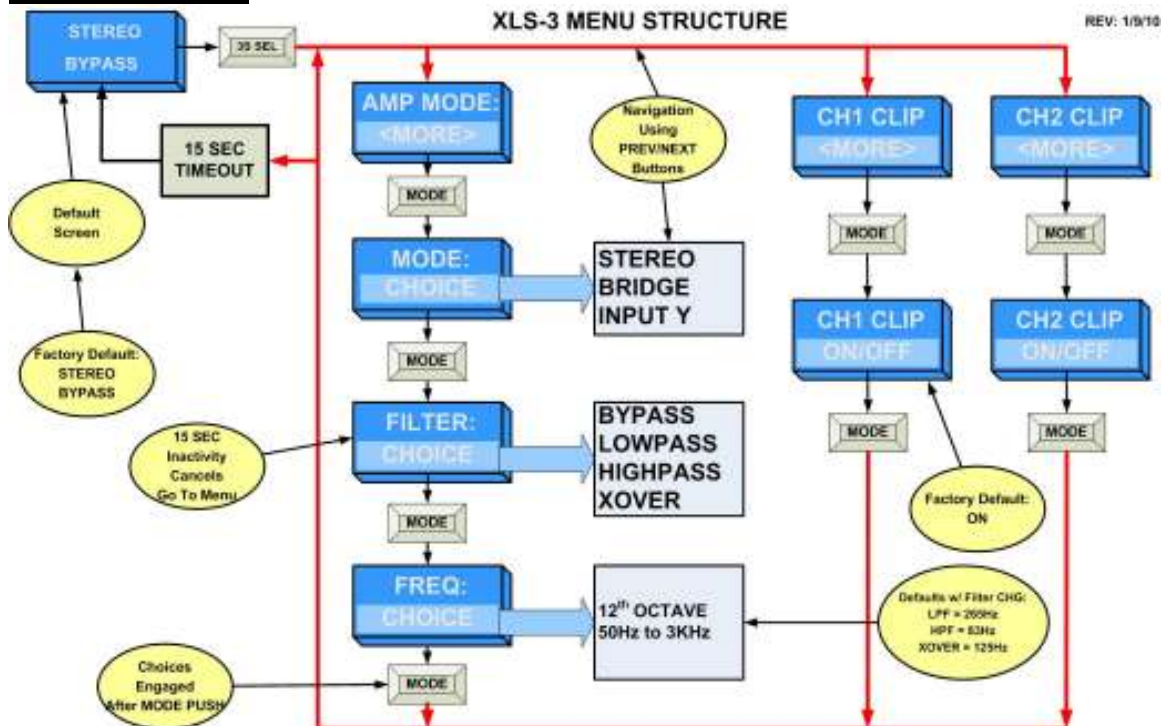


# XLS1000 – 2500 Service Manual



**XLS-3 MENU:**

The XLS main menu structure communicates functionality of the amplifier in terms of its input routing (MODE), filter selection (FILTER), and frequency of the filter (FREQ)...when available.

**MODE:** Amplifier audio routing.

**STEREO:** Channel 1 input to Channel 1 output, Channel 2 input to Channel 2 output.

**BRIDGE:** Channel 1 input to Channel 1, with the inverted Channel 1 input to Channel 2. By taking the two positive outputs of the amplifier, twice the output voltage (twice the power) is realized. In BRIDGE mode, Crossover (XOVER) filters are not allowed since the same audio is required for both output channels.

**INPUT Y:** Channel 1 input to both Channel 1 and Channel 2's processing and output. Switching occurs pre-pot and pre-filter.

**FILTER:** Audio filtering.

**BYPASS:** Both channels are full spectrum audio (20Hz – 20KHz). In BYPASS mode, no FREQ choice is allowed.

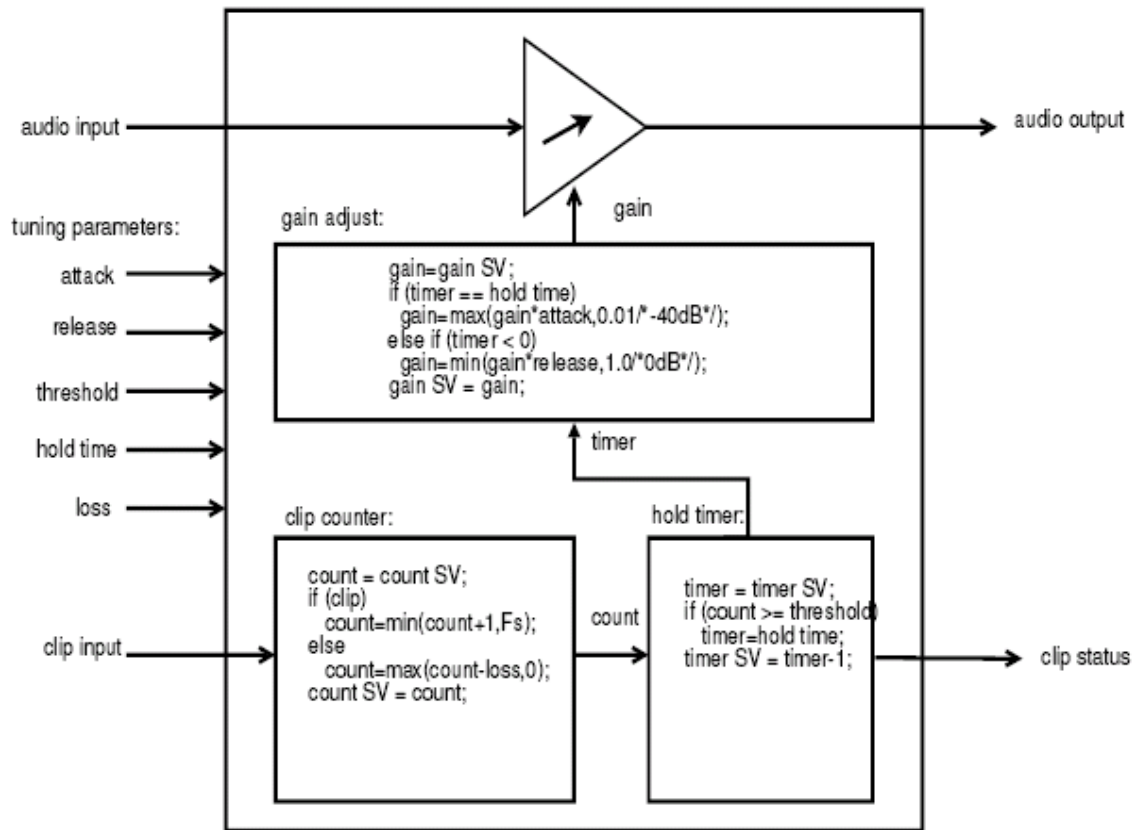
**LOWPASS:** Both channels are 4<sup>th</sup> order Linkwitz-Riley filters with frequency breakpoint determined by the FREQ choice.

**HIGHPASS:** Both channels are 4<sup>th</sup> order Linkwitz-Riley filters with frequency breakpoint determined by the FREQ choice.

**XOVER:** When XOVER is selected, the MODE choice is automatically changed to INPUT Y. Channel 1 is fed to both channels' processing with Channel 1 being Lowpass and Channel 2 being Highpass. The crossover frequency is determined by the FREQ choice.

**CLIP COMPRESSOR:** Allows the clip compressor for each channel to be either turned on or off. The Clip compressor is a proprietary algorithm that limits clipping on a real-time basis.

### XLS-3 Clip Compressor

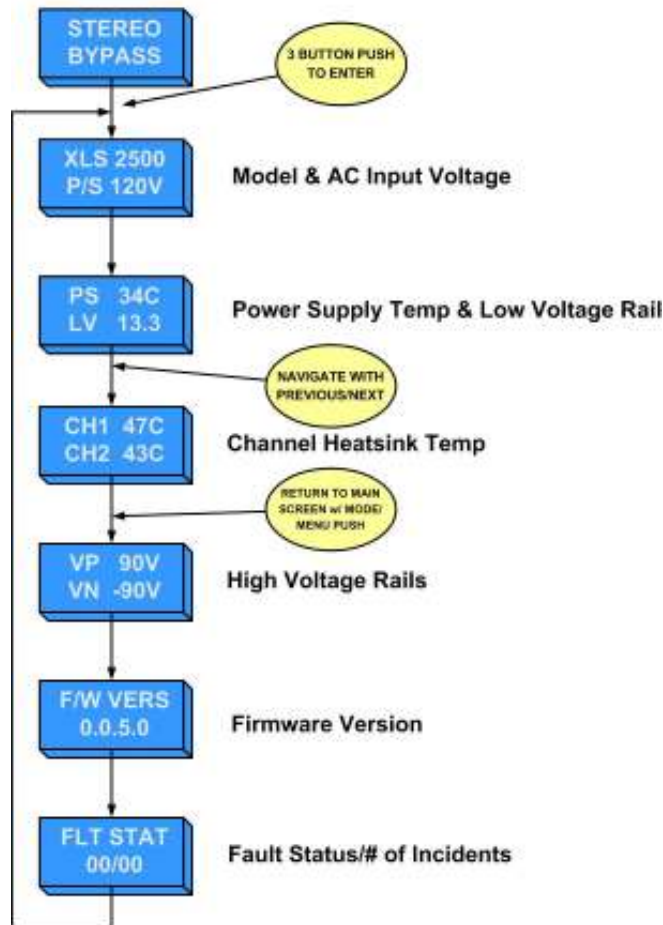


notes:

- 1 - clip assertion level is zero; monitored via digital audio input w/external multiplexer; sampling @ Fs accomplished by defining clip as clip input >=0, i.e. sign bit clear
- 2 - attack = 0.1^(sample period/attack time), where attack time units are seconds/20dB
- 3 - release = 10^(sample period/release time), where release time units are seconds/20dB
- 4 - threshold is the clip counter value at which attack begins, (min=1)
- 5 - hold time specified in # of samples delays release by hold time-1 samples (min=1)
- 6 - loss parameter determines clip counter rate of decay under no-clip conditions (min>0)
- 7 - per-instance internal state variables are maintained for gain, clip counter and hold timer
- 8 - clip counter is clamped to Fs for anti-windup under prolonged clip conditions;
- 9 - saturation arithmetic makes timer decrement safe under prolonged no-clip conditions
- 10 - bridge mode requires logical ORing of the clip inputs in addition to ensuring the ch1/ch2 parameters are identical.
- 11 - clip status is sticky; it is set when count >= threshold and remains set until explicitly cleared

### DIAGNOSTIC MENU:

### XLS-3 DIAGNOSTIC MENU STRUCTURE



A set of diagnostic menus can be accessed at anytime by pushing all three menu buttons at the same time. The amplifier continues to pass audio, but the diagnostic menus are displayed until the MODE/MENU button is pushed and normal amplifier functionality returns.

**MODEL & VOLTAGE TYPE:** Displays the Model and voltage type.

**POWER SUPPLY TEMP & LOW VOLTAGE RAIL:** Displays the Power Supply Heatsink Temperature and the Low Voltage rail (in volts).

**AMPLIFIER CHANNEL TEMP:** Displays the heatsink temperature for the power devices of each channel.

**HIGH VOLTAGE RAILS:** Indicates the Amplifier voltage rails, Positive (VP) and Negative (VN).

**FIRMWARE VERSION:** Shows the firmware version.

**FAULT STATUS:** Indicates the latest fault that the amplifier has had and the number of instances of that fault. Refer to the Error Codes section for specific Fault/Error codes.

## **ERROR CODES:**

The amplifier's processor runs through a series of Power On Self Tests (POST) when the amplifier is first powered up. If the processor encounters an error, it will communicate the error via the front panel Thermal LED's.

These error codes are unique and based upon a Major and Minor element. The Major element is determined by which portion of the amplifier failed POST, while the Minor portion is which part of the Major element failed. They are displayed by CH1 Thermal LED = MAJOR, CH2 Thermal LED = MINOR. The MAJOR is blinked 1<sup>st</sup>, then the MINOR.

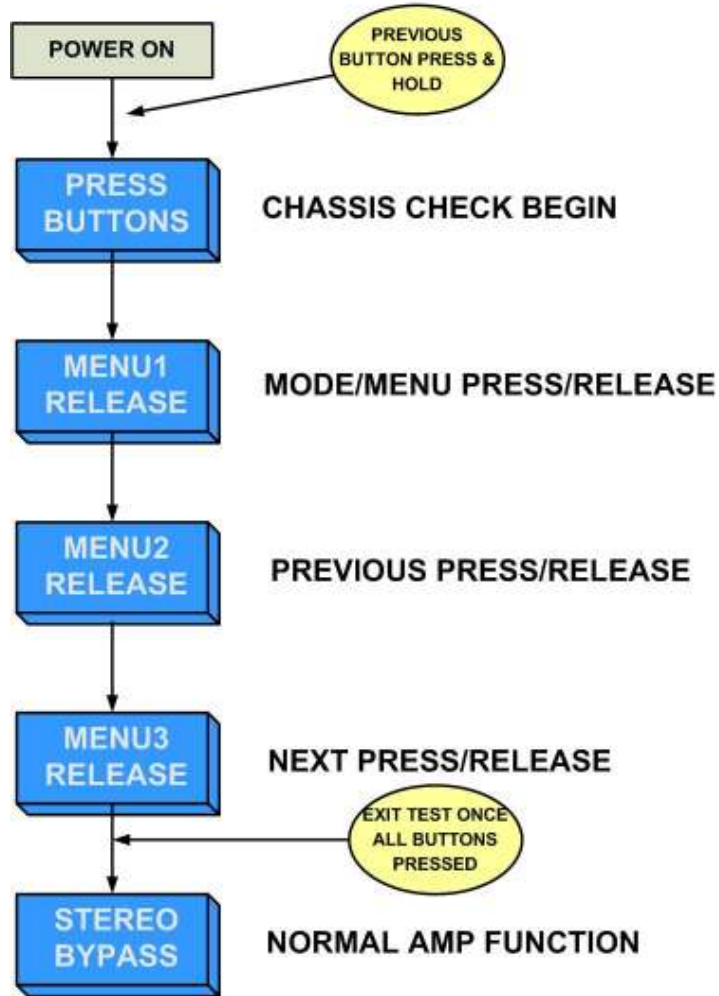
<b>MAJOR</b>	<b>MINOR</b>	<b>ERROR</b>	<b>COMMENT</b>
<b>0</b>	<b>1</b>	Processor POST Fail	Internal MCU error (PLL, etc)
<b>0</b>	<b>2</b>	Processor Assert Fail	Something catastrophic in the firmware.
<b>0</b>	<b>3</b>	Processor Watchdog Fail	Firmware error where watchdog timeout has not been attended.
<b>0</b>	<b>4</b>	Power Fail	Power Sequencing of the Power Supply has failed.
<b>1</b>	<b>1</b>	LCD POST Fail	Initialization of LCD failed
<b>1</b>	<b>2</b>	LCD Communications Fail	MCU unable to communicate with LCD. Can occur anytime as opposed to POST
<b>2</b>	<b>1</b>	DSP Boot Fail	MCU is unable to boot the DSP via I2C
<b>2</b>	<b>2</b>	DSP POST Fail	MCU was able to boot the DSP, but not able to communicate and control.
<b>2</b>	<b>3</b>	DSP Communications Fail	Can happen anytime. Would have been found via Boot or POST failure if full time I2C problem
<b>3</b>	<b>1</b>	RUBY POST Fail	Unable to communicate with Ruby on amplifier board initially.
<b>3</b>	<b>2</b>	RUBY Communications Fail	I2C communications failure for some reason. Not caught at POST
<b>3</b>	<b>3</b>	RUBY ADC Sensor Fail	An illegal ADC value was encountered by MCA via Ruby
<b>4</b>	<b>1</b>	MFGTEST Result Byte Failure	APM's MFGTEST byte indicates test failure or not

			tested.
4	2	MFGTEST GPIO Comm Fail	APM is unable to communicate with the MFG Test fixture's I2C GPIO registers.
4	3	MFGTEST ADC Comm Fail	APM is unable to communicate with the MFG Test fixture's I2C ADC registers.

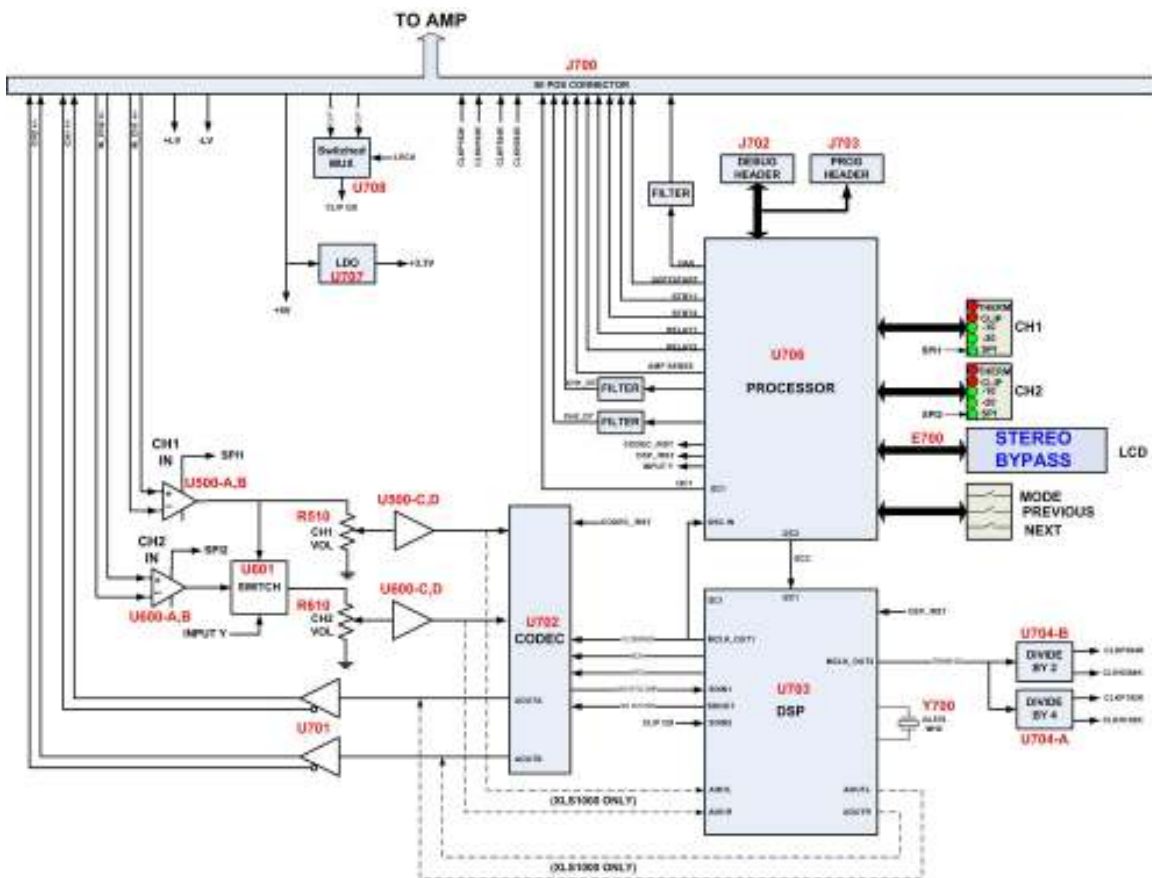
### **CHASSIS LEVEL SELF-TEST:**

This test is used to ensure the functionality of the LCD, Buttons, and Fan once the amplifier is assembled. The self-test is initiated by holding down the PREVIOUS (middle) button during power up. The amplifier enters a test mode where all of the front panel LED's except the SPI indicators are lit. Additionally, the fan is at full speed and the LCD indicates which of the three front panel buttons are pushed. Once all three buttons have been pushed and released, the test completes and the amplifier returns to normal operation.

# XLS-3 CHASSIS CHECK



# APM SECTION THEORY OF OPERATION



## **ANALOG INPUTS:**

The input to the APM can accept 1.4Vrms input and drive the resultant APM output to a level that drives the amplifier to full rated power into 8Ω. The differential analog inputs come from J700 which connects to the MAIN board of the amplifier. The input XLR, ¼”, and RCA connectors tie directly to this point on the MAIN board. The following will be for CH2, with CH1 being identical except for the analog Y input switch (U601).

U600-A,B form a differential to single ended gain stage with a gain of -3.54dB. See Gain Block Diagrams below. The output of U600B drives the input of U601, which is a unity gain amplifier that selects either the ‘A’ input (CH2) or ‘B’ input (CH1) dependent upon the INPUT\_Y drive from the microprocessor (Q600 to U601-1). U601 provides the Input Y audio routing. The output of U601 drives front panel pot R610 that feeds single ended amplifier section U600-C. This stage has a maximum gain of +13.86dB as shown.

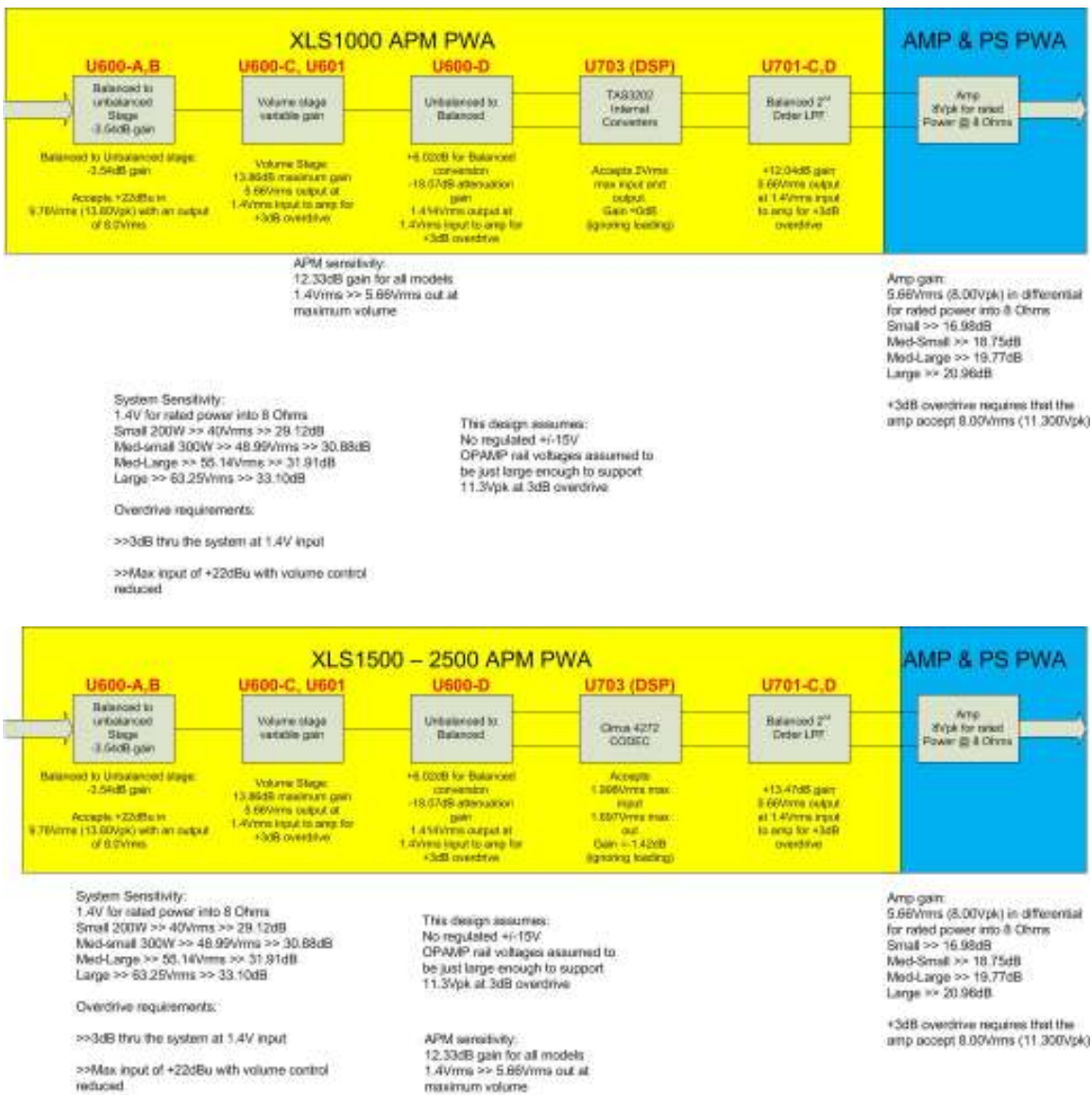
For CH2, the output of U601-5,6 drives a comparator, U700-B, that lights the front panel SPI LED when the input signal is >-40dBu. R600/601 provides the DC bias



that provides the comparator reference point. For CH1, the input to the SPI indicator comes from U500-7.

U600-D acts as a unity gain inverter that creates a differential signal (+6dB gain) to feed the attenuator for either the TI DSP's ADC (XLS1000) or Cirrus Codec (XLS1500, 2000, 2500). For the XLS1000, R618-619, R621-623 form a voltage divider and bias network into the TI DSP (CH2±\_DSP\_AD). In the case of the XLS1500 – 2500, R613-614, R617, R620 form the voltage divider and bias network into the Cirrus codec (CH2±\_AD).

As you can see, the major difference between the XLS1000 and XLS1500 – 2500 APM's resides in the use of an external Cirrus Codec (U702) for the larger amplifiers. This results in ~4dB better S/N, but at an additional cost of \$2.

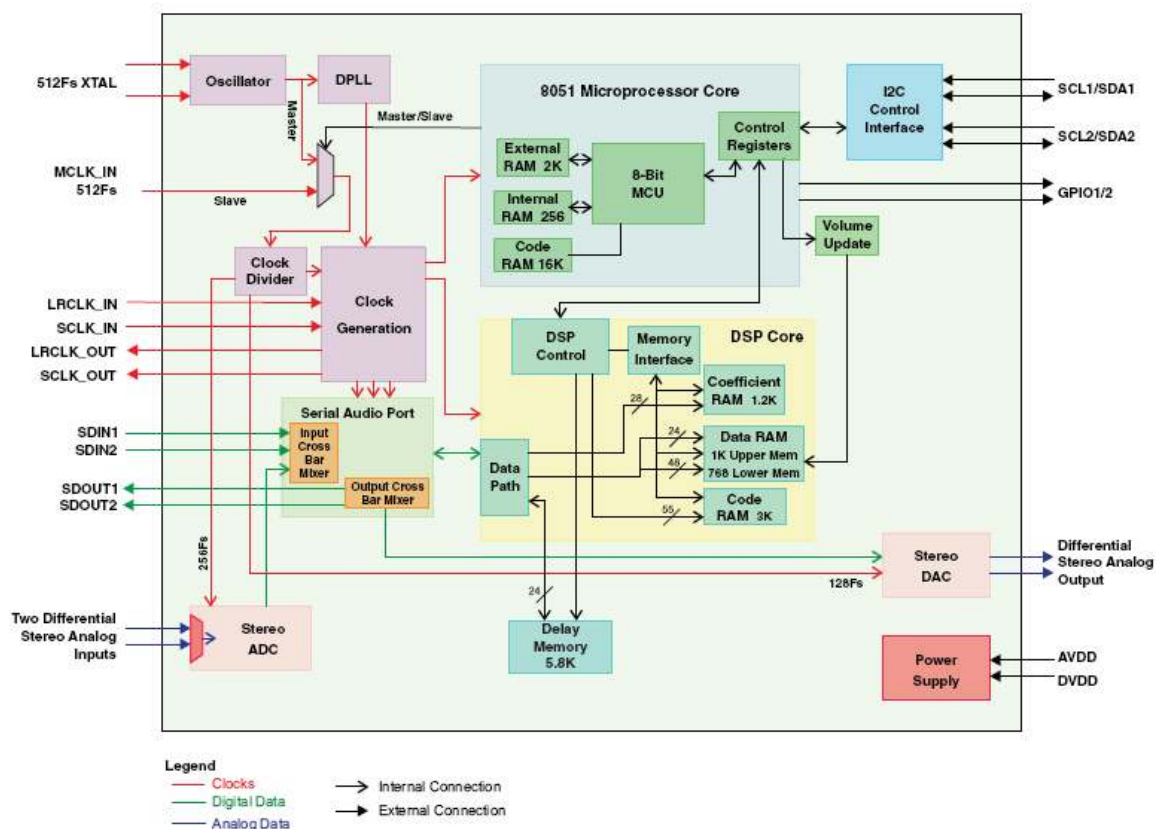


## ANALOG OUTPUTS:

The output of the APM is driven by a differential gain stage (U701-C,D) that receives its input from the DAC. In the case of the XLS1000, the DAC resides within the TI DSP (CH2±\_DSP\_DA), while in the case of the XLS1500 – 2500, the DAC is part of the Cirrus codec (CH2±\_DA). This gain stage matches the output of the DAC to the amplifier's input requirement of 5.66Vrms to drive the amplifier's output to full rated power.

## DIGITAL PROCESSING:

The TAS3202 is an integrated converter and DSP that provides all of our signal processing at an affordable cost. The IC is powered from +3.3V and uses ~200mA.

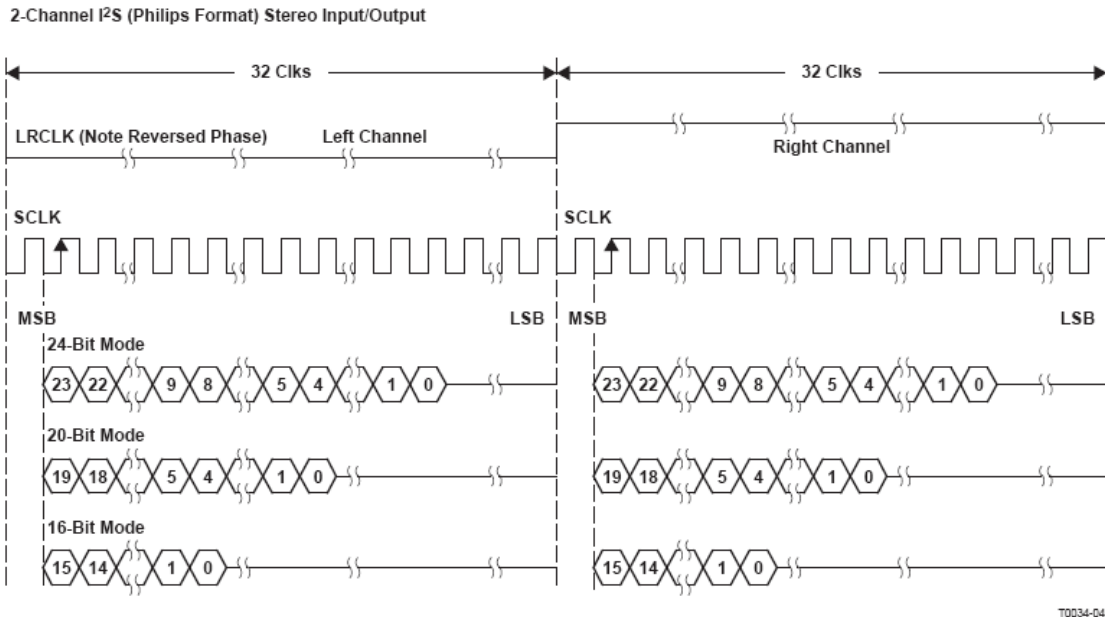


## Clock Generation:

The amplifier runs from a single clock that is generated by the TAS3202 (U703) using the 24.576MHz crystal, Y700. This clock is divided by 2 internally by the DSP and sent to the microprocessor (MCLK\_UP) and Cirrus codec (MCLK\_CODEC). The fundamental clock is divided internally in the DSP to 768KHz and sent to Divide-by-2 (U704-B) to provide differential 384KHz to the MAIN board's Ruby PWM IC and the 384KHz is then divided by U704-A to provide 192KHz to the MAIN SMPS via J700.

## Digital Audio:

The DSP runs at 48KHz sampling rate and also requires that the external codec also samples at 48KHz. The DSP utilizes I2S digital audio to get audio to/from the external codec (DSP\_SDIN, DSP\_SDOU). The timing diagram below shows the relationship between serial clock (SCLK), channel clock (LRCK), and digital audio (SDIN, SDOU).



## CLIP Inputs:

The Ruby IC (U1) on the MAIN PWA supplies individual channel clip indications via J700. In order to get these clip indications directly into the TI DSP (U703) as an input for the clip compressor, a 2<sup>nd</sup> I2S input is used. The channel clip indications (CLIP1 & CLIP2) are gated into their own I2S channel using the LRCK signal and U708. CLIP1 events are gated onto the 'L' I2S channel and the CLIP2 events are gated onto the 'R' I2S channel. This provides 48KHz sampling of the Ruby clip events into the DSP for the clip compressor.

## Serial Communications:

The TAS3202 has two I2C channels: I2C1 and I2C2 for external communications and booting. The DSP initially tries to use I2C2 to access an external EEPROM to boot itself. In this design, an external EEPROM is not used and the DSP is booted from the microprocessor (U706) via I2C1. The DSP acts as a slave with the processor being the master. Control for filter selection, frequency setting, input level monitoring, clip events, and other control and monitoring functions are handled thru this serial communications port.

**NOTE: Don't confuse I2C with I2S.** Both are used in this device. I2C is a 2-wire serial communications protocol that allows an external processor to boot, monitor, and control the TAS3202. I2S is a 3-wire serial digital audio protocol that supports 2 channels of real-time audio and allows digital audio to move in and out of the TAS3202.

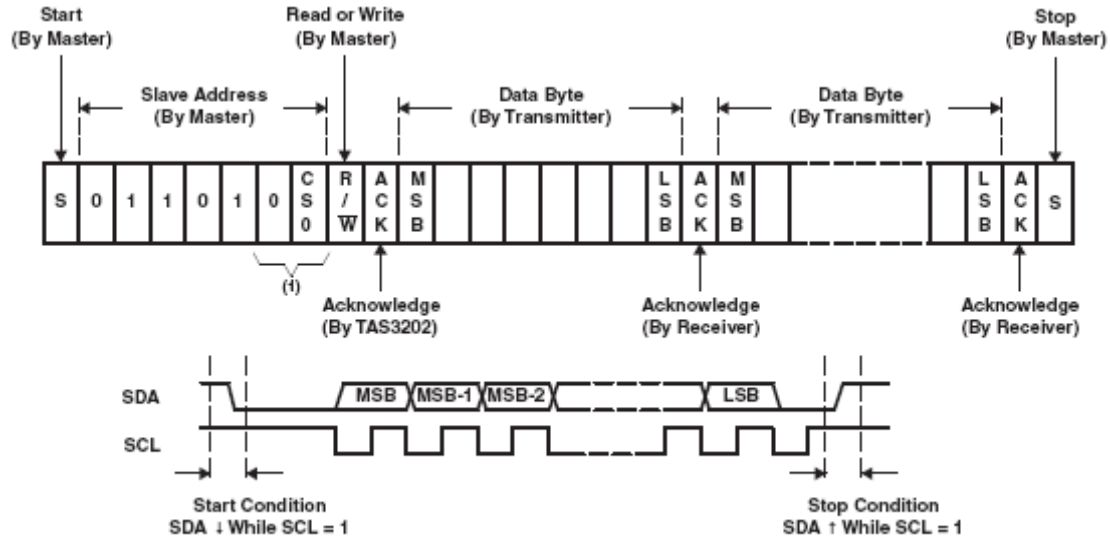
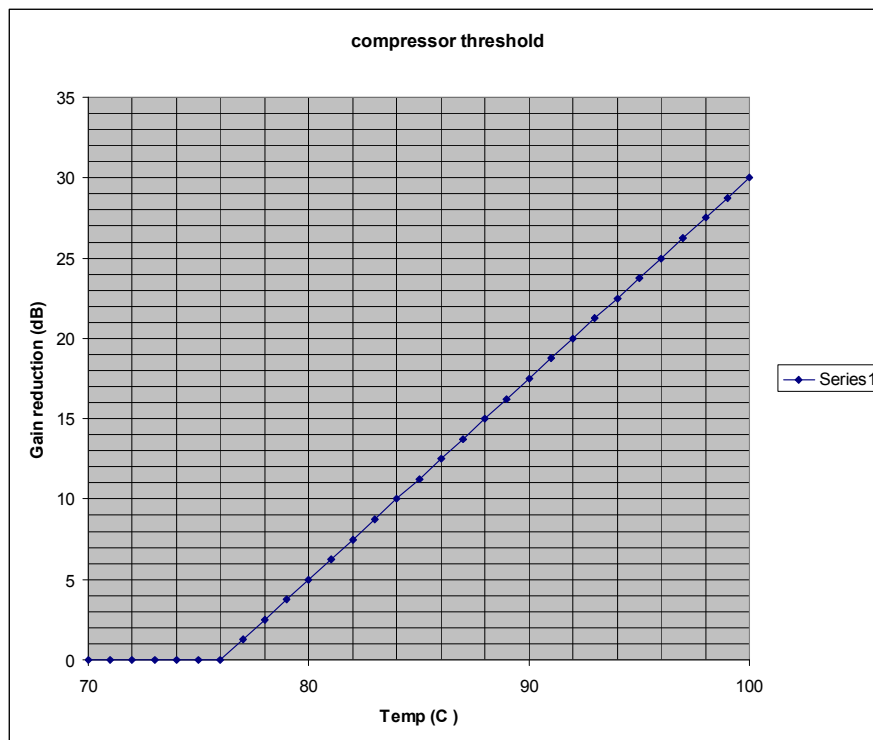


Figure 6-1. I<sup>2</sup>C Slave-Mode Communication Protocol

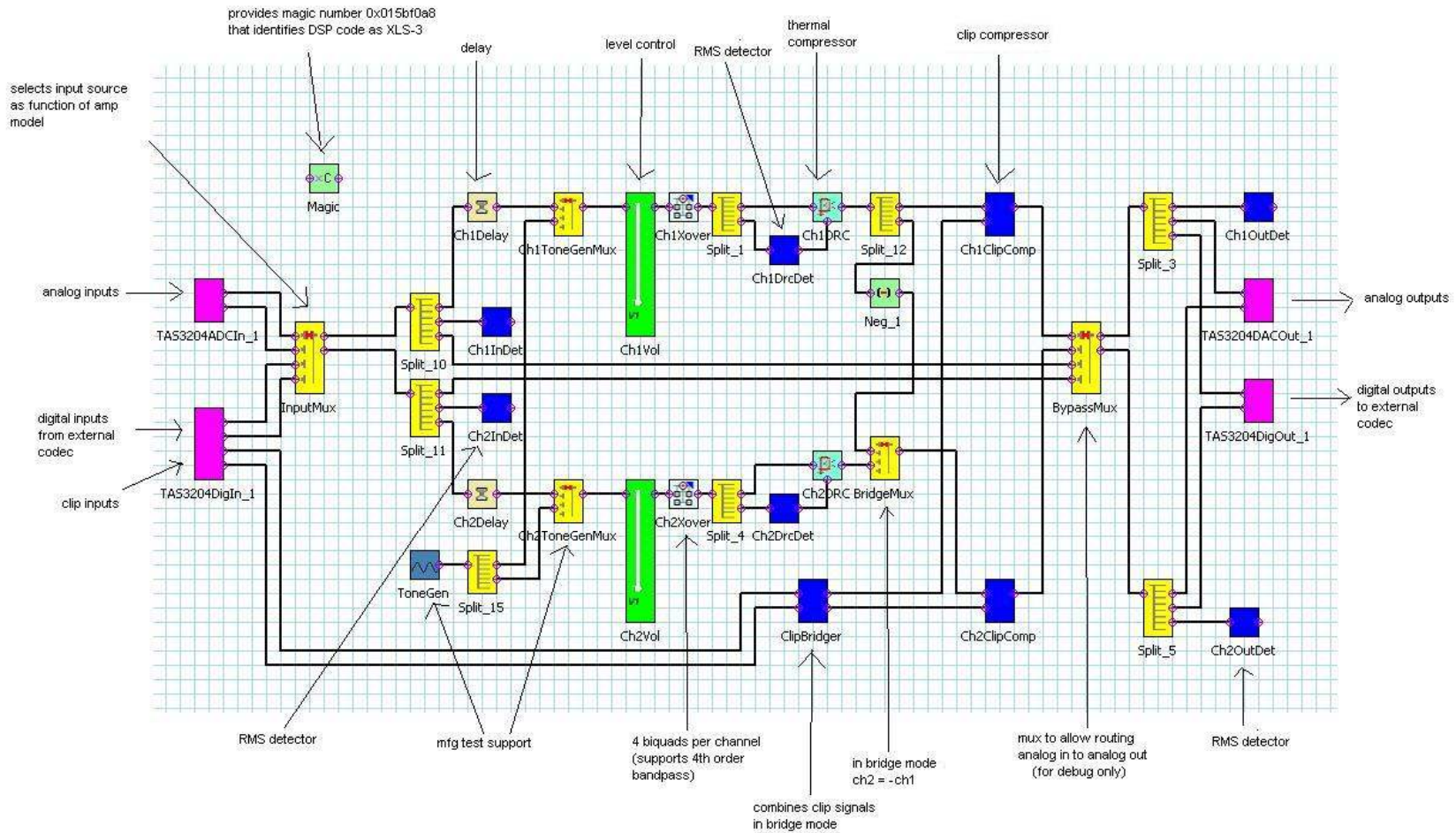
### Thermal Limiter Compressor (TLC):

There are thermistors that monitor each of the amplifier channel's heatsinks as well as one that monitors the heatsink for the secondary diodes ( $\pm V_{cc}$ ) of the power supply. The TLC adjusts the gain at a rate of 1.25dB/°C at temperatures greater than 75°C. The TLC takes the worst case of the three thermistor readings and adjusts both channels at the same rate.



### Bridge Mode:

As can be seen by the DSP signal flow, when the amplifier is placed in Bridge mode, CH1 signal is taken post-crossover, inverted, and sent to CH2 output. This ensures that the gains are matched and that the same signal is on both outputs ( $CH2 = -CH1$ ). When in Bridge mode, both channel's clip signals are or'ed together and the output clip indicators are driven from the same signal.



# MICROPROCESSOR CONTROL:

## Boot & POST:

The microprocessor boots from its internal FLASH and does a variety of Power On Self-Tests (POST). See the Error Codes section of the manual for a description of all of the error codes and their meanings.

## RUBY Interface:

Part of the processor's POST involves interface with Ruby and ensuring that it is up and working. The processor has two separate I2C interfaces: One for Ruby (I2C1) and one for the TI DSP (I2C2).

## DSP Interface:

As discussed previously, the processor boots the DSP via the dedicated I2C port. Processor interfacing for various controls and monitoring is via this interface.

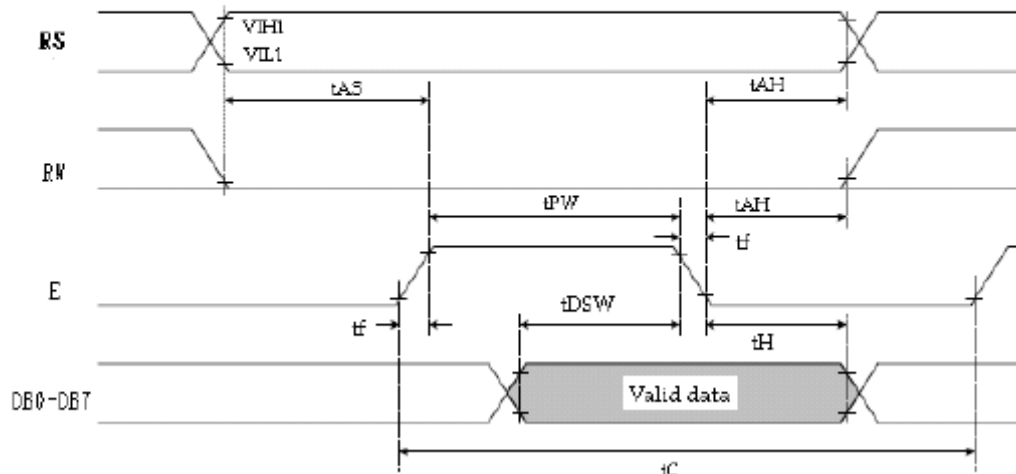
## LCD Interface:

The LCD is purchased as a module and has an interface composed of an Enable, Read/Write, Register Select, and Data Lines. The module works in nibble mode where only Data Lines LCD\_D[7:4] are used. The module has an internal character register that generates the correct letter in the correct position based upon the processor's inputs. While the LCD module runs from +5V, the processor utilizes +3.3V. The interface works due to the processor's LCD's I/O lines using open drain outputs with +5V pullups.

Bias for the LCD's contrast is provided via the processor's PWM output that is filtered by R725/C761. The module's LED backlight is set by R730 from +5V.

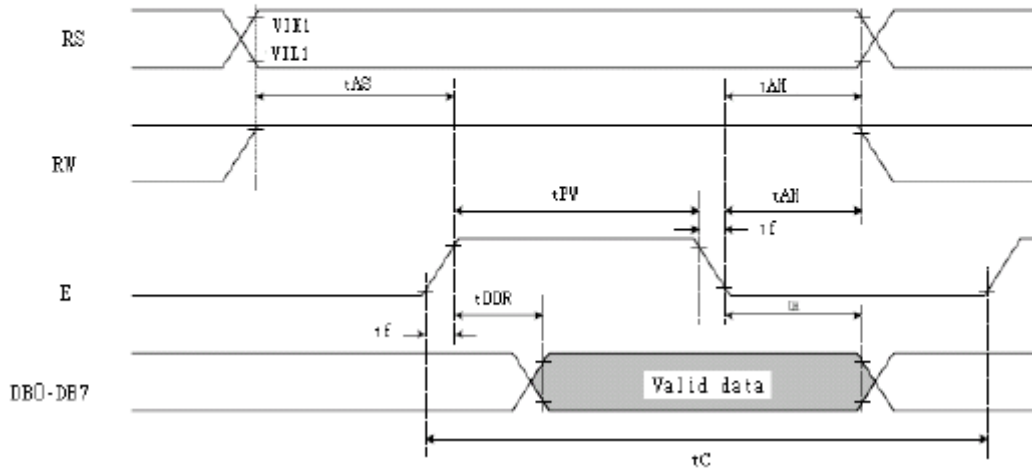
### 12.1 Write Operation

- Writing data from MPU



## 12.2 Read Operation

- Reading data from ST7066U



### Front Panel LED's & Switches:

The processor monitors the (3) front panel control switches and provides the necessary interface to the display and amplifier. In addition, the processor monitors the thermal sensors from Ruby and provides thermal LED lights during over temperature. The processor lights the output -20dB, -10dB, and CLIP LED's as required.

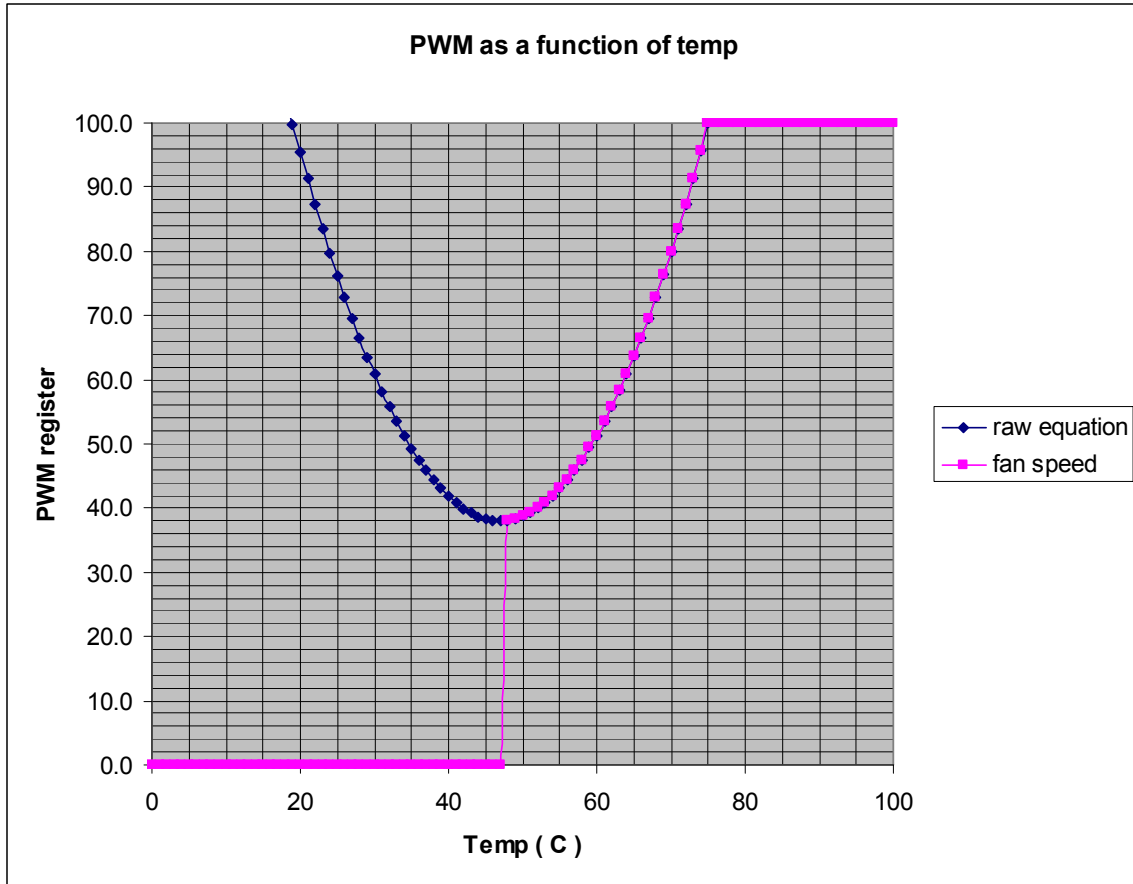
### PWM DeadTime Control:

Although not presently used, the processor has the capability of changing the switching deadtime of the PWM amplifier channels through the use of the processors PWM outputs and filtering.

### Fan Control:

The processor monitors the thermal sensors as discussed earlier and controls the fan speed using a PWM output and filter R704/C721. The curve below shows the relationship of temperature to fan speed.





**BOM: 141558-4 XLS1500/2000/2500 APM**

REF. DES.	CPN	DESCRIPTION	MAP LOC.
C500	139719-1	CAP, 1.0UF 25V X7R 10% 0805	F 2
C501	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	B 2
C502	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	B 2
C503	A11369-101J1	100PF 50V 5% NPO 0603	B 2
C504	126623-1	47UF 16V 6.3X5.5MM 20% SMT	C 2
C505	A11369-101J1	100PF 50V 5% NPO 0603	A 2
C506	A11369-101J1	100PF 50V 5% NPO 0603	A 2
C507	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	A 3
C508	126623-1	47UF 16V 6.3X5.5MM 20% SMT	B 3
C509	126623-1	47UF 16V 6.3X5.5MM 20% SMT	A 3
C511		OPEN	B 3
C512	A11369-101J1	100PF 50V 5% NPO 0603	A 2
C513	A11369-101J1	100PF 50V 5% NPO 0603	A 2
C514	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	B 1
C515	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 1
C516	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C517	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	B 2
C518	126623-1	47UF 16V 6.3X5.5MM 20% SMT	A 1

C519	126623-1	47UF 16V 6.3X5.5MM 20% SMT	A 2
C600	139719-1	CAP, 1.0UF 25V X7R 10% 0805	F 2
C601	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	G 1
C602	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	G 2
C603	A11369-101J1	100PF 50V 5% NPO 0603	G 2
C604	126623-1	47UF 16V 6.3X5.5MM 20% SMT	G 2
C605	A11369-101J1	100PF 50V 5% NPO 0603	G 2
C606	A11369-101J1	100PF 50V 5% NPO 0603	G 2
C607	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 3
C608	126623-1	47UF 16V 6.3X5.5MM 20% SMT	F 3
C609	126623-1	47UF 16V 6.3X5.5MM 20% SMT	E 3
C611		OPEN	D 4
C612	A11369-101J1	100PF 50V 5% NPO 0603	B 2
C613	A11369-101J1	100PF 50V 5% NPO 0603	B 2
C614	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	B 2
C615	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C616	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 1
C617	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	B 1
C618	126623-1	47UF 16V 6.3X5.5MM 20% SMT	C 2
C619	126623-1	47UF 16V 6.3X5.5MM 20% SMT	B 1
C620	135505-1	CAP, 0.1UF 25V 10% X7R 0603	F 2
C621	135505-1	CAP, 0.1UF 25V 10% X7R 0603	F 2
C700	135505-1	CAP, 0.1UF 25V 10% X7R 0603	F 2
C701	135505-1	CAP, 0.1UF 25V 10% X7R 0603	F 2
C702	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 2
C703	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 2
C704	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C705	135505-1	CAP, 0.1UF 25V 10% X7R 0603	A 2
C706	139947-1	CAP, 10UF 10V 10% X5R 1206	A 3
C707	141914-104KB	CAP, 100NF 16V 10% X7R 0402	A 3
C708	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C709	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C711	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C713	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C714		OPEN	D 2
C715		OPEN	D 2
C716	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 2
C717	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 2
C718	139719-1	CAP, 1.0UF 25V X7R 10% 0805	D 3
C719	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 2
C720	138663-1	CAP, 10UF 6.3V X5R 0805	D 2
C721	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 2
C722	139947-1	CAP, 10UF 10V 10% X5R 1206	B 3
C723	141914-104KB	CAP, 100NF 16V 10% X7R 0402	B 3
C724	141914-104KB	CAP, 100NF 16V 10% X7R 0402	B 3
C725	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 3
C726	126623-1	47UF 16V 6.3X5.5MM 20% SMT	B 3
C727	141914-104KB	CAP, 100NF 16V 10% X7R 0402	B 3

C728	138663-1	CAP, 10UF 6.3V X5R 0805	C 3
C729	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C730	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C731	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C732	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C733	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C734	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 4
C735	138663-1	CAP, 10UF 6.3V X5R 0805	C 4
C736	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	C 2
C737	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	C 3
C738	138663-1	CAP, 10UF 6.3V X5R 0805	B 3
C739	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C740	138663-1	CAP, 10UF 6.3V X5R 0805	B 3
C741	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C742	138663-1	CAP, 10UF 6.3V X5R 0805	C 3
C743	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C744	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 4
C745	138663-1	CAP, 10UF 6.3V X5R 0805	C 4
C746	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C747	138663-1	CAP, 10UF 6.3V X5R 0805	C 3
C748	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 3
C750	141914-104KB	CAP, 100NF 16V 10% X7R 0402	E 2
C751	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 3
C752	141914-104KB	CAP, 100NF 16V 10% X7R 0402	E 2
C753	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 2
C754	141914-104KB	CAP, 100NF 16V 10% X7R 0402	E 3
C755	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 2
C756	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 3
C757	141914-104KB	CAP, 100NF 16V 10% X7R 0402	F 3
C758	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 2
C759	141914-104KB	CAP, 100NF 16V 10% X7R 0402	G 3
C760	141914-104KB	CAP, 100NF 16V 10% X7R 0402	D 3
C761	139719-1	CAP, 1.0UF 25V X7R 10% 0805	F 2
C762	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C763	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C764	141914-104KB	CAP, 100NF 16V 10% X7R 0402	B 3
C765	141914-104KB	CAP, 100NF 16V 10% X7R 0402	C 3
C766	138663-1	CAP, 10UF 6.3V X5R 0805	E 2
D500	135343-1	DIODE, DUAL MMBD4148SE SOT-23	B 2
D501	135343-1	DIODE, DUAL MMBD4148SE SOT-23	B 2
D502		OPEN	B 2
D503		OPEN	B 2
D600	135343-1	DIODE, DUAL MMBD4148SE SOT-23	G 1
D601	135343-1	DIODE, DUAL MMBD4148SE SOT-23	G 1
D602		OPEN	G 2
D603		OPEN	G 2
E500	126473-1	LED, GRN SMT 1206	B 2
E600	126473-1	LED, GRN SMT 1206	G 2

E700	131105-1	LED, RED 638NM 1206 SMT	B 3
E701	131105-1	LED, RED 638NM 1206 SMT	B 3
E702	126473-1	LED, GRN SMT 1206	B 3
E703	126473-1	LED, GRN SMT 1206	B 2
E704	131105-1	LED, RED 638NM 1206 SMT	G 3
E705	131105-1	LED, RED 638NM 1206 SMT	G 3
E706	126473-1	LED, GRN SMT 1206	G 3
E707	126473-1	LED, GRN SMT 1206	G 2
E708	141620-1	LCD, 38MMX16MM 40X16 DOT BKLIGHT	E 3
FB700	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 3
FB701	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 3
FB702	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 2
FB703	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 2
HW1		OPEN	D 1
HW2		OPEN	E 1
HW3		OPEN	F 1
HW11	141621-1	SPCR, 0.098"X0.18"X0.156" NYL	D 3
HW12	141621-1	SPCR, 0.098"X0.18"X0.156" NYL	D 2
HW13	141621-1	SPCR, 0.098"X0.18"X0.156" NYL	F 3
HW14	141621-1	SPCR, 0.098"X0.18"X0.156" NYL	F 2
J700	141746-1	CON, FFC 50P ZIF LOC LTCH SM HOR	C 2
J702		OPEN	F 3
J703	141668-1	HDR, 6POS TH	G 3
PWB1	141557-4	PWB, XLS3 DISPLAY	
Q600	C 7448-1	MMBT3904 CHIP NPN	F 2
R500	A11371-2250	RES, 2.2 MOHM 1/16W 5% 0603	F 2
R501	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	F 2
R502	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 2
R503	A11371-2223	2.2K 0.25W 5% 1210 T/R	F 2
R504	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	B 2
R505	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	B 2
R506	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	B 2
R507	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	B 2
R508	A11368-10000	RES, 100 OHM 1/16W 1% 0603	B 2
R509	A11368-66511	RES, 6.65 KOHM 1/16W 1% 0603	B 2
R510	138593-1	POT, ALPHA RV110T-40E1-125A-B10K-0E	C 3
R511	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	C 2
R512	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	A 2
R513	A11368-82500	RES, 825 OHM 1/16W 1% 0603	A 3
R514	A11368-82500	RES, 825 OHM 1/16W 1% 0603	A 3
R515	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 2
R516	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 2
R517	A11368-15000	RES, 150 OHM 1% 1/16W 0603	A 3
R518		OPEN	B 3
R519		OPEN	B 3
R520	A11368-15000	RES, 150 OHM 1% 1/16W 0603	A 3
R521		OPEN	B 3
R522		OPEN	B 3

R523		OPEN	B 3
R524	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	A 2
R525	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	A 2
R526	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	A 2
R527	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	A 2
R528	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 1
R529	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 2
R530	A11368-40200	402 OHM 1/16W 1% 0603 T/R	B 2
R531	A11368-75000	RES, 750 OHM 1/16W 1% 0603	B 1
R532	A11368-75000	RES, 750 OHM 1/16W 1% 0603	B 2
R533	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	A 3
R535		OPEN	A 2
R536		OPEN	A 2
R537		OPEN	B 2
R538		OPEN	B 2
R539		OPEN	C 2
R600	A11371-2250	RES, 2.2 MOHM 1/16W 5% 0603	F 2
R601	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	F 2
R602	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 2
R603	A11371-2223	2.2K 0.25W 5% 1210 T/R	F 2
R604	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	G 1
R605	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	G 1
R606	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	G 1
R607	140467-10020	RES, 10KOHM 0.063W 0.1% 0603 THNF	G 2
R608	A11368-10000	RES, 100 OHM 1/16W 1% 0603	G 2
R609	A11368-66511	RES, 6.65 KOHM 1/16W 1% 0603	G 2
R610	138593-1	POT, ALPHA RV110T-40E1-125A-B10K-0E	F 3
R611	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	G 2
R612	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	G 2
R613	A11368-82500	RES, 825 OHM 1/16W 1% 0603	A 3
R614	A11368-82500	RES, 825 OHM 1/16W 1% 0603	B 3
R615	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	G 2
R616	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	G 2
R617	A11368-15000	RES, 150 OHM 1% 1/16W 0603	A 3
R618		OPEN	D 4
R619		OPEN	D 4
R620	A11368-15000	RES, 150 OHM 1% 1/16W 0603	B 3
R621		OPEN	D 4
R622		OPEN	D 4
R623		OPEN	C 4
R624	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	B 2
R625	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	B 2
R626	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	B 2
R627	A11368-15010	RES, 1.5 K OHM 1/16W 1% 0603	B 2
R628	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 2
R629	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 1
R630	A11368-40200	402 OHM 1/16W 1% 0603 T/R	B 1
R631	A11368-75000	RES, 750 OHM 1/16W 1% 0603	B 2

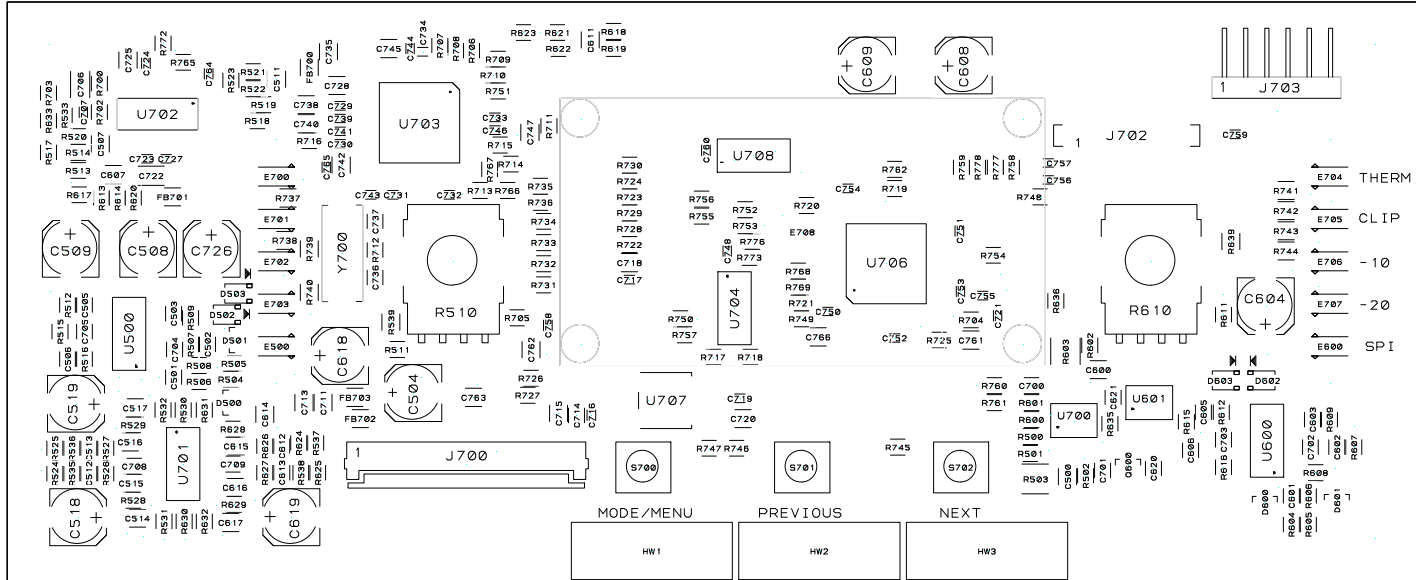
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R635	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 2
R636	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 2
R639		OPEN	G 3
R700		OPEN	A 3
R702	A11368-40200	402 OHM 1/16W 1% 0603 T/R	A 3
R703	A11368-40200	402 OHM 1/16W 1% 0603 T/R	A 3
R704	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	F 2
R705	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R706	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 4
R707	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 4
R708	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 4
R709	A11368-10000	RES, 100 OHM 1/16W 1% 0603	C 3
R710	A11368-10000	RES, 100 OHM 1/16W 1% 0603	C 3
R711	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R712	A11368-10040	RES, 1.00 MOHM 1/16W 1% 0603	C 3
R713	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 3
R714	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 3
R715	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 3
R716	A11368-22120	RES, 22.1 KOHM 1% 1/16W 0603	B 3
R717	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 2
R718	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	E 2
R719	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	E 3
R720	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	E 3
R721	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	E 2
R722	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R723	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R724	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R725	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	E 2
R726	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	C 2
R727	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	C 2
R728	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 3
R729	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 3
R730	A11368-10000	RES, 100 OHM 1/16W 1% 0603	D 3
R731	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 2
R732	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R733	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 3
R734	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 3
R735	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R736	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R737	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	B 3
R738	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	B 3
R739	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	B 3
R740	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	B 2
R741	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	G 3
R742	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	G 3
R743	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	G 3

R744	A11368-34001	RES, 340 OHM 1% 0.1W SMT 0805	G 3
R745	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	E 2
R746	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 2
R747	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 2
R748	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 3
R749	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	E 2
R750	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 2
R751	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 3
R752		OPEN	E 3
R753	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	E 3
R754	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	F 3
R755	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R756	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 3
R757	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	D 2
R758	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	F 3
R759	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	F 3
R760	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	F 2
R761	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	F 2
R762	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	E 3
R765	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	B 3
R766	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 3
R767	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 3
R768	A11368-10000	RES, 100 OHM 1/16W 1% 0603	E 2
R769	A11368-10000	RES, 100 OHM 1/16W 1% 0603	E 2
R772	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 4
R773	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	E 3
R776	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	E 3
R777	A11368-10000	RES, 100 OHM 1/16W 1% 0603	F 3
R778	A11368-10000	RES, 100 OHM 1/16W 1% 0603	F 3
S700	141850-1	SW, 1P1T PB 250V 50MA SM VRT	D 2
S701	141850-1	SW, 1P1T PB 250V 50MA SM VRT	E 2
S702	141850-1	SW, 1P1T PB 250V 50MA SM VRT	F 2
U500	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	B 2
U600	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	G 2
U601	141622-1	IC, OPAMP HISPDP W/SW NJM2121 SO8	F 2
U700	126559-1	COMPARATOR, LM393 SO-8 DUAL	F 2
U701	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	B 2
U702	138251-1	IC, CS4272 24 BIT 192KHZ CODEC	B 3
U703	141593-1	IC, DSP 48BIT 135MHZ I2C TAS3202 PQFP64	C 3
U704	C10344-7	74HC74AD DUAL D FLIP FLOP SOIC	D 2
U706	141881-1	IC, MCU 32BIT 36MHZ FLASH128KB LQFP64	E 3
U707	141588-1	IC, REG LDO 3.3V 800MA LD1117 TO-252	D 2
U708	135219-1	IC, 74HC00 QUAD 2-IN NAND	E 3
Y700	140549-1	XTAL, 24.576MHZ HC49SM 30PPM 18PF	C 3

# COMPONENT MAP

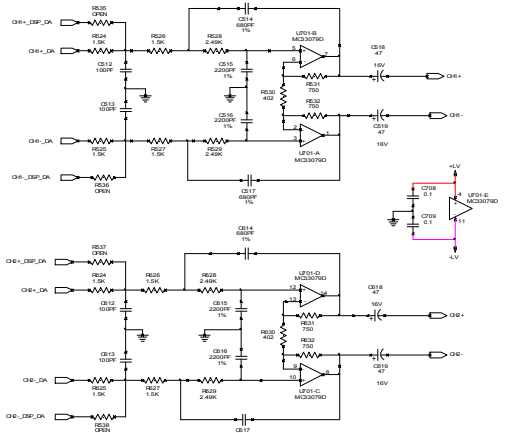
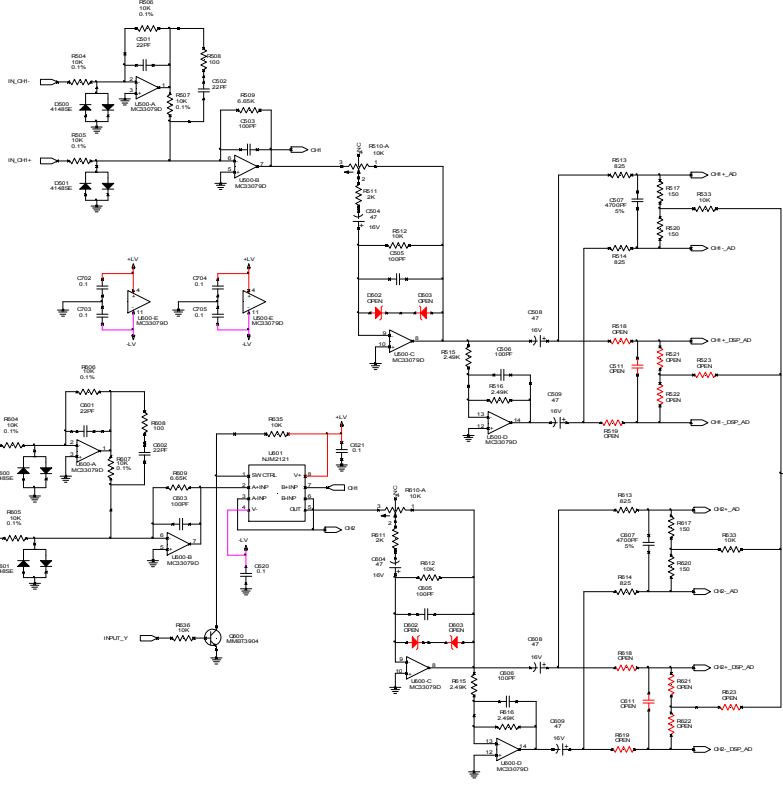
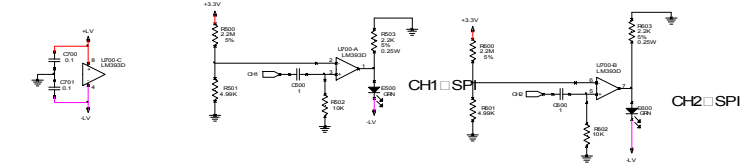
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4  
3  
2  
1



A | B | C | D | E | F | G | H





REFERENCE DESIGNATIONS: 60000 E CHW

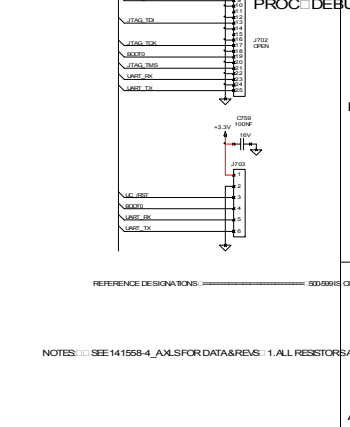
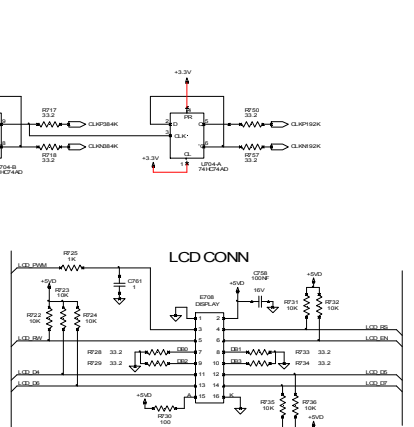
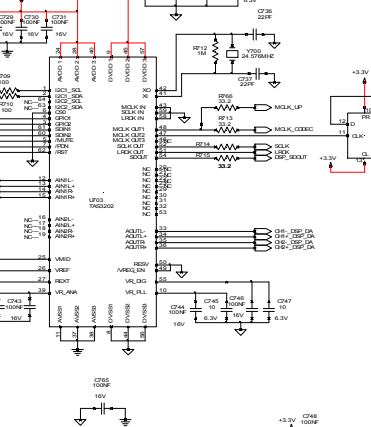
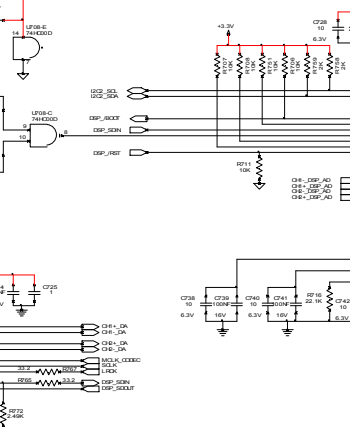
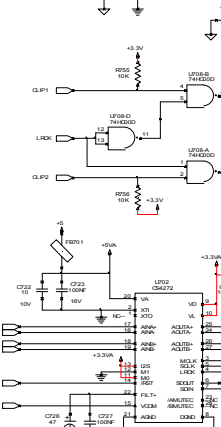
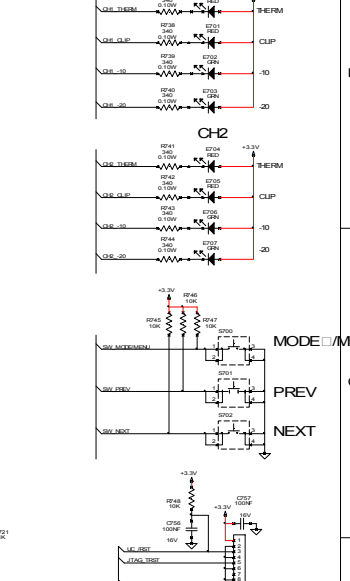
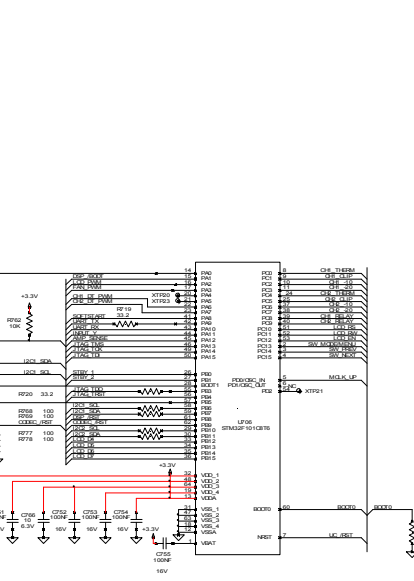
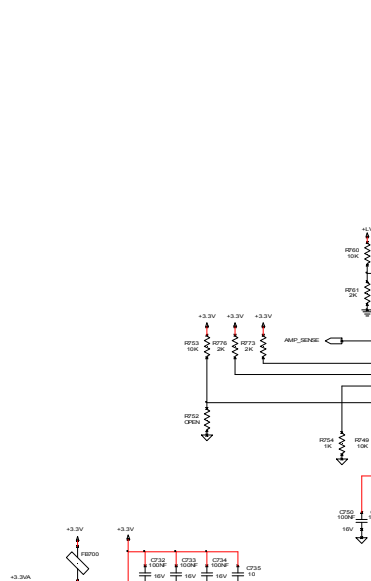
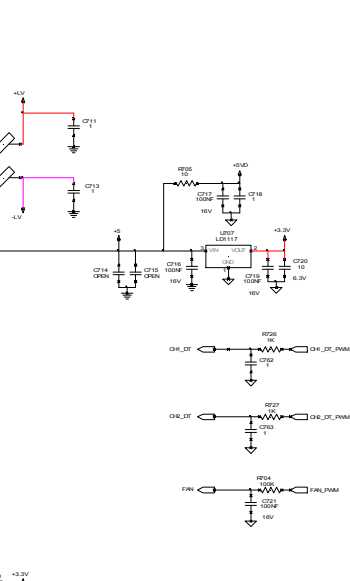
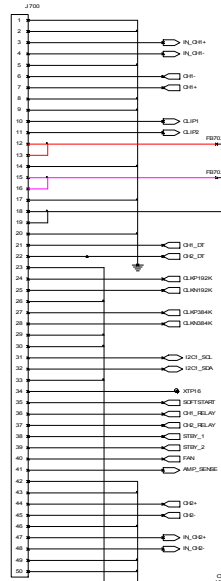
NOTES: SEE 141558-4\_AXL FOR DATA & REVS. 1. ALL RESISTORS ARE

ANALOG SECTION

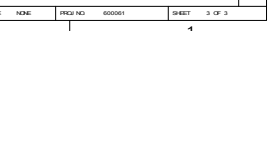
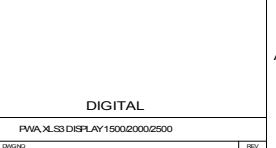
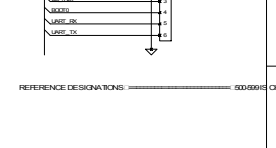
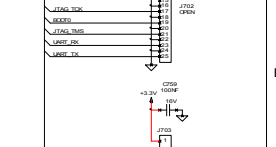
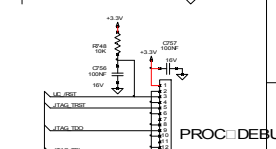
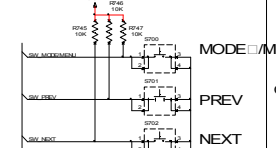
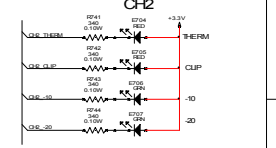
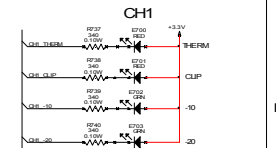
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### AMP CONN



### LCD CONN

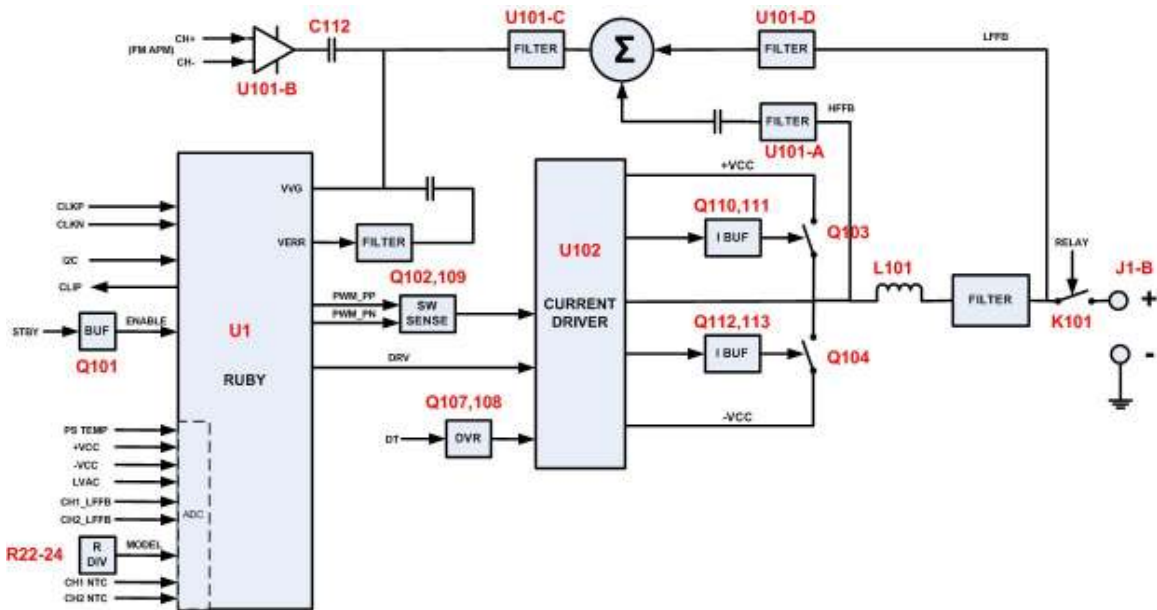


REFERENCE DESIGNATIONS: 6000001 CHAN

NOTES: SEE 141658-4\_A\_XLS FOR DATA & REVISIONS. 1. ALL RESISTORS ARE

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SCALE	DATE	REV. NO.	SHEET
		600001	3 OF 3

# AMPLIFIER SECTION THEORY OF OPERATION



Amplifier Block Diagram: One channel shown w/ common Ruby

Since the 2 channels are the same we will discuss just channel one and know that the same applies to channel two.

## **Balanced to unbalanced input stage.**

The channel one balanced audio enters the amplifier at one of the back panel connectors J101, J102 or J3. The signal is then routed to the APM (Audio Processing Module) through J700B pins 3 and 4. The function of the APM is covered elsewhere in this document. The signal returns from the APM on J700B pins 6 and 7. It is converted from balanced to un-balanced at U101B where it is filtered before being combined with the feedback signal at the junction of R108 and R115. This combined signal connects to the error amplifier opamp inside the Ruby IC ( U1 ) at pin 61. We will go into detail of the Ruby IC a little later but for now let's look at the feedback circuitry.

## **Feedback Circuits.**

The feedback circuit is comprised of two distinct feedback paths, the High Frequency feedback and the Low Frequency feedback.

The Low frequency feedback comes directly from the output signal at the output relay which maximizes the damping factor. The Low Frequency feedback is fed into U101D, pin 13, through the resistors R132 and R133. This circuit attenuates the output signal to a level acceptable to U101C, provides the 2V DC offset required by the Ruby error amplifier, filters out the higher frequency switching content and provides the low frequency/DC feedback to be summed with the High Frequency Feedback.

The High Frequency Feedback comes directly from the switching node at the junction of the output MOSFETs and the input to the output filter at L101. This signal has the full switching signal on it and therefore must be filtered. R139/140 and C176 provide the first filtering to attenuate the VHF spectrum. The next filter is a notch filter tuned to the 384KHz switching frequency and includes R139/138/137/136 as well as C137/138/139. This notch filter attenuates the switching frequency and passes it on to the next 2 filtering done by C136 and C135. This additional filtering helps to keep the switching noise out of the feedback while allowing the audio band signals to pass at an attenuated level to U101A.

The feedback summing is done by resistor/capacitor network at R126/127/128/129 C130/131/132. This summing combines the HF Feedback and LF Feedback in equal parts to create a resultant full audio band feedback. U101C does the function of buffering the summed feedback and adds phase lead ( C128/129; R125 ) to improve stability margin. The feedback signal out of U101C is then further filtered by the 2<sup>nd</sup> harmonic (768KHz) trap comprised of R116/117/118/119 and C122/123/124. Passing through R115 we are back to the combining point of the input signal and the feedback which as stated earlier goes to the Ruby (U1) error amplifier.

### **The Ruby signal path.**

Before the Ruby IC (U1) will pass a signal the STBY pin (17, 18) must be pulled high. This line is an open collector output/input on Ruby so an external source can pull the pin low to inhibit PWM switching ( Q101 ) or the Ruby IC can pull the line low in case of a Ruby determined fault condition. This pin must be high for the Ruby to be enabled. The ruby error amplifier uses a triple integrated feedback (C116-121 and R109-111) to maximize the amount of feedback in the audio frequency range. R142 and C158 provide a high frequency load for the error amp to improve the internal opamp stability. Inside of the Ruby IC the resultant error signal is compared to the Ruby generated triangle wave which creates the PWM signal used to drive the Output Stage. Ruby varies the amplitude of the triangle wave based on the Vcc voltage it senses through R7-10 which it also uses for an overvoltage protection circuit. U2-B is a buffer/filter for the Ruby Reference Voltage called VR on the schematic. This VR signal connects directly to the Ruby error amp and must be highly filtered to reduce noise injected into the feedback.

### **The Output Stage.**

The PWM signal from Ruby ( pin 54 ) drives the gate drive IC (U102). The transistors Q102 and Q109 use the PWM signal to determine if the gate drive IC should be enabled and will only enable U102 if there is a valid PWM signal coming from Ruby. U102 does several functions. First it translates the signal from the ground referenced signal that Ruby provides to signals capable of driving the MOSFETs that are referenced to -Vcc (Q104) and to the switching node (Q103). This drive signal is buffered by Q110-113 in order to provide adequate current to drive the MOSFETs.

U102 has programmable dead-time which can be changed by the APM through a programming current drive into Q107-108. U102 provides current limit protection for the MOSFETs. R153-154 set the negative current limit and R158-159 set the positive current limit. U102 provides under-voltage protection for the MOSFETs to protect against low gate drive voltage.

U102 is supplied 12V for the low side drive from the gate supply powered from the LVAC winding on the transformer and is regulated to 12V by U3.

The output PWM from the MOSFETs is filtered by L101 and a series of capacitors as shown on the schematic. Further reduction of the switching frequency ripple is achieved by the 384KHz trap consisting of C147/173 and L102. L102 is tuned for minimum ripple at the output terminals.

From the output filter the signal passes through a relay (K101) before going to the output terminals. The relay is controlled by the APM and is enabled after the power on self test has passed.

### **Ruby control circuits.**

The Ruby IC is placed in slave mode and in order for Ruby to function it must be provided a clock signal on pins 5 and 6. This is a 384KHz signal that is provided by the APM. It must be powered by 5VDC at pins 29,30,38 and 59.

Pins 12 and 13 provide I2C communications with the APM.

The Ruby IC has several ADC channels that the APM reads and uses to control the operation of the amplifier. These inputs are all referenced to the VREFSAR internal voltage reference which is buffered by U2A.

RT1 is a temperature sensor (NTC) placed under the Secondary Diode heatsink and is connected to pin 19. This temperature is then read by the APM and used to limit the temperature in case of a fault.

RT101 is a temperature sensor (NTC) placed under the Channel 1 heatsink and is connected to pin 53. This temperature is then read by the APM and used to limit the temperature in case of a fault.

RT201 is a temperature sensor (NTC) placed under the Channel 2 heatsink and is connected to pin 52. This temperature is then read by the APM and used to limit the temperature in case of a fault.

As mentioned before a scaled version of the +/-Vcc levels are connected to pins 20 and 21. These signals can be queried by the APM and also will shut down the PWM signal in case of an overvoltage on the Vcc's.

A scaled version of the output signal is also provided to the Ruby (pins 22 and 24) and is available to the APM.

The LVAC signal is rectified and provided to pin 23 for the APM and is used to display line voltage and provide under voltage and overvoltage protection in case the line voltage is out of bounds.

R13 programs the current applied to the Ch1 and Ch2 temperature sensors.

Pins 15 and 16 provide a signal informing the APM that a clip event has occurred. It will be triggered by either a voltage limit or current limit event.

R22/23/24 provides a way for the APM to know what model of amplifier it is connected to. See the chart below.

### **XLS 2000/2500 Amplifier Theory of operation.**

The XLS2000 and XLS2500 are very similar to the XLS1000/1500 and so only the differences will be discussed here.

### **XLS 2000/2500 Output Stage.**

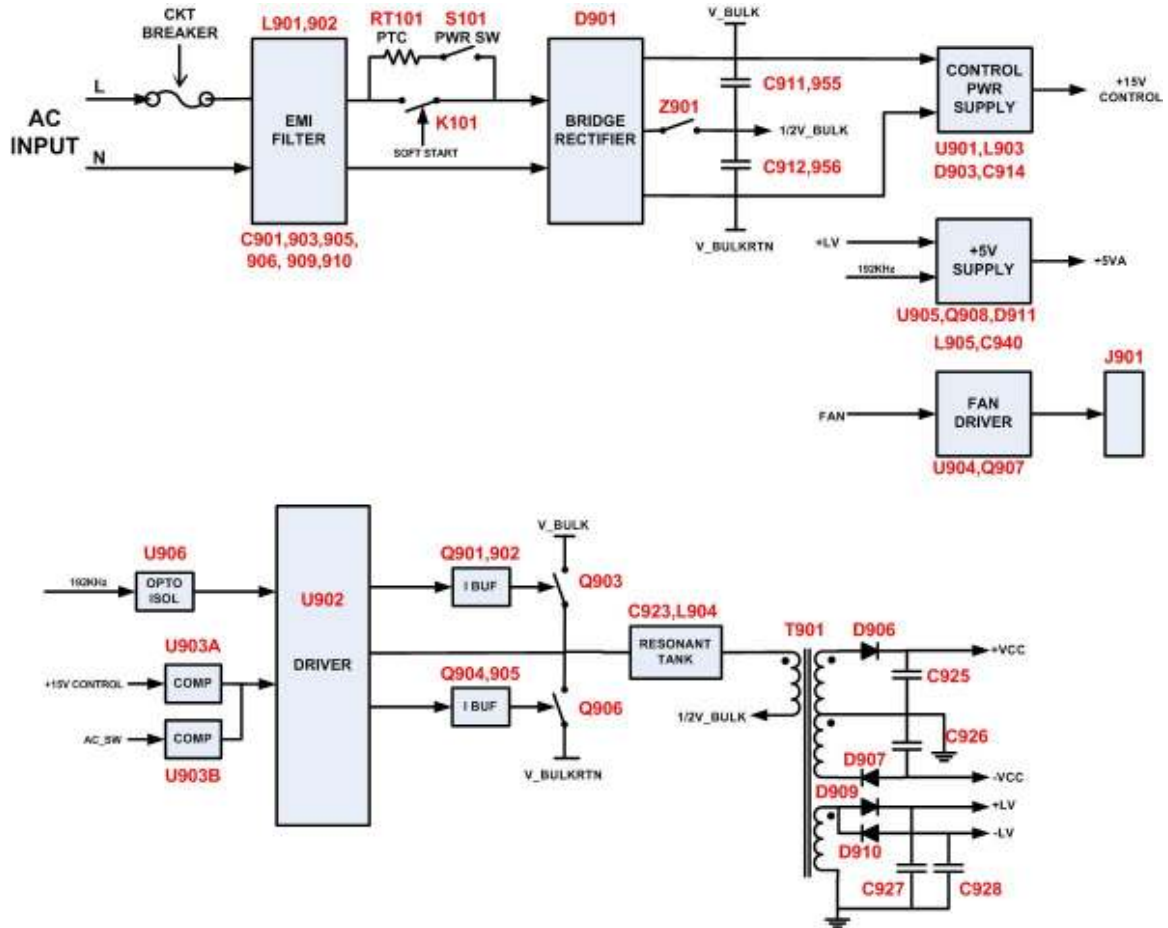
There are value differences of some of the resistors and capacitors but the main difference in the amplifier section, between the 1000/1500 and the larger 2000/2500, is in the output stage topology. Where the 1000/1500 uses the MOSFET body diode to carry the current to the Vcc supplies when the MOSFET is turned off, the 2000/2500 uses diodes D108, 109 to block the current and force it through the anti-parallel diodes D105, 106. This improves the efficiency of the amplifier. The rest of the amplifier circuits are the same as the smaller amplifiers.

The APM determines the model and voltage rating of the amplifier by the values of R22, 23 and R24. Below is a chart showing the values for each model.

Model	Voltage	Part Number	R22	R23	R24
XLS1000	100V	141576	Open	10K	1.1K
XLS1000	120V	141577	Open	10K	2.49K
XLS1000	220V	141578	Open	4.99K	2.49K
XLS1000	240V	141579	Open	4.99K	4.99K
XLS1500	100V	141580	Open	2.49K	4.99K
XLS1500	120V	141581	Open	2.49K	10K
XLS1500	220V	141582	Open	1.1K	10K
XLS1500	240V	141583	Open	10Ω	Open
XLS2000	100V	141607	20K	15K	Open
XLS2000	120V	141608	20K	20K	Open
XLS2000	220V	141609	15K	20K	Open
XLS2000	240V	141610	1.1K	2K	Open

XLS2500	100V	141603	10K	1K	Open
XLS2500	120V	141604	10K	2K	Open
XLS2500	220V	141605	20K	6.81K	Open
XLS2500	240V	141606	20K	10K	Open

## PWR SUPPLY SECTION THEORY OF OPERATION



Note:

- Any component references will be to the 141576-4 thru 141583-4, 141607-5 thru 141610-5, and 142028-3 thru 142031-2 PWAs. Later PWAs should be compatible except where additions have been made.
- Underlined text references components that are only used on 141607-5 thru 141610-5, and 142028-3 thru 142031-2 PWAs.

### Brief summary of operation

The power supplies of the XLS series of amplifiers are efficient and light weight, but yet extremely robust switchmode designs. The topology of the main supply employed is a half-bridge series resonant converter. The use of this topology allows for soft switching of the main semiconductors Q903 and Q906 reducing dissipation at idle and throughout the operating power range. Two other buck derived switching power supplies are employed. One serves as a bias supply for the main power supply and the other generates the +5V from the low voltage output of the main supply

## **Front end**

This power supply is equipped with an internal EMI filter that both reduces the transfer of power supply related noises onto the power line, and improves the power supplies immunity from voltage transients on the power line.

The AC line voltage is converted to DC by a bridge rectifier D901. 120Vac and 100Vac models use voltage doubler, while 220V and 230-240Vac models use a full wave rectifier. Z901 determines this operating mode. It is present on the 120Vac and 100V models, and is open on the 220V and 230-240Vac models

When switch S901 is closed the bulk storage capacitors C911, C912, C955, and C956 begin charging thru the PTC (RT901). This PTC limits the inrush current, eliminating circuit breaker trips at turn on. After the charging cycle is complete the soft start relay (K901) bypass the PTC.

## **Bias Supply**

The main supply's integrated control IC & gate driver (U902) is powered by a primary referenced 15V buck power converter that is supplied by the "V\_BULK" rail. The heart of this bias supply is the Power Integration LinkSwitch-TN control IC (U901). This IC contains an integrated MOSFET, control circuitry, current limit, and thermal protection. It provides a regulated 15V during power up, normal operation, brownouts and line transients.

The Buck converters major components are the integrated MOSFET in U901, freewheeling diode D903, filter inductor L903, and filter capacitor C915. Voltage feedback to the control IC is feedback thru D902 which charges C914 only when the freewheeling diode D903 is conducting. The voltage stored on C914 is scaled down by R909 and R908 which feed pin #2 of U901. The control loop within U901 adjusts the duty cycle of the MOSFET in the order of 60,000 times per second such that the voltage on Pin #2 remains constant. This mechanism regulates the +15V output voltage.

## **Main supply**

The main supply consists of a half-bridge power converter utilizing two IGBT power devices, a center tapped secondary transformer, a full-wave secondary rectifier, a half



wave-secondary rectifier, and control circuitry. In addition two components are added to form a resonant tank which significantly increases the overall efficiency of the converter.

The IGBTs, Q903 and Q906, switch at approximately 40% duty cycle each at a frequency of 96kHz. During their on time period the IGBTs transfer energy from the primary bulk storage (C911, C912, C955, and C956) and the AC line through the resonant tank (C923//C954 & L904) to the transformer, T901. The energy is magnetically coupled to the secondary of the transformer, rectified by D905-D908, and stored in C925 & C926 for the amplifier to use.

The transformer (T901) magnetizing inductance results in a small triangular shaped current flow in the primary of the transformer. This current provides a soft switching action to the IGBTs by charging/discharging the parasitic capacitance of the devices during dead time such that the IGBT turns on with near zero voltage across its collector to emitter terminals. This reduces power loss on the IGBTs. As the power output increases, the voltage developed across the resonant capacitor (C923//C954) reduces this effect. Another form of soft switching is also employed with the additional of components: C923//C954 & L904 that form a series resonant tank. The resonant frequency of this tank circuit is greater than that of the switching frequency. The tank forces the load current to be drawn in half sinewave portions. Thus the current drops to near zero before the IGBTs gate is turned off. This is a form of zero current turn off, which greatly reduces the dissipation associated with the turn off of the IGBTs, and thus results in higher power supply efficiency.

The current through the converter is passively limited two main variables. The maximum current through the converter is directly proportional to the driving “VBULK” voltage and by the impedance of the tank itself, C923//C954 & L904. This along with the proper selection of semiconductors (Q903, Q906, and D905-D908) and temperature limiting result in a very robust design.

A single auxiliary winding on the transformer is half-wave rectified by D909 & D910, creating both the “+LV” and “-LV” unregulated supplies. Another supply is also derived from this winding via an AC coupled voltage doubler referenced to the “-VCC” supply. This output is then regulated to +12V referenced to “-VCC” via U3 for the gate drive ICs U102 & U202.

Modulating the main converter is a control IC with an integrated high side gatedriver (U902), and a comparator (U903) that controls when the converter starts and stops. Both sections of the comparator U903 outputs must be high for the converter to run. Comparator section U903A output goes high when the “+15V\_CONTROL” voltage above 13V and goes low when “+15V\_CTRL drops below 12V. U903B enables the power supply if the AC supply voltage above 75% of the nominal line voltage, and disables it if the AC supply voltage is below 50% of nominal line.

C947 & R910 set the free running frequency of the internal oscillator of U902, until synchronization to the master clock is achieved. The deadtime between when one IGBT turns off and the other one turns on is set by R911. During startup C917 forms a time constant with R911 that determines the rate at which the duty cycle increases from 0% (off) at startup to the final duty cycle of approximately 40% on each switch when it is running. The duty cycle is also forced to zero when either comparator section of U903 goes low. Transistors Q901, Q902, Q904, and Q905 increase the current available to drive IGBTs Q903 and Q906 over what U902 can source or sink.

### **Low voltage Power Supply**

A regulated and noise +5V supply is required by the APM/Display and U1. This is generated with a buck topology switching power supply operating from the “+LV” rail and switches at 192 kHz when synchronized. Q908, D911, L905, C950, and C940 process the power, and U905 a TL494 control IC contains the control loop and modulator. The free running oscillator frequency is set by R942 which controls the charging current of C944. The +5V output is filtered by R938, and C941 before it is fed directly into the non-inverting input (U905 pin#1) of the TL494 internal error amp. This error amp is a non-inverting stage, and is compensated by components R940, R939, and C942. A second error amp is used as a 7.5V under voltage lockout is formed by R943 & R944. Its purpose is to prevent the converter from starting when the supply voltage is too low to for the internal +5V reference (U905 pin#14) to maintain regulation. P channel MOSFET Q908 is turned on via R937 & R936 when the gate driver output (U905 pin#8&11) of the control IC pulls low.

### **Soft Start Relay control**

The softstart relay (K901) provides an alternate high current path around the power switch (S901) and the inrush limiting PTC (RT901). This maximizes the rail voltage available for improved power output compared to simpler NTC inrush limiting designs. The microprocessor U706 controls the softstart relay via common base transistor Q911 which supplies base current to Q912 which switches the relay on and off. D915 is present to catch the flyback voltage coming off K901 as it de-energizes.

Softstart relay (K901) engages once the microprocessor determines that the +Vcc and – Vcc rails are within their nominal range. If the rails are either too high or too low the softstart relay will disengage to protect the power supply and amplifier channels.

### **Temperature sensor circuit**

The NTC temperature sensor RT1 measures the temperature of the main secondary diodes (D905-D908) which are mounted to a heatsink (HS3). This sensor is a surface mount 0603 NTC that picks up the heatsink temperature near diode D906.

### **Synchronization circuit and AC Buss generation**

The synchronization circuit forces the +5V supply to switch at 192 kHz, which is half of the amplifier stages switching frequency. It also forces the main supply to switch at 96

kHz, one quarter the amplifier switching frequency. The synchronization is necessary to prevent beat tones from forming in the amplifier output stage.

A 192 kHz balanced square wave signal is generated on the APM and is routed to the main board via J700B pins #24 & #25. Q909 resets the timing cap (C944) on the +5V control IC (U905) when the “CLKP192K” signal rises, forcing the control IC to operate at this frequency. Optocoupler (U906) transfers the clock signal from the secondary ground referenced side to the primary AC line referenced side. Transistor Q910 turns on when the Optocoupler output voltage rises, when this happens C947 is charged as the emitter voltage drops. This forces U902, the main supply control IC to follow synchronization signal.

### **Fan Driver Circuit**

A variable speed 12V fan is controlled by the uP via the fan driver circuit. The fan driver uses a simple NPN (Q907) pass transistor and a feedback control loop (U904) to regulate the voltage applied to the fan to four times the “FAN” drive voltage. The feedback control loop is purposely slow responding so that it does not react to the impulsive motor currents drawn by the brushless DC fan motor. This isolates –LV supply from these noise currents, yet precisely regulates the fan to desired voltage.

### **BOM: 141581-5\_A XLS1500/120V MAIN PWA**

REF. DES.	CPN	DESCRIPTION	MAP LOC.
C1	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C2	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C3	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 1
C4	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 1
C5	135505-1	CAP, 0.1UF 25V 10% X7R 0603	K 1
C7	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C8	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C10		OPEN	C 5
C11	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C12	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 4
C13	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C14	103429-474K8	CAP, 470NF 250V 10% X7R 1812	I 3
C15	C 4477-3	470 UF 35V VERT	I 3
C16	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	E 2
C17	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C18	135505-1	CAP, 0.1UF 25V 10% X7R 0603	E 2
C19	139947-1	CAP, 10UF 10V 10% X5R 1206	C 1
C20	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 1
C21	139947-1	CAP, 10UF 10V 10% X5R 1206	C 1
C22	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C98	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C100	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 5
C101	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 5

C102	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 5
C103	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 5
C104	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 5
C105	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 5
C106	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 5
C107	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 5
C108	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 1
C109	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	A 1
C110	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C111	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	A 1
C112	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	B 2
C113	102438-150J2	CAP, 15PF 5% 200V NPO 0805	C 2
C114	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C115	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 5
C116	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	C 2
C117	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C118	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C119	A11369-102F2	1000PF 50V 1% CHIP CAP	B 2
C120	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 2
C121	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C122	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2
C123	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2
C124	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2
C125		OPEN	B 3
C126		OPEN	B 2
C127		OPEN	B 2
C128	A11369-681J2	680 PF 50V 5% NPO MLC 0805 T/R	B 2
C129	A11369-121J1	CAP, 120PF 50V 5% NPO 0603	B 2
C130	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C131	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C132	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C133	132191-1	CAP, 22UF 16V ELECTROLYTIC SMT	A 2
C134	A11369-391F2	CAP, 390PF 1% 50V 0805	A 2
C135	102438-150J2	CAP, 15PF 5% 200V NPO 0805	A 2
C136	102438-470J2	47PF 200V 5% NPO 0805	A 1
C137	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C138	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C139	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C141	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 3
C142	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	E 3
C143	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 3
C144	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 2
C145	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	E 2
C146	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 4
C147	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	H 4
C148	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 4
C149	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 4
C150	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	J 4

C151	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	J 4
C152	135224-1	.001UF 10% 500V X7R MLC 1206	H 4
C153	135224-1	.001UF 10% 500V X7R MLC 1206	J 5
C154	103429-474K8	CAP, 470NF 250V 10% X7R 1812	G 2
C155	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	F 3
C156	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	F 2
C157	103429-474K8	CAP, 470NF 250V 10% X7R 1812	F 3
C158	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 3
C159	135224-1	.001UF 10% 500V X7R MLC 1206	J 5
C160	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 3
C161	135224-1	.001UF 10% 500V X7R MLC 1206	J 5
C162	135224-1	.001UF 10% 500V X7R MLC 1206	L 4
C163	135224-1	.001UF 10% 500V X7R MLC 1206	L 4
C164	135224-1	.001UF 10% 500V X7R MLC 1206	M 4
C165		OPEN	J 5
C166		OPEN	J 5
C167	135505-1	CAP, 0.1UF 25V 10% X7R 0603	E 2
C168		OPEN	L 5
C169		OPEN	L 5
C170		OPEN	G 3
C171	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C172	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C173	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	H 4
C174	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 5
C175	135224-1	.001UF 10% 500V X7R MLC 1206	F 3
C176	102438-150J2	CAP, 15PF 5% 200V NPO 0805	A 2
C198	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C199	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C200	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 5
C201	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 5
C202	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C203	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C204	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C205	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C206	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C207	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 5
C208	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	D 1
C209	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	D 1
C210	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	D 2
C211	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	D 1
C212	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	D 2
C213	102438-150J2	CAP, 15PF 5% 200V NPO 0805	C 2
C214	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C215	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 5
C216	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	C 2
C217	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C218	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C219	A11369-102F2	1000PF 50V 1% CHIP CAP	C 2

C220	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C221	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	C 2
C222	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C223	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C224	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C225		OPEN	D 3
C226		OPEN	D 3
C227		OPEN	D 2
C228	A11369-681J2	680 PF 50V 5% NPO MLC 0805 T/R	D 2
C229	A11369-121J1	CAP, 120PF 50V 5% NPO 0603	D 2
C230	A11369-102F2	1000PF 50V 1% CHIP CAP	E 2
C231	A11369-102F2	1000PF 50V 1% CHIP CAP	E 2
C232	A11369-102F2	1000PF 50V 1% CHIP CAP	E 2
C233	132191-1	CAP, 22UF 16V ELECTROLYTIC SMT	E 2
C234	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C235	102438-150J2	CAP, 15PF 5% 200V NPO 0805	D 2
C236	102438-470J2	47PF 200V 5% NPO 0805	D 1
C237	A11369-391F2	CAP, 390PF 1% 50V 0805	E 1
C238	A11369-391F2	CAP, 390PF 1% 50V 0805	E 1
C239	A11369-391F2	CAP, 390PF 1% 50V 0805	E 1
C241	139719-1	CAP, 1.0UF 25V X7R 10% 0805	F 1
C242	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	G 1
C243	139719-1	CAP, 1.0UF 25V X7R 10% 0805	G 1
C244	139719-1	CAP, 1.0UF 25V X7R 10% 0805	G 1
C245	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	G 1
C246	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 4
C247	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 4
C248	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 4
C249	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 4
C250	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 4
C251	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 4
C252	135224-1	.001UF 10% 500V X7R MLC 1206	K 4
C253	135224-1	.001UF 10% 500V X7R MLC 1206	K 5
C254	103429-474K8	CAP, 470NF 250V 10% X7R 1812	G 2
C255	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	H 2
C256	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	G 1
C257	103429-474K8	CAP, 470NF 250V 10% X7R 1812	H 1
C258	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 3
C259	135224-1	.001UF 10% 500V X7R MLC 1206	K 5
C260	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 3
C261	135224-1	.001UF 10% 500V X7R MLC 1206	K 5
C262	135224-1	.001UF 10% 500V X7R MLC 1206	N 5
C263	135224-1	.001UF 10% 500V X7R MLC 1206	N 5
C264	135224-1	.001UF 10% 500V X7R MLC 1206	N 4
C265		OPEN	L 5
C266		OPEN	K 5
C267	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 1
C268		OPEN	N 5

C269		OPEN	N 5
C270		OPEN	G 3
C271	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C272	139719-1	CAP, 1.0UF 25V X7R 10% 0805	D 2
C273	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 4
C274	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 5
C275	135224-1	.001UF 10% 500V X7R MLC 1206	H 1
C276	102438-150J2	CAP, 15PF 5% 200V NPO 0805	E 2
C298	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 2
C299	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 2
C300		OPEN	I 1
C301		OPEN	F 4
C302		OPEN	G 3
C901	137030-1	CAP, 1UF X2 REDUCED SIZE	P 4
C902		OPEN	Q 4
C903	137030-1	CAP, 1UF X2 REDUCED SIZE	Q 3
C904		OPEN	Q 2
C905	137455-1	CAP, 4700 PF 10% FILM Y2	Q 3
C906	137455-1	CAP, 4700 PF 10% FILM Y2	P 3
C907	135224-1	.001UF 10% 500V X7R MLC 1206	J 2
C908	103429-474K8	CAP, 470NF 250V 10% X7R 1812	J 2
C909	137455-1	CAP, 4700 PF 10% FILM Y2	Q 1
C910	137455-1	CAP, 4700 PF 10% FILM Y2	P 1
C911	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	N 1
C912	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	M 2
C913	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	O 3
C914	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	O 3
C915	141679-1	CAP, 47UF 35V 20% ELEC RAD	N 3
C916	139719-1	CAP, 1.0UF 25V X7R 10% 0805	M 1
C917	A11427-103K1	0.01UF 50V 10% X7R MLC 0603	M 2
C918	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	L 2
C919	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 1
C920	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 2
C921	103429-474K8	CAP, 470NF 250V 10% X7R 1812	M 1
C922	103429-474K8	CAP, 470NF 250V 10% X7R 1812	L 3
C923	134115-1	CAP, .22UF 630V 5% POLYPROP	M 3
C924	140670-101J5	CAP, 100PF 5% 500V NPO 1206	K 2
C925	139192-1	CAP, 3300UF 100VDC PC MNT ELECT	I 1
C926	139192-1	CAP, 3300UF 100VDC PC MNT ELECT	I 2
C927	141924-1	CAP, 1000UF 25V 20% ELEC RAD	J 3
C928	141924-1	CAP, 1000UF 25V 20% ELEC RAD	J 3
C929	139719-1	CAP, 1.0UF 25V X7R 10% 0805	K 1
C930	139719-1	CAP, 1.0UF 25V X7R 10% 0805	K 2
C931	102438-470J2	47PF 200V 5% NPO 0805	M 2
C932	139719-1	CAP, 1.0UF 25V X7R 10% 0805	M 3
C933	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	N 3
C934	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 3
C935	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 4

C936	141924-1	CAP, 1000UF 25V 20% ELEC RAD	D 4
C937	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 4
C938	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	B 4
C939	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 3
C940	141924-1	CAP, 1000UF 25V 20% ELEC RAD	B 3
C941	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 4
C942	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 4
C943	102438-470J2	47PF 200V 5% NPO 0805	B 3
C944	A11369-102F2	1000PF 50V 1% CHIP CAP	B 4
C945	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	B 4
C946	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	B 4
C947	A11369-102F2	1000PF 50V 1% CHIP CAP	M 2
C948	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 2
C949		OPEN	B 4
C950	141924-1	CAP, 1000UF 25V 20% ELEC RAD	C 4
C951	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	J 1
C952	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	J 2
C953		OPEN	D 4
C997	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 4
C998	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 4
C999	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 3
D1	135343-1	DIODE, DUAL MMBD4148SE SOT-23	K 1
D2	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	D 1
D10	125593-1	DIODE, SCHOTTKY 40V 1A SMA	I 3
D11	125593-1	DIODE, SCHOTTKY 40V 1A SMA	I 3
D100	142022-1	DIODE, ZEN 15V 500MW DDZ15-7 SOD-123	E 3
D101	141801-1	DIODE, 200MA 250V BAS21 SOT23	E 3
D102	138997-1	DIODE, 600V 1A SMA	E 3
D105		OPEN	E 4
D106		OPEN	E 3
D107	135343-1	DIODE, DUAL MMBD4148SE SOT-23	K 4
D110	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	C 3
D200	142022-1	DIODE, ZEN 15V 500MW DDZ15-7 SOD-123	G 2
D201	141801-1	DIODE, 200MA 250V BAS21 SOT23	G 2
D202	138997-1	DIODE, 600V 1A SMA	G 1
D205		OPEN	G 2
D206		OPEN	G 2
D207	135343-1	DIODE, DUAL MMBD4148SE SOT-23	M 4
D210	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	C 3
D901	142060-1	PRP, 141658-1 (RBV2506) 0.32"	O 2
D901B	141776-1	CLIP, XLS3 RECTIFIER	O 2
D901C	103415-10605	SCR, #6-32X.312 SEMS TFS CONE	O 3
D901D	103415-10605	SCR, #6-32X.312 SEMS TFS CONE	O 2
D902	138997-1	DIODE, 600V 1A SMA	N 3
D903	138997-1	DIODE, 600V 1A SMA	O 3
D904	138997-1	DIODE, 600V 1A SMA	M 1
D905	142057-1	PRP, 141569-1 (FFPF10UP20S) 0.3"	J 2
D906	142057-1	PRP, 141569-1 (FFPF10UP20S) 0.3"	J 1



D907	142057-1	PRP, 141569-1 (FFPF10UP20S) 0.3"	J 2
D908	142057-1	PRP, 141569-1 (FFPF10UP20S) 0.3"	J 1
D909	125593-1	DIODE, SCHOTTKY 40V 1A SMA	K 1
D910	125593-1	DIODE, SCHOTTKY 40V 1A SMA	K 2
D911	125593-1	DIODE, SCHOTTKY 40V 1A SMA	C 4
D912	135343-1	DIODE, DUAL MMBD4148SE SOT-23	J 3
D913	C 9773-0	DIODE, ZENER 5.1V 1N5231 SMT	N 3
D914	135343-1	DIODE, DUAL MMBD4148SE SOT-23	N 3
D915	135343-1	DIODE, DUAL MMBD4148SE SOT-23	O 1
D916	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	M 3
D917	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	M 2
E901	131238-1	LED, BLUE 470NM 1206 SMT	N 1
FB2	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 1
FB100	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 3
FB101	125846-1	FERRITE BEAD, 600 OHM .5A 0805	A 5
FB102	125846-1	FERRITE BEAD, 600 OHM .5A 0805	A 5
FB103	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 5
FB104	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 5
FB105	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 5
FB106	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 5
FB107	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 5
FB108	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 5
FB200	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 3
FB201	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
FB202	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
FB203	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
FB204	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
FB205	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 5
FB206	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 5
FB207	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
FB208	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 5
HS1A	141678-1	HTSK, XLS3 AMP 202/402	F 3
HS1B	141669-1	INSL, 2.06" X 0.82" CRMC	F 3
HS1C		OPEN	E 4
HS1D	140180-1	CLIP, 2 FINGER TO-220	F 3
HS2A	141678-1	HTSK, XLS3 AMP 202/402	G 2
HS2B	141669-1	INSL, 2.06" X 0.82" CRMC	G 2
HS2C		OPEN	G 2
HS2D	140180-1	CLIP, 2 FINGER TO-220	H 1
HS3A	141563-1	HTSK, XLS3 PS	I 2
HS3B	141669-1	INSL, 2.06" X 0.82" CRMC	J 2
HS3C	140180-1	CLIP, 2 FINGER TO-220	J 2
HS3D	140180-1	CLIP, 2 FINGER TO-220	J 1
HS4A	141563-1	HTSK, XLS3 PS	L 2
HS4B	141669-1	INSL, 2.06" X 0.82" CRMC	L 2
HS4C	140180-1	CLIP, 2 FINGER TO-220	L 2
HS4D	140180-1	CLIP, 2 FINGER TO-220	L 1
HW901	141600-1	BRKT, XLS3 SML EMI FLTR	O 5

J1	141695-1	CON, BDPT, F 4P RED/BLK N-TCH TH HOR V0	K 6
J3	141937-1	CON, RCA F 2P BRT TH VRT	C 6
J101	141639-1	CON, PHN F 4P 0.25" TH HOR	A 5
J102	138319-1	XLR, FEM HORZ PC PLASTIC	B 5
J103	102473-1	SPEAKON, 4 POLE PCB HORZ	M 5
J201	141639-1	CON, PHN F 4P 0.25" TH HOR	E 5
J202	138319-1	XLR, FEM HORZ PC PLASTIC	D 5
J203	102473-1	SPEAKON, 4 POLE PCB HORZ	N 5
J700B	141746-1	CON, FFC 50P ZIF LOC LTCH SM HOR	C 1
J901	141905-1	CON, HDR M 2P LOC TIN VRT	D 4
K101	141719-1	RELAY, SPDT 12A 24VDC PC MT	J 4
K201	141719-1	RELAY, SPDT 12A 24VDC PC MT	M 4
K901	141719-1	RELAY, SPDT 12A 24VDC PC MT	O 1
L101	141634-1	IND, 10UH 15A 5% T130-2 TH	G 4
L102	133326-2	INDUCTOR, 1UH ADJUSTABLE	H 4
L201	141634-1	IND, 10UH 15A 5% T130-2 TH	H 3
L202	133326-2	INDUCTOR, 1UH ADJUSTABLE	K 4
L901	141736-1	IND, CM 1MH 30% TOR 14AWG TH	P 3
L902	141736-1	IND, CM 1MH 30% TOR 14AWG TH	P 1
L903	141644-1	INDUCTOR, 3.3MH	O 4
L904	141735-1	IND, 5.9UH 6% TOR 18AWG T94-2	K 3
L905	140543-1	IND, 100UH 1A 10X12.7 SMD	C 3
P901	138320-1	IEC, ISA RA PC MNT	P 6
PWB1	141574-4	PWB, XLS1000/XLS1500 AMP/PS	A 1
Q101	C 7448-1	MMBT3904 CHIP NPN	D 1
Q102	C 7448-1	MMBT3904 CHIP NPN	C 3
Q103	142058-1	PRP, 141630-1 (FDP52N20) 0.3"	F 3
Q104	142058-1	PRP, 141630-1 (FDP52N20) 0.3"	F 2
Q105	125798-1	XSTR,MMBT3906 LT3 10K REEL	A 3
Q106	C 7448-1	MMBT3904 CHIP NPN	A 3
Q107	102483-1	PNP 300V 500MA SOT-23	E 2
Q108	125798-1	XSTR,MMBT3906 LT3 10K REEL	E 2
Q109	C 7448-1	MMBT3904 CHIP NPN	E 3
Q110	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 3
Q111	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 3
Q112	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 2
Q113	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 2
Q201	C 7448-1	MMBT3904 CHIP NPN	D 1
Q202	C 7448-1	MMBT3904 CHIP NPN	C 3
Q203	142058-1	PRP, 141630-1 (FDP52N20) 0.3"	G 1
Q204	142058-1	PRP, 141630-1 (FDP52N20) 0.3"	G 1
Q205	125798-1	XSTR,MMBT3906 LT3 10K REEL	B 3
Q206	C 7448-1	MMBT3904 CHIP NPN	B 3
Q207	102483-1	PNP 300V 500MA SOT-23	F 1
Q208	125798-1	XSTR,MMBT3906 LT3 10K REEL	G 1
Q209	C 7448-1	MMBT3904 CHIP NPN	F 1
Q210	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 2
Q211	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 1

Q212	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 1
Q213	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 1
Q901	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 1
Q902	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 1
Q903	142056-1	PRP, 141567-1 (GW20NC60VD) 0.3"	L 1
Q904	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 2
Q905	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 2
Q906	142056-1	PRP, 141567-1 (GW20NC60VD) 0.3"	L 2
Q907	141640-1	XTOR, NPN 32V 2A FJD3076 TO-252	D 4
Q908	141641-1	XTOR, PFET 20V 1.5A FDN308P SOT23	C 4
Q909	C 7448-1	MMBT3904 CHIP NPN	B 3
Q910	C 7448-1	MMBT3904 CHIP NPN	M 1
Q911	125798-1	XSTR,MMBT3906 LT3 10K REEL	D 1
Q912	C 7448-1	MMBT3904 CHIP NPN	D 1
R3	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 1
R4		OPEN	E 2
R5		OPEN	E 1
R6	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	C 2
R7	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	E 1
R8	A11368-64910	RES, 6.49KOHM 0.063W 1% 0603	C 1
R9	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	E 1
R10	A11368-64910	RES, 6.49KOHM 0.063W 1% 0603	C 1
R11	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R12	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R13	A11368-30110	3.01KOHM 1/16W 1% 0603 T/R	C 2
R14	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 2
R15	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R16	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	B 3
R17	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	C 1
R18	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	C 1
R19	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	C 1
R20	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	D 3
R21	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	C 1
R22		OPEN	C 2
R23	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	C 2
R24	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R25		OPEN	D 1
R26	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 2
R27	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 2
R101	A11371-8205	82 OHM 1W 5% SMD 2512	B 5
R102	A11368-69800	RES, 698 OHM 1/16W 1% 0603	B 1
R103	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	B 1
R104	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 2
R105	A11368-69800	RES, 698 OHM 1/16W 1% 0603	B 1
R106	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	B 1
R107	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 1
R108	A11368-11020	RES, 11.0 KOHM 1/16W 1% 0603	B 2
R109	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	B 2

R110	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R111	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R112	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R113	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	C 2
R114	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R115	A11368-54910	RES, 5.49KOHM 0.063W 1% 0603	B 2
R116	A11368-90900	RES, 909 OHM 1% 1/16W 0603	B 2
R117	A11368-90900	RES, 909 OHM 1% 1/16W 0603	B 2
R118	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	B 3
R119	A11368-10000	RES, 100 OHM 1/16W 1% 0603	B 3
R120	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 3
R121		OPEN	B 3
R122	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 2
R123	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 2
R124	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	B 2
R125	A11368-20000	RES, 200 OHM 1/16W 1% 0603	B 2
R126	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R127	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R128	A11368-56200	RES, 562 OHM 1/16W 1% 0603	A 2
R129	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R130	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	A 2
R131	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	A 2
R132	A11368-13721	13.7K 1/10W 1% SMD 0805 T/R	A 2
R133	A11368-11821	RES, 11.8K 0.10W 1% 0805	A 3
R134	A11368-59010	RES, 5.9 KOHM 1/16W 1% 0603	A 2
R135	A11368-27411	2.74KOHM 0.1W 1% 0805 T/R	A 2
R136	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	A 2
R137	A11368-14701	RES, 147 OHM 0.1W 1% 0805	A 1
R138	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	A 2
R139	A11368-34821	RES, 34.8KOHM 0.10W 1% 0805	A 2
R140	A11368-10013	1K 0.25W 1% 1210 T/R	G 3
R141	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 3
R142	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R143	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 2
R144	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R145	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	A 3
R146	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R147	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R148	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R149	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R150	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	E 3
R151		OPEN	C 3
R152	A11371-1035	RES, 10KOHM 1W 5% 2512	E 3
R153	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	E 2
R154	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	E 2
R155	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	E 2
R156		OPEN	E 2
R157	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	E 2

R158	A11368-39211	3.92 KOHM 1% 0.10W 0805	E 3
R159	A11368-61911	6.19KOHM .1W 1% 0805 T/R	E 3
R160	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	E 3
R161	A11368-34824	RES, 34.8KOHM 0.5W 1% 2010	E 3
R162	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	E 2
R163	A11368-36524	RES, 36.5K 0.5W 1% 2010	F 3
R164	A11371-5R11	5.1 OHM 0.1W 5% 0805 SMT	F 3
R165	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R166	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R167	A11371-5R11	5.1 OHM 0.1W 5% 0805 SMT	F 2
R168	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R169	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R170	A11371-7525	RES, 7.5KOHM 1W 5% 2512	H 4
R190	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R191	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R192	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R193	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R194	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 5
R195	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 4
R196	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 4
R197	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 5
R198	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 5
R199	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 5
R201	A11371-8205	82 OHM 1W 5% SMD 2512	D 5
R202	A11368-69800	RES, 698 OHM 1/16W 1% 0603	D 1
R203	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	D 1
R204	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 2
R205	A11368-69800	RES, 698 OHM 1/16W 1% 0603	D 1
R206	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	D 1
R207	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 1
R208	A11368-11020	RES, 11.0 KOHM 1/16W 1% 0603	C 2
R209	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	C 2
R210	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	D 2
R211	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	C 2
R212	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R213	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	C 2
R214	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 2
R215	A11368-54910	RES, 5.49KOHM 0.063W 1% 0603	C 2
R216	A11368-90900	RES, 909 OHM 1% 1/16W 0603	D 2
R217	A11368-90900	RES, 909 OHM 1% 1/16W 0603	D 2
R218	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	D 3
R219	A11368-10000	RES, 100 OHM 1/16W 1% 0603	D 3
R220	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 3
R221		OPEN	D 3
R222	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 2
R223	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 2
R224	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	D 2
R225	A11368-20000	RES, 200 OHM 1/16W 1% 0603	D 2

R226	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	E 2
R227	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	E 2
R228	A11368-56200	RES, 562 OHM 1/16W 1% 0603	D 2
R229	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	E 2
R230	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	E 2
R231	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	D 2
R232	A11368-13721	13.7K 1/10W 1% SMD 0805 T/R	D 2
R233	A11368-11821	RES, 11.8K 0.10W 1% 0805	D 3
R234	A11368-59010	RES, 5.9 KOHM 1/16W 1% 0603	D 2
R235	A11368-27411	2.74KOHM 0.1W 1% 0805 T/R	D 2
R236	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	E 2
R237	A11368-14701	RES, 147 OHM 0.1W 1% 0805	E 1
R238	A11368-17810	RES, 1.78KOHM 0.063W 1% 0603	E 2
R239	A11368-34821	RES, 34.8KOHM 0.10W 1% 0805	E 2
R240	A11368-10013	1K 0.25W 1% 1210 T/R	G 3
R241	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 3
R242	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R243	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 2
R244	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R245	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 3
R246	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R247	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R248	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R249	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R250	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	F 2
R251		OPEN	C 3
R252	A11371-1035	RES, 10KOHM 1W 5% 2512	F 2
R253	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	G 1
R254	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	G 1
R255	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	G 1
R256		OPEN	G 1
R257	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	F 1
R258	A11368-39211	3.92 KOHM 1% 0.10W 0805	G 1
R259	A11368-61911	6.19KOHM .1W 1% 0805 T/R	G 1
R260	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	G 1
R261	A11368-34824	RES, 34.8KOHM 0.5W 1% 2010	G 2
R262	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	F 1
R263	A11368-36524	RES, 36.5K 0.5W 1% 2010	G 1
R264	A11371-5R11	5.1 OHM 0.1W 5% 0805 SMT	G 1
R265	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R266	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 2
R267	A11371-5R11	5.1 OHM 0.1W 5% 0805 SMT	G 1
R268	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R269	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R270	A11371-7525	RES, 7.5KOHM 1W 5% 2512	I 3
R290	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R291	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R292	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4

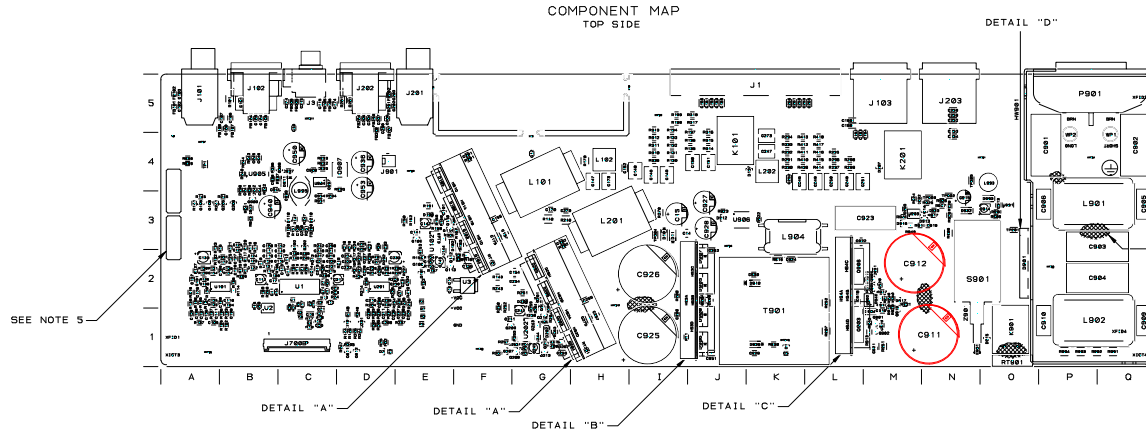
R293	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R294	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R295	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R296	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R297	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R298	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R299	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R300	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	I 2
R301	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	F 4
R302	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	G 3
R303	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	E 3
R304	A11368-1R000	RES, 1 OHM 1/16W 1% 0603	F 3
R305	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	F 2
R306	A11368-10230	RES, 102KOHM 0.063W 1% 0603	B 2
R307	A11368-25520	RES, 25.5KOHM 0.063W 1% 0603	B 2
R308	A11368-1R000	RES, 1 OHM 1/16W 1% 0603	F 2
R309	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R310	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R311	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R312	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 4
R313	A11368-16204	RES, 162 OHM 0.5W 1% 2010	I 5
R314	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 4
R315	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 4
R316	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 5
R317	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 5
R318	A11368-16204	RES, 162 OHM 0.5W 1% 2010	J 5
R319	A11368-34821	RES, 34.8KOHM 0.10W 1% 0805	A 2
R403	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	G 1
R404	A11368-1R000	RES, 1 OHM 1/16W 1% 0603	G 1
R405	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	G 1
R406	A11368-10230	RES, 102KOHM 0.063W 1% 0603	D 2
R407	A11368-25520	RES, 25.5KOHM 0.063W 1% 0603	D 2
R408	A11368-1R000	RES, 1 OHM 1/16W 1% 0603	G 1
R409	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R410	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R411	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R412	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R413	A11368-16204	RES, 162 OHM 0.5W 1% 2010	K 4
R414	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R415	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R416	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R417	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R418	A11368-16204	RES, 162 OHM 0.5W 1% 2010	L 4
R419	A11368-34821	RES, 34.8KOHM 0.10W 1% 0805	E 2
R901	A11368-49923	49.9KOHM .25W 1% CHIP 1210	Q 1
R902	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 1
R903	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 1
R904	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 1

R905	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R906		OPEN	N 3
R907		OPEN	L 1
R908	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	O 3
R909	A11368-15421	15.4K 1/10W 1% SMD 0805 T/R	O 3
R910	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	M 1
R911	A11368-20020	RES, 20.0 KOHM 1/16W 1% 0603	M 2
R912	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	M 1
R913	A11368-10R01	10 OHM .1W 1% 0805 T/R ROHS	M 1
R914	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	M 2
R915	A11368-10R01	10 OHM .1W 1% 0805 T/R ROHS	M 2
R916	A11368-10003	100 OHM 0.25W 1% 1210 T/R	K 2
R917	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	N 3
R918	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	M 3
R919	A11368-20020	RES, 20.0 KOHM 1/16W 1% 0603	N 3
R920	A11368-51100	511 OHM 1/16W 1% 0603 T/R	M 2
R921	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	M 2
R922	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	K 3
R923	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	J 3
R924	A11368-68130	RES, 681K OHM 1% 1/16W 0603	M 3
R925	A11368-20031	200K 0.1W 1% SMD CHIP 0805	N 3
R926	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	N 3
R927	A11368-12131	121KOHM, 0.10W 1% CHIP 0805	N 3
R928	A11368-20031	200K 0.1W 1% SMD CHIP 0805	N 3
R929	A11368-20031	200K 0.1W 1% SMD CHIP 0805	N 3
R930	A11368-40201	402 OHM 1% 0805 RES T/R	K 1
R931	A11368-20031	200K 0.1W 1% SMD CHIP 0805	C 3
R932	A11368-49921	49.9KOHM .1W 1% CHIP 0805	C 4
R933	A11368-20031	200K 0.1W 1% SMD CHIP 0805	C 4
R934	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 3
R935	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 4
R936	A11368-40201	402 OHM 1% 0805 RES T/R	B 4
R937	A11368-40201	402 OHM 1% 0805 RES T/R	B 4
R938	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 4
R939	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 4
R940	A11368-49921	49.9KOHM .1W 1% CHIP 0805	B 4
R941	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 3
R942	A11368-60410	RES, 6.04 KOHM 1/16W 1% 0603	B 4
R943	A11368-49921	49.9KOHM .1W 1% CHIP 0805	B 4
R944	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 4
R945	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	B 3
R946	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	M 3
R947	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 1
R948	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	M 2
R949	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	M 3
R950	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	M 2
R951		OPEN	M 1
R952		OPEN	L 2

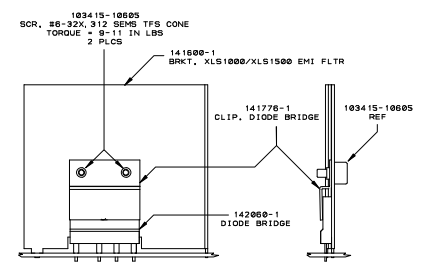


R998		OPEN	A 4
R999	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	A 4
RT1	140098-1	THERMISTOR, 10K NTC 1% 0603	I 1
RT101	140098-1	THERMISTOR, 10K NTC 1% 0603	F 2
RT201	140098-1	THERMISTOR, 10K NTC 1% 0603	H 1
RT901	138466-1	PRP, 101103-1 PTC .125	O 1
S901	132498-1	SWITCH, DPST PUSHBUTTON VDECSA	N 2
T901	141650-1	XFMR, MAIN XLS3 402 120V/240V	K 1
TP1		OPEN	A 4
TP901		OPEN	O 3
TP902		OPEN	N 3
TP903		OPEN	N 3
TP904		OPEN	I 3
TP905		OPEN	N 4
U1	140419-1	IC, RUBY SOP64 SMD	C 2
U2	C 8262-5	IC, OPAMP DUAL LONNOIS 33078 SO8	B 2
U3	141744-1	IC, REG 12V 500MA 78M12C TO-263	F 2
U101	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	B 2
U102	141643-1	IC, DRV PWM IRS20957S	E 3
U201	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	D 2
U202	141643-1	IC, DRV PWM IRS20957S	G 1
U901	141369-1	IC, REG ADJ LNK302DN SO8	O 3
U902	141572-1	IC, DRV SMPS FAN7387 SO8	M 2
U903	126559-1	COMPARATOR, LM393 SO-8 DUAL	M 3
U904	133552-1	OP AMP, LM358 LOW PWR DUAL S08	C 4
U905	138341-1	IC, TL494 PWM CTRL SO-16	B 4
U906	141638-1	IC, OPTOCOUPLER	J 3
WP1	141672-1	CBL, 16AWG BRN 2.1" STRP FLG	Q 4
WP2	141671-1	CBL, 16AWG BRN 2.6" STRP FLG	P 4
Z901	134606-2	JUMP, 14AWG CU TIN BUS .210" X.225"	N 1

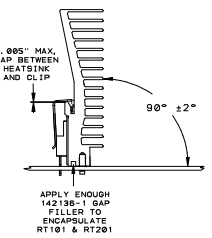
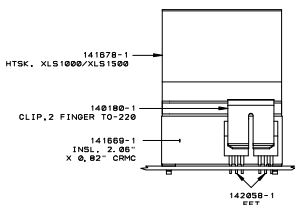
# COMPONENT MAP: XLS1000/1500 MAIN PWA



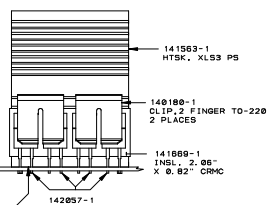
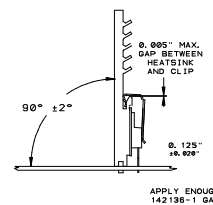
ADD HOT MELT GLUE TO LOCATIONS SHOWN (5 PLACES)



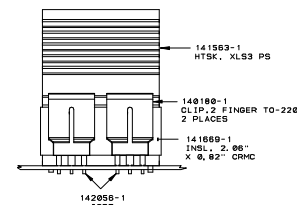
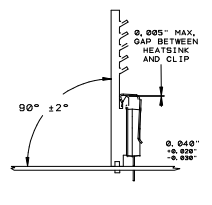
DETAIL "D"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN D981 BRIDGE DIODE AND THE SHIELD / HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



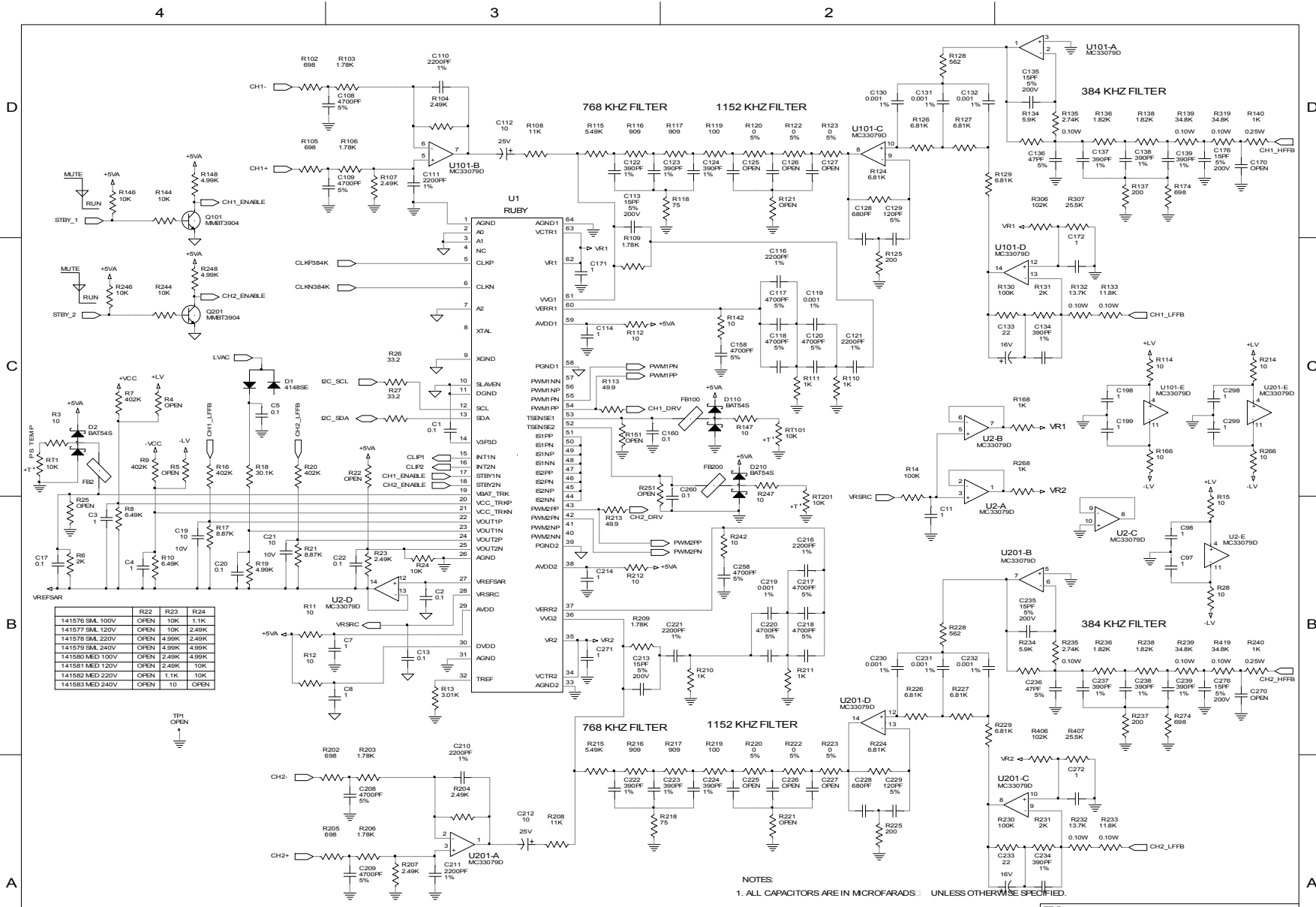
DETAIL "A"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



DETAIL "B"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



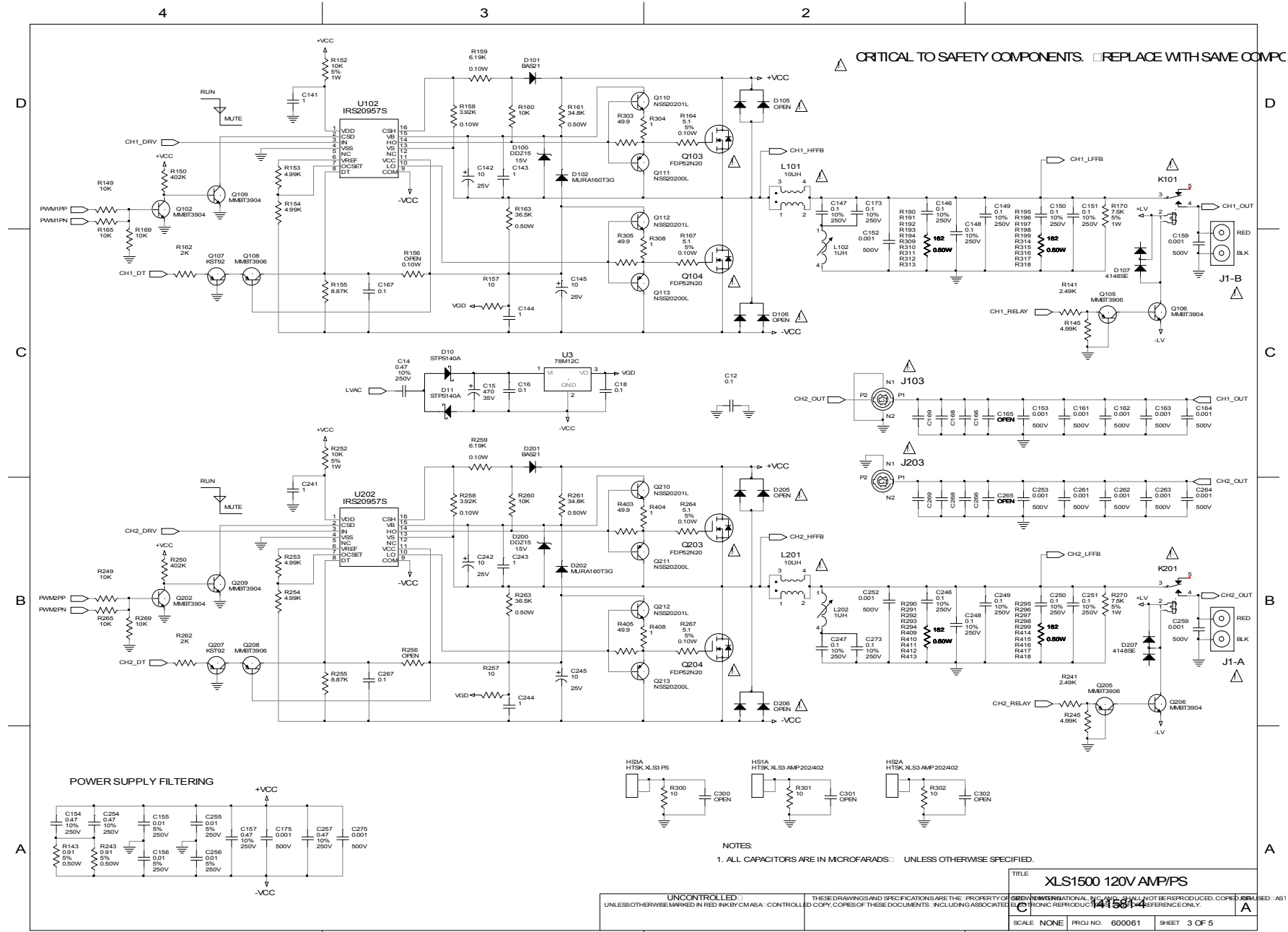
DETAIL "C"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



NOTES  
 1. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

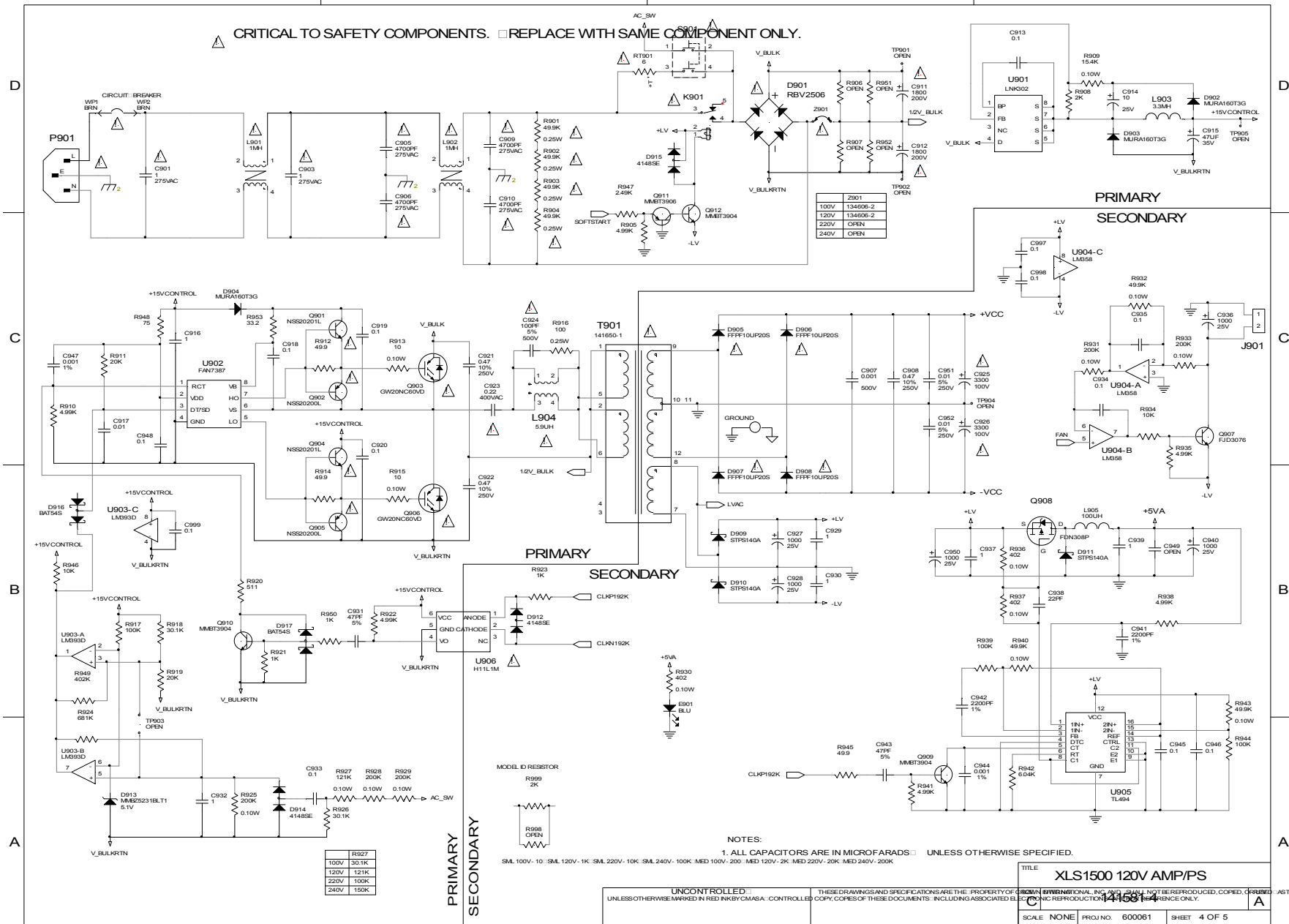
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TITLE: XLS1500 120V AMP/PS  
 SCALE: NONE PROJ NO: 600061 SHEET 2 OF 5



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			SHEET 3 OF 5

CRITICAL TO SAFETY COMPONENTS.  REPLACE WITH SAME COMPONENT ONLY.



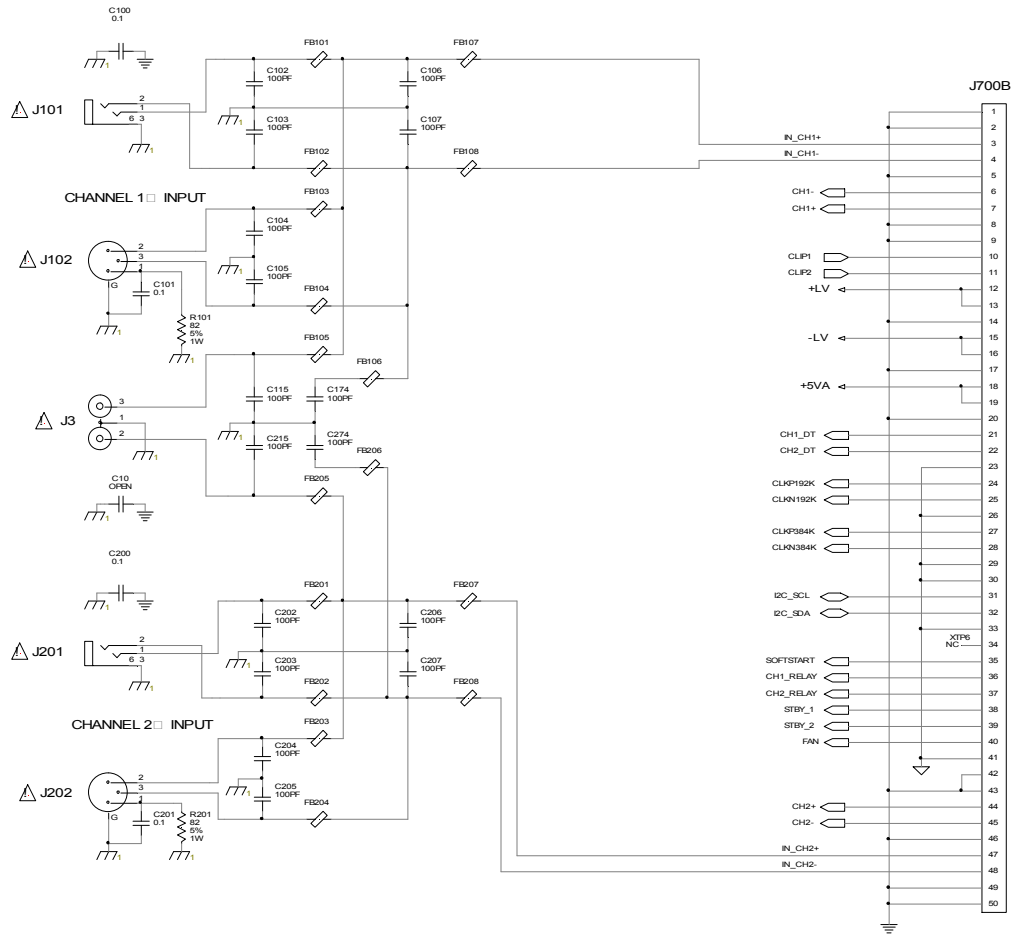
NOTES:

1. ALL CAPACITORS ARE IN MICROFARADS  UNLESS OTHERWISE SPECIFIED.

SM: 100V - 10; SM: 120V - 1K; SM: 220V - 10K; SM: 240V - 100K; MED: 100V - 200; MED: 120V - 2K; MED: 220V - 20K; MED: 240V - 200K

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UNLESS OTHERWISE MARKED IN RED IN K/M/ASA: CONTROLLED COPY, COPIES OF THESE DOCUMENTS INCLUDING ASSOCIATED ELECTRICAL REVISIONS SHALL BE REFERENCE ONLY.	141001-4	SCALE: NONE PROJ. NO. 600061 SHEET 4 OF 5

⚠ CRITICAL TO SAFETY COMPONENTS. □ REPLACE WITH SAME COMPONENT ONLY.



NOTES:  
1. ALL CAPACITORS ARE IN MICROFARADS □ UNLESS OTHERWISE SPECIFIED.

TITLE XLS1500 120V AMP/PS

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	SCALE NONE	PROJ. NO. 600061	

4

3

2

1

## BOM: 142029-5\_A XLS2500/120V MAIN PWA

REF. DES.	CPN	DESCRIPTION	MAP LOC.
C1	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C2	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C3	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 1
C4	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 1
C5	135505-1	CAP, 0.1UF 25V 10% X7R 0603	K 1
C7	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C8	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C10		OPEN	C 7
C11	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C12	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 6
C13	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C14	103429-474K8	CAP, 470NF 250V 10% X7R 1812	J 3
C15	C 4477-3	470 UF 35V VERT	I 4
C16	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	F 3
C17	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C18	135505-1	CAP, 0.1UF 25V 10% X7R 0603	F 3
C19	139947-1	CAP, 10UF 10V 10% X5R 1206	C 1
C20	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 1
C21	139947-1	CAP, 10UF 10V 10% X5R 1206	C 1
C22	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 2
C98	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 2
C100	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 7
C101	135505-1	CAP, 0.1UF 25V 10% X7R 0603	B 7
C102	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 7
C103	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 7
C104	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 7
C105	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 7
C106	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	B 7
C107	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 7
C108	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 1
C109	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	A 1
C110	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C111	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	A 1
C112	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	B 2
C113	102438-150J2	CAP, 15PF 5% 200V NPO 0805	C 2
C114	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C115	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 7
C116	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C117	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 2
C118	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 2
C119	A11369-102F2	1000PF 50V 1% CHIP CAP	B 2
C120	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 2
C121	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 2
C122	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2

C123	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2
C124	A11369-391F2	CAP, 390PF 1% 50V 0805	B 2
C125		OPEN	B 3
C126		OPEN	B 2
C127		OPEN	B 2
C128	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	B 2
C129	A11369-121J1	CAP, 120PF 50V 5% NPO 0603	B 2
C130	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C131	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C132	A11369-102F2	1000PF 50V 1% CHIP CAP	A 2
C133	132191-1	CAP, 22UF 16V ELECTROLYTIC SMT	A 2
C134	A11369-391F2	CAP, 390PF 1% 50V 0805	A 2
C135	102438-150J2	CAP, 15PF 5% 200V NPO 0805	A 2
C136	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	A 1
C137	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C138	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C139	A11369-391F2	CAP, 390PF 1% 50V 0805	A 1
C141	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 5
C142	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	E 5
C143	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 5
C144	139719-1	CAP, 1.0UF 25V X7R 10% 0805	E 4
C145	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	E 4
C146	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 6
C147	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	H 6
C148	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 6
C149	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 6
C150	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	I 6
C151	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	J 6
C152	135224-1	.001UF 10% 500V X7R MLC 1206	I 6
C153	135224-1	.001UF 10% 500V X7R MLC 1206	J 7
C154	103429-474K8	CAP, 470NF 250V 10% X7R 1812	G 4
C155	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	F 6
C156	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	F 4
C157	103429-474K8	CAP, 470NF 250V 10% X7R 1812	F 3
C158	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	B 3
C159	135224-1	.001UF 10% 500V X7R MLC 1206	J 7
C160	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 3
C161	135224-1	.001UF 10% 500V X7R MLC 1206	J 7
C162	135224-1	.001UF 10% 500V X7R MLC 1206	L 7
C163	135224-1	.001UF 10% 500V X7R MLC 1206	L 7
C164	135224-1	.001UF 10% 500V X7R MLC 1206	L 7
C165		OPEN	J 7
C166		OPEN	J 7
C167	135505-1	CAP, 0.1UF 25V 10% X7R 0603	E 4



C168		OPEN	L 7
C169		OPEN	L 7
C170		OPEN	G 6
C171	139719-1	CAP, 1.0UF 25V X7R 10% 0805	B 2
C172	139719-1	CAP, 1.0UF 25V X7R 10% 0805	A 2
C173	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	H 6
C174	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 7
C176	A11369-100J2	CAP, 10PF 5% 50V SMT 0805	A 2
C180	135224-1	.001UF 10% 500V X7R MLC 1206	F 5
C181	135224-1	.001UF 10% 500V X7R MLC 1206	F 4
C182	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	E 6
C183	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	F 4
C198	135505-1	CAP, 0.1UF 25V 10% X7R 0603	A 2
C199	135505-1	CAP, 0.1UF 25V 10% X7R 0603	A 2
C200	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 7
C201	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 7
C202	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C203	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C204	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C205	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C206	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C207	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 7
C208	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	D 1
C209	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	D 1
C210	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	D 2
C211	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	D 1
C212	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	C 2
C213	102438-150J2	CAP, 15PF 5% 200V NPO 0805	C 2
C214	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C215	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 7
C216	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	C 2
C217	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C218	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C219	A11369-102F2	1000PF 50V 1% CHIP CAP	C 2
C220	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 2
C221	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	C 2
C222	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C223	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C224	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C225		OPEN	D 3
C226		OPEN	D 3
C227		OPEN	D 2
C228	A11369-681F2	CAP, 680PF 50V 1% NPO 0805	D 2
C229	A11369-121J1	CAP, 120PF 50V 5% NPO 0603	D 2
C230	A11369-102F2	1000PF 50V 1% CHIP CAP	D 2
C231	A11369-102F2	1000PF 50V 1% CHIP CAP	E 2
C232	A11369-102F2	1000PF 50V 1% CHIP CAP	E 2
C233	132191-1	CAP, 22UF 16V ELECTROLYTIC SMT	D 2

C234	A11369-391F2	CAP, 390PF 1% 50V 0805	D 2
C235	102438-150J2	CAP, 15PF 5% 200V NPO 0805	D 2
C236	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	D 1
C237	A11369-391F2	CAP, 390PF 1% 50V 0805	D 1
C238	A11369-391F2	CAP, 390PF 1% 50V 0805	E 1
C239	A11369-391F2	CAP, 390PF 1% 50V 0805	E 1
C241	139719-1	CAP, 1.0UF 25V X7R 10% 0805	F 2
C242	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	F 2
C243	139719-1	CAP, 1.0UF 25V X7R 10% 0805	G 2
C244	139719-1	CAP, 1.0UF 25V X7R 10% 0805	G 2
C245	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	G 2
C246	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 6
C247	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 6
C248	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 6
C249	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 6
C250	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	L 6
C251	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	M 6
C252	135224-1	.001UF 10% 500V X7R MLC 1206	K 6
C253	135224-1	.001UF 10% 500V X7R MLC 1206	K 7
C254	103429-474K8	CAP, 470NF 250V 10% X7R 1812	H 2
C255	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	G 3
C256	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	H 1
C258	A11369-472J2	CAP, 4700PF 5% 50V SMT 0805	C 3
C259	135224-1	.001UF 10% 500V X7R MLC 1206	K 7
C260	135505-1	CAP, 0.1UF 25V 10% X7R 0603	C 3
C261	135224-1	.001UF 10% 500V X7R MLC 1206	K 7
C262	135224-1	.001UF 10% 500V X7R MLC 1206	N 7
C263	135224-1	.001UF 10% 500V X7R MLC 1206	N 7
C264	135224-1	.001UF 10% 500V X7R MLC 1206	N 7
C265		OPEN	L 7
C266		OPEN	K 7
C267	135505-1	CAP, 0.1UF 25V 10% X7R 0603	G 2
C268		OPEN	N 7
C269		OPEN	N 7
C270		OPEN	H 5
C271	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 2
C272	139719-1	CAP, 1.0UF 25V X7R 10% 0805	D 2
C273	A10434-104KD	CAP, 0.1UF 250V 10% PEST RAD	K 6
C274	A11369-101J2	100 PF 50V 5% NPO MLC 0805 T/R	C 7
C276	A11369-100J2	CAP, 10PF 5% 50V SMT 0805	E 2
C280	135224-1	.001UF 10% 500V X7R MLC 1206	H 3
C281	135224-1	.001UF 10% 500V X7R MLC 1206	H 1
C282	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	G 3

C283	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	G 1
C298	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 2
C299	135505-1	CAP, 0.1UF 25V 10% X7R 0603	D 2
C300		OPEN	I 2
C301		OPEN	F 6
C302		OPEN	G 4
C901	137030-1	CAP, 1UF X2 REDUCED SIZE	O 7
C902		OPEN	Q 7
C903	137030-1	CAP, 1UF X2 REDUCED SIZE	P 4
C904		OPEN	P 4
C905	137455-1	CAP, 4700 PF 10% FILM Y2	Q 5
C906	137455-1	CAP, 4700 PF 10% FILM Y2	O 5
C907	135224-1	.001UF 10% 500V X7R MLC 1206	J 2
C908	103429-474K8	CAP, 470NF 250V 10% X7R 1812	J 2
C909	137455-1	CAP, 4700 PF 10% FILM Y2	Q 3
C910	137455-1	CAP, 4700 PF 10% FILM Y2	O 3
C911	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	N 4
C912	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	M 5
C913	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	L 5
C914	130561-1	10UF 25V 20% ALUM ELEC SMT T/R	L 4
C915	141679-1	CAP, 47UF 35V 20% ELEC RAD	L 5
C916	139719-1	CAP, 1.0UF 25V X7R 10% 0805	M 3
C917	A11427-103K1	0.01UF 50V 10% X7R MLC 0603	M 3
C918	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	M 3
C919	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 2
C920	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 3
C921	103429-474K8	CAP, 470NF 250V 10% X7R 1812	M 2
C922	103429-474K8	CAP, 470NF 250V 10% X7R 1812	L 4
C923	134115-1	CAP, .22UF 630V 5% POLYPROP	L 2
C924	140670-101J5	CAP, 100PF 5% 500V NPO 1206	M 2
C925	139189-1	CAP, 4700UF 125V ALUM ELECT	I 2
C926	139189-1	CAP, 4700UF 125V ALUM ELECT	I 3
C927	141924-1	CAP, 1000UF 25V 20% ELEC RAD	J 4
C928	141924-1	CAP, 1000UF 25V 20% ELEC RAD	J 4
C929	139719-1	CAP, 1.0UF 25V X7R 10% 0805	K 3
C930	139719-1	CAP, 1.0UF 25V X7R 10% 0805	J 3
C931	A11369-470K1	CAP, 47PF 50V 10% NPO 0603 T/R	M 3
C932	139719-1	CAP, 1.0UF 25V X7R 10% 0805	K 5
C933	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	K 5
C934	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 6
C935	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 6
C936	141924-1	CAP, 1000UF 25V 20% ELEC RAD	D 6
C937	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 6

C938	A11369-220J1	CAP, 22PF 50V 5% 0603 NPO	B 6
C939	139719-1	CAP, 1.0UF 25V X7R 10% 0805	C 6
C940	141924-1	CAP, 1000UF 25V 20% ELEC RAD	B 5
C941	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 6
C942	A11369-222F2	CAP, 2200PF 50V NPO 1% 0805	B 6
C943	A11369-470K1	CAP, 47PF 50V 10% NPO 0603 T/R	B 5
C944	A11369-102F2	1000PF 50V 1% CHIP CAP	B 6
C945	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	B 6
C946	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	B 6
C947	A11369-102F2	1000PF 50V 1% CHIP CAP	M 3
C948	135505-1	CAP, 0.1UF 25V 10% X7R 0603	M 3
C949		OPEN	B 6
C950	141924-1	CAP, 1000UF 25V 20% ELEC RAD	C 6
C951	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	J 2
C952	103429-103J5	0.01UF 250V 5% X7R 1206 T/R	J 3
C953		OPEN	J 4
C954	134115-1	CAP, .22UF 630V 5% POLYPROP	L 1
C955	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	M 4
C956	141944-1	CAP, 1800UF 200V 20% ELEC RAD SNAP-IN	N 5
C997	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 6
C998	A11427-104K2	.1UF 50V CHIP CAP 10% 0805 X7R	C 6
C999	135505-1	CAP, 0.1UF 25V 10% X7R 0603	K 5
D1	135343-1	DIODE, DUAL MMBD4148SE SOT-23	K 1
D2	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	D 1
D10	125593-1	DIODE, SCHOTTKY 40V 1A SMA	I 3
D11	125593-1	DIODE, SCHOTTKY 40V 1A SMA	I 4
D100	142022-1	DIODE, ZEN 15V 500MW DDZ15-7 SOD-123	E 5
D101	141801-1	DIODE, 200MA 250V BAS21 SOT23	E 5
D102	138997-1	DIODE, 600V 1A SMA	E 5
D105	141982-1	DIODE, DUAL 10A 300V TO-263	F 5
D106	141982-1	DIODE, DUAL 10A 300V TO-263	F 4
D107	135343-1	DIODE, DUAL MMBD4148SE SOT-23	J 6
D108	142055-1	PRP, 138883-1 (B30H100G) 0.3"	E 6
D109	142055-1	PRP, 138883-1 (B30H100G) 0.3"	F 5
D110	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	C 3
D200	142022-1	DIODE, ZEN 15V 500MW DDZ15-7 SOD-123	G 2
D201	141801-1	DIODE, 200MA 250V BAS21 SOT23	G 2
D202	138997-1	DIODE, 600V 1A SMA	G 2
D205	141982-1	DIODE, DUAL 10A 300V TO-263	H 2
D206	141982-1	DIODE, DUAL 10A 300V TO-263	H 2
D207	135343-1	DIODE, DUAL MMBD4148SE SOT-23	N 6
D208	142055-1	PRP, 138883-1 (B30H100G) 0.3"	G 3
D209	142055-1	PRP, 138883-1 (B30H100G) 0.3"	G 2
D210	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	C 3
D901	138689-1	PRP, 125427-1 (RBV5006) .300	O 2

D901B	141776-1	CLIP, XLS3 RECTIFIER	O 2
D901C	103415-10605	SCR, #6-32X.312 SEMS TFS CONE	O 3
D901D	103415-10605	SCR, #6-32X.312 SEMS TFS CONE	O 2
D902	138997-1	DIODE, 600V 1A SMA	L 4
D903	138997-1	DIODE, 600V 1A SMA	L 5
D904	138997-1	DIODE, 600V 1A SMA	M 3
D905	142061-1	PRP, 142004-1 (STTH30R04D) 0.3"	J 3
D906	142061-1	PRP, 142004-1 (STTH30R04D) 0.3"	J 2
D907	142061-1	PRP, 142004-1 (STTH30R04D) 0.3"	J 3
D908	142061-1	PRP, 142004-1 (STTH30R04D) 0.3"	J 2
D909	125593-1	DIODE, SCHOTTKY 40V 1A SMA	K 3
D910	125593-1	DIODE, SCHOTTKY 40V 1A SMA	K 3
D911	125593-1	DIODE, SCHOTTKY 40V 1A SMA	C 6
D912	135343-1	DIODE, DUAL MMBD4148SE SOT-23	J 5
D913	C 9773-0	DIODE, ZENER 5.1V 1N5231 SMT	K 5
D914	135343-1	DIODE, DUAL MMBD4148SE SOT-23	K 5
D915	135343-1	DIODE, DUAL MMBD4148SE SOT-23	P 1
D916	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	K 4
D917	137118-1	DIODE, 30V 200MA DUAL SCHOTTKY	M 3
E901	136344-1	LED, BLUE 1206 INNER LENS	N 1
FB2	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 1
FB100	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 3
FB101	125846-1	FERRITE BEAD, 600 OHM .5A 0805	A 7
FB102	125846-1	FERRITE BEAD, 600 OHM .5A 0805	A 7
FB103	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 7
FB104	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 7
FB105	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 7
FB106	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 7
FB107	125846-1	FERRITE BEAD, 600 OHM .5A 0805	B 7
FB108	125846-1	FERRITE BEAD, 600 OHM .5A 0805	A 7
FB200	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 3
FB201	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
FB202	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
FB203	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
FB204	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
FB205	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 7
FB206	125846-1	FERRITE BEAD, 600 OHM .5A 0805	C 7
FB207	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
FB208	125846-1	FERRITE BEAD, 600 OHM .5A 0805	D 7
HS1A	141597-1	HTSK, XLS3 AMP 602/802	F 5
HS1B	141596-1	INSL, 3.06"X0.70" CRMC	F 5
HS1C	140180-1	CLIP, 2 FINGER TO-220	F 5
HS1D	140180-1	CLIP, 2 FINGER TO-220	F 4
HS2A	141597-1	HTSK, XLS3 AMP 602/802	G 2
HS2B	141596-1	INSL, 3.06"X0.70" CRMC	G 2
HS2C	140180-1	CLIP, 2 FINGER TO-220	G 2
HS2D	140180-1	CLIP, 2 FINGER TO-220	G 3
HS3A	141563-1	HTSK, XLS3 PS	J 2

HS3B	141669-1	INSL, 2.06" X 0.82" CRMC	J 2
HS3C	140180-1	CLIP, 2 FINGER TO-220	J 3
HS3D	140180-1	CLIP, 2 FINGER TO-220	J 2
HS4A	141563-1	HTSK, XLS3 PS	L 3
HS4B	141669-1	INSL, 2.06" X 0.82" CRMC	L 3
HS4C	140180-1	CLIP, 2 FINGER TO-220	L 3
HS4D	140180-1	CLIP, 2 FINGER TO-220	L 3
HS4E	142134-1	INSL, 1.8"X0.85" NOMX	M 3
HW901	141748-1	BRKT, XLS3 1800/2400 EMI FLTR	O 7
J1	141695-1	CON, BDPT, F 4P RED/BLK N-TCH TH HOR V0	K 8
J3	141937-1	CON, RCA F 2P BRT TH VRT	C 8
J101	141639-1	CON, PHN F 4P 0.25" TH HOR	A 7
J102	138319-1	XLR, FEM HORZ PC PLASTIC	B 8
J103	102473-1	SPEAKON, 4 POLE PCB HORZ	M 8
J201	141639-1	CON, PHN F 4P 0.25" TH HOR	E 7
J202	138319-1	XLR, FEM HORZ PC PLASTIC	D 8
J203	102473-1	SPEAKON, 4 POLE PCB HORZ	N 8
J700B	141746-1	CON, FFC 50P ZIF LOC LTCH SM HOR	C 1
J901	141905-1	CON, HDR M 2P LOC TIN VRT	D 6
K101	C10335-5	RELAY 30A 24V T90 SEALED CE	J 6
K201	C10335-5	RELAY 30A 24V T90 SEALED CE	N 6
K901	C10335-5	RELAY 30A 24V T90 SEALED CE	P 1
L101	141635-1	IND, 10UH 30A 5% T157-2 TH	G 5
L102	133326-2	INDUCTOR, 1UH ADJUSTABLE	H 6
L201	141635-1	IND, 10UH 30A 5% T157-2 TH	I 4
L202	133326-2	INDUCTOR, 1UH ADJUSTABLE	K 6
L901	141736-1	IND, CM 1MH 30% TOR 14AWG TH	P 5
L902	141736-1	IND, CM 1MH 30% TOR 14AWG TH	P 3
L903	141644-1	INDUCTOR, 3.3MH 150MA T/H	L 5
L904	141734-1	IND, 2.7UH 6% TOR 18AWG T94-2	M 1
L905	140543-1	IND, 100UH 1A 10X12.7 SMD	C 6
P901	138320-1	IEC, ISA RA PC MNT	P 8
PWB1	141601-5	PWB, XLS2000/XLS2500 AMP/PS	A 1
Q101	C 7448-1	MMBT3904 CHIP NPN	D 1
Q102	C 7448-1	MMBT3904 CHIP NPN	C 3
Q103	142059-1	PRP, 141632-1 (FDP51N25) 0.3"	E 5
Q104	142059-1	PRP, 141632-1 (FDP51N25) 0.3"	F 4
Q105	125798-1	XSTR,MMBT3906 LT3 10K REEL	A 6
Q106	C 7448-1	MMBT3904 CHIP NPN	A 6
Q107	102483-1	PNP 300V 500MA SOT-23	E 4
Q108	125798-1	XSTR,MMBT3906 LT3 10K REEL	E 4
Q109	C 7448-1	MMBT3904 CHIP NPN	E 5
Q110	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 5
Q111	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 5
Q112	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 4
Q113	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	E 4
Q201	C 7448-1	MMBT3904 CHIP NPN	D 1
Q202	C 7448-1	MMBT3904 CHIP NPN	C 3

Q203	142059-1	PRP, 141632-1 (FDP51N25) 0.3"	G 2
Q204	142059-1	PRP, 141632-1 (FDP51N25) 0.3"	G 1
Q205	125798-1	XSTR,MMBT3906 LT3 10K REEL	B 6
Q206	C 7448-1	MMBT3904 CHIP NPN	B 6
Q207	102483-1	PNP 300V 500MA SOT-23	F 1
Q208	125798-1	XSTR,MMBT3906 LT3 10K REEL	F 1
Q209	C 7448-1	MMBT3904 CHIP NPN	F 2
Q210	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 2
Q211	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 2
Q212	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 2
Q213	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	G 1
Q901	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 2
Q902	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 2
Q903	142054-1	PRP, 137921-1 (2ON6OA4D) 0.3"	M 2
Q904	142034-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 3
Q905	142033-1	XTOR, NPN 20V 4A NSS20201LT1G SOT-23	M 3
Q906	142054-1	PRP, 137921-1 (2ON6OA4D) 0.3"	L 3
Q907	141640-1	XTOR, NPN 32V 2A FJD3076 TO-252	C 6
Q908	141641-1	XTOR, PFET 20V 1.5A FDN308P SOT23	B 6
Q909	C 7448-1	MMBT3904 CHIP NPN	B 6
Q910	C 7448-1	MMBT3904 CHIP NPN	M 3
Q911	125798-1	XSTR,MMBT3906 LT3 10K REEL	D 1
Q912	C 7448-1	MMBT3904 CHIP NPN	D 1
R3	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 1
R4		OPEN	E 2
R5		OPEN	E 1
R6	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	C 2
R7	A11368-47530	RES, 475K OHM 1% 1/16W 0603	E 1
R8	A11368-64910	RES, 6.49KOHM 0.063W 1% 0603	C 1
R9	A11368-47530	RES, 475K OHM 1% 1/16W 0603	E 1
R10	A11368-64910	RES, 6.49KOHM 0.063W 1% 0603	C 1
R11	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R12	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R13	A11368-30110	3.01KOHM 1/16W 1% 0603 T/R	C 2
R14	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 2
R15	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R16	A11368-47530	RES, 475K OHM 1% 1/16W 0603	A 3
R17	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	C 1
R18	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	C 1
R19	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	C 1
R20	A11368-47530	RES, 475K OHM 1% 1/16W 0603	D 3
R21	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	C 1
R22	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R23	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	C 2
R24		OPEN	C 2

R25		OPEN	D 1
R26	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 2
R27	A11368-33R20	RES, 33.2 OHM 1/16W 1% 0603	C 2
R100	A11371-1035	RES, 10KOHM 1W 5% 2512	H 6
R101	A11371-8205	82 OHM 1W 5% SMD 2512	B 7
R102	A11368-69800	RES, 698 OHM 1/16W 1% 0603	B 1
R103	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	B 1
R104	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	B 2
R105	A11368-69800	RES, 698 OHM 1/16W 1% 0603	A 1
R106	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	A 1
R107	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 1
R108	A11368-11321	RES, 11.3K 0.1W 1% 0805	B 2
R109	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	B 2
R110	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R111	A11368-33210	RES, 3.32 KOHM 1/16W 1% 0603	B 2
R112	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R113	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	C 2
R114	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R115	A11368-53610	RES, 5.36KOHM 0.063W 1% 0603	B 2
R116	A11368-90900	RES, 909 OHM 1% 1/16W 0603	B 2
R117	A11368-90900	RES, 909 OHM 1% 1/16W 0603	B 2
R118	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	B 3
R119	A11368-10000	RES, 100 OHM 1/16W 1% 0603	B 3
R120	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 3
R121		OPEN	B 3
R122	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 2
R123	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	B 2
R124	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	B 2
R125	A11368-20000	RES, 200 OHM 1/16W 1% 0603	B 2
R126	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R127	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R128	A11368-56200	RES, 562 OHM 1/16W 1% 0603	A 2
R129	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	A 2
R130	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	A 2
R131	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	A 2
R132	A11368-16221	RES, 16.2K 0.1W 1% 0805	A 2
R133	A11368-16221	RES, 16.2K 0.1W 1% 0805	A 3
R134	A11368-46410	RES, 4.64 KOHM 1/16W 1% 0603	A 2
R135	A11368-27411	2.74KOHM 0.1W 1% 0805 T/R	A 2
R136	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	A 2
R137	A11368-14701	RES, 147 OHM 0.1W 1% 0805	A 1
R138	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	A 2
R139	A11368-34823	RES, 34.8KOHM 0.25W 1% 1210	A 2
R140	A11368-10013	1K 0.25W 1% 1210 T/R	G 6



R141	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 6
R142	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 3
R143	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	G 4
R144	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R145	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	A 6
R146	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R147	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R148	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R149	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R150	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	D 5
R151		OPEN	C 3
R152	A11368-15025	RES, 15KOHM 1W 1% 2512	E 5
R153	A11368-51100	511 OHM 1/16W 1% 0603 T/R	E 4
R154	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	E 4
R155	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	E 4
R156		OPEN	E 4
R157	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	E 4
R158	A11368-16511	1.65 KOHM 1% 0805 RES T/R	E 5
R159	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	E 5
R160	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	E 5
R161	A11368-38325	RES, 38.3KOHM 1W 1% 2512	E 5
R162	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	D 4
R163	A11368-40225	RES, 40.2 KOHM 1W 1% 2512	E 5
R164	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	E 5
R165	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R166	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	B 2
R167	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	F 4
R168	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R169	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R170	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 6
R171	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 6
R172	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 5
R173	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	F 5
R190	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R191	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R192	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R193	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R194	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R195	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R196	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R197	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R198	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R199	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R200	A11371-1035	RES, 10KOHM 1W 5% 2512	J 5

R201	A11371-8205	82 OHM 1W 5% SMD 2512	D 7
R202	A11368-69800	RES, 698 OHM 1/16W 1% 0603	D 1
R203	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	D 1
R204	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 2
R205	A11368-69800	RES, 698 OHM 1/16W 1% 0603	D 1
R206	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	D 1
R207	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 1
R208	A11368-11321	RES, 11.3K 0.1W 1% 0805	C 2
R209	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	C 2
R210	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	C 2
R211	A11368-33210	RES, 3.32 KOHM 1/16W 1% 0603	C 2
R212	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 2
R213	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	C 2
R214	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 2
R215	A11368-53610	RES, 5.36KOHM 0.063W 1% 0603	C 2
R216	A11368-90900	RES, 909 OHM 1% 1/16W 0603	D 2
R217	A11368-90900	RES, 909 OHM 1% 1/16W 0603	D 2
R218	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	D 3
R219	A11368-10000	RES, 100 OHM 1/16W 1% 0603	D 3
R220	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 3
R221		OPEN	D 3
R222	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 2
R223	A11371-0R00	RES, 0 OHM 0603 50 MILOHM MAX	D 2
R224	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	D 2
R225	A11368-20000	RES, 200 OHM 1/16W 1% 0603	D 2
R226	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	D 2
R227	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	E 2
R228	A11368-56200	RES, 562 OHM 1/16W 1% 0603	D 2
R229	A11368-68110	RES, 6.81KOHM 0.0625W 1% 0603	D 2
R230	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	D 2
R231	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	D 2
R232	A11368-16221	RES, 16.2K 0.1W 1% 0805	D 2
R233	A11368-16221	RES, 16.2K 0.1W 1% 0805	D 3
R234	A11368-46410	RES, 4.64 KOHM 1/16W 1% 0603	D 2
R235	A11368-27411	2.74KOHM 0.1W 1% 0805 T/R	D 2
R236	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	D 2
R237	A11368-14701	RES, 147 OHM 0.1W 1% 0805	E 1
R238	A11368-17811	1.78K 0.1W 1% 0805 SMD T/R	E 2
R239	A11368-34823	RES, 34.8KOHM 0.25W 1% 1210	E 2
R240	A11368-10013	1K 0.25W 1% 1210 T/R	H 5
R241	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	A 6
R242	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R243	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	H 1
R244	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R245	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 6

R246	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	D 1
R247	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	C 3
R248	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R249	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R250	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	F 2
R251		OPEN	C 3
R252	A11368-15025	RES, 15KOHM 1W 1% 2512	F 2
R253	A11368-51100	511 OHM 1/16W 1% 0603 T/R	F 2
R254	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	G 2
R255	A11368-88710	RES, 8.87KOHM 0.063W 1% 0603	G 1
R256		OPEN	F 2
R257	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	F 2
R258	A11368-16511	1.65 KOHM 1% 0805 RES T/R	G 2
R259	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	G 2
R260	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	G 2
R261	A11368-38325	RES, 38.3KOHM 1W 1% 2512	F 3
R262	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	F 1
R263	A11368-40225	RES, 40.2 KOHM 1W 1% 2512	G 2
R264	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	G 2
R265	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R266	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	D 2
R267	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	G 1
R268	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	B 2
R269	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 2
R270	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	G 3
R271	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	G 3
R272	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	G 2
R273	A11371-R914	RES, 0.91 OHM 5% 1/2W 2010	H 2
R290	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R291	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R292	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R293	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R294	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R295	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R296	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R297	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R298	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R299	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R300	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	I 3
R301	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	F 6
R302	A11368-10R00	RES, 10 OHM 1/16W 1% 0603	G 4
R303	A11368-	RES, 49.9 OHM 1% 1/16W 0603	E 5

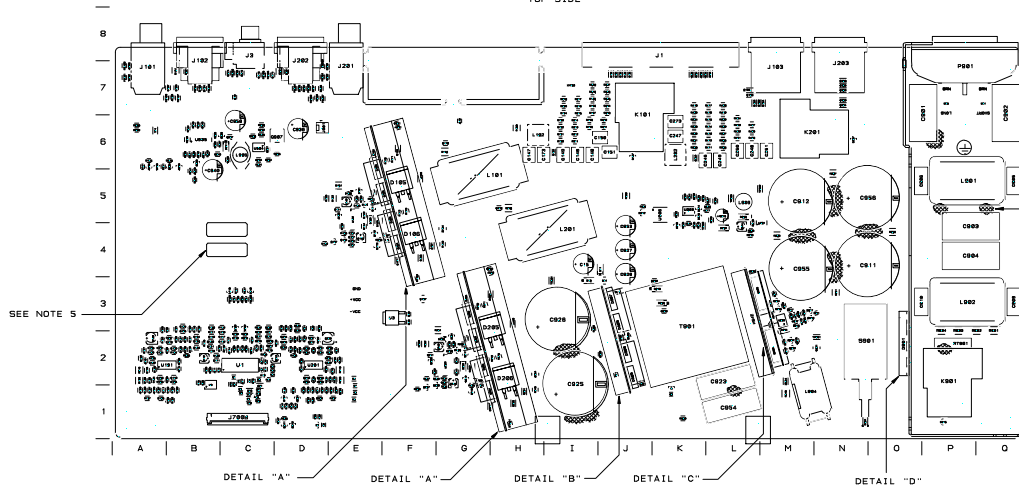
	49R90		
R304	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	E 5
R305	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	E 4
R306	A11368-10230	RES, 102KOHM 0.063W 1% 0603	B 2
R307	A11368-32420	RES, 32.4 KOHM 1% 1/16W 0603	A 2
R308	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	E 4
R309	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R310	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R311	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R312	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R313	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R314	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 6
R315	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R316	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R317	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R318	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R319	A11368-34823	RES, 34.8KOHM 0.25W 1% 1210	A 2
R320	A11368-22104	RES, 221 OHM 0.5W 1% 2010	I 7
R321	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 6
R322	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 6
R323	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 7
R324	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 7
R325	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 7
R326	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 7
R327	A11368-22104	RES, 221 OHM 0.5W 1% 2010	J 7
R403	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	G 2
R404	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	G 2
R405	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	G 1
R406	A11368-10230	RES, 102KOHM 0.063W 1% 0603	D 2
R407	A11368-32420	RES, 32.4 KOHM 1% 1/16W 0603	D 2
R408	A11368-3R011	RES, 3.01 OHM .1W 1% 0805	G 2
R409	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 7
R410	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 7
R411	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R412	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R413	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R414	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R415	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 6
R416	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 7
R417	A11368-22104	RES, 221 OHM 0.5W 1% 2010	K 7
R418	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 7
R419	A11368-34823	RES, 34.8KOHM 0.25W 1% 1210	E 2
R420	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 7

R421	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R422	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R423	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R424	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R425	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R426	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R427	A11368-22104	RES, 221 OHM 0.5W 1% 2010	L 6
R901	A11368-49923	49.9KOHM .25W 1% CHIP 1210	Q 3
R902	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 3
R903	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 3
R904	A11368-49923	49.9KOHM .25W 1% CHIP 1210	P 3
R905	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	D 1
R906		OPEN	M 4
R907		OPEN	N 5
R908	A11368-20010	RES, 2.0 KOHM 1/16W 1% 0603	L 4
R909	A11368-15421	15.4K 1/10W 1% SMD 0805 T/R	L 4
R910	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	M 3
R911	A11368-49920	RES, 49.9 KOHM 1/16W 1% 0603	M 3
R912	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	M 2
R913	A11368-10R01	10 OHM .1W 1% 0805 T/R ROHS	M 2
R914	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	M 3
R915	A11368-10R01	10 OHM .1W 1% 0805 T/R ROHS	M 3
R916	A11368-10003	100 OHM 0.25W 1% 1210 T/R	M 1
R917	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	K 5
R918	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	K 4
R919	A11368-20020	RES, 20.0 KOHM 1/16W 1% 0603	K 4
R920	A11368-51100	511 OHM 1/16W 1% 0603 T/R	M 3
R921	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	M 3
R922	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	K 5
R923	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	J 5
R924	A11368-68130	RES, 681K OHM 1% 1/16W 0603	K 5
R925	A11368-20031	200K 0.1W 1% SMD CHIP 0805	K 5
R926	A11368-30120	RES, 30.1 KOHM 1/16W 1% 0603	K 5
R927	A11368-12131	121KOHM, 0.10W 1% CHIP 0805	K 5
R928	A11368-20031	200K 0.1W 1% SMD CHIP 0805	L 5
R929	A11368-20031	200K 0.1W 1% SMD CHIP 0805	L 5
R930	A11368-40201	402 OHM 1% 0805 RES T/R	K 1
R931	A11368-20031	200K 0.1W 1% SMD CHIP 0805	C 6
R932	A11368-49921	49.9KOHM .1W 1% CHIP 0805	C 6
R933	A11368-20031	200K 0.1W 1% SMD CHIP 0805	C 6
R934	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	C 6
R935	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	C 6
R936	A11368-40201	402 OHM 1% 0805 RES T/R	B 6
R937	A11368-40201	402 OHM 1% 0805 RES T/R	B 6
R938	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 6

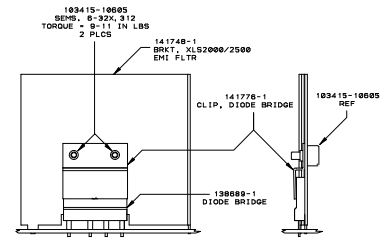
R939	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 6
R940	A11368-49921	49.9KOHM .1W 1% CHIP 0805	B 6
R941	A11368-49910	RES, 4.99 KOHM 1/16W 1% 0603	B 5
R942	A11368-60410	RES, 6.04 KOHM 1/16W 1% 0603	B 6
R943	A11368-49921	49.9KOHM .1W 1% CHIP 0805	B 6
R944	A11368-10030	RES, 100.0 KOHM 1/16W 1% 0603	B 6
R945	A11368-49R90	RES, 49.9 OHM 1% 1/16W 0603	B 5
R946	A11368-10020	RES, 10.0 KOHM 1/16W 1% 0603	K 4
R947	A11368-24910	RES, 2.49 KOHM 1/16W 1% 0603	D 1
R948	A11368-75R00	RES, 75 OHM 1/16W 1% 0603	M 3
R949	A11368-40230	RES, 402KOHM 0.0625W 1% 0603	K 4
R950	A11368-10010	RES, 1.0 KOHM 1/16W 1% 0603	M 3
R951		OPEN	N 3
R952		OPEN	O 4
R998		OPEN	A 6
R999	A11368-49900	RES, 499 OHM 1/16W 1% 0603	A 6
RT1	140098-1	THERMISTOR, 10K NTC 1% 0603	J 2
RT101	140098-1	THERMISTOR, 10K NTC 1% 0603	F 3
RT201	140098-1	THERMISTOR, 10K NTC 1% 0603	H 1
RT901	138466-1	PRP, 101103-1 PTC .125	P 2
S901	132498-1	SWITCH, DPST PUSHBUTTON VDECSA	N 2
T901	141666-1	XFMR, MAIN XLS2500 120V/240V	K 3
TP1		OPEN	A 6
TP901		OPEN	M 2
TP902		OPEN	L 5
TP903		OPEN	K 4
TP904		OPEN	I 3
TP905		OPEN	L 5
U1	140419-1	IC, RUBY SOP64 SMD	C 2
U2	C 8262-5	IC, OPAMP DUAL LONOIS 33078 SO8	B 2
U3	141744-1	IC, REG 12V 500MA 78M12C TO-263	F 3
U101	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	A 2
U102	141643-1	IC, DRV PWM IRS20957S	E 5
U201	C 9012-3	OP AMP, QUAD LO NOISE MC33079D	D 2
U202	141643-1	IC, DRV PWM IRS20957S	G 2
U901	141369-1	IC, REG ADJ LNK302DN SO8	L 5
U902	141572-1	IC, DRV SMPS FAN7387 SO8	M 3
U903	126559-1	COMPARATOR, LM393 SO-8 DUAL	K 5
U904	133552-1	OP AMP, LM358 LOW PWR DUAL S08	C 6
U905	138341-1	IC, TL494 PWM CTRL SO-16	B 6
U906	141638-1	IC, OPTOCOUPLER	K 5
WP1	141672-1	CBL, 16AWG BRN 2.1" STRP FLG	Q 7
WP2	141671-1	CBL, 16AWG BRN 2.6" STRP FLG	P 7
Z901	134606-2	JUMP, 14AWG CU TIN BUS .210" X.225"	N 2

# COMPONENT MAP: XLS2000/2500 MAIN PWA

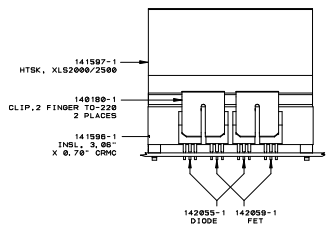
COMPONENT MAP  
TOP SIDE



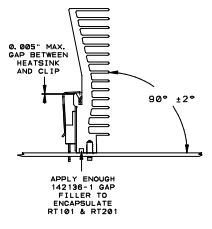
ADD HOT MELT GLUE TO LOCATIONS SHOWN (11 PLACES)



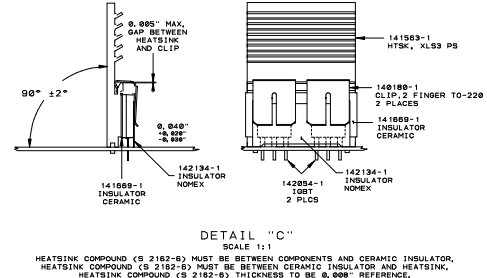
DETAIL "D"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN BRIDGE DIODE AND THE SHIELD / HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



DETAIL "A"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.

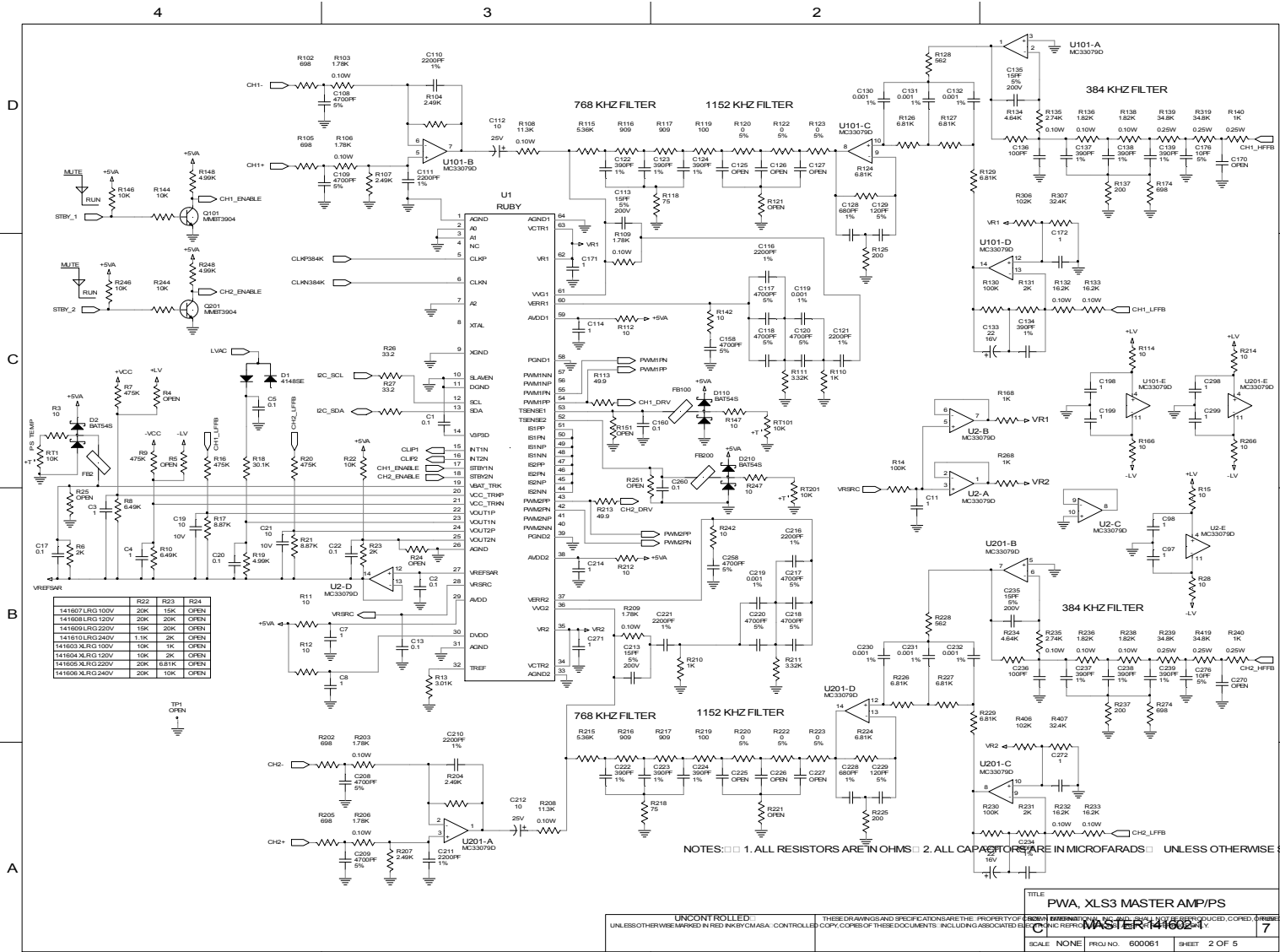


DETAIL "B"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.



DETAIL "C"  
SCALE 1:1  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN COMPONENTS AND CERAMIC INSULATOR.  
HEATSINK COMPOUND (S 2162-B) MUST BE BETWEEN CERAMIC INSULATOR AND HEATSINK.  
HEATSINK COMPOUND (S 2162-B) THICKNESS TO BE 0.008" REFERENCE.

MASTER  
PWA, XLS2000/XLS2500 AMP/PS



4

3

2

4

3

2

1

D

D

C

C

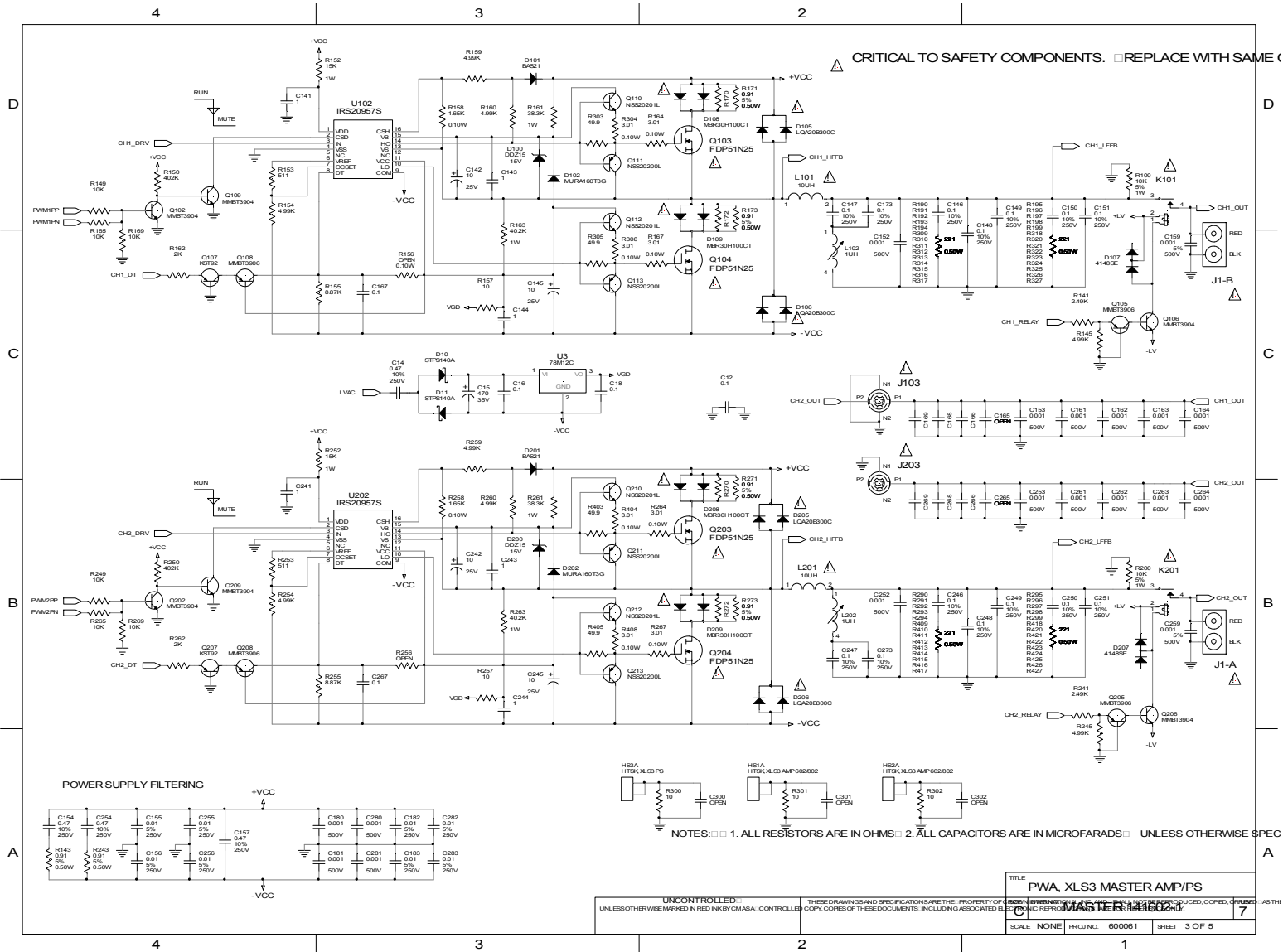
B

B

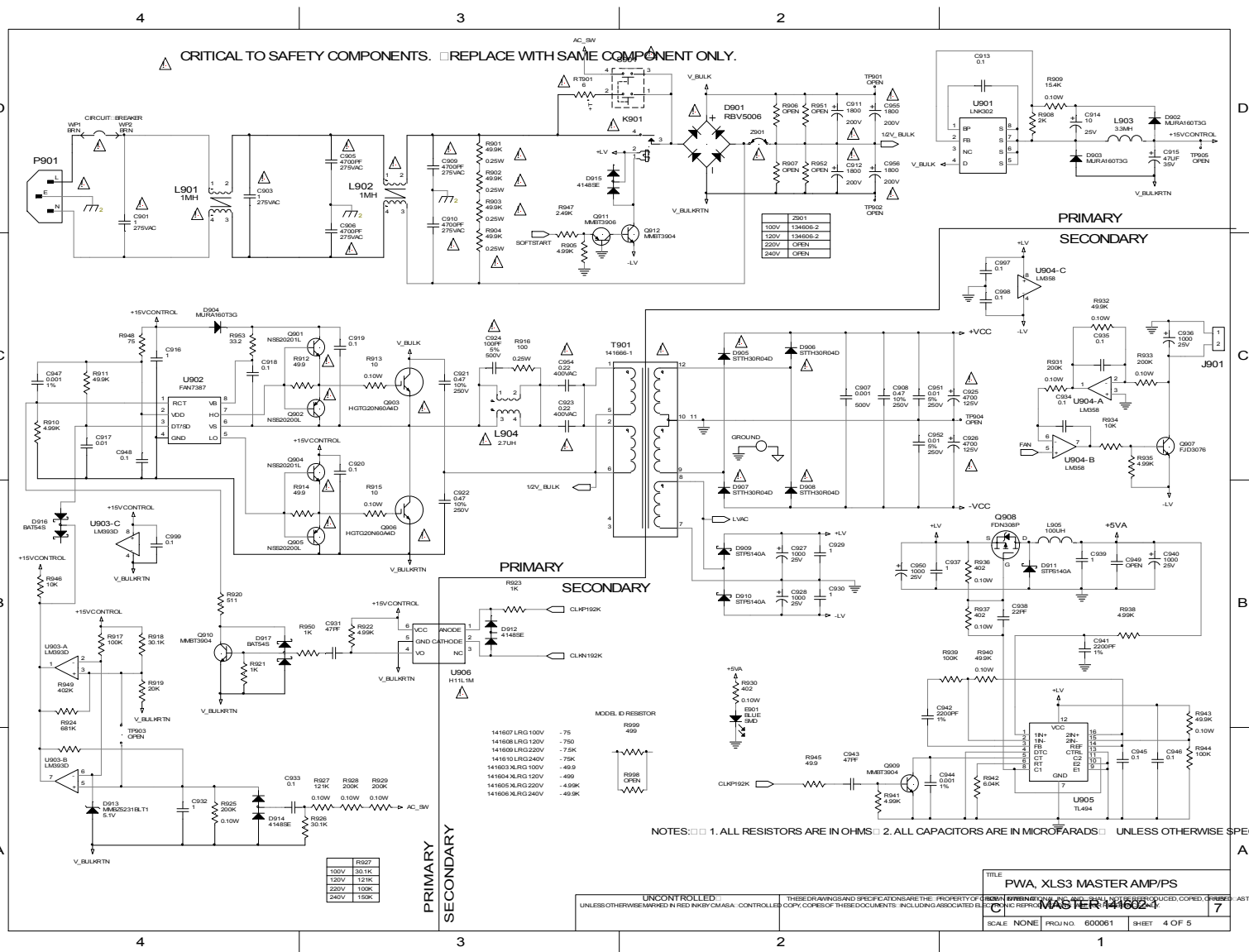
A

A





NOTES: □ 1. ALL RESISTORS ARE IN OHMS □ 2. ALL CAPACITORS ARE IN MICROFARADS □ UNLESS OTHERWISE SPEC



CRITICAL TO SAFETY COMPONENTS. □ REPLACE WITH SAME COMPONENT ONLY.

120V	134606-2
120V	134606-2
220V	OPEN
240V	OPEN

141607	LRG 100V	-75
141608	LRG 120V	-750
141609	LRG 220V	-7.5K
141610	LRG 240V	-7.5K
141603	XLRG 100V	-49.0
141604	XLRG 120V	-490
141605	XLRG 220V	-49.9K
141606	XLRG 240V	-49.9K

R927	100V	30.1K
	120V	121K
	220V	100K
	240V	150K

NOTES: □ 1. ALL RESISTORS ARE IN OHMS □ 2. ALL CAPACITORS ARE IN MICROFARADS □ UNLESS OTHERWISE SPEC

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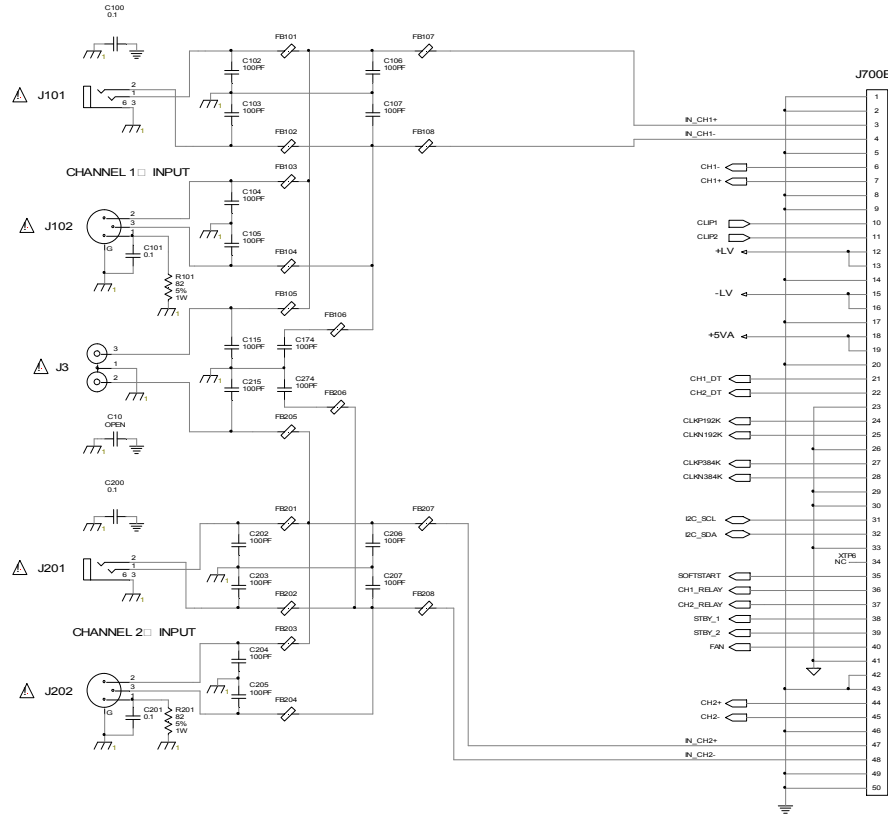
TITLE: PWA, XLS3 MASTER AMP/PS  
 PWA-141602-1  
 SCALE: NONE  
 PROJ. NO.: 600061  
 SHEET: 4 OF 5

4

3

2

CRITICAL TO SAFETY COMPONENTS. □ REPLACE WITH SAME COMPONENT ONLY.



NOTES: □ 1. ALL RESISTORS ARE IN OHMS □ 2. ALL CAPACITORS ARE IN MICROFARADS □ UNLESS OTHERWISE SPECI

TITLE		PWA, XLS3 MASTER AMP/PS	
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SCALE	PROJ. NO.	SHEET	7
NONE	600061	5 OF 5	

4

3

2

1

## **APPENDIX A: VIC's Report of XLS-3** by Victor Marquis

NEW XLS series Overview

Page 1 of 6

Introduction to the new XLS family of amplifiers.

Consisting of the XLS1000 XLS1500 XLS2000 XLS2500

Very efficient very powerful and very lightweight. Good specs and easy to use.

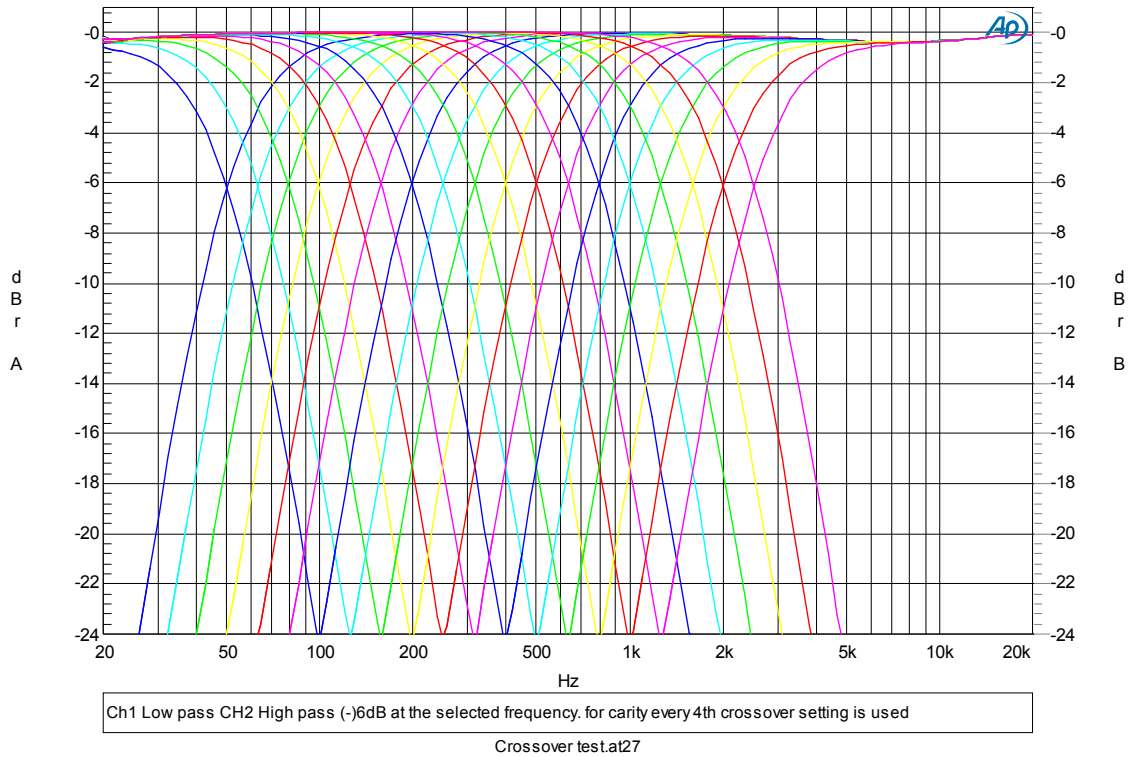


XLS2500 this is a state of the art amplifier with Efficiency and weight as its major advantages. The input stage has simple easy to manipulate crossovers that can be setup as ch1 low pass and ch2 high pass or both channels low-pass and or both channels high-pass. The 6dB down crossover points are selectable from 50hz to 3Khz in very fine steps 72 steps to be exact Below is a chart where I only plotted every 4<sup>th</sup> possible crossover point for clarity

Audio Precision

XLS2500 Cross over points skipping 3 for clarity

01/13/10 07:57:21



The available crossover frequencies are the following **Red were shown on the above plot.**  
**50** 53 56 59 **63** 66 70 74 **79** 83 88 94 **99** 105 111 118 **125** 132 140 149hz  
**157** 167 177 187 **198** 210 223 236 **250** 265 281 297 **315** 334 354 375 **397**hz  
 420 445 472 **500** 530 561 595 **630** 667 707 749 **794** 841 891 944hz  
 values in Khz **1.0** 1.06 1.12 1.19 **1.26** 1.33 1.41 1.50 **1.59** 1.68 1.78 1.89 **2.00**Khz  
 2.12 2.24 2.38 **2.52** 2.67 2.83 3Khz

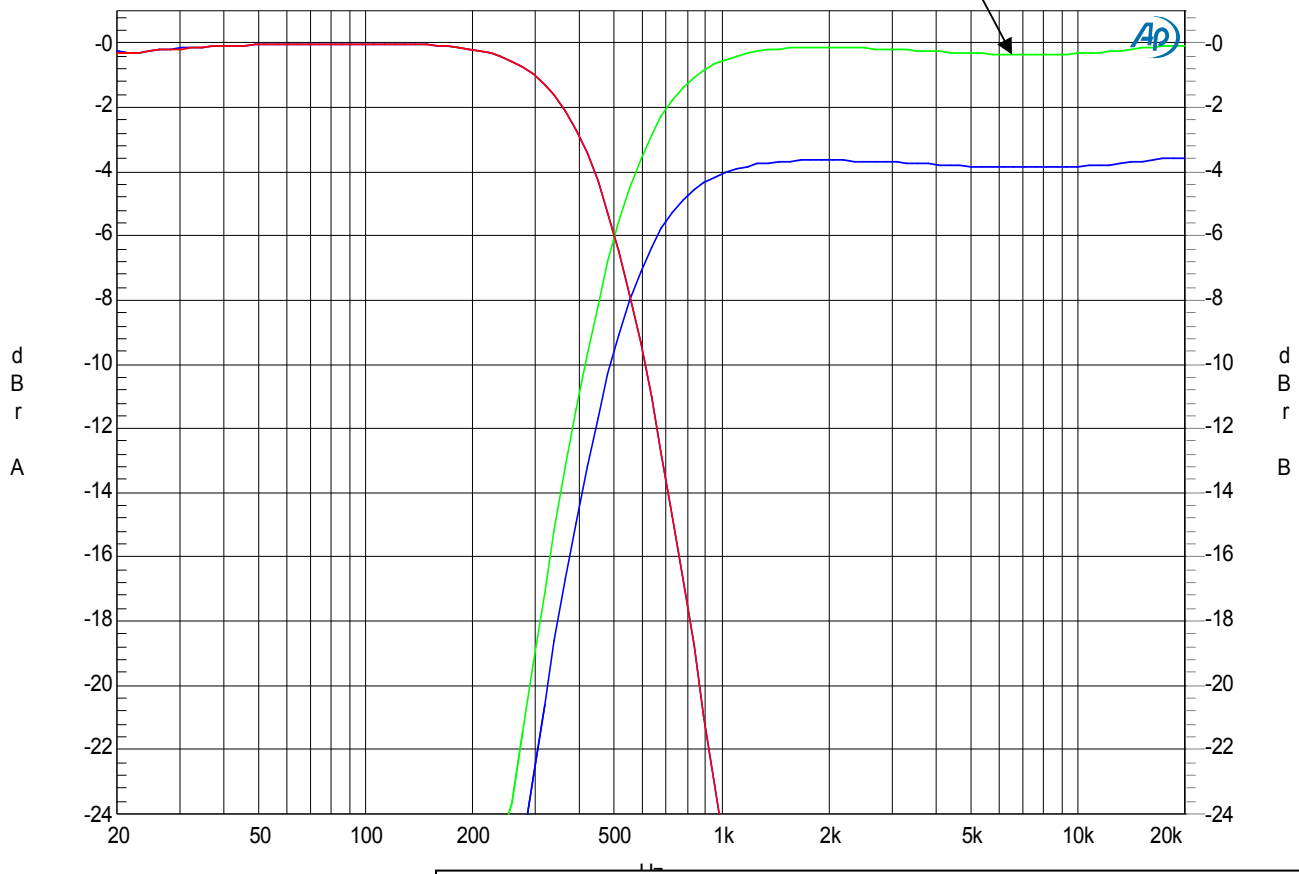
Additionally you can turn down the high pass channel by adjusting the input Potentiometer and then you can drive the Low frequencies higher and not overwhelm the mid's and highs. So you can have full power delivered to the woofers and 4- 6 to 12dB less delivered to the mid's and highs. This is fully adjustable by varying the ch2 level control.

Here I turned ch2 Pot down a couple of clicks for -4db

Audio Precision

XLS2500 Cross over points skipping 3 for clarity

01/13/10 10:05:25

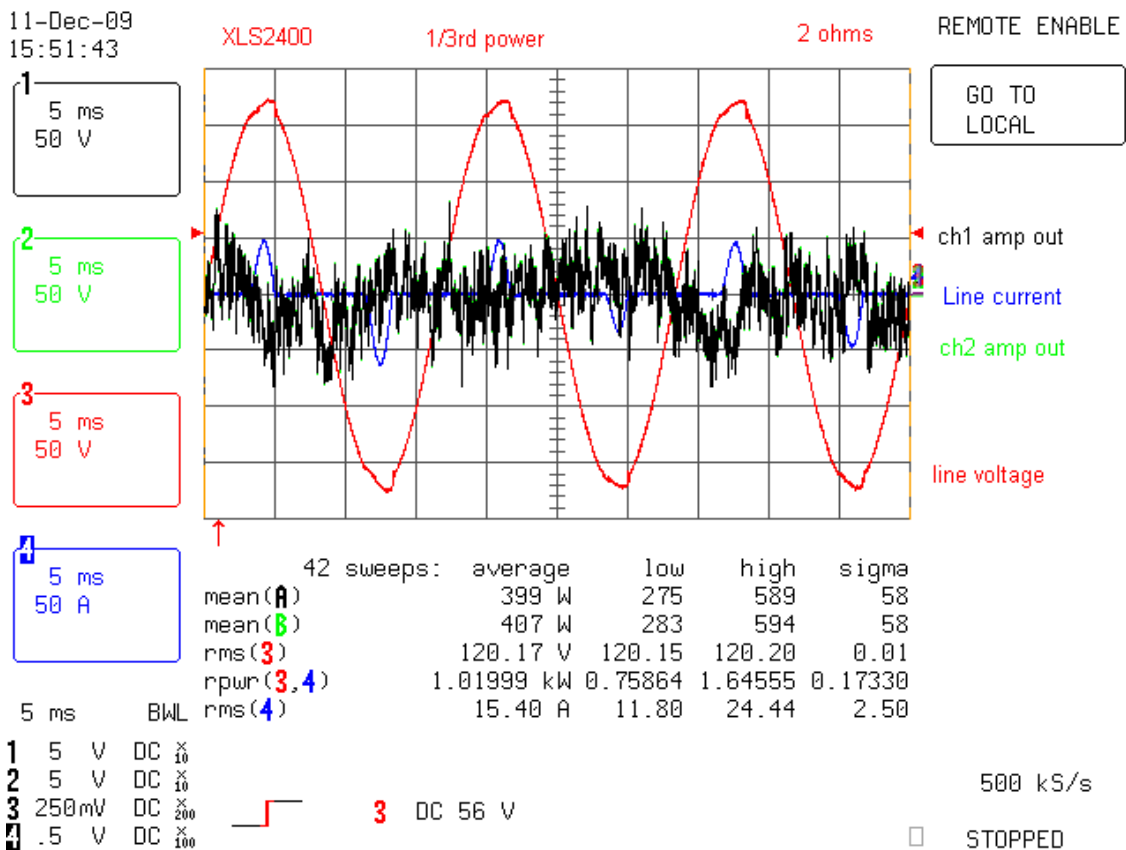


Ch1 Low pass CH2 High pass (-)6dB

Crossover set at 500hz and ch2 pot adjusted down a little

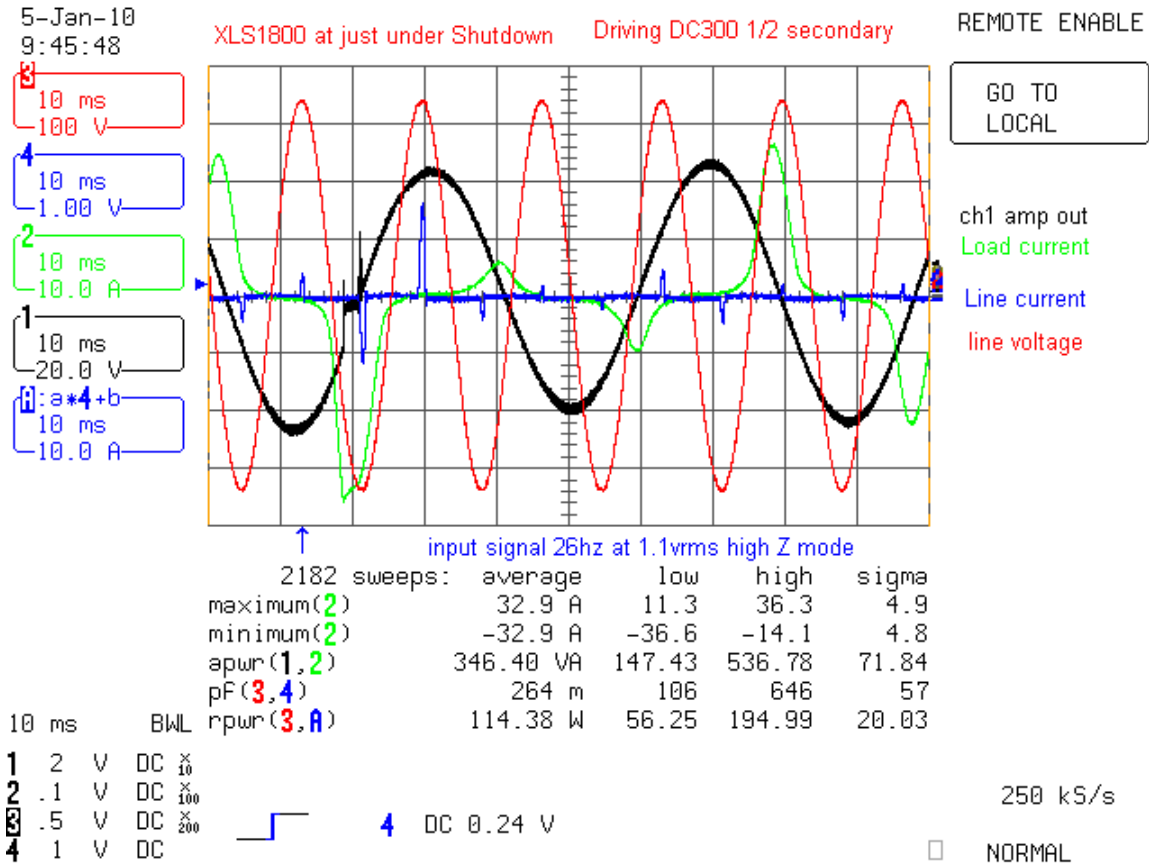
Crossover test.at27

The amplifiers efficiency is the highest efficiency I have ever tested. Especially at 2 ohms where efficiencies can hover between 25% for conventional Class AB output stage to 35% to 45% with a tracking supply depending on the topology of the tracking supply. BCA amps average 60% at 1/3<sup>rd</sup> power 2 ohms. SO this is one step in efficiency above that. At almost 80% efficient this about 90% power supply and 90% amplifier. At idle the amplifier only consumes 35Watts. While the output stage active. Sleep mode is not necessary in this case. This represents audio signals with signals heavily clipped. Most music signals only approach or exceed these levels briefly.



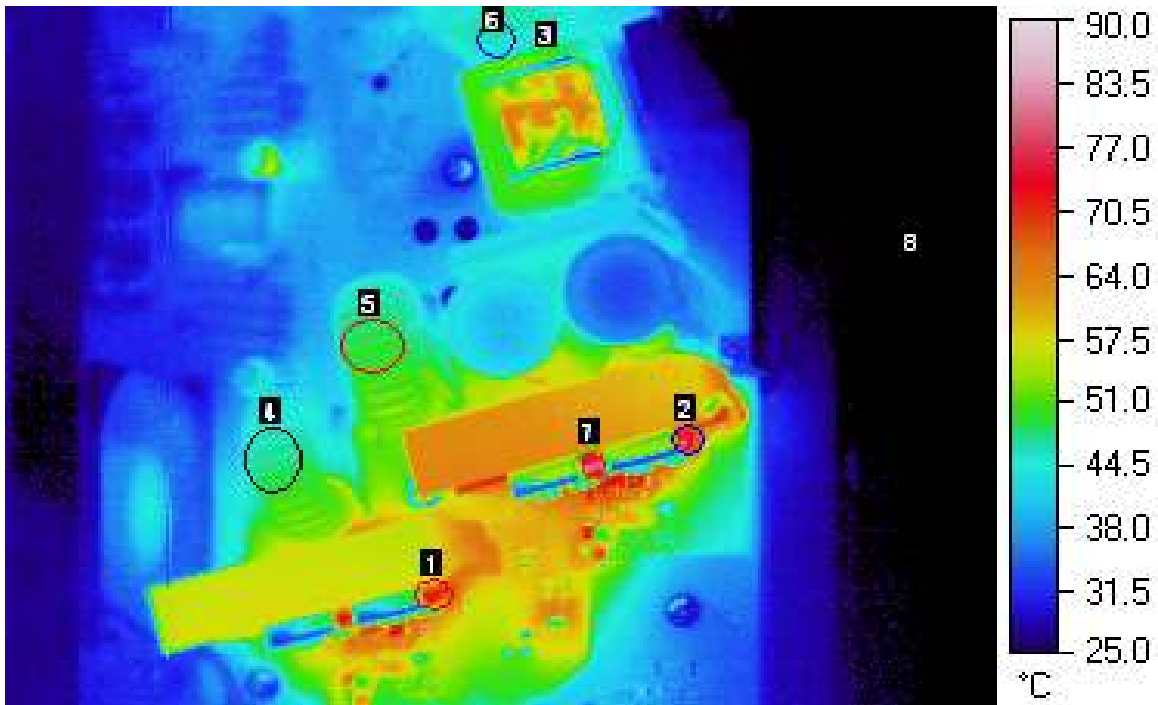
	CH1	CH2	total	efficiency	power	power out	806.00
volts out	28.25	28.53	power out	Pout/Pin	dissipated	line current	15.40
power out	399.00	407.00	806.00			Watts/ Amp	52.34
	power in = 1019.99			79.02%	213.99		

The amplifiers output stage can recycle reactive load energies that are normally wasted as heat in the amplifiers output stage. You can see the Reactive power out is 346W or VA and the power consumed by the amp is only 114W. That is because the amplifier is recycling the power. You wouldn't dare run a Linear Class AB amplifier into this load. Peak load currents are occurring at amp out Voltages near zero. The dissipations would be very high. Here I am driving very low frequencies into a large 60hz transformer and since I am less than 30hz the transformer is starting to saturate. As denoted by very large currents when amp out is at 0V. For most amps this is a very brutal if not damaging test. This plot was from an XLS1800 running at just under Extreme current protection shutdown. That briefly shuts amp down and then restarts and continues to run if conditions have improved. This ran like this overnight without shutting down.





This was running music at max power into 2 ohms both channels driven for 1 hr continuous. All temperatures were well in control and stabilized. The thermals are very good considering the extreme levels used during this test. Most customers will never run this much power for this sustained time. Additionally the voice coils would have heated up and become like 4-ohm resistors.



Here are the max temperatures inside any of the drawn circles.

	Min. °C	Max. °C	Avg. °C	Range °C
Circle 1	36.7	74.7	62.6	38.0
Circle 2	35.6	80.0	66.3	44.4
Circle 3	31.1	65.1	52.4	34.0
Circle 4	42.6	50.9	46.9	8.3
Circle 5	45.6	50.9	48.6	5.3
Circle 6	44.0	49.6	45.8	5.6
Circle 7	33.7	81.6	64.2	47.9
Circle 8	22.0	24.7	23.5	2.7

## **APPENDIX B: XLS-3 LCD TROUBLESHOOTING:**

Affects: 141673-x PWA, XLS DISPLAY 1000  
141558-x PWA, XLS DISPLAY 1500/2000/2500

New functionality has been added to firmware version 1.1.2.2 that allows for more simplified troubleshooting of issues relating to the LCD. If troubleshooting an LCD on an audio processing module (APM) with older firmware, it is suggested to update the firmware to at least 1.1.2.2 before continuing. Please refer to the service manual for instructions on updating firmware.

At bootup, the updated firmware initializes the LCD. Then the microcontroller writes to the registers in the LCD module and attempts to read them back. If there are no issues, the amp will continue booting. Otherwise, there are two possible error codes relating to the LCD that are:

<b>MAJOR</b>	<b>MINOR</b>	<b>ERROR</b>	<b>COMMENT</b>
<b>1</b>	<b>1</b>	LCD POST Fail	Initialization of LCD failed
<b>1</b>	<b>2</b>	LCD Communications Fail	MCU unable to communicate with LCD. Can occur anytime as opposed to POST

These error codes are unique and based upon a Major and Minor element. The Major element is determined by which portion of the amplifier failed POST, while the Minor portion is which part of the Major element failed. They are displayed by CH1 Thermal LED = MAJOR, CH2 Thermal LED = MINOR. The MAJOR is blinked 1st, then the MINOR. Other symptoms may be observed like a row of solid squares in the LCD.

This procedure was developed in order that the board could be troubleshot with an oscilloscope and one probe. It will be necessary to probe the signals on the LCD header. If a test fixture is available to power the APM outside of the amplifier, this is probably recommended for ease of probing the different pins on the header. However, it can be troubleshot inside the amplifier. Below is a figure to help identify pin one of the LCD header in either case.

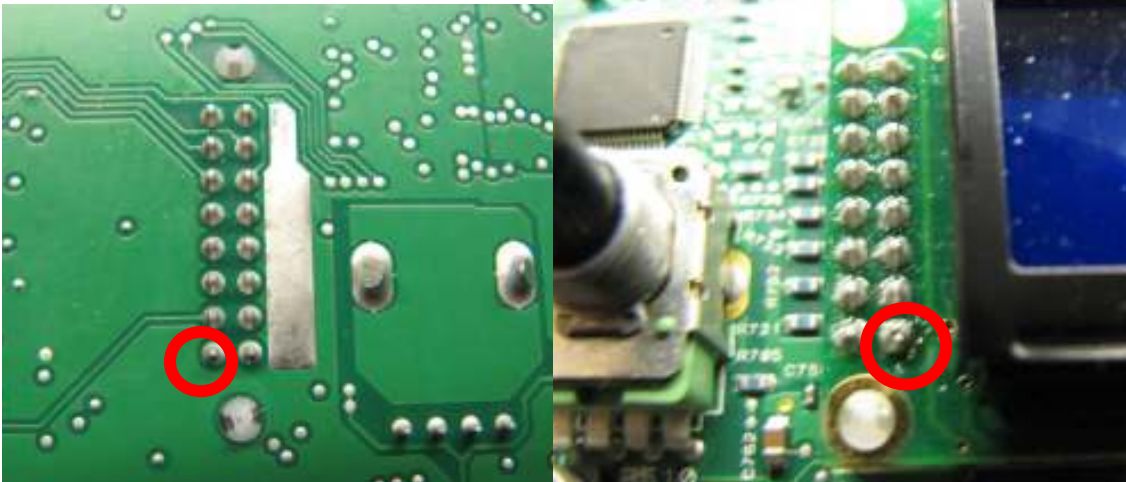


Figure 1: Pin 1 of LCD header

A portion of the schematic is included in Figure 2, below, from the 141673-4 schematic and is not expected to deviate significantly in the future. There is also a list of signals in Table 1, below.

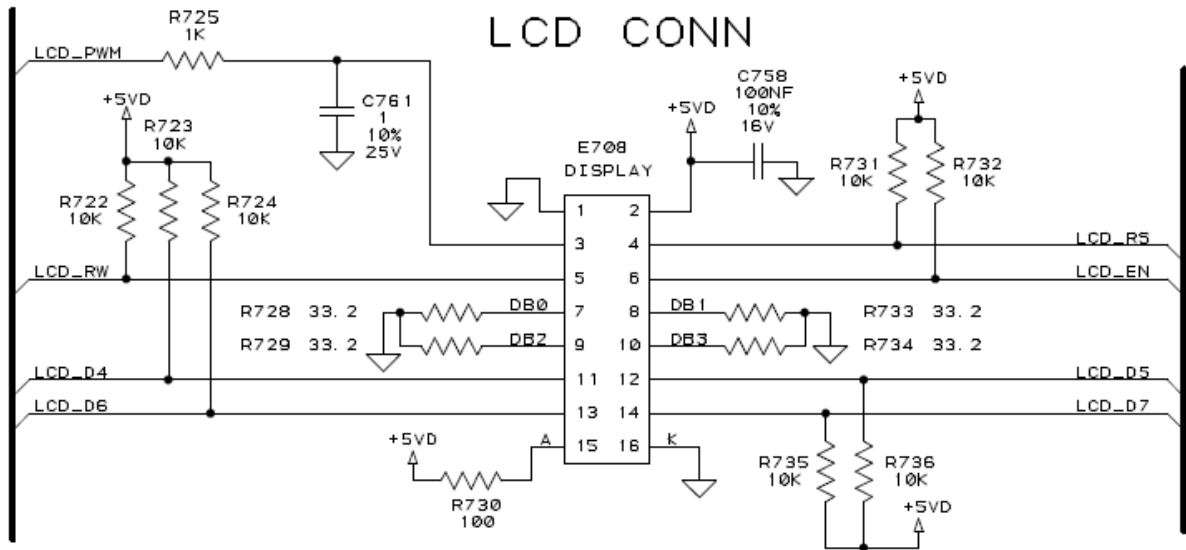


Figure 2: LCD portion of APM schematic

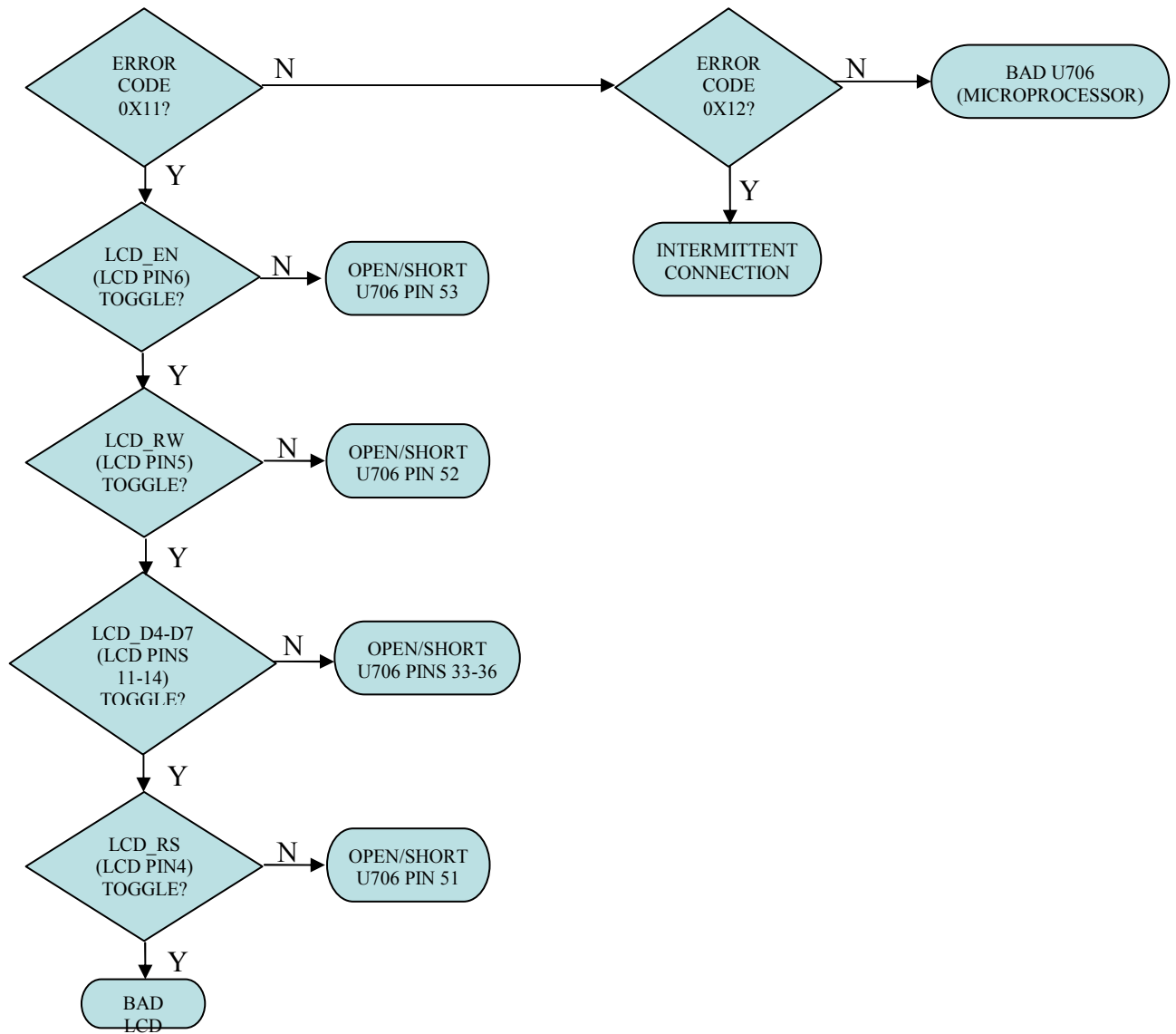
Pin	Signal/Function
1	DGND
2	+5VD (SUPPLY V FOR LOGIC)
3	\$2397; LCD_PWM THRU 1K (OPERATING V FOR LCD)
4	LCD_RS
5	LCD_RW
6	LCD_EN
7	\$1837; DB0; TIED LOW TO DGND
8	\$1836; DB1; TIED LOW TO DGND

9	\$1839; DB2; TIED LOW TO DGND
10	\$1838; DB3; TIED LOW TO DGND
11	LCD_D4
12	LCD_D5
13	LCD_D6
14	LCD_D7
15	\$1830; LCD BACKLIGHT ANODE (A) TO +5VD THRU 100 OHMS
16	LCD BACKLIGHT CATHODE (K) TO DGND

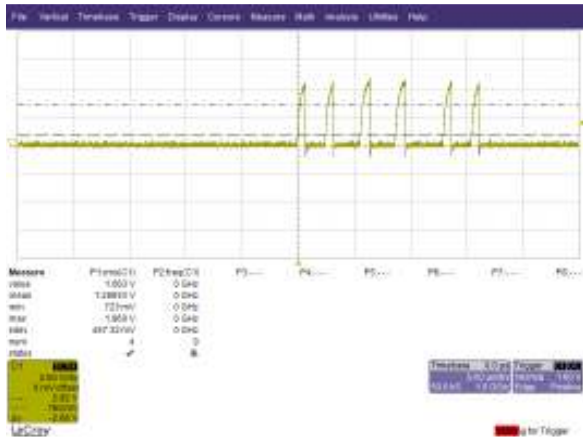
**Table 1: LCD header signals**

The flowchart in Figure 3, below, walks through troubleshooting LCD issues beginning with the error code explained above. If identified as error code 0x11, the pins on the LCD need to be looked at with the scope according to the order in the flowchart. A scope set with 2 V/div and 5  $\mu$ sec/div should be able to capture the toggling on the lines identified in the flowchart.

As a reference, examples of the scope displaying toggling bits on different lines can be seen in Figures 4-6, below. The unit in the example displayed toggling on the LCD\_EN, LCD\_RW, and data lines but NOT on the LCD\_RS line, therefore it was concluded and verified that something was wrong with the LCD\_RS line. In this particular case, the microcontroller (U706) pin 51 was not soldered.



**Figure 3: Flowchart for troubleshooting LCD issues**



**Figure 4: Toggling on LCD\_EN**

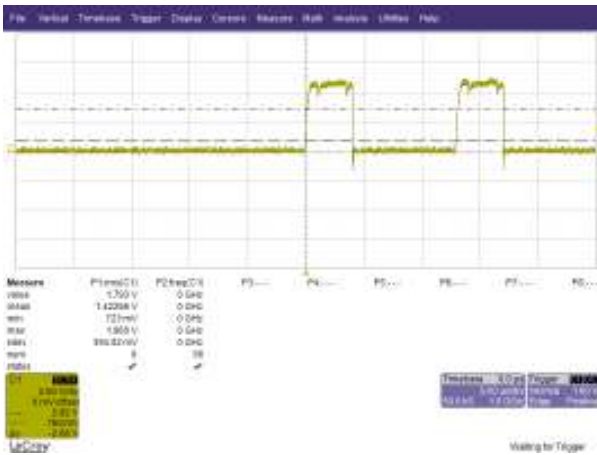


Figure 5: Toggling on LCD\_RW

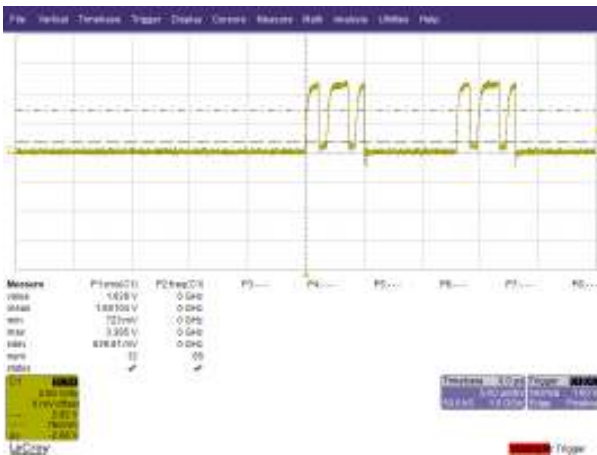


Figure 6: Toggling on data line

After determining the issue to be with a pin on the microcontroller U706, care must be taken to remove the LCD and identify the issue. Most likely there will be an unsoldered pin or shorted pins on the micro. There is a smaller chance there could be a broken path between the pins on the micro and the LCD header. The layout of the U706 is shown in Figure 7, below. A portion of the schematic around U706 is also provided for reference in Figure 8, below. U706 is a 64 pin LQFP.

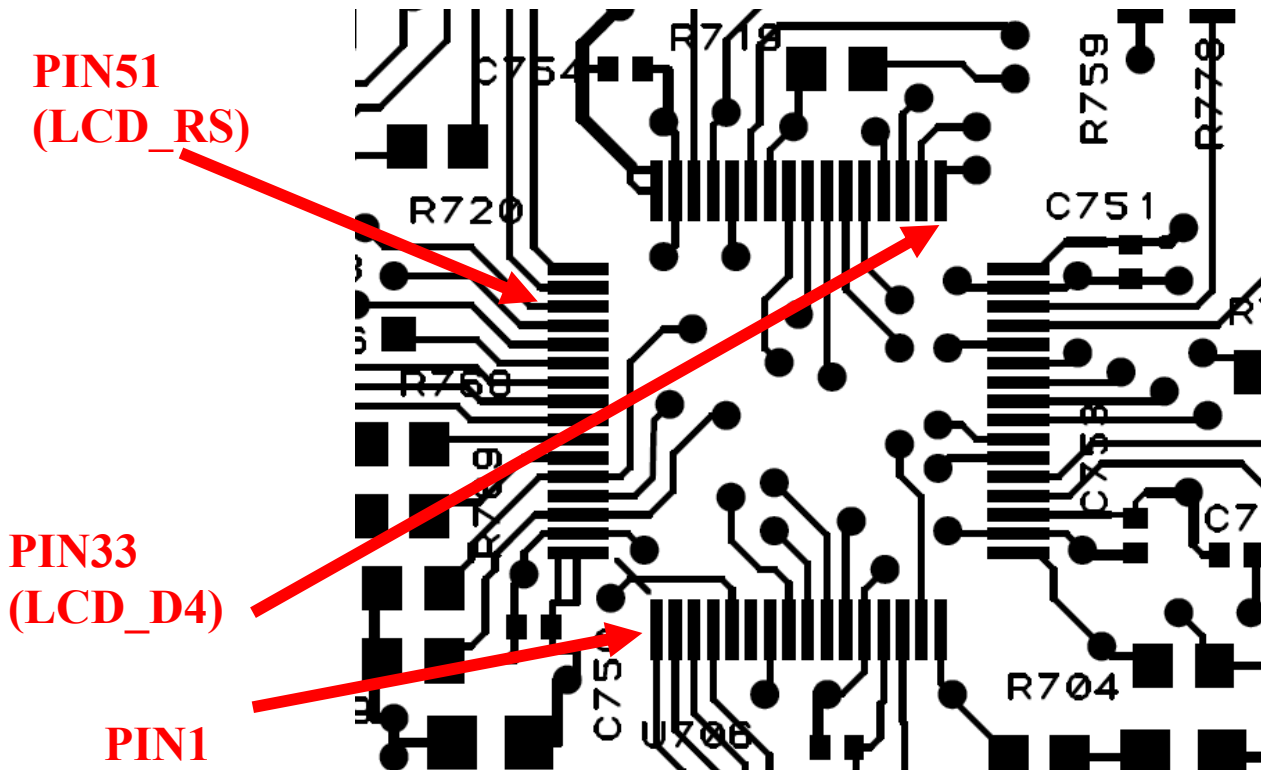
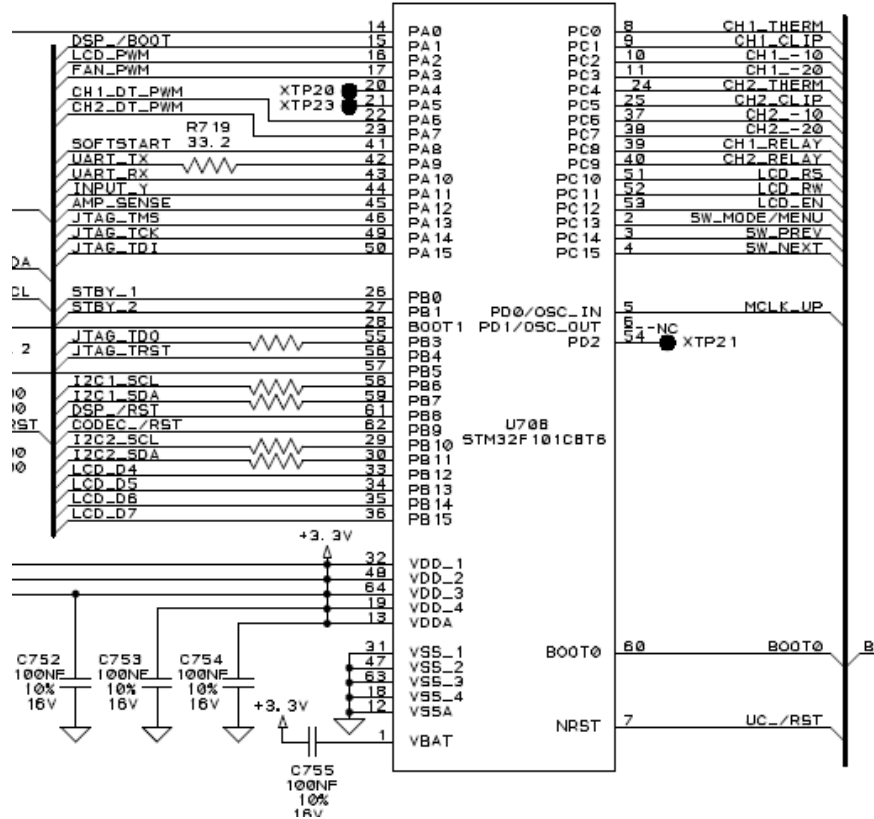


Figure 7: Microcontroller (U706, 64 pin LQFP) layout



U706 LCD PINS	
33	LCD_D4
34	LCD_D5
35	LCD_D6
36	LCD_D7
51	LCD_RS
52	LCD_RW
53	LCD_EN

Figure 8: U706 portion of schematic

## **APPENDIX C: XLS-3 PWA/PWB REFERENCE:**

### **ASSEMBLIES:**

<b><u>Model</u></b>	<b><u>New Description</u></b>
<b>XXLS1000-0-US</b>	XLS 1000W AMP W/ XOVER & LIMTR 120V
<b>XXLS1000-2-EU</b>	XLS 1000W AMP W/ XOVER & LIMTR 220V
<b>XXLS1000-2-US</b>	XLS 1000W AMP W/ XOVER & LIMTR 220V
<b>XXLS1000-34-EU</b>	XLS 1000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1000-34-UK</b>	XLS 1000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1000-34-IN</b>	XLS 1000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1000-34-AU</b>	XLS 1000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1500-0-US</b>	XLS 1500W AMP W/ XOVER & LIMTR 120V
<b>XXLS1500-2-EU</b>	XLS 1500W AMP W/ XOVER & LIMTR 220V
<b>XXLS1500-2-US</b>	XLS 1500W AMP W/ XOVER & LIMTR 220V
<b>XXLS1500-34-EU</b>	XLS 1500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1500-34-UK</b>	XLS 1500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1500-34-IN</b>	XLS 1500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS1500-34-AU</b>	XLS 1500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2000-0-US</b>	XLS 2000W AMP W/ XOVER & LIMTR 120V
<b>XXLS2000-2-EU</b>	XLS 2000W AMP W/ XOVER & LIMTR 220V
<b>XXLS2000-2-US</b>	XLS 2000W AMP W/ XOVER & LIMTR 220V
<b>XXLS2000-34-EU</b>	XLS 2000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2000-34-UK</b>	XLS 2000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2000-34-IN</b>	XLS 2000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2000-34-AU</b>	XLS 2000W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2500-0-US</b>	XLS 2500W AMP W/ XOVER & LIMTR 120V
<b>XXLS2500-2-EU</b>	XLS 2500W AMP W/ XOVER & LIMTR 220V
<b>XXLS2500-2-US</b>	XLS 2500W AMP W/ XOVER & LIMTR 220V
<b>XXLS2500-34-EU</b>	XLS 2500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2500-34-UK</b>	XLS 2500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2500-34-IN</b>	XLS 2500W AMP W/ XOVER & LIMTR 230-240V
<b>XXLS2500-34-AU</b>	XLS 2500W AMP W/ XOVER & LIMTR 230-240V

### **PWA's:**

141576-x	PWA, XLS1000 100V AMP/PS
----------	--------------------------



141577-x	PWA, XLS1000 120V AMP/PS
141578-x	PWA, XLS1000 220V AMP/PS
141579-x	PWA, XLS1000 240V AMP/PS
141673-x	PWA, XLS DISPLAY 1000

141580-x	PWA, XLS1500 100V AMP/PS
141581-x	PWA, XLS1500 120V AMP/PS
141582-x	PWA, XLS1500 220V AMP/PS
141583-x	PWA, XLS1500 240V AMP/PS
141607-x	PWA, XLS2000 100V AMP/PS
141608-x	PWA, XLS2000 120V AMP/PS
141609-x	PWA, XLS2000 220V AMP/PS
141610-x	PWA, XLS2000 240V AMP/PS
142028-x	PWA, XLS2500 100V AMP/PS
142029-x	PWA, XLS2500 120V AMP/PS
142030-x	PWA, XLS2500 220V AMP/PS
142031-x	PWA, XLS2500 240V AMP/PS
141558-x	PWA, XLS DISPLAY 1500/2000/2500

**PWB's:**

141557-3	PWB, XLS DISPLAY
141574-3	PWB, XLS1000/1500 AMP PS
141601-4	PWB, XLS2000/2500 AMP PS

**AUX TEST ASSEMBLIES:**

<b>PWB</b>	<b>PWA</b>	<b>DESCRIPTION</b>
141614-1	141615-1	RUBYLATOR
142104-1	142103-1	APM SELF-TEST BOARD, APM SIMULATOR, CORTEX ADAPTOR BOARD (MFG Version)
142104-1	142980-2	APM SELF-TEST BOARD, APM SIMULATOR, CORTEX ADAPTOR BOARD (DESIGN Version)

**50POS FFC CABLE:** 141747-1

**TRANSFORMERS BY MODEL:**

<b>CPN</b>	<b>DESCRIPTION</b>
141646-1	XFMR, MAIN XLS1000 100V
141647-1	XFMR, MAIN XLS1000 120V/240V
141648-1	XFMR, MAIN XLS1000 220V
141649-1	XFMR, MAIN XLS1500 100V
141650-1	XFMR, MAIN XLS1500 120V/240V

141651-1	XFMR, MAIN XLS1500 220V
141662-1	XFMR, MAIN XLS2000 100V
141663-1	XFMR, MAIN XLS2000 120V/240V
141664-1	XFMR, MAIN XLS2000 220V
141665-1	XFMR, MAIN XLS2500 100V
141666-1	XFMR, MAIN XLS2500 120V/240V
141667-1	XFMR, MAIN XLS2500 220V

**BREAKERS BY MODEL:**

The screenshot shows a technical drawing of a circuit breaker assembly. The drawing includes a table with the following columns: MODEL, Circuit Breaker CPN#, and AMPS. The table lists various models and their corresponding amperage ratings. Below the table, there is a note: "XX=Suffix denotes the power cord needed." and a legend for quality check symbols: QUALITY CHECK (red triangle), WORK CONTENT (yellow square), and VERIFY (blue circle). The drawing also includes a title block with the following information: XLS1000/1500/2000/2500 MAIN C04, DRAWN BY ET 10/20, APPR BY, DATE 02, W0004507, and Rev. 2.

MODEL	Circuit Breaker CPN#	AMPS
XLS1000-0-xx	141689-1	8A
XLS1000-1-xx	141689-1	8A
XLS1000-2-xx	141687-1	4A
XLS1000-34-xx	141687-1	4A
XLS1500-0-xx	141690-1	12A
XLS1500-1-xx	141690-1	12A
XLS1500-2-xx	141688-1	6A
XLS1500-34-xx	141688-1	6A
XLS2000-0-xx	142005-1	15A
XLS2000-1-xx	142005-1	15A
XLS2000-2-xx	141689-1	8A
XLS2000-34-xx	141689-1	8A
XLS2500-0-xx	142005-1	15A
XLS2500-1-xx	142005-1	15A
XLS2500-2-xx	141689-1	8A
XLS2500-34-xx	141689-1	8A

XX=Suffix denotes the power cord needed.

QUALITY CHECK (red triangle)  
 WORK CONTENT (yellow square)  
 VERIFY (blue circle)

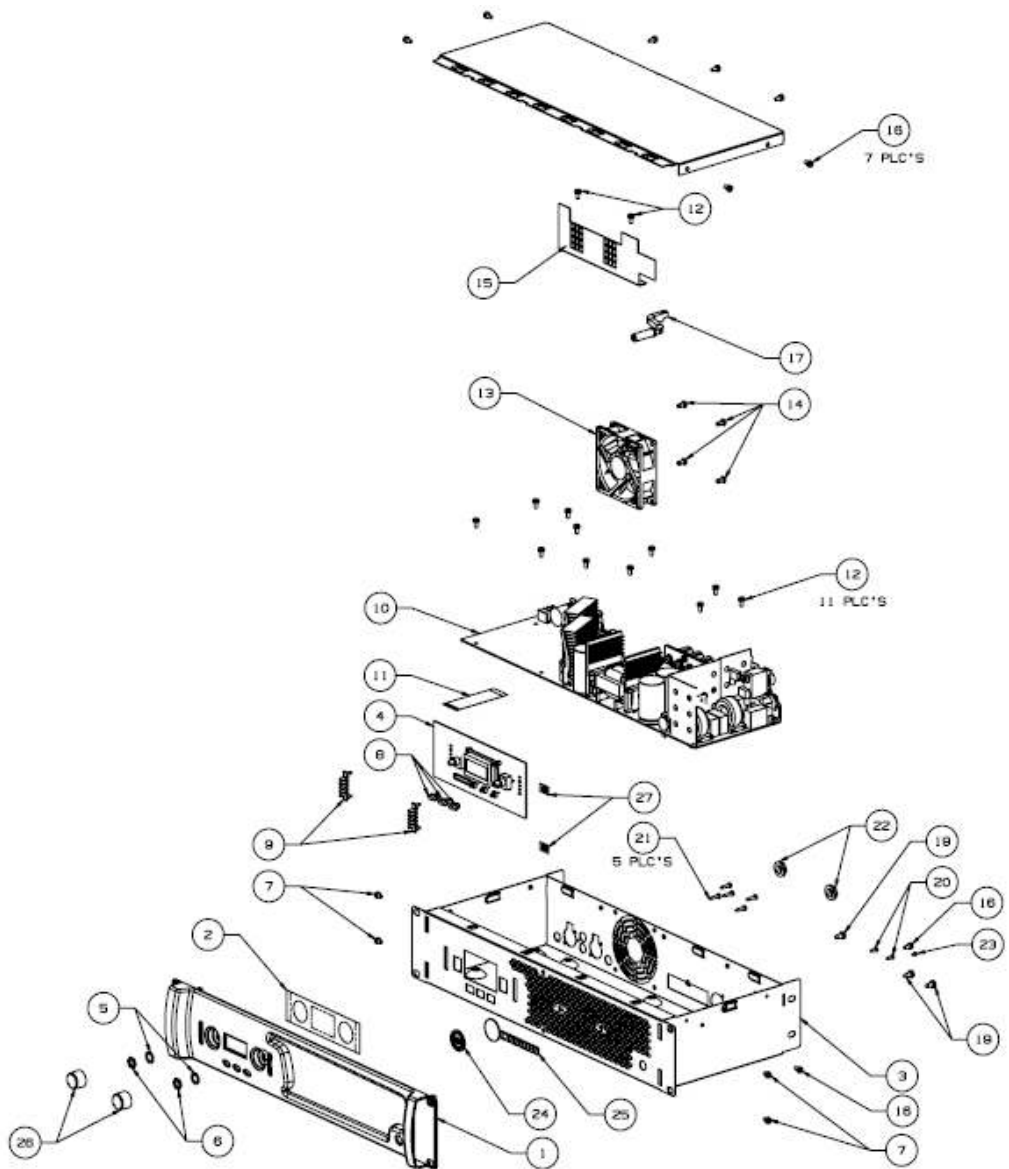
XLS1000/1500/2000/2500 MAIN C04  
 DRAWN BY ET 10/20 APPR BY DATE 02  
 W0004507 Rev. 2

# APPENDIX D: XLS1000/1500 ASSEMBLY DRAWING:

				XLS1000	XLS1000E1	XLS1000E13	XLS1000E14					
				SPECIFICATIONS								
				VOLTAGE	120V	100V	220V	240V				
				FREQUENCY	60Hz	50Hz - 60Hz	50Hz - 60Hz	50Hz - 60Hz	120V	100V	220V	240V
ITEM	QTY	DESCRIPTION	C.P.N.									
①	1	PNL, XLS1000 FRONT	141516-1	X	X	X	X					
	1	PNL, XLS1500 FRONT	141891-1						X	X	X	X
③	1	CHAS, XLS3 1000	141514-2	X		X	X					
	1	CHAS, XLS3 1500	141829-1						X		X	X
	1	CHAS, XLS3 1000 AMCRON	141925-1		X							
	1	CHAS, XLS3 1500 AMCRON	141926-1							X		
	1	CHAS, XLS3 1000 CCC	141928-1									
	1	CHAS, XLS3 1500 CCC	141930-1									
④	1	PWA, XLS DISPLAY 1000	141673-*	X	X	X	X					
	1	PWA, XLS DISPLAY 1500/2000/2500	141558-*						X	X	X	X
⑩	1	PWA, XLS1000 120V AMP/PS	141577-*	X								
	1	PWA, XLS1000 220V AMP/PS	141578-*			X						
	1	PWA, XLS1000 240V AMP/PS	141579-*				X					
	1	PWA, XLS1000 100V AMP/PS	141576-*		X							
	1	PWA, XLS1500 120V AMP/PS	141581-*						X			
	1	PWA, XLS1500 220V AMP/PS	141582-*								X	
	1	PWA, XLS1500 240V AMP/PS	141583-*									X
⑫	1	PWA, XLS1500 100V AMP/PS	141580-*							X		
	1	EMBL, CROWN SPECIAL ABS BLK/SLV	141674-1	X		X	X		X		X	X
⑮	1	EMBL, AMCRON SPECIAL ABS BLK/SLV	141933-1		X					X		

**NOTES:**

- 1) \* REPRESENTS MOST CURRENT PWA REV UNLESS OTHERWISE SPECIFIED.



RECOMMENDED ASSEMBLY TORQUE:

ITEM	C.P.N.	TORQUE SETTING
6	FROM 130503-1	5-7 IN LBS
7	103425-70804	9-11 IN LBS
12	103415-10805	9-11 IN LBS
16	103453-70805	9-11 IN LBS
19	30334-70805	7-9 IN LBS
20	139311-1	4-6 IN LBS
21	139334-70408	7-9 IN LBS
22	141700-1	7-9 IN LBS

ITEM	QTY	DESCRIPTION	PART NO.
2	2	NUT, PPH 5/32" STD 3/8"x5/16" STL PHS	A10178-2
2	2	KNOB, PND 20.1MMX18.18 ABS BLK	141987-1
1	1	EMBLN	SEE SHEET 1
1	1	EMBL, XLS3 DDM 25.4MM W/LR CHR/BLU	141877-1
1	1	RVT, BLIND 0.175"x0.13"x0.078" PLAS	141847-1
2	2	NUT, HEX 0.4375"-20 FLANGE PLAS	141790-1
5	5	4-24X.5 PND T10 AB BZ	139334-70408
2	2	NO. 24X.5 PND FLTD TRX TFS BZ AB	139311-1
3	3	SCR, HEX. TFS TORX PND AB BZ	139334-70805
1	1	CVR, XLS3 1000/1500	141815-1
1	1	PSWCH, XLS3 POWER SWITCH	141813-1
8	8	SEMS, 8-32X.31 TFS TORX PND STAR	103423-70805
1	1	SKRT, XLS3 1000/1500 SCREEN	141930-1
4	4	RVT, BLIND .315"x.315"x.188" PLAS PAN	141925-1
1	1	FAN, 12VDC 80MMX29MM	141701-1
13	13	SCR, #8-32X.312 SEMS TFS CONE	103415-10805
1	1	CLL, PFC SOP 3.0" BSTRP	141747-1
1	1	PWA, MAIN	SEE SHEET 1
2	2	LTPP, 1.985"x0.967"x0.286" XLS3 DISPLAY	141750-1
3	3	BTN, CYL 4.775MM X 8.90MM PLAS BLK	141580-1
4	4	SEMS, 8-32X.25 MACHINE TORX PND STAR	103425-70804
2	2	NUT	FROM 130503-1
2	2	WSH1	FROM 130503-1
1	1	PWA, DISPLAY	SEE SHEET 1
1	1	CHASSIS	SEE SHEET 1
1	1	LENS, REC 145mmX30mm	141806-1
1	1	PWL, FRONT	SEE SHEET 1

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 FAX: (913) 666-1101  
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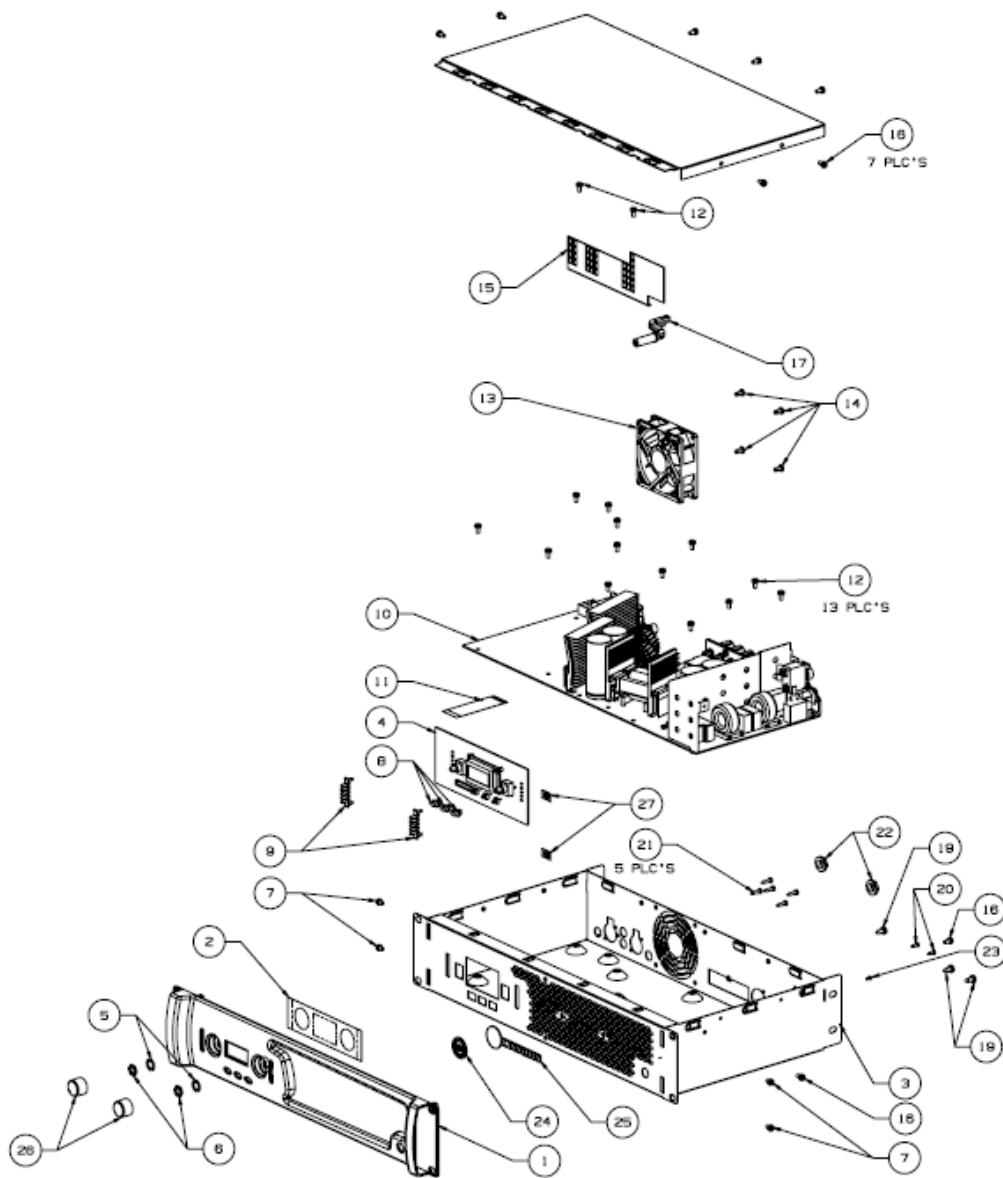
DRAWING NO. 141897  
 SHEET 2 OF 2

## APPENDIX E: XLS2000/2500 ASSEMBLY DRAWING:

				XLS2000				XLS2500				
				XLS2000E1	XLS2000E13	XLS2000E14						
SPECIFICATIONS				VOLTAGE				VOLTAGE				
				120V	100V	220V	240V	120V	100V	220V	240V	
				FREQUENCY				FREQUENCY				
				60Hz	50Hz-60Hz	50Hz-60Hz	50Hz-60Hz	60Hz	50Hz-60Hz	50Hz-60Hz	50Hz-60Hz	
ITEM	QTY	DESCRIPTION	C.P.N.									
①	1	PNL, XLS2000 FRONT	141692-1	X	X	X	X					
	1	PNL, XLS2500 FRONT	141694-1					X	X	X	X	
③	1	CHAS, XLS 2000	141517-1	X		X	X					
	1	CHAS, XLS 2500	141830-1					X		X	X	
	1	CHAS, XLS 2000 AMCRON	141927-1		X							
	1	CHAS, XLS 2500 AMCRON	141928-1					X				
	1	CHAS, XLS 2000 CCC	141931-1									
	1	CHAS, XLS 2500 CCC	141932-1									
④	1	PWA, XLS DISPLAY 1500/2000/2500	141558-*	X	X	X	X	X	X	X	X	
⑩	1	PWA, XLS2000 120V AMP/PS	141608-*	X								
	1	PWA, XLS2000 220V AMP/PS	141609-*			X						
	1	PWA, XLS2000 240V AMP/PS	141610-*				X					
	1	PWA, XLS2000 100V AMP/PS	141607-*		X							
	1	PWA, XLS2500 120V AMP/PS	142029-*					X				
	1	PWA, XLS2500 220V AMP/PS	142030-*							X		
	1	PWA, XLS2500 240V AMP/PS	142031-*									X
	1	PWA, XLS2500 100V AMP/PS	142028-*						X			
⑫	1	EMBL, CROWN SPECIAL ABS BLK/SLV	141674-1	X		X	X	X		X	X	
	1	EMBL, AMCRON SPECIAL ABS BLK/SLV	141933-1		X				X			

**NOTES:**

- 1) \* REPRESENTS MOST CURRENT PWA REV UNLESS OTHERWISE SPECIFIED.



RECOMMENDED ASSEMBLY TORQUE:

ITEM	C.P.N.	TORQUE SETTING
8	FROM 138503-1	5-8 IN LBS
7	103425-70804	9-11 IN LBS
12	103415-10905	9-11 IN LBS
18	103433-70805	9-11 IN LBS
19	138334-70806	7-9 IN LBS
20	139311-1	4-6 IN LBS
21	138334-70408	7-9 IN LBS
22	141700-1	7-9 IN LBS

2	NUT, PGH 5/32" STUD 3/8"x9/16" STL PHG	A10179-2	
2	KNOB, PND 20.1MMX19.10 ABS BLK	141587-1	
1	EMBLEM	SEE SHEET 1	
1	EMBL, XLSS DOM 25.4MM W/LR CHR/BLU	141877-1	
1	RYT, BLIND 0.175"x0.13"x0.078" PLAS	141847-1	
2	NUT, HEX 0.4375"-20 FLANGE PLAS	141700-1	
5	4-24X.5 PND TIC AD BZ	138334-70408	
2	M2_RWS_PAW_PLTND TRX TFS BZ AD	138311-1	
3	SCR, HEX.375 TORX PND AD BZ	138334-70806	
1	CVR, XLSS 1000/1500	141515-1	
1	PSWCH, XLSS POWER SWITCH	141813-1	
9	SEMS, 8-32X.31 TFS TORX PND STAR	103423-70805	
1	BRKT, XLSS 1000/1500 SCREEN	141830-1	
4	RYT, BLIND .315"x.315"x.188" PLAS FAN	141835-1	
1	FAN, 12VDC 50MMX25MM	141701-1	
15	SCR, #8-32X.312 SEMS TFS CONE	103415-10905	
1	CDL, PFC 50P 3.0" BSTRP	141747-1	
1	PWA, MAIN	SEE SHEET 1	
2	LTPP, 1.985"x0.985"x0.298" XLSS DISPLAY	141750-1	
3	BTN, OVL 4.77MM X 9.50MM PLAS BLK	141580-1	
4	SEMS, 8-32X.25 MACHINE TORX PND STAR	103425-70804	
2	NUT	FROM 138503-1	
2	WSR	FROM 138503-1	
1	PWA, DISPLAY	SEE SHEET 1	
1	CHASSIS	SEE SHEET 1	
1	LENS, REC 145mmX30mm	141808-1	
1	PNL, FRONT	SEE SHEET 1	
ITEM	QTY	DESCRIPTION	PART NO.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS (IN PARENTHESES). DIMENSIONS IN INCHES ARE APPROXIMATE. DIMENSIONS IN MILLIMETERS ARE PRECISE.  
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TO CHECK ANGLE OF VIEW, SEE SHEET 1 OF 2.  
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**CROWN** is a Honeywell International Company  
 718 ROUTE 200, SUITE 200, HAVERTHILL, NJ 07648  
 TEL: 201-991-1000 FAX: 201-991-1001  
 WWW.CROWN.COM

DRAWING NO. 142035  
 SHEET 2 OF 2