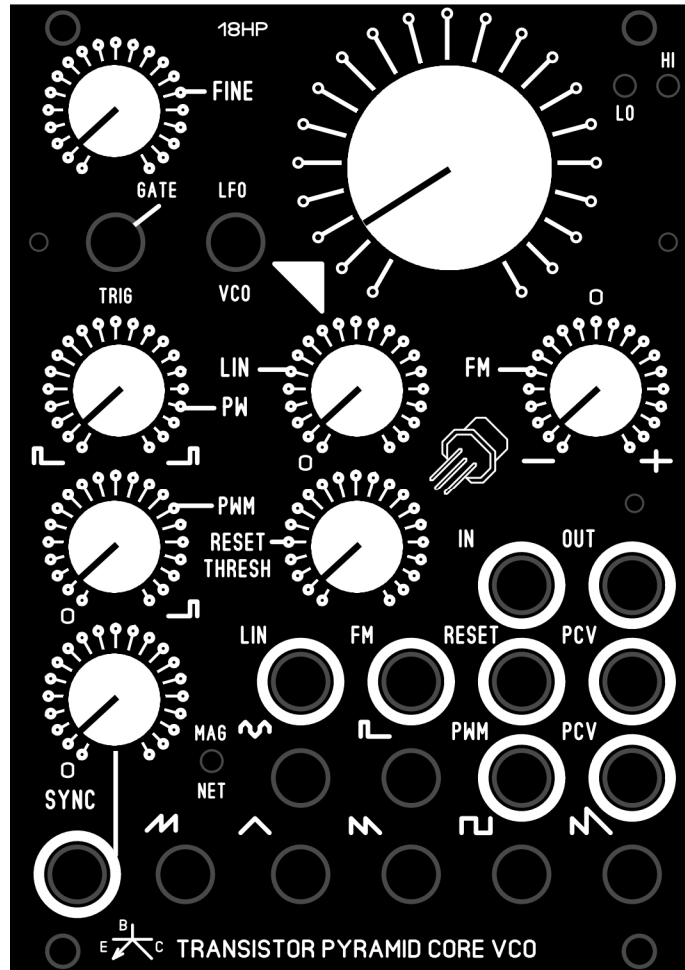


TPC VCO Reference Manual and Tech Guide

In this reference manual I will try my best to describe the various functions and guide you how to test the module the first time you operate it.

First lets make sure you got the right manual. Here is a virtual picture of the front panel.



To make it easier I numbered all the knobs and input jacks. You will see that on the third page.

So what does this module do? This is considered a synthesizer 'singer' or voice. This module generates audio signals, and at slow frequency can control other modules (LFO mode). I also included an analog Sample and Hold circuit, internally clocked by the core vco.

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It is important that I first talk about how to test to make sure everything works.

Follow these directions: First make sure RESET knob is turned fully counter clockwise!!!

Next lets initialize all the knobs:

1. Have the Fine tune knob set to 12'o clock or middle position.
2. Have the FM knob set to middle position.
3. Have PW knob set to middle postion.
4. Have PWM set to zero.
5. Have Lin Knob set to zero.
6. Have Sync knob set to zero

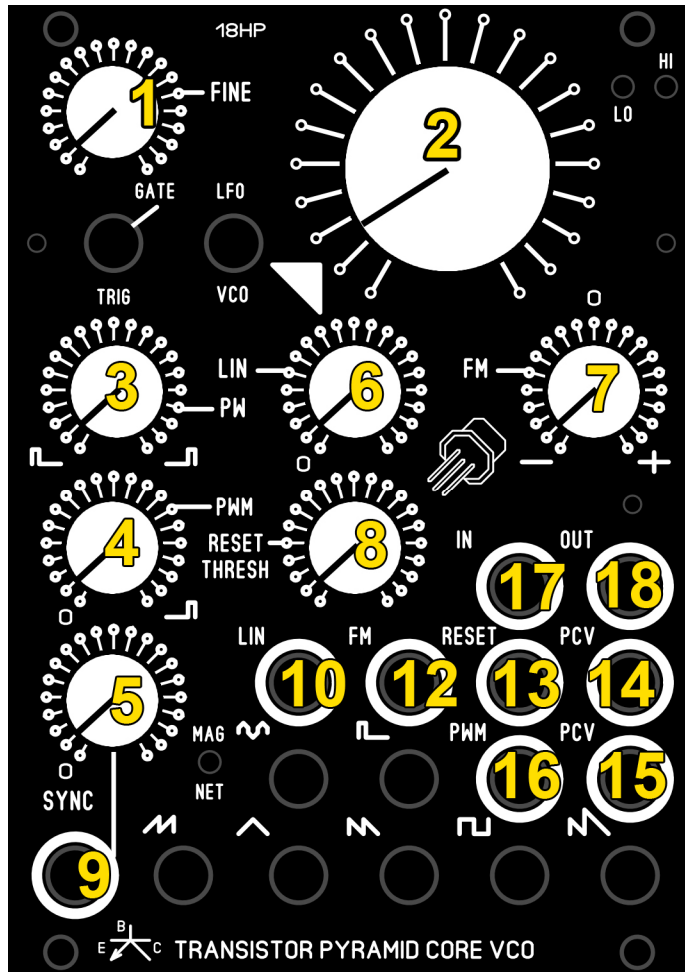
Have the switch set to VCO mode, and Switch next to it set to 'GATE'.

With a patch cable let's hear some audio. You will need to patch from the TPC vco into some sort of external mixer module or method to allow you to hear sound. Test out all the wave shapes on the TPC vco. Use the Big knob to quickly sweep the frequency. You should see the LED's on the left and right light up. If you only see the right side led lighting up perhaps the vco is locked up. Make sure the reset thresh knob is not fully turned clockwise, as this will manually lock the vco frequency.

After hearing some audio you can test to see if all modulation inputs work. PCV stands for Pitch CV and those are direct CV inputs. So perhaps you can patch an external VCO like the Lunar Modulation Center VCO to create some obvious FM modulation. Lin means Linear CV, and FM input is for the FM bipolar attenu-inverter knob.

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This page describes all the controls and jack inputs.



1. Fine Knob: This is used to fine tune the frequency of the internal Triangle generator.
2. Big Tune Knob: Use this knob to quickly sweep through the entire frequency spectrum.
3. Pulse Width knob: Use this knob to manually shape the pulse wave. From skinny to square-ish sounding.
4. Pulse Width Modulation Knob: This knob is used in conjunction with jack #16. If you patch for example another module like an lfo, you can have that external module control the pulse width. Don't always have the PWM knob set to zero when jack 16 is not in use. If you turn pwm knob a little clockwise, you can achieve even skinnier pulse shapes from the PW knob.
5. Sync knob: This knob is used in conjunction with jack #9. When it is set to zero, no sync is possible. As you slowly turn the sync knob clockwise you bring on the 'hard sync' effect. There is a trimmer labeled 'magnet'. This trimmer determines how hard you want the sync effect when the knob is turned fully clockwise. There is really no need to adjust the magnet trimmer. I added this on the front panel for expert type of users.
6. Linear CV knob: This is used in conjunction with jack # 10. LIN knob is just a level knob the determines how much linear fm you want.

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7. FM knob: This is used in conjunction with jack #12. Middle position is Zero, left or right position will invert or non invert the signal patched into jack #12. This is an exponential modulation input.
8. Reset Thresh Knob: What the hell is this? This is used in conjunction with jack #13 and the switch labeled 'gate', 'trig'. The way you use this knob is to have it fully counter clockwise first. You if turn it fully clockwise you will manually lock the frequency of the internal vco. The led on the middle left will light up and stay lit. So if you don't know about this feature on this vco you will be convinced it is broken. Just unlock it by turning the knob counter clockwise. The reset thresh knob allows you to fine tune and adjust the various signals out there to be compatible and successfully reset the internal triangle generator. This is very useful for LFO mode also. You can reset the lfo frequency! The gate mode allows you to reset it and keep it locked until the gate signal has ended. Trigger mode resets to frequency and lets it continue with no lock.

All the other jacks with shapes represent audio outputs. You get ramp, saw, Sine, triangle, double saw, pulse wave, and square wave.

There is also an internal sample and hold circuit that uses LF398M IC chip. The circuit uses the internal pulse wave as a clock. So you can use the PW knob to change the clock gate length. The way you use the sample and hold is to patch for example a wave from another external module into jack #17. Now patch from the 'OUT' jack #18 into some other vco like the Lunar Modulation Center VCO's PCV jack. The TPC vco is controlling the speed of the S&H, the external module is being sampled, the Lunar modulation Center VCO is being modulated by the S&H. Sorry there is no way to apply an external clock into this sample and hold. But this is why I gave you two sync circuits on the tpc vco, hint, hint***

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Here are some notes and nerd talk about this product:

This vco uses a discrete transistor core to generate a triangle. After that I use op-amps to create the various wave shapes found on the front panel. On this vco the sine wave is also discrete transistor based. On the Lunar Modulation Center VCO the sine wave is OTA LM13700 IC chip based. The Lunar Modulation Center VCO and TPC VCO share the same discrete triangle core. Both of these modules complement each other nicely.

The frequency sweep range on the TPC vco and LMC vco are identical. This is using my own tweaked out exponential converter circuit, that allows big broad range frequency exploring. The core vco circuit is based on the BERFOTRON advanced vco. Deep customization had to be done in order for me to adapt the circuit for the Euro Format use.

Where are all the transistors then? I took a look at the pcb, I see zero.

-I use smt quad transistor ic chips. Hell no not CA3046. I don't use obsolete parts. I am taking advantage of the latest surface mount transistors. They are very very impressive.

Now ask yourself this: Are my other modules in my rack precise?

-Blue Lantern Modules since day #1 only uses multi turn trimmers, not cheap single turn trimmers. I just started offering front access to some of the more important adjustments. The TPC vco offers high and low pitch calibration for 1v/ octave adjustments, accessible right from the front panel. Why has nobody thought of this?