IWATSU

Digital Oscilloscopes

DS-5500 Series

8 models 100MHz ～ 500MHz

NEW!

ViewGo II

Transfer rate x100

High-Speed Waveform Data Transfer

[Approx. 100 times faster (compared with former IWATSU models)]

Touch Screen Operations

Japan Quality

ViewGo II

Provides Ultimate Performance.

The observation of signal waveforms is the most important function of oscilloscopes. ViewGo makes the best use of its first class design based on our long term experience in analog oscilloscope engineering.

DS-5500 Series **5 Major Functions**

1: **High-Speed** Waveform Data Transfer

Approx. 100 times faster waveform transfer speed (compared with former IWATSU models).
The high-speed transfer creates a shorter tact time and contributes to production efficiency.

2: The first of its class to feature **touch screen operations**

7.5-inch LCD with touch screen operations. Intuitive operations with a screen menu.
Glass touch screen for high environmental toughness.

3: **Individual operation keys and knobs** for each channel

Features individual operation keys and knobs for simple and comfortable operations.

4: 1M points/channel **long memory**

The 1M points/channel long memory allows long-term high-quality waveform capturing at a higher sampling rate.

5: Versatile **trigger functions**

Versatile trigger functions offer the best suited trigger for each type of signal.

[Edge ALT] Trigger	allows alternate rising edge and falling edge triggering.
[Edge OR] Trigger	allows edge triggering of signals for multiple channels.
[Pattern] Trigger	allows triggering using complex patterns of logical signals.
[Dropout] Trigger	allows triggering on signal dropouts, etc.

1: **High-Speed** Waveform Data Transfer

Waveform data transfer processing has been optimized in the ViewGo II, achieving a waveform transfer speed approx. 100 times*1 faster than the previous models.
This shortens the tact time and improves production efficiency during the remote collection of test data.

*1: Comparison result based on measurement of time required for PC to acquire 100k points of data for four channels via LAN with the oscilloscope set to waveform display OFF mode and using single mode triggering. This value is for reference only.
The actual transfer speed depends on the specifications of the PC used.
Waveform display is not updated during high-speed waveform data transfer.
Value of approx. 100 times (compared with IWATSU former models) is performed during continuous capturing without changing the setting conditions.
Performance of waveform data transfer is improved not only at the LAN connection, but also when connected with USB or GPIB.

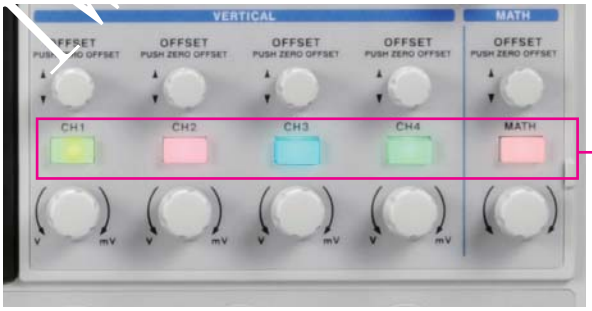
2: Touch Screen Operations

The ViewGo II features a 7.5-inch LCD display with touch screen for intuitive operations.
This touch screen, which replaces the menu function keys, allows easy operations by directly touching the functions to be changed.

Touch screen operation area

1. Function menu operations
   (Settings can be changed by touching the menu.)
2. CH and MATH menu display
   (The CH or MATH function menu can be displayed by touching the corresponding display area.)

3: Individual Operation Keys and Knobs



Streamlined one-step operations have been realized through the use of individual CH/MATH keys and knobs.

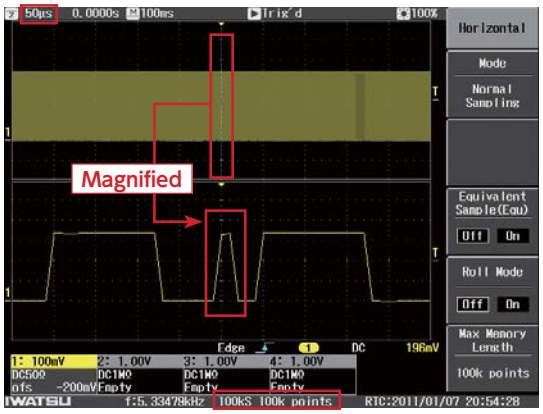
Easy ON/OFF switching of trace display with the keys.

4: **Long memory** of 1M points/channel

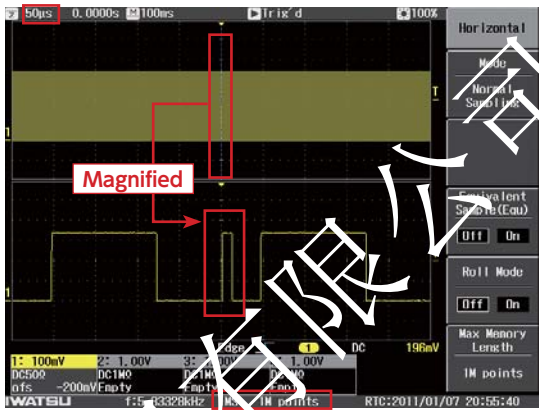
ViewGo II comes with 1M point memory per channel, allowing waveform capture while maintaining higher sampling speed. At the same sampling speed, the waveform capture time has doubled, from 500k points to 1M points.

Original waveform 100ms/div

Zoomed-in waveform 50µs/div



Short memory:
Memory length = 100k points
Sampling speed = 100kS/s
(only some of the waveform characteristics can be acquired)



Long memory:
Memory length = 1M points,
sampling speed = 1MS/s
(Pulse waveform characteristics can be fully acquired)

Long memory features

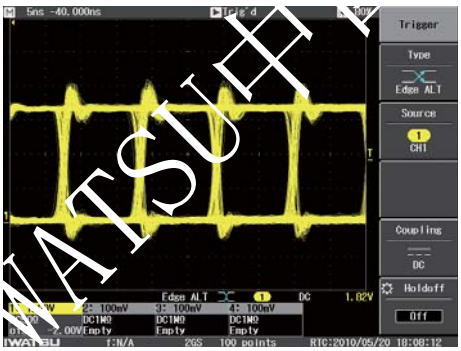
1. Same waveform capture time:
   Sampling can be done at a higher speed, allowing excellent waveform reproduction through subsequent magnification of part of the waveform along the time axis through zoom-in, etc.
2. Same sampling speed:
   The waveform capture time (time range [s/div]x10 div) can be extended.

5: Versatile **trigger functions**

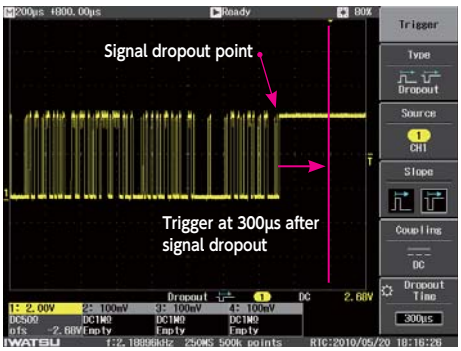
[Alternate Edge, Edge OR, Dropout, and Pattern trigger functions provided as standard]

ViewGo II offers a powerful trigger functions that allow waveform triggering under optimum conditions even for complex logical signals.

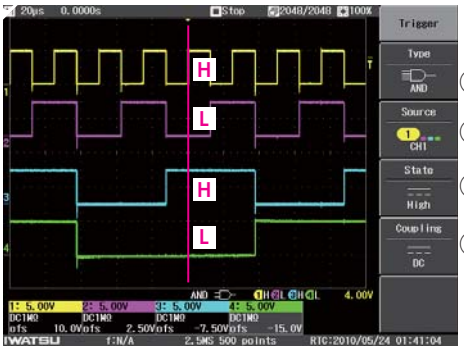
Advanced settings for the pattern trigger function are easy to make on the touch screen.



Alternate edge trigger (Example: SDRAM dataline eye patterns)



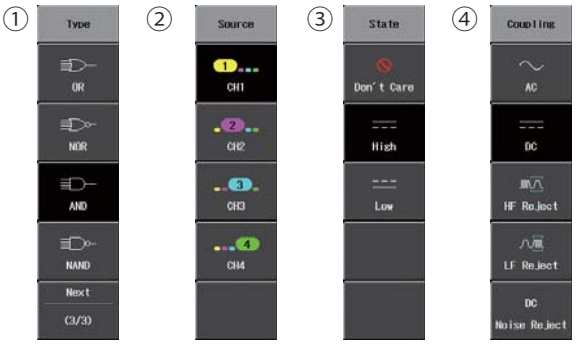
Dropout trigger (Example: Detection at the end of serial data frame)



Pattern trigger (Example: Logic output signal from counter)

① ② ③ ④

Trigger threshold level can be set independently for each channel.



Pattern trigger setting items

Analog Persistence Display Function

This function displays the waveform leaving the path of the trace for each sweep. This allows easy observation of the frequency information of signals like an analog oscilloscope. This display function is ideally suited for measuring amplitude such as jitter whose timing and amplitude varies along with time.

1. Persistence time (off, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, ∞)
2. Color display (monochrome/spectrum)

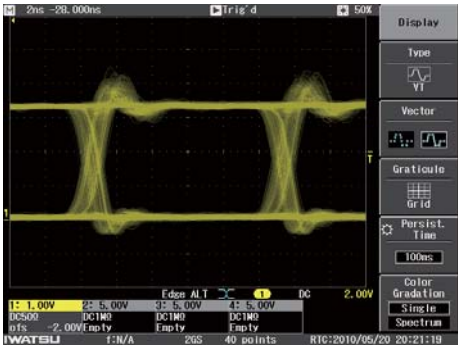
Applications

- Observation of jitter of digital signals (allowing observation of the signal edge at which the signal state changes)
- Observation of less repetitive signals (setting persistence time to ∞)
- RF signal observation such as light pickup (observed with repetitive frequency information of the waveform)

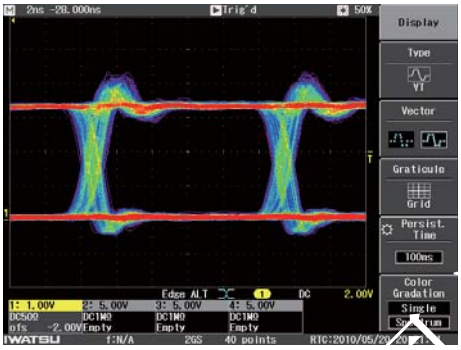
Waveform Observation of Memory Data Line

To visually observe fast changes
Set persistence time to 100ms

Monochrome display



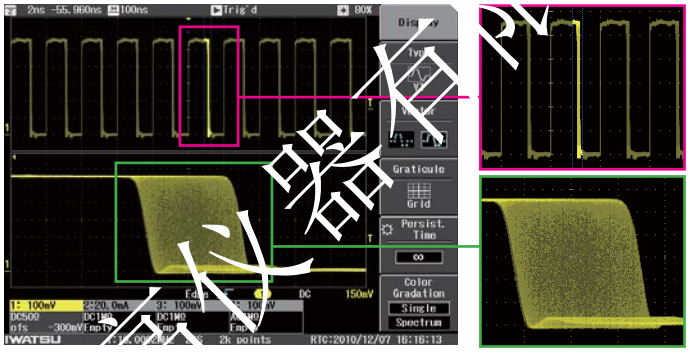
Spectrum display



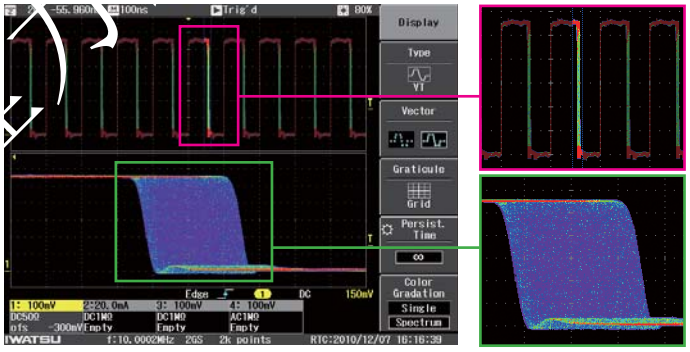
Jitter Observation of Pulse Width

To visually observe min/max range of pulse width changes
Set persistence time to ∞

Monochrome display



Spectrum display



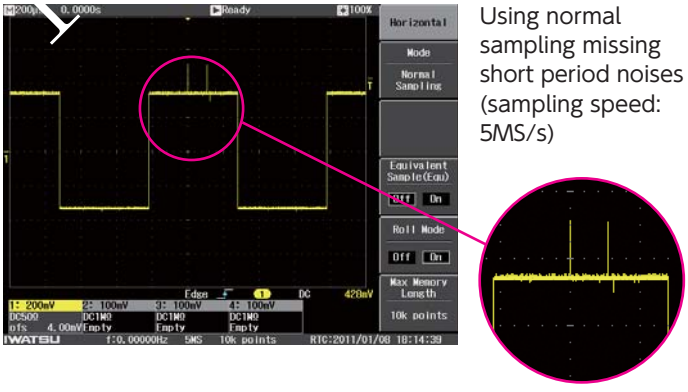
Frequency information can be observed with the spectrum display: Red: High frequency/Purple: Low frequency

Peak Detection Function

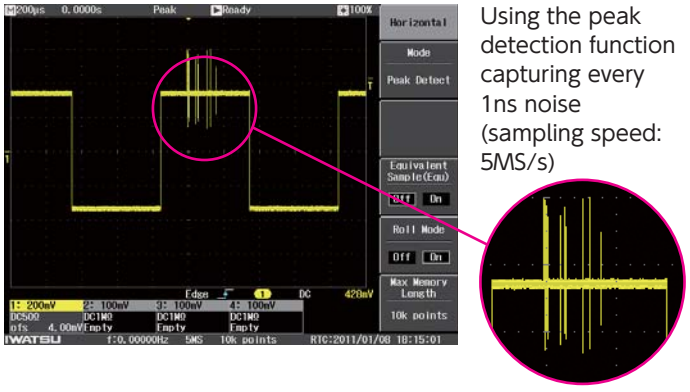
The peak detection function is for constantly displaying the min/max range of a signal at 1ns resolution. This function allows rigid measurement of signals that slowly change over a long time interval, even when 1ns pulse width noise is combined with the signal. The following example shows the comparison in waveform observation that can be achieved by using this function.

Applications

- Observation of noise riding on motor rotation signals
- Observation of noise of switching power supply



Using normal sampling missing short period noises (sampling speed: 5MS/s)



Using the peak detection function capturing every 1ns noise (sampling speed: 5MS/s)

Automatic Waveform Parameter Measurement Functions

These functions measure the various waveform parameters, such as signal frequency, amplitude, and timing, and output them as numerical values. Automatic measurement is possible by using the function in conjunction with the cursor function and specifying the range of the measuring period. Furthermore, the maximum and minimum values of the measurement results can be obtained. Up to four waveform parameters can be displayed simultaneously.

Applications

- Signals whose frequency and/or amplitude varies with time, which are difficult to measure with the cursor function

Name	Display Name	Icon	Measurement Condition (within the measurement section)
Maximum value	Maximum		Maximum value within the measurement section
Minimum value	Minimum		Minimum value within the measurement section
Peak-to-peak value	Peak-to-peak		Difference between maximum value and minimum value within the measurement section
Root mean square (RMS) value	RMS		RMS value within the measurement section
Cycle root mean square (RMS) value	Cycle RMS		RMS value in duty cycle within the measurement section
Mean value	Mean		Mean value within the measurement section
Cycle mean value	Cycle Mean		Mean value in duty cycle within the measurement section
Top value	Top		Top value of amplitude probability density distribution within the measurement section
Base value	Base		Base value of amplitude probability density distribution within the measurement section
Top-base value	Top-Base		Difference between the base and top within the measurement section
+ Overshoot value	+ Over shoot		Value of the overshoot at the first rise within the measurement section
- Overshoot value	- Overshoot		Value of the overshoot at the first fall within the measurement section

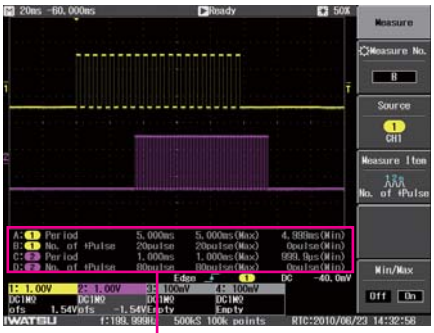
Name	Display Name	Icon	Measurement Condition (within the measurement section)
Rise time 20-80%	Tr 20-80%		Transition time of rise from 20% to 80% of the top-base of the waveform
Fall time 20-80%	Tf 20-80%		Transition time of fall from 80% to 20% of the top-base of the waveform
Rise time 10-90%	Tr 10-90%		Transition time of rise from 10% to 90% of the top-base of the waveform
Fall time 10-90%	Tf 10-90%		Transition time of fall from 90% to 10% of the top-base of the waveform
Frequency	Frequency		Frequency from the first rise until the last rise
Period	Period		Time from the first rise until the last rise
Number of positive pulses	No.of+Pulse		Number of pulses, using the first rise to the first fall as the unit
Number of negative pulses	No.of-Pulse		Number of pulses, using the first fall to the first rise as the unit
Positive pulse width	+Pulse Width		Time from the first rise to the first fall
Negative pulse width	-Pulse Width		Time from the first fall to the first rise
Duty cycle	Duty cycle		+ cycle ratio in relation to 1 cycle

Name	Display Name	Icon	Measurement Condition (within the measurement section)
Integral	Integral		Integral of the waveform relative to GND
Skew	Skew		Time difference between two waveform edges
Skew@Level	Skew@Level		Time difference between two waveform edges using absolute voltage at the measurement point

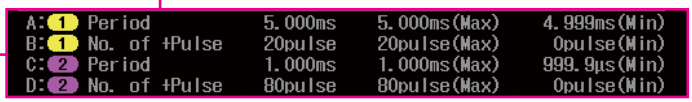
Measurement of Cycle RMS of the Burst Waveform (1Vrms)

This function is useful because it allows automatic measurement of burst waveforms in cycles instead of RMS within the measurement section.

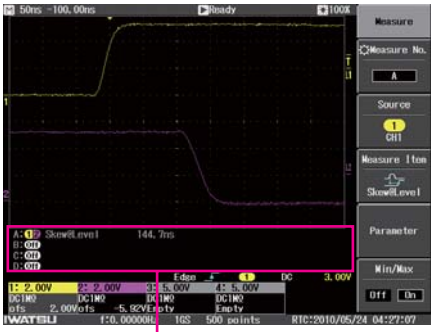
Measurement of the Number of Positive Pulses of the Pulse Train



This function can be applied for counting the number of drive pulses of a stepping motor, etc.
Using the cursor function, measurement can be performed within the measurement section.



Measurement of Skew (Time Difference) Between Two Signals



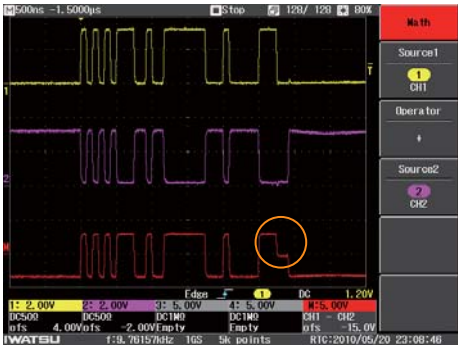
This is an example of measuring the propagation delay of logic devices.
Rising edge/falling edge and level can be freely specified.

Waveform Calculation Functions

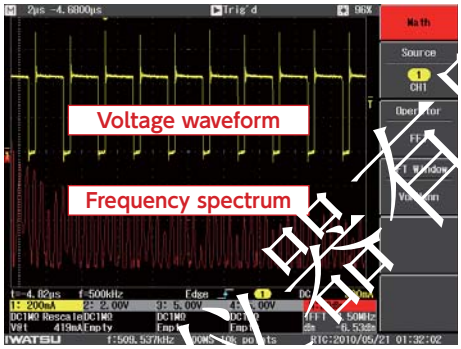
These functions allow addition, subtraction, and multiplication of two waveforms, as well as frequency analysis (FFT) of signal waveforms.
The calculated waveforms can be saved as data file. These calculation results can be used as a source for automatic waveform parameter measurement.

Applications

- **Addition, subtraction**
  Evaluation of the differential signal of serial interfaces
- **Multiplication**
  Evaluation of power waveforms from the multiplied voltage waveform by current waveform (calculation of electric energy using waveform parameters)
- **FFT**
  Frequency domain analysis of noise, vibration, etc.



Measurement of differential serial data signals (CH1: D+, CH2: D- measurement and calculation of difference)



Frequency spectrum of voltage waveforms (Measurement and FFT operations of switching voltage waveforms)

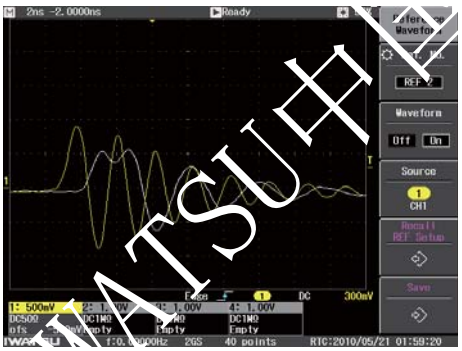
FFT operations support up to 8k points, allowing complete analysis of the captured waveforms.

Reference (Waveform/Setting) Function

Reference waveforms can be displayed on the screen for the comparative evaluation of newly acquired waveforms.
Up to five reference waveforms can be saved.
The measured waveforms and panel settings can be saved at the same time. As a result, waveforms saved in the past as well as the panel settings can be easily recalled, reproducing previous measurement conditions smoothly.

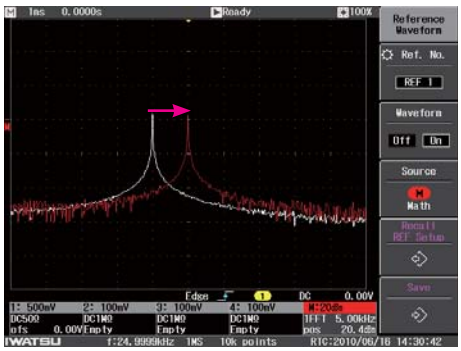
Applications

- Comparative measurement of transient waveforms (step response of devices)
- Comparative measurement of the frequency spectrum
- Multiple measurement of pre-defined measurement conditions (Waveforms and settings can easily be saved to and individually recalled from internal memories REF1 through REF5)



Comparative measurement of transient waveform

White: Reference waveform
Yellow: CH1 measured waveform



Comparative measurement of frequency spectrum

White: Reference spectrum
Red: FFT analysis frequency spectrum

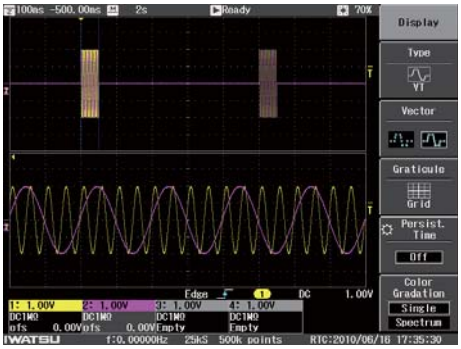
XY Trigger Display Function

In addition to normal XY display, XY triggered display that traces the XY waveform each time a trigger is detected is also supported.
Even signals that occur intermittently over a long time can be displayed.

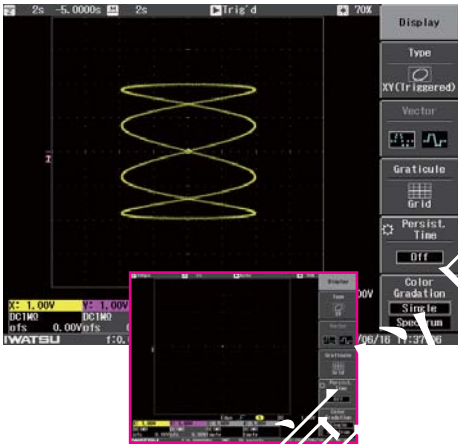
Applications

- Measurement of phase shifts of two signals included on burst signals
- Measurement of rotary encoder output (rotation angle versusoutput)

Burst signals every 10 s
(Frequency ratio of two signals = 4:1)



Waveform using XY triggered display function



Signal changes are unable to be observed with the normal X-Y display

Rescale Function

This function allows unit conversion for direct reading of the output voltage signal measured with the following devices.

- Current probe
- Shunt resistor
- Sensors of various types

Unit conversion formula

$$a\,x + b$$

Multiplication factor: Offset

x = measured voltage value

Current conversion example

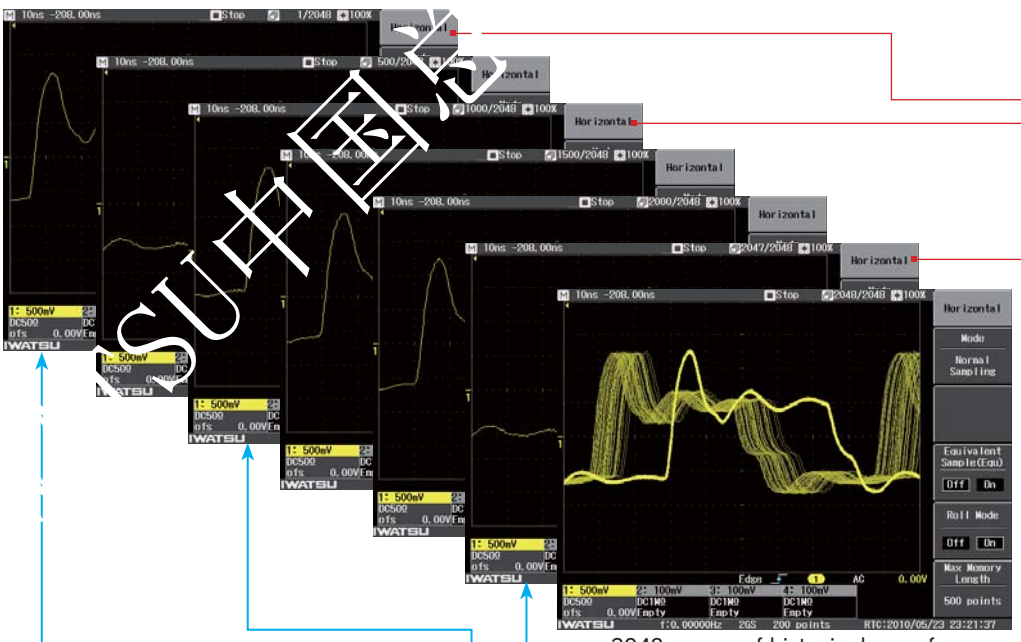
The unit can be chosen (V, A, W, ˚C, no unit)

Replay Function

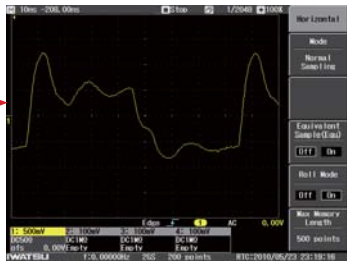
Up to 2,048 pages of previously captured waveforms are automatically saved by selected memory length per page up to 1M points. Since the saved historical waveforms can be replayed later, this function is very useful, for example, for verifying abnormal waveforms. Waveforms that have been saved in the past are overwritten reciprocally from the oldest one with newly captured waveforms.

Applications

- Verification of abnormal signals from repetitive signals



2048 pages of historical waveforms



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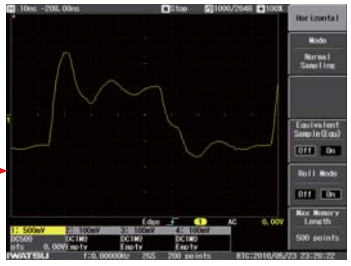

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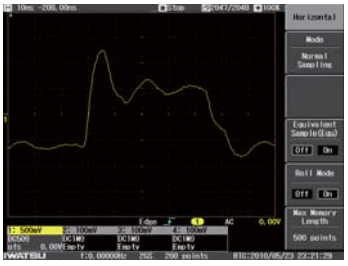

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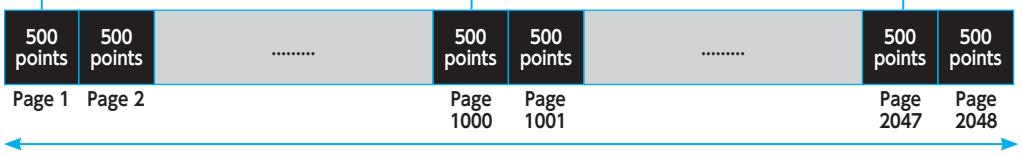


As long as the waveform memory length is used shorter than 1M points during capture, entire historical waveforms can be replayed.

Scope Viewer [freeware: Can be downloaded from the Iwatsu website]

This freeware allows you to easily acquire data from ViewGo II and perform simple remote control via the USB or LAN interface.

Toolbar
Allows quick execution of the major functions

Waveform display area
Displays the waveforms of each channel and the setup information. Cursor operations are also possible using a computer mouse.

Scope Viewer display screen

Left panel
Displays the information of the functions of the selected window in tree form.

Operation panel
This panel allows operations of the oscilloscope settings.

Cursor measurement result
The results of measurements with the X-axis and Y-axis cursors for of all the channels can be displayed.

Probes and Accessories

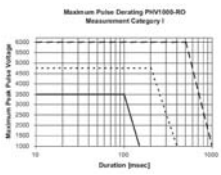
Passive Probes

SS-0130R
Frequency band...DC: 200MHz, Input RC...10MΩ//12.5pF
Attenuation factor...10:1, Length...1.5m

SS-101R
Frequency band...DC: 500MHz, Input RC...10MΩ//12pF
Attenuation factor...10:1, Length...1.2m

High-Voltage Probes

PHV 1000-P0
Attenuation factor...100:1,
Input RC...50MΩ 75pF
Frequency band...400MHz*1
Variable capacitance range...10 to 50pF,
Length...2m



HV-P30
30kV or DC+ACpeak, single pulse 40kV

HV-P60
DC 60kV or ACpeak, single pulse 80kV


HV-P60+SK-301

* Please select high-voltage probes according to the required derating characteristics.

*1: Single probe

SV-301
Probe stand for HV-P30/HV-P60

Active Probes

SFP-5A
Active probe unit, frequency bandwidth...DC to 1GHz*1
Input capacitance...1.9pF, Input resistance...Approx. 1MΩ,
Attenuation factor..10:1

SFP-4A
Active probe unit, frequency bandwidth...DC to 800MHz*1
Input capacitance...2.15pF, Input resistance...Approx. 1MΩ,
Attenuation factor..10:1

PS-25
Probe power supply for AC100V only, Power supply for SFP-5A/4A

Current Probes

SS-250
DC to 100MHz*1 (30Arms max.)

SS-240A
DC to 50MHz*1 (30Arms max)

SS-260
DC to 10MHz*1 (150Arms max.)

SS-270
DC to 2MHz*1 (500Arms max.)

PS-26
Power supply for current probe


SS-240A+PS-26

Smooth and comfortable operations and **compact in size**

Front view

Touch screen area

AUTO SETUP button

Touch screen display
7.5-inch color LCD with touch screen functions.
Allows intuitive operations.
* Operations in touch screen area.

Trace intensity/Replay (historical waveform recalling) function knob
This knob allows you to replay waveforms captured in the past.
This switch adjusts trace intensity as well. The mode is toggled by a single push on the knob.

* Photo: DS-5554 4-channel model

Horizontal axis ZOOM keys/knobs
In addition to zooming of the time axis (frequency axis) of each channel input and MATH (waveform data computation), the waveform can be expanded on a different grid with the ZOOM key.

CH/MATH vertical axis manipulation keys/knobs
The manipulation keys/knobs for each channel input and MATH (waveform data computation) are independent, enabling smooth operations. Moreover, the lighted trace buttons clearly indicate the display on/off status.

Calibration signal
This signal can be used to adjust the phase of the probe. A 1kHz, 3Vp-p square waveform can be generated.

POWER switch
Short time startup allowing immediate measurement in just a few seconds.

USB 2.0 Hi-Speed port
Hard copies, waveform data, and panel setup information can be saved to a USB memory. High-speed support enables mass capacity waveform data.

Channel input, trigger input
Auto sensing of probe attenuation factor to avoid conversion error due to probe replacement (this function is available when using probes with readout pins.) Dedicated external trigger input also provided.

Rear view

GP-IB interface (factory option)
IEEE 488 support with DS-576 (factory option)

Port for future expansion

Standard interfaces (USB, LAN)
Remote control is available when connected to a PC. ViewGo prints out screen shots directly by connecting a PictBridge® compatible printer via the USB port. Even the paper size can be selected.

AUX I/O (factory option)
CH-out and trigger-out support.
- CH1/CH2 output (DS-577)
- CH1/TRIG output (DS-578)

Standard Accessories
- Probe (1 per channel)*, • Power cord (1),
- Front panel cover (1),
- Operation Manual (CD-ROM) (1),
- User's Guide (1)

* For the standard probe type, see Specifications.

Options (Factory Options)
DS-576: GP-IB interface
DS-577: AUX I/O option (CH1/CH2 output)
DS-578: AUX I/O option (CH1/TRIG output)

DS-5500 Carrying Bag

DS-5500 Series **Specifications**

		DS-5514	DS-5512	DS-5524	DS-5522	DS-5534	DS-5532	DS-5554	DS-5552
Frequency bandwidth(-3dB)		100MHz		200MHz		350MHz		500MHz	
Rise time(Typical)		3.5ns		1.75ns		1ns		750ps	
Input Channel		4	2	4	2	4	2	4	2
Maximum Sampling Speed		1GS/s		1GS/s (all CHs) / 2GS/s (Channel combined)					
Equivalent Sampling Rate		100GS/s							
Peak detect resolution		1ns							
Averaging		2 to 256 times							
Maximum Memory Length		1Mpts/ch (for all CHs)							
Vertical Resolution		8-bit							
Vertical System	Range	2mV/div - 10V/div (1Mohm)				2mV/div - 10V/div (1Mohm) ,2mV/div - 2V/div (50ohm)			
	Offset	2mV/div - 50mV/div : +/-1V,50.2mV/div - 500mV/div : +/-10V,502mV/div - 10V/div : +/-100V							
	DC accuracy	+/ (- 1.5% + 0.5% of Full Scale)							
Maximum Input Voltage		+/-400Vpeak CAT I (1Mohm)				+/-400Vpeak CAT (I 1Mohm) , 5Vrms (50ohm)			
BW Limit		20MHz				20MHz,100MHz			
Input coupling		GND, DC 1Mohm, AC 1Mohm				GND, DC 1Mohm, AC 1Mohm, DC 50oh			
Input Impedance		1Mohm +/-1.5% // 20pF				1Mohm +/-1.5% // 16pF,50ohm +/-1.5%			
Probe sense		Automatic 1:1, 10:1, 100:1, 1000:1, Manual 1:1, 5:1, 10:1, 20:1, 50:1, 100:1, 200:1, 500:1, 1000:1, 2000:1							
Probe (One per channel)		SS-0130R				SS-101R			
Timebase		5ns/div - 50s/div		2ns/div - 50s/div		1ns/div - 50s/div		500ps/div - 50s/div	
Roll mode		50ms/div - 50s/div (100kS/s, max.)							
Timebase (Clock) accuracy		10ppm							
Trigger Function		Edge, Edge ALT, Edge OR, Pulse Count, Pulse Width, Period, Dropout, TV, Pattern (OR, NOR, AND, NAND)							
Trigger System	TV mode	NTSC, PAL, Custom							
	Line number /Field sequence	upto 3,000 / 1, 2, 4 & 8 fields							
	Pulse Count Trigger	1 to 9,999events							
	Pulse Width Trigger	15ns to 50s							
	Period Trigger	40ns to 50s							
	Dropout Trigger	50ns to 50s							
	Pattern Trigger	OR, NOR, AND, NAND							
	Trigger source / Status	Input CHs / High , Low , Don't-care							
	Trigger threshhold level setting	Individually available for each CH							
Trigger Source		Input CHs, Line, EXT(+/-0.5V), EXT10(+/-5.0V)							
Trigger Coupling		AC, DC, HF Rej, LF Rej, Noise Rej							
Display size/ resolution		7.5inch color TFT LCD with Toucn screen / VGA(640*480pixels)							
Display mode		Y-T, X-Y, XY (Triggered)							
Vector Display Method		Interpolation on sample points or Dots							
Analog persistence mode		Monochrome grayscale or Color Spectrum							
Persistence time setting		100ms, 200ms, 500ms, 1s, 2s, 5s, 10s & Infinite							
Reference waveform memory		5waveforms							
Panel setting memory		5settings for Internal memory or USB memory							
Parameter measurement		Maximum, Minimum, Peak-Peak, RMS, Cycle RMS, Mean, Cycle Mean, Top, Base, Top-Base, +Overshoot, -Overshoot, Tr 20-80%, Tf 80-20%, Tr 10-90%, Tf 90-10%, Freq., Period, +Pulse Count, -Pulse Count, +Pulse Width, -Pulse Width, Duty Cycle, Integral, Skew (+, -), Skew at level							
Cursor		Time, Amplitude, Time and Amplitude, Value at cursor							
Zoom		Zoom key enable display at individual grid area							
Calculation		Addition, Subtraction, Multiplication, FFT(8k points maximum, RECTANGULAR, HANNING, FLATTOP)							
Rescaling / Unit conversion		a*x+b(x: input voltage at User defined a and b) / Volt, Ampere, Watt, degree and unit-less							
Replay		Automatic waveform recording upto 2,048waveforms, History Replayable							
Counter		6-digit							
Interfaces		USB 2.0(Host&Device), 10/100-BaseTX LAN, IEEE488.2 GPIB (Factory option: DS-576)							
Multi Language Help		Japanese, English, Simplified Chinese							
AUX Interface		AUX connector for External options							
EXT Output(option)		CH1&CH2 output: DS-577, CH1&TRIG output: DS-578							
Waveform Data Storage		USB memory for Binary, ASCII, Mathcad, Calculation(ASCII) & Calculation(Mathcad)							
Hardcopy Output		Output to USB memory in TIFF, BMP & PNG format or Output to PictBridge Printers							
AC input voltage / frequency, Power consumption		90 to 264V AC at 50Hz/60Hz, 90 to 132V AC at 50Hz/60Hz/400Hz, 95VA (60W) max.							
Dimensions / Weight		330(W)*190(H)*124(L) mm / 3.7kg							
Performance guaranteed Temperature range		+10˚C to +35˚C							
Operating temperature and humidity / Altitude conditions		0deg. to +40˚C at 5 to 80%(RH<=30˚C) and 55%RH or less at 40˚C non-condensation / 2,000meter or lower							
Storage temperature		-20˚C to +60˚C							

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