CLX-VU

VCA COMPRESSOR

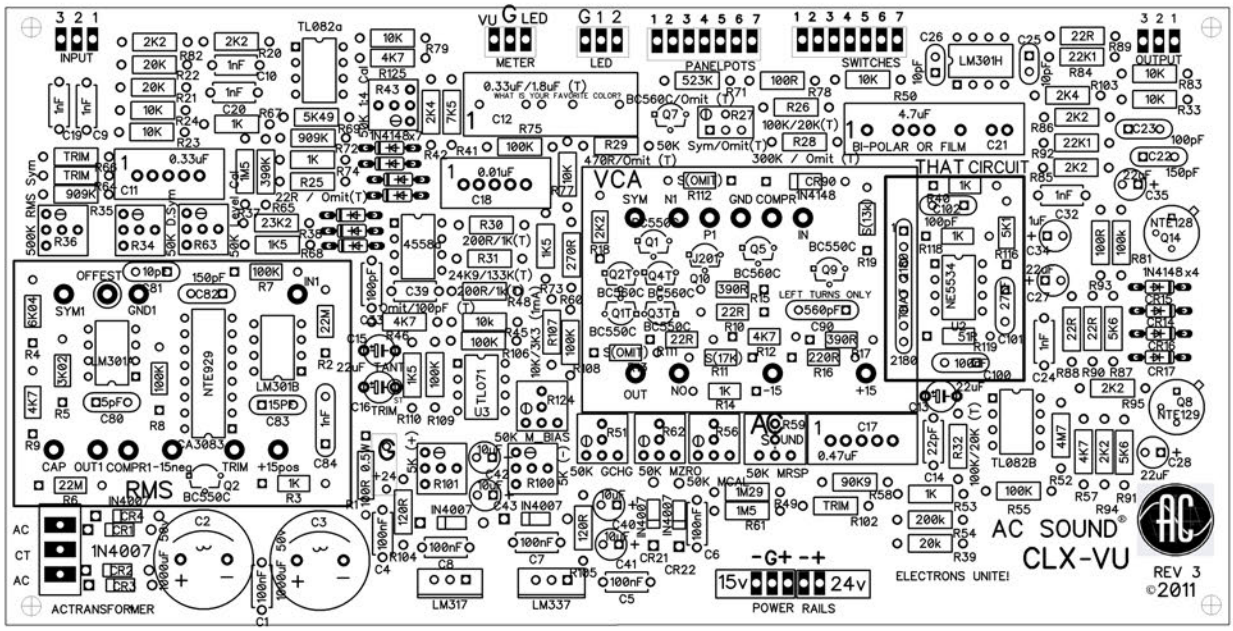
REV 3

PROJECT MANUAL

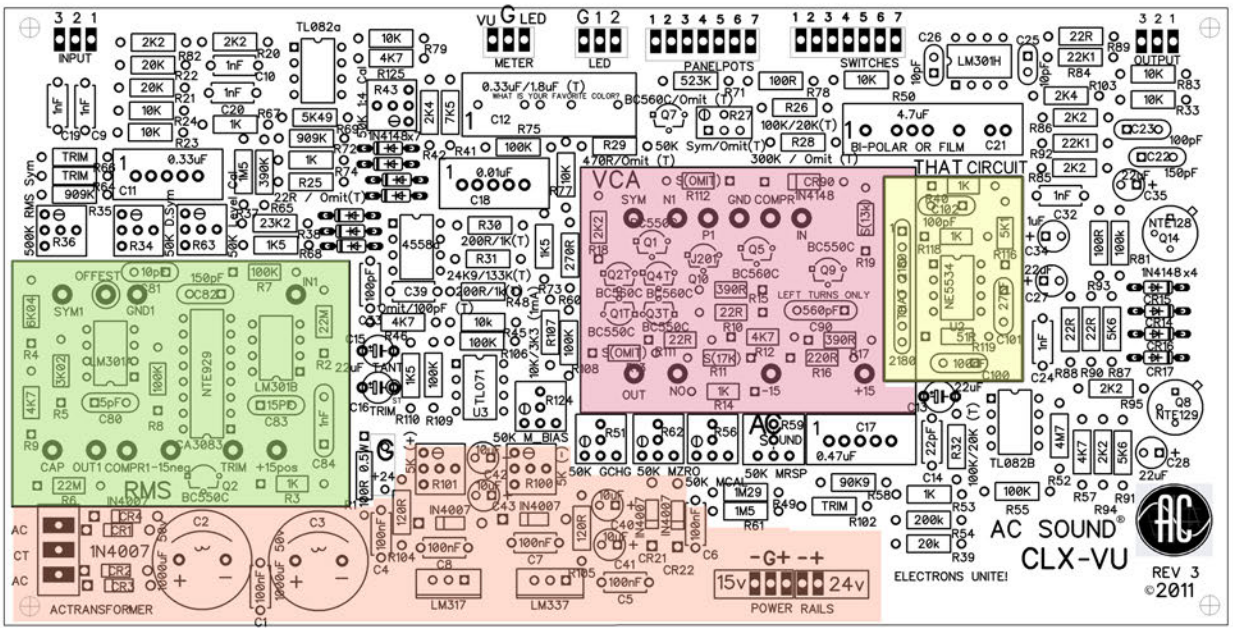
SECTION 1

SPECIFICATIONS

THE CLX-VU REVISION 3 CIRCUIT BOARD



CLX-VU PCB SECTIONS



DISCRETE 200 VCA

POWER SUPPLY

THAT 2180 VCA

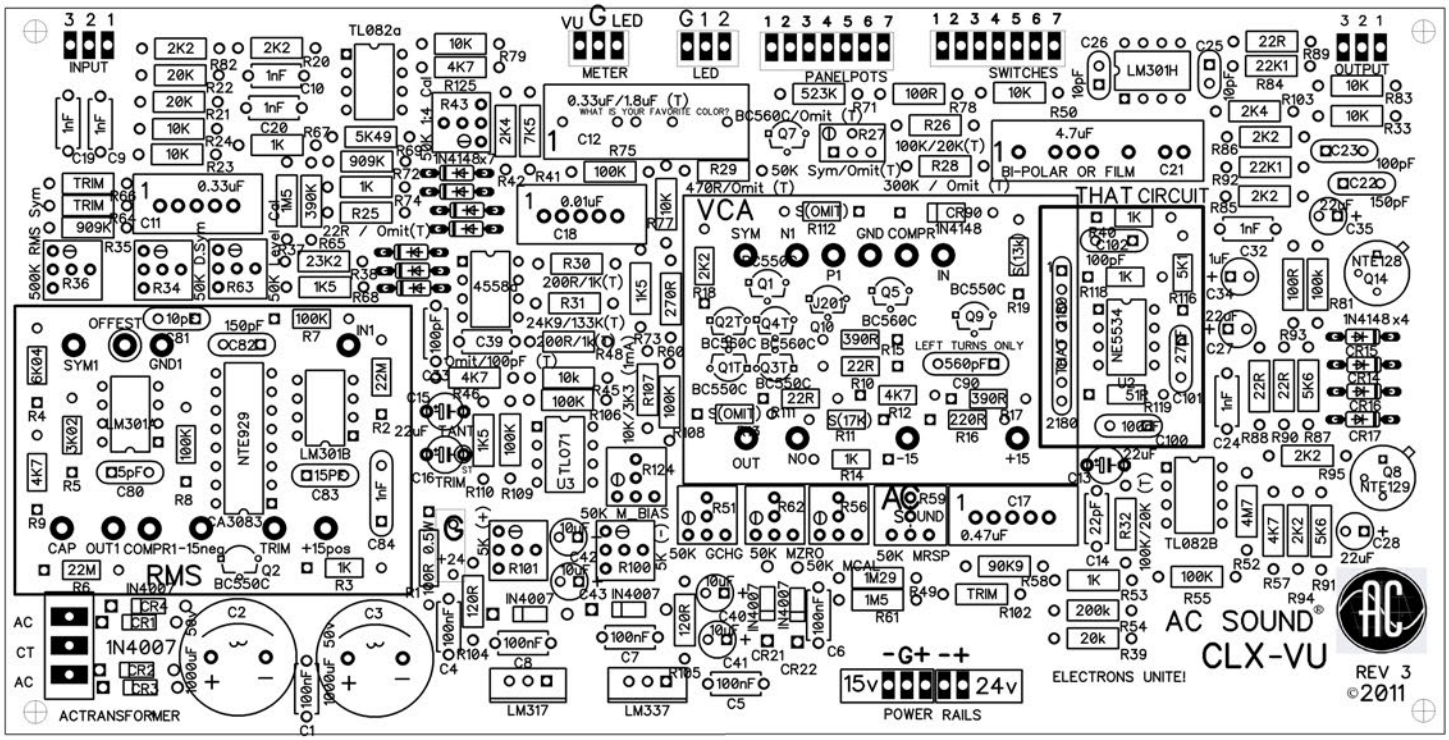
RMS UNIT

PCB COLOR DESIGNATION

SECTION 1

INTRODUCTION

CLX-VU PCB REV 3



Congratulations on your purchase of the **AC Sound CLX-VU** Compressor/Limiter! This compressor is based on a classic design from the '70s. Its sonic signature can be heard on countless records. An engineers favorite for Kick & Snare, and Bass.

Please use this build manual as a reference. If you have any questions email us at:
info@acsoundstudio.com

Disclaimer: Electricity kills! Please use every precaution when working on this project. We can not be responsible for any accidents that may occur while working on this project.

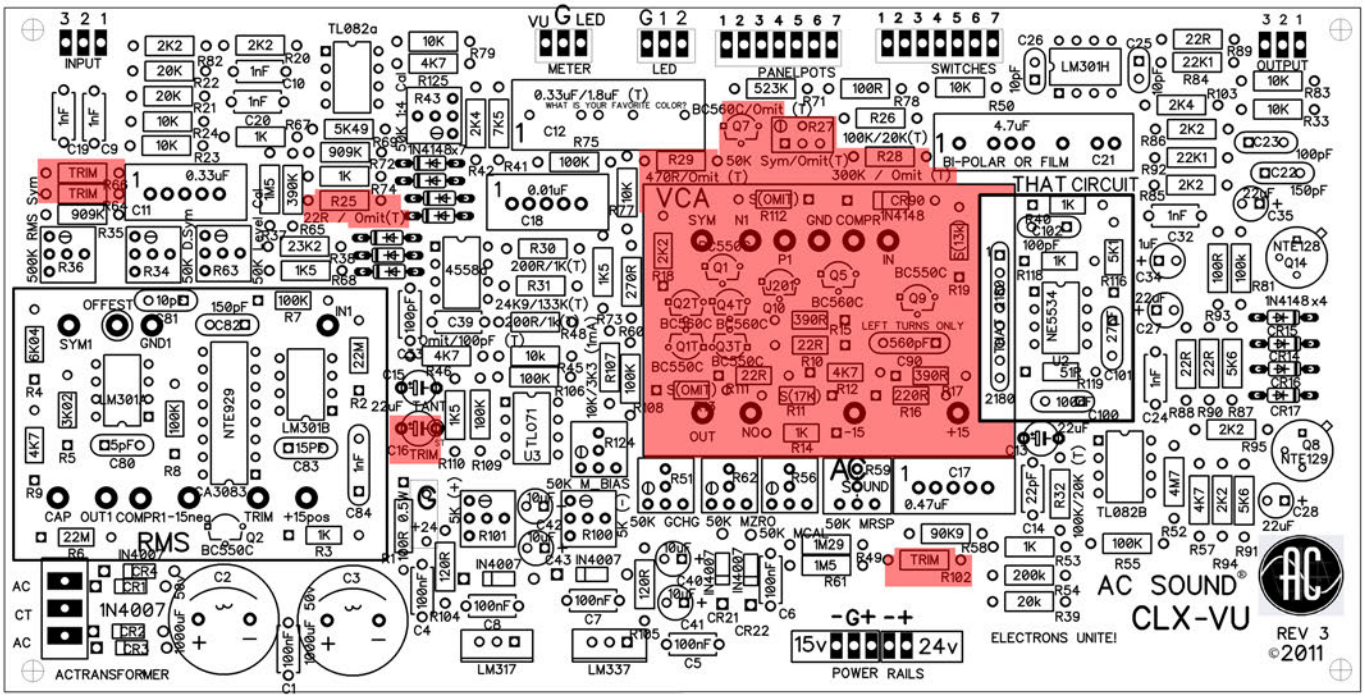
VCA options

Discrete VS. Monolithic THAT 2180 VCA

The original compressor the CLX was based on used a very primitive (but awesome) discrete VCA. Rolling your own VCA is out of the scope of this manual as it is said to be very time consuming and the sonic results can be heavliy outweighed by a modern replacement chip (made by some of the orignal enigeers from DBX) the THAT 2180. We're not trying to sell the That chip, but we love it because it sounds great and is much easier to implement then sitting in a dark room all night matching transistors.

But we have the original VCA on the board if you want to make your own discrete VCA. Or you can get an original 200 series VCA and plug it right into the board.

Anyway! Enough confusion. This manual is for the CLX build using a That 2180 chip.



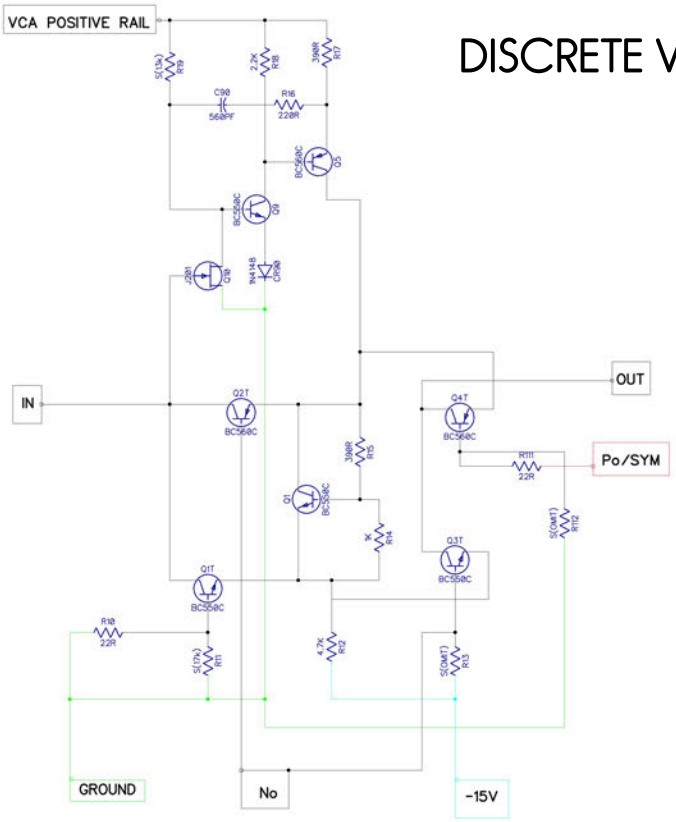
NOT NEEDED FOR THAT 2180 BUILD

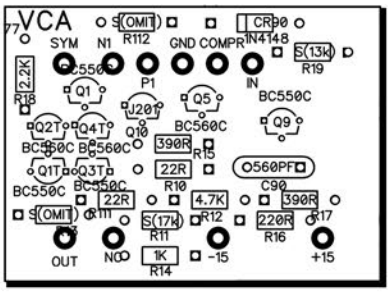
PCB COLOR DESIGNATION

DISCRETE VCA

SCHEMATICS

DISCRETE VCA CIRCUIT

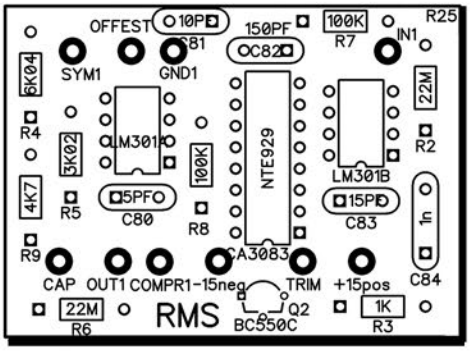




THE DISCRETE VCA IN THE CLX-VU CONSISTS OF 8 TRANSISTORS. THEY MUST BE MATCHED AND THEN THERMALLY COUPLED SO THEY TRACK TOGETHER AS TEMPERATURE FLUCTUATES. THE EXTERNAL TRANSISTOR BC560C MUST BE SELECTED ATER THE 200 SERIES VCA IS INSTALLED/BUILT. EXACTLY HOW THESE TRANSISTORS ARE SELECTED AND OPTIMIZED IS OUT OF THE SCOPE OF THIS MANUAL.

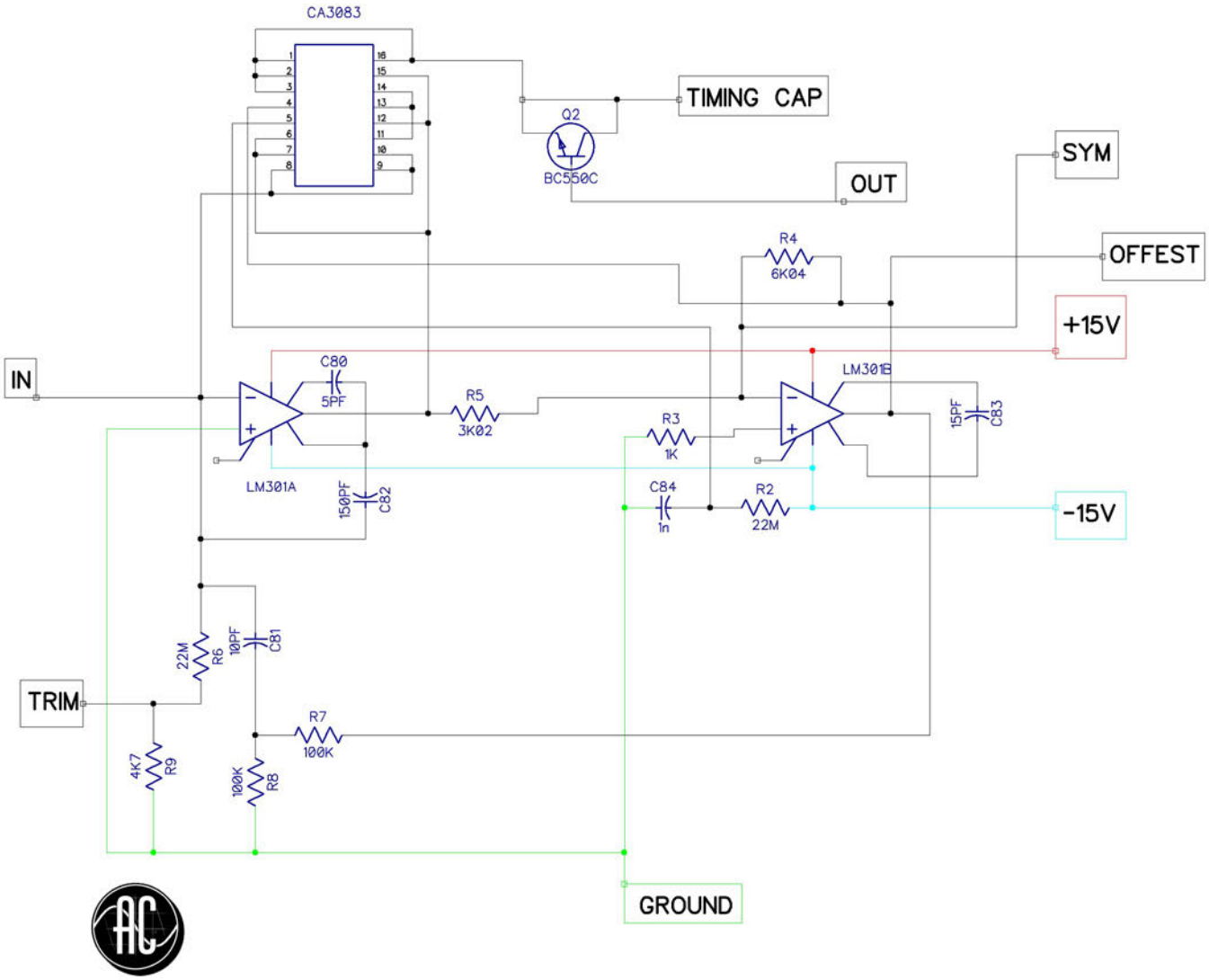
RMS

RMS UNIT PCB



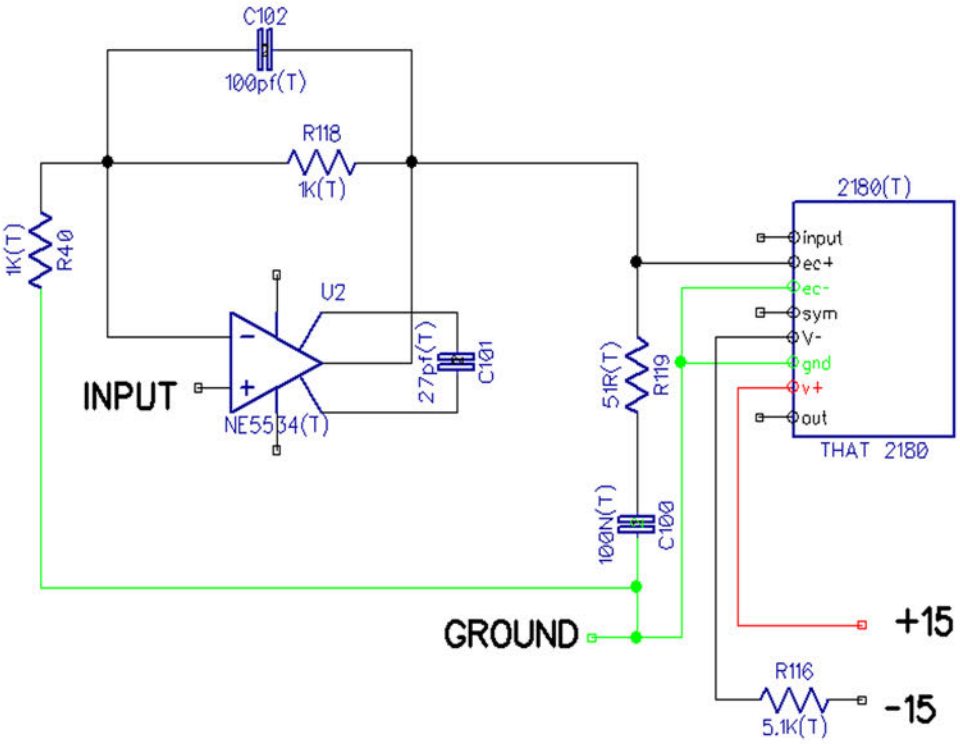
This is the RMS unit. It converts the audio signal into a DC voltage that is fed to the VCA. This section automatically creates the attack and release times. The beauty of this circuit is that it responds naturally, much like a human ear.

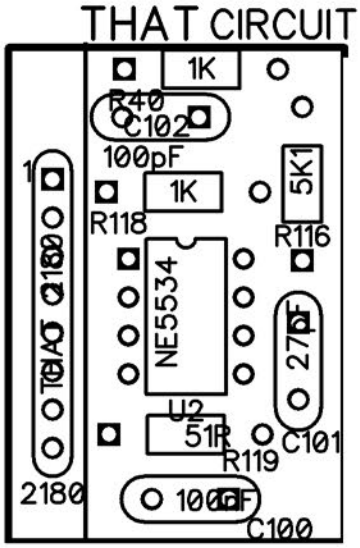
RMS UNIT SCHEMATIC



THAT 2180 VCA CIRCUIT

SCHEMATICS

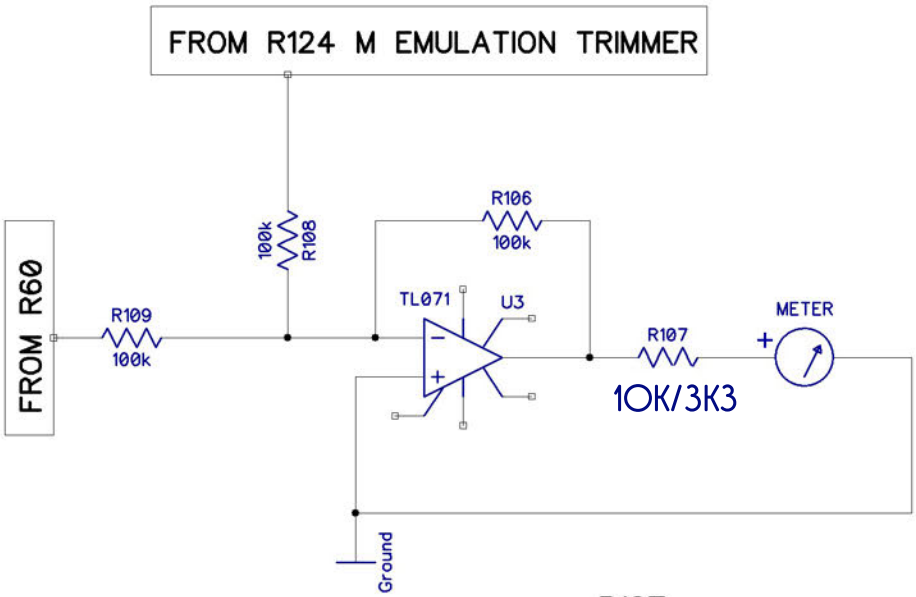




THE 2180 THAT CHIP IS A HIGH PERFORMANCE MONOLITHIC VCA CHIP. ITS SPECIFICATIONS OUTPERFORM EVERY SPECIFICATION OF ITS ANCESTOR, THE DISCRETE 200 SERIES VCA. THIS CHIP REQUIRES A LOW IMPEDENCE BUFFERED OPAMP TO WORK CORRECTLY, AS SHOWN IN THE SCHEMATIC. THE CHIPS' INPUTS AND OUTPUTS ARE CONNECTED JUST LIKE THE ORIGINAL VCA BUT IS DESIGNED TO WORK AT A LOWER IMPENDENCE SO THE RESISTORS AROUND THE CHIP ARE SCALED FROM THE ORIGINAL 100K TO 20K. THE LOWER IMPEDENCE CHANGES THE LOW BASS EXTENTION ROLL OFF ON CAPACITOR C12, AND MUST BE COMPENSATED BY INCREASING C12'S VALUE FROM 0.33uF TO 1.8uF.

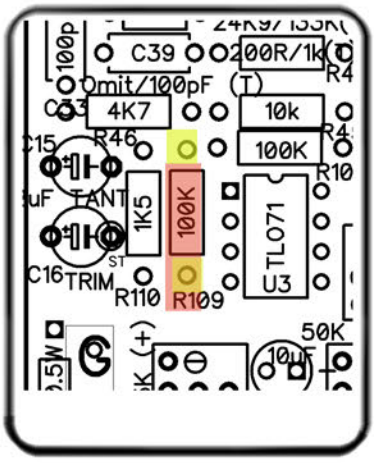
METER EMULATION CIRCUIT

SCHEMATICS



R107

3K3	1 mA METER
10K	0.1 mA METER



LEAVE OPEN ONE SIDE FOR CALIBRATION

RESISTOR IN QUESITON

BOM

The original units used a center-detented meter: when no signal is applied the meter rests at “0”. In order for the circuit to interface with relatively inexpensive DC meters, some compensation circuitry must be implemented. This is that circuitry. 1ma and 0.1ma meters can be used. If using a 1ma meter install a 3k3 resistor in R107 to achieve the proper sensitivity. If using a 100ua (0.1ma) meter use a 10k resistor in R107. When soldering resistors leave one side of resistor R109 open for later calibration of the emulation circuit.

AC SOUND CLX-VU REV 3 BOM FOR COMPLETE THAT 2180 CHIP BUILD 11/2/2011

Refrence Definition	Value	Quantity
OPAMPS AND OTHER ICs		
CA3083	CA3083 or NTE929	1
2180(T)	THAT 2180 VCA	1
TL082a, TL082B	TL082	2
U2	NE5534	1
U3	TL071	1
4558a	RC4558	1
LM301A, LM301B, LM301OUTPUT	LM301	3
LM317	LM317	1
LM337	LM337	1
CHIP SOCKETS (HIGHLY RECOMMENDED)		
SOCKET	DIP 8	8
SOCKET	SIP 8	1
SOCKET	DIP 16	1
DIODES		
CR1-CR4, CR20-CR23	IN4004	8
CR6-CR9 , CR12-CR17, CR19	1N4148	11
TRANSISTORS		
Q8	NTE129 or 2N4037	1
Q14	NTE128 or 2N3053	1
Q2	BC550C	1
C0G/NPO TYPE CERAMIC CAPACITORS		
C80	5pf	1
C25, C26, C81	10pf	3
C83	15pf	1
C14	22pf	1
C101	27pf	1
C23, C102, C33, C39, C100	100pf	5
C22, C82	150pf	2
POLYESTER FILM CAPACITORS(PIN SPACING)		
C24, C84 (7.5mm)	1nf	2
C18 (5mm, 7.5mm, 10mm)	10nf (0.01uf)	1
C5,C6,C7,C8 (5mm)	100nf (0.1uf)	4
C11 (7.5mm, 10mm, 15mm, 22.5mm)	0.33uf	1
C17 (5mm, 7.5mm, 10mm, 15mm)	0.47uf	1

POLYPROPYLENE FILM CAPACITOR

C12 (7.5mm, 10mm, 15mm, 22.5mm)	1.8uf	1
C9, C10, C19, C20 , C32, (7.5mm)	1nf	5

ELECTROLYTIC CAPACITORS (SPACING)

C34 (2.54mm)	1uf 50v	1
C21 (BIPOLAR OR POLY FILM) (5, 7.5, 10, 15, 20, 22.5mm)	4.7uf 25v (BIPOLAR)	1
C40, C41, C42, C43 (2.54mm)	10uF 25v	4
C27, C28 C35 (2.54mm)	22UF 16V	3
C2,C3 (7.62mm)	1000uf 35v	2

TANTALUM CAPACITOR (SPACING)

C15 (5mm)	22uf TANT	1

RESISTORS (ASSUME ALL ARE 1%)

R88,R89,R90	22r	3
R119	51r	1
R78,R93	100r	2
R1 ***NOT NEEDED IF USING LEDS IN METER***	100r 0.5W	1
R104,R105	120r	2
R60	270r	1
R3,R40,R48,R53,R67,R74,R118	1k	7
R68,R73, R110	1.5k	3
R20, R82, R85, R86, R94, R95	2.2k	6
R42, R103	2.4k	2
R5	3.02k	1
R107 **(3k3 for 1ma meter/10k for 0.1ma meter)**	3k3/10k METER	1
R9, R46, R57	4.7k	3
R125 **(FOR METER LEDS)**	4.7K	1
R116	5.1k	1
R69	5.49k	1
R87, R91	5.6k	2
R4	6.04k	1
R41	7.5k	1
R23, R24, R33, R45, R50,R77,R79,R83	10k	8
R21,R22, R26, R32, R39	20k	5
R84, R92	22.1k 1%	2
R38	23.2k	1
R58	90.9k	1
R106,R108,R109,R55,R7,R75,R8,R81	100k	8
R31	133k	1
R54	200k	1
R65	390k	1
R71	523k	1
R35, R72	909k	2
R49	1.29M	1
R37, R61	1.5M	2

R52	4.7M	1
R2, R6	22M	2

TRIMMER RESISTORS (0.1" STANDARD PIN SPACING)

R100, R101	5k	2
R124,R34,R43,R51,R56,R59,R62,R63	50k TRIMMER	8
R36 **(250k or 500k)**	250k COMP SYM TRIM	1

POTENTIOMETERS

THRESHOLD,RATIO,OUTPUT GAIN	20K (LINEAR)	3

MOLEX CONNECTORS

KK SERIES 2.54 mm SPACING (0.1")	3 PIN	4
KK SERIES 2.54 mm SPACING (0.1")	7 PIN	2
KK SERIES 3.96 mm SPACING (0.156") **(0.46" HOLE)**	3 PIN **(ROUND PIN ONLY)**	1

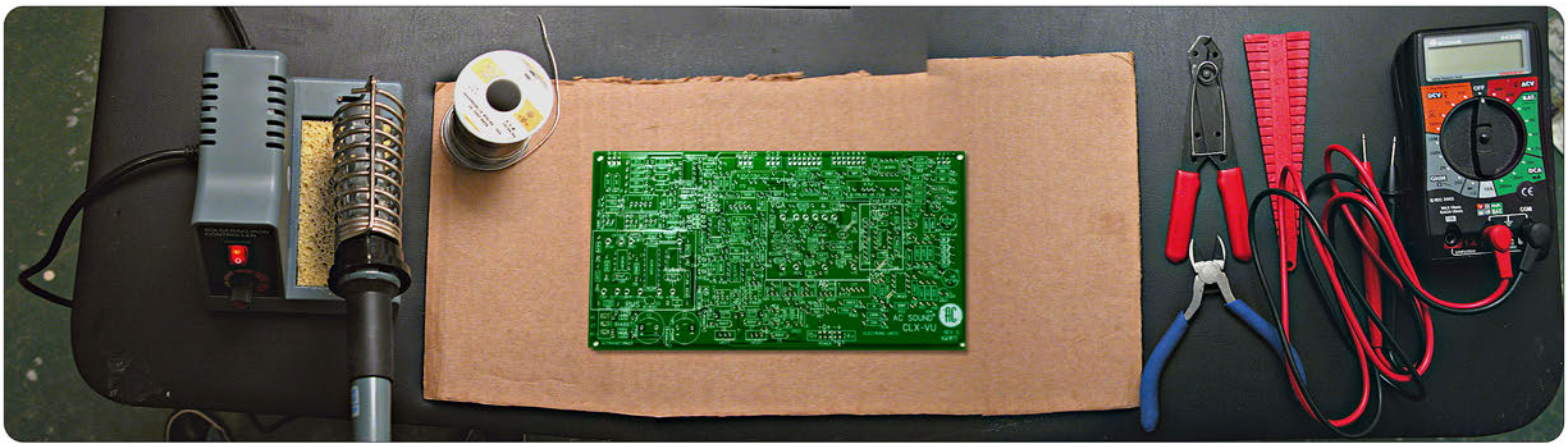
REMEMBER ALL PARTS FOR MOLEX CONNECTORS

EXTRA

METER SWITCHES 3 GANG	SPDT (TIMES 3)	
ABOVE AND BELOW LEDS	LED (COLORS OF CHOICE)	2
METER (CUSTOM SCALE)	1 or 10 ma DC	1
POWER TRANSFORMER	2 X 18V (AT LEAST 25VA)	1
INPUT/ OUTPUT JACKS	TRS/XLR	2
IEC Connector and Fuse	0.25 Amp	1

SECTION 2

GETTING STARTED



WORKSPACE SETUP

Now you're ready to start building your compressor. The first step is the stuffing of your board with all of the components. It is important to give yourself plenty of time to complete this task. You are probably eager to finish your project and start using it, but it is important to focus on the build to decrease the chances of making mistakes.

Make yourself a relaxed working environment with a lot of light. Put on a favorite album. Check and double check your work. Any extra time spent during these beginning steps exponentially saves troubleshooting time in the long run.

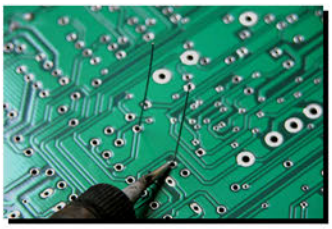
ITEMS NEEDED:

A SOLDERING IRON, ROSIN CORE SOLDER, LEAD TRIMMERS, A MULTI-METER TO CHECK RESISTOR VALUES AND PREFERABLIY A LEAD BENDER.

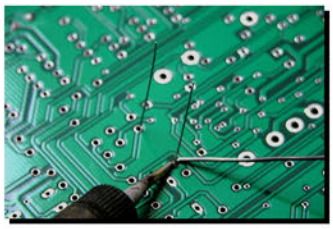
NOTE: THIS BUILD MANUAL IS JUST A REFRENCE. THERE ARE MANY DIFFERENT WAYS TO DO THE PROCEDURES OUTLINED IN THIS MANUAL. DON'T BE AFAID TO FIND A WAY THAT WORKS FOR YOU.

HOW TO SOLDER:

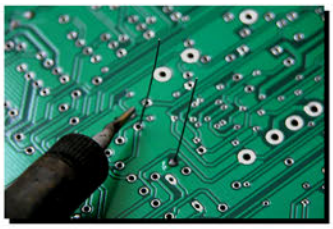
IN 3 SIMPLE STEPS



1. Allow the soldering iron to reach operating temperature. If you have a variable temperature iron, set the iron were the solder melts almost instantly when touched to the tip, but not hotter. Touch the tip of the soldering iron to the joint to be soldered. Allow the joint to reach the same temperature as the tip (1- 2 seconds).



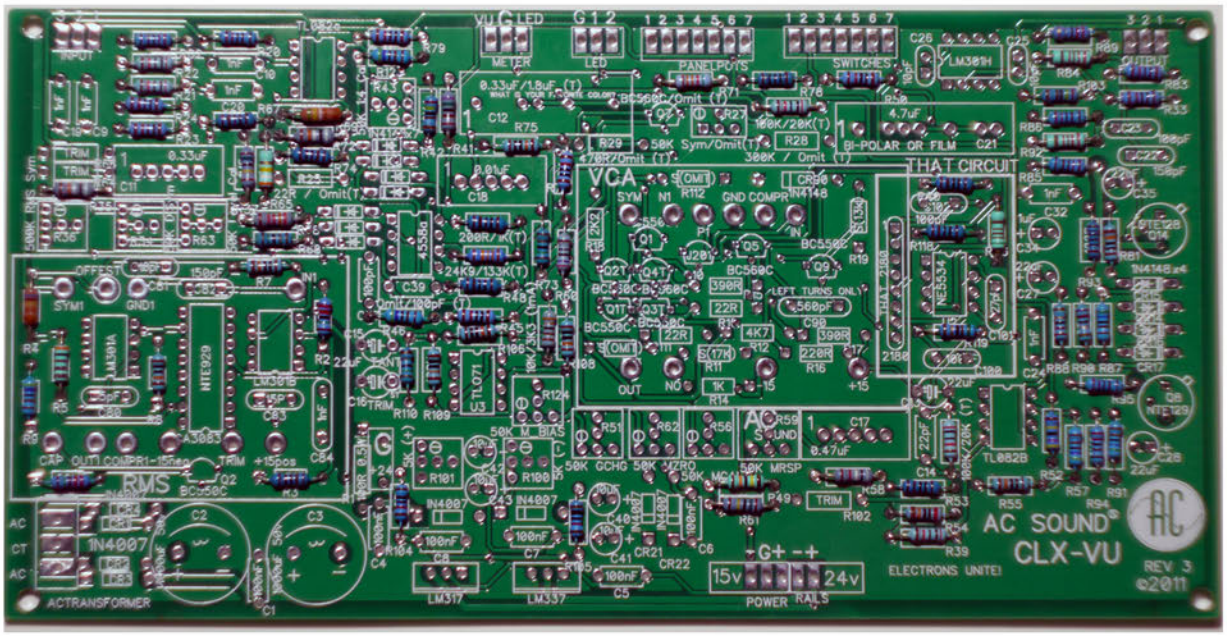
2. Touch the solder to the joint that is being soldered. Allow the solder to flow around the joint, in and through to the otherside. The trick to soldering is leaving the iron on long enough to allow the solder time to flow to make a strong joint, but not too long to where parts are possibly damaged by the heat.



3. Finally, pull away the tip and allow the joint to cool. Inspect the solder joint. It should be nice and shiny.

STUFFING THE BOARD

INSTALLING THE RESISTORS



CLX-VU PCB WITH ALL RESISTORS SOLDERED

Installing the resistors on your CLX-VU board is a very important step.
It is recommended that you measure each resistor with a correctly calibrated multimeter before it is installed on the board.

Some resistors are labeled TRIM. They are for calibration and are normalLy left unused.

TIPS WHEN DEALING WITH RESISTORS:

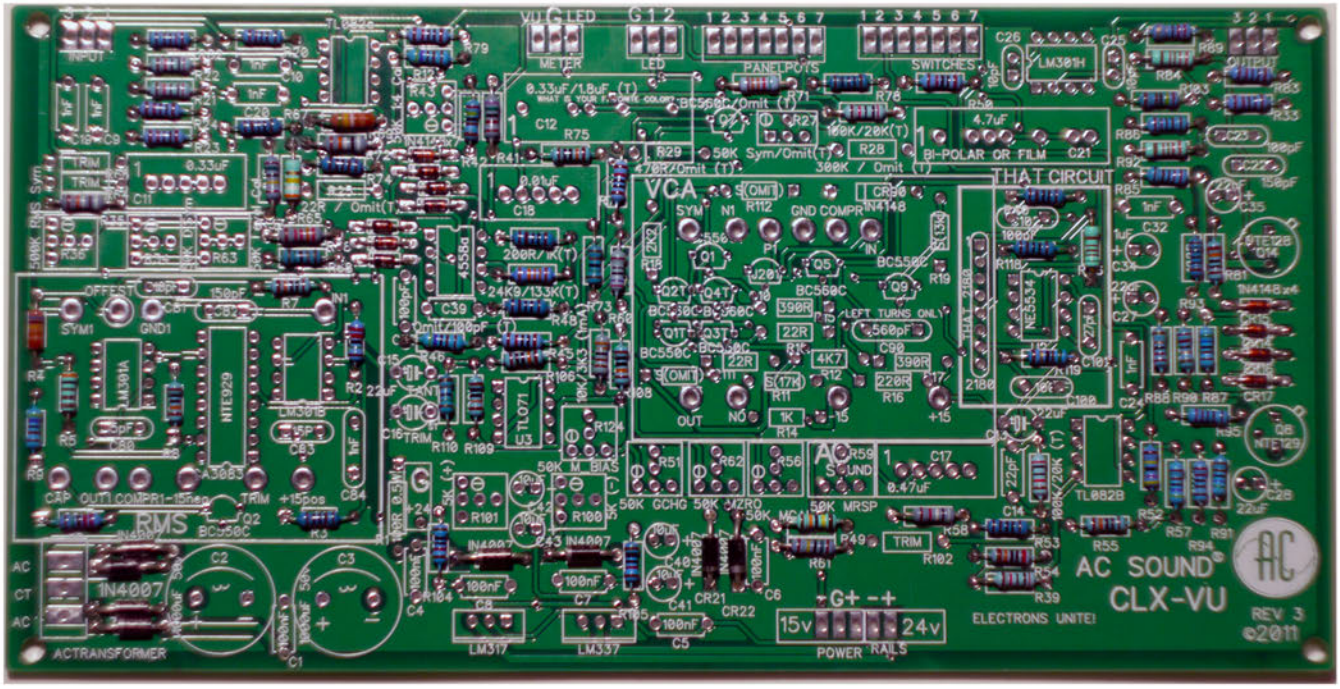
*A LEAD BENDER CAN BE VERY HELPFUL WHEN INSTALLING LEADED COMPONENTS SUCH AS RESISTORS.
*PCB HOLDERS ARE VERY NICE IF YOU HAVE ONE, THEY ALLOW ONE TO INSTALL THE RESISTORS AND THEN FLIP THE PCB OVER FOR EASY SOLDERING
*AN EXTRA PIECE OF CARDBOARD WORKS GREAT FOR COVERING THE TOP OF THE PCB AND FOR HOLDING THE UNSOLDERED RESISTORS IN PLACE AS YOU FLIP THE PCB OVER.
*RESISTOR DESIGNATIONS CAN BE: 6.8K = 6K8 = 6800R = 6800r = 6800
THEY ALL MEAN THE SAME THING.

MORE NOTES:

Resistor R125 determines how much current your LEDS get.

Resistor R1 should be ignored unless you are using a lamp in your build.

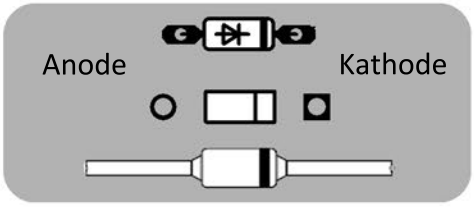
INSTALLING THE DIODES



CLX-VU PCB WITH ALL DIODES INSTALLED – NOTE POLARITY

Diodes allow voltage to flow in only one direction. Therefore, they need to be installed the correct way. To determine the polarity of a diode look for the side with the band around it. This ring marks the side that current flows toward. When installing the diode be sure to install the ring on the correct side. See picture.

NOTE THE POLARITY

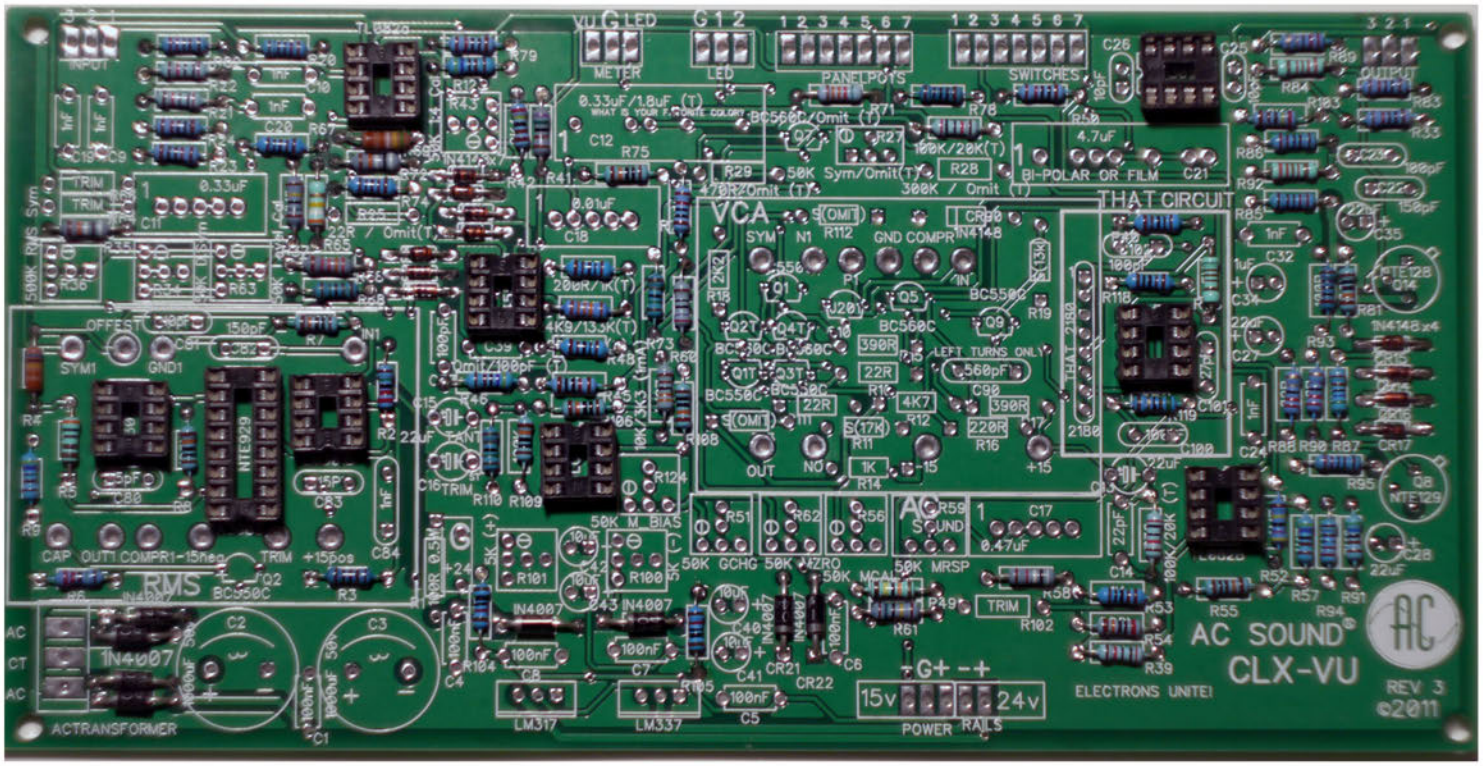


INSTALL DIODES IN THE CORRECT DIRECTION

REMEMBER:

- SILICON DEVICES, SUCH AS DIODES, ARE MORE SUSCEPTABLE TO BEING DAMAGED BY EXCESSIVE HEAT FROM SOLDERING.
- STATIC ELECTRICTY CAN HARM SEMI-CONDUCTOR DEVICES SUCH AS DIODES.

INSTALLING THE DIP ADAPTORS

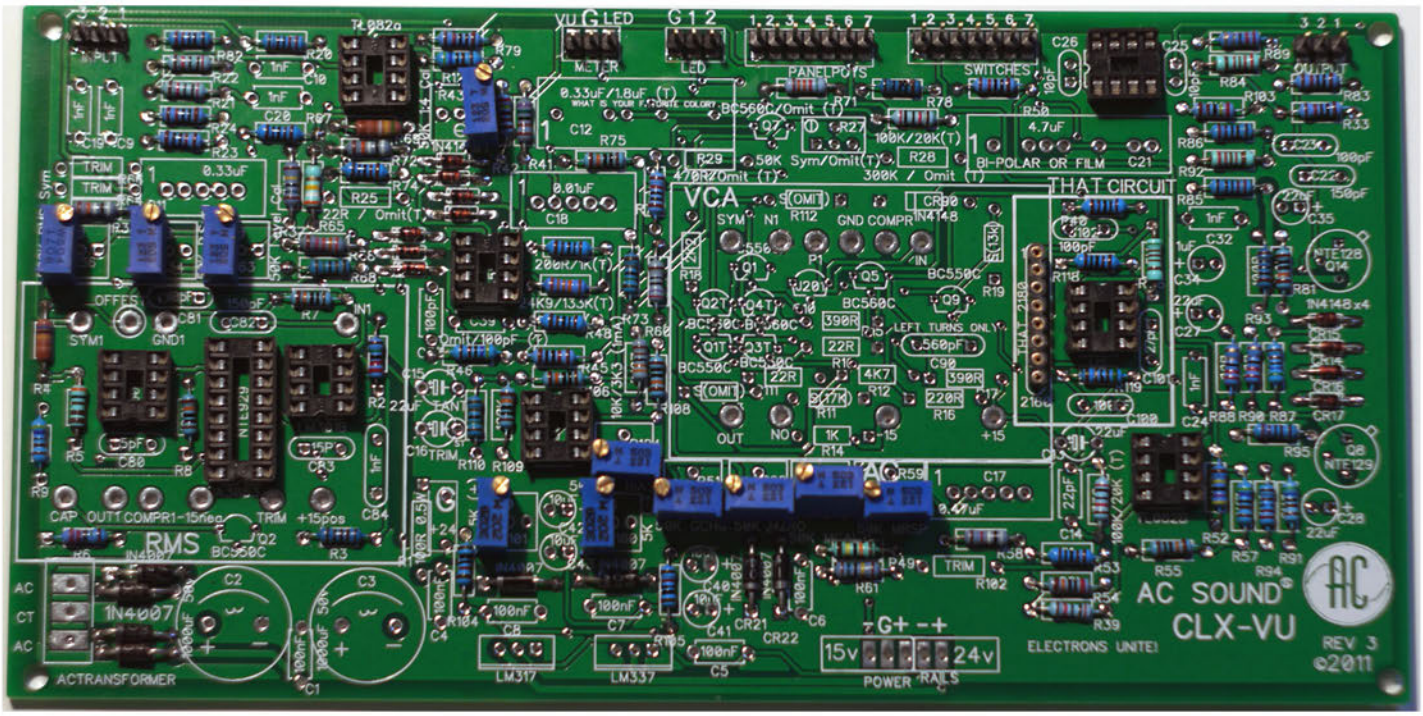


CLX-VU PCB WITH ALL DIP ADAPTORS INSTALLED

Dip adaptors are used for easy installation of inter-gated circuits and other devices in the dip package. They are very important, especially when building projects that use plated-through holes, such as the AC Sound CLX-VU. These holes are great for making a solid connection when soldering but are more difficult when unsodlering leads(such as a Op-amp). Using Dip adapters also protect opamps from heat and handling of the soldering process.

NOTE: The adaptor for the transistor array in the RMS unit is for DIP 16, not the more common DIP 14.

INSTALLING THE TRIMMERS



CLX-VU PCB WITH TRIMMER RESISTORS INSTALLED FOR THAT 2180 BUILD

The CLX-VU uses 11 total trimmers for the THAT 2180 build. If you are using a THAT 2181 (un-trimmed) chip or a discrete 200 series VCA you will also need to install R27 to trim extra distortion from the VCA.

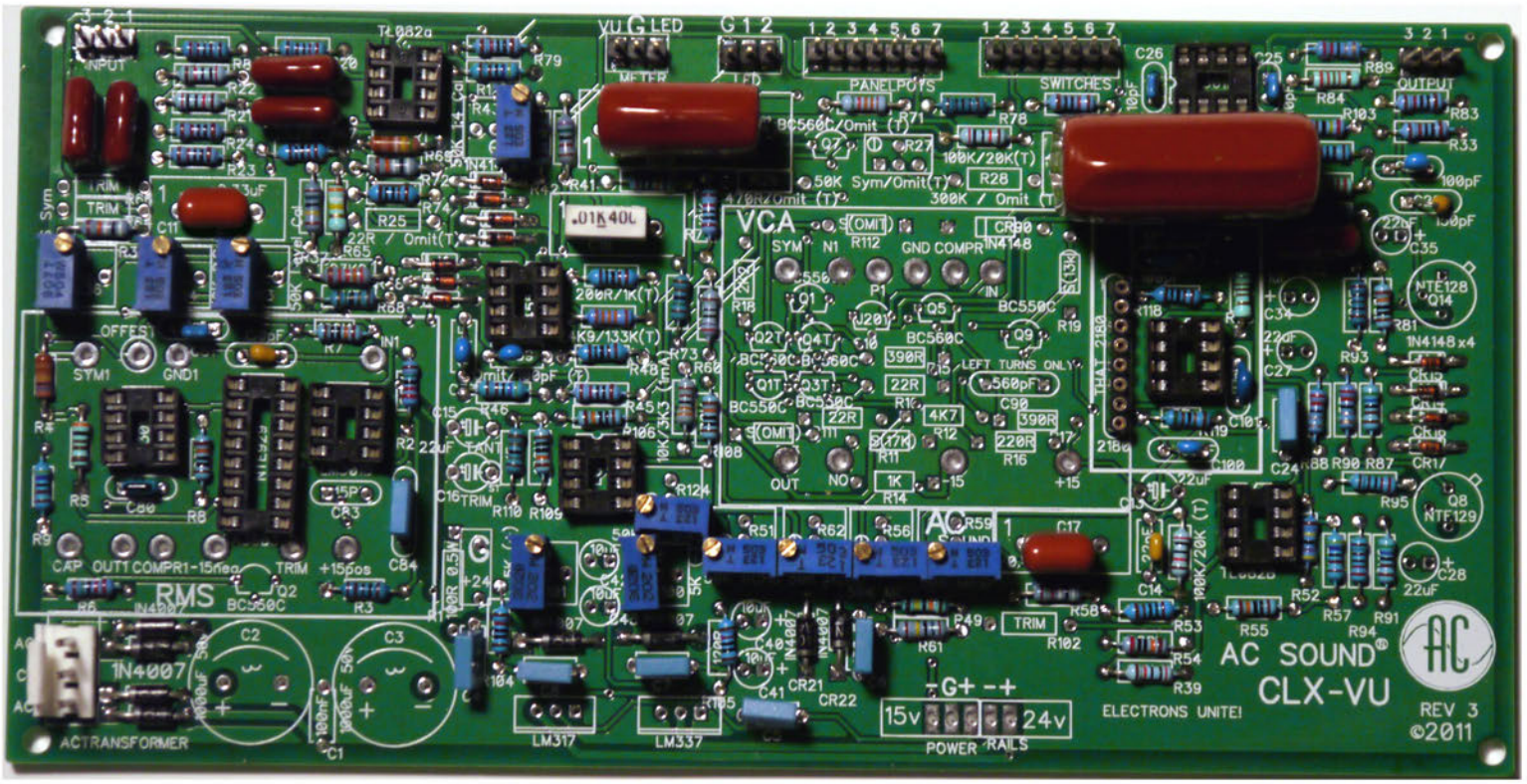
1 Two 5k trimmers that can be found in the power supply section of the PCB. These are used to vary the voltage of the plus and negative supply rails.

2 Eight 50k trimmers that can be found all over the board, used to trim extra distortion from the RMS unit, to set ratio calibration, to set threshold calibration and to set various aspects of the meter circuit.

3 One 500k trimmer used during calibraiton to correctly set up the RMS unit.

NOTE: If you are so inclined you can measure the resistance of the two trimmers intalled in the power supply (R100 & R101) to about 1.3k to avoid high voltages on intial power up. This is probably more trouble than its worth.

INSTALLING FILM & CERAMIC CAPACITORS



CLX-VU PCB WITH FILM & CERAMIC PARTS INSTALLED

BASIC FILM CAPACITORS COME IN TWO TYPES:

Polyester -

Cheap to make, great for bypassing power supplies, good for audio but people tend to prefer:

Polypropelene -

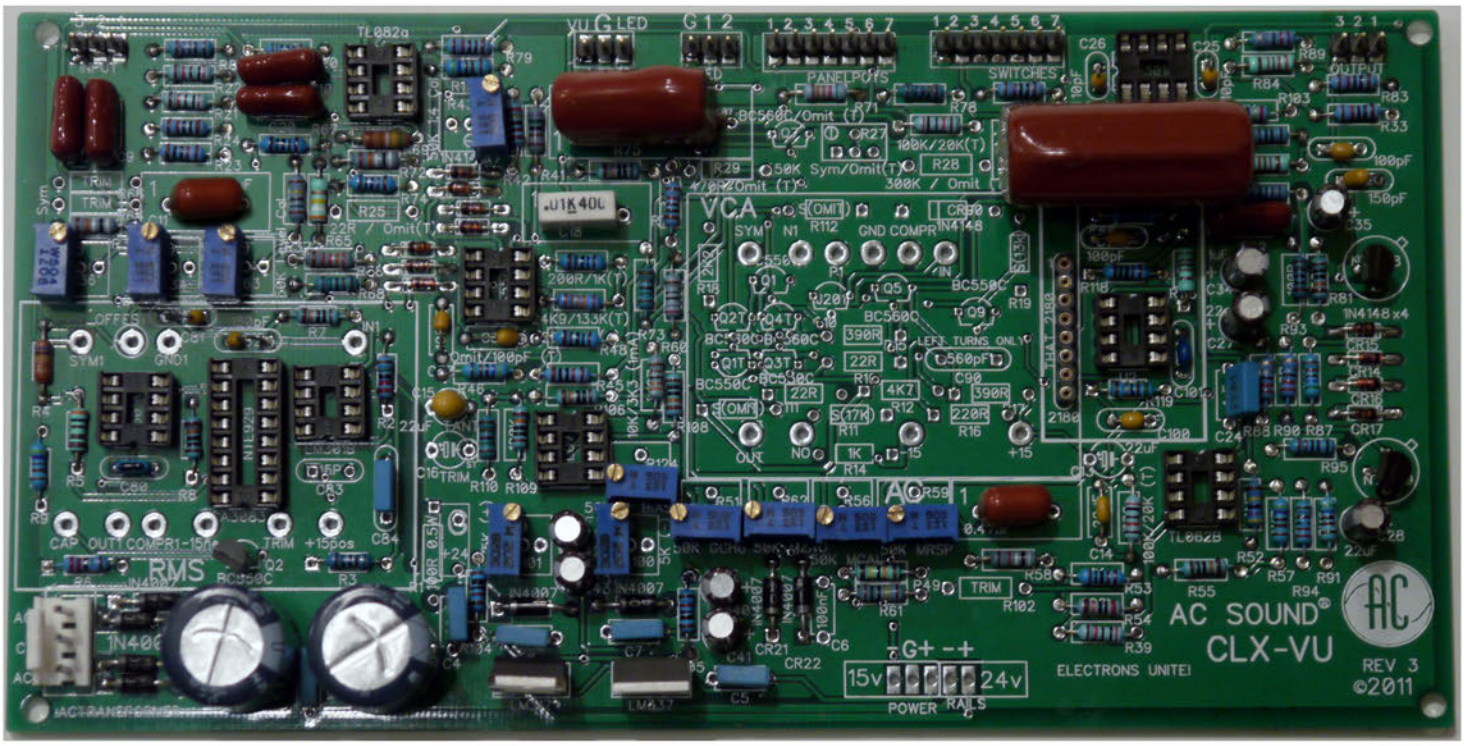
for capacitors directly in the audio signal path. They outperform most any other type of capacitor in listening and measurement tests.

NOTE: CERAMIC AND FILM CAPACITORS ARE NOT POLARIZED. THEY CAN BE INSERTED ANY DIRECTION.

CERAMIC CAPACITORS:

Come in many different types but the ones we want are the c0g/nP0 types. These types are higher quality and are more stable at different temperatures. Ceramic capacitors are usually found in very small values and excel at passing very high frequency signals. They are used throughout the CLX-VU design to stop oscillations and RF interference in the circuits.

INSTALLING POLARIZED CAPACITORS



CLX-VU PCB WITH POLARIZED CAPACITORS INSTALLED

POLARIZED CAPACITORS COME IN TWO TYPES:

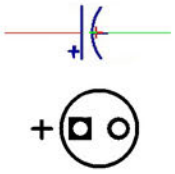
Electrolytic - Most common type of polarized capacitor. Can fit a large amount of capacitance in a small package.

Tantalum - Very fast and consistent discharge rate. Used in the timing circuit of the CLX-VU.

NOTE: ELECTROLYTIC AND TANTALUM CAPACITORS ARE POLAROIZED AND MUST BE INSERTED THE CORRECT WAY.

ELECTROLYTIC CAPACITORS:

Can store a great amount of electricity in a relatively small space. Be warned that these capacitors can be very non-linear when not used properly. Example: When these parts are directly in the signal path it can result in a smeared or unfocused sound. The CLX-VU has no electrolytic capacitors directly in the signal path. This offers a clear and focused sound and great transient response.

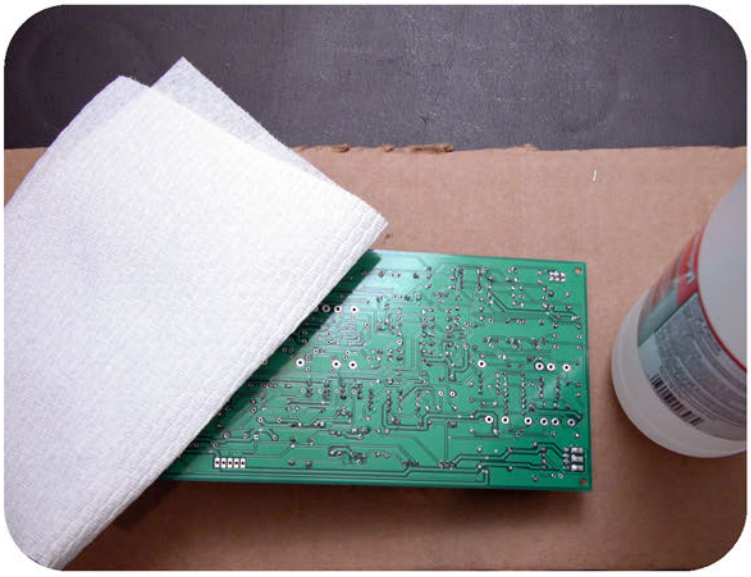


Take note of polarity!

FINISH STUFFING YOUR BOARD

Congratulations, you finished stuffing your board!

But we're not finished yet. We still need to clean the board of rosin and check for any bad solder joints or solder blobs.



You will need paper towels and rubbing alcohol

NOTE: THIS CAN GET MESSY!

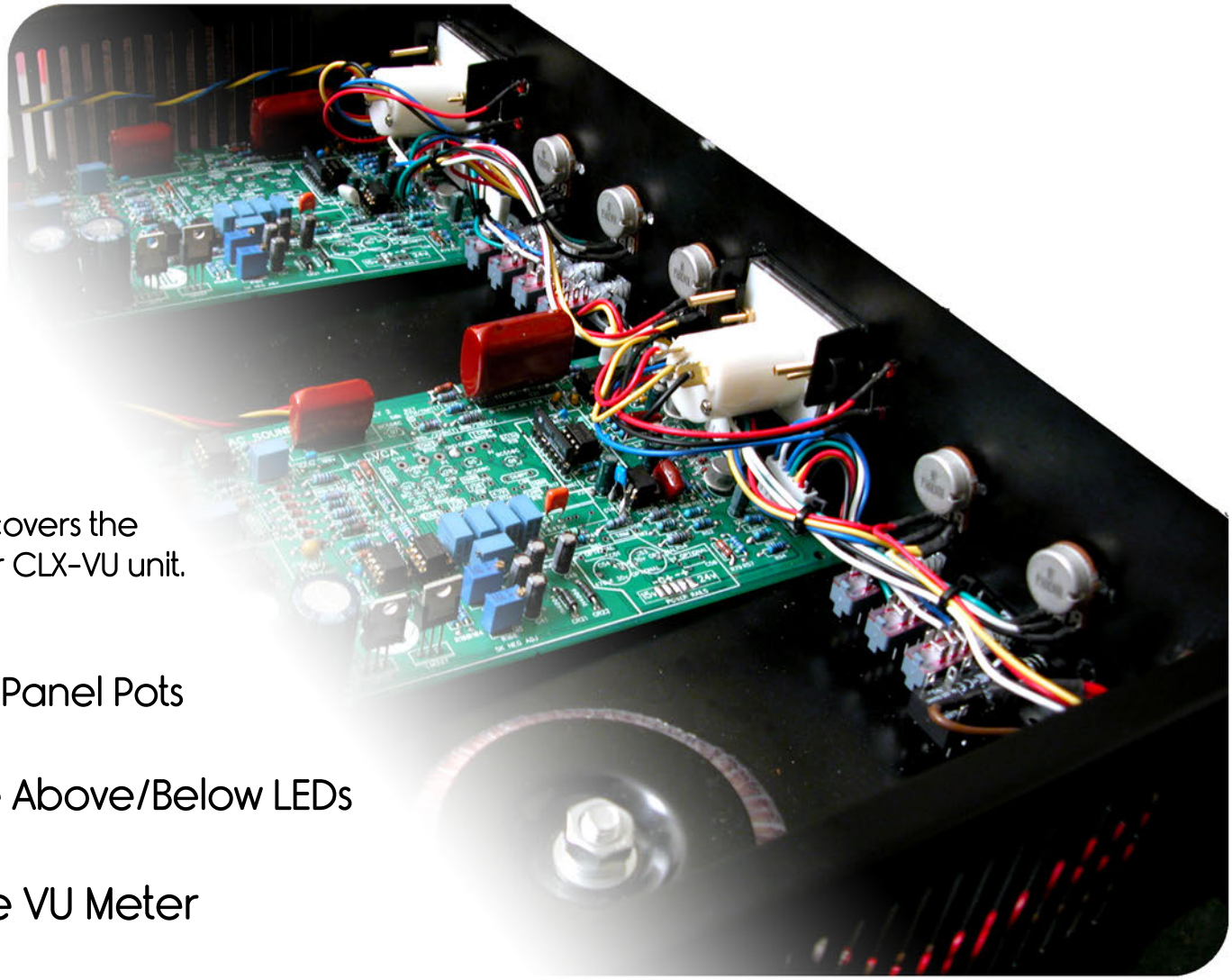
OLD TOOTHBRUSHES WORK GREAT FOR THIS TOO!

Wet the paper towel and rub the rosin away! The alcohol lifts the rosin and the paper towel absorbs it.

Now is a great time to inspect your circuit board for any cold solder joints or blobs. If in doubt, reflow the solder by touching the tip of your soldering iron to the joint. A cold solder joint can be very hard to track down and they do happen!

You are FINISHED stuffing your board!!

SECTION 3 WIRING



This section covers the wiring of your CLX-VU unit. Namely:

Wiring the Panel Pots

Wiring the Above/Below LEDs

Wiring the VU Meter

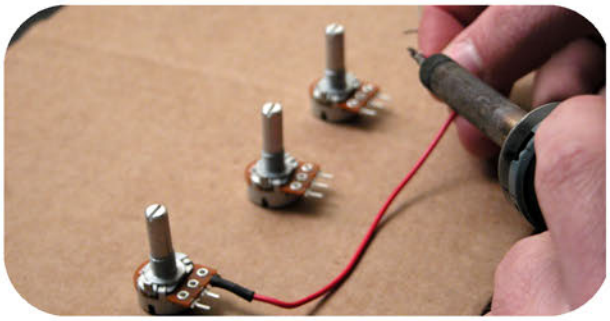
Wiring the Input and Output

Wiring the Meter Switches

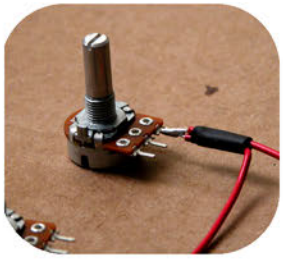
Wiring the Power Transformer

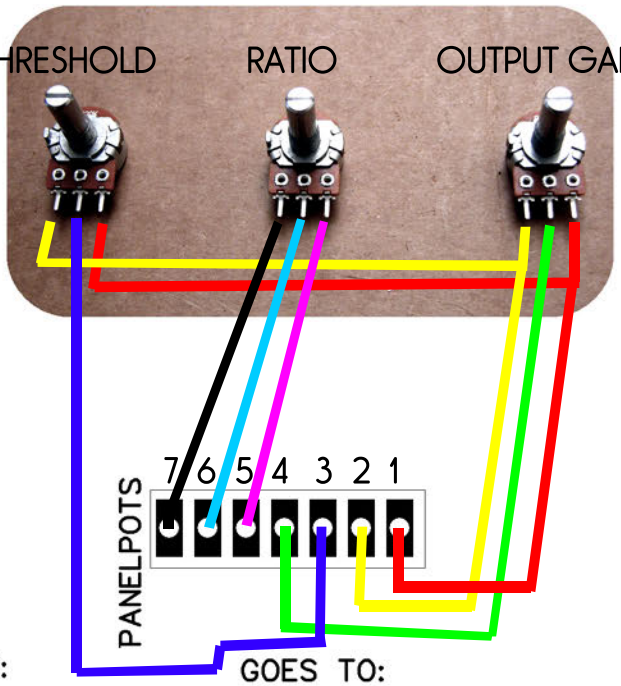
WIRING THE PANEL POTS

START WITH THREE 20K LINEAR POTS



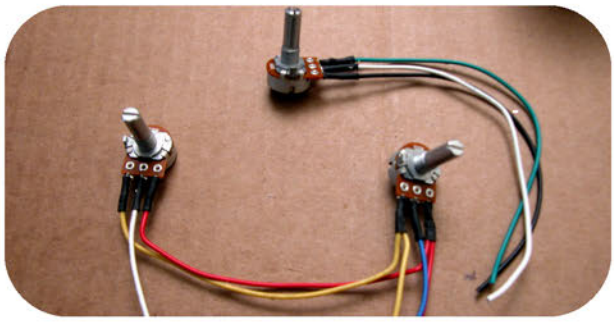
EXAMPLES OF SOLDERING

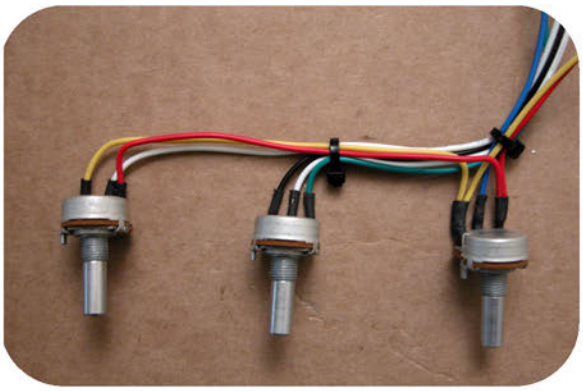




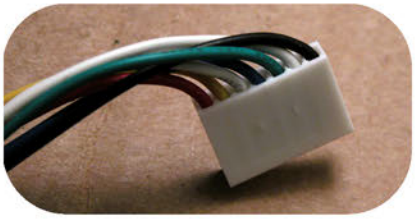
PIN #:	GOES TO:
PIN 7	RATIO POT (CCW)
PIN 6	RATIO POT (CENTER WIPER)
PIN 5	RATIO POT (CW)
PIN 4	GAIN POT (CENTER WIPER)
PIN 3	THRESHOLD POT(CENTER WIPER)
PIN 2	THRESHOLD POT(CCW) AND GAIN POT(CCW)
PIN 1	THRESHOLD POT(CW) AND GAIN POT(CW)

WIRE ACCORDING TO TABLE AND PICTURES



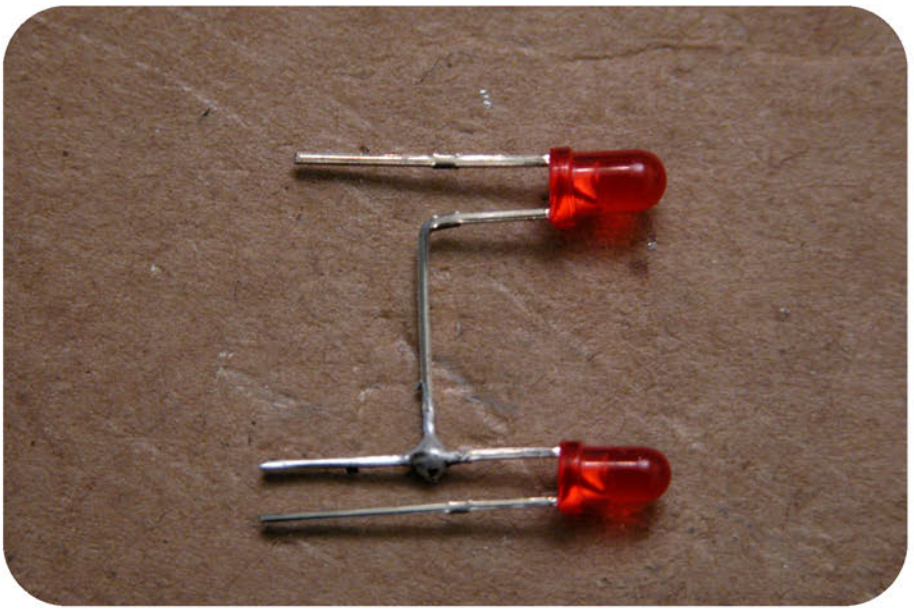


PICTURES OF PANEL POTENTIOMETER ASSEMBELY



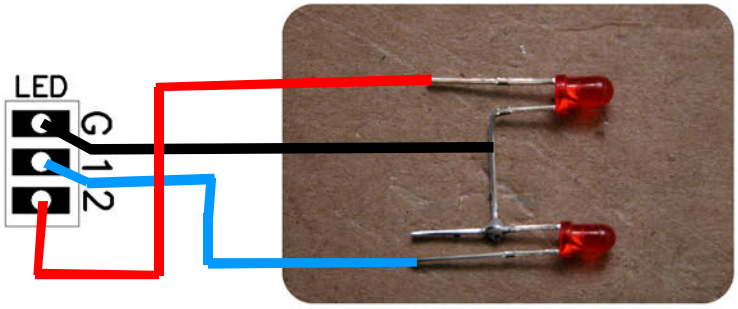
WIRING ABOVE/BELOW LEDS

REMEMBER: The anode (+) of an LED is the long LEAD (like on electrolytic capacitors) and the small side in the LED housing

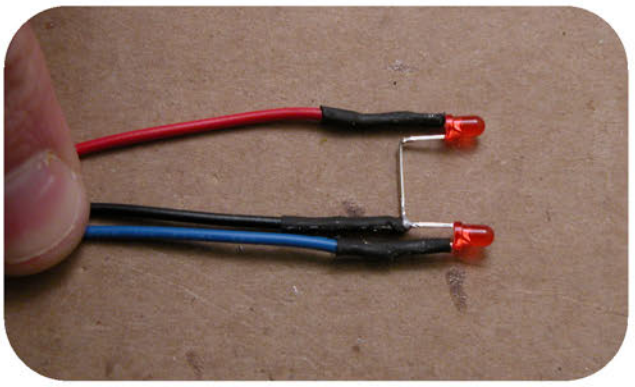


Prepare your two LEDS as shown. With the Anode (+) of the above LED going to the Cathode (-) of the below LED

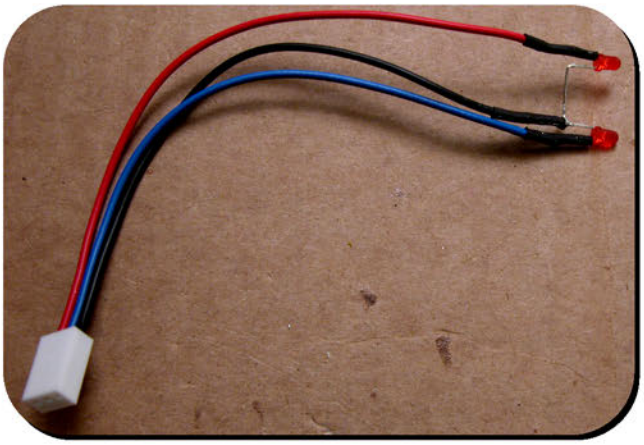
PIN:	GOES TO:
PIN G	BELOW LED (-) AND ABOVE LED (+)
PIN 1	BELOW LED (+)
PIN 2	ABOVE LED (-)



LED HOOK-UP DIAGRAM



FINISHED LED ASSEMBLY

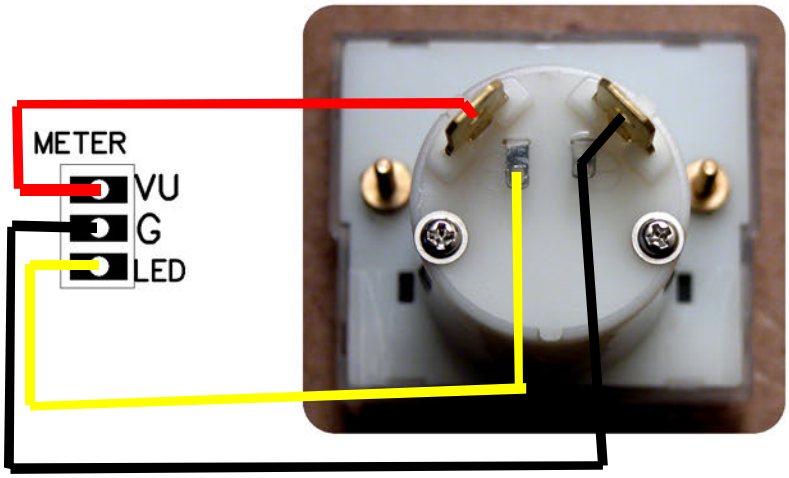


WIRING THE VU METER

The VU meter in your CLX-VU unit should be a DC 1ma or a DC 0.1ma meter. The unit requires a custom scale that can be printed out. It goes from -40dB to +20dB!

PIN:	GOES TO:
PIN VU	(+) ON METER
PIN G	GROUND FOR METER/LEDS
PIN LED	TO + LED ON METER

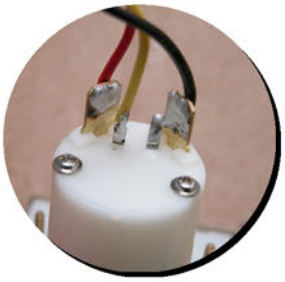
Note:
If using a 1ma DC meter use a 3k3 resistor for R107.
If using a 0.1 ma use a 10k resistor for R107.



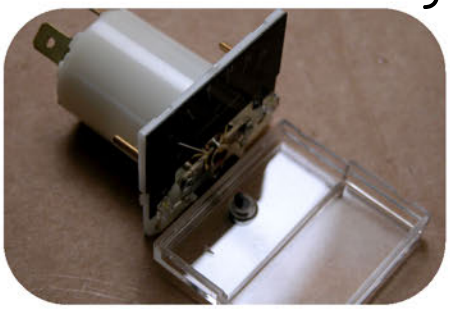
If using a meter with built in LEDs connect a wire across R1.

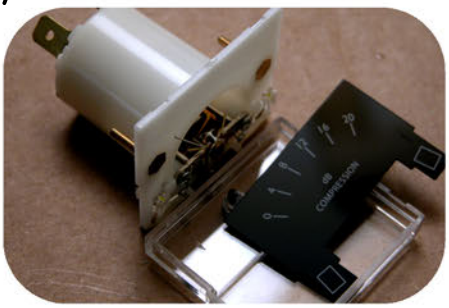
R125 controls LED brightness. Standard is 4k7.

If using a meter with Lamps use 100ohm 1/2watt for R1 and wire for R125



Inserting your own custom meter scale





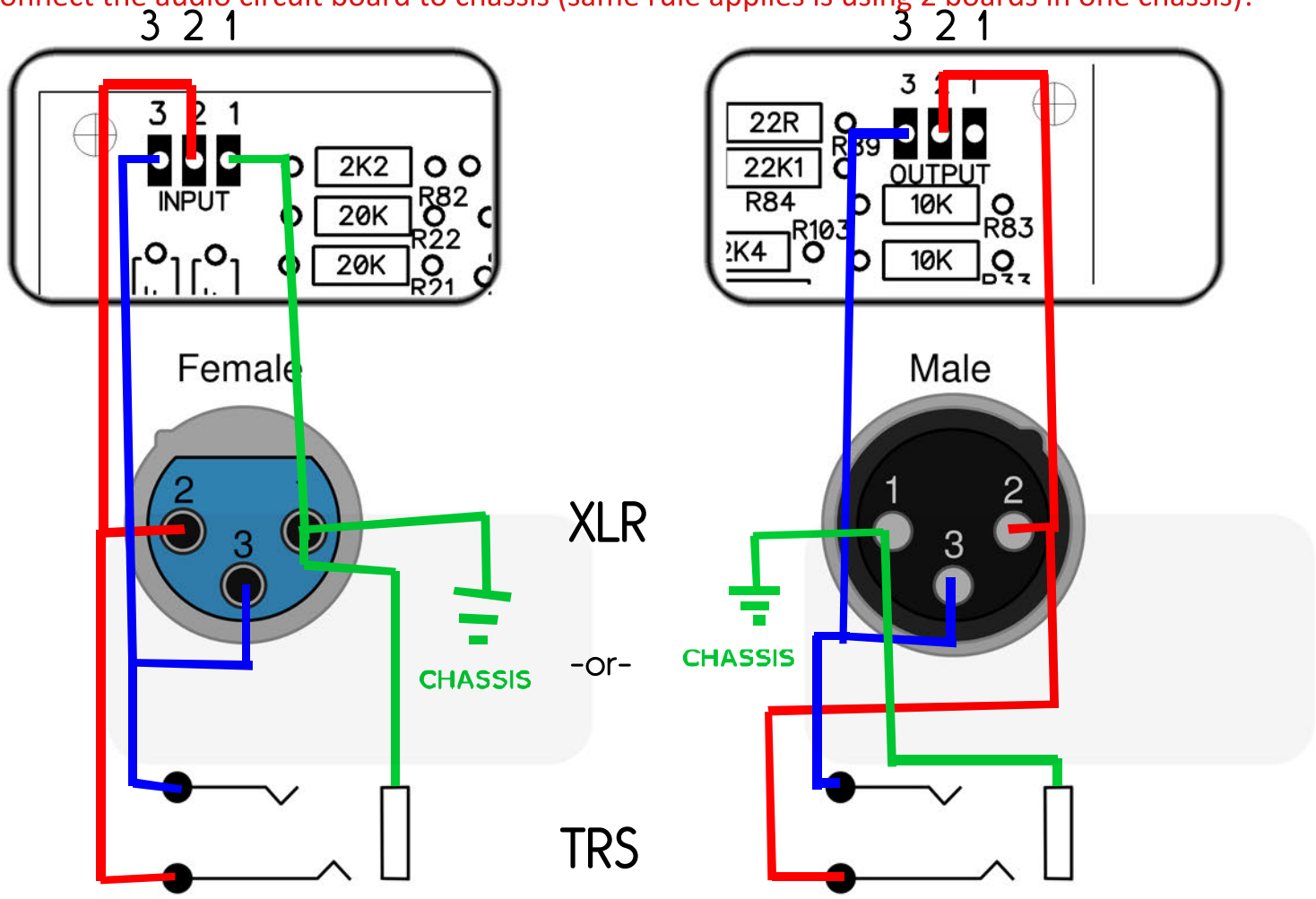
SEE NEXT PAGE FOR METER PRINT OUTS

VU CUSTOM SCALE INSERT

WIRING THE INPUT AND OUTPUTS

The inputs and outputs of the CLX-VU compressor are electronically balanced. This means they reject noise but reqiure 3 seperate conductors. When wiring remember 1 is ground, 2 is hot, 3 is common. See pictures.

!Note: Pin 1 of all XLRs or TRS connectors should be firmly connected to chasses preferably through the chassis tab found on most XLR connectors. Then through ONLY one INPUT XLR connect the audio circuit board to chassis (same rule applies is using 2 boards in one chassis)!



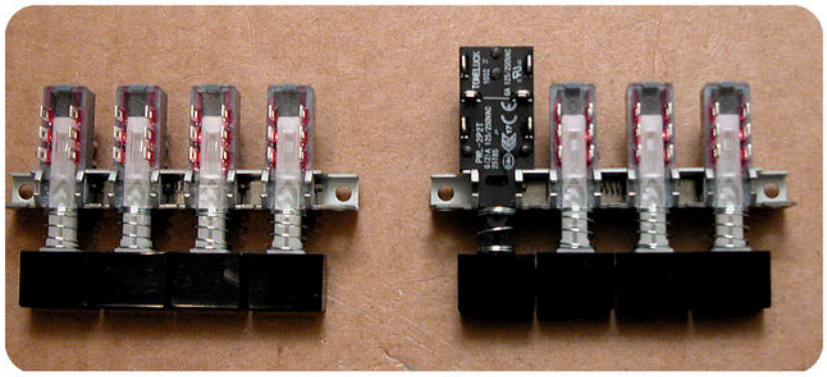
PIN:	GOES TO:
PIN 1	GND
PIN 2	IN (+)
PIN 3	IN (-)

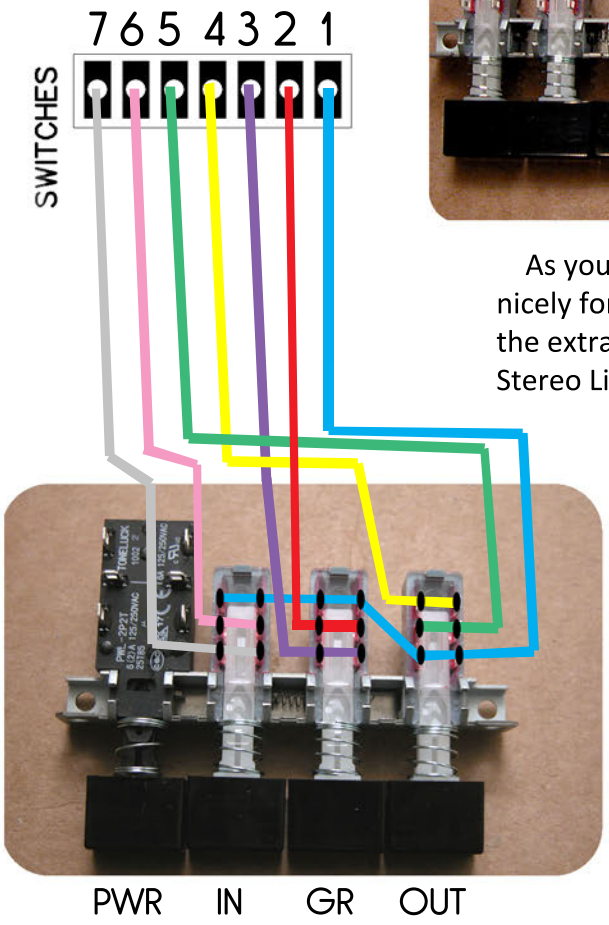
PIN:	GOES TO:
PIN 1	GROUND
PIN 2	OUTPUT (+)
PIN 3	OUTPUT (-)

NOTE: It is a good idea to tightly twist the wire connecting the jacks to the PCB for best noise performance. Also when mounting the AC power and you need to cross input/output lines it is a good Idea to cross at a 90 degree angle and also remember during chassis layout the output wires are usually less susceptible to noise than the input.

WIRING THE METER SWITCHES

Correctly wiring the meter switches is an important step to getting your meter working correctly. You first need to decide what order you will want your switches to be in. The original unit had it switches (in order from left to right) IN/OUT/GR.
You might choose to wire your units in IN/GR/OUT as it seems to make more logical sense and some premade cases are slikscreened in this manner. Either way the basic idea is the same.

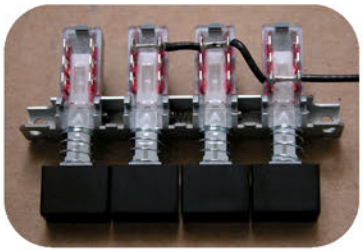


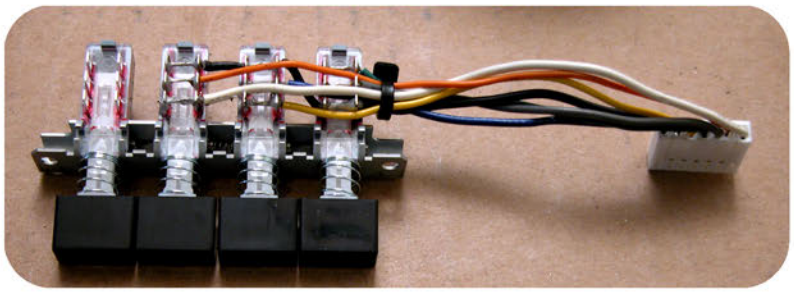


As you can see we think 4 gang switches work nicely for this project. They are readily available and the extra switch allows for a power switch and a Stereo Link of creating a stereo unit.

PIN #	GOES TO:
PIN 7	IN - NOT ENGAGED
PIN 6	IN - MIDDLE
PIN 5	OUT - MIDDLE
PIN 4	OUT - ENGAGED
PIN 3	GR - NOT ENGAGED
PIN 2	GR - MIDDLE
PIN 1	IN - ENGAGED, OUT - NOT ENGAGED, GR - ENGAGED

COMPELTED SWITCH ASSEMBLY

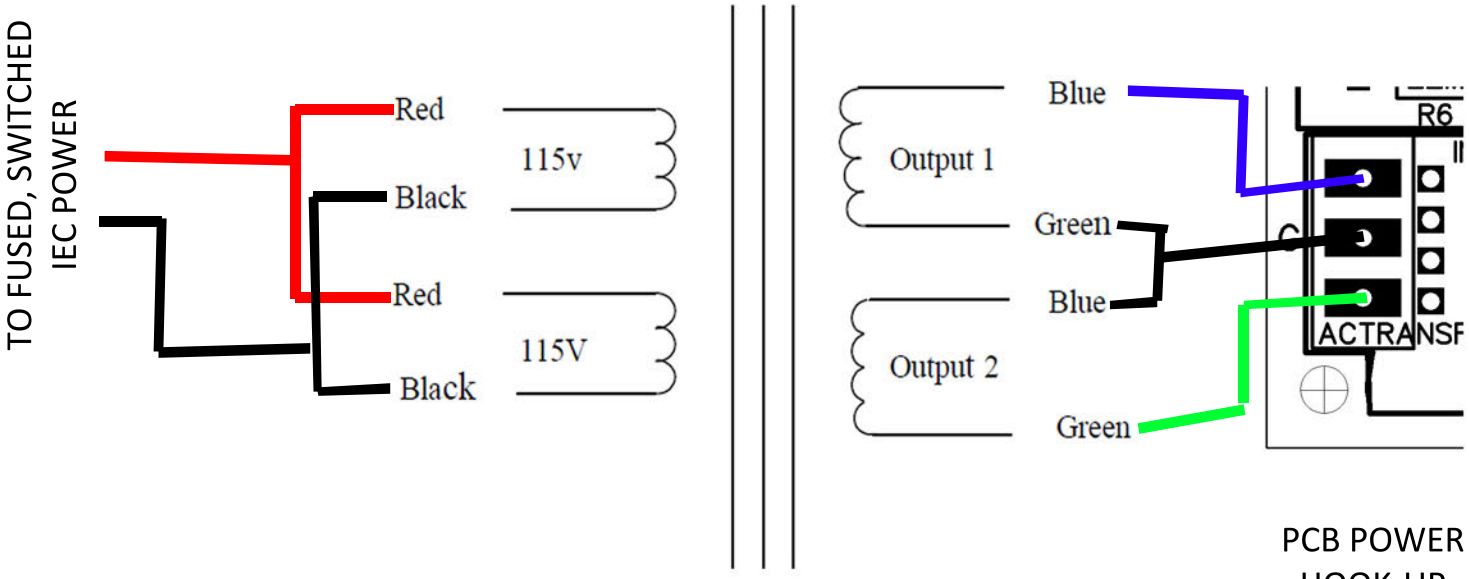




WIRING THE POWER TRANSFORMER

REMEMBER! ELECTRICITY KILLS! NEVER WIRE UP POWER WITH THE POWER ON! NEVER POWER ON WITHOUT ALL WIRES PROPERLY INSULATED.

BE CAREFUL! Please.



PCB POWER HOOK-UP

You will need a power transformer that is rated at 18v - 0 - 18v and capable of outputing at least 25va per CLX-VU board.
Example: if you wanted to run 2 x CLX-VU PCBs from one transformer your transformer should be rated at 50VA (at least).

Choosing a fuse:

1 CLX-VU PCB = 0.25amp

2 CLX-VU PCB = 0.5amp

NOTE: When hooking up more than one CLX-VU circuit board to one transformer be sure to run the wires parallel from the transformer. This ensures that each PCB is receiving the power it needs from the transformer.

SECTION 4

CALIBRATION

Remember all those trimmers you installed and soldered? Well now you get to adjust each one! Don't worry, its not hard. Just take it a step at a time and once you're done you should never have to do it to the unit again!

STEPS OF CALIBRATION

Power up and adjustment
Power Rails

RMS and Level Calibration
RMS Unit
RMS Symmetry
Level Calibration
Threshold Calibration

Meter Calibration
Meter Circuit Emualtion calibration
Meter Calibration
Input and output calibration
GR calibration

TEST EQUIPMENT NEEDED

SMALL SCREWDRIVER

MULTIMETER

OSCILLISCOPE (OR EQUIVALENT COMPUTER SOFTWARE)

HARMONIC DISTORTION METER (OR EQUIVALENT SOFTWARE)

VU METER (OR A MULTIMETER)

POWER UP AND ADJUSTMENT

So this is the moment you've been waiting for. The intial power up of your CLX -VU! Maybe you feel like a gambler with dices loaded, or like a kamakazi fighter pilot. Either way, double check all of your connections and measure the resistance between the power rails and make sure it is above at least 1000 ohms to avoid any obvious shorts. (If it is very low try adjusting R100 and R101 the power adjustment trimmers. If that doesn't help then double check your soldering for any solder shorts). Leave all the socketed ICs out until you confirm your power rails are working and are properly adjusted.

AFTER YOUR POWER RAILS WORK AND YOU INSERT YOUR ICs....

Your unit should now pass audio.

The controls should respond as expected, and the unit should compress.

At this point your meter should not be responding. That is because we left R109 disconnected.

The Above and Below lights should behave as expected.

NOTE: IF YOUR UNIT IS NOT WORKING CORRECTLY, DON'T WORRY. 9 OUT OF 10 TIMES IT'S SOMETHING SIMPLE. GO BACK AND CHECK EVERYTHING METHODICALLY.

FIRST STEPS

MEASURE RESISTANCE BETWEEN POWER RAILS. SHOULD BE HIGHER THAN 1000 OHMS.

LEAVE OUT ALL SOCKETED ICS UNTIL POWER RAILS ARE ADJUSTED.

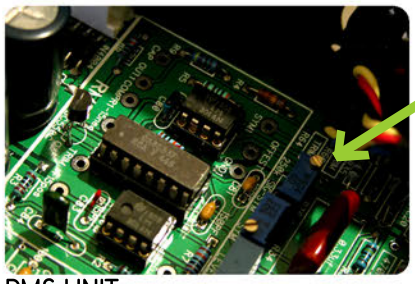
ADJUST POWER WITH R100 AND R101 TO +/- 50 mV OF 15 VOLT RAILS.

POWER OFF, INSERT ICS CORRECTLY AND APPLY POWER AND READJUST R100/R101.

ALLOW UNIT TO WARM UP FOR 15 MINUTES OR SO AND DOUBLE CHECK VOLTAGES. READJUST IF NECESSARY.

CALIBRATING THE RMS UNIT

The RMS unit could be called the heart of your compressor. It converts your audio into a DC control voltage. We need to correctly calibrate the RMS unit using R36.



RMS UNIT

RMS UNIT WITH OFFSET PIN PROBED.

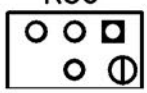
Things you will need:
Small screwdriver
Signal generator
Oscilloscope

STEPS

1) INSERT A -60 dB 100HZ SINE WAVE AT THE INPUT OF YOUR UNIT.

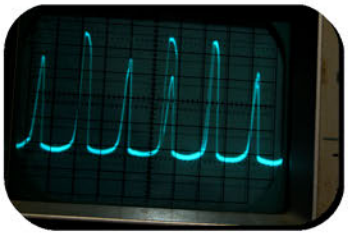
2) PROBE THE "OFFSET PIN" OF THE RMS UNIT WITH AN OSCILLOSCOPE. (its the hole with the circle around it)

3) ADJUST R36 UNTIL WAVEFORM IS SYMMETRICAL.

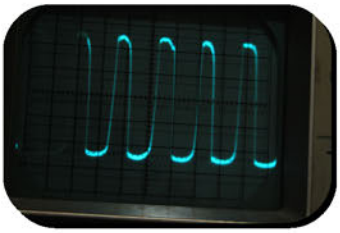


If you don't have access to a oscilliscope / signal generator you can try a software version and a soundcard such as:

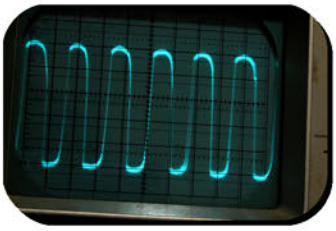
http://www.zeitnitz.de/Christian/scope_en



Waveform mis-adjusted

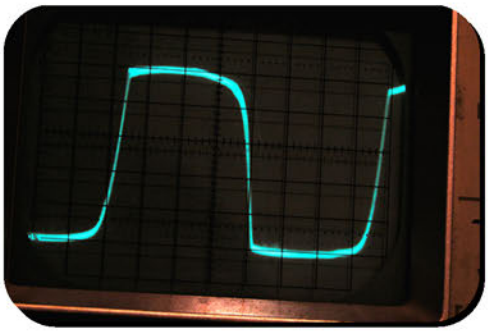


Getting closer



Looks better

NOTE: If there is no waveform on your oscillscope, try adjusting R36 till a waveform appears.



Zoom in and adjust till waveform is Symmetrical.

GREAT!

RMS SYMMETRY

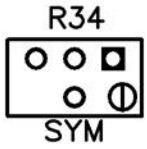
STEPS

1) Get Rightmark AudioAnalyzer software:
http://audio.rightmark.org/index_new.shtml
(or a distortion meter)

2) Set the test tone of RMAA to 100Hz, and start the "Playback/Recording" screen, so its beeping the test tones.

3) Adjust your unit so its compressing about 20db.

3) Look on the screen at the 2nd harmonic and 3rd harmonic distortion. Adjust R34 until lowest distortion is achieved.

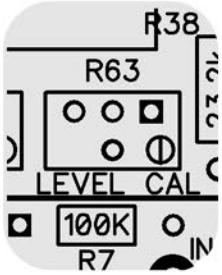


LEVEL CALIBRATION

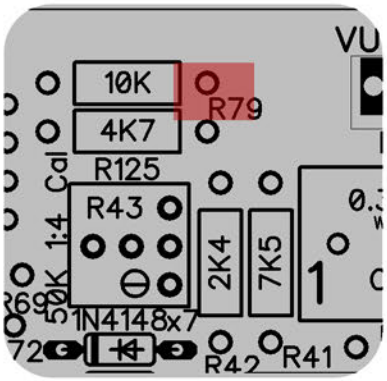
STEPS

1) Set oscillator to 100 Hz @ 1.228 VRMS and apply to input of the CLX-VU

2) Set meter to "INPUT" &Turn R63 until the voltage at the end of R79 is -0.011 VDC



R36



TEST POINT

THRESHOLD KNOB ADJUSTMENT:

WITH THE 1.228VRMS SIGNAL STILL ON INPUT TURN THRESHOLD KNOB TILL BOTH FRONT LEDs ARE OFF.

ADJUST KNOB TILL IT READS ABOUT 1.2V

1:4 RATIO CALIBRATION

1) Adjust RATIO control to 4 and THRESHOLD all the way counterclockwise.
2) Input the CLX-VU with a -30dB 100hz sinewave with no compression. Adjust output for a convenient reading on an external VU meter (-30dB)
3) Step-up output of oscillator to +10dB
3) Output of CLX-VU should be only be 10dB louder. Adjust R43 until this is true.

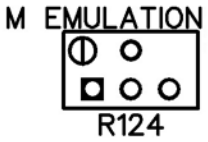
METER CALIBRATION

Now it is time for the Meter calibration. The first step is to set up our “center-detented” meter emulation circuit. It is simple if you just take it a little at a time!

METER EMULATION CALIBRATION

1)Confirm that one side of R109 disconnected. (If its not, disconnect it now)

2)Adjust R124 until the meter reads “0”.



3) Connect R109

GR & INPUT CALIBRATION

1) Set oscillator to 100Hz @ 1.228VRMS

2) Set “THRESHOLD” clockwise, “RATIO” counter-clockwise and set meter into “GR” mode.

3) Adjust R51 for “0” on the meter.

4) Set meter to “IN” and adjust R62 for “0” on the meter.

Rinse and Repeat steps 2 t o4 unit both GR and IN meter settings read “0”.

ENJOY!

OUTPUT KNOB ADJUSTMENT

WITH 1.228VRMS ON INPUT SET METER INTO “OUTPUT” MODE.

ADJUST GAIN CONTROL SO METER READS “O”.

ATTACH OUTPUT KNOB SO IT POINTS TO “O”