

DL1540C / DL1540CL

Specifications

Vertical Unit

Number of input channels:	4
Vertical resolution:	8 bits (in normal mode) (25 LSB/div) 9 bits (in smoothing mode) 12 bits (after averaging with a 256 weighting)
Maximum sampling rate:	Normal 200 MS/s (using half of the available channels) 100 MS/s (using all channels) Equivalent time: 20 GS/s
Effective storage frequency (-3dB):	Repeated waveform DC to 150 MHz ⁽¹⁾ Single waveform DC to 80 MHz ⁽²⁾ (using half of the available channels) DC to 40 MHz ⁽²⁾ (using all channels)
Sensitivity:	1 mV/div ⁽³⁾ to 5 V/div
DC accuracy ⁽⁴⁾ :	At 100 mV/div $\pm(1.5\%$ of 8 div + 1 LSB) At 1 mV/div $\pm(5\%$ of 8 div + 1 LSB) Other ranges $\pm(2.5\%$ of 8 div + 1 LSB)
Offset voltage accuracy:	1 m to 50 mV/div $\pm(2.5\%$ of setting + 0.2 mV) 100 m to 500 mV/div $\pm(1\%$ of setting + 2 mV) 1 to 5 V/div $\pm(2.5\%$ of setting + 20 mV) Inter-channel isolation: -40 dB (typical value ⁽⁵⁾ for the same range)
Maximum input voltage:	250 V (DC + AC peak) (max. 1 kHz) (CAT I & II, 177 V rms)
Input impedance:	1 MW $\pm 1.5\%$ (approximately 25 pF)
Input coupling:	AC / DC / GND

Horizontal Unit

Sweep time:	5 ns/div to 50 s/div
Time-axis accuracy:	$\pm(0.01\% + 500 \text{ ps})$ ⁽⁶⁾
Maximum record length (DL1540CL):	2 M words (2 channels at the same time) 1 M word (3 or 4 channels at the same time)
Maximum record length (DL1540C):	120 k words (2 channels at the same time) 56 k words (3 or 4 channels at the same time)
External clock input:	EXT CLOCK IN input 40 Hz to 15 MHz ⁽⁷⁾ CH4 input ⁽¹¹⁾ 40 Hz to 80 MHz ⁽⁷⁾

Trigger

Modes:	AUTO / AT-LVL / NORMAL SGL (S) ⁽⁹⁾ / SGL (L) ⁽⁹⁾ SINGLE ⁽¹⁰⁾ / N-SGL: sequential store
Sources:	CH1 / CH2 / CH3 / CH4 / EXT / LINE
Coupling:	AC / DC / HF Rej
Sensitivity:	1 div p-p (DC to 150 MHz)
Types:	Edge NTSC / PAL / HDTV Window ⁽⁸⁾ OR (optional) Pattern (optional) Pulse width (optional)
External trigger input:	Range $\pm 6 \text{ V}$ Level 1.5V / 0.15 V Frequency band DC to 15 MHz

Screen Refresh Rate

Using one channel:	Maximum 60 Hz
Using all channels:	Maximum 60 Hz

Display

Display:	6.4-inch color TFT LCD with wide viewing angle
Resolution:	640 × 480 (Approximately 0.02% of the total number of pixels in the LCD unit may be defective.)
Waveform resolution:	501 × 401 (601 × 401 in wide display mode)
Display types:	Zoom MAIN / ZOOM / Main Zoom X-Y T-Y / X-Y / T-Y & X-Y
Accumulate display (stack):	PERSIST Stacking in one color. COLOR Stacking in eight colors encoded according to the rate of incidence of various measurements.
Number of display traces:	Maximum 8 traces Four captured waveforms and four enlarged waveforms (in Zoom mode)

Extended Functions

Calculation:	Addition, subtraction, multiplication, FFT (1000-point power spectrum)
GO/NO-GO evaluation:	Zone evaluation: All waveforms can be evaluated at the same time.
Parameter evaluation:	Evaluations can be made based on a combination of four parameters.
Automated measurement of waveform parameters:	As many as 23 parameters can be measured per trace. Parts can be measured simultaneously on all traces, and automated measurements can be displayed on the screen. As many as 24 parameters can be displayed.
Measured parameters:	Peak to Peak (P-P), maximum value (MAX), minimum value (MIN), most frequent high voltage value (HIGH), most frequent low voltage value (LOW), average value (AVG), root mean square (RMS), overshoot (OVERSHOOT), undershoot (UNDERSHOOT), rise time (RISE), fall time (FALL), frequency (FREQ), period (PERIOD), +duty (High duty ratio), +WIDTH (High pulse width), -WIDTH (Low pulse width), INTEG1 TY, INTEG2 TY (area calculated TY), INTEG1 XY, INTEG2 XY (area calculated XY), DELAY (edge rise or fall time difference), burst width (BURST), pulse count (PlsN)
Supported image formats for saving data:	HP-GL, PostScript, TIFF, BMP
Snapshot:	An unlimited number of waveforms can be accumulated on the screen by pressing the snapshot key.

I²C bus analysis function (option for DL1540CL only)

• Applicable bus	
I ² C bus:	Bus transfer rate: Maximum 400 kbps Address mode: 7 bit
SM bus:	Complies with System Management Bus
• Analysis Functions	
Detailed data display mode:	Data transferred time starting at trigger point Data (simultaneous binary and hex notation) Acknowledgement exist/not exist
Waveform & data display mode:	Simultaneous display of data (hex notation) and waveform
Maximum analyzed data size:	1000 bytes before and after a trigger point
• Trigger	
Trigger source:	CH1: SCL CH2: SDA CH3, CH4: Analog signal inputs
Start trigger:	Based on start conditions
Non-ACK trigger:	When there is no acknowledgement
Address trigger:	Comparison with set address
Data trigger:	Comparison with set data (one or two bytes can be set)
Byte count trigger:	Maximum count setting is 8191
Combination trigger:	Address, Data and Byte Count trigger types combined
Mixed pattern trigger:	Trigger consisting of parallel pattern of CH3/CH4 analog signals and I ² C bus analysis trigger types can be set

External Interfaces

- GP-IB interface

Electrical and mechanical specifications:

Conforming to IEEE std. 488-1978

Protocol: Conforming to IEEE std. 488.2-1987

- RS-232-C interface (available through RS-232-C interface unit)

Baud rates: 75 / 150 / 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200

- Centronics interface

Supported print commands:

BJ, ESC-P, ESC-P2, LIPS3, PR201, PCL5
(available through GPIB/Centronics adapter)

SCSI Interface (DL1540CL, when option /C8 is selected)

Standard: SCSI, ANSI X3. 131-1986

Connector Type: Half-pitch 50-pin

Connector pin assignment: Unbalanced (single-end)

(or available through special SCSI interface unit)

Signal I/O

- TRIG OUT: TTL level

- GO/NO-GO evaluation: TTL level (through option box connector)

- VGA video signal output (optional)

Connector type: D-Sub 15-pin (VGA VIDEO OUT)

Output format: VGA compatible

3.5-inch FDD

Usable disk types: 640 kB / 720 kB / 1.2 MB / 1.44 MB

Format: MS-DOS*

Internal Hard Disk Drive (option for DL1540CL only)

Number of Drive: 1

Size: 3.5 inches

Capacity: 2.1 GB

Windows compatibility: The internal Hard Disk Drive can be connected to a PC running Windows95, Windows98 or WindowsNT via the SCSI interface.

SCSI ID: 4 (fixed)

Built-in printer (optional)

Printer type: Thermal head

Dot density: 6 dots per mm

Paper width: 112 mm

Real-time printing: Maximum chart speed is 16.7 mm per second.
(Works with time-axis ranges slower than 500 ms/div.)

General Specifications

Operating temperature range: 5 to 40°C

Operating humidity range: 20 to 85% RH (without printer)

35 to 85% RH (with printer)

Source voltage: 100 to 120 V AC / 220 to 240 V AC (switches automatically)

Source frequency: 50 / 60 Hz

Power consumption: 280 VA max

External dimensions: 216 mm (W) × 268 mm (H) × 278 mm (D)
(excluding protrusions)

Weight: Approximately 4.9 kg (DL1540C)

Approximately 5.2 kg (DL1540CL)

*1: In range of 5 V/div to 10 mV/div. DC to 80 MHz at 5 mV/div; DC to 20 MHz at 2 mV/div or 1 mV/div.

*2: In range of 5 V/div to 5 mV/div. DC to 20 MHz at 2 mV/div or 1 mV/div.

*3: 1 mV/div can be obtained by 2 mV/div zooming.

*4: At reference temperature (23 ±2°C, 55 ±10% RH)
30 minutes after warmup, following calibration.

*5: A typical value is a common or average value; there is no guarantee of a precise value.

*6: At reference temperature (23 ±2°C, 55 ±10% RH)
30 minutes after warmup.

*7: Continuous clock signal only.

*8: Only works with CH1.

*9: DL1540C

*10: DL1540CL

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