

GPS-800X / 1000X series

Technical Datasheet

Handheld digital oscilloscopes with a built-in multimeter and recorder, 100 and 200 MHz, 2 channels

GPS-810X · GPS-820X · GPS-1102X · GPS-1202X

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The GPS-800X and GPS-1000X series are two-channel handheld digital storage oscilloscopes in 100 and 200 MHz bandwidths, each with a 6000-count true RMS multimeter and a recorder built in. They sample at up to 1 GSa/s into a record of up to 12 Mpts, capture up to 400,000 waveforms a second in sequence mode, and run for up to 5.5 hours on the internal 6900 mAh battery.

The GPS-1000X models isolate the two oscilloscope channels, the multimeter, the power adapter and the USB port from one another, and are rated CAT III 600 Vrms, CAT II 1000 Vrms from input to earth, for floating measurements in the field and on the bench.

Five serial buses are triggered on and decoded as standard, the FFT runs on up to 1 M points, and the housing is sealed to IP51. This technical datasheet gives the complete specification; the standard datasheet summarises it.

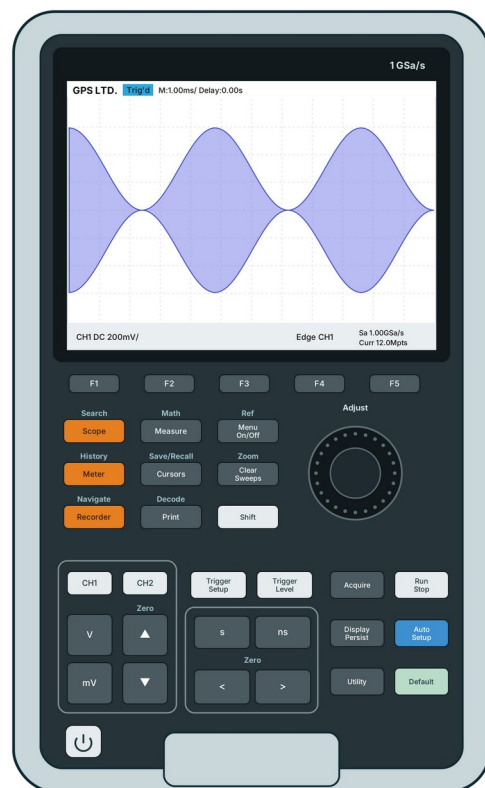


Figure 1 The front panel, schematic

200 MHz

MAXIMUM BANDWIDTH

1 GSa/s

MAXIMUM SAMPLE RATE

12 Mpts

MAXIMUM RECORD LENGTH

6000

COUNT MULTIMETER

1 Models

	GPS-810X	GPS-820X	GPS-1102X	GPS-1202X
Bandwidth (–3 dB)	100 MHz	200 MHz	100 MHz	200 MHz
Rise time, typical	3.5 ns	1.7 ns	3.5 ns	2.0 ns
Analogue channels	2	2	2	2
Multimeter channel	1, isolated	1, isolated	1, isolated	1, isolated
Isolation	Multimeter	Multimeter	Full	Full
Vertical resolution	8-bit	8-bit	8-bit	8-bit
Vertical scale, probe 1X	2 mV to 100 V/div	2 mV to 100 V/div	5 mV to 100 V/div	5 mV to 100 V/div
Sample rate, one channel on	1 GSa/s	1 GSa/s	1 GSa/s	1 GSa/s
Sample rate, two channels on	500 MSa/s	500 MSa/s	500 MSa/s	500 MSa/s
Memory, one channel on	12 Mpts	12 Mpts	12 Mpts	12 Mpts
Memory per channel, two on	6 Mpts	6 Mpts	6 Mpts	6 Mpts
Scope input, signal to earth	CAT II 300 Vrms	CAT II 300 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms
Multimeter input	CAT III 300 Vrms, CAT II 600 Vrms	CAT III 300 Vrms, CAT II 600 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms
Battery operating time	5.5 hours	5.5 hours	4 hours	4 hours
Part number	180810	180820	180860	180890

Isolation: on the GPS-800X models the multimeter is isolated from the oscilloscope; the GPS-1000X models isolate both oscilloscope channels, the multimeter, the power adapter and the USB port from one another. Section 4 gives the input ratings in full.

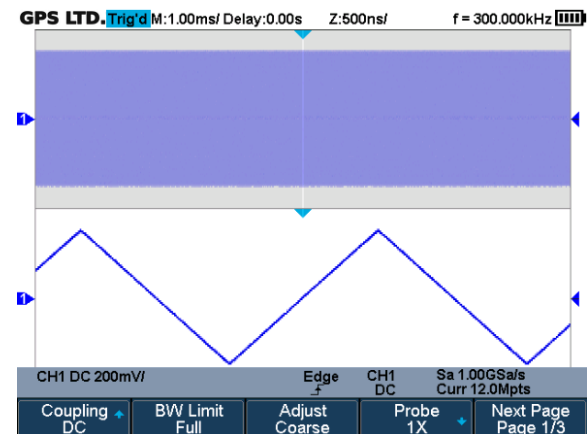
Where the full sample rate runs out

The record holds a fixed number of points, so at a slow enough timebase the instrument has to lower the sample rate to cover the time on screen. With one channel on, 12 Mpts at 1 GSa/s covers 12 ms; with two, 6 Mpts at 500 MSa/s also covers 12 ms. Across the 12-division screen, the full sample rate is therefore held down to 1 ms/div in either mode, on every model.

Calculated from the sample rates and memory depths above, and the 12-division screen.

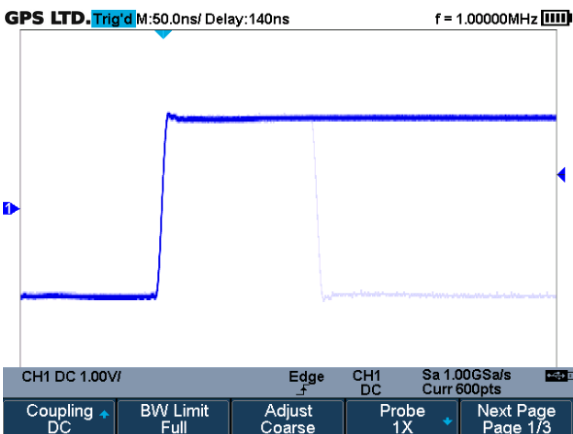
2 Key features

What sets the series apart, shown as the instrument shows it.



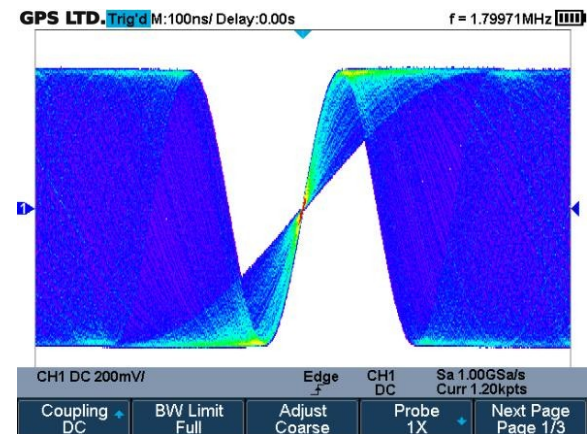
Deep memory and zoom

Up to 12 Mpts with one channel on, and 6 Mpts each with two. Capture a long stretch at a high sample rate, then zoom in on the detail: the upper trace is the whole record, the lower one the zoomed section.



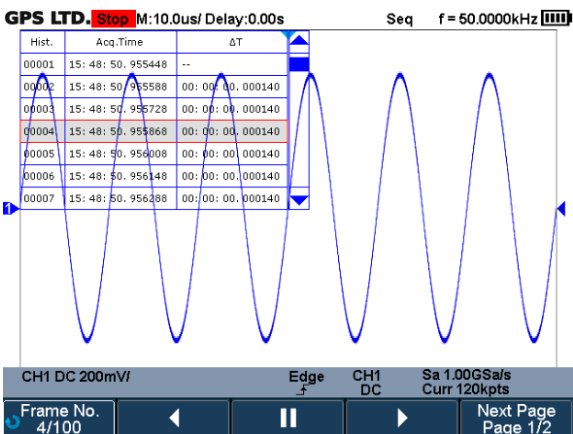
Fast waveform capture

Up to 100,000 waveforms a second in normal mode and 400,000 in sequence mode, so an unusual or infrequent event is caught: here, the faint trace that occasionally follows the edge.



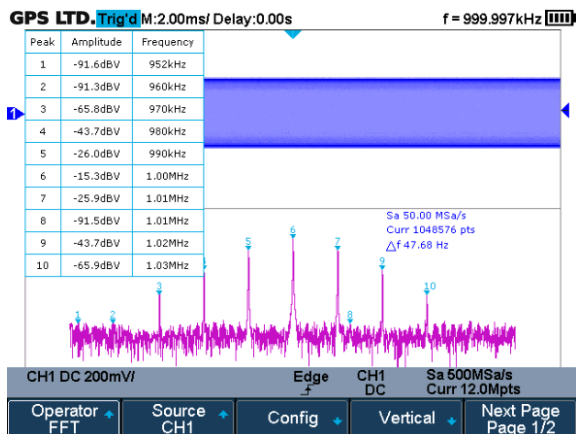
Intensity grading and colour

256 levels of intensity grading show how often each part of a trace occurs. The colour temperature mode does the same in colour, red for frequent events and blue for rare ones, as here.



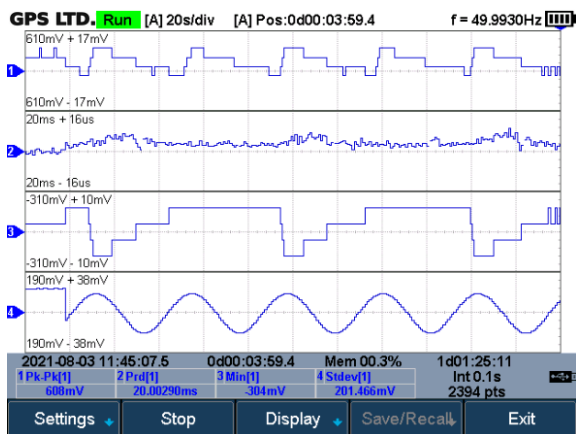
History and sequence

History replays up to 80,000 earlier frames, each with its time stamp. Sequence mode divides the memory into up to 80,000 segments and stores one triggered event in each, with very little dead time between them.



1 Mpts FFT

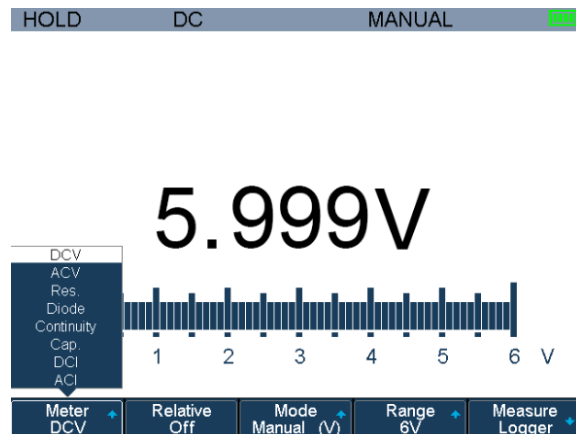
The FFT takes up to 1 M points from each waveform for fine frequency resolution, with five window functions. Peaks are found and listed automatically, and markers pick out each one.



Recorder

The measurement logger records up to four measurements at intervals from 0.1 s to 10 minutes. The sample logger records the waveform itself at up to 25 kSa/s, for up to 22 hours to external memory.

The captures are from the instrument. The multimeter capture shows the meter screen alone.



Built-in multimeter

A 6000-count multimeter, isolated from the oscilloscope: DC and true RMS AC voltage and current, resistance, capacitance, diode and continuity. Current is measured through the two adapters supplied.

Also standard

- Serial trigger and decode: I²C, SPI, UART, CAN, LIN
- 38 automatic measurements, with statistics and gating
- Search for events, and navigate by time or by frame
- Hardware counter, 6 digits
- Rechargeable 6900 mAh battery and mains adapter
- Sealed IP51 housing with a rubberised surface

3 Acquisition

Item	Specification
Sample rate	One channel on: 1 GSa/s • two channels on: 500 MSa/s each. The two channels share one converter
Memory depth	One channel on: 12 Mpts • two channels on: 6 Mpts each
Waveform capture rate	Up to 100,000 wfm/s in normal mode • up to 400,000 wfm/s in sequence mode
Intensity grading	256 levels, with a colour temperature display mode
Peak detect	2 ns
Average	4, 16, 32, 64, 128, 256, 512 or 1024 averages
Enhanced resolution	0.5, 1.5, 2, 2.5 or 3 bits
Sequence	Up to 80,000 segments, each with its time stamp
History	Up to 80,000 frames
Interpolation	Sin(x)/x and linear

4 Inputs and isolation

Item	GPS-800X (810X, 820X)	GPS-1000X (1102X, 1202X)
Channels	2 analogue • 1 multimeter	2 analogue • 1 multimeter
Isolation	The multimeter channel is isolated. The two oscilloscope channels are not	Full isolation between the two oscilloscope channels, the multimeter channel, the power adapter and the USB host and device port
Coupling	DC, AC, GND	DC, AC, GND
Input impedance	1 MΩ ± 2% in parallel with 14 pF ± 2 pF	1 MΩ ± 2% in parallel with 14 pF ± 2 pF
Maximum input, BNC signal to earth	CAT II 300 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms
Maximum input, BNC ground to earth	CAT II 30 Vrms	CAT III 600 Vrms, CAT II 1000 Vrms
Maximum input, BNC signal to BNC ground	CAT II 300 Vrms	CAT III 300 Vrms
Channel-to-channel isolation	Better than 40 dB, DC to full bandwidth	Better than 40 dB, DC to full bandwidth
Probe attenuation	0.1X, 0.2X, 0.5X, 1X, 2X, 5X, 10X ... 1000X, 2000X, 5000X, 10000X, and custom	As GPS-800X

A voltage above 30 Vrms is hazardous (IEC 61010-1). Take the necessary precautions, and keep within the input ratings above. On the GPS-800X, the BNC ground is rated CAT II 30 Vrms to earth.

5 Vertical system

Item	Specification
Bandwidth (–3 dB)	100 MHz or more (GPS-810X, GPS-1102X) • 200 MHz or more (GPS-820X, GPS-1202X)
Rise time, typical	3.5 ns (GPS-810X, GPS-1102X) • 1.7 ns (GPS-820X) • 2.0 ns (GPS-1202X)
Resolution	8-bit
Vertical scale, probe 1X	2 mV/div to 100 V/div (GPS-800X) • 5 mV/div to 100 V/div (GPS-1000X), 1-2-5 sequence
Offset range, probe 1X	± 5 V at 2 to 296 mV/div • ± 80 V at 302 mV to 7.5 V/div • ± 400 V at 7.6 to 100 V/div
Bandwidth limit	20 MHz ± 40%
Flatness	DC to 10% of bandwidth: ± 1 dB • 10% to 50%: ± 2 dB • 50% to 100%: +2 dB / –3 dB
Low-frequency response	AC coupling, –3 dB at 2 Hz or below, at the input BNC
Signal-to-noise ratio	2 mV/div: over 24 dB • 5 mV/div: over 25 dB • 10 mV/div and above: over 35 dB
Spurious-free dynamic range	Including harmonics: 30 dB or better (GPS-800X) • 28 dB or better (GPS-1000X)
Common-mode rejection	Over 100 dB at DC • over 50 dB for AC up to 1 MHz
DC gain accuracy	± 3% or better at 10 mV/div and above • ± 4% or better below 10 mV/div
Offset accuracy	± (1.5% of the offset setting + 1.5% of eight divisions + 5 mV)
Overshoot, 500 ps pulse	12% typical (GPS-800X) • 18% typical (GPS-1000X)

Every input is 1 M Ω . Bandwidth and pulse response are verified with an external 50 Ω adapter, for signal integrity at higher frequencies.

6 Horizontal system

Item	Specification
Timebase range	1.0 ns/div to 100 s/div
Screen range	12 divisions
Display modes	Y-T, X-Y and roll
Roll mode	50 ms/div to 100 s/div, 1-2-5 sequence
Channel skew	Under 300 ps
Timebase accuracy	± 25 ppm

7 Trigger

General

Item	Specification
Modes	Auto, normal, single
Level range	± 4.5 divisions from the centre of the screen
Holdoff	80 ns to 1.5 s
Coupling	DC, AC, LF reject, HF reject, noise reject
Coupling response	DC passes all components • AC blocks DC and attenuates below 8 Hz • LF reject blocks DC and attenuates below 2 MHz • HF reject attenuates above 1.2 MHz
Accuracy	± 0.2 division typical
Sensitivity	0.8 division, DC to full bandwidth
Jitter	Under 100 ps
Displacement	Pre-trigger 0 to 100% of memory • delay trigger 0 to 10,000 divisions

Trigger types

Type	Source and settings	Limits and ranges
Edge	CH1, CH2 • rising, falling, or rising and falling	—
Slope	CH1, CH2 • rising or falling	Limits <, >, in range, out of range • 2 ns to 4.2 s, 1 ns resolution
Pulse width	CH1, CH2 • positive or negative width	Limits <, >, in range, out of range • 2 ns to 4.2 s, 1 ns resolution
Video	CH1, CH2 • NTSC, PAL, 720p/50, 720p/60, 1080p/50, 1080p/60, 1080i/50, 1080i/60, custom • any or selected sync	On a line or on a field
Window	CH1, CH2 • absolute or relative window	—
Interval	CH1, CH2 • rising or falling	Limits <, >, in range, out of range • 2 ns to 4.2 s, 1 ns resolution
Dropout	CH1, CH2 • timeout on edge or on state • rising or falling	2 ns to 4.2 s, 1 ns resolution
Runt	CH1, CH2 • positive or negative	Limits <, >, in range, out of range • 2 ns to 4.2 s, 1 ns resolution
Pattern	CH1, CH2 • each don't care, low or high • AND, OR, NAND, NOR	Limits <, >, in range, out of range • 2 ns to 4.2 s, 1 ns resolution
Serial	CH1, CH2 • I ² C, SPI, UART, CAN, LIN	See section 8

8 Serial trigger and decode

Two serial buses can be decoded at the same time, each on any of the five protocols. The decoded data is shown on a bus display and in an event list of 1 to 7 lines, in a table. The decode threshold is set within ± 4.5 divisions.

Protocol	Trigger	Decode
I ² C	Start, stop, restart, no acknowledge, EEPROM, 7-bit address and data, 10-bit address and data, data length • data in hex • EEPROM limit =, >, < • data length: EEPROM 1 byte, address and data 1 to 2 bytes, data length 1 to 12 bytes • read, write or don't care	Signals SCL and SDA • 7-bit or 10-bit address
SPI	Data • data in binary, 4 to 96 bits, each 0, 1 or don't care • bit order LSB or MSB	Signals clock, MISO, MOSI and CS, two of them at a time on the two channels • clock edge rising or falling • idle level low or high • bit order MSB or LSB
UART	Start, stop, data, parity error • data in hex, 1 byte, limit =, >, < • 5 to 8 data bits • parity none, odd, even, space or mark • stop bit 1, 1.5 or 2 • idle level high or low • baud rate 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 115,200 bit/s, or custom from 300 to 5,000,000 bit/s	Signals RX and TX • 5 to 8 data bits • parity none, odd, even, space or mark • stop bit 1, 1.5 or 2 • idle level low or high
CAN	Start, remote frame, ID, ID with data, error • ID standard 11-bit or extended 29-bit • data in hex, 1 to 2 bytes • baud rate 5k, 10k, 20k, 50k, 100k, 125k, 250k, 500k, 800k, 1M bit/s, or custom	Signals CAN_H and CAN_L • source CAN_H, CAN_L or CAN_H – CAN_L
LIN	Break, frame ID, ID with data, error • ID 1 byte • data in hex, 1 to 2 bytes • baud rate 600, 1200, 2400, 4800, 9600, 19,200 bit/s, or custom from 300 bit/s to 20 Mbit/s	LIN revision 1.3 or 2.0

9 Measurement, cursors and counter

Item	Specification
Sources	Both channels, both channels in zoom, math, all references, history
Displayed	Four measurements at the same time • five in the statistics table
Range	The screen, or a gated region
Parameters	38, listed below
Statistics	Current, mean, min, max, standard deviation, count
Cursors, manual	Time X1, X2, X1–X2, 1/ΔT • voltage Y1, Y2, Y1–Y2
Cursors, track	Time X1, X2, X1–X2
Counter	Hardware, 6 digits, on either channel

The 38 parameters

Group	Parameter	Definition
Vertical	Max	The highest value of the waveform
	Min	The lowest value of the waveform
	Pk-Pk	Max minus min
	Amplitude	Top minus base on a two-level signal, or max minus min on a one-level signal
	Top	The most probable upper level of a two-level waveform
	Base	The most probable lower level of a two-level waveform
	Mean	The average of all data values
	Cycle mean	The average over the first cycle
	Stdev	The standard deviation of all data values
	Cycle stdev	The standard deviation over the first cycle
	RMS	The root mean square of all data values
	Cycle RMS	The root mean square over the first cycle
	FOV	Overshoot after a falling edge: $(\text{base} - \text{min}) / \text{amplitude}$
	FPRE	Overshoot before a falling edge: $(\text{max} - \text{top}) / \text{amplitude}$
	ROV	Overshoot after a rising edge: $(\text{max} - \text{top}) / \text{amplitude}$
	RPRE	Overshoot before a rising edge: $(\text{base} - \text{min}) / \text{amplitude}$
	Level@trigger	The voltage at the trigger point
Horizontal	Period	Between the middle threshold points of two consecutive edges of the same polarity
	Frequency	The reciprocal of the period
	+Width	Measured at the 50% level on a positive pulse
	-Width	Measured at the 50% level on a negative pulse
	Rise time	The rising edge from 10% to 90%
	Fall time	The falling edge from 90% to 10%
	Burst width	From the first rising edge to the last falling edge, or the first falling edge to the last rising edge, at the 50% crossing
	+Duty	From the 50% point of a rising edge to the 50% point of the next falling edge
	-Duty	From the 50% point of a falling edge to the 50% point of the next rising edge
	Delay	From the trigger to the first transition, at the 50% crossing
	Time@level	From the trigger to each rising edge at the 50% crossing. Without statistics, the last such edge; with statistics, the mean, min, max and standard deviation over the frames counted

Group	Parameter	Definition
Delay, between channels A and B	Phase	The phase difference between two edges
	FRFR	First rising edge of A to the following first rising edge of B
	FRFF	First rising edge of A to the following first falling edge of B
	FFFR	First falling edge of A to the following first rising edge of B
	FFFF	First falling edge of A to the following first falling edge of B
	FRLR	First rising edge of A to the last rising edge of B
	FRLF	First rising edge of A to the last falling edge of B
	FFLR	First falling edge of A to the last rising edge of B
	FFLF	First falling edge of A to the last falling edge of B
	Skew	The time of an edge on A minus the time of the nearest edge on B

10 Math and FFT

Item	Specification
Operations	+, −, ×, ÷, FFT, d/dt, ∫dt, √
Data used	Math and measurements use every sampled point, up to 12 Mpts
FFT length	Up to 1 M points per waveform
FFT window	Rectangular, Blackman, Hanning, Hamming, Flattop
FFT display	Full screen, split, exclusive • peak list and markers

11 Search and navigate

Item	Specification
Search events	Edge, slope, pulse, interval, runt
Events found	Y-T mode: up to 600 • roll mode: no limit • after roll mode is stopped: up to 600
Navigate	By search event, by time (the delay position), or by history frame

12 Recorder

Two loggers record over long periods: the sample logger records the waveform itself, the measurement logger records measured values.

Sample logger

Item	Specification
Sources	CH1, CH2, or CH1 and CH2
Sample rate	1 Sa/s to 25 kSa/s, 1-2-5 sequence
Memory	50 MB internal • external memory up to 2 GB
Recording time at 25 kSa/s	Internal memory: about 23 minutes with one channel, 11 minutes with two • external memory: about 22 hours with one channel, 11 hours with two
Data format	Binary
Review	Recalled on the instrument, or analysed on a computer

The sample logger writes to internal memory or to an external drive as it records.

Measurement logger

Item	Specification
Sources	Measurements, the multimeter, or both
Logging interval	0.1 s to 10 minutes
Items logged at once	Up to 4
Memory	About 3.6 M samples with one item • 900 k samples with four
Recording time at 0.1 s	About 100 hours with one item • about 25 hours with four (calculated)
Data format	Binary • exported as binary, CSV or MATLAB

Calculated: 3.6 M samples at 0.1 s is 100 hours for one item; 900 k samples at 0.1 s is 25 hours for four. The measurement logger holds its data in memory, and it is saved to internal memory or an external drive when logging stops.

13 Multimeter

Item	Specification
Resolution	6000 counts • true RMS AC voltage and current
Functions	DC and AC voltage, DC and AC current, resistance, capacitance, diode, continuity
Maximum input, GPS-800X	CAT III 300 Vrms • CAT II 600 Vrms
Maximum input, GPS-1000X	CAT III 600 Vrms • CAT II 1000 Vrms
Maximum input, through a current adapter	CAT III 60 Vrms
Isolation	Isolated from the oscilloscope channels, on all models

DC voltage

Range	Resolution	Accuracy
60.00 mV	10 μ V	$\pm (1\% + 15 \text{ digits})$
600.0 mV	100 μ V	$\pm (1\% + 5 \text{ digits})$
6.000 V	1 mV	$\pm (1\% + 5 \text{ digits})$
60.00 V	10 mV	$\pm (1\% + 5 \text{ digits})$
600.0 V	100 mV	$\pm (1\% + 5 \text{ digits})$
1000 V (GPS-1000X)	1 V	$\pm (1.5\% + 5 \text{ digits})$

AC voltage, 45 Hz to 400 Hz

Range	Resolution	Accuracy
60.00 mV	10 μ V	$\pm (1\% + 15 \text{ digits})$
600.0 mV	100 μ V	$\pm (1\% + 5 \text{ digits})$
6.000 V	1 mV	$\pm (1\% + 5 \text{ digits})$
60.00 V	10 mV	$\pm (1\% + 5 \text{ digits})$
600.0 V	100 mV	$\pm (1\% + 5 \text{ digits})$
750 V (GPS-1000X)	1 V	$\pm (1.5\% + 5 \text{ digits})$

DC current, and AC current from 45 Hz to 400 Hz

Range	Resolution	Accuracy
60.00 mA	10 μ A	$\pm (4\% + 10 \text{ digits})$
600.0 mA	100 μ A	$\pm (4\% + 10 \text{ digits})$
6.000 A	1 mA	$\pm (5\% + 5 \text{ digits})$
10.00 A	10 mA	$\pm (5\% + 5 \text{ digits})$

Current is measured through the current adapters supplied: the 600 mA adapter for the 60 mA and 600 mA ranges, the 10 A adapter for the 6 A and 10 A ranges. DC and AC current share these ranges and accuracies.

Resistance

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	$\pm (1\% + 5 \text{ digits})$
6.000 k Ω	1 Ω	$\pm (1\% + 5 \text{ digits})$
60.00 k Ω	10 Ω	$\pm (1\% + 5 \text{ digits})$
600.0 k Ω	100 Ω	$\pm (1\% + 5 \text{ digits})$
6.000 M Ω	1 k Ω	$\pm (1\% + 5 \text{ digits})$
60.00 M Ω	10 k Ω	$\pm (4\% + 5 \text{ digits})$

Capacitance

Range	Resolution	Accuracy
40.00 nF	0.01 nF	± (5% + 50 digits)
400.0 nF	0.1 nF	± (5% + 5 digits)
4.000 µF	1 nF	± (5% + 5 digits)
40.00 µF	10 nF	± (5% + 5 digits)
400.0 µF	100 nF	± (5% + 5 digits)

Diode and continuity

Item	Specification
Diode	0 to 2 V
Continuity	Continuous beep below 50 Ω

Accuracy is ± (% of reading + digits). Specifications are calibrated and verified on battery power at 23 °C ± 5 °C after 30 minutes' warm-up. For AC, the input should be over 10% of the range. The 1000 V DC and 750 V AC ranges are on the GPS-1000X; the GPS-800X measures up to 600 V DC or AC.

On the 6 A and 10 A ranges, measure for less than 10 seconds at a time, and allow more than 15 minutes between measurements.

14 Interfaces and remote control

Item	Specification
USB host	1 port, isolated, type A • full and low speed • for memory sticks
USB device	1 port, Micro USB-B (USBTMC) • for remote control
Remote control	SCPI commands
Probe compensation output	1 kHz square wave, 0 to 5 V
Location	USB ports on the right-hand side, under a cover

15 Display and controls

Item	Specification
Type	5.6 inch TFT LCD, 24-bit colour
Resolution	640 × 480
Contrast, typical	500:1
Backlight	200 nit
Waveform area	8 × 12 divisions
Trace display	Dots or vectors
Persistence	Off, 1 s, 5 s, 10 s, 30 s, infinite
Colour display	Normal, or colour temperature

Item	Specification
Screen saver	1, 5, 10 or 30 minutes, 1 hour, or off
Languages	11 interface languages, with built-in help
Keys	One key each for oscilloscope, multimeter and recorder • eight one-touch keys: run/stop, auto setup, default, measure, cursors, display/persist, clear sweeps, print • more functions with the shift key
Utilities	Default key set to factory defaults or to a saved setup • security erase

16 Power and battery

Item	Specification
Mains adapter input	100 to 240 Vrms, 50/60 Hz • 1.2 A (GPS-800X), 1.1 A (GPS-1000X)
Mains adapter output	9 V, 4 A (GPS-800X) • 12 V, 4 A (GPS-1000X)
Battery	Rechargeable lithium, 6900 mAh • the battery pack is certified to UL 2054
Operating time on battery	5.5 hours (GPS-800X) • 4 hours (GPS-1000X)
Power consumption on battery	9 W (GPS-800X) • 11 W (GPS-1000X)
Charging	In the instrument whenever the adapter is connected • 4 hours with the instrument switched off • or in the optional external charger
Charging protection	At a battery temperature of 55 °C or more

17 Environment and mechanical

Item	Specification
Operating temperature	0 °C to 40 °C
Storage temperature	-20 °C to 60 °C
Humidity	Operating: 85% RH, 40 °C, 24 hours • non-operating: 85% RH, 65 °C, 24 hours
Altitude	Operating up to 2000 m • non-operating up to 5000 m
Ingress protection	IP51, dust and drip proof, tested to IEC 60529
Dimensions	276 × 168 × 68 mm (l × w × h)
Mass, with battery	1.75 kg • 3.5 kg packaged

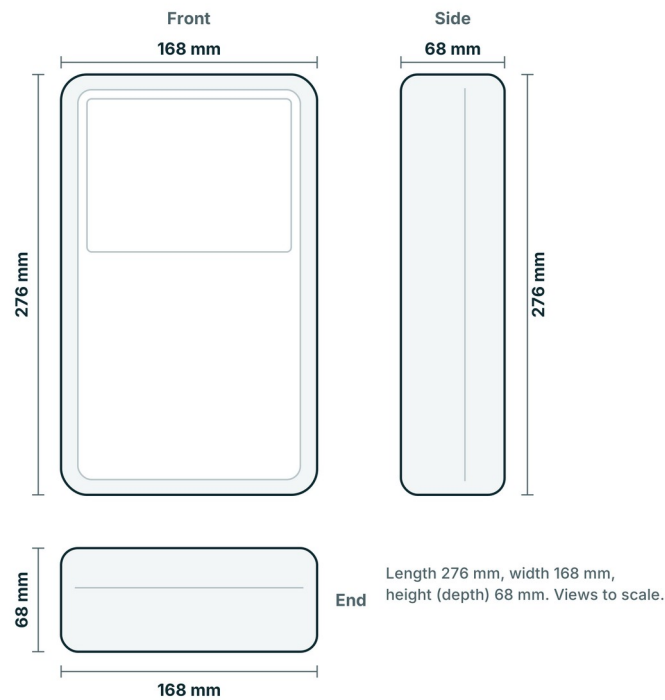


Figure 2 Overall dimensions, three views, to scale

18 Standards

Item	Specification
EMC	Meets the EMC directive 2014/30/EU • IEC 61326-1:2012 / EN 61326-1:2013 (basic)
Emissions	CISPR 11 / EN 55011 class A, group 1 • conducted 150 kHz to 30 MHz • radiated 30 MHz to 1 GHz
Immunity	ESD (IEC 61000-4-2) 4 kV contact, 8 kV air • RF field (IEC 61000-4-3) 10 V/m 80 MHz to 1 GHz, 3 V/m 1.4 to 2 GHz, 1 V/m 2.0 to 2.7 GHz • fast transients (IEC 61000-4-4) 2 kV on the AC power input • surges (IEC 61000-4-5) 1 kV line to line • conducted RF (IEC 61000-4-6) 3 V, 0.15 to 80 MHz • voltage dips (IEC 61000-4-11) 0% for 1 cycle, 40% for 10/12 cycles, 70% for 25/30 cycles, interruptions 0% for 250/300 cycles
Safety	UL 61010-1:2012/R:2018-11 • CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11 • UL 61010-2-030:2018 • CAN/CSA-C22.2 No. 61010-2-030:2018 • UL 61010-2-033:2020
Battery	UL 2054
Enclosure	IP51, IEC 60529

19 Ordering information

Models

Code	Description	Part number
GPS-810X	2 channel, 5.6 inch TFT LCD, 100 MHz handheld oscilloscope	180810
GPS-820X	2 channel, 5.6 inch TFT LCD, 200 MHz handheld oscilloscope	180820
GPS-1102X	2 channel, 5.6 inch TFT LCD, 100 MHz handheld oscilloscope, fully isolated	180860
GPS-1202X	2 channel, 5.6 inch TFT LCD, 200 MHz handheld oscilloscope, fully isolated	180890

Supplied with the instrument

Two passive probes, two multimeter test leads, the 6900 mAh battery, the mains power adapter, a USB cable, the 600 mA and 10 A current adapters, a carrying bag, a quick start guide and a certificate.

Item	Specification
Current adapter, 600 mA	Shunt resistance $0.5\ \Omega$ · 600 mA maximum · for the 60 mA and 600 mA ranges
Current adapter, 10 A	Shunt resistance $5\ m\Omega$ · 10 A maximum, for 10 s · for the 6 A and 10 A ranges
Carrying bag	Black · $325 \times 310 \times 95\ mm$ · 200 g

Probes and test leads

Probe	Specification
Passive probe, 100 MHz	1X / 10X · $1\ M\Omega$ / $10\ M\Omega$ · 1X: CAT II 150 V · 10X: CAT II 300 V
Passive probe, 200 MHz	1X / 10X · $1\ M\Omega$ / $10\ M\Omega$ · 1X: CAT II 150 V · 10X: CAT II 300 V
High-voltage passive probe, 250 MHz	10X fixed · $10\ M\Omega$ · CAT III 600 V, CAT II 1000 V
Multimeter test leads	1 m · CAT II 1000 V

The two probes supplied with each instrument are matched to the model.

Current probes, optional

Bandwidth, current	Specification
200 kHz, 20 A	20 Arms continuous, 60 A peak · 50 mV/A and 5 mV/A · 50 mV/A (0.4 to 10 Apk) $\pm 2\%$, 5 mV/A (1 to 60 Apk) $\pm 2\%$ · 9 V battery
300 kHz, 70 A	70 Arms continuous, 200 A peak · 50 mV/A and 5 mV/A · 50 mV/A (0.4 to 10 Apk) $\pm 2\%$, 5 mV/A (1 to 200 Apk) $\pm 2\%$ · 9 V battery
1 MHz, 50 A	50 Arms continuous, 140 A peak · 500 mV/A and 50 mV/A · 500 mV/A (20 mA to 14 Apk) $\pm 3\%$ $\pm 20\ mA$, 50 mV/A (200 mA to 100 Apk) $\pm 4\%$ $\pm 200\ mA$, 50 mV/A (100 to 140 Apk) $\pm 15\%$ max · 9 V battery
5 MHz, 500 A	500 Arms continuous, 750 A peak · 100 mV/A and 10 mV/A · 100 mV/A $\pm 1\%$ $\pm 10\ mA$, 10 mV/A $\pm 1\%$ $\pm 100\ mA$ · 12 V, 1.2 A DC adapter
12 MHz, 150 A	150 Arms continuous, 300 A peak · 100 mV/A and 10 mV/A · 100 mV/A $\pm 1\%$ $\pm 10\ mA$, 10 mV/A $\pm 1\%$ $\pm 100\ mA$ · 12 V, 1.2 A DC adapter

Bandwidth, current	Specification
50 MHz, 30 A	30 Arms continuous, 50 A peak · 1 V/A and 100 mV/A · 1 V/A $\pm 1\%$ ± 1 mA, 100 mV/A $\pm 1\%$ ± 10 mA · 12 V, 1.2 A DC adapter
100 MHz, 30 A	30 Arms continuous, 50 A peak · 1 V/A and 100 mV/A · 1 V/A $\pm 1\%$ ± 1 mA, 100 mV/A $\pm 1\%$ ± 10 mA · 12 V, 1.2 A DC adapter

Differential and high-voltage probes, optional

Probe	Specification
Differential, 50 MHz, 800 V	800 V (DC + peak AC) · 100X, 200X, 500X, 1000X · $\pm 1\%$ · 9 V, 1 A DC adapter
Differential, 70 MHz, 1500 V	1500 V (DC + peak AC) · 50X, 500X · $\pm 2\%$ · 5 V, 1 A USB adapter
Differential, 100 MHz, 1500 V	1500 V (DC + peak AC) · 50X, 500X · $\pm 2\%$ · 5 V, 1 A USB adapter
Differential, 70 MHz, 7000 V	7000 V (DC + peak AC) · 100X, 1000X · $\pm 2\%$ · 5 V, 1 A USB adapter
Differential, 100 MHz, 7000 V	7000 V (DC + peak AC) · 100X, 1000X · $\pm 2\%$ · 5 V, 1 A USB adapter
High voltage, 40 MHz	DC 10 kV · AC 7 kV rms (sine) · 20 kV peak to peak (pulse) · 1000X · 3% or better

Other options

Option	Specification
Isolated front end	Isolates standard oscilloscope channels from one another and the measured signal from ground · up to ± 600 V peak · powered from USB, 5 V
Demonstration board	Square, sine, AM, fast edge, pulse, PWM, I ² C, CAN, LIN and other signals, for teaching and demonstrations
External battery charger	Input 9 to 26 V DC · output 0 to 4 A, 40 W maximum · efficiency over 85% · 180 × 92 × 58 mm · 235 g without battery

All of these are available from GPS. Accessory part numbers are available on request.

20 Warranty and service

One year warranty from the date of purchase, subject to product registration with GPS at www.gpslimited.com/register-product. Service and calibration are available. For enquiries, pricing and technical support: +44 (0) 203 093 0914, sales@gpslimited.com.

Specifications are subject to change without notice.