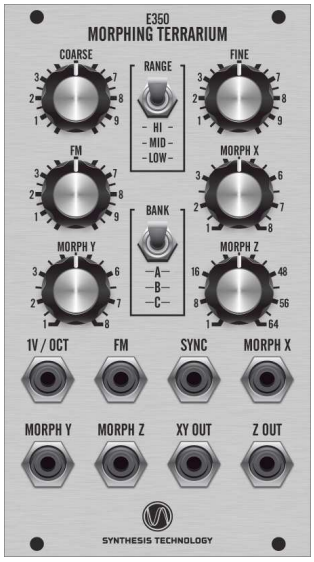
E350 Morphing Terrarium DIY Kit

www.synthtech.com/euro/e350

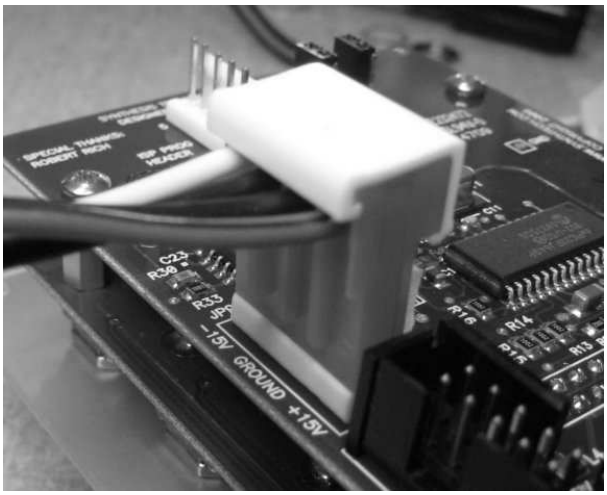


What is the E350?

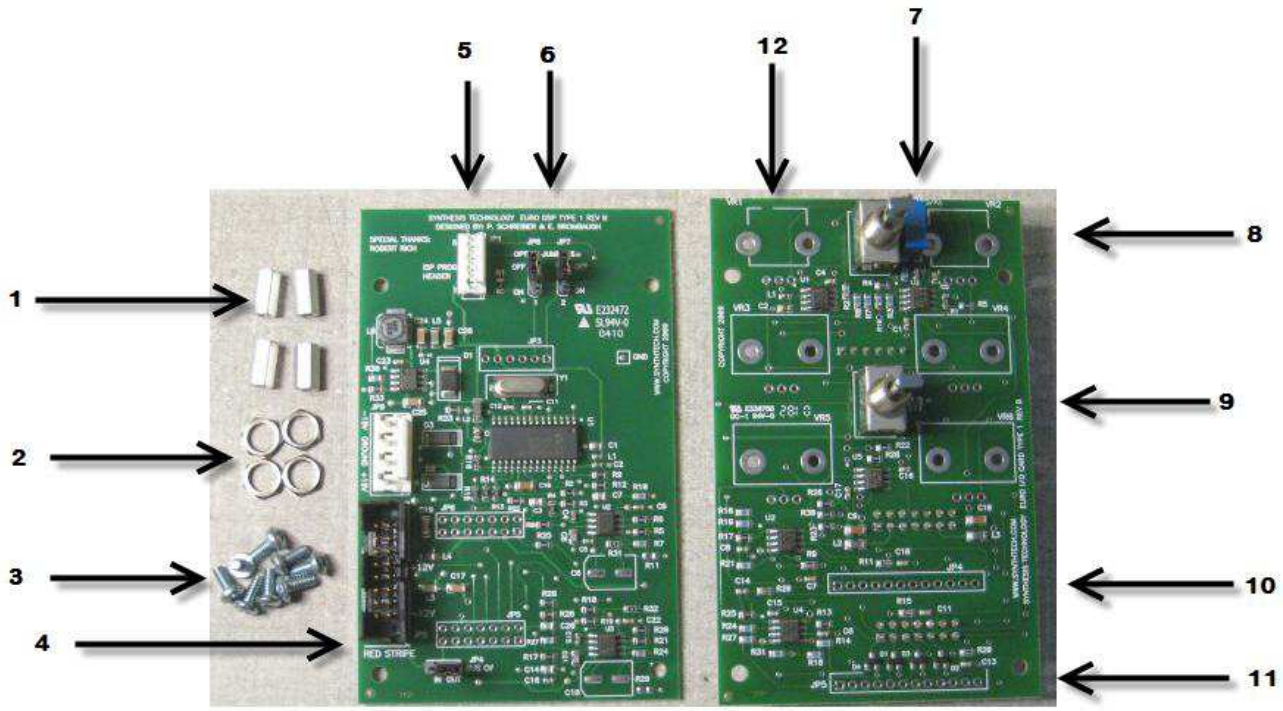
The Synthesis Technology E350 is a 2-output wavetable VCO. There are 3 banks of 64 wavetables. Each bank is arranged like a chessboard: there are 8 rows (the 'X' direction) and 8 columns (the 'Y' direction). Waves in a row tend to be alike, or will progress from 'dark' to 'bright' in timbre. The E350 has independent controls to index/select where in this array the DSP 'scans' the data to generate these 2 outputs. The DSP has sophisticated algorithms that smooth the 2 outputs into over 24,000 unique waves.

Connecting to the power supply

The E350 can use either a MOTM 4-pin, MTA-156 style connector (+-15V) or a 16-pin Euro style (+-12V) connector. See the photos below. The Euro ribbon cable has a red stripe to indicate -12V. The supplied Euro power cable is keyed so that when inserted in the E350, the red stripe is 'down' (towards the jacks) and by the white lettering on the pc board.



What's in the Kit (Euro Power Cable Included, not Shown)



1- 4ea spacers, threaded for 4-40 screws, length 0.375in
2- 4ea hex nuts for the switches
3- 8ea 4-40 x 0.25in pan head screws
4- This is where the Euro power cable goes (see Page 1)
5- This is the DSP programming header. DO NOT CONNECT ANYTHING TO HERE!
6- Option jumpers (see text). You can also wire these to SPDT switches
7- 1V/OCT trimmer. This trimmer is NOT ADJUSTED at the factory!
8- The RANGE select switch (HI, MID, LO)
9- The BANK select switch (A, B, C)
10 – Jack/wire connections for the first row of jacks
11 – Jack/wire connections for the second row of jacks
12 – 6ea pot mounting/hole locations

NOTE: LATEST KITS HAVE ALL 6 POTS PRE_SOLDERED.

What you will need to supply

8 jacks. These can be banana, 3.5mm or 1/4". For lowest frequency jitter, the 1V/OCT, FM and SYNC jacks should be NC shorting type (Switchcraft 112AX or equivalent). The switched contact is tied to ground on the pc board, so that when no

patch cord is inserted, the input is grounded. If non-shorting jacks are used (like banana) then you may experience small variances in output frequency.

Here is how to connect to the pot & jack board

Step 1

Decide if you want to keep the 2 toggle switches soldered to the front panel (highly recommended) or not.

If you decide that you want to remove them (you can reuse them if you are careful), then use solder wick to remove as much solder as possible, then apply a vacuum 'solder sucker' to remove all the solder. The switches are called ON_OFF_ON types (SPDT) because they have 3 positions. The center position is OFF, meaning the common side is not connected to either switched side.

The switches have 2 mounting nuts. For maximum mounting strength, the 'bottom nut' should be threaded up touching the rear of the front panel before the 'top nut' is tightened.

Also note that when the toggle switch it flipped 'up' (say to select the HI frequency range) this means the center pin (COMMON) is connected to the **bottom** switch lug.

If you remove the switches/use your own, use 24ga tinned stranded wire.

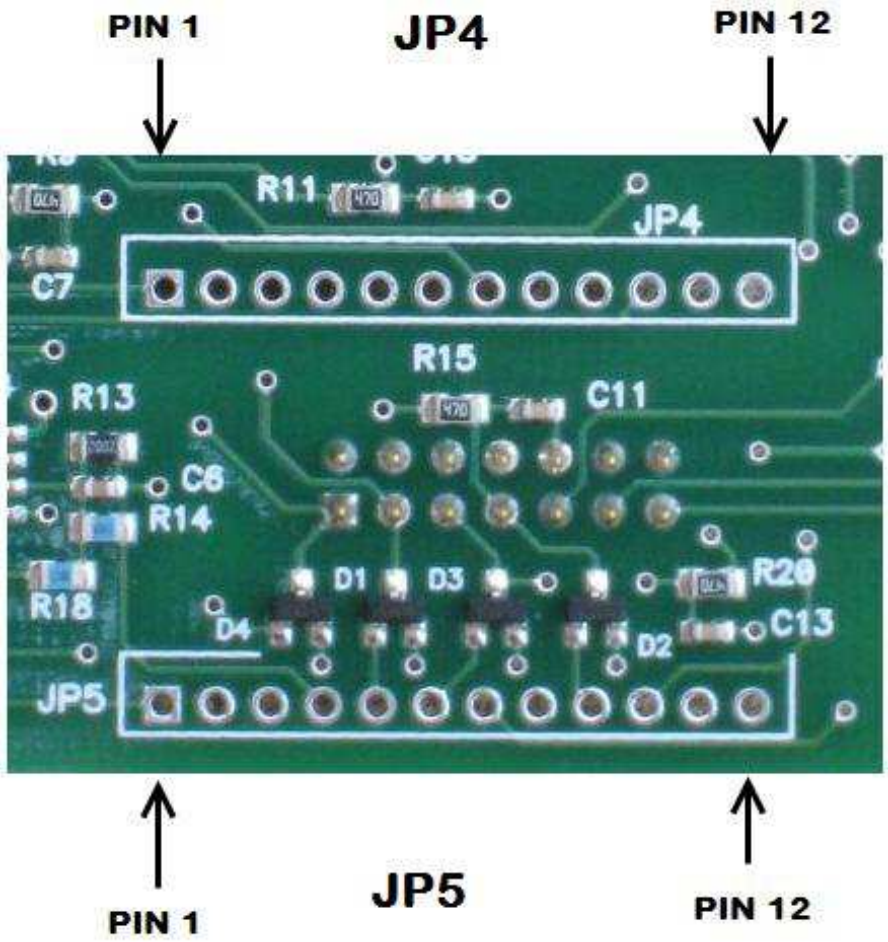
Step 2

Wire up the pots. The wire should be inserted from the front (component) side, not from the back where the 3 connectors are. All 6 pots are wired exactly the same. There are 3 horizontal holes that correspond to the 3 pot lugs when the pot is viewed from the **front** and **NOT FROM THE BACK SIDE**. If you wire the pots up backwards, you will not damage anything but you will quickly figure it out.

So, using 24ga stranded wire, wire the left pot lug (when facing the FRONT of the shaft) to the left hole, the center lug to the center hole and the right lug to the right hole.

Step 3

Wire up the 8 jacks. Refer to the photo below:



You will notice that PIN 1 of the jack connectors has a square pad. As before, insert the wire from this side and solder on the back side. The connections to the jacks are as follows:

JP4

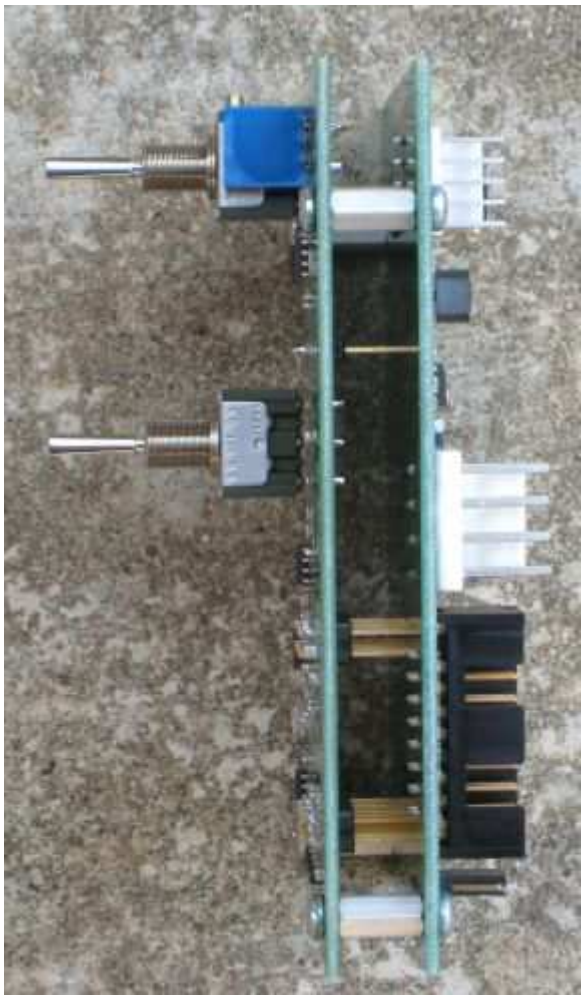
1 – 1V/OCT input signal
2 – 1V/OCT switched lug (optional)
3 – Ground lug
4 – FM input signal
5 – FM switched lug (optional)
6 – Ground lug
7 – SYNC input signal
8 – SYNC switched lug (optional)
9 – Ground lug
10 – MORPH X input signal
11 – do not connect
12 - Ground lug

JP5

1 – MORPH Y input signal
2 - do not connect
3 – Ground lug
4 – MORPH Z input signal
5 - do not connect
6 – Ground Lug
7 – XY OUT output signal
8 – do not connect
9 – Ground lug
10 – Z OUT signal
11 – do not connect
12 – Ground lug

Step 4

Attach the DSP board to the front board. You will note there are 3 gold-plated headers that are on the rear of the pot/jack board. These will solder to the top (component) side of the DSP board. See the photo below:



a) thread a hex nut on the top switch
b) thread a hex nut on the bottom switch
c) place a screw and threaded standoff on the back side of the pot/jack board in each mounting hole. There are 4 holes, 1 in each corner.
d) carefully align the DSP board so all the header pins are inserted into the corresponding holes. The 4 corner holes on the DSP card will align with the other ends of the standoffs. Use the 4 remaining screws to screw the 2 boards "back-to-back" as shown.
e) Very carefully solder each of the header pins to the top side of the DSP card. The header pins are custom-made so that there is no need to cut excess after soldering

Step 5

There are 3 jumper options on the DSP board as follows:

JP4 – buss CV. This is for Doepfer-style bussboards. The default position is OUT (the buss CV is not connected to the 1V/OCT summer). Placing the jumper to the IN position will cause the buss CV to be added to the overall frequency summer.

JP6 – Disable interpolation. The default is OFF (the wavetables are interpolated). Placing the jumper to ON will disable interpolation. The result of this is a "noise glitch" as the wavetables are scanned by MORPH X, MORPH Y, or MORPH Z.

JP7 – Disable Phase Shift Output mode. The default position is OFF (the module does not have variable phase shifted outputs). Placing the jumper to the ON position re-maps the front panel controls and functions as follows:

a) The MORPH X pot and CV remap to a variable phase wavetable output on the XY OUT jack. The Z OUT is unchanged. The phase shift is continuously variable from 0-360 degrees.
b) The MORPH Y pot and CV remap to a 'reversing attenuator' function for the XY OUT signal. When the pot is at '1', the XY OUT waveform is inverted (a gain of -1). As you rotate the pot clockwise, the gain reduces to 0 at mid-point and approaches +1 at full rotation (the '8' tick mark).

You can also remove the jumper shunts and carefully solder wires and SPDT switches to JP6 and JP7.

Step 6

All that is left to do is mount the board assembly and the wiring/pots/jacks/switches to a panel. If you keep the 2 switches on the pc board, remember to "thread up" the bottom nuts to lay against the back of the panel for mechanical support when you place the front nuts on and tighten.

The module does NOT come calibrated to 1V/OCT tracking. There is a 25-turn trimmer that will be roughly in the middle range (about 12 turns of the screw adjust from one end) when calibrated. This is a good place to start.

If you have any questions or issues please email me at: synth1@airmail.net