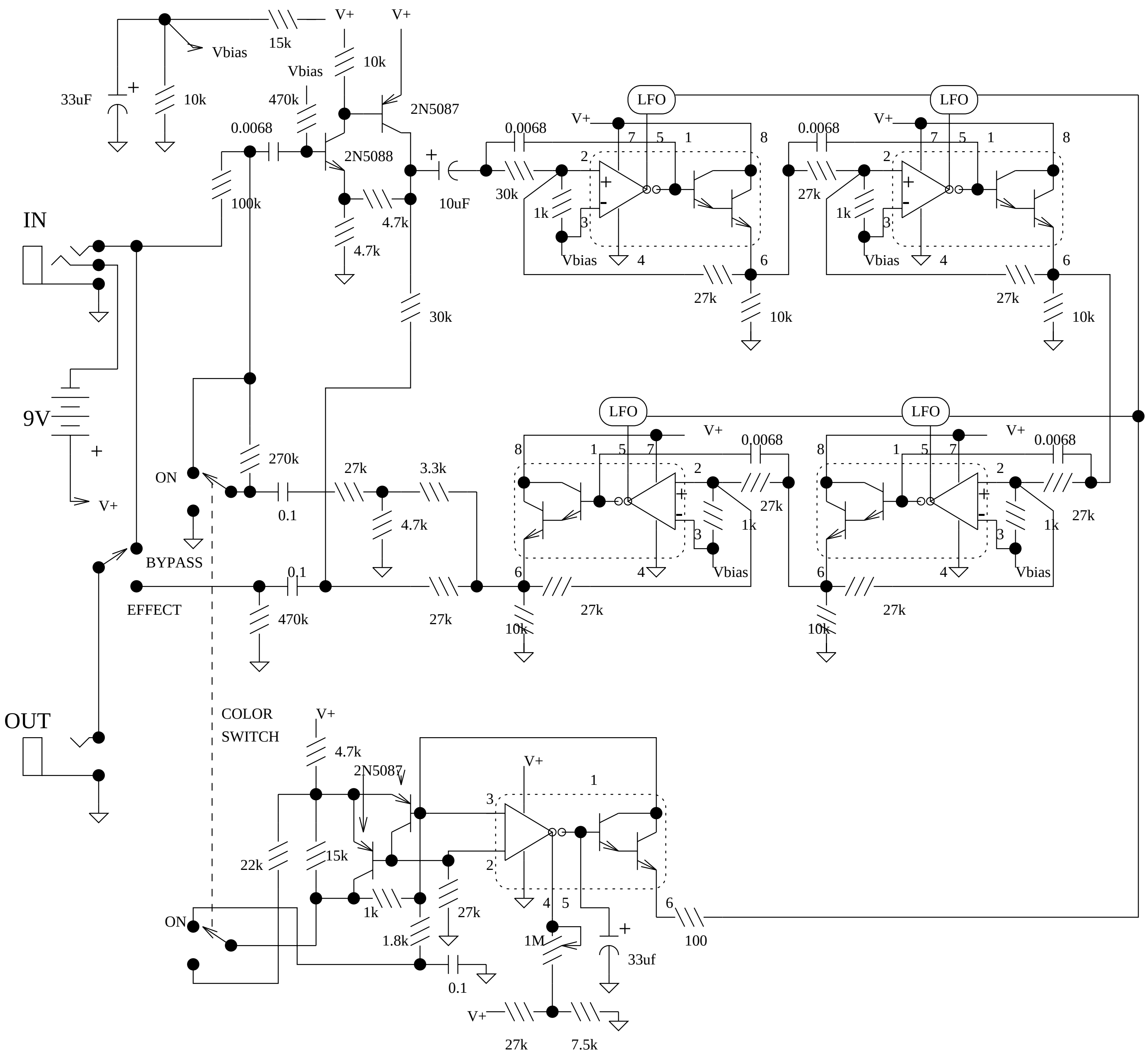
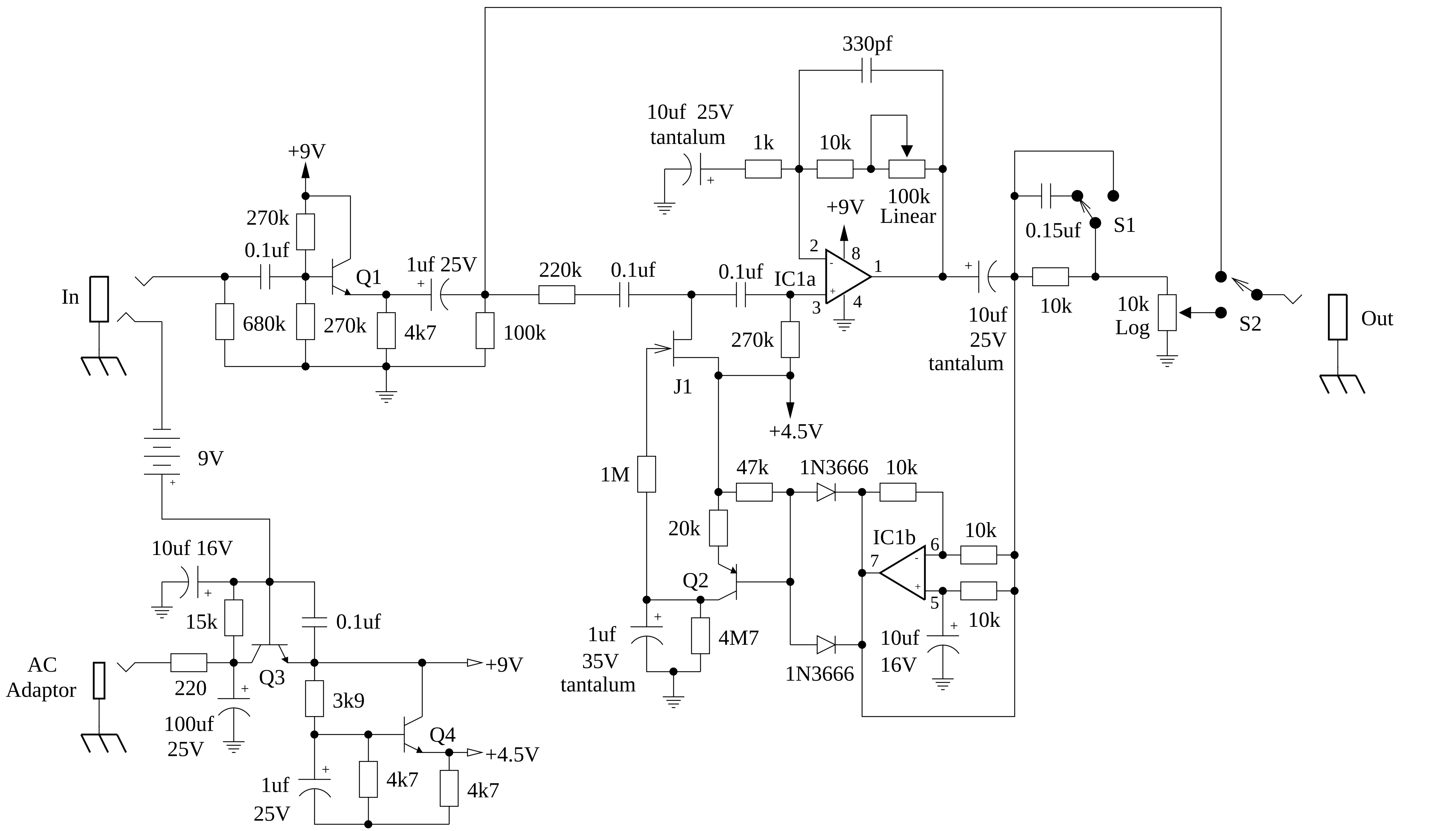
EH Small Stone Phaser

Issue J



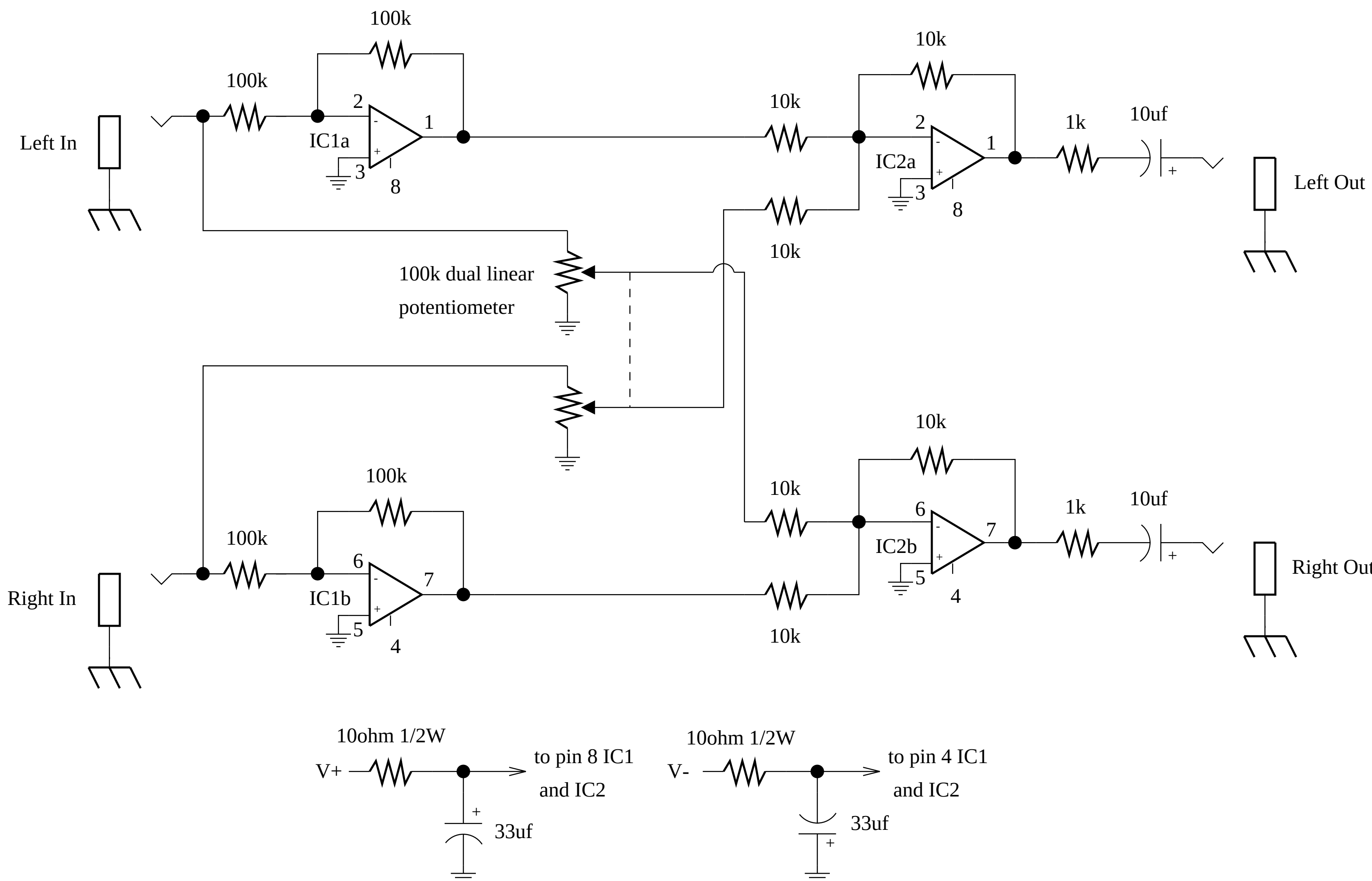
The Small Stone is somewhat unique in using Operational Transconductance Amplifiers (OTA's) for phase shift stages instead of opamps with variable resistors. All of the IC's are house marked EH1048, but can be replaced with CA3094 which is a combination of an OTA equal to the CA3080 and a darlington emitter follower. Later Small Stones used slightly different circuits, but all used the OTA.

Name: Soul Preacher	Manufacturer / Designer: Electro-Harmonix	Revision: 10/13/95	Model #



-All resistors are carbon film, 1/4W, 5%, unless otherwise noted
-All non-polarized capacitors are mylar, 50V, 10%, unless otherwise noted
-Transistors Q1-4 and FET J1 are unknown
-IC1 is a 4558

EM Stereo Spreader



IC1 & IC2 are 5532 Dual Op amps for low noise. All resistors are 1% metal film 1/4W unless otherwise noted. Requires bipolar power supply from 9 to 15 volts.

For that different sound, Music a la Theremin

By Louis E. Garner, Jr.

Published November 1967, Popular Electronics

For about the price of an inexpensive guitar, plus a few hours assembly time, you can own and enjoy what is perhaps one of the most versatile of all musical instruments: the unique and amazing theremin. Named after its Russian-born inventor, Leon Theremin, its frequency range exceeds that of all other instruments, including theater pipe organs, while its dynamic range is limited only by he power capabilities of the amplifier and speaker system with which it is used. Above all, it is a true electronic instrument, not just an “electronic version” of a familiar string, reed, or percussion instrument. Its tone is unlike that of any conventional instrument.

A musician playing a theremin seems almost like a magician, for he can play a musical selection without actually touching the instrument itself! As he moves his hands back and forth near two metal plates, he seems to “conjure up” individual notes at any desired volume; he can “slide” from one musical note to another with ease, can produce tremolo and vibrato effects at will, and can even sound notes which fall outside the standard musical scale. He can play tunes or melodies, produce unusual sound effects, or can accompany a singer or another instrument-all by means of simple hand movements.[*]

The theremin is ideal for amateur as well as professional musicians and can be used for “fun” sound effects as well as for serious music. It makes a wonderful addition to the home recreation room, and can be used equally well by rock’n’ roll groups or larger bands. Theatrical groups find it just the thing for producing eerie and spine-tingling background effects to accompany mystery or horror plays, and for the budding scientist or engineer, it is an excellent Science Fair project.

The typical theremin has two r.f. oscillators, one having a fixed, the other a variable, frequency, with their output signals combined in a mixer/amplifier stage. At “tune-up,” the oscillators are preset to “zero beat” at the same frequency. The frequency of the variable oscillator is controlled by an external tuning capacity--the “antenna”—which is a “whip” or simple metallic plate.

As the musician’s hand is moved near this antenna, the variable oscillator shifts frequency and a beat note is set up between the two oscillators. The pitch is proportional to the difference in frequency between the two oscillators. This beat note, amplified, is the theremin’s output signal. The more advanced theremin designs—such as the version presented here—use a third oscillator to control output volume and two antennas. This theremin also uses a unique FET volume, and a FET output stage. See Fig. 1.

Construction

Except for the two control antennas, power switch S1, and battery B1, all components are assembled on a printed circuit board as shown full-size in Fig. 2(B). An insulated jumper is required between C15 and R20 as shown in Fig. 2(B) and Fig. 3. Mount the PC board in a suitable cabinet with four spacers (see Fig. 3), making sure that suitable holes are drilled in the cabinet or though a dialplate to accept the tuning-slug screws of L2 and L4. Coils L1 and L3 are mounted on small L-brackets; initially, these brackets should be adjusted so that L1 is at right angles to L2 and L3 at right angles to L4. Switch S1 is also mounted on the cabinet or

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[*] Nearly everyone who has ever watched television or attended a motion picture has heard music and background effects produced by a theremin, yet relatively few could recognize the instrument, and fewer still have had the chance to own or play one. With its astounding tonal and dynamic ranges, it has been used to produce background music and special effects in scores of science-fiction, fantasy, horror, and mystery shows.

dialplate, in the area of the L2 and L4 slug screws, while the battery is secured to the cabinet wall.

Ordinary copper-clad circuit board can be used to make up the pitch and volume control antennas. Although the author’s units are equilateral triangles approximately 9” on a side—almost any other design will do—shape is not critical. If desired, the upper surface of the antennas may be covered with a colorful material (see cover photo).

The antennas are mechanically mounted on an electrically conducting support. The ones used by the author, (see Fig. 4) were six-inch lengths of 3/4” aluminum pipe with appropriate mounting flanges. The antennas were attached to the pipe with conduit plug buttons soldered to the bottom of each antenna. The flanges of the buttons should make a good friction fit to the pipe. A solder lug for connection to the PC board is placed under one of the pipe support mounting screws as shown in Fig. 3.

Connect the negative lead of the battery to terminal B on the PC Board; then connect the positive battery lead, via S1, to terminal A. The center lead of the audio output coaxial cable is connected to terminal C on the PC board, while the associated braid is soldered to the ground foil. Connect the volume control lead and one lead from L3 to the proper hole on the PC board (see Fig. 3), then connect the pitch control lead and one lead of L1 together and solder to the hole on the PC board. The other ends of both coils are soldered to the ground foil of the PC board.

Tuning

Although the theremin is used with an external audio amplifier and speaker, no special test equipment is needed for the tuning adjustments. The procedure is as follows.

1. Temporarily short Q6’s gate and source electrodes together, using either a short clip lead, or a short length of hookup wire, tack-soldered in place.
2. Preset the coil (L1, L2, L3, and L4) cores to their mid-position.
3. Connect the theremin’s output cable to the input jack of an audio amplifier (with speaker)--a guitar amplifier is ideal. Turn the amplifier on, volume up to nearly full.
4. Turn the theremin on by closing S1 and adjust L2’s slug (keep hands or other parts of the body away from the pitch antenna) until a low frequency growl is heard from the speaker.
5. Turn the theremin off and remove the short from Q6.
6. Turn the theremin back on and adjust L4’s slug until a point is found where the growl is heard from the speaker. Then adjust L3’s stud until the sound is reduced to near zero. This setting, although somewhat critical, will be stable once obtained.
7. Finally, adjust L2’s slug until the growl becomes lower and lower in pitch, finally disappearing as “zero beat” is reached.

With the coils properly adjusted, no output signal will be obtained unless the operator’s hands are moved near the *pitch* and *volume* control plates *simultaneously*. As the operator approaches the *pitch* control plate, a low-frequency note should be heard increasing in pitch as the hand moves nearer and, finally, going higher and higher and beyond audibility as the hand almost touches the plate. As the operator puts his hand near the *volume* control, a low level signal should be heard, increasing in amplitude until maximum volume is attained just before the plate is touched.

After the initial adjustments, L2 and L4 can be readjusted from time to time (using the front panel knobs) as needed to correct for minor frequency drift. In any case, a preliminary check of adjustment is always desirable whenever the theremin is to be used for a performance.

One further adjustment is optional. Coil L1’s positioning with respect to L2 will determine, to some extent, the shape of the output waveform and, hence, its harmonic content. The mounting bracket supporting L1 can be adjusted to reduce the mutual coil orientation to less than 90 degrees if a greater harmonic content is desired. However, as the angle is reduced, low-frequency notes may tend to become pulse-like in character.

Installation

A guitar or instrument amplifier is an ideal companion unit for the theremin; either one allows bass or treble boost, as desired, and fuzz (distortion) or reverberation (if these features are incorporated in the amplifier's circuit). Simply provide a suitable cable plug and connect the theremin's output cable to the amplifier's input jack.

It is not necessary to purchase a special amplifier. The theremin's output signal level is sufficient to drive most power amplifiers to full output without additional preamp stages. The instrument can be used, for example, with a monaural version of the "Brute-70" amplifier described in the February, 1967 issue (of *Popular Electronics*).

If the theremin is used in conjunction with a power amplifier which does not have a built-in gain (or volume) control, a "volume level" control should be added to its basic circuit to prevent accidental overdrive. This can be accomplished quite easily by replacing source load resistor R16 (Fig. 1) with a 10,000-ohm potentiometer.

Operation

The results obtained depend more on the ability of the operator than on built-in limitations within the unit itself. A good "ear" for music is a must, of course, but, in addition, a moderate amount of skill is required, particularly in finger or hand dexterity and movement. The latter is learned only through practice. For a start, here are the basic techniques.

To sound an individual note, first move the "pitch" control hand to the proper position near the *pitch* antenna (as determined by practice) to sound the desired pitch. Next move the "volume" control hand *quickly* to the proper position near the *volume* antenna to sound the note at the desired level, then away after the proper interval to sound an eighth, quarter, half or full note.

To sustain a note, hold both hands in position. The note volume may be increased slowly by moving the "volume control" hand *slowly* nearer the *volume* antenna, reduced by moving it slowly away.

To "slide" from one note to another, hold the "volume hand" fixed in position and move the "pitch hand" nearer (or away from) the pitch antenna plate.

To produce a vibrato effect, hold the "volume hand" fixed in position and shake—or tremble—the "pitch hand" at the desired rate.

To create a tremolo effect, hold the "pitch hand" fixed in position and vibrate—or tremble—the "volume control" hand.

Tremolo and vibrato effects can be produced by simultaneously rapidly moving both hands back and forth.

If you've used triangularly shaped control plates in your instrument (as in the model shown), you'll find that a given hand movement has less effect on operation near the narrow (pointed) end of the triangle than near its broad base.

Practice is important!

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How It Works

Transistors Q1 and Q2 are the variable and fixed “pitch” oscillators respectively, while Q4 serves as the “volume” oscillator. Essentially similar circuits are used in all three oscillators, so only one (Q1) will be described here. Base bias is established by resistor voltage divider R1 and R2, with the former bypassed for r.f. by C3. Resistor R3 serves as the emitter (output) load. The basic operating frequency is determined by the tuned circuit of L1 and the combination of C1 and C2.

In the case of Q1 and Q4, their tuned circuits are also connected to external “antennas.” When these antennas are “loaded” due to body capacitance (the presence of a hand near the antenna), this “load” is reflected to the tuned circuits as a capacitive change which, in turn, alters the frequency of oscillation. Because Q2’s circuit uses no “antenna,” its frequency remains constant at all times.

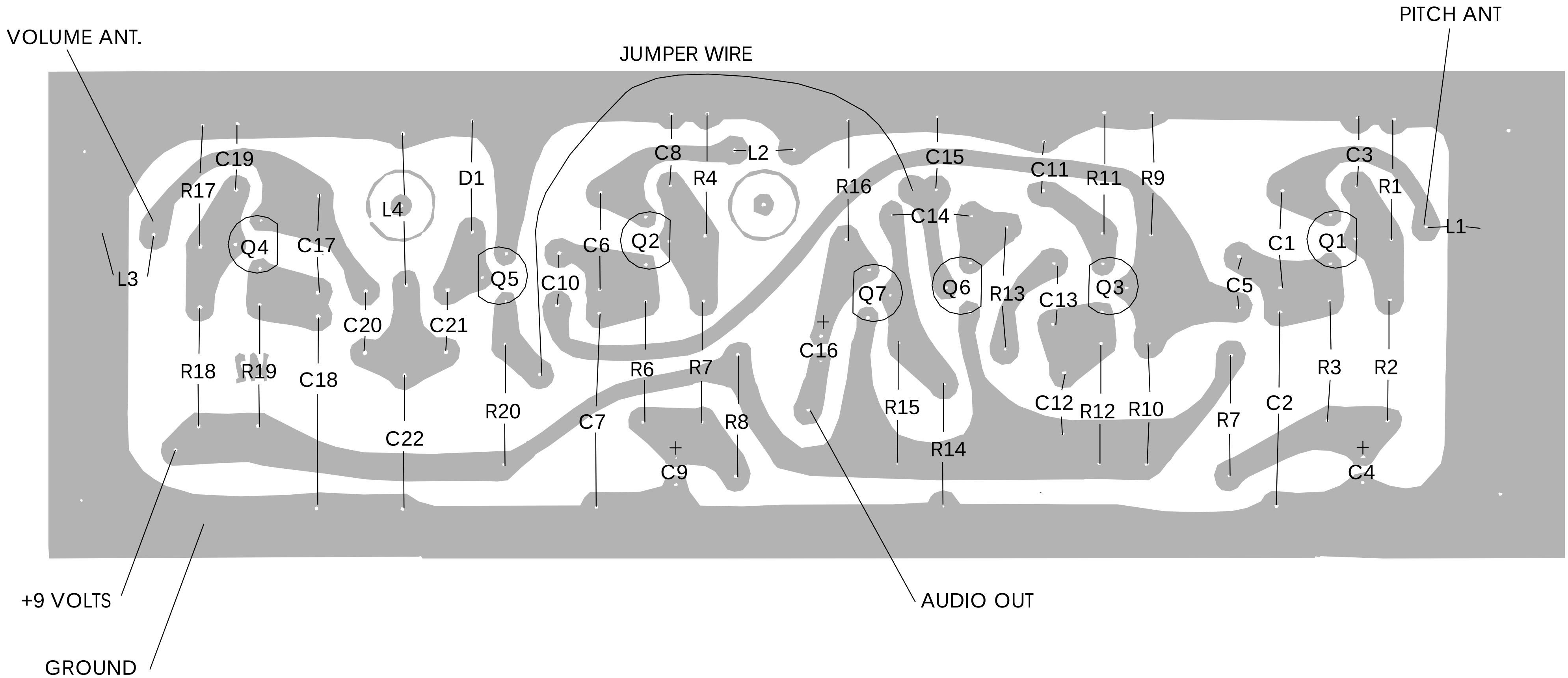
In operation, Q1’s r.f. output signal is coupled to mixer/amplifier Q3 via coupling capacitor C5—while Q2’s signal is coupled to Q3 via C10. If these two oscillators (Q1 and Q2) are at the same frequency, then there will be no resultant “beat” present at the collector of Q3. However, since Q1’s frequency is determined by how close the operator’s hand is to the “pitch” antenna, the resultant beat frequency will vary as the distance between the hand and antenna varies. Because the mixing action of Q3 produces both r.f. and audio beats, capacitor C12 is used to bypass the r.f. components and prevent them from appearing at the collector of Q3. The resultant audio beat is passed, via the volume control circuit, to the FET output stage, Q7.

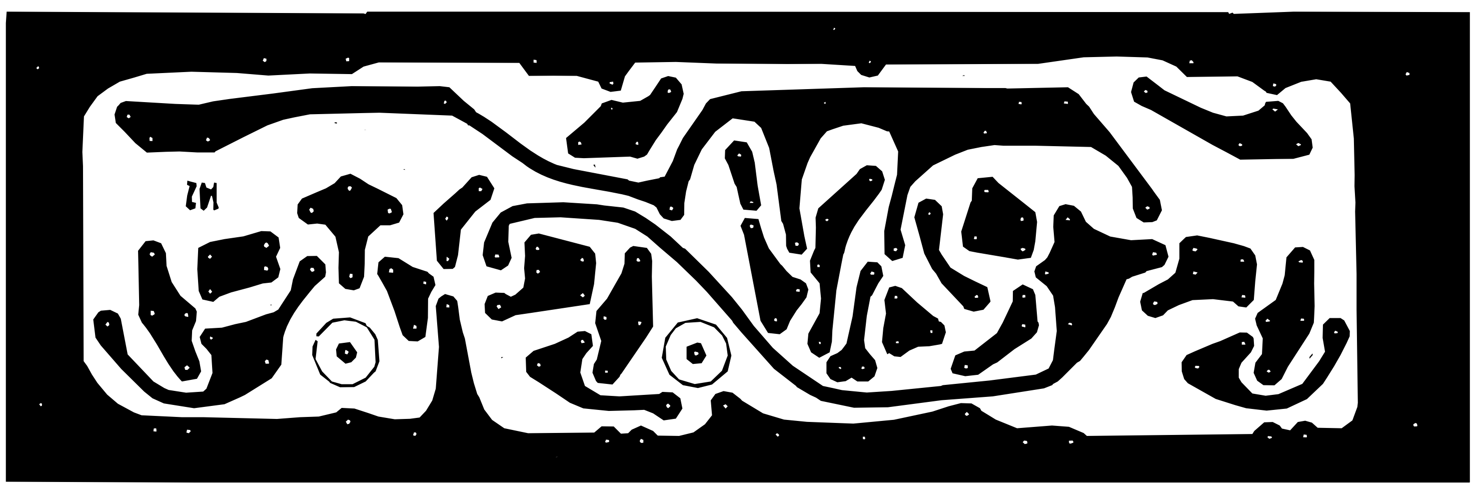
Oscillator Q4 (the “volume” oscillator), like “pitch” oscillator Q1, has its frequency of oscillation determined by the amount of hand capacitance near its “antenna.” The r.f. signal at the collector is coupled via C20 to another tuned circuit consisting of L4 and C22. The r.f. signal across this second tuned circuit is rectified by diode D1 and applied to the base of d.c. amplifier Q5. Thus, the d.c. voltage level present at the collector of Q5 is a function of the amount of r.f. present on L4-C22. This level is at its maximum when the L4-C22 tuned circuit is at the *same* frequency as the Q4 collector tuned circuit.

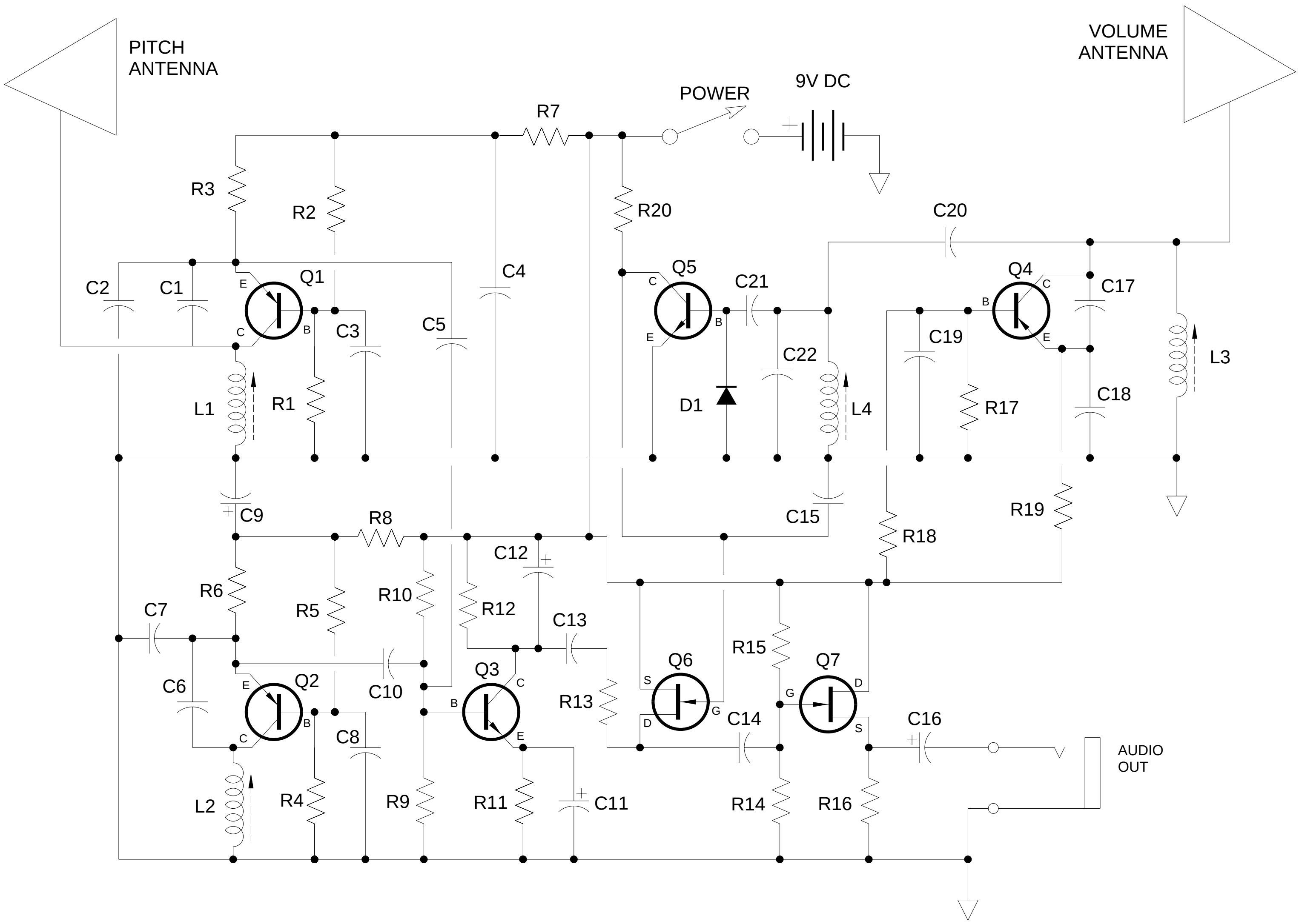
In practice, however, the frequency of Q4’s tuned circuit is made to be *slightly higher* than the L4-C22 frequency. As a result, very little d.c. signal is passed to the base of Q5. This means that the voltage at the collector of Q5 is at a maximum. If the frequency of Q4’s tuned circuit is reduced, when a hand is placed near the “volume” antenna, the base current applied to Q5 increases, causing the collector voltage to drop.

The unique volume control consists of FET Q6, connected in shunt with the audio signal flow. The audio signal at the collector of Q3 passes through d.c. blocking capacitor C13 and is also isolated (for d.c.) from Q7 by C14. Resistor R13 and FET Q6 are arranged as a voltage divider. If the gate voltage of Q6 is highly positive, then the FET acts as a low resistance between R13 and ground, greatly reducing the signal level allowed to pass to Q7. As the gate of Q6 gods less positive, the effective resistance of Q6 increases and the level of audio signal to Q7 increases.

The voltage at the collector of d.c. amplifier Q5 is connected to the gate of Q6. As this voltage level is determined by the frequency of Q4, the operator can readily adjust the output volume by changing his hand capacitance to the “volume” antenna. The variable pitch variable-volume audio signal is coupled to an external audio amplifier via FET Q7. A FET is used for Q7 because its very high input-impedance (a couple of megohms) will not affect operation of FET Q6. If desired, the source resistor of Q7 can be changed to a similar valued potentiometer.


VOLUME ANT.
JUMPER WIRE
PITCH ANT
C19
R17
Q4
C17
L4
D1
Q5
C10
C6
Q2
C8
R4
L2
R16
C15
C14
C11
R11
R9
C3
R1
L1
Q1
C1
C5
Q3
C13
R13
Q6
Q7
C16
L3
C20
C21
R18
R19
C18
C22
R20
C7
R6
R7
R8
C9
R15
R14
C12
R12
R10
R7
C2
R3
R2
C4
+9 VOLTS
GROUND
AUDIO OUT



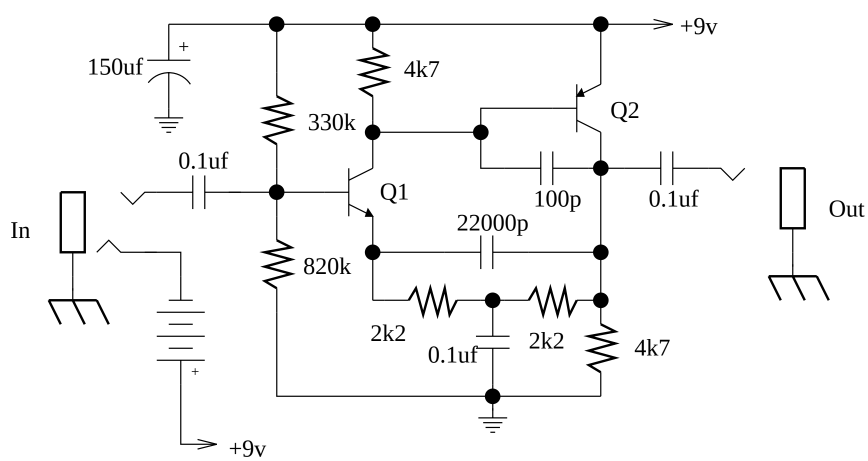


B1	9-VOLT BATTERY
C1,C6	390pF POLYSTYRENE CAPACITOR
C2,C7,C17,C22	0.001uF POLYSTYRENE CAPACITOR
C3,C8,C19	0.1uF DISC CERAMIC CAPACITOR
C4,C9	10uF, 15V ELECTOLYTIC CAPACITOR
C5,C10	60pF POLYSTYRENE CAPACITOR
C11	200uF, 15V ELECTOLYTIC CAPACITOR
C12,C14,C15	0.001uF DISC CERAMIC CAPACITOR
C13	0.01uF DISC CERAMIC CAPACITOR
C16	5uF, 15V ELECTOLYTIC CAPACITOR
C18	0.01uF POLYSTYRENE CAPACITOR
C20,C21	4.7pF POLYSTYRENE CAPACITOR
D1	1N34A DIODE
L1,L2,L3,L4	50-300uH ADJUSTABLE COIL
Q1,Q2,Q4	MPS3638 TRANSISTOR (MOTOROLA)
Q3,Q5	MPS3708 TRANSISTOR (MOTOROLA)
Q6,Q7	TIS-59 N-CHANNEL FET (TEXAS INST)
R1,R4,R17	47K 1/2W 10% RESISTOR
R2,R5,R18	33K 1/2W 10% RESISTOR
R3,R6,R7,R8, AND R11,R19	1K 1/2W 10% RESISTOR
R9,R12,R16,R20	10K 1/2W 10% RESISTOR
R10,R13	100K 1/2W 10% RESISTOR
R14,R15	4.7MEG 1/2W 10% RESISTOR

Tone Booster

from Everyday Electronics Sept. 1978

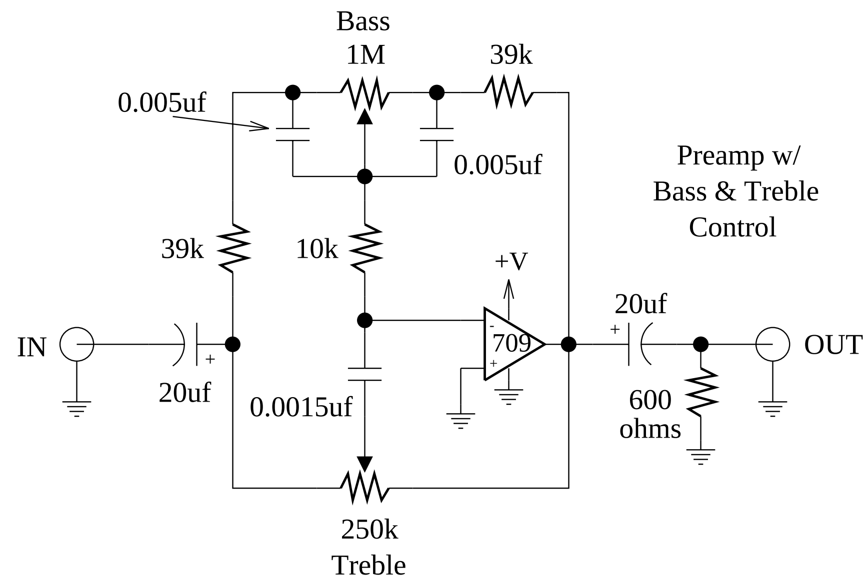
peaks frequencies at 5000 Hz for a "cleaner and more penetrating" sound



Q1 - ztx384

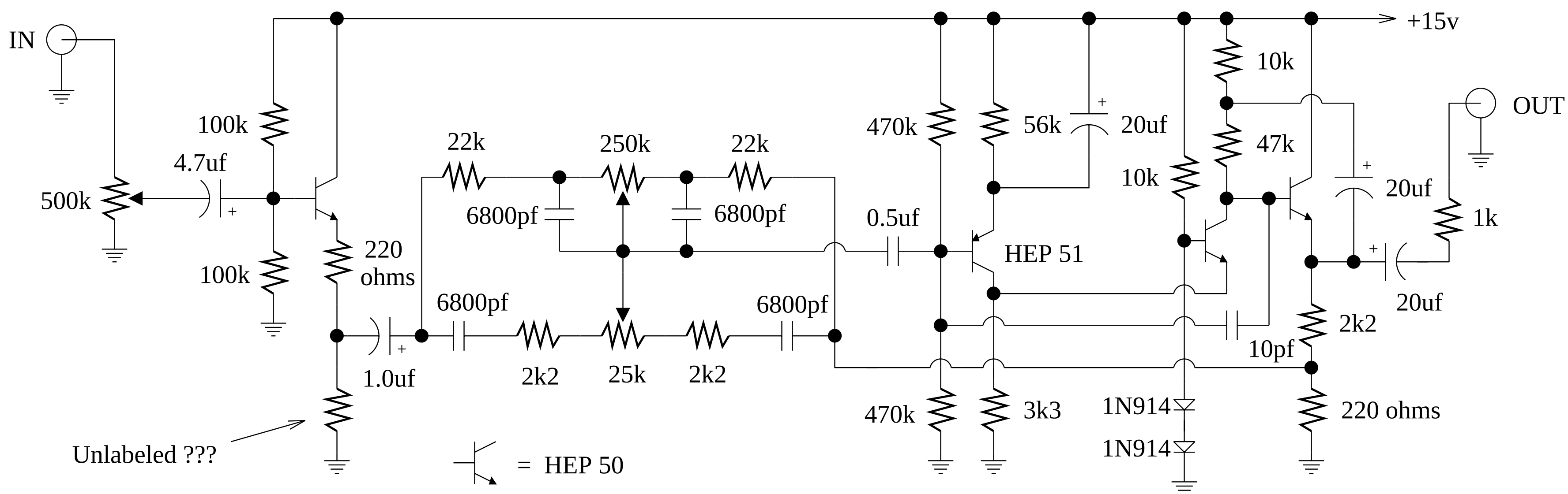
Q2 - BC415p

Tone Control Circuits



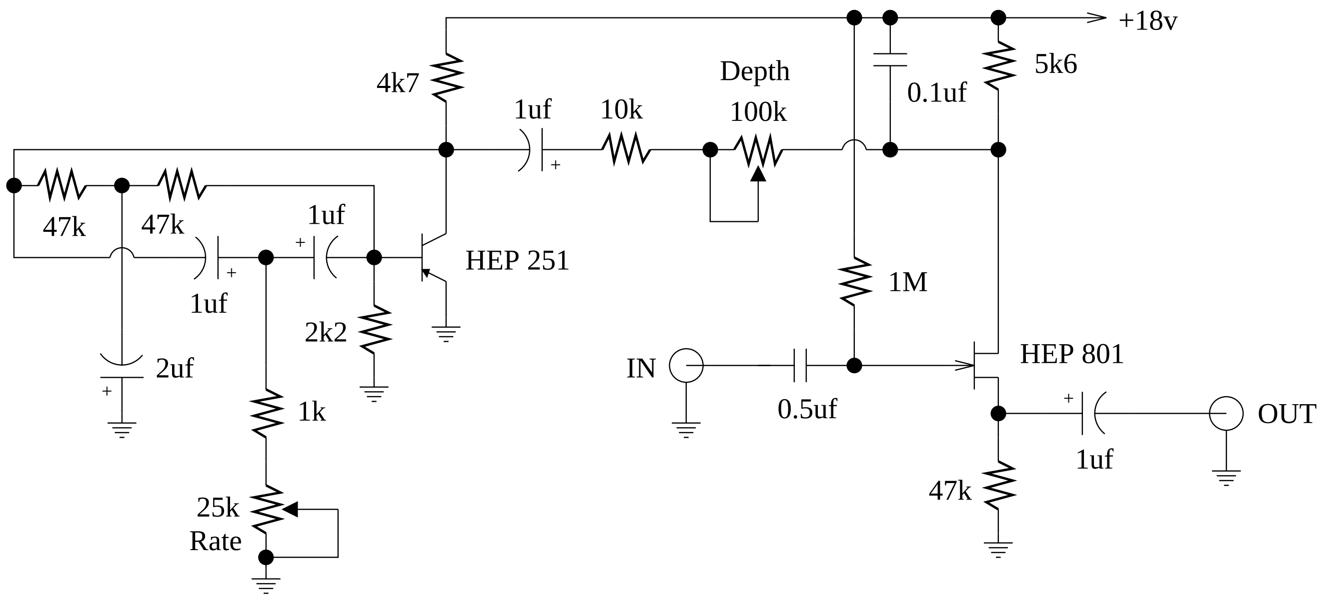
Preamp w/
Bass & Treble
Control

Both of these circuits provide some additional control over tone. They were origionally intended for use with synth modules but could be easily incorporated into most any effects circuit.



Tone Control circuit with signal isolation and impedance-matching stages.

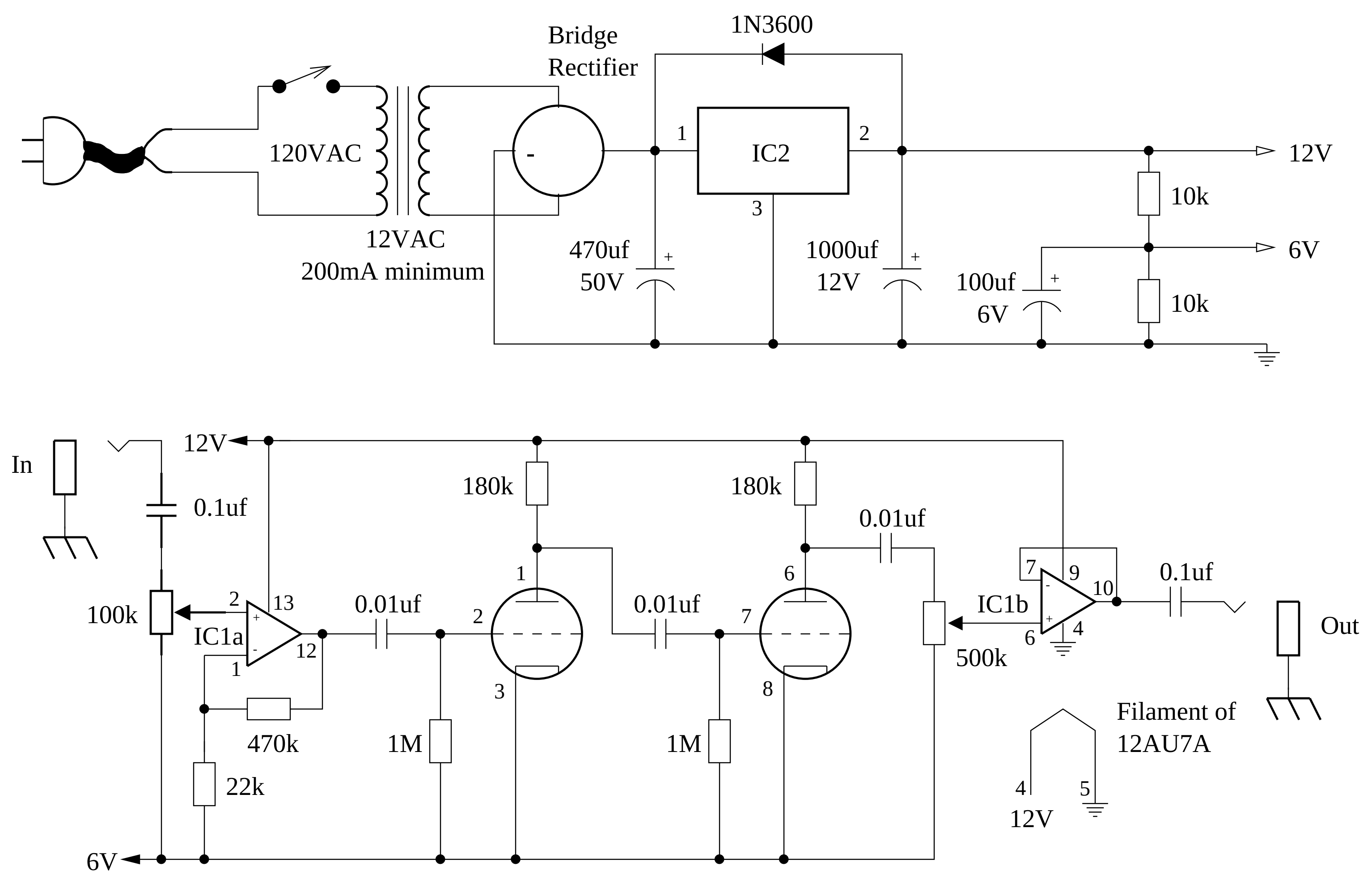
Controllable Tremolo Circuit



This tremolo circuit is not a "plug and play" ready guitar effect, however it could be converted to one with relative ease. It just needs some buffering on the input and ouput and perhaps some bypass switching.

Name: Tube Distortion	Manufacturer / Designer: Ron Black	Revision: 10/13/95	Model #

Circuit from Guitar Player : October 1981



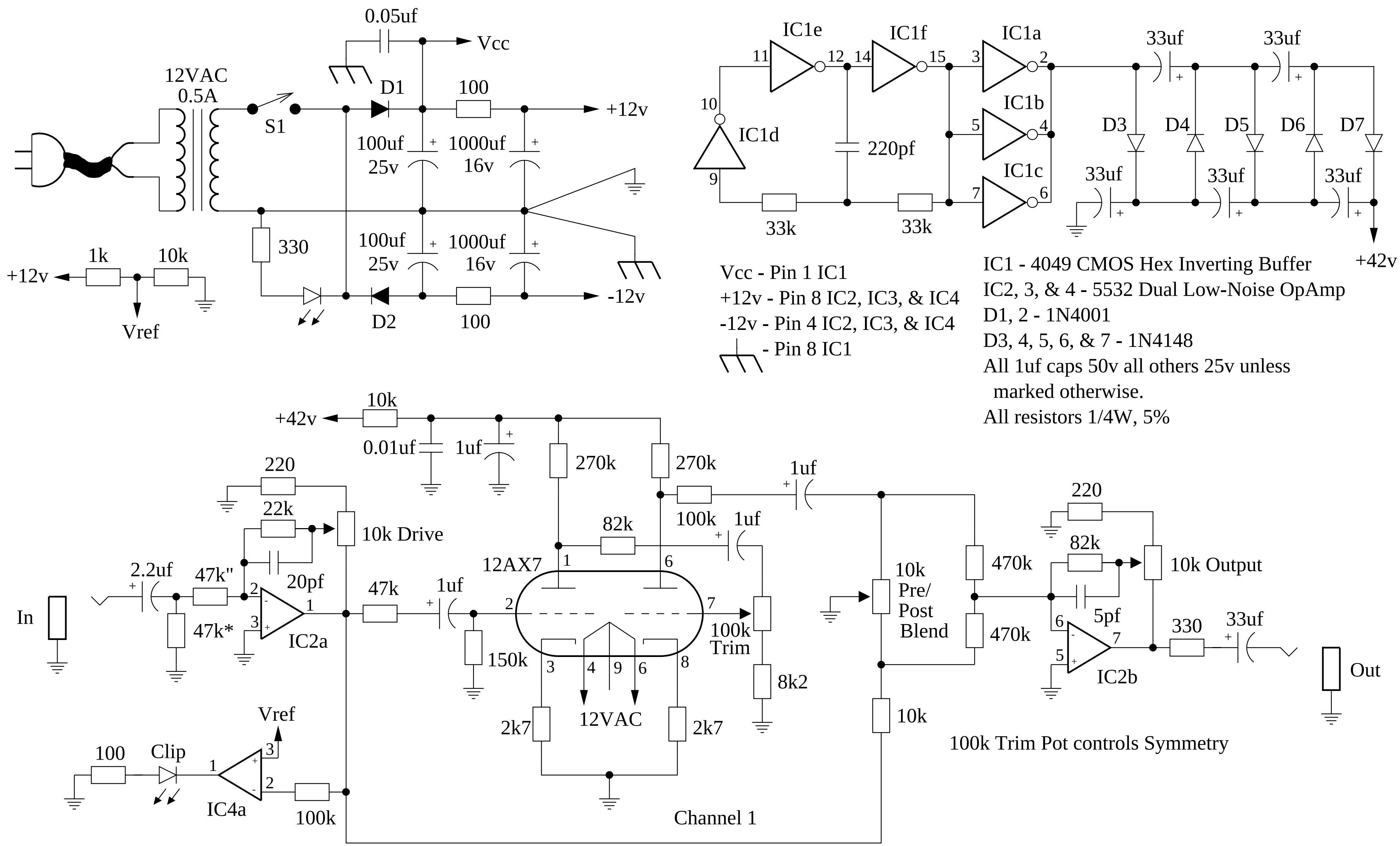
IC1 - 747 dual op-amp, others may be substitued but pinout will differ

IC2 - LM340K-12V Voltage Regulator

Bridge Rectifier - Full wave bridge recitifier, 50 Volts, 500 mA minimum

All resistors 1/2 W, 10% prefered

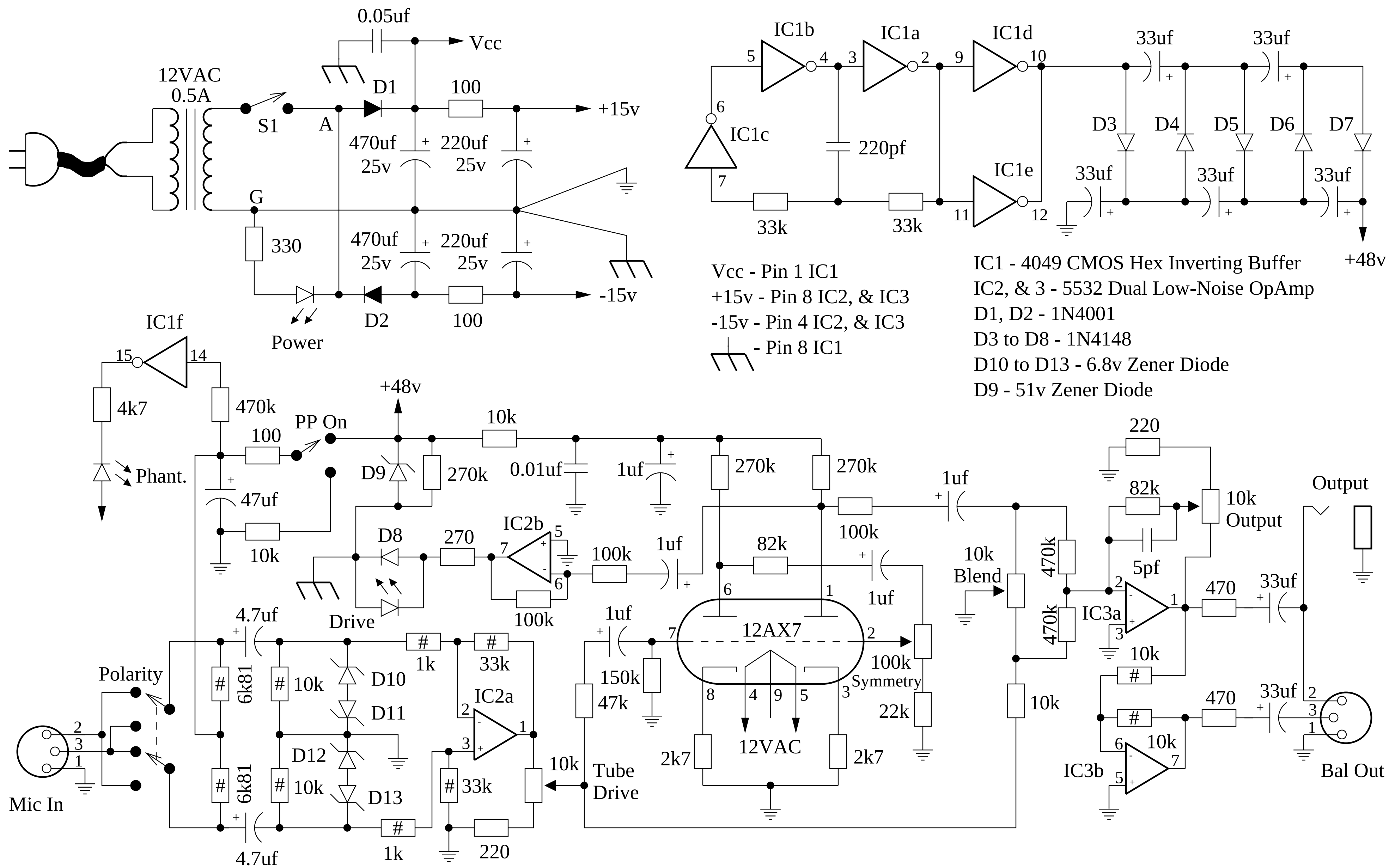
Name: TubeHead	Manufacturer / Designer: PAiA Electronics	Revision: 11/4/95	Model # 9305



Channel 2 is identicle to Channel 1, and uses IC4b for the clipping meter and IC3 for the input/output driver. The input impedance of the TubeHead is about 20k ohms, which is consistant with most gear like Synths, Effects Processors, Mixers, EQs, and so on. 20k is too low for a proper match with high impedance sources like guitar pickups, but a few minor changes take care of this. To use the TubeHead as a instrument pickup preamp, remove the 47k* resistor and the 20pf cap from the feedback loop of the driving OpAmp. Then change the 47k" resistor to 680k and the 22k resistor in the feedback loop of the driving OpAmp to 100k. Now the TubeHead can be used to warm up a cold sounding guitar amp or just provide a great preamp tone.

Original circuit from December 1993 Electronic Musician

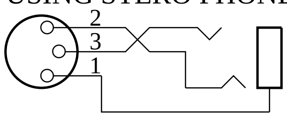
Name: Tube Mic Pre	Manufacturer / Designer: PAiA Electronics	Revision: 11/11/95	Model # 9407



All 33uf caps 16v all others 50v unless marked othewise. Resistors marked with # are 1% film type. The "Drive" LED indicates how hard the tube is being driven. The "Blend" control allows for a mixing of SS and tube coloration. Symmetry controls the relative amounts of even and odd harmonics, CCW the Tube Mic Pre may sound punchier, while CW it may sound warmer. The 12VAC needed for pin 5 of the 12AX7 can be obtained from point G while pin 4 should be connected to point A.

Name: Tube Mic Pre (Mods)	Manufacturer / Designer: PAiA Electronics	Revision: 11/11/95	Model #

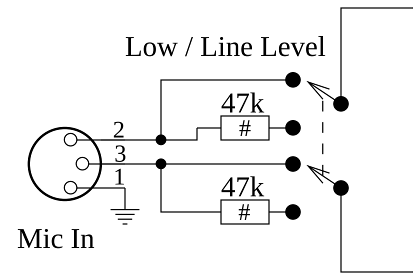
USING STEREO PHONE JACKS FOR INPUT

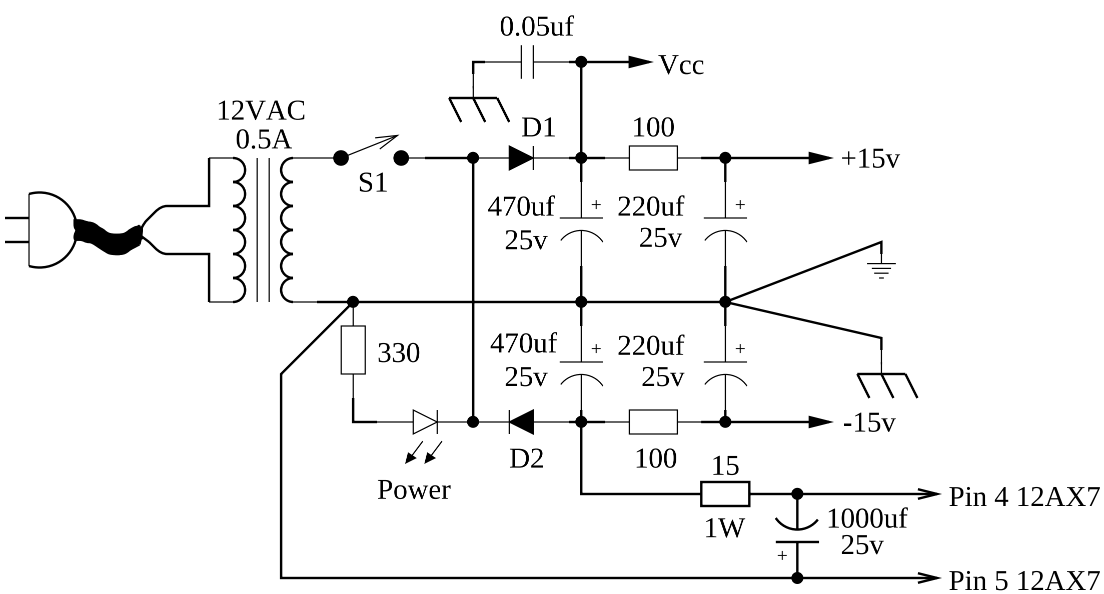


This mod converts the XLR jacks to 1/4" balanced stereo jacks. However, when a mono plug is used with this new jack the inverting input of the differential amp is grounded, this single-ends the balanced input so standard phone plugs on dyanmic mics can be plugged in directly. Additionally the polarity switch still works, even for unbalanced inputs. If phantom power is not turned off while using a singled ended input the performance of the TMP will not be up to par but it won’t damage the TMP either.

USING THE TMP WITH LINE LEVEL SIGNALS

There are two options for line level signals. First if you know that you’ll be using line level signals all the time with the TMP then you can change the two 33k 1% resistors to 1k 1% types and your done. Alternatively if you want the option of line level or low level signals then you can sacrifice the polarity switch and and rewire it here as shown. Notice that the 47k resistors are again of the 1% variety.

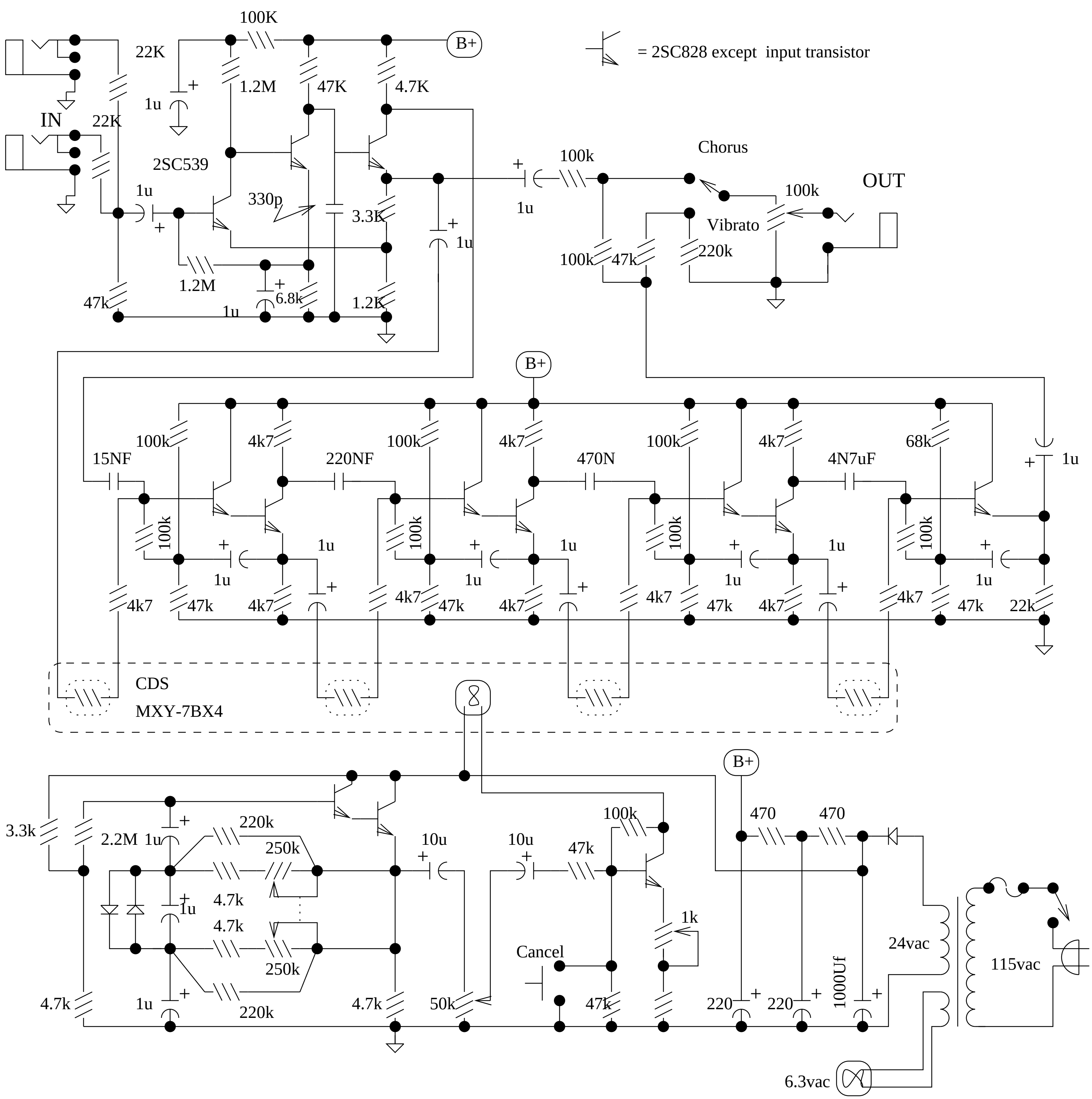




USING DC TO POWER THE HEATER FILAMENTS

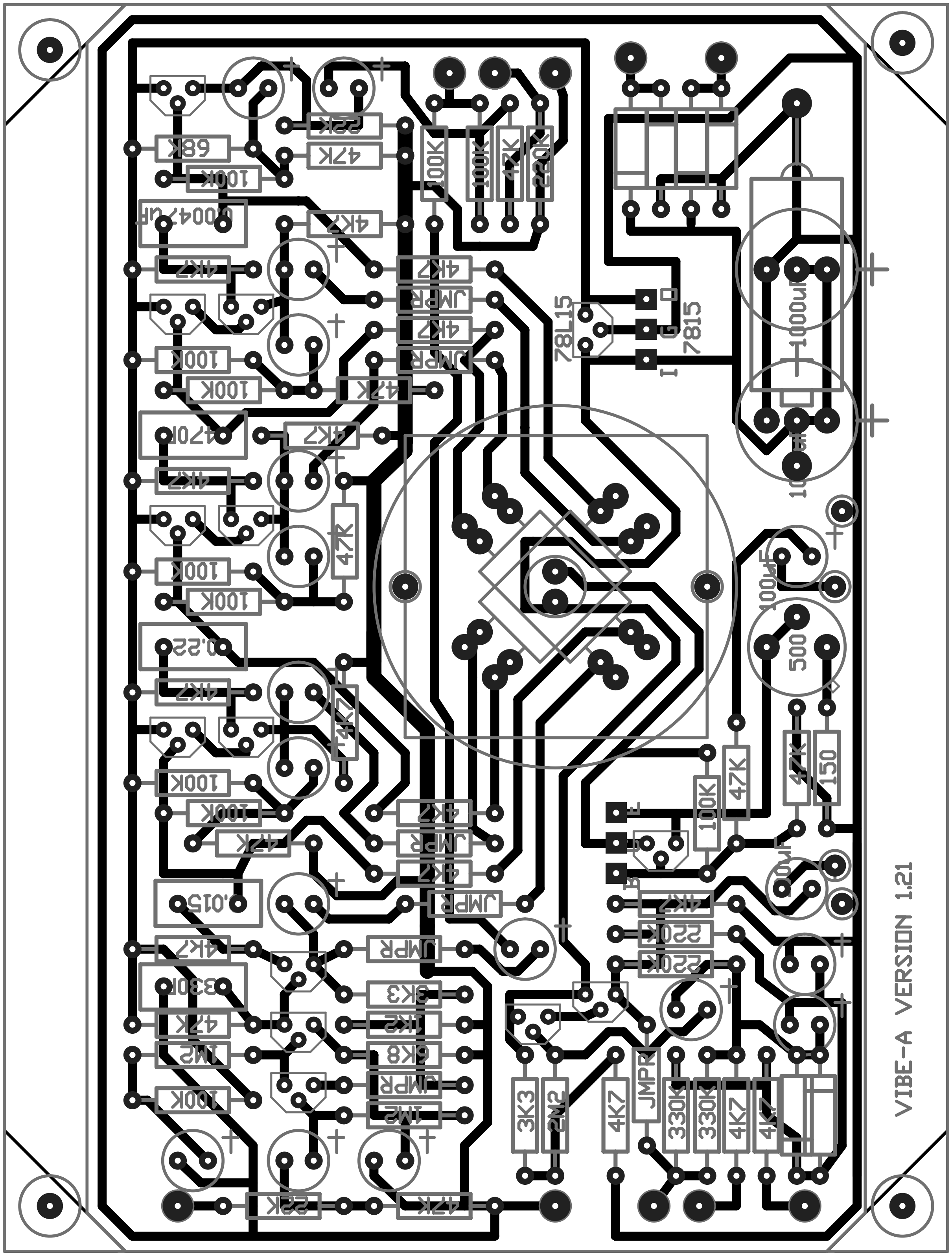
This mod can make the TMP quiter. Insted of using the 12VAC to power the heater filaments rectified and filtered DC can be used. This is accomplished as shown. The new resistor added is a 15 ohm 1W type, the new cap is a 1000uf 25v as shown. It is critical that pin 5 of the 12AX7 connects to the ground point shown.

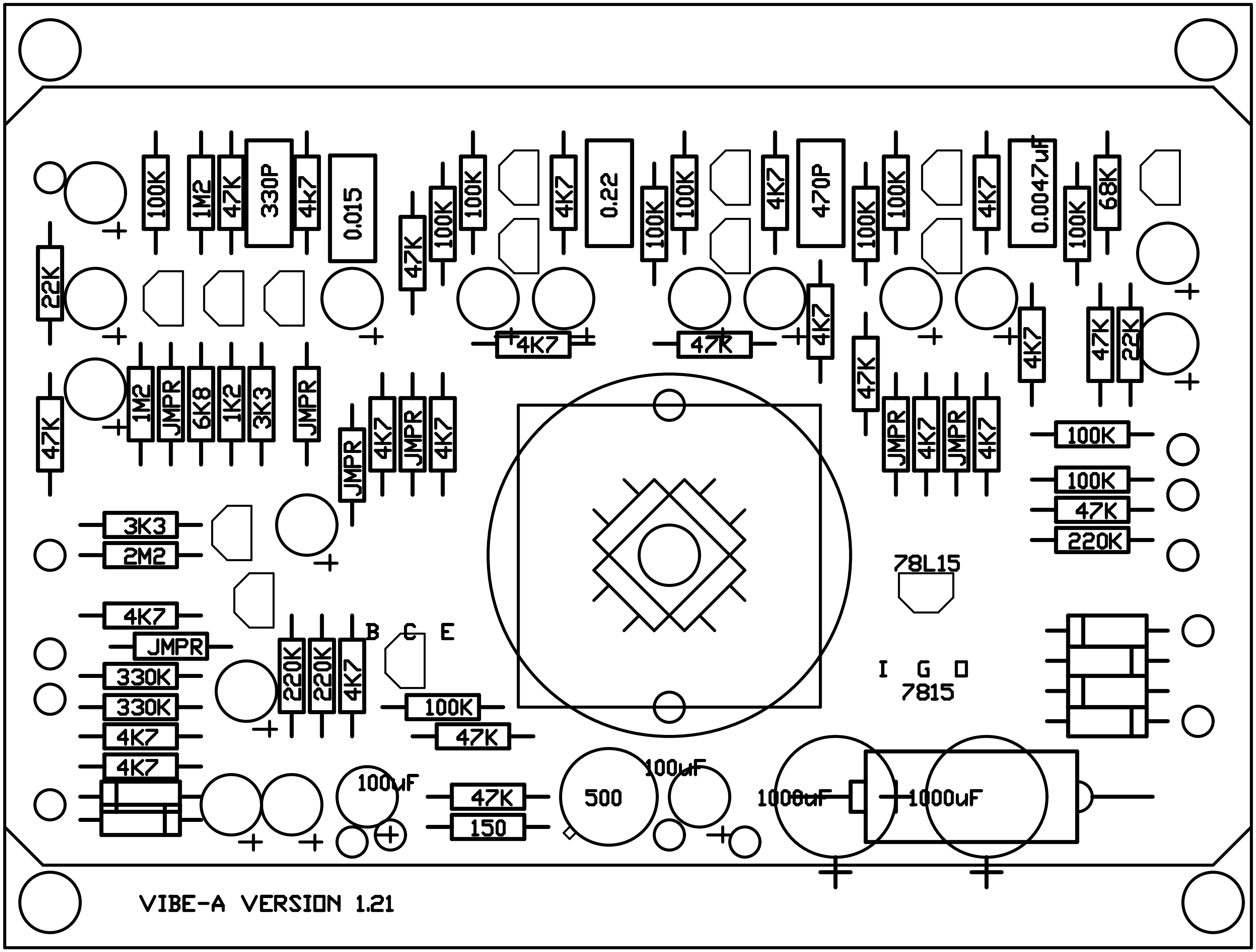
UniVibe (model 905, by Unicord, circa 1968)



The UniVibe is famous from Jimi's use of it. The LFO is a phase shift oscillator, with the dual 250K pots in the pedal assembly to control speed. A modern version would substitute an LED/photocell optocoupler for the four LDR's and the incandescent light bulb that makes the shifting work. This IS just a four stage phaser, perhaps with some distortion from the signal path thrown in.

Since the Univibe (r) is being reissued by Dunlop, Dunlop probably owns the "Univibe" trademark these days. This schematic bears no resemblance, except accidental, to the reissue that Dunlop or anyone else may be making.


VIBE-A VERSION 1.21


VIBE-A VERSION 1.21
7815
78L15
I G O
B C E
1000uF
1000uF
100uF
100uF
500
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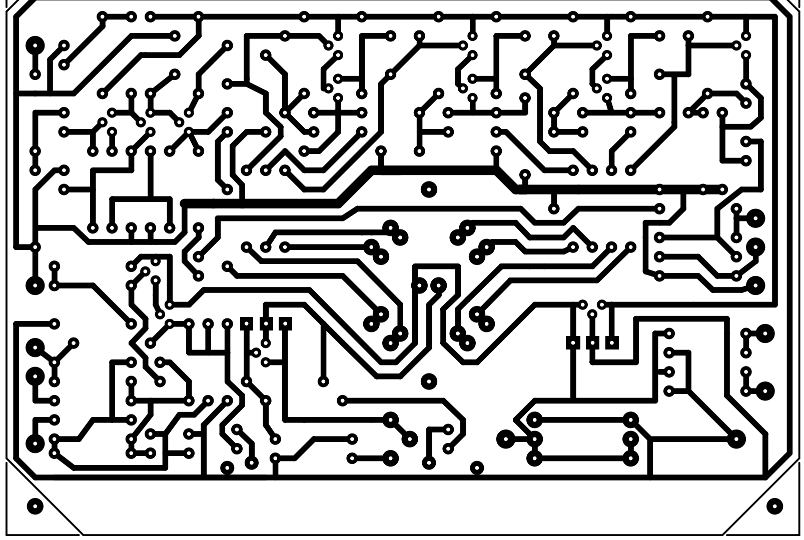
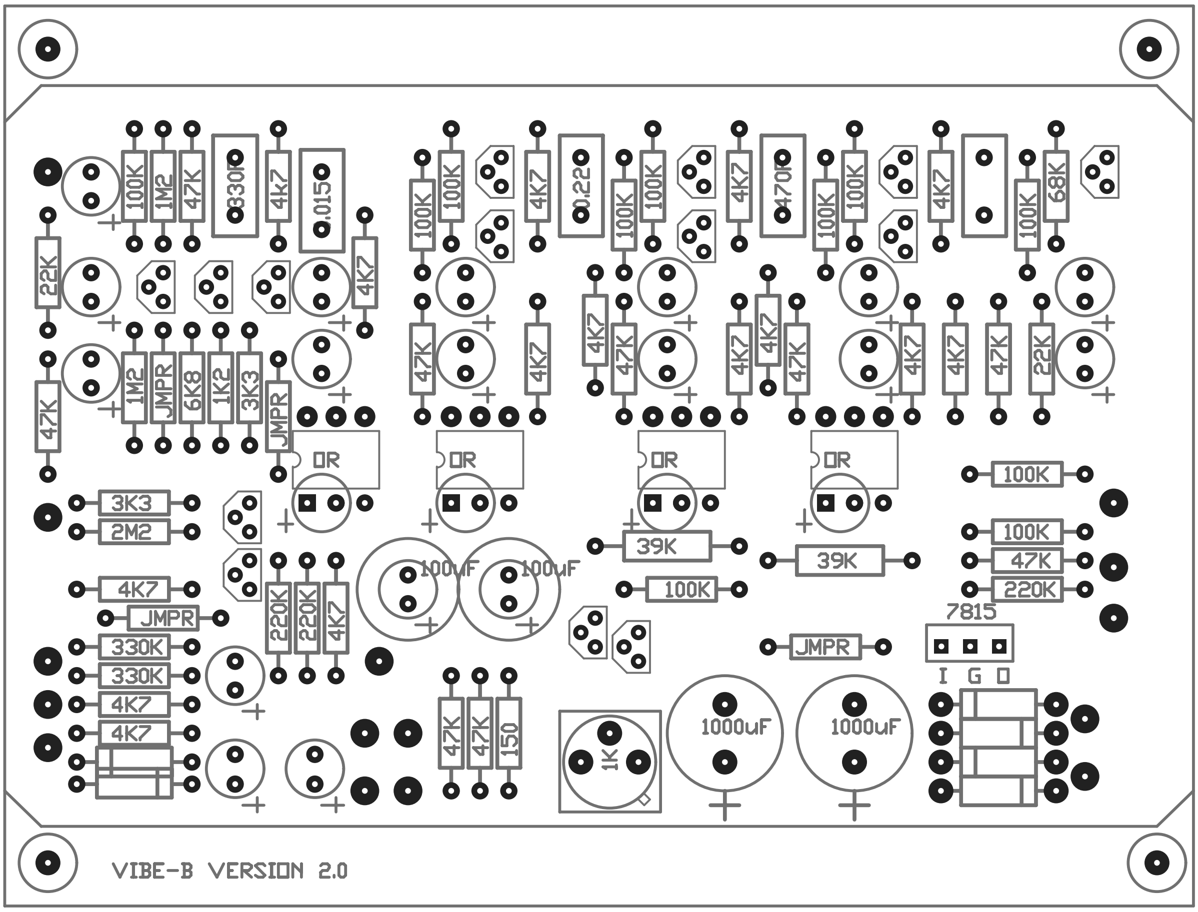
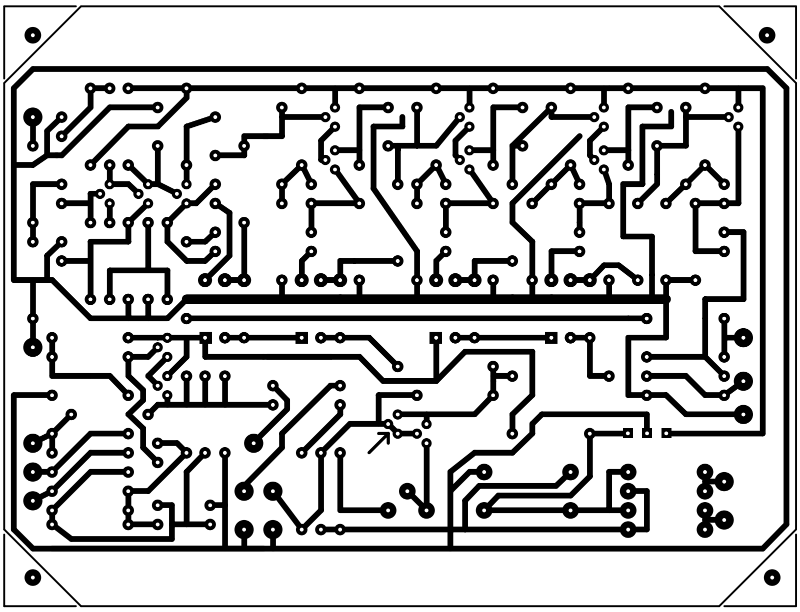
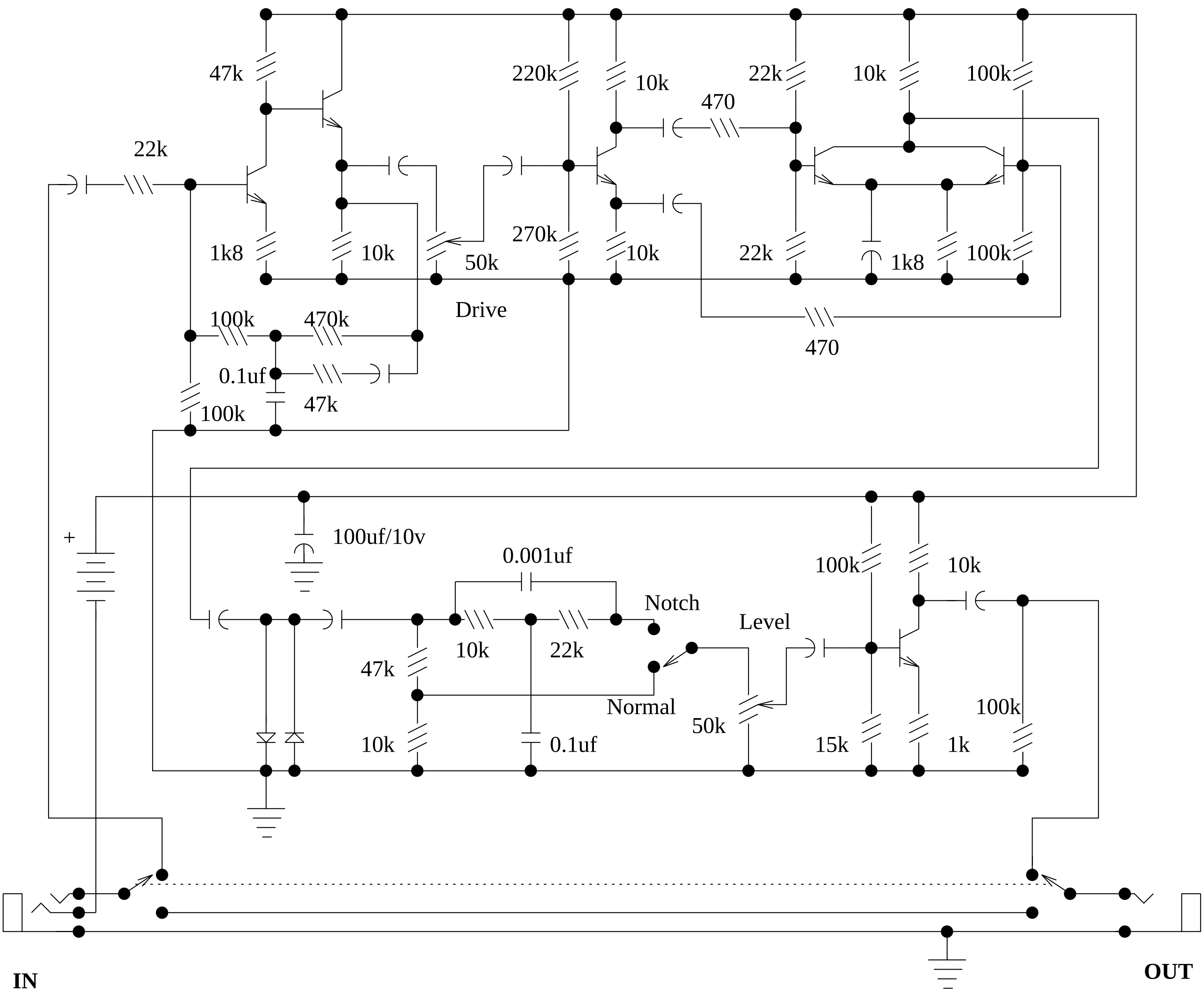
470P
0.22
0.015
330P
68K
22K
47K
100K
220K
330K
4K7
3K3
2M2
1M2
1K2
6K8
JMPR

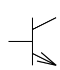


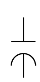

VIBE-B VERSION 2.0
100K
1M2
47K
330n
4k7
.015
22K
4K7
1M2
JMPR
6K8
1K2
3K3
47K
100K
100K
0.22
470n
68K
39K
1000uF
100uF
7815
I G O
JMPR
330K
2M2
220K
150
1K



Univox Super-Fuzz

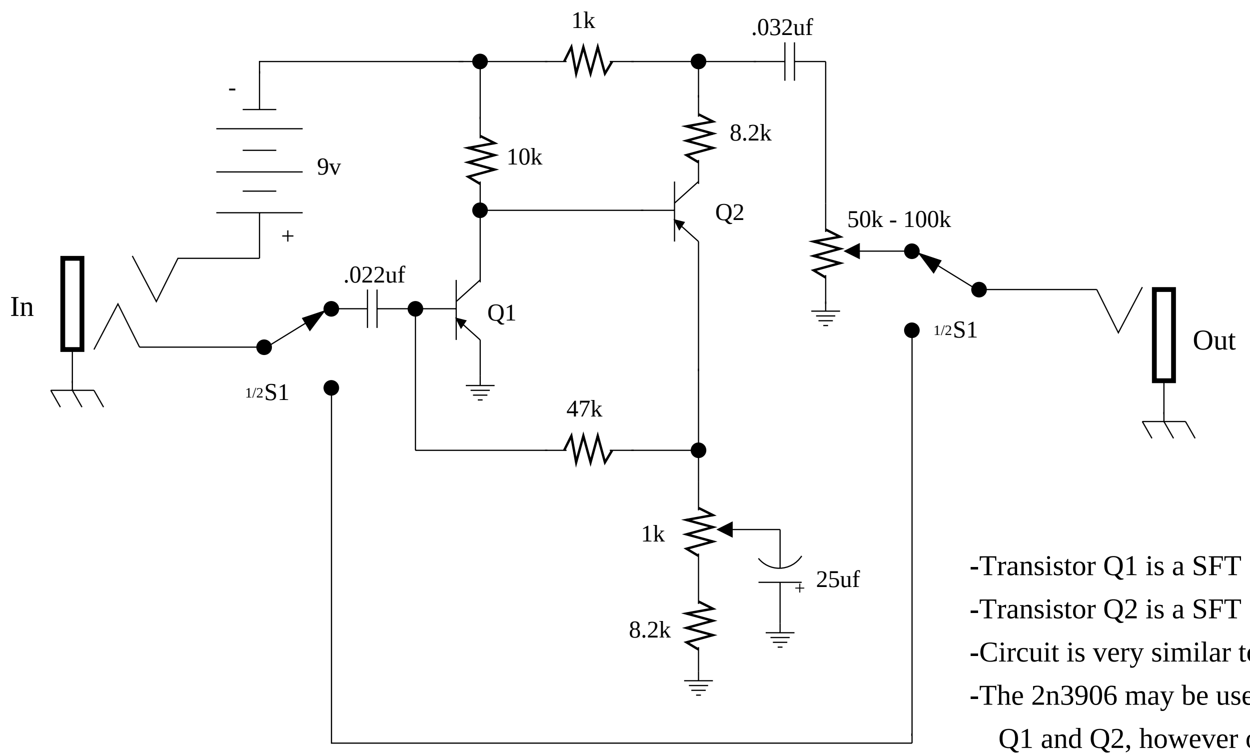



= high gain NPN; 2N2222, 2N3391


= 10 uF electrolytic cap, positive at straight bar

The Univox Super-Fuzz is a 69-to-early 70's design that includes two unique features. These are the octave generation effect from the differential-pair-with-collectors -tied-together and the choice of just a clipping amp or a 1kHz notch for different sounds. The odd-diffamp is actually a full wave rectifier as used here. The clipping is all done with the pair of back-to-back diodes just before the normal/notch filter section. These were originally germanium, although silicon works. You can use LED's here for a different sound, but you need a lot of gain in the input to get enough signal to them to break them over.

Vox Tone Bender



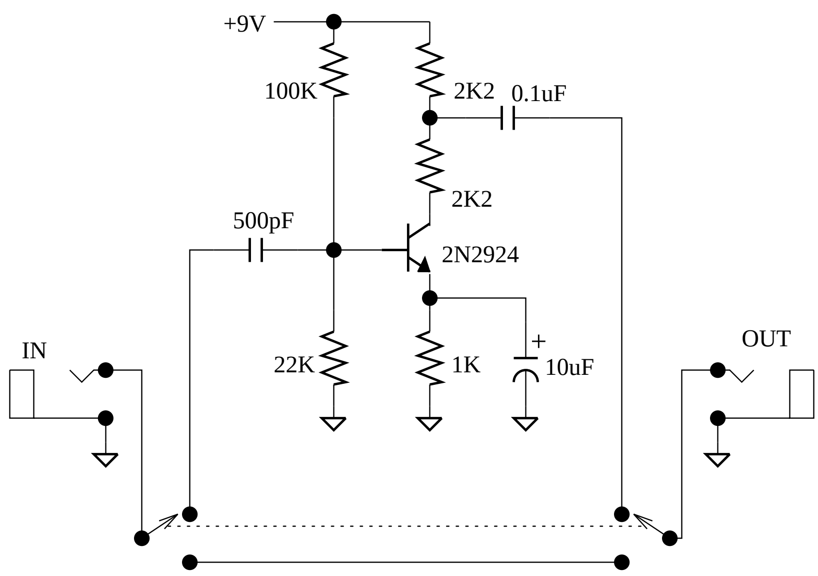
-Transistor Q1 is a SFT 363

-Transistor Q2 is a SFT 337

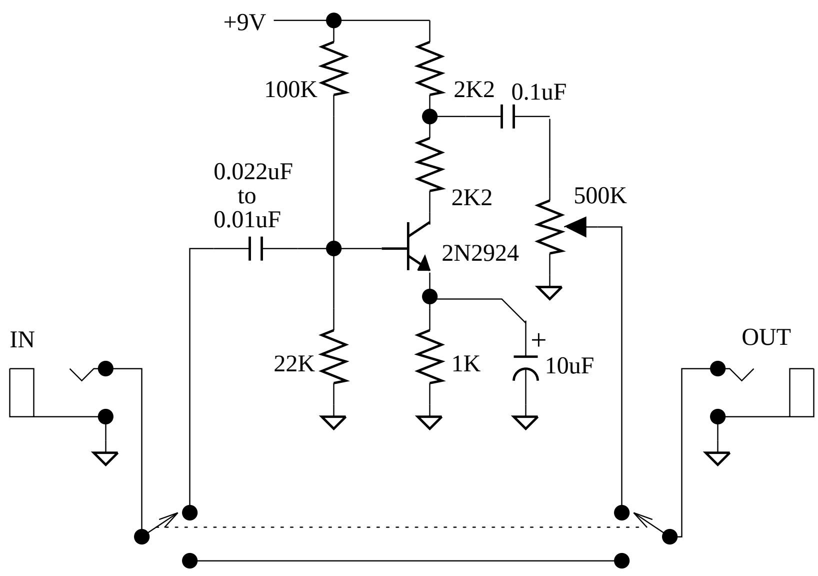
-Circuit is very similar to "Fuzz Face"

-The 2n3906 may be used as a replacement for Q1 and Q2, however originals were probably germanium.

VOX Treble Booster

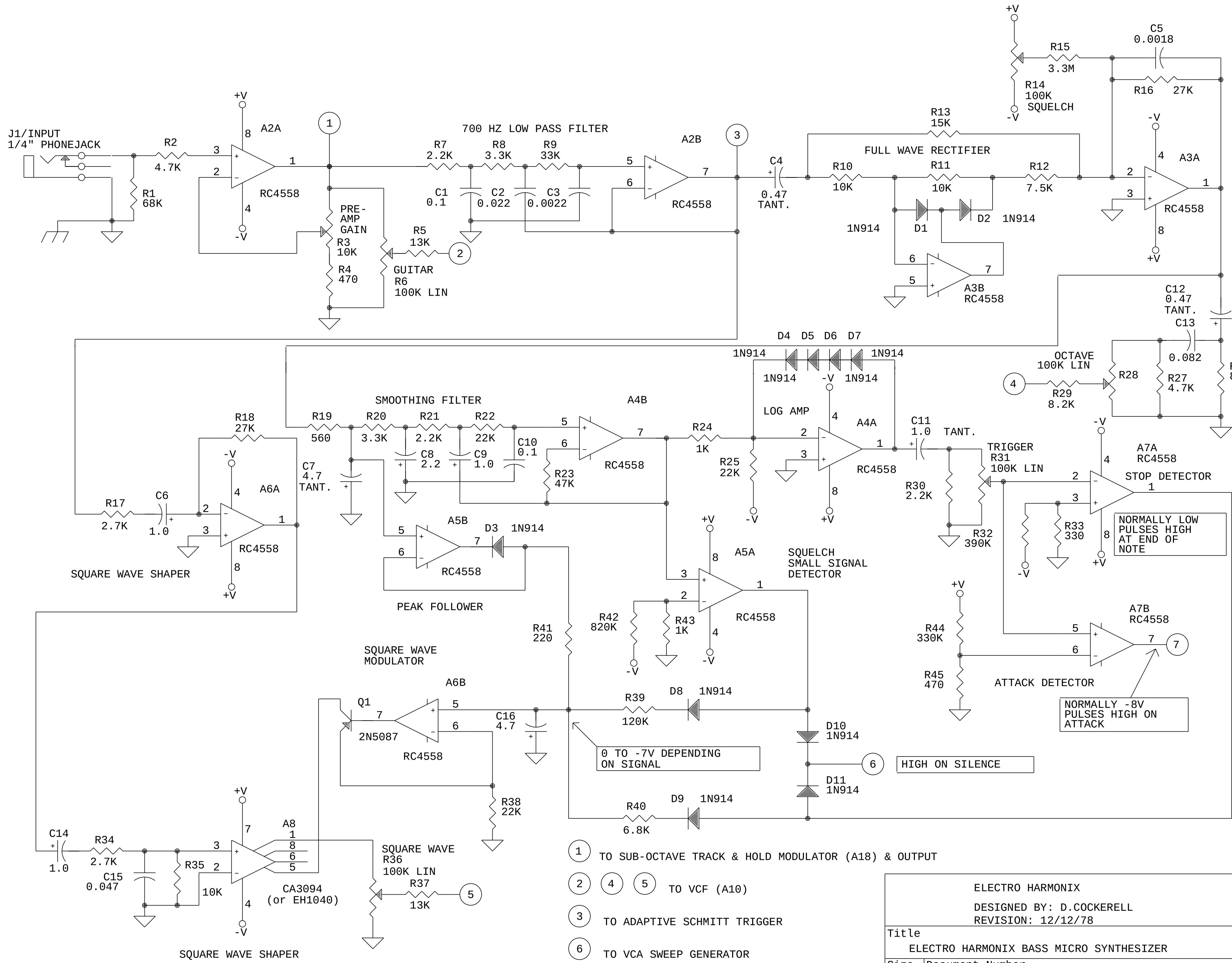


Original Circuit



Modified to be used as an overdrive/distortion unit

The input cap is changed from 500pF to 0.01 uF (1000pF) or 0.022 uF (2200 pF) to allow more bass in. This usually overloads the booster and causes crunchy distortion.



(1) TO SUB-OCTAVE TRACK & HOLD MODULATOR (A18) & OUTPUT

(2) (4) (5) TO VCF (A10)

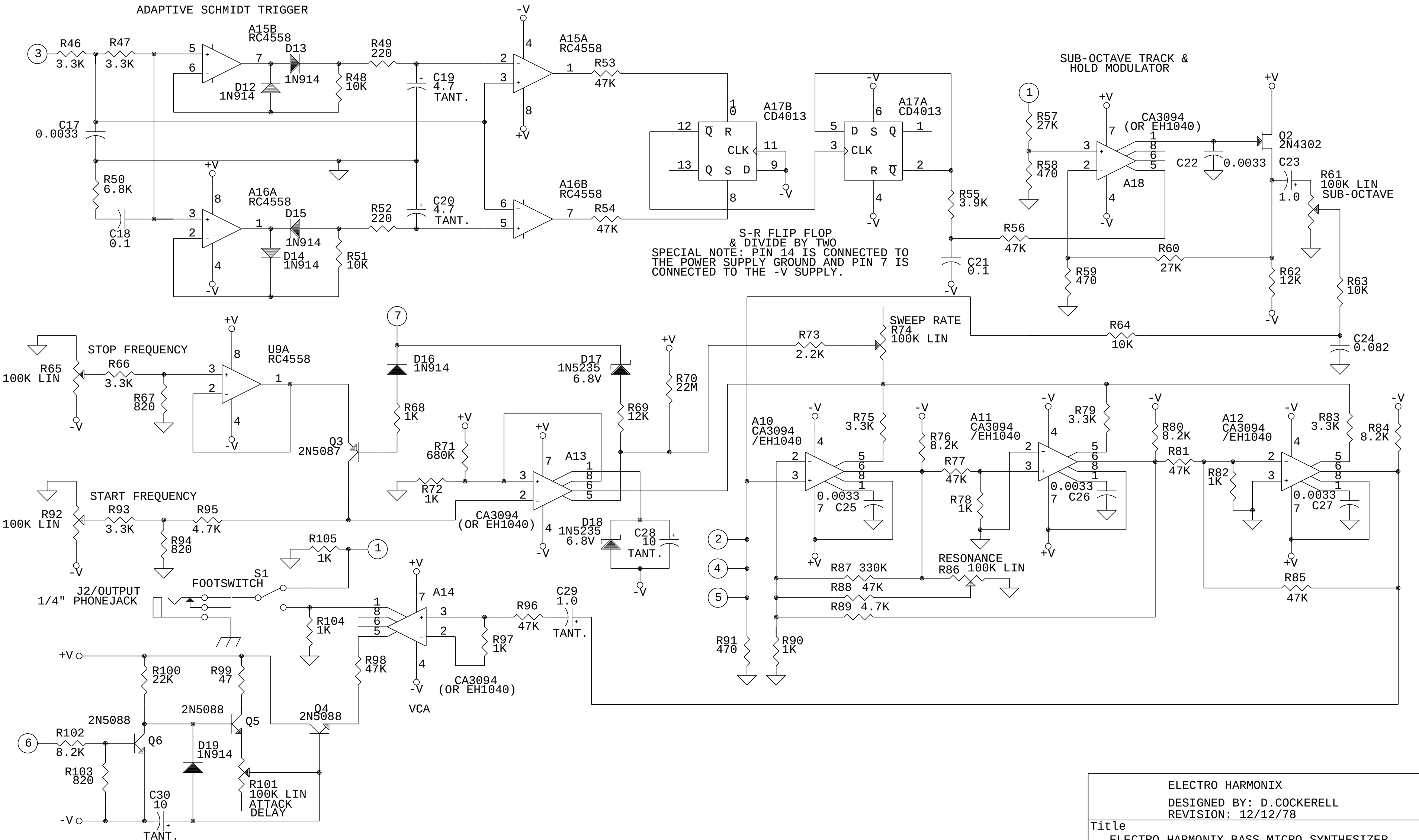
(3) TO ADAPTIVE SCHMITT TRIGGER

(6) TO VCA SWEEP GENERATOR

(7) TO VCF SWEEP GENERATOR

* ALL CAPACITOR VALUES IN MICROFARADS

ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78		
Title ELECTRO HARMONIX BASS MICRO SYNTHESIZER		
Size A	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 1 of 3	

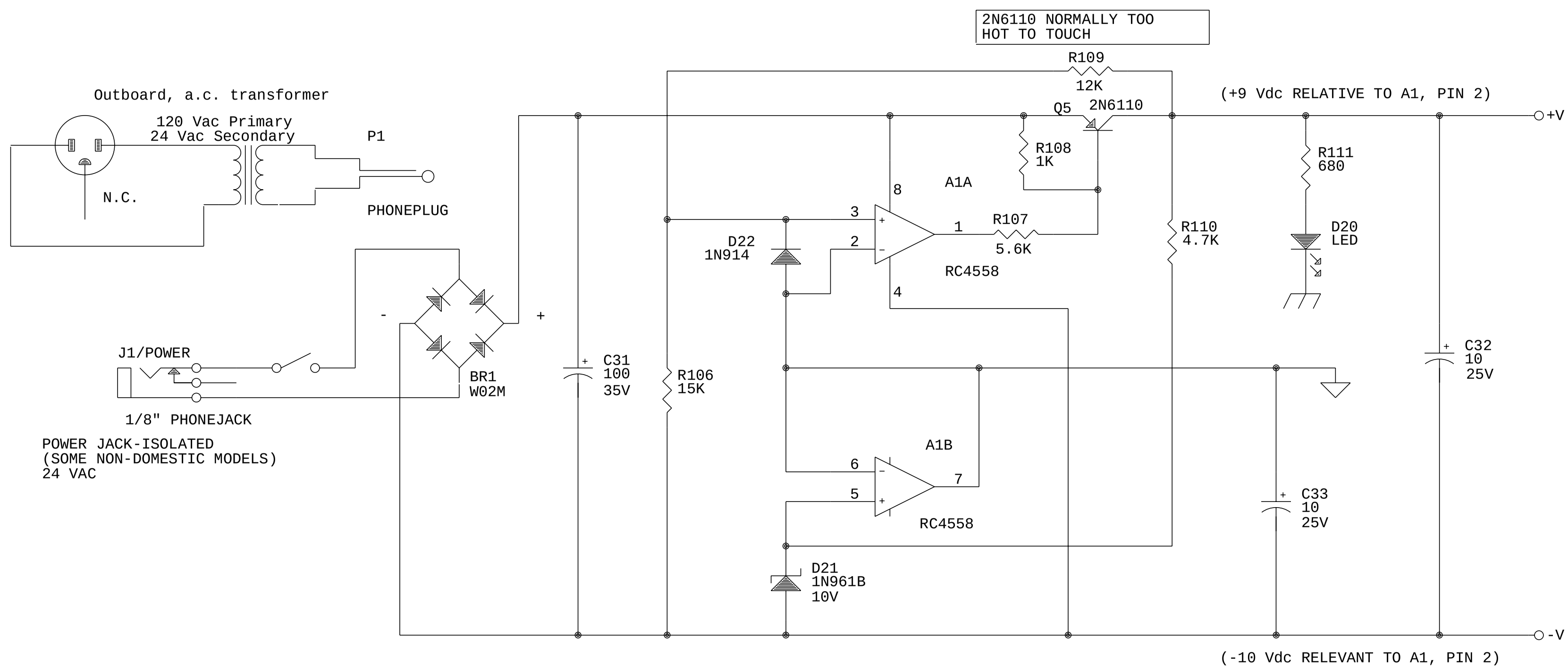


* ALL CAPACITOR VALUES IN MICROFARADS

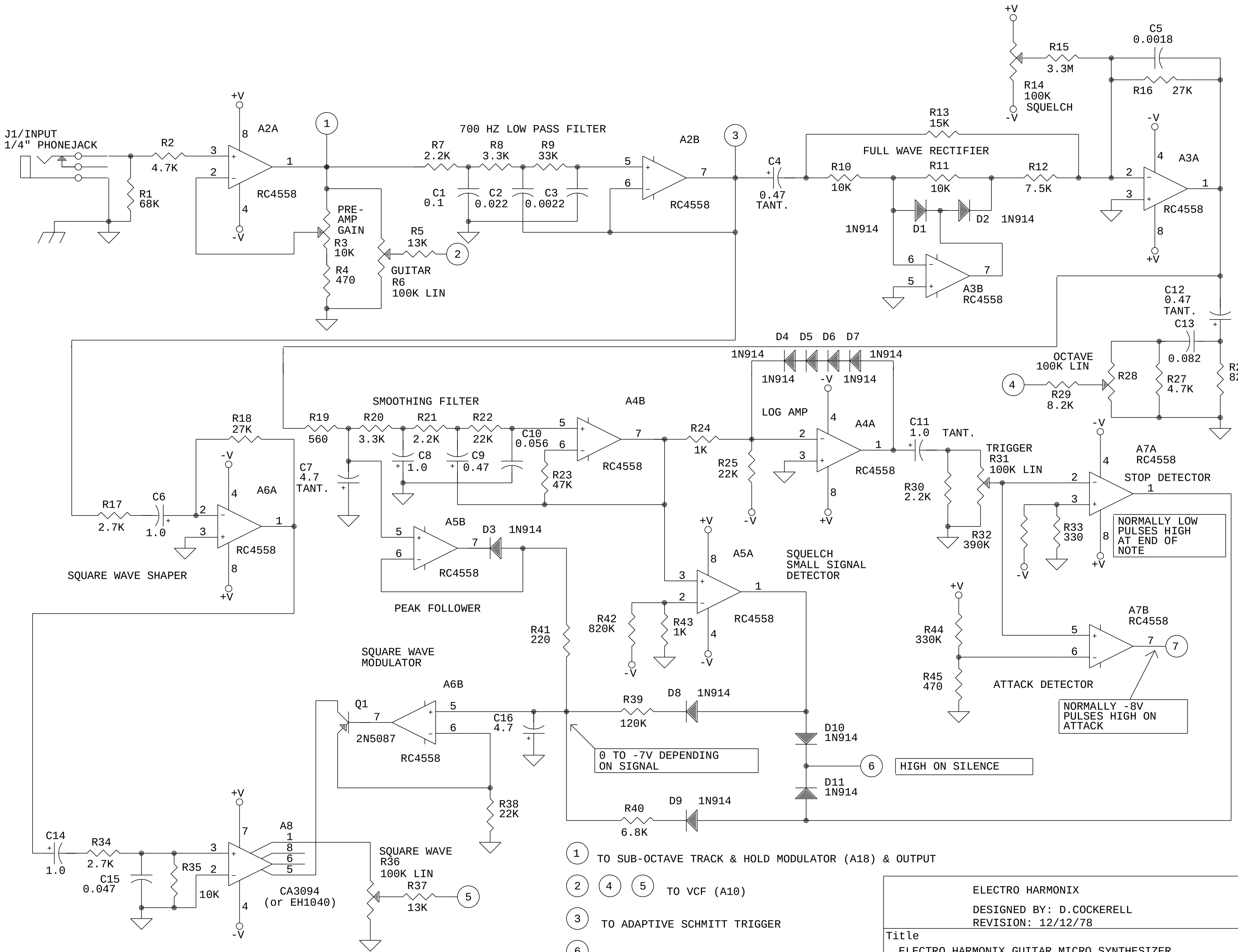
ELECTRO HARMONIX

DESIGNED BY: D.COCKERELL
REVISION: 12/12/78

Title	ELECTRO HARMONIX BASS MICRO SYNTHESIZER	
Size B	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 2 of 3	



ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78			
Title ELECTRO HARMONIX BASS MICRO SYNTHESIZER			
Size A	Document Number DRAWN BY: FABIAN P. HARTERY		REV 1
Date:	September 28, 1996	Sheet	3 of 3



(1) TO SUB-OCTAVE TRACK & HOLD MODULATOR (A18) & OUTPUT

(2) (4) (5) TO VCF (A10)

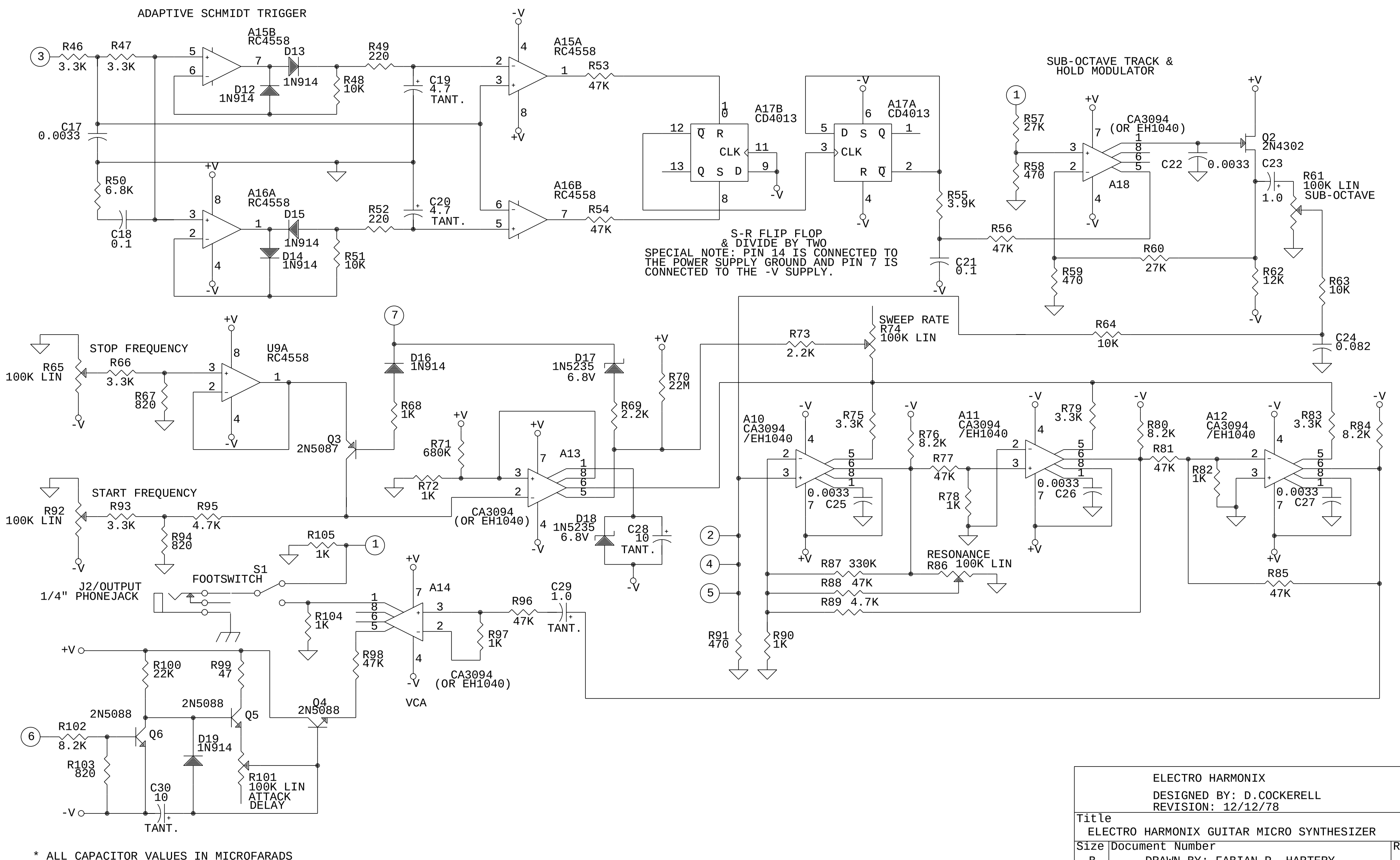
(3) TO ADAPTIVE SCHMITT TRIGGER

(6) TO VCA SWEEP GENERATOR

(7) TO VCF SWEEP GENERATOR

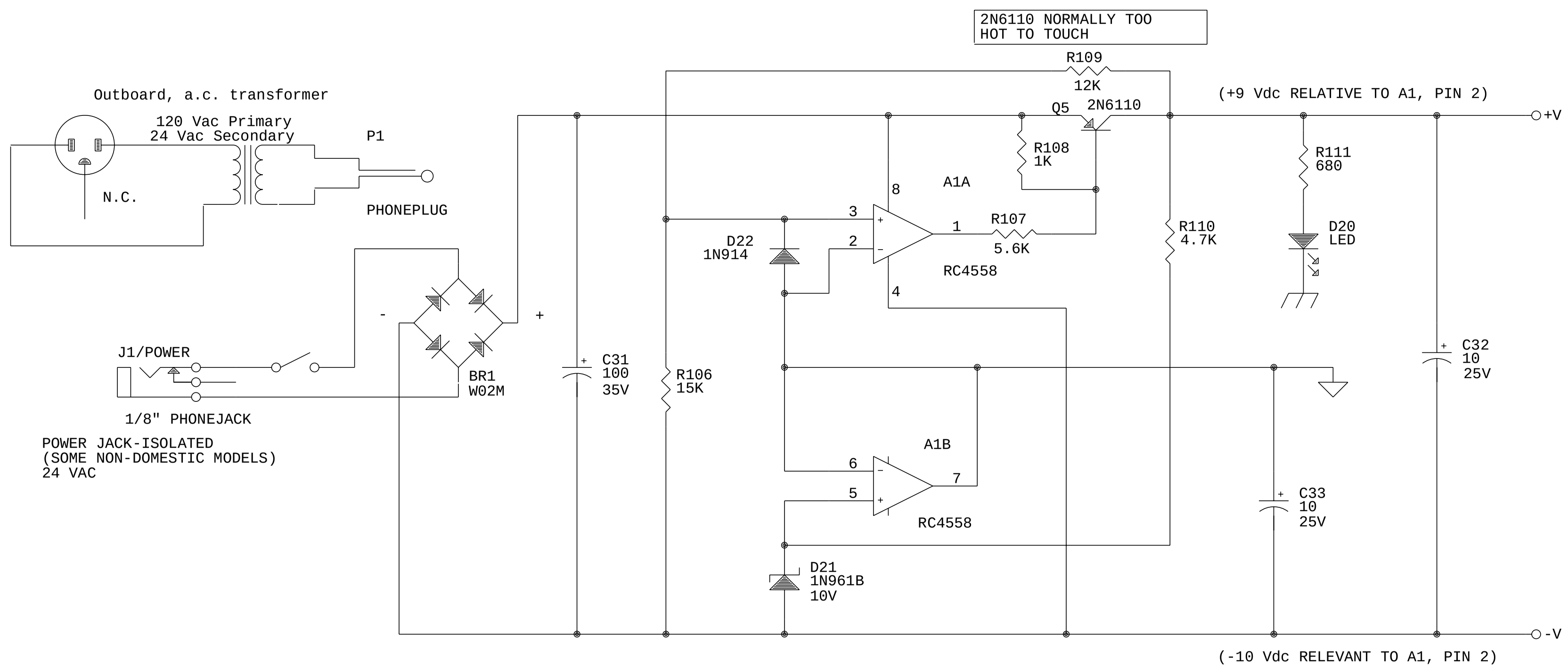
* ALL CAPACITOR VALUES IN MICROFARADS

ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78		
Title ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER		
Size: A	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 1 of 3	



* ALL CAPACITOR VALUES IN MICROFARADS

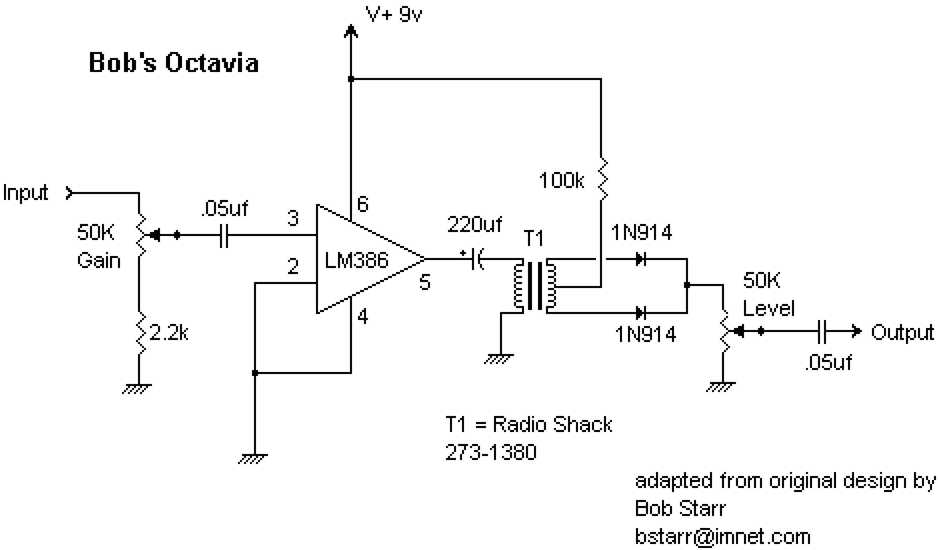
ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78		
Title ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER		
Size B	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 2 of 3	



ELECTRO HARMONIX

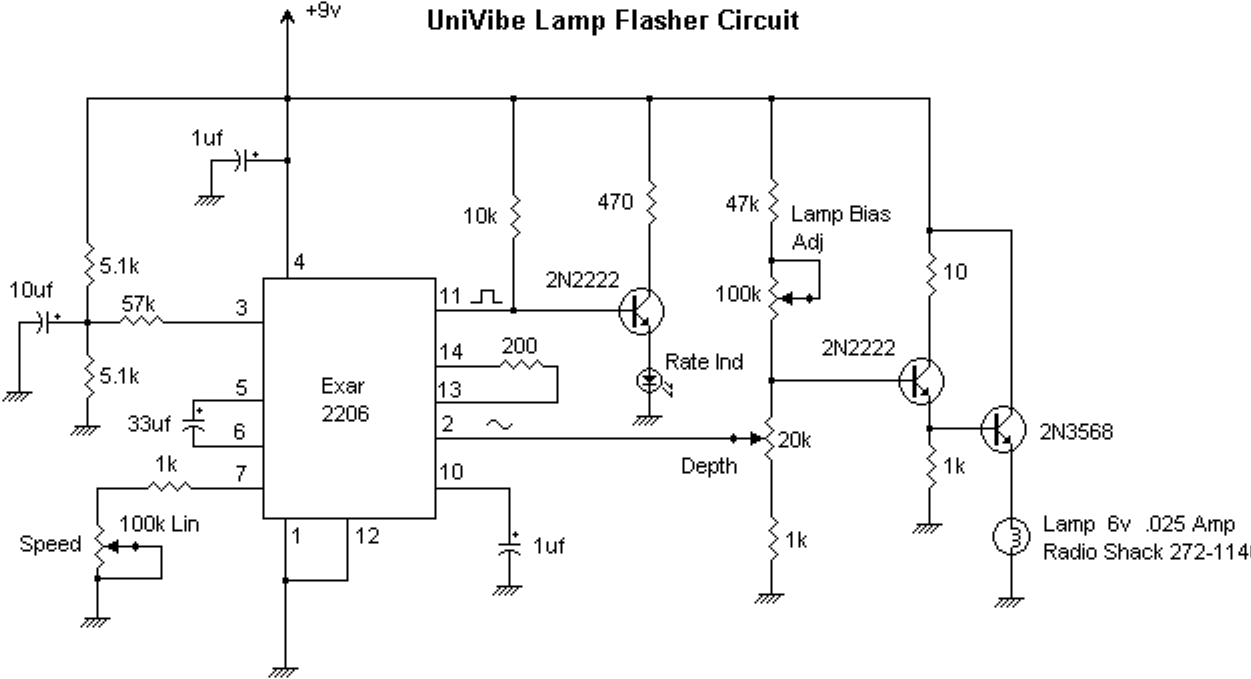
DESIGNED BY: D.COCKERELL
REVISION: 12/12/78

Title: ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER		
Size: A	Document Number: DRAWN BY: FABIAN P. HARTERY	REV: 1
Date: September 28, 1996	Sheet 3 of 3	



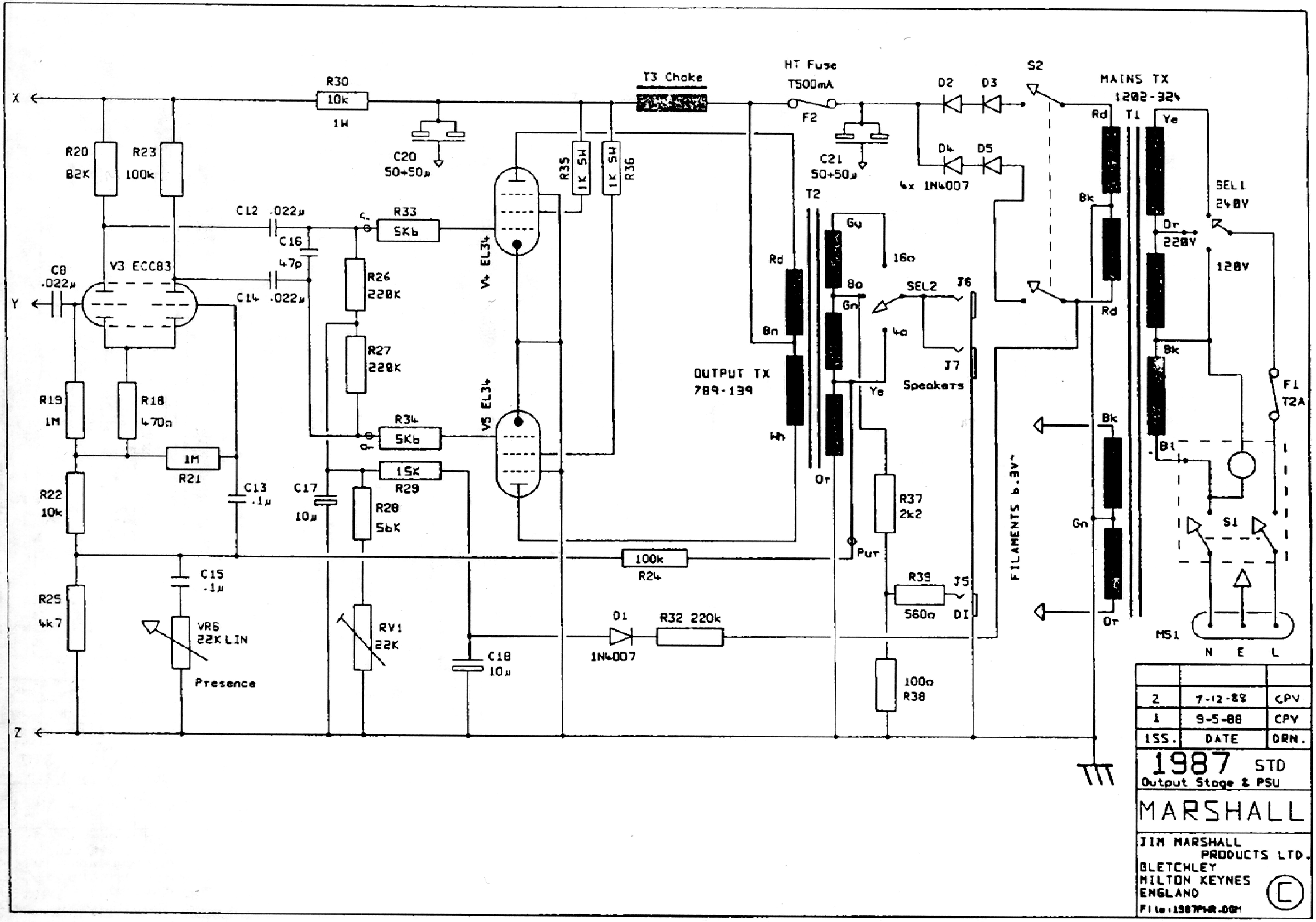
V+ 9v
Bob's Octavia
Input
.05uf
50K
Gain
2.2k
3
2
6
4
5
LM386
220uf
T1
100k
1N914
1N914
50K
Level
Output
.05uf
T1 = Radio Shack
273-1380
adapted from original design by
Bob Starr
bstarr@imnet.com

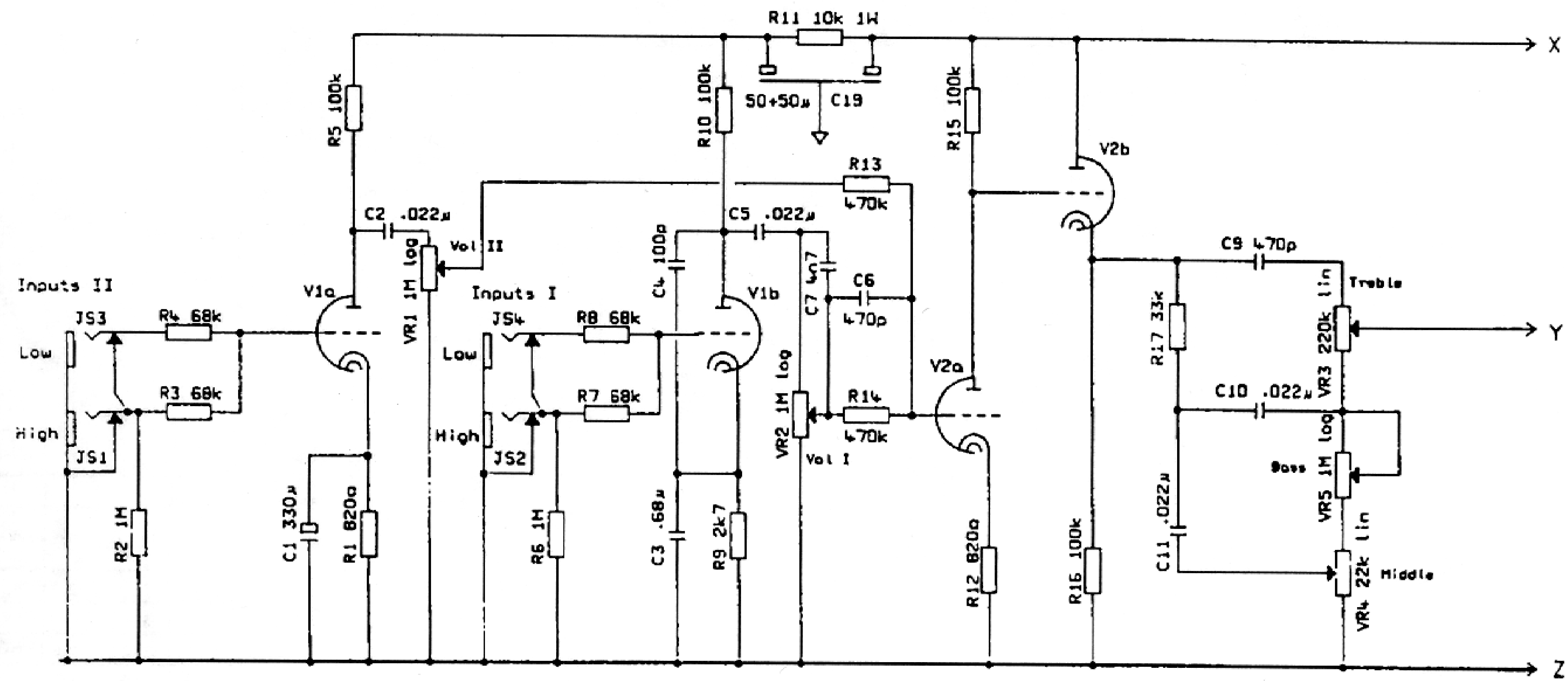
UniVibe Lamp Flasher Circuit



Exar Integrated Systems
(408) 733-7700

designed by Bob Starr
bstarr@imnet.com


X
Y
Z
R30
10k
1W
C20
50+50µ
T3 Choke
HT Fuse
T500mA
F2
C21
50+50µ
D2
D3
D4
D5
4x 1N4007
S2
MAINS TX
1202-324
T1
Rd
Ye
Bk
Or
220V
SEL1
240V
120V
F1
T2A
R20
82K
R23
100k
C12 .022µ
R33
5K6
C16
47p
C8
.022µ
V3 ECC83
C14 .022µ
R26
220K
R27
220K
V4 EL34
V5 EL34
R35
1K 5W
R36
1K 5W
T2
Gy
16Ω
8Ω
Gn
SEL2
J6
4Ω
J7
Speakers
OUTPUT TX
789-139
Rd
Bn
Wh
Or
Ye
Pur
R19
1M
R18
470Ω
R34
5K6
R21
1M
R22
10k
C13
.1µ
C17
10µ
R29
15K
R28
56K
R37
2k2
R25
4k7
C15
.1µ
VR6
22K LIN
Presence
RV1
22K
C18
10µ
100k
R24
D1
1N4007
R32 220k
R39
560Ω
J5
DI
100Ω
R38
FILAMENTS 6.3V~
Bk
Gn
Or
S1
MS1
N
E
L
2
7-12-88
CPV
1
9-5-88
CPV
ISS.
DATE
DRN.
1987 STD
Output Stage & PSU
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
©
File:1987PWR.DGM



NOTES

PCB: JM8D

V1.2: ECC83. filament supply shown on power stage diagram.

JS3.4 chassis mounted and linked to board

ISS.	DATE	DRN.
4	18-5-88	CPV

DRAWING NUMBER

1987 STD
Preamp

MARSHALL

JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File: 1987PRE.DGM

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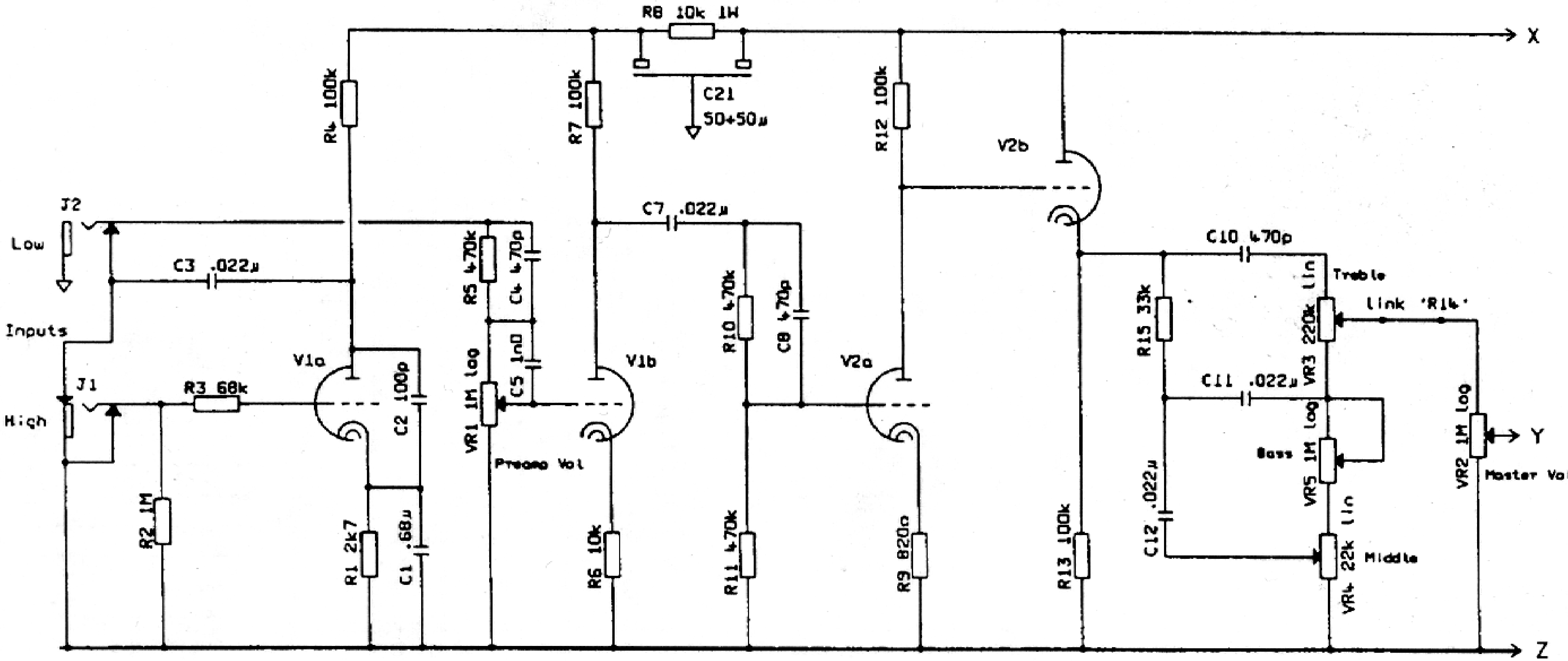


NOTES

PCB: JM80

V1,2: ECC83. filament supply shown on power stage diagram.

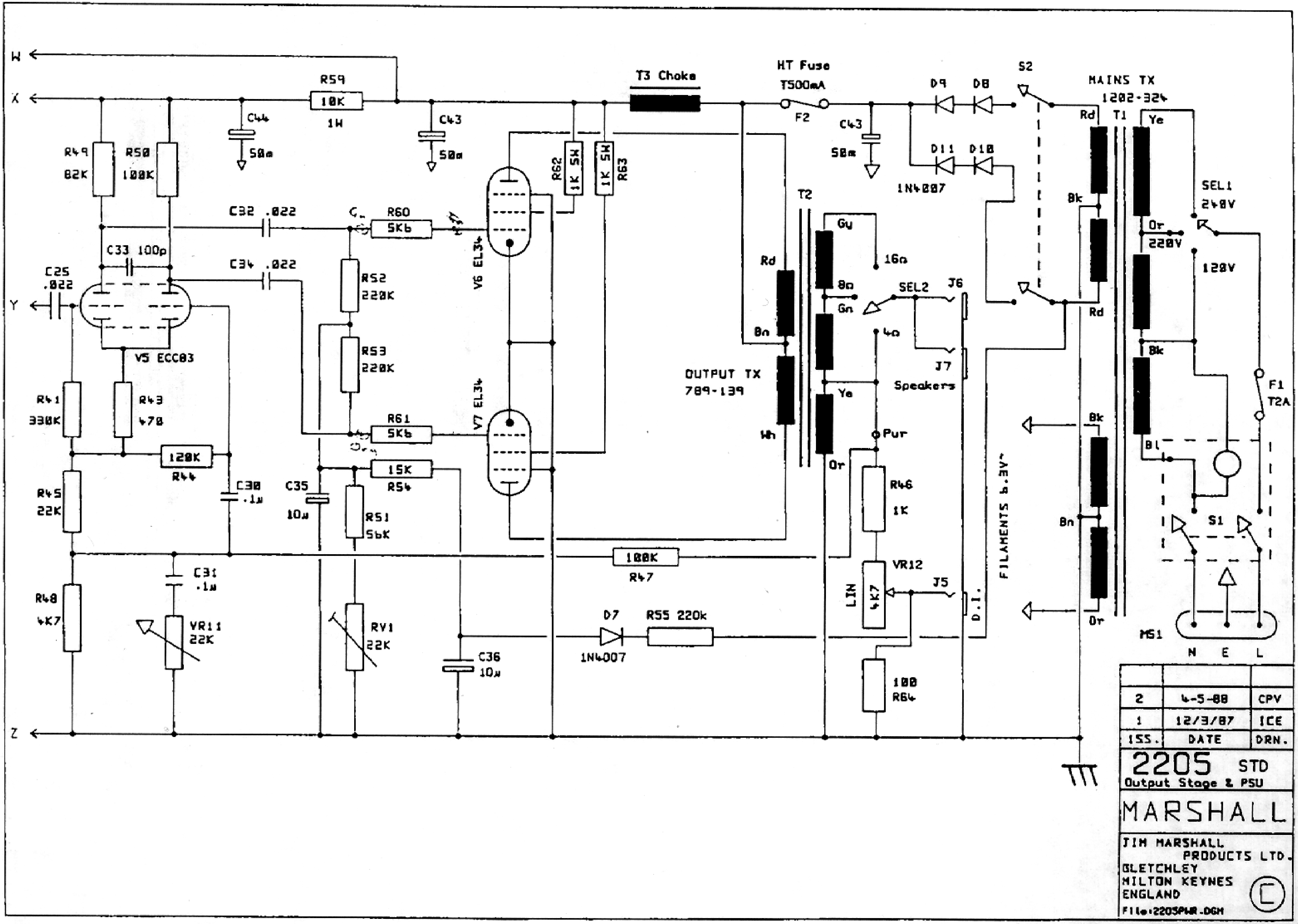
ISS.	DATE	DRN.
4	19-5-88	CPV

DRAWING NUMBER

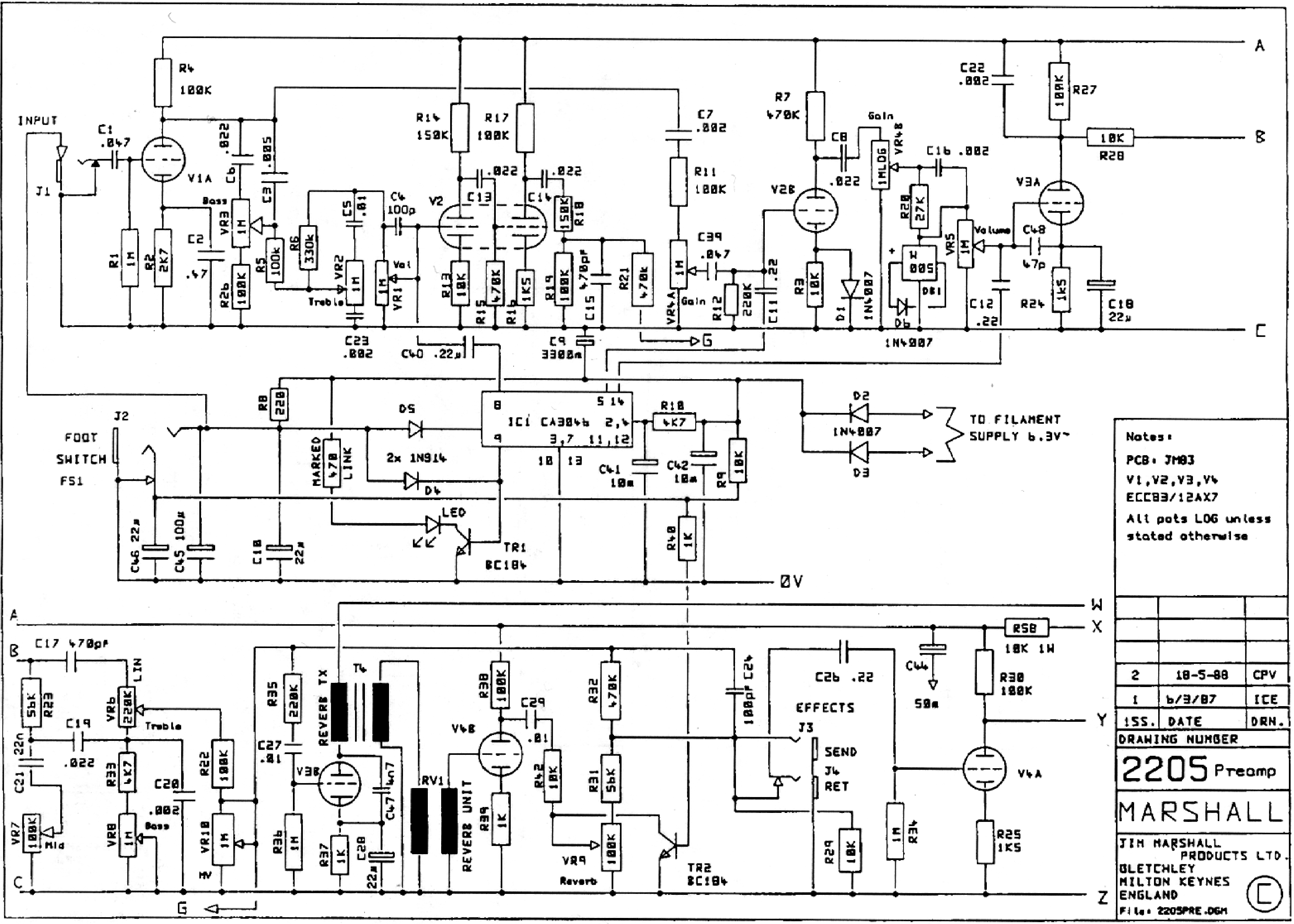
2204 STD
Preamp

MARSHALL

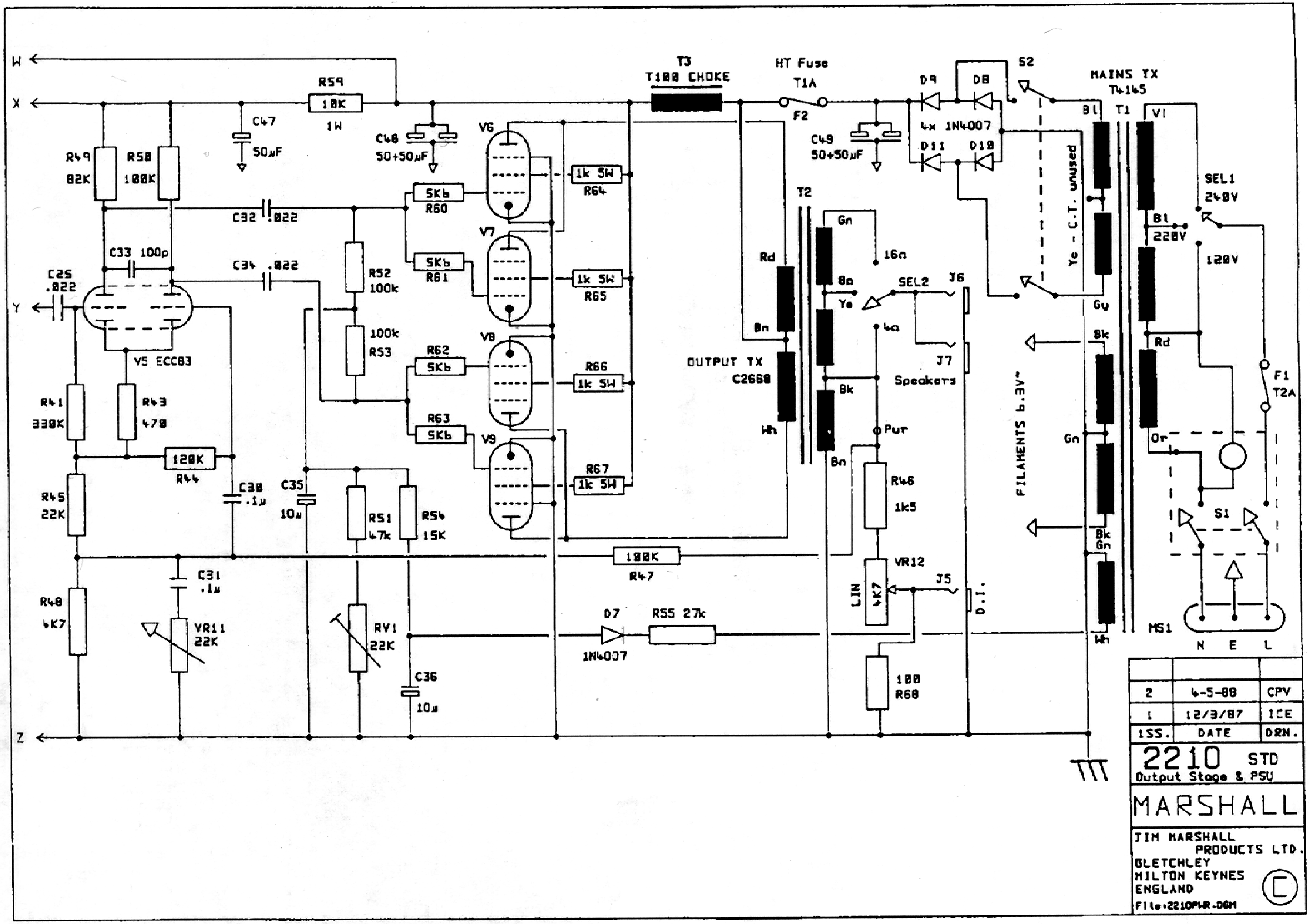
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File: 2204PRE.DGM

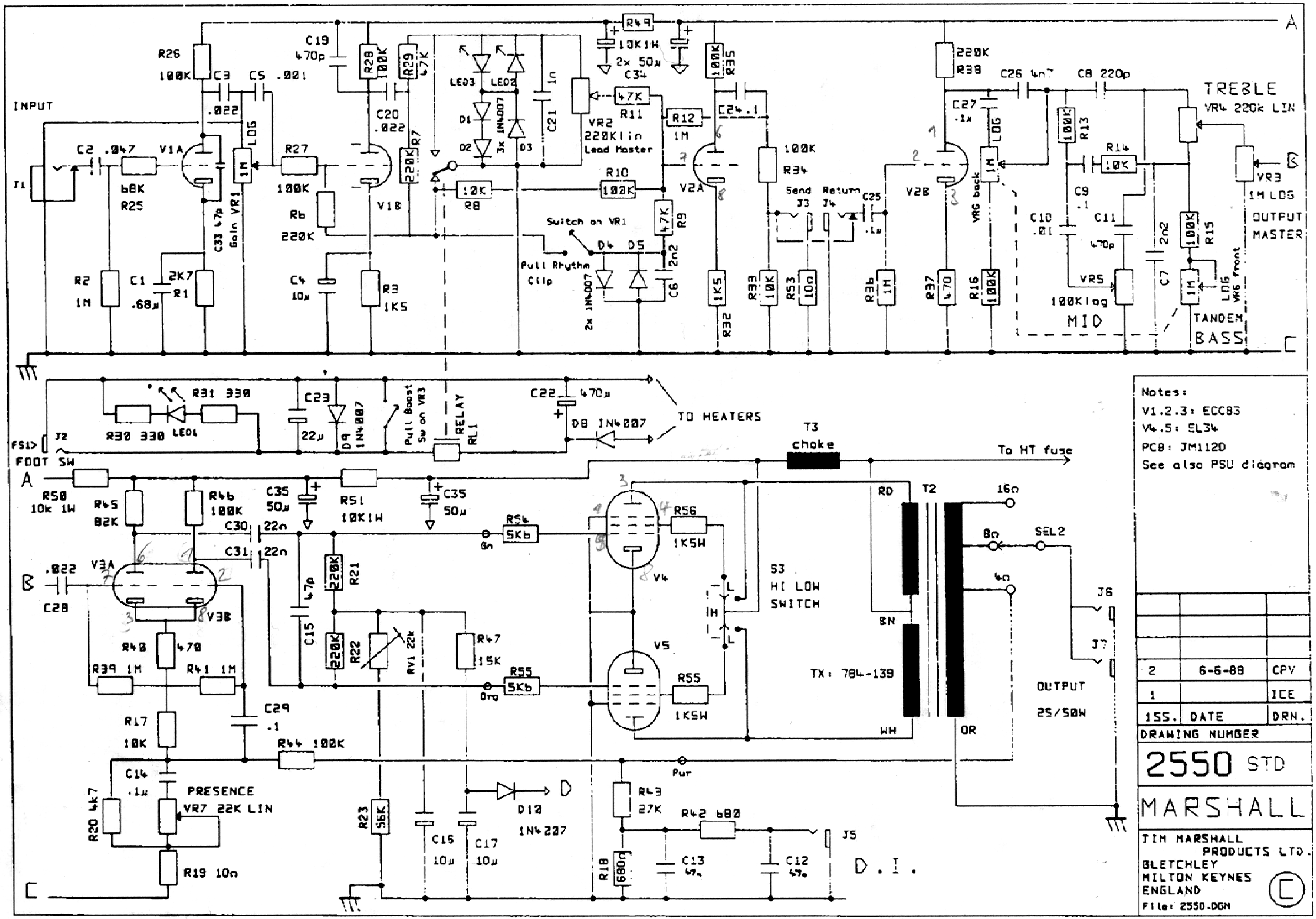


W
X
Y
Z
R59 10K 1W
T3 Choke
HT Fuse T500mA F2
D9 D8
S2
MAINS TX 1202-324
C44 50u
C43 50u
C43 50u
R49 82K
R50 100K
R62 1K 5W
R63 1K 5W
D11 D10 1N4007
T1
Rd
Ye
Bk
SEL1 240V
Or 220V
120V
C32 .022
R60 5K6
V6 EL34
T2
Gy
16Ω
8Ω
Gn
4Ω
SEL2
J6
J7
Speakers
C33 100p
C34 .022
R52 220K
R53 220K
C25 .022
V5 ECC83
OUTPUT TX 789-139
Rd
Bn
Wh
Ye
Pur
Or
R41 330K
R43 470
R61 5K6
V7 EL34
R44 120K
C30 .1u
C35 10u
15K R54
R51 56K
R46 1K
R45 22K
FILAMENTS 6.3V~
F1 T2A
Bl
S1
R47 100K
VR12
LIN 4K7
J5
D.I.
R48 4K7
C31 .1u
VR11 22K
RV1 22K
C36 10u
D7 1N4007
R55 220k
100 R64
MS1
N E L
2 4-5-88 CPV
1 12/3/87 ICE
ISS. DATE DRN.
2205 STD
Output Stage & PSU
MARSHALL
TIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File:2205PWR.DGM

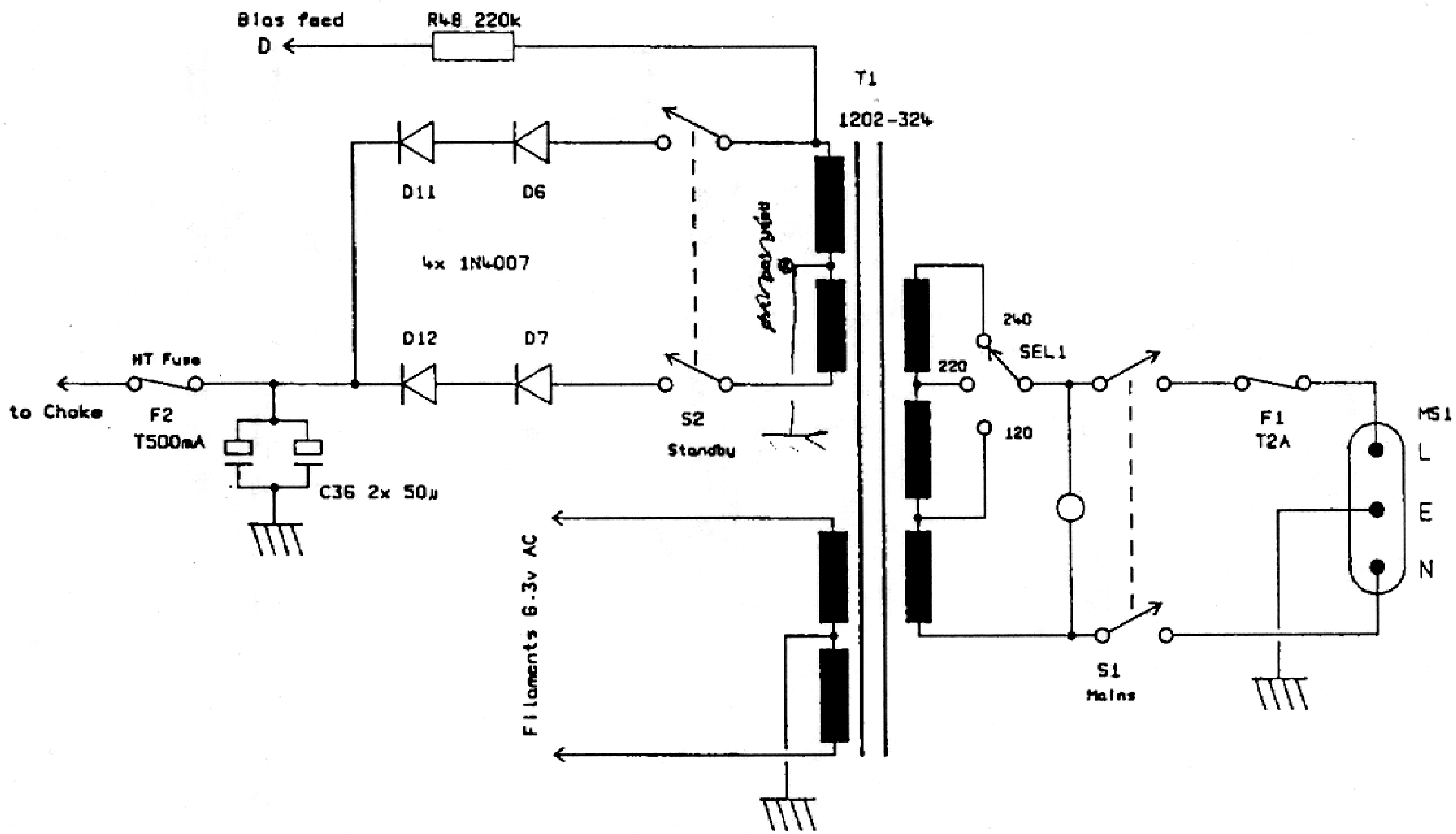


INPUT
J1
C1 .047
V1A
R4 100K
R1 1M
R2 2K7
C2 .47
C6 .022
C3 .005
Bass
VR3 1M
R2b 100K
R5 100k
R6 330k
C5 .01
VR2 1M
Treble
C23 .002
C4 100p
Vol
VR1 1M
V2
R14 150K
R17 100K
C13 .022
C14 .022
R13 10K
R15 470K
R16 1K5
R18 150K
R19 100K
C15 470pF
R21 470k
C40 .22µ
C9 3300m
C7 .002
R11 100K
C39 .047
VR4A 1M
Gain
R12 220K
C11 .22
G
R7 470K
C8 .022
Gain
VR4B 1MLOG
C16 .002
V2B
R3 10K
D1 1N4007
R20 27K
DB1 005
D6
1N4007
VR5 1M
Volume
C48 47p
C12 .22
C22 .002
R27 100K
R28 10K
V3A
R24 1k5
C18 22µ
A
B
C
R8 220
MARKED 470 LINK
D5
2x 1N914
D4
IC1 CA3046
8 9 5 14 2,4 3,7 11,12 10 13
R10 4K7
C41 10m
C42 10m
R9 10K
R40 1K
D2 1N4007
D3
TO FILAMENT SUPPLY 6.3V~
J2
FOOT SWITCH
FS1
C46 22µ
C45 100µ
C10 22µ
LED
TR1 BC184
0V
Notes:
PCB: JM03
V1,V2,V3,V4 ECC83/12AX7
All pots LOG unless stated otherwise
A
B
C17 470pF
R23 56K
VR6 220K LIN
Treble
C19 .022
C21 22n
R33 4K7
C20 .002
R22 100K
VR7 100K Mid
VR8 1M Bass
VR10 1M MV
C
G
R35 220K
C27 .01
REVERB TX
T4
V3B
C47 4n7
R36 1M
R37 1K
C28 22µ
RV1
REVERB UNIT
R38 100K
C29 .01
V4B
R39 1K
R42 10K
R32 470K
R31 56K
VR9 100K Reverb
TR2 BC184
C24 100pF
C26 .22
EFFECTS
J3 SEND
J4 RET
R29 10K
C44 50m
R34 1M
R58 10K 1W
R30 100K
V4A
R25 1K5
W
X
Y
Z
2 10-5-88 CPV
1 6/3/87 ICE
ISS. DATE DRN.
DRAWING NUMBER
2205 Preamp
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File: 2205PRE.DGM


W
X
Y
Z
R59 10K 1W
C47 50µF
C48 50+50µF
R49 82K
R50 100K
C32 .022
C33 100p
C25 .022
C34 .022
V5 ECC83
R52 100k
R53 100k
R60 5K6
R61 5K6
R62 5K6
R63 5K6
V6
V7
V8
V9
R64 1k 5W
R65 1k 5W
R66 1k 5W
R67 1k 5W
R41 330K
R43 470
R44 120K
R45 22K
C30 .1µ
C35 10µ
R51 47k
R54 15K
R47 100K
R48 4K7
C31 .1µ
VR11 22K
RV1 22K
C36 10µ
D7 1N4007
R55 27k
T3 T100 CHOKE
HT Fuse T1A
F2
C49 50+50µF
D9 D8 D11 D10
4x 1N4007
S2
MAINS TX T4145
T2
Rd
Bn
Wh
Gn
16Ω
8Ω
Ye
Bk
Bn
Pur
4Ω
SEL2
J6
J7
Speakers
OUTPUT TX C2660
R46 1k5
VR12 LIN 4K7
J5 D.I.
100 R68
Ye - C.T. unused
FILAMENTS 6.3V~
Bl
T1
Vl
Gy
SEL1 240V
Bl 220V
120V
Rd
Or
F1 T2A
S1
MS1
N E L
2 4-5-88 CPV
1 12/3/87 ICE
ISS. DATE DRN.
2210 STD
Output Stage & PSU
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File:2210PWR.DGM



INPUT
TREBLE VR4 220k LIN
VR3 1M LOG OUTPUT MASTER
VR2 220K lin Lead Master
Gain VR1
Switch on VR1
Pull Rhythm Clip
Send J3
Return J4
MID
TANDEM BASS
TO HEATERS
Pull Boost Sw on VR3
RELAY RL1
FOOT SW
T3 choke
To HT fuse
S3 HI LOW SWITCH
TX: 784-139
OUTPUT 25/50W
PRESENCE VR7 22K LIN
D.I.
Notes:
V1.2.3: ECC83
V4.5: EL34
PCB: JM112D
See also PSU diagram
ISS.	DATE	DRN.
2	6-6-88	CPV
1		ICE
DRAWING NUMBER
2550 STD
MARSHALL
TIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File: 2550.DGM



NOTES

ISS.	DATE	DRN.
2	6-6-88	CPV

2550 PSU STD

MARSHALL

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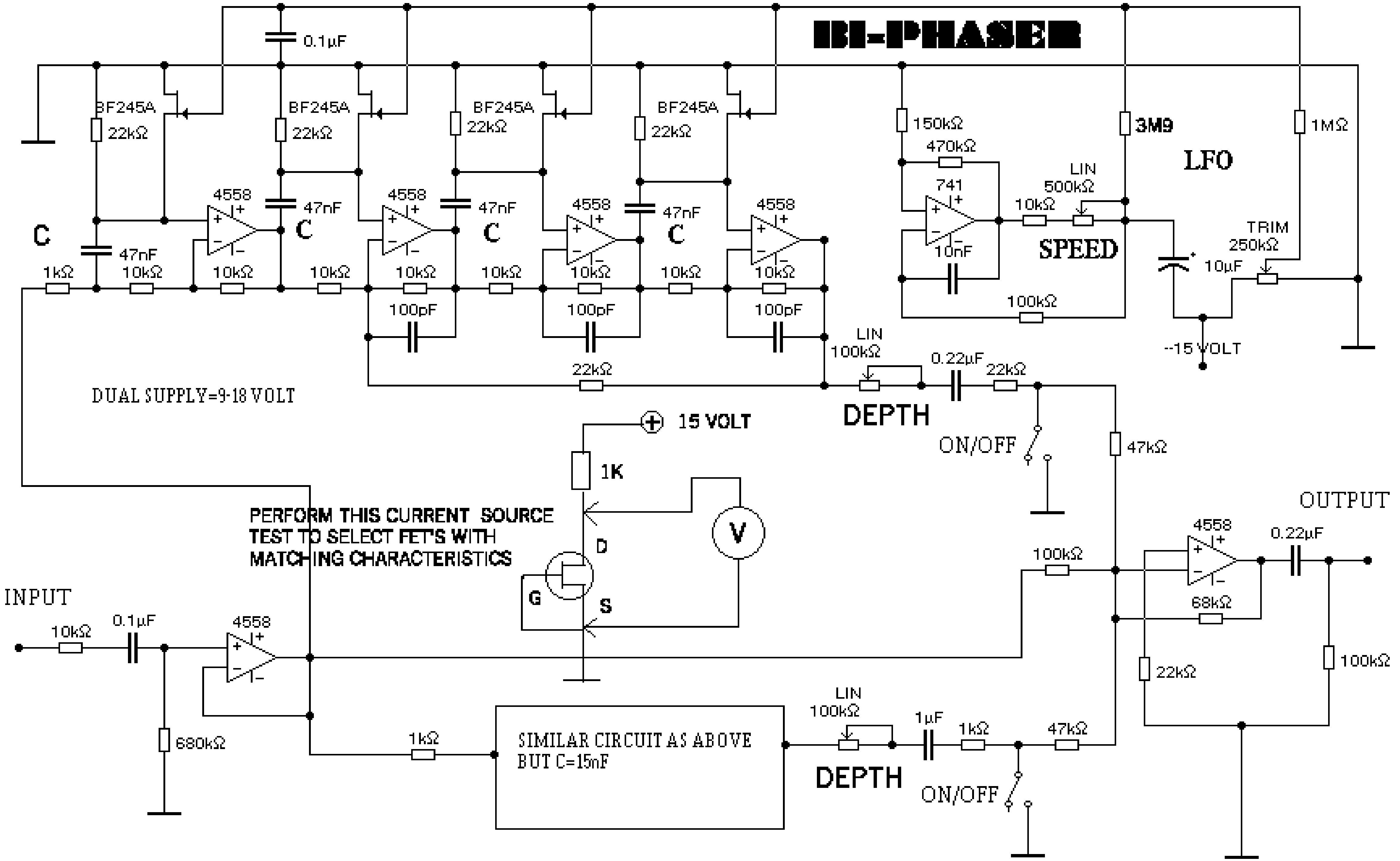
BLETCHLEY
MILTON KEYNES
ENGLAND
File: 2550PSU.DGM


BI-PHASER
0.1µF
BF245A
22kΩ
4558
47nF
C
1kΩ
10kΩ
100pF
150kΩ
470kΩ
741
10nF
100kΩ
10kΩ
LIN
500kΩ
SPEED
3M9
LFO
1MΩ
TRIM
250kΩ
10µF
-15 VOLT
LIN
100kΩ
DEPTH
0.22µF
22kΩ
ON/OFF
47kΩ
DUAL SUPPLY=9-18 VOLT
15 VOLT
1K
V
D
G
S
PERFORM THIS CURRENT SOURCE
TEST TO SELECT FET'S WITH
MATCHING CHARACTERISTICS
INPUT
10kΩ
0.1µF
680kΩ
SIMILAR CIRCUIT AS ABOVE
BUT C=15nF
1µF
1kΩ
OUTPUT
68kΩ
100kΩ

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	RELEASED PR #246	17-SEP-93	PW
	B	EC 1067	03-NOV-93	PW
	C	EC 1084	09-DEC-94	PW
	D	EC 1112	08-FEB-94	PW
	E	ECO LO 2799	30-MAR-94	PW
	F	EC 1226	27-JUN-94	PB

100V 50/60HZ	230V 50/60HZ	240V 50/60HZ
CP11	CP11	CP11
CP6	CP6	CP6
CP8	CP8	CP8
CP7	CP9	CP9
CP25	CP12	CP12
CP12	CP25	CP13
CP9	CP13	CP25

EXPORT TRANSFORMER WIRING DIAGRAM.

NOTES (UNLESS SPECIFIED OTHERWISE):

1.) ALL RESISTORS 1/4W.
2.) 6-DIGIT NUMBERS ARE FENDER PART NUMBERS.
3.) ALL VOLTAGES MEASURED WITH RESPECT TO GROUND. USING A DVM OF AT LEAST 1MΩ AC INPUT IMPEDANCE AND 10MΩ DC INPUT IMPEDANCE. TEST CONDITIONS:
   LINE VOLTAGE 120VAC 60HZ.
   FOOTSWITCH CONNECTED, DRIVE CH. SEL., BRIGHT SW. OFF.
   ALL CONTROLS 50% ROT. EXCEPT REVERB 0%.
   SUPPLY AND BIAS VOLTAGES MAY VARY +5%, -10%.
   SIGNAL VOLTAGES MAY VARY ±20%.
4.) X WITH INSTANCE NAME - FLYWIRE CONNECTION.
5.) LAST INSTANCES: RY2, LD1, U4, Q1, TH1, R97, C52, CR25, T2, S3, CP25, V5, LA1, P16, J7, F1.
6.) INSTANCES NOT USED: CR4,8,10,18, C29,32,36,47,48, J7, R44,45,64,66,67,73, TP13,14,19,20,21,33,34.
7.) ALL DIODES 1N4448.

DATABASE FILE: 22465.DBF
CHECKED BY: Wien DATE: 6/30/94
APPROVED: Wien DATE: 6/30/94

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

PROPRIETARY

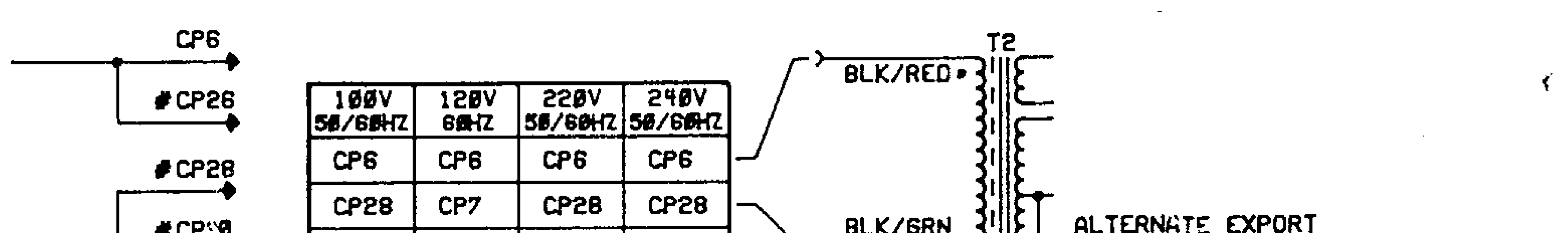
NEXT HIGHER ASSEMBLY: BLUES DELUXE

Fender MUSICAL INSTRUMENTS
1130 Columbia Street
Brea, CA 92621

TITLE: BLUES DELUXE SCHEMATIC DIAGRAM

SIZE D | DRAWN: P.WIERS | ENGR: P.WIERS | DRAWING NUMBER 047019 | REV. F
CREATED: 23-SEP-93 | PLOTTED: 27-JUN-94 | SHEET 1 OF 1

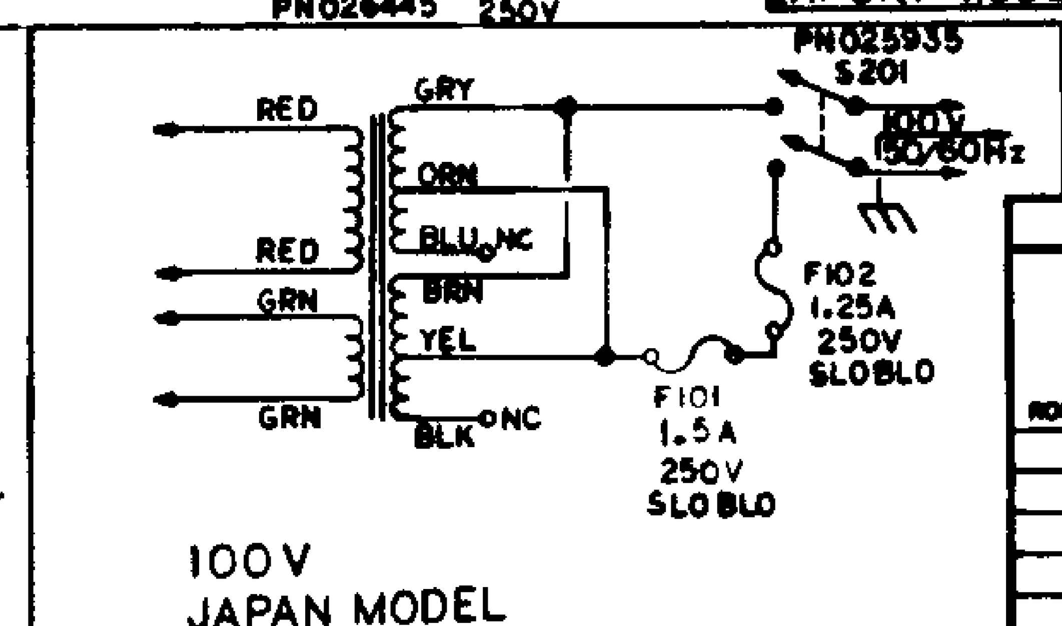
PART NO. 0047020000



1). ALL RESISTORS 1/4 WATT CARBON FILM UNLESS OTHERWISE NOTED.

2). EXTERNAL LINE FUSE 3A IN 100/120V MODELS, 1.6A IN 200/240V MODELS.

3). ALL VOTAGES MEASURED TO GROUND USING A DVM OF AT LEAST 1MΩ INPUT IMPEDANCE. ALL CONTROLS FULL CW. DC VOLTAGES MEASURED



100V JAPAN MODEL

5. (MV) AC VOLTAGES DENOTE TYPICAL 1KHZ SIGNAL WITH AMP SET IN CLEAN MODE. ALL CONTROLS SET TO 12 O'CLOCK, REVERB AND MID BOOST OFF.

4. DC VOLTAGES READ TO GROUND WITH V.T.V.M.. NO INPUT SIGNAL.

3. SIX DIGIT NUMBERS ARE FENDER PART NUMBERS.

2. ALL CAPACITORS 400V MIN. } EXCEPT AS NOTED.

1. ALL RESISTORS 1/4 W, ±5 % }

* REVERB RETURN LEVEL CALIBRATION PROCEDURE: PARALLEL R 29 (470K) WITH A 1 MEG, 1/4 W, ±5 % RESISTOR. PLUG HEADPHONES INTO HEADPHONE JACK, SET FRONT PANEL REVERB FULL CW, (TO 10), INPUT INSTRUMENT OR GATED TEST SIGNAL ≈ 1 KHZ IN CLEAN MODE AND ADJUST TRIM R 41 SO THAT AMPLIFIER WILL BE ON THE THRESHOLD OF OSCILLATION THROUGH THE REVERB. DISCONNECTION OF THE 1 MEG RESISTOR ACROSS R 29 SHOULD CAUSE THE OSCILLATION TO DECAY AWAY. THIS COMPLETES CALIBRATION.

NOTES: UNLESS OTHERWISE SPECIFIED

REV.	REVISIONS	BY	DATE	APPD.
A	RELEASE			
B	S201 WAS SPST			
C	ADDED EXPORT SCHEMATICS			
D	R22 WAS 220K, ADD C26 180pf			
E	ADDED R201, 1.5K AT V3			
F	LDR 1 & 2 WERE 029945 & CHL0109			

SAMPLES OF FIRST ARTICLE PARTS MUST BE APPROVED BY ☒ FENDER ☐ ROGERS ☐ RHODES R & D ENG. BEFORE STARTING PRODUCTION

Fender / Rogers / Rhodes

CBS MUSICAL INSTRUMENTS — A DIVISION OF CBS, INC. FULLERTON, CALIFORNIA

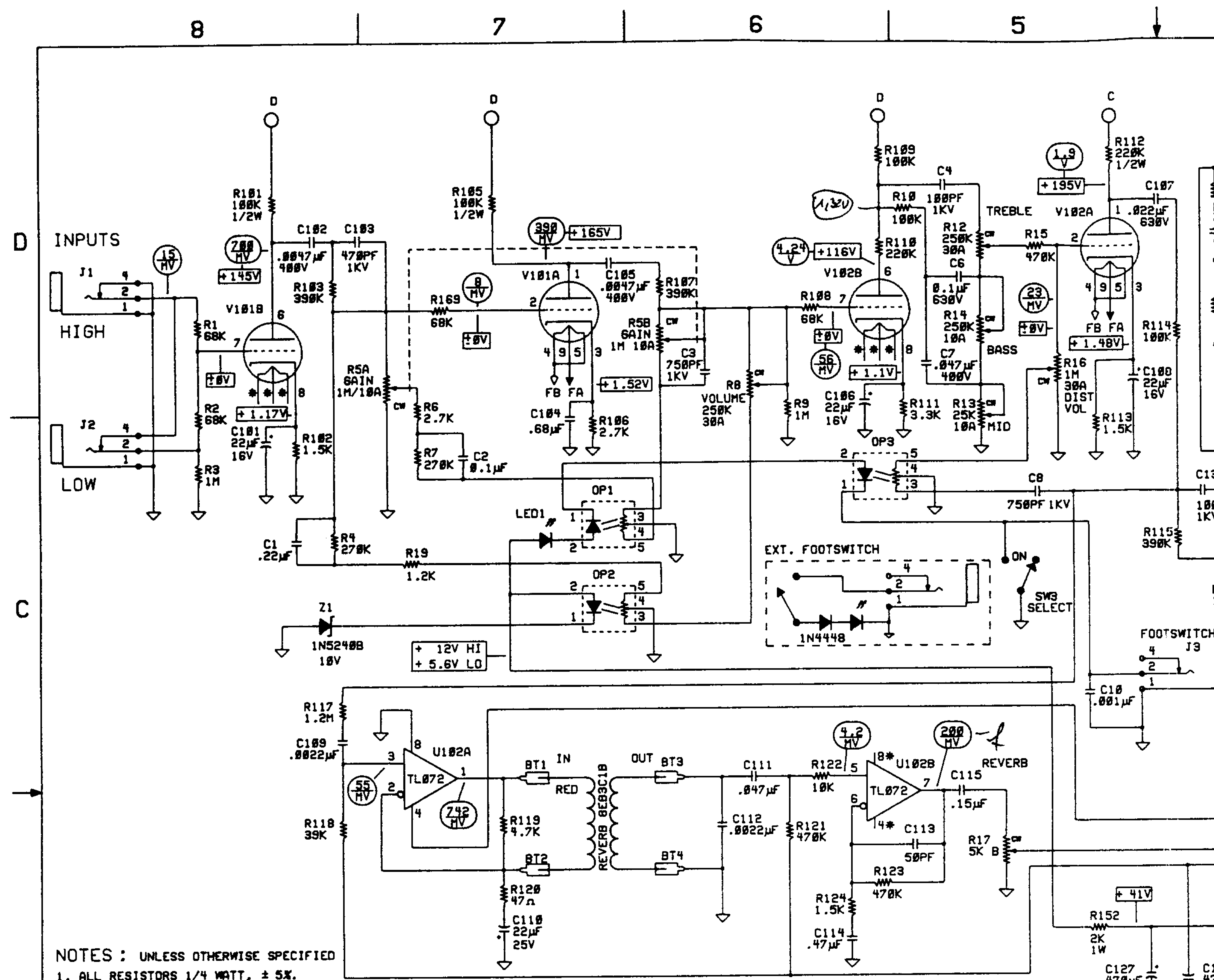
SCHEMATIC - CHAMP 12

RELEASE	SIZE	PART NO.	REV
3-19-86	D	025836	F

SCALE N/A

DO NOT SCALE DRAWING

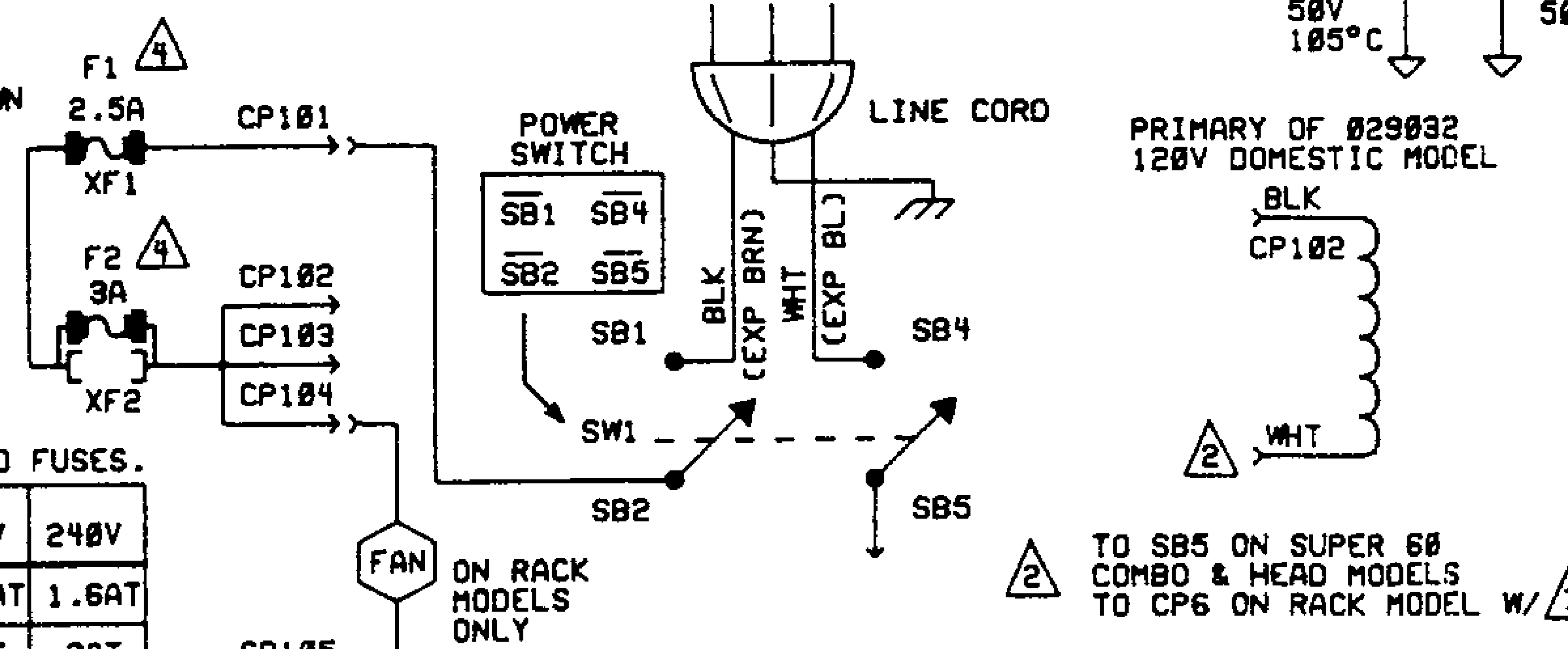
0025836



NOTES : UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS 1/4 WATT, ± 5%.
2. ALL CAPACITORS 63 VOLT MINIMUM.
3. SIX DIGIT NUMBERS ARE FENDER P/N's.
4. ALL VOLTAGES MEASURED USING DVM WITH MINIMUM 1MEG INPUT IMPEDANCE, AND MAY VARY ± 20%.
5. ▭ DC VOLTAGES READ TO GROUND WITH NO INPUT TO AMP AND FOOTSWITCH DISCONNECTED. NOTE: ON U101 & U102 PINS 1, 2, 3, 5, 6, 7, MEASURE -15V.
6. ◯ OR ◯ AC RMS VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS:
   - 1 kHz SINE WAVE INPUT TO J1.
   - 8Ω RESISTIVE LOAD ACROSS CP129/130.
   - REVERB CONTROL SET TO "0".
   - ALL OTHER CONTROLS SET TO 12 O'CLOCK.
   - SELECT SWITCH OFF.
   - GUITAR CORD CONNECTED BETWEEN PREAMP OUT" & "POWER AMP IN" JACKS.
7. RATED OUTPUT POWER - 60 WATTS RMS AT 5% THD, UNDER SAME CONDITIONS AS NOTE 6, EXCEPT INPUT INTO J102, POWER AMP IN.

NOTE: 120V MODEL SHOWN

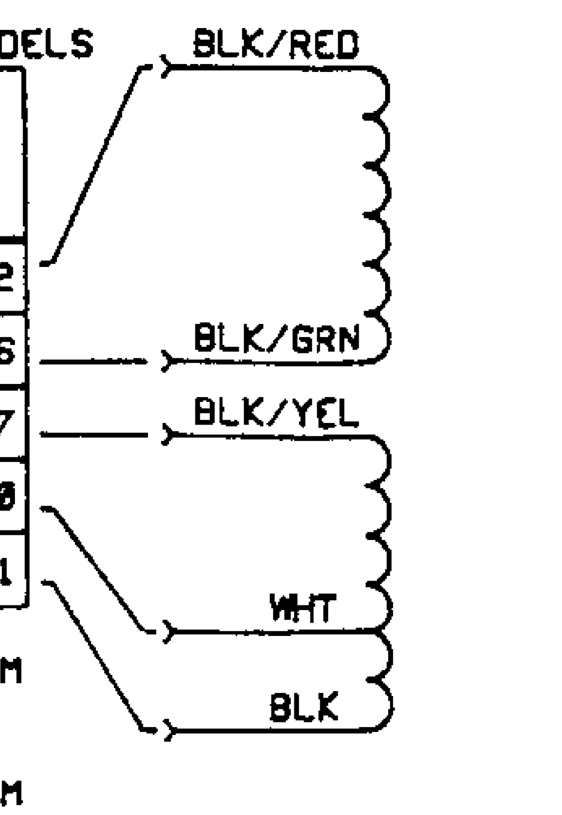


⚠4 NOTE: USE ONLY SLO-BLO FUSES.

LINE VOLTAGE	100V	120V	220V	240V
F1	3A	2.5A	1.6AT	1.6AT
F2	4A	3A	2AT	2AT
MINIMUM VOLTAGE RATING	125VAC		250VAC	

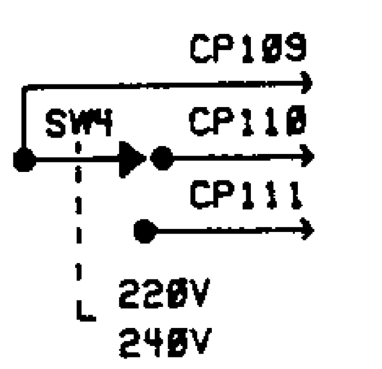
PRIMARY OF 029035 USED ON EXPORT MODELS

100V	120V ⚠1	220/240V ⚠3
CP102	CP102	CP102
CP106	CP106	CP106
CP103	CP103	CP107
SB5	CP110	CP110
CP107	CP107	CP111



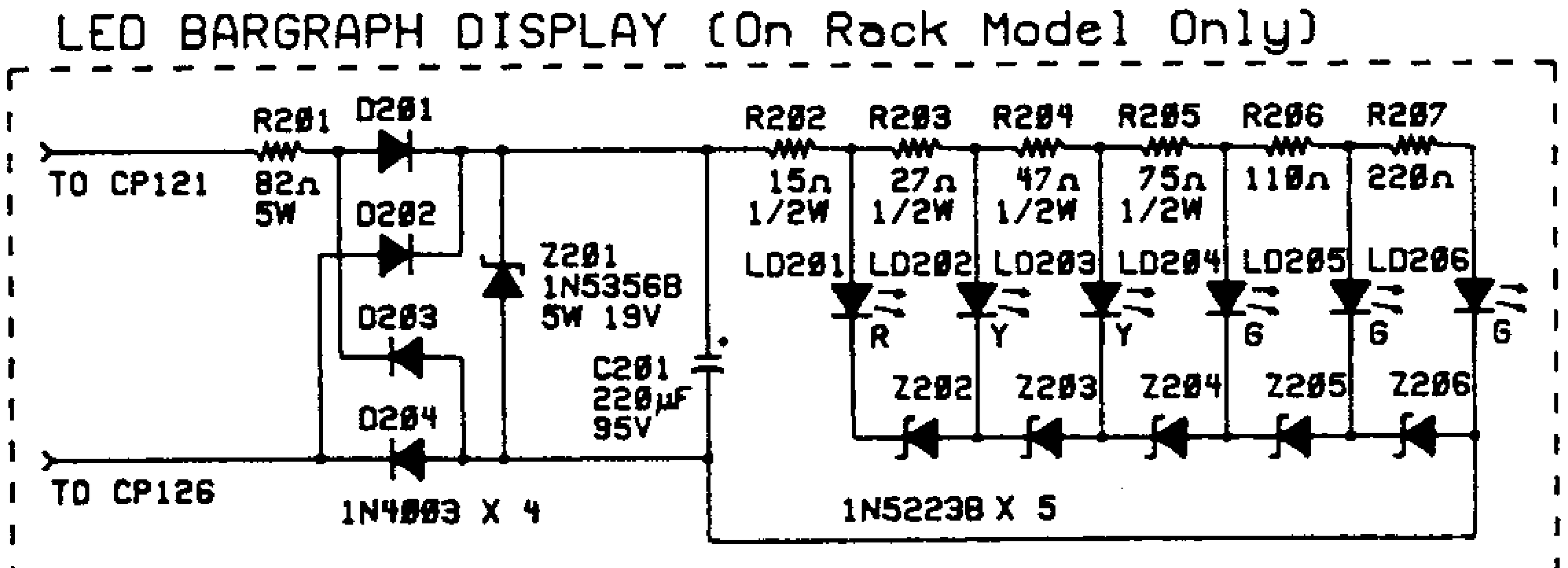
⚠1 GREY WIRE FROM SB5 TO CP108

⚠3 GREY WIRE FROM SB5 TO CP109



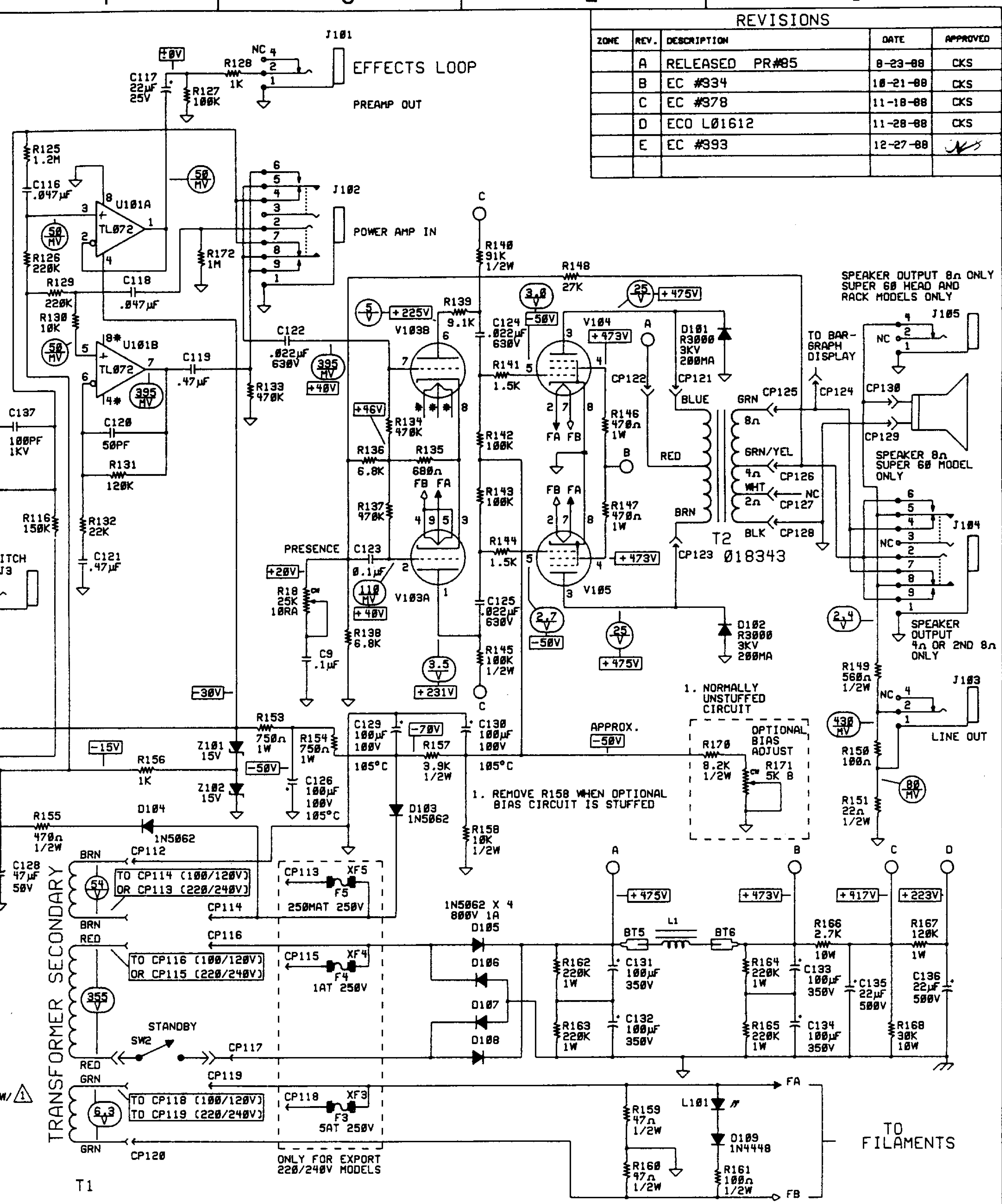
LINE VOLTAGE SELECTOR SWITCH ON 220/240V EXPORT MODELS ONLY.

LED BARGRAPH DISPLAY (On Rack Model Only)



8 7 6 5

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	RELEASED PR#85	8-23-88	CKS
	B	EC #334	10-21-88	CKS
	C	EC #378	11-18-88	CKS
	D	ECO L01612	11-28-88	CKS
	E	EC #393	12-27-88	



REF. DES.	ITEM	QTY	PART NO.	DESCRIPTION

DATABASE FILE: S60_01

CHECKED BY: DATE: 12-28-88

APPROVED: DATE: 12-28-88

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

PROPRIETARY

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NEXT HIGHER ASSEMBLY: SUPER 60, SUPER RACK, SUPER 60 HEAD

Fender MUSICAL INSTRUMENTS
1130 Columbia Street
Brea, Ca. 92621

TITLE: SCHEMATIC DIAGRAM OF 60 SERIES TUBE AMPS.

SIZE: D | DRAWN: C.LINSKENS | ENGR: C.KOBYLARZ | DES: M.WENTLING | DRAWING NUMBER: 028921 | REV. E

SCALE: | DATE: 8-23-88 | SHEET 1 OF 1

0028931000


REVISIONS
ZONE | REV. | DESCRIPTION | DATE | APPROVED
A | RELEASED EC# 135
B | CHANGED R38,R39 FROM 2.2Kn | 10-22-87
INPUT NO. 1
INPUT NO. 2
"MID BOOST"
"GAIN"
"LIMITER"
"PRESENCE"
"VOLUME"
"TREBLE"
"BASS"
"MID"
"REVERB"
"SELECT"
"FOOT SWITCH"
"POWER ON"
"PREAMP OUT"
"POWER AMP IN"
"HEAD PHONES"
TO REVERB SUBASSEMBLY
FROM REVERB SUBASSEMBLY
TO SPKR
EXPORT ONLY
STAKE-ON FOR STORAGE ONLY
ONLY FOR EXPORT 220/240V MODELS
OUTPUT POWER TEST
1 KHZ POWER AMP INPUT
8 Ω RESISTIVE LOAD
120 VAC LINE INPUT
RESULT-
63 WRMS
AT 5% T.H.D.
4. AC VOLTAGE READINGS TAKEN UNDER THE FOLLOWING CONDITIONS:
ALL CONTROLS AT 12 O'CLOCK
REVERB CONTROL "OFF"
MID BOOST "OFF"
SELECT "ON"
NO FOOTSWITCH
8 Ω SPEAKER CONNECTED
1 KHZ INPUT
3. DC VOLTAGES READ TO GROUND WITH DVM. NO INPUT SIGNAL.
2. ALL CAPACITORS 63V MIN.
1. ALL RESISTORS ¼W, ±5%
NOTES: UNLESS OTHERWISE SPECIFIED
REF. DES. | ITEM | QTY | PART NO. | DESCRIPTION
DATABASE FILE: FFF015
CHECKED BY: MW
DATE: 10-22-87
APPROVED:
DATE: 10-22-87
TOLERANCES: UNLESS OTHERWISE NOTED
X.X ±0.050"
X.XX ±0.010"
X.XXX ±0.005"
ANGLES ±0.500°
PROPRIETARY
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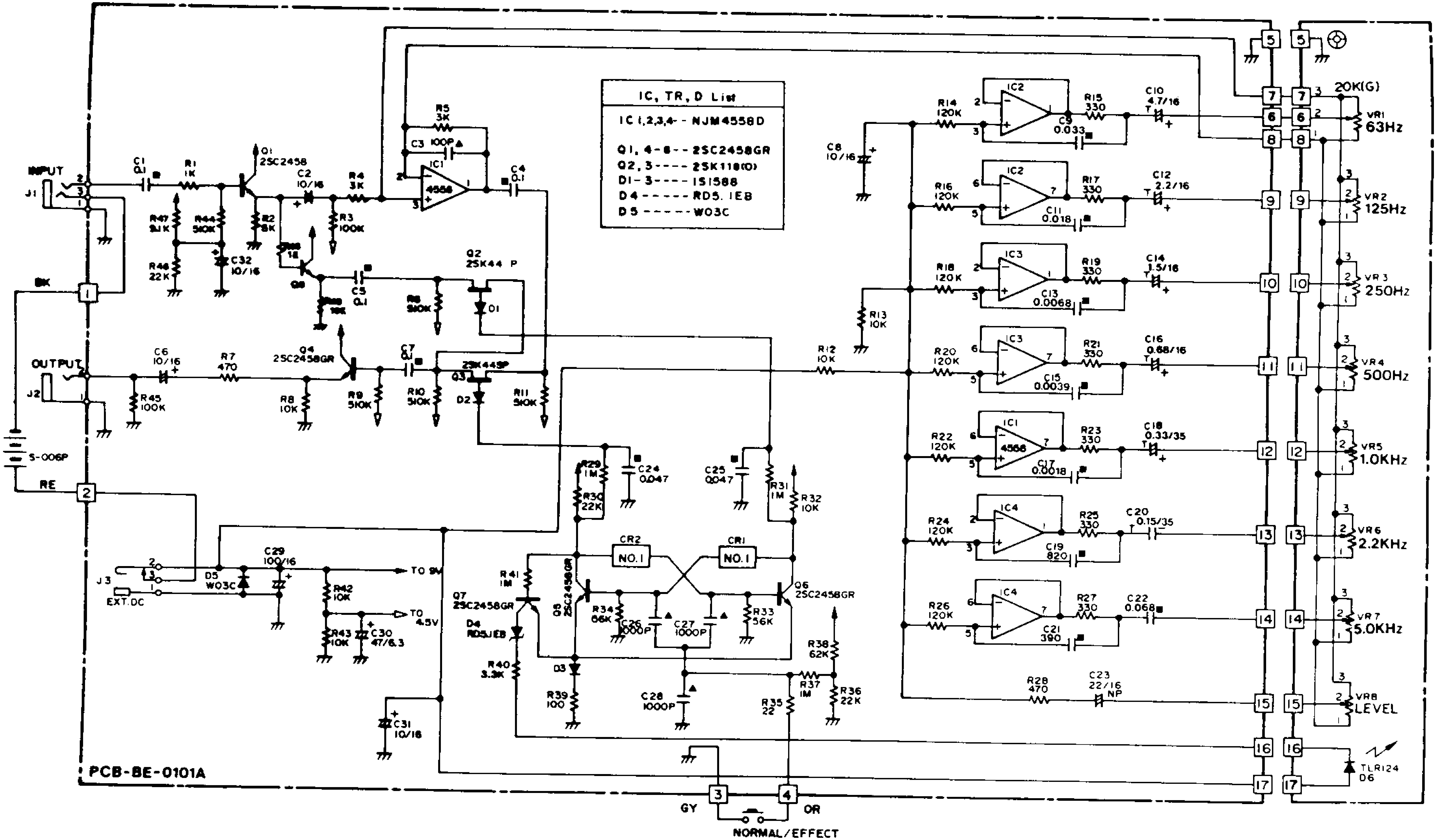
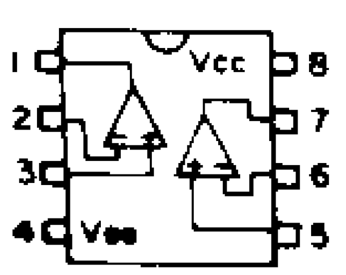
NEXT HIGHER ASSEMBLY: STUDIO 85
Fender MUSICAL INSTRUMENTS
1130 Columbia Street
Brea, Ca. 92621
TITLE: SCHEMATIC DIAGRAM OF AMPLIFIER - STUDIO 85
SIZE D
DRAWN: MULLIN
ENGR: WENTLING
DRAWING NUMBER 028051
REV. B
SCALE:
DATE: 9-2-87
SHEET 1 OF 1
0028521000



CAUTION : This schematic diagram is a normal standard one.
The parts rating and/or schematic diagram will be changed without notice.

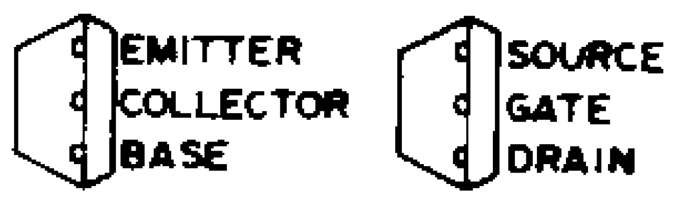
Top View

NJM4558D



Bottom View

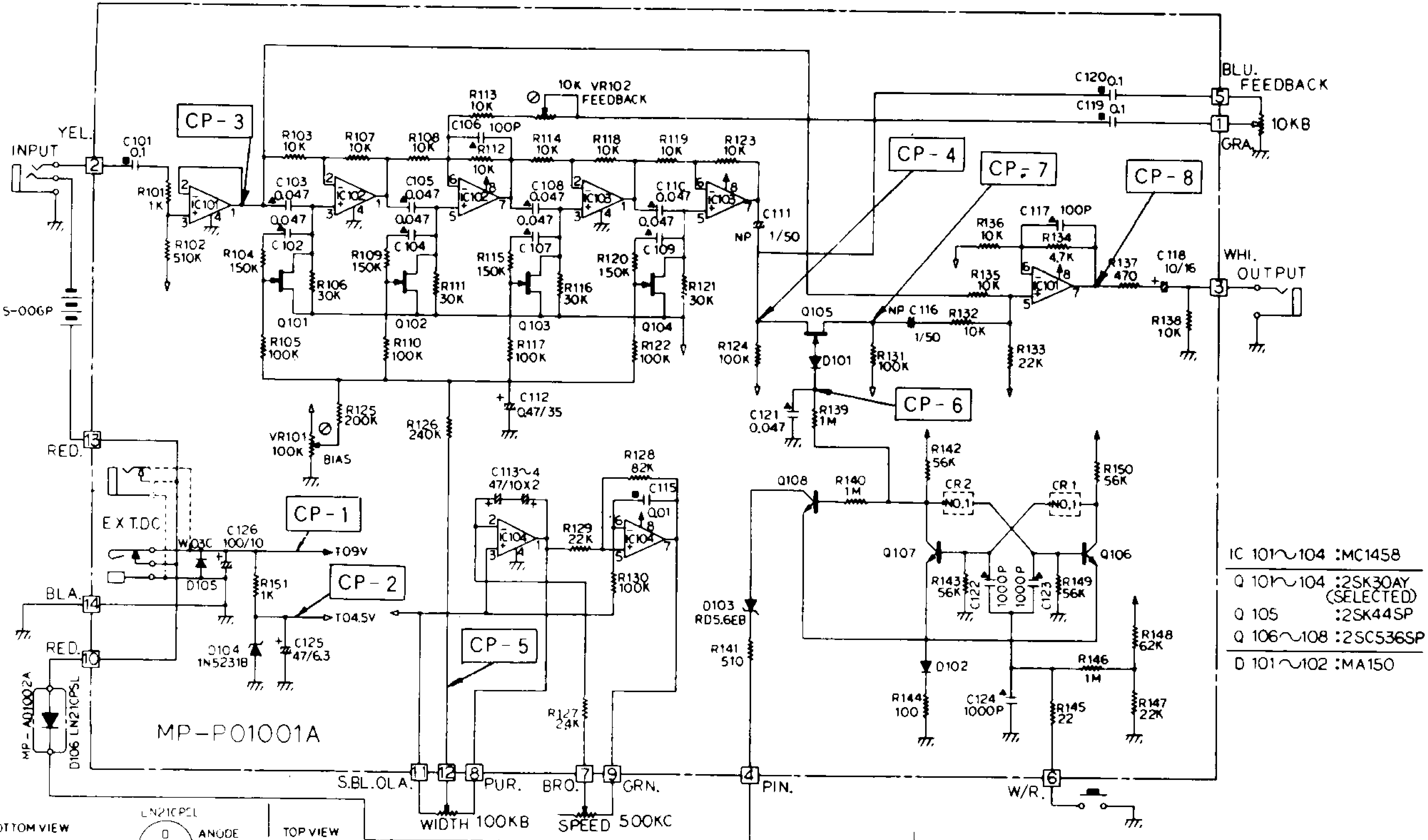
2SC2458GR　　2SK118(O)

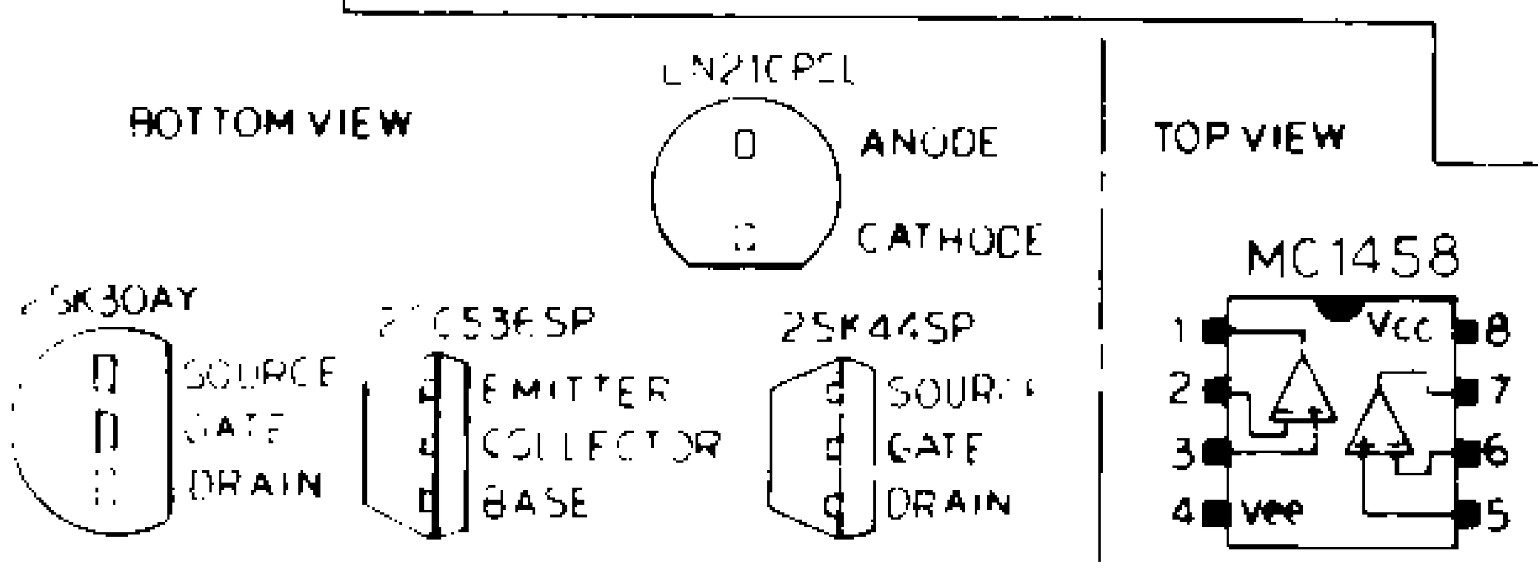


NOTES

▲ : CERAMIC capacitor. All ceramic capacitors are above 25V rating
■ : FILM capacitor. All film capacitors are above 50V rating
NP : NON POLAR capacitor
T : TANTALUM capacitor

And all capacitors are ELECTOLYTIC capacitors, unless otherwise marked
Unless otherwise indicated
Resistance in Ω, K=KΩ, M=MΩ
Resistors, 1/4W ±5% rating
Capacitance in P=PF, μ=μF





NOTE

▲ CERAMIC capacitor. All ceramic capacitors are above 25V rating

■ MYLAR capacitor. All mylor capacitors are above 50V rating

NP. NON POLAR capacitor.

T TANTALUM capacitor

And all capacitors are ELECTOLYTIC capacitors, unless otherwise marked

Unless otherwise indicated

Resistance in Ω, K = K Ω, M = MΩ

Resistors, 1/8W, ±5% rating

Capacistance in pF μ = μF

Notes:

1. D1 - 5 1N4007
2. PCB, JMP500 Onwards
3. Effects loop shown on preamp
4. Output impedance select can be wired for either 8 & 16 ohm (normal) or 4 & 8 ohm.
5. V3: ECC83
   V4 - 7: EL34
6. Unless stated, components are Off-PCB components.
7. All resistors 1/4w unless stated.

JCM900 Series:

100 Watt Power Amp
Circuit Diagram

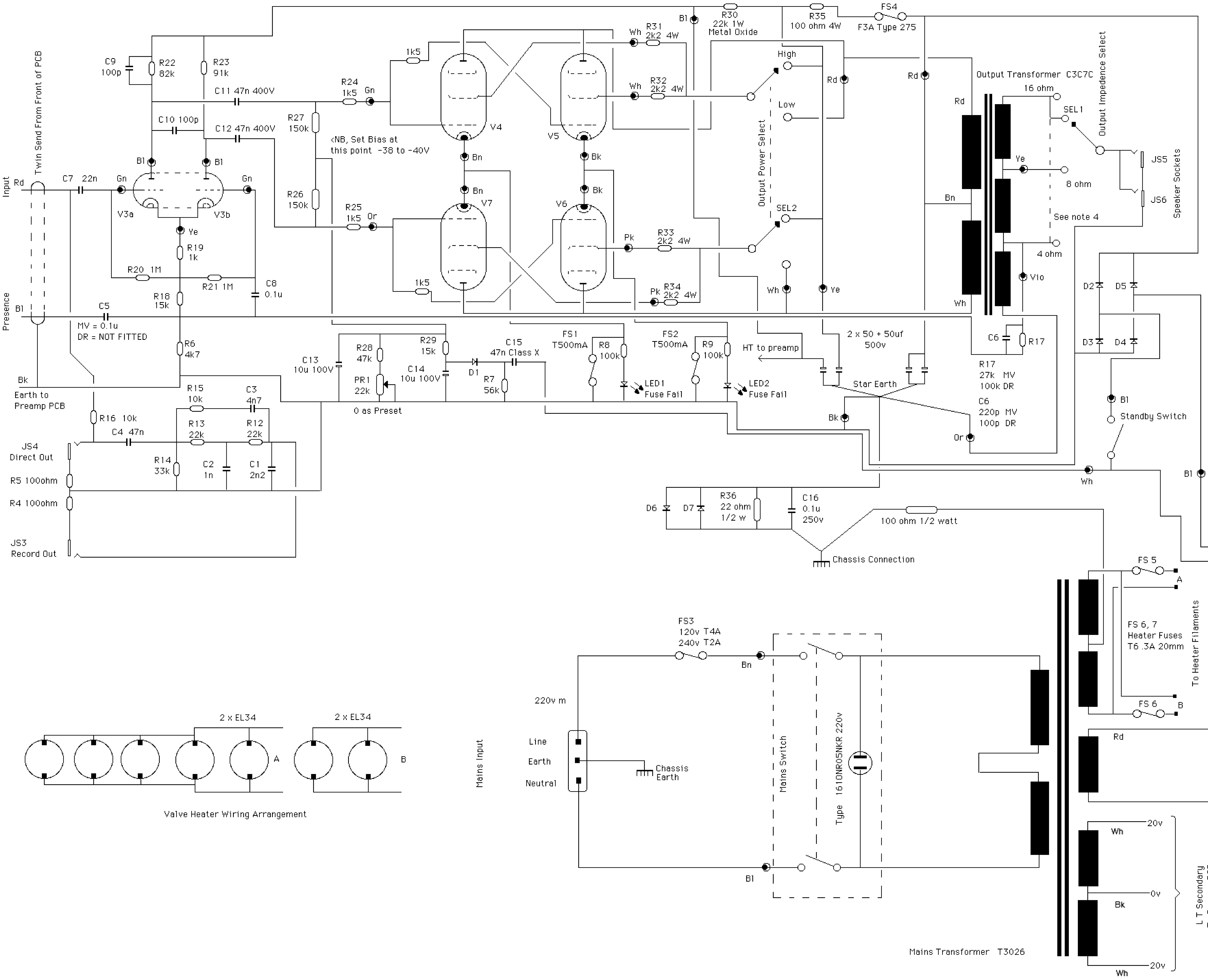
All Countries

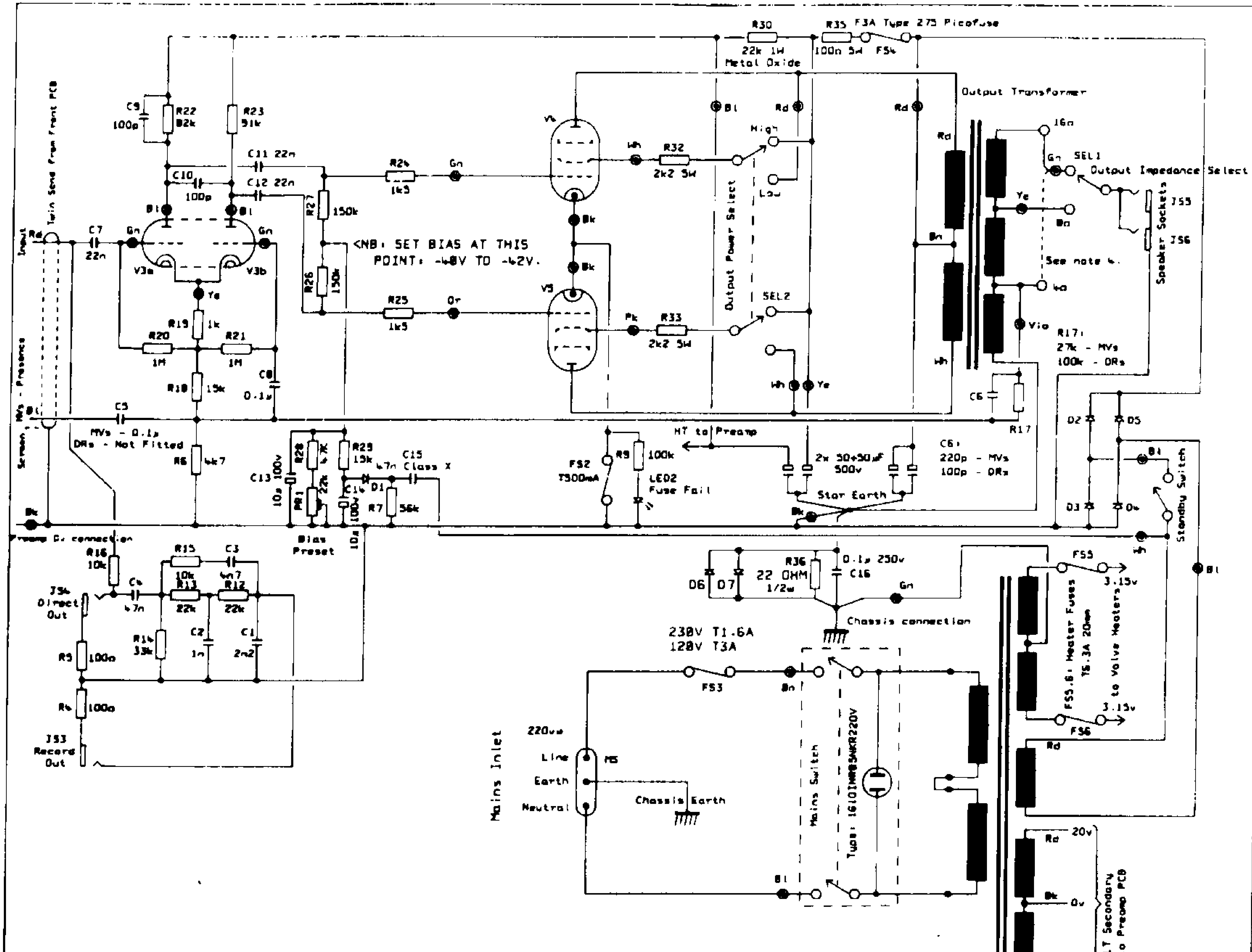
Marshall

Jim Marshall
(Products) Ltd.

BLETCHLEY
MILTON KEYNES
ENGLAND

File: CD0109.DGM





Models: 2500, 2501, 2502, 4500, 4501 & 4502

NOTES:

1. D1-5: 1N4007.
2. PCB: JMP50C onwards
3. Effects loop components shown on preamp cct. diag.
4. Output impedance select can be wired for either 8 & 16n (normal) or 4 & 8n.
5. Components not fitted: Resistors: R8,20,23,24, 27,33,36 Others: FS1, LED1
6. V3: ECC83 V4,5: EL34
7. All resistors are 1/4w unless stated otherwise.

Iss.7: JMP50C PCB

Iss.	Date	Drn.
10	ECO 8147 10/03/92	CJR
9	ECO 8126 12/12/91	CJR
8	10-9-90	SKB
7	4-9-90	CPV
6	16-5-90	CPV
5	26-2-90	CPV

Dwg. Number: CD0112

JCM900 Series
50w Power Amp
Circuit Diagram
SEMKO AND CSA

Marshall

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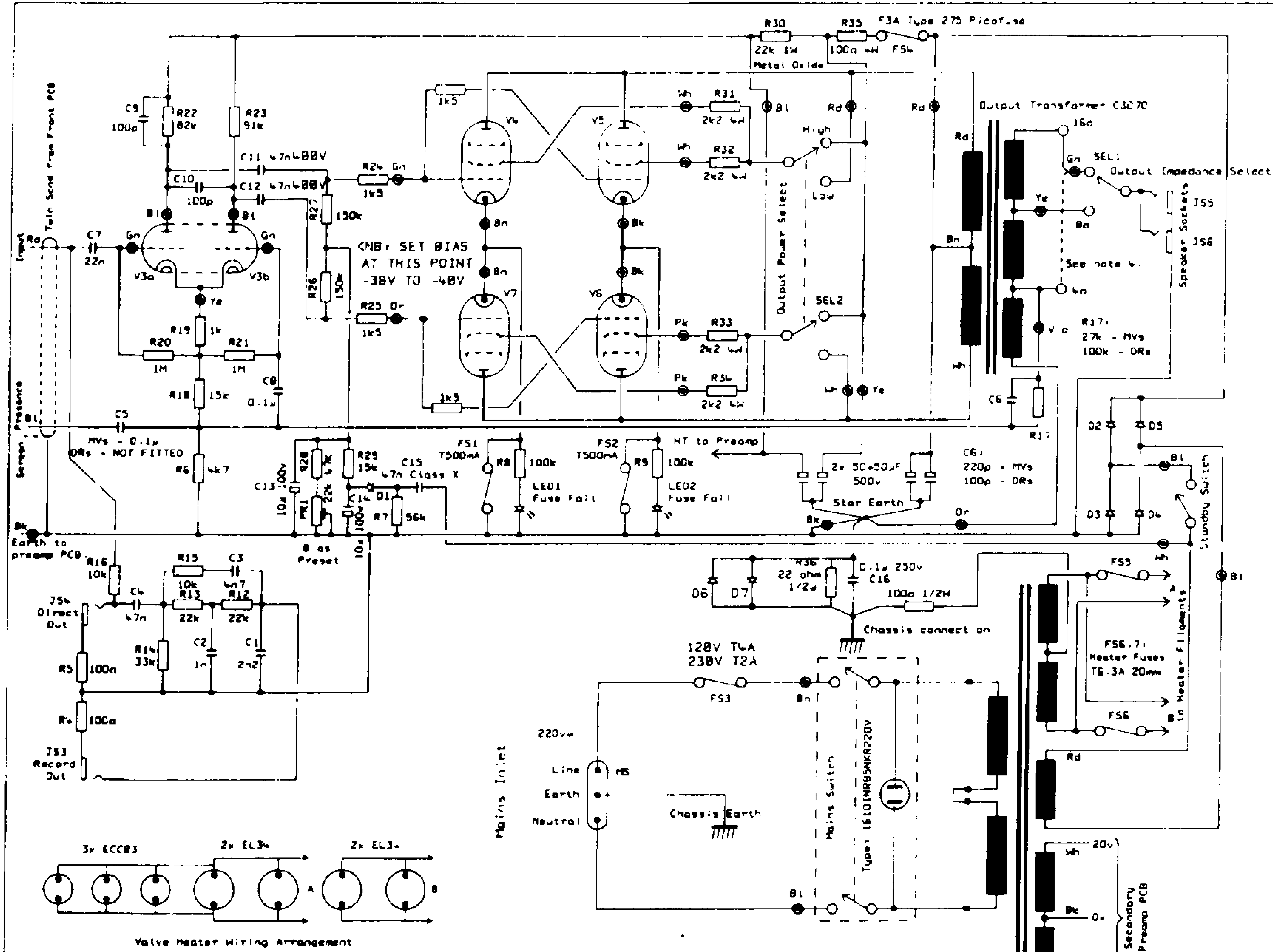
BLETCHLEY
MILTON KEYNES
ENGLAND

File: JMP50C1.DGM



Models: 2100, 2101, 4100, 4101 & 4102

NOTES:

1. D1-5: 1N4007
2. PCB: JMP50C onwards
3. Effects loop components shown on preamp cct. diag.
4. Output impedance select can be wired for either 8 & 16Ω (normal) or 4 & 8Ω.
5. V3: ECC83
   V4-7: EL34
6. Undesignated components are off-PCB components.
7. All resistors are 1/4w unless stated otherwise.

Iss.7: JMP50C PCB

Iss.	Date	Drn.
10	ECO 0147 18/03/92	CJR
9	ECO 0126 12/12/91	CJR
8	19-9-90	SKB
7	4-9-90	CPV
6	16-5-90	CPV
5	9-3-90	CPV

Dwg. Number: CD0192

JCM900 Series
100w Power Amp
Circuit Diagram
SEMKO AND CSA

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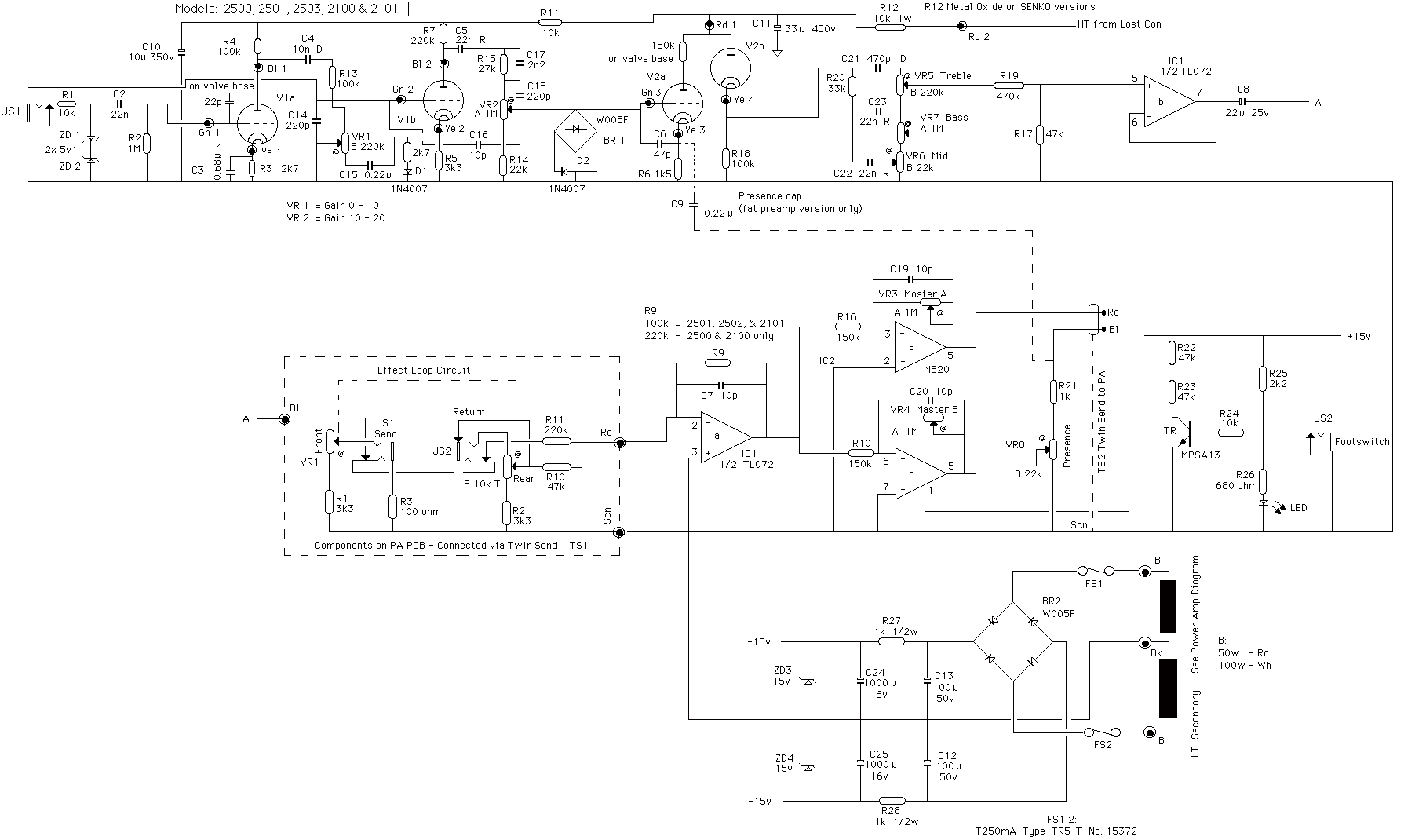
File: JMP50C2.DGM



Notes:

1. All resistors 1/4w unless stated.
2. PCB, JMP51B Onwards
3. Power supply and power amp diagram: CD0112 50w
   CD0152 100w
4. All non-electrolyte caps are 50v axial unless marked.

   D = Ceramic Disk

   R = MKT Radial
5. All zeners 300mw.
6. C1,5,7,24 not fitted. C11 only fitted on rack preamp versions.
7. V1,2 ECC83.
8. M5201 switching IC pins:

9. @ on pots indicates clockwise.

JCM900 Series:

Master Volume preamp
Circuit Diagram

All Countries

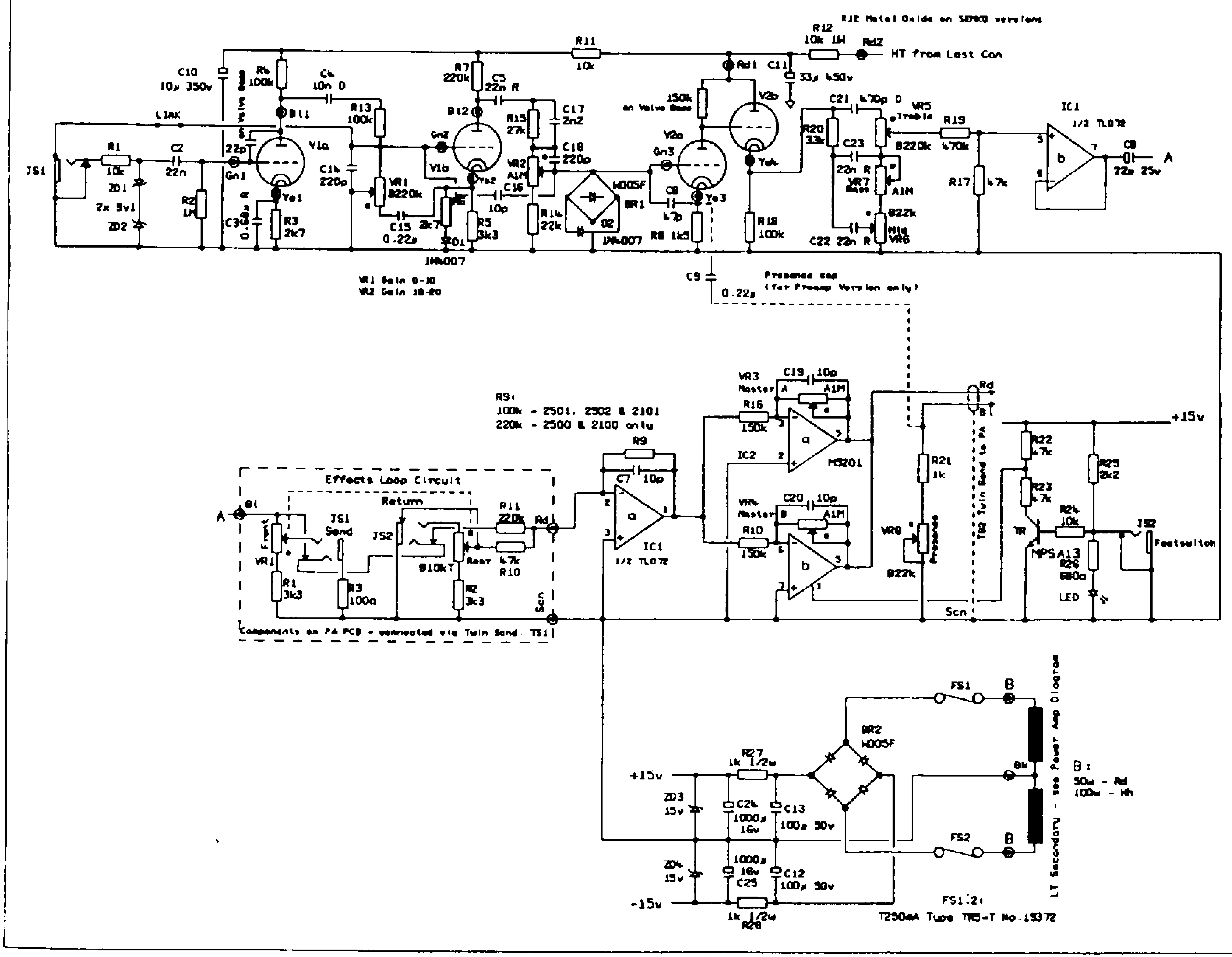
Marshall

Jim Marshall
(Products) Ltd.

BLETCHLEY
MILTON KEYNES
ENGLAND

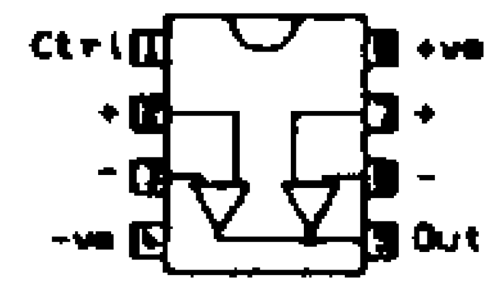
File: CD0109.DGM

Models: 2500, 2501, 2502, 2100 & 2101



NOTES:

1. All resistors 1/4w unless stated.
2. PCB: JMP518 ONWARDS
3. Power supply and power amp diagram: CD0112 50w
   CD0132 100w
4. All non-elect. caps are 50v axial unless marked:
   D: Ceramic disk
   R: MKT Radial
5. All zeners 500mW.
6. C1,3,7,24 not fitted. C11 only fitted on rack preamp versions.
7. V1,2: ECC83.
8. M5201 switching IC pins:



9. • on pots indicates clockwise.

Iss.	Date	Drn.
9	18-9-98	SKB
8	2-7-90	CPV
7	29-1-90	CPV

Dwg. Number: CD0109

JCM900 Series
MASTER VOLUME Preamp Circuit Diagram
ALL COUNTRIES

Marshall

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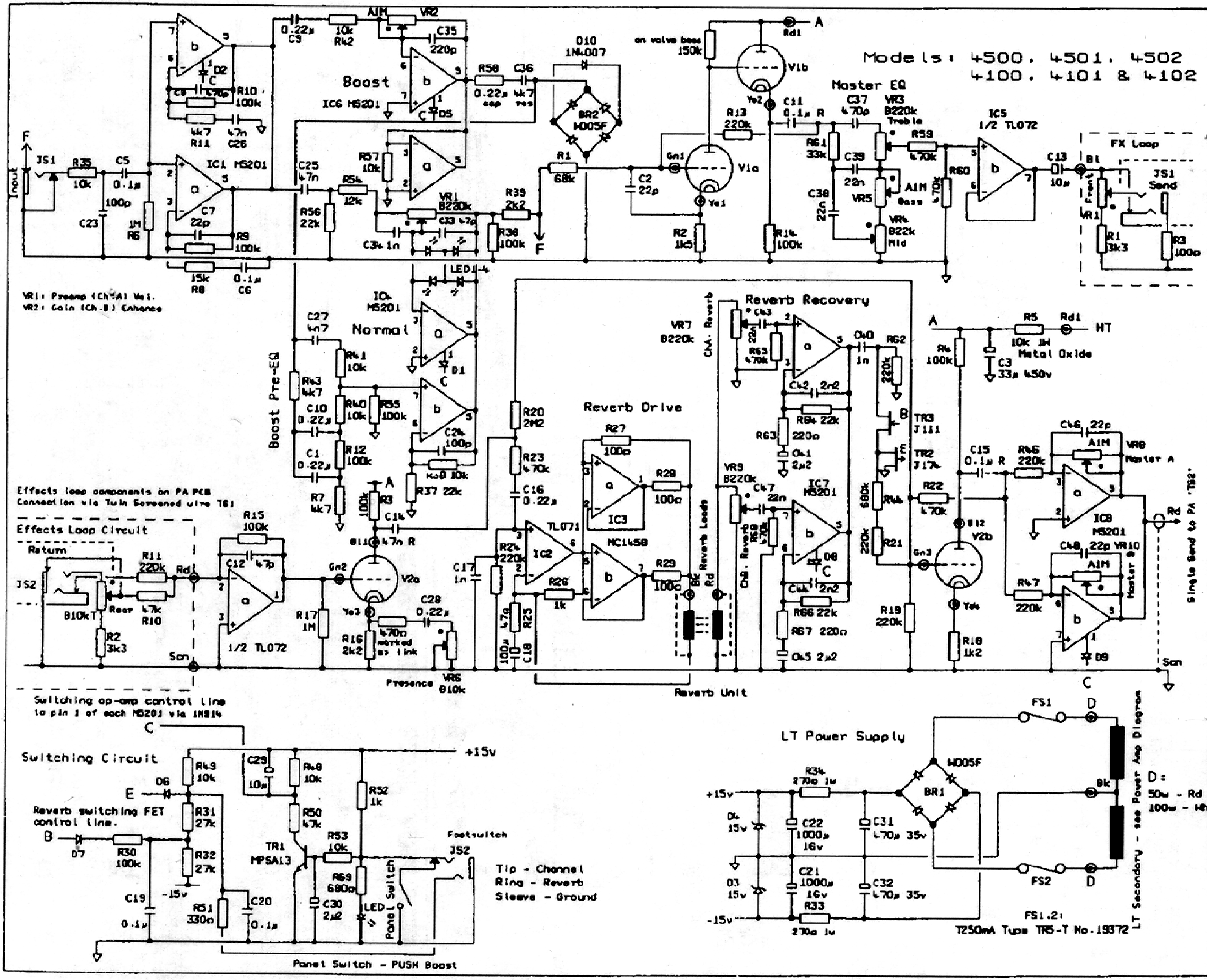
MILTON KEYNES
ENGLAND

File: CD0109.DGM



NOTES:

1. All resistors 1/4w unless stated.
2. PCA: JMP52C onwards
3. Power amp diagrams: CD0112 50w, CD0192 100w
4. All non-elect. caps are 50v axial unless marked:
   D: Ceramic disk
   R: MKT Radial } High voltage
5. All zeners 500mW.
6. All unmarked diodes are 1N914.
7. IC supplies:
   All ICs but TL071, pin 8: +15v
   TL071, pin 7: +15v
   All ICs, pin 4: -15v
8. M5201 switching IC pins:
   Ctrl 1, +ve 8; + 2, + 7; - 3, - 6; -ve 4, Out 5
9. R45 not fitted.
10. V1,2,3: ECC83.

Iss.	Date	Drn.
7	22-11-90	SKB
6	1-11-90	SKB
5	2-7-90	CPV
4	11-4-90	CPV

Dwg. Number: CD0189

JCM900 Series
DUAL REVERB Preamp
Circuit Diagram
ALL COUNTRIES

Marshall

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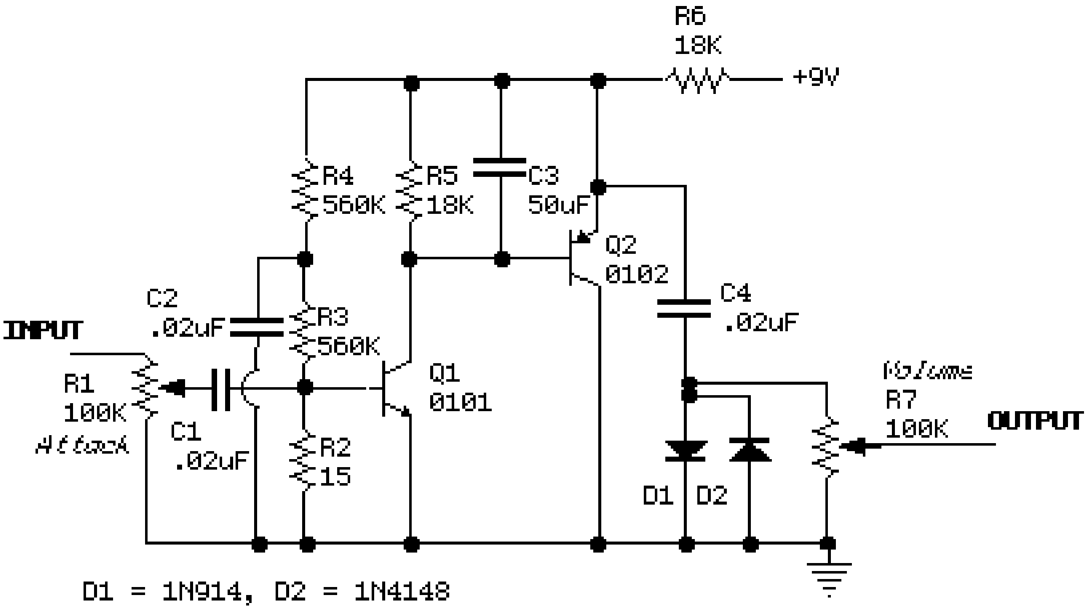
BLETCHLEY
MILTON KEYNES
ENGLAND

File: CD0189.DGM

JORDAN BossTone

Drawn by Aron Nelson 6/98



D1 = 1N914, D2 = 1N4148

The Jordan BossTone as drawn in the factory schematic (minus switching circuit).
The above circuit has been tested with the following modifications:

C1,C2 and C4 = .022uF capacitors
C3 = 47pF capacitor
R2 = 150K resistor
R7 = 10K potentiometer
Q1 = 2N2222 NPN
Q2 = 2N2904 (NTE-129) PNP!

JORDAN ELECTRONICS
A DIVISION OF THE VICTOREEN INSTRUMENT CO.
ALHAMBRA, CALIFORNIA


INPUT
PJ1
R14 10K
C5 0.022
R13 4.7K
C7 0.0047
IC-1
R12 47K
IC1
R16 1M
C8 10μ 16V
R7 6.8K
R9 220Ω
R8 220Ω
IC2
Q1 C2785K
R10 22K
VR1 22KB 47KB
R11 10K
R6 100K
D3
C9 10μ 16V
R18 20K
R17 10K
C11 .001
R20 1K
A
B
C
FOOT SW.
OUT PUT
PJ2
006P
D1 SR1K2
DCJK 1
RD 5.6EB1
D6
R30 1.2K
C2 100μ 16V
D2
R1 10K
R2 10K
C1 100μ 16
C14 10μ 16V
D
E
F
R31 1.2K
C6 10μ 16V
R4 1K
C3 0.001
R3 100Ω
C4 10μ 16V
R5 100K
R15 100K
R24 5.1K
R25 5.1K
R27 100K
D7
D8
D9
R28 100K
IC3
C13 0.22μ 50V RB-LL
C15 0.022
R26 1K
C12 100μ 16V
R29 150K
R22 2.2K
R32 470Ω
D4
Q2 K381B
R19 33K
2MA
RELEASE TIME
RD 5.1EB2 D5
C10 1μ 50V RB-LL
R23 180Ω
10KB
R21 56K
THRES HOLD
IC1 : NJM4558DV
IC2 : NJM13600 Selected (red)
IC3 : LM358
DIODES WITHOUT DESIGNATION: 1S1555


INPUT
POLARITY
C10 MS 1µ 50V
R22 470Ω
R21 100K
R25 91K
R24 470K
C8 0.022
R20 10K
R23 1M
IC4
PJ1
D1 SRIK 2
006P
DCJK 1
D4
D2
RD5.6EB1
R1 1.2K
PR5534S
C11 100µ 16V
R15 10K
R16 10K
C6 100µ 16
C9 10µ 16V
R26 22K
VR1 100K
R27 100K
R11 470K
R6 470Ω
R12 5.1K
R7 470Ω
R9 47K
C2 0.0033
IC2
C3 1µ 50V
R5 27K
R2 10K
C5 0.022
C14 0.0022
R39 330K
R28 22K
C18 0.01
R38 330K
C15 220P
IC6
R34 3.3K
C11 0.022
C12 0.0033
R33 1M
R43 22M
R35 220K
R36 1M
C13 0.0015
R19 1K
D5
C7 0.047
R18 1M
IC3
R17 47K
R14 47K
IC1
D3
R3 47K
R4 10K
R8 10K
C4 0.022
R13 100K
EFFECT LEVEL
R31 220K
R32 100K
100KB
DIRECT LEVEL
R30 220K
R29 100K
IC5
R41 100K
C17 1µ MS 50V
R40 470Ω
R42 100K
R44 47K
FOOT SW
OUTPUT
PJ2
R10 100K
NC
R37 1.2K
C16 10µ 16V
f — NJM13600 SELECTED
DIODES WITHOUT DESIGNATION: 1S1555
a --- 4558
b --- TL062
c --- TL062
SELECTED
d --- 4558
e --- 4013

IC1.2.3 : TX-429D(selected)
IC4,5,6,7 : NJM4558DV

D2.5.6 : 1S1555

NOTE 1 IC TX429D HAS TWO SELECTED COLORED POINTS. THE CARBON RESISTOR (R40) SHOULD BE USED 1.5MΩ IF THERE IS A BROWN POINT ON IC1 OR IC2

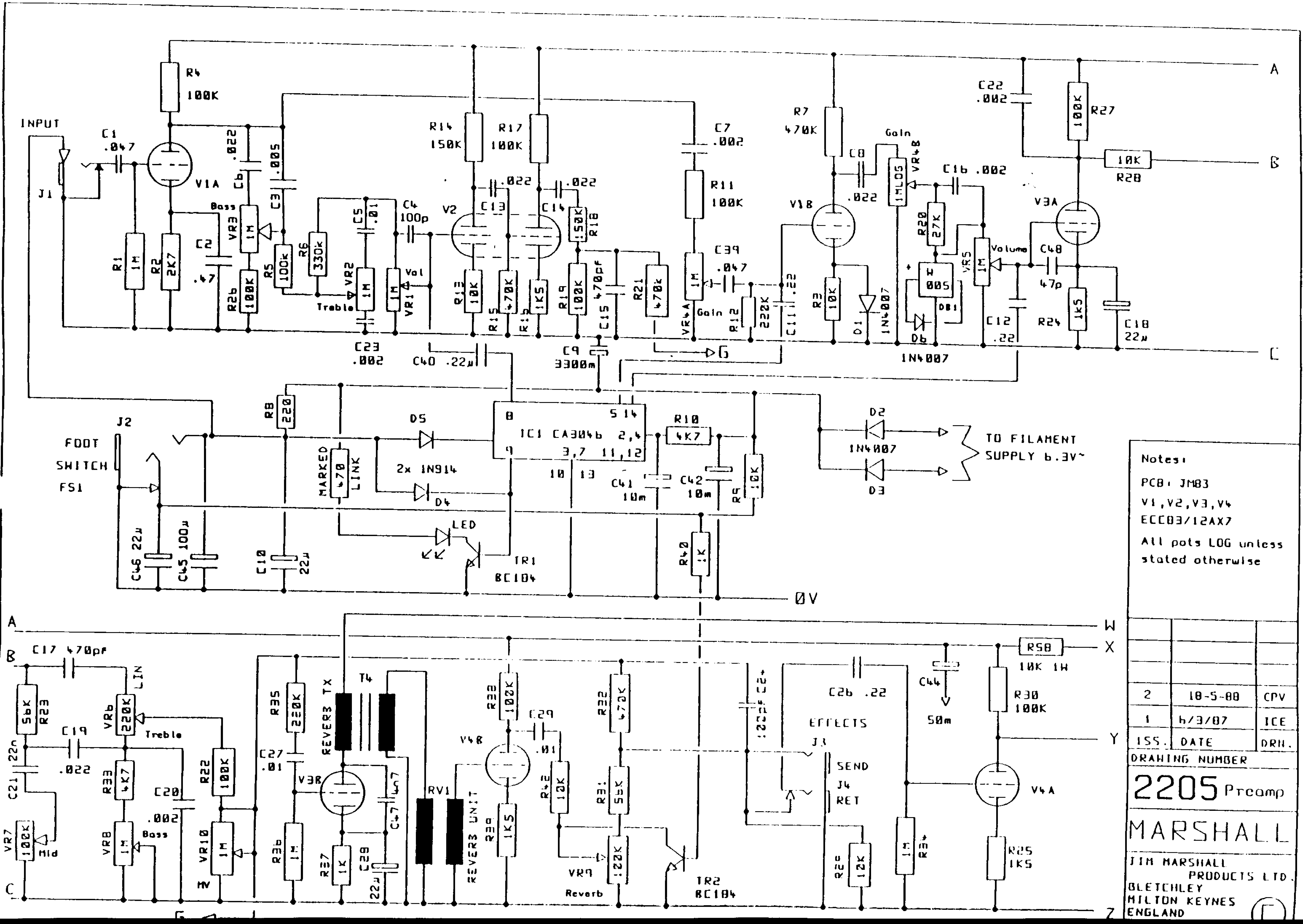
NOTE 2 WHEN THE COLORED POINTS ON THE IC3 ARE ORANGE/BROWN OR GREEN/BROWN OR BLUE/BROWN, THE DIODE (D6) WOULD BE USED

IC 1, 2, 3, 4: TX-429D (selected)

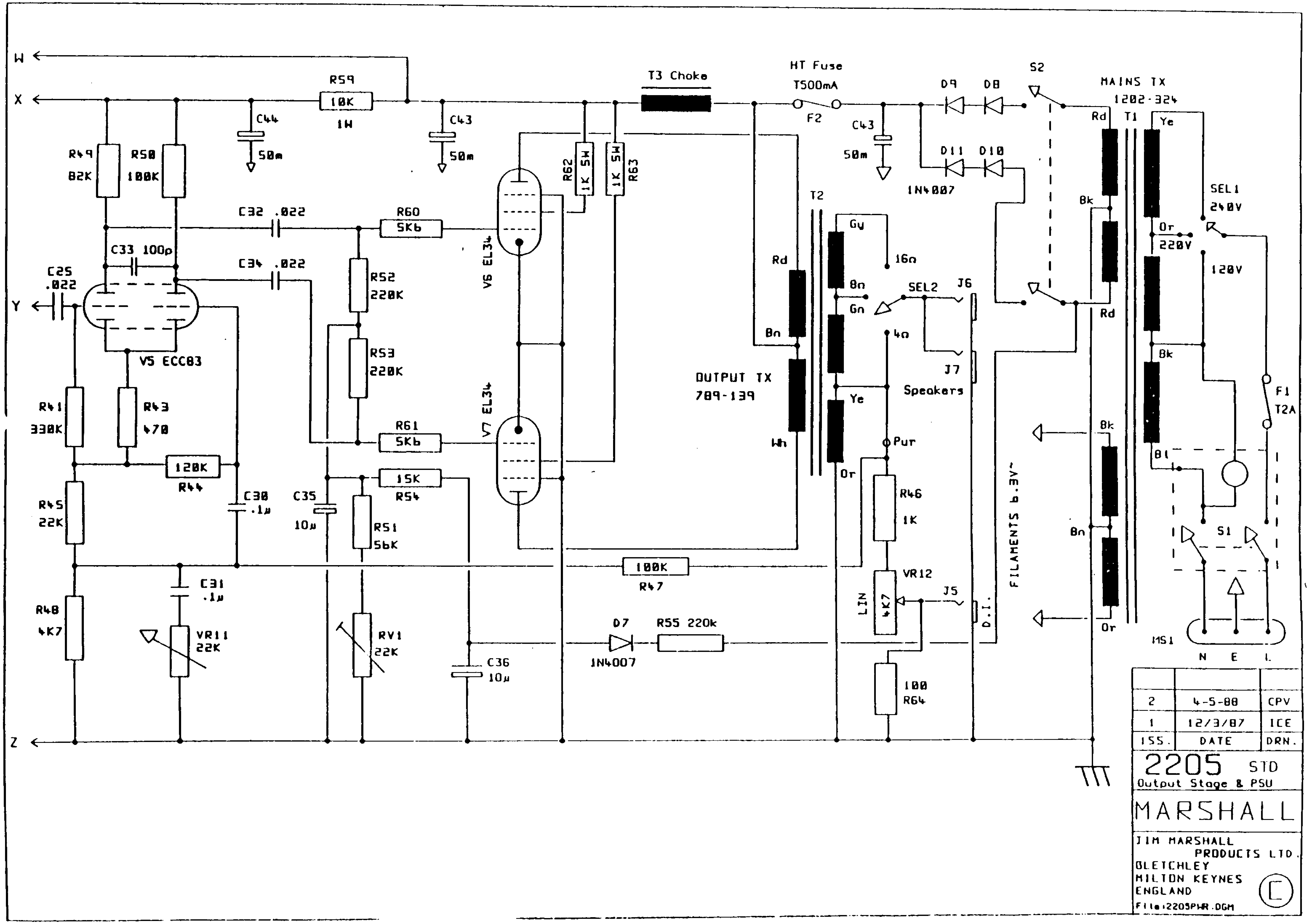
IC 5, 6, 7: NJM4558DV

IC 8: TL062

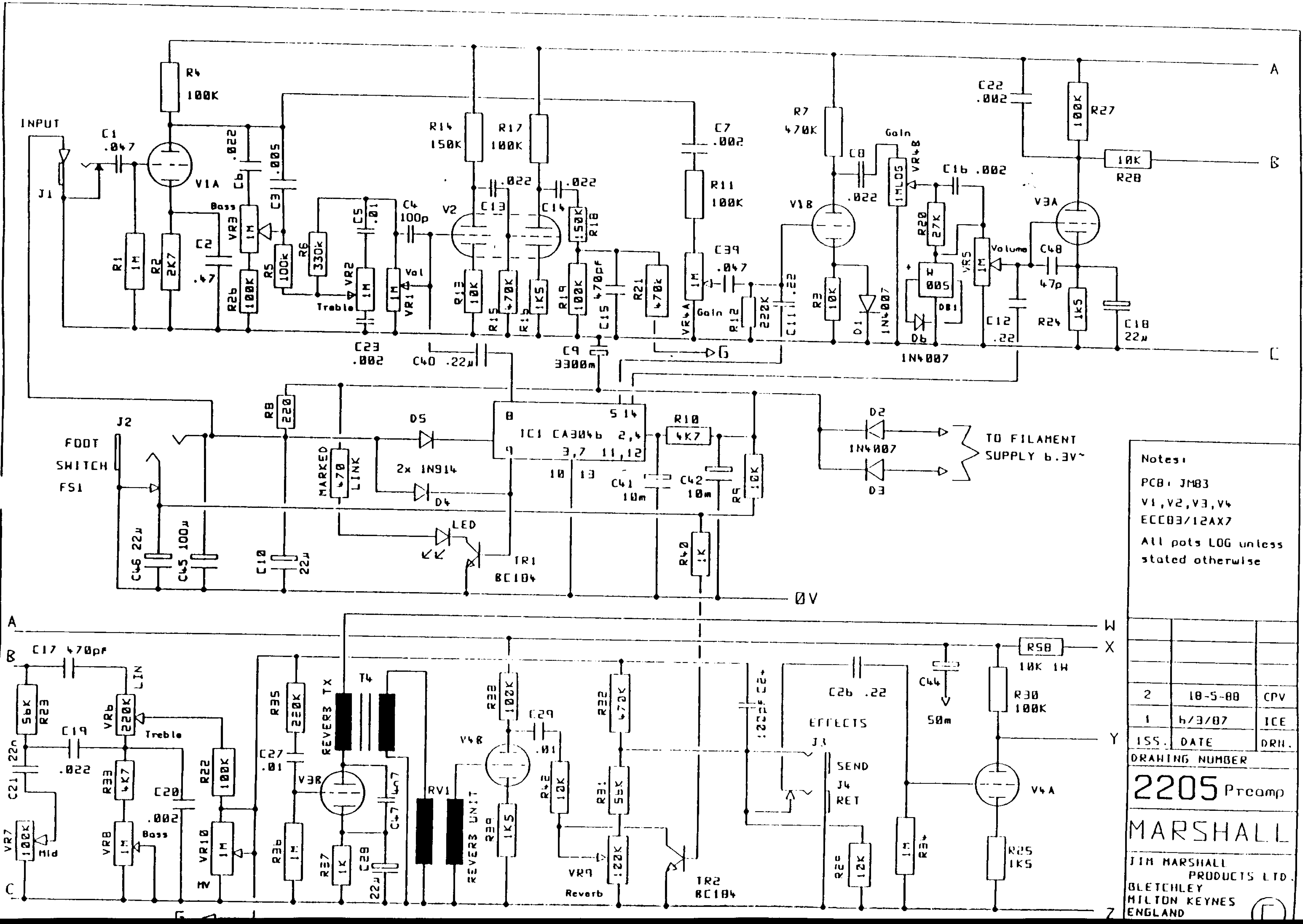
IC1...... TL-072
D2....... SRIK 2
DIODES WITHOUT DESIGNATION: 1S1555



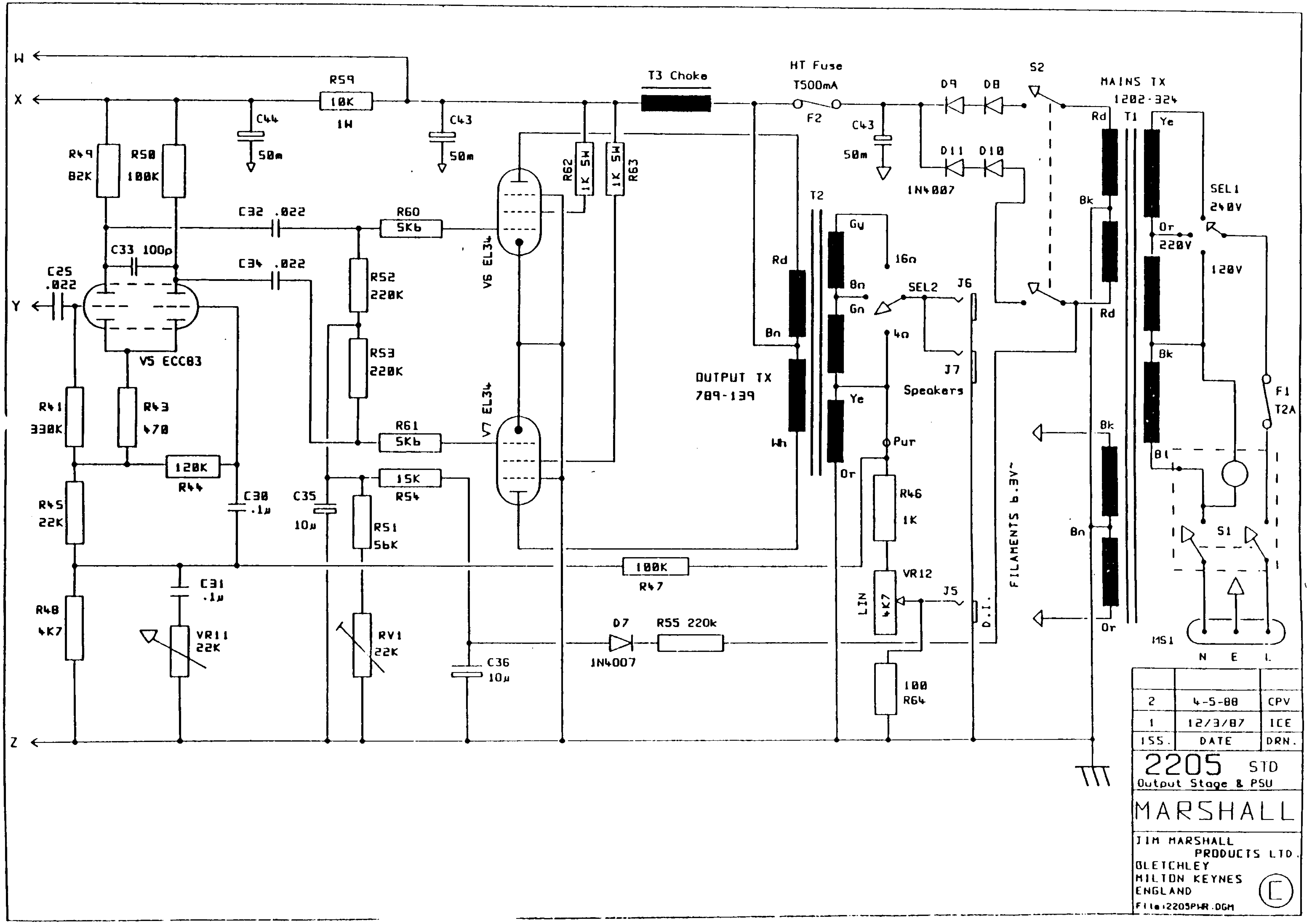
INPUT
J1
C1 .047
V1A
R4 100K
R1 1M
R2 2K7
C2 .47
VR3 1M
Bass
R26 100K
C6 .022
C3 .005
R5 100k
R6 330k
C5 .01
VR2 1M
Treble
C4 100p
VR1 1M
Vol
C23 .002
V2
R14 150K
R17 100K
C13 .022
C14 .022
R18 150K
R13 10K
R15 470K
R16 1K5
R19 100K
C15 470pF
R21 470k
C40 .22μ
C9 3300m
C7 .002
R11 100K
VR4A 1M
Gain
C39 .047
R12 220K
C11 .22
R7 470K
C8 .022
V1B
R3 10K
D1 1N4007
VR4B 1MLOG
Gain
C16 .002
R20 27K
W005
DB1
D6 1N4007
VR5 1M
Volume
C12 .22
C22 .002
R27 100K
R28 10K
V3A
C48 47p
R24 1K5
C18 22μ
A
B
C
G
J2
FOOT SWITCH FS1
C46 22μ
C45 100μ
R8 220
C10 22μ
MARKED 470 LINK
D5
2x 1N914
D4
LED
TR1 BC184
IC1 CA3046
R10 4K7
C41 10m
C42 10m
R9 10K
R40 1K
D2
D3
1N4007
TO FILAMENT SUPPLY 6.3V~
0V
C17 470pF
R23 56K
VR6 220K LIN
Treble
C19 .022
C21 22n
R33 4K7
C20 .002
VR7 100K
Mid
VR8 1M
Bass
R22 100K
VR10 1M
MV
R35 220K
C27 .01
V3B
R36 1M
R37 1K
C29 22μ
C47 4n7
T4
REVERB TX
RV1
REVERB UNIT
V4B
R38 100K
C29 .01
R39 1K5
R42 10K
VR9 100K
Reverb
R32 470K
R31 56K
TR2 BC184
C28 .022
C26 .22
EFFECTS
J3 SEND
J4 RET
R26 10K
R34 1M
C44 50m
R58 10K 1W
R30 100K
V4A
R25 1K5
W
X
Y
Z
Notes:
PCB: JM83
V1,V2,V3,V4 ECC83/12AX7
All pots LOG unless stated otherwise
2 | 18-5-88 | CPV
1 | 6/3/87 | ICE
ISS. | DATE | DRN.
DRAWING NUMBER
2205 Preamp
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND



W
X
Y
Z
R59 10K 1W
C44 50m
C43 50m
R49 82K
R50 100K
C32 .022
C33 100p
C34 .022
C25 .022
V5 ECC83
R60 5K6
R61 5K6
R52 220K
R53 220K
R41 330K
R43 470
R44 120K
R45 22K
R48 4K7
C30 .1µ
C31 .1µ
VR11 22K
C35 10µ
R54 15K
R51 56K
RV1 22K
C36 10µ
V6 EL34
V7 EL34
R62 1K 5W
R63 1K 5W
T3 Choke
D7 1N4007
R55 220k
R47 100K
OUTPUT TX 789-139
T2
Rd
Bn
Wh
Gy
8Ω
Gn
Ye
Or
Pur
16Ω
4Ω
SEL2
J6
J7
Speakers
R46 1K
VR12
LIN 4K7
J5
D.I.
100 R64
HT Fuse T500mA
F2
C43 50m
D9
D8
D11
D10
1N4007
S2
FILAMENTS 6.3V~
MAINS TX 1202-324
T1
Rd
Bk
Bn
Or
Ye
Or
220V
Bk
Bl
SEL1 240V
120V
F1 T2A
S1
MS1
N E L
2 4-5-88 CPV
1 12/3/87 ICE
ISS. DATE DRN.
2205 STD
Output Stage & PSU
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
File:2205PWR.DGM



INPUT
J1
C1 .047
R4 100K
V1A
C6 .022
C3 .005
Bass
VR3 1M
R1 1M
R2 2K7
C2 .47
R26 100K
R5 100k
R6 330k
C5 .01
VR2 1M
Treble
C4 100p
Vol
VR1 1M
C23 .002
V2
R14 150K
R17 100K
C13 .022
C14 .022
R18 150K
R13 10K
R15 470K
R16 1K5
R19 100K
C15 470pf
R21 470k
C40 .22µ
C9 3300m
C7 .002
R11 100K
VR4A 1M
Gain
C39 .047
R12 220K
C11 .22
R7 470K
C8 .022
V1B
R3 10K
D1 1N4007
Gain
VR4B 1MLOG
C16 .002
R20 27K
005
DB1
D6 1N4007
VR5 1M
Volume
C22 .002
R27 100K
R28 10K
V3A
C48 47p
C12 .22
R24 1K5
C18 22µ
A
B
C
G
J2
FOOT
SWITCH
FS1
R8 220
MARKED 470 LINK
D5
2x 1N914
D4
IC1 CA3046
8 5 14
2,4
9 3,7 11,12
10 13
R10 4K7
C41 10m
C42 10m
R9 10K
D2 1N4007
D3
TO FILAMENT SUPPLY 6.3V~
C46 22µ
C45 100µ
C10 22µ
LED
TR1 BC184
R40 1K
0V
Notes:
PCB: JM83
V1,V2,V3,V4 ECC83/12AX7
All pots LOG unless stated otherwise
A
B
C17 470pf
R23 56K
VR6 220K LIN
Treble
C19 .022
C21 22n
R33 4K7
C20 .002
R22 100K
VR7 100K
Mid
VR8 1M
Bass
VR10 1M
MV
C
R35 220K
REVERB TX
T4
C27 .01
V3B
C47 4n7
R36 1M
R37 1K
C29 22µ
RV1
REVERB UNIT
R38 100K
C29 .01
V4B
R39 1K5
R42 10K
R32 470K
R31 56K
VR9 100K
Reverb
TR2 BC184
C28 .022
C26 .22
EFFECTS
J3
SEND
J4
RET
R26 12K
R34 1M
C44 50m
R58 10K 1W
R30 100K
V4A
R25 1K5
W
X
Y
Z
2 | 18-5-88 | CPV
1 | 6/3/87 | ICE
ISS. | DATE | DRN.
DRAWING NUMBER
2205 Preamp
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND


W
X
Y
Z
R59 10K 1W
C44 50m
C43 50m
R49 82K
R50 100K
C32 .022
C33 100p
C34 .022
C25 .022
V5 ECC83
R60 5K6
R61 5K6
R52 220K
R53 220K
R41 330K
R43 470
R44 120K
R45 22K
R48 4K7
C30 .1µ
C31 .1µ
VR11 22K
C35 10µ
R51 56K
R54 15K
RV1 22K
C36 10µ
V6 EL34
V7 EL34
R62 1K 5W
R63 1K 5W
T3 Choke
R47 100K
D7 1N4007
R55 220k
HT Fuse
T500mA
F2
D9
D8
D11
D10
1N4007
S2
MAINS TX
1202-324
T1
T2
OUTPUT TX
789-139
Rd
Bn
Wh
Gy
16Ω
8Ω
Gn
4Ω
Ye
Pur
Or
SEL2
J6
J7
Speakers
R46 1K
VR12
LIN 4K7
J5
D.I.
R64 100
FILAMENTS 6.3V~
Bk
SEL1
240V
220V
120V
F1
T2A
Bl
S1
MS1
N
E
L
2 4-5-88 CPV
1 12/3/87 ICE
ISS. DATE DRN.
2205 STD
Output Stage & PSU
MARSHALL
JIM MARSHALL PRODUCTS LTD.
BLETCHLEY
MILTON KEYNES
ENGLAND
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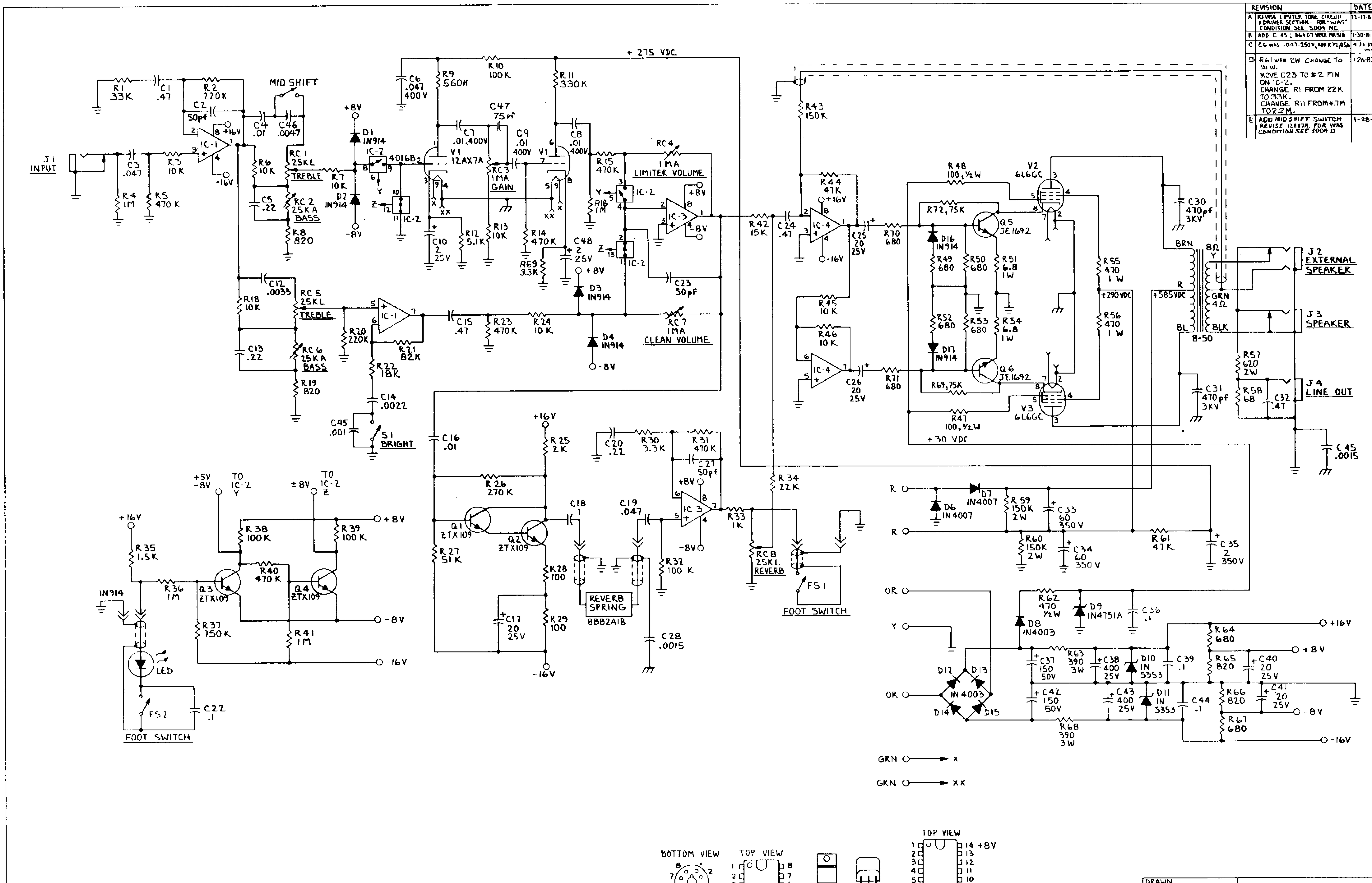
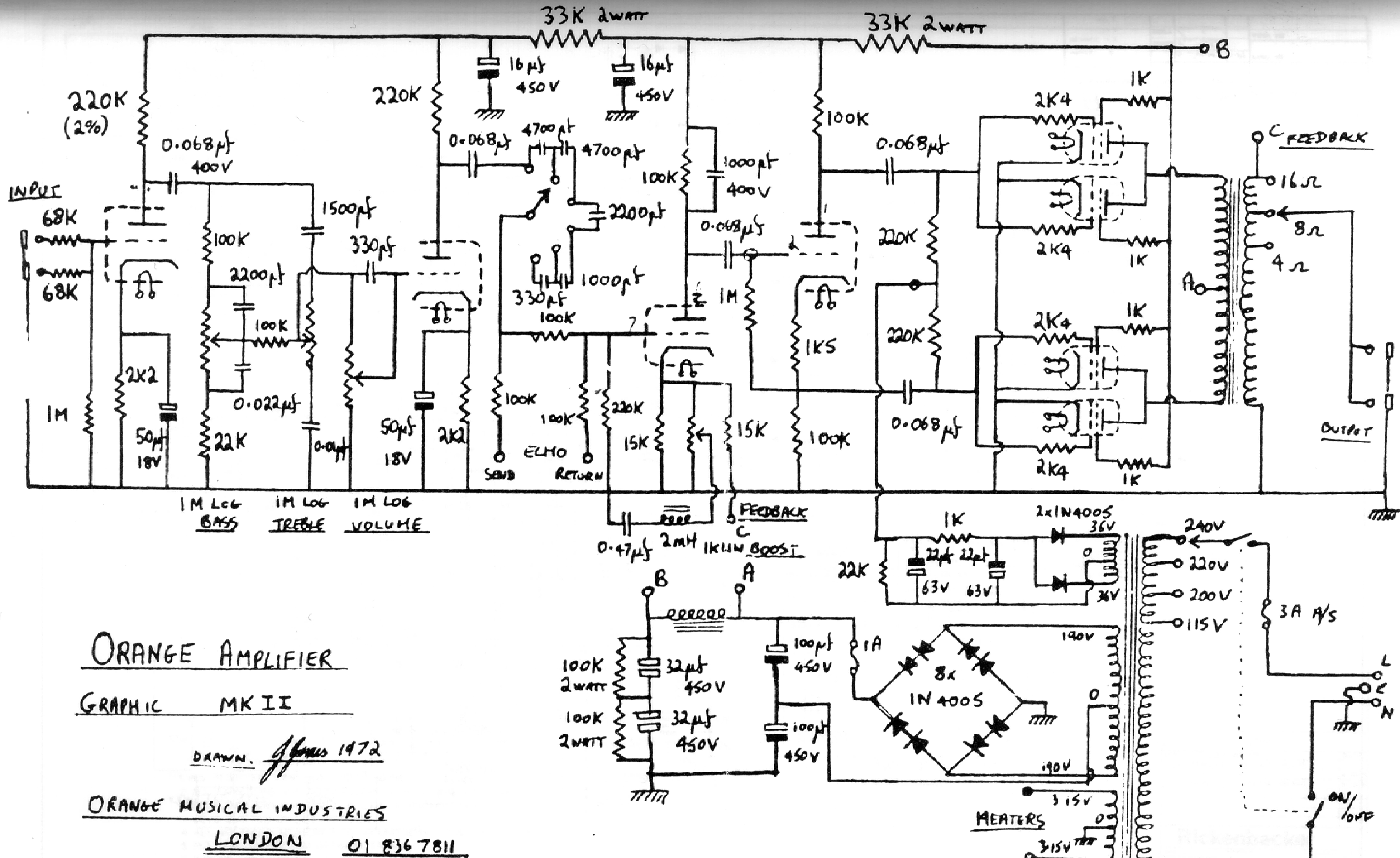


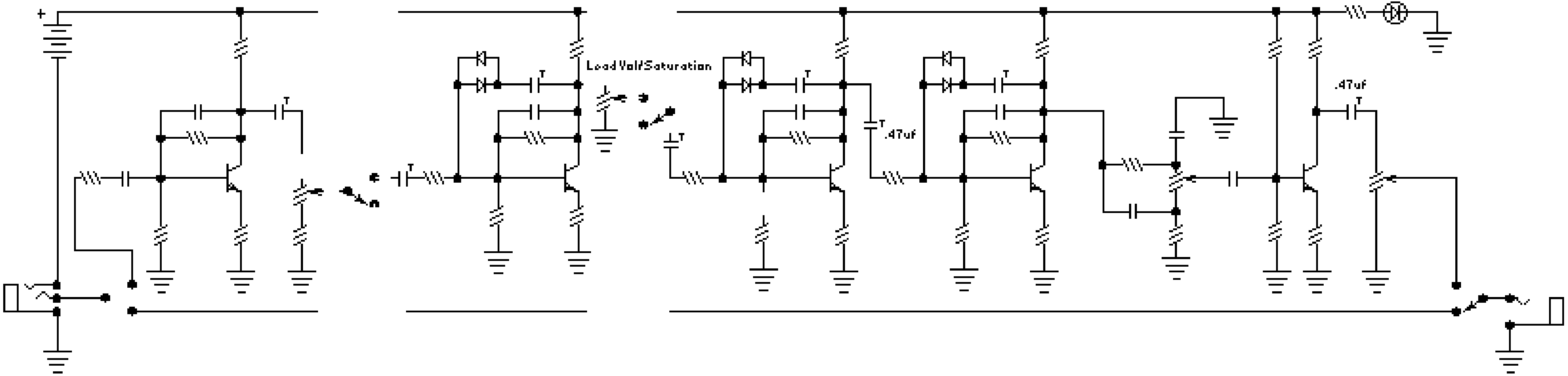
5. +8V & -8V ARE NOMINAL; ACTUAL VOLTAGE MAY VARY ±1.5 VOLTS.
4. IC-2 IS 4016B.
3. IC'S 1, 3, & 4 ARE TL072.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS (μF) EXCEPT WHERE NOTED.
NOTE: 1. ALL RESISTANCE VALUES ARE IN OHMS (Ω), 1/4 WATT, EXCEPT WHERE NOTED.

DRAWN C BASS 3-1-82	MUSIC MAN INC. ANAHEIM, CA.
CHECKED 1-20-81	RD-50 AMPLIFIER SCHEMATIC DIAGRAM RD-50B BOARD
DESIGNED T. WALKER	
APPROVED 1-20-81	SCALE
APPROVED	DWG. No 5004 REV. E SHEET 1 OF 1


33K 2watt
33K 2watt
B
16µf 450V
16µf 450V
220K (2%)
220K
100K
1K
2K4
0.068µf 400V
0.068µf
4700pf
4700pf
100K
1000pf 400V
0.068µf
C FEEDBACK
16Ω
8Ω
4Ω
INPUT
68K
68K
100K
1500pf
330pf
2200pf
2200pf
0.068µf
220K
2K4
1K
100K
1000pf
330pf
1M
A
2K4
1K
220K
1KS
1M
2K2
50µf 18V
22K
0.022µf
0.01µf
50µf 18V
2K2
100K
100K
ECHO
SEND
RETURN
220K
15K
15K
100K
0.068µf
2K4
1K
OUTPUT
1M Log BASS
1M Log TREBLE
1M Log VOLUME
0.47µf
2mH
1K LIN BOOST
FEEDBACK
C
1K
2x1N4005
36V
240V
220V
200V
115V
22K
22µf 63V
22µf 63V
36V
3A A/S
B
A
100K 2watt
100K 2watt
32µf 450V
32µf 450V
100µf 450V
100µf 450V
1A
8x IN4005
190V
190V
L
E
N
ON/OFF
HEATERS
3.15V
3.15V
ORANGE AMPLIFIER
GRAPHIC MK II
DRAWN. 1972
ORANGE MUSICAL INDUSTRIES
LONDON 01 836 7811

120 Watt.

The Purple Pedal



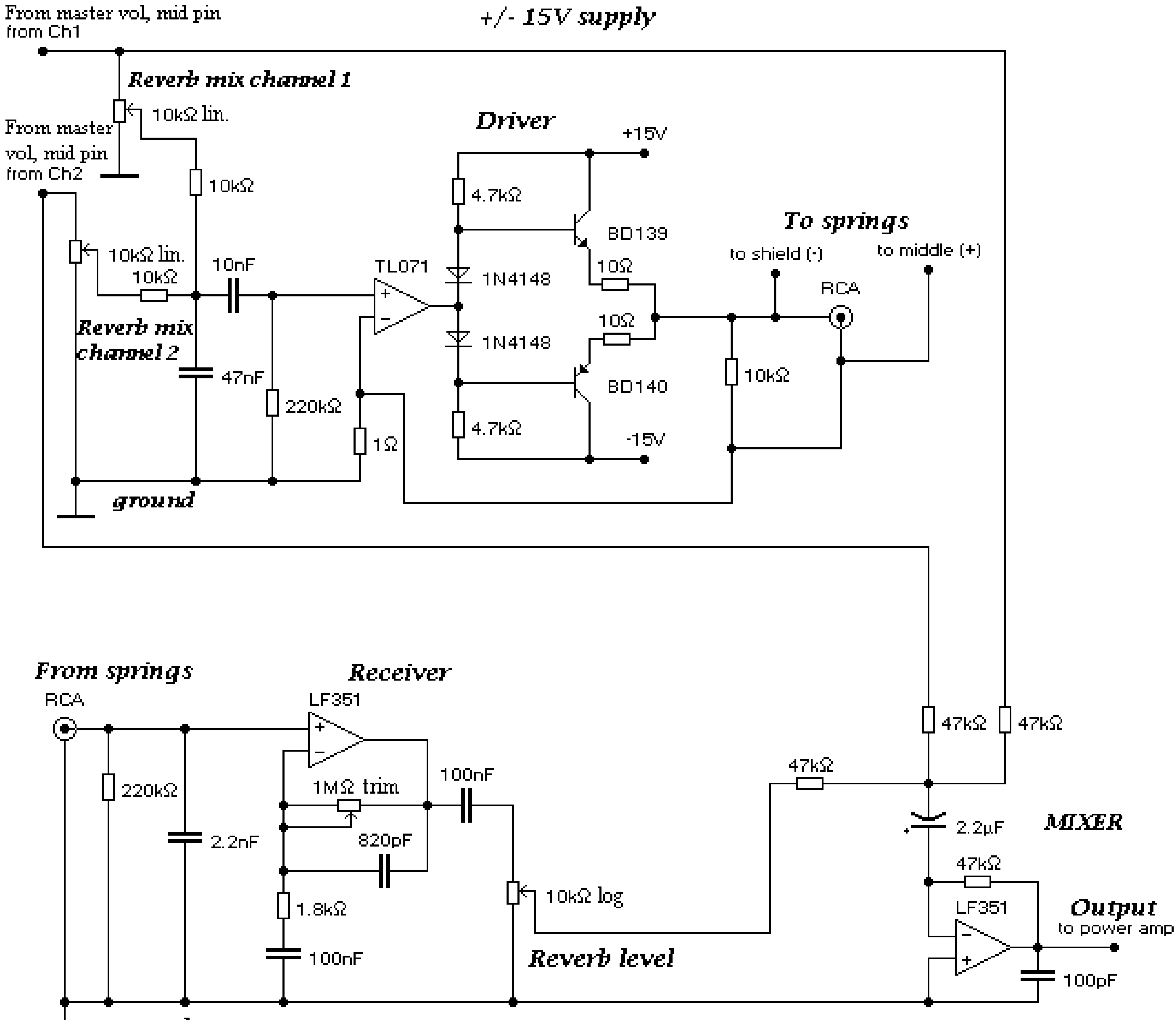
Q1-5: High gain NPN transistors. 2N5088's and 5089's work best. I used: Q1,Q4 - 2N5088; Q2,Q3,Q5 - 2N5089

The trick is finding a mix that sounds good for your playing style - The higher the gain, the higher the clipping.

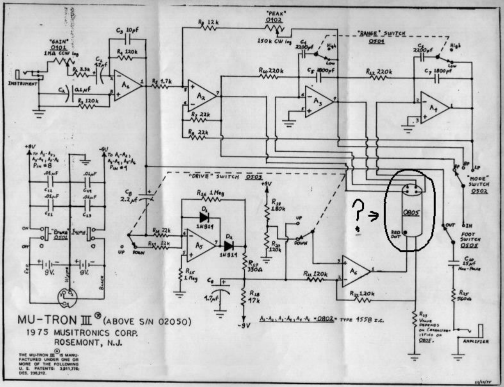
2N2222's even sound pretty good for Q2, given the characteristics of D1 and D2

D1, D2: Germanium 1N34A. Very high clipping. May substitute 1N914. D3-6: 1N914

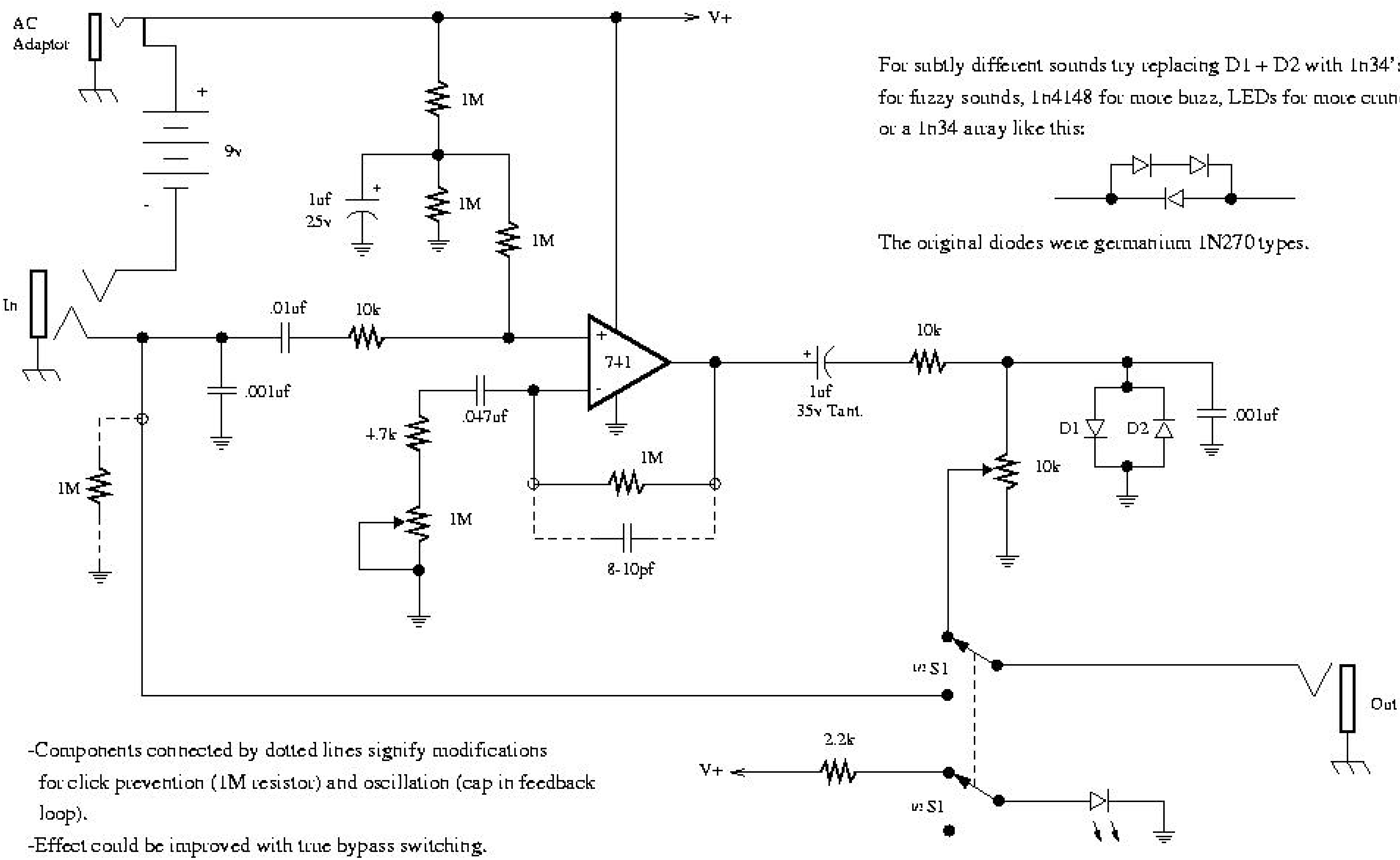
D7: Red LED- Only monitors power, not effect status (in/bypass)



Reverb driver/receiver


"GAIN"
0101
1MΩ CCW log
INSTRUMENT
"PEAK"
0102
150k CW log
"RANGE" SWITCH
0504
High
Low
A1
A2
A3
A4
A5
A6
"DRIVE" SWITCH 0503
+9V
-9V
UP
DOWN
1N914
"MODE" SWITCH
0502
BP
LP
HP
0805
RED DOT
FOOT SWITCH
0505
OUT
IN
Non-Polar
"Power"
0501
ON
OFF
RED
WHITE
BLACK
9V.
A1-A2, A3-A4, A5-A6 = 0802 = TYPE 4558 I.C.
Value depends on characteristics of 0805.
AMPLIFIER
MU-TRON III (ABOVE S/N 02050)
1975 MUSITRONICS CORP.
ROSEMONT, N.J.
THE MU-TRON III IS MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U. S. PATENTS: 3,911,776; DES. 238,212.

MXR Distortion +



For subtly different sounds try replacing D1 + D2 with 1n34's for fuzzy sounds, 1n4148 for more buzz, LEDs for more crunch, or a 1n34 array like this:

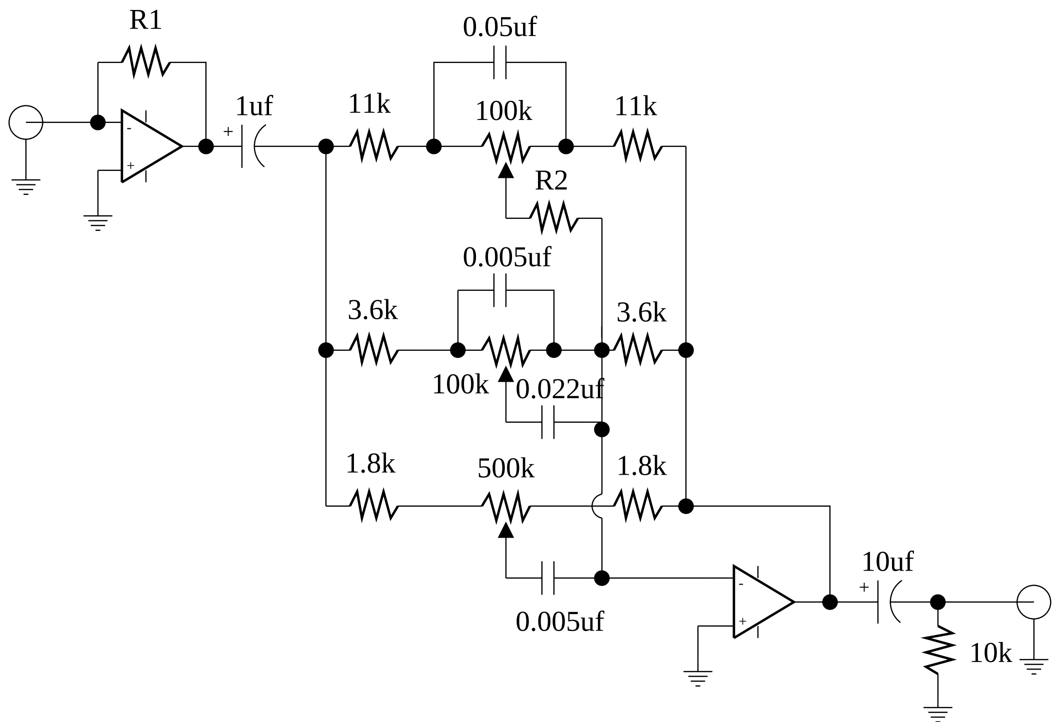
The original diodes were germanium 1N270 types.

-Components connected by dotted lines signify modifications for click prevention (1M resistor) and oscillation (cap in feedback loop).

-Effect could be improved with true bypass switching.

Simple 3 Band Tone Control

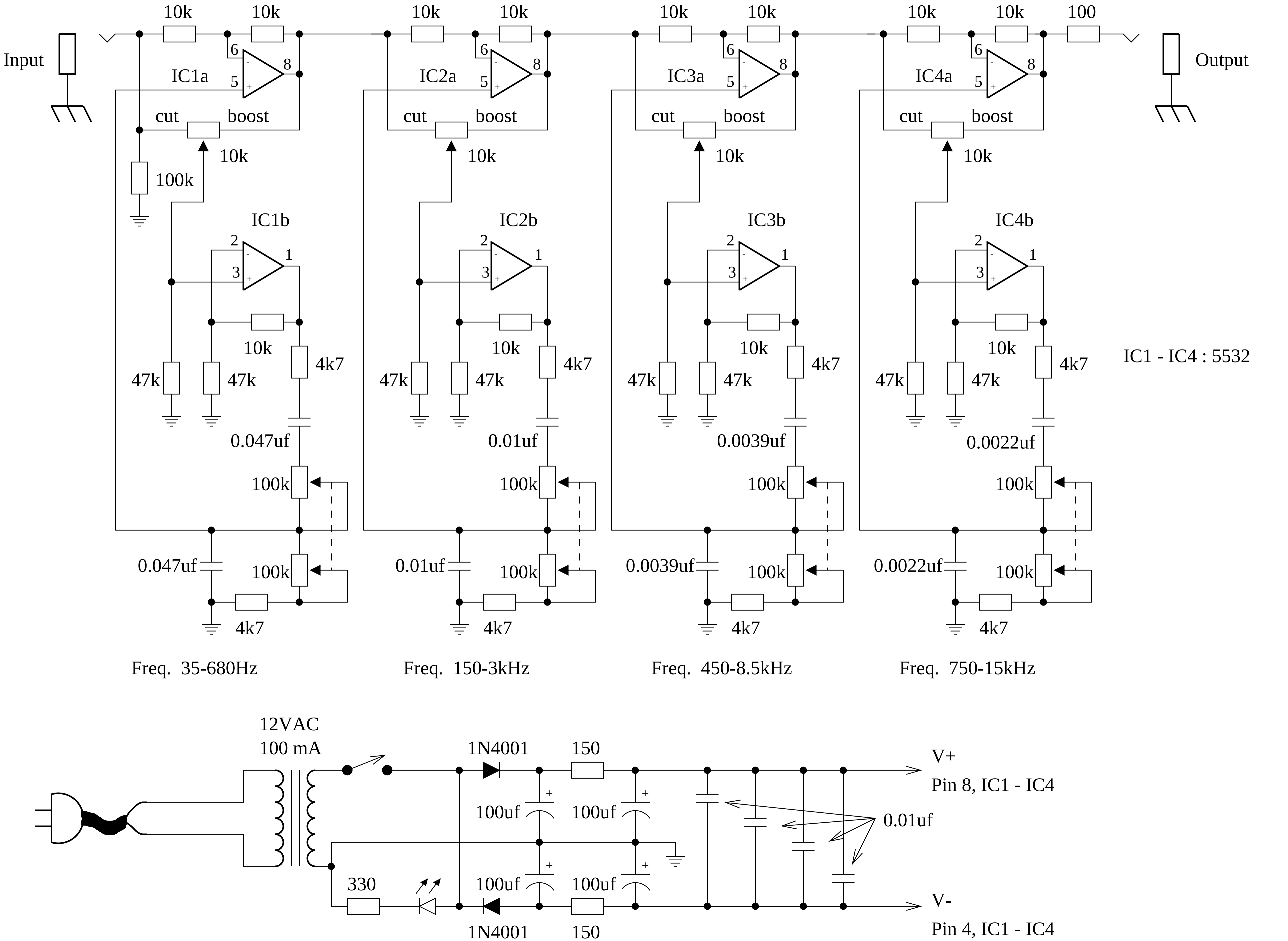
from Graff's Encylcopedia of Electronic Circuits / Popular Electronics

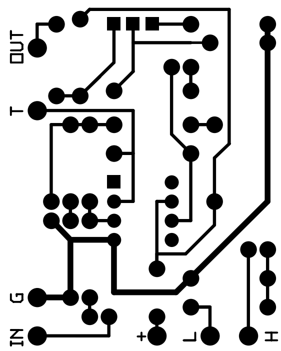


R1 is left up to the user depending on gain needs, R2 is unknown - experiment, the op-amps are not critical, any standard ones could be used. This circuit was originally intended for home audio use, but should be able to be hacked into an effect circuit with very minor modification.

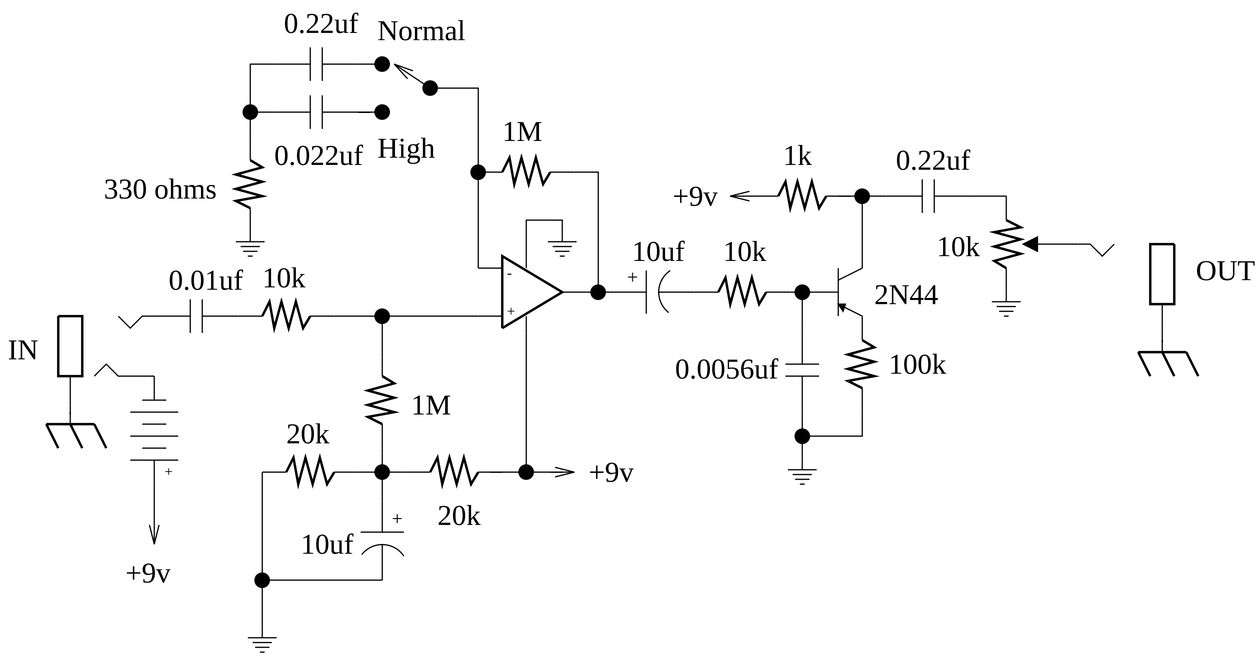
Name:	Four-Band EQ	Manufacturer / Designer:	PAiA Electronics	Revision:	9/21/95	Model #	9303

Originally designed by Jules Rychkebusch




OUT
T
G
IN
+
L
H

Angry Beard III



The op-amp can be any lownoise single op-amp, the original used a NE5534. The 2N44 could probably be replaced by other PNP germanium transitors with out much change in sound. The switching aspect has been left out of this schem, but you will probably want to add a bypass of some type to this effect. The emphasis switch chooses a tone flavor, this could be expanded to include a wider range of frequencies, but too small a cap value may cause oscillation. Any attempt at taming the internal gain of this effect has been left out, but could be easily added. This can be noisy depending on your rig, so a 10-15pf cap could be placed in the feedback loop of the op-amp if your concerned about too much squeaking.

-Jamie Heilman
n9343176@cc.wwu.edu

Name:	Axe Grinder	Manufacturer / Designer:	PAiA Electronics	Revision:	10/28/95	Model #	5750

S1 - Cancel Effect
S2 - Full Intensity
5k Pot - Tone Control
500k Pot - Distortion Intensity
100k Pot (by tone) - Distortion Level
100k Pot (by IC2c) - Clean Level

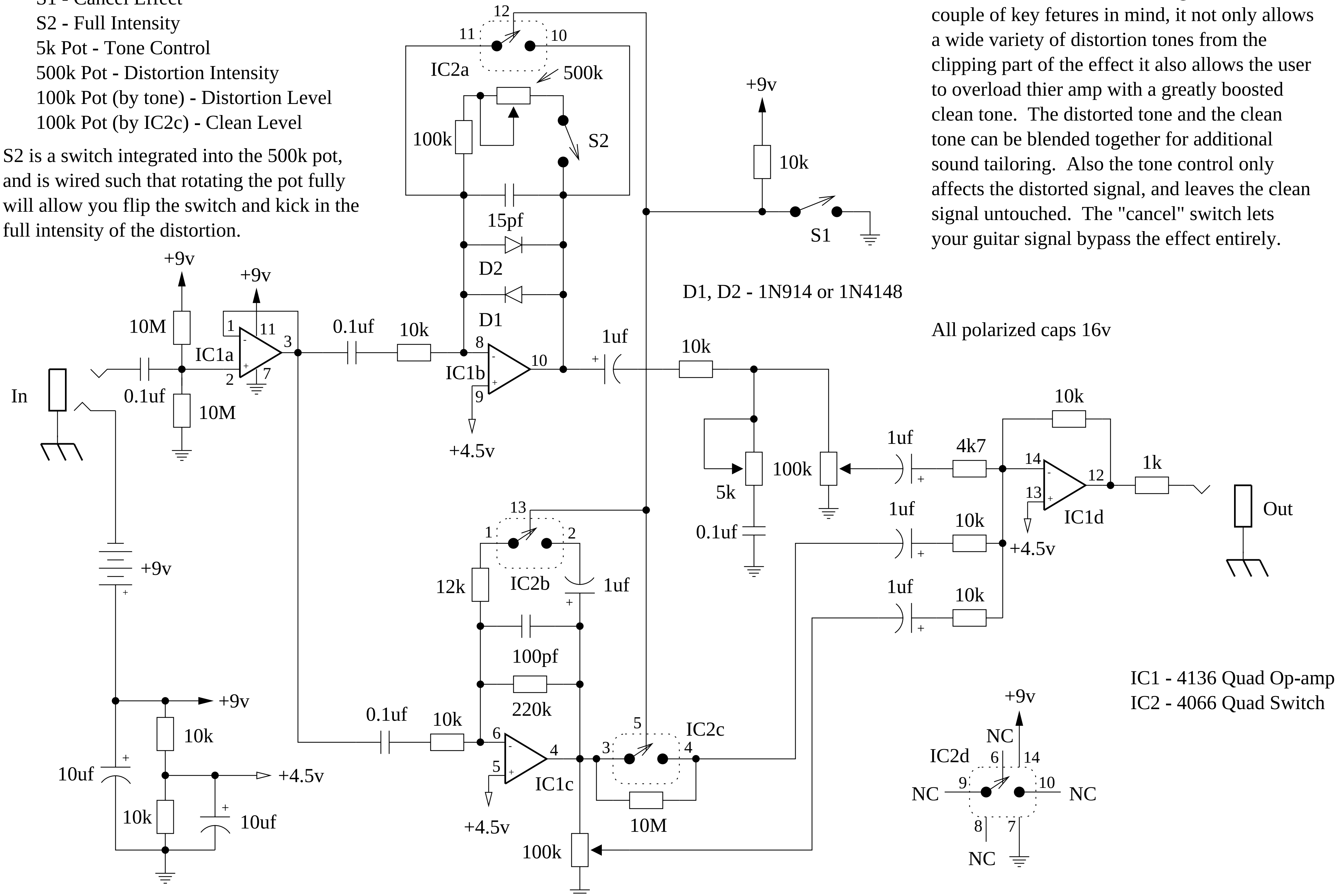
S2 is a switch integrated into the 500k pot, and is wired such that rotating the pot fully will allow you flip the switch and kick in the full intensity of the distortion.

The Axe Grinder has been designed with a couple of key fetures in mind, it not only allows a wide variety of distortion tones from the clipping part of the effect it also allows the user to overload thier amp with a greatly boosted clean tone. The distorted tone and the clean tone can be blended together for additional sound tailoring. Also the tone control only affects the distorted signal, and leaves the clean signal untouched. The "cancel" switch lets your guitar signal bypass the effect entirely.

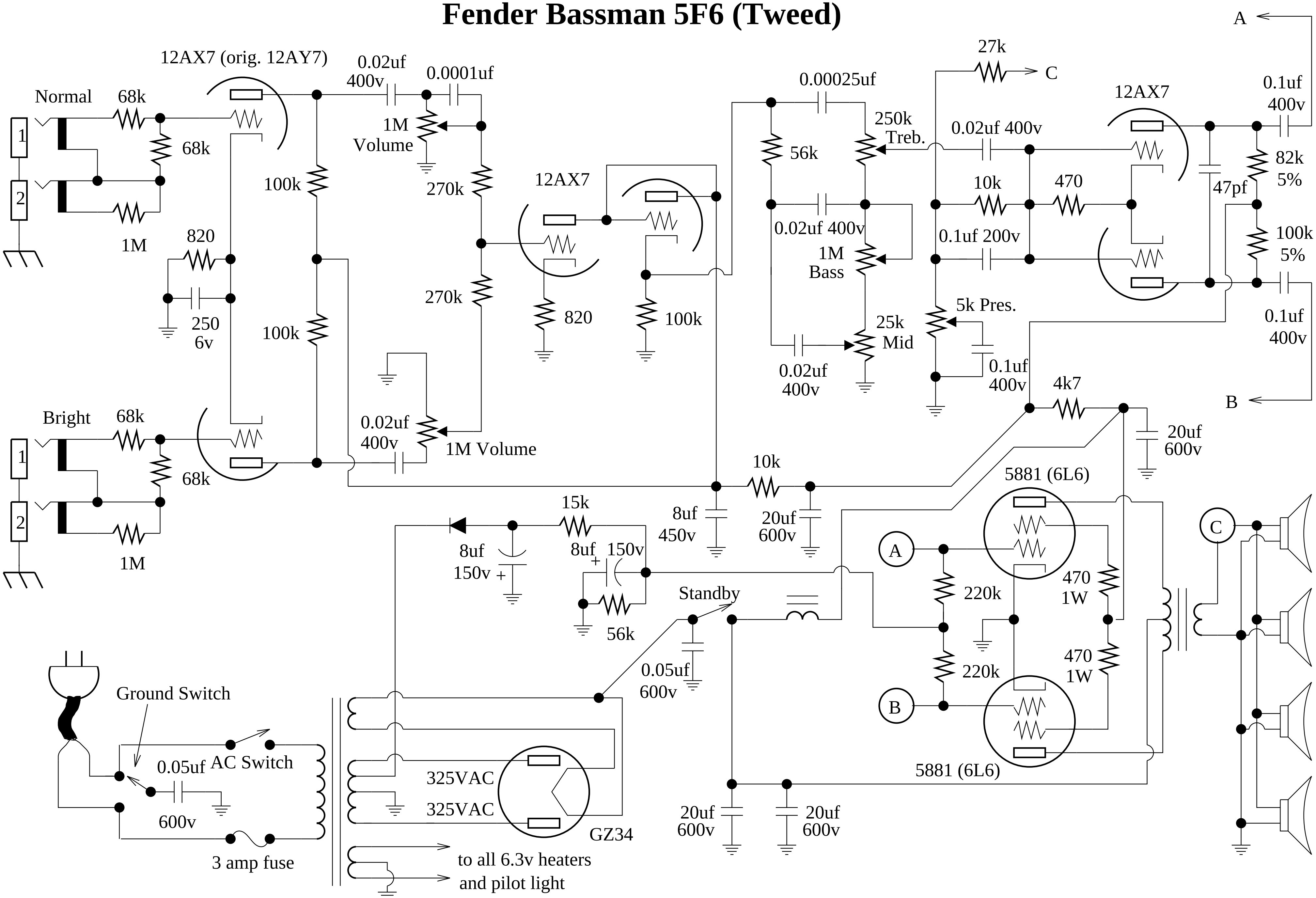
D1, D2 - 1N914 or 1N4148

All polarized caps 16v

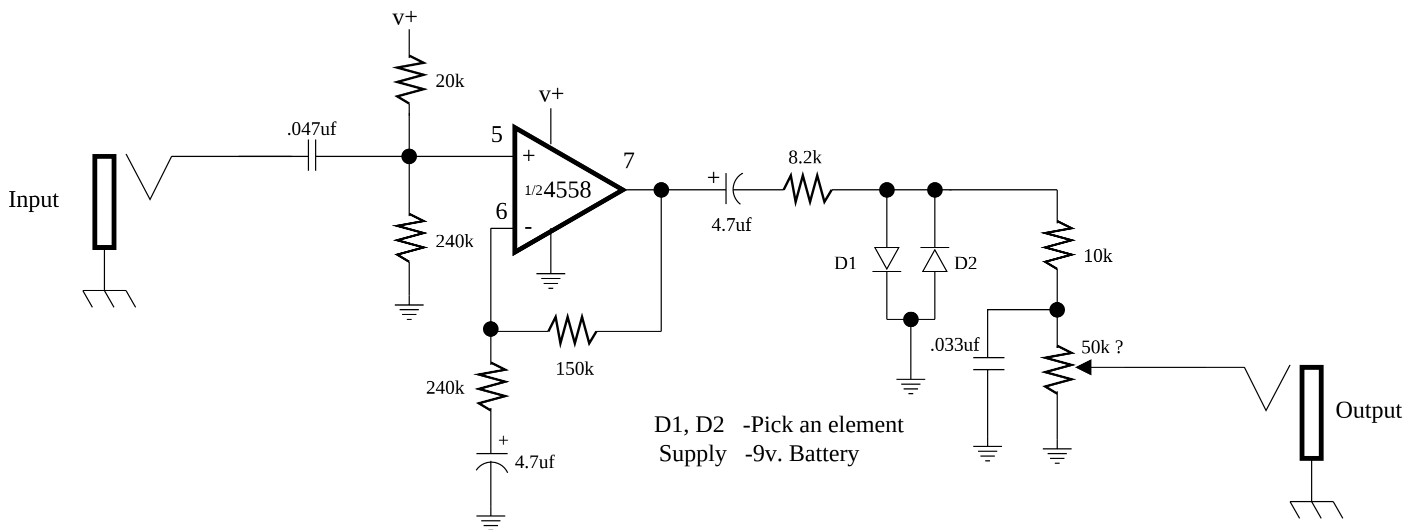
IC1 - 4136 Quad Op-amp
IC2 - 4066 Quad Switch



Fender Bassman 5F6 (Tweed)

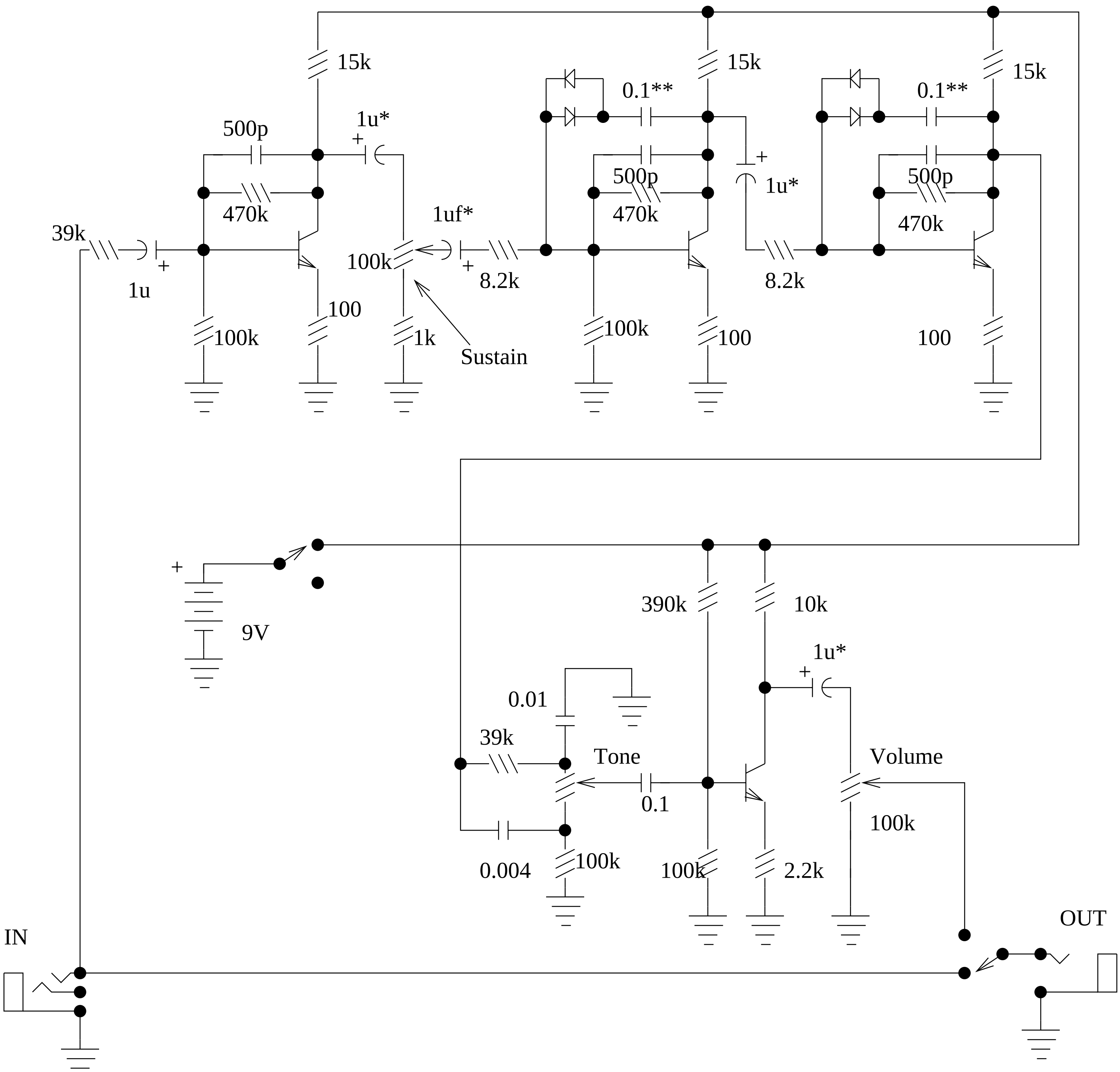


Blue Clipper



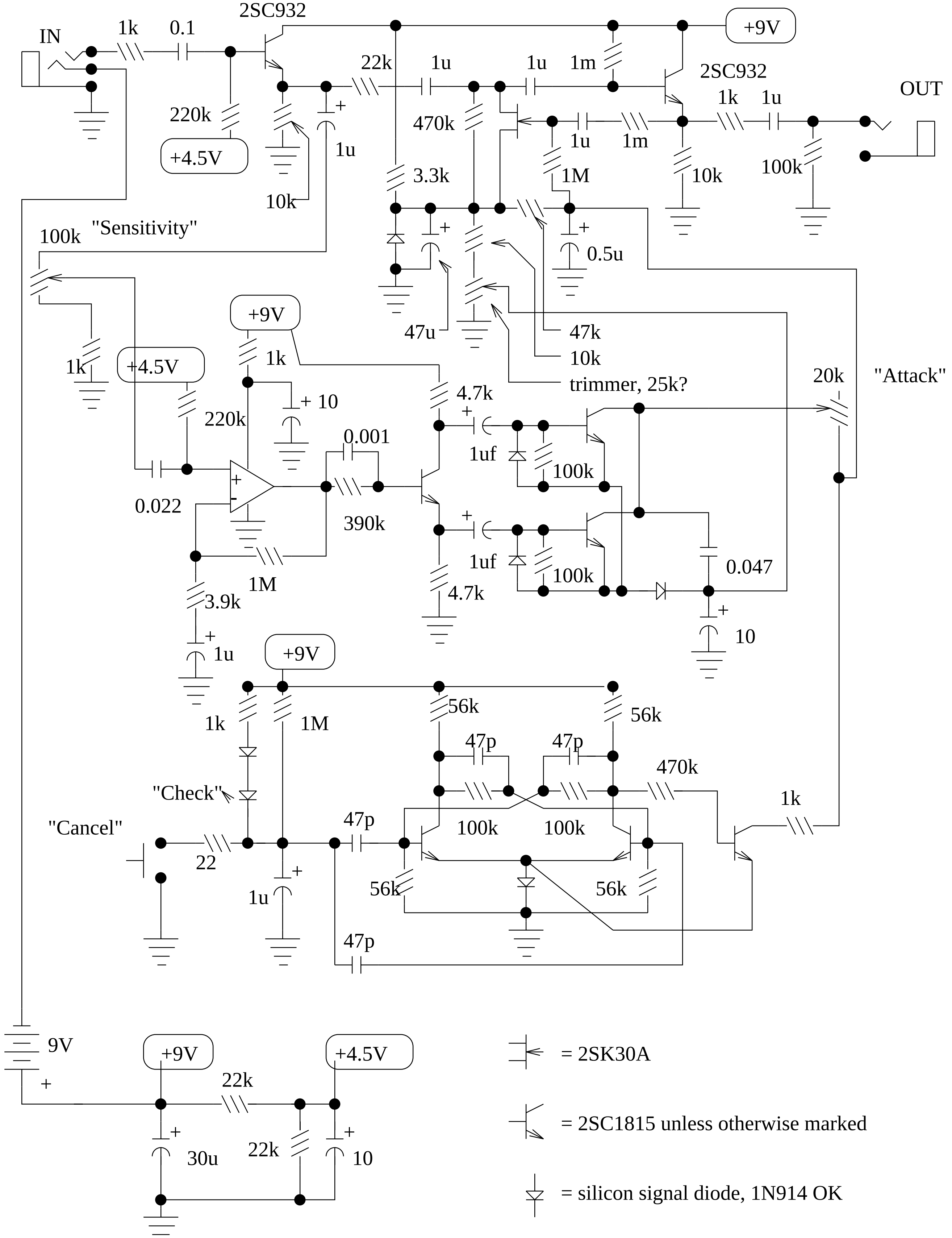
D1, D2 -Pick an element
Supply -9v. Battery

ELECTRO-HARMONIX BIG MUFF PI



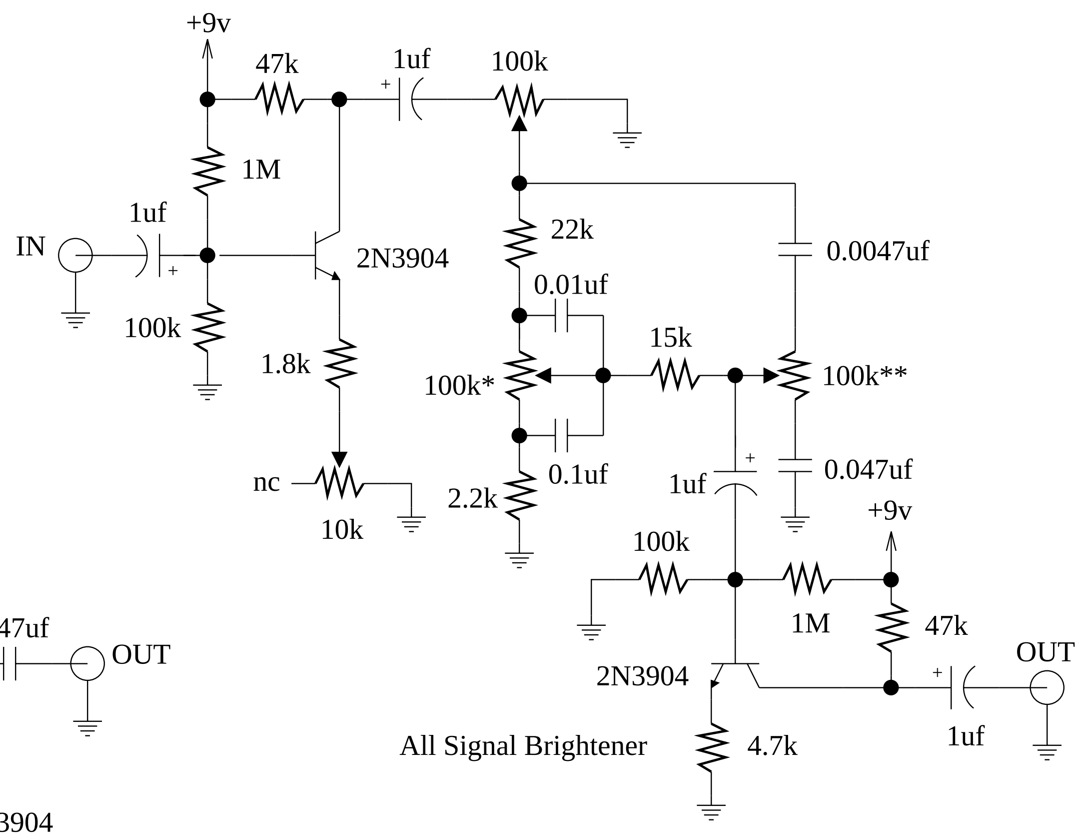
The EH Big Muff Pi would probably be improved by modern input-jack power switching and a DPDT bypass switch. This is the original schematic. The diode and transistor types are unknown. Probably any high gain NPN and 1N914s work. Coupling caps marked by a * have been reported to sound better if changed to 0.1uf as have the ** marked ones if changed to 1.0uf. The original transistors were marked SPT 87-103, and the original diodes were marked 525GY or 523GY (hard to read).

BOSS Slow Gear SG-1 Attack Delay

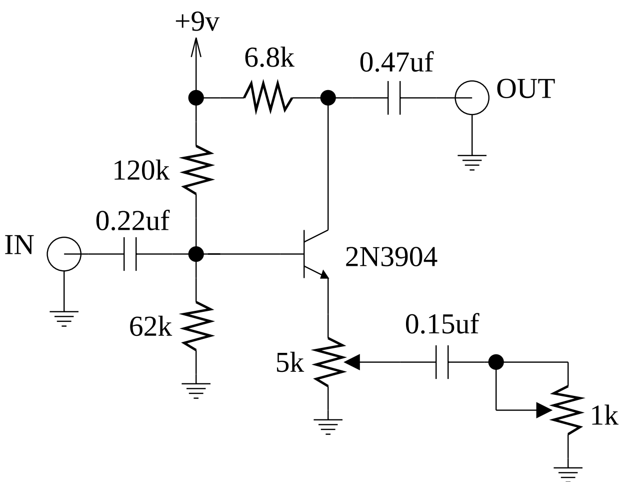


The SG-1 is an attack delay unit. A struck note is at first inaudible, then fades up, similar to a reversed tape recording.

Frequency Brighteners

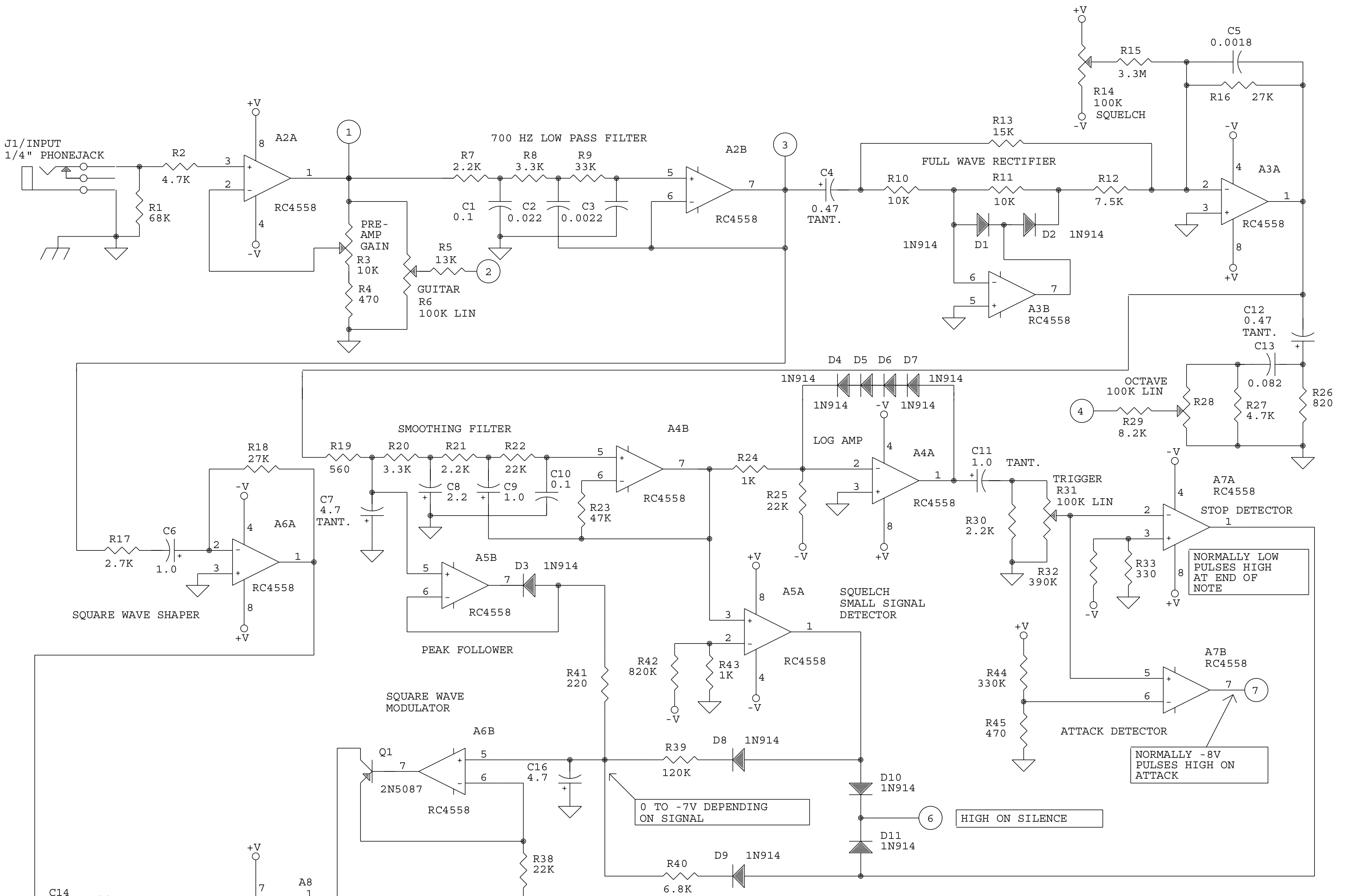


All Signal Brightener



High Frequency Brightener

These two effect modules are not actually "guitar" effects per say, but rather synth modules that will work on any analog signal. The input and output impedances may need altering depending on your needs. The high frequency brightener is nothing more than a simple treble booster with a gain control (1k) and an intensity control (5k). The all signal brightener, however, has a seperate control for brightening the low end (100k*) as well as the high end of the frequency spectrum (100k**). The 10k trimmer is a set and forget type adjustment. Set it so the circuit breaks into oscillation, then back up the setting to the point where the oscillation just stops. These two modules were excerpted from Music Synthesizers - A Manual of Design and Construction by Delton Horn; TAB Books, 1984.



(1) TO SUB-OCTAVE TRACK & HOLD MODULATOR (A18) & OUTPUT

(2) (4) (5) TO VCF (A10)

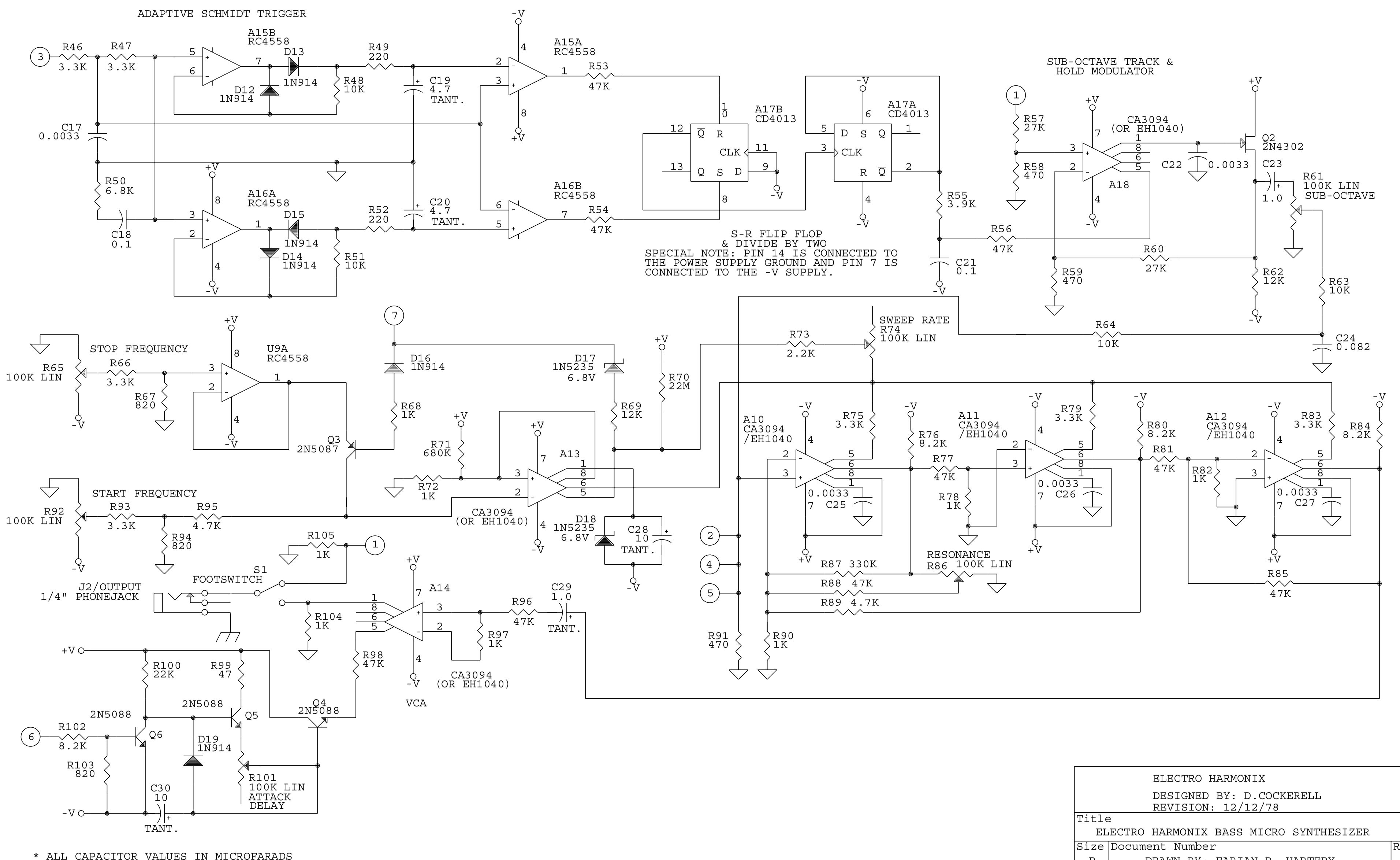
(3) TO ADAPTIVE SCHMITT TRIGGER

(6) TO VCA SWEEP GENERATOR

(7) TO VCF SWEEP GENERATOR

* ALL CAPACITOR VALUES IN MICROFARADS

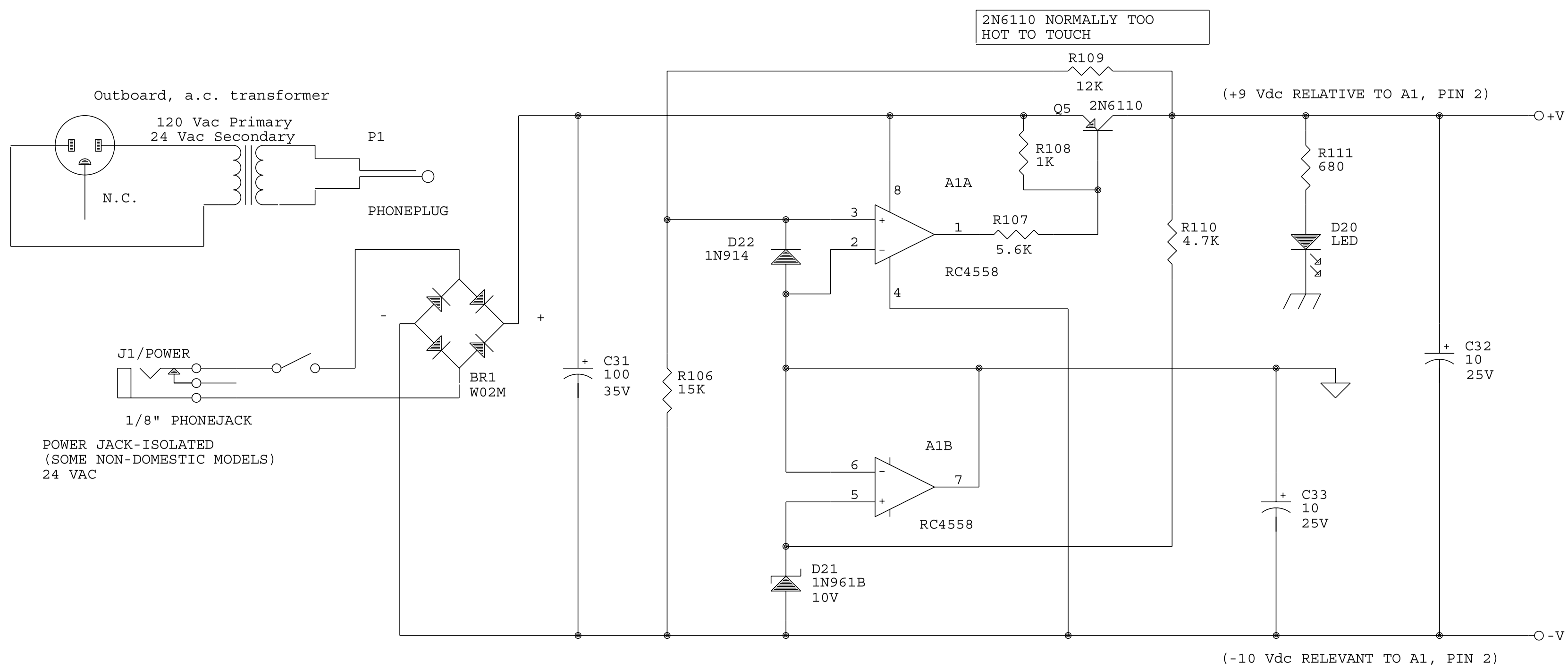
ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78		
Title ELECTRO HARMONIX BASS MICRO SYNTHESIZER		
Size A	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 1 of 3	



ELECTRO HARMONIX

DESIGNED BY: D.COCKERELL
REVISION: 12/12/78

Title ELECTRO HARMONIX BASS MICRO SYNTHESIZER		
Size B	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 2 of 3	



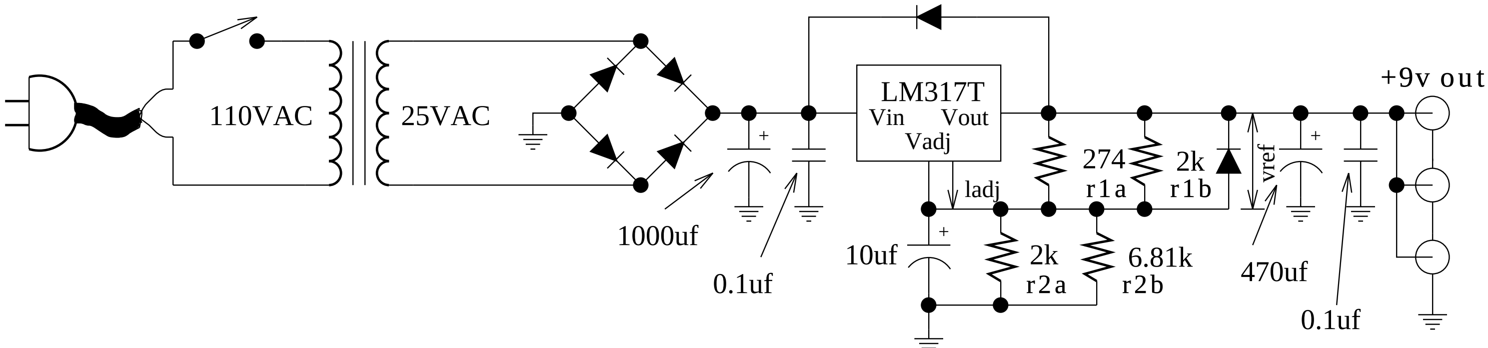
ELECTRO HARMONIX

DESIGNED BY: D.COCKERELL
REVISION: 12/12/78

Title ELECTRO HARMONIX BASS MICRO SYNTHESIZER		
Size A	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: September 28, 1996	Sheet 3 of 3	

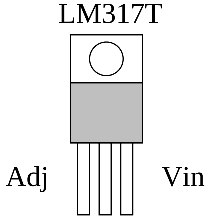
Ultra-Clean 9vdc Power Supply

Designed by Rick Barker



 = 1N4002

LM317T



274 2k

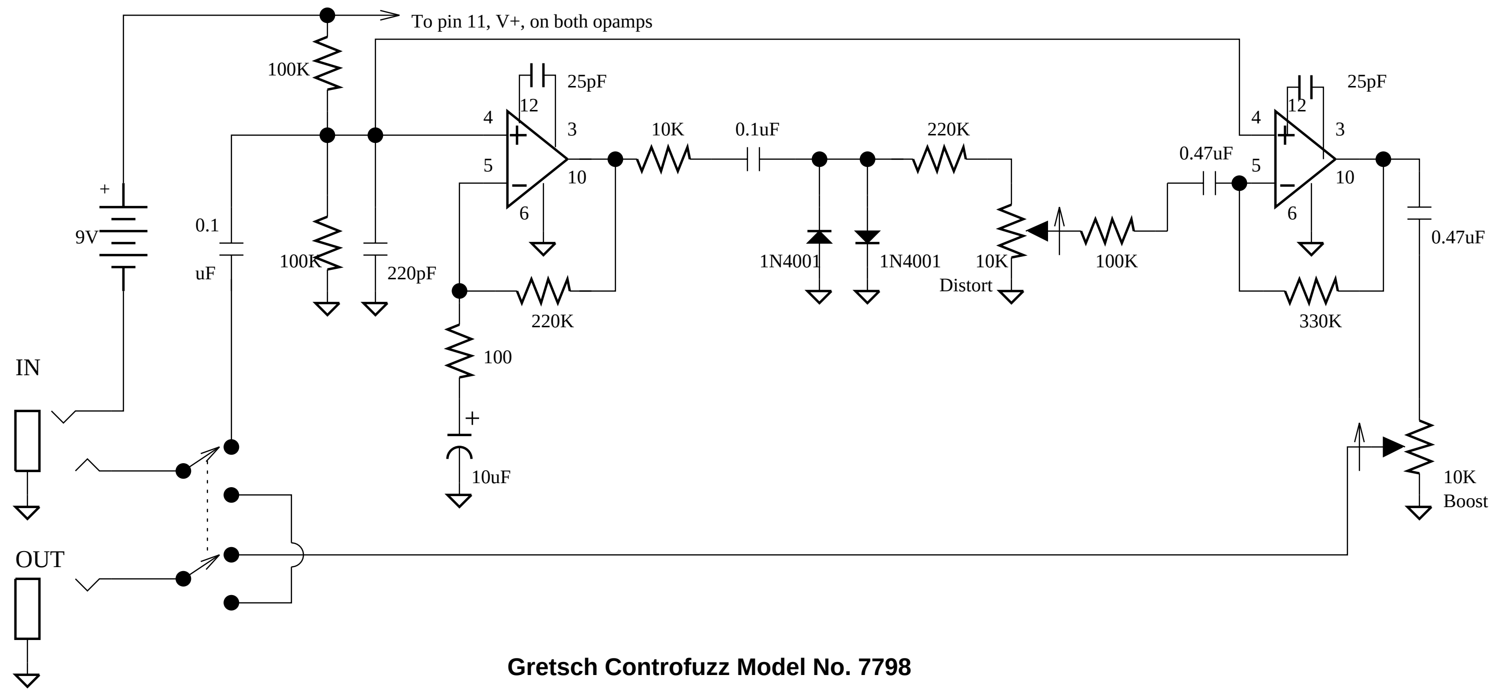
R1= r1a || r1b = 241 ohms

R2 = r2a || r2b = 1456 ohms

Vref = 1.25V

ladj = 50uA

Vout = Vref(1+r2/r1)+ladj*r2 = 9.35VDC

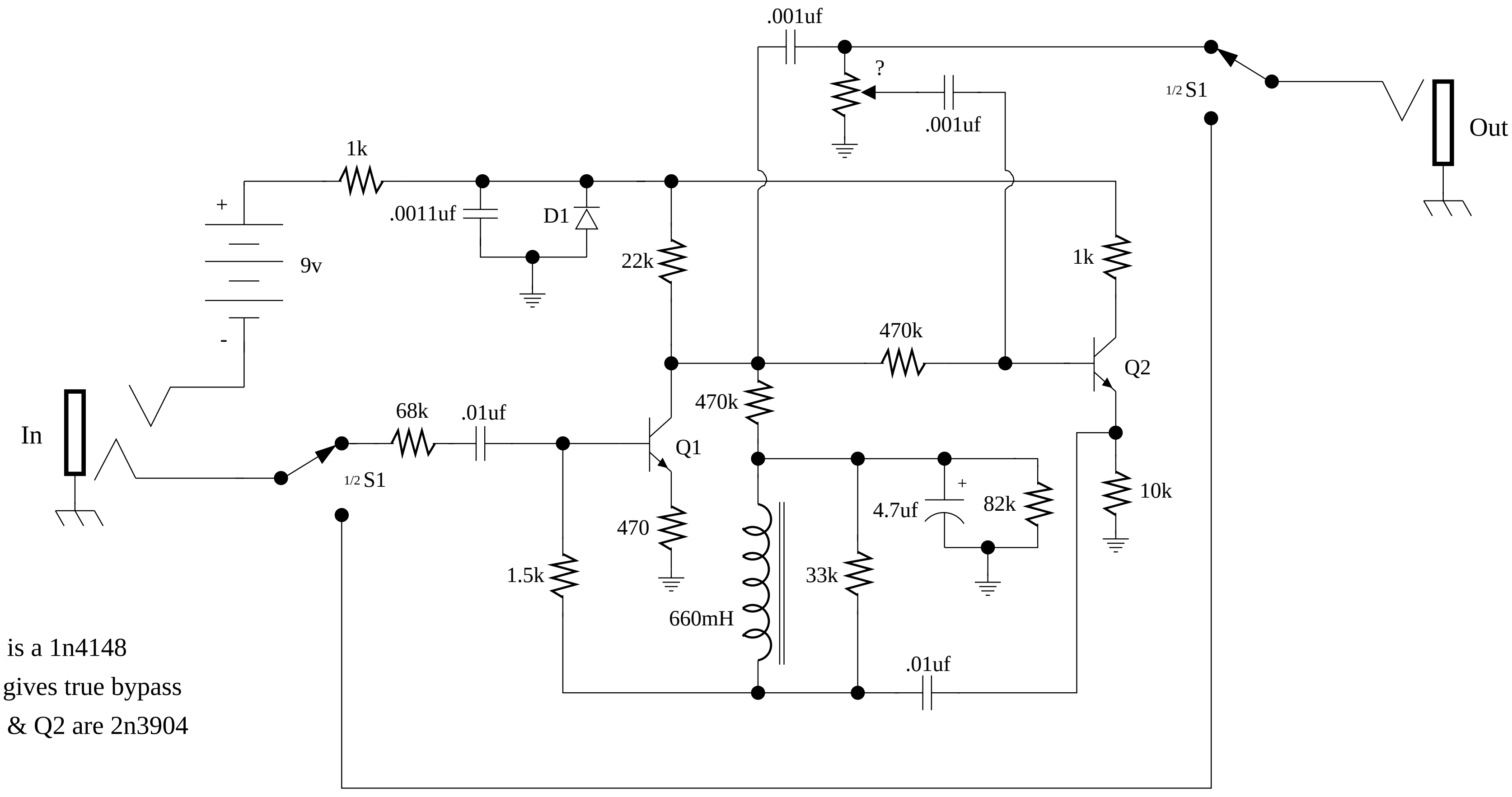


Gretsch Controfuzz Model No. 7798

The Gretsch Controfuzz is a variant of the op-amp-driving-diode-clipper type of distorter. The only unusual features are that the distortion is run at high boost all the time in the first opamp, and then subtracted from the dry signal in the second opamp. The amount of distortion mixed in is determined by the "Distort" control, and the overall volume level when the distortion is switched in is set by the "Boost" control.

The op amps are both type 748, which needs a compensation capacitor (25 pF in this case) to be stable. Other modern opamps should work.

Dunlop Cry Baby Wah Wah

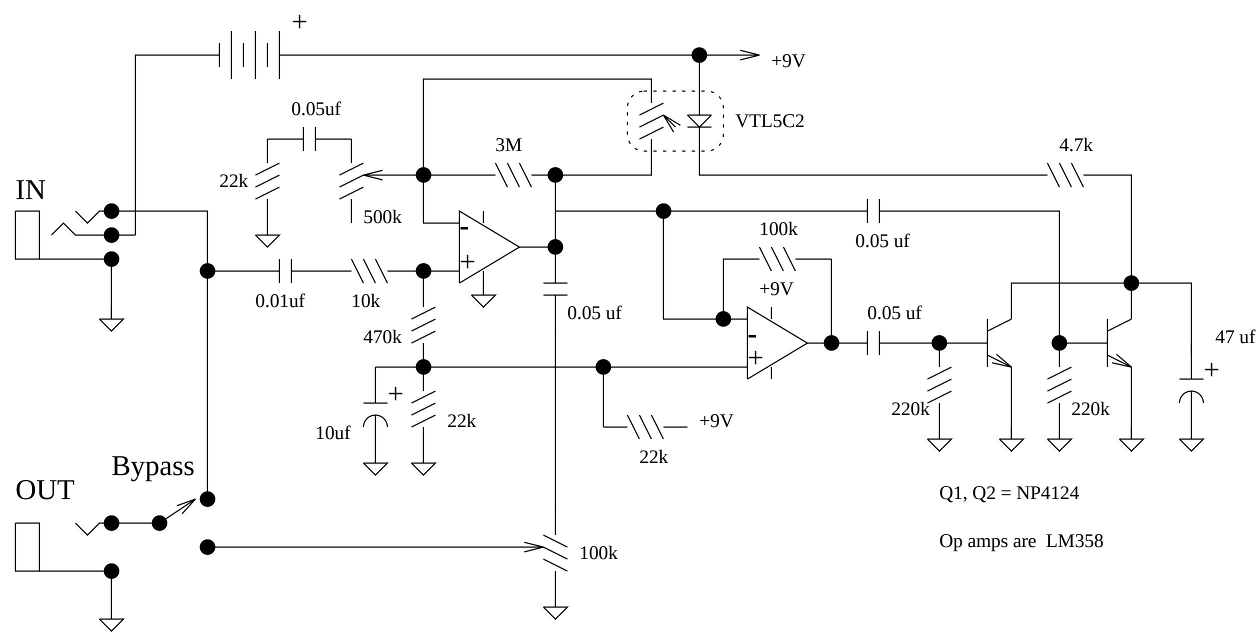


-D1 is a 1n4148

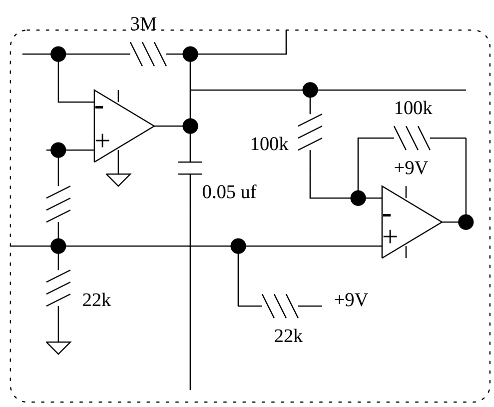
-S1 gives true bypass

-Q1 & Q2 are 2n3904

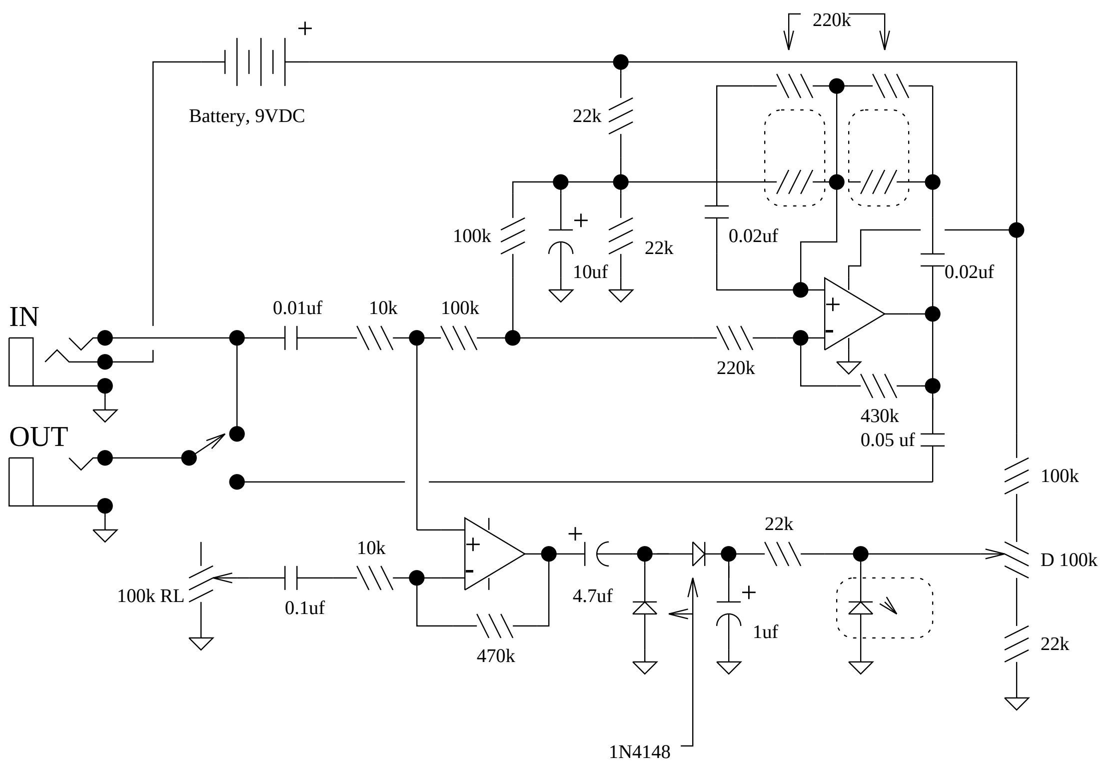
DOD Compressor 280A



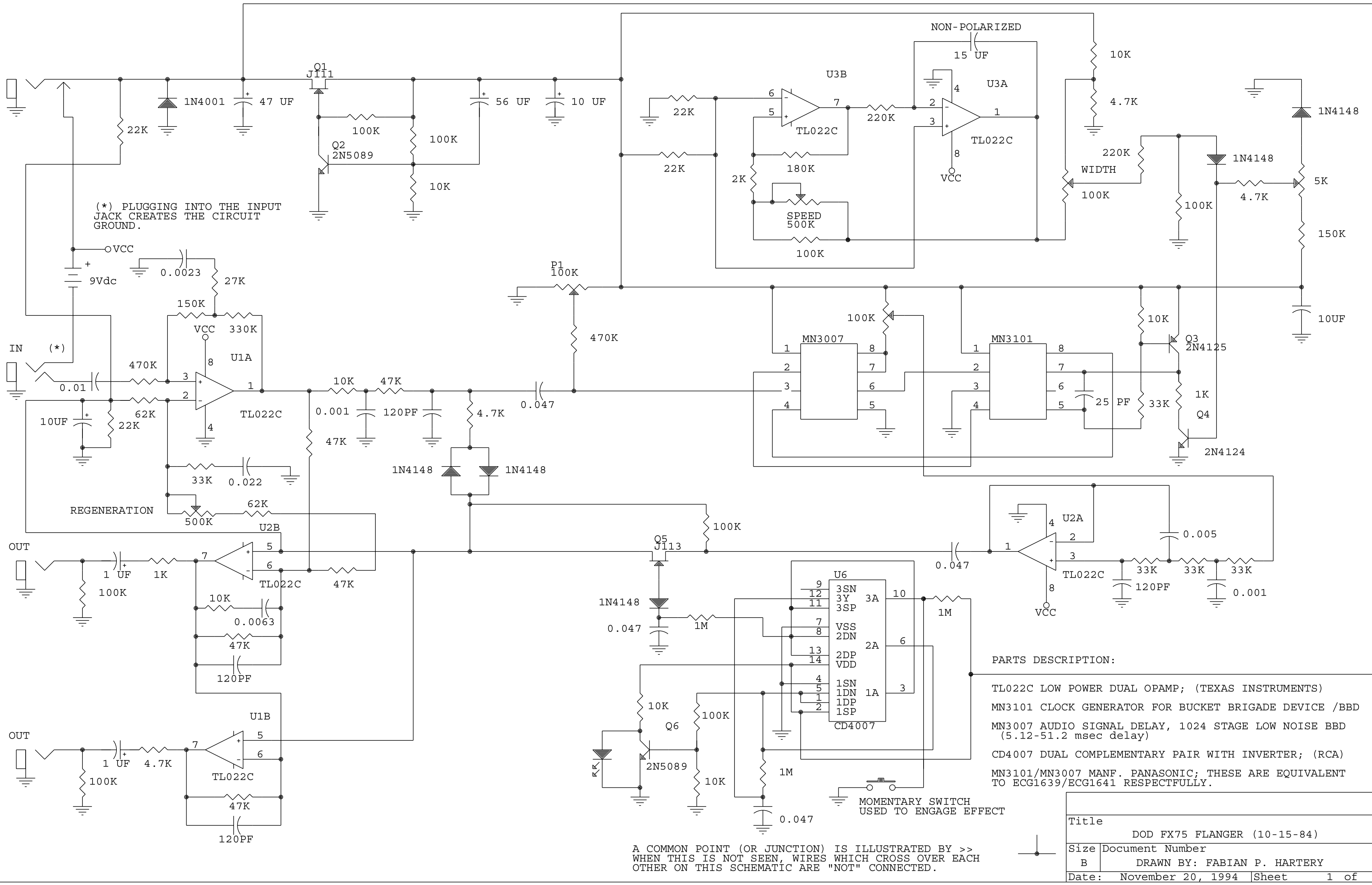
This is the original schematic, but it looks funny to me. I think that there should be a 100k resistor at the (-) input of the second opamp to make it a pure inverter. As it is, that stage would have a very large voltage gain, unbalancing what I think works as a full wave rectifier/current source for the LED in the compression feedback loop. I would expect that the proper circuit is as shown in the fragment below.
I think the VTL5C2 LED/LDR module could be replaced with a CLM6000 if you could find one of those.



DOD Envelope Filter 440



Opamps are each 1/2 of TL022dual low power opamp. LED/LDR module is unknown, but is probably a Vactec VTL module with LED to center-tapped LDR.



PARTS DESCRIPTION:

TL022C LOW POWER DUAL OPAMP; (TEXAS INSTRUMENTS)

MN3101 CLOCK GENERATOR FOR BUCKET BRIGADE DEVICE /BBD

MN3007 AUDIO SIGNAL DELAY, 1024 STAGE LOW NOISE BBD (5.12-51.2 msec delay)

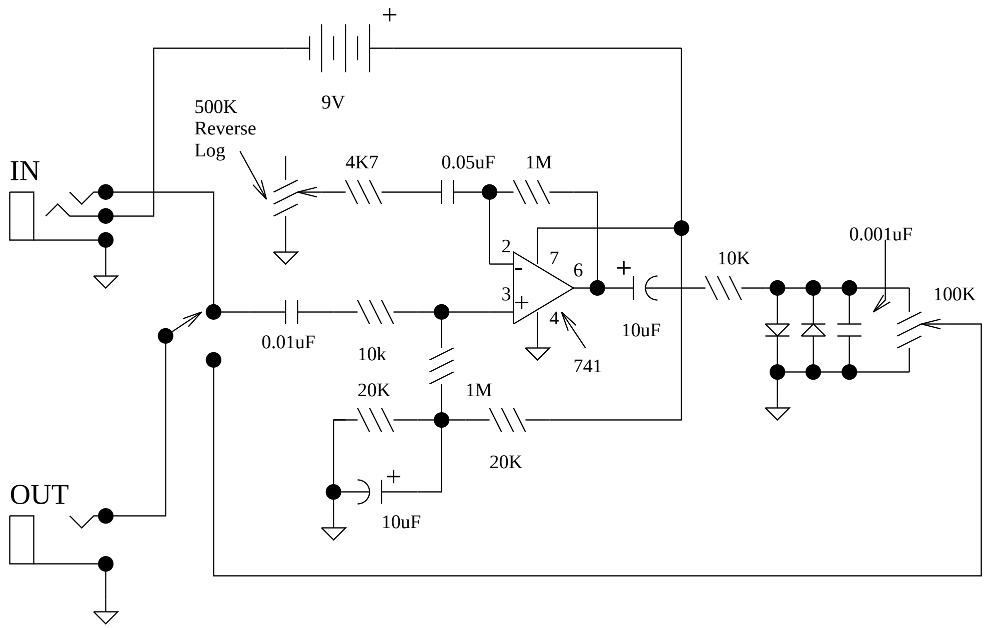
CD4007 DUAL COMPLEMENTARY PAIR WITH INVERTER; (RCA)

MN3101/MN3007 MANF. PANASONIC; THESE ARE EQUIVALENT TO ECG1639/ECG1641 RESPECTFULLY.

A COMMON POINT (OR JUNCTION) IS ILLUSTRATED BY >> WHEN THIS IS NOT SEEN, WIRES WHICH CROSS OVER EACH OTHER ON THIS SCHEMATIC ARE "NOT" CONNECTED.

Title	DOD FX75 FLANGER (10-15-84)	
Size B	Document Number: DRAWN BY: FABIAN P. HARTERY	REV 1
Date: November 20, 1994	Sheet 1 of 1	

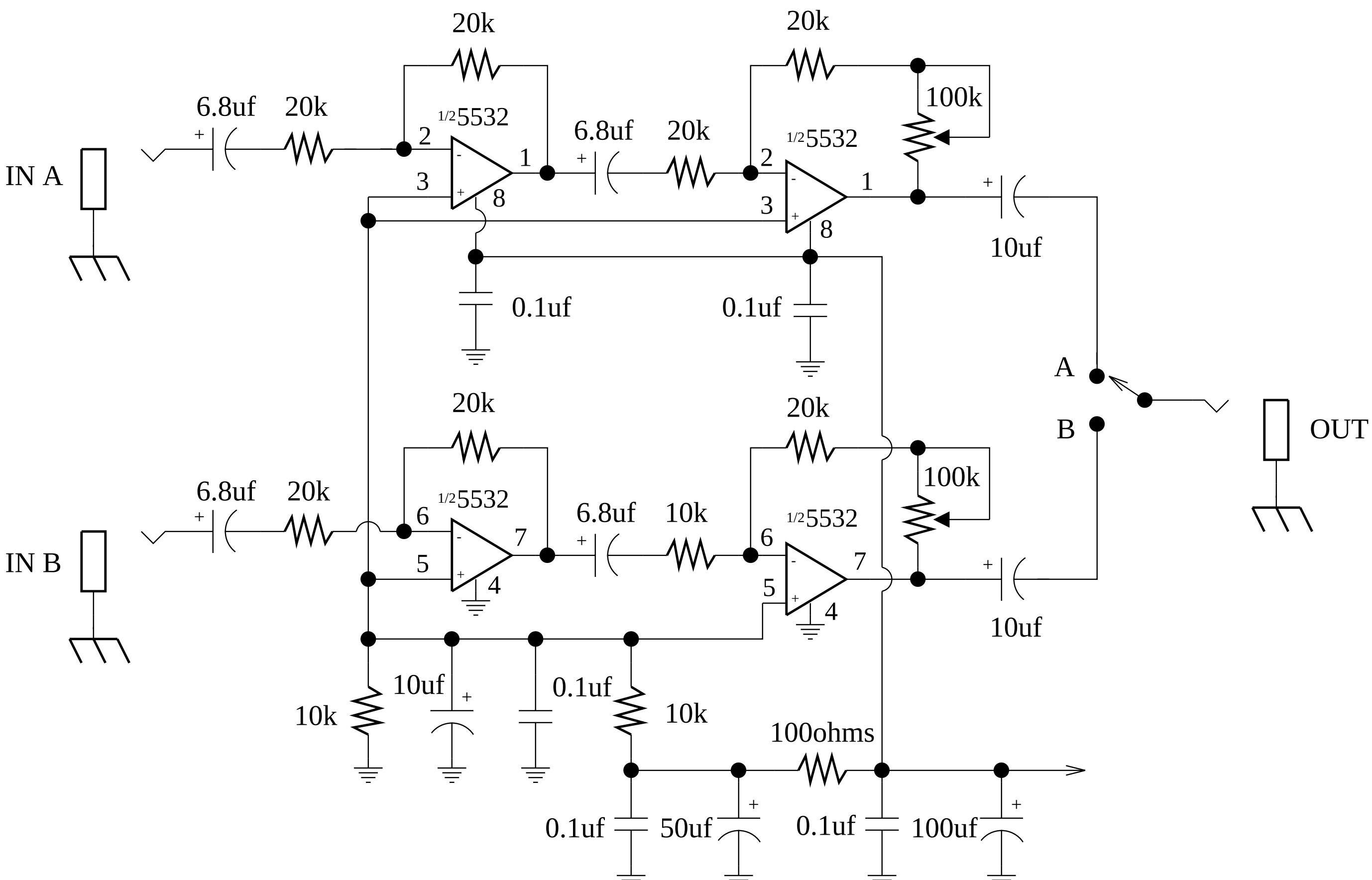
DOD Overdrive 250



The DOD Overdrive 250 is Yet Another 741With Two Diodes On The Output. It is almost exactly the same as the MXR Distortion Plus, and a number of other units.

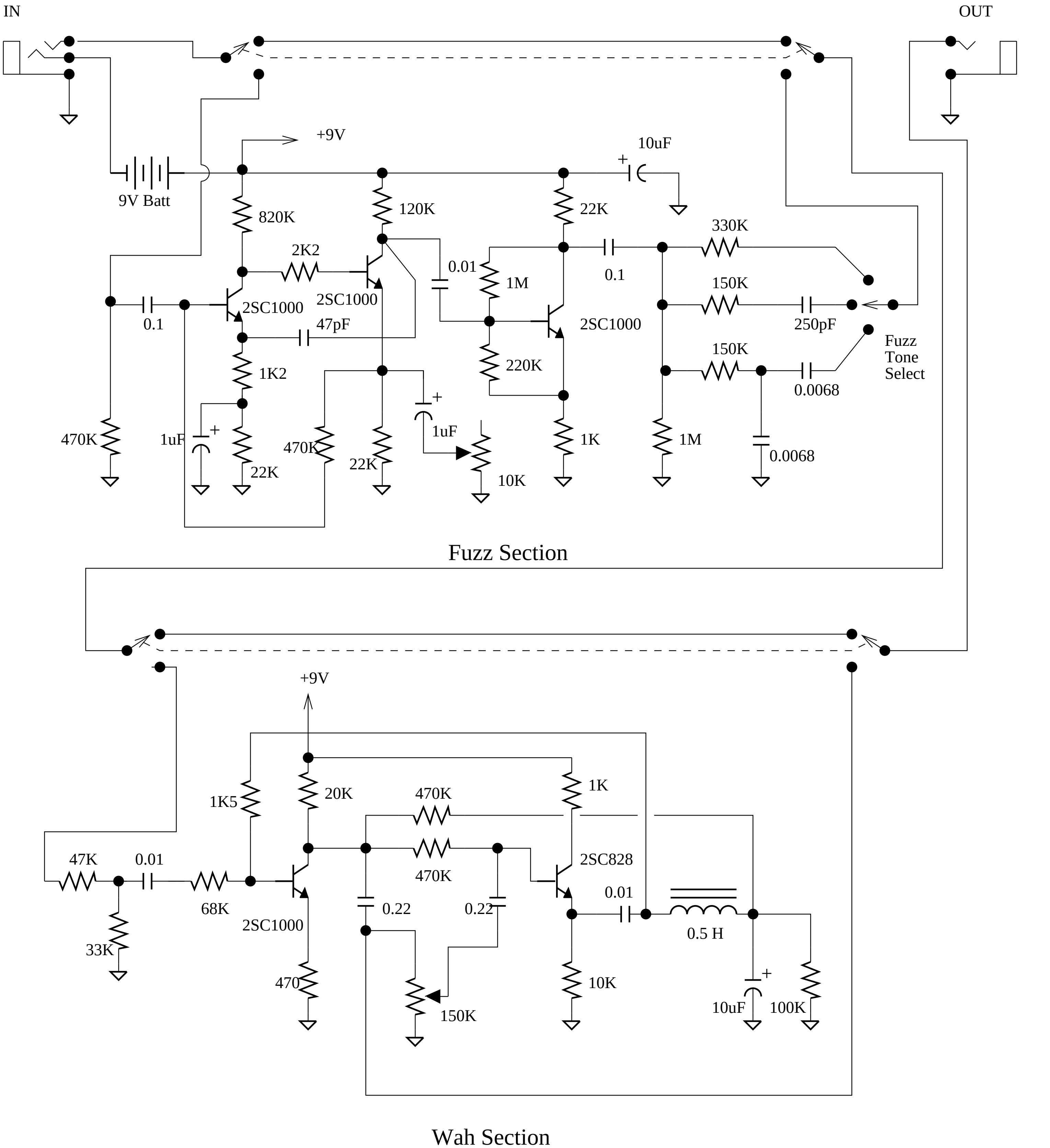
Dual Pre-Amp & A/B Box

Designed by Rick Barker



This low noise preamp & a/b box was originally designed for switching between different harmonica mics.

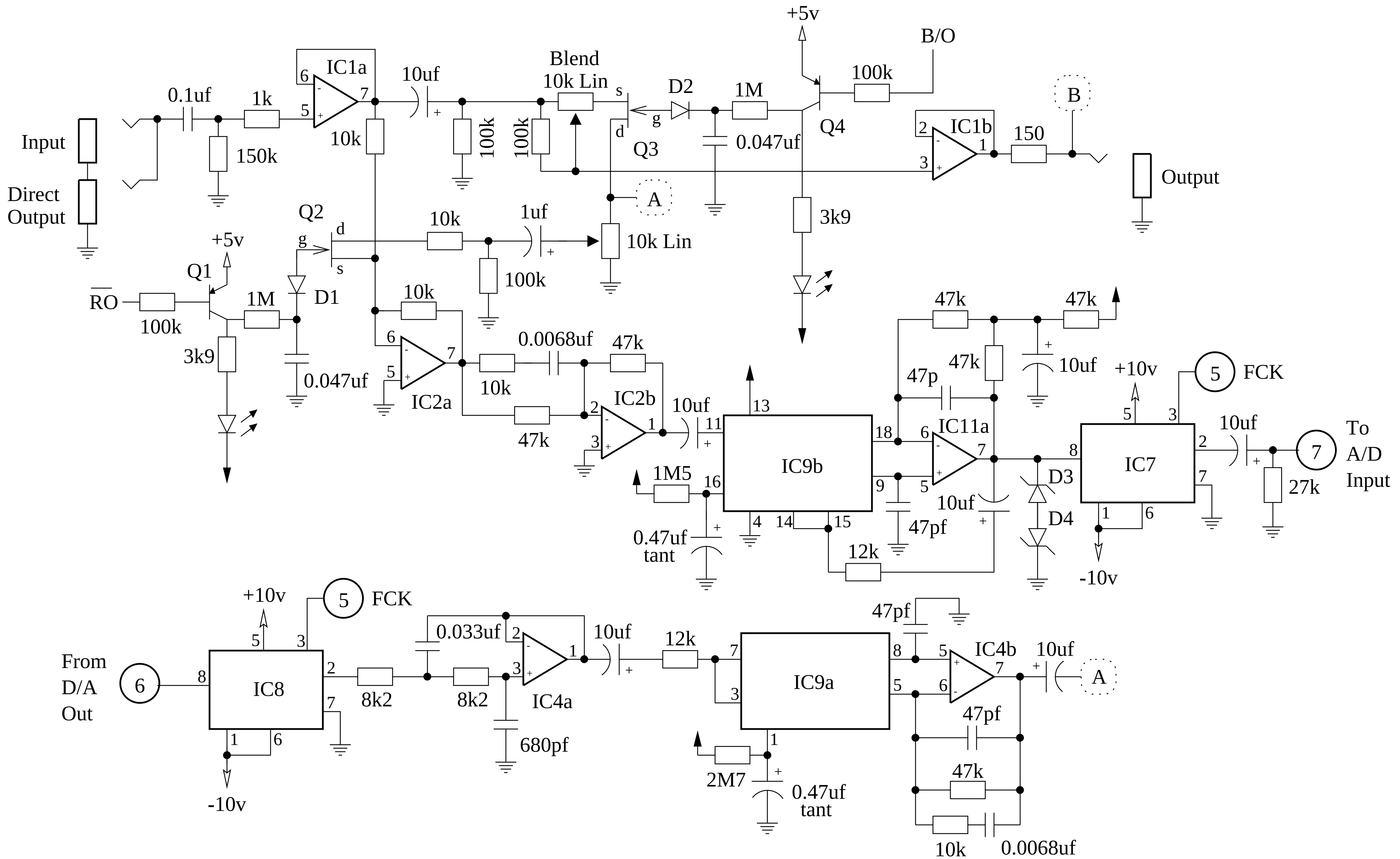
Roland Double Beat



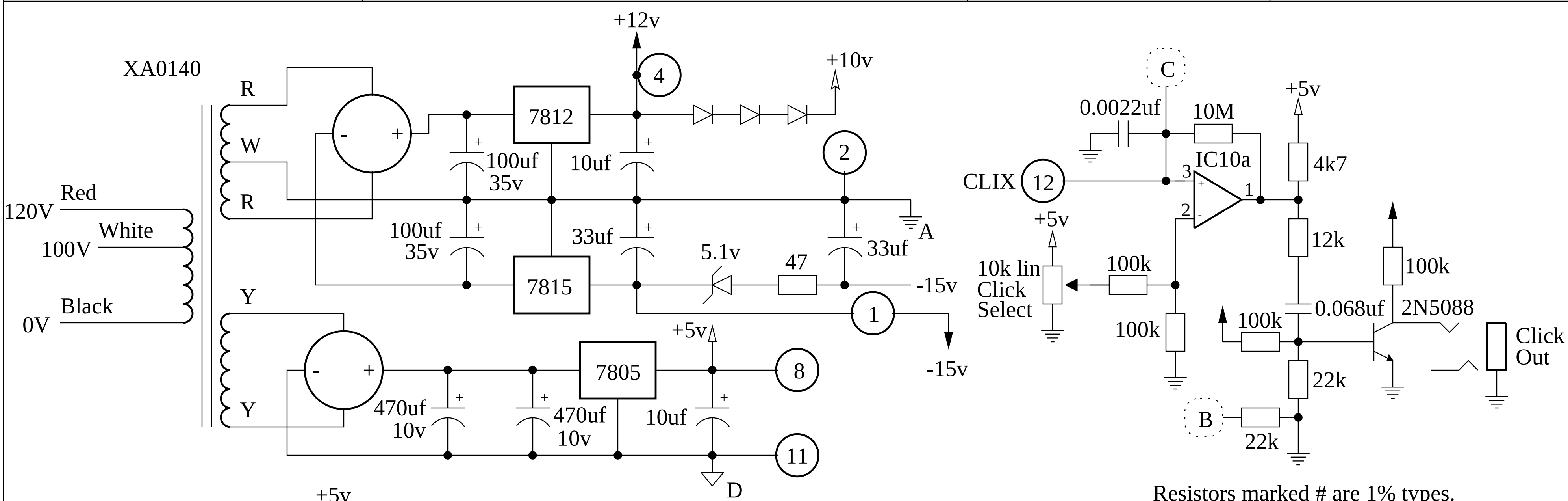
The Double Beat is another of those funky, funky Fuzz Wahs. The wah function is pretty standard, if a little quiet because of the resistive divider in front of the wah section cutting the signal down. The Fuzz secttion is pretty good, though. It has a good sound - no surprise as the first section is a lot like a Fuzz Face, but is followed up by yet another gain stage to distort even more. The three fuzz tone selections are RADICALLY different from each other.

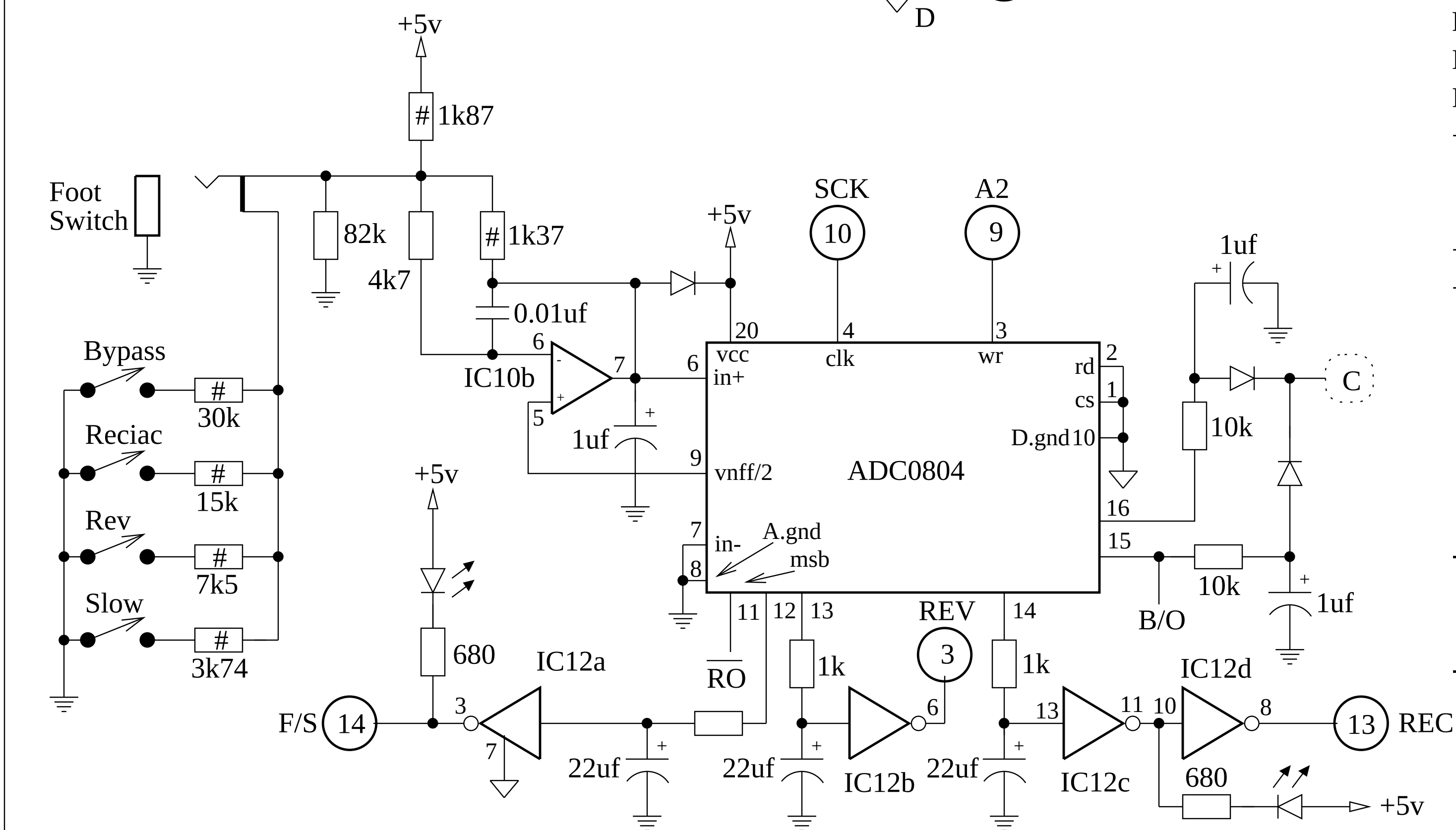
Name: 16 Second Digital Delay	Manufacturer / Designer: Electro-Harmonix	Revision: 12/9/95	Model # EH7875-2A

IC1 - TL082
IC2 - 4558
Q1, Q4 - 2N5087
Q2, Q3 - 2N4859A
IC9 - 571
IC11, IC4 - Unmarked Dual Op-Amp, probably a 4558
D1, D2 - Signal Diode ?
D3, D4 - 6.8v Zener
IC7, IC8 - Unmarked ?



Name:	16 Second Digital Delay	Manufacturer / Designer:	Electro-Harmonix	Revision:	12/9/95	Model #	EH7875-2A





Resistors marked # are 1% types.

IC10 - LM358

IC12 - unmarked, CD4049 perhaps?

+12v to pin 8 on IC1, IC2, IC4, IC5, IC6, IC10, IC11, IC43, & IC44 pin 13 on IC9, & IC3

+10v to pin 5 on IC7, & IC8

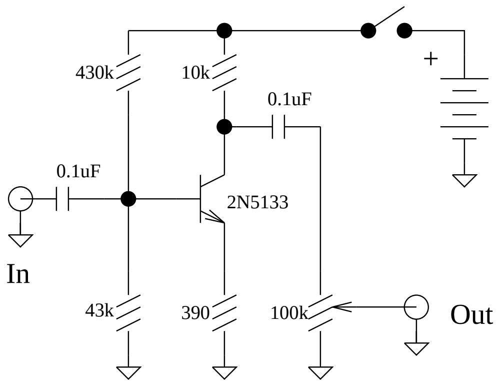
+5v to pin 20 on the ADC0804 a pin # I coudn't read on IC12 pin 14 on IC13, IC14, & IC21 through IC24 pin 16 on IC15 through IC18 pin 3 on IC19 pin 8 on IC20, & IC30 through IC41 pin 20 on IC27, & IC42 pin 5 on IC28 pin 12 on IC29, & IC3 pin 7 on IC44 pin 9 on IC19

-15v to pin 4 on IC1 through IC4, IC10, IC11, IC20, IC43, & IC44 pin 17 on IC42

-10v to pins 1 & 6 on IC7, & IC8

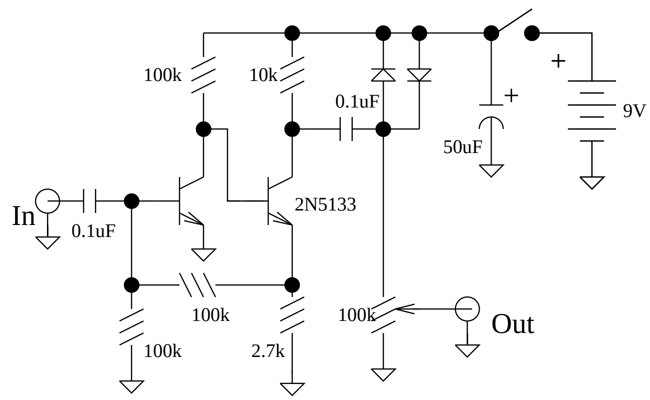
All diodes were unmarked.

ELECTRO HARMONIX BOOSTERS

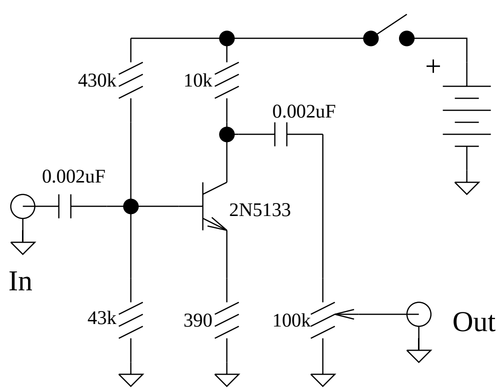


LPB-1, LPB-2, EGO

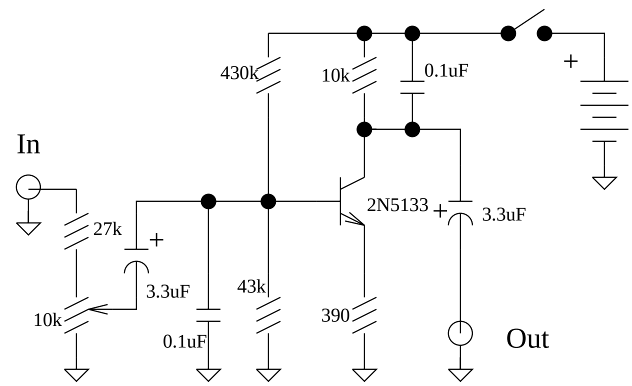
Other variations on the LPB-1 include a BC239 with a 100k resistor from base to ground and a 1M resistor between base and collector.



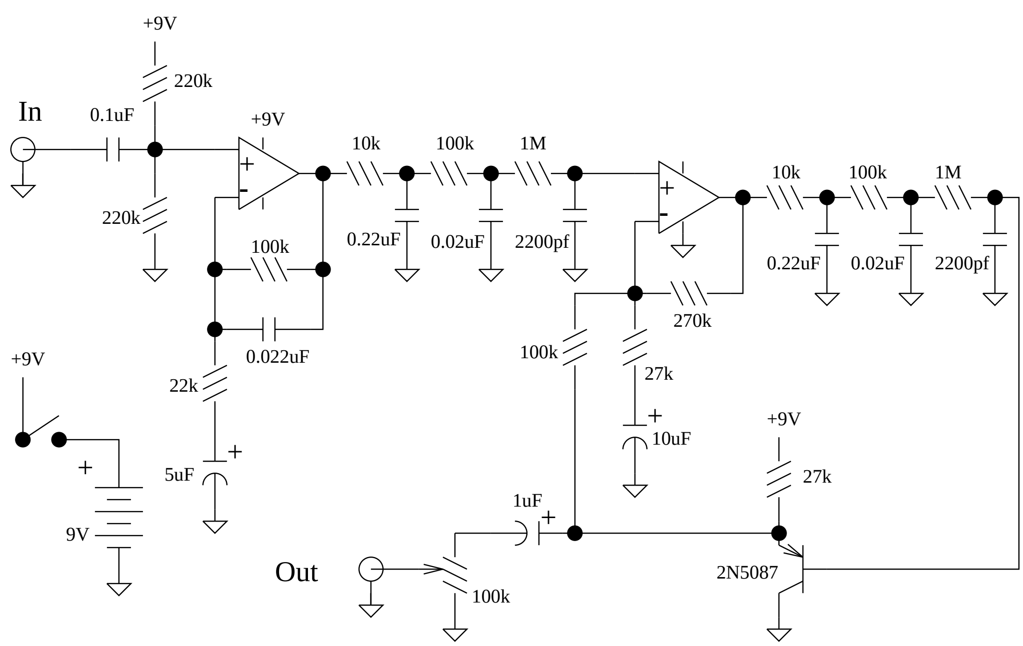
Muff Fuzz / Little Muff Pi (early)



Screaming Bird/Tree



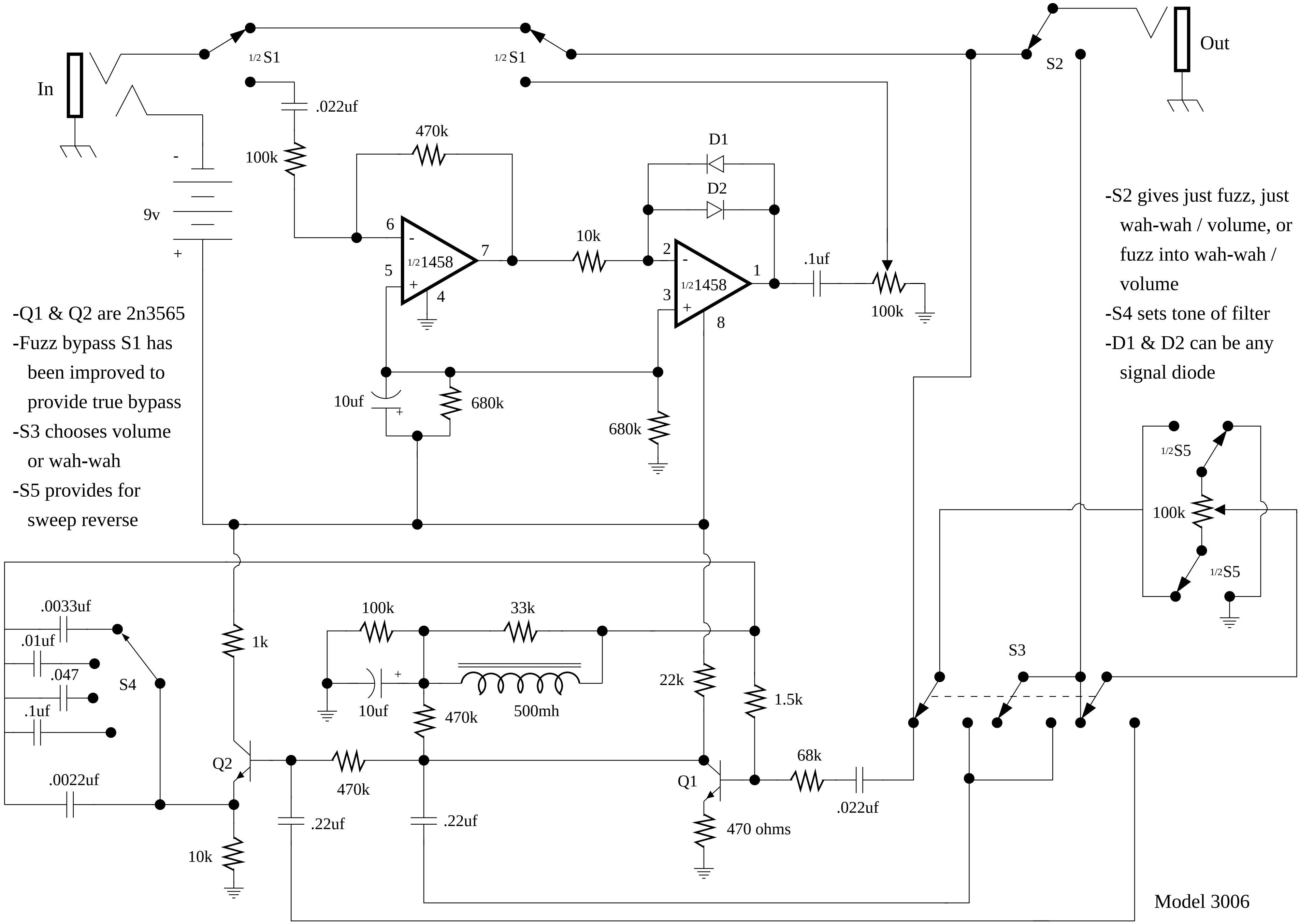
Mole/ Hog's Foot (Old Version)



Hog's Foot (new)

Electro Harmonix Fuzz-Wah

(Actually Fuzz-Wah/Volume)

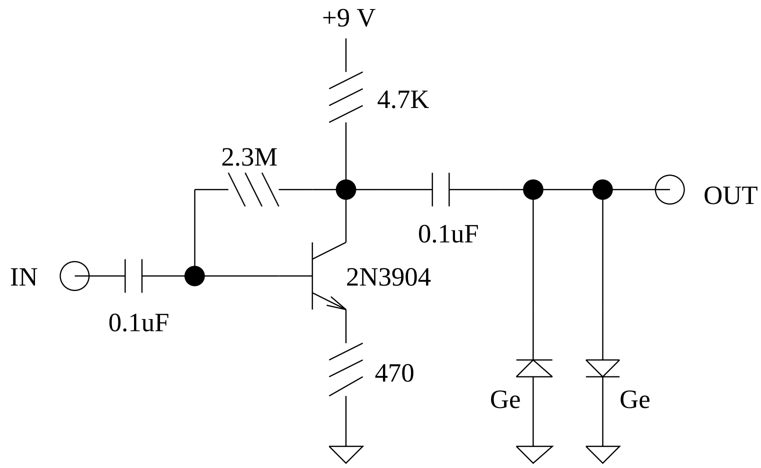


- Q1 & Q2 are 2n3565
- Fuzz bypass S1 has been improved to provide true bypass
- S3 chooses volume or wah-wah
- S5 provides for sweep reverse

- S2 gives just fuzz, just wah-wah / volume, or fuzz into wah-wah / volume
- S4 sets tone of filter
- D1 & D2 can be any signal diode

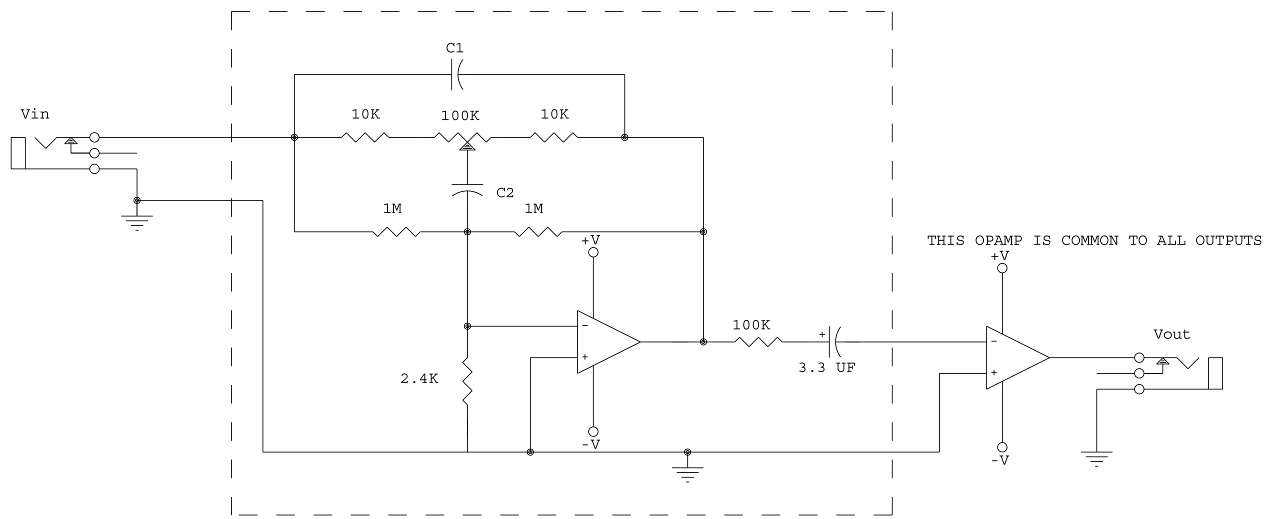
Model 3006

ELECTRA DISTORTION



This distortion was posted to the net by Bruce E. (?), bew4568@zeus.tamu.edu on 5/14/94. It is supposed to sound amazingly like a Tube Screamer. With the exception of the diodes, the circuit is the same as the circuit for the Electra Power Overdrive module, which was fitted inside some Electra guitars in the 70’s. It’s important to use germanium diodes to get the right sound. Silicon is supposed to produce more power and less distortion. Ge gives 0.4 volts of signal out, Si gives 1.4 volts. The values of the collector and emitter resistors can be changed to give more or less gain and distortion. The unit is not just a hard diode clipper, as the diodes load the output of the transistor and modify its gain as they turn on, giving softer clipping than you would expect.

REPEAT CIRCUIT IN BOX FOR ALL FREQUENCIES.
THE TABLE GIVEN BELOW SPECIFIES COMPONENT
VALUES FOR C1 AND C2.



* A SUGGESTED OPAMP WOULD BE A TL082 OR SIMILIAR LOW NOISE OPAMP

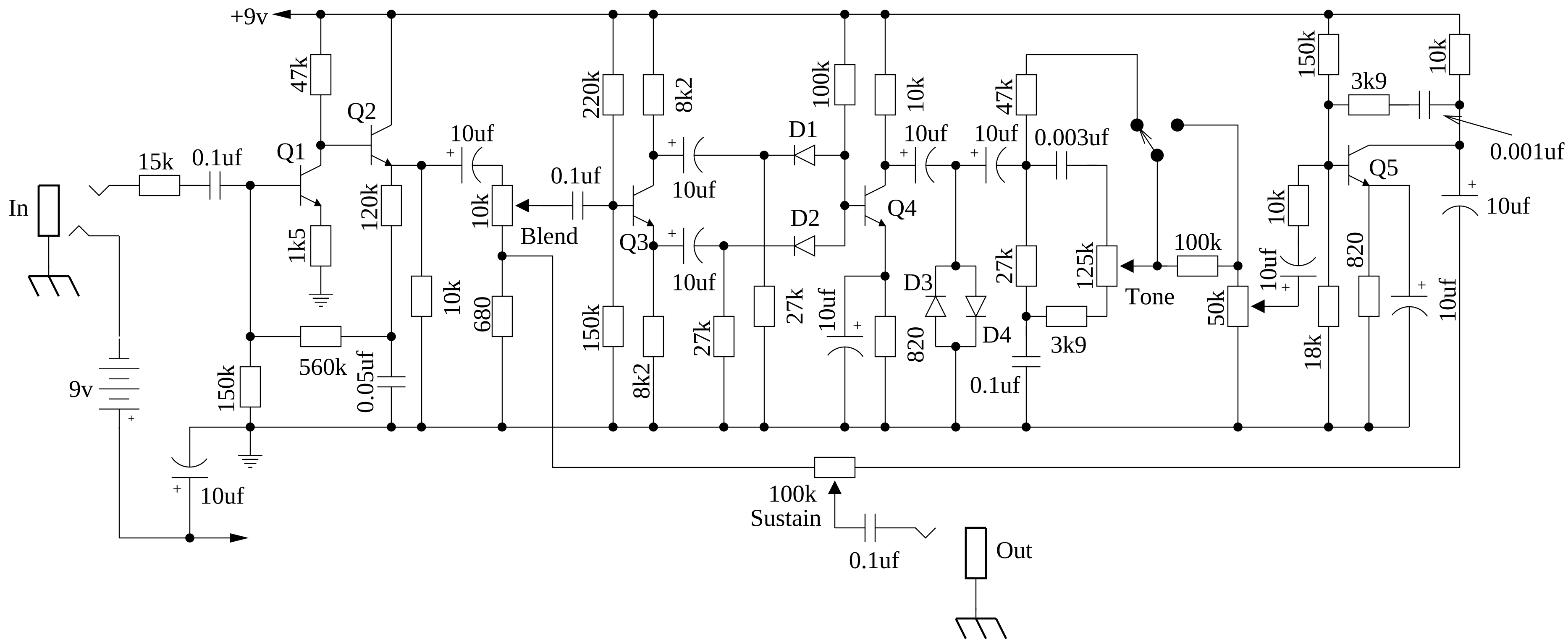
CHANNEL CENTRE FREQ. (IN Hz.)	C1	C2
32	180nF	18nF
64	100nF	10nF
125	47nF	4.7nF
250	22nF	2.2nF
500	12nF	1.2nF
1000	5.6nF	560pF
2000	2.7nF	270pF
4000	1.5nF	150pF
8000	680pF	68pF
16000	360pF	36pF

FROM ENCYL. OF ELECTRONIC CIRCUITS (VOL. 2)

DESIGN FIRST PUBLISHED IN
ELECTRONICS TODAY INTERNATIONAL

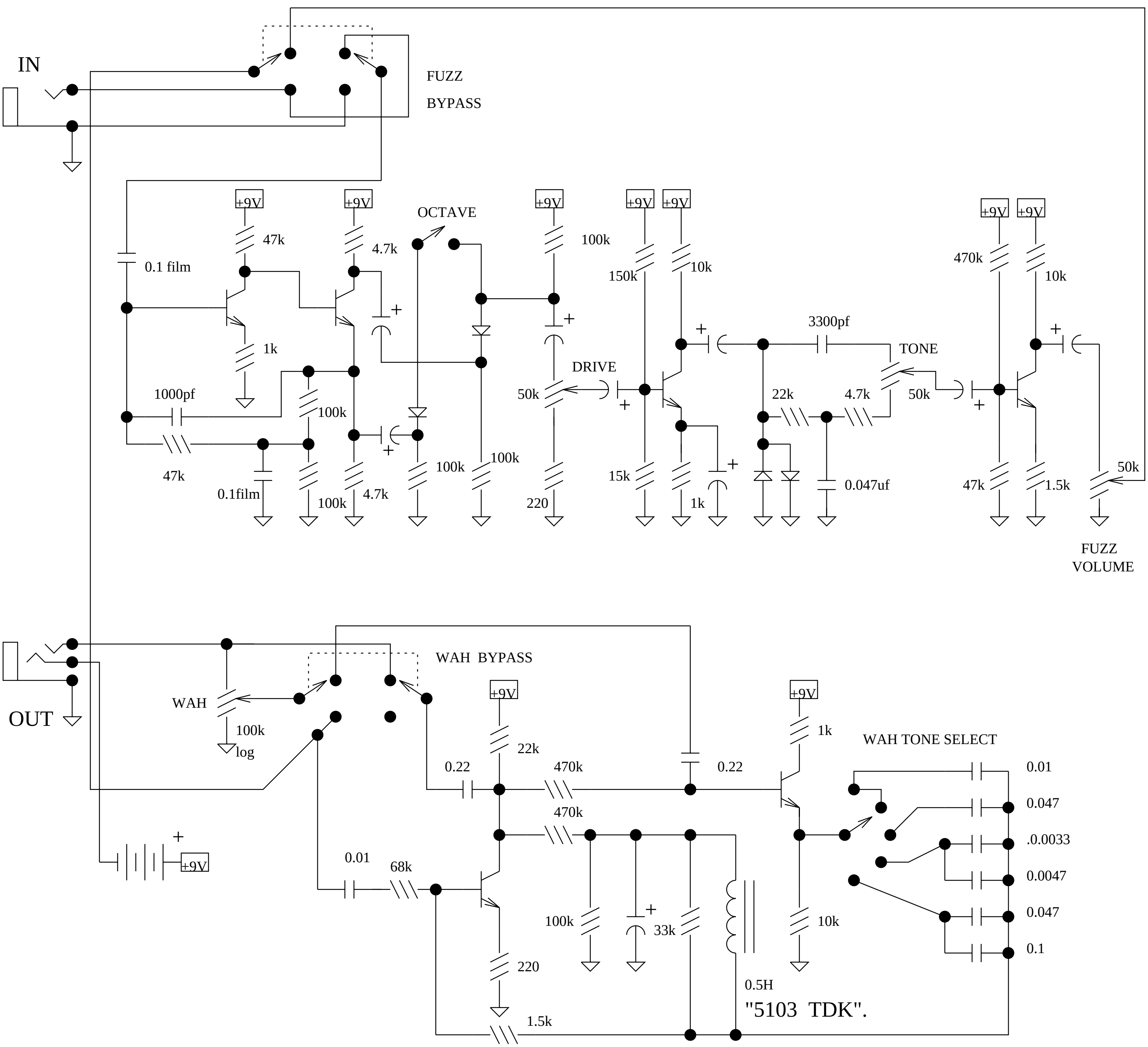
Title	TEN BAND GRAPHIC EQUALIZER	
Size A	Document Number DRAWN BY: FABIAN P. HARTERY	REV 1
Date: February 16, 1995	Sheet 1 of 1	

Name: Fender Blender	Manufacturer / Designer: Fender	Revision: 11/18/95	Model #



All resistors 5% (many of the orginals were actually 10%) 1/2W
All capacitors minimum 25V
Q1 & Q2 - 2N3391A
Q3 to Q5 - 2N3391
D1 to D4 - 1N276
Original switching scheme was a spdt, not true bypass. This effect would benefit from a true bypass mod.
The effect itself is a distortion with octaving.

FOXX FUZZ-WAH

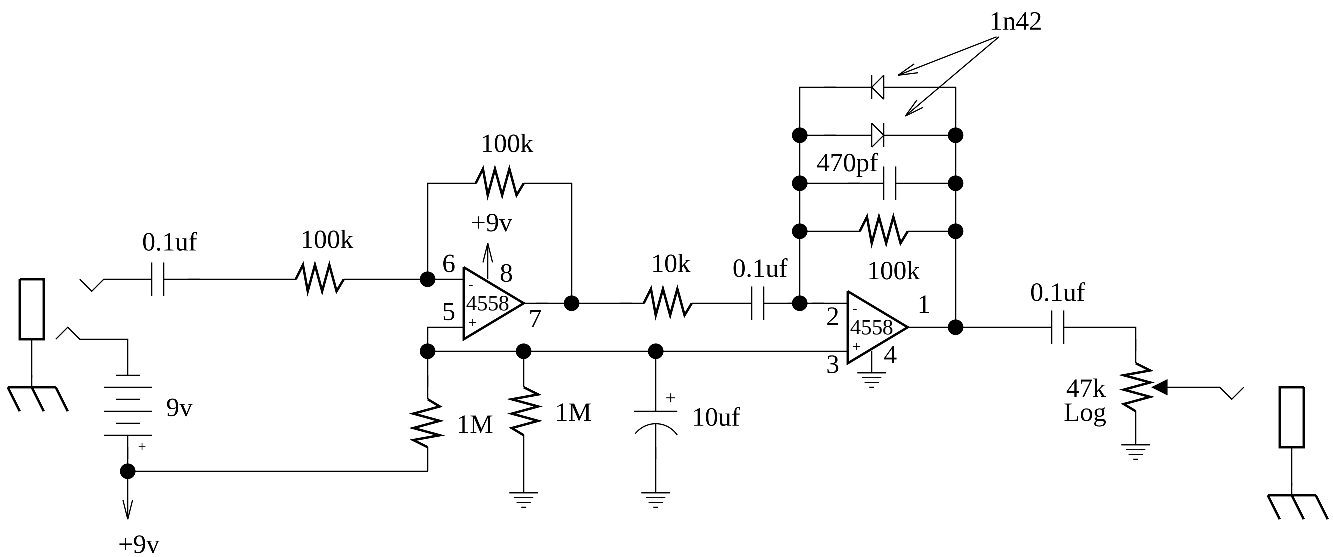


The Foxx Fuzz Wah includes a fuzz, an octave effect, a wah pedal, and in later versions a volume pedal al l in the same box. The box, by the way, is covered in blue or red no-fooling stiff plastic fuzz. The wah has four different resonant frequencies selected by a rotary switch. The inductor should be relatively easy to find, as it looks to be a somewhat standard part.
The volume pedal action is the default when wah is bypassed. Max volume is with the pedal all the way back, very odd.

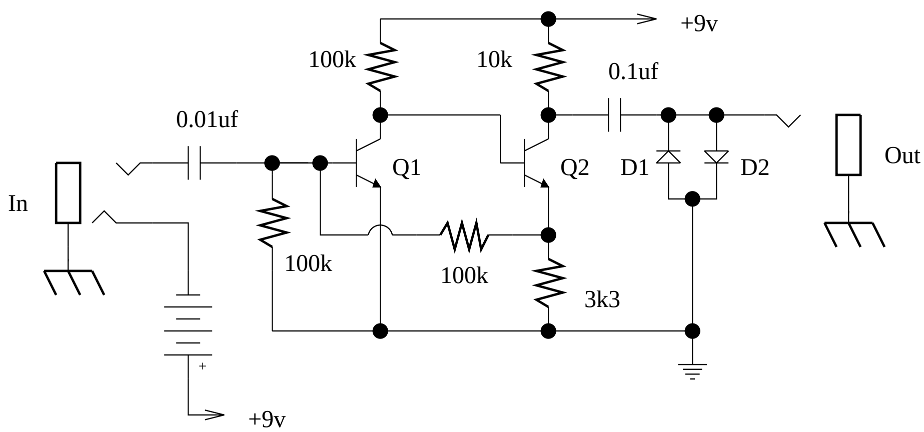
- All transistors 2N3565-R249, NPN silicon in little plastic button packages.
- All diodes germanium
- All unmarked electrolytic capacitors 10 uF, 16Vdc.

The fuzz and octave section MAY be a copy of the Octavia pedal.
Note that the Wah pot is log (audio) taper. The wah sound is really sensitive to the positioning of the wah pot’s rotation in the rack-and-pinion.

Fuzz 001 - Unknown Commerical Source



Distortion Booster



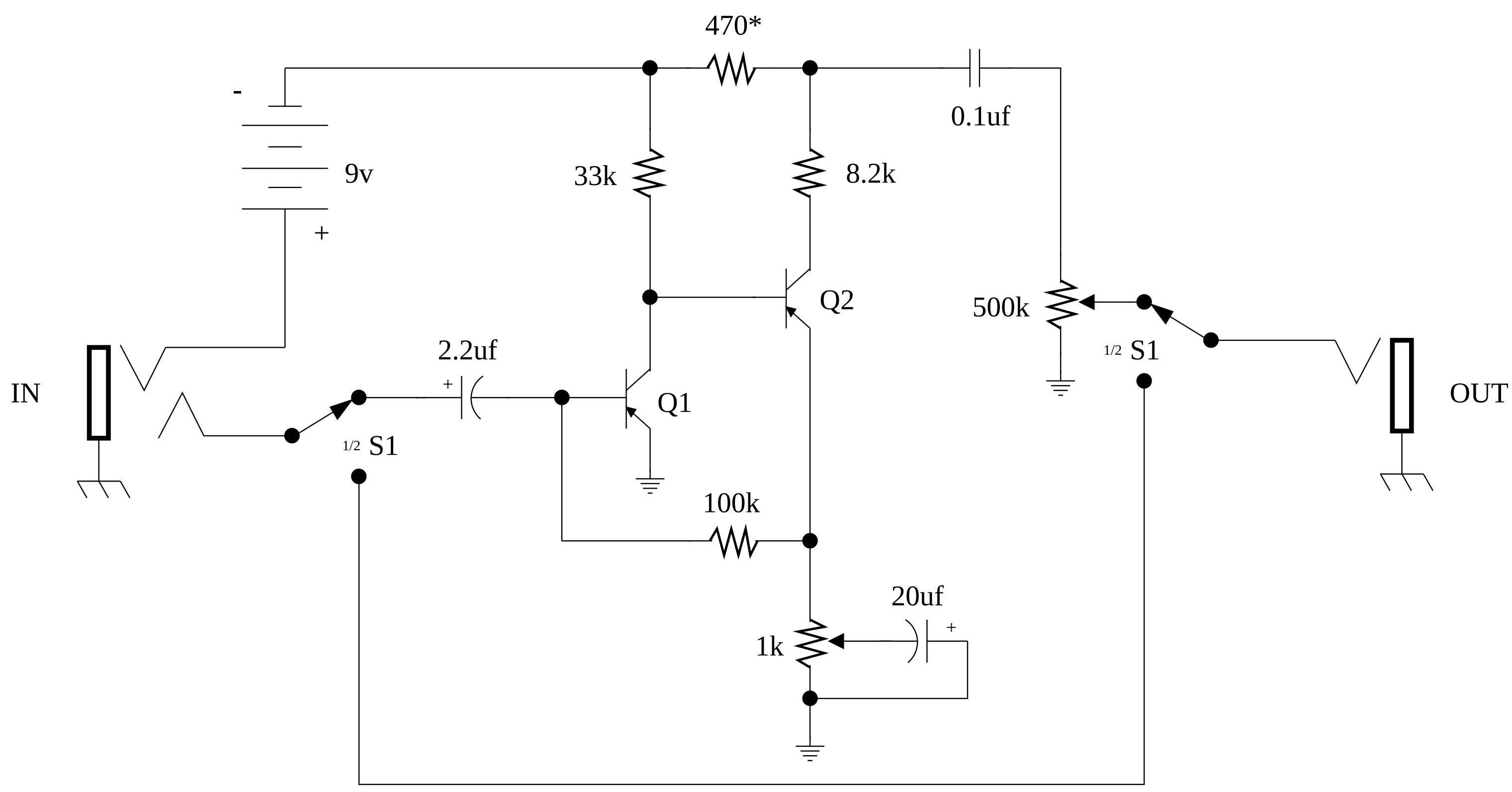
Q1 and Q2 are BC108

D1 and D2 are silicon or germanium (pick your favorite flavor) signal diodes.

-make unknown...

Fuzz Face

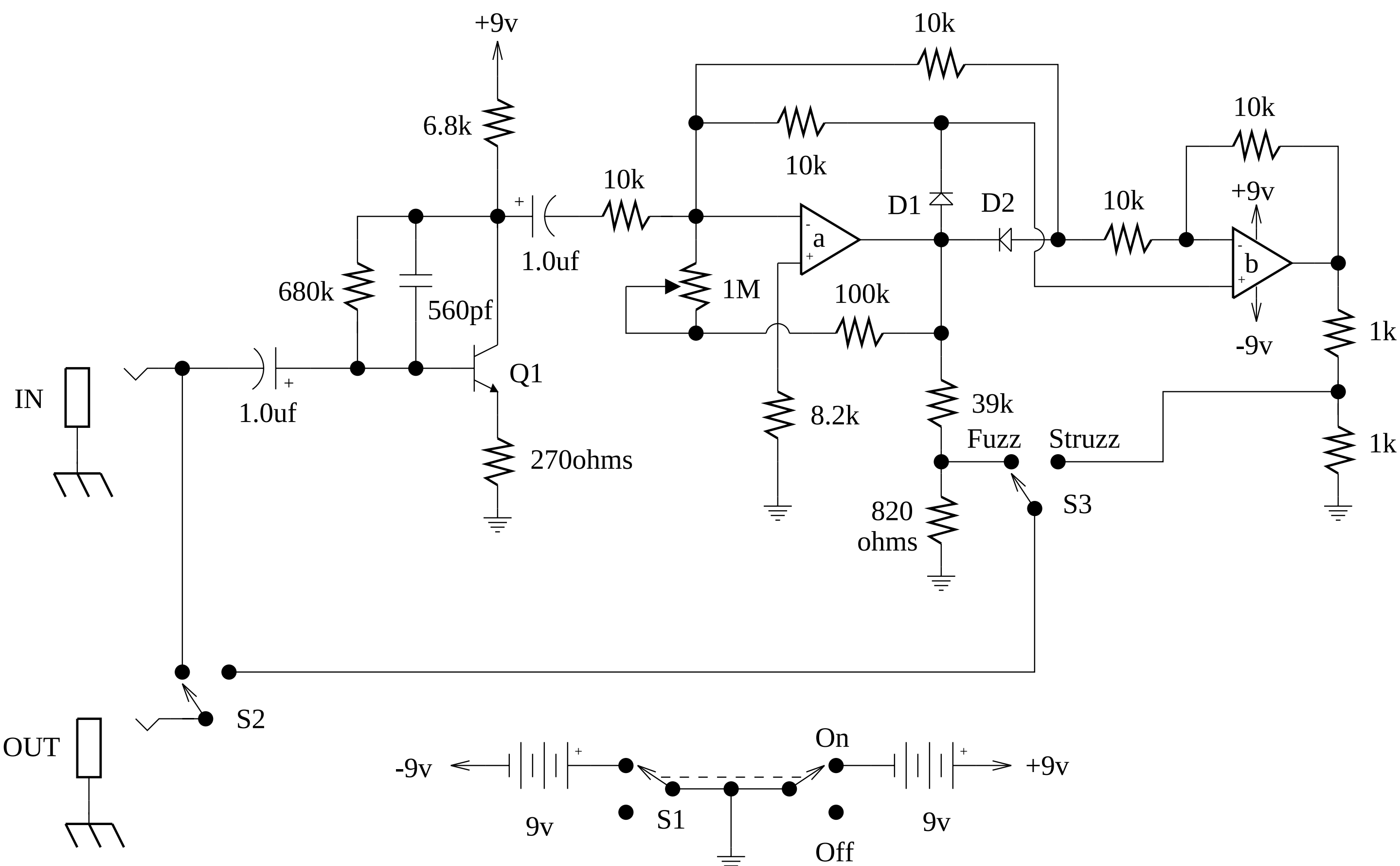
Dallas Arbiter



There are apparently two similar versions of the fuzz face. In one Q1 and Q2 were PNP germanium AC128 or NKT275 types in the other they were NPN sillicon BC108C types. Now depending on which type you choose to build will influence some of the other components. For a PNP version the schematic is as shown, but if you build the NPN version then the 470 ohm resistor marked by a * must be changed to 330 ohms and the battery and all the polarized capacitors must be reversed. The original schematic is not exaclty what is shown above, it had a very complex switching system which has been simplified (nothing has been lost don't worry) and a unique grounding setup. Aside from that the schem is exact with minor differences in components on various units (eg. some had the 0.1uf cap listed as .047uf, which shouldn't make a difference as long as you feed a high impedance amp). The transistors are hard to find, the thing to look for is germanium transistors with a decent gain factor (gain > 80). Note silicon transistors will clip harshly and may not sound good, though 2n3906 has been said to work.

Guitar Effects Unit
(Octaver-Fuzz)

extracted from ETI-Canada, January 1980



Q1 is MPS6515

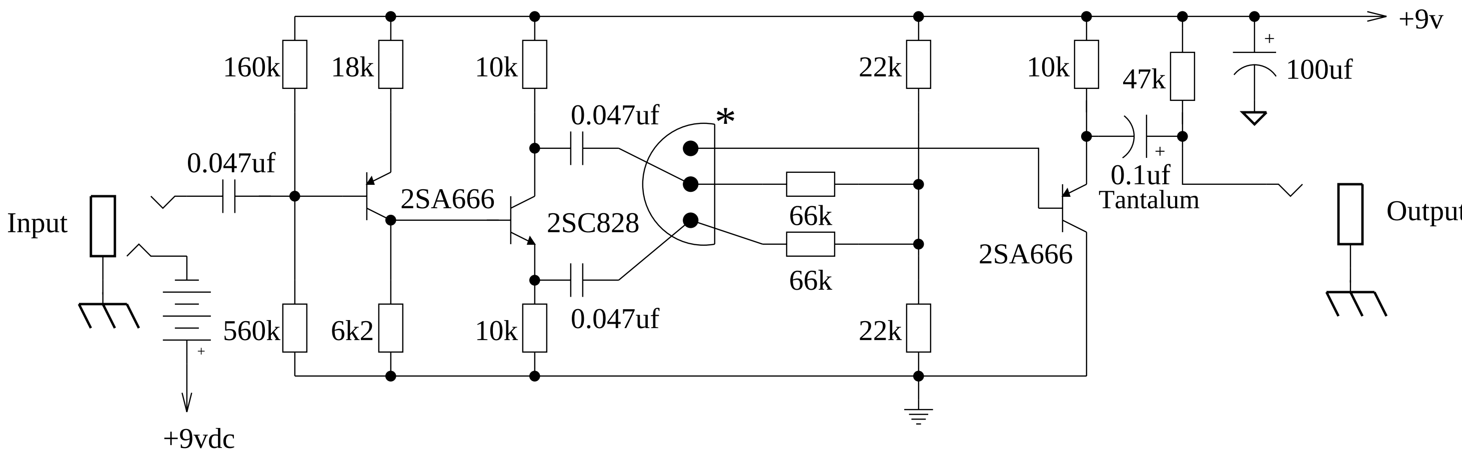
DI and D2 are 1N4148

The IC is any lownoise dual op-amp, shown is the 4558.

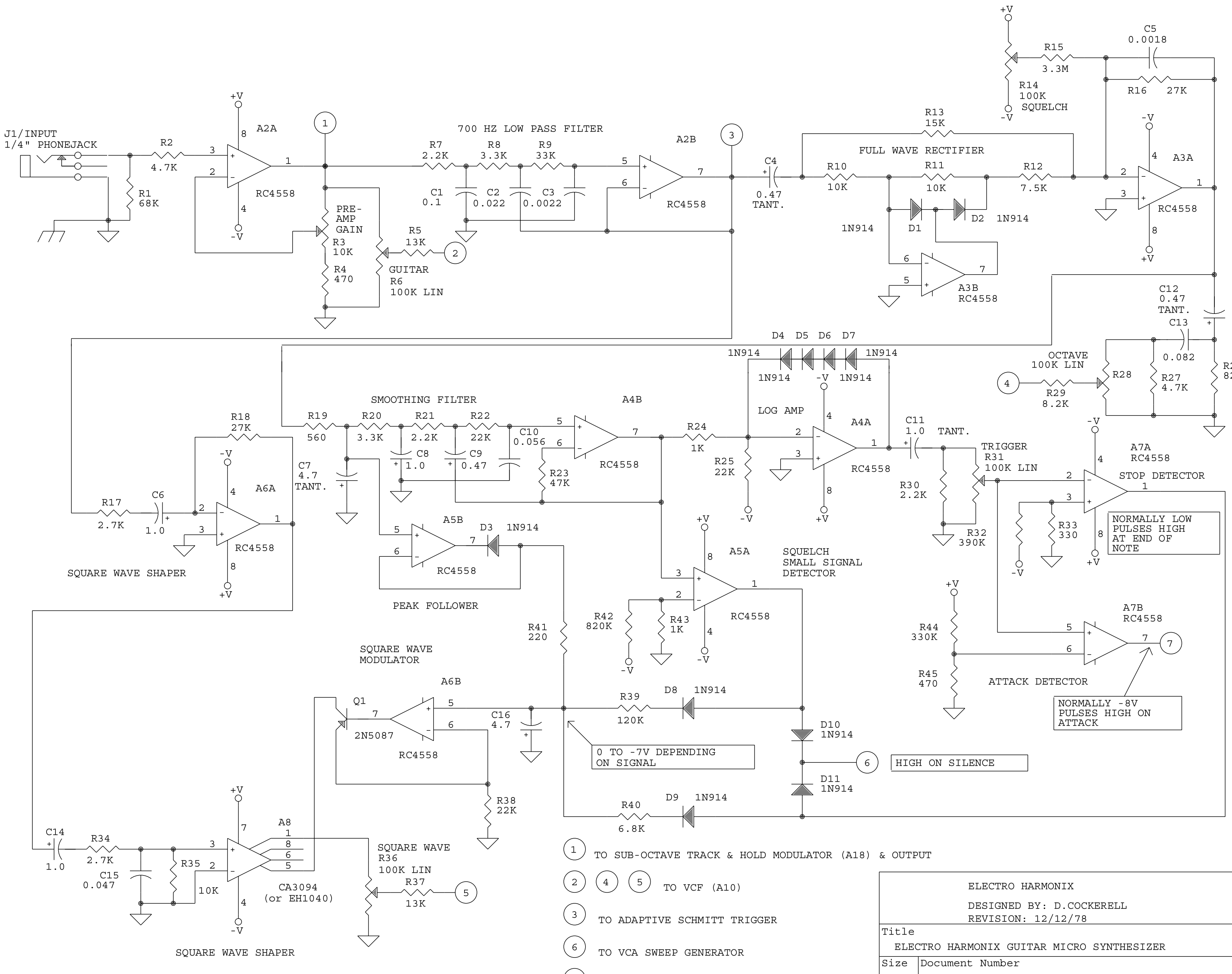
Switching could be improved with a full bypass mod.

The GEU is good sounding octave fuzz, with an optional mode of just fuzz. The fuzz is a fully rectified signal and is quite chewy. For some the Fuzz alone might not be loud enough, this can be fixed by raising the value of the 820 ohm resistor and lowering the 39k one. Or one could just replace both with a normal volume pot for a more standard approach. The "struzz" is the fuzz with an octave higher signal mixed in. Good for singal notes and leads.

Name: Green Ringer	Manufacturer / Designer: Dan Armstrong	Revision: 9/23/95	Model #



The transitor marked "*" has no markings other than three stripes; green, blue, white, from top to bottom. It is PROBABLY a low gain NPN used as a dual diode with the anodes connected together at the base of the final transistor. The continuity test on the device shows no conductivity except that the topmost pin conducts when it is positive of the pins in the middle and other side; otherwise, no conduction. This is what would be expected if it were an NPN with the same pinout (base, collector, emitter) as the other transistors.



(1) TO SUB-OCTAVE TRACK & HOLD MODULATOR (A18) & OUTPUT

(2) (4) (5) TO VCF (A10)

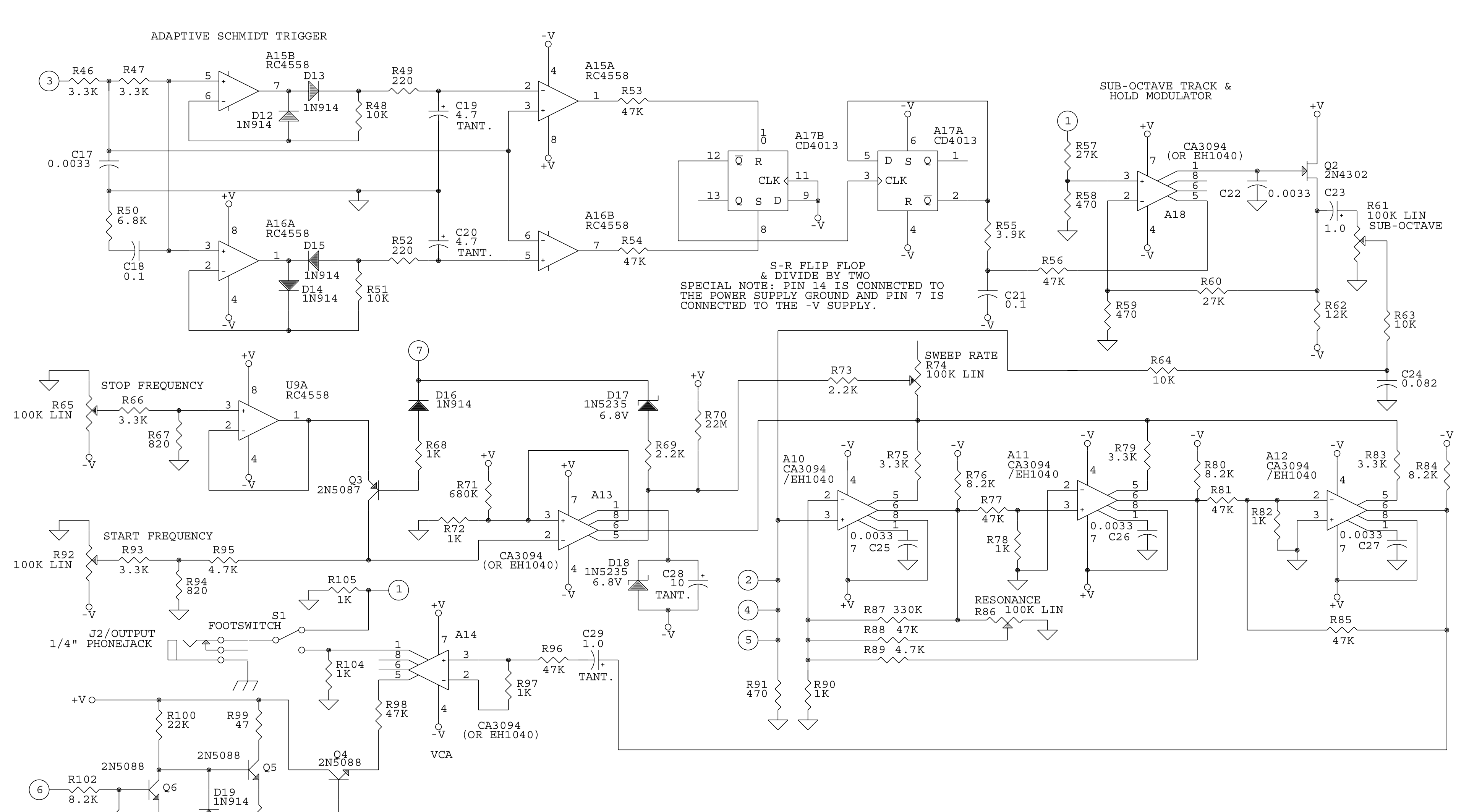
(3) TO ADAPTIVE SCHMITT TRIGGER

(6) TO VCA SWEEP GENERATOR

(7) TO VCF SWEEP GENERATOR

* ALL CAPACITOR VALUES IN MICROFARADS

ELECTRO HARMONIX DESIGNED BY: D.COCKERELL REVISION: 12/12/78				
Title: ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER				
Size: A	Document Number: DRAWN BY: FABIAN P. HARTERY			REV: 1
Date: September 28, 1996		Sheet 1 of 3		

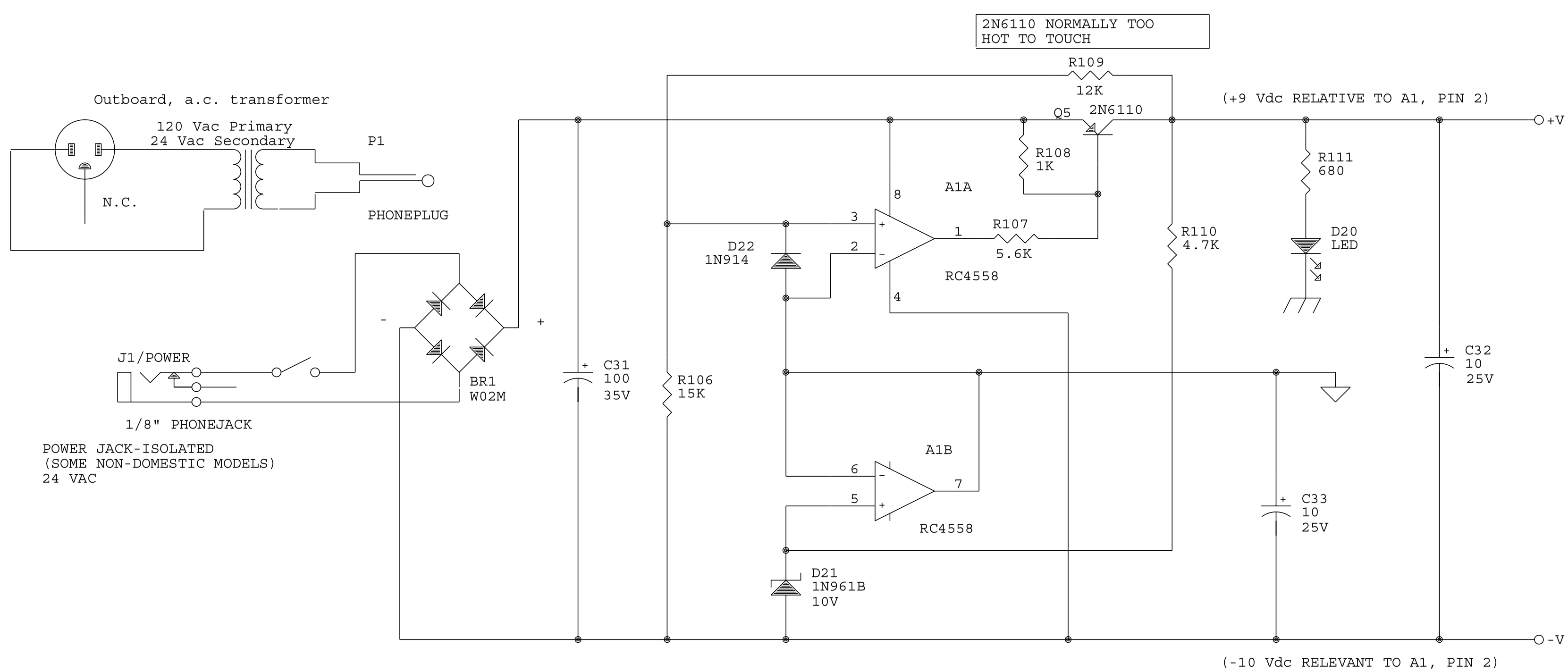


ELECTRO HARMONIX

DESIGNED BY: D.COCKERELL
REVISION: 12/12/78

Title		
ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER		
Size	Document Number	REV
B	DRAWN BY: FABIAN P. HARTERY	1
Date: September 28, 1996	Sheet 2 of 3	

* ALL CAPACITOR VALUES IN MICROFARADS



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Title ELECTRO HARMONIX GUITAR MICRO SYNTHESIZER		
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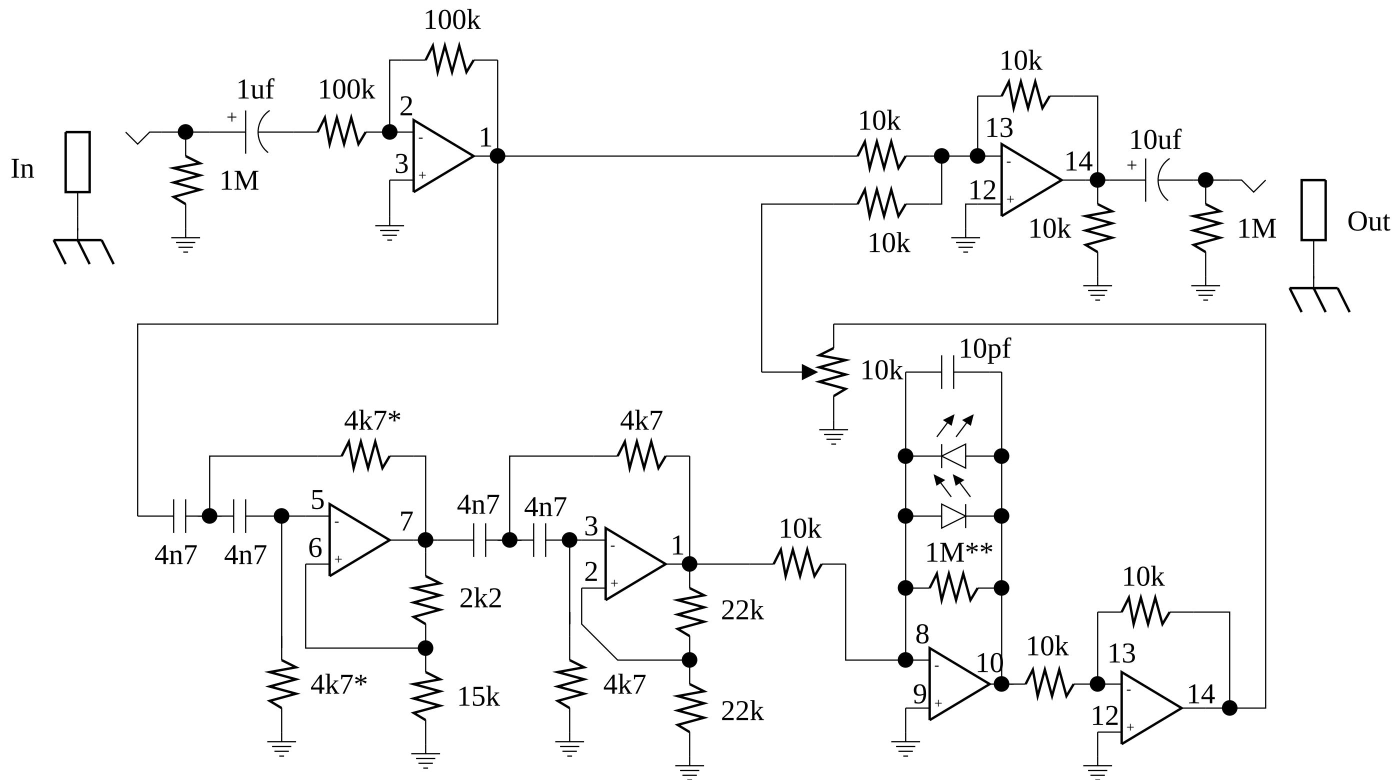
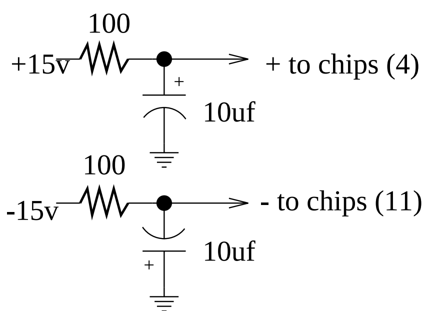
Date: September 28, 1996	Sheet 3 of 3	

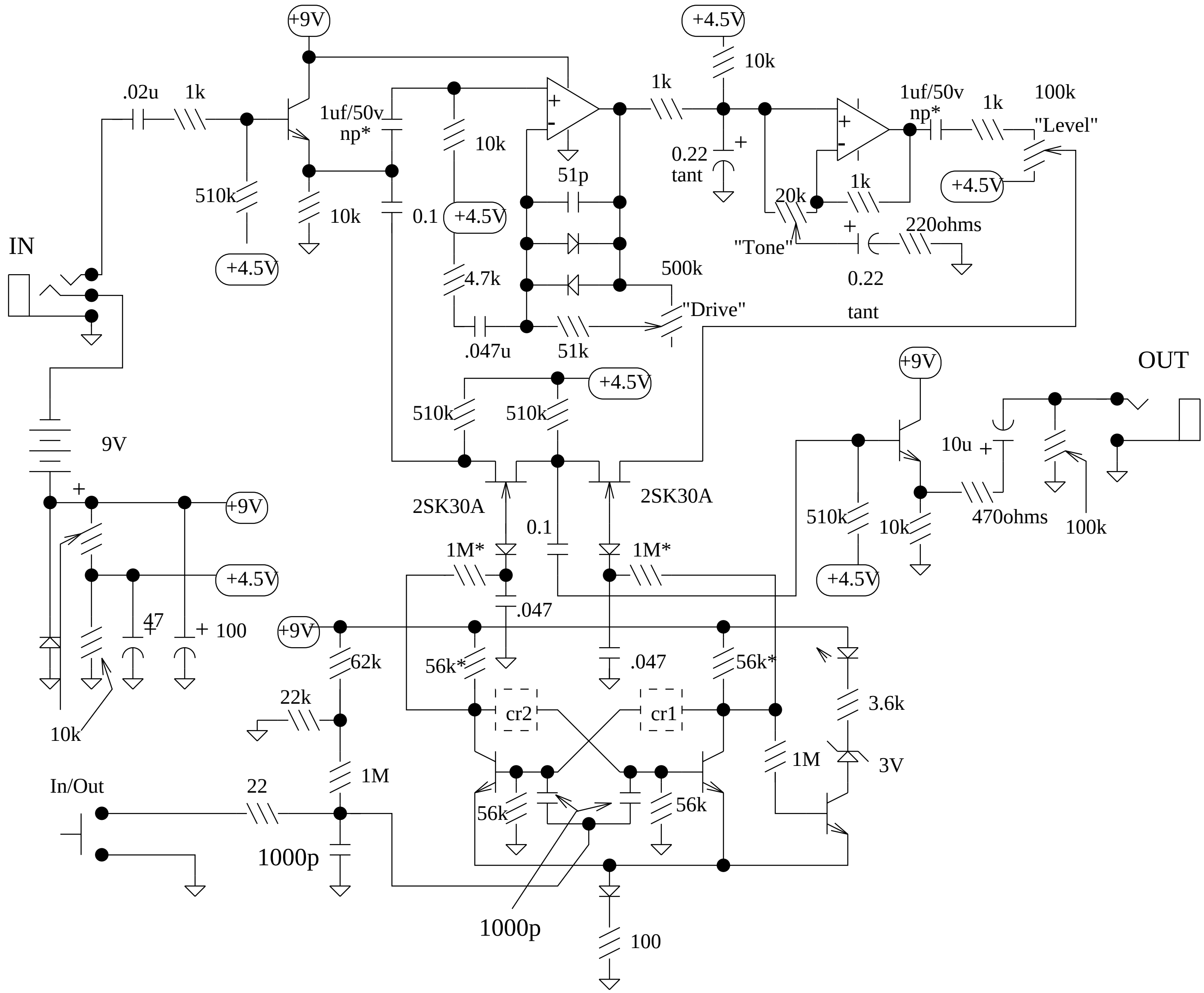
Harmonic Sweetener





A couple of red led's will work nicely for the clipping section. The op-amps shown are TL074 types with 3 of the 4 amps used. Possible modifications include changing the resistors marked * to a 10k dual-ganged pot for a tunable filter, and/or changing the resistor marked ** to a 2.5 M pot for a drive option.

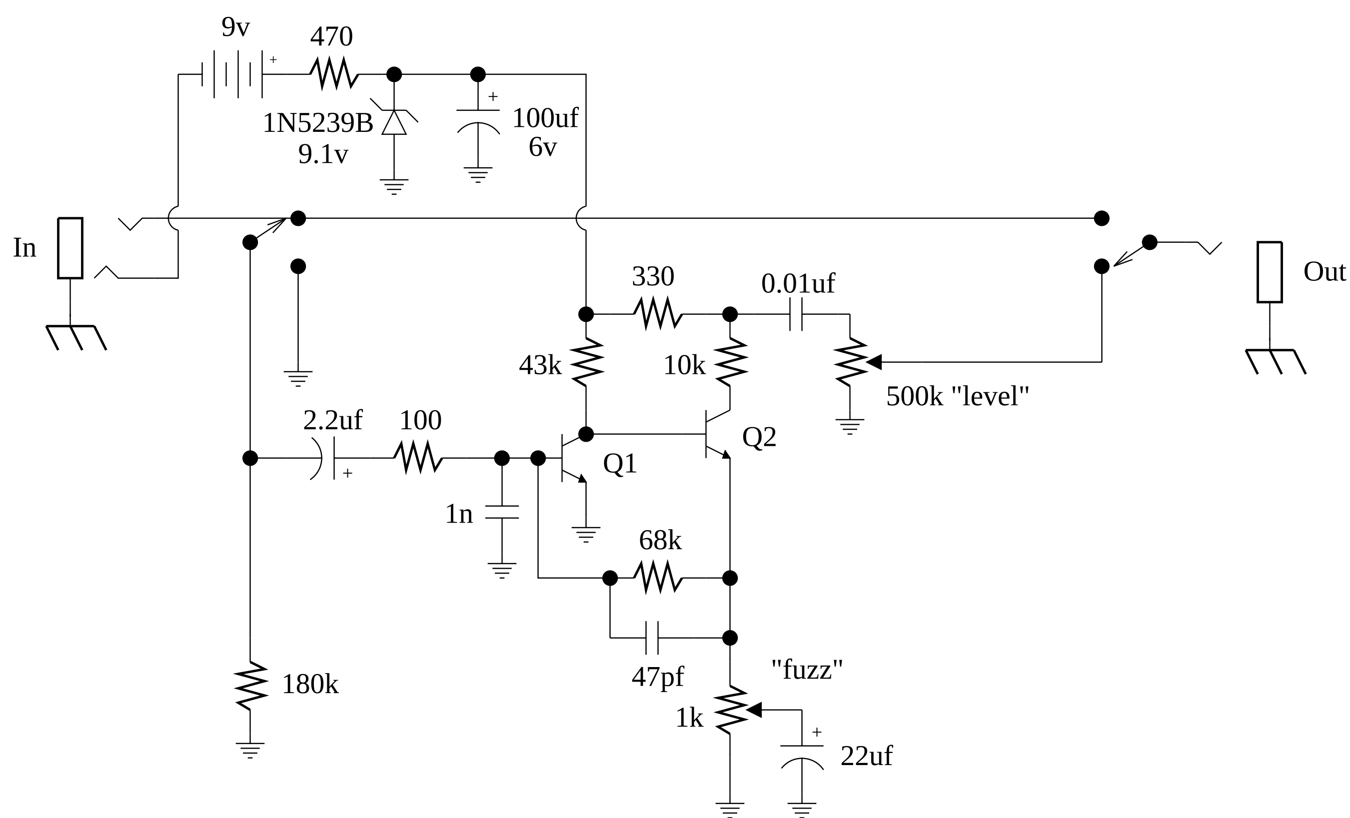
TS-9 Tube Screamer



Opamps are in a dual 8 pin dip, 4558. All transistors 2SC1815. All diodes silicon signal diodes, 1n914 or similar. np* = nonpolorized resistors denoted by * marked as 1M on original might be 22k and those marked as 56K might be 10k. crf1 and cr2 are a special cap and resistor in parallel, the cap is 51p the resistor is 56k.

Jimi Hendrix Fuzz Face

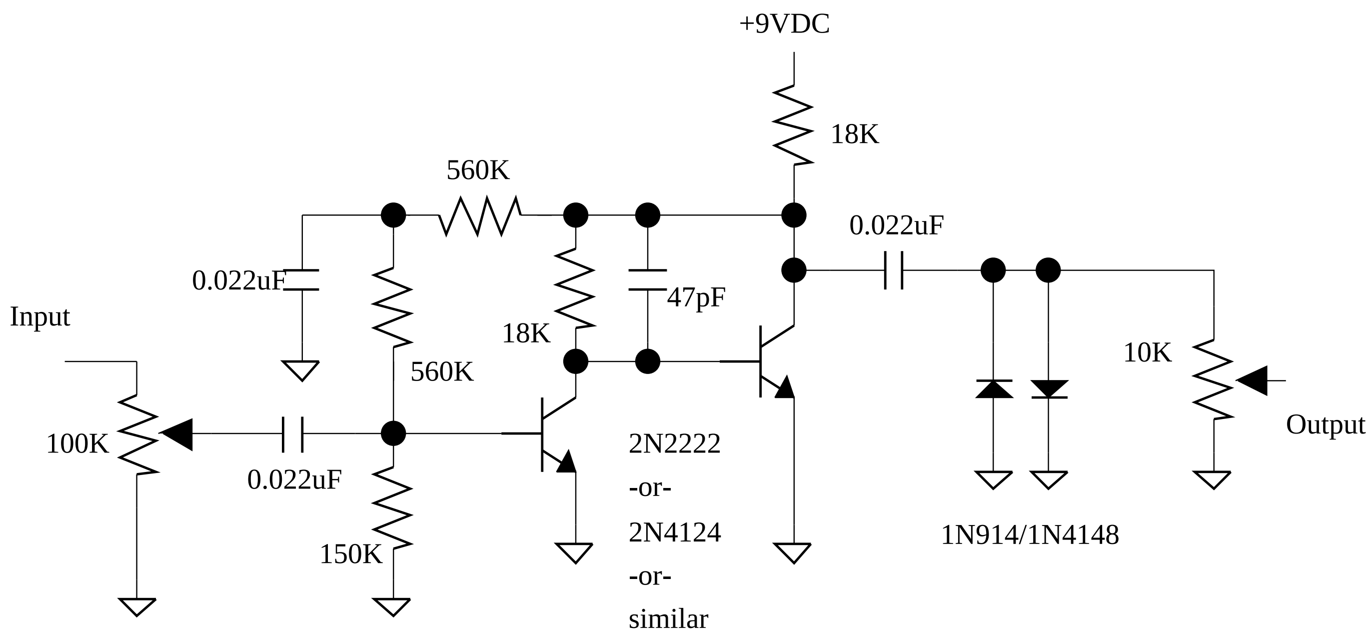
by Jim Dunlop



Q1 & Q2 are MPSA18

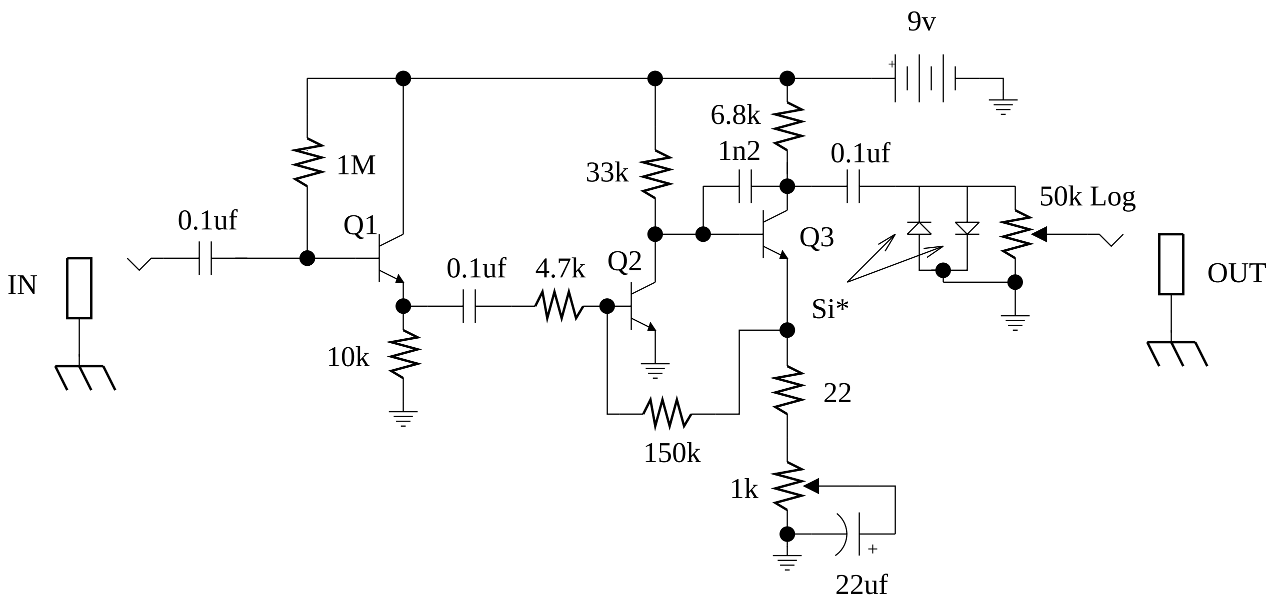
Model JH-2

Jordan Boss-Tone



The Jordan Boss-Tone is another distorter from the Inna-Gotta-Have-A-Fuzza era of effects. This circuit fragment shows only the effects circuit, not the in/out switching and the battery circuit. A DPDT stomp switch and input-jack battery switching would finish this up nicely. Like many others, the circuit is based on a collector voltage feedback single transistor circuit with a second transistor as a buffer following the first gain stage. Others in this genre are the Vox Tone Bender and the venerable Fuzz Face, although these do not have a diode-clipping limiter after the gain stages.

JSH Fuzz

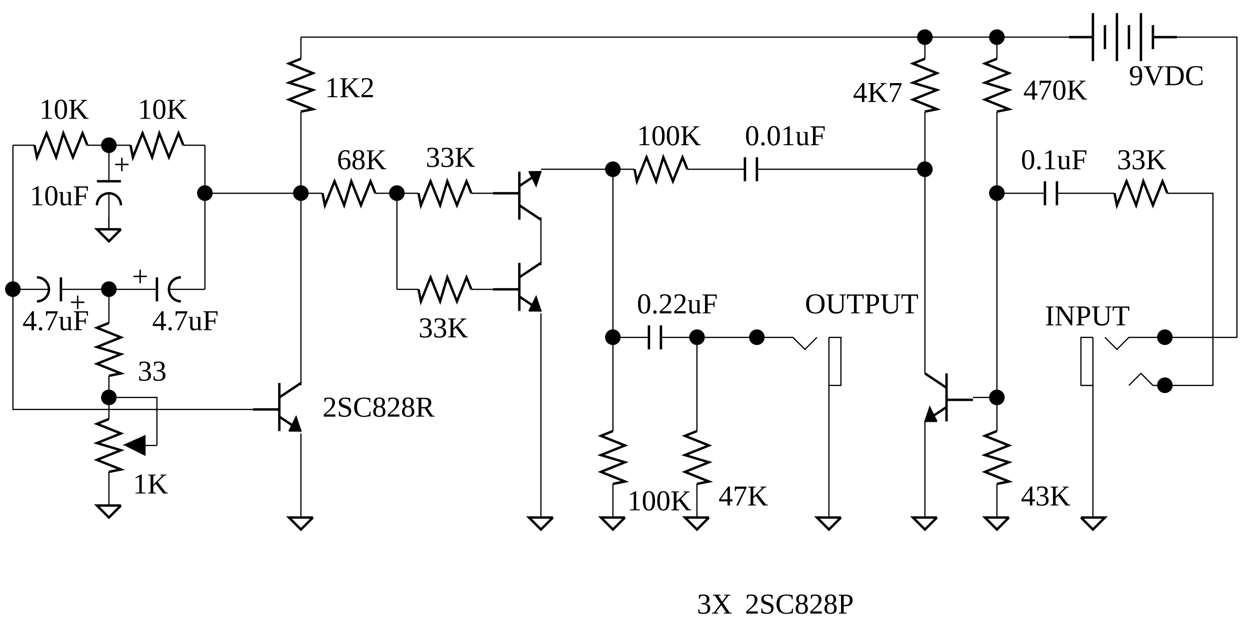


*pretty much any silicon signal diode can be used here

Q1 - BC238B

Q2, Q3 - BC239C

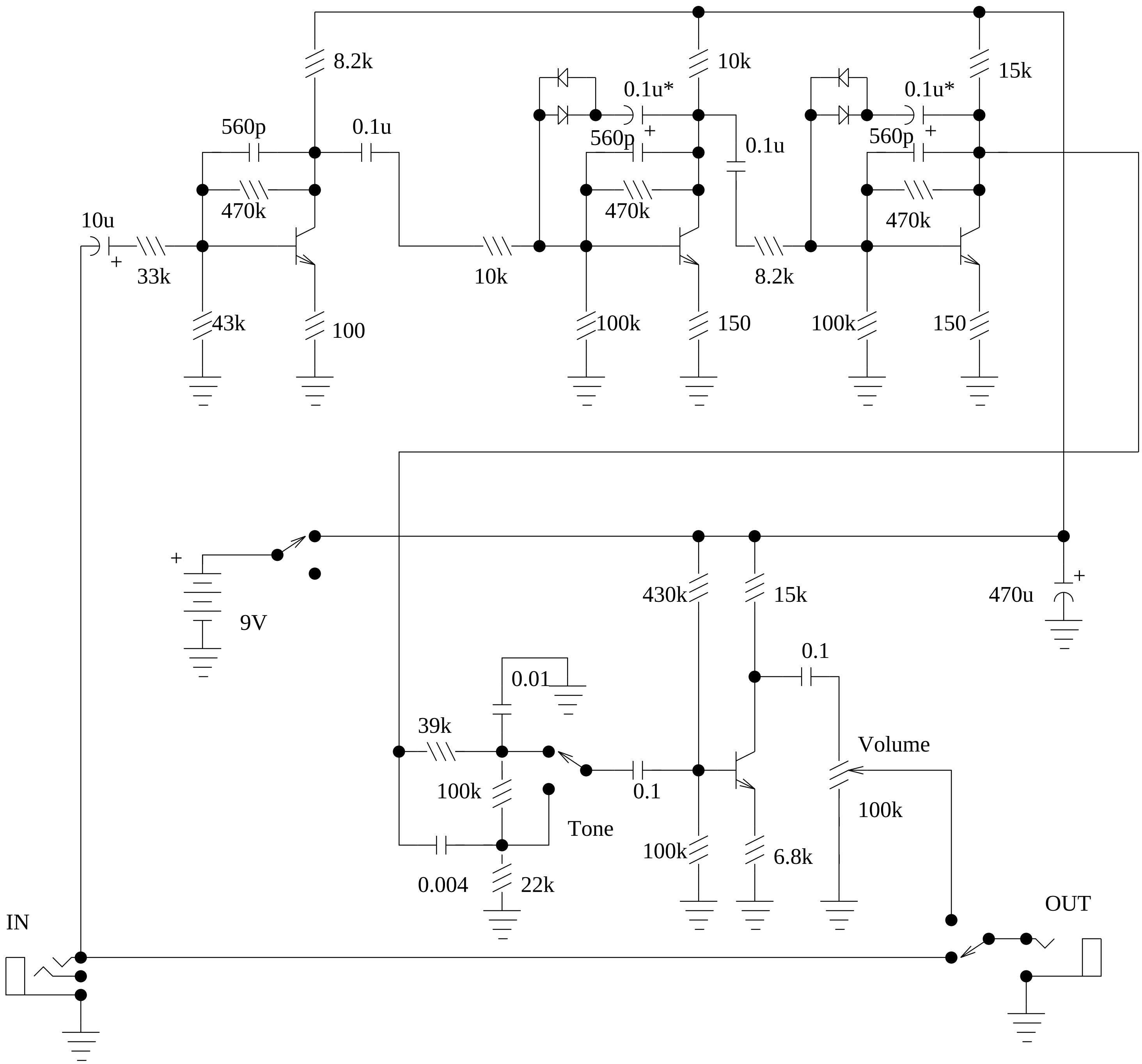
Model FZIII



Kay Tremolo Model T-1

The Kay model T-1 tremolo is a very simple circuit. A twin-T oscillator circuit drives two bipolar transistors to load the signal down after it is amplified by a single input stage. The sound of this is more like the "repeat percussion" effect of Thomas Organ Vox amplifiers than the smooth variation in loudness of tube based amplifier tremolos, but it is a useful sounding effect; just different. The pedal itself is a cheesy plastic case with a wah-pedal like treadle which controls the speed of the oscillator. There is no tremolo depth control, and the in/out switch is not shown on the schematic from the inside of the case, although it is a very conventional DPDT bypass. The bypass was unique in that you had to slide a switch manually, no stomp switch on this one.

Electro-Harmonix Little Big Muff

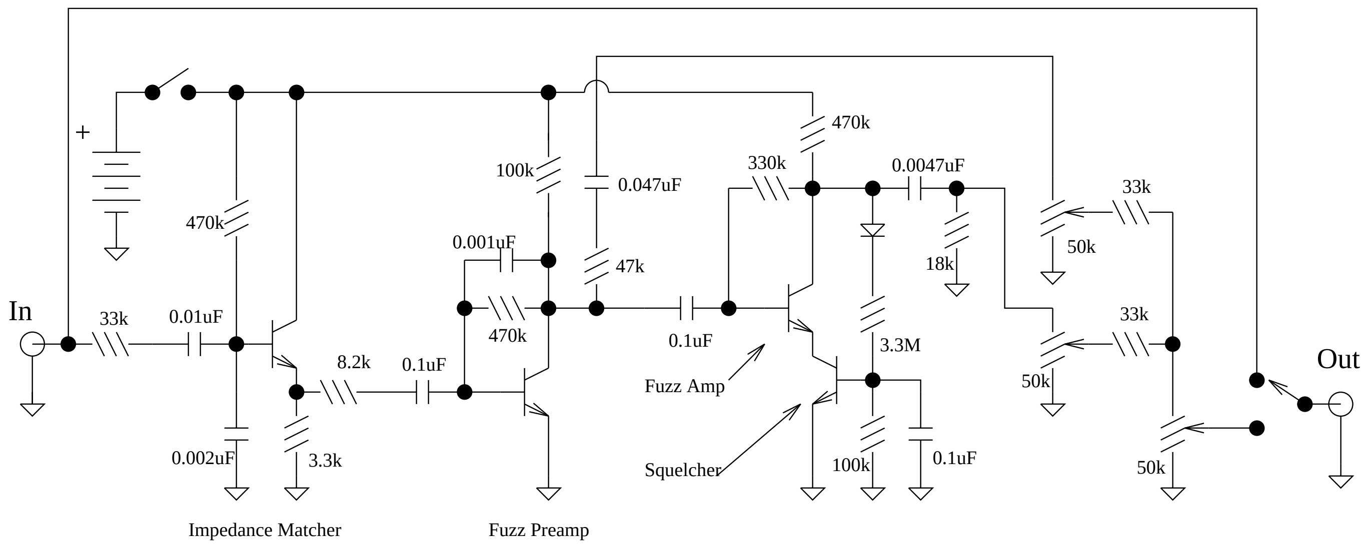


The EH Little Big Muff could probably be improved with modern input jack power switching and a DPDT bypass.

This is the original schematic. The diode and transistor types are unknown. Probably any high gain NPN and 1N914s work.

The caps marked with a * have been reported to work great at 1.0uf.

Maestro Fuzz

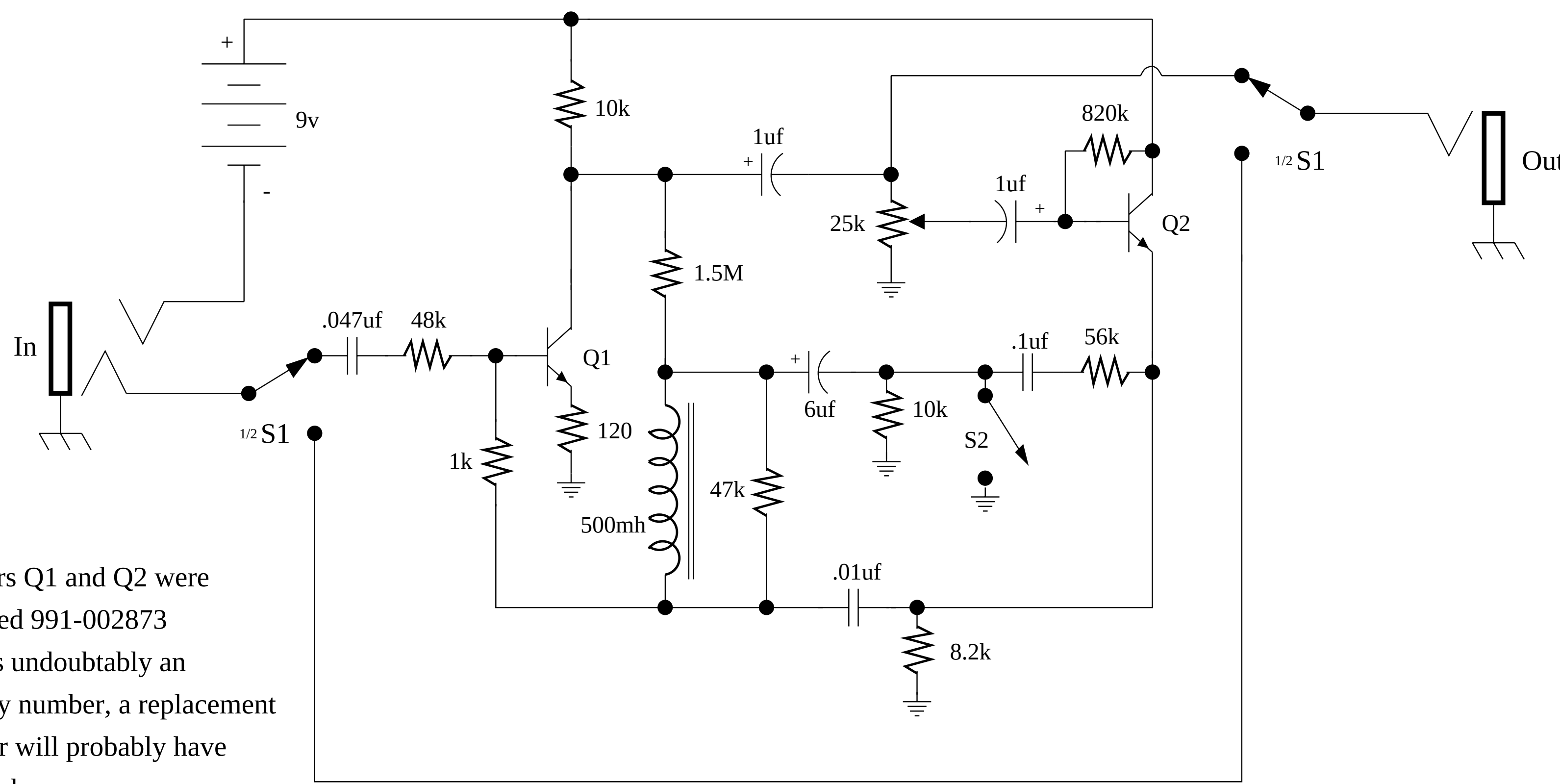


The Maestro Fuzz is reputed to be the fuzz used in the recording of the Stones' "Satisfaction". The transistors are house numbered "991-002298" and the diode is house numbered "919-004799". They are probably all germanium devices. The use of a squelch device is somewhat unique, possibly put there to tame hiss and noise during quiet passages between notes. The two 50K pots which have their wipers connected by resistors are wired so that as one increases, the other decreases, giving a pan from one point in the circuit to another, probably changing the amount of distortion. The last 50K pot is an output level control.

This unit could probably benefit from a modern DPDT switch setup to completely isolate the circuit when it is switched out, and a modern input-jack power switching arrangement.

Maestro Boomer 2

(Wah-Wah / Volume)



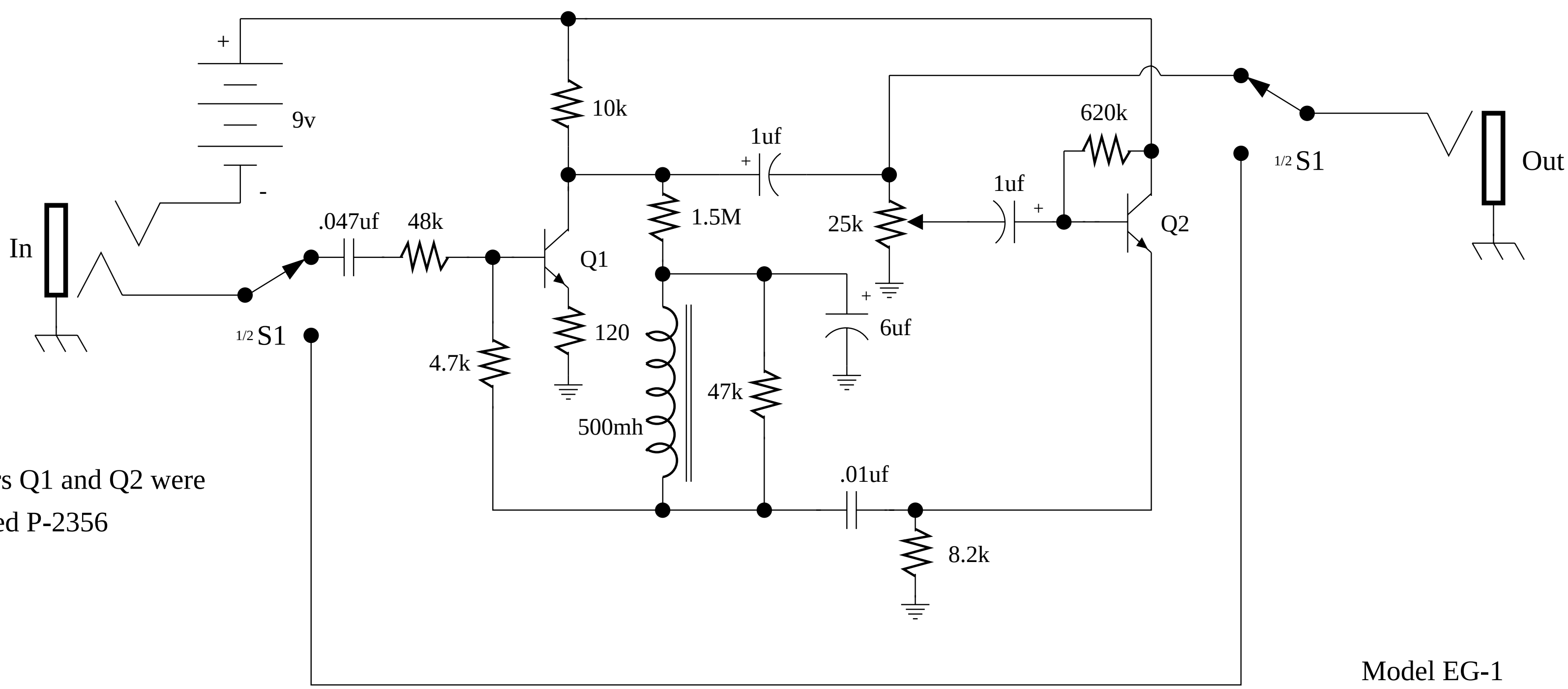
-Transistors Q1 and Q2 were designated 991-002873 This was undoubtably an inventory number, a replacement transistor will probably have to be used.

-S2 is used to switch the pedal between its modes of wah-wah (off as shown) and volume (on).

Model EG-2

Maestro Boomerang

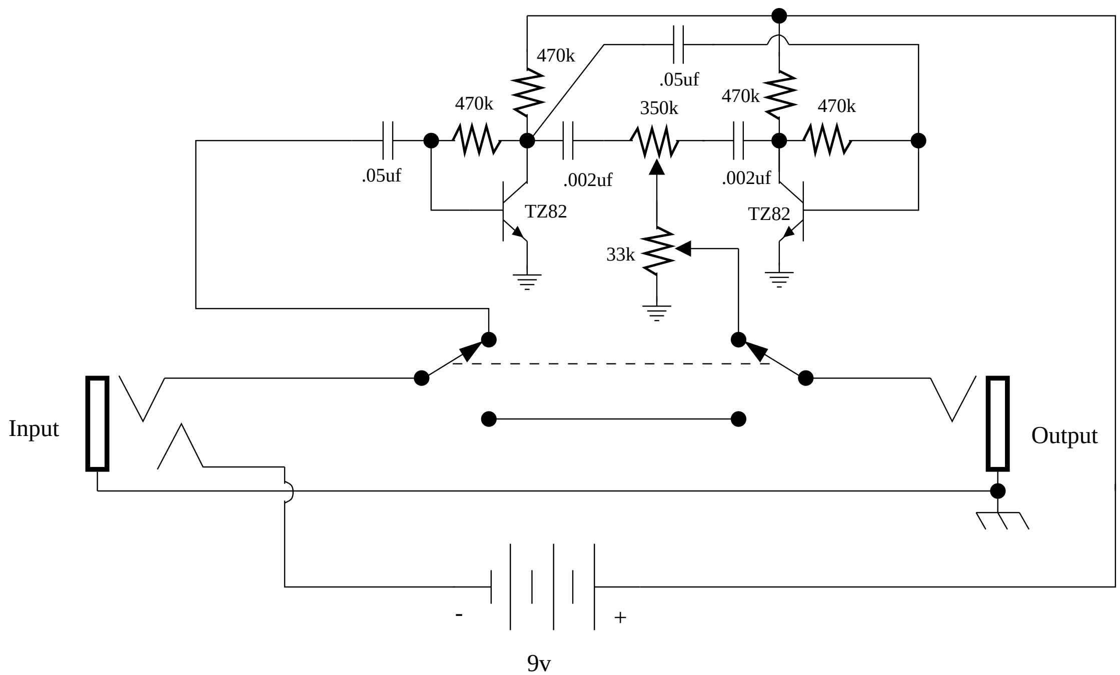
(Wah-Wah)



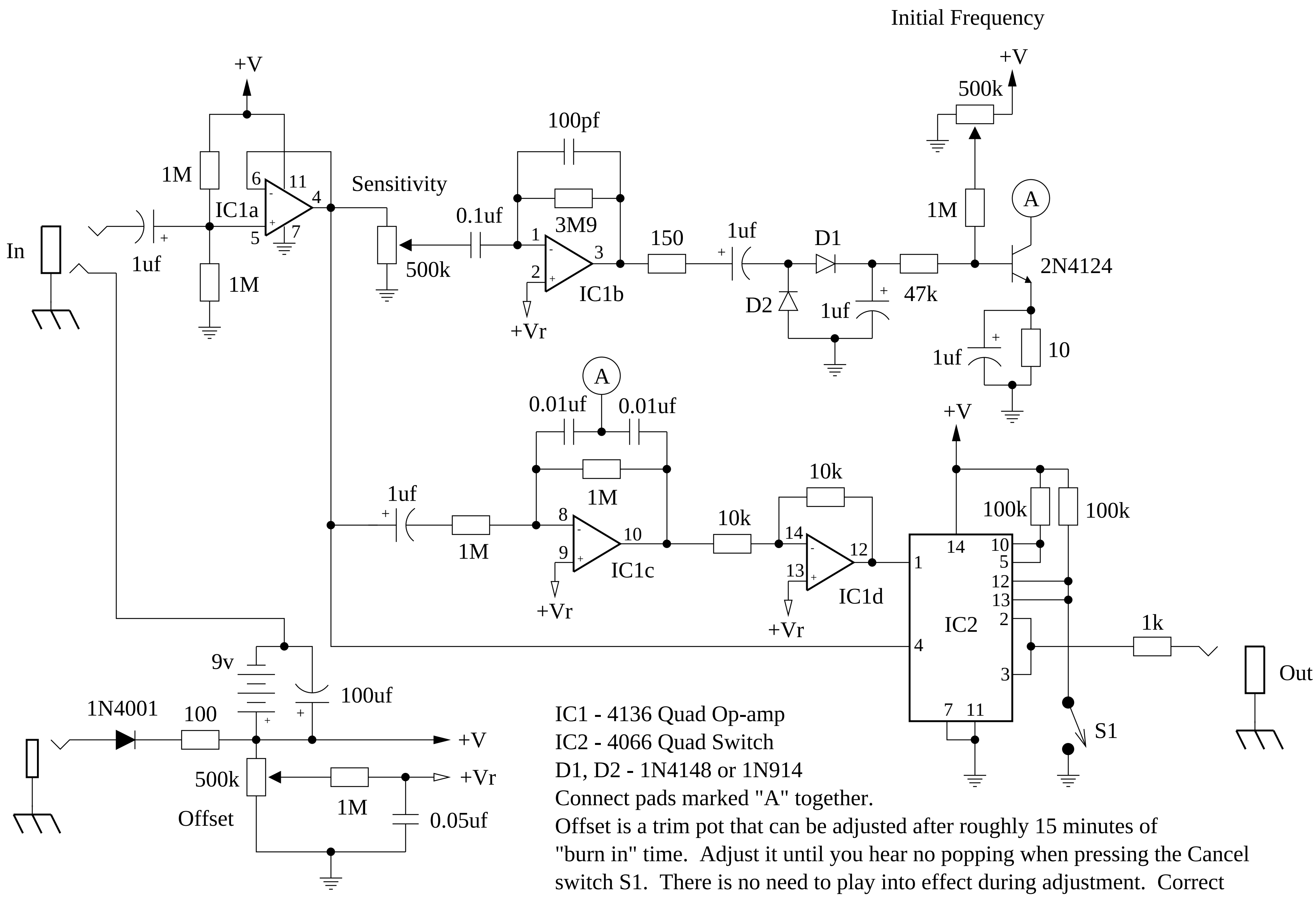
-Transistors Q1 and Q2 were designated P-2356

Model EG-1

Mosrite Fuzz-Rite



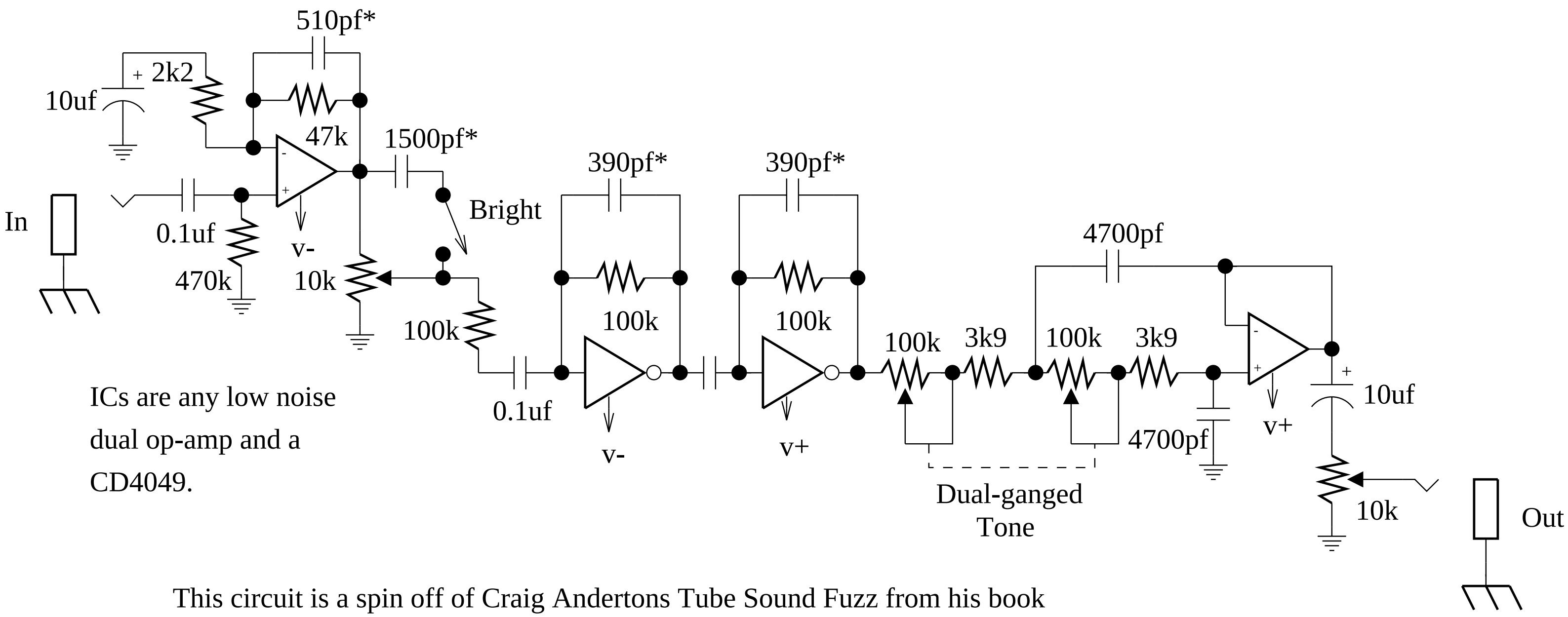
Name: Motion Filter / Follower	Manufacturer / Designer: PAiA Electronics	Revision: 10/29/95	Model # 5720



IC1 - 4136 Quad Op-amp
IC2 - 4066 Quad Switch
D1, D2 - 1N4148 or 1N914
Connect pads marked "A" together.
Offset is a trim pot that can be adjusted after roughly 15 minutes of "burn in" time. Adjust it until you hear no popping when pressing the Cancel switch S1. There is no need to play into effect during adjustment. Correct setting should be near the middle of the rotation.

Modified Tube Sound Fuzz

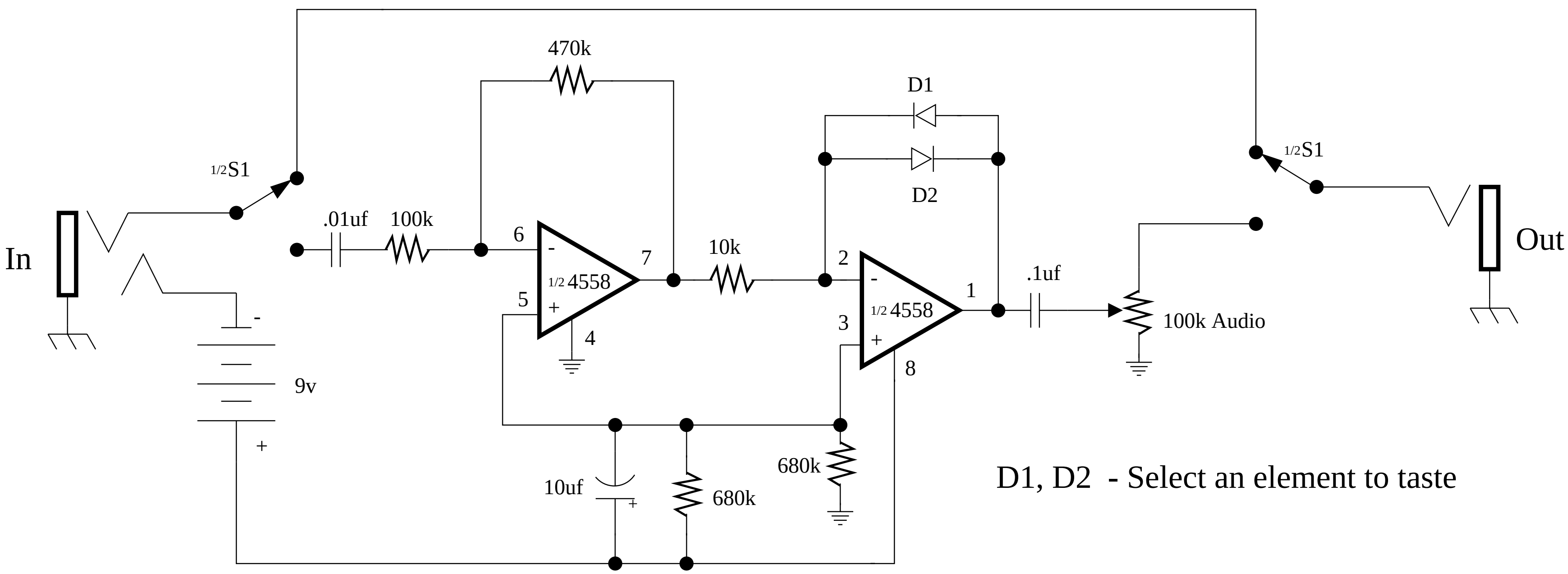
by M. Hammer



This circuit is a spin off of Craig Andertons Tube Sound Fuzz from his book Electronic Projects for Musicians. This only uses 2 stages of a CD4049 hex inverter/buffer the rest were left out of the schematic to keep it simple. Components with a * are suggested values, substitutions can be made freely within 30%.

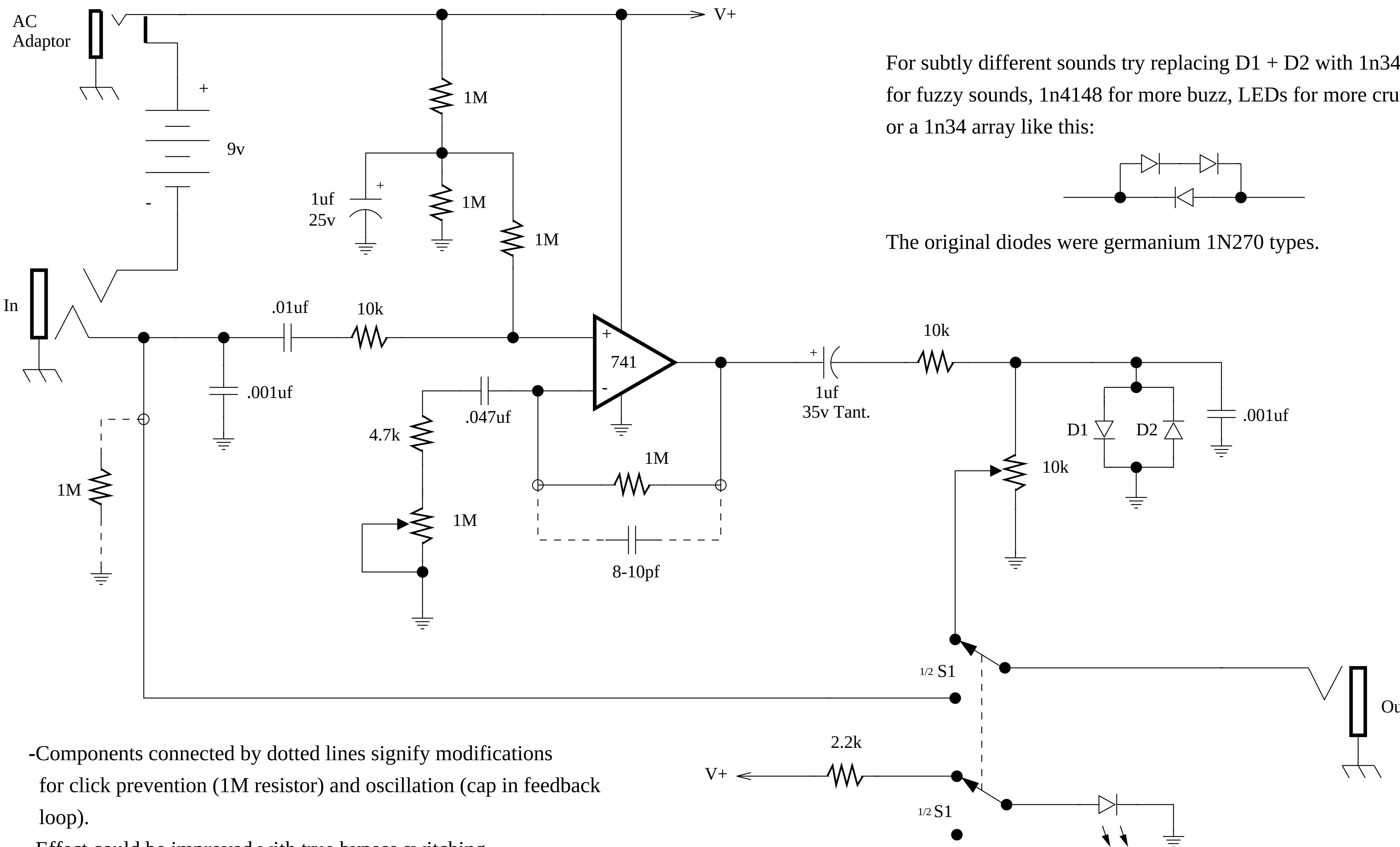
Muff Fuzz

Electro Harmonix



D1, D2 - Select an element to taste

MXR Distortion +



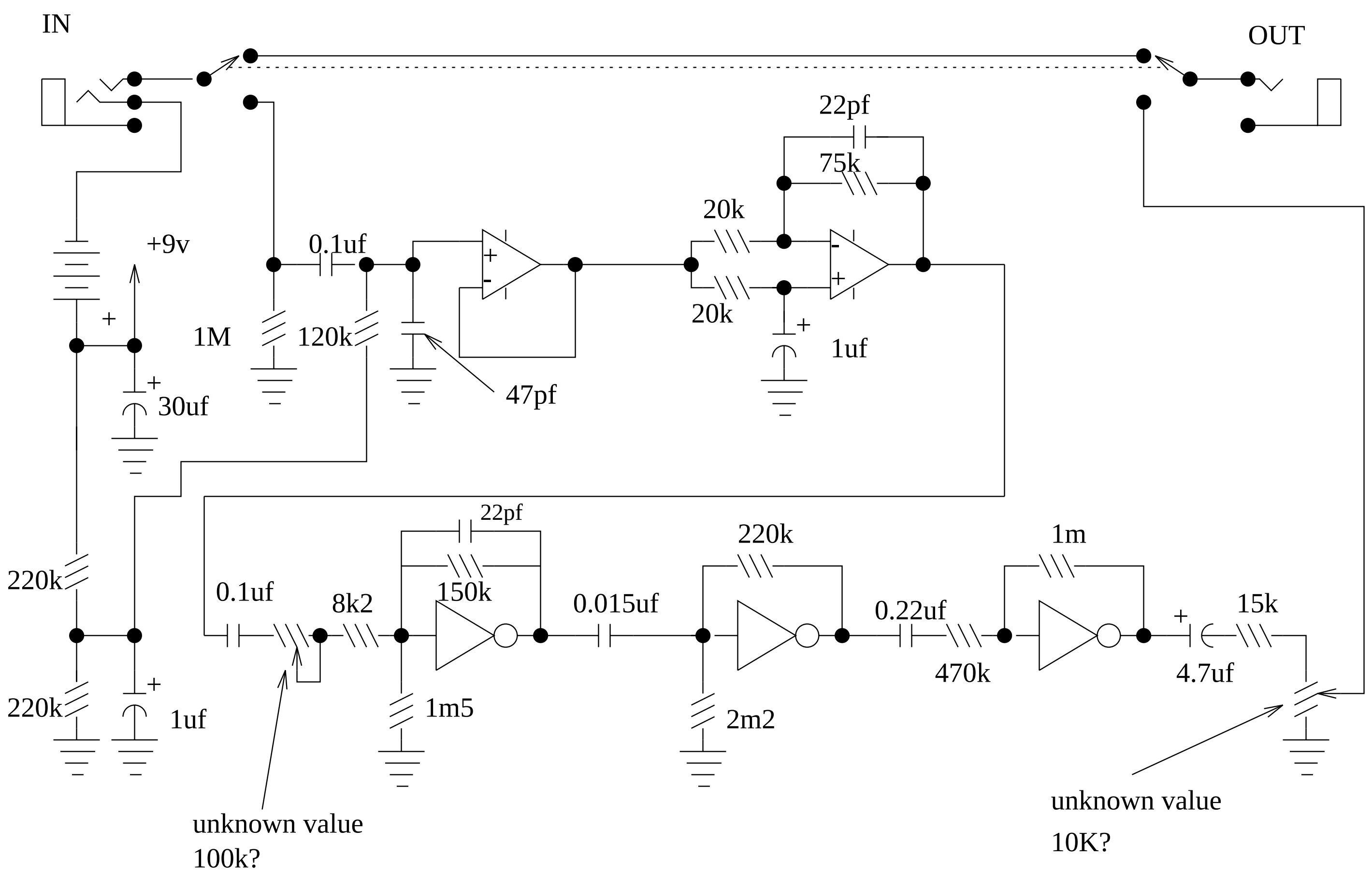
For subtly different sounds try replacing D1 + D2 with 1n34's for fuzzy sounds, 1n4148 for more buzz, LEDs for more crunch, or a 1n34 array like this:

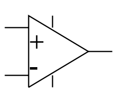
The original diodes were germanium 1N270 types.

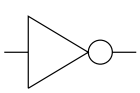
-Components connected by dotted lines signify modifications for click prevention (1M resistor) and oscillation (cap in feedback loop).

-Effect could be improved with true bypass switching.

MXR Hot Tubes Distortion

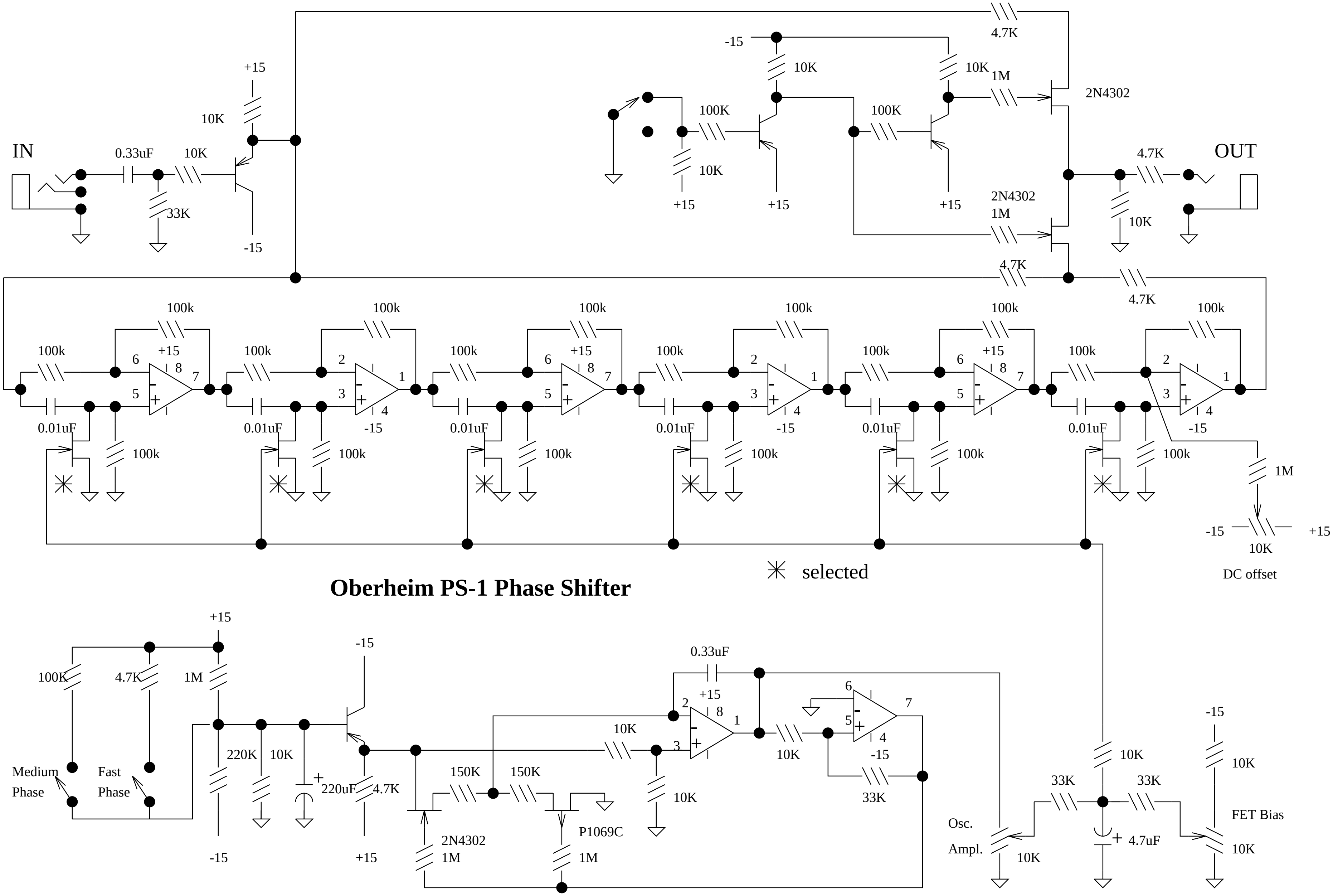


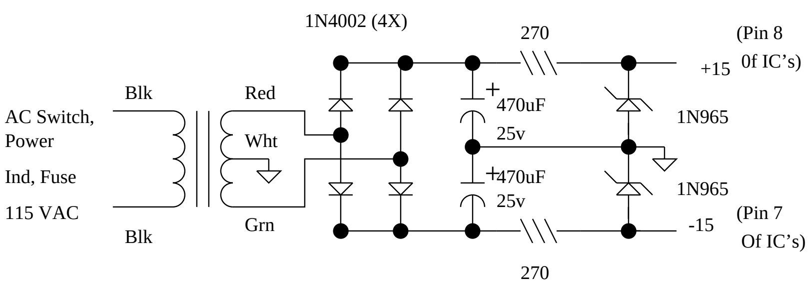
 = 1/2 of dual 741 or 4558 opamp; +v on pin 8, -v on pin 4

 = 1/6 of CD 4049 CMOS inverter. Vdd on pin 1, Vss on pin 8

The MXR Hot Tubes is a commercial cousin of Craig Anderton's "Tube Sound Fuzz". It differs in that it uses a dual opamp input buffer, more stages, and more filtering. Also, there appears to be a DC offset in the bias points of two of the inverter/distortion stages.

Oberheim PS-1 Phase Shifter



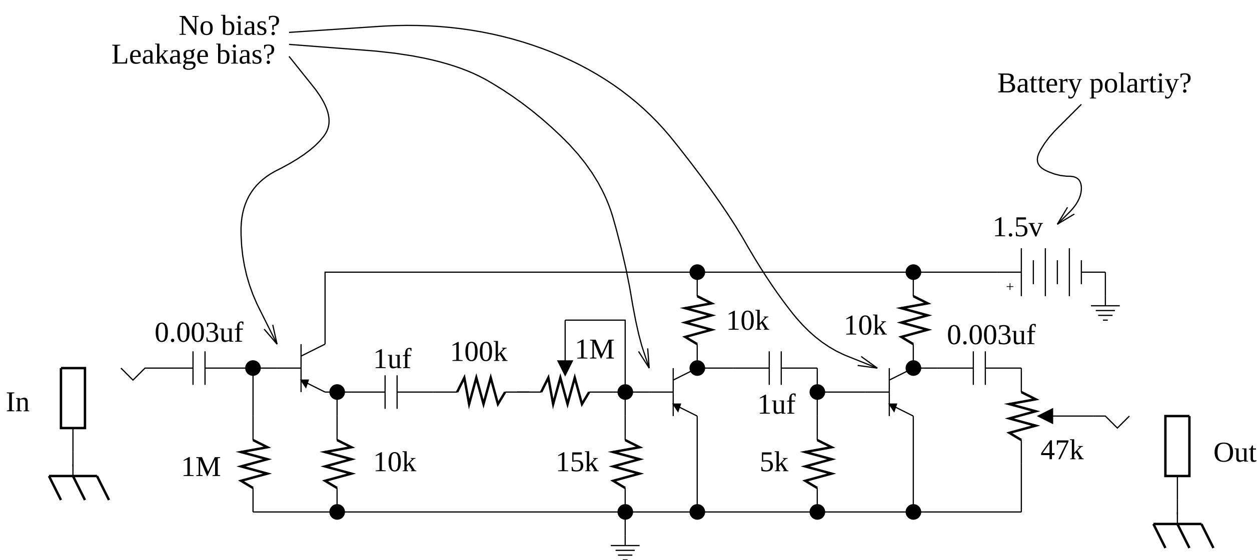


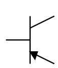
All IC's are 1458 dual op amp. All bipolars are 2N3638A.

Adjustment procedure:

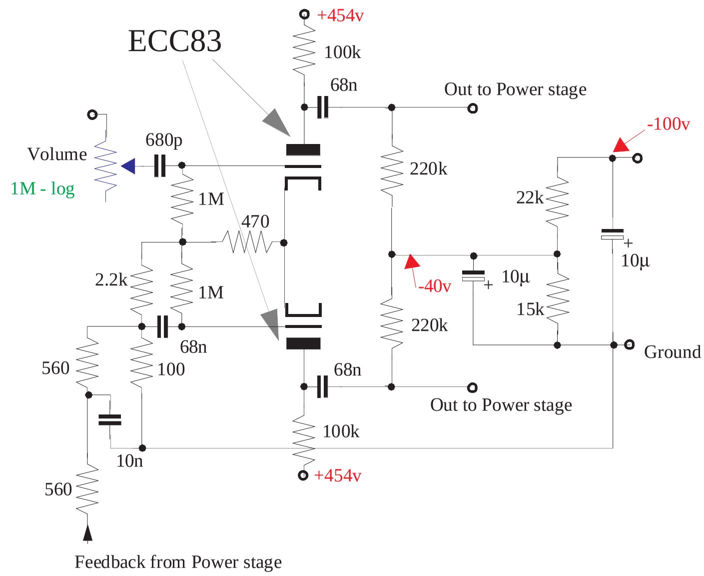
1. FET Bias: With Osc.Ampl. trimmer fully counterclockwise, adjust FET Bias so that audibile phasing sound is in the middle of its range.
2. Osc. Ampl.: Adjust for desired depth of phasing sound.
3. Output Offset: adjust for minimum "click" when Off/Slow Phase switch is operated.

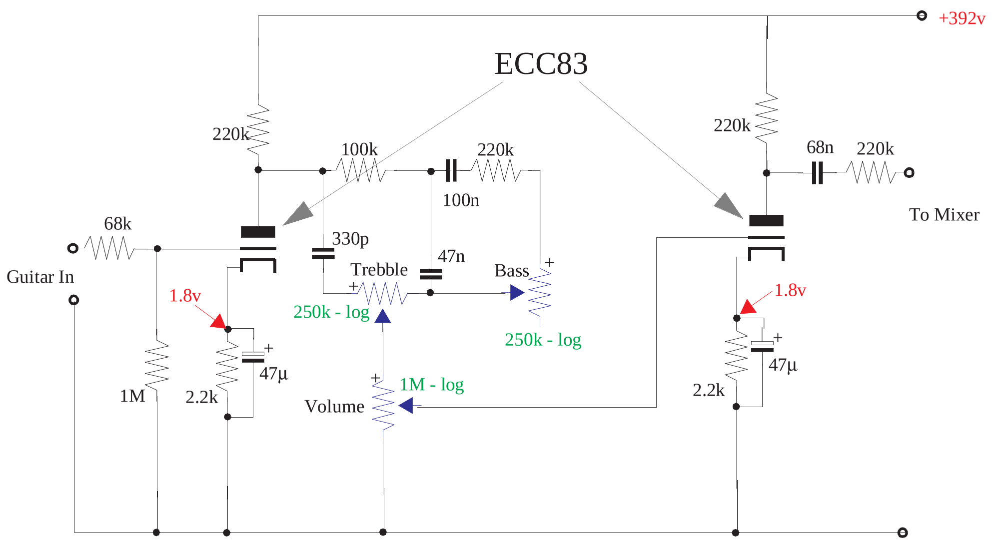
Olson New Sound

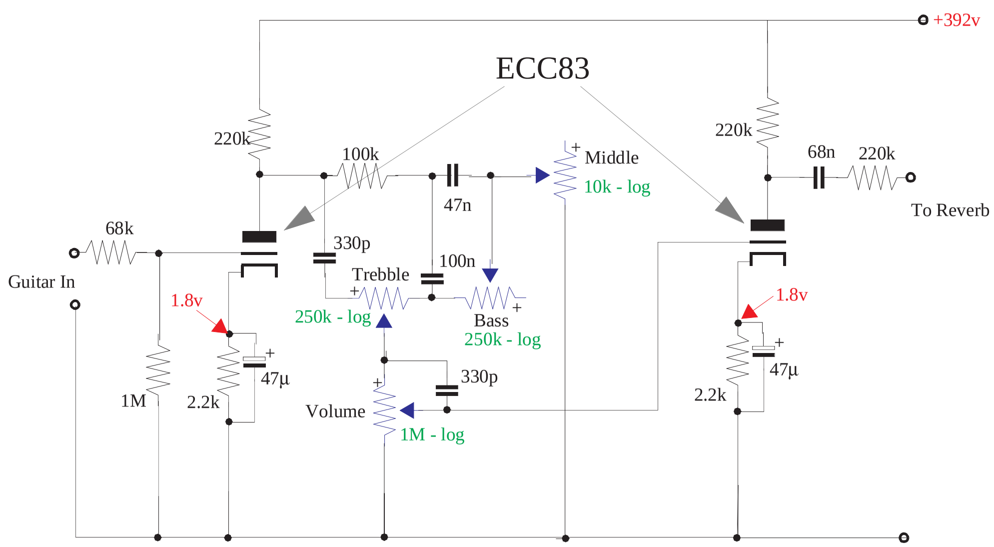


 = 2SB175

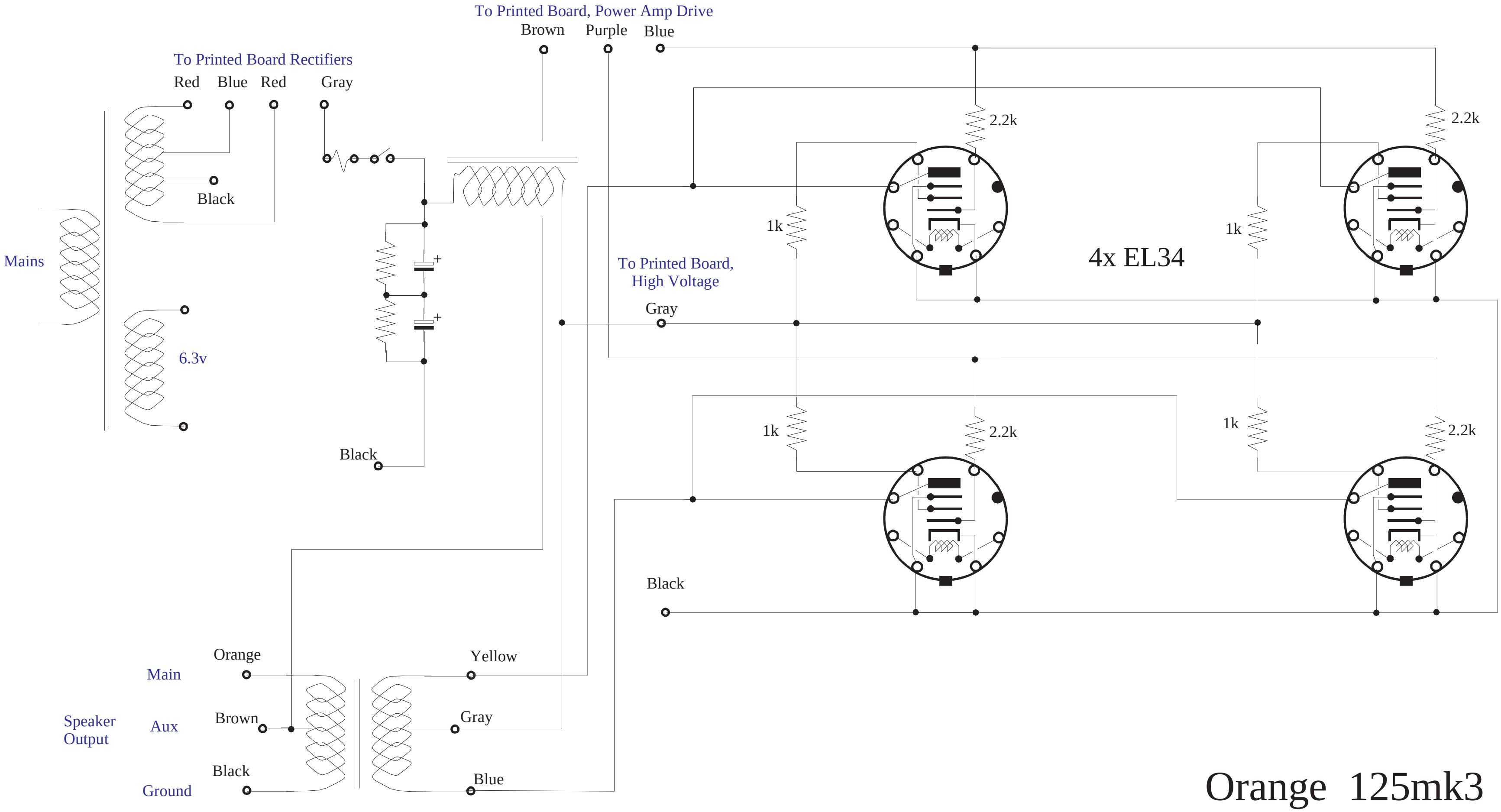
Runs on one 1.5v battery!


ECC83
+454v
100k
68n
Out to Power stage
-100v
Volume
1M - log
680p
1M
470
220k
22k
2.2k
1M
-40v
10µ
10µ
15k
68n
560
100
220k
Ground
68n
Out to Power stage
100k
10n
+454v
560
Feedback from Power stage

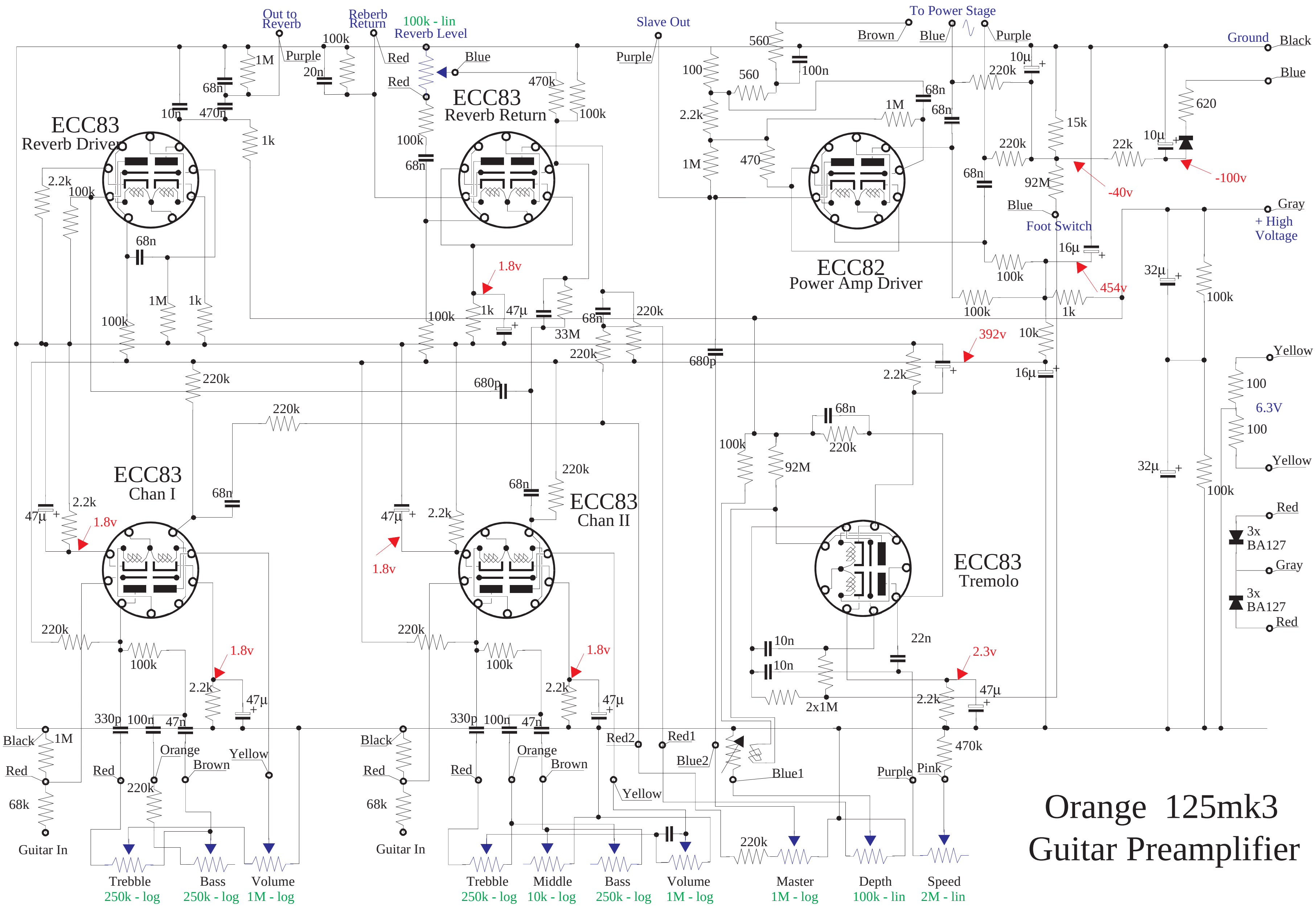




Orange Preamp Section - Channel II



Orange 125mk3
Power Section



Orange 125mk3
Guitar Preamplifier
ECC83
Reverb Driver
ECC83
Reverb Return
ECC82
Power Amp Driver
ECC83
Chan I
ECC83
Chan II
ECC83
Tremolo
Out to
Reverb
Reberb
Return
100k - lin
Reverb Level
Slave Out
To Power Stage
Brown
Blue
Purple
Ground
Black
Blue
Gray
+ High
Voltage
Foot Switch
-40v
-100v
454v
392v
1.8v
2.3v
6.3V
Yellow
Red
3x
BA127
Gray
Guitar In
Black
Red
68k
1M
Orange
Brown
Yellow
Red1
Red2
Blue1
Blue2
Pink
Trebble
250k - log
Bass
250k - log
Volume
1M - log
Middle
10k - log
Master
1M - log
Depth
100k - lin
Speed
2M - lin

Voltage Controlled Panner

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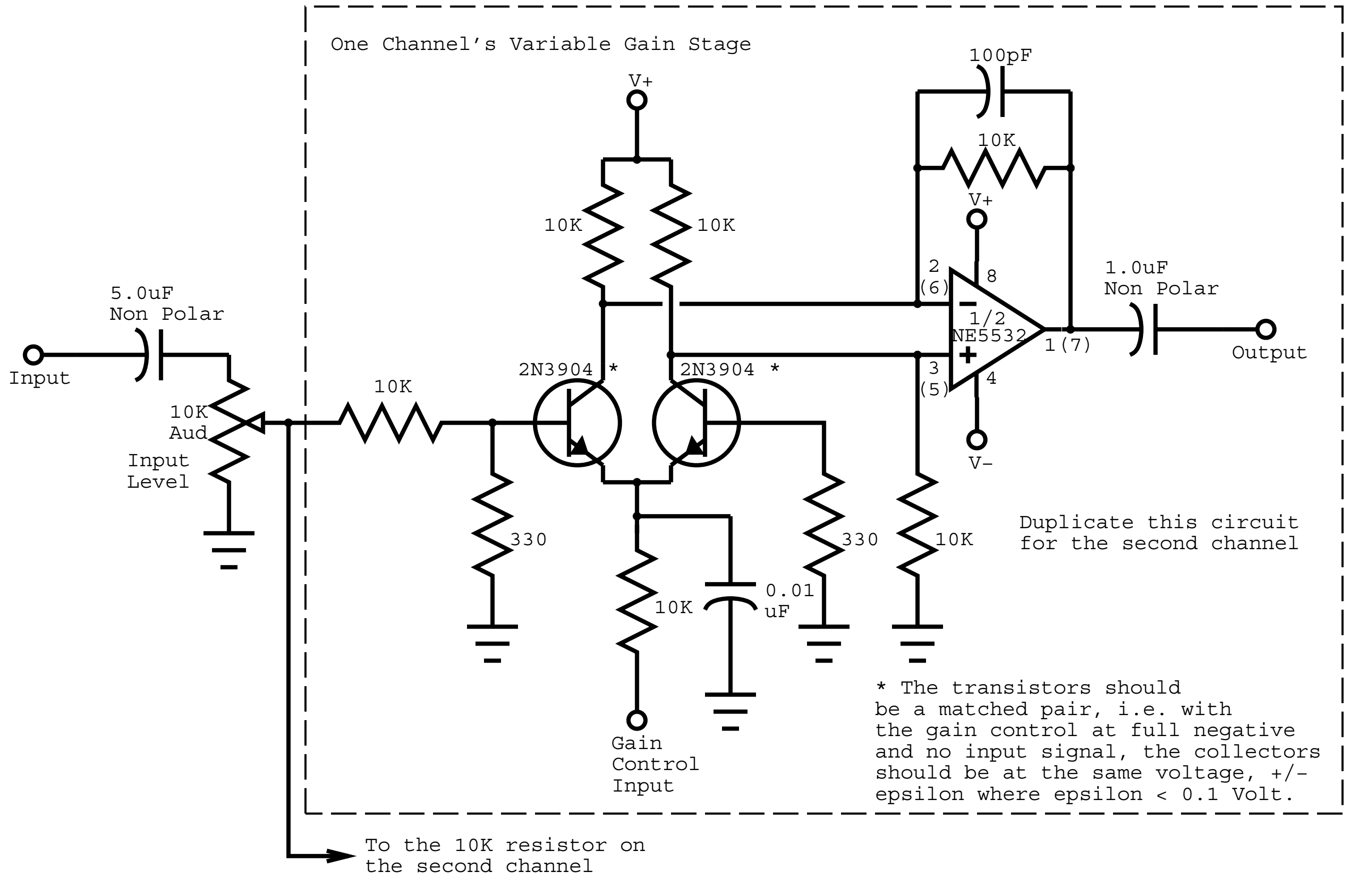
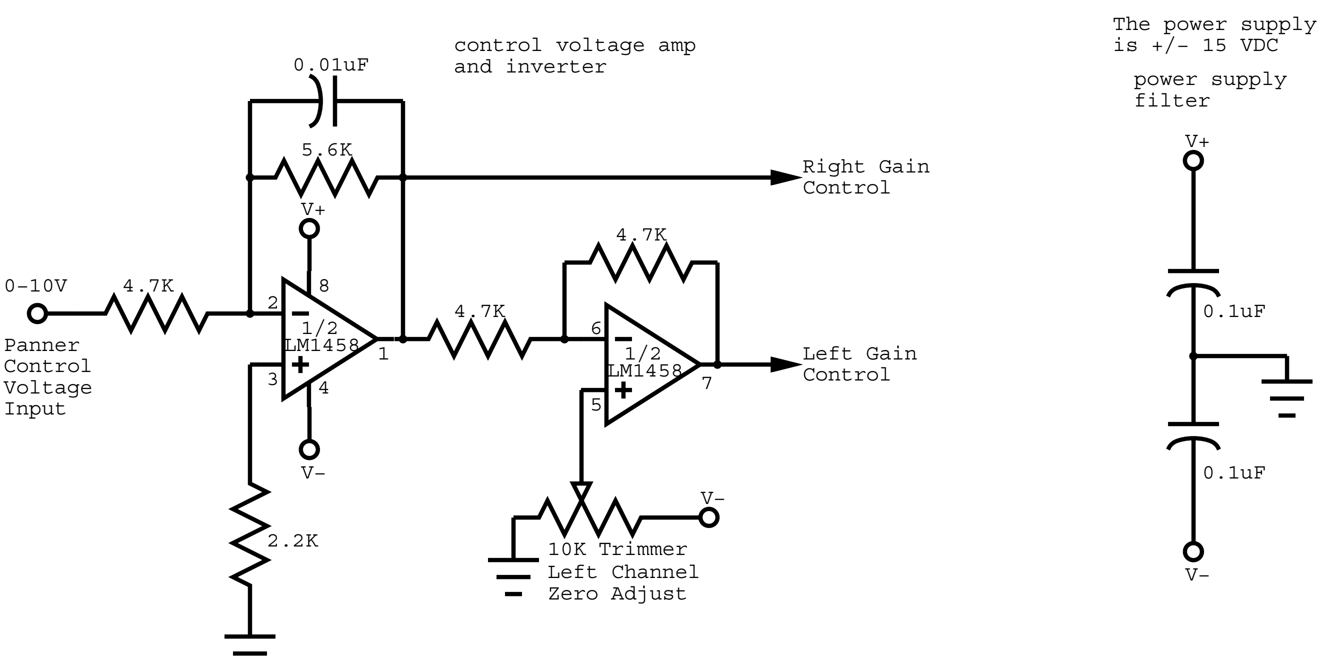
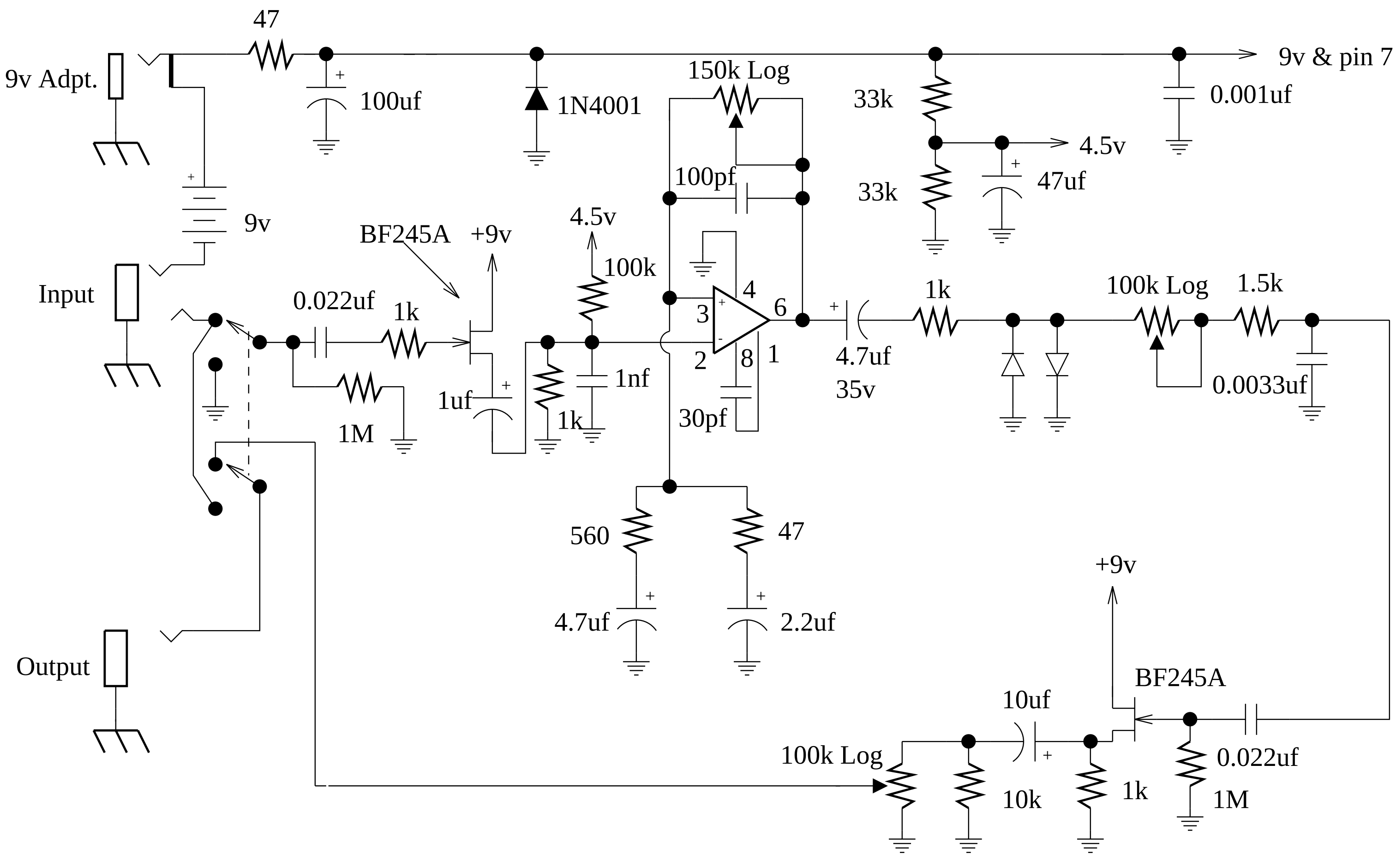
cook@stout.atd.ucar.edu





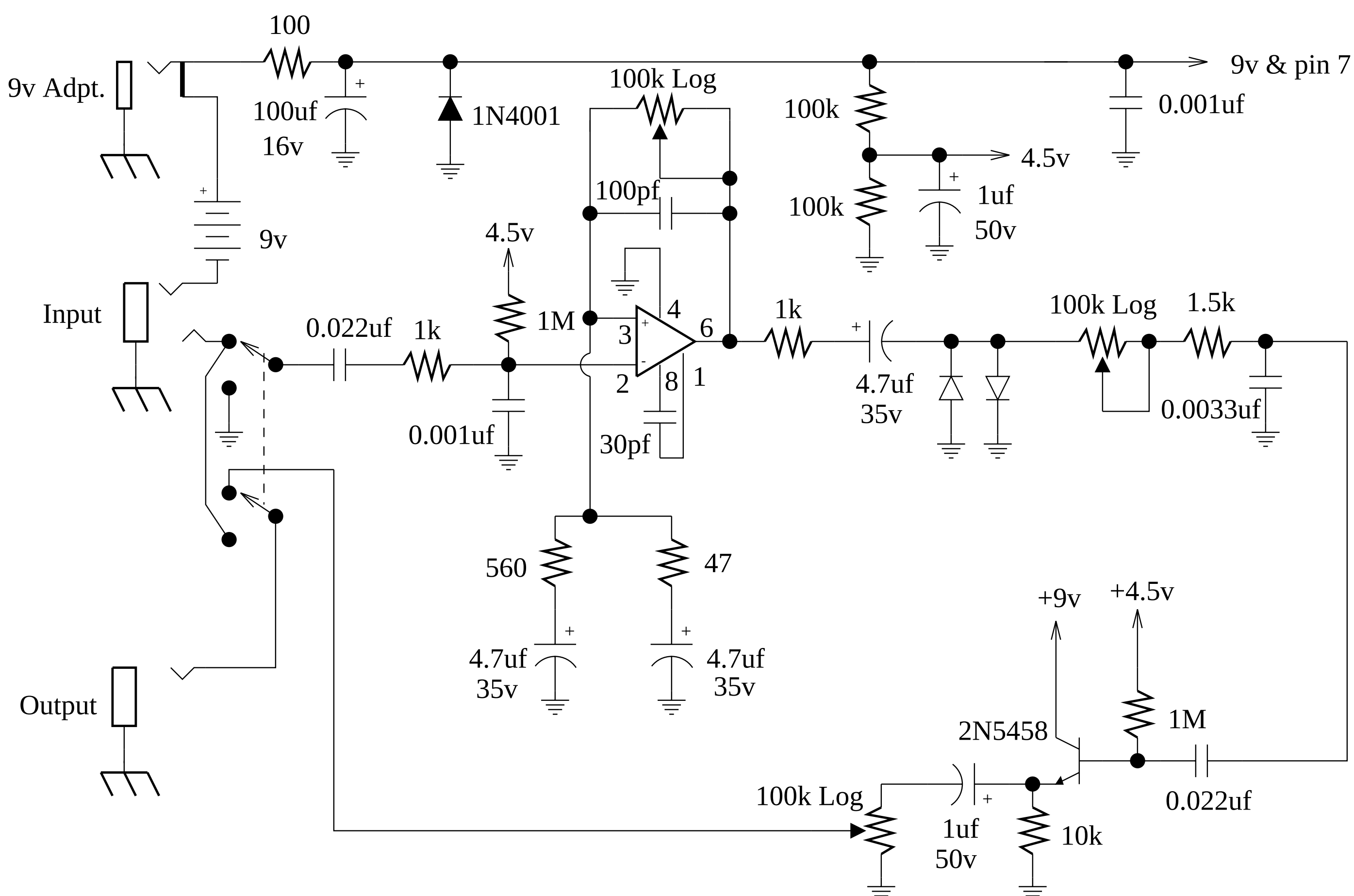
ProCo Rat Distortion



IC = LM308

Diodes = 1N4148

ProCo Rat Distortion



Type B Rev 7-81

Current Drain @ 9v

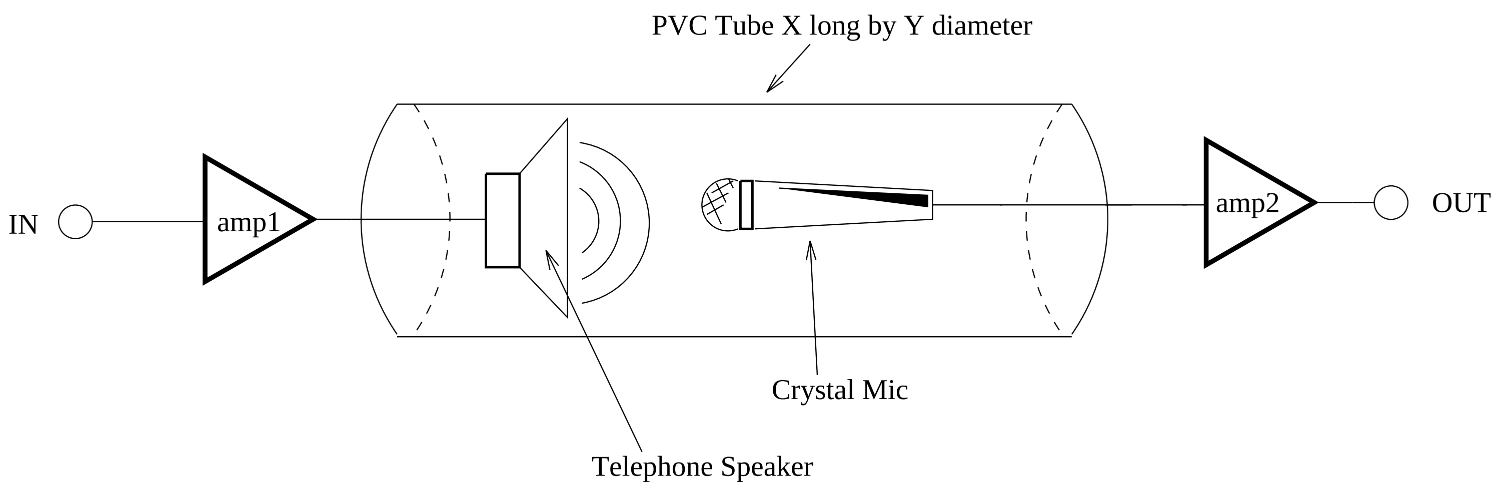
~ .6ma, no Input (idle)

~ 1.6ma, full output

IC = LM308

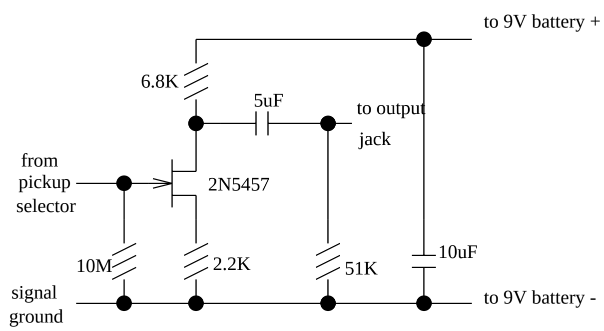
Diodes = 1N4148

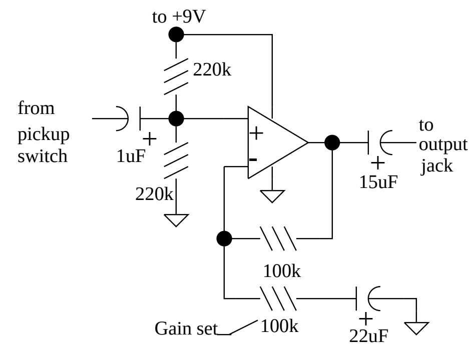
THE PIPE BOMB



My dimensions for my prototype are X= 36cm, Y= 5.5cm. This imparted a pretty high pitch tone but I like it. The X and Y dimensions should be played with to create the exact tone your looking for, also I chose a telephone speaker and a crystal mic so I got the funkiest tone I could think of. A dynamic mic would limit the trebel somewhat probably make it sound less harsh. I'd be interested in any mods made to this design (ie. stories, ideas, etc.) so feel free to email me. The amps can be any old simple op-amp configuration that can drive a speaker or take a mic input. I just used some surplus stuff I had lying around to make mine. The end product had all the circuitry inside the tube and the battery on the outside, with one control for the gain of the speaker (mic was at fixed gain). Note, if you place this infront of your amp and turn every thing up, without adding any dampening to the tube it will feedback like you wont believe! You will probably wish to avoid this as it tends to hurt your ears. I put a bit of foam rubber in one end of the tube and an old sock in the other to dampen feedback. I like to leave my options open though, so I also didn't make this a permanent addition. My prototype is basically a fuzz, as my guitar will overload the speaker quite easily and the tube just adds a bit of strange overtone and what I swear is the tiniest hint of reverb. Sounds great though! Clean tones through a similar set up would sound good too, but I haven't built one of those yet. Perhaps a larger speaker (4-5") and an old carpet tube would add better characteristics for clean tones. Try changing the tube matierial also for a different tone, I almost used a bit of gutter piping when I first built this, now I wonder what it would've sounded like.

Jamie Heilman 11/93
n9343176@cc.wwu.edu

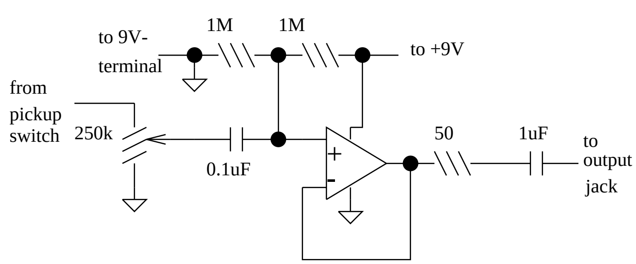




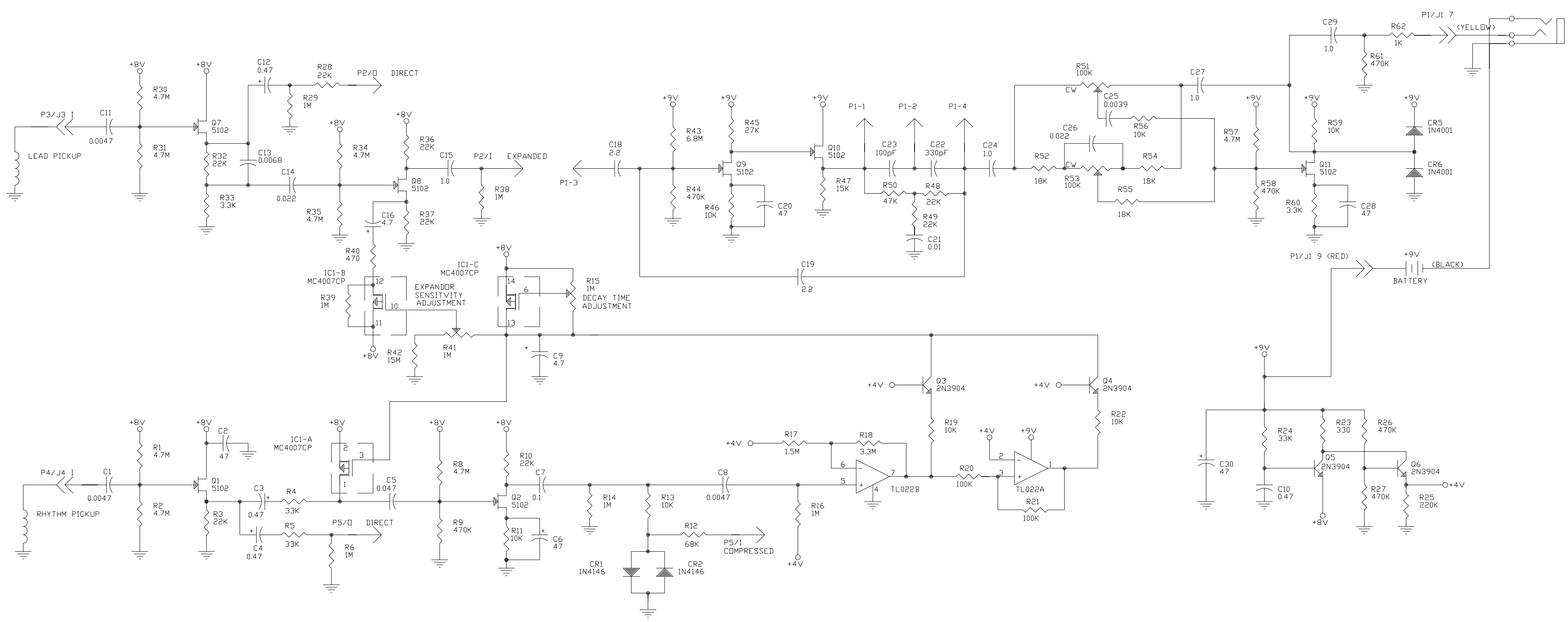
For people who don't like op amps, here is a discrete JFET preamp design. It has low distortion, low noise, low feedback, overloads gracefully, is small, etc, etc. Overall gain is 3db (2X) or so. It uses about 1/2 ma, so a 9V battery will last a long time. You can add a high boost switch if you like by having it shunt the 2.2k resistor with a 0.05uF cap (or other value; smaller cap = boosts only higher frequencies, and the reverse). You can just put in a 10uF cap across the 2.2k resistor to up the gain.

Circuit by Don Tillman. don@till.com

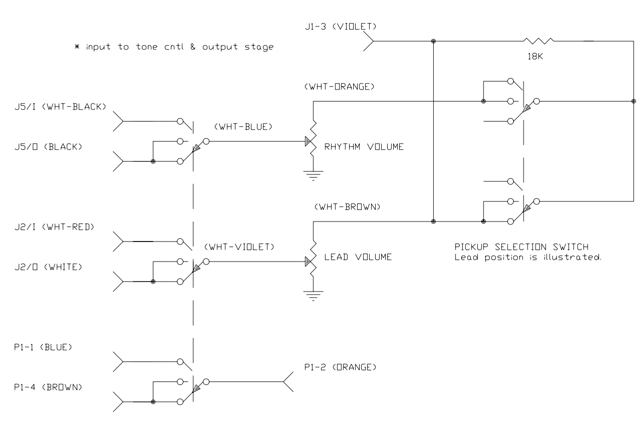
A preamp from a TL071 op amp. The gain set resistor lets you customize the gain. As shown, it is 2. Lowering the Gain Set resistor lets you raise the gain. You get distortion at high gains.



The opamp is a LT1012 micro power opamp, could be other low noise low power op amp. Use a stereo jack on the guitar to turn power on when a cable is plugged in. The circuit produces no noticeable noise or distortion and a 9 volt battery lasts a couple of years. This is intended to buffer the guitar pickups and controls from the cable capacitance. It is possible to add gain to this circuit by modifying the



RD Artist switch wiring description:



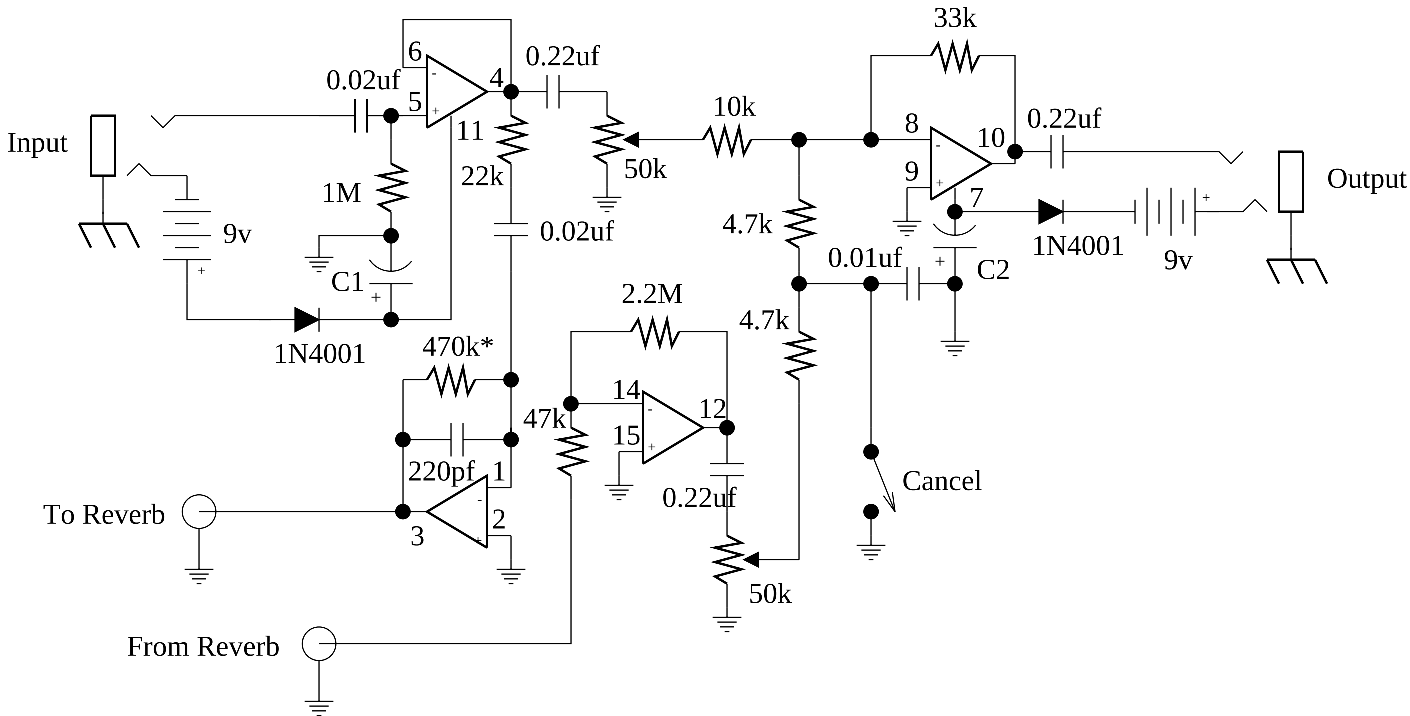
NOTE:

(1) Both compression and expansion effects are determined by the lead pickup output only.
(2) P and J designations refer to plugs and jacks respectively.
(3) I and O designations refer to inner and outer connections for the specfic plug/jack.
(4) Two green wires connecting P1-(5,6) are signal grounds. P1-8 is used for plug polarity sensing.

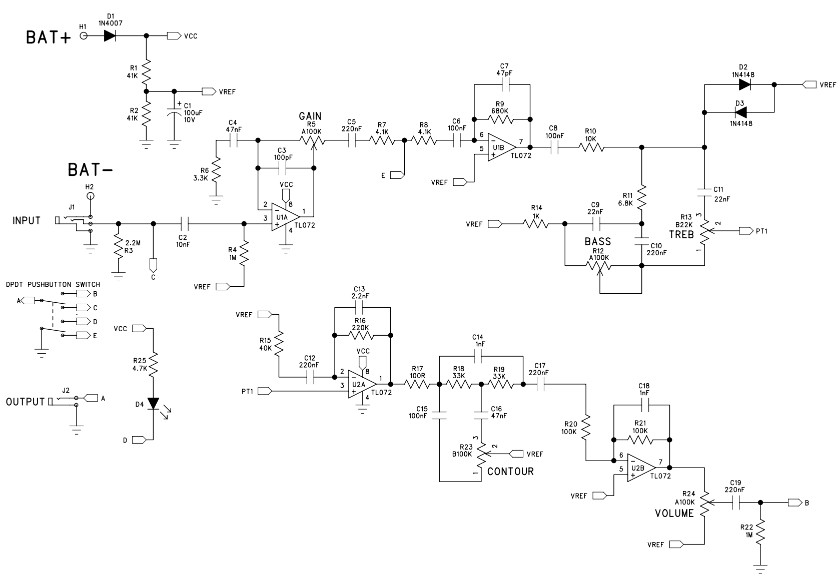
GIBSON RD-Artist		
Schematic drawn by: Fabian P. Hartery		
Title: RD Artist Active Electronics (Assy. Rev. C)		
Size: C	Document Number: 996-042368-001 (MOOG 980-042367A)	REV: C
Date: November 20, 1994	Sheet 1 of 1	

Stage Center Reverb Unit

from Guitar Player 1976 by Craig Anderton

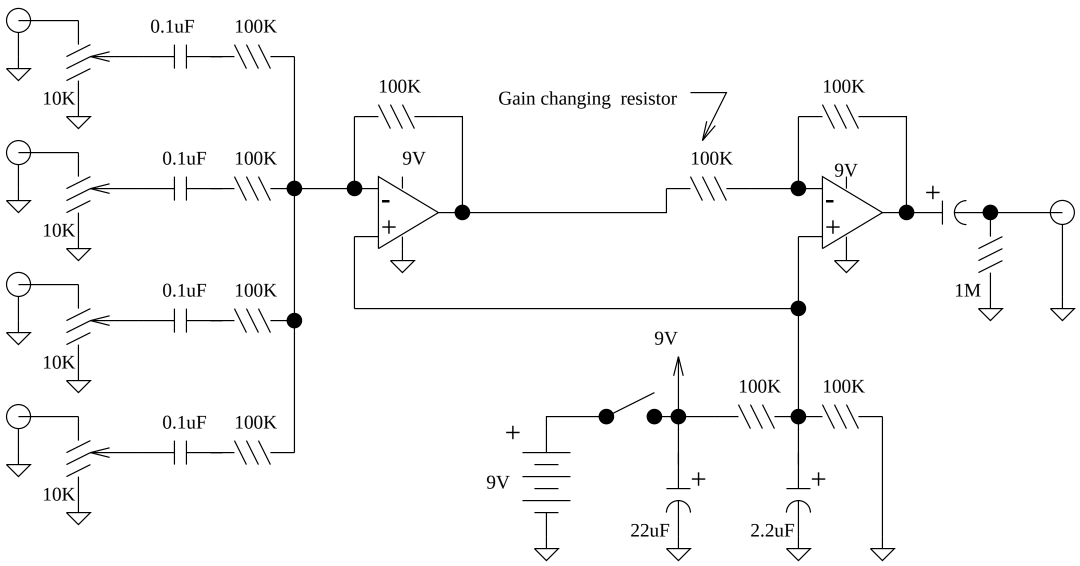


This simple spring reverb can be built cheaply and requires a minimal amount of space for the circuit it self. The op-amp is a quad type, the pinout for a 4136 is shown, but others may be substituted. The bypass caps C1 and C2 can be from 10 to 100 uf. The resistor marked with a * may need to be lessened if you experience distortion in your reverb, lower this to achive maximum signal with no distortion. Many spring reverb units may be used with this circuit, the original article suggested an accutronics model. Many reverb units also use RCA style jacks for in’s and out’s, be prepared for this. The cancel switch will shut off the reverb effect without any clicks or pops. All resistors are 1/4 or 1/2 watt, 5% tolerence, and all caps are rated at 10 or more volts.



DATE Dec. 19, 1994	
	DRAWING NAME Marshall Shredmaster
	SIZE	DRAWING NUMBER
	SHEET 1 OF 4

Simple Mixer



A simple mixer suitable for mixing microphones or effects outputs. The overall gain from input to output is one if the pot corresponding to the input is full up. You can make this a net gain of ten (or any other reasonable gain) by reducing the input resistor to the second op amp. 10K in this position gives a gain of ten, or 20db. If you are mixing effects outputs which have an output level control built into them, you can dispense with the input level controls, or make some have level controls, some not. Audio taper pots are probably better, but linear will work.

For the opamps, choose a jfet input dual or singles, like from the National Semi LF3xx series, or something like the TL072 or TL082.