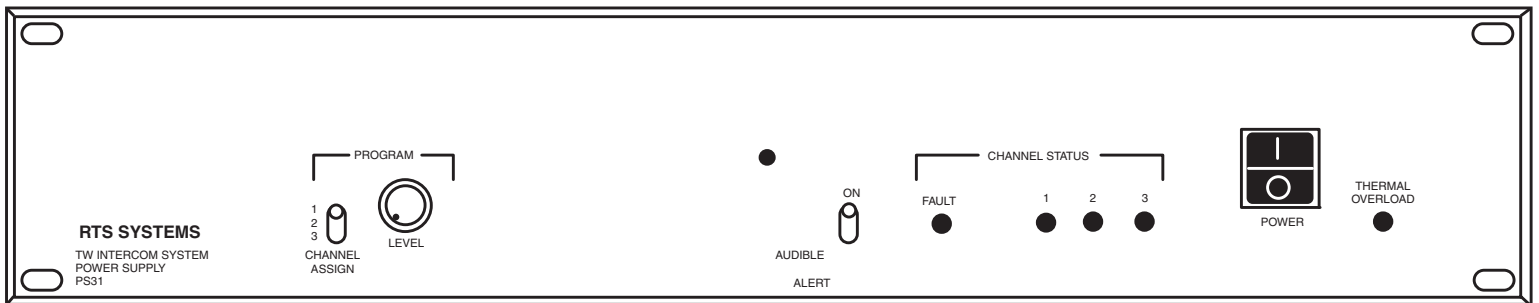


# *MODEL PS-31*

## *Power Supply*

*User Manual*



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**WARRANTY NOTICE**

See the enclosed warranty card for further details.

**CUSTOMER SUPPORT**

Technical questions should be directed to:

Customer Service Department  
RTS/Telex Communications, Inc.  
12000 Portland Avenue South  
Burnsville, MN 55337 USA  
Telephone: 800-392-3497  
Fax: 800-323-0498

**RETURN SHIPPING INSTRUCTIONS**

Customer Service Department  
Telex Communications, Inc. (Lincoln, NE)  
Telephone: 402-467-5321  
Fax: 402-467-3279  
Factory Service: 800-553-5992

Please include a note in the box which supplies the company name, address, phone number, a person to contact regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s).

**SHIPPING TO THE MANUFACTURER**

All shipments of product should be made via UPS Ground, prepaid (you may request from Factory Service a different shipment method). Any shipment upgrades will be paid by the customer. The equipment should be shipped in the original packing carton. If the original carton is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the equipment should be wrapped in paper and surrounded with at least four (4) inches of excelsior or similar shock-absorbing material. All shipments must be sent to the following address and must include the Proof of Purchase for warranty repair. Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper, collect.

Factory Service Department  
Telex Communications, Inc.  
8601 East Cornhusker Hwy.  
Lincoln, NE 68507 U.S.A.  
Attn: Service

This package should include the following:

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# *DESCRIPTION*

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## *DESCRIPTION*

### **GENERAL**

The Model PS31 supplies 32 volts regulated DC power to each of three intercom channels. It has short circuit and thermal overload protection, with automatic recovery when the fault is removed.

### **FEATURES**

#### *Program Input*

There is a PROGRAM INPUT connector on the rear panel. A CHANNEL ASSIGN switch on the front panel assigns the program to any of the three channels. A LEVEL control adjusts the program level to the intercom channel.

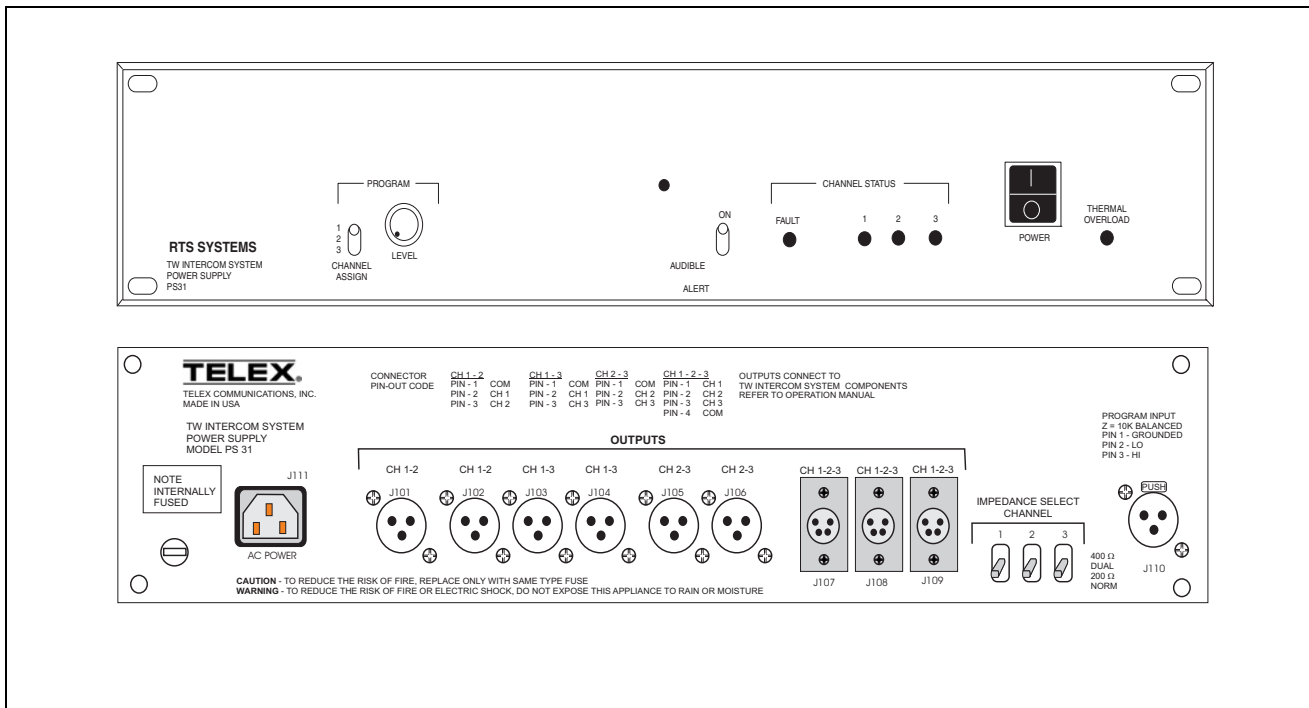


FIGURE 1. PS-31 Front and Back View

## Status Indicators

There is an audible alarm and a red FAULT indicator for current overload indication on any of the three channels. An AUDIBLE ALERT switch on the front panel turns the alarm on or off, but the FAULT indicator will continue to flash during current overload conditions. There is also a green status indicator for each channel. Each of these indicators will remain lit during normal operation, but will turn off during a channel current overload condition. Output current is automatically reduced during an overload, and normal operation is restored when the overload is removed.

## Input Power

The PS31 is available in two versions: one for 115 VAC operation and one for 230 VAC operation. A simple internal modification changes the operating voltage for 100 VAC or 200 VAC. A POWER on/off switch is provided on the front panel.

## Intercom Channel Connections

Intercom channels are connected to the rear panel of the PS31. A variety of connector pin-outs is provided to accommodate individual system requirements.

## Impedance Selection

The PS31 provides the required channel terminating impedance for each channel. A 200/400 ohm IMPEDANCE SELECT switch for each channel is located on the rear panel. These switches are set to 200 ohms for normal operation. The 400 ohm setting permits two PS31's to be coupled to double the DC capacity of the system.

---

## *Installation*

### **MECHANICAL INSTALLATION**

The Model PS31 can be rack mounted or used free standing. The rack mount is a standard 19-inches wide by 3.5-inches high. Allow room for cable connections.

### **ELECTRICAL INSTALLATION**

#### ***CONNECTING INTERCOM STATIONS***

**NOTE:** When connecting intercom stations, do not exceed the power supply capacity, either for one channel or for all three channels. Power supply capacity is graphically illustrated in Figure 1. If more capacity is required, refer to “PS 31 Capacity” on page 4.

Connect intercom channels to the OUTPUTS connectors on the rear panel. Pin assignments are printed above the connectors. These connectors provide three alternatives for intercom channel connection:

- Connectors J101 through J106 can be used to connect various combinations of two channels.
- Connectors J107 and J108 can be used to connect all three channels.
- Connector J109 can also be used to connect three channels, but unlike all the other connectors, no power is supplied at this connector. This connector can be used to interconnect the audio channels when using two PS31 power supplies.

#### ***USING TWO PS31'S TO EXPAND CAPACITY***

If there are more stations on one or more channels than the power supply capacity will allow, two PS31 power supplies may be used to double capacity. For each channel that requires added capacity:

1. Use the J109 connectors on both power supplies to interconnect the audio and ground pins of the desired channel (See “PS-31 Front and Back View” on page 2.).
2. Divide the stations that you wish to connect into two groups. Connect one group to the first power supply. Connect the other group to the second power supply. For each group, do not exceed the capacity (either total or per channel) of the power supply.
3. On both power supplies, set the IMPEDANCE SELECT switches for the channel to the 400<F128M>W<F255D> DUAL position. (Leave all impedance switches for channels that are not interconnected in the 200<F128M>W<F255D> NORM position.

#### ***PROGRAM INPUTS***

A program source may be connected to the PROGRAM INPUT connector on the rear panel. Pin assignments are printed above the connector (See “PS-31 Front and Back View” on page 2.).

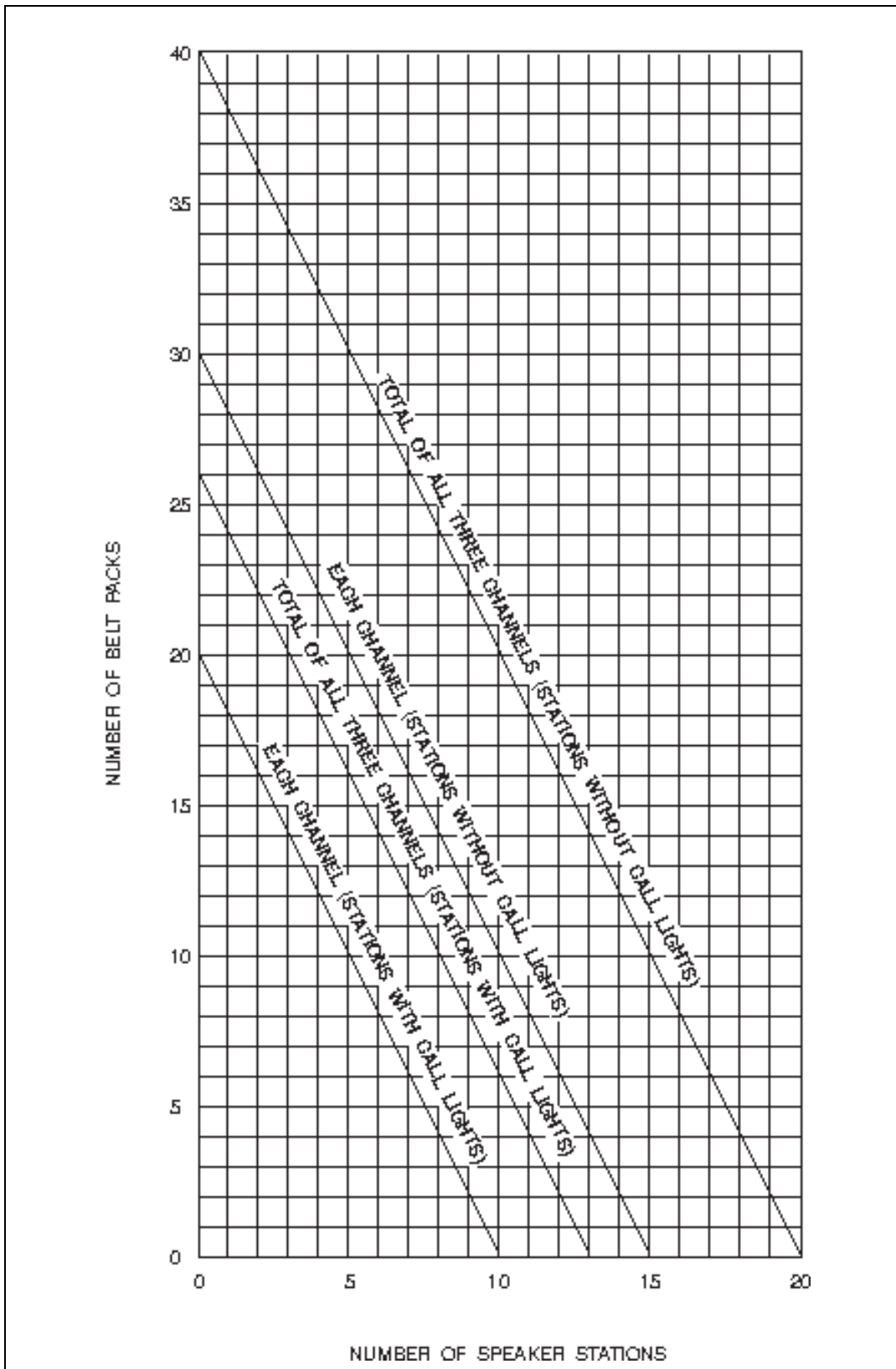
To connect an unbalanced program source, connect pin 2 to pin 1. Then connect program ground to pin 1 and program HI to pin 3.

If two PS31's are interconnected, a separate program source may be connected to each.

#### ***AC POWER***

Plug the AC power cord into the PS31 and into an AC mains outlet.

**NOTE:** The PS31 is factory-set for either 110-120-volt operation or 220-240-volt operation. The operating voltage is indicated on the back of the unit. Operation at 100-110 volts or 200-220 volts requires an internal modification. Refer to "MAINTENANCE" on page 11.



**FIGURE 2.** PS 31 Capacity



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*POWER-UP INDICATIONS*

Turn on the POWER switch. During normal operation the three CHANNEL STATUS indicators should be lit and the FAULT and THERMAL OVERLOAD indicators should be off.

---

*FAULT INDICATIONS*

If there is a fault on a channel, the CHANNEL STATUS indicator for that channel will turn off and the red FAULT indicator will flash. If the AUDIBLE ALERT is set to “ON”, the alarm will beep. Possible causes of a fault include: overvoltage, overcurrent, short circuit to ground or severe brown-outs.

---

*THERMAL OVERLOAD*

If the PS31 overheats, the THERMAL OVERLOAD indicator will turn on and AC power to the PS31 will be shut off. Normal operation will resume when the PS31 cools. Possible causes of a thermal shut-down include overloading the output channels or improper internal mains voltage selection.

---

*IMPEDANCE SELECT SWITCHES*

The IMPEDANCE SELECT switches on the rear panel allow each channel to be set for 200 ohm or 400 ohm operation. Select 200<F128M>W<F255D> NORM for each channel operated independently. Select 400<F128M>W<F255D> DUAL for each channel connected to another channel through the AUDIO ONLY connector (J109). Figure 1, “PS-31 Front and Back View,” on page 2

---

*PROGRAM INPUT*

If a program source is connected to the PROGRAM INPUT connector on the back of the PS31, it may be routed to any one of the intercom channels using the CHANNEL ASSIGN switch. Use the LEVEL control to adjust the program level on the selected channel.



---

# *THEORY OF OPERATION*

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## *GENERAL*

The PS31 electronic circuits include an AC to DC converter, an impedance generator for each channel, a program insertion amplifier, and display and diagnostics circuits (Figure 3 on page 9). The following paragraphs describe these circuits. For schematic reference, see drawing SD3225 in Chapter 7.

---

## *AC TO DC CONVERSION*

Transformer T101 steps down the AC mains voltage to 33 volts rms. Diodes D101-D104 rectify this voltage and capacitor C117 filters out the AC component, leaving about 45-50 volts unregulated DC. This raw DC voltage feeds the impedance generators (through fuses F201, F301, and F401), and regulator U101.

U101 provides regulated 30 volts DC. This voltage is supplied to the impedance generators, to the program insertion amplifier, and to U102. Diodes D109 and D110 protect U101. Resistors R107 and R108 establish the output voltage reference of 30 volts DC. Capacitor C121 reduces the amount of ripple on the 30 volts DC, and C122 provides decoupling.

U102 provides regulated 7.5 volts DC. This voltage is used as a reference level by the program insertion amplifier. It also powers the display circuits. Diodes D111 and D112 protect U102. Resistors R109 and R110 establish the output voltage reference of 7.5 volts. Capacitor C123 reduces the amount of ripple on the 7.5 volts DC and C124 filters the output.

---

## *IMPEDANCE GENERATOR*

There is a separate impedance generator for each channel. The impedance generator supplies regulated 32 volts DC to the channel and also provides the channel terminating impedance. The following paragraphs describe the impedance generator for channel 1. Other channels are identical.

Diodes D202 and D201 and resistors R202 and R201 divide the raw DC for the variable DC reference. This variable DC reference allows the quiescent output voltage of the regulators to follow the rms value of the AC mains voltage. Capacitors C202, C203 and C204 and resistors R203 and R206 are a low pass filter for the variable DC reference and provide fast start up response time. Integrated circuit U202B, resistors R214, R215 and R217 and capacitors C210 and C207 amplify and buffer the variable DC reference. Resistor R213 and capacitor C209 decouple the supply voltage for integrated circuit U202. Resistors R211 and R208 set the amount by which the output voltage of the regulator exceeds the variable DC reference. R205 sinks the quiescent current from R208. Diode D203 clamps excessive output voltage of the regulator due to transients while diodes D204 and D206 protect the regulator from reversed voltages due to shorts on the output line.

---

Resistors R219 and R221 sense the output current from the regulators into the RTS line. Integrated circuit U202A, together with capacitors C212 and C214 and resistors R220, R225, R223, and R216 differentially amplify this output current and feed it back to the adjust terminal of the regulators to create the audio impedance. Diodes D207, D208, D211, D212, D209, and D210 clamp the audio output voltage to avoid over-driving the RTS line and allow fast recovery from large transients.

Diode D214 protects the impedance generator from an over voltage on the RTS line. Capacitor C215 is an RF bypass and resistor R227 biases diode D214 on with 10 mA of current for “dry line” operation. Toggle switch S201, located on the rear panel selects an output impedance of 200 or 400 ohms. Since the impedance generator operates at 400 ohms, toggle switch S201 shunts the output with 390 ohms for a 200 ohm output.

---

## *PROGRAM INSERTION AMPLIFIER*

The program-insertion amplifier circuitry accepts balanced or unbalanced input from any source and injects this input, via a bilateral current source, onto the RTS line.

Program audio, present at connector J110, rear panel, is applied via input isolation transformer T103 to PROGRAM LEVEL potentiometer R111. Resistor R606 and capacitor C601 provide RF suppression. Integrated circuit U601a, capacitor C602 and resistors R603 and R602 amplify the input and provide a low impedance drive for the following stage. Integrated circuit U601b, capacitor C606 and resistors R604, R607, R609, R605, and R608 form the bilateral current source which turns the input voltage into an output current. Capacitors C604, C605 and resistor R610 blocks any DC potential on the RTS line. Diodes D601 and D602 protect integrated circuit U601 from transients and resistor R601 and capacitor C603 decouple the power to integrated circuit U601.

---

## *DISPLAY AND DIAGNOSTIC CIRCUITRY*

The display and diagnostic circuits detect fault conditions and warn the user with front panel lights and an audio indicator.

### **CHANNEL STATUS INDICATORS**

(The channel status indicator for channel 1 is described. The channel status indicators for channels 2 and 3 are identical.)

As long as the output voltage on channel 1 is above approximately 21 VDC, diode D205 will conduct causing transistor Q201 to be on, which turns on DS201, the CHANNEL 1 STATUS LED on the front panel. If the channel 1 voltage drops below approximately 21 volts, transistor Q201 shuts off, LED DS201 goes dark, and the fault indicator circuitry is notified through diode D215.

### **FAULT INDICATOR**

If pin 5 of integrated circuit U103 is driven high by an under-voltage condition on any channel, the flasher circuit, which consists of half of integrated circuit U103, capacitor C126 and resistors R116 and R117, will flash the FAULT indicator LED, DS101, and pulse the audible alarm circuit. The audible alarm oscillator consists of the other half of integrated circuit U103, capacitor C127 and resistors R120 and R121.

### **THERMAL OVERLOAD**

Switch S101 is a thermal sensing switch connected in series with the power switch. It is attached to the power transformer, T101. The front panel THERMAL OVERLOAD indicator, DS5, is connected across S101. If the transformer temperature remains below approximately 75 C, S101 will remain closed, and there will be no voltage drop across DS5. If the transformer temperature rises above 75 C, S101 will open and remove AC primary power to T101. The AC voltage will be developed across DS5 and it will light.

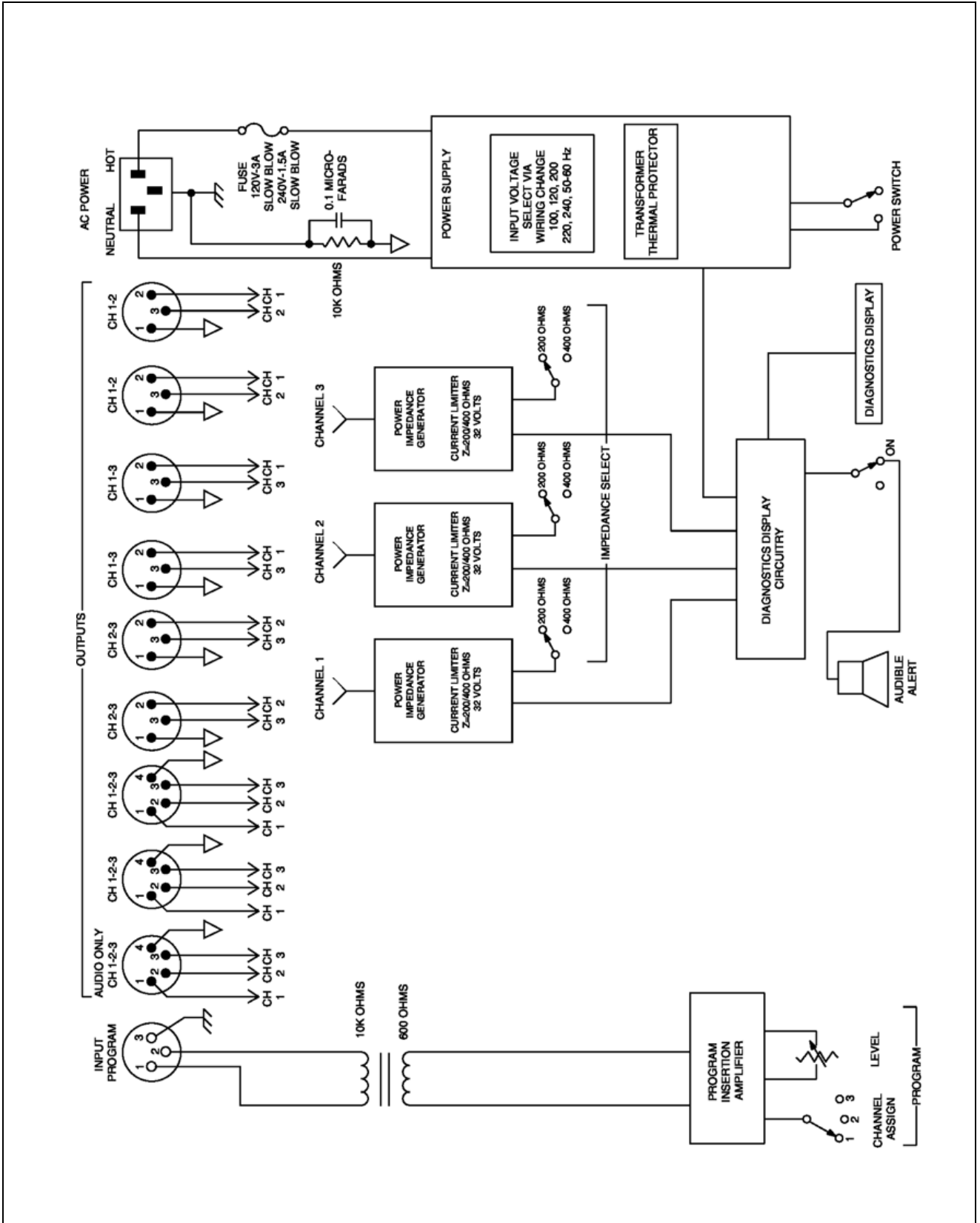


FIGURE 3. Block Diagram



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*INTRODUCTION*

This section provides service information for normal maintenance, factory performance tests and troubleshooting tips.

---

*GENERAL MAINTENANCE*

**SAFETY CONSIDERATIONS**

Service and adjustments should be performed only by qualified service personnel.

Any adjustment, maintenance, and repair of the opened equipment while any power or voltage is applied should be avoided as much as possible, and should be carried out only by a skilled person who is aware of the hazard involved.

It is possible for capacitors inside the equipment to still be charged even if the equipment has been disconnected from its power source.

Be certain that only fuses with the required current rating and of the specified type (fast blow, time delay, slow blow, etc.) are used for replacement. The use of repaired fuses and the short-circuiting of fuse holders must be avoided.

**ACCESS**

To get inside the Model PS31, remove the screws on the top and bottom covers. Slide covers off toward the back of the unit.

**CLEANING**

Clean the outside of the Model PS31 with denatured alcohol or a mild solution of detergent and water. Clean the interior with dry, low pressure air. The circuit boards can be cleaned with 1,1,1 trichloroethane or Freon TF. Do not allow these or any solvents to get into any potentiometers.

---

## INPUT POWER SELECTION

**CAUTION:** These maintenance instructions are for qualified personnel only. To avoid electric shock, do not perform any servicing unless qualified to do so. Disconnect AC power before servicing. The Model PS31 operates on 100, 120, 200, or 240 volts AC at 50/60 hertz, depending on the internal power settings. To convert from one mains voltage to another, remove the covers and set the internal switch, jumpers and use the proper rear panel fuse as specified in Table 3. (The switch and jumpers are located on the circuit board next to the power transformer connector.)

**TABLE 1.** Voltage Selection

AC Source	S107 Setting	Jumpers		Rear Panel Fuse
		Add	Remove	
100 VAC	115	W2, W3	W1, W4	3A
120 VAC	115	W1, W4	W2, W3	3A
200 VAC	230	W2, W3	W1, W4	1.5A
240 VAC	230	W1, W4	W2, W3	1.5A

## CHANNEL DC OUTPUT FUSE REPLACEMENT

To replace channel fuses (F201, F301, F401), remove covers. These fuses are located on the circuit board.

---

## TEST PROCEDURES

### TEST EQUIPMENT

- An isolated, variable voltage power transformer with voltage and current metering ("VARIAC", "POWERSTAT", or equivalent)
- A sine wave oscillator
- An oscilloscope, 15 megahertz minimum bandwidth
- A distortion analyzer (HP331 through HP334, HP339, or equivalent)
- An AC voltmeter capable of reading volts, dBm and dBu
- Two DC voltmeters
- A test load (see Figure 4)
- A capacitive load box (see Figure 5)
- A program input cable (see Figure 6)
- Two channel output cables (see Figure 7)

### INITIAL INSPECTION

Verify electrical orientation of power supply capacitors. Verify proper wiring of transformer primary for local mains voltage. Verify that the proper fuses are installed in the back panel fuse holder and on the printed circuit board. Check that the transformer is securely mounted and that it is electrically isolated from the chassis (resistance from chassis to transformer core should be greater than 10 kohms). Check that the power supply capacitor is securely fastened. Using an ohmmeter, verify that the chassis is electrically connected to the grounding pin on the power connector (less than 0.2 ohm).

### POWER-UP TEST

1. Set the variable voltage power transformer to off, and set the voltage to zero.



- 
2. Plug the PS31 into the variable voltage power transformer.
  3. Set the PS31 POWER switch to ON.
  4. Set the PS31 AUDIBLE ALERT switch to ON.
  5. Turn on the variable voltage power transformer.
  6. Slowly turn up the voltage. Watch for excessive sustained current consumption above 1 ampere. While the voltage is being increased, the audible alert indicator should sound and the FAULT light should flash. Stop increasing the voltage when the standard operating voltage level is reached.
  7. Set the AUDIBLE ALERT switch to off.
  8. Turn the PS31 POWER switch off: the STATUS lights should fade, and finally, the FAULT light should blink. The audible alert should not sound.
  9. Turn the POWER switch back on.
  10. Turn the AUDIBLE ALERT switch on.

## POWERED CHANNEL TEST

The following procedure tests channel 1. Repeat for channels 2 and 3.

1. Connect the DC meters and capacitive load to the test load as shown in Figure 5-1.
2. Set the capacitive load to OFF.
3. On the test load, set the output current potentiometer in the fully CCW position (minimum output load).
4. Plug one of the four-wire channel output cables into J108 on the PS31. This will be the powered output cable
5. Connect the ground lead of the powered output cable to the test load ground terminal.
6. Connect channel 1 of the powered output cable to the powered channel terminal of the test load.
7. Connect the second four-wire output cable to J109 on the PS31. This will be the AUDIO ONLY output cable.
8. Connect channel 1 and ground of the audio only output cable to the distortion analyzer input and to the AC voltmeter.
9. Connect the program input cable to the PS31 PROGRAM INPUT (J110) and to the sine wave oscillator.
10. On the PS31, set the PROGRAM CHANNEL ASSIGN switch to channel 1. Turn the PS31 PROGRAM LEVEL control fully CCW (minimum level).
11. Set the sine wave oscillator for 1 kilohertz, 0.10 volt rms at the PROGRAM INPUT of the PS31.
12. Observe the DC output voltage on DC voltmeter 1. It should be between 31.0 and 32.5 volts DC.
13. Set the output current adjustment control on the test load so that the output current is 0.50 amperes (0.5 volts at DC voltmeter 2). The output voltage at voltmeter 1 should drop by 0.5 volts or less.
14. Adjust the PS31 PROGRAM LEVEL control fully CW (maximum level). The AC voltage should be 1.8 volts rms.
15. Adjust the PROGRAM LEVEL control until the AC voltmeter reads 1.0 volt rms. The waveform on the scope should be a sine wave with no hum or distortion.
16. Set the capacitive load box switch to 100 pF. The waveform on the scope should remain unaffected. Repeat this step for all the positions of the switch. The only noticeable effect should be waveform attenuation with the higher capacitance values.
17. Set the capacitive load to OFF.
18. Set the oscillator frequency to 10 kilohertz (the oscillator level should remain constant). The AC voltage should read between 0.79 and 1.0 volts rms.
19. Set the oscillator frequency to 100 hertz (the oscillator level should remain constant). The AC voltage should read between 0.71 and 0.89 volts rms. Return the oscillator frequency to 1 kilohertz.
20. Place a 200-ohm resistor across the distortion analyzer input. The AC voltmeter should read from 0.45 to 0.55 volts rms. Remove the 200-ohm resistor.
21. Short the POWERED CHANNEL terminal of the test load to the SHORTING TERMINAL on the test load. The output short circuit current should be 0.5 amp (0.5 volts at DC voltmeter 2), 30%. The channel 1 STATUS light should be extinguished, the FAULT light should be flashing, and the audible alert should sound. Remove the short. The FAULT light should go out and the channel 1 STATUS light should turn on.

22. On the test load, slowly turn the output current adjustment control CW. The output current (as measured at DC voltmeter 2) should slowly increase. The FAULT light and audible alert should again come on as the output voltage drops below approximately 21 volts (measured at DC voltmeter 1). The current will reach a maximum fold-back value of 2.0 amps (2.0 volts on voltmeter 2), 30% before falling very suddenly back to the short circuit value of 0.5 amps.
23. Turn the output current adjustment control on the test load fully CCW. The AC voltmeter should still read 1.0 to 1.1 volts rms and the waveform on the oscilloscope should be a sine wave free from distortion.
24. Turn the PROGRAM LEVEL control fully CCW. Read the hum and noise on the distortion analyzer meter using a low pass filter on the analyzer (approximately 30 kilohertz). The hum and noise should be less than 1.0 millivolt rms.
25. Repeat tests for PS31 output channels 2 and 3.

## FUNCTIONAL TEST OF ALL OUTPUTS

Plug a user station into each output connector. Verify that each station works.

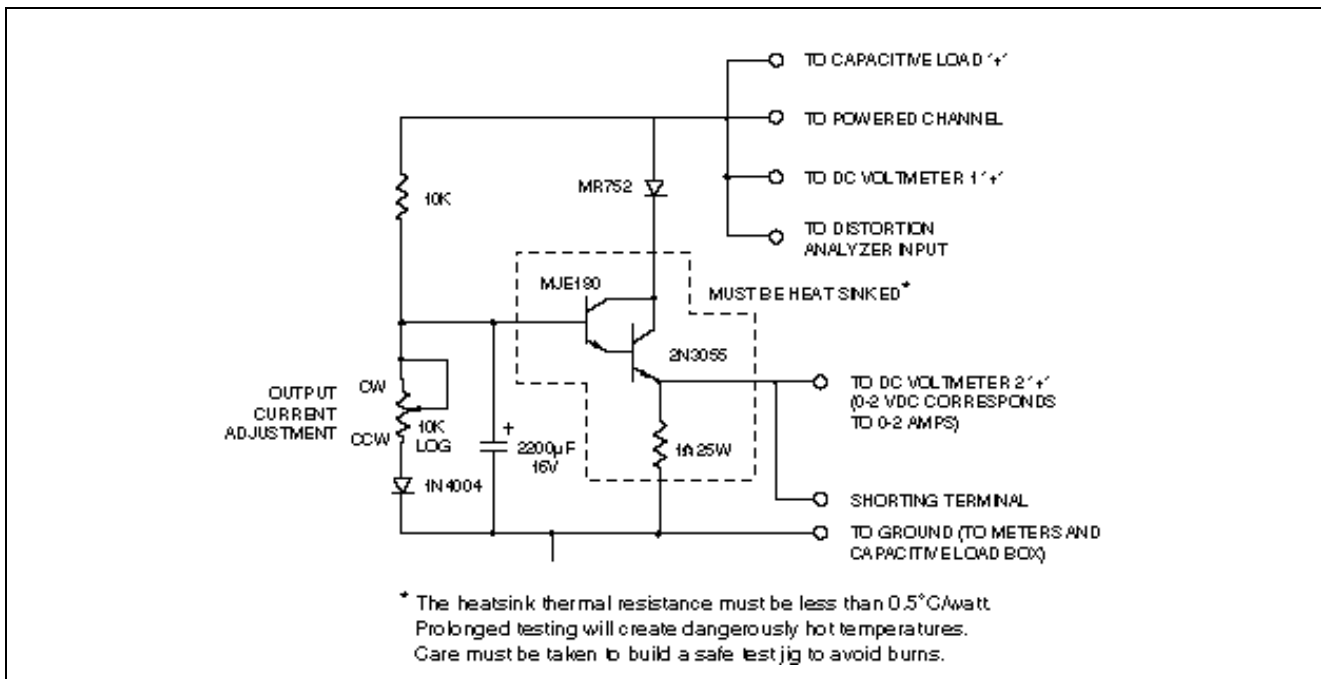


FIGURE 4. Test Load

## 4.4 TROUBLESHOOTING

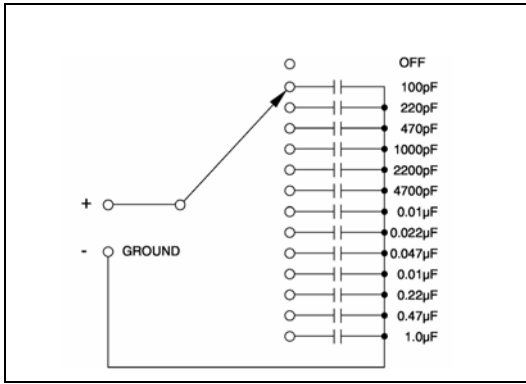


Figure 2. Capacitive Load Box

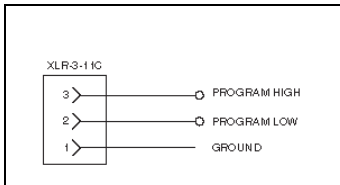


Figure 3. Program Input Cable

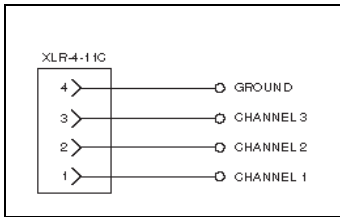


Figure 4. Channel Output Cable

Problem	Check
No Output & No Lights	<ul style="list-style-type: none"> <li>Plug, power</li> <li>Fuse, back panel (F105)</li> <li>Voltage Selection</li> <li>Excessive transformer temperature (thermal cut-out will self reset after a cooling period.</li> <li>Raw DC supply voltage (should be 45-50 volts)</li> </ul>
No Program	<ul style="list-style-type: none"> <li>Input Connections</li> <li>Input LEVEL control CHANNEL ASSIGN switch</li> </ul>
Hum	<ul style="list-style-type: none"> <li>Input Connections</li> <li>Intercom cable routing (too close to AC, lights, etc.)</li> <li>User station too close to a power transformer.</li> <li>PS31 common lead connected to a "humming" chassis ground someplace.</li> <li>Mains voltage wiring incorrect.</li> </ul>
Fault indicator ON	<ul style="list-style-type: none"> <li>Short on intercom channel</li> <li>Channel overloaded</li> <li>"Brown-out" on mains</li> <li>Voltage selection is set wrong</li> <li>Brown fuse on PCB (F201, F301, F401)</li> <li>DC voltage output (32 volts nominal)</li> </ul>
Status OK, Yet NO Output	<ul style="list-style-type: none"> <li>Check for AC on RTS line due to faulty power line wiring</li> </ul>
Distorted Sound	<ul style="list-style-type: none"> <li>Input connections</li> <li>PROGRAM LEVEL control</li> <li>Termination</li> <li>DC line voltage</li> </ul>



*REPLACEMENT PARTS*

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*WHERE TO OBTAIN PARTS*

Parts may be obtained directly from RTS at:

Telex/RTS Systems  
Attn: Factory Service  
1930 West 1<sup>st</sup> Street  
Blue Earth, MN 56013  
Phone 1-507-526-3205  
Toll Free 1-800-218-2412

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**MECHANICAL PARTS**

Reference AS3233 Drawing.

<b>Mechanical Parts</b>			
<b>Item No.</b>	<b>Qty</b>	<b>Description</b>	<b>RTS Part No.</b>
1	1	Front Panel/Chassis	9090-3232-00
2	1	Rear Panel (120V version)	9080-3229-01
	1	Rear Panel (220V version)	9080-3229-00
3	1	Printed Circuit Board Assy (Ref Section 6.3 for electrical parts)	9030-3225-00
4	2	Top/Bottom Cover	9030-3230-00
5	4	Transformer Bracket	9110-2629-00
6	1	Power Transformer (T101)	9140-2623-00
7	8	Washer, #6 Shoulder, Nylon	1006-0017-00
10	16	Screw, 4-40 X 3/8"	1008-4035-00
11	8	Screw, 6-32 X 1/4" Pan Head, Phil	1008-6038-00
12	4	Screw, 6-32 X 3/8" Pan Head, Phil	1008-6013-00
13	4	Screw, 6-32 X 2" Pan Head, Phil	1008-8036-00
14	8	Screw, 8-32 X 3/8" Pan Head, Phil	1008-8022-00
15	8	Washer, Lock, Int Th, #6	50014-001
16			
17	8	Washer, Lock, Int Th, #8	50014-003
18	16	Nut, Keps, #4-40	51745-000
19	4	Nut, Keps, #6-32	51745-004
20	1	Nut, #6-32	1007-0003-00
21			
22	1	Knob, Gray	2703-0002-00
23	1	Cap, Gray with Dot	2705-0001-00
24	1	Fuseholder, PCB Mount	2802-001-01
25	1	Fuseholder Cap	57074-006

**ELECTRICAL PARTS**

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
1	2	W1	Resistor, 0 Ohm, 1/4W 5%	52154-971
		W4		
2	4	R217	Resistor, 100 Ohm, 1/4W 5%	52154-305
		R317		
		R417		
		R609		
3	3	R122	Resistor, 1 KOhm, 1/4W 5%	52154-281
		R602		
		R606		
4	10	R203	Resistor, 10 KOhm, 1/4W 5%	52154-257
		R206		
		R218		
		R303		
		R306		
		R318		
		R403		
		R406		
		R418		
R603				
5	6	R101	Resistor, 100 KOhm, 1/4W, 5%	52154-233
		R102		
		R103		
		R115		
		R123		
		R610		
6	1	R117	Resistor, 1 MOhm, 1/4W, 5%	52154-209
7	1	R121	Resistor, 11 KOhm, 1/4W, 5%	52154-256
8	1	R109	Resistor, 1.3 MOhm, 1/4W 5%	52154-278
9	1	R119	Resistor, 2.2 KOhm, 1/4W 5%	52154-273

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
10	7	R120	Resistor, 22 KOhm, 1/4W 5%	52154-249
		R210		
		R226		
		R310		
		R326		
		R410		
R426				
11	1	R116	Resistor, 2.2 MOhm, 1/4W, 5%	52154-201
12	2	R108	Resistor, 240 Ohm, 1/4W 5%	52154-296
		R110		
13	3	R204	Resistor, 2.7 Ohm, 1/4W 5%	52154-343
		R304		
		R404		
14	3	R227	Resistor, 3.3 KOhm, 1W, 5%	52154-623
		R327		
		R427		
15	3	R205	Resistor, 3.6 KOhm, 1/4W, 5%	52154-268
		R305		
		R405		
16	3	R207	Resistor, 390 Ohm, 1/4W, 5%	52154-291
		R307		
		R407		
17	3	R222	Resistor, 470 Ohm, 1/4W, 5%	52154-289
		R322		
		R422		
18	1	R114	Resistor, 4.7 KOhm, 1/4W, 5%	52154-265
19	1	R118	Resistor, 47 KOhm, 1/4W, 5%	52154-241
20	7	R212	Resistor, 47 Ohm, 1/4W, 5%	52154-313
		R213		
		R312		
		R313		
		R412		
		R413		
R601				

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
21	1	R107	Resistor, 5.6 KOhm, 1/4W, 5%	52154-263
22	1	R113	Resistor, 10 KOhm, 1/2W, 5%	52154-434
23	1	R111	Resistor, Var. Audio, 10 KOhm (Installed)	1406-0032-00
24	6	R220	Resistor, 100 Ohm, 1/4W 1%	54042-100
		R225		
		R320		
		R325		
		R420		
		R425		
25	6	R201	Resistor, 10 KOhm, 1/4W 1%	54045-100
		R202		
		R301		
		R302		
		R401		
		R402		
26	2	R607	Resistor, 20 KOhm, 1/4W, 1%	54045-200
		R608		
27	3	R208	Resistor, 2.26 KOhm, 1/4W, 1%	54044-226
		R308		
		R408		
28	3	R211	Resistor, 243 Ohm, 1/4W, 1%	54042-243
		R311		
		R411		
29	6	R216	Resistor, 42.2 KOhm, 1/4W, 1%	54045-422
		R223		
		R316		
		R323		
		R416		
		R423		
30	2	R604	Resistor, 60.4 KOhm, 1/4W, 1%	54045-604
		R605		

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
31	6	R214	Resistor, 47.5 KOhm, 1/4W, 1%	54045-475
		R215		
		R314		
		R315		
		R414		
32	6	R219	Resistor, WW, 2 Ohm 5W 5%	1404-02R0-5I
		R221		
		R319		
		R321		
		R419		
33	1	C607	CAP. CER. DISC. RAD. 10pF/50V	52157-502
34	1	C602	CAP. CER. DISC. RAD. 100PF/50V	52157-330
35	8	C109	CAP. CER. DISC. RAD.	1510-R103-2R
		C110		
		C113		
		C114		
		C125		
		C215		
36	3	C315	CAP. CER. DISC. 0.1UF/500V 20%	1510-R104-2Q
		C415		
		C213		
		C313		
37	3	C413	CAP. CER. DISC. 220pF/50V	52157-534
		C208		
		C308		
38	1	C408	CAP. CER. MONO. 0.01 UF/ 50V	1511-R103-2I
		C127		



Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
39	7	C126	B SIZE BULK RPE121Z5U 104M05V / SR205E104 MAA	52676-113
		C210		
		C216		
		C310		
		C316		
		C410		
		C416		
40	5	C122	CAP .22 UF/ 50V Z5U 20%, B SIZE BULK CERAMIC MONO MURATA ZR205E224 MAA-AVX- KEMET	52676-115
		C209		
		C309		
		C409		
		C603		
41	1	C128	CAP. ELEC. RAD. 1.0 UF / 50V	51821-106
42	12	C121	CAPACITO R, ELEC. RAD. 10 UF / 50V	51821-110
		C123		
		C202		
		C203		
		C204		
		C302		
		C303		
		C304		
		C402		
		C403		
		C404		
43	4	C124	CAPACITO R, ELEC. RAD. 100 UF / 25 V	51821-524
		C206		
		C306		
		C406		
44	3	C207	CAPACITO R, ELEC. RAD. 100 UF / 35 V	51821-529
		C307		
		C407		

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
45	1	C117	CAPACITO R, CDS123U07 5V4C	1513-R129-6K
46	12	C102	CAP 22 UF 50V P10394TB- ND	51821-640
		C103		
		C104		
		C212		
		C312		
		C412		
		C214		
		C314		
		C414		
		C217		
47	3	C123	CAP. CER. DISC. 120 pF / 50 V	52157-531
		C311		
		C411		
48	2	C105	CAPACITO R, AC LINE, 2200 PF ECK- ATS222ME OR ECK- DRS222ME Y	517003-003
C106				
49	1	C604	CAP. ELEC. RAD 47 UF / 16 V	51821-068
50	1	C605	CAP. ELEC. RAD 47 UF / 50 V	51821-534
51	1	C601	CAP. MYLAR 0.001 UF / 50 V	1514-R102-2L

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
52	7	D101	DIO. REC. 7 AMP MR752	1601-0752-00
		D102		
		D105		
		D106		
		D214		
		D314		
		D414		
53	9	D211	DIODE 1N914B	1601-0914- 0BT
		D212		
		D215		
		D311		
		D312		
		D315		
		D411		
		D412		
54	12	D109	DIODE REC. 1 AMP 1N4004	50745-005
		D110		
		D111		
		D112		
		D204		
		D206		
		D304		
		D306		
		D404		
		D406		
		D601		
D602				

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
55	12	D207	DIODE, ZENER, 5.1 V, 5% 1N5231B MOT OR DIODES INC.	1601-5231- 0BTM
		D208		
		D209		
		D210		
		D307		
		D308		
		D309		
		D310		
		D407		
		D408		
56	3	D201	DIODE, ZENER, 10 V, 5% 1N5240B	86266011
		D301		
		D401		
57	6	D202	DIODE, ZENER, 20 V, 5% 1N5240B	1061-5250- 0BT
		D205		
		D302		
		D305		
		D402		
58	3	D203	DIODE, ZENER, 36 V 5% 1N5365B	1601-5365- 0BT
		D303		
		D403		
59	4	Q101	XSTR, NPN, 2N5210	1602-5210-00
		Q201		
		Q301		
		Q401		
60	4	U101	IC, VOLTAGE REG., LM317HVK	1603-0009-00
		U201		
		U301		
		U401		
61	1	U102	ADJ REG. 3 TERMINAL NATL LM317T	53290-000
62	1	U103	IC CD4011UB E	1603-4011-00

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
63	4	U202	IC NE5532N- ONLY	53295-000
		U302		
		U402		
		U601		
64	1	S101	TERMAL CUT-OUT (INST. TOP ASSY LEV.)	1914-0001-00
65	1	S102	SWITCH, PWR, ON- OFF MARQUAR DT 1802.1123	1912-0004-00
66	1	S104	SWITCH, TOGGLE, 3 POS. PC MT (INST. TOP ASSY LEV.)	1903-0051-00
67	1	S106	SWITCH, TOGGLE, SPDT PC MT (INST. TOP ASSY LEV.)	1903-0050-00
68	1	S107	SWITCH, SLIDE, DPDT, SWCRFT # 11A1101A	1902-0001-00
69	3	S201	SW, C&K #7101SPYA V2GE	1903-0016-00
		S301		
		S401		
70	1	J1	CONNECT OR, AMP # 640445-8	57762-508
71	1	J2	CONN MOLEX # 26-60-4020	57708-102

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
72	6	J101	CONN. AUDIO E3MRA	59892-001
		J102		
		J103		
		J104		
		J105		
		J106		
73	1	J111	AC ADAPTOR, SWCRFT #EAC333	2018-0012-00
74	3	J107	CONNECT OR, 4-PIN AUDIO, MALE	2018-0006-00
		J108		
		J109		
75	1	J110	CONNECT OR,NEUTR IK #NC3FD-H	59893-001
76	1	T101	PWR TRANSFOR MER	9140-2623-00
77	1	T103	XFMR MOUSER 42TM019	2306-0012-00
78	1	T105	FUSE, LITTELFUS E # 313003	50547-161
79	3	F201	FUSE 3 AMP, BUSSMAN N #AGC-3	50547-010
		F301		
		F401		
80	1	LS-1	AUDIBLE ALERT (INST. TOP ASSY LEV.)	2605-0003-00
81	1	DS5	OVERHEA T INDICATO R LAMP	1805-0006-00
82	1	DS10 1	LED, RED (INST. TOP ASSY LEV.)	1801-0147-0R

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
83	3	DS20 1	LED, GREEN (INST. TOP ASSY LEV.)	1801-0147-0G
		DS30 1		
		DC40 1		
84	1	PC1	BARE_PCB	9040-3225-00
85	6		FUSE CLIP, LITTLEFUS E #102071	2802-0005-00
86	1		SOCKET 14-PIN	53041-300
87	4		SOCKET 8- PIN	53041-302
88	4		INSULATO R MICA	50587-000
89	8		INSULATO R WASHER KEYSTON E 3045	1006-0017-00
90	2		WASHER # 10	1006-0021-00
91	2		SCREW 10- 32 X 1/4" SLOT CAD PLATED	1008-1002-00
92	8		LOCKWAS HER #6 CAD PLATED	50014-001
93	8		SCREW 10- 32 X 5/8" PHIL CAD PLATED	1008-6006-00
94	1		HEAT SINK	9180323100
95	1		HEATSINK (IRC 7-362- BA)	4502000300
96	1		RIVET	50015-150
97	17		SPACER	46293P1
98	14		PEM NUT 6-32	59832-003
99	8		PC RECPTACL E AMP 1- 380758-0	2004-0008-00

Electrical Parts				
Item	Qty	Ref_Des	Description	Part Number
100	2		CRIMP TERMINAL #10	1005-0099-00
101	1		SOLDER LUG #4	1003-0004-00
102	2		CABLE TIE; PANDUIT # PLT4S-M	51709-002
103	1		WIRE #18 AWG TEFLON GREEN 2" LONG	2511-0110-00
104	AR		WIRE, 18 AWG BUSS	50704-007
105	AR		THERMAL GREASE	51741-000
106	AR		SOLDER_P ASTE	SS360

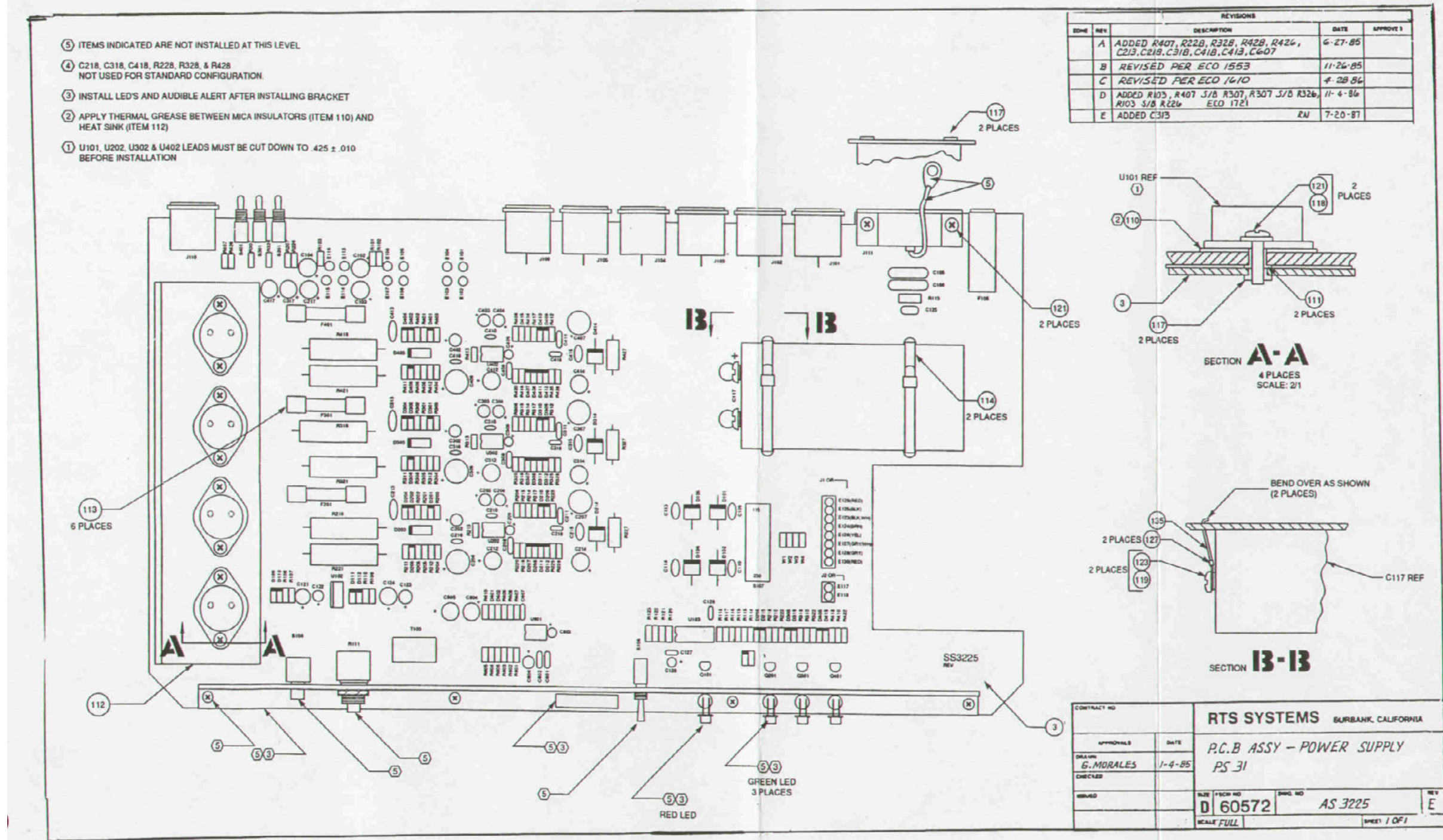
*DIAGRAMS and SPECIFICATIONS*

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<b>DRAWING Number</b>	<b>Title</b>
AS3225	P.C.B., Assembly, Power Supply, Model PS31
SD3225	Schematic Diagram, Power Supply, Model PS31, sheet 1 of 2
SD3225	Schematic Diagram, Power Supply, Model PS31, sheet 2 of 2
AS3233	Final Assembly, Model PS31
WD3525	Wiring Diagram, Model PS31





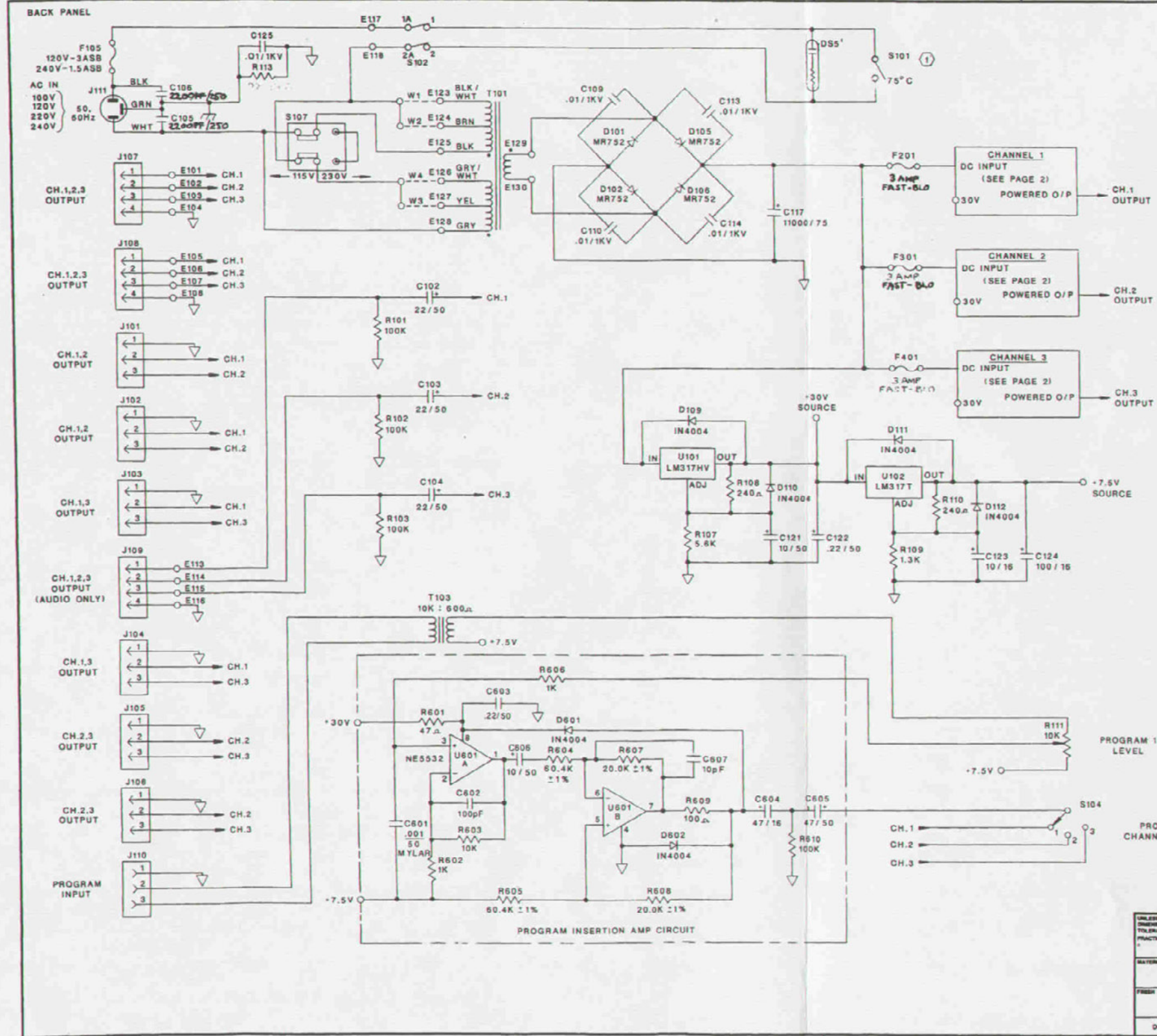
- ⑤ ITEMS INDICATED ARE NOT INSTALLED AT THIS LEVEL
- ④ C218, C318, C418, R228, R328, & R428 NOT USED FOR STANDARD CONFIGURATION.
- ③ INSTALL LED'S AND AUDIBLE ALERT AFTER INSTALLING BRACKET
- ② APPLY THERMAL GREASE BETWEEN MCA INSULATORS (ITEM 110) AND HEAT SINK (ITEM 112)
- ① U101, U202, U302 & U402 LEADS MUST BE CUT DOWN TO .425 ± .010 BEFORE INSTALLATION

REVISIONS				
EDM#	REV	DESCRIPTION	DATE	APPROVE 1
	A	ADDED R407, R228, R328, R428, R426, C213, C218, C318, C418, C413, C607	6-27-85	
	B	REVISED PER ECO 1553	11-26-85	
	C	REVISED PER ECO 1410	4-28-86	
	D	ADDED R103, R407 5/8 R307, R307 5/8 R326, R103 5/8 R226 ECO 1721	11-4-86	
	E	ADDED C313	7-20-87	RAI

CONTRACT NO		RTS SYSTEMS BURBANK, CALIFORNIA		
APPROVALS	DATE	P.C.B ASSY - POWER SUPPLY PS 31		
DRAWN G. MORALES	1-4-85			
CHECKED				
REVISED		REV NO D 60572	DRWG NO AS 3225	REV E
SCALE FULL		SHEET 1 OF 1		

FIGURE 5. PCB, Assembly, Power Supply, Model PS 31





2	CHT	SHT
P	REV	TAB

REV	DESCRIPTION	DATE	APPROVED
B	UPDATED	7-25-84	
C	UPDATED FOR PROD RELEASE	10-4-84	
D	UPDATED PER EGO 1316	10-24-84	
E	ADDED R228,R328,R428	11-29-84	
F	REVISED PER EGO 1414	2-7-85	
G	UPDATED FOR PROD RELEASE	3-22-85	
H	C209,C309,C409 WERE 1/35 TANT. C122 WAS 1/50 TANT	8-20-85	
J	REVISED PER EGO 1533	11-26-85	
K	REDRAWN WITHOUT CHANGE	11-7-88	
L	CHANGED C603 VALUE PER EGO# 2326	11-8-88	
M	REVISED E117,E118,D55, S101,S102 PER EGO 2196	1-10-90	JK
N	CHNG F201 F202 F203 WAS 3 AMP FAST ACTING LHMG SHT 2 EOD 54582	7-27-91	YD L.A.
P	CHNG GROUNDING T101-B J110 WAS CHASSIS GND B W/CHASSIS EGO# 55034	1-13-92	YD T.A.
R	CHNG F201,F301,F401 WAS 6 AMP, CHNG CIDL,C109, WAS .00475KV; C110,C111 WAS .01KV		YD P.1-13
S	CHNG F201,F301,F401 PER EGO# 2196	11-17-93	SP

① THERMAL BREAKER 75°C OPENING TEMPERATURE.  
THERMALLY ATTACHED TO TRANSFORMER T101.  
NOTES SPECIFICALLY FOR PAGE 1:  
(FOR GENERAL NOTES, SEE PAGE 2)

NOTES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED		CONTRACT NO. TW SYSTEM	RTS SYSTEMS BURLINGAME, CALIFORNIA	
MATERIAL	APPROVALS	DATE	SCHEMATIC DIAGRAM POWER SUPPLY PS-31	
DESIGNED BY R. NELSON	CHECKED	11-7-80	SIZE FROM NO. D 60572	
ISSUED	DATE		DWG. NO. SD 3225	
DO NOT SCALE DRAWING		SCALE	SHEET 1 OF 2	

FIGURE 6. Schematic Diagram, Power Supply, Model PS 31 page 1



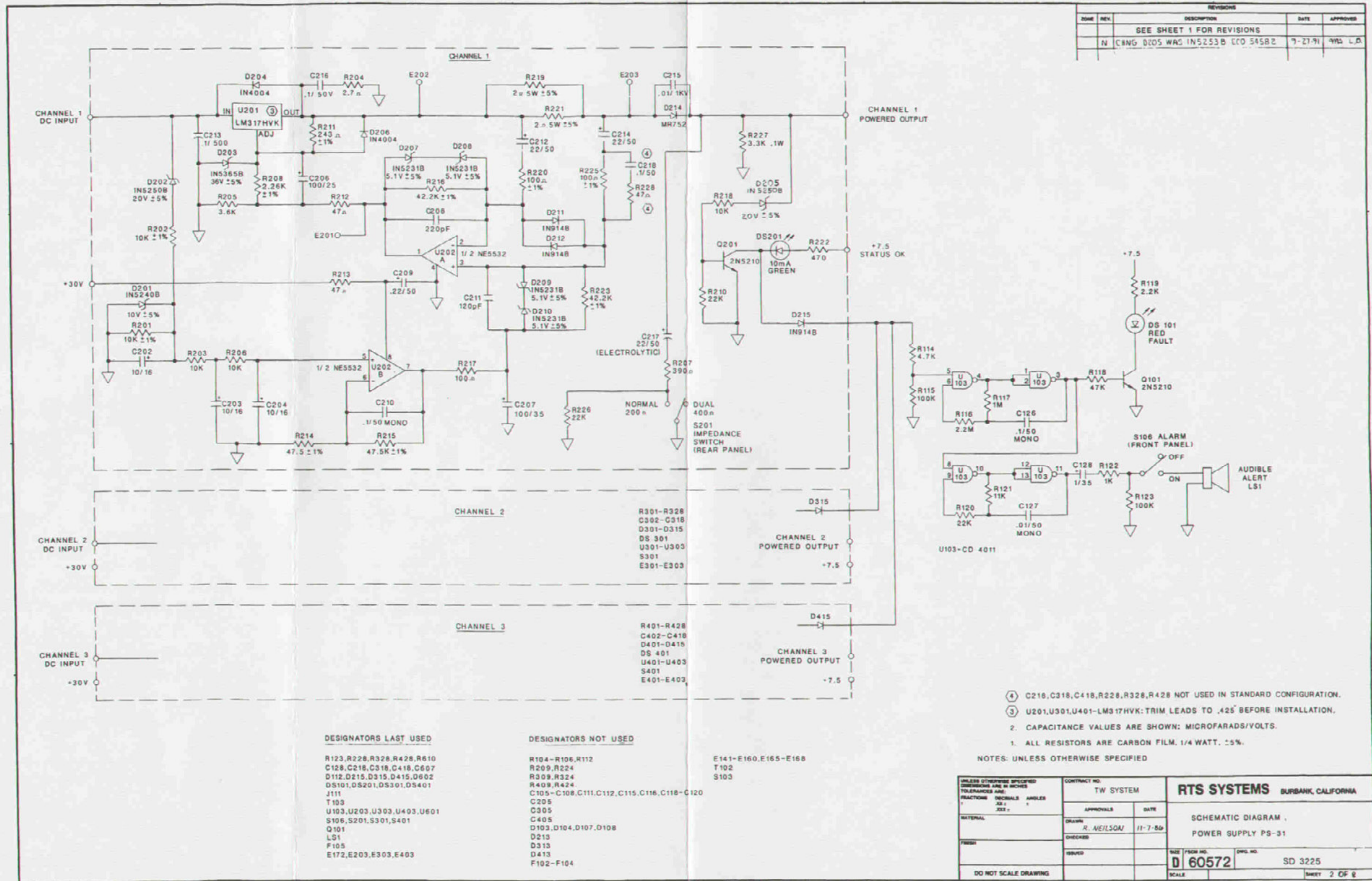


FIGURE 7. Schematic Diagram, Power Supply, Model PS 31 page 2



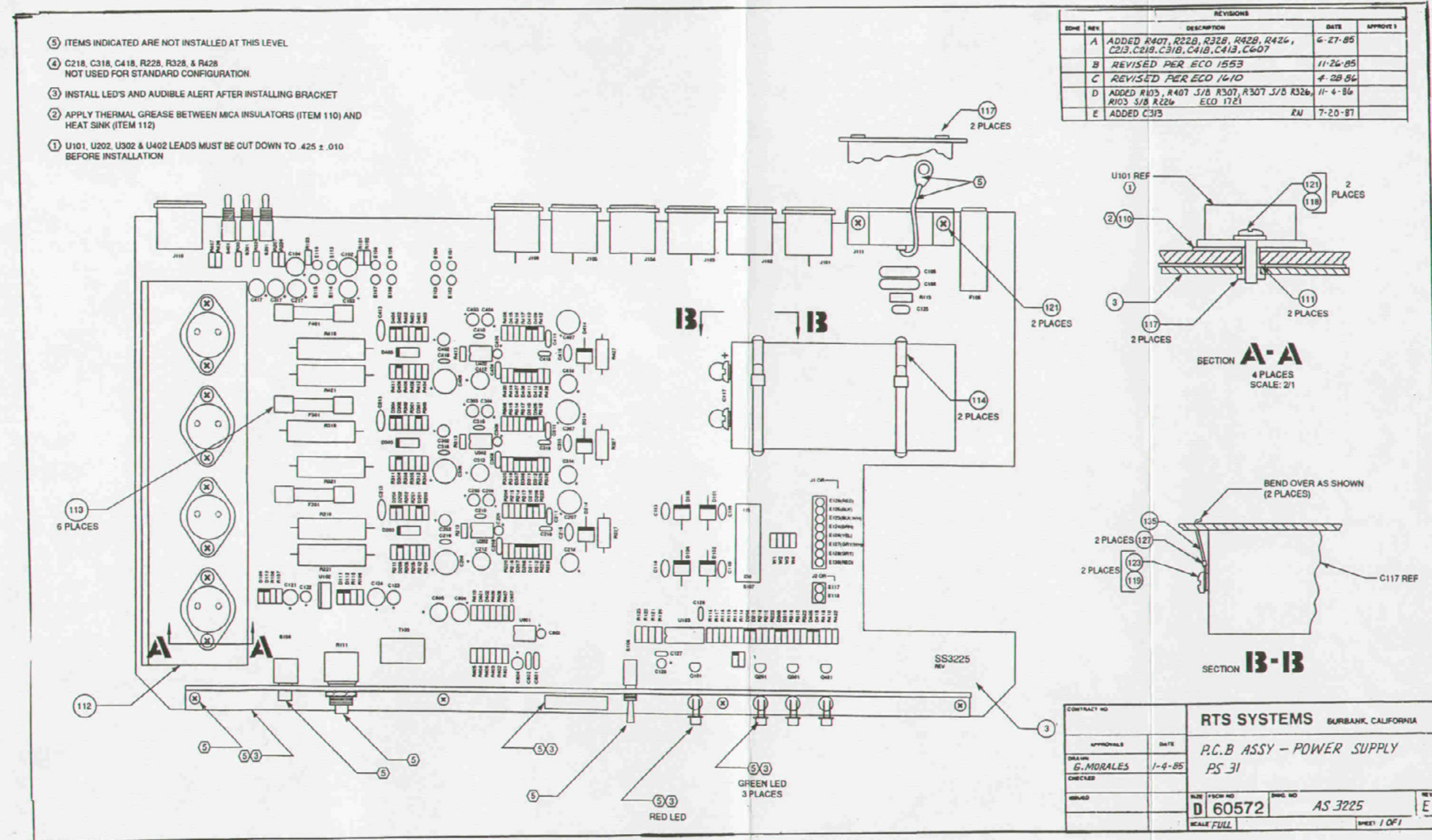


FIGURE 8. Final Assembly, Model PS 31



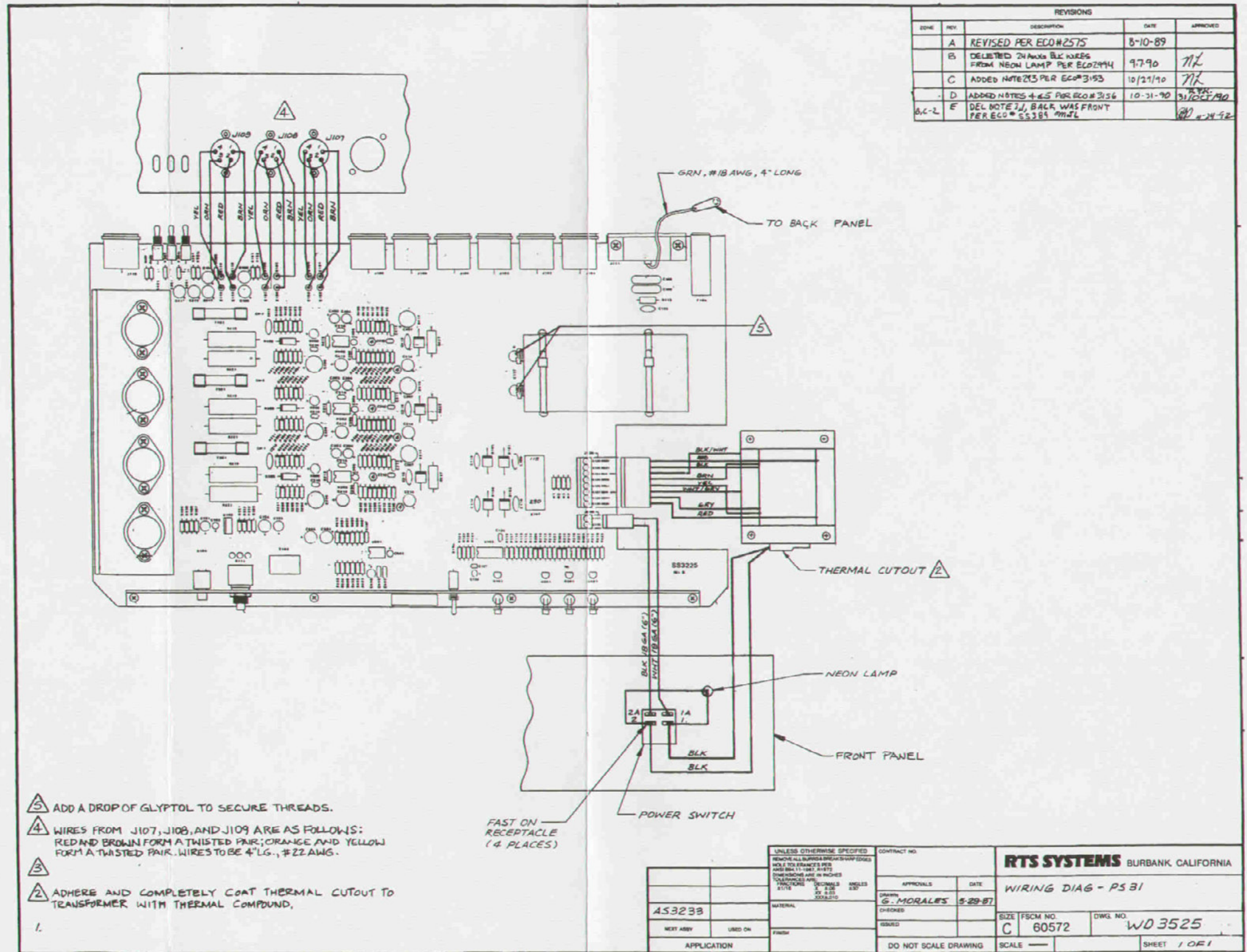


FIGURE 9. Wiring Diagram, Model PS 31



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## Specifications

### Channels

Three

### Connectors

Six XLR-3 type connectors (2 channel)  
Three XLR-4 connectors (three channel)  
One XLR-3 type connector (program input)

### DC Output Voltage (each channel)

32 volts nominal

### Line Terminating Impedance (each channel)

200 ohms, switchable to 400 ohms when operating two supplies in parallel

### Output Current Ratings (per channel) (see also, Figure 1-1)

Max before fault indication:

1.5 amps

Sustained Overload 50° C ambient:

2.0 amps

Max before foldback limiting:

2.5 amps

Short circuit current:

0.5 amps

Startup current:

0.5 amps

### Max Total Sustained Current (50° C ambient)

2.0 amps

### Intercom Audio

Level

2 volts pp nominal

Head Room

6 dB minimum

Frequency Response

75 Hz to 20 kHz (-3 dB) unloaded

### Signal to Noise and Hum Ratio (Ref to 2V pp)

-60 dB

### Program Input

Balanced or unbalanced, transformer isolated, program assignable to channels 1-3

### Program Input Sensitivity

28 dBm to +14 dBm (Ref. 600ohm) for 2 volts pp on RTS line

### Program Input Impedance

10,000 ohms

### Program Frequency Response (-3 dB)

100 Hz to 20 kHz input to RTS line.

### Indicators

Channel STATUS

Three green LEDs

Channel FAULT

One red LED and one audible alarm

THERMAL OVERLOAD

One red NEON type

### Switches

One PROGRAM CHANNEL ASSIGN switch;  
One AUDIBLE ALERT on/off switch; one POWER switch; three 200/400-ohm IMPEDANCE SELECT switches.

### Temperature

0 - 50° C operating; 0 - 75° C storage

### Power Requirements

Voltage

100, 120, 220, or 240 VAC, 50/60 Hz

Power

100 volt-amps

### Fuses

AC Panel Fuse

100/120 volts - 3A slow blow; 200, 240 volts - 1.5A slow blow

Internal DC fuses (each channel)

6A fast blow

### Dimensions

Height

3.5 inches (8.9 cm)

Width

19 inches (48.3 cm)

Depth

10.5 inches (26.7 cm)

### Weight

14.5 pounds (6.6 kg)

