

Fender®

SUPER CHAMP® XD
(This is the model name for warranty claims)

p/n 2331100000 (120V)

SERVICE MANUAL



ATTENTION:

WARRANTY SERVICE PROCEDURES

Warranty field service except for tube replacement is not allowed on the Super Champ XD® Amplifier (**See Service Bulletin #SB07-1**). Any Dealer or Service Center in possession of a defective Super Champ® XD with a warrantable defect other than failed tubes, should contact the Fender Customer Service Support Center to arrange for a replacement amplifier. The Support Center can be reached at (800) 345-3642 or by email at service@fender.com.

THIS TECHNICAL DATA PROVIDED FOR NON-WARRANTY REPAIRS ONLY



January, 2007

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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 CR = Ceramic Radial
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 MOX = Metal Oxide
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



SPECIFICATIONS

Model Name:		SUPER CHAMP XD
Release Number:		PR 737
Part Numbers	(120V, 60Hz) US:	2331100000
	(240V, 50Hz) AUS:	2331103900
	(230V, 50Hz) UK:	2331104900
	(230V, 50Hz) EUR:	2331106900
	(100V, 50Hz) JPN:	2331107900
Power Requirement:		90 W
Power Output:		20 W RMS into 8 ohms @ 5 %THD
Power Amp Sensitivity:		50mV for 20 W into 8 ohms @ 5 %THD
Impedances	Input (Pre-Amp):	>1M Ohms
	Line Out:	1 kOhm
Speaker Complement:		Fender Special Design, 8 ohm, 10" (P/N 0073858000)
Dimensions	Height:	15.0 in (38 cm)
	Width:	17.5 in (45 cm)
	Depth:	9.0 in (22.9 cm)
Weight:		24 lbs (10.9 kg)

Product specifications are subject to change without notice



SERVICE NOTES

1. **CHASSIS REMOVAL** is accomplished by first removing the cabinet's upper back panel. Then remove the four (4) screws from the top of the cabinet that secure the chassis. Disconnect the ¼" speaker plug from the speaker jack. Then slide the chassis toward the rear of the cabinet.
2. **MAIN PCB REMOVAL** is accomplished by removing the IEC Connector, the fuse holder, the speaker jack nut, the line out jack nut and the two screws that hold the chassis' rear panel to the chassis. Remove the rear panel and the vacuum tubes. Disconnect the ribbon cable that goes between the main PCB and the uDSP

PCB. Remove all screws holding the main PCB to the stand offs on the chassis. Then remove the front panel knobs and the nuts holding the controls to the front panel. Slide the front panel PCB back away from the front panel. Remove all the fast-ons connecting the main PCB to the power indicator, the power transformer and the output transformer. Now the main PCB can be lifted up and out of the chassis taking advantage of the slots in the back of the chassis.



PCB EXCHANGE POLICY

Parts marked with a single asterisk (*) in the Part Lists are not field replaceable. If a failure due to one of these components is detected, please con-

tact the FMIC Customer Service Department to order the complete PCB Assembly.

CIRCUIT DESCRIPTION

This section provides concise information about new or unusual circuitry designs incorporated into this amplifier model. The purpose is to aid the service technician by providing insight into the design areas most likely to become obstacles in troubleshooting. Information is focused for its effective use while maintaining the security of Fender® proprietary information wherever possible.

MAIN PCB

The main PCB contains the circuitry for the pre-amplifier, the power amplifier and the power supply. The controls are located on a breakaway section of the main PCB with ribbon cables connecting them.

PRE-AMPLIFIER

Op-amp U7-A provides the high impedance instrument input with 15db of gain. Op-amp U7-B is configured as a three pole active filter. The filtered output signal (Lin) drives the encoder portion of the CODEC U13 of the uDSP PCB. Signal VQ2 is the D.C. reference voltage from the CODEC thus centering the output signal about this level. Op-amp U3-A is configured as a differential input amp recovering the signal after uDSP processing and conversion back to an analog signal in the decoder portion of the CODEC U13. The LOUT+ and LOUT- signals are the input to the differential amp which acts as a three pole active low pass filter. The output of U3-A is applied to a buffer amp U1-A which drives op-amp U1-B which provides the LINE OUT signal and the power amp input. FET Q1 provides system muting during power up/down in conjunction with the power sense circuits comprised of D9, Q2 and Q4.

USER INTERFACE

The 4 - 16 position encoders (S2 –S3) for the VOICE and EFFECT SELECT are read via the port expander U4 and the data sent to the uDSP system via the I²C interface lines SCL and SDA.

The 6 potentiometers CH1 VOLUME (R85), CH2 VOLUME (R83), CH2 GAIN (R84), TREBLE (R82), BASS (R81) and FX LEVEL (R80) generate DC voltages (+1.0V to +4.0V) that are read by the analog multiplexer U6. IO0-IO3 are the digital control lines used to multiplex these analog signals which are sent serially to the system CODEC U13 on the Rin channel. The uDSP system reads the state of these controls and inputs digitally from the CODEC.

POWER AMPLIFIER

The power amplifier consists of V1, V2, V3, T2 and associated circuitry. The signal is fed to the gate of V1-B in common cathode configuration. The signal is then fed from the plate of V1-B to the gate of V1-A which is operating as a phase splitter which drives V2 from its plate and V3 from its cathode. V2 and V3 are operating in class A-B push-pull mode. T2 matches the impedance of V2's plate to the 8 Ohm speaker. Negative feedback is provided by R23 feeding signal back to V1-B's cathode.

uDSP PCB

The uDSP PCB is located in the back of the chassis opposite the power transformer. It provides the amplifier voicing and effects functions. The uDSP PCB is not field serviceable and must be replaced as an assembly.



POWER SUPPLY

T1 has four secondary windings for the +5V regulator, the +/-12V supplies, the tube filaments and the high voltage supply. The violet winding is rectified by a full wave bridge, filtered by C41 and fed to a three terminal regulator to produce 5VDC for the digital circuitry on the main PCB and fed to the uDSP PCB where it is regulated to +3.3.VDC and fed back on to the main PCB. Similarly, the center tapped orange and yellow winding is rectified, filtered and fed to +/-12V zeners to provide power to the operational amplifiers and other circuitry. The red windings provide the high voltage for the vacuum tubes. The green winding provides 6.3VAC for the vacuum tube filaments. A voltage doubler is employed to produce -41.9VDC to bias the output tubes, V2 and V3.

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.PARTS LIST:		MAIN PCB ASSEMBLY	
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
4	0050687000	CABLE JMPR 6 CKT .156 ROUND	PW1A PW1B PW2A PW2B
2	0054817000	CABLE RIBBON 4 CKT 3"	P15 P17
2	0051410000	CABLE RIBBON 8 CKT 16"	PW3A PW3B
4	0038692000	CAP AE AX 10uF 35V 20%	C27 C45-46 C56
3	0038690000	CAP AE AX 1uF 100V 20%	C12 C28 C42
1	0009521001	CAP AE AX 22uF 25V 20%	C8
2	0028494000	CAP AE RDL 1000uF 35V 20%	C57 C60
2	0028476003	CAP AE RDL 100uF 50V 20%	C16-17
3	0054204000	CAP AE RDL 22uF 450V 20% 85°C	C38 C40-41
1	0055992000	CAP AE RDL 4700uF 16V 20% 85°C	C53
2	0028471003	CAP AE RDL 47uF 50V 20%	C59 C62
2	0039270001	CAP CA .01uF 50V	C4 C11
1	0038703001	CAP CA .1uF 50V	C64
1	0039263001	CAP CA 1000pF 50V LL	C14
2	0039259001	CAP CA 220pF 100V LL	C2 C65
1	0039267001	CAP CA 3900pF 100V	C15
2	0051457003	CAP CD 100pF 500V 5%	C13 C25
5	0051406003	CAP CD 220pF 500V 10%	C1 C3 C24 C26 C29
2	0051458003	CAP CD 470pF 500V 10%	C21 C43
16	0034788003	CAP CR .1uF 50V 20% .2" LS	C9-10 C18-19 C22-23 C34-35 C39 C47-51 C54-55
1	0027255003	CAP MPF .001uF 100V 10%	C7
1	0027270003	CAP MPF .033uF 100V 10%	C37
1	0053860000	**CAP MPF .1uF 250VAC 20%	C58
2	0027278003	CAP MPF .1uF 63V 10%	C52 C63
1	0024833000	CAP MPF RDL .022uF 400V 10%	C20
3	0024855000	CAP MPF RDL .1uF 630V 10%	C5-6 C61
6	0033578003	CAP PFF RDL .001uF 100V 10%	C30-33 C36 C44
6	0027941000	CONTROL SNAPIN 50k B TAPER	R80-85
9	0064089001	DIODE 1N4003	D3, D26-30 D32-33 D36
6	0026730001	DIODE 1N4006 800V 1A	D7-8 D12-15
13	0006260001	DIODE 1N4448 SIGNAL LL	D4-6 D10-11 D18-25
2	0029690001	DIODE HV 3kV 200mA	D1-2
1	0031017001	DIODE ZEN 1N5223B 2.7V 5% LL	D17
1	0027327001	DIODE ZEN 1N5234B 6.2V 5% LL	D9
1	0029898001	DIODE ZEN 1N5236B 7.5V 5% LL	D16
2	0047140060	DIODE ZEN 1N5349B 12V 5W 5%	D34-35
2	0063204000	ENCODER 16-POS 4-BIT GRAY CODE	S2-3
8	0026000001	FSTN TAB MALE .187x.032 PCB MT	P1-4 P6-8 P18
10	0025802000	FSTN TAB MALE .250x.032 PCB MT	P9-14 P16 P19-21
2	0073586000	FUSE PICO 1A	F4-5
1	0075607000	FUSE PICO 2A	F3
1	0070334001	FUSE PICO 7 AMP 125V	F2
1	0057191000	HDR .1 CTR 10x2 CKT SQ PIN	P5

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY section above.

shaded Unique Fender® part. Order directly from the FMIC Parts Department.

shaded + * Access to this part or assembly is controlled. Please contact the FMIC Customer Service Department.

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

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



.PARTS LIST:		MAIN PCB ASSEMBLY	
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0028128000	IC 4051B SINGLE 8 CHANNEL SWITCH	U6
1	0071001000	IC 8-BIT I/O EXPANDER MCP23008	U4
3	0031611000	IC OP-AMP DUAL PC4560	U2 U8-9
3	0016795000	IC OP-AMP DUAL TL072	U1 U3 U7
1	0041812000	IC REGULATOR +5V MC7805CT	U10
1	0073348000	IC SMT RESET 5V MC34064D-5	U5
2	0053450000	JACK STEREO R/A	J1-2
2	0059889000	JACK STEREO R/A w/METAL BUSH	J3-4
1	0020888001	JUMPER	JMP2
1	0020888001	JUMPER	JMP1
1	0049948000	LED, RED LONG LEAD LUMEX	D31
1	0027873000	CONTROL PCB MNT LIN 30% 25K	R6
1	0026549001	RES CF 1/2W 5% 1.5k LL	R16
1	0037169001	RES CF 1/2W 5% 1.8k LL	R86
2	0026368001	RES CF 1/2W 5% 100ohm LL	R22 R24
1	0053869001	RES CF 1/2W 5% 1M LL	R14
1	0027871001	RES CF 1/2W 5% 1k LL	R13
1	0026493001	RES CF 1/2W 5% 2.7k LL	R23
2	0025117001	RES CF 1/2W 5% 220k LL	R2-3
1	0025109001	RES CF 1/2W 5% 47ohm LL	R17
2	0047434001	RES CF 1/2W 5% 56k LL	R12 R15
1	0024969001	RES CF 1/4W 5% 1.5k LL	R34
2	0024997001	RES CF 1/4W 5% 100k LL	R32 R41
2	0024952001	RES CF 1/4W 5% 100ohm LL	R60-61
1	0025084001	RES CF 1/4W 5% 10M LL	R45
8	0024981001	RES CF 1/4W 5% 10k LL	R5 R9 R18-19 R44 R54 R62-63
1	0029598001	RES CF 1/4W 5% 110ohm LL	R46
5	0024983001	RES CF 1/4W 5% 12k LL	R37-40 R67
3	0024985001	RES CF 1/4W 5% 15k LL	R7 R26 R36
2	0025069001	RES CF 1/4W 5% 1M LL	R43 R52
5	0024965001	RES CF 1/4W 5% 1k LL	R1 R35 R77 R89-90
1	0029600001	RES CF 1/4W 5% 200ohm LL	R66
2	0029006001	RES CF 1/4W 5% 20k LL	R29 R31
2	0024956001	RES CF 1/4W 5% 220ohm LL	R11 R33
1	0024942001	RES CF 1/4W 5% 22ohm LL	R64
1	0024988001	RES CF 1/4W 5% 27k LL	R48
1	0029005001	RES CF 1/4W 5% 2k LL	R53
1	0024973001	RES CF 1/4W 5% 3.3k LL	R10
3	0024975001	RES CF 1/4W 5% 3.9k LL	R27 R42 R56
1	0024977001	RES CF 1/4W 5% 4.7k LL	R59
7	0024993001	RES CF 1/4W 5% 47k LL	R49-51 R72-75
3	0024947001	RES CF 1/4W 5% 47ohm LL	R65 R71 R76
1	0028034001	RES CF 1/4W 5% 5.1k LL	R8

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



.PARTS LIST: MAIN PCB ASSEMBLY			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0029607001	RES CF 1/4W 5% 620ohm LL	R57
1	0024995001	RES CF 1/4W 5% 68k LL	R30
1	0029608001	RES CF 1/4W 5% 750ohm LL	R55
1	0024996001	RES CF 1/4W 5% 82k LL	R28
2	0029597001	RES CF 1/4W 5% 91ohm LL	R58 R68
1	0027353001	RES FILM 1W 5% 100k LL	R21

PARTS LIST: MISCELLANEOUS			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0016540001	RES MF 1/4W 1% 2.61k LL	R69
2	0016946001	RES MF 1/4W 1% 825ohm LL	R70 R78
2	0036351001	RES MOX 2W 5% 100ohm LL	R87-88
1	0041268001	RES MOX 2W 5% 10k LL	R47
1	0036921001	RES MOX 2W 5% 1k LL	R79
2	0028021001	RES MOX 2W 5% 470ohm LL	R4 R25
1	0033095001	RES MOX FP 1W 5% 1ohm LL	R20
1	0028091000	SWITCH PUSH SLFLK SHORT STROKE	S1
1	0994020002	DUET (MATCHED) 6V6GTA /STR391A	V2-3
1	0994024000	TUBE 7025/12AX7WA (RUSSIAN)	V1
7	REF	WIRE JUMPER	WJ8 WJ1A WJ1B WJ2A WJ2B WJ3A WJ3B
1	REF	WIRE JUMPER	WJ6
1	0014689003	XSTR N-CH JFET J111 TO-92	Q3
2	0016739003	XSTR NPN 2N4401 TO-92	Q4-5
2	0016742003	XSTR PNP 2N4403 TO-92	Q1-2

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SUPER CHAMP® XD
 (This is the model name for warranty claims)

1	0036702000	**FUSE CARRIER	
1	0054642000	**IEC CONNECTOR	
1	0054798000	POWER JEWEL RED	
1	0055812000	TULIP LED ASSY	
1	0022913000	**XFMR OUTPUT 2-6V6GT to 8 Ohms	T2
1	0039287000	**SWITCH POWER	
1	0074592000	**XFMR PWR CHAMP XD AMPS 120V	T1
1	0074595000	**XFMR PWR CHAMP XD AMPS 100V	T1
1	0074596000	**XFMR PWR CHAMP XD AMPS 230V	T1
1	0074597000	**XFMR PWR CHAMP XD AMPS 240V	T1
1	0077982000	**FUSE 1 ¼ X ¼ 3A FAST ACTING	F2 (100/120V UNITS)
1	0020793000	**FUSE 5mmX20MM 1.6A FAST ACTING	F2(230/240V UNITS)
2	0057347000	KNOB ROTARY W/CHROME INSERT	FX SELECT/VOICE
5	0054419000	KNOB ROTARY W/CHROME INSERT	VOLUME/TONE
1	0073858000	SPEAKER 10" SUPER CHAMP XD	
1	0074594000	*PCB ASSY uDSP SUPER CHAMP XD	

* Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY section above.

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shaded + * Access to this part or assembly is controlled. Please contact the FMIC Customer Service Department.

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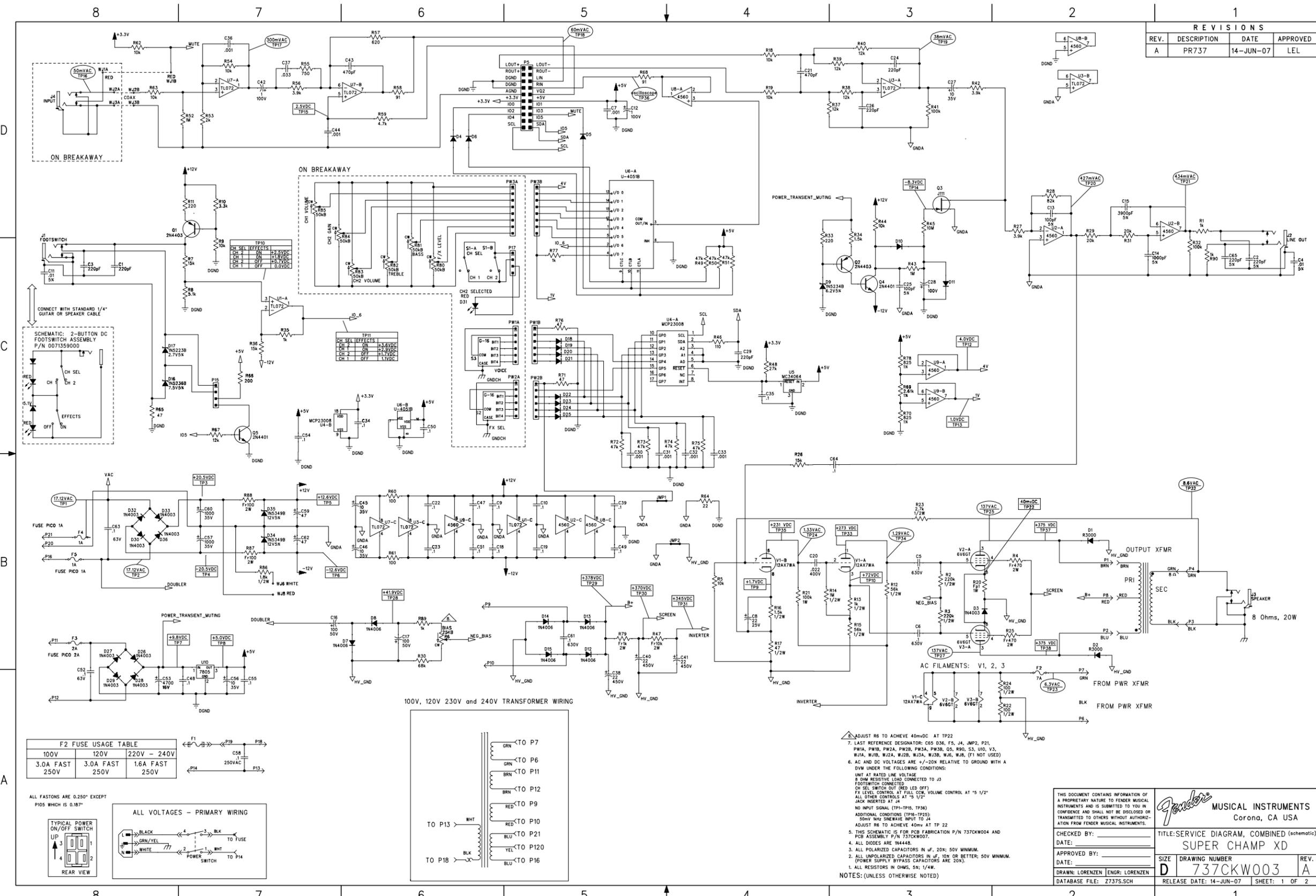
shaded + ** Both a unique Fender® part and a Safety Requirement part as defined above.



SUPER CHAMP[®] XD
(This is the model name for warranty claims)

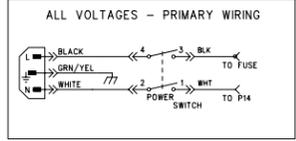
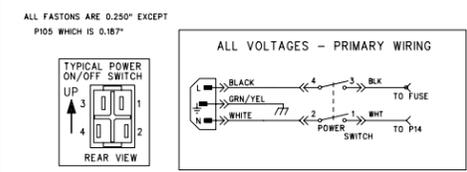
Service Diagram List

- Service Diagram (Schematic)SUPER CHAMP XD
- Service Diagram (PCB Assembly)SUPER CHAMP XD

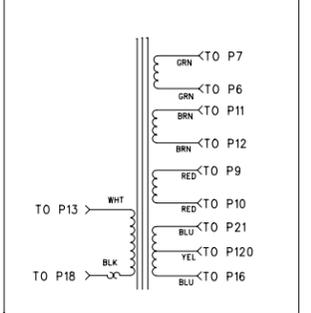


REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR737	14-JUN-07	LEL

F2 FUSE USAGE TABLE		
100V	120V	220V - 240V
3.0A FAST	3.0A FAST	1.6A FAST
250V	250V	250V



100V, 120V 230V and 240V TRANSFORMER WIRING



- ADJUST R6 TO ACHIEVE 40mVDC AT TP22
- LAST REFERENCE DESIGNATOR: C65 D36, F5, J4, JMP2, P21, PW1A, PW1B, PW2A, PW2B, PW3A, PW3B, Q5, R90, S3, U10, V3, W1A, W1B, W2A, W2B, W3A, W3B, W4, W5, W6, W7, W8, W9, W10, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, W21, W22, W23, W24, W25, W26, W27, W28, W29, W30, W31, W32, W33, W34, W35, W36, W37, W38, W39, W40, W41, W42, W43, W44, W45, W46, W47, W48, W49, W50, W51, W52, W53, W54, W55, W56, W57, W58, W59, W60, W61, W62, W63, W64, W65, W66, W67, W68, W69, W70, W71, W72, W73, W74, W75, W76, W77, W78, W79, W80, W81, W82, W83, W84, W85, W86, W87, W88, W89, W90, W91, W92, W93, W94, W95, W96, W97, W98, W99, W100
- AC AND DC VOLTAGES ARE +/- 20% RELATIVE TO GROUND WITH A DVM UNDER THE FOLLOWING CONDITIONS:
 UNIT AT RATED LINE VOLTAGE
 8 OHM RESISTIVE LOAD CONNECTED TO J3
 FOOTSWITCH CONNECTED
 CH SEL SWITCH OUT (RED LED OFF)
 FX LEVEL CONTROL AT FULL CCW, VOLUME CONTROL AT '5 1/2'
 JACK INSERTED AT J4
- NO INPUT SIGNAL (TP1-TP5, TP36)
- ADJUST R6 TO ACHIEVE 40mV AT TP 22
- THIS SCHEMATIC IS FOR PCB FABRICATION P/N 737CKW004 AND PCB ASSEMBLY P/N 737CKW007.
- AC AND DC VOLTAGES ARE +/- 20% RELATIVE TO GROUND WITH A DVM UNDER THE FOLLOWING CONDITIONS:
 UNIT AT RATED LINE VOLTAGE
 8 OHM RESISTIVE LOAD CONNECTED TO J3
 FOOTSWITCH CONNECTED
 CH SEL SWITCH OUT (RED LED OFF)
 FX LEVEL CONTROL AT FULL CCW, VOLUME CONTROL AT '5 1/2'
 JACK INSERTED AT J4
- NO INPUT SIGNAL (TP1-TP5, TP36)
- ADJUST R6 TO ACHIEVE 40mV AT TP 22
- THIS SCHEMATIC IS FOR PCB FABRICATION P/N 737CKW004 AND PCB ASSEMBLY P/N 737CKW007.

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Fender MUSICAL INSTRUMENTS
Corona, CA USA

CHECKED BY: _____
DATE: _____

APPROVED BY: _____
DATE: _____

DRAWN: LORENZEN [ENGR: LORENZEN]
DATABASE FILE: 27375.SCH

TITLE: SERVICE DIAGRAM, COMBINED (schematic)
SUPER CHAMP XD

SIZE: _____ DRAWING NUMBER: **737CKW003** REV. **A**

RELEASE DATE: 14-JUN-07 SHEET: 1 OF 2

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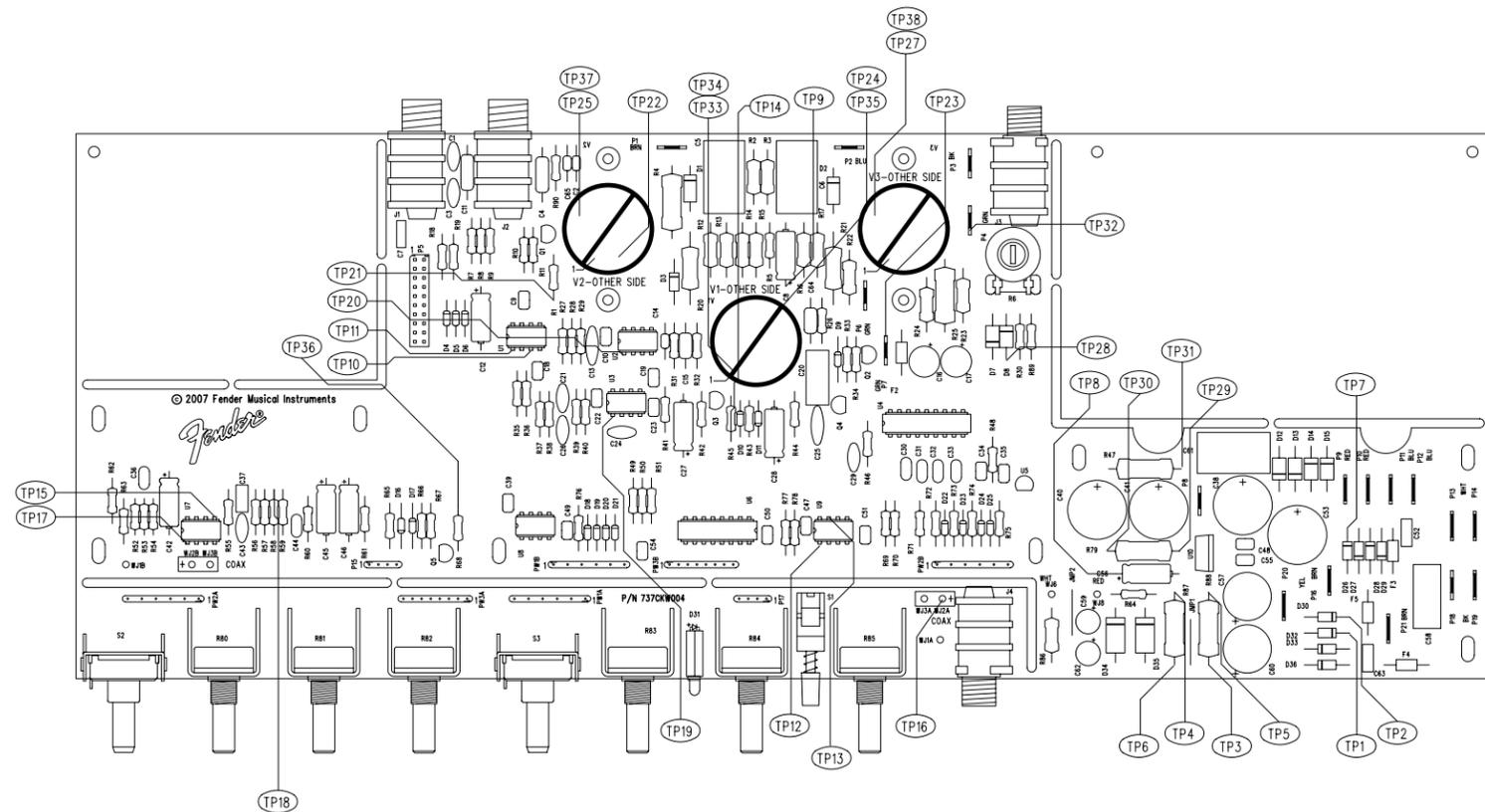
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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR737	14-JUN-07	L E L



FILM/DWG: SERVICE DIAGRAM
 DATABASE: Z737P.PCB DATE: 14-JUN-07

SEE SHEET 1
 NOTES: (UNLESS OTHERWISE NOTED)

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CHECKED BY: _____ DATE: _____		TITLE: SERVICE DIAGRAM, COMBINED (PCB assy) SUPER CHAMP XD (assembly name)	
APPROVED BY: _____ DATE: _____		SIZE: D	DRAWING NUMBER: 737CKW003
DRAWN: HAN LE	ENGR: LORENZEN	RELEASE DATE: 14-JUN-07	SHEET 2 OF 2
DATABASE FILE: Z737P.PCB			

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