



HDO4000 High Definition Oscilloscopes



TELEDYNE LECROY
Everywhere you look™

Key Features

HD
4096

- 12-bit ADC resolution, up to 15 bit with enhanced resolution
- 200 MHz, 350 MHz, 500 MHz, 1 GHz bandwidths
- Long Memory – up to 25 Mpts/Ch (50 Mpts interleaved)
- 12.1" Multi-touch screen display
- WaveScan – Advanced Search and Find
- LabNotebook Documentation and Report Generation
- History Mode – Waveform Playback
- Spectrum Analyzer Mode
- Power Analysis Software
- Serial Data Trigger and Decode



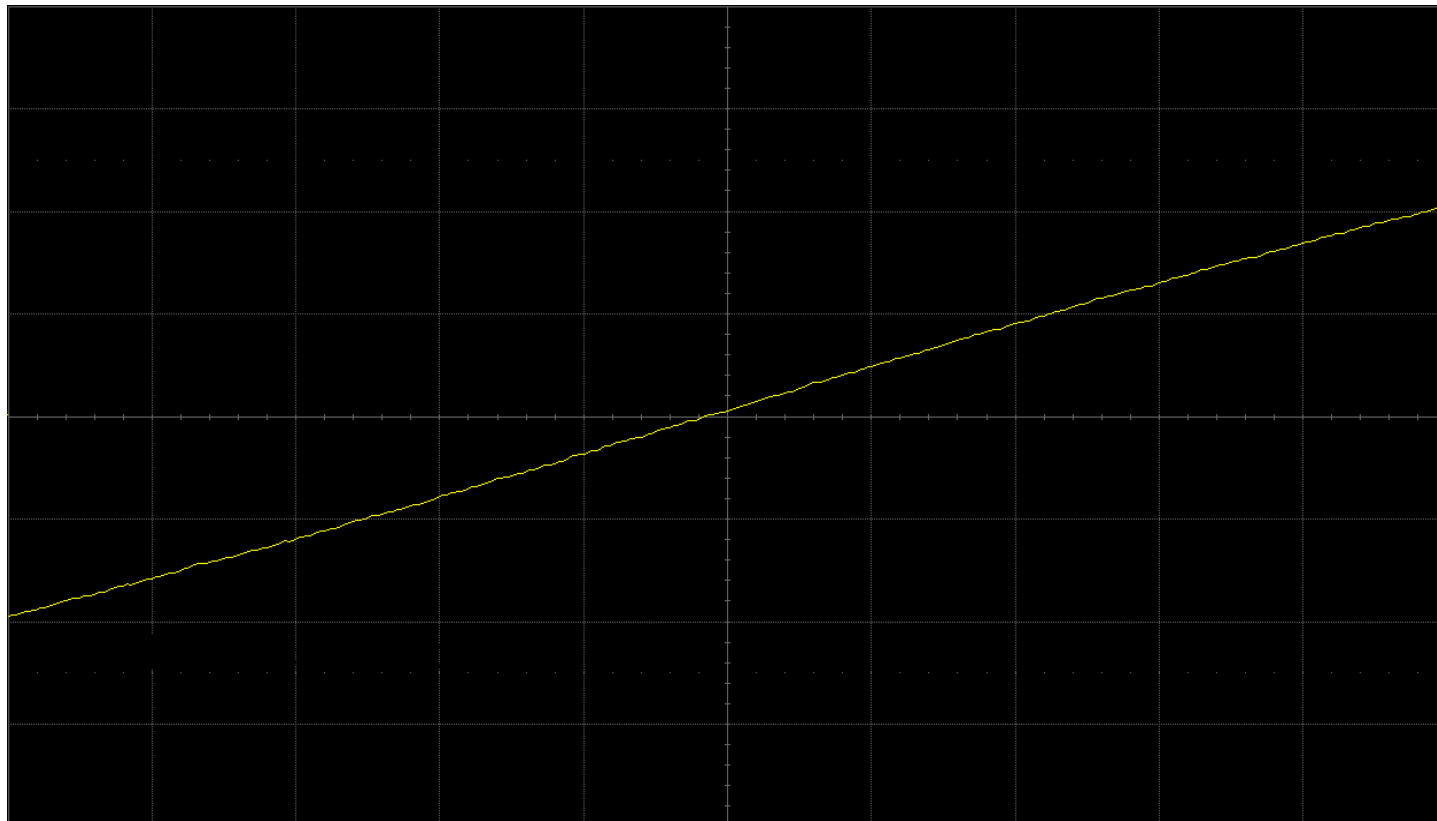


- Combination of
 - High Sample Rate 12-bit ADCs
 - High signal-to-noise input amplifiers
 - Low noise system architecture
- 16 times more resolution than any other oscilloscope on the market
- Capture high frequency signals with 1GHz bandwidth
- Benefits
 - Clean, Crisp Waveforms
 - More Signal Details
 - Precise Waveform Measurements

HD4096 Benefits – Clean, Crisp Waveforms



HD4096 Benefits – Clean, Crisp Waveforms



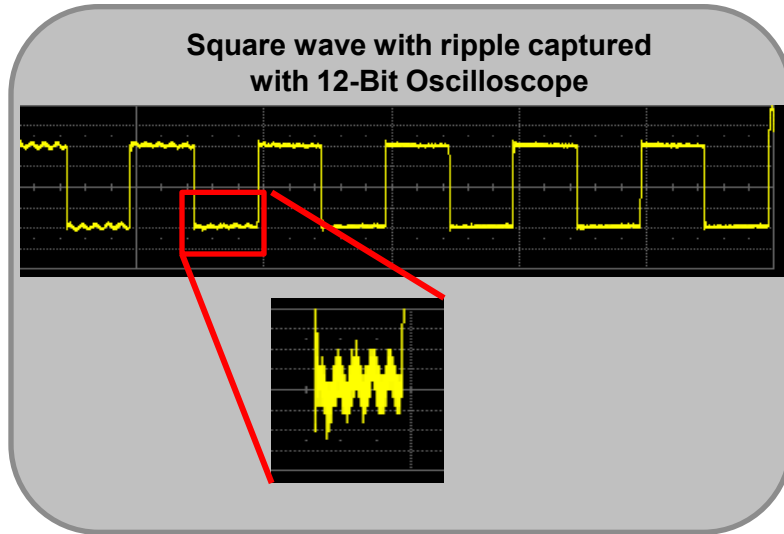
HD4096 Benefits – Clean, Crisp Waveforms



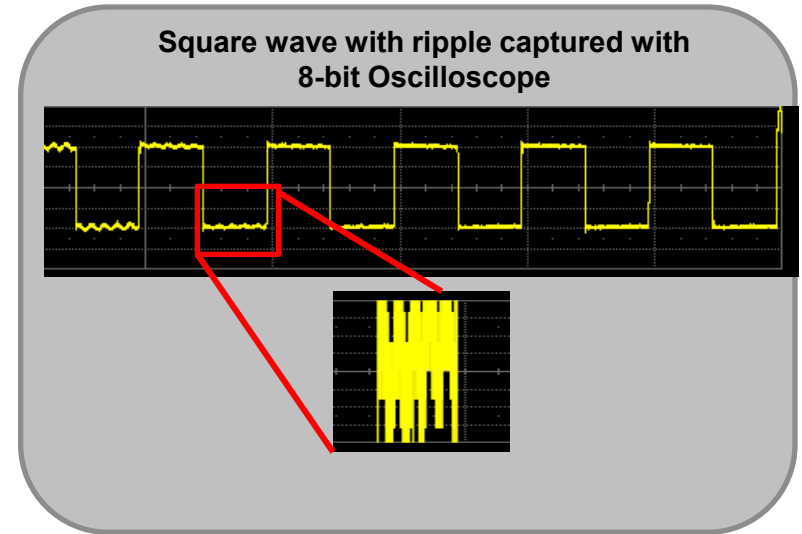
HD4096 Benefits – See More Signal Details



- Details of a waveform are visible due to extra vertical bits, details are not lost in quantization noise



Ripple clearly seen above the noise

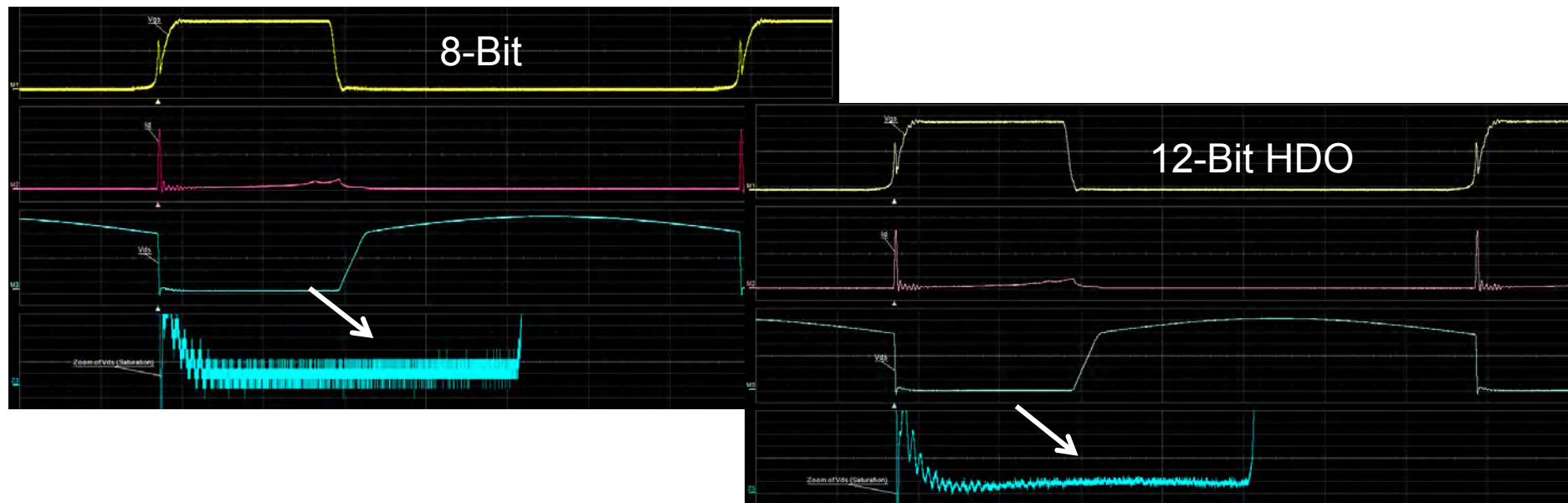


Ripple hidden in noise of the signal

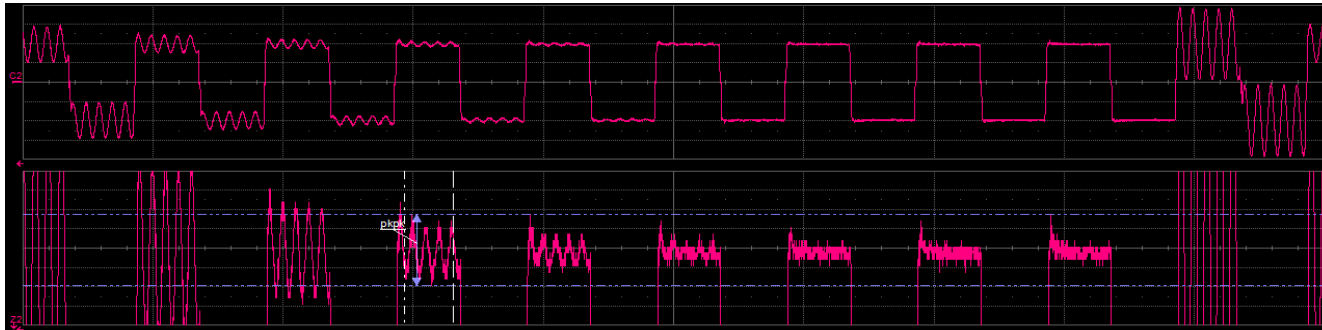
HD4096 Benefits – See More Signal Details



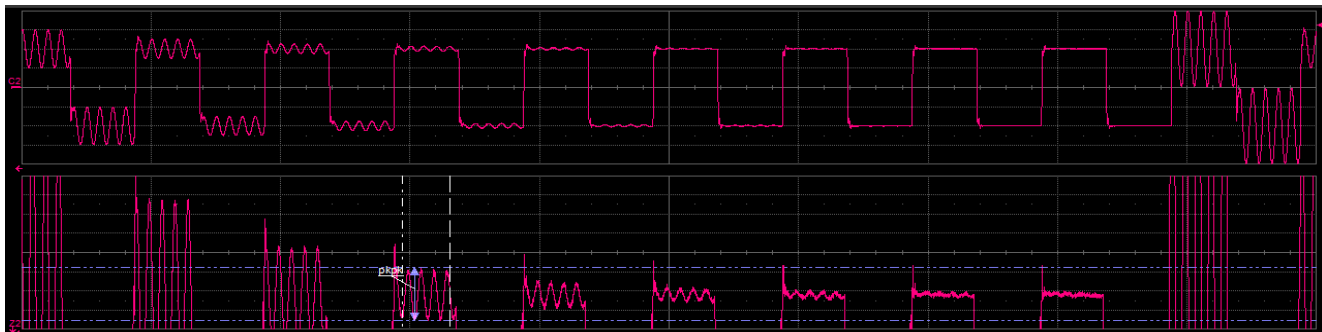
- MOSFET signals in switched-mode power supply application
- User needs to view V_{DS} Saturation Voltage
- 8-bit oscilloscope shows fuzzy saturation voltage trace with no detail
- 12-bit HDO shows clean saturation voltage trace with plenty of detail



HD4096 Benefits – Precise Waveform Measurements



8-Bit Oscilloscope



12-Bit HDO

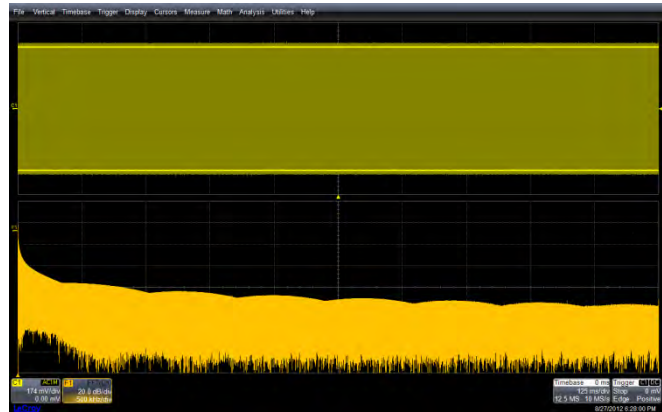
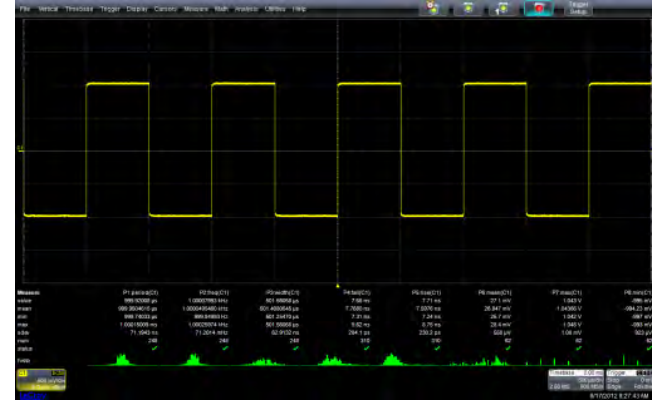
- 12-bit ADC will provide more accurate measurement results
- Measurements in 8-bit oscilloscope include quantization noise
- 12-bit HDO with 16x more quantization levels more accurately characterizes the waveform
- Peak-to-Peak measurement of fourth oscillation with 8-bit and 12-bit ADC results
 - 8 bit = 165 mV
 - 12 bit = 134 mV

Multi-Touch Display Interface for Easy Operation

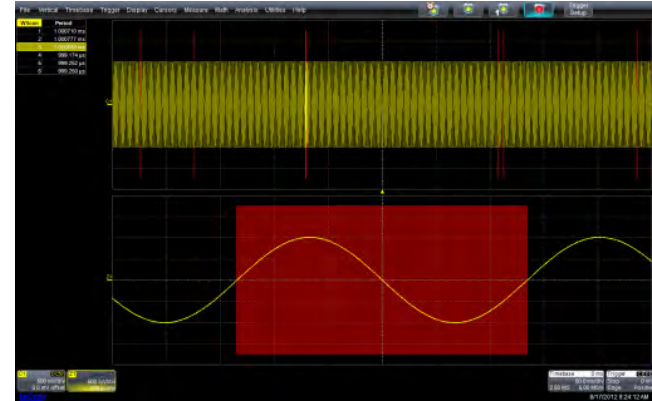


- HDO4000 is the only instrument in its class with a touch-screen
- Intuitive Touch-Screen interface easily controls
 - Channels
 - Trigger
 - Math Traces
 - Measurements
- Advanced Multi-Touch Display
 - Pinch-to-zoom
 - Swipe-to-pan

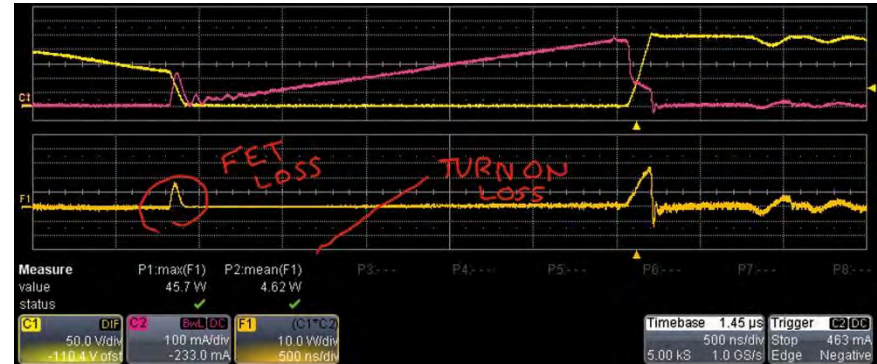
- HD4096 technology improves precision and reduces inaccuracies in math and measurements
- Variety of math functions for waveform debug
 - Display 2 simultaneous math traces
 - Each trace supports dual math functions
- Large set of measurement parameters to quantify waveform characteristics
 - Display 8 measurements at the same time
 - Statistics provide mean, min, max, standard deviation and count information
- Histicons provide thumbnail preview of the statistical distribution of each measurement



- WaveScan - Advanced Search and Find
 - Automatically analyzes waveforms for runts, glitches, or other signal abnormalities
 - Search captured waveforms or scan live waveforms
- History Mode - Waveform Playback
 - Scroll back in time to isolate anomalies
 - Always active, one button press quickly shows all waveforms in the history buffer



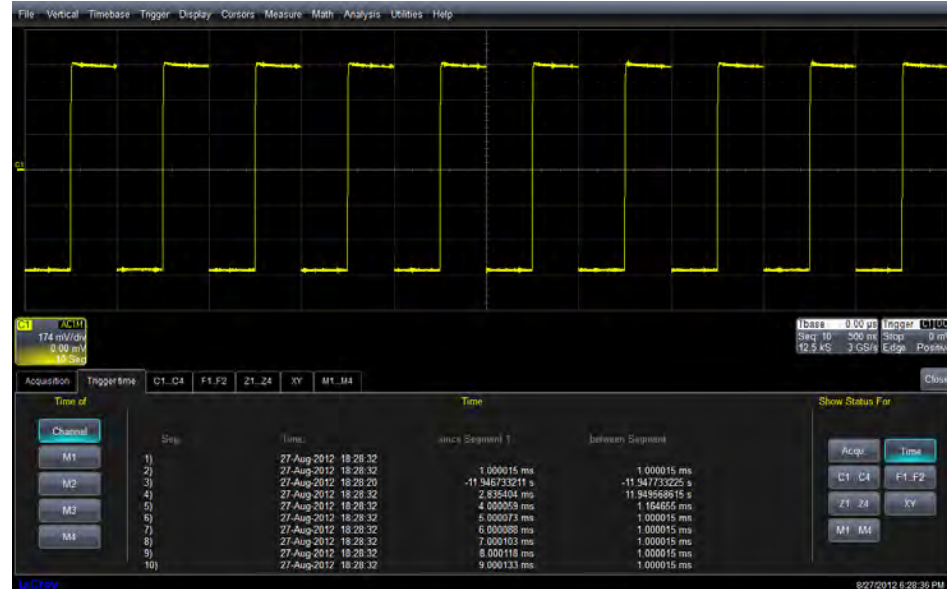
- Save and document all waveforms, settings and screen images at once
- Annotate screen images using touch-screen
- Create custom reports to document measurements and test results
- Flashback function returns the oscilloscope to that state it was in when the entry was saved
 - Measure and analyze recalled waveforms as if they were recently captured



Sequence Mode



- Segments memory and creates a single waveform
- Each segment is triggered, captured and stored when the pre-determined number of triggers is reached
- Ideal for capturing fast pulses in quick succession or events spaced over long periods
- All triggers are times stamped and displayed for the user



- Spectrum analyzer style interface for easy viewing and measuring in the frequency domain.
 - Quickly adjust center frequency, frequency span and resolution bandwidth
- Automatically find and label peaks in the spectrum
- Use markers for frequency and magnitude measurements across the entire spectrum
- Interactive table to quickly navigate between peaks and measure between markers
- Spectrogram display shows how the spectrum changes over time



Power Analysis Software Option



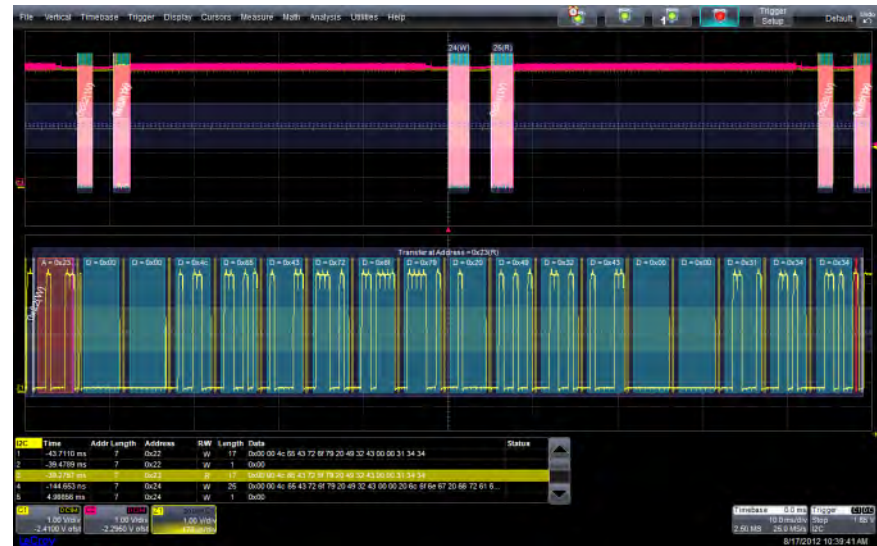
- Measure and analyze operating characteristics of power conversion devices and circuits
- Automatic detection and measuring of turn-on, turn-off and conduction losses
- Identify areas of power loss with color coded waveform overlay
- Streamlined user interface to guide user through various stages of analysis
- Operating modes for:
 - Power switching device measurements
 - Control loop modulation analysis
 - Line power harmonics



Serial Trigger and Decode



- Color coded overlay of decoded data directly on top of physical layer signal
- Trigger on protocol specific information to isolate events
- Up to 4 decodes simultaneously – can be a combination of any protocol at any speed
- Decode table provides a quick overview of decode and can be clicked to zoom to specific packet
- Wide variety of different protocols supported
 - I²C, SPI, UART/RS232
 - CAN, LIN, FlexRay, SENT
 - Audio (I²S, LJ, RJ, TDM)
 - DigRF3G, DigRFv4, DPHY
 - ARINC429, MIL-STD 1553
 - USB 1.0/1.1/2.0, USB-HSIC



Banner Specifications



	HDO4022	HDO4024	HDO4032	HDO4034	HDO4054	HDO4104
Bandwidth	200 MHz	200 MHz	350 MHz	350 MHz	500 MHz	1 GHz
Channels	2	4	2	4	4	4
ADC Resolution	12 bit	12 bit	12 bit	12 bit	12 bit	12 bit
Sample Rate (All Channels)	2.5 GS/s	2.5 GS/s	2.5 GS/s	2.5 GS/s	2.5 GS/s	2.5 GS/s
Memory	12.5 Mpts/ch	12.5 Mpts/ch	12.5 Mpts/ch	12.5 Mpts/ch	12.5 Mpts/ch	12.5 Mpts/ch
Max Memory (per ch / intlv'd)	25 Mpts / 50 Mpts	25 Mpts / 50 Mpts	25 Mpts / 50 Mpts	25 Mpts / 50 Mpts	25 Mpts / 50 Mpts	25 Mpts / 50 Mpts
Display	12.1" Multi-touch display	12.1" Multi-touch display	12.1" Multi-touch display	12.1" Multi-touch display	12.1" Multi-touch display	12.1" Multi-touch display

- HDO4000 will have new passive probes matched to its front end
- Active probes currently compatible with WaveSurfer will be compatible with HDO4000
- Serial Trigger and Decode options currently available on WaveSurfer will be available on HDO4000
- Two new software options will be available with the HDO4000
 - Spectrum Analyzer Software
 - Power Analysis Software (will also be available on existing WS models)
- Rack mount and carrying case accessories will be available

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