

TONE-MASTER

CUSTOM SHOP SERIES

SERVICE MANUAL



CONTENTS:

- Notices
- Theory of Operation
- Parts lists:
 - PCB assembly
 - Chassis assembly
 - Cabinet assembly
 - Alt. Enclosures
 - Miscellaneous
- Schematics/diagrams

TONE-MASTER

(This is the model name for warranty claims)

SERVICE MANUAL

OCTOBER 1994 REV A TYPE CSR 3

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

TONE-MASTER

THEORY OF OPERATION

The input to J1 feeds pin 7 of V1B. This is the first preamp stage for both the A and B channels. The signal exits through pin 6, and from there the signal splits, one side goes to R1, the A channel VOLUME control and the other side goes to R5A, the B channel GAIN control. SW1 is the FAT switch for the A channel. SW1 connects the Capacitor C1 to ground to provide a 3dB increase in gain, mostly in the lows and mids. Relay RLY 1A activates that circuit automatically when switching to the B channel. Resistor R15 is there to prevent “popping” of the A channel FAT switch when actuated. NOTE: The FAT switch may pop the first time it is switched. This is due to the tubes warm-up/stabilization cycle.

For the A channel, the signal goes from the VOLUME control to pin 2 of V1A. From here it exits via pin 1 and then feeds the tone control driver section. The signal leaves the tone controls through the TREBLE pot, R2. The signal then goes to the Line Transformer T5, then to the Effects-Loop SEND. The signal is then routed to the EFFECTS RETURN jack, then to Line Transformer T6 and on to Relay RLY 1B, which provides the channel switching from A to B. For the B channel, after the signal leaves the GAIN control R5A, it goes to V2B pin 7. The signal feeds to the tone control driver section. Switch SW3 is the B channel FAT switch, operating on the same principle as the A channel FAT, only this time across R26.

The signal leaves the tone controls through the TREBLE control R6. The signal then goes to the Line Transformer T3 and the Effects Loop SEND, just like the A channel, then back in to Line Transformer T4 and then to Relay RLY 1B which performs channel switching. Relay RLY 2A is used to mute the channel that is not in use so bleeding of channels is eliminated. Relay RLY 2B is used to light LED 1 in the B channel mode. From the channel switching Relay RLY1B, the signal then goes to the Phase Inverter V3A and V3B. It is a classic Fender-style split load type, used without feedback. Capacitors C16 and C17 isolate the high voltage of V3's plates from the B channel master VOLUME control R9. Relays RLY 3A and RLY 3B switch the B channel master Volume control out of the circuit when the amp is in the A channel mode. Capacitors C18 and C19 isolate R9 from the negative voltage (Bias) supplying the 5881 power tubes. The 5881s are used in a push-pull configuration that will produce 100 watts into 4,8, or 16 ohms.

The IMPEDANCE Ω switch is labeled “Low, Med, Hi”. In normal operation of the Tone-Master, this switch serves two functions. One, to set the output impedance of the amplifier to better achieve the cranked-up sound at a lower volume level. On the B channel, with a single Tone-master enclosure, this switch should be set according to the setting of the B channel VOLUME control. For volume setting of 3.5 and lower, “Lo” would be the appropriate setting. For settings of 3.5 to 7, “Med” is best. For settings above 7, “Hi” will produce full power and tone. The impedance switch will not damage or reduce tube life at these settings. What it does do is increase the gain in the “Lo” and “Med” settings and thereby better approximate the “Full Volume” sound at a lower level. Diodes CR7 and CR8 are used to protect the output transformer from arcing due to flyback voltage in the event of a no load output condition. The speaker output jack will short to ground to protect the output transformer in case of no speaker cord plugged in.

SPEAKER ENCLOSURES

All Tone-Master speaker enclosures are configured at 16 ohms. The 212 enclosure (P/N 081300000) with tilt-back legs is loaded with Celestion G12-80 loudspeakers. This cabinet can produce a creamy blues tone, sounding much like it looks. The 412 enclosure (P/N 081300100) features Celestion Vintage 30 loudspeakers. It offers a bright, full bodied sound, great for Hard Rock or Country. Another 212 enclosure (P/N081300300) features a Vintage look and is loaded with two Celestion Vintage 30 loudspeakers.

TONE-MASTER PARTS LIST

PRINTED CIRCUIT BOARD ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	013638	CAP 220 MFD 285V ELEC.	C24,25
1	038691	CAP AE AX 4.7uF 50V	R11
1	031069	CAP AE RDL 10uF 100V 20%	C23
6	024819	CAP AE AX 22uF 500V	C26-31
2	026502	CAP AE AX 100uF 100V	C20,22
1	018741	CAP AE AX 2200uF 50V	C21
4	024835	CAP MPF RDL .022uF 630V 10%	C10,13,14,15
5	024846	CAP MPF RDL .047uF 630V 10%	C9,16,17,18,19
1	024855	CAP MPF RDL .1uF 630V 10%	C32
1	024861	CAP MPF RDL .22uF 250V 10%	C2
2	024880001	CAP MPF 1uF 250V LL	C1,6
3	026202001	CAP PFF .0022uF 600V LL	C3-5
1	025962001	CAP PFF .0047uF 400V LL	C7
2	031780	CAP SLVR MICA 150PF 300V	C8,12
2	064089001	DIODE 1N4003 LL	CR5,6
4	026730001	DIODE 1N4006 800V LL	CR1,2,3,4
3	006260001	DIODE 1N4448 SIGNAL LL	CR9-11
2	029690	DIODE HV 3KV 200MA	CR7,8
2	028119001	DIODE ZEN 1N5353B 16V 5W 5% LL	ZR1,2
1	01669	LED RED PNL MT SUPER BRITE	LED1
3	036613	RELAY DPDT DIP 24V 8.3 MA	RLY1-3
2	026368001	RES CF 1/2W 5% 100Ω LL	R50,61
1	9901218220	RES 1/2W 5% 820 OHM	R30
4	9901251021	RES CF 1/2W 5% 1M LL	R11,28,46,63
9	026549001	RES CF 1/2W 5% 1.5K LL	R12,14,20,25,38,39,56-58
1	036955001	RES CF 1/2W 5% 6.8K LL	R48
1	041270001	RES CF 1/2W 5% 8.2K LL;	R47
1	025832001	RES CF 1/2W 5% 22K LL	R59
5	041271001	RES CF 1/2W 5% 47K LL	R15.26.29.34.35
2	025116001	RES CF 1/2W 5% 100K LL	R17,27
4	025117001	RES CF 1/2W 5% 220K LL	R36,37,51,52
4	036957001	RES CF 1/2W 5% 470K LL	R16,18,19,21
1	04151901	RES CF 1/2W 5% 680K LL	R64
1	041280001	RES CF 1/2W 5% 2.2M LL	R66
1	028029	RES FILM 1W 5% 1.5K	R31
1	027352001	RES FILM 1W 5% 91K LL	R32
5	027353001	RES FILM 1W 5% 100K LL	R13,24,33,62,65
6	036468001	RES MOX FP 1W 5% 470 OHM LL	R40-44, 60
1	041269001	RES CF 2W 5% 1.2K LL	R53
1	041268001	RES CF 2W 5% 10K LL	R54
2	025936	STANDOFF NYLON PCB SNAPIN 3/8"	(@ POWER SUPPLY PCB)
3	037209	STANDOFF SWEDGE 4-40X3/16X3/4	(PCB MOUNT)
1	026472	SWITCH SLIDE DPTT	SW4 (IMPEDANCE SELECT)
3	037835	SWITCH SLIDE SPST	SW1-3

CHASSIS ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
7	018022	BUSHING SNAP 5/16X17/32 BLK	
1	012560	BUSHING SNAP 5/8X27/32 BLK	
1	026038	BUSHING SR .625X.062X37/64 BLK	(100/120V ONLY)
1	031105	CABLE ASSY PWR .187X.250 120V	(100/120V ONLY)
1	036486	CHOKE	L1
4	031091	CLAMP TUBE (277H-1)	(@V4-7)
1	032219	COLLAR-PILOT LIGHT	
1	017502	CONTROL 10K 20% SCR ADJ	R10 (BIAS ADJUST)
7	041266	CONTROL DUAL B500K LIN	R1-3, 5-7, 9
2	041265	CONTROL DUAL B50K LIN	R4,8 (MID CONTROLS)
1	025239	COVER CAPACITOR CUSTOM AMPS	
1	036702	FUSE HOLDER 3AG FINGER GRIP	XF1
1	036703	FUSEHOLDER 5mm FINGER GRIP	(220/230/240V ONLY)

TONE-MASTER CHASSIS ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	013737	FUSE TD 1-1/4X1/4 250V 4AMP	F1 (100/120V ONLY)
1	013115	FUSE TD 20MMX5MM 250V 2AMP	F1 (230/240V EXPORT)
1	021741	HOLDER DIAL LITE ASSEMBLY PILOT	
1	041469	INSULATOR FILTERCAP PC	
2	023760	JACK PHONE 3/CD DCC 14B	J3,8
3	068270	JACK PHONE TIP SHUNT L12A 3/8L	J1,4,6
1	021626	JACK PHONE 2/CD SOC L11 3/8" L	J5
2	013043	JACK PHONE STEREO 12B	J2,7
1	025718	JEWEL #20 PILOT LITE	
9	041263	KNOB VINTAGE CREAM	
1	031625	NUT HOLDER PILOT LIGHT 1/16-27	
4	028272	NUT KEP 1/4X20 FOJ	(@ POWER TRANSFORMER)
4	022004	NUT KEPS #8-32 ZINC	(@ OUTPUT TRANSFORMER)
1	040910	PANEL FRONT ALUM TONE MASTER	
1	041216	PANEL REAR ALUM TONE MASTER	
1	021642	PILOT LIGHT #T47	
1	026438	PLUG BUTTON .437" BLACK	
4	026501	SCRW C 1/4-20X1/2 HH BLX	(POWER TRANSFORMER MOUNT)
6	014172	SCRW M 4-40X1/4 PHP BLX	(SLIDE SWITCH MOUNT)
3	039420	SCRW M 4-40X3/8 PHP SS SEMS	(PCB TO CHASSIS MOUNT)
2	031184	SCRW M 6-32X1/4 PHPS BLX	(@ IMPEDANCE SWITCH)
2	032806	SCRW TF 6-32X1/4 PHP BLX	(REAR PANEL MOUNT)
27	038900	SCRW TF 6-32X1/4 PHP ZI	(TUBE SOCKET & MOUNT)
2	028937	SCRW TF 6-32X5/8 PHP ZI TAPTYT	(POWER SUPPLY MOUNT)
12	032902	SCRW TF 6-32X3/8 PHP ZI	
4	026553	SCRW M 8-32X3/8 PHP BLX	(OUTPUT TRANSFORMER MOUNT)
2	036570	SWITCH TOGGLE DPST W/ NUTS	SW5-6
4	039214	TUBE 5881/6L6WGC	V4-7
3	013341	TUBE 7025/12AX7	V1-3
4	023580	TUBE SOCKET 8 PIN	XV4-7
3	041267	TUBE SOCKET 9 PIN PORCEL W/ SHIELD	XV1-3
5	9904300100	WASHER LCK INTL 3/8X.681X.032	(@ SOME 1/4" JACKS)
2	022293	WSHR FLAT .473X.750 NI	(@ INPUT JACK)
8	022319	WSHR FLAT 1/4X9/16 NI	(@ POWER TRANSFORMER)
10	031153	SWHR FLAT 3/8X.614 NI	
9	024049	WSHR LCK INTL 5/16X.600X.03 ZO	(@ CONTROLS)
10	026401	WSHR SHLDR FIB 3/8X5/8	(@J1-3,7-8)
2	047281	XFMR DIRECT BOX	T3-4
2	047280	XFMR LINE INPUT	T5-6
1	026478	XFMR OUTPUT	T2
11	026554	XFMR PWR MULTI VOLT	T1 (100/120/230/240V)

CABINET ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	040770	CAB ASSY TONE MASTER	
2	024687	CLIP BAR SLIDE AMP	
2	022858	CLIP SPRING STEEL	(BAR SLIDE MOUNT)
.22	040883	CLOTH GIRLLE OXBLOOD	
4	026566	CORNER 2 HOLE W/ TAB NI	
4	024653	GLIDE CABINET NICKEL PLATED	(NO INSERT)
1	040891	GRILLE ASSY TONE MASTER	
1	036784	HANDLE MOLDED BROWN	
4	022483	INSERT GLIDE CUSHION 1.02 DIA	(RUBBER ONLY)
1	036795	NAMEPLATE 62 FENDER	(LOGO)
4	021972	NUT T 10-32X3/4 TR 3 PRNG BLX	(SLIDE BAR MOUNT)
4	064162	NUT T 8-32X1/2 STR 3 PRNG BLX	(HANDLE MOUNT)
1	040934	PANEL METAL PERFORATED	(@ CABINET REAR)
4	026571	SCRW CORNER MOUNTING	
4	037210	SCRW SMA 2X3/8 OHP NI	(NAMEPLATE MOUNT)
4	037952	SCRW SMA #6X1 OHP NI	(BACKBOARD MOUNT)
4	017439	SCRW SMA 6X1/2 PHP BLX	
4	036112	SCRW SMAB 6X1-1/4 OHP BLX W/WS	(GRILLE MOUNT)

TONE-MASTER CABINET ASSEMBLY (CONT)

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
4	037247	SCRW M 8-32X1 OHP NI	(HANDLE MOUNT)
4	022236	SCRW M 8-32X1/4 OHP NI CONE	
3	029828	SCRW PB 8X3/4 PHP ZI	
4	026625	SCRW WOOD 6X1 FH	(GLIDE MOUNT)
4	016014	SCRW M 10-32X1 THP NI	(BAR SLIDE MOUNT)
2	024752	STRAP CHASSIS 4-1/2" NICKEL	
.9	040882	TOLEX CREAM	
4	037215	WSHR C'SNK #6 NI	(BACKBOARD MOUNT)

FOOTSWITCH ASSEMBLY

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	021691	BUSHING SR .500X.100X7/16 BLK	
1	022657	COVER CLIP 1 BTTN FT.SW. ASSY	
1	041228	FOOTSWITCH 1 BTTN VINT STYLE	(COMPLETE FOOTSWITCH)
1	028915	PLUG PHONE RTANG SHIELDED	
1	024042	SWITCH SPST PUSH BUTTON	

TONE-MASTER CIRC212 & 212 V-30 SPEAKER ENCLOSURE

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	025429	BUSHING THUMB SCREW CHROME	(PIGGY BACK)
.667	040883	CLOTH GRILLE OXBLOOD	
4	026566	CORNER 2 HOLE W/TAB NI	
4	026568	CORNER 3 HOLE NI	
1	041537	COVER TONE-MASTER 212	(SOFT PROTECTIVE COVER)
1	021452	FERRULE JACK STD TELE CHROME	(@ INPUT JACK)
4	024653	GLIDE CABINET NICKEL PLATED	(NO INSERT)
1	040911	GRILLE ASSY TONE MASTER 2-12	(COMPLETE GRILLE)
1	036784	HANDLE MOLDED BROWN	
4	022483	INSERT GLIDE CUSHION 1.02 DIA	(RUBBER ONLY)
1	021956	JACK PHONE OPEN CIRCUIT 11	
2	024828	LEG AMP TILT 16"	
2	022301	LOCKWASHER SPLIT 7/16	(BUSHING MOUNT, PIGGY BACK)
1	036795	NAMEPLATE 62 FENDER	(LOGO)
1	041227	NAMEPLATE TONE MASTER 2-12	
2	021998	NUT FLEX LOCK 10-32 W/NYLON IN	(TILT BACK LEG MOUNT)
1	016352	NUT HEX 3/8-32X3/32 TK NI	(@ INPUT JACK)
2	021980	NUT HEX 7/16-20X1/4 TK NI	(BUSHING MOUNT, PIGGY BACK)
4	064162	NUT T 8-32X1/2 STR 3 PRNG BLX	(HANDLE MOUNT)
8	021972	NUT T 10-32X3/4 STR 3 PRNG BLX	(SPEAKER MOUNT)
	036650	PIN ESCUTCHEON #18X3/8 NI	(REAR PANEL MOUNT)
1	010355060	RETAINER JACK NI PLT (TELE)	
4	037210	SCREW SMA 2X3/8 OHP NI	(LOGO MOUNT)
20	026571	SCRW CORNER MOUNTING	
4	037247	SCRW M 8-32X1 OHP NI	(HANDLE MOUNTING)
2	022277	SCRW M 10-32X1-1/5 OHP NI	(TILT BACK LEG MOUNT)
8	029505	SCRW M 10-32X1-1/4 PHP BLX	(SPEAKER MOUNT)
2	031344	SCRW SMA 10X3/4 OHP NI	(LEG STOP MOUNT)
4	026625	SCRW WOOD 8X1 FH	(GLIDE MOUNT)
2	041234	SPEAKER 12" 8 OHM 80 WATTS	(CELESTION G1280, T3969)
2	047279	SPEAKER 12" 8 OHM CEL VINTAGE	(CELESTION VINTAGE 30)
2.1	040882	TOLEX CREAM	
2	025437	THUMB SCREW KNURLED HEAD CHR	(PIGGY BACK HOLD DOWN)
2	024646	WASHER LEG STOP TN	
2	023517	WSHR FLAT .515X.750 GLD	
1	048904	WSHR FLAT .901X1.375X.030 SS	(BENEATH FERRULE)
6	022319	WSHR FLAT 1/4X9/16 NI	(TILT BACK LEG MOUNT)
1	016436	WSHR LCK INTL 3/8X.687X.035 NI	(@ INPUT JACK)
2	022285	WSHR SP LOCK 1/4X.493 ZI	(TILT BACK LEG MOUNT)

TONE-MASTER

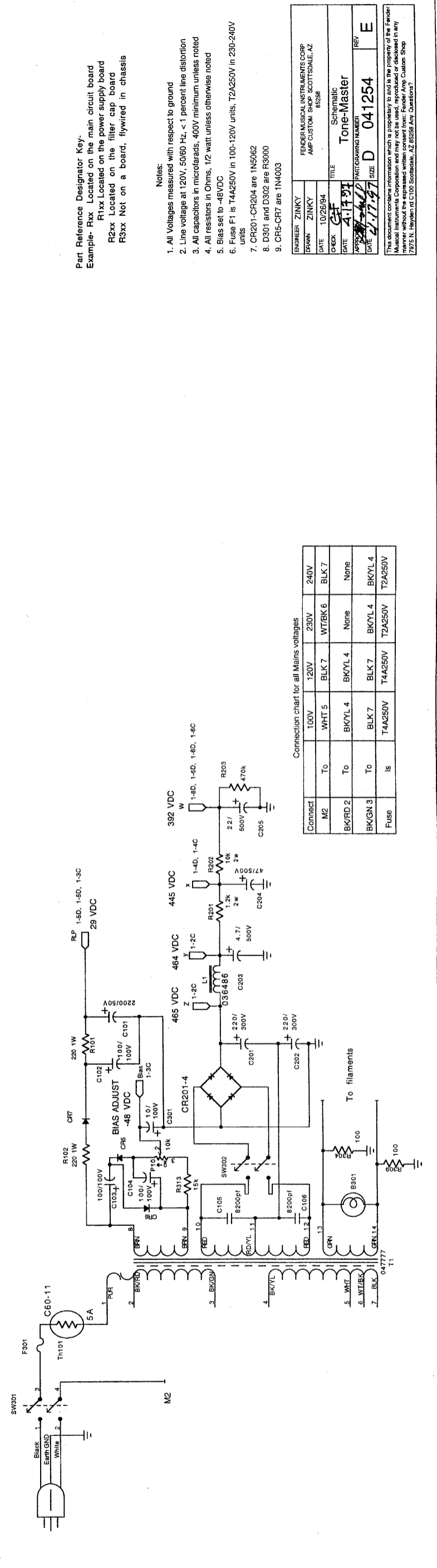
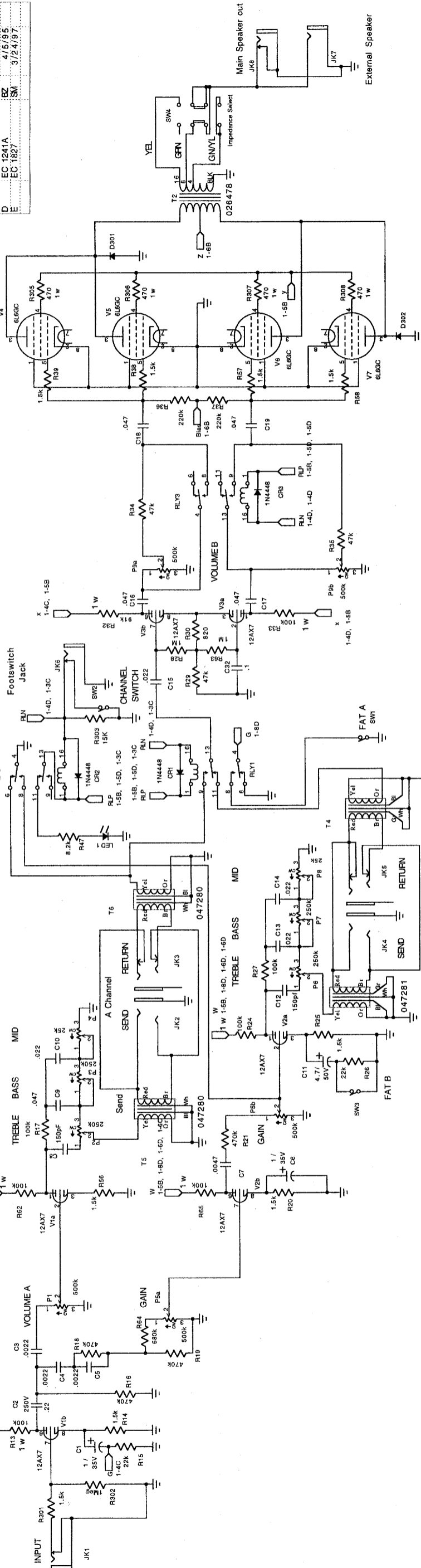
TONE-MASTER 412 & 412 "GREENBACK" SPEAKER ENCLOSURE

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	025429	BUSHING THUMB SCREW CHROME	(PIGGY BACK)
4	023513	CASTER SWIVEL	
.883	040883	CLOTH GRILLE OXBLOOD	
4	026566	CORNER 2 HOLE W/TAB NI	
4	026568	CPRMER 3 HOLE NI	
1	041538	COVER TONE-MASTER 412	(SOFT PROTECTIVE COVER)
4	040581	CUP STACKING GLIDE RECEPTICLE	
1	021452	FERRULE JACK STD TELE CHROME	(@ INPUT JACK)
4	019276	GLIDE CAB 1.24X.335 NI	(NO INSERT)
1	040925	GRILLE ASSY TONE-MASTER 4-12	(COMPLETE GRILLE)
2	041584	HANDLE	(HANDLE ONLY, NO HOUSING)
2	041585	HANDLE HOUSING	(HOUSING ONLY, NO HANDLE)
4	019275	INSERT GLIDE CUSHION 1.27 DIA	(RUBBER ONLY)
1	021956	JACK PHONE OPEN CIRCUIT 11	
4	023505	MTG PLATE SWIVEL CASTER	
1	036795	NAMEPLATE 62 FENDER	(LOGO)
1	041226	NAMEPLATE TONE-MASTER 4-12	
1	016352	NUT HEX 3/5-32X3/32 TK NI	(@ INPUT JACK)
16	021972	NUT T 10-32X3/4 STR 3 PRNG BLX	(SPEAKER MOUNT)
	036850	PIN ESCUTCHEON #18X3/8 NI	(REAR PANEL MOUNT)
1	010355060	RETAINER JACK NI PLT TELE	
4	037210	SCREW SMA 2X./5 OHP NI	(LOGO MOUNT)
16	026571	SCRW CORNER MOUNTING	
20	016627	SCRW SMA 8X3/4 OHP BLX	(HANDLE MOUNT)
4	017942	SCRW WOOD 8X1 FHP BLX	(@ CUP STACKING)
16	027199	SCRW SMAB 10X3/4 PHP NI	(@ CASTER MTG PLATES)
16	029505	SCRW M 10-32X1-1/4 PHP BLX	(SPEAKER MOUNT)
4	026625	SCRW WOOD 8X1 FH	(GLIDE MOUNT)
4	041233	SPEAKER 12" 16 OHM 75 WATTS	(CELESTION VINTAGE 30, T3904)
4	041262	SPEAKER 12" 16 OHM 25 WATTS	(CELESTION G12M, T1221)
1	048904	WSHR FLAT .901X1.375X.030 SS	(BENEATH FERRULE)
1	016436	WSHR LCK INTL 3/8X, 687X.035 NI	(@ INPUT JACK)

MISCELLANEOUS

QTY	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	047148	SCHEMATIC REDUCED TONE-MASTER	

REV	BY	Date	CHK
A	Released	EC963	4/21/93
B	EC 1037	9/9/93	
C	EC 1166	10/26/94	
D	EC 1241A	4/5/95	
E	EC 1827	3/24/97	



Part Reference Designator Key:
 Example- Rxx Located on the main circuit board
 R1xx Located on the power supply board
 R2xx Located on the filter cap board
 R3xx Not on a board, flywired in chassis

- Notes:
- All Voltages measured with respect to ground
 - Line voltage at 120V, 50/60 Hz, < 1 percent line distortion
 - All capacitors in microfarads, 400V minimum unless noted
 - All resistors in Ohms, 1/2 watt unless otherwise noted
 - Bias set to -48VDC
 - Fuse F1 is T4A250V in 100-120V units, T2A250V in 230-240V units
 - CR201-CR204 are 1N5062
 - D301 and D302 are R3000
 - CR5-CR7 are 1N4003

ENGINEER	ZINKY	FENDER MUSICAL INSTRUMENTS CORP
DRAWN	ZINKY	AMP CUSTOM SHOP SCOTTSDALE, AZ
DATE	10/26/94	85298
CHECK		
DATE	4-17-97	
APPROVED		
DATE	4-17-97	
TITLE	Tone-Master Schematic	
PARTS DRAWING NUMBER	D 041254	
REV	E	

Connection chart for all Mains voltages

Connect	100V	120V	230V	240V
M2	To WHT 5	BLK 7	WTRBK 6	BLK 7
BK/RD 2	To BK/YL 4	BK/YL 4	None	None
BK/GN 3	To BLK 7	BLK 7	BK/YL 4	BK/YL 4
FUSE	Is	T4A250V	T2A250V	T2A250V

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 7975 N. Hayden Rd. C100 Scottsdale, AZ 85258 Any Questions?