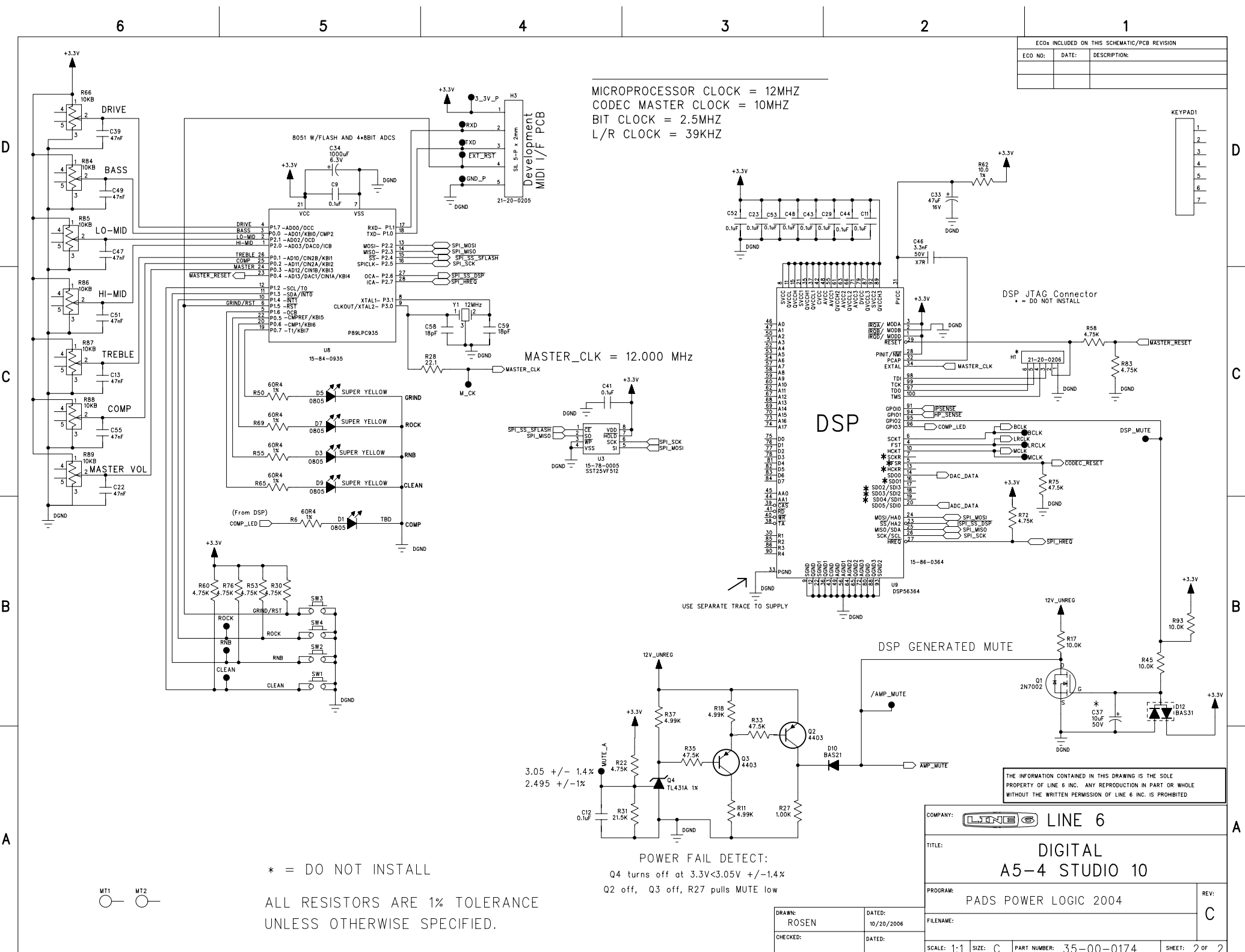




Low Down Studio 110

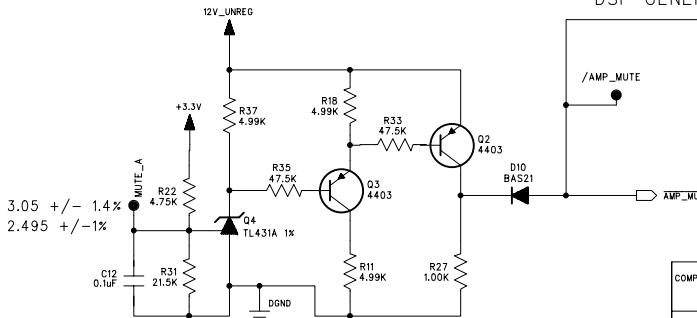
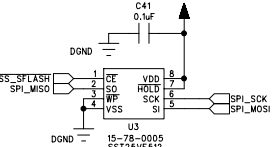
Service Manual

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



MICROPROCESSOR CLOCK = 12MHZ
 CODEC MASTER CLOCK = 10MHZ
 BIT CLOCK = 2.5MHZ
 L/R CLOCK = 39KHZ

MASTER_CLK = 12.000 MHz

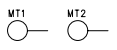


POWER FAIL DETECT:
 Q4 turns off at 3.3V < 3.05V ± 1.4%
 Q2 off, Q3 off, R27 pulls MUTE low

* = DO NOT INSTALL
 ALL RESISTORS ARE 1% TOLERANCE
 UNLESS OTHERWISE SPECIFIED.

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	
TITLE: DIGITAL A5-4 STUDIO 10	
PROGRAM: PADS POWER LOGIC 2004	REV: C
DRAWN: ROSEN	DATED: 10/20/2006
CHECKED:	DATED:
SCALE: 1:1	SIZE: C
PART NUMBER: 35-00-0174	SHEET: 2 OF 2



99-015-0505 A5-4 LOW DOWN STUDIO-10 US 75W			
Part Numbers	Description	Qty. Per	Reference Designator(s)
21-37-1160	CBL PWR UL/CSA SJT 8.2ft Blk EL-302 w/GND EL70	1	PACKOUT
40-00-0301	MANUAL USER STUDIO 10 A5-4	1	PACKOUT
40-00-1000	CARD WARRANTY LINE 6 HARDWARE	1	PACKOUT
40-01-0016	CARD LICENSE-AGREEMNT END-USERALL-PRODUCTS	1	PACKOUT
40-03-0031	CARD REGISTRATION UK	1	PACKOUT
40-03-2000	CARD REGISTRATION US	1	PACKOUT
40-03-2000-1	CARD REGISTRATION EUROPE	1	PACKOUT
40-10-0108	PROTECTOR CORNER CARTON SPIDER2-1508/3012	8	PACKOUT
40-10-0250	CARTON SHIPPING STUDIO 1x10 14" x 14" x 14" A5-4	1	PACKOUT
40-15-0022	SILICA GEL PACK 3.0" x 3.5"	1	PLACE INSIDE PLASTIC BAG WITH UNIT
40-15-0023	ANTISEPTIC PACK (5g/package)	1	PACKOUT
40-20-0011	BAG PLASTIC 10 x 16 2 mil	1	PACKOUT
40-20-0113	PLASTIC BAG 16 x 16 x 25" 2MILCLEAR A5-4	1	PACKOUT
40-25-0100	LABEL BAR CODE SERIAL NUMBER 4-PANEL LABEL	1	REAR CHASSIS & GIGT/SHIPPING BOX
59-00-0030-1	ASSY UNIT COMPLETE BASS AMP US STUDIO 10 A5-4	1	

59-00-0030-1 ASSY UNIT COMPLETE BASS AMP US STUDIO 10			
Part Numbers	Description	Qty. Per	Reference Designator(s)
11-20-0013	SPEAKER BASS 10" 8-OHM 75W HI-TOUCH P-0610001B-X2	1	INSTALL INTO CABINET
11-30-0006	XFMR 100/120VAC 50/60Hz 76mm 34VAC x 2 / 9.8VAC 1-CONNECTOR	1	
24-19-4025	FUSE 4A 125V TL 5x20mm Littlefuse# H239 004 or equiv.	1	F1 (on AC BREAK-AWAY PCBA)
30-00-0079	SCREW 8-32 x 1.25" PHILLIPS PHBLK	12	CHASSIS to SHROUD to CABINET
30-00-1016	SCREW 10-24 x 1" PPB STL	4	INSTALL SPEAKER to CABINET
40-00-0307	GUIDE POP-TOP LOW DOWN STUDIO 10 A5-4	1	
40-25-0020	LABEL INSPECTION QUALITY	1	
40-25-0113	STICKER SPEAKER-GRILL PROMO LOW DOWN STUDIO 10 A5-4	1	
50-03-0036	ASSY CAB LOW DOWN STUDIO-10 A5-4	1	
50-04-0056	ASSY E/M CHASSIS STUDIO 110 LOW DOWN A5-4	1	

50-03-0036 ASSY CAB LOW DOWN STUDIO-10			
Part Numbers	Description	Qty. Per	Reference Designator(s)
21-36-0271-2	CBL 18AWG 4-COND TWSTED/PAIR 1-JST/.205 SPADE-Fx2 15.5-IN	1	
30-00-0812	SCREW w/WAX 8 x 3/4 PTB	16	SECURES CORNERS
30-00-1020	SCREW 10-24 x 1-1/4 OVAL CTSKPB STL	2	SECURES HANDLE
30-00-3485	SCREW #3-48 x 3/8" PHIL FLAT STL BLK	2	SECURES LOGO to GRILL
30-00-8112	SCREW WOOD #8 x 1 1/2" OVAL PHH STL BLK OXIDE	4	SECURES GRILL to CABINET
30-03-0112	WASHER FINISHING #10 FLANGED STL BLK OXIDE	4	INSTALL to GRILL WITH SCREW (30-00-8100)
30-03-0335	WASHER #3 x .350 x .040 FLAT STEEL BLK	2	SECURES LOGO to GRILL
30-06-0014	NUT HEX 3-48 BLK STL ZINC W/NYLON INSERT	2	SECURES LOGO to GRILL
30-06-0028	NUT-T 8-32 x 1/4" STL	12	
30-06-1024	NUT-T 10-24 X 5/16 STEEL	6	SPKR AND HANDLE
30-15-0037	SPACER NYLON, ABS, LDPE OR HDPE BLK	4	INSTALL BETWEEN GRILL & SPEAKER BAFFLE
30-27-0186	SHROUD 9.0" x 8.5" x 4.0" ABS BLK	1	CHASSIS & CABINET
30-30-1530	CORNER PROTECTOR 2-LEG CUT OUTMETAL BLK	8	CABINET CORNERS
30-33-0061	CAB 0.59" PARTICLE BRD 12.5" x 12.5" x 12.5" A5-4	1	
30-39-0007	CARPET SYNTHETIC 0.06" THK BLK	4.9	INSTALL ON BARE CABINET
30-51-0274	GRILL 10.9 x 10.9 x .050 GALV STL BLK PAINT FINISH A5-4	1	INSTALL to CAB
30-57-0580	HANDLE/STRAP HEAVY DUTY BLACK	1	CABINET TOP
30-57-0581	ENDCAPS BLACK TEXTURED FINISH	2	HANDLE
30-60-0005	LOGO LINE 6 MED 139.70x28.63mmBRUSHED/BLK FINISH AL	1	INSTALL to GRILL
30-63-0600-2	FOAM W/ADH. 5.0" x 0.25" x 0.06" VOLARAPOLELEFIN	2	INSTALL ON BACK SIDE OF LOGO
30-75-0030	FOOT RUBBER 1.5 O.D. x .40 HT BLACK	4	CABINET BOTTOM

50-04-0056 ASSY E/M CHASSIS STUDIO 110 LOW DOWN			
Part Numbers	Description	Qty. Per	Reference Designator(s)
21-34-0075-2	CBL ASSY SIL 10-COND 26AWG 6.25-IN 2mm F-F Z-TYPE BLUE A5	1	POWER SUPPLY to MAIN BOARD
24-21-1124	CAP SWITCH PLASTIC .354" DIA. x .197" BLK	2	INSTALL ON SW6 (PCBA XLR/PREAMP), SW5 (HPN/CD)
24-24-0606	SWITCH POWER ROCKER 6A/250VAC 10A/120VAC PNL-MNT BLK	1	CHASSIS - REAR
30-00-0005	SCREW 6-32 x 1/4 w/LK WASHER PPZ STL	1	GND WIRE to CHASSIS
30-00-0034	SCREW 6-32 PHH PNH x7/16 LG BLK OXIDE W/EXT LK WASH	1	TERMINAL BRACKET (J1) ON MAIN BOARD
30-00-0042	SCREW SHEET METAL 4 x 0.375 INSELF-TAP PPB	2	MOUNTS J3 (XLR/PREAMP) To CHASSIS
30-00-0043	SCREW 6-32 x 5/16 w/LK WASH PPZ STL	4	PWR AMP/SUPPLY PCBA
30-00-0097	SCREW 8-32 x 7/16" PHH PNH STL BLK OXIDE	2	HEATSINK to CHASSIS
30-03-0027	WSHR LOCK EXT T #8 STL BLK	2	HEATSINK to CHASSIS
30-06-0624	NUT HEX 6-32 x .25IN STEEL/ ZINC-PLATE W/STAR WASHER	2	IEC JACK
30-06-0832	NUT .335 HEX 8-32 STL ZINC W/ TOOTH WASHER	4	SECURES TRANSFORMER
30-15-0004	SPACER .13THKx.63OD NYLON	3	J6-8 (USE WITH 21-00-6617)
30-24-0003	CABLE-TIE 4" CLEAR	2	1-SECURE THE ROCKER TERMINALS, 1-SECURE THE 3-PIN TRANFORMERCABLE
30-45-0011	KNOB POT .77 DIA x .76 HT PLASTIC CHROME-PLATED	7	INSTALL KNOBS ON POT
30-51-0256	CHASSIS 9.0" x 8.5" x 4.0" x 1/8" AL BLK ANODIZE A5-4	1	
30-75-0042	KEYPAD SILICONE RBR CLR 4.4" x1.4" x 1.0" A5-4	1	
50-02-0174	PCBA MAIN STUDIO-110 A5-4	1	
50-02-0174-1	PCBA GUITAR INPUT STUDIO-110 (A5-4)/SPIDER 110 (A14)	1	
50-02-0174-2	PCBA HPN/CD STUDIO-110 (A5-4)/SPIDER 110 (A14)	1	
50-02-0174-3	PCBA XLR/PREAMP STUDIO-110 A5-4	1	
50-02-0179	PCBA PWR AMP & SUPPLY w/H.SINKLOW DOWN 75W A5-4	1	

50-02-0174		PCBA MAIN STUDIO-110	
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-24-1000	RES 100R 1% 0805	1	R26
01-24-1001	RES 1.00K 1% 0805	1	R27
01-24-1002	RES 10.0K 1% 0805	7	R5,R7,R17,R25,R29,R45,R93
01-24-10R0	RES 10.0R 1% 0805	1	R62
01-24-1332	RES 13.3K 1% 0805	1	R44
01-24-1650	RES 165R 1% 0805	1	R9
01-24-1741	RES 1.74K 1% 0805	1	R81
01-24-1781	RES 1.78K 1% 0805	2	R39,R63
01-24-22R1	RES 22.1R 1% 0805	1	R28
01-24-3242	RES 32.4K 1% 0805	1	R12
01-24-3742	RES 37.4K 1% 0805	1	R10
01-24-4021	RES 4.02K 1% 0805	1	R24
01-24-4532	RES 45.3K 1% 0805	1	R42
01-24-4751	RES 4.75K 1% 0805	8	R22,R30,R53,R58,R60,R72,R76,R83
01-24-4752	RES 47.5K 1% 0805	7	R1,R3,R33,R35,R61,R67,R75
01-24-4991	RES 4.99K 1% 0805	7	R11,R15,R18,R19,R37,R41,R80
01-24-5R11	RES 5.11R 1% 0805	2	R59,R70
01-24-60R4	RES 60.4R 1% 0805	5	R6,R50,R55,R65,R69
01-24-7500	RES 750R 1% 0805	2	R16,R52
01-48-6103	POT MONO 10KB LINEAR TAPER 25mm W/9mm NUT D-SHAFT	7	R66,R84,R85,R86,R87,R88,R89
03-10-1107	CAP ELEC 100uF 6.3V 20% RADIAL5/11/5	2	C2,C19
03-10-6108	CAP ELEC 1000uF 6.3V 20% RADIAL 8/11.5/5	2	C34,C35
03-12-0476	CAP ELEC 47uF 16V 20% RADIAL 6.3/11.2/5	1	C33
03-18-0105	CAP ELEC 1uF 50V 20% RADIAL 5/11/5	2	C31,C36
03-18-0106	CAP ELEC 10uF 50V 20% RADIAL 5/11/5	5	C3,C4,C32,C69,C70
03-50-0101	CAP NPO 100pF 50V 5% 0805	5	C21,C26,C27,C67,C68
03-50-0221	CAP NPO 220pF 50V 5% 0805	1	C66
03-52-0104	CAP X7R 0.1uF 50V 10% 0805	14	C8,C9,C11,C12,C20,C23,C29,C41,C43,C44,C48,C52,C53,C54

50-02-0174 PCBA MAIN STUDIO-110			
Part Numbers	Description	Qty. Per	Reference Designator(s)
03-52-0332	CAP X7R 3.3nF 50V 10% 0805	1	C46
03-52-0473	CAP X7R 47nF 50V 10% 0805	13	C10,C13,C22,C39,C45,C47,C49,C51,C55,C64,C65,C71,C72
03-56-0180	CAP NPO 18pF 50V 5% 0603	2	C58,C59
06-34-0021	DIODE SWITCHING 250V 200mA 50nS SOT-23 SM BAS21LT1	1	D10
06-34-0031	DIODE GEN PUR DUAL 120V 600mA 50nS SOT-23 SM BAS31	4	D2,D4,D11,C12
09-06-7002	TRANS MOSFET N-CHAN 60V 7R5 SOT-23 SM 2N7002	1	Q1
09-10-4403	TRANS PNP SMALL-SIGNAL MBT4403SOT-23 SM	2	Q2,Q3
11-00-1201	CRYSTAL 12MHZ SHORT-CAN HC49 TH	1	Y1
12-00-0317	IC VREG ADJ 1.2-37V 1.5 AMP TO-220 LM317/NOBP TH	1	U6
12-00-0432	IC ADJ SHUNT REG TO-92 TH	1	Q4
12-54-0072	IC OP-AMP DUAL TL072CD SM	1	U10
12-54-0084	IC OP AMP QUAD TL084CD SM	1	U2
12-64-4556	IC CONVERTER 3V 24B 192KHz AKM4556 20-PIN TSOP SM	1	U4
15-86-0364	IC DSP 24-BIT TQFP-100 SM DSPB56364AF100	1	U9
18-22-0003	LED YELLOW SUPER 2.0x1.2x1.1mmAP2012SYC SM	5	D1,D3,D5,D7,D9
21-18-0002	TERMINAL SCREW PCB MOUNT RT ANGLE SNAP-IN TH	1	J1
21-20-0205	HDR SIL PCB-MT 5-PIN x 2mm MALE SHRD VERT MT TH	1	H3
21-20-0210	HDR SIL PCB-MT 10-PIN x 2mm MALE SHRD VERT MT TH	1	H2
21-30-0016-3	CBL RIBBON SIL 4-COND 3 IN 2mm 26AWG w SPLIT ENDS S/T	1	JP4 [PCBA XLR/Preamp] to JP5 [PCBA MAIN]
21-30-0018-1	CBL RIBBON SIL 6-PIN 2mm x 3in26AWG wSLIT ENDS S/T	1	JP1 [PCBA Guitar Input] to JP6 [PCBA Main]
21-30-0019-1	CBL RIBBON SIL 8-PIN 2mm x 3in26AWG wSLIT ENDS S/T	1	JP2 [PCBA Main] to JP3 [PCBA HPT/CD]
30-00-0043	SCREW 6-32 x 5/16 w/LK WASH PPZ STL	1	(U6)
30-12-2210	STANDOFF HEX .250 6-32 F-F .500 LG AL	1	(U6)
30-15-0007	INSULATOR XTAL 4.9mm C-C 11.8x5.6mm MYLAR	1	(Y1)
35-00-0174	PCB MAIN STUDIO-110 (A5-4)/ SPIDER 110 (A14) REV. C	1	
45-01-0031	IC PROGRAMMED MCU v1.00 c/s 0x2DC3C4EA STUDIO 110 A5-4	1	U8
45-02-0036	IC PROGRAMMED FLASH v1.00 LOW DOWN (STUDIO 110) A5-4	1	U3

50-02-0174-1 PCBA GUITAR INPUT STUDIO-110			
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-24-1001	RES 1.00K 1% 0805	1	R38
01-24-1004	RES 1.00M 1% 0805	1	R2
01-24-1052	RES 10.5K 1% 0805	1	R13
01-24-10R0	RES 10.0R 1% 0805	2	R4,R40
01-24-1502	RES 15.0K 1% 0805	1	R36
01-24-2872	RES 28.7K 1% 0805	1	R23
01-24-3741	RES 3.74K 1% 0805	1	R21
01-24-4641	RES 4.64K 1% 0805	1	R8
03-18-0106	CAP ELEC 10uF 50V 20% RADIAL 5/11/5	2	C1,C40
03-27-0682	CAP POLYESTER 6.8nF 50V 5% TH 7/3/6/5	1	C38
03-45-0473	CAP 47nF 16V 20% 1206 FILM	1	C6
03-52-0470	CAP X7R 47pF 50V 10% 0805	1	C5
06-28-8424	DIODE ZENER 24V 5% 350mW SOT-23 SM BZX84C24	2	D6,D8
11-10-0601	FERRITE BEAD 600R @100MHZ 1206	6	L3,L4,L5,L6,L7,L8
11-10-2012	FERRITE BEAD 600R@100MHZ 300mA 0805 SM	2	L9,L11
12-54-0072	IC OP-AMP DUAL TL072CD SM	1	U1
21-00-6617	JACK 1/4" TRS 6-PIN PCB MT HORIZ TH W/CHROME HRDWARE	1	J6
24-01-0003	SWITCH LATCHING PUSH BUTTON SPDT 3-PIN SIL HORIZONTAL TH	1	SW5
30-18-3030	CLIP GND PCB .30x.30x.07	1	GF2
35-00-0174-1	PCB GUITAR INPUT STUDIO-110 (A5-4)/SPIDER 110 (A14) REV. C	1	

50-02-0174-2 PCBA HPN/CD STUDIO-110			
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-24-1002	RES 10.0K 1% 0805	2	R47,R49
01-24-15R0	RES 15R 1% 0805	2	R54,R57
01-24-2002	RES 20.0K 1% 0805	2	R64,R68
01-24-3161	RES 3.16K 1% 0805	2	R32,R34
01-24-4751	RES 4.75K 1% 0805	2	R74,R79
01-24-47R5	RES 47.5R 1% 0805	8	R46,R48,R51,R56,R71,R73,R77,R78
03-18-0106	CAP ELEC 10uF 50V 20% RADIAL 5/11/5	2	C62-63
03-52-0102	CAP X7R 1nF 50V 10% 0805	4	C14,C15,C16,C18
03-52-0104	CAP X7R 0.1uF 50V 10% 0805	3	C17,C24,C25
03-52-0473	CAP X7R 47nF 50V 10% 0805	4	C42,C50,C60,C61
11-10-2012	FERRITE BEAD 600R@100MHZ 300mA 0805 SM	6	L2,L12,C13,L15,L16,L17
12-54-0084	IC OP AMP QUAD TL084CD SM	2	U5,U7
21-00-6617	JACK 1/4" TRS 6-PIN PCB MT HORIZ TH W/CHROME HRDWARE	1	J8
21-12-0035	JACK 3.5mm STEREO 5 PIN CRIMPED LEADS NON-THREADED	1	J4
30-18-3030	CLIP GND PCB .30x.30x.07	1	GF3
35-00-0174-2	PCB HPN/CD STUDIO-110 (A5-4)/ SPIDER 110 (A14) REV. C	1	

50-02-0174-3 PCBA XLR/PREAMP STUDIO-110			
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-24-2050	RES 205R 1% 0805	2	R91,R92
01-24-3741	RES 3.74K 1% 0805	2	R14,R20
01-24-4750	RES 475R 1% 0805	1	R82
03-52-0102	CAP X7R 1nF 50V 10% 0805	3	C7,C28,C57
03-52-0104	CAP X7R 0.1uF 50V 10% 0805	2	C30,C56
11-10-2012	FERRITE BEAD 600R@100MHZ 300mA 0805 SM	5	L1,L10,L14,L19,L20
21-00-6617	JACK 1/4" TRS 6-PIN PCB MT HORIZ TH W/CHROME HRDWARE	1	J7
21-08-0013	JACK XLR MALE PCB MNT RT ANG TH NEUTRIK-NC3MAH	1	J3
24-01-0003	SWITCH LATCHING PUSH BUTTON SPDT 3-PIN SIL HORIZONTAL TH	1	SW6
30-18-3030	CLIP GND PCB .30x.30x.07	1	GF1
35-00-0174-3	PCB XLR/PREAMP STUDIO-110 (A5-4)/SPIDER 110 (A14) REV. C	1	

50-02-0179		PCBA PWR AMP & SUPPLY w/H.SINKLOW DOWN 75W	
Part Numbers	Description	Qty. Per	Reference Designator(s)
30-00-0010	SCREW 8-32 x 9/16 SKT-CAP S-STL	1	HEATSINK to POWER AMP
30-03-0002	WASHER #8 .293 x.174x .040 STEEL	1	HEATSINK to POWER AMP
30-51-0073	CLAMP HEATSINK TO-220 1.3x.45x.35" CR STEEL 1018	1	TO HOLD THE POWER AMP TO THE HEADSINK
30-51-0229-1	HEATSINK AL BLK ANODIZED 3.81A5-1 A5-2	1	
30-63-0006	PAD THERMAL 6mil 25mm x 30mm w/ADHESIVE 4KVAC VTM-O	1	HEATSINK - BEHIND POWER AMP
50-02-0080	PCBA POWER SUPPLY STUDIO-10 A5-4	1	
50-02-0080-1	PCBA POWER AMP STUDIO-10 A5-4	1	
50-02-0080-2	PCBA POWER AC STUDIO-10 A5-4	1	

50-02-0080		PCBA POWER SUPPLY STUDIO-10	
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-12-0473	RES CARBON FILM 47K 1/4W 5% TH	1	R8
01-22-02R2	RES METAL OXIDE 2.2R 2W 5% TH	1	R2
01-24-0000	RES 0R 1% 0805	1	R7
01-24-1003	RES 100K 1% 0805	1	R1
03-12-0478	CAP ELEC 4700uF 16V 20% RADIAL 16/25/7.5	1	C14
03-14-0107	CAP ELEC 100uF 25V 20% RADIAL 6.3/11.2/5	2	C9,C13
03-16-0477	CAP ELEC 470uF 35V 20% 105C RADIAL 10/16/5	4	C6,C7,C10,C11
03-18-0105	CAP ELEC 1uF 50V 20% RADIAL 5/11/5	1	C15
03-18-0225	CAP ELEC 2.2uF 50V 20% RADIAL 5/11/5	2	C16,C17
03-18-1478	CAP ELEC 4700uF 50V 20% SNAPINRADIAL 25/40/10	2	C4,C5
03-22-0476	CAP ELEC 47uF 100V 20% RADIAL 10/15/5	2	C21,C22
03-24-0564	CAP MET-POLY 0.56uF 100VDC 5% TH 4.5/7.5/7/5	1	C18
03-36-0102	CAP ESTR 1nF 100V 5% TH 7.2/2.5/6.5/5	2	C19,C20
03-52-0473	CAP X7R 47nF 50V 10% 0805	2	C8,C12
06-16-0008	DIODE BRIDGE-RECT 8A 600V 4-PIN SIL TH KBU8J	1	D1
06-32-4006	DIODE RECTIFIER 800V 1A SMA SM MRA4006T3G	5	D2,D3,D4,D5,D6
12-02-7815	IC REG +15V 1AMP TO-220 TH	1	U3
12-02-7915	IC REG -15V 1AMP TO-220 TH 7915	1	U2
21-20-0210	HDR SIL PCB-MT 10-PIN x 2mm MALE SHRD VERT MT TH	1	H4
21-20-1564	HDR SIL PCB-MT 4-PIN X .156 MALE VERT-MNT FRIC-LOCK	1	H5
21-20-1565	HDR SIL PCB-MT 5-PIN X .156 MALE VERT-MNT FRIC-LOCK	1	H3
21-30-0012	CBL SIL 10-PIN 2.54 x 40mm 26AWG S/T	1	JP1-A [Power Amp] to JP2-A [Power Supply]
35-00-0175	PCB POWER SUPPLY LOW DOWN 75W (A5-4)/SPIDER 110 (A14) REV. B	1	

50-02-0080-1 PCBA POWER AMP STUDIO-10			
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-24-1002	RES 10.0K 1% 0805	2	R3,R6
01-24-2742	RES 27.4K 1% 0805	2	R4,R5
03-18-0225	CAP ELEC 2.2uF 50V 20% RADIAL 5/11/5	2	C25,C26
03-18-0336	CAP ELEC 33uF 50V 20% RADIAL 5/11/5	1	C27
03-36-0103	CAP ESTR 10nF 50V 5% TH 7.3/3.2/5/5	1	C23
03-50-0101	CAP NPO 100pF 50V 5% 0805	2	C24,C28
12-30-72930	IC POWER-AMP 100W TDA7293 TO-220/15 TH	1	U1
35-00-0175-1	PCB POWER AMP LOW DOWN 75W (A5-4)/SPIDER 110 (A14) REV. B	1	

50-02-0080-2 PCBA POWER AC STUDIO-10			
Part Numbers	Description	Qty. Per	Reference Designator(s)
01-12-0000	RES CARBON FILM 0R 1/4W 5% TH	2	L1,L2
21-14-0001	JACK IEC 3-PIN MALE PCB-MNT RT-ANG GND SS-7B-1	1	J1
21-20-3123	HDR SIL PCB-MT 3-PIN X 7.92mm MALE VERT-MNT FRIC-LOCK	2	H1,H2
21-34-1102-2	CBL 18AWG 76.2mm S-T/TAB-FSTN INSUL F-FLAG .25mm BLK	1	W1,W2
21-34-1116-1	CBL EARTHING w/EYELET 16AWG 3-IN GREEN w/YELLOW STRIPE	1	SOLDER to IEC JACK (J1) GND TAB
21-48-9521	CLIP FUSE HOLDER	2	F1
30-00-0607	SCREW 6-32 x 7/16IN w/LK WASH PPZ STL	2	(J1) SECURE AC RECEPTACLE to PCB
30-06-0623	NUT HEX 6-32 w/CAPTIVE STAR-WASHER	2	(J1) SECURE AC RECEPTACLE to PCB
35-00-0175-2	PCB POWER AC LOW DOWN 75W (A5-4)/SPIDER 110 (A14) REV. B	1	



Engineering

STUDIO 10 (A5-4)
MAIN PCB ASSEMBLY NOTES

Rev.B

Part Numbers:

50-02-0174: PCBA MAIN

50-02-0174-1: PCBA GUITAR INPUT

50-02-0174-2: PCBA HPN/CD

50-02-0174-3: PCBA XLR/PREAMP

!!!!!!CAUTION!!!!!!

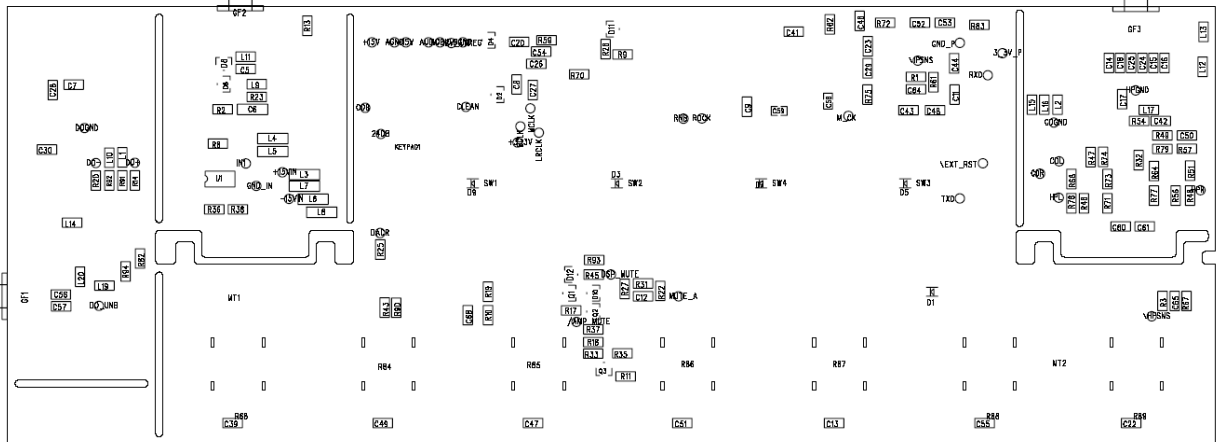
**ELECTROSTATICALLY-SENSITIVE PARTS!
WEAR ESD PROTECTIVE CLOTHING!
ASSEMBLE IN AN ESD CONTROLLED
ENVIRONMENT!**

Revision History

<u>Revision:</u>	<u>Notes:</u>	<u>Date:</u>	<u>Released By:</u>
A	Initial Release.	08/28/06	Erik VP
B	Removed R80 from Do Not Install list for 50-02-0174.	09/27/06	Erik VP

- 50-02-0174: PCBA MAIN
- 50-02-0174-1: PCBA GUITAR INPUT
- 50-02-0174-2: PCBA HPN/CD
- 50-02-0174-3: PCBA XLR/PREAMP

TOP SIDE

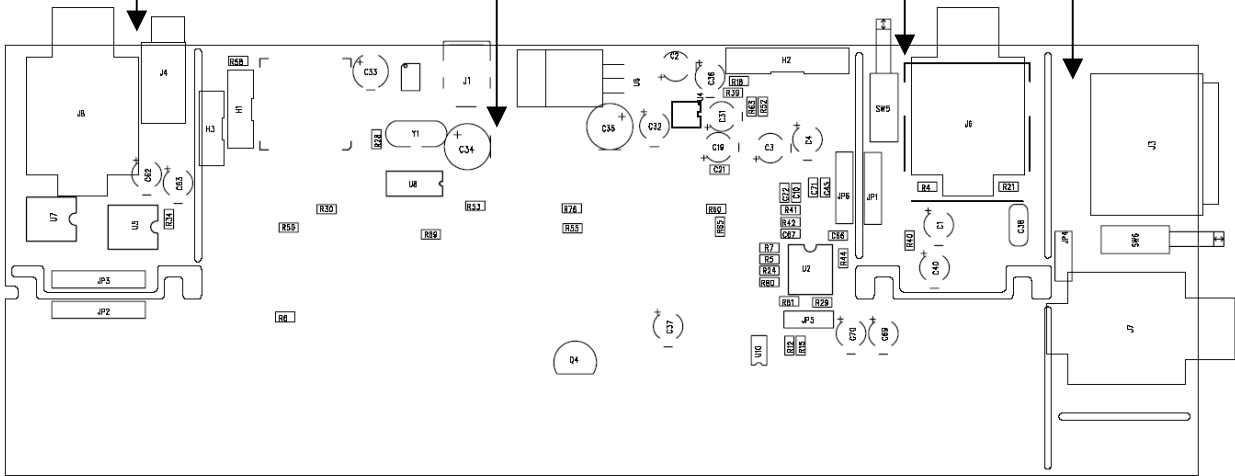


50-02-0174-2
PCBA HPN/CD

50-02-0174
PCBA MAIN

50-02-0174-1
PCBA GUITAR INPUT

50-02-0174-3
PCBA XLR/PREAMP



BOTTOM SIDE

1. **“DO NOT INSTALL” COMPONENTS:**

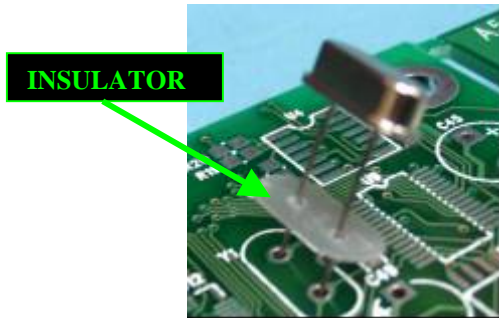
- 50-02-0174: PCBA MAIN - C37, H1, R43, R90
- 50-02-0174-1: PCBA GUITAR INPUT - None
- 50-02-0174-2: PCBA HPN/CD - None
- 50-02-0174-3: PCBA XLR/PREAMP - R94

2. **BREAKAWAY SECTIONS:**

Do not break apart the four sections of the PCBA until after PCBA testing is complete.

3. **CRYSTAL (Y1) AND INSULATOR:**

Install insulator (30-15-0007) onto leads of crystal (11-00-1201), and install at Y1. Crystal must be mounted flush with the PCB.



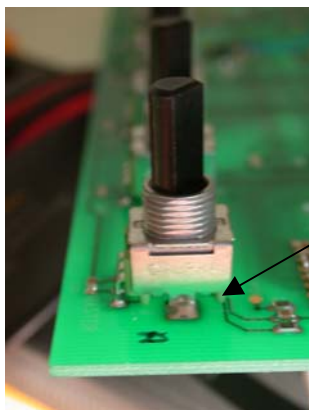
BE SURE TO INSTALL INSULATOR



CRYSTAL INSTALLED WITH INSULATOR

4. **POTENTIOMETERS:**

Each potentiometer (7 total) must be securely mounted to the PCB before soldering. Verify that all four mounting legs touch the PCB.



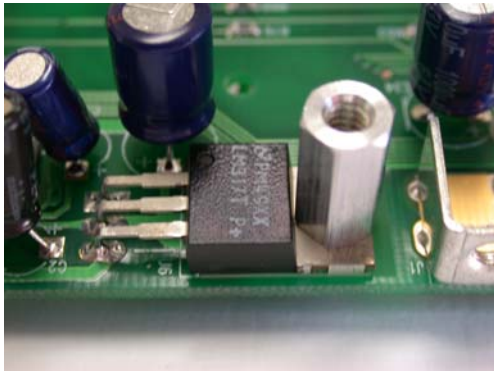
5. **DO NOT WATER WASH THE BOARD:**

The potentiometers are sensitive to water washing. If wave soldering is preferred, we recommend using a no-clean flux wave soldering process, rather than a process that requires washing. The fluxing process wave must be controlled so as not to have flux migrate inside the pot through the top of the housing. Good venting is required. No-clean flux vapors can enter the switch if adequate venting is not available. The vapors will condense on the internal contacts and become an insulator when they solidify.

6. **REGULATOR IC's:**

Secure voltage regulator U6 to the PCB with standoff (30-12-2210) and screw (30-00-0043) before soldering. This will ensure proper alignment of the regulator, and reduce strain on the regulator leads.

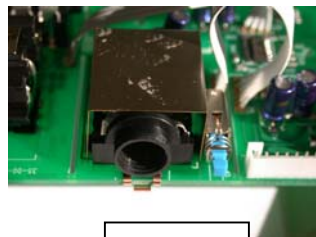
Torque each screw/standoff to 10-12 in-lbs.



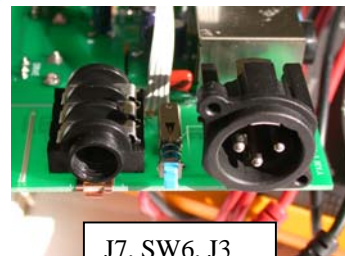
7. **JACKS, SWITCHES, SCREW TERMINAL, HEADERS:** All jacks, switches, screw terminal, and headers must be mounted flush to the PCB.



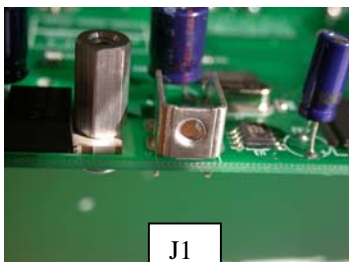
J4, J8



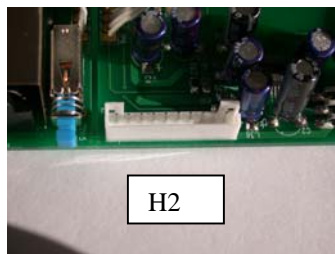
J6, SW5



J7, SW6, J3



J1



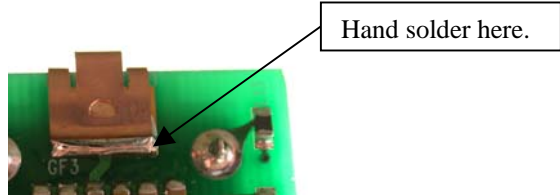
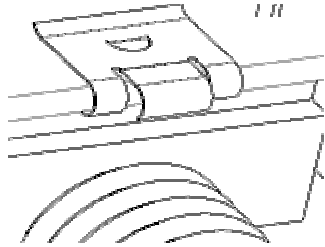
H2



H3

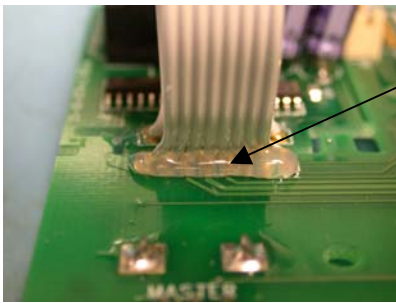
8. **GROUNDING FINGERS:**

Grounding fingers GF1-3 (30-18-3030) are mounted flush against the PCB edge with the center clip hole on the **SOLDER SIDE** of the PCB. The “curl” of the grounding finger should curve toward the jack it is mounted under. **It should then be manually soldered on the SOLDER SIDE.**

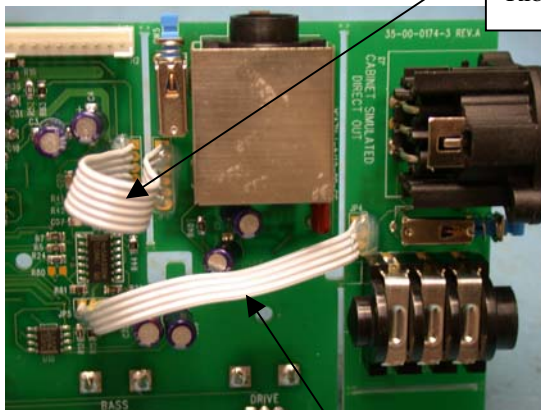


9. **RIBBON CABLES:**

Apply RTV or hot glue to all ribbon cables (JP1-JP6, JP2-JP3, JP4-JP5). The RTV or hot glue should run along the entire width of the cable.



Apply RTV or hot glue along entire length of ribbon cable.



JP1 – JP6
Ribbon Cable: 21-30-0018-1

JP4 – JP5
Ribbon Cable: 21-30-0016-3



JP2 – JP3
Ribbon Cable: 21-30-0019-1



Engineering

STUDIO 10 A5-4
POWER PCB ASSEMBLY NOTES

Rev. D

Part Numbers:

50-02-0179 PCBA POWER AMP & HEATSINK ASSY

50-02-0080: PCBA POWER SUPPLY

50-02-0080-1: PCBA POWER AMP

50-02-0080-2: PCBA POWER AC

CAUTION

**ELECTROSTATICALLY-SENSITIVE PARTS!
WEAR ESD PROTECTIVE CLOTHING!
ASSEMBLE IN AN ESD CONTROLLED
ENVIRONMENT!**

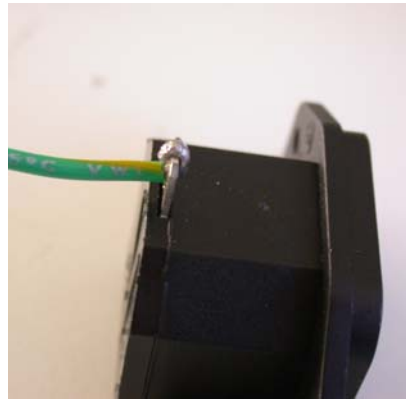
Revision History

Revision:	Notes:	Date:	Released By:
A	Initial Release.	08/28/06	Erik VP
B	1. Revised sil pad to 30-63-4003 in step #10. 2. Revised #7 to add loc-tite to screw/nuts. Included power amp/heatsink assembly part number on pg.1 and step#10.	09/29/06	Erik VP
C	1. Changed Sil pad from 30-63-4003 to 30-63-0006 in step #10 2. Changed screw with bushing to screw with washer (30-03-0335). 3. Step#3 – Added note to skip step if L1, L2 are 0R (01-12-0000). 4. Step#7. Changed screw 30-00-0043 to 30-00-0607. Changed nut 30-06-0624 to 30-06-0623. Reference ECO#0629801. 5. Step#8 – Removed instruction to add hot glue on bottom side of ribbon cable.	10/27/06	Justin B
D	1. Step #10 - Changed clamp hardware from a #4 screw with flat washer to hex screw (30-00-0010) with a split washer (30-03-0002).	11/02/06	Justin B

1. BREAKAWAY SECTIONS:

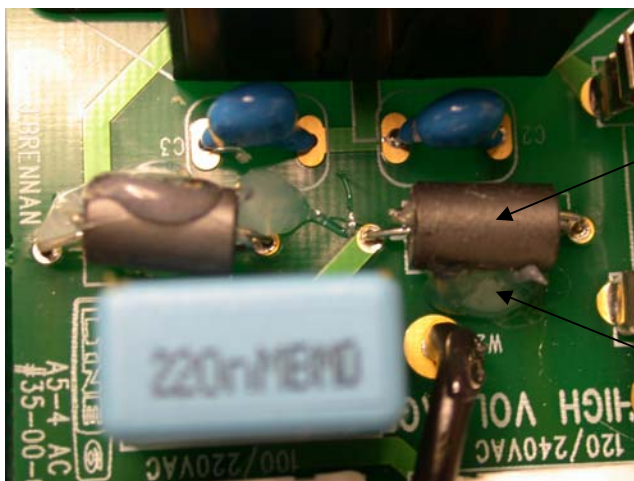
Do not break apart the three sections of the PCBA until after PCBA testing is complete.

2. **AC RECEPTACLE & GROUND WIRE ASSEMBLY:** Bend ground wire 180°. Insert wire into terminal and bend with pliers so it is secured before soldering. Solder wire to terminal.



3. **HOT GLUE FOR INDUCTORS:** Place hot glue on PCB before installing inductors at L1, 2. Add additional hot glue after parts are installed.

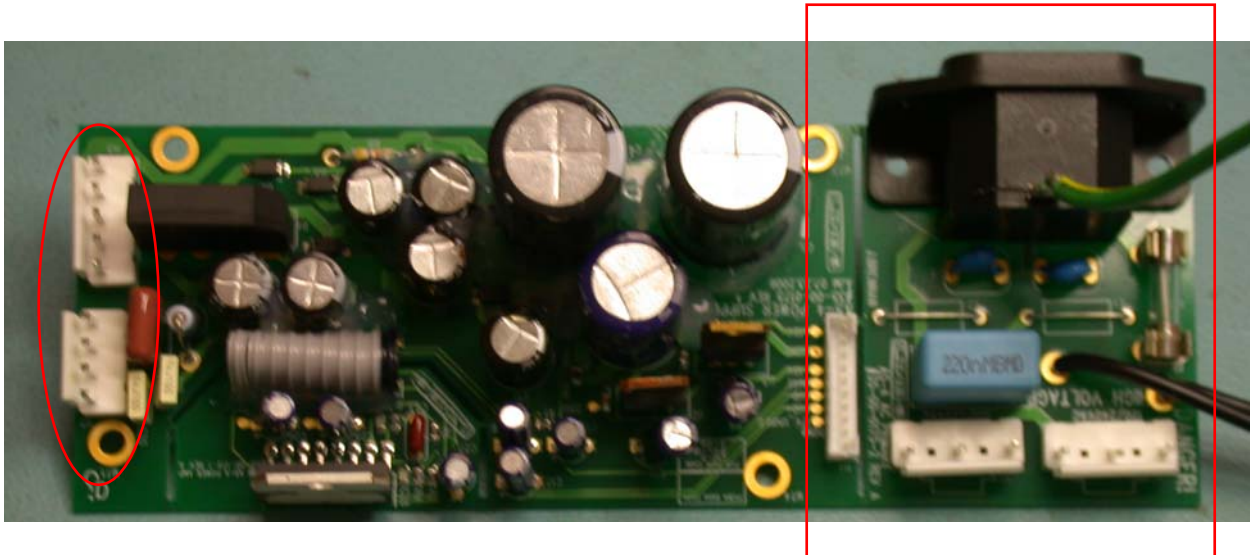
IMPORTANT: SKIP THIS STEP IF L1, L2 ARE 0R RESISTORS (01-12-0000).



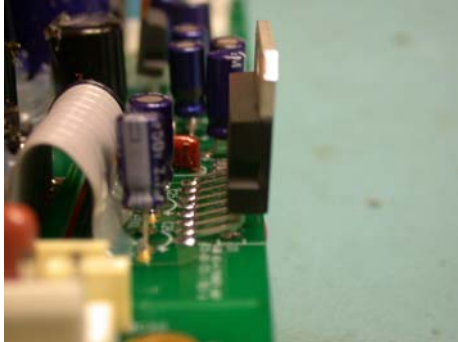
Apply glue under inductors (L1, 2) directly to PCB.

Apply additional hot glue on sides of inductors (L1, 2) & PCB.

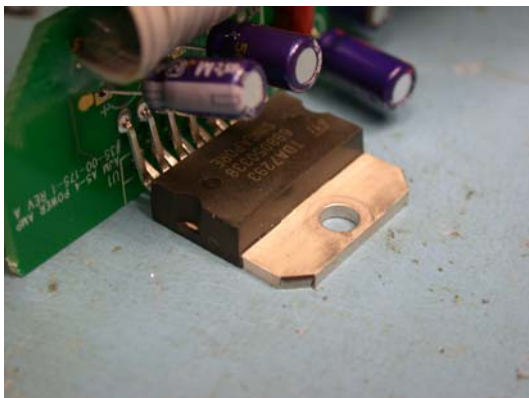
4. **JACKS, HEADERS:** All jacks (J1) and headers (H1, H2, H3, H4, H5) must be mounted flush to the PCB.



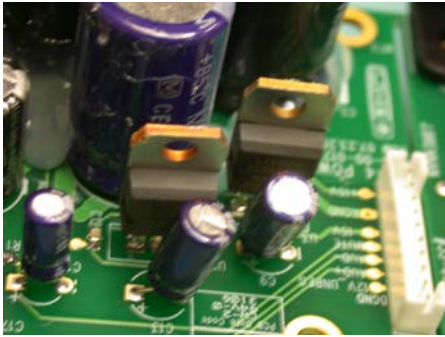
5. **POWER AMP MOUNTING:** Install Power Amp IC (12-30-7293) at location U1. Part must sit perpendicular to PCB prior to soldering.



Verify power amp IC is installed properly by resting part against flat surface. There should be no gap between the back of the part and the flat surface.



6. **VOLTAGE REGULATORS:** Verify that U1 and U2 are not touching C9, 13, 14.



7. **AC RECEPTACLE TO PCB ASSEMBLY:** Install AC receptacle into PCB at location J1. Secure receptacle to PCBA using two screws (30-00-0607) and two nuts (30-06-0623). Apply loc-tite to both locations. Note: Loc-tite can be applied at PCB assembly level or at final chassis assembly level.

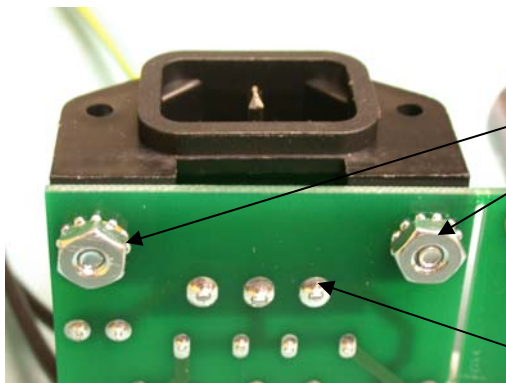
There are two assembly options.

IMPORTANT: DO NOT INSTALL SCREWS AND NUTS AFTER SOLDERING. THIS CAN ADD STRESS TO PART AND CAUSE FRACTURED SOLDERED JOINTS.

Option #1: It is ok to wave solder the AC receptacle if the screws and nuts do not overheat and melt the plastic housing of the AC receptacle. Contact Manufacturer must confirm this.

Option #2: Install AC receptacle after wave solder and hand solder.

Torque: 8-10 in/lbs.

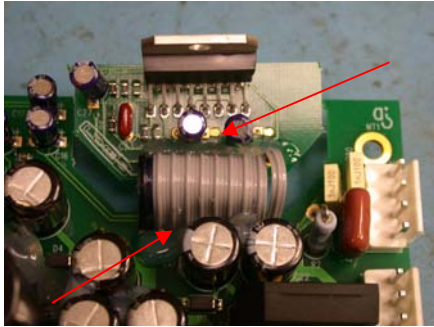


Screw (30-00-0607)
Hex Nut (30-06-0623)
Apply loc-tite at both
locations.

Only solder AC receptacle to
PCBA after screws and nuts are
installed.

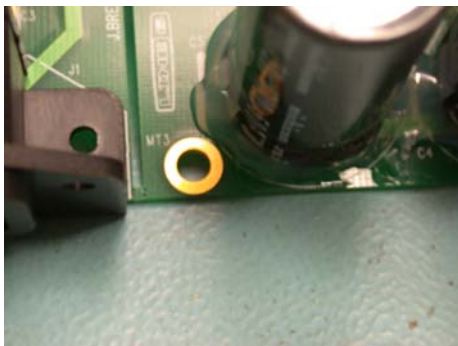
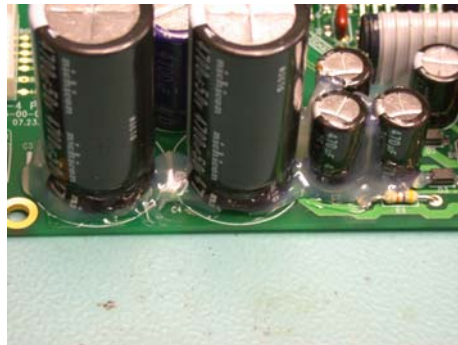
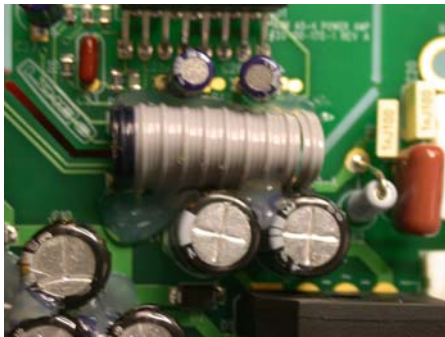
8. POWER AMP RIBBON CABLE:

Break away power amp PCBA (50-00-0175-1). Apply RTV or hot glue to both ends of ribbon cable (JP1-A to JP1-B). The RTV or hot glue should run along the entire width of the cable.



9. RTV/HOT GLUE FOR CAPACITORS & INDUCTORS:

Apply RTV or hot glue to the base of capacitors (C4,5,6,7,10,11,14,21,22, L1,2). Keep RTV or hot glue out of mounting hole (M13).

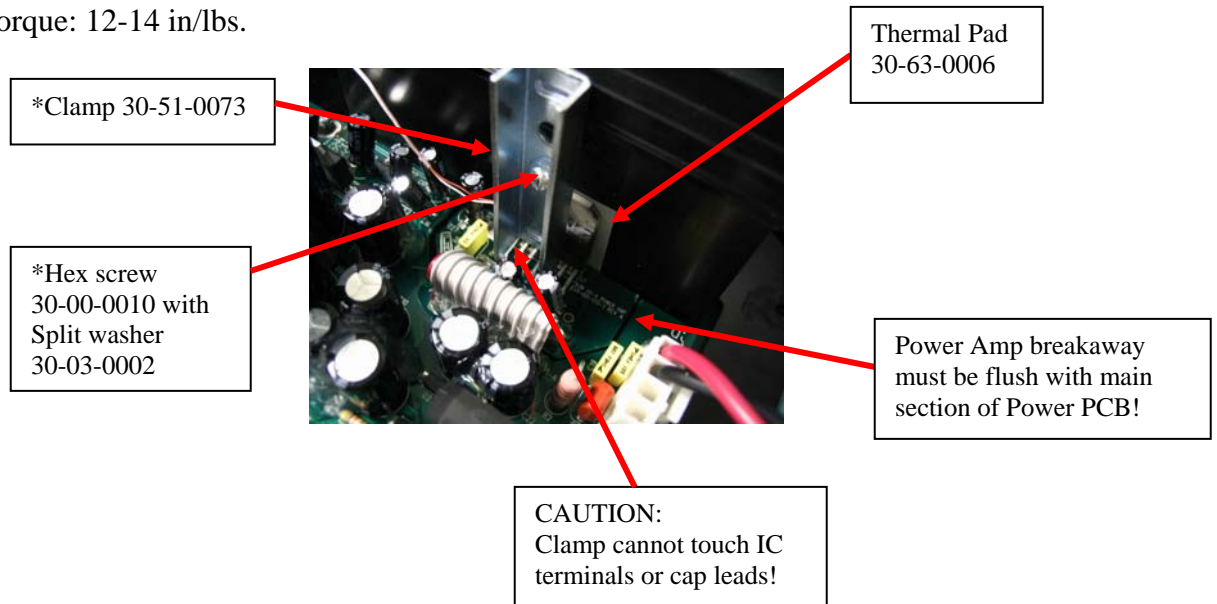


10. **POWER AMP & HEATSINK ASSEMBLY (50-02-0179):** Secure power amp IC to heat sink (30-51-0229-1) using a thermal pad (30-63-0006), clamp (30-51-0073), hex screw (30-00-0010) with split washer (30-03-0002). Position Power Amp breakaway PCB flush with main section of Power PCBA and insert hex screw with split washer through center hole of clamp. Torque screw to 12-14 in-lbs. The notch at each end of the clamp should be center both on the Power Amp IC (12-30-7293) and with the Heat sink channel.

Make sure the clamp is NOT touching the terminal leads of caps C25-26 or the Power Amp U1 terminals! The clamp bottom should be approximately 200mil from the PCB.

The back of the power amp IC must only touch the thermal pad and not come in direct contact with the heat sink. The power amp IC must rest completely flush to the heat sink otherwise the part will overheat during operation.

Torque: 12-14 in/lbs.



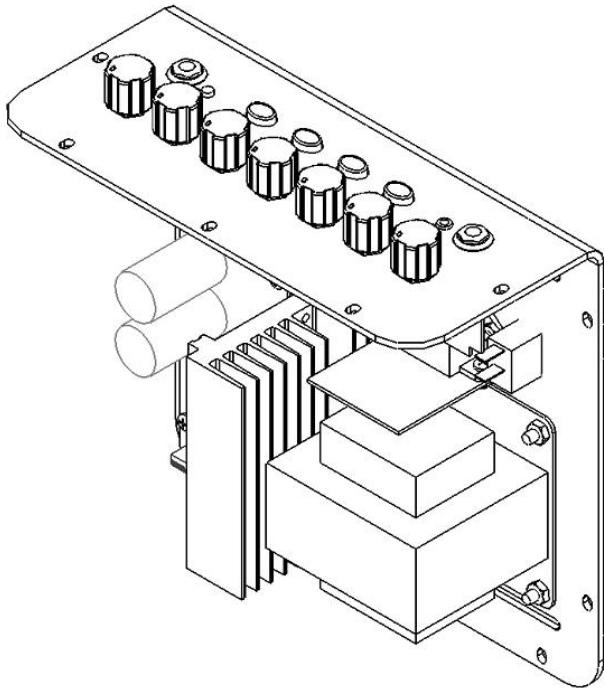
** picture does not match actual part numbers*

CHASSIS E/M ASSY INSTRUCTIONS

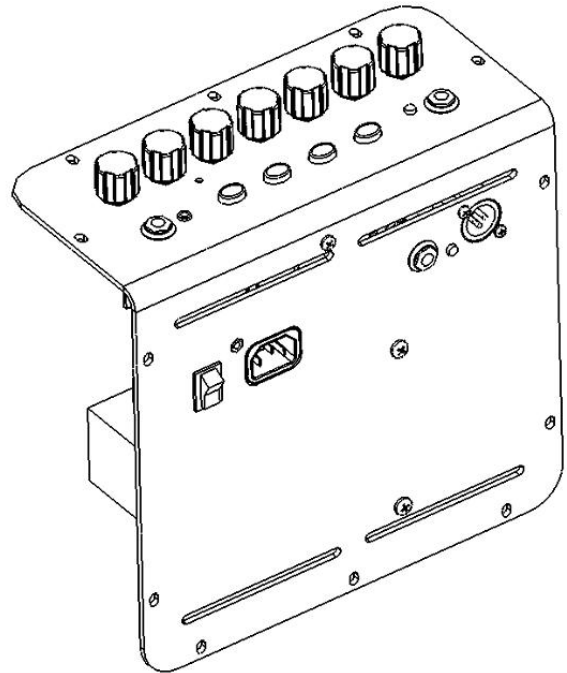
STUDIO 10 (A5-4)

Rev C

L6D000124



Front Isometric View



Rear Isometric View

Special Notes

The instructions describe the electro-mechanical assembly of the Low Down Studio 10 (A5-4) chassis assembly (P/N 50-04-0056).

A note on the text: the illustrations in this book are for reference only. In some cases, color and geometry of illustrations may not accurately reflect the color or exact geometry of actual parts.

- Unless otherwise noted, all dimensions are in inches.
- Part identifying notes are in this format: Description (Part Number)
- Drawings are not to scale.
- Torque value tolerance +/- .5 in.-lbs. Do not over tighten any components.

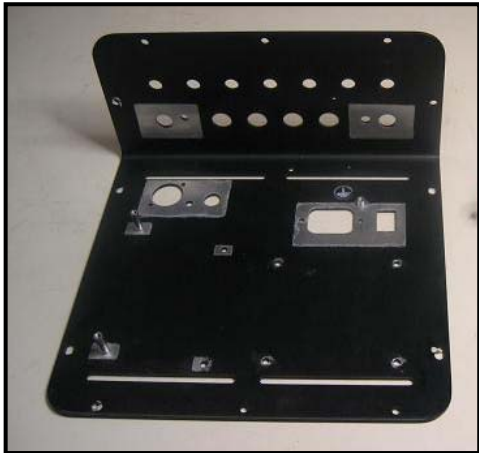
For clarity, not all component details are shown. This is especially true with respect to cable assemblies. They are often omitted from views to provide a clearer picture of the material discussed. Do not be confused by the absence (or unexpected presence) of any component in the illustrations in this book.

Revision Comment Sheet

Revision	Changes
A	Initial Release – see ECO 0621503.
B	ECO 0627202 Step 17 – Added loctite to screw heads and screw/nut interfaces, 4 PL. Step 18 – Added loctite at nut/standoff interface, 2 PL. Step 22a – WAS step 22. No other change. Step 22b – Added installation of cable ties (P/N 30-24-0003), 2 PL.
C	ECO 0629801 Step 11 – Removed P/N 30-00-6103. Potentiometer nut is included with potentiometer and does not require a separate part callout.

STEP 1:

Obtain one (1) 30-51-0256 Chassis.



STEP 2:

Determine which transformer to install in chassis using the table below:

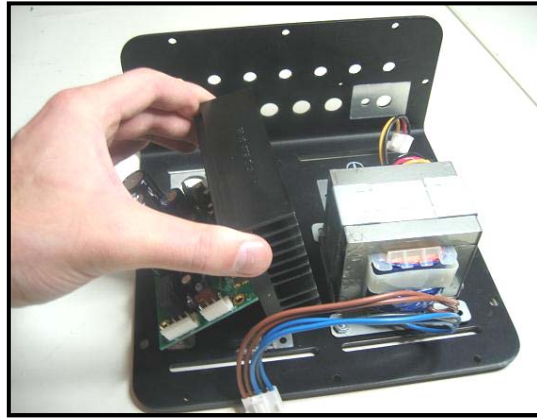
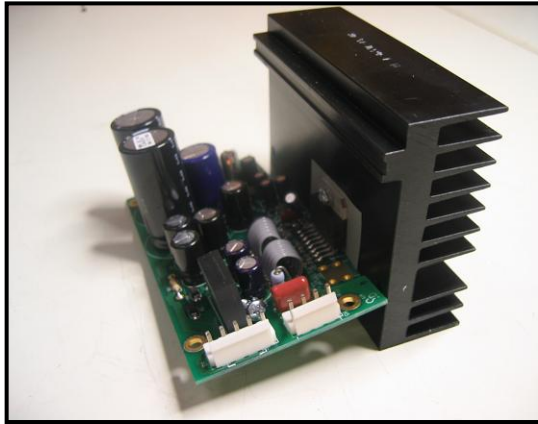
Assembly Part Number	Country/Voltage	Transformer
59-00-0030-1	US-120VAC	11-30-0006
59-00-0030-2	AU-240VAC	11-30-0007
59-00-0030-3	EU-220VAC	11-30-0007
59-00-0030-4	JA-100VAC	11-30-0006
59-00-0030-5	UK-240VAC	11-30-0007
59-00-0030-6	CH-220VAC	11-30-0007

Install the transformer (11-30-0006, or 11-30-0007) to the chassis in the orientation shown. The red/black/yellow primary cable should be facing the folded part of the chassis. Secure transformer to chassis by installing four (4) #8-32 hex nuts (P/N 30-06-0832) onto chassis standoffs. Torque each nut 8-10 in-lbs. Apply Loctite P/N 21463 (Threadlocker 222) after tightening.

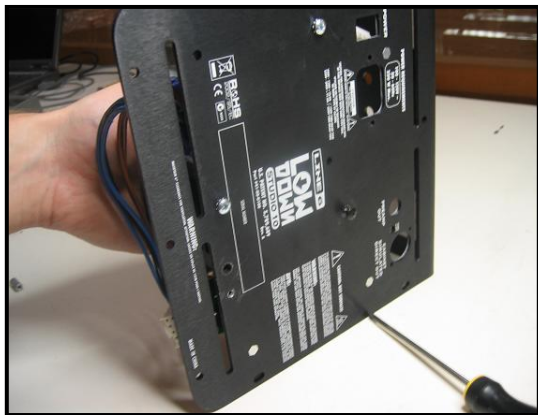


STEP 3:

Install Power Amp/Supply assembly with heatsink (50-02-0179) into chassis.



Use two (2) #8-32 x 7/16" screws (P/N 30-00-0097) and two (2) #8 external tooth lock washers (P/N 30-03-0027). Torque each screw 10-12 in-lbs.



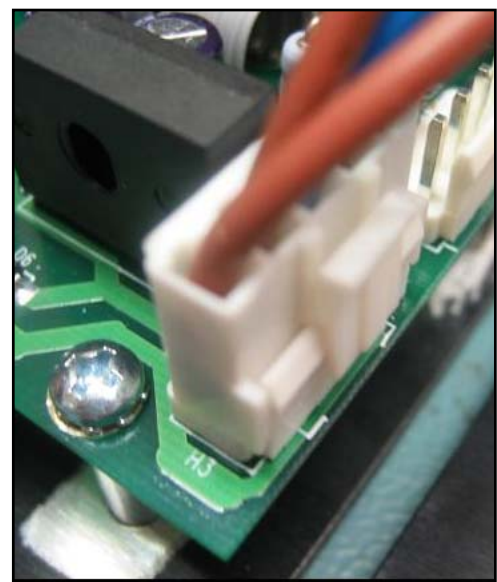
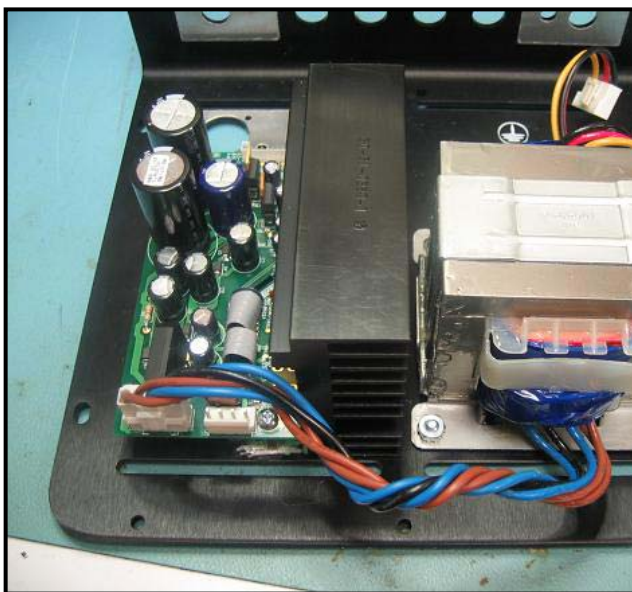
STEP 4:

Secure Power Amp/Power Supply PCBA to standoffs on chassis with four (4) #6-32 screws (P/N 30-00-0043). Torque each screw to 8-10 in-lbs. Apply Loctite P/N 21463 (Threadlocker 222) after tightening.



STEP 5:

Install the 5-pin secondary transformer cable in the H3 header on the Power Amp/Supply PCBA.



STEP 6:

Obtain one (1) 50-02-0174 PCBA Main and two (2) black plastic switch caps (P/N 24-21-1124). Install one (1) switch cap on each push button switch as shown. Switch cap shall be completely seated on the button shaft after installation.



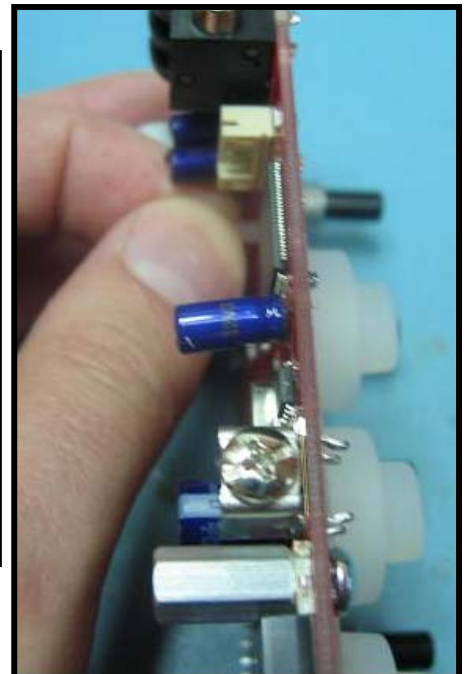
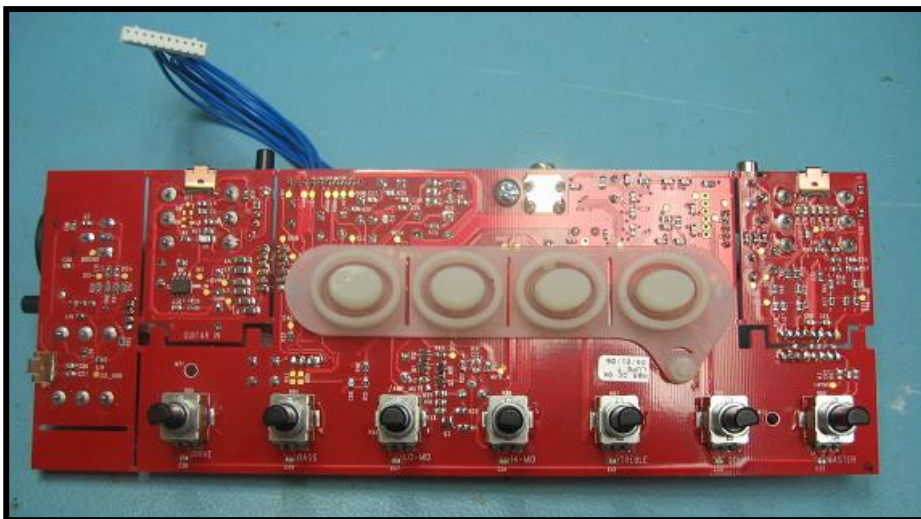
STEP 7:

Obtain one (1) 21-34-0075-2 Cable Assy (blue, 10-pin). Install one (1) end of the cable into the H2 header on the Main PCBA. Leave the other end of the cable dangling.



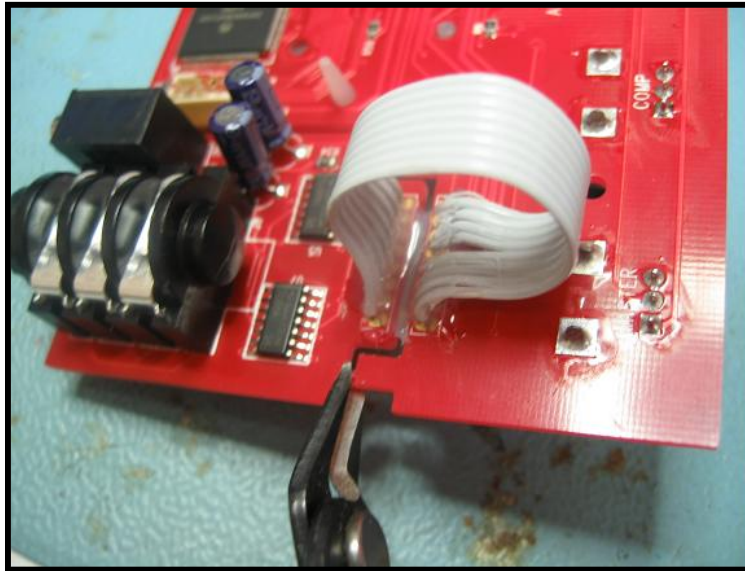
STEP 8:

Obtain one (1) 30-75-0042 Rubber Keypad. Insert the Keypad through the holes in the Main PCBA as shown.



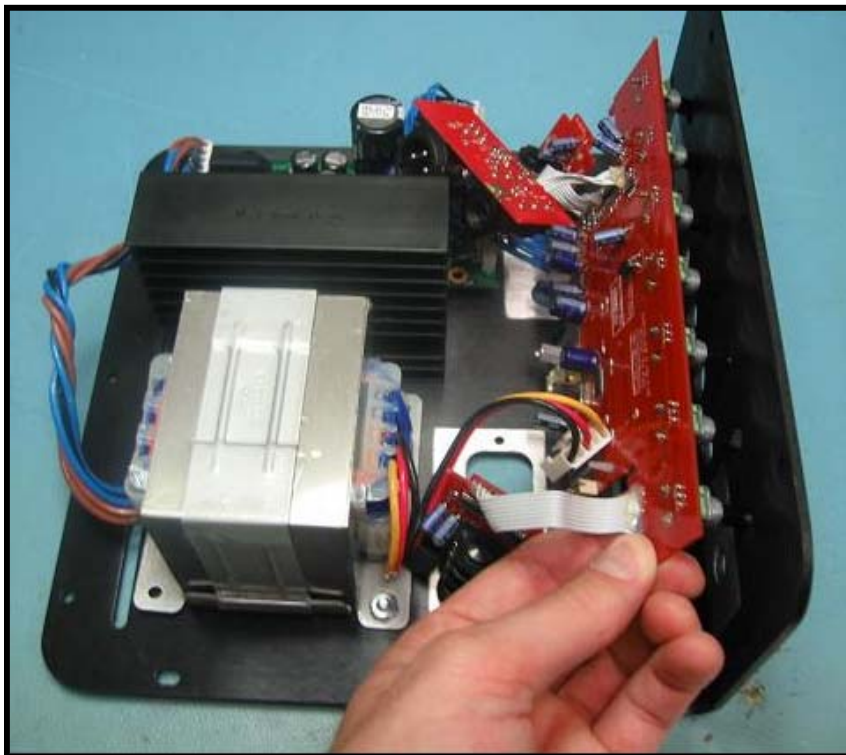
STEP 9:

Clip tabs and release the three (3) breakaway boards.



STEP 10:

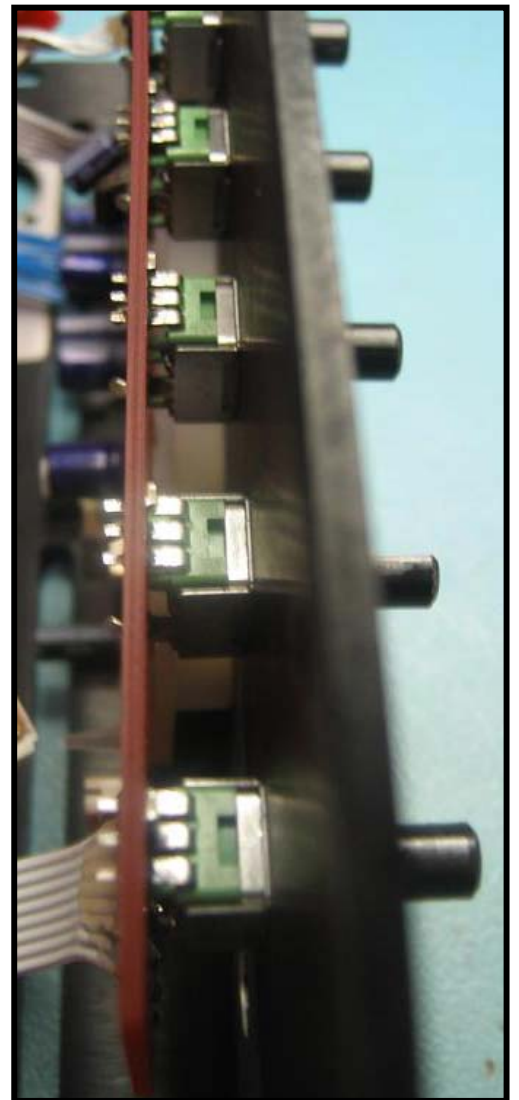
Insert the Main PCBA potentiometer shafts through the holes on the chassis as shown below.



STEP 11:

Secure the Main PCBA to the chassis with the seven (7) potentiometer nuts (nut is included with potentiometer). The flat surface at the base of the potentiometer shaft shall be flush with the chassis. Torque each nut to 8-10 in-lbs.

Note – make sure that the LED is centered and protruding through the top hole in the chassis before tightening nuts.



STEP 12:

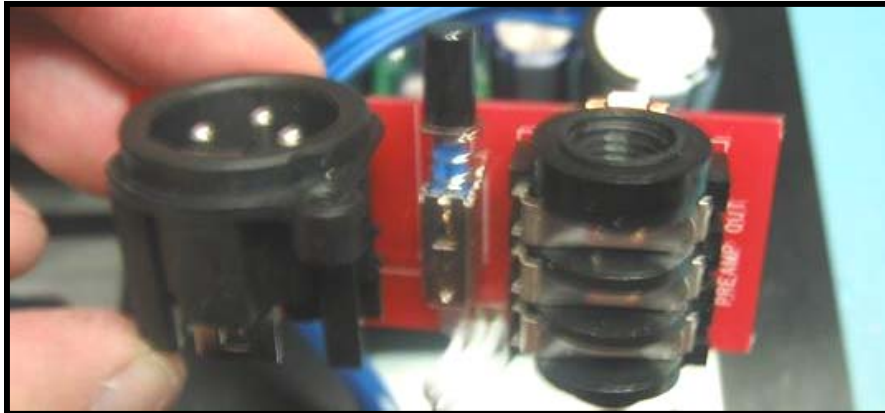
Secure the rear of the Main PCB to the chassis with one (1) #6-32 screw (P/N 30-00-0034). Torque screw to 8-10 in/lbs.



STEP 13:

Install the Direct Out breakaway PCBA to rear wall of the chassis. The board is secured in three (3) places.

- 1) Use one (1) black nylon spacer (P/N 30-15-0004), black finishing washer and chrome nut to secure the ¼" jack. The black finishing washer and chrome nut are included with the ¼" jack (P/N 21-00-6617). The black nylon spacer shall be installed inside the chassis against the ¼" jack. Torque chrome nut to 5-6 in-lbs.



- 2) Use two (2) #4 x 3/8" (P/N 30-00-0042) to secure the XLR jack to the chassis. Torque each screw to 6-8 in-lbs.

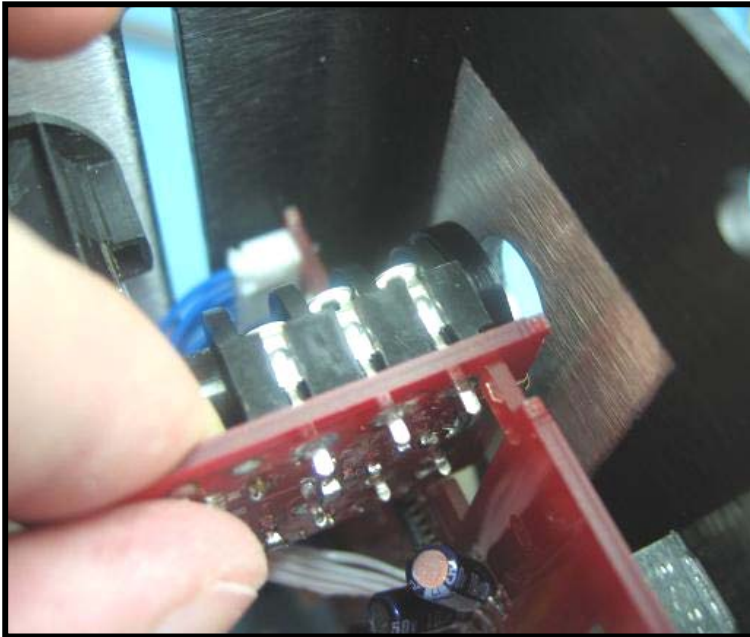


STEP 14:

Install the Guitar Input breakaway PCBA to the top wall of the chassis. Use one (1) black nylon spacer (P/N 30-15-0004), black finishing washer and chrome nut to secure the ¼" jack.

Note - the black finishing washer and chrome nut are included with the ¼" jack (P/N 21-00-6617).

The black nylon spacer shall be installed inside the chassis against the ¼" jack. Torque chrome nut to 5-6 in-lbs. Ensure the push button switch cap is centered in the hole before tightening the chrome nut.



STEP 15:

Install the CD/Headphone breakaway PCBA to the top wall of the chassis. Use one (1) black nylon spacer (P/N 30-15-0004), black finishing washer and chrome nut to secure the ¼" jack.

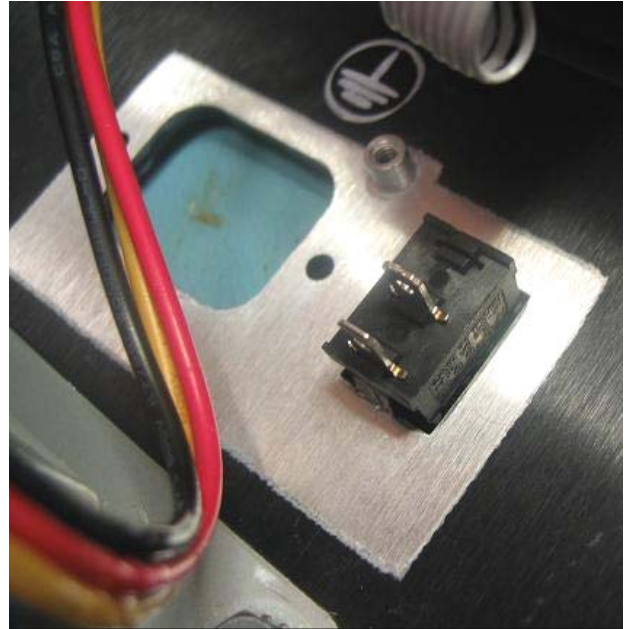
Note - the black finishing washer and chrome nut are included with the ¼" jack (P/N 21-00-6617).

The black nylon spacer shall be installed inside the chassis against the ¼" jack. Torque chrome nut to 5-6 in-lbs. Ensure the 1/8" headphone jack is centered in the hole before tightening the chrome nut.



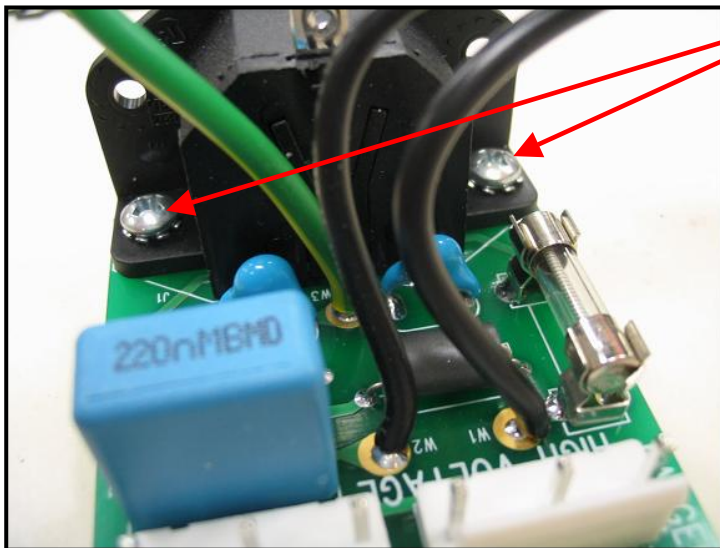
STEP 16:

Install rocker switch (P/N 24-24-0606) with the "I" above the "O" on the rear wall of the chassis. The switch should snap securely into place.

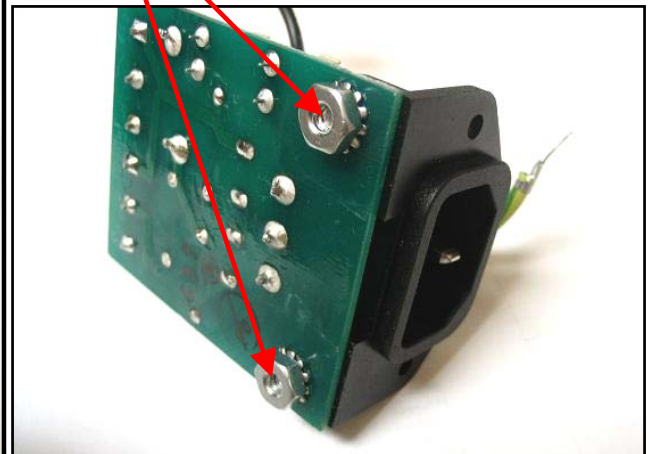


STEP 17:

Obtain one (1) 50-02-0080-2 PCBA POWER AC and two (2) 30-00-0607 screws and two (2) 30-06-0623 hex nuts. Secure base of A/C receptacle to the PCB with screws and nuts (2 PL). Torque each screw to 8-10 in/lbs. Apply Loctite P/N 21463 (Threadlocker 222) at the base of each screw head and at screw/nut interface (4 PL total) after tightening.

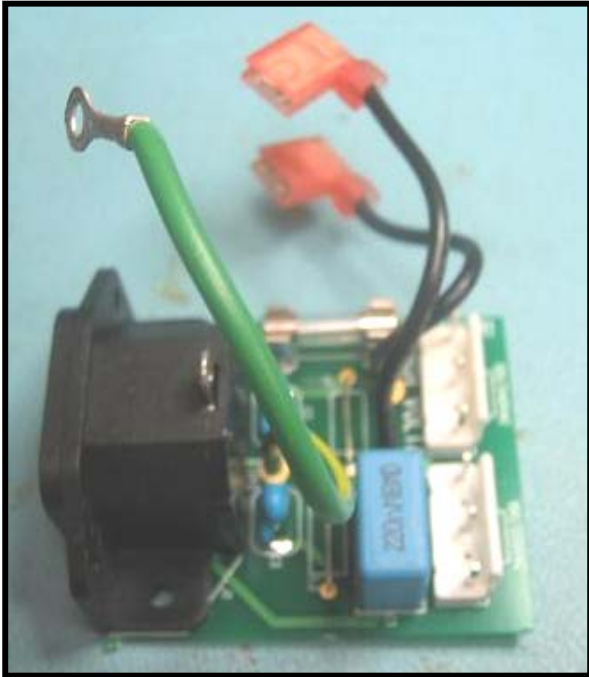


Apply Loctite here

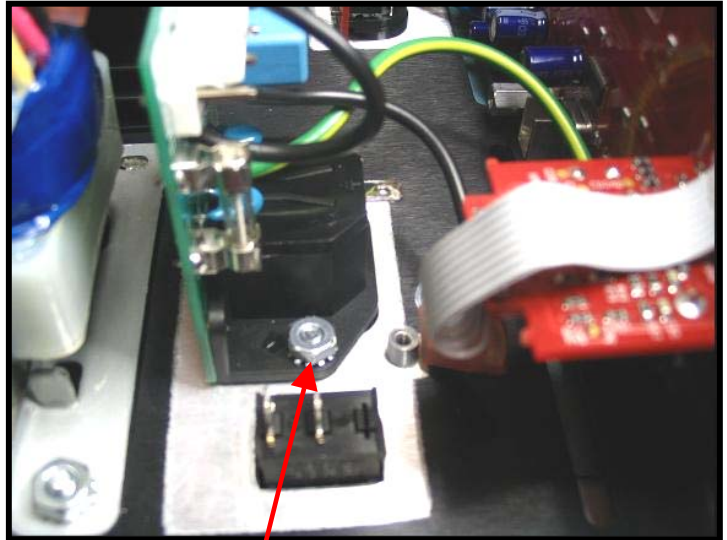


STEP 18:

Install 50-02-0080-2 PCBA POWER AC over the standoffs on the rear wall of the chassis as shown. Secure to the standoffs with two (2) 30-06-0624 hex nuts. Torque each hex nut to 8-10 in/lbs. Apply Loctite P/N 21463 (Threadlocker 222) to nut/standoff interface (2 PL) after tightening.



Note – screws and hex nuts from Step 17 not shown.

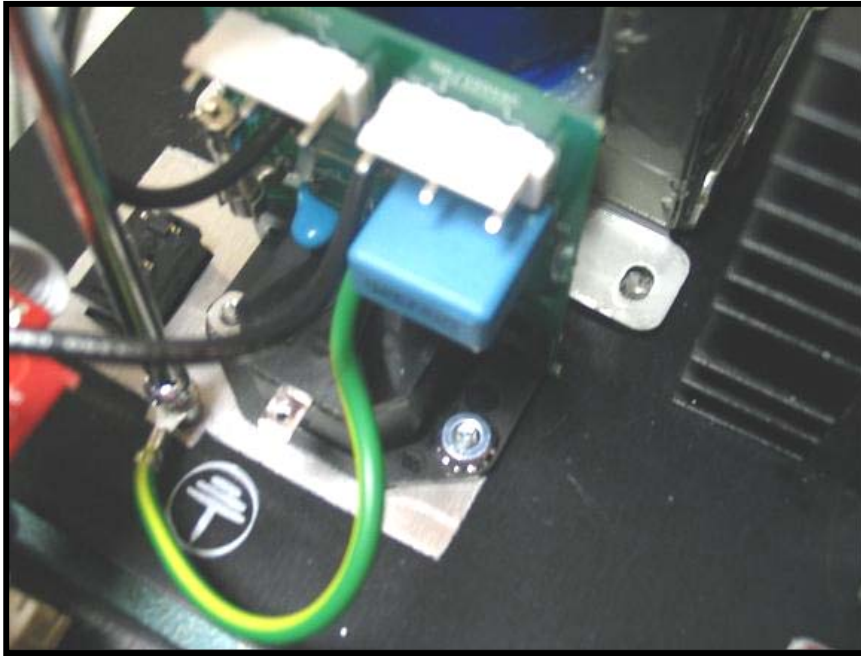


30-06-0624 Hex Nut
2 PL
Secure and apply
loctite

STEP 19:

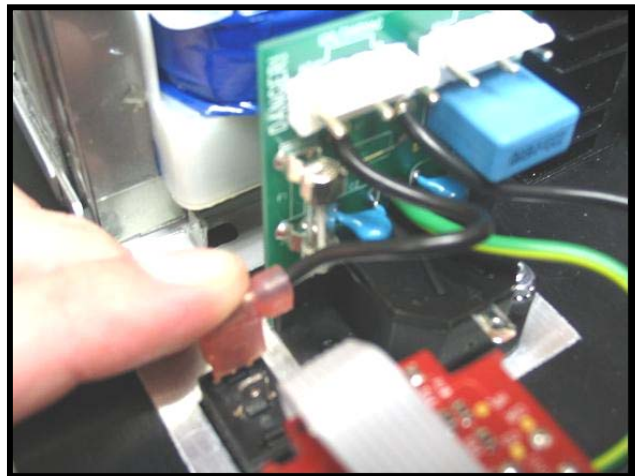
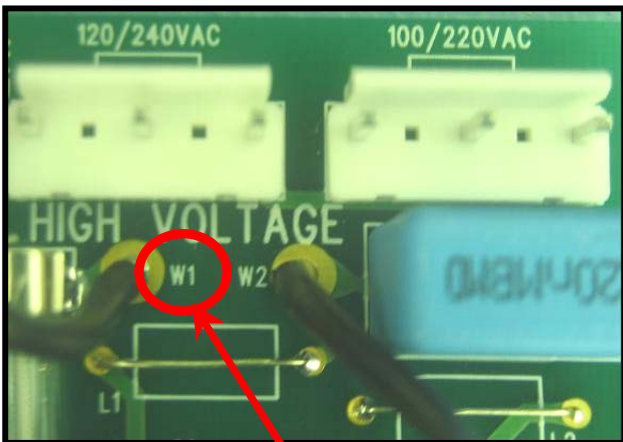
Connect the green/yellow ground wire (P/N 21-34-1116-1) from the AC Receptacle to the PEM stud in the chassis using a #6-32 screw (P/N 30-00-0005). Torque to 8-10 in-lbs. Apply Loctite P/N 21463 (Threadlocker 222) after tightening

Note that one end of the 21-34-1116-1 Cable, Earthing should already be soldered to the AC Receptacle.



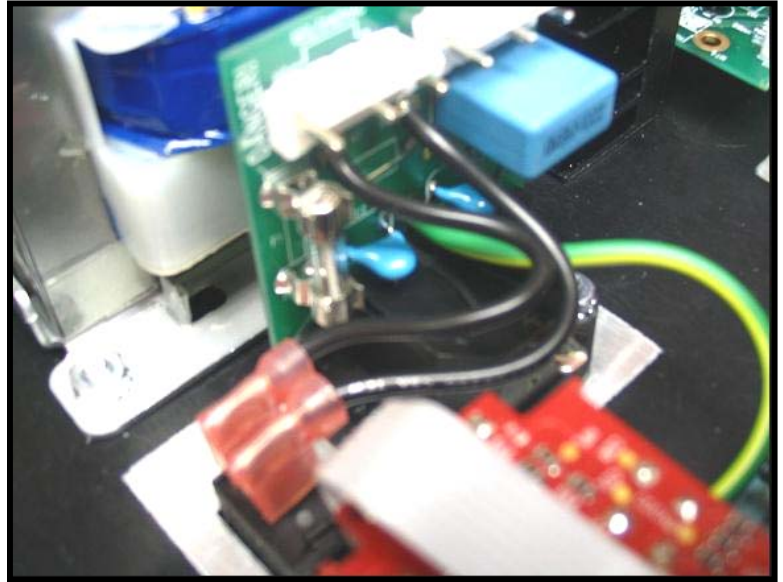
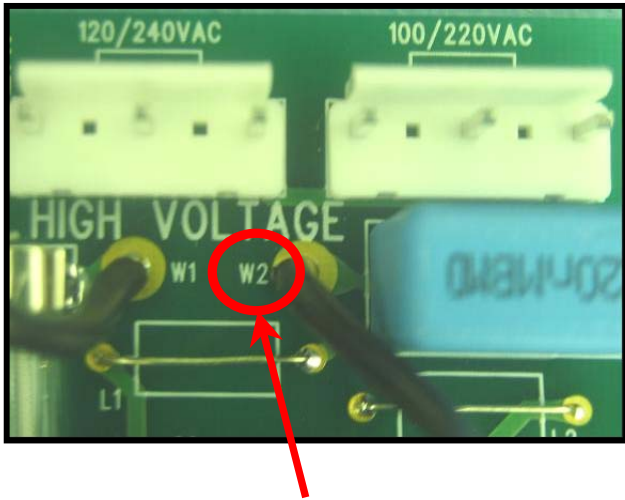
STEP 20:

Install the free end of the cable extending from the 'W1' solder location on the Power A/C PCBA to the bottom terminal on the Rocker Switch.



STEP 21:

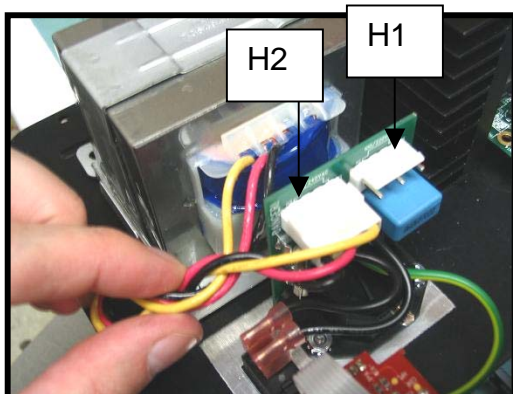
Install the free end of the cable extending from the 'W2' solder location on the Power A/C PCBA to the top terminal on the Rocker Switch.



STEP 22a:

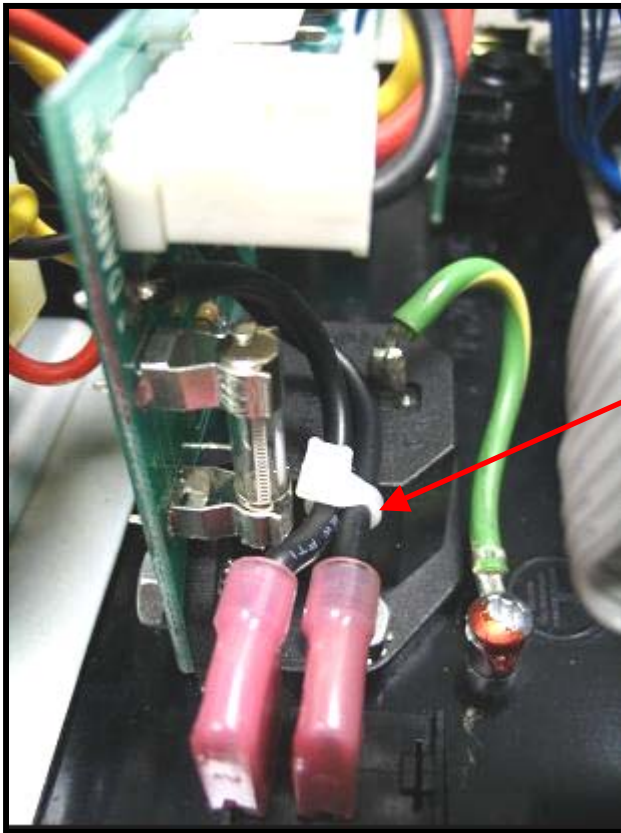
Install the 3-pin primary transformer cable (yellow, red, black) onto the H2 header on the Power A/C PCBA.

Assembly Part Number	Country/Voltage	Header (H1, H2)
59-00-0030-1	US-120VAC	H2
59-00-0030-2	AU-240VAC	H2
59-00-0030-3	EU-220VAC	H1
59-00-0030-4	JA-100VAC	H1
59-00-0030-5	UK-240VAC	H2
59-00-0030-6	CH-220VAC	H1



STEP 22b:

Install two (2) cable ties in the locations shown below. Pull cable ties tight and trim excess.

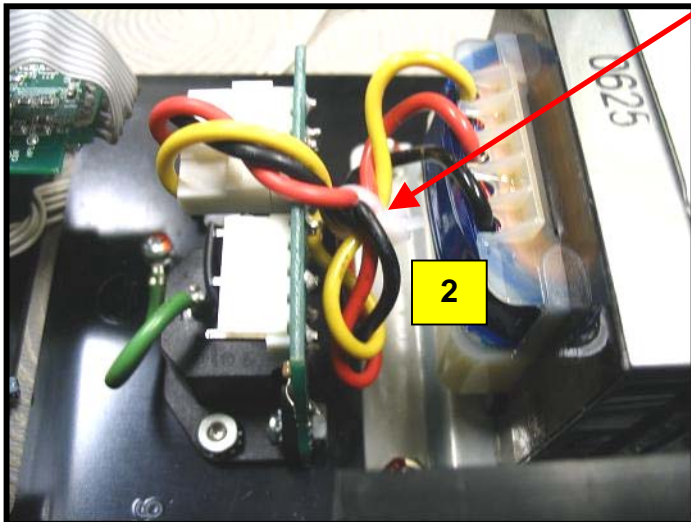


1

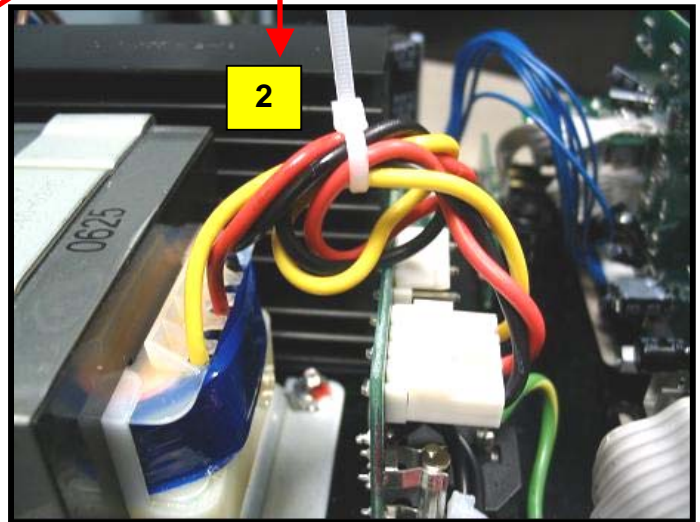
Location 1:
Secure the two (2)
cables just behind
rocker terminals.

Location 2:
Loop and secure the
3-pin transformer
cable as shown.

2



2



STEP 23:

Install the dangling end of the 21-34-0075-2 Cable Assy (blue, 10-pin) of the cable into the H4 header on the Power Amp/Supply PCBA.



STEP 24:

Install seven (7) plastic knobs (P/N 30-45-0011) on all potentiometer shafts. Press each knob firmly until fully seated on the potentiometer.





Reference View 1
Completed 50-04-0056 Assy E/M Chassis



Reference View 2
Completed 50-04-0056 Assy E/M Chassis

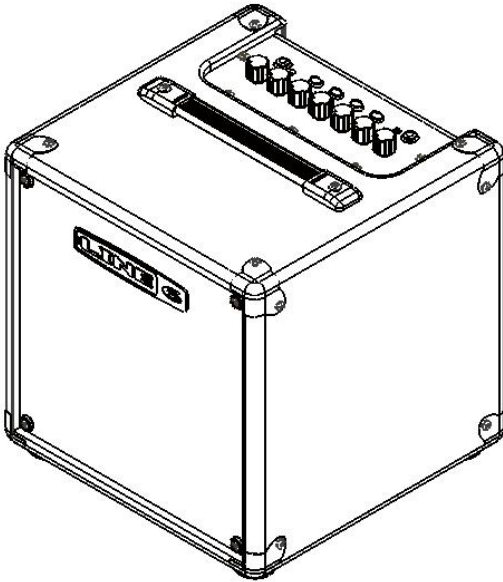


ASSY INSTRUCTIONS – CABINET AND UNIT COMPLETE

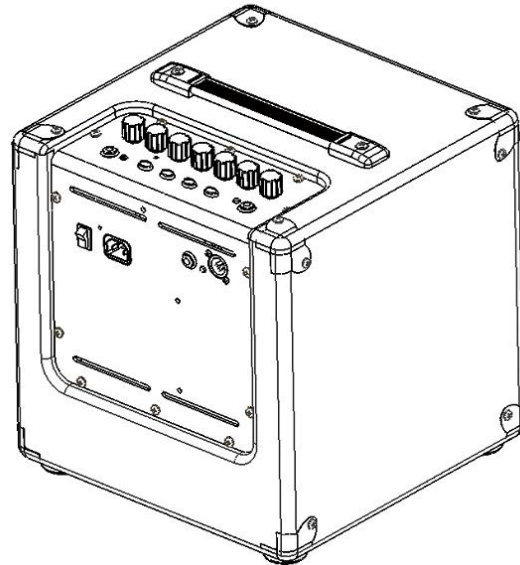
STUDIO 10 (A5-4)

Rev B

L6D000127



Front Isometric View



Rear Isometric View

Special Notes

These instructions apply to the mechanical assembly of the Low Down Studio 10 speaker cabinet. This document supplements the 50-03-0036 engineering drawing.

The instructions begin with a box sub-assembly (P/N 30-33-0061) with all carpet, rubber feet, corners, t-nuts and handle installed. The instructions specify the installation of all mating cosmetic components.

A note on the text: the illustrations in this book are for reference only. In some cases, color and geometry of illustrations may not accurately reflect the color or exact geometry of actual parts.

- Unless otherwise noted, all dimensions are in inches.
- Part identifying notes are in this format: Description (Part Number)
- Drawings are not to scale.
- Torque value tolerance +/- .5 in.-lbs. Do not over tighten any components.

For clarity, not all component details are shown. They are often omitted from views to provide a clearer picture of the material discussed. Do not be confused by the absence (or unexpected presence) of any component in the illustrations in this book.

Revision Comment Sheet

Revision	Changes
A	Initial Release – see ECO 0621503.
B	ECO 0627202 Step 2 – Revised RTV bead centerline location to 20mm (WAS 25.4mm). Step 18 – Revised #8 screw to specify longer length. IS P/N 30-00-8112 #8 x 1.5” wood screw (WAS P/N 30-00-8100 #8 x 1” wood screw). Step 19 – Revised #8 screw to specify longer length. IS P/N 30-00-8112 #8 x 1.5” wood screw (WAS P/N 30-00-8100 #8 x 1” wood screw). Step 20 – Added inspection sticker application (P/N 40-25-0020).

STEP 1:

Obtain the following parts:

- One (1) 30-27-0186 Shroud
- One (1) cabinet box sub-assembly (P/N 30-33-0061)

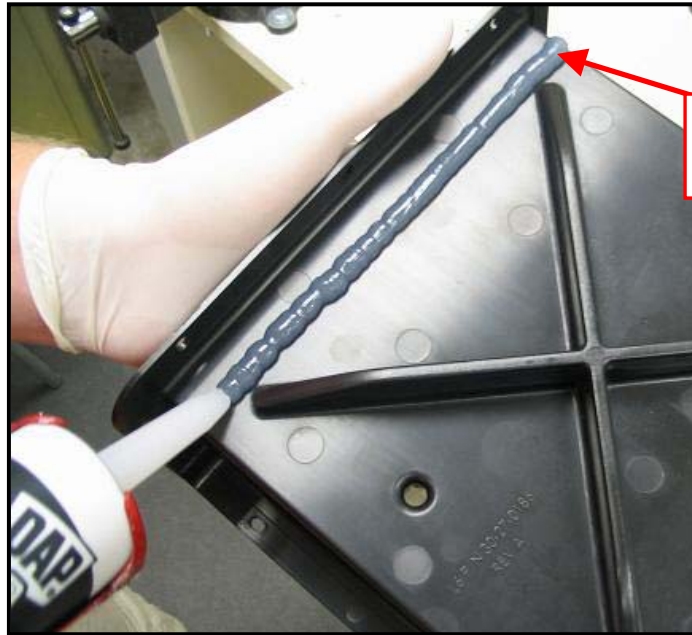
Note that cabinet box sub-assembly shall already have all carpet, rubber feet, corners, t-nuts and handle installed.



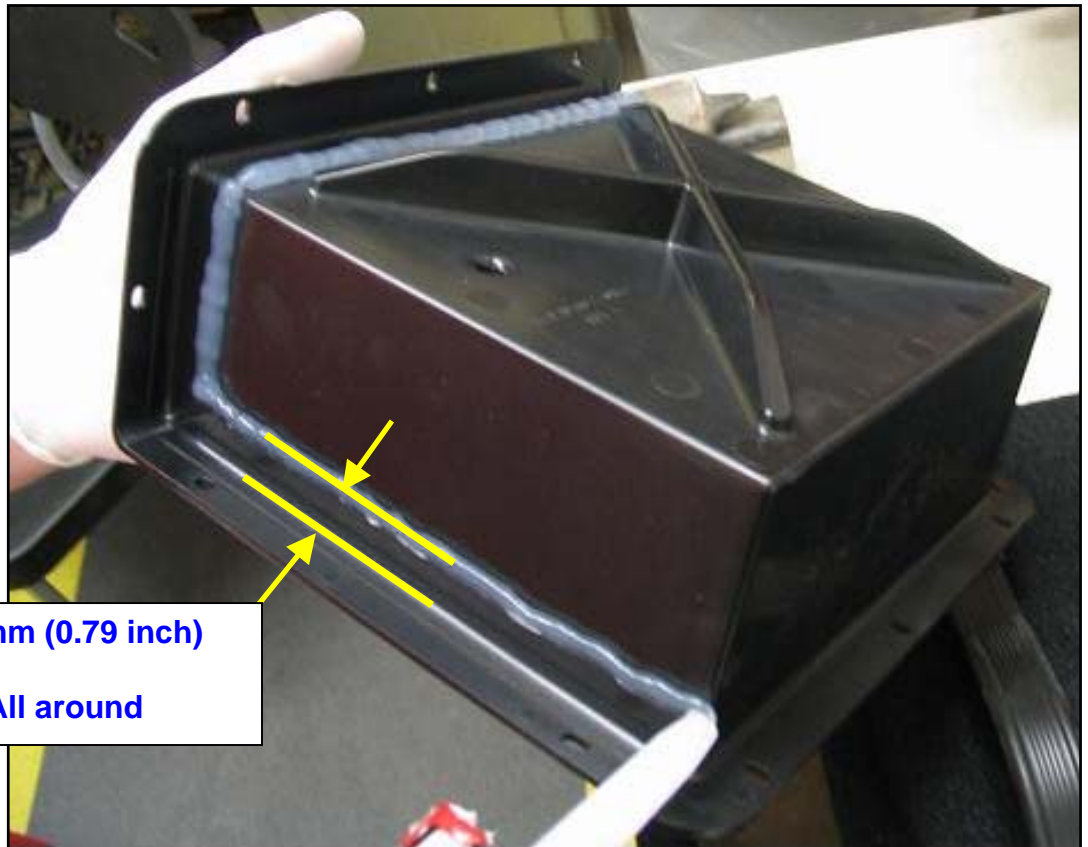
**Cabinet Box Sub-Assembly - Rear Isometric
Reference View**

STEP 2:

Apply a continuous bead of RTV around the 30-27-0186 Shroud as shown. Bead shall be approximately 10.2mm (0.4 inch) in diameter. Center of bead shall run ~20mm (0.79 inch) from the flange corner edge around the perimeter of the Shroud. **No gaps shall exist in the RTV bead!**



RTV Bead
Ø 10.2mm (0.4 in)



~20mm (0.79 inch)
All around

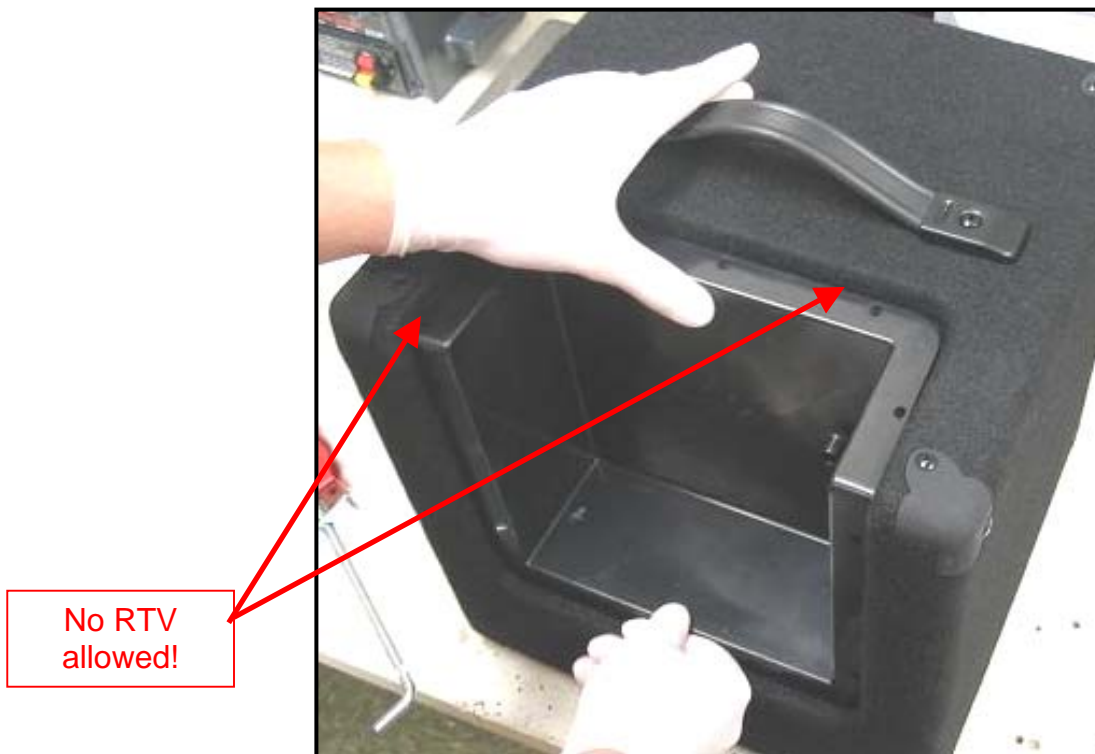
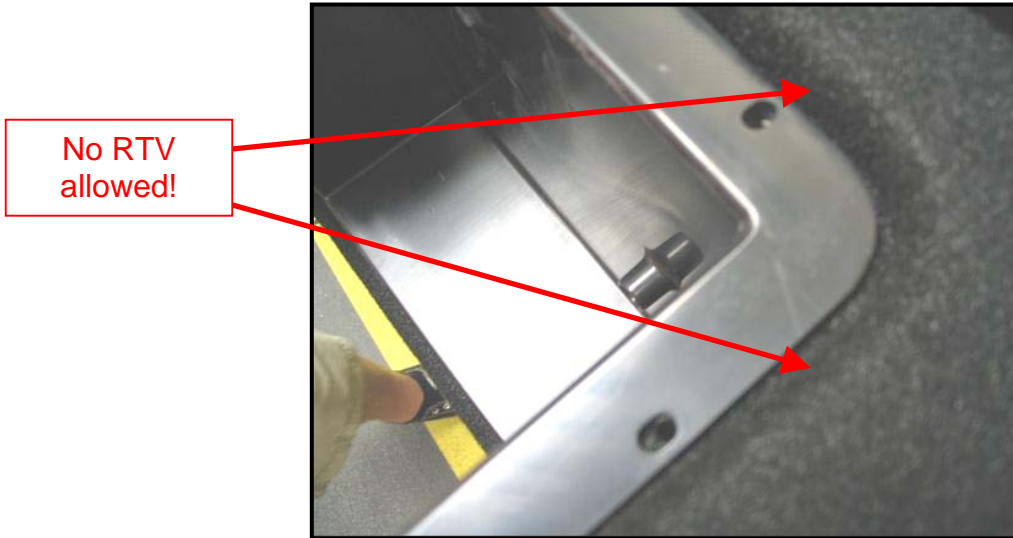
STEP 3:

Install 30-27-0186 Shroud (with uncured RTV) onto cabinet as shown. Be careful not to get any RTV on external carpeted surfaces. Press firmly until the Shroud is fully seated. Slotted holes in the Shroud shall be concentric with the holes in the cabinet.



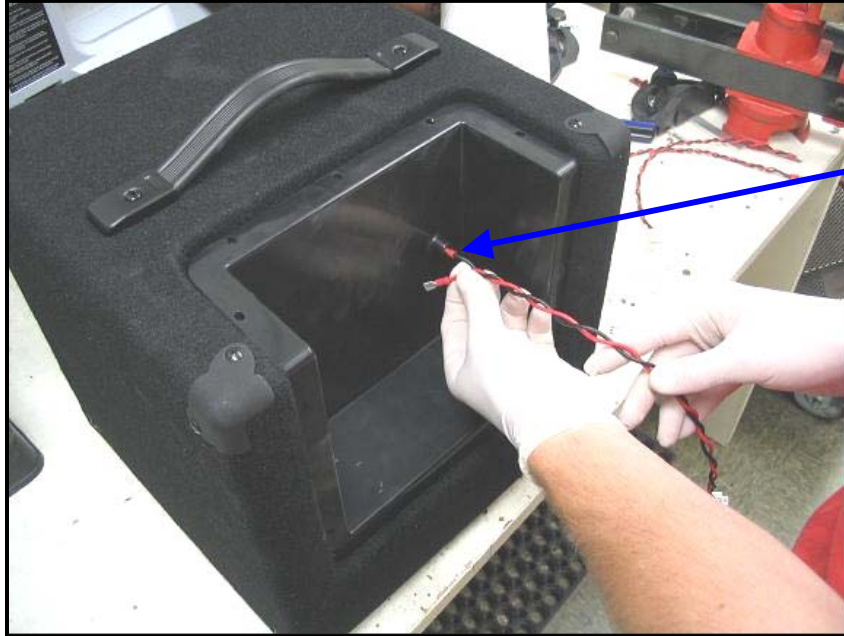
STEP 4:

Clean off any visible excess RTV. All external surfaces shall be clean and free of any residual RTV, as shown below.



STEP 5:

Obtain one (1) 21-36-0271-2 Cable Assembly. Pass cable thru hole in Shroud such that the spade lug terminals are in the speaker chamber. Note that the speaker terminals will need to be inserted one at a time thru the hole.



Leave 127mm (5.0 inch) of cable protruding into the shroud cavity. See Figure below.



STEP 6:

Apply RTV to speaker pass-thru hole. It is recommended to apply RTV from the front of the unit thru the speaker hole as shown.



Apply RTV thru speaker hole in baffle



Finished RTV Application

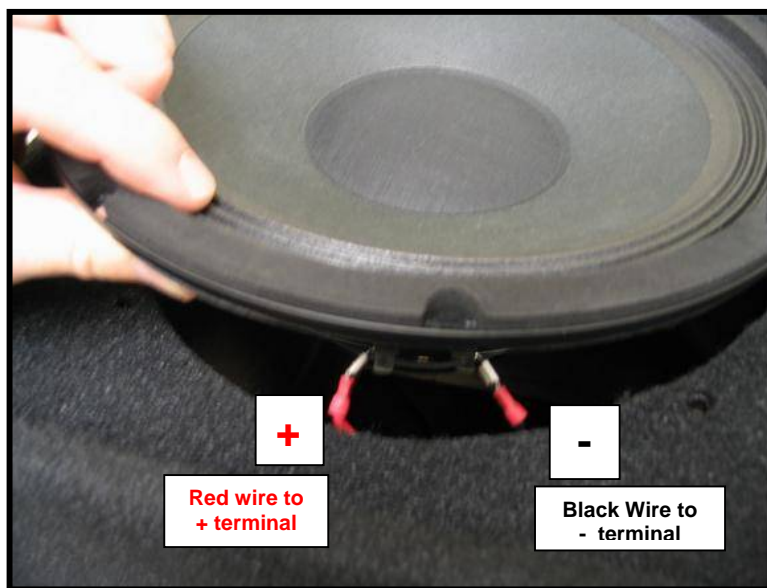
STEP 7:

****Important**** Let unit sit undisturbed for 4 hours. Do not handle the unit during this cure period.

STEP 8:

After 4 hours have passed (per Step 7), tilt cabinet and set on its back. Obtain speaker (P/N 11-20-0013) and connect 21-36-0271-2 cable assembly spade lugs to speaker terminals.

Color – connect black to negative and red to positive.



STEP 9:

Install four (4) #10-24 speaker screws (P/N 30-00-1016). Torque screws to 14-16 in-lbs. Note that four (4) holes in the speaker frame will not be used.

#10-24 Screws (P/N 30-00-1016)
4 PL



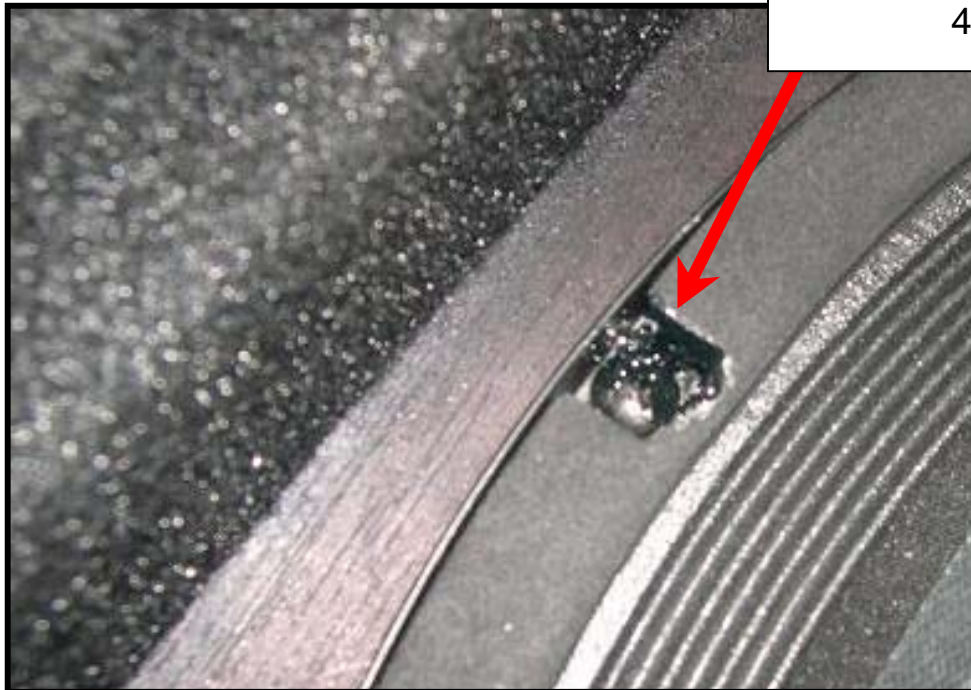
Installation of Speaker Screws

STEP 10:

Place one drop of TF-536 black loctite at the base of each speaker screw head as shown.

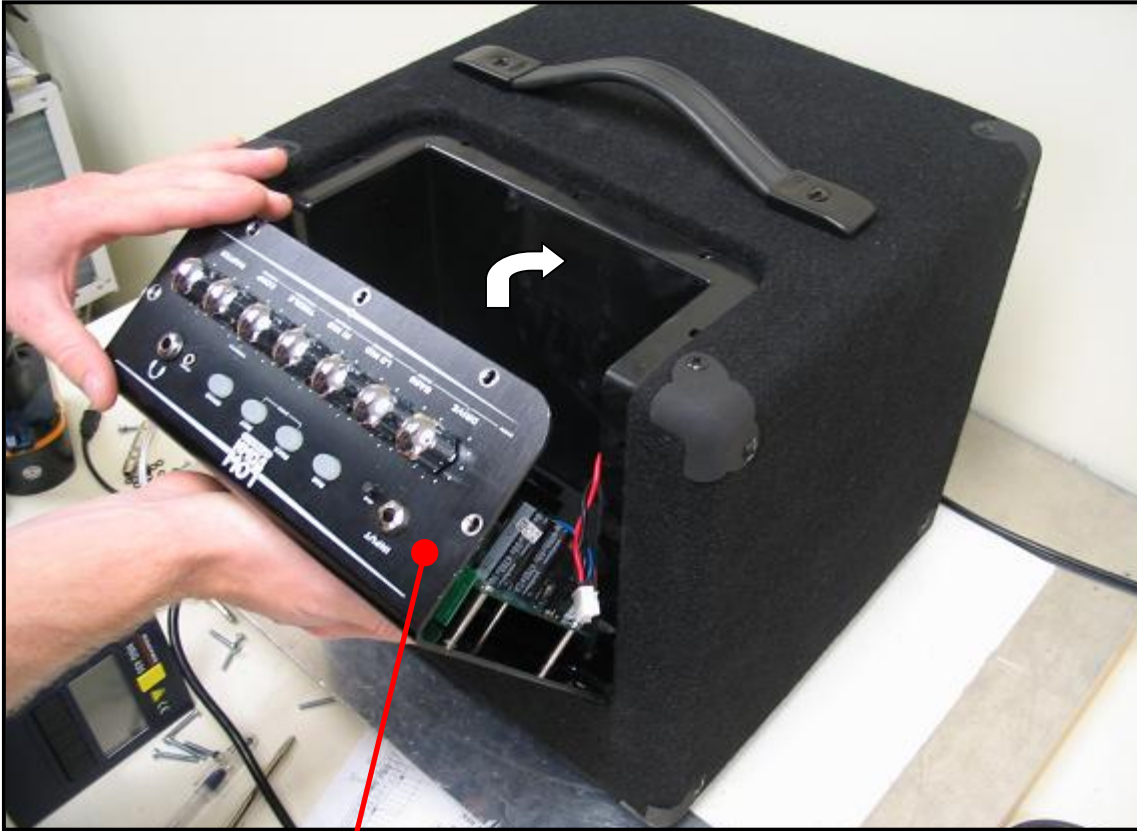


Apply loctite at the base of the screw head
4 pl



STEP 11:

Obtain one (1) 50-04-0056 E/M Chassis Assembly. Place into shroud cavity as shown.



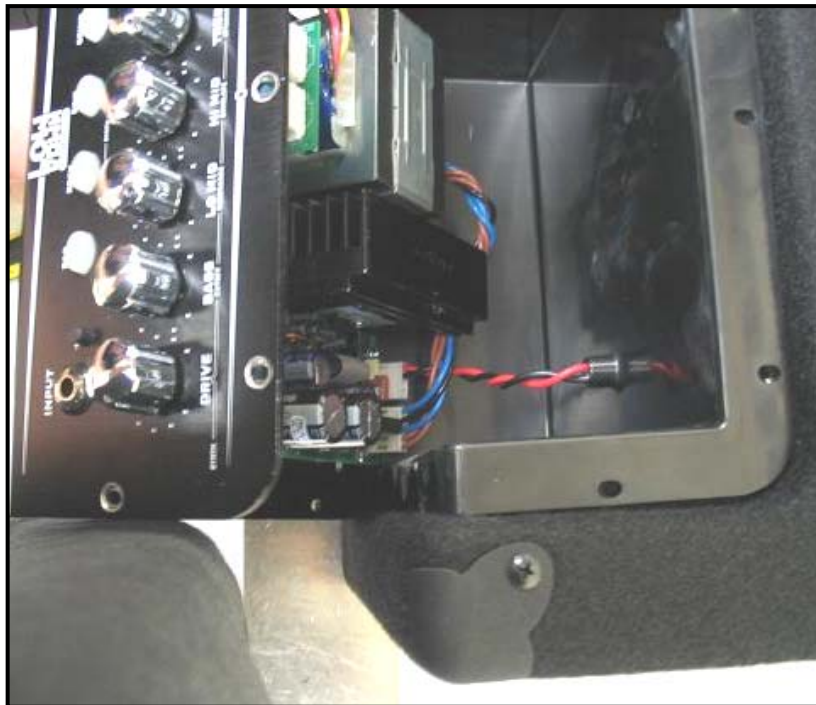
E/M Chassis Assembly (P/N 50-04-0056)

STEP 12:

Connect the 21-36-0271-2 cable assembly header to Power Amp/Supply header labeled H5.



Connect Cable Header to Power Amp



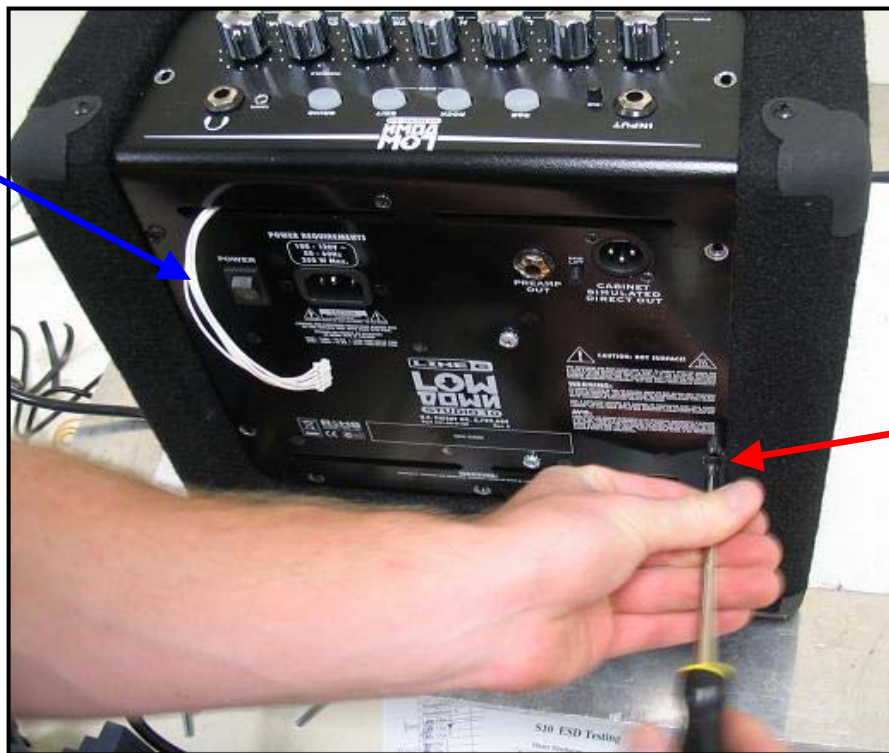
Header Connected

STEP 13:

Place Chassis Assembly onto shroud as shown. Install #8-32 screws (P/N 30-00-0079) to secure the chassis (12 pl). Torque to 12-14 in-lbs.



Note – this cable will not be here



#8-32 Screw
(P/N 30-00-0079)
12 PL

STEP 14:

Perform Speaker Chamber Leak Test and Troubleshooting procedure per separate L6D000131 instructions. Ref ECO 0622701.

NOTE – Speaker Chamber Seal must be verified per L6D000131 instructions before proceeding to Step 15.

STEP 15:

Obtain one (1) logo (P/N 30-60-0005). Install two (2) adhesive foam strips (P/N 30-63-0600-2) to the back surface of the logo as shown.



Logo (30-60-0005)
Top View



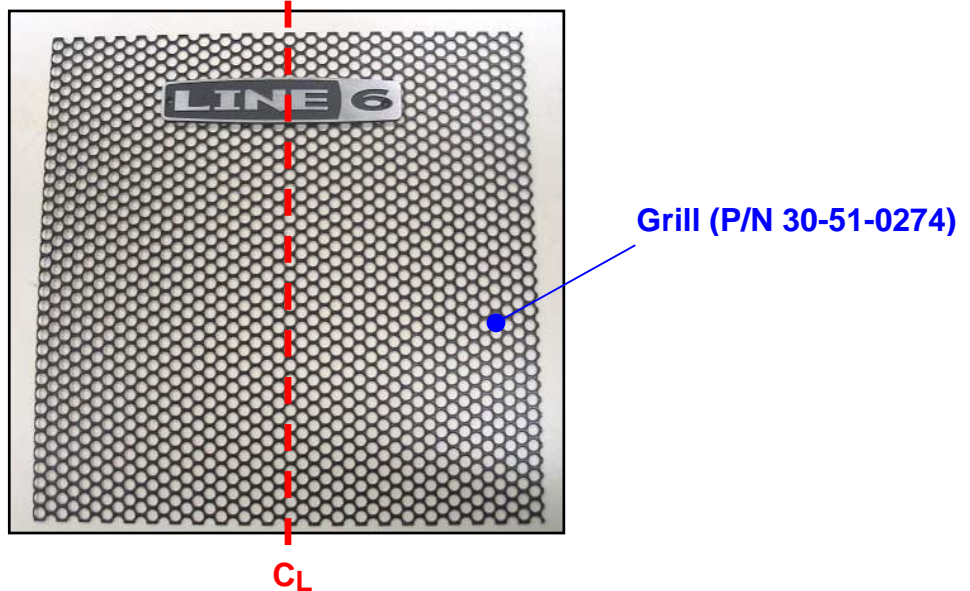
Adhesive Foam Strip
(30-63-0600-2)
2 PL

Logo (30-60-0005)
Bottom View

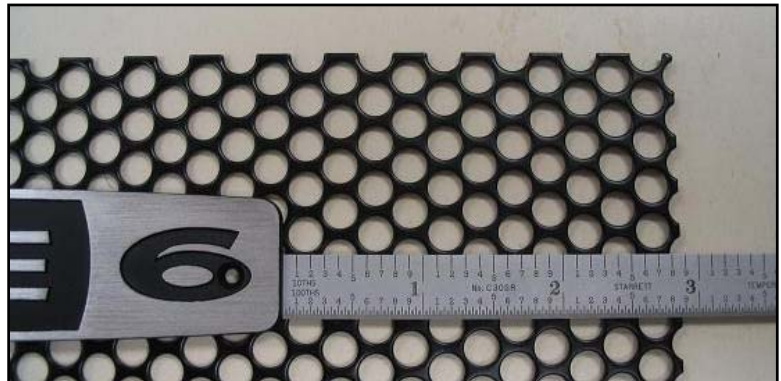
STEP 16:

Obtain one (1) grill (P/N 30-51-0274). Caution – handle grill carefully, as burrs might be present. Place one (1) logo with two (2) adhesive foam strips onto the grill and position as described below.

The centerline of the logo shall be collinear with the centerline of the grill. The top tangent edge of the logo shall be 25.4 mm (1.0 inch) from the top edge of the grill. Each side edge of the logo shall be 72.1 mm (2.84 inch) from the side edge of the grill.



Top Edge Distance

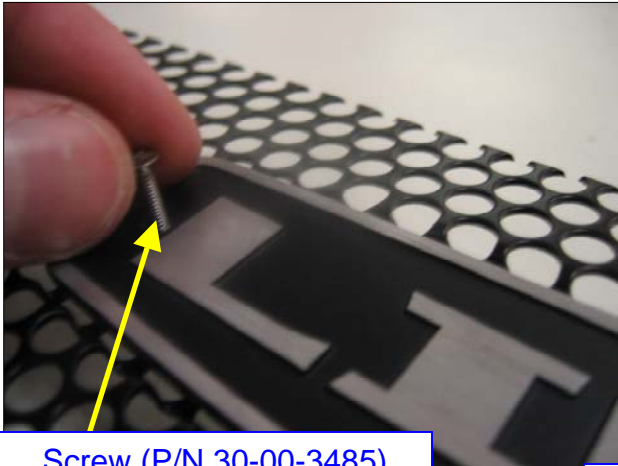


Side Edge Distance

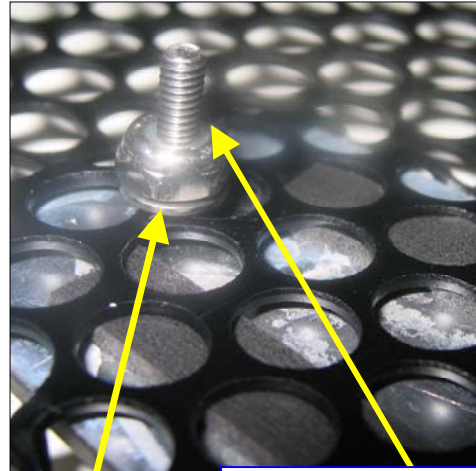
STEP 17:

Maintaining the logo position described in Step 16, secure logo to grill with two (2) screws (P/N 30-00-3485), two (2) washers (P/N 30-03-0335) and two (2) hex nuts (P/N 30-06-0014). Verify logo is centered on grill. Torque each screw to 8-10 in/lbs.

Note – all fasteners shall be black



Screw (P/N 30-00-3485)
2 PL



Washer (P/N 30-03-0335)
2 PL

Hex Nut (P/N 30-06-0014)
2 PL

STEP 18:

Obtain four (4) of each of the following parts:

- Nylon spacers (P/N 30-15-0037)
- Finishing washers (P/N 30-03-0112)
- #8 x 1.5 inch long Oval Head Wood Screws (P/N 30-00-8112)



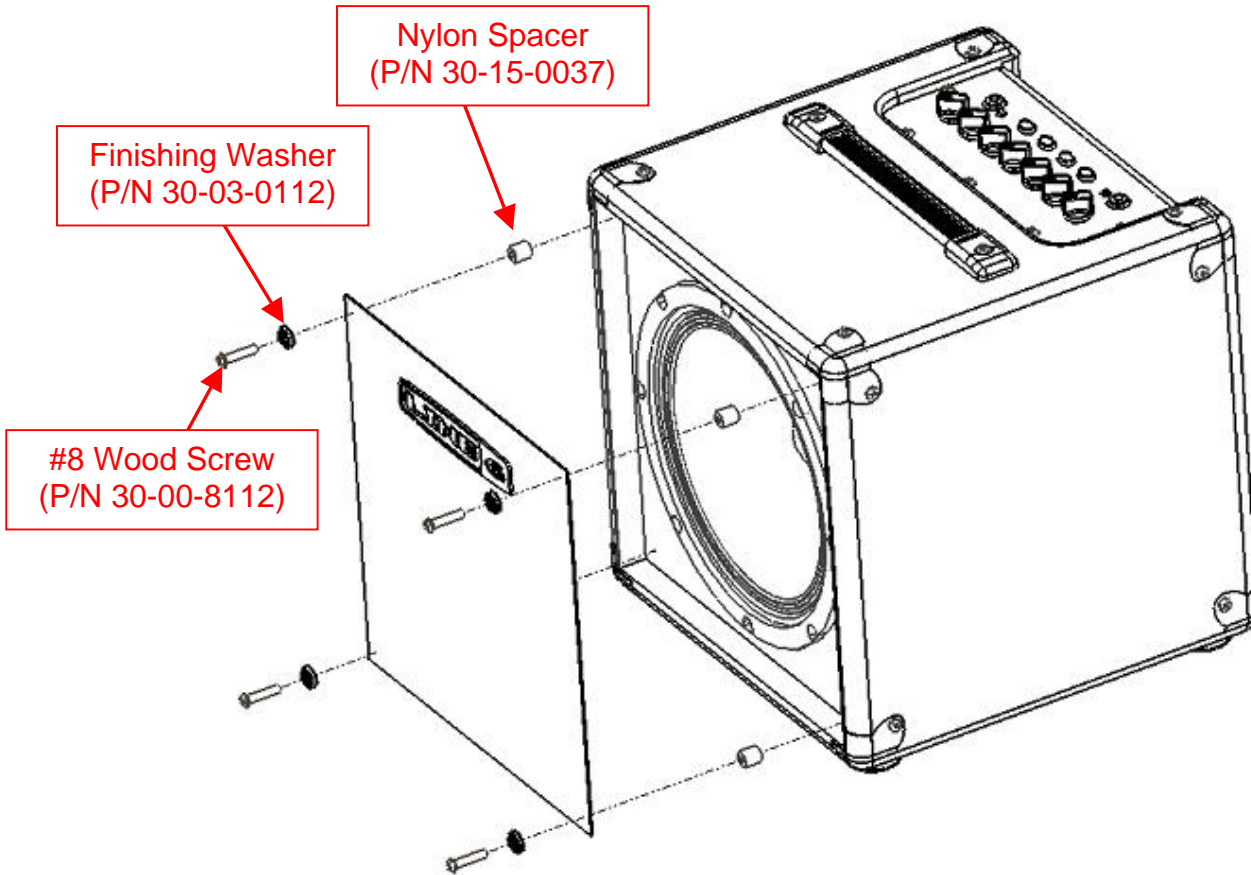
#8 x 1.5" Wood Screw
(P/N 30-00-8112)

Finishing Washer
(P/N 30-03-0112)

Nylon Spacer
(P/N 30-15-0037)

STEP 19:

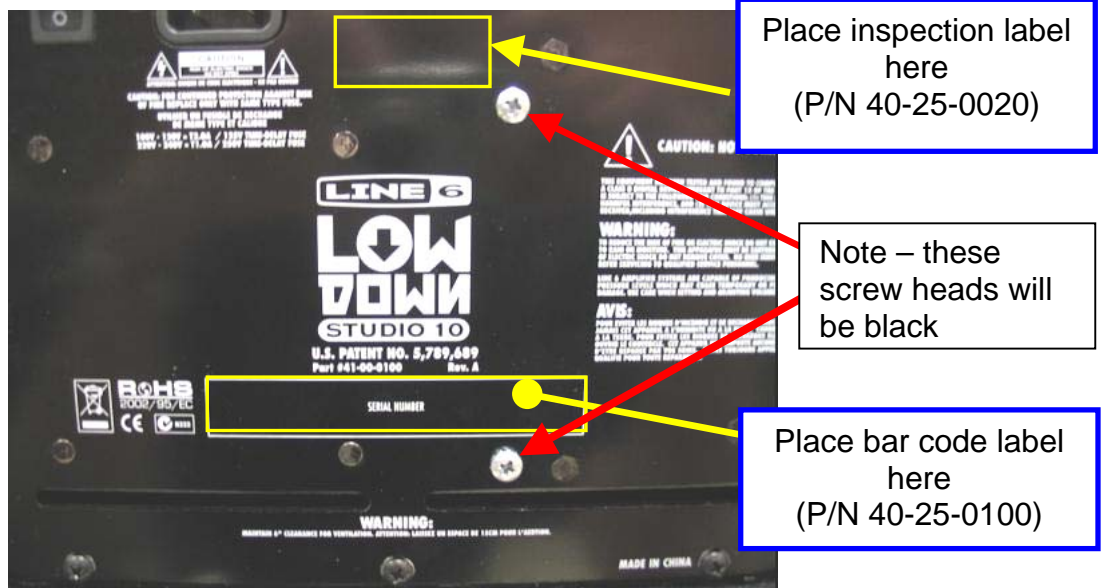
Match drill holes to secure the grill (with logo) to the baffle board. Grill shall be centered on the unit. Secure the grill (with logo) to the baffle board with the fastening scheme shown below. Screw locations shall be symmetric about the horizontal and vertical centerlines of the unit.



Reference View – Corner of Grill (4 PL)

STEP 20:

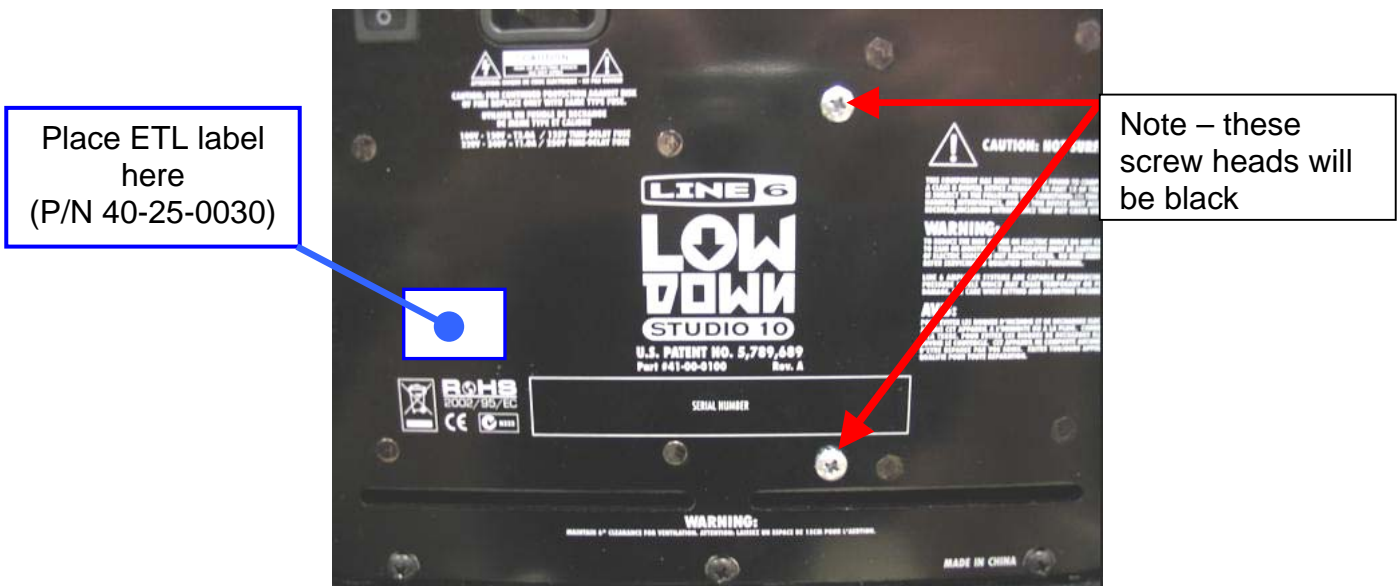
Apply bar code label (P/N 40-25-0100) and inspection label (P/N 40-25-0020) to the rear of the chassis approximately as shown.



STEP 21:

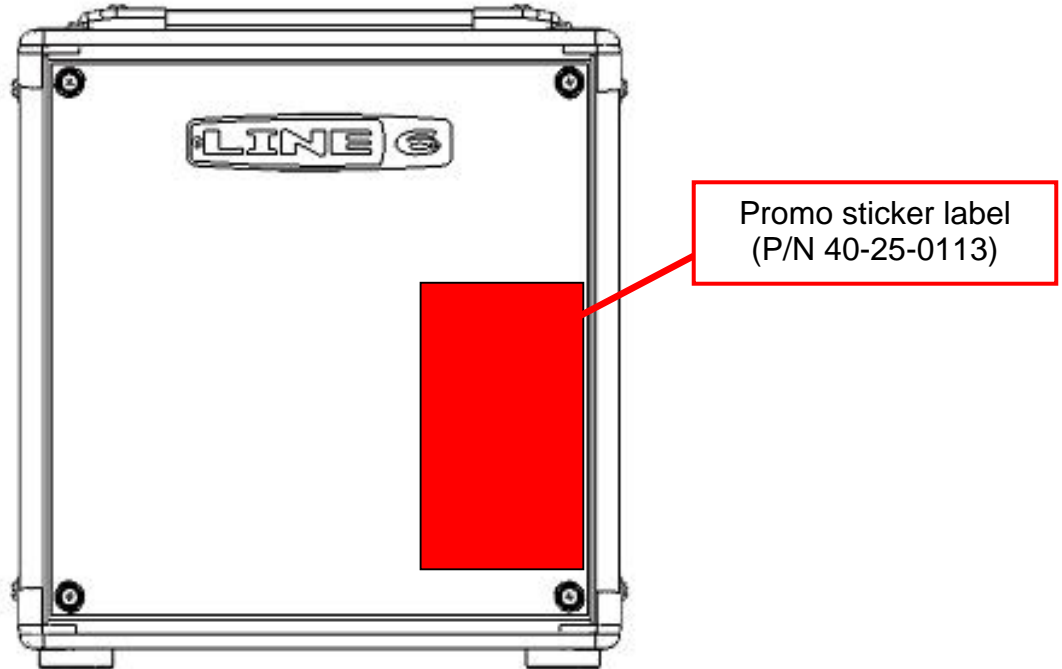
Apply ETL label (P/N 40-25-0030) to rear of chassis.

Note: Line 6 must complete all safety certification testing before ETL label can be applied. Do not apply ETL label until an ECO has been issued to add the ETL label.



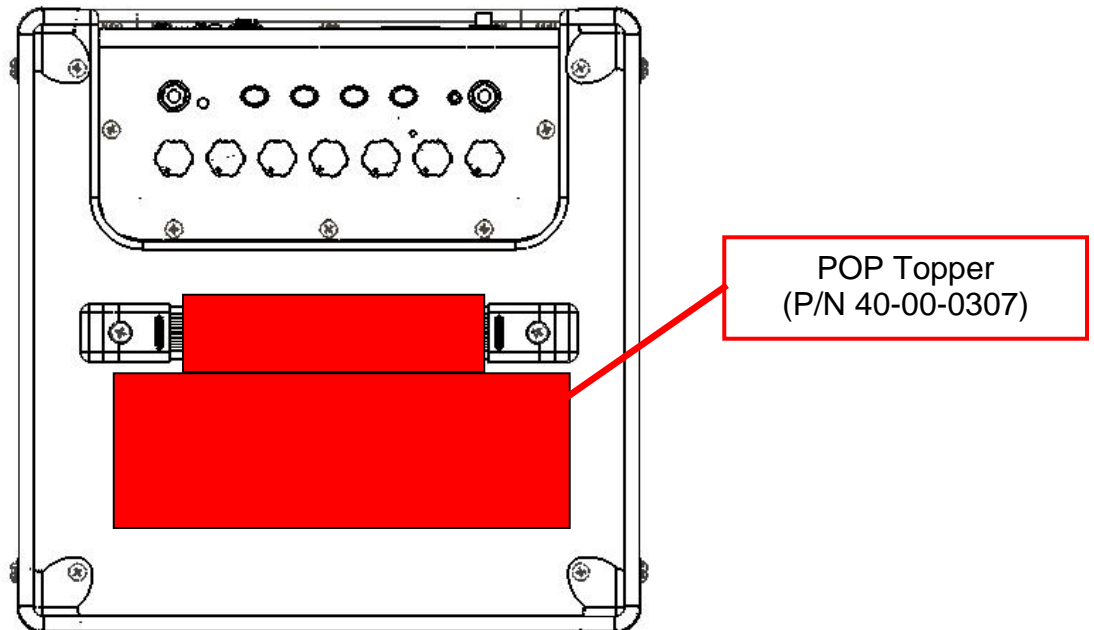
STEP 22:

Apply promo sticker label (P/N 40-25-0113) to front of grill approximately as shown below. Align bottom edge of sticker with horizontal holes on the grill.

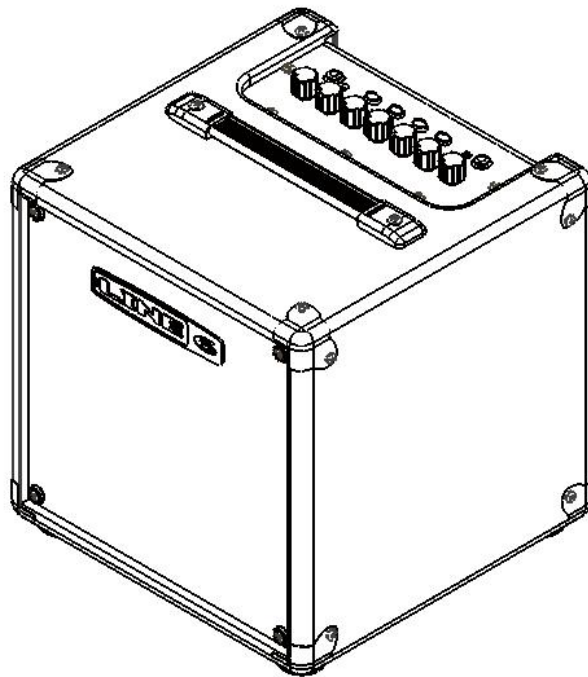


STEP 23:

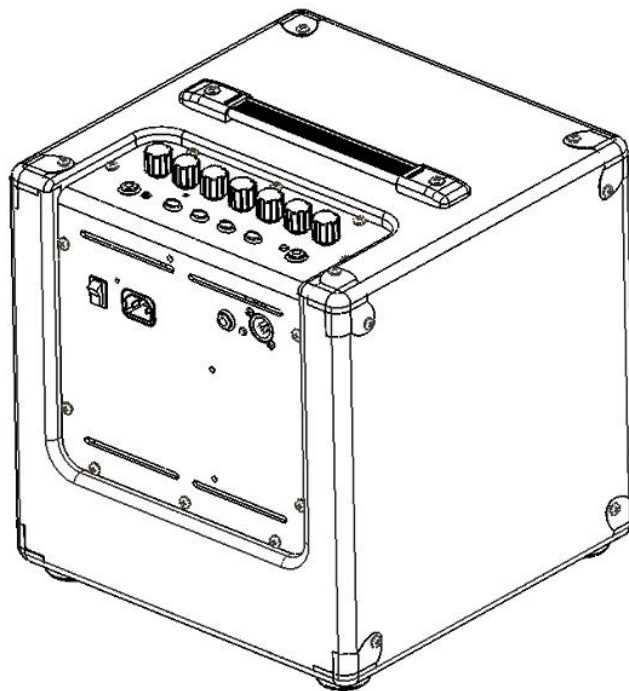
Install POP Topper (P/N 40-00-0307) to the top of the unit. Secure underneath the handle in the position shown below.



Completed Unit Reference Views:



Front Isometric View



Rear Isometric View



LOW DOWN STUDIO 110

Pilot's Guide
Manuel de pilotage
Pilotenhandbuch
Pilotenhandboek
Manual del Piloto

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**You should read these Important Safety Instructions.
Keep these instructions in a safe place.**



Before using your LowDown, carefully read the applicable items of these operating instructions and the safety suggestions.

1. Obey all warnings on the amp and in the LowDown Studio 110 Manual.
2. Connect only to AC power outlets rated 100-120V or 200-240V 47-63Hz (depending on voltage range of the unit; refer to back panel).
3. Do not perform service operations beyond those described in the LowDown Studio 110 Manual. Service is required when the apparatus has been damaged in any way, such as:
 - power-supply cord or plug is damaged
 - liquid has been spilled or objects have fallen into the apparatus
 - the unit has been exposed to rain or moisture
 - the unit does not operate normally or changes in performance in a significant way
 - the unit is dropped or the enclosure is damaged.
4. The bottom of the metal chassis can get hot during operation. Do not touch during operation or shortly after.
5. Do not place near heat sources, such as radiators, heat registers, or appliances which produce heat. Keep the rear of the unit at least three inches from walls or other items that might block heat radiation.
6. Do not block any of the ventilation openings or use in an enclosed space.
7. Guard against objects or liquids entering the enclosure. Do not use or place unit near water.
8. Do not step on power cords. Do not place items on top of power cords so that they are pinched or leaned on. Pay particular attention to the cord at the plug end and the point where it connects to the amp.
9. Unplug the amp when not in use for extended periods of time. Unplug the amp during lightning storms.
10. Clean only with a damp cloth.
11. Do not defeat the safety purpose of the grounding type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
12. Only use attachments/accessories specified by the manufacturer.
13. Prolonged listening at high volume levels may cause irreparable hearing loss and/or damage. Always be sure to practice “safe listening.”

CAUTION: This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.



The exclamation point within a triangle means “caution!” Please read the information next to all caution signs.

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



The lightning symbol within a triangle means “electrical caution!” It indicates the presence of information about operating voltage and potential risks of electrical shock.



This symbol within a triangle means “caution! hot surface!” It is placed in areas that may become too hot to touch when device is in operation.

LOW DOWN STUDIO110

INPUT



CLEAN

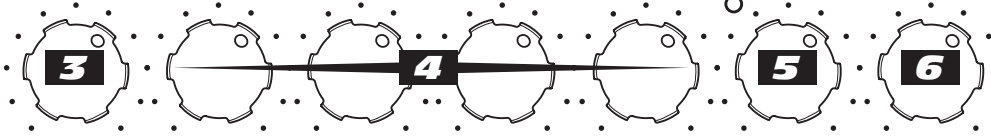
R&B

ROCK

GRIND



7
CD/MP3



THRESHOLD

DRIVE

BASS

LO-MID

HI-MID

TREBLE

OPTO COMP

MASTER

SYNTH

CUTOFF

RESONANCE

ENVELOPE

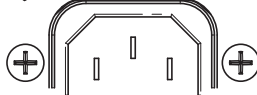
ATTACK/DECAY

WAVEFORM



POWER REQUIREMENTS

11
POWER



120V ~
50 - 60Hz
300 W Max.



PREAMP
OUT

GND
LIFT



CABINET
SIMULATED
DIRECT OUT



1. Input and -10 dB pad button – Plug in and start with the pad in the up/passive mode. If your bass's output distorts the input section, switch to the down/active mode. A “passive” instrument has no built-in preamp and does not use a battery. An “active” bass utilizes a battery operated preamp.

2. Amp Models – Select one of these buttons to select one of 4 groovealicious Amp Models or hit R&B and Rock together to get Synth Bass and all the LowDown controls will automatically dial in to sound great, so you can just play! These buttons come pre-loaded with great factory presets but can be used to save your own custom settings.

3. Drive - is like the volume or gain knob on other amps; controls how much “dirt” you get in your sound.

4. Tone Controls – Bass, Low Mid, Hi Mid and Treble controls are customized for each Amp Model to give you optimal tonal control.

5. Opto Comp - Turn clockwise to even out your playing dynamics (more compression). Watch for the Threshold light, and set the knob so that it comes on just at the point where you play with your typical intensity.

6. Master Volume - You can choose the overall volume of the amplifier, without affecting your tone.

7. CD/MP3 – Plug in any audio source and it feeds directly into the LowDown's speaker or headphones so you can jam with your favorite music or a drum machine. Use the input device's output control to adjust its volume.

8. Headphone - Listen with headphones to your LowDown mixed with what ever you would like to input into the CD/MP3 jack.

9. XLR Direct Out – This gives the sound man a simulation of a miked cabinet that is model specific. To the left of the input is a ground lift.

10. Preamp Out – Plug in here to send your sound to an external bass amp, power amplifier, mixing console, or house PA system.

11. Power – on or off. The amp sounds better on.

Here's the LowDown...

Hey. Thanks for choosing the Line 6 LowDown. We're excited to welcome you to the Line 6 community. We've spent tons of time dialing in your new amp with artists and technicians to deliver a fabulous range of critical bass tones. The LowDown was inspired by some classic bass amps that shaped the tone of rock and roll such as the Ampeg® SVT®, Ampeg® B-15, and the Marshall® Super Bass - amps that deliver tone that will rearrange your insides. These were, and still are the standard for professional bass players the world over. Unfortunately, many of them are incredibly heavy and can very quickly empty your checking account or max out your credit card, so most of us working stiffs gravitate to one of many fine portable utility combo amps with fairly generic tone . Until now...

With LowDown we have worked hard to bring to you, for the first time, serious stadium bass rig tone in a portable/affordable combo. We have spent countless hours modeling the best of the best and faithfully reproducing them on the very amp you're probably sitting on or fondly staring at right now. Whether you are looking for that mind bending funk tone or that classic rock tone heard 'round the world, Line 6's LowDown brings it to you. The endless search for the perfect small gigging amp has come to an end... Now let's get started!

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Some sage advice...

Here are a couple bits of wisdom that will hopefully make your LowDown Studio 110 experience a happy and productive one.

- TAKE ONLY WHAT YOU NEED! We have designed the LowDown Studio 110 to give you the ability to do just that. When a bass player takes the industry standard behemoth into a studio, 95% of the time the engineer only mikes up only one of the 8x10 speakers anyway. While the Studio 110's D.I. is ready to make any engineer feel waves of joy, some old school cats still want to mike up the cabinet and feel the air in the track. That is why we have built a 1x10 combo and sound designed it to, when miked up, give you that behemoth sound without breaking your back or your bank.

- But wait, there's more!!! With the preamp out, we have given you the ability to customize your favorite tones from your favorite amps and take it on the road, so to speak. When gigging or rehearsing around town you just bring your bass and Studio 110 and use a guitar cable to come out of the preamp out and jack into the house or rehearsal studio rig. This is especially exciting for you urban musicians. Never again do you have to sacrifice tone for convenience. And for all you road rats that own reliable but plain sounding solid state rigs but wish for that tube sound, use the Studio 110 as the ultimate tube preamp for your stage rig while using the D.I. to send your signal to the sound guy. That way the audience will enjoy the exact tone you are enjoying on the stage.

Amp Model Details

Just as a great artist has many colors to paint with, you will be able to paint your music in many colors, thanks to the wide range of tone available in the LowDown. Each of these models, when selected, automatically dials up a great useable default sound that you can leave or change to your liking and save by pressing and holding the button for 2 seconds.

Some helpful hints

We have given you model specific tone controls. They react as the actual amp would in a given situation. For instance turning the treble up all the way is a very different experience on each model. We would suggest that you pull up an amp and start with these controls at 12 o'clock and the drive down, then decide what you want to hear from there.

If you want more low end, ask yourself if you want more round thick low end or do you want punchy low end. This will help you determine if you should add Bass or Low Mid to your sound. Sometimes adding Low Mid gives you the bottom you want with a punchier sound. The same goes for the high end. Are you looking for clarity for your note or a percussive attack? If you want clarity many times Hi Mid will give that to you without adding the percussive attack.

Experiment with the tone controls because we have given you a range of tone that has never been available in a combo before.

Drive

This control is used to overdrive the preamp in order to get various distorted sounds. In the fully counter-clockwise position is the cleanest, least distorted sound and as you turn it clockwise you bring in distortion. Adjust to your taste.

Tone Controls

Bass, Low Mid, Hi Mid and Treble controls are customized for each Amp Model to give you optimal tonal control. These controls will help you to shape the tone you hear in your head.

Opto Comp - The compressor control adjusts the threshold of the compressor. The farther the control is rotated clockwise, the more dramatic the compression becomes which brings a more even dynamic to your sound. When completely in the counter-clockwise position, the compressor circuit is off. As you turn the knob clockwise, the threshold at which the compressor kicks in is lowered. The LED to the left of this control will light when the compressor hits -5db of gain reduction, which is a very good place to start.

Amp Model Descriptions

Clean

This model is all about clean, funk and fusion bass tone. It'll give you all the warm lows and punchy highs you need. This sound was crafted during our studies of the Eden Traveler.

R & B

This Amp Model is a tribute to those late 60's and early 70's clean fat bass tones. It is the kind of tone you hear on most Motown recordings, as played by a pioneering young James Jamerson. This Amp Model draws on our analysis of a 1968 B-15 Flip Top.

Rock

This sound was crafted during our studies of the '74 Ampeg® SVT®. This workhorse has appeared on innumerable recordings and arena stages worldwide. And now all the tone of the 300 lbs behemoth 8X10 and head is available in your combo!

Grind

As the name would suggest, this is for you modern rock lovers, Alice in Chains, Mudvayne and Rage against the Machine. This model is based on* a distorted SansAmp PSA-1 into an SVT® with direct clean bass signal mixed in for that angry, clear and punchy aggression that takes your sound to DEFCON 1.

Synth

Remember the Gap Band or the Dazz Band? How bout Marilyn Manson or NIN? They all incorporate Synth Bass into their music and now you can too with this synth that we based on the classic synths of the 70's. See the following page for a breakdown on Synth controls.

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About the Synth:

Selecting the Synth re-works the amp controls to give you Analog Synth control over the Bass Synth. Here's what happens:

Drive

Adds post filter distortion. Start with this knob at 10 o'clock for a little dirt.

Cutoff (Bass)

Filter Frequency Cutoff. Start with this at 10 o'clock for deeper synth tones.

Resonance (Low Mid)

As you turn this knob clockwise you bring in resonance, think laser sounds.

Envelope (High Mid)

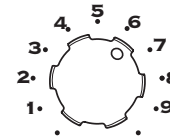
Filter Envelope Depth. The Filter Envelope is triggered every time you play a new and clear note. The Envelope amount controls how much the filter will open each time you play a note.

Attack/Decay (Treble)

Filter Envelope Rate. Controls the speed of the Filter envelope from fast to slow. Start with this control at 9 o'clock for typical Synth bass sounds.

Waveform (Opto Comp)

A number of Waveforms are offered on this knob:



1. Sawtooth
2. Sawtooth plus Octave Down
3. Sawtooth plus Octave Down Sawtooth
4. Triangle PWM
5. Triangle plus Octave Down
6. Square
7. Square PWM plus Octave
8. Square PWM plus Octave Down with Chorus and added fifth
9. Square PWM plus Octave Down & Chorus

Saving

We have preloaded the four model buttons with very popular and usable sounds. But you can also store your own version of the model here as well. You can always get the factory presets back so don't worry, change and save them to your heart's content.

To store your own "snapshot" of all knob positions (except Master Volume), press and hold the current model button for two seconds. The LED flashes twice when the save is complete.

XLR Direct Output

This is your Direct Out for recording or sending your sound to a house sound system when you're playing live. This output utilizes Line 6's exclusive A.I.R. processing which has made Line 6 products like POD the undisputed standard for recording direct. The level of this output is set via Channel Volume and has a ground lift switch to lift the ground if your direct out is causing a buzz in the sound/recording system you are connected to. A bit of advice, many pro sound engineers here at Line 6 have made the direct out experience from this amp a beautiful one. Many sound engineers prefer to take a Pre Amplifier Direct Signal via a Direct Box. This is the de facto technique for getting basic bass tone in the house PA. When playing a gig in a club, ask the sound guy to consider using

your direct out for amp and cabinet tone - they will not be disappointed!

Important

When using the direct out, there can be a 'pop' on the output on power up or power down. We recommend that you either disconnect the direct out or mute whatever the direct out is connected to before powering your LowDown on or off.

CD/MP3

Connect a CD player, MP3 player, drum machine or other device here, and you'll hear it from LowDown's speaker or headphone output. Very handy for jamming along! Use the output volume control on the connected device to set its level.

Phones

Connect your stereo headphones here to listen to your bass and/or your favorite CD and jam along for working on your favorite licks. Plugging in headphones disables your speaker output.

Factory Reset of the Model Defaults and a Special Hidden Feature

You can reset all 4 of your LowDown's programmable models to their factory-programmed states by pressing and holding down the Clean model button as you turn on the power. Clean will flash to tell you the reset is complete. Warning: This will erase ALL custom sounds you might have created. Ask yourself, "Do I really want to do this?" If your answer is yes, then go for it!

Also, there is a very popular sound that you may have seen on the Studio 110's big brothers. We have given you a secret way to change the Clean model to be the Brit model and put your Studio 110 into Rock Mode. Press and hold the Clean and R&B model buttons as you turn on the power. Clean and R&B will flash back and forth to indicate that you have changed the Clean model into the Brit model.

Brit

Based on* a '68 Marshall® Super Bass. Enough said. The Super Bass covers the kind of overdriven bass sound brought to us by late '60's British rock pioneers such as Cream and The Who as well as '70's giants Yes and Rush.

If you would like to return the Clean model to the Studio 110 just press and hold the Clean and R&B model buttons as you turn on the power. Clean and R&B will light solid to indicate that you have restored the Clean model. As long as you don't mind losing your settings for Clean and Brit, you can change from Normal Mode to Rock Mode anytime you want.