (TERMINATED WITH P1011) FROM CHANNEL GUARD BD. TO J911 ON SYSTEM BD.

GROUP 3
DECODE ONLY

P1006 TO J906

GREEN WIRE TO C1

CUT DA WIRE JUMPER BETWEEN H1 & H2 ON SYSTEM BD.

DISCONNECT ORANGE WIRE (TERMINATED WITH P1001) WHICH IS CONNECTED TO J910 ON SYSTEM BD. AND CONNECT TO J1001 ON CHANNEL GUARD BD.

INSTALLATION INSTRUCTIONS

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communications Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-30295

DF-5047

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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