MAINTENANCE MANUAL
TRANSMIT/RECEIVE ASSEMBLY
19D902727G1 136-153 MHz
19D902727G2 150-174 MHz

TABLE OF CONTENTS

	Page
DESCRIPTION	Front Cover
CIRCUIT ANALYSIS	
LOGIC CIRCUIT	1
TRANSMIT CIRCUIT	2
RECEIVE CIRCUIT	3
TRANSMIT AUDIO PROCESSING	3
RECEIVE AUDIO PROCESSING	4
REGULATORS	4
OUTLINE DIAGRAMS	
ACCESSORY JACK COMPONENT BOARD (19C851890G1)	5
TRANSMIT/RECEIVE BOARD (19D902468G1 & G2)	6
OPERATION SEQUENCES	
ALERT TONE SEQUENCE	7
RX-SQUELCH OPERATION	7
RX-CG OPERATION	8
RX-TYPE 99 TONE OPERATION	8
TX-VOICE ONLY	9
TX-CG OPERATION	9
IC DATA	10
PARTS LIST	
TRANSMIT/RECEIVE BOARD (19D902727G1 & G2)	13
MECHANICAL PARTS BREAKDOWN	
TRANSMIT/RECEIVE ASSEMBLY	16
SCHEMATIC DIAGRAM	
TRANSMIT/RECEIVE BOARD (19D902468G1 & G2)	17
FIGURES	
FIGURE 1 - MICROPROCESSOR BLOCK DIAGRAM	1
FIGURE 2 - TRANSMIT/RECEIVE BLOCK DIAGRAM	2
FIGURE 3 - AUDIO RESPONSE CURVE	3
FIGURE 4 - AUDIO PROCESSING BLOCK DIAGRAM	4

DESCRIPTION

The Transmit/Receive Assembly 19D902727G1 & G2, attaches to the Rear Cover and consists of the Transmit/Receive Board (19D902468G1 & G2), the Side Panel (19D901089G3), and the Top Cover (19B800865G7).

The Transmit/Receive Board contains the Logic circuit, Transmit circuit, Receive circuit, Regulator circuits, and special circuitry. All controls, switches, and the BNC type antenna connector are soldered to the T/R Board. The Synthesizer Board plugs into the top of the T/R Board at J5 and J6.

Ericsson GE Mobile Communications Inc.
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LBI-38555

The side panel contains the plunger for the Push-To-Talk switch and the channel selector switch panel. The Top Cover mounts to the top of the T/R Assembly.

CIRCUIT ANALYSIS

LOGIC CIRCUIT

The Logic Circuit consists of an 80C51 Microprocessor (U701), an EEPROM (U702) and the associated circuitry.

Microprocessor

The 80C51 microprocessor is a CHMOS 8-bit microprocessor and provides all control signals required by the radio. The microprocessor also generates the Channel Guard tones and detects Channel Guard and Type 99 tones. See Figure 1 for the microprocessor block diagram. The microprocessor port pin definitions are shown on the following pages.

Port Pins: I = Input

O = Output

I/O = Bidirectional

P0.0 (O) Channel Guard encode bit 0

P0.1 (O) CG encode bit 1

P0.2 (O) CG encode bit 2

P0.3 (O) CG encode bit 3

P0.4 (O) Synthesizer 5.4V control (active high)

P0.5 (O) Receive 5.4V control (active high)

P0.6 (O) Type 99 enable (active high)

P0.7 (O) Alert tone

P1.0 (I) $\overline{\text{Test}}$ (active low)

P1.1 (O) Tone Option

P1.2 (O) Mic Mute (active high)

P1.3 (O) $\overline{\text{DPTT}}$ (active low)

P1.4 (O) RX Mute (active high)

P1.5 (O) Receive CG switch (active high)

P1.6 (O) Band Switch

P1.7 (O) Squelch Switch

P2.0 (I) $\overline{\text{Type 99 Reset/Talk Around}}$ (active low)

P2.1 (I) $\overline{\text{Monitor}}$ (active low)

P2.2 (O) Hysteresis

P2.3 (I/O) EEPROM Data

P2.4 (O) EEPROM Clock

P2.5 (O) Xtal Switch

P2.6 (I) Channel Select

P2.7 (O) $\overline{\text{Mute}}$ (active low)

RXD (I) Programmer data in

TXD (I/O) Programmer data out/$\overline{\text{PTT}}$

P3.2 (I) Tone data in

P3.3 (I) Lock detect (active high)

P3.4 (O) Synthesizer enable

P3.5 (O) Synthesizer data

P3.6 (O) Synthesizer clock

P3.7 (I) $\overline{\text{CAS}}$ (active low)

EEPROM

The 256 x 8-bit EEPROM (U702), commonly referred to as the personality PROM, stores the customer information shown below:

- Customer frequencies
- Customer tones
- Customer options

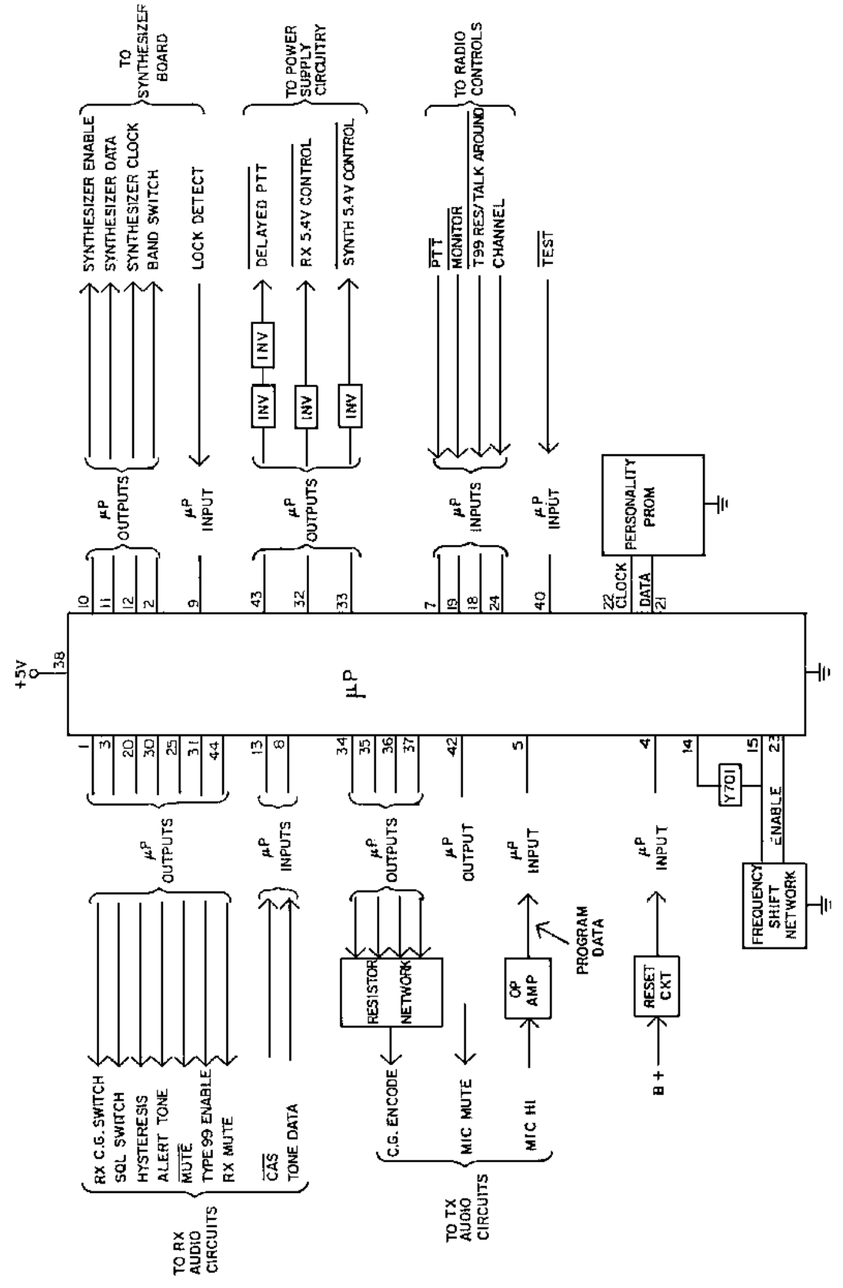

Figure 1 - Microprocessor Block Diagram

T/R ASSEMBLY

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Using an EEPROM provides the convenience of programming without opening the radio. Programming of the EEPROM is accomplished by driving the MIC HI lead, which is located at the accessory jack. This is connected to operational amplifier circuit U301-C. With no external signal connected to MIC HI, a voltage level of approximately 2.25 volts is at MIC HI. This causes the output of U301-C, the program Data line, to be high. If the MIC HI is pulled low, the program data line is pulled low. If this line remains low for 20 milliseconds or more, the microprocessor is put in the programming mode. Once in this mode, the radio will not operate or respond to any of the front case controls. The radio must be turned off and then back on to get the processor out of this mode. If programming is actually done, the processor will be taken out of the programming mode by the proper command from the personal computer programmer. See TQ-3551 for Programming Instructions.

TRANSMIT CIRCUIT

The transmitter circuit begins at the output from the Synthesizer (J5-6) and continues on to the antenna connector J3. See Figure 2 for the block diagram. The circuit consists of five stages of buffering and amplifications, a TX/RX RF switch, a low pass filter and several matching networks. Since the Synthesizer output is at the carrier frequency, there is no frequency multiplication. Each stage description, approximate gain and output level are shown in Table 1.

The band-switch voltage for TX (approximately 4.7V), is dropped to approximately 3.9V by the base-emitter junction of Q101. This band-switch voltage provides the supply for Q102 and the bias for Q106, Q107 and Q104. Switched B+ provides the supply for transistors Q106, Q107 and Q103. Fixed B+ provides the supply for Q104 and Q105.

Buffer Amplifier

Transistor Q102 provides a fixed gain. Q102 also provides reverse isolation and reduces amplitude variation from the synthesizer to the transmitter. Buffer/amplifier Q106 and Q107 provides gain, reverse isolation and further reduces amplitude variations.

Driver/Final Amplifier

Transistor Q104 is the driver for Final Amplifier Q105. Q104 and Q105, along with tuning elements C118, C124 and C126 provide the desired signal level. Variable capacitors C118, C124 and C126 are peaked for the output level on the desired channel frequency. Then C118 and C126 are detuned in the lower current direction to obtain the correct output power level (2W/7.5V or 4W/10V). C124 is peaked for power.

TX/RX RF Switch

During the transmit mode, B+ Switched is applied through R118, R119, R126, L115, Transmit diode D101, through L113, and on to Receiving diode D102. This causes a short at D102 which is reflected back through the 1/4 wave transformer (C129, C132, C135 and L113) as a high impedance which does not load the transformer. This enables the transmit signal to be passed through D101 and on to the low pass filter, the LO (local oscillator) Notch Filter, W1 and then to the antenna jack J3. Bias is also applied through R126 to D103, disabling the receive function LO Notch Filter.

Table 1 - Transmitter Stages

STAGE	DESCRIPTION	APPROXIMATE GAIN (dB)		APPROXIMATE GAIN (dB)	
		7.5V	10V	7.5V	10V
Q102	Buffer	0	0	0/1 mW	0/1 mW
Q107/106	Buffer/Amp	13	13	13/.02	13/.02
Q103	Predriver	8	9	21/.12	22/.12
Q104	Driver	8	8	29/.8	30/1
Q105	Final Amp	7	8	36/4	38/6
----	TX Diode/LP Filter	-1	-1	35/3	37/5

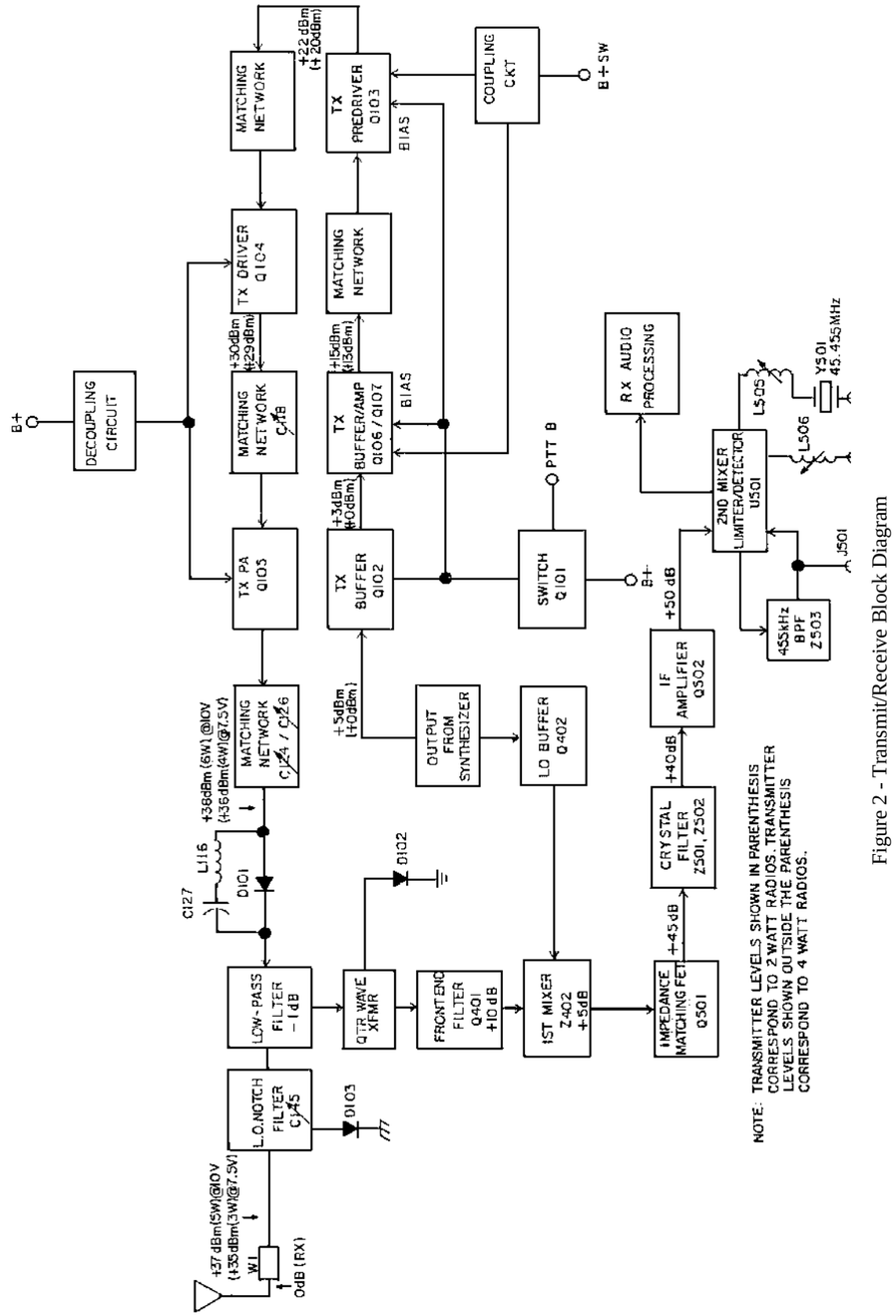

Figure 2 - Transmit/Receive Block Diagram

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In the receive mode, diodes D101, D102 and D103 are open. The residual capacitance of D101 is tuned out by L116 and the combination isolates the transmitter circuit from the receiver input. D102 has no effect on the receive signal. A low pass matching network for the receiver input is then formed by C129, C132, C135 and L113.

Low Pass Filter

The low pass filter is a nine element, low pass with three intermediate poles for the stop band at 270, 315, and 340 MHz (for the 136-153 MHz band), and 310, 340 and 375 MHz (for the 150-174 MHz band). In-band loss is less than 1/2 dB. The filter, in conjunction with the low pass matching circuitry of the final amp, limits the conducted harmonic output to less than -16 dBm.

Transmit DC Switch

The DPPT signal (low) from the Audio/Logic section turns on Q805. Turning on Q805 passes the B+ (dropped by V_{SAT}) on to the transmit circuitry.

RECEIVE CIRCUIT

The dual conversion receive circuit consists of a receive front end, a 45 MHz first IF and a 455 kHz second IF with an FM detector. See Figure 2 for the Transmit/Receive block diagram. The output from the FM detector is used for all audio processing and squelch functions.

Front End

RF is coupled from antenna jack J3 to the T/R Board through antenna contact W1. The receive signal is then conducted through the LO Notch Filter, the TX low pass filter and the quarter wave transformer to the receive front end filter Q401 and associated circuitry. This is a fixed tuned band pass filter covering the 136-153 MHz band or the 150-174 MHz band. A fixed tuned output is connected between the front end filter and double balanced mixer Z402. About 12 dB of RF gain is provided to the mixer input. The local oscillator port of the mixer (pin 1) is driven by LO buffer transistor Q402. The filtered synthesizer output drives the buffer. The output of Q402 drives a 2-pole filter which couples the drive to the mixer at about +5 dBm.

LO Notch Filter

L114, C144, C145, C150 and D103 form a shunt series LO trap. C145 is tuned to best performance for the programmed receive frequencies, reducing the conducted LO leakage.

45 MHz IF

The mixer output is connected to the source of Common Gate Field Effect Transistor (FET) Q501. This stage provides a low impedance input to match the mixer and high impedance output to drive the 45 MHz, 4-pole crystal filter. The crystal filter output is amplified by bipolar transistor Q502. This IF amplifier output drives the Second Mixer circuit in Mixer/Limiter/FM Detector module U501. Crystal Y501 is an external crystal operating a 45.455 MHz. This crystal, when coupled to the internal circuitry, forms the second LO for the second mixer circuit. The frequency of the second LO is adjusted with inductor L505. The second mixer output is a 455 kHz IF and is filtered by a 4-pole ceramic filter. This is further amplified and limited by U501. A quadrature detector circuit provides an audio output from U501. The quadrature detector coil is L506. The audio output is pre-filtered and connected to the audio processing circuits as VOL SQ HI.

TRANSMIT AUDIO PROCESSING

Audio from the microphone is applied to mic pre-amplifier circuit consisting of Q301 and associated circuitry. This high-pass filter rolls off frequencies below 300 Hz to prevent voice blocking during Channel Guard transmissions. The output of Q301 is fed to a 6 dB/octave pre-emphasis network consisting of capacitor C303 and resistor R331 and then to amplifier-limiter U301-D. The output of U301-D is applied to the post-limiter filter U301-A. The Mic Mute switch Q303 is used to keep microphone audio from getting to the Synthesizer Board when not in transmit.

The transmit signal is applied to the low frequency boost circuit U301-B and associated circuitry. The low frequency boost circuitry provides an increasing output level as the input frequency decreases below 20 Hz. The shape of the response curve is shown in Figure 3. This shape is intended to be the mirror image of the synthesizer frequency response curve. The combined result of these two curves provide relatively flat modulation below 20 Hz. This is necessary for Digital Channel Guard modulation. The output of U301-B is fed to the synthesizer board at pin J6-2.

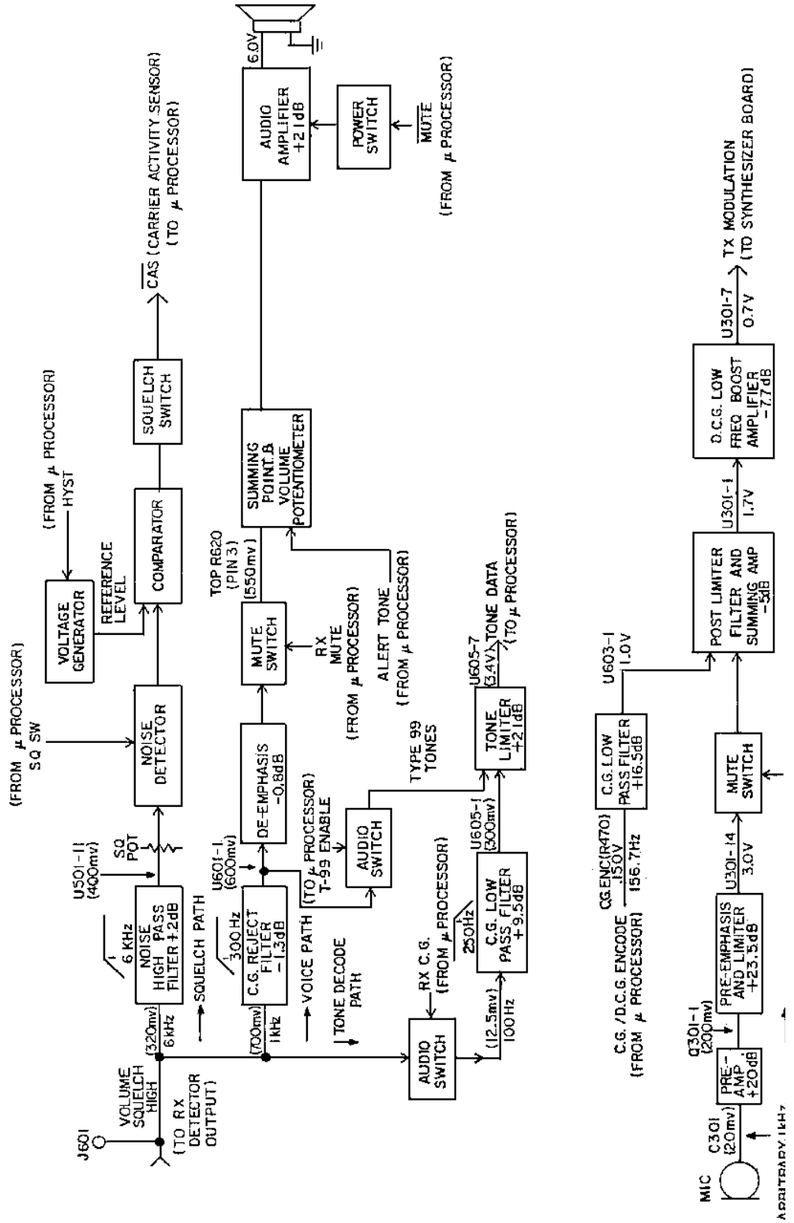

Figure 3 - Audio Response Curve

T/R ASSEMBLY

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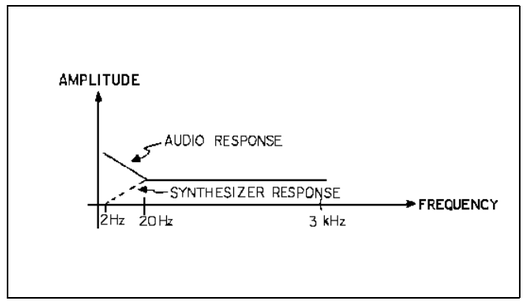


Figure 4 - Audio Processing Block Diagram

RECEIVE AUDIO PROCESSING

Voice Path

Receive audio (VOL SQ HI) enters the audio processing circuitry and includes voice, Channel Guard tones, and higher frequency noise used for squelch. Voice audio takes the path through Volume Pot R620 where frequencies below 300 Hz are attenuated by the Channel Guard reject filter consisting of U601-A and associated circuitry.

The output from the CG reject filter is coupled through receive mute switch transistor Q603 to the volume pot R620. Here the 500 Hz Alert tone, generated by the microprocessor, can be added to the received audio. The volume pot output is coupled to audio amplifier device U602-B. Power is supplied to the audio amplifier by transistor Q602 and controlled by the MUTE line from the microprocessor. Amplifier U602-B drives the speaker and is also connected to the accessory connector on the side of the radio.

Squelch Path

The squelch circuit operates on the noise components contained in the discriminator output. The signal (VOL SQ HI) is applied to a high-pass filter consisting of U501-D and associated circuitry. The output of U501-D is noise in the band above 6 kHz. The output of the high-pass filter is attenuated by squelch pot R619.

The noise from the squelch pot is rectified and amplified by noise detector U603-D. This signal is compared to a DC reference level by U603-C. The switched output level is connected to squelch switch U603-B. If the rectified noise is more than approximately 220 mVDC the CAS line is high and the microprocessor mutes the audio . R631, R634, and R635 provide about 2 dB of hysteresis. The microprocessor outputs SQ SW and HYST are used to provide rapid carrier detection during standby operation.

The threshold level is temperature compensated at cold temperatures only. This is necessary because of a drop on the discriminator output noise level. Thermistor R639 has a negative temperature coefficient. At 25C and above, the thermistor has little effect on the amplifier output U603-D, pin 14. At temperatures below 25C, the resistor increases exponentially, thereby increasing the gain of the amplifier. This gain approximately tracks the drop oat discriminator output.

Limited Tone Data Path

Limited Tone Data is the 5 volts (Peak-To-Peak) representation of a received tone and is fed to the microprocessor where the actual tone decoding occurs. This circuit consists of a low-pass filter for voice rejection and a voltage comparator.

The low-pass filter consists of U605-A, U605-B and associated circuitry. The filter has a breakpoint at 210 Hz. Type 99 decoding is done by bypassing the low-pass filter and going directly to the comparator circuit consisting of Q605 and Q607.

REGULATORS

5.4 Volt Regulator

The 5.4 volt regulator circuit supplies a regulated 5.4 volts to all circuits requiring a stable reference voltage. This regulated voltage is generated by voltage reference diode U801 and transistors Q801, Q802 and Q803. Diode U801 provides 2.5 volts which is stable with both temperature and battery voltage. The 2.5 volt reference is fed to the base of Q802. Transistors Q802 and Q803 form a differential amplifier while Q801 acts as a pass transistor. The regulated 5.4 volts output on the collector of Q801 is divided by voltage divider resistors R805 and R806 to apply 2.5 volts to the base of transistor Q803. With this voltage on the base of Q803 the differential amplifier is balanced.

Receiver 5.4 Volts

The regulated 5.4 volts is switched through transistor Q804 to the Receiver circuitry as RX 5.4V. While in standby, this voltage is switched ON for 25 milliseconds, OFF for 75 milliseconds. Once a carrier is detected, the voltage is switched ON until the carrier is gone. When the radio is in Transmit, the voltage is switched OFF.

Synthesizer 5.4 Volts

The regulated 5.4 volts is switched through transistor Q809 to the Synthesizer Board as SYNTH 5.4V. While in standby, this voltage is switched ON for 25 milliseconds, OFF for 75 milliseconds. Once a carrier is detected, the voltage is switched ON until the carrier is gone. When the radio is in Transmit, the voltage is switched ON.

Switched B+

When in Transmit, the microprocessor pulls the Delayed PTT line low. This turns on transistor Q805, which supplies switched B+ volts (7.5V for 2 watt operation, 10V for 4 watt operation) to the first three stages of the transmitter circuit and antenna switch consisting of D101, D102, and associated circuitry.

+5 Volt Regulator

A +5 volt regulator (U802) supplied power to the microprocessor and all other circuitry requiring +5 volts.

Low Voltage Reset

The low voltage reset consists of Q806, Q807 and associated circuitry. This circuit provides the microprocessor with the necessary reset signal during the power-up routine and also resets the microprocessor when the battery falls below approximately 4.5 volts.

Synthesizer Programming

After a reset, when toggling between transmit and receive, and any time a new channel is selected, the microprocessor must reprogram the synthesizer through SYN CLK (P3.6), SYN DAT (P3.5) and SYN EN (P3.4). When locked, the LOCK DET line (J6-4) is high.

Microprocessor XTAL Frequency Pull

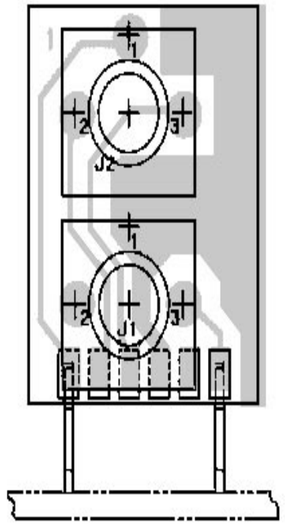
Port P2.5 of the microprocessor is used to switch a 33 pF capacitor (C730) into the crystal oscillator circuit. The effect of adding this capacitor is to move or pull the crystal frequency approximately 250 ppm. This is done to keep harmonics of the microprocessor ALE line away from the receive channel frequency.

The programming at this point happens automatically when channel frequencies are initially programmed.

Alert Tones

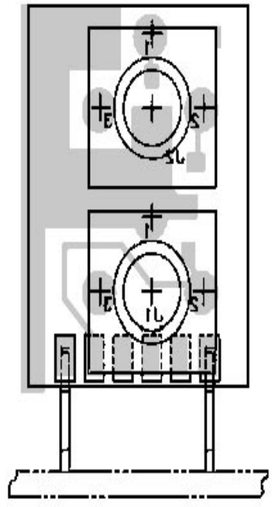
The microprocessor generates a 500 Hz ALERT tone (P0.7) used to signal the user of a critical event, such as the synthesizer failing to lock. It is introduced into the voice path at the Volume Pot R620. The ALERT tone can be disabled by the programmer.

COMPONENT SIDE



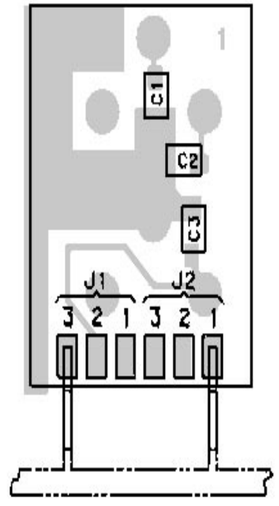
(19C851890, Sh. 1, Rev. 1)
(19C851889, Sh. 1, Rev. 1)

SOLDER SIDE



(19C851890, Sh. 1, Rev. 1)
(19C851889, Sh. 2, Rev. 1)

SOLDER SIDE



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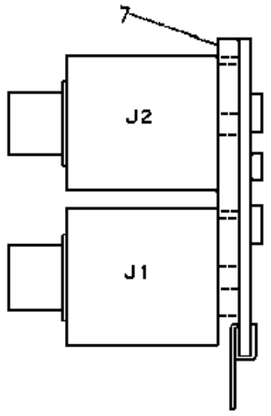
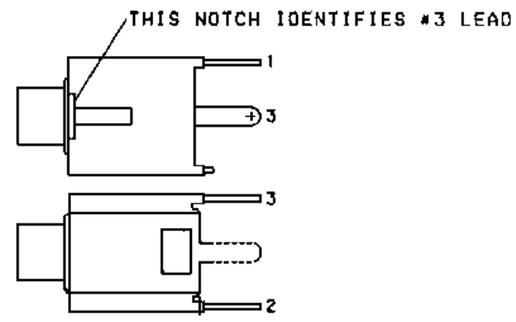
(19C851889, Sh. 2, Rev. 1)

T/R ASSEMBLY





CAUTION
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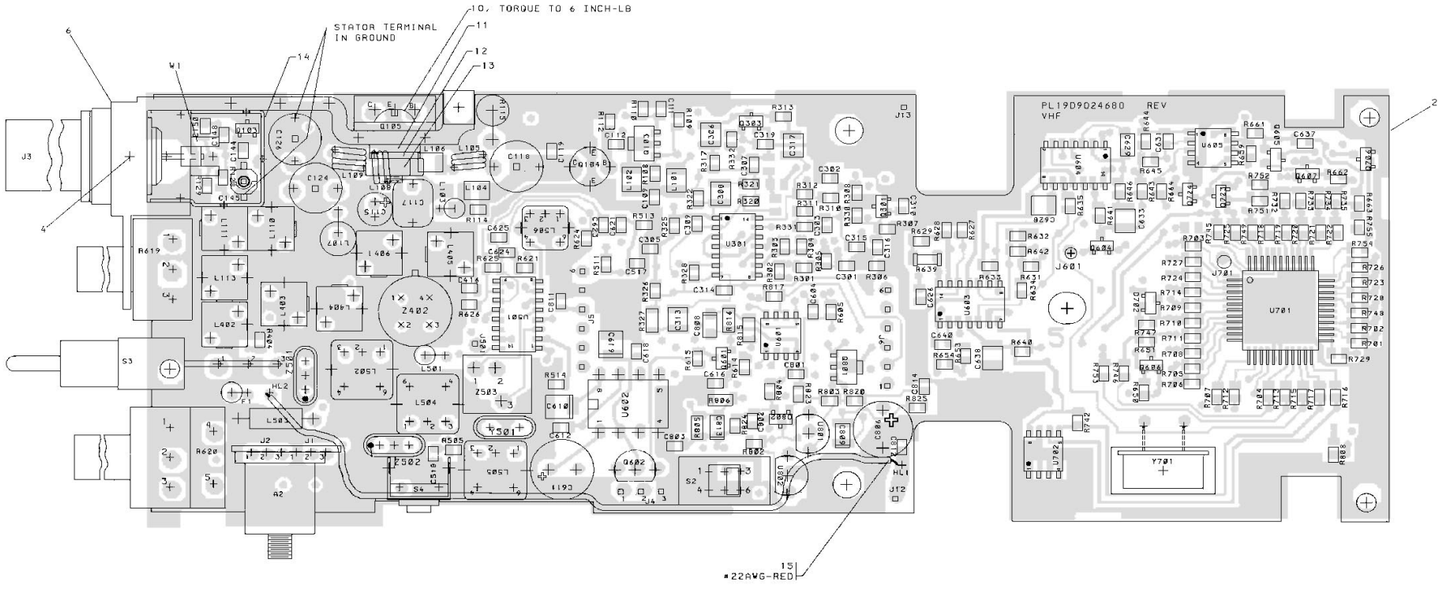
ELECTROSTATIC SENSITIVE DEVICES

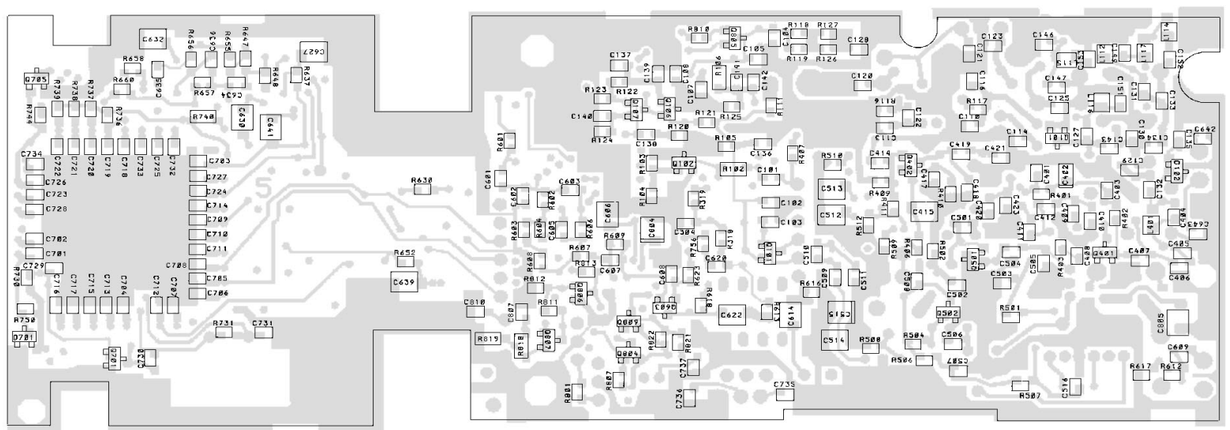
JACK COMPONENT BOARD
19C851890G1

COMPONENT SIDE



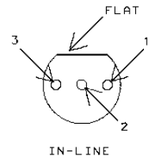
(19D902468, Sh. 1, Rev. 7)
(19D902469, First Layer, Rev. 5)

SOLDER SIDE



(19D902468, Sh. 1, Rev. 2)
(19D902469, Fourth Layer, Rev. 2)

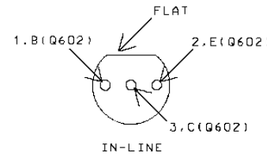
LEAD IDENTIFICATION FOR U801



NOTE: CASE SHAPE IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

TOP VIEW

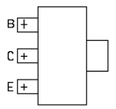
LEAD IDENTIFICATION FOR Q602 & U802



NOTE: CASE SHAPE IS DETERMINING FACTOR FOR LEAD IDENTIFICATION

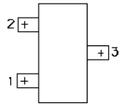
TOP VIEW

LEAD IDENTIFICATION FOR Q103 AND Q801 (TOP VIEW)



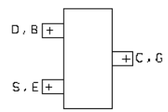
LEAD IDENTIFICATION FOR D102,D103,D301,D701 & D702 (SOT) DIODES

(TOP VIEW)



LEAD IDENTIFICATION FOR Q101,Q102,Q106,Q107,Q401,Q402, Q501,Q502,Q603-Q606,Q701,Q705, Q706,Q804-Q807 & D809 (SOT) TRANSISTORS

(TOP VIEW)



CAUTION
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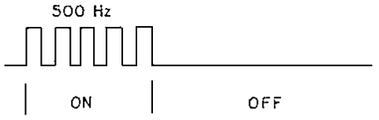
ELECTROSTATIC SENSITIVE DEVICES

T/R BOARD
19D902468G2

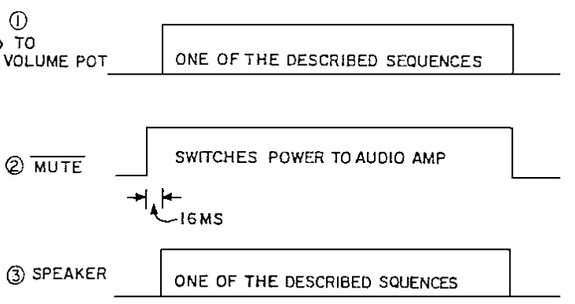
ALERT TONE SEQUENCE

① ALERT TONE SEQUENCE

SQUARE WAVE AT 500 Hz

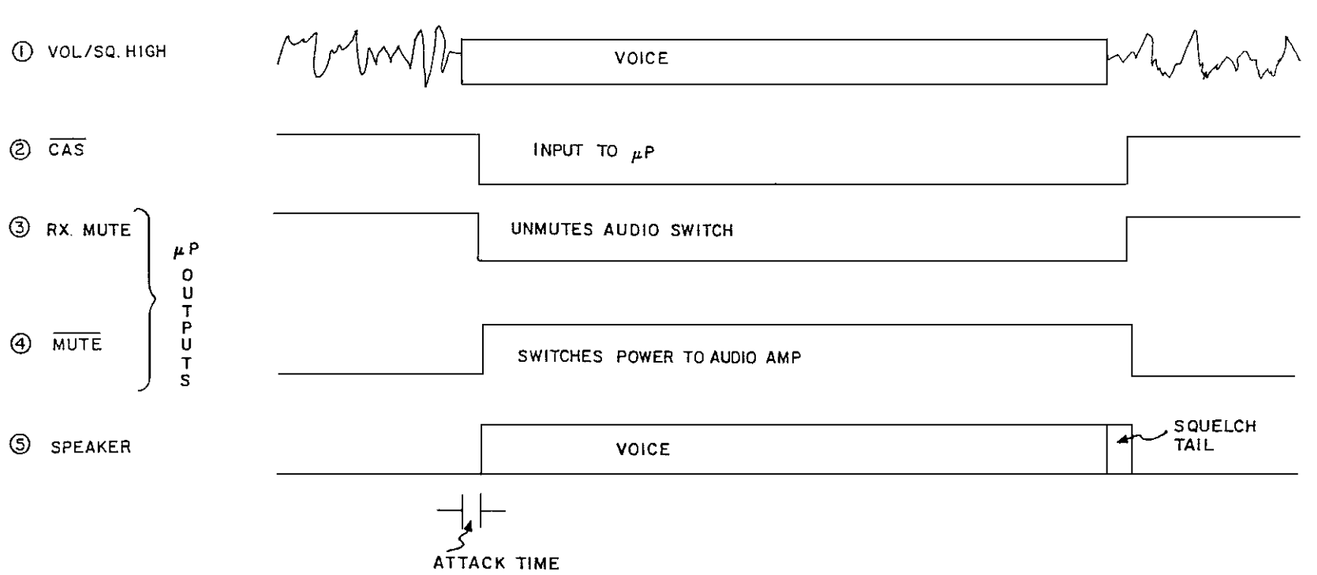


	MS ON	MS OFF	MS ON	MS OFF	MS ON	MS OFF	
① SELF TEST	48	128	48	128	48	128	
② OUT OF LOCK SYN	48	350	48	350	48	350	→ AS LONG AS NOT LOCKED
③ TX CH. NOT PROG.	48	350	48	350	48	350	→ AS LONG AS PTT OPERATED
④ T99 DECODE	VARIES W/ T99 TONE						



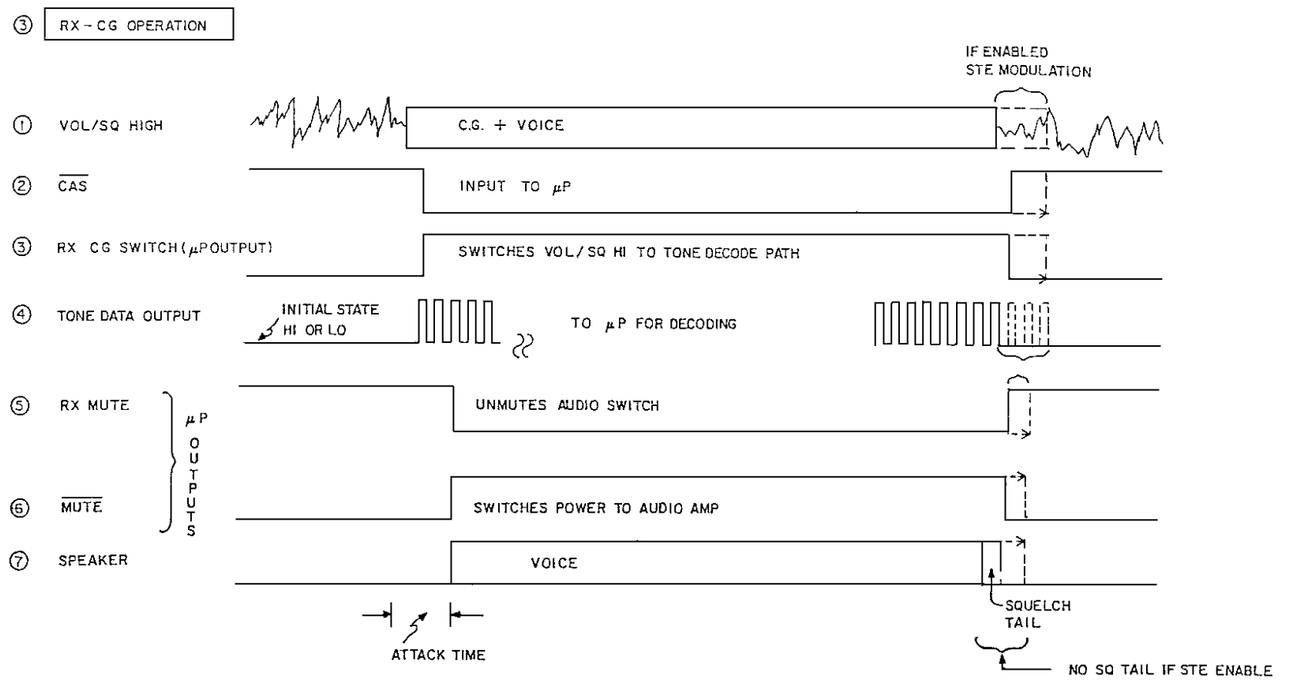
VOLUME POT SETTING AFFECTS LOUDNESS IN ALL CASES.

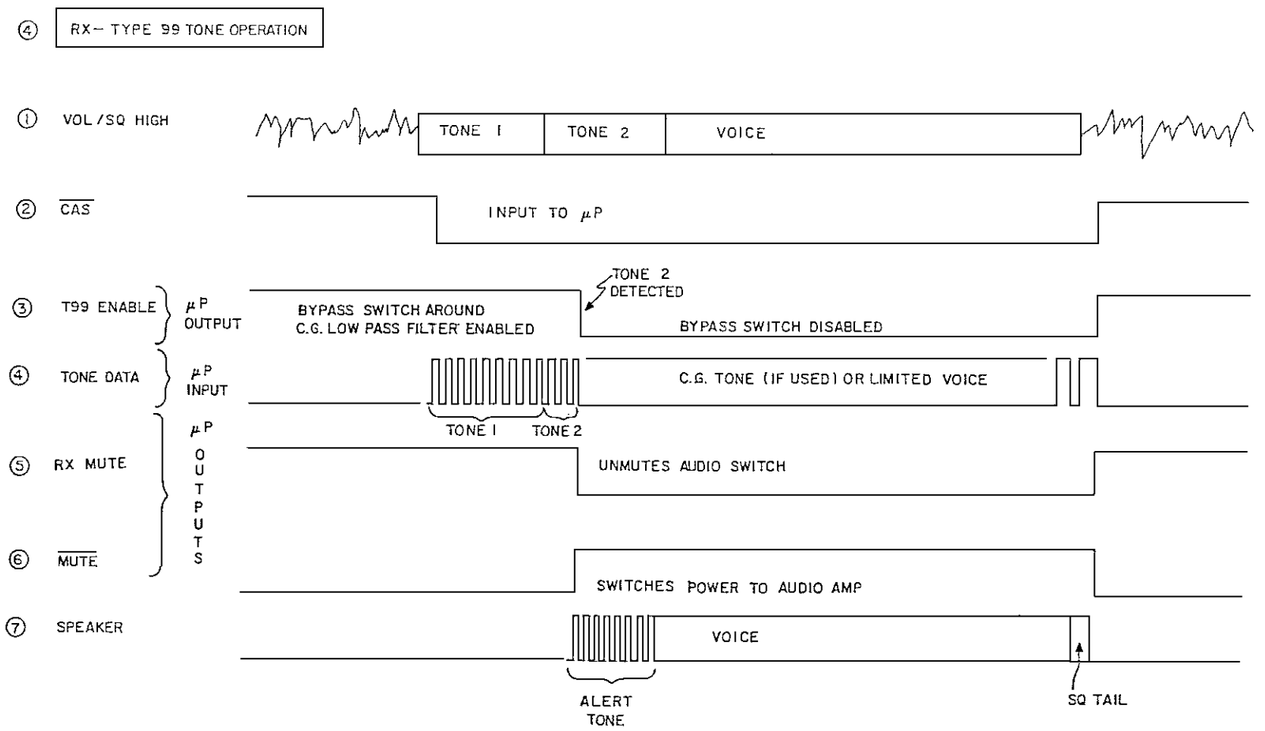
② RX — SQUELCH OPERATION



RX SQUELCH OPERATION

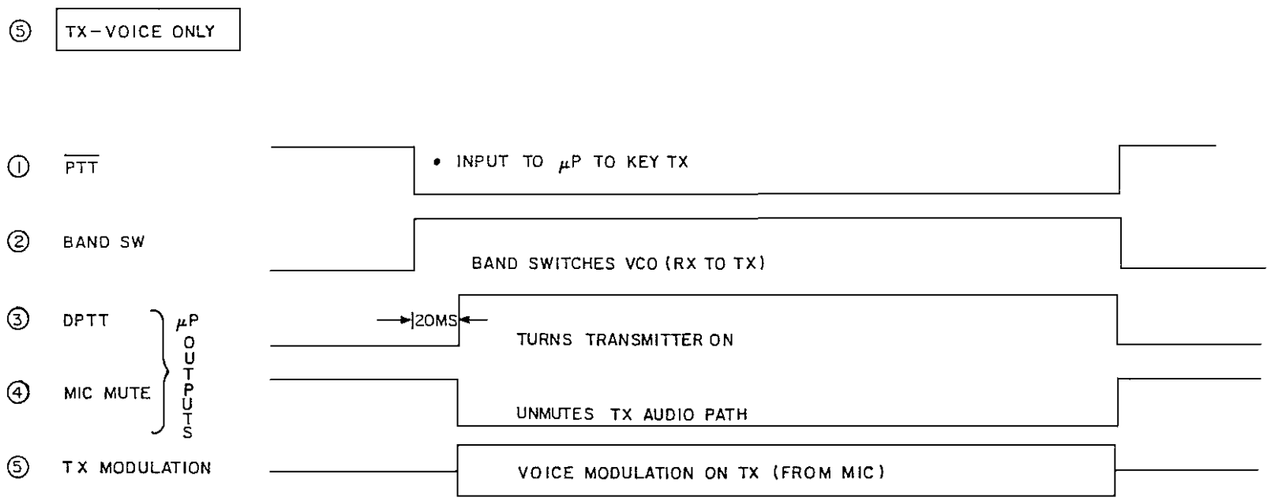
RX CHANNEL GUARD OPERATION

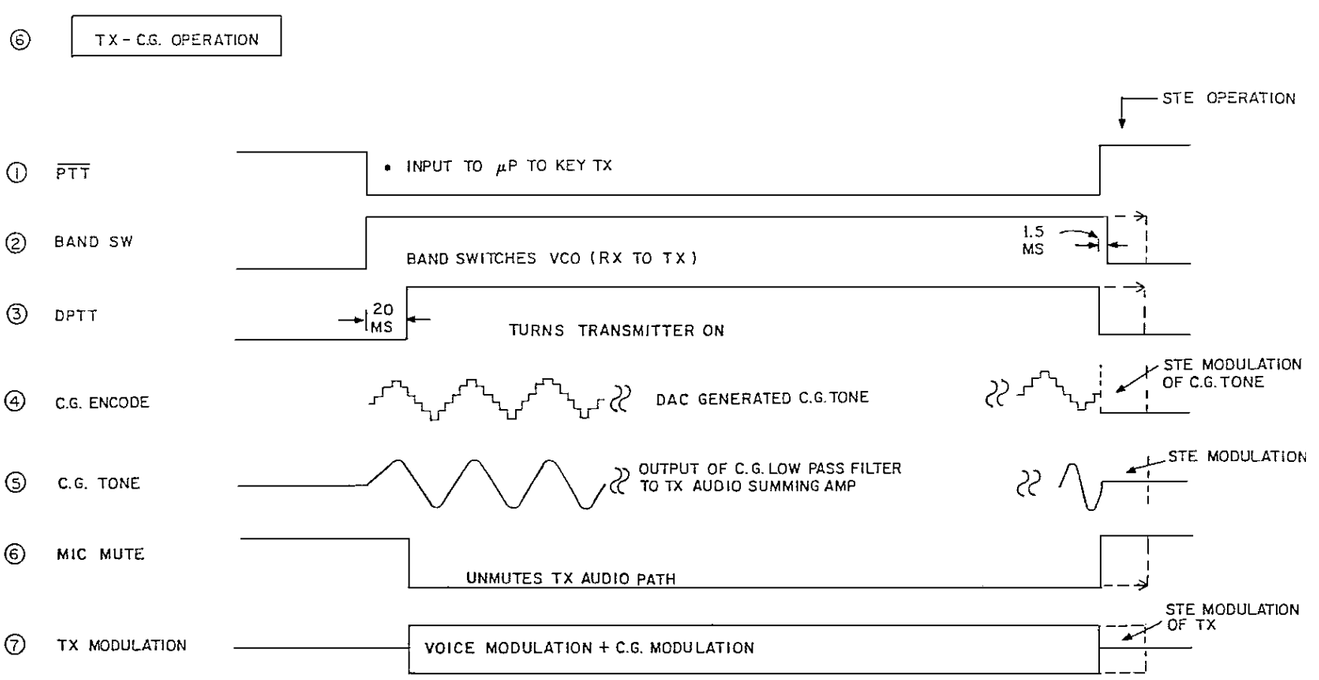




RX TYPE 99 OPERATION

TX VOICE ONLY

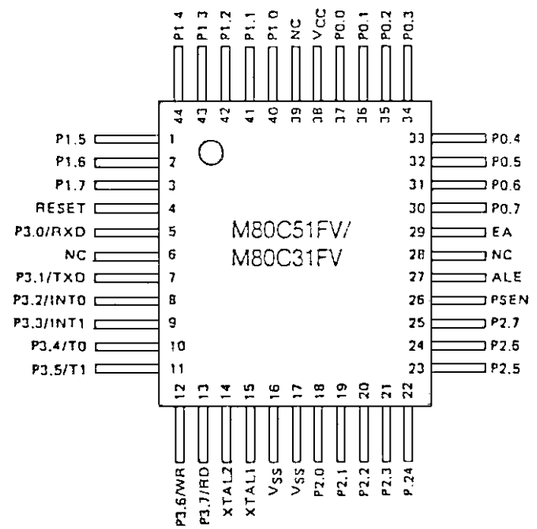




TX CHANNEL GUARD OPERATION

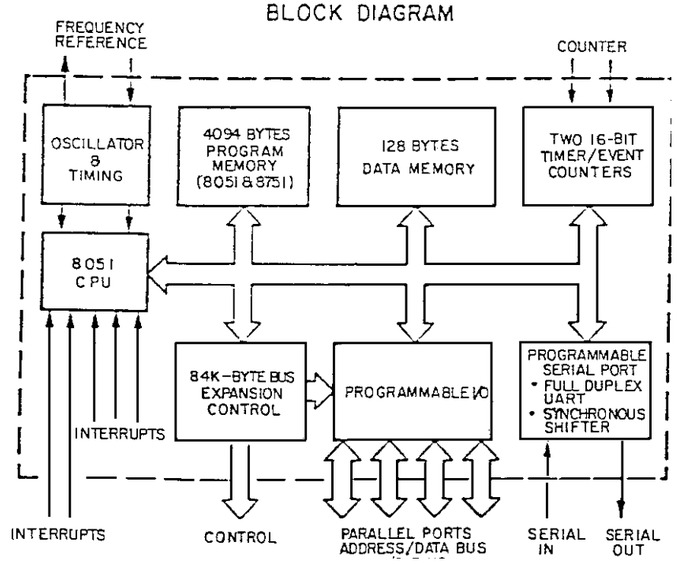
U701

CHMOS 8-BIT MICROCOMPUTER
19A704345P20,21,30



PIN IDENTIFICATION

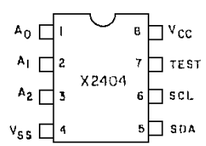
BLOCK DIAGRAM



U702:

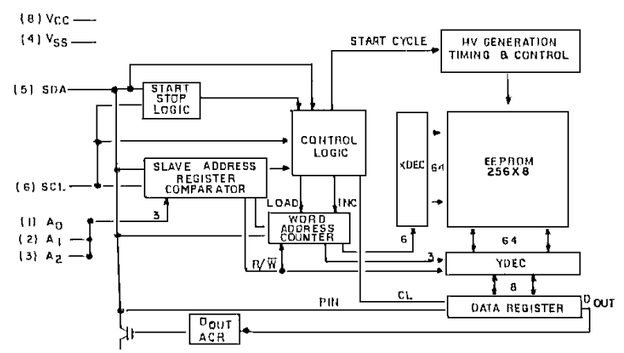
DIGITAL 256X8 EEPROM
19A704724P2 & P204

PIN CONFIGURATION



1 A_0 → TO V_{SS}
2 AND 3 A AND A ADDRESS INPUTS
4 V_{SS}
5 SDA SERIAL DATA — I^2C BUS
6 SCL SERIAL CLOCK — I^2C BUS
7 TEST INPUT — TO V_{SS}
8 V_{CC}

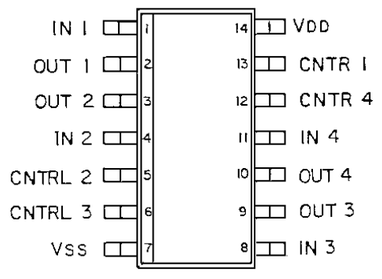
FUNCTION DIAGRAM



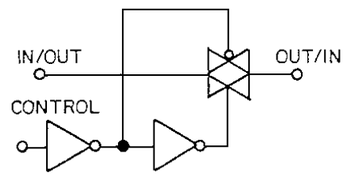
U604:

QUAD ANALOG SWITCH/MULTIPLEXER
19A702705P1,P4
(CMOS)

PIN CONFIGURATION



LOGIC DIAGRAM

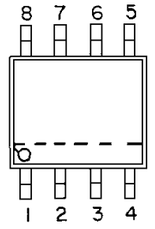


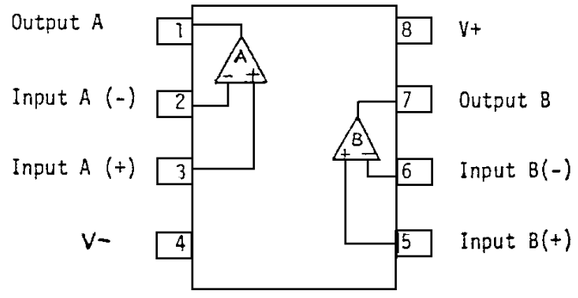
(1/4 OF DEVICE SHOWN)

CONTROL	SWITCH
0	OFF
1	ON

U601, U605:

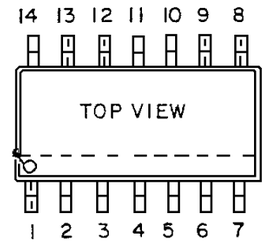
OPERATIONAL AMPLIFIER
19A702293P2 & P3

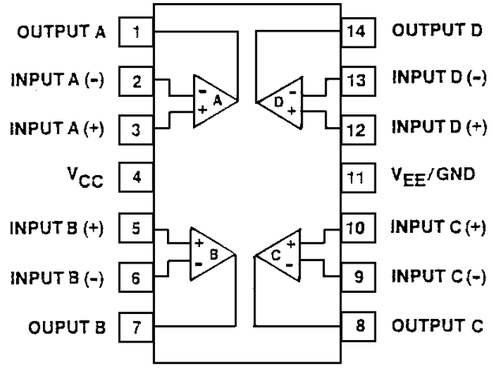




U301, U603:

OPERATIONAL AMPLIFIER
19A702293P1



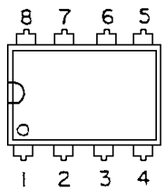


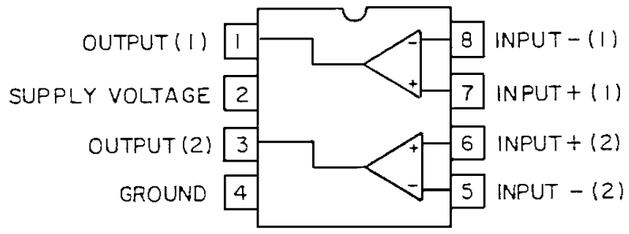
PIN 1 MAY BE IDENTIFIED BY INDENT OR CHAMFER

T/R ASSEMBLY

U602:

AUDIO AMPLIFIER
19A705452P1, P2

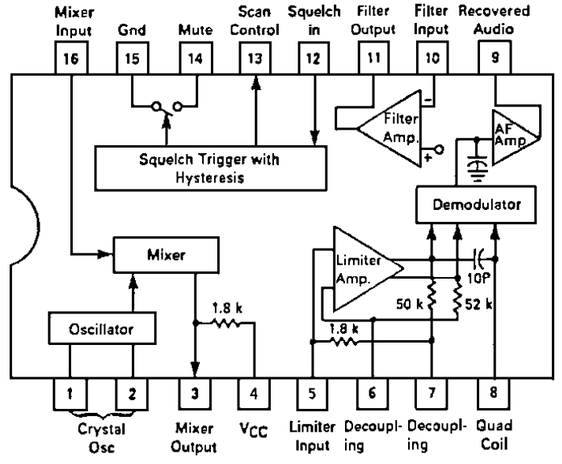




(TOP VIEW)

U501

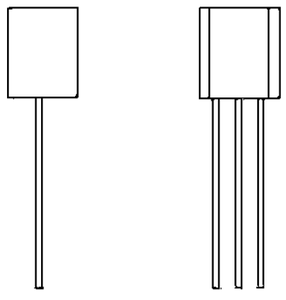
LINEAR IF AMPL & DETECTOR
19A704619P2

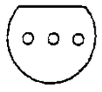


PIN IDENTIFICATION (TOP VIEW) AND FUNCTIONAL BLOCK DIAGRAM

U801:

LINEAR
19A702536P1



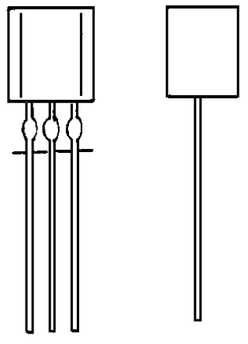


BOTTOM VIEW

PIN 1 INPUT
PIN 2 OUTPUT
PIN 3 GROUND

U802:

ADJUSTABLE SHUNT REGULATOR
19A702939P1 &P2



BOTTOM VIEW

TO 92 PACKAGE
PIN 1 - REFERENCE
PIN 2 - ANODE
PIN 3 - CATHODE

TRANSMIT/RECEIVE BOARD
19D902727G1-G2

SYMBOL	PART NO.	DESCRIPTION
		——— ASSEMBLIES ———
A1	19D902468G1	Component board, Transmit/Receive. (Used in G1).
		——— ASSEMBLIES ———
A2	19C851890G2	Component Board, Accessory Jack.
		——— CAPACITORS ———
C1 thru C3	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
		——— JACKS ———
J1 and J2	19A149973P1	Telephone jack; sim to Hoside HSJO798-01-020. (Used in G2).
		——— MISCELLANEOUS ——
7	19A149926P1	Insulator. (Used in G2).
10	19C852112P1	Printed wire board. (Used in G2).
		——— CAPACITORS ———
C101	19A702061P77	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ±30 PPM.
C102	19A702236P50	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C103	19A702061P77	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ±30 PPM.
C104	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C105	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C107	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C107	19A702236P46	Ceramic: 68 pF ±5%, 50 VDCW, temp coef 0 PPM ±30 PPM. (Used in G1).
C108	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C108	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C109	19A702061P77	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ±30 PPM.
C110	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C111	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C112	19A702236P42	Ceramic: 47 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C112	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C113	19A702236P54	Ceramic: 150 pF ±5%, 500 VDCW, temp coef 0 ±30 PPM/°C.
C114	19A702052P30	Ceramic: 0.022 µF ±10%, 50 VDCW.
C115	19A703324P2	Electrolytic: 2.2 µF ±20%, 50 VDCW.
C116	19A702236P54	Ceramic: 150 pF ±5%, 500 VDCW, temp coef 0 ±30 PPM/°C.
C117	162B3688P422K	Ceramic: 0.22 µF ±10%, 50 VDCW; sim to Erie 8131-M050-W5R-224K.
C118	19B800873P1	Ceramic, variable: 6 to 35 pF, 150 VDCW; sim to Johanson 9613.

* COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	PART NO.	DESCRIPTION
C119	19A702236P42	Ceramic: 47 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C119	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C120	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C120	19A702236P42	Ceramic: 47 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C121	19A702236P48	Ceramic: 82 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C121	19A702236P50	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C122	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C123	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C123	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C124	19B800873P1	Ceramic, variable: 6 to 35 pF, 150 VDCW; sim to Johanson 9613.
C125	19A702236P32	Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM (Used in G2).
C125	19A702236P36	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C126	19B800873P1	Ceramic, variable: 6 to 35 pF, 150 VDCW; sim to Johanson 9613.
C127 and C128	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C129	19A702236P32	Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM (Used in G2).
C129	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C130	19A702236P32	Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM (Used in G2).
C130	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C131	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C131	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C132	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C133	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C134	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C134	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G1).
C135	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C135	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C136 thru C138	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C139	19A702236P7	Ceramic: 1.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C140 and C141	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C142	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.

SYMBOL	PART NO.	DESCRIPTION
C143	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C143	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C144	19A702236P28	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C144	19A702236P30	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C145	19B800873P11	Ceramic, variable: 1-5 pF, 150 VDCW.
C146	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C147	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C147	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G1).
C148	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C148	19A702236P6	Ceramic: 1.0 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C149	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C150	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C150 and C151	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C151	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C152	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C153	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C301	19A702052P16	Ceramic: 0.015 µF ±10%, 50 VDCW.
C302	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C303	19A702052P7	Ceramic: 2200 pF ±10%, 50 VDCW.
C304	19A702052P130	Ceramic: 0.022 µF ±5%, 50 VDCW.
C305	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C306	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C307	19A702052P107	Ceramic: 2200 pF ±5%, 50 VDCW.
C308	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C309	19A702061P67	Ceramic: 180 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C310	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C313	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C314	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C315	19A702052P10	Ceramic: 4700 pF ±10%, 50 VDCW.
C316	19A702052P16	Ceramic: 0.015 µF ±10%, 50 VDCW.
C317	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C319	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C401	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C402	19A705205P2	Tantalum: 1 µF, 16 VDCW; sim to Sprague 293D.
C403	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C404	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.

SYMBOL	PART NO.	DESCRIPTION
C405	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G2).
C405	19A702236P23	Ceramic: 8.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C406	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C406	19A702236P23	Ceramic: 8.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C407	19A702236P54	Ceramic: 150 pF ±5%, 500 VDCW, temp coef 0 ±30 PPM/°C.
C408	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C409	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C409	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G1).
C410	19A702236P25	Ceramic: 10 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C410	19A702236P34	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C411	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G2).
C411	19A702236P23	Ceramic: 8.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C412	19A702236P32	Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM (Used in G2).
C412	19A702236P36	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C414	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C415	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C416	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C417	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C418	19A702236P23	Ceramic: 8.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C418	19A702236P25	Ceramic: 10 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G1).
C419	19A702236P19	Ceramic: 5.6 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C419	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G1).
C420	19A702236P30	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C421	19A702236P36	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C421	19A702236P40	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C423	19A702236P30	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G2).
C423	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C424	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C424	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C501	19A702236P40	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C502 and C503	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C504	19A702236P40	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.

T/R ASSEMBLY

SYMBOL	PART NO.	DESCRIPTION
C505	19A702236P23	Ceramic: 8.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C506	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C507 and C508	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C509	19A702236P36	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C510 and C511	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C512 thru C514	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C515	19A705205P14	Tantalum: 6.8 µF, 6 VDCW; sim to Sprague 293D.
C516	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C517	19A702052P7	Ceramic: 2200 pF ±10%, 50 VDCW.
C518	19A702236P25	Ceramic: 10 pF ±5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C601	19A702052P114	Ceramic: 0.01 µF ±5%, 50 VDCW.
C602	19A702052P10	Ceramic: 4700 pF ±10%, 50 VDCW.
C603 and C604	19A702052P114	Ceramic: 0.01 µF ±5%, 50 VDCW.
C605	19A702052P130	Ceramic: 0.022 µF ±5%, 50 VDCW.
C606	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C607	19A702052P10	Ceramic: 4700 pF ±10%, 50 VDCW.
C608	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C609	19A702052P30	Ceramic: 0.022 µF ±10%, 50 VDCW.
C610	19A705205P13	Tantalum: 4.7 µF, 10 VDCW; sim to Sprague 293D.
C611	19A703314P15	Electrolytic: 100 µF ±20%, 25 VDCW.
C612	19A702052P16	Ceramic: 0.015 µF ±10%, 50 VDCW.
C614	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C616	19A702236P50	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C618	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C619	19A705205P13	Tantalum: 4.7 µF, 10 VDCW; sim to Sprague 293D.
C620	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C621	19A702052P6	Ceramic: 1500 pF ±10%, 50 VDCW.
C622	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C623	19A702052P6	Ceramic: 1500 pF ±10%, 50 VDCW.
C624	19A702052P12	Ceramic: 6800 pF ±10%, 50 VDCW.
C625 and C626	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C627 and C628	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C629	19A705205P2	Tantalum: 1 µF, 16 VDCW; sim to Sprague 293D.
C630	19A702052P22	Ceramic: 0.047 µF ±10%, 50 VDCW.
C631	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C632	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C633	19A702052P22	Ceramic: 0.047 µF ±10%, 50 VDCW.
C634	19A702052P10	Ceramic: 4700 pF ±10%, 50 VDCW.
C635	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C636	19A702052P10	Ceramic: 4700 pF ±10%, 50 VDCW.
C637	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C638	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C639	19A702052P20	Ceramic: 0.033 µF ±10%, 50 VDCW.
C640	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C641	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C642 and C643	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C701 thru C717	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C718	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C719 thru C729	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C730	19A702236P38	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C731	19A702061P35	Ceramic: 30 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C732 thru C734	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C735 thru C737	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C801	19A702052P34	Ceramic: 0.1 µF ±10%, 25 VDCW.
C802	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C803	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C805	19A702052P26	Ceramic: 0.1 µF ±10%, 50 VDCW
C806	19A701534P9	Tantalum: 47 µF ±20%, 6.3 VDCW.
C807	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C808	19A705205P2	Tantalum: 1 µF, 16 VDCW; sim to Sprague 293D.
C809	19A705205P12	Tantalum: .33 µF, 16 VDCW; sim to Sprague 293D.
C810	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C811 and C812	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C813	19A705205P2	Tantalum: 1 µF, 16 VDCW; sim to Sprague 293D.
C814	19A702052P30	Ceramic: 0.022 µF ±10%, 50 VDCW.
		— — — — DIODES — — — — —
D101	19A700155P2	Silicon: 100 mA, 35 PIV; sim to BAT 18.
D102	19A702525P2	Silicon, PIN: sim to MMBV3401.
D103	19A700155P2	Silicon: 100 mA, 35 PIV; sim to BAT 18.
D701 and D702	19A700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
		— — — — FUSES — — — — —
F1	19A702169P9	Enclosed link: rated 3 amps @ 125 v; sim to Littelfuse 255003.

SYMBOL	PART NO.	DESCRIPTION
		— — — — — JACKS — — — — —
J1 and J2	19A149973P1	Telephone jack; sim to Hoside HSJo798-01-020.
J3	19A702270P2	Connector, coaxial, BNC series; sim to Amp 413649-1.
J4	19A703248P11	Post: Gold Plated, 10 mm length.
J5 and J6	19A703248P20	Contact, electrical.
J12 and J13	19A703248P11	Post: Gold Plated, 10 mm length.
J501	19A703248P11	Post: Gold Plated, 10 mm length.
J601		Part of printed wire board 19D902469P1.
		— — — MISCELLANEOUS— — —
2	19A700122P1	Torroidal core. (Used in G1).
3	19A700125P10	Wire Magnet, Plastic Coated. (Used in G1).
		— — — — INDUCTORS— — — —
L101	19A705470P25	Coil, fixed: 1 µH ±20%, sim to 38LB-IR0M.o 38OLB-I
L102	19A705470P5	Coil, Fixed: 22 nH; sim to Toko 380NB-22nM.
L103	19A700024P19	Coil, RF: 3.3 µH ±10%.
L104	19A705470P13	Coil: 0.10 µH ±20%.
L105	19A702472P19	Coil. (Used in G1).
L105	19A702472P28	Coil. (Used in G2).
L106	19A705470P25	Coil, fixed: 1 µH ±20%, sim to 38LB-IR0M.o 38OLB-I
L107	19A702473G1	Coil.
L108	19A702472P28	Coil.
L109	19A702472P24	Coil.
L110 and L111	19B801493P4	Coil, RF; sim to Toko NE545GNAS-100128.
L112	344A3289P5	Coil, fixed: .033 µH ±20%; sim to TDK NL252018T-033M.
L113	19B801493P6	Coil, RF; sim to Toko NE545GNAS-1130.
L114 thru L117	344A3289P10	Coil, fixed: .100 µH ±20%; sim to TDK NL252018T-R10M.
L401	344A3289P22	Coil, fixed: 2.7 µH ±5%; sim to TDK NL252018T-2R7J.
L402	19B801493P5	Coil, RF; sim to Toko NE545GNAS-100127.
L403	19B235530P49	Coil, shielded, molded; sim to Toko NE547GNAS100161.
L404	19B801493P5	Coil, RF; sim to Toko NE545GNAS-100127.
L405 and L406	19B801493P3	Coil, RF, shielded: 35 nH; sim to TOKO NE545GNAS-100127.
L501	19A700024P7	Coil, RF: 330 nH ±10%.
L502	19B801413P4	Coil, 39 MHz.
L503	19A700024P19	Coil, RF: 3.3 µH ±10%.
L504	19B801413P3	Coil, 39 MHz.
L505	19B801413P4	Coil, 39 MHz.
L506	19A703591P1	IF: sim to Toko America P5SVLC-A291EL.
		— — — — TRANSISTORS — — —
Q101	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q102	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q103	19A702108P2	Silicon, NPN: sim to BFQ17.
Q104	19A149957P1	Silicon, NPN, RF: sim to Motorola MRF-553.
Q105	19A701891P1	Silicon, NPN, VHF Amplifier, 5 watt, 12.5 v.
Q106 and Q107	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q301	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q303	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q401 and Q402	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q501	19A702524P3	N-Type, field effect; sim to MMBFJ310.
Q502	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q601	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q602	19A700026P2	Silicon, PNP: sim to BC369.
Q603 thru Q605	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q606	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q607	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q701	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q703 thru Q706	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q801	19A134577P2	Silicon, PNP: sim to Phillips BCX51-16.
Q802	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q804 and Q805	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q806	19A134739P2	Silicon, NPN.
Q807	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q809	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
		— — — — RESISTORS — — —
R102	19B800607P101	Metal film: 100 ohms ±5%, 1/8 w.
R103	19B801251P392	Metal film: 3.9K ohms ±5%, 1/10 w.
R104	19B801251P152	Metal film: 1.5K ohms ±5%, 1/10 w.
R105	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.

SYMBOL	PART NO.	DESCRIPTION
R106	19B800607P101	Metal film: 100 ohms ±5%, 1/8 w. (Used in G2).
R106	19B800607P1	Metal film: Jumper. (Used in G1).
R108	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R109	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R110	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R111	19B801251P152	Metal film: 1.5K ohms ±5%, 1/10 w.
R112	19B801251P820	Metal film: 82 ohms ±5%, 1/10 w.
R114	19B801251P182	Metal film: 1.8K ohms ±5%, 1/10 w.
R115	19A700113P21	Composition: 18 ohms ±5%, 1/2 w.
R116 and R117	19B801251P100	Metal film: 10 ohms ±5%, 1/10 w.
R118 and R119	19B801251P181	Metal film: 180 ohms ±5%, 1/10 w.
R120	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.
R121	19B801251P122	Metal film: 1.2K ohms ±5%, 1/10 w.
R122	19B801251P332	Metal film: 3.3K ohms ±5%, 1/10 w.
R123	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R124	19B801251P100	Metal film: 10 ohms ±5%, 1/10 w.
R125	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.
R126 and R127	19B801251P151	Metal film: 150 ohms ±5%, 1/10 w.
R128	19B801251P560	Metal film: 56 ohms ±5%, 1/10 w.
R129	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R301	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R302	19B801251P105	Metal film: 1M ohms ±5%, 1/10 w.
R303	19B801251P272	Metal film: 2.7K ohms ±5%, 1/10 w.
R304	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R305	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R306	19B801251P682	Metal film: 6.8K ohms ±5%, 1/10 w.
R307	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R308	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R310	19B801251P332	Metal film: 3.3K ohms ±5%, 1/10 w.
R311	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R312	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R313	19B801251P823	Metal film: 82K ohms ±5%, 1/10 w.
R317	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R318 and R319	19B801251P154	Metal film: 150K ohms ±5%, 1/10 w.
R320	19B801251P683	Metal film: 68K ohms ±5%, 1/10 w.
R321	19B801251P124	Metal film: 120K ohms ±5%, 1/10 w.
R322	19B801251P564	Metal film: 560K ohms ±5%, 1/10 w.
R325	19B801251P153	Metal film: 15K ohms ±5%, 1/10 w.
R326	19B801251P154	Metal film: 150K ohms ±5%, 1/10 w.
R327	19A702931P401	Metal film: 100K ohms ±1%, 200 VDCW, 1/8 w.
R328	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R330	19B801251P684	Metal film: 680K ohms ±5%, 1/10 w.
R331	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R332	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R401	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.
R402 and R403	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R404	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R406	19B801251P470	Metal film: 47 ohms ±5%, 1/10 w.
R407	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R409	19B801251P272	Metal film: 2.7K ohms ±5%, 1/10 w.
R410	19B801251P680	Metal film: 68 ohms ±5%, 1/10 w.
R411	19B801251P123	Metal film: 12K ohms ±5%, 1/10 w.
R501	19B801251P151	Metal film: 150 ohms ±5%, 1/10 w.
R502	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R504	19B801251P273	Metal film: 27K ohms ±5%, 1/10 w.
R505	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R506	19B801251P392	Metal film: 3.9K ohms ±5%, 1/10 w.
R507	19B801251P151	Metal film: 150 ohms ±5%, 1/10 w.
R508	19B801251P821	Metal film: 820 ohms ±5%, 1/10 w.
R509	19B801251P154	Metal film: 150K ohms ±5%, 1/10 w.
R510	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R511	19B801251P392	Metal film: 3.9K ohms ±5%, 1/10 w.
R512	19B801251P270	Metal film: 27 ohms ±5%, 1/10 w.
R513	19B801251P682	Metal film: 6.8K ohms ±5%, 1/10 w.
R514	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R601	19B801251P563	Metal film: 56K ohms ±5%, 1/10 w.
R602	19B801251P562	Metal film: 5.6K ohms ±5%, 1/10 w.
R603	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R604 and R605	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R606	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R607	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R608	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R609	19B801251P823	Metal film: 82K ohms ±5%, 1/10 w.
R612	19B801251P123	Metal film: 12K ohms ±5%, 1/10 w.
R613	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R614	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R615	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R616	19B801251P2R2	Metal film: 2.2 ohms ±5%, 1/10 w.
R617	19B801251P683	Metal film: 68K ohms ±5%, 1/10 w.
R618	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R619	19B800762P1	Variable, carbon film: 5K ohms ±20%, 150 VDCW, .1 w; sim to TOCOS RPR124.
R620	19B801350P1	Variable, 5 ohms to 10K ohms ±20%, 1/4 w.
R621	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R623	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R624	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R625	19B801251P683	Metal film: 68K ohms ±5%, 1/10 w.
R626 and R627	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R628	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R629	19B801251P393	Metal film: 39K ohms ±5%, 1/10 w.
R630	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R631	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R632	19B801251P272	Metal film: 2.7K ohms ±5%, 1/10 w.
R633	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R634	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R635	19B801251P334	Metal film: 330K ohms ±5%, 1/10 w.
R637	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R639	19A705813P1	Thermistor: sim to AL03006-624-73-G100.
R640	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R641	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R642	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.
R643	19B801251P124	Metal film: 120K ohms ±5%, 1/10 w.
R644	19B801251P334	Metal film: 330K ohms ±5%, 1/10 w.
R645	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R646	19B801251P393	Metal film: 39K ohms ±5%, 1/10 w.
R647 and R648	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R650	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R651	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R652	19B801251P124	Metal film: 120K ohms ±5%, 1/10 w.
R653	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R654	19B801251P334	Metal film: 330K ohms ±5%, 1/10 w.
R655 and R656	19B801251P154	Metal film: 150K ohms ±5%, 1/10 w.
R657	19B801251P683	Metal film: 68K ohms ±5%, 1/10 w.
R658	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R659	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R660	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R661	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R662 and R663	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R664	19B801251P334	Metal film: 330K ohms ±5%, 1/10 w.
R701 thru R704	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R705 thru R707	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R708 thru R715	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R716 and R717	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.
R718	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R719 thru R729	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R730	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R731	19B801251P333	Metal film: 33K ohms ±5%, 1/10 w.
R732 thru R734	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R735	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R736	19B801251P824	Metal film: 820K ohms ±5%, 1/10 w.
R737	19B801251P394	Metal film: 390K ohms ±5%, 1/10 w.
R738	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R739	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R740	19A702931P253	Metal film: 3480 ohms ±1%, 200 VDCW, 1/8 w.
R742	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R744	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R745	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R746 and R747	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R748	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
R749	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.
R750 and R751	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R752	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R753	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R754	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R755 and R756	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R801	19B801251P392	Metal film: 3.9K ohms ±5%, 1/10 w.
R802	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R803	19B801251P392	Metal film: 3.9K ohms ±5%, 1/10 w.
R804	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R805	19A702931P334	Metal film: 22.1K ohms ±1%, 200 VDCW, 1/8 w.
R806	19A702931P330	Metal film: 20K ohms ±1%, 200 VDCW, 1/8 w.
R807	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R808	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R810	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R811	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R812	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R813	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R815	19A702931P334	Metal film: 22.1K ohms ±1%, 200 VDCW, 1/8 w.
R816	19A702931P321	Metal film: 16.2K ohms ±1%, 200 VDCW, 1/8 w.
R817	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R818	19A702931P210	Metal film: 1240 ohms ±1%, 200 VDCW, 1/8 w.
R819	19A702931P347	Metal film: 30.1K ohms ±1%, 200 VDCW, 1/8 w.
R820	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R821	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R822	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R823	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.
R824	19B801251P182	Metal film: 1.8K ohms ±5%, 1/10 w.
R825	19B801251P334	Metal film: 330K ohms ±5%, 1/10 w.
		— — — — — SWITCHES — — —
S1		Part of R620.
S2	19A702244P1	Slide switch: DPDT, contact rating 1 mA @ 10 VDC; sim to Alps SSS02200.

T/R ASSEMBLY

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 the description of parts affected by these revisions.

REV. ATRANSMIT/RECEIVE BOARD 19D902468G2
Incorporated in the initial shipment.

REV. BTRANSMIT/RECEIVE BOARD 19D902468G2
To improve current capability of 5.4V regulator and increase sensitivity of Type 99 Decode; R650 was changed from 19B801251P104 to 19B801251P333, R659 was changed from 19B801251P104 to 19B801251P473, and R804 was changed from 19B801251P102 to 19B801251P471.

REV. CTRANSMIT/RECEIVE BOARD 19D902468G2
To incorporate smaller chip coils, eliminate need for milling of rear covers, improve TX conducted spurious output, and improve L.O. leaakage and RX sensitivity the following parts were changed or added.

Changed:
C127 from: 19A702236P44 to: 19A702061P77
C128 from: 19A702052P5 to: 19A702061P77
C131 from: 19A702236P17 to: 19A702236P19
C133 from: 19A702061P77 to: 19A702236P44

Added:
C146 19A702061P77
C147 19A702236P19
C148 19A702236P15
C149 19A702236P11
C150 19A702236P11
C151 19A702236P17
C152 19A702061P77

Changed:
D103 from: 19A700053P2 to: 19A700155P2
L112 from: 19A705470P7 to: 344A3289P5
L114 from: 19A705470P13 to: 344A3289P10
L115 from: 19A705470P17 to: 344A3289P10
L116 from: 19A705470P17 to: 344A3289P10

Added:
L117 344A3289P10

Changed:
R118 from: 19B801251P471 to: 19B801251P181
R119 from: 19B801251P471 to: 19B801251P181

Added:
R126 19B801251P151
R127 19B801251P151
R128 19B801251P560
R129 19B801251P102

Changed:
L401 from: 19A705470P30 to: 344A3289P22
C506 from: 19A702236P11 to: 19A702236P25
Z503 from: 19A702171P1 to: 19A702171P3
C621 from: 19A702052P5 to: 19A702052P6
C623 from: 19A702052P5 to: 19A702052P6
C625 from: 19A702061P73 to: 19A702052P5
R624 from: 19B801251P822 to: 19B801251P472
R625 from: 19B801251P184 to: 19B801251P683
R626 from: 19B801251P154 to: 19B801251P473
U601 from: 19A702293P2 to: 19A702293P3
U604 from: 19A702705P1 to: 19A702705P4
U605 from: 19A702293P2 to: 19A702293P3
R752 from: 19B801251P104 to: 19B801251P472

Added:
C813 19A705205P2

Changed:
R806 from: 19A702931P328 to: 19A702931P330
R816 from: 19A702931P315 to: 19A702931P321

REV. DTRANSMIT/RECEIVE BOARD 19D902468G2
To update software, U701 was changed from 19A704345P20 to 19A704345P21.

REV. ETRANSMIT/RECEIVE BOARD 19D902468G2
To improve TX conducted spurious output and improve L.O. leakage and RX sensitivity.

REV. FTRANSMIT/RECEIVE BOARD 19D902468G2
To improve new PWB layout, the 5.4V regulator circuit was changed to match the UHF version (preferred). The following components were changed, added, or deleted.

Changed:
C801 from: 19A702052P14 to: 19A702052P30
C802 from: 19A702061P73 to: 19A702061P69
R804 from: 19B801251P471 to: 19B801251P102
R818 from: 19A702931P315 to: 19A702931P210
R820 from: 19B801251P474 to: 19B801251P104

Added:
C813 19A705205P2
C814 19A705052P30
R823 19B801251P681
R824 19B801251P182
R825 19B801251P334

Deleted:
Q803 19A700076P2

REV. GTRANSMIT/RECEIVE BOARD 19D902468G2
To increase the microphone sensitivity in the MPI-II and improve Channel Guard performance in cold temperatures, the following component has been changed.
R311 from: 19B801251P274 to: 19B801251P474
R751 from: 19B801251P333 to: 19B801251P473
R650 was 19B801251P104

REV. HTRANSMIT/RECEIVE BOARD 19D902468G2
To make the MPI-II Radio comply with Canadian DOC requirements, the following changes or additions have been made.

Changed:
J5 from: 19A703248P14 to: 19A703248P20
J6 from: 19A703248P14 to: 19A703248P20
C143 from: 19A702236P15 to: 19A702236P11
C144 from: 19A702236P17 to: 19A702236P28
C148 from: 19A702236P15 to: 19A702236P6
C151 from: 19A702236P17 to: 19A702236P11
C809 from: 19A702052P26 to: 19A705205P12

Added:
C424 19A702236P13

REV. ATRANSMIT/RECEIVE BOARD 19D902468G1

REV. JTRANSMIT/RECEIVE BOARD 19D902468G2
To reduce differences between intrinsically safe and non-intrinsically safe MPI-II radios to only battery and FM label. To accomplish this C611 was changed from 19A703314P14 to 19A703314P15.

REV. BTRANSMIT/RECEIVE BOARD 19D902468G1

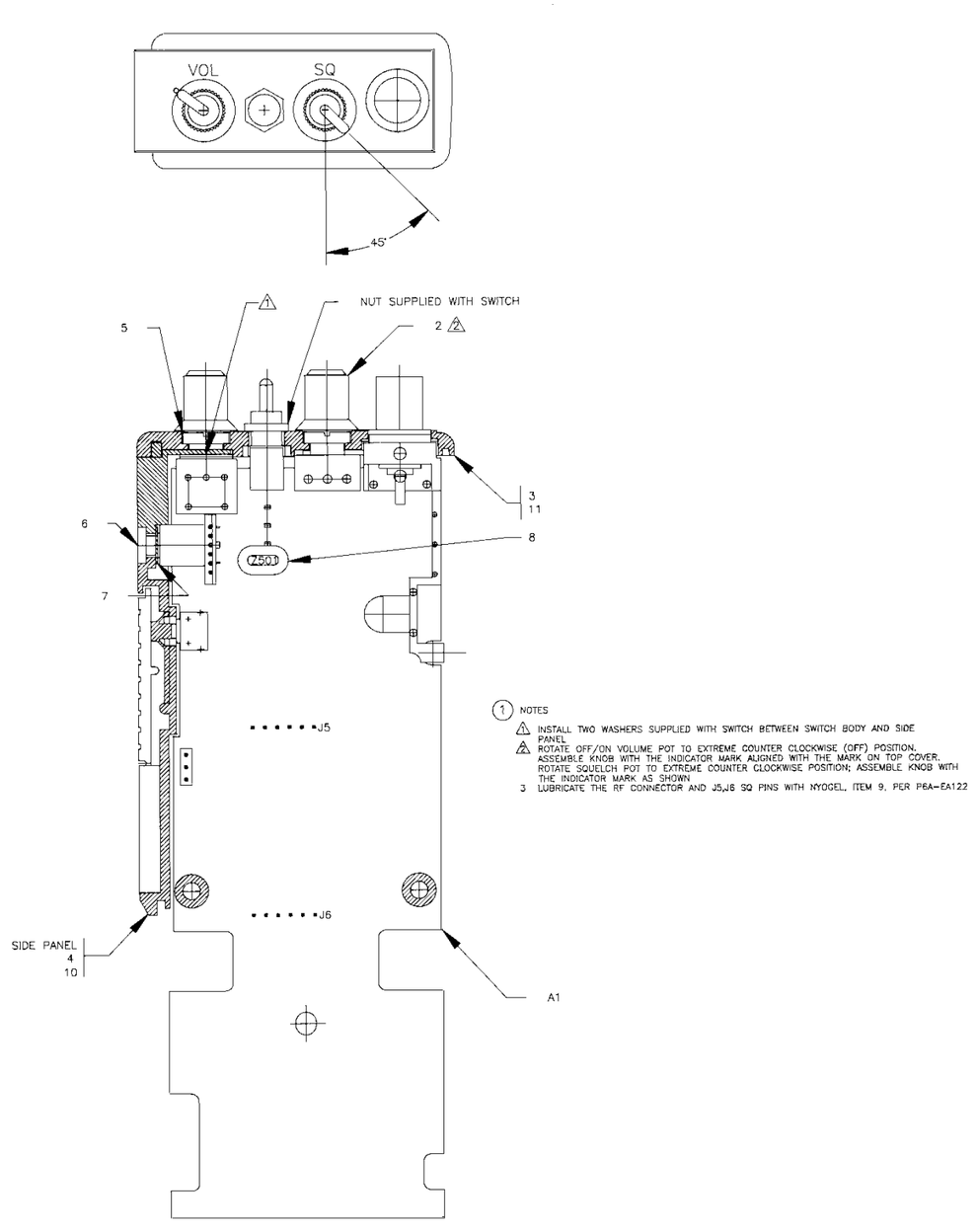
REV. KTRANSMIT/RECEIVE BOARD 19D902468G2
To reduce noise in the 5.4V regulator, the following changes have been made.

Deleted:
C804 19A705205P14

Changed:
C801 from: 19A702052P30 to: 19A702052P34
R823 from: 19B801251P681 to: 19B801251P101

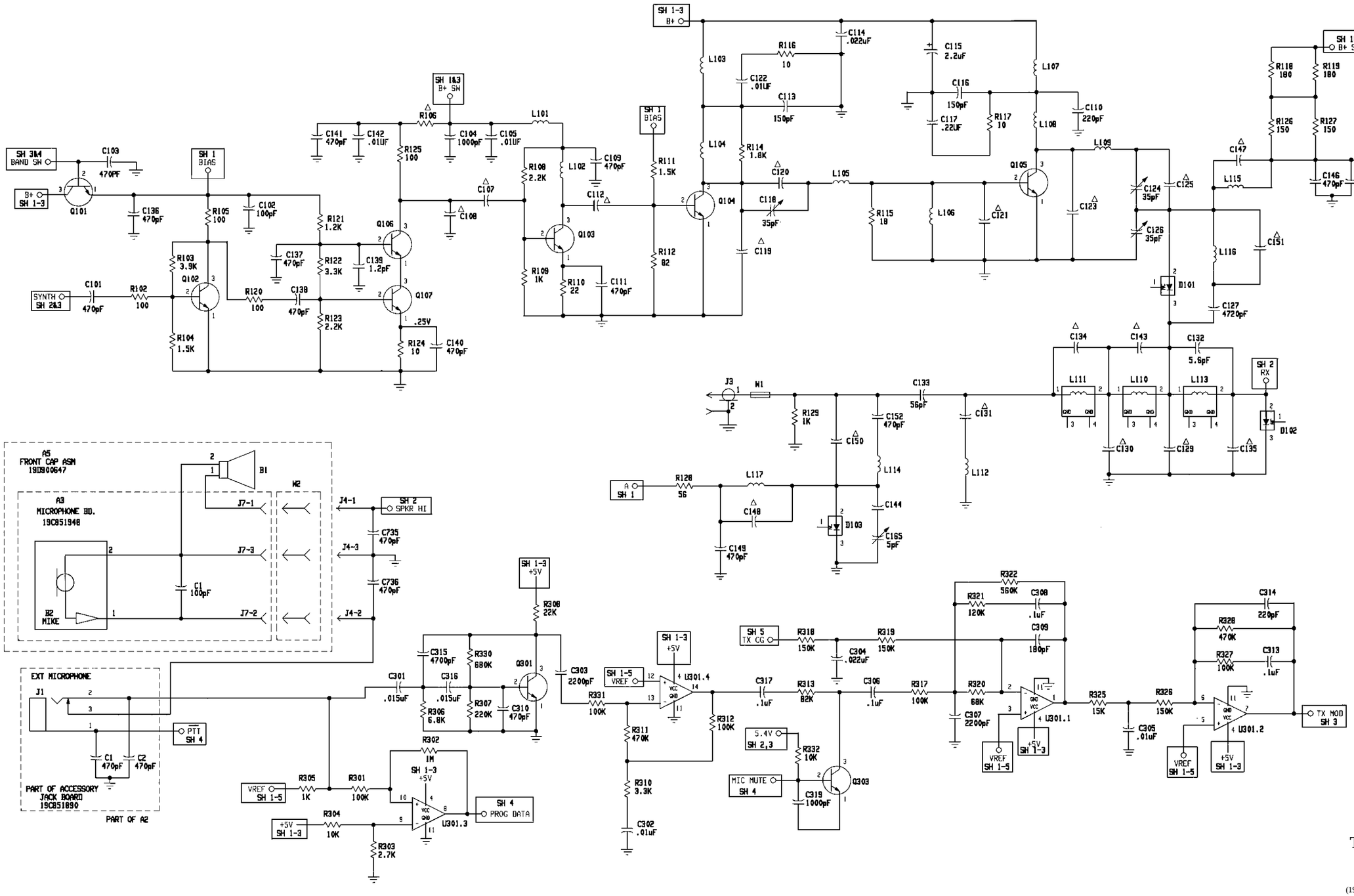
REV. CTRANSMIT/RECEIVE BOARD 19D902468G1

REV. LTRANSMIT/RECEIVE BOARD 19D902468G2
To update software to resolve T99 function bug which moved RX noise up after receipt of a call, U701 was changed from 19A704345P21 to 19A704345P22.



T/R ASSEMBLY
19D902727G2

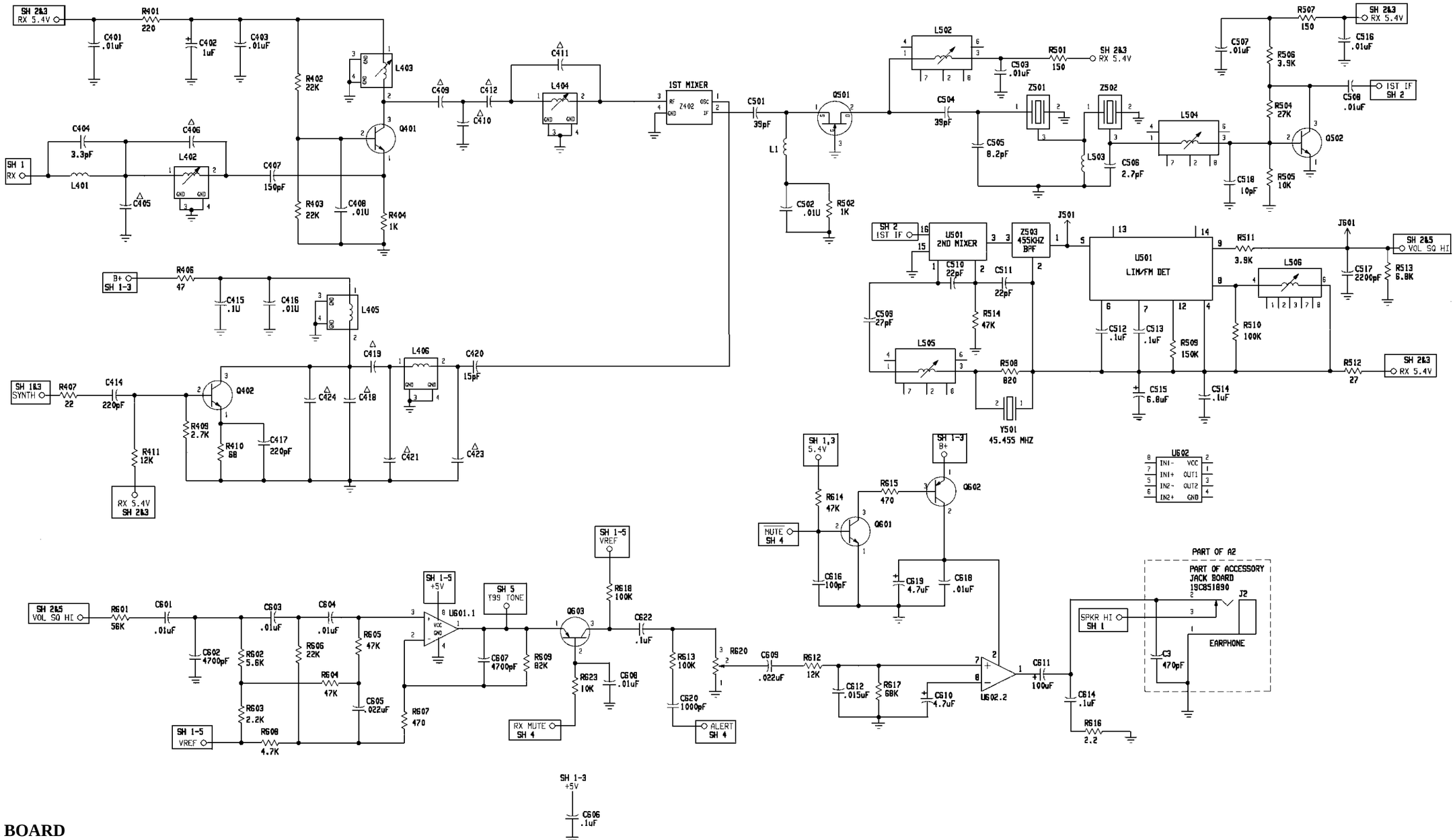
(19D902727, Sh. 1, Rev. 4)



T/R BOARD
19D902468G2

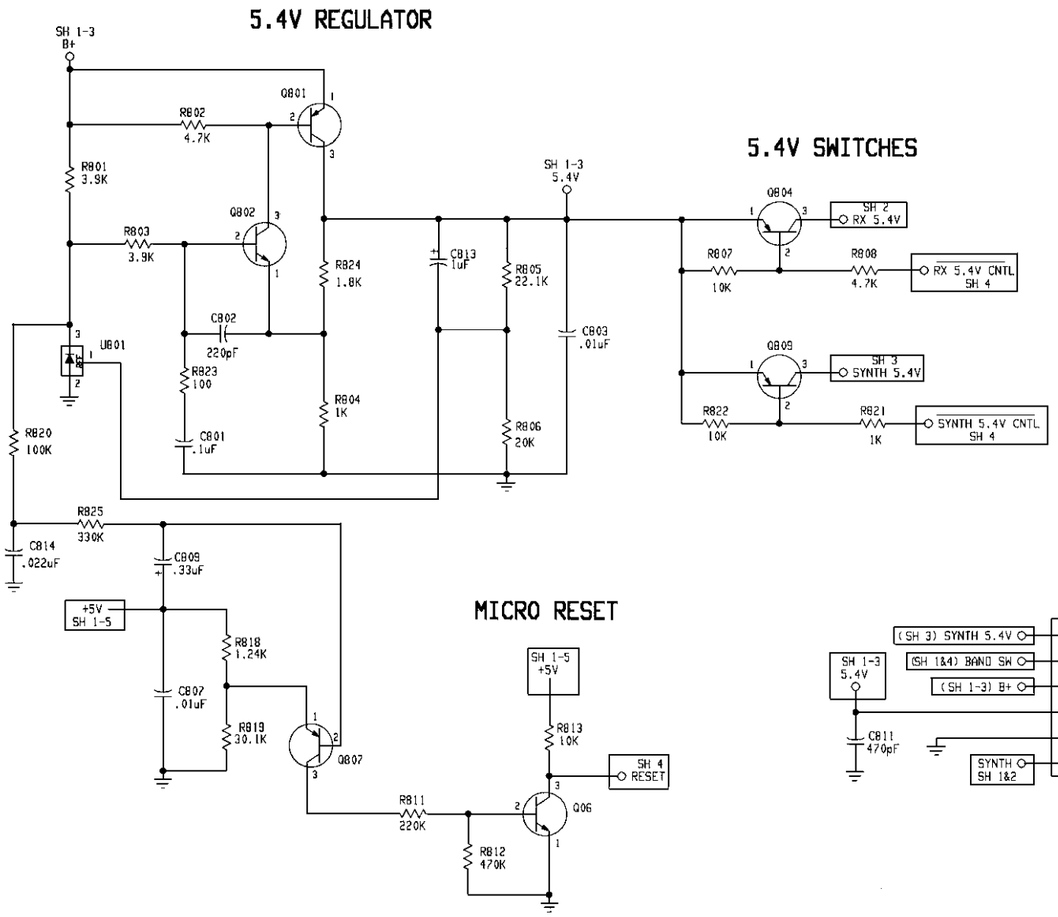
(19D902470, Sh. 1, Rev. 10)

T/R ASSEMBLY



T/R BOARD
19D902468G2

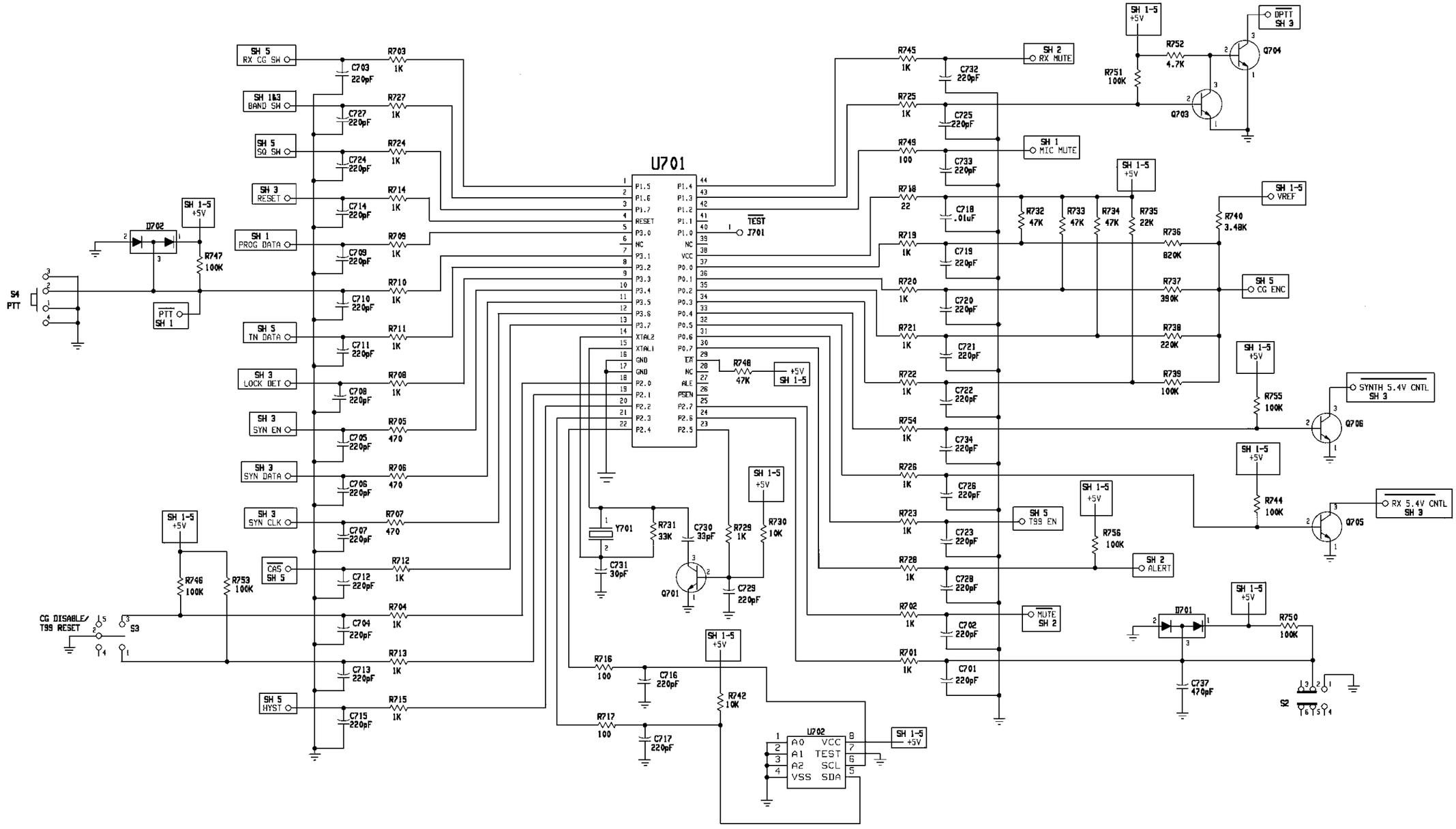
(19D902470, Sh. 2, R



Δ COMPONENT	GROUP 1 136-153 MHZ	GROUP 2 150-174 MHZ
C107	68P	56P
C108	3.3P	2.7P
C112	56P	47P
C119	56P	47P
C120	47P	22P
C121	100P	82P
C123	5.6P	4.7P
C125	27P	18P
C129	22P	18P
C130	22P	18P
C131	4.7P	5.6P
C134	6.8P	5.6P
C135	3.3P	2.7P
C143	3.3P	2.7P
C144	15P	12P
C147	6.8P	5.6P
C148	3.3P	1P
C150	3.3P	2.7P
C151	3.3P	2.7P
C405	8.2P	6.8P
C406	8.2P	5.6P
C409	6.8P	4.7P
C410	15P	10P
C411	8.2P	6.8P
C412	27P	18P
C418	10P	8.2P
C419	6.8P	5.6P
C421	39P	27P
C423	22P	15P
C424	4.7P	3.3P
R106	0	100

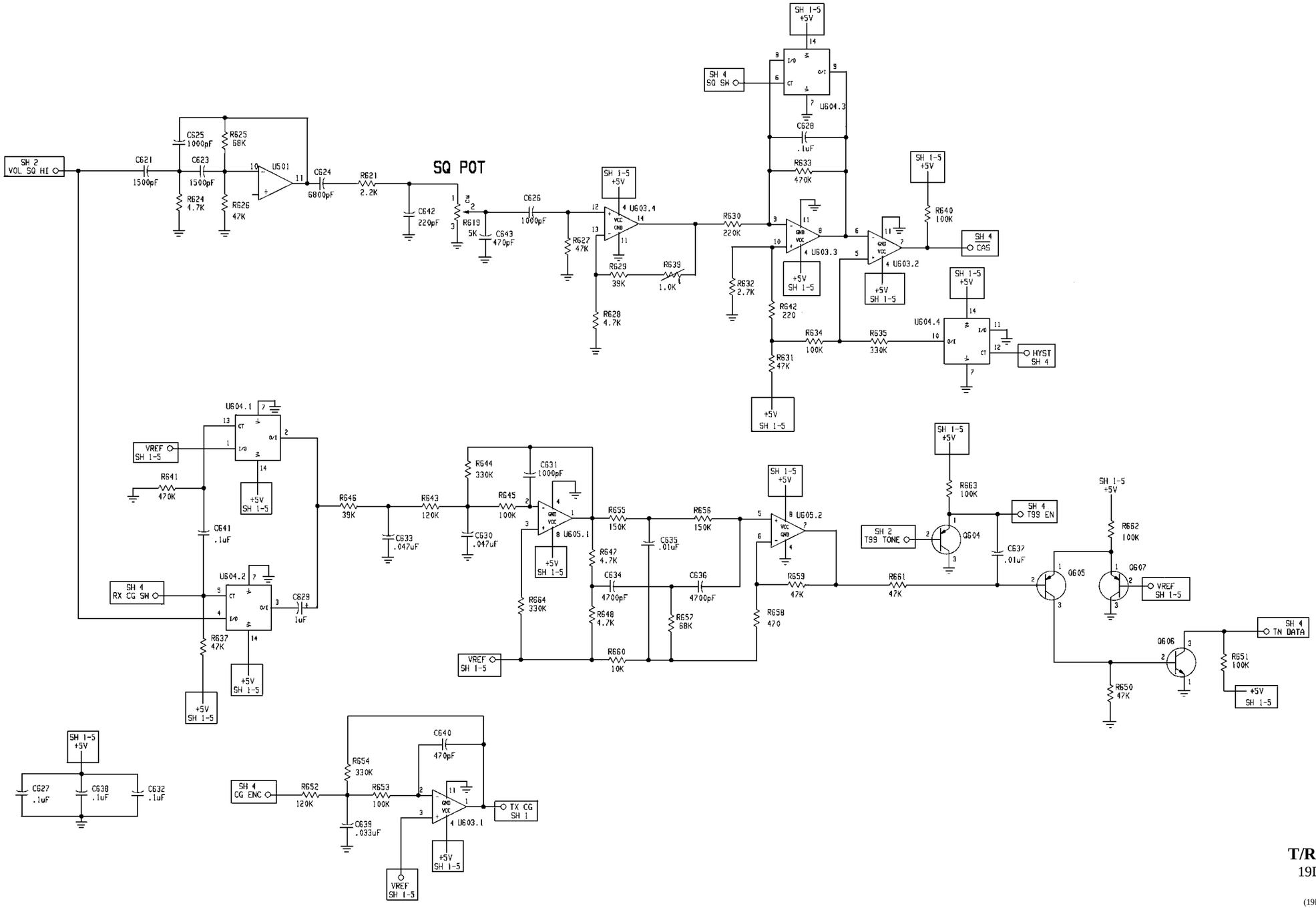
T/R BOARD
19D902468G2

(19D902470, Sh. 3, Rev. 9



T/R BOARD
19D902468G2

(19D902470, Sh. 4, Rev.



T/R BOARD
19D902468G2

(19D902470, Sh. 5, Re