

7014 Digital Oscilloscope DL7100

Signal Explorer

NEW



DL7014(701420)
373 x 210.5 x 306mm 9kg
(14.69 x 8.29 x 12.05" 19.8lbs)

★ Safety Standard; EN61010-1
Emission; EN61326 Class A
Immunity Standard; EN61326

The YOKOGAWA SignalExplorer DL7100 was designed to satisfy the key feature requirements for waveform measuring systems. These features are:

- Simple and accurate capturing of complex signals
- High-speed extraction and screen display of desired information from large volumes of captured data

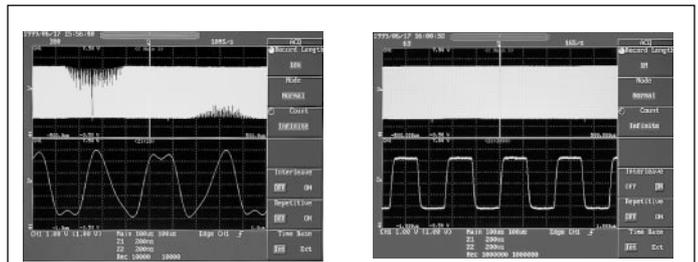
Our goal was to create a waveform measuring system that truly meets your needs.

FEATURES

- Maximum 1 GS/s
- 500 MHz analog bandwidth
- Large recording memory (maximum 8 MW with 701420, 2 MW with 701410)
- 4 analog input channels and 16-bit logic input (optional)
- Newly developed DSE chip for high-speed screen updating
- Standard equipped with SCSI, GP-IB, SERIAL (RS-232), and Centronics interfaces
- History search and serial pattern search functions
- Easy to use

FUNCTIONS

- Large recording memory to ensure waveforms are captured accurately
High-speed sampling alone won't necessarily ensure that your instrument captures all the waveform information you need. A large recording memory can ensure that every detail of the signal is available for evaluation. Short memory can cause decreased sampling rates, even if the basic specification is 5 GS/s. The DL7100 has up to 2 MW or 8 MW of memory to ensure faster sampling and complete waveform acquisition.



10 kW, 10 MS/s

1 MW, 1 GS/s

These pictures are of the same waveform. The only difference is the memory length used. When the memory is limited to 10 kWords, the sampling rate is reduced to 10 MS/s. When a longer memory of 1 Mword is used the sampling rate is much higher, 1 GS/s, and complete waveform data is captured.

- 1 MW all-points display (*1) and screen updating 30 times per second so that you can detect problems more reliably

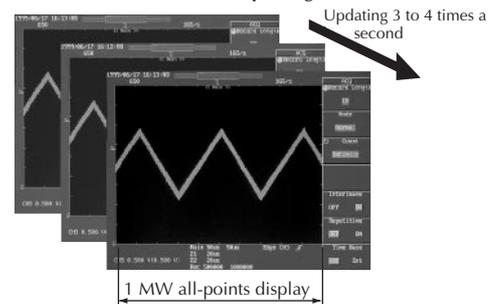
The DL7100 has a new Data Stream Engine "DSE" (*2) IC designed to handle large amounts of data and provide fast screen update rates. This new DSE combined with an "all-points display" technique, which plots all data points without compression, makes it easy to capture abnormal signals such as high-speed surge signals. The DL7100 updates the display 30 times per second even when using 1 Mword of memory and the all-points display.

- *1 This feature is a high-speed process which plots on the screen all of the data points in memory, without any down-sampling or compression.
- *2 DSE stands for *Data Stream Engine*. It is an IC chip capable of updating the screen at high speed using large amounts of data.



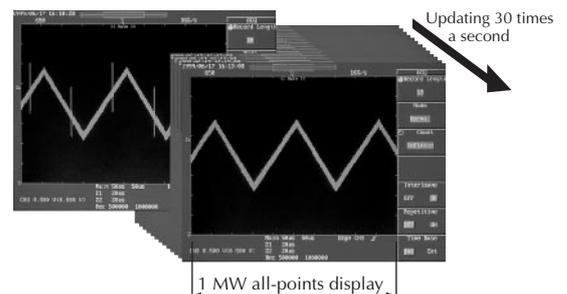
Data Stream Engine

Conventional screen updating



Screen updating with the DL7100

High-speed screen updating makes it easy to catch abnormal events.



DL7100

- **4 analog channels and 16-bit logic input (optional) for simultaneous measurement on a total of 20 channels.**

Most oscilloscopes limit you to two or four channels of analog data. It is difficult to set up multiple instruments to evaluate analog and logic signals at the same time.

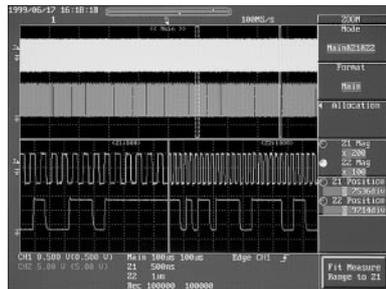
The DL7100 has four analog inputs plus an additional sixteen logic inputs (option). Set up complex triggers and capture analog and digital information. All your data is on a single display.



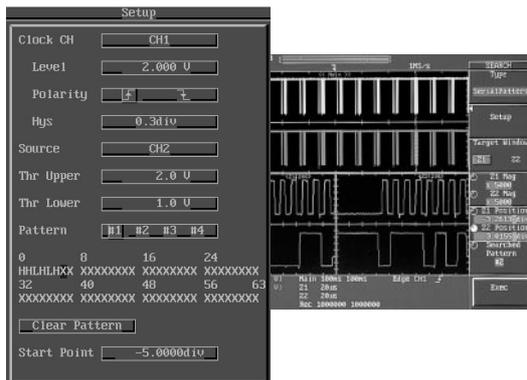
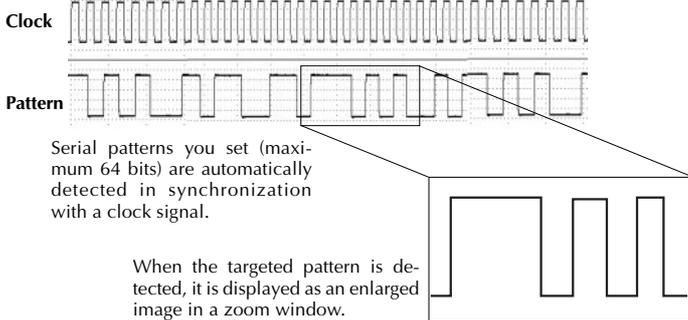
- **Serial pattern search and Zooming**

You can set a serial pattern of up to 64 bits and then automatically search for that pattern in the stored data. When that specific pattern is located it will be displayed in the zoom window. Two zoom windows can be used to compare different areas.

You can also use pattern search to count rising and falling edges and detect any edge.



Screen displaying overall waveform window and two zoom waveform windows

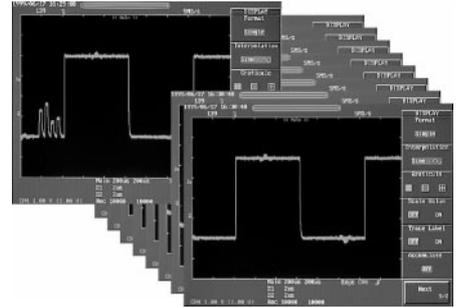


- **History memory and History Search**

With most oscilloscopes, new waveform data replaces previous data with each acquisition. Even if you press the STOP key, an abnormal signal waveform can be lost.

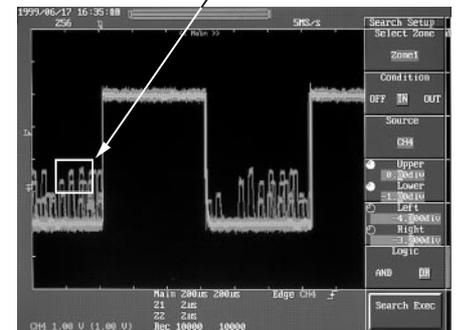
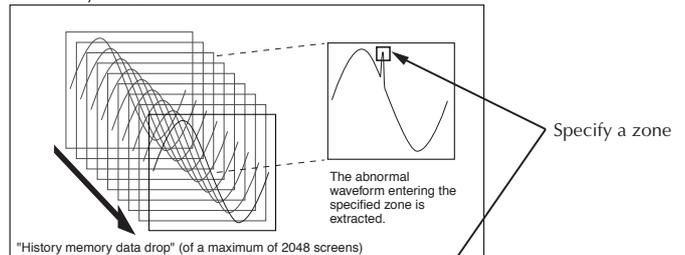
The History memory can save up to 2048 previous acquisitions. This makes it possible to store waveforms with events not even covered by trigger settings.

The History Search function will find the stored waveform that has abnormal components. You can specify a zone and select just waveforms with components that pass or bypass the specified zone.



- Abnormal waveforms are saved in History memory

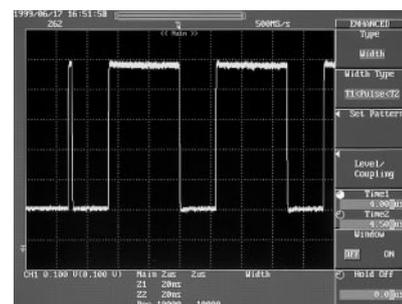
- History search



- **Simple and enhanced trigger functions**

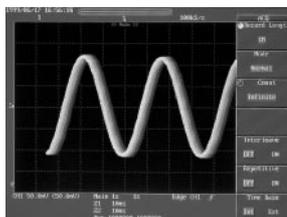
Simple edge triggering may not be good enough to capture the desired signal.

Enhanced trigger functions are standard on the DL7100. They include A->B(n), A delay B, OR, Pattern, Pulse width, TV, Logic, and external. It is easy to jump between enhanced and simple edge triggering.



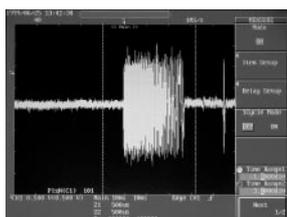
DL7100

● High-speed scroll mode



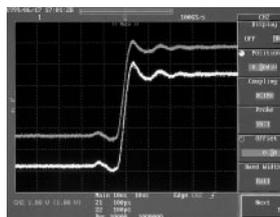
At slower sweep speeds, the signal will scroll across the screen similar to a chart recorder. The DL7100 is capable of high-speed scrolling at time base settings up to 50 msec/div (2 MS/s sampling.) With envelope mode selected, high speed sampling is used to peak detect fast transients even at slow time base settings.

● Pulse count



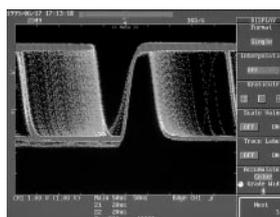
Count the number of pulses in a waveform between cursors. This is useful for counting the pulses of a stepping motor, the rack error signals on an optical disk, or interrupt signals due to software debugging.

● Snapshot



Save the current waveform on the screen as if you took a picture with a camera. This Snapshot waveform will remain on the screen until CLEAR is pressed. Snapshot is useful for comparing the saved and active waveforms. Snapshot waveforms can be saved to storage media.

● Color accumulate and persistence



In addition to a persistence display which accumulates data in monochrome, the DL7100 has a color accumulate mode that distinguishes the frequency of events by color. This is useful for jitter evaluation and identifying abnormal signals.

SPECIFICATIONS

Basic Specifications

| | |
|---|---|
| Input channels: | 4 analog (CH1 through CH4) and 16-bit digital (optional) |
| Input coupling settings: | AC, DC, GND, DC50Ω |
| Input impedance: | 1MΩ ± 1.0%, 50Ω ± 1.0% |
| Voltage axis sensitivity setting range: | For 50Ω input: 1 V/div to 10 V/div (steps of 1, 2, or 5) For 1MΩ input: 2 mV/div to 10 V/div (steps of 1, 2, or 5) |
| Frequency characteristic*1: | For 50Ω input 1 V/div to 10 mV/div: DC to 500 MHz 5 mV/div to 2 mV/div: DC to 400 MHz For 1MΩ input (using passive probe model 700988; specified at probe tip) 10 V/div to 10 mV/div: DC to 400 MHz 5 mV/div to 2 mV/div: DC to 300 MHz |
| A/D conversion resolution: | 8 bits (24 LSB/div) |
| Maximum sampling rate: | Real-time sampling mode Interleave mode on: 1 GS/s*2 Interleave mode off: 500 MS/s Equivalent time sampling mode: 100 GS/s |
| Maximum record length: | 701420 Interleave mode on: 8 MW*2 Interleave mode off: 4 MW 701410 Interleave mode on: 2 MW*2 Interleave mode off: 1 MW |
| DC accuracy*1: | ±(1.5% of 8 div + offset voltage accuracy) |
| Sweep time: | 1 ns/div to 50 s/div (for record length of 10 kW or greater) 1 ns/div to 5 s/div (for record length of 1kW) |
| Time axis accuracy*1: | ±(0.005% + 50 ps + 1 sampling period) |
| External clock input: | Input frequency range: 40 Hz to 20 MHz (EXT CLOCK IN) (continuous clock signal only) |

*1: Measurements are obtained following calibration with the internal clock as the time base after the warmup period under the reference operating conditions (see below).
Reference operating conditions Ambient temperature: 23 ± 2°C
Ambient humidity: 55 ± 10% RH
Supply voltage/frequency tolerance: Within 1% of rating

*2: When interleave mode is on, the number of available channels is half (2 ch) the installed number of channels.

Trigger

| | |
|------------------|---|
| Trigger modes: | Auto, Auto Level, Normal, Single, Single (N) |
| Trigger sources: | CH1 through CH4 (signals input to individual input terminals) LINE (connected utility power signal) EXT (signal input from EXT TRIG IN terminal) |
| Trigger types: | Edge, A → B(n), A delay B, OR, pattern, pulse width, TV, Logic, external trigger |

Display

| | |
|------------------------|---|
| Screen updating speed: | Maximum 60 times per second (for 10 kW all-points display) Maximum 30 times per second (for 1 MW all-points display) |
| Display: | 8.4-inch color TFT liquid crystal display |

Functions

● Vertical/Horizontal axis setting function

| | |
|----------------|--|
| Input filters: | 100 MHz or 20 MHz band limits can be set independently for CH1 through CH4. |
| Roll mode: | Scroll mode display on the time axes shown below when trigger mode is Auto, Auto Level, or Single. For record length of 1 MW or less: 50 ms/div to 50 s/div (or 50 ms to 5 s/div for 1 kW) For record length of 2 MW: 100 ms/div to 50 s/div For record length of 4 MW: 200 ms/div to 50 s/div For record length of 8 MW: 500 ms/div to 50 s/div |

● Waveform acquisition/display functions

| | |
|--------------------|--|
| Acquisition modes: | Normal, Averaging, Envelope, Box Average |
| Zoom: | Zoom in on displayed waveforms along the time axis (one or two zoom windows with separate enlargement ratios). |
| X-Y display: | Two X-Y waveform displays (XY1 and XY2) |

● Analysis functions

| | |
|----------------------|--------------------------------------|
| Search: | Edge, serial pattern, history |
| Cursor measurements: | Marker, Horizontal, Vertical, Degree |

DIGITAL OSCILLOSCOPES & DIGITAL SCOPES



DL7100

Automatic measurement of waveform parameters:

P-P, Max, Min, High, Low, Avg., Rms, +OShot, -OShot, Sdev, Rise, Fall, Freq, Period, Duty, +Width, -Width, Int1TY, Int2TY, Int1XY, Int2XY, Pulse, Burst1, Burst2, AvgFreq, AvgPeriod

The following statistical processes can also be performed.

Covered parameters: Those listed above.

Statistic types: Min, Max, Avg, Cnt, Sdv

Mathematical functions:

Addition, subtraction, multiplication, binary conversion, differentiation, integration, power spectrum, invert

GO/NO-GO judgement:

Decided based on automatically measured waveform parameters

● Screen data output

Built-in printer (optional):

Paper width: 112 mm
Outputs hard copies of screens data.

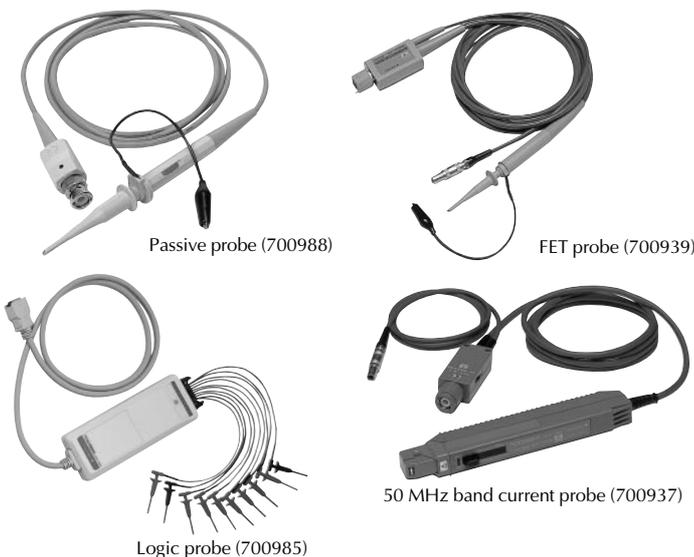
External printers:

Output to external printers through the Centronics port.
Supported printer commands: ESC/P, ESC/P2, LIPS3, PCL5, BJ

Floppy disk/SCSI output data formats: PostScript, TIFF, BMP

● Accessories (Optional)

| Name | Model | Specifications |
|---------------|--------|---|
| Passive probe | 700988 | 10MΩ (10:1) 400 MHz, 1.5 meters (one per unit) |
| FET probe | 700939 | 900 MHz band |
| Logic probe | 700985 | 8-bit input, toggle frequency: 80 MHz |
| Front cover | 701481 | Transparent type, for DL7100 only |



Rear Panel I/O

Interfaces: SCSI, GP-IB, SERIAL(RS-232), Centronics

Signal I/O: External trigger input/External clock input/
Trigger Gate input,
Trigger output (TRIG OUT),
RGB video signal output (VGA)

Logic input (optional): Measured with 700985 logic probe (8 bits)
Number of inputs: 16 (using two logic probes)

Probe power terminals: Output terminals: 4
Output voltage: ±12 V

● Current Probe

| Name | Model | Specifications |
|---------------|--------|-------------------|
| Current probe | 700937 | DC to 50 MHz band |

● Supplies

| Name | Model | Specifications | Order Q'ty |
|--------------------|---------|-----------------------------|------------|
| Printer roll paper | B9850NX | 30 meters (1 roll per unit) | 5 |

General Specifications

Supply frequency: 50/60 Hz
Maximum power consumption: 250 VA
External dimensions: 373 mm (W) x 210.5 mm (H) x 306 mm (D)
(in side printer cover; does not include knobs and protrusions)
Weight: Approximately 9 kg
(including printer; does not include logic inputs)

AVAILABLE MODELS

| Model | Suffix Code | Description |
|-------------|-------------|--|
| 701410 | | DL7100 Digital Oscilloscope with maximum 2 MW/channel memory |
| 701420 | | DL7100 Digital Oscilloscope with maximum 8 MW/channel memory |
| Power cable | -D | UL/CSA standard |
| | -F | VDE standard |
| | -Q | BS standard |
| | -R | SAA standard |
| Options | /B5 | Built-in printer |
| | /N1 | 701410 logic input (*1) |
| | /N2 | 701420 logic input (*1) |
| | /E2 | Two additional passive probes (*2) |
| | /E3 | Two FET probes (*3) |

*1: Specify /N1 for model 701410; specify /N2 for model 701420. Logic probes are sold separately. Accessory logic probes (700985) must be purchased separately.

*2: The DL7100 main unit comes standard with two passive probes (700988).

*3: The DL7100 main unit has power output terminals (4) for FET probes and current probes (700937).

● Standard Accessories

| Name | Q'ty |
|---|------|
| Power cable | 1 |
| Passive probes (700988) | 2 |
| Power fuses | 2 |
| Printer roll paper (when option /B5 is specified) | 1 |
| User's manual (one set) | 1 |
| Front cover (B9969BY) | 1 |
| Soft carrying case (for probes, etc.) | 1 |

DIMENSIONS

