PicoPak

Clock Measurement Modules
Models PP1, PA1, PS1, PG1 & PM1

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The PicoPak module is the core instrument in its family of T&F measurement products.

The PicoPak Family of Clock Measurement Modules is a set of small and inexpensive USB-powered and controlled instruments for making precise phase and frequency stability measurements on precision clocks and oscillators.

The PicoPak Model PP1 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 ms or 1 s intervals with a resolution of 6.1 picoseconds at 10 MHz to a custom PC application that controls the measurement process, captures and displays the results, and optionally launches the Stable32 or TimeLab program for frequency stability analysis. The module can measure sources having moderate to high stability any nominal frequency between 5 and 15 MHz. The PicoPak stores time-tagged phase data to a disk file, and optionally to a PicoPak PostgreSQL database. PicoPak Windows® software supports its basic operation, the PicoMon Windows®program allows monitoring PicoPak measurements via the database, and the PicoSQL Windows®program provides convenient access to the that data. Command line programs are available to enumerate PicoPak family modules and capture PicoPak phase data at a 10ms rate.

The PicoAmp Model PA1 is a 4-channel RF distribution amplifier intended mainly for supplying 10 MHz reference signals to a set of PicoPak modules. It has unity gain, handles +7 dBm nominal power level, and has the high isolation and low distortion needed for this application.

The PicoScan Model PS1 is a 4-Channel RF switch intended mainly to support scanned clock measurements when used with a PicoPak module. It has the required high inter-channel isolation, and can be operated manually or via its PicoSwitch Windows® software. Its use with a PicoPak module for scanned measurements is supported by the PicoScan Windows®program.

The PicoGPS Model PG1 is a simple, moderate performance GPS timing receiver based on the Jackson Labs GPSTCXO compatible with the PicoPak family of products. Connected to a suitable outdoor powered GPS antenna, it can provide a traceable absolute reference for calibrating a local frequency standard.

The PicoMult Model PM1 is a frequency error multiplier for the PicoPak that enhances its resolution by a factor of x10.625 to 0.56 ps and lowers its white PM noise floor to $2x10^{-12}\tau^{-1/2}$.

In addition the PicoTIC is a proposed interpolating time interval counter to complement the PicoPak family by supporting high-resolution 1 PPS time interval measurements.