

NEPTUNE 2

ANALOG SYNTHESIZER



Service Manual



Spectral
Audio

Contents

1	General Note.....	2
2	Manual Changes.....	2
2.1	Having pulse-width modulation (PWM) for the rectangular wave on OSC1..OSC3	2
2.1.1	OSC1.....	2
2.1.2	OSC2.....	2
2.1.3	OSC3.....	2
2.2	OSC3/LFO sync with OSC1 or OSC2	3
2.3	Even faster envelopes	3
2.4	Increase the tuning range for OSC1..OSC3	3
2.5	General in/outputs	3
2.5.1	Oscillators.....	3
2.5.2	Envelopes.....	3
2.5.3	Filter.....	3
2.5.4	Distorter.....	4
2.5.5	VCA	4
3	Assembly plan Analogue Print (see also separate .gif file at the homepage).....	5
4	Assembly plan Digital Print	6
5	Adjustment.....	6
5.1	Adjustment of 12.000 V Supply	6
5.2	CV slope adjustment	6
5.3	Osc1	6
5.4	Osc 2	6
5.5	Osc 3	7
5.6	Filter.....	7
5.7	Noise generator	7

1 General Note

Fully schematic is not supported by this manual. If you think you really need to receive it, please write to spectralsound@swissonline.ch.

2 Manual Changes

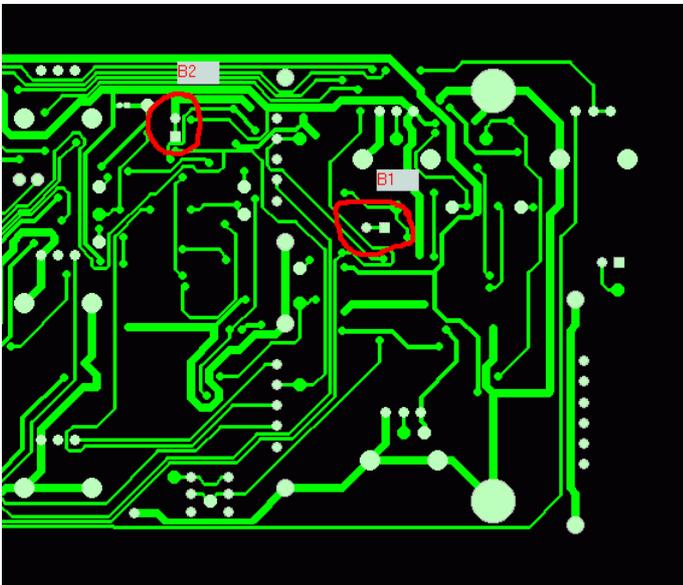
2.1 Having pulse-width modulation (PWM) for the rectangular wave on OSC1..OSC3

2.1.1 OSC1

Open B1 with a sharp cutter.

2.1.2 OSC2

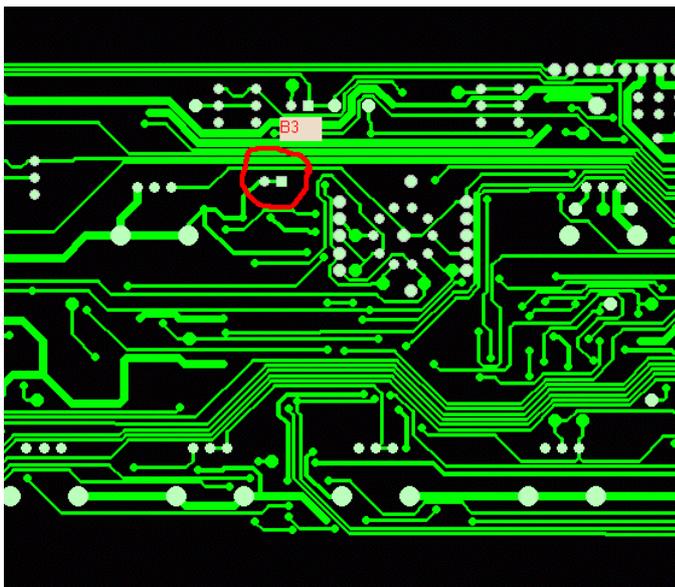
Open B2 with a sharp cutter.



Pictures shows Backside of the PCB.

2.1.3 OSC3

Open B3 with a sharp cutter.



The square Pad is now the DC Signal input for PWM. It ranges from $-3.8V$ to $2.3V$ for 0% to 100% PWM or you if want to use the range 50% to 100% (the 0% to 50% do sound exactly the same), $-0.75V$ to $2.3V$.

2.2 OSC3/LFO sync with OSC1 or OSC2

For this, connect a 470pF capacitor (it may be ceramic) from TP19 (OSC1 out) or TP45 (OSC2 out) to TP46 (you may want to use a switch).

2.3 Even faster envelopes

To increase even more speed of EG1 (Volume), you may solder a resistor in the value of 100 Ohm down to 10 Ohm from the middle pin of Release Pot to TP50. For the VCF Envelope use TP44. Both may be result in some click noise because of the low rise and decrease time of the Envelope.

2.4 Increase the tuning range for OSC1..OSC3

It is possible to reduce the value of R001 for OSC1, R022 for OSC2 and R128 for OSC3. Its standard value is 1M5. Decreasing its value may also mean to decrease of R002, R021 and R129 to have the reference note in the middle of the Tune Pot. To learn another Reference Note over MIDI is another solution but this decreases the note range.

2.5 General in/outputs

2.5.1 Oscillators

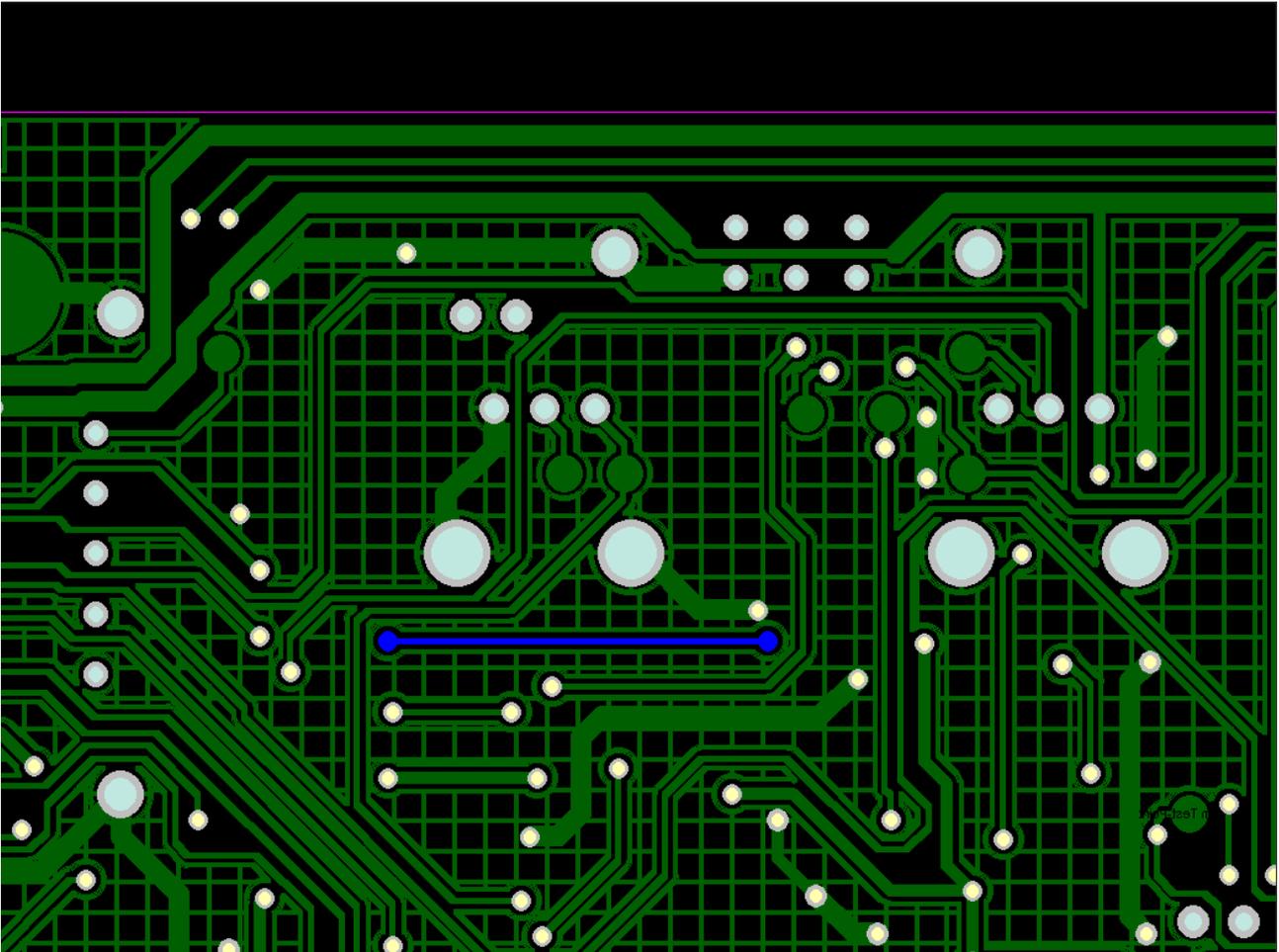
The easiest way to get the signals of the Oscillators are the switches SW02, SW03 and SW11. Amplitude is 0 to +9V. Same for the noise generator.

2.5.2 Envelopes

These signals can be taken on ENV MOD potentiometer for the filter envelope and on the Volume potentiometer for the VCA envelope.

2.5.3 Filter

The Filter input is at C18 and its output is U07 pin 14. Control voltage is applied to the Base of T05 and R073. You can also access this voltage from the backside at this track below the resonance potentiometer:



2.5.4 Distorter

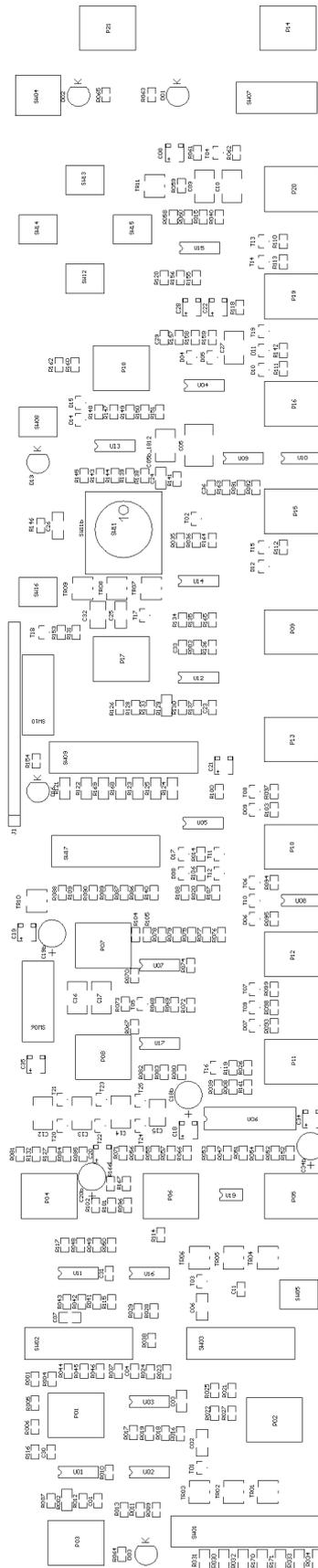
The filter output is directly connected to the distorter/fuzzer selection input. Remove pin 14 from U07 from the solder pad (leave it in the air and connect R105 to it). The remaining pad is now the input for the distorter/fuzzer selection.

Output is at U05 pin 7.

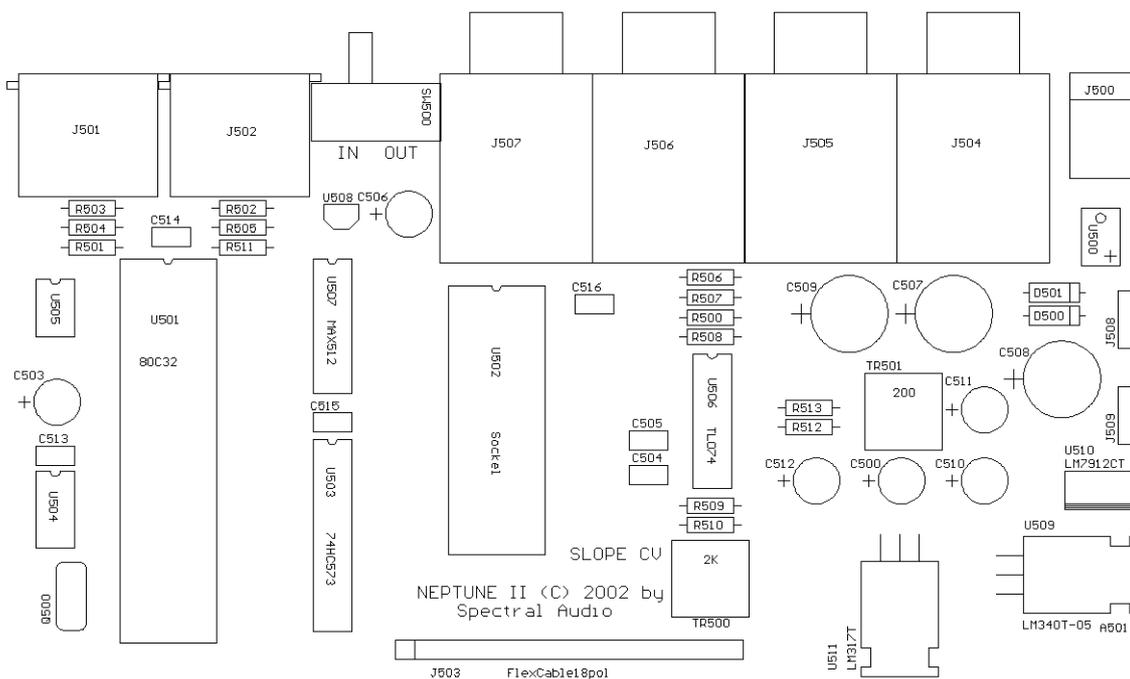
2.5.5 VCA

Input is R026 (sold it away from the output of U05 pin 7). Output is pin 12 from U06 and at the output jack on the rear side. Control voltage can be applied to the volume potentiometer.

3 Assembly plan Analogue Print (see also separate .gif file at the homepage)



4 Assembly plan Digital Print



5 Adjustment

Keep the following sequence.

5.1 Adjustment of 12.000 V Supply

Connect a precise DVM to R031 and Ground (i.e. casing of octave select switch Osc2) and adjust TR501 to 12.000V after a warm-up phase of at least 30 minutes.

5.2 CV slope adjustment

Connect a precise DVM to the output jack of CV. Adjust TR500 to 3.00V between C1 – C4 (input over MIDI).

5.3 Osc1

The offset for VCO1 is set with TR01 and the oscillator slope with TR02. Nonlinearity in the upper frequency range is adjusted with TR03.

Proceed as follows to make the adjustment:

1. Set the **MIDI reference note** to C1 by pressing the learn-key.
2. Press key A3 and set the VCO1 frequency with offset trimmer to 220.0 Hz, measured with an exactly frequency meter.
3. Press key A1 and set the frequency to 55.0 Hz with oscillator slope trimmer.
4. Repeat steps 2 and 3 until frequency values are stable.
5. Press the key A5 and set the frequency to 880.0 Hz with nonlinearity trimmer.
6. Repeat steps 2 to 5 and re-adjust if necessary.

5.4 Osc 2

Same as above but with TR04 as offset, TR05 as oscillator slope and TR06 as nonlinearity correction. Do it first with Oct switch in 16' pos and correct later the Nonlinearity pot with Oct switch in the highest position until no beats are hear able to Osc 1.

5.5 Osc 3

Same as above but with TR07 as offset, TR08 as oscillator slope and TR09 as Nonlinearity correction. Do it first with Oct switch in 32' pos. Now all frequencies are half the value of the above. Correct later the Nonlinearity pot with Oct switch in the highest position until no beats are hear able to Osc 1.

5.6 Filter

Put it in self resonance (start of). Set key follow switch to 100%. Measure the generated frequency and set Cut-off pot to 100Hz with C1 at MIDI input. Input now C4 at MIDI and adjust TR10 to 800 Hz. Repeat if necessary.

5.7 Noise generator

Read out the output with an Oscilloscope at the wave select switch. Adjust TR11 to maximum amplitude whitout climps.

~~~

Have fun!