SPECTRUM

SPECTRUM is a precision, saw-core VCO with eight possible waveforms (six simultaneous outputs), an eight octave switch, LFO mode and FM mode select with attenuation. In addition to the standard waveforms; (sine, pulse, triangle and saw), SPECTRUM features two selectable saw/pulse hybrid waveforms and two selectable sub-octave waveforms with variable range. Additional features include pulse width modulation with CV and attenuation, hard sync and panel accessible 1V/OCT calibration.

CT — **COARSE TUNE CONTROL**
Wide range control of the VCO frequency.

FT — **FINE TUNE CONTROL**
Narrow range control for fine tuning the VCO frequency.

PW — **PULSE WIDTH CONTROL**
Controls the pulse width of the PULSE and CRP/ESP waveforms.

PW CV — **PULSE WIDTH CV ATTENUATOR**
Adjusts the control voltage (CV) level or depth of signals applied the PWM input.

FM — **FREQUENCY MODULATION CV ATTENUATOR**
Adjusts the control voltage (CV) level or depth of signals applied the FM input.

PWM — **PULSE WIDTH MODULATION INPUT**
Apply audio or control voltage signals here to modulate the pulse width. The effect is dependent on the relative PULSE WIDTH CONTROL and ATTENUATOR settings.

FM — **FREQUENCY MODULATION INPUT**
Apply audio or control voltage signals here to modulate the frequency of the VCO. Use the FM CV ATTENUATOR to adjust the depth of modulation. The response can be either linear or exponential - see operation modes on page two for more information.

SFM — **SCALED (1V/OCT) FM INPUT**
This is the direct input for, but not limited to, controlling the VCO frequency with keyboard control voltages, midi to CV converters, sequencers and other devices. This is an exponential CV input.

SYNC — **HARD SYNC INPUT**
Apply pulsed or falling edge sawtooth waveforms to the SYNC input to slave the oscillator to the applied signal frequency. The hard sync method causes the slaved VCO to reset abruptly - adding harmonic content to the output waveform.

PLS — **SQUARE/ PULSE WAVE OUTPUT**
PULSE wave output. Change the width/shape of the pulse with the PULSE WIDTH control and PULSE WIDTH MODULATION input.

S/P — **SAW/PULSE HYBRID WAVE OUTPUT**
Center-Ramp-Pulse and Edge-Saw-Pulse wave outputs. Change the width/shape of both waveforms with the PULSE WIDTH control and PULSE WIDTH MODULATION input. Only one wave type can be selected at a time. See operation modes on page two for details.

SINE — **SINE WAVE OUTPUT**
Very high purity sine wave output.

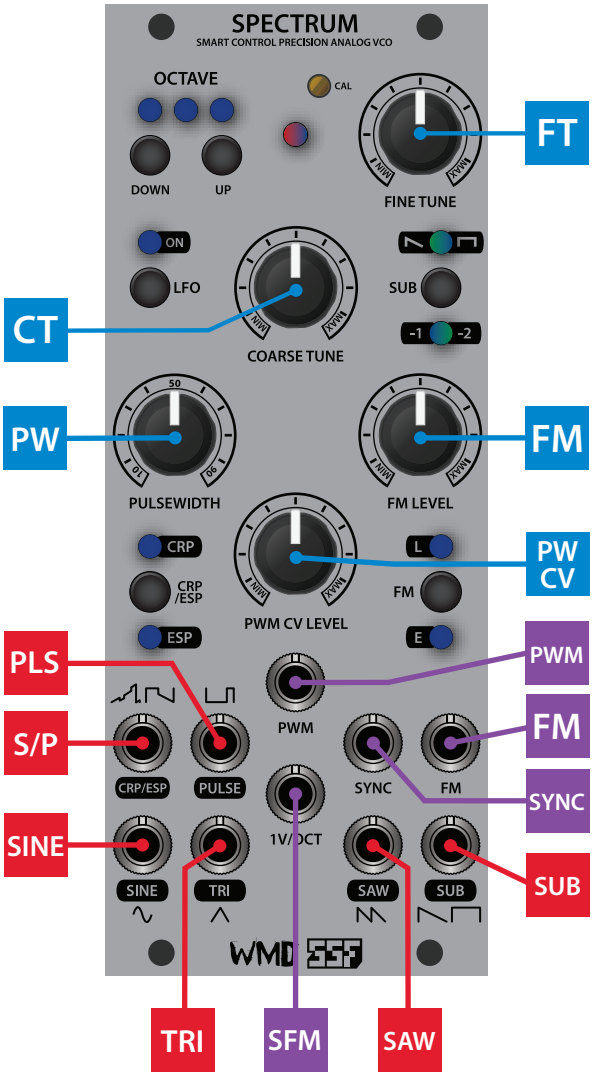
TRI — **TRIANGLE WAVE OUTPUT**
Symmetrical triangle out.

SAW — **SAWTOOTH WAVE OUTPUT**
Falling edge ramp wave - also known as a sawtooth wave.

SUB — **SUB OCTAVE OUTPUT**
Outputs a sub octave sawtooth or square wave that is one or two octaves below the main oscillator frequency. See operation modes on page two for waveform and octave selection.

COLOR KEY LEGEND

- PANEL CONTROL
- LED INDICATOR
- INPUT
- OUTPUT
- MODE SELECTOR



SPECTRUM OPERATION MODES

OCT
OCT

OCTAVE SELECT SWITCHES and LEDs

Use the UP/DOWN buttons to select between a range of 8 octaves. The three LEDs are used to indicate the currently selected octave range in 3-bit binary notation. See 3-bit binary conversion chart below.

LFO
LFO

LFO MODE SELECT and LED

Push this button to set the VCO into Low Frequency Oscillator (LFO) mode. The LFO LED is lit when LFO mode is active.

SUB
SUB 1
SUB 2

SUB OCTAVE MODE SELECT and LEDs

Hold this button down (approx 1.5s) to switch the SUB oscillator waveform type. The SUB 1 LED will turn green for SUB SAW and blue for SUB PULSE.
Push this button quickly to select the octave of the SUB oscillator output. The SUB 2 LED will turn blue for one octave and green for two octaves below the main frequency.

WS
CRP
ESP

SAW/PULSE HYBRID WAVE SELECT and LEDs

Push this button to select the hybrid waveform present at the CRP/ESP waveform output. The respective waveform LED will be lit when that waveform is active.

FM
L
E

FM INPUT MODE SELECT and LEDs

Push this button to select between Linear and Exponential response to signal applied to the FM input and FM LEVEL control. The respective response LED will be lit when that mode is active.

CAL

1V/OCT CALIBRATION TRIMPOT

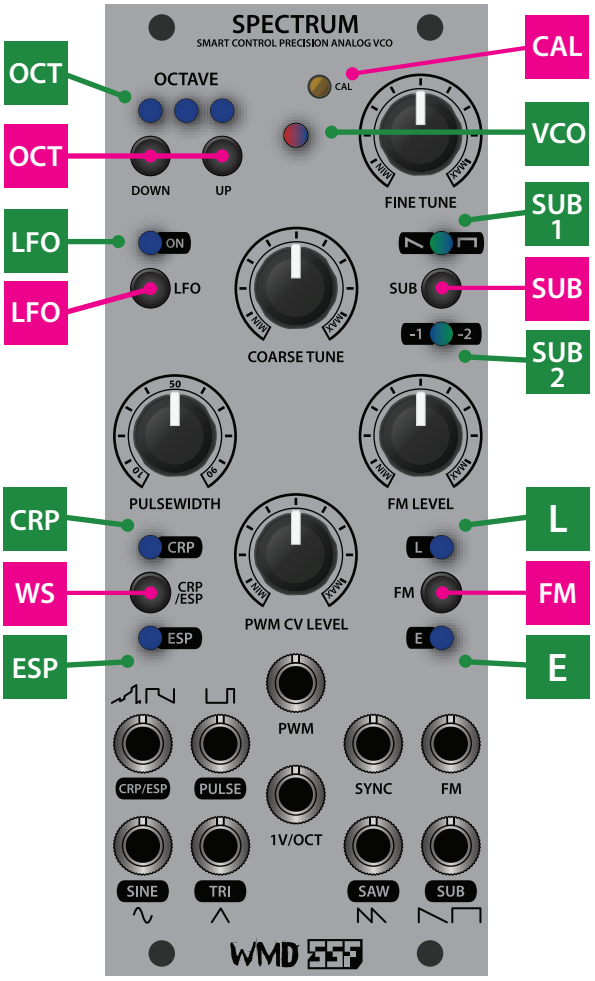
This is the front panel access point for 1V/OCT calibration of the VCO. SPECTRUM is calibrated at the factory to precisely track 7-8 octaves. Therefore, it is not necessary or recommended to change the position of the trimpot unless absolutely necessary! It is best to leave this adjustment to a qualified technician or hobbyist.

SAVING MODE STATES

Spectrum will store all mode states during power cycle intervals. Please allow a minimum of 60 seconds to pass in order to insure that your mode states will be retained when power is cycled off/on.

COLOR KEY LEGEND

- PANEL CONTROL
- LED INDICATOR
- INPUT
- OUTPUT
- MODE SELECTOR



BINARY to DECIMAL CONVERSION CHART

BINARY	OCTAVE #
○○○	0
○○●	1
○●○	2
○●●	3
●○○	4
●○●	5
●●○	6
●●●	7

(ACTIVE LEDs in BLUE)