

# PRINCETON 112

p/n 022-6704-000 (120V)

# SERVICE MANUAL



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**PRINCETON 112**  
(This is the model name for warranty claims)

**SERVICE MANUAL**

**MAY 1993**

**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

**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

# PRINCETON 112

## PARTS LIST

### PRINTED CIRCUIT BOARD ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	040539	PCB ASSY PRINCETON 112	
1	028104	BUTTON PUSH SWITCH BLACK	(@S1)
1	028577	CABLE ASSY REVERB 30	(@P1-4)
4	038689	CAP AE AX .47uF 100V	C15,16,28,34
6	025960	CAP AE AX 22uF 16V	C9,10,25,32,40,41
1	038690	CAP AE AX 1.0uF 100V	C53
3	026517	CAP AE AX 2.2uF 50V	C7,35,37
3	038691	CAP AE AX 4.7uF 50V 20%	C36,42,43
4	028471	CAP AE RDL 47uF 50V 20%	C38,39,51,52
2	041048	CAP AE RDL 2200uF 50V 20%	C47,48
2	038703	CAP CA .1uF 50V 5%	C49,50
1	038873	CAP CA 22pF 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 33000pF 100V 5%	C21
2	039268	CAP CA 4700pF 50V 5%	C1,2
1	027281	CAP MPF .22uF 63V 10%	C5
2	027286	CAP MPF .47uF 63V 10%	C4,44
1	036234	CAP PFF RDL .015uF 100V 10%	C29
1	033590	CAP PFF RDL .022uF 100V 10%	C20
6	033591	CAP PFF RDL .033uF 100V 10%	C11-13,30,45,46
3	033592	CAP PFF RDL .047uF 100V 10%	C18,19,23
2	037324	CONTROL 100K 30C SNAP IN	R23,32
2	037323	CONTROL 50K 15A SNAP IN	R8,9
2	034719	CONTROL 50KB SNAP IN	R30,44
2	038658	CONTROL RTRY 50K 30C	R16,31
1	040552	CONTROL 250K 30C	R37
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 BY V26D 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.187X032	CP11,12
10	025802	FSTN TAB MALE .250X.032 PCB MT	CP1-10
2	025996	FUSE CLIP PCB .250 x 5MM USE	(@XF1)
1	041112*	FUSE QA 1-1/4X1/4 250V 1.25AMP	F1 (100V/120V ONLY)
1	020787*	FUSE QA 20mmX5mm 250V .630AMP	F1 (220V/230V/240V ONLY)
1	028497	HEATSINK PLATE	(TRANSISITOR MOUNT)
1	028120	IC 4053B TPL 2 CHAN ANLG SW	U7
4	016795	IC DUAL OP AMP TLOC2P	U1-4
1	031611	IC DUAL OP PC4560	U6
1	028047	IC OP AMP MC 1436PI	U5
2	040903	INSULATOR MICA TO-218	(@Q1,2)
3	037036	JACK PHONE PCB MONO CA PREMIUM	J2,3,5
2	031570	JACK PHONE PCB STEREO PREMIUM	J1,4
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% 470Ω	R10

### PRINTED CIRCUIT BOARD ASSEMBLY (CONT)

# PRINCETON 112

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	029609	RES CF 1/4W 5% 910Ω	R82
6	024965	RES CF 1/4W 5% 1K	R18,27,49,62,63,75
1	024969	RES CF 1/4W 5% 1.5K	R43
1	024971	RES CF 1/4W 5% 2.2K	R15
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% 470K	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
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	034704	RES FILM 2W 5% 180Ω	R68,69
1	027628	RES FILM 2W 5% 47Ω	R67
3	028028	RES WW BT 5W 10% 47Ω	R65,66,72
2	028898	RES WW BT 5W 5% 240Ω	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
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

## CHASSIS ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	040543	CHS ASSY PRINCETON 112 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	(@ POWER CABLE 100/120V ONLY)
1	010401	BUSHING SR .625X.125X37/64WHT 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)

## CHASSIS ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
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# PRINCETON 112

9	026403	KNOB POINTER BLACK 180 °	
4	028591	NUT ACORN 8-32	(TRANSFORMER MOUNT)
1	040540	PANEL FRONT PRINCETON 112	
1	040541	PANEL REAR PRINCETON 112	
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	040550	XFMR POWER PRINCETON 112	(120V DOMESTIC ONLY)
1	040551	XFMR POWER EXPORT PRINCETON 112	(100V/115V/230V)

## CABINET ASSEMBLY

<u>QTY</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>REFERENCE DESIGNATION</u>
1	040547	CAB ASSY PRINCETON 112	(COMPLETE CABINET)
1	022491	CLAMP CABLE NYL SCRW MNT 5/196	(@ 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 .215OD 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	
1	032524	INSERT HANDLE	(SPRING STEEL)
1	011298	NAMEPLATE FENDER SMALL	
4	021972	NUT T 10-32X3/4 STR 3 PRNG BLX	(HANDLE MOUNT)
1	028055	REVERB UNIT 800 Ω 8EB2C1B DN	
10	026571	SCRW CORNER MOUNTING	
4	022244	SCRW M 10-32X1-1/8 OHP NI	(HANDLE MOUNT)
4	026625	SCRW WPPD 8X1 FH	(GLIDE MOUNT)
4	026577	SCRW M 10-32X1-3/16 OHP BLX WX	(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 PJ[ BLX	(GRILLE MOUNT)
8	029527	WSHR FNSH 8-5/8 FLNGD BLX WX	

## MISCELLANEOUS

<u>QTY</u>	<u>PART #</u>	<u>DESCRIPTION</u>	<u>REFERENCE DESIGNATION</u>
1	028510	CARTON PRINCETON 112	
1	010917	FOAM BLOCK FORMED LH ¾	
1	010919	FOAM BLOCK FORMED RH ¾	
6	010981	FOAM CORNER AMP	
1	040549	MANUAL OWNERS PRINCETON 112	
1	040536	SCHEM REDUCED W/ SRV PRINCETON 112	



# TECH NOTES

FENDER MUSICAL INSTRUMENTS CORP.  
7975 N. HAYDEN ROAD  
SCOTTSDALE, ARIZONA 85258



## PRINCETON 112 HIGH FREQUENCY OSCILLATIONS

An engineering change notice has been issued requiring two (2) resistor changes in the Power amp section of the Princeton 112. This was necessary to eliminate a high frequency oscillation which under certain conditions may occur at U5 (Motorola MC1436 High voltage op-amp).

Under normal operating conditions the units will not oscillate. The problem shows up when patching an external device into the Effects Loop Send and Return jacks. If the external device has an output impedance greater than  $8K\Omega$ , the IC (U5) may oscillate. The oscillation can vary from about 16KHz to 50KHz, and can drive the amplifier to full power output. Symptoms of the oscillation may appear as excessive distortion, overheating, or an open speaker.

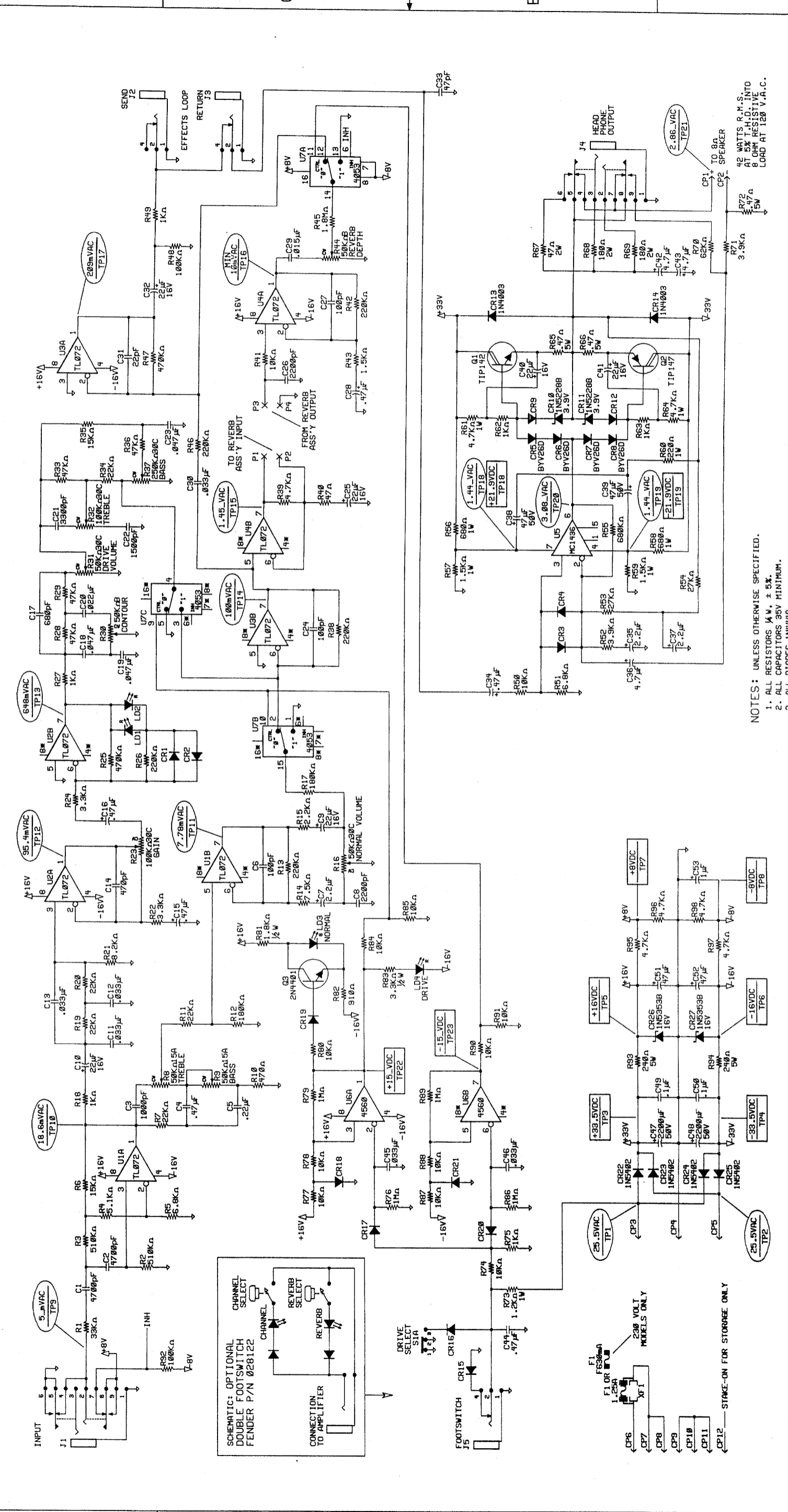
Product recall is unnecessary, but any Princeton 112 in for service should have this change performed under warranty.

The Serial Number cut-over is **LO - 450000**. That is, Serial Numbers below **LO-450000** do not have the upgrade. Serial Numbers above **LO - 450000** have the upgrade.

Remove R50 (100K 5% 1/4W) and replace with 10K 5% 1/4W Carbon Film Resistor (P/N 024981).

Remove R51 (62K 5% 1/4W) and replace with 6.8K 5% 1/4W Carbon Film Resistor (P/N 024979).

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A	RELEASED PR#226		1-8-93	
B	ECO#L02596		4-13-93	
C	EC#1027		7-23-93	



**REVISIONS**

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A	RELEASED PR#226		1-8-93	
B	ECO#L02596		4-13-93	
C	EC#1027		7-23-93	

**PROPRIETARY**  
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**DATABASE FILE:** PR112S  
**CHECKED BY:** [Signature]  
**DATE:** 7-23-93  
**APPROVED:** [Signature]  
**DATE:** 7-23-93

**TOLERANCES:** UNLESS OTHERWISE SPECIFIED:  
 X.XX .05%  
 X.X .1%  
 X.XXX .1%  
 ANGLES .500"

**PRINCETON 112**

**MUSICAL INSTRUMENTS**  
 1190 Columbia Street  
 BRIDGE, CA 94921

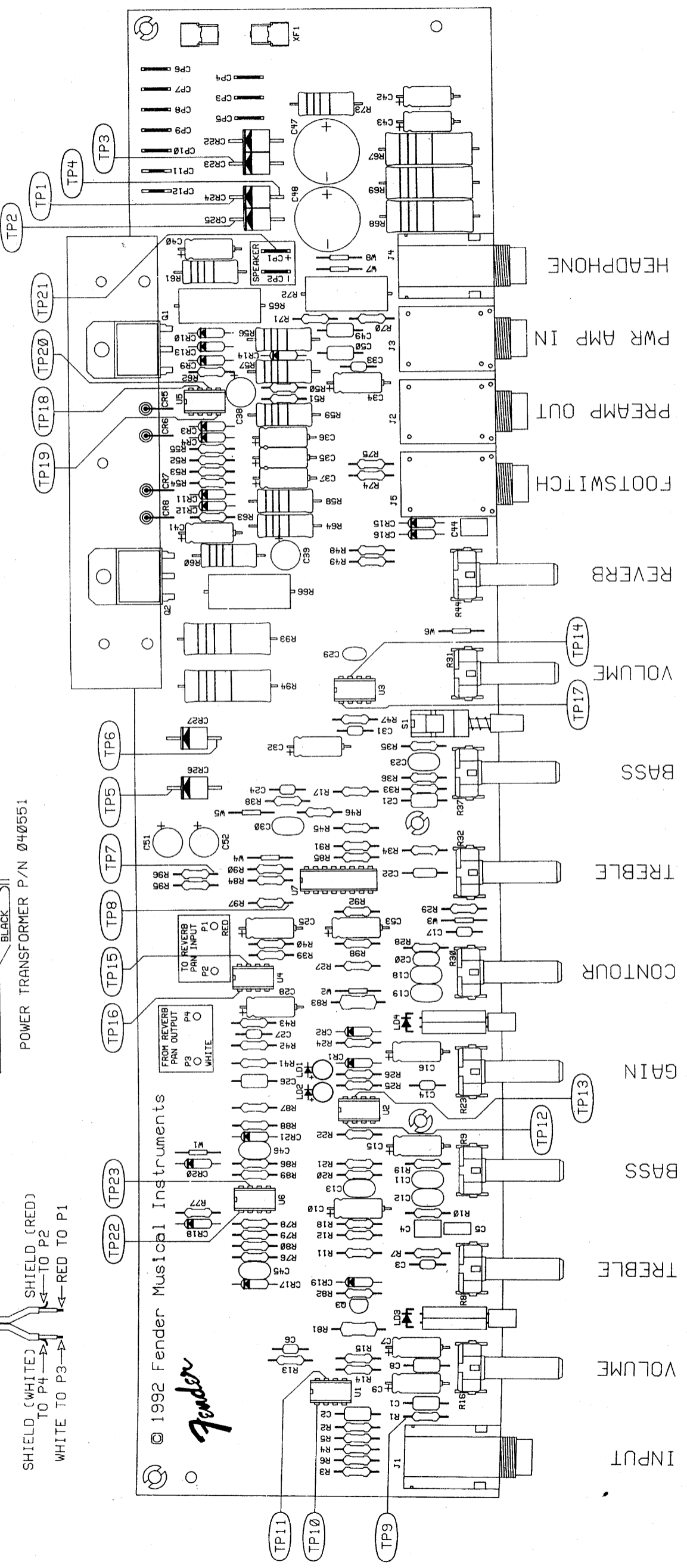
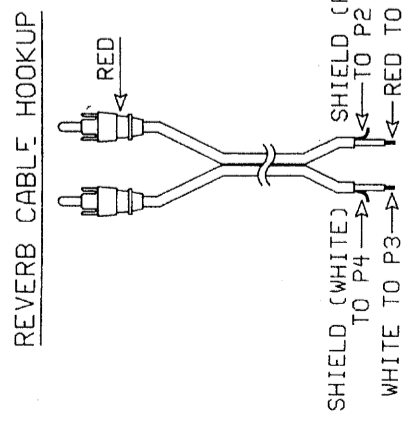
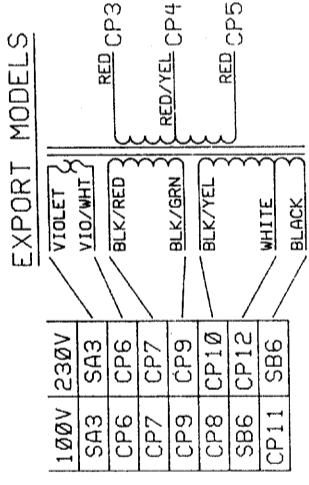
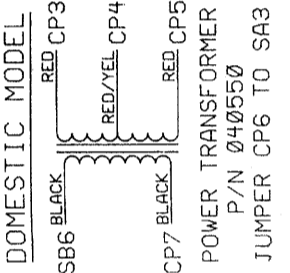
**TITLE:** SCHEMATIC DIAGRAM, PRINCETON 112 AMPLIFIER  
**SIZE:** DRAWN: B. DESI  
**REV.:** 040535  
**SCALE:** 1 OF 1

**NOTES:** UNLESS OTHERWISE SPECIFIED.  
 1. ALL RESISTORS 1/4W, ± 5%.  
 2. ALL CAPACITORS 35V MINIMUM.  
 3. ALL DIODES 1N4148.  
 4. ALL DC VOLTAGES READ TO NO FOOTSWITCH UNDER FOLLOWING CONDITIONS:  
 144P5 INPUT AT J1  
 NO FOOTSWITCH  
 DRIVE SELECT "ON"  
 REVERB "OFF"  
 ALL OTHER CONTROLS SET TO 0'CLOCK

**LAST INSTANCES:** C63 CP12 CR27 F1 J5 LD4 P4 Q3 R98 S1 TP23 U7 XF1

8 7 6 5 4 3 2 1

REVISIONS			DATE	APPROVED
ZONE	REV.	DESCRIPTION	1-8-92	<i>B.D.</i>
	A	RELEASED PR#226		



**Fender MUSICAL INSTRUMENTS**  
1130 Columbia Street  
Brea, Ca. 92621

TITLE: SERVICE DIAGRAM,  
PRINCETON 112 AMPLIFIER

SIZE: **B** DRAWN: B. DESI  
ENGR: B. DESI

DRAWING NUMBER: **040537**

REV. **A**

SCALE: CREATED: 04-DEC-92  
PLOTTED: 22-DEC-92 SHEET 1 OF 1

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1130 COLUMBIA ST. 92621  
BREA, CALIFORNIA

DATABASE FILE: PR112SER  
CHECKED BY: *B.D.*  
DATE: 12-28-92  
APPROVED: *B.D.*  
DATE: 12-28-92

TOLERANCES: UNLESS OTHERWISE NOTED  
X.X: ±0.050"  
X.XX: ±0.010"  
X.XXX: ±0.005"  
ANGLES: ±0.500°

NEXT HIGHER ASSEMBLY:  
PRINCETON 112

FILM/DWG: SERVICE DIAGRAM  
DATABASE: PR112SER DATE: 22-DEC-92  
LAYERS PLOTTED: 1 2 3 4 10 15 19

POWER ON/OFF SWITCH  
3 2  
6 5

REAR VIEW

BLACK (EXPORT-BROWN) SA3  
WHITE (EXPORT-BLUE) SB6  
GREEN (EXPORT-GRN/YEL) TO CHASSIS GROUND

OFF ON 1  
SA 2 3  
SB 5 6  
POWER SWITCH

8 7 6 5 4 3 2 1