



Service Dept.

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*****WARNING!!!*****

Dangerous and lethal potentials are present in this product!!

Before proceeding any further, the service center is warned that caution must be used when troubleshooting, repairing and testing the circuits in this unit. High voltage AC line-connected potentials are present in the circuits used in this unit.

All work performed on this unit must be done with an isolation transformer connected between the power circuit's input and the AC line in order to prevent electric shock, especially when connecting test equipment to the circuit. **Extreme caution must be used when working on this product!!!**

HDII Power Amplifier Theory of Operation

Overview

The HDII power amplifier is designed to “model” many of the characteristics of a tube amplifier. So it is significantly different from “typical” solid state amplifiers. The output stage consists of a class H, push-pull MOSFET transconductance power amplifier. A limited amount of negative feedback is used to reduce the output impedance. Both transconductance and the amount of negative feedback are switched to match the output impedance of the amplifier to the load.

Output Stage

The output stage consists of four power MOSFETs configured as voltage controlled current sources. For the MOSFETs connected to the negative rail, operational amplifiers are connected to drive the gates of the MOSFETs such that the voltage at the non-inverting input of the op-amp is equal to the voltage across a current sense resistor connected to the source of the FET. For the “high-side” MOSFETs a similar arrangement is used but in an inverting configuration.

Local Power Supplies

The op-amp that drives the high side power MOSFETs requires a 12V power supply is referenced to the output voltage. To create this “floating” supply Q20, Q34 and Q39 regulate +BIAS_HIGH while the output is below +LOW. During the part of the waveform that the output is above +LOW C25 holds-up +BIAS_HIGH.

For the low side op-amps Q21, Q23, Q33 provide a similar function. Since the output voltage can go all the way to the negative rail, a negative supply is required for U7 to maintain control of the high side MOSFETs. This negative rail is provided by Q35 and D10.

The power amplifier uses a new TLC084 op-amp. This op-amp has very low offset voltages, low noise and can run from a single supply, but it’s maximum supply voltage is 16V total. This is why Q18 and Q19 are used to derive a $\pm 6.8V$ supply from the $\pm 15V$ rails.

The class H step switches Q2 and Q12 have similar gate drive requirements to the main power devices. In these circuits, the gate drive voltage is controlled by the level shifting circuits.

Class H Step Switching

To modulate the power rails going to the output stage, comparator U10 switches the appropriate circuit when the output voltage approaches either rail. A small amount of hysteresis is used to eliminate chattering around the switch point.

Signal Processing

Phase Splitter

To drive the output stage, a voltage analog of the desired current needs to be developed. This is done with U4-A,B,D and associated circuitry.

Mute Circuit

The amplifier is muted by pulling JFET Q31's gate to -15V . The main board provides a mute line that mutes the amplifier when it is low and un-mutes in the high ($+5\text{V}$) state. The main board will mute the amplifier at startup and when in STUDIO MODE. The amplifier also mutes it when the supply voltage is below the breakdown voltage of D21 – about 18V .

Output Impedance Switching

Analog switch U1 provides the switching for the 4, 8 and 16 Ohm settings. This is done by simultaneously adjusting the transconductance and the open circuit voltage gain to match the output impedance to the load impedance.

DC Servo

Op-amp U2-C provides DC feedback to reduce the offset voltage at the amplifier output.

Current limiting

D2, D3, D5 and D27 clamp the voltage going into the transconductance stage which limits the output current. The clamping level is reduced when the amp is driven hard or when the thermal limiting circuit detects excessive heatsink temperature.

Error amplifier

Q30 sums the input voltage and the output voltage to create an error signal that drives the transconductance amplifier. Unlike a traditional amplifier the error amplifier has a low gain and as such the output voltage is loosely regulated.

HDII Power Supply Theory of Operation

Overview

Two Switch Mode Power Supplies (SMPS) provide regulated outputs to the main board and power amplifiers.

The main board outputs are provided by a small “housekeeping” power supply that runs independently of the main supply. The three outputs are provided are ± 20 and $+8$. Linear regulators on the main board provide ± 15 and $+5$.

The main power supply provides four outputs to the power amplifiers. To maintain a constant output power capability at 4, 8 and 16 Ohm loads these outputs change to match the load impedance selected on the rear switch. The nominal outputs are ± 30 and ± 45 for 4 Ohms, ± 45 and ± 60 for 8 Ohms and ± 60 and ± 90 for 16 Ohms. Four outputs are used because the amplifier is class H. In class H operation the lower voltage rails are used until the output voltage gets close to the rail voltage. At this point the high rails are switched in to provide additional power to the output. This operation dramatically reduces power dissipation in the amplifier.

Line Filter:

The line filter board is not attached to the power supply but it limits RF energy from being transmitted to the AC power lines. There are no active components on the board so most troubleshooting can be done by doing continuity checks. The black disk is a Negative Temperature Coefficient Resistor (NTC) or inrush limiter. When it is cold, it has a high resistance and limits the input current at turn-on. As current is drawn from the AC line, power is dissipated in the NTC and it heats up. As it's temperature increases it's resistance decreases and it ceases to limit current draw.

Input rectifier:

The input rectifier performs line frequency AC to DC conversion. There are separate configurations 120VAC and 240VAC. When connector J2 has a jumper installed, the unit is configured for 120VAC operation and should never be connected to 240VAC – unit goes BANG! If the jumper is not installed, the unit is set for 240VAC operation and will not be damaged if connected to 120VAC.

When the unit is configured for 240VAC, the large electrolytic caps, C1 and C2, are connected in series and the circuit operates like a typical full wave rectifier.

When the voltage-doubler jumper is installed, the neutral is connected to the center point of the two caps and the line alternately charges C1 and C2 to the peak line voltage. Since the output is taken across both caps, the input voltage to the high frequency power converter remains the same for both configurations. Note that only two of the four diodes are used in the voltage-doubler mode.

The two 47k 2W power resistors, R1 and R2 ensure that the capacitor voltages are balanced in 240VAC operation.

High Frequency Power Converter

The High Frequency Power Converter is a multi-output, two transistor forward converter with coupled output inductor – quite a mouthful. The interested reader will find a much more detailed description in power supply literature. The Readers Digest version is: Both power transistors are turned on and off

simultaneously at a 130kHz rate. When they are on, the input DC bus is connected across the primary of the transformer and reflected to the secondaries. This places voltage across the coupled output inductor and power is transferred to the output. The output voltage is regulated by increasing or decreasing the time the power transistors are on or Pulse Width Modulation (PWM). Two “catch” diodes are used to return any energy stored in the transformer back to the input capacitors.

Current transformer T2 has a single turn primary and a 100 turn secondary. Using a transformer provides electrical isolation and allows a larger voltage proportional to current signal to be derived without excessive power dissipation.

Gate Drive transformer T3 drives the gates of the primary connected power transistors from the secondary connected PWM chip. Small signal transistors Q13 and Q14 improve power transistor turn-off and reduce gate drive power requirements by not allowing the gates of the power transistors to swing negative. A zener diode is connected in series with the primary of the transformer to eliminate the possibility of saturation of the transformer core. When small signal transistor Q8 is turned off energy stored in the core of T3 cause the voltage to “flyback” but the voltage is limited by zener diode D40.

Control Loop

The control topology used is an average current mode control loop. Again the Readers Digest version. There are two loops used the “inner” loop is comprised of U4-C, U4-D and the secondary of current sense transformer T2. This loop attempts to maintain a constant average current whose magnitude is determined by the voltage loop. The “outer” loop is the voltage loop, which is comprised of U4-A and U4-B. This loop looks at a weighted sum of all four outputs and attempts to regulate this quantity. Currently the weights given to the lower rails is zero, so only the high rails are considered. U4-B scales the output voltage to a single voltage that is regulated by U4-A. U4-A regulates the output voltage by demanding more or less current from the “inner” average current loop. Note that the output voltage switching is done at U4-A by transistors Q9-11.

PWM Control IC

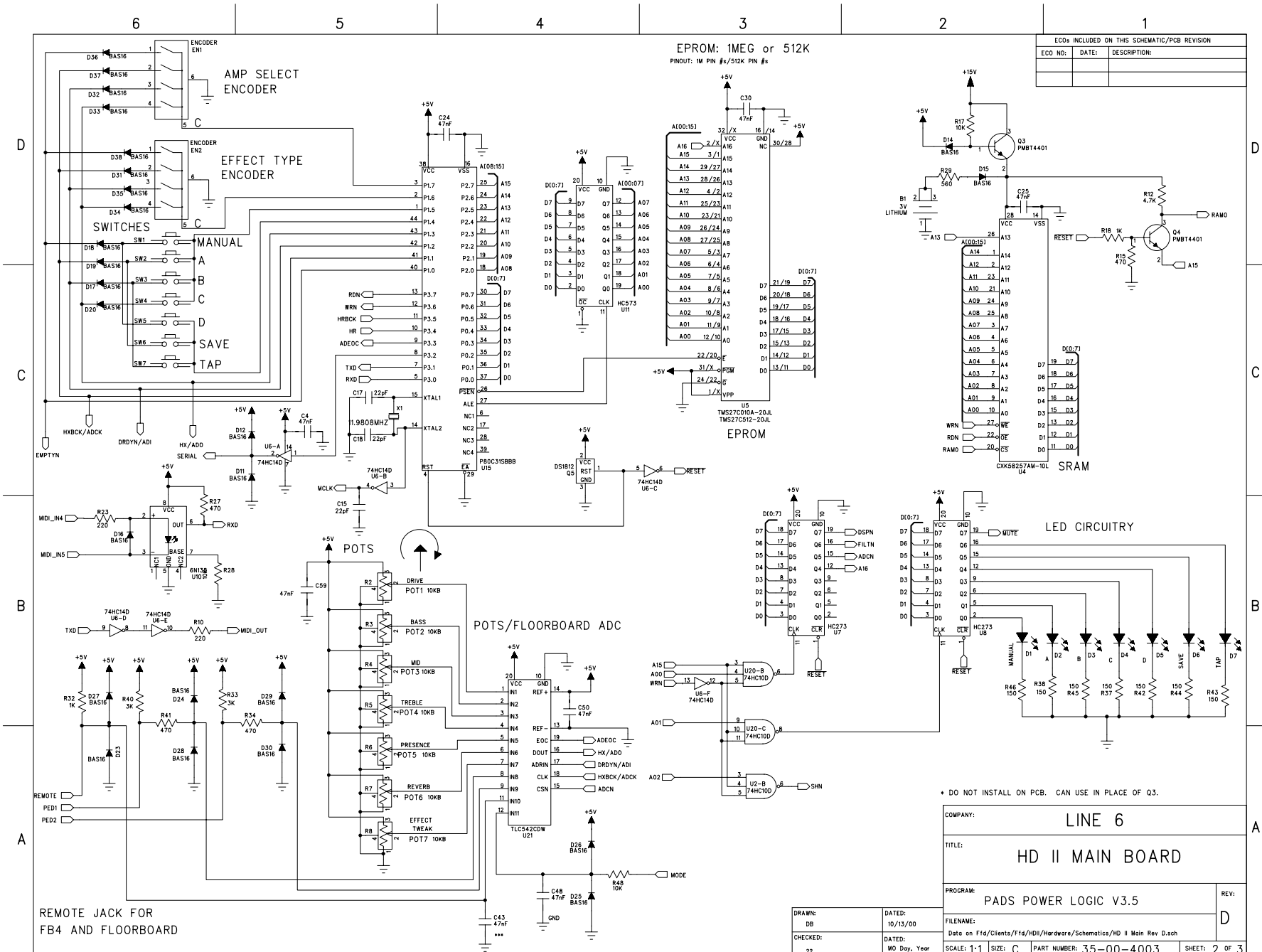
A UC3845 or UC3844 control IC is used to provide the PWM drive signals for the main SMPS. The UC384x family is typically used in peak current mode control but it is very low cost and readily available so we have “tricked” it into doing average current mode control. The timing ramp is scaled and used instead of the current sense signal, but the peak current is “OR’ed” into this pin to provide pulse by pulse current limit. Q6 and associated components provide a “soft-start” for the current loop while C13 provides voltage loops soft start.

Thermal Shutdown

PTC1 is a Positive Temperature Coefficient resistor whose resistance increases with temperature. These parts have a sharp “knee” in their resistance vs. temperature curve so they can act like a thermal switch. PTC1 is mounted on the output rectifier heatsink, so when the temperature threshold is exceeded Q7 is turned on and the output voltage is reduced.

Housekeeping Supply

Power for the main power supplies control circuitry and the digital and analog circuits in the rest of the system are developed in the housekeeping supply. It is based on the TOP234 integrated PWM IC. This IC contains the power MOSFET and all of the PWM control circuitry to run a power supply. See Mfg. Data sheet for complete explanation.



ECOs INCLUDED ON THIS SCHEMATIC/PCB REVISION		
ECO NO:	DATE:	DESCRIPTION:

COMPANY: LINE 6	
TITLE: HD II MAIN BOARD	
PROGRAM: PADS POWER LOGIC V3.5	REV: D
FILENAME: D:\data\Fid\Clients\Fid\HDII\Hardware\Schematics\HD II Main Rev D.sch	SCALE: 1:1
CHECKED: ??	DATE: 10/13/00
DRAWN: DB	MO Day, Year
PART NUMBER: 35-00-4003	
SHEET: 2 OF 3	

6

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3

2

1

ECOs INCLUDED ON THIS SCHEMATIC/PCB REVISION		
ECO NO:	DATE:	DESCRIPTION:

D

C

B

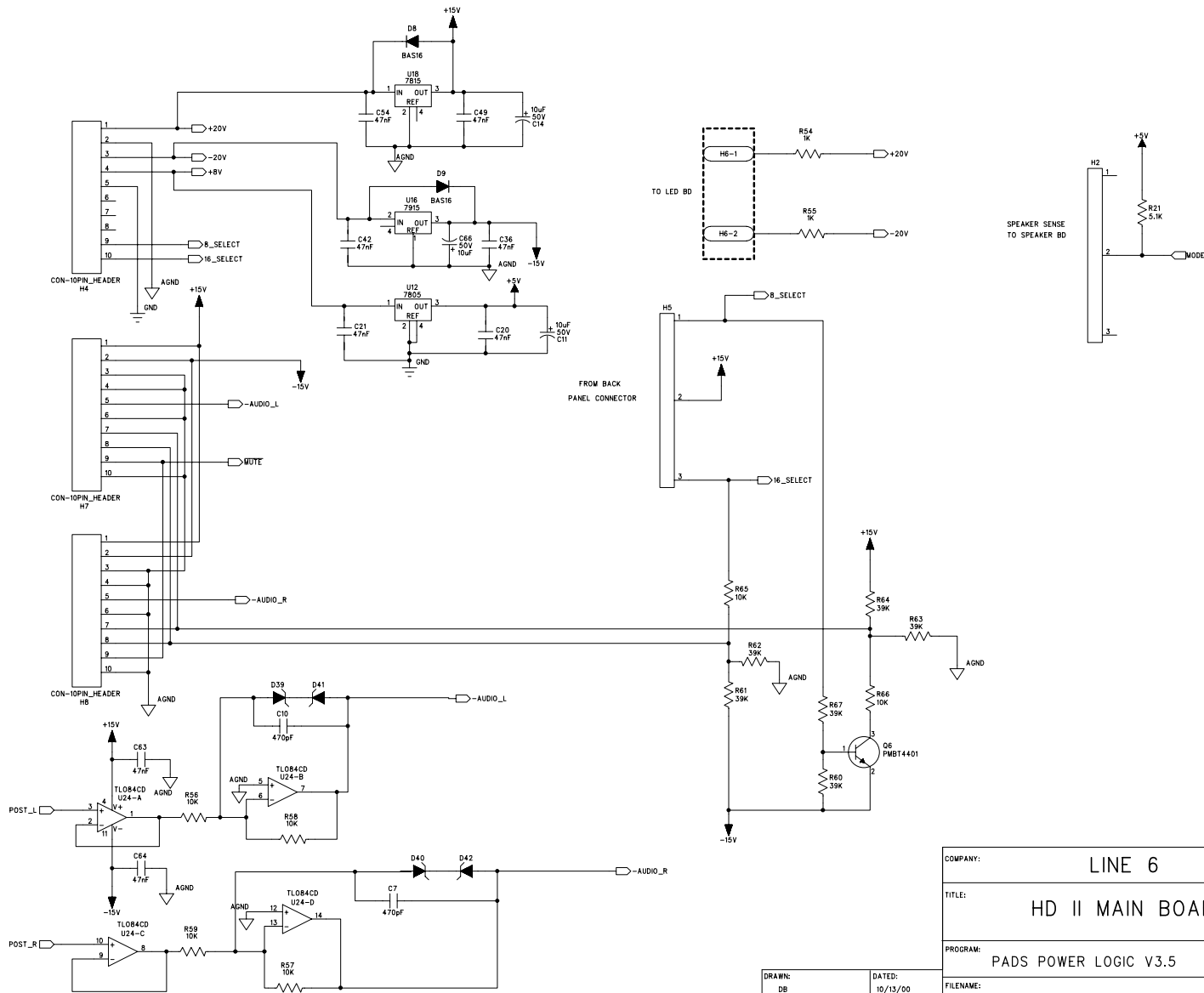
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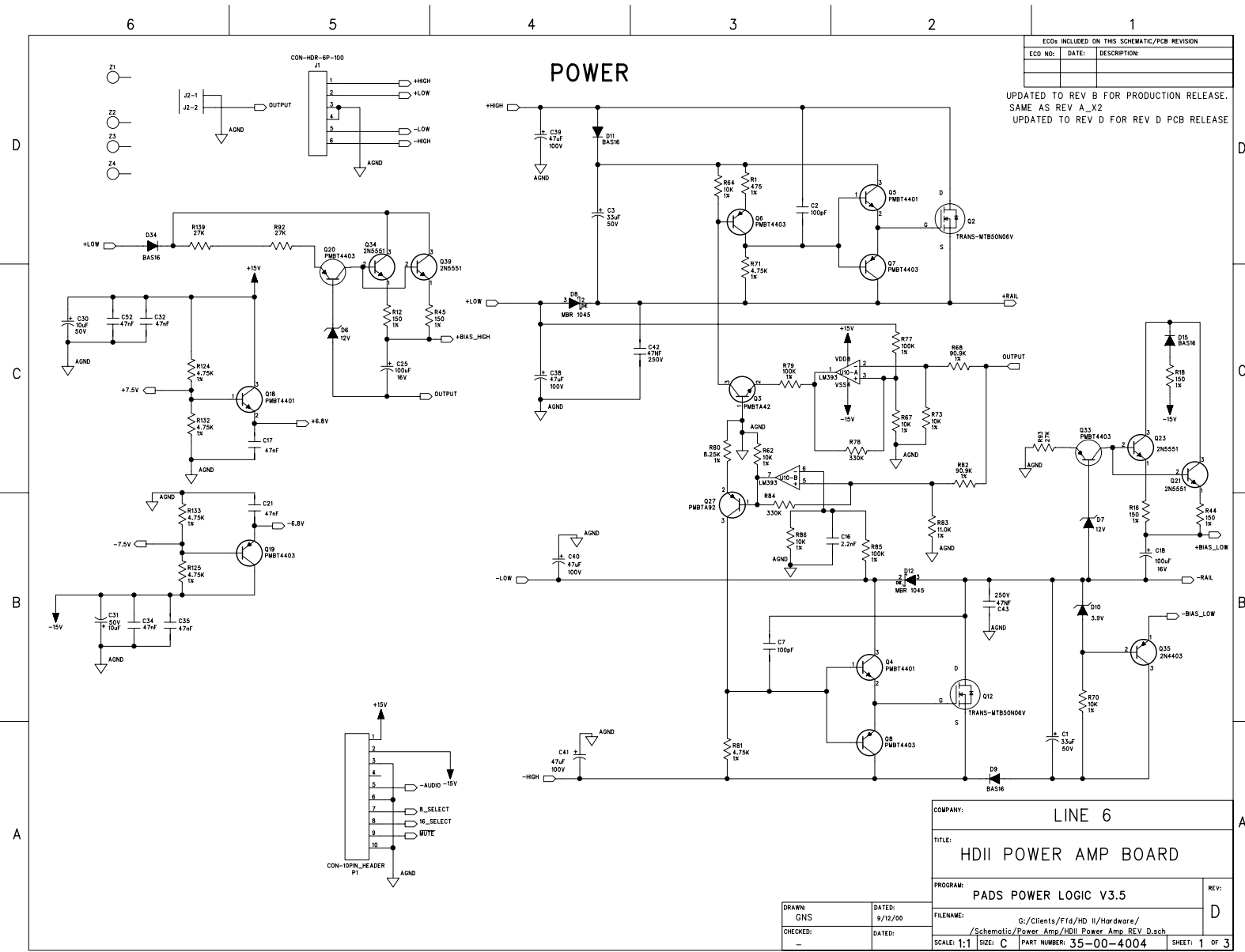
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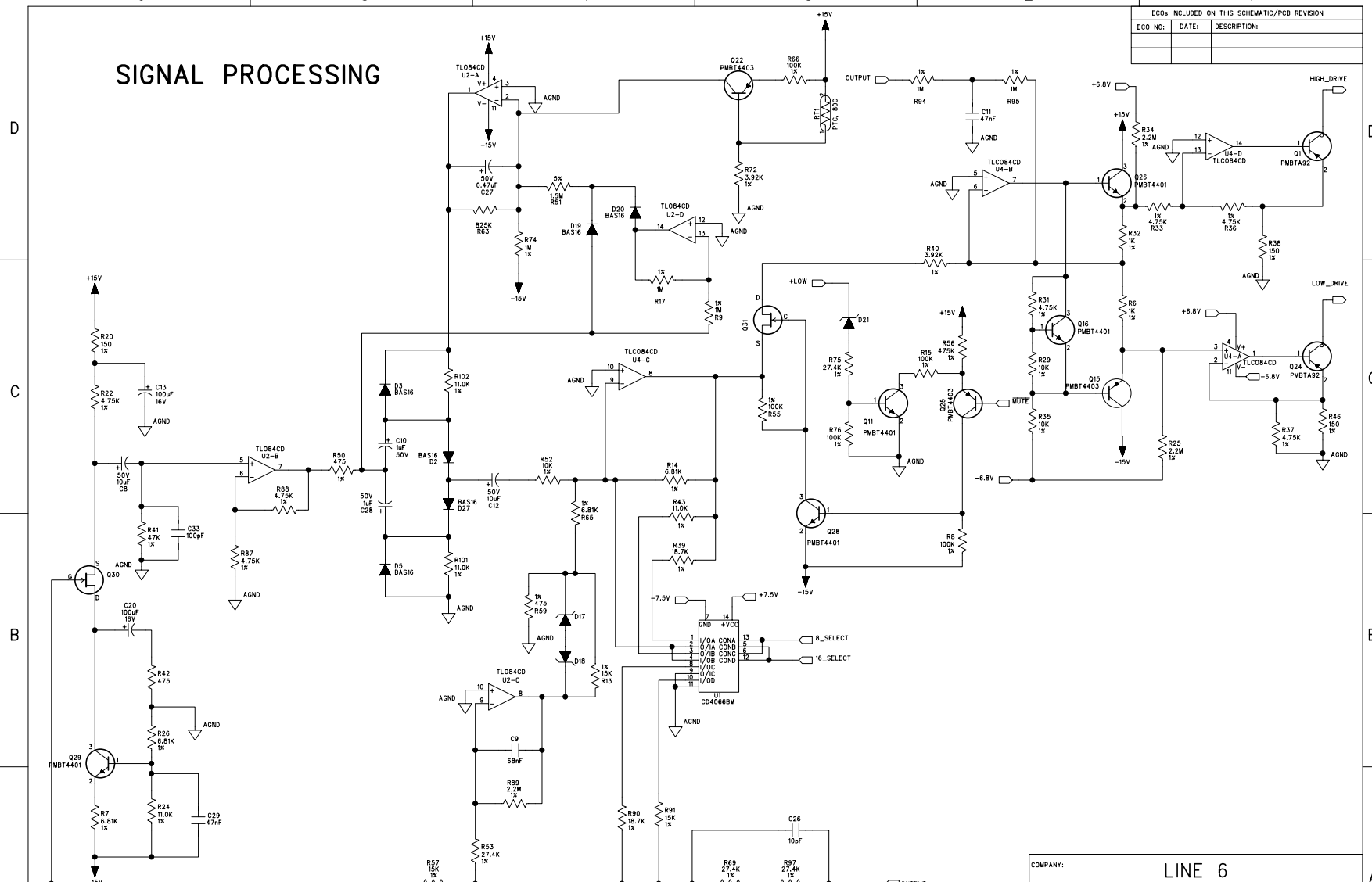


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		UPDATED TO REV D FOR REV D PCB RELEASE

COMPANY:		LINE 6	
TITLE:		HDII POWER AMP BOARD	
PROGRAM:	PADS POWER LOGIC V3.5	REV:	D
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CHECKED:	-	DATED:	
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SCALE:	1:1	SIZE:	C
PART NUMBER:	35-00-4004		SHEET: 1 OF 3

SIGNAL PROCESSING

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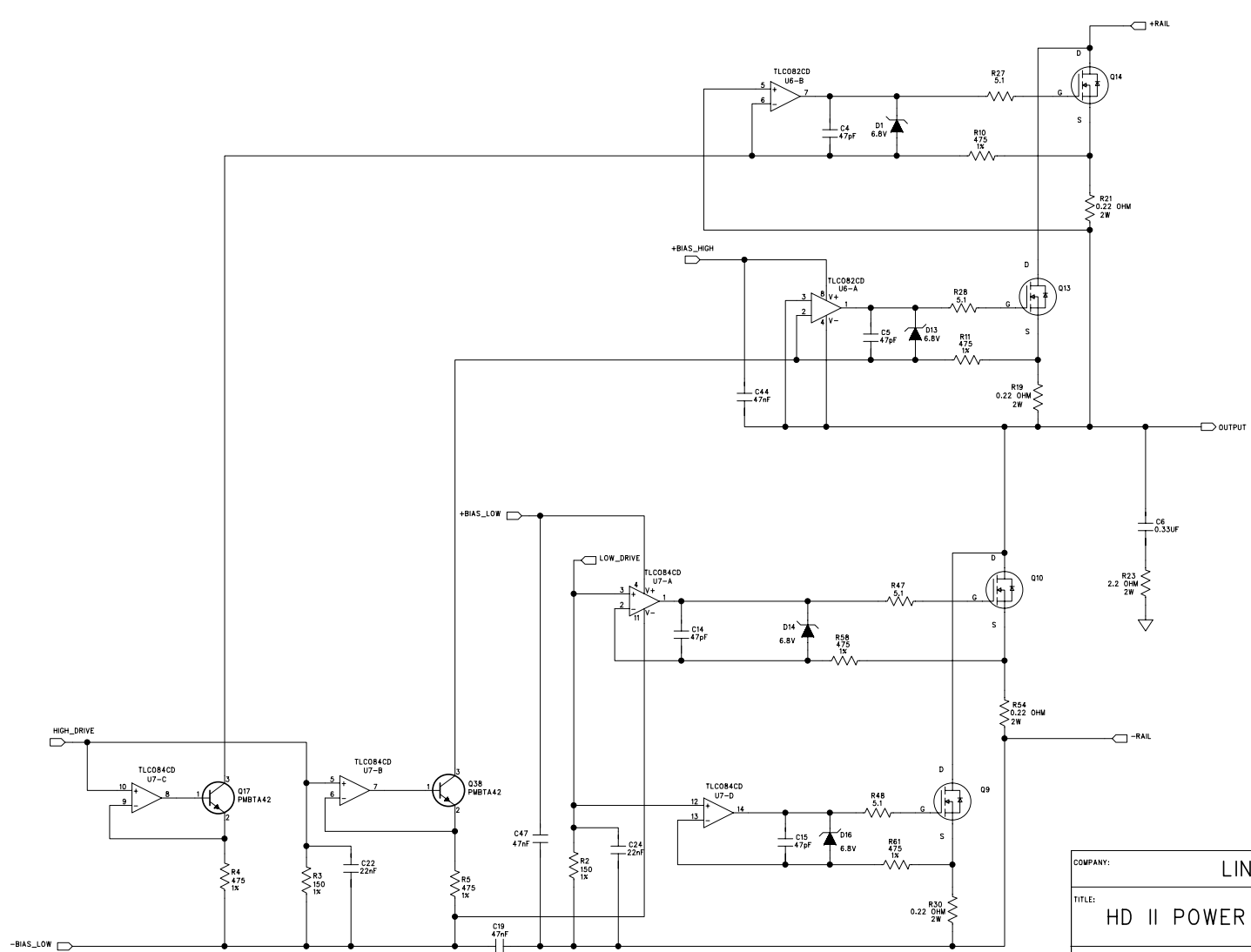
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SCALE: 1:1	SIZE: C	PART NUMBER: 35-00-4004	SHEET: 2 OF 3

DRAWN:	DATED:
GNS	9/12/00
CHECKED:	DATED:
-	-

REV: D

OUTPUT STAGE

ECOs INCLUDED ON THIS SCHEMATIC/PCB REVISION		
ECO NO:	DATE:	DESCRIPTION:



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PROGRAM:		PADS POWER LOGIC V3.5	
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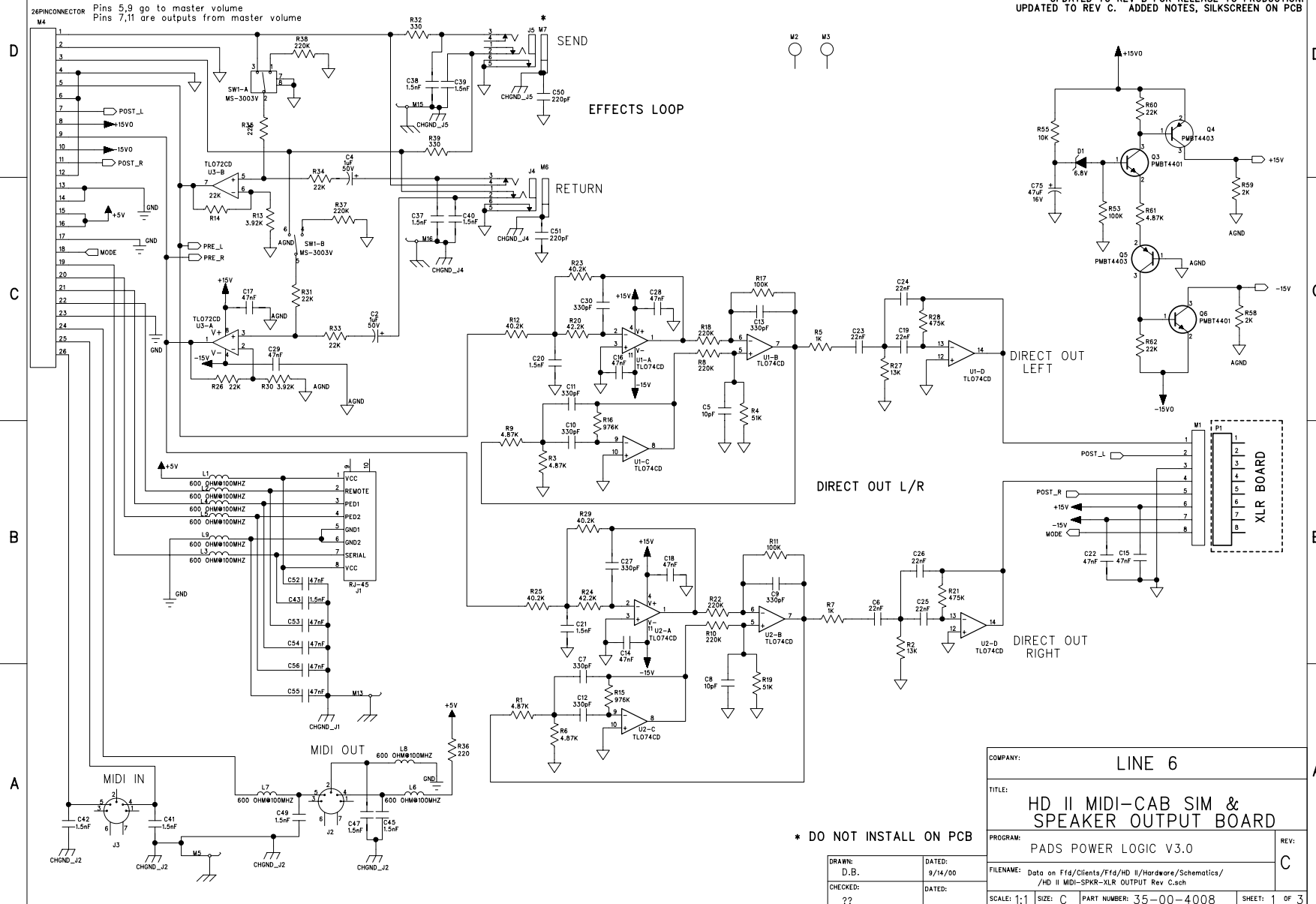
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1

MIDI - CAB SIM BREAKAWAY BOARD

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UPDATED TO REV B FOR RELEASE TO PRODUCTION.
 UPDATED TO REV C. ADDED NOTES, SILKSCREEN ON PCB



* DO NOT INSTALL ON PCB

COMPANY:	LINE 6		REV:
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PROGRAM:	PADS POWER LOGIC V3.0		
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SCALE: 1:1	SIZE: C	PART NUMBER: 35-00-4008	SHEET: 1 OF 3

DRAWN:	DATED:
D.B.	9/14/00
CHECKED:	DATED:
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ECO NO:	DATE:	DESCRIPTION:

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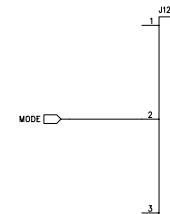
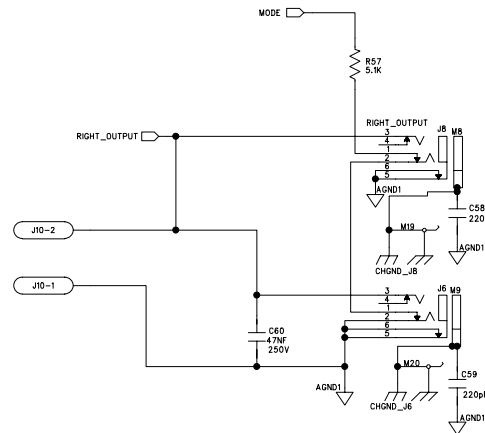
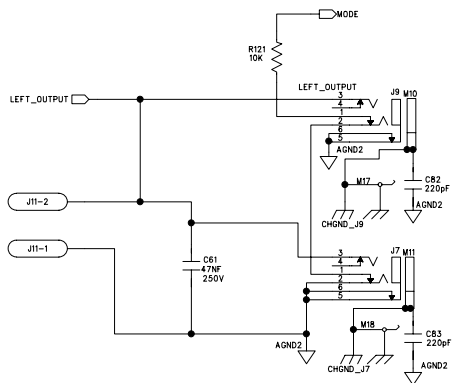
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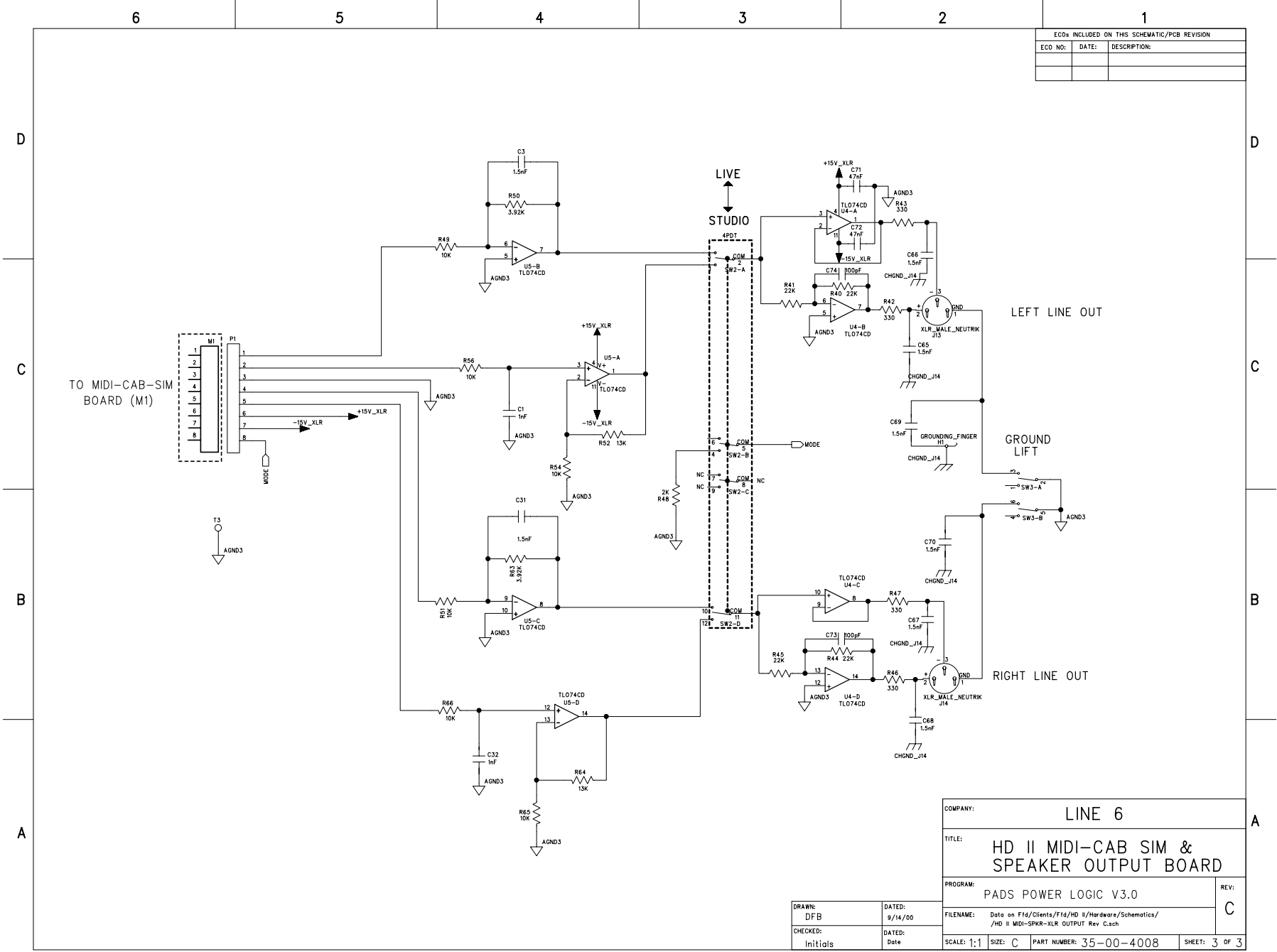


STEREO = 5.0
RIGHT = 3.3
LEFT = 2.5
NONE = 2.0
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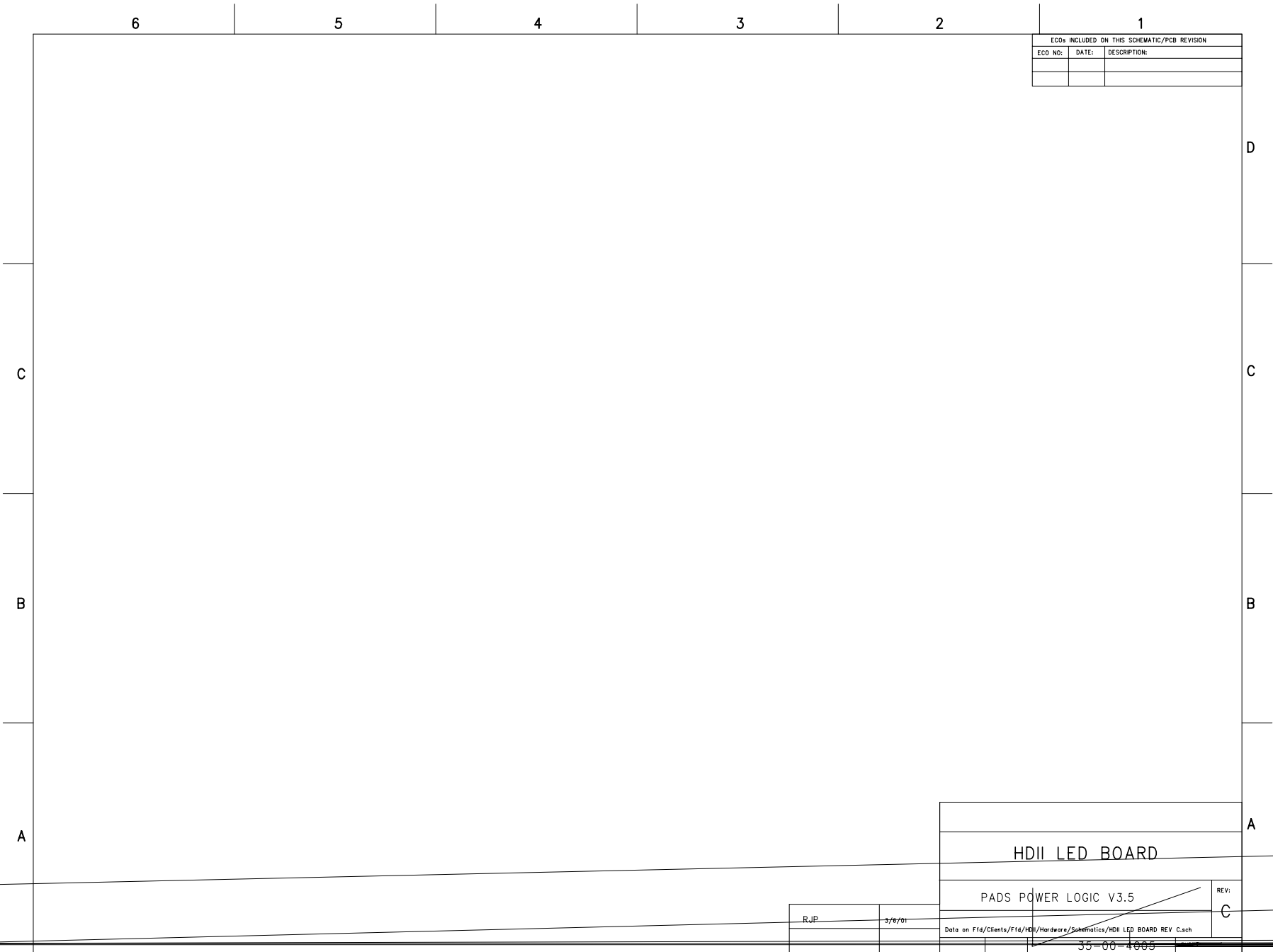
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DRAWN: D.B.	DATED: 9/14/00
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ECO NO:	DATE:	DESCRIPTION:



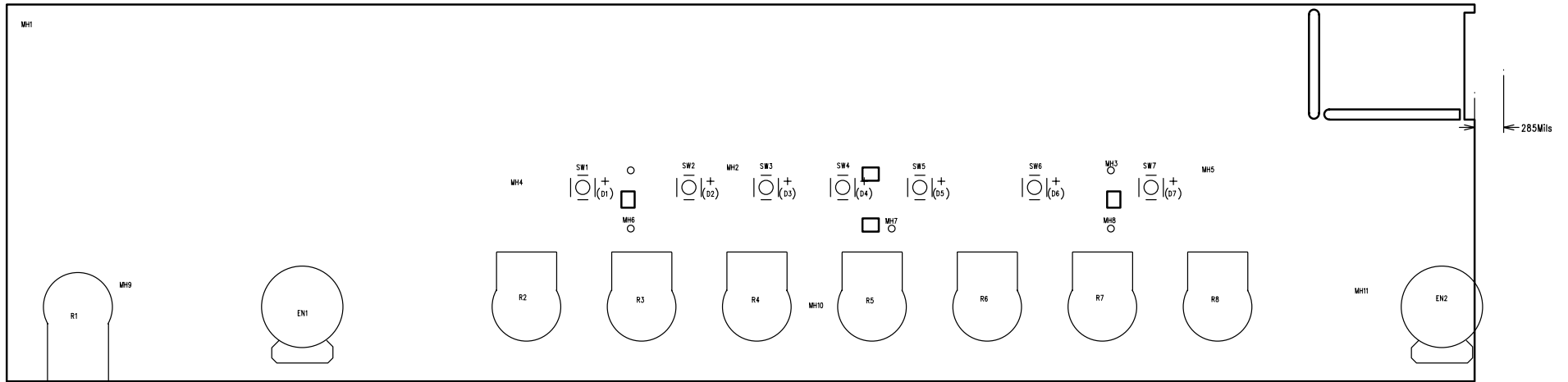
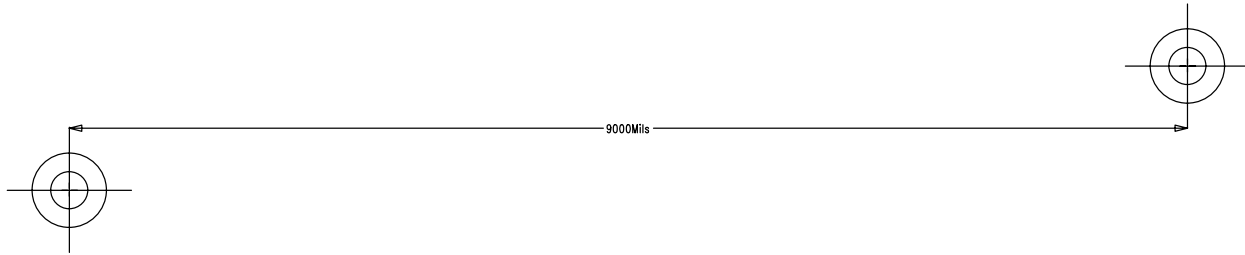
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35-00-4005	

B,JP	3/6/01



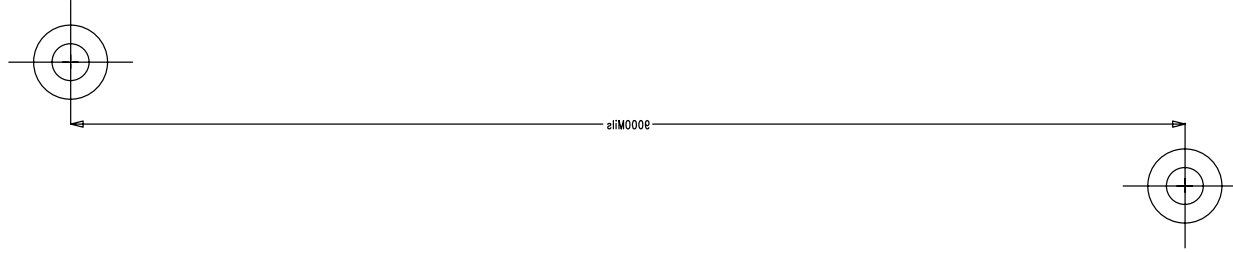
HD II MAIN REV:C ASSEMBLY TOP

ASSEMBLY TOP

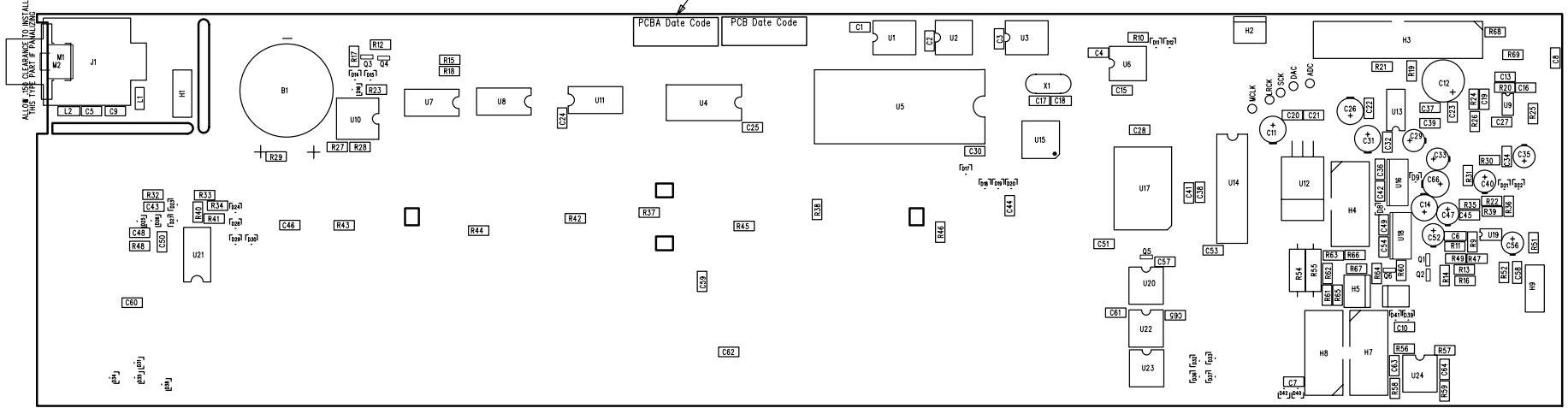
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PROGRAM: PADS POWER PCB 3.5.1			
FILE: Data on F:\Clients\FFD\HD II\Hardware\pcb\HD II Main RevC.pcb			
SCALE: 1:1	REV: C	DATE: FEB 5, 2001	
TITLE:		HD II Main Board	#35-00-4003

BREAKAWAY BOARD IS: HD II Guitar Input #35-00-4012



Place PCBA Date Code Here,
Bottom Side in Area Indicated.



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COMPANY: **LINE 6 INC**

PROGRAM: PADS POWER PCB 3.2.1

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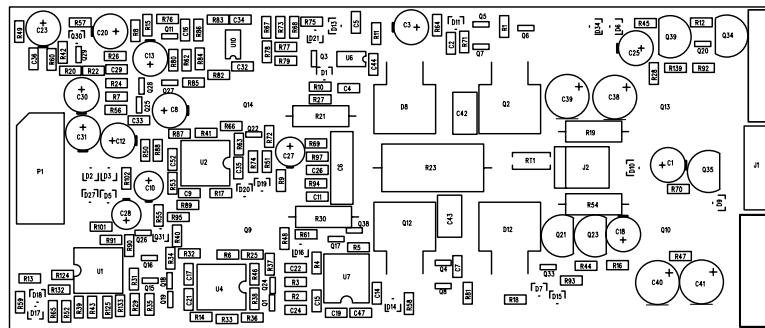
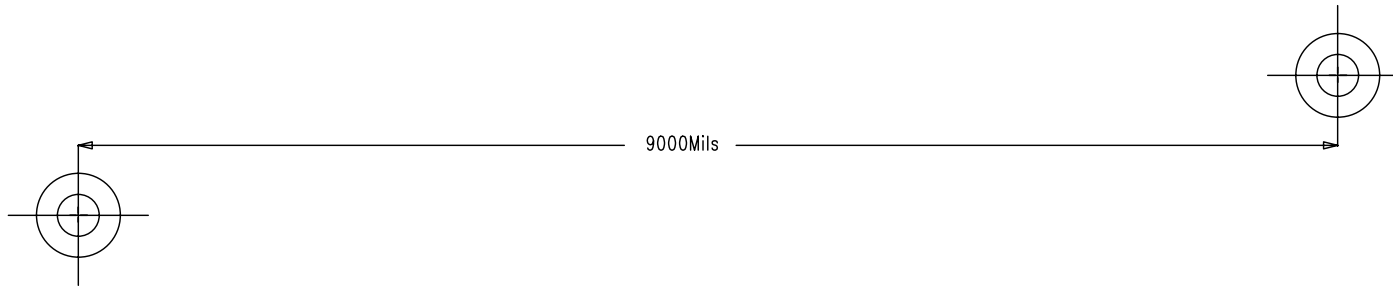
SCALE: 1:1 DATE: FEB 6 2001 REV: C

TITLE: **HD II Main Board #32-00-4003**

ASSEMBLY BOTTOM HD II MAIN REV:C ASSEMBLY BOTTOM

- DATE CODE REQUIREMENTS
- 1) Silkscreen date code for bare PCB fabrication in area marked on drawing.
 - 2) Place date code stamp or sticker for finished PCBA in area marked on drawing.

BREAKAWAY BOARD IS: **HD II Guitar Input #32-00-4015**



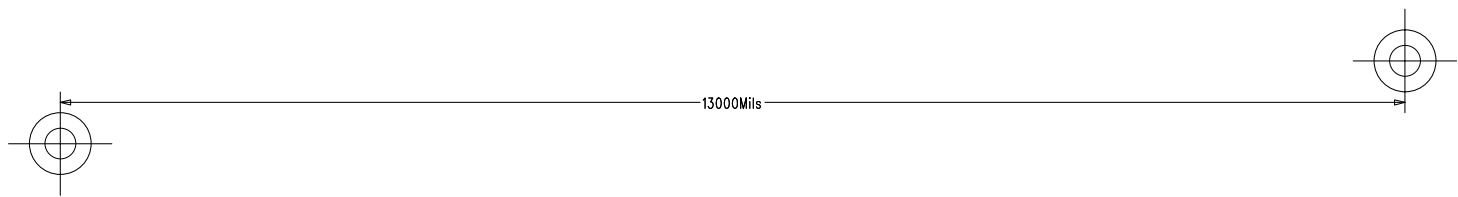
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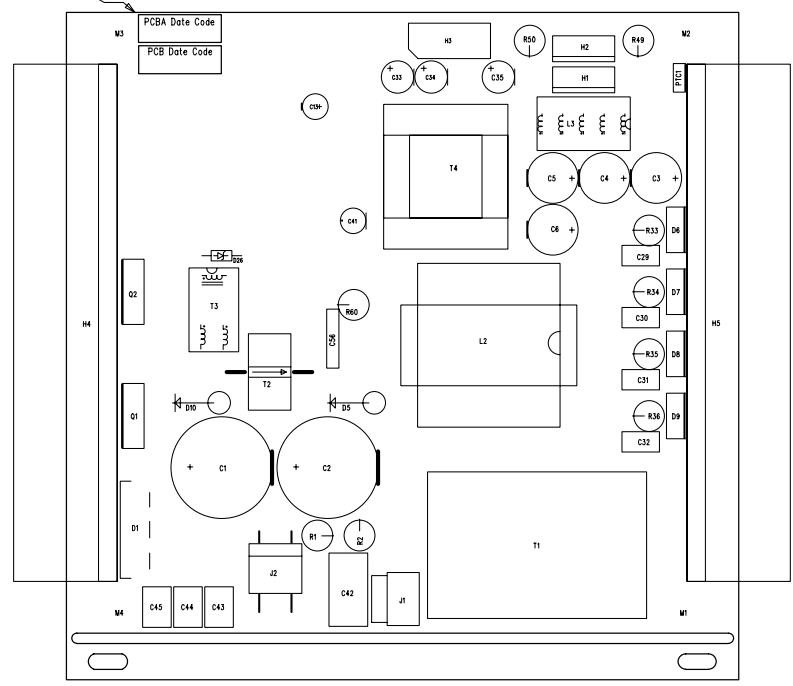
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- 2) Place date code stamp or sticker for finished PCBA in area marked on drawing.

ASSEMBLY TOP

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF LINE 6 INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF LINE 6 INC. IS PROHIBITED	
COMPANY: LINE 6 INC.	
PROGRAM: PADS POWER PCB 3.6	
FILE: Data on Ffd\Clients\FFD\HDII\Hardware\Pcb\Power Amp\Power Amp Rev D.pcb	
SCALE: NONE	REV: D
DATE: MARCH 5, 2001	
TITLE: HDII POWER AMP	DRAWING NO: 35-00-4004



Place PCBA Date Code Here.



ASSEMBLY TOP

DATE CODE REQUIREMENTS

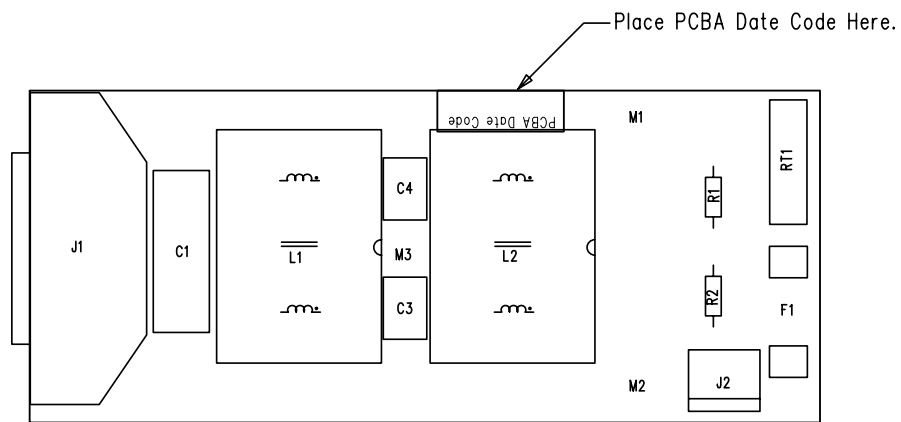
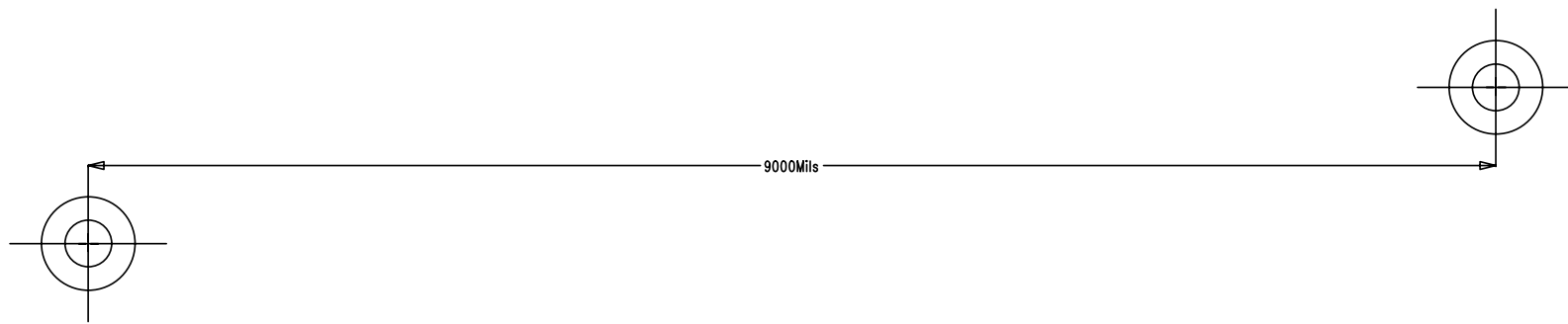
- 1) Silkscreen date code for bare PCB fabrication in area marked on drawing.
- 2) Place date code stamp or sticker for finished PCBA in area marked on drawing.

REQUIREMENTS FOR PCB MANUFACTURER:

- 1) Remove all sharp edges and burrs.
- 2) Maximum allowable line reduction due to pinholes or nicks on line runs, and line shrinkage <= 20%
- 3) Drill positioning error <= 5X of drill size.
- 4) Mfg ID and any other required markings for UL may NOT be added to copper layers. Additional markings may be added to silkscreen layers only.

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COMPANY: LINE 6 INC.	
PROGRAM: PADS POWER PCB 3.0	
FILE: Data on F:\Clients\FFD\HDI\Hardware\PCB\HDI POWER SUPPLY REV C.PCB	
SCALE: NONE	REV: C
DATE: MARCH 6, 2001	
TITLE: HDII POWER SUPPLY	DRAWING NO: 35-00-4000

BREAKAWAY BOARD IS: HEAT SINK SUPPORT BRACKET #35-00-4013



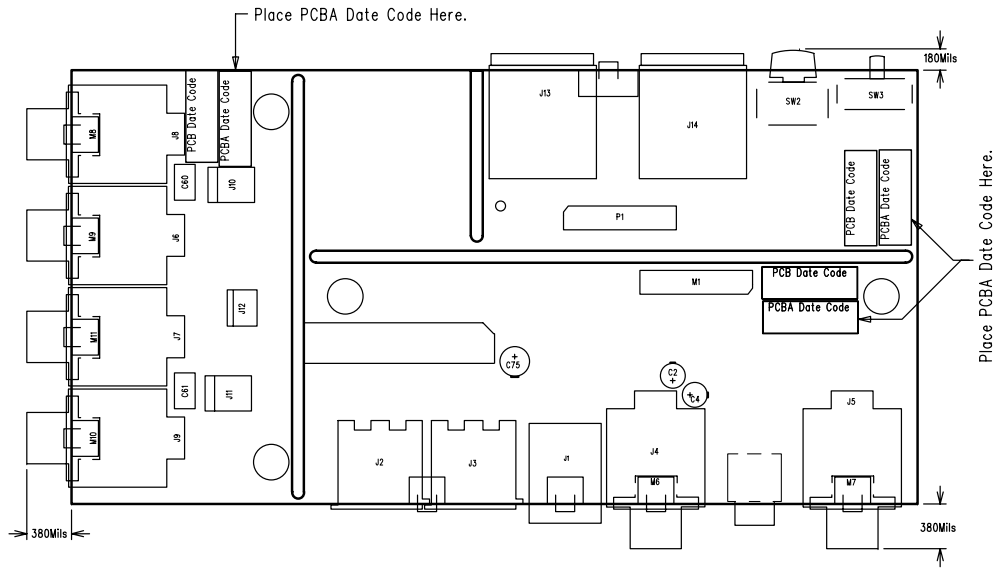
ASSEMBLY TOP

DATE CODE REQUIREMENTS

- 1) Silkscreen date code for bare PCB fabrication in area marked on drawing.
- 2) Place date code stamp or sticker for finished PCBA in area marked on drawing.

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COMPANY:			LINE 6 INC.		
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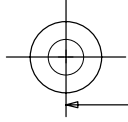
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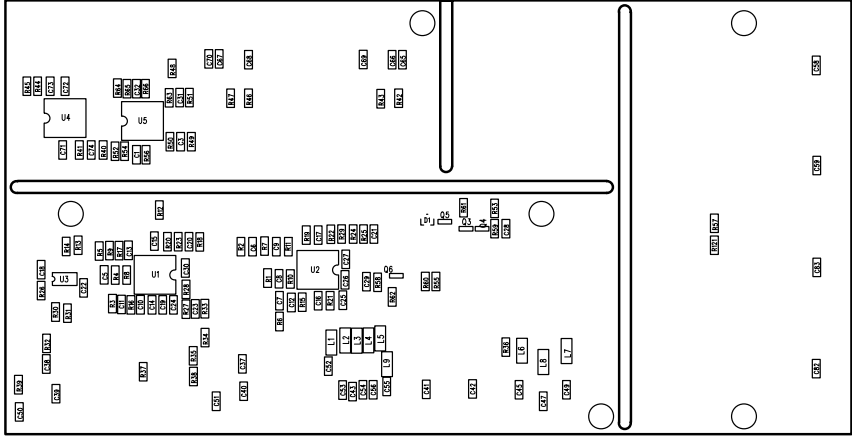
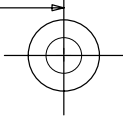
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PROGRAM: PADS POWER PCB 3.5.1		
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SCALE: 1:1	REV: C	DATE: MARCH 5, 2001
TITLE: HD II MIDI-CAB-SPEAKER PCB		

- DATE CODE REQUIREMENTS**
- 1) Silkscreen date code for bare PCB fabrication in area marked on drawing.
 - 2) Place date code stamp or sticker for finished PCBA in area marked on drawing.

MIDI CAB SIM Board PART#: 35-00-4009
 Speaker Board PART#: 35-00-4010
 XLR Board PART#: 35-00-4011



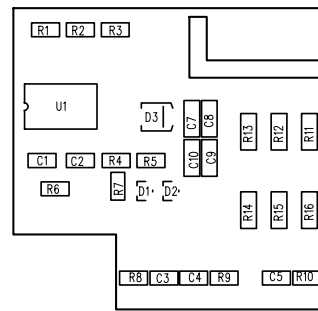
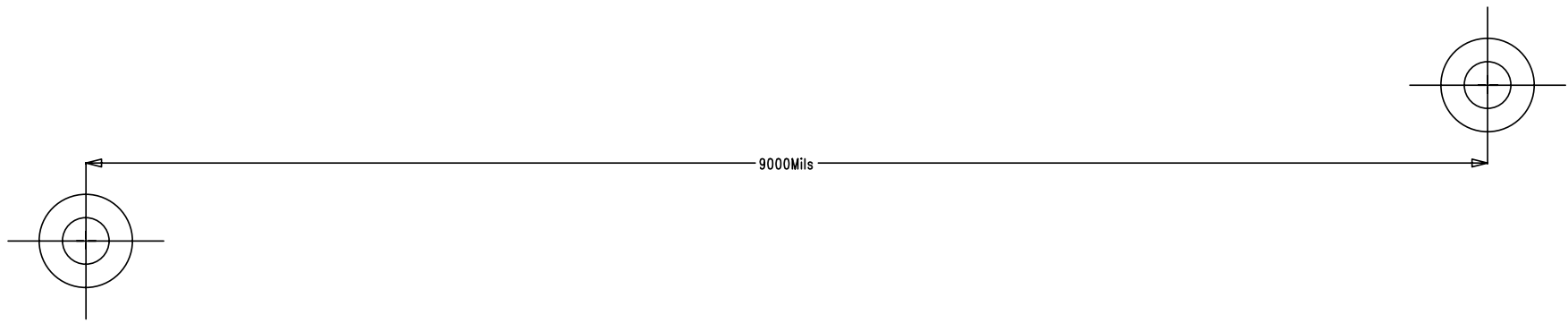
1300MIP



INSERTION BOTTOM

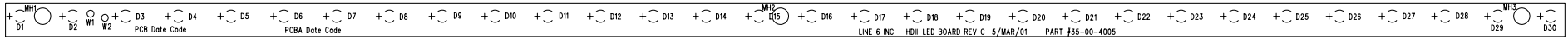
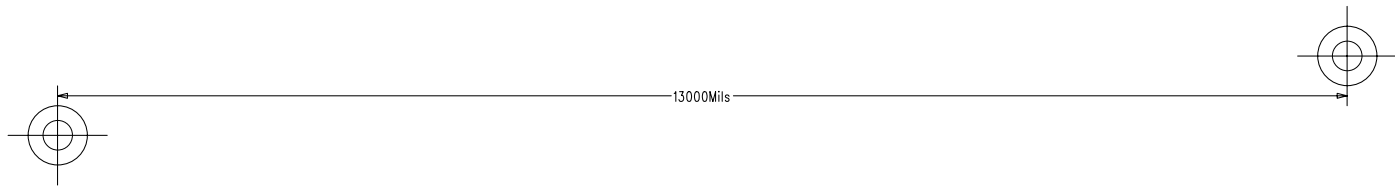
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FAST FORWARD DESIGNS INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF FAST FORWARD DESIGNS INC. IS PROHIBITED	
COMPANY: LINE 6	
PROGRAM: PADS POWER PCB 3.2.1	
FILE: d:\hd\ltd\circuit\ftd\hd\ltd\hardware\pcb\hd\ltd\mid_spkr_xlr_rev.cpcb	
TITLE: HD II MIDI-CAB-SPEAKER PCB	SCALE: 1:1 REV: C DATE: MARCH 2, 2001

XLR Board PART#: 35-00-4011
 Speaker Board PART#: 35-00-4010
 MIDI CAB SIM Board PART#: 35-00-4008



ASSEMBLY TOP

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF LINE 6 INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF LINE 6 INC. IS PROHIBITED		
COMPANY: LINE 6 INC.		
PROGRAM: PADS POWER PCB 3.5		
FILE: Data on Ffd/Clients/FFD/HDII/Hardware/Pcb/HDII TOP SWITCH BD REV A.PCB		
SCALE: NONE	REV: A	DATE: JANUARY 18, 2001
TITLE: HDII TOP SWITCH BD		DRAWING NO: 35-00-4014



Place PCBA Date Code Here.

SILKSCREEN TOP

DATE CODE REQUIREMENTS
 1) Silkscreen date code for bare PCB fabrication in any open area, top side.
 2) Place date code stamp or sticker for finished PCBA in any open area, top side.

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF LINE 6 INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF LINE 6 INC. IS PROHIBITED

COMPANY:		LINE 6 INC.	
PROGRAM: PADS POWER PCB 3.5.1			
FILE: Date on F14/Ghosts/FFD/HDII/ledboard/Pad/HDII LED BOARD REV C.PCB			
SCALE: NONE	REV: C	DATE: MARCH 5, 2001	
TITLE: HDII LED BOARD		DRAWING NO: 35-00-4005	

99 FLEX HD2 120v

=====			
Parent Item: 99 FLEX HD2 120 Flexitone 2 HD Assembly 120V			
1	21-34-0012	CABLE SIL FAB TO PRINT REV A INCOR ECO # 24102	1.000000
1	21-34-1001	Cable Assembly, FHD 2 PWR-Main 10 pin	1.000000
1	21-34-1002	Cable Assembly, FHD 2 Amp1-Main 10 pin	1.000000
1	21-34-1003	Cable Assembly, FHD 2 Amp2-Main 10 pin	1.000000
1	21-34-1004	Cable Assembly, FHD 2 Power Supply to Right Amp 6pin	1.000000
1	21-34-1005	Cable Assembly, FHD 2 AC line-Power3 1 pin	1.000000
1	21-34-1006	Cable Assembly, FHD 2 Amps-Out 2 pin	2.000000
1	21-34-1007	Cable Assembly, FHD 2 Imp Sw-Main 3 pin	1.000000
1	21-34-1008	Cable Assembly, FHD 2 Out-Main 3 pin	1.000000
1	21-34-1009	CAB RIBBON DIL 26-PIN 2mm 7" Z-TYPE	1.000000
1	21-34-1012	Cable Assembly, FHD 2 Power Supply to Left Amp 6pin	1.000000
1	21-34-1013	Cable Assembly, FHD 2 Power Switch to Power Supply	1.000000
1	21-34-1021	CA SIL 3-PIN 1"LG JUMPER HD2 230V TO 120V (PIN 2 NOT USED)	1.000000
1	21-37-1160	CABLE PWR UL/CSA SJT 18awg Blk EL-302 w/gnd plug EL701 Sockt	1.000000
1	24-06-0011	SWITCH,POWER,ROCKER, CHASSIS MOUNT, OSLO RTP11A9C9	1.000000
1	24-09-1301	SWITCH SLIDER 3-POS PNL-MNT	1ALPHA SS13010-0203-8T-011-NB 1.000000

1	24-21-1122	Flextone II SWITCH CAP	1.000000
1	30-00-0305	SCREW M3 X 5 MM PHILLIPS FLAT BLACK	2.000000
1	30-00-0412	SCREW #4-40 X 1/4 PHILLIPS PAN BLACK	2.000000
1	30-00-0607	SCR 6-32 x 7/16 LG PHILLIPS PN H STL ZINC (W/ LK WASH)	30.000000
1	30-00-0632	SCR 6-32 x .375 LG TAMPER RESI STANT BLK	1.000000
1	30-00-1012	SCREW #10-32 X 1/2 PHILLIPS PAN ZINC	4.000000
1	30-00-1020	SCR, 10-24 x 1 1/4 LG, OVAL CT SK, PHH, STL, BLK	2.000000
1	30-00-1124	Ref: Handle mounting to cabinet. SCR, 10-32 x 1 1/2 LG, OVAL CT SK, PHH, STL, BLK	4.000000
1	30-00-1632	SCR 6-32x3/8 PNH PHH TAP TITE STL BLK	8.000000
1	30-00-4250	SCR sheet metal pan head slf tap. w/blk oxide 4 x.250"	4.000000
1	30-00-9358	SCR, NO.3, 1/2LG, OVAL CTSK PH H, BLK (SUBST FOR 30-00-0358)	4.000000
1	30-03-0001	WASHER #10 EXTERNAL TOOTH LOCKWASHER ZINC	4.000000
1	30-03-0011	WASHER, FINISHING, NO. 10, CTS K, BLK OXIDE	4.000000
1	30-03-1010	WASHER #10 FLAT ZINC	1.000000
1	30-06-3232	Threaded Hex Nut for 1/4" 6 pin stereo phone jack	7.000000
1	30-12-0200	STANDOFF HEX 6-32 X 2.00 LONG	4.000000
1	30-27-0150	FHD2 Lamp Lens Extrusion	1.000000
1	30-42-0035	Overlay, FHD II	1.000000

=====			
1	30-45-2000	KNOB PLASTIC	10.000000
1	30-51-0150	Metal Chassis, FHD 2	1.000000
1	30-51-0151	Metal Cover, FHD 2	1.000000
1	30-57-0580	HANDLE/STRAP HEAVY DUTY BLACK	1.000000
1	30-57-0581	END CAPS, BLACK, TEXTURED FINI SH	2.000000
1	30-60-2010	LOGO LINE 6	1.000000
1	30-60-2015	LOGO, Flexitone II HD Name Badge	1.000000
1	40-00-0073	SHEET ACCESSORY DOMESTIC	1.000000
1	40-00-0131	Manual, User's, Flexitone 2 HD	1.000000
1	40-00-0132	Chart, Patch, Flexitone II	1.000000
1	40-10-0033	Foam corner, Flex2 HD	8.000000
1	40-10-0003	CARTON FLEXTONE HD2	1.000000
1	40-20-0010	Plastic Bag,43"x38"x.004,clear	1.000000
1	40-20-0011	BAG PLASTIC 10 x 16 2 mil	1.000000
1	40-25-0015	Label, Grounding	1.000000
1	40-25-0100	Label, Bar Code Serial Number 4 panel label - LTX 16 1125503	1.000000
1	40-25-4001	STICKER HDII CAB-MODES COVER-UP 4.5" X 1.5" X .002"	1.000000
1	45-00-0075	CD-Rom, Flexitone 2,Pod 2,Pod Pro,Pod2 Upgrade,and Bod	1.000000
1	50-00-0165	Ref: REVISION H ONWARD TO BE USED. FHD 2 Wood Box Assembly	1.000000

2	30-00-0812	SCR NO.8 x 3/4 LG PHH TRUSS BL K OXIDE W/WAX (CORNER)	12.000000
2	30-00-6839	FEET SCREW FOR AMP WOOD BOX #10-12X7/8 PHIL PN	4.000000
2	30-06-1024	NUT 10-24 X 5/16 Tee Plain steel, Tape/reel package	2.000000
2	30-30-1530	Corner, black, black, two legs and cut out	8.000000
2	30-36-0001	FABRIC VINYL BLACK-BRONCO ASC03 54"-Wide	.625000
2	30-48-1686	FEET, 1.48 INCH O.D., RBR, BLK , AX2-HD-XL-212s	4.000000
1	50-00-4000	PCBA POWER SUPPLY HDII	1.000000
2	01-00-0100	RES 10R 5% 1/8W 0805 SM	2.000000
2	01-00-0101	Ref: R51,R52. RES 100R 5% 1/8W 0805 SM	4.000000
2	01-00-0200	Ref: R23,R24,R53,R59. R23,R53,R59 RES 20R 1/8W 5% 0805 SM	2.000000
2	01-00-0331	Ref: R7-R8. RES 330R 1/8W 5% 0805 SM	2.000000
2	01-00-0684	Ref: R57-R58. RES 680K 1/8W 5% 0805 SM	3.000000
2	01-00-1001	Ref: R5,R46,R54. RES 1K 1/8W 1% 0805 SM	5.000000
2	01-20-0102	Ref: R17,R19,R40,R42-R43. RES 1K 2W 5% METAL-OXIDE TH	2.000000
2	01-20-0390	Ref: R49-R50. RES 39R 2W 5% METAL-OXIDE TH	2.000000
2	01-20-0473	Ref: R33,R36. R34,R35 removed by way of eco# 107501. DIGIKEY 47.0KW-2-ND Ref: R1-R2.	2.000000

2	01-20-0623	RES 62K 1W 5% METAL OXIDE TH	1.000000
2	01-20-0750	Ref: R60. RES 75R 2W 5% METAL-OXIDE	2.000000
2	01-24-1002	Ref: R34-R35. RES 10K 1/8w 1% 0805 SM	13.000000
		Ref: R3,R4,R20,R31,R38-R39,R47-R48,R56,R61-R64,R56	
2	01-24-1503	RES 150K 1/8W 1% 0805 SM	4.000000
2	01-24-2002	Ref: R9,R16,R37,R55. RES 20.0K 1/8W 1% 0805 SM	2.000000
2	01-24-2432	Ref: R6,R21. RES 24.3K 1/8w 1% 0805 SM	1.000000
2	01-24-3012	Ref: R22. RES, 30.1K, 1/8W,1%,0805 SM	1.000000
2	01-24-4121	Ref: R32. RES, 4.12K,1/8W,1%,0805 SM	2.000000
2	01-24-47R5	Ref: R11-R12. RES 47.5R 1/8W 1% 0805 SM	1.000000
2	01-24-4751	Ref: R29. RES 4.75K 1/8W 1% 0805 SM	3.000000
2	01-24-4752	Ref: R27-R28,R44. RES 47.5K 1/8W 1% 0805 SM	3.000000
2	01-24-6191	Ref: R18,R25,R26. RES 6.19K 1/8W 1% 0805 SM	1.000000
2	01-24-7501	Ref: R41. RES 7.50K 1/8W 1% 0805 SM	1.000000
2	01-70-0009	Ref: R45. THERMISTOR 16V .1A TH MURATA PTH9M04BB471TS2F333	1.000000
		Ref:PTC1.	

2	03-00-0331	CAP 330pf 1000V 20% CERDISC TH	2.000000
2	03-00-0471	Ref: C30-C31. CAP 470pF 1000V 20% CER-DISCTH	2.000000
2	03-00-1471	Ref: C29,C32. CAP 470pF 250VAC 20% CER-DISC TH Y-CAP	3.000000
2	03-14-0476	Ref: C43-C45. CAP 47uF 25V 20% RAD ELEC TH	1.000000
2	03-14-1227	Ref: C41. HAND SOLDER TO C41 AFETR DAUGHTER BOARD IS INSTALLED PER ECO3 103101. CAP 220uF 25V 20% RADIAL ELECT 8x15x3.5mm	3.000000
2	03-16-1108	Ref: C33-C35. CAP 1000uF 35V 20% 105C RAD ELEC	2.000000
2	03-18-0106	Ref: C3,C6 CAP 10uF 50V 20% RAD ELEC TH	1.000000
2	03-20-0227	Ref: C13. CAP 220uF 63V 20% RADIAL ELEC 12.5x20x5mm NICH UPL1J221MHH	2.000000
2	03-22-0108	Ref: C4-C5. CAP 1000uF 200V 20% ELEC TH 25x50x10mm PAN. ECO-S2DP102CA	2.000000
2	03-24-0223	Ref: C1-C2. CAP 22nF 250V 20% TH METAL FILM-POLY ECQ-E2223KS	1.000000
2	03-41-0224	Ref: C56. CAP X-CAP 0.22uF 250V 20% TH 9.5x18x17.5x15mm	1.000000
2	03-50-0102	Ref: C42. CAP 1nF 50V 5% 0805 NPO SM	5.000000
2	03-52-0101	Ref: C15-C17,C20,C39. TOLERANCE CHANGED FROM 20% TO 5% VIA ECO# 102401. C12 REMOVED BY WAY OF ECO# 103101. CAP 100 pF 50V 20% 0805 SM X7R 0805C101M5RAC ref:C12,C37	2.000000

2	03-52-0331 X7R	CAP 330pF 50v 20% 0805 SM	1.000000
2	03-52-0332 X7R	Ref: C19. C26 REMOVED AND C19 ADDED BY WAY OF ECO# 103101. CAP 3.3nF 50V 20% 0805 SM	1.000000
2	03-52-0333 X7R	Ref: C26. CAP 33nF 50V 20% 0805 SM	1.000000
2	03-52-0470 X7R	Ref: C14. REPLACES PART# 03-52-0104 PER ECO# 103101. CAP 47pF 50V 20% 0805 SM	2.000000
2	03-52-0473 X7R	Ref: C27,C38. CAP 47nF 50V 20% 0805 SM	12.000000
2	03-52-1103	Ref: C21,C23-C24,C40,C46,C47-C48,C50-C51,C53-C55. C18,C47,C53 C18 removed by way of eco# 109901. CAP 10nF 100V 10% 0805 SM X7R	7.000000
2	03-52-1471	Ref: C7-C11,C22,C49. CAP 470pF 100V 20% 0805 SM X7R	3.000000
2	06-08-0068	Ref: C28,C36,C52. DIODE ZENER 6.8V 1W TH	1.000000
2	06-16-0008	Ref: D26. DIODE BRIDGE-RECT 8A 600V TH GENERAL-SEMI KBU8J	1.000000
2	06-24-0460	Ref: D1. DIODE POWER RECTIFIER MOTOROLA MUR460	2.000000
2	06-24-1660	Ref: D5,D10. DIODE POWER RECTIFIER DUAL MOTOROLA MUR1660CT	4.000000
2	06-28-8410	Ref: D6-D9. DIODE ZENER 10V BZX84C10 SOT23 FAIRCHILD	1.000000
2	06-28-8418	Ref: D34. DIODE ZENER 18V BZX84C18 SOT23 FAIRCHILD	2.000000
		Ref: D24,D40.	

2	06-32-0160	DIODE RECT U-FAST DO-214A SM GENERAL-SEMI MURS160	10 EA	4.000000
2	06-34-0016	DIODE SWITCHING BAS16LT1 SOT23 MOTOROLA	10 EA	14.000000
		Ref: D4,D13,D14,D16. Ref: D3,D12,D17-D23,D30,D33,D35,D37,D39. Removed D38,D40.		
2	09-06-0460	TRANS POWER-MOSFET IRFP460 TH		2.000000
2	09-06-3306	TRANS POWER FET ZVN3306F SM ZETEC		1.000000
2	09-06-7002	TRANS POWER FET NCHL 2N7002 TH		2.000000
2	09-10-4401	TRANS NPN SMALL-SIGNAL MBT4401 SOT-23 SM		7.000000
2	09-10-4403	TRANS PNP SMALL-SIGNAL MBT4403 SOT-23 SM		3.000000
2	10-11-0616	INDUCTOR POWER FWD-CNVRT ICE ICA-0616		1.000000
2	11-10-0002	INDUCTOR CUR-SENSING TH PREMIEROMAGNETICS PM-CI02		1.000000
2	11-10-0584	XFMR OFFLINE GATE DR TH PULSE P0584		1.000000
2	11-10-1255	INDUCTOR COMMON-MODE 5-WIND TH PREMIER-MAGNETICS TSD-1255		1.000000
2	11-30-0617	XFMR VERT BOBBIN 49/v20/-1rtg ICE ICA-0617		1.000000
2	11-30-0633	XFMR HOUSE-KEEPING ICA-0633		1.000000
2	12-54-0084	IC OP AMP Quad TL084CD SM mfg p/n# TL084CD		1.000000
		Ref: U4.		

2	12-62-0234	IC SWITCHER INTERGATED POWER-INTERGRATIONS TOP234G SM	1.000000
		Ref: U1.	
2	15-68-3844	IC CONTROLLER PWM SO-8 UC3844D8	1.000000
		Ref: U2.	
2	21-20-0006	HDR DIL 6-PIN VRT-MNT FRIC-LCK MOLEX 22-23-2061	2.000000
		Ref: H1-H2.	
2	21-20-2010	HDR DIL 10-PIN .100SPC VRT-MNT SHROUDED	1.000000
		Ref: H3.	
2	21-20-4002	HDR SIL 2-PIN .312SPC HORIZ RIGHT-ANG MOLEX 09-75-2034	1.000000
		Ref: J2.	
2	21-20-5002	HDR SIL 2-PIN .312SPC VRT-MNT MOLEX 09-65-2038	1.000000
		Ref: J1.	
2	30-00-0440	SCREW #4-40 X 3/8 Socket CAP ALLOY	11.000000
2	30-00-0607	SCR 6-32 x 7/16 LG PHILLIPS PN H STL ZINC (W/ LK WASH)	4.000000
2	30-00-1632	SCR 6-32x3/8 PNH PHH TAP TITE STL BLK	2.000000
2	30-00-2632	SCR 6-32 x .500 LG SHCS BLK	3.000000
2	30-03-0400	WASHER #4 SPLIT LOCKWASHER ZINC	11.000000
2	30-03-0404	WASHER #4 FLAT ZINC	4.000000
2	30-03-0425	WASHER,#4,1.25" ID,.233" OD, .018 HEIGHT,ZINC PLATE	11.000000
2	30-03-0600	WASHER #6 SPLIT LOCKWASHER ZINC	3.000000
2	30-03-0606	WASHER #6 FLAT ZINC	3.000000
2	30-12-6321	Standoff Pem Hex SO-632-14	7.000000
2	30-15-0404	SHOULDER BUSHING TO-220 VALPAK NY04-040-140-012TWG	4.000000
2	30-51-0158	BRACKET MOUNTING FHD 2 P/S	1.000000

2	30-51-6001	Heat sink, HD 2 P/S#1	1.000000
2	30-51-6002	Ref: H4. Heat sink, HD 2 P/S#2	1.000000
2	30-63-4002	Ref: H5. INSULATOR, THERMAL, MFG PN# K6-AC-104 TO-247	2.000000
2	30-63-4005	THERMAL PAD TO-220 CASE BREGQUIST BERG-400-7-54	4.000000
2	35-00-4013	PCB SUPPORT HEAT SINK	1.000000
1	50-00-4001	PCBA LINE FILTER HDII	1.000000
2	01-12-0154	RES 150K 1/4W 5% DIP TH	2.000000
2	01-70-0516	Ref: R1-R2. THERMISTOR 0.5R 16A TH	1.000000
2	03-00-1102	Ref: RT1. CAP 1nF 250V 20% CER-DISC AC TH	2.000000
2	03-41-0224	Ref: C3-C4. CAP X-CAP 0.22uF 250V 20% TH 9.5x18x17.5x15mm	1.000000
2	10-11-3501	Ref: C1. INDUCTOR COMMON-MODE CUSTOM ICE LF-35040-0044	2.000000
2	21-14-8301	Ref: L1-L2. CON IEC ANGLED 10A IEC320 POWER-COMPONENTS 83011172	1.000000
2	21-20-5002	Ref: J1. HDR SIL 2-PIN .312SPC VRT-MNT MOLEX 09-65-2038	1.000000
2	21-34-1116	Ref: J2. Cable, Earthing FHD green with yellow strip Ref: Solder to through hole clip on pn# 21-14-0001 at M4.	1.000000

2	21-48-9521	CLIP FUSE HOLDER p/n 19521	2.000000
		Ref: F,F1.	
2	24-19-8250	FUSE 8 AMP 250V 5X20mm FAST ACTING Littlefuse 217 or equiv	1.000000
		Ref: f,f1(install into fuse clip holders,pn# 21-48-9521).	
1	50-00-4003	PCBA MAIN HDII	1.000000
2	01-00-0051	RES 5.1R 1/8W 5% 0805 SM	1.000000
		Ref: R19.	
2	01-00-0102	RES 1K 1/8W 5% 0805 SM	5.000000
		Ref: R18,R32,R47,R68,R69.	
2	01-00-0103	RES 10K 1/8W 5% 0805 SM	11.000000
		Ref: R17,R20,R24,R28,R48,R56-R59,R65-R66.	
2	01-00-0104	RES 100K 1/8W 5% 0805 SM	1.000000
		Ref: R51.	
2	01-00-0105	RES 1M 1/8W 5% 0805 SM	1.000000
		Ref: R52.	
2	01-00-0132	RES 1.3K 5% 1/8W 0805 SM	2.000000
		Ref: R22,R36.	
2	01-00-0151	RES 150R 5% 1/8W 0805 SM	8.000000
		Ref: R11,R37-R38,R42-R46.	
2	01-00-0153	RES 15K 1/8W 5% 0805 SM	1.000000
		Ref: R39.	
2	01-00-0221	RES 220R 5% 1/8W 0805 SM	2.000000
		Ref: R10,R23.	
2	01-00-0223	RES 22K 1/8W 5% 0805 SM	2.000000
		Ref: R25-R26.	
2	01-00-0302	RES 3K 1/8W 5% 0805 SM	2.000000
		Ref: R33,R40.	

2	01-00-0362	RES 3.6K 1/8W 5% 0805 SM	4.000000
2	01-00-0393	Ref: R13-R14,R16,R49. RES 39K 1/8W 5% 0805 SM	6.000000
2	01-00-0471	Ref: R60-R64,R67. RES 470R 1/8W 5% 0805 SM	7.000000
2	01-00-0472	Ref: R15,R27,R30-R31,R34-R35,R41. RES 4.7K 1/8W 5% 0805 SM	1.000000
2	01-00-0512	Ref: R12. RES 5.1K 1/8W 5% 0805 SM	1.000000
2	01-00-0561	Ref: R21. (R28 REMOVED) RES 560R 1/8W 5% 0805 SM	1.000000
2	01-16-0102	Ref: R29. RES 1K 1/2W 5% TH	2.000000
2	01-24-6191	Ref: R54-R55. RES 6.19K 1/8W 1% 0805 SM	1.000000
2	01-48-0103	Ref: R9. POT 10K MONO LINEAR D-SHAFT-25 mm	7.000000
2	01-48-4103	Ref: R2-R8. POT 10KB DUAL 25MM STEREO	1.000000
2	03-12-0337	Ref: R1. CAP 330uF 16V 20% RAD ELEC TH	1.000000
2	03-18-0105	Ref: C12. CAP 1uF 50V 20% RAD ELEC TH	7.000000
2	03-18-0106	Ref: C29,C33,C35,C40,C47,C52,C56. CAP 10uF 50V 20% RAD ELEC TH	5.000000
2	03-45-0103	Ref: C11,C14,C26,C31,C66. CAP 10nF 50V 20% 1206 FILM SM X7R Ref:C6	1.000000

2	03-45-0473	CAP 47nF 16V 20% 1206 FILM SM	1.000000
2	03-50-1220	Ref: C58. CAP 22pF 200V 5% 0805 SM NPO	5.000000
2	03-52-0102 X7R	Ref: C9,C15,C17-C18,C61. CAP 1nF 50V 20% 0805 SM	2.000000
2	03-52-0103 X7R	Ref: C37,C39. CAP 10nF 50V 20% 0805 SM	6.000000
2	03-52-0471 X7R	Ref: C8,C44,C46,C60,C62,C65 CAP 470pF 50V 20% 0805 SM	4.000000
2	03-52-0473 X7R	Ref: C7,C10,C13,C19. CAP 47nF 50V 20% 0805 SM	33.000000
2	06-28-8439 FAIRCHILD	Ref: C1-C5,C16,C20-C25,C27-C28,C30,C32,C34,C36,C38,C41-C43,C45, C48-C51,C53-C54,C57,C59,C63-C64. DIODE ZENER BZX84C3V9 SOT-23	4.000000
2	06-34-0016 MOTOROLA	Ref: D39-D42. DIODE SWITCHING BAS16LT1 SOT23	29.000000
2	09-10-4401 SOT-23 SM	Ref: D8-D9,D11-D12,D14-D38. TRANS NPN SMALL-SIGNAL MBT4401	4.000000
2	09-10-4403 SOT-23 SM	Ref: Q1,Q3-Q4,Q6. TRANS PNP SMALL-SIGNAL MBT4403	1.000000
2	11-00-1198	Ref: Q2. XTAL 11.98080MHz HC-49/U	1.000000
2	11-10-0120 1206	Ref: X1. BEAD FERRITE 120R @100MHz SM	2.000000
2	11-40-0030	Ref: L1-L2. BATTERY LITHIUM 3V BR2325-1HG	1.000000
2	12-02-7805	Ref: B1. IC REG +5v 1.5 Amp TH	1.000000

Ref: U12.

2	12-02-7815	IC REG +15V 1AMP TH	1.000000
		Ref: U18.	
2	12-02-7915 7915	IC REG -15V 1AMP TH	1.000000
		Ref: U16.	
2	12-54-0072	IC OP-AMP DUAL TL072CD SM	2.000000
		Ref: U9,U19.	
2	12-54-0084	IC OP AMP Quad TL084CD SM mfg p/n# TL084CD	1.000000
		Ref: U24.	
2	12-64-0542 SM	IC CONVERTER A/D 8-BIT TLC542	1.000000
		Ref: U21.	
2	12-64-4520 SM	IC CONVERTER A/S 20-BIT AK4520	1.000000
		Ref: U13.	
2	15-40-6138	IC OPTO-ISOLATOR 6N138 TH	1.000000
		Ref: U10.	
2	15-62-0010 3-IN SM	IC 74HC10 NAND-GATE TRIPLE	2.000000
		Ref: U2,U20.	
2	15-62-0014 1-IN SM	IC 74HC14 INVERTER-HEX SIN	1.000000
		Ref: U6.	
2	15-62-0074 2-IN SM	IC 74HC74 FLIP-FLOP DUAL DTYPE	1.000000
		Ref: U22.	
2	15-62-0161 4-BIT SM	IC 74HC161 COUNTER BINARY	1.000000
		Ref: U3.	
2	15-62-0165	IC 74HC165 SHIFT-REGISTER PARLL-IN/SERIAL-OUT SM	1.000000
		Ref: U1.	
2	15-62-0273 8-BIT SM	IC 74HC273 FLIP-FLOP D-TYPE	2.000000
		Ref: U7,U8.	
2	15-62-0393 4-BIT SM	IC 74HC393 COUNTER BINARY DUAL	1.000000
		Ref: U23.	
2	15-62-0573	IC 74HC573 BUFFER INVERTING 8-BIT SM	1.000000
		Ref:U11.	

2	15-70-6256	IC DRAM ISSI IS4IC16257-35K	1.000000
		Ref: U14.	
2	15-72-0256	IC SRAM 32K X 8 CY62256LL-70SNC 0024 623249	1.000000
		Ref: U4.	
2	15-84-8033	IC P80C31SBBB SOT307-2 SM	1.000000
		Ref: U15.	
2	15-86-7070	IC DSP TMS57070FFT SM	1.000000
		Ref: U17.	
2	15-92-1812	IC RESET CHIP DS1812R-5/T&R SOT-23	1.000000
		Ref: Q5.	
2	18-02-0034	LED YELLOW L34YDLK TH	7.000000
		Ref: D1-D7.	
2	21-20-0204	HDR SIL 4-PIN 2mm SHRD	2.000000
		Ref: H1,H9.	
2	21-20-1003	HDR DIL 3-PIN 100SPC VERT-MNT FRIC-LOCK MOLEX 22-23-2031	2.000000
		Ref: H2,H5.	
2	21-20-1010	HDR DIL 10-PIN 2x5x.100 CTRS AMP 103308-1	3.000000
		Ref: H4,H7-H8.	
2	21-20-3002	HDR SIL 2-PIN VERT-MNT LOCKING MOLEX 22-23-2021 or 22-23-2022	1.000000
		Ref: H6.	
2	21-23-0026	HEADER, 26-PIN, 2X13-100 VERT, 2X13X.100 PITCH	1.000000
		Ref: H3.	
2	21-42-0032	SOCKET 32-PIN DIP TH	1.000000
		Ref: U5.	
2	24-12-0025	ENCODER 16-STEP V-MOUNT PCB	2.000000
		Ref: EN1-EN2.	
2	24-31-1105	SWITCH TACT	7.000000

Ref: SW1-SW7

2	30-00-0607	SCR 6-32 x 7/16 LG PHILLIPS PN H STL ZINC (W/ LK WASH)	1.000000
2	30-12-0632	Ref: U12. See eco# 110702. STDF HEX #6-32 x 1"LG F-F	1.000000
2	45-00-0200	IC EPROM PROGRAMMED HDII v1.1	1.000000
3	15-26-1000	Ref: U5. IC EPROM 1M 32-PIN DIP W27E010-70 TH (BLANK)	1.000000
1	50-00-4004	Ref: U5. PCBA AMPLIFIER HDII	2.000000
2	01-00-0051	RES 5.1R 1/8W 5% 0805 SM	8.000000
2	01-00-0105	Ref: R27,R28,R47-R48. RES 1M 1/8W 5% 0805 SM	10.000000
2	01-00-0273	Ref: R9,R17R74,R94-R95. RES 27K 1/8W 5% 0805 SM	14.000000
2	01-00-1504	Ref: R53,R69,R75,R92-R93,R97.R139. RES 1.5M 1/8W 5% 0805 SM	2.000000
2	01-00-3303	Ref: R51. RES 330K 1/8W 5% 0805 SM	4.000000
2	01-20-0022	Ref: R78,R84. RES 0.22R 2W 5% TH	8.000000
2	01-20-0220	Ref: R19,R21,R30,R54. RES 2.2R 2W 5% DIP TH	2.000000
2	01-24-0113	Ref: R23. RES 11.0K 1/8W 1% 0805 SM	10.000000
2	01-24-0151	Ref: R24,R43,R83,R101,R102. RES 150R 1/8W 1% 0805 SM	20.000000
		Ref: R2-R3,R12,R16,R18,R20,R38,R44-R46.	

2	01-24-0153	RES 15.0K 1/8W 1% 0805 SM	6.000000
		Ref: R13,R57,R91.	
2	01-24-0225	RES 2.2M 1/8W 5% 0805 SM	6.000000
		Ref: R25,R34,R89.	
2	01-24-1001	RES 1.00K 1/8W 1% 0805 SM	8.000000
		Ref: R6,R32,R49,R60.	
2	01-24-1002	RES 10K 1/8w 1% 0805 SM	18.000000
		Ref: R29,R35,R52,R62,R64,R67,R70,R73,R86.	
2	01-24-1003	RES 100K 1/8W 1% 0805 SM	16.000000
		Ref: R8,R15,R55,R66,R76-R77,R79,R85.	
2	01-24-1873	RES 187K 1/8W 1% 0805 SM	4.000000
		Ref: R39,R90.	
2	01-24-3921	RES 3.92K 1/8W 1% 0805 SM	4.000000
		Ref: R40,R72.	
2	01-24-4750	RES 475R 1/8W 1% 0805 SM	20.000000
		Ref: R1,R4-R5,R10-R11,R42,R50,R58,R59,R61.	
2	01-24-4751	RES 4.75K 1/8W 1% 0805 SM	26.000000
		Ref: R22,R31,R33,R36-R37,R71,R81,R87-R88,R124-R125,R132-R133.	
2	01-24-4752	RES 47.5K 1/8W 1% 0805 SM	2.000000
		Ref: R41.	
2	01-24-4753	RES 475K 1/8W 1% 0805 SM	2.000000
		Ref: R56.	
2	01-24-6811	RES 6.81K 1/8W 1% 0805 SM	8.000000
		Ref: R7,R14,R26,R65.	
2	01-24-8251	RES 8.25K 1/8W 1% 0805 SM	2.000000
		Ref: R80.	
2	01-24-8253	RES 825K 1/8W 1% 0805 SM	2.000000
		Ref: R63.	

QTY	PN	DESCRIPTION	QTY
2	01-24-9093	RES 90.9K 1/8W 1% 0805 SM	4.000000
2	01-70-0080	Ref: R68,R82. THERMISTOR 80C PTC TH	2.000000
2	03-12-0107	Ref: RT1. CAP 100uF 16V 20% RAD ELEC TH	8.000000
2	03-18-0105	Ref: C13,C18,C20,C25. CAP 1uF 50V 20% RAD ELEC TH	4.000000
2	03-18-0106	Ref: C10,C28. CAP 10uF 50V 20% RAD ELEC TH	8.000000
2	03-18-0333	Ref: C8,C12,C30,C31. CAP 33uF 50V 20% RAD ELEC TH	6.000000
2	03-18-0474	Ref: C1,C3,C23. CAP 0.47uF 50V 20% RAD ELEC TH	2.000000
2	03-22-0473	Ref: C27. CAP 47NF 250V 20% POLY TH SEE 03-32-0473	4.000000
2	03-22-0476	Ref: C42-C43. CAP 47uF 100V 20% RAD ELEC TH 10x15x5mm	8.000000
2	03-24-0334	Ref: C38-C41. CAP 0.33uF 250V 5% FILM TH	2.000000
2	03-50-1220	Ref: C6. CAP 22pF 200V 5% 0805 SM NPO	2.000000
2	03-52-0101	Ref: C26. CAP 100 pF 50V 20% 0805 SM X7R 0805C101M5RAC	8.000000
2	03-52-0222	Ref: C2,C7,C33,C36. CAP 2.2nF 50V 20% 0805 SM X7R	2.000000
2	03-52-0223	Ref: C16. CAP 22nF 50V 20% 0805 SM X7R	4.000000
2	03-52-0470	Ref: C22,C24. CAP 47pF 50V 20% 0805 SM X7R Ref: C4-C5,C14-C15.	8.000000

2	03-52-0473 X7R	CAP 47nF 50V 20% 0805 SM	22.000000
2	03-52-0683 X7R	Ref: C11,C17,C19,C21,C29,C32,C34-C35,C44,C47,C52. CAP 68nF 50V 20% 0805 SM	2.000000
2	06-28-8412	Ref: C9. DIODE ZENER 12V BZX84C12 SOT23	4.000000
2	06-28-8418 FAIRCHILD	Ref: D6-D7. DIODE ZENER 18V BZX84C18 SOT23	2.000000
2	06-28-8439 FAIRCHILD	Ref: D21. DIODE ZENER BZX84C3V9 SOT-23	6.000000
2	06-28-8468 SOT-23 FAIRCHILD	Ref: D10,D17-D18. DIODE ZENER 6.8V BZX84C6V8	8.000000
2	06-32-1045 MBRB1045 SMD	Ref: D1,D13-D14,D16. DIODE SCHOTKY 45V 10A	4.000000
2	06-34-0016 MOTOROLA	Ref: D8,D12. DIODE SWITCHING BAS16LT1 SOT23	20.000000
2	09-00-4403 TH	Ref: D2-D3,D5,D9,D11,D15,D19-D20,D27,D34. TRANS PNP SMALL-SIGNAL 2N4403	2.000000
2	09-00-4404	Ref: Q35. TRANS LOW-POWER PMBT4403 TH	18.000000
2	09-00-5551 TH	Ref: Q6-Q8,Q15,Q19-Q20,Q22,Q25,Q33. TRANS NPN SMALL-SIGNAL 2N5551	8.000000
2	09-06-0250	Ref: Q21,Q23,Q34,Q39 TRANS POWER-MOSFET IRFP250 TH	8.000000
2	09-10-0042 SOT-23 SMD	Ref: Q9-Q10,Q13-Q14. TRANS SMALL-SIGNAL MMBTA42LT1	6.000000
2	09-10-0092 SOT-23 SMD	Ref: Q3,Q17,Q38. TRANS SMALL-SIGNAL PMBTA92	6.000000
		Ref: Q1,Q24,Q27.	

2	09-10-4401	TRANS NPN SMALL-SIGNAL MBT4401 SOT-23 SM	16.000000
		Ref: Q4,Q5,Q11,Q16,Q18,Q26,Q28-Q29	
2	09-10-4416	TRANS SMALL-SIGNAL SST4416 N-CHANNEL J-FET	4.000000
		Ref: Q30,Q31.	
2	09-61-7563	TRANS POWER FET HUF75639S3S N-CHANNEL	4.000000
		Ref: Q2,Q12.	
2	12-54-0084	IC OP AMP Quad TL084CD SM mfg p/n# TL084CD	2.000000
		Ref: U2.	
2	12-54-1082	IC OP-AMP DUAL TLC082CD WIDE-BAND SM	2.000000
		Ref: U6.	
2	12-54-1084	IC OP-AMP QUAD TLC084CD WIDE-BAND SM	4.000000
		Ref: U4,U7.	
2	12-58-0393	IC COMPARATOR DUAL LM393D-T SM	2.000000
		Ref: U10.	
2	12-62-4066	IC SWITCH QUAD BI 14-PIN SM TI CD4066BM	2.000000
		Ref: U1.	
2	21-20-0006	HDR DIL 6-PIN VRT-MNT FRIC-LCK MOLEX 22-23-2061	2.000000
		Ref: J1.	
2	21-20-2010	HDR DIL 10-PIN .100SPC VRT-MNT SHROUDED	2.000000
		Ref: P1.	
2	21-20-6002	HDR SIL 2-PIN .156SPC VERT-MNT	2.000000
		Ref: J2.	
2	30-00-2632	SCR 6-32 x .500 LG SHCS BLK	8.000000
2	30-03-0600	WASHER #6 SPLIT LOCKWASHER ZINC	8.000000
2	30-51-6003	Heat sink, HD 2 Amplifier	2.000000
2	30-63-4002	INSULATOR, THERMAL, MFG PN# K6-AC-104 TO-247	8.000000

2	30-63-5050	GAP-PAD VO-SOFT .125"THK x .50 " x .50"	2.000000
1	50-00-4005	PCBA LED HDII	1.000000
2	18-01-0131	LED, Superorange Am. Bright BLBJ0131E	30.000000
2	21-34-1010	Ref: D1-D30. Cable Assembly, FHD 2 LED-Main 4 pin Ref: CONNECT W1 TO W2.	1.000000
1	50-00-4009	PCBA MIDI-CAB SIMULATION HDII	1.000000
2	01-00-0102	RES 1K 1/8W 5% 0805 SM	2.000000
2	01-00-0103	Ref: R5,R7. RES 10K 1/8W 5% 0805 SM	1.000000
2	01-00-0104	Ref: R55. RES 100K 1/8W 5% 0805 SM	3.000000
2	01-00-0133	Ref: R11,R17,R53. RES 13K 1/8W 5% 0805 SM	2.000000
2	01-00-0202	Ref: R2,R27 RES 2K 1/8W 5% 0805 SM	2.000000
2	01-00-0221	Ref: R58-R59, RES 220R 5% 1/8W 0805 SM	1.000000
2	01-00-0223	Ref: R36. RES 22K 1/8W 5% 0805 SM	8.000000
2	01-00-0224	Ref: R14,R26,R31,R33-R35,R60,R62 RES 220K 1/8W 5% 0805 SM	6.000000
2	01-00-0331	Ref: R8,R10,R18,R22,R37-R38. RES 330R 1/8W 5% 0805 SM	2.000000
		Ref: R32,R39	

2	01-00-0513	RES 51K 1/8W 5% 0805 SM	2.000000
		Ref: R4,R19.	
2	01-24-3921	RES 3.92K 1/8W 1% 0805 SM	2.000000
		Ref: R13,R30.	
2	01-24-4022	RES 40.2K 1/8W 1% 0805 SM	4.000000
		Ref: R12,R23,R25,R29.	
2	01-24-4222	RES 42.2K 1/8W 1% 0805 SM	2.000000
		Ref: R20,R24.	
2	01-24-4753	RES 475K 1/8W 1% 0805 SM	2.000000
		Ref: R21,R28.	
2	01-24-4871	RES 4.87K 1/8W 1% 0805 SM	5.000000
		Ref: R1,R3,R6,R9,R61.	
2	01-24-9763	RES 976K 1/8W 1% 0805 SM	2.000000
		Ref: R15-R16.	
2	03-14-0476	CAP 47uF 25V 20% RAD ELEC TH	1.000000
		Ref: C75.	
2	03-18-0105	CAP 1uF 50V 20% RAD ELEC TH	2.000000
		Ref: C2,C4.	
2	03-52-0100 X7R	CAP 10pF 50V 20% 0805 SM	2.000000
		Ref: C5,C8.	
2	03-52-0152 X7R	CAP 1.5nf 50v 20% 0805 SM	12.000000
		Ref: C20-C21,C37-C43,C45,C47,C49	
2	03-52-0221 X7R	CAP 220pF 50V 20% 0805 SM	2.000000
		Ref: C50-C51.	
2	03-52-0223 X7R	CAP 22nF 50V 20% 0805 SM	6.000000
		Ref: C6,C19,C23-C26.	
2	03-52-0331 X7R	CAP 330pF 50v 20% 0805 SM Ref:C7,C9-C13,C27,C30.	8.000000

2	03-52-0473 X7R	CAP 47nF 50V 20% 0805 SM	13.000000
2	06-28-8468 SOT-23 FAIRCHILD	Ref: C14-C18,C22,C28-C29,C52-C56 DIODE ZENER 6.8V BZX84C6V8	1.000000
2	09-00-4404	Ref: D1. TRANS LOW-POWER PMBT4403 TH	2.000000
2	09-10-4401 SOT-23 SM	Ref: Q4-Q5. TRANS NPN SMALL-SIGNAL MBT4401	2.000000
2	11-10-0601	Ref: Q3-Q6. FERRITE BEAD 600R @100MHZ 1206	9.000000
2	12-54-0072	Ref: L1-L9. IC OP-AMP DUAL TL072CD SM	1.000000
2	12-54-0074	Ref: U3. IC OP-AMP TL074 SM	2.000000
2	21-00-4420 JB0661-K01-3	Ref: U1,U2. WASHER EARTHING 1/4" JACK	2.000000
2	21-00-6616 6-PIN FLUSH	Ref: M6-M7 JACK 1/4" STEREO FEMALE PCB-MN	2.000000
2	21-04-5075 PCB-MNT RT-ANG LN 05075	Ref: J4-J5 JACK DIN 5-PIN FEMALE MIDI	2.000000
2	21-16-0045 PCB-MNT RT-ANG	Ref: J2-J3. JACK RJ-45 8-PIN FEMALE	1.000000
2	21-23-0026 2X13X.100 PITCH	Ref: J1. HEADER, 26-PIN, 2X13-100 VERT,	1.000000
2	24-09-3003	Ref: M4. DPDT SWITCH MS-3003V	1.000000
1	50-00-4010	Ref: SW1. PCBA OUTPUT SPEAKER HDII	1.000000

2	01-00-0103	RES 10K 1/8W 5% 0805 SM	1.000000
2	01-00-0512	Ref: R121. RES 5.1K 1/8W 5% 0805 SM	1.000000
2	01-24-3921	Ref: R57. RES 3.92K 1/8W 1% 0805 SM	2.000000
2	03-22-0473	Ref: R50,R63. CAP 47NF 250V 20% POLY TH SEE 03-32-0473	2.000000
2	03-52-0221	Ref: C60-C61. CAP 220pF 50V 20% 0805 SM X7R	4.000000
2	21-00-4420	Ref: C58-59,C82-83. WASHER EARTHING 1/4" JACK JB0661-K01-3	4.000000
2	21-00-6616	Ref: M8-M11. JACK 1/4" STEREO FEMALE PCB-MN 6-PIN FLUSH	4.000000
2	21-20-1003	Ref: J6-J9. HDR DIL 3-PIN 100SPC VERT-MNT FRIC-LOCK MOLEX 22-23-2031	1.000000
2	21-20-6002	Ref: J12. HDR SIL 2-PIN .156SPC VERT-MNT	2.000000
		Ref: J10-J11.	
1	50-00-4011	PCBA XLR HDII	1.000000
2	01-00-0103	RES 10K 1/8W 5% 0805 SM	6.000000
2	01-00-0133	Ref: R49,R51,R54,R56,R65-R66 RES 13K 1/8W 5% 0805 SM	2.000000
2	01-00-0202	Ref: R52,R64. RES 2K 1/8W 5% 0805 SM	1.000000
2	01-00-0223	Ref: R48. RES 22K 1/8W 5% 0805 SM	4.000000
		Ref: R40,R41,R44,R45.	

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2	01-00-0331	RES 330R 1/8W 5% 0805 SM	4.000000
2	01-24-3921	Ref: R42,R43,R46,R47. RES 3.92K 1/8W 1% 0805 SM	2.000000
2	03-52-0101	Ref: R50,R63. CAP 100 pF 50V 20% 0805 SM X7R 0805C101M5RAC	2.000000
2	03-52-0102	Ref: C73-C74. CAP 1nF 50V 20% 0805 SM X7R	2.000000
2	03-52-0152	Ref: C1,C32. CAP 1.5nf 50v 20% 0805 SM X7R	8.000000
2	03-52-0473	Ref: C3,C31,C65-C70. CAP 47nF 50V 20% 0805 SM X7R	2.000000
2	12-54-0074	Ref: C71,C72. IC OP-AMP TL074 SM	2.000000
2	21-08-0013	Ref: U4-U5. JACK XLR MALE NEUTRIK-NC3MAH	2.000000
2	21-34-1011	Ref: J13-J14. Cable Assembly, FHD 2 Cab Sim-LineOut 8 pin	1.000000
2	24-09-0222	Ref: P1. SWITCH SLIDE DPDT SK-22H03	1.000000
2	24-09-0422	Ref: SW3. SWITCH SLIDE 4PDT 42MS2R1	1.000000
		Ref: SW2.	
1	50-00-4012	PCBA INPUT GUITAR HDII	1.000000
2	03-52-0220	CAP 22pF 50V 20% 0805 SM X7R	1.000000
2	03-52-0473	Ref: C9. CAP 47nF 50V 20% 0805 SM X7R Ref:C5.	1.000000

2	11-10-0120	BEAD FERRITE 120R @100MHz SM 1206	2.000000
		Ref: L1,L2.	
2	21-00-4420	WASHER EARTHING 1/4" JACK JB0661-K01-3	1.000000
		Ref: M2.	
2	21-00-6616	JACK 1/4" STEREO FEMALE PCB-MN 6-PIN FLUSH	1.000000
		Ref: J1.	

HD II FINAL TEST PROCEDURE

February 19, 2001

STEREO/MONO

MANUAL

EPROM

A

EEPROM

B

ADC8

C

ADC9

D

ADC11

SAVE

TAP

HOLD DOWN
ON POWER UP

ENTERING TEST MODE:

- 1) Plug a MIDI cable between the MIDI IN and MIDI OUT on the rear of unit.
- 2) Hold down **TAP** button for 3 seconds while turning on **POWER**.
- 3) **SOFTWARE TEST** - Four software tests will run automatically. A LED will turn on for each test that passed. Check that 4 LED's are on.
LED **A** - EPROM Test
LED **B** - SRAM Test
LED **D** - BATTERY backed RAM
LED **SAVE** - MIDI
- 4) Advance to next test stage by pressing the **MANUAL** button. **MANUAL** will scroll through three more tests A,B,C. Each LED A,B,C will light up to indicate which test has been selected. Start with Test A. Press the **SAVE** button to start Test A.
 - 4.1). **TEST A** – Test the front panel LED's (D1-D7).
 - 4.1.1). **LED Test** – All front panel LED's (D1-D7) will light up together, then each LED will light up one at a time from left to right. Make sure brightness for all LED's is the same and that each LED turns on/off properly.
 - 4.1.2). When Test A is complete, the B LED will light up to indicate that Test B has been selected. Press **SAVE** to start Test B.
 - 4.2). **TEST B** – Test encoders (**AMP MODELS & EFFECTS**) and 7 buttons.
 - 3.2.1). **BUTTON Test** – Push each button and check that the LED (for that button), toggles on/off.
 - 3.2.2). **ENCODER Test** – Turn each encoder (**AMP MODELS & EFFECTS**) clockwise and the button LED (D1-D7) will light up, one at a time from left to right.
 - 3.2.3). **POTS Test** – Turn each pot from one end to the other. LED's (D1-D7) will light up, one at a time from left to right or vice versa, depending on which direction the pot shaft is turned. The **MASTER VOLUME** pot (R1) cannot be tested.
- 5) Turn off power to the HD II head and plug a signal generator and 2 speaker cabinets to the outside left and Right ¼" speaker outputs.
- 6) Set the 2 way switch on the rear to **LIVE** and the other 2 way switch to **SERIES**. Remove the MIDI Cable.

NOTE: **TEST C** does not need to be performed in the HD II Final Test.

- 7) Turn power on (NOTE: audible click is normal, a loud pop is not) signal should be heard evenly through both cabinets (unplug one cable at a time to tell if the volume is the same), unplug the cables from the outside 2 speaker jacks and plug them into the 2 inside speaker jacks. Again an even signal should be heard from both cabinets.
- 8) On the rear change the switch from **4 OHMS** to **8 OHMS** to **16 OHMS**, a signal should be heard at all 3 settings.
- 9) Plug a stereo ¼” cable into the **SEND** (the signal should still be present), plug the other end into the **RETURN** (the signal should still be present), unplug the end in the SEND jack (the signal should disappear), select **PARALLEL** with the 2 way switch and the signal should return. Unplug the cable.
- 10) Plug the XLR listening cable into each XLR output, a clear signal should be heard from each channel.
- 11) Select **STUDIO** with the 2 way switch, the signal should disappear from the speaker cabinets, and a clear signal should be heard from both XLR outputs. The **MASTER VOLUME** may need to be adjusted.
- 12) Plug the footswitch into the RJ-45 connector on the rear and test that the unit works with the floorboard.
- 13) Turn off the unit.



Flexitone II Head Assembly Instruction

January 12, 2001

General Notes:

1. Unless otherwise noted, all dimensions are in inches.
2. Unless otherwise noted, all screws shall be installed with external teeth (star) washers.
3. For clarity, not all component details are shown in the figures.
4. Part identifying notes are in this format: Description (Quantity)
P/N part number
5. Right and Left designations are used as if you were looking at the front panel.

Step 1: Install buttons onto Main PCBA (Printed Circuit Board Assembly):

- a. Align the Button assembly with the holes in the PCBA and snap the buttons onto the PCBA. See Figure 1.
- b. Test the buttons by pushing on each one and listen for a “click”.

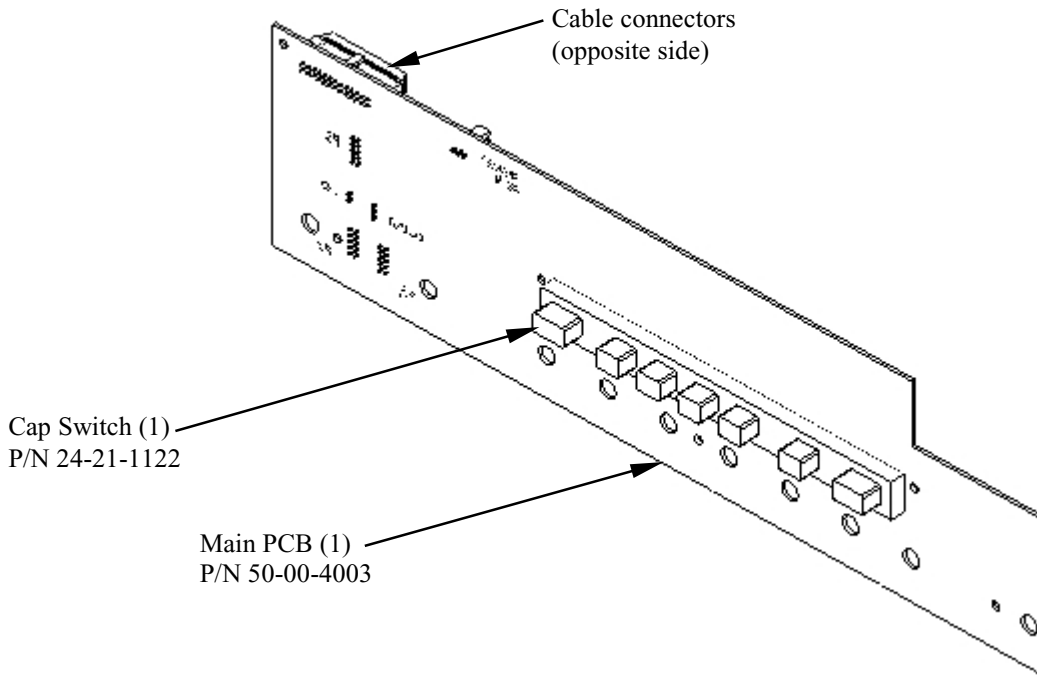


Figure 1

Step 2: Install Main PCBA into Chassis.

- a. Install the Main PCBA into the Chassis using six 6-32UNC x 3/8 screws. See Figures 2 and 3.

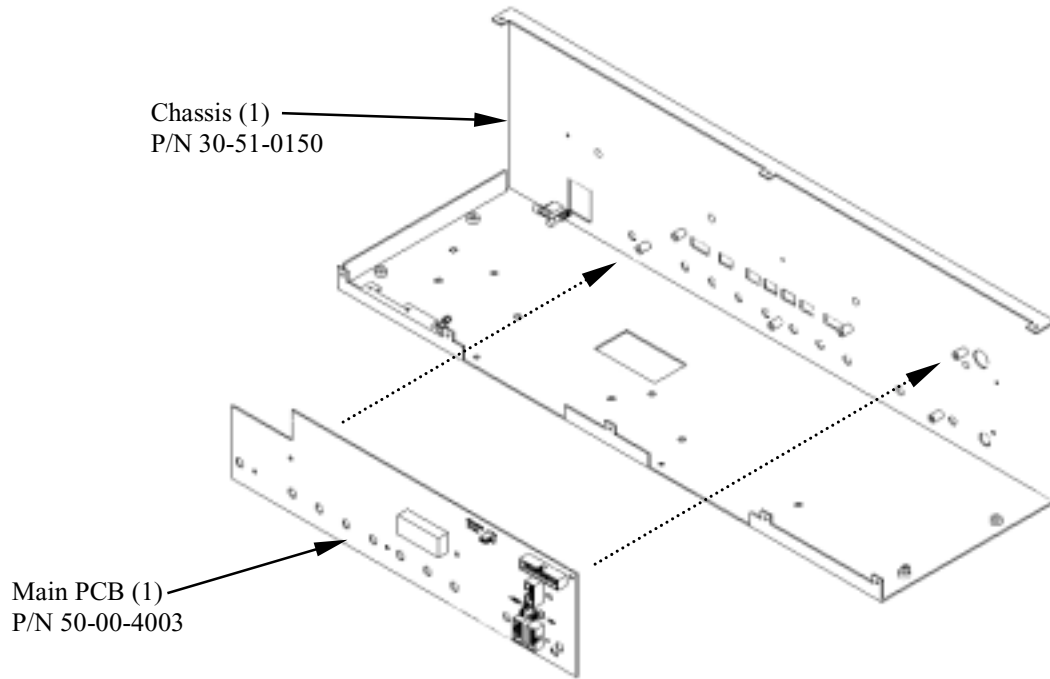


Figure 2

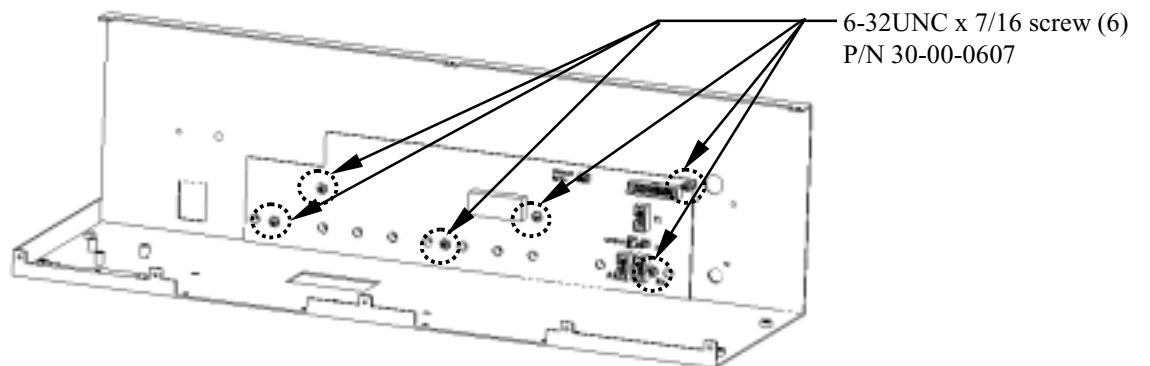


Figure 3

Step 3: Front panel assembly (see figure 4):

- a. Wipe chassis front surface with clean cloth dampened with isopropyl alcohol.
- b. Align and mount Overlay.
- c. Align LED lens and LED PCBA with Chassis mount holes and install using 6-32 UNC x 3/8 screws. Route LED power cable as noted.
- d. Align Knobs with potentiometer and encoder shafts and press on until fully seated.

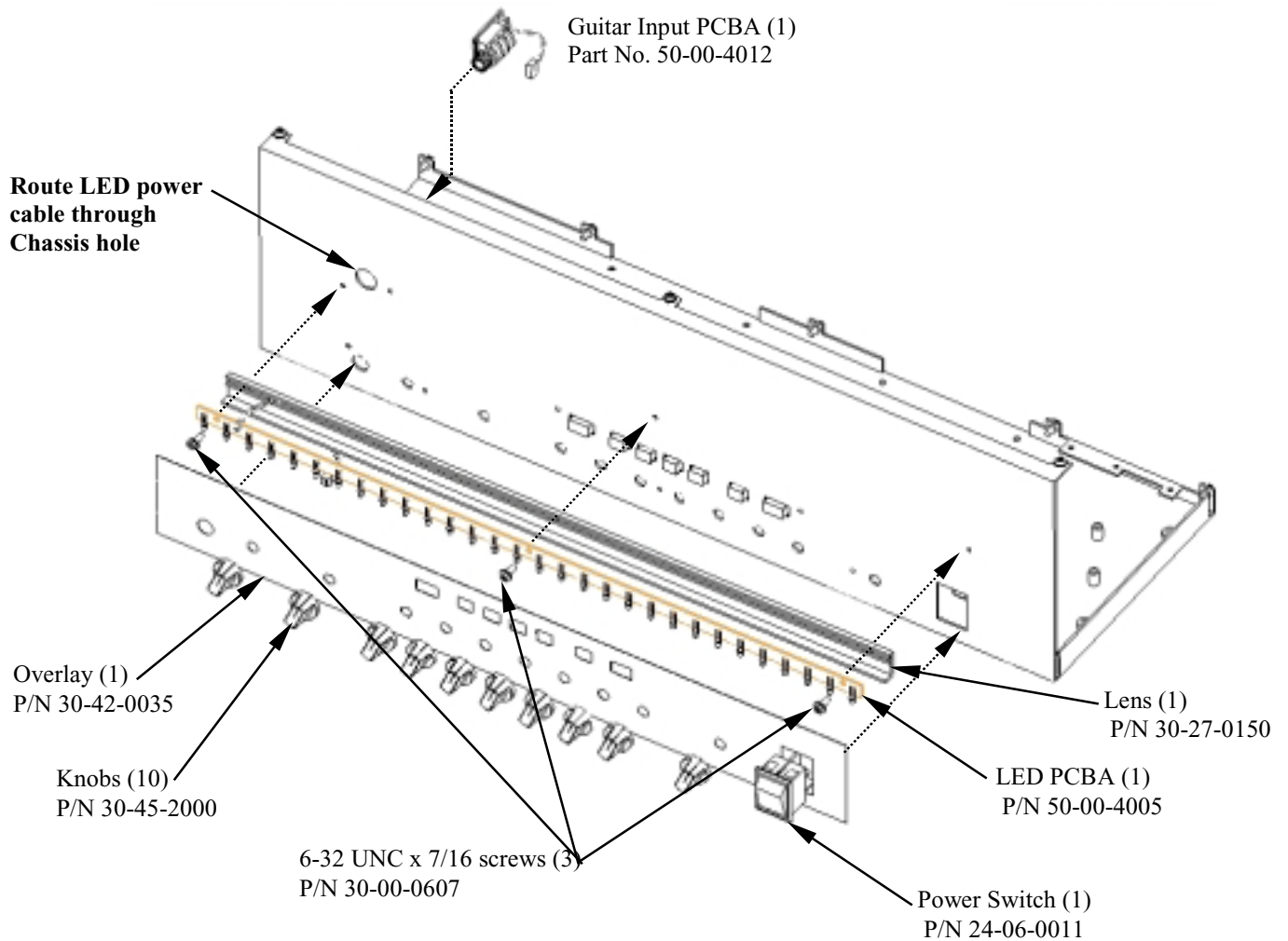


Figure 4 (front view)

Step 3: Front panel assembly (continued).

- e. Install Power Switch. Push firmly until Switch seats flat against front panel Overlay. See figures 4 and 5 for position and correct orientation.

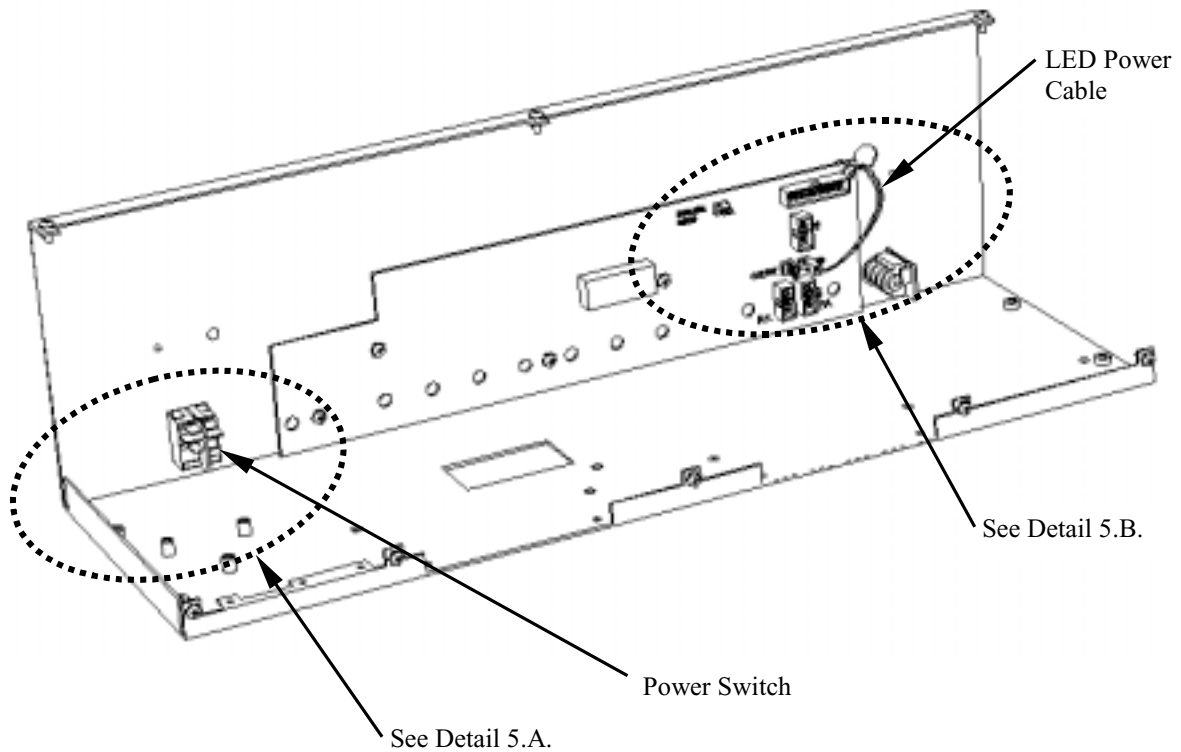
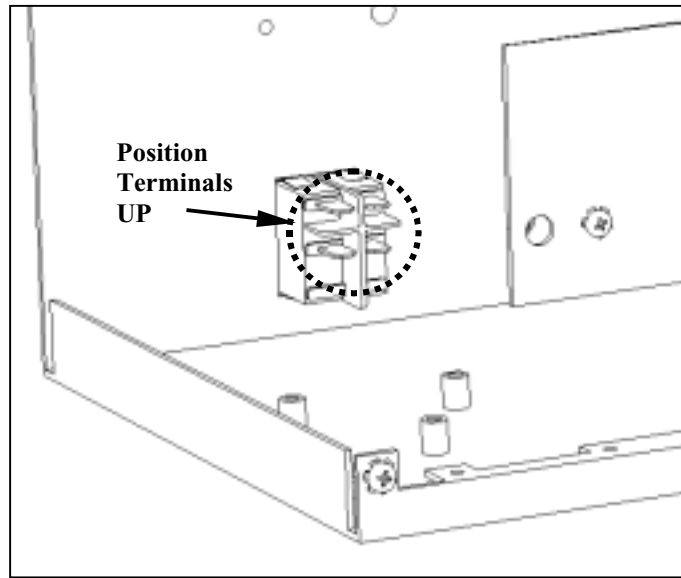


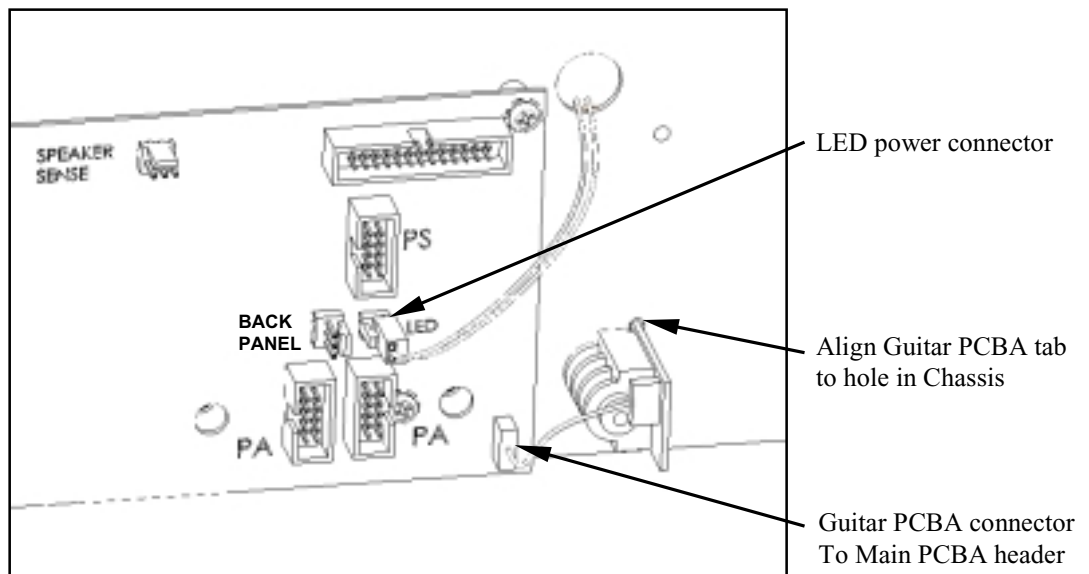
Figure 5 (rear view)

Step 3: Front panel assembly (continued).



Detail 5.A.

- f. Install Guitar input PCBA cable assembly onto Main PCBA header. See Detail 5.B.
- g. Align Guitar input PCBA tab with hole in chassis.
- h. Install LED power cable connector onto main PCBA header.



Detail 5.B.

Step 3: Front panel assembly (continued).

- i. Secure guitar input PCBA using plastic nut. See figure 6.

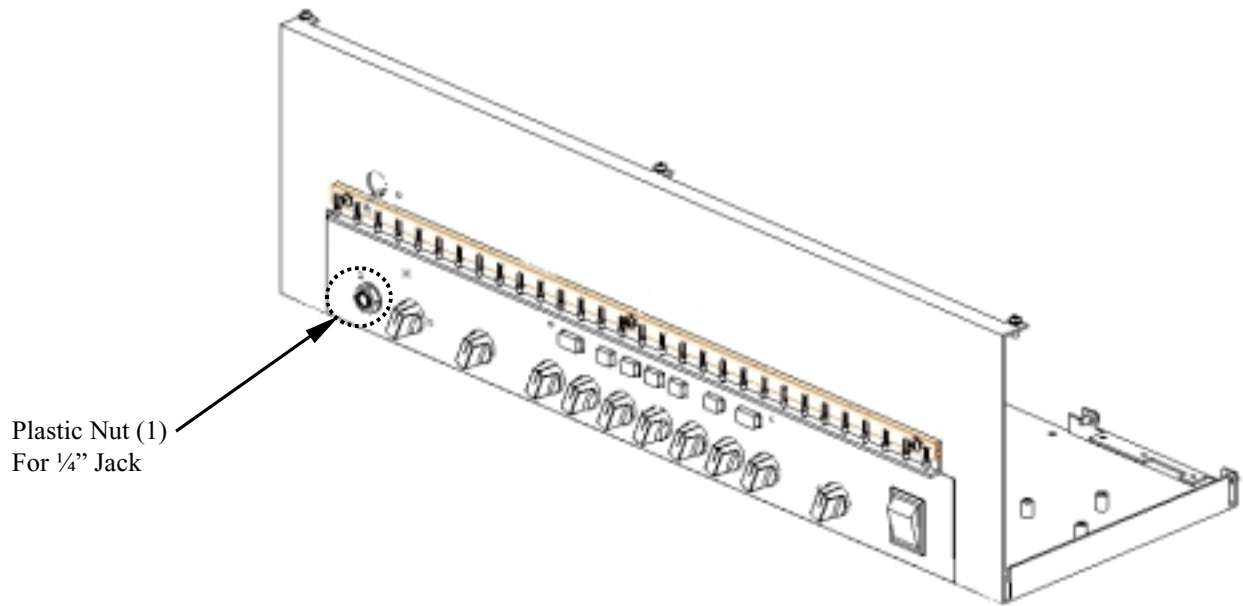


Figure 6

Step 4: Install Power Supply cable assemblies:

- a. With Power Supply oriented as shown in figure 7 (bracket notch on top), install a ribbon cable assembly and a 2-wire cable assembly.

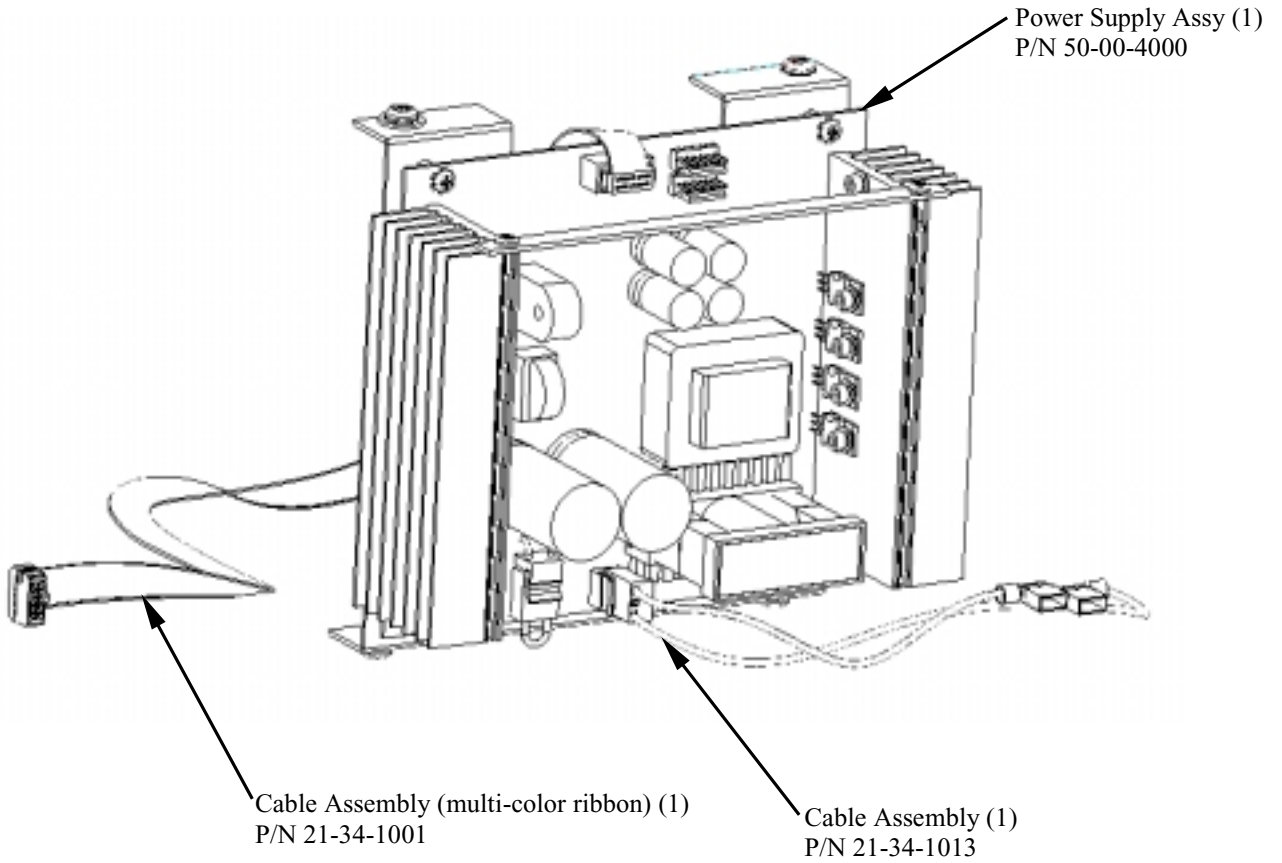


Figure 7

Step 5: Install Power Supply into Chassis:

- a. Install Power Supply onto Chassis. Guide Black and White wires to the side. See figure 8.

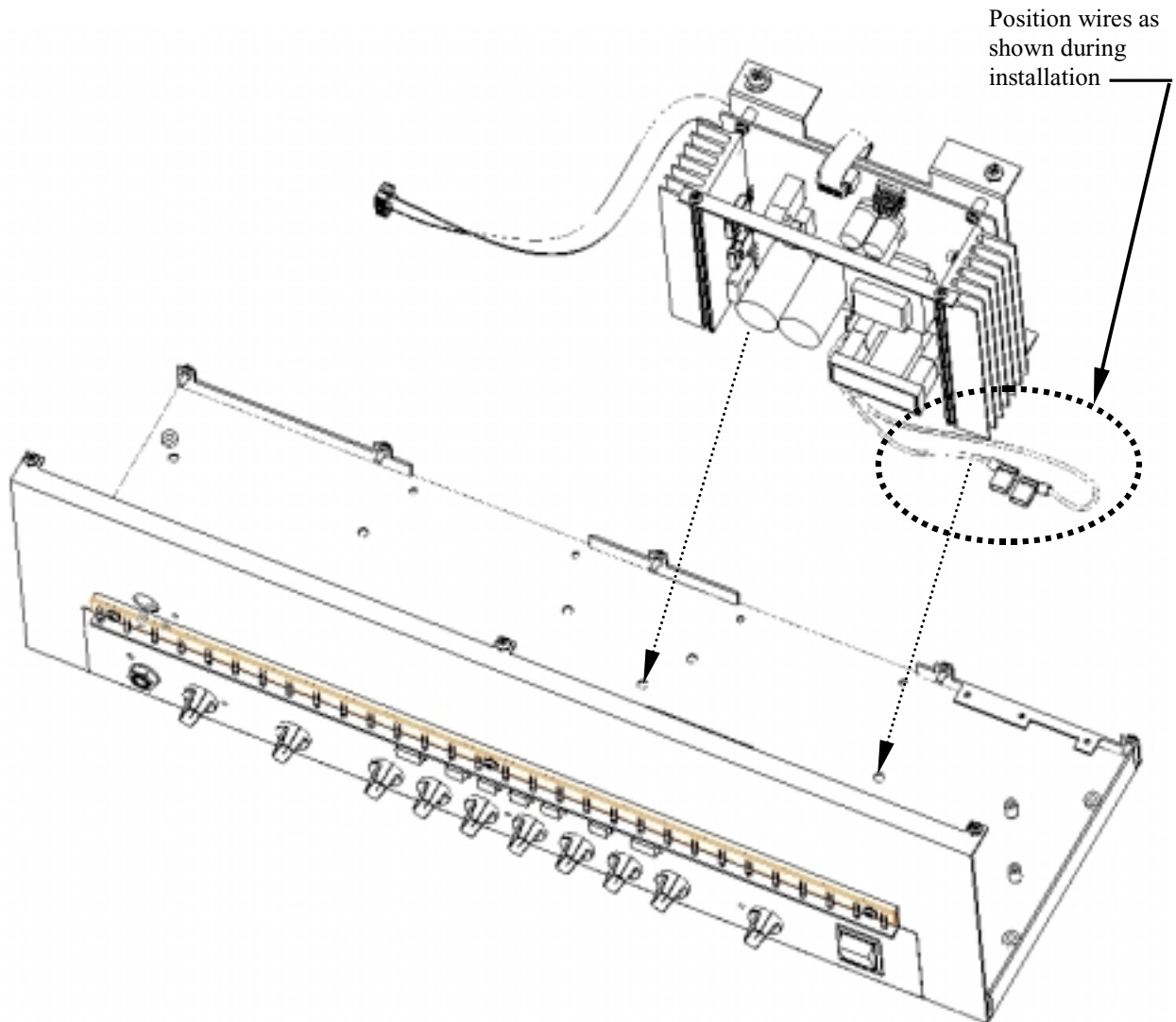


Figure 8

Step 5: Install Power Supply into Chassis (continued):

- a. Install 10-32UNF x 3/8 screws with Star Washers through bottom of Chassis into Power Supply Bracket. See figure 9.
- b. Install ribbon cable assy connector onto Main PCBA header. See detail 9.B.
- c. Install Power Switch wires onto lower terminals. See detail 9.A.

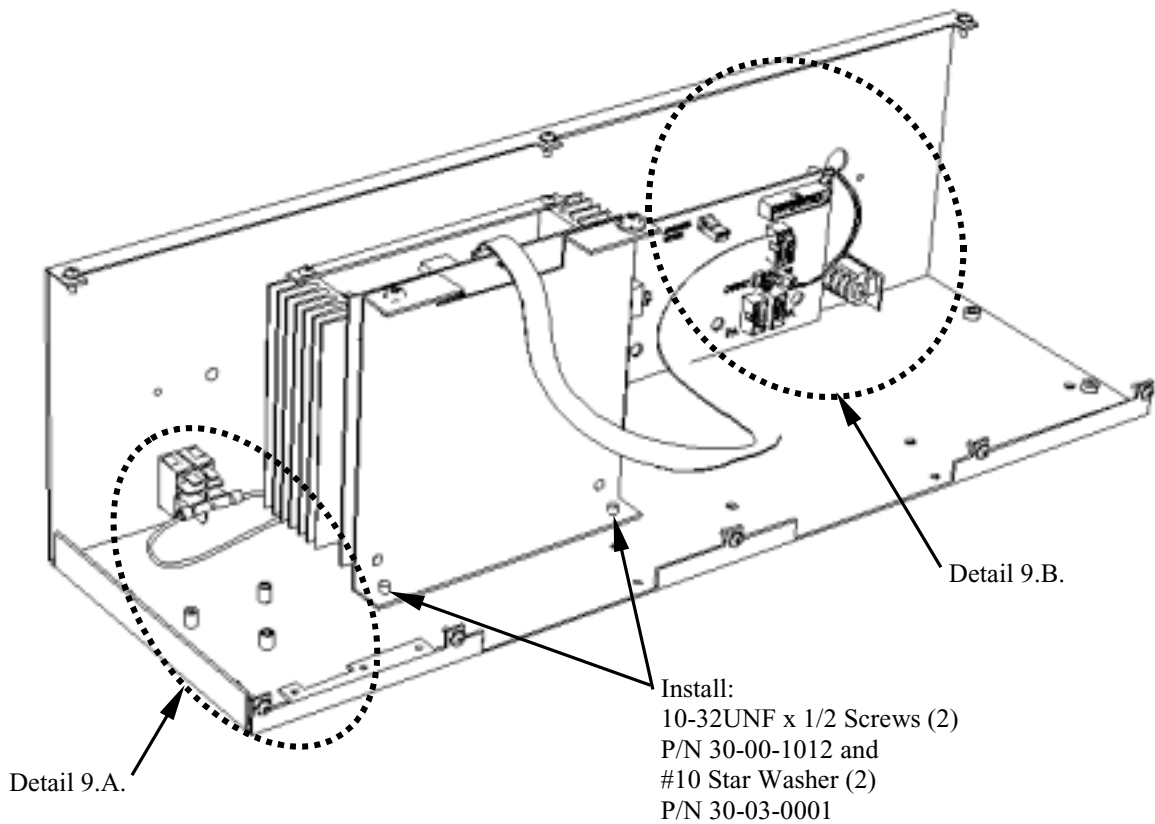
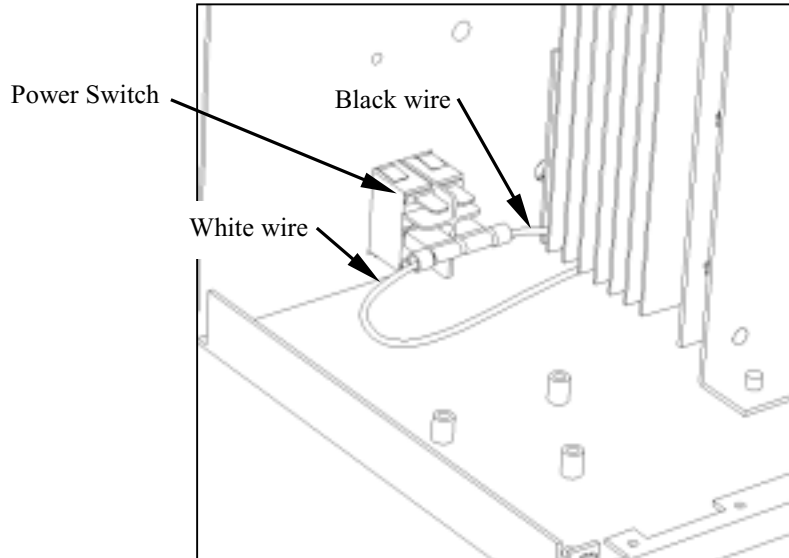
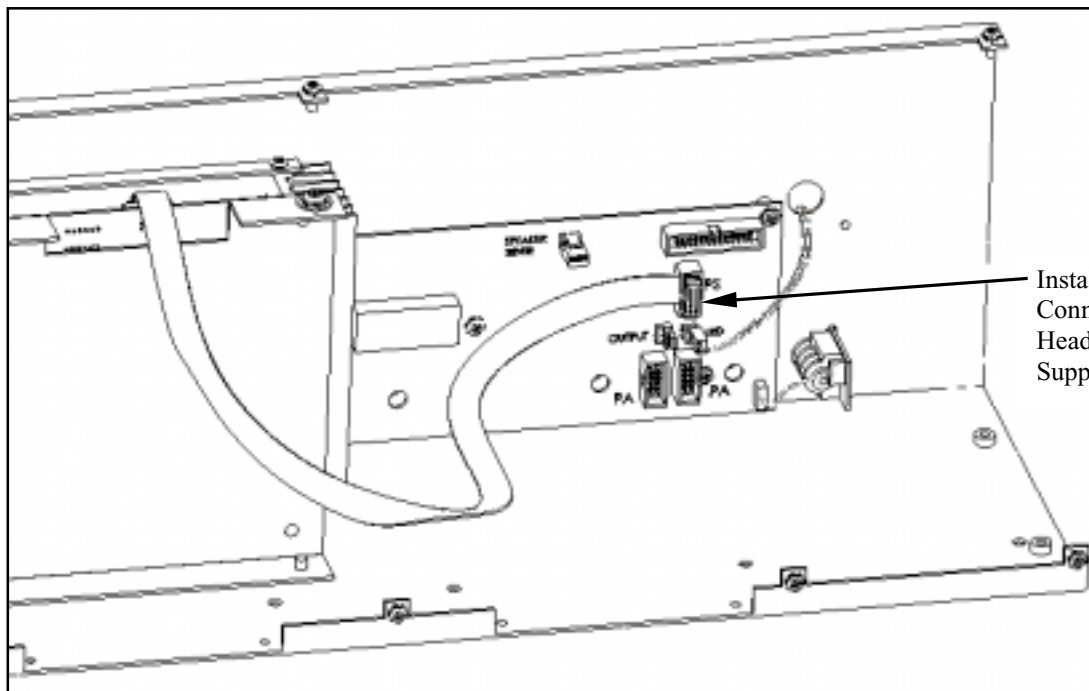


Figure 9

Step 5: Install Power Supply into Chassis (continued):



Detail 9.A.



Install multi-color ribbon Connector to Main PCBA Header labeled Power Supply (PS)

Detail 9.B.

Step 6: Install Line Filter PCBA into Chassis:

- a. Install Line Filter PCBA. See figure 10.
- b. Install Line Filter to Power Switch Cable Assy. See detail 10.A.

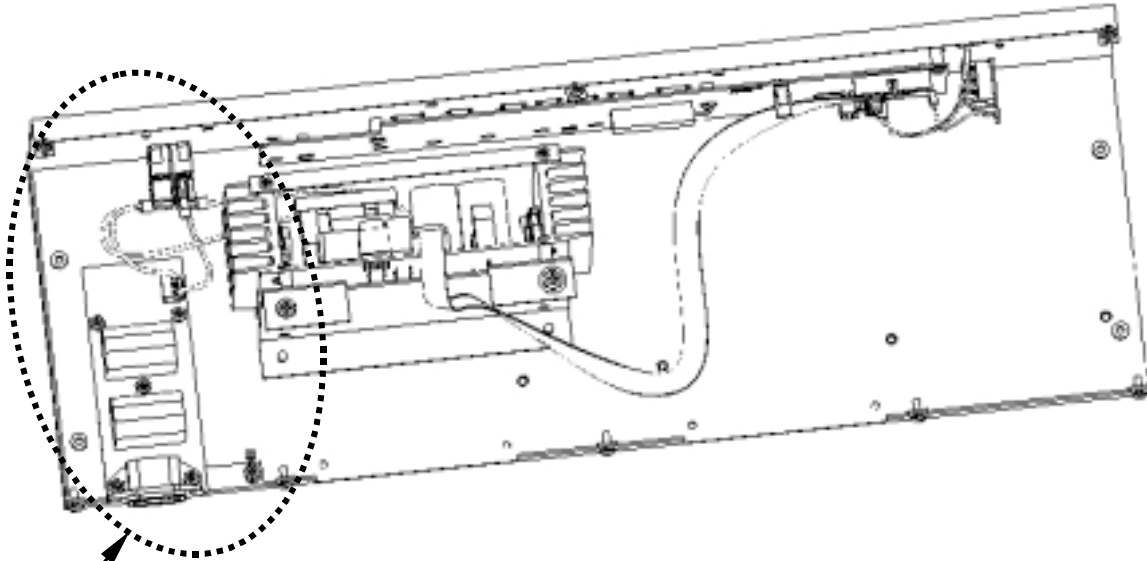
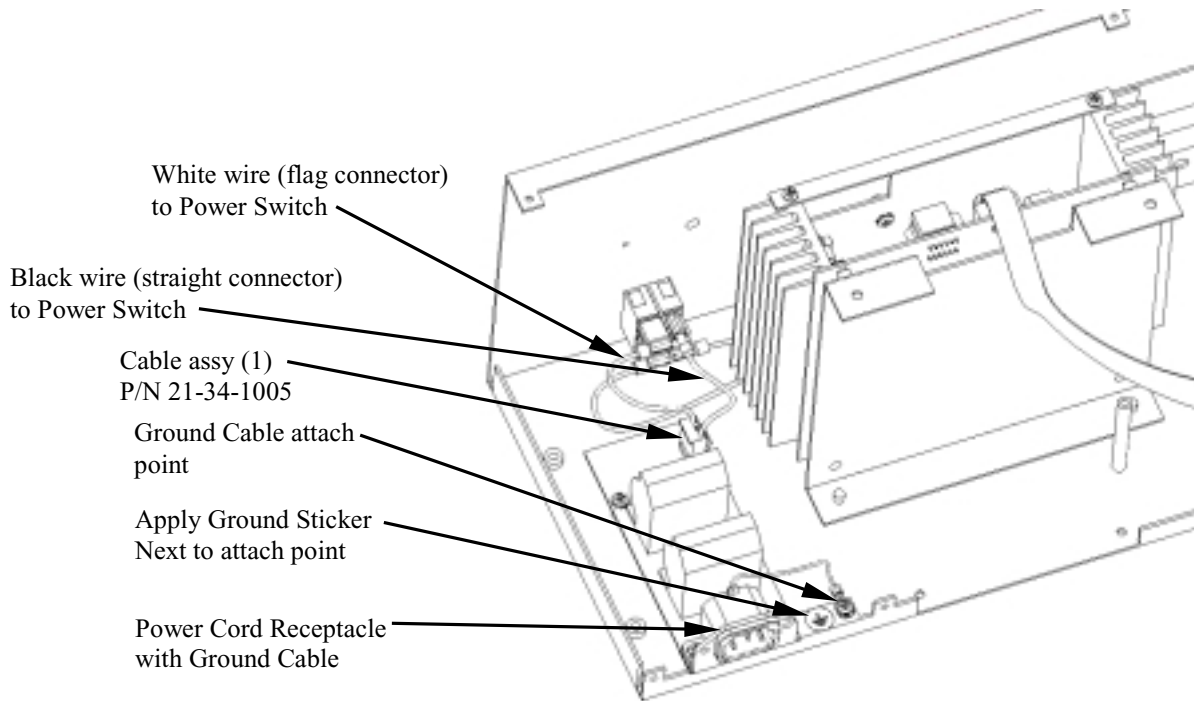


Figure 10 (top view)

Detail 10.A.



Detail 10.A.

Step 7: Install 2" standoffs.

- a. Install four 2" standoffs using 6-32 UNC x 7/16 (P/N 30-00-0607) screws inserted through bottom of Chassis. See figure 11.
- b. Route multi-color ribbon cable around 2" standoff as shown.

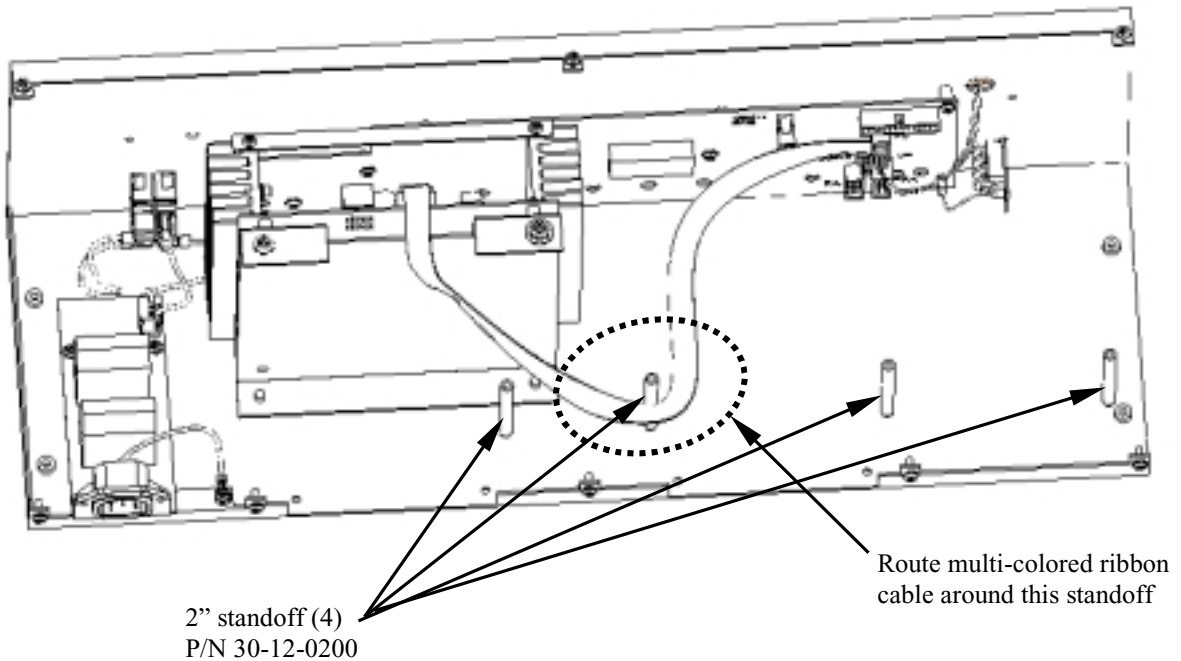


Figure 11

Step 8: Mount Midi-Cab/XLR PCBA and Speaker Output PCBA:

- a. Mount Midi-Cab/XLR PCBA and Speaker Output PCBA onto the 2" standoffs. See figure 12.
- b. Install Output to Main Cable assembly. The Main PCBA header is labeled "Speaker Sense". See figure 12 and 13.

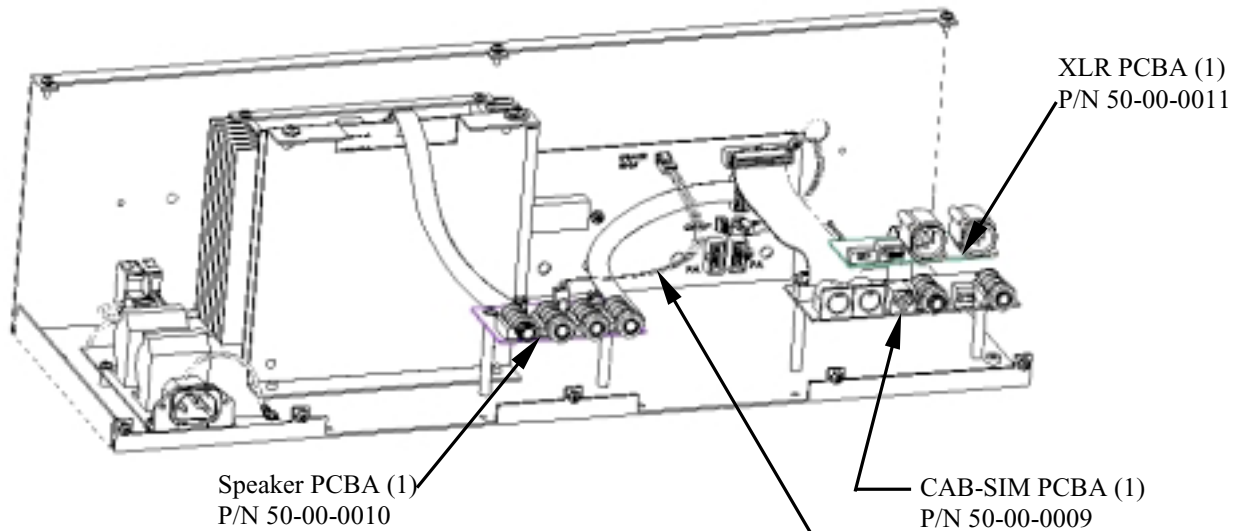


Figure 12 (rear view)

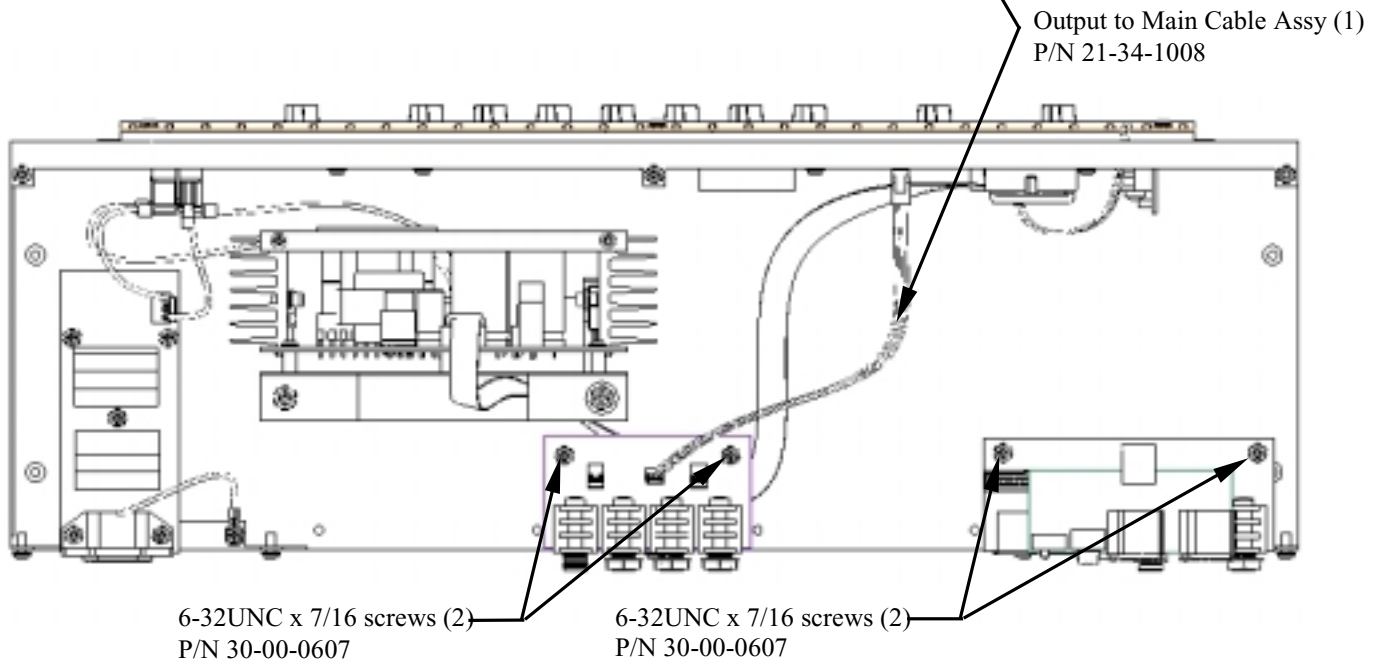


Figure 13 (top view)

Step 8: Mount Midi-Cab/XLR PCBA and Speaker Output PCBA (continued):

- a. The XLR PCBA will remain loose until the Cover is installed. See figure 14.

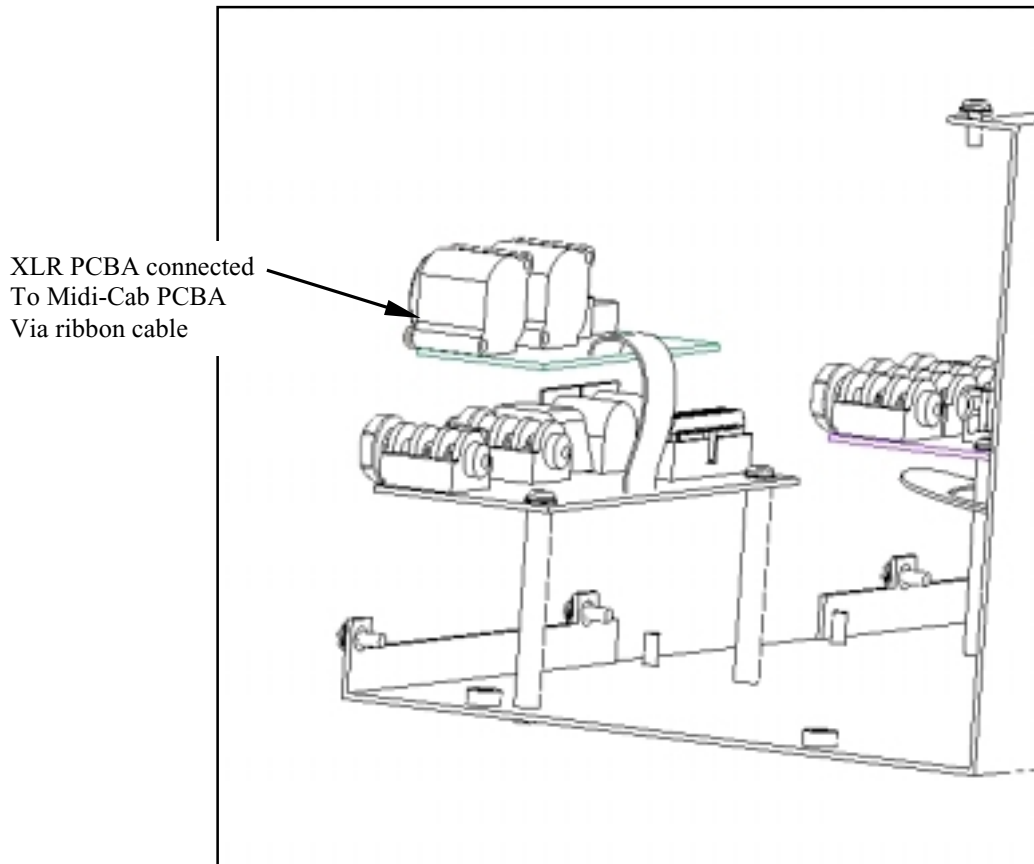


Figure 14

Step 9: Install cables onto Power Amplifiers:

- a. Install cable assemblies onto the Power Amplifiers. See figure 15.
- Note: All none Ribbon cable assemblies should be twisted 4 to 5 times.

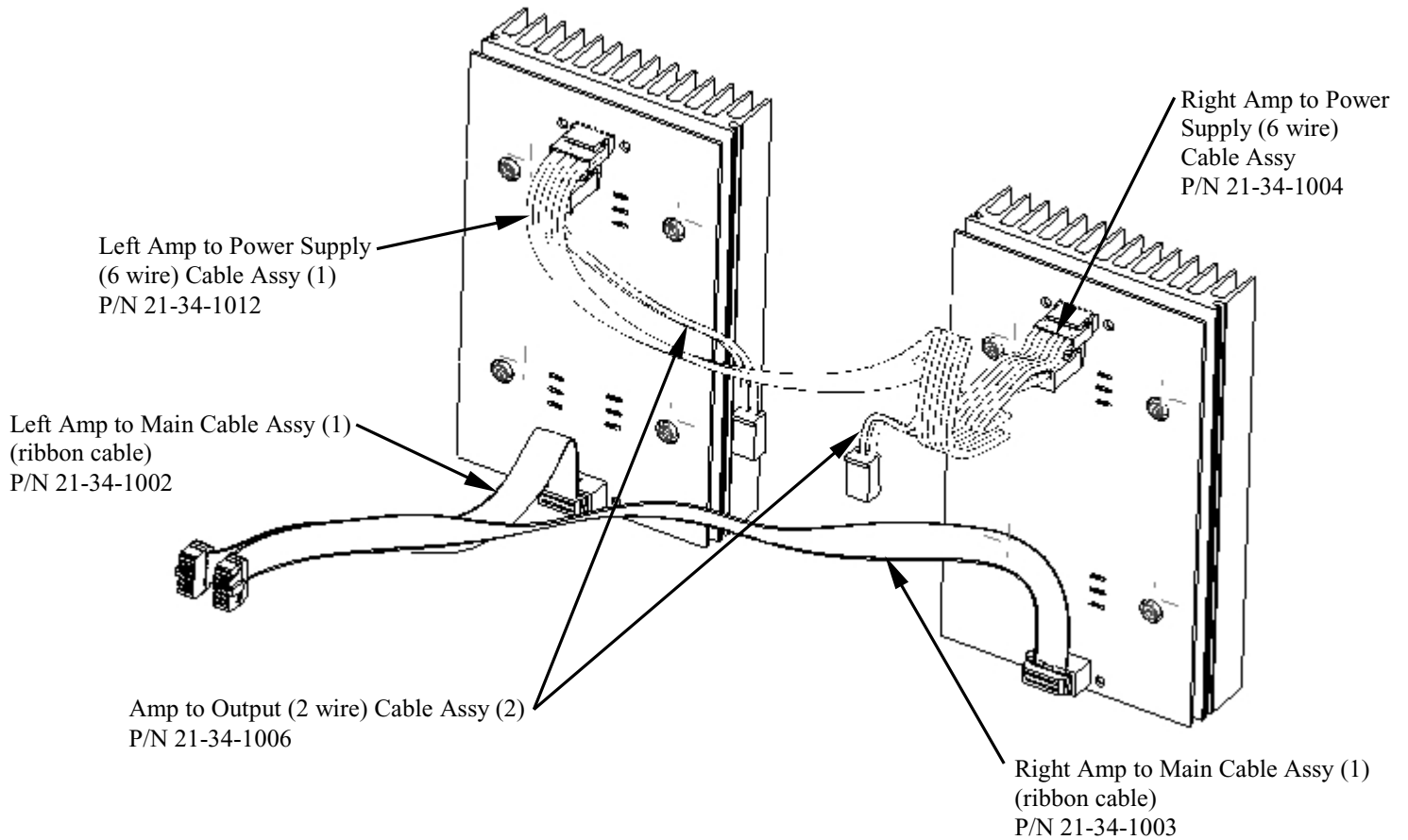


Figure 15

Step 10: Install Power Amplifiers (P/N 50-00-4004) into Chassis:

- a. Mount Power Amplifiers onto the Chassis using 6-32UNC x 3/8 self-tapping screws threaded into the Power Amplifier heat sink channels. See figure 16.

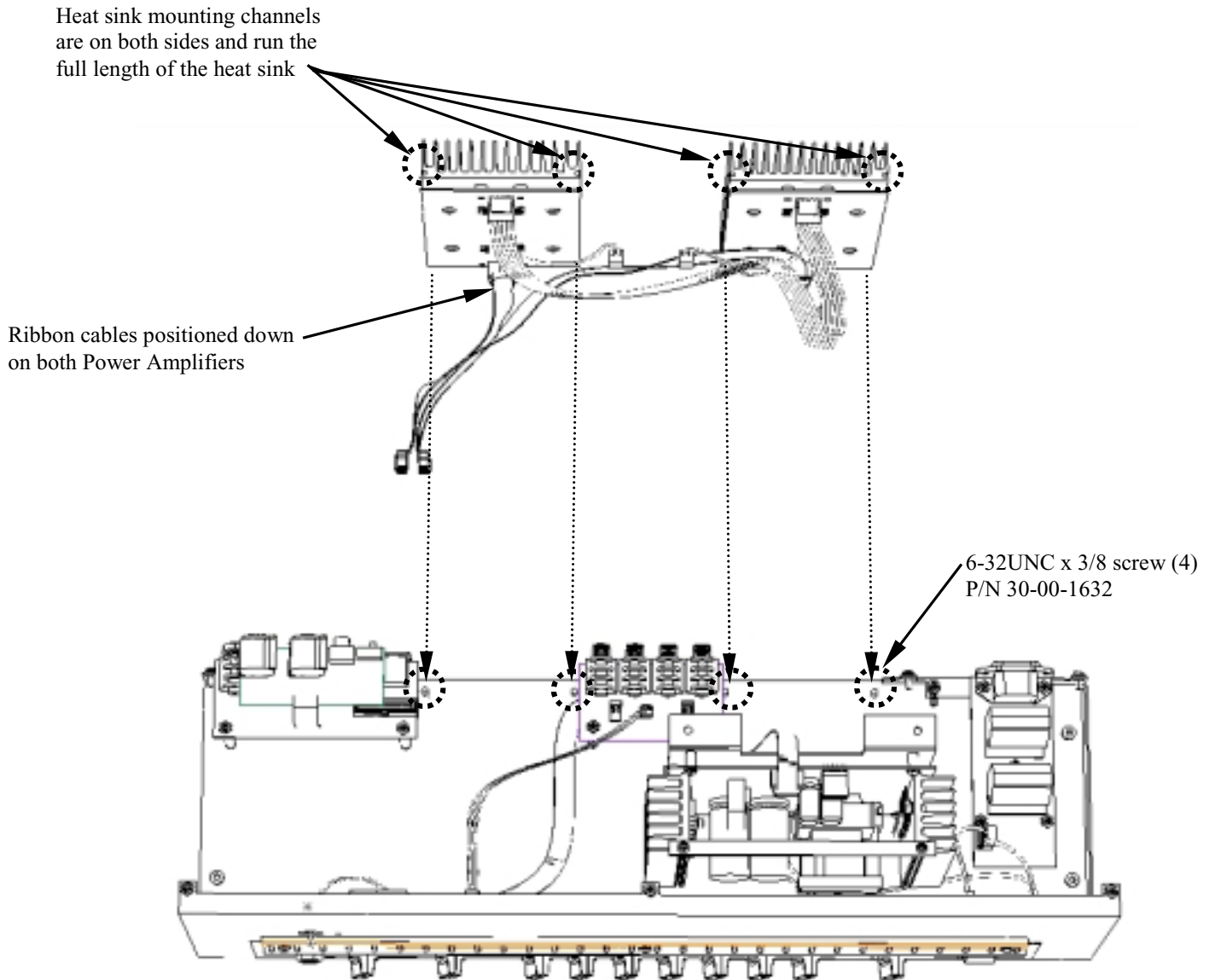


Figure 16

Step 11: Route/connect Power Amplifiers cables:

- a. Route and connect Power Amplifier cables. See figure 17.

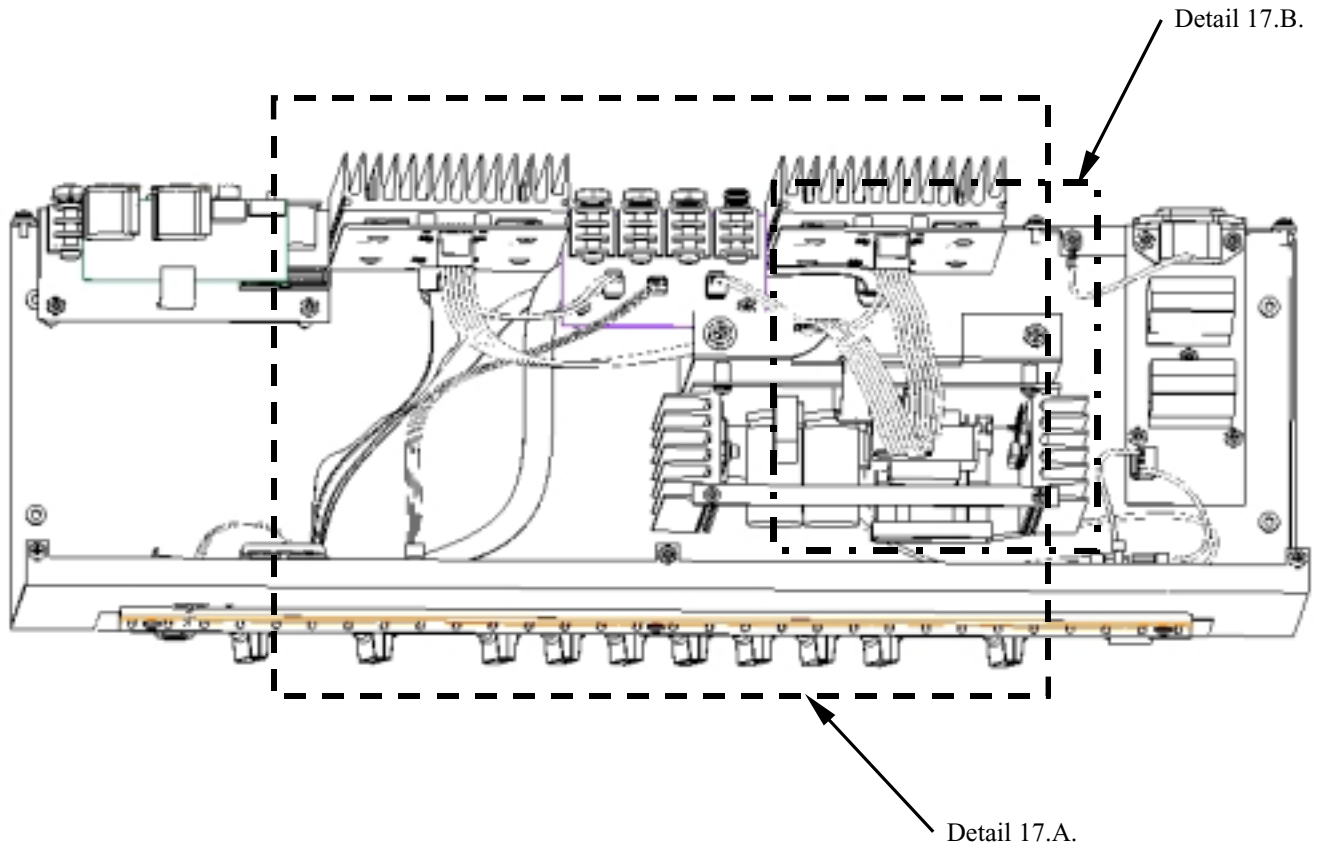
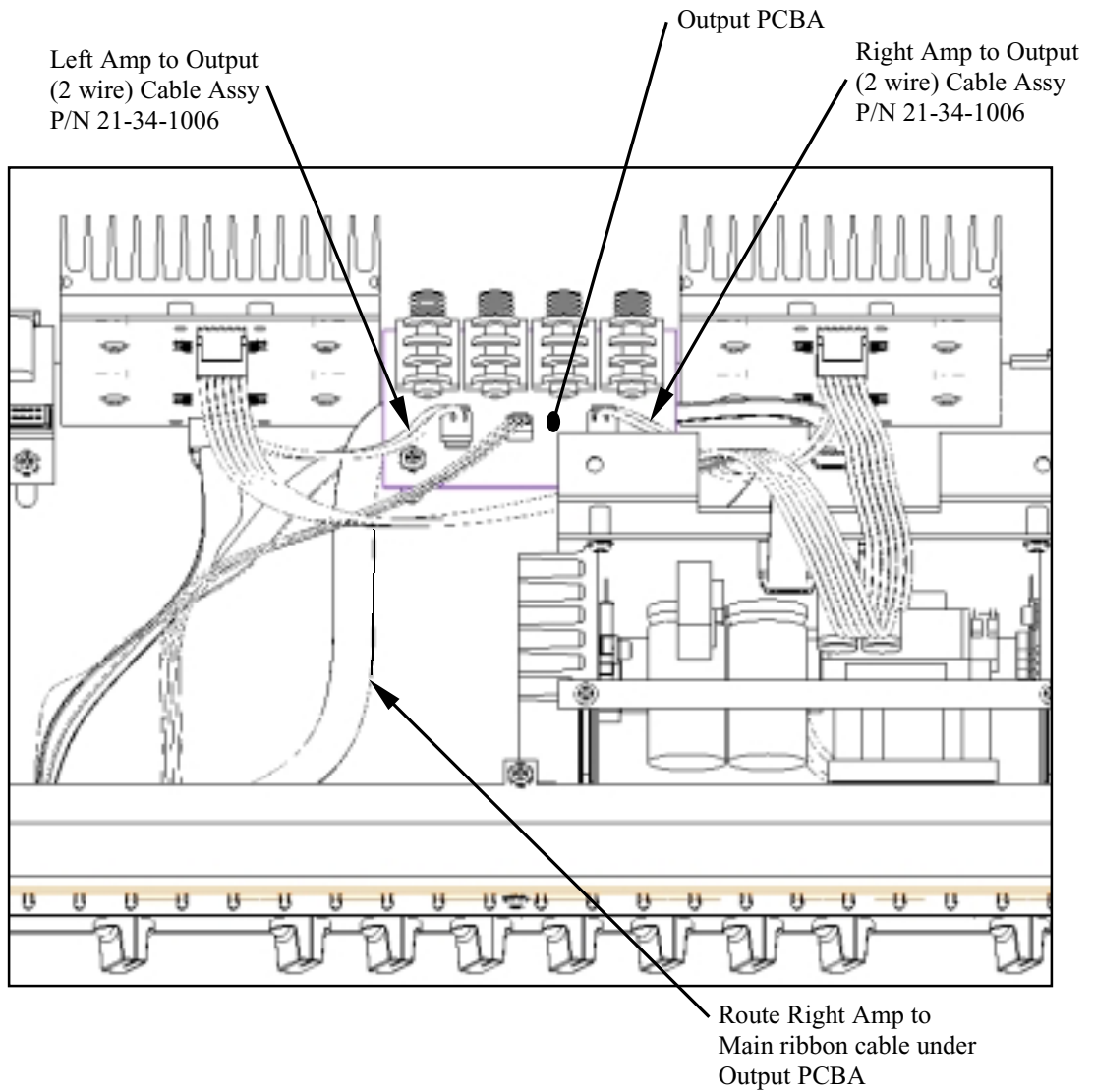


Figure 17

Step 11: Route/connect Power Amplifiers cables (continued):

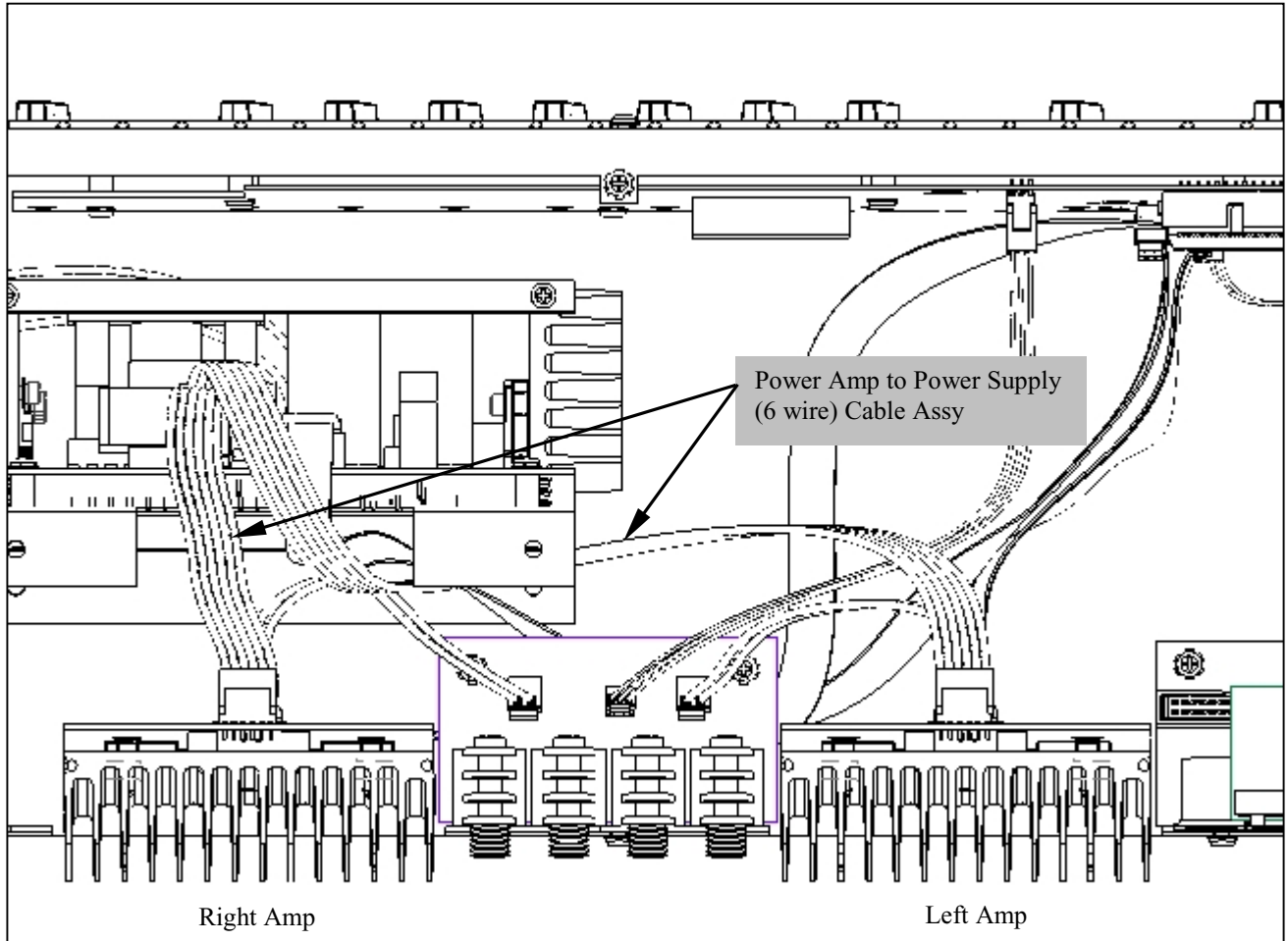
- b. Route ribbon cable from the right Power Amplifier to the Main PCBA under the Output PCBA. See detail 17.A.
- c. Connect Power Amplifier (2 wire) cables to Output PCBA.



Detail 17.A. (top view - looking backward)

Step 11: Install Power Amplifiers (continued):

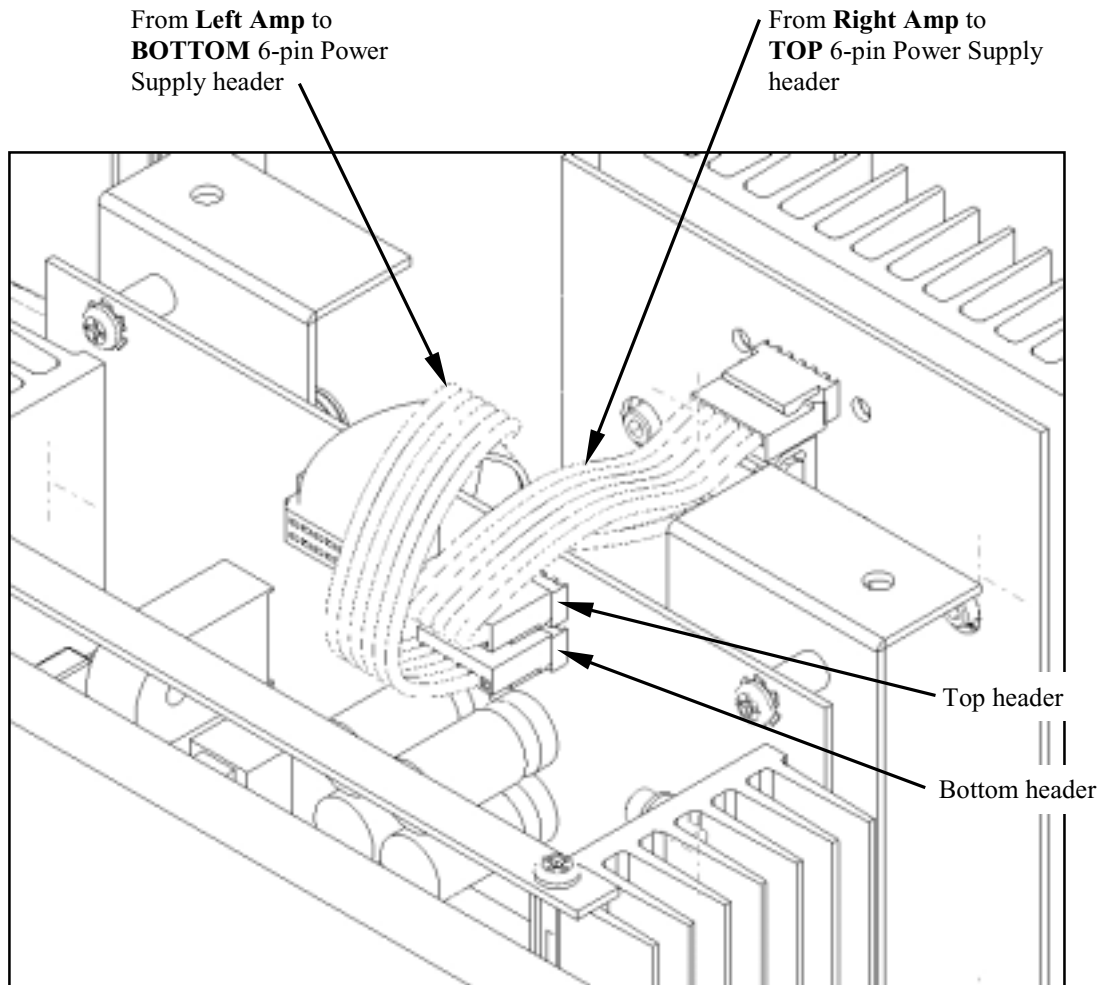
- d. Route Power Amplifier to Power Supply Cables as shown. See detail 17.A.



Detail 17.A. (top view - looking forward)

Step 11: Install Power Amplifiers (continued):

- e. Connect 6 wire cable assemblies to Power Supply. See detail 17.B.



Detail 17.B.

Step 12: Mount Load Switch onto Cover:

- a. Position Load Switch in Cover as shown in figures 18 and 19.
- b. Install mounting screws. See figure 18

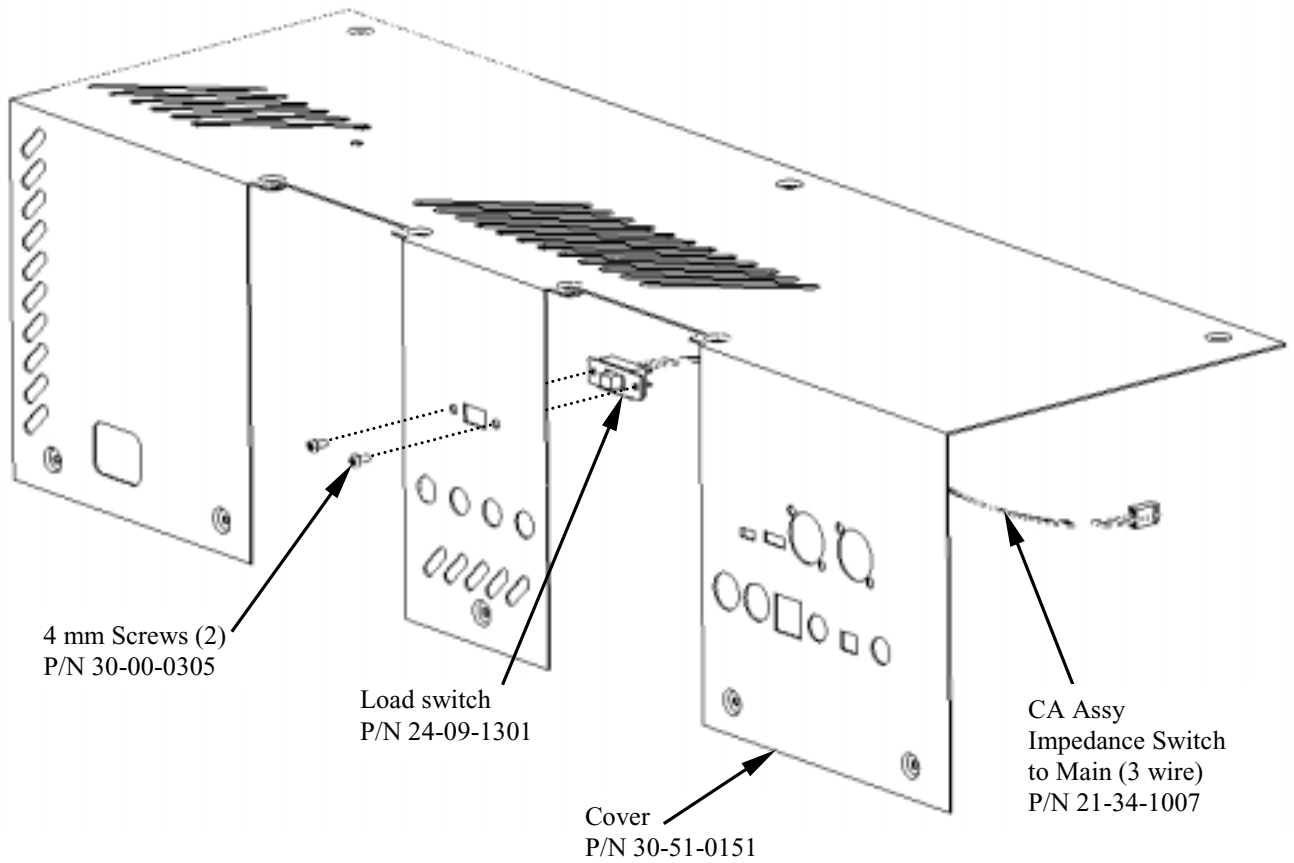


Figure 18

Step 12: Mount Load Switch onto Cover (continued):

Install Load Switch with
soldered terminals positioned up

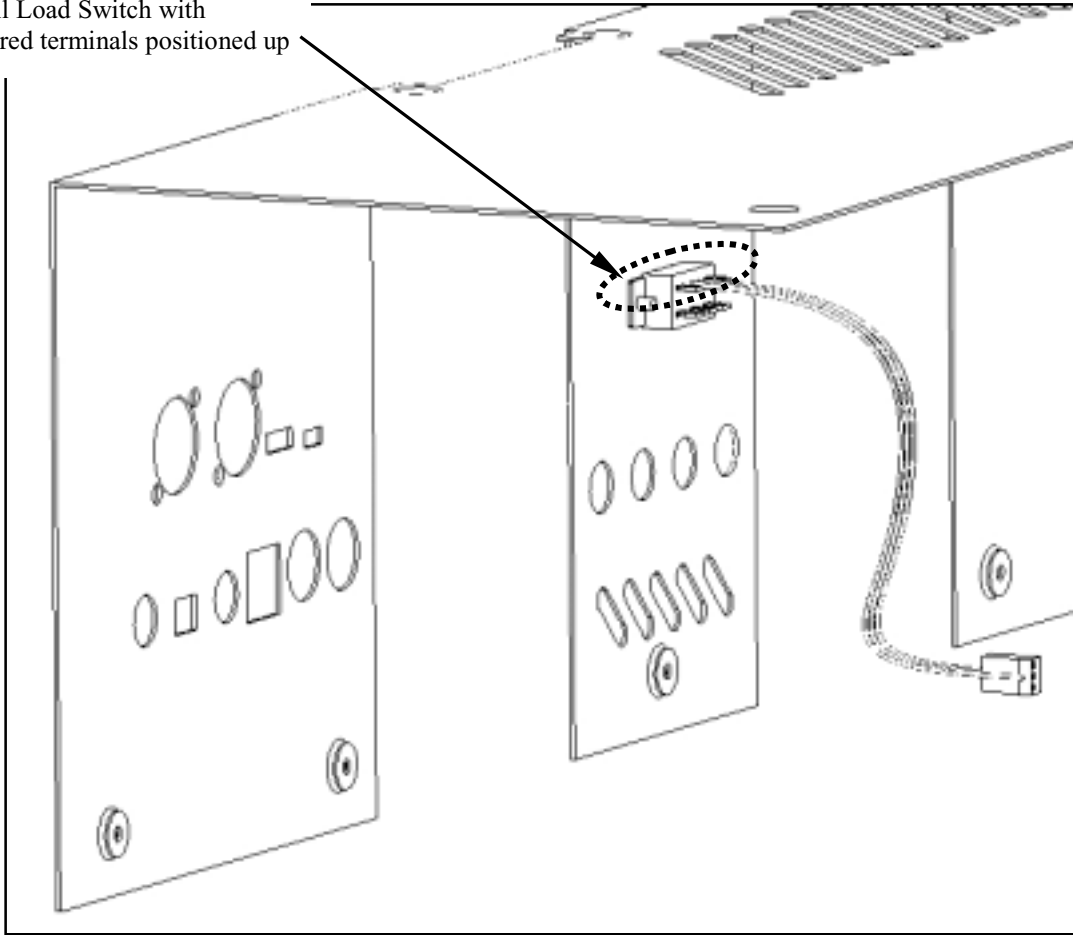


Figure 19 (rear view of Cover)

Step 13: Mount Cover onto Chassis:

- a. Slide Cover into position near the Chassis close enough so that you are able to connect the Load Switch cable connector to the Main PCBA header. See Figure 20.

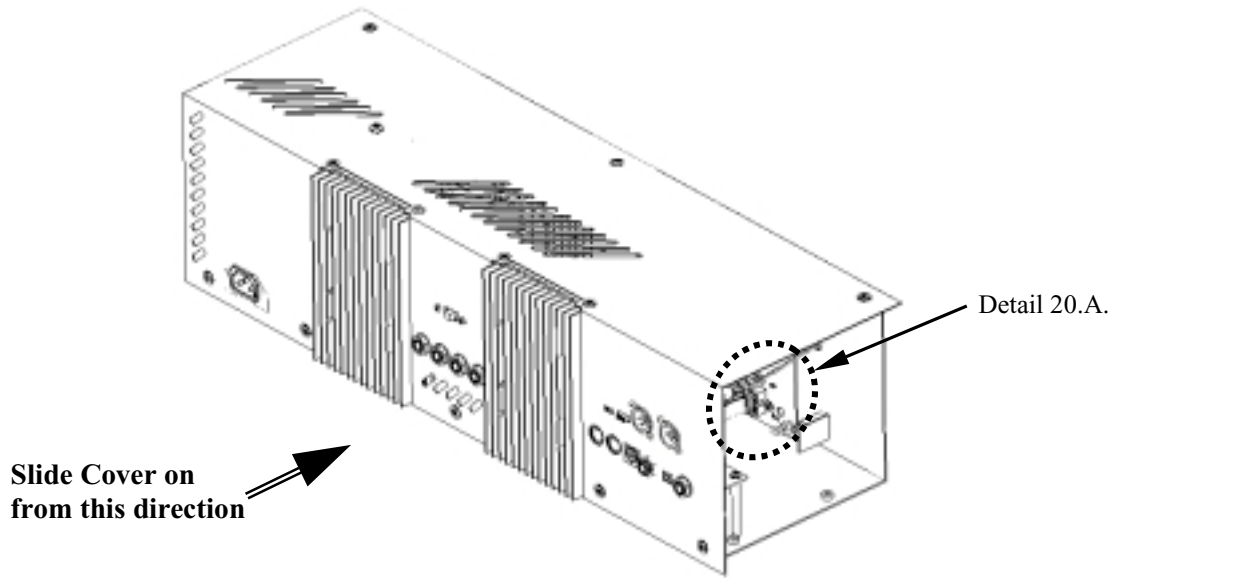
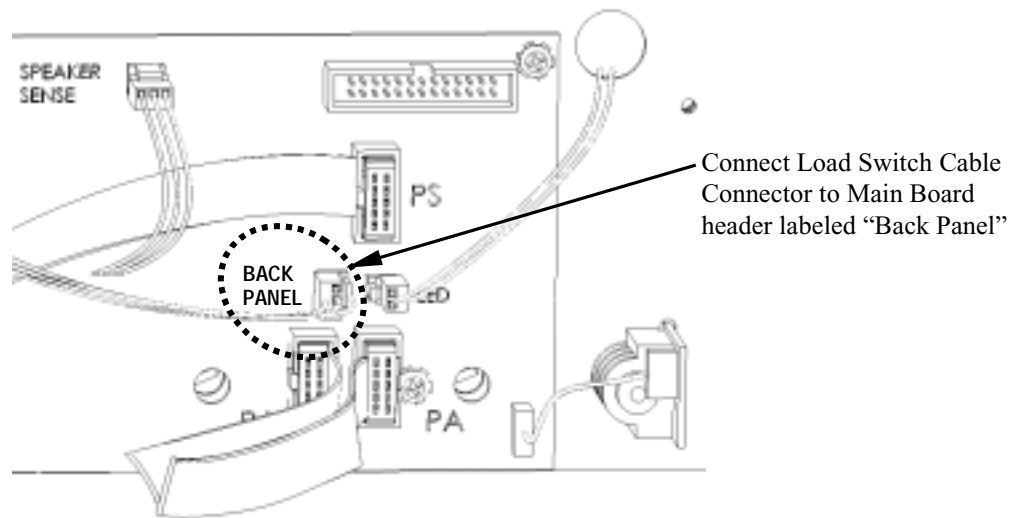


Figure 20



Detail 20.A.

Step 13: Mount Cover onto Chassis (continued):

- b. Install 6-32UNC x 3/8 screws. See figure 21.

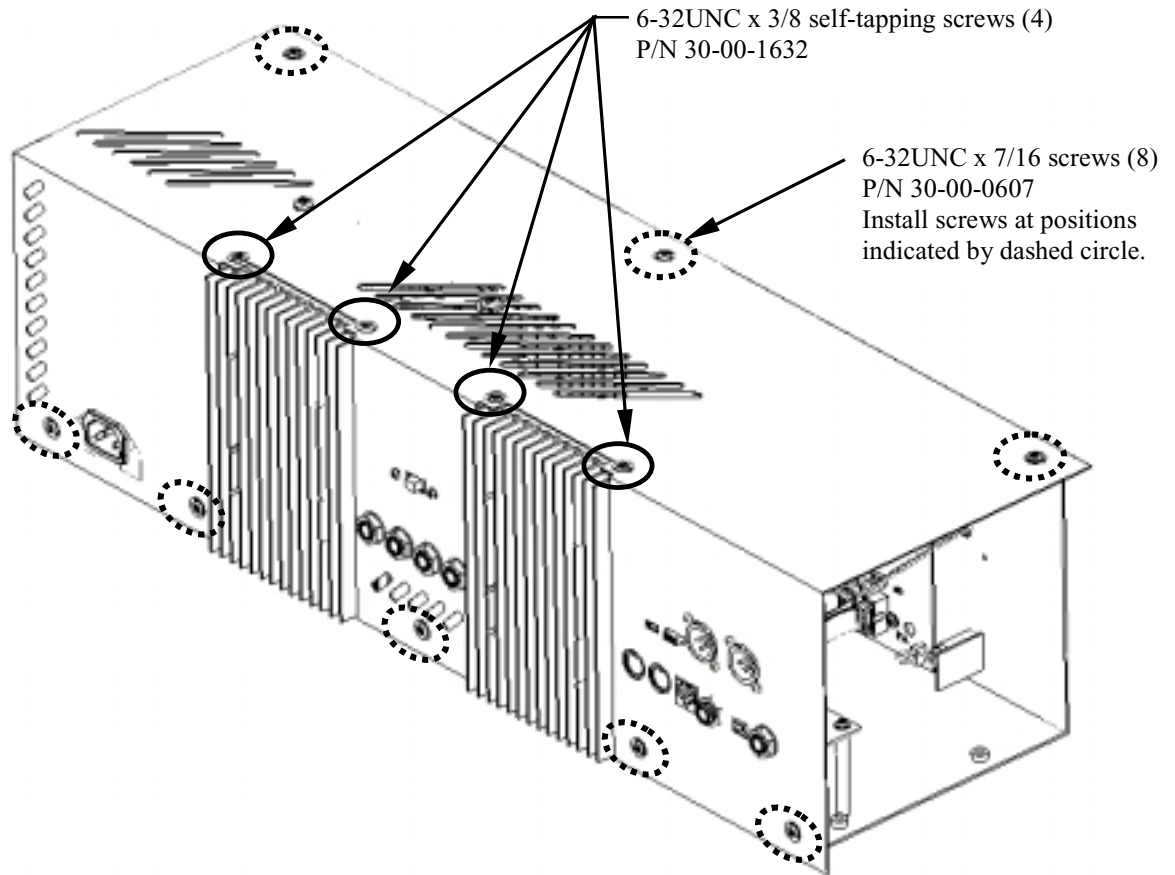
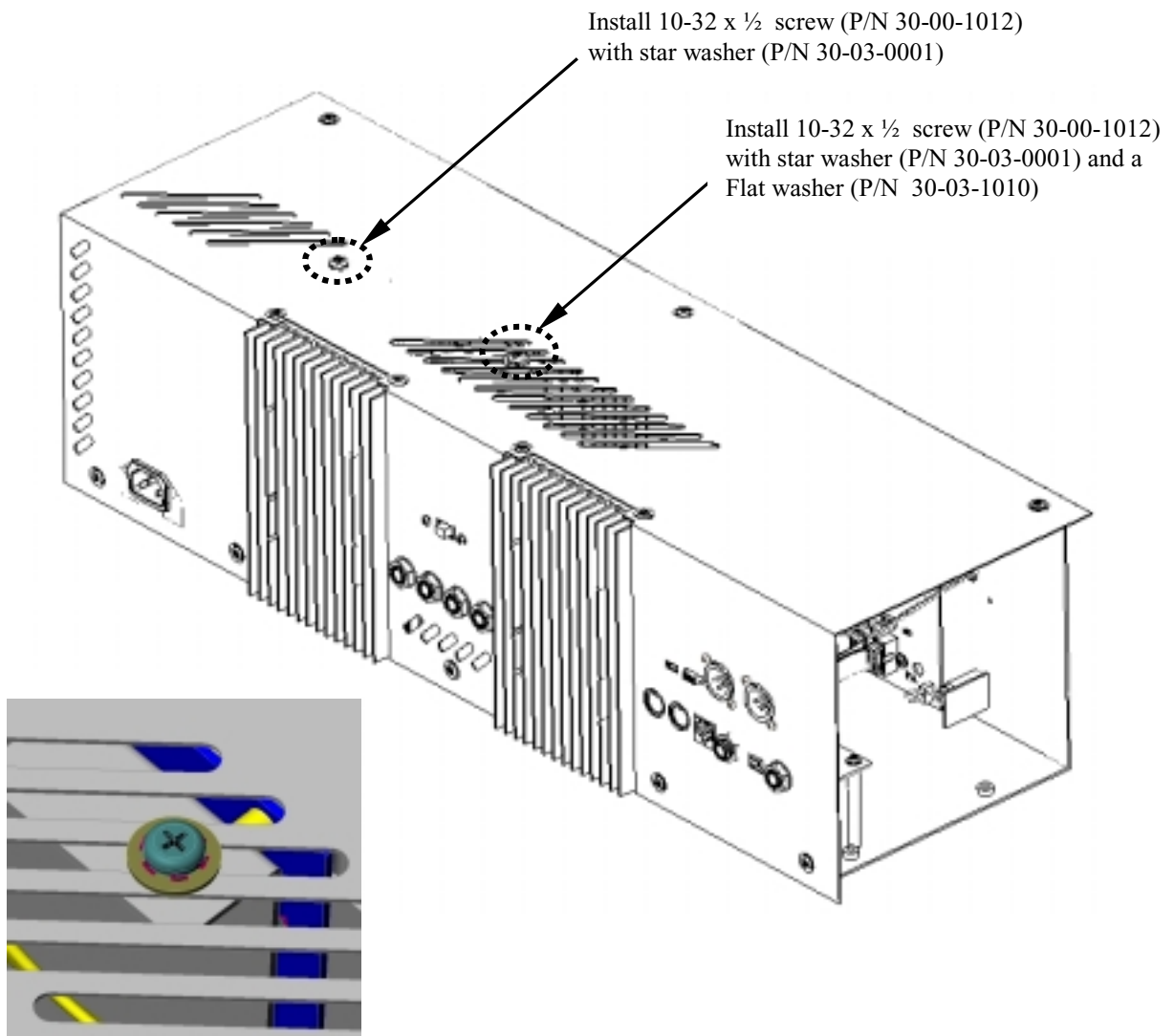


Figure 21

Step 13: Mount Cover onto Chassis (continued):

- c. Complete mounting of the Power Supply Bracket. Install two 10-32 x 3/8 screws. See figure 22.



Screw, star washer and flat washer Detail

Figure 22

Step 13: Mount Cover onto Chassis (continued):

- d. Install plastic nuts onto input/output jacks. See figure 23.
- e. Install four 4- x 1/4 screws into XLR jacks. See figure 23.

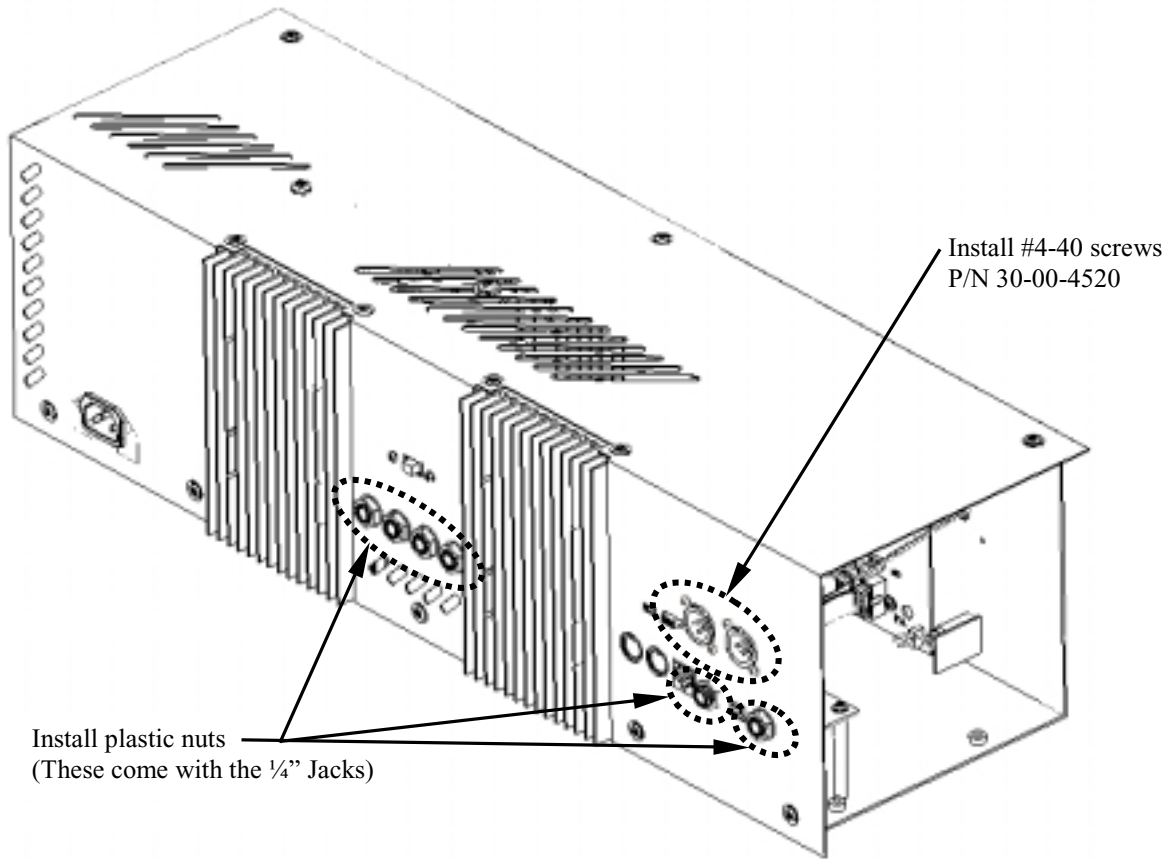


Figure 23

Step 14: Install Midi-Cab PCBA to Main PCBA cable assembly:

- a. Install 26 pin Midi-Cab to Main PCBA ribbon cable assembly. See figure 24.

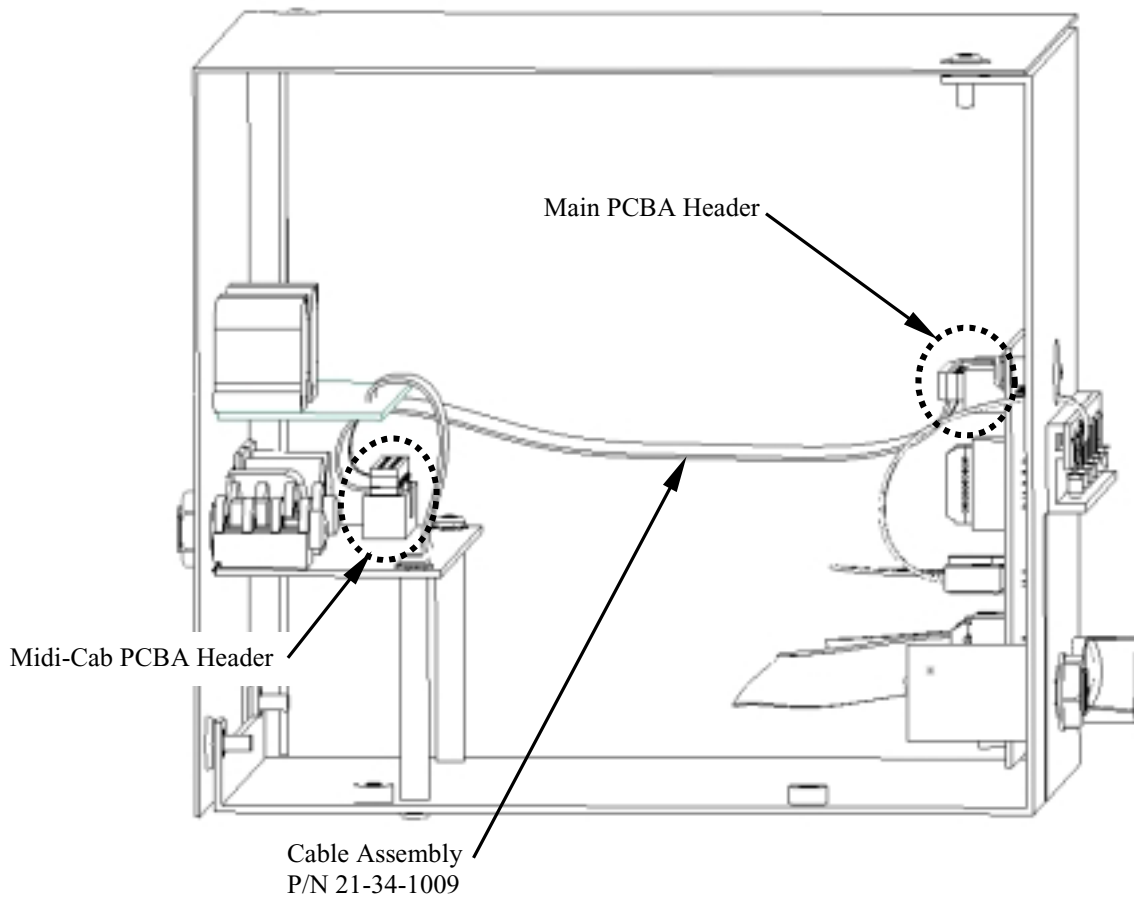


Figure 24 (left side view)

Step 15: Flextone II Head chassis assembly complete:

- a. Proceed to Chassis assembly into Cabinet.

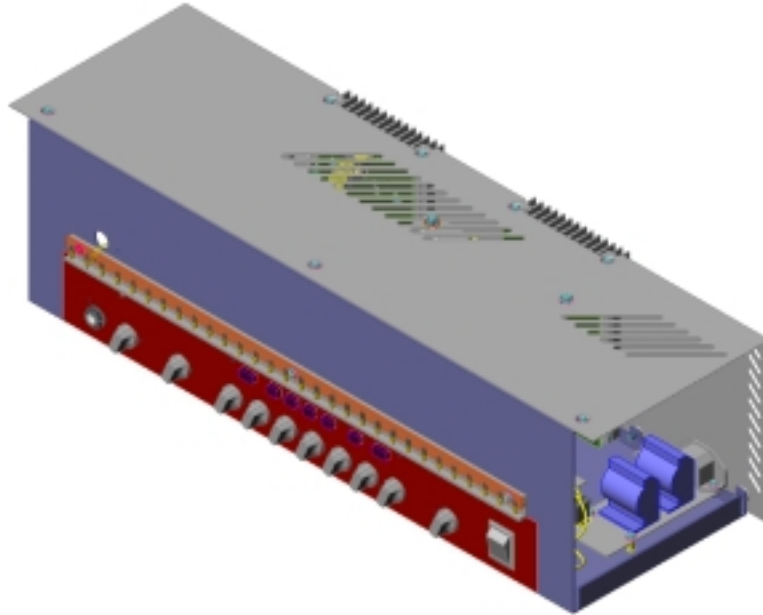


Figure 25 (front view)

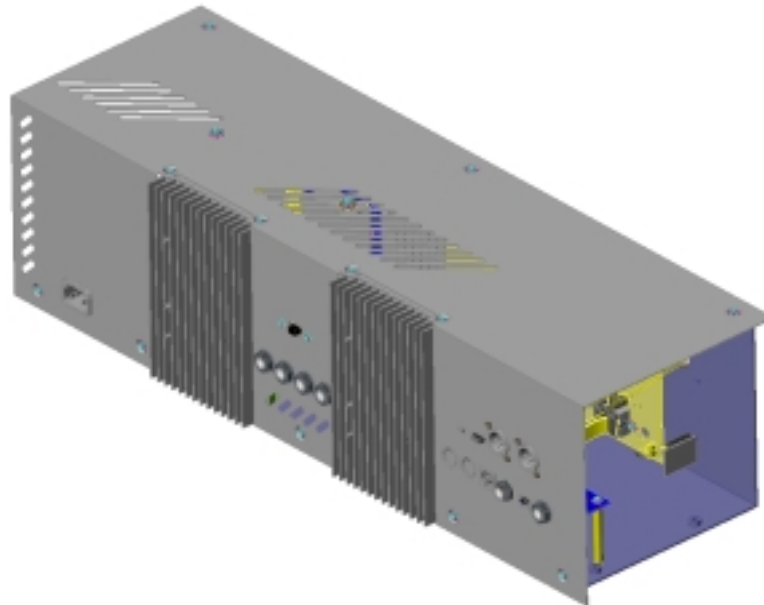


Figure 26 (rear view)

Step 16: Flexitone II Head assembly:

- a. From inside the Cabinet, poke the Chassis mounting holes and surface covering so they can be easily located on the outer surface. See figure 27.
- b. Install Chassis assembly into Cabinet. See figure 28.

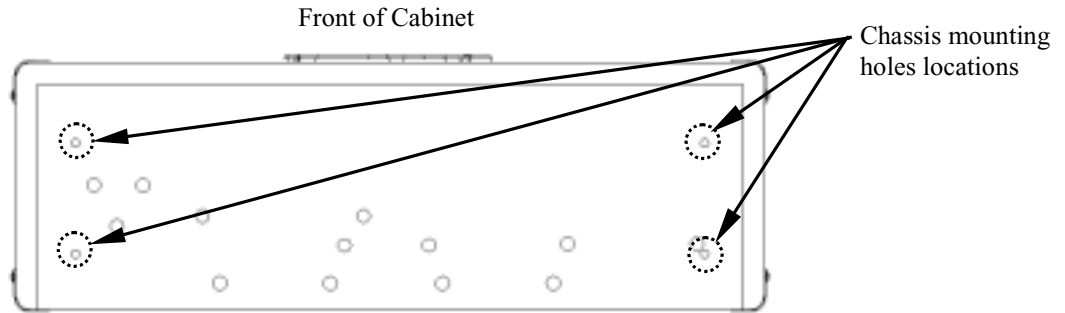


Figure 27 (top view)

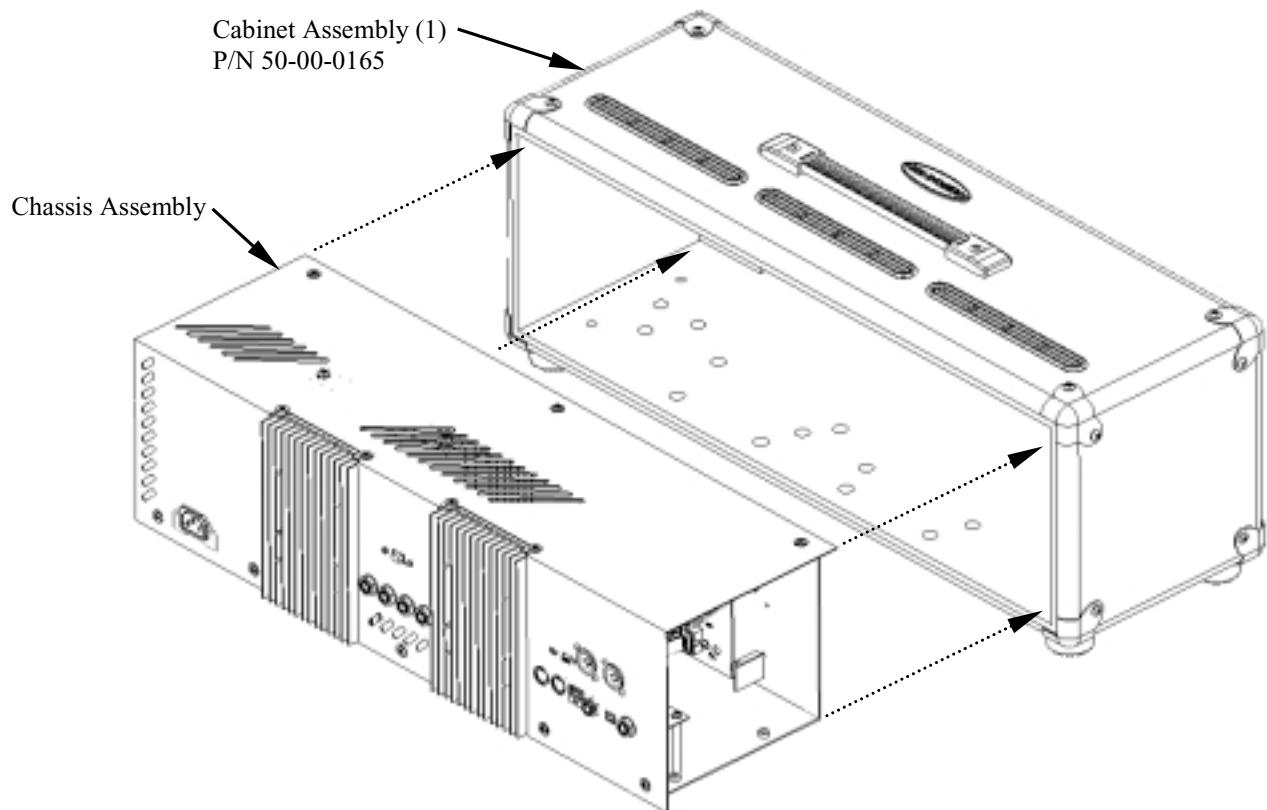


Figure 28

Step 16: Flexitone II Head assembly (continued):

- c. Rotate Cabinet (face down) and install Chassis mounting screws through bottom of Cabinet. See figure 29.
- d. The Flexitone II Head is now complete – ROCK ON!! See figure 30.

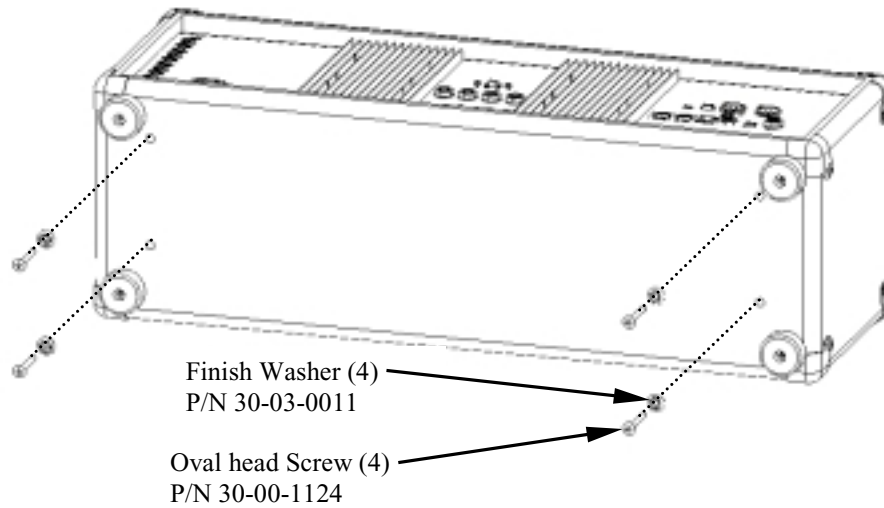


Figure 29

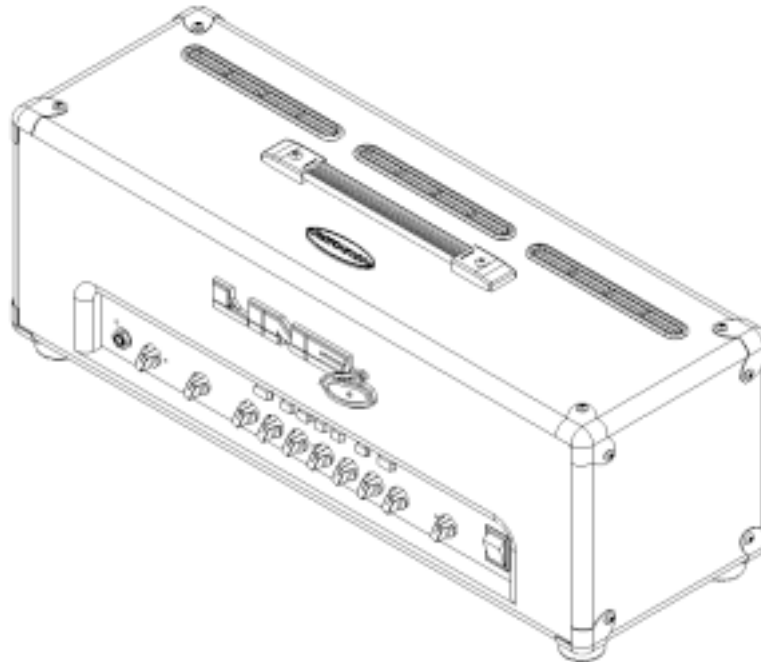


Figure 30



Service Dept.

6033 De Soto Ave.

Woodland Hills, CA 91367

P. 818-575-3600

F. 818-676-1585

E. service@line6.com

Procedure for reinitialization of Flexitone and Flexitone 2 amps
(Hard reset)

Power unit up while holding down the A, B, C, and D buttons. Hold for 3 seconds and then release. Factory presets will be re-installed.

Procedure for identifying firmware version of Flexitone and
Flexitone 2 amps

Power unit up while holding down the “C” button. “D” button will flash for major version; “Save” button will flash for minor version.

Example: For Flexitone 2.1 software, the “D” button will flash 2 times and then the “Save” button will flash once.