



STAGE® 100/160 DSP

(This is the model name for warranty claims)

p/n 2267000020 / 2268000020 (120V)
Head Version p/n 2269000010 (120V)

SERVICE MANUAL



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June, 2002

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specifications are subject to change without notice. This information and any copies produced electronically or otherwise must be surrendered upon demand of Fender Musical Instruments Corporation.

- Parts marked with two asterisks (**) indicate the required use of that specific part. This is necessary for RELIABILITY and SAFETY requirements. **DO NOT USE A SUBSTITUTE!**

PARTS LIST CODES

The description codes used in the itemized Parts Lists are defined below:

CAPACITOR CODES

CAP AE = Aluminum Electrolytic
CAP CA = Ceramic Axial
CAP CD = Ceramic Disk
CAP MPF = Metalized Polyester Film
CAP MY = Mylar
CAP PFF = Polyester Film/Foil

RESISTOR CODES

RES CC = Carbon Comp
RES CF = Carbon Film
RES FP = Flame Proof
RES MF = Metal Film
RES WW = Wire Wound

HARDWARE CODES

BLX = Black Oxide
CR = Chrome Plated
HWH = Hex Washer Head
M = Machine Screw
NI = Nickel Plated
OHP = Oval Head Phillips
PB = Particle Board
PHP = Pan Head Phillips
PHPS = Pan Head Phillips Sems
SMA = Sheet Metal "A" Point
SMB = Sheet Metal "B" Point
SS = Stainless Steel
TF = Thread Forming
ZI = Zinc Plated

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SPECIFICATIONS

Model Name:	Stage 100 DSP	Stage 160 DSP	Stage 100H DSP (Head Version)
Release Number: <i>(Not model numbers)</i>	PR 501	PR 501	PR 501
Part Numbers	(120V, 60Hz) US: 2267000020 (110V, 60Hz) TW: 2267001020 (240V, 50Hz) AUS: 2267003020 (230V, 50Hz) UK: 2267004020 (230V, 50Hz) ARG: 2267005020 (230V, 50Hz) EUR: 2267006020 (100V, 50/60Hz) JPN: 2267007020 (220V, 60Hz) ROK: 2267009020	2268000020 2268001020 2268003020 2268004020 2268005020 2268006020 2268007020 2268009020	2269000010 2269001010 2269003010 2269004010 2269005010 2269006010 2269007010 2269009010

(For all Models)

Power Requirement:	400W		
Power Output:	100W RMS into 8 ohms @ 5%THD 160W RMS into 4 ohms @ 5%THD		
Power Amp Sensitivity:	620mV for 100W into 8 ohms @ 5%THD 810mV for 160W into 4 ohms @ 5%THD		
Impedances	Input (Pre-Amp): 1M ohms Pre Amp Out: 1k ohms Pwr Amp In: 10k ohms		

Speaker Complement:	One (1) 12", 8 ohm, Celestion G12T-100 (P/N 0054420000)	Two (2) 12", 8 ohm, Celestion G12T-100 (P/N 0054420000)	-NA-
Dimensions	Height: 17.5 in (45 cm) Width: 22.4 in (57 cm) Depth: 10.2 in (26 cm)	18.5 in (47 cm) 26.1 in (66 cm) 10.3 in (26 cm)	8.5 in (22 cm) 22.4 in (57 cm) 9.5 in (24 cm)
Weight:	42 lbs (19.1 kg)	53 lbs (24.1 kg)	24 lbs (10.9 kg)

Product specifications are subject to change without notice



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SERVICE NOTES

- 1. CHASSIS REMOVAL** is accomplished by first removing two (2) screws from the cabinet side panel and four (4) screws from the top of the cabinet; disconnect the ¼" speaker plug(s) from the speaker jack(s) and then slide the chassis toward the rear of the cabinet.
- 2. uDSP PCB ASSEMBLY REMOVAL** is accomplished by disconnecting the ribbon cable on the PCB Assembly, releasing the tabs on each of the plastic stand-offs which the PCB assembly is mounted. Removal of the uDSP PCB assembly may be necessary should any of the Digital Effects operate improperly.
- 3. STAGE 100/160 DSP MAIN PCB REMOVAL** is accomplished by removing the following items: All knobs including washers and nuts (14) , one (1) input jack nut and washer, (1) screw near mains fuse, seven (7) screws at the heatsink attached from the bottom of the chassis. Disconnect the transformer and primary leads at P1-P14. Disconnect the breakaway PCB ribbon cable at P20 and speaker wires (blk/wht) at P15-P16. Disconnect the ribbon cable to uDSP assembly at P19. Remove the power LED from the jewel assembly.
- 4. STAGE 100/160 DSP BREAKAWAY PCB REMOVAL** is accomplished by removing five (5) nuts and washers at the jacks and two (2) screws at the XLR jack. Disconnect the ribbon cable from the main PCB at P20 and the speaker wires (blk/wht) at P15-P16.

PCB EXCHANGE POLICY

Parts marked with a single asterisk (*) in the Part Lists (starting on page 10) are not field replaceable. If a failure due to one of these components is detected, please contact the Fender® Dealer

Customer Service Department to order the complete PCB Assembly.



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CIRCUIT DESCRIPTION

This section provides an overview of any new or unusual circuitry incorporated into this amplifier model. The purpose is to aid the service technician by providing insight into the design areas most likely to present a challenge in troubleshooting. This overview is focused for the efficient use and security of Fender® proprietary information.

PRE-AMPLIFIER

The guitar input signal is fed into the high pass filter at U1-A before splitting into two signal paths. The normal channel signal path (U1-B to U3-B) is active until FETs Q2, Q4, and Q6 are turned on activating the drive channel signal path (U2-A to U3-B). Turning on FETs Q1, Q3, and Q5 activates the “More Drive” channel signal path for increased gain and sustain. Differential amp U8-A and follower U8-B adjust the signal level and provides +1.65VDC bias voltage to the uDSP effects card. The preamp is in series with the digital effects card, therefore, disconnecting the card breaks the overall signal path. The low pass filter at U5-B recovers the signal from the uDSP card and sends it to the external effects loop and power amplifier.

POWER AMPLIFIER

“Flying Rail” power amp topology. The output stage is referenced to ground, and the output signal is derived from the center tap of the high voltage power supply (C86 & C87) which is floating. Diff-amp U7-B amplifies voltage developed at the load sense resistors (R120-123) to provide negative current feedback. Inserting an 8Ω load at Ext. Spkr (J7) turns on FET Q20 creating an attenuation network (R117-119) to compensate for the increased current at 4Ω total load impedance. This allows the amplifier to have a similar frequency response running either an 8 or 4Ω speaker load.

Thermistor RT2 monitors the heatsink temperature. Its resistance increases with temperature and at approx. 100 °C turns on xstr Q23. This shorts out C77, turning on FET Q22 providing a muting function at the power amp input. The amplifier remains muted until the heatsink cools down, at which point, normal operation is restored.

POWER SUPPLY

Standard bridge rectifiers for both high and low voltage sections, with zener regulation (D52-53) for the +/-16V supplies. Half-wave rectifier (D46-47, C48) supplies U11, 7805 regulator for +5V supply for the uDSP card and digital user-interface.

DIGITAL USER INTERFACE

The uDSP effects card generates clock signals HD0 (~45Hz) and HD1 (~90Hz) which control the 4053 CMOS switch to read pots R134, R135, and R138. The DC level (0-5V) of the pots controls the reverb level, fx level, and fx time/rate. Power (+3.3V) is switched to encoders S4 and S5 via the 4053, also controlled by HD0. The outputs of the 4-bit encoders, isolated by diodes D28-D35, determine the active reverb and fx algorithms (HD4-HD7).

DIGITAL NOISE

The uDSP effects card generates some high frequency noise (>50kHz), which is a normal product of DSP processing. This noise is not audible and does not effect amplifier performance, but may be visible when observing the output of the amplifier on an oscilloscope.



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PARTS LIST: MAIN – PCB ASSEMBLY

QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0057616004	**PCB ASSY STAGE 100/160 DSP	
1	*	PCB FAB STAGE 100/160 DSP	
REF	0057619000	SVC DIAG COMB STAGE 100/160 DSP	
1	0048914000	CABLE RIBBON 8 CKT 7"	PW20
2	0033606003	CAP AE RDL .47uF 50V 20%	C16 C47
3	0028458003	CAP AE RDL 1uF 50V 20%	C14 C75 C77
4	0028459003	CAP AE RDL 2.2uF 50V 20%	C6 C17 C53 C70
10	0028467003	CAP AE RDL 22uF 50V 20%	C8 C10 C19 C31 C39-40 C46 C81 C110-111
3	0028471003	CAP AE RDL 47uF 50V 20%	C51 C102-103
7	0028474003	CAP AE RDL 100uF 25V 20%	C50 C55-56 C84-85 C100-101
3	0055780000	**CAP AE RDL 1000uF 35V 105C 20%	C78 C82-83
2	0028031000	CAP AE RDL 3300uF 63V +100%-20	C86-87
2	0039256001	CAP CA 68pF 100V LL	C44-45
6	0038699001	CAP CA 100pF 100V LL	C7 C30 C32 C41-42 C115
6	0039259001	CAP CA 220pF 100V LL	C35 C37 C62-63 C117-118
5	0038701001	CAP CA 470pF 50V LL	C9 C15 C43 C119 C121
4	0039263001	CAP CA 1000pF 50V LL	C3 C18 C22 C27
1	0051445003	CAP CD 22pF 500V 5%	C116
1	0051457003	CAP CD 100pF 500V 5%	C94
3	0051406003	CAP CD 220pF 500V 10%	C66-67 C95
12	0034788003	CAP CR .1uF 50V 20% .2" LS	C57-58 C68-69 C79-80 C104-109
4	0027255003	CAP MPF .001uF 100V 10%	C71-74
2	0027257003	CAP MPF .0022uF 100V 10%	C59-60
2	0027259003	CAP MPF .0033uF 100V 10%	C23 C48
3	0027261003	CAP MPF .0047uF 100V 10%	C1-2 C24
3	0027264003	CAP MPF .01uF 100V 10%	C28 C54 C122
1	0030950003	CAP PFF RDL .022uF 50V 5%	C34
2	0030953003	CAP PFF RDL .039uF 50V 5%	C33 C36
1	0051416003	CAP SF .1uF 100V 10%	C61
10	0027272003	CAP MPF .047uF 63V 10%	C11 C20 C64-65 C76 C92 C96-99
1	0027275003	CAP MPF .068uF 100V 10%	C49
2	0027278003	CAP MPF .1uF 63V 10%	C25-26
2	0052003003	**CAP MPF .1uF 250V 10%	C112-113
1	0053860000	**CAP MPF .1uF 250VAC 20%	C114
4	0027281003	CAP MPF .22uF 63V 10%	C5 C89-91
4	0027286003	CAP MPF .47uF 63V 10%	C4 C52 C88 C93
1	0030950003	CAP PFF RDL .022uF 50V 5%	C34
2	0030953003	CAP PFF RDL .039uF 50V 5%	C33 C36
1	0051416003	CAP SF .1uF 100V 10%	C61
3	0027940000	CONTROL SNAPIN 50k 15A TAPER	R10 R16 R34 BASS, VOLUME, (DR) VOLUME
5	0027941000	CONTROL SNAPIN 50k B TAPER	R9 R38 TREBLE, (DR) MID
2	0027947000	CONTROL SNAPIN 100k 30C TAPER	R134-135 R138 REV LVL, TIME/RATE, FX LVL
1	0027949000	CONTROL SNAPIN 250k 30C TAPER	R27 R42 DRIVE, (DR) TREBLE
1	0054390000	CONTROL SNAPIN 5k 15A TAPER	R11 (DR) BASS
52	0006260001	DIODE 1N4448 SIGNAL LL	R11 MID
9	0064089001	DIODE 1N4003 LL	D1-8 D11-18 D21-24 D27-39 D41-44 D58-59
4	0029045000	DIODE 6A 400V 6A4 LEAD FORMED	D63 D65 D67 D70-77 D79-80
2	0054210001	DIODE BAT85	D25-26 D40 D46-51
3	0027329001	DIODE ZEN 1N5228B 3.9V 5% LL	D54-57
1	0031635001	DIODE ZEN 1N5240B 10V 5% LL	D19-20
1	0031019001	DIODE ZEN 1N5245B 15V 5% LL	D60-62
2	0028119000	DIODE ZEN 1N5353B 16V 5W 5%	D64
			D66
			D52-53

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

Unique Fender® part. Order directly from the Fender® dealer Customer Service Department.

** Safety Requirement part. Replacement must match *Safety Agency*...–*Value*, if specified –*Type*, if specified –*Approval Mark(s)* if on part.

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PARTS LIST:		MAIN – PCB ASSEMBLY		(continued)
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION	
2	0041074000	ENCODER 16-POS 4-BIT BINARY	S4-5	REV SELECT, FX SELECT
16	0025802000	FASTON TAB, .250"	P1-16	
2	0020775000	**FUUSE CLIP PCB 5mm	@ F1	
1	0027416000	HDR .1 CTR 8 CKT SQ PIN	P20	
1	0057350000	HDR .1 CTR 8x2 CKT SQ PIN	P19	
1	0025796000	HEATSINK TO-220	@ U11	
1	0054259000	HEATSINK PLATE STAGE 100/160		
6	0032908000	SCRW TF 6-32x3/8 PHP ZI	@ HEATSINK	
1	0016795000	IC OP-AMP DUAL TL072	U1	
1	0028120000	IC 4053B TPL 2 CHAN ANLG SW	U10	
8	0031611000	IC OP-AMP DUAL PC4560	U2-9	
2	0041261000	IC VOLT REF LM4040DIZ-10.0	D68-69	
1	0041812000	IC REGULATOR +5V MC7805CT	U11	
1	0027387000	INDUCTOR AIR CORE RDL 2.5uH	L1	
3	0051658000	JACK MONO R/A	J2-3 J6	FTSW, PRE AMP OUT, MAIN SPKR
3	0053450000	JACK STEREO R/A	J1 J4 J7	INPUT, PWR AMP IN, EXT. SPKR
1	0054261000	JACK XLR MALE RT ANGLE	J5	LINE OUT
1	0040271000	LED RED/YELLOW	D78	DRIVE STATUS
2	0049948000	LED, RED LONG LEAD LUMEX	D9-10	DISTORTION
1	0055812000	LED TULIP ASSY	D45	POWER
4	0024947001	RES CF 1/4W 5% 47ohm LL	R7 R196-197 R203	
1	0024954001	RES CF 1/4W 5% 150ohm LL	R81	
4	0024956001	RES CF 1/4W 5% 220ohm LL	R87 R94 R198-199	
1	0029604001	RES CF 1/4W 5% 300ohm LL	R80	
1	0024961001	RES CF 1/4W 5% 470ohm LL	R36	
10	0024965001	RES CF 1/4W 5% 1k LL	R20 R85 R95-96 R118-119 R127 R131 R151 R202	
10	0024969001	RES CF 1/4W 5% 1.5k LL	R24 R98-99 R102-103 R106-107 R132 R162 R181	
10	0024971001	RES CF 1/4W 5% 2.2k LL	R17 R49-50 R66-67 R82 R84 R89 R92 R117	
2	0024972001	RES CF 1/4W 5% 2.7k LL	R90-91	
5	0024973001	RES CF 1/4W 5% 3.3k LL	R28 R76 R88 R93 R133	
2	0024977001	RES CF 1/4W 5% 4.7k LL	R47 R77	
6	0028034001	RES CF 1/4W 5% 5.1k LL	R4 R25 R68-71	
2	0024979001	RES CF 1/4W 5% 6.8k LL	R5 R14	
1	0024980001	RES CF 1/4W 5% 8.2k LL	R23	
19	0024981001	RES CF 1/4W 5% 10k LL	R26 R33 R51-53 R62-63 R97 R115-116 R129	
			R136-137 R139 R143-144 R183 R185 R193	
2	0024985001	RES CF 1/4W 5% 15k LL	R1 R6	
7	0024987001	RES CF 1/4W 5% 22k LL	R8 R12 R21-22 R48 R150 R153	
10	0024988001	RES CF 1/4W 5% 27k LL	R59-60 R64-65 R72-75 R113-114	
5	0024989001	RES CF 1/4W 5% 33k LL	R29 R40 R43 R46 R176	
6	0024993001	RES CF 1/4W 5% 47k LL	R32 R37 R39 R78-79 R195	
1	0024995001	RES CF 1/4W 5% 68k LL	R44	
21	0024997001	RES CF 1/4W 5% 100k LL	R18-19 R35 R41 R54 R61 R83 R86 R128 R130	
			R145-148 R165 R172 R182 R188-190 R200	
2	0025058001	RES CF 1/4W 5% 180k LL	R13 R55	
3	0025059001	RES CF 1/4W 5% 220k LL	R15 R31 R180	
2	0025061001	RES CF 1/4W 5% 330k LL	R175 R184	
5	0025065001	RES CF 1/4W 5% 470k LL	R30 R159 R169 R171 R174	
2	0028018001	RES CF 1/4W 5% 510k LL	R2-3	
1	0025068001	RES CF 1/4W 5% 820k LL	R168	
10	0025069001	RES CF 1/4W 5% 1M LL	R149 R152 R166 R170 R173 R177 R186-187	
			R194 R201	
1	0031767001	RES CF 1/2W 5% 15ohm LL	R126	
1	0047750001	RES CF 1/2W 5% 330ohm LL	R154	

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

Unique Fender® part. Order directly from the Fender® dealer Customer Service Department.

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PARTS LIST: MAIN – PCB ASSEMBLY (continued)			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0027872001	RES CF 1/2W 5% 1.2k LL	R191
1	0026549001	RES CF 1/2W 5% 1.5k LL	R192
4	0039209001	RES FILM 1W 5% .22ohm LL	R120-123
1	0027627001	RES FILM 1W 5% 10ohm LL	R112
1	0031067001	RES FILM 1W 5% 750ohm LL	R158
4	0027632001	RES MF 1/4W 1% 2.43k LL	R56 R140-142
2	0015582001	RES MF 1/4W 1% 10.0k LL	R57 R179
1	0025816001	RES MF 1/4W 1% 20.0k LL	R178
2	0016971001	RES MF 1/4W 1% 33.2k LL	R58 R160
1	0017191001	RES MF 1/4W 1% 36.5k LL	R167
2	0017372001	RES MF 1/4W 1% 51.1k LL	R161 R164
1	0016979001	RES MF 1/4W 1% 215k LL	R163
3	0055781001	**RES MF FUSE 2W 5% 82ohm LL	R155-157
2	0027628001	RES MOX 2W 5% 47ohm LL	R110-111
2	0028021001	RES MOX 2W 5% 470ohm LL	R124-125
6	0028028000	RES WW 5W 10% .47ohm	R100-101 R104-105 R108-109
3	0028091000	SWITCH PUSH SLFLK SHORT STROKE	S1-3 CH SEL, MORE DR, MID CONTOUR
3	0048451000	BUTTON PUSH OFF WHITE	@ S1-3
1	0051418003	**THERMAL SENSOR PTC 100 DEG C	RT2
1	0026411000	**THERMISTOR 2.5 ohm 8A C30-19	RT1
11	0014689003	XSTR N-CH JFET J111 TO-92	Q1-9 Q20 Q22
3	0016739003	XSTR NPN 2N4401 TO-92	Q12 Q26 Q29
8	0016742003	XSTR PNP 2N4403 TO-92	Q13 Q21 Q23-25 Q27-28 Q30
1	0051447003	XSTR PNP 2SB1236	Q11
1	0051448003	XSTR NPN 2SD1857	Q10
3	0028114000	XSTR NPN TIP142 TO-218AC	Q14 Q16 Q18
3	0028115000	XSTR PNP TIP147 TO-218AC	Q15 Q17 Q19
7	0027638000	SCRW TF 4-40x3/8 HWHS ZI .1" HD	@ Q14-Q19, U11
6	0028169000	WSHR SHLDR NYL 5/32x1/4	@ Q14-Q19
6	0040903000	INSULATOR MICA TO-218	@ Q14-Q19
2	0020888001	JUMPER WIRE .300"	W21-22
10	0020888001	JUMPER WIRE .400"	W7 W19-20 W23-28 W35
23	0020888001	JUMPER WIRE .500"	W1-6 W8-18 W29-34
1	0052457000	WIRE SET PCB STAGE 100/160	@ P17-P18

PARTS LIST: uDSP – PCB ASSEMBLY			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0057605008	**PCB ASSY uDSP STAGE 100/160	w/ EPROM
REF	0057283000	SVC DIAG COMB MICRO DSP	
1	*	IC ROM STAGE 100/160 DSP V1.00	
1	*	PCB Fab u-DSP	
2	*	CAP 0805 CER .001uF 25V 5%	
14	*	CAP 0805 CER .01uF 25V 5%	
10	*	CAP 0805 CER .1uF 25V 5%	
2	*	CAP 0805 CER 22pF 25V 5%	
2	*	CAP 0805 CER 750Pf 25v 5%	
3	*	CAP 3528 TAN 4.7uF 16V 20%	
6	*	CAP 3528 TAN 10uF 16V 20%	
5	*	DIODE SMT 1N4448 SIGNAL	
2	*	HDR .1 CTR 8x2 CKT SQ PIN	
4	*	RES 0805 MF 1/10W 5% 0ohm	
2	*	RES 0805 MF 1/10W 5% 100ohm	
4	*	RES 0805 MF 1/10W 5% 750ohm	

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PARTS LIST: uDSP – PCB ASSEMBLY (continued)			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
4	*	RES 0805 MF 1/10W 5% 1k	
1	*	RES 0805 MF 1/10W 5% 2k	
1	*	RES 0805 MF 1/10W 5% 3.3k	
2	*	RES 0805 MF 1/10W 5% 4.7k	
1	*	RES 0805 MF 1/10W 5% 15k	
1	*	RES 0805 MF 1/10W 5% 47k	
1	*	IC SMT SOCKET PLCC 44-TT	
1	*	IC SMT TLC549 AD	
1	*	IC SMT SRAM 64Kx16	
1	*	IC SMT COUNTER 74LV4040	
1	*	IC SMT HEX SCHMITT-T INV 74HC14	
1	*	IC SMT VREG +3.3V LM1117	
1	*	IC SMT CODEC TLC320AD77C	
1	*	IC SMT DSP TMS320VC5402PGE	
1	*	IC SMT VREG +1.8V 150mA TPS76318	
1	*	IC SMT RESET 5V MC34064D-5	
1	*	XTAL 20MHz HC49SD	

PARTS LIST: CHASSIS ASSEMBLY			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0057359000	CABLE RIBBON 16 CKT W/2 CONN	CONNECT uDSP ASSY TO MAIN PCB
1	*	CHASSIS STAGE 100 DSP	STAGE 100 DSP
-	*	CHASSIS STAGE 160 DSP	STAGE 160 DSP
1	0054642000	CONNECTOR IEC SNAP IN	
1	0053884000	**FUSE QA 20mmX5mm 125V 4A UL/CSA	100-120V ONLY
-	0020795000	**FUSE QA 20mmx5mm 250v 2.5A	220-240V ONLY
1	0039203000	HEATSINK BAR STAGE 112SE	@ HEATSINK
7	0028500000	SCRW TF 8-32x3/4 HWH SLTD Z1	@ HEATSINK
1	0054798000	JEWEL ASSY LED	
1	0031625000	NUT HOLDER PILOT LIGHT 11/16-27	@ JEWEL ASSY
12	0053986000	KNOB ROTARY SS W/CHR INSERT	@ CONTROLS
2	0057256000	KNOB ROTARY ARROW W/CHRM INSRT	@ ENCODERS
1	*	LABEL GROUNDING SEMKO	@ GND
1	0038900000	SCRW TF 6-32X1/4 PHP ZI	@ GND
-	*	LABEL VOLTAGE 230V	@ REAR PANEL
-	*	LABEL VOLTAGE 240V	@ REAR PANEL
-	*	LABEL VOLTAGE 100V	@ REAR PANEL
1	0057613000	PANEL FRONT STAGE 100 DSP	STAGE 100 DSP
-	0057635000	PANEL FRONT STAGE 160 DSP	STAGE 160 DSP
1	*	PANEL REAR STAGE 100 DSP	STAGE 100 DSP
-	*	PANEL REAR STAGE 160 DSP	STAGE 160 DSP
6	0053479000	NUT HEX 7/16 20X1/8 NI	@ JACKS
6	0053480000	WASHER FLAT .442 X.692 NI	@ JACKS
2	0051155000	SCRW SMB #4X3/8 PHP BLX	@ XLR JACK
4	0051404000	STANDOFF NYLON BLK .375	@ uDSP ASSY
1	0025936000	STANDOFF NYL PCB SNAP 3/8" NAT	@ MAIN PCB
1	0028937000	SCRW TF 6-32x5/8 PHP ZI TAPTYT	@ STANDOFF
1	0039236000	**SWITCH ROCKER DPST PSEUDO-IEC	100-120V ONLY
-	0040582000	**SWITCH DPST .250 TAB GLOBAL	220-240V ONLY
1	0054258000	**WIRE SET CHS STAGE 100/160 DOM	120V ONLY
-	0054262000	**WIRE SET CHS STAGE 100/160 EXP	100V, 220-240V ONLY
1	0039129000	**XFMR PWR STAGE 120V	120V ONLY
-	0039084000	**XFMR PWR STAGE 112SE EXP	100V, 220-240V ONLY

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

Unique Fender® part. Order directly from the Fender® dealer Customer Service Department.

** Safety Requirement part. Replacement must match *Safety Agency*...–*Value*, if specified –*Type*, if specified –*Approval Mark(s)* if on part.

*** Both a unique Fender® part and a Safety Requirement part as defined above.



STAGE® 100/160 DSP

(This is the model name for warranty claims)

PARTS LIST: CHASSIS ASSEMBLY (continued)			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0028564000	END BELL XFMR 185 Series	@ XFMR
4	0028591000	NUT ACORN 8-32	@ XFMR
4	0030007000	WSHR LCK INTL 8x.330x.02 ZI	@ XFMR

PARTS LIST: CABINET ASSEMBLY			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
4	0026566000	CORNER 2 HOLE w/TAB NI	
2	0026568000	CORNER 3 HOLE NI	
10	0026571000	SCRW SMAB 8X5/8 THP NI	@ CORNERS, STAGE 100/160 DSP
14	0026571000	SCRW SMAB 8X5/8 THP NI	@ CORNERS/FOOT, STAGE 100H DSP
4	0019276000	GLIDE CAB 1.24x.335 NI	STAGE 100/160 DSP
4	0019275000	INSERT GLIDE CUSHION 1.27 DIA	@ GLIDE, STAGE 100/160 DSP
4	0026625000	SCRW WOOD 8x1 FH	@ GLIDE, STAGE 100/160 DSP
4	0029323000	FOOT RUBBER 1.0 DIA SMALL	STAGE 100H DSP
1	0027846000	HANDLE 9.25" NO LOGO	
2	0019279000	HANDLE CAP 2 HOLE NICKEL	@ HANDLE
1	0032524000	INSERT HANDLE	@ HANDLE
4	0022244000	SCRW M 10-32x1-1/8 OHP NI	@ HANDLE
4	0056482000	MOUNTING PLATE EL COM	@ CASTERS, STAGE 160 DSP
16	0027199000	SCRW SMAB 10x3/4 PHP NI	@ MOUNTING PLATE, STAGE 160 DSP
8	0021972000	NUT T 10-32x3/4 STR 3 PRNG BLX	@ HANDLE/SPEAKER, STAGE 100 DSP
12	0021972000	NUT T 10-32x3/4 STR 3 PRNG BLX	@ HANDLE/SPEAKERS, STAGE 160 DSP
4	0021972000	NUT T 10-32x3/4 STR 3 PRNG BLX	@ HANDLE, STAGE 100H DSP
0.02	0027648000	TAPE ALUM 6"x60YDS	
0.33	0031752000	RIBBON PULL-TAB	@ GRILLE, STAGE 100H DSP
1.06	0026570000	TOLEX "BRAVURA BLACK"	STAGE 100 DSP
1.18	0026570000	TOLEX "BRAVURA BLACK"	STAGE 160 DSP
1.01	0026570000	TOLEX "BRAVURA BLACK"	STAGE 100H DSP
0.39	0029085000	VELCRO STRIP LOOP 1.5"wd BLK	@ FTSW LOOPS
0.39	0029086000	VELCRO STRIP HOOK 1.5"wd BLK	@ FTSW LOOPS
0.17	0029085000	VELCRO STRIP LOOP 1.5"wd BLK	@ GRILLE, STAGE 160 DSP
0.25	0029085000	VELCRO STRIP LOOP 1.5"wd BLK	@ GRILLE, STAGE 160 DSP
0.22	0029085000	VELCRO STRIP LOOP 1.5"wd BLK	@ GRILLE, STAGE 100H DSP
0.17	0029086000	VELCRO STRIP HOOK 1.5"wd BLK	@ BAFFLE, STAGE 100 DSP
0.25	0029086000	VELCRO STRIP HOOK 1.5"wd BLK	@ BAFFLE, STAGE 160 DSP
0.22	0029086000	VELCRO STRIP HOOK 1.5"wd BLK	@ BAFFLE, STAGE 100H DSP

PARTS LIST: END ITEM ASSEMBLY			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0040025000	CAB ASSY STG112/100/RP1000MKII	STAGE 100 DSP
-	0040071000	CAB ASSY ULT CHORUS/STAGE160	STAGE 160 DSP
-	0040988000	CAB ASSY STAGE100H	STAGE 100H DSP
1	0038566000	CABLE ASSY SPKR RT ANG 13-1/2"	STAGE 100 DSP
2	0038566000	CABLE ASSY SPKR RT ANG 13-1/2"	STAGE 160 DSP
4	0056483000	CASTER SWIVEL EL COM 2-12CABS	STAGE 160 DSP
1	0047248000	**CORD PWR W/IEC CONN DOM	120V DOMESTIC
-	0047249000	**CORD PWR W/IEC CONN 230V UK	230V UK
-	0047250000	**CORD PWR W/IEC CONN 240V	240V AUST
-	0047251000	**CORD PWR W/IEC CONN 230V	230V EUR
-	0057674000	**CORD PWR W/IEC 230V ARG	230V ARG
-	0053997000	**CORD PWR W/IEC CONN 100V JPN	100V JPN
1	0057601000	FTSW ASSY 4 BTN STAGE DSP	CH SEL-DRV/MRDRV-EFX-REV

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

Unique Fender® part. Order directly from the Fender® dealer Customer Service Department.

** Safety Requirement part. Replacement must match *Safety Agency*...-Value, if specified -Type, if specified -Approval Mark(s) if on part.

** Both a unique Fender® part and a Safety Requirement part as defined above.

**STAGE® 100/160 DSP**

(This is the model name for warranty claims)

PARTS LIST:		END ITEM ASSEMBLY		(continued)
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION	
1	0029906000	NAMEPLATE FENDER® GENERIC SMALL		
2	0018113000	SCRW SMA 4x1/2 OHP BLX	@ NAMEPLATE	
6	0036199000	SCRW M 8-32x1-3/16 OHP BLX CP	@ CHASSIS	
6	0029527000	WSHR FNSH 8-5/8 FLNGD BLX WX	@ CHASSIS	
1	0057620000	MANUAL OWNERS STAGE 100/160DSP		
1	0054420000	SPEAKER 12"8 OHM G12T-100 1887	STAGE 100 DSP	
2	0054420000	SPEAKER 12"8 OHM G12T-100 1887	STAGE 160 DSP	
4	0026577000	SCRW M 10-32x1 PHP BLX	@ SPEAKER, STAGE 100 DSP	
8	0026577000	SCRW M 10-32x1 PHP BLX	@ SPEAKERS, STAGE 160 DSP	

PARTS LIST:		FOOTSWITCH ASSY		
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION	
1	0028895000	CABLE ASSY FTSW RT ANG 12'		
1	*	HOUSING FTSW 4 BUTTON		
1	*	HSG END CUP LEFT FTSW		
1	*	HSG END CUP RIGHT FTSW		
1	*	PLATE FTSW 4 BTN STAGE DSP		
8	*	SCRW SMB 6x3/8 PH PHS BLX	@ END CUPS	
1	*	NUT HEX 12mmx1mm NI	@ JACK	
4	*	WSHR NYL .485x.775x.150 TK	@ SWITCHES	
1	*	PCB FAB FTSW 4 BTN STAGE DSP		
5	*	DIODE 1N4448 SIGNAL	D1, D2, D6, D10, D11	
2	*	DIODE ZEN 1N5228B 3.9V 5%	D7, D12	
1	*	DIODE ZEN 1N5223B 2.7V 5%	D4	
1	*	JACK PCB MONO CA	J1	
1	*	LED BI-COLOR 5mmx5mm	D9	
3	*	LED RED 5mmx5mm SLB-55VR3	D3, D5, D8	
1	*	RES CF 1/4W 5% 75 ohm	R1	
3	*	SPACER RND NYL .147x.250x.780	@ D3, D5, D8	
1	*	SPACER RND NYL .147x.250x.680	@ D9	
4	*	SWITCH PUSH SPDT	S1-S4	

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

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** Both a unique Fender® part and a Safety Requirement part as defined above.



STAGE® 100/160 DSP

(This is the model name for warranty claims)

Schematics and Drawings

Service Diagram (Schematic)	Stage 100/100H/160
Service Diagram (PCB Assy)	Stage 100/100H/160
Service Diagram (Schematic)	Micro DSP
Service Diagram (PCB Assy)	Micro DSP
Chassis Assy	Stage 100/100H
Chassis Assy	Stage 160
End Item Assy	Stage 100
End Item Assy	Stage 100H
End Item Assy	Stage 160
Assy	4-Button Footswitch

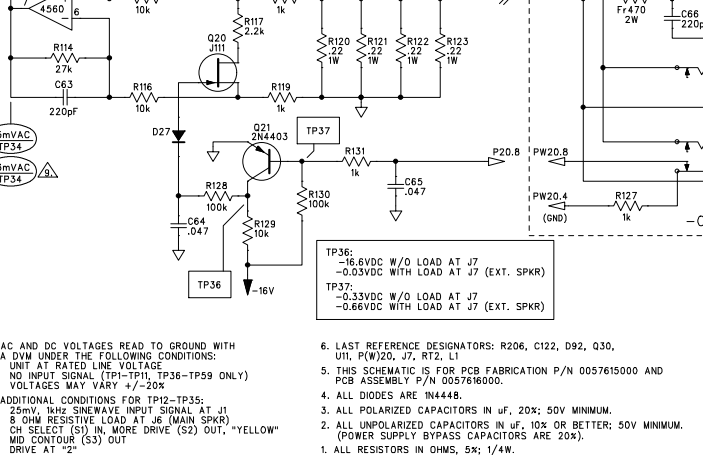
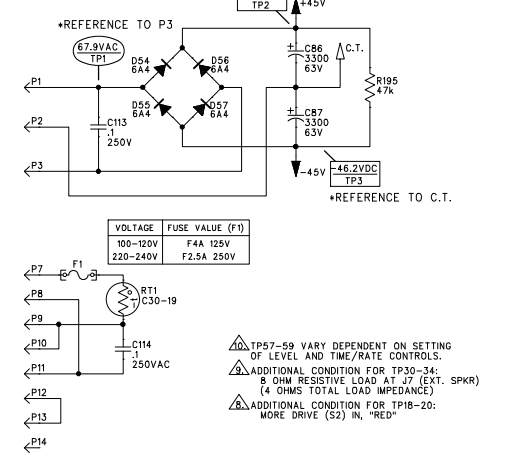
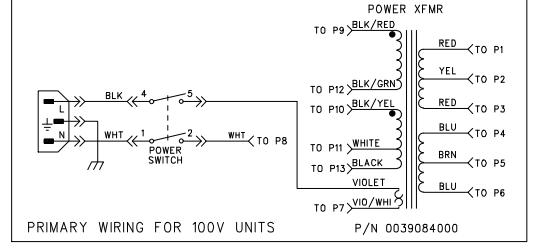
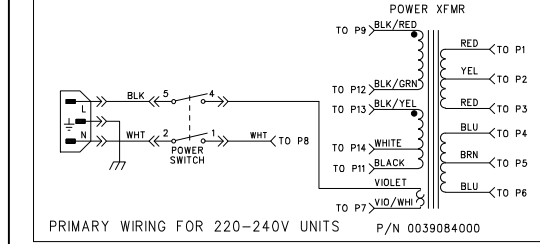
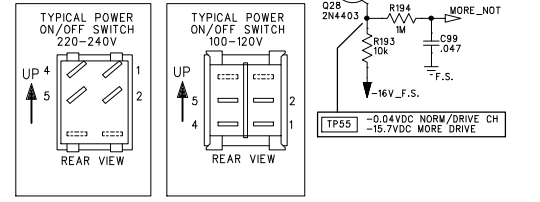
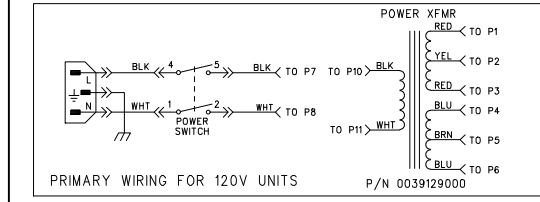
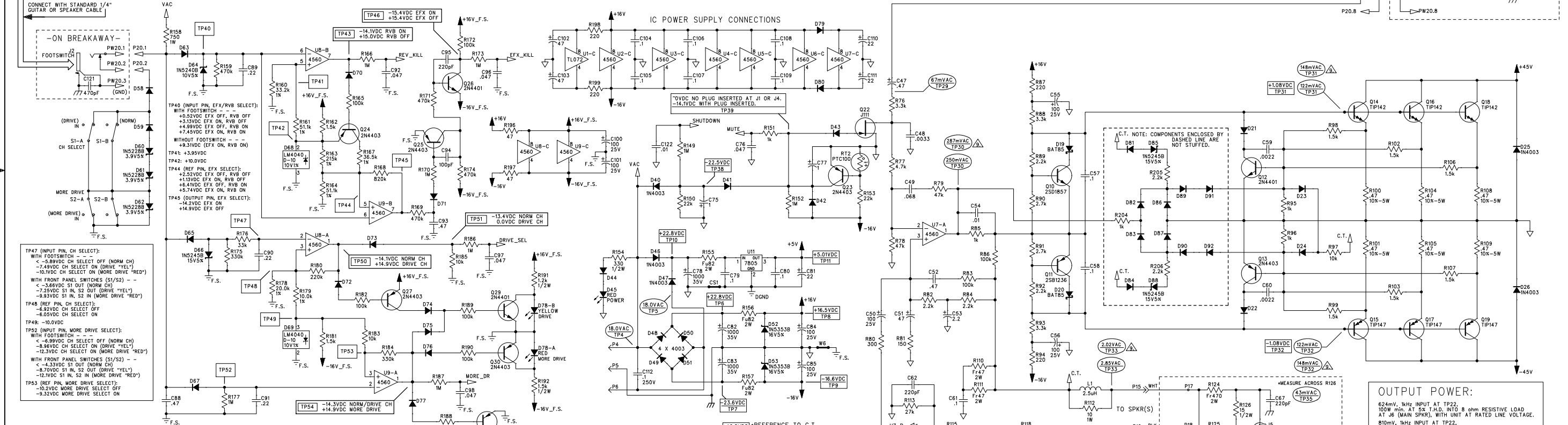
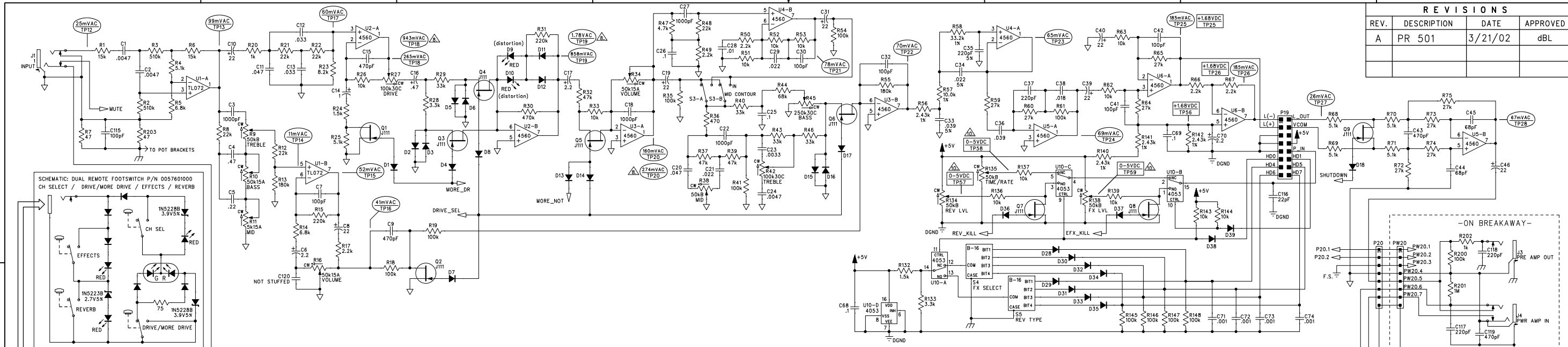
* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY on page 4.

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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR 501	3/21/02	dBL



OUTPUT POWER:
 624mV, 1kHz INPUT AT TP22, 100W min. AT 5% T.H.D. INTO 8 ohm RESISTIVE LOAD AT J6 (MAIN SPKR.) WITH UNIT AT RATED LINE VOLTAGE.
 810mV, 1kHz INPUT AT TP22, 160W AT 5% T.H.D. INTO 8 ohm TOTAL RESISTIVE LOAD, (2X) 8 ohm RESISTIVE LOADS AT J6 (MAIN SPKR.) AND J7 (EXT. SPKR.) WITH UNIT AT RATED LINE VOLTAGE.

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Fender MUSICAL INSTRUMENTS
 Corona, CA U.S.A.

CHECKED BY: _____
 DATE: _____

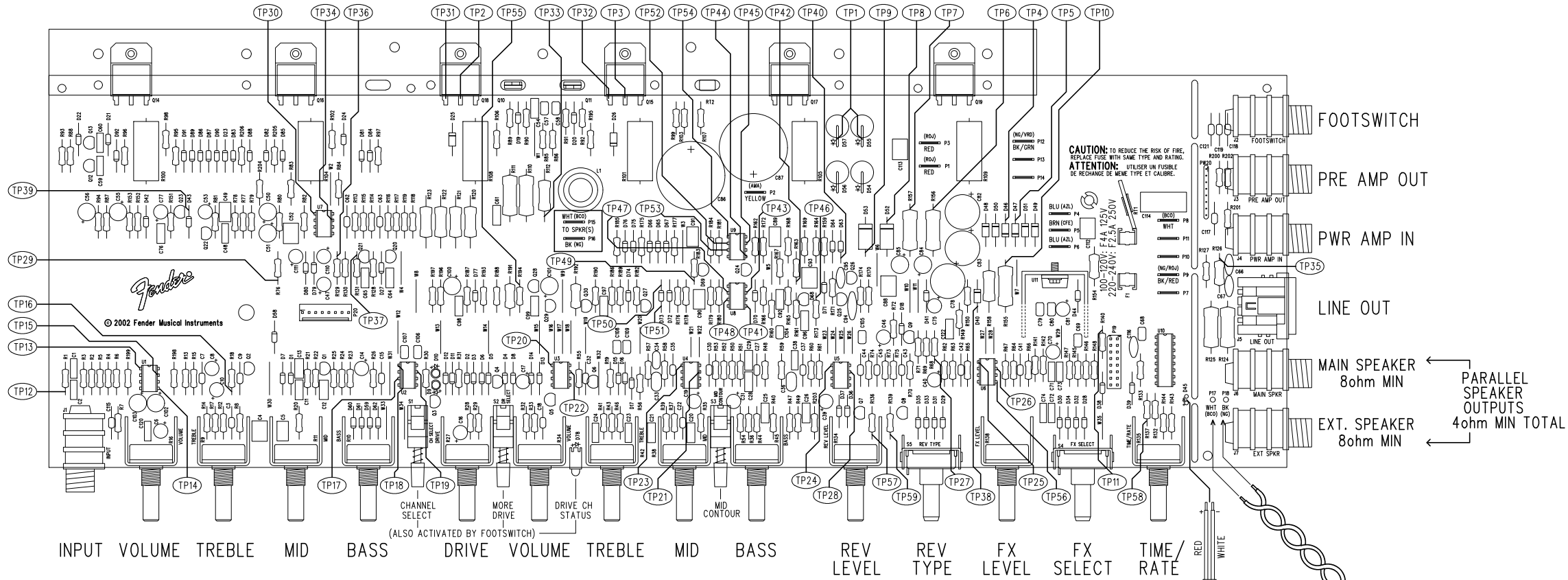
APPROVED BY: _____
 DATE: _____

DRAWN: D. LEWIS ENGR: D. LEWIS
 DATABASE FILE: Z501S.SCH

TITLE: SERVICE DIAGRAM, COMBINED (schematic)
 STAGE 100/160 DSP AMPLIFIERS

SIZE: D DRAWING NUMBER: 0057619000 REV. A
 RELEASE DATE: 22-MAR-02 SHEET: 1 OF 2

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR 501	20-MAR-02	dBL



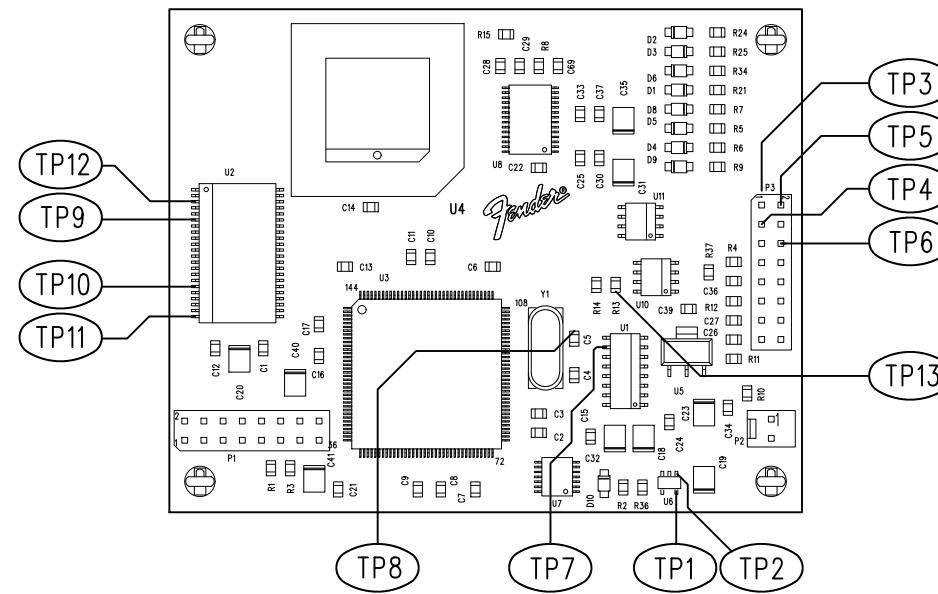
FILM/DWG: SERVICE DIAGRAM
 DATABASE: Z501P.PCB DATE: 20-MAR-02

1. SEE SHEET 1 FOR PRIMARY WIRING, TEST CONDITIONS, TEST POINT VALUES, AND STUFFING DIFFERENCES BETWEEN MODELS.
 NOTES: (UNLESS OTHERWISE NOTED)

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CHECKED BY:	DATE:	TITLE: SERVICE DIAGRAM, COMBINED (PCB assy) STAGE 100/160 DSP AMPLIFIERS	
APPROVED BY:	DATE:	SIZE: D	DRAWING NUMBER: 0057619000
DRAWN: D. Lewis	ENGR: D. Lewis	RELEASE DATE: 22-MAR-02	REV. A
DATABASE FILE: Z501P.PCB		SHEET 2	OF 2

REVISIONS


REV.	DESCRIPTION	DATE	APPROVED
A	PR480	30-NOV-01	J T L
B	EC 2743	07-MAR-02	J T L

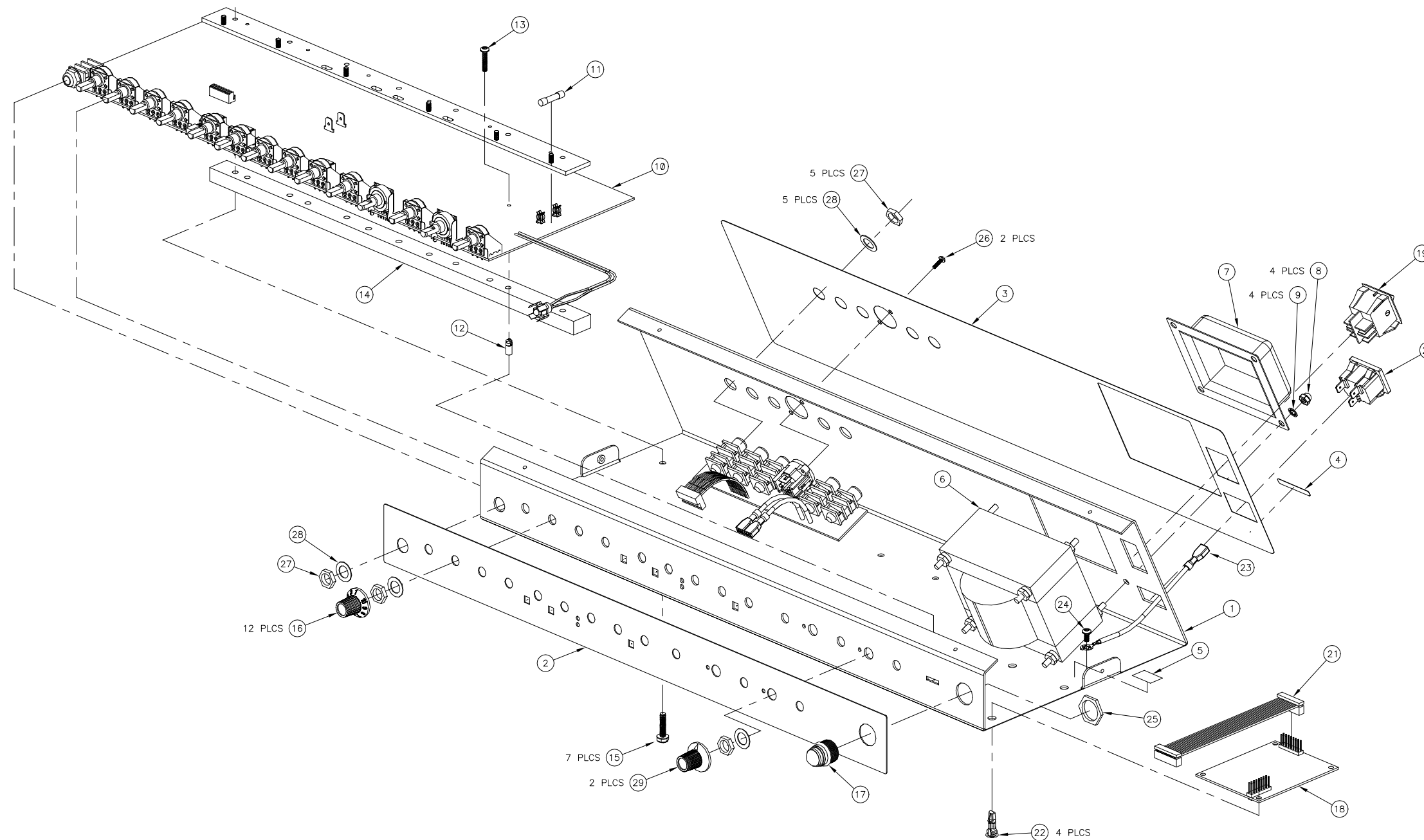


FILM/DWG: SERVICE DIAGRAM
 DATABASE: Z481P.PCB DATE: 07-MAR-02


1. SEE SHEET 1 FOR TEST CONDITIONS AND TEST POINT VALUES.

NOTES: (UNLESS OTHERWISE NOTED)

THIS DOCUMENT CONTAINS INFORMATION OF A PROPRIETARY NATURE TO FENDER MUSICAL INSTRUMENTS AND IS SUBMITTED TO YOU IN CONFIDENCE AND SHALL NOT BE DISCLOSED OR TRANSMITTED TO OTHERS WITHOUT AUTHORIZATION FROM FENDER MUSICAL INSTRUMENTS.		 MUSICAL INSTRUMENTS Corona, CA U.S.A.	
CHECKED BY: _____ DATE: _____		TITLE: SERVICE DIAGRAM, COMBINED (PCB assy) uDSP SERIES	
APPROVED BY: _____ DATE: _____		SIZE B	DRAWING NUMBER 0057283000
DRAWN: J. Jimenez	ENGR: J. Lamb	REV. B	
DATABASE FILE: Z481P.PCB		RELEASE DATE: 30-NOV-01	SHEET 2 OF 2



29	2	KNOB ROTARY ARROW W/CHRM INSRT
28	6	WASHER FLAT .442x.692 NI
27	6	NUT HEX 7/16x1/8 NI
26	2	SCRW SMB #4X3/8 PHP BLX
25	1	NUT HOLDER PILOT LIGHT 11/16-27
24	1	SCRW TF 6-32X1/4 PHP ZI
23	1	WIRE SET
22	4	STANDOFF NYLON BLK .375
21	1	RIBBON CABLE 16 CKT W/2 CONN
20	1	CONNECTOR IEC SNAP IN
19	1	SWITCH
18	1	PCB ASSY uDSP STAGE 100/160
17	1	JEWEL ASSY LED
16	12	KNOB ROTARY SS W/CHR INSERT
15	7	SCRW TF 8-32X3/4 HWH SLTD Z1
14	1	HEATSINK BAR STAGE 112SE
13	1	SCRW TF 6-32X5/8 PHP ZI TAPTYT
12	1	STANDOFF NYL PCB SNAP 3/8" NAT
11	1	FUSE
10	1	PCB ASSY STAGE 100/160 DSP
9	4	WSHR LCK INTL 8x.330x.02 ZI
8	4	NUT ACORN 8-32
7	1	END BELL XFMR 185 SERIES
6	1	XFMR
5	1	LABEL GROUNDING SEMKO
4	1	LABEL VOLTAGE
3	1	PANEL REAR STAGE 100 DSP
2	1	PANEL FRONT STAGE 100 DSP
1	1	CHASSIS STAGE 100 DSP
ITEM	QTY.	DESCRIPTION

			
DATE		FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA U.S.A.	
8/9/2001			
DFT.	ENG.	ENG.	TITLE
			CHASSIS ASSEMBLY STAGE 100 DSP
DATE	DATE	DATE	
APPROVED	SHEET	SIZE	DRAWING NUMBER
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DATE	SCALE		REV.
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		MASTER/ASSEMBLY	

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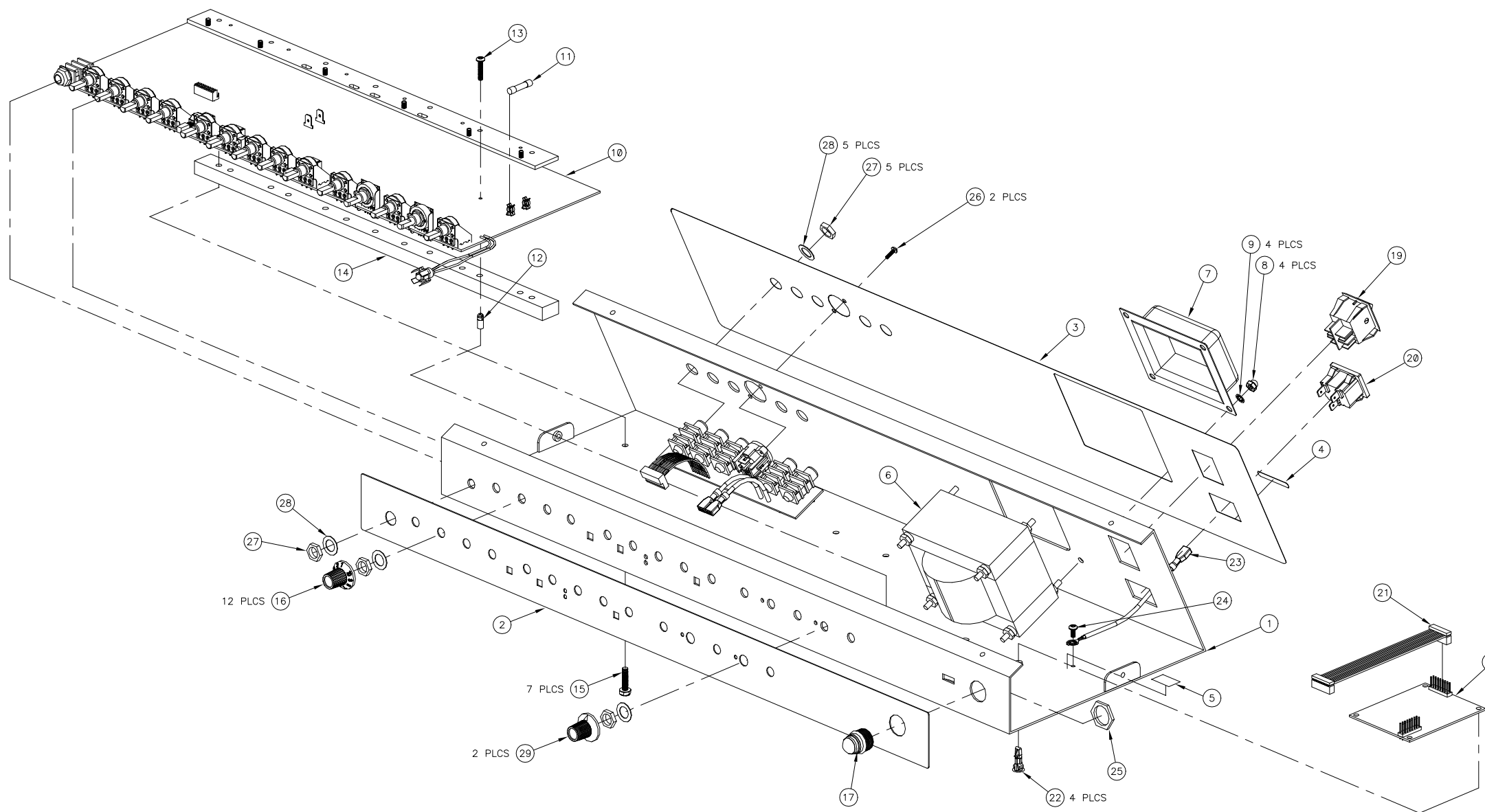
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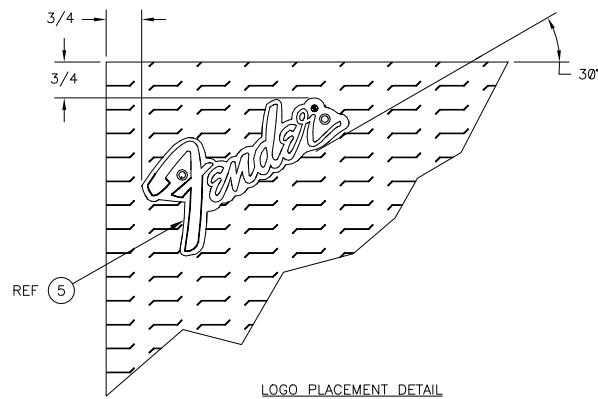


29	2	KNOB ROTARY ARROW W/CHRM INSRT
28	6	WASHER FLAT .442x.692 NI
27	6	NUT HEX 7/16x1/8 NI
26	2	SCRW SMB #4X3/8 PHP BLX
25	1	NUT HOLDER PILOT LIGHT 11/16-27
24	1	SCRW TF 6-32X1/4 PHP ZI
23	1	WIRE SET
22	4	STANDOFF NYLON BLK .375
21	1	CABLE RIBBON 16 CKT W/2 CONN
20	1	CONNECTOR IEC SNAP IN
19	1	SWITCH
18	1	PCB ASSY uDSP STAGE 100/160
17	1	JEWEL ASSY LED
16	12	KNOB ROTARY SS W/CHR INSERT
15	7	SCRW TF 8-32x3/4 HWH SLTD ZI
14	1	HEATSINK BAR STAGE 112SE
13	1	SCRW TF 6-32x5/8 PHP ZI TAPTYT
12	1	STANDOFF NYL PCB SNAP 3/8" NAT
11	1	FUSE
10	1	PCB ASSY STAGE 100/160 DSP
9	4	WSHR LCK INTL 8x.330x.02 ZI
8	4	NUT ACORN 8-32
7	1	END BELL XFMR 185 SERIES
6	1	XFMR
5	1	LABEL GROUNDING SEMKO
4	1	LABEL VOLTAGE
3	1	PANEL REAR STAGE 160 DSP
2	1	PANEL FRONT STAGE 160 DSP
1	1	CHASSIS STAGE 160 DSP
ITEM	QTY.	DESCRIPTION

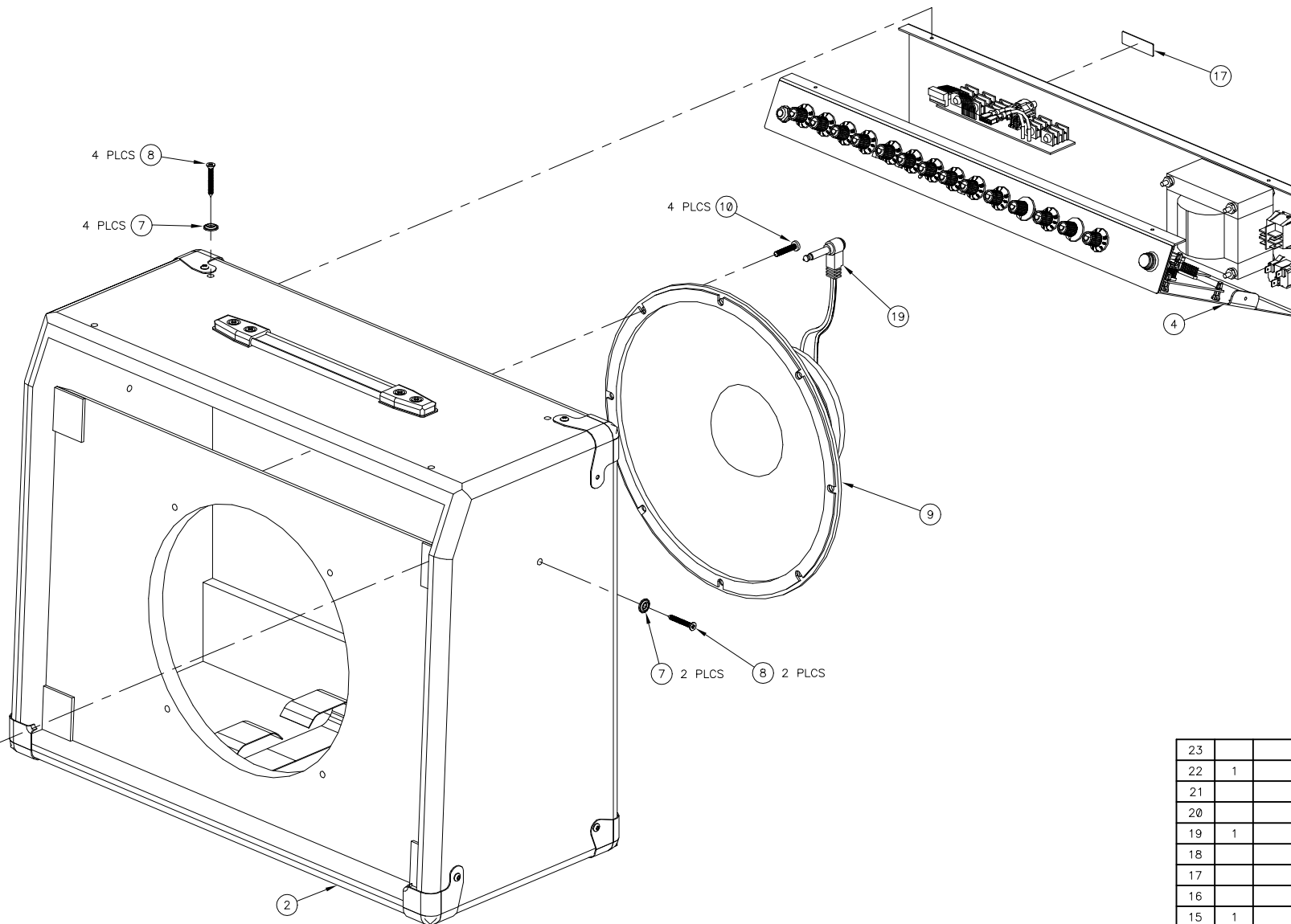
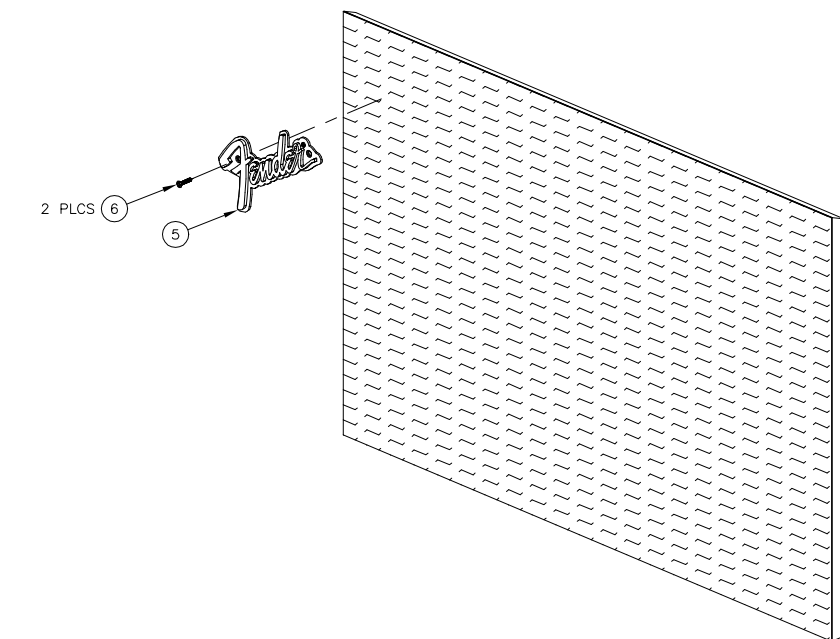
				FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA U.S.A.			
DATE 8/3/2001							
DFT.		ENG.		ENG.		TITLE CHASSIS ASSEMBLY STAGE 160 DSP	
DATE	DATE	DATE					
APPROVED		SHEET 1/1	SIZE D	DRAWING NUMBER 0057628000	REV. A		
DATE		SCALE N/A	MASTER/ASSEMBLY				

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REV EC NUMBER BY DATE/WORK



LOGO PLACEMENT DETAIL



(N.S.)=NOT SHOWN

23		
22	1	POWER CORD (N.S.)
21		
20		
19	1	CABLE ASSY SPKR RT ANG 13-1/2"
18		
17		
16		
15	1	FTSW ASSY 4 BTN STAGE DSP (N.S.)
14		
13		
12		
11		
10	4	SCRW M 10-32x1 PHP BLX
9	1	SPEAKER 12" 8 OHM G12T-100 1887
8	6	SCRW M 8-32x1-3/16 OHP BLX CP
7	6	WSHR FNSH 8-5/8 FLNGD BLX WX
6	2	SCRW SMA 4x1/2 OHP BLX
5	1	NAMEPLATE FENDER GENERIC SMALL
4	1	CHASSIS ASSY STAGE 100 DSP
3		
2	1	CAB ASSY STG112/100/RP1000MKII
1		
ITEM	QTY	DESCRIPTION

MATERIAL	n/a	DATE		8/14/2001		Fender® FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA U.S.A.		
FINISH	n/a	DFT.	ENG.	ENG.	TITLE			
TOL. UNLESS NOTED		DATE	DATE	DATE	END ITEM ASSEMBLY STAGE 100 DSP			
FRACT. ----- +- 1/32		APPROVED		SHEET		SIZE	DRAWING NUMBER	REV.
.X ----- +- 0.050		DATE		1/1		D	2267000020	A
.XX ----- +- 0.010		DATE		SCALE				
.XXX ----- +- 0.010		DATE		DATE				
ANGLES ----- +- 0.5 DEGREES		DATE		DATE				
HOLE DIA. ----- +0.005 - 0.001		DATE		DATE				
UNMARKED ANGLES ARE 90 DEGREES.		DATE		DATE				

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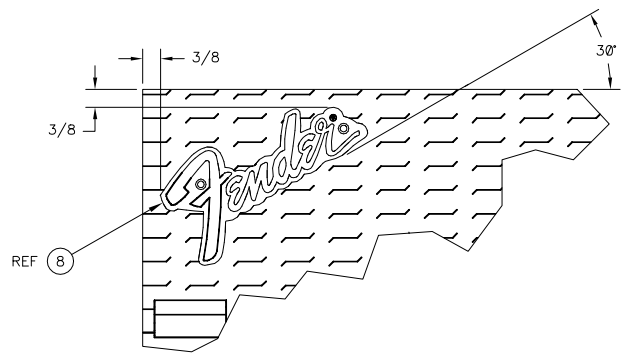
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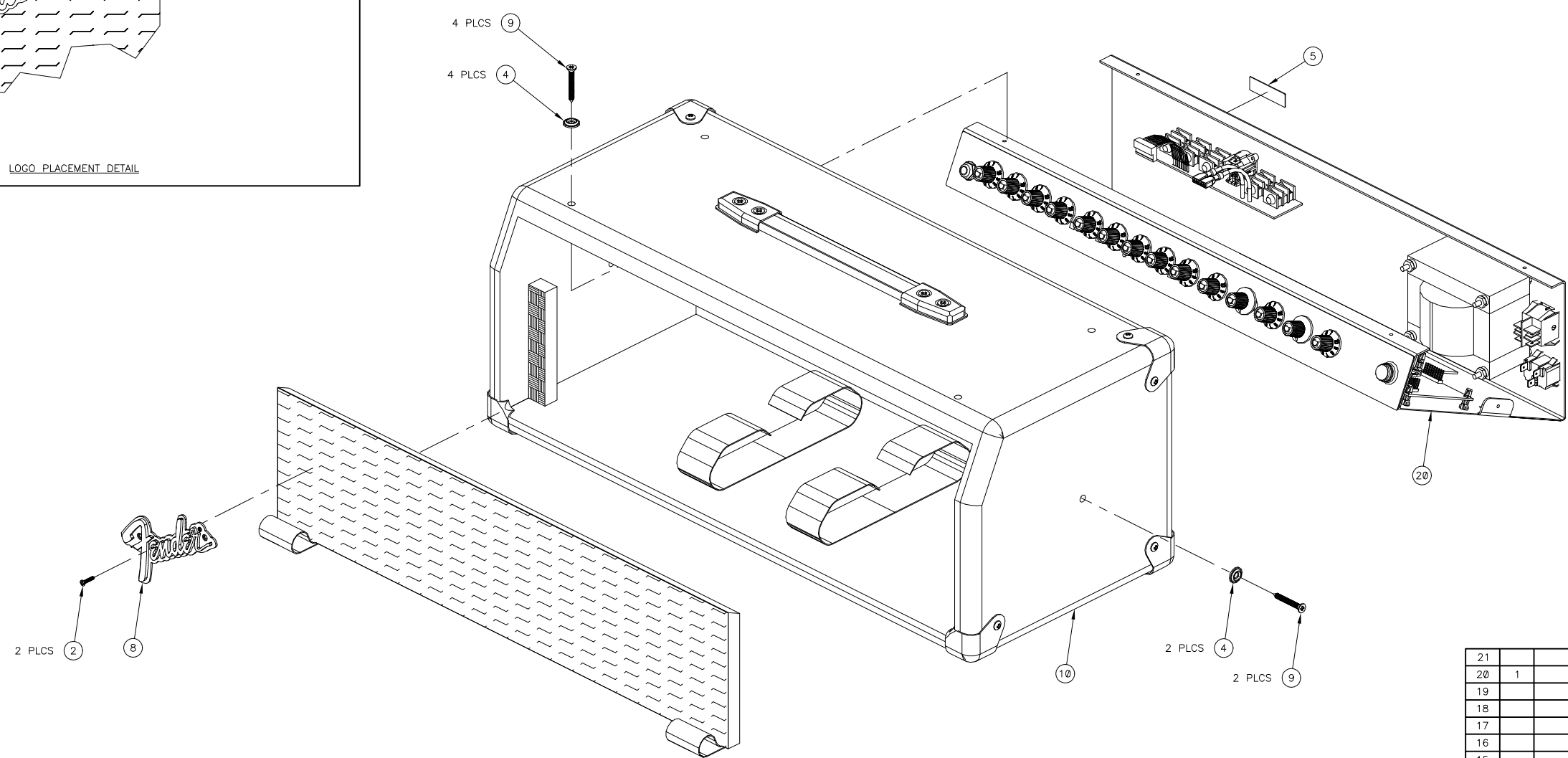
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REV. EC NUMBER BY DATE/WORK



LOGO PLACEMENT DETAIL



(N.S.) = NOT SHOWN

21		
20	1	CHS ASSY STAGE 100
19		
18		
17		
16		
15		
14		
13		
12	1	POWER CORD (N.S.)
11		
10	1	CAB ASSY STAGE 100H
9	6	SCRW M 8-32x1-3/16 OHP BLX CP
8	1	NAMEPLATE FENDER GENERIC SMALL
7		
6	1	FTSW ASSY 4 BTN STAGE DSP (N.S.)
5		
4	6	WSHR FNH 8-5/8 FLNGD BLX WX
3		
2	2	SCRW SMA 4x1/2 OHP BLX
1		
ITEM	QTY.	DESCRIPTION

MATERIAL	n/a	 FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA U.S.A.	
FINISH	n/a		
TOL. UNLESS NOTED FRACT. ----- +- 1/32 .X ----- +- 0.050 .XX ----- +- 0.010 .XXX ----- +- 0.010 ANGLES ----- +- 0.5 DEGREES HOLE DIA. ----- +0.005 - 0.001 UNMARKED ANGLES ARE 90 DEGREES.		DATE	8/23/2001
		DFT.	ENG.
		DATE	DATE
		APPROVED	
		DATE	
SHEET	1/1	SIZE	D
SCALE	N/A	DRAWING NUMBER	2269000010
		REV.	A
		MASTER/ASSEMBLY	

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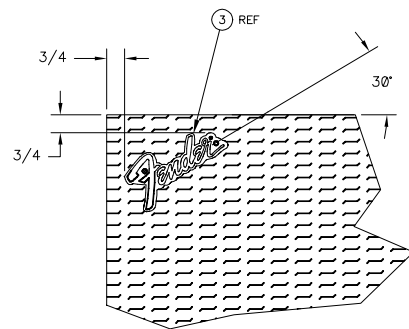
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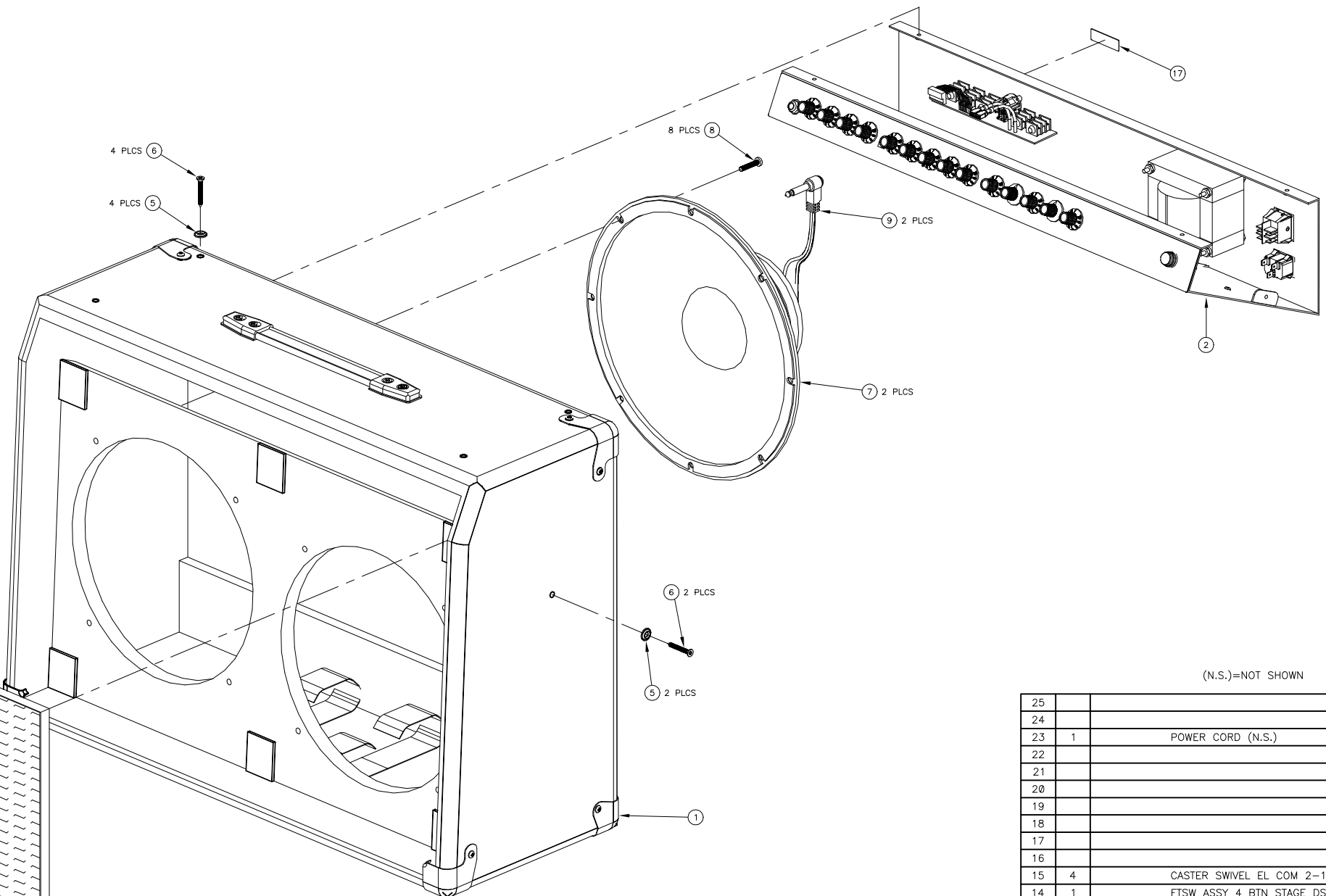
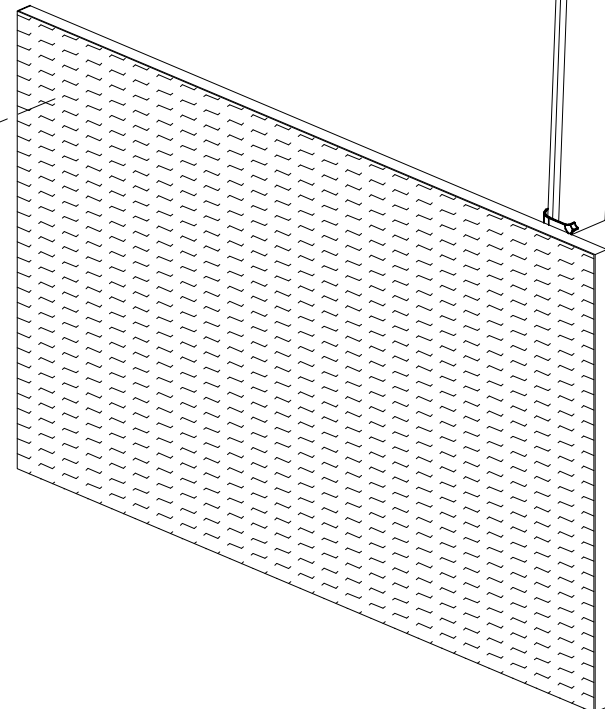
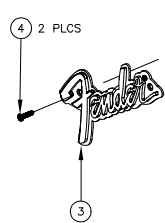
A

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REV. EC NUMBER BY DATE/WORK



LOGO PLACEMENT DETAIL



(N.S.)=NOT SHOWN

25		
24		
23	1	POWER CORD (N.S.)
22		
21		
20		
19		
18		
17		
16		
15	4	CASTER SWIVEL EL COM 2-12 CABS (N.S.)
14	1	FTSW ASSY 4 BTN STAGE DSP (N.S.)
13		
12		
11		
10		
9	2	CABLE ASSY SPKR RT ANG 13-1/2"
8	8	SCRW M 10-32X1 PHP BLX
7	2	SPEAKER 12" 8 OHM G12T-100 1887
6	6	SCRW M 8-32x1-3/16 OHP BLX CP
5	6	WSHR FNH 8-5/8 FLNGD BLX WX
4	2	SCRW SMA 4x1/2 OHP BLX
3	1	NAMEPLATE FENDER GENERIC SMALL
2	1	CHASSIS ASSY.
1	1	CAB ASSY ULT CHORUS/STAGE160
ITEM	QTY.	DESCRIPTION

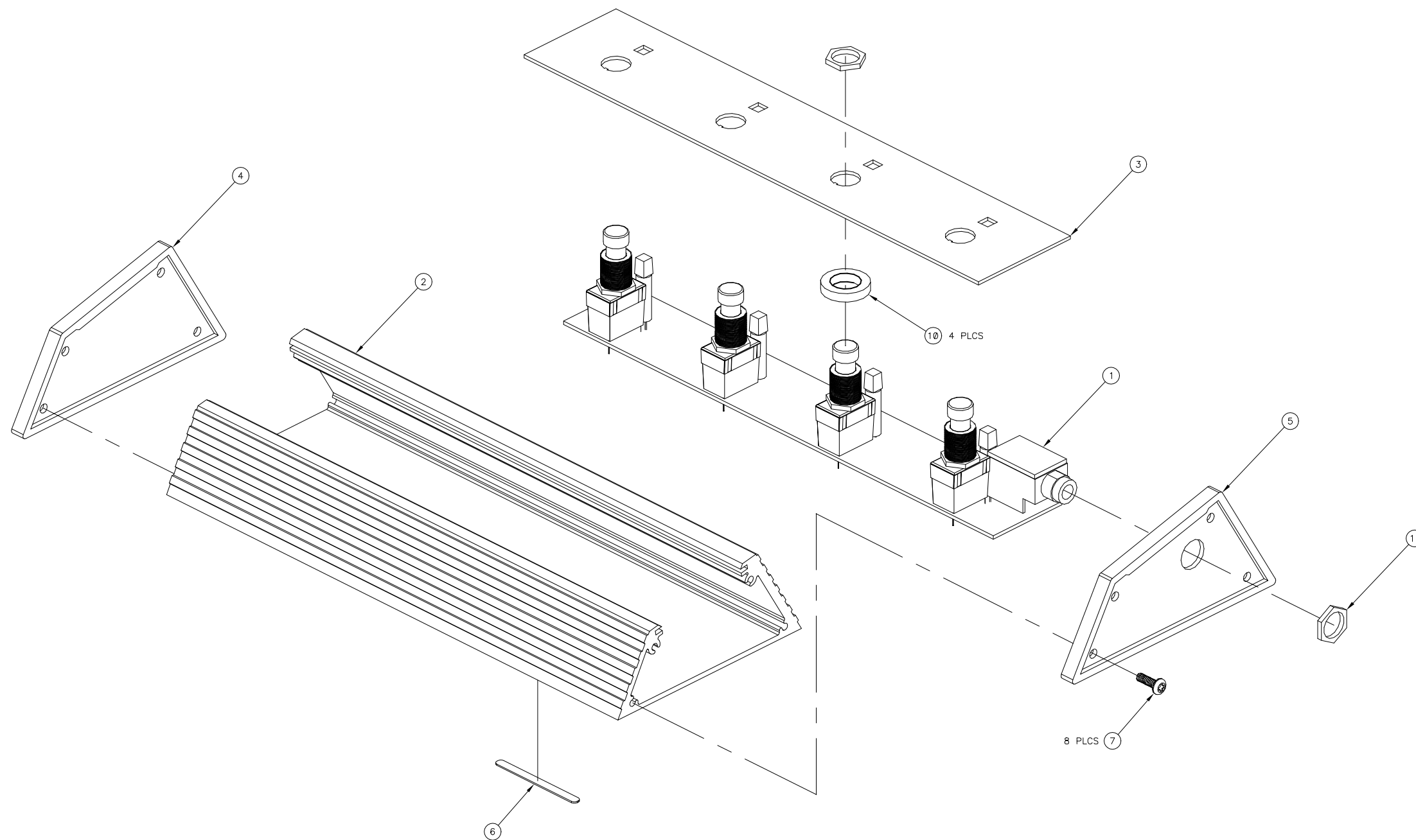
MATERIAL	n/a
FINISH	n/a
TOL. UNLESS NOTED FRACT. ----- +- 1/32 .X ----- +- 0.050 .XX ----- +- 0.010 .XXX ----- +- 0.010 ANGLES ----- +- 0.5 DEGREES HOLE DIA. ----- +0.005 - 0.001 UNMARKED ANGLES ARE 90 DEGREES.	

DATE		8/8/2001	
DFT.	ENG.	ENG.	
DATE	DATE	DATE	
APPROVED		SHEET	1/1
DATE		SCALE	N/A
		SIZE	D
		DRAWING NUMBER	2268000020
		REV.	A
		MASTER/ASSEMBLY	

Fender
FENDER MUSICAL INSTRUMENTS CORP.
CORONA, CALIFORNIA U.S.A.

TITLE
END ITEM ASSEMBLY
STAGE 160 DSP

8 7 6 5 4 3 2 1



(N.S.) = NOT SHOWN

ITEM	QTY.	DESCRIPTION
11	1	NUT HEX 12mmx1mm NI
10	4	WSHR NYL .485x.775x.150 TK
9	1	CABLE ASSY FTSW RT ANG 12' (N.S.)
8	REF	SVC DIAG COMB (N.S.)
7	8	SCRW SMB 6x3/8 PH PHS BLX
6	1	LABEL MADE IN MEXICO
5	1	HSG END CUP RIGHT FTSW
4	1	HSG END CUP LEFT FTSW
3	1	PLATE TOP FTSW 4 BTN
2	1	HOUSING FTSW 4 BUTTON
1	1	PCB ASSY FTSW 4 BTN

DATE		6-12-2000		 FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA U.S.A.	
DFT.	ENG.	ENG.			
DATE		DATE	DATE	TITLE FOOTSWITCH ASSEMBLY, FOUR BUTTON	
APPROVED		SHEET 1/1	SIZE D	DRAWING NUMBER 0057025000	REV. B
DATE		SCALE N/A	MASTER/ASSEMBLY		

8

7

6

5

4

3

2

1

D

C

B

A