Technical Service Manual

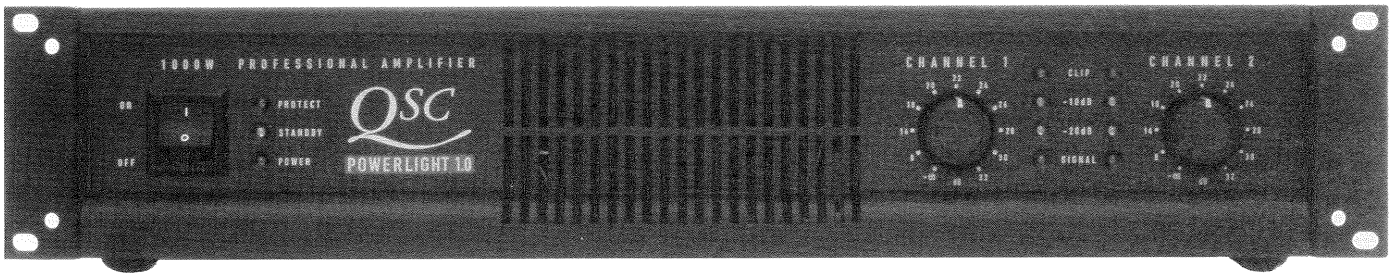
PowerLight™

- **PowerLight 1.0**
- **PowerLight 1.4**
- **PowerLight 1.8**

QSC®
AUDIO

TD-000056-00 REV. A

▲ PL–1.0



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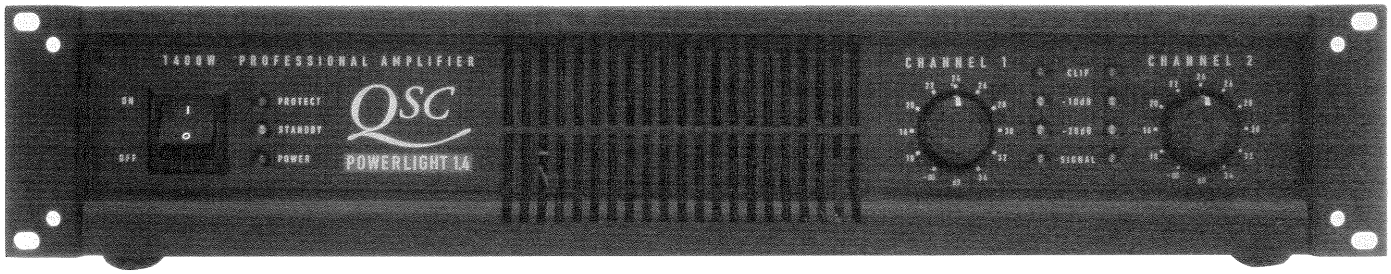

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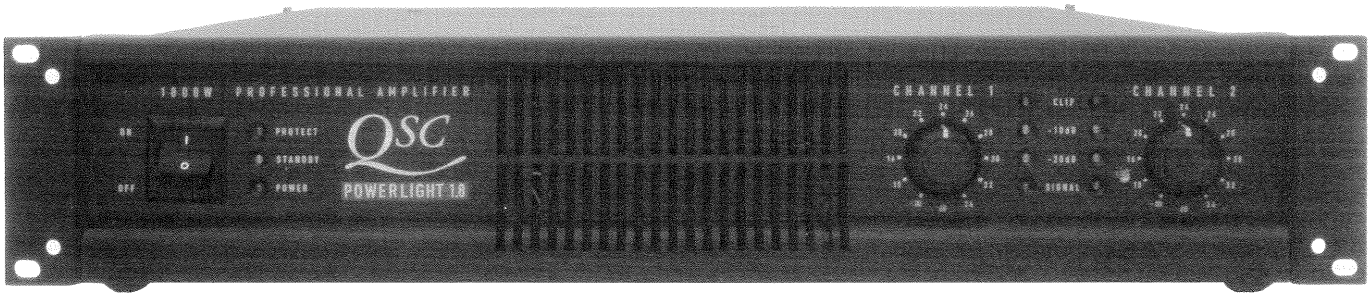

POWERLIGHT SERIES AMPLIFIER
SERVICE MANUAL

PowerLight - 1.0
PowerLight - 1.4
PowerLight - 1.8

QSC Technical Services
Wats: 1-800-772-2834
Local: 1-714-957-7150
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1-800-856-6003
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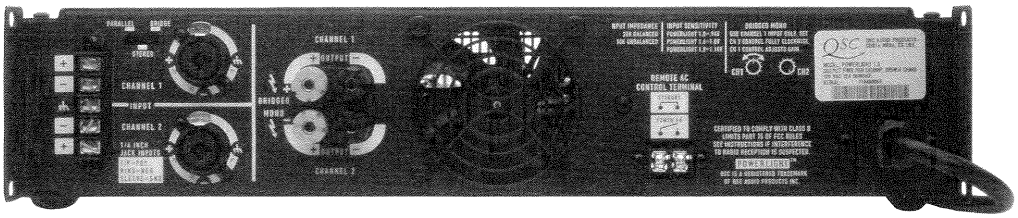
Table of Contents

Schematics

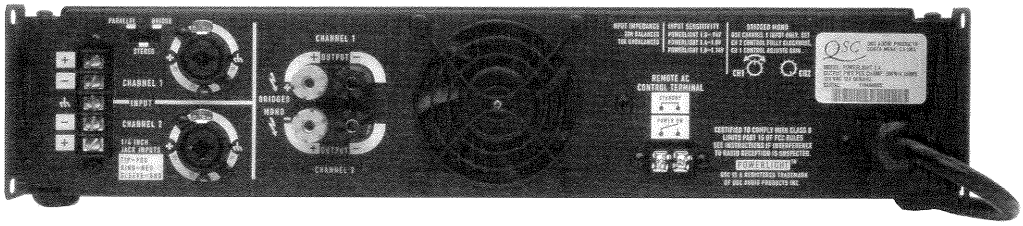
Printed Circuit Board Diagrams

PowerLight Product Specifications

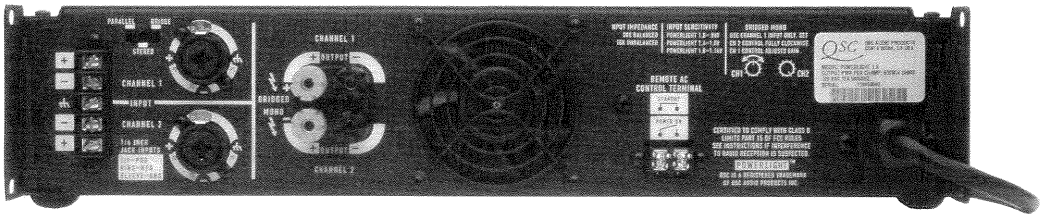
PL-1.0



PL-1.4



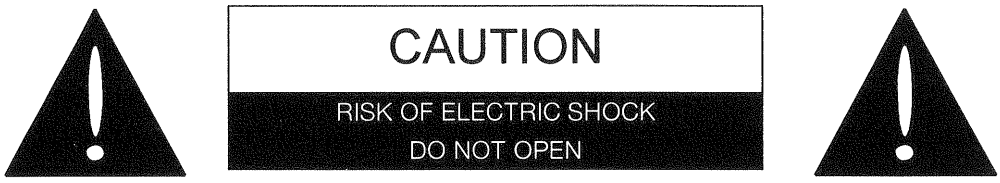
PL-1.8



	PL-1.0	PL-1.4	PL-1.8
Output Power (per channel):			
Continuous Average Output Power both channels driven:			
8 ohms, 20Hz - 20kHz, 0.1% THD	190 watts	300 watts	400 watts
4 ohms, 20Hz - 20kHz, 0.1% THD	325 watts	500 watts	650 watts
Continuous Average Output Power bridged mono operation:			
8 ohms, 20Hz - 20kHz, 0.1% THD	650 watts	1000 watts	1300 watts
Voltage Gain (dB):	32	34	34
Sensitivity (for rated power @ 8 ohms)	1.00 V rms	0.96 Vrms	1.14 Vrms
Distortion:			
SMPTE-IM	Less than 0.05%		
Dynamic Headroom:	1.9dB at 4 ohms		
Frequency Response:	20Hz to 20kHz, +/-0.15dB 8Hz to 100kHz, +0/-3dB		
Damping Factor:	Greater than 250		
Noise:	100dB below rated output (20 Hz to 20 kHz)		
Input Impedance	20k ohms unbalanced and balanced		
Dimensions			
Faceplate Width	Standard 19" Rack Mounting		
Faceplate Height	3.5"	3.5"	3.5"
Chassis Depth	17.9"	17.9"	17.9"
Weight			
Shipping, Lbs/kg	24/10.6	24/10.6	24/10.6
Net, Lbs/kg	18/8.2	18/8.2	18/8.2

Introduction

This manual is prepared to assist service personnel with the repair and calibration of the PowerLight Series power amplifiers . The procedures described in this manual require advanced technical experience and sophisticated audio test equipment.



CAUTION: To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

Documentation

This manual contains schematics, printed circuit board (PCB) drawings, parts lists, and mechanical assembly drawings. This information should be used in conjunction with the test and troubleshooting guide.

The electrical and electronic components are identified by circuit identification numbers on the schematics and the parts list. The test & troubleshooting sections refer to designations shown in the schematics.

Equivalent Parts

Although many of the electronic components used in this product may be available from electronic suppliers, some components are specially tested and approved by QSC. A product repaired with non-QSC supplied components may not meet factory specifications. Repairs performed using non-QSC parts may void the product warranty. When in doubt, you may contact QSC Technical Services for assistance.

Parts orders to QSC should include the product model number, the part description, and the QSC part number (from the parts list in this manual). Parts will be shipped via UPS, F.O.B. Costa Mesa, California. Shipping, handling and COD charges may be added to the cost of the parts.

Factory Repair

It may become necessary to return a product to the factory for repair. Call QSC Technical Services for return instructions. You must obtain a Return Authorization number from QSC before returning a product to the factory. QSC Technical Services may be reached at (800) 772-2834.

Test Equipment

For testing, as outlined in this manual, the following equipment will be needed.

REQUIRED TEST EQUIPMENT

- Distortion Analyzer capable of 0.05% THD+N
- High Power Load Bank (8, 4, & 2 ohms)
- Function Generator
- 20MHz Oscilloscope
- Digital Multimeter
- Variac (0-140 VAC, 10-20A)

SUGGESTED TEST EQUIPMENT

- Audio Precision - System One
- Thermocouple probe

Audio Precision test and procedures files are made available, free of charge, from QSC Technical Services by either sending a self addressed stamped envelope and a 3 1/2" disk to QSC, or by logging on to QSC Online and downloading the appropriate files.

Test Point Schedule

The following test points are described for testing and troubleshooting references. These test points are universal among all models. Actual voltages and current readings will vary.

AMPLIFIER SECTION

J502 Bed of Nails (J602 is for channel 2):

Pin 1 - Negative 15VDC IC Supply.
Pin 2 - Positive 15VDC IC Supply.
Pin 3 - No Connection.
Pin 4 - Second Stage OpAmp.
Less than 100mVDC offset.
Pin 5 - No Connection.
Pin 6 - Positive Switched Bus Rail.
Test signal superimposed on DC voltages.
Pin 7 - No Connection.
Pin 8 - Negative Switched Bus Rail.
Test signal superimposed on DC voltages.

Test Points (DMM VAC Measurement):

Channel 2
TP 8 - Q610 output transistor emitter voltage.
TP 9 - Q609 output transistor emitter voltage.
TP 10 - Q608 output transistor emitter voltage.
TP 11 - Q607 output transistor emitter voltage.
TP 12 - Q606 output transistor emitter voltage.
TP 13 - Q605 output transistor emitter voltage.
Channel 1
TP 14 - Q510 output transistor emitter voltage.
TP 15 - Q509 output transistor emitter voltage.
TP 16 - Q508 output transistor emitter voltage.
TP 17 - Q507 output transistor emitter voltage.
TP 18 - Q506 output transistor emitter voltage.
TP 19 - Q505 output transistor emitter voltage.

POWER SUPPLY SECTION

Test Points
TP 1 - 12V Keep alive supply
TP 2 - 7.37MHz Clock pulse
TP 3 - 230kHz Step down counter
TP 4 - Protect/Shutdown send
TP 5 - Standby sense
TP 6 - 114kHz PWM B
TP 7 - 114kHz PWM A

Note:
The output emitter voltages will have different readings depending on how much power the amplifier is producing. When evaluating the strength of an output power transistor, measure the emitter resistor voltage drop across one of the emitter resistors. There should not be more than a 15% deviation from one reading to another. This measurement will show the gain consistency of one device relative to another.

T e s t & C a l i b r a t i o n

NOTE: This test procedure will refer to the amplifier's channels as Ch1 (Channel 1) & Ch2 (Channel 2). Component designation will have the prefix "5" for Ch1 and "6" for Ch2.

PowerLight 1.0 Test Procedure

- SET-UP
  1. Connect a test load to the output terminals of the amplifier.
  2. Make sure the Stereo / Bridge switch is set to the Stereo position.
  3. Connect a distortion analyzer with a resolution of 0.05%, 20-20kHz (or better) to the output terminals of the amplifier. Enable the 80kHz low pass filter.
  4. Connect a dual-channel oscilloscope to the following test points:
     Ch1 - a 10X (vertical sensitivity - 2V/cm) scope probe to the channel speaker output.
     Ch2 - a 1X scope probe (vertical sensitivity - 0.1V/cm) to the distortion analyzer output.
  5. Set amp gain pots fully clockwise and turn on power switch.
  6. Connect the output of the signal generator to the input terminals of the amplifier and select an output of 1.00 VRMS, 1KHz sine wave.
  7. Plug the amplifier in to a variac and set up an AC line current monitor.

- POWER UP & MUTE DELAY TEST
  1. Slowly raise the variac voltage and watch for excessive current draw (Line current greater than 0.5A a.c. at 60 Volts). *This is slightly less for 240V.* Pause at 90VAC *(200VAC European)* for three seconds until the mute / protect circuit disengages. Continue to 120VAC *(240V European).*
  2. Turn the power switch off and on a few times to verify the 1 - 3 second power-up muting delay. Check both channels.

- CHANNEL OUTPUT
  1. Look for amplified signal on the scope for channel 1. Switch the input signal and scope to channel 2 and repeat output test. Check for noisy / contaminated gain pots by observing general instability on the distortion waveform while adjusting the gain control levels.
  2. Select an 8 ohm load and confirm that this amplifier is producing 210 watts at 1kHz just beyond the point of clipping (1.0% THD+N). Check both channels.

- BRIDGE MODE
  1. Turn the power switch off.
  2. Move the bridge switch on the amp from the Stereo to Bridge position. Ensure that CH2 gain is fully clockwise (on) and remove the input plug from CH2.
  3. Set load to both red output binding posts (CH1 positive and CH2 negative).
  4. Apply a 1VRMS, 1kHz sinewave input to channel 1 of the amplifier. Check the power and verify that the output does not collapse.

5. Turn power off and place the amplifier under test back into the Stereo mode with output loads connected to each channel. Reinsert CH2 input plug and turn both gain controls fully up.

- BIAS ADJUSTMENT
  1. Let the amplifier cool down to room temperature.
  2. With an input amplitude of 1Vrms, increase the input frequency to 20kHz. Reduce the input signal 20dB (80%) from full output. Now, adjust the crossover trimpot VR501 for about a 400mVpk-pk crossover spike protruding from the noise trace on the oscilloscope. It will be necessary to have the oscilloscope measure unfiltered distortion from the amplifier in order to see the crossover spike. It is necessary to disable the 80kHz lowpass filter on the analyzer for this test. Further trim VR501 so that the total distortion for that channel is at about 0.1% THD+N. If bias is not adjustable, see the bias description and troubleshooting section of this manual.
  3. If a distortion analyzer is not available, a less accurate crossover distortion and bias adjustment can be made by monitoring the driver transistor (Q501 & Q502) bias current. With the amplifier at room temperature, and with no input signal plugged into the amplifier, measure the DC voltage across the emitter resistors of Q501 and Q502 (R501, R502). Adjust VR501 to obtain about 80mV d.c. across one of these resistors.
  4. With no signal plugged into the amplifier and with an 8 ohm load, verify that the AC idle current from the AC service is no more than 1.0 amps a.c.
  5. Let the amplifier cool down and check channel 2.

- SHORT CIRCUIT CURRENT
  1. Select a 4 ohm load and apply a 1Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.
  2. While the amplifier is producing power into the loads, apply a short to the output binding posts of each channel. In other words, apply a jumper between the red and black binding posts of each channel. Do not connect the two red binding posts together as this will cause a failure. Once this is done, combined AC line current draw for both channels should be no greater than **7.5A** ac. This is with a 120 volt AC service to the amplifier. Current may be lower as AC line voltage is lower.
  3. While the amplifier is driving a short, observe the main supply rail voltages. Ideally, they will be no more than 3 volts from each other.
  4. Remove the short from each channel and verify that the channels recover in to 4 ohm loads. The output should not experience any hang up and a full sinewave should be present just as it was before a short was applied for this test.
  5. If the amplifier does not pass any of the above steps, follow the proceeding steps. If steps 2, 3, and 4 above pass, continue to the next test FREQUENCY RESPONSE.

Setting Short Circuit Current Limits

a. Select a 4 ohm load and apply a 1.2Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.
b. Turn gain controls on CH2 fully down. CH1 should be producing max power in the 4 ohm load.
c. While CH1 is delivering power into the load, apply a short across channel 1's binding posts.
d. Observe that the A.C. current draw is **2.5 to 3.5** amps A.C.. Adjust VR502 and VR503 to get this current reading if your initial reading is off. VR502 is the positive current limit adjust and VR503 is the negative current limit adjust. Adjust both

channels the same for a change in current limiting. Both wipers need to adjust evenly to achieve a balanced setting.

e. Once the correct AC current draw is set, remove the short from the output. When this is done, the output power should spring back into the 4 ohm load. If it does not, the current limits are set too low.

f. Once the output recovers into the 4 ohm load, verify that both polarities of the output sinewave are clipping at the same time. If one polarity clips before the other, adjust the current limit for that polarity (I + or I -) until both polarities clip at the same time.

g. After the short circuit current is set and even clipping is achieved, re apply the short to the output to reconfirm AC line current. If the current draw is not within the range specified, again balance the current limit trimpots until even clipping and the correct AC current draw is met.

h. Remove the input signal from CH1 and calibrate CH2. It is important to calibrate only one channel at a time.

- FREQUENCY RESPONSE
  1. Set load to 8 ohms and scale the input generator to gain 1 watt of power from the amplifier on each channel. Gain controls on the amplifier should be fully up.
  2. Check frequency response from 20Hz to 20kHz (+/- 0.15dB) by sweeping random frequencies between these extremes. This is done by verifying the same voltage amplitude at each of the frequencies selected (within 20Hz to 20kHz). Check both channels.

- POWER vs. DISTORTION TEST
  1. Check to ensure that both channels will produce rated power at 20Hz, 2KHz, and 20kHz. into an 8 ohm load.
  2. While verifying rated power, check that at all frequencies the distortion measurement is less than or equal to 0.1%.

- THERMAL TEST
  1. Set input frequency to 1KHz and short both channels while they are producing power into a load.
  2. AC line current draw should be about **7.0 - 8.0** amps for both channels. As the amplifier gets hot, there will be some current drift upwards. This is not a problem as long as the case temperature on the output transistors does not exceed 105 degrees C.
  3. Verify that the PTC circuit causes thermal shutdown after an extended period.
  4. When thermal shutdown occurs, verify AC idle current of less that 0.90 amperes.

- CM TEST
  1. Select an 8 ohm load and confirm that this amplifier is producing rated power. While this amplifier is producing power, proceed to the next step of this test.
  2. Check the Common Mode of the amplifier by inserting a 1/4" input jack halfway into each channel and observe about 6 dB of output power reduction. There will also be a 180 degree phase inversion at the output of the amplifier under test.

- OUTPUT NOISE
  1. Set the amplifier gain controls all the way up, with a 1kHz 1.00Vrms sinewave input signal. Note the output level.
  2. Remove the input signal connector from the amplifier and measure the residual noise level produced into the load by the amplifier. The noise signal should be 100 dB down from the full output power point measured. A signal to noise ratio should be better than or equal to 100dB. Check both channels.

- FINAL CHECK

  This completes the amplifier test procedure for this model. Inspect the amplifier for mechanical defects. Inspect the solder connections. Reassemble the amplifier and verify the amplifier's operation before returning the product to service.

PowerLight 1.4 Test Procedure

- SET-UP
  1. Connect a test load to the output terminals of the amplifier.
  2. Make sure the Stereo / Bridge switch is set to the Stereo position.
  3. Connect a distortion analyzer with a resolution of 0.05%, 20-20kHz (or better) to the output terminals of the amplifier. Enable the 80kHz low pass filter.
  4. Connect a dual-channel oscilloscope to the following test points:
     Ch1 - a 10X (vertical sensitivity - 2V/cm) scope probe to the channel speaker output.
     Ch2 - a 1X scope probe (vertical sensitivity - 0.1V/cm) to the distortion analyzer output.
  5. Set amp gain pots fully clockwise and turn on power switch.
  6. Connect the output of the signal generator to the input terminals of the amplifier and select an output of 1.00 VRMS, 1KHz sine wave.
  7. Plug the amplifier in to a variac and set up an AC line current monitor.

- POWER UP & MUTE DELAY TEST
  1. Slowly raise the variac voltage and watch for excessive current draw (Line current greater than 0.5A a.c. at 60 Volts). *This is slightly less for 240V.* Pause at 90VAC *(200VAC European)* for three seconds until the mute / protect circuit disengages. Continue to 120VAC *(240V European).*
  2. Turn the power switch off and on a few times to verify the 1 - 3 second power-up muting delay. Check both channels.

- CHANNEL OUTPUT
  1. Look for amplified signal on the scope for channel 1. Switch the input signal and scope to channel 2 and repeat output test. Check for noisy / contaminated gain pots by observing general instability on the distortion waveform while adjusting the gain control levels.
  2. Select an 8 ohm load and confirm that this amplifier is producing 325 watts at 1kHz just beyond the point of clipping (1.0% THD+N). Check both channels.

- BRIDGE MODE
  1. Turn the power switch off.
  2. Move the bridge switch on the amp from the Stereo to Bridge position. Ensure that CH2 gain is fully clockwise (on) and remove the input plug from CH2.
  3. Set load to both red output binding posts (CH1 positive and CH2 negative).
  4. Apply a 1VRMS, 1kHz sinewave input to channel 1 of the amplifier. Check the power and verify that the output does not collapse.
  5. Turn power off and place the amplifier under test back into the Stereo mode with output loads connected to each channel. Reinsert CH2 input plug and turn both gain controls fully up.

- BIAS ADJUSTMENT
  1. Let the amplifier cool down to room temperature.
  2. With an input amplitude of 1Vrms, increase the input frequency to 20kHz. Reduce the input signal 20dB (80%) from full output. Now, adjust the cross-over trimpot VR501 for about a 400mVpk-pk crossover spike protruding from the noise trace on the oscilloscope. It will be necessary to have the oscilloscope measure unfiltered distortion from the amplifier in order to see the crossover spike. It is necessary to disable the 80kHz lowpass filter on the analyzer for this test. Further trim VR501 so that the total distortion for that channel is at about 0.1% THD+N. If bias is not settable, see the bias description and troubleshooting section of this manual.
  3. If a distortion analyzer is not available, a less accurate crossover distortion and bias adjustment can be made by monitoring the driver transistor (Q501 & Q502) bias current. With the amplifier at room temperature, and with no input signal plugged into the amplifier, measure the DC voltage across the emitter resistors of Q501 and Q502 (R501, R502). Adjust VR501 to obtain about 80mV d.c. across one of these resistors.
  4. With no signal plugged into the amplifier and with an 8 ohm load, verify that the AC idle current from the AC service is no more than 1.0 amps a.c.
  5. Let the amplifier cool down and check channel 2.

- SHORT CIRCUIT CURRENT
  1. Select a 4 ohm load and apply a 1Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.
  2. While the amplifier is producing power into the loads, apply a short to the output binding posts of each channel. In other words, apply a jumper between the red and black binding posts of each channel. Do not connect the two red binding posts together as this will cause a failure. Once this is done, combined AC line current draw for both channels should be no greater than **7.5A** ac. This is with a 120VAC service. Current may be lower as AC line voltage is lower.
  3. While the amplifier is driving a short, observe the main supply rail voltages. Ideally, they will be no more than 3 volts from each other.
  4. Remove the short from each channel and verify that the channels recover in to 4 ohm loads. The output should not experience any hang up and a full sinewave should be present just as it was before a short was applied for this test.
  5. If the amplifier does not pass any of the above steps, follow the proceeding steps. If steps 2, 3, and 4 above pass, continue to the next test "Frequency Response. "

Setting Short Circuit Current Limits

a. Select a 4 ohm load and apply a 1.2Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.

b. Turn gain controls on CH2 fully down. CH1 should be producing max power in the 4 ohm load.

c. While CH1 is delivering power into the load, apply a short across channel 1's binding posts.

d. Observe that the A.C. current draw is **3.0 - 4.0** amps A.C.. Adjust VR502 and VR503 to get this current reading if your initial reading is off. VR502 is the positive current limit adjust and VR503 is the negative current limit adjust. Adjust both channels the same for a change in current limiting. Both wipers need to adjust evenly to achieve a balanced setting.

e. Once the correct AC current draw is set, remove the short on the output. When this is done, the output power should spring back into the 4 ohm load. If it does not, the current limits are set too low.
f. Once the output recovers into the 4 ohm load, verify that both polarities of the output sinewave are clipping at the same time. If one polarity clips before the other, adjust the current limit for that polarity (I + or I -) until both polarities clip at the same time.
g. After the short circuit current is set and even clipping is achieved, re apply the short to the output to reconfirm AC line current. If the current draw is not within the range specified, again balance the current limit trimpots until even clipping and the correct AC current draw is met.
h. Remove the input signal from CH1 and calibrate CH2. It is important to calibrate only one channel at a time.

- FREQUENCY RESPONSE
  1. Set load to 8 ohms and scale the input generator to gain 1 watt of power from the amplifier on each channel. Gain controls on the amplifier should be fully up.
  2. Check frequency response from 20Hz to 20kHz (+/- 0.15dB) by sweeping random frequencies between these extremes. This is done by verifying the same voltage amplitude at each of the frequencies selected (within 20Hz to 20kHz). Check both channels.

- POWER vs. DISTORTION TEST
  1. Check to ensure that both channels will produce rated power at 20Hz, 2KHz, and 20kHz. into an 8 ohm load.
  2. While verifying rated power, check that at all frequencies the distortion measurement is less than or equal to 0.1%.

- THERMAL TEST
  1. Set input frequency to 1KHz and short both channels while they are producing power into a load.
  2. AC line current draw should be about 7.0 - 8.0 amps for both channels. As the amplifier gets hot, there will be some current drift upwards. This is not a problem as long as the case temperature on the output transistors does not exceed 105 degrees C.
  3. Verify that the PTC circuit causes thermal shutdown after an extended period.
  4. When thermal shutdown occurs, verify AC idle current of less that 0.90 amperes.

- CM TEST
  1. Select an 8 ohm load and confirm that this amplifier is producing rated power. While this amplifier is producing power, proceed to the next step of this test.
  2. Check the Common Mode of the amplifier by inserting a 1/4" input jack halfway into each channel and observe about 6 dB of output power reduction. There will also be a 180 degree phase inversion at the output of the amplifier under test.

- OUTPUT NOISE
  1. Set the amplifier gain controls all the way up, with a 1kHz 1.00Vrms sinewave input signal. Note the output level.
  2. Remove the input signal connector from the amplifier and measure the residual noise level produced into the load by the amplifier. The noise signal should be 100 dB down from the full output power point measured. A signal to noise ratio should be better than or equal to 100dB. Check both channels.

- FINAL CHECK

  This completes the amplifier test procedure for this model. Inspect the amplifier for mechanical defects. Inspect the solder connections. Reassemble the amplifier and verify the amplifier's operation before returning the product to service.

PowerLight 1.8 Test Procedure

- SET-UP
  1. Connect a test load to the output terminals of the amplifier.
  2. Make sure the Stereo / Bridge switch is set to the Stereo position.
  3. Connect a distortion analyzer with a resolution of 0.05%, 20-20kHz (or better) to the output terminals of the amplifier. Enable the 80kHz low pass filter.
  4. Connect a dual-channel oscilloscope to the following test points:

     Ch1 - a 10X (vertical sensitivity - 2V/cm) scope probe to the channel speaker output.
     Ch2 - a 1X scope probe (vertical sensitivity - 0.1V/cm) to the distortion analyzer output.
  5. Set amp gain pots fully clockwise and turn on power switch.
  6. Connect the output of the signal generator to the input terminals of the amplifier and select an output of 1.00 VRMS, 1KHz sine wave.
  7. Plug the amplifier in to a variac and set up an AC line current monitor.

- POWER UP & MUTE DELAY TEST
  1. Slowly raise the variac voltage and watch for excessive current draw (Line current greater than 0.5A a.c. at 60 Volts). *This is slightly less for 240V.* Pause at 90VAC *(200VAC European)* for three seconds until the mute / protect circuit disengages. Continue to 120VAC *(240V European).*
  2. Turn the power switch off and on a few times to verify the 1 - 3 second power-up muting delay. Check both channels.

- CHANNEL OUTPUT
  1. Look for amplified signal on the scope for channel 1. Switch the input signal and scope to channel 2 and repeat output test. Check for noisy / contaminated gain pots by observing general instability on the distortion waveform while adjusting the gain control levels.
  2. Select an 8 ohm load and confirm that this amplifier is producing 450 watts at 1kHz just beyond the point of clipping (1.0% THD+N). Check both channels.

- BRIDGE MODE
  1. Turn the power switch off.
  2. Move the bridge switch on the amp from the Stereo to Bridge position. Ensure that CH2 gain is fully clockwise (on) and remove the input plug from CH2.
  3. Set load to both red output binding posts (CH1 positive and CH2 negative).
  4. Apply a 1VRMS, 1kHz sinewave input to channel 1 of the amplifier. Check the power and verify that the output does not collapse.
  5. Turn power off and place the amplifier under test back into the Stereo mode with output loads connected to each channel. Reinsert CH2 input plug and turn both gain controls fully up.

- BIAS ADJUSTMENT
  1. Let the amplifier cool down to room temperature.
  2. With an input amplitude of 1Vrms, increase the input frequency to 20kHz. Reduce the input signal 20dB (80%) from full output. Now, adjust the cross-over trimpot VR501 for about a 400mVpk-pk crossover spike protruding from the noise trace on the oscilloscope. It will be necessary to have the oscilloscope measure unfiltered distortion from the amplifier in order to see the crossover spike. It is necessary to disable the 80kHz lowpass filter on the analyzer for this test. Further trim VR501 so that the total distortion for that channel is at about 0.1% THD+N. If bias is not adjustable, see the bias description and troubleshooting section of this manual.
  3. If a distortion analyzer is not available, a less accurate crossover distortion and bias adjustment can be made by monitoring the driver transistor (Q501 & Q502) bias current. With the amplifier at room temperature, and with no input signal plugged into the amplifier, measure the DC voltage across the emitter resistors of Q501 and Q502 (R501, R502). Adjust VR501 to obtain about 80mV d.c. across one of these resistors.
  4. With no signal plugged into the amplifier and with an 8 ohm load, verify that the AC idle current from the AC service is no more than 1.0 amps a.c.
  5. Let the amplifier cool down and check channel 2.

- SHORT CIRCUIT CURRENT
  1. Select a 4 ohm load and apply a 1Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.
  2. While the amplifier is producing power into the loads, apply a short to the output binding posts of each channel. In other words, apply a jumper between the red and black binding posts of each channel. Do not connect the two red binding posts together as this will cause a failure. Once this is done, combined AC line current draw for both channels should be no greater than **7.5A** ac. This is with a 120VAC service. Current may be lower as AC line voltage is lower.
  3. While the amplifier is driving a short, observe the main supply rail voltages. Ideally, they will be no more than 3 volts from each other.
  4. Remove the short from each channel and verify that the channels recover in to 4 ohm loads. The output should not experience any hang up and a full sinewave should be present just as it was before a short was applied for this test.
  5. If the amplifier does not pass any of the above steps, follow the proceeding steps. If steps 2, 3, and 4 above pass, continue to the next test "Frequency Response. "

  Setting Short Circuit Current Limits

  a. Select a 4 ohm load and apply a 1.2Vrms sinewave (1kHz) input signal to both channels of the amplifier. Ensure that power is on and that the gain controls are fully up.
  b. Turn gain controls on CH2 fully down. CH1 should be producing max power in the 4 ohm load.
  c. While CH1 is delivering power into the load, apply a short across channel 1's binding posts.
  d. Observe that the A.C. current draw is **3.5 - 4.0** amps A.C.. Adjust VR502 and VR503 to get this current reading if your initial reading is off. VR502 is the positive current limit adjust and VR503 is the negative current limit adjust. Adjust both channels the same for a change in current limiting. Both wipers need to adjust evenly to achieve a balanced setting.

e. Once the correct AC current draw is set, remove the short on the output. When this is done, the output power should spring back into the 4 ohm load. If it does not, the current limits are set too low.
f. Once the output recovers into the 4 ohm load, verify that both polarities of the output sinewave are clipping at the same time. If one polarity clips before the other, adjust the current limit for that polarity (I + or I -) until both polarities clip at the same time.
g. After the short circuit current is set and even clipping is achieved, re apply the short to the output to reconfirm AC line current. If the current draw is not within the range specified, again balance the current limit trimpots until even clipping and the correct AC current draw is met.
h. Remove the input signal from CH1 and calibrate CH2. It is important to calibrate only one channel at a time.

- FREQUENCY RESPONSE
  1. Set load to 8 ohms and scale the input generator to gain 1 watt of power from the amplifier on each channel. Gain controls on the amplifier should be fully up.
  2. Check frequency response from 20Hz to 20kHz (+/- 0.15dB) by sweeping random frequencies between these extremes. This is done by verifying the same voltage amplitude at each of the frequencies selected (within 20Hz to 20kHz). Check both channels.

- POWER vs. DISTORTION TEST
  1. Check to ensure that both channels will produce rated power at 20Hz, 2KHz, and 20kHz. into an 8 ohm load.
  2. While verifying rated power, check that at all frequencies the distortion measurement is less than or equal to 0.1%.

- THERMAL TEST
  1. Set input frequency to 1KHz and short both channels while they are producing power into a load.
  2. AC line current draw should be about **7.0 - 8.0** amps for both channels. As the amplifier gets hot, there will be some current drift upwards. This is not a problem as long as the case temperature on the output transistors do not exceed 105 degrees C.
  3. Verify that the PTC circuit causes thermal shutdown after an extended period.
  4. When thermal shutdown occurs, verify AC idle current of less that 0.90 amperes.

- CM TEST
  1. Select an 8 ohm load and confirm that this amplifier is producing rated power. While this amplifier is producing power, proceed to the next step of this test.
  2. Check the Common Mode of the amplifier by inserting a 1/4" input jack halfway into each channel and observe about 6 dB of output power reduction. There will also be a 180 degree phase inversion at the output of the amplifier under test.

- OUTPUT NOISE
  1. Set the amplifier gain controls all the way up, with a 1kHz 1.00Vrms sinewave input signal. Note the output level.
  2. Remove the input signal connector from the amplifier and measure the residual noise level produced into the load by the amplifier. The noise signal should be 100 dB down from the full output power point measured. A signal to noise ratio should be better than or equal to 100dB. Check both channels.

- FINAL CHECK

  This completes the amplifier test procedure for this model. Inspect the amplifier for mechanical defects. Inspect the solder connections. Reassemble the amplifier and verify the amplifier's operation before returning the product to service.

T r o u b l e s h o o t i n g

Current Draw

(Circuit breakers and fuses blow. Burning smell or smoke)

Symptoms:

- Fuses immediately blow
- Amplifier quickly gets very hot
- Line circuit breakers tripping upon turn on
- Amplifier emits smoke
- A burning smell is emanating from the amplifier

Possible Causes:

- EXCESSIVE CURRENT WITHOUT SIGNAL PRESENT

  The amplifier draws high current when the AC supply voltage is first applied. This symptom may mean that there is a short in the power stages of the circuit.
  This could also be a misadjusted bias setting. See calibration procedures in this manual for setting bias.

- FAST CURRENT DRAW (increases rapidly at only a few volts AC):
  1. Reversed or shorted main bridge rectifier BR701. Check BR701 by setting DVM to diode mode. To verify a good BR701, connect the negative lead to BR701+ and check for 0.4 to 0.6v at both AC terminals. Connect positive lead to BR701- and check for 0.4 to 0.6v at both AC terminals.
  2. Both supply clamping diodes D512, D513, D612, D613 reversed or shorted.
  3. Output transistors or both drivers shorted.
  4. IGBT devices Q701, Q702 shorted.
  5. Shorted or reversed D740 or D741.
  6. Shorted or reversed C707, 708, 726, 727, 709, 728, 782, 781, 783, 784.

- MEDIUM CURRENT DRAW (increases slowly, can go to 30 VAC before current becomes excessive.):
  1. Single polarity driver or output short.
  2. Open or missing bias diodes D505, D506, D605, D606 or bias trim pot VR501, VR601.

- SLOW CURRENT DRAW (above 60 volts AC before current begins to increase, amp may pass signal):
  1. Severely misadjusted bias circuit or defective bias diodes D505-506.
  2. Severe oscillation causing current drain.

- RUNAWAY CURRENT DRAW (30-40V AC before current begins to increase or runaway):
  1. A reversed filter capacitor: caution, may vent explosively.

Protection, Standby, and Power Up.

(The amplifier locks up or does not startup and shut off correctly)

Symptoms:

- Amplifier does not come out of protect
- Amplifier does not come out of standby
- No thermal shutdown
- D.C. protection problems
- No status board LED lights
- Fan doesn't work

Possible Causes:

- AMPLIFIER DOES NOT COME OUT OF PROTECT

1. Check for wrong switching frequency. Failures of this sort could be related to the wrong switching frequency being produced within the switching section of the amplifier. The switching frequency must be 115kHz and may vary by several hundred Hz. An incorrect frequency above 116kHz is a dangerous situation that could cause the IGBTs (Q701, 702) to explode if the test is continued.
   A failure from an incorrect switching frequency is caused by the section containing U710, 704, and 701. U701 (PWM chip) has a built-in oscillator that is normally synchronized to the signal at U710-3. Even with a proper sync signal at U710-3, if oscillator timing components are the wrong value (C753, R730, R729), the oscillator will not sync and run at a different frequency. C753 may be a primay cause for this. Even if the removed cap reads ok on a capacitance meter, replace it anyway. The sync signal at U710-3 should look like narrow high going (+5 to +6v) pulses of 230.4kHz. Pulses going negative should be limited to -1.8v by D742. U704-1 TP2) should have a 7.3728Mhz signal on it, and U704-5 (TP3) should have a 230kHz square wave.
2. Check for open PTC (R556, R656).
3. Check TP5, or D746 anode for a high (+5v). If this is pulsing low (+3v or less), the unit is cycling through DC protect. This condition can imitate an overcurrent shutdown, with bursts of pulses at U710-11,14. If some VUs of only one channel flash, this can indicate the bad channel. Check both speaker outputs for a pulsing dc voltage (2 to over 30v) of either polarity. DC protect is detected by BR501, Q515 or BR601, Q615. Because this causes the power supply to cycle, it can be difficult to tell what is causing it. To defeat DC protect, add jumpers across R557, to keep the power supply on. Check +/-15VIC supplies (at J502) of both channels for +/-12v (in soft start), or +/-15v (in hard start). Check +/- switched busses (at J502,602) for about +/-34v (soft start) or +/-48v (hard start) for a PL1.4, PL1.8.
4. Missing +/-15V supplies. 15V op amp zeners in backwards or shorted.
5. Check U503-2,7 for DC offset (0mVdc +/-20mV).
6. Check for folded op amp pins at socket pins 8 and 4.
7. Check for shorted driver Q502, Q501.
8. Check for defective U501, U502 step drivers. Sometimes these step drivers will have cracked or burned semi-conductors.
9. VR501, 502, 503 wrong part or swapped.
10. Output transistors shorted.
11. R512 or R522 open.
12. RN505 wrong value.
13. R555, 551, C535 open or wrong value.

- AMPLIFIER DOES NOT COME OUT OF STANDBY
  1. Q706 shorted collector-emitter.
  2. Q704 shorted collector-emitter.
  3. Q703 shorted collector-emitter.
  4. Excessive DC voltage or subsonic frequencies (<5Hz) on speaker line.
  5. Solder bridge causing TP5 or pin 9 of U710 to remain low at 0Vdc.
  6. Excessive AC line voltage (>150VAC).

- NO THERMAL SHUTDOWN
  1. PTC R556 lifted from output transistor clamps.
  2. R549 open or wrong value.
  3. D525 wrong sex, mistuffed, or open.
  4. R550 open, D532 open.

- D.C. PROTECTION PROBLEMS

  DC FAULT WITHOUT CURRENT DRAW. In most cases, shorts in the output circuit will cause current draw, but certain shorts will only cause DC offset in the output. In both cases, measure the various circuit voltages and look for abnormal values to help trace the fault which can be a solder or component short (zero volts), reversed zener or diode (.6V), reversed electrolytic (several volts), or wrong value parts (abnormal voltage). Look at the following points in the circuit to identify causes of dc protection.
  1. Shorted IC rail, sometimes both shorted together.
  2. Defective 15v zener diodes D521, D522, or C525, C526.
  3. Collector-base short on driver (rare without further damage).
  4. Sometimes IC forces the rest of the circuit into DC due to shorts in the feedback network, etc. To check this, remove IC, check for +15V, -15V on IC rails, and balanced voltages in the drivers and outputs. If so, output stage is probably OK. Look for problems in IC or its associated parts.
  5. Defective or reversed IC (pull and check voltages).

- NO STATUS BOARD LED LIGHTS
  1. Check LED voltage. If over +2V, LED is defective. If 0V (meaning no positive voltage to LED), check for solder short.
  2. Check to ensure J706 is properly seated.
  3. Check Q101, Q102.

- FAN DOESN'T WORK
  1. Always operate at high speed: LD704 open, or check shorted BC junction of Q515, 520, and Q517.
  2. Always operate at low speed: check RN505:2.
  3. Doesn't operate: check shorted BE junction of Q517, Q520, Q515.

Faults with Signal Present

(The amplifier passes a signal but is not running correctly)

Symptoms:

- Output power "breaking up"
- 'Ringing' sound with no input to amplifier
- Output collapses into a 8, 4, or 2 ohm load
- Voltage rails ok without signal
- Amplifier gets too hot without load
- One channel clips prematurely

Possible Causes:

- OUTPUT POWER "BREAKING UP" (*Output distorted*)
  1. R523, 524, 526, 527 open.
  2. C513, C514 open.
  3. Check for continuity between speaker ground, input ground and ac ground.
  4. R501, R502 open.
  5. Current limits out of adjustment.
  6. Defective gain control.

- "RINGING' SOUND WITH NO INPUT TO AMPLIFIER
  1. C518, C519, C523 open or wrong value.
  2. R542, R568, R547 open or wrong value.
  3. Defective op amp U503.
  4. Unstable driver transistors (Q501, Q502), or output transistors (Q505 - Q510).

- OUTPUT COLLAPSES INTO A LOAD
  1. D519, D520, R548 wrong value or open.
  2. Misadjusted current limits (VR502, VR503).
  3. Defective op amp U503.

- VOLTAGE RAILS OK WITHOUT SIGNAL *(Collapses with a signal)*
  1. C525, C526 leaky or not holding a charge.
  2. Check for capacitance value of C520.

- AMPLIFIER GETS TOO HOT WITHOUT LOAD
  1. Bias trimpot (VR501) misadjusted, opened or burned.
  2. Incorrect bias diodes (D505, 506 should be 1N4934).
  3. R517, R518 open or has drifted in value.
  4. Defective op amp U503.

- ONE CHANNEL CLIPS PREMATURELY
  1. R517 or R518 may be open or drifted in value.
  2. Misadjusted current limits (VR502, VR503).
  3. Open bias diode D505, D506.
  4. Check for open R512, R522, R539, R546.
  5. 680 ohm chargeback resistor R548 may be open.

Instability

(Gain problems, spurious noises, and oscillations)

All Models

- General Output Distortion
- Excessive or unbalanced crossover
- Output waveform appears "fuzzy"

Possible Causes:

First, distinguish between instability (fuzziness), "ringing" which is momentary instability after a transition, "step" distortion, crossover distortion (both often show ringing), or general distortion.

- GENERAL OUTPUT DISTORTION

  SEVERE:

  All loads, often with current draw: often associated with feed back components (U503, C532, C520, C519, C518, C523). Check resistor values on R540, R541, R542, R568, R538, R547.

  MEDIUM:

  Check C563, C564. Jump with comparable value. If distortion improves, replace with increased value, if worse, try replacing with 50% lower value.

  LOW GAIN:

  Suspect open circuit in feedback shunt R541 and C520. Check for broken circuit trace. Substitute IC and check IC socket for contamination.

- EXCESSIVE OR UNBALANCED CROSSOVER (*Excess notch or ringing at zero crossing*)
  1. Severe: shorted bias diode D505, D506.
  2. Moderate: Out-of-spec bias diodes.
  3. Defective bias trimmer components VR501, R511.
  4. Check for open base resistors R517, 518 on output devices.

- OUTPUT WAVEFORM APPEARS "FUZZY"
  1. Check main heatsink ground continuity with chassis ground.
  2. High frequency snubbers defective (C513, C514, R525, R526, R523, R527).
  3. Check capacitors on speaker output board.
  4. Check/adjust driver emitter capacitors C563 and C564.

Power Supply and Voltage Rail Balancing

(Uneven rails and power supply problems)

Symptoms:

- Current limiting wrong
- Current limiting too high into a short
- IC rail too high into a short
- Current limiting too low into a short
- Uneven voltage rails

Possible Causes:

- CURRENT LIMITING WRONG

  Current limits should remain high down to 2 ohms, and collapse to a lower value for short circuits. This is caused by the IC rails going from normal 14 - 15 volts to about 5-6 volts. Current limit trimmers TR502 & TR503 permits adjustment of each channel to a specified range. See Test & Calibration Procedures for correct adjustment of the current limiting.

- CURRENT LIMITING TOO HIGH INTO SHORT *(IC rails check normal 5-6 volts)*
  1. Reversed or shorted 4.7V zeners D511, D514.
  2. Shorted bias diode D505, D506 (also shows severe crossover).

- IC RAIL TOO HIGH INTO SHORT
  1. Check op amp (weak output current).

- CURRENT LIMITING TOO LOW INTO SHORT AND 2 OHM LOAD
  1. Bias resistor R512, R522 high.
  2. Very low gain driver transistors.
  3. Missing connection or open emitter resistors in some of the paralleled output transistors.

- CURRENT LIMITING TOO LOW INTO SHORT ONLY *(OK into normal loads)*
  1. 3.9 or 4.7V zeners high (7.5V or 15V).

- OK INTO SHORT BUT LOW INTO 2 OHMS: *(Usually on one side only)*
  1. IC RAIL LOW: Check replenishing resistor R548.
  2. IC RAIL OK: (until clipping starts) usually indicates low output section gain caused by weak driver, open output devices, or open emitter resistors. Also check value of driver emitter resistors R501, R502.

- UNBALANCED RAIL VOLTAGES:
  1. Shorted Q503, Q504.
  2. Defective U501, U502.
  3. Open R506, R505.
  4. Open D514, D511.

PowerLight Input Jack Panel

Part Number	Description	Reference
CA-122001-10	CAP CER 220PF 10% 100V	C31
CA-147001-10	CAP CER 470PF 10% 100V	C301,302, C401,402
CO-000000-ZT	Z-TABS WITH SUPPORTS	J33
CO-000005-BS	5 POSITION BARRIER STRIP	J31
CO-000044-CO	HEADER 14 PIN .100 X .100	J32
CO-000086-00	CONN VERT COMBO XLR/JACK	J301,401
HW-060040-PS	#6-32 X 4 PEM STUD	REF: J31
HW-060120-SO	STANDOFF,1/4" HEX AL 6-32X3/4"	
PC-000154-00	INPUT PCB FAB, POWERLIGHT	
RE-220001-BM	RES MF 20.0K 1% 1/4W	R31
RE-224005-BC	RES CF 24K 5% 1/4W	R32
SW-000036-00	SWITCH SLIDE DP3T VERT PC MTG	SW31

PowerLight Voltage Board (120v)

Part Number	Description	Reference
CA-215001-00	CAP CER Y .0015UF 20% 125VAC	C801,802, C805,806, C807,808, C810
CA-410001-00	CAP MET POLY X.1UF 20% 250VAC	C804
CA-410004-10	CAP CER .1UF 20% 50V	C811
CA-522001-00	OBS-CAP MET POLY X.47UF 20% 25	C803,809
CO-000000-ZT	Z-TABS WITH SUPPORTS	
CO-000045-CO	.156 HEADER 4 PIN	J808
CO-000079-00	BARRIER STRIP,RT ANGLE 3/8" CT	J809
HW-000001-FC	FUSE CLIPS	
HW-000630-HW	BRACKET, RIGHT ANGLE, ZIERECK	J809
HW-060040-PS	#6-32 X 4 PEM STUD	J809
NW-060010-SL	#6 SPLIT TOOTH LOCKWASHER	J809
NW-060400-HN	#6-32 X 1/4" HEX NUT	J809
PC-000155-00	PCB,AC LINE FLTR,PWRLIGHT 1.8	
RE-000150-NR	THERMISTOR NTC 30A CUR LIM	R802
RE-375005-BM	RES MF 750K 5% 1/2W	R801
SC-062041-PP	SCREW PHP BLK "B" 6-32 X 1/4"	
WC-000049-00	AC PWR CORD ASSY POWERLIGHT	18
XF-000007-00	XFMR PWR PCB MNT DUAL 5V 0.5A	T801
XF-000009-00	1.6MH CHOKE COMMON MODE	L801-L803

PowerLight Power Status Board

Part Number	Description	Reference
CA-410004-10	CAP CER .1UF 20% 50V	C104
QD-000052-00	LED GRN T-1	LD107
QD-000053-00	LED YEL T-1	LD109
QD-000054-00	LED RED T-1	LD106,206, LD108
QD-004410-TX	XISTOR NPN TO-92 80V 0.25A	Q101,102
RE-110005-BC	RES CF 1K 5% 1/4W	R108,109, R111,114
RE-210001-BM	RES MF 10.0K 1% 1/4W	R105,110,
WC-003078-00	CABLE ASSY 5 COND. FLAT	J102

PowerLight Display Board

Part Number	Description	Reference
CA-422001-10	CAP MYLAR .22UF 5% 50V	C103,203
CA-547001-10	CAP LYTIC RL 4.7UF 20% 16V	C102,202
CA-610035-BE	CAP LYTIC RL 10UF 20% 35V	C101,201
CO-000044-CO	HEADER 14 PIN .100 X .100	J1,101,201
IC-000001-IC	IC LIN LED VU MTR DRVR BA6124	U102,201
PC-000153-00	DISPLAY PCB POWERLIGHT	
PL-000040-PL	POT COVERS	
PL-000060-00	SPACER LED T-1 0.42"L	LD102,103, LD106-109, LD201-203, LD206
PT-310000-CR	RES VAR IT 10K 20% 0.2W W/DET	REF:LD101, VR101,201
QD-000045-00	DIODE BRIDGE RECT DIP 200V 1A	BR102,202
QD-000052-00	LED GRN T-1	LD101,201
QD-000053-00	LED YEL T-1	LD102,202, LD103,203
QD-000054-00	LED RED T-1	LD106,206
RE-010005-BC	RES CF 100 5% 1/4W	R101,201
RE-064901-BM	RES MF 649 1% 1/4W	R106,206
RE-135701-BM	RES MF 3.57K 1% 1/4W	R102,202
RE-210001-BM	RES MF 10.0K 1% 1/4W	R205
RE-339005-BC	RES CF 390K 5% 1/4W	R104,204

PowerLight 1.0 Chassis Assembly

Part Number	Description	Reference
CA-410003-10	CAP MET POLY .1UF 10% 250V	
CH-000009-00	CHASSIS 2 SP	
CH-000014-00	TOP COVER	
CH-000016-00	RACK EAR,POWERLIGHT 1.8	
CH-000017-00	PLATE REAR EAR	
CH-000024-00	SHIELD, AC FILTER	
CO-000011-00	CONN DUAL 5-WAY BIND RD/BLK R	
CO-000012-00	CONN DUAL 5-WAY BIND RD/BLK L	
HW-060000-HW	#6-32 x 9/16", NYLON STANDOFF	
HW-060090-SO	#6-32 X 9/16" HEX STANDOFF	
LB-000044-00	LBL,REMOTE,AC,SLS PLATFORM	
LB-000048-00	INPUT LABEL, SLS	
LB-000054-00	LABEL, WARNING, TOP COVER	
LB-000060-00	LABEL,FACEPLATE,LT,PWRLGHT 1.0	
LB-000061-00	LABEL,FACEPLATE,RT,PWRLGHT 1.0	
LB-160225-00	SERIAL NUM GEN W OUTPUT PWR	
MS-000050-MS	FUSE, 20A, 250V	
MS-000071-00	MPA 2 SPACE FAN GUARD	
MS-000085-00	FAN, 3.5", 24VDC	
NW-060410-ET	#6 EXTERNAL TOOTH LOCKWASHER	
NW-080001-NW	#8 EXT TOOTH LOCKWASHER, ZINC	
NW-080002-00	WASHER,#8 FLAT .049 TH,SS,BLK	
NW-080500-KP	#8-32 KEPS NUT	
PL-000000-AF	ADHESIVE FEET	
PL-000054-00	KNOB FAB.	
PL-000062-00	SHROUD, FAN	
PL-000064-00	INSULATOR,AC FILTER PCB	
PL-000065-00	INSULATOR, MAIN PCB	
PL-905385-SP	SPACER,ROUND,NYLON,#6,0.385"L	
SC-030000-SC	3mm x 8mm,P/P,TYPE 1,BLK. OX.	

PowerLight 1.0 Chassis Assembly (cont.)

Part Number	Description	Reference
SC-060041-PP	6-32 X 1/4" TYPE I PH PAN, BLK	
SC-060081-PP	#6-32 X 1/2" P/P BLACK	
SC-060441-PP	SCREW 6-32 X 2-3/4" BLK PH	
SC-080051-PS	#8-32 X 5/16" P/P SEMS BLACK	
SC-082051-PL	SCREW,TAP,PAN PH#8X5/16" "B"BK	
SC-082081-PP	SCREW 8-18X1/2" BLK STL BP PH	
SC-083061-PU	SCREW 8-18 X 3/8" FLAT HD BLK	
SW-002750-00	SWITCH,POWER,DOUBLE-POLE	
WC-000014-01	CABLE ASSY 14 COND RIB. 10" LG	
WC-000037-00	WIRE ASSY, AC SWITCH	
WC-000038-00	RIBBON CABLE,14 COND 23"LG	
WC-000044-00	JUMPER ASSY, VOLTAGE PROGM	
WC-000045-00	WIRE ASSY, OUTPUT	
WC-000047-00	WIRE ASSY, INPUT GROUND	
WC-000050-00	WIRE ASSY, BLACK 3" 14GA	
WC-000051-00	CABLE ASSY, SECONDARY	
WC-001048-TQ	WIRE 1048, 4", BLACK	
WP-000153-00	DISPLAY PCB ASSY, POWERLIGHT	
WP-000154-00	INPUT PCB ASSY, POWERLIGHT	
WP-000155-00	AC PCB ASSY (120V)	
WP-000158-00	MN AMP PCB ASSY POWERLIGHT 1.0	

PowerLight 1.0 Main Board

Part Number	Description	Reference
CA-010001-10	CAP CER 10PF 10% 100V	C528,628
CA-018001-10	CAP SM 18PF 5% 500V	C519,619
CA-047100-BD	CAP CER 47PF 10% 100V, NPO	C521,522, C621,622
CA-110001-10	CAP SM 100PF, 5%, 500V	C706,712
CA-122001-10	CAP CER 220PF 10% 100V	C527,627, C756,757
CA-133001-10	CAP SM 330PF 5% 500V	C764,765
CA-147001-10	CAP CER 470PF 10% 100V	C763
CA-210001-10	CAP MYLAR .001UF 5% 50V	C753
CA-222001-10	CAP MYLAR .0022UF 5% 50V	C523,623
CA-310001-10	CAP MYLAR .01UF 10% 100V	C508,531, C608,631, C745,748, C754,761
CA-322001-10	CAP MYLAR .022UF 10% 100V	C524,624
CA-347400-BP	CAP MYLAR .047UF 10% 400V	C781-784
CA-410002-10	CAP MYLAR .1UF 5% 100V	C513,514, C518,613, C614,618
CA-410003-10	CAP MET POLY .1UF 10% 250V	C702,704, C714,716, C721,723, C732,735
CA-410004-10	CAP CER .1UF 20% 50V	C536,537, C566,636,
CA-410004-10	CAP CER .1UF 20% 50V	C637,717, C739,743, C759,760, C766,778, C779,780
CA-510001-10	CAP CER 1UF 20% 50V	C737,746, C749
CA-510250-CO	CAP POLYPROP 1UF 5% 250V	C771,773
CA-520200-CO	CAP POLYPROP 2UF 5% 200V	C709,728
CA-547001-10	CAP LYTIC RL 4.7UF 20% 16V	C532,535, C632
CA-610001-10	CAP LYTIC RL 10UF 20% 35V	C736,747, C755,758
CA-622001-10	CAP LYTIC RL 22UF 20% 35V	C534
CA-647001-10	CAP LYTIC RL 47UF 10% 10V NP	C520,620
CA-647002-10	CAP LYTIC RL 47UF 20% 50V	C530
CA-722001-10	CAP LYTIC RL 220UF 20% 10V	C529,629
CA-733025-AE	330UF,25V,ELEC. RADIAL, 20%	C525,526, C625,626, C705,718, C738,742
CA-747063-AE	CAP LYTIC RL 470UF 20% 63V	C701,703, C713,715, C720,722, C731,734, C768,769, C770,772, C774,775, C776,777
CA-822200-AE	CAP LYTIC RL 2200UF 20% 200V	C707,708, C726,727
CH-000011-00	CLAMP BR/TO3	
CH-000022-00	HEATSINK,EXTRU. HOLLOW	
CH-000624-AX	CLAMP TO-3 PL 6 FINGER	
CH-400003-00	CLAMP TO-220 6 FINGER	
CO-000000-ZT	Z-TABS WITH SUPPORTS	
CO-000008-IC	8 PIN IC SOCKET	U503,603
CO-000045-CO	.156 HEADER 4 PIN	J703
CO-000049-CO	HEADER, 5 PIN, .10 CENTER	J706
CO-000055-CO	14 PIN HEADER/LOCKING STD.	J503,603
CO-000074-00	HEADER POLARIZED 8-POS	J502,602
CO-000085-00	TERMINAL BLOCK, 2 POS, EURO	J53
IC-000022-00	OSC CMOS 6.144MHZ	U701
IC-000023-00	IC CMOS 7-STG RIPPLE 74HC4024N	U704
IC-000024-00	IC REG PWM 40V 0.1A SG3525A	U710
IC-000025-00	IC MOSFET DUAL NON-INV DRVR	U709
IC-000026-00	IC LIN DUAL COMP LM 393N	U711
IC-005532-OP	IC LIN DUAL OP AMP 5532 EX/MPA	U503,603
PC-000152-00	MAIN PCB POWERLIGHT 1.8	
PL-000059-00	INSULATOR MICA 1.750" X 1.125"	Q702 REF:Q701,
PL-000061-00	INSUL TO-220 18-POS SILPAD	
PL-000063-00	INSULATOR,HEATSINK,SLS,PLATFRM	
PL-903125-SP	SPACER,ROUND,NYLON,0.125"L	
PL-905156-SP	SPACER,ROUND,NYLON,#6,0.155"L	
PT-110000-AT	RES VAR IT 100 20% 0.15W CARB	VR501,601
PT-220000-AT	RES VAR IT 2K 20% 0.15W CARB	VR502,503, VR602,603
QD-000001-TX	XISTOR NPN TO-226AE 30V 1A	Q514
QD-000018-QD	XISTOR NPN TO-220 200V 1A	Q502,602
QD-000019-QD	XISTOR PNP TO-220 200V 1A	Q501,601
QD-000021-QD	IN4740 10V ZENER 1W	D732
QD-000022-QD	DIODE ZNR 18V 5% 1W 1N4746A	D533,726,

PowerLight 1.0 Main Board (cont.)

Part Number	Description	Reference
		D743
QD-000040-00	DIODE BRIDGE RECT 400V 40A	BR701
QD-000041-00	DIODE PWR 2X TO220 200V 16A CC	D704,714
QD-000042-00	DIODE RECT ULTRAFAST 400V 4A	D720,722,
		D740,741
	XISTOR IGBT TO-247AC 600V 55A	Q701,702
	DIODE PWR 2X TO220 200V 16A CA	D703,713
QD-000045-00	DIODE BRIDGE RECT DIP 200V 1A	BR501,601,
		BR702
QD-000051-10	XISTOR PNP TO-92 30V 1A	Q521
QD-000055-10	XISTOR NPN TO-92 80V 0.25A	Q511,515,
		Q516,518,
		Q615,704,
		Q705
QD-000056-10	XISTOR PNP TO-92 80V 0.5A	Q512,513,
		Q519,520,
		Q703,706
QD-000134-LG	LED GRN T-1 3/4	LD703,704
QD-0004.7-ZT	DIODE ZNR 4.7V TESTED	D511,514,
		D611,614
QD-0007.5-ZT	DIODE ZNR 7.5V TESTED	D532
QD-001302-PN	XISTOR PNP TO-3P 200V 15A	Q508-Q510,
		Q608-Q610
QD-002762-TU	XISTOR NPN TO-220 150V 8A	Q517
QD-003281-NP	XISTOR NPN TO-3P 200V 15A	Q505-Q507,
		Q605-Q607
QD-004004-DX	DIODE RECT DO41 400V 1A	D524,526,
		D530,535,
		D554,626,
		D630,635,
		D636,723,
		D747,748
QD-004148-DX	DIODE SWITCH DO35 75V 75MA	D525,531,
		D625,705,
		D710,727,
		D728,729,
		D730,731,
		D733,734,
		D742,746
QD-004744-ZA	DIODE ZNR 15V 5% 1W 1N4744A	D521,522,
		D621,622
QD-004934-DX	DIODE RECT DO41 FAST 100V 1A	D507,508,
		D519,520,
		D607,608,
		D619,620,
		D735,737,
		D738,739
QD-004934-VP	DIODE RECT DO41 FAST 100V 1AVF	D505,506,
		D605,606
QD-005402-DX	DIODE RECT DO27 200V 3A	D512,513,
		D612,613
RE-.02210-FW	RES WW 0.22 10% 3W VERT MNT	R513-R515,
		R519-R521,
		R613-R615,
		R619-R621
RE-.33005-DM	RES MOFP 3.3 5% 1W	R543,643
RE-.56005-BC	RES CF 5.6 5% 1/4W	R708,719,
RE-.56005-BC	RES CF 5.6 5% 1/4W	R729,732
RE-.56005-EM	RES MOFP 5.6 5% 2W	R525,625
RE-.68005-DM	RES MOFP 6.8 5% 1W	R501,502,
		R601,602
RE-000006-VP	RES PTC 60C 0.1K MAX COLD VP	R556,656,
		R739
RE-000050-NR	THERMISTOR NTC 50 OHM	R511,611
RE-000105-BC	RES CF 1 5% 1/4W	R746
RE-001005-EM	RES MOFP 10 5% 2W	R523,524,
		R526,527,
		R623,624,
		R626,627
RE-001505-CC	RES CF 15 5% 1/2W	R528,529,
		R741
RE-001505-DM	RES MOFP 15 5% 1W	R705,706
RE-002205-DM	RES MOFP 22 5% 1W	R517,518,
		R617,618
RE-004705-BC	RES CF 47 5% 1/4W	R544,644
RE-005621-AM	RES MF 56.2 1% 1/8W	R547,647
RE-022005-DM	RES MOFP 220 5% 1W	R703,712
RE-027005-BC	RES CF 270 5% 1/4W	R530,736
RE-033201-BM	RES MF 332 1% 1/4W	R541,641
RE-045010-HW	RES WW 450 10% 5W	R548,648
RE-047005-BC	RES CF 470 5% 1/4W	R745,748
RE-053601-BM	RES MF 536 1% 1/4W	R561,661
RE-082005-BC	RES CF 820 5% 1/4W	R512,522,
		R612,622
RE-095301-BM	RES MF 953 1% 1/4W	R568,668
RE-110005-BC	RES CF 1K 5% 1/4W	R545,740,
		R564,645
RE-116201-BM	RES MF 1.62K 1% 1/4W	R531
RE-122005-BC	RES CF 2.2K 5% 1/4W	R553,562,
		R747
RE-125005-HW	2.5K OHM, 5W, WIREWOUND, 10%	R539,546,
		R639,646
RE-139005-BC	RES CF 3.9K 5% 1/4W	R557,657
RE-147005-BC	RES CF 4.7K 5% 1/4W	R540,567,
		R640
RE-171501-10	RES MF 7.15K 1% 1/8W	R730
RE-175005-EM	RES MOFP 7.5K 5% 2W	R560,660
RE-210001-BM	RES MF 10.0K 1% 1/4W	R550,563,
		R709,722,
		R731,737,
		R749,750,
		R751
RE-210005-EM	RESISTOR,MET FLM,10K 5% 2W	R558,658
RE-215001-BM	RES MF 15.0K 1% 1/4W	R552
RE-221001-CM	RES MF 21.0K 1% 1/2W	R538,638
RE-227005-BC	RES CF 27K 5% 1/4W	R738
RE-247005-BC	RES CF 47K 5% 1/4W	R559,569,
		R734
RE-268001-10	68K OHM, 1/4W, 5%, CARBON FILM	R554
RE-268005-DM	RES MOFP 68K 5% 1W	R743,744
RE-275001-BM	RES MF 75.0K 1% 1/4W	R542,642
RE-312005-BC	RES CF 120K 5% 1/4W	R733
RE-333005-BC	RES CF 330K 5% 1/4W	R549,649
RE-339005-BC	RES CF 390K 5% 1/4W	R555,551,
		R735,566
RN-110002-BM	RES NTWK 8-PIN SIP 1K 2% 4R	RN504,604,
		RN704
RN-122002-BM	RES NTWK 8-PIN SIP 2.2K 2% 4R	RN503,603,
		RN702

PowerLight 1.0 Main Board (cont.)

Part Number	Description	Reference
RN-147002-BM	RES NTWK 8-PIN SIP 4.7K 2% 4R	RN506
RN-210002-BM	RES NTWK 8-PIN SIP 10K 1% 4R	RN502,602, RN701
RN-222002-BM	RES NTWK 8-PIN SIP 22K 2% 4R	RN505
WC-2.0016-JW	JMPR INS 2.0" 16AWG SOLID	
XF-000005-00	BEAD FERRITE W/20AWG LEAD	L701,704, L705,708, L709,710
XF-000006-00	XFMR GATE DRIVE PCB MNT	T701
XF-000008-00	INDUCTOR CUR SENSE PCB MNT	T704
XF-000012-00	LOW POWER XFMR 96KHZ	T702
XF-200014-CR	INDUCTOR 2UH 14AWG VERT MNT	L501,601

PowerLight 1.4 Chassis Assembly

Part Number	Description	Reference
CA-410003-10	CAP MET POLY .1UF 10% 250V	
CH-000009-00	CHASSIS 2 SP	
CH-000014-00	TOP COVER	
CH-000016-00	RACK EAR,POWERLIGHT 1.8	
CH-000017-00	PLATE REAR EAR	
CH-000024-00	SHIELD, AC FILTER	
CO-000011-00	CONN DUAL 5-WAY BIND RD/BLK R	
CO-000012-00	CONN DUAL 5-WAY BIND RD/BLK L	
HW-060000-HW	#6-32 x 9/16", NYLON STANDOFF	
HW-060090-SO	#6-32 X 9/16" HEX STANDOFF	
LB-000044-00	LBL,REMOTE,AC,SLS PLATFORM	
LB-000046-00	LABEL,FACEPLATE,RT,PWRLGHT 1.8	
LB-000048-00	INPUT LABEL, SLS	
LB-000054-00	LABEL, WARNING, TOP COVER	
LB-000058-00	LABEL,FACEPLATE,LT,PWRLGHT 1.4	
LB-160225-00	SERIAL NUM GEN W OUTPUT PWR	
MS-000050-MS	FUSE, 20A, 250V	
MS-000071-00	MPA 2 SPACE FAN GUARD	
MS-000085-00	FAN, 3.5", 24VDC	
NW-060410-ET	#6 EXTERNAL TOOTH LOCKWASHER	
NW-080001-NW	#8 EXT TOOTH LOCKWASHER, ZINC	
NW-080002-00	WASHER,#8 FLAT .049 TH,SS,BLK	
NW-080500-KP	#8-32 KEPS NUT	
PL-000000-AF	ADHESIVE FEET	
PL-000054-00	KNOB FAB.	
PL-000062-00	SHROUD, FAN	
PL-000064-00	INSULATOR,AC FILTER PCB	
PL-000065-00	INSULATOR, MAIN PCB	
PL-905385-SP	SPACER,ROUND,NYLON,#6,0.385"L	
SC-030000-SC	3mm x 8mm,P/P,TYPE 1,BLK. OX.	
SC-060041-PP	6-32 X 1/4" TYPE I PH PAN, BLK	
SC-060081-PP	#6-32 X 1/2" P/P BLACK	
SC-060441-PP	SCREW 6-32 X 2-3/4" BLK PH	
SC-080051-PS	#8-32 X 5/16" P/P SEMS BLACK	
SC-082051-PL	SCREW,TAP,PAN PH#8X5/16" "B"BK	
SC-082081-PP	SCREW 8-18X1/2" BLK STL BP PH	
SC-083061-PU	SCREW 8-18 X 3/8" FLAT HD BLK	
SW-002750-00	SWITCH,POWER,DOUBLE-POLE	
WC-000014-01	CABLE ASSY 14 COND RIB. 10" LG	
WC-000037-00	WIRE ASSY, AC SWITCH	
WC-000038-00	RIBBON CABLE,14 COND 23"LG	
WC-000044-00	JUMPER ASSY, VOLTAGE PROGM	
WC-000045-00	WIRE ASSY, OUTPUT	
WC-000047-00	WIRE ASSY, INPUT GROUND	
WC-000050-00	WIRE ASSY, BLACK 3" 14GA	
WC-000051-00	CABLE ASSY, SECONDARY	
WC-001048-TQ	WIRE 1048, 4", BLACK	
WP-000153-00	DISPLAY PCB ASSY, POWERLIGHT	
WP-000154-00	INPUT PCB ASSY, POWERLIGHT	
WP-000155-00	AC PCB ASSY (120V)	
WP-000157-00	MN AMP PCB ASSY POWERLIGHT 1.4	

PowerLight 1.4 Main Board

Part Number	Description	Reference
CA-010001-10	CAP CER 10PF 10% 100V	C528,628
CA-018001-10	CAP SM 18PF 5% 500V	C519,619
CA-047100-BD	CAP CER 47PF 10% 100V, NPO	C521,522, C621,622
CA-110001-10	CAP SM 100PF, 5%, 500V	C706,712
CA-122001-10	CAP CER 220PF 10% 100V	C527,627, C756,757
CA-133001-10	CAP SM 330PF 5% 500V	C764,765
CA-147001-10	CAP CER 470PF 10% 100V	C763
CA-210001-10	CAP MYLAR .001UF 5% 50V	C753
CA-210002-10	CAP MYLAR .OO1UF 10% 100V	C503,506, C603,606
CA-222001-10	CAP MYLAR .0022UF 5% 50V	C523,623
CA-310001-10	CAP MYLAR .01UF 10% 100V	C508,531, C608,631, C745,748, C754,761
CA-322001-10	CAP MYLAR .022UF 10% 100V	C524,624
CA-347400-BP	CAP MYLAR .047UF 10% 400V	C781-784
CA-410002-10	CAP MYLAR .1UF 5% 100V	C513,514, C518,613, C614,618
CA-410003-10	CAP MET POLY .1UF 10% 250V	C501,505, C601,605, C702,704, C714,716, C721,723, C732,735
CA-410004-10	CAP CER .1UF 20% 50V	C536,537, C566,636, C637,717, C739,743,
CA-410004-10	CAP CER .1UF 20% 50V	C759,760, C766,778, C779,780
CA-510001-10	CAP CER 1UF 20% 50V	C737,746, C749
CA-510250-CO	CAP POLYPROP 1UF 5% 250V	C771,773
CA-520200-CO	CAP POLYPROP 2UF 5% 200V	C709,728
CA-547001-10	CAP LYTIC RL 4.7UF 20% 16V	C532,535, C632
CA-610001-10	CAP LYTIC RL 10UF 20% 35V	C736,747, C755,758

PowerLight 1.4 Main Board (cont.)

Part Number	Description	Reference
CA-622001-10	CAP LYTIC RL 22UF 20% 35V	C534
CA-647001-10	CAP LYTIC RL 47UF 10% 10V NP	C520,620
CA-647002-10	CAP LYTIC RL 47UF 20% 50V	C504,530, C604
CA-722001-10	CAP LYTIC RL 220UF 20% 10V	C529,629
CA-733025-AE	330UF,25V,ELEC. RADIAL, 20%	C525,526, C625,626, C705,718, C738,742
CA-747001-10	CAP LYTIC RL 470UF 20% 16V	C507,607
CA-747063-AE	CAP LYTIC RL 470UF 20% 63V	C701,703, C713,715, C720,722, C731,734, C768,769, C770,772, C774,775, C776,777
CA-822200-AE	CAP LYTIC RL 2200UF 20% 200V	C707,708, C726,727
CH-000011-00	CLAMP BR/TO3	
CH-000022-00	HEATSINK,EXTRU. HOLLOW	
CH-000624-AX	CLAMP TO-3 PL 6 FINGER	
CH-400003-00	CLAMP TO-220 6 FINGER	
CO-000000-ZT	Z-TABS WITH SUPPORTS	
CO-000008-IC	8 PIN IC SOCKET	
CO-000045-CO	.156 HEADER 4 PIN	J703
CO-000049-CO	HEADER, 5 PIN, .10 CENTER	J706
CO-000055-CO	14 PIN HEADER/LOCKING STD.	J503,603
CO-000074-00	HEADER POLARIZED 8-POS	J502,602
CO-000085-00	TERMINAL BLOCK, 2 POS, EURO	J53
IC-000008-00	IC SMT POS STEP DRVR	U501,601
IC-000009-00	IC SMT NEG STEP DRVR	U502,602
IC-000022-00	OSC CMOS 6.144MHZ	U701
IC-000023-00	IC CMOS 7-STG RIPPLE 74HC4024	U704
IC-000024-00	IC REG PWM 40V 0.1A SG3525A	U710
IC-000025-00	IC MOSFET DUAL NON-INV DRVR	U709
IC-000026-00	IC LIN DUAL COMP LM 393N	U711
IC-005532-OP	IC LIN DUAL OP AMP 5532 EX/MP	U503,603
PC-000152-00	MAIN PCB POWERLIGHT 1.8	
PL-000059-00	INSULATOR MICA 1.750" X 1.125	Q702 REF:Q701,
PL-000061-00	INSUL TO-220 18-POS SILPAD	
PL-000063-00	INSULATOR,HEATSINK,SLS,PLATFR	
PL-903125-SP	SPACER,ROUND,NYLON,0.125"L	
PL-905156-SP	SPACER,ROUND,NYLON,#6,0.155"L	
PT-110000-AT	RES VAR IT 100 20% 0.15W CARB	VR501,601
PT-220000-AT	RES VAR IT 2K 20% 0.15W CARB	VR502,503, VR602,603
QD-000001-TX	XISTOR NPN TO-226AE 30V 1A	Q514
QD-000018-QD	XISTOR NPN TO-220 200V 1A	Q502,602
QD-000019-QD	XISTOR PNP TO-220 200V 1A	Q501,601
QD-000021-QD	IN4740 10V ZENER 1W	D732
QD-000022-QD	DIODE ZNR 18V 5% 1W 1N4746A	D533,726, D743
QD-000031-QD	FET NCHAN TO220 60V 50A	Q503,504, Q603,604
QD-000040-00	DIODE BRIDGE RECT 400V 40A	BR701
QD-000041-00	DIODE PWR 2X TO220 200V 16A C	D702,712
QD-000042-00	DIODE RECT ULTRAFAST 400V 4A	D720,722, D740,741
QD-000043-00	XISTOR IGBT TO-247AC 600V 55A	Q701,702
QD-000044-00	DIODE PWR 2X TO220 200V 16A C	D701,711
QD-000045-00	DIODE BRIDGE RECT DIP 200V 1A	BR501,601, BR702
QD-000051-10	XISTOR PNP TO-92 30V 1A	Q521
QD-000055-10	XISTOR NPN TO-92 80V 0.25A	Q511,515, Q516,518, Q615,704, Q705
QD-000056-10	XISTOR PNP TO-92 80V 0.5A	Q512,513, Q519,520, Q703,706
QD-000057-00	DIODE PWR 2X TO220 400V 16A C	D703,713
QD-000058-00	DIODE PWR 2X TO220 400V 16A C	D704,714
QD-000134-LG	LED GRN T-1 3/4	LD703,704
QD-0004.7-ZT	DIODE ZNR 4.7V TESTED	D511,514, D611,614
QD-0007.5-ZT	DIODE ZNR 7.5V TESTED	D532
QD-000810-DX	DIODE RECT TO220 FAST 100V 8A	D501,502, D601,602
QD-001302-PN	XISTOR PNP TO-3P 200V 15A	Q508-Q510, Q608-Q610
QD-002762-TU	XISTOR NPN TO-220 150V 8A	Q517
QD-003281-NP	XISTOR NPN TO-3P 200V 15A	Q505-Q507, Q605-Q607
QD-004004-DX	DIODE RECT DO41 400V 1A	D524,526, D530,535, D554,626, D630,635, D636,723, D747,748
QD-004148-DX	DIODE SWITCH DO35 75V 75MA	D525,531, D625,705, D710,727, D728,729, D730,731, D733,734, D742,746
QD-004744-ZA	DIODE ZNR 15V 5% 1W 1N4744A	D509,510, D521,522, D609,610, D621,622
QD-004934-DX	DIODE RECT DO41 FAST 100V 1A	D507,508, D519,520, D607,608, D619,620, D735,737, D738,739
QD-004934-VP	DIODE RECT DO41 FAST 100V 1AV	D505,506, D605,606
QD-005402-DX	DIODE RECT DO27 200V 3A	D512,513, D612,613
RE-.02210-FW	RES WW 0.22 10% 3W VERT MNT	R513-R515, R519-R521, R613-R615, R619-R621
RE-.27005-EM	RESISTOR,METAL FLM, 2.7 5% 2W	R504,508, R604,608

PowerLight 1.4 Main Board (cont.)

Part Number	Description	Reference
RE-.33005-DM	RES MOFP 3.3 5% 1W	R543,643
RE-.47005-DM	RES MOFP 4.7 5% 1W	R501,502, R601,602
RE-.56005-BC	RES CF 5.6 5% 1/4W	R708,719, R729,732
RE-.56005-EM	RES MOFP 5.6 5% 2W	R525,625
RE-000006-VP	RES PTC 60C 0.1K MAX COLD VP	R556,656, R739
RE-000050-NR	THERMISTOR NTC 50 OHM	R511,611
RE-000105-BC	RES CF 1 5% 1/4W	R746
RE-001005-EM	RES MOFP 10 5% 2W	R523,524, R526,527, R623,624, R626,627
RE-001505-CC	RES CF 15 5% 1/2W	R528,529, R741
RE-001505-DM	RES MOFP 15 5% 1W	R705,706
RE-002205-DM	RES MOFP 22 5% 1W	R505,506, R517,518, R605,606 R617,618,
RE-004705-BC	RES CF 47 5% 1/4W	R544,644
RE-005621-AM	RES MF 56.2 1% 1/8W	R547,647
RE-022005-DM	RES MOFP 220 5% 1W	R703,712
RE-027005-BC	RES CF 270 5% 1/4W	R530,736
RE-033201-BM	RES MF 332 1% 1/4W	R541,641
RE-045010-HW	RES WW 450 10% 5W	R548,648
RE-047005-BC	RES CF 470 5% 1/4W	R745,748
RE-047005-DM	RES MOFP 470 5% 1W	R561,661
RE-095301-BM	RES MF 953 1% 1/4W	R568,668
RE-110005-BC	RES CF 1K 5% 1/4W	R512,522, R545,740, R564,612, R622,645
RE-116201-BM	RES MF 1.62K 1% 1/4W	R531
RE-122005-BC	RES CF 2.2K 5% 1/4W	R553,562, R747
RE-130005-EM	RES MOFP 3K 5% 2W	R510,610
RE-130005-HW	RES WW 3K 10% 5W	R539,546, R639,646
RE-139005-BC	RES CF 3.9K 5% 1/4W	R557,657
RE-147005-BC	RES CF 4.7K 5% 1/4W	R540,567, R640
RE-171501-10	RES MF 7.15K 1% 1/8W	R730
RE-175005-EM	RES MOFP 7.5K 5% 2W	R560,660
RE-210001-BM	RES MF 10.0K 1% 1/4W	R550,563, R709,722, R731,737, R749,750, R751
RE-210005-EM	RESISTOR,MET FLM,10K 5% 2W	R558,658
RE-212005-BC	RES CF 12K 5% 1/4W	R503,507, R603,607
RE-215001-BM	RES MF 15.0K 1% 1/4W	R552
RE-221001-CM	RES MF 21.0K 1% 1/2W	R538,638
RE-222006-BM	RES MOFP 22K 5% 1W	R509,609
RE-227005-BC	RES CF 27K 5% 1/4W	R738
RE-247005-BC	RES CF 47K 5% 1/4W	R559,569, R734
RE-268001-10	68K OHM, 1/4W, 5%, CARBON FIL	R554
RE-268005-DM	RES MOFP 68K 5% 1W	R743,744
RE-275001-BM	RES MF 75.0K 1% 1/4W	R542,642
RE-312005-BC	RES CF 120K 5% 1/4W	R733
RE-333005-BC	RES CF 330K 5% 1/4W	R549,649
RE-339005-BC	RES CF 390K 5% 1/4W	R555,551, R735,566
RN-110002-BM	RES NTWK 8-PIN SIP 1K 2% 4R	RN504,604, RN704
RN-122002-BM	RES NTWK 8-PIN SIP 2.2K 2% 4R	RN503,603, RN702
RN-147002-BM	RES NTWK 8-PIN SIP 4.7K 2% 4R	RN506
RN-210002-BM	RES NTWK 8-PIN SIP 10K 1% 4R	RN502,602, RN701
RN-222002-BM	RES NTWK 8-PIN SIP 22K 2% 4R	RN505
WC-2.0016-JW	JMPR INS 2.0" 16AWG SOLID	
XF-000005-00	BEAD FERRITE W/20AWG LEAD	L701-L710
XF-000006-00	XFMR GATE DRIVE PCB MNT	T701
XF-000008-00	INDUCTOR CUR SENSE PCB MNT	T704
XF-000011-00	MEDIUM POWER XFMR 96KHZ	T702
XF-200014-CR	INDUCTOR 2UH 14AWG VERT MNT	L501,601

PowerLight 1.8 Chassis Assembly

Part Number	Description	Reference
CA-410003-10	CAP MET POLY .1UF 10% 250V	
CH-000009-00	CHASSIS 2 SP	
CH-000014-00	TOP COVER	
CH-000016-00	RACK EAR,POWERLIGHT 1.8	
CH-000017-00	PLATE REAR EAR	
CH-000024-00	SHIELD, AC FILTER	
CO-000011-00	CONN DUAL 5-WAY BIND RD/BLK R	
CO-000012-00	CONN DUAL 5-WAY BIND RD/BLK L	
HW-060000-HW	#6-32 x 9/16", NYLON STANDOFF	
HW-060090-SO	#6-32 X 9/16" HEX STANDOFF	
LB-000044-00	LBL,REMOTE,AC,SLS PLATFORM	
LB-000045-00	LABEL,FACEPLATE,LT,PWRLGHT 1.8	
LB-000046-00	LABEL,FACEPLATE,RT,PWRLGHT 1.8	
LB-000048-00	INPUT LABEL, SLS	
LB-000054-00	LABEL, WARNING, TOP COVER	
LB-160225-00	SERIAL NUM GEN W OUTPUT PWR	
MS-000071-00	MPA 2 SPACE FAN GUARD	
MS-000085-00	FAN, 3.5", 24VDC	
MS-000086-00	FUSE 3AB 25A 125V	
NW-060410-ET	#6 EXTERNAL TOOTH LOCKWASHER	
NW-080001-NW	#8 EXT TOOTH LOCKWASHER, ZINC	
NW-080002-00	WASHER,#8 FLAT .049 TH,SS,BLK	
NW-080500-KP	#8-32 KEPS NUT	
PL-000000-AF	ADHESIVE FEET	
PL-000054-00	KNOB FAB.	
PL-000062-00	SHROUD, FAN	
PL-000064-00	INSULATOR,AC FILTER PCB	
PL-000065-00	INSULATOR, MAIN PCB	
PL-905385-SP	SPACER,ROUND,NYLON,#6,0.385"L	
SC-030000-SC	3mm x 8mm,P/P,TYPE 1,BLK. OX.	
SC-060041-PP	6-32 X 1/4" TYPE I PH PAN, BLK	
SC-060081-PP	#6-32 X 1/2" P/P BLACK	
SC-060441-PP	SCREW 6-32 X 2-3/4" BLK PH	

PowerLight 1.8 Chassis Assembly (cont.)

Part Number	Description	Reference
SC-080051-PS	#8-32 X 5/16" P/P SEMS BLACK	
SC-082051-PL	SCREW,TAP,PAN PH#8X5/16" "B"BK	
SC-082081-PP	SCREW 8-18X1/2" BLK STL BP PH	
SC-083061-PU	SCREW 8-18 X 3/8" FLAT HD BLK	
SW-002750-00	SWITCH,POWER,DOUBLE-POLE	
WC-000014-01	CABLE ASSY 14 COND RIB. 10" LG	
WC-000037-00	WIRE ASSY, AC SWITCH	
WC-000038-00	RIBBON CABLE,14 COND 23"LG	
WC-000044-00	JUMPER ASSY, VOLTAGE PROGM	
WC-000045-00	WIRE ASSY, OUTPUT	
WC-000047-00	WIRE ASSY, INPUT GROUND	
WC-000050-00	WIRE ASSY, BLACK 3" 14GA	
WC-000051-00	CABLE ASSY, SECONDARY	
WC-001048-TQ	WIRE 1048, 4", BLACK	
WP-000152-00	MN AMP PCB ASSY,POWERLIGHT 1.8	
WP-000153-00	DISPLAY PCB ASSY, POWERLIGHT	
WP-000154-00	INPUT PCB ASSY, POWERLIGHT	
WP-000155-00	AC PCB ASSY (120V)	

PowerLight 1.8 Main Board

Part Number	Description	Reference
CA-010001-10	CAP CER 10PF 10% 100V	C528,628
CA-018001-10	CAP SM 18PF 5% 500V	C519,619
CA-047100-BD	CAP CER 47PF 10% 100V, NPO	C521,522, C621,622
CA-110001-10	CAP SM 100PF, 5%, 500V	C706,712
CA-122001-10	CAP CER 220PF 10% 100V	C527,627, C756,757
CA-133001-10	CAP SM 330PF 5% 500V	C764,765
CA-147001-10	CAP CER 470PF 10% 100V	C763
CA-210001-10	CAP MYLAR .001UF 5% 50V	C753
CA-210002-10	CAP MYLAR .OO1UF 10% 100V	C503,506, C603,606
CA-222001-10	CAP MYLAR .0022UF 5% 50V	C523,623
CA-310001-10	CAP MYLAR .01UF 10% 100V	C508,531, C608,631, C745,748, C754,761
CA-322001-10	CAP MYLAR .022UF 10% 100V	C524,624
CA-347400-BP	CAP MYLAR .047UF 10% 400V	C781-784
CA-410002-10	CAP MYLAR .1UF 5% 100V	C513,514, C518,613, C614,618
CA-410003-10	CAP MET POLY .1UF 10% 250V	C501,505, C601,605, C702,704, C714,716, C721,723, C732,735
CA-410004-10	CAP CER .1UF 20% 50V	C536,537, C566,636, C637,717, C739,743, C759,760, C766,778, C779,780
CA-510001-10	CAP CER 1UF 20% 50V	C737,746, C749
CA-510250-CO	CAP POLYPROP 1UF 5% 250V	C771,773
CA-520200-CO	CAP POLYPROP 2UF 5% 200V	C709,728
CA-547001-10	CAP LYTIC RL 4.7UF 20% 16V	C532,535, C632
CA-610001-10	CAP LYTIC RL 10UF 20% 35V	C736,747, C755,758
CA-622001-10	CAP LYTIC RL 22UF 20% 35V	C534
CA-647001-10	CAP LYTIC RL 47UF 10% 10V NP	C520,620
CA-647002-10	CAP LYTIC RL 47UF 20% 50V	C504,530, C604
CA-722001-10	CAP LYTIC RL 220UF 20% 10V	C529,629
CA-733025-AE	330UF,25V,ELEC. RADIAL, 20%	C525,526, C625,626, C705,718, C738,742
CA-747001-10	CAP LYTIC RL 470UF 20% 16V	C507,607
CA-747063-AE	CAP LYTIC RL 470UF 20% 63V	C701,703, C713,715, C720,722, C731,734,
CA-747063-AE	CAP LYTIC RL 470UF 20% 63V	C768,769, C770,772, C774,775, C776,777
CA-822200-AE	CAP LYTIC RL 2200UF 20% 200V	C707,708, C726,727
CH-000011-00	CLAMP BR/TO3	
CH-000022-00	HEATSINK,EXTRU. HOLLOW	
CH-000624-AX	CLAMP TO-3 PL 6 FINGER	
CH-400003-00	CLAMP TO-220 6 FINGER	
CO-000000-ZT	Z-TABS WITH SUPPORTS	
CO-000008-IC	8 PIN IC SOCKET	
CO-000045-CO	.156 HEADER 4 PIN	J703
CO-000049-CO	HEADER, 5 PIN, .10 CENTER	J706
CO-000055-CO	14 PIN HEADER/LOCKING STD.	J503,603
CO-000074-00	HEADER POLARIZED 8-POS	J502,602
CO-000085-00	TERMINAL BLOCK, 2 POS, EURO	J53
IC-000008-00	IC SMT POS STEP DRVR	U501,601
IC-000009-00	IC SMT NEG STEP DRVR	U502,602
IC-000022-00	OSC CMOS 6.144MHZ	U701
IC-000023-00	IC CMOS 7-STG RIPPLE 74HC4024N	U704
IC-000024-00	IC REG PWM 40V 0.1A SG3525A	U710
IC-000025-00	IC MOSFET DUAL NON-INV DRVR	U709
IC-000026-00	IC LIN DUAL COMP LM 393N	U711
IC-005532-OP	IC LIN DUAL OP AMP 5532 EX/MPA	U503,603
PC-000152-00	MAIN PCB POWERLIGHT 1.8	
PL-000059-00	INSULATOR MICA 1.750" X 1.125"	Q702 REF:Q701,
PL-000061-00	INSUL TO-220 18-POS SILPAD	
PL-000063-00	INSULATOR,HEATSINK,SLS,PLATFRM	
PL-903125-SP	SPACER,ROUND,NYLON,0.125"L	
PL-905156-SP	SPACER,ROUND,NYLON,#6,0.155"L	
PT-110000-AT	RES VAR IT 100 20% 0.15W CARB	VR501,601
PT-220000-AT	RES VAR IT 2K 20% 0.15W CARB	VR502,503,

PowerLight 1.8 Main Board (cont.)

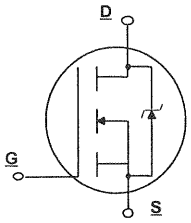
Part Number	Description	Reference
		VR602,603
QD-000001-TX	XISTOR NPN TO-226AE 30V 1A	Q514
QD-000018-QD	XISTOR NPN TO-220 200V 1A	Q502,602
QD-000019-QD	XISTOR PNP TO-220 200V 1A	Q501,601
QD-000021-QD	IN4740 10V ZENER 1W	D732
QD-000022-QD	DIODE ZNR 18V 5% 1W 1N4746A	D533,726, D743
QD-000031-QD	FET NCHAN TO220 60V 50A	Q503,504, Q603,604
QD-000040-00	DIODE BRIDGE RECT 400V 40A	BR701
QD-000041-00	DIODE PWR 2X TO220 200V 16A CC	D702,712
QD-000042-00	DIODE RECT ULTRAFAST 400V 4A	D720,722, D740,741
QD-000043-00	XISTOR IGBT TO-247AC 600V 55A	Q701,702
QD-000044-00	DIODE PWR 2X TO220 200V 16A CA	D701,711
QD-000045-00	DIODE BRIDGE RECT DIP 200V 1A	BR501,601, BR702
QD-000051-10	XISTOR PNP TO-92 30V 1A	Q521
QD-000055-10	XISTOR NPN TO-92 80V 0.25A	Q511,515, Q516,518, Q615,704, Q705
QD-000056-10	XISTOR PNP TO-92 80V 0.5A	Q512,513, Q519,520, Q703,706
QD-000057-00	DIODE PWR 2X TO220 400V 16A CC	D703,713
QD-000058-00	DIODE PWR 2X TO220 400V 16A CA	D704,714
QD-000134-LG	LED GRN T-1 3/4	LD703,704
QD-0004.7-ZT	DIODE ZNR 4.7V TESTED	D511,514, D611,614
QD-0007.5-ZT	DIODE ZNR 7.5V TESTED	D532
QD-000810-DX	DIODE RECT TO220 FAST 100V 8A	D501,502, D601,602
QD-001302-PN	XISTOR PNP TO-3P 200V 15A	Q508-Q510, Q608-Q610
QD-002762-TU	XISTOR NPN TO-220 150V 8A	Q517
QD-003281-NP	XISTOR NPN TO-3P 200V 15A	Q505-Q507, Q605-Q607
QD-004004-DX	DIODE RECT DO41 400V 1A	D524,526, D530,535, D554,626, D630,635, D636,723, D747,748
QD-004148-DX	DIODE SWITCH DO35 75V 75MA	D525,531, D625,705, D710,727, D728,729, D730,731, D733,734, D742,746
QD-004744-ZA	DIODE ZNR 15V 5% 1W 1N4744A	D509,510, D521,522, D609,610, D621,622
QD-004934-DX	DIODE RECT DO41 FAST 100V 1A	D507,508, D519,520, D607,608, D619,620, D735,737, D738,739
QD-004934-VP	DIODE RECT DO41 FAST 100V 1AVF	D505,506, D605,606
QD-005402-DX	DIODE RECT DO27 200V 3A	D512,513, D612,613
RE-.02210-FW	RES WW 0.22 10% 3W VERT MNT	R513-R515, R519-R521, R613-R615, R619-R621
RE-.27005-EM	RESISTOR,METAL FLM, 2.7 5% 2W	R504,508, R604,608
RE-.33005-DM	RES MOFP 3.3 5% 1W	R501,502, R543,601, R602,643
RE-.56005-BC	RES CF 5.6 5% 1/4W	R708,719, R729,732
RE-.56005-EM	RES MOFP 5.6 5% 2W	R525,625
RE-000006-VP	RES PTC 60C 0.1K MAX COLD VP	R556,656, R739
RE-000050-NR	THERMISTOR NTC 50 OHM	R511,611
RE-000105-BC	RES CF 1 5% 1/4W	R746
RE-001005-EM	RES MOFP 10 5% 2W	R523,524, R526,527, R623,624, R626,627
RE-001505-CC	RES CF 15 5% 1/2W	R528,529,
RE-001505-CC	RES CF 15 5% 1/2W	R741
RE-001505-DM	RES MOFP 15 5% 1W	R705,706
RE-002205-DM	RES MOFP 22 5% 1W	R505,506, R517,518, R605,606 R617,618,
RE-004705-BC	RES CF 47 5% 1/4W	R544,644
RE-005621-AM	RES MF 56.2 1% 1/8W	R547,647
RE-022005-DM	RES MOFP 220 5% 1W	R703,712
RE-027005-BC	RES CF 270 5% 1/4W	R530,736
RE-033201-BM	RES MF 332 1% 1/4W	R541,641
RE-047005-BC	RES CF 470 5% 1/4W	R745,748
RE-053601-BM	RES MF 536 1% 1/4W	R561,661
RE-068010-HW	RES WW 680 10% 5W	R548,648
RE-095301-BM	RES MF 953 1% 1/4W	R568,668
RE-110005-BC	RES CF 1K 5% 1/4W	R512,522, R545,740, R564,612, R622,645
RE-116201-BM	RES MF 1.62K 1% 1/4W	R531
RE-122005-BC	RES CF 2.2K 5% 1/4W	R553,562, R747
RE-130005-EM	RES MOFP 3K 5% 2W	R510,610
RE-135005-HW	RES WW 3.5K 10% 5W	R539,546, R639,646
RE-139005-BC	RES CF 3.9K 5% 1/4W	R557,657
RE-147005-BC	RES CF 4.7K 5% 1/4W	R540,567, R640
RE-171501-10	RES MF 7.15K 1% 1/8W	R730
RE-175005-EM	RES MOFP 7.5K 5% 2W	R560,660
RE-210001-BM	RES MF 10.0K 1% 1/4W	R550,563, R709,722, R731,737,

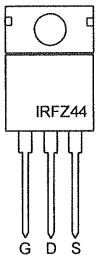
PowerLight 1.8 Main Board (cont.)

Part Number	Description	Reference
		VR602,603
		R751
RE-210005-EM	RESISTOR,MET FLM,10K 5% 2W	R558,658
RE-212005-BC	RES CF 12K 5% 1/4W	R503,507,
		R603,607
RE-215001-BM	RES MF 15.0K 1% 1/4W	R552
RE-221001-CM	RES MF 21.0K 1% 1/2W	R538,638
RE-222006-BM	RES MOFP 22K 5% 1W	R509,609
RE-227005-BC	RES CF 27K 5% 1/4W	R738
RE-247005-BC	RES CF 47K 5% 1/4W	R559,569,
		R734
RE-268001-10	68K OHM, 1/4W, 5%, CARBON FILM	R554
RE-268005-DM	RES MOFP 68K 5% 1W	R743,744
RE-275001-BM	RES MF 75.0K 1% 1/4W	R542,642
RE-312005-BC	RES CF 120K 5% 1/4W	R733
RE-333005-BC	RES CF 330K 5% 1/4W	R549,649
RE-339005-BC	RES CF 390K 5% 1/4W	R555,551,
		R735,566
RN-110002-BM	RES NTWK 8-PIN SIP 1K 2% 4R	RN504,604,
		RN704
RN-122002-BM	RES NTWK 8-PIN SIP 2.2K 2% 4R	RN503,603,
		RN702
RN-147002-BM	RES NTWK 8-PIN SIP 4.7K 2% 4R	RN506
RN-210002-BM	RES NTWK 8-PIN SIP 10K 1% 4R	RN502,602,
		RN701
RN-222002-BM	RES NTWK 8-PIN SIP 22K 2% 4R	RN505
WC-2.0016-JW	JMPR INS 2.0" 16AWG SOLID	
XF-000004-00	XFMR HIGH PWR 96KHz	
XF-000005-00	BEAD FERRITE W/20AWG LEAD	L701-L710
XF-000006-00	XFMR GATE DRIVE PCB MNT	T701
XF-000008-00	INDUCTOR CUR SENSE PCB MNT	T704
XF-200014-CR	INDUCTOR 2UH 14AWG VERT MNT	L501,601

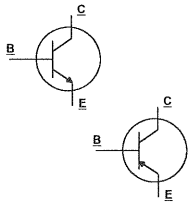
PowerLight
Semiconductor Identification

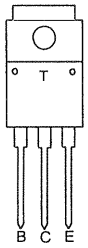
TMOS FET IRFZ44
TMOS Power Field Effect Transistor



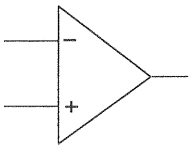


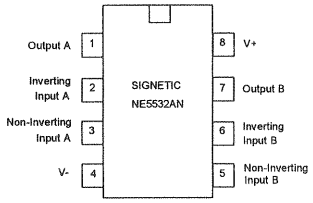
DRIVER TRANSISTORS
2SC3298 NPN / 2SA1306 PNP



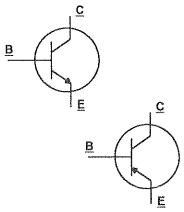


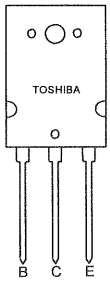
OP-AMP NE5532AN
Dual Operational Amplifier



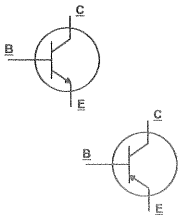


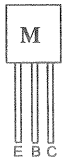
POWER TRANSISTORS
2SC3281 NPN / 2SA1302 PNP



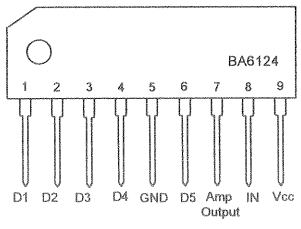


SMALL SIGNAL TRANSISTORS
2N4410 NPN / MPS8599 PNP



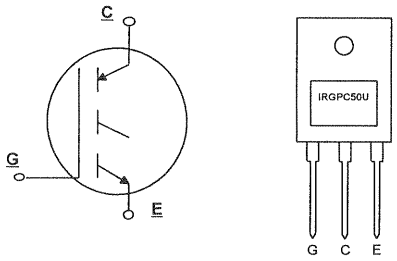


LED DRIVER BA6124
5 Point LED VU Level Meter Driver

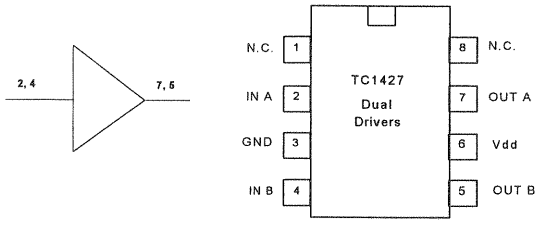


PowerLight
Semiconductor Identification

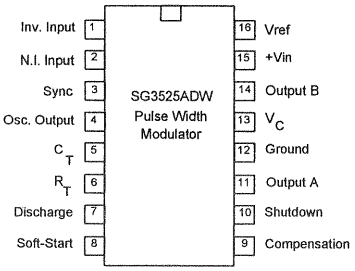
IGBT IRGPC50U
Insulated Gate Bipolar Transistor



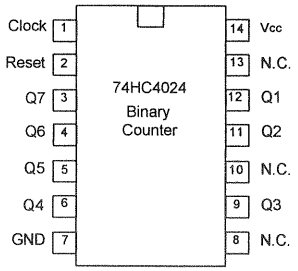
MOSFET DRIVER TC1427CPA
1.2a Dual High Speed Mosfet Drivers



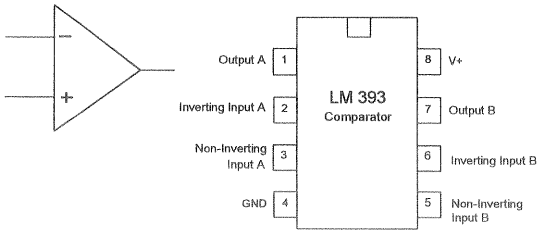
PWM SG3525AN
Regulating Pulse Width Modulator



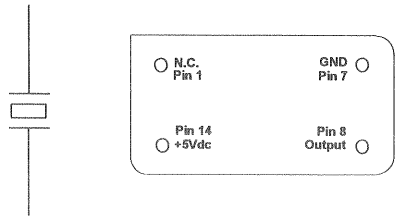
CMOS COUNTER 74HC4024
7-Stage Binary Ripple Counter

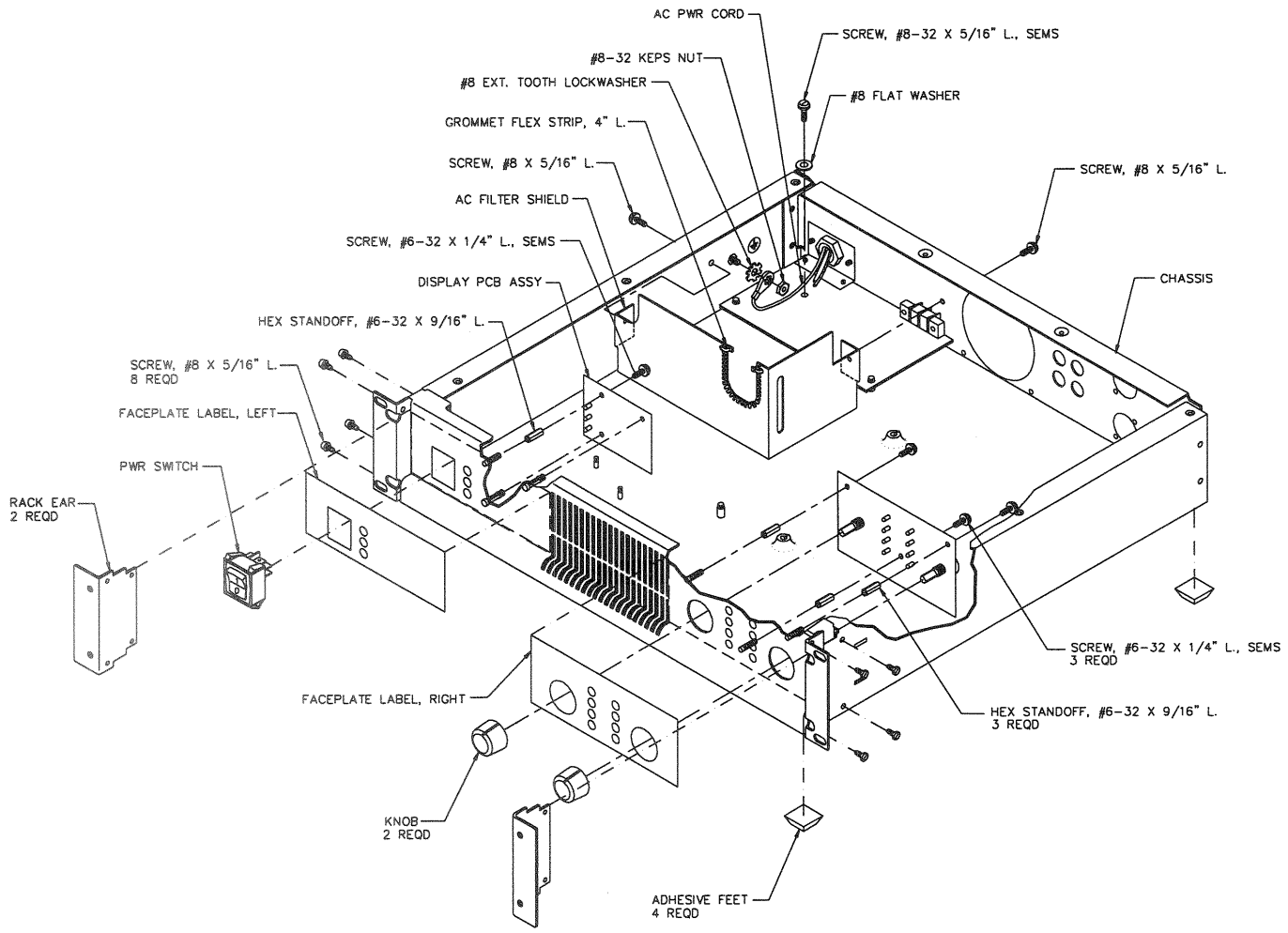


COMPARATOR LM393NE
Low Power Dual Comparators



CMOS CRYSTAL 970H2B2A
6.144MHz Crystal Oscillator





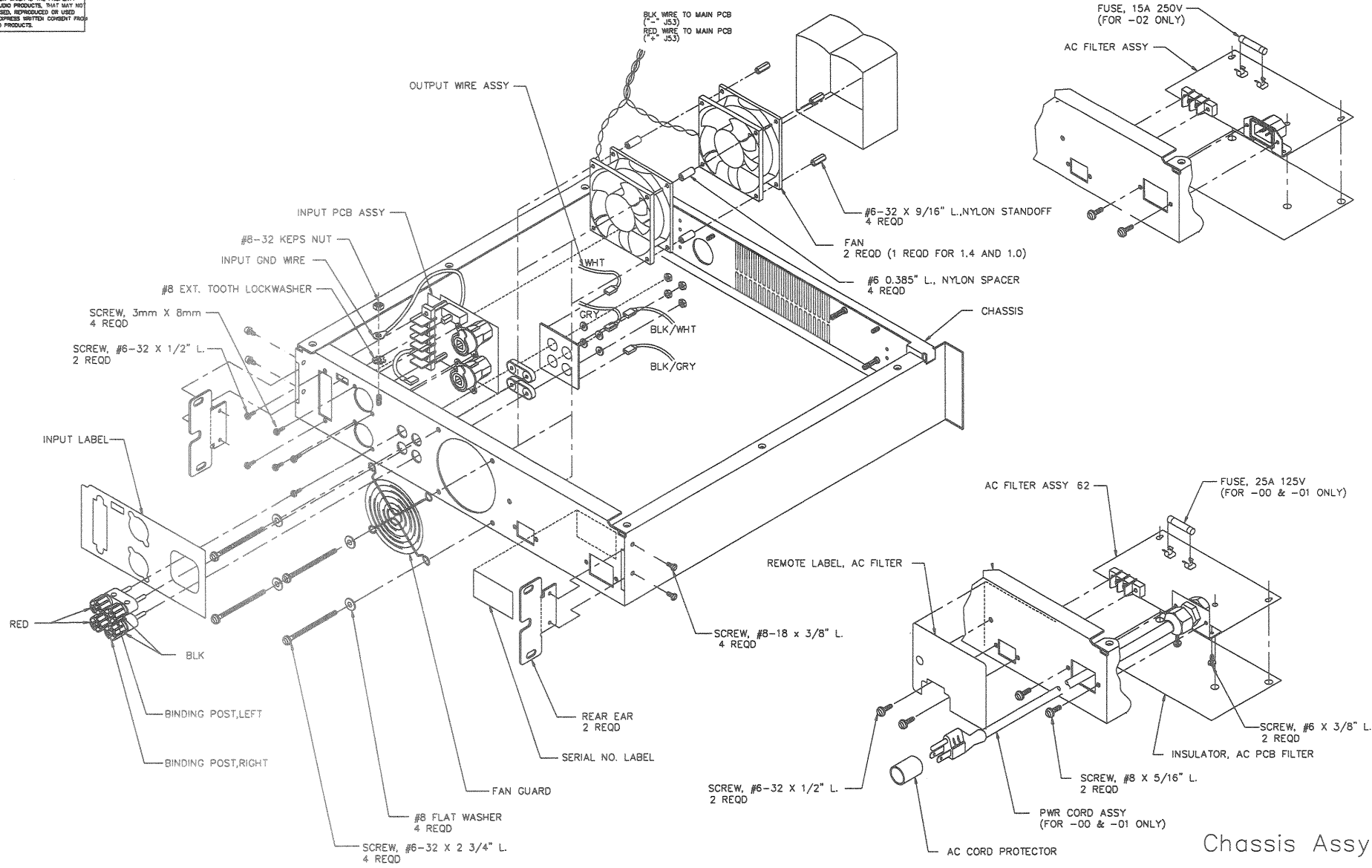
QSC AUDIO PRODUCTS, INC.
COSTA MESA, CALIFORNIA

CHASSIS ASSY
POWERLIGHT

WP-000150-00

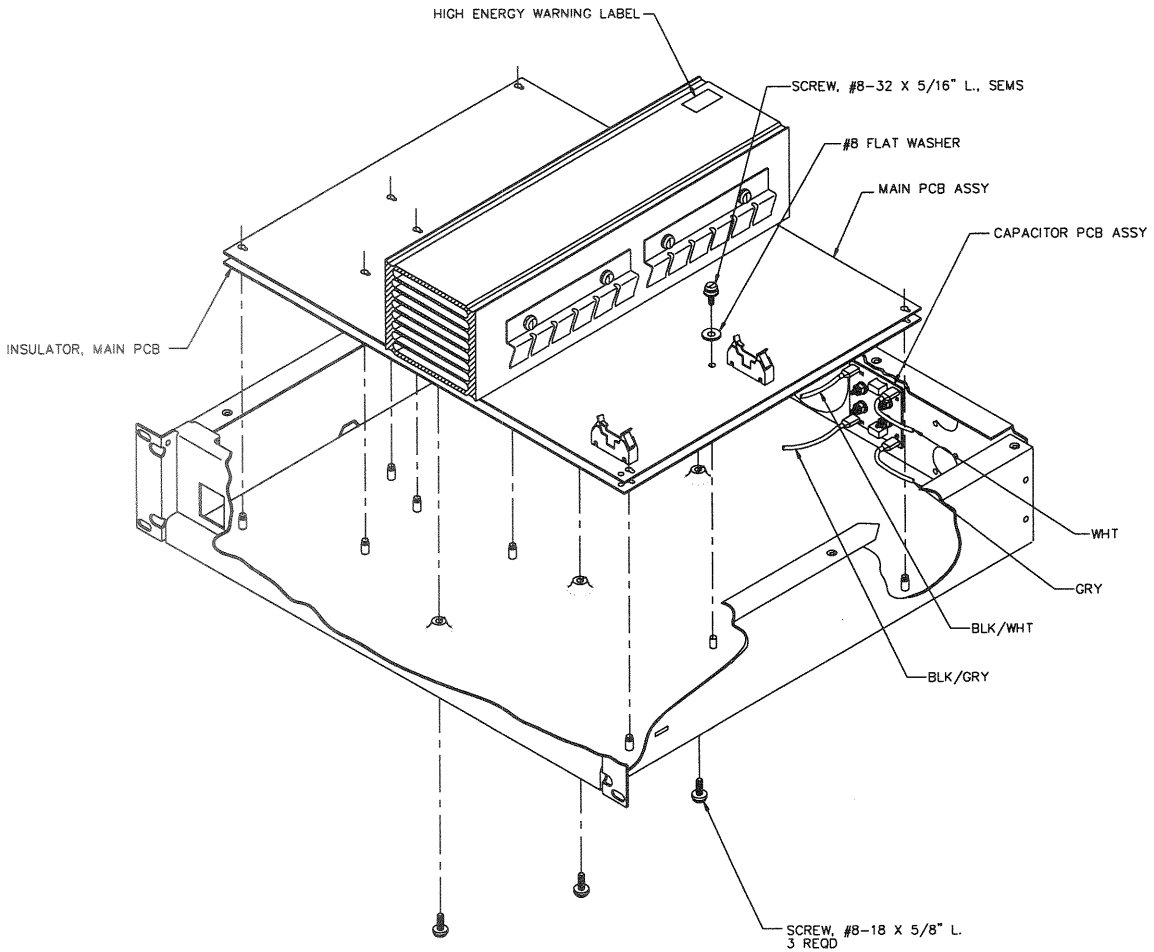
THIS DRAWING USED IN CONJUNCTION WITH SCHEMATIC DWGs MAIN PCB ASSY SH-000152-XX, SH-000157-00, SH-000158-00, DISPLAY PCB SH-000153-00, INPUT PCB ASSY SH-000154-00, AC FILTER PCB SH-000155-00, WIRING DIAGRAM SH-000150-00 AND FINAL ASSY FG-000150-XX.

NOTES: UNLESS OTHERWISE SPECIFIED

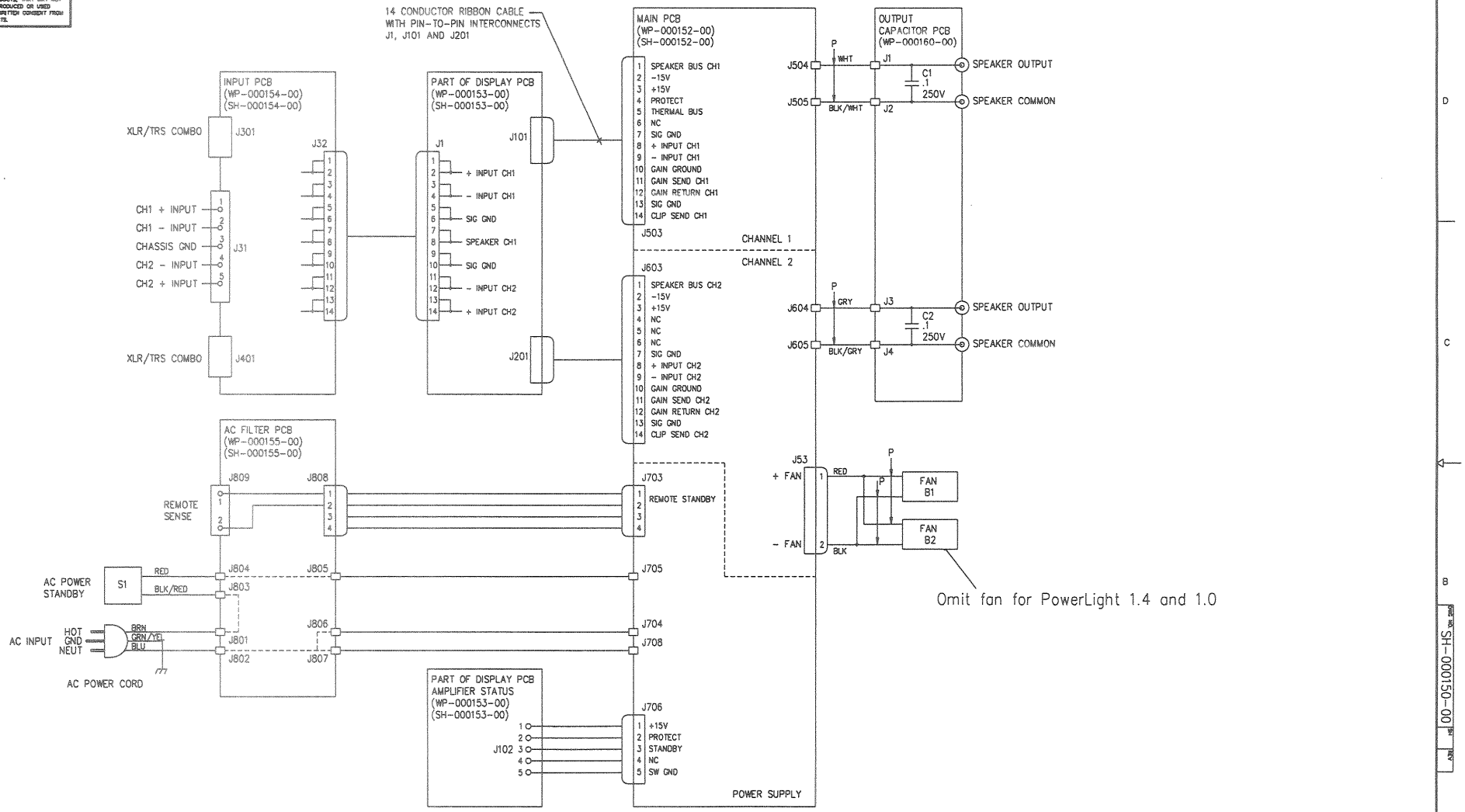


Chassis Assy PowerLight

WP-000150-XX



Chassis Assy
PowerLight



1. USE IN CONJUNCTION WITH SCHEMATIC DIAGRAMS: SH-000152-XX, SH-000153-00, SH-000154-00, SH-000155-00, SH-000156-00 AND CHASSIS ASSY: WP-000150-XX

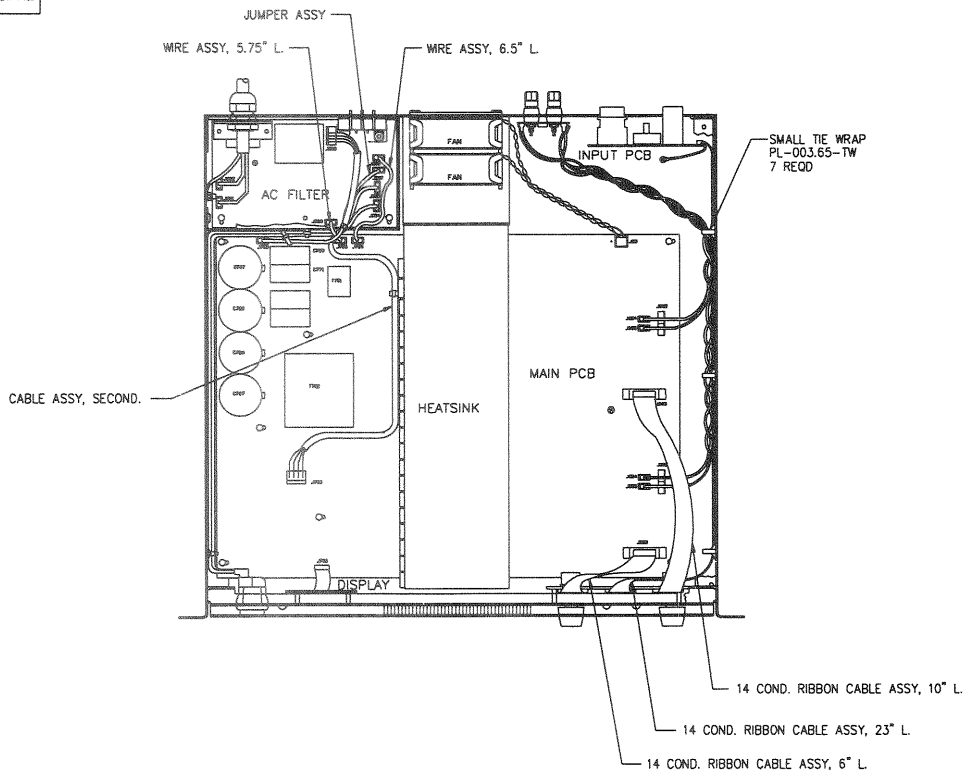
NOTES: UNLESS OTHERWISE SPECIFIED

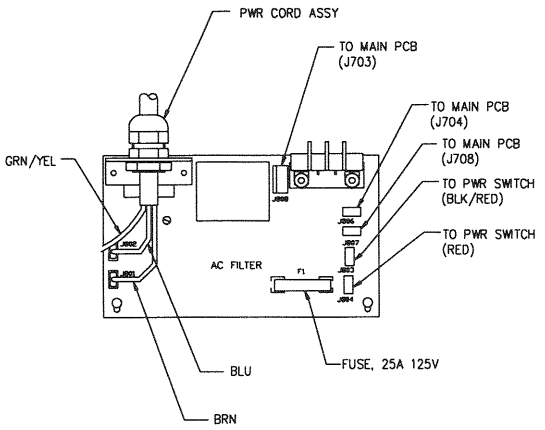
WIRING DIAGRAM - POWERLIGHT

QSC AUDIO PRODUCTS, INC.
COSTA MESA, CALIFORNIA

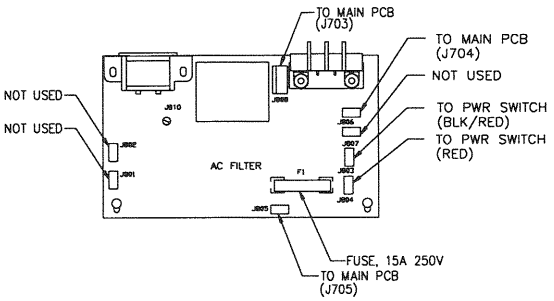
WIRING DIAGRAM, POWERLIGHT

SH-000150-00

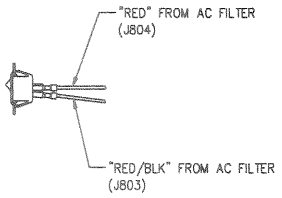




AC PCB ASSY FOR 100V/120V



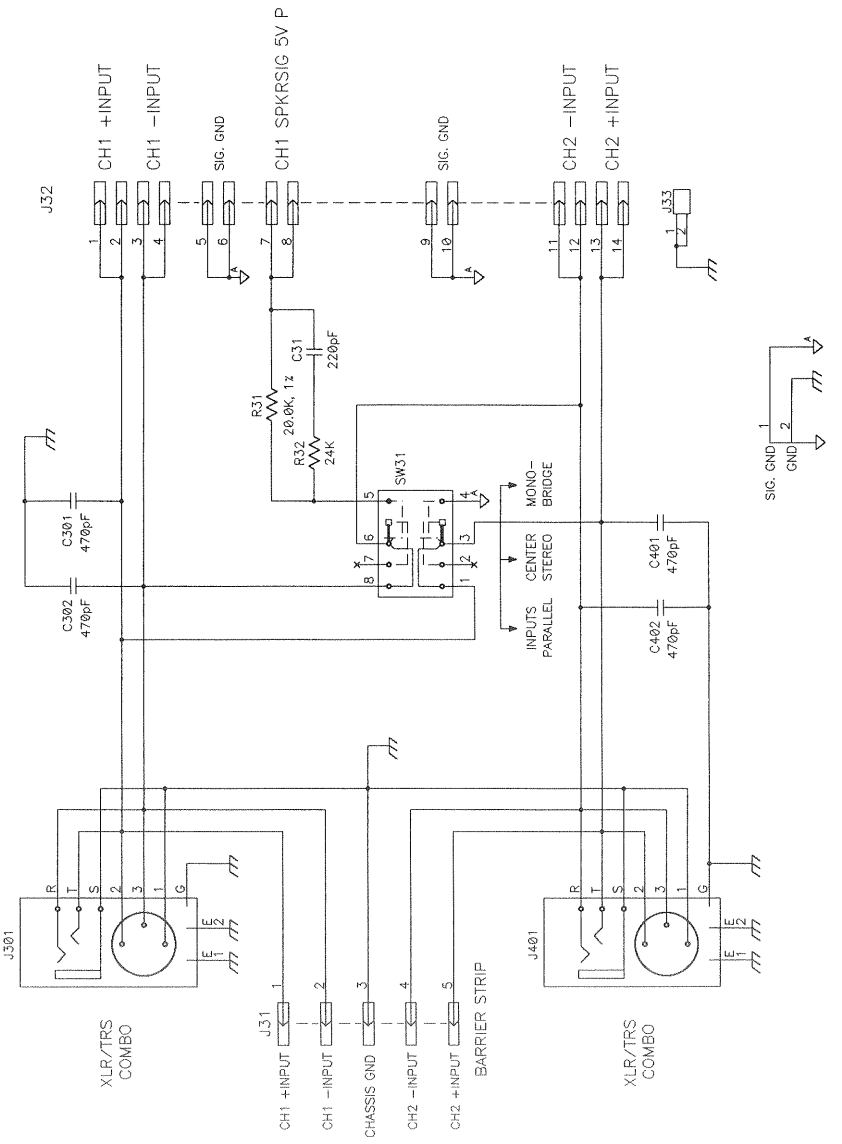
AC PCB ASSY FOR 230V



Note: This wiring diagram does not contain all of the information needed to perform a voltage conversion. Contact QSC Technical Services for details on conversion kits and documentation.

WIRING DIAGRAM
POWERLIGHT

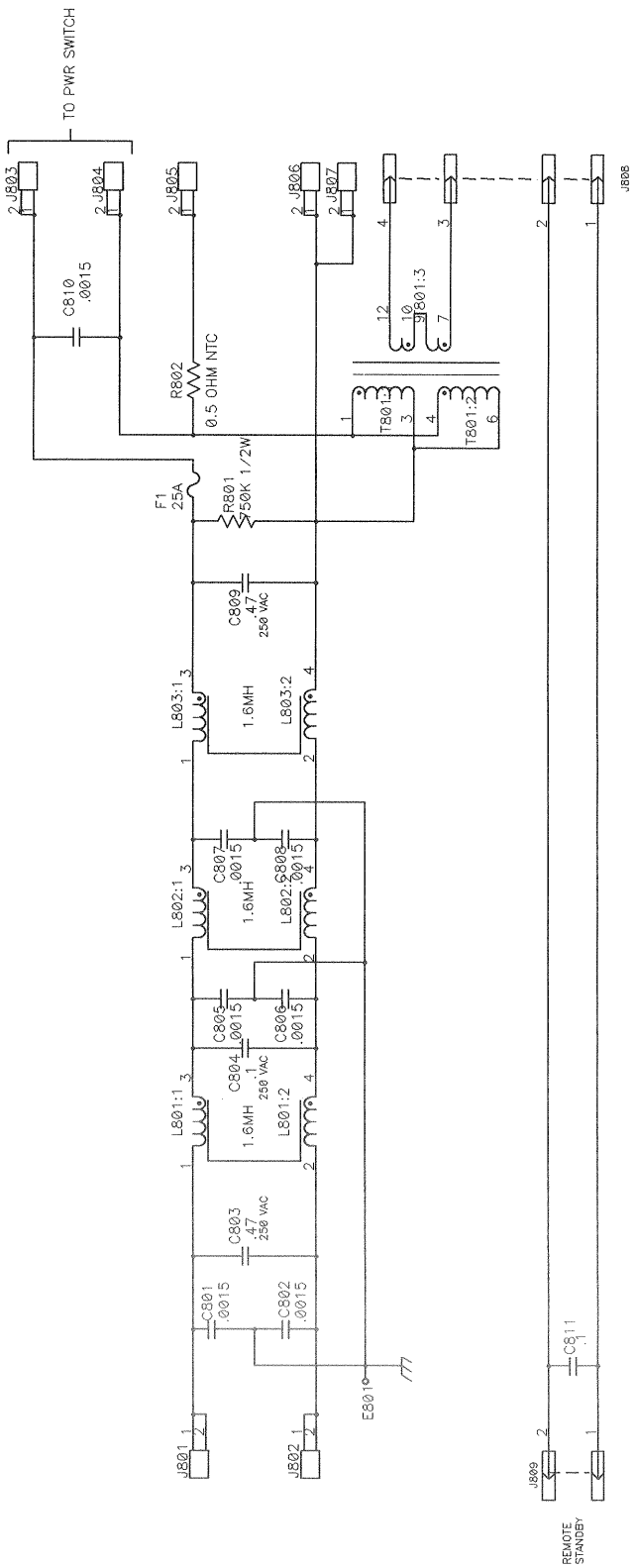
WP-000150-XX



SCHEMATIC DIAGRAM,
INPUT, POWERLIGHT

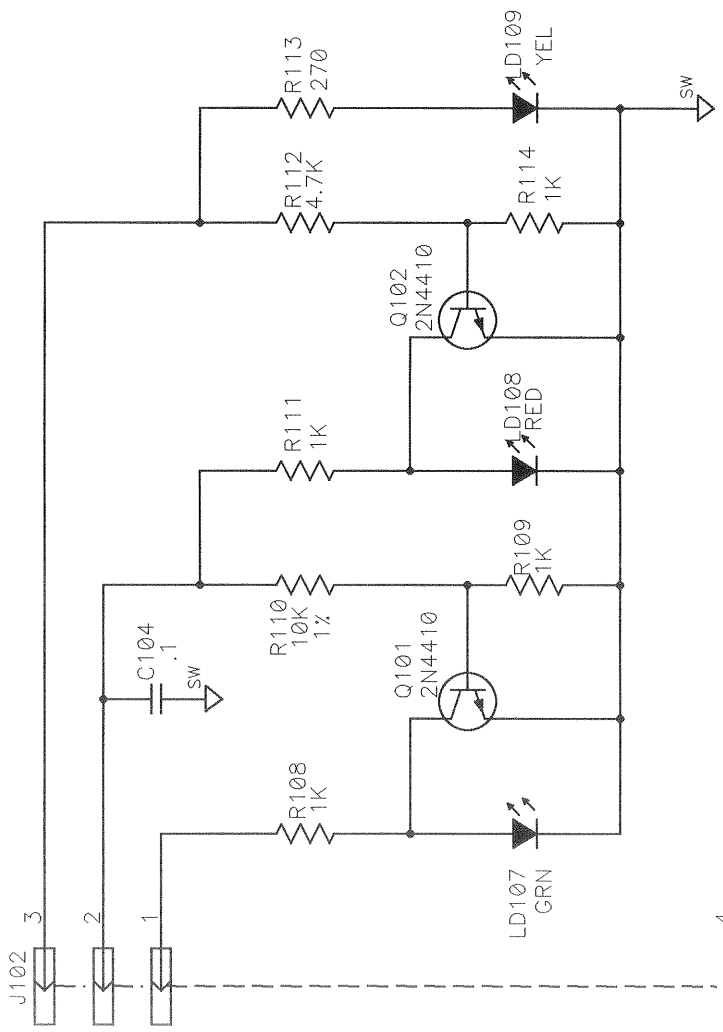
3. ⊱ DENOTES NO CONNECTION.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS. 100V, +/-10%.
1. ALL RESISTOR VALUES ARE IN OHMS, +/-5%. 1/4W.

NOTES: UNLESS OTHERWISE SPECIFIED



SCHEMATIC DIAGRAM,
120VAC FILTER, POWERLIGHT

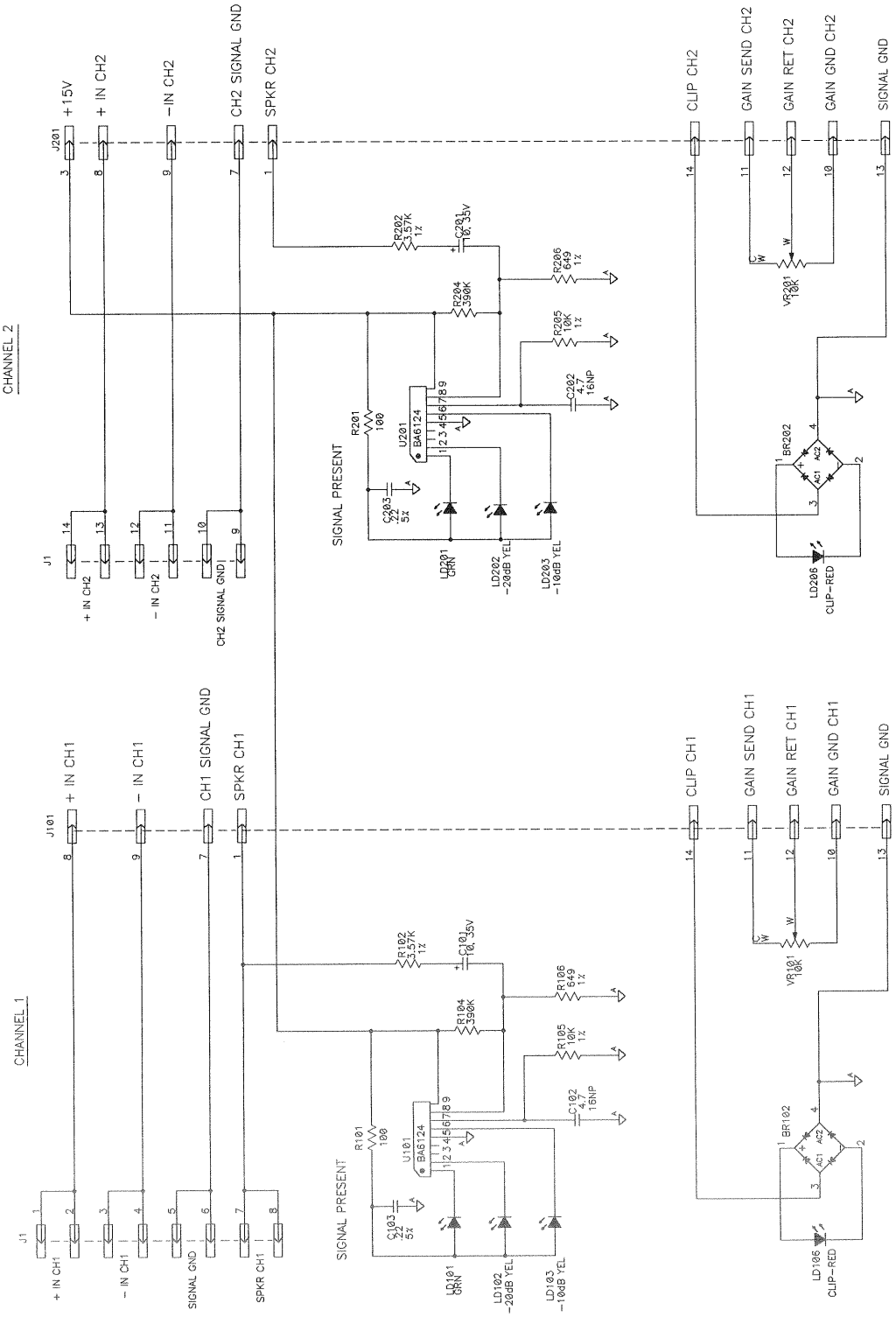
2. ALL CAPACITOR VALUES ARE IN MICROFARADS, 125 VAC, +/-20%.
1. ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT, +/-5%.
NOTES: UNLESS OTHERWISE SPECIFIED



SCHEMATIC DIAGRAM, STATUS BOARD, POWERLIGHT

NOTES: UNLESS OTHERWISE SPECIFIED

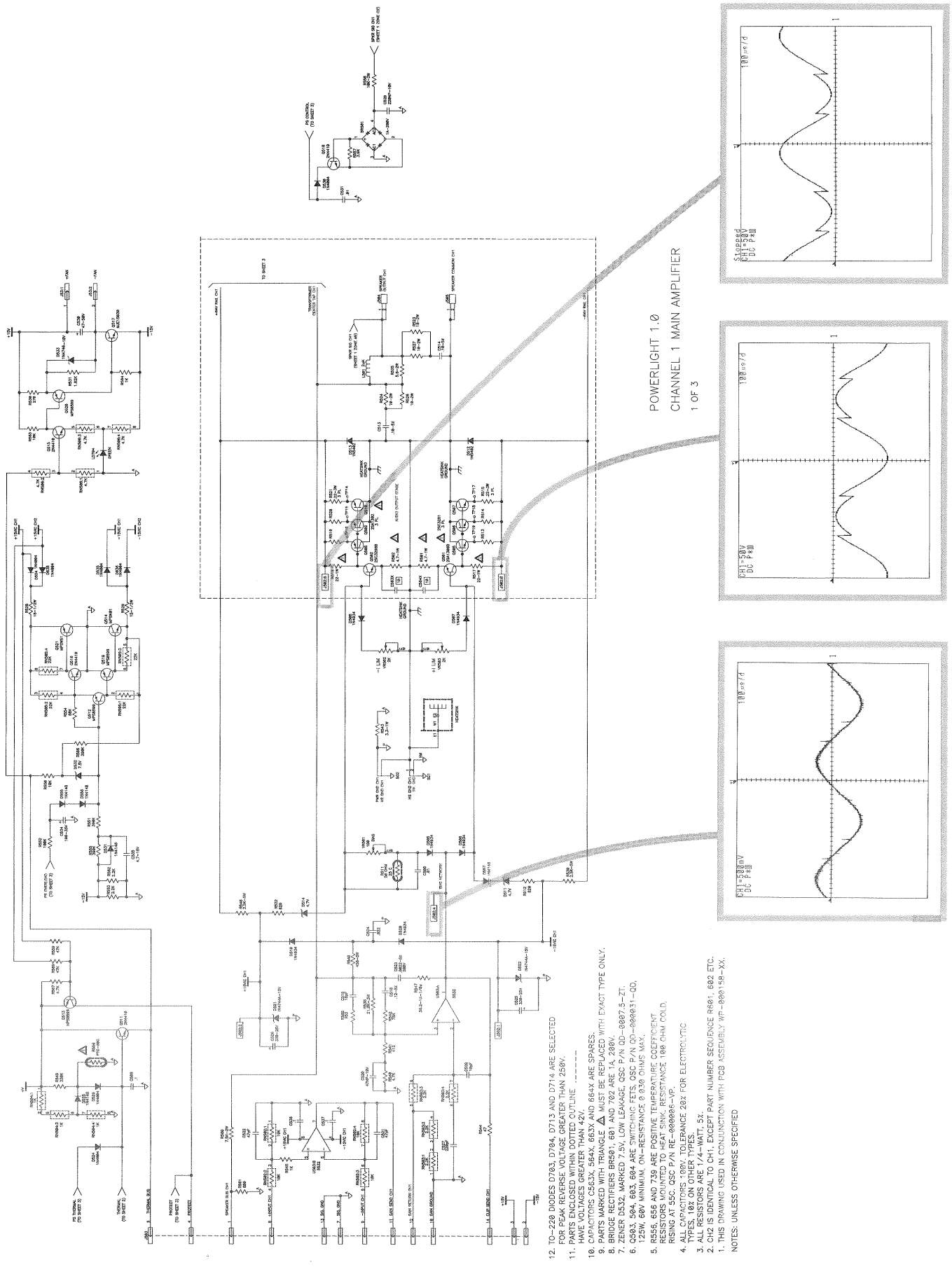
1. ALL CAPACITORS VALUES ARE IN MICROFARADS, 25V MIN.
2. ALL RESISTORS VALUES ARE IN OHMS +/-5%, 1/4 W.
3. LD103, LD203, LD104, LD204, HIGH-EFFICIENCY RED LED.
4. LD101, LD201, LD102, LD202, HIGH-EFFICIENCY GREEN LED.

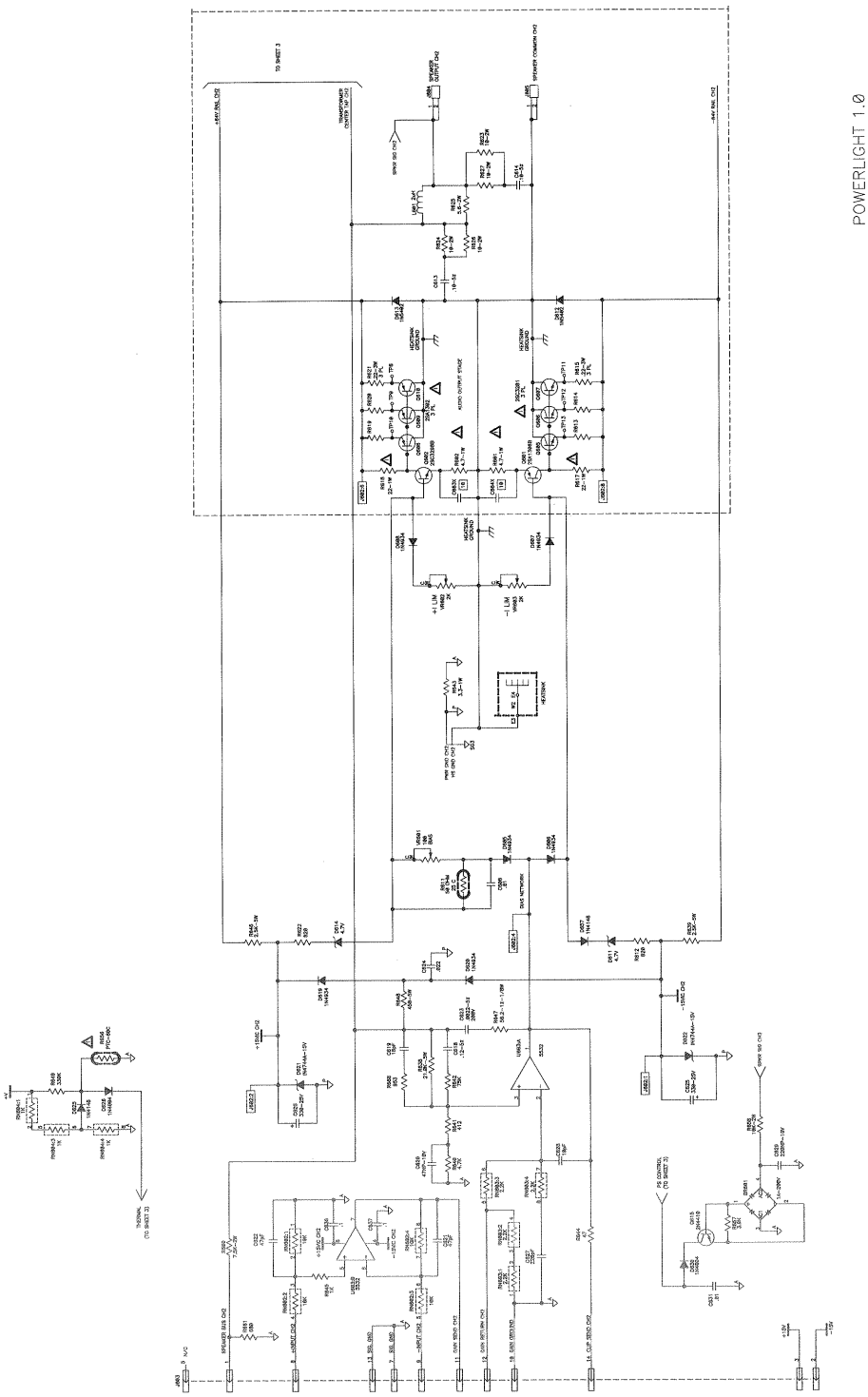


SCHEMATIC DIAGRAM,
DISPLAY BOARD, POWERLIGHT

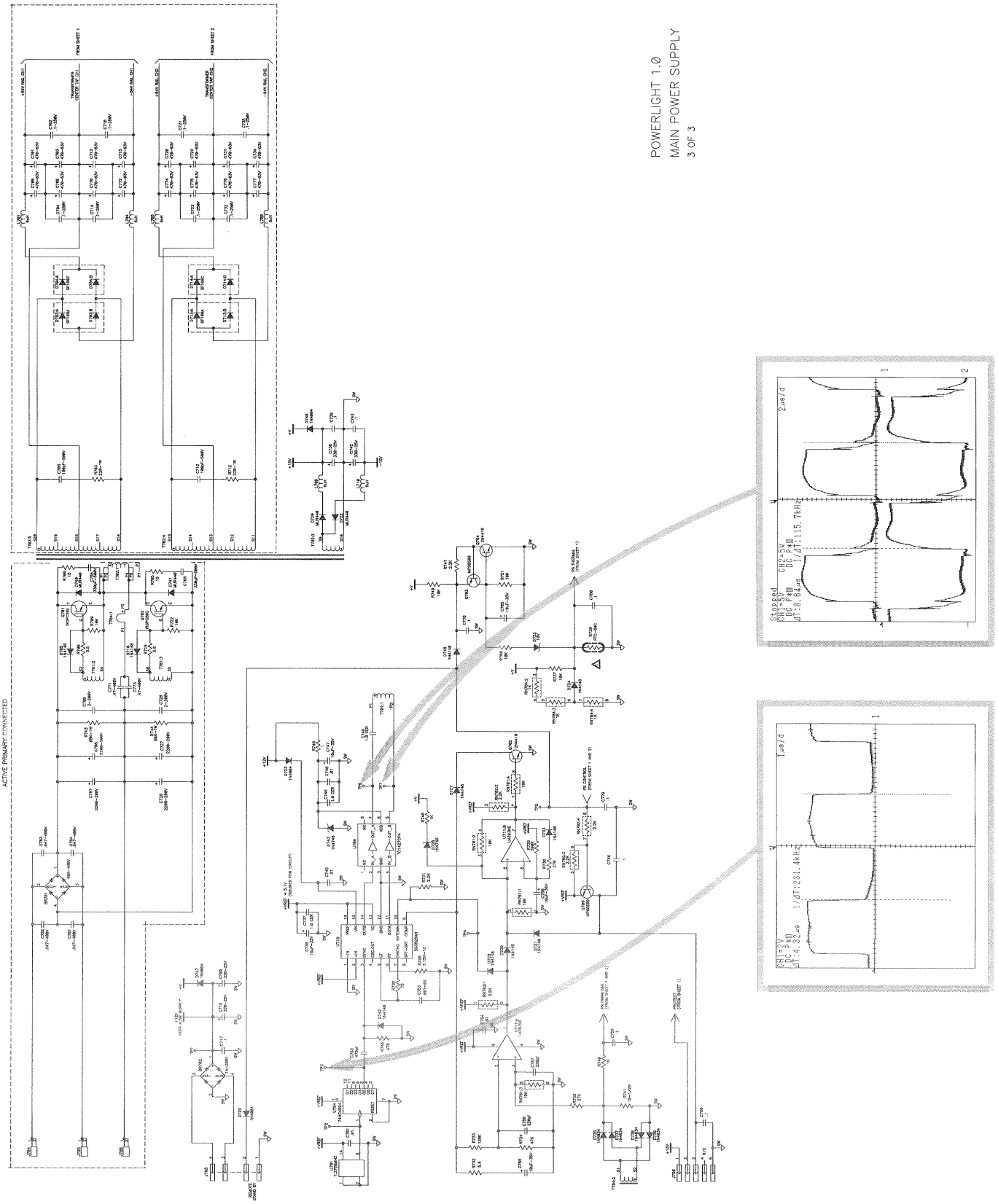
7. LD101, LD201, LD102, LD202, HIGH-EFFICIENCY GREEN LED.
6. LD103, LD203, LD104, LD204, HIGH-EFFICIENCY RED LED.
5. PARTS IN COMMON TO BOTH CHANNELS NUMBERED 1-99.
4. CH 2 COMPONENTS NUMBERED 201-299.
3. CH 1 COMPONENTS NUMBERED 101-199.
2. ALL RESISTORS VALUES ARE IN OHMS +/-5%, 1/4 W.
1. ALL CAPACITORS VALUES ARE IN MICROFARADS, 25V MIN.

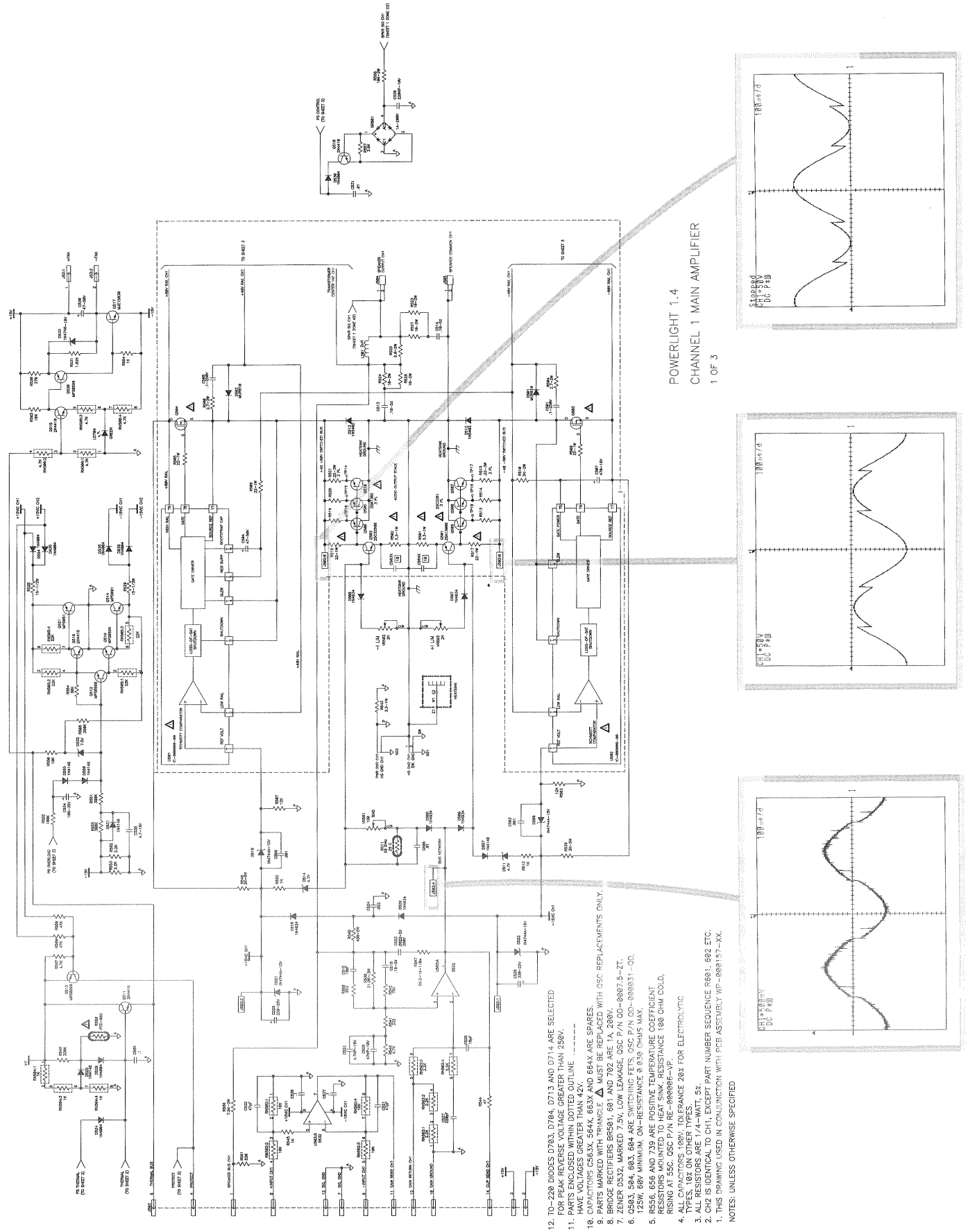
NOTES: UNLESS OTHERWISE SPECIFIED

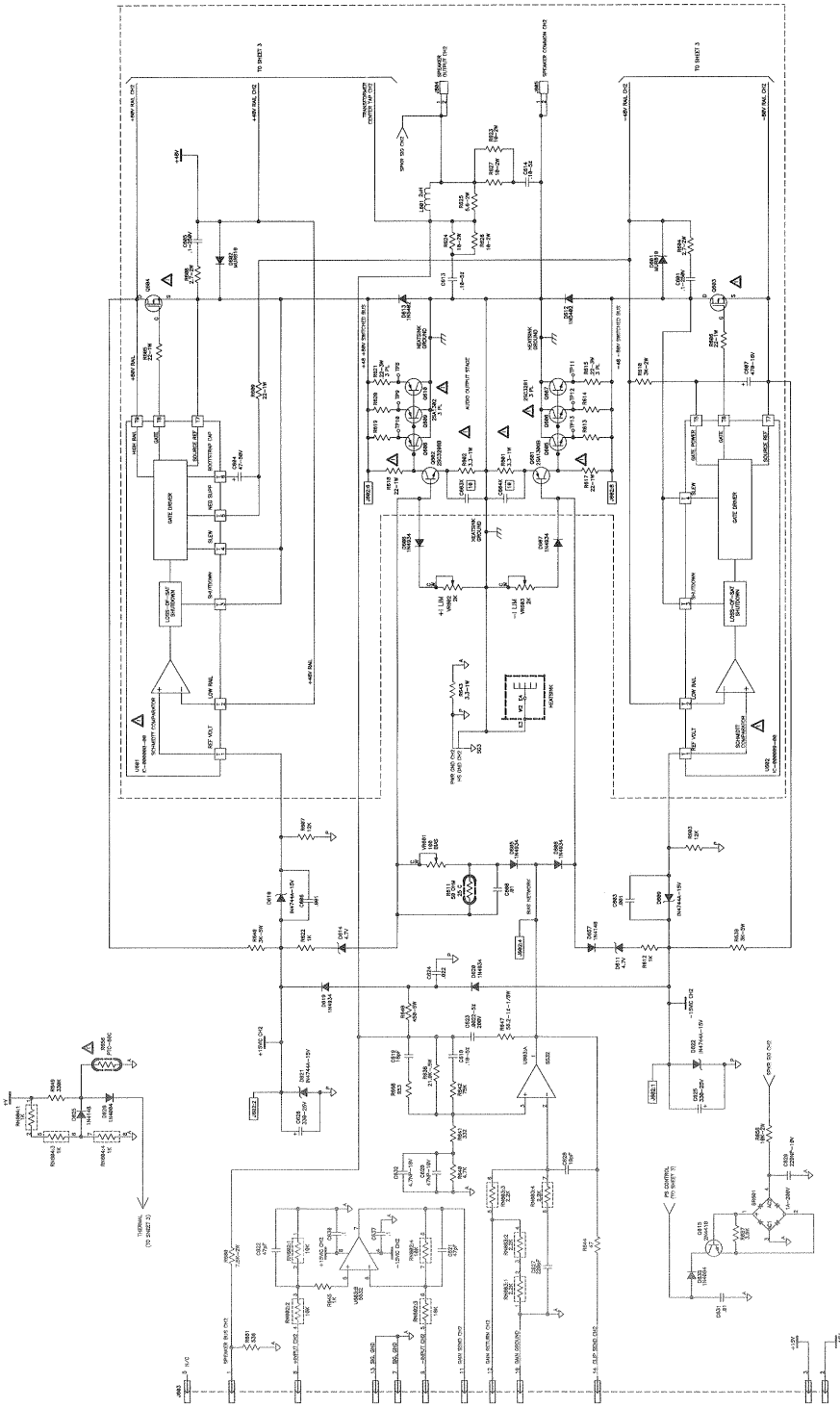

POWERLIGHT 1.0
CHANNEL 1 MAIN AMPLIFIER
1 OF 3
NOTES: UNLESS OTHERWISE SPECIFIED
1. THIS DRAWING USED IN CONJUNCTION WITH PCB ASSEMBLY WP-000158-XX.
2. CH2 IS IDENTICAL TO CH1, EXCEPT PART NUMBER SEQUENCE R601, 602 ETC.
3. ALL RESISTORS ARE 1/4-WATT, 5%.
4. ALL CAPACITORS 100V, TOLERANCE 20% FOR ELECTROLYTIC TYPES, 10% ON OTHER TYPES.
5. R556, 656 AND 739 ARE POSITIVE TEMPERATURE COEFFICIENT. RESISTORS MOUNTED TO HEAT SINK, RESISTANCE 100 OHM COLD, RISING AT 55Ω. QSC P/N RE-000006-VP.
6. Q503, 504, 603, 604 ARE SWITCHING FETS. QSC P/N QD-0000031-QD, 125W, 60V MINIMUM, ON-RESISTANCE 0.030 OHMS MAX.
7. ZENER D532, MARKED 7.5V, LOW LEAKAGE. QSC P/N QD-0007.5-ZT.
8. BRIDGE RECTIFIERS BR501, 601 AND 702 ARE 1A, 200V.
9. PARTS MARKED WITH TRIANGLE △ MUST BE REPLACED WITH EXACT TYPE ONLY.
10. CAPACITORS C563X, 564X, 663X AND 664X ARE SPARES.
11. PARTS ENCLOSED WITHIN DOTTED OUTLINE _ _ _ _ HAVE VOLTAGES GREATER THAN 42V.
12. TO-220 DIODES D703, D704, D713 AND D714 ARE SELECTED FOR PEAK REVERSE VOLTAGE GREATER THAN 250V.



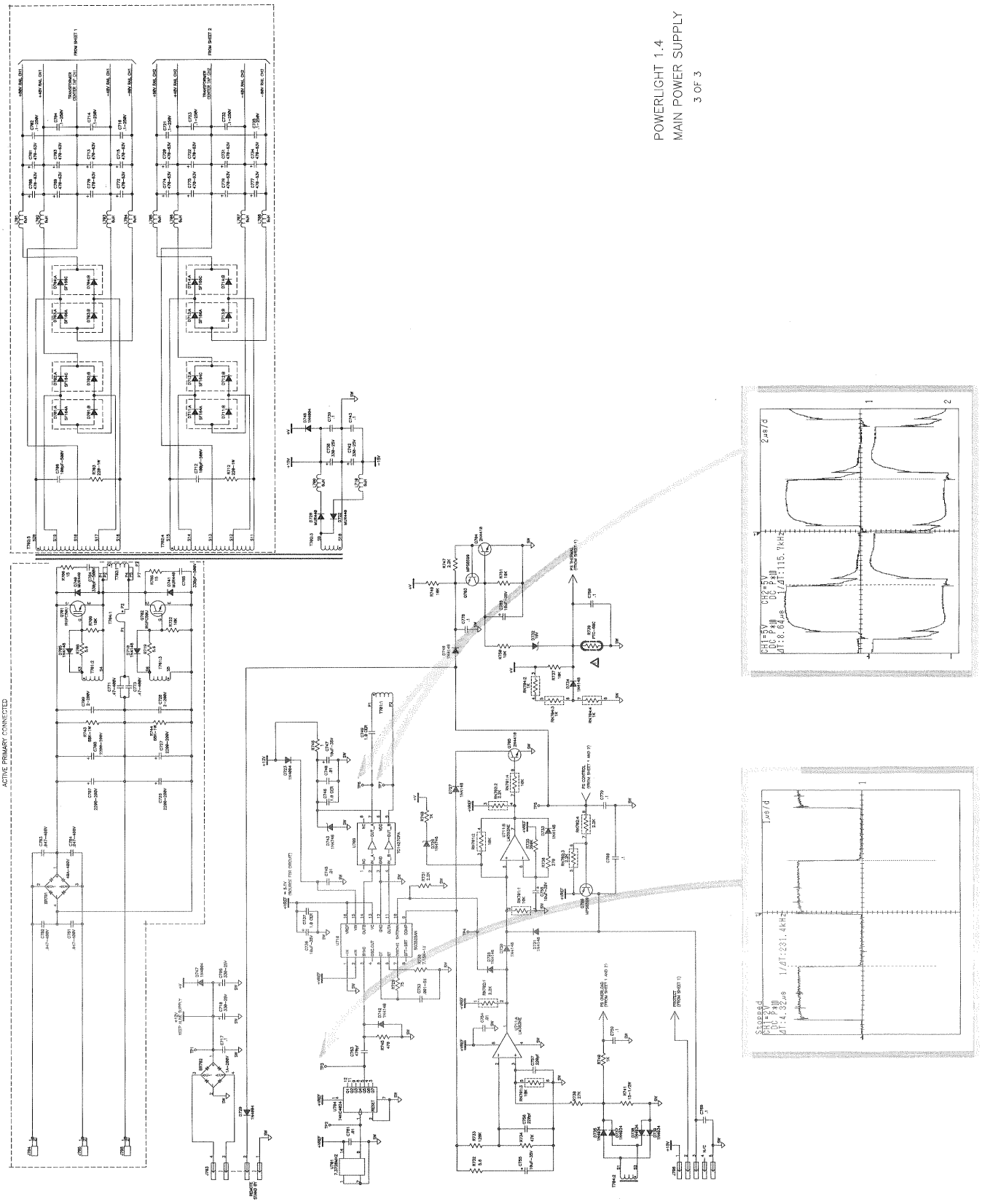
POWERLIGHT 1.0
CHANNEL 2 MAIN AMPLIFIER
2 OF 3

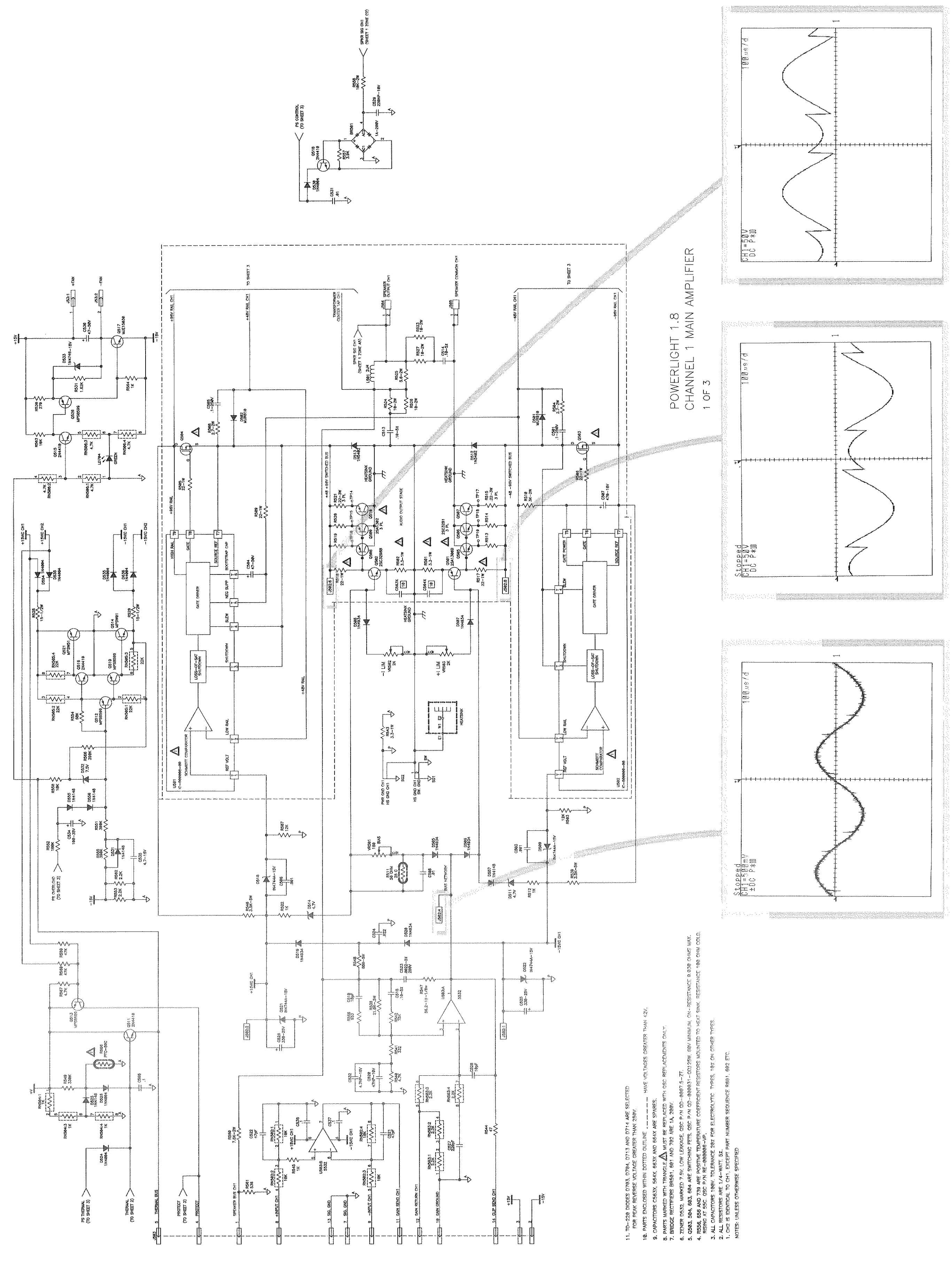

POWERLIGHT 1.0
MAIN POWER SUPPLY
3 OF 3
ACTIVE PRIMARY CONNECTED
2 µs/d
1 µs/d

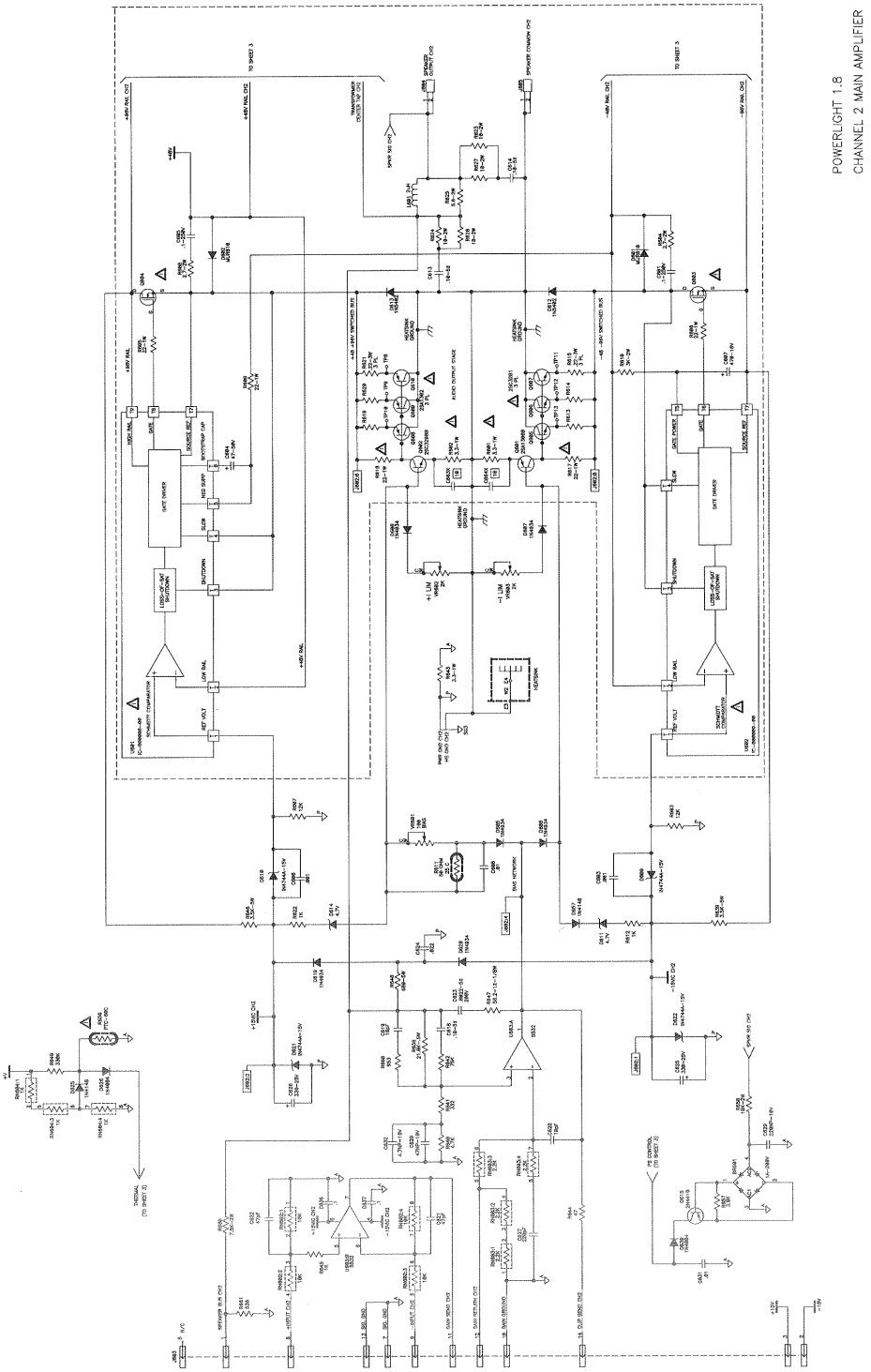

POWERLIGHT 1.4
CHANNEL 1 MAIN AMPLIFIER
1 OF 3
NOTES: UNLESS OTHERWISE SPECIFIED
1. THIS DRAWING USED IN CONJUNCTION WITH PCB ASSEMBLY WP-000157-XX.
2. CH2 IS IDENTICAL TO CH1, EXCEPT PART NUMBER SEQUENCE R801, 802 ETC.
3. ALL RESISTORS ARE 1/4 WATT, 5%.
4. ALL CAPACITORS 100V, TOLERANCE 20% FOR ELECTROLYTIC AND 10% FOR OTHER TYPES, UNLESS OTHERWISE SPECIFIED.
5. R656, 656 AND 739 ARE POSITIVE TEMPERATURE COEFFICIENT RESISTORS MOUNTED TO HEAT SINK; RESISTANCE 100 OHM COLD, RISING AT 55C. QSC P/N RE-000066-VP.
6. Q583, 584, 603, 604 ARE SWITCHING FETS, QSC P/N OD-0000031-QD. 120V, 60V MINIMUM, ON-RESISTANCE 0.030 OHMS MAX.
7. ZENER D532, MARKED 7.5V, LOW LEAKAGE, QSC P/N OD-0007.5-ZT.
8. BRIDGE RECTIFIERS BR501, 601 AND 702 ARE 1A, 200V.
9. PARTS MARKED WITH TRIANGLE ◁ MUST BE REPLACED WITH QSC REPLACEMENTS ONLY.
10. CAPACITORS C563X, 564X, 663X AND 664X ARE SPARES.
11. PARTS ENCLOSED WITHIN DOTTED OUTLINE _ _ _ _ _ HAVE VOLTAGES GREATER THAN 42V.
12. TO-220 DIODES D703, D704, D713 AND D714 ARE SELECTED FOR PEAK REVERSE VOLTAGE GREATER THAN 250V.
Stopped
CH1 50V
DC P-P
100 us/d
CH1 50V
DC P-P
100 us/d
CH1 50mV
DC P-P
100 us/d



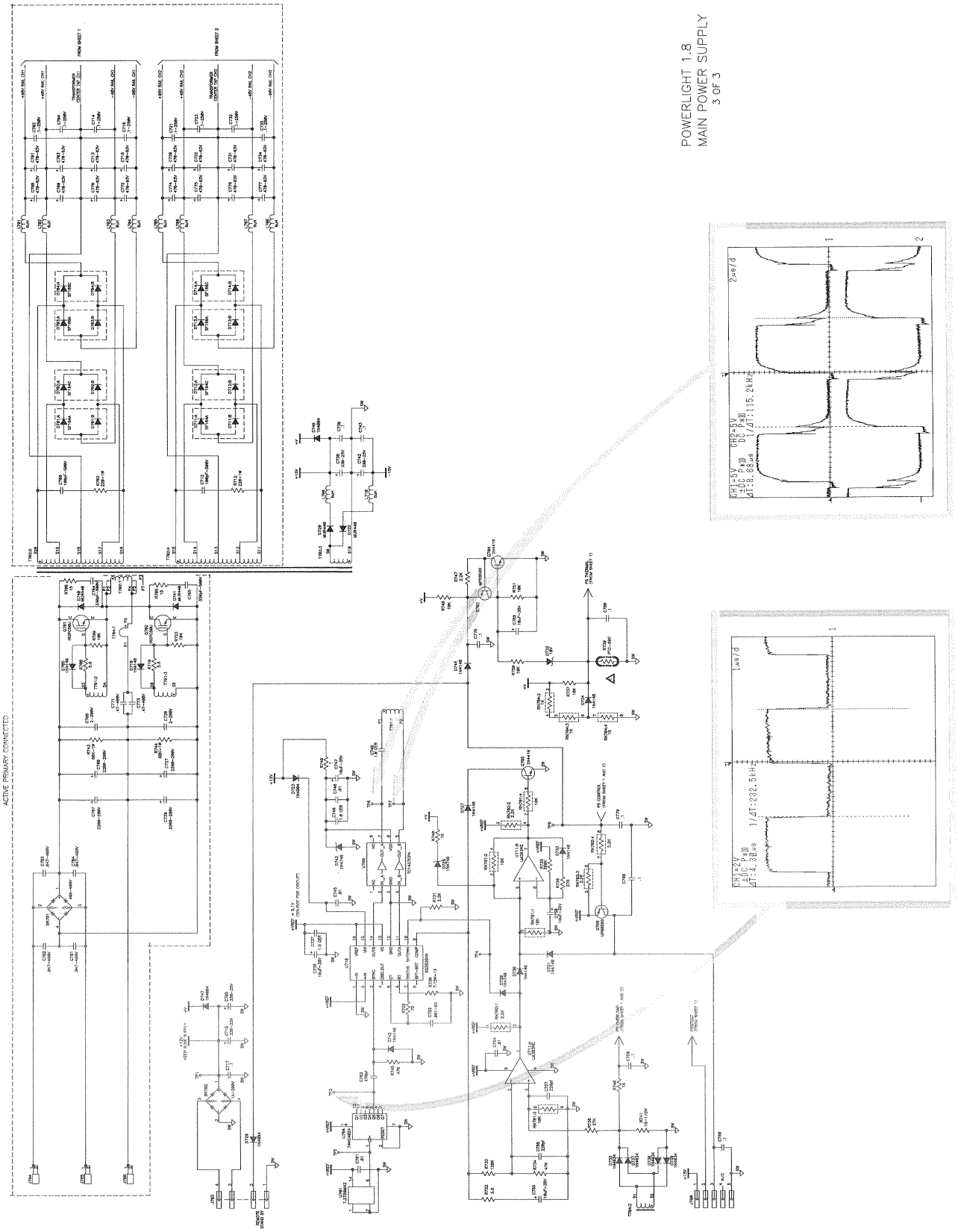
POWERLIGHT 1.4
CHANNEL 2 MAIN AMPLIFIER
2 OF 3


POWERLIGHT 1.4
MAIN POWER SUPPLY
3 OF 3
ACTIVE PRIMARY CONNECTED
FROM SHEET 1
FROM SHEET 2
CH1=5V CH2=5V
DC P-P DC P-P
ΔT:6.64µs 1/ΔT:115.7kHz
2µs/d
Stopped
CH1=5V
DC P-P
ΔT:4.32µs 1/ΔT:231.4kHz
1µs/d


POWERLIGHT 1.8
CHANNEL 1 MAIN AMPLIFIER
1 OF 3

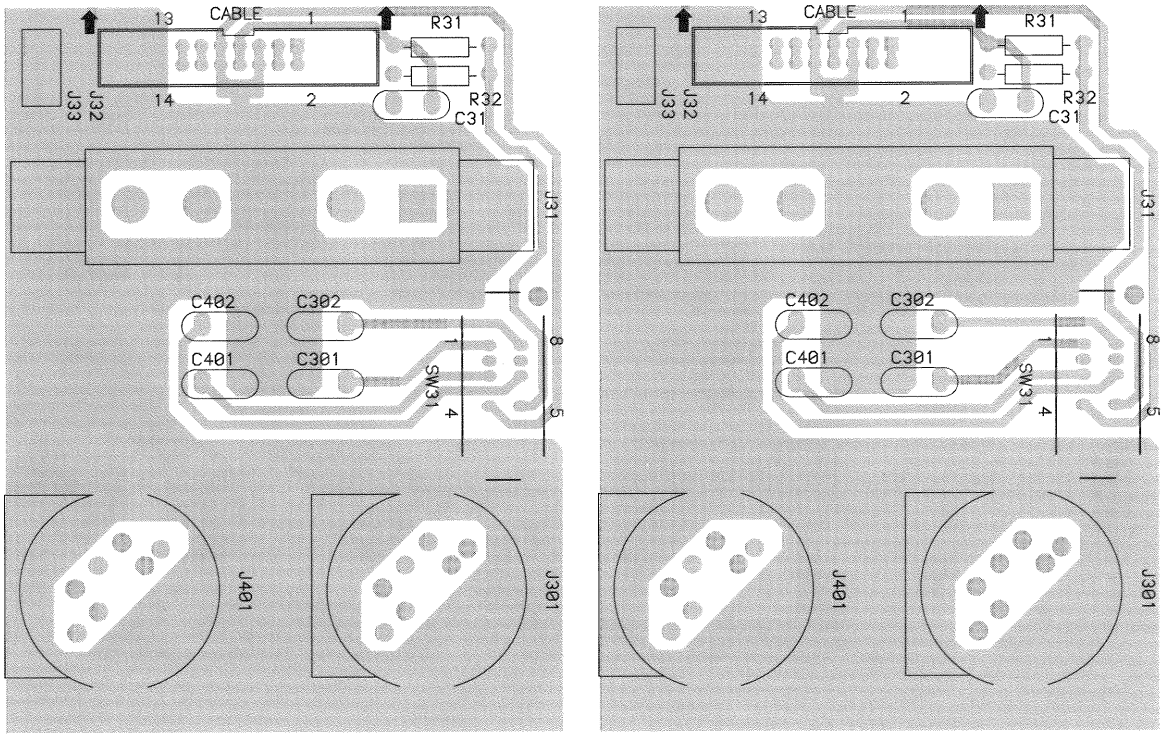


POWERLIGHT 1.8
CHANNEL 2 MAIN AMPLIFIER
2 OF 3


POWERLIGHT 1.8
MAIN POWER SUPPLY
3 OF 3
ACTIVE PRIMARY CONNECTED
2us/d
1us/d

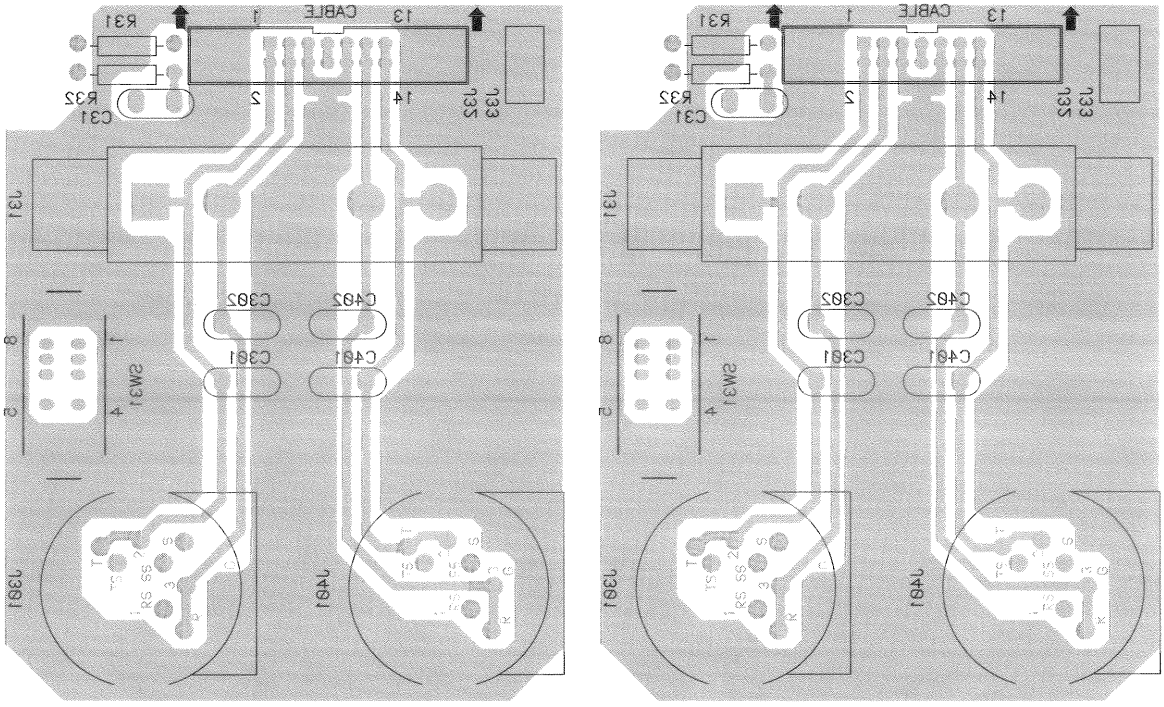
Input Board PCB

Component side

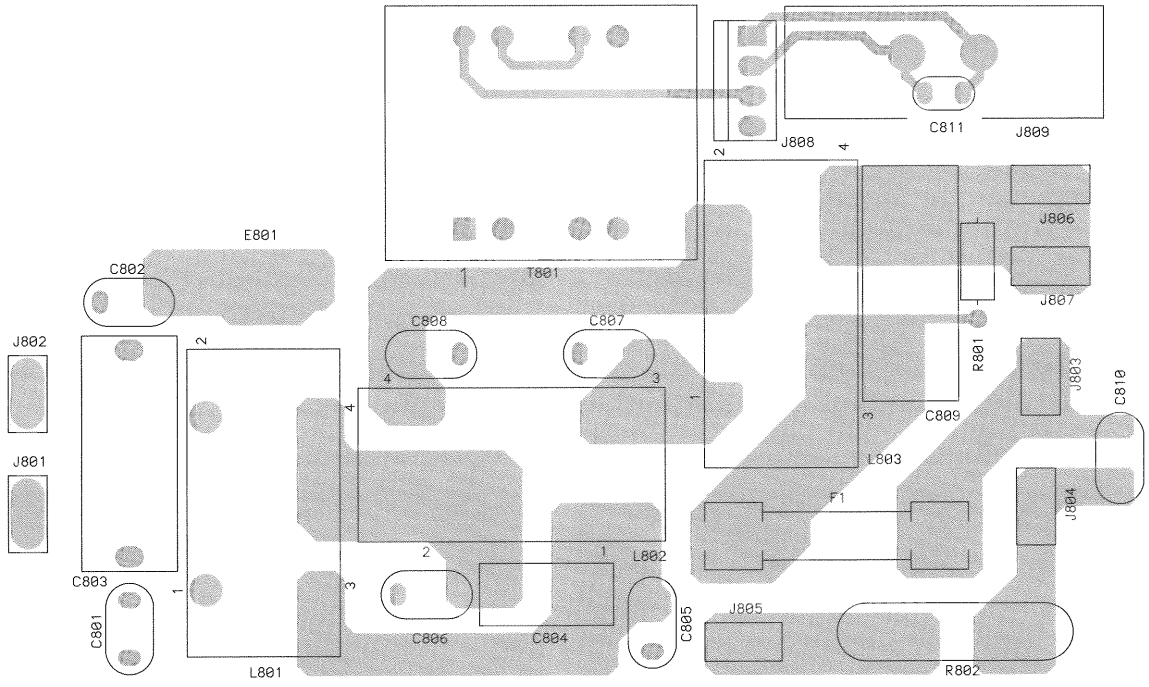


Input Board PCB

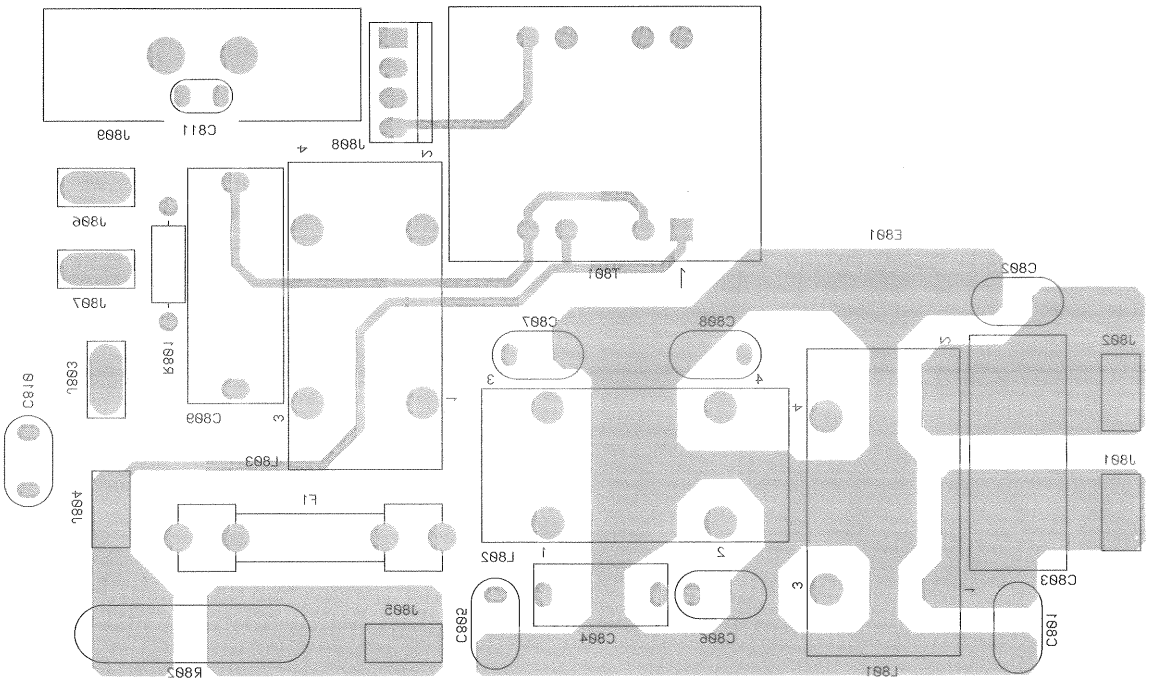
Solder side



Voltage Board PCB
Component side

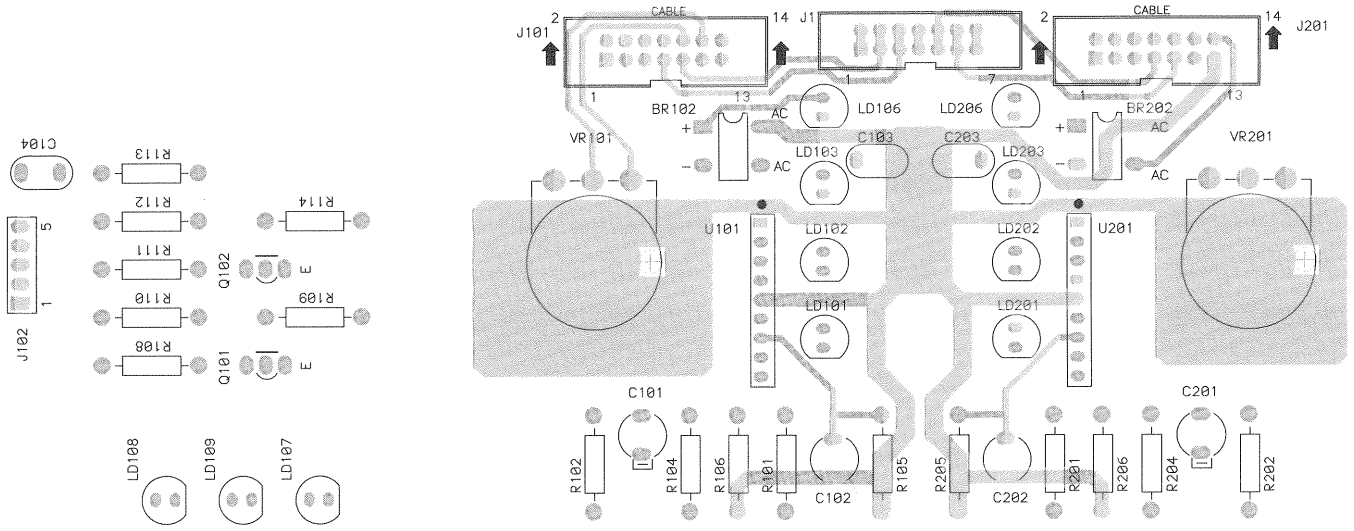


Voltage Board PCB
Solder side



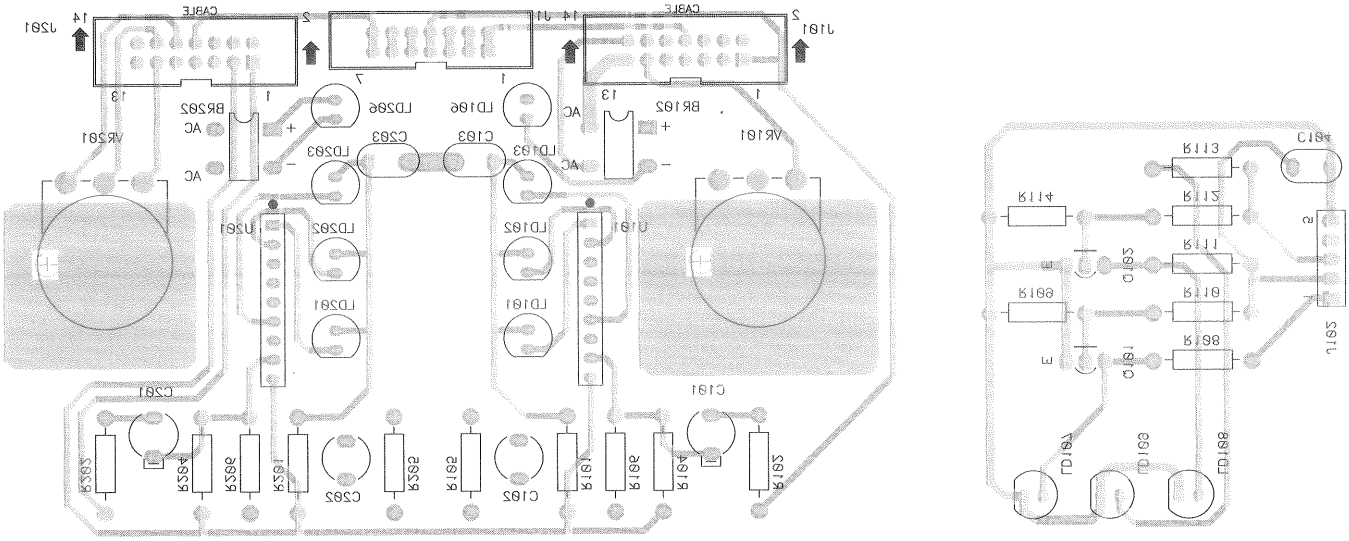
Power Status and Display Board PCB

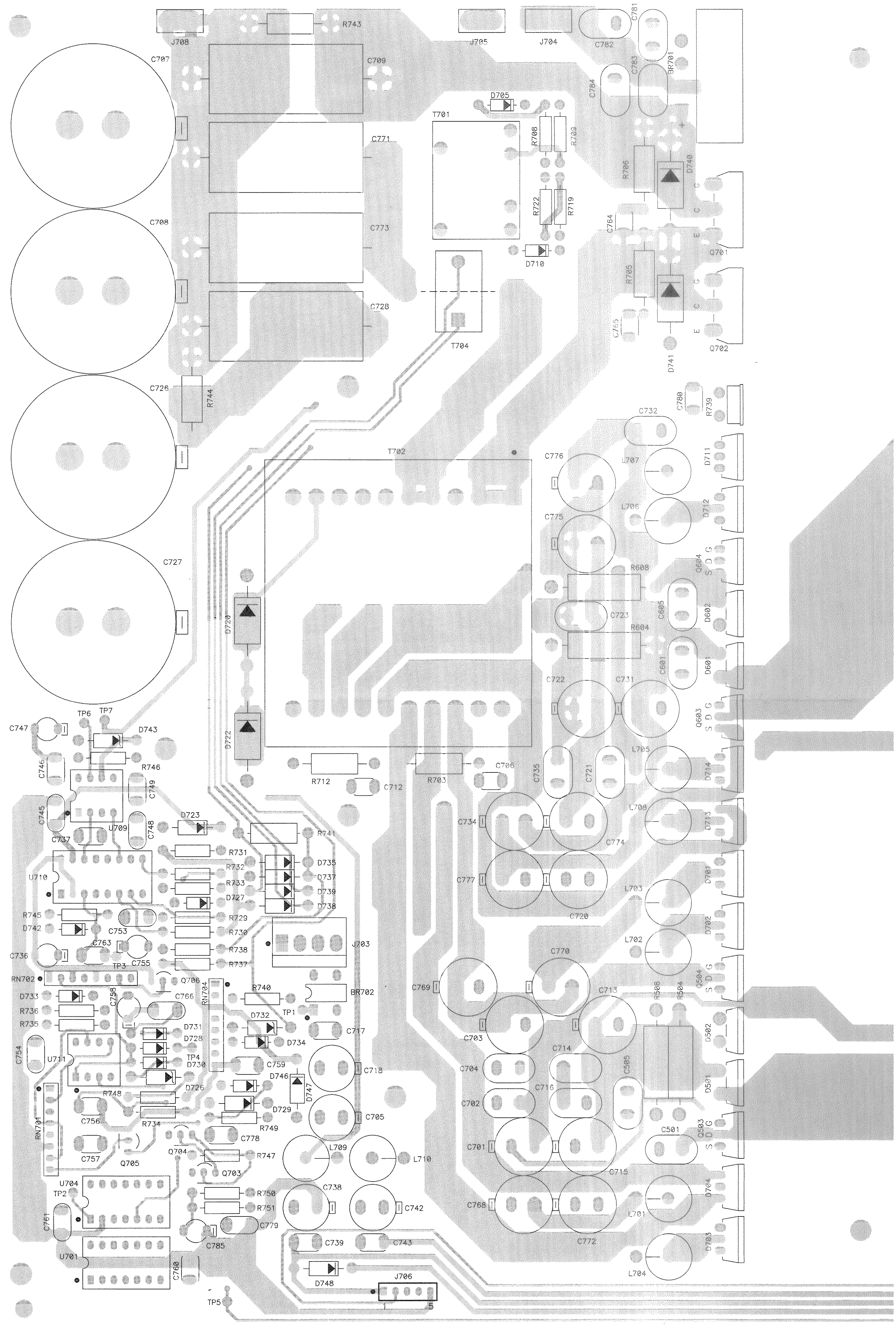
Component side



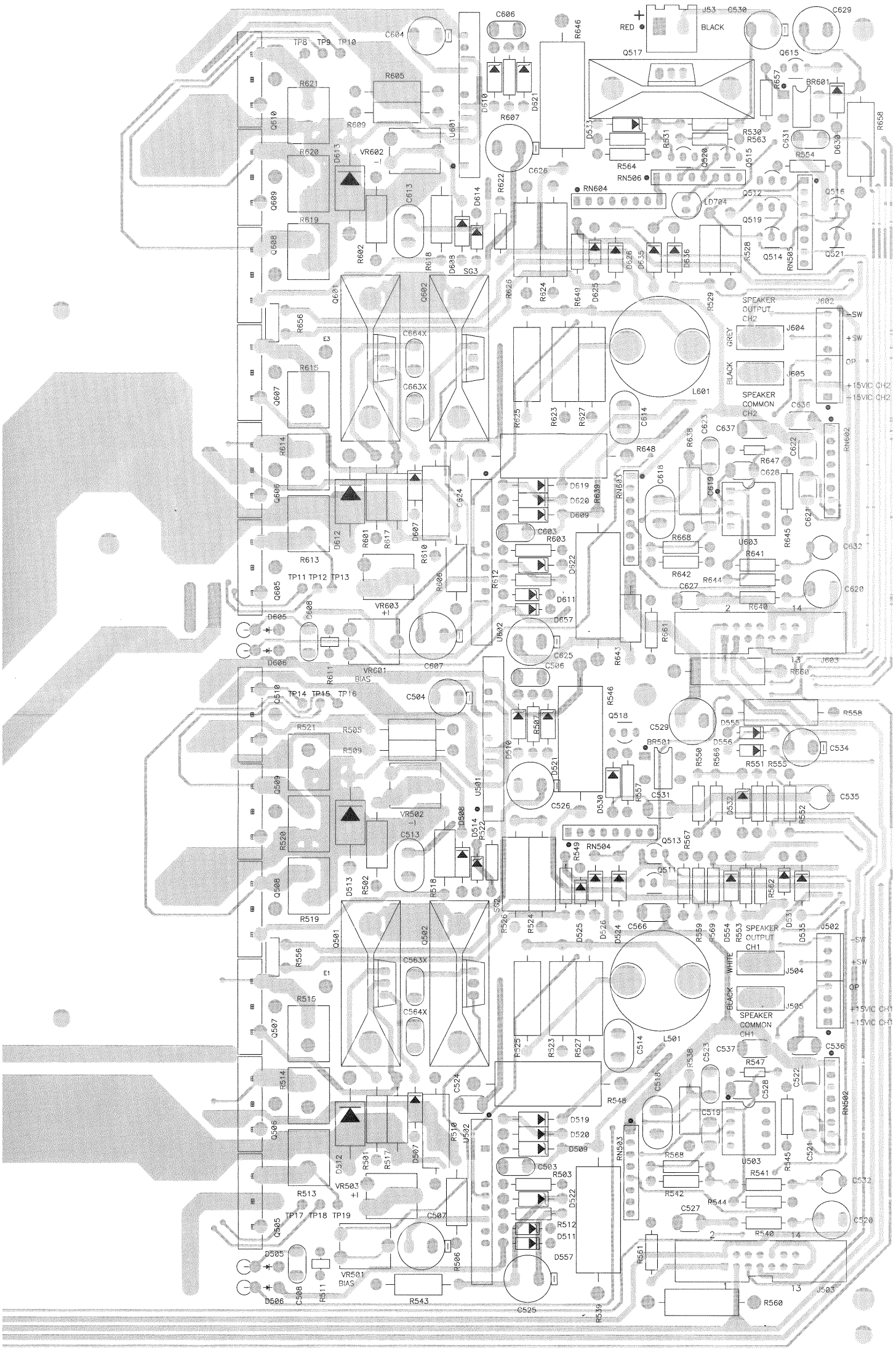
Power Status and Display Board PCB

Solder side



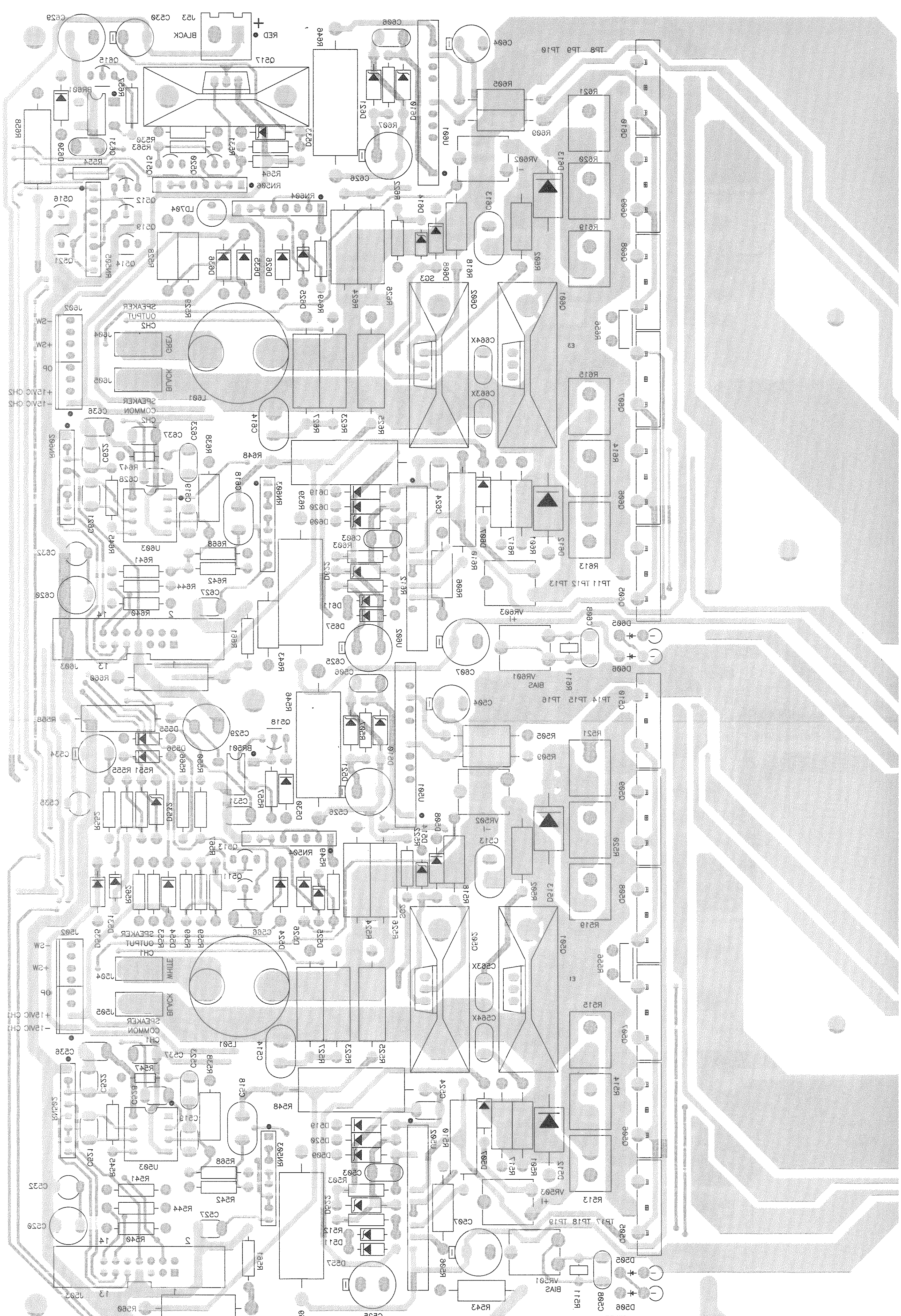

J708
R743
J705
J704
C782
C781
C707
C709
C784
C783
BR701
D705
T701
R708
R709
C771
R706
D740
G
C
E
Q701
R722
R719
C764
C708
C773
D710
R705
C728
T704
C765
Q702
D741
C726
R744
C780
R739
C732
T702
C776
L707
D711
L706
D712
C775
Q604
S D G
R608
C727
C723
C605
D602
R604
D720
C601
D601
C722
C731
Q603
D722
L705
D714
R712
C712
R703
C706
C735
C721
L708
D715
C734
C774
C777
C720
D701
L703
L702
D702
C770
Q504
C769
C713
R508
R504
D502
C703
C714
C704
C505
C716
D501
C702
C701
C715
C501
Q503
C768
C772
L701
D704
L704
D703
C747
TP6
TP7
D743
R746
C746
C749
C745
U709
C748
D723
C737
R741
R731
U710
R732
D735
R733
D737
D727
D739
D738
R745
R729
D742
C753
R730
C763
J703
C736
C755
R738
TP3
R737
RN702
Q706
RN704
D733
C758
C766
R740
BR702
R736
TP1
D732
R735
D731
C717
D728
D734
C754
U711
TP4
D730
C759
C718
D746
R748
D726
D747
C756
D729
C705
RN701
R734
R749
C778
C757
Q705
Q704
R747
L709
L710
Q703
U704
TP2
R750
C738
R751
C742
C761
C779
C785
C739
C743
U701
C760
D748
J706
TP5
1
5

ɟ PCB
t side

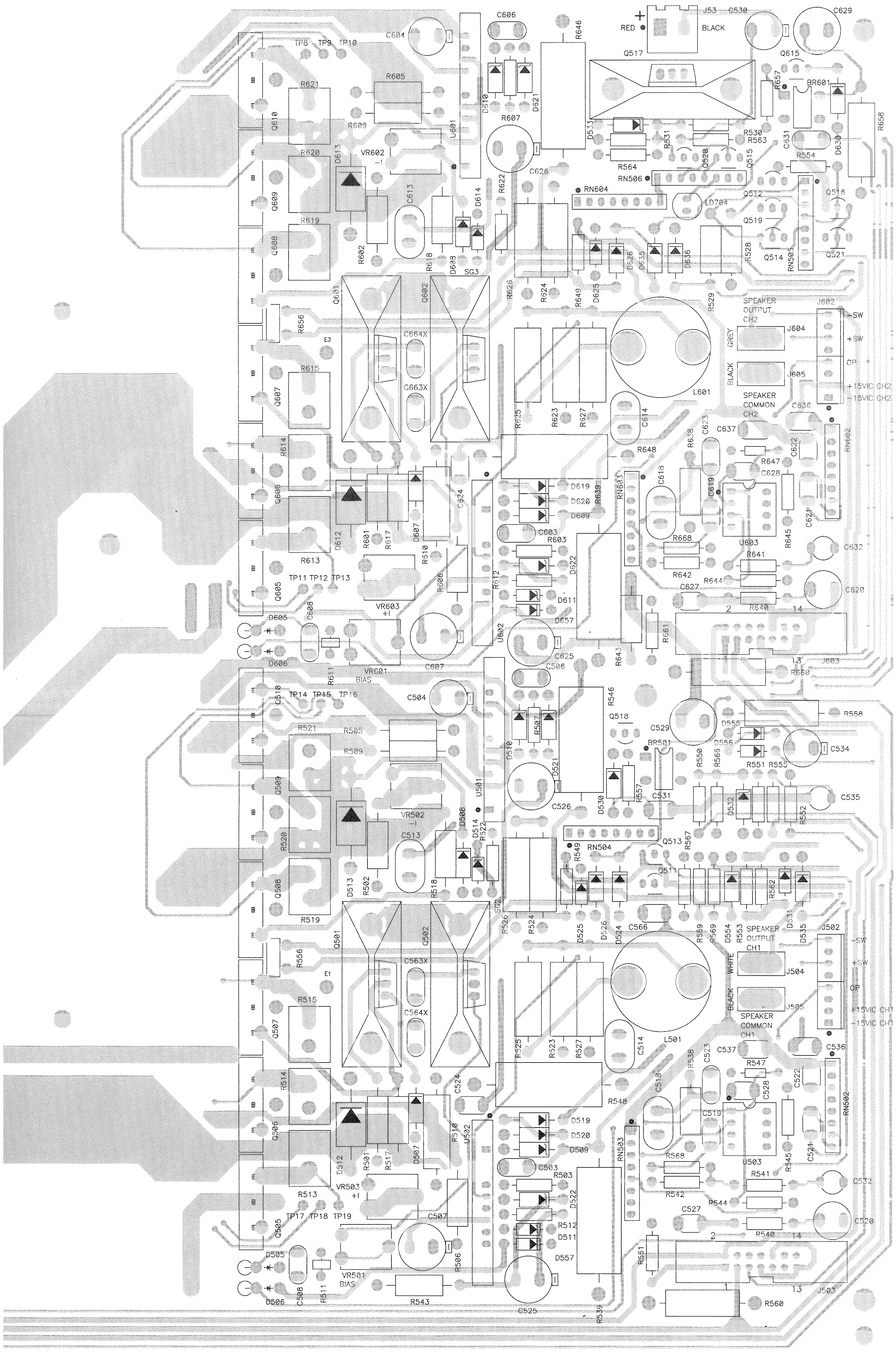

C606
C604
TP8 TP9 TP10
R646
RED
J53
C530
BLACK
C629
Q517
Q615
R621
R605
R657
BR601
R658
Q610
R609
D610
D521
U601
R607
D533
R530
R563
C631
D630
D613
VR602
R620
R531
Q520
Q515
R554
C626
R564
RN506
R622
RN604
Q512
Q516
Q609
D614
LD704
R619
Q519
Q608
R602
R618
D638
SG3
D626
D635
D636
R528
Q514
RN505
Q521
R626
R624
R649
D623
R529
SPEAKER
OUTPUT
CH2
J602
Q601
Q602
R656
E3
C664X
GREY
J604
+SW
-SW
OP
R615
C663X
BLACK
J605
+15VIC CH2
-15VIC CH2
L601
R625
R623
R527
C614
SPEAKER
COMMON
CH2
C636
C623
C637
R614
R648
R638
C622
RN602
R647
C628
C618
R639
RN601
D619
D620
D609
C624
C603
R603
R668
U603
R645
C621
Q606
D612
R601
R617
D607
R610
R613
R642
R641
C632
TP11 TP12 TP13
R606
R612
D522
R644
C627
C620
Q605
VR603
D611
D657
2
R640
14
C608
D605
U602
C625
C506
R643
R661
J3
J603
D606
C607
VR601
BIAS
R611
R660
Q510
TP14 TP15 TP16
C504
R546
R558
R521
R505
Q518
C529
D555
R509
D516
R507
D556
BR501
C534
R550
R566
R551
R555
Q509
D521
U501
C526
D530
R557
C531
D532
R552
C535
VR502
D508
D514
R522
C513
R567
Q513
RN504
R549
Q520
Q511
Q508
D513
R502
R518
S02
R562
R519
R526
R524
D525
D526
D524
C566
R569
R554
R553
SPEAKER
OUTPUT
CH1
D535
J502
Q501
Q502
R556
E1
C563X
WHITE
J504
-SW
+SW
OP
+15VIC CH1
-15VIC CH1
R515
C564X
BLACK
J505
SPEAKER
COMMON
CH1
Q507
R525
R523
R527
C514
L501
C537
C536
R538
C523
R547
C524
C518
C522
C528
R514
R548
RN502
D519
D520
D509
Q506
R510
U502
C519
RN503
R568
U503
R545
C521
D512
R501
R517
D507
C503
R503
R541
C532
R513
VR503
D522
R542
R544
C527
TP17 TP18 TP19
C507
R512
D511
C520
Q505
R540
14
2
D505
R561
D557
R506
VR501
BIAS
1
13
U503
D506
C508
R511
R543
R560
C525
R539

Main E

Sol



d PCB
t side


RED
BLACK
J53
TP8 TP9 TP10
TP11 TP12 TP13
TP14 TP15 TP16
TP17 TP18 TP19
VR601
BIAS
VR501
BIAS
VR602
VR603
VR502
VR503
SPEAKER OUTPUT CH2
GREY
J604
BLACK
J605
SPEAKER COMMON CH2
J602
-SW
+SW
OP
+15VIC CH2
-15VIC CH2
SPEAKER OUTPUT CH1
WHITE
J504
BLACK
J505
SPEAKER COMMON CH1
J502
-SW
+SW
OP
+15VIC CH1
-15VIC CH1
J603
J503
L601
L501
SG2
SG3
E1
E3

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