

MAINTENANCE MANUAL

SYNTHESIZER/INTERCONNECT BOARD 19D900876G1, 2
(NARROWBAND)

TABLE OF CONTENTS

	<u>Page</u>
SPECIFICATIONS	Cover
DESCRIPTION	1
CIRCUIT ANALYSIS	2
OUTLINE DIAGRAM	7
SCHEMATIC DIAGRAM	9-12
PARTS LIST	13-15

DESCRIPTION

The Synthesizer/Interconnect board for the Phoenix S two-way radio is micro-computer controlled. A phase locked loop synthesizer generates the transmitter and receiver frequencies in a common voltage controlled oscillator (VCO). The frequency range is approximately 140-165 MHz (X3) for UHF and 150-174 MHz for high band. The microcomputer also controls the generation of Channel Guard tones and codes and provides the carrier control timer when in the transmit mode.

It contains interface circuitry for voltage protection and level shifting, an audio processor, a microcomputer, a frequency synthesizer, a microphone pre-amplifier, and an electrically erasable PROM (EE PROM). The EE PROM stores the binary data for the transmit and receive frequencies, Channel Guard tones and codes, and the CCT delay on a per channel basis. A block diagram of the Synthesizer/Interconnect board is shown in Figure 1.

NOTE

The EE PROM provides the user with the capability to re-program the EE PROM to meet changing individual system requirements.

Programming information for the EE PROM is included in the instruction manual for the Programmer.

In addition to providing the normal radio functions, the microcomputer has the ability to execute a maintenance

diagnostic instruction set to aid in troubleshooting the radio. Further details are included in the Service Section of this manual.

CIRCUIT ANALYSIS

CHANNEL SELECT

Frequency selection is controlled by channel select switch S1. When pressed, A- is applied to microcomputer U801-32 (P15 = port 1 bit 5), causing the microcomputer to advance through the selected channels at the rate of 3 Hz until the switch is released. If the switch is pressed for less than 650 ms the channel selected is advanced by one. After the channel displayed reaches 8 it will automatically roll over and the next channel displayed will be 1.

Once the switch is released, the microcomputer applies +5 VDC to the EE PROM through Q802. The frequency bit code corresponding to the channel displayed is then loaded into the synthesizer. If the channel select switch is pressed while the transmitter is keyed, the microcomputer will unkey the transmitter until the channel select switch is released.

The channel select switch is not provided in single frequency or two frequency radios; however a REPEAT/DIRECT switch on two frequency radios (located on the Tx/Rx board) allows selection of either the repeated path or the direct path for communications.

MODE A/B

The Mode A/B switch doubles the channel selection capability of the radio.

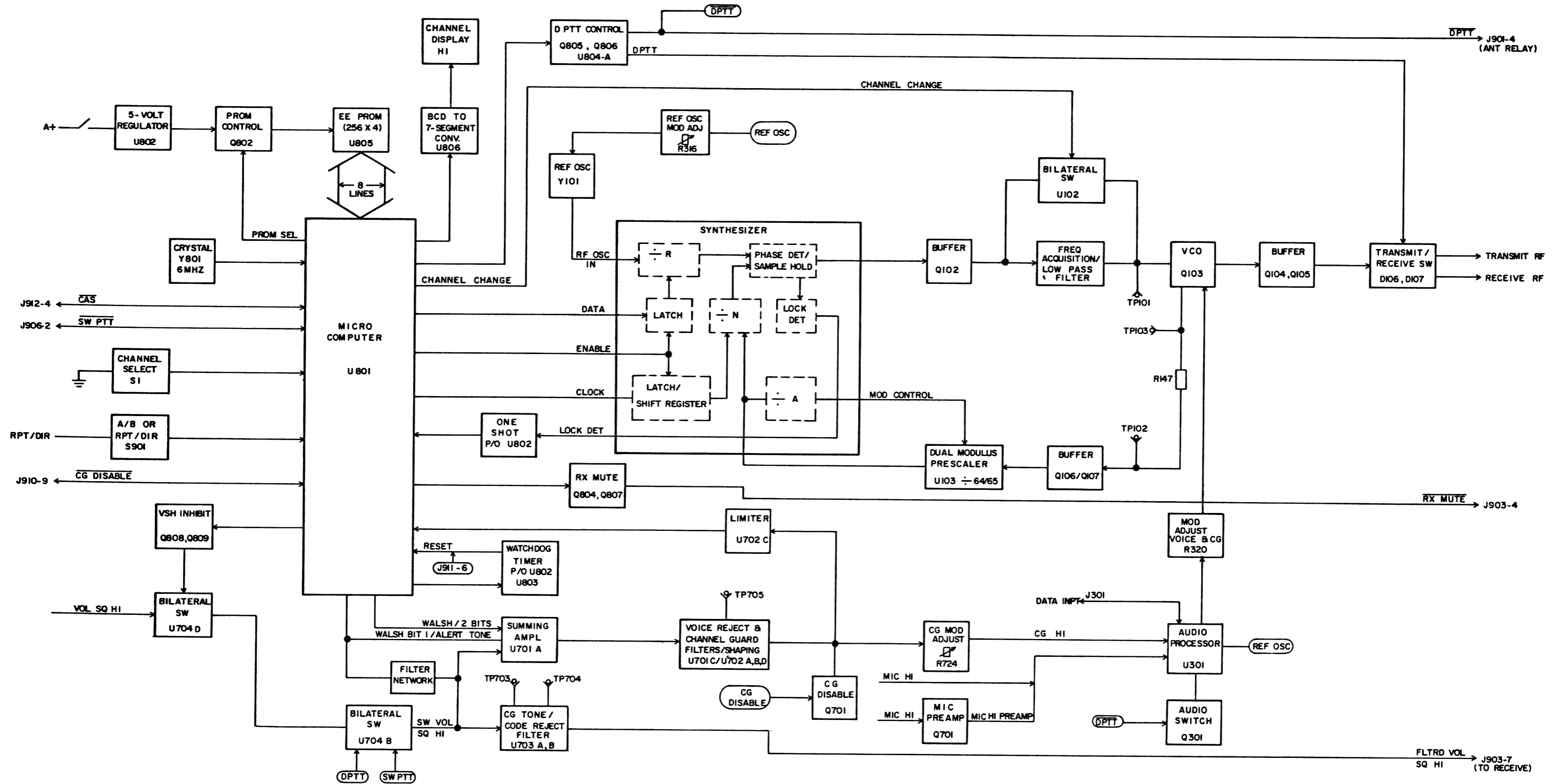


Figure 1 - Block Diagram

Eight address locations are used in the EE PROM for each transmit and receive frequency. The display is capable of displaying channels one through eight. By operating the A/B pushbutton switch the user can select two independent transmit and receive frequencies per channel displayed, providing the radio with up to 16 independent transmit and receive frequencies.

Channel frequencies may be selectively programmed so that repeater talk-around capability can be provided.

In single frequency radios the MODE A/B switch is not provided. When this condition exists R914 holds the MODE A/B input to the microcomputer low, preventing it from selecting any other channel. In two frequency radios with MODE A/B switch, the level of the MODE A/B input is controlled by the MODE A/B switch located on the transmit/receive board.

MICROCOMPUTER CONTROL SYSTEM

The microcomputer responds to the manually initiated functions of Push-to-talk, Channel Select, A/B and Repeat/Direct. All other operations occur automatically and are controlled by the microcomputer.

When the PTT switch is pressed A- is applied to microcomputer U801-38 from J911-2. The microcomputer immediately mutes the receiver by turning on Q807 which provides a low level to J903-4 to mute the receiver. The microcomputer then delays 10 milliseconds before loading the synthesizer with the transmit bit code. This allows the audio amplifier to be turned off before the synthesizer frequency is changed. After this delay the microcomputer turns on PROM controller Q802, applying +5V to EE PROM U805. The transmit bit code is then loaded serially into the frequency synthesizer over the clock and data input lines.

Once the bit stream is loaded into the synthesizer an enable pulse and a 10 millisecond channel change pulse is provided to allow the synthesizer to generate the correct RF frequency. The microcomputer immediately begins monitoring the LOCK DET line to verify that the synthesizer is 'on' frequency. If the synthesizer is not locked on the correct frequency negative pulses will be present on the LOCK DET line and the microcomputer will reload the synthesizer in an attempt to lock it on frequency. If the synthesizer is locked on the correct frequency, the microcomputer will key the transmitter by pulling the input line to inverter U804A low. This allows the output of U804A to rise to +8.5 VDC, forward biasing transmit select diode D106, permitting the synthesizer generated RF

frequency to pass through to the exciter through P151. Typical attack time of the transmitter is 50 milliseconds.

At the same time audio switch Q301 is also turned off, removing the 'short' from amplifier U301A and enabling the audio processor.

WATCHDOG TIMER

The watchdog timer consisting of reset switch Q803 and P/O U802 clock timer monitors the operation of the microcomputer and generates a reset pulse in the abnormal condition that the microprocessor gets lost or does not execute the software properly.

When the microcomputer is operating properly, reset pulses from U801-35 are applied to the base of reset switch Q803 through delay network R836 and C305. Q803 turns on, grounding the clock timer input which, in turn, holds the microcomputer RESET input high.

When the microcomputer is not functioning properly, the reset pulses will not be present. Q803 will turn off and the timer will generate a square wave to reset the microcomputer.

FREQUENCY SYNTHESIZER

The frequency synthesizer generates the transmit and receive frequencies for all channels under control of the microcomputer. The frequency synthesizer consists of a reference oscillator Y101, synthesizer IC U101, bilateral switch U102, low pass filter, VCO -Q103, buffers -Q106, -Q107, and -Q102, and a high speed dual modulus counter.

Reference Oscillator

The reference oscillator consists of Y101, a junction FET Q101, varicap D101, tuned coil L101, and associated circuitry. The 5 PPM Colpitts oscillator operates at a frequency of 13.2 MHz. Voltage is provided by the 8.5V continuous supply. A temperature compensation network consisting of R101 thru R106, provide a temperature compensated voltage to varicap D101 to maintain the correct frequency. The temperature compensator, utilizing an inverse DC S-curve output characteristic, varies the output voltage to the varicap as a function of temperature. The temperature compensation network maintains frequency over a temperature range of -30°C to +60°C (-22°F to +140°F). The varicap is also used to modulate the oscillator.

Diode D108 produces a negative DC level at the gate of FET Q101 depending on the amplitude of the oscillators.

This, in effect, produces a negative feedback, RF to DC, and prevents the oscillator from going into limiting. Slug tuned coil L101 sets the frequency of the oscillator. Modulation voltage for the reference oscillator is adjusted by R316 in the audio processor and applied to varicap D101 through C101 and R109. R316 adjusts the deviation and is set for a deviation of 2 kHz.

The synthesizer contains three dividers, a phase detector, two shift registers, and a lock detect circuit. When the PTT switch is pressed (transmit), released (receive), or a different channel selected, new frequency data is received on the clock, data, and enable lines and the synthesizer immediately begins generating the new RF frequency. This serial data determines the VCO frequency by setting the dividers. The reference oscillator frequency applied to the programmable divide by R counter is divided down to some lower frequency as indicated by the input data and applied to the internal phase detector.

The phase detector compares this signal with the output of the internal $\div N$ counter. The output of the $\div N$ counter is a function of the RF frequency which is divided down by the dual modulus prescaler and the $\div N$ counter. When operating on the correct frequency the inputs to the phase detector are identical and the output voltage of the phase detector is constant. Under these conditions, the VCO is stabilized or locked on frequency. If the compared frequencies (phases) differ a \pm error voltage is generated and applied to Q102. This error voltage is supplied to the VCO through the frequency acquisition circuit and low pass filter. The capacitance of varicaps D102 and D103 vary in accordance with the applied error voltage thereby resetting the VCO to the correct frequency. Capacitor C116 is a holding capacitor to store the 'hold' voltage for the phase detector/sample and hold circuit. C117 is a ramp capacitor which also is part of the sample and hold circuit.

The lock detect line provides lock status information to the microcomputer.

Acquisition and Low Pass Filter

The output of the synthesizer is applied through buffer Q102 to the low pass filter. The low pass filter consisting of R118-R120, and C119-C121 eliminates undesired pulses on the VDO error control line to provide a constant DC level to frequency determining varicaps D102 and D103.

When a channel change pulse is received bilateral switch U102 is turned on to bypass the low pass filter effectively increasing the bandwidth and decreasing

channel acquisition time. The channel change pulse is 10 milliseconds wide.

Voltage Controlled Oscillator VCO

The VCO is a wide range JFET oscillator with an operating range of 150-175 MHz. It consists of Q103, L104, L105, C126-C129, and D102 and D103. VCO frequency is controlled by an error control voltage from the synthesizer and varicaps D102 and D103. Frequency range centering is provided by L104. L104 is set for 6.5V or the highest tunable voltage up to 6.5V as measured at TP101 on the highest VCO operating frequency. Audio modulation is provided by the audio processor and applied to the VCO through C122, D104 and C125.

The output of the VCO is taken from the source of Q103 and applied in parallel to RF output buffers Q104 and Q105 and to feedback buffers Q106 and Q107. The RF output buffers provide drive for receiver injection and the transmitter exciter. A transmit/receive PIN diode switch, D106 and D107, directs the RF output to the transmitter or receiver. The switch is controlled by the DPTT signal from the microcomputer. When DPTT is high, RF is fed to the transmitter and to the receiver when DPTT is low.

Dual Modulus Counter

The VCO frequency is fed back to dual modulus counter, U103, through buffers Q107 and Q106. The counter divides the VCO frequency by 64 or by 65 depending on the status of the modulus control line. The divided down reference frequency is 4.16 kHz for radios operating in the 450-470 MHz band and 5.0 kHz when operating in the 150-174 MHz band.

The output of the dual modulus counter is applied to the $\div N$ counter in the synthesizer. It is then divided down and compared in frequency and phase with the divided down frequency from the reference oscillator. The $\div N$ count is set by the microcomputer.

MICROPHONE PREAMPLIFIER

A preamplifier stage (Q701 and associated circuitry) is provided for the standard electret microphone without a built-in preamplifier.

With this microphone, MIC HI is coupled through J911-5 to the preamplifier stage. The amplified output is coupled through C312 and R301 to the audio processor.

For optional microphones with a built-in preamplifier, audio is coupled through J911-4, bypassing MIC PRE AMP Q701.

Audio Processor

The audio processor provides audio pre-emphasis with amplitude limiting and post limiter filtering. A total gain of approximately 24 dB is realized through the audio processor. 20 dB is provided by U301 and 4 dB by U301A.

The 8.5 Volt regulator powers the audio processor and applies regulated +8.5V through J903-2 to a voltage divider consisting of R306 through R309. The +4.25V output from the voltage divider establishes the operating reference point for both operational amplifiers. C305 provides an AC ground at the summing input of both operational amplifiers.

Audio direct from the microphone is coupled to the audio processor through C313 and R302 to the input of operational amplifier U301B-6.

When the input signal to U301B-6 is of a magnitude such that the amplifier output at J301B-7 does not exceed 4 volts P-P, the amplifier provides a nominal 20 dB gain. When the audio signal level exceeds 4 volts peak-to-peak, diodes D301 and D302 conduct on the positive and negative half cycles providing 100% negative feedback to reduce the amplifier gain to 1. This limits the audio amplitude at U301B-7 to 5 volts peak-to-peak.

Resistors R303, R304, R305, and capacitor C302 comprise the audio pre-emphasis network that enhances the signal to noise ratio. R304 and C302 control the pre-emphasis curve below limiting. R305 and C302 control the cut-off point for high frequency pre-emphasis. As high frequencies are attenuated, the gain of U301B is increased.

The amplified output of U301B is coupled through C307, R313 and R314 to a second operational amplifier U307A.

The Channel Guard tone and data inputs are applied to U301A-2. The CG tone (or data) is then combined with the microphone audio.

A post limiter filter consisting of R314, R313, R315, C308 and C309 provide 12 dB per octave roll-off. R313 and C307 provide an additional 6 dB per octave roll-off for a total of 18 dB.

SERVICE NOTE

R313-R315 are 1% resistors. This tolerance must be maintained to assure proper operation of the post limiter filter. Use exact replacements.

The audio processor output is coupled through J302 to the transmitter. R316 and R320 are output level adjustment controls to set the modulation sensitivity for the VCO and reference oscillator.

Shorting switch Q301 is turned on in the receive mode (DPTT is high) to short out U301-A and prevent any interference from the transmit audio circuits.

CHANNEL GUARD

Channel Guard provides a means of restricting calls to specific radios through the use of a continuous tone coded squelch system (CTCSS) or a digitally coded system (CDCSS). Tone frequencies range from 71.9Hz to 210.7 Hz. There are 83 standard programmable digital codes. These codes and frequencies are listed in the Channel Guard Programmers Manual.

The microcomputer selects the assigned code/tone information from the EE PROM memory for each channel, transmit and receive, and generates the Channel Guard signal. This signal is applied as Walsh Bit 1 and 2 to summing amplifier U701A. These two bits are summed together and filtered to provide a smooth sine wave for tone Channel Guard.

The switched volume/squelch Hi signal to the summing amplifier is controlled by bilateral switches U704B and C. In the encode mode DPTT is high applying A- from U704C-8 to the control input of U704B, turning it off and preventing any input from the SW Vol/Sq Hi line from interfering with the encoding signal.

The output of summing amplifier U701A is applied to buffer/amplifier U702B through a two-pole active voice reject filter consisting of U701B and C and U702A and D. The active filter shunts all frequencies above 300 Hz to ground, thereby preventing those frequencies from interfering with the encoded signal. The output of U702B is the assigned CG tone or digital signal. This signal is applied to the audio processor through CG deviation control R724. Channel Guard deviation is set for 0.75 kHz.

CG Decode

In the decode mode DPTT is low, U704C is turned off and audio from the SW Vol/Sq Hi line is applied to the summing amplifier U701A through bilateral switch U704B. This signal is amplified and filtered by U701A, B, C and U702A, B and D, so that only the CG signal (if present) is applied to hard limiter U702C. The CG signal is squared up for comparison by the microcomputer to determine if the CG signal is correct. If the microcomputer

determines the CG signal to be correct, RX Mute transistor Q804 is turned on (Q807 is turned off), applying +5 VDC to the RX MUTE line to open the receiver.

CHANNEL GUARD (CG) DISABLE

The CG DIS line has a double function. It can disable the encode or the decode CG function. The encode disable function is controlled by the PTT switch while the decode function is disabled within the microcomputer software. To disable the decoder, the CG DIS SER CLK line should be grounded. The microcomputer will detect that the line is low, and pull RX MUTE high. The decode filter/limiter circuit is not affected, it continues to operate. The detection software also does not stop working. This allows the off hook STE to function. When the CG DIS line is pulled high (>8.5V), the microcomputer does not sense any changes. It is buffered by protection diode D810. Channel Guard disable transistor Q701 will turn on when the CG DIS line goes above 8.5 V and shorts the output of the filter to ground. This will prevent any signal from going out on CG HI and will also disable the decoder since no limited CG tone will go to the microcomputer. The receiver will be muted since no CG is decoded. Disabling the decoder this way will never allow the audio to open up, while taking the radio off hook (pulling CG DIS low) will always make the radio open up. Turning CG Disable transistor Q701 on causes the DC bias to change. It will take 2 or 3 seconds for the bias to restore itself after the encoder is disabled.

SQUELCH TAIL ELIMINATION (STE)

STE eliminates squelch tails when the radio is on hook or off hook. When Channel Guard is disabled (off hook) the decoder is still looking at the received signal. The RX MUTE line is high, as would be normally expected. The Channel Guard decoder is looking for the STE burst (phase reversal in tone Channel Guard, STE tone in Digital Channel Guard.) If an STE burst is detected, the RX MUTE line will go low for about 200 ms. This will prevent the squelch tail from being heard. After 200 ms, the RX

MUTE line will go high again; by now the transmission has ended and the squelch will hold the audio closed. The off hook STE does not affect the operation of the Channel Guard while on hook. Another way of looking at it: the radio will go quiet for 200 ms any time STE is detected. If it was on hook it will stay quiet after the 200 ms, if it was off hook it will revert to noise squelch operation.

Data Polarity Inversion

In some instances it is necessary to invert the polarity of the digital Channel Guard signal to enhance system compatibility. Inverted polarity normally results in a wrong code or one that cannot be used. When this occurs, restrap jumper cable W701 connected between HL70 and HL69 to HL70 and HL66.

CARRIER CONTROL TIMER

The Carrier Control Timer (CCT) is contained within and controlled by the microcomputer. Each time the PTT switch is activated an internal counter begins to count down. If the counter times out, the transmitter is unkeyed and a 100 mV rms 1 kHz tone is sounded until the microphone is unkeyed. The CCT is set for 1 minute.

CHANNEL MEMORY

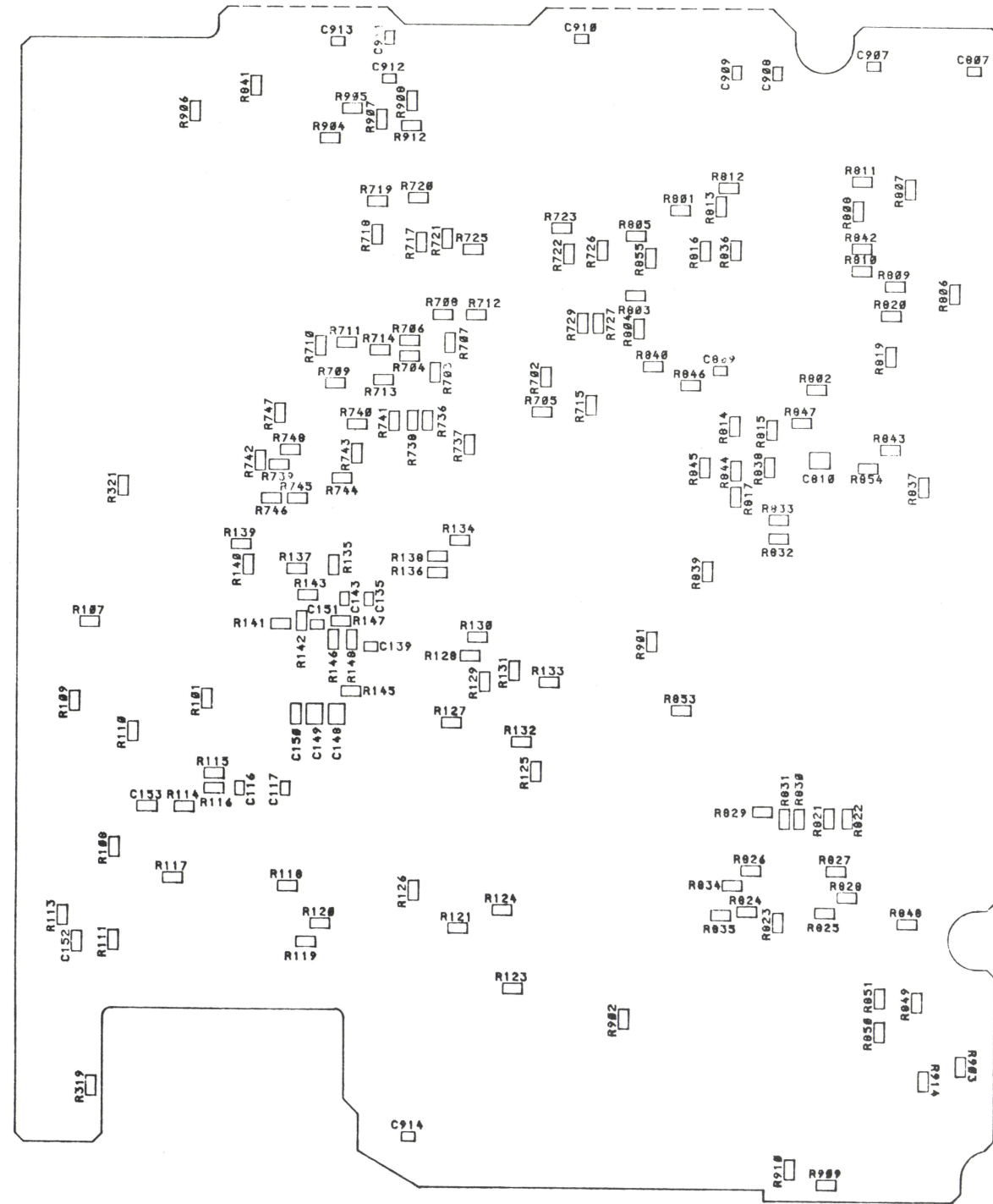
Channel memory allows channel selection and display at any time. It is not dependent upon switched A+ (ignition turn on). Channel memory is enabled by removing W801 and adding insulated DA jumper from H63 to H64 - all on the interconnect/synthesizer board.

CHANNEL BUSY

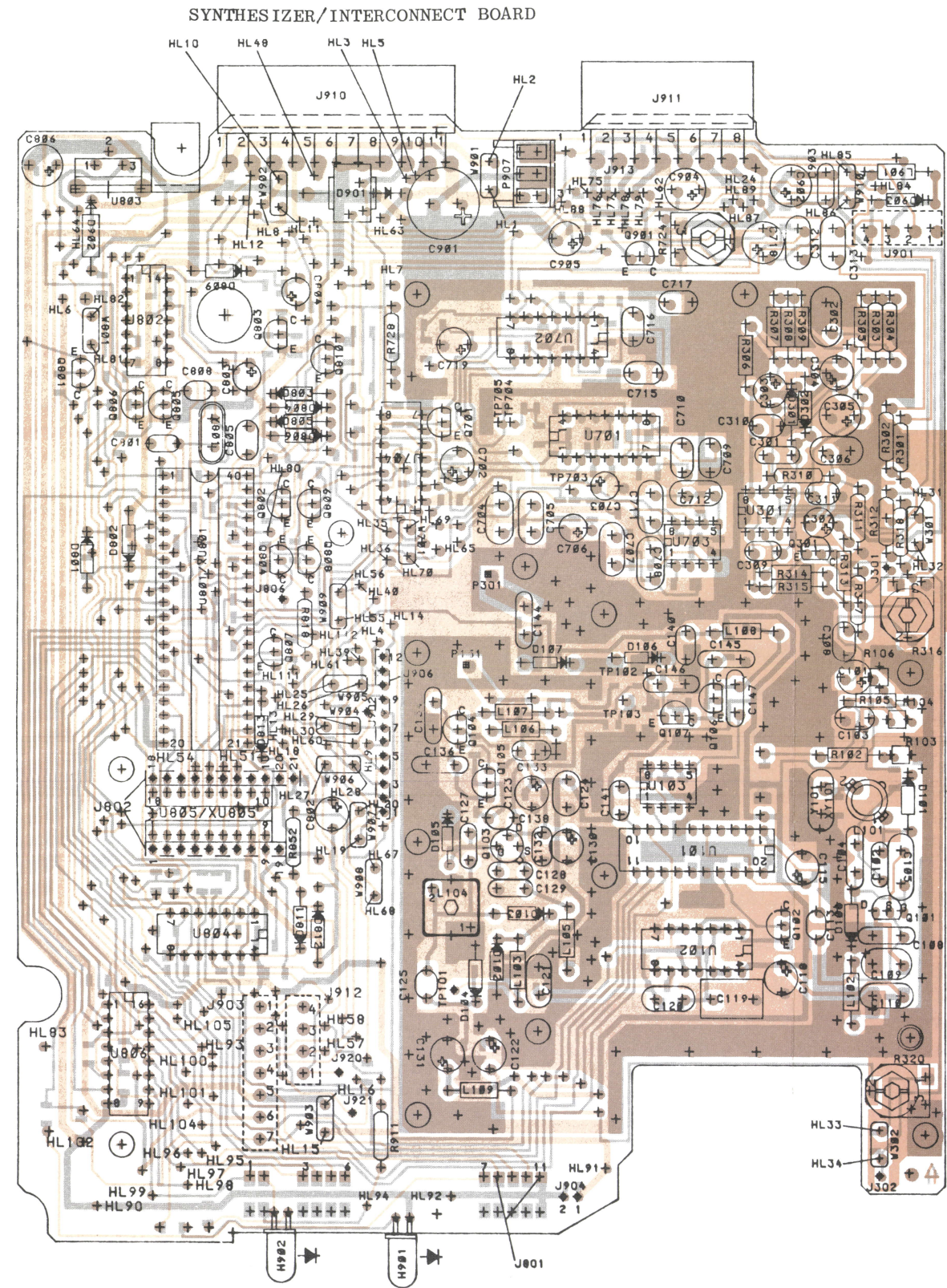
The channel busy function provides a visual indication when the selected channel is in use. A- is applied to H902 cathode through current limiting resistor R910. When the carrier activity sensor detects a carrier, Q602 on the receiver board turns on and applies 8.5 V cont to H902 anode through J912-3 and R911, causing it to light.

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

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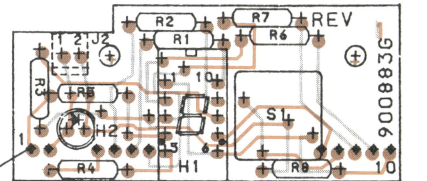


(19D900876, Rev. 3)



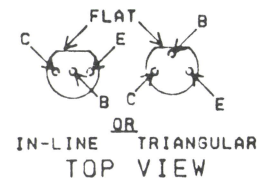
(19D900907, Rev. 4)
 (19A703009, Sh. 1, Rev. 4)
 (19A703009, Sh. 2, Rev. 4)

DISPLAY BOARD

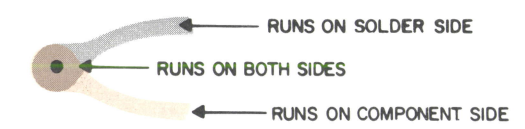


(19D900903, Rev. 2)
 (19A703023, Sh. 1, Rev. 1)
 (19A703023, Sh. 2, Rev. 1)

LEAD IDENTIFICATION FOR:
 Q102, Q104-Q107, Q301, Q701,
 Q801-Q810, AND Q901



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



OUTLINE DIAGRAMS

SYNTHESIZER/INTERCONNECT AND DISPLAY BOARD

TABLE OF CONTENTS

SHEET

NOTES AND CHARTS-----1

SYSTEM-----2

<u>FUNCTION</u>	<u>CPNT SERIES</u>
SYSTEM	900

SYSTEM-----3

<u>FUNCTION</u>	<u>CPNT SERIES</u>
MICROCOMPUTER CONTROL	800
MULTI FREQ DISPLAY	A901

SYNTHESIZER-----4

<u>FUNCTION</u>	<u>CPNT SERIES</u>
SYNTHESIZER	100
TX AUDIO PROCESSOR	300

CHANNEL GUARD-----5

<u>FUNCTION</u>	<u>CPNT SERIES</u>
CHANNEL GUARD	700

NOTES:

- 1. FOR T99 DECODER, ADD JUMPERS HL7 TO HL9, HL12 TO HL14, HL39 TO HL40, HL48 TO HL60. OMIT JUMPERS W905, W909, W908.
- 2. FOR PUBLIC ADDRESS OPTION, ADD JUMPERS HL60 TO HL48, HL3 TO HL4, HL8 TO HL9, HL12 TO HL14. OMIT JUMPERS W902, W906, W904, W908. MIC WITHOUT AMP REQUIRES HL61 TO HL62 JUMPER AND DELETE W905.
- 3. FOR CHANNEL MEMORY (200MA CONTINUOUS BATTERY DRAIN) ADD INSULATED JUMPER HL63 TO HL64 AND OMIT W801.
- 4. FOR IGNITION SWITCH CONTROL, REMOVE JUMPER W901.
- 5. FOR SPEAKER MUTE FUNCTION WITH THE UNIVERSAL TONE CABLE OPTION, OMIT JUMPER W903. ADD JUMPER HL5 TO HL6 (EXCEPT WITH PA OPTION).
- 6. FOR EXTERNAL SPEAKER OPTION, REMOVE JUMPER W903 TO DISABLE THE INTERNAL SPEAKER.
- 7. CUT OUT W301 AND W302 FOR UHF.
- 8. PRESENT FOR UNITS WITHOUT A901.
- 9. FOR MASKED VERSION OF U801, ADD JUMPER FROM HL111 TO HL112.
- 10. PWB HAS PROVISION FOR MOUNTING COMPONENTS SHOWN DASHED.
- 11. # DENOTES CHIP COMPONENTS (EXAMPLE R1#) WHICH ARE LOCATED ON SOLDER SIDE OF PWB.
- 12. \perp DENOTES A- COMMON TO CHASSIS.
- 13. TO INVERT DIGITAL CHANNEL GUARD DECODE POLARITY, REMOVE W701 AND ADD A JUMPER FROM HL66 TO HL65.
- 14. FOR INTERNAL/EXTERNAL SPEAKER OPTION WITH SWITCH (EXTERNAL TO RADIO) DELETE W903 AND ADD JUMPER HL5 TO HL6.
- 15. WHEN T99 OPTION OR PUBLIC ADDRESS OPTION ARE PRESENT WITH MULTI-FREQ DISPLAY, REMOVE R911 AND R8.

DEVICE	5V PIN NO	GND PIN NO	0.5V CONT PIN NO	0.5V SYN PIN NO
U102		7		14
U301		4	8	
U701		11, 12, 13	4	
U702		11	4	
U703		4	8	
U704		7	14	
U804	14	7		

ALL CHIP RESISTORS ARE 1/8 WATT.
 ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
 RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER k OR M.
 CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER μ , n OR p.
 INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m, n OR μ .

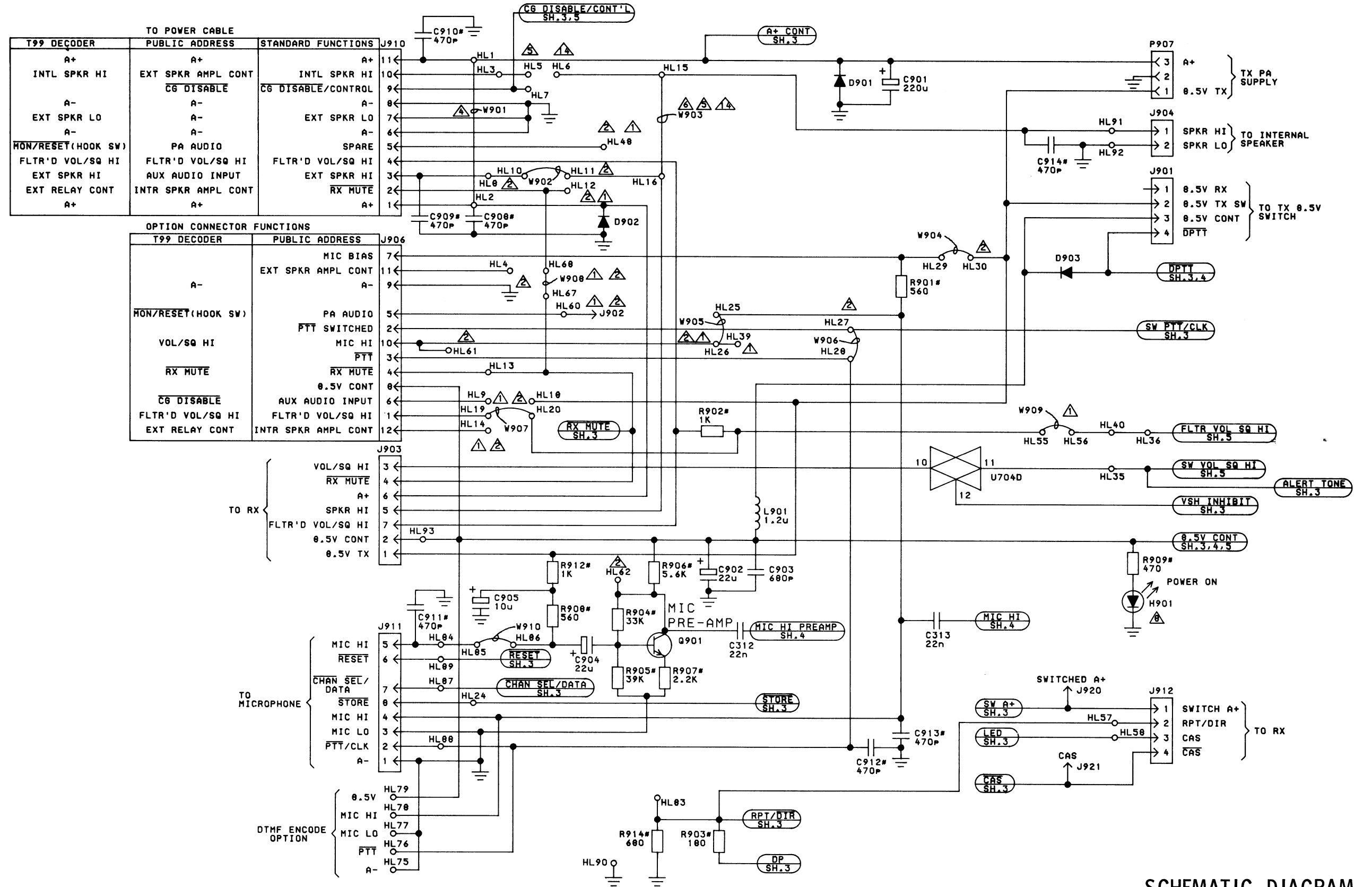
MODEL NO.	REV. LETTER
19D900876G1	D
19D900883G1	A

SPARE IC FUNCTION

DEVICE	INPUT PIN NO.	OUTPUT PIN NO.
U701-D	12, 13	14

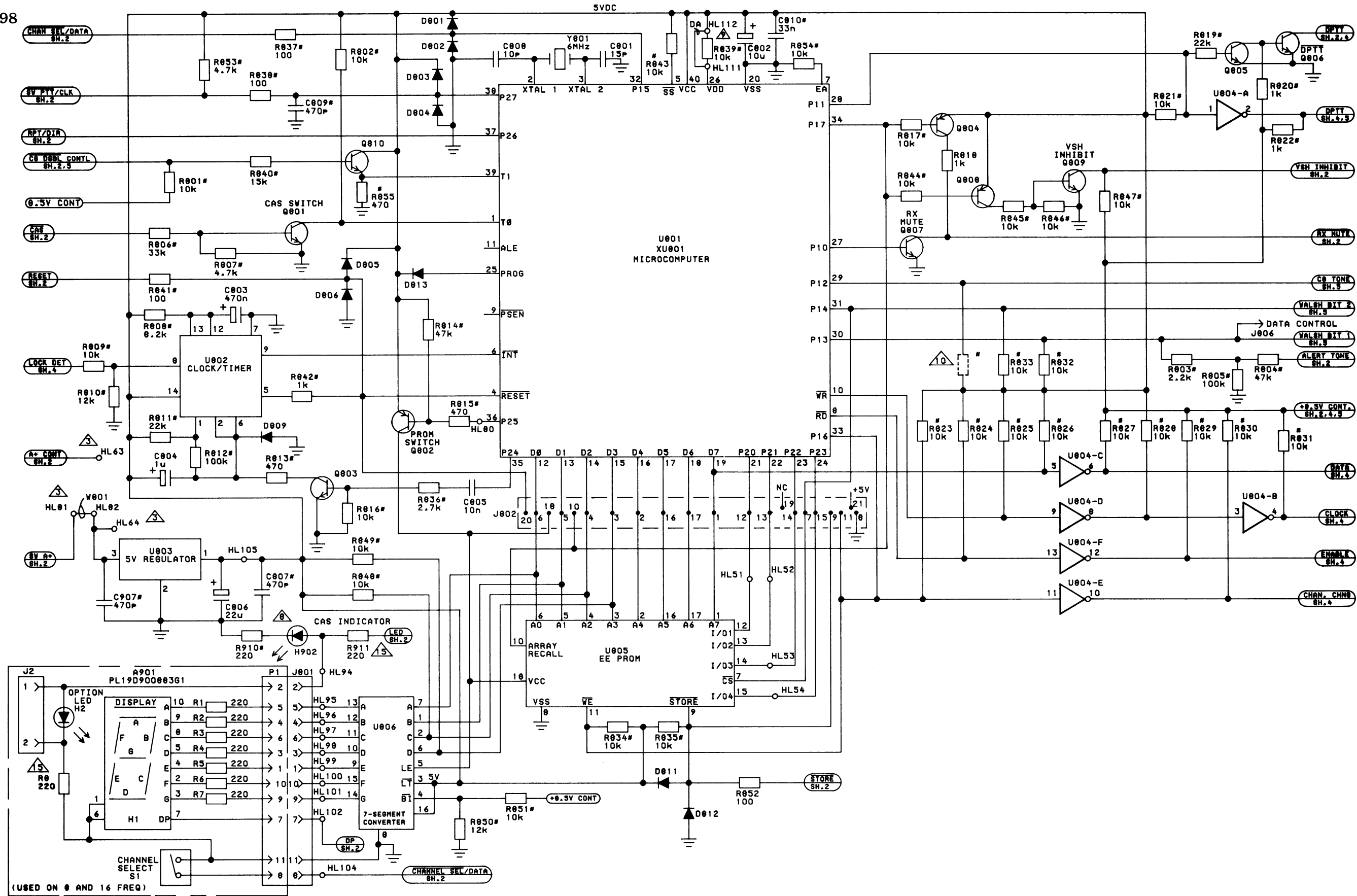
SCHEMATIC DIAGRAM NOTES:

SYNTHESIZER/INTERCONNECT BOARD



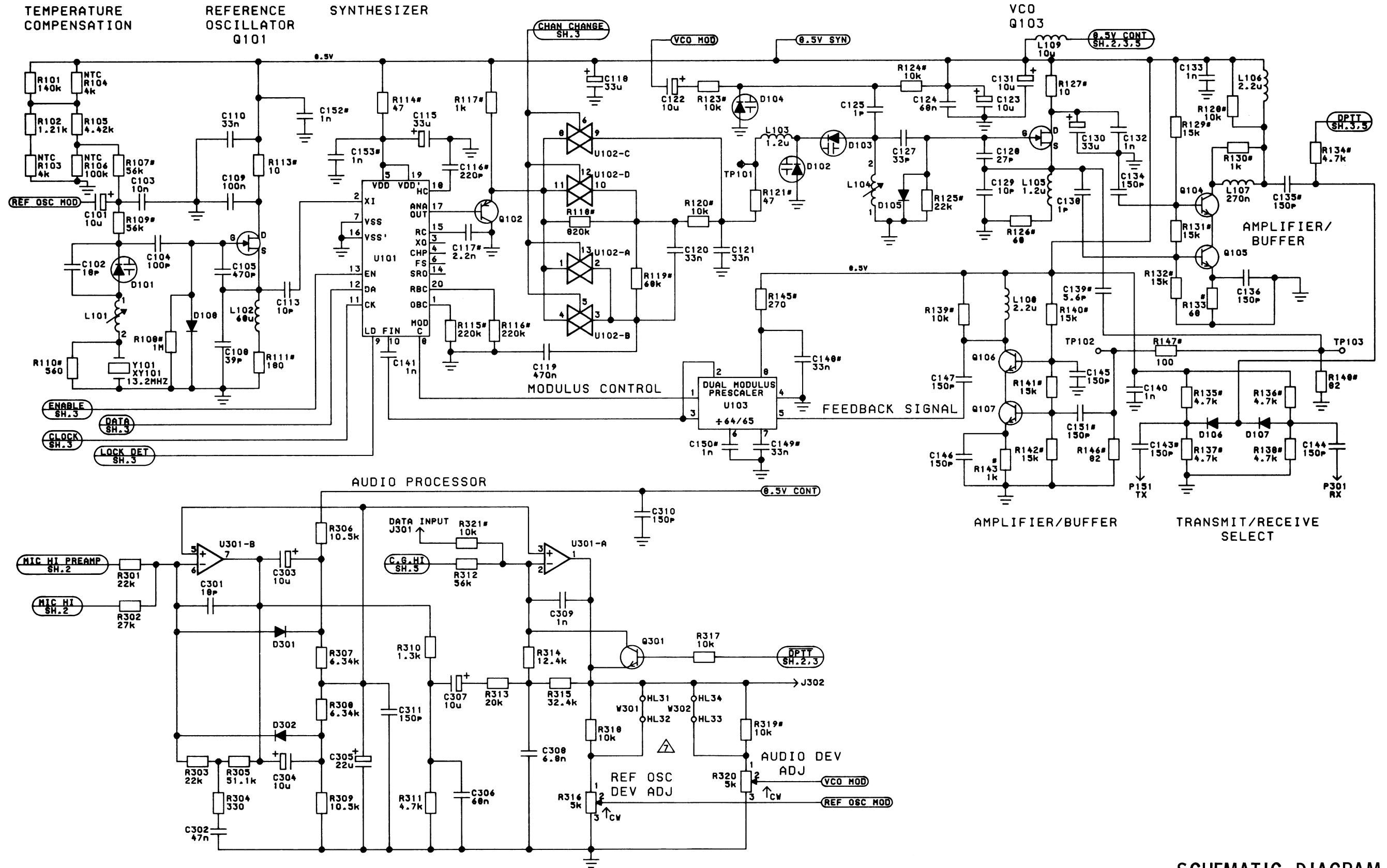
SCHEMATIC DIAGRAM

SYNTHESIZER/INTERCONNECT BOARD



SCHEMATIC DIAGRAM

SYNTHESIZER/INTERCONNECT BOARD



SCHEMATIC DIAGRAM

SYNTHESIZER/INTERCONNECT BOARD

Issue 2

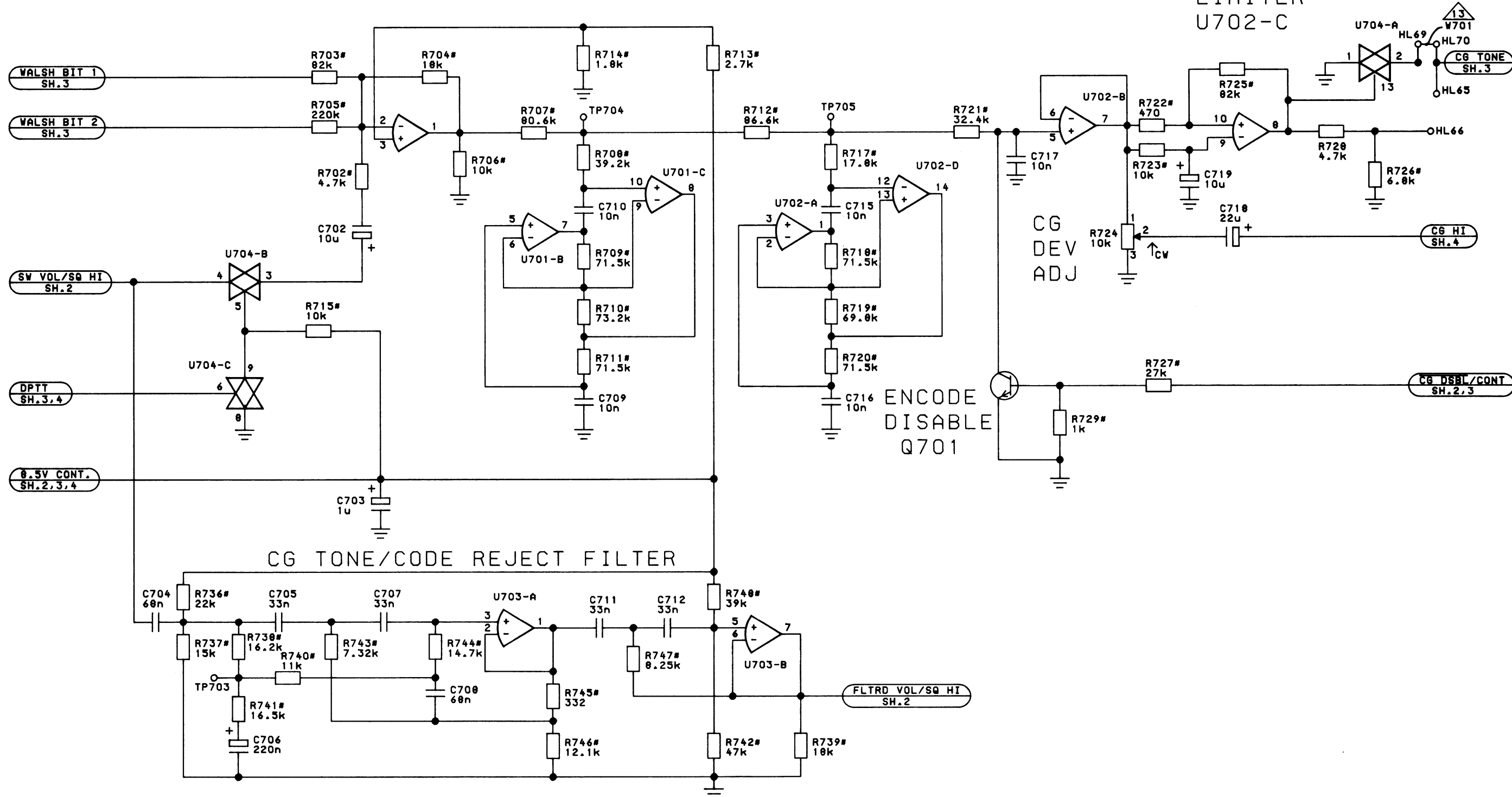
11

(19D900910, Sh. 4, Rev. 5)

VOICE REJECT FILTER
U701-B,C U702-A,B,D

SUMMING AMPL
U701-A

LIMITER
U702-C



SCHEMATIC DIAGRAM

PARTS LIST

SYNTHESIZER INTERCONNECT BOARD
 19D900876G1 8 FREQUENCY - REV E
 19D900876G2 16 FREQUENCY - REV A
 ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
		SYNTHESIZER
		----- CAPACITORS -----
C101	19A701534P10	Tantalum: 10 uF ±20%, 25 VDCW.
C102	19A700235P16	Ceramic: 18 pF ±5%, 50 VDCW.
C103	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C104	19A700235P25	Ceramic: 100 pF ±5%, 50 VDCW.
C105	5493366P470J	Mica: 470 pF ±5%, 100 VDCW; sim to Electro Motive Type DM-15.
C108	19A700235P20	Ceramic: 39 pF ±5%, 50 VDCW.
C109	19A700234P13	Polyester: 0.1 uF ±10%, 50 VDCW.
C110	19A700234P10	Polyester: 0.033 uF ±10%, 50 VDCW.
C113	19A700235P13	Ceramic: 10 pF ±5%, 50 VDCW.
C115	19A701950P2	Tantalum: 33 uF ±20%, 10 VDCW.
C116	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C117	19A702052P7	Ceramic: 2200 pF ±10%, 50 VDCW.
C118	19A701950P2	Tantalum: 33 uF ±20%, 10 VDCW.
C119	19A700004P6	Metallized polyester: 0.47 uF ±10%, 63 VDCW.
C120 and C121	19A700234P10	Polyester: 0.033 uF ±10%, 50 VDCW.
C122 and C123	19A701534P10	Tantalum: 10 uF ±20%, 25 VDCW.
C124	19A702250P112	Polyester: 0.068 uF ±10%, 50 VDCW.
C125	19A700235P1	Ceramic: 1 pF ±0.25 pF, 50 VDCW, temp coef 0 PPM.
C126	19A700235P9	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef -150 PPM.
C127	19A700235P19	Ceramic: 33 pF ±5%, temp coef -150 PPM.
C128	19A700235P18	Ceramic, disc: 27 pF ±5%, 50 VDCW.
C129	19A700235P13	Ceramic: 10 pF ±5%, 50 VDCW.
C130	19A701950P2	Tantalum: 33 uF ±20%, 10 VDCW.
C131	19A701534P10	Tantalum: 10 uF ±20%, 25 VDCW.
C132 and C133	19A700234P1	Polyester: 1000 pF ±10%, 50 VDCW.
C134	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.
C135	19A702061P65	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C136	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.
C137	19A700234P1	Polyester: 1000 pF ±10%, 50 VDCW.
C138	19A700235P1	Ceramic: 1 pF ±.25 pF, 50 VDCW, temp coef -150 PPM.
C139	19A702061P10	Ceramic: 5.6 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.
C140 and C141	19A700234P1	Polyester: 1000 pF ±10%, 50 VDCW.
C143	19A702061P65	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C144	19A700235P15	Ceramic: 15 pF ±5%, 50 VDCW.
C145 thru C147	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C148 and C149	19A702052P20	Ceramic: 0.033 uF ±10%, 50 VDCW.
C150	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C151	19A702061P65	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C152 and C153	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
		----- DIODES -----
D101 thru D104	19A700073P1	Silicon; sim to BB409.
D105	19A700047P2	Silicon.
D106 and D107	19A116925P1	Silicon.
D108	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
		----- INDUCTORS -----
L101	19C850701P301	Coil, RF: sim to Paul Smith EF186-1.
L102	19A700024P35	Coil, RF: 68 uH ±10%.
L103	19A700024P14	Coil, RF: 1.2 uH ±10%.
L104	19B800962P112	Coil, RF: sim to Paul Smith SK767-1.
L105	19A700024P14	Coil, RF: 1.2 uH ±10%.
L106	19A700024P17	Coil, RF: 2.2 uH ±10%.
L107	19A700024P6	Coil, RF: 270 nH ±10%.
L108	19A700024P17	Coil, RF: 2.2 uH ±10%.
L109	19A700024P25	Coil, RF: 10.0 uH ±10%, 3.70 ohms DC res max.
		----- PLUGS -----
P151	19A701785P3	Contact, electrical.
		----- TRANSISTORS -----
Q101	19A700060P2	N Type, field effect.
Q102	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q103	19A700060P1	N-Type, field effect.
Q104 thru Q107	19A701808P1	Silicon, NPN; sim to MPS 6595.
		----- RESISTORS -----
R101	19A702931P415	Metal film: 140K ohms ±1%, 1/8 w.
R102	19A701250P209	Metal film: 1.21K ohms ±1%, 1/4 w.
R103 and R104	19A702161P1	Thermistor: 3300 ohms ±5%, sim to Philips 2322-64R2-12332.
R105	19A701250P263	Metal film: 4.42K ohms ±1%, 1/4 w.
R106	19A702161P2	Composition: 12K ohms ±5%, 1/4 w.
R107	19B800607P563	Metal film: 56K ohms ±5%, 200 VDCW, 1/8 w.
R108	19B800607P105	Metal film: 1M ohms ±5%, 200 VDCW, 1/8 w.
R109	19B800607P563	Metal film: 56K ohms ±5%, 200 VDCW, 1/8 w.
R110	19B800607P561	Metal film: 560 ohms ±5%, 200 VDCW, 1/8 w.
R111	19B800607P181	Metal film: 180 ohms ±5%, 200 VDCW, 1/8 w.
R113	19B800607P100	Metal film: 10 ohms ±5%, 200 VDCW, 1/8 w.
R114	19B800607P470	Metal film: 47 ohms ±5%, 200 VDCW, 1/8 w.
R115	19B800607P224	Metal film: 220K ohms ±5%, 200 VDCW, 1/8 w.
R116	19B800607P154	Metal film: 150K ohms ±5%, 200 VDCW, 1/8 w.
R117	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R118	19B800607P824	Metal film: 820K ohms ±5%, 200 VDCW, 1/8 w.
R119	19B800607P683	Metal film: 68K ohms ±5%, 200 VDCW, 1/8 w.
R120	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.

SYMBOL	GE PART NO.	DESCRIPTION
R121	19B800607P470	Metal film: 47 ohms ±5%, 200 VDCW, 1/8 w.
R123 and R124	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R125	19B800607P223	Metal film: 22K ohms ±5%, 200 VDCW, 1/8 w.
R126	19B800607P680	Metal film: 68 ohms ±5%, 200 VDCW, 1/8 w.
R127	19B800607P100	Metal film: 10 ohms ±5%, 200 VDCW, 1/8 w.
R128	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R129	19B800607P153	Metal film: 15K ohms ±5%, 200 VDCW, 1/8 w.
R130	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R131 and R132	19B800607P153	Metal film: 15K ohms ±5%, 200 VDCW, 1/8 w.
R133	19B800607P680	Metal film: 68 ohms ±5%, 200 VDCW, 1/8 w.
R134 thru R138	19B800607P472	Metal film: 4.7K ohms ±5%, 200 VDCW, 1/8 w.
R139	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R140 thru R142	19B800607P153	Metal film: 15K ohms ±5%, 200 VDCW, 1/8 w.
R143	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R144	19B800607P563	Metal film: 56K ohms ±5%, 200 VDCW, 1/8 w.
R145	19B800607P271	Metal film: 270 ohms ±5%, 200 VDCW, 1/8 w.
R146	19B800607P820	Metal film: 82 ohms ±5%, 200 VDCW, 1/8 w.
R147	19B800607P101	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 w.
R148	19B800607P820	Metal film: 82 ohms ±5%, 200 VDCW, 1/8 w.
		----- TEST POINTS -----
TP101	19A703248P1	Contact, electrical.
		----- INTEGRATED CIRCUITS -----
U101	19B800902P1	SYNTHESIZER: CMOS SERIAL INPUT.
U102	19A700029P44	Digital: BILATERAL SWITCH.
U103	19A703091P1	DIVIDER.
		----- SOCKETS -----
XY101	19A702742P1	Crystal socket.
		----- CRYSTALS -----
Y101	19A703049G1	Quartz: 13.200 MHZ.
		----- AUDIO PROCESSOR -----
		----- CAPACITORS -----
C301	19A700235P16	Ceramic: 18 pF ±5%, 50 VDCW.
C302	19A702059P11	Polyester: 0.047 uF ±5%, 50 VDCW.
C303 and C304	19A701534P7	Tantalum: 10 uF ±20%, 16 VDCW.
C305	19A701534P8	Tantalum: 0.47 uF ±20%, 35 VDCW.
C306	19A702059P12	Polyester: 0.068 uF ±5%, 50 VDCW.
C307	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to Panasonic LS Series.
C308	19A702059P6	Polyester: 6800 pF ±5%, 50 VDCW.
C309	19A702059P1	Polyester: 1000 pF ±5%, 50 VDCW.
C310 and C311	19A700233P2	Ceramic, disc: 100 pF ±20%, 50 VDCW.
C312 and C313	19A700234P9	Polyester: 0.022 uF ±10%, 50 VDCW.
		----- DIODES -----
D301 and D302	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
J301 and J302	19A703248P1	----- JACKS ----- Contact, electrical.
P301	19A701785P3	----- PLUGS ----- Contact, electrical.
Q301	19A700023P1	----- TRANSISTORS ----- Silicon, NPN; sim to Type 2N3904.
R301	19A700019P53	----- RESISTORS ----- Deposited carbon: 22K ohms $\pm 5\%$, 1/4 w.
R302	19A700019P54	Deposited carbon: 27K ohms $\pm 5\%$, 1/4 w.
R303	19A700019P53	Deposited carbon: 22K ohms $\pm 5\%$, 1/4 w.
R304	19A700019P31	Deposited carbon: 330 ohms $\pm 5\%$, 1/4 w.
R305	19A701250P369	Metal film: 51.1K ohms $\pm 1\%$, 1/4 w.
R306	19A701250P303	Metal film: 10.5K ohms $\pm 1\%$, 1/4 w.
R307 and R308	19A701250P278	Metal film: 6.34K ohms $\pm 1\%$, 1/4 w.
R309	19A701250P303	Metal film: 10.5K ohms $\pm 1\%$, 1/4 w.
R310	19A143400P38	Deposited carbon: 1.3K ohms $\pm 5\%$, 1/4 w.
R311	19A700019P45	Deposited carbon: 4.7K ohms $\pm 5\%$, 1/4 w.
R312	19A700019P58	Deposited carbon: 56K ohms $\pm 5\%$, 1/4 w.
R313	19A701250P330	Metal film: 20K ohms $\pm 1\%$, 1/4 w.
R314	19A701250P310	Metal film: 12.4K ohms $\pm 1\%$, 1/4 w.
R315	19A701250P350	Metal film: 32.4K ohms $\pm 1\%$, 1/4 w.
R316	19B800784P106	Variable: 5K ohms $\pm 20\%$, 1/2 w.
R317 and R318	19A700019P49	Deposited carbon: 10K ohms $\pm 5\%$, 1/4 w.
R319	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R320	19B800784P106	Variable: 5K ohms $\pm 20\%$, 1/2 w.
R321	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
U301	19A700086P4	----- INTEGRATED CIRCUITS ----- Operation Amplifier, Dual OP AMP; sim to 4558 Type.
W301 and W302	19B800890P1	----- CABLES ----- Coil, RF: 9.5 nH $\pm 5\%$; sim to Paul Smith SK-896-1.
		CHANNEL GUARD
C702	19A701534P7	----- CAPACITORS ----- Tantalum: 10 uF $\pm 20\%$, 16 VDCW.
C703	19A701534P4	Tantalum: 1 uF $\pm 20\%$, 35 VDCW.
C704	19A702059P12	Polyester: 0.068 uF $\pm 5\%$, 50 VDCW.
C705	19A702059P10	Polyester: 0.033 uF $\pm 5\%$, 50 VDCW.
C706	19A701534P2	Tantalum: 0.22 uF $\pm 20\%$, 35 VDCW.
C707	19A702059P10	Polyester: 0.033 uF $\pm 5\%$, 50 VDCW.
C708	19A702059P12	Polyester: 0.068 uF $\pm 5\%$, 50 VDCW.
C709 and C710	19A702059P7	Polyester: .01 uF $\pm 5\%$, 50 VDCW.
C711 and C712	19A702059P10	Polyester: 0.033 uF $\pm 5\%$, 50 VDCW.
C715 thru C717	19A702059P7	Polyester: .01 uF $\pm 5\%$, 50 VDCW.
C718	19A701534P8	Tantalum: 0.47 uF $\pm 20\%$, 35 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C719	19A701534P7	Tantalum: 10 uF $\pm 20\%$, 16 VDCW.
Q701	19A700023P1	----- TRANSISTORS ----- Silicon, NPN; sim to Type 2N3904.
R702	19B800607P472	----- RESISTORS ----- Metal film: 4.7K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R703	19B800607P823	Metal film: 82K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R704	19B800607P183	Metal film: 18K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R705	19B800607P224	Metal film: 220K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R706	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R707	19A702931P388	Metal film: 80.6K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R708	19A702931P358	Metal film: 39.2K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R709	19A702931P383	Metal film: 71.5K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R710	19A702931P384	Metal film: 73.2K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R711	19A702931P383	Metal film: 71.5K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R712	19A702931P391	Metal film: 86.6K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R713	19B800607P272	Metal film: 2.7K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R714	19B800607P182	Metal film: 1.8K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R715	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R717	19A702931P325	Metal film: 17.8K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R718	19A702931P383	Metal film: 71.5K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R719	19A702931P382	Metal film: 69.8K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R720	19A702931P383	Metal film: 71.5K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R721	19A702931P350	Metal film: 32.4K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R722	19B800607P471	Metal film: 470 ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R723	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R724	19B800784P108	Variable: 10K ohms $\pm 20\%$, 1/2 w.
R725	19B800607P823	Metal film: 82K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R726	19B800607P682	Metal film: 6.8K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R727	19B800607P273	Metal film: 27K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R728	19A700019P45	Deposited carbon: 4.7K ohms $\pm 5\%$, 1/4 w.
R729	19B800607P102	Metal film: 1K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R735	19B800607P100	Metal film: 10 ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R736	19B800607P223	Metal film: 22K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R737	19B800607P153	Metal film: 15K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R738	19A702931P321	Metal film: 16.2K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R739	19B800607P183	Metal film: 18K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R740	19A702931P305	Metal film: 11K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R741	19A702931P322	Metal film: 16.5K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R742	19B800607P473	Metal film: 47K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R743	19A702931P284	Metal film: 7320 ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R744	19A702931P317	Metal film: 14.7K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R745	19A702931P151	Metal film: 332 ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R746	19A702931P309	Metal film: 12.1K ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R747	19A702931P289	Metal film: 8250 ohms $\pm 1\%$, 250 VDCW, 1/8 w.
R748	19B800607P393	Metal film: 39K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
U701 and U702	19A701789P1	----- INTEGRATED CIRCUITS ----- Linear, Low Power OP AMP; sim to LM324N.
U703	19A700086P2	DUAL OP AMP; sim to Type 1458.
U704	19A700029P44	Digital: BILATERAL SWITCH.
W701	19B800890P1	----- CABLES ----- Coil, RF: 9.5 nH $\pm 5\%$; sim to Paul Smith SK-896-1.

SYMBOL	GE PART NO.	DESCRIPTION
		SYSTEM
C801	19A700235P17	----- CAPACITORS ----- Ceramic: 22 pF $\pm 5\%$, 50 VDCW.
C802	19A701534P7	Tantalum: 10 uF $\pm 20\%$, 16 VDCW.
C803	19A701534P3	Tantalum: 0.47 uF $\pm 20\%$, 35 VDCW.
C804	19A701534P4	Tantalum: 1 uF $\pm 20\%$, 35 VDCW.
C805	19A700234P7	Polyester: 0.01 uF $\pm 10\%$, 50 VDCW.
C806	19A701534P8	Tantalum: 0.47 uF $\pm 20\%$, 35 VDCW.
C807	19A702052P3	Ceramic: 470 pF $\pm 10\%$, 50 VDCW.
C808	19A700235P13	Ceramic: 10 pF ± 0.25 pF, 50 VDCW.
C809	19A702052P3	Ceramic: 470 pF $\pm 10\%$, 50 VDCW.
C810	19A702052P20	Ceramic: 0.033 uF $\pm 10\%$, 50 VDCW.
D801 thru D806	19A700028P1	----- DIODES ----- Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D809	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D811 thru D813	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
J801	19A702517P2	----- JACKS ----- Contact, electrical: rated 4.5 amps; sim to Berg 4820S. (Quantity 10).
J802	19A703248P2	Contact, electrical. (Quantity 210).
J806	19A703248P1	Contact, electrical.
Q801	19A700023P1	----- TRANSISTORS ----- Silicon, NPN; sim to Type 2N3904.
Q802	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q803	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q804	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q805 thru Q807	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q808	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q809 and Q810	19A700023P1	Silicon, NPN; sim to Type 2N3904.
R801 and R802	19B800607P103	----- RESISTORS ----- Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R803	19B800607P222	Metal film: 2.2K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R804	19B800607P473	Metal film: 47K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R805	19B800607P104	Metal film: 100K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R806	19B800607P333	Metal film: 33K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R807	19B800607P472	Metal film: 4.7K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R808	19B800607P822	Metal film: 8.2K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R809	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R810	19B800607P123	Metal film: 12K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R811	19B800607P223	Metal film: 22K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R812	19B800607P104	Metal film: 100K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R813	19B800607P471	Metal film: 470 ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R814	19B800607P473	Metal film: 47K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R815	19B800607P471	Metal film: 470 ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R816 and R817	19B800607P103	Metal film: 10K ohms $\pm 5\%$, 200 VDCW, 1/8 w.
R818	19A700019P37	Deposited carbon: 1K ohms $\pm 5\%$, 1/4 w.

PARTS LIST

DISPLAY BOARD
 19D900883G1 W CHANNEL BUSY LIGHT - REV A
 19D900883G2 W/O CHANNEL BUSY LIGHT - REV A
 ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
R819	19B800607P223	Metal film: 22K ohms ±5%, 200 VDCW, 1/8 w.
R820	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R821	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R822	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R823 thru R835	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R836	19B800607P272	Metal film: 2.7K ohms ±5%, 200 VDCW, 1/8 w.
R837 and R838	19B800607P101	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 w.
R839	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R840	19B800607P153	Metal film: 15K ohms ±5%, 200 VDCW, 1/8 w.
R841	19B800607P101	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 w.
R842	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R843 thru R849	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R850	19B800607P123	Metal film: 12K ohms ±5%, 200 VDCW, 1/8 w.
R851	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R852	19A700019P25	Deposited carbon: 100 ohms ±5%, 1/4 w.
R853	19B800607P472	Metal film: 4.7K ohms ±5%, 200 VDCW, 1/8 w.
R854	19B800607P103	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 w.
R855	19B800607P471	Metal film: 470 ohms ±5%, 200 VDCW, 1/8 w.
----- INTEGRATED CIRCUITS -----		
U802	19A116968P3	Linear, timer: DUAL IN-LINE 14 Pin Dip Package; sim to Signetics SA556N.
U803	19J706032P1	Linear: POSITIVE VOLTAGE REGULATOR; sim to MC7805CT.
U804	19A116180P33	Digital: HEX INVERTER BUFFER/DRIVER (OPEN COLLECTOR).
U805	19A703072P2	Digital: (STATIC RAM); sim to XICOR 2212D (Unprogrammed).
	19C850828P1	Label. (Not part of U805).
U806	19A700029P204	Digital: BCD-TO-SEVEN SEGMENT LATCH/DECODER/DRIVER.
----- CABLES -----		
W801	19B800890P1	Coil, RF: 9.5 nH ±5%; sim to Paul Smith SK-896-1.
----- SOCKETS -----		
XU801	19A700156P5	Integrated circuit.
XU805	19A700156P11	Integrated circuit.
----- CRYSTALS -----		
Y801	19A702511G3	Quartz: 6.000000 MHz.
CONTROL		
----- CAPACITORS -----		
C901	19A701225P3	Electrolytic: 220 uF, -10+50%, 25 VDCW.
C902	19A701534P8	Tantalum: 0.47 uF ±20%, 35 VDCW.
C903	19A700233P6	Ceramic: 680 pF ±20%, 50 VDCW.
C904	19A701534P8	Tantalum: 0.47 uF ±20%, 35 VDCW.
C905	19A701534P7	Tantalum: 10 uF ±20%, 16 VDCW.
C907 thru C914	19A702052P3	Ceramic: 470 pF ±10%, 50 VDCW.
----- DIODES -----		
D901	19A700082P1	Rectifier, silicon; sim to MR751.
D902	19J706100P1	Rectifier, silicon; sim to 1N4001.
D903	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.

SYMBOL	GE PART NO.	DESCRIPTION
H901	19A134354P3	Optoelectronic: yellow; sim to Hewlett Packard 5082-4555.
H902	19A134354P9	Optoelectronic: Yellow; sim to HLMP4719.
----- JACKS -----		
J901	19J706214P4	Connector: 4 contacts rated @ 7 amps; sim to Molex 09-67-1042.
J902	19A703248P1	Contact, electrical.
J903	19J706214P7	Flat wafer: 7 contacts rated @ 7 amps; sim to Molex 09-67-1072.
J904	19A703248P2	Contact, electrical.
J906	19A703248P4	Contact, electrical.
J910	19A116659P151	Connector, printed wiring: sim to Molex 09-75-1111.
J911	19A116659P145	Connector, printed wiring: sim to Molex 09-75-1081.
J912	19J706214P4	Connector, 4 contacts rated @ 7 amps; sim to Molex 09-67-1042.
J920 and J921	19A703248P1	Contact, electrical.
----- INDUCTORS -----		
L901	19A700024P14	Coil, RF: 1.2 uH ±10%.
----- PLUGS -----		
P907	19A700102P10	Printed wire: 3 contacts; sim to Molex 09-52-3032.
----- TRANSISTORS -----		
Q901	19A116774P1	Silicon, NPN; sim to Type 2N5210.
----- RESISTORS -----		
R901	19B800607P561	Metal film: 560 ohms ±5%, 200 VDCW, 1/8 w.
R902	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R903	19B800607P181	Metal film: 180 ohms ±5%, 200 VDCW, 1/8 w.
R904	19B800607P333	Metal film: 33K ohms ±5%, 200 VDCW, 1/8 w.
R905	19B800607P393	Metal film: 39K ohms ±5%, 200 VDCW, 1/8 w.
R906	19B800607P562	Metal film: 5.6K ohms ±5%, 200 VDCW, 1/8 w.
R907	19B800607P222	Metal film: 2.2K ohms ±5%, 200 VDCW, 1/8 w.
R908	19B800607P561	Metal film: 560 ohms ±5%, 200 VDCW, 1/8 w.
R909	19B800607P471	Metal film: 470 ohms ±5%, 200 VDCW, 1/8 w.
R910	19B800607P221	Metal film: 220 ohms ±5%, 200 VDCW, 1/8 w.
R911	19A700019P29	Deposited carbon: 220 ohms ±5%, 1/4 w.
R912	19B800607P102	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 w.
R914	19B800607P681	Metal film: 680 ohms ±5%, 200 VDCW, 1/8 w.
----- CABLES -----		
W901 thru W910	19B800890P1	Coil, RF: 9.5 nH ±5%; sim to Paul Smith SK-896-1.
----- MISCELLANEOUS -----		
	19B800952P1	Support. (Mounts U803).
	19A700068P1	Insulator, bushing. (Used with U803).
	19A700115P3	Insulator, plate. (Used with U803).
	19A701516P1	Insulator, plate. (Used with Y801).
ASSOCIATED PARTS		
----- INTEGRATED CIRCUITS -----		
U801	19A703134G4	Microcomputer.

SYMBOL	GE PART NO.	DESCRIPTION
----- INDICATORS -----		
H1	19A134712P5	Display, optoelectronic: green, sim to HOSP 3603
H2	19A134354P9	Optoelectronic: yellow; sim to HLMP4719
----- JACKS -----		
J2	19A700072P28	Printed wire: 2 contacts rated @ 2.5 amps; sim to Molex 22-27-2021.
----- PLUGS -----		
P1	19A703248P3	Contact, electrical. (Quantity 11).
----- RESISTORS -----		
R1 thru R8	19A700019P29	Deposited carbon: 220 ohms ±5%, 1/4 w.
----- SWITCHES -----		
S1	19A701324P2	Push: sim to IEE/Schadow MDP Module.
----- MISCELLANEOUS -----		
	19A701341P1	Spacer.
	19C850665P1	Pushbutton.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

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

REV. A-C -Transmit/Receive/Synthesizer
 Board 19D900876G1,2
 Incorporated in initial shipment

REV. D -To improve synthesizer operation. Changed R116.
 R116 was:
 19B800607P224; Metal film: 220K ohms ±5%, 200VDCW, 1/8w.

REV. E -To insure compatibility with option boards, and relocate some components to allow use of microprocessor removal tone.
 Changed R101, R727, R840, U805, and C307. Added Q810, R839, R855, TP102, TP103, and TP703-TP705. Deleted D807, D808, and D810.
 R101 was:
 19A701250P415; Metal film, 140K ohms ±1%, 1/4w.
 R727 was:
 19B800607P153; Metal film; 15K ohms ±5%, 200 VDCW 1/8w.
 R840 was:
 19B800607P101; Metal film, 100 ohms ±5%, 200 VDCW 1/8w.
 U805 was:
 EE Prom Kit 19A703396G1
 C307 was:
 19A701534P7 Tantalum, 10µf±20%, 16 VDCW.
 D807, D808, & D810 was:
 19A700028P1; Silicon, fast recovery: fwd current 75mA
 75 PIV, sim to Type 1N4148.

REV. A -Display Board 19D900883G1
 Incorporated in initial shipment

ADDENDUM NO. 1 TO LBI31198A

Software has been modified in the Phoenix S/SX UHF radios. The 19A703134G4 microcomputer has been replaced with a 19A703134G5 microcomputer.

The "new" -G5 microcomputer provides programmable Squelch Tail Elimination (STE) for each channel equipped with tone Channel Guard.

Radios equipped with the 19A703134G5 microcomputer will be shipped from the factory with STE disabled on all channels equipped with tone Channel Guard. Digital Channel Guard (DCG) has STE enabled and is not programmable. Tone Channel Guard STE may be enabled or disabled with the EEPROM Programmer Model 4EX22A10 by substituting Table 2 on page 2 of LBI31266A with the following table:

TABLE 2
CHANNEL GUARD TYPE

FUNCTION	W/O STE	With STE
	HEX CODE	HEX CODE
NO CG or TONE CG ONLY	0	2
RX & TX DCG	C	C
RX DCG & TX TONE CG or NO TX CG/DCG	8	A
TX DCG & RX TONE CG or NO RX CG/DCG	4	6

NOTE

The current software in the GE Universal Programmer Model TQ2310 will not enable/disable the 19A703134G5 microcomputer equipped radios. The use of the EEPROM Programmer Model 4EX22A10 for STE programming will be necessary in the interim until new Universal Programmer software is available (estimated: end of July 1983).

This addendum also corrects the part numbers for R727 and R801 and incorporates REV. E on the Schematic Diagram

R727 is: 19B800607P153; Metal film: 15K ohms $\pm 5\%$, 200 vdcw, 1/8 w.
R801 is: 19B800607P183; Metal film: 18K ohms $\pm 5\%$, 200 vdcw, 1/8 w.