Eclipse Digital Signal Averager
with 2 GSa/s Effective Sampling Rate

Features
• 2 GSa/s (500 ps per point) effective sampling rate (500 MSa/s real-time sampling rate)*
• Record lengths up to 262,144 points (131 µs at 500 ps/point)
• 1 to 65,536 sweeps averaged per record
• <1 µs end-of-scan deadtime* during averaging(<1 % idle time)
• Averaged records continuously streamed to hard disk at 4 MB/s
• Precision Enhancer* transforms 8-bit ADC into 12-bit ADC, for 16 times greater dynamic range
• Live or post-acquisition trend display
• Computes and displays an FFT of recorded waveforms
• Complete with software for Windows 95, 98 and NT
• ActiveX Controls compatible with LabVIEW, C++, Visual Basic and other popular software packages

The Eclipse is a high performance, digital signal averager supplied as a compact line-powered console designed to be operated from a personal computer via the supplied PCI-bus plug-in card and connecting cable. The instrument includes a full applications software package, designed for Windows 95/98/NT, which gives access to all the unit’s controls and graphically displays acquired records, as well as allowing live or post acquisition trend analysis. In addition, an FFT display mode calculates and displays the intensity versus frequency spectrum of recorded waveforms. Alternatively, the user can develop his or her own software using the supplied ActiveX controls, which are compatible with most modern programming languages.

The outstanding performance of the Eclipse is demonstrated by the very low deadtime when averaging of less than 1 µs. This feature is the key figure of merit when comparing the Eclipse with other techniques, such as digital storage oscilloscopes, which often require significant times - up to milliseconds in some cases - after each sweep in order to perform the averaging process. Because of this low deadtime, the overall data throughput rate can be very high, allowing higher repetition rates and shorter experiment times than are possible when using other methods.

This very low deadtime is achieved by averaging sweeps as they are acquired. The input signal, after amplification, is digitized with an 8-bit flash ADC and resulting sample added to the sum of all previous samples at the same point in time in a 24-bit deep output memory. The sampling process is repeated to record the input waveform versus time, so that by choosing the number of samples taken and the sampling rate the time span being monitored can be adjusted.

In order to deliver the best possible time resolution the Eclipse has to operate as the source of trigger signals for the experiment, but this should rarely cause a problem. In those cases where the experiment cannot be arranged for external triggering then we do of course offer the model 9826 Signal Averager as well.

The Eclipse is suitable for use in any application requiring on-line averaging and/or high repetition rates, especially those with noisy repetitive signals of a transient nature. In these cases, where measurement times are necessarily short, the low deadtime and high data throughput will make it the instrument of first choice.
Input

- Channels: 1
- Impedance: 50 Ω
- Sensitivity: ±0.5 V FS
- Coupling: DC
- Offset: -0.4 V to +0.4V
- Bandwidth: DC coupled; rise time < 1 ns
- Input Protection: Max ±2 V DC, or ±10 V for 50 ns and <1% duty cycle
- Digitization: Binary
- Resolution: 8 bits with Precision Enhancer* to deliver 12-bit performance

Sampling Time Per Point

- 0.5, 1.0 or 2.0 ns (Eclipse must act as source of system trigger)

Min No of Sweeps per complete Record

- 0.5 ns/point: 4
- 1 ns/point: 2
- 2 ns/point: 1

Trigger Output

- Impedance: 50 Ω
- Pulse Width: 64 ns
- Pulse Polarity: Low to High signifies start of sweep

Sweep Duration

- 512 to 262,144 clock periods

Deadtime (between end of sweep and generation of next trigger)

- Adjustable from 0.544 µs to 8.554 µs in 32 ns steps

Memory

- 262,144 × 24-bit words

Number of Sweeps in Average

- 1 to 65,536

Averaging Method

- Linear summation

Data Output - Eclipse to PC via supplied PCI bus card and cable

- Typically 4 averaged records, each of 262,144 points, per second to hard disk

Software

- Full operating package running under Windows 95/98/NT is provided to enable instrument control and graphical or file representation of the averaged result. ActiveX controls are compatible with LabVIEW, C++, Visual Basic and other software development environments.

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