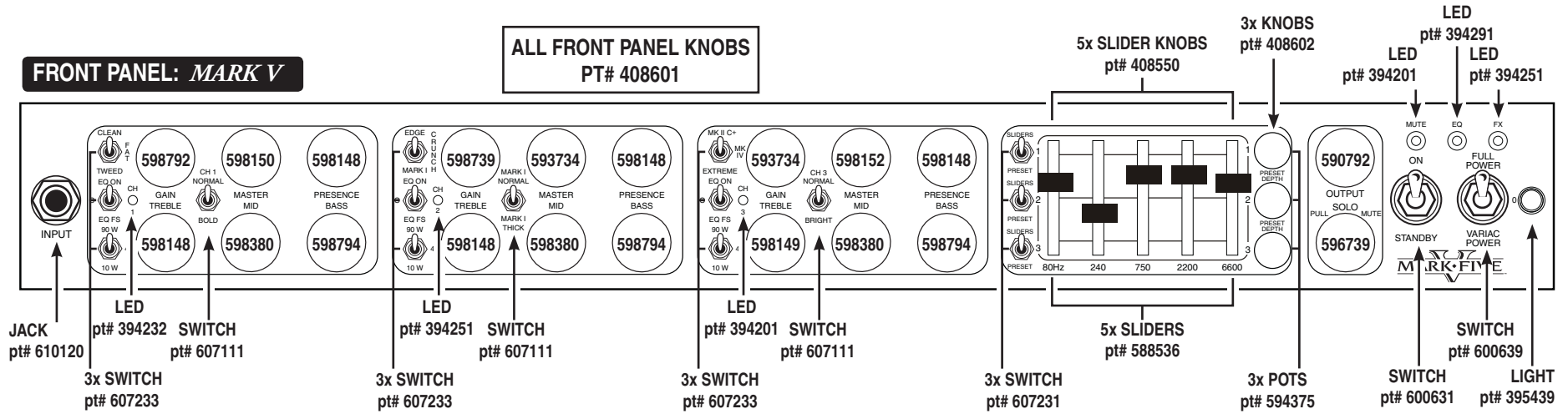
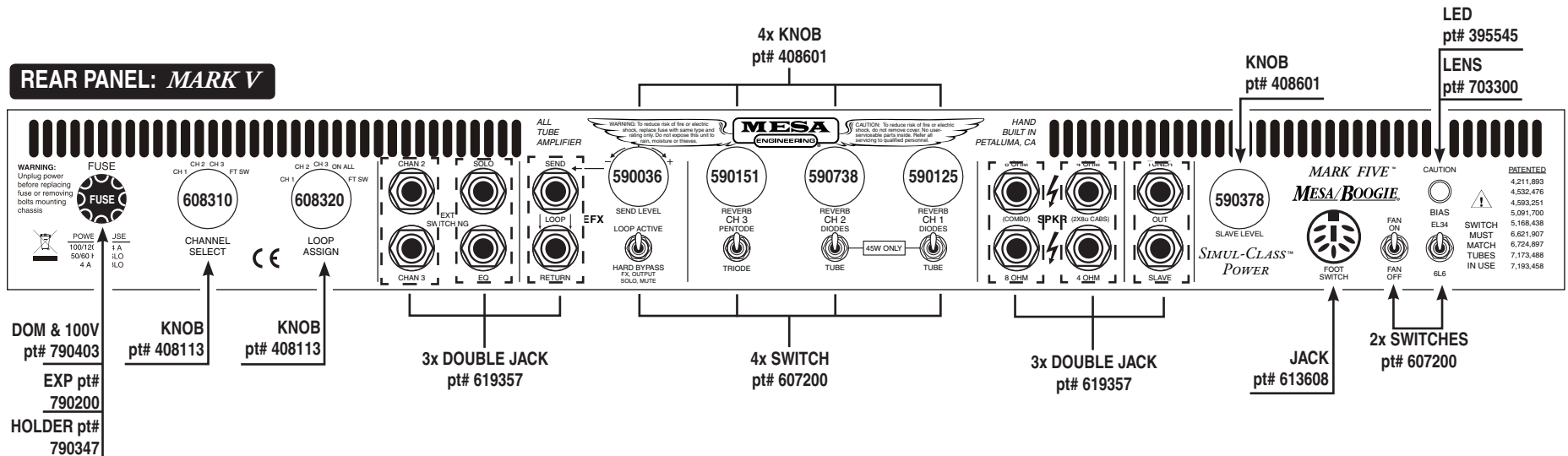


FRONT PANEL: *MARK V*

ALL FRONT PANEL KNOBS PT# 408601



REAR PANEL: *MARK V*



[illegible]

MESA/BOOGIE

MARK V

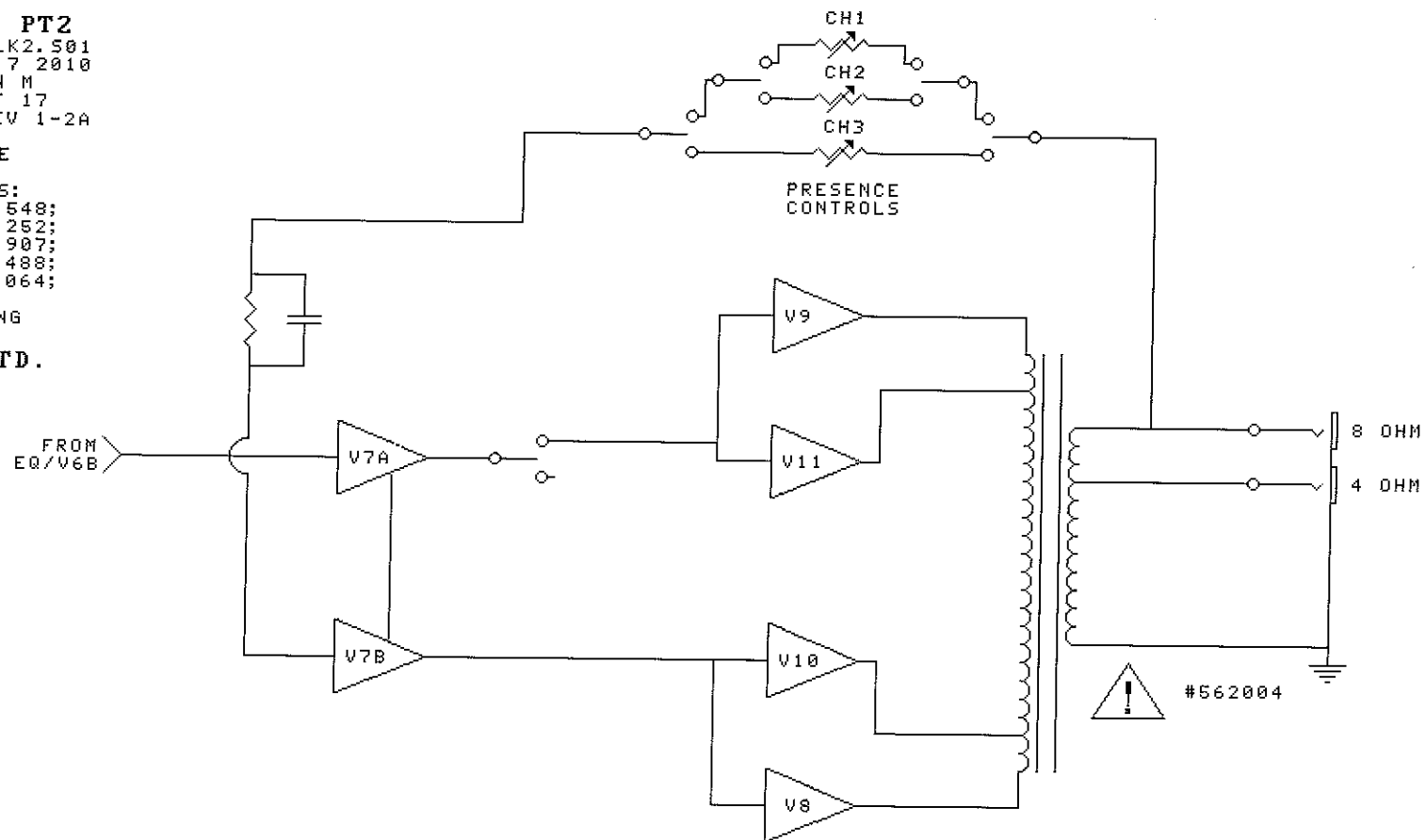
BLOCK DIAGRAM PT2

FILE: MUBLK2.501
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 2 OF 17
BOARD REV: MARKV 1-2A

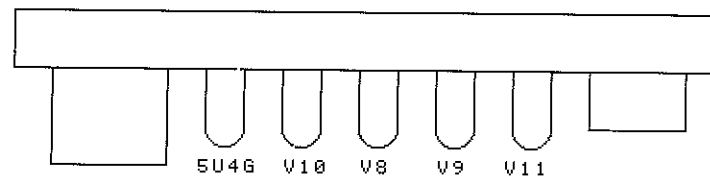
COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

MESA/BOOGIE, LTD.

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TUBE LAYOUT



CHASSIS REAR VIEW

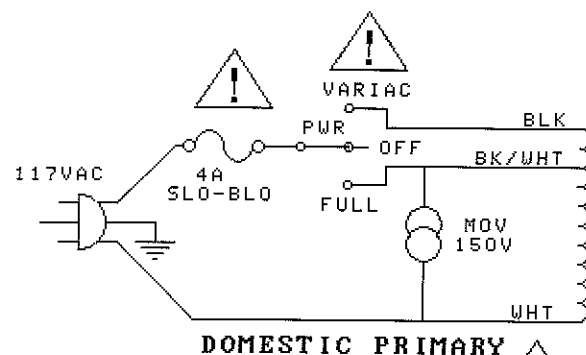
MESA/BOOGIE MARK V

POWER SUPPLY

FILE: MVSUP.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 3 OF 17
BOARD REV: MARKV 1-2A

ALL VOLTAGES MEASURED
WITH 117VAC IN, 90 WATT,
FULL POWER, STANDBY ON,
LOOP ACTIVE, NO SIGNAL.

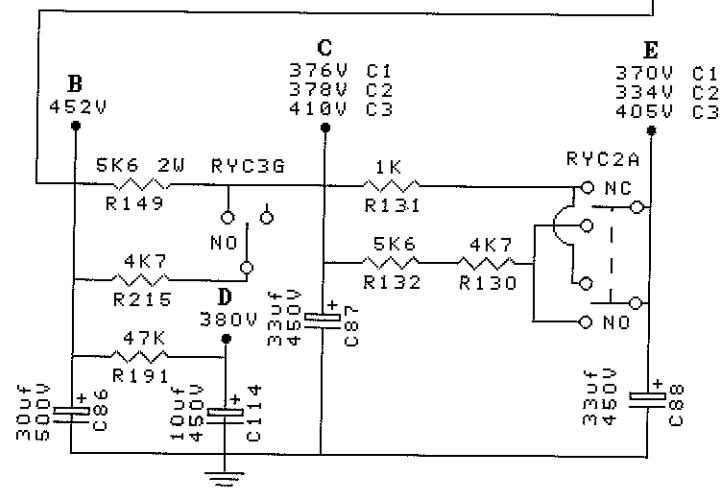
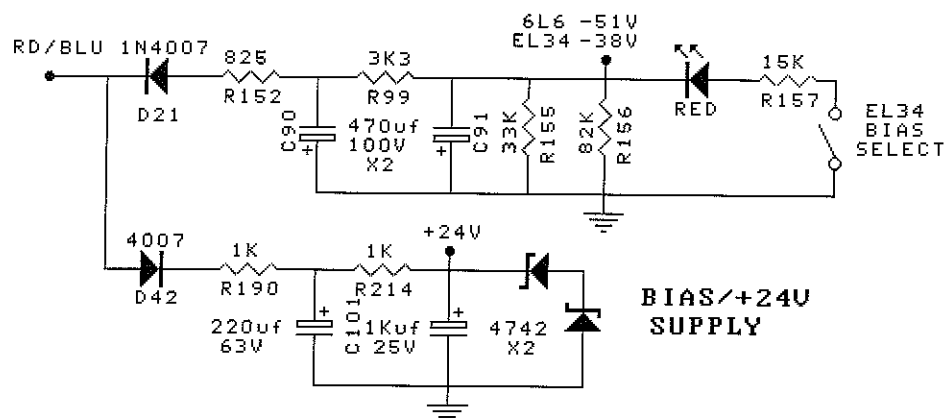
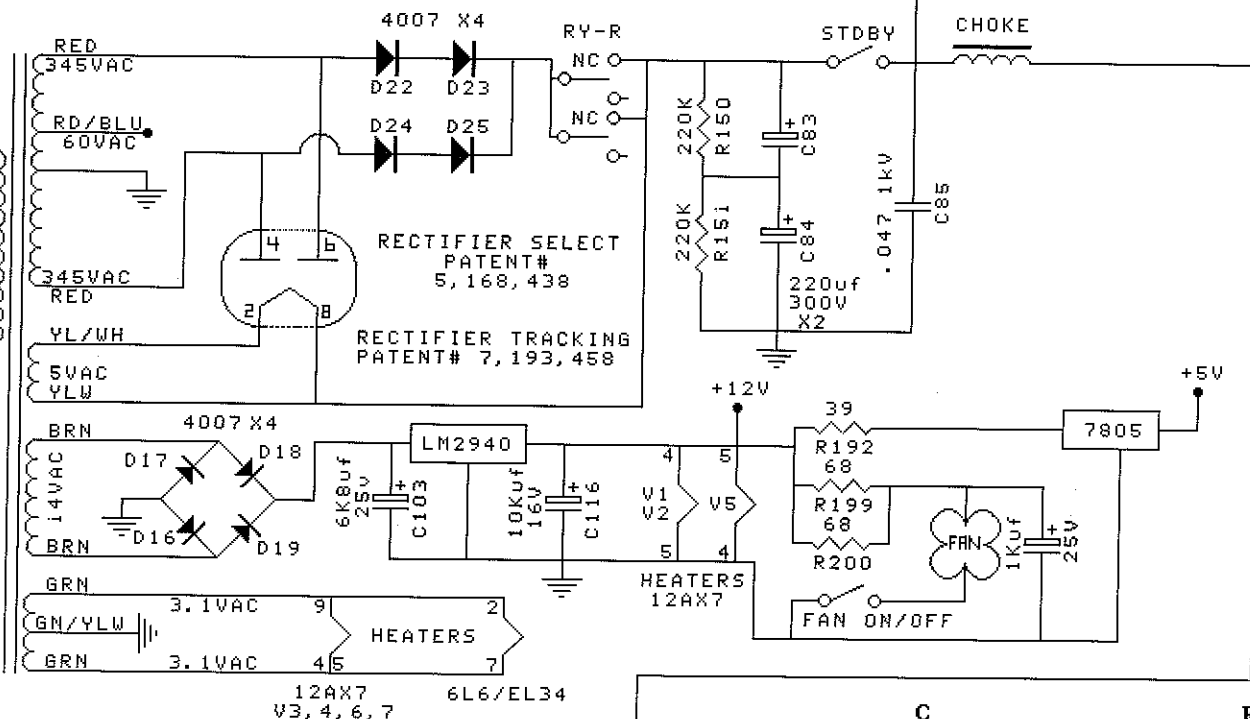
SUPPLIES A-E MEASURED IN
90 WATT SETTING. FOR OTHER
SETTINGS, ADJUST:
50 WATT TUBE, -20V
50 WATT DIODE, +8V
10 WATT (TUBE), -50V



COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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POWER SUPPLY PT 2

FILE: MVSUP1.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 4 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

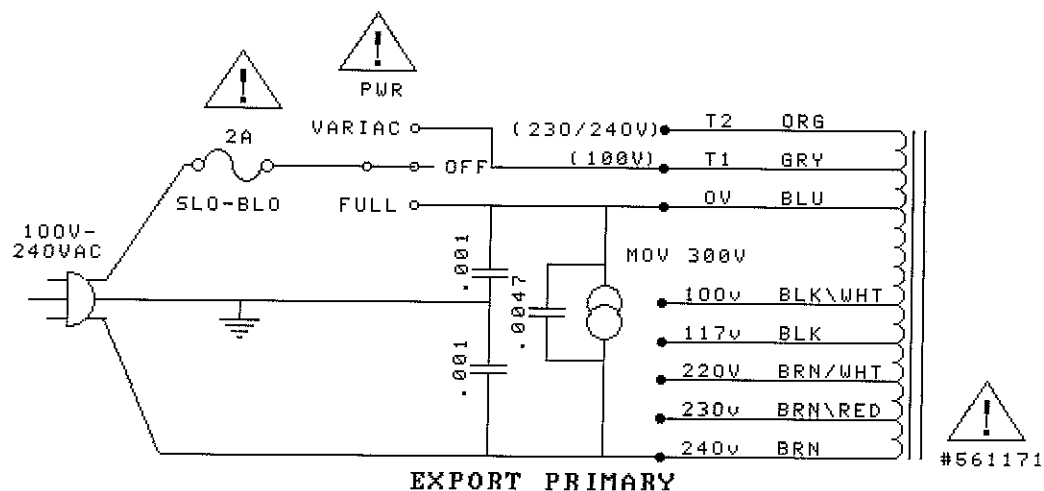
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DESIGNATORS:

C1= CHANNEL 1
C2= CHANNEL 2
C3= CHANNEL 3
M1= CHAN 1 CLEAN
M2= CHAN 1 FAT
M3= CHAN 1 TWEED
M4= CHAN 2 EDGE
M5= CHAN 2 CRUNCH
M6= CHAN 2 MARK 1
M7= CHAN 3 MKIIC+
M8= CHAN 3 MKIV
M9= CHAN 3 EXTREME

RELAY NAME INDICATES
RELAY IS ON FOR THAT
MODE OR CHANNEL.
ASTERISK BY NAME
INDICATES REVERSE
LOGIC (RELAY IS OFF
FOR THAT MODE OR
CHANNEL). SEE RELAY
CHART FOR MORE INFO.



MESA/BOOGIE MARK V

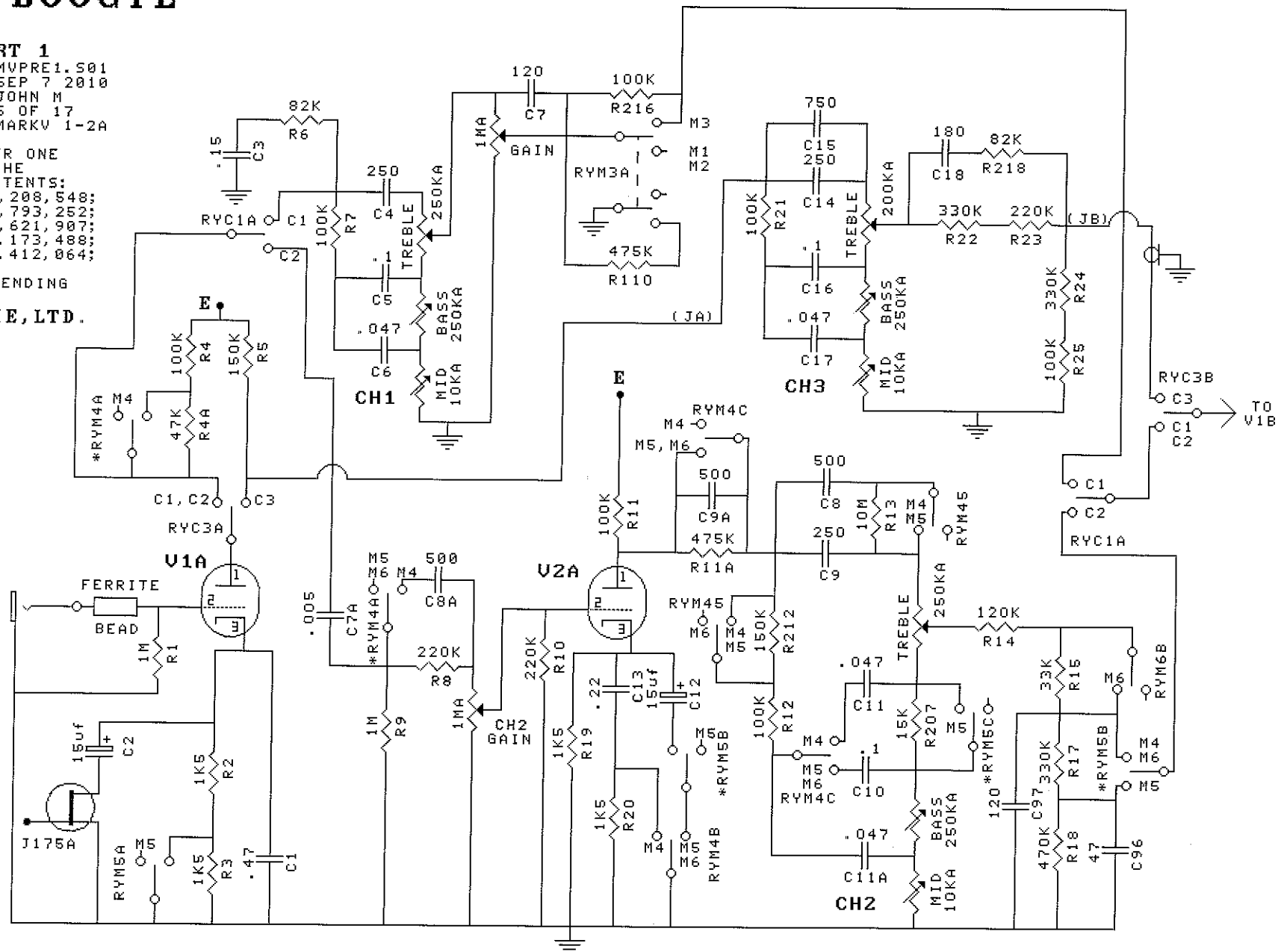
PREAMP PART 1

FILE: MVPRE1.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 5 OF 17
BOARD REV: MARKV 1-2A

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OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MARK V

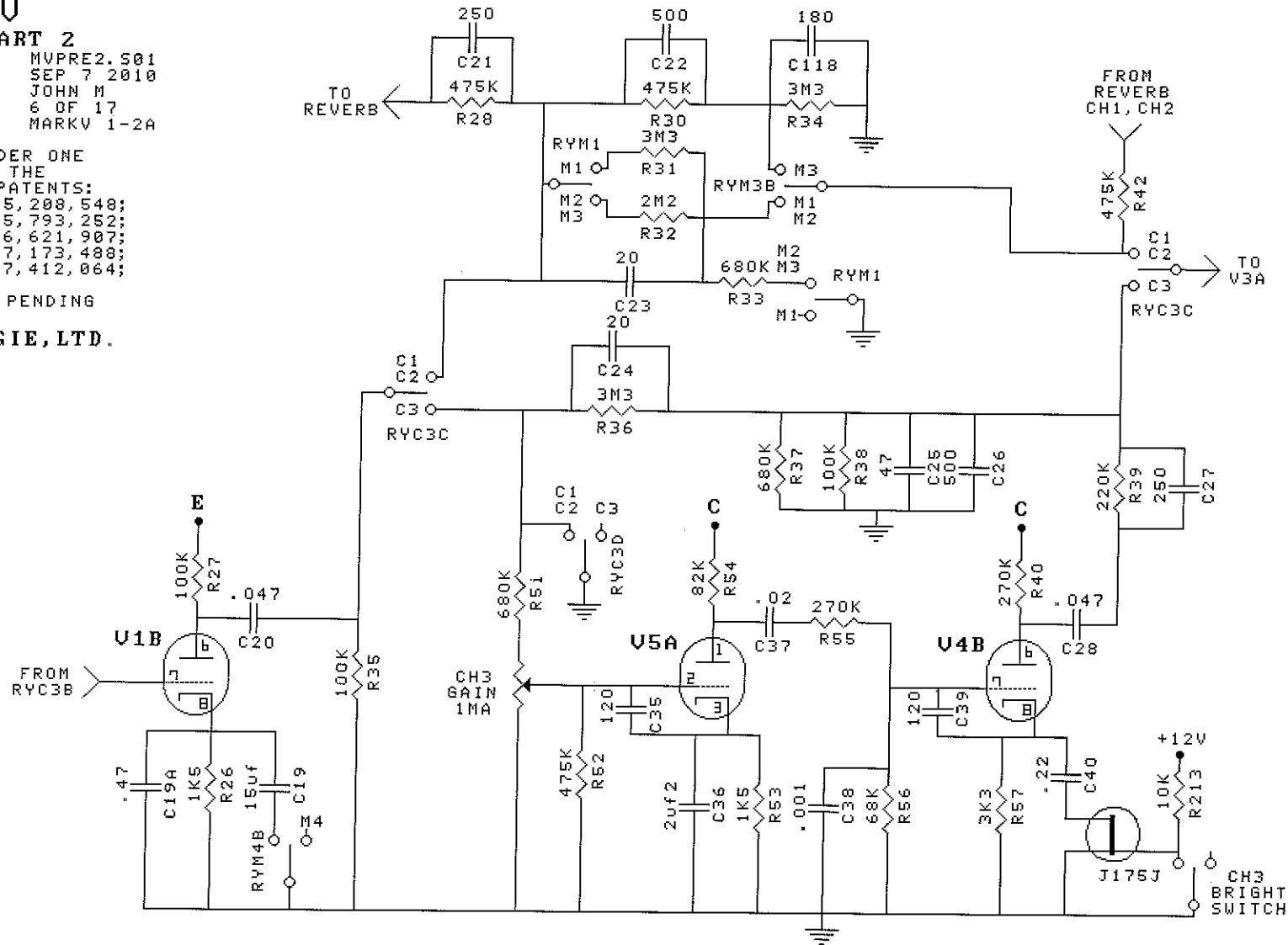
PREAMP PART 2

FILE: MVPRE2.S01
 DATE: SEP 7 2010
 DRAWN BY: JOHN M
 PAGE: 6 OF 17
 BOARD REV: MARKV 1-2A

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 OR MORE OF THE
 FOLLOWING PATENTS:
 5,168,438; 5,208,548;
 5,559,469; 5,793,252;
 6,522,752; 6,621,907;
 6,724,897; 7,173,488;
 7,193,458; 7,412,064;
 7,602,927
 AND OTHERS PENDING

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MESA/BOOGIE MARK V

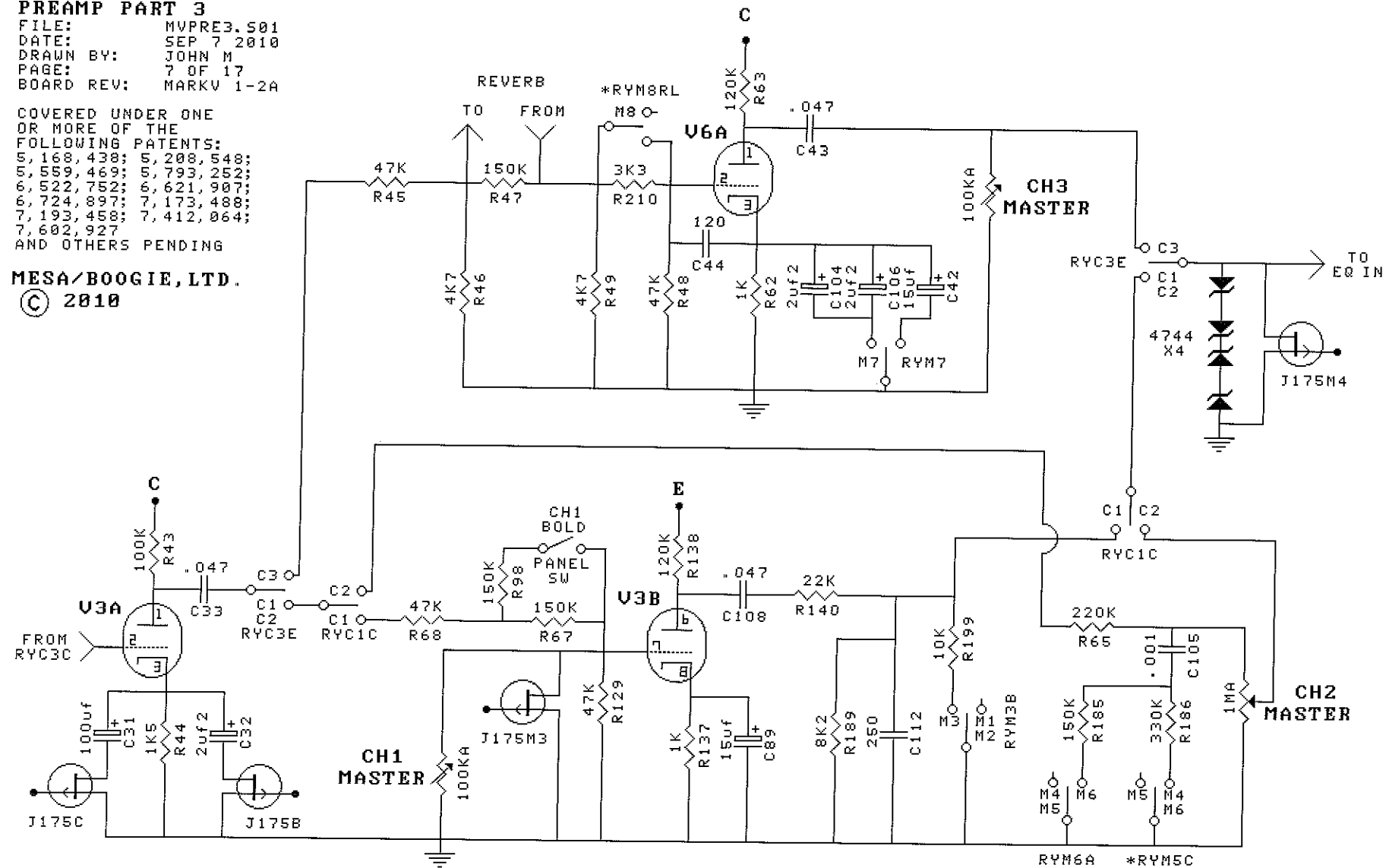
PREAMP PART 3

FILE: MVPRE3.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 7 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MARK V

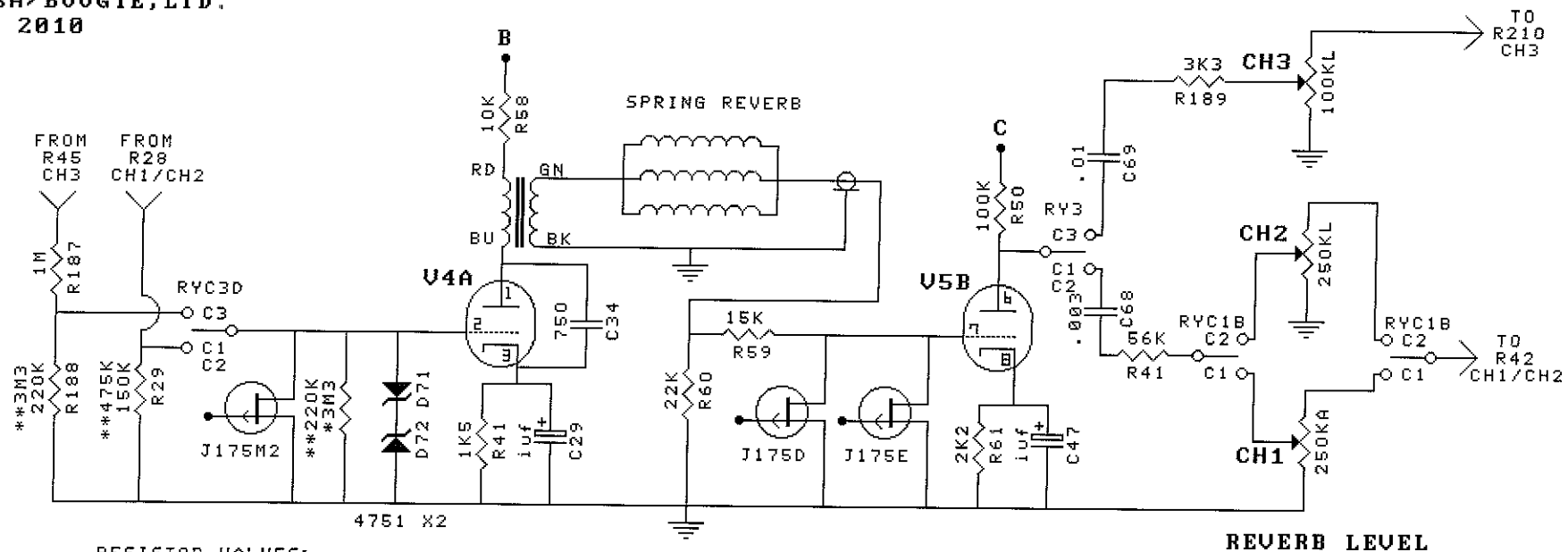
REVERB

FILE: MVREV.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 8 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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RESISTOR VALUES:

* AFTER SERIAL #372
** AFTER SERIAL #2601

MESA/BOOGIE

MARK V

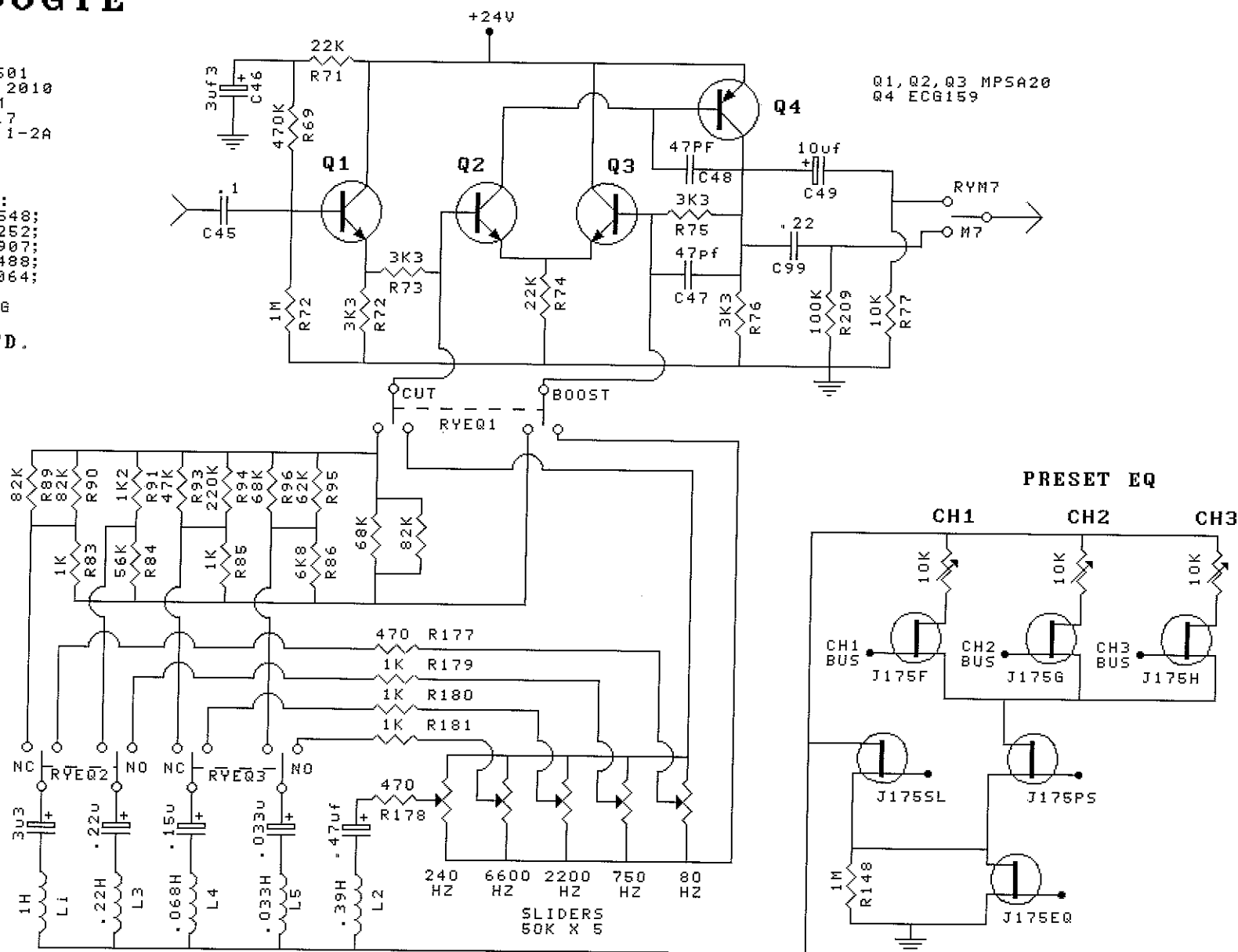
EQ CIRCUIT

FILE: MVEQ.501
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 9 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MARK V

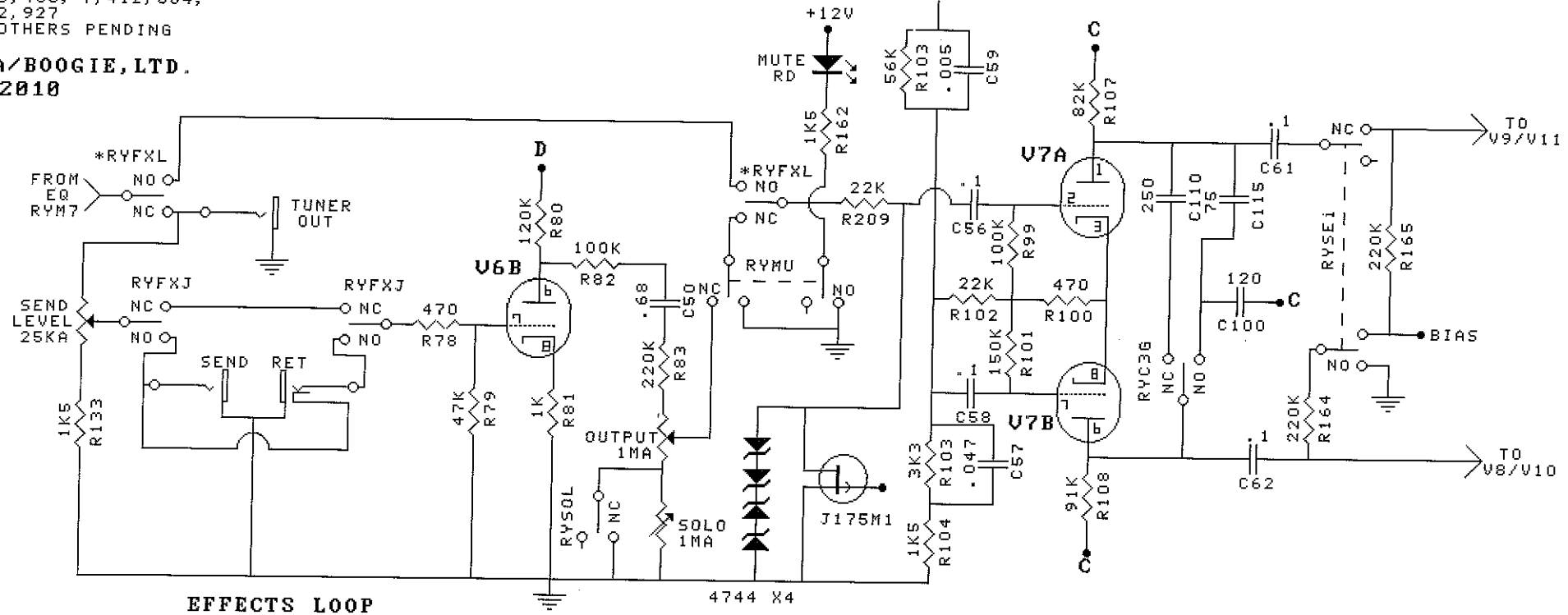
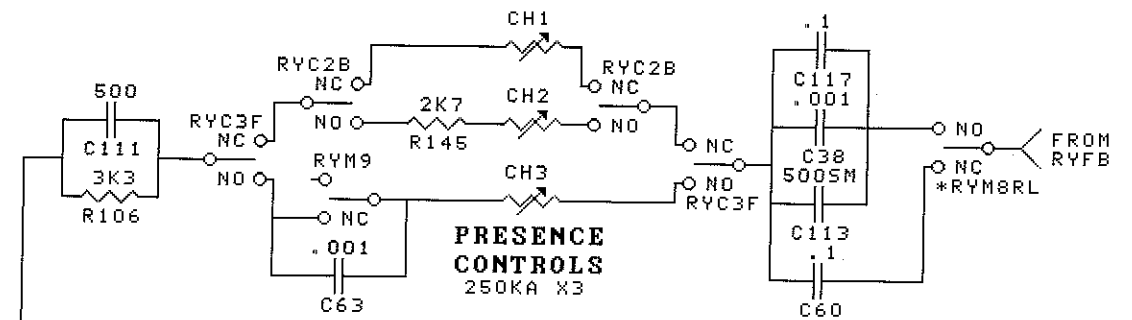
LOOP/DRIVER

FILE: MVLOOP.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 10 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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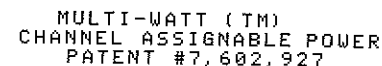
POWER AMP

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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	10W	45W	90W
V8P	315V	460V	452V
V8S	263V	458V	450V
V8G	--	-47V	-47V
V8K	17V	0V	0V
V9P	393V	460V	452V
V9S	391V	458V	450V
V9G	-47V	-47V	-47V
V9K	--	0V	0V
V10P	314V	460V	452V
V10S	265V	459V	451V
V10G	--	-51V	-51V
V10K	17V	--	0V
V11P	393V	460V	452V
V11S	392V	459V	451V
V11G	-51V	-51V	-51V
V11K	--	--	0V

ALL VOLTAGES MEASURED
WITH 117VAC, CH1, FULL POWER.
BIAS VOLTAGES MEASURED
ON STANDBY.



SIMUL-CLASS (TM)
PATENT# 4,532,476
AND 4,593,251

DUO-CLASS POWER (TM)
PATENT# 7,173,488

TUBE LAYOUT

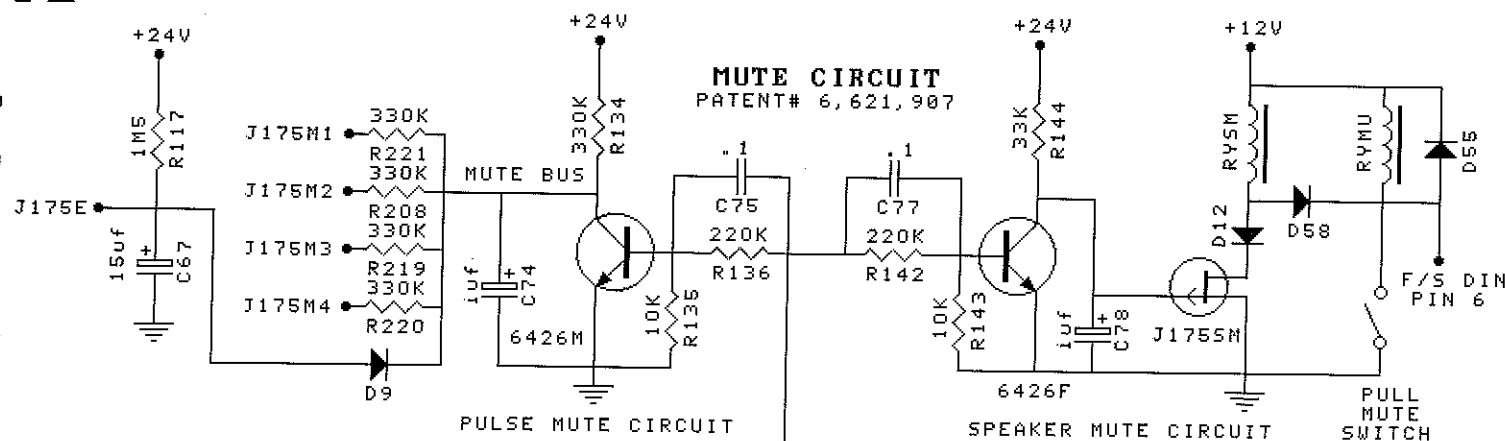
5U4G V10 V8 V9 V11

CHASSIS REAR VIEW

FILE: MVSU1.501
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 12 OF 17
BOARD REV: MARKV 1-2A

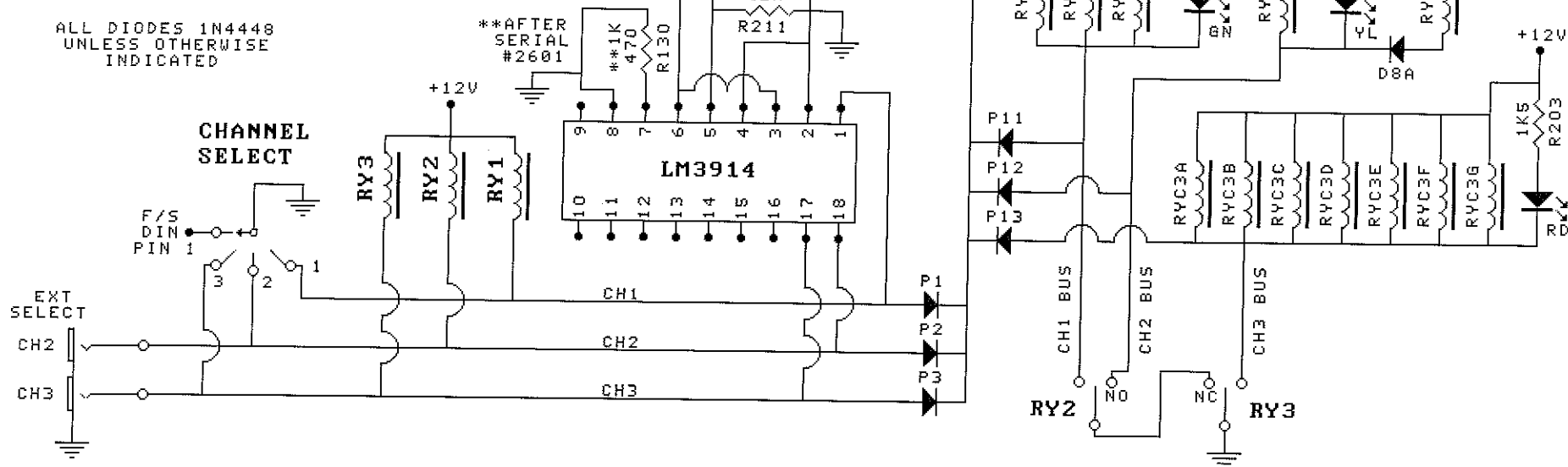
COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5, 168, 438; 5, 208, 548;
5, 559, 469; 5, 793, 252;
6, 522, 752; 6, 621, 907;
6, 724, 897; 7, 173, 488;
7, 193, 458; 7, 412, 064;
7, 602, 927
AND OTHERS PENDING

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CHANNEL SWITCHING		LOCATION
MUTE FET FUNCTIONS		
J175M1--	MUTE ALL CHANNELS	DRIVER INPUT
J175M2--	MUTE REVERB SEND	V4A GRID
J175M3--	MUTE CHANNEL 1	V3B GRID
J175M4--	MUTE ALL CHANNELS	EQ INPUT
J175E--	REVERB TIMED MUTE	V5B GRID

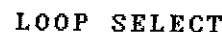
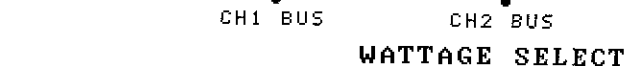
ALL DIODES 1N4448
UNLESS OTHERWISE
INDICATED



SWITCH MATRIX PART 2

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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SOLO ON/OFF

SOLO CIRCUIT
PATENT# 6,724,897

MESA/BOOGIE MARK V

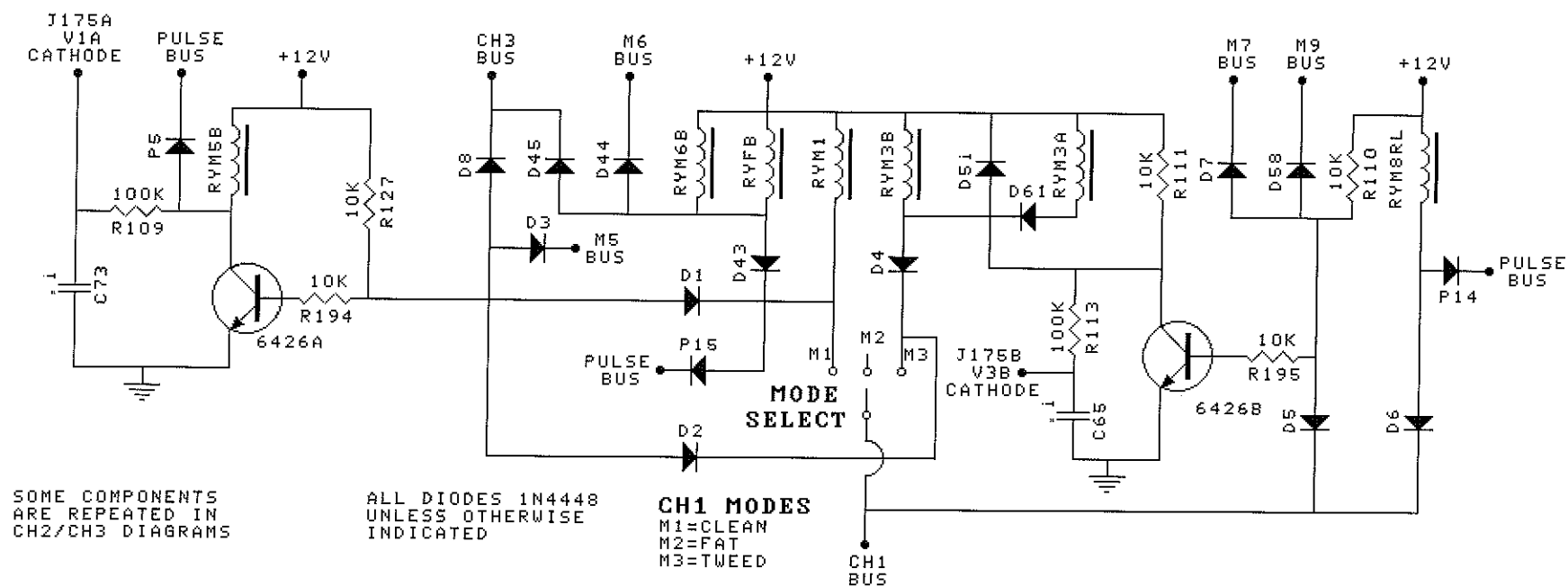
CH1 MODE SWITCHING

FILE: MYSW3.501
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 14 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MESA/BOOGIE MARK V

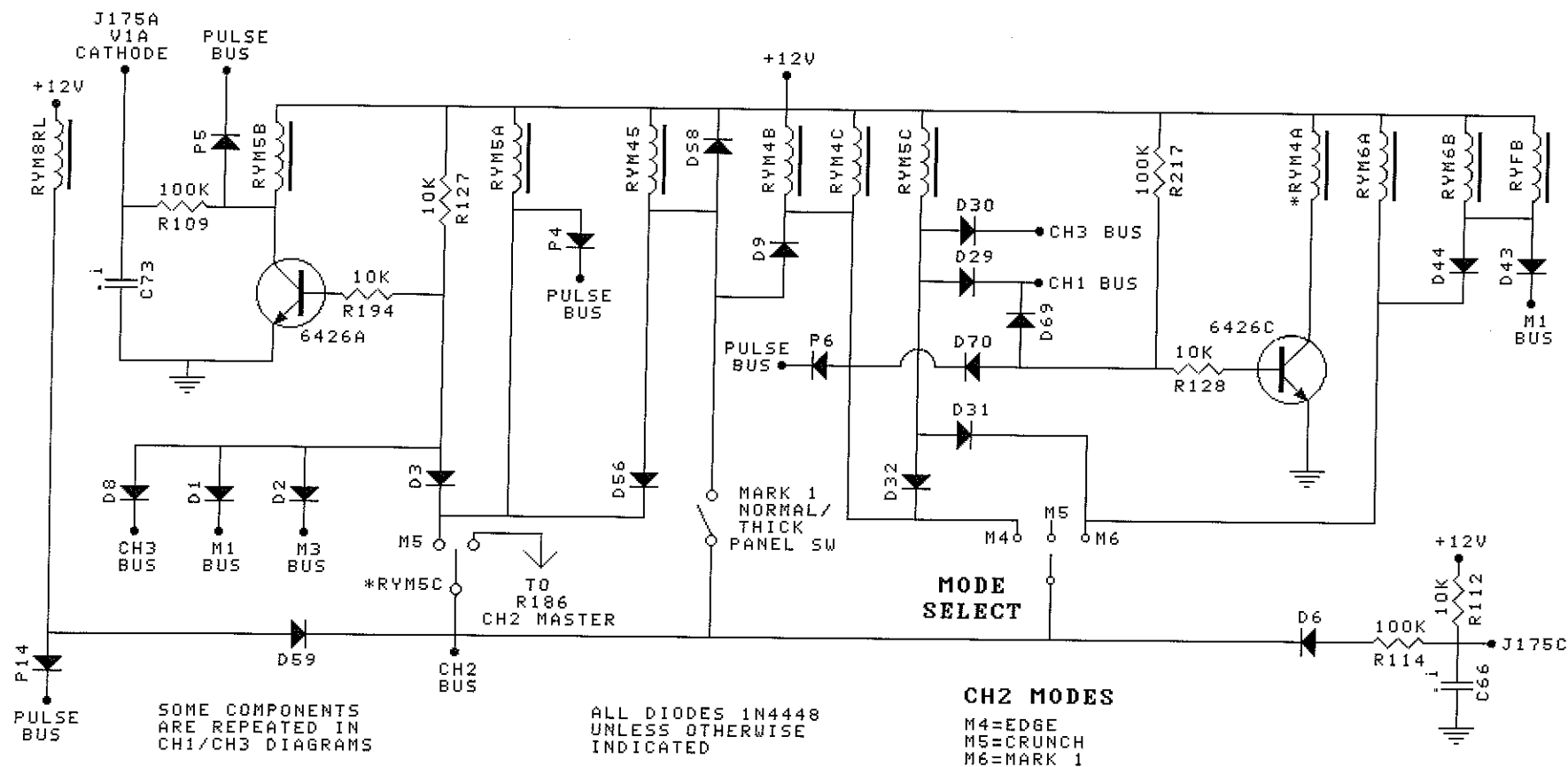
CH2 MODE SWITCHING

FILE: MYSW4.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 15 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MESA/BOOGIE MARK V

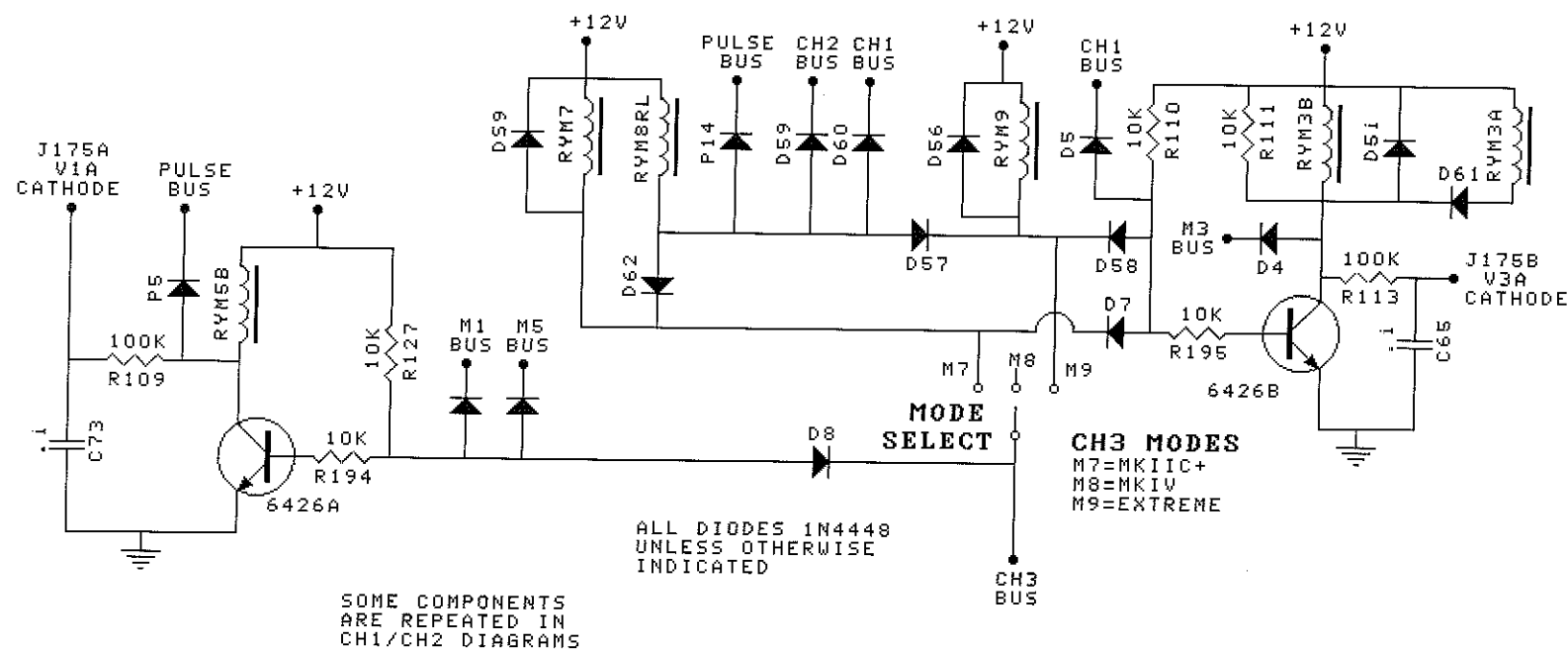
CH3 MODE SWITCHING

FILE: MVSU5.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 16 OF 17
BOARD REV: MARKV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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MARK U

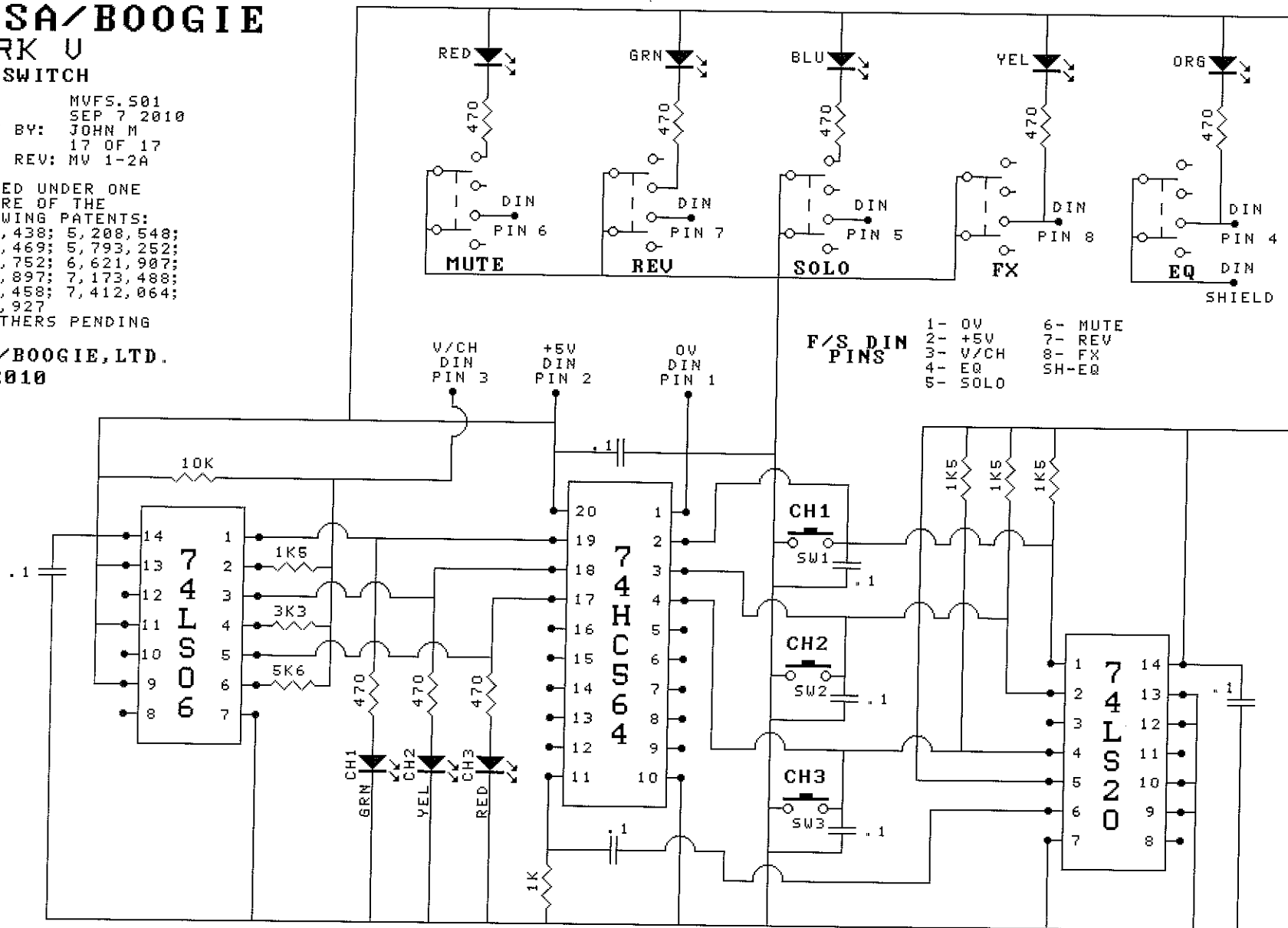
FOOTSWITCH

FILE: MVFS.S01
DATE: SEP 7 2010
DRAWN BY: JOHN M
PAGE: 17 OF 17
BOARD REV: MV 1-2A

COVERED UNDER ONE
OR MORE OF THE
FOLLOWING PATENTS:
5,168,438; 5,208,548;
5,559,469; 5,793,252;
6,522,752; 6,621,907;
6,724,897; 7,173,488;
7,193,458; 7,412,064;
7,602,927
AND OTHERS PENDING

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Mark V Voltage Chart

Node	Modes								
	M1	M2	M3	M4	M5	M6	M7	M8	M9
V1A P	211	211	211	190	258	220	228	228	228
V1A K	1.6	1.6	1.6	1.4	2.3	1.6	1.7	1.7	1.7
V1B P	244	244	244	219	221	217	265	265	265
V1B K	1.9	1.9	1.9	1.7	1.7	1.7	2	2	2
V2A P	256	256	256	230	232	229	280	280	280
V2A K	1.6	1.6	1.6	1.5	1.5	1.5	1.8	1.8	1.8
V2B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V3A P	259	259	259	261	261	261	283	283	283
V3A K	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8
V3B P	219	219	219	197	198	195	239	239	239
V3B K	1.2	1.2	1.2	1.1	1.1	1.1	1.3	1.3	1.3
V4A P	418	418	418	418	418	418	418	418	418
V4A K	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
V4B P	227	227	227	228	228	228	248	248	248
V4B K	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8
V5A P	273	273	273	275	275	275	297	297	297
V5A K	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9
V5B P	279	279	279	281	281	281	304	304	304
V5B K	2	2	2	2	2	2	2.2	2.2	2.2
V6A P	216	216	216	217	217	217	235	235	235
V6A K	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.4
V6B P	217	217	217	217	217	217	217	217	217
V6B K	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
V7A P	271	271	271	273	273	273	296	296	296
V7B P	265	265	265	267	267	267	289	289	289
V7 K	66	66	66	67	67	67	72	72	72
V7A G	58	58	58	59	59	59	63	63	63

All Voltages DC. Measured with 117VAC in, Full Power, Standby On, 90 Watt, Loop Active, no signal.

P=Plate

K=Cathode

G=Grid

Modes:

M1= Chan1 Clean

M2= Chan1 Fat

M3= Chan1 Tweed

M4= Chan2 Edge

M5= Chan2 Crunch

M6= Chan2 MarkI

M7= Chan3 MkIIC+

M8= Chan3 MkIV

M9= Chan3 Extreme

Mark V Relay Chart

[illegible]

Mark V Transistor Switching Chart

Transistor		Function/Location	Notes
6426A		Controls J175A	
6426C		Controls RYC3A	
6426D		Controls J175PS	
6426F		Spkr Mute Pulse Transistor	On rear board
6426M		Chan Mute Pulse Transistor	On rear board
6426R		Controls RYR	
6426PT		Controls Pent/Triode Relays	
J175A		V1A Cathode Cap	
J175B		V3A Cathode Cap	
J175C		V3A Cathode Cap	
J175D		Rev F/S On/Off V5B Grid	
J175E		Rev Timed Mute V5B Grid	
J175EQ		EQ Off/On	
J175F		Ch1 EQ Preset Control	On EQ board
J175G		Ch2 EQ Preset Control	On EQ board
J175H		Ch3 EQ Preset Control	On EQ board
J175J		V4B Cathode Ch3 Bright Switch	
J175M1		Sig Mute at Driver Input	All Channels
J175M2		Rev Mute at V4A Grid	
J175M3		Sig Mute at Ch1 Master	Ch1 only
J175M4		Sig Mute at EQ Input	All Channels
J175PS		EQ Preset On/Off	
J175SL		EQ Slider On/Off	
J175SM		Controls RYSM	

Mark V Mute Circuit FETs

The channel switching mute circuit in the Mark V uses five J175 FETs and one relay to mute the signal when switching channels.

To check to see if the FET circuit is working properly (the relay circuit is separate), measure the voltage at the collector of 6426M. (6426M is located on the rear circuit board, near the Send control wires). The voltage on the collector should read $\pm 23\text{V}$.

If it reads $\pm 12\text{V}$, this usually indicates that one of the FETs has failed and needs to be replaced. There will be different symptoms depending on which FET has failed:

J175M1 or J175M4—all channels will be muted.

J175M2—reverb will be muted.

J175M3—Channel 1 will be muted.

To confirm which FET has failed, measure the voltage at the gate (center leg) of the suspected FET. If it reads below 1V or so, that is most likely the failed FET. If it reads 12V (same as the collector of 6426M), then it is probably OK. After replacing the suspected FET, measure again the voltage at the collector of 6426M. It should read $\pm 23\text{V}$.

Reverb: J175D and J175E are part of the reverb circuit. However, if either one of these fails, the voltage at 6426M will not be affected. The best way to diagnose these two FETs is to measure the voltage at the gate (center leg). If it is low, (less than 1V or so), the FET should be replaced. (Remember—if the footswitch is connected and the reverb button is turned off, the voltage at J175D will stay low!)

To check the mute relay circuit, check the voltage at the collector of 6426F (located on the rear board in front of the speaker output jacks). If the voltage is low, this usually indicates that J175SM has failed and needs to be replaced. J175SM controls RYSM (speaker mute relay), and is located next to 6426F. Make sure the Pull Mute switch is off when checking this circuit.

(Note: use caution when replacing the FETs. The small orange relays can be damaged if the outside of the relay is melted by a stray soldering iron! Use a small tip on your soldering iron).

8/19/09

Mark V Switching Update

This update applies to units with serial #s 1224 and earlier only. Units after this serial# have this update installed from the factory.

This update is not mandatory and should only be performed if you have a Mark V in for any repair, or if you have an amp with these symptoms:

Symptom: With the footswitch in use--- switching into Ch3 with the EQ on (on the footswitch), Ch3 won't engage fully. There will be a loud buzzing noise, caused by relays being "half on". The symptom does not appear when switching into any other channel, does not appear with the EQ off, and does not appear without the footswitch being used.

Solution: Changing the values of one cap and one resistor will eliminate this problem. They are R211 and C76, both located on the far left edge of the rear circuit board, one on either side of the LM3914 switching IC. R211 will be changed from a 22K ½ watt to a 47K ½ watt, and C76 will be changed from a .1 50V ceramic to a .47 rated at least 25V. If using a polarized cap, the positive end is toward the rear of the amp. Note: earlier versions of the schematic show this cap incorrectly as C45, but the correct designator is C76.

Procedure: The cap can be reached easily without any disassembly, but reaching the resistor requires you to remove the Channel and Loop assign switches.

To make things easier, you can lift the forward end of the existing 22K and install another 22K in series with it. The resulting value is well suited to accomplish what's needed.

Mark V 12V Supply Diode Tech Bulletin

August 2013

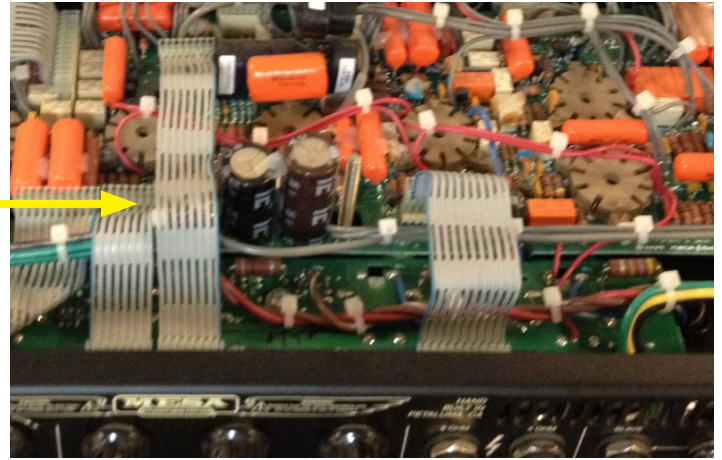
For units showing 12V supply issues.

The "Diode Update" should **ONLY** be performed if and when the 12V supply has actually failed.

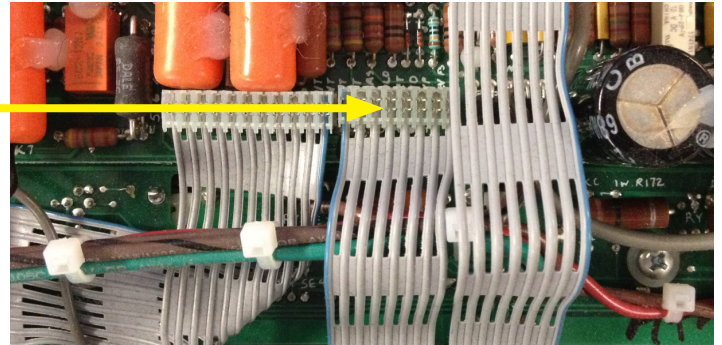
Serial numbers below MK5-10486

**Replace D16-D19 (4) 1N4007 diodes with (4) 1N5392.
MESA Part# 517392 100V 1.5A Diodes**

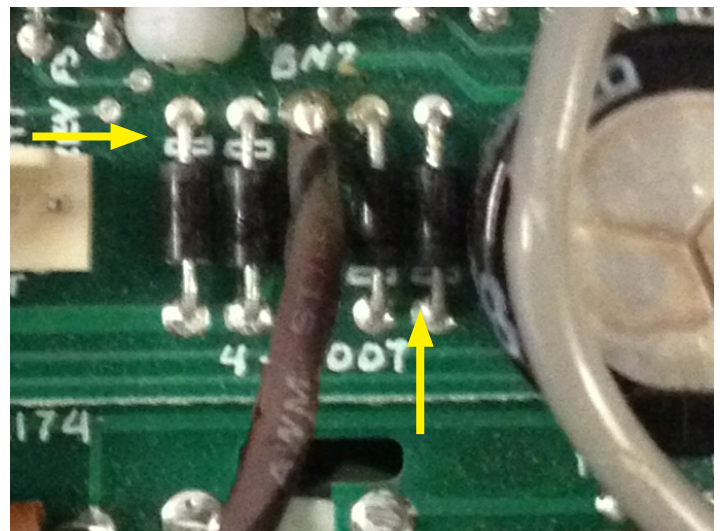
1. Facing rear of chassis, Diodes are located under these two ribbon cables just left of C103 6800uf @ 25V Radial Cap



2. Lift the two ribbon cables out of the way.



3. It's best to clip the leads from the top side of the board and heat the remainder of the leads and let them drop out of the bottom of the board into the chassis. Once heated, slightly lift chassis (1-2 inches) and drop on bench to allow leads to fall out. Leads are crimped to the board and may pull the pads out if you try to lift the whole component through the top side. Once old components and leads are removed, tilt the chassis and make sure to collect all discarded lead scraps. Cathode stripes are marked on PCB silkscreen.



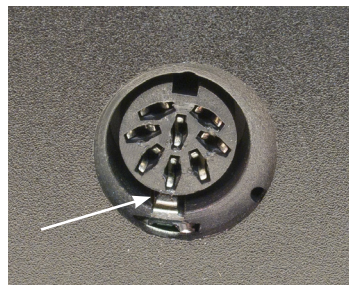
Mesa/Boogie Mark V Intermittent Footswitch Quick Fix

For customers suffering from intermittent EQ on/off footswitching issues, a quick fix exists by carefully bending the footswitch DIN jack Ground Tab into a more reliably tensioned position. Only a small, slotted screwdriver no more than 3/16" wide is needed to restore reliable footswitch function.

The goal of this fix is to bend the Ground Tab from pointing downward and instead bending it up and under the multi-pin DIN housing. The current positioning of the Ground Tab can become intermittently connected when the cable is removed and re-installed numerous times. The re-positioning of the ground tab as described below restores solid connection of the Ground Tab to the cable's housing. No disassembly is needed and 5-10 minutes is all the time required to successfully complete this mod.



BEFORE



AFTER

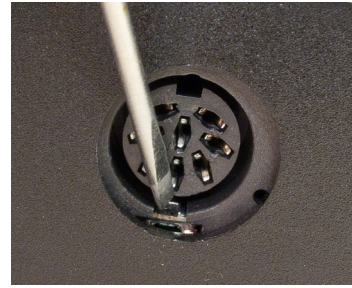
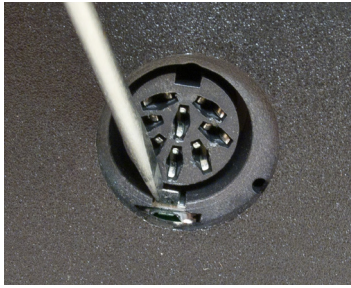
1. Insert the screwdriver underneath the Ground Tab and slowly bend upward until the tab is either flat or bent slightly upward.



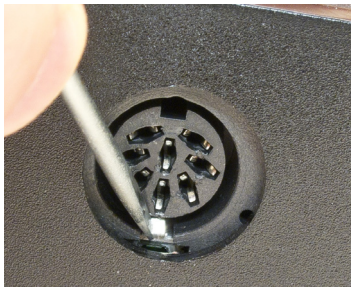
2. Bend the tab up toward the face of the DIN plug until flat against it. It will 'snap back' slightly once released. This is OK.



3. Using the edge of the screwdriver, push down slightly on the Ground Tab and pivot the top edge of the screwdriver inward, carefully bending the Tab end underneath the plastic DIN housing. When you let go, the Tab will tension itself under the bottom of the DIN housing.



4. Once the tab is under the DIN housing you can adjust the bend and tension by inserting the screwdriver above or below the tab and levering the tab to insure a solid connection to the bottom of the housing. When completed properly, the tip of the Ground Tab should be touching the plastic and bent inward just past the outside edge of the DIN housing by 1/16".



Please contact Mesa Customer Service with any questions or further support regarding this advisory.

The Spirit of Art in Technology



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