# DLM 2000 Series

**Standard Main Unit Accessories**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cord</td>
<td>710130</td>
<td></td>
</tr>
<tr>
<td>710115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>710110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>710105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*9: The 701939 probes are not included when this option is selected.

### Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Memory expansion option of 1 ch, 2ch, 4ch, 8ch</td>
</tr>
<tr>
<td>M2</td>
<td>Memory expansion option of 1 ch, 2ch, 4ch, 8ch</td>
</tr>
<tr>
<td>M3</td>
<td>Memory expansion option of 1 ch, 2ch, 4ch, 8ch</td>
</tr>
<tr>
<td>M4</td>
<td>Memory expansion option of 1 ch, 2ch, 4ch, 8ch</td>
</tr>
</tbody>
</table>

**Accessory Models**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive probe</td>
<td>701927</td>
<td></td>
</tr>
<tr>
<td>701924</td>
<td></td>
<td></td>
</tr>
<tr>
<td>701921</td>
<td></td>
<td></td>
</tr>
<tr>
<td>701944</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive probe</td>
<td>701938</td>
<td></td>
</tr>
<tr>
<td>701920</td>
<td></td>
<td></td>
</tr>
<tr>
<td>701929</td>
<td></td>
<td></td>
</tr>
<tr>
<td>701930</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1: The 701938 probes are not included when /EX22 or /EX24 is selected.

**Special Site**


**Yokogawa’s Approach to Preserving the Global Environment**

- Yokogawa’s electrical products are developed and produced in facilities that have received ISO14001 approval.
- Yokogawa’s electrical products are designed in accordance with Yokogawa’s Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.
Flexible inputs and flexible performance

Signal observation on 4 channels or more...

Flexible MSO Input
- Capture a mixed signals of analog and logic signals -

Four channels is not sufficient to view the functioning of digital control circuits. The DLM2000 series converts 4 ch of analog input to 8-bit logic, and functions as a 3 ch analog + 8-bit logic MSO (mixed signal oscilloscope).

3 ch analog + 8-bit logic

The performance of up to 11 inputs by converting to logic

Using logic input, up to 11 input signals can be observed simultaneously as 3 ch of analog and 8-bit logic. It is not only possible to use logic input for observation of data and control signals, or as a trigger source, but also for logic input analysis of I2C and SPI serial busses.

Logic probe for the DLM2000

Fast data processing with ScopeCORE
With our proprietary ScopeCORE fast data processing IC, real-time display is possible even when simultaneously measuring multichannel signals of 11 inputs.

DLM2000 Series Lineup

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input channels</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Logic input</td>
<td>-</td>
<td>-</td>
<td>8-bit</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum sampling rate</td>
<td>2 GS/s (interleave ON)</td>
<td>2.5 GS/s (interleave ON)</td>
<td>2 GS/s (interleave ON)</td>
<td>2 GS/s (interleave ON)</td>
<td>2 GS/s (interleave ON)</td>
<td>2 GS/s (interleave ON)</td>
</tr>
<tr>
<td>Frequency characteristics</td>
<td>200 MHz</td>
<td>350 MHz</td>
<td>500 MHz</td>
<td>200 MHz</td>
<td>350 MHz</td>
<td>500 MHz</td>
</tr>
<tr>
<td>Maximum record length</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
<td>62.5 Mpoints (Single measurement, memory length/1000, interleave OFF)</td>
</tr>
</tbody>
</table>

* Or 3 channels when using logic input.
Sophisticated waveform acquisition engine

With long memory and the History function, you'll never miss an historical waveform. A variety of trigger functions reliably capture the waveforms you want.

Large capacity (125 Mpoint) memory enables long-duration measurements

For taking 2 ch measurements in Single mode, you can add the /M2 memory expansion option giving you up to 125 Mpoints of large memory capacity. 10,000 ch signals can be recorded for up to 9,000 seconds. Even at a sampling rate of 1.25 GS/s, waveforms down to 0.1 seconds can be captured.

<table>
<thead>
<tr>
<th>Continuous Measurement</th>
<th>Single-Shot Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>With 4 ch (With 2ch for DL2000)</td>
</tr>
<tr>
<td>/M1, /M1S memory option</td>
<td>With 2 ch (With 1ch for DL2000)</td>
</tr>
<tr>
<td>2 ch, 4 ch same</td>
<td>6.25 Mpoints</td>
</tr>
<tr>
<td></td>
<td>25 Mpoints</td>
</tr>
<tr>
<td>/M2 memory option</td>
<td>62.5 Mpoints</td>
</tr>
<tr>
<td></td>
<td>125 Mpoints</td>
</tr>
</tbody>
</table>

You can replay waveforms later on, so you'll never miss an abnormal waveform - History Function -

With the DLM2000 series, up to 20,000 previously captured waveforms can be saved in the acquisition memory. With the History function, you can display just one or all of the previously captured waveforms (history waveforms) on screen. You can also perform cursor measurement, computation, and other operations on history waveforms. Using the History function, you can analyze rarely-occurring abnormal signals.

Replay function

You can search the up to 20,000 previously captured waveforms for history waveforms that meet certain conditions. You can perform cursor measurement and other analyses on the found waveforms.

Abnormal signal

Input signal A CAN Input signal B LIN

Dual pulse trigger:
Example: Trigger on a combination of CAN and LIN bus triggers. PC + SPI bus triggers, and other combinations are possible.

Trigger when either LIN or CAN bus signal conditions become true

A to B trigger:
Example: Trigger on the 7th edge of signal on B. This is effective for measurements with shifted timing, such as non-standard video signal vertical/horizontal periods or motor reference position pulses and drive pulses.
**Capture & Display**

**Zoom and Search Functions**

The DLM2000 series has two types of filters, one processed at the input circuit and one based on MATH functions. These filters are effective for rejecting unwanted signals, allowing observation of only the desired bandwidths.

**Real time filter with optimum noise reduction supports a wide range of frequencies** (from 8 kHz to 200 MHz)

The DLM2000 series has two types of filters, one processed at the input circuit and one based on MATH functions. These filters are effective for rejecting unwanted signals, allowing observation of only the desired bandwidths.

**Zooms into two different points**

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**Waveform zoom and search functions**

**Zoom two locations simultaneously**

Because the DLM2000 series lets you set zoom factors independently, you can display two zoomed waveforms with different time axis scales at the same time. Also, using the Auto Scroll function, you can automatically scroll waveforms captured in long memory and change the zoomed location. With Auto Scroll you can choose forward, backward, fast-forward, scroll speed, and other control options.

**Large capacity memory gives you a variety of waveform search functions.**

Two types of waveform searching:

- Normally, searching for data takes time and costs money, and long memory is useless without functions for extracting desired data from a large capacity memory. That's why the DLM2000 series does not simply offer long memory; it also provides powerful waveform search functions.

- Searching for data in a single screen: the Zoom Search function

- Searching for history waveforms: the History Search function

This function searches captured waveforms in the long memory and displays waveforms that meet the search criteria in the zoom area. The locations of the found waveforms are marked on screen (shows the current location).

- **Waveform search criteria**
  - Edge: edge (with conditional slider pattern, pulse width, state width, serial bus [only on models with the serial bus analysis option])

- **Zoom keys**
  - Dedicated: dedicated keys
  - Zoom1 and Zoom2

- **Zoom menu**
  - Auto Scroll

- **Input signal**
  - Computing waveform

- **Filtered waveform**
  - Filtering of a PWM waveform using computation

- **Cursor**
  - Degree Cursor

- **Simultaneous level and time difference measurement with the cursor**

- **Marker**

- **FFT analysis**
  - Up to 2 FFT analyses can be performed simultaneously. FFT can be performed on computed waveforms in addition to the actual waveforms on CH1 to CH4. Analysis can be performed on the frequency components of waveforms filtered for limited bandwidth, frequency for changes in period of rotary objects, and other phenomena.

- **Displays trends of peak-to-peak or pulse width per cycle**

- **Measure function and statistics**
  - Waveform parameters such as period, pulse width, and amplitude can be measured repeatedly and displayed in graphs. In a single screen you can observe period by period fluctuations, compute amplitudes and display amplitudes as trends. You can also display histograms redefining the voltage or time axis using values from repeated automated measurement of waveform parameters.

- **Displays of waveform parameters**
  - Histogram display using the time axis

- **Trend display of waveform parameters**
  - Simultaneous level and time difference measurement with the cursor and waveform can be displayed. There are six types of cursor: ST, AT, LV, Marker, Degree Cursor.

- **FFT analysis**
  - **Analysis**
    - Cursor Measurement
    - Measure function and statistics
    - Trend and histogram displays
    - Measure voltage/time differences automatically
    - Displays trends of peak-to-peak or pulse width per cycle

- **Action on trigger**
  - GO/NO-GO function

- **Can check functions with graphical online help**

- **Graphical online help**
  - You can view detailed graphical explanations of the oscilloscope’s functions by pressing the “?” key in the lower left of the screen. This lets you get help on functions and operations on screen without having to consult the user’s manual.
Solutions of the DLM2000

Analysis Applications

DLM 2000 Series

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**Serial analysis function options** (IF1, /F2, /F3, /F4, /F5, /F6)

- UART(RS232)/I2C/CSI/CAN/LIN/FlexRay-

Triggers for embedded systems and inter-chip bus signals are supported along with decode display analysis (serial bus analysis option only on 4-ch models).

Logic input can also be used for serial buses (excluding FlexRay, CAN and LIN). Intelligent serial bus auto setup: Complicated trigger and decode settings such as bit rate and threshold level are automatically detected by DLM2000.

Simultaneous analyses of four different busses: Up to four busses can be analyzed simultaneously. Waveforms and analysis results from busses with different speeds can be displayed using 2 Zoom windows.

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**Power supply analysis option (/G4)**

Dedicated power supply analysis options are available (4 ch models only) for switching loss, joule integral (12), SOA (safe operating area) analysis, harmonic analysis of power supply current based on EN61000-3-2, and other power parameter measurement such as active power, power factor etc.

**Switching loss analysis**

Utilizing the long memory capability, voltage and current waveforms over long cycles can be input for computation of switching loss (\( V(t) \times I(t) \)). A wide variety of switching loss analyses are supported, including turn-on/off loss calculation, loss including continuity loss, and loss over long cycles. Results can be statistically processed and calculated.

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**Software Control**

[Website](http://tmi.yokogawa.com/en/products/oscilloscopes/oscilloscopes-application-software/)

**Free Software**

- XviewerLite – Basic check – Zoom, V-cursor, conversion to CSV format
- Xviewer – Advanced check – Waveform observation and analysis
- Xviewer – Advanced and useful functions are supported. Used for precise, off-line waveform analysis.

**Data transfer to a PC**

- Remote control
- Sends waveform, screen, and settings data
- Send waveform, screen, and settings data

**Optional Software**

- MATLAB Tool Kit
- Remote control from MATLAB and data file importing.

---

**Connectivity & Software**

DLM 2000 Series

**Broad Connectivity and Easier Control**

- Probe power terminal (optional)
- Power supply output terminal for current probe (701930 and 701931) and differential probes (701920, 701921, 701922, 700924, 709095, and 701926).
- GPIB connection terminal (optional)
- Enables control from a PC.
- External trigger input
  - Lets you input a trigger signal separately from the input signal.
- Trigger output
  - Outputs a CMOS 3.3V level trigger signal.

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**Accessories**

- **PBDH1000 Differential probe** (701914)
  - 1.0 GHz bandwidth
  - 1 kΩ maximum resistance
  - Approximately 1.1 pF
  - 1 MΩ
  - 12V ± 25V
  - 100 kHz

- **PBC100/PBC050 Current probe** (701920, 701921, 701922, 700924, 709095, and 701931)
  - 30 Arms
  - 1000 Vrms/1000 Vpeak
  - DC to 150 MHz

- **Differential probe (701920)**
  - DC to 50 MHz bandwidth
  - 100 kHz maximum resistance
  - Approximately 2.5 pF

- **Differential probe (701921)**
  - DC to 100 MHz bandwidth

- **Differential probe (701922)**
  - DC to 500 MHz bandwidth

- **Differential probe (701930)**
  - 30 Arms

- **Power supply output terminal for current probe** (701920, 701921, 701922, 700924, 709095, and 701931)
  - Outputs a CMOS 3.3V level trigger

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**Related Accessories**

- **Differential probe (701926)**
  - DC to 50 MHz
  - 5000 Vrms/7000 Vpeak

- **PBDH1000 Differential probe** (701927)
  - DC to 150 MHz
  - 1000 Vrms/1400 Vpeak

- **PBC100/PBC050 Current probe** (701920, 701921, 701922, 700924, 709095, and 701931)
  - 30 Arms

- **Desker correction signal source** (701930)
  - 30 Arms

---

**Software Development**

- LabVIEW instrument driver
- Interactive tool
- DL-Term
- Custom software
- Command control
- Interactive tool

- XWirepuller
- Remote trigger and operation
- XviewerLITE – Basic check – Zoom, V-cursor, conversion to CSV format
- Xviewer – Advanced check – Waveform observation and analysis
- Xviewer – Advanced and useful functions are supported. Used for precise, off-line waveform analysis.
- Multiple file display
- Statistical Analysis
- Advanced waveform operations
- Data transfer to a PC
- Remote control
- Probe power terminal
- Power supply output terminal
- Trigger output
- GPIB connection terminal
- Ethernet (optional)

---

**Probe power terminal** (optional)

- Supports 100BASE-T, 100BASE-TX, 10BASE-T

- GO/NO-GO output terminal
  - Using the GO/NO-GO function, you can output the result as a TTL level signal.

- RGB video signal output terminal
  - You can output an image signal and check the waveform on an external monitor.

- USB-PC connection terminal
  - Enables control from a PC.

- USB peripheral connection terminal
  - Supports USB storage, USB keyboards, USB printers.

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**On PCs**

- **DLM2000 Series**
  - You can output an image signal and check RGB video signal output terminal
  - USB-PC connection terminal
  - USB peripheral connection terminal
  - USB storage, USB keyboards, USB printers

- **100BASE-T/10BASE-TX**
  - sends waveform, screen, and settings data
  - Sends waveform, screen, and settings data
  - Mail transmission (GO/NO-GO action)
  - Remote control
  - Supports USB storage, USB mouse and keyboards

- **10BASE-T**
  - 10BASE-T
  - 100BASE-TX
  - 1000BASE-T

---

**Differential probes** (701920, 701921, 701922, 701930, 701931, 700924, 709095, and 701931)

- 1 MΩ bandwidth
- 1 kΩ maximum resistance
- Approximately 1.1 pF

- 1 MΩ
- 12V ± 25V

- 100 kHz

---

**PBC100/PBC050 Current probes** (701920, 701921, 701922, 700924, 709095, and 701931)

- 30 Arms

- 1000 Vrms/1000 Vpeak
- DC to 150 MHz

- 1000 Vrms/7000 Vpeak
- DC to 500 MHz

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**USB printers**

- Supports USB storage, USB keyboards, USB printers
- USB peripheral connection terminal
- USB-PC connection terminal

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**Custom software**

- Interactive tool
- Command control
- Data transfer to a PC
- Remote control
- OPEN-CONNECT

---

**Remote control**

- Sends waveform, screen, and settings data
- Remote control
- Sends waveform, screen, and settings data

---

**Software Development**

- LabVIEW instrument driver
- Interactive tool
- DL-Term
- Custom software
- Command control
- Interactive tool

- XWirepuller
- Remote trigger and operation
- XviewerLITE – Basic check – Zoom, V-cursor, conversion to CSV format
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- Xviewer – Advanced and useful functions are supported. Used for precise, off-line waveform analysis.
- Multiple file display
- Statistical Analysis
- Advanced waveform operations
- Data transfer to a PC
- Remote control
- Probe power terminal
- Power supply output terminal
- Trigger output
- GPIB connection terminal
- Ethernet (optional)

---

**Probe power terminal** (optional)

- Supports 100BASE-T, 100BASE-TX, 10BASE-T

- GO/NO-GO output terminal
  - Using the GO/NO-GO function, you can output the result as a TTL level signal.

- RGB video signal output terminal
  - You can output an image signal and check the waveform on an external monitor.

- USB-PC connection terminal
  - Enables control from a PC.

- USB peripheral connection terminal
  - Supports USB storage, USB keyboards, USB printers.
Main Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Bandwidth</th>
<th>Input Channels</th>
<th>Max. Sample Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLM2022</td>
<td>200 MHz</td>
<td>2 analog channels</td>
<td>125 GS/s (approx. 450,000 waveforms/sec/ch)</td>
</tr>
<tr>
<td>DLM2034</td>
<td>350 MHz</td>
<td>3 analog channels + (interleave mode on)</td>
<td>250 GS/s (approx. 180,000 waveforms/sec/ch)</td>
</tr>
</tbody>
</table>

DLM Signal Input (4 ch model only)

- Logic Signal Input (4 ch model only)

4 ch model Repeat/Single/Single Interleave:

- Basic Specifications
  - Frequency characteristics (-3 dB attenuation when inputting a sinewave of amplitude 10 mVp-p)
  - Input coupling setting: AC, DC, DC50
  - Input channels: Analog input DLM20x2: CH1, CH2

- Trigger type, trigger source
  - A triggers: Edge CH1 to CH4, Logic, EXT, LINE
  - B triggers: Edge CH5 to CH8, Logic, EXT, LINE

Repetitive sampling mode: 125 GS/s

- A/D resolution: 8-bit (25 LSBD/div)

- Min. input voltage: 701988: 500 mVp-p

- Maximum toggle frequency: 50 MHz

- Input impedance: 701988: Approx. 1 MΩ

- Maximum sample rate: 701988: 100 MSpS, 500 MSpS, 1 GSpS

- Model 701989: 100 MHz

- Model 701989: threshold (CH1 to CH4 when using logic input)

- 4 ch model Repeat/Single/Single Interleave:
  - Model 701989: threshold (CH1 to CH4 when using logic input)

- Oscillator specifications
  - Frequency: 4 MHz
  - Phase noise: -110 dBc/Hz at 1 MHz offset

- Power supply requirements
  - 5 VDC, 1 A

- Environmental specifications
  - Operating temperature: 0°C to 40°C
  - Storage temperature: -20°C to 60°C

- Physical specifications
  - Dimensions: 290 mm x 250 mm x 61 mm
  - Weight: 4.6 kg

- Safety

- Accessories
  - Carrying case
  - User manual
  - Power cord

- Optional Accessories
  - PC interface cables
  - USB cables
  - RS-232 cables

- Data analysis functions
  - Automatic measurement and statistical analysis of power spectral density
  - DSA analysis by Y display, measuring voltage as X, and current flowing as Y

- Analysis result display
  - 100 frames max.
**DLM 2000 Series**

## Model and Option Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>710105</td>
<td>Power cord</td>
</tr>
<tr>
<td>710110</td>
<td>10:1 Voltage probe</td>
</tr>
<tr>
<td>710115</td>
<td>20:1 Voltage probe</td>
</tr>
<tr>
<td>710120</td>
<td>1000 Vrms differential probe</td>
</tr>
<tr>
<td>710125</td>
<td>2000 Vrms differential probe</td>
</tr>
<tr>
<td>710130</td>
<td>10 MΩ differential probe</td>
</tr>
<tr>
<td>710135</td>
<td>1 GΩ differential probe</td>
</tr>
</tbody>
</table>

### Language Options
- English
- French
- Italian
- Spanish
- Korean
- Japanese

### Option Codes
- **M1**: Memory expansion option (4 ch model only)
- **M2**: Memory expansion option (2 ch model only)
- **M3**: Memory expansion option (1 ch model only)

### Power Supply
- **M**: Memory expansion option

### Display
- **L**: Large 8.4-inch LCD display

### Interface
- **Y**: 9-pin D-sub serial interface
- **S**: USB/RS-232C interface

### Accessories
- **B**: Battery pack (100 VAC/12 VDC)
- **P**: Power cord
- **G**: Grounding cable
- **C**: Carrying case
- **F**: FlexRay trigger and analysis (4 ch model only)
- **H**: UART trigger and analysis (4 ch model only)
- **R**: User defined math (4 ch model only)
- **D**: Built-in printer

### Special Site
- **Y**: Yokogawa electric products
- **B**: Yokogawa Meters & Instruments Corporation

### Mixed Signal Oscilloscope
- **DLM 2000 Series**: Up to 4 serial bus analysis and power parameter measurement

**NOTE**
- *1: 2000 Models only*
- *2: 1000 Models only*
- *3: 2000 Models only*
- *4: 1000 Models only*

## Standard Main Unit Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Part Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cord</td>
<td>710105</td>
<td>1</td>
</tr>
<tr>
<td>10:1 Voltage probe</td>
<td>710110</td>
<td>1</td>
</tr>
<tr>
<td>20:1 Voltage probe</td>
<td>710115</td>
<td>1</td>
</tr>
<tr>
<td>10 MΩ differential probe</td>
<td>710130</td>
<td>1</td>
</tr>
<tr>
<td>1 GΩ differential probe</td>
<td>710135</td>
<td>1</td>
</tr>
</tbody>
</table>

**NOTES**
- Only one of these may be selected at a time.
- *2: The 701939 probes are not included when this option is selected.

**Specifications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>DLM 2000 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>Large 8.4-inch LCD display</td>
</tr>
<tr>
<td>Weight</td>
<td>Lightweight and compact</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Lightweight and compact</td>
</tr>
</tbody>
</table>

**Up to 4 serial bus analysis and power parameter measurement**

**Lineup includes**
- 200 MHz, 350 MHz, 500 MHz bandwidth models
- Large 8.4-inch LCD display
- Long memory: Up to 1250 points (with /M2 option)
- High speed sampling: Up to 2.5 GS/s (1.25 GS/s with 4 ch)