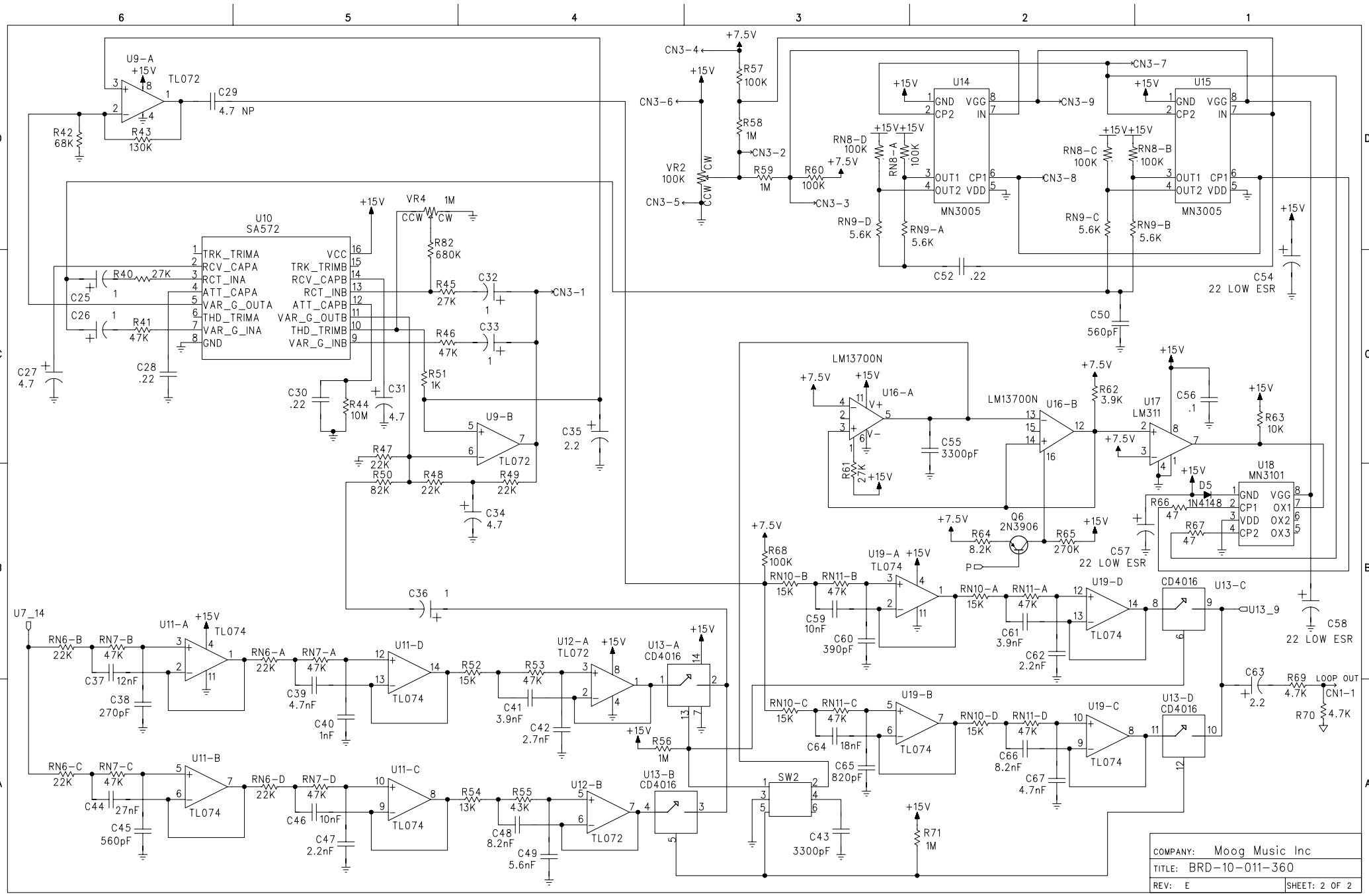
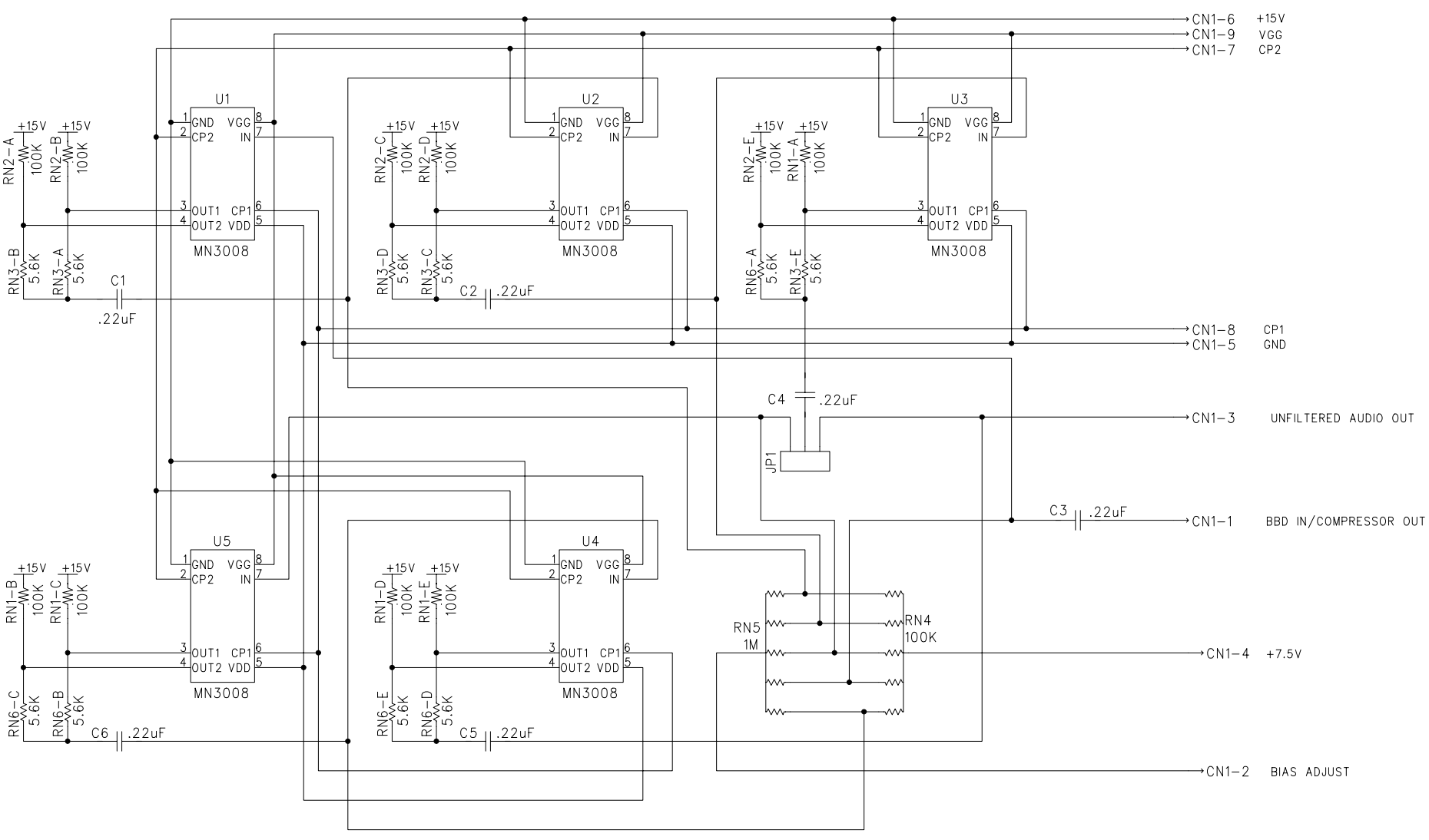


COMPANY:	Moog Music Inc
TITLE:	BRD-10-011-360
REV:	E
SHEET:	1 OF 2



COMPANY: Moog Music Inc
 TITLE: BRD-10-011-360
 REV: E
 SHEET: 2 OF 2

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COMPANY:		Moog Music Inc
TITLE:		BRD-10-011-365
REV: E	SHEET: 1 OF 1	

104-Z Analog Delay Spillover Mod Directions

Introduction

This mod should only be attempted by experienced technicians with a basic understanding of electronics. You can easily damage your 104 while cutting traces, soldering components, drilling holes and re-wiring circuits. Please read over all the instructions first and do not attempt this modification unless you feel confident doing so! Moog Music is not responsible for any damages that may occur to your instrument while attempting this mod. Contact Moog Tech Support for assistance (techsupport@moogmusic.com).



The "Spillover Mod" for the 104 will allow you to toggle between normal operation and "Spillover" operation with a single DPDT switch. The mod switch can be installed on the front panel next to the Int/Ext Loop (see above pictures). In Spillover mode, you can exit Active mode (green light) WITHOUT an abrupt end to the delayed signal. Whatever delayed signal is left within the analog delay chips will die off naturally when you click into bypass mode (red light). For some compositions, this can provide smoother transition between sections.

Notes:

1. In Spillover mode, the Mix knob is always active (in both active and bypass).
2. The main expense in this mod is the labor (disassembly, hand-wiring a circuit and switch, drilling a hole in chassis, re-assembly).

To perform this mod, you will need:

Phillips screwdriver

Hex wrenches (sizes listed in disassembly instructions)

Razor-blade or trace-cutting device

At least 32" of 24 gauge wire. (Four 8" lengths of different colored wires recommended)

Soldering iron + solder

Solder-wick or Pump to remove solder

Small DPDT switch (Available from Moog for \$14.76. Digikey part # EG2403-ND)

Hand drill or drill press with .255" bit

A multimeter that can read resistance

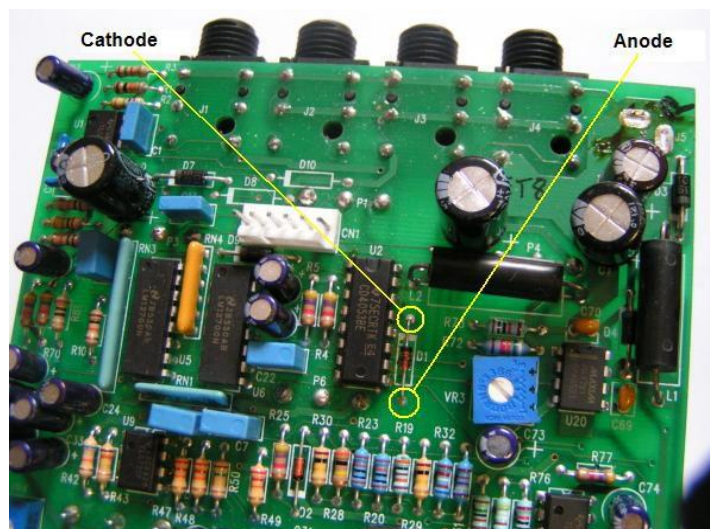
Disassembly

1. Remove all the knobs on the front panel. They will pull off by hand with the exception of the Drive/Output knobs. For these knobs, you will need to loosen the set screw with a small flathead screwdriver or a 1/16 in (1.58 mm) or Allen wrench (earlier models).
2. Remove the Metal Backplate and four back screws.
3. Remove the eight black plastic jack nuts with a 15 mm hex wrench.
4. Remove the front panel hardware, nuts and washers, w/ 1/2 in hex wrench.
5. Undo the stomp-switch/jack cables from the main PCB and remove the PCBs carefully. There are lock-washers on the pots. Make sure they don't spill off the unit! You may have to wiggle it to get the pots to come out.

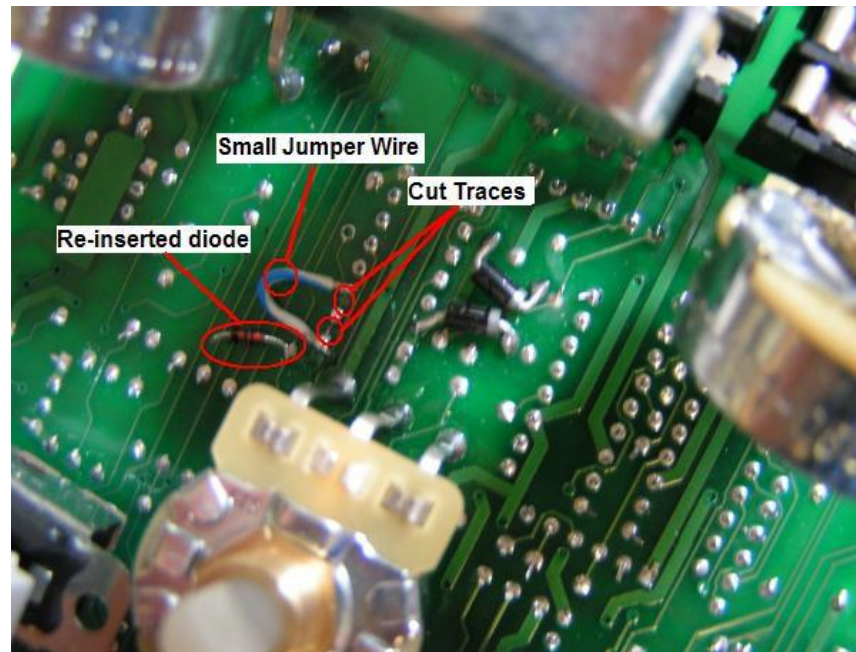
Note: When you handle the 104-Z main PCB, make sure the smaller daughterboard PCB makes a firm connection with the larger board. This smaller board contains most of the delay circuitry and is essential to 104 Operation.

Modding the Main PCB

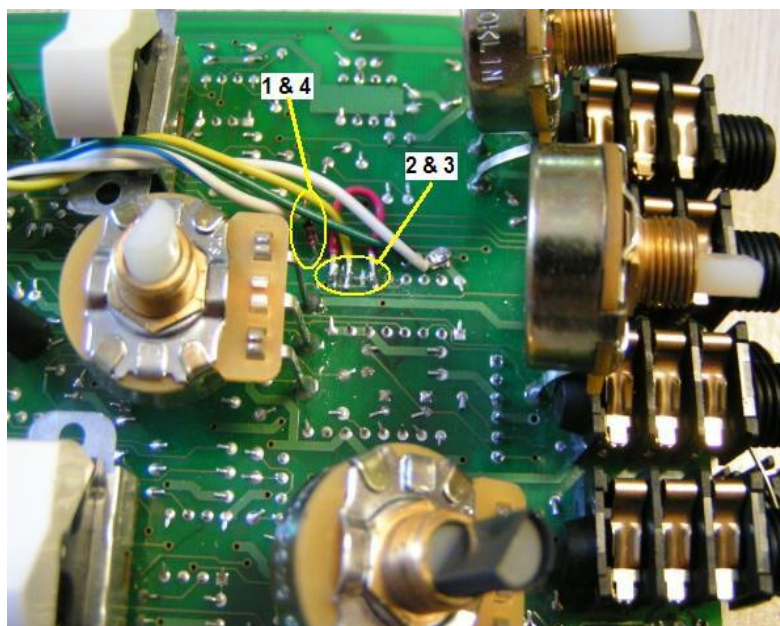
1. Set the Main PCB on a well-lit surface and clip D1 at the cathode end, leaving enough wire to solder to. Then pull this component out from the anode end, remove solder/wire from both diode holes and re-insert diode on the other side of the PCB in the same hole (anode end in anode hole). The cathode side should be disconnected from circuit.

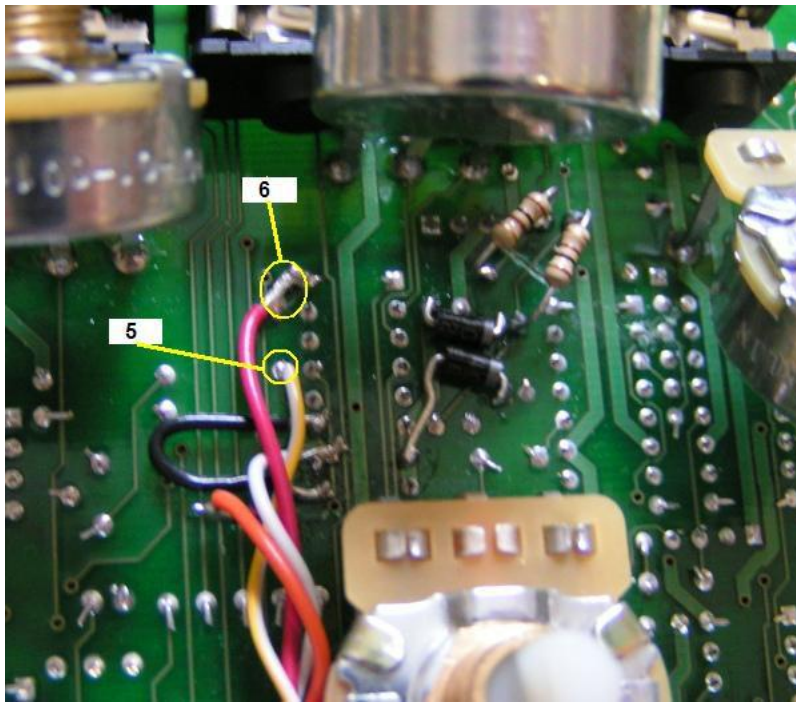


2. Locate the underside of chip U2 (gently bend the Drive pot back). Cut the traces that connect pins 9 and 11 to pin 10 and attach an 8" wire to pin 10.



3. Jumper pins 9 and 11 of U2 back together with a small bit of wire (approx 1/2"). Measure the resistance between pins 9, 10 and 11. Make sure 9 and 11 are shorted together and 10 is isolated.
4. Attach an 8" wire to cathode side of D1.
5. Attach an 8" wire to empty cathode hole of D1. This is the hi/low 'N' control signal for active/bypass.
6. Attach an 8" wire to pin 16 of U2.





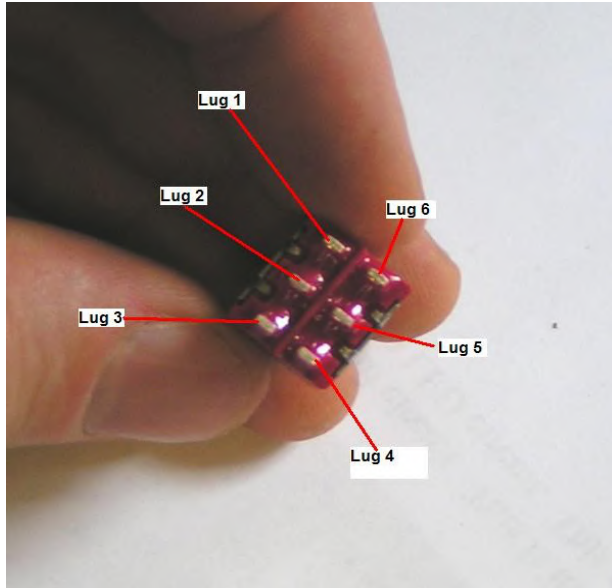
Note: Different eras of the 104 may have slight component variations. Most notably, you may see two diodes and/or two resistors near the underside of U2. The first picture has the diodes. The second picture has neither. The third has the diodes and resistors. As long as the unit is functioning properly, you need not worry if these components are present or not.

Prepping the PCB and Switch



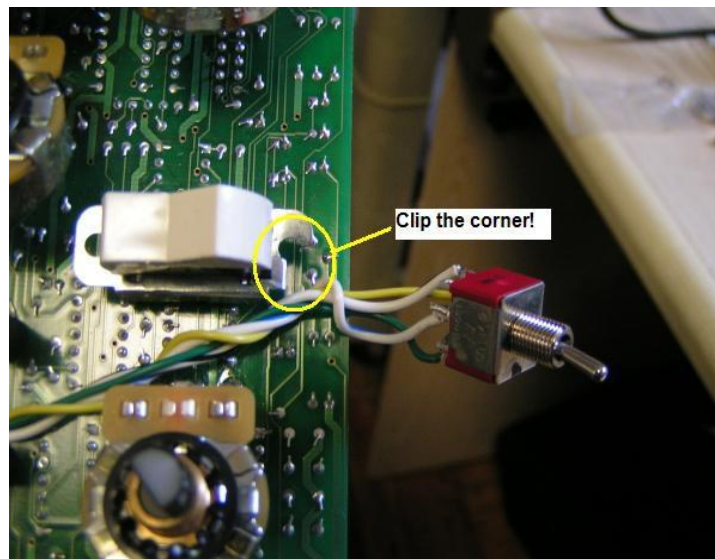
The above picture shows a good length for the switch wiring. Wire the switch as follows

1. Wire U2 pin 16 (+15V) to lug 1.
2. Wire U2 pin 10 to lug 2.
3. Wire 'N' control signal (cathode hole) to lugs 3 & 4.
4. Wire D1 cathode to lug 5.



(Switch Lug 6 remains disconnected from circuit)

5. After wiring up the switch, you can add the jacks and power to the PCB and test the Spillover switch. Be careful handling the raw PCB. Don't let anything short out!
6. To Make room for the switch, you'll need to clip off the edge of the Int/Ext switch hardware. Use sharp cutters and don't over-stress the Int/Ext switch. It can break easily!



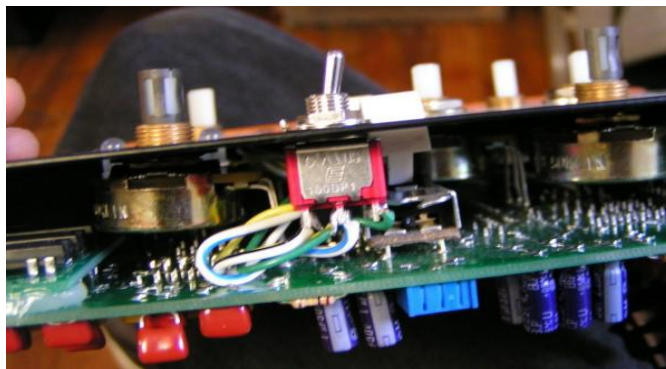
7. Add a dab of silicone glue to D1 on the PCB to keep it in place

Drilling Out the Chassis

Drilling out the chassis is simple enough if you have experience with a drill. However, it's one of the riskiest parts of the mod. A poorly drilled hole can ruin the chassis! The switch needs to sit between the Int/Ext Loop switch and the wooden side piece. It's snug, but a 1/4" bit will allow for enough 'play' if the hole is to the lower right of the Int/Ext switch on the corner of the white lines (see pictures below).



1. Make a small guide hole and carefully drill through with a fine bit. Then increase the hole size to .255" This should allow a little 'play' for the switch.
2. Remove the right wooden side piece via four small black metal wood screws.
3. Mount the switch and hardware (lock-washer, washer and nut) in the hole and make sure the wiring is properly tucked under the pots. The wires should not interfere with the operation of any switches or pots. Traditionally, the 'up' position is Spillover on.



4. Make sure the wooden side piece fits on without stressing the Spillover switch. You may have to adjust the Spillover switch or angle it slightly to keep the Ext/Int switch moving freely. Test the Ext/Int switch before re-assembly.
5. Reassemble PCB in chassis. The pots can be tricky to get back through the holes, but it can be done with patience and a little finesse. Don't forget to put the lock-washers on the pots.

Testing the Spillover Mod

If the mod has been done correctly, the unit should operate normally with the switch in the down position. In Spillover position (switch up) the Mix knob remains active all the time and the delayed signal will not be abruptly cut off when you switch to bypass (red light). With the Feedback knob turned up all the way, the delay signal will last indefinitely, even in bypass mode. Enjoy!

value changes for the different MF-104 versions

For both versions

Omit D8 and D10

C60 is 820pF

C65 is 1200pF

R50 is 150K ohm

R66 and R67 are 100 ohm

For the SD version [570/575 board set]

R45 is 7.5K ohm

R46 is 22K ohm

Daughter board is fully populated

Jumper is set 1 and 2

For the Z version [580/585 board set]

R45 is 22K ohm

R46 is 30K ohm

Daughter board is has RN1, U4, U5, C5, C6 removed

Jumper is set 2 and 3