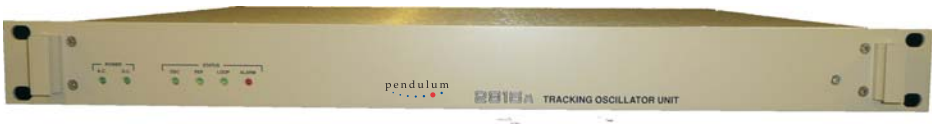
product data

2816
Tracking Oscillator

Ultra-low-noise Frequency

- **Low phase noise outputs** - even from noisy input reference
- Four outputs **phase locked to Reference input**
- **Autosensing frequency input** 5 or 10 MHz for application flexibility
- 5 or 10 MHz outputs can give input **frequency doubling or halving**
- Good **holdover performance** if input signals source fails
- **Built in test** and remote control and monitoring



The 2816 is a Precision Tracking Oscillator for 5 or 10 MHz scientific or metrology applications. The 2816 accepts any noisy frequency input coming from e.g. Rubidium Frequency Standards or badly disciplined GPS-controlled oscillators and effectively remove the noise, while maintaining excellent long-term stability.

2816 Overview

The 2816 is a high quality Frequency Reference source that faithfully tracks the frequency accuracy of its reference input.

By using a unique conditioning algorithm, the 2816 senses the input frequency it is supplied and adjusts the frequency of its own ovenised, low phase noise oscillator to maintain frequency and phase coherence.

Thus the product can be used to restore the quality of a frequency signal degraded by transmission over long and noisy lines, or to improve the intrinsic noise level of a signal coming from a Rubidium atomic oscillator.

Another application could be in the accurate conversion of 5 MHz signals to 10 MHz and vice versa.

Low-noise and High Stability

Due to its highly stable internal oscillator, the 2816 has excellent hold over capabilities if the input signal is lost for any reason.

All four sinewave outputs will be maintained with minimal drift until the reference signal is restored. As with all aspects of the 2816 operation this is detected automatically and frequency conditioning restarted. Initial product start up and recovery from power failures all require no operator intervention or assistance.

Frequency Doubling or Halfing

A useful feature of the 2816 is that it can be used to perform frequency conversion operations within a system. This means that a standard 2816 unit will produce outputs at 10 MHz regardless of whether the synchronising reference is 5 MHz or 10 MHz.

When fitted with the relevant option, the 2816 will produce 5 MHz outputs regardless of whether the synchronising reference is 5 MHz or 10 MHz.

Unlike synthesized outputs, these frequency converted signals from the 2816 come directly from the on board low phase noise oscillator and so are not subject to the noise and spurious signals often associated with synthesized outputs.

Flexible Remote Control and Monitoring

In addition to front panel indications of status, the 2816 has a fully featured RS232 bi-directional interface to permit remote Control and Monitoring. This may be by direct serial port connection, or by use of Pendulum Instruments Ethernet interface, via a remote web browser. Built in test in the 2816 ensures that all critical unit parameters are kept under constant observation and that exceptions are rapidly reported.

2816 Technical Specifications

Standard Inputs and Outputs

Inputs

Freq. Ref input: 1x BNC, 5/10MHz auto-sensing, 50 ohm

Status input: 1x 9-way 'D-sub' male

Outputs

Freq. Ref. outputs: 4x 10MHz reference frequency outputs, sine, +10dBm, 50ohm, BNC

Alarm output 1x BNC

Basic Oscillator

10MHz SC-cut Low Phase-Noise Quartz OCXO

Phase Noise

Oscillator:	**Low noise**
	10 MHz OCXO
Offset from carrier:	**dBc/Hz**
1 Hz	-103
10 Hz	-130
100 Hz	-138
1 kHz	-145
10 kHz	-148
Harmonics	<-35 dBc (typ.)
Spurious	<-65 dBc (typ.)

Frequency Uncertainty

Locked to reference source	
Freq. offset (24 h averaging)	$<5 \cdot 10^{-12}$
Freq. offset (long term avg)	$<1 \cdot 10^{-12}$
Freq. stability ADEV (1000 s averaging)	$<5 \cdot 10^{-11}$
Free run mode	
Ageing per 24h (after 30 days operation)	$<1 \cdot 10^{-10}$
Short term stability ADEV 10s averaging	$<3 \cdot 10^{-12}$
Stabilty vs. Temperature 25 °C ±10 °C typ.	$<2 \cdot 10^{-10}$

5 MHz Frequency Output (opt. 17)

5MHz frequency outputs in place of 10MHzFrequency

Freq. Ref. outputs: 4x 5MHz reference frequency outputs, sine, +10dBm, 50ohm, BNC

Phase noise

Oscillator:	**Low noise**
	5MHz OCXO
Offset from carrier:	**dBc/Hz**
1 Hz	-105
10 Hz	-135
100 Hz	-143
1 kHz	-147
10 kHz	-150
Harmonics	<-40 dBc (typ.)
Spurious	<-70 dBc (typ.)

Front Panel Indicators

AC power ON	(green)
DC power ON	(green)
Alarm status	(red)
Loop OK status	(green)
Reference OK status	(green)
Oscill. OK status	(green)

Power Supply

AC mains: 100, 115 or 230V nominal, switch selectable, +/-10%, (45 to 66 Hz), <60VA

Ext. DC supply: 18V to 32V

RS232 Communication

Standard 2816 command set or NMEA (selectable)

Baud rate: 4800bps

Connectors: 1 x 9-pin male DB9

Ethernet Communication

Model 1874A (add-on option): *Ethernet Communication port in place of RS232 for alarm and status monitoring and control*

Protocol Support ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, Auto IP, SMTP, FTP, DNS, HTTP, Modbus TCP, Modbus ASCII/RTU

RJ45 connector. 10Base-T/100Base-TX Full or half duplex, Auto negotiating

General Specifications

Environmental Data

Operating Temp:	+5°C to +45°C
Storage Temp:	-40°C to +71°C
Humidity	5% to 95% rel. humidity, non condensating
Safety:	EN 61010-1, EN 60950, CE
EMC:	EN 50081-1, EN50081-2, CE

Dimensions and Weight

Width x Height x Depth: 483 x 44 x 350 mm (19" x 1¾" x 13¾")

Weight: 3.8 kg

Ordering Information

2816: Tracking oscillator, 10 MHz or 5 MHz, alarm output, RS232

Included with shipment

Mains cable

User manual on CD

18 months warranty

Built in options

Option 17: 5 MHz output reference frequency in place of 10 MHz

Communication options

Model 1874A: RS232 to Ethernet converter + digital input/output

Other options

Option 95/03: Extended warranty to 3 years (instead of 18 months)

Option 95/05: Extended warranty to 5 years (instead of 18 months)

Specifications subject to change without notice

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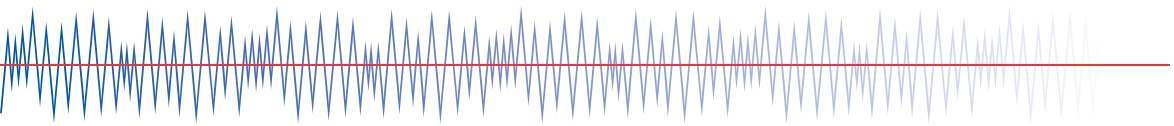
- Experts in time & frequency calibration, measurement and analysis



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