16 PLUS ™

GENERAL ELECTRIC TRUNKING CARD

(GETC) SERVICE MANUAL

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INTRODUCTION

This manual contains the information required for testing and servicing the General Electric Trunking Card (GETC) station shelf. Included are adjustment and troubleshooting procedures, GETC shelf Interconnection Diagram, Outline and Schematic Diagrams, and Parts List for the GETC logic board and the Regulator Assembly.

The adjustments cover the GETC shelf and 16PLUS ™ station. Service information includes four areas of GETC test: off-site test (bench lab stand-alone test), on-site test (limited test with minimum equipment in a station), station test (test in a station), and trunking test (test with a mobile or portable acquiring the station).

INSTALLATION

The GETC is installed in a 69-inch 16PLUS station cabinet, above the station radio housing. A slide mount supports the GETC shelf assembly, and also allows for easy access during setup and servicing. The GETC Logic card assembly may be removed from the Shelf Assembly by disconnecting the connecting cables and removing the card assembly from the shelf slide. Installation of the GETC shelf assembly is as follows:

1. Mount the GETC Shelf Assembly in the desired rack position, using the hardware provided. Extend the shelf to the service position.

2. Connect the harness assembly (19C620811) plug P26 to GETC Logic card connector J6.

3. Connect the harness assembly (19C620811) plug P27 to GETC Logic card connector J7.

4. Connect the harness assembly (19C620811) plug P10 to GETC Logic card connector J10.

5. Connect the harness assembly (19C620811) plug P19 to GETC Logic card connector J19.

6. Connect the harness assembly (19C336863) plug P8 to GETC Logic card connector J8.

7. Connect the harness assembly (19C336863) plug P19 to GETC Logic card connector J19.

8. Slide the GETC shelf back into the cabinet.

9. Connect the Main Site Controller cable (from patch panel) to connector J100 at the back of the GETC Shelf Assembly.

10. Connect the Backup Site Controller cable (from patch panel) to connector J101 at the back of the GETC Shelf Assembly.

11. Connect the Backup Serial Link cable (from patch panel) to connector J102 at the back of the GETC Shelf Assembly.

ADJUSTMENTS

Adjustments in this section are necessary when the GETC shelf is installed in a station. The adjustments properly configure the GETC (DIP switches and jumpers), align the station for digital signalling (station IF), balance the telephone line, eliminate repeated 9600 dotting (4800 Hz tone notch level), and set high speed, low speed, and audio modulation.

DIP SWITCHES

There are three dual-in-line (DIP) switches on the GETC logic board that must be configured for proper transmitter frequency, desired channel number, data polarity, and default operating mode.

The station transmitter frequency must be properly set up (if used in a control or working channel), a unique channel number must be defined (channel 1 through 20, and 26 for control, working, and downlink channels), default channel setup must be performed (control, downlink, working, or failsoft control channel), and transmit data polarity must be selected.

The GETC test mode of operation is enabled by setting the channel number to 31 (11111 binary) and resetting the GETC shelf. The test mode of operation is used in the off site test, on site test, and station test. Switches S1-8, S2-5 thru S2-7, and S3-6 may be in any position.

Selecting Channel Number

Switches S3-1 through S3-5 configure the GETC with the channel number. Allowable channel numbers range from 1 (00001 binary) to 20 (10100 binary) for control and working channels. Channel numbers 0, 21 thru 25, and 27-30 are reserved, and channel number 31 (11111 binary) is used in the test mode. Switch S3-5 is the most-

TABLE 1. GETC CHANNEL NUMBER SETTINGS

CHANNEL NUMBER	SWITCH SETTINGS S3-1 THRU S3-5	COMMENTS
0	00000	RESERVED
1	00001	CONTROL OR WORKING
2	00010	CONTROL OR WORKING
3	00011	CONTROL OR WORKING
4	00100	CONTROL OR WORKING
5	00101	CONTROL OR WORKING
6	00110	CONTROL OR WORKING
7	00111	CONTROL OR WORKING
8	01000	CONTROL OR WORKING
9	01001	CONTROL OR WORKING
10	01010	CONTROL OR WORKING
11	01011	CONTROL OR WORKING
12	01100	CONTROL OR WORKING
13	01101	CONTROL OR WORKING
14	01110	CONTROL OR WORKING
15	01111	CONTROL OR WORKING
16	10000	CONTROL OR WORKING
17	10001	CONTROL OR WORKING
18	10010	CONTROL OR WORKING
19	10011	CONTROL OR WORKING
20	10100	CONTROL OR WORKING
21	10101	RESERVED
22	10110	RESERVED
23	10111	RESERVED
24	11000	RESERVED
25	11001	RESERVED
26	11010	DOWNLINK
27	11011	RESERVED
28	11100	RESERVED
29	11101	RESERVED
30	11110	RESERVED
31	11111	TEST MODE

significant bit (MSB), and S3-1 is the least-significant bit (LSB) of the GETC channel number. Also, a logic 0 is defined as a closed (on) switch setting, and a logic 1 is defined as an open (off) switch setting. Table 1 lists the allowable channel numbers and their binary equivalents.

Selecting RF Transmit Frequency

The rf transmit frequency is set by S1-1 thru S1-7 and S2-1 thru S2-4. These eleven bits encode the transmitter frequency, in the range from 850 to 870 MHz, at a 12.5 kHz channel spacing. At power up, reset, or out-of-lock condition of the synthesizer, the GETC will attempt to load the transmit frequency code to the Synthesizer. The allowable transmit frequencies and their corresponding switch settings are listed in the appendix.

Inversion Of High- And Low-Speed Data

The GETC is able to invert the high-speed and low-speed data to the Synthesizer-Exciter board. When switch S2-8 is closed, the high-speed and low-speed data are not inverted. When S2-8 is open, the data are inverted. For normal operation, set S2-8 to the open (off) position.

Selecting Default Failsoft Operation

Default failsoft operation is defined by S3-8. Setting S3 to open on a control channel will force failsoft operation at the next reset.

JUMPER CONFIGURATION

The jumpers on the GETC logic board are configured for 16^{PLUS} applications. Table 2 describes the functions of the jumpers. Other jumper configurations enable the GETC to be used in VoiceGuard® systems. Unless otherwise specified, the jumpers are to be configured for 16^{PLUS} operation.

TABLE 2. JUMPER FUNCTIONS

CONNECTOR	JUMPER	FUNCTION
J11-1&2	P11	Receive data from 9600 baud Modem board
J12-1&2	P12	Clear to send from 9600 baud Modem board
J13-1&2	P13	Route backup serial link tx output to backup serial link rx input
J14-1&2	P14	Master site controller path selection enable
J15-1&2	P15	Backup site controller path selection enable
J16-1&2	P16	Backup serial link selection enable
J17-1&2	P17	Low-speed data encode path enable
J18-1&2	P18	Low-speed data decode path enable
J20-1&2	P20	Combined ptt from station disable
J21-1&2	P21	High-speed, data-acquisition rate control
J22-1&2	P22	4800 Hz tone notch path enable
J24-1&2	P24	Backup serial link selection enable
J25-1&2	P25	Low-speed data encode path enable
J26-1&2	P26	Lock-detect input path enable
J28-1&2	P28	Sync line input path enable
J29-1&2	P29	No function
J30-2&3	P30	Enable clock drive to microcomputer
J30-4&5	P31	CMOS configuration

STATION IF ADJUSTMENT

Certain receiver adjustments and fine tuning are necessary in order to place the GETC into a station. The procedure for aligning the receiver IF of the station involves re-peaking the IF adjustments using an RF signal source being modulated with a 9600 baud pseudorandom data signal, and using the MASTR-II test set for DC meter readings. An oscilloscope is also used to observe the data signal (eye pattern) while making adjustments. Additional information can be found in the receiver maintenance manual.

Equipment Required

The equipment necessary for the receiver IF adjustment is:

1. Oscilloscope (Tektronix 468 or equivalent)
2. VoiceGuard® Digital Test Generator (G.E.-19A149117P1 or equivalent)
3. RF Signal Generator (HP-8640B or equivalent)
4. MASTR-II Test Set (G.E.-4EX3A12 or equivalent)

Adjustment Procedure

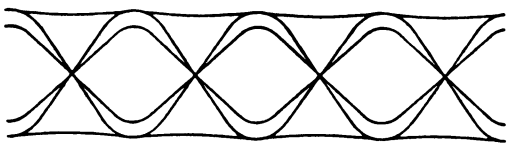
The following procedure will align the receiver IF for optimum data-detection operation.

NOTE

Use a signal generator capable of producing RF in the desired receiver frequency operating range. Insure that the signal generator is capable of direct FM modulation to produce constant deviation with constant input over the frequency range of 10 Hz to 4.8 kHz.

1. Connect a 9600 baud pseudorandom modulating signal (from a VG9600 module or a VoiceGuard® Digital Test Generator) to the modulation input of the signal generator. Set for rated high speed data deviation.
2. Set the signal generator to the operating frequency of the receiver, and connect the generator RF output to the receiver antenna.
3. Adjust the RF level out of the signal generator to produce a below-limiting reading on the "B" position of the MASTR-II test set.

4. Connect an oscilloscope to VOL/SQ HI (IFAS Board terminal 11 in the receiver), and adjust the scope display to show an eye pattern as shown in the Figure 1.



RC-5207

FIGURE 1 - "EYE" PATTERN AT VOL/SQ HI

NOTE

Receiver front-end and local oscillator chain must be properly aligned before adjusting the IFAS board.

5. Adjust T4 (T604), T3 (T603) and T2 (T602) on the IFAS board (19D432667G2) for peak output, being careful to stay out of limiting.

6. Adjust the MIF (OSCILLATOR/MULTIPLIER Board, 19D423194G1) coils and crystal filter for a maximum reading (some peaks are broad) on the "B" position of the test set while staying out of limiting.

7. Start with the MIF crystal filter, and slightly detune the MIF adjustments (each side of the peak) to find the best eye pattern display on the oscilloscope. Care should be taken to stay near the peak of the "B" reading.

TELEPHONE LINE ADJUSTMENT

The GETC shelf is adjusted to the four-wire telephone (3002 grade) dedicated link.

Equipment Required

The equipment necessary for the telephone adjustment is a Volt-Ohmmeter (Triplett Model 630-PL or equivalent)

Adjustment Procedure

The following procedure will align the four-wire telephone interface for optimum data-detection operation:

1. Adjust R1 (PH RX ADJ), on the GETC logic board, while receiving a downlink communication message (from the console, over the phone line, and to the GETC), for 0.16 volts RMS measured on U18-1 (J3-32A).

2. Adjust R2 (PH TX ASJ), on the GETC logic board, for 0.77 volts RMS on J6-8 and J6-9 while transmitting a downlink communication message from the GETC to the console over the phone line.

4800 HZ TONE NOTCH LEVEL ADJUSTMENT

The 4800 Hz Tone Notch Filter is adjusted to eliminate the 9600 baud dotting waveform received from mobile/portable units.

Equipment Required

The equipment necessary for the 4800 Hz tone notch level adjustment is:

1. HP-334A Distortion Analyzer or equivalent

2. HP-3312A Function Generator or equivalent

3. HP-8640B Signal Generator or equivalent

Adjustment Procedure

The following steps will align the 4800 Hz tone notch filter:

1. Set R110 (TN1 REJ ADJ) and R115 (TN2REJ ADJ) fully counterclockwise.

2. Connect the distortion analyzer to J22-1 (filter output).

3. Inject a 4800 Hz signal at J7-5 and record the level displayed by the distortion analyzer.

4. Adjust R110 (TN1 REJ ADJ) for a minimum reading on the distortion analyzer.

5. Adjust R115 (TN2 REJ ADJ) for a minimum reading on the distortion analyzer.

6. Verify that the depth of the notch at J22-1 is at least 30 dB with respect to the reference level of the 4800 Hz tone recorded in step 3.

HIGH-SPEED DATA MODULATION ADJUSTMENT

The high speed data modulation adjustment (R31) sets the deviation level for the 9600 baud transmitted (RF) data.

Equipment Required

The equipment necessary for the 4800 Hz tone notch level adjustment is:

1. HP-3312A Function Generator or equivalent

2. HP-8901A Modulation Analyzer or equivalent

Adjustment Procedure

The following steps will align the high-speed-data filter:

1. Inject a TTL squarewave at 9600 baud into the GETC at TP114.

2. Activate the PTT (transmit) line of the station.

3. Adjust R31 for the rated deviation on the high speed data.

SERVICE AND TEST

This section describes four test procedures that are used to test the GETC. These include the off site test, the on site test, the station test, and the Trunking test.

The off site test is used to test the GETC in a laboratory environment or under bench test. On-site testing is used to test the GETC at the site location using a limited set of tools or equipment. Station testing is used to test the GETC in a station and to perform adjustments. The Trunking test is used to test the GETC as part of a functional system.

TERMINAL CONNECTION

A terminal (or computer with terminal program and RS-232C port) is used to communicate with the GETC in the test mode of operation. The terminal should be configured for a 2400 baud link, odd parity, full duplex, and uppercase characters. A Tandy 102 can be used as a dumb terminal. Terminal and GETC pin assignments are listed in Table 3. A sample connection cable is shown in Figure 2.

TABLE 3. - GETC AND RS-232C PIN ASSIGNMENTS

SIGNAL FROM GETC	GETC LOGIC BD PIN NUMBER	GETC SHELF PIN NUMBER	TERMINAL EIA RS-232C D-TYPE CONNECTOR PIN NUMBER
TXD	J8-1 (MASTER)	J100-3 (MASTER)	PIN 3
TXD	J19-1 (BACKUP)	J101-3 (BACKUP)	PIN 3
RXD	J8-2 (MASTER)	J100-2 (MASTER)	PIN 2
RXD	J19-2 (BACKUP)	J101-2 (BACKUP)	PIN 2
GND	J8-3 (MASTER)	J100-7 (MASTER)	PIN 7
GND	J19-3 (BACKUP)	J101-7 (BACKUP)	PIN 7

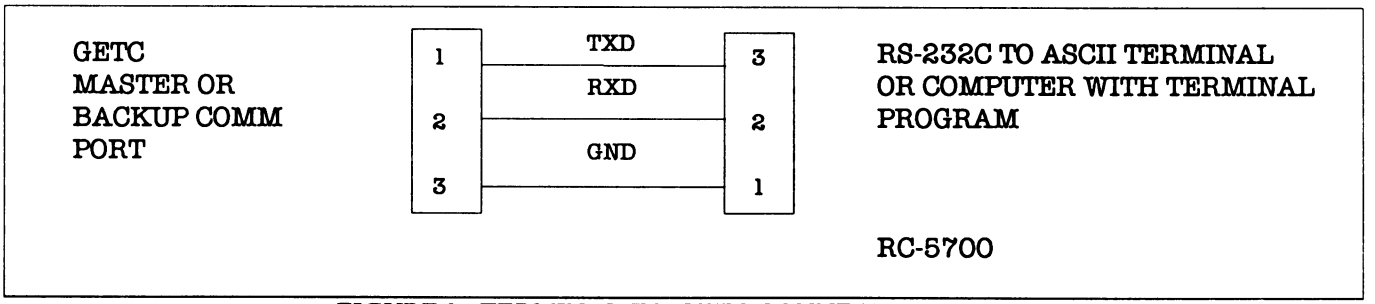


FIGURE 2 - TERMINAL-TO-GETC CONNECTION CABLE

This connection cable may be used any time the terminal is used during a GETC test procedure. Characters that are typed from the keyboard are followed by RETURN (ENTER). A key press on the keyboard (such as ESC, TAB, or RETURN) is indicated by the key name enclosed in square brackets [KEY PRESS]. Control functions are indicated by CTRL - <CONTROL CHARACTER>, such as CTRL-Z to indicate the Z is pressed while holding down the CTRL key. If variable data or commands are to be entered, they will be enclosed in angle brackets <VARIABLE DATA> or <COMMAND>. Variable data depends on your particular application or test. Type the appropriate response (do not include brackets) and follow by return if required.

POWER SUPPLY TEST

1. Verify the rated supply current for the nominal rated voltage.

2. Verify the power requirement listed below. Make measurements at J10-1 and J10-2 (system ground).

INPUT POWER	=	11.0 VOLTS
		13.8 VOLTS
		16.6 VOLTS

MONITOR POINT	VOLTAGE (VOLTS)
TP110	+5.0 ± 0.25
TP111	+5.0 ± 0.25
TP108	-12.0 ± 1.2
TP109	+12.0 ± 1.2

MICROCOMPUTER CLOCK TEST

Equipment Required

- Frequency Counter

Test Procedure

1. Connect frequency counter to J30-3.

2. Verify the microcomputer clock frequency (U4-14) is 11.0592 MHz ± 500 Hz.

OFF-SITE TEST

The off site test is used to test the GETC in a laboratory environment or under bench test. This section outlines the testing of the GETC as a standalone unit outside of the station.

Equipment Required

The equipment necessary for the off site test includes:

1. HP-6286A (or equivalent) DC power supply with current limit

2. Tektronix-468 (or equivalent) digital storage scope

3. HP-3312A (or equivalent) Function Generator

4. Fluke-1920A (or equivalent) Frequency Counter

5. Data Technology Model 30 digital Multimeter or equivalent

6. Triplett Model 630-PL Type 5 VOM or equivalent

7. Tandy 102 portable computer or equivalent

8. HP-334A (or equivalent) Distortion Analyzer

Preliminary Setup

1. Set switchs S3-1 thru S3-5 to their off (open) positions.

2. Connect the terminal or computer to the GETC master communication link (J8). Refer to Table 3 for GETC and RS-232C pin assignments.

Serial Link Test

1. Power-up (or press RESET button S4) the GETC, and verify that the GETC responds with the welcome message to the terminal.

2. Execute the <BCL> command (backup communications link) on the terminal. Press [RETURN] and verify that terminal communication on the master link is inoperative.

3. Move the terminal from the master (J8) to the backup link (J19). Press [RETURN] and verify that terminal communication on the backup link is operative by executing the <BCL> command.

4. Execute the <MCL> command (master communications link) on the terminal. Press

[RETURN] and verify that terminal communication on the backup link is inoperative.

5. Move the terminal from the backup (J19) to the master (J8) link. Press [RETURN] and verify that terminal communication on the master link is operative by executing the <MCL> command.

EPROM Test

Execute the command <CHK 0-7FFF>. Verify the terminal response of "CHECKSUM=00".

RAM Test

Execute the command <TMX 000-7FF>. Verify the terminal response of "SIX PATTERNS CHECK OK".

Reset Circuit Test

1. Lower the input power to 6 volts.

2. Raise the input power to 9 volts. Verify the GETC welcome message to the terminal.

Watchdog Timer Test

1. Execute the command <WAT>.

2. Verify the GETC response of the welcome message to the terminal after 2 seconds.

Output Latch and Buffer Test

NO.	STEP	TEST POINT	LOGIC LEVEL
1.	Move jumper P14 from J14-1 and J14-2 to J14-2 and J14-3.		
2.	Move jumper P24 from J24-1 and J24-2 to J24-2 and J24-3.		
3.	Move jumper P25 from J25-1 and J25-2 to J25-2 and J25-3.		
4.	Move jumper P20 from J20-1 and J20-2 to J20-2 and J20-3.		
5.	Install a 10K resistor from J7-14 to ground.		
6.	Install a 10k resistor from the open collector points (OC) to +13.8 volts.		

NOTE

Unless otherwise specified, a logic one is defined as 13.8 ± 0.5 volts, and a logic zero is defined as 0 ± 0.5 volts.

7. Execute the command <XBY A800=52>.		
8. Execute the command <XBY B000=42>.		
9. Connect J7-6 to ground J6-11		
	J6-1	1
	J6-2	1
	J6-3	1
	J6-4	0
	J6-5	1
	J6-10	1
	J6-11	0
	J6-12	1
	J6-13	0
	J6-14	1
	J6-15	0
	J6-16	1
	J7-14	<0.5V
	J7-15	<0.5V
	J7-16	0
	J9-1	>10V
	J3-25A	<0.5V
	J3-13C	1
	H1 (L7)	OFF
	H2 (L6)	ON
	H3 (L5)	OFF
	H4 (L4)	ON
	H5 (L3)	ON
	H6 (L2)	OFF
	H7 (L1)	OFF

NOTE

Reset the GETC to terminate this test

NO.	STEP	TEST POINT	LOGIC LEVEL
10.	Execute the command <XBY B000=B9>.		
11.	Execute the command <XBY A800=AD>.		
12.	Connect J7-6 to ground.		
		J6-1	0
		J6-2	0
		J6-3	0
		J6-4	1
		J6-5	0
		J6-10	0
		J6-11	1
		J6-12	0
		J6-13	1
		J6-14	0
		J6-15	1
		J6-16	0
		J7-14	>7V
		J7-15	>7V
		J7-16	1
		J9-1	<-10V
		J3-25A	>3.5V
		J3-13C	0
		H1 (L7)	ON
		H2 (L6)	OFF
		H3 (L5)	ON
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	ON
		H7 (L1)	ON
13.	Execute the command <XBY A800=00>.		
14.	Execute the command <XBY B000=0C>. Do not connect J7-6 to ground.		
		J6-1	1
		J6-2	1
		J6-3	1
		J6-4	1
		J6-5	1
		J6-10	1
		J6-11	1
		J6-12	1
		J6-13	1
		J6-14	1
		J6-15	1
		J6-16	1
		J7-14	>7V
		J7-15	<0.5V
		J7-16	1
		J9-1	>10V
		J3-25A	<0.5V
		J3-13C	0
		H1 (L7)	OFF
		H2 (L6)	OFF
		H3 (L5)	OFF
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	OFF
		H7 (L1)	OFF

NO.	STEP	TEST POINT	LOGIC LEVEL
	NOTE *Reset the GETC to terminate this test*		
15.	Execute the command <XBY B000=08>.		
16.	Execute the command <XBY A800=80>. Do not connect J7-6 to ground.		
		J6-1	1
		J6-2	0
		J6-3	1
		J6-4	1
		J6-5	1
		J6-10	1
		J6-11	1
		J6-12	1
		J6-13	1
		J6-14	1
		J6-15	1
		J6-16	1
		J7-14	>7V
		J7-15	>7V
		J7-16	1
		J9-1	>10V
		J3-25A	<0.5V
		J3-13C	0
		H1 (L7)	OFF
		H2 (L6)	OFF
		H3 (L5)	OFF
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	OFF
		H7 (L1)	OFF
17.	Move jumper P20 from J20-2 and J20-3 to J20-1 and J20-2.		
18.	Move jumper P14 from J14-2 and J14-3 to J14-1 and J14-2.		
19.	Move jumper P24 from J24-2 and J24-3 to J24-1 and J24-2.		
20.	Move jumper P25 from J25-2 and J25-3 to J25-1 and J25-2.		

Input Buffer And Port Test

1. Move jumper P20 from J20-1 and J20-2 to J20-2 and J20-3.

2. Move jumper P26 from J26-1 and J26-2 to J26-2 and J26-3.

3. Move jumper P28 from J28-1 and J28-2 to J28-2 and J28-3.

4. Connect J7-7, J7-9, J7-11, J7-13, and J3-25C to ground.

5. Execute the command <POR1> and, verify the terminal response of 10101010.

6. Execute the command <POR3>, and verify the terminal response of XX01XXXX, where X is any state.

7. Remove the ground from J7-7, J7-9, J7-11, J7-13, and J3-25C.

8. Connect J7-6, J7-8, J7-10, J7-12, and J7-14 to ground.

9. Execute the command <POR1>, and verify the terminal response of 01010101.

10. Execute the command <POR3>, and verify the terminal response of XX10XXXX, where X is any state.

11. Remove the ground from J7-6, J7-8, J7-10, J7-12 and J7-14.

12. Move jumper P20 from J20-2 and J20-3 to J20-1 and J20-2.

13. Move jumper P26 from J26-2 and J26-3 to J26-1 and J26-2.

14. Move jumper P28 from J28-2 and J28-3 to J28-1 and J28-2.

High Speed Data Test

1. Jumper J7-2 to J7-4.

2. Execute the command <MDS 0>.

3. Execute the command <BER DE-00=10>, and verify the terminal response of:

   "RECEIVE ERROR COUNT=0000 RECEIVE CHECKSUM=00188123"

   which continually updates every 10 seconds.

4. Enter CTRL-Z or [ESC] to end the test. Remove the jumper from J7-2 and J7-4.

Low-Speed-Data Test

1. Jumper J19-5 to J7-2.

2. Connect an oscilloscope to J19-5.

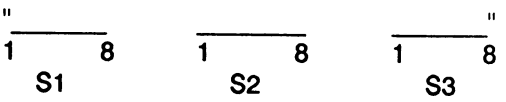
3. Execute the commands and verify the responses listed in the table below. The command format is [LSH <command from table>].

COMMAND	FREQUENCY ON J19-5 (HZ)	AMPLITUDE ON J19-5 (V P-P) CENTERED AT 0	FREQUENCY OF SQUAREWAVE ON J18-1 (HZ)
1-1	10	2.0 ± 0.25	10
1-2	100	2.0 ± 0.25	100
1-3	200	2.0 ± 0.25	200
1-4	1000	<-32 dB OF 2.0	UNDEFINED
2-1	10	1.0 ± 0.25	10
2-2	100	1.0 ± 0.25	100
2-3	200	1.0 ± 0.25	200
2-4	1000	<-32 dB OF 1.0	UNDEFINED
3-1	10	3.5 ± 0.5	10
3-2	100	3.5 ± 0.5	100
3-3	200	3.5 ± 0.5	200
3-4	1000	<-32 dB 0F 3.5	UNDEFINED

4. Enter CTRL-Z or [ESC] to end the test.

DIP Switch Test

1. Execute the command <DSW> and verify the settings of DIP switches, S1, S2, and S3. The terminal display is as shown:



   An open (or OFF) on the DIP switch is displayed as a "1", while a closed (or ON) is displayed as a "0".

   This test continually updates the terminal display at each DIP switch setting change.

2. Enter CTRL-Z or [ESC] to end the test. Set S3-1 thru S3-5 to open.

High Speed Data Filter Response Test

1. Execute the command <XB^{V} B000=10>.

2. Connect the function generator, through a 10 μF capacitor to TP114 on the GETC logic board.

3. Adjust the function generator for 1.0 volt rms at TP114.

4. Connect a distortion analyzer to J7-4.

5. Verify the frequency response shown in the table below (1000 Hz reference at 1.0 volt rms output).

INPUT FREQUENCY (HZ)	OUTPUT LEVEL (DB)
100	0 ± 0.1
1000	0
3000	0 ± 0.1
6000	0 ± 0.1
7000	3 ± 0.5
8000	5 ± 1.0

4800 Hz Tone Notch Filter Response Test

1. Connect the function generator, through a 10 μF capacitor to J7-5.

2. Connect a distortion analyzer to J22-1.

3. Use a reference input signal of 1000 Hz at 1.0 volt rms. Set the input tone at 4800 Hz and adjust R110 and R115 to null the output tone to the distortion analyzer. The depth of the notch should be greater than 30 dB.

4. Verify the frequency response of the filter to be within ±2 dB of the reference from 10 Hz to 3000 Hz.

Phone Data Test

1. Remove jumper P11 from J11-1 to J11-2.

2. Install jumper P11 from J11-2 to J11-3.

3. Install a jumper from J9-3 to J9-4.

4. Execute the command <MDS 1>.

5. Execute the command <BER DE-00=10>, and verify the terminal response of:

   "RECEIVE ERROR COUNT=0000 RECEIVE CHECKSUM=00188123"

   continually updates every 10 seconds.

6. Enter CTRL-Z or [ESC] to end the test.

7. Remove jumper P11 from J11-2 to J11-3.

8. Install jumper P11 from J11-1 to J11-2.

9. Remove the jumper from J9-3 to J9-4.

9600 Baud Modem Test

1. Connect a jumper between J6-6 and J6-8 on the GETC logic board.

2. Connect a jumper between J6-7 and J6-9.

3. Place a 680 ohm resistor (1/2 watt) between J6-8 and J6-9.

4. Adjust R1 (PH RX ADJ) and R2 (PH TX ADJ) to midrange.

5. Execute the command <TIM 19>.

6. Execute the command <MDS 1>.

7. Execute the command <BER DE-00=10>, and verify the terminal response of:

   "RECEIVE ERROR COUNT=0000 RECEIVE CHECKSUM=00188123"

   continually updates every 10 seconds. Ignore the first message to the terminal.

8. Enter CTRL-Z or [ESC] to end the test.

9. Remove jumper P11 from J11-2 and J11-3.

10. Install jumper P11 from J11-1 to J11-2.

11. Remove the 680-ohm resistor and jumpers on J6-6 thru J6-9.

ON-SITE TEST

This test is used to test the GETC at the system site location using limited tools and equipment. This procedure is a quick functional test of the GETC as a stand-alone unit in the station.

Equipment Required

The equipment necessary for the on-site test includes:

1. Tektronix 468 (or equivalent) digital storage scope
2. Triplett Model 630-PL Type 5 VOM or equivalent
3. Tandy 102 portable computer or equivalent

Preliminary Setup

1. Disconnected the master (J8) and backup (J19) site controllers from the GETC.
2. Set S3-1 thru S3-5 to their open (off) positions.
3. Connect the terminal or computer to the GETC master communication link (J8). Refer to Table 3 for GETC and RS-232C pin assignments.
4. Proceed with on-site test(s).

Serial Link Test

1. Power-up (or press RESET button S4) the GETC, and verify that the GETC responds with the welcome message to the terminal.
2. Execute the command <BCL> (backup communications link) on the terminal. Press [RETURN] and verify that terminal communication on the master link is inoperative.
3. Move the terminal from the master (J8) to the backup (J19) link. Press [RETURN] and verify that terminal communication on the backup link is operative by executing the <BCL> command.
4. Execute the command <MCL> (master communications link) on the terminal. Press [RETURN] and verify that terminal communication on the backup link is inoperative.
5. Move the terminal from the backup (J19) to the master (J8) link. Press [RETURN] and verify that terminal communication on the master link is operative by executing the <MCL> command.

EPROM Test

Execute the command <CHK 0-7FFF>. Verify the terminal response of "CHECKSUM=00".

RAM Test

Execute the command <TMX 000-7FF>. Verify the terminal response of "SIX PATTERNS CHECK OK".

Watchdog Timer Test

1. Execute the command <WAT>.
2. Verify the GETC response of the welcome message to the terminal after 2 seconds.

Output Latch and Buffer Test

NO.	STEP	TEST POINT	LOGIC LEVEL
1.	Disconnect the station connectors from J6, J7, and J19.		
2.	Move jumper P14 from J14-1 and J14-2 to J14-2 and J14-3.		
3.	Move jumper P24 from J24-1 and J24-2 to J24-2 and J24-3.		
4.	Move jumper P25 from J25-1 and J25-2 to J25-2 and J25-3.		

NO.	STEP	TEST POINT	LOGIC LEVEL
5.	Remove jumper P20 from J20-1 to J20-2 and install on J20-2 to J20-3.		
6.	Install a 10k resistor from J7-14 to ground.		
7.	Install a 10k resistor from the open collector points (OC) to +13.8 volts.		

NOTE

Unless otherwise specified, a logic one is defined as 13.8 (± 0.5) volts, and a logic zero is defined as 0 (± 0.5) volts.

NOTE

Reset the GETC to terminate this test

8.	Execute the command <XBY A800=52>.		
9.	Execute the command <XBY B000=42>.		
10.	Connect J7-6 to ground.		
		J6-1	1
		J6-2	1
		J6-3	1
		J6-4	0
		J6-5	1
		J6-10	1
		J6-11	0
		J6-12	1
		J6-13	0
		J6-14	1
		J6-15	0
		J6-16	1
		J7-14	<0.5V
		J7-15	<0.5V
		J7-16	0
		J9-1	>10V
		J3-25A	<0.5V
		J3-13C	1
		H1 (L7)	OFF
		H2 (L6)	ON
		H3 (L5)	OFF
		H4 (L4)	ON
		H5 (L3)	ON
		H6 (L2)	OFF
		H7 (L1)	OFF

NO.	STEP	TEST POINT	LOGIC LEVEL
11.	Execute the command <XBY B000=B9>.		
12.	Execute the command <XBY A800=AD>.		
13.	Connect J7-6 to ground.		
		J6-1	0
		J6-2	0
		J6-3	0
		J6-4	1
		J6-5	0
		J6-10	0
		J6-11	1
		J6-12	0
		J6-13	1
		J6-14	0
		J6-15	1
		J6-16	0
		J7-14	>7V
		J7-15	>7V
		J7-16	1
		J9-1	<-10V
		J3-25A	>3.5V
		J3-13C	0
		H1 (L7)	ON
		H2 (L6)	OFF
		H3 (L5)	ON
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	ON
		H7 (L1)	ON
14.	Execute the command <XBY A800=00>.		
15.	Execute the command <XBY B000=0C>. Do not connect J7-6 to ground.		
		J6-1	1
		J6-2	1
		J6-3	1
		J6-4	1
		J6-5	1
		J6-10	1
		J6-11	1
		J6-12	1
		J6-13	1
		J6-14	1
		J6-15	1
		J6-16	1
		J7-14	>7V
		J7-15	<0.5V
		J7-16	1
		J9-1	>10V
		J3-25A	<0.5V
		J3-13C	0
		H1 (L7)	OFF
		H3 (L5)	OFF
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	OFF
		H7 (L1)	OFF

NO.	STEP	TEST POINT	LOGIC LEVEL
	NOTE *Reset the GETC to terminate this test*		
16.	Execute the command <XBY B800=08>.		
17.	Execute the command <XBY A800=80>. Do not connect J7-6 to ground.	J6-1	1
		J6-2	0
		J6-3	1
		J6-4	1
		J6-5	1
		J6-10	1
		J6-11	1
		J6-12	1
		J6-13	1
		J6-14	1
		J6-15	1
		J6-16	1
		J7-14	>7V
		J7-15	>7V
		J7-16	1
		J9-1	>10V
		J3-25A	<0.5V
		J3-13C	0
		H1 (L7)	OFF
		H2 (L6)	OFF
		H3 (L5)	OFF
		H4 (L4)	OFF
		H5 (L3)	OFF
		H6 (L2)	OFF
		H7 (L1)	OFF
18.	Move jumper P20 from J20-2 and J20-3 to J20-1 and J20-2.		
19.	Move jumper P14 from J14-2 and J14-3 to J14-1 and J14-2.		
20.	Move jumper P24 from J24-2 and J24-3 to J24-1 and J24-2.		
21.	Move jumper P25 from J25-2 and J25-3 to J25-1 and J25-2.		
22.	Connect the station connectors back to J6, J7, and J19.		

Input Buffer And Port Test

1. Disconnect the station connectors from J6, J7, and J19.
2. Move jumper P20 from J20-1 and J20-2 to J20-2 and J20-3.
3. Move jumper P26 from J26-1 and J26-2 to J26-2 and J26-3.
4. Move jumper P28 from J28-1 and J28-2 to J28-2 and J28-3.
5. Connect J7-7, J7-9, J7-11, J7-13, and J3-25C to ground.
6. Execute the command <POR1>, and verify the terminal response of 10101010.
7. Execute the command <POR3>, and verify the terminal response of XX01XXXX, where X is any state.
8. Remove the ground from J7-7, J7-9, J7-11, J7-13, and J3-25C.
9. Connect J7-6, J7-8, J7-10, J7-12, and J7-14 to ground.
10. Execute the command <POR1>, and verify the terminal response of 01010101.
11. Execute the command <POR3>, and verify the terminal response of XX10XXXX, where X is any state.
12. Remove the ground from J7-6, J7-8, J7-10, J7-12 and J7-14.
13. Move jumper P20 from J20-2 and J20-3 to J20-1 and J20-2.
14. Move jumper P26 from J26-2 and J26-3 to J26-1 and J26-2.
15. Move jumper P28 from J28-2 and J28-3 to J28-1 and J28-2.
16. Connect the station connectors back to J6, J7, and J19.

Low Speed Data Test

1. Disconnect the station connectors from J6, J7, and J19.

2. Jumper 19-5 to J7-2.

3. Connect an oscilloscope to J19-5.

4. Execute the commands and verify the responses listed in the table below. The command format is [LSH <command from table>].

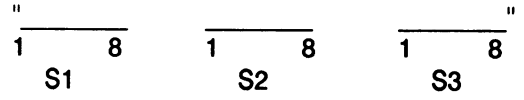
COMMAND	FREQUENCY ON J19-5 (HZ)	AMPLITUDE ON J19-5 (V P-P) CENTERED AT 0	FREQUENCY OF SQUAREWAVE ON J18-1 (HZ)
1-1	10	2.0 ± 0.25	10
1-2	100	2.0 ± 0.25	100
1-3	200	2.0 ± 0.25	200
1-4	1000	< -32 dB OF 2.0	UNDEFINED
2-1	10	1.0 ± 0.25	10
2-2	100	1.0 ± 0.25	100
2-3	200	1.0 ± 0.25	200
2-4	1000	< -32 dB OF 1.0	UNDEFINED
3-1	10	3.5 ± 0.5	10
3-2	100	3.5 ± 0.5	100
3-3	200	3.5 ± 0.5	200
3-4	1000	< -32 dB OF 3.5	UNDEFINED

5. Enter CTRL-Z or [ESC] to end the test.

6. Connect the station connectors back to J6, J7, and J19.

DIP Switch Test

1. Execute the command W and verify the settings of DIP switches, S1, S2, and S3. The terminal display is as shown:



An open (or OFF) on the DIP switch is displayed as a "1", while a closed (or ON) is displayed as a "0".

This test continually updates the terminal display at each DIP switch setting change.

2. Enter CTRL-Z or [ESC] to end the test.

3. Set S3-1 thru S3-5 to open.

4800 Hz Tone Notch Filter Response Test

1. Disconnect the station connectors from J6, J7, and J19.

2. Connect a jumper from J7-4 to J7-5. Monitor J22-1 with the meter.

3. Execute the command <FNT1>. Set up the meter for a 0 dB reference point with the incoming 1200 Hz signal on J22-1.

4. Execute the command <FNT2>. Verify that the generated 2400 Hz signal has an attenuation of no more than 2 dB on J22-1.

5. Execute the command <FNT3>. Verify that the generated 4800 Hz signal has an attenuation of more than 24 dB on J22-1.

6. Connect the station connectors back to J6, J7, and J19.

Test Completion

1. Connect the master and/or backup site controllers to the GETC on J100, J101, and J102.

2. Connect the GETC under test to the backup serial link and sync lines to the other GETC shelves at the site on J6 thru J8, and J19.

3. Set the GETC DIP switches to the operational configuration for the station.

STATION TEST

The station test is used to test the GETC in a station and to perform adjustments. This section describes the test (and adjustments) of the GETC as part of a station.

Equipment Required

The equipment necessary for the station test includes:

1. Cushman CE-51A communications monitor or equivalent

2. Tektronix 468 (or equivalent) digital storage scope

3. HP-3312A (or equivalent) Function Generator

4. Fluke-1920A (or equivalent) Frequency Counter

5. Data Technology Model 30 (or equivalent) digital Multimeter

6. Triplett Model 630-PL Type 5 (or equivalent) VOM

7. Tandy 102 portable computer (or equivalent)

8. HP-334A (or equivalent) Distortion Analyzer

Preliminary Setup

1. Disconnect the master (J8) and backup (J19) site controllers from the GETC.

2. Disconnected the backup serial link and sync lines to the other GETC shelves at the site from the GETC under test.

3. Set switches S3-1 thru S3-5 to their open (off) positions.

4. Attach the terminal or computer to the GETC on the master communication link (J8).

The station receiver is tested and aligned per Standard MASTR-II Station receiver procedures (see the appropriate maintenance manual). The delay timer on the Repeater Control Board (19D417385G1) is set for minimum. The limit timer on the Repeater Control Board (19D417385G1) is disabled. All RF station inputs are at a 1 μV signal level.

Serial Link Test

1. Power-up (or reset) the GETC, and verify that the GETC responds with the welcome message to the terminal. Reset of the GETC is performed via the pushbutton switch on the GETC logic board (S4).

2. Execute the command <BCL> (backup communications link) on the terminal. Press [RETURN] and verify that terminal communication on the master link is inoperative.

3. Move the terminal from the master (J8) to the backup (J19) link. Press [RETURN] and verify that terminal communication on the backup link is operative by executing the <BCL> command.

4. Execute the command <MCL> (master communications link) on the terminal. Press [RETURN] and verify that terminal communication on the backup link is inoperative.

5. Move the terminal from the backup (J19) to the master (J8) link. Press [RETURN] and verify that terminal communication on the master link is operative by executing the <MCL> command.

EPROM Test

Execute the command <CHK 0-7FFF>. Verify the terminal response of "CHECKSUM=00".

RAM Test

Execute the command <TMX 000-7FF>. Verify the terminal response of "SIX PATTERNS CHECK OK".

Watchdog Timer Test

1. Execute the command <WAT>.

2. Verify the GETC response of the welcome message to the terminal after 2 seconds.

High Speed Data Transmit Test

1. Execute the commands and verify the responses given in the table below. Adjust the 4800 Hz deviation to 3.1 kHz via R31 on the GETC logic board.

COMMAND	TONE GENERATED (HZ)	FM DEVIATION (HZ)
<HST 1>	1200	3100 ± 100
<HST 2>	2400	3100 ± 100
<HST 3>	4800	3100 ± 100

2. Execute [ESC] or CTRL-Z to exit.

Low-Speed Data Transmit Test

1. Execute the commands and verify the responses given in the table below. Adjust the 10 Hz deviation to 0.75 kHz via R50 on the Synthesized-Exciter Board in the station.

COMMAND	TONE GENERATED (HZ)	FM DEVIATION (HZ)
<LST 3-1>	10 ± 0.1	750 ± 10
<LST 3-2>	100 ± 10	750 ± 10

2. Execute [ESC] or CTRL-Z to exit.

Mic Transmit Test

1. Inject a 1 kHz tone at 33 mV (through a 22 μF capacitor) into the Mic Preamp input on the 10 Volt Regulator/Control Board (19D417401G1).
2. Set the Local Mic control (R14) to maximum.
3. Execute the command <M1T>.
4. Adjust R52 on the Synthesized-Exciter Board to 3.75 kHz deviation, measured at the output of the Synthesizer-Exciter Board.
5. Execute [ESC] or CTRL-Z to exit.

Mic Low-Speed Transmit Test

1. Inject a 1 kHz tone at 33 mV (through a 22 μF capacitor) into the Mic Preamp input on the 10 Volt Regulator/Control Board (19D417401G1).
2. Execute the command <M2T 3-1>.
3. Verify the presence of the tone with a subaudible squarewave of 10 Hz and a total deviation of 4.5 kHz.
4. Execute [ESC] or CTRL-Z to end the test.

Audio Transmit Test

1. Connect the RF signal generator into the station receiver. Input a 1000 Hz tone at 3.0 kHz deviation.
2. Execute the command <A1T>.
3. Verify the transmitted tone of 1000 Hz and adjust R15 on the Repeater Audio Board (19A129924G2) to 3.0 ± 0.1 kHz deviation measured at the output of the Synthesizer-Exciter Board.
4. Raise the input deviation to 5.0 kHz. Verify the output deviation at 3.5 ± 0.1 kHz.
5. Execute [ESC] or CTRL-Z to end the test.

Audio Low Speed Transmit Test

1. Connect the RF signal generator into the station receiver. Input a 1000 Hz tone at 4.0 kHz deviation.
2. Execute the command <A2T 3-1>.
3. Verify the transmitted tone of 1000 Hz with a subaudible squarewave of 10 Hz and a total deviation of 4.5 kHz at the output of the Synthesizer-Exciter Board.
4. Execute [ESC] or CTRL-Z to end the test.

Repeater Operation

1. Connect an RF signal generator to the receiver input. Input a signal of 1 kHz at 3.0 kHz deviation.
2. Execute the command <CON>.
3. Verify the tone transmitted to be 1000 Hz at 3.0 ± 0.1 kHz deviation at the output of the Synthesizer-Exciter Board.
4. Remove the signal input and verify that the station unkeys. Insert the signal input and verify that the station keys.

5. Key the remote controller and adjust the remote audio level, R50 on the Repeater Audio Board (19A129924G2), to 3.0 ± 0.1 kHz deviation.

6. Unkey the remote controller and adjust the 600-ohm output from the receiver, R14 on the Repeater Audio Board (19A129924G2), to 0 dBm.

7. Execute [ESC] or CTRL-Z to end the test.

Sync Line Test

1. Execute the command.

2. Verify the presence of a 3.8 ± 0.1 ms periodic pulse train at J19-6.

3. Execute [ESC] or CTRL-Z to end the test.

Backup Serial Link Test

1. Execute the command.

2. Verify the terminal response indicating that the test has passed.

4800 Hz Tone Notch Filter Response Test

1. Connect the function generator, through a 10 μF capacitor to J7-5.

2. Connect a distortion analyzer to J22-1.

3. Use a reference input signal of 1000 Hz at 1.0 volt rms. Set the input tone at 4800 Hz and adjust R110 and R115 to null the output tone to the distortion analyzer. The depth of the notch should be greater than 30 dB.

4. Verify the frequency response of the filter to be within ±2 dB of the reference from 10 Hz to 3000 Hz.

TRUNKING TEST

The Trunking test is used to test the GETC as part of a functional system.

Equipment Required

- Single-channel trunked system (control channel, working channel, and site controller)
- Trunked mobile or portable

Test Procedure

1. Set the mobile or portable and the site controller to the frequencies and channel numbers used for the control and working channels.

2. Configure the control and working channels for trunked operation.

3. Enable the site controller.

4. Key the mobile or portable on a standard group call.

5. Verify the mobile/portable unit keys once on the control channel and then keys a second time followed by open voice communication.

6. Disable the site controller.

7. Key the mobile or portable on a standard group call.

8. Verify the mobile/portable keys several times prior to the system reverting to failsoft mode (L1 on).

9. Verify the mobile/portable unit keys once on the control channel and then keys a second time followed by open voice communication.

APPENDIX A

GETC FREQUENCY SELECTION SWITCH SETTINGS

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
851.0125	0000	1000111	851.6625	1000	1010010	852.3125	1000	1001101
851.0250	0000	0100111	851.6750	1000	0110010	852.3250	1000	0101101
851.0375	0000	1100111	851.6875	1000	1110010	852.3375	1000	1101101
851.0500	0000	0010111	851.7000	1000	0001010	852.3500	1000	0011101
851.0625	0000	1010111	851.7125	1000	1001010	852.3625	1000	1011101
851.0750	0000	0110111	851.7250	1000	0101010	852.3750	1000	0111101
851.0875	0000	1110111	851.7375	1000	1101010	852.3875	1000	1111101
851.1000	0000	0001111	851.7500	1000	0011010	852.4000	1000	0000011
851.1125	0000	1001111	851.7625	1000	1011010	852.4125	1000	1000011
851.1250	0000	0101111	851.7750	1000	0111010	852.4250	1000	0100011
851.1375	0000	1101111	851.7875	1000	1111010	852.4375	1000	1100011
851.1500	0000	0011111	851.8000	1000	0000110	852.4500	1000	0010011
851.1625	0000	1011111	851.8125	1000	1000110	852.4625	1000	1010011
851.1750	0000	0111111	851.8250	1000	0100110	852.4750	1000	0110011
851.1875	0000	1111111	851.8375	1000	1100110	852.4875	1000	1110011
851.2000	1000	0000000	851.8500	1000	0010110	852.5000	1000	0001011
851.2125	1000	1000000	851.8625	1000	1010110	852.5125	1000	1001011
851.2250	1000	0100000	851.8750	1000	0110110	852.5250	1000	0101011
851.2375	1000	1100000	851.8875	1000	1110110	852.5375	1000	1101011
851.2500	1000	0010000	851.9000	1000	0001110	852.5500	1000	0011011
851.2625	1000	1010000	851.9125	1000	1001110	852.5625	1000	1011011
851.2750	1000	0110000	851.9250	1000	0101110	852.5750	1000	0111011
851.2875	1000	1110000	851.9375	1000	1101110	852.5875	1000	1111011
851.3000	1000	0001000	851.9500	1000	0011110	852.6000	1000	0000111
851.3125	1000	1001000	851.9625	1000	1011110	852.6125	1000	1000111
851.3250	1000	0101000	851.9750	1000	0111110	852.6250	1000	0100111
851.3375	1000	1101000	851.9875	1000	1111110	852.6375	1000	1100111
851.3500	1000	0011000	852.0000	1000	0000001	852.6500	1000	0010111
851.3625	1000	1011000	852.0125	1000	1000001	852.6625	1000	1010111
851.3750	1000	0111000	852.0250	1000	0100001	852.6750	1000	0110111
851.3875	1000	1111000	852.0375	1000	1100001	852.6875	1000	1110111
851.4000	1000	0000100	852.0500	1000	0010001	852.7000	1000	0001111
851.4125	1000	1000100	852.0625	1000	1010001	852.7125	1000	1001111
851.4250	1000	0100100	852.0750	1000	0110001	852.7250	1000	0101111
851.4375	1000	1100100	852.0875	1000	1110001	852.7375	1000	1101111
851.4500	1000	0010100	852.1000	1000	0001001	852.7500	1000	0011111
851.4625	1000	1010100	852.1125	1000	1001001	852.7625	1000	1011111
851.4750	1000	0110100	852.1250	1000	0101001	852.7750	1000	0111111
851.4875	1000	1110100	852.1375	1000	1101001	852.7875	1000	1111111
851.5000	1000	0001100	852.1500	1000	0011001	852.8000	0100	0000000
851.5125	1000	1001100	852.1625	1000	1011001	852.8125	0100	1000000
851.5250	1000	0101100	852.1750	1000	0111001	852.8250	0100	0100000
851.5375	1000	1101100	852.1875	1000	1111001	852.8375	0100	1100000
851.5500	1000	0011100	852.2000	1000	0000101	852.8500	0100	0010000
851.5625	1000	1011100	852.2125	1000	1000101	852.8625	0100	1010000
851.5750	1000	0111100	852.2250	1000	0100101	852.8750	0100	0110000
851.5875	1000	1111100	852.2375	1000	1100101	852.8875	0100	1110000
851.6000	1000	0000010	852.2500	1000	0010101	852.9000	0100	0001000
851.6125	1000	1000010	852.2625	1000	1010101	852.9125	0100	1001000
851.6250	1000	0100010	852.2750	1000	0110101	852.9250	0100	0101000
851.6375	1000	1100010	852.2875	1000	1110101	852.9375	0100	1101000
851.6500	1000	0010010	852.3000	1000	0001101	852.9500	0100	0011000

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
852.9625	0100	1011000	853.6125	0100	1000001	854.2625	0100	1010111
852.9750	0100	0111000	853.6250	0100	0100001	854.2750	0100	0110111
852.9875	0100	1111000	853.6375	0100	1100001	854.2875	0100	1110111
853.0000	0100	0000100	853.6500	0100	0010001	854.3000	0100	0001111
853.0125	0100	1000100	853.6625	0100	1010001	854.3125	0100	1001111
853.0250	0100	0100100	853.6750	0100	0110001	854.3250	0100	0101111
853.0375	0100	1100100	853.6875	0100	1110001	854.3375	0100	1101111
853.0500	0100	0010100	853.7000	0100	0001001	854.3500	0100	0011111
853.0625	0100	1010100	853.7125	0100	1001001	854.3625	0100	1011111
853.0750	0100	0110100	853.7250	0100	0101001	854.3750	0100	0111111
853.0875	0100	1110100	853.7375	0100	1101001	854.3875	0100	1111111
853.1000	0100	0001100	853.7500	0100	0011001	854.4000	1100	0000000
853.1125	0100	1001100	853.7625	0100	1011001	854.4125	1100	1000000
853.1250	0100	0101100	853.7750	0100	0111001	854.4250	1100	0100000
853.1375	0100	1101100	853.7875	0100	1111001	854.4375	1100	1100000
853.1500	0100	0011100	853.8000	0100	0000101	854.4500	1100	0010000
853.1625	0100	1011100	853.8125	0100	1000101	854.4625	1100	1010000
853.1750	0100	0111100	853.8250	0100	0100101	854.4750	1100	0110000
853.1875	0100	1111100	853.8375	0100	1100101	854.4875	1100	1110000
853.2000	0100	0000010	853.8500	0100	0010101	854.5000	1100	0001000
853.2125	0100	1000010	853.8625	0100	1010101	854.5125	1100	1001000
853.2250	0100	0100010	853.8750	0100	0110101	854.5250	1100	0101000
853.2375	0100	1100010	853.8875	0100	1110101	854.5375	1100	1101000
853.2500	0100	0010010	853.9000	0100	0001101	854.5500	1100	0011000
853.2625	0100	1010010	853.9125	0100	1001101	854.5625	1100	1011000
853.2750	0100	0110010	853.9250	0100	0101101	854.5750	1100	0111000
853.2875	0100	1110010	853.9375	0100	1101101	854.5875	1100	1111000
853.3000	0100	0001010	853.9500	0100	0011101	854.6000	1100	0000100
853.3125	0100	1001010	853.9625	0100	1011101	854.6125	1100	1000100
853.3250	0100	0101010	853.9750	0100	0111101	854.6250	1100	0100100
853.3375	0100	1101010	853.9875	0100	1111101	854.6375	1100	1100100
853.3500	0100	0011010	854.0000	0100	0000011	854.6500	1100	0010100
853.3625	0100	1011010	854.0125	0100	1000011	854.6625	1100	1010100
853.3750	0100	0111010	854.0250	0100	0100011	854.6750	1100	0110100
853.3875	0100	1111010	854.0375	0100	1100011	854.6875	1100	1110100
853.4000	0100	0000110	854.0500	0100	0010011	854.7000	1100	0001100
853.4125	0100	1000110	854.0625	0100	1010011	854.7125	1100	1001100
853.4250	0100	0100110	854.0750	0100	0110011	854.7250	1100	0101100
853.4375	0100	1100110	854.0875	0100	1110011	854.7375	1100	1101100
853.4500	0100	0010110	854.1000	0100	0001011	854.7500	1100	0011100
853.4625	0100	1010110	854.1125	0100	1001011	854.7625	1100	1011100
853.4750	0100	0110110	854.1250	0100	0101011	854.7750	1100	0111100
853.4875	0100	1110110	854.1375	0100	1101011	854.7875	1100	1111100
853.5000	0100	0001110	854.1500	0100	0011011	854.8000	1100	0000010
853.5125	0100	1001110	854.1625	0100	1011011	854.8125	1100	1000010
853.5250	0100	0101110	854.1750	0100	0111011	854.8250	1100	0100010
853.5375	0100	1101110	854.1875	0100	1111011	854.8375	1100	1100010
853.5500	0100	0011110	854.2000	0100	0000111	854.8500	1100	0010010
853.5625	0100	1011110	854.2125	0100	1000111	854.8625	1100	1010010
853.5750	0100	0111110	854.2250	0100	0100111	854.8750	1100	0110010
853.5875	0100	1111110	854.2375	0100	1100111	854.8875	1100	1110010
853.6000	0100	0000001	854.2500	0100	0010111	854.9000	1100	0001010

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
854.9125	1100	1001010	855.5625	1100	1011101	856.2125	0010	1000100
854.9250	1100	0101010	855.5750	1100	0111101	856.2250	0010	0100100
854.9375	1100	1101010	855.5875	1100	1111101	856.2375	0010	1100100
854.9500	1100	0011010	855.6000	1100	0000011	856.2500	0010	0010100
854.9625	1100	1011010	855.6125	1100	1000011	856.2625	0010	1010100
854.9750	1100	0111010	855.6250	1100	0100011	856.2750	0010	0110100
854.9875	1100	1111010	855.6375	1100	1100011	856.2875	0010	1110100
855.0000	1100	0000110	855.6500	1100	0010011	856.3000	0010	0001100
855.0125	1100	1000110	855.6625	1100	1010011	856.3125	0010	1001100
855.0250	1100	0100110	855.6750	1100	0110011	856.3250	0010	0101100
855.0375	1100	1100110	855.6875	1100	1110011	856.3375	0010	1101100
855.0500	1100	0010110	855.7000	1100	0001011	856.3500	0010	0011100
855.0625	1100	1010110	855.7125	1100	1001011	856.3625	0010	1011100
855.0750	1100	0110110	855.7250	1100	0101011	856.3750	0010	0111100
855.0875	1100	1110110	855.7375	1100	1101011	856.3875	0010	1111100
855.1000	1100	0001110	855.7500	1100	0011011	856.4000	0010	0000010
855.1125	1100	1001110	855.7625	1100	1011011	856.4125	0010	1000010
855.1250	1100	0101110	855.7750	1100	0111011	856.4250	0010	0100010
855.1375	1100	1101110	855.7875	1100	1111011	856.4375	0010	1100010
855.1500	1100	0011110	855.8000	1100	0000111	856.4500	0010	0010010
855.1625	1100	1011110	855.8125	1100	1000111	856.4625	0010	1010010
855.1750	1100	0111110	855.8250	1100	0100111	856.4750	0010	0110010
855.1875	1100	1111110	855.8375	1100	1100111	856.4875	0010	1110010
855.2000	1100	0000001	855.8500	1100	0010111	856.5000	0010	0001010
855.2125	1100	1000001	855.8625	1100	1010111	856.5125	0010	1001010
855.2250	1100	0100001	855.8750	1100	0110111	856.5250	0010	0101010
855.2375	1100	1100001	855.8875	1100	1110111	856.5375	0010	1101010
855.2500	1100	0010001	855.9000	1100	0001111	856.5500	0010	0011010
855.2625	1100	1010001	855.9125	1100	1001111	856.5625	0010	1011010
855.2750	1100	0110001	855.9250	1100	0101111	856.5750	0010	0111010
855.2875	1100	1110001	855.9375	1100	1101111	856.5875	0010	1111010
855.3000	1100	0001001	855.9500	1100	0011111	856.6000	0010	0000110
855.3125	1100	1001001	855.9625	1100	1011111	856.6125	0010	1000110
855.3250	1100	0101001	855.9750	1100	0111111	856.6250	0010	0100110
855.3375	1100	1101001	855.9875	1100	1111111	856.6375	0010	1100110
855.3500	1100	0011001	856.0000	0010	0000000	856.6500	0010	0010110
855.3625	1100	1011001	856.0125	0010	1000000	856.6625	0010	1010110
855.3750	1100	0111001	856.0250	0010	0100000	856.6750	0010	0110110
855.3875	1100	1111001	856.0375	0010	1100000	856.6875	0010	1110110
855.4000	1100	0000101	856.0500	0010	0010000	856.7000	0010	0001110
855.4125	1100	1000101	856.0625	0010	1010000	856.7125	0010	1001110
855.4250	1100	0100101	856.0750	0010	0110000	856.7250	0010	0101110
855.4375	1100	1100101	856.0875	0010	1110000	856.7375	0010	1101110
855.4500	1100	0010101	856.1000	0010	0001000	856.7500	0010	0011110
855.4625	1100	1010101	856.1125	0010	1001000	856.7625	0010	1011110
855.4750	1100	0110101	856.1250	0010	0101000	856.7750	0010	0111110
855.4875	1100	1110101	856.1375	0010	1101000	856.7875	0010	1111110
855.5000	1100	0001101	856.1500	0010	0011000	856.8000	0010	0000001
855.5125	1100	1001101	856.1625	0010	1011000	856.8125	0010	1000001
855.5250	1100	0101101	856.1750	0010	0111000	856.8250	0010	0100001
855.5375	1100	1101101	856.1875	0010	1111000	856.8375	0010	1100001
855.5500	1100	0011101	856.2000	0010	0000100	856.8500	0010	0010001

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
856.8625	0010	1010001	857.5125	0010	1001111	858.1625	1010	1011010
856.8750	0010	0110001	857.5250	0010	0101111	858.1750	1010	0111010
856.8875	0010	1110001	857.5375	0010	1101111	858.1875	1010	1111010
856.9000	0010	0001001	857.5500	0010	0011111	858.2000	1010	0000110
856.9125	0010	1001001	857.5625	0010	1011111	858.2125	1010	1000110
856.9250	0010	0101001	857.5750	0010	0111111	858.2250	1010	0100110
856.9375	0010	1101001	857.5875	0010	1111111	858.2375	1010	1100110
856.9500	0010	0011001	857.6000	1010	0000000	858.2500	1010	0010110
856.9625	0010	1011001	857.6125	1010	1000000	858.2625	1010	1010110
856.9750	0010	0111001	857.6250	1010	0100000	858.2750	1010	0110110
856.9875	0010	1111001	857.6375	1010	1100000	858.2875	1010	1110110
857.0000	0010	0000101	857.6500	1010	0010000	858.3000	1010	0001110
857.0125	0010	1000101	857.6625	1010	1010000	858.3125	1010	1001110
857.0250	0010	0100101	857.6750	1010	0110000	858.3250	1010	0101110
857.0375	0010	1100101	857.6875	1010	1110000	858.3375	1010	1101110
857.0500	0010	0010101	857.7000	1010	0001000	858.3500	1010	0011110
857.0625	0010	1010101	857.7125	1010	1001000	858.3625	1010	1011110
857.0750	0010	0110101	857.7250	1010	0101000	858.3750	1010	0111110
857.0875	0010	1110101	857.7375	1010	1101000	858.3875	1010	1111110
857.1000	0010	0001101	857.7500	1010	0011000	858.4000	1010	0000001
857.1125	0010	1001101	857.7625	1010	1011000	858.4125	1010	1000001
857.1250	0010	0101101	857.7750	1010	0111000	858.4250	1010	0100001
857.1375	0010	1101101	857.7875	1010	1111000	858.4375	1010	1100001
857.1500	0010	0011101	857.8000	1010	0000100	858.4500	1010	0010001
857.1625	0010	1011101	857.8125	1010	1000100	858.4625	1010	1010001
857.1750	0010	0111101	857.8250	1010	0100100	858.4750	1010	0110001
857.1875	0010	1111101	857.8375	1010	1100100	858.4875	1010	1110001
857.2000	0010	0000011	857.8500	1010	0010100	858.5000	1010	0001001
857.2125	0010	1000011	857.8625	1010	1010100	858.5125	1010	1001001
857.2250	0010	0100011	857.8750	1010	0110100	858.5250	1010	0101001
857.2375	0010	1100011	857.8875	1010	1110100	858.5375	1010	1101001
857.2500	0010	0010011	857.9000	1010	0001100	858.5500	1010	0011001
857.2625	0010	1010011	857.9125	1010	1001100	858.5625	1010	1011001
857.2750	0010	0110011	857.9250	1010	0101100	858.5750	1010	0111001
857.2875	0010	1110011	857.9375	1010	1101100	858.5875	1010	1111001
857.3000	0010	0001011	857.9500	1010	0011100	858.6000	1010	0000101
857.3125	0010	1001011	857.9625	1010	1011100	858.6125	1010	1000101
857.3250	0010	0101011	857.9750	1010	0111100	858.6250	1010	0100101
857.3375	0010	1101011	857.9875	1010	1111100	858.6375	1010	1100101
857.3500	0010	0011011	858.0000	1010	0000010	858.6500	1010	0010101
857.3625	0010	1011011	858.0125	1010	1000010	858.6625	1010	1010101
857.3750	0010	0111011	858.0250	1010	0100010	858.6750	1010	0110101
857.3875	0010	1111011	858.0375	1010	1100010	858.6875	1010	1110101
857.4000	0010	0000111	858.0500	1010	0010010	858.7000	1010	0001101
857.4125	0010	1000111	858.0625	1010	1010010	858.7125	1010	1001101
857.4250	0010	0100111	858.0750	1010	0110010	858.7250	1010	0101101
857.4375	0010	1100111	858.0875	1010	1110010	858.7375	1010	1101101
857.4500	0010	0010111	858.1000	1010	0001010	858.7500	1010	0011101
857.4625	0010	1010111	858.1125	1010	1001010	858.7625	1010	1011101
857.4750	0010	0110111	858.1250	1010	0101010	858.7750	1010	0111101
857.4875	0010	1110111	858.1375	1010	1101010	858.7875	1010	1111101
857.5000	0010	0001111	858.1500	1010	0011010	858.8000	1010	0000011

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
858.8125	1010	1000011	859.4625	0110	1010100	860.1125	0110	1001001
858.8250	1010	0100011	859.4750	0110	0110100	860.1250	0110	0101001
858.8375	1010	1100011	859.4875	0110	1110100	860.1375	0110	1101001
858.8500	1010	0010011	859.5000	0110	0001100	860.1500	0110	0011001
858.8625	1010	1010011	859.5125	0110	1001100	860.1625	0110	1011001
858.8750	1010	0110011	859.5250	0110	0101100	860.1750	0110	0111001
858.8875	1010	1110011	859.5375	0110	1101100	860.1875	0110	1111001
858.9000	1010	0001011	859.5500	0110	0011100	860.2000	0110	0000101
858.9125	1010	1001011	859.5625	0110	1011100	860.2125	0110	1000101
858.9250	1010	0101011	859.5750	0110	0111100	860.2250	0110	0100101
858.9375	1010	1101011	859.5875	0110	1111100	860.2375	0110	1100101
858.9500	1010	0011011	859.6000	0110	0000010	860.2500	0110	0010101
858.9625	1010	1011011	859.6125	0110	1000010	860.2625	0110	1010101
858.9750	1010	0111011	859.6250	0110	0100010	860.2750	0110	0110101
858.9875	1010	1111011	859.6375	0110	1100010	860.2875	0110	1110101
859.0000	1010	0000111	859.6500	0110	0010010	860.3000	0110	0001101
859.0125	1010	1000111	859.6625	0110	1010010	860.3125	0110	1001101
859.0250	1010	0100111	859.6750	0110	0110010	860.3250	0110	0101101
859.0375	1010	1100111	859.6875	0110	1110010	860.3375	0110	1101101
859.0500	1010	0010111	859.7000	0110	0001010	860.3500	0110	0011101
859.0625	1010	1010111	859.7125	0110	1001010	860.3625	0110	1011101
859.0750	1010	0110111	859.7250	0110	0101010	860.3750	0110	0111101
859.0875	1010	1110111	859.7375	0110	1101010	860.3875	0110	1111101
859.1000	1010	0001111	859.7500	0110	0011010	860.4000	0110	0000011
859.1125	1010	1001111	859.7625	0110	1011010	860.4125	0110	1000011
859.1250	1010	0101111	859.7750	0110	0111010	860.4250	0110	0100011
859.1375	1010	1101111	859.7875	0110	1111010	860.4375	0110	1100011
859.1500	1010	0011111	859.8000	0110	0000110	860.4500	0110	0010011
859.1625	1010	1011111	859.8125	0110	1000110	860.4625	0110	1010011
859.1750	1010	0111111	859.8250	0110	0100110	860.4750	0110	0110011
859.1875	1010	1111111	859.8375	0110	1100110	860.4875	0110	1110011
859.2000	0110	0000000	859.8500	0110	0010110	860.5000	0110	0001011
859.2125	0110	1000000	859.8625	0110	1010110	860.5125	0110	1001011
859.2250	0110	0100000	859.8750	0110	0110110	860.5250	0110	0101011
859.2375	0110	1100000	859.8875	0110	1110110	860.5375	0110	1101011
859.2500	0110	0010000	859.9000	0110	0001110	860.5500	0110	0011011
859.2625	0110	1010000	859.9125	0110	1001110	860.5625	0110	1011011
859.2750	0110	0110000	859.9250	0110	0101110	860.5750	0110	0111011
859.2875	0110	1110000	859.9375	0110	1101110	860.5875	0110	1111011
859.3000	0110	0001000	859.9500	0110	0011110	860.6000	0110	0000111
859.3125	0110	1001000	859.9625	0110	1011110	860.6125	0110	1000111
859.3250	0110	0101000	859.9750	0110	0111110	860.6250	0110	0100111
859.3375	0110	1101000	859.9875	0110	1111110	860.6375	0110	1100111
859.3500	0110	0011000	860.0000	0110	0000001	860.6500	0110	0010111
859.3625	0110	1011000	860.0125	0110	1000001	860.6625	0110	1010111
859.3750	0110	0111000	860.0250	0110	0100001	860.6750	0110	0110111
859.3875	0110	1111000	860.0375	0110	1100001	860.6875	0110	1110111
859.4000	0110	0000100	860.0500	0110	0010001	860.7000	0110	0001111
859.4125	0110	1000100	860.0625	0110	1010001	860.7125	0110	1001111
859.4250	0110	0100100	860.0750	0110	0110001	860.7250	0110	0101111
859.4375	0110	1100100	860.0875	0110	1110001	860.7375	0110	1101111
859.4500	0110	0010100	860.1000	0110	0001001	860.7500	0110	0011111

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON			1 = OPEN or OFF			
860.7625	0110	1011111	861.4125	1110	1000110	862.0625	1110	1010011
860.7750	0110	0111111	861.4250	1110	0100110	862.0750	1110	0110011
860.7875	0110	1111111	861.4375	1110	1100110	862.0875	1110	1110011
860.8000	1110	0000000	861.4500	1110	0010110	862.1000	1110	0001011
860.8125	1110	1000000	861.4625	1110	1010110	862.1125	1110	1001011
860.8250	1110	0100000	861.4750	1110	0110110	862.1250	1110	0101011
860.8375	1110	1100000	861.4875	1110	1110110	862.1375	1110	1101011
860.8500	1110	0010000	861.5000	1110	0001110	862.1500	1110	0011011
860.8625	1110	1010000	861.5125	1110	1001110	862.1625	1110	1011011
860.8750	1110	0110000	861.5250	1110	0101110	862.1750	1110	0111011
860.8875	1110	1110000	861.5375	1110	1101110	862.1875	1110	1111011
860.9000	1110	0001000	861.5500	1110	0011110	862.2000	1110	0000111
860.9125	1110	1001000	861.5625	1110	1011110	862.2125	1110	1000111
860.9250	1110	0101000	861.5750	1110	0111110	862.2250	1110	0100111
860.9375	1110	1101000	861.5875	1110	1111110	862.2375	1110	1100111
860.9500	1110	0011000	861.6000	1110	0000001	862.2500	1110	0010111
860.9625	1110	1011000	861.6125	1110	1000001	862.2625	1110	1010111
860.9750	1110	0111000	861.6250	1110	0100001	862.2750	1110	0110111
860.9875	1110	1111000	861.6375	1110	1100001	862.2875	1110	1110111
861.0000	1110	0000100	861.6500	1110	0010001	862.3000	1110	0001111
861.0125	1110	1000100	861.6625	1110	1010001	862.3125	1110	1001111
861.0250	1110	0100100	861.6750	1110	0110001	862.3250	1110	0101111
861.0375	1110	1100100	861.6875	1110	1110001	862.3375	1110	1101111
861.0500	1110	0010100	861.7000	1110	0001001	862.3500	1110	0011111
861.0625	1110	1010100	861.7125	1110	1001001	862.3625	1110	1011111
861.0750	1110	0110100	861.7250	1110	0101001	862.3750	1110	0111111
861.0875	1110	1110100	861.7375	1110	1101001	862.3875	1110	1111111
861.1000	1110	0001100	861.7500	1110	0011001	862.4000	0001	0000000
861.1125	1110	1001100	861.7625	1110	1011001	862.4125	0001	1000000
861.1250	1110	0101100	861.7750	1110	0111001	862.4250	0001	0100000
861.1375	1110	1101100	861.7875	1110	1111001	862.4375	0001	1100000
861.1500	1110	0011100	861.8000	1110	0000101	862.4500	0001	0010000
861.1625	1110	1011100	861.8125	1110	1000101	862.4625	0001	1010000
861.1750	1110	0111100	861.8250	1110	0100101	862.4750	0001	0110000
861.1875	1110	1111100	861.8375	1110	1100101	862.4875	0001	1110000
861.2000	1110	0000010	861.8500	1110	0010101	862.5000	0001	0001000
861.2125	1110	1000010	861.8625	1110	1010101	862.5125	0001	1001000
861.2250	1110	0100010	861.8750	1110	0110101	862.5250	0001	0101000
861.2375	1110	1100010	861.8875	1110	1110101	862.5375	0001	1101000
861.2500	1110	0010010	861.9000	1110	0001101	862.5500	0001	0011000
861.2625	1110	1010010	861.9125	1110	1001101	862.5625	0001	1011000
861.2750	1110	0110010	861.9250	1110	0101101	862.5750	0001	0111000
861.2875	1110	1110010	861.9375	1110	1101101	862.5875	0001	1111000
861.3000	1110	0001010	861.9500	1110	0011101	862.6000	0001	0000100
861.3125	1110	1001010	861.9625	1110	1011101	862.6125	0001	1000100
861.3250	1110	0101010	861.9750	1110	0111101	862.6250	0001	0100100
861.3375	1110	1101010	861.9875	1110	1111101	862.6375	0001	1100100
861.3500	1110	0011010	862.0000	1110	0000011	862.6500	0001	0010100
861.3625	1110	1011010	862.0125	1110	1000011	862.6625	0001	1010100
861.3750	1110	0111010	862.0250	1110	0100011	862.6750	0001	0110100
861.3875	1110	1111010	862.0375	1110	1100011	862.6875	0001	1110100
861.4000	1110	0000110	862.0500	1110	0010011	862.7000	0001	0001100

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
862.7125	0001	1001100	863.3625	0001	1011001	864.0125	1001	1000000
862.7250	0001	0101100	863.3750	0001	0111001	864.0250	1001	0100000
862.7375	0001	1101100	863.3875	0001	1111001	864.0375	1001	1100000
862.7500	0001	0011100	863.4000	0001	0000101	864.0500	1001	0010000
862.7625	0001	1011100	863.4125	0001	1000101	864.0625	1001	1010000
862.7750	0001	0111100	863.4250	0001	0100101	864.0750	1001	0110000
862.7875	0001	1111100	863.4375	0001	1100101	864.0875	1001	1110000
862.8000	0001	0000010	863.4500	0001	0010101	864.1000	1001	0001000
862.8125	0001	1000010	863.4625	0001	1010101	864.1125	1001	1001000
862.8250	0001	0100010	863.4750	0001	0110101	864.1250	1001	0101000
862.8375	0001	1100010	863.4875	0001	1110101	864.1375	1001	1101000
862.8500	0001	0010010	863.5000	0001	0001101	864.1500	1001	0011000
862.8625	0001	1010010	863.5125	0001	1001101	864.1625	1001	1011000
862.8750	0001	0110010	863.5250	0001	0101101	864.1750	1001	0111000
862.8875	0001	1110010	863.5375	0001	1101101	864.1875	1001	1111000
862.9000	0001	0001010	863.5500	0001	0011101	864.2000	1001	0000100
862.9125	0001	1001010	863.5625	0001	1011101	864.2125	1001	1000100
862.9250	0001	0101010	863.5750	0001	0111101	864.2250	1001	0100100
862.9375	0001	1101010	863.5875	0001	1111101	864.2375	1001	1100100
862.9500	0001	0011010	863.6000	0001	0000011	864.2500	1001	0010100
862.9625	0001	1011010	863.6125	0001	1000011	864.2625	1001	1010100
862.9750	0001	0111010	863.6250	0001	0100011	864.2750	1001	0110100
862.9875	0001	1111010	863.6375	0001	1100011	864.2875	1001	1110100
863.0000	0001	0000110	863.6500	0001	0010011	864.3000	1001	0001100
863.0125	0001	1000110	863.6625	0001	1010011	864.3125	1001	1001100
863.0250	0001	0100110	863.6750	0001	0110011	864.3250	1001	0101100
863.0375	0001	1100110	863.6875	0001	1110011	864.3375	1001	1101100
863.0500	0001	0010110	863.7000	0001	0001011	864.3500	1001	0011100
863.0625	0001	1010110	863.7125	0001	1001011	864.3625	1001	1011100
863.0750	0001	0110110	863.7250	0001	0101011	864.3750	1001	0111100
863.0875	0001	1110110	863.7375	0001	1101011	864.3875	1001	1111100
863.1000	0001	0001110	863.7500	0001	0011011	864.4000	1001	0000010
863.1125	0001	1001110	863.7625	0001	1011011	864.4125	1001	1000010
863.1250	0001	0101110	863.7750	0001	0111011	864.4250	1001	0100010
863.1375	0001	1101110	863.7875	0001	1111011	864.4375	1001	1100010
863.1500	0001	0011110	863.8000	0001	0000111	864.4500	1001	0010010
863.1625	0001	1011110	863.8125	0001	1000111	864.4625	1001	1010010
863.1750	0001	0111110	863.8250	0001	0100111	864.4750	1001	0110010
863.1875	0001	1111110	863.8375	0001	1100111	864.4875	1001	1110010
863.2000	0001	0000001	863.8500	0001	0010111	864.5000	1001	0001010
863.2125	0001	1000001	863.8625	0001	1010111	864.5125	1001	1001010
863.2250	0001	0100001	863.8750	0001	0110111	864.5250	1001	0101010
863.2375	0001	1100001	863.8875	0001	1110111	864.5375	1001	1101010
863.2500	0001	0010001	863.9000	0001	0001111	864.5500	1001	0011010
863.2625	0001	1010001	863.9125	0001	1001111	864.5625	1001	1011010
863.2750	0001	0110001	863.9250	0001	0101111	864.5750	1001	0111010
863.2875	0001	1110001	863.9375	0001	1101111	864.5875	1001	1111010
863.3000	0001	0001001	863.9500	0001	0011111	864.6000	1001	0000110
863.3125	0001	1001001	863.9625	0001	1011111	864.6125	1001	1000110
863.3250	0001	0101001	863.9750	0001	0111111	864.6250	1001	0100110
863.3375	0001	1101001	863.9875	0001	1111111	864.6375	1001	1100110
863.3500	0001	0011001	864.0000	1001	0000000	864.6500	1001	0010110

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
864.6625	1001	1010110	865.3125	1001	1001011	865.9625	0101	1011100
864.6750	1001	0110110	865.3250	1001	0101011	865.9750	0101	0111100
864.6875	1001	1110110	865.3375	1001	1101011	865.9875	0101	1111100
864.7000	1001	0001110	865.3500	1001	0011011	866.0000	0101	0000010
864.7125	1001	1001110	865.3625	1001	1011011	866.0125	0101	1000010
864.7250	1001	0101110	865.3750	1001	0111011	866.0250	0101	0100010
864.7375	1001	1101110	865.3875	1001	1111011	866.0375	0101	1100010
864.7500	1001	0011110	865.4000	1001	0000111	866.0500	0101	0010010
864.7625	1001	1011110	865.4125	1001	1000111	866.0625	0101	1010010
864.7750	1001	0111110	865.4250	1001	0100111	866.0750	0101	0110010
864.7875	1001	1111110	865.4375	1001	1100111	866.0875	0101	1110010
864.8000	1001	0000001	865.4500	1001	0010111	866.1000	0101	0001010
864.8125	1001	1000001	865.4625	1001	1010111	866.1125	0101	1001010
864.8250	1001	0100001	865.4750	1001	0110111	866.1250	0101	0101010
864.8375	1001	1100001	865.4875	1001	1110111	866.1375	0101	1101010
864.8500	1001	0010001	865.5000	1001	0001111	866.1500	0101	0011010
864.8625	1001	1010001	865.5125	1001	1001111	866.1625	0101	1011010
864.8750	1001	0110001	865.5250	1001	0101111	866.1750	0101	0111010
864.8875	1001	1110001	865.5375	1001	1101111	866.1875	0101	1111010
864.9000	1001	0001001	865.5500	1001	0011111	866.2000	0101	0000110
864.9125	1001	1001001	865.5625	1001	1011111	866.2125	0101	1000110
864.9250	1001	0101001	865.5750	1001	0111111	866.2250	0101	0100110
864.9375	1001	1101001	865.5875	1001	1111111	866.2375	0101	1100110
864.9500	1001	0011001	865.6000	0101	0000000	866.2500	0101	0010110
864.9625	1001	1011001	865.6125	0101	1000000	866.2625	0101	1010110
864.9750	1001	0111001	865.6250	0101	0100000	866.2750	0101	0110110
864.9875	1001	1111001	865.6375	0101	1100000	866.2875	0101	1110110
865.0000	1001	0000101	865.6500	0101	0010000	866.3000	0101	0001110
865.0125	1001	1000101	865.6625	0101	1010000	866.3125	0101	1001110
865.0250	1001	0100101	865.6750	0101	0110000	866.3250	0101	0101110
865.0375	1001	1100101	865.6875	0101	1110000	866.3375	0101	1101110
865.0500	1001	0010101	865.7000	0101	0001000	866.3500	0101	0011110
865.0625	1001	1010101	865.7125	0101	1001000	866.3625	0101	1011110
865.0750	1001	0110101	865.7250	0101	0101000	866.3750	0101	0111110
865.0875	1001	1110101	865.7375	0101	1101000	866.3875	0101	1111110
865.1000	1001	0001101	865.7500	0101	0011000	866.4000	0101	0000001
865.1125	1001	1001101	865.7625	0101	1011000	866.4125	0101	1000001
865.1250	1001	0101101	865.7750	0101	0111000	866.4250	0101	0100001
865.1375	1001	1101101	865.7875	0101	1111000	866.4375	0101	1100001
865.1500	1001	0011101	865.8000	0101	0000100	866.4500	0101	0010001
865.1625	1001	1011101	865.8125	0101	1000100	866.4625	0101	1010001
865.1750	1001	0111101	865.8250	0101	0100100	866.4750	0101	0110001
865.1875	1001	1111101	865.8375	0101	1100100	866.4875	0101	1110001
865.2000	1001	0000011	865.8500	0101	0010100	866.5000	0101	0001001
865.2125	1001	1000011	865.8625	0101	1010100	866.5125	0101	1001001
865.2250	1001	0100011	865.8750	0101	0110100	866.5250	0101	0101001
865.2375	1001	1100011	865.8875	0101	1110100	866.5375	0101	1101001
865.2500	1001	0010011	865.9000	0101	0001100	866.5500	0101	0011001
865.2625	1001	1010011	865.9125	0101	1001100	866.5625	0101	1011001
865.2750	1001	0110011	865.9250	0101	0101100	866.5750	0101	0111001
865.2875	1001	1110011	865.9375	0101	1101100	866.5875	0101	1111001
865.3000	1001	0001011	865.9500	0101	0011100	866.6000	0101	0000101

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
866.6125	0101	1000101	867.2625	1101	1010000	867.9125	1101	1001110
866.6250	0101	0100101	867.2750	1101	0110000	867.9250	1101	0101110
866.6375	0101	1100101	867.2875	1101	1110000	867.9375	1101	1101110
866.6500	0101	0010101	867.3000	1101	0001000	867.9500	1101	0011110
866.6625	0101	1010101	867.3125	1101	1001000	867.9625	1101	1011110
866.6750	0101	0110101	867.3250	1101	0101000	867.9750	1101	0111110
866.6875	0101	1110101	867.3375	1101	1101000	867.9875	1101	1111110
866.7000	0101	0001101	867.3500	1101	0011000	868.0000	1101	0000001
866.7125	0101	1001101	867.3625	1101	1011000	868.0125	1101	1000001
866.7250	0101	0101101	867.3750	1101	0111000	868.0250	1101	0100001
866.7375	0101	1101101	867.3875	1101	1111000	868.0375	1101	1100001
866.7500	0101	0011101	867.4000	1101	0000100	868.0500	1101	0010001
866.7625	0101	1011101	867.4125	1101	1000100	868.0625	1101	1010001
866.7750	0101	0111101	867.4250	1101	0100100	868.0750	1101	0110001
866.7875	0101	1111101	867.4375	1101	1100100	868.0875	1101	1110001
866.8000	0101	0000011	867.4500	1101	0010100	868.1000	1101	0001001
866.8125	0101	1000011	867.4625	1101	1010100	868.1125	1101	1001001
866.8250	0101	0100011	867.4750	1101	0110100	868.1250	1101	0101001
866.8375	0101	1100011	867.4875	1101	1110100	868.1375	1101	1101001
866.8500	0101	0010011	867.5000	1101	0001100	868.1500	1101	0011001
866.8625	0101	1010011	867.5125	1101	1001100	868.1625	1101	1011001
866.8750	0101	0110011	867.5250	1101	0101100	868.1750	1101	0111001
866.8875	0101	1110011	867.5375	1101	1101100	868.1875	1101	1111001
866.9000	0101	0001011	867.5500	1101	0011100	868.2000	1101	0000101
866.9125	0101	1001011	867.5625	1101	1011100	868.2125	1101	1000101
866.9250	0101	0101011	867.5750	1101	0111100	868.2250	1101	0100101
866.9375	0101	1101011	867.5875	1101	1111100	868.2375	1101	1100101
866.9500	0101	0011011	867.6000	1101	0000010	868.2500	1101	0010101
866.9625	0101	1011011	867.6125	1101	1000010	868.2625	1101	1010101
866.9750	0101	0111011	867.6250	1101	0100010	868.2750	1101	0110101
866.9875	0101	1111011	867.6375	1101	1100010	868.2875	1101	1110101
867.0000	0101	0000111	867.6500	1101	0010010	868.3000	1101	0001101
867.0125	0101	1000111	867.6625	1101	1010010	868.3125	1101	1001101
867.0250	0101	0100111	867.6750	1101	0110010	868.3250	1101	0101101
867.0375	0101	1100111	867.6875	1101	1110010	868.3375	1101	1101101
867.0500	0101	0010111	867.7000	1101	0001010	868.3500	1101	0011101
867.0625	0101	1010111	867.7125	1101	1001010	868.3625	1101	1011101
867.0750	0101	0110111	867.7250	1101	0101010	868.3750	1101	0111101
867.0875	0101	1110111	867.7375	1101	1101010	868.3875	1101	1111101
867.1000	0101	0001111	867.7500	1101	0011010	868.4000	1101	0000011
867.1125	0101	1001111	867.7625	1101	1011010	868.4125	1101	1000011
867.1250	0101	0101111	867.7750	1101	0111010	868.4250	1101	0100011
867.1375	0101	1101111	867.7875	1101	1111010	868.4375	1101	1100011
867.1500	0101	0011111	867.8000	1101	0000110	868.4500	1101	0010011
867.1625	0101	1011111	867.8125	1101	1000110	868.4625	1101	1010011
867.1750	0101	0111111	867.8250	1101	0100110	868.4750	1101	0110011
867.1875	0101	1111111	867.8375	1101	1100110	868.4875	1101	1110011
867.2000	1101	0000000	867.8500	1101	0010110	868.5000	1101	0001011
867.2125	1101	1000000	867.8625	1101	1010110	868.5125	1101	1001011
867.2250	1101	0100000	867.8750	1101	0110110	868.5250	1101	0101011
867.2375	1101	1100000	867.8875	1101	1110110	868.5375	1101	1101011
867.2500	1101	0010000	867.9000	1101	0001110	868.5500	1101	0011011

TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7	TX FREQ MHZ	S2-1 THRU 4	S1-1 THRU 7
		0 = CLOSED or ON		1 = OPEN or OFF				
868.5625	1101	1011011	869.0375	0011	1100100	869.5250	0011	0101110
868.5750	1101	0111011	869.0500	0011	0010100	869.5375	0011	1101110
868.5875	1101	1111011	869.0625	0011	1010100	869.5500	0011	0011110
868.6000	1101	0000111	869.0750	0011	0110100	869.5625	0011	1011110
868.6125	1101	1000111	869.0875	0011	1110100	869.5750	0011	0111110
868.6250	1101	0100111	869.1000	0011	0001100	869.5875	0011	1111110
868.6375	1101	1100111	869.1125	0011	1001100	869.6000	0011	0000001
868.6500	1101	0010111	869.1250	0011	0101100	869.6125	0011	1000001
868.6625	1101	1010111	869.1375	0011	1101100	869.6250	0011	0100001
868.6750	1101	0110111	869.1500	0011	0011100	869.6375	0011	1100001
868.6875	1101	1110111	869.1625	0011	1011100	869.6500	0011	0010001
868.7000	1101	0001111	869.1750	0011	0111100	869.6625	0011	1010001
868.7125	1101	1001111	869.1875	0011	1111100	869.6750	0011	0110001
868.7250	1101	0101111	869.2000	0011	0000010	869.6875	0011	1110001
868.7375	1101	1101111	869.2125	0011	1000010	869.7000	0011	0001001
868.7500	1101	0011111	869.2250	0011	0100010	869.7125	0011	1001001
868.7625	1101	1011111	869.2375	0011	1100010	869.7250	0011	0101001
868.7750	1101	0111111	869.2500	0011	0010010	869.7375	0011	1101001
868.7875	1101	1111111	869.2625	0011	1010010	869.7500	0011	0011001
868.8000	0011	0000000	869.2750	0011	0110010	869.7625	0011	1011001
868.8125	0011	1000000	869.2875	0011	1110010	869.7750	0011	0111001
868.8250	0011	0100000	869.3000	0011	0001010	869.7875	0011	1111001
868.8375	0011	1100000	869.3125	0011	1001010	869.8000	0011	0000101
868.8500	0011	0010000	869.3250	0011	0101010	869.8125	0011	1000101
868.8625	0011	1010000	869.3375	0011	1101010	869.8250	0011	0100101
868.8750	0011	0110000	869.3500	0011	0011010	869.8375	0011	1100101
868.8875	0011	1110000	869.3625	0011	1011010	869.8500	0011	0010101
868.9000	0011	0001000	869.3750	0011	0111010	869.8625	0011	1010101
868.9125	0011	1001000	869.3875	0011	1111010	869.8750	0011	0110101
868.9250	0011	0101000	869.4000	0011	0000110	869.8875	0011	1110101
868.9375	0011	1101000	869.4125	0011	1000110	869.9000	0011	0001101
868.9500	0011	0011000	869.4250	0011	0100110	869.9125	0011	1001101
868.9625	0011	1011000	869.4375	0011	1100110	869.9250	0011	0101101
868.9750	0011	0111000	869.4500	0011	0010110	869.9375	0011	1101101
868.9875	0011	1111000	869.4625	0011	1010110	869.9500	0011	0011101
869.0000	0011	0000100	869.4750	0011	0110110	869.9625	0011	1011101
869.0125	0011	1000100	869.4875	0011	1110110	869.9750	0011	0111101
869.0250	0011	0100100	869.5000	0011	0001110	869.9875	0011	1111101

APPENDIX B

DRAWINGS, SCHEMATICS & PARTS LISTS

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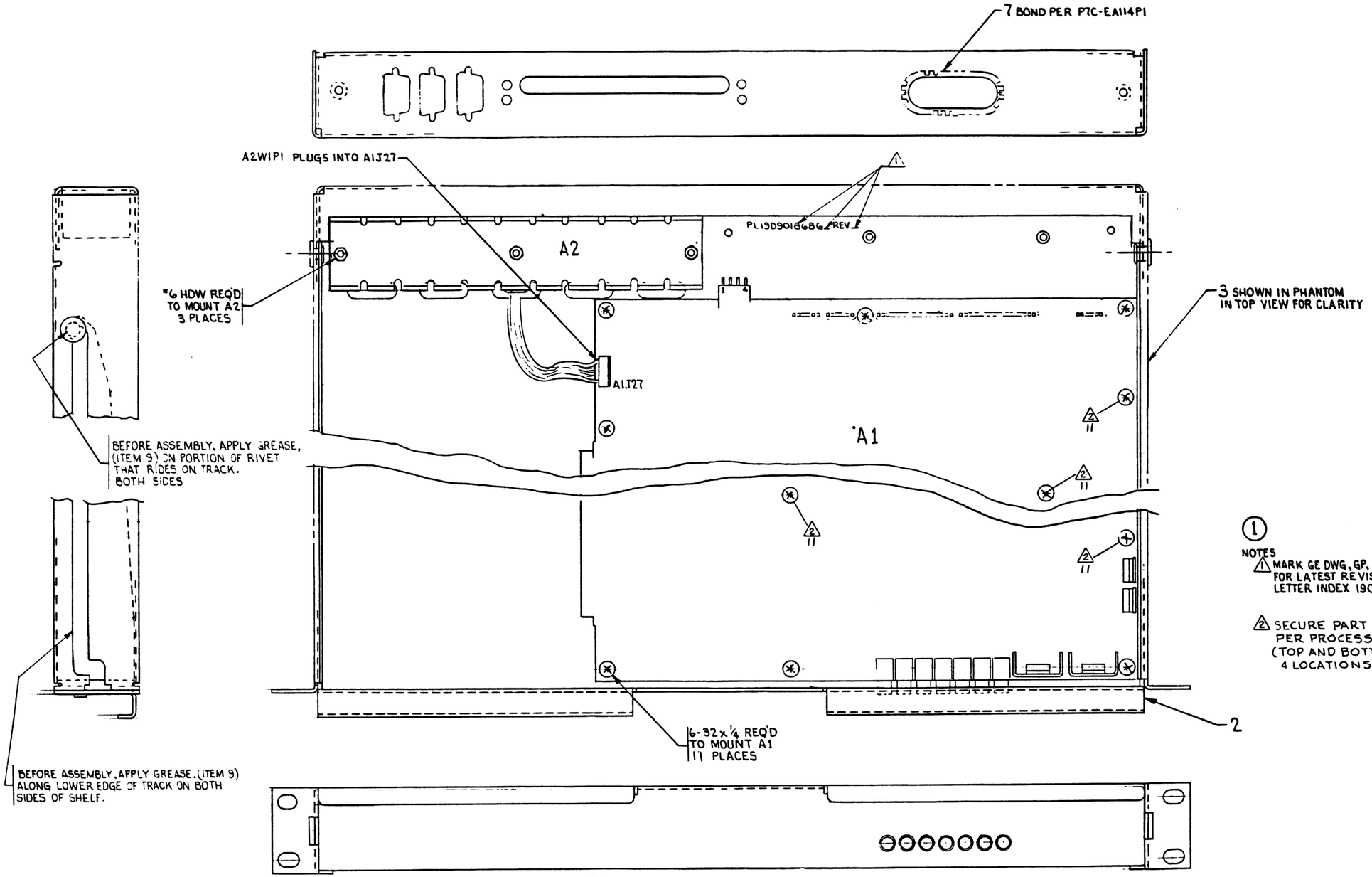


(1)

NOTES

⚠1 MARK GE DWG., GP, & REV. PER 19A115740P1 FOR LATEST REVISION, SEE REVISION LETTER INDEX 19C320100 SH 9

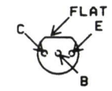
⚠2 SECURE PART 11 TO BOARD PER PROCESS P7CEA112 P3. (TOP AND BOTTOM SIDES AT 4 LOCATIONS SHOWN)

ASSEMBLY DIAGRAM

GETC Shelf 19D901868G1

(19D901868, Sh. 1, Rev. 5)

LEAD IDENTIFICATION FOR Q2-Q11 AND Q14



IN-LINE
TOP VIEW

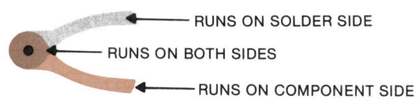
NOTE: CASE SHAPE IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

OUTLINE DIAGRAM

GETC Board 19D901855G1

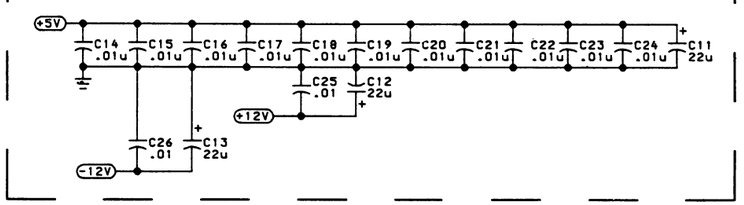
B-2

(19D901853, Sh. 1, Rev. 1)
(19A705103, Sh. 1, Rev. 0)
(19A705103, Sh. 2, Rev. 0)



JUMPER	VOICEGUARD, REMOTE/REPEAT, SATELLITE RX, VOTED REMOTE/REPEAT	VOICEGUARD, VOTER RX VOTER SELECTOR	PUBLIC SERVICE TRUNKED
P11	J11-1&2	J11-1&2	J11-1&2
P12	J12-1&2	J12-1&2	J12-1&2
P13	J13-2&3	J13-2&3	J13-1&2
P14	J14-2&3	J14-2&3	J14-1&2
P15	J15-2&3	J15-2&3	J15-1&2
P16	J16-1&2	J16-2&3	J16-1&2
P17	J17-2&3	J17-2&3	J17-1&2
P18	J18-2&3	J18-2&3	J18-1&2
P20	J20-2&3	J20-2&3	J20-1&2
P21	J21-2&3	J21-2&3	J21-1&2
P22	J22-2&3	J22-2&3	J22-1&2
P24	J24-2&3	J24-2&3	J24-1&2
P25	J25-2&3	J25-2&3	J25-1&2
P26	J26-2&3	J26-2&3	J26-1&2
P28	J28-2&3	J28-2&3	J28-1&2
P29	J29-2&3	J29-1&2	J29-2&3
P30	J30-2&3	J30-2&3	J30-2&3
P31	J30-4&5	J30-4&5	J30-4&5

A1
PL19D901855

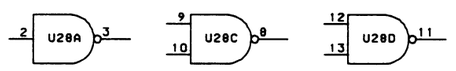


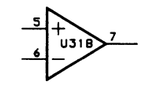
POWER & GND CONNECTIONS

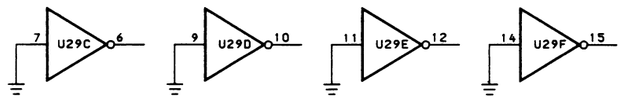
DEVICE	GND PIN NO	+5V PIN NO	+12 PIN NO	-12 PIN NO
U1	20	40		
U2	14	28		
U3	14	26,28		
U4	13	15		
U5	10	20		
U6	10	20		
U7	10	20		
U8	10	20		
U9	10	20		
U10	8	16		
U11	8	1		
U12	8	1		
U13	8	1		
U14	7		14	1
U15	6,8		16	7
U16			4	11
U17	4		8	
U18			8	4
U19	13	15		
U20	10	20		
U21	10	20		
U22	7	14		
U23	7	14		
U24	7	14		
U25	7	14		
U26	7	14		
U27	7	14		
U28	7		14	1
U29	8	1		
U30			4	11
U31			8	4
U32			4	11
U33			4	11
U34	6,8		16	7
U37			4	11
U38	10	20		

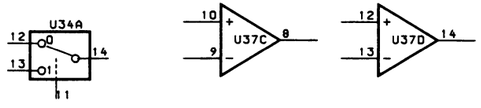
ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER k OR M.
CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER μ,n OR p.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR μ.

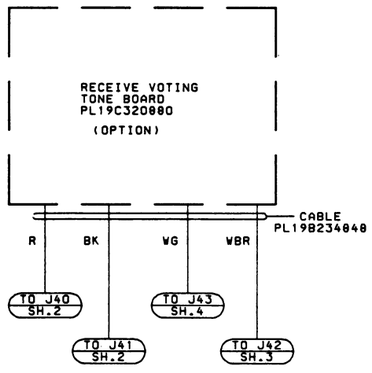
UNUSED GATES











NOTES:

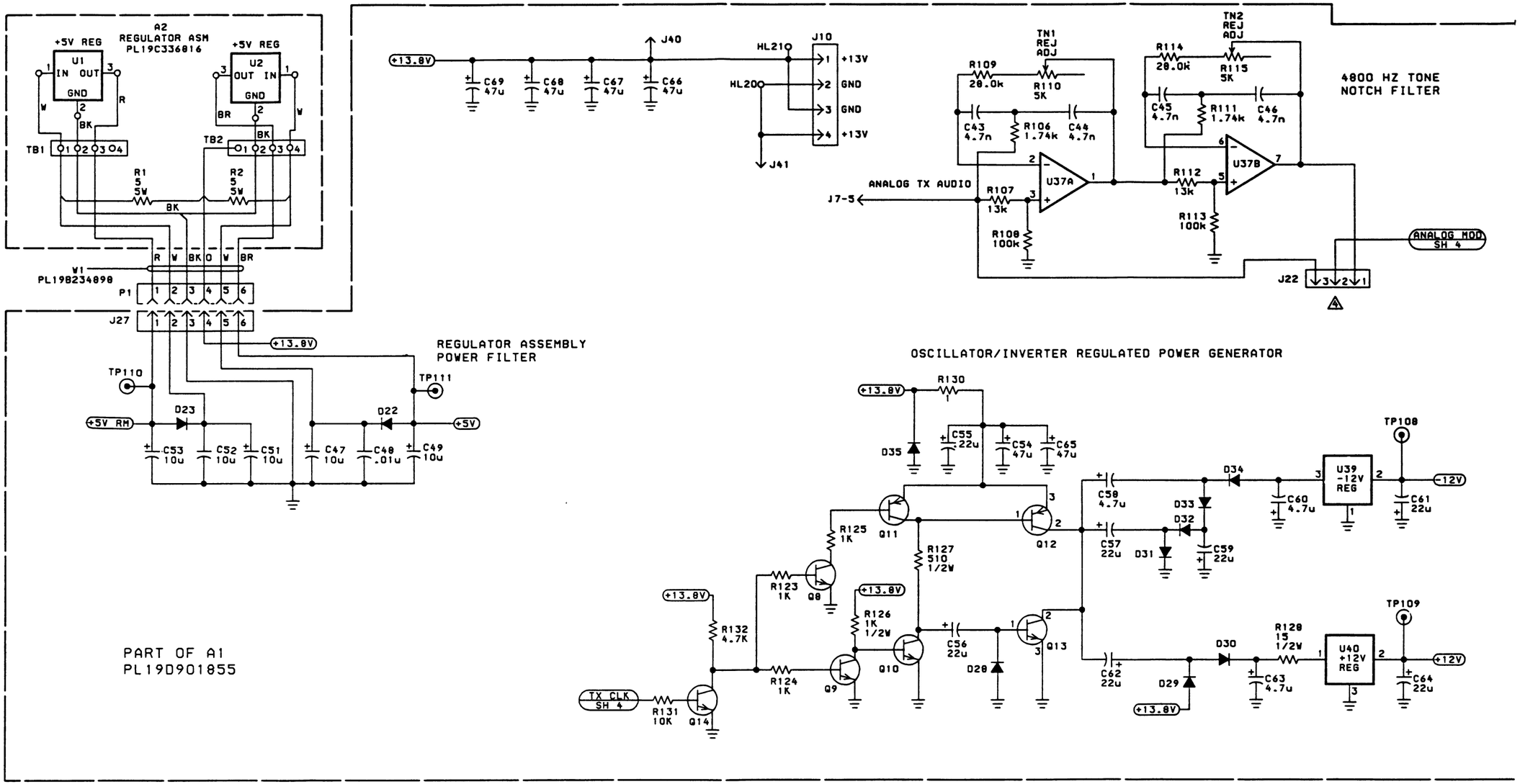
1. FOR PHONE MODEM OPERATION, JUMPER J11-1 TO J11-2 AND J12-1 TO J12-2. FOR EXTERNAL MODEM OPERATION VIA J9 AT RS232C LEVELS, JUMPER J11-2 TO J11-3 AND J12-2 TO J12-3.
2. FOR 2764 OR 27128 EPROM SHORT HL5 TO HL4. FOR 27256 SHORT HL5 TO HL6.
3. FOR 6116 RAM SHORT HL1 TO HL2
   FOR 6164 SHORT HL2 TO HL3.
4. FOR JUMPER PLACEMENT, SEE JUMPER CHART.
5. FOR 8031 OR 8032 UC JUMPER J30-1 TO J30-2 AND J30-3 TO J30-4. FOR 8031 UC JUMPER J30-2 TO J30-3 AND J30-4 TO J30-5.

MODEL NO.	REV. LETTER
PL19D901855G1	
PL19C336816G1	

(19D901852, Sh. 1, Rev. 0)

SCHEMATIC DIAGRAM

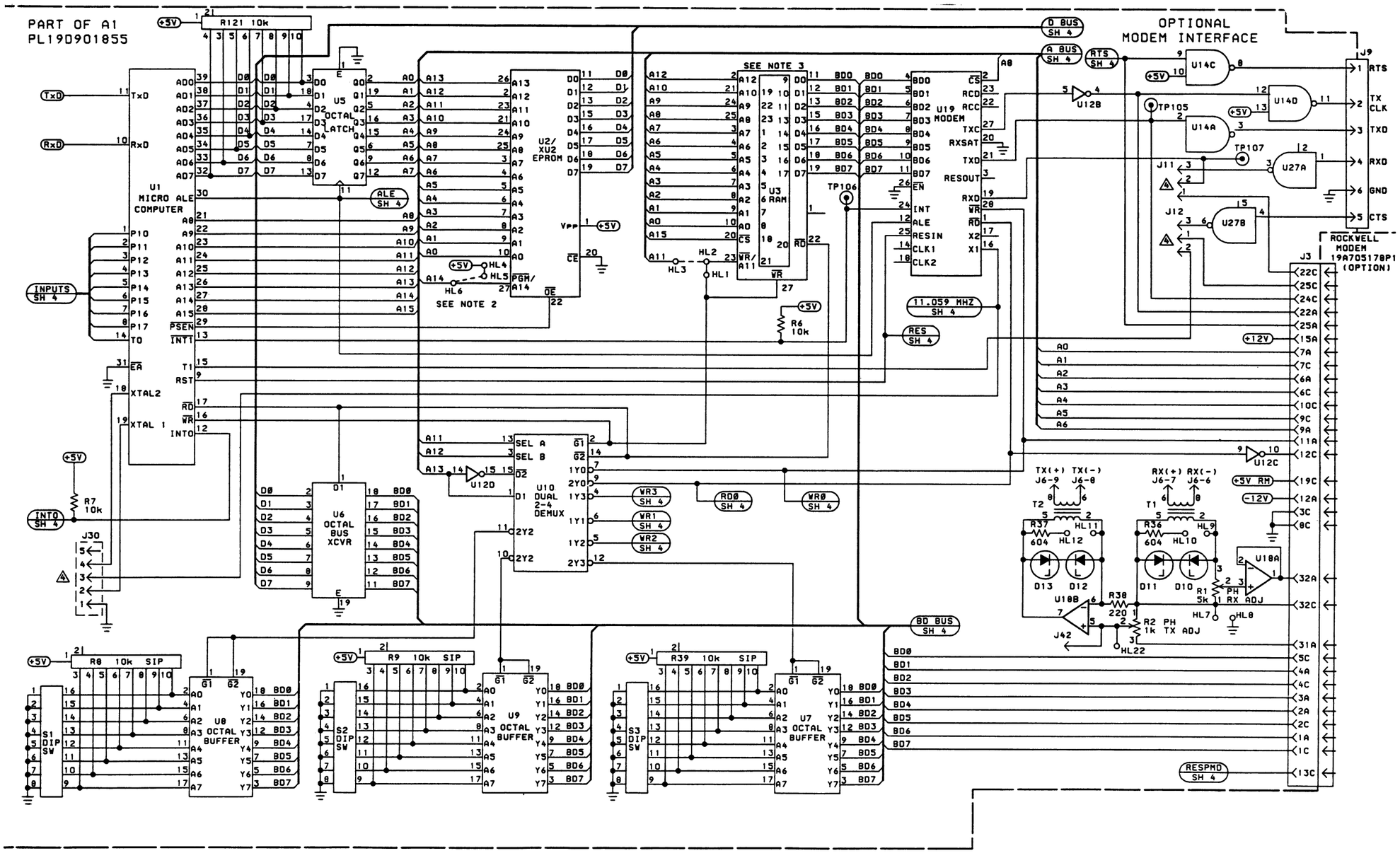
GETC Shelf 19D901868G1



(19D901852, Sh. 2, Rev. 3)

SCHEMATIC DIAGRAM

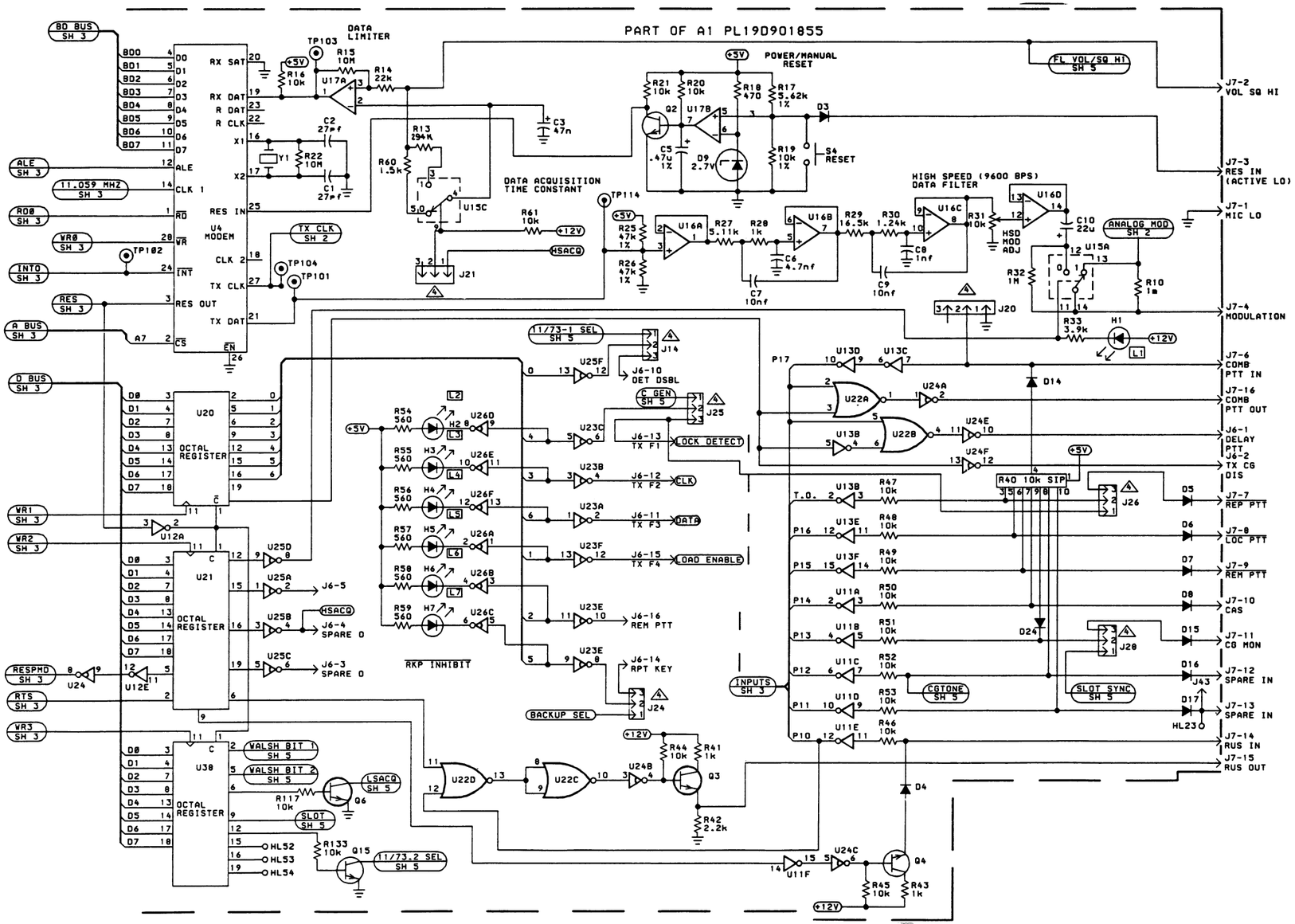
GETC Shelf 19D901868G1



(19D901852, Sh. 3, Rev. 1)

SCHEMATIC DIAGRAM

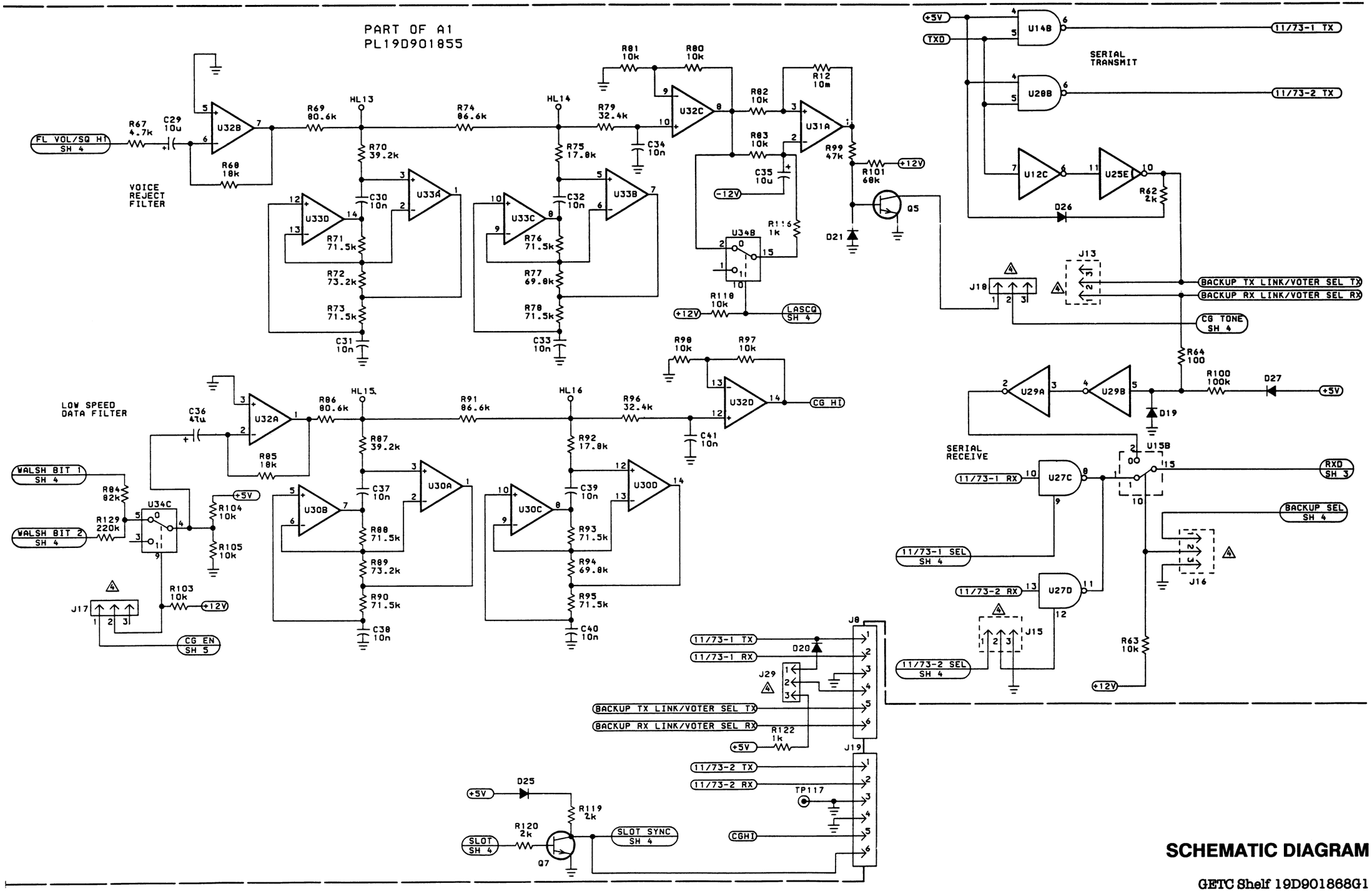
GETC Shelf 19D901868G1



SCHEMATIC DIAGRAM

GETC Shelf 19D901868G1

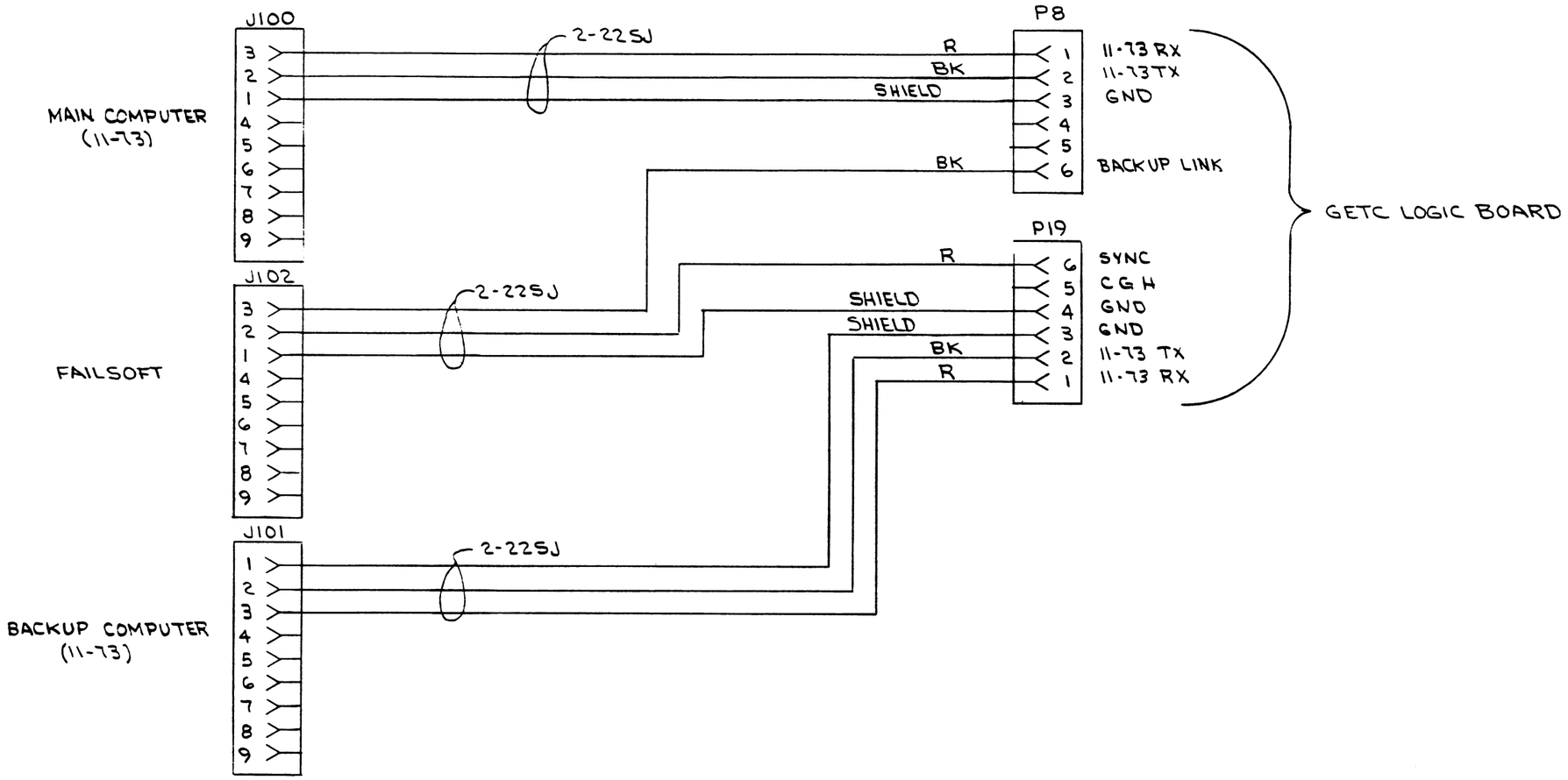
PART OF A1
PL19D901855



SCHEMATIC DIAGRAM

GETC Shelf 19D901868G1

(19D901852, Sh. 5, Rev. 1)



(19C336866, Sh. 1, Rev. 0)

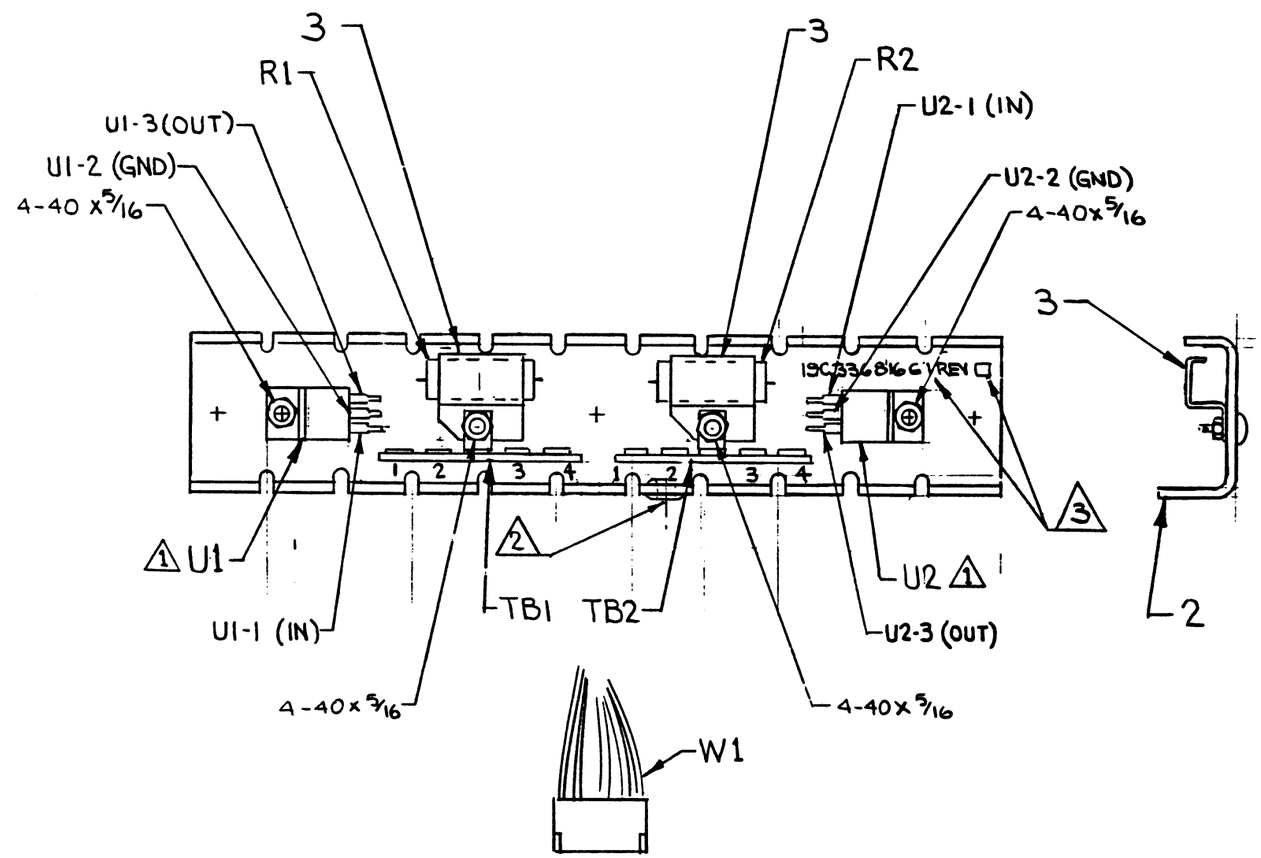
WIRING DIAGRAM

Cable Assembly 19C336863G1

WIRING CHART			
WIRE	FROM	TO	REMARKS
ST22-W	U1-1	TB1-1	+5V R.M. INPUT
R1	TB1-1	TB2-1	
W1-W	W1P1-2	TB1-1	+5V R.M. INPUT
ST22-BK	U1-2	TB1-2	GND
ST22-BK	TB1-2	TB2-2	
ST22-BK	U2-2	TB2-2	
W1-BK	W1P1-3	TB1-2	
ST22-R	U1-3	TB1-3	+5V R.M.
W1-R	W1P1-1	TB1-3	
ST22-W	U2-1	TB2-4	+5V INPUT
R2	TB2-1	TB2-4	
W1-W	W1P1-5	TB2-4	+5V INPUT
ST22-BR	U2-3	TB2-3	+5V
W1-BR	W1P1-6	TB2-3	
W1-O	W1P1-4	TB2-1	+13.8V

NOTES:

1. APPLY SILICONE GREASE TO THE MATING SURFACES OF U1 & U2 AND HEAT SINK, ITEM 2 PER 19A701431.
2. FEED ALL WIRES FROM W1 THRU EYELET IN HEAT SINK, ITEM 2
3. MARK GE DWG, & GP NO & REV LTR PER REV LTR INDEX 19C320100 SH 9. PER 19A115740P1



(19C336816, Sh. 1, Rev. 2)

ASSEMBLY DIAGRAM

Regulator Assembly 19C336816G1

PARTS LIST

PARTS LIST

GETC SHELF
19D901868G1
ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
A1		GETC BOARD 19D901855G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	19A701624P118	Ceramic, disc: 27 pF + or -5%, 500 VDCW, temp coef N80 PPM + or -30.
C3	19A702250P111	Polyester: .047 uF + or -10%, 50 VDCW.
C5	19A701534P3	Tantalum: 0.47 uF + or - 20%, 35 VDCW.
C6	T644ACP247J	Polyester: .0047 uF + or -5%, 50 VDCW.
C7	19A702059P7	Polyester: .01 uF + or -5%, 50 VDCW.
C8	T644ACP210J	Polyester: .0010 uF + or -5%, 50 VDCW.
C9	19A702059P7	Polyester: .01 uF + or -5%, 50 VDCW.
C10 thru C13	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C14 thru C26	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C29	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C30 thru C34	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C35	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C36	19A701534P9	Tantalum: 47 uF + or -20%, 6.3 VDCW.
C37 thru C41	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C43 thru C46	T644ACP247J	Polyester: .0047 uF + or -5%, 50 VDCW.
C47	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C48	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C49	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C51	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C52	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C53	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C54	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim to Panasonic LS Series.
C55	19A701534P2	Tantalum: 0.22 uF + or -20%, 35 VDCW.
C56	19A701534P4	Tantalum: 1 uF + or - 20%, 35 VDCW.
C57	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C58	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C59	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C60	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C61 and C62	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C63	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C64	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C65 thru C69	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim to Panasonic LS Series.
		- - - - - - - - - - DIODES - - - - - - - - - -
D3 thru D8	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D9	19A700025P2	Silicon, zener: 400 mW max; sim to BZX55-C2V7.
D10 thru D13	19J706030P2	Silicon; sim to 1N4736A.
D14 thru D17	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D19 thru D21	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D22 and D23	T324ADP1041	Rectifier, silicon; general purpose.
D24 thru D28	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D29 thru D35	T324ADP1041	Rectifier, silicon; general purpose.
		- - - - - - - - - - - LEDS - - - - - - - - - - -
H1 thru H7	162B3011P0002	Diode, optoelectronic: red; sim to Hew. Packard 5082-4650.
		- - - - - - - - - - - JACKS - - - - - - - - - - -
J3	19A705181P1	Connector: 64 contacts; sim to Burndx Cat. RP196B32R1GO22J1.
J6 thru J9	19A703248P12	Contact, electrical: 0.635 Square.
J10	19A116659P175	Printed wire: Sim to Molex 09-75-1044.
J11 thru J22	19A703248P12	Contact, electrical: 0.635 Square.
J24 thru J26	19A703248P12	Contact, electrical: 0.635 Square.
J27	19A700072P32	Printed wire: 6 contacts rated at 2.5 amps; sim to Molex 22-27-2061.
J28 thru J30	19A703248P12	Contact, electrical: 0.635 Square.
J40 thru J43	19A703248P12	Contact, electrical: 0.635 Square.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2 thru Q10	19A700023P2	Silicon, NPN: sim to 2N3904.
Q11	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q12	19A116375P1	Silicon, PNP.
Q13	19A700054P1	Silicon, NPN, 60 w; sim to BD-201.
Q14 and Q15	19A700023P2	Silicon, NPN: sim to 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R2	19B800784P105	Variable: 1K ohms + or -20%, 350 VDCW, .5 w.
R6 and R7	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R8 and R9	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R10	H212CRP510C	Deposited carbon: 1M ohms + or -5%, 1/4 w.
R12	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R13	19A701250P446	Metal film: 294K ohm + or - 1%, 250 VDCW, 1/4 w.
R14	H212CRP322C	Deposited carbon: 22K ohms + or -5%, 1/4 w.
R15	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R16	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R17	19A701250P273	Metal film: 5.6K ohms + or -1%, 250 VDCW, 1/4 w.
R18	H212CRP147C	Deposited carbon: 470 ohms + or -5%, 1/4 w.
R19	19A701250P301	Metal film: 10K ohms + or - 1%, 1/4 w.
R20 and R21	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R22	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R25 and R26	H212CRP347C	Deposited carbon: 47K ohms + or -5%, 1/4 w.
R27	19A701250P269	Metal film: 5.11K ohms + or -1%, 1/4 w.
R28	19A701250P201	Metal film: 1K ohms + or -1%, 250 VDCW, 1/4 w.
R29	19A701250P322	Metal film: 16.5K ohms + or -1%, 250 VDCW, 1/4 w.
R30	19A701250P210	Metal film: 1240 ohms + or -1%, 250 VDCW, 1/4 w.
R31	19B800784P108	Variable: 10K ohms + or -20%, 1/2 w.
R32	H212CRP510C	Deposited carbon: 1M ohms + or -5%, 1/4 w.
R33	H212CRP239C	Deposited carbon: 3.9K ohms + or -5%, 1/4 w.
R36 and R37	19A701250P176	Metal film: 604 ohms + or -1%, 1/4 w.
R38	H212CRP122C	Deposited carbon: 220 ohms + or -5%, 1/4 w.
R39 and R40	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R41	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R42	H212CRP222C	Deposited carbon: 2.2K ohms + or -5%, 1/4 w.
R43	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R44 thru R53	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R54 thru R59	H212CRP156C	Deposited carbon: 560 ohms + or -5%, 1/4 w.
R60	H212CRP215C	Deposited carbon: 1.5K ohms + or -5%, 1/4 w.
R61	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R62	H212CRP220C	Deposited carbon: 2.0K ohms + or -5%, 1/4 watt.
R63	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R64	H212CRP110C	Deposited carbon: 100 ohms + or -5%, 1/4 w.
R67	H212CRP247C	Deposited carbon: 4.7K ohms + or -5%, 1/4 w.
R68	H212CRP318C	Deposited carbon: 18K ohms + or -5%, 1/4 w.
R69	19A701250P388	Metal film: 80.6K ohms + or - 1%, 250 VDCW, 1/4 w.
R70	19A701250P358	Metal film: 2.7 ohms + or -5%, 1/4 w.
R71	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R72	19A701250P384	Metal film: 73.2K ohms + or -1%, 1/4 w.
R73	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R74	19A701250P391	Metal film: 86.6K ohms + or -1%, 1/4 w.
R75	19A701250P325	Metal film: 17.8K ohms + or -1%, 1/4 w.
R76	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R77	19A701250P382	Metal film: 69.8K ohms + or -1%, 1/4 w.
R78	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R79	19A701250P350	Metal film: 32.4K ohms + or -1%, 1/4 w.
R80 thru R83	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R84	H212CRP382C	Deposited carbon: 82K ohms + or -5%, 1/4 w.
R85	H212CRP318C	Deposited carbon: 18K ohms + or -5%, 1/4 w.
R86	19A701250P388	Metal film: 80.6K ohms + or - 1%, 250 VDCW, 1/4 w.
R87	19A701250P358	Metal film: 2.7 ohms + or -5%, 1/4 w.
R88	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R89	19A701250P384	Metal film: 73.2K ohms + or -1%, 1/4 w.
R90	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.

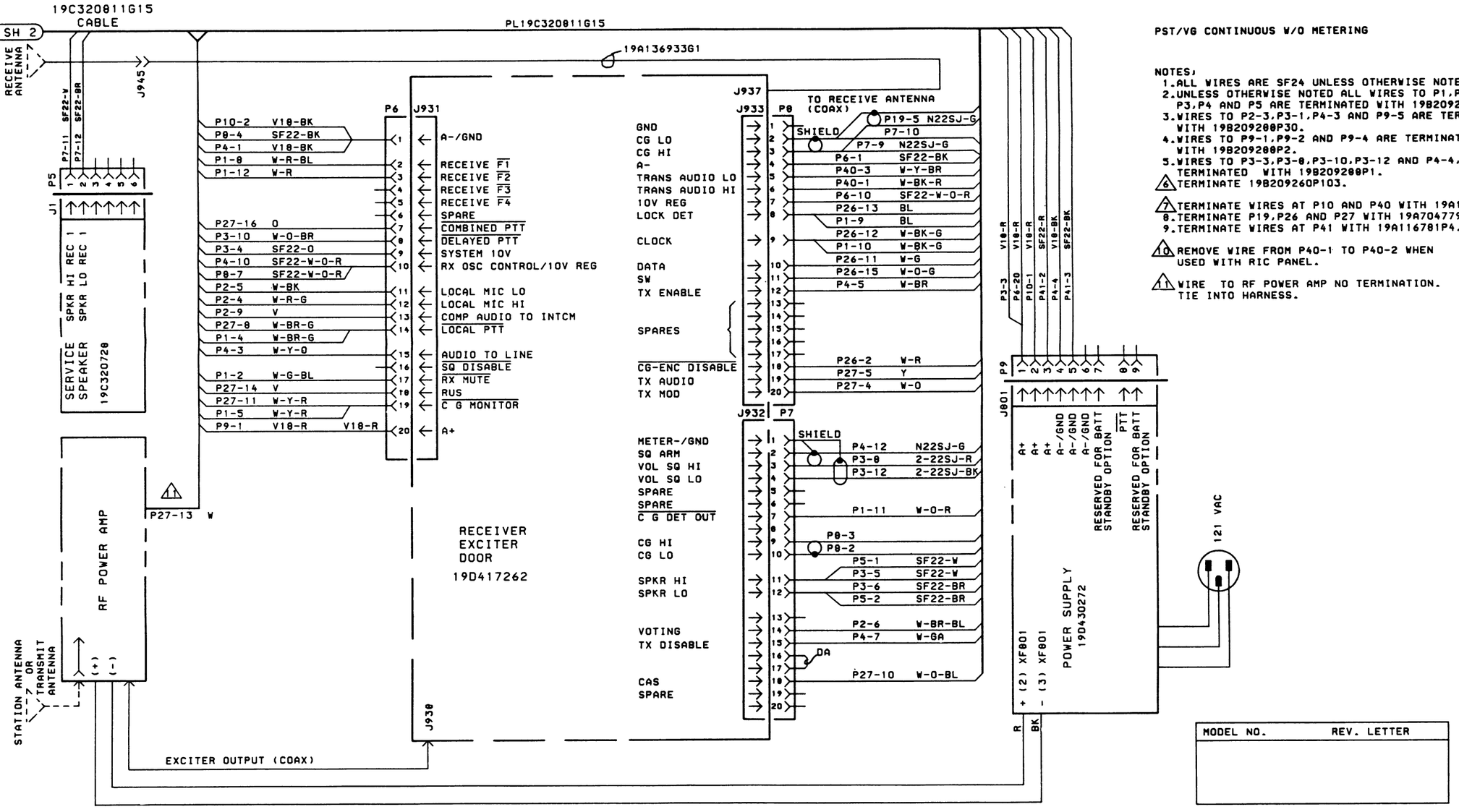
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

SYMBOL	GE PART NO.	DESCRIPTION
R91	19A701250P391	Metal film: 86.6K ohms + or -1%, 1/4 w.
R92	19A701250P325	Metal film: 17.8K ohms + or -1%, 1/4 w.
R93	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R94	19A701250P382	Metal film: 69.8K ohms + or -1%, 1/4 w.
R95	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R96	19A701250P350	Metal film: 32.4K ohms + or -1%, 1/4 w.
R97 and R98	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R99	H212CRP347C	Deposited carbon: 47K ohms + or -5%, 1/4 w.
R100	H212CRP410C	Deposited carbon: 0.1M ohms + or -5%, 1/4 w.
R101	H212CRP368C	Deposited carbon: 68K ohms + or -5%, 1/4 w.
R103 thru R105	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R106	19A701250P224	Metal film: 1740 ohm + or - 1%, 250 VDCW, 1/4 w.
R107	19A701250P312	Metal film: 13K ohms + or -1%, 1/4 w.
R108	19A701250P401	Metal film: 100K ohms + or -1%, 1/4 w.
R109	19A701250P334	Metal film: 22.1K ohms + or -1%, 1/4 w.
R110	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R111	19A701250P224	Metal film: 1740 ohm + or - 1%, 250 VDCW, 1/4 w.
R112	19A701250P312	Metal film: 13K ohms + or -1%, 1/4 w.
R113	19A701250P401	Metal film: 100K ohms + or -1%, 1/4 w.
R114	19A701250P344	Metal film: 28K ohms + or -1%, 250 VDCW, 1/4 w.
R115	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R116	19A701250P201	Metal film: 1K ohms + or -1%, 250 VDCW, 1/4 w.
R117 and R118	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R119 and R120	H212CRP220C	Deposited carbon: 2.0K ohms + or -5%, 1/4 watt.
R121	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R122 thru R125	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R126	19A700113P63	Composition: 1K ohms + or - 5%, 1/2 w.
R127	3R77P511J	Composition: 510 ohms + or -5%, 1/2 w.
R128	19A700113P19	Composition: 15 ohms + or - 5%, 1/2 w.
R129	19A701250P434	Metal film: 221 K ohms + or -1%, 250 VDCW, 1 w.
R130	19A700050P13	Wirewound: 1 ohms + or - 10%, 2 w.
R131	19A701250P301	Metal film: 10K ohms + or - 1%, 1/4 w.
R132	19A701250P266	Metal film: 4.75K ohms + or -1%, 1/4 w.
R133	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
		- - - - - - - - - - - SWITCHES - - - - - - - - - -
S1 thru S3	19B800010P2	Push: 4 station contacts rated 25 mA at 24 VDC; sim to CTS 205-8.
S4	19A701324P1	Push: contacts rated 1 mA at 10 volts; sim to IEE/Schadown 210091.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 and T2	19A703656P1	Audio Frequency: sim to Nova Magnetics 5577-06-0001.
		- - - - - - - - - - TEST POINTS - - - - - - - - - -
TP101 thru TP111	19A703248P12	Contact, electrical: 0.635 Square.
TP114	19A703248P12	Contact, electrical: 0.635 Square.
TP117	19A703248P12	Contact, electrical: 0.635 Square.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1	19A704345P1	Microcomputer: CMOX 8-BIT.
U3	19A702934P1	READ/WRITE MEMORY, sim to Hitachi HM6116LPI-4.
U4	19A704727P2	Digital: MODEM.
U5	19A703471P2	Digital: High Speed CMOS.
U6	19A703471P8	Digital: High Speed CMOS.
U7 thru U9	19A703471P1	Digital: OCTAL TRI-STATE BUFFER.
U10	19A700037P363	Digital: (DUAL 2-LINE-TO-1-LINE DECODER/DEMULTIPLEXER).
U11 thru U13	19A700176P1	Digital. HEX BUFFER/CONVERTER (INVERTING).
U14	19A116704P1	Linear/Digital: QUAD DTL LINE DRIVER.
U15	19A700029P38	Digital: Triple 2-Channel Multiplexer.
U16	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U17	19A134764P2	Linear: (VOLTAGE COMPARATOR), sim to LM393N.
U18	19A700086P4	Operation Amplifier, Dual OP AMP; sim to 4558 Type.
U19	19A704727P2	Digital: MODEM.
U20 and U21	19A704380P11	Digital: High Speed CMOS.
U22	19A703483P1	Digital: HIGH-SPEED CMOS LOCK GATES.
U23 thru U26	19A116180P75	Digital: HEX BUFFER INVERTER (OPEN COLLECTOR).
U27	19A116704P2	Linear/Digital: QUAD DTL LINE RECEIV.
U28	19A116704P1	Linear/Digital: QUAD DTL LINE DRIVER.
U29	19A700176P1	Digital. HEX BUFFER/CONVERTER (INVERTING).
U30	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U31	19A134764P2	Linear: (VOLTAGE COMPARATOR), sim to LM393N.
U32 and U33	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U34	19A700029P38	Digital: Triple 2-Channel Multiplexer.
U37	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U38	19A704380P11	Digital: High Speed CMOS.
U39	19A134718P2	Linear: NEGATIVE VOLTAGE REGULATOR; sim to uA 7912U.
U40	19A134717P2	Linear: POSITIVE VOLTAGE REGULATOR; sim to UA7812U.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XU2	19A700156P3	Integrated circuit: 28 contacts; sim to AMP 640362P3.
		- - - - - - - - - - - CRYSTALS - - - - - - - - - -
Y1	19A702511G15	Quartz: 11.059200 MHz.
A2		REGULATOR ASSEMBLY 19C336816G1
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	5493035P1	Wirewound: 5 ohms + or -5%, 5 watt; sim to Hamilton Hall Type HR-5W.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1 and TB2	7775500P11	Phen: 5 terminals.
		- - - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U1 and U2	19A134717P1	4K PROGRAMMED MEMORY.
		- - - - - - - - - - - - CABLES - - - - - - - - - - -
W1	19B234898G1	Cable. (Includes P1, 19A700041P32).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A700041P26	Contact: sim to Molex 08-50-0113.
	19B234903G1	Heat sink. (Used with R1 & R2 (19C336816G1))
	4038930P1	Clip: approx 13/16 x 13/16 inches. (Used with 19B234903G1 Heat sink).
	19A134521P1	Lens, red. (XMIT).
	19A134521P6	Lens.
	19A702917P7	Heat Sink, Transistor: Sim to Thermalloy Cat 6030B-TT.
	19B232901P2	Support.
	19A701516P1	Insulator, plate.
	19A115594P2	Grommet.
		COMPUTER CABLE 19C336863G1
		- - - - - - - - - - - - JACKS - - - - - - - - - - - -
J100 thru J102	19B209727P18	Connector: 9 contacts, sim to AMP 205203-1.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P8	19A700041P32	Shell.
P19	19A700041P32	Shell.
	19B209727P11	Connector: sim to AMP 1-66504-0.
	19A704779P26	Connector: sim to Molex 08-55-0101.
	19J706152P5	Retainer strap: sim to Panduit Corp. SST-1.
		TRAY ASSEMBLY 19C851553G1
	19D901867P1	Tray.
	19A143578P208	Spacer threaded. (Quantity 17).
	19A143578P212	Spacer threaded. (Quantity 2).
		SHELF 19C851587G1
	19D901866P1	Shelf.
	7160523P2	Nut. (Quantity 2).
	7160523P3	Nut. (Quantity 2).

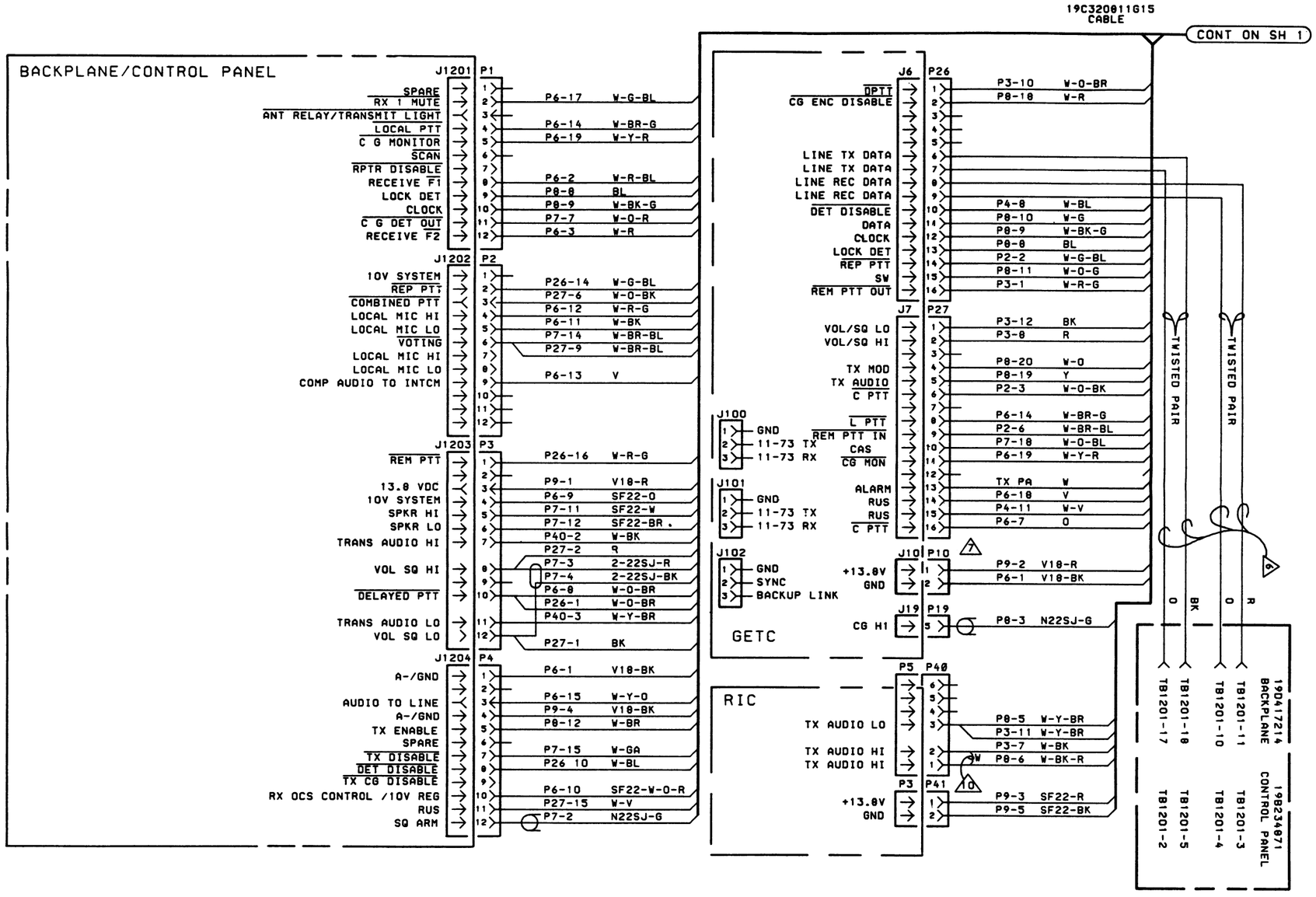


PST/VG CONTINUOUS W/O METERING

NOTES:
1. ALL WIRES ARE SF24 UNLESS OTHERWISE NOTED.
2. UNLESS OTHERWISE NOTED ALL WIRES TO P1, P2, P3, P4 AND P5 ARE TERMINATED WITH 19B209280P29.
3. WIRES TO P2-3, P3-1, P4-3 AND P9-5 ARE TERMINATED WITH 19B209280P30.
4. WIRES TO P9-1, P9-2 AND P9-4 ARE TERMINATED WITH 19B209280P2.
5. WIRES TO P3-3, P3-8, P3-10, P3-12 AND P4-4, ARE TERMINATED WITH 19B209280P1.
6. TERMINATE 19B209260P103.
7. TERMINATE WIRES AT P10 AND P40 WITH 19A116781P3.
8. TERMINATE P19, P26 AND P27 WITH 19A704779P26.
9. TERMINATE WIRES AT P41 WITH 19A116781P4.
10. REMOVE WIRE FROM P40-1 TO P40-2 WHEN USED WITH RIC PANEL.
11. WIRE TO RF POWER AMP NO TERMINATION. TIE INTO HARNESS.

INTERCONNECTION DIAGRAM

(19D438278, Sh. 1, Rev. 2)



(19D438278, Sh. 2, Rev. 3)

INTERCONNECTION DIAGRAM

ADDENDUM NO. 1 TO LBI-31859A

This addendum incorporates the 19D901868G2 GETC Shelf Assembly which includes the 19D901995G1 GETC circuit card assembly. The board uses a new layout and added jumpers for additional applications.

JUMPER CONFIGURATION, page 3

Change the following:

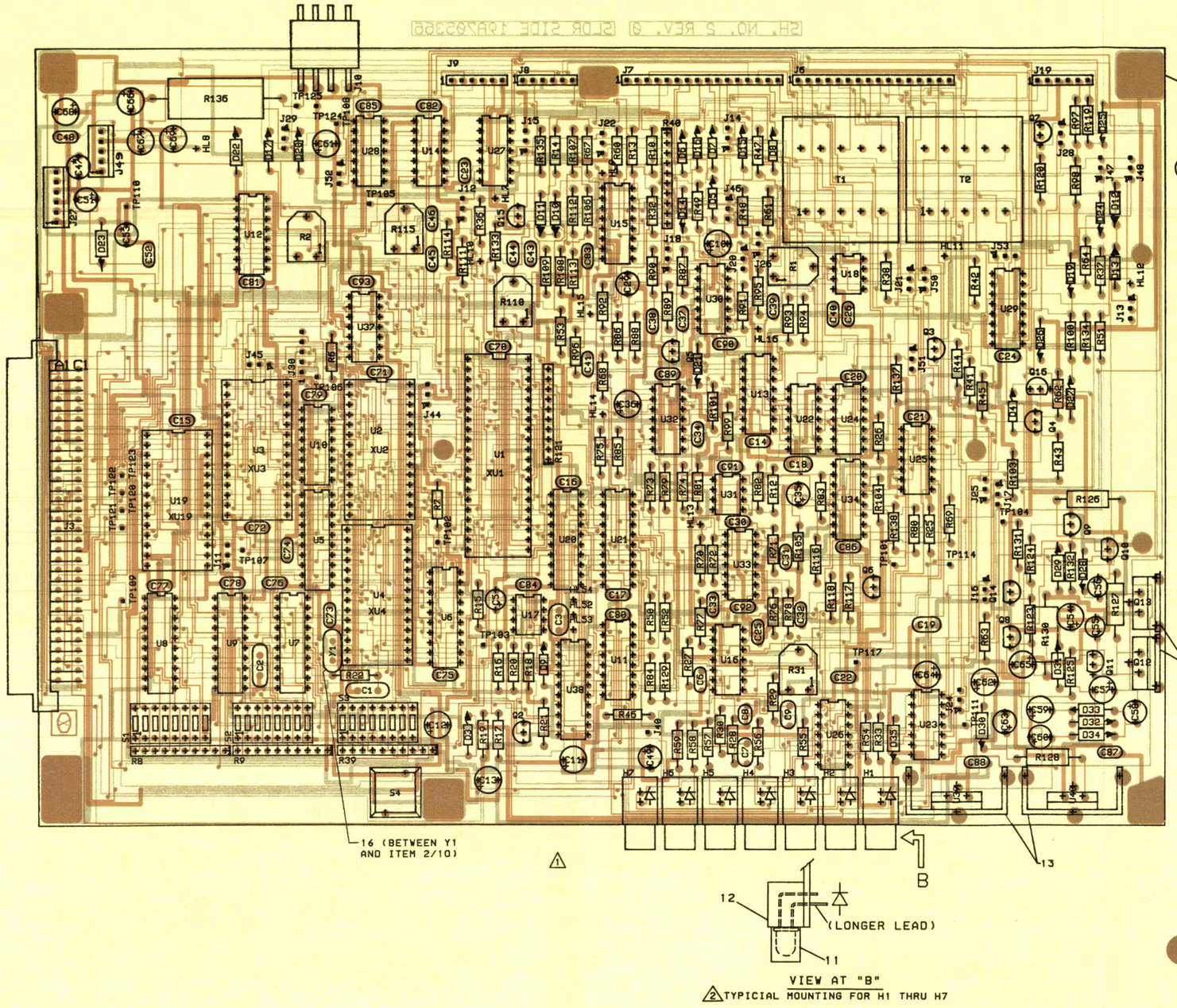
TABLE 2 - JUMPER CONFIGURATIONS

CONNECTOR	JUMPER	FUNCTION
J11-1&2	P11	Receive data from 9600 baud Modem board
J12-1&2	P12	Clear to send from 9600 baud Modem board
J13-1&2	P13	Route backup serial link tx output to backup serial link rx input
J14-1&2	P14	Master site controller path selection enable
J15-1&2	P15	Backup site controller path selection enable
J16-1&2	P16	Backup serial link selection enable
J17-1&2	P17	Low-speed data encode path enable
J18-1&2	P18	Low-speed data decode path enable
J20-1&2	P20	Combined ptt from station disable
J21-1&2	P21	High-speed, data-acquisition rate control

TABLE 2 - JUMPER CONFIGURATIONS (CONTINUED)

CONNECTOR	JUMPER	FUNCTION
J22-1&2	P22	4800 Hz tone notch path enable
J24-1&2	P24	Backup serial link selection enable
J25-1&2	P25	Low-speed data encode path enable
J26-1&2	P26	Lock-detect input path enable
J28-1&2	P28	Sync line input path enable
J29-1&2	P29	No function
J30-2&3 J30-4&5	P30 P31	Enable clock drive to microcomputer for CMOS configuration
J44-2&3	P44	EPROM size
J45-1&2	P45	A11 select
J46-2&3	P46	INTO for voter concentrator
J47-1&2	P47	Backup serial link select
J48-1&2	P48	Backup serial link select
J50-1&2	P50	Tone control for voted system
J51-2&3	P51	Morse code ID enable
J52-2&3	P52	TXD polarity select
J53-2&3	P53	RXD polarity select

OUTLINE DRAWING
GETC (19D901995G1)



(1) NOTES:

⚠1 INDICATES FRONT OF COMPONENT AUTO-INSERTION MACHINES.

⚠2 SNAP LED (H1 THRU H7) INTO LENS ITEM 11. INSERT LED LEADS THROUGH HOLES IN HOLDER, ITEM 12. BEND LEADS ON LED OVER, UNTIL LENS SEATS IN HOLDER. WHILE AT THE SAME TIME HOLDER IS CLOSED AND SNAPPED TOGETHER.

3 MARK APPLICABLE GROUP AND REVISION PER 19A115740P1 FOR LATEST REVISION, SEE REVISION LETTER INDEX 19C320100 SH.9.

(19D901995, Sh. 1, Rev. 0)
(19A705366, Sh. 1, Rev. 0)
(19A705366, Sh. 2, Rev. 0)

PARTS LIST

PARTS LIST

GETC LOGIC BOARD
19D901995G1
ISSUE 1

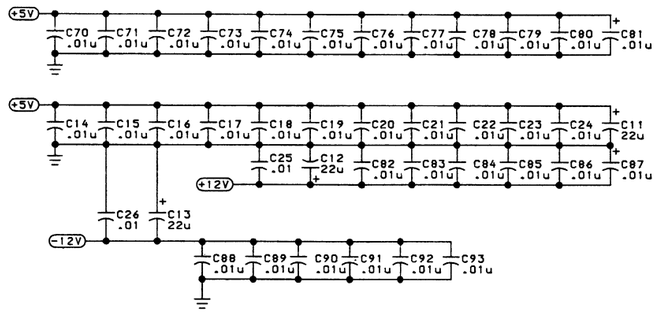
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	19A701624P118	Ceramic, disc: 27 pF + or -5%, 500 VDCW, temp coef N80 PPM + or -30.
C3	19A702250P111	Polyester: .047 uF + or -10%, 50 VDCW.
C5	19A701534P3	Tantalum: 0.47 uF + or - 20%, 35 VDCW.
C6	T644ACP247J	Polyester: .0047 uF + or -5%, 50 VDCW.
C7	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C8	T644ACP210J	Polyester: .0010 uF + or -5%, 50 VDCW.
C9	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C10 thru C13	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C14 thru C26	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C29	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C30 thru C34	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C35	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C36	19A701534P9	Tantalum: 47 uF + or -20%, 6.3 VDCW.
C37 thru C41	T644ACP310J	Polyester: .010 uF + or -5%, 50 VDCW.
C43 thru C46	T644ACP247J	Polyester: .0047 uF + or -5%, 50 VDCW.
C47	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C48	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C49	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C51	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C52	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
C53	19A701534P7	Tantalum: 10 uF + or -20%, 16 VDCW.
C54	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim to Panasonic LS Series.
C55	19A701534P2	Tantalum: 0.22 uF + or -20%, 35 VDCW.
C56	19A701534P4	Tantalum: 1 uF + or - 20%, 35 VDCW.
C57	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C58	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C59	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C60	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C61 and C62	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C63	19A701534P6	Tantalum: 4.7 uF + or -20%, 35 VDCW.
C64	19A701534P8	Tantalum: 22 uF + or -20%, 16 VDCW.
C65 thru C69	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim to Panasonic LS Series.
C70 thru C93	T644ACP310K	Polyester: .010 uF + or -10%, 50 VDCW.
		- - - - - - - - - - DIODES - - - - - - - - - -
D3 thru D8	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D9	19A700025P2	Silicon, zener: 400 mW max; sim to BZX55-C2V7.
D10 thru D13	19J706030P2	Silicon; sim to 1N4736A.
D14 thru D17	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D19 thru D21	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D22 and D23	T324ADP1041	Rectifier, silicon; general purpose.
D24 thru D28	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
D29 thru D35	T324ADP1041	Rectifier, silicon; general purpose.
		- - - - - - - - - - LEDS - - - - - - - - - -
H1 thru H7	162B3011P0002	Diode, optoelectronic: red; sim to Hew. Packard 5082-4650.
		- - - - - - - - - - JACKS - - - - - - - - - -
J3	19A705181P1	Connector: 64 contacts; sim to Burndx Cat. RP196B32R1G021.
J6 and J7	19A704852P42	Printed wire, two part: 16 contacts, sim to Molex 22-29-2161.
J8 and J9	19A704852P32	Printed wire, two part: 6 contacts, sim to Molex 22-29-2061.
J10	19A116659P173	Printed wire, two part: 4 contacts, sim to Molex 09-75-1041.
J19	19A704852P32	Printed wire, two part: 6 contacts, sim to Molex 22-29-2061.
J27	19A700072P32	Printed wire: 6 contacts rated at 2.5 amps; sim to Molex 22-27-2061.
J49	19A704852P31	Connector: 5 contacts; sim to Molex 22-29-2051.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2 thru Q6	19A700023P2	Silicon, NPN: sim to 2N3904.
Q7	19A134959P1	Silicon, NPN; sim to Type 2N4401.
Q8 thru Q10	19A700023P2	Silicon, NPN: sim to 2N3904.
Q11	19A700022P1	Silicon, PNP; sim to Type 2N3906.
Q12	19A116375P1	Silicon, PNP.
Q13	19A700054P1	Silicon, NPN, 60 w; sim to BD-201.
Q14 and Q15	19A700023P2	Silicon, NPN: sim to 2N3904.
Q16	19A134959P1	Silicon, NPN; sim to Type 2N4401.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R2	19B800784P105	Variable: 1K ohms + or -20%, 350 VDCW, .5 w.
R6 and R7	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R8 and R9	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R10	H212CRP510C	Deposited carbon: 1M ohms + or -5%, 1/4 w.
R12	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R13	19A701250P446	Metal film: 294K ohm + or - 1%, 250 VDCW, 1/4 w.
R14	H212CRP322C	Deposited carbon: 22K ohms + or -5%, 1/4 w.
R15	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R16	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R17	19A701250P273	Metal film: 5.6K ohms + or -1%, 250 VDCW, 1/4 w.
R18	H212CRP147C	Deposited carbon: 470 ohms + or -5%, 1/4 w.
R19	19A701250P301	Metal film: 10K ohms + or - 1%, 1/4 w.
R20 and R21	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R22	19A701537P1	Composition: 10M ohms + or - 5%, 250 VDCW, 1/4 w.
R25 and R26	H212CRP347C	Deposited carbon: 47K ohms + or -5%, 1/4 w.
R27	19A701250P269	Metal film: 5.11K ohms + or -1%, 1/4 w.
R28	19A701250P201	Metal film: 1K ohms + or -1%, 250 VDCW, 1/4 w.
R29	19A701250P322	Metal film: 16.5K ohms + or -1%, 250 VDCW, 1/4 w.
R30	19A701250P210	Metal film: 1240 ohms + or -1%, 250 VDCW, 1/4 w.
R31	19B800784P108	Variable: 10K ohms + or -20%, 1/2 w.
R32	H212CRP510C	Deposited carbon: 1M ohms + or -5%, 1/4 w.
R33	H212CRP239C	Deposited carbon: 3.9K ohms + or -5%, 1/4 w.
R36 and R37	19A701250P176	Metal film: 604 ohms + or -1%, 1/4 w.
R38	H212CRP122C	Deposited carbon: 220 ohms + or -5%, 1/4 w.
R39 and R40	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R41	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R42	H212CRP222C	Deposited carbon: 2.2K ohms + or -5%, 1/4 w.
R43	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R44 thru R53	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R54 thru R59	H212CRP156C	Deposited carbon: 560 ohms + or -5%, 1/4 w.
R60	H212CRP215C	Deposited carbon: 1.5K ohms + or -5%, 1/4 w.
R61	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R62	H212CRP182C	Deposited carbon: 820 ohms + or -5%, 1/4 w.
R63	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R64	H212CRP110C	Deposited carbon: 100 ohms + or -5%, 1/4 w.
R67	H212CRP247C	Deposited carbon: 4.7K ohms + or -5%, 1/4 w.
R68	H212CRP318C	Deposited carbon: 18K ohms + or -5%, 1/4 w.
R69	19A701250P388	Metal film: 80.6K ohms + or - 1%, 250 VDCW, 1/4 w.
R70	19A701250P358	Metal film: 2.7 ohms + or -5%, 1/4 w.
R71	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R72	19A701250P384	Metal film: 73.2K ohms + or -1%, 1/4 w.
R73	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R74	19A701250P391	Metal film: 86.6K ohms + or -1%, 1/4 w.
R75	19A701250P325	Metal film: 17.8K ohms + or -1%, 1/4 w.
R76	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R77	19A701250P382	Metal film: 69.8K ohms + or -1%, 1/4 w.
R78	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R79	19A701250P350	Metal film: 32.4K ohms + or -1%, 1/4 w.
R80 thru R83	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R84	H212CRP382C	Deposited carbon: 82K ohms + or -5%, 1/4 w.
R85	H212CRP318C	Deposited carbon: 18K ohms + or -5%, 1/4 w.
R86	19A701250P388	Metal film: 80.6K ohms + or - 1%, 250 VDCW, 1/4 w.
R87	19A701250P358	Metal film: 2.7 ohms + or -5%, 1/4 w.
R88	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R89	19A701250P384	Metal film: 73.2K ohms + or -1%, 1/4 w.
R90	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R91	19A701250P391	Metal film: 86.6K ohms + or -1%, 1/4 w.
R92	19A701250P325	Metal film: 17.8K ohms + or -1%, 1/4 w.
R93	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R94	19A701250P382	Metal film: 69.8K ohms + or -1%, 1/4 w.
R95	19A701250P383	Metal film: 71.5K ohms + or -1%, 1/4 w.
R96	19A701250P350	Metal film: 32.4K ohms + or -1%, 1/4 w.
R97 and R98	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R99	H212CRP347C	Deposited carbon: 47K ohms + or -5%, 1/4 w.
R100	H212CRP410C	Deposited carbon: 0.1M ohms + or -5%, 1/4 w.
R101	H212CRP368C	Deposited carbon: 68K ohms + or -5%, 1/4 w.
R103 thru R105	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R106	19A701250P224	Metal film: 1740 ohm + or - 1%, 250 VDCW, 1/4 w.
R107	19A701250P312	Metal film: 13K ohms + or -1%, 1/4 w.
R108	19A701250P401	Metal film: 100K ohms + or -1%, 1/4 w.
R109	19A701250P334	Metal film: 22.1K ohms + or -1%, 1/4 w.
R110	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R111	19A701250P224	Metal film: 1740 ohm + or - 1%, 250 VDCW, 1/4 w.
R112	19A701250P312	Metal film: 13K ohms + or -1%, 1/4 w.
R113	19A701250P401	Metal film: 100K ohms + or -1%, 1/4 w.
R114	19A701250P344	Metal film: 28K ohms + or -1%, 250 VDCW, 1/4 w.
R115	19B800784P106	Variable: 5K ohms + or -20%, 1/2 w.
R116	19A701250P201	Metal film: 1K ohms + or -1%, 250 VDCW, 1/4 w.
R117 and R118	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R119	H212CRP239C	Deposited carbon: 3.9K ohms + or -5%, 1/4 w.
R120	H212CRP133C	Deposited carbon: 330 ohms + or -5%, 1/4 w.
R121	19A701630P2	Resistor, network: 9 resistors rated 10K ohms + or -2%, 50 VDCW; sim to Bourns 4310R-101-103.
R123 thru R125	H212CRP210C	Deposited carbon: 1K ohms + or -5%, 1/4 w.
R126	19A700113P63	Composition: 1K ohms + or - 5%, 1/2 w.
R127	3R77P51LJ	Composition: 510 ohms + or -5%, 1/2 w.
R128	19A700113P19	Composition: 15 ohms + or - 5%, 1/2 w.
R129	19A701250P434	Metal film: 221 K ohms + or -1%, 250 VDCW, 1 w.
R130	19A700050P13	Wirewound: 1 ohms + or - 10%, 2 w.
R131	19A701250P301	Metal film: 10K ohms + or - 1%, 1/4 w.
R132	19A701250P266	Metal film: 4.75K ohms + or -1%, 1/4 w.
R133	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R134	H212CRP239C	Deposited carbon: 3.9K ohms + or -5%, 1/4 w.
R135	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R136	5493035P2	Wirewound: 1 ohm + or -5%, 5 w.
R137	H212CRP310C	Deposited carbon: 10K ohms + or - 5%, 1/4 w.
R138	H212CRP315C	Deposited carbon: 15K ohms + or -5%, 1/4 w.
		- - - - - - - - - - SWITCHES - - - - - - - - -
S1 thru S3	19B800010P2	Push: 4 station contacts rated 25 mA at 24 VDC; sim to CTS 205-8.
S4	19A701324P1	Push: contacts rated 1 mA at 10 volts; sim to IEE/Schadown 210091.
		- - - - - - - - - - TRANSFORMERS - - - - - - - -
T1 and T2	19A703656P1	Audio Progquency: sim to Nova Magnetics 5577-06-0001.
		- - - - - - - - - - INTEGRATED CIRCUITS - - - - - - -
U1	19A704345P1	Microcomputer: CHMOX 8-BIT.
U3	19A702934P1	READ/WRITE MEMORY, sim to Hitachi HM6116LPI-4.
U4	19A704727P2	Digital: MODEM.
U5	19A703471P2	Digital: High Speed CMOS.
U6	19A703471P8	Digital: High Speed CMOS.
U7 thru U9	19A703471P1	Digital: OCTAL TRI-STATE BUFFER.
U10	19A700037P363	Digital: (DUAL 2-LINE-TO-1-LINE DECODER/DEMULTIPLEXER).
U11 thru U13	19A700176P1	Digital. HEX BUFFER/CONVERTER (INVERTING).
U14	19A116704P1	Linear/Digital: QUAD DTL LINE DRIVER.
U15	19A700029P38	Digital: Triple 2-Channel Multiplexer.
U16	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U17	19A134764P2	Linear: (VOLTAGE COMPARATOR), sim to LM393N.
U18	19A700086P4	Operation Amplifier, Dual OP AMP; sim to 4558 Type.
U19	19A704727P2	Digital: MODEM.
U20 and U21	19A704380P11	Digital: High Speed CMOS.
U22	19A703483P1	Digital: HIGH-SPEED CMOS LOCK GATES.
U23 thru U26	19A116180P75	Digital: HEX BUFFER INVERTER (OPEN COLLECTOR).
U27	19A116704P2	Linear/Digital: QUAD DTL LINE RECEIV.
U28	19A116704P1	Linear/Digital: QUAD DTL LINE DRIVER.
U29	19A700176P1	Digital. HEX BUFFER/CONVERTER (INVERTING).
U30	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U31	19A134764P2	Linear: (VOLTAGE COMPARATOR), sim to LM393N.
U32 and U33	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U34	19A700029P38	Digital: Triple 2-Channel Multiplexer.
U37	19A704883P1	OP AMP, QUAD: sim to: Motorola MC 3303P.
U38	19A704380P11	Digital: High Speed CMOS.
U39	19A134718P2	Linear: NEGATIVE VOLTAGE REGULATOR; sim to uA 7912U.
U40	19A134717P2	Linear: POSITIVE VOLTAGE REGULATOR; sim to UA7812U.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XU1	19A700156P5	Socket, integrated circuit: 40 contacts; sim to Augat 340-AG39D.
XU2 thru XU4	19A700156P3	Integrated circuit: 28 contacts; sim to AMP 640362P3.
XU19	19A700156P3	Integrated circuit: 28 contacts; sim to AMP 640362P3.
		- - - - - - - - - - CRYSTALS - - - - - - - - -
Y1	19A702511G15	Quartz: 11.059200 MHz.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A703248P12	Contact, electrical: 0.635 Square.
	19A134521P1	Lens, red. (XMIT).
	19A134521P6	Lens.
	19A702917P7	Heat Sink, Transistor: Sim to Thermalloy Cat 6030B-TT.
	19B232901P2	Support.
	19A701516P1	Insulator, plate.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SCHEMATIC DIAGRAM
GETC
(SHEET 1 OF 5)

JUMPER	VOICEGUARD, REMOTE/REPEAT, SATELLITE RX, VOTED REMOTE/REPEAT	VOICEGUARD, VOTER SELECTOR	VOICEGUARD, VOTER RX	PUBLIC SERVICE TRUNKED, REMOTE/REPEAT, VOTER CONCENTRATOR	PUBLIC SERVICE TRUNKED, VOTER SELECTOR
P11	J11-1&2	J11-1&2	J11-1&2	J11-1&2	J11-1&2
P12	J12-1&2	J12-1&2	J12-1&2	J12-1&2	J12-1&2
P13	J13-2&3	J13-2&3	J13-2&3	J13-1&2	J13-1&2
P14	J14-2&3	J14-2&3	J14-2&3	J14-1&2	J14-1&2
P15	J15-2&3	J15-2&3	J15-2&3	J15-1&2	J15-1&2
P16	J16-1&2	J16-1&2	J16-2&3	J16-1&2	J16-1&2
P17	J17-2&3	J17-2&3	J17-2&3	J17-1&2	J17-1&2
P18	J18-2&3	J18-2&3	J18-2&3	J18-1&2	J18-1&2
P20	J20-2&3	J20-2&3	J20-2&3	J20-1&2	J20-1&2
P21	J21-2&3	J21-2&3	J21-2&3	J21-1&2	J21-1&2
P22	J22-2&3	J22-2&3	J22-2&3	J22-1&2	J22-1&2
P24	J24-2&3	J24-2&3	J24-2&3	J24-1&2	J24-1&2
P25	J25-2&3	J25-2&3	J25-2&3	J25-1&2	J25-1&2
P26	J26-2&3	J26-2&3	J26-2&3	J26-1&2	J26-1&2
P28	J28-2&3	J28-2&3	J28-2&3	J28-1&2	J28-1&2
P29	J29-1&2	J29-2&3	J29-1&2	J29-1&2	J29-1&2
P30	J30-2&3	J30-2&3	J30-2&3	J30-2&3	J30-2&3
P31	J30-4&5	J30-4&5	J30-4&5	J30-4&5	J30-4&5
P44	J44-2&3	J44-2&3	J44-2&3	J44-1&2	J44-1&2
P45	J45-1&2	J45-1&2	J45-1&2	J45-1&2	J45-1&2
P46	J46-1&2	J46-1&2	J46-1&2	J46-1&2	J46-2&3
P47	J47-1&2	J47-1&2	J47-2&3	J47-1&2	J47-1&2
P48	J48-1&2	J48-1&2	J48-1&2	J48-1&2	J48-1&2
P50	J50-1&2	J50-2&3	J50-1&2	J50-1&2	J50-1&2
P51	J51-2&3	J51-2&3	J51-2&3	J51-1&2	J51-2&3
P52	J52-2&3	J52-2&3	J52-2&3	J52-1&2	J52-1&2
P53	J53-2&3	J53-2&3	J53-2&3	J53-1&2	J53-1&2

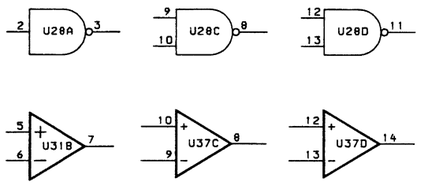
A1
PL19D901995

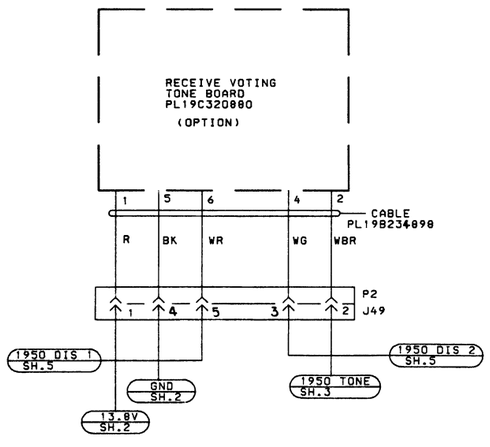


POWER & GND CONNECTIONS

DEVICE	GND PIN NO	+5V PIN NO	+12 PIN NO	-12 PIN NO
U1	20	40		
U2	14	28		
U3	14	26,28		
U4	13	15		
U5	10	20		
U6	10	20		
U7	10	20		
U8	10	20		
U9	10	20		
U10	8	16		
U11	8	1		
U12	8	1		
U13	8	1		
U14	7		14	1
U15	6,8		16	7
U16			4	11
U17	4		8	
U18			8	4
U19	13	15		
U20	10	20		
U21	10	20		
U22	7	14		
U23	7	14		
U24	7	14		
U25	7	14		
U26	7	14		
U27	7	14		
U28	7		14	1
U29	8	1		
U30			4	11
U31			8	4
U32	3,5		4	11
U33			4	11
U34	6,8		16	7
U37			4	11
U38	10	20		

UNUSED GATES





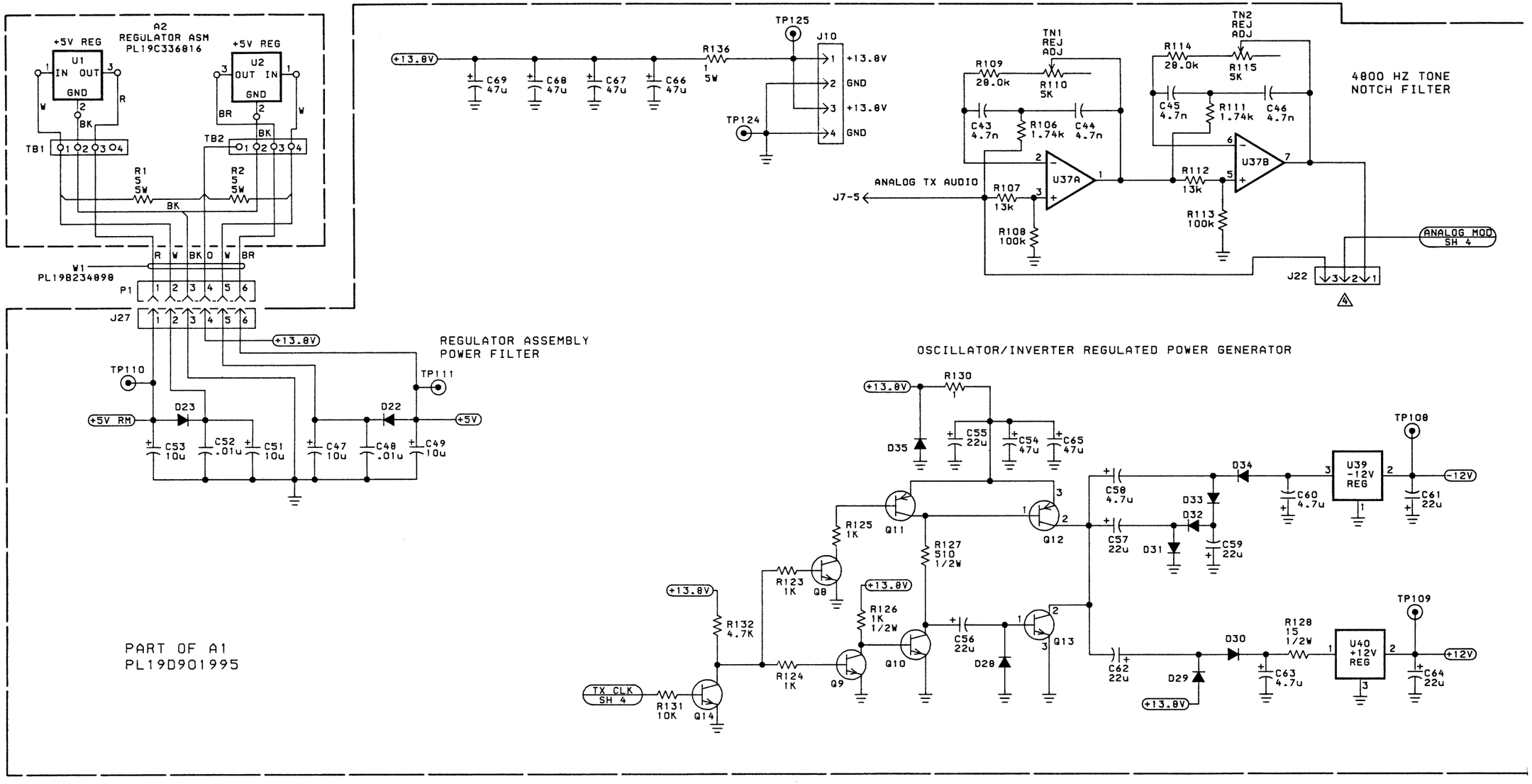
ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER k OR M.
CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER μ,n OR p.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR μ.

NOTES:

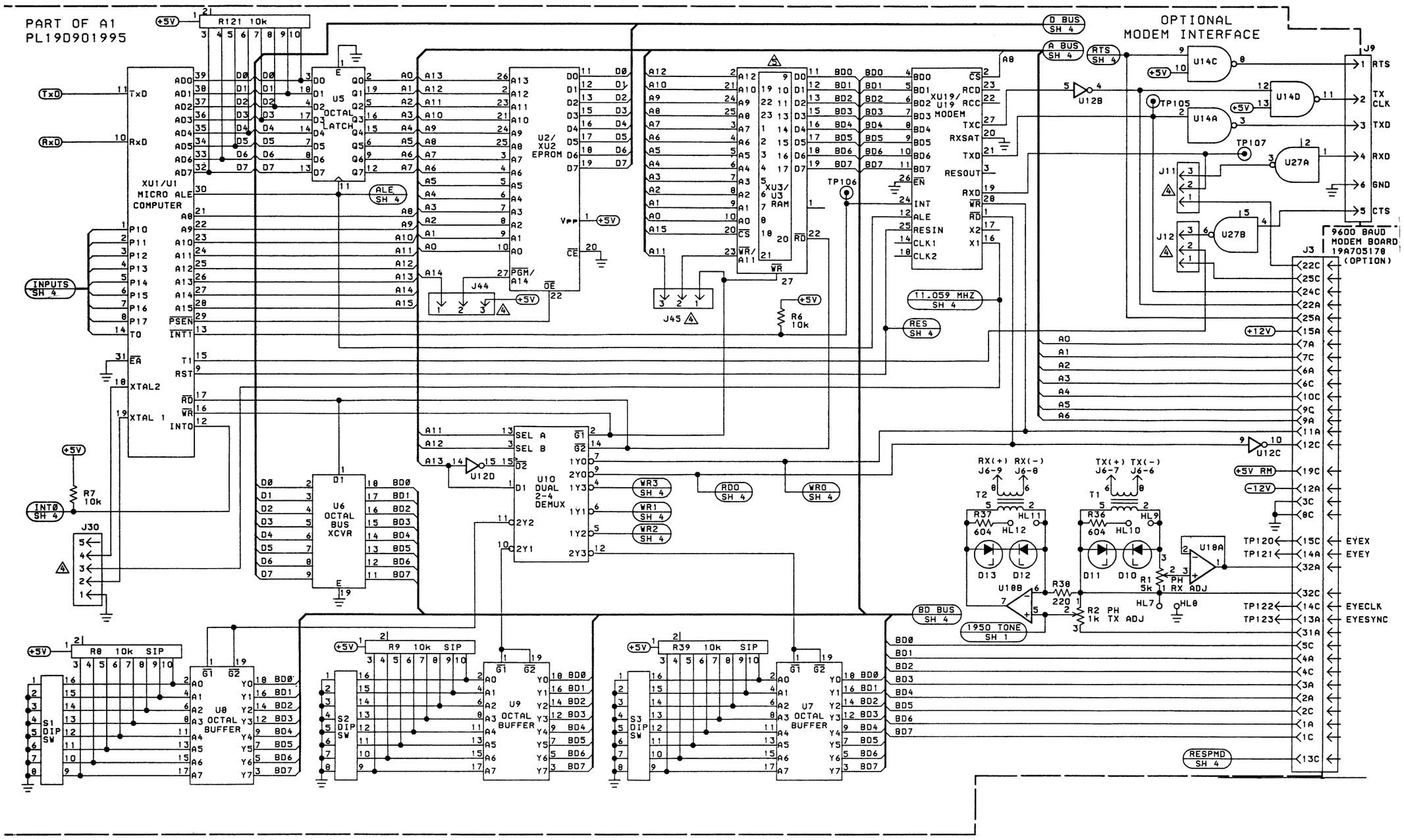
4. FOR JUMPER PLACEMENT, SEE JUMPER CHART.
5. FOR A 6116 RAM (24 PINS), OFFSET DOWNWARD IN THE 28 PIN SOCKET.

MODEL NO.	REV. LETTER
PL19D901995G1	
PL19C336816G1	

SCHEMATIC DIAGRAM
GETC
(SHEET 2 OF 5)



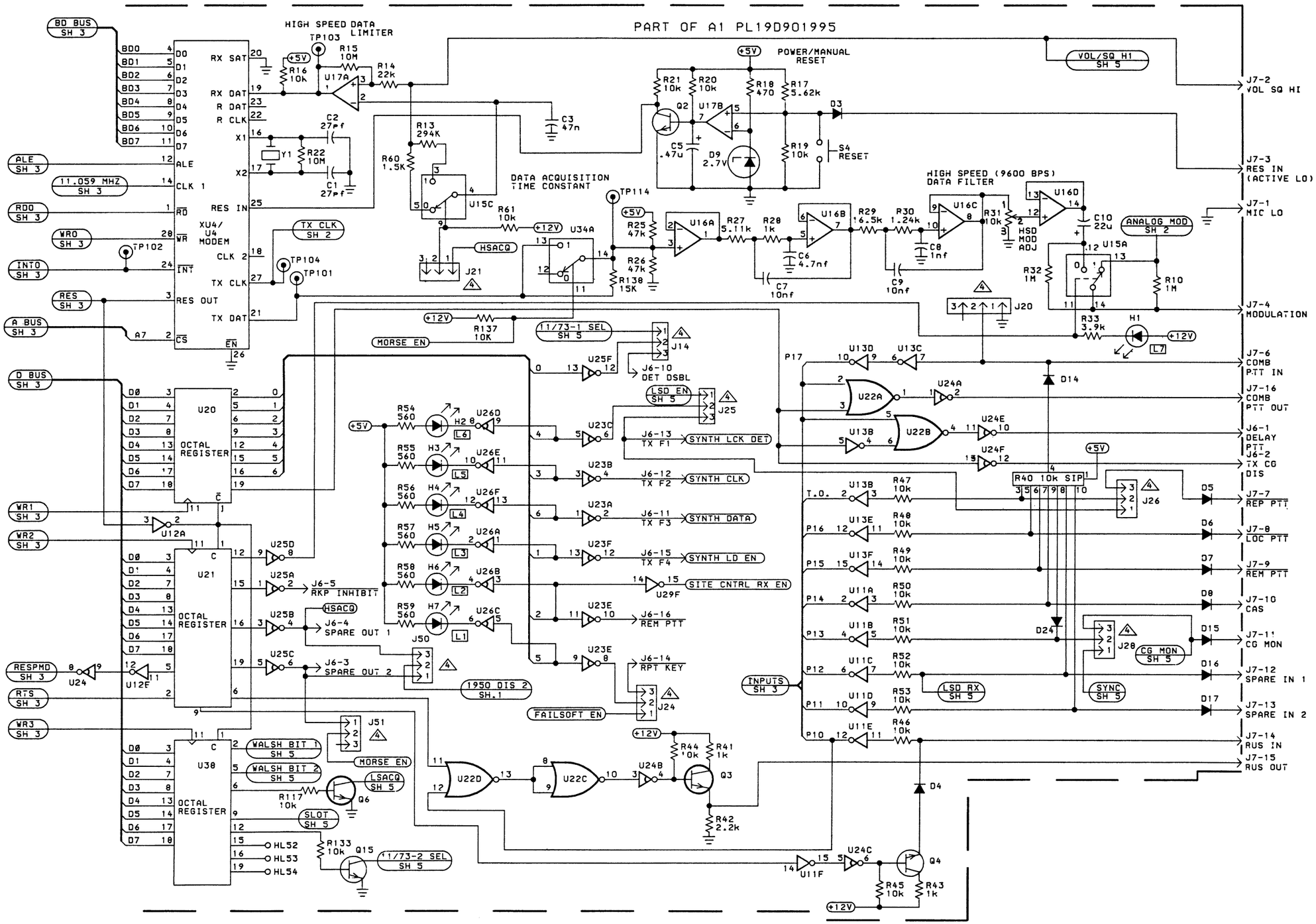
SCHEMATIC DIAGRAM
GETC
(SHEET 3 OF 5)



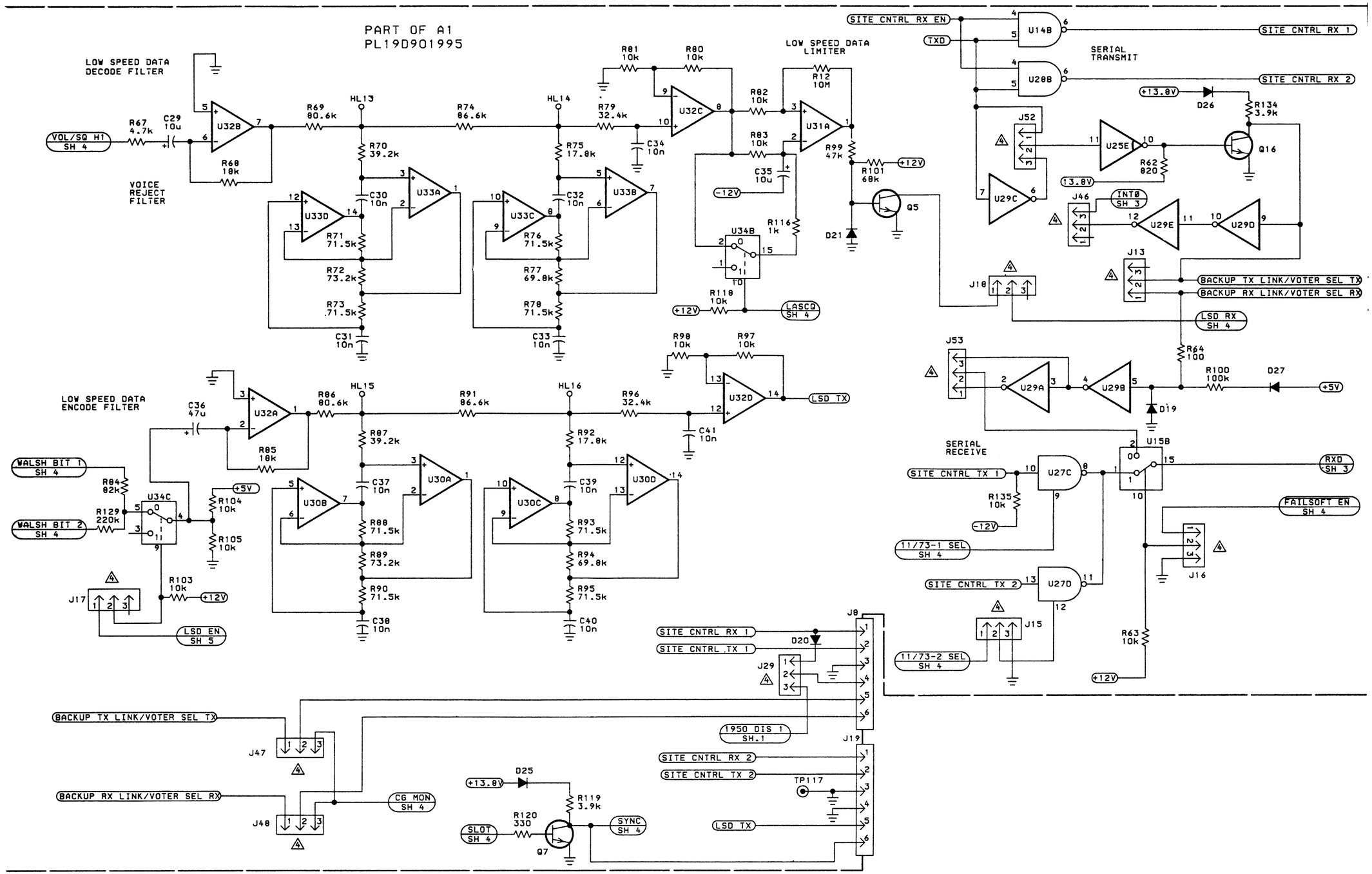
(19D901992, Sh. 3, Rev. 0)

SCHEMATIC DIAGRAM
GETC
(SHEET 4 OF 5)

PART OF A1 PL19D901995



SCHEMATIC DIAGRAM
GETC
(SHEET 5 OF 5)



ADDENDUM NO. 2 TO LBI-31859A

The SERVICE AND TEST procedure described in this manual requires the use of an ASCII terminal or computer with terminal emulation program. In addition to this method, test software is available to run on an IBM PC or any true IBM compatible. Software may be ordered under the GE part number 19A149522.

The test software exercises the same test functions as described in this manual (although structure differs slightly). In addition to the testing procedure, the software provides help information and allows the recording of user notes.