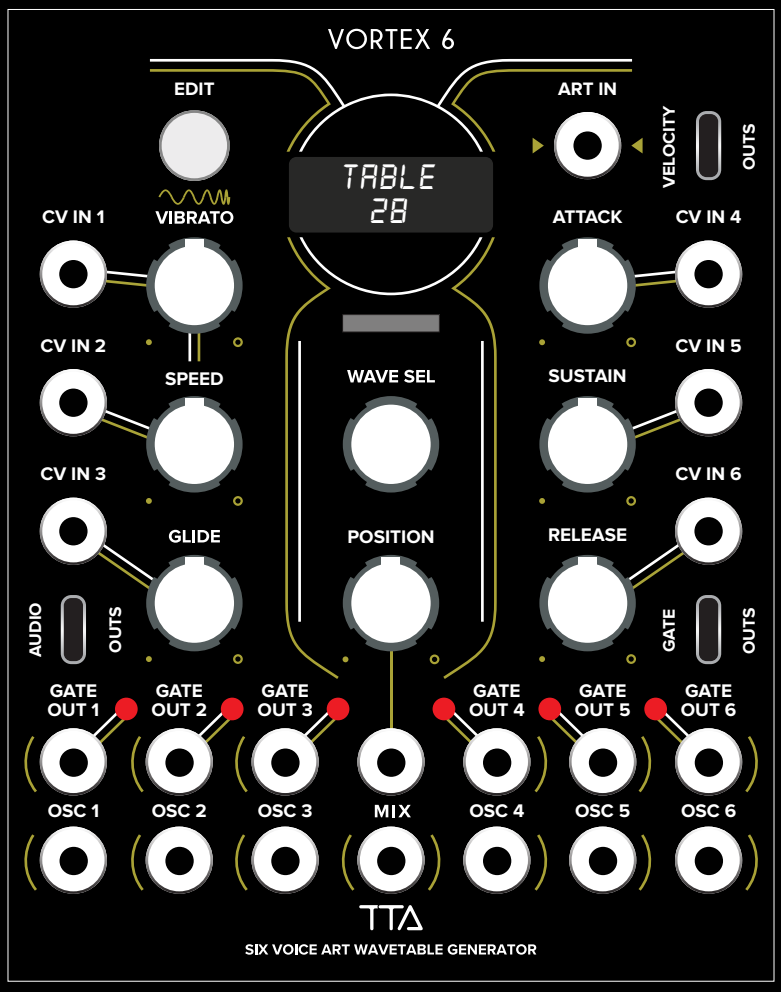
VORTEX 6

SIX VOICE ART WAVETABLE GENERATOR



Vortex 6 Manual

Vortex 6 is a polyphonic digital wavetable oscillator that uses the ART pitch control. Its sound generation is based on the legendary PPG wavetable synths of the 80s and even uses the vintage digital audio converters of the original.

- ART Input for Pitch
- 6 independent voice outputs on 3.5mm jacks
- 6 independent Gate outputs on 3.5mm jacks
- 6 voice outs on Polytip connector
- 6 Gate outputs on Polytip connector
- Velocity CV Output on Polytip
- Mix voice output
- Internal ASR envelope for wavetable position with CV
- Wavetable start control with CV
- Internal LFO for vibrato with rate and amount with CV
- Glide amount control with CV

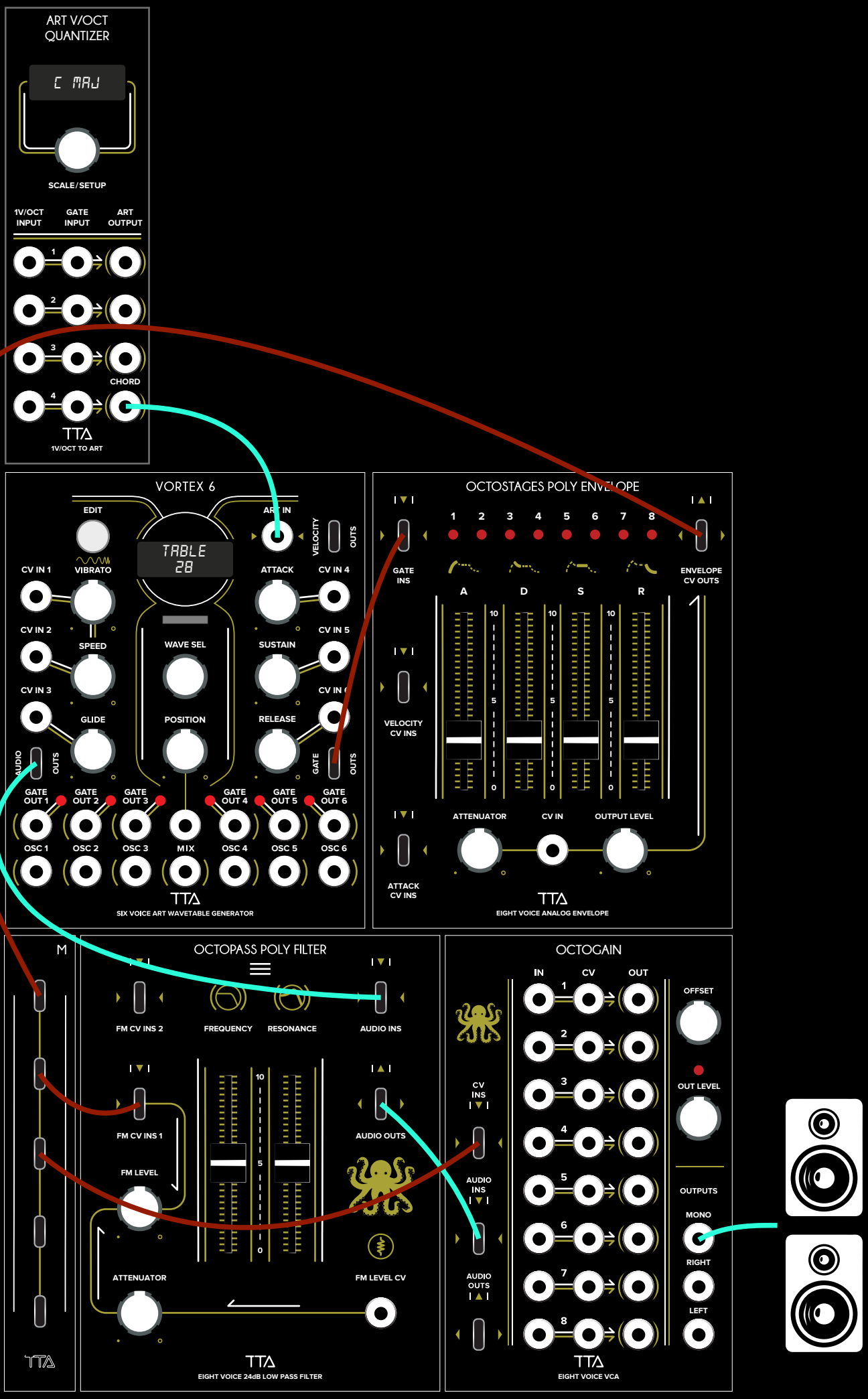
Quick start

Vortex 6 uses the ART digital communication standard for pitch and gate data. Note that it does not respond to 1V/Oct for pitch.

Connect an ART signal from Octopus, V/OCT Quantizer or an ART sequencer to the ART In jack.

Start sending notes and you will see the Gate lights on Vortex 6 turning on or off in response to the note on/off commands. You can patch the MIX out to your audio system and hear the notes continuously playing and changing pitch. There are plenty of ways to patch Vortex6. Some are:

Using Polytip jacks to patch full polyphonic synthesizer


ART V/OCT QUANTIZER
C MAJ
SCALE/SETUP
1V/OCT INPUT
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OSC 1
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CV IN
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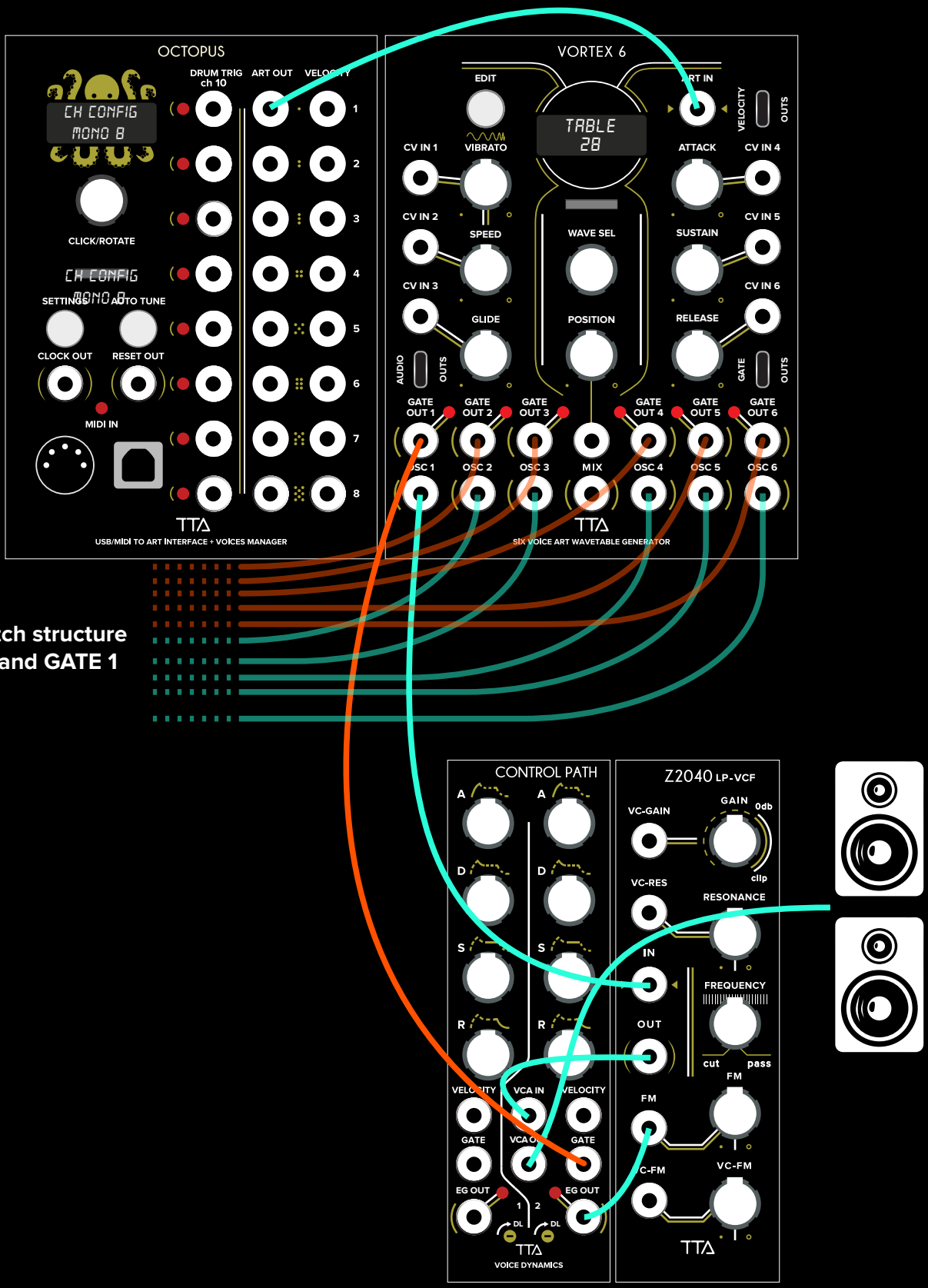
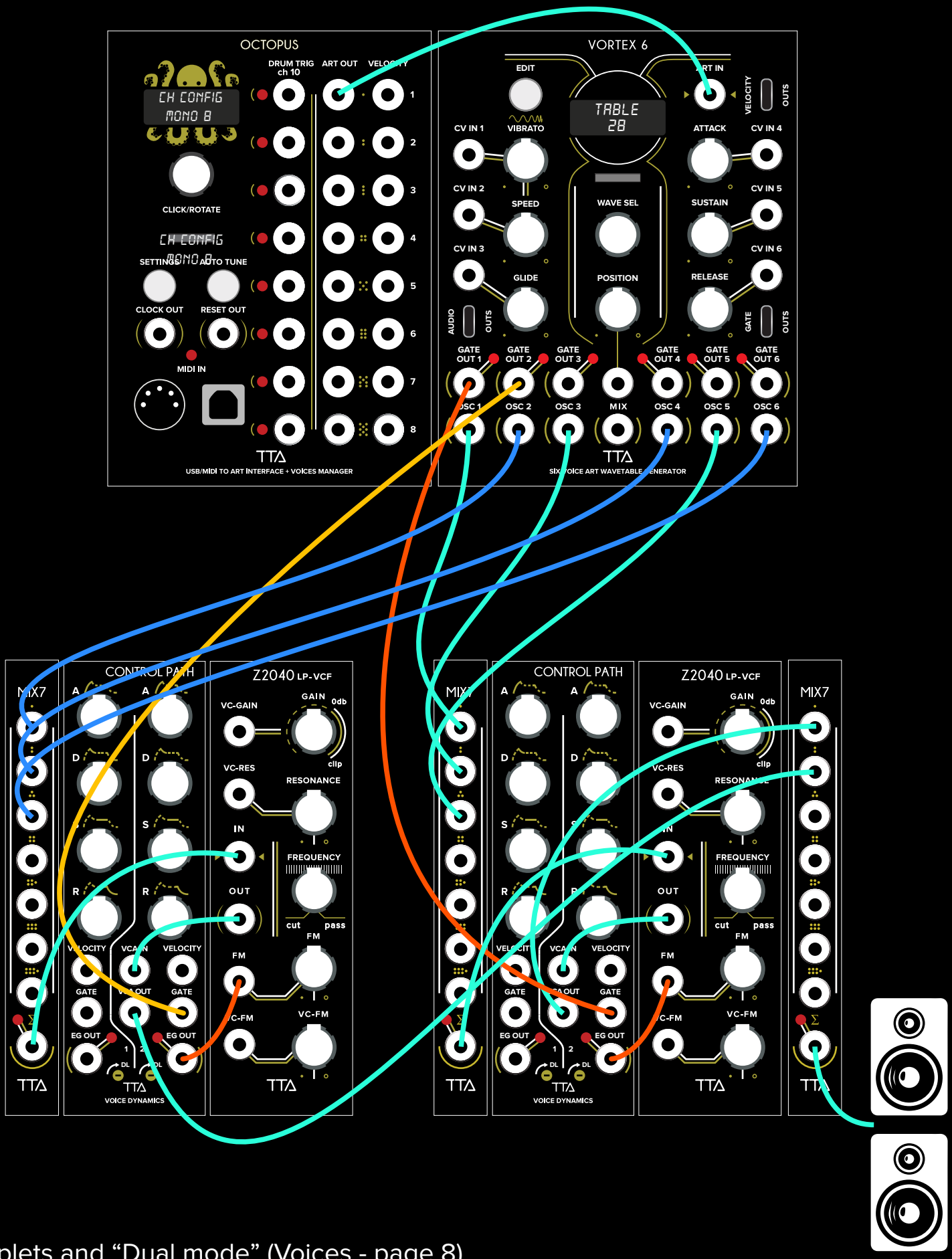
ATTACK CV INS
EIGHT VOICE ANALOG ENVELOPE
M
OCTOPASS POLY FILTER
FM CV INS 2
FREQUENCY
RESONANCE
AUDIO INS
FM CV INS 1
FM LEVEL
AUDIO OUTS
ATTENUATOR
FM LEVEL CV
EIGHT VOICE 24dB LOW PASS FILTER
OCTOGAIN
IN
CV
OUT
CV INS
AUDIO INS
AUDIO OUTS
OFFSET
OUT LEVEL
OUTPUTS
MONO
RIGHT
LEFT
EIGHT VOICE VCA



Using 3.5mm patch cables to build discrete polyphonic patch, that means having multiple envelopes filters and optionally VCAs too and patch each voice by itself



Triplets and “Dual mode” (Voices - page 8)

These are obviously just a few examples, once you get the concept you can see how far on a strict or odd patching you can go with that.

Here are the exact settings to build a discrete polyphonic patch:

Connect the VCO out of each voice to a separate filter and into a VCA/etc. That is now a voice.

Connect the Gate Out of each voice to any envelope generator (EG) like the Z4000 to control the VCA or VCF or both.

Notes will change the pitch of the oscillator and also set the Gate out high when the note starts and low when the note ends.

Connect the outputs of all voices into a mixer and take the mix out into an effect processor like Z5000. Start playing notes, adjust the envelopes and filters, add some effect and start exploring that polyphonic architecture. This type of patch takes many modules and cables but it means that each voice can have a different filter, different envelope or just about anything you want in a voice to make it different from other voices. CONTROL PATH is a module that helps reduce some of the amount of modules needed for such a patch.

Oscillators

Each voice in the Vortex 6 has an independent hardware digital oscillator and some voice modes can add in detuning or sub octave to the sound. The oscillators use vintage hardware from the 80s and are not based on modern DSP emulations.

The VCOs waveform can be controlled with a per voice Morph envelope to move through the tables as voices are triggered. The Position control can also be used to sweep all of the voices at once with external CV.

The oscillators can be arranged in various ways. Click the EDIT button (yellow), scroll with the encoder to VOICES, click the button (red) and now scroll through the various modes and hear the results. More on that in the Editing Settings section of the manual.

Each voice VCOs has a separate output and also feeds a combined Mix output.

Wavetables

Vortex 6 loads a table from its internal memory on power up and the LED will be RED indicating edit mode. Turning the encoder loads a new table and the display updates as the new table is loaded (TABLE 12, for example).

Vortex 6 uses wavetable files filled with 64 different waveforms that make a 'table'. It only plays one of the waveforms at a time per voice but it can 'morph' through the table creating a seamless blend between the waveforms using the Morph knob and/or external CV.

There are two sources for wavetables: Internal memory and SD card

Internally are 55 Wavetables that come with the module. The majority of these wavetables have a smooth continuity in the harmonic structure when you sweep through the waves in the table.

Loading wavetables from the SD Card

An SD card can be used to load a wavetable. WaveEdit is a wonderful place to make your own, share or download Wave tables. WaveEdit outputs files compatible with Vortex 6.
Please visit: www.waveeditonline.com

Once you have the wavetables ready drop them to an SD card. The card should be formatted with the standard Fat32 that most cards are already formatted in. Put the card in the SD socket, click the Edit button so it is (YELLOW), scroll to SOURCE, click the Edit button (RED), select SD CARD, click the Edit button again (YELLOW), scroll back to FILE and the file name will appear under. Click Edit again (RED) and now scroll through the files as you play.

Here is some more general information about the files:

The files should be in this format:

Type:	WAV
Channels:	MONO
SampleRate:	N/A
Bit Depth:	16
Length:	16384 samples

Vortex will turn every 256 samples into a single cycle waveform and load the first 64 waves (total of 16384 samples) it finds in the file.

The encoder changes the file and loads a new set of waveforms into Vortex. The display shows which file is loaded using the first 8 characters of the filename without the .WAV extension (FILE / <FILENAME>).

OSC Out
The individual audio outputs for each voice on 3.5mm jacks.

Audio Outs
A Polytip connector with all 6 voice outputs.

Gate Out
Each of the Gate outputs is set by the voice on or off status. When a note is off the output is 0V and +5V when the note is on.

Both the 3.5mm and Polytip Gate outputs have the same signal per voice.

Velocity Outs
This Polytip connector outputs a 0 to +5V per voice control based on velocity or the note value (key tracking).

CV Inputs
Vortex 6 has 7 control voltage inputs for modulation of the parameters. All CV inputs have a range from 0V to +5V.

Controls

Wavetable Envelope

Vortex 6 has four panel controls for the wavetable position which uses an internal envelope with Position, Attack, Sustain and Release controls. Each voice has its own envelope so they can move independently through the table as notes are played and the voice is triggered.

Morph envelope stages:

- Position. Sets the wave in the table that the attack portion starts from and the release returns to. You can think of it as an offset.
- Attack. Amount of time it takes to move from the Position to Sustain section
- Sustain. The final wave in the table for the morph envelope. Like the attack, This is offset to by Position. Setting this to 0 turns off the envelope and Position can sweep the table for all voices at once.
- Release. Amount of time to return from Sustain to Position waveform

Try playing long notes with the Attack and Sustain set high to hear a slow evolving wavetable morph effect. Then bring the Position up and Sustain down to narrow down the envelope sweep on a specific area of the table.

Vibrato

The Internal Vibrato LFO adds Frequency Modulation to the oscillator pitch over a small range to provide classic synth vibrato sounds. There is a system setting to set the waveform of the LFO. The controls are:

- VIBRATO : Amount of vibrato
- SPEED : Rate of the LFO.

Note: the vibrato Speed control also sets the detune amount in DETUNE voice mode.

Glide

Glide creates a per note portamento effect to change the pitch smoothly on each note on event.

Editing Settings

Vortex 6 has several parameters that can be set using the combination of the Edit button and the encoder. The edit button toggles between two modes: Select and Edit. Select is the YELLOW light and Edit is the RED light. In Select the Encoder changes the parameter to edit and scrolls both directions through the options. Pressing the Edit button and entering Edit mode (RED) allows the encoder to change the parameter.

TABLE/FILE

This is the main menu which shows the table number or file name currently playing.

SOURCE

Changes the source of wave tables between Internal memory and external files on a microSD card.

INTERNAL : : The memory storing the factory set of wave tables
SD CARD : User created wave table files from the microSD card on the front panel

VOICES

The structure of the six voices and their oscillators can be set with this parameter.

POLY	: each voice is output to a separate output jack with no processing
UNISON	: the voices all play the same pitch with detuning between the voices
UNISUB	: also plays a single pitch but half of the voices are one octave down
DETUNE	: POLY but adds detuned sound controlled by vibrato rate
SUB	: each voice is output like POLY but an octave down signal is added
DUAL	: two voices for each note with one slightly detuned. Great for stereo!

LFO WAVE

The internal vibrato LFO waveform can be edited here. Standard waveforms Ramp, Triangle, Square and Sine are available.

VELO OUT

Sets the source for the 6 channels of CV on the Polytip Velocity Out

VELO	: velocity out from 0 to 5V (0 to 127)
- VELO	: inverted velocity from 5V to 0V (0 to 127)
KEY	: keytracking with the lower notes producing lower voltage (note 0 = 0V)
- KEY	: inverted key tracking with lower notes producing higher voltage (note 0 = 5V)

PRG CHNG

Wavetables can be addressed with MIDI Program change. This setting turns the response to MIDI Program Change messages ON or OFF.

VERSION

Firmware version currently loaded is displayed. There is no editing on this menu.

MIDI Commands

ART forwards some standard MIDI performance and status parameters. Below is how Vortex 6 uses them.

Velocity - can be sent (VELO) to the Velocity CV out with the option of inverted polarity (-VELO).

Pitch Bend - Vortex 6 bends pitch up and down the number of semitones set by Pitch Bend Range (default is one octave +/- 12 semitones)

Program Change - loads the internal table or file on the SD card. The first 64 values are used.

Pitch Bend Range (CC 3) from 1 to 12 semitones.

Firmware Updates:

The microSD card is also used to update the Vortex6 firmware. You can use the same MSDOS FAT32 formatted card for wavetable WAVs and for the firmware update.

1. Unzip the firmware update file. It will be called image.hex. Copy to microSD card
2. Power off the case with Vortex6 and insert the microSD card.
3. Hold the front panel button down and power on the case. The button LEDs will flash
4. Once the update is done Vortex6 will run the updated firmware code.

Specifications:

CV Input - 0 to +5V
Polytip CV Out - 0 to +5V
Gate Out - 0 to +5V

Width - 20 HP
Depth - 40 mm

+12V - 190 mA
-12V - 50 mA
+5V - 0 mA