

E352 Cloud Terrarium

www.synthtech.com/euro rack/e352



What is the E352?

The Synthesis Technology E352 is a dual output, wavetable VCO that replaces the older E340 Cloud Generator and the E350 Morphing Terrarium, while adding over 30 new features.

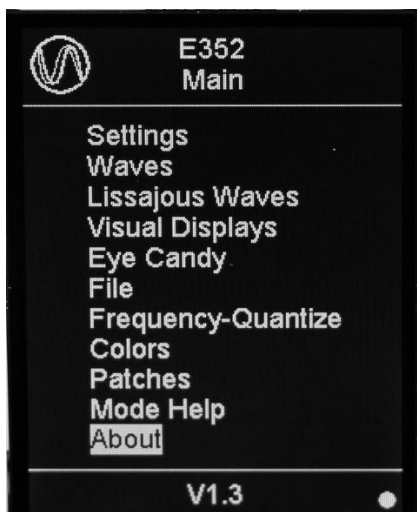
Shipping with all 192 waves of the E350, it also allows 8 User Defined banks (a bank is a 8x8 matrix of 64 individual waves) which are easily loaded using the free WaveEdit application and a uSD card. The WaveEdit program supports PC/Mac/Linux and has a full toolbox for importing, drawing and creating wavetables. The uSD card needs to be FAT32 formatted, 32GB size or smaller (no speed requirement). The card is not required for normal operation, only to load files into the E352.

The large color TFT screen is used to select the modes and parameters, using a "shallow" menu: only 1 page is below another page. The menu items are selected by rotating the encoder left or right (to go 'back' or 'forward') and then 'clicking' the encoder knob. SynthTech modules come with a lifetime warranty. Support is primarily via the SynthTech Modular Group on Facebook.

Watch the tutorial video

Go to the link at the top of this sheet and watch the overview videos. This will touch on all the different modes of the E352 and show you the 'shallow' menu system.

MAIN MENU



The Main Menu is like a table of contents. The encoder is used to highlight the function, and the encoder knob is 'clicked' (like a mouse) to go to that page.

The color scheme is customizable.

There are 8 presets to store the setting of the module. This includes any user-loaded wavetables. Each preset can have 192 different user wavetables plus the 192 factory waves.

The green dot in the lower right turns red (default) when the memory is being written. Do not power off when this is active.

Please check the link above for the latest firmware version.

Controls and Jacks

There are 3 CVs that are assigned, based on what mode you are in. Each CV (called X, Y and Z) has a dedicated 'offset' or PARAMETER and an external CV in (-5V to +5V range) with a dedicated attenuator.

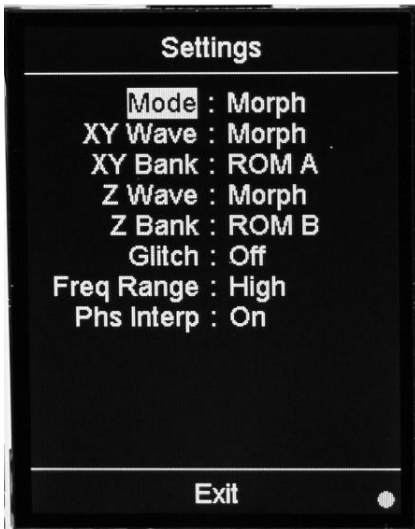
It is important to note, just like on all SynthTech modules, the attenuated CV is *added* to the PARAMETER knob position. If a PARAMETER knob is at 12:00 (straight up), then a -5V to +5V unattenuated CV input will swing that X/Y/Z value "end-to-end" or minimum to maximum. This is exactly the same as having no CV into the jack, and turning the panel knob end-to-end.

The 2 outputs (OUT1 and OUT2) are determined by the Mode in the Settings menu. SYNC is used to hard sync the VCO or to trigger Sample Player.

Settings

The **Settings** menu is where the 'mode' of the E352 is selected and the options for that 'mode' are programmed. Each setting has a unique way the 3 Parameter CVs (PARM X, Y and Z) are used within that mode. The **Mode Help** screen will show how all the CVs and Outputs are mapped.

Morphing Modes



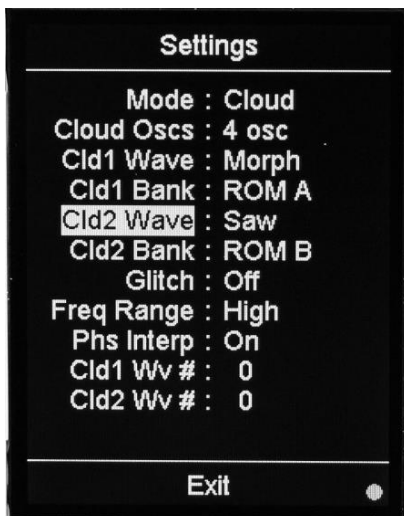
Morphing is the smooth transition ('blending') from adjacent wavetables within the Bank's 8x8 grid. If you picture a chess board with 8 rows and 8 columns, this is how the wavetables are stored in a Bank. The 'X direction' is within a row. The 'Y direction' is within a column, and 'Z direction' scans the entire bank end-to-end (from the first to the last wavetable).

Menu item **Phs Interp** (Phase Interpolation) can be set to Off and **Glitch** can be set to 1 of 3 intensities to simulate older wavetable synths (like the PPG) that do not smoothly morph.

The E352 ships with 3 Banks of wavetables that were originally in the E350 Morphing Terrarium (ROM A, ROM B, and ROM C). In addition, standard 'analog VCO' waves can be selected (sine, saw, etc) as well as 8 USR banks created by the free WaveEdit application. The **File** menu page is used to load in user Banks.

There are 2 other Morphing modes: with a Wavefolder (**Morph+WFld**) and with a 0-360deg phase shift between the outputs (**Morph+Phs**). See **Mode Help** for how the controls are mapped for these modes.

Cloud Mode



A 'Cloud' is 2, 4, or 8 VCOs that are detuned from each other. When a Sawtooth is used, the old term was a 'supersaw' effect. The E352 can use any waveform or wavetable for the Cloud. Each output can have a different waveshape being 'clouded', but the 2 outputs share the same controls.

The 3 parameters are mapped as follows:

- X - Spreads each VCO from the 'root' frequency
- Y - adds filtered noise (Chaos) to the Spread amount
- Z - the bandwidth of the filtered noise

If you select 'Morph' for a Wave type, the **Wv #** (0-63) selects which wavetable within the Bank is being 'clouded'. Wave # 0 is the first Row (0) at the first Column (0).

Morphing Clouds Mode



The **Cloud+Morph** mode adds the ability to Z Morph the Bank at the same time the Cloud algorithm detunes the VCO cluster.

The 3 parameters are mapped as follows:

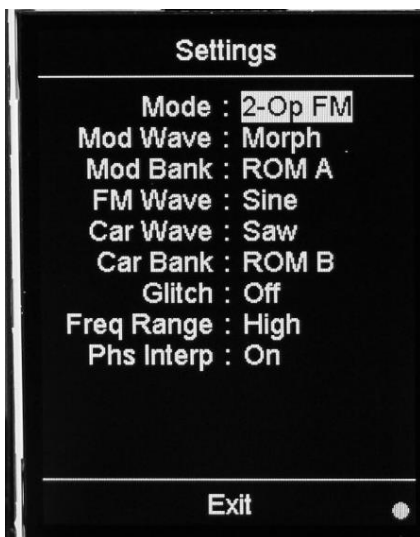
- X – Spread
- Y – Chaos, which is now the filtered noise amount + BW combined
- Z – Morph the wavetable Bank 'start-to-finish'

This setting can have very dramatic effects, especially using slow LFOs into Spread and Morph CVs.

For all Morph modes, the **Freq Range** is as follows:

- High: 10Hz to 10KHz
- Mid: 0.1Hz to 165Hz
- Low: 1 cycle in 13min to 0.1Hz

2-Operator FM Mode



The 2-op FM uses a Carrier Wave (originally a Sine) that is FM modulated at audio rates by the Modulation Wave (also a Sine in the original implementation). The E352 allows either Sines or wavetables to be used for a much wider variety of sounds.

Since there are 2 outputs, the Mode will output the FM-modulated result on OUT 1, and the selected Carrier Wave on OUT 2.

The 3 parameters are mapped as follows:

- X: FM Index ('depth') 0 – 314%
- Y: quantized frequency Ratio of Modulator to Carrier (1/8 to 8)
- Z: Morphing if 'Morph' is the selected Mod Wave/Car Wave

A typical patch is to envelope FM Index to get "percussive" drums and mallet sounds.

Noise

Each output can be 1 of 8 types of noise. The noise can be low-pass filtered by a 4-pole ladder filter with resonance. The noise selection table is quantized (no morphing between types).

Each noise type has different harmonic content as follows:

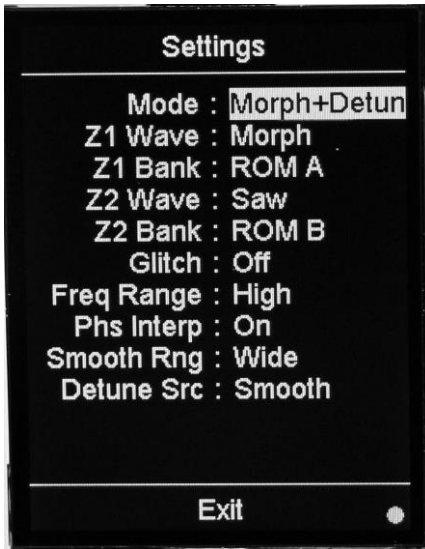
- White: full bandwidth noise
- Pink: slightly filtered noise
- Clocked: 'digital noise' used in old gaming consoles
- Crackle: narrow pulses spaced infrequently

The 3 parameters are mapped as follows:

- X: noise type for OUT1
- Y: noise type for OUT2
- Z: if a filtered noise, the resonance

The COARSE/FINE and 1V/Oct controls the cutoff frequency of the filter (10Hz to 10.3KHz).

Detuning Mode



This is a new mode, added at V1.3 of the firmware.

The signal at OUT2 is detuned from the signal at OUT1 by either a fixed amount from a table or 'smoothly' by a variable CV.

Each output can have its own wavetable or standard shape, and can be Z Morphed. The outputs have the same frequency range.

Smooth Mode: continuously variable detuning, from Wide (+-2.5 octaves) to Narrow (+-1.25 octaves)

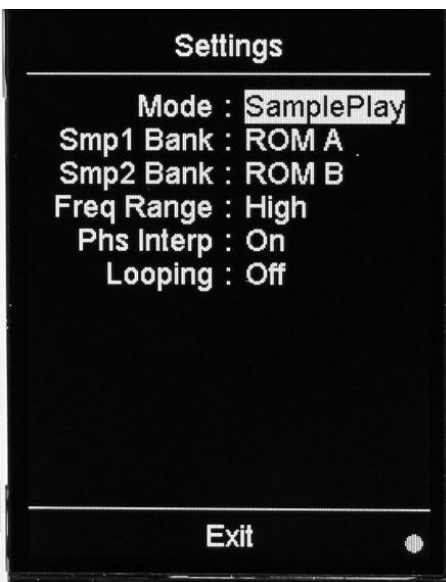
Fixed Intervals: the outputs are in fixed "musical ratios":

- 4th-5th-Octaves
- 12 Tone steps
- Harmonics (1st-8th)

The last selection is Unison + Phase shifter. The 2 outputs are no detuned, but there is a variable 0-360deg phase shift by applying a CV.

Mix the 2 outputs together when using this mode for best effect.

Sample Player Mode



This is a new mode, added at V1.3 of the firmware.

The Sample Player treats the loaded Bank as 1 giant sample playback file. The file must be created by WaveEdit (if not using a ROM Bank) and then loaded to the uSD card using Save Bank. This will write the correct file size (33KB and WAV format the E352 can read).

Using the **File** menu, you can select a Bank from the uSD card and load into a USR Bank.

The sample can be either Looped (On) or 1-shot (Off), triggered by a rising SYNC signal. The SYNC can be a Gate, Trigger, LFO, Envelope or any other signal. A valid SYNC is a voltage rising through 0.65V.

Playback of the sample file is controlled as follows:

- X: Starting point for the sample played via OUT1
- Y: Starting point for the sample played via OUT2
- Z: length (0-100% of the file to play) that Start 1 plays

The 2 Start pointers are independent of each other, but both play the same length (number of samples). This allows, for example, 1 sample file to have 2 different samples (each 50% of the total length). Setting Start 1 at '0' and Start 2 at halfway and the Length at 50%, will play the 2 samples at once each loop/SYNC trigger. You can also overlap the Start pointers (Start 2 can be 'first').

However, the Length is governed by Start 1 as follows:

- If Start 1's playback length hits the end of the sample file, this will reset the Start 1 pointer back to the beginning. If there are more samples to be played in the Start 2 section, they will not be heard.
- If the section of the sample file using Start 2 is shorter than the Length, the OUT2 signal will be 0V until Start 1 section is finished playing. The Start 1 section will always play for the set Length.

Importing Using WaveEdit

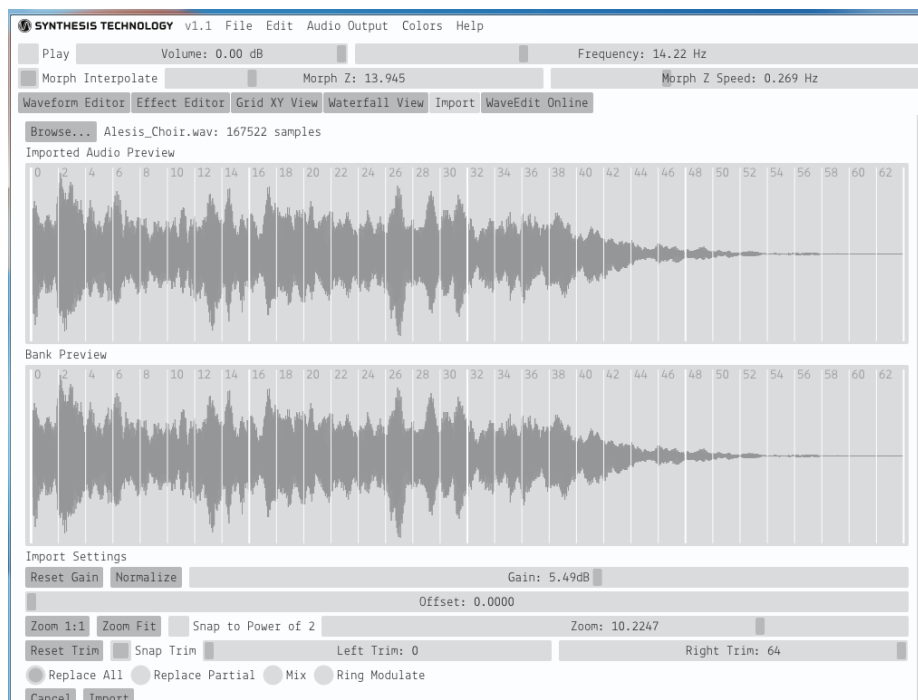
The Bank file used in Sample Player does not have a 'sample rate' associated with it like a standard sampler. The file length is fixed at 16K 16bit words + the WAV header. This will be reported (based on the OS) as either 32KB or 33KB length. Although many samplers/DAWs/libraries are WAV format, they are a variable length with a specific sample rate. This is why WaveEdit is used to properly format the files.

WaveEdit runs on Windows, Mac and Linux and is available at www.synthtech.com/waveedit

Step 1: Load the sample WAV file into the edit buffer using the Browse... tab. Note in this example, the file size is much larger than 33KB. WaveEdit resamples the file in order to fit the desired length.



Step 2: Normalized the sample for maximum dynamic range (click Normalize tab)



Step 3: Note the 2 preview panes are “edit buffers”. In order to actually save the final sample file, click the Import tab at the very bottom left corner. Then you can Save Bank As... to your computer/uSD card. Note that the file system in the E352 uses the old MSDOS 8.3 file naming format. Longer file names will be displayed in a truncated version. Flute1.wav is valid, but Flute_Sample_1.wav will have a truncated name.



When you click the Import tab, the screen shows the Bank data, and then use Save Bank As...



Power Requirement: +12V @ 65ma, -12V @24ma.
Size: 26HP width, 0.85in (21.6mm) deep.