Future Retro 777 Modifications

Most of the modifications explained here are simple to do if you have at least some experience with soldering. If you are not sure you know what you are doing have someone help who has some experience. If you are not clear on how to do some of the modifications, contact us and we will do our best to help.

Increasing envelope range

Extended envelope range for filter cutoff
Solder a 220K resistor in parallel with R131 (220K) or replace R131 with a 100K resistor, for twice the range.

Extended envelope range for OSC B
Solder a 47K resistor in parallel with R178 (47K) or replace R178 with a 22K resistor, for twice the range.

Creating faster envelope rates

Snappy filter envelope
Short out R78 (47K) or replace R78 with a 50K potentiometer for adjustable accent times and shortest possible envelope times for the filter's envelope. NOTE: You will probably want to make this mod switchable between original and mod version. To do so use a DPDP switch and use it to short resistor R78 or to switch between resistor R78 and the 50K potentiometer.

Faster envelope time for OSC B's sweep
Same procedure as the "snappy filter envelope" but with resistor R68 (47K).

Infinite VCA envelope time

Envelope drone for VCA
By lifting D11's (which will be either a diode or (zero) 0 ohm resistor, depending on revision) lead that goes to ground and making this connection switchable you can cause the VCA's envelope to sustain for an infinite amount of time. When D11 is disconnected from ground, once triggered the envelope's capacitor will be unable to discharge keeping the VCA level on. The VCA will stay on until D11 is connected back to ground or the Gate is selected to control the VCA. Note: The envelope will need 1 trigger either from the internal sequencer or from the external gate in to start the envelope. Once the envelope has been started/triggered you can either play with the droning tones while the sequencer is stopped or let the sequencer run and control everything as usual.

Extending the range that accent will affect the filter's cutoff frequency

Filter accent amount
You can change R130 (100K) anywhere from a 100K to 10K resistor to adjust the amount of affect accent will have on the filter's cutoff frequency. The less resistance used the higher the cutoff frequency for accented notes will be. This will allow for more of the "wow" and "whap" sound when high levels of resonance are used.

Increasing the noise source's level

Bring the noise
You can increase the maximum level of noise that goes to the filter's input by replacing resistor R102 (15K) with a 4.7K or 10K resistor. Less resistance equals more noise, and with low values of resistance you may overdrive the input of the filter.

Bypassing notes with glides

Glide time zero
Desolder R186 (100K) resistor's lead that DOES NOT go to the base of transistor Q41 and use a switch to select whether R186's lead goes to its original connection or ground. When the switch is in the ground position notes programmed with a glide will not glide but will sustain at their programmed pitch for the entire duration a note. Usually notes last for 50% duration of a step. By mixing glided notes (100% duration) and normal notes (50% duration) you can add a completely new feel to your sequences.

Adding a CV in to control both oscillators independently from an external CV source

Secondary CV in for OSC B
For this mod we will let the original CV IN be the control for oscillator A and the secondary CV IN to control oscillator B. First locate the trace on the top side of the circuit board that runs from S1 (OSC B's internal/external switch) to S2 (OSC A's internal/external switch). The trace will be just to the right of the two trim pots located between these CV switches. You will need to cut this trace and wire it to the tip of the jack you will use for the secondary CV input. Next, connect the sleeve of the jack to ground. You should also run a diode (IN4148 type) from the secondary CV IN to +6v and another to ground. This will help protect the circuit from high positive voltages or negative voltages.

For mounting the jack, you may be able to place a 1/4" jack (depending on its body size) just to the left of the original CV input on the back panel. If you use 1/8" jacks you could mount it to the left of the original CV input or between the jacks on the back panel.

Control voltages should run between 0 and +6v, avoid higher voltages than +6v or any negative voltages!

NOTE: If you use a switching type jack you could wire the secondary CV input so that when nothing is plugged into it, it allows the original CV IN source to control oscillator B. To do this, wire the other half of the trace you previously cut to the switching terminal of the jack.

Adding a CV in to control the filter's cutoff frequency

External filter CV input
For this mod you can use the same procedure as the "secondary CV in for OSC B" except obviously you won't need to cut the trace for the switches as mentioned above. Locate R37 (0 ohm) resistor and lift the lead that connects to diode D31, located just next to R37. For this mod we will run a wire from the tip of the CV jack to be used, to the lead of the diode D31 that was connected to R37. If you use a switching jack you can run a wire from the lifted lead of R37 to the switching terminal of the jack. This way when nothing is inserted in the jack, connection for the circuit will be as it was originally. Next, wire up the jack's sleeve to ground. Positioning of the jack is up to you.

With this mod you can use the CV type switch in the filter mod section to select how the CV affects the cutoff frequency of the filter. You can use the CV amount knob to control the amount of affect the CV has on the filter's cutoff frequency.

Control voltages should run between 0 and +6v, avoid higher voltages than +6v or any negative voltages!

Additional notes for those doing modifications

There are 2 hex inverters that are not used. These are in IC U3 (part type MC14584). This IC runs between +6v and +12v.

Pins for the unused inverters are:

1. 5 input, 6 output
2. 9 input, 8 output

There are 3 analog switches that are not used. These are in IC U11, and U14 (part type 4066). These IC's run between ground and +12v.

Pins for unused switches are:

U11

1) 1 & 2 are input/output, pin 13 is control

2) 10 & 11 are input/output, pin 12 is control

U14

1) 1 & 2 are input/output, pin 13 is control

Infinite sustain for sustained or glided notes

Infinite sustain
As in the original 303, if a long sustain is written for a note's duration the VCA's gate signal will eventually decay until no sound is heard. You can change this so that the gate signal never decays, and infinite gate times are possible. For this mod, lift the anode end (side opposite the black band) of diode D20 and run a wire to connect the lifted end of D20 to the anode of diode D19. You could also use a switch to make the connection of D20 selectable between its original source and D19.

Turning your VCA's gate into an ASR type envelope

Variable attack time
You can adjust the time it takes for the gate signal to reach its full potential by increasing the resistance of resistor R176 (10K). For adjustable attack times, lift one end of R176 and run a wire from the lifted end of R176 to one of the outer terminals of a potentiometer. Run another wire from the hole which R176 went to, to the other outer terminal of the potentiometer. Connect the wiper of the potentiometer to one of its outer terminals so that the resistance of the pot increases as you turn the potentiometer clockwise. Note that more resistance creates longer attack times, I would recommend using a 50K or 100K potentiometer for this mod, but feel free to experiment.

Variable release time

You can adjust the time it takes for the gate signal to decay once a notes gate signal is turned off by increasing the resistance of resistor R175 (10K). For adjustable release times, lift one end of R175 and run a wire from the lifted end of R175 to one of the outer terminals of a potentiometer. Run another wire from the hole which R175 went to, to the other outer terminal of the potentiometer. Connect the wiper of the potentiometer to one of its outer terminals so that the resistance of the pot increases as you turn the potentiometer clockwise. Note that more resistance creates longer release times. Again, I would recommend using a 50K or 100K potentiometer for this mod, but feel free to experiment.

This is a pseudo ASR type envelope in that the sustain portion is not adjustable in amplitude. With less extreme settings for the attack and decay time you can eliminate "popping" in the VCA and still retain the normal gate signal.

Increasing the overall amount all modifiers have on the filter's cutoff frequency

For those of you who want some truly bizarre filter effects try this one.

By increasing the resistance of resistor R128 you will increase the range of each one of the filter's modifiers (Ie. CV/Warp, Osc B amount, Envelope amount). Lift one end of R128 (2.2K) and run a wire from the lifted end of R128 to one of the outer terminals of a potentiometer. Run another wire from the hole which R128 went to, to the other outer terminal of the potentiometer. Connect the wiper of the potentiometer to one of its outer terminals so that the resistance of the pot increases as you turn the potentiometer clockwise. Note that more resistance results in more affect the modifiers will have on the filter's cutoff frequency. Try using a 50K potentiometer for this mod, and again experiment.

Additional information

Filter cutoff frequency adjustment

It is not recommended to adjust the internal trim pots in the 777, unless you are retuning the instrument.

There is one trim pot users can adjust to their liking. It is to control the range the cutoff knob has on the filter's cutoff frequency. You can find the trim pot just to the left of the filter's cutoff potentiometer. By rotating the trimmer clockwise you will allow for higher frequencies in the filter's cutoff setting. By turning the trimmer counter-clockwise you will reduce the higher frequencies in the filter's cutoff frequency range.

Sub oscillator waveform

The waveform each sub oscillator produces is a square wave. By selecting a sawtooth waveform in an oscillator (oscillator A), with its level at max, you can then turn up its related sub oscillator level (sub- oscillator A) and the result waveform is a sawtooth 1 octave below the frequency of oscillator A. The same applies to oscillator B.

You can look at this in two ways.

1. When sub oscillator A's level is up, by bringing up oscillator A's level with sawtooth as its waveform you are changing sub oscillator A's waveform from square to sawtooth.
2. The reverse of this is when oscillator A is set to sawtooth and its level is up, by bringing up sub oscillator A's level you transpose the sawtooth 1 octave down in pitch