Precise Time and Frequency,LLC
an LGL Group company

7510A PicoPak
Precision Measurement Module

The new PicoPak Module is a small and inexpensive USB instrument for making precise phase and frequency measurements on precision reference clocks (GPS, Rubidium, Cesium etc.) and oscillators.

The ptf 7510A PicoPak uses a unique measurement technique employing phase control of a direct digital synthesizer (DDS) to track and report the phase variations of the signal under test with respect to a 10 MHz reference.

These readings are output at 10 millisecond or 1 second intervals with a resolution of 6.1 picoseconds at 10 MHz.

The output is directed to a custom PC application that controls the measurement process, captures and displays the results, and optionally launches a frequency analysis program (Stable32 or TimeLab) for frequency stability analysis.

The module can measure frequency sources, having moderate to high stability, at any nominal frequency between 5 and 15 MHz.

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Specifications			
Parameter			**Specification**
Signal Input	Frequency		5 to 15 MHz
	Waveform		Sinusoidal
	Level		0 to +10 dBm
	Impedance		50 ohms nominal
	VSWR		≤ 1.5:1 between 5 to 15 MHz
Reference Input	Frequency		10 MHz
	Waveform		Sinusoidal
	Level		0 to +10 dBm
	Impedance		50 ohms
	VSWR		≤ 1.5:1 at 10 MHz
Resolution	Phase		0.022 degrees at signal frequency (6.1 ps at 10 MHz)
	Frequency		1x10-11 at 1 second (11 digits/s)
Noise	0.01-10,000 seconds (or longer)		≤ 3x10-11/ τ , ≤ 1.5x10-11/ τ typical , for τ in seconds
	Floor		≤ 1x10-15 (or lower)
Frequency Slew	Tracking Limit		≤ 3x10-8/second
Temperature Coefficient	Phase versus Temperature		+5 ps / °C typical
O/P Data Stream (uses standard FTDI PC USB virtual serial port driver)	Sampling Rate		2.5 kHz (τ=400 µs)
	5 documented formats, ASCII characters, 1 row per datum, no time tags	#1: 100/s rate	Signed decimal integer phase increments
		#2: 100/s rate	Hex phase and frequency increments
		#3: 1/s rate	Hex phase increments, frequency adjustments and phase corrections
		#4: 100/s rate	Signed binary phase increments
		#5: 1/s rate	Hex DDS phase word
USB Commands	ASCII Characters		Proprietary documented commands to control PicoPak from PC
Power	Voltage		+5 VDC from USB
	Current		≤ 100 mA (85 mA typical)
Connectors	USB		Type B Male on rear panel
	Signal Input		SMA Female on front panel
	Reference Input		SMA Female on front panel
	Programming		Internal 6-Pin 2 mm header for Microchip PICkit-3 (factory use only)
Indicators	Monitor		LED on front panel
Controls	Reset		Pushbutton on rear panel
Physical	Size (LxWxH)		3.28”x2.25”x1.03” (excluding connectors, feet and trim)
	Weight		≤ 5 oz (extruded aluminum case)
Accessories (Included)	Cable		5’ USB Type A plug to Type B plug with ferrite choke
	Software		PC applications to control and monitor PicoPak module

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