



PRINCETON 112 PLUS

p/n 022-6704-010 (120V)

SERVICE MANUAL



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PRINCETON 112 PLUS

(This is the model name for warranty claims)

APRIL 1995 REV A

IMPORTANT NOTICE:

The information contained herein is CONFIDENTIAL and PROPRIETARY to Fender Musical Instruments Corp. It is disclosed solely for use by qualified technicians for purposes of equipment maintenance and service. It is not to be disclosed to others without the expressed permission of Fender Musical Instruments Co. All specifications subject to change without notice.

For warranty repair service, only Fender specified part numbers are to be used. It is recommended they also be used for post-warranty maintenance and repair.

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

A coded naming convention is used in the description of certain parts. The codes and what they mean are as follows:

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

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

RESISTOR CODES

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

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SPECIFICATIONS

Part Number:	022-6704-010 (120V) 022-6734-010 (240V Australia) 022-6744-010 (230V UK) 022-6764-010 (230V) 022-6774-010 (100V)
Input impedance:	Greater than 1M Ohm
Nominal input level:	100mV
Power output:	63 Watts R.M.S. @ 5% T.H.D
Rated load impedance:	8 Ohms
Effects loop:	Nominal level -10 dBv Output impedance 1k Ohm Input impedance 16k Ohms
Dimensions:	
Width:	18-5/8 inches (47.3 cm)
Height:	16-1/2 inches (41.9 cm)
Depth:	9 inches (22.9 cm)
Weight:	28 lbs. (12.7 kg)

THEORY OF OPERATION

PREAMP

Input jack J1 contains the switching circuit for the inhibit function of the 4053 CMOS switch (U7). Without a plug inserted into J1 -8Vdc is available to pin 6 of U7A. This inhibits the CMOS switch from functioning, effectively muting the preamp. When the input plug is inserted into J1, +8Vdc becomes available at the inhibit line allowing the CMOS switch to function.

TROUBLESHOOTING TIP: When the channel switching circuit does not operate, first check that the inhibit voltage toggles properly. In some cases a faulty CMOS switch can load down the inhibit line. Desolder pin 6 (of U7) and check that the voltage toggles between -8Vdc to +8Vdc. If so, the CMOS switch may need to be replaced.

The first stage (U1A) sets up the initial response of the amplifier. It provides a second order high pass filter with a 3dB down point at 60 Hz, and a gain of about 3.5. The output of U1A splits to feed the clean and overdrive channels. For the clean channel, the signal feeds the treble and bass controls, which provide boost and cut respectively. The signal then flows to the Auto-pad circuit (U1B). It provides excellent headroom and low noise. At upper volume control settings, it also rolls off low frequencies.

The signal split from U1A feeds the overdrive channel through a special tone shaping circuit located just prior to U2A. This circuit is a third order bandpass filter with a peak boost at 2.2kHz. It provides the optimum frequency response for the distortion circuit that follows. U2A provides the variable gain adjustment that drives the distortion circuit. It also acts as a bandpass filter with 3dB down points at 90Hz and 4kHz. U2B is the distortion circuit. LD1 and LD2 provide diode distortion.

The Contour control adjusts the overall tone quality of the overdrive channel by emphasizing or notching the mid range frequencies. In the fully CCW position the response is fairly flat up to about 2kHz, where a gentle roll-off occurs. In the fully CW position, the circuit provides a -20db notch at about 1kHz. The signal then feeds the overdrive volume control and then to the treble and bass controls.

U3B sums the clean and overdrive channels through CMOS switches U7B and U7C. The output from U3B feeds the reverb drive circuit (U4B) and summing amp U3A. U4A is the reverb sensing circuit. The output of U4A drives the reverb volume control and then feeds through U7A, which sums the reverb with the dry signal at U3A. The output of U3A drives the preamp out jack, is normalled through the power amp in jack, and feeds the power amp input.

THEORY OF OPERATION CONT.

PARTS LIST

PRINTED CIRCUIT BOARD ASSEMBLY

CHANNEL AND REVERB SWITCHING

The A.C. voltage from the power transformer secondary is tapped off through dropping resistor R73, and presented to the footswitch jack (Approx 20 V R.M.S.). By rectifying the positive or negative side of the waveform, we create a D.C. control voltage that is sensed by comparators U6A and U6B. Diode's CR18 and CR21 set up the reference voltages for the comparators. Therefore the control voltage must toggle above and below the reference voltage to cause the output of the comparator to toggle between +15Vdc and -15Vdc. The comparator output controls the state of the CMOS switches and the indicator LEDs. Without the footswitch connected to the footswitch jack, CR15 rectifies the negative half of the waveform. U6B senses the DC control voltage, and provides -15vdc to U7A, allowing the reverb output to function.

POWER AMPLIFIER

U5 is a high voltage op-amp that provides voltage gain for the power amplifier. CR3 and CR4 act as differential protection diodes that prevent the positive and negative inputs of U5 from becoming more than 0.6 volts apart. Bootstrap Capacitors C38 and C39 sense the output through R60. This provides more voltage swing for the opamp with respect to ground.

Diodes' CR5 - CR8 (BYV26D) make up the Fixed Bias circuit for the output transistors. The Bias Diodes mount through a hole in the transistor heatsink. This insures the Diodes will properly track the temperature of the output transistors. These Diodes were selected because they exhibit a 2mV decrease in Knee Voltage for every 1 degree (Celsius) increase in temperature. Pin 6 of U5 is at 0 Vdc. Therefore the Bias Diodes provide 2 voltage drops (+/-1.2volts) to the Base of Darlington Transistors Q1 and Q2.

TROUBLESHOOTING TIP: With the circuit board removed, the heatsinking for the output transistors is greatly reduced. With no signal applied, the Bias/Idle current will cause the output transistors to quickly overheat. Use a jumper wire to short across the bias diodes. The easiest way is to jumper from the bases of opposing output transistors. This will turn off the transistors.

Diodes' CR9 - CR12 make up a voltage clamp protection circuit. If the bases of the output transistors reach 4.5 volts with respect to the output, the diodes will turn on, clamping the bases of the output transistors.

The output signal feeds through the Headphone jack circuit, before driving the speaker. With headphones connected to the Headphone Jack, the speaker is muted and a new feedback path is created through R78.

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	048523001	PCB ASSY PRINCETON 112 PLUS		
1	028104	BUTTON PUSH SWITCH BLACK	(@ S1 DRIVE SELECT)	
1	028577	CABLE ASSY REVERB 30	(@ P1-4)	
4	038689	CAP AE AX .47µF 100V	C15,16,28,34	
6	025960	CAP AE AX 22µF 16V	C9,10,25,32,40,41	
1	038690	CAP AE AX 1.0µF 100V	C53	
5	026517	CAP AE AX 2.2µF 50V	C7,35,37,42,43	
1	038691	CAP AE AX 4.7µF 50V	C36	
4	028471	CAP AE RDL 47µF 50V	20% C38,39,51,52	
2	041048	CAP AE RDL 2200µF 50V	20% C47,48	
2	038703	CAP CA .1µF 50V	5% C49,50	
1	038873	CAP CA 22µF 100V	5% C31	
1	038698	CAP CA 47pF 100V	5% C33	
3	038699	CAP CA 100pF 100V	5% C6,24,27	
1	038701	CAP CA 470pF 50V	5% C14	
1	039262	CAP CA 680pF 100V	5% C17	
1	039263	CAP CA 1000pF 100V	5% C3	
1	039264	CAP CA 1500pF 100V	5% C22	
2	039265	CAP CA 2200pF 100V	5% C8,26	
1	039266	CAP CA 3300pF 100V	5% C21	
2	039268	CAP CA 4700pF 50V	5% C1,2	
1	027281	CAP MPF .22µF 63V	10% C5	
2	027286	CAP MPF .47µF 63V	10% C4,44	
1	036234	CAP PFF RDL .015µF 100V	10% C29	
1	033590	CAP PFF RDL .022µF 100V	10% C20	
6	033591	CAP PFF RDL .033µF 100V	10% C11-13,30,45,46	
3	033592	CAP PFF RDL .047µF 100V	10% C18,19,23	
2	037324	CONTROL 100K 30C SNAP IN	R23,32 (GAIN,DRIVE CH-TREBLE)	
2	037323	CONTROL 50K 15A SNAP IN	R8,9 (CLEAN CH TREBLE,BASS)	
2	034719	CONTROL 50KB SNAP IN	R30,44 (CONTOUR,REVERB)	
2	038658	CONTROL RTRY 50K 30C	R16,31 (CLEAN/DRIVE VOLUME)	
1	040552	CONTROL 250K 30C	R37 (DRIVE CHANNEL BASS)	
2	064089	DIODE 1N4003 200PRV	CR13,14	
13	006260	DIODE 1N4448 75PRV	CR1-4,9,12,15-21	
4	020534	DIODE 1N5402 RECTIFIER 200PRV C&F	CR22-25	
4	028776 *	DIODE BIAS BYV26D LEAD FORMED	CR5-8	
2	027329	DIODE ZEN 1N5228B 3.9V 5%	CR10,11	
2	028119	DIODE ZEN 1N5353B 16V 5W 5%	CR26,27	
2	026000	FSTN TAB MALE PCB MT .187x.032	CP11,12	
10	025802	FSTN TAB MALE .250x.032 PCB MT	CP1-10	
2	025996	FUSE CLIP PCB .250 & 5MM FUSE	(@ XF1)	
1	048827	FUSE QA 1-1/4x1/4 250V 2AMP	F1(100V/120V ONLY)	

PARTS LIST

PRINTED CIRCUIT BOARD ASSEMBLY CONTINUED

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	020789	FUSE QA 20mmX5mm 250V 1AMP	F1	(220V/230V/240V ONLY)
1	028497	HEATSINK PLATE	U7	(TRANSISTOR MOUNT)
1	028120	IC 4053B TPL 2 CHAN ANLG SW	U6	
4	016795	IC DUAL OP AMP TL072CP	U1-4	
1	031611	IC DUAL OP PC4560	U5	
1	028047	IC OP AMP MC1436PI	U5	
2	040903	INSULATOR MICA TO-218	(@ Q1,2)	
3	037036	JACK PHONE PCB MONO CA PREMIUM	J2,3,5	(PRE OUT,PWR IN,FTSW)
2	031570	JACK PHONE PCB STEREO PREMIUM	J1,4	(INPUT,HEADPHONE)
8	020888	JUMPER WIRE 22GA .5x.175	W1-8	
1	028098	LED 5x5mm GREEN SLB-55MG3	LD3	
1	028039	LED RED 5x5mm SLB-55VR3	LD4	
2	9902202281 *	LED RED LONG LEAD LUMEX CS02	LD1,2	
1	040538	PCB FAB PRINCETON 112	(BLANK BOARD)	
1	024947	RES CF 1/4w 5% 47Ω	R40	
1	024961	RES CF 1/4w 5% 70Ω	R10	
1	029609	RES CF 1/4w 5% 10Ω	R82	
4	024965	RES CF 1/4w 5% 1K	R18,27,49,75	
1	024969	RES CF 1/4w 5% 1.5K	R43	
3	024971	RES CF 1/4w 5% 2.2K	R15,62,63	
2	024973	RES CF 1/4w 5% 3.3K	R22,24	
2	024975	RES CF 1/4w 5% 3.9K	R52,71	
5	024977	RES CF 1/4w 5% 4.7K	R39,95-98	
1	028034	RES CF 1/4w 5% 5.1K	R4	
1	024979	RES CF 1/4w 5% 6.8K	R5	
1	025942	RES CF 1/4w 5% 7.5K	R14	
1	024980	RES CF 1/4w 5% 8.2K	R21	
11	024981	RES CF 1/4w 5% 10K	R41,74,77,78,80,84,85,87,88,90,91	
2	024985	RES CF 1/4w 5% 15K	R6,35	
5	024987	RES CF 1/4w 5% 22K	R7,11,19,20,34	
2	024988	RES CF 1/4w 5% 27K	R53,54	
1	024989	RES CF 1/4w 5% 33K	R1	
4	024993	RES CF 1/4w 5% 47K	R28,29,33,36	
2	026507	RES CF 1/4w 5% 62K	R51,70	
3	024997	RES CF 1/4w 5% 100K	R48,50,92	
2	025058	RES CF 1/4w 5% 180K	R12,17	
5	025059	RES CF 1/4w 5% 220K	R13,26,38,42,46	
2	025065	RES CF 1/4w 5% 270K	R25,47	
2	028018	RES CF 1/4w 5% 510K	R2,3	
1	025067	RES CF 1/4w 5% 680K	R55	
4	025069	RES CF 1/4w 5% 1M	R76,79,86,89	

PARTS LIST

PRINTED CIRCUIT BOARD ASSEMBLY CONTINUED

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	025074	RES CF 1/4w 5% 1.8M	R45	
1	037169	RES CF 1/2w 5% 1.8K	R81	
1	028861	RES CF 1/2w 5% 3.3K	R83	
1	027346	RES FILM 1w 5% 1.2K	R73	
2	028029	RES FILM 1w 5% 1.5K	R57,59	
2	037354	RES CF 1w 5% 4.7K	R61,64	
1	028045	RES FILM 1w 5% 220Ω	R60	
2	028030	RES FILM 1w 5% 680Ω	R56,58	
2	028021	RES FILM 2w 5% 470Ω	R68,69	
1	028022	RES FILM 2w 5% 120Ω	R67	
1	027478	RES WW BT 5w 10% .22Ω	R72	
2	028028	RES WW BT 5w 10% .47Ω	R65,66	
2	028037	RES WW BT 5w 10% 330Ω	R93,94	
2	027638	SCRW TF 4-40x3/8 HWHS ZI	(@ Q1,2)	
2	032908	SCRW TF 6-32x3/8 PHP ZI	(HEATSINK TO PCB MOUNT)	
2	9904701440	SPACER LED .7x.125 BLUE	(@ LD3,4)	
1	028091	SWITCH PUSH SLFLK SHORT STROKE	S1	(DRIVE SELECT)
2	028169	WSHR SHLDR NYL 5/32x1/4	(@ Q1,2)	
1	016739	XSTR NPN 2N4401 TO-92	Q3	
1	028114	XSTR NPN TIP142 TO-218AC	Q1	
1	028115	XSTR PNP TIP147 TO-218AC	Q2	

PARTS LIST

CHASSIS ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	048526	CHS ASSY PRNCETON 112PLUS 120V		
9	033206	BUSHING KNOB SPACER		
1	021709	BUSHING SR .437x.062x13/32 BLK	(@ SPEAKER CABLE)	
1	026116	BUSHING SR .500x.063x7/16 BLK	(@ REVERB CABLE)	
1	026038	BUSHING SR .625x.062x37/64 BLK	(@ PWR CABLE 100/120V ONLY)	
1	010401	BUSHING SR .625X.125X37/64 WHT 230V	(@ POWER CABLE 230V)	
1	026527	CABLE ASSY POWER W/.187 TABS	(POWER CABLE 100V/120V ONLY)	
1	026528	CABLE ASSY POWER 230V W/.187 TABS	(PWR CABLE 230V EXPORT ONLY)	
1	036479	CABLE ASSY POWER AUST.W/.187 TABS	(240V AUSTRALIA ONLY)	
1	040542	CHS PRINCETON 112	(RAW CHASSIS)	
1	028560	END BELL XFMR 85w	(@ POWER TRANSFORMER)	
1	028499	HEATSINK BAR	(COUPLER TO CHASSIS)	
9	026403	KNOB POINTER BLACK 180 DEG		
4	028591	NUT ACORN 8-32	(TRANSFORMER MOUNT)	
1	048844	PANEL FRONT PRINCETON 112 PLUS		
1	048525	PANEL REAR PRINCETON 112 PLUS		
4	028937	SCRW TF 6-32x5/8 PHP ZI ROLOK	(PCB TO CHASSIS MOUNT)	
1	038900	SCRW TF 6-32X1/4 PHP ZI	(@ GROUND LUG)	
3	028500	SCRW TF 8-32x3/4 HWH SLTD Z1	(CHASSIS TO HEATSINK MOUNT)	
4	025936	STAND OFF PCB PUSH ON NY 3/8L	(PCB TO CHASSIS MOUNT)	
1	025935	SWITCH POWER DPST	(120V DOMESTIC ONLY)	
1	039287 *	SWITCH POWER DPST .187 TAB GLOBAL	(EXPORT ONLY)	
4	030007	WSHR LCK INTL 8x.330x.02 ZI	(TRANSFORMER MOUNT)	
1	027668	XFMR POWER 120V 85W	(120V DOMESTIC ONLY)	
1	039357	XFMR POWER EXPORT DELUXE 112	(100V/115V/230V)	

FOOTSWITCH ASSEMBLY (OPTIONAL)

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	028122	FOOTSWITCH 2 BTN REVERB F/LOGO	(COMPLETE FOOTSWITCH)	
2	006260	DIODE 1N4448/1N914B SIGNAL	CR1.2	
1	037036	JACK PHONE PCB MONO CA PREMIUM	J1	
2	028039	LED RED 5X5MM SLB-55VR3	LD1.2	
2	028714	SWITCH PUSH SPDT	S1.2	

PARTS LIST

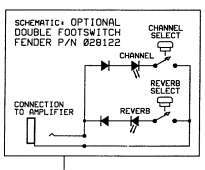
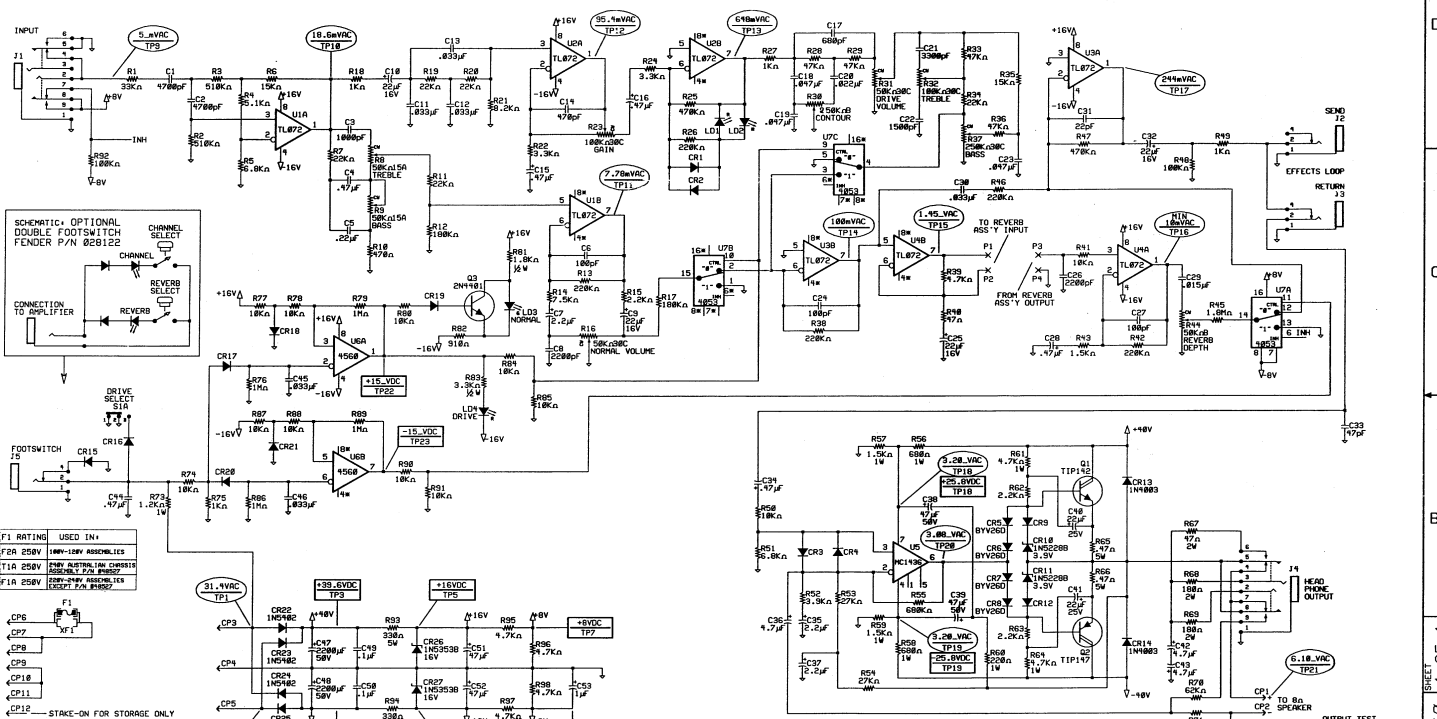
CABINET ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	040547	CAB ASSY PRINCETON 112		(COMPLETE CABINET)
1	022491	CLAMP CABLE NYL SCRW MNT 5/16	(@ REVERB CABLE)	
4	026566	CORNER 2 HOLE w/TAB NI		(TOP REAR, BOTTOM FRONT)
2	026568	CORNER 3 HOLE NI		(BOTTOM REAR)
4	029821	EYELET RFLNGD .215 OD x.315 L		(REVERB PAN MOUNT)
4	019276	GLIDE CAB 1.24x.335 NI		(STEEL ONLY)
4	019275	GLIDE CUSHION INSERT		(RUBBER ONLY)
1	040548	GRILLE BAFFLE ASSY PRNCTON 112		(COMPLETE GRILLE)
1	027846	HANDLE 9.25		(RUBBER ONLY, NO INSERT)
2	019279	HANDLE CAP 2-3/16 NI		(HANDLE MOUNT)
1	032524	INSERT HANDLE		(SPRING STEEL)
1	011298	NAMEPLATE FENDER SMALL		(LOGO)
4	021972	NUT T 10-32x3/4 STR 3 PRNG BLX		(HANDLE MOUNT)
1	028055	REVERB UNIT 800 ohm 8EB2C1B DN		(PAN)
10	026571	SCRW CORNER MOUNTING		
4	022244	SCRW M 10-32x1-1/8 OHP NI		(HANDLE MOUNT)
4	026625	SCRW WOOD 8x1 FH		(GLIDE MOUNT)
4	026577	SCRW M 10-32x1 PHP BLX		(SPEAKER MOUNT)
6	036199	SCRW M 8-32x1-3/16 OHP BLX WX		(CHASSIS MOUNT)
5	029828	SCRW PB 8x3/4 PHP ZI		(REVERB PAN/CABLE CLAMP MNT)
2	018113	SCRW SMA 4x1/2 OHP BLX		(LOGO MOUNT)
2	011678	SCRW SMA 8x1-1/2 OHP BLX		(GRILLE MOUNT)
1	025923	SPEAKER 12" 8ohm 75 WATT		
8	029527	WSHR FNSH 8-5/8 FLNGD BLX WX		(CHASSIS/GRILLE MOUNT)

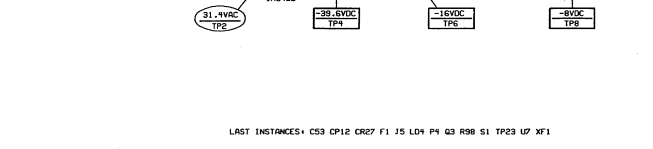
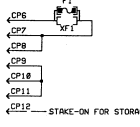
MISCELLANEOUS

QTY	PART #	DESCRIPTION	REFERENCE	DESIGNATION
1	048524	MANUAL OWNERS PRINCETON 112		
1	040536	SCHEM REDUCED W/SRV PRINCETON 112		

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	EC #1170	1-8-93	MH
	B	EC #2058	4-20-98	FM



F1 RATING	USED IN
F2A 250V	14W-15W ASSEMBLIES
T1A 250V	14W-15W ASSEMBLIES
F1A 250V	14W-15W ASSEMBLIES

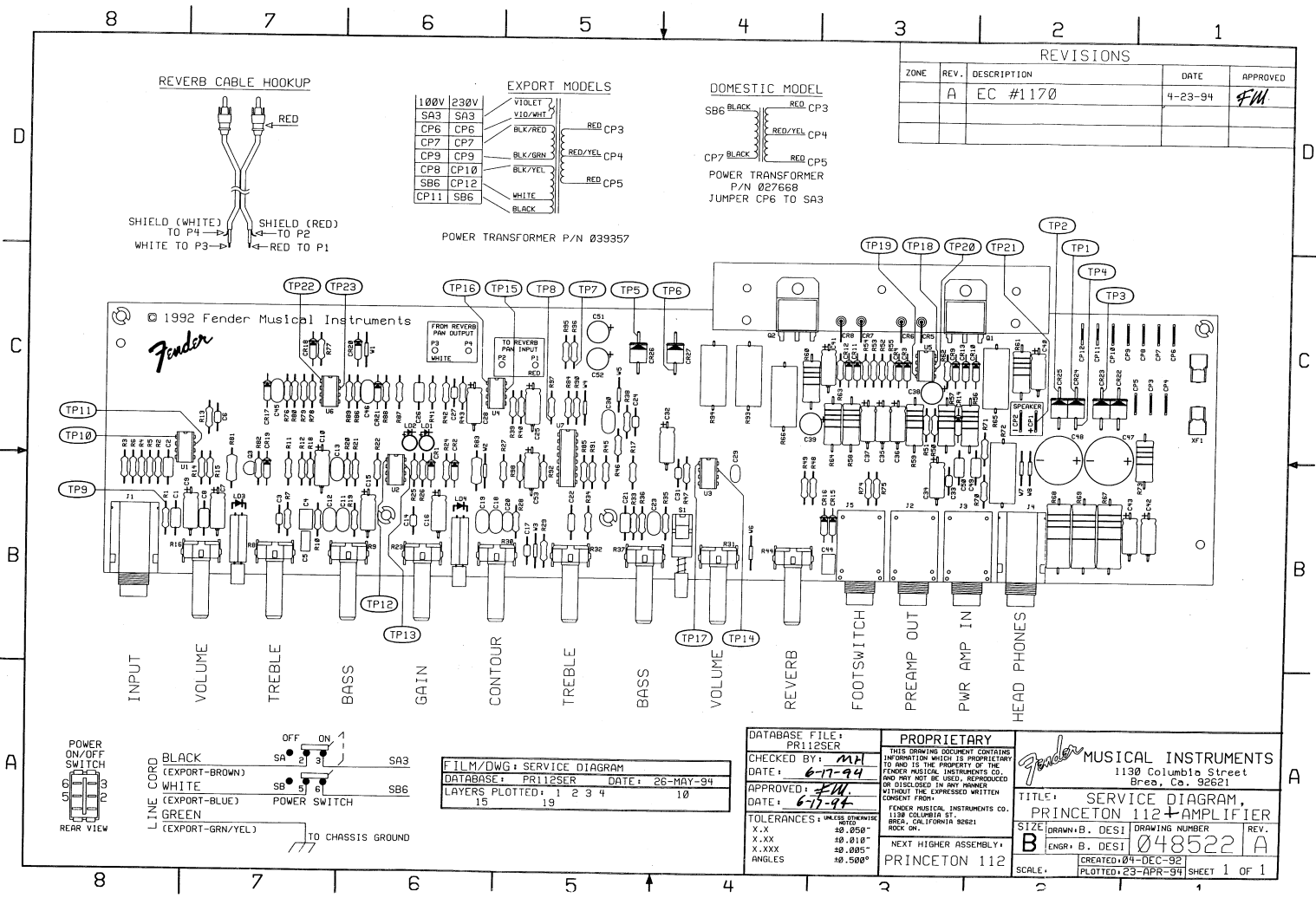


- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTORS M.W. ± 5%.
 2. ALL CAPACITORS 5%V MINIMUM.
 3. ALL DIODES 1N4001.
 4. AC AND DC VOLTAGES READ TO GROUND WITH A DOW UNDER THE FOLLOWING CONDITIONS:
 1. 140V INPUT AT J1
 - NO FOOTSWITCH
 - DRIVE SELECT "ON"
 - REVERB "OFF"
 - GAIN SET TO 9 O'CLOCK
 - ALL OTHER CONTROLS SET TO 12 O'CLOCK

DATABASE FILE: CHECKED BY: [Signature] DATE: 4-22-98 APPROVED: [Signature] TOLERANCES: .1% .5% 1% 5% 10% UNLESS OTHERWISE SPECIFIED	PROPRIETARY THIS DESIGN IS THE PROPERTY OF GARDNER MUSICAL INSTRUMENTS 1138 Columbia Street Dept. CA 3851 Princeton, NJ 08540 TITLE: SCHEMATIC DIAGRAM, PRINCETON 112 PLUS AMPLIFIER SIZE: (DRAWN BY: DESI) 048520 B (CHKD BY: DESI) 048520 B SCALE: (CHECKED BY: DESI) 1:1 PLOTTER: [Signature] SHEET 1 OF 1
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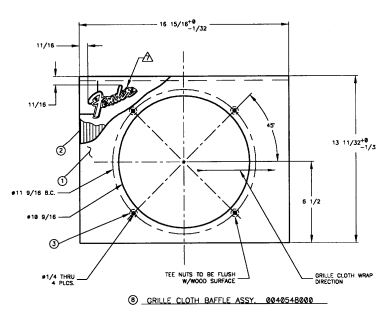
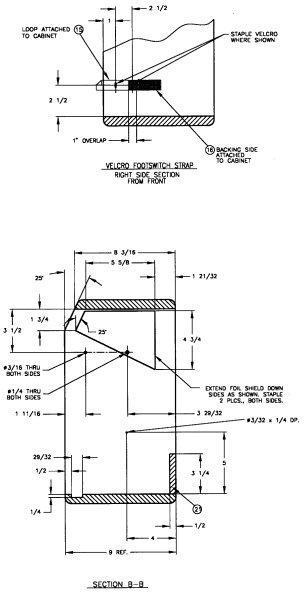
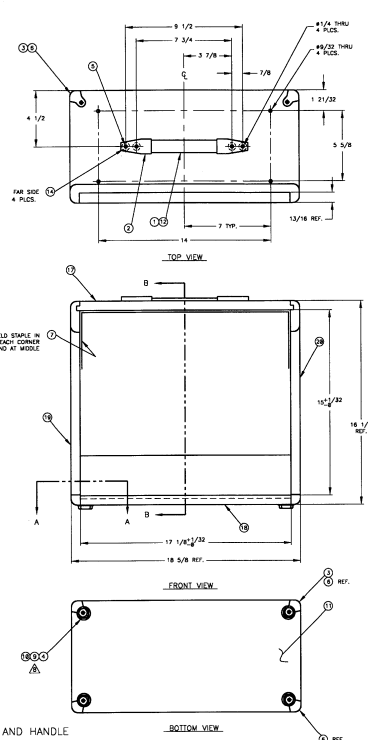
LAST INSTANCES: C59 CP12 CR27 F1 15 LD4 P4 Q3 R98 S1 TP23 UP X71

SHEET 1 OF 1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	EC #1170	4-23-94	FM

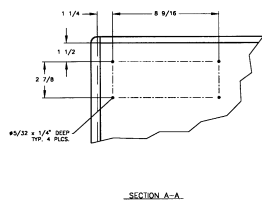
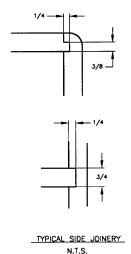
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REV	DESCRIPTION	DATE	BY	CHKD
D	ECCR 29	EW	8/25/96	
E	PR 483	BS	9/1/98	
F	IMP25-ADD HOLES FOR CHAIR CLAMP SECTION A-A	DW	3/16/2000	
G	IMP25-ADD HOLES FOR CHAIR CLAMP SECTION A-A	JC	8/21/2000	

ITEM	QTY.	PART NO.	DESCRIPTION
4	AR	0048677000	CAB CLEAT
3	4	0021972000	NUT T 18-32x3/4 STR 3 PRNG BLK
2	1	0037700000	CLOTH DRILL BLACK/SILVER
1	1	0031324000	CAB BAFFLE EIGHTY-FIVE

21	1	0031267000	CAB BACK LOW SPR66
20	1	0031317000	CAB RIGHT SIDE 85/DLX85
19	1	0031316000	CAB LEFT SIDE 85/DLX85
18	1	0031323000	CAB BOTTOM EIGHTY-FIVE
17	1	0031322000	CAB TOP EIGHTY-FIVE
16	7	0029886000	VELCRO STRIP LOOP 1.5\"/>



9. FEET, CORNERS AND HANDLE NOT SHOWN IN ALL VIEWS FOR CLARITY.
- A USE BOTTOM CORNER SCREW HOLE TO MOUNT FEET USING ITEM #10.
- B NAMEPLATE NOT PART OF THIS ASSEMBLY LOCATE AS SHOWN.
6. HOLES DRILLED IN CABINET BEFORE COVERING.
5. ALL RADII TO BE 1/2\"/>

MATERIAL	1/2\"/>
FINISH	ALL EXPOSED SURFACES MUST BE STAINED BLACK
FRAC.	1/32
X	0.005
XXX	0.010
ANGLE	0.0 DEGREE
HOLE DIA.	0.005 - 0.001 UNMATED ANGLES ARE 90 DEGREE

ENGINEER	R&D
DRAWN	BEATA.S
DATE	9/3/98
BY	ENG. TENG.
DATE	9/3/98
SCALE	1/1
SHEET	D
DRAWING NUMBER	0040547000
REV.	G
ASSEMBLY	