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SERIES  
TWO  
POWER  
AMPLIFIERS

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A2300 / A2150  
INSTALLERS  
MANUAL

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**A2300/A2150**

**SERIES TWO POWER AMPLIFIERS**  
**FEBRUARY 88**

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Thank you for selecting a QSC product for your audio system. Our goal is to be sure you remain happy with your choice for many years to come. Please do not hesitate to call your QSC Dealer or QSC Audio Product's customer service department if you have any service problem or questions not answered in this manual.

**Welcome.**

Your QSC A2300/A2150 can be readily operated by anyone. However, we recommend that you use a qualified audio professional to install and set-up the system. In this manner, you will be assured of achieving optimum system performance.

Please consult the Table of Contents for fast guidance to the sections of interest. We recommend that all users read Section Two, Front Panel Controls and Indicators. This will provide operating information on the user front panel controls. For individuals installing this product we urge you to read the entire manual. Set-up instructions are contained in Section Two, Basic Set-up Instructions. All users should read Section Two, Unpacking and Inspection, and Important Precautions.

QSC Audio Products warrants all Series Two products to be free from defective material and/or workmanship for a period of three years from date of sale. QSC will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use, provided the unit is returned to our factory or one of our Authorized Service Stations via prepaid transportation. This warranty provides that examination of the returned product must disclose, in our judgement, a manufacturing defect. This warranty does not extend to any product which has been subject to misuse, neglect, accident, improper installation, or where the serial number has been removed or defaced. Manufacturer shall not be liable for consequential damages resulting from defects in materials and/or workmanship.

**Warranty.**

**Overview and Description.**

The A2300/A2150 are 8Ω/70V amplifiers designed for commercial sound applications. The features incorporated to improve performance, ease installation and simplify use include:

- PowerLimit™ controls to set maximum level, prevent clipping and protect speakers.
- Active balanced inputs.
- Direct 8Ω/70V outputs to improve damping and lower distortion.
- +/- 15V power supply taps to power outboard signal processing.
- Switched AC accessory outlet.
- Delayed Turn-on/off and DC Fault speaker protection.

Each channel has a 150 watt power amplifier to drive 25-35v, 8 ohm loads or 70V lines. The direct-output circuit significantly improves damping while lowering distortion and is protected from shorts, mis-matched loads, and thermal over-temp. Speakers are protected from DC fault and the PowerLimit™ circuit prevents clipping, protects speakers from excess power, and/or limits overall level to a preset maximum.

The A2300/A2150 are designed to provide years of trouble free performance. Quality components and contemporary high performance circuits assure optimum performance and long-term reliability. A three year limited parts and labor warranty is among the longest in the industry.

- **Check for carton damage while unpacking.**
- **Check the product for loose or rattling parts.**
- **Save the carton for return shipment, if required.**
- **If shipping damage is evident**, notify the transportation company immediately. File a claim with the carrier for shipping damage. Be sure to save the carton for the shipper to inspect.
- **Keep power OFF when making any connections.**
- **Check the AC voltage before connecting the AC plug.** CONNECTION TO WRONG VOLTAGE WILL IMMEDIATELY DAMAGE THE PRODUCT and void the warranty.
- **Start with the Volume controls all the way off.** Turn the controls up gradually until normal operation is verified.
- **Never connect speaker barriers from different channels together or the same speaker to more than one channel.**
- **Do not connect speaker barriers to chassis or signal ground.**
- **Keep speaker wiring separate from input wiring.**
- **Always connect speakers with power off.** Use heavy gauge cable with no frayed strands or damaged insulation.
- **Failure to observe precautions could lead to fire or shock hazard.** Never plug in a damaged amplifier until the condition of the internal insulation is checked. If the internal fuse blows the amplifier section is defective and must be repaired or replaced.
- **Be sure to provide adequate support and ventilation.**

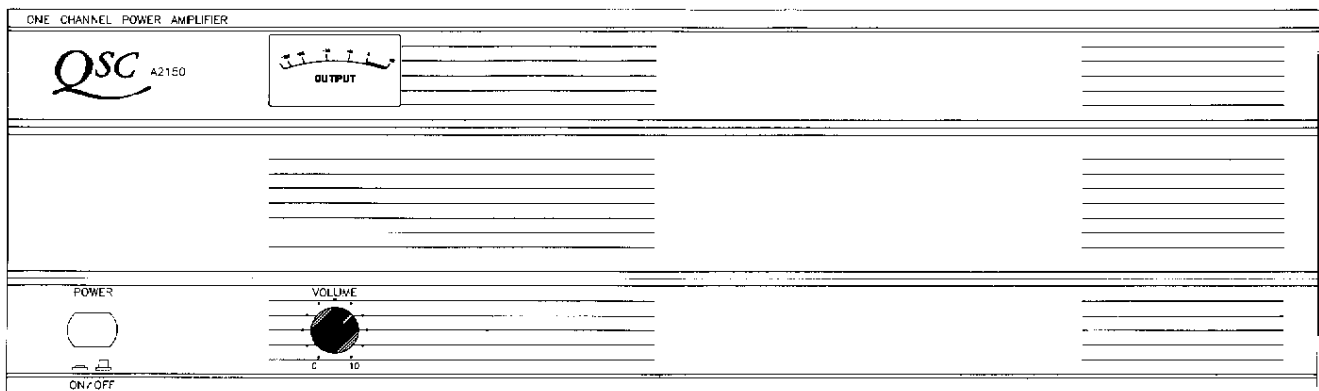
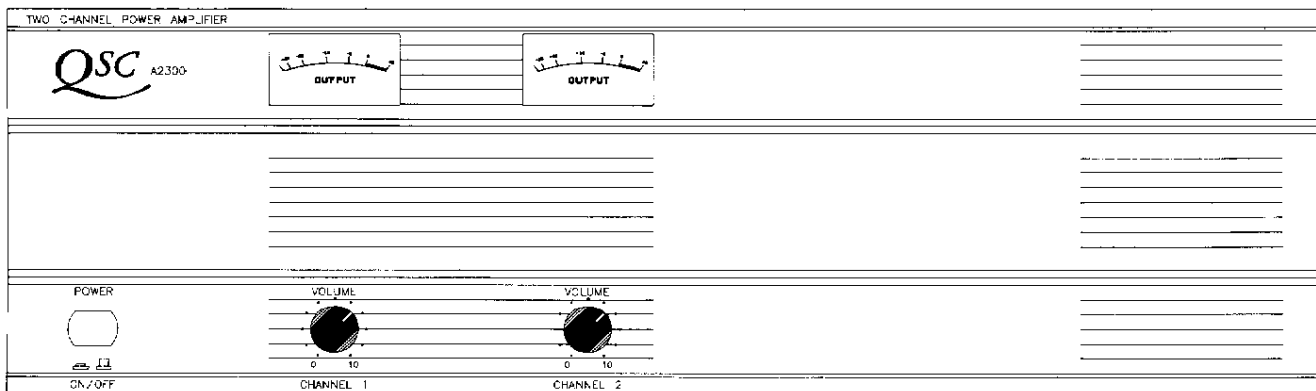
**Unpacking and  
Inspection.**

**Important  
Installation  
Precautions.**

**Safety Warning.**

**DANGEROUS VOLTAGES INSIDE.** Do not remove the cover or expose to rain or moisture. Refer all servicing to qualified personnel. Warranty may be void if the product is repaired or tampered with by non-QSC repair centers or personnel. Please call the factory for Service Center information and locations.

**Front Panel Controls and Indicators.**



**Power Switch.**

Power Switch controls entire unit including outlet and +/- 15V power supply taps.

**Volume Controls  
Channel 1 &  
Channel 2**

Volume Controls Channel 1 and Channel 2 are the gain controls for each power amp. The nominal position for full output is all the way up. A center detent marks the -6 dB



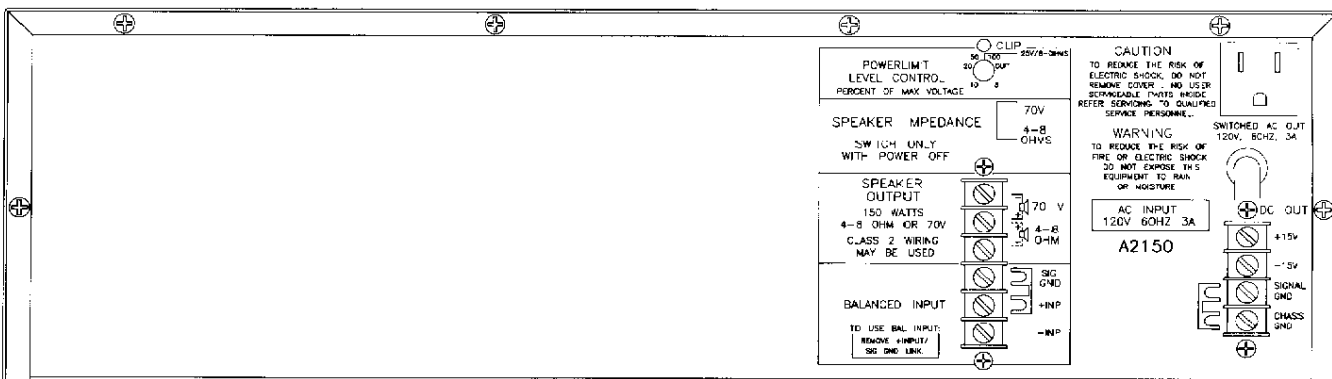
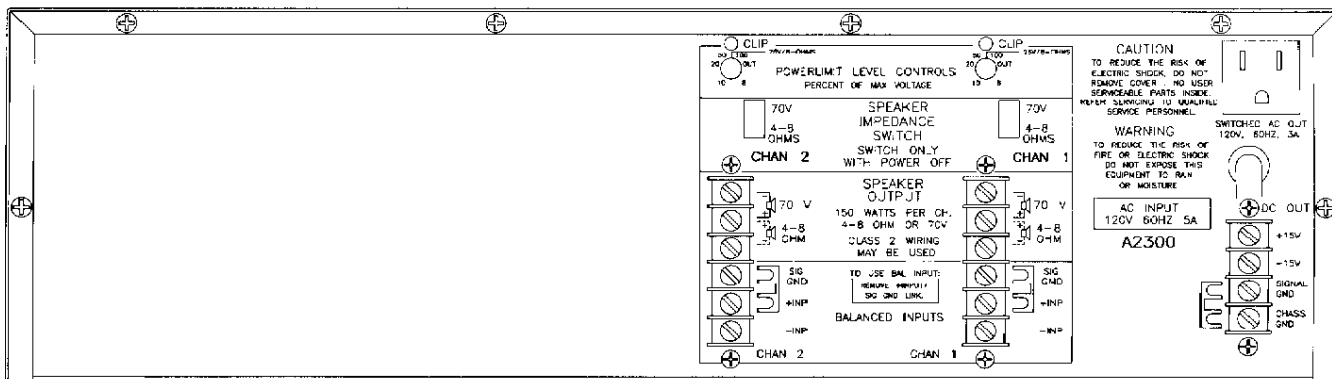
gain position.

Treble and Bass Controls are part of the power amplifier section and provide 10 dB of cut and boost at 15 KHz and 50 Hz to EQ speakers. A center detent marks the flat position. To access tone controls you must remove the front panel (remove knob(s) and screws from front panel first). Use caution with front panel meters, the wires are delicate.

**Treble and Bass Controls.**

Output Level Meters have extended range (30 dB) to monitor typical signal levels. Illumination of the meter indicates

**Output Level Meters.**



**Rear Panel Controls and Features.**

Clip Indicator flashes during the presence of distortion. Useful to set-up PowerLimit™.

**Clip Indicator.**

PowerLimit™ Control adjusts built-in limiter to prevent clipping, protect speakers, and/or limit maximum output level.

**PowerLimit™ Control.**

**Speaker Impedance Switch.**

Speaker Impedance Switch selects output voltage for 70V, 32 ohm systems or 25-35V, 8 ohm systems without need of output transformer.

**Power Amp Output Terminals.**

Power Amp Output Terminals provide reliable long-term connections. Connections must be in accordance with output voltage switch setting.

**Power Amp Active Balanced Inputs.**

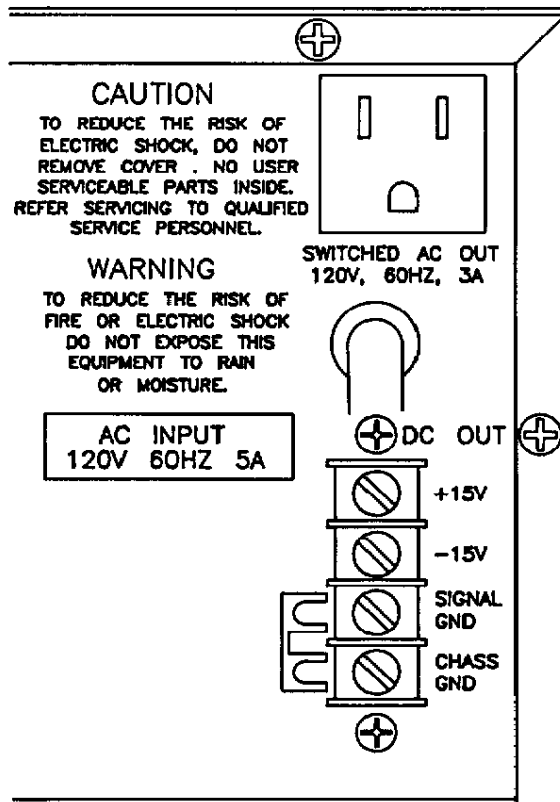
Power Amp Active Balanced Inputs with barrier connector are provided for each amplifier. Use of balanced input requires removal of the input shorting link that converts the input section to unbalanced operation.

**Switched AC Outlet.**

Switched AC Outlet is provided for a music source or other piece of related equipment. Power is limited to 3 amps (360 watts).

**Switched +/- 15V Power Supply Taps.**

Switched +/- 15V Power Supply taps are provided to power outboard signal processing equipment or relays. Power supply limited to 500 mA.



These instructions cover normal use of the A2300/A2150. See Section Three for installation instructions.

Before plugging in AC cord, ensure your mains power matches the voltage configuration on the serial number label.

There is a provision for lifting signal ground relative to chassis ground. **For safety reasons do not remove the ground pin on the AC cord.** Electronic balanced inputs are provided for hum rejection, if needed. Use balanced input cables and ground lift strap if necessary to avoid hum and interference.

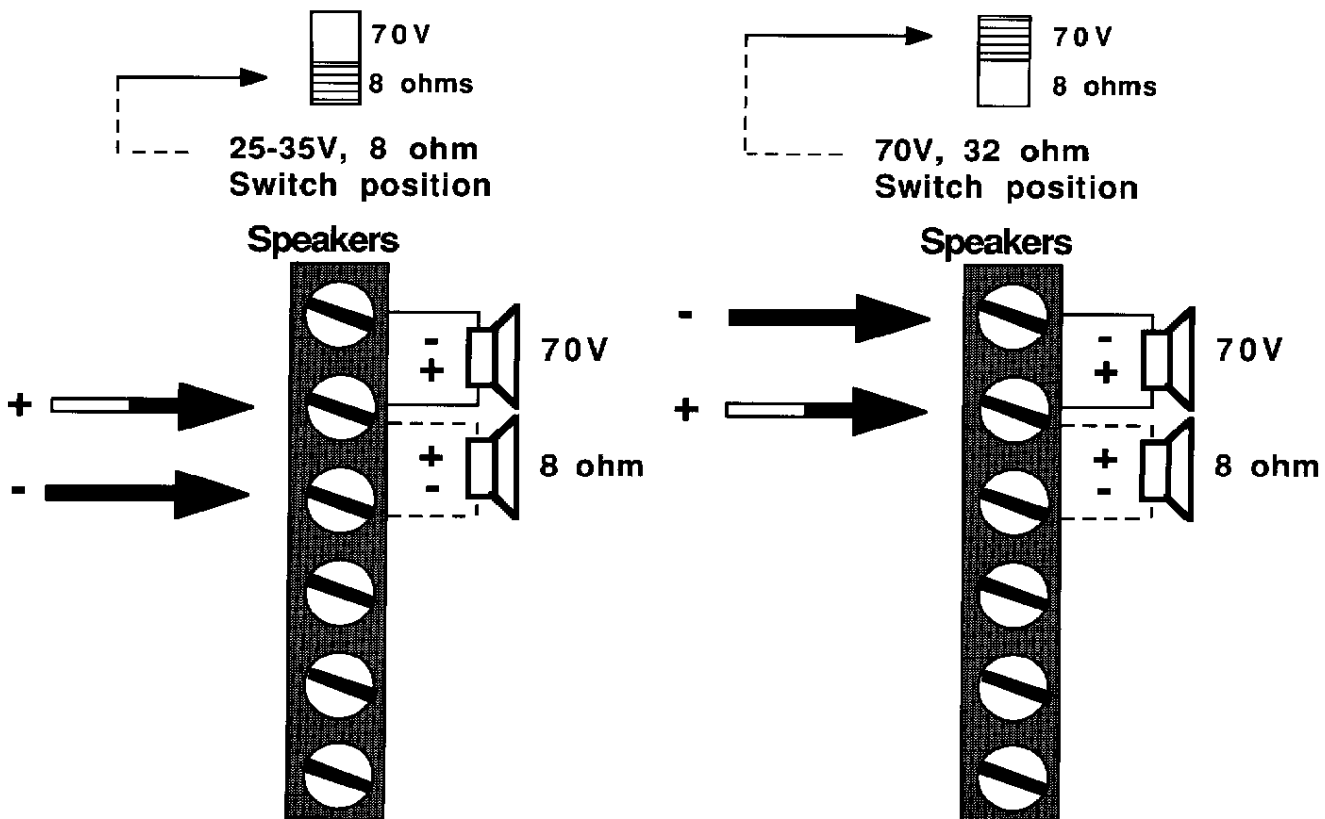
Speaker connections must be made in conjunction with setting the speaker voltage switch. See diagram for proper hook-up. Make certain power is off during hook-up. **Do not change switch setting after speaker hook-up.** Switching output voltage with power on could cause amplifier failure.

**Basic Set-Up  
Instructions.**

**AC power.**

**Chassis Ground.**

**Speaker Connections.**



**PowerLimit™ Control.**

Each amplifier channel is equipped with an adjustable limiter and clipping indicator which can limit overall level, protect speakers from excess power, prevent power amp clipping, and/or limit the output for 25V systems. As with any piece of processing equipment too much can be as detrimental as none at all. Use the PowerLimit™ control to do the job but no more. Too much limiting will flatten the natural dynamics of music and voice and cause excessive "pumping" or modulation of the level by the bass material present in the music. You cannot hurt anything by turning the control to maximum, but it may not sound good.

**Limiting Overall  
Level.**

Using PowerLimit™:

1. Start with the PowerLimit™ control in the "out" position (full clockwise) and the front panel controls in their normal positions as determined by the previous set-up procedures.
2. Increase the volume in one channel until you achieve the desired maximum level.
4. Dial in limiting (rotate counterclockwise) until you begin to hear the level drop. Stop.
5. Increase the volume controls to full. The peak level should only increase somewhat; if necessary, dial in a little more limiting. Continue to make small adjustments until you are satisfied with the combination of maximum level and limiting action.
6. Repeat with the other zone.

**Protecting Speakers  
from Excess Power.**

The PowerLimit™ control can be used to control maximum power delivered to the load. Since the PowerLimit™ circuit monitors output voltage, it will be of primary benefit when used to protect 8 ohm loads from excess power. (Speakers in 70V systems are tapped for the appropriate wattage). To use the PowerLimit™ control to protect

8 ohm speakers from excess power:

1. For 8 ohm speakers:
  - a. Determine the manufacturer's power rating (eg 50 watts).
  - b. Divide this number by 150 to get the percentage (eg,  $50/150 = 33\%$ ).
  - c. Adjust the PowerLimit™ Control to this value (eg, 33%).
  
2. For 4 ohm speakers:
  - a. Determine manufacturer's power rating (e.g. 50 watts)
  - b. Divide this number by two (e.g.  $50/2 = 25$  watts).
  - c. Follow steps **b.** and **c.** above (e.g.  $25/150 = 16\%$ , set PowerLimit™).

This method of setting the PowerLimit™ control is based on the speaker manufacturer's ratings. Follow personal experience in conservatively allowing for differences between ratings and real-world performance.

To allow full output but prevent clipping:

1. Put the PowerLimit™ control in the out position (full clockwise).
2. Play signal (preferably music) and increase the Volume until the Clip LED (on rear) of the affected channel lights.
3. Dial in (counterclockwise) just enough limiting to extinguish the LED.
4. Increase the volume a little more. If the LED lights

**Preventing Output Clipping.**

again, dial in just enough limiting to put it out.

5. Repeat with the other zone.

**Note-** the 100% setting on the PowerLimit™ control should be a very close first setting.

### **25V Systems.**

Output voltage can be limited to 25V if required for a 25V system:

1. Use the 8 ohm speaker voltage hook-up and Speaker Impedance switch setting.
2. Adjust the PowerLimit™ to the 25V setting.

### **Amplifier Active Balanced Inputs.**

These inputs reduce hum and noise problems that sometimes occur.

### **Using Amplifier Active Balanced Input.**

Remove grounding jumper from +Input of amplifier. Connect balanced input signal to amplifier. Use front panel controls to adjust amplifier level and EQ.

### **Switched AC Outlet.**

Due to AC Outlet restrictions make sure the appliance plugged in draws no more than 3 amps or 360 watts.

### **+/- 15V Power Supply Taps.**

Regulated power supply taps are available to drive external signal processing equipment. Current available is limited to 500 mA. Do not overload supply or short leads to opposite polarity or ground. DC Power is controlled by the AC Switch. DC Power stabilizes promptly after AC turn-on, but remains on for a few seconds after AC turn-off. The A2300/A2150 power amplifiers have turn-on/turn-off muting to block signals during these intervals. **CARE SHOULD BE TAKEN WHEN CONNECTING DC POWERED ACCESSORIES TO NON-QSC AMPLIFIERS WHICH LACK TURN-ON/TURN-OFF MUTING.**

Leave 2 to 3 inches clearance around sides, back and top to ensure adequate ventilation. Make sure the shelf itself is well mounted and ventilated.

**Shelf Mounting.**

Remove four (4) screws holding front panel ends on each side. Replace with rack mounting brackets. Do one end at a time to keep front panel in position. Mount in rack.

**Rack Mounting.**

When mounting more than one unit be sure to separate by at least one (1) rack space to assure adequate ventilation. Use of a ventilated spacer panel is recommended. Fan cooling the rack with a blower of 360 cfm or larger is advised for heavy duty usage and/or high ambient temperature conditions.

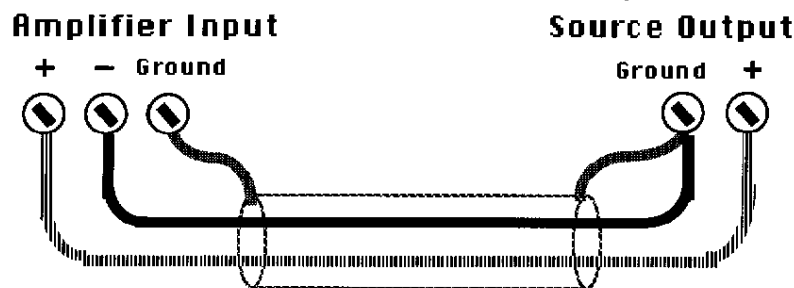
Knob Lock-out Plugs can be used to replace any front panel control knob. Remove knobs by pulling straight out, using padded pliers if necessary.

**Knob Lock-out Plug.**

Even if a balanced line output is not available, the benefits of balanced line input can still be obtained. Special cables will need to be made as follows:

**Quasi-balanced Lines.**

1. Connect AMPLIFIER end of the cable to the plus, minus, and ground terminals of the input (music or amplifier) as shown in the above drawing.



2. At the SOURCE end, use a plug or lead that matches the unbalanced output connector. Connect the plus lead to the hot terminal. Connect the minus lead and shield together to ground AT THIS END ONLY.

DO NOT CONNECT THE MINUS AND SHIELD TOGETHER AT THE AMPLIFIER END OF THE CABLE. This maintains the separation of signal ground and shield (circuit) ground needed to obtain balanced line noise rejection. As a further refinement, a small variable resistance can be connected in series with the "minus" conductor, with a value roughly equal to the output impedance of the signal (usually less than 600 ohms). This resistance can be adjusted to null out any residual hum or interference.



This section contains troubleshooting hints which should help you locate a problem. Systematically check the inputs and outputs. Since the A2300 is a two channel system, double check the problem by confirming it on the other channel. Please refer to Section One for an illustration of the front and rear panels.

Check AC Power switch. Reset switch off/on. If unit operates only momentarily, service is required (DC fault).

Switch on but meters not illuminated. Check AC cord/AC service. A lamp plugged into the accessory outlet should light when the Power Switch is "On". If AC service is good and switch is "On", problem is with A2300/A2150. Refer to Authorized Service personnel.

Switch on and meters illuminated. Check Volume control, make sure it is at the proper setting.

If meters are active. Check speaker connections and speakers.

Usually indicates lack of input signal or incorrect gain (Volume) adjustment at some point. Check settings of volume controls. Also insure rear panel PowerLimit™ is set to desired value (fully Clockwise gives maximum output level). Test on other channel.

Watch Output Meter and rear panel Clip indicator during distorted sound. If Clip indicator lights without full scale meter deflection, there is a shorted speaker cable, the speaker is faulty, or the amplifier channel is defective. If Clip indicator lights with full meter deflection, the amplifier is being overdriven, so cause of weak sound must be in speakers or wiring. If Clip indicator does not light during distortion, the distortion is happening outside the amplifier section. Check adjustment (gain staging) of all gain controls, input connections and sources, and speakers.

Generally caused by a bad connection. If same on all sources, check input and speaker connections.

**Summary.**

**No Sound.**

**Weak but Clear  
Sound.**

**Weak and Distorted  
Sound.**

**Sound Cuts In and  
Out.**

**Lacks Power.**

Check gain staging. Check PowerLimit™ control. If a 70V system, check to make sure Output Voltage Switch and speaker connections are set for 70V operation.

**Unwanted Noises.**

**Hum.**

Defined as a rounded 60 Hz tone. Severe hum is caused by broken cables or jacks, with disconnected ground (shield). Also caused by corroded connectors. A milder form of hum is usually caused by ground loops. Try repositioning the input cables away from the various components.

**Buzz.**

Defined as a very "razzy" kind of hum. Usually caused by interference from solid-state light-dimmer circuits. Follow the same precautions shown above, and make sure the electronics are not connected to an AC outlet which has a dimmer control.

**Hiss.**

Defined as a smooth "shhh" noise. Always a problem with sensitive, high-gain electronic inputs, and usually starts at the point of weakest signal (usually the initial mic, phono, or tape source). Proper gain staging minimizes hiss by keeping signal below distortion but above the noise floor. To isolate the source of unwanted hiss, start at the Amplifier Volume control and work backwards, reducing and then restoring gains on preceding equipment. You should hear a reduction of hiss and audio together at each point, showing the hiss is coming in earlier. When you find a control which lowers the audio volume, but not the hiss level, you know the hiss is coming in after that stage. Assuming that the hiss has not always been there, this indicates defective electronics.

**Crackles.**

Defined as a "popcorn" noise. If the crackle persists during pauses, this indicates defective electronics. Trace using the procedure shown under Hiss. Crackles which occur during audio peaks or when the electronics are vibrated usually indicate bad connections.

**Radio Interference.**

Defined as unwanted pickup of broadcast or CB radio. The source of RF pickup can be traced by removing each input in turn until the interference stops. If interference continues with no inputs, RF is entering through speaker or AC wiring. Consult factory for assistance.

The unit can be cleaned with a soft cloth and a mild non-abrasive cleaning solution, such as Windex. Avoid cleaning powders and scrubbing pads, as these will scratch and dull the finish. Be sure to unplug the unit prior to cleaning. Do not apply liquid directly to the surface. Dampen the cloth with the cleaning solution and wipe gently. You may wish to buff the surface lightly with a dry soft cloth.

#### **Cleaning.**

After prolonged use, especially in dusty environments or in fan-cooled racks, the heat sinks may become clogged with dust. This will interfere with cooling, leading to higher temperature operation and reduced life. Dust build-up can be most easily removed by directing an air jet between the fins of the heat sinks, which are located inside the vented area on the top left side of the chassis.

#### **Dust Removal.**

There are no periodic "tune-up" adjustments required. The unit should provide stable performance until parts fail from age. Internal servicing must be referred to qualified personnel. The amplifier may be inspected for loose screws on the outside. If any loose parts rattle around on the inside when the amp is turned over in all directions, please have it serviced immediately, as a loose part could lodge in a dangerous place and cause further damage or shock hazard.

#### **User Maintenance.**

If the amplifier isn't working properly, please consult the troubleshooting chart in Section Four. If proper operation cannot be restored, the amplifier may require service. This must be performed by qualified technical personnel, to avoid shock hazard or improper repairs. To obtain the location of the nearest authorized Service Center, please contact your QSC dealer/contractor or the QSC factory (714-645-2540, Costa Mesa, CA).

#### **Obtaining Service.**

Please note that the Series Two warranty does not cover repairs made by non-authorized service personnel. Improper repairs may void future warranty coverage.

If the unit is returned to the factory for service, it must be sent in the original type shipping carton. If you have not saved your carton, see if your QSC dealer/contractor has one, or call QSC to have an empty carton sent for shipping.

The Series Two warranty does not cover shipping damage caused by returning a product in an improper carton.

## SPECIFICATIONS

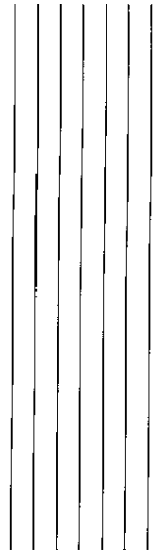
Note: unless otherwise specified, all ratings shown with EQ controls flat, Volume controls on full.

<b>Type</b>	A2300, 2 channel amplifier; A2150 1 channel amplifier
<b>Special Features</b>	Adjustable PowerLimit™ output limiting Auxiliary +/- 15V power supply
<b>Output Power</b> per channel, both channels driven	125 watts RMS, 20-20KHz, 0.1% THD, (8Ω/25V) 150 watts RMS, 20-20KHz, 0.1% THD, (70V)
<b>Frequency Response</b>	20-20 KHz, -1.5 dB, (8Ω/25V) -3dB rolloff, 60Hz, (70V)
<b>Distortion</b>	(8Ω or 70V) .01% THD @ 1 KHz
<b>Power Amp In</b>	1V, 10K unbalanced, 20K balanced
<b>Power Amp Outputs</b>	8Ω/25V, direct coupled unbalanced 70V, direct coupled balanced
<b>Output Regulation</b>	Less than 0.04 dB no load to full load (Equivalent damping factor, 200)
<b>Noise</b> Tone Controls Centered	-100 dB referred to full output A weighted.
<b>Front Controls</b> Each Channel	Treble: +/- 10 dB at 15 KHz Bass: +/- 10 dB at 50 Hz Volume: -6 dB on center detent AC Power (one only), push on/off
<b>Rear Controls</b>	PowerLimit™ Control: (each channel) Speaker 70V/8Ω switch: (each channel)
<b>Front Indicators</b>	Illuminated Output meter(each channel)
<b>Rear Indicators</b>	Red Clip LED,(each channel)

<b>Protection and Processing Circuits</b>	Turn-on/off muting Adjustable PowerLimit™ output limiting Patented short circuit, open circuit, ultrasonic and RF protection (self resetting).  Stable into reactive and mismatched loads. Inputs protected from overload. DC Fault speaker protection (DC shutdown) Power transformer & heat sink thermal protection Internal amplifier fault fuses
<b>Auxiliary Power Supply</b>	Regulated +/- 15V, 500 mA Short-circuit protected, however shorting external supply will interfere with normal operation
<b>Connectors</b>	Switched AC outlet All other connections: barrier Barrier Strips all on 3/8-inch centers.
<b>Power Consumption</b>	115 or 230 VAC - A2300,600watts; A2150,400 watts Switched Accessory outlet, 360 watts.
<b>Cooling</b>	Passive, side, top and bottom vents.
<b>Temperature Range</b>	-10°C to +60°C (12°F to 140°F)
<b>Dimensions</b>	5.25" Tall + 0.75" for feet 17" Wide (19" Wide in rack mount configuration) 12" Deep chassis + 0.5" front and back for knobs
<b>Weight</b>	A2300 - 30 lbs. net, 34 lbs. shipping weight A2150 - 26 lbs. net, 30 lbs. shipping weight
<b>Color</b>	Dark grey
<b>Standard Accessories</b>	Knob lock-outs  On-Site User's Manual
<b>Optional Accessories</b>	Rack mounting brackets

TWO CHANNEL POWER AMPLIFIER

**QSC** A2300



POWER



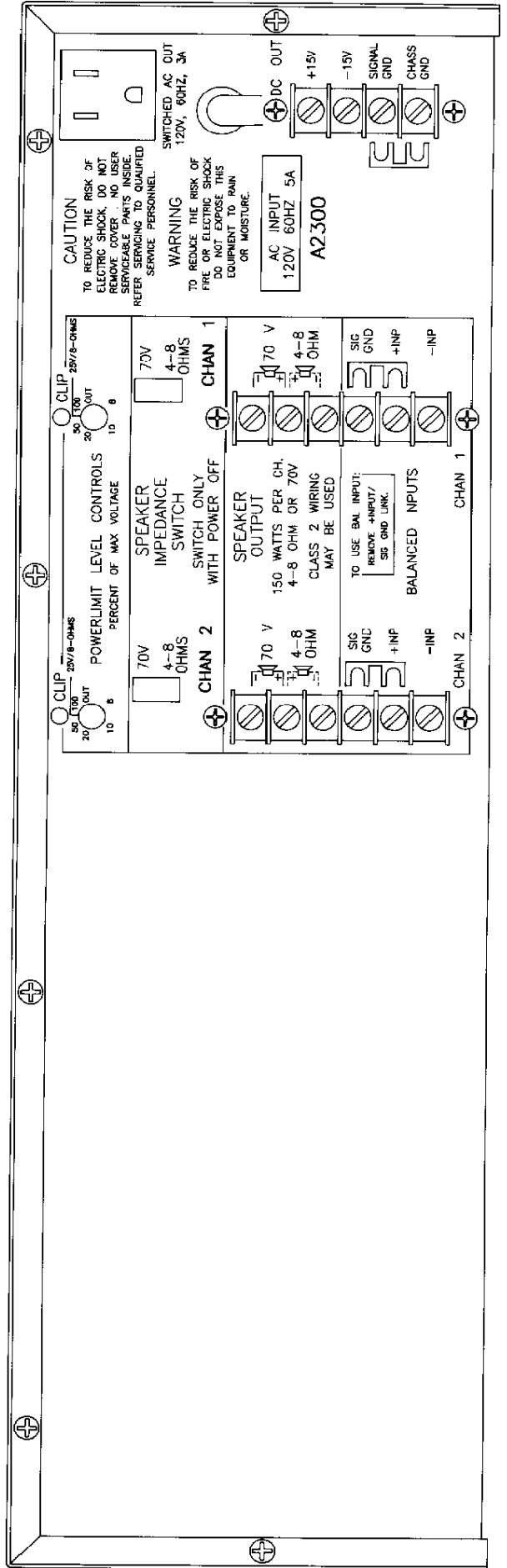
VOLUME



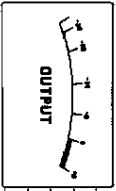
CHANNEL 1

CHANNEL 2

ON/OFF



**QSC**  
A2150



POWER 

VOLUME 

ON/OFF

0 10

**POWER LIMIT LEVEL CONTROL**  
PERCENT OF MAX VOLTAGE

**SPEAKER IMPEDANCE SWITCH ONLY WITH POWER OFF**

**SPEAKER OUTPUT**  
150 WATTS  
4-8 OHM OR 70V  
CLASS 2 WIRING  
MAY BE USED

**BALANCED INPUT**  
TO USE BAL INPUT:  
REMOVE +INPUT/  
SIG GND LINK.

**CAUTION**  
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

**WARNING**  
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

**CLIP**  
50%  
20%  
10%  
8

**70V**  
4-8 OHMS

**70V**  
4-8 OHM

**AC INPUT**  
120V 60HZ 3A

**A2150**

**SWITCHED AC OUT**  
120V, 60HZ, 3A

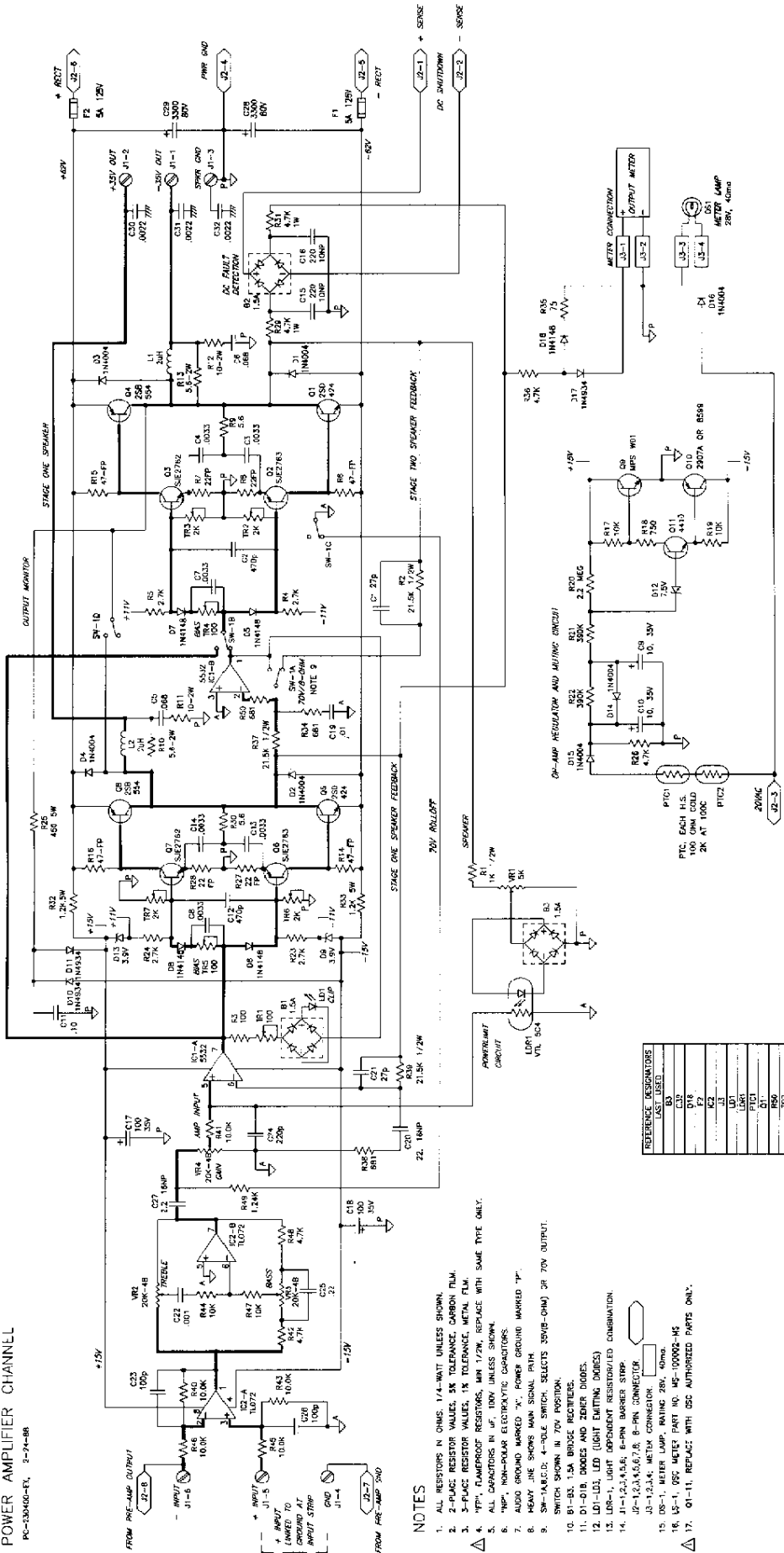
**SIG**  
GND  
+15V  
-15V

**SIGNAL**  
GND  
CHASS  
GND



# POWER AMPLIFIER CHANNEL

PC-3340G-KT, 3-74-88



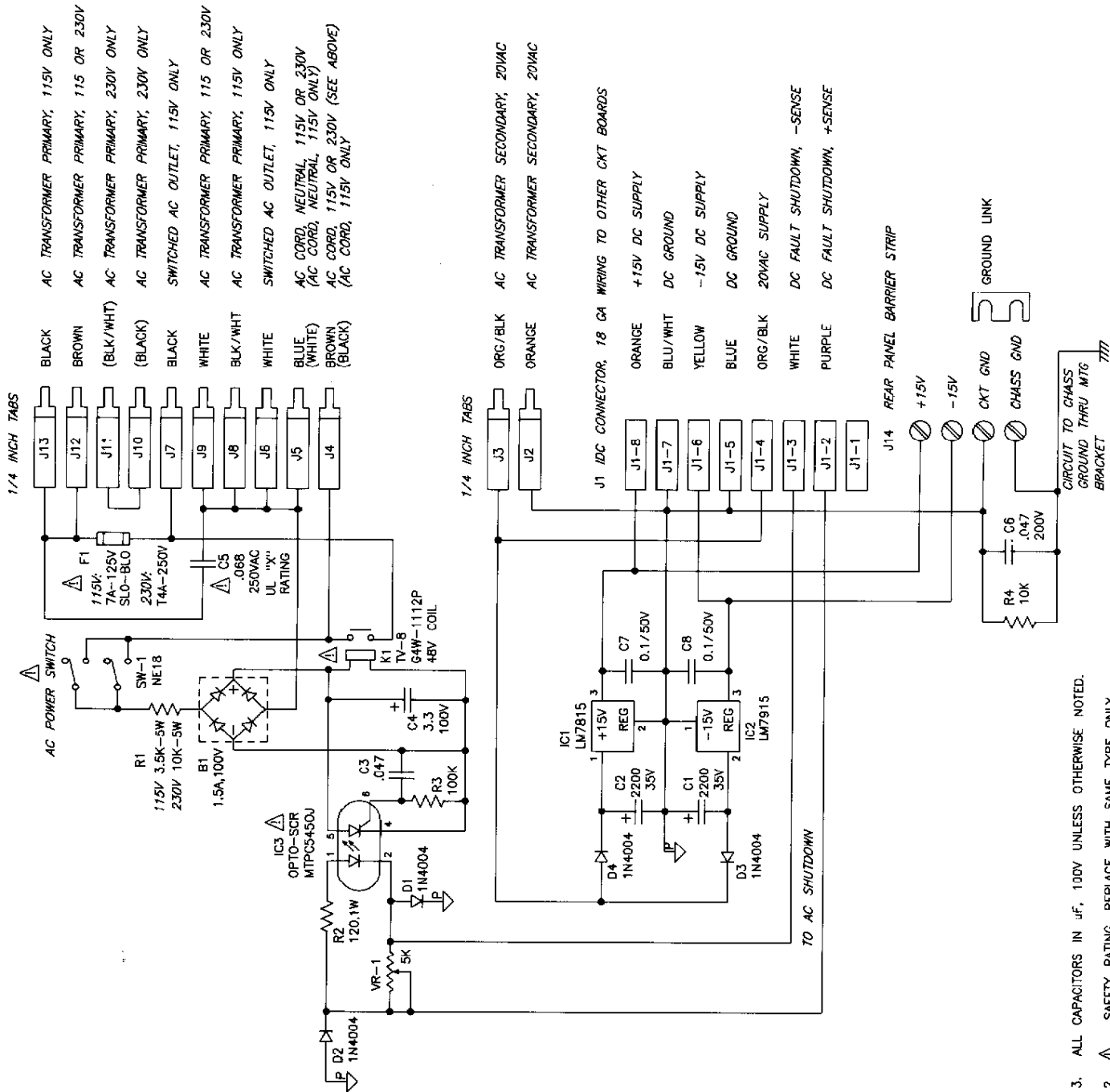
REFERENCE DESIGNATOR	LAST USED
C17	
C18	
D18	
F7	
L1	
L2	
L3	
L4	
L5	
L6	
L7	
L8	
L9	
L10	
L11	
L12	
L13	
L14	
L15	
L16	
L17	

## NOTES

1. ALL RESISTORS IN OHMS, 1/4-WATT, UNLESS SHOWN.
2. PLACE RESISTOR VALUES, 5% TOLERANCE CARBON FILM.
3. 5-PLACE RESISTOR VALUES, 1% TOLERANCE METAL FILM.
4. "VF" DIODES, 1N4148, 1N4149, 1N4150, 1N4151, 1N4152, 1N4153, 1N4154, 1N4155, 1N4156, 1N4157, 1N4158, 1N4159, 1N4160, 1N4161, 1N4162, 1N4163, 1N4164, 1N4165, 1N4166, 1N4167, 1N4168, 1N4169, 1N4170, 1N4171, 1N4172, 1N4173, 1N4174, 1N4175, 1N4176, 1N4177, 1N4178, 1N4179, 1N4180, 1N4181, 1N4182, 1N4183, 1N4184, 1N4185, 1N4186, 1N4187, 1N4188, 1N4189, 1N4190, 1N4191, 1N4192, 1N4193, 1N4194, 1N4195, 1N4196, 1N4197, 1N4198, 1N4199, 1N4200.
5. ALL CAPACITORS IN  $\mu$ F, UNLESS SHOWN.
6. "NP" NON-POLAR ELECTROLYTIC CAPACITORS.
7. AUDIO GROUND MARKED "G", POWER GROUND MARKED "P".
8. HEAVY LINE SHOWS MAIN SIGNAL PATH.
9. SW-1A,B,C,D: 4-POLE SWITCH, SELECTS 28VDC (ON) OR 70V OUTPUT. SWITCH SHOWN IN 70V POSITION.
10. B1-B3: 1.5A BRIDGE RECTIFIERS.
11. D1-D10: DIODES AND ZENER DIODES.
12. LD1-LD3: LIGHT EMITTING DIODES.
13. LRN-1, LIGHT DEPENDENT RESISTOR/LED COMBINATION.
14. J1-1,2,3,4,5,6: 6-PIN BARBER STRIP.
15. J2-1,2,3,4,5,6,7,8: 8-PIN CONNECTOR.
16. J3-1,2,3,4: METER CONNECTOR.
17. DS-1: METER LAMP, RATING 28V, 0.0mA.
18. LS-1, 0.5% METER PART NO. MS-100002-MS.
19. 01-11: REPLACE WITH ISC AUTHORIZED PARTS ONLY.

# SERIES IWO 15V REGULATOR/DC SHUTDOWN

REV D, 2-15-88



3. ALL CAPACITORS IN  $\mu$ F, 100V UNLESS OTHERWISE NOTED.

2.  $\Delta$  SAFETY RATING, REPLACE WITH SAME TYPE ONLY.

1. ALL RESISTORS ARE 1/4 W 5% UNLESS OTHERWISE NOTED.