MOBILE RADIO

MAINTENANCE MANUAL

FOR S-550 16PLUS™ CONTROL UNITS

SCAN 19B801551P1
SELECT 19B801551P2
BASIC 19B801551P3

Maintenance Manual LBI-31573A

S-550 16PLUS™ CONTROL UNITS

SPECIFICATIONS*

Input Voltage	**13.8 Vdc**
Current Drain	**500 mA**
Temperature Range (operating)	**-22 to =158°F (-30 to =70°C)**
Dimensions (H × W × D)	**2.8 × 6.7 × 7.5 inches (7.15 × 17.07 × 19.0 cm)**
Weight	**15 oz. (425.25 g)**

***These specifications are intended for use during servicing. Refer to the appropriate specifications sheet for the complete specifications.**

GENERAL ELECTRIC

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WARNING

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

High-level rf energy in the transmitter power amplifier assembly can cause rf burns upon contact. Keep away from these circuits when the transmitter is energized.

COMBINATION NOMENCLATURE

Digits 1 & 2	Digit 3	Digit 4	Digit 5	Digit B	Digit M	Digit R	Digit S
Product Code	Number of Frequencies	Option	Use	Tone Cables	Microphone Hookswitch	Power Control Cable	Internal Speaker
S6	D Public Service Trunking	O Standard	D Public Service Trunking	O None	O Standard	O Standard	O Standard
		B Special Call/Emer.			1 Special Call/Emer	1 10 ft. Short Ground	5 Horn Speaker
		C Scan, Special Call, Spkr. Ext Alarm/Emer			2 MASTR11 Noise Cancel	2 30 ft. Short Ground	6 Delete
					3 Handset	C Delete	
					4 Delete	N Delete Power/Ctrl Cables Speaker Microphone Hookswitch	

DESCRIPTION

The S-550 16PLUS™ Series Control Units (19B801551) are attractively styled, highly functional units that are enclosed in a two piece molded housing for durability and ease of disassembly (Figure 1). The control unit utilizes printed circuit boards to minimize wiring and increase reliability. The control unit is mounted to the vehicle with a safety-release mounting bracket assembly for passenger safety.

Cable plugs are secured to the back of the control unit by plastic locking clips. The plugs are equipped with indexing tabs to assure connection to the correct jack. The microphone plug is secured to a jack at the back of the unit by means of a captive locking screw.

All indicators are light-emitting diodes (LEDs) that increase reliability, provide long life, and lower power consumption. The seven-segment displays indicate group and system.

The S-550 16PLUS™ Control Unit is provided in three versions as identified in the chart below. The Control Units each contains a System board, Display board, and Microprocessor board.

Power to the S-550 16PLUS Control Unit and RANGR 16PLUS radio is controlled by the OFF/VOLUME control. Power on is indicated by an illuminated ON indicator and/or GROUP and SYSTEM displays. The radio is operated by the Control Unit front-panel controls.

TRUNKED RADIO OPERATION

The following procedures should be followed when operation the radio in the trunked mode. Trunked mode is the "normal" operating mode for the S-550 16PLUS Control Unit and RANGR 16PLUS radio.

Receive a Message

1. Turn the radio and Control Unit on by rotating the OFF/VOLUME control to the right.

NOTE

The Control Unit/radio will be set to the previous stored or selected settings at power up.

2. Select the desired system by rotating the SYSTEM control until the desired identification is shown by the SYSTEM digital display. (This step is not required for Control Unit style III.)

TABLE 1. CONTROL UNIT FEATURES

CONTROL UNIT PART NUMBER & MODEL	FEATURE				
	VOLUME ADJUST	SPECIAL CALL & SYSTEM/GROUP	SCAN	EMERGENCY SWITCH	EXTERNAL SPEAKER/ALARM
19B801551P1 (SCAN)	X	X	X	X	X
19B801551P2 (SELECT)	X	X			
19B801551P3 (BASIC)	X				

OPERATION

The operating instructions that follow are condensed instructions intended for use when servicing the S-550 16PLUS™ Control Unit. Refer to the to the S-550 16PLUS™ Operator's manual for complete operating information.

3. Select the desired group by rotating the GROUP control until the desired identification is shown by the GROUP digital display. (This step is not required for Basic Control Unit.)

SCAN - 19B801551P1

SELECT - 19B801551P2

BASIC - 19B801551P3

FIGURE 1 - S-550 16PLUS™ CONTROL UNITS

4. Adjust the OFF/VOLUME control for the desired volume level.

5. The radio is now ready to receive a call from the selected system/group. If scan is desired, press the SCN button to enable group scan operation. (This step is not required for the Basic Control and Select Units.)

Transmit a Message

1. Press the push-to-talk (PTT) switch on the microphone.

2. Wait for the TX indicator to flash on-off-on and a beep to be heard in the speaker (indicating the trunked channel has been acquired). The BSY indicator will also illuminate.

3. Speak into the face of the microphone at a normal speaking level.

4. Release the PTT switch when the message is completed and listen for any reply.

CONVENTIONAL RADIO OPERATION

The following procedures should be followed when operating the radio in the conventional (channel) mode (CNV indicator illuminated) on Select and Scan models.)

Receive a Message

1. Turn the radio and the Control Unit on by rotating the OFF/VOLUME control to the right.

> **NOTE**
> The Control Unit/radio will be set to the previous stored or selected settings at power up.

2. Select the desired channel by rotating the SYSTEM control until the desired channel is displayed by the SYSTEM digital display. (This step is not required for the Basic Control Unit.)

3. Hold the SPC/GRP/CLR switch in the CLR position, and adjust the OFF/VOLUME control for the desired volume level. (This step is not required for the Basic Control Unit.)

> **NOTE**
> Squelch level must be adjusted when no call (BSY indicator is off) is being received.

4. Set the squelch level by pressing the SCN button and rotating the SYSTEM control clockwise until the radio unsquelches. Rotate the SYSTEM control counterclockwise three steps past where the radio squelches. (This step is not required for the Basic and Select Control Units.)

5. Release the SCN button. (This step is not required for the Basic and Select Control Units.)

6. The radio is now ready to receive a call over the selected channel. If scan is desired, press the SCN button to enable channel scan operation. (This step is not required for the Basic or Select Control Units.)

Transmit a Message

1. Select the desired channel by rotating the SYSTEM control until the desired channel is displayed by the SYSTEM digital display. (This step is not required for the Basic Control Unit.)

2. Check the BSY (channel busy) indicator to make sure the channel is not being used.

3. Press the push-to-talk (PTT) switch on the microphone. The TX indicator will illuminate.

4. Speak into the face of the microphone at a normal speaking level.

5. Release the PTT switch when the message is completed and listen for any reply.

CIRCUIT ANALYSIS

The following paragraphs describe the hardware theory of operation of each of the three boards used in the Control Unit. Refer to the schematic diagrams and the block diagrams provided when reading each description.

SYSTEM BOARD

The System board (Figure 2) contains decoding and driving circuitry for the seven-segment displays and LED indicators on the Display board. There is a five-volt regulator for supplying regulated power to the board, and several transistor switches used to control the seven-segment LEDs (Display board), drive the speaker relay, handle the serial interface to the RANGR 16PLUS radio unit, and drive an external alarm relay. Additionally, the board is the interface point between the Microprocessor board, Display board, radio unit, microphone and speaker, power, and external options. The GROUP and SYSTEM switches are located on this board, along with the OFF/VOLUME control and associated circuitry.

Interface to the mobile radio occurs at connector J202. Balanced audio from the radio (speaker drive) enters at J202-17 (SPKR1) and J202-18 (SPKR2). A relay (K201) is used to route audio to an external speaker or internal speaker or handset. Transistor Q211 is the relay driver which is controlled by SPKRLY (J101-5), originating at the microcontroller. The unswitched speaker lead (SPKR2) is routed to J201-4 and mic connector J204-6.

The serial-data interface between the mobile radio and the Control Unit is handled by three lines: MOB SER TX DATA (J202-16), MOB SER RX DATA (J202-14), and SER RQST (J202-10). Transmit data (MOB SER TX DATA) are the data signals originating at the mobile radio unit going to the control unit microcontroller. The Control Unit is polled from the radio microcontroller when the control unit SER RQST (Serial Request) line transitions from high to low. The MOB SER RX DATA (received data) are data signals from the Control Unit microcontroller going to the mobile radio unit. The SER RQST line is released (set high) when communications are completed.

The SER RQST signal originates at the microcontroller as SSR and enters the System board at J101-32. An open-collector transistor driver (Q203) and filter (C203, R205, and C204) are used to control the SER RQST line.

Control Unit serial transmit data enters the System board at J101-22 and drives transistor switch Q201/Q202. Filtering at the output of the switch is provided by C201, R201, and C202 before the line exits as MOB SER TX DATA.

Power and ground connections for the mobile radio are made at J202-19 (A-), J202-11 (SWA+), and J202-3 (UNSWA+). The vehicle positive battery connection (A+) to the Control Unit is made at J201-11, and then tied to OFF/VOLUME switch SW203, and the unswitched A+ (UNSWA+) connector at J202-3. Switched A+ (SWA+) comes from the OFF/VOLUME switch (SW203).

Microphone connections to the mobile radio are made at J202-5 (MICHIIN) and J202-2 (MICLO/SHLD). These lines are tied directly to J201-6 and J204-1 (MIC LO), and J201-5 and J204-2 (MIC HI) which connects to the microphone.

Connections between the Display board and System board are made at J301. Signal lines DIG0 thru DIG3 (J301-9, 8, 6, and 4) are used to enable the LED displays on the Display board. These signal lines are outputs from transistor switches (buffers) Q205 thru Q208, which are driven by DIG0 thru DIG3 (J101-40, 38, 36, and 34) originating at the microcontroller.

The segment control lines (SIG A thru SEG G), which illuminate the various segments of the GROUP and SYSTEM displays on the Display board, exit the System board at J301-18 thru 24. The decimal point is controlled by the DP line at J301-30. These control lines originate at the Microprocessor board as SEG a thru SEG g (J101-19, 31, 21, 4, 28, 8, and 6) and DPIN (J101-17), and are tied to LED driver U202.

Control signals for the LED indicators on the Display board originate at the microcontroller and enter the System board as a serial data stream (S DATA) at J101-18. Decoder/driver U201 provides nine control signals (IND 1 thru IND 8, plus BCKLIT) at J301-12 thru 14, 25 thru 29, and 31 for driving the indicators and control backlighting. A BLNK (blank) and LEDCK (LED clock) signal are also input to the decoder/driver.

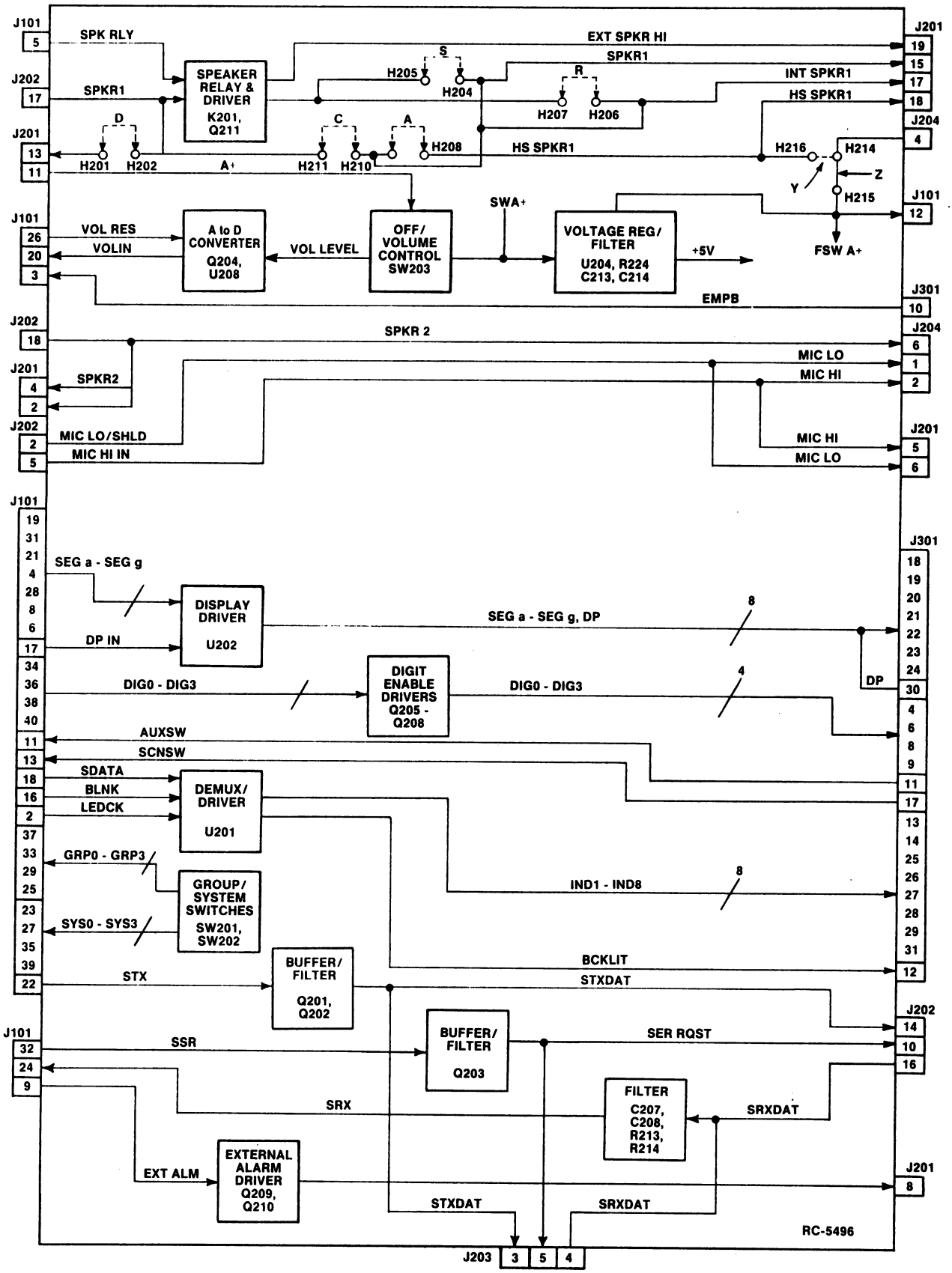

FIGURE 2 - SYSTEM BOARD BLOCK DIAGRAM

Voltage regulation for the board is performed by five-volt regulator U204. Power input to the regulator (SWA+) is obtained from the OFF/VOLUME switch SW203. Resistor R224 limits current to U204 to prevent case overheating and provide additional filtering with C213.

The EMPB (emergency pushbutton) line is used to tell the microcontroller if an emergency pushbutton is being used with the Control Unit. When this line is held low (by a jumper on the Display board), the emergency pushbutton is disabled. This line enters the System board at J301-10 and is filtered (R225 and C216) and diode protected (D209 and D210) before exiting to the Microprocessor board at J101-3.

Multiplexed switch data from the Display board enters the System board as SCNSW at J301-17. This line is diode protected (D213 and D214) before exiting to the Microprocessor board at J101-13. This line is also tied to J203-9 (CTL TEST MODE) which is used during the Control Unit test mode.

The microphone connection at the Control Unit is made at J204. Pins 1 (MIC LO) and 2 (MIC HI) are the microphone connections, and the push-to-talk (PTT) line is connected to pin 3. The PTT line is filtered and diode protected by R222, C212, D205, D206 before connecting to the Microprocessor board at J101-7. When a hand microphone with a DTMF keypad is used, J204-4 (HS SPKRL) supplies switched A+ to the keypad (jumper Z) installed. If a handset hookswitch is used, jumper H214-H215 is cut and jumper Y is installed to supply balanced audio to the handset (J204-4 and J204-6).

The GROUP and SYSTEM controls are 16-position binary switches (without stops). The switch lines are held high by pull-up resistor pack RP201. Depending on the switch positions, the appropriate lines are grounded. Switch outputs to the Microprocessor board are made at J101-23, 25, 27, 29, 33, 35, 37, and 39.

Setting the volume level is accomplished by the OFF/VOLUME control, an analog-to-digital converter, and the microcontroller on the Microprocessor board. A voltage divider formed by R212, R237, and SW203 sets the voltage level stored across C205, which represents the volume-control setting. This voltage level is input to comparator U203. The other side of the comparator is tied to C206. Capacitor C206 is charged by the five-volt supply through R209. Transistor switch Q204 is used to discharge C206 when VOL RES (volume reset) line goes high at J101-26. The output of the comparator is connected to the Microprocessor board at J101-20 (VOLIN). Periodically the microcontroller lowers the VOL RES line, which allows C206 to charge and the output of the comparator (VOLIN) to go low. As C206 charges, the microcontroller starts counting up until the VOLIN line goes high. When the voltage level across C206 equals the voltage level (volume level) stored on C205, the comparator output goes high and the microcontroller stops counting. The count represents the volume level set by the OFF/VOLUME control.

MICROPROCESSOR BOARD

An 8751 microcontroller is the central part of the Microprocessor board (Figure 2). This microcontroller has an internal 4k x 8 PROM and 128 x 8 data RAM. There are four I/O ports of eight lines each, for a total of 32 I/O lines. The Microprocessor board handles the serial data interface, drives the LED indicators and displays, reads volume control level, and reads switch responses. The microcontroller runs at 7.3728 MHz.

An on-board voltage regulator (U109) provides regulated five volts for the board and a power-on reset for the microcontroller. When the power is first supplied, U109 pin 2 goes low, causing Q1 to pull the RES (reset) line high momentarily. This resets the microcontroller.

The serial interface consists of the MTX (P101-24), MRX (P101-22), and SSR (P101-32) signal lines. Serial data enters the microcontroller at pin 10 (MTX). Serial data coming from the microcontroller (MRX) comes from pin 11 and goes to connector P101-22. Serial Service Request (SSR) is connected to pin 5 of the microcontroller and enters the Microprocessor board at P101-32. The serial transmit and receive ports are alternate functions of the microcontroller port three.

Digit enable signals, which control which LED digit (GROUP and SYSTEM displays) is illuminated, originate at the microcontroller and exit to the Display board at P101-34, 36, 38, and 40. These lines are held high by pull-up resistors R112-R115.

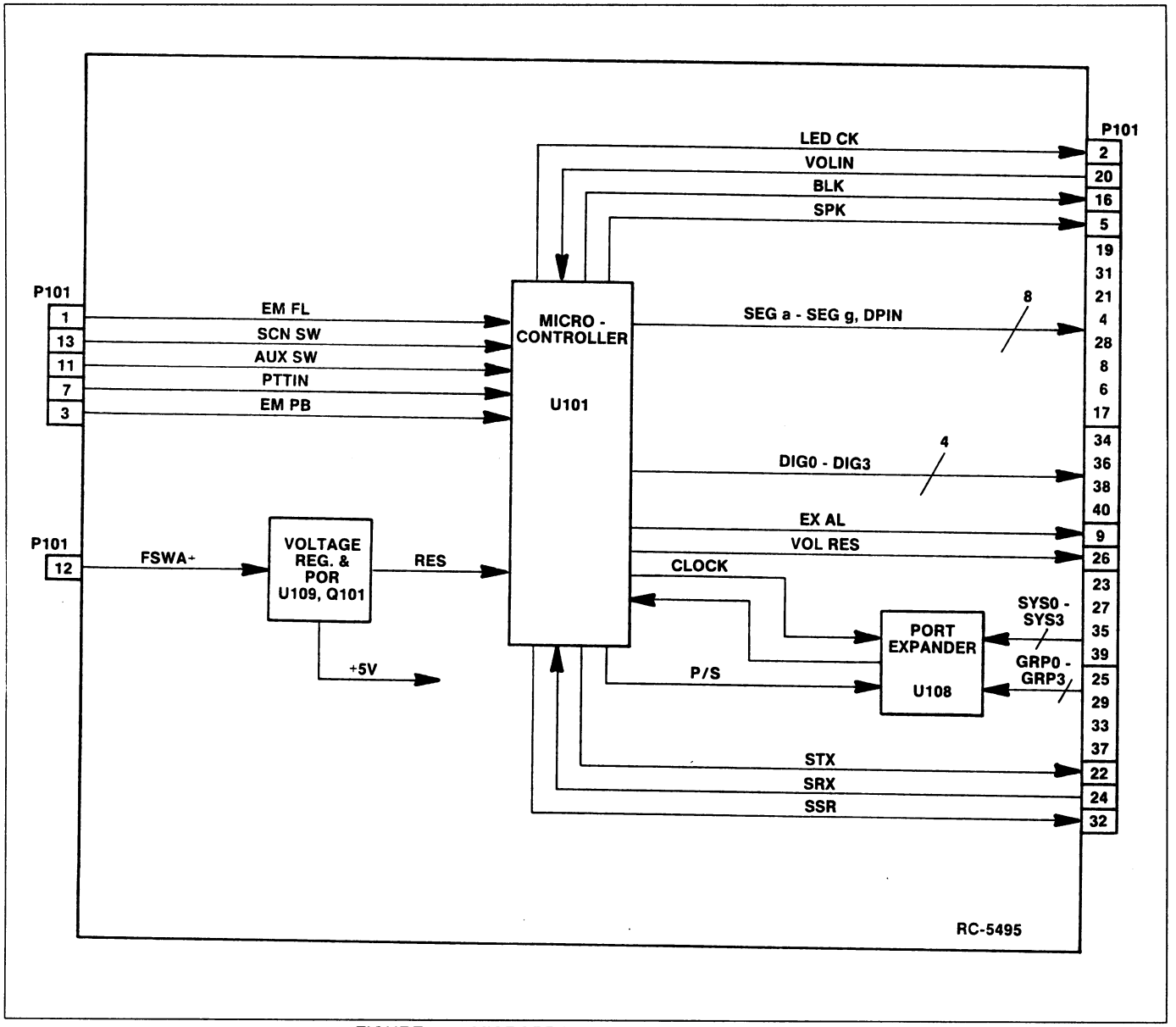

FIGURE 3 - MICROPROCESSOR BLOCK DIAGRAM

A speaker relay on the System board is controlled by the SPK (speaker) line at P101-5. When this line is pulled high by the microcontroller, the internal speaker is selected. When the line is low, an optional external speaker is selected.

Volume is controlled by the OFF/VOLUME control and analog-to-digital converter on the System board. The microcontroller used VOLRES (Volume Reset) to reset the analog-to-digital converter and start sampling the volume control setting. The VOLIN (Volume In) line tells the microcontroller when to begin the count (for the analog-to-digital conversion) and when to stop the counter. The count represents the digital equivalent of the volume control setting.

The EXTALM (P101-9) line controls an external alarm switch on the System board. When microcontroller pin 12 goes low, the external alarm relay (optional) is turned on. Serial data which drives the LED indicators (NC, ON, TX, etc.) on the Display board, exits the Microprocessor board as SDATA at P101-18.

Serial-to-parallel converter U108 is used to expand the I/O capability of the microcontroller. The expanded ports are used to receive the SYS0 thru SYS3 and GRP0 thru GRP3 (P102-23, 25, 27, 29, 33, 35, 37, and 39) signals from the System board. These signals are the settings from the GROUP and SYSTEM switches.

The SEG a thru SEG g (P101-4, 6, 9, 19, 21, 28, and 31) and DP IN (P101-17) signals are used to drive the LED segments and decimal point of the GROUP and SYSTEM displays on the Display board. These lines are normally held high by pull-up resistor pack RP101. There are also the blank (BLK, P101-16) and LED clock (LED CK, P101-2) lines which are used to control the display digit brightness.

The microcontroller U101 can be used with external memory. In our application this capability is not used, so the EA (external access) line at pin 31 is held high to allow access of the microcontroller internal memory. The read strobe, PSEN (program strobe enable) at pin 29 of the microcontroller, is also not required because we are using internal memory. This line is tied to +5 volts through diode D102.

Power (Vcc) and ground (Vss) connections are made through pins 40 and 20, respectively. The frequency of the microcontroller internal oscillator is controlled by Y101, connected to the XTAL1 and XTAL2 inputs.

DISPLAY BOARD

The Display board (Figure 3) is used to communicate information about the status and configuration of the RANGR 16PLUS radio unit to and from the operator. Digital LED indicators for system and group are located on the board, as are the various LED indicators and backlight LEDs. The SCAN, ADD, and DEL switches (and associated circuitry), and some of the display-selection circuitry for the seven-segment displays also reside here.

There are four seven-segment (plus decimal) LED indicators (SG301 and SG302) on the board used to display the system (or channel) and group selected. The data is multiplexed over an eight-bit bus, entering the board at J301 pins 18 thru 24, and 30. Each of these lines is tied to the same segment of each display. The digit to be illuminated is selected by enabling the proper transistor switch: Q303 and Q304 for the GROUP display, and Q301 and Q302 for the SYSTEM display. The DIG0 thru DIG3 lines are scanned sequentially, allowing the GROUP and SYSTEM displays to appear continuously illuminated and updated. The duty cycle (on time) controls the brightness of the displays. Power to the transistor switches is supplied through the OFF/VOLUME switch (SWA+) at J301 pins 3, 5, and 7.

There are up to eight LED indicators located on the Control Unit front panel which display information such as transmitter status (TX), control channel quality (NC), and emergency operation (EMER). These indicators are controlled by an eight-bit bus (IND1 thru IND8) which enters the board at J301 pins 13, 14, 25 thru 29, and 31. When the selected line enables, the LED is biased on. Backlighting for the SCN, ADD, and DEL pushbuttons is provided by LEDs D309 thru D311, when the BCKLIT (J301-12) line is enabled. This line is pulsed to control the brightness of the backlighting.

The SCAN, ADD, and DEL pushbuttons all are connected to transistor switch Q305. Each switch is scanned sequentially to see if it has been pressed. The scanning is accomplished by the same lines used to enable the GROUP and SYSTEM displays. When DIG1 is low, transistor Q304 is biased on and power is supplied to the GROUP display and the DEL pushbutton. Similarly, when DIG2 is low Q302 is biased on and power is supplied to the ADD pushbutton. The DIG3 line controls Q301 which supplies power to the SCAN pushbutton.

An EMPB (emergency pushbutton) line (J301-10) is used to disable or enable the EMER pushbutton. When wire jumper W301 is in place, the EMER pushbutton is enabled.

The three-position CALL (SPC/GRP/CLR) and SPKR/OFF/ALRM (speaker) switches are located on the Display board. The CALL switch common is tied to the base of Q306 through H303, and the speaker switch common is tied to the base through H304. These switches are scanned for a response in much the same way as the SCN, ADD, and DEL switches. When the DIG0 lines goes low, switch Q303 turns on allowing power to be applied to the ALRM switch position. In the same way, when the DIG1 line goes low, Q304 turns on allowing power to be applied to the SPLR switch position. The SPC and CLR switch positions are scanned by the DIG2 and DIG3 lines, and Q301 and Q302. There are

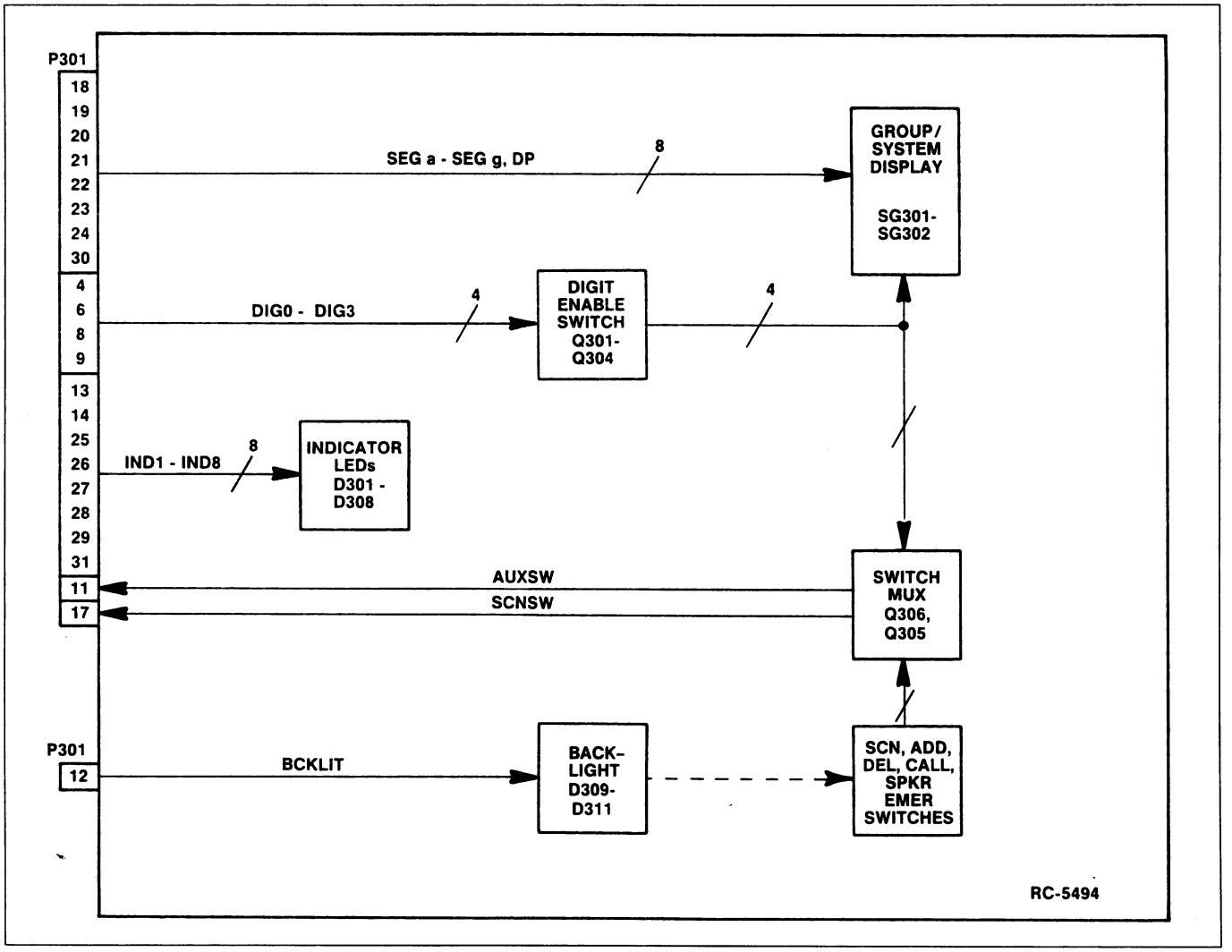

FIGURE 4 - DISPLAY BOARD BLOCK DIAGRAM

no switch connections for the GRP and SPKR OFF positions. Software determines if any of the other two switch positions are active, if they are not, the third position (GRP or SPKR OFF) is assumed.

MAINTENANCE

The three-board design of the Control Unit makes it easy to service. Suggested disassembly/assembly and troubleshooting procedures are provided in this section. Before attempting to service the Control Unit, review the circuit analysis as presented in this manual. You may also want to refer to the Operator's and Installation manuals for additional information. Schematic diagrams and circuit card assembly outline diagrams are provided at the back of this manual.

There are no adjustments, alignments, or preventive maintenance required for the Control Unit. The only configuration required is for the addition or removal of options.

DISASSEMBLY

Remove the three circuit card assemblies from the Control Unit as follows:

1. Remove any cables (microphone, control, power, and options) from the connectors at the rear of the Control Unit.

2. Remove the two cross-head screws, spring washers, and flat washers (at the bottom of the Control Unit) which hold the top and bottom covers together.

3. Lift up on the front of the Front Housing, and slide back to remove.

4. Disconnect the Display board cable from System board connector J301.

5. Unplug the microphone jack from System board connector J204.

6. Lift the Microprocessor board on each side, while gently rocking the board, to remove it from System board connector J101.

7. Remove the four cross-head screws at the corners of the System board.

8. Remove the System board from the Rear Housing.

9. Place the Front Housing face down to expose the Display board.

10. Remove the five cross-head screws which hold the Display board to the Front Housing.

11. Lift the Display board out of the Front Housing.

ASSEMBLY

Replace the three circuit card assemblies into the Control Unit as follows:

1. Place the Display board into the Front Housing so that the switches and digital displays align with the openings in the Control Panel.

2. Replace and tighten the five cross-head screws which hold the Display board to the Front Housing.

3. Place the System board into the Rear Housing so that the front knobs and rear connectors fit properly into the Rear Housing openings.

4. Replace and tighten the five cross-head screws at the corners of the System board.

5. Position the Microprocessor board (Shield Can facing the front of the Front Housing) so that its edge connector aligns with connector J101 on the System Board. Gently press the Microprocessor board into the connector.

6. Plug the microphone jack cable into connector J204 on the System board.

7. Plug the Display board cable into System board connector J301.

8. Slide the Front Housing back onto the Rear Housing.

9. Replace and tighten the two cross-head screws, spring washers, and flat washers at the bottom of the Rear Housing.

10. Connect any cables (microphone, control, power, and options) to the connectors at the rear of the Control Unit.

REMOVING ICs

CAUTION

CMOS integrated circuit devices used in this equipment can be destroyed by static discharges. Before handling one of these devices, discharge yourself by touching the case of a piece of test equipment that has a three-prong power plug connected to an outlet with a known good earth ground. When soldering or desoldering CMOS devices, the soldering iron should also have a three-prong power plug connected to an outlet with a known good earth ground. A battery operated soldering iron may be used in place of the regular soldering iron.

OPTION SELECTION

When shipped from the factory, the Control Unit has a standard jumper configuration, when adding or deleting options, these jumpers may have to be modified. The jumpers are printed wire runs which must be cut to remove or bridged to restore a connection. The options available for use with the S-550 16PLUS are as follows:

- Handset (without hookswitch)
- Handset/hookswitch
- External speaker
- DTMF microphone

Currently available options are configured by the A, C, D, R (or S), Y, and Z jumpers located on the System circuit card assembly (see circuit card assembly outline drawing). Jumpers A, C, R, S, and D are used to route audio to the speaker or handset. Depending on which jumpers are installed, audio may be directed to the internal, external, or handset speaker element. Jumpers Z and Y are used to provide power to a DTMF keypad on the microphone or direct audio to the handset speaker element, depending on the application.

Table 2 shows the jumper configurations for the various options. It is assumed the S-550 16PLUS is initially in the SHIPPED CONFIGURATION. If options are added or removed, the indicated jumper must be remove or installed as directed. To access the System board, follow the Disassembly procedure in this manual.

Table 2. Jumper Configurations

OPTION	SYSTEM BOARD JUMPERS					
	A	C	D	R or S	Y	Z
SHIPPED CONFIGURATION	I	I	I	I	R	I
HANDSET ONLY					I	R
HANDSET/ HOOKSWITCH	R	R			I	R
EXTERNAL SPEAKER		R				
DTMF MICROPHONE						I

R = Remove jumper (printed wire run removed)
I = Install jumper (printed wire run restored)

TEST AND TROUBLESHOOTING

Procedures for testing and troubleshooting the Control Unit are provided in this section. The procedures assume that the RANGR 16PLUS and interconnecting cables are operational. Resident software diagnostics are available within the Control Unit that excercise its key and indicator functions, which test the majority of the circuitry within the Control Unit. Use these procedures to help isolate a problem to the circuit card and stage.

Equipment Required

Control Power Cable, 19D901864 or equivalent
Speaker or equivalent test load
12-volt power supply or storage load
Jumpers (for grounding pins)

Test Procedure

Perform this test whenever the Control Unit is not operating properly or after servicing the Control Unit to verify proper operation.

1. Connect the Control Unit as shown in Figure 5.
2. Perform test procedure presented in Table 3.
3. Connect the Control Unit to the mobile radio and verify proper operation. If the Control Unit still fails to operate correctly: check the serial TX link (Q201 and Q202), check serial RX link (R213, R214, R201, and D202), and check serial request (Q203).
4. If Control Unit still fails to operate correctly, refer to the mobile radio maintenance manual for instructions on checking out the radio.

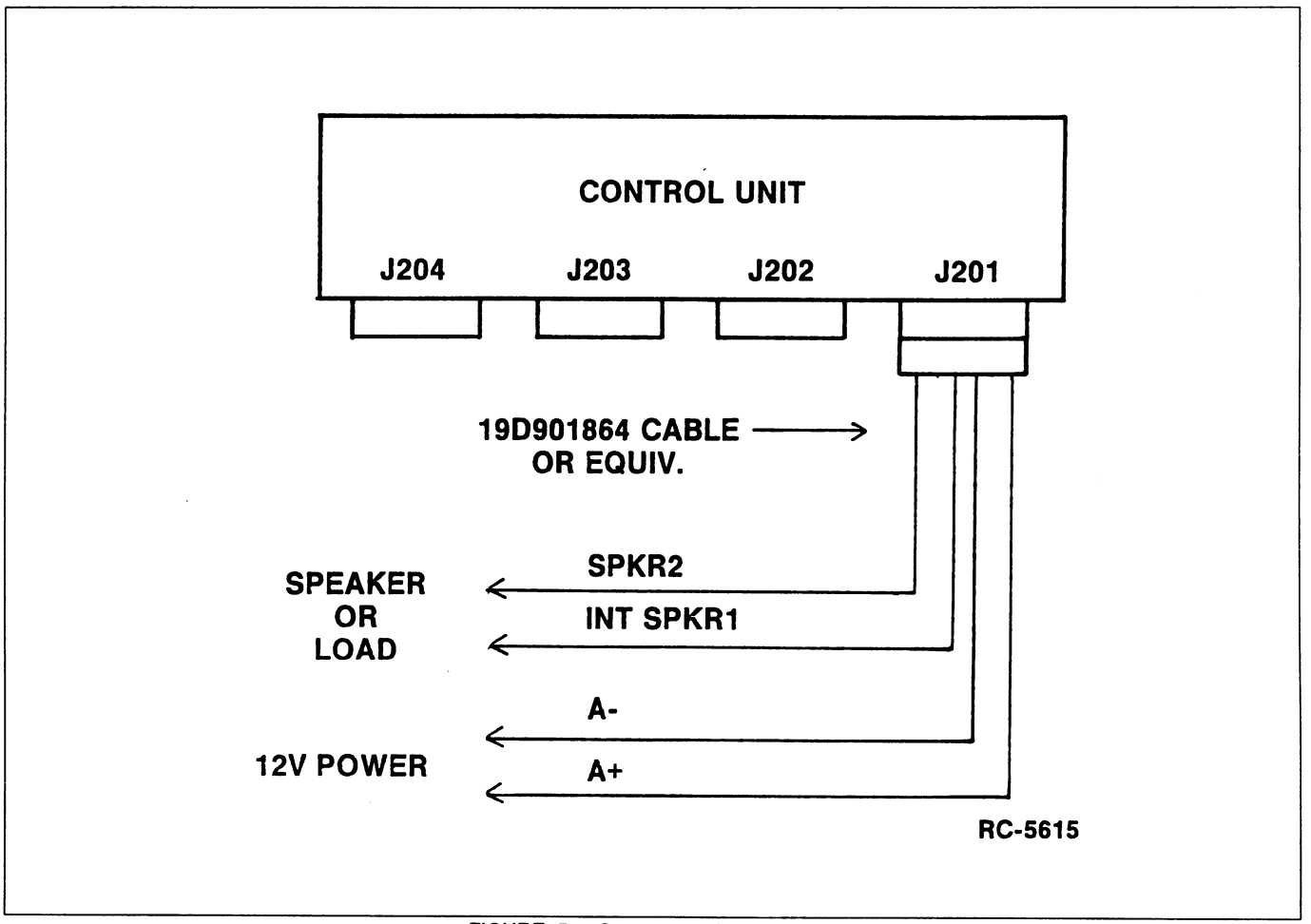

FIGURE 5 - S-550 16PLUS TEST SETUP

Table 3 - Test Procedure

1. Place the OFF/VOLUME control in the OFF position.	All indicator off, no volume from radio.	Check OFF/VOLUME control on System board.
2. Ground connector J203-9.*		
3. Place the OFF/VOLUME control in the on position.	ON, P2, and P1 indicators will light.	a. Check Q305, D301 thru D308 on the Display board. b. Check U201 on the System board.
	GROUP and SYSTEM displays will display a number between 00 and 15.	a. Check SG301 and SG302 on the Display board. b. Check D319 thru D322, and Q301 thru Q304 on the Display board. c. Check U202, and Q205 thru Q208 on the System board.
4. Remove ground from J203-9.	ON, P2, and P1, indicators will go off.	
5. Rotate the SYSTEM control through all positions.	SYSTEM display will show digits from 00 through 15.	a. Check SG301 on Display board. b. Check D319, D320, Q301, and Q302 on the Display board. c. Check SG202, Q207, and Q208 on the Sytem board. d. Check SW202 and RP201 on the system board. e. Check U108 on the Microprocessor board.
6. Rotate the GROUP control through all positions.	GROUP displays will show digits from 00 through 15.	a. Check SG302 on the Display board b. Check D321, D322, Q303, and Q304 on the Display board. c. Check U202, Q205, Q206 on the System Board.

* Grounding J203-9 is equivalent to holding SCN, ADD, and DEL on the scan version.

STEP	OBSERVATION	CORRECTIVE ACTION
6. Continued		d. Check SW201 ond RP201 on the System board. e. Check U108 on the Microprocessor board.
7. Place the SPC/GRP/CLR switch in the SPC position.	SYSTEM tens decimal point will illuminate.	a. Check SG301 D319, Q312, Q301, and Q306 on the Display board. Also check wiring from H301 and H303 to the switch. b. Check Q207, Q208, and U202 on the System board.
8. Place the SPC/GRP/CLR switch in the CLR position.	GROUP tens decimal point will illuminate.	a. Check SG302, D321, Q304, D314, Q302, and Q306 on the Display board. Also check wiring from H302 and H303 to the switch. b. Check Q207, Q208, and U202 on the System board.
9. Place the SPKR/OFFALRM switch in the SPKR position.	GROUP ones decimal point will illuminate.	a. Check SG302, D322, Q303, Q304, D317, and Q306 on the Display board. Also check wiring from H305 and H304 to the switch. b. Check Q205, Q206, and U202 on the System board.
10. Place the SPKR/OFF/ ALRM switch in the ALRM position.	SYSTEM ones decimal point will illuminate.	a. Check SG301, D320, Q301, D318, Q303, and Q306 on the Display board. Also check wiring from H306 and H304 to switch. b. Check Q205, Q207 and U202 on the System board.
11. Press the SCN button.	The ON indicator will light.	a. Check D301, Q301, D313, and Q305 on the Display board. b. Check Q208 and U202 on the System board.

STEP	OBSERVATION	CORRECTIVE ACTION
12. Press the ADD button.	The P2 indicator will light.	a. Check D302, Q305, D315, on the Display board. b. Check Q207 and U202 on the System board.
13. Press the DEL button.	The P1 indicator will illuminate.	a. Check D303, Q305, Q316, and Q304 on the Display board. b. Check Q206 and U202 on the System board.
14. Ground J201-10 (CG Disable).	The NC indicator will light.	a. Check D305 on the Display board. b. Check U201, R223, D207, D208, and C215 on the System board.
15. Ground J203-13 (EMER FLOOR SW).	The TX indicator will light.	a. Check D306 on the Display board. b. Check U201, R231, D203, D204, and C211 on the System board.
16. Ground J204-3 (PTT).	The SPC indicator will light.	a. Check R222, D205, D206, and U201 on the System board. b. Check D307, and R319 on the Display board.
17. Toggle the EMER push-button	The EMER indicator will light.	a. Check D308, and R320 on the Display board. Also check wires from H307 and H308 to the switch. b. Check U201, D209, D210, and R225 on the System board

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

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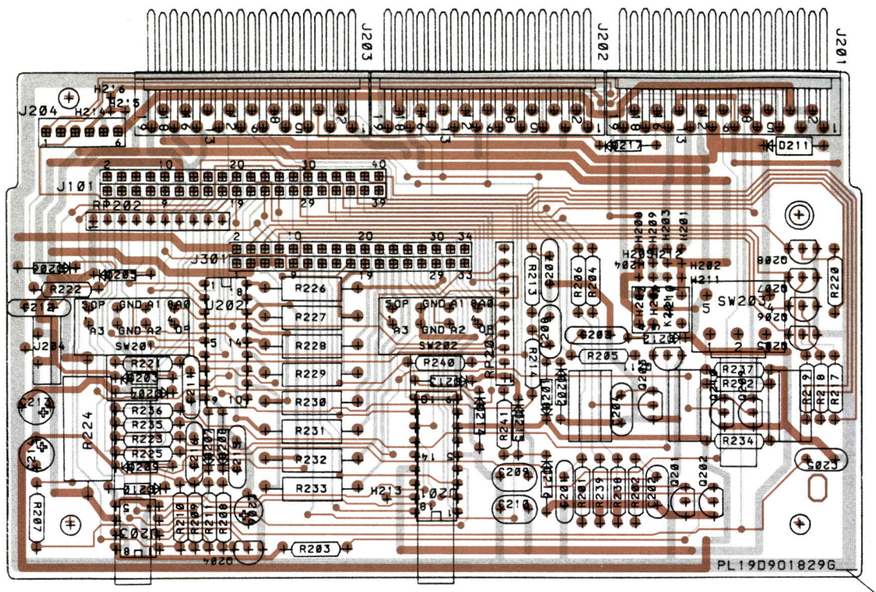
SYSTEM BOARD

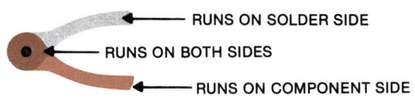


MARK APPLICABLE GROUP NUMBER CHARACTERS 2.3 HIGH

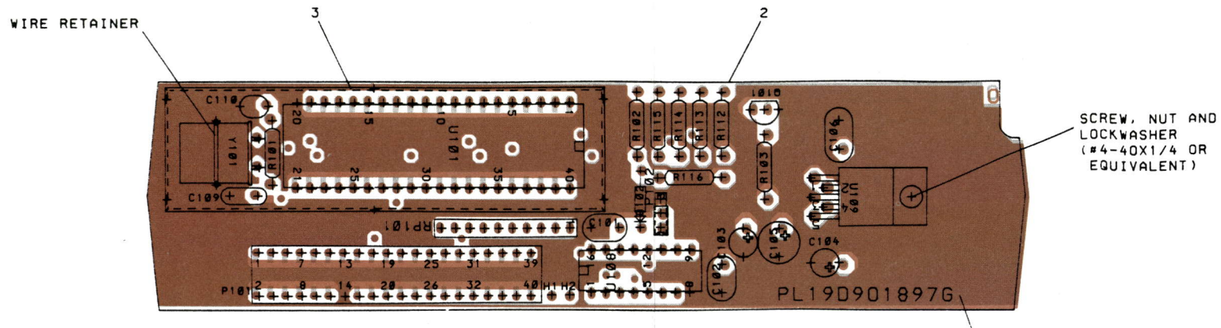
(19D901829, Sh. 1, Rev. 0)
(19A705051, Sh. 1, Rev. 0)
(19A705057, Sh. 2, Rev. 0)

(1) NOTES:
1. SOLDER ALL ELECTRICAL CONNECTIONS.
2. COMPONENT LEADS TO PROTRUDE 1.6 MAX. BELOW SOLDER SIDE OF BOARD.

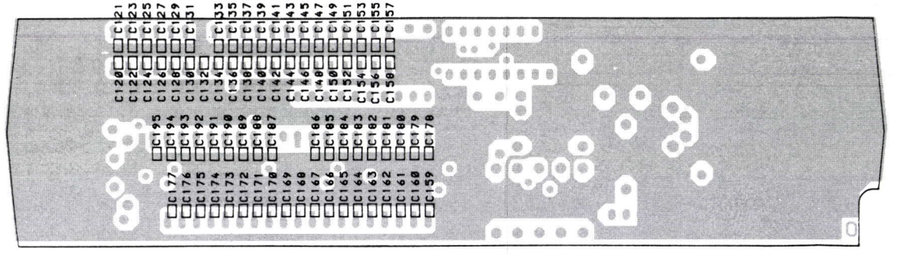
THIS DRAWING FOR REFERENCE ONLY NOT INTENDED FOR MANUFACTURING



MICROPROCESSOR BOARD



(19D901897, Sh. 1, Rev. 0)
(19A705146, Sh. 1, Rev. 0)
(19A705146, Sh. 4, Rev. 0)

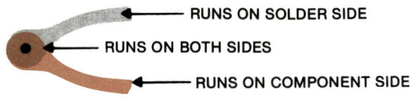


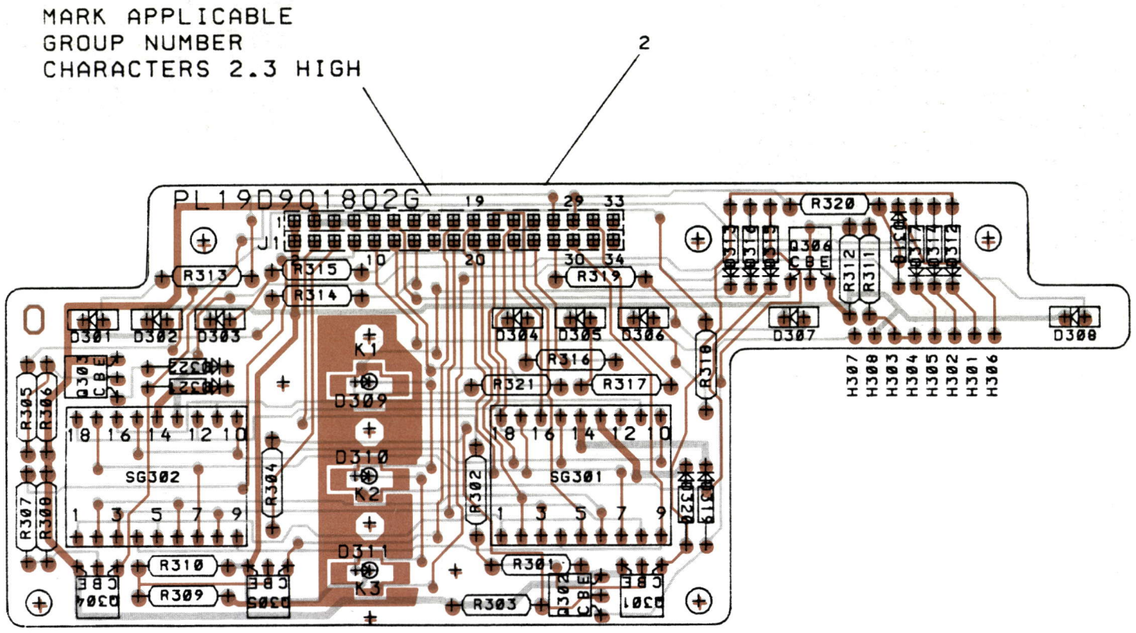
BACK VIEW

(19D901897, Sh. 1, Rev. 0)
(19A705146, Sh. 4, Rev. 0)

(1) NOTES:
1. SOLDER ALL ELECTRICAL CONNECTIONS.
2. COMPONENT LEADS TO PROTRUDE 1.5 MAX. BELOW SOLDER SIDE OF BOARD.

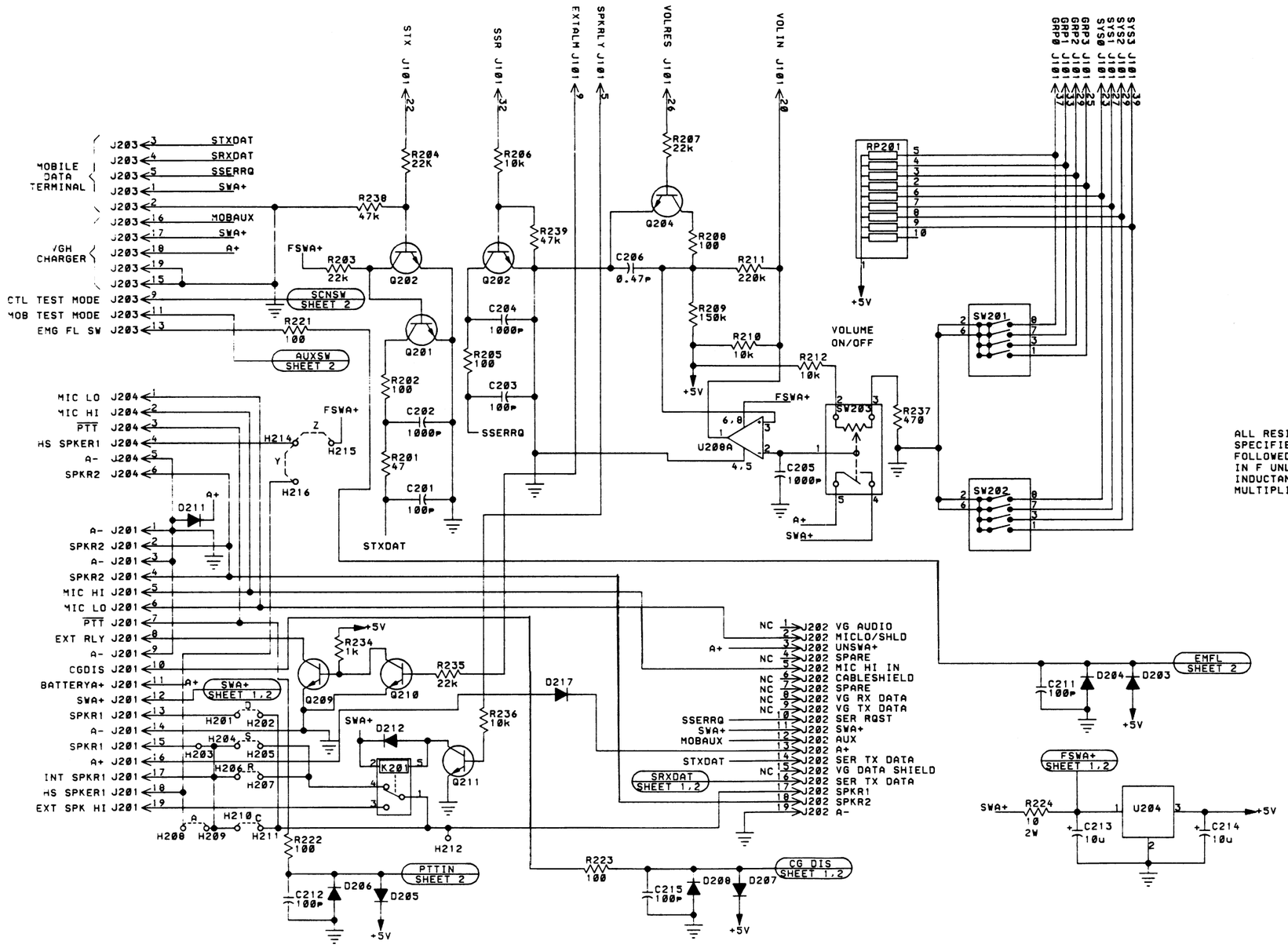
DISPLAY BOARD





(1) NOTES:
1. SOLDER ALL ELECTRICAL CONNECTIONS.
2. COMPONENT LEADS TO PROTRUDE 1.6 MAX. BELOW SOLDER SIDE OF BOARD.

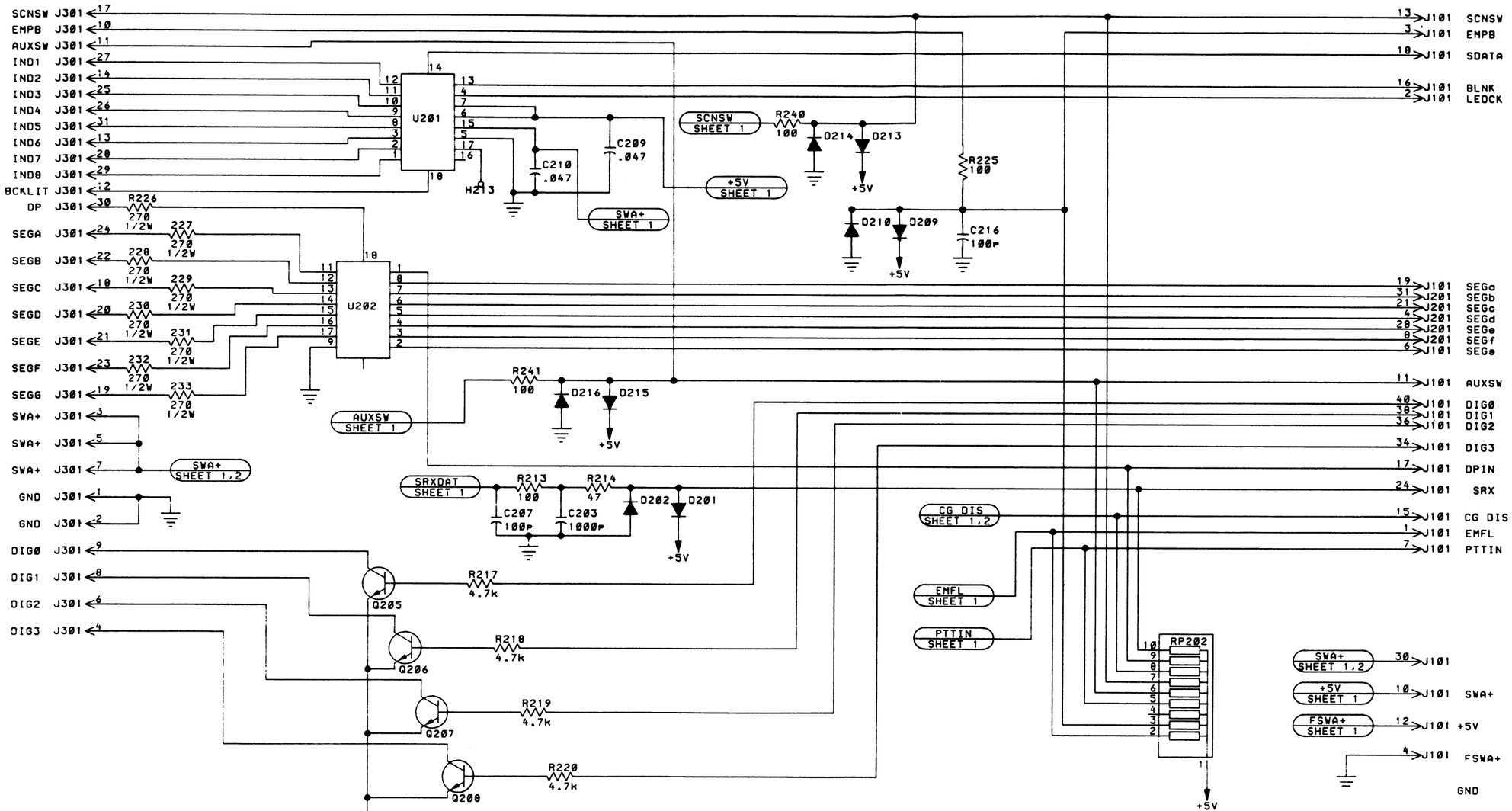
(19A901802, Sh. 1, Rev. 0)
(19A705028, Sh. 1, Rev. 0)
(19A705028, Sh. 2, Rev. 0)



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

SYSTEM BOARD (SHEET 1 OF 2)

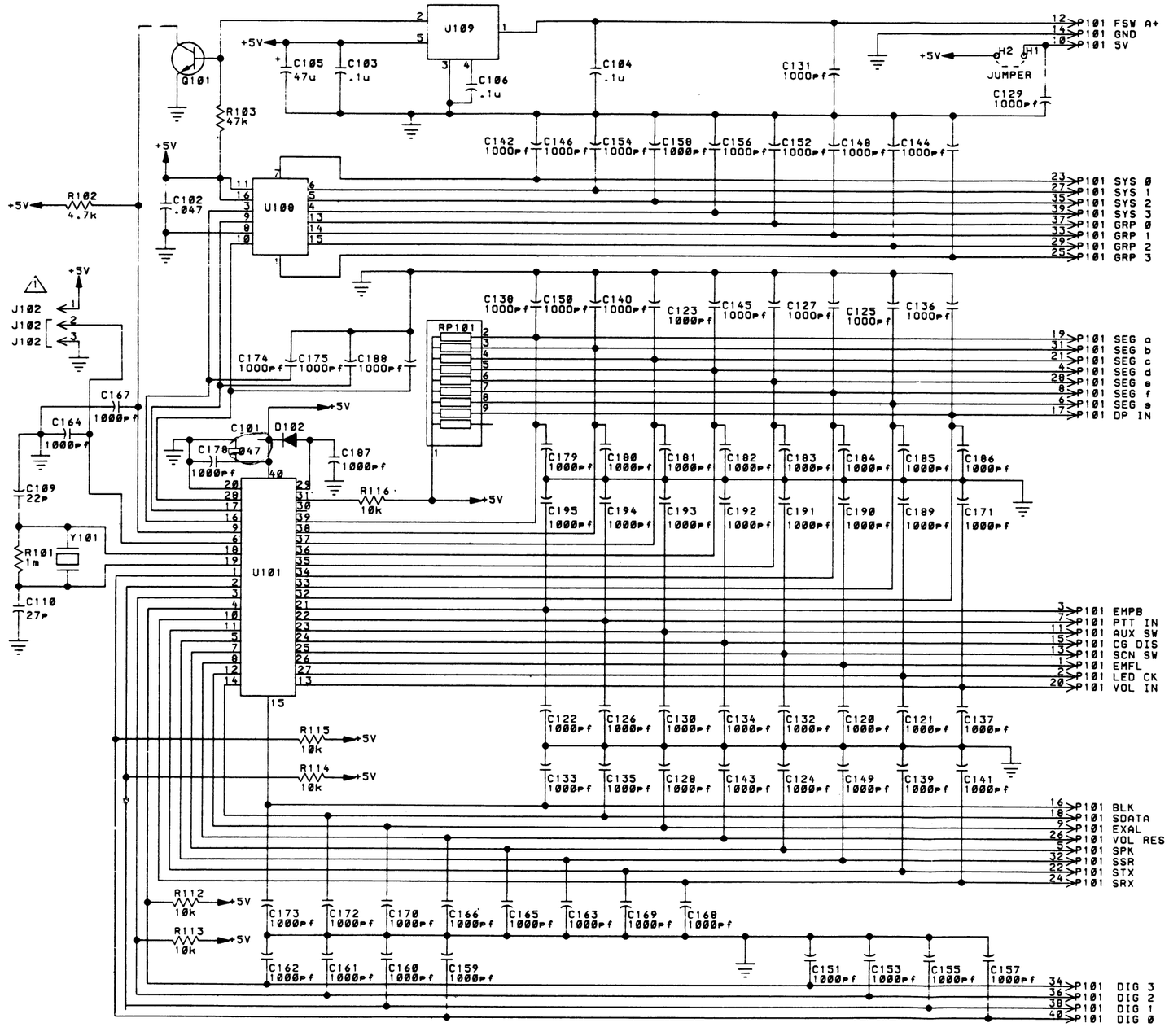
(19D901973, Sh. 1, Rev. 0)



ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY MULTIPLIER k OR M.CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER u,n OR P. INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR u.

SYSTEM BOARD (SHEET 2 OF 2)

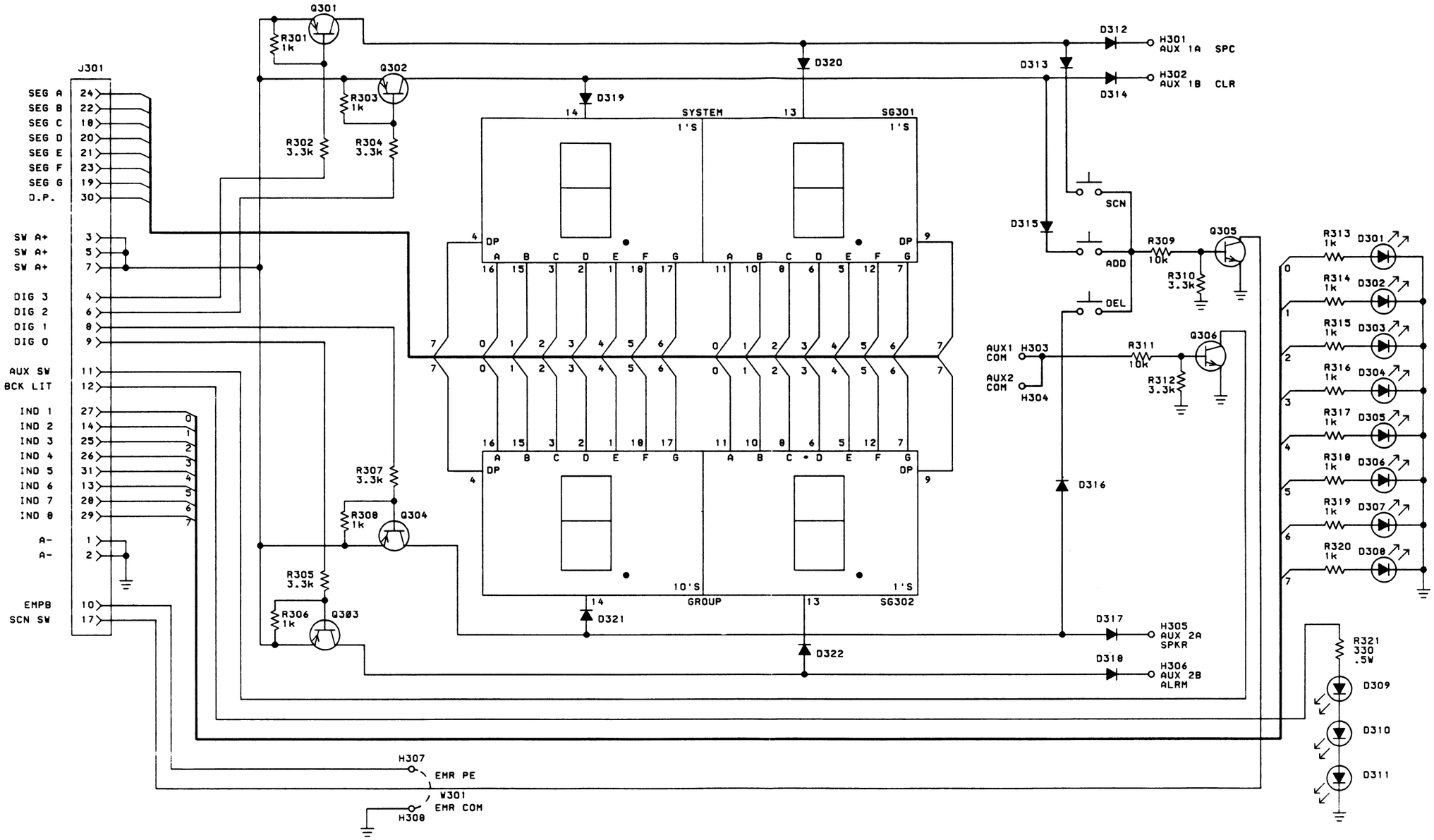
(19D901973, Sh. 2, Rev. 0)



⚠1 SINGLE CONTROL HEAD CONFIGURATION

MICROPROCESSOR BOARD

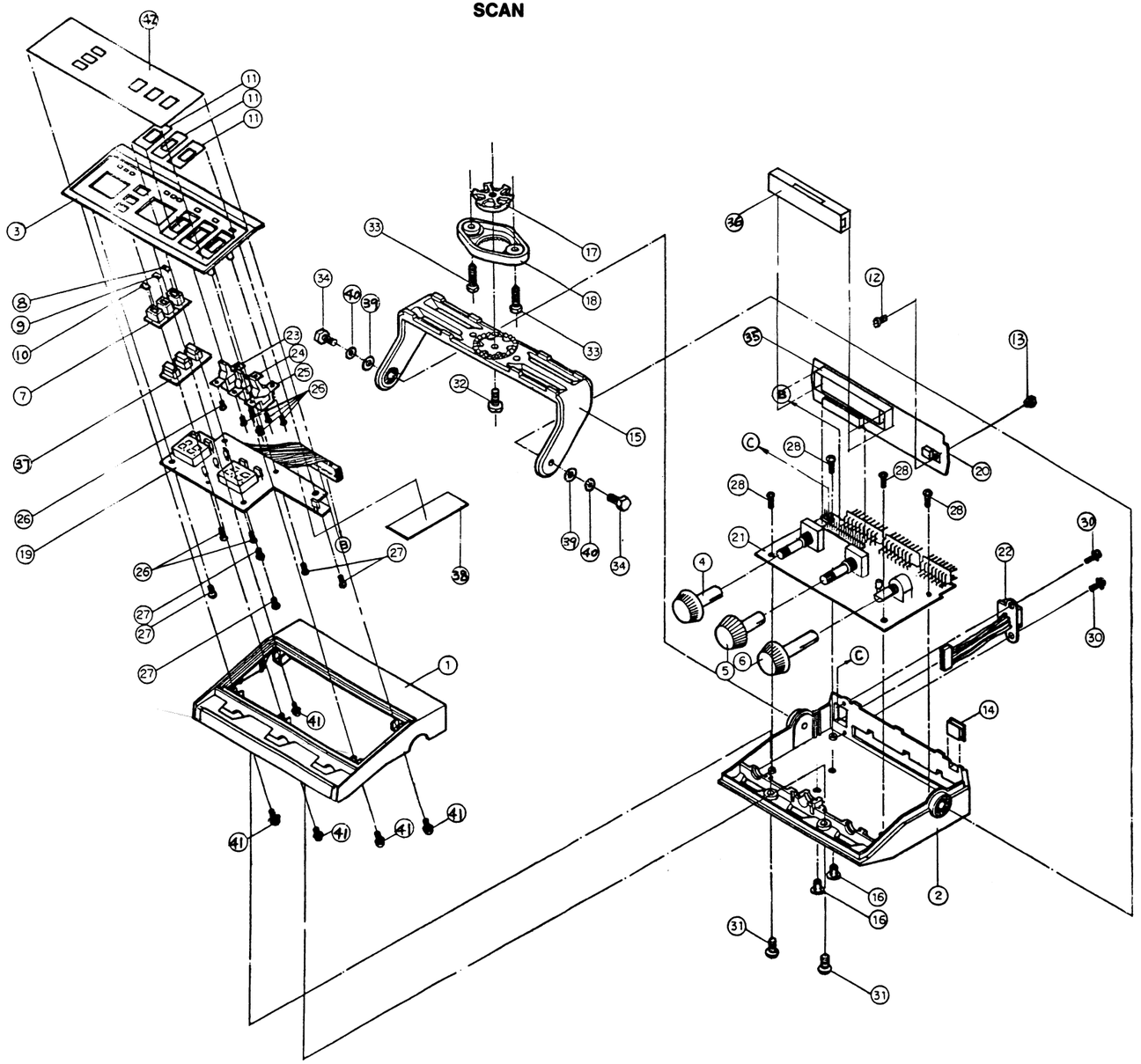
(19D901971, Rev. 0)



DISPLAY BOARD

(19D901972, Sh. 1, Rev. 0)

SCAN



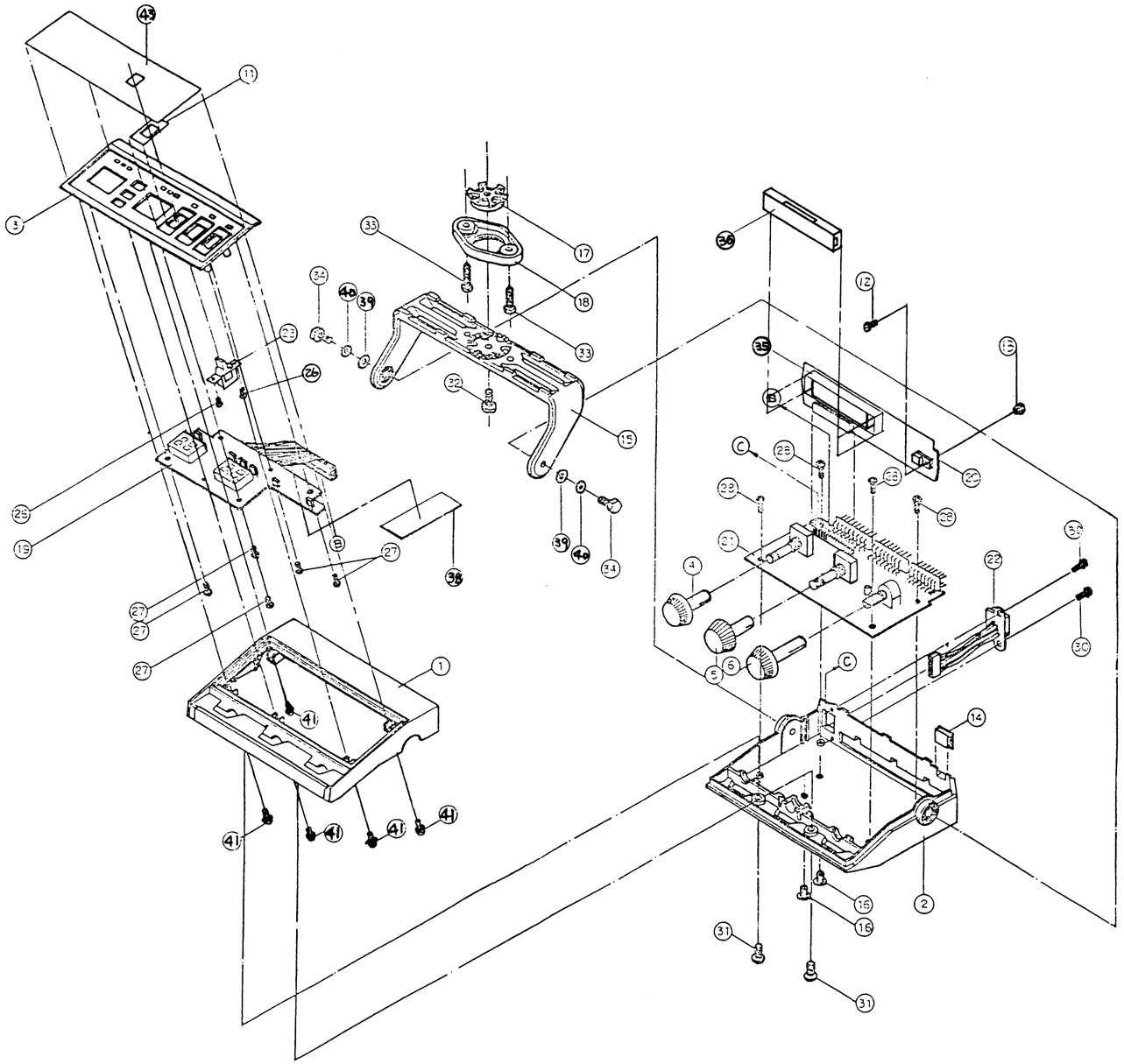
PARTS LIST

LBI-31876
S550 PLUS
(MECHANICAL PARTS)
MODEL P1

SYMBOL	GE PART NO.	DESCRIPTION
1	T19/ME-0S550-037	FRONT HOUSING
2	T19/ME-0S550-002	REAR HOUSING
3	T19/ME-0S550-003	CONTROL PANEL
4	T19/ME-0S550-026	GROUP KNOB
5	T19/ME-0S550-005	CHANNEL KNOB
6	T19/ME-0S550-025	VOLUME KNOB
7	T19/ME-0S550-007	KEY TOP
8	T19/MS-0S550-301	KEY PLATE (SCN)
9	T19/MS-0S550-302	KEY PLATE (ADD)
10	T19/MS-0S550-303	KEY PLATE (DEL)
11	T19/MP-0S550-011	MASK
12	T19/80-SN404-P1Z	4-40 UNC x 1/4"
13	T19/83-SN400-H1Z	4-40 UNC NUT
14	T19/MR-0S550-019	DUST COVER
15	T19/ME-0S990-009	MOUNTING BRACKET
16	T19/ME-0S990-021	CAP
17	T19/ME-0S990-032	BREAKAWAY DEVICE
18	T19/ME-0S990-033	RETAINER MOUNTING
19	T19/69-550DT-003	DISPLAY BOARD
20	T19/69-550DT-002	SCAN BOARD
21	T19/69-550DT-001	SYSTEM BOARD
22	T19/51-006SD-500	6 P. MIC PHONE JACK
23	T19/55-7105K-J2Z	MOM.-OFF-MOM. SWITCH
24	T19/55-1021K-08M	ON-OFF-ON SWITCH
25	T19/55-7108K-J2Z	ON-MOM. SWITCH
26	T19/77-S2006-P0Z	2x6 SELF TAPPING SCREW. (QUANTITY 8)
27	T19/77-S3008-P0M	3x8 SELF TAPPING SCREW. (QUANTITY 5)
28	T19/77-S3006-P0M	3x6 SELF TAPPING SCREW.
29		NOT USED
30	T19/77-S4010-K0M	4x10 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 2)
31	T19/77-0S550-032	PTB 4x10 MC SCREW, WITH F/S WASHER. (QUANTITY 2)
32	T19/81-SA010-C1M	10-32 UNF x 5/8" LG
33	T19/77-S4820-H1M	4.8x20 SELF TAPPING SCREW. (QUANTITY 2)
34	T19/75-S5012-C1B	M5x12 MACHINE SCREW. (QUANTITY 2)
35	T19/MP-0S550-036	METAL CAN HOLDER
36	T19/MP-0S550-035	METAL CAP
37	T19/MR-0S550-008	RUBBER KEY
38	T19/74-0S550-23M	TAPE
39	T19/79-S50A0-F0M	M5 FLAT WASHER
40	T19/79-S50A0-EBM	M5 EX. TOOTH WASHER
41	T19/77-S3008-K0M	3x8 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 5)
42	T19/MS-0S550-401	NAMEPLATE
43		NOT USED
44		NOT USED

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SELECT



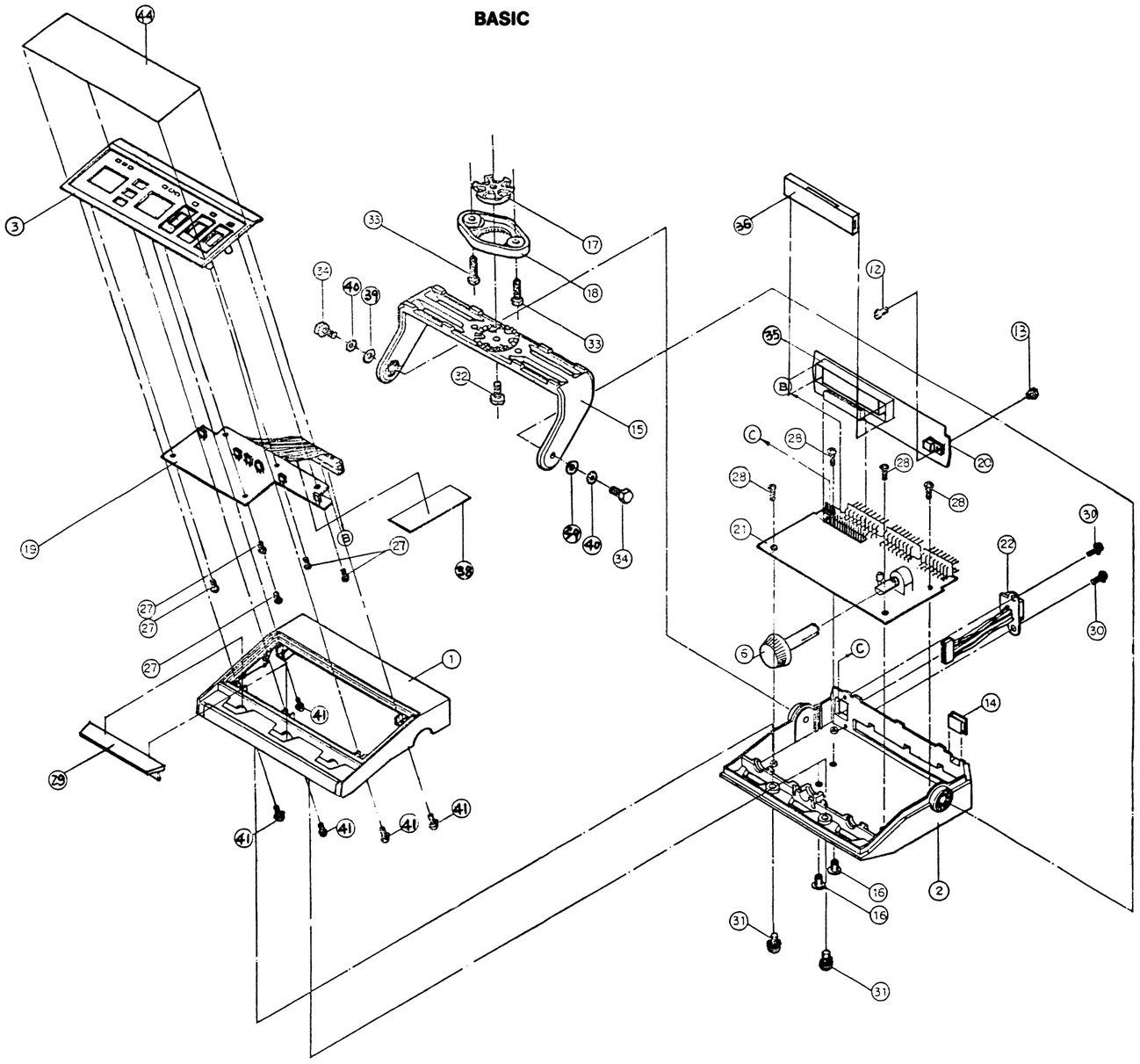
PARTS LIST

LBI-31875
S550 PLUS
(MECHANICAL PARTS)
MODEL P2

SYMBOL	GE PART NO.	DESCRIPTION
1	T19/ME-0S550-037	FRONT HOUSING
2	T19/ME-0S550-002	REAR HOUSING
3	T19/ME-0S550-003	CONTROL PANEL
4	T19/ME-0S550-026	GROUP KNOB
5	T19/ME-0S550-005	CHANNEL KNOB
6	T19/ME-0S550-025	VOLUME KNOB
7		NOT USED
8		NOT USED
9		NOT USED
10		NOT USED
11	T19/MP-0S550-011	MASK
12	T19/80-SN404-P1Z	4-40 UNC x 1/4"
13	T19/83-SN400-H1Z	4-40 UNC NUT
14	T19/MR-0S550-019	DUST COVER
15	T19/ME-0S990-009	MOUNTING BRACKET
16	T19/ME-0S990-021	CAP
17	T19/ME-0S990-032	BREAKAWAY DEVICE
18	T19/ME-0S990-033	RETAINER MOUNTING
19		NOT USED
20		NOT USED
21		NOT USED
22	T19/51-006SD-500	6 P. MIC PHONE JACK
23	T19/55-7105K-J2Z	MOM.-OFF-MOM. SWITCH
24		NOT USED
25		NOT USED
26	T19/77-S2006-P0Z	2x6 SELF TAPPING SCREW. (QUANTITY 2)
27	T19/77-S3008-P0M	3x8 SELF TAPPING SCREW. (QUANTITY 5)
28	T19/77-S3006-P0M	3x6 SELF TAPPING SCREW. (QUANTITY 4)
29		NOT USED
30	T19/77-S4010-K0M	4x10 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 2)
31	T19/77-0S550-032	PTB 4x10 MC SCREW, WITH F/S WASHER. (QUANTITY 2)
32	T19/81-SA010-C1M	10-32 UNF x 5/8" LG
33	T19/77-S4820-H1M	4.8x20 SELF TAPPING SCREW. (QUANTITY 2)
34	T19/75-S5012-C1B	M5x12 MACHINE SCREW. (QUANTITY 2)
35	T19/MP-0S550-036	METAL CAN HOLDER
36	T19/MP-0S550-035	METAL CAP
37		NOT USED
38	T19/74-0S550-23M	TAPE
39	T19/79-S50A0-F0M	M5 FLAT WASHER.
40	T19/79-S50A0-EBM	M5 EX. TOOTH WASHER
41	T19/77-S3008-K0M	3x8 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 5)
42		NOT USED
43	T19/MS-0S550-402	NAMEPLATE
44		NOT USED

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

BASIC



PARTS LIST

LBI-31874
S550 PLUS
(MECHANICAL PARTS)
MODEL P3

SYMBOL	GE PART NO.	DESCRIPTION
1	T19/ME-0S550-037	FRONT HOUSING
2	T19/ME-0S550-002	REAR HOUSING
3	T19/ME-0S550-003	CONTROL PANEL
4		NOT USED
5		NOT USED
6	T19/ME-0S550-025	VOLUME KNOB
7		NOT USED
8		NOT USED
9		NOT USED
10		NOT USED
11		NOT USED
12	T19/80-SN404-P1Z	4-40 UNC x 1/4"
13	T19/83-SN400-H1Z	4-40 UNC NUT
14	T19/MR-0S550-019	DUST COVER
15	T19/ME-0S990-009	MOUNTING BRACKET
16	T19/ME-0S990-021	CAP
17	T19/ME-0S990-032	BREAKAWAY DEVICE
18	T19/ME-0S990-033	RETAINER MOUNTING
19		NOT USED
20		NOT USED
21		NOT USED
22	T19/51-006SD-500	6 P. MIC PHONE JACK
23		NOT USED
24		NOT USED
25		NOT USED
26		NOT USED
27	T19/77-S3008-P0M	3x8 SELF TAPPING SCREW. (QUANTITY 5)
28	T19/77-S3006-P0M	3x6 SELF TAPPING SCREW. (QUANTITY 4)
29	T19/ME-0S550-042	KNOB COVER
30	T19/77-S4010-K0M	4x10 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 2)
31	T19/77-0S550-032	PTB 4x10 MC SCREW, WITH F/S WASHER. (QUANTITY 2)
32	T19/81-SA010-C1M	10-32 UNF x 5/8" LG
33	T19/77-S4820-H1M	4.8x20 SELF TAPPING SCREW. (QUANTITY 2)
34	T19/75-S5012-C1B	M5x12 MACHINE SCREW. (QUANTITY 2)
35	T19/MP-0S550-036	METAL CAN HOLDER
36	T19/MP-0S550-035	METAL CAP
37		NOT USED
38	T19/74-0S550-23M	TAPE
39	T19/79-S50A0-F0M	M5 FLAT WASHER
40	T19/79-S50A0-EBM	M5 EX. TOOTH WASHER
41	T19/77-S3008-K0M	3x8 SELF TAPPING SCREW, WITH F/S WASHER. (QUANTITY 5)
42		NOT USED
43		NOT USED
44	T19/ME-0S550-403	NAMEPLATE

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

LBI-31873
S550 16 PLUS SYSTEM BOARD
MODEL P1, P2 & P3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C201	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V
C202	T19/13-10DKI-A6A	Multi-Layer Ceramic: 1000 pF 10%, 50V
C203	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V
C204 and C205	T19/13-10DKI-A6A	Multi-Layer Ceramic: 1000 pF 10%, 50V
C206	T19/14-47BMP-A0A	Tantalum: 0.47 uF 20%, 16V
C207	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V
C208	T19/13-10DKI-A6A	Multi-Layer Ceramic: 1000 pF 10%, 50V
C209 and C210	T19/12-47CKI-A0A	Polyester: 0.047 uF 10%, 50V
C211 and C212	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V
C213 and C214	T19/14-100MG-A0A	Tantalum: 10 uF 20%, 25V
C215	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V
C216	T19/13-10EKI-A6A	Multi-Layer Ceramic: 100 pF 10%, 50V. (P1 & P2 only).
		- - - - - - - - - - DIODES - - - - - - - - - -
D201 thru D208	T19/22-04148-01N	Silicon, fast recovery: 1N4148
D209 and D210	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 & P2 only).
D211	T19/22-04001-01N	Rectifier: 1N4001
D212	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 & P2 only).
D213 thru D217	T19/22-04148-01N	Silicon, fast recovery: 1N4148.
		- - - - - - - - - - JACKS - - - - - - - - - -
J101	T19/51-140BD-201	Microprocessor board plugs: 40 pins
J201	T19/51-119CD-701	Connector, printed wiring: 19 pins
J301	T19/51-134BD-201	Display board plugs: 34 pins
J202 and J203	T19/51-119CD-701	Connector, printed wiring: 19 pins
J204	T19/51-106BS-301	Mic to System Board Base: 6 pins
		- - - - - - - - - - RELAYS - - - - - - - - - -
K201	T19/59-380F6-SS0	Relay: 12V 37.5 mA. (P1 & P2 only).
		- - - - - - - - - - PLUGS - - - - - - - - - -
P204	T19/51-006CD-000	Mic Jack: 6 pins
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q201 thru Q204	T19/32-03904-2N1	Silicon, NPN: 2N3904
Q205 thru Q208	T19/32-03904-2N1	Silicon, NPN: 2N3904. (P1 & P2 only).
Q209	T19/32-04401-2N1	Silicon, NPN: 2N4401
Q210	T19/32-03904-2N1	Silicon, NPN: 2N3904
Q211	T19/32-03904-2N1	Silicon, NPN: 2N3904. (P1 & P2 only).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R201	T19/03-470AJ-00C	Carbon film: 47 ohms 5%, 1/4 w
R202	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w
R203 and R204	T19/03-2202J-00C	Carbon film: 22K ohms 5%, 1/4 w
R205	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w
R206	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w
R207	T19/03-2202J-00C	Carbon film: 22K ohms 5%, 1/4 w
R208	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w
R209	T19/03-1503J-00C	Carbon film: 150K ohms 5%, 1/4 w
R210	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w
R211	T19/03-2203J-00C	Carbon film: 220K ohms 5%, 1/4 w
R212	T19/03-2202J-00C	Carbon film: 22K ohms 5%, 1/4 w
R213	T19/03-1000J-00C	Carbon film: 47 ohms 5%, 1/4 w
R214	T19/03-470AJ-00C	Carbon film: 47 ohms 5%, 1/4 w
R217 thru R220	T19/03-470BJ-00C	Carbon film: 4.7K ohms 5%, 1/4 w. (P1 & P2 only).
R221 thru R223	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w
R224	T19/03-100AJ-20A	Carbon film: 10 ohms 5%, 2 w
R225	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w. (P1 & P2 only).
R226 thru R233	T19/03-2700J-00D	Carbon film: 270 ohms 5%, 1/2 w. (P1 & P2 only).
R234	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w
R235	T19/03-2202J-00C	Carbon film: 22K ohms 5%, 1/4 w
R236	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w. (P1 & P2 only).
R237	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w
R238 and R239	T19/03-4702J-00C	Carbon film: 47K ohms 5%, 1/4 w
R240 and R241	T19/03-1000J-00C	Carbon film: 100 ohms 5%, 1/4 w
		- - - - - - - - - - NETWORKS - - - - - - - - - -
RP201	T19/01-2202J-2GC	Res Network: 22K ohms 5%, 1/8 w, 10 pin 9 element. (P1 & P2 only)
RP202	T19/01-2202J-2GC	Res Network: 22K ohms 5%, 1/8 w, 10 pin 9 element.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
SW101 and SW102	T19/55-081GR-SRR	16 Position Binary Encoder Switch (P1 & P2 only).
SW203	T19/55-163SR-B25	Switch with Potentiometer: 25K ohms 20%, 1/10 w, linear.
		- - - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U201	T19/45-5810A-CPC	10 Bits Serial/Parallel: UCN-5810A
U202	T19/45-2803A-BPC	Darlington Transistor Array: ULN-2803A. (P1 & P2 only).
U203	T19/36-00393-01M	Dual Comparator: LM393
U204	T19/36-00005-078	5V Regulator: 7805
		- - - - - - - - - - CABLES - - - - - - - - - -
W204	T19/51-006BS-301	Housing with 26 AWG 5cm * 6 : 6 pins

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

LBI-31877
S550 16 PLUS MICROPROCESSOR BOARD
MODEL P1, P2 AND P3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101 and C102	T19/12-47CKI-A0A	Polyester: 0.047 uF 10%, 50V
C103 and C104	T19/14-10BMH-A0A	Tantalum: 0.1 uF 20%, 35V
C105	T19/14-470MD-A0A	Tantalum: 47 uF 20%, 6.3V
C106	T19/12-10BKI-A0A	Polyester: 0.1 uF 10%, 50V
C109	T19/13-22FKI-A6A	Multi-Layer Ceramic: 22 pF 10%, 50V
C110	T19/13-27FKI-A6A	Multi-Layer Ceramic: 27 pF 10%, 50V
C120	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
C122 thru C134	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
C136 thru C171	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
C173 thru C175	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
C178 thru C188	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
C190 thru C195	T19/13-10DKI-A4A	Multi-Layer Ceramic chip: 1000 pF 10%, 50V
		- - - - - - - - - - DIODES - - - - - - - - - -
D102	T19/22-04148-01N	Silicon, fast recovery: 1N4148
		- - - - - - - - - - JACKS - - - - - - - - - -
J102	T19/51-103BS-201	3 Pin Mini Jumper Base, Male
		- - - - - - - - - - PLUGS - - - - - - - - - -
P101	T19/51-040BD-001	40 Pin Printed Circuit Connector, Female
P102	T19/49-DM2GB-2GS	2 Pin Mini Jumper, Female
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q101	T19/32-03904-2N1	Silicon, NPN: 2N3904
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101	T19/03-1004J-00C	Carbon film: 1M ohms 5%, 1/4 w
R102	T19/03-4701J-00C	Carbon film: 4.7K ohms 5%, 1/4 w
R103	T19/03-4702J-00C	Carbon film: 47K ohms 5%, 1/4 w
R112 thru R116	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w
		- - - - - - - - - - NETWORKS - - - - - - - - - -
RP101	T19/01-1002J-2GC	Res Network: 10K ohms 5%, 1/8 w, 10 pin 9 element.
		- - - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U101	T19/46-80516-CPC	Microprocessor: 80C51
U108	T19/40-021AT-0PC	8-Stage Static Shift Register: 4021
U109	T19/36-00387-00L	5 V Regulator and Reset: L387
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XU101	T19/50-401T0-01S	40 Pin Socket
		- - - - - - - - - - CRYSTALS - - - - - - - - - -
Y101	T19/60-73728-D00	Crystal: 7.3728 MHz

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

LBI-31878
S550 16 PLUS DISPLAY BOARD
MODEL P1, P2 AND P3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - - DIODES - - - - - - - - - - -
D301	T19/24-24VR2-SLB	Red Square LED: SLB24VR3F. (P1 and P3 only).
D302	T19/24-24MG5-SLB	Green Square LED: SLB24MG3F. (P1 and P2 only).
D303	T19/24-24YY4-SLB	Yellow Square LED: SLB24YY3F. (P1 and P3 only).
D304	T19/24-24YY4-SLB	Yellow Square LED: SLB24YY3F
D305	T19/24-24MG5-SLB	Green Square LED: SLB24MG3F
D306	T19/24-24VR2-SLB	Red Square LED: SLB24VR3F
D307	T19/24-24YY4-SLB	Yellow Square LED: SLB24YY3F
D308	T19/24-24VR2-SLB	Red Squre LED: SLB24VR3F
D309 thru D311	T19/24-20GD5-000	Green LED Lamp. (P1 only).
D312 and D313	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 only).
D314	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 and P2 only).
D315 and D316	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 only).
D317	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 and P2 only).
D318	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 only).
D319 thru D322	T19/22-04148-01N	Silicon, fast recovery: 1N4148. (P1 and P2 only).
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P301	T19-51-034BD-201	Printed Circuit Connector with Cable: 34 pins
		- - - - - - - - - - - TRANSISTORS - - - - - - - - - - -
Q301 thru Q304	T19/31-04403-2N1	Silicon, PNP: 2N4403. (P1 and P2 only).
Q305	T19/32-03904-2N1	Silicon, NPN: 2N3904. (P1 only).
Q306	T19/32-03904-2N1	Silicon, NPN: 2N3904. (P1 and P2 only).
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R301	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P2 only).
R302	T19/03-3301J-00C	Carbon film: 3.3K ohms 5%, 1/4 w. (P1 and P2 only).
R303	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P2 only).
R304 and R305	T19/03-3301J-00C	Carbon film: 3.3K ohms 5%, 1/4 w. (P1 and P2 only).
R306	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P2 only).
R307	T19/03-3301J-00C	Carbon film: 3.3K ohms 5%, 1/4 w. (P1 and P2 only).
R308	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P2 only).
R309	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w. (P1 only).
R310	T19/03-3301J-00C	Carbon film: 3.3K ohms 5%, 1/4 w. (P1 only).
R311	T19/03-1002J-00C	Carbon film: 10K ohms 5%, 1/4 w. (P1 and P2 only).
R312	T19/03-3301J-00C	Carbon film: 3.3K ohms 5%, 1/4 w. (P1 and P2 only).
R313	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P3 only).
R314	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P2 only).
R315	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w. (P1 and P3 only).
R316 thru R320	T19/03-1001J-00C	Carbon film: 1K ohms 5%, 1/4 w.
R321	T19/03-3300J-00D	Carbon film: 330 ohms 5%, 1/2 w. (P1 only).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S301	T19/55-7107K-J2Z	Rocker and Lever Handle Switch: 7105-J2-Z-Q-I. (P1 and P2 only).
S302	T19/55-1021K-08M	Rocker and Lever Handle Switch: 8M1021. (P1 only).
S303	T19/55-7108K-J2Z	Rocker and Lever Handle Switch: 7108-J2-Z-Q-I. (P1 only).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U301 and U302	T19/26-5521G-HDS	Dual 7-Segment Display: HDSP-5521 G. (P1 and P2 only).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

ADDENDUM NO 1 TO LBI-31573A
(PCS6)

This addendum identifies revision letter changes not previously incorporated in this publication.

REV A - CONTROL UNIT 19B801551P1-3
To change PTT timing and improve switch de-bounce, changed U101.

REV B - CONTROL UNIT 19B801551P1-3
To prevent group/system switch bounce/skip, deleted C174, C175, and C188 on CPU board.

REV C - CONTROL UNIT 19B801551P1-3
To eliminate PTT switch bounce, changed U101.

U101 is: 19A149271G5.

ADDENDUM NO 2 TO LBI-31573A
(PCS6)

This addendum adds the following part numbers to this publication. When ordering, use the appropriate part number for each board.

MODEL	PWB NAME	PART NUMBER
19B801551P1,2	SYSTEM BOARD	T19/AS16P1001A
19B801551P3	SYSTEM BOARD	T19/AS16P3001A
19B801551P1-3	PROCESSOR BOARD	T19/AS16P1002A
19B801551P1	DISPLAY BOARD	T19/AS16P1003B
19B801551P2	DISPLAY BOARD	T19/AS16P2003B
19B801551P3	DISPLAY BOARD	T19/AS16P3003B