



# SUNN 1200S

p/n 021-3300-000 (120V)

## SERVICE MANUAL

# SUNN 1200S

(This is the model name for warranty claims)

AUGUST 1998

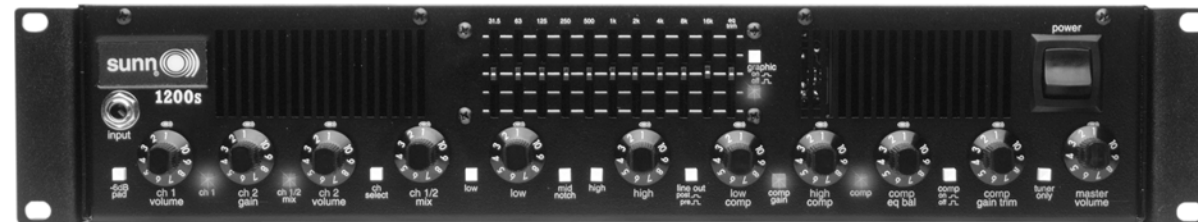
### IMPORTANT NOTICE:

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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:



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### 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

# SPECIFICATIONS

# CIRCUIT DESCRIPTION

The Sunn 1200S Bass Amplifier employs many new technologies in various sections. This document is a brief overview.

<b>Product Release No.:</b>	PR 348 <i>(This is not a model number)</i>
<b>Part Number:</b>	120V Version : 21-3300 240V Aust : 21-3330 230V UK : 21-3340 230V : 21-3360 100V : 21-3370
<b>Preamp section</b>	
<b>Input impedance:</b>	470k $\Omega$
<b>Full power sensitivity:</b>	12.75mV
<b>Tone controls:</b>	Treble: +/- 15dB @ 3kHz Bass: +/- 15dB @ 40Hz
<b>Graphic Equalizer:</b>	+/- 12dB @ 31.5Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz
<b>Mid notch:</b>	-20dB @ 700Hz
<b>Low boost:</b>	+10dB @ 40Hz
<b>High boost:</b>	+10dB @ 6kHz
<b>Power Amplifier Section</b>	
<b>Power output:</b>	1200 Watts RMS into 2 $\Omega$ @ <0.2% THD
<b>Sensitivity:</b>	1V RMS (0dBV)
<b>Power Requirements:</b>	100V AC, 50/60 Hz, 1800W 120V AC, 60 Hz, 1800W 230V AC, 50 Hz, 1800W
<b>Speaker Complement:</b>	Designed for use with the Sunn 410H or Sunn 215 Bass Loudspeaker Enclosures
<b>Dimensions:</b>	Height: 3.5" (8.9 cm) Width: 19.0" (48.3 cm) Depth: 15.0" (38.1 cm)
<b>Weight:</b>	35 lbs (15.9 kg)

*Product specifications are subject to change without notice*

## Preamp

The preamp section employs two 12AX7 tubes. Channel one (V1) is fairly conventional, while channel two (V2) uses a second tube with additional op-amp gain (U2B) to provide a 60's style overdrive sound. The op-amp is used as straight gain and is never allowed to become non-linear.

In typical operation, the drive channel and the clean channel are presented to the channel 1/2 mix control (R25) so that a "blend" can be established. The channel select button (S7) on the front panel (or it's foot switch counterpart) selects between this channel mix or channel one only. This selection employs JFETS Q1-Q4.

Signals are then presented to a second-order Sallen and Key filter set to  $F_0$  of 36.6 Hz and a Q of 2.1. This filter provides about 6.5dB of boost at 41 Hz.

The signal path is routed to U4B where low-boost (S2), mid-notch (S4), and high-boost (S3) equalization switches can be used. These circuits are followed by conventional Baxendall low (R67) and high (R70) equalization. The Baxendall circuit output is then sent to a graphic equalizer which can be selected by the footswitch or graphic EQ button (S61) on the front panel. The far-right graphic EQ slider (R660) is a +/- 10dB trim for graphic EQ gain compensation.

Next, the signal is presented to a second-order state-variable filter before being presented to the compressor circuit. Said filter is set to 420 Hz. At the compressor, low-frequency compression ratio (R88) and high-frequency compression ratio (R98) are adjustable to suit the user. Audio is presented to the "compressor EQ balance" (R107). The compressor EQ balance controls the mix ratios of the compressor outputs. A compressor gain trim (R113) is provided to compensate for the amount of amplification lost due to using the compressor. The compressor-gain trim control is able to compensate for a compressed signal of up to 10dB.

The FETs Q5 and Q6 select between pre- and post-compressor via the front panel switch (S8) or footswitch. After passing through op-amp U10B and master-gain control R116, the signal is sent to output jack J3, effects-loop send. The signal input at J4, effects-loop return, goes to differential receiver U11B.

Signals are forwarded to power amp pass through amplifier U12B and on to J5. At these same nodes, the signal is passed on to the 1200 Watt class H power amplifier.

### Power Amplifier

The power amplifier employs class AB topology in the pre-driver circuit Q8-Q11. Quiescent current is established with transistors Q12-Q13. Driver transistors Q16-Q17 provide drive for Q23-Q26, and Q31-Q34. Transistors Q19, Q21, and Q27-Q30 provide positive "on demand" supply-rail boost. Transistors Q20, Q22, and Q35-Q38 provide the same function for the negative rail.

Transistor Q18 provides "charge depletion" of Q23-Q26 and Q31-Q34. This allows for the suppression of common mode current that can occur at high frequencies.

Relay K1 and associated components reduce output-stage current gain to unity during power-up and over-temperature events as monitored by thermistor RT1 on the main heatsink.

### Power supply

Primary circuit inrush limiting is accomplished by TH1, a negative temperature coefficient thermistor.

The power supply employs a toroidal power transformer with only one tapped-main secondary. Two large bridge rectifiers are used to obtain +/-47VDC and +/- 94VDC.

High voltage (356VDC) for vacuum tube sections is generated by half-wave multiplier comprised of CR92-CR95, C125-C128.

Low voltage (+/-22VDC) and (+10~ +28VDC variable fan) is supplied by the synchronous rectifier system located on the power supply break-away board. This synchronous system observes the input sine and allows Q81, Q85, and Q88 to be forced on until the input sine wave reaches the correct level as observed by Q83, Q87, and Q90. References Q84 (variably controlled by RT2) CR811 and CR818 are employed. Regulators U21 and U22 reduce the +/-22V lines to +/-16VDC

Heater voltage (24VDC for 2 series-connected 12AX7s in the preamp) is derived from the 32VDC supply (+/-16VDC).. Excess voltage is dropped across across paralleled ballast resistors, R354-R356, on the preamp PCB.

# PARTS LIST

**NOTE: SHADED ITEMS ARE FOR REFERENCE ONLY**

### PRINTED CIRCUIT BOARD ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	0052047000	BRIDGE RECT 35A 800V	BR1 BR2
9	0048451000	BUTTON PUSH OFF WHITE	
2	0053930000	CABLE RIBBON 3 CKT 3 in	P1A P5A
1	0048914000	CABLE RIBBON 8 CKT 7 in	P4A
1	0054388000	CABLE RIBBON 8 CKT 9 in	P8A
2	0033606003	CAP AE RDL .47UF 50V 20%	C116 C640
3	0028494000	CAP AE RDL 1000uF 35V 20%	C802 C805 C809
2	0028476003	CAP AE RDL 100UF 50V 20%	C806 C810
6	0028463003	CAP AE RDL 10UF 50V 20%	C39 C43 C46 C50 C55 C59
1	0028458003	CAP AE RDL 1UF 50V 20%	C53
10	0028459003	CAP AE RDL 2.2UF 50V 20%	C24 C34-35 C52 C57 C81-83 C85 C88
2	0054204000	CAP AE RDL 22UF 450V 20%	C130-131
37	0028467003	CAP AE RDL 22UF 50V 20%	C1-2 C7 C19 C23 C40 C48 C51 C56 C61 C64-66 C69 C72-74 C76 C105 C134 C137 C601 C603-613 C634 C636 C638-639
4	0028460003	CAP AE RDL 4.7UF 50V 20%	C12-13 C28 C161
2	0053955003	CAP AE RDL 47UF 160V 20%	C92-93
4	0054206000	CAP AE RDL 47UF 350V 20%	C125-128
1	0054205000	CAP AE RDL 47UF 450V 20%	C129
6	0047195003	CAP AE RDL 47UF 63V 20%	C4 C86 C98-99 C803 C807
2	0037182000	CAP AE RDL 6800UF 63V 20%	C121-122
2	0053915000	CAP AE100V10000uF 20%	C123-124
1	0039261001	CAP CA 330PF 100V	C80
34	0034788003	CAP CD .1UF 50V 20% .15"CUT	C644-649 C94-95 C132-133 C135-136 C139-160
3	0051457003	CAP CD 100pF 500V 5%	C100-101 C637
2	0051960003	CAP CD 180 PF 500V 10%	C14 C20
9	0051406003	CAP CD 220PF 500V 10%	C25 C45 C62-63 C67-68 C70-71 C641
4	0051445003	CAP CD 22PF 500V 5%	C18 C49 C54 C58
3	0051409003	CAP CD 68pF 500V 5%	C16 C60 C89
2	0027255003	CAP MPF .001UF 100V	C5 C11
3	0027257003	CAP MPF .0022UF 100V	C44 C47 C87
1	0027260003	CAP MPF .0039UF 100V	C79
5	0027261003	CAP MPF .0047UF 100V	C38 C84 C96-97 C162
2	0027262003	CAP MPF .0068UF 100V	C41-42
2	0027264003	CAP MPF .01UF 100V	C602 C635

PRINTED CIRCUIT BOARD ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0047165000	CAP MPF .01UF 250V	C138
9	0027267003	CAP MPF .022UF 100V	C31-33 C622-627
9	0027272003	CAP MPF .047UF 63V	C26-27 C75 C107-108 C114-115 C642-643
1	0027275003	CAP MPF .068UF 100V	C30
1	0027277003	CAP MPF .082UF 100V	C17
6	0027280003	CAP MPF .15UF 63V	C616-C621
14	0027278003	CAP MPF .1UF 63V 10%	C3 C6 C10 C29 C36-37 C106 C109-111 C113 C801 C804 C808
1	0027281003	CAP MPF .22UF 63V	C112
4	0027283003	CAP MPF .33UF 63V	C77-78 C614-615
1	0027286003	CAP MPF .47UF 63V	C117
3	0024853000	CAP MPF RDL .1UF 250V 10%	C118-120
5	0024854000	CAP MPF RDL .1UF 400V 10%	C8 C9 C15 C21 C104
1	0024823000	CAP MPF RDL.01uf 400v 10%	C22
6	0030937003	CAP PFF RDL .0027UF 50V 5%	C628-633
11	0050514000	CONTROL SLIDER 30MM 50KW	R607-616 R660
3	0027945000	CONTROL SNAPIN 100K B TAPER	R113 R88 R98
1	0053926000	CONTROL SNAPIN 10K 5A 10K 5C	R107
1	0053929000	CONTROL SNAPIN 10K B 250K B	R25
2	0039053000	CONTROL SNAPIN 1M 30A	R20 R47
1	0053928000	CONTROL SNAPIN 250K 30A TAPER	R37
2	0031087000	CONTROL SNAPIN 25K 2B W/DETENT	R67 R70
1	0027941000	CONTROL SNAPIN 50K B TAPER	R116
15	0064089001	DIODE 1N4003 LL	CR44-45 CR103-104 CR801-802 CR805-808 CR812-815 CR819
4	0026730001	DIODE 1n4006 800v LL	CR92-95
72	0006260001	DIODE 1N4448 SIGNAL LL	CR3-27 CR38-39 CR50-53 CR60 CR62-85 CR87-88 CR96-100 CR601-603 CR803-804 CR809-810 CR816-817
4	0054209001	DIODE 1N5817 1A	CR36-37 CR42-43
2	0029045000	DIODE 6A 400V 6A4 LEAD FORMED	CR58-59
12	0025821001	DIODE HV FDH-400 SWITCHING LL	CR28-35 CR46-47 CR54-55
2	0052050000	DIODE MUR1520 200PRV 15AMP	CR56-57
1	0041261000	DIODE VOLT REF LM4040DIZ-10.0	U15
2	0009165001	DIODE ZEN 1n4744a 15v 1w 5%	CR90-91
1	0027329001	DIODE ZEN 1n5228b 3.9v 5% LL	CR86
4	0027327001	DIODE ZEN 1n5234b 6.2v 5% LL	CR40-41 CR101-102
1	0029898001	DIODE ZEN 1N5236B 7.5V 5%	CR89
5	0031635001	DIODE ZEN 1n5240b 10v 5% LL	CR1-2 CR48-49 CR61
2	0038686001	DIODE ZEN IN4737A 7.5V.5W 5%	CR811 CR818
11	0025802000	FSTN TAB MALE .250 x .032 PCB MT	CP1-11
2	0025996000	FUSE CLIP PCB .250 5MM FUSE	XF1
1	0053654000	GASKET HEATSINK 1200S	

PRINTED CIRCUIT BOARD ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0027408000	HDR .1 CTR 2 CKT SQ PIN	P9
2	0027410000	HDR .1 CTR 3 CKT SQ PIN	P1 P5
2	0027416000	HDR .1 CTR 8 CKT SQ PIN	P4 P8
1	0053864000	HEATSINK DRVR 1200S FRNT	
1	0053865000	HEATSINK DRVR 1200S REAR	
1	0053488000	HEATSINK MAIN SUNN 1200S	
1	0053866000	HEATSINK RECTIFIER 1200S	
2	0025796000	HEATSINK TO-220	
17	0051198000	IC DUAL OP AMP BA4560N SIP	U5-7 U11-13 U16-17 U19-20 U61-67
7	0016795000	IC DUAL OP AMP TL072	U1-4 U9-10 U14
1	0051680000	IC DYNAMIC RANGE PROCESSOR DUAL VCA SSM2120	U8
1	0013562000	IC REGULATOR 15V MC7815CT	U21
1	0013564000	IC REGULATOR 15V MC7915CT	U22
1	0051856000	IC QUAD 2-IN NAND GATE 4011	U18
1	0027387000	INDUCTOR AIR CORE RDL 2.5UH	L1
4	0017974000	INSULATOR MICA TO-220	
20	0038815000	INSULATOR SILICONE TO-3P	
1	0051006000	JACK 1/4 PCB DUAL TIP MONO	J1
2	0051658000	JACK MONO R/A	J2 J12
4	0029175000	JACK PHONE 1/4" HI CURRENT PC	J8-11
4	0053450000	JACK STEREO RA	J3-6
1	0049892000	JACK XLR MALE	J7
4	0028039000	LED RED 5x5MM SLB-55VR3	LD3-5 LD61
2	0053951000	LED RED, T-1.75 Clr	LD1-2
1	0033177000	LED RED/GREEN 5x5mm BI-COLOR	LD6
1	0053616000	PCB MAIN SUNN 1200S	
1	0036613000	RELAY DPDT DIP 24 VOLT 8.3mA	K1
2	0026505001	RES CF 1/2W 5% 1 OHM LL	R813 R819
3	0026368001	RES CF 1/2W 5% 100 OHM	R3-5
4	0025116001	RES CF 1/2W 5% 100K	R18 R23 R36 R44
4	0026493001	RES CF 1/2W 5% 2.7K LL	R238 R244 R268 R675
3	0026512001	RES CF 1/2W 5% 3.9K LL	R802 R809 R815
2	0025941001	RES CF 1/2w 5% 560 ohm LL	R6 R292
4	0024967001	RES CF 1/4W 5% 1.2K	R13 R22 R31 R637
2	0028862001	RES CF 1/4W 5% 1.3K	R159-160
7	0024969001	RES CF 1/4W 5% 1.5K	R43 R58 R155-156 R179-180 R229
2	0025073001	RES CF 1/4W 5% 1.5M	R86 R96
2	0024937001	RES CF 1/4W 5% 10 OHM	R230 R301

**PRINTED CIRCUIT BOARD ASSEMBLY (CONT)**

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	0024952001	RES CF 1/4W 5% 100 OHM	R119 R130
18	0024997001	RES CF 1/4W 5% 100K	R12 R16 R33-34 R56 R122 R133 R135-136 R140 R196-197 R228 R277-279 R282 R668
61	0024981001	RES CF 1/4W 5% 10K	R8 R10 R14 R24 R26 R28-29 R32 R38 R48 R50-51 R54 R60 R69 R72-74 R77 R79 R82-83 R89 R99 R106 R110 R115 R117-118 R120-121 R124-129 R131-132 R137 R141 R157-158 R236 R241 R253 R265 R276 R285 R290 R601-606 R657-658 R664-665 R671
1	0024998001	RES CF 1/4W 5% 120K	R21
3	0024983001	RES CF 1/4W 5% 12K	R143 R188-189
2	0029539001	RES CF 1/4W 5% 13K	R61-62
5	0024999001	RES CF 1/4W 5% 150K	R41 R95 R251 R256 R271
4	0024985001	RES CF 1/4W 5% 15K	R642 R647 R651 R656
2	0024986001	RES CF 1/4W 5% 18K	R633 R638
11	0024965001	RES CF 1/4W 5% 1K	R17 R93 R103 R151 R153 R646 R655 R803-804 R811 R817
18	0025069001	RES CF 1/4W 5% 1M	R9 R15 R27 R30 R39 R59 R64 R94 R104 R139 R240 R246 R270 R274 R302-303 R670 R673
6	0024971001	RES CF 1/4W 5% 2.2K	R235 R248 R257 R652 R810 R816
1	0025075001	RES CF 1/4W 5% 2.2M	R289
5	0029455001	RES CF 1/4W 5% 2.4K	R87 R97 R198-199 R634
1	0024942001	RES CF 1/4w 5% 22 ohm LL	R806
6	0024956001	RES CF 1/4W 5% 220 OHM	R90-91 R100-101 R123 R134
1	0025059001	RES CF 1/4W 5% 220K	R19
18	0024987001	RES CF 1/4W 5% 22K	R46 R52 R227 R242-243 R252 R261 R263-264 R266-267 R272 R286 R288 R661-662 R672 R674
2	0024988001	RES CF 1/4W 5% 27K	R144-145
1	0029005001	RES CF 1/4W 5% 2K	R643
7	0024973001	RES CF 1/4W 5% 3.3K	R40 R617-618 R620 R622-623 R625
2	0026504001	RES CF 1/4W 5% 3.6K	R65-66
4	0024975001	RES CF 1/4W 5% 3.9K	R192-193 R628 R640
4	0028865001	RES CF 1/4W 5% 30K	R639 R644 R648 R653
3	0025061001	RES CF 1/4W 5% 330K	R49 R262 R275
3	0024989001	RES CF 1/4W 5% 33K	R627 R630 R635
1	0024960001	RES CF 1/4w 5% 390 ohm	R807
1	0025063001	RES CF 1/4W 5% 390K	R53
7	0024991001	RES CF 1/4W 5% 39K	R68 R80 R84 R105 R109 R186-187
4	0029610001	RES CF 1/4W 5% 3K	R619 R621 R624 R626
1	0029472001	RES CF 1/4W 5% 4.3K	R649
5	0024977001	RES CF 1/4W 5% 4.7K	R55 R57 R142 R176 R631
1	0025079001	RES CF 1/4w 5% 4.7m LL	R284
1	0029592001	RES CF 1/4w 5% 43 ohm LL	R184
2	0029451001	RES CF 1/4w 5% 430 ohm LL	R174-175

**PRINTED CIRCUIT BOARD ASSEMBLY (CONT)**

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
5	0024947001	RES CF 1/4W 5% 47 OHM	R81 R85 R146 R194-195
9	0024961001	RES CF 1/4W 5% 470 OHM	R1-R2 R204-207 R280 R287 R293
5	0025065001	RES CF 1/4W 5% 470K	R7 R45 R233 R247 R669
14	0024993001	RES CF 1/4W 5% 47K	R42 R71 R108 R111-112 R114 R147-150 R152 R154 R163 R281
1	0028034001	RES CF 1/4W 5% 5.1K	R291
5	0024978001	RES CF 1/4W 5% 5.6K	R11 R35 R76 R659 R663
2	0025066001	RES CF 1/4w 5% 560k LL	R258-259
4	0024994001	RES CF 1/4W 5% 56K	R75 R78 R641 R650
1	0028948001	RES CF 1/4W 5% 6.2K	R63
3	0024979001	RES CF 1/4W 5% 6.8K	R237 R666-667
1	0029596001	RES CF 1/4W 5% 62 OHM	R185
7	0024995001	RES CF 1/4W 5% 68K	R92 R102 R138 R181 R234 R629 R632
2	0025942001	RES CF 1/4W 5% 7.5K	R645 R654
1	0028153001	RES CF 1/4W 5% 75K	R283
2	0029581001	RES CF 1/4W 5% 8.2 OHM	R170-171
1	0024980001	RES CF 1/4W 5% 8.2K	R636
2	0024964001	RES CF 1/4w 5% 820 ohm LL	R172-173
4	0025068001	RES CF 1/4W 5% 820K	R239 R245 R269 R273
1	0029613001	RES CF 1/4w 5% 91k LL	R260
1	0027627001	RES FILM 1W 5% 10 OHM	R224
2	0027348001	RES FILM 1W 5% 3.3K	R202-203
1	0053946001	RES FILM 2W 5% 180K	R297
3	0036921001	RES FILM 2W 5% 1k	R805 R812 R818
2	0027628001	RES FILM 2W 5% 47 OHM	R225-226
1	0041810001	RES FILM 2W 5% 6.8K	R298
2	0036960001	RES FUSE MF 1/4w 5% 47ohm T/R	R200-201
2	0015582001	RES MF 1/4w 1% 10k LL	R250 R254
1	0016965001	RES MF 1/4w 1% 12.1k	R249
1	0027632001	RES MF 1/4w 1% 2.43k LL	R231
1	0036379001	RES MF 1/4w 1% 23.7k LL	R255
1	0016961001	RES MF 1/4w 1% 6.81k LL	R232
5	0051731001	RES MF FUSE 1/4W 5% 1K ohm T/R	R161-162 R182-183 R304
2	0041738001	RES MOX 1W 15k 5% LL	R190-191
1	0028022001	RES MOX 2W 120 OHM 5%	R294
2	0031008001	RES MOX 2W 240 ohm 5%	R295-296
2	0036470001	RES MOX FP 1W 5% 10K	R299-300
2	0041741001	RES MOX FP1/2W 5% 47 ohm	R164-165
8	0050815001	RES WW 3W 5% .05 OHM LL	R220-223 R212-215
8	0050814000	RES WW BT 5W 10% .15 OHM	R216-219 R208-211
2	0053921000	RES WW 5W 1.3kohm10	R168-169

**PRINTED CIRCUIT BOARD ASSEMBLY (CONT)**

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
3	0054207000	RES WW 5W 2.2ohm 10	R801 R808 R814
2	0053922000	RES WW 10W 470ohm10	R166-167
20	0032934000	SCRW TF 4-40x1/2 HIHS ZI	@ Q16-17 Q21-38
17	0027638000	SCRW TF 4-40x3/8 HWHS ZI .1"HD	@ U21-22 Q10-11 Q13 Q19-20 CR56-57 PLUS 8 @ HEATSINK
2	0028500000	SCRW TF 8-32x3/4 HWH SLTD Z1	
1	0051411000	SPACER LED .4X.1 TURQUOISE	@ LD61
4	0036178000	SPACER LED .5x.1 BRN	@ LD3-5 LD6
1	0050817000	SWITCH PB PC VERT MNT DPDT	S61
8	0028091000	SWITCH PUSH SLFLK SHORT STROKE	S1-8
1	0053923003	THERMAL SENSOR PTC 80 DEG C	RT2
1	0052051000	THERMISTOR, NTC 20	TH1
1	0051418003	THERMISTOR, PTC100 DEG C	RT1
2	0029167000	TUBE SOCKET 9 PIN PCB MOUNT	
20	0032937000	WSHR CONE	
4	0017746000	WSHR SHLDR NYL 1/8x1/4	
1	0027325000	XFMR LINE OUTPUT	T1
10	0054418000	XISTOR NPN 2SC3263	Q16 Q21 Q23-30
10	0054417000	XISTOR PNP 2SA1294	Q17 Q22 Q31-38
10	0041465003	XSTR N-CH JFET J113 TO-92	Q1-7 Q46 Q61-62
1	0016739003	XSTR NPN 2N4401 TO-92	Q45
1	0025751003	XSTR NPN 2SC2362K/2SC2389STPS	Q8
3	0028760000	XSTR NPN 2SC4793/2SC3298B	Q11 Q18-19
4	0051448003	XSTR NPN 2SD1857	Q12 Q14 Q82 Q86
1	0028164000	XSTR NPN MJE15030	Q88
2	0014867003	XSTR NPN MPSW42 (TO-92)	Q83 Q87
7	0016742003	XSTR PNP 2N4403 TO-92	Q39 Q41-44 Q63 Q84
2	0025752003	XSTR PNP 2SA1038STPS	Q9 Q40
3	0028759000	XSTR PNP 2SA1837 TOP-220	Q10 Q13 Q20
2	0051447003	XSTR PNP 2SB1236	Q15 Q89
2	0028166000	XSTR PNP MJE15031	Q81 Q85
1	0014866003	XSTR PNP MPSW92 TO-226AE	Q90

**CHASSIS ASSEMBLY**

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	025905	BUSHING SR .875x.125x3/4 7-K-2	230V/240V UNITS
1	025907	BUSHING SR .875x.125x3/4 7-W-2	120V/100V UNITS
1	040994	CABLE ASSY PWR 10A U.K..250TAB	230V UK
1	048912	CABLE ASSY PWR 14GA 120V .250	120V
1	026622	CABLE ASSY PWR 14GA 230V .250	230V
1	038602	CABLE ASSY PWR AUST .250 TAB	240V AUST
1	051651	CHASSIS TOP SUNN 1200S	
1	051649	CHASSIS WRAP SUNN 1200S	
1	053911	COOLING FAN, DC 24V	
2	049650	CORD WRAP STYLE 2	
1	020802	FUSE QA 20mmx5mm 250v 10A	230V/240V VERSIONS
1	032030	FUSE TD 1-1/4x1/4 250v 20A	120V/100V VERSIONS
11	019798	KNOB ROTARY SS	
1	053439	LEXAN LAMP SHADE	
1	069393	NUT 6-32 HEX EXT LOCK	GND SCREW
5	016352	NUT HEX 3/8-32x3/32 TK NI	AT 1/4" JACKS
1	028272	NUT KEP 1/4x20 FOJ	FOR XFORMER
4	022004	NUT KEPS #8-32 ZINC	FAN MOUNT
1	053912	PCB ASSY SUNN 1200S	
2	051652	RACK EAR SUNN 1200S	
1	053910	SCREW M 1/4-20 x 3" CAR BLX	FOR XFORMER
2	037623	SCREW TC25 6 x 1/2" PHP ZI	@ CORD WRAPS
6	026501	SCRW C 1/4-20x1/2 HH BLK	RACK EARS TO CHASSIS
4	033051	SCRW M 6-32x1/2 PHP ZI LW	MAIN HS TO STDOFFS
4	033051	SCRW M 6-32x1/2 PHP ZI LW	H.S. TO STDOFF
10	014999	SCRW M 6-32x1/4 PHP BLX	EQ PCB AND PCB STD OFF
1	9904101500	SCRW M 6-32x3/8 PHPS BLX ITLW	GND SCREW
4	069385	SCRW M 6-32x5/8 PHP ZI	EQ PCB to STD OFF
4	029656	SCRW M 8-32x3/8 PHP BLX SEM/LW	FAN MOUNT
10	031184	SCRW M6-32x1/4 PHPS BLX ITLW	MAIN PCB TO CHASSIS
2	051155	SCRW SMB #4X3/8 PHP BLX	@ XLR jack
19	028684	SCRW SMB 6x3/8 PH PHS BLX	@ CHASSIS PANELS
10	031073	STANDOFF 6-32x3/8 RND AL	MAIN PCB TO CHASSIS
4	053931	STANDOFF 6-32x9/16 RND AL	
4	037783	STANDOFF NYL PCB SNAP 1/4" NAT	EQ SANDWICH
4	053952	STANDOFF, NYLON BLACK .250"	
1	040582	SWITCH DPST .250 TAB GLOBAL	EXPORT
1	039236	SWITCH ROCKER DPST PSEUDO-IEC	DOMESTIC

# PARTS LIST

## CHASSIS ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	013341	TUBE 7025/12AX7WA RUSSIAN MADE	12AX7A
1	9904300900	WASHER FLAT 1/4X1 STL BLX	FOR XFORMER
4	027520	WSHR FLAT .380x.630 FIBER	AT SPEAKER JACKS
5	031153	WSHR FLAT 3/8x.614 NI	AT 1/4" JACKS
1	016436	WSHR LCK INTL 3/8x.687x.035 NI	AT 1/4" INPUT JACK
4	026401	WSHR SHLDR FIBER 3/8x5/8	AT SPEAKER JACKS
6	022285	WSHR SP LOCK 1/4x.493 ZI	RACK EARS TO CHASSIS
1	053909	XFRMR POWER TOROIDAL 100V 1200H	100V
1	053908	XFRMR POWER TOROIDAL 230V 1200H	230V/240V
1	050855	XFRMR POWER TOROIDAL DOMESTIC 1200H	120V

### END ITEM

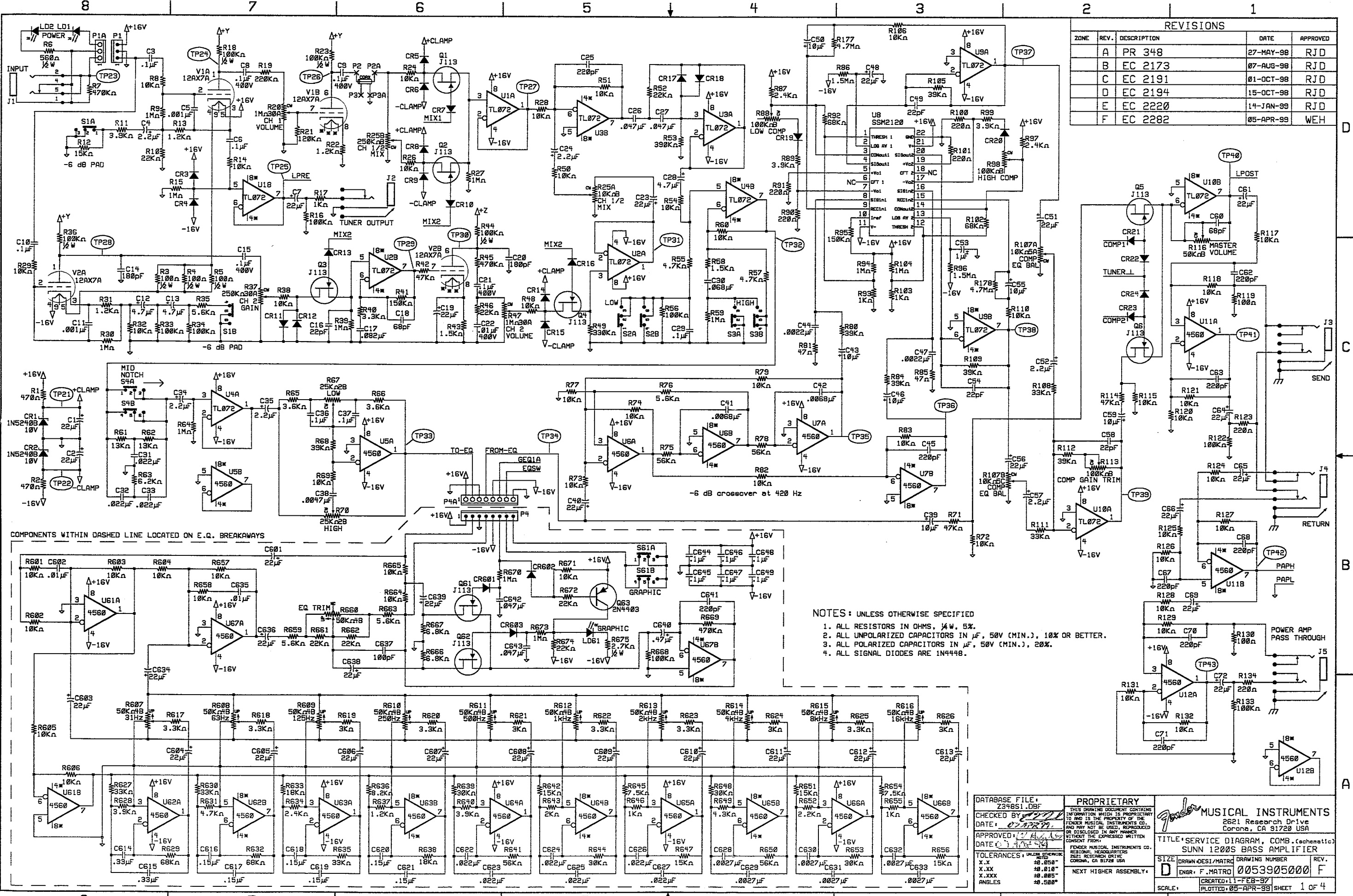
QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	053899	CHASSIS ASSY SUNN 1200S 120V	
1	053900	CHASSIS ASSY SUNN 1200S 240V AUST	
1	053901	CHASSIS ASSY SUNN 1200S 230V UK	
1	053902	CHASSIS ASSY SUNN 1200S 230V	
1	053903	CHASSIS ASSY SUNN 1200S 100V	
1	053895	FOOTSWITCH 3 BUTTON SUNN BASS	

### FOOTSWITCH END ITEM

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	053897	PCB ASSY FTSW 3 BTN SUNN BASS	
1	053896	PLATE FTSW 3 BTN SUNN BASS	
1	028895	CABLE ASSY FTSW RT ANG 12'	
1	028109	HSG END CUP LEFT FTSW	
1	028143	HSG END CUP RIGHT FTSW	
1	028141	HSG FTSW 3 BUTTON	
1	031647	NUT HEX 12mmx1mm NI	
8	028684	SCRW SMB 6x3/8 PH PHS BLX	
3	031899	WSHR NYL .485x.775x.150 TK	

### FOOTSWITCH PCB ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	053898	PCB FAB FTSW 3 BTN SUNN BASS	
2	000626	DIODE 1N4448 SIGNAL LL	
1	031017	DIODE ZEN 1N5223B 2.7V 5%	
2	027327	DIODE ZEN 1N5234B 6.2V	
3	028039	LED RED 5x5MM SLB-55VR3	
1	037036	JACK PHONE PCB MONO CA PREMIUM	
3	041527	SPACER RND NYL .680x.250x.147	
3	028714	SWITCH PUSH SPDT	



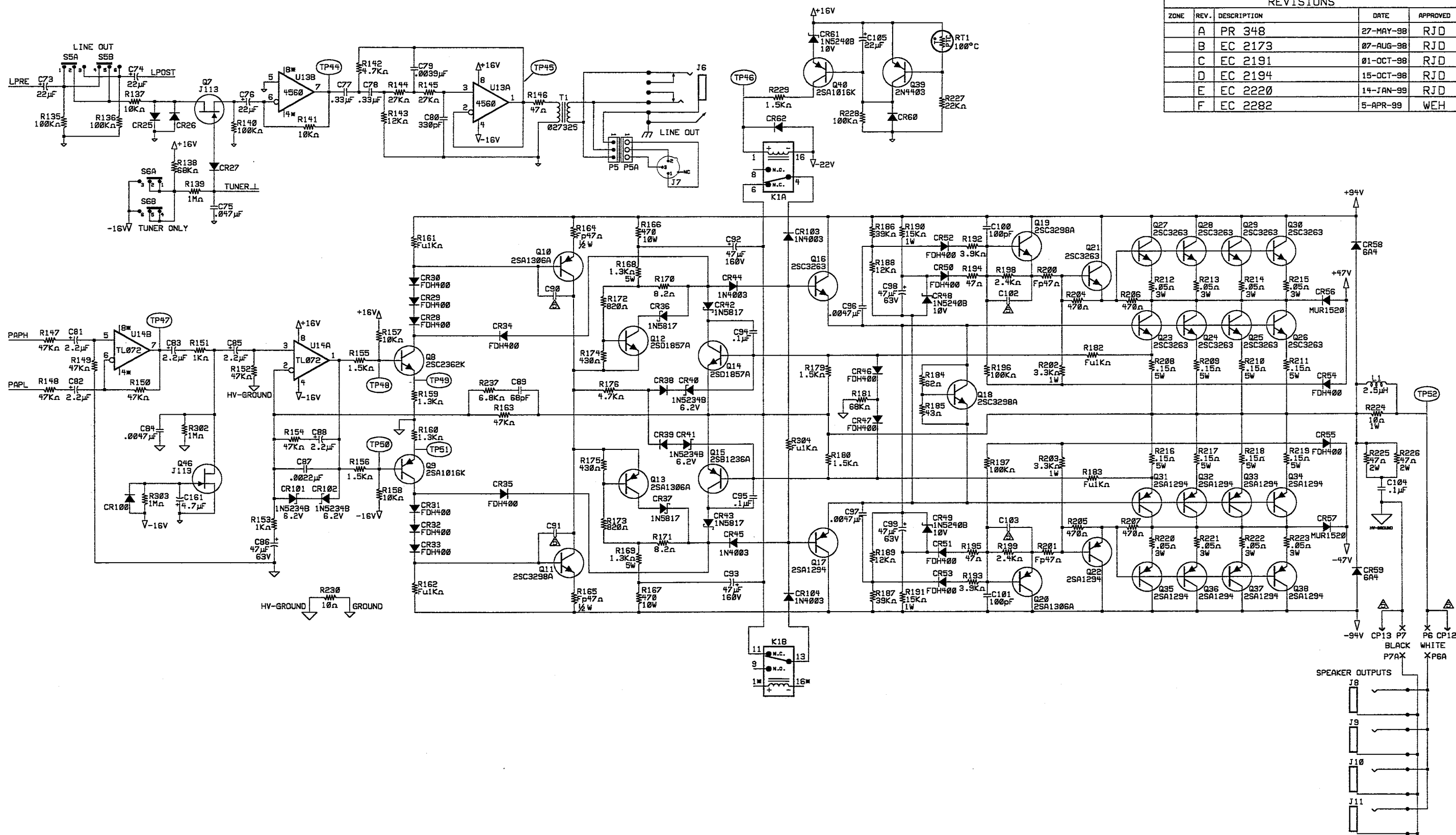
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PR 348	27-MAY-98	RJD
	B	EC 2173	07-AUG-98	RJD
	C	EC 2191	01-OCT-98	RJD
	D	EC 2194	15-OCT-98	RJD
	E	EC 2220	14-JAN-99	RJD
	F	EC 2282	05-APR-99	WEH

- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS IN OHMS, 1/4 W, 5%.
  2. ALL UNPOLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 10% OR BETTER.
  3. ALL POLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 20%.
  4. ALL SIGNAL DIODES ARE 1N4448.

DATABASE FILE: Z34851.DBF CHECKED BY: DATE: APPROVED: DATE:	<b>PROPRIETARY</b> THIS DRAWING DOCUMENT CONTAINS INFORMATION WHICH IS PROPRIETARY TO AND IS THE PROPERTY OF THE FENDER MUSICAL INSTRUMENTS CO. AND MAY NOT BE USED, REPRODUCED OR DISCLOSED IN ANY MANNER WITHOUT THE EXPRESS WRITTEN CONSENT FROM FENDER MUSICAL INSTRUMENTS CO. HEADQUARTERS 2321 RESEARCH DRIVE CORONA, CA 91728 USA NEXT HIGHER ASSEMBLY:	<b>Fender</b> MUSICAL INSTRUMENTS 2621 Research Drive Corona, CA 91728 USA TITLE: SERVICE DIAGRAM, COMB. (Schematic) SUNN 1200S BASS AMPLIFIER SIZE: DRAWING NUMBER: 0053905000 ENGR: F. MATRO CREATED: 11-FEB-97 PLOTTED: 05-APR-99 SHEET 1 OF 4
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PR 348	27-MAY-98	RJD
	B	EC 2173	07-AUG-98	RJD
	C	EC 2191	01-OCT-98	RJD
	D	EC 2194	15-OCT-98	RJD
	E	EC 2220	14-JAN-99	RJD
	F	EC 2282	5-APR-99	WEH



- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS IN OHMS, 1/4W, 5%.
  2. ALL UNPOLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 10% OR BETTER.
  3. ALL POLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 20%.
  4. ALL SIGNAL DIODES ARE 1N4448.
- ⊠ C90-91, C102-103, CP12-13 NOT STUFFED.

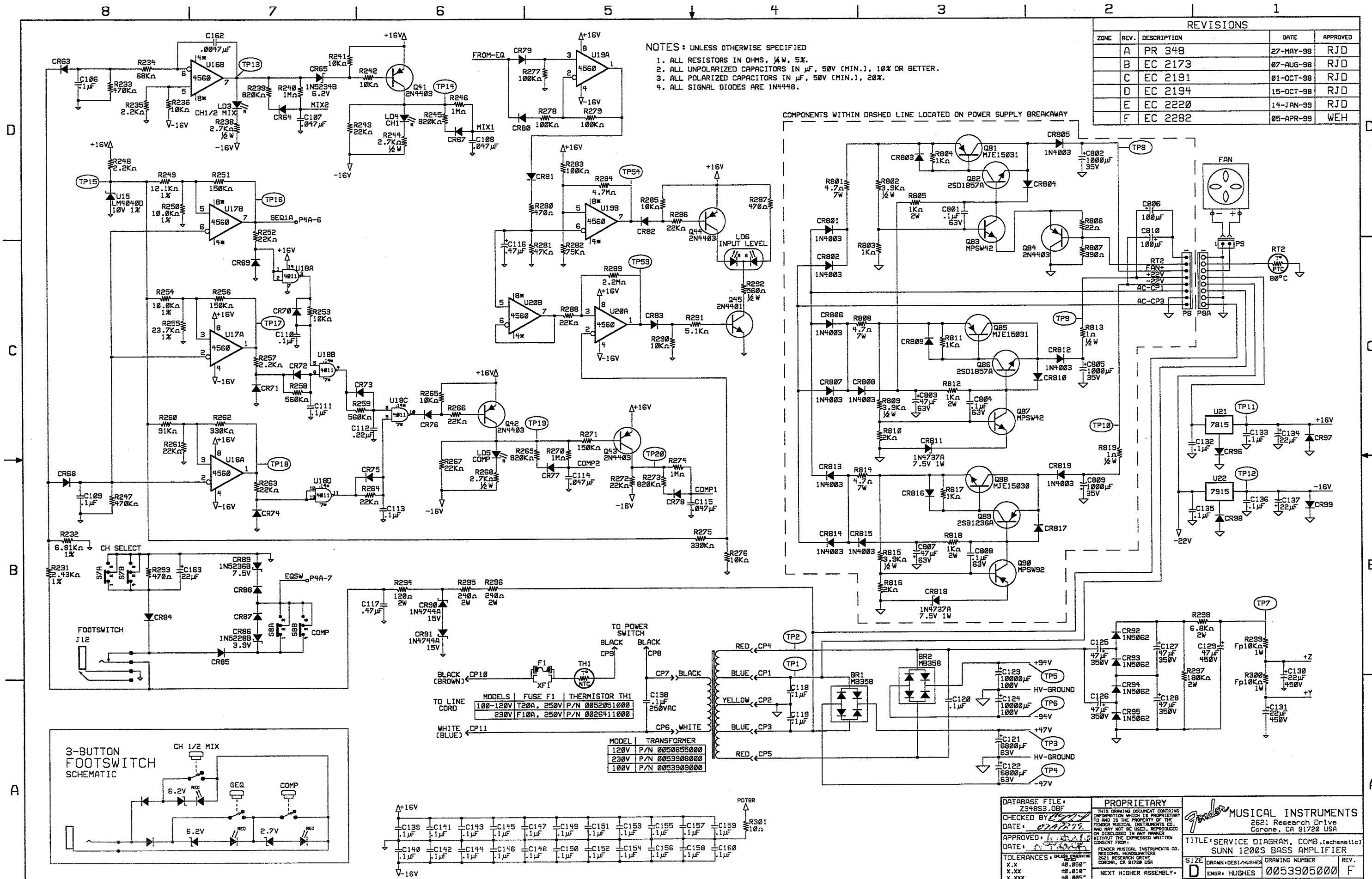
DATABASE FILE: 234852.OBF CHECKED BY: [Signature] DATE: 02/27/99 APPROVED: [Signature] DATE: 02/27/99 TOLERANCES: UNLESS OTHERWISE NOTED X.X .05% X.XX .01% X.XXX .005% ANGLES .500°	PROPRIETARY THIS DRAWING DOCUMENT CONTAINS INFORMATION WHICH IS PROPRIETARY TO AND IS THE PROPERTY OF THE FENDER MUSICAL INSTRUMENTS CO. AND MAY NOT BE USED, REPRODUCED OR DISCLOSED IN ANY MANNER WITHOUT THE EXPRESSED WRITTEN CONSENT FROM: FENDER MUSICAL INSTRUMENTS CO. REGIONAL HEADQUARTERS 2621 RESEARCH DRIVE CORONA, CA 91720 USA NEXT HIGHER ASSEMBLY:	Fender MUSICAL INSTRUMENTS 2621 Research Drive Corona, CA 91720 USA TITLE: SERVICE DIAGRAM, COMB. (schematic) SUNN 1200S BASS AMPLIFIER SIZE: DRAWN: DESI/HUGHES D ENGR: HUGHES 0053905000 F CREATED: 11-FEB-97 PLOTTED: 05-APR-99 SHEET 2 OF 4
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REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A	PR 348		27-MAY-98	RJD
B	EC 2173		07-AUG-98	RJD
C	EC 2191		01-OCT-98	RJD
D	EC 2194		15-OCT-98	RJD
E	EC 2220		14-JAN-99	RJD
F	EC 2282		05-APR-99	WEH

- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS IN OHMS, 1/4W, 5%.
  2. ALL UNPOLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 10% OR BETTER.
  3. ALL POLARIZED CAPACITORS IN  $\mu$ F, 50V (MIN.), 20%.
  4. ALL SIGNAL DIODES ARE 1N4448.

COMPONENTS WITHIN DASHED LINE LOCATED ON POWER SUPPLY BREAKAWAY



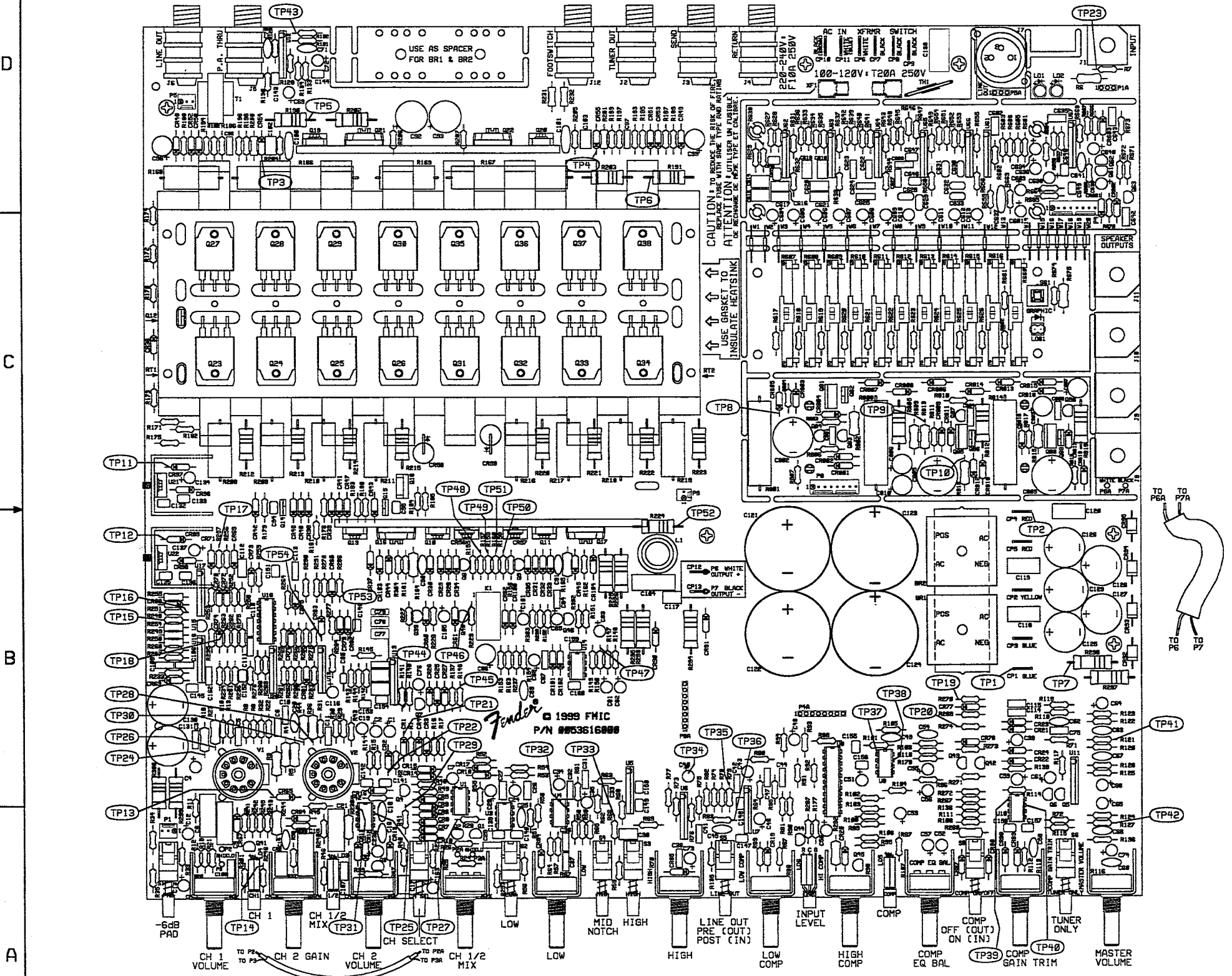
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	PR 348	27-MAY-98	RJD
	B	EC 2173	07-AUG-98	RJD
	C	EC 2191	01-OCT-98	RJD
	D	EC 2194	15-OCT-98	RJD
	E	EC 2220	14-JAN-99	RJD
	F	EC 2282	05-APR-99	WEH

ALL AC AND DC VOLTAGES READ TO GROUND WITH A DVM UNDER THE FOLLOWING CONDITIONS: (UNLESS OTHERWISE NOTED)

1. UNIT AT RATED LINE VOLTAGE.
2. 8 OHM RESISTIVE LOAD CONNECTED AT SPEAKER OUTPUTS (TP52).
3. 12AX7A TUBES INSTALLED IN SOCKETS LABELED V1 AND V2.
4. ALL CONTROLS AT CENTER ROTATION (5 1/2).
5. ALL SWITCHES OUT.
6. 25.8 mV 420Hz SINEWAVE APPLIED TO J1 (TP23).
7. NO FOOTSWITCH CONNECTED.

TP#	DC VOLTS	AC VOLTS	ADDITIONAL CONDITIONS/NOTES
1		33	
2		66	
3	+47		
4	-47		
5	+94		
6	-94		
7	+356		
8	+10		CAN VARY DEPENDENT UPON MAIN HEATSINK TEMPERATURE
9	+22		
10	-22		
11	+16		
12	-16		
13	+15		WITH S7 (CH SELECT) DEPRESSED
14	+15		WITH S7 (CH SELECT) DEPRESSED
15	+10		
16	+15		WITH S61 (GRAPHIC) DEPRESSED
17	+15		WITH S8 (COMP) AND S61 (GRAPHIC) DEPRESSED
18	+15		WITH S8 (COMP) DEPRESSED
19	+15		WITH S8 (COMP) DEPRESSED
20	+15		WITH S8 (COMP) DEPRESSED
21	+10		
22	-10		
23		25.8mV	
24	+166	382mV	
25		20mV	
26	+166	1V	
27		1V	
28	+166	70.5mV	WITH S7 (CH SELECT) DEPRESSED AND 5.9mV INPUT AT J1
29		548mV	WITH S7 (CH SELECT) DEPRESSED AND 5.9mV INPUT AT J1
30	+185	30.5V	WITH S7 (CH SELECT) DEPRESSED AND 5.9mV INPUT AT J1
31		1V	WITH S7 (CH SELECT) DEPRESSED AND 5.9mV INPUT AT J1
32		1V	
33		1V	
34		1V	
35		500mV	
36		500mV	
37		1V	MAXIMUM
38		1V	MAXIMUM
39		1V	MAXIMUM
40		500mV	
41		500mV	
42		500mV	
43		500mV	
44		25.8mV	
45		25.8mV	
46	+3		5 SECONDS AFTER POWER ON
47		500mV	
48	+2.0		NO INPUT SIGNAL
49	+1.5		NO INPUT SIGNAL
50	-2.0		NO INPUT SIGNAL
51	-1.5		NO INPUT SIGNAL
52		24V	
53	-15		NO INPUT SIGNAL
54	+15		
54	-15		WITH R20 (CH 1 VOL) AT 10 (CW), INPUT SIGNAL AT 100mV



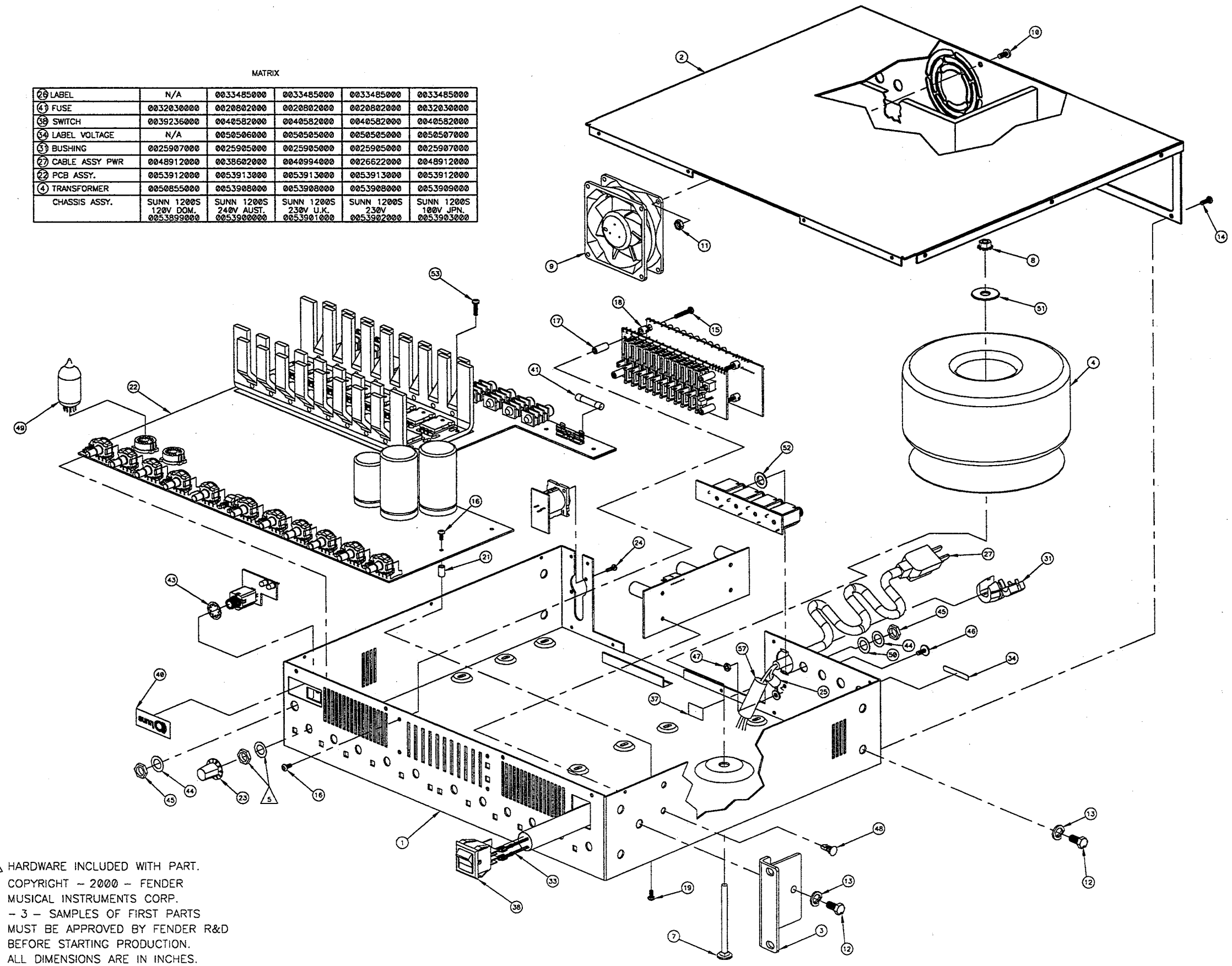
FILM/DWG: SERVICE DIAGRAM  
 DATABASE: Z348P.DBF DATE: 05-APR-99  
 LAYERS PLOTTED: 1 2 3 4  
 18 19

DATABASE FILE: Z348P.DBF CHECKED BY: DATE: APPROVED: DATE:	<b>PROPRIETARY</b> THIS DRAWING DOCUMENT CONTAINS INFORMATION WHICH IS PROPRIETARY TO AND IS THE PROPERTY OF THE FENDER MUSICAL INSTRUMENTS CO. AND MAY NOT BE USED, REPRODUCED OR DISCLOSED IN ANY MANNER WITHOUT THE EXPRESSED WRITTEN CONSENT FROM: FENDER MUSICAL INSTRUMENTS CO. REGIONAL HEADQUARTERS 2621 RESEARCH DRIVE CORONA, CA 91720 USA NEXT HIGHER ASSEMBLY:	<b>Fender</b> MUSICAL INSTRUMENTS 2621 Research Drive Corona, CA 91720 USA TITLE: SERVICE DIAGRAM, COMB. (PCB) <b>SUNN 1200S BASS AMPLIFIER</b> SIZE: DRAWN: B.DESI DRAWING NUMBER: REV. ENGR: HUGHES 0053905000 F SCALE: CREATED: 27-MAR-99 PLOTTED: 05-APR-99 SHEET 4 OF 4
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REV	EC NUMBER	BY	DATE
C	EC 2191	GHG	10/5/98
D	EC 2194	GHG	10/14/98
E	EC 2378 - CHG ITEM 58 TO 25 ADD ITEM 26	BW	1/13/2000


MATRIX

QTY	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION
25	N/A	0033485000	0033485000	0033485000	0033485000
4	0032030000	0020802000	0020802000	0020802000	0032030000
38	0039236000	0040582000	0040582000	0040582000	0040582000
34	N/A	0050506000	0050505000	0050505000	0050507000
31	0025907000	0025905000	0025905000	0025905000	0025907000
27	0048912000	0038602000	0040994000	0026622000	0048912000
22	0053912000	0053913000	0053913000	0053913000	0053912000
4	0050855000	0053908000	0053908000	0053908000	0053908000
CHASSIS ASSY.		SUNN 1200S 120V DOM. 0053899000	SUNN 1200S 240V AUST. 0053900000	SUNN 1200S 230V U.K. 0053901000	SUNN 1200S 230V 0053902000



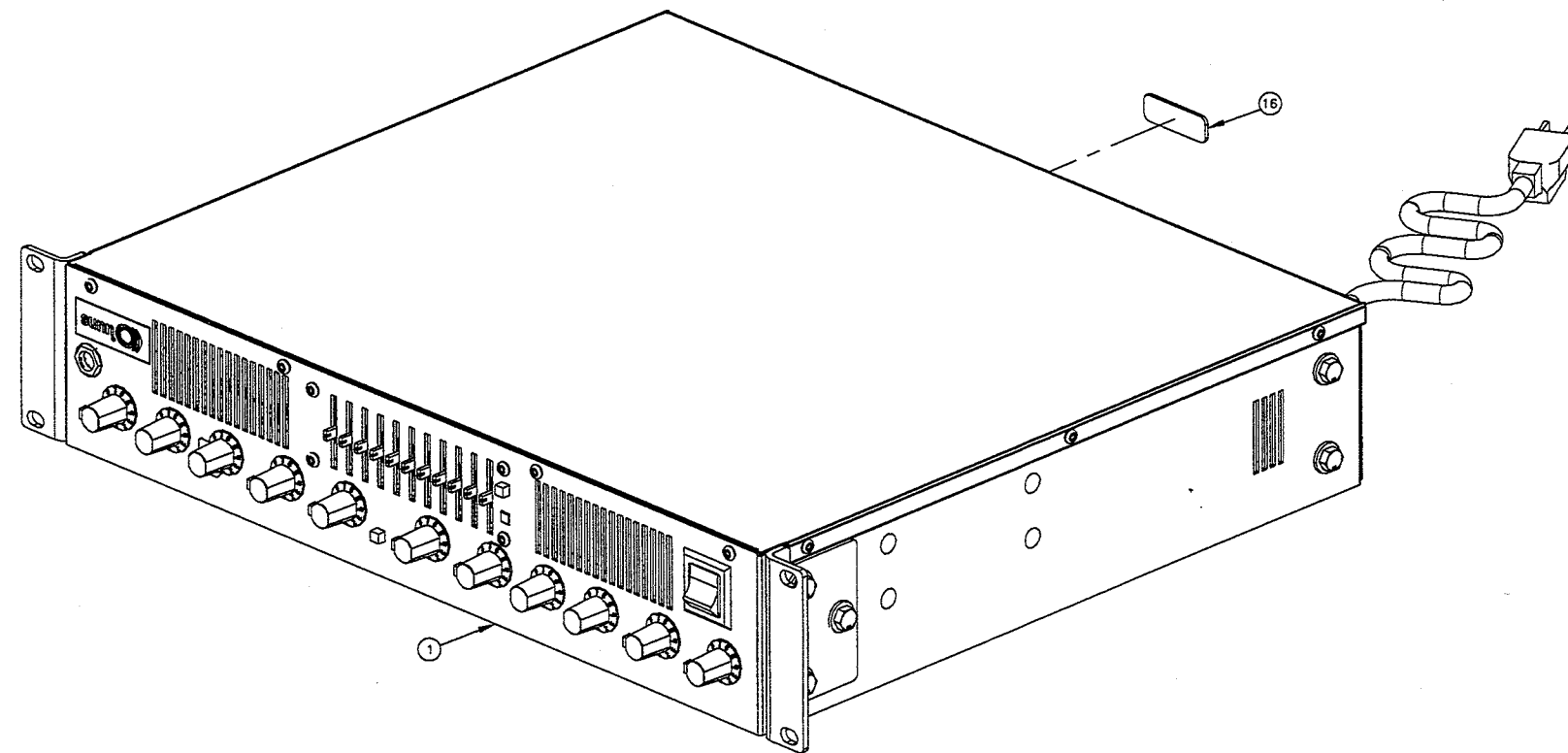
(N.S.) = NOT SHOWN

ITEM	QTY.	PART NO.	DESCRIPTION
57	.25	0023978000	TUBING SHRINK 1/2 BLK
53	4	0033051000	SCRW M 6-32x1/2 PHP ZI LW
52	4	0026401000	WSHR SHLDR FIBER 3/8x5/8
51	1	9904300900	WSHR FLAT 1/4x1 STL BLK
50	4	0027520000	WSHR FLAT .380x.630 FIBER
49	2	0013341000	TUBE 7025/12AX7WA RUSSIAN MADE
48	4	0053952000	STANDOFF, NYLON BLACK .250
47	1	0069393000	NUT 6-32 HEX EXT LOCK
46	1	9904101500	SCRW M 6-32x3/8 PHPS BLX ITLW
45	5	0016352000	NUT HEX 3/8-32x3/32 TK NI
44	5	0031153000	WSHR FLAT 3/8x.614 NI
43	1	0016436000	WSHR LCK INTL 3/8x.687x.035 NI
41	1	SEE MATRIX	FUSE
40	1	0053439000	LEXAN, INSERT 1200S
38	1	SEE MATRIX	SWITCH
37	1	0013020000	LABEL GROUNDING SEMKO
34	1	SEE MATRIX	LABEL VOLTAGE
33	1	0053914000	WIRE SET SUNN 1200S CHASSIS ASSY
31	1	SEE MATRIX	BUSHING
27	1	SEE MATRIX	CABLE ASSY PWR
26	1	SEE MATRIX	LABEL MADE IN USA 1-3/4 x 7/32 (N.S.)
25	.25	0088013000	TUBING SHRINK 3/8 BLACK
24	2	0051155000	SCRW SMB #4x3/8 PHP BLX
23	11	0019798000	KNOB ROTARY SS
22	1	SEE MATRIX	PCB ASSY SUNN 1200S
21	10	0031073000	STANDOFF 6-32x3/8 RND AL
19	10	0031184000	SCRW M6-32x1/4 PHPS BLX ITLW
18	4	0037783000	STANDOFF NYL PCB SNAP 1/4" NAT
17	4	0053931000	STANDOFF 6-32x9/16 RND AL
16	14	0014999000	SCRW M 6-32x1/4 PHP BLX
15	4	0069385000	SCRW M 6-32x5/8 PHP ZI
14	19	0028684000	SCRW SMB 6x3/8 PH PHS BLX
13	10	0022285000	WSHR SP LOCK 1/4x.493 ZI
12	10	0026501000	SCRW C 1/4-20x1/2 HH BLK
11	4	0022004000	NUT KEPS #8-32 ZINC
10	4	0029656000	SCRW M 8-32x3/8 PHP BLX SEM/LW
9	1	0053911000	24VDC FAN ASSY.
8	1	0028272000	NUT KEP 1/4x20 FOJ
7	1	0053910000	SCREW M 1/4-20 x 3" CAR BLX.
4	1	SEE MATRIX	TRANSFORMER
3	2	0051652000	RACK EAR SUNN 1200S
2	1	0051651000	CHASSIS, TOP, SUNN 1200S
1	1	0051649000	CHASSIS, WRAP, SUNN 1200S

ENGINEER HUGHES		 FENDER MUSICAL INSTRUMENTS CORP. CORONA, CALIFORNIA 91720
DRAWN GOOLER		
DATE 5/5/98		
DFT. DATE	ENG. DATE	TITLE CHASSIS ASSEMBLY SUNN 1200S
DATE	DATE	SHEET 1/1
DATE	DATE	SCALE N/A
DATE	DATE	SIZE D
DATE	DATE	DRAWING NUMBER 0053899000
DATE	DATE	REV. E
DATE	DATE	MASTER/ASSEMBLY

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REV	EC NUMBER	BY	DATE/WORK
A	PR 348	GHG	5/27/98
B	EC 2175/2155	GHG	8/19/98
C	EC 2194	GHG	10/13/98
D	CR 199 CHG BOM	JR	2/2/99



4. COPYRIGHT - 1999 - FENDER MUSICAL INSTRUMENTS CORP.
  3. - 3 - SAMPLES OF FIRST PARTS MUST BE APPROVED BY FENDER R&D BEFORE STARTING PRODUCTION.
  2. ALL DIMENSIONS ARE IN INCHES.
  1. DO NOT SCALE DRAWING.
- NOTES: UNLESS OTHERWISE NOTED

N.S.=NOT SHOWN

20	1	0054813000	CABLE ASSY SPEAKER SUNN (N.S.)
19	1	0054807000	BRACKET, REAR RACK 1200S (N.S.)
18	2	0054808000	BRACKET, REAR CHASSIS 1200S (N.S.)
17	4	0025743000	SCRW M 10-32x1/2 PHP BLX (N.S.)
16	1	0049081000	LABEL SERIAL (CORONA)
15	1	0053924000	END CAP SET (N.S.)
14	1	0053916000	CARTON SUNN 1200S (N.S.)
13	1	0010032000	BAG POLY BOX BTM 23x17x40 .002 (N.S.)
12	4	9903311400	BAG JIFFY #1 7-1/4x12 (N.S.)
11	1	9903320000	BAG POLY ZIP 10x13 2M (N.S.)
10	1	0053905000	SERVICE DIAGRAM, COMB SUNN 1200S (N.S.)
9	1	0053904000	MANUAL OWNERS SUNN 1200S (N.S.)
6	1	0053895000	FTSW 3 BUTTON SUNN BASS (N.S.)
1	1	SEE MATRIX	CHASSIS ASSY.

ITEM	QTY.	PART NO.	DESCRIPTION
ENGINEER HUGHES			
DRAWN GOOLER			
DATE 5/11/98			
DFT.	ENG.	ENG.	TITLE
DATE	DATE	DATE	END ITEM SUNN 1200S
APPROVED WLF	DATE 8 Feb 99		
SHEET 1/1	SCALE N/A	SIZE D	DRAWING NUMBER 0213300000
			REV. D

MATRIX

① CHASSIS ASSY	0053899000	0053900000	0053901000	0053902000	0053903000
END ITEM	SUNN 1200S 120V DOM. 0213300000	SUNN 1200S 240V AUST. 0213330000	SUNN 1200S 230V U.K. 0213340000	SUNN 1200S 230V 0213350000	SUNN 1200S 100V JAP. 0213370000