

Poly Phobos 4 VCO Reference Manual

Hello,

This is the Reference PDF for:
Poly Phobos 4 VCO Module.

SPECS

Width: 24hp

Depth: Physical is 2 inches (50.8mm), clearance is 2.25 inches (57.15mm) (ribbon cable included).

Current: Ribbon Cable 1 is +92mA/-72mA, Ribbon Cable 2 is +105mA/-92mA.

Total expected power draw is: **+197mA/-164mA** on your system.

Oscillator Type: Saw Core generator using Phase Lock Loop (PLL) IC.

Exponential CV type: VCA v2164 Exponential converter.

Label Cheat Sheet

PCV: Pitch Control Voltage , 1v/octave input

SYNC: VCO input synchronization circuit for forced HARD SYNC

PWM: Pulse Width Modulation Input, only effects the Pulse Wave.

FM: Frequency Modulation. Linear on this product.

MOD: Modulation, Exponential on this product.

LOCK: sets mode to use the small trimmer instead of big Tune Knob.

FREE: sets mode to use the Big TUNE knob and not the small trimmer.

SELECT: refers to trigger input and used to select the wave-forms. The black tactile button is a manual selector.

What does this do?

This is a polyphonic true analog vco. There are 4 internal vco's. You get 'one set of controls' for fast, easy polyphonic patch editing.

This product can make:

- audible sound, raw continuous.

- be 1v/octave controlled and conforms to 'popular' musical note intonation.

- can do Frequency Modulation with no harsh aliasing. This is TRUE ANALOG.

- voltages to control your other modules. -5v/+5v swing.

- polyphonic Pulse Width Modulation. 4 vco possible.

- polyphonic sync control with the 4 vco's.

- detuned unison sounds by using a mixer module to monitor.

- audible 6 wave-forms at once 'switching' patches.

- there are calibration trimmers to adjust the four fine tune knobs, and there are trimmers to 'mess up the musical 1v per octave scale'.

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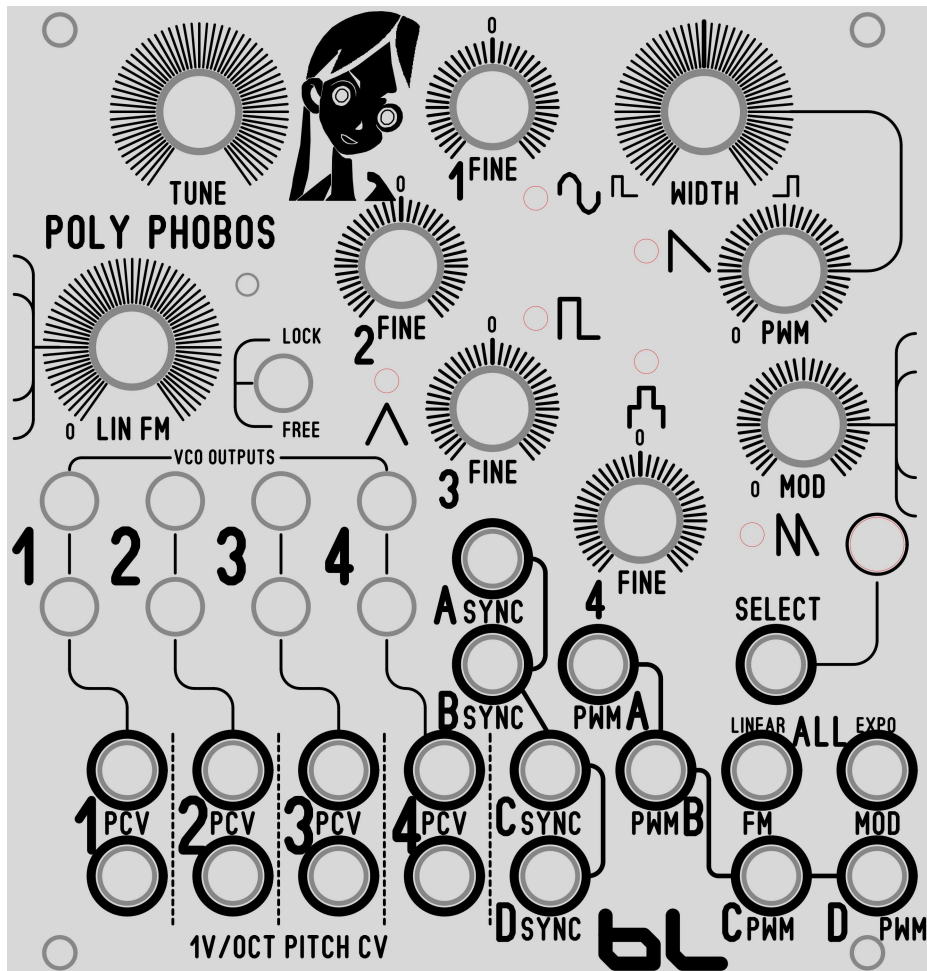
This product **does not have**:

- digital memory storage or recall. No presets.
- on-board sequencing
- Voltage Control Amplifier (VCA), so that the sound stops on the outputs. The user is to have their own VCA modules.
- individual outputs jacks for each waveform of each individual vco. That would have been 24 output jacks and too much panel width. You instead get a lazy patching approach, where you use the tactile button to change wave-forms instead of un-patching and picking a wave-form.
- (does not have) lfo toggle mode. It can be tuned to go very slow with the tune knob though.

Examples of how to use this product:

- with the use of a Midi to CV converter module, you can make four note chords.
- (use Midi-CV module or sequencers) make 4 track sequences that follow a 'in the note of....' easy transpose patch.
- in a mono patch, make a FAT 4 layer stacked Unison Patch.

Let's make sure you got the right PDF. The product is this one.



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There is an individual side to the Poly Phobos 4 VCO and an 'ALL' side.

Individual jacks:

PCV: Pitch Control Voltage. 1V per octave input control for each individual vco. Each vco can get 2 possible individual control voltages.

VCO Output Jacks: Each vco can output one wave-form at a time. Use the tactile button to select which wave-form.

Individual SYNC jack inputs: Sync Jack A is internally connected to all the rest B,C,D. So if you wish to do an 'ALL 4' patch, use Jack A sync. When you wish to individually sync an independent vco you can break the internal connection by simply 'patching in', for example B sync jack.

Individual PWM jack inputs: Pulse Width Modulation. PWM Jack A is internally connected to all the rest B,C,D. So if you wish to do an 'ALL 4' patch, use Jack A sync. When you wish to individually PWM an independent vco you can break the internal connection by simply 'patching in', for example B sync jack.

ALL Linear FM, and ALL MOD exponential jacks.

-Linear input jack is connected to all 4 vco's. You use the Linear Knob as an attenuation for your input.

-MOD input jack is connected to all 4 vco's. You use the MOD Knob as an attenuation for your input.

Toggle Switch: Lock and Free

-Lock mode, is used with conjunction of the front panel small trimmer. You need to setup what voltage you want by turning the trimmer with a small flat screw driver. For example Note C @ zero volts inputed on PCV is usually good.

Just think of this as a mini 'tune' knob that your kids can't turn.

When in Lock Mode the big tune knob does not function any more.

-free mode. This mode decides to use the Big Tune knob instead of the small trimmer.

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If you are just starting out in Euro Format and acquired this module, this is the bare bones setup you will need to at least make a drone.

1. Poly Phobos 4 VCO Module.
2. Multi-channel mixer Module. Mix Em Up or Sir Mix Alot BLM products will work.
3. VCF, analog filter module for tone control.

The above setup will at least give you mixing and tone control.

The next setup below will give you a barebones FAT mono synth:

1. Poly Phobos 4 VCO Module
2. Midi-CV converter or sequencer Module
3. Multi-channel mixer Module. Mix Em Up or Mono Sir Mix Alot BLM products will work.
4. VCF, analog filter module for tone control.
5. VCA Module
6. Envelope Generator Module. Simple ADSR will work. 2 of these is recommended, but 1 can still be used.

In order to have true 4 Voice Polyphony on your modular, you will need this kind of setup:

1. Poly Phobos 4 VCO Module
2. Mutable Instruments Midi to CV Yarns product.
3. BLM Poly Mix Module (for true poly mixing)
4. Quad Envelope Generator Module, or a future product with 'one set of controls' quad internal envelope generation. Blue Lantern modules HINT HINT. The standard setup is one set for the filters, one set for the VCA's. So either 8 envelope generators or a two BLM Poly ADSR modules.
5. Quad VCF Module, or a future product with 'one set of controls' quad internal analog filters . Blue Lantern modules HINT HINT.
6. Quad VCA (or more is fine) module.
7. You will need a regular mono multi-channel mixer module. This is patched right after the vca's in the chain. From this mono mixer is where you will monitor the polyphonic sound.

The above polyphonic setup is just for reference. Remember this is modular, so you do what you gotta do to destroy the audio.

NOTE****The Blue Lantern Modules Poly Mix Module is meant for polyphonic patches. This is 4 individual mixers, as opposed to a single multi-channel mono mixer like the Mix Em Up Module.

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Technical Calibration Guide for Technicians and Rainbow DWEEBS with OCD (JK).

In all seriousness the only trimmer you should be adjusting is the 100kTR trimmer with the 'FINE ADJ' in red (look at the picture below). This one adjusts the Front Panel Fine Tune offset.

Here are the steps.

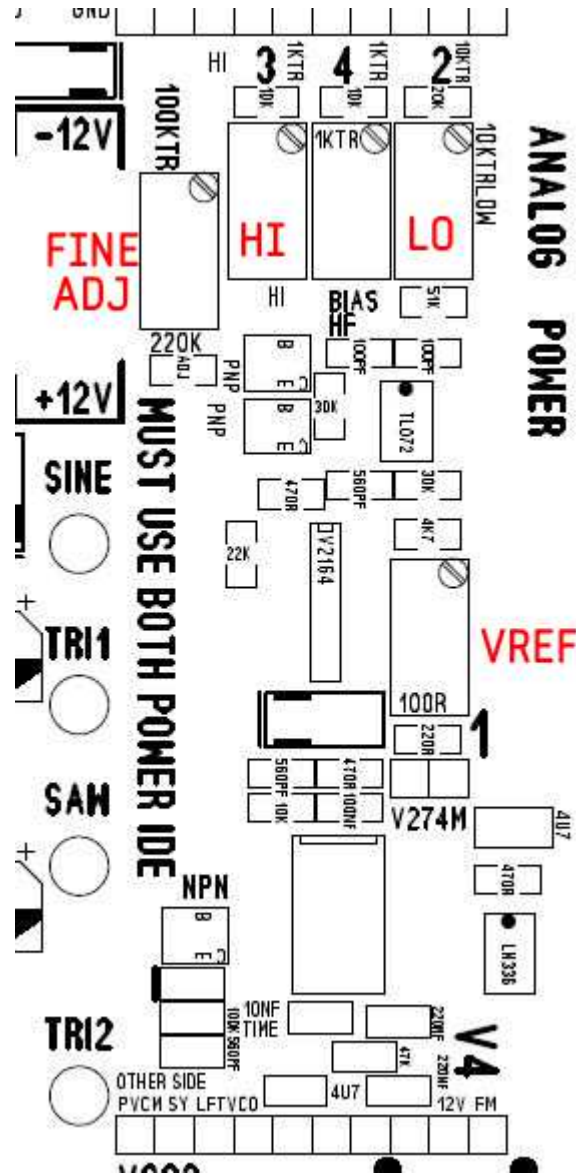
1. have all the fine tune knobs in the middle position.
2. Adjust vco 2 100KTR so that vco 1 and 2 are very close in beating. You will here a flange.
3. Adjust vco 3 100KTR so that vco 1 and 3 are very close in beating. You will here a flange.
4. Adjust vco 4 100KTR so that vco 1 and 4 are very close in beating. You will here a flange.

So vco 1 is your master, and all the other vco's should flange very close to vco 1 when the fine tune knob is in the middle position. This is for a regular front panel experience. Otherwise if you like to have the vco's never really in tune, then you can offset each one to your liking.

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(this one is for me, it is for a fresh made product.)

Flavio's new born poly phobos notes:



1. VREF goes first. Voltage adjust to 274m Volts.
2. Shape shifters are more important. Adjust Triangle Wave-form first. Sine shaper is #2. Saw Shape is #3 in importance. Note**Pulse wave, Double pulse, Double Saw are good to go.
3. For Tuning Calibration use the graphic on the pcb to guide fresh start turn direction. Lo Trimmer (2) goes first. Adjust the usual. 50, 100, 200, 400, 800hz.
4. HI Trimmer (3) calibration goes next. Use the usual 800, 1600, 3200hz.
5. (4) Trimmer should usually not be needed, use only if HI trimmer is really off.
6. Once all the vco's are calibrated, use 100kTR trimmer to adjust the fine tune knob sweep.

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Users guide to calibrate the Poly Phobos 4 VCO product.

-There are 4 vco's. The back pcb has them neatly grouped up. The vco group should look like the picture above. The last vco is simply laid out 90 degrees.

-you will have to repeat this for each vco. Remember to use the correct vco output to monitor the correct vco being worked on.

The Scale Calibration should not be totally off. These products are shipped out ready to go. If you acquired one second hand and someone totally un-calibrated the module. You can contact me for help.

Any DIY guru who has tuned analog vco's, can tune the poly phobos. There is nothing magical or new that they have not seen before.

Below is from my DIY kit days. It is a guide how to calibrate in general. This can be applied to many vco's.

Tuning Calibration. (This was a copy and paste from my how to calibrate text file.)

VCO TUNING PROCEEDURE

DON'T HAVE A \$1000 OSCILLASCOPE?

CHECK TO SEE IF THIS HANDY FREEWARE IS STILL AVAILABLE:

PROGRAM--->TUNER12.EXE

OVER AT WEBSITE: <http://techmind.org/audio/>

THIS USES YOUR SOUND CARD FOR THE TUNNING.

YOU CAN USE THAT PROGRAM TO ADJUST THE TRIANGLE SHAPE ALSO.

THE ACTUAL TUNNING TAKES SOME PRACTICE AND PATIENCE.

YOU ARE GOING TO NEED A MIDI-TO-CV CONVERTER OR CV KEYBOARD OR GENERATOR. YOU CAN ALSO LITERALLY APPLY THE REQUIRED VOLTAGES ALSO BUT THAT IS NOT RECOMMENDED.

STEP1. THE VCO SHOULD ONLY BE A LITTLE BIT OFF, RE-CALIBRATION IS ONLY NEEDED, NOT A FRESH CALIBRATION. IF THE TUNING IS WAY OFF, THEN YOU MIGHT WANT TO LOOK AT THE ABOVE TECHNICAL NOTES THAT WERE MEANT FOR ME.

STEP2. APPLY 0V TO THE PCV OR CV1 INPUT AND TUNE THE VCO TO 50Hz. USE THE TRIANGLE PREFERABLY. BUT YOU ARE FREE TO USE THE SAW/RAMP ALSO.

STEP3. APPLY 4V AND CHECK OUT THE FREQUENCY. THE GOAL IS TO HAVE 800HZ. MOST LIKELY YOU WILL BE IN THE 600HZ, OR 700HZ AREA. BASICALLY SOMEWHAT CLOSE. IF YOU ARE ABOVE 800HZ THEN DO THIS: ADJUST 100RTR LO TRIMMER (2) TO A VALUE A LITTLE BIT HIGHER. FOR EXAMPLE IF YOU GOT 827HZ, ADJUST IT TO 832HZ. IF

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YOU ARE BELOW 800HZ, FOR EXAMPLE 779HZ, ADJUST IT A LITTLE BIT LOWER LIKE 767HZ.

IT MIGHT BE EASIER TO GO BACK TO 50HZ AND ADJUST THE TRIMMER AT THAT VALUE BECAUSE YOU WILL SEE IT CHANGE, SOMETIMES AT 800HZ YOU TURN THE TRIMMER AND IT DOES NOT REALLY CHANGE THE VALUE.

NOW AFTER ADJUSTING REPEAT STEP2. KEEP DOING THIS METHOD UNTILL YOU ARE WITHIN 800HZ +/- 1 (801.00 HZ OR 799HZ).

OKAY YOU GOT THE LOWER OCTAVES TUNED, NOW TO TUNE THE HIGHER OCTAVES.

STEP4. APPLY 0V AND ADJUST TO FREQUENCY 800HZ.

STEP5. APPLY 3V AND MEASURE. THE GOAL IS TO HAVE 3200 +/- 5HZ (WITHIN 3225HZ OR 3215HZ IS FINE). IF YOU ARE ABOVE 3520Hz ADJUST THE HI TRIMMER (3) A LITTLE BIT LOWER. IF YOU ARE BELOW 3520HZ ADJUST A LITTLE BIT HIGH. REPEAT STEP4 UNTIL YOU ARE WITHIN 3200 +/- 5HZ.

ON THE POLY PHOBOS IF YOU ARE HAVING PROBLEMS CALIBRATING THE HI SIDE, THERE IS ANOTHER TRIMMER: HI OFFSET (4), THAT WILL AID IN OFFSETING THE RANGE A BIT.