



POWER AMPLIFIER SERVICE MANUAL

Macro-Tech

MA-3600VZ

Some models may be exported under the name *Amcron[®]*

© 2000 by Crown International, Inc., P.O. Box 1000, Elkhart, Indiana 46515-1000 U.S.A.
Telephone: 219-294-8000. Trademark Notice: *PIP[™]*, *Grounded Bridge[™]*, and *SmartAmp[™]*
are trademarks and *Amcron[®]*, *Crown[®]*, *Macro-Tech[®]*, *IOC[®]*, *ODEP[®]* and *IQ System[®]* are
registered trademarks of Crown International, Inc. Other trademarks are the property
of their respective owners.

H A Harman International Company

130366-1
11-00
Rev. A

The information furnished in this manual does not include all of the details of design, production, or variations of the equipment. Nor does it cover every possible situation which may arise during installation, operation or maintenance. If you need special assistance beyond the scope of this manual, please contact the Crown Technical Support Group.

Mail: P.O. Box 1000 Elkhart IN 46515-1000
Shipping: Plant 2 SW 1718 W. Mishawaka Road Elkhart IN 46517
Phone: (800) 342-6939 / (219) 294-8200
FAX: (219) 294-8301

<div data-bbox="435 646 727 741" data-label="Section-Header"> <h3>CAUTION</h3> </div> <div data-bbox="321 787 836 1045" data-label="Text"> <p>TO PREVENT ELECTRIC SHOCK DO NOT REMOVE TOP OR BOTTOM COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. DISCONNECT POWER CORD BEFORE REMOVING REAR INPUT MODULE TO ACCESS GAIN SWITCH.</p> </div>	<div data-bbox="933 646 1226 741" data-label="Section-Header"> <h3>AVIS</h3> </div> <div data-bbox="889 819 1274 1077" data-label="Text"> <p>À PRÉVENIR LE CHOC ÉLECTRIQUE N'ENLEVEZ PAS LES COUVERTURES. RIEN DES PARTIES UTILES À L'INTÉRIEUR. DÉBRANCHER LA BORNE AVANT D'OUVRIR LA MODULE EN ARRIÈRE.</p> </div>
---	--



WARNING

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE!



The lightning bolt triangle is used to alert the user to the risk of electric shock.



The exclamation point triangle is used to alert the user to important operating or maintenance instructions.

Revision History

Revision Number	Date	Comments
Rev. A	11-2000	Initial Printing

This page intentionally left blank

Table of Contents

1 Introduction	1-1
1.1 Introduction.....	1-1
1.2 The Macro-Tech Series Amplifiers	1-1
1.3 Scope.....	1-1
1.4 Warranty.....	1-1
2 Specifications	2-1
2.1 Performance	2-1
2.2 Power	2-1
2.3 Controls.....	2-1
2.4 Indicators	2-1
2.5 Input/Output.....	2-2
2.6 Protection.....	2-2
2.7 Construction.....	2-2
3 Theory of Operation	3-1
3.1 Overview	3-1
3.2 Features	3-1
3.3 Front End Operation.....	3-1
3.4 Voltage Amplification	3-2
3.5 Grounded Bridge Topology	3-2
3.6 Output Device Emulation Protection (ODEP).....	3-4
3.7 VZ Power.....	3-4
4 Maintenance	4-1
4.1 Cautions and Warnings.....	4-1
4.2 General Information	4-1
4.3 Test Procedures	4-1
5 Parts	5-1
5.1 General Information	5-1
5.2 Ordering and Receiving Parts	5-1
5.3 Mechanical Parts	5-1
5.4 Circuit Board Parts.....	5-19
6 Schematic Diagrams	6-1

This Page Intentionally Left Blank

1 Introduction

1.1 Introduction

This manual contains complete service information on the *Crown*[®] MA-3600VZ power amplifier. It is designed to be used in conjunction with the Reference Manual; however, some important information is duplicated in this Service Manual in case the Reference Manual is not readily available.



NOTE: THE INFORMATION IN THIS MANUAL IS INTENDED FOR USE BY AN EXPERIENCED TECHNICIAN ONLY!

1.2 The Macro-Tech Series Amplifiers

The *Macro-Tech*[®] series is a complete family of amplifiers designed for pro sound reinforcement. Macro-Tech amplifiers are designed to provide enormous levels of pure, undistorted power in a rugged low-profile package, utilizing Crown's patented *Grounded Bridge*[™] output topology. They also employ Crown's patented *ODEP*[®] protection circuitry, which keeps the amplifier working under extreme conditions that would shut down a lesser amplifier. The MA-3600VZ features Crown's *PIP*[™] (Programmable Input Processor) expansion system. The PIP expansion system makes it easy to tailor the amplifier to a specific application. Providing high power amplification from 20 Hz to 20 kHz with minimum distortion, *Macro-Tech* series amplifiers

feature balanced inputs with bridged and parallel monophonic capability. Specific features vary depending on model.

1.3 Scope

This Service Manual is intended to apply to all versions of the MA-3600VZ amplifier. The Parts Listings include parts specific for the US version and the European version (E17CE). For parts specific only to other versions contact the Crown Technical Support Group for help in finding part numbers.

1.4 Warranty

Each Reference Manual contains basic policies as related to the customer. In addition, it should be stated that this service documentation is meant to be used only by properly trained personnel. Because most Crown products carry a 3-Year Full Warranty (including round trip shipping within the United States), all warranty service should be referred to the Crown Factory or Authorized Warranty Service Center. See the applicable Reference Manual for warranty details. To find the location of the nearest Authorized Warranty Service Center or to obtain instructions for receiving Crown Factory Service, please contact the Crown Technical Support Group (within North America), or your Crown/Amcron Importer (outside North America). If you are an Authorized Warranty Service Center and have questions regarding the warranty of a product, please contact the Field Service Manager or the Technical Support Group.

Crown Customer Service

Technical Support Group
Factory Service
Parts Department

Mailing Address: P.O. Box 1000, Elkhart IN 46515

Shipping Address: Plant 2 S. W.

1718 W. Mishawaka Rd., Elkhart IN 46517

Phone: (219) 294-8200

Toll Free: (800) 342-6939

Fax: (219) 294-8301

<http://www.crownaudio.com>

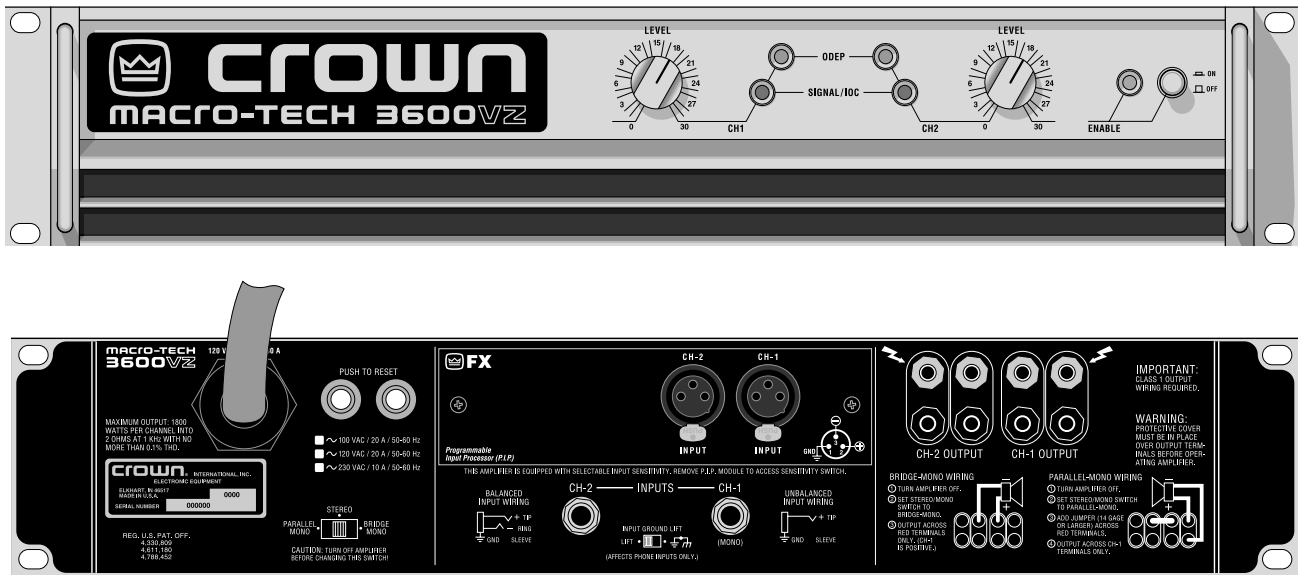


Figure 1.1 MA-3600VZ Front and Rear Views

2 Specifications

These specifications apply to 120 VAC units in stereo mode with 8 ohm loads and an input sensitivity of 26 dB unless otherwise specified.

120 VAC, 60 Hz Units: These units are equipped with transformers rated for 120 VAC, 60 Hz power.

International Units: These units are equipped with transformers for either 100 VAC, 50/60 Hz, or 230 VAC, 50/60 Hz power.

2.1 Performance

Frequency Response: ± 0.1 dB from 20 Hz to 20 kHz at 1 watt.

Phase Response: $\pm 10^\circ$ from 10 Hz to 20 kHz at 1 watt.

Signal-to-Noise Ratio: Greater than 105 dB below rated output (20 Hz to 20 kHz, A-weighted); 100 dB below rated output (20 Hz to 20 kHz, no weighting).

Harmonic Distortion (THD): At rated output, less than 0.05% from 20 Hz to 1 kHz increasing linearly to less than 0.1% at 20 kHz.

IM Distortion (IMD): Less than 0.05% from 368 milliwatts to full rated output.

Damping Factor: Greater than 1,000 from 10 Hz to 400 Hz.

Crosstalk: See Figure 2.1.

Slew Rate: Greater than 30 volts per microsecond.

Voltage Gain: (At maximum output) 20:1 $\pm 3\%$ or 26 dB ± 0.25 dB at +26 dB sensitivity, and 124.6:1 $\pm 12\%$ or 41.9 dB ± 1.0 dB at 0.775 volt sensitivity.

2.2 Power

Output Power:

Note: Maximum average watts per channel (unless in Mono mode) at 1 kHz with 0.1% or less THD.

120 VAC, 60 Hz Units:

Stereo mode with both channels driven:

1800	watts into 2 ohms.
1565	watts into 4 ohms.
1120	watts into 8 ohms.

Bridge-Mono mode:

3505	watts into 4 ohms.
3140	watts into 8 ohms.

Parallel-Mono mode:

3555	watts into 1 ohm.
3190	watts into 2 ohms.

100 VAC International Units:

Stereo mode with both channels driven:

1460	watts into 2 ohms.
1300	watts into 4 ohms.
980	watts into 8 ohms.

Bridge-Mono mode:

2835	watts into 4 ohms.
2625	watts into 8 ohms.

Parallel-Mono Mode

2820	watts into 1 ohm.
2585	watts into 2 ohms.

120 VAC International Units:

Stereo mode with both channels driven:

1490	watts into 2 ohms.
1300	watts into 4 ohms.
985	watts into 8 ohms.

Bridge-Mono mode:

2980	watts into 4 ohms.
2600	watts into 8 ohms.

Parallel-Mono Mode

2980	watts into 1 ohm.
2600	watts into 2 ohms.

230 VAC International Units:

Stereo mode with both channels driven:

1520	watts into 2 ohms.
1325	watts into 4 ohms.
965	watts into 8 ohms.

Bridge-Mono mode:

2800	watts into 4 ohms.
2515	watts into 8 ohms.

Parallel-Mono Mode

2910	watts into 1 ohm.
2565	watts into 2 ohms.

Load Impedance: Rated for 16, 8, 4, and 2 ohm use only. Safe with all types of loads, even reactive ones.

AC Power Requirements: 100 VAC, 50/60 Hz; 120 VAC, 50/60 Hz; and 230 VAC, 50/60 Hz units are available. 230 VAC, 50/60 Hz units can be used with 220 and 240 VAC. All versions draw 90 watts or less at idle. 100 and 120 VAC units can draw up to 30 amps of current; 230 VAC units can draw up to 15 amps. Refer to the back panel for your unit's specifications.

2.3 Controls

Enable: A front panel push button used to turn the amplifier on and off.

Level: A 31-position detented rotary attenuator for each channel located on the front panel used to control the output level.

Stereo/Mono: A three-position back panel switch used to select Stereo, Bridge-Mono or Parallel-Mono operation.

Sensitivity: A three-position switch located inside the PIP compartment used to select one of three input sensitivities for both channels: 0.775 volts or 1.4 volts for standard 1 kHz power or a voltage gain of 26 dB.

Input Ground Lift: A two position back panel switch used to isolate the phone jack signal grounds from the chassis (AC) ground.

Reset: A back panel button for each channel used to reset the corresponding power supply. 100 and 120 VAC units have 15 amp circuit breakers. 230 VAC units have 7.5 amp circuit breakers.

2.4 Indicators

Enable: This amber indicator is on when the amplifier is switched on to show that the low voltage power supply is operating.

Signal / IOC: Two green indicators flash with medium intensity in sync with the amplifier's outputs to show signal pres-

ence. In the unlikely event the output waveform differs from that of the input by 0.05% or more, they flash brightly to indicate distortion. As sensitive distortion indicators they provide proof of performance. Note: It is normal for the Channel 2 IOC indicator to remain on in Parallel-Mono mode.

ODEP: Each channel has a multifunction LED (light emitting diode) indicator that shows the channel's energy reserve status. Normally, the LEDs are brightly lit to show that reserve energy is available. An indicator will dim proportionally as the energy reserve for its channel decreases. In the rare event that a channel has no reserve energy, the indicator turns off and ODEP proportionally limits the channel's output drive level so the amplifier can continue safe operation even when conditions are severe.

2.5 Input/Output

Input Connector: Balanced 1/4-inch phone jacks on chassis and internal PIP connector. (Balanced 3-pin XLR connectors are provided on the P.I.P.-FX which is a standard feature.)

Input Impedance: Nominally 20 k ohms, balanced. Nominally 10 K ohms, unbalanced.

Input Sensitivity: Switchable between 0.775 V (unbalanced) for rated output or a fixed voltage gain of 26 dB.

Output Connector: Color-coded dual binding posts (banana jacks).

Output Impedance: Less than 10 milliohms in series with less than 2 microhenries.

DC Output Offset: (Shorted input) ± 10 millivolts.

Output Signal;

Stereo: Unbalanced, two-channel,

Bridge-Mono: Balanced, single-channel. Channel 1 controls are active; Channel 2 controls are inactive and not removed from operation,

Parallel-Mono: Unbalanced, single-channel. Channel 1 controls are active; Channel 2 controls are inactive but not removed from operation.

2.6 Protection

Macro-Tech amplifiers are protected against shorted, open or mismatched loads; overloaded power supplies; excessive temperature, chain destruction phenomena, input overload damage and high-frequency blow-ups. They also protect loudspeakers from input/output DC and turn-on/turn-off transients.

If unreasonable operating conditions occur, the patented ODEP circuitry proportionally limits the drive level to protect the output devices, particularly in the case of elevated temperature. Transformer overheating results in a temporary shutdown of the offending channel. When it has cooled to a safe temperature, the transformer automatically resets itself. Controlled slew rate voltage amplifiers protect against RF burnouts, and input overload protection is provided by current-limiting resistance at the input.

Turn On: The four second turn-on delay prevents dangerous turn-on transients. Turn-on occurs at zero crossing of the AC waveform, so power sequencers are rarely needed with multiple units. Note: The turn-on delay time may be changed. Contact Crown's Technical Support Group for details.

Circuit Breaker: Circuit breaker current ratings vary based on the AC operating power.

2.7 Construction

Durable black powder coated steel chassis and aluminum front panel with Lexan overlay; specially designed "flow-through" ventilation from front to side panels.

Cooling: Forced-air with custom heat diffusers and patented circuitry to promote uniform dissipation.

Dimensions: 19 inch (48.3 cm) standard rack mount (EIA Std. RS-310-B), 3.5 inch (8.9 cm) height, 16 inch (40.6 cm) depth behind mounting surface and 2.5 inches (6.4 cm) in front of mounting surface (see Figure 2.2).

Approximate Weight: Center of gravity is 6 inches (15.2 cm) behind the front mounting surface.

120 VAC, 60 Hz Units:

Net weight 55 lbs, 1.5 ounces (25.0 kg); shipping weight 63 lbs, 10 ounces (28.9 kg).

100 VAC International Units:

Net weight 54 lbs, 5 ounces (24.7 kg); shipping weight 63 lbs, 0.5 ounces (28.6 kg).

120 VAC International Units:

Net weight 55 lbs, 1.5 ounces (25.0 kg); shipping weight 63 lbs, 10 ounces (28.9 kg).

230 VAC International Units:

Net weight 53 lbs, 6 ounces (24.2 kg); shipping weight 61 lbs, 15 ounces (28.1 kg).

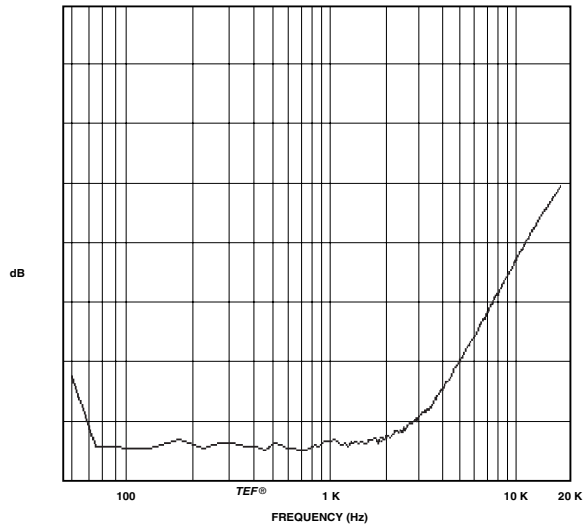


Figure 2.1 Typical Crosstalk

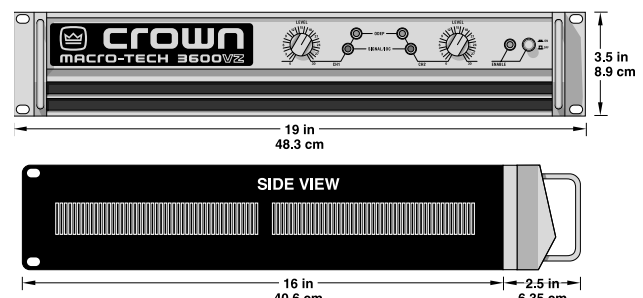


Figure 2.2 Dimensions

3 Theory of Operation

3.1 Overview

It should be noted that over time Crown makes improvements and changes to their products for various reasons. This manual is up to date as of the time of writing. For additional information regarding these amplifiers, refer to the applicable Technical Notes provided by Crown for this product.

This section of the manual explains the general operation of a Macro-Tech 3600VZ power amplifier. Topics covered include Front End, Grounded Bridge, ODEP, and VZ supply. Due to variations in design from vintage to vintage (and similarities with other Crown products) the theory of operation remains simplified.

3.2 Features

Macro Tech amplifiers utilize numerous Crown innovations including grounded bridge and ODEP technologies. Cooling techniques make use of the what is essentially air conditioner technology. Air flows bottom to top, and front to side. Air flows a short distance across a wide heatsink. This type of air flow provides significantly better cooling than the “wind tunnel” technology used by many other manufacturers. Output transistors are of the metal can type rather than plastic case. This allows for a significantly higher thermal margin for the given voltage and current ratings. All devices used are tested and graded to ensure maximum reliability. Another electronic technique used is negative feedback. Almost all power amplifiers utilize negative feedback to control gain and provide stability, but Crown uses multiple nested feedback loops for maximum stability and greatly improved damping. Most Crown amplifiers have damping in excess of 1000 in the bass frequency range. This feedback, along with our compensation and ultra-low distortion output topology, makes Crown amplifiers superior.

Features specific to the Macro Tech Series' include two separate power transformers (one for each channel), a full time full speed fan which also serves as the low voltage transformer, slew rate limiting, and audio muting for delay or protective action. This amplifier can operate in either a Bridged or Parallel Mono mode as well as dual (stereo). A sensitivity switch allows selection of input voltage required for rated output. Level controls are mounted on the

front panel and are of the rotary type. Front panel indicators let the user know the status of the low voltage power supply (enable), an ODEP indicator for each channel which shows the reserve energy status, and a SPI/IOC indicator for each channel which indicates signal output and distortion. In general, the packaging of this model is designed for maximum watt/price/weight/size value with user friendly features.

For additional details refer to the specification section, or to the applicable Owner's Manual.

3.3 Front End Operation

The front end is comprised of three stages: Balanced Gain Stage (BGS), Variable Gain Stage (VGS), and the Error Amp. Figure 3.1 shows a simplified diagram of a typical front end with voltage amplification stages.

3.3.1 Balanced Gain Stage (BGS)

Input to the amplifier is balanced. The shield may be isolated from chassis ground by an RC network to interrupt ground loops via the Ground Lift Switch. The non-inverting (hot) side of the balanced input is fed to the non-inverting input of the first op-amp stage. The inverting (negative) side of the balanced input is fed to the inverting input of the first op-amp stage. A potentiometer is provided for common mode rejection adjustment. Electrically, the BGS is at unity gain. (From an audio perspective, however, this stage actually provides +6dB gain if a fully balanced signal is placed on its input.) The BGS is a non-inverting stage. Its output is delivered to the Variable Gain Stage.

3.3.2 Variable Gain Stage (VGS)

From the output of the BGS, the signal goes to the VGS where gain is determined by the position of the Sensitivity Switch, and level is determined by the level control. VGS is an inverting stage with the input being fed to its op-amp stage. Because gain after this stage is fixed at 26dB (factor of 20), greater amplifier sensitivity is achieved by controlling the ratio of feedback to input resistance. The Sensitivity Switch sets the input impedance to this stage and varies the gain such that the overall amplifier gain is 26 dB, or is adjusted appropriately for 0.775V or 1.4V input to attain rated output.

3.3.3 Error Amp

The inverted output from the VGS is fed to the non-inverting input of the Error Amp op-amp stage through

an AC coupling capacitor and input resistor. Amplifier output is fed back via the negative feedback (NFb) loop resistor. The ratio of feedback resistor to input resistor fixes gain from the Error Amp input to the output of the amplifier at 26 dB. Diodes prevent overdriving the Error Amp. Because the Error Amp amplifies the difference between input and output signals, any difference in the two waveforms will produce a near open loop gain condition which in turn results in high peak output voltage. The output of the Error Amp, called the Error Signal (ES) drives the Voltage Translators.

3.4 Voltage Amplification

The Voltage Translator stage separates the output of the Error Amp into balanced positive and negative drive voltages for the Last Voltage Amplifiers (LVAs), translating the signal from ground referenced $\pm 15V$ to $\pm V_{CC}$ reference. LVAs provide the main voltage amplification and drive the High Side output stages. Gain from Voltage Translator input to amplifier output is a factor of 25.2.

3.4.1 Voltage Translators

A voltage divider network splits the Error Signal (ES) into positive and negative drive signals for the balanced voltage translator stage. These offset reference voltages drive the input to the Voltage Translator transistors. A nested NFb loop from the output of the amplifier mixes with the inverted signal riding on the offset references. This negative feedback fixes gain at the offset reference points (and the output of the Error Amp) at a factor of -25.2 with respect to the amplifier output. The Voltage Translators are arranged in a common base configuration for non-inverting voltage gain with equal gain. They shift the audio from the $\pm 15V$ reference to V_{CC} reference. Their outputs drive their respective LVA.

Also tied into the Voltage Translator inputs are ODEP limiting transistors and control/protection transistors. The ODEP transistors steal drive as dictated by the ODEP circuitry (discussed later). The control/protection transistors act as switches to totally shunt audio to ground during the turn-on delay, or during a DC/LF or Fault protective action.

3.4.2 Last Voltage Amplifiers (LVAs)

The Voltage Translator stage channels the signal to the Last Voltage Amplifiers (LVA's) in a balanced configuration. The +LVA and -LVA, with their push-pull effect through the Bias Servo, drive the fully complementary output stage. The LVAs are configured as common emitter amplifiers. This configuration provides sufficient voltage gain and inverts the audio. The polarity inversion is necessary to avoid an overall polarity inversion from input jack to output jack, and it allows the NFb loop to control Error Amp gain by feeding back to its non-inverting input (with its polarity opposite to the output of the VGS). With the added voltage swing provided by the LVAs, the signal then gains current amplification through the Darlington emitter-follower output stage.

3.5 Grounded Bridge Topology

Figure 3.2 is a simplified example of the grounded bridge output topology. It consists of four quadrants of three deep Darlington (composite) emitter-follower stages per channel: one NPN and one PNP on the High Side of the bridge (driving the load), and one NPN and one PNP on the Low Side of the bridge (controlling the ground reference for the rails). The output stages are biased to operate class AB+B for ultra low distortion in the signal zero-crossing region and high efficiency.

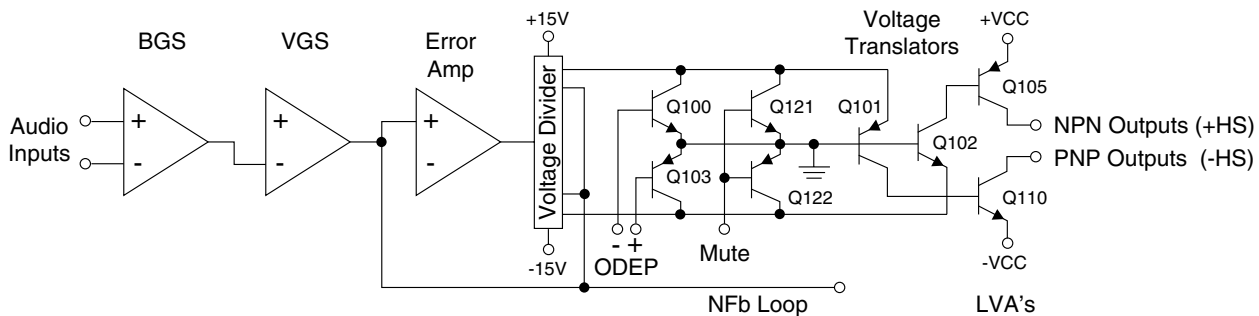


Figure 3.1 Typical Amplifier Front End and Voltage Amplification Stages.

3.5.1 High Side (HS)

The High Side (HS) of the bridge operates much like a conventional bipolar push-pull output configuration. As the input drive voltage becomes more positive, the HS NPN conducts and delivers positive voltage to the load. Eventually the NPN devices reach full conduction and +Vcc is across the load. At this time the HS PNP is biased off. When the drive signal is negative going, the HS PNP conducts to deliver -Vcc to the load and the HS NPN stage is off.

The output of the +LVA drives the base of predriver device. Together, the predriver and driver form the first two parts of the three-deep Darlington and are biased class AB. They provide output drive through the bias resistor, bypassing the output devices, at levels below about 100mW. An RLC network between the predriver and driver provide phase shift compensation and limit driver base current to safe levels. Output devices are biased class B, just below cutoff. At about 100mW output they switch on to conduct high current to the load. Together with predriver and driver, the output device provide an overall class AB+B output.

The negative half of the HS is almost identical to the positive half, except that the devices are PNP. One difference is that the PNP bias resistor is slightly greater in value so that PNP output devices run closer to the cutoff level under static (no signal) conditions. This is because PNP devices require greater drive current.

HS bias is regulated by Q18, the Bias Servo. Q18 is a Vbe multiplier which maintains approximately 3.3V Vce under static conditions. The positive and negative halves of the HS output are in parallel with this 3.3V. With a full base-emitter on voltage drop across predrivers and drivers, the balance of voltage results in approximately .35V drop across the bias resistors in the positive half, and about .5V across the bias resistor in the negative half. Q18 conduction (and thus bias) is adjustable.

A diode string prevents excessive charge build up within the high conduction output devices when off. Flyback diodes shunt back-EMF pulses from reactive loads to the power supply to protect output devices from dangerous reverse voltage levels. An output terminating circuit blocks RF on output lines from entering the amplifier through its output connectors.

3.5.2 Low Side (LS)

The Low Side (LS) operates quite differently. The power supply bridge rectifier is not ground referenced, nor is the secondary of the main transformer. In other words, the high voltage power supply floats with respect to ground, but $\pm V_{cc}$ remain constant with respect to each other. This allows the power supply to deliver +Vcc and -Vcc from the same bridge rectifier and filter as a total difference in potential, regardless of their voltages with respect to ground. The LS uses inverted feedback from the HS output to control the ground reference for the rails ($\pm V_{cc}$). Both LS quadrants are arranged in a three-deep Darlington

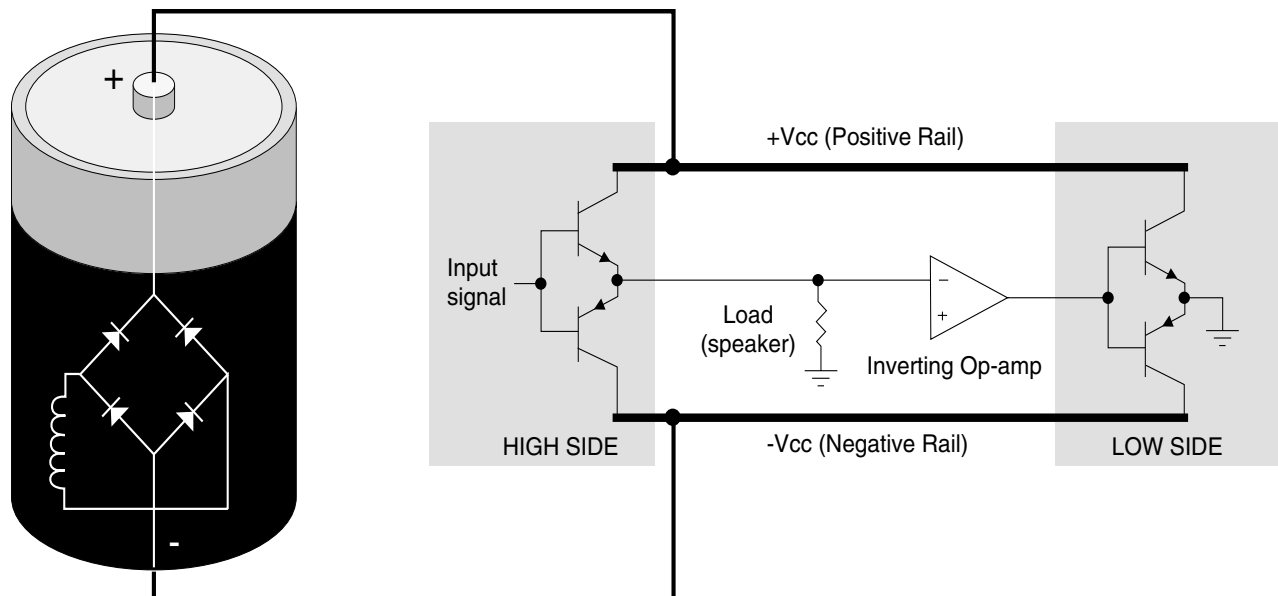


Figure 3.2 Grounded Bridge Output Topology

and are biased AB+B in the same manner as the HS.

When the amplifier output swings positive, the audio is fed to an op-amp stage where it is inverted. This inverted signal is delivered directly to the bases of the positive (NPN) and negative (PNP) LS predrivers. The negative drive forces the LS PNP devices on (NPN off). As the PNP devices conduct, V_{ce} of the PNP Darlington drops. With LS device emitters tied to ground, $-V_{cc}$ is pulled toward ground reference. Since the power supply is not ground referenced (and the total voltage from $+V_{cc}$ to $-V_{cc}$ is constant) $+V_{cc}$ is forced higher above ground potential. This continues until, at the positive amplifier output peak, $-V_{cc} = 0V$ and $+V_{cc}$ equals the total power supply potential with a positive polarity. If, for example, the power supply produced a total of 70V from rail to rail ($\pm 35V_{DC}$ measured from ground with no signal), the amplifier output would reach a positive peak of +70V.

Conversely, during a negative swing of the HS output where HS PNP devices conduct, the op-amp would output a positive voltage forcing LS NPN devices to conduct. This would result in $+V_{cc}$ swinging toward ground potential and $-V_{cc}$ further from ground potential. At the negative amplifier output peak, $+V_{cc} = 0V$ and $-V_{cc}$ equals the total power supply potential with a negative polarity. Using the same example as above, a 70V supply would allow a negative output peak of -70V. In summary, a power supply which produces a total of 70VDC rail to rail (or $\pm 35V_{DC}$ statically) is capable of producing 140V peak-to-peak at the amplifier output when the grounded bridge topology is used. The voltage used in this example are relatively close to the voltages of the PB-1/460CSL.

The total effect is to deliver a peak to peak voltage to the speaker load which is twice the voltage produced by the power supply. Benefits include full utilization of the power supply (it conducts current during both halves of the output signal; conventional designs require two power supplies per channel, one positive and one negative), and never exposing any output device to more than half of the peak to peak output voltage (which does occur in conventional designs).

Low side bias is established by a diode string which also shunts built up charges on the output devices. Bias is adjustable via potentiometer. Flyback diodes perform the same function as the HS flybacks. The output of the LS is tied directly to chassis ground via ground strap.

3.6 Output Device Emulation Protection (ODEP)

To further protect the output stages, a specially developed ODEP circuit is used. It produces a complex analog output signal. This signal is proportional to the always changing safe-operating-area margin of the output transistors. The ODEP signal controls the Voltage Translator stage by removing drive that may exceed the safe-operating-area of the output stage.

ODEP senses output current by measuring the voltage dropped across LS emitter resistors. LS NPN current (negative amplifier output) and $+V_{cc}$ are sensed, then multiplied to obtain a signal proportional to output power. Positive and negative ODEP voltages are adjustable via two potentiometers. Across $\pm ODEP$ are a PTC and a thermal sense (current source). The PTC is essentially a cutoff switch that causes hard ODEP limiting if heatsink temperature exceeds a safe maximum, regardless of signal level. The thermal sense causes the differential between $+ODEP$ and $-ODEP$ to decrease as heatsink temperature increases. An increase in positive output signal output into a load will result in $-ODEP$ voltage dropping; an increase in negative output voltage and current will cause $+ODEP$ voltage to drop. A complex RC network between the $\pm ODEP$ circuitry is used to simulate the thermal barriers between the interior of the output device die (immeasurable by normal means) and the time delay from heat generation at the die until heat dissipates to the thermal sensor. The combined effects of thermal history and instantaneous dynamic power level result in an accurate simulation of the actual thermal condition of the output transistors.

3.7 VZ Power

VZ means Variable Impedance and is the name of Crown's patented articulated power supply technology. It enables Crown to pack tremendous power into just 3½ inches of vertical rack space.

3.7.1 Background

A power supply must be large enough to handle the maximum voltage and current necessary for the amplifier to drive its maximum rated power into a specified load. In the process of fulfilling this requirement conventional power supply designs produce excessive heat, are heavy, and take up precious real estate. It's no secret that heat is one of a power amplifiers worst enemies.

According to Ohm's Law, the bigger the power supply, the more heat the power transistors must dissipate. Also, the lower the resistance of the power transistors, the more voltage you can deliver to the load. But at the same time that you lower the resistance of the transistors, you increase the current passing through them, and again increase the amount of heat they must dissipate.

3.7.2 The VZ supply

An articulated power supply, like VZ, can circumvent much of this problem by reducing the voltage applied to the transistors when less voltage is required. Reducing the voltage reduces the heat. Since the amplifier runs cooler, you can safely pack more power into the chassis.

The VZ supply is divided into segments to better match the voltage and current requirements of the power transistors. Remember that audio signals like music are complex waveforms.

For music the average level is always much less than the peak level. This means a power supply does not need to produce full voltage all the time.

The VZ supply is divided into two parts. When the voltage requirements are not high, it operates in a parallel mode to produce less voltage and more current (Figure 3.3). In this mode the power transistors stay cooler and are not forced to needlessly dissipate heat. This is the normal operating mode of the VZ power supply.

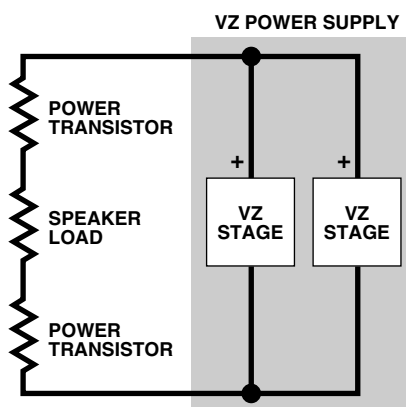


Figure 3.3 VZ Supply in Parallel Mode

When the voltage requirements are high the VZ supply switches to a series mode to produce the higher voltage and less current (Figure 3.4). The amplified output signal never misses a beat and gets full voltage when it needs it—not when it doesn't need it.

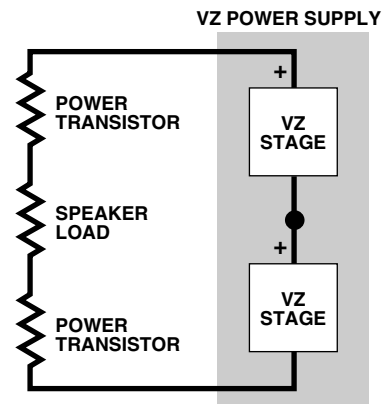


Figure 3.4 VZ Supply in Series Mode

Sensing circuitry watches the voltage of the signal to determine when to switch modes. The switching circuitry is designed to prevent audible switching distortion to yield the highest dynamic transfer function—you hear only the music and not the amplifier. You get not only the maximum power with the maximum safety, you also get the best power matching to your load.

3.7.3 VZ Switch Control

The two halves of U03 form identical comparators that monitor the available voltage of DC supply V2 and compare it to the output voltage of the amplifier. When a positive going output voltage exceeds a predetermined ratio of the available supply voltage, U03 pin 1 produces a low voltage triggering U04. When triggered, the "Q" output of U04 changes from low to high driving the gates of FET's Q00, Q01, and Q02. The other half of U03 (pin 7) reacts to negative going output voltage. Both halves of U03 receive V2 and amplifier output voltage differentially.

The time constant set by C18 and R16 on the input of U04 sets the maximum switch frequency of the supply. This time constant forces the supply to stay in the series mode regardless of amplifier condition for 200 ms. The reset pin of U04 (pin 4) forces the output of U04 low when FET damage conditions exist.

C16 and C17 provide hysteresis around the comparators of U03 to insure stable operation.

VZ Protection Circuit

Protecting high current transistors can be troublesome in circuits that do not provide convenient current sample points. FETs Q00-Q02 fall into this class of problems, but protection has been designed based on the following two conditions being present at the same time:

- Higher than normal on-state drain to source voltage
- Gate drive present.

When both of these conditions exist, a reasonable assumption can be made that the FETs are operating in an area that if sustained will cause damage to the FETs. These two conditions are detected by U05 pins 5 and 7.

U05 detects gate drive to the FETs at pin 7. Pin 6 is a reference input with the reference voltage set by R22 in series with R19.

U05 detects excessive source to drain voltage on the

FETs at pin 5. R17 in series with R18 forms a voltage divider to pin 5 of U05. The reference is set by a voltage divider formed by R29, R20, and R22.

When both conditions are detected the outputs of U05 (pins 1 and 2) allow C20 to start charging through R23. After 20µS, C20 will be sufficiently charged to turn on the section of U05 whose output is pin 14, discharging C21. As C21 discharges, it turns on Q03 which pulls the non-inverting input low (pin 9). U05 pin 13 drives the reset pin of U04 low which removes gate drive from the FETs. This hysteresis makes the circuit auto-resetting. Every 10ms (set by C21 and R26) it will make another 20µs try at driving the FETs. R25 prevents Q03 from pulling the input of U05 below its negative supply.

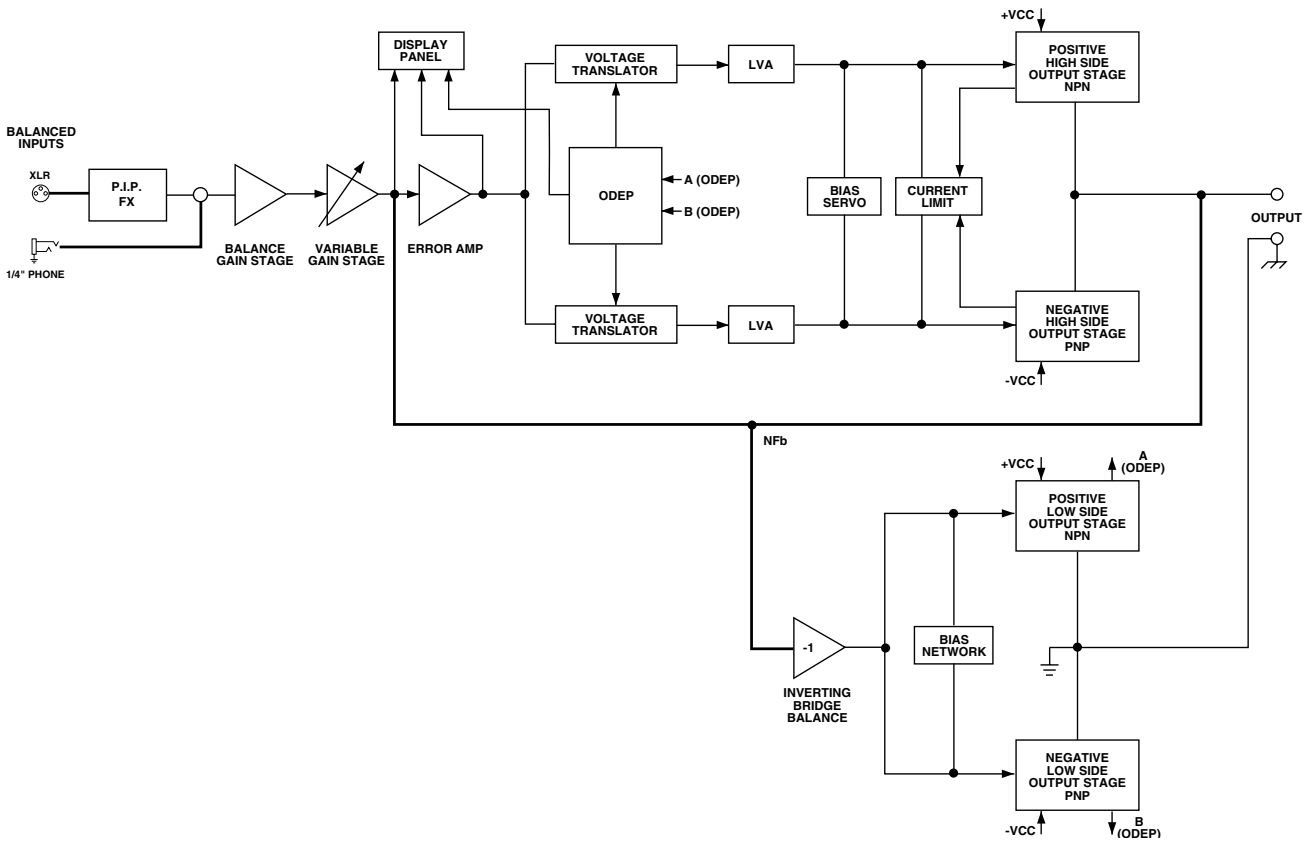


Figure 3.5 Typical Crown Grounded Bridge Amplifier Basic Block Diagram (One Channel Shown)

4 Maintenance

4.1 Cautions and Warnings



DANGER: The outputs of this amplifier can produce LETHAL energy levels! Be very careful when making connections. Do not attempt to change output wiring until the amplifier has been off at least 10 seconds.



WARNING: This unit is capable of producing high sound pressure levels. Continued exposure to high sound pressure levels can cause permanent hearing impairment or loss. User caution is advised and ear protection is recommended when using at high levels.



WARNING: Do not expose this unit to rain or moisture.

WARNING: Only properly trained and qualified technicians should attempt to service this unit. There are no user serviceable parts inside.



WARNING: When performing service checks with the power off, discharge the main power supply filter capacitors fully before taking any measurements or touching any electrical components. A 300-ohm 10-W resistor is recommended for this. Hold the resistor with pliers, as the resistor may become extremely hot.



WARNING: Under load, with a sine wave signal at full power into both channels, the amplifier may draw in excess of 30 amperes from the AC service mains.



WARNING: Do not change the position of the Mode Switch when the amplifier is turned on. If the position of this switch is changed while the amplifier is powered, transients may damage your speakers.



WARNING: Heatsinks are not at ground potential. Simultaneously touching either heatsink and ground, or both heatsinks will cause electrical shock.



CAUTION: Eye protection should be worn at all times when protective covers are removed and the amplifier is plugged in.



CAUTION: Disconnect the power cord before installing or removing any cover or panel.

4.2 General Information

The following test procedures are to be used to verify operation of this amplifier. DO NOT connect a load or inject a signal unless directed to do so by the procedure. These tests, though meant for verification and alignment of the amplifier, may also be very helpful in troubleshooting. For best results, tests should be performed in order.

All tests assume that AC power is from a regulated AC source appropriate for the unit under test. Test equipment includes an oscilloscope, a DMM, a signal generator, loads, and I.M.D. and T.H.D. noise test equipment.

4.3 Test Procedures

4.3.1 Standard Initial Conditions

Level controls fully clockwise.

Stereo/Mono switch in Stereo.

Sensitivity switch in 26 dB fixed gain position.

Ambient Temperature: 20 to 30 degrees C.

It is assumed, in each step, that conditions of the amplifier are per these initial conditions unless otherwise specified.

4.3.2 Test 1: DC Offset

Spec: 0 VDC, ± 5 mV.

Initial Conditions: Controls per standard, inputs shorted.

Procedure: Measure DC voltage at the output connectors (rear panel). There is no adjustment for output offset. If spec is not met, there is an electrical malfunction. Slightly out of spec measurement is usually due to U104/U204 out of tolerance.

4.3.3 Test 2: Output Bias Adjustment

Spec: 310 ± 10 mVDC.

Initial Conditions: Controls per standard, heatsink temperature less than 40°C.

Procedure: Measure DC voltages on the output PWA across R02, adjust R26 if necessary. Measure DC voltages on the output PWA across R21, adjust R23 if necessary. Repeat for second channel.

4.3.4 Test 3: ODEP Voltage Adjustment

Spec: Bias Per Chart, ± 0.1 V DC.

Initial Conditions: Controls per standard, heatsink at room temperature 20 to 30°C (68 to 86°F). Note: This adjustment should normally be performed within 2 minutes of turn on from ambient (cold) conditions. If possible measure heatsink temperature, if not measure ambient room temperature. Use this information when referencing the chart on the following page.

°F	°CV	-ODEPV	+ODEP
66	18.9	-11.31	11.31
68	20.0	-11.26	11.26
70	21.1	-11.20	11.20
72	22.2	-11.14	11.14
74	23.3	-11.09	11.09
76	24.4	-11.03	11.03
77	25.0	-11.00	11.00
78	25.6	-10.97	10.97
80	26.7	-10.91	10.91
82	27.8	-10.86	10.86
84	28.9	-10.80	10.80
86	30.0	-10.74	10.74
88	31.1	-10.69	10.69
90	32.2	-10.63	10.63
92	33.3	-10.57	10.57
94	34.4	-10.51	10.51

-ODEP Procedure: Measure pin 6 of U100 and, if necessary, adjust R121 to obtain V-ODEP as specified above. Measure pin 6 of U200 and, if necessary, adjust R221 to obtain V-ODEP as specified above.

+ODEP Procedure: Measure pin 6 of U103 and, if necessary, adjust R132 to obtain V+ODEP as specified above. Measure pin 6 of U203 and, if necessary, adjust R232 to obtain V+ODEP as specified above.

4.3.5 Test 4: AC Power Draw

Spec: 100 Watts maximum quiescent.

Initial Conditions: Controls per standard.

Procedure: With no input signal and no load, measure AC line wattage draw. If current draw is excessive, check for high AC line voltage or high bias voltage.

4.3.6 Test 5: Common Mode Rejection

Spec at 1KHz: -70 dB.

Initial Conditions: Sensitivity switch in 0.775V

Procedure: No load. Inject a 0 dBu (.775VRMS) 1K Hz sine wave into each channel, one channel at a time, with inverting and non-inverting inputs shorted together (common mode). Adjust R512 for minimum A.C output of Channel 1, R612 for Channel 2. At the output measure less than -28 dBu (30.5mVRMS).

4.3.7 Test 6: Voltage Gain

Spec 26dB Gain: Gain of 20.0 ±3%.

Spec 0.775V Sensitivity: ±12%.

Spec 1.4V Sensitivity: ±12%.

Initial Conditions: Controls per standard.

Procedure: 8 ohm load connected. Inject a single ended 0.775 VAC 1 kHz sine wave with the Sensitivity Switch in the 26 dB position. Measure 15.5 VAC, ±0.3 VAC, at the amplifier output. Switch the Sensitivity Switch to the 0.775V position. Adjust the level of the input signal so that the output is at rated power. Measure 0.775 VAC ±12% at the amplifier input. Switch the sensitivity switch to the 1.4V position. Measure 1.4 VAC, ±12%, at the amplifier input.

4.3.8 Test 7: Phase Response

Spec: ±10° from 10 Hz to 20 kHz at 1 Watt.

Initial Conditions: Controls per standard, 8 ohm load on each channel.

Procedure: Inject a 1 kHz sine wave and adjust for 1 Watt output (2.8 VAC). Check input and output signals against each other, input and output signals must be within 10° of each other.

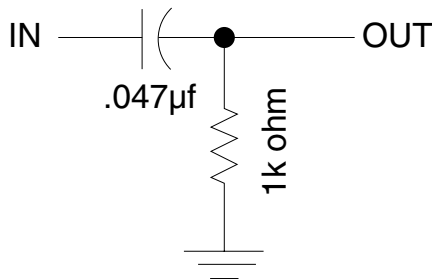


Figure 4.1 Differentiator Circuit

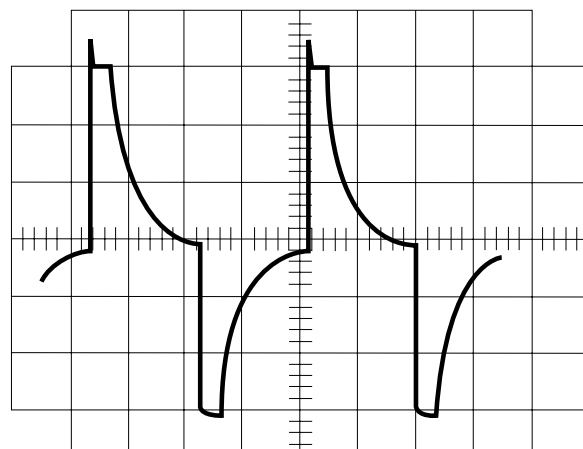


Figure 4.2 Differentiated wave form at current limit

4.3.9 Test 8: Level Controls

Spec: Level controlled by level controls.

Initial Conditions: Controls per standard.

Procedure: No Load. Inject a 1 kHz sine wave. With level controls fully clockwise you should see full gain. As controls are rotated counterclockwise, observe similar gain reduction in each channel. When complete, return level controls to fully clockwise position.

4.3.10 Test 9: Current Limit

Spec: Current Limit at 43 - 48 Amps

Initial Conditions: Controls per standard.

Procedure: Load each channel to 1 Ohm. Inject a 1 kHz differentiated (or 10% duty cycle) square wave. See figure 4.1. Increase output level until current limit occurs. Current limit should occur at 43 - 48 Amps (43-48 Vpk). Disregard waveform overshoot. Observe clean (no oscillations) current clipping. See Figure 4.2 for differentiated wave form at current limit.

4.3.11 Test 10: Slew Rate & 10 kHz Square Wave

Spec: 30 - 40 V/ μ S.

Initial Conditions: Controls per standard.

Procedure: Load each channel to 8 ohms. Inject a 10 kHz square wave to obtain 90 volts zero-to-peak at each output. Observe the slope of the square wave. It should typically measure 30 to 40 V/ μ S. Also, the square wave must not include overshoot, ringing, or any type of oscillation. See Figure 4.3 for typical 10 kHz square wave response.

4.3.12 Test 11: Crosstalk

Spec: -60dB at 20 kHz.

Initial Conditions: Controls per standard. Terminate input of channel not driven with 600 ohms.

Procedure: 8 ohm load on each channel. Inject a 20 kHz sine wave into the Channel 1 input and increase output level to 80 VAC. Measure less than 80 mVAC at the output of Channel 2. Inject a 20 kHz sine wave into the Channel 2 input and increase output level to 80 VAC. Measure less than 80 mVAC at the output of Channel 1.

4.3.13 Test 12: Output Power

Spec at 8 Ohm Stereo: $\geq 1125W$ at 0.1% THD.

Spec at 4 Ohm Stereo: $\geq 1625W$ at 0.1% THD.

Spec at 2 Ohm Stereo: $\geq 1800W$ at 0.1% THD.

International 8 Ohm Stereo: $\geq 945W$ at 0.1% THD.

International 4 Ohm Stereo: $\geq 1255W$ at 0.1% THD.

International 2 Ohm Stereo: $\geq 1490W$ at 0.1% THD.

Initial Conditions: Controls per standard.

Procedure: Load each channel to 8 ohms. Inject a 1 kHz sine wave and measure at least 94.67 VAC at the output of each channel. Load each channel to 4 ohms. Inject a 1 kHz sine wave and measure at least 80.62 VAC. Load each channel to 2 ohms. Inject a 1 kHz sine wave and measure at least 60.00 VAC. All power measurements must be at less than 0.1% THD. For international units, calculate output voltage with above power specifications.

4.3.14 Test 13: Reactive Loads

Spec: No oscillations. Safe with all types of loads.

Initial Conditions: Controls per standard.

Procedure Capacitive: Load each channel to 8 ohms in parallel with 2 μ F. Inject a 20 kHz sine wave with 48 VAC output for 10 seconds.

Procedure Inductive: Load each channel to 8 ohms in parallel with 159 μ Henries. Inject a 1 kHz sine wave with 36 VAC output for 10 seconds.

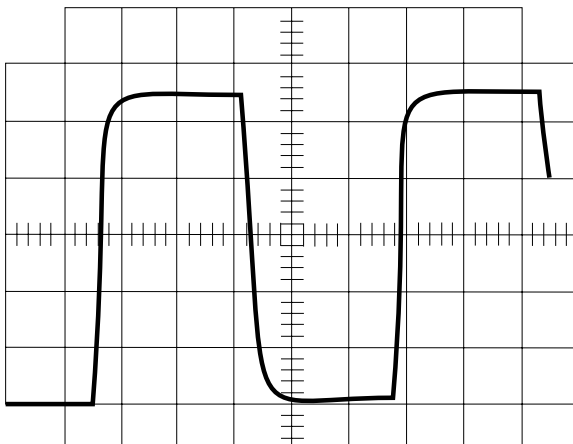


Figure 4.3 10 kHz square wave response

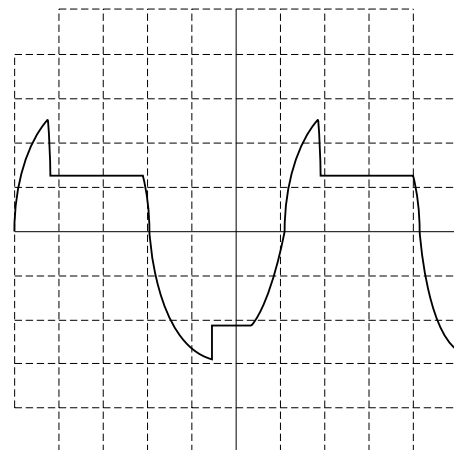


Figure 4.4 ODEP limiting wave form

Procedure Torture: Load each channel with the primary (red and black leads) of a PSU transformer (D 7040-5). Inject a 35 Hz sine wave for an output level of 89.5 Vrms, for 10 seconds.

Procedure Short: Inject a 60 Hz sine wave with 30.0 VAC at the amplifier output. After establishing signal, short the output for 10 seconds.

4.3.15 Test 14: ODEP Limiting

Spec: ODEP Limiting occurs per the procedure. Either channel controls limiting in Parallel Mono Mode.

Initial Conditions: Controls per standard; rag or other obstruction blocking fan so that it does not turn.

Procedure: Load the amplifier to 2 ohms on each channel. Inject a 60 Hz sine wave and adjust for 30 Vrms at the output. After a few minutes observe a wave form similar to Figure 4.4. Both positive and negative alternations must show the distinctive waveform. There is no requirement of symmetry between positive and negative alternations. There is no requirement of uniformity from channel to channel. Remove the input signal from both channels and allow the amplifier to cool for a few minutes. Switch the amplifier to Parallel Mono and remove the load from Channel 1. Inject the signal into Channel 1 and observe that ODEP limiting occurs at the output of both channels. Remove the load from Channel 2, and install the load on Channel 1. Again, observe that both channels limit. Return all amplifier controls to standard initial conditions. Remove the fan obstruction.

4.3.16 Test 15: LF Protection

Spec: Amplifier mutes for low frequency.

Initial Conditions: Controls per standard.

Procedure: No load. Inject a 0.5 Hz, 10 volt peak-to-peak, square wave, or a 1Hz, 17 volt peak-to-peak, sine wave into each channel and verify that each channel cycles into mute.

4.3.17 Test 16: Signal to Noise Ratio

Spec: 100 dB below rated 8 ohm power 20 Hz to 20 kHz. 105 dB A-Weighted.

Initial Conditions: 26dB Sensitivity. Short inputs.

Procedure: Load each channel to 8 ohms. Measure less than 950 μ V at the output of each channel (20 Hz-20 kHz bandpass filter).

4.3.18 Test 17: Turn On Transients

Spec: No dangerous transients.

Initial Conditions: Controls per standard.

Procedure: From an off condition, turn on the amplifier and monitor the output noise at the time of turn on. Note: Turn on noise may increase significantly if the amplifier is cycled off and on.

4.3.19 Test 18: Turn Off Transients

Spec: No dangerous transients.

Initial Conditions: Controls per standard.

Procedure: From an on condition, turn off the amplifier and monitor the output noise at the time of turn off. Note: Turn off noise may increase significantly if the amplifier is cycled off and on.

4.3.20 Test 19: Intermodulation Distortion

Spec at 0 dB Output: 0.02%.

Spec at -35 dB Output: 0.05%.

Initial Conditions: Controls per standard.

Procedure: Load each channel to 8 ohms. Inject a SMPTE standard IM signal (60 Hz and 7 kHz sine wave mixed at 4:1 ratio). Set the 60 Hz portion of the sine wave to 72 Volt RMS. Set the 7 kHz portion to 25%. With an IM analyzer measure less than 0.02% IMD. Repeat test at -35 dB (reference 72 Volt RMS, 60 Hz portion) and measure less than 0.05% IMD.

4.3.21 Test 20: High Line Cutout

Spec: 10% - 12% above nominal.

Initial Conditions: Controls per standard.

Procedure: Using an AC line variac, increase the line voltage until the unit goes into standby. The unit should fo into standby at 10% - 12% above the nominal (120V U.S. units).

4.3.22 Post Testing

After completion of testing, if all tests are satisfactory, the amplifier controls should be returned to the positions required by customer. If conditions are unknown or unspecified, factory settings are as follows:

Level Controls: 9 to 11 O'Clock.

Sensitivity Switch: 0.775V U.S., 1.4V International.

Stereo/Mono Switch: Stereo.

Ground Lift: Lift.

Power: Off.

5 Parts

5.1 General Information

Replacement parts for this Crown amplifier can be ordered from the Crown Parts Department.

PART PRICES AND AVAILABILITY ARE SUBJECT TO CHANGE WITHOUT NOTICE.

5.2 Ordering and Receiving Parts

When ordering parts, be sure to give the product model, and include a description and part number from the parts listing. Price quotes are available on request.

5.2.1 Terms

Normal terms are prepaid. Net-30 Days applies to only those having pre-established accounts with Crown. The Crown Parts Department does accept Visa or Master Card. If prepaying, the order must be packed and weighed before a total bill can be

established, after which an amount due will be issued and shipment made upon receipt of payment. New parts returned for credit are subject to a restocking fee, and authorization from the Crown Parts Department must be obtained before returning parts for credit.

5.2.2 Shipment

Shipment will normally be made via UPS, or best other method unless you specify otherwise. Shipments are made to and from Elkhart, Indiana USA, only. Established accounts with Crown will receive shipment freight prepaid and will be billed. All others will receive shipment on a C.O.D. or prepayment (check or credit card) basis.

5.3 Mechanical Parts

This section includes a mechanical part list for this product. All serviceable parts and assemblies will have a Crown Part Number (CPN) listed in this chapter. The parts listed are current as of the date printed. Crown reserves the right to modify and improve its products for the benefit of its customers.

Crown Customer Service

Technical Support Group
Factory Service
Parts Department

Mailing Address: P.O. Box 1000, Elkhart IN 46515

Shipping Address: Plant 2 S. W.
1718 W. Mishawaka Rd., Elkhart IN 46517

Phone: (219) 294-8200

Toll Free: (800) 342-6939

Fax: (219) 294-8301

<http://www.crownaudio.com>

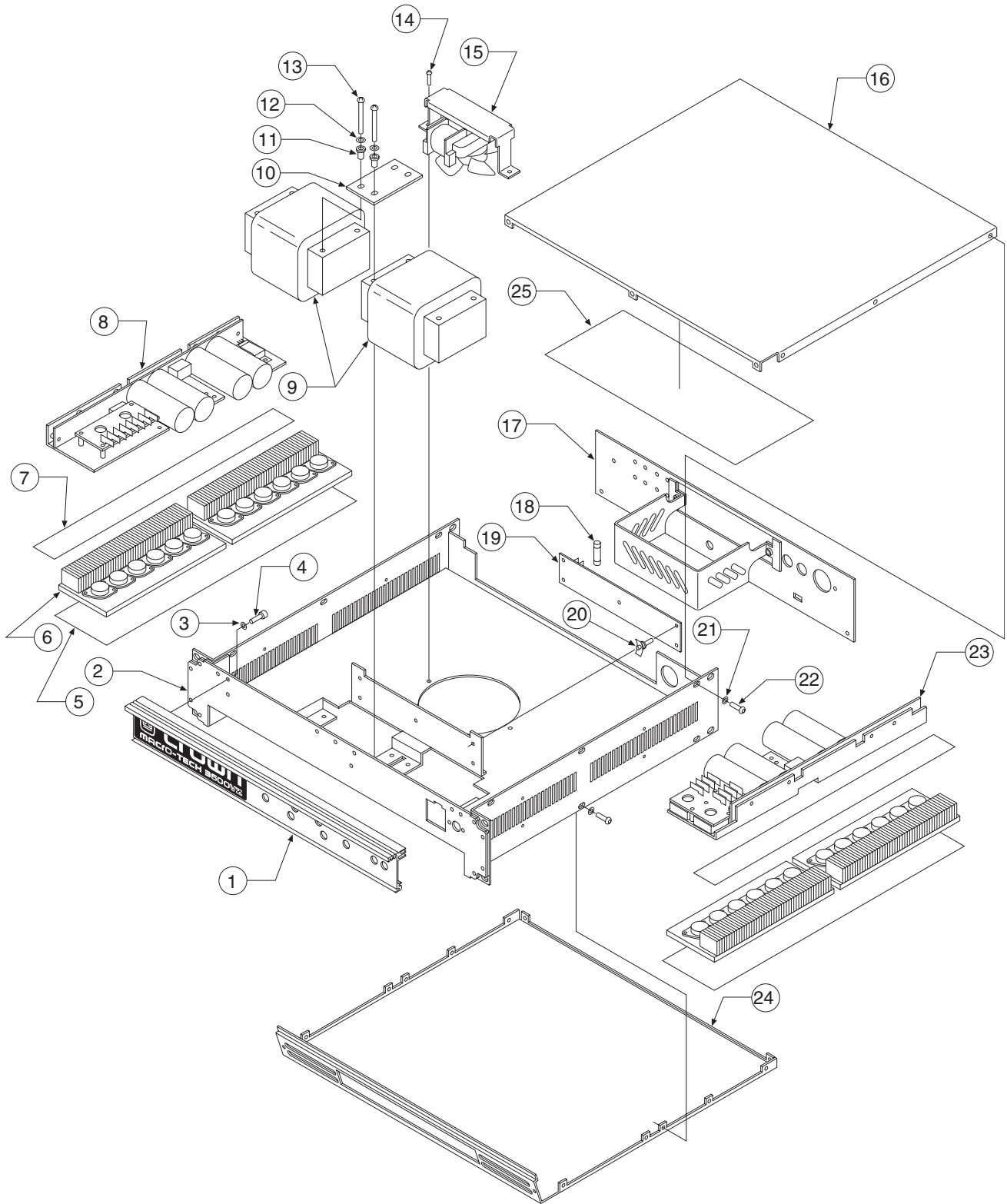


Figure 5.1 Top Chassis Assembly

5.3.1 Top Chassis Assembly

Refer to Figure 5.1 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	1	Front Assembly	see Section 5.3.3
2	1	Chassis	F12621-3
3			see Section 5.3.3
4			see Section 5.3.3
5			see Section 5.3.6
6	4	Heatsink Assembly	see Section 5.3.8
7	2	Paper Shroud	D 8867-0
8		Channel 1 B-L Switch Assembly	see Section 5.3.5
9	2	Power Transformer 120VAC 60Hz Domestic	D 8874-6
		Power Transformer 230VAC 50Hz E17CE	D8876-1
10	1	Transformer Plate	F12588-4
11	8	#8 Nylon Shoulder Washer	A10099-5
12	8	#8 Int Star Washer	A10094-6
13	8	Screw, 8-32 x 2.75 MSCR PNHD Zinc	A10089-10844
14			see Section 5.3.7
15	1	Fan Assembly	see Section 5.3.7
16	1	Top Cover	F12544J6
17	1	Back Panel Assembly	see Section 5.3.4
18	1	Fuse, 1A 3AG 1.25 x .25	A10285-10
19	1	Control PWA	see Section 5.4
20	5	1/4 PC BD Support	C 6032-4
21		star washer	included with screw
22	20	Screw, 6-32 x.31 TORX PNHD STAR	103433-70605
23		Channel 2 B-L Switch Assembly	see Section 5.3.6
24	1	Bottom Cover	F12609-8
25	1	Insulator, 11 x 15 Transformer	D8249-1
Not Pictured	1	Cable Tie Mount	C 6918-4

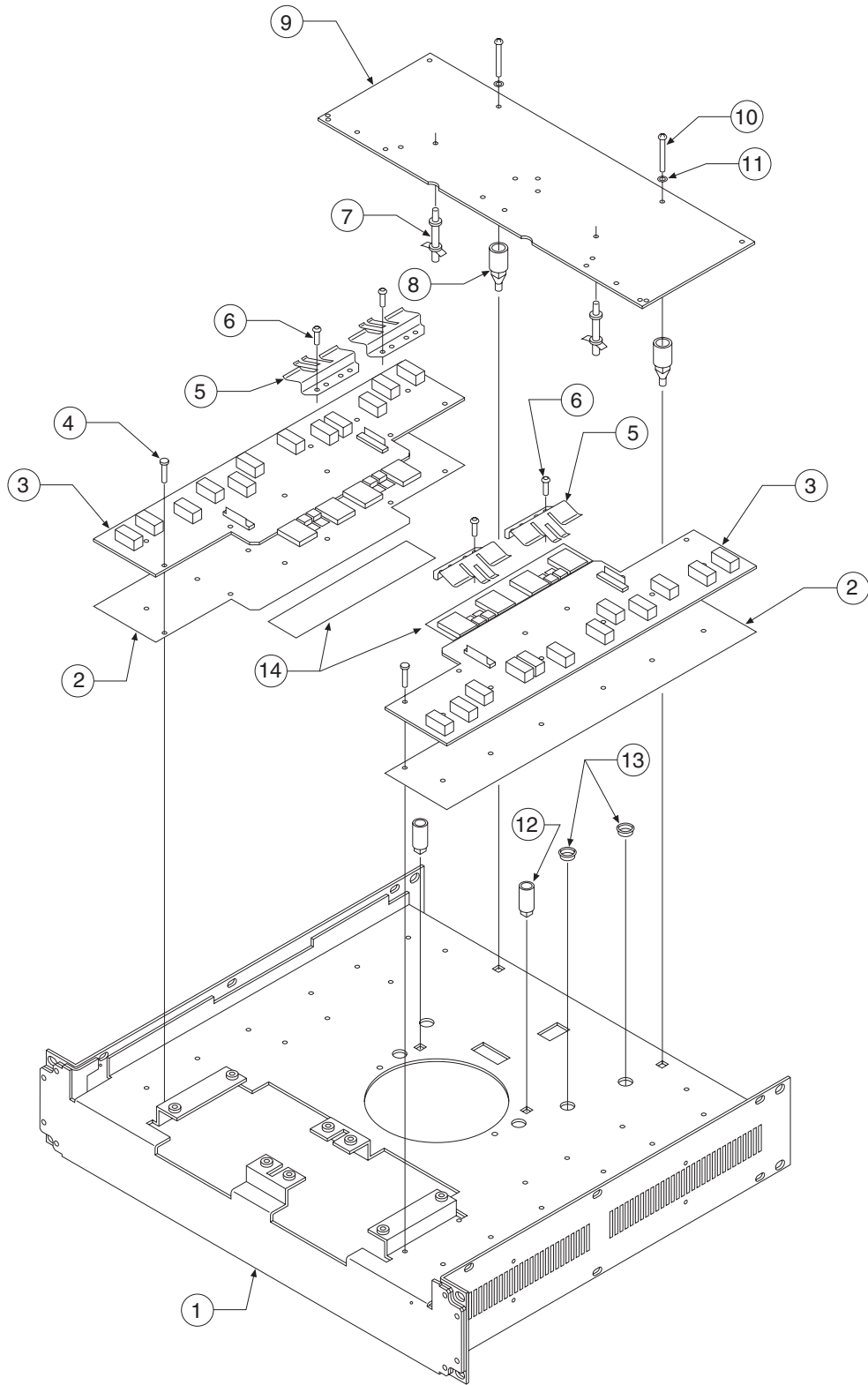


Figure 5.2 Bottom Chassis Assembly

5.3.2 Bottom Chassis Assembly

Refer to Figure 5.2 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	1	Chassis	see Section 5.3.1
2	2	Pad, VZ Thru Hole Note: use CPN #D 7679-0 with Output PWB P10316-1 and earlier.	D7839-0
3	2	Output PWA	See Section 5.4
4	24	6-32 x .312 Pan HD T15 Screw	A10315-1
5	4	Driver Bracket	D8300-2
6	8	Screw, 6-32 x.312 Torx	103415-70605
7	2	Spacer, .75 Plastic	C6914-3
8	2	Spacer, 1.0 Plastic	C6913-5
9	1	Main PWA	See Section 5.4
10	2	Screw, 8-18 x 1.375 PNHD MSCR Zinc	A10109-10822
11	2	Nylon Washer	D4137-2
12	2	Board Support, Plastic	C6912-7
13	4	Slip Collar	A10192-1
14	2	Sil Pad, 1.12 x 5 60	D8440-6

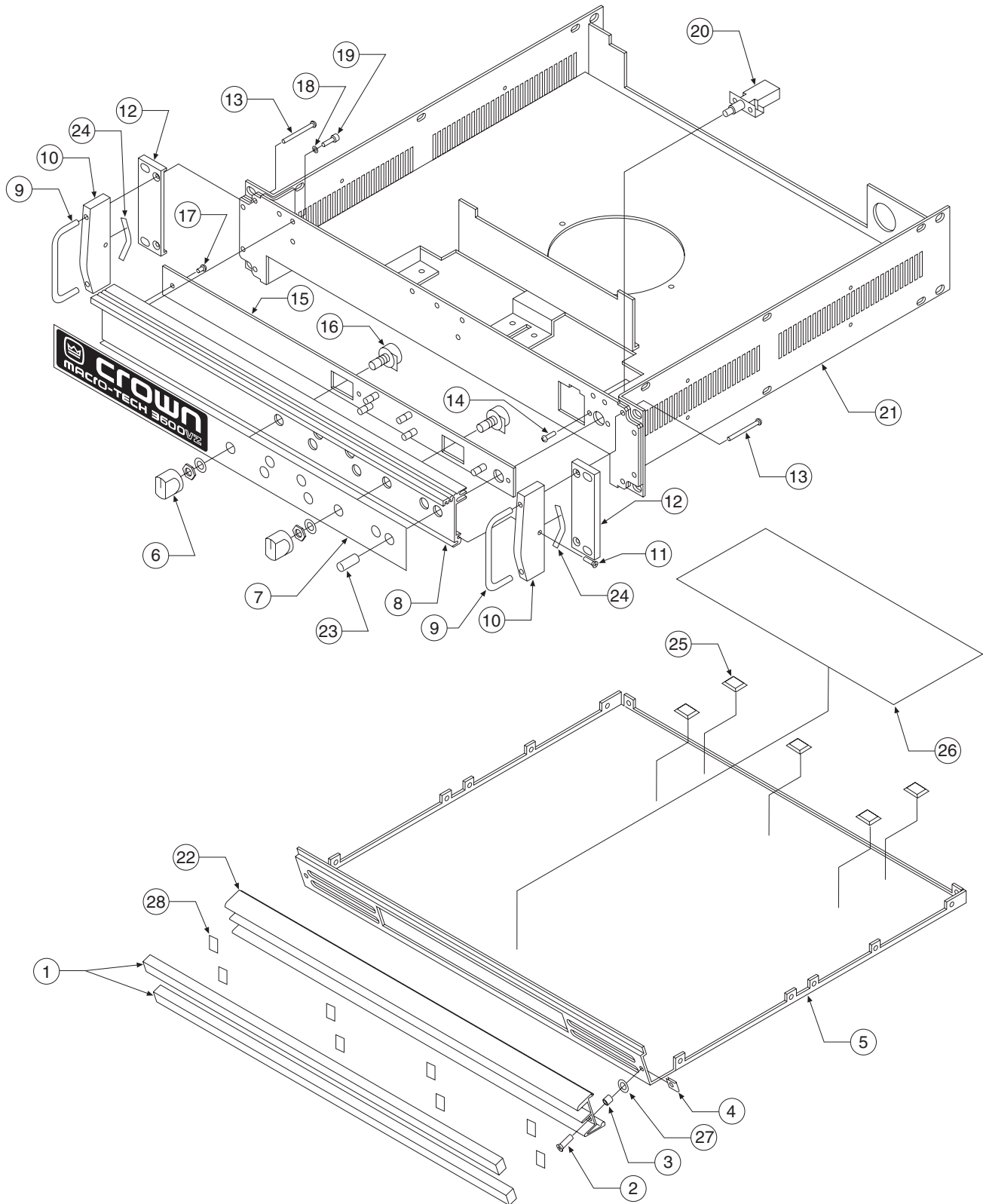


Figure 5.3 Front Assembly

5.3.3 Front Assembly

Refer to Figure 5.3 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	2	Foam Filter	D7696-4
2	2	Screw, #8 x 1.00 Type AB Flat HD	A10103-10816
3	2	Nylon Spacer	A10101-12
4	2	Grille Clip	A10173-1
5	1	Bottom Cover	F12609-8
6	2	Knob	D6265-9
7	1	Overlay	D 9148-4
8	1	Display Panel	F12887-0
9	2	Handle	D8048J6
10	2	Panel Cap	D8049J4
11	2	Screw, #6-32 x .75 FLTHD TT	C10258-9
12	2	End Cap	D8052J8
13	2	Screw, 8-18 x 1.375 PNHD	A10086-10824
14	2	Screw, 4-40 x .37 Taptite Pan	C5961-5
15	1	Display PWA	See Section 5.4
16	2	5KOhm Linear 31 Detent Pot 15MM Shaft	C7280-8
17	3	Screw, 6-32 x .25 RDHD	A10086-10604
18	3	Washer, #6 Int Star	A10094-3
19	3	Screw, 6-32 x .437 Socket Cap	A10092-20607
20	1	Switch, DPST Pushbtn 6A 250VAC	C10180-5
21	1	Chassis	see Section 5.3.1
22	1	Lower Grille Extrusion	D8752-4
23	1	Push Button, .75 Threaded	D6013-3
24	2	Panel Cap Spacer	F12647-8
25	5	Self-Stick Rubber Feet	C3342-0
26	1	Insulator, 11 x 15 Transformer	D8249-1
27	2	.5 x .136 Nylon Washer	A10101-5
28	8	Velcro Tape	D5796-6
	1	Grille Assembly (includes Bottom Cover)	M46504-3

Note: Old style grilles with the one-piece filter behind the grille are no longer available. If an older amplifier needs a new grille, the only option is to convert it to the new style by ordering CPN #M46504-3, which includes the bottom cover, grille extrusion, filters and necessary hardware. New grilles will not fit onto old bottom covers.

5.3.4 Back Panel Assembly

Refer to Figure 5.4 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	4	Dual Binding Post	C10184-7
2	2	Screw, 8-32 x .37 RDHD MSCR	A10086-70806
3	2	#8 Int Star Washer, Black	A10094-5
4	1	Standard PIP Assembly	See Section 5.3.9
5	1	Power Cord, NEMA TT-30P Plug, Domestic	D8247-5
		Power Cord, HAR 230VAC 15A Plug, E17CE	D8844-9
6	1	Strain Relief	C7315-2
7	1	Edge Connector	C 6821-0
8	2	Circuit Breaker, 15A, Domestic	C10169-8
		Circuit Breaker, 8A, E17CE	C10171-4
9	2	#4 Int Star Lockwasher	A10094-2
10	2	Screw, 4-40 x .62 RDHD	A10086-10410
11	1	Jumper, 4 Position Ground	D8855-5
12	1	Back Panel	F12864-9
13	10	Washer, #6 Int Star	A10094-3
14	2	Screw, 6-32 x .312 Pan HD T15 Taptite	C 9491-9
15	2	Aluminum Spacer	A10100-7
16	1	PWB, PIP Interconnect	101240-1
17	1	Cable W/Terminals	D7623-8
18	1	Daisy Ribbon Cable	D8573-4
19	2	2-Position Jumper	F12812-8

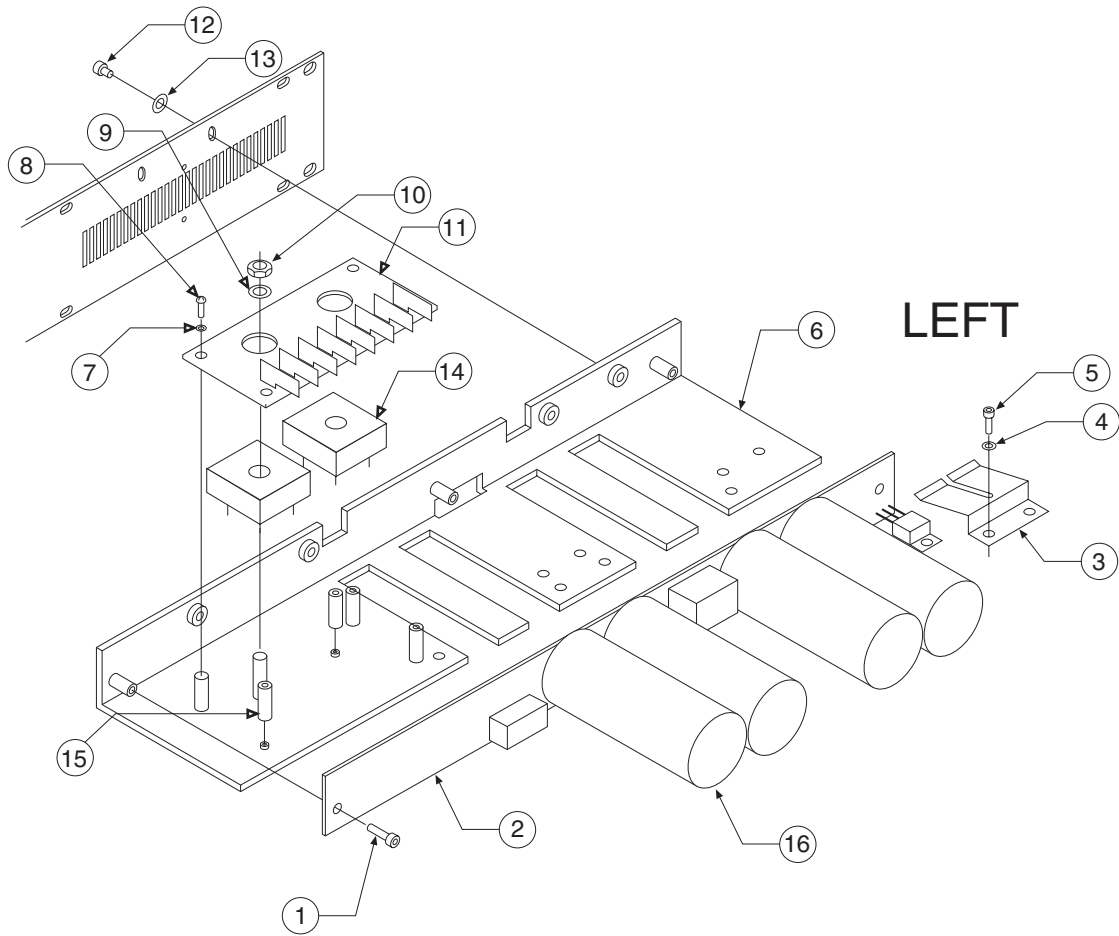


Figure 5.5 Channel 1 Bi-Level Switch Assembly

5.3.5 Channel 1 (Left) Bi-Level Switch Assembly

Refer to Figure 5.5 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	7	Screw, 6-32 x .25 Socket Cap	A10092-20604
2	1	PWA, B-L Switch	See Section 5.4
3	2	Clamp, TO-220 Bi-Level	D8301-1
4	4	#6 Int Star Washer	A10094-4
5			Same as #1
6	1	Left Shelf	125238-1
7	4	Screw, 4-40 x .25 RDHD	A10086-10404
8	4	#4 Int Star Lockwasher	A10094-2
9	2	#8 Belleville Washer	A10098-3
10	2	8 x 32 Hex Nut	A10102-6
11	1	PWA, CH1 B-L Bridge	See Section 5.4
12	4	Screw, 6.32 x.25 Ind Hex	A10107-70604
13	4	Washer, #6 Int Star	A10094-3
14	2	Bridge, 35A 400V	C10246-4
15	3	Nylon Hex Spacer	A10608-10
16	4	Capacitor, 6900uF 100V Elec.	D7595-8
Not Pictured	1	Insulator, 1.5 x .75 (Orange)	C9539-5
Not Pictured	1	Insulator, 1.5 x 1.25 (Gray)	D8480-2
	1	Channel 1 Bi-Level Switch Assembly	M46562-1
		Note: for units built before September, 1995 use CPN#M46663-7 Switch Assembly.	

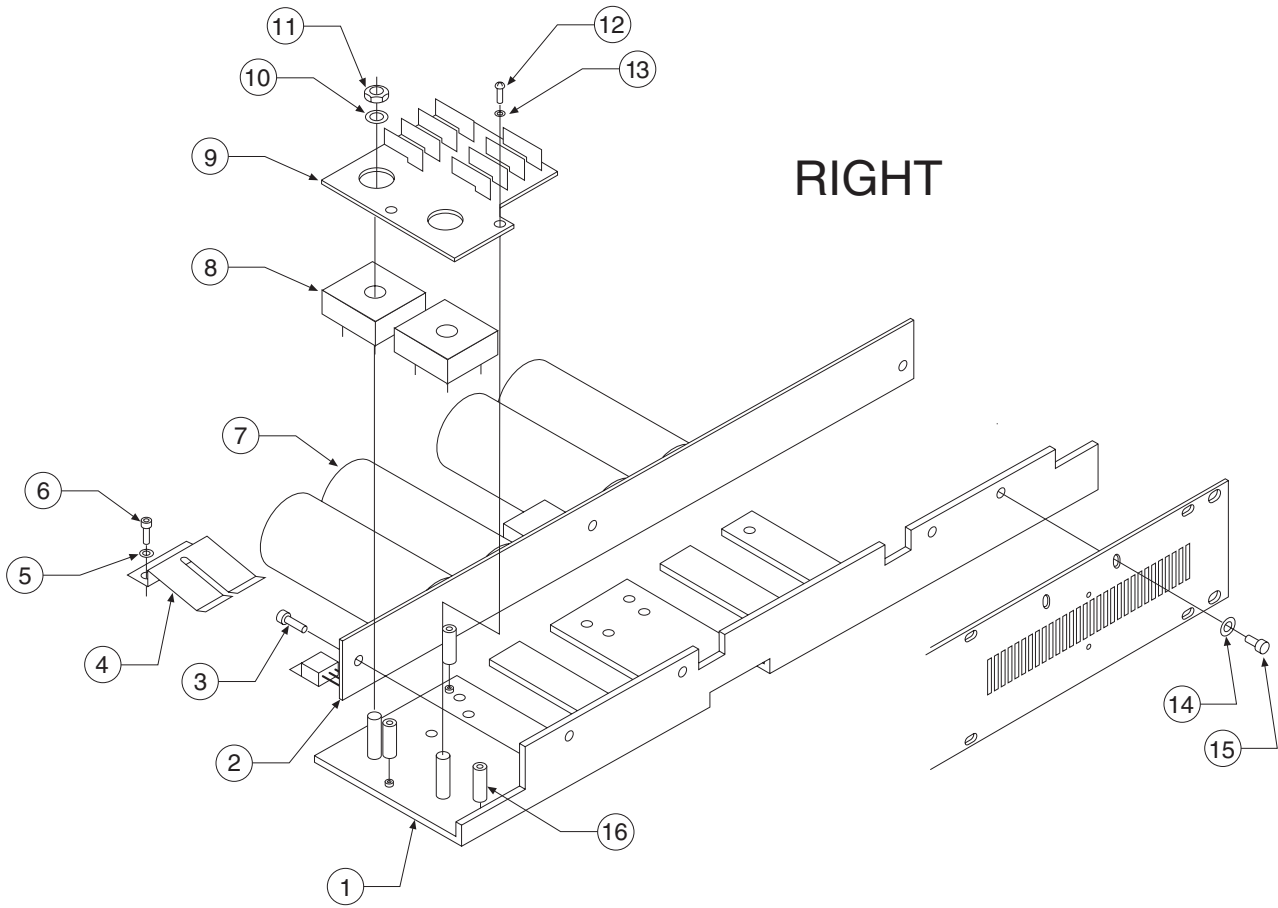


Figure 5.6 Channel 2 Bi-Level Switch Assembly

5.3.6 Channel 2 (Right) Bi-Level Switch Assembly

Refer to Figure 5.6 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	1	Right Shelf	125238-1
2	1	PWA, B-L Switch	See Section 5.4
3	7	Screw, 6-32 x .25 Socket Cap	A10092-20604
4	2	Clamp, TO-220 Bi-Level	D8301-1
5	4	#6 Int Star Washer	A10094-4
6			Same as #3
7	4	Capacitor, 6900uF 100V Elec.	D7595-8
8	2	Bridge, 35A 400V	C10246-4
9	1	PWA, CH2 B-L Bridge	See Section 5.4
10	2	#8 Belleville Washer	A10098-3
11	2	8 x 32 Hex Nut	A10102-6
12	4	Screw, 4-40 x .25 RDHD	A10086-10404
13	4	#4 Int Star Lockwasher	A10094-2
14	4	Screw, 6.32 x.25 Ind Hex	A10107-70604
15	4	Washer, #6 Int Star	A10094-3
16	3	Nylon Hex Spacer	A10608-10
Not Pictured	1	Insulator, 1.5 x .75 (Orange)	C9539-5
Not Pictured	1	Insulator, 1.5 x 1.25 (Gray)	D8480-2
	1	Channel 2 Bi-Level Switch Assembly	M46561-3
		Note: for units built before September, 1995 use CPN #M46662-9 Switch Assembly.	

5.3.7 Fan Assembly

Refer to Figure 5.7 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	2	Screw, 6-32 x 5/16 FLTHD	C 7062-0
2	1	Fan Bracket	D8439-8
3	2	Screw, 6-32 x .312 Pan HD T15 Taptite	C 9491-9
4	1	Transmotor, 120V, Domestic	H43076-1
	1	Transmotor, 240V, E17CE	H43358-3
5	1	Fan Blade, 4.5 Inch CCW	C 9938-9
6	1	Label, 1A Fuse Replacement	D8671-6

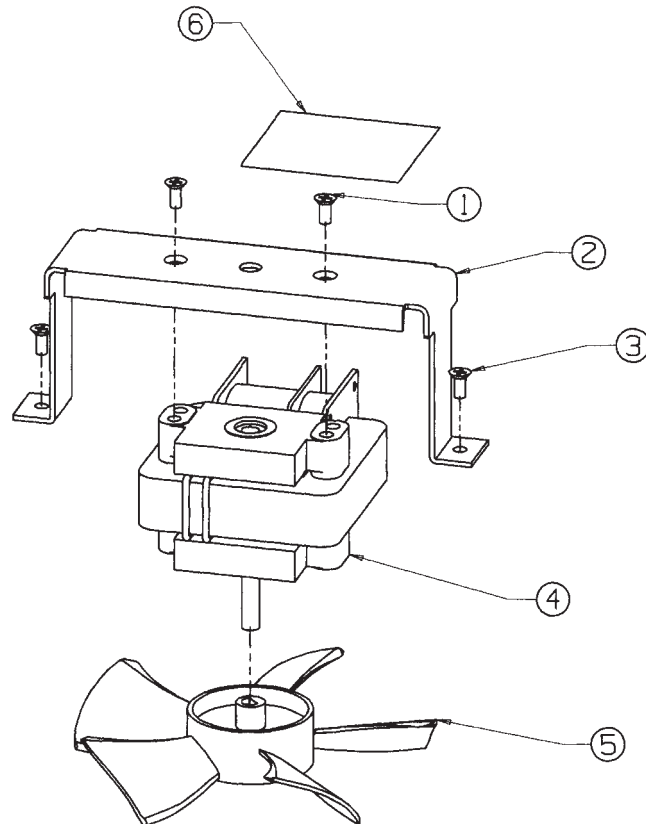


Figure 5.7 Fan Assembly

5.3.8 Heatsink Assembly

(Channel 1 and 2 are Identical)

Refer to Figure 5.8 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	24	Screw, 6-32 x .312 Pan HD T15 Taptite	C 9491-9
2	12	NPN Power Transistor	C 8187-4
3	12	PNP Power Transistor	C 8188-2
4	2	PTC	D 8774-8
5	2	LM234Z Thermal Sense	C 5826-0
6	2	Heatsink	M21322J8
7	2	Silpad, 2.87 x 14.57	D 7796-2
Not Pictured		Note: use CPN #D6280-8 with Output PWB P10316-1 or earlier. Teflon Tubing	126508-1

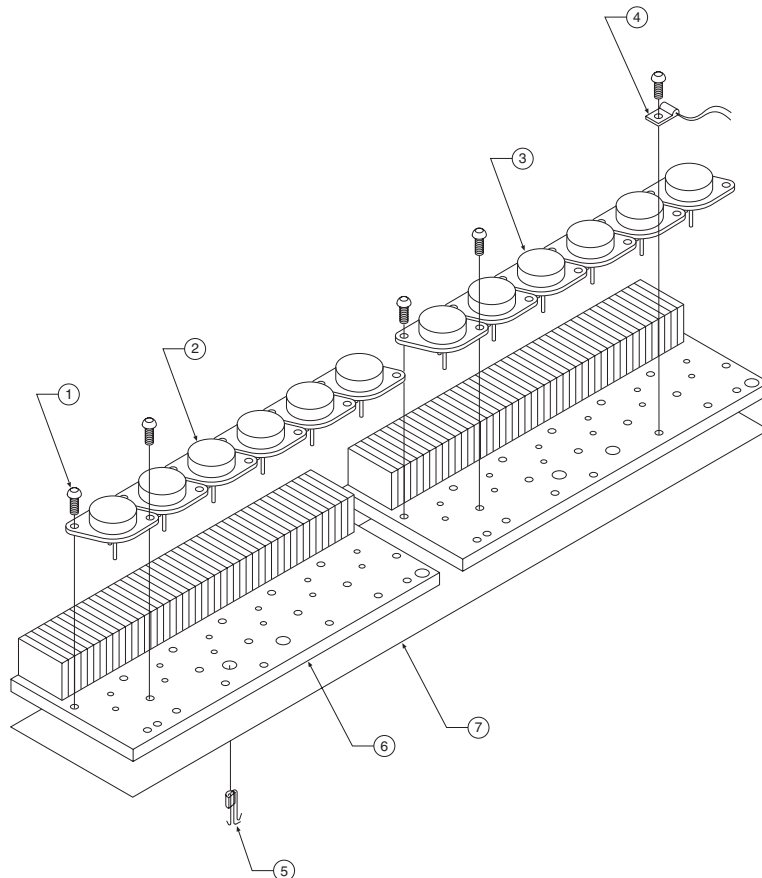


Figure 5.8 Heatsink Assembly

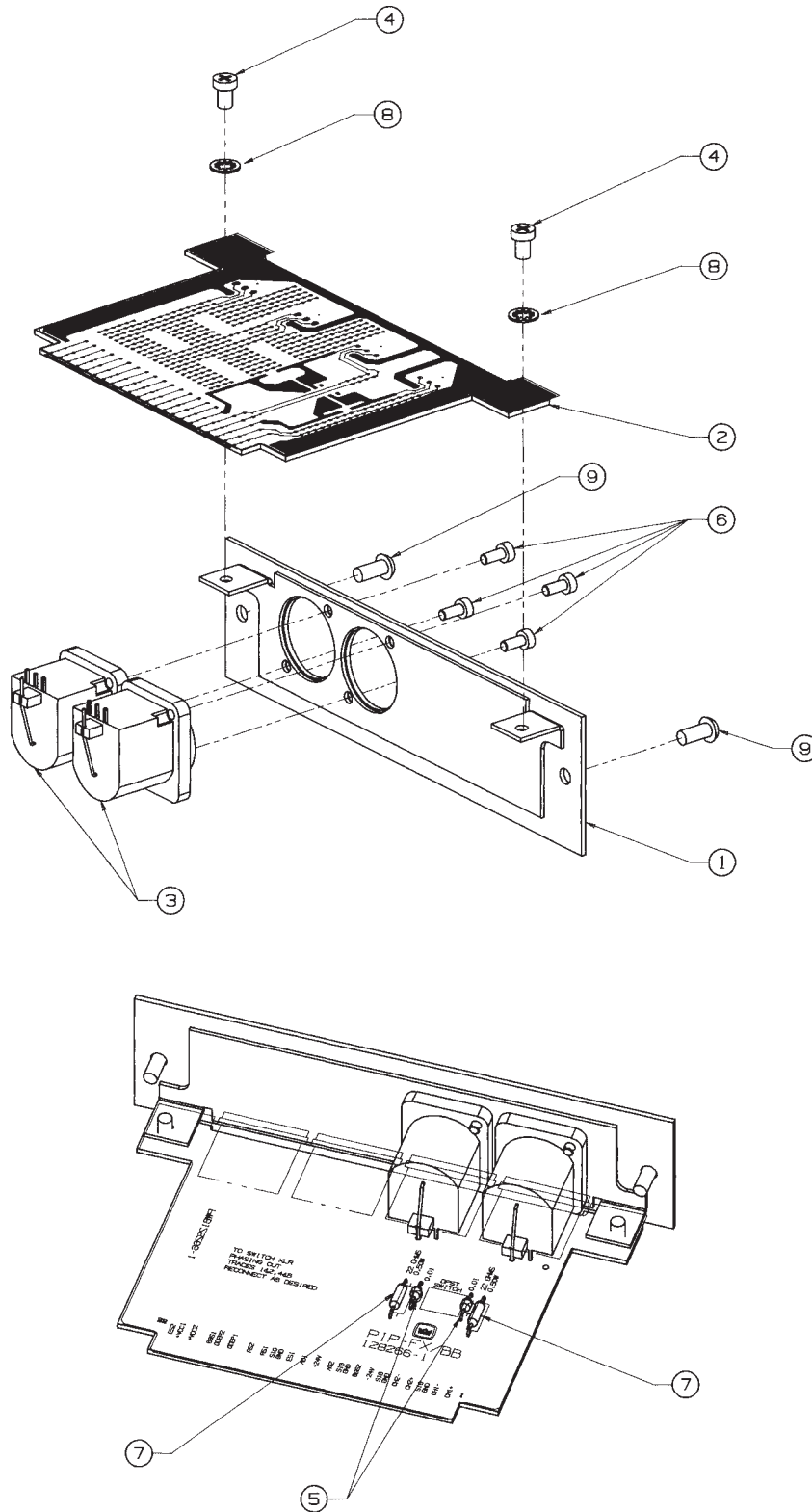


Figure 5.9 Standard PIP Assembly

5.3.9 Standard PIP Assembly

Refer to Figure 5.9 for Exploded View

Item	Quantity	Description	Part # (CPN)
1	1	PIP-FX Panel	M21176J8
2	1	PWB, PIP-FX/BB w/GND Lift	128266-1
3	2	Female XLR Connector	C 8163-5
4	2	Screw, #8 x 1/4 #6 PNHD	C 7161-0
5	2	Cap, .01uF 100V Axial Cer	C 6806-1
6	4	Screw, M3 x .5 x 7 MM PNHD	A10330-9
7	2	Resistor, 22.0 Ohm .5W 5%	A10266-2202
8	2	#8 Int. Star Lockwasher	A10094-5
9	2	Screw, 8-32 x .37 RDHD MSCR	A10086-70806

This Page Intentionally Left Blank

5.4 Circuit Board Parts

This section includes electrical parts lists for this product. All serviceable parts and assemblies will have a Crown Part Number (CPN) listed in this section. The parts listed are current as of the date printed. Crown reserves the right to modify and improve its products for the benefit of its customers. Please note: where reference designations are listed as "installed on next assembly," the CPN (Crown Part Number) for the associated part may be found in Section 5.2, Mechanical Parts.

5.4.1 Circuit Board and Schematic Part Numbers

The schematics referenced and provided are representative only. There may be slight variations between amplifier to amplifier. These schematics are intended to be used for troubleshooting purposes only.

Note on circuit board designations: Crown circuit boards are referenced with a PWA and/or PWB part number. PWA stands for Printed Wire Assembly. This is the completed circuit board with all components assembled. PWB stands for Printed Wire Board. This is the circuit board only, without components.

Output PWAs: (left and right are identical)

Q42893-0

Output PWA on P10316-1 PWB. For schematic see J0464-8.

Q43100-9

Output PWA on P10373-2 PWB. Use Q43387-2 as service replacement. For schematic see J0547-0.

Q43318-7

Output PWA on P10423-5 PWB. Use Q43387-2 as service replacement. For schematic see J0675-9.

Q43387-2

Output PWA on P10423-5 PWB. For schematic see J0675-9.

Main PWAs:

Q42942-5

Main PWA on D 7686-5 PWB. For schematic see J0464-8.

Q43107-4

Main PWA on D 8102-2 PWB. For schematic see J0547-0.

Q43382-3

Main PWA with Quad-Mute on D 8920-7 PWB. Not reverse compatible. For schematic see J0675-9.

Control PWAs:

Q42859-1

Control PWA on P10291-6 PWB. For schematic see J0454-9.

Q43124-9

Control PWA on D 8172-5 PWB. For schematic see J0560-3.

Q43296-5

Control PWA on D 8543-7 PWB. For schematic see J0643-7.

Q43363-3

Control PWA on D 8696-3 PWB. For schematic see J0643-7 REV C.

Q43364-1

Control PWA on D 8696-3 PWB. For schematic see J0643-7 REV C.

Display PWAs:

Q42851-8

Display PWA on D 7617-0 PWB. For schematic see J0456-4.

Q43314-6

Display PWA on D 8572-6 PWB. For schematic see J0456-4.

Q43440-9

Display PWA on D 8897-7 PWB. For schematic see J0703-9.

VZ Switch PWAs:

Q42861-7

VZ switch PWA on D 7272-4 PWB. For schematic see J0453-1.

Q43123-1

VZ switch PWA on D 8174-1 PWB. For schematic see J0561-1.

Q43181-9

VZ switch PWA on D 8174-1 PWB. For schematic see J0561-1.

Q43298-1

VZ switch PWA on D 8174-1 PWB. For schematic see J0561-1.

Q43323-7

VZ switch PWA on D 8589-0 PWB. For schematic see J0561-1.

Bridge PWAs: Used with Q43323-7 VZ Switch PWA Only**Q43411-0**

Channel 2 bridge PWA on D 8870-4 PWB. For schematic see J0699-9.

Q43412-8

Channel 1 bridge PWA on D 8869-6 PWB. For schematic see J0699-9.

Q42893-0 Output PWA (P10316-1 PWB) Parts List

Capacitors

C01	C 3978-1	.047 μ F
C02	C 8426-6	.1 μ F
C03	C 8426-6	.1 μ F
C04	C 6806-1	.01 μ F
C05	C 6806-1	.01 μ F
C06	C 6806-1	.01 μ F
C07	C 6807-9	.001 μ F
C08	C 8577-6	68pF
C12	C 6809-5	220pF
C13	C 7502-5	.47 μ F
C15	C 6809-5	220pF
C16	C 8426-6	.1 μ F

Diodes

D01	C 2851-1	1N4004
D02	C 2851-1	1N4004
D03	C 2851-1	1N4004
D04	C 2851-1	1N4004
D05	C 8383-9	MR822
D06	C 8383-9	MR822
D07	C 8383-9	MR822
D08	C 8383-9	MR822
D09	C 2851-1	1N4004
D10	C 2851-1	1N4004
D11	C 2851-1	1N4004
D12	C 2851-1	1N4004

Inductors

L00	D 7701-2	2.5 μ H
L01	C 3510-2	470 μ H
L02	C 3510-2	470 μ H

Transistors

Q01	C 8159-3	2SC4029
Q05	C 8186-6	2SA1553
Q12	C 8159-3	2SC4029
Q16	C 8186-6	2SA1553
Q17	C 8508-1	2SC3298B
Q18	D 2962-5	MPSA18
Q19	C 8509-9	2SA1306B

Resistors

R00	C 5236-2	130
R01	C 2872-7	100
R02	C 8544-6	8.2 .5W
R03	C 3583-9	.33 5W
R04	C 3583-9	.33 5W
R05	C 3583-9	.33 5W
R06	C 3583-9	.33 5W
R07	C 3583-9	.33 5W
R08	C 3583-9	.33 5W
R09	C 7779-9	22
R10	C 2872-7	100
R11	C 6625-5	5.6 5W
R12	C 1001-4	2.7 1W
R13	C 5236-2	130
R14	C 1001-4	2.7 1W
R15	C 3583-9	.33 5W
R16	C 3583-9	.33 5W
R17	C 3583-9	.33 5W
R18	C 3583-9	.33 5W
R19	C 3583-9	.33 5W
R20	C 3583-9	.33 5W
R21	C 8544-6	8.2 .5W
R22	C 7779-9	22
R23	C 6844-2	250 POT
R24	C 4300-7	13K
R25	C 2628-3	2.2K
R26	C 6844-2	250 POT
R27	C 6495-3	390
R28	C 4300-7	13K
R29	C 6402-9	51
R30	C 6626-3	102 1%
R31	C 6625-5	5.6 5W
R35	C 3612-6	1 .5W
R36	C 3612-6	1 .5W

Miscellaneous

(2)	C 7057-0	10 Pin Header
-----	----------	---------------

Q43100-9 Output PWA (P10373-2 PWB) Parts List

Capacitors

C01	A10434-473JD	.047μF
C02	C 8426-6	.1μF
C03	C 8426-6	.1μF
C04	C 6806-1	.01μF
C05	C 6806-1	.01μF
C06	C 6806-1	.01μF
C07	C 6807-9	.001μF
C08	C 8577-6	68pF
C10	C 6807-9	.001μF
C11	C 6806-1	.01μF
C12	C 6809-5	220pF
C13	C 8991-9	.47μF
C15	C 6809-5	220pF
C16	C 8426-6	.1μF

Diodes

D01	C 2851-1	1N4004
D02	C 2851-1	1N4004
D03	C 2851-1	1N4004
D04	C 2851-1	1N4004
D05	C 8383-9	MR822
D06	C 8383-9	MR822
D07	C 8383-9	MR822
D08	C 8383-9	MR822

Inductors

L00	D 7701-2	2.5μH
L01	C 3510-2	470μH
L02	C 3510-2	470μH

Transistors

Q00	C 4647-1	TIP47
Q01	C 8159-3	2SC4029
Q05	C 8186-6	2SA1553
Q12	C 8159-3	2SC4029
Q16	C 8186-6	2SA1553
Q17	C 8508-1	2SC3298B
Q18	C 4647-1	TIP47
Q19	C 8509-9	2SA1306B

Resistors

R00	A10266-1311	130
R01	A10266-1011	100
R02	A10266-8R22	8.2 .5W
R03	C 3583-9	.33 5W
R04	C 3583-9	.33 5W
R05	C 3583-9	.33 5W

R06	C 3583-9	.33 5W
R07	C 3583-9	.33 5W
R08	C 3583-9	.33 5W
R09	C 7779-9	22
R10	A10266-1011	100
R11	C 6625-5	5.6 5W
R12	A10266-2R74	2.7 2W
R13	A10266-1311	130
R14	A10266-2R74	2.7 2W
R15	C 3583-9	.33 5W
R16	C 3583-9	.33 5W
R17	C 3583-9	.33 5W
R18	C 3583-9	.33 5W
R19	C 3583-9	.33 5W
R20	C 3583-9	.33 5W
R21	A10266-8R22	8.2 .5W
R22	C 7779-9	22
R23	C 6844-2	250 POT
R24	A10266-1331	13K
R25	A10266-2221	2.2K
R26	C 6844-2	250 POT
R27	A10266-3911	390
R28	A10266-1331	13K
R29	A10266-5101	51
R30	A10265-10201	102 1%
R31	C 6625-5	5.6 5W
R35	A10266-1R02	1 .5W
R36	A10266-1R02	1 .5W
R37	C 7779-9	22
R38	C 7779-9	22
R39	C 7779-9	22
R40	C 7779-9	22
R41	C 7779-9	22
R42	C 7779-9	22
R43	A10266-5101	51
R44	A10266-2021	2K
R45	A10266-7511	750

Miscellaneous

(4)	A10094-2	Lockwasher, #4
(2)	C 7481-2	4 Way Tab Conn.
(4)	A10608-3	4-40 x 3/8 Standoff
(1)	D 8441-4	Fishpaper, 5.5 x 018
(4)	A10020-1	4-40 x .25 Capt. Stud
(2)	C 9828-2	12 Pin Header

Q43318-7 Output PWA (P10423-5 PWB) Parts List

Capacitors

C01	A10434-473JD	.047μF
C02	C 8426-6	.1μF
C03	C 8426-6	.1μF
C04	C 6806-1	.01μF
C05	C 6806-1	.01μF
C06	C 6806-1	.01μF
C07	C 6807-9	.001μF
C08	C 8577-6	68pF
C10	C 6807-9	.001μF
C12	C 6809-5	220pF
C13	C 8963-8	.47μF
C15	C 6809-5	220pF
C16	C 8426-6	.1μF

Diodes

D01	C 2851-1	1N4004
D02	C 2851-1	1N4004
D03	C 2851-1	1N4004
D04	C 2851-1	1N4004
D05	C 8383-9	MR822
D06	C 8383-9	MR822
D07	C 8383-9	MR822
D08	C 8383-9	MR822
D15	C 2851-1	1N4004
D16	C 2851-1	1N4004

Inductors

L00	D 7701-2	2.5μH
L01	C 3510-2	470μH
L02	C 3510-2	470μH

Transistors

Q00	C 4647-1	TIP47
Q01	C 8159-3	2SC4029
Q05	C 8186-6	2SA1553
Q12	C 8159-3	2SC4029
Q16	C 8186-6	2SA1553
Q17	C 8508-1	2SC3298B
Q18	C 4647-1	TIP47
Q19	C 8509-9	2SA1306B

Resistors

R00	A10266-1311	130
R01	A10266-1011	100
R02	A10266-8R22	8.2 .5W
R03	C 3583-9	.33 5W
R04	C 3583-9	.33 5W

R05	C 3583-9	.33 5W
R06	C 3583-9	.33 5W
R07	C 3583-9	.33 5W
R08	C 3583-9	.33 5W
R09	C 7779-9	22
R10	A10266-1011	100
R11	C 6625-5	5.6 5W
R12	A10266-2R74	2.7 2W
R13	A10266-1311	130
R14	A10266-2R74	2.7 2W
R15	C 3583-9	.33 5W
R16	C 3583-9	.33 5W
R17	C 3583-9	.33 5W
R18	C 3583-9	.33 5W
R19	C 3583-9	.33 5W
R20	C 3583-9	.33 5W
R21	A10266-8R22	8.2 .5W
R22	C 7779-9	22
R23	C 6844-2	250 POT
R24	A10266-1331	13K
R25	A10266-2221	2.2K
R26	C 6844-2	250 POT
R27	A10266-3911	390
R28	A10266-1331	13K
R29	A10266-5101	51
R30	A10265-10201	102 1%
R31	C 6625-5	5.6 5W
R35	A10266-1R02	1 .5W
R36	A10266-1R02	1 .5W
R37	C 7779-9	22
R38	C 7779-9	22
R39	C 7779-9	22
R40	C 7779-9	22
R41	C 7779-9	22
R42	C 7779-9	22
R43	A10266-5101	51
R44	A10266-2021	2K
R45	A10266-7511	750

Miscellaneous

(4)	A10094-2	Lockwasher, #4
(2)	C 7481-2	4 Way Tab Conn.
(4)	A10608-3	4-40 x 3/8 Standoff
(1)	D 8441-4	Fishpaper, 5.5 x 018
(4)	A10020-1	4-40 x .25 Capt. Stud
(2)	C 9828-2	12 Pin Header

This Page Intentionally Left Blank

E. C. N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS			
						CHK	ME	EE	PE
95-205		(A)	Q301, Q312, Q401, Q412 WERE C8159-3 Q305, Q316, Q405, Q416 WERE C8186-6	07/18/95	LCD				JW
		(B)	ADDED OPTIONAL PWB PART NUMBER TO NOTE 2. REVISED NOTE 3 & RENUMBERED AS NOTE 4. ADDED FIG. 4.	01/03/97	JAW				<i>JAW</i>

NOTES:

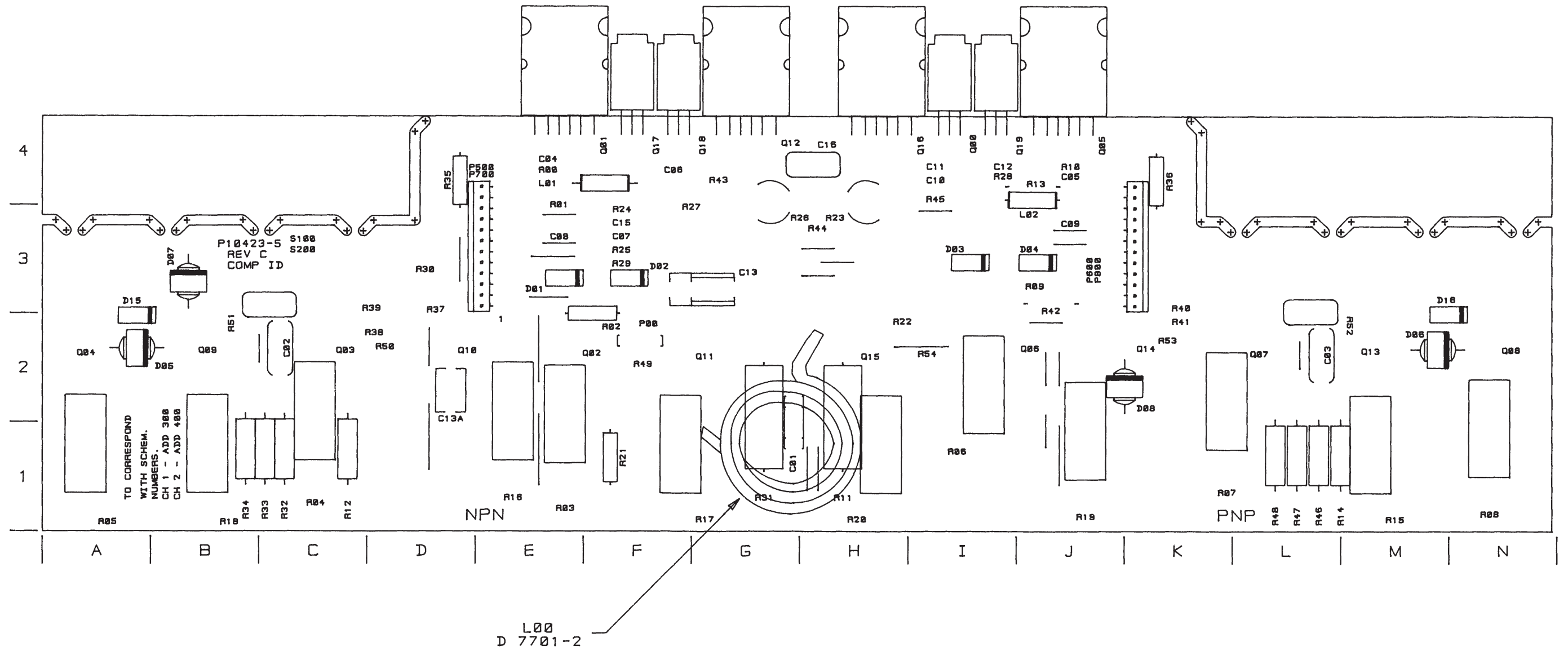
- FOR SCHEMATIC SEE J0675-9.
- FOR PRINTED WIRING BOARD SEE P10423-5 OR 101444-1.



ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
**ELECTROSTATIC
SENSITIVE
PARTS**

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

PRINTS TO		CROWN INTERNATIONAL INC.				1718 WEST MISHAWAKA ROAD ELKHART, INDIANA 48517		PHONE (219) 294-8000	
K		MOD, MA3600VZ OTPT				TOL. UNLESS SPECIFIED X.XX - ± 0.020 X.XXX - ± 0.010 DRILLS - ± 0.003			
		DRAWN	LCD	03-21-95	APPROVED BY:	DO NOT SCALE PRINT			
		CHECKED			ME	SUPERSEDES			
		SCALE	NONE		EE	E. C. N.			
		PROJ #	D255		PE	JW	06/05/95	C. P. N. SHEET 1 OF 7	
		NEXT ASSEMBLY				Q43387-2		REV (B)	



PWA #Q43387-2 Component Map

This page intentionally left blank

Q42942-5 Main PWA (D 7686-5 PWB) Parts List

Capacitors

C1	C 3913-8	470µF
C2	C 4303-1	1000µF
C4	C 6802-0	.47µF
C7	C 6804-6	.1µF
C100	C200 C 8576-8	100µF
C101	C201 C 6227-0	20pF
C103	C203 C 6805-3	.022µF
C104	C204 C 6805-3	.022µF
C105	C205 C 6813-7	27pF
C106	C206 C 6813-7	27pF
C107	C207 C 7870-6	.33µF
C108	C208 C 6813-7	27pF
C109	C209 C 6683-4	4700pF
C110	C210 C 5362-6	2.2µF
C111	C211 C 6804-6	.1µF
C112	C212 C 8529-7	.33µF
C113	C213 C 8530-5	12µF
C114	C214 C 8848-1	100µF
C115	C215 C 8848-1	100µF
C116	C216 C 8530-5	12µF
C117	C217 C 8529-7	.33µF
C118	C218 C 6813-7	27pF
C119	C219 C 6802-0	.47µF
C120	C220 C 6804-6	.1µF
C122	C222 C 5194-3	68pF
C123	C223 C 6808-7	470pF
C124	C224 C 5194-3	68pF
C129	C229 C 6812-9	47pF
C130	C230 C 6814-5	12pF
C133	C233 C 6813-7	27pF
C134	C234 C 6805-3	.022µF
C135	C235 C 6805-3	.022µF
C136	C236 C 6808-7	470pF
C137	C237 C 6808-7	470pF
C138	C238 C 6812-9	47pF
C139	C239 C 6812-9	47pF
C140	C240 C 6814-5	12pF
C141	C241 C 6814-5	12pF
C144	C244 C 8576-8	100µF
C145	C245 C 6812-9	47pF
C146	C246 C 6812-9	47pF
C148	C248 C 6808-7	470pF
C149	C249 C 6807-9	.001µF
C150	C250 C 6806-1	.01µF
C151	C251 C 6806-1	.01µF
C152	C252 C 6811-1	100pF
C153	C253 C 6804-6	.1µF
C154	C254 C 8426-6	.1µF
C155	C255 C 6804-6	.1µF
C156	C256 C 6804-6	.1µF

C157	C257	C 6813-7	27pF
C158	C258	C 6806-1	.01µF
C159	C259	C 8551-1	.01µF
C160	C260	C 6811-1	100pF
C161	C261	C 6814-5	12pF
C162	C262	C 6808-7	470pF

Diodes

D1		C 2851-1	1N4004
D2		C 2851-1	1N4004
D3		C 2851-1	1N4004
D4		C 2851-1	1N4004
D5		C 2851-1	1N4004
D6		C 2851-1	1N4004
D7		C 2851-1	1N4004
D108	D208	C 3181-2	1N4148
D109	D209	C 3181-2	1N4148
D110	D210	C 3181-2	1N4148
D112	D212	C 3181-2	1N4148
D113	D213	C 3181-2	1N4148
D120	D220	C 3181-2	1N4148
D121	D221	C 3181-2	1N4148
D122	D222	C 3181-2	1N4148
D124	D224	C 3181-2	1N4148
D125	D225	C 3181-2	1N4148
D126	D226	C 2851-1	1N4004
D127	D227	C 2851-1	1N4004
D129	D229	C 5061-4	1N3070
D130	D230	C 3181-2	1N4148
D131	D231	C 3181-2	1N4148
D132	D232	C 3181-2	1N4148
D133	D233	C 3181-2	1N4148

Resistor Networks

N101	N201	D 7606-3	7 Pin SIP
N102	N202	D 7639-4	7 Pin SIP

Transistors

Q100	Q200	D 2961-7	2961
Q101	Q201	C 8104-9	MPSW92
Q102	Q202	C 8103-1	MPSW42
Q103	Q203	C 3786-8	PN4250A
Q105	Q205	C 8104-9	MPSW92
Q106	Q206	C 3625-8	2N4125
Q107	Q207	C 3786-8	PN4250A
Q108	Q208	C 5891-4	MTS105
Q109	Q209	D 2961-7	2961
Q110	Q210	C 8103-1	MPSW42
Q112	Q212	C 3625-8	2N4125
Q113	Q213	C 3625-8	2N4125

Q42942-5 Main PWA (D 7686-5 PWB) Parts List Cont.

Q118	Q218	D 2961-7	2961
Q119	Q219	C 3625-8	2N4125
Q120	Q220	C 3625-8	2N4125
Q121	Q221	C 7458-0	2N4123
Q122	Q222	C 7458-0	2N4123
Q123	Q223	C 7458-0	2N4123
Q124	Q224	C 3625-8	2N4125
Q125	Q225	C 8104-9	MPSW92
Q126	Q226	C 8103-1	MPSW42
Q127	Q227	C 3786-8	PN4250A
Q128	Q228	C 5891-4	MTS105

Resistors

R1		A10265-22121	22.1K 1%
R4		A10265-28721	28.7K 1%
R7		A10266-4331	43K
R8		A10265-75021	75K 1%
R9		A10266-5121	5.1K
R10		OPEN	
R16		A10266-5121	5.1K
R17		A10265-75021	75K 1%
R18		A10266-4331	43K
R19		A10266-2R72	2.7 .5W
R101	R201	A10265-24911	2.49K 1%
R102	R202	A10266-5111	510
R103	R203	A10265-49923	49.9K 1W 1%
R104	R204	A10266-2721	2.7K
R105	R205	A10266-2721	2.7K
R106	R206	A10266-1231	12K
R107	R207	A10266-9131	91K
R108	R208	A10266-8211	820
R109	R209	A10265-75R01	75 1%
R110	R210	A10266-9131	91K
R111	R211	A10266-1231	12K
R112	R212	A10266-5131	51K
R113	R213	A10266-4721	4.7K
R114	R214	A10266-4721	4.7K
R115	R215	A10266-5141	510K
R116	R216	A10266-3351	3.3M
R117	R217	A10266-4731	47K
R118	R218	A10265-28701	287 1%
R119	R219	A10265-16911	1.69K 1%
R120	R220	A10265-28701	287 1%
R121	R221	C 5062-2	100K Pot
R122	R222	A10266-2041	200K
R123	R223	A10266-2431	24K
R124	R224	A10265-11021	11K 1%
R125	R225	C 7782-3	100 FP
R126	R226	C 7782-3	100 FP
R127	R227	A10265-11021	11K 1%
R128	R228	A10266-1031	10K

R129	R229	A10266-1041	100K
R130	R230	A10266-1041	100K
R131	R231	A10266-1031	10K
R132	R232	C 5062-2	100K Pot
R133	R233	A10266-2741	270K
R134	R234	A10266-2431	24K
R135	R235	C 7782-3	100 FP
R136	R236	A10265-11021	11K 1%
R137	R237	C 7782-3	100 FP
R138	R238	A10265-11021	11K 1%
R139	R239	A10266-8211	820
R140	R240	A10265-75R01	75 1%
R141	R241	A10266-1541	150K
R142	R242	A10266-1541	150K
R143	R243	A10266-1041	100K
R144	R244	A10266-1041	100K
R145	R245	A10266-3351	3.3M
R146	R246	A10265-14321	14.3K 1%
R147	R247	A10266-5102	51 .5W
R148	R248	A10266-2721	2.7K
R149	R249	A10266-5102	51 .5W
R150	R250	A10266-2721	2.7K
R151	R251	A10265-14321	14.3K 1%
R152	R252	A10265-11821	11.8K 1%
R154	R254	A10265-20031	200K 1%
R155	R255	A10266-4731	47K
R156	R256	A10266-1321	1.3K
R157	R257	A10266-1321	1.3K
R158	R258	A10265-11821	11.8K 1%
R159	R259	A10266-1331	13K
R160	R260	A10265-10021	10K 1%
R161	R261	A10266-4701	47
R162	R262	A10266-4701	47
R163	R263	A10265-20031	200K 1%
R164	R264	A10265-10021	10K 1%
R165	R265	A10265-20031	200K 1%
R166	R266	A10266-3351	3.3M
R167	R267	A10266-1021	1K
R168	R268	A10265-97601	976 1%
R170	R270	A10266-1021	1K
R171	R271	A10265-95301	953 1%
R173	R273	A10265-10021	10K 1%
R174	R274	A10265-11821	11.8K 1%
R175	R275	A10265-22611	2.26K
R176	R276	A10265-11821	11.8K 1%
R179	R279	A10266-1021	1K
R180	R280	A10266-4711	470
R181	R281	A10266-4721	4.7K
R182	R282	A10266-2201	22
R183	R283	A10266-2421	2.4K
R184	R284	A10266-4741	470K
R185	R285	A10266-2421	2.4K

Q42942-5 Main PWA (D 7686-5 PWB) Parts List Cont.

R187	R287	A10266-3631	36K
R188	R288	A10266-3631	36K
R189	R289	A10266-2731	27K
R190	R290	A10266-2051	2M
R191	R291	A10266-3331	33K
R192	R292	A10266-1031	10K
R193	R293	A10266-1031	10K
R194	R294	A10265-49921	49.9K 1%
R195	R295	A10266-4701	47
R196	R296	A10266-3921	3.9K
R197	R297	A10266-1031	10K
R198	R298	A10266-3921	3.9K
R199	R299	A10266-1031	10K
R500	R600	A10266-1541	150K
R501	R601	A10266-1541	150K
R502	R602	A10266-1541	150K
R503	R603	A10266-4702	47 .5W
R504	R604	A10266-4741	470K
R505	R605	A10266-4741	470K
R506	R606	A10266-1521	1.5K
R507	R607	A10266-4711	470
R508	R608	A10266-1051	1M
R509	R609	A10265-10021	10K 1%
R510	R610	A10265-10021	10K 1%
R511	R611	A10265-10021	10K 1%
R512	R612	C 6173-6	100
R513	R613	A10265-10021	10K 1%
R514	R614	C 7340-0	24 5W
R516	R616	A10266-1051	1M
R517	R617	A10265-75R01	75 1%
R518	R618	A10265-75R01	75 1%
R519	R619	A10265-16911	1.69K 1%
R520	R620	A10266-1521	1.5K
R521	R621	A10266-9121	9.1K
R522	R622	A10266-5641	560K
R523	R623	A10266-1521	1.5K
R524	R624	A10266-5641	560K
R525	R625	A10265-95311	9.53K 1%

Switches

S2	C 7325-1	DPDT, GND LFT
S3	C 7363-2	Input Sensitivity
S4	C 6781-6	6P3T, MONO

Integrated Circuits

U1	C 5095-2	7815, +15V Reg	
U2	C 5096-0	7915, -15V Reg	
U100	U200	C 6911-9	UPA75
U101	U201	C 4345-2	LM339
U102	U202	C 4345-2	LM339
U103	U203	C 6910-1	UPA76
U104	U204	C 7558-7	33079

Miscellaneous

(2)	A10094-4	Washer, #6 Int Star	
(2)	A10102-5	Nut, 6-32 Hex	
(2)	A10240-0608	Screw, 6-32 x .5	
(2)	C 5341-0	Heatsink, TO220	
(2)	C 6541-4	Torque Spreader	
J2	C 4508-5	IC Socket, 16 Pin	
J100	J200	C 8432-4	3 Pin Phone Jack
J100X	J200X	C 6778-2	Phone Jack Cover
J500	J800	D 7625-3	7.75" Ribbon Cable
J600	J700	D 7624-6	2.5" Ribbon Cable
P1	C 7593-4	Header, 5 Pin	
P6	C 8418-3	Header, 3 Pin Gold	
P11	C 7526-4	Header, 3 Pos	
P101	P201	C 7526-4	Header, 3 Pos
(6)	C 3450-1	IC Socket, 14 Pin	

Q43107-4 Main PWA (D 8102-2 PWB) Parts List

Capacitors

C1	C 3913-8	470µF
C2	C 4303-1	1000µF
C4	C 6802-0	.47µF
C7	C 6804-6	.1µF
C100	C200 C 8576-8	100µF
C101	C201 C 6227-0	20pF
C102	C202 C 8576-8	100µF
C103	C203 C 6805-3	.022µF
C104	C204 C 6805-3	.022µF
C105	C205 C 6813-7	27pF
C106	C206 C 6813-7	27pF
C107	C207 C 7870-6	.33µF
C108	C208 C 6813-7	27pF
C109	C209 C 8576-8	100µF
C110	C210 C 5362-6	2.2µF
C112	C212 C 8991-9	.47µF
C113	C213 C 8530-5	12µF
C114	C214 C 8576-8	100µF
C115	C215 C 8576-8	100µF
C116	C216 C 8530-5	12µF
C117	C217 C 8991-9	.47µF
C118	C218 C 6813-7	27pF
C119	C219 C 6802-0	.47µF
C122	C222 C 5194-3	68pF
C123	C223 C 6808-7	470pF
C124	C224 C 5194-3	68pF
C129	C229 C 6812-9	47pF
C130	C230 C 6814-5	12pF
C131	C231 C 6814-5	12pF
C132	C232 C 6807-9	.001µF
C133	C233 C 6813-7	27pF
C134	C234 C 6805-3	.022µF
C135	C235 C 6805-3	.022µF
C136	C236 C 6808-7	470pF
C137	C237 C 6808-7	470pF
C138	C238 C 6812-9	47pF
C139	C239 C 6812-9	47pF
C140	C240 C 6814-5	12pF
C141	C241 C 6814-5	12pF
C143	C243 C 6808-7	470pF
C144	C244 C 8576-8	100µF
C145	C245 C 6812-9	47pF
C146	C246 C 6950-7	82pF
C148	C248 C 6808-7	470pF
C149	C249 C 6807-9	.001µF
C151	C251 C 6806-1	.01µF
C152	C252 C 6811-1	100pF
C153	C253 C 6804-6	.1µF
C154	C254 C 8426-6	.1µF
C155	C255 C 6804-6	.1µF

C156	C256	C 6804-6	.1µF
C157	C257	C 6813-7	27pF
C159	C259	C 8551-1	.01µF
C160	C260	C 6811-1	100pF

Diodes

D1		C 2851-1	1N4004
D2		C 2851-1	1N4004
D3		C 2851-1	1N4004
D4		C 2851-1	1N4004
D5		C 2851-1	1N4004
D6		C 2851-1	1N4004
D7		C 2851-1	1N4004
D100	D200	C 3181-2	1N4148
D101	D201	C 3181-2	1N4148
D108	D208	C 3181-2	1N4148
D109	D209	C 3181-2	1N4148
D110	D210	C 3181-2	1N4148
D112	D212	C 3181-2	1N4148
D113	D213	C 3181-2	1N4148
D114	D214	C 8158-5	1SS143
D115	D215	C 8158-5	1SS143
D122	D222	C 3181-2	1N4148
D124	D224	C 3181-2	1N4148
D125	D225	C 3181-2	1N4148
D126	D226	C 8158-5	1SS143
D127	D227	C 8158-5	1SS143
D129	D229	C 5061-4	1N3070
D130	D230	C 3181-2	1N4148
D131	D231	C 3181-2	1N4148
D132	D232	C 3181-2	1N4148
D133	D233	C 3181-2	1N4148

LED's

E100	E200	C 9857-1	Red
E101	E201	C 9857-1	Red

Resistor Networks

N101	N201	D 8279-8	Resistor Network
N102	N202	D 7639-4	7 Pin SIP

Transistors

Q100	Q200	D 2961-7	2961
Q101	Q201	C 8104-9	MPSW92
Q102	Q202	C 8103-1	MPSW42
Q103	Q203	C 3625-8	2N4125
Q104	Q204	C 8104-9	MPSW92
Q105	Q205	C 8104-9	MPSW92
Q106	Q206	C 3625-8	2N4125

Q43107-4 Main PWA (D 8102-2 PWB) Parts List Cont.

Q111	Q211	C 8103-1	MPSW42	R123	R223	A10266-2432	24K .5W
Q112	Q212	C 3625-8	2N4125	R124	R224	A10265-11021	11K 1%
Q113	Q213	C 3625-8	2N4125	R125	R225	A10266-1011	100
Q114	Q214	C 7458-0	2N4123	R126	R226	A10266-1011	100
Q115	Q215	D 2962-5	MPS8097	R127	R227	A10265-11021	11K 1%
Q116	Q216	C 3786-8	PN4250A	R128	R228	A10266-1331	13K
Q117	Q217	D 2961-7	2961	R129	R229	A10266-1041	100K
Q118	Q218	D 2961-7	2961	R130	R230	A10266-1041	100K
Q119	Q219	C 3625-8	2N4125	R131	R231	A10266-1331	13K
Q120	Q220	C 3625-8	2N4125	R132	R232	C 5062-2	100K Pot
Q121	Q221	C 7458-0	2N4123	R133	R233	A10266-2741	270K
Q122	Q222	C 7458-0	2N4123	R134	R234	A10266-2432	24K .5W
Q123	Q223	C 3625-8	2N4125	R135	R235	A10266-1011	100
Q124	Q224	C 3786-8	PN4250A	R136	R236	A10265-11021	11K 1%
Q125	Q225	C 5891-4	MTS105	R137	R237	A10266-1011	100
Q126	Q226	C 3625-8	2N4125	R138	R238	A10265-11021	11K 1%
Q127	Q227	C 7458-0	2N4123	R139	R239	A10266-8211	820
Q128	Q228	C 3625-8	2N4125	R140	R240	A10265-75R01	75 1%
Q129	Q229	C 7458-0	2N4123	R141	R241	A10266-1541	150K
Q130	Q230	C 3625-8	2N4125	R142	R242	A10266-1541	150K
Resistors				R143	R243	A10266-4711	470
R1		A10265-22121	22.1K 1%	R144	R244	A10266-4711	470
R4		A10265-28721	28.7K 1%	R145	R245	A10266-4711	470
R7		A10266-4331	43K	R146	R246	A10265-11821	11.8K 1%
R8		A10265-75021	75K 1%	R147	R247	A10124-24	Jumper Wire
R17		A10265-75021	75K 1%	R148	R248	A10265-19111	1.91k 1%
R18		A10266-4331	43K	R149	R249	A10266-5102	51 .5W
R19		A10266-2R72	2.7 .5W	R150	R250	A10265-19111	1.91k 1%
R101	R201	A10265-24911	2.49K 1%	R151	R251	A10265-11821	11.8k 1%
R102	R202	A10266-5111	510	R152	R252	A10265-11821	11.8K 1%
R103	R203	A10265-49923	49.9K 1W 1%	R153	R253	A10124-24	Jumper Wire
R104	R204	A10265-26711	2.67K 1%	R154	R254	A10266-5601	56
R105	R205	A10265-26711	2.67K 1%	R155	R255	A10266-4731	47K
R106	R206	A10265-11821	11.8K 1%	R156	R256	A10266-1321	1.3K
R107	R207	A10266-9131	91K	R157	R257	A10266-1321	1.3K
R108	R208	A10266-8211	820	R158	R258	A10265-11821	11.8K 1%
R109	R209	A10265-75R01	75 1%	R159	R259	A10266-1331	13K
R110	R210	A10266-9131	91K	R160	R260	A10266-5601	56
R111	R211	A10265-11821	11.8K 1%	R161	R261	A10266-4701	47
R112	R212	A10265-49921	49.9K 1%	R162	R262	A10266-4701	47
R113	R213	A10265-48711	4.87K 1%	R163	R263	A10266-5601	56
R114	R214	A10265-48711	4.87K 1%	R164	R264	A10266-4711	470
R115	R215	A10266-5141	510K	R165	R265	A10266-4711	470
R116	R216	A10266-3351	3.3M	R166	R266	A10266-4711	470
R117	R217	A10266-4731	47K	R167	R267	A10265-10011	1K 1%
R118	R218	A10265-28701	287 1%	R168	R268	A10265-97601	976 1%
R119	R219	A10265-16211	1.62K 1%	R169	R269	A10266-1041	100K
R120	R220	A10265-28701	287 1%	R170	R270	A10265-10011	1K 1%
R121	R221	C 5062-2	100K Pot	R171	R271	A10265-95301	953 1%
R122	R222	A10266-2041	200K	R172	R272	A10266-1041	100K
				R173	R273	A10266-5601	56
				R174	R274	A10265-11821	11.8K 1%

Q43107-4 Main PWA (D 8102-2 PWB) Parts List Cont.

R179	R279	A10265-10011	1K 1%
R180	R280	A10266-4711	470
R181	R281	A10265-48711	4.87K
R182	R282	A10266-2201	22
R183	R283	A10265-24911	2.49K 1%
R184	R284	A10266-4741	470K
R185	R285	A10265-24911	2.49K 1%
R186	R286	A10266-2751	2.7M
R187	R287	A10266-3321	3.3K
R188	R288	A10266-3321	3.3K
R189	R289	A10266-2731	27K
R190	R290	A10266-2051	2M
R191	R291	A10266-3331	33K
R192	R292	A10266-6221	6.2K
R193	R293	A10266-6221	6.2K
R194	R294	A10265-49921	49.9K 1%
R195	R295	A10266-4701	47
R196	R296	A10266-3921	3.9K
R197	R297	A10265-10021	10K 1%
R198	R298	A10266-3921	3.9K
R199	R299	A10265-10021	10K 1%
R500	R600	A10266-1541	150K
R501	R601	A10266-1541	150K
R502	R602	A10266-1541	150K
R503	R603	A10266-4702	47 .5W
R504	R604	A10266-5141	510K
R505	R605	A10266-5141	510K
R506	R606	A10266-1521	1.5K
R507	R607	A10266-4711	470
R508	R608	A10266-1051	1M
R509	R609	A10265-10021	10K 1%
R510	R610	A10265-10021	10K 1%
R511	R611	A10265-10021	10K 1%
R512	R612	C 9079-2	200
R513	R613	A10265-10021	10K 1%
R514	R614	C 7340-0	24 5W
R516	R616	A10266-1051	1M
R517	R617	A10265-75R01	75 1%
R518	R618	A10265-75R01	75 1%
R519	R619	A10265-16911	1.69K 1%
R520	R620	A10266-1521	1.5K
R521	R621	A10266-9121	9.1K
R522	R622	A10266-5641	560K
R523	R623	A10266-1521	1.5K
R524	R624	A10266-5641	560K
R525	R625	A10265-95311	9.53K 1%

Switches

S2	C 7325-1	DPDT, GND LFT
S3	C 7960-5	Input Sensitivity
S4	C 6781-6	6P3T, MONO

Integrated Circuits

U1	C 5095-2	7815, +15V Reg	
U2	C 5096-0	7915, -15V Reg	
U100	U200	C 6911-9	UPA75
U101	U201	C 6411-0	H11C2
U102	U202	C 4345-2	LM339
U103	U203	C 6910-1	UPA76
U104	U204	C 7558-7	33079

Miscellaneous

(4)	C 1811-6	4" Cable Tie	
(2)	C 9494-3	Heatsink, TO220	
J2	C 4508-5	IC Socket, 16 Pin	
J100	J200	C 8432-4	3 Pin Phone Jack
J100X	J200X	C 6778-2	Phone Jack Cover
J500	J800	D 8395-2	7.75" 12 Cond. Cable
J600	J700	D 8397-8	2.5" 12 Cond. Cable
P1	C 7593-4	Header, 5 Pin	
P6	C 8418-3	Header, 3 Pln Gold	
P11	C 7526-4	Header, 3 Pos	
P101	P201	C 7592-6	Header, 3 Pos
(1)	C 9450-5	Header, 6 Pos, TP1	
(2)	C 8019-9	IC Socket, 6 Pin	
(4)	C 3450-1	IC Socket, 14 Pin	

E. C. N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS			
						CHK	ME	EE	PE
95-209 95-227		A	CHANGE R515 AND R615 TO NOT USED CORRECT NOTE 2 AND ADD NOTE 10	08/30/95	LCD				JW
96-233		B	REVISED NOTE 2. ADD NOTES 9A & 9B. DELETED NOTE 10. ADDED NOTES AND ILLUSTRATIONS TO COMPONENT MAP. CHANGED MAP LOCATION ON C114 & C214 & PART #'S ON J100/200.	11/20/96	JAW				
T991731		C	INCORPORATES THE CHANGES FROM EC #'S 98E0497, 97E0064, 97E139B, AND 97E161B. ADD NOTES 10 AND 11.	09/14/99	DK	SW	N/A	N/A	JL

NOTES:

- FOR SCHEMATIC SEE J0675-9
- FOR PRINTED WIRING BOARD SEE D8920-7.

NOTE FOR REPAIRING EARLIER PWA. ONGOING PRODUCTION USES 3.3K FOR R189 AND R289. WHEN REPAIRING EARLIER PWA, ONE MUST SELECT R189 AND R289 DEPENDING ON THE DATE CODE OF U101 AND U201, C 6411-0 ISOCOM H11C2 OPTOCOUPLER. IF ISOCOM H11C2 DATE CODE IS 1746 OR EARLIER, R189 AND R289 SHALL BE 27K (A10266-2731). IF ISOCOM H11C2 DATE CODE IS 1806 OR LATER, R189 AND R289 SHALL BE 3.3K (A10266-3321). THE DATE CODE 1806 REPRESENTS THE 6TH WEEK OF 1998.



EIA STD. RS-471

ATTENTION

OBSERVE PRECAUTIONS
FOR HANDLING

ELECTROSTATIC
SENSITIVE
PARTS

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

CROWN INTERNATIONAL INC.									
PRINTS TO		1718 WEST MISHAWAKA ROAD ELKHART, INDIANA 46517				PHONE (219) 294-8000			
K		MOD. MA3600VZ MAIN 4 QUAD MUTE				TOL. UNLESS SPECIFIED X.XX - ± 0.020 X.XXX - ± 0.010 DRILLS - ± 0.003			
		DRAWN	LCD	03-09-95	APPROVED BY:	DO NOT SCALE PRINT			
		CHECKED			ME	SUPERSEDES 043382-3 03/09/95			
		SCALE	NONE		EE	E. C. N.			
		PROJ #	D255		PE JW	05/17/95	C. P. N. SHEET 1 OF 20		REV
		NEXT ASSEMBLY				043382-3		(C)	

PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
C1	C 3913-8	470MF 35V AXIAL LEAD CAP	I 4
C2	C 3913-8	470MF 35V AXIAL LEAD CAP	G 4
C4	C 6802-0	.47MF 50V AXIAL CER T/R 474	I 5
C7	C 6804-6	.1MF 50V AXIAL CER T/R 104	D 2
C1A		*** NOT USED ***	I 4
C100	C 8576-8	100MF 35V 10% ALUM ELECT T/A	J 2
C101	C 6227-0	20PF 500V 5% MICA	J 3
C102	C 8576-8	100MF 35V 10% ALUM ELECT T/A	J 5
C103	C 6805-3	.022MF 100V AXIALCER T/R 223	I 3
C104	C 6805-3	.022MF 100V AXIALCER T/R 223	J 3
C105	C 6813-7	27PF 200V 10% NPO AXIAL CER	M 3
C106	C 6813-7	27PF 200V 10% NPO AXIAL CER	N 3
C107	C 7870-6	.33 MF 63V 10% POLYESTER	I 5
C108	C 6813-7	27PF 200V 10% NPO AXIAL CER	N 4
C109	C 8576-8	100MF 35V 10% ALUM ELECT T/A	K 5
C110	C 5362-6	2.2MF 50V VERT ELECT T/A	J 5
C111	C 6807-9	.001MF 100V 10% AXL CER T/R	J 3
C112	C 8991-9	0.47MF 63V 5%(K) FILM	N 2
C113	C 8530-5	12MF 35V 10% ELECT CAP	N 2
C114	C 8576-8	100MF 35V 10% ALUM ELECT T/A	M 2
C115	C 8576-8	100MF 35V 10% ALUM ELECT T/A	N 1
C116	C 8530-5	12MF 35V 10% ELECT CAP	N 1
C117	C 8991-9	0.47MF 63V 5%(K) FILM	M 1
C118	C 6813-7	27PF 200V 10% NPO AXIAL CER	N 4
C119	C 6802-0	.47MF 50V AXIAL CER T/R 474	J 5
C120	C 6804-6	.1MF 50V AXIAL CER T/R 104	O 4
C121	C 6804-6	.1MF 50V AXIAL CER T/R 104	L 4
C122	C10176-3	33PF 5% 200V AX CERAM NPO T/R	O 4
C123	C 6808-7	470PF 100V AXIAL CER T/R 471	J 3
C124	C10176-3	33PF 5% 200V AX CERAM NPO T/R	L 5
C129	C 6812-9	47PF 100V AXIAL CER T/R 470	J 4
C130	C 6814-5	12PF 200V AXIAL CER T/R 120	J 5
C131	C 6814-5	12PF 200V AXIAL CER T/R 120	J 4
C132	C 6807-9	.001MF 100V AXIAL CER T/R 102	L 3
C133	C 6813-7	27PF 200V 10% NPO AXIAL CER	H 2
C134	C 6805-3	.022MF 100V AXIALCER T/R 223	N 2
C135	C 6805-3	.022MF 100V AXIALCER T/R 223	L 3
C136	C 6808-7	470PF 100V AXIAL CER T/R 471	O 2
C137	C 6808-7	470PF 100V AXIAL CER T/R 471	L 2
C138	C 6812-9	47PF 100V AXIAL CER T/R 470	I 3
C139	C 6812-9	47PF 100V AXIAL CER T/R 470	I 3
C140	C 6814-5	12PF 200V AXIAL CER T/R 120	N 3
C141	C 6814-5	12PF 200V AXIAL CER T/R 120	N 3
C143	C 6808-7	470PF 100V AXIAL CER T/R 471	N 4
C144	C 8576-8	100MF 35V 10% ALUM ELECT T/A	I 2
C145	C 6812-9	47PF 100V AXIAL CER T/R 470	J 2
C146	C 6950-7	82PF 200V 5% NPO AXIAL CER T/R 820	J 3

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 6 OF 20	REV
PROJ #	D255	Q43382-3		C

PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
C147		NOT USED, . . .	N 3
C148	C 6808-7	470PF 100V AXIAL CER T/R 471	M 4
C149	C 6807-9	.001MF 100V 10% AXL CER T/R	N 4
C150		*** NOT USED ***	O 5
C151	C 6806-1	.01MF 100V AXIAL CER T/R 103	L 5
C152	C 6811-1	100PF 200V AXIAL CER T/R 101	N 4
C153	C 6804-6	.1MF 50V AXIAL CER T/R 104	J 2
C154	C 8426-6	.1MF 250V 10% MET POLY RADIAL	N 5
C155	C 6804-6	.1MF 50V AXIAL CER T/R 104	K 2
C156	C 6804-6	.1MF 50V AXIAL CER T/R 104	N 1
C157	C 6813-7	27PF 200V 10% NPO AXIAL CER	J 3
C159	C 8551-1	.01MF 400V 10% POLYESTER	I 2
C160	C 6811-1	100PF 200V AXIAL CER T/R 101	M 4
C161	C10176-3	33PF 5% 200V AX CERM NPO T/R	O 4
C162	C10176-3	33PF 5% 200V AX CERM NPO T/R	L 5
C200	C 8576-8	100MF 35V 10% ALUM ELECT T/A	F 2
C201	C 6227-0	20PF 500V 5% MICA	E 2
C202	C 8576-8	100MF 35V 10% ALUM ELECT T/A	F 5
C203	C 6805-3	.022MF 100V AXIALCER T/R 223	F 3
C204	C 6805-3	.022MF 100V AXIALCER T/R 223	G 3
C205	C 6813-7	27PF 200V 10% NPO AXIAL CER	A 3
C206	C 6813-7	27PF 200V 10% NPO AXIAL CER	C 3
C207	C 7870-6	.33 MF 63V 10% POLYESTER	G 5
C208	C 6813-7	27PF 200V 10% NPO AXIAL CER	B 4
C209	C 8576-8	100MF 35V 10% ALUM ELECT T/A	E 5
C210	C 5362-6	2.2MF 50V VERT ELECT T/A	F 5
C211	C 6807-9	.001MF 100V 10% AXL CER T/R	F 3
C212	C 8991-9	0.47MF 63V 5%(K) FILM	B 2
C213	C 8530-5	12MF 35V 10% ELECT CAP	B 2
C214	C 8576-8	100MF 35V 10% ALUM ELECT T/A	C 2
C215	C 8576-8	100MF 35V 10% ALUM ELECT T/A	B 1
C216	C 8530-5	12MF 35V 10% ELECT CAP	B 1
C217	C 8991-9	0.47MF 63V 5%(K) FILM	B 1
C218	C 6813-7	27PF 200V 10% NPO AXIAL CER	B 4
C219	C 6802-0	.47MF 50V AXIAL CER T/R 474	F 5
C220	C 6804-6	.1MF 50V AXIAL CER T/R 104	D 4
C221	C 6804-6	.1MF 50V AXIAL CER T/R 104	A 4
C222	C10176-3	33PF 5% 200V AX CERM NPO T/R	D 5
C223	C 6808-7	470PF 100V AXIAL CER T/R 471	F 3
C224	C10176-3	33PF 5% 200V AX CERM NPO T/R	A 4
C229	C 6812-9	47PF 100V AXIAL CER T/R 470	F 3
C230	C 6814-5	12PF 200V AXIAL CER T/R 120	F 5
C231	C 6814-5	12PF 200V AXIAL CER T/R 120	F 5
C232	C 6807-9	.001MF 100V AXIAL CER T/R 102	D 3
C233	C 6813-7	27PF 200V 10% NPO AXIAL CER	G 2
C234	C 6805-3	.022MF 100V AXIALCER T/R 223	A 2
C235	C 6805-3	.022MF 100V AXIALCER T/R 223	D 3

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 7 OF 20
PROJ #	D255		Q43382-3

REV


PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
C236	C 6808-7	470PF 100V AXIAL CER T/R 471	A 2
C237	C 6808-7	470PF 100V AXIAL CER T/R 471	D 2
C238	C 6812-9	47PF 100V AXIAL CER T/R 470	G 3
C239	C 6812-9	47PF 100V AXIAL CER T/R 470	G 3
C240	C 6814-5	12PF 200V AXIAL CER T/R 120	B 3
C241	C 6814-5	12PF 200V AXIAL CER T/R 120	B 3
C243	C 6808-7	470PF 100V AXIAL CER T/R 471	C 4
C244	C 8576-8	100MF 35V 10% ALUM ELECT T/A	G 2
C245	C 6812-9	47PF 100V AXIAL CER T/R 470	F 2
C246	C 6950-7	82PF 200V 5% NPO AXIAL CER T/R 820	F 3
C247		*** NOT USED ***	C 3
C248	C 6808-7	470PF 100V AXIAL CER T/R 471	A 4
C249	C 6807-9	.001MF 100V 10% AXL CER T/R	B 4
C250		*** NOT USED ***	D 5
C251	C 6806-1	.01MF 100V AXIAL CER T/R 103	A 5
C252	C 6811-1	100PF 200V AXIAL CER T/R 101	C 4
C253	C 6804-6	.1MF 50V AXIAL CER T/R 104	F 2
C254	C 8426-6	.1MF 250V 10% MET POLY RADIAL	B 5
C255	C 6804-6	.1MF 50V AXIAL CER T/R 104	E 2
C256	C 6804-6	.1MF 50V AXIAL CER T/R 104	A 1
C257	C 6813-7	27PF 200V 10% NPO AXIAL CER	F 3
C259	C 8551-1	.01MF 400V 10% POLYESTER	G 2
C260	C 6811-1	100PF 200V AXIAL CER T/R 101	A 4
C261	C10176-3	33PF 5% 200V AX CERM NPO T/R	C 5
C262	C10176-3	33PF 5% 200V AX CERM NPO T/R	A 4
D1	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	H 4
D2	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	H 4
D3	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	I 4
D4	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	H 4
D5	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	H 4
D6	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	G 4
D7	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	G 4
D100	C 3181-2	DIODE, 1N4148 T/R	J 6
D101	C 3181-2	DIODE, 1N4148 T/R	J 6
D108	C 3181-2	DIODE, 1N4148 T/R	J 2
D109	C 3181-2	DIODE, 1N4148 T/R	N 4
D110	C 3181-2	DIODE, 1N4148 T/R	M 4
D111		*** NOT USED ***	M 4
D112	C 3181-2	DIODE, 1N4148 T/R	N 3
D113	C 3181-2	DIODE, 1N4148 T/R	N 3
D114	C 8158-5	DIODE 1SS143 SWITCHING T/R	N 3
D115	C 8158-5	DIODE 1SS143 SWITCHING T/R	M 3
D119	C 3181-2	DIODE, 1N4148 T/R	O 4
D120	C 3181-2	DIODE, 1N4148 T/R	L 4
D121	C 3824-7	DIODE, 1N9708 24V ZENER	J 4
D122	C 3181-2	DIODE, 1N4148 T/R	J 3
D123		*** NOT USED ***	N 4

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 8 OF 20	REV
PROJ #	D255		043382-3	Ⓢ

PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
J2	C 4508-5	IC SKT, 16PIN DIP 2-640358-3	H 4
J100	C 6777-4	JK PHONE 3COND PCMT R ANG	I 1
J100X	C 6778-2	CVR, PHONE JK PC MT R ANGLE	I 1
J200	C 6777-4	JK PHONE 3COND PCMT R ANG	G 1
J200X	C 6778-2	CVR, PHONE JK PC MT R ANGLE	G 1
J500	D 8395-2	CBL ASM, 12 PIN MTA 7.75	O 5
J600	D 8397-8	CBL ASM, 12 PIN MTA 2.5	N 5
J700	D 8397-8	CBL ASM, 12 PIN MTA 2.5	B 5
J800	D 8395-2	CBL ASM, 12 PIN MTA 7.75	A 5
N101	D 8279-8	RES NET 7PIN SIP 3600 ODEP #2	M 2
N102	D 7639-4	RES NET 7PIN SIP VZ LOW SIDE	J 4
N201	D 8279-8	RES NET 7PIN SIP 3600 ODEP #2	C 2
N202	D 7639-4	RES NET 7PIN SIP VZ LOW SIDE	E 4
N101A		*** NOT USED ***	M 2
N101B		*** NOT USED ***	M 2
N101C		*** NOT USED ***	M 2
N101D		*** NOT USED ***	M 2
N101E		*** NOT USED ***	M 2
N101F		*** NOT USED ***	M 2
N201A		*** NOT USED ***	C 2
N201B		*** NOT USED ***	C 2
N201C		*** NOT USED ***	C 2
N201D		*** NOT USED ***	C 2
N201E		*** NOT USED ***	C 2
N201F		*** NOT USED ***	C 2
P1	C 7593-4	5POS .1 CENTER MTA HEADER	H 2
P6	C 8418-3	3POS GOLD .1 CTR MTA HEADER	H 2
P11	C 7526-4	3POS .1 CENTER MTA HEADER	H 5
P12		*** NOT USED ***	G 4
P101	C 7592-6	4POS .1 CENTER MTA HEADER	J 1
P201	C 7592-6	4POS .1 CENTER MTA HEADER	F 1
Q100	D 2961-7	SPS8010 60V NPN T/R	N 3
Q101	C 8104-9	MPSW92 300V 1 WATT PNP T/R	M 3
Q102	C 8103-1	MPSW42 300V 1 WATT NPN T/R	N 3
Q103	C 3625-8	2N4125 30V PNP T/R	M 3
Q104	C 8104-9	MPSW92 300V 1 WATT PNP T/R	N 4
Q105	C 8104-9	MPSW92 300V 1 WATT PNP T/R	N 4
Q106	C 3625-8	2N4125 30V PNP T/R	O 3
Q107	C 3786-8	PN4250A	M 4
Q108	C 7458-0	2N4123 30V NPN T/R	N 4
Q109	D 2961-7	SPS8010 60V NPN T/R	K 3
Q110	C 8103-1	MPSW42 300V 1 WATT NPN T/R	M 4
Q111	C 8103-1	MPSW42 300V 1 WATT NPN T/R	M 4
Q112	C 3625-8	2N4125 30V PNP T/R	J 4
Q113	C 3625-8	2N4125 30V PNP T/R	J 4
Q114	C 7458-0	2N4123 30V NPN T/R	K 3
Q115	D 2962-5	MPSA1B 45V NPN T/R	O 5

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 10 OF 20	REV
PROJ #	D255		Q43382-3	Ⓢ

PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
Q116	C 3786-8	PN4250A	L 5
Q117	D 2961-7	SPS8010 60V NPN T/R	O 3
Q118	D 2961-7	SPS8010 60V NPN T/R	O 3
Q119	C 3625-8	2N4125 30V PNP T/R	K 3
Q120	C 3625-8	2N4125 30V PNP T/R	K 3
Q121	C 7458-0	2N4123 30V NPN T/R	O 4
Q122	C 3625-8	2N4125 30V PNP T/R	L 3
Q123	C 3625-8	2N4125 30V PNP T/R	K 4
Q124	C 3786-8	PN4250A	M 5
Q125	C 7458-0	2N4123 30V NPN T/R	N 5
Q126	C 3625-8	2N4125 30V PNP T/R	K 6
Q127	C 7458-0	2N4123 30V NPN T/R	K 6
Q128	C 3625-8	2N4125 30V PNP T/R	K 5
Q129	C 7458-0	2N4123 30V NPN T/R	K 5
Q130	C 3625-8	2N4125 30V PNP T/R	K 5
Q131	C 3625-8	2N4125 30V PNP T/R	L 3
Q132	C 3625-8	2N4125 30V PNP T/R	K 3
Q133	C 3625-8	2N4125 30V PNP T/R	O 4
Q134	C 7458-0	2N4123 30V NPN T/R	L 3
Q135	C 3810-6	MPSA42 300V NPN T/R	K 4
Q136	C 3578-9	MPSA93 200V PNP T/R	K 4
Q200	D 2961-7	SPS8010 60V NPN T/R	C 3
Q201	C 8104-9	MPSW92 300V 1 WATT PNP T/R	B 3
Q202	C 8103-1	MPSW42 300V 1 WATT NPN T/R	C 3
Q203	C 3625-8	2N4125 30V PNP T/R	B 3
Q204	C 8104-9	MPSW92 300V 1 WATT PNP T/R	C 4
Q205	C 8104-9	MPSW92 300V 1 WATT PNP T/R	C 4
Q206	C 3625-8	2N4125 30V PNP T/R	A 3
Q207	C 3786-8	PN4250A	B 4
Q208	C 7458-0	2N4123 30V NPN T/R	C 4
Q209	D 2961-7	SPS8010 60V NPN T/R	E 3
Q210	C 8103-1	MPSW42 300V 1 WATT NPN T/R	B 4
Q211	C 8103-1	MPSW42 300V 1 WATT NPN T/R	B 4
Q212	C 3625-8	2N4125 30V PNP T/R	E 4
Q213	C 3625-8	2N4125 30V PNP T/R	F 4
Q214	C 7458-0	2N4123 30V NPN T/R	E 3
Q215	D 2962-5	MPSA18 45V NPN T/R	D 5
Q216	C 3786-8	PN4250A	A 5
Q217	D 2961-7	SPS8010 60V NPN T/R	A 3
Q218	D 2961-7	SPS8010 60V NPN T/R	A 3
Q219	C 3625-8	2N4125 30V PNP T/R	E 3
Q220	C 3625-8	2N4125 30V PNP T/R	E 3
Q221	C 7458-0	2N4123 30V NPN T/R	D 4
Q222	C 3625-8	2N4125 30V PNP T/R	A 3
Q223	C 3625-8	2N4125 30V PNP T/R	E 4
Q224	C 3786-8	PN4250A	B 5
Q225	C 7458-0	2N4123 30V NPN T/R	C 5

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 11 OF 20	REV
PROJ #	D255		Q43382-3	(C)

PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
Q226	C 3625-8	2N4125 30V PNP T/R	E 6
Q227	C 7458-0	2N4123 30V NPN T/R	E 6
Q228	C 3625-8	2N4125 30V PNP T/R	E 5
Q229	C 7458-0	2N4123 30V NPN T/R	E 5
Q230	C 3625-8	2N4125 30V PNP T/R	E 5
Q231	C 3625-8	2N4125 30V PNP T/R	D 3
Q232	C 3625-8	2N4125 30V PNP T/R	D 3
Q233	C 3625-8	2N4125 30V PNP T/R	D 4
Q234	C 7458-0	2N4123 30V NPN T/R	A 3
Q235	C 3810-6	MPSA42 300V NPN T/R	E 4
Q236	C 3578-9	MPSA93 200V PNP T/R	D 5
R1	A10265-22121	22.1 KOHM .25W 1 MF T/R	E 2
R4	A10265-28721	8.7 KOHM .25W 1% MF T/R	D 1
R5		*** NOT USED ***	H 4
R7	A10266-4331	43. KOHM .25W 5% CF T/R	I 6
R8	A10265-75021	75. KOHM .25W 1 MF T/R	H 6
R10		*** NOT USED ***	D 2
R11		*** NOT USED ***	L 5
R12		*** NOT USED ***	D 5
R17	A10265-75021	75. KOHM .25W 1 MF T/R	H 6
R18	A10266-4331	43. KOHM .25W 5% CF T/R	G 6
R19		*** NOT USED ***	I 4
R100		*** NOT USED ***	I 3
R101	A10265-24911	2.49KOHM .25W 1 MF T/R	J 2
R102	A10266-5111	510. OHM .25W 5 CF T/R	J 3
R103	A10265-49923	49.9 KOHM 1W 1% MF T/R	J 2
R104	A10265-26711	2.67KOHM .25W 1 MF T/R	M 3
R105	A10265-26711	2.67KOHM .25W 1 MF T/R	N 3
R106	A10265-11821	11.8 KOHM .25W 1% MF T/R	L 3
R107	A10266-9131	91. KOHM .25W 5 CF T/R	M 3
R108	A10266-8211	820. OHM .25W 5% CF T/R	N 4
R109	A10266-7501	75.0 OHM .25W 5 CF T/R	N 4
R110	A10266-9131	91. KOHM .25W 5 CF T/R	N 3
R111	A10265-11821	11.8 KOHM .25W 1% MF T/R	O 3
R112	A10265-49921	49.9 KOHM .25W 1 MF T/R	H 3
R113	A10265-48711	4.87KOHM .25W 1 MF T/R	J 4
R114	A10265-48711	4.87KOHM .25W 1 MF T/R	I 4
R115	A10266-5141	510. KOHM .25W 5% CF T/R	L 2
R116	A10266-3351	3.3 MOHM .25W 5% CF T/R	J 4
R117	A10266-4731	47. KOHM .25W 5% CF25 T/R	H 3
R118	A10265-28701	287. OHM .25W 1% MF T/R	N 4
R119	A10265-16211	1.62KOHM .25W 1 MF T/R	N 5
R120	A10265-28701	287. OHM .25W 1% MF T/R	N 4
R121	C 5062-2	100KOHM LINEAR TRIMPOT	O 1
R122	A10266-2041	200. KOHM .25W 5 CF T/R	N 2
R123	A10266-2432	24. KOHM .5W 5 CF T/R	O 2
R124	A10265-11021	11KOHM .25W 1% MF T/R	O 1

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 12 OF 20	REV
PROJ #	D255		Q43382-3	Ⓢ

PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
R125	A10266-1011	100. OHM .25W 5% CF T/R	O 2
R126	A10266-1011	100. OHM .25W 5% CF T/R	O 2
R127	A10265-11021	11KOHM .25W 1% MF T/R	N 3
R128	A10266-1331	13.0KOHM .25W 5% CF T/R	N 2
R129	A10266-1041	100. KOHM .25W 5% CF25 T/R	N 3
R130	A10266-1041	100. KOHM .25W 5% CF25 T/R	L 3
R131	A10266-1331	13.0KOHM .25W 5% CF T/R	L 3
R132	C 5062-2	100KOHM LINEAR TRIMPOT	K 1
R133	A10266-2741	270. KOHM .25W 5% CF25 T/R	K 2
R134	A10266-2432	24. KOHM .5W 5 CF T/R	M 3
R135	A10266-1011	100. OHM .25W 5% CF T/R	K 2
R136	A10265-11021	11KOHM .25W 1% MF T/R	L 2
R137	A10266-1011	100. OHM .25W 5% CF T/R	K 2
R138	A10265-11021	11KOHM .25W 1% MF T/R	L 3
R139	A10266-8211	820. OHM .25W 5% CF T/R	M 4
R140	A10266-7501	75.0 OHM .25W 5 CF T/R	M 4
R141	A10266-1541	150. KOHM .25W 5% CF T/R	N 3
R142	A10266-1541	150. KOHM .25W 5% CF T/R	L 3
R143	A10266-4711	470. OHM .25W 5% CF T/R	K 6
R144	A10266-4711	470. OHM .25W 5% CF T/R	K 5
R145	A10266-4711	470. OHM .25W 5% CF T/R	K 6
R146	A10265-11821	11.8 KOHM .25W 1% MF T/R	O 4
R147	A10124-24	WIRE, #24 SOILD BUSS	O 5
R148	A10265-19111	1.91KOHM .25W 1 MF T/R	N 4
R149	A10266-5102	51.0 OHM .5W 5 CF T/R	L 5
R150	A10265-19111	1.91KOHM .25W 1 MF T/R	M 4
R151	A10265-11821	11.8 KOHM .25W 1% MF T/R	L 4
R152	A10265-11821	11.8 KOHM .25W 1% MF T/R	O 2
R153	A10124-24	WIRE, #24 SOLID BUSS	J 4
R154	A10266-5601	56.0 OHM .25W 5% CF T/R	K 5
R155	A10266-4731	47. KOHM .25W 5% CF25 T/R	J 4
R156	A10266-1321	1.3 KOHM .25W 5 CF T/R	N 2
R157	A10266-1321	1.3 KOHM .25W 5 CF T/R	L 2
R158	A10265-11821	11.8 KOHM .25W 1% MF T/R	K 2
R159	A10266-1331	13.0KOHM .25W 5% CF T/R	J 3
R160	A10266-5601	56.0 OHM .25W 5% CF T/R	K 6
R161	A10266-4701	47.0 OHM .25W 5 CF T/R	N 3
R162	A10266-4701	47.0 OHM .25W 5 CF T/R	N 3
R163	A10266-5601	56.0 OHM .25W 5% CF T/R	K 5
R164	A10266-4711	470. OHM .25W 5% CF T/R	K 5
R165	A10266-4711	470. OHM .25W 5% CF T/R	K 5
R166	A10266-4711	470. OHM .25W 5% CF T/R	K 5
R167	A10265-10011	1.0 KOHM .25W 1 MF T/R	O 2
R168	A10265-97601	976. OHM .25W 1% MF T/R	O 2
R169	A10266-1041	100. KOHM .25W 5% CF25 T/R	N 3
R170	A10265-10011	1.0 KOHM .25W 1 MF T/R	K 3
R171	A10265-95301	953. OHM .25W 1% MF T/R	K 3

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 13 OF 28	REV
PROJ #	D255	Q43382-3		C

PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
R172	A10266-1041	100. KOHM .25W 5% CF25 T/R	M 3
R173	A10266-5601	56.0 OHM .25W 5% CF T/R	K 5
R174	A10265-11821	11.8 KOHM .25W 1% MF T/R	I 2
R175	A10265-22611	2.26K, 0.25W, 1%, MF	H 2
R176	A10265-11821	11.8 KOHM .25W 1% MF T/R	J 2
R177	A10265-48711	4.87KOHM .25W 1 MF T/R	H 3
R179	A10265-10011	1.0 KOHM .25W 1 MF T/R	K 4
R180	A10266-4711	470. OHM .25W 5% CF T/R	M 3
R181	A10265-48711	4.87KOHM .25W 1 MF T/R	N 4
R182	A10266-2201	22.0 OHM .25W 5 CF T/R	J 2
R183	A10266-4731	47. KOHM .25W 5% CF25 T/R	O 3
R184	A10266-4741	470. KOHM .25W 5% CF T/R	K 5
R185	A10266-4731	47. KOHM .25W 5% CF25 T/R	O 4
R186	A10266-2751	2.7 MOHM .25W 5% CF T/R	J 5
R187	A10266-3321	3.3 KOHM .25W 5% CF T/R	K 6
R188	A10266-3321	3.3 KOHM .25W 5% CF T/R	K 6
R189	A10266-3321	3.3 KOHM .25W 5% CF T/R	K 5
R190	A10266-2051	2.0 MOHM .25W 5 CF T/R	J 5
R191	A10266-4731	47. KOHM .25W 5% CF25 T/R	L 3
R192	A10266-4731	47. KOHM .25W 5% CF25 T/R	L 3
R193	A10265-10021	10. KOHM .25W 1 MF T/R	J 5
R194	A10265-49921	49.9 KOHM .25W 1 MF T/R	J 2
R195	A10266-4701	47.0 OHM .25W 5 CF T/R	K 4
R196	A10266-3921	3.9 KOHM .25W 5% CF T/R	K 4
R197	A10265-10021	10. KOHM .25W 1 MF T/R	K 4
R198	A10266-3921	3.9 KOHM .25W 5% CF T/R	K 3
R199	A10265-10021	10. KOHM .25W 1 MF T/R	K 3
R200		*** NOT USED ***	G 3
R201	A10265-24911	2.49KOHM .25W 1 MF T/R	F 2
R202	A10266-5111	510. OHM .25W 5 CF T/R	F 3
R203	A10265-49923	49.9 KOHM 1W 1% MF T/R	F 2
R204	A10265-26711	2.67KOHM .25W 1 MF T/R	A 3
R205	A10265-26711	2.67KOHM .25W 1 MF T/R	C 3
R206	A10265-11821	11.8 KOHM .25W 1% MF T/R	A 3
R207	A10266-9131	91. KOHM .25W 5 CF T/R	A 3
R208	A10266-8211	820. OHM .25W 5% CF T/R	C 4
R209	A10266-7501	75.0 OHM .25W 5 CF T/R	C 4
R210	A10266-9131	91. KOHM .25W 5 CF T/R	C 3
R211	A10265-11821	11.8 KOHM .25W 1% MF T/R	D 3
R212	A10265-49921	49.9 KOHM .25W 1 MF T/R	G 3
R213	A10265-48711	4.87KOHM .25W 1 MF T/R	F 4
R214	A10265-48711	4.87KOHM .25W 1 MF T/R	G 4
R215	A10266-5141	510. KOHM .25W 5% CF T/R	D 2
R216	A10266-3351	3.3 MOHM .25W 5% CF T/R	F 4
R217	A10266-4731	47. KOHM .25W 5% CF25 T/R	G 3
R218	A10265-28701	287. OHM .25W 1% MF T/R	B 4
R219	A10265-16211	1.62KOHM .25W 1 MF T/R	C 5

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 14 OF 20
PROJ #	D255	043382-3	

REV


PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
R267	A10265-1001	1.0 KOHM .25W 1 MF T/R	A 2
R268	A10265-97601	976. OHM .25W 1% MF T/R	A 2
R269	A10266-1041	100. KOHM .25W 5% CF25 T/R	C 3
R270	A10265-10011	1.0 KOHM .25W 1 MF T/R	E 3
R271	A10265-95301	953. OHM .25W 1% MF T/R	E 3
R272	A10266-1041	100. KOHM .25W 5% CF25 T/R	A 3
R273	A10266-5601	56.0 OHM .25W 5% CF T/R	D 5
R274	A10265-11821	11.8 KOHM .25W 1% MF T/R	G 2
R275	A10265-22611	2.26K, 0.25W, 1%, MF T/R	G 2
R276	A10265-11821	11.8 KOHM .25W 1% MF T/R	F 2
R277	A10265-48711	4.87KOHM .25W 1 MF T/R	G 3
R279	A10265-10011	1.0 KOHM .25W 1 MF T/R	E 4
R280	A10266-4711	470. OHM .25W 5% CF T/R	A 3
R281	A10265-48711	4.87KOHM .25W 1 MF T/R	B 4
R282	A10266-2201	22.0 OHM .25W 5 CF T/R	F 2
R283	A10266-4731	47. KOHM .25W 5% CF25 T/R	D 3
R284	A10266-4741	470. KOHM .25W 5% CF T/R	D 5
R285	A10266-4731	47. KOHM .25W 5% CF25 T/R	D 3
R286	A10266-2751	2.7 MOHM .25W 5% CF T/R	F 5
R287	A10266-3321	3.3 KOHM .25W 5% CF T/R	E 6
R288	A10266-3321	3.3 KOHM .25W 5% CF T/R	E 6
R289	A10266-3321	3.3 KOHM .25W 5% CF T/R	E 5
R290	A10266-2051	2.0 MOHM .25W 5 CF T/R	F 6
R291	A10266-4731	47. KOHM .25W 5% CF25 T/R	A 3
R292	A10266-4731	47. KOHM .25W 5% CF25 T/R	A 3
R293	A10265-10021	10. KOHM .25W 1 MF T/R	F 5
R294	A10265-49921	49.9 KOHM .25W 1 MF T/R	F 2
R295	A10266-4701	47.0 OHM .25W 5 CF T/R	F 3
R296	A10266-3921	3.9 KOHM .25W 5% CF T/R	E 4
R297	A10265-10021	10. KOHM .25W 1 MF T/R	E 4
R298	A10266-3921	3.9 KOHM .25W 5% CF T/R	E 3
R299	A10265-10021	10. KOHM .25W 1 MF T/R	E 3
R500	A10266-3041	300. KOHM .25W 5% CF T/R	J 3
R501	A10266-3041	300. KOHM .25W 5% CF T/R	J 3
R502	A10266-3041	300. KOHM .25W 5% CF T/R	J 3
R503	A10266-4702	47.0 OHM .5W 5% CF T/R	J 2
R504	A10266-5141	510. KOHM .25W 5% CF T/R	L 2
R505	A10266-5141	510. KOHM .25W 5% CF T/R	L 2
R506	A10266-1521	1.5 KOHM .25W 5% CF T/R	J 5
R507	A10266-4711	470. OHM .25W 5% CF T/R	J 5
R508	A10266-2731	27. KOHM .25W 5 CF T/R	J 5
R509	A10265-10021	10. KOHM .25W 1 MF T/R	I 3
R510	A10265-10021	10. KOHM .25W 1 MF T/R	H 2
R511	A10265-10021	10. KOHM .25W 1 MF T/R	H 2
R512	C 9079-2	200/220 OHM TRIM CERMET	H 3
R513	A10265-10021	10. KOHM .25W 1 MF T/R	H 3
R514	C 7340-0	24.0 OHM 3W 5% MF FP T/R	H 1

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 16 OF 20	REV
PROJ #	D255		Q43382-3	Ⓢ

PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
R515		*** NOT USED ***	J 1
R516	A10266-1051	1.0 MOHM .25W 5% CF T/R	L 2
R517	A10266-7501	75.0 OHM .25W 5% CF T/R	N 4
R518	A10266-7501	75.0 OHM .25W 5% CF T/R	N 4
R519	A10265-16911	1.69KOHM .25W 1% MF T/R	M 5
R520	A10266-1521	1.5 KOHM .25W 5% CF T/R	M 5
R521	A10266-9121	9.1 KOHM .25W 5% CF T/R	N 5
R522	A10266-5641	560. KOHM .25W 5% CF T/R	M 5
R523	A10266-1521	1.5 KOHM .25W 5% CF T/R	N 5
R524	A10266-5641	560. KOHM .25W 5% CF T/R	N 5
R525	A10265-95311	9.53KOHM .25W 1% MF T/R	N 5
R526	A10265-10021	10. KOHM .25W 1% MF T/R	I 5
R527	A10266-3921	3.9 KOHM .25W 5% CF T/R	L 4
R528	A10265-10021	10. KOHM .25W 1% MF T/R	L 4
R529	A10266-4731	47. KOHM .25W 5% CF25 T/R	L 4
R530	A10265-10021	10. KOHM .25W 1% MF T/R	O 3
R531	A10266-4731	47. KOHM .25W 5% CF25 T/R	L 3
R532	A10265-10021	10. KOHM .25W 1% MF T/R	L 4
R533	A10265-10021	10. KOHM .25W 1% MF T/R	O 3
R534	A10265-10021	10. KOHM .25W 1% MF T/R	L 3
R535	A10266-1R01	1.0 OHM .25W 5% CF T/R	O 5
R536	A10266-4701	47.0 OHM .25W 5% CF T/R	K 5
R537	A10266-1031	10. KOHM .25W 5% CF T/R	K 4
R538	A10266-1031	10. KOHM .25W 5% CF T/R	L 4
R539		*** NOT USED ***	J 1
R540		*** NOT USED ***	J 1
R541		*** NOT USED ***	I 2
R542		*** NOT USED ***	I 3
R543		*** NOT USED ***	J 5
R544	A10266-2031	20. KOHM .25W 5% CF T/R	L 4
R545	A10266-2031	20. KOHM .25W 5% CF T/R	K 4
R600	A10266-3041	300. KOHM .25W 5% CF T/R	F 3
R601	A10266-3041	300. KOHM .25W 5% CF T/R	F 3
R602	A10266-3041	300. KOHM .25W 5% CF T/R	F 3
R603	A10266-4702	47.0 OHM .5W 5% CF T/R	F 2
R604	A10266-5141	510. KOHM .25W 5% CF T/R	D 2
R605	A10266-5141	510. KOHM .25W 5% CF T/R	D 2
R606	A10266-1521	1.5 KOHM .25W 5% CF T/R	F 5
R607	A10266-4711	470. OHM .25W 5% CF T/R	F 5
R608	A10266-2731	27. KOHM .25W 5% CF T/R	F 5
R609	A10265-10021	10. KOHM .25W 1% MF T/R	G 3
R610	A10265-10021	10. KOHM .25W 1% MF T/R	G 2
R611	A10265-10021	10. KOHM .25W 1% MF T/R	G 2
R612	C 9079-2	200/220 OHM TRIM CERMET	H 3
R613	A10265-10021	10. KOHM .25W 1% MF T/R	G 3
R614	C 7340-0	24.0 OHM 3W 5% MF FP T/R	H 1
R615		*** NOT USED ***	F 1
R616	A10266-1051	1.0 MOHM .25W 5% CF T/R	D 2
R617	A10266-7501	75.0 OHM .25W 5% CF T/R	B 4

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 17 OF 20	REV
PROJ #	D255		043382-3	C

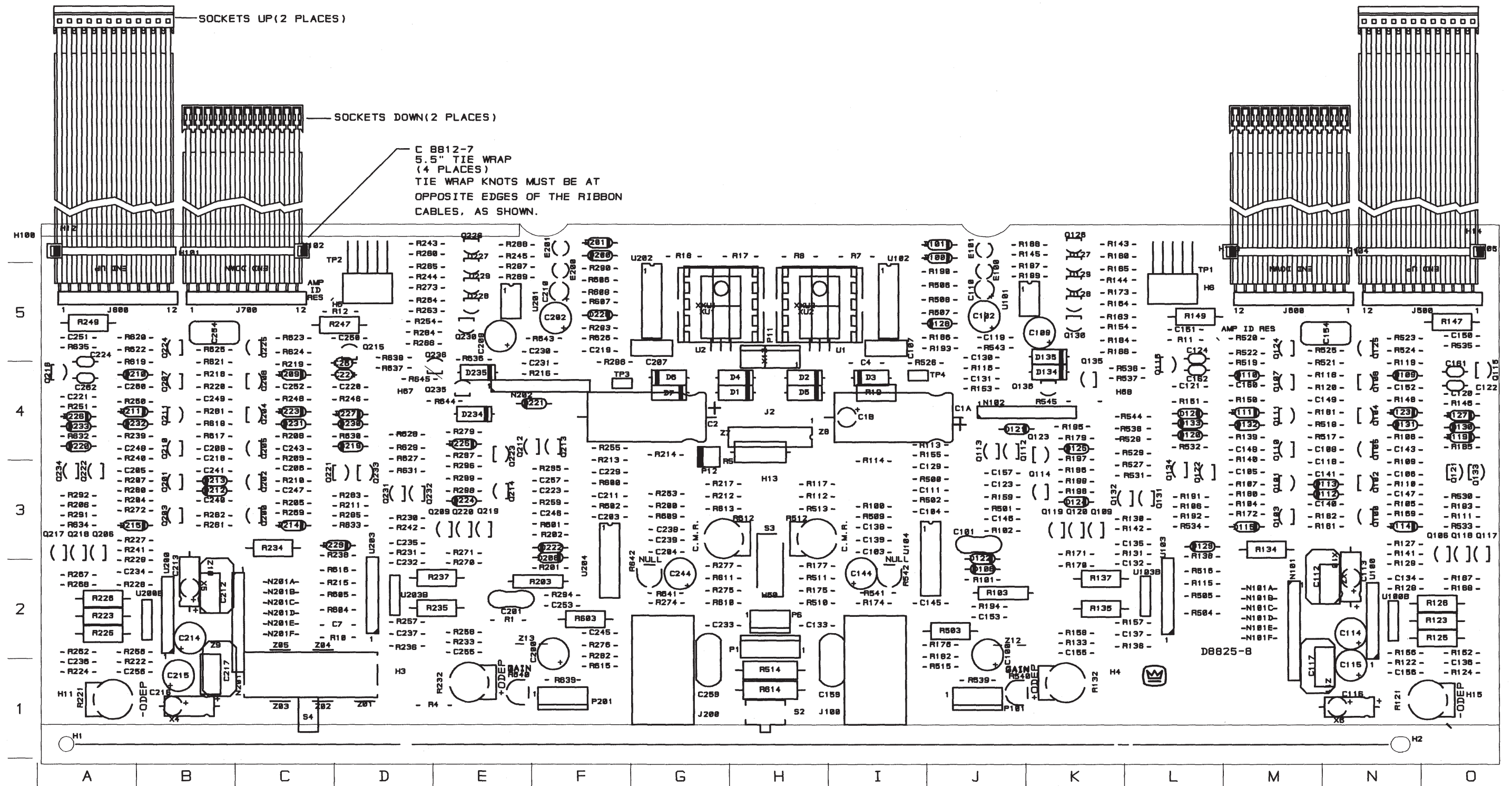
PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
R618	A10266-7501	75.0 OHM .25W 5 CF T/R	B 4
R619	A10265-16911	1.69KOHM .25W 1% MF T/R	A 5
R620	A10266-1521	1.5 KOHM .25W 5% CF T/R	A 5
R621	A10266-9121	9.1 KOHM .25W 5% CF T/R	B 5
R622	A10266-5641	560. KOHM .25W 5% CF T/R	A 5
R623	A10266-1521	1.5 KOHM .25W 5% CF T/R	C 5
R624	A10266-5641	560. KOHM .25W 5% CF T/R	C 5
R625	A10265-95311	9.53KOHM .25W 1% MF T/R	B 5
R626	A10265-10021	10. KOHM .25W 1 MF T/R	F 5
R627	A10266-3921	3.9 KOHM .25W 5% CF T/R	D 4
R628	A10265-10021	10. KOHM .25W 1 MF T/R	D 4
R629	A10266-4731	47. KOHM .25W 5% CF25 T/R	D 4
R630	A10265-10021	10. KOHM .25W 1 MF T/R	D 4
R631	A10266-4731	47. KOHM .25W 5% CF25 T/R	D 3
R632	A10265-10021	10. KOHM .25W 1 MF T/R	A 4
R633	A10265-10021	10. KOHM .25W 1 MF T/R	D 3
R634	A10265-10021	10. KOHM .25W 1 MF T/R	A 3
R635	A10266-1R01	1.0 OHM .25W 5% CF T/R	A 5
R636	A10266-4701	47.0 OHM .25W 5 CF T/R	E 5
R637	A10266-1031	10. KOHM .25W 5% CF T/R	D 4
R638	A10266-1031	10. KOHM .25W 5% CF T/R	D 5
R639		*** NOT USED ***	F 1
R640		*** NOT USED ***	E 1
R641		*** NOT USED ***	G 2
R642		*** NOT USED ***	G 3
R643		*** NOT USED ***	F 5
R644	A10266-2031	20. KOHM .25W 5% CF T/R	E 4
R645	A10266-2031	20. KOHM .25W 5% CF T/R	D 4
S2	C 7325-1	2POLE 2POS PC SLIDE SWITCH	H 1
S3	C 7960-5	DPDT 3POS PC SLIDE SWITCH	H 2
S4	C 6781-6	6P3T MONO/STEREO SWITCH	C 1
TP1	C 6564-6	10P DBLROW UNSHRD HDR 87230-5	L 5
TP2	C 6564-6	10P DBLROW UNSHRD HDR 87230-5	D 5
TP3		*** NOT USED ***	F 4
TP4		*** NOT USED ***	I 4
U1	C 5095-2	MC7815CT +15V. REG	H 5
U1X	C 9494-3	HEATSINK, T0220 PLUG IN	H 5
U2	C 5096-0	MC7915CT -15V. REG	G 5
U2X	C 9494-3	HEATSINK, T0220 PLUG IN	G 5
U100	101374-1	2SA1349 DUAL PNP 80V SIP	N 2
U101	C 6411-0	H11C2 OPTO SCR	J 5
U101X	C 8019-9	IC SOCKET 6 PIN DIP 2-641259-1	J 5
U102	C 4345-2	LM339N VOLT COMPARATOR	I 5
U102X	C 3450-1	IC SOCKET, 14PIN DIP	I 5
U103	101375-1	2SC3381 DUAL NPN 80V SIP	L 2
U104	C 7558-7	MC33079P QUAD LOW NOISE OP AMP	I 3
U104X	C 3450-1	IC SOCKET, 14PIN DIP	I 3
U200	101374-1	2SA1349 DUAL PNP 80V SIP	B 2
U201	C 6411-0	H11C2 OPTO SCR	E 5

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 18 OF 20	REV
PROJ #	D255		043382-3	

This Page Intentionally Left Blank



PWA #Q43382-3 Component Map

This page intentionally left blank

Q42859-1 Control PWA (P10291-6 PWB) Parts List

Capacitors

C801	C 5234-7	.047 μ F
C802	C 5234-7	.047 μ F

Resistors

R801	C 3753-8	10 Ohm
R802	C 3753-8	10 Ohm

Fuse

F801	C 3065-7	1 Amp
------	----------	-------

Relays

K801	C 7891-2	24V 10A Relay
K802	C 7891-2	24V 10A Relay

Diodes

D801	C 2851-1	1N4004
D802	C 2851-1	1N4004

Transistors

Q801	C 3625-8	2N4125
Q802	C 3625-8	2N4125

Misc.

P801-P815	C 7817-7	Tab, .25 Faston
J5	C 4508-5	16 Pin IC Socket
(2)	C 5060-6	Fuse Clip

Q43124-9 Control PWA (D 8172-5 PWB) Parts List

Capacitors

C801	C 5234-7	.047 μ F
C802	C 5234-7	.047 μ F
C803	C 8897-8	.01 μ F
C804	C 8897-8	.01 μ F

Diodes

D801	C 2851-1	1N4004
D802	C 2851-1	1N4004
D803	C 3549-0	1N961B 10V

Fuse

F801	C 3065-7	1 Amp
------	----------	-------

Relays

K801	C 9787-0	30A, 24V
K802	C 9787-0	30A, 24V

Transistors

Q801	C 3625-8	2N4125
Q802	C 3625-8	2N4125

Resistors

R801	A10266-1001	10 Ohm
R802	A10266-1001	10 Ohm
R803	A10266-4731	47K
R804	A10266-8231	82K
R805	A10266-1331	13K
R806	A10266-1331	13K
R807	A10266-2231	22K
R808	A10266-1331	13K
R809	A10266-1331	13K

IC's

U801	C 7444-0	LM393
------	----------	-------

Misc.

(2)	C 5060-6	Fuse Clip
J5	C 4508-5	16 Pin IC Socket
P801-P815	C 7817-7	Tab, .25 Faston
P816, P817	C 7873-0	2 Pin Header
(1)	C 3451-9	8 Pin IC Socket

Q43296-5 Control PWA (D 8543-7 PWB) Parts List

Capacitors

C801	C 5234-7	.047μF
C802	C 5234-7	.047μF
C803	C 8897-8	.01μF
C804	C 8897-8	.01μF

Diodes

D801	C 2851-1	1N4004
D802	C 2851-1	1N4004
D803	C 3549-0	1N961B 10V
D804	C 3181-2	1N4148
D805	C 3181-2	1N4148
D806	C 9596-5	1N5237B 8.2V
D807	C 9929-8	TL431ACLP

Fuse

F801	C 3065-7	1 Amp
------	----------	-------

Relays

K801	C 9787-0	30A, 24V
K802	C 9787-0	30A, 24V

Transistors

Q801	C 3625-8	2N4125
Q802	C 3625-8	2N4125
Q803	C 3625-8	2N4125

Resistors

R801	A10266-1001	10 Ohm
R802	A10266-1001	10 Ohm
R803	A10266-1821	1.8K
R804	A10266-8231	82K
R805	A10266-1331	13K
R806	A10266-1331	13K
R807	A10266-2231	22K
R808	A10266-1331	13K
R809	A10266-1331	13K
R810	A10266-2231	22K
R811	A10266-4741	470K
R812	A10266-8211	820 Ohm
R813	A10266-6221	6.2K
R814	C 9928-0	51.1K
R815	C 9639-3	4.99K

IC's

U801	C 7444-0	LM393
------	----------	-------

Misc.

(2)	C 5060-6	Fuse Clip
J5	C 4508-5	16 Pin IC Socket
P801-P815	C 7817-7	Tab, .25 Faston
P816, P817	C 7873-0	2 Pin Header
(1)	C 3451-9	8 Pin IC Socket

Q43363-3 Control PWA (D 8696-3 PWB) Parts List

Capacitors

C801	C 5234-7	.047 μ F
C802	C 5234-7	.047 μ F
C803	C 8897-8	.01 μ F
C804	C 8897-8	.01 μ F
C805	C 6807-9	.001 μ F

Diodes

D801	C 2851-1	1N4004
D802	C 2851-1	1N4004
D803	C 3549-0	1N961B 10V
D804	C 3181-2	1N4148
D805	C 3181-2	1N4148
D806	C 9596-5	1N5237B 8.2V
D807	C 9929-8	TL431ACL

Fuse

F801	C 3065-7	1 Amp
------	----------	-------

Relays

K801	C 9787-0	30A, 24V
K802	C 9787-0	30A, 24V

Transistors

Q801	C 3625-8	2N4125
Q802	C 3625-8	2N4125
Q803	C 3625-8	2N4125
Q804	C 3786-8	MPS4250A
Q805	C 3786-8	MPS4250A

Resistors

R801	A10266-1001	10 Ohm
R802	A10266-1001	10 Ohm
R803	A10266-1821	1.8K
R804	A10266-8231	82K
R805	A10266-1331	13K
R806	A10266-1331	13K
R807	A10266-2231	22K
R808	A10266-1331	13K
R809	A10266-1331	13K
R810	A10266-2231	22K
R811	A10266-4741	470K
R812	A10266-8211	820 Ohm
R813	A10266-6221	6.2K
R814	C 9928-0	51.1K
R815	C 9639-3	4.99K
R816	A10266-1041	100K
R817	A10266-3941	390K
R818	A10266-1041	100K
R819	A10266-3941	390K

IC's

U801	C 7444-0	LM393
------	----------	-------

Misc.

(2)	C 5060-6	Fuse Clip
J5	C 4508-5	16 Pin IC Socket
P801-P815	C 7817-7	Tab, .25 Faston
P816, P817	C 7873-0	2 Pin Header
(1)	C 3451-9	8 Pin IC Socket

E.C.N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS			
						CHK	ME	EE	PE
98E0158		A	ADDED NOTE 8. ADDED CPN 125490-1 TUBING.	06-22-98	TLM	<i>[Signature]</i>			<i>[Signature]</i>

NOTES:

1. FOR SCHEMATIC SEE J 0643-7.
2. FOR PRINTED WIRING BOARD SEE D 8696-3.

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

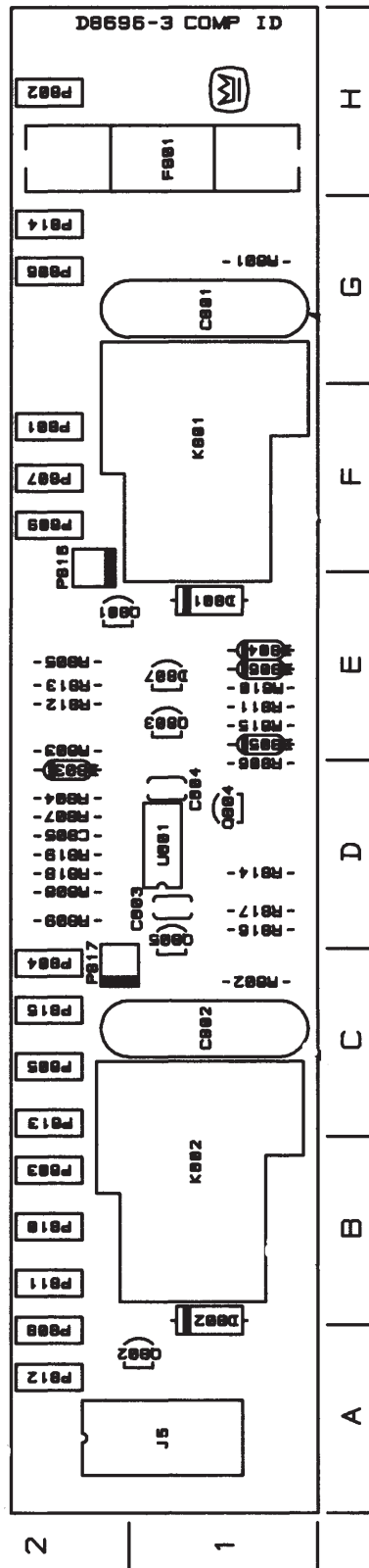
CROWN INTERNATIONAL INC.									
PRINTS TO		1718 WEST MISHAWAKA ROAD ELKHART, INDIANA 46517				PHONE (219) 294-8000			
K		MOD. MA3600VZ 100V CONTROL #2				TOL. UNLESS SPECIFIED X.XX - ± 0.020 X.XXX - ± 0.010 DRILLS - ± 0.003			
		DRAWN	KLW	11-28-94	APPROVED BY:	DO NOT SCALE PRINT			
		CHECKED	<i>[Signature]</i>	06/23/98	ME	SUPERSEDES			
		SCALE	NONE		EE	E.C.N. 98E0158			
		PROJ #	D255		PE	JW	11-29-94	C.P.N. SHEET 1 OF 5	REV
		NEXT ASSEMBLY				Q43364-1			(A)

PARTS LIST			
REF DES	C. P. N.	DESCRIPTION	MAP LOC.
C801	C 5234-7	0.047MF 125VAC	G 1
C802	C 5234-7	0.047MF 125VAC	C 1
C803	C 8897-8	.1MF 100V 20% Z5U RAD CER T/R	D 1
C804	C 8897-8	.1MF 100V 20% Z5U RAD CER T/R	D 1
C805	C 6807-9	.001MF 100V 10% AXL CER T/R	D 2
D801	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	E 1
D802	C 2851-1	RECTIFIER, 1N4004 SILICON T/R	B 1
D803	C 3549-0	DIODE, 1N961B 10V ZENER T/R	D 2
D804	C 3181-2	DIODE, 1N414B T/R	E 1
D805	C 3181-2	DIODE, 1N414B T/R	E 1
D806	C 9596-5	DIODE, 1N5237B 8.2V ZENER T/R	E 1
D807	C 9929-8	TL431ACL P ADJ PREC RFNC T/R	E 1
F801		--- INSTALLED ON NEXT ASSEMBLY ---	H 2
F801X	C 5060-6	PC MOUNT FUSE CLIP #926	H 2
F801X	C 5060-6	PC MOUNT FUSE CLIP #926	H 2
J5	C 4508-5	IC SKT, 16PIN DIP 2-640358-3	A 2
K801	C 9787-0	RELAY, 30A 24V T90 SEALED	F 1
K802	C 9787-0	RELAY, 30A 24V T90 SEALED	B 1
P801	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	F 2
P802	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	H 2
P803	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	B 2
P804	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	C 2
P805	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	C 2
P806	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	G 2
P807	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	F 2
P808	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	A 2
P809	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	F 2
P810	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	B 2
P811	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	B 2
P812	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	A 2
P813	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	C 2
P814	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	G 2
P815	C 7817-7	TAB, AMP .25 FASTON PC MOUNT	C 2
P816	C 7873-0	2POS .1 CENTER MTA HEADER TIN	E 2
P817	C 7873-0	2POS .1 CENTER MTA HEADER TIN	C 2
Q801	C 3625-8	2N4125 30V PNP T/R	E 2
Q802	C 3625-8	2N4125 30V PNP T/R	A 2
Q803	C 3625-8	2N4125 30V PNP T/R	E 1
Q804	C 3786-8	MPS4250A 40V PNP T/R	D 1
Q805	C 3786-8	MPS4250A 40V PNP T/R	D 1
R801	A10266-1001	10.0 OHM .25W 5% CF T/R	G 1
R802	A10266-1001	10.0 OHM .25W 5% CF T/R	C 1
R803	A10266-1821	1.8 KOHM .25W 5% CF T/R	E 2
R804	A10266-8231	82. KOHM .25W 5% CF T/R	D 2
R805	A10266-1331	13.0KOHM .25W 5% CF T/R	E 2
R806	A10266-1331	13.0KOHM .25W 5% CF T/R	D 1
R807	A10266-2231	22. KOHM .25W 5% CF T/R	D 2
R808	A10266-1331	13.0KOHM .25W 5% CF T/R	D 2
R809	A10266-1331	13.0KOHM .25W 5% CF T/R	D 2
R810	A10266-2231	22. KOHM .25W 5% CF T/R	E 1

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 3 OF 5	REV
PROJ #	D255	Q43364-1		A



PWA #Q43364-1 Component Map

Q42851-8 Display PWA (D 7617-0 PWB) Parts List

Capacitors

C501	C601	C 6802-0	.47 μ F Ax
C502	C602	C 6806-1	.01 μ F Ax
C503	C603	C 6806-1	.01 μ F Ax
C507	C607	C 6809-5	220pF
C701		C 6804-6	.1 μ F Ax
C702		C 6804-6	.1 μ F Ax
C703		C 6804-6	.1 μ F Ax
C704		C 6804-6	.1 μ F Ax

Diodes

D501	D601	C 3181-2	1N4148
D502	D602	C 3181-2	1N4148
D503	D603	C 3181-2	1N4148

LEDs

E501	E601	C 7863-1	Grn SPI/IOC
E502	E602	C 4342-9	Amber ODEP
E701		C 4342-9	Amber Enable

Transistors

Q501	Q601	C 3625-8	PNP 2N4125
Q502	Q602	D 2961-7	NPN 2N3859A Sel
Q503	Q603	D 2961-7	NPN 2N3859A Sel
Q504	Q604	C 3625-8	PNP 2N4125

Resistors

R501	R601	A10266-1051	1M
R502	R602	A10266-3331	33K
R503	R603	A10266-2741	270K
R504	R604	A10266-1031	10K
R505	R605	A10266-1022	1K .5W
R506	R606	A10266-2222	2.2K .5W
R507	R607	A10266-3332	33K .5W
R508	R608	A10266-1351	1.3M
R509	R609	A10266-7551	7.5M
R510	R610	A10266-7551	7.5M
R511	R611	A10266-4741	470K
R512	R612	A10266-2221	2.2K
R513	R613	A10266-1522	1.5K .5W
R514	R614	A10266-1001	10
R701		A10266-1522	1.5K .5W
R703		A10266-2031	20K
R704		A10266-1031	10K
R705		A10266-1031	10K
R706		A10266-2031	20K

ICs

U501	U601	C 4345-2	LM339
U502		C 5070-7	TL072
U701		C 8518-0	MC78L15ACP +15V
U702		C 8519-8	MC79L15ACP -15V

Misc.

J3		C 4508-5	16 Pin Header
Spacers (5)		A10101-2	LED Spacer

Q43314-6 Display PWA (D 8572-6 PWB) Parts List

Capacitors

C501	C601	C 6802-0	.47 μ F Ax
C502	C602	C 6806-1	.01 μ F Ax
C503	C603	C 6806-1	.01 μ F Ax
C507	C607	C 6809-5	220pF
C701		C 6804-6	.1 μ F Ax
C702		C 6804-6	.1 μ F Ax
C703		C 6804-6	.1 μ F Ax
C704		C 6804-6	.1 μ F Ax

Diodes

D501	D601	C 3181-2	1N4148
D502	D602	C 3181-2	1N4148
D503	D603	C 3181-2	1N4148
D701		C 8235-1	1N6263

LEDs

E501	E601	C 7863-1	Grn SPI/IOC
E502	E602	C 4342-9	Amber ODEP
E701		C 4342-9	Amber Enable

Transistors

Q501	Q601	C 3625-8	PNP 2N4125
Q502	Q602	D 2961-7	NPN 2N3859A Sel
Q503	Q603	D 2961-7	NPN 2N3859A Sel
Q504	Q604	C 3625-8	PNP 2N4125

Resistors


R501	R601	A10266-1051	1M
R502	R602	A10266-3331	33K
R503	R603	A10266-2741	270K
R504	R604	A10266-1031	10K
R505	R605	A10266-1022	1K .5W
R506	R606	A10266-2222	2.2K .5W
R507	R607	A10266-3332	33K .5W
R508	R608	A10266-1351	1.3M
R509	R609	A10266-7551	7.5M
R510	R610	A10266-7551	7.5M
R511	R611	A10266-4741	470K
R512	R612	A10266-2221	2.2K
R513	R613	A10266-1522	1.5K .5W
R514	R614	A10266-1001	10
R701		A10266-1522	1.5K .5W
R703		A10266-2031	20K
R704		A10266-1031	10K
R705		A10266-1031	10K
R706		A10266-2031	20K

ICs

U501	U601	C 4345-2	LM339
U502		C 5070-7	TL072
U701		C 8518-0	MC78L15ACP +15V
U702		C 8519-8	MC79L15ACP -15V


Misc.

J3		C 8784-8	16 Pin Header
Spacers (5)		A10101-2	LED Spacer

E. C. N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS			
						CHK	ME	EE	PE
EAT# 95-306		A	REVISED NOTES 1 AND 2 REVISION LEVELS.	01/02/96	TLM				TS
EAT# 96-199		B	R505, R605 WERE 1K R506, R606 WERE 2.2K E501, E601 WERE C 7003-1	06/26/96	LCD				

NOTES:

1. FOR SCHEMATIC SEE J 0703-9 REV.C.
2. FOR PRINTED WIRING BOARD SEE D8897-7 REV.B.
3. ALL LEADS SHALL BE TRIMMED TO 0.062" OR LESS.
EXCEPT FOR J3 WHICH CAN BE 0.090" OR LESS.
4. POSITION COMPONENTS AS SHOWN ON COMPONENT MAP.
5. J3 SHALL BE MOUNTED TO THE SOLDER SIDE OF THE PCB.
SEE FIGURE 1 FOR CLARITY.
6. EACH LIGHT EMITTING DIODE SHALL BE INSTALLED WITH A NYLON
SPACER (A10101-2). SEE FIGURE 1 FOR CLARITY.
7. MAXIMUM COMPONENT HEIGHT SHALL NOT EXCEED 0.275" EXCEPT FOR
LIGHT EMITTING DIODES.
8. THE CROWN PART NUMBER FOR THIS MODULE SHALL BE MARKED ON THE
P.C. BOARD AND SHALL BE PERMANENT.



CAUTION

STATIC CAN DAMAGE COMPONENTS!

DO NOT HANDLE

UNLESS WRIST STRAP IS WORN

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

CROWN INTERNATIONAL INC.									
PRINTS TO		1718 WEST MISHAWAKA ROAD ELKHART, INDIANA 46517				PHONE (219) 294-8888			
K		MOD, MA3600VZ DISPLAY				TOL. UNLESS SPECIFIED X.XX - ± 0.020 X.XXX - ± 0.010 DRILLS - ± 0.003			
		DRAWN	TLM	08-03-95	APPROVED BY:	DO NOT SCALE PRINT			
		CHECKED			ME	SUPERSEDES Q43440-9 REV. -			
		SCALE	NONE		EE	E. C. N. EAT# 95-306			
		PROJ #	D264		PE	TS	11-29-95	C. P. N. SHEET 1 OF 5	REV
		NEXT ASSEMBLY				Q43440-9		(B)	

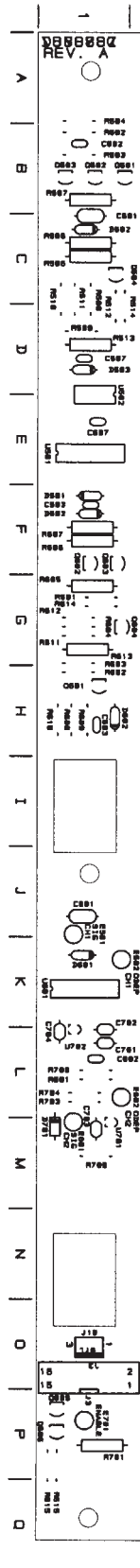
PARTS LIST			
REF DES	C.P.N.	DESCRIPTION	MAP LOC.
1	D 8897-7	BD, MA DISPLAY,	
C501	C 6802-0	.47UF 50V AXIAL CER T/R 474	C 1
C502	C 6806-1	.01UF 100V AXIAL CER T/R 103	B 1
C503	C 6806-1	.01UF 100V AXIAL CER T/R 103	F 1
C507	C 6809-5	220PF 100V AXIAL CER T/R 221	D 1
C601	C 6802-0	.47UF 50V AXIAL CER T/R 474	J 1
C602	C 6806-1	.01UF 100V AXIAL CER T/R 103	L 1
C603	C 6806-1	.01UF 100V AXIAL CER T/R 103	H 1
C607	C 6809-5	220PF 100V AXIAL CER T/R 221	E 1
C701	C 6804-6	.1UF 50V AXIAL CER T/R 104	L 1
C702	C 6804-6	.1UF 50V AXIAL CER T/R 104	L 1
C703	C 6804-6	.1UF 50V AXIAL CER T/R 104	M 1
C704	C 6804-6	.1UF 50V AXIAL CER T/R 104	L 1
D501	C 3181-2	DIODE, 1N4148 T/R	F 1
D502	C 3181-2	DIODE, 1N4148 T/R	C 1
D503	C 3181-2	DIODE, 1N4148 T/R	D 1
D601	C 3181-2	DIODE, 1N4148 T/R	K 1
D602	C 3181-2	DIODE, 1N4148 T/R	H 1
D603	C 3181-2	DIODE, 1N4148 T/R	F 1
D701	C 8235-1	DIODE, 1N6263 SCHOTTKY T/R	M 1
E501	C10592-1	LED, T 1.75 GREEN	J 1
E501X	A10101-2	.187X.115X.125 NYLON SPCR	J 1
E502	C 4342-9	LED, AMBER GI #MV5153	K 1
E502X	A10101-2	.187X.115X.125 NYLON SPCR	K 1
E601	C10592-1	LED, T 1.75 GREEN	M 1
E601X	A10101-2	.187X.115X.125 NYLON SPCR	M 1
E602	C 4342-9	LED, AMBER GI #MV5153	L 1
E602X	A10101-2	.187X.115X.125 NYLON SPCR	L 1
E701	C 4342-9	LED, AMBER GI #MV5153	P 1
E701X	A10101-2	.187X.115X.125 NYLON SPCR	P 1
J3	C 8784-8	16POS VERT EJECT HEADER	O 1
J10		--- NOT USED ---	O 1
Q501	C 3625-8	2N4125 30V PNP T/R	B 2
Q502	D 2961-7	SPS8010 60V NPN T/R	B 1
Q503	D 2961-7	SPS8010 60V NPN T/R	B 1
Q504	C 3625-8	2N4125 30V PNP T/R	C 1
Q505		--- NOT USED ---	P 1
Q601	C 3625-8	2N4125 30V PNP T/R	H 1
Q602	D 2961-7	SPS8010 60V NPN T/R	F 1
Q603	D 2961-7	SPS8010 60V NPN T/R	F 1
Q604	C 3625-8	2N4125 30V PNP T/R	G 1
Q605		--- NOT USED ---	P 1
R501	A10266-1051	1.0 MOHM .25W 5 CF T/R	G 1
R502	A10266-3331	33. KOHM .25W 5% CF T/R	B 1
R503	A10266-2741	270. KOHM .25W 5% CF25 T/R	B 1
R504	A10266-1031	10. KOHM .25W 5% CF T/R	A 1
R505	A10266-1522	1.5 KOHM .5W 5% CF T/R	C 1

CROWN INTERNATIONAL INC.
 1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C.P.N.	SHEET 3 OF 5
PROJ #	D264	Q43440-9	

REV

COMPONENT MAP
(COMPONENT SIDE VIEW)

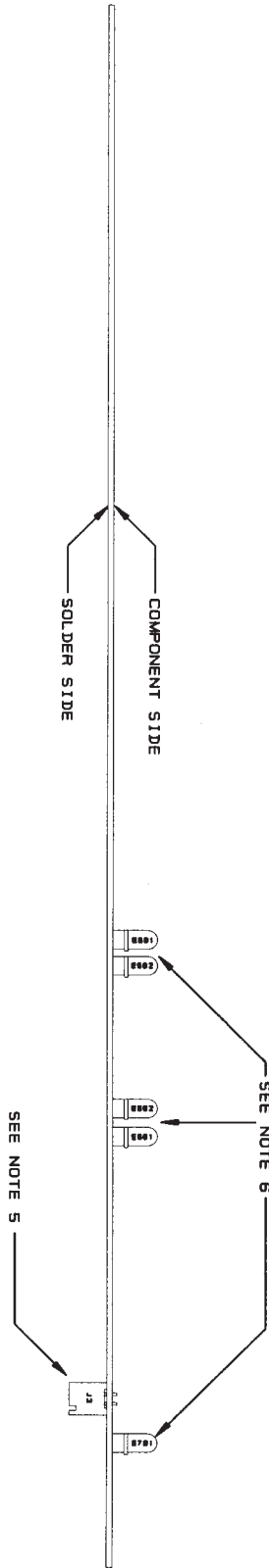


FIGURE 1
SCALE 1:1
(MOST COMPONENTS OMITTED FOR CLARITY)

PWA #Q43440-9 Component Map

Q42861-7 VZ Switch PWA (D 7272-4 PWB) Parts List

Capacitors

C16	C 2821-4	10pF
C17	C 2821-4	10pF
C18	C 3411-3	200pF
C19	C 3728-0	10μF
C20	C 3411-3	200pF
C21	C 6683-4	4700pF
C22	D 7595-8	6900μF
C23	D 7595-8	6900μF
C24	D 7595-8	6900μF
C25	D 7595-8	6900μF

Diodes

D17	C 3549-0	1N961B 10V
D18	C 6578-6	1N4735 6.2V

Resistors

R01	C 7421-8	2.5K .5W
R02	C 7441-6	90.9K 1%
R03	C 5707-2	100K 1%
R04	C 7440-8	27.4K 1%
R06	C 5707-2	100K 1%
R07	C 7441-6	90.9K 1%
R08	C 5707-2	100K 1%
R09	C 7440-8	27.4K 1%
R11	C 5707-2	100K 1%
R12	C 6317-9	953 1%
R13	C 6317-9	953 1%
R14	C 4850-1	1K 1%
R15	C 4850-1	1K 1%
R16	C 4225-6	470K
R17	C 3620-9	68K
R18	C 2631-7	10K
R19	C 3939-3	4.7K
R20	C 2632-5	15K
R21	C 2875-0	1.2K
R22	C 4167-0	43K
R23	C 3622-5	200K
R24	C 6090-2	62K
R25	C 3804-9	2K
R26	C 7654-4	3.9M
R27	C 5975-5	680
R28	C 2883-4	100K

Integrated Circuits

U03	C 7444-0	LM393
U04	C 7445-7	LM555
U05	C 4345-2	LM339

Transistors

Q03	D 2961-7	2N3859A, SEL
-----	----------	--------------

Misc.

C 3451-9	8 Pin IC Socket
----------	-----------------

Q43123-1 VZ Switch PWA (D 8174-1 PWB) Parts List

Capacitors

C00	C 2288-6	.001 μ F
C16	C 2821-4	10pF
C17	C 2821-4	10pF
C18	C 3411-3	200pF
C19	C 3728-0	10 μ F
C20	C 3411-3	200pF
C21	C 6683-4	4700pF
C22*	D 7595-8	6900 μ F
C23*	D 7595-8	6900 μ F
C24*	D 7595-8	6900 μ F
C25*	D 7595-8	6900 μ F

Diodes

D17	C 3549-0	1N961B 10V
D18	C 6578-6	1N4735 6.2V
D19	C 8855-6	BYV72-150
D20	C 8855-6	BYV72-150

Ferrite Bead

FB00	C 9156-0	30 Ohm, 10MHz
FB01	C 9156-0	30 Ohm, 10MHz
FB02	C 9156-0	30 Ohm, 10MHz

Transistors

Q00	C 8516-4	IRF641
Q01	C 8516-4	IRF641
Q02	C 8516-4	IRF641
Q03	D 2961-7	2N3859A, SEL

Integrated Circuits

U00	C 6901-0	MOC8021
U03	C 7444-0	LM393
U04	C 7445-7	LM555
U05	C 4345-2	LM339

Resistors

R00	C 2872-7	100
R01	C 7852-4	2.4K 5W
R02	A10265-90921	90.9K 1%
R03	C 5707-2	100K 1%
R04	A10265-27421	27.4K 1%
R06	C 5707-2	100K 1%
R07	A10265-90921	90.9K 1%
R08	C 5707-2	100K 1%
R09	A10265-27421	27.4K 1%
R11	C 5707-2	100K 1%
R12	C 6317-9	953 1%
R13	C 6317-9	953 1%
R14	A10265-10011	1K 1%
R15	A10265-10011	1K 1%
R16	C 4225-6	470K
R17	C 3620-9	68K
R18	C 2631-7	10K
R19	C 3939-3	4.7K
R20	C 2632-5	15K
R21	A10266-1221	1.2K
R22	C 4167-0	43K
R23	C 3622-5	200K
R24	C 6090-2	62K
R25	C 3804-9	2K
R26	A10266-3951	3.9M
R27	A10266-6811	680
R28	C 5707-2	100K

Misc.

P00	C 9527-0	6 Pin Header
P01	C 7592-6	4 Pin Header
	C 3451-9	8 Pin IC Socket

* These components do not come with the Q43123-1 PWA.

Q43181-9 VZ Switch PWA (D 8174-1 PWB) Parts List

Capacitors

C00	C 2288-6	.001 μ F
C16	C 2821-4	10pF
C17	C 2821-4	10pF
C18	C 3411-3	200pF
C19	C 3728-0	10 μ F
C20	C 3411-3	200pF
C21	C 6683-4	4700pF
C22*	D 7595-8	6900 μ F
C23*	D 7595-8	6900 μ F
C24*	D 7595-8	6900 μ F
C25*	D 7595-8	6900 μ F

Diodes

D17	C 3549-0	1N961B 10V
D18	C 6578-6	1N4735 6.2V
D19*	C 8855-6	BYV72-150
D20*	C 8855-6	BYV72-150

Ferrite Bead

FB00	C 9156-0	30 Ohm, 10MHz
FB01	C 9156-0	30 Ohm, 10MHz
FB02	C 9156-0	30 Ohm, 10MHz

Transistors

Q00*	C 8516-4	IRF641
Q01*	C 8516-4	IRF641
Q02*	C 8516-4	IRF641
Q03	D 2961-7	2N3859A, SEL

Integrated Circuits

U03	C 7444-0	LM393
U04	C 7445-7	LM555
U05	C 4345-2	LM339

Resistors

R00	C 2872-7	100
R01	C 7852-4	2.4K 5W
R02	A10265-90921	90.9K 1%
R03	C 5707-2	100K 1%
R04	A10265-27421	27.4K 1%
R06	C 5707-2	100K 1%
R07	A10265-90921	90.9K 1%
R08	C 5707-2	100K 1%
R09	A10265-27421	27.4K 1%
R11	C 5707-2	100K 1%
R12	C 6317-9	953 1%
R13	C 6317-9	953 1%
R14	A10265-10011	1K 1%
R15	A10265-10011	1K 1%
R16	C 4225-6	470K
R17	C 3620-9	68K
R18	C 2631-7	10K
R19	C 3939-3	4.7K
R20	C 2632-5	15K
R21	A10266-1221	1.2K
R22	C 4167-0	43K
R23	C 3622-5	200K
R24	C 6090-2	62K
R25	C 3804-9	2K
R26	A10266-3951	3.9M
R27	A10266-6811	680
R28	C 5707-2	100K

Misc.

P00	C 9527-0	6 Pin Header
P01	C 7592-6	4 Pin Header
	C 3451-9	8 Pin IC Socket
	D 8174-1	Board

* These components do not come with the Q43181-9 PWA.

Q43298-1 VZ Switch PWA (D 8174-1 PWB) Parts List

Capacitors

C00	C 2288-6	.001 μ F
C16	C 2821-4	10pF
C17	C 2821-4	10pF
C18	C 3411-3	200pF
C19	C 3728-0	10 μ F
C20	C 3411-3	200pF
C21	C 6683-4	4700pF
C22*	D 7595-8	6900 μ F
C23*	D 7595-8	6900 μ F
C24*	D 7595-8	6900 μ F
C25*	D 7595-8	6900 μ F

Diodes

D17	C 3549-0	1N961B 10V
D18	C 6578-6	1N4735 6.2V
D19	C 8855-6	BYV72-150
D20	C 8855-6	BYV72-150

Ferrite Bead

FB00	C 9156-0	30 Ohm, 10MHz
FB01	C 9156-0	30 Ohm, 10MHz
FB02	C 9156-0	30 Ohm, 10MHz

Transistors

Q00	C 9927-2	IRF540
Q01	C 9927-2	IRF540
Q02	C 9927-2	IRF540
Q03	D 2961-7	2N3859A, SEL

Integrated Circuits

U00	C 6901-0	MOC8021
U03	C 7444-0	LM393
U04	C 7445-7	LM555
U05	C 4345-2	LM339

Resistors

R00	A10266-1011	100
R01	C 7852-4	2.4K 5W
R02	A10265-90921	90.9K 1%
R03	A10265-10031	100K 1%
R04	A10265-27421	27.4K 1%
R06	A10265-10031	100K 1%
R07	A10265-90921	90.9K 1%
R08	A10265-10031	100K 1%
R09	A10265-27421	27.4K 1%
R11	A10265-10031	100K 1%
R12	A10265-95301	953 1%
R13	A10265-95301	953 1%
R14	A10265-10011	1K 1%
R15	A10265-10011	1K 1%
R16	A10266-4741	470K
R17	A10265-24921	24.9K 1%
R18	A10265-10021	10K 1%
R19	A10265-4721	4.7K
R20	A10266-1531	15K
R21	A10266-1221	1.2K
R22	A10266-4331	43K
R23	A10266-2041	200K
R24	A10266-6231	62K
R25	A10266-2021	2K
R26	A10266-3951	3.9M
R27	A10266-6811	680
R28	A10265-10031	100K 1%

Misc.

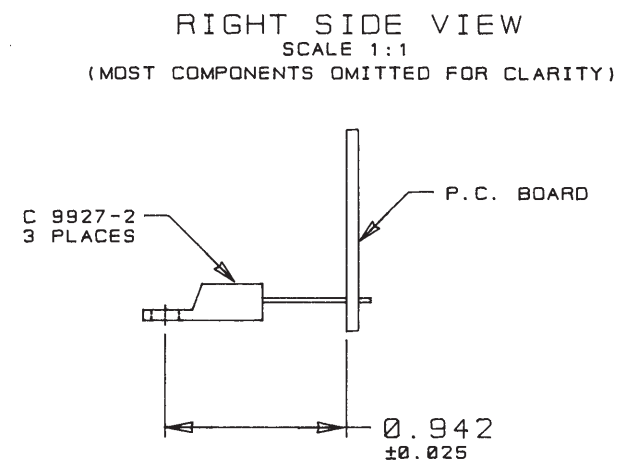
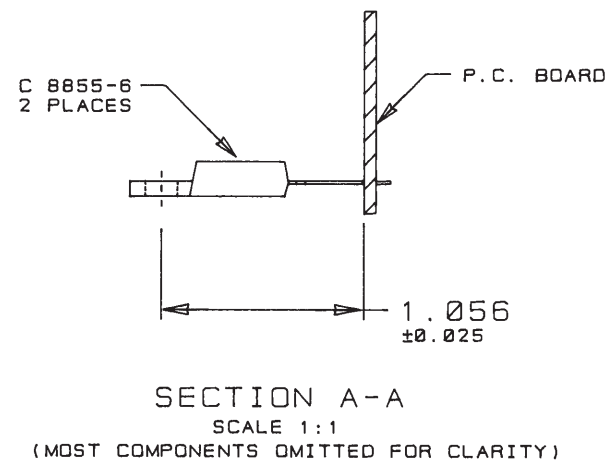
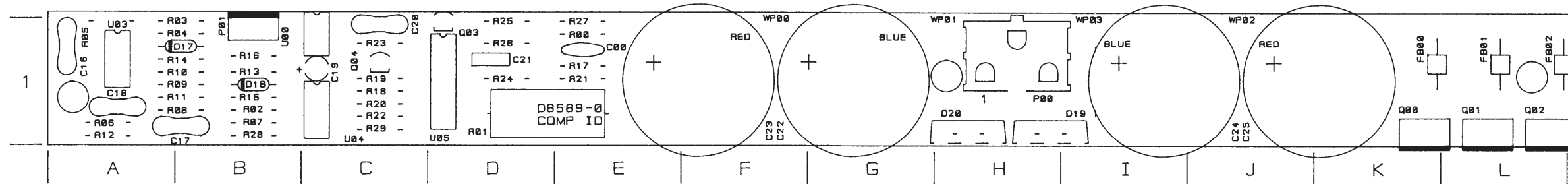
P00	C 9527-0	6 Pin Header
P01	C 7592-6	4 Pin Header
	C 3451-9	8 Pin IC Socket
	D 8174-1	Board

* These components do not come with the Q43298-1 PWA.

Q43323-7 VZ Switch PWA (D 8589-0 PWB) Parts List

COMPONENT LIST			
REF	CPN	DESCRIPTION	MAP LOCATION
C00	C 2288-6	0.001, , , DISC	E1
C16	C 9631-0	10PF, , ,	A1
C17	C 9631-0	10PF, , ,	B1
C18	C 9796-1	200PF, , ,	A1
C19	C 9465-3	10, 50V, ,	C1
C20	C 9796-1	200PF, , ,	C1
C21	C 6683-4	4700PF, 63V, 10%, POLY	D1
C22		--- INSTALLED ON NEXT ASSEMBLY ---	G1
C23		--- INSTALLED ON NEXT ASSEMBLY ---	F1
C24		--- INSTALLED ON NEXT ASSEMBLY ---	I1
C25		--- INSTALLED ON NEXT ASSEMBLY ---	K1
D17	C 3549-0	1N961B, 10V, ,	B1
D18	C 6578-6	1N4735, 6.2V, ,	B1
D19	C 8855-6	BYV72-150	I1
D20	C 8855-6	BYV72-150	H1
FB00	C 9156-0	30 OHM, 10MHZ, , FERRITE BEAD WIRED	K1
FB01	C 9156-0	30 OHM, 10MHZ, , FERRITE BEAD WIRED	L1
FB02	C 9156-0	30 OHM, 10MHZ, , FERRITE BEAD WIRED	L1
P00	C 9527-0	HDR, MATE-N-LOK, 6PIN, 94V-2	H1
P01	C 7592-6	HDR, MTA, 4PIN, .1 CTR	B1
Q00	C 9927-2	IRF540	K1
Q01	C 9927-2	IRF540	L1
Q02	C 9927-2	IRF540	L1
Q03	D 2961-7	2961, , ,	D1
Q04	C 3954-2	MPSA56, ,	C1
R00	A10266-1011	100, 0.25W, 5%, CF	E1
R01	C 7852-4	2.4K, 5W, 5%, WW	D1
R02	A10265-90921	90.9K, 0.25W, 1%, MF	B1
R03	A10265-10031	100K, 0.25W, 1%, MF	B1
R04	A10265-27421	27.4K, 0.25W, 1%, MF	B1
R05		--- NOT USED ---	A1
R06	A10265-10031	100K, 0.25W, 1%, MF	A1
R07	A10265-90921	90.9K, 0.25W, 1%, MF	B1
R08	A10265-10031	100K, 0.25W, 1%, MF	B1
R09	A10265-27421	27.4K, 0.25W, 1%, MF	B1
R10		--- NOT USED ---	B1
R11	A10265-10031	100K, 0.25W, 1%, MF	B1
R12	A10265-95301	953, 0.25W, 1%, MF	A1
R13	A10265-95301	953, 0.25W, 1%, MF	B1
R14	A10265-10011	1K, 0.25W, 1%, MF	B1
R15	A10265-10011	1K, 0.25W, 1%, MF	B1
R16	A10266-4741	470K, 0.25W, 5%, CF	B1
R17	A10265-24921	24.9K, 0.25W, 1%, MF	E1
R18	A10265-10021	10K, 0.25W, 1%, MF	C1
R19	A10266-4721	4.7K, 0.25W, 5%, CF	C1
R20	A10266-1531	15K, 0.25W, 5%, CF	C1
R21	A10266-1221	1.2K, 0.25W, 5%, CF	E1
R22	A10266-4331	43K, 0.25W, 5%, CF	C1
R23	A10266-2041	200K, 0.25W, 5%, CF	C1
R24	A10266-6231	62K, 0.25W, 5%, CF	D1

This Page Intentionally Left Blank



PWA #Q43323-7 Component Map

This page intentionally left blank

E. C. N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS				
						CHK	ME	EE	PE	
EAT896-100		A	NOTE 2 D8870-4 WAS REV. -	01/24/96	TLM					98

NOTES:

1. FOR SCHEMATIC SEE J0699-9 REV. -.
2. FOR PRINTED WIRING BOARD SEE D8870-4 REV. A.
3. ALL LEADS SHALL BE TRIMMED TO 0.093" OR LESS.
4. POSITION COMPONENTS AS SHOWN ON COMPONENT MAP.
5. THE CROWN PART NUMBER FOR THIS MODULE SHALL BE MARKED ON THE P.C. BOARD AND SHALL BE PERMANENT.

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

CROWN INTERNATIONAL INC.

PRINTS TO	1718 WEST MISHAWAKA ROAD ELKHART, INDIANA 46517		PHONE (219) 294-8888	
K	MOD, MA3600VZ CH2 B-L BRIDGE			TOL. UNLESS SPECIFIED X.XX = 1 0.020 X.XXX = 1 0.010 DRILLS = 1 0.003
	DRAWN	TLM 07-20-95	APPROVED BY:	DO NOT SCALE PRINT
	CHECKED		ME	SUPERSEDES Q43411-0 REV. -
	SCALE	NONE	EE	E. C. N. EAT896-100
	PROJ #	D255	PE TS 07-25-95	C. P. N. SHEET 1 OF 4
	NEXT ASSEMBLY			Q43411-0 A

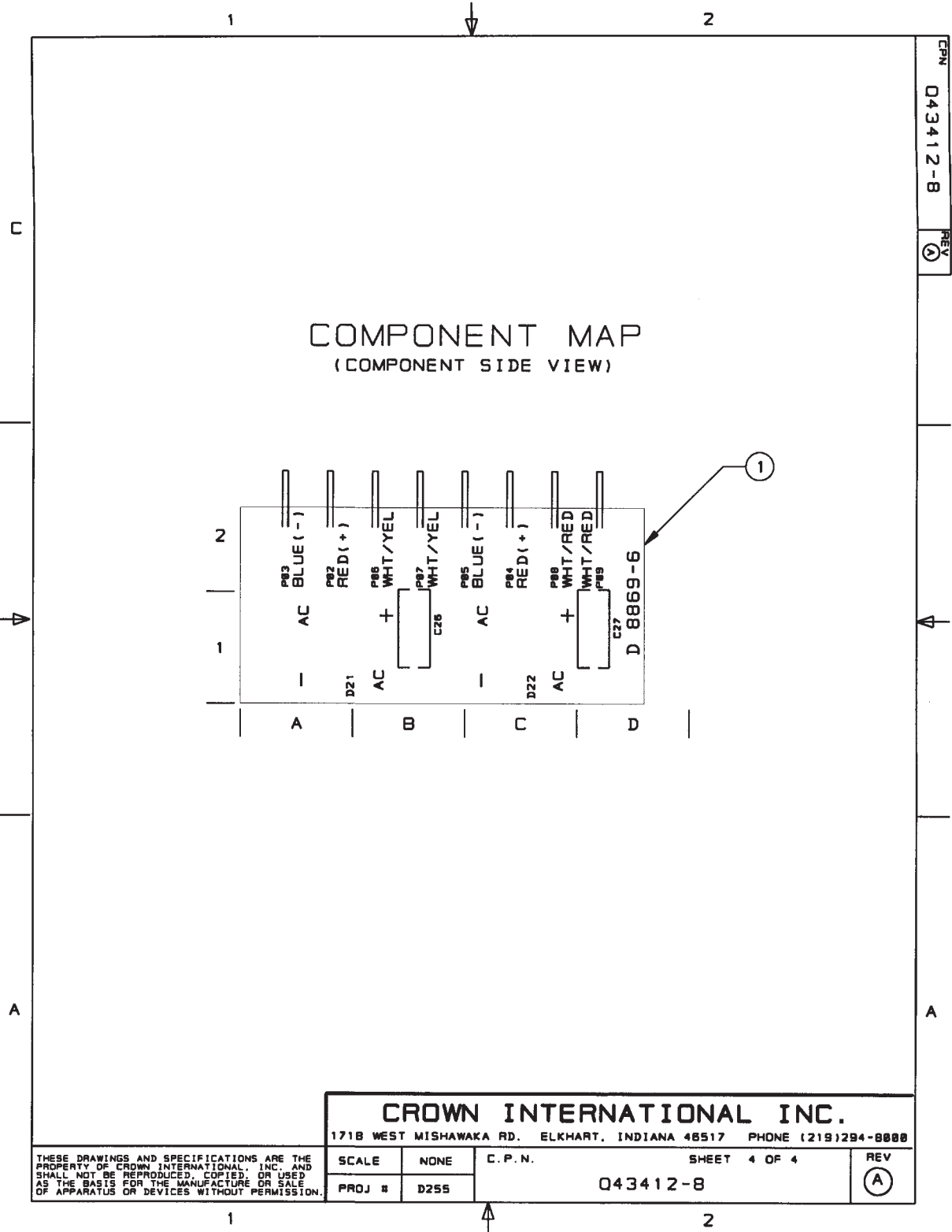
E.C.N.	ZONE	REV.	DESCRIPTION	DATE	BY	APPROVALS			
						CHK	ME	EE	PE
EAT# 96-107		A	NOTE 2 D8869-6 WAS REV. -	01-23-96	TLM				TS

NOTES:

1. FOR SCHEMATIC SEE J0699-9 REV. -.
2. FOR PRINTED WIRING BOARD SEE D8869-6 REV. A.
3. ALL LEADS SHALL BE TRIMMED TO 0.093" OR LESS.
4. POSITION COMPONENTS AS SHOWN ON COMPONENT MAP.
5. THE CROWN PART NUMBER FOR THIS MODULE SHALL BE MARKED ON THE P.C. BOARD AND SHALL BE PERMANENT.

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

PRINTS TO		1719 WEST MISHAWAKA ROAD ELKHART, INDIANA 46517				PHONE (219) 294-8800	
K		MOD, MA3600VZ CH1 B-L BRIDGE				TOL. UNLESS SPECIFIED X.XX - 1 0.020 X.XXX - 1 0.010 DRILLS - 1 0.003	
		DRAWN	TLM	07-20-95	APPROVED BY:	DO NOT SCALE PRINT	
		CHECKED			ME	SUPERSEDES Q43412-B REV. -	
		SCALE	NONE		EE	E.C.N. EAT#96-107	
		PRDJ #	D255	PE	TS	07-25-95	C.P.N. SHEET 1 OF 4
		NEXT ASSEMBLY				Q43412-B	
							REV (A)



CPN
043412-8
REV
A

CROWN INTERNATIONAL INC.
1718 WEST MISHAWAKA RD. ELKHART, INDIANA 46517 PHONE (219)294-8000

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN INTERNATIONAL, INC. AND SHALL NOT BE REPRODUCED, COPIED, OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS OR DEVICES WITHOUT PERMISSION.

SCALE	NONE	C. P. N.	SHEET 4 OF 4	REV
PROJ #	D255	043412-8		A

6 Schematic Diagrams

The schematics referenced and provided are representative only. There may be slight variations between amplifier to amplifier. These schematics are intended to be used for troubleshooting purposes only.

J0453-1

J0454-9

J0464-8

J0547-0

J0560-3

J0561-1

J0643-7

J0643-7 Rev. C

J0675-9

J0699-9

J0703-9

This Page Intentionally Left Blank