Functional comparison of the R&S RTB2000, Siglent SDS2000X Plus and Keysight InfiniiVision DSOX 1000 Oscilloscope series

Made by Rudi's Electronics Lab. YouTube channel

Document Version 0.40. This is a document under construction.
Comments, corrections, additions etc. are welcome, please share here.

LEGEND

Keyboard: feature not mentioned in manual but present on the instrument
Blue: significant advantage, not present in other instruments
RED: significant disadvantage
Orange: something to note but not a significant disadvantage
`Courier font`: the precise naming as used on the instrument
FW02.400: reference to the FW version that first introduced the feature.
`DISPLAY > Persistence. M85, S12.` Reference to where this can be found on the instrument. `SETUP` refers to a physical knob or rotary dial. Lower key refers to menu item or soft button (DSOCX). For information sources,

- `M` refers to a page in User Manual[1],
- `S` refers to a page in Specification Sheet,
- `B` refers to a page in the product brochure,
- `OHF` refers to onscreen help function.

[statement] something assumed or observed, but not explicitly documented

Acknowledgements

This document has benefitted from feedback by:
EEV-Blog user 2N3055, Kcbrown, HJ, Calvin, tautech, bdunham7, mawyatt, Domitronic, Martin72, Pope, Normi, PeDre and others @@@

INTRODUCTION

General

Series	R&S RTB2000	Siglent SDS2000X Plus	Keysight InfiniiVision 1000 X
Model/version reviewed	**RTB2K-COM4**	**SDS2104X Plus, 16LA, AWG**	**DSOX1204G**
Market introduction	March 2017	January 2020	March 2017 (4ch. version January 2019)[2]
Market position	Low mid-range	Low mid-range	Low range
FW version reviewed	FW 2.4 (released 06 December 2021)	FW 1.3.9R6 (released 25 October 2021)	FW 2.12 (released 10 September 2021)
FW updates	10 updates in 56 months	6 updates in 22 months	~ 5 + 3 updates in 56 months

[1] RTB: Version 11 (for 2.4 FW); SDS: version EN01C (undated and no reference to which FW version); DSOX: Fourth edition, September 2021 (for FW 2.12).
[2] Some report that the 2019 models, recognizable by their black case, run on Linux OS whereas earlier models run on Windowa CE. (Source)

Physical construction

		SIGLENT	KEYSIGHT TECHNOLOGIES
Physical design	Very solid	OK, but not top notch[3]	Very solid
Front panel color	Grey	Beige	Black
Power switch (front panel)	Hard (back panel) Soft (front panel) Auto power-on	Soft (front panel) Auto power-on selectable Utility > Menu > Power On Line. M29 Turn off, Reboot Utility > Shutdown / Reboot	Hard (front panel)
Start-up time	8-10 sec	55 sec	44 sec (was longer before FW2.01)
Settings on power-on	From last session M34	From last session (Not discussed in manual)	From last session (Not discussed in manual)
Button/control layout	Very logical	I do not find it always logical[4], but opinions differ across users	Not always logical
Rotary dials	6, all have clicks Shared V scale, V position H scale, H position Trigger Multifunction	6, two have clicks Shared V scale, V position H scale, H position Trigger Multifunction	9, three have clicks Shared V scale, V position M/FFT scale, M/FFT position (not very useful, and not used for REF) H scale, H position Trigger Cursor Multifunction
Recessed buttons		Default, Auto-setup	Auto Scale, Default Setup
Channel indicators for shared vertical controls[5]	Active Ch: lighted button, screen Selected Ch.: matching colour LEDs in both vertical dials[6]	Active Ch.: screen only Selected Ch.: lighted button	Active Ch.: lighted button, screen Selected Ch.: matching colour LED[7] indicator next to vertical dials
Channel indicators for shared vertical controls	Matching colour LED in Trigger button	Screen only	Screen only
Painted front panel colour indicators for channels	None	Around BNC[8]	Around BNC
Fan noise	Silent to very low	Very loud	Notable
Energy use[9]	45 Watt (on, measured) 0.5 Watt (standby, measured) Manual: "max. 60 W" M33	55 Watt (on measured) 4 Watt (standby, measured) Manual "Up to 100 Watt" M14	31 Watt (measured) Manual: "50Wmax" M22
Weight	2.6 kg	3.5 kg	3.2 kg
Transport accessories	Plastic front cover, Soft case, Transit case	Soft Carry Bag	Soft carrying case

[3] Rotary dials wobble a bit. Rubber feet come off regularly. Overall, a more plastic feel.
[4] Examples: "Start/Stop" button is away from "Single" button, whereas on most other oscilloscopes these are together. Yet, in the EVVBlog Forum some users express they find the SDS button layout intuitive.
[5] Across digital oscilloscopes, the implementation to have channel button lights indicate active channels (like the RTB and SDOX) seems to be the dominant one. We see it in various LeCroy models (WavePro HD, WaveRunner 8000HD, HDO6000B, WaveSurfer 4000HD), on Tektronix models (3 series, 4 series, 5 series), on R&S models (RTM3000, RTA4000, RTE1000, RTO2000 and RTP RTP), and Keysight models (2000X, 3000X, 4000X), to name a few. While it is my own preference too, others may prefer the Siglant choice to show on selected channels.
[6] In some versions (recent years?) the colors around the rotary dials do not look constant.
[7] Sever color mismatch for Channel 1 (dark yellow on button, bright yellow on the screen).
[8] On pictures on the internet, all the SDS2000X Plus scopes I see also have colors printed around the channel selection buttons. But on my unit, these colors are gone. Perhaps when FR1.3.7R5 introduced the selectable color for analogue traces (and changed the LED colours in the buttons accordingly with the chosen user color), Siglent decided to remove the paint on the front panel. But why they remove it only for one of the two places ?!?
[9] Measured with GW-INSTEK GPM-8310 Power Meter. Here, on means turned on, showing one channel, no special processing, no USB devices connected, etc.

I/O connectors

		SIGLENT	KEYSIGHT TECHNOLOGIES
BNC connectors	Goldplated (all)	Not goldplated automatic x10 probe sense for supported probes	Not goldplated
USB (Flash, Mouse, Keyboard, Power)	1x host (FMKP) 1x device	2x host (FMKP) 1x device	1x host (FPK)[10] (keyboard since FW2.10) 1x device
Provides error information for connected USB devices?	Yes, detailed error information is provided for unsupported devices/file systems or when multiple devices in same device class are connected.	No messages shown	An error is shown when unsupported USB devices are connected.
Allows USB hub	Manual says a hub is not supported[11] M177, but in practice, a hub works just fine.	Manual is silent on this; experiences with hubs seem to differ across connected devices.[12]	Manual is silent on this but in practice, a hub works just fine.
Network	Ethernet (1Gbps)	Ethernet (100Mbps)	Ethernet (100Mbps) Recessed socket, gives problem with some plugs[13]
Ext. trigger In	Front (dedicated) Sensitivity 300mV, level -5/5V, max. 300 V (RMS), max. 400 V (Vp)	Back (dedicated) Max. 1 5Vrms; max. 7.5Vrms with EXT/5 attenuator	Back (dedicated) Max 30 Vrms, 40 Vpk
Trigger out	Front (shared conn.) Polarity: positive or negative pulse Level: 4.8V (2.4@50Ω) Pulse width (250ns to 1s) and polarity (pos or neg pulse) can be set via remote command; default 250ns (measured)[14] Trigger > Action on Trigger. M77, 86, 461, 462; remote command 461, 462, 87.	Back (shared conn.) Polarity: negative pulse Level: 2.6Vpp (900mVpp @ 50Ω) (measured) Pulse width varies with horizontal scale (measured): 600ms @ 100ms/div 860µs @ 100µs/div 90µs @ 100ns/div (but duty cycle at 99%)	Front (shared conn.) Polarity: positive pulse Level: 5.3Vpp (2.7Vpp @ 50Ω) (measured) Pulse width varies with horizontal scale (measured): 500ms @ 100ms/div 520µs @ 100µs/div 20µs @ 100ns/div (but duty cycle at 85%)
Mask test out	Pass, fail Front (shared conn.)	Pass, fail Back (shared conn.)	Fail (5V) Front (shared conn.)
Generator out	Front (shared conn.)	Front (dedicated)	Front (shared conn.)
10MHz reference in/out	–/+ (shared conn.)	–/–	–/–
Combined in multifunction out connector	Trigger Out, 10MHz ref, Mask, Function Generator (labelled Aux Out) Setup > Aux out. M27,177/178 Via SCPI commands, more flexible routing options are possible[15]	Trigger Out, Mask (labelled Auxiliary Out) (Output is Trigger, except when Mask analysis is activated))	Trigger Out, Mask, Function Generator (labelled GEN OUT) UTILITY > Options > Auxilary. M242-243
Probe compensation	1kHz, 2.5V (measured)	1 kHz (meas.), 2.5Vpp (measured)	1 kHz (meas.), 2.5Vpp (measured)
Other IO	4 pin pattern generator		

[10] Mouse does not make sense because the device does not have a graphic UI.
[11] Maybe they wrote this in the manual because connecting two storage devices may cause problems.
[12] In my own tests, the SDS did not work with a Anker type A7516 (a fairly straightforward, recent 4 port hub) and a HP H3C52AA keyboard (a fairly standard PC keyboard) or an Apple A1243 keyboard (both keyboards did work with the same hub on the RTB and DSOX. Yet, the SDS with hub did accept 'original' Raspberry Pi keyboard and the Logitech wireless K270 keyboard with its supplied proprietary (not 'unity') Logitech dongle.
[13] The socket is recessed by about 5.5mm in the case. This makes it difficult to read the latch clip to remove the plug again, and connectors that have plastic/rubber covers over the latch clip (which is increasingly common) may have problems fitting in this instrument.
[14] A 50% duty cycle square with 260ns positive pulse has a period of 520ns and a frequency of 1.9MHz. So, with trigger actions above this frequency one will want to shorten the pulse width.
[15] For instance, with the SCPI command :WGENerator:OUTPut DESTination BNC | P3 you can also switch the output from the Function Generator to the Pattern Generator P3. Such documents are not documented in the user manual, though.

Documentation

User manual	Available here (609 pages). Well written and informative Updated with each new FW versions (now FW2.4) Also interactive online web version with very good search function, available here.[16]	Available here (352 pages). Less informative, (specified) functions often poorly explained and some are missing altogether. Often, figures are not readable.[17] Manual is not dated and not (systematically?) updated with new firmware versions.	Available here (332 pages) Well written and informative Updated with each new FW versions (now FW2.12)
Programming guide (SCPI)	Part of User Manual List if commands is here in the interactive online web version (adapted to online environment)[18]	Separate document, available here (585 pages) Also SDS2000X Plus IVI-C Programming Guide	Separate, available here (952 pages) Offers some information missing in the user manual[19] There is also a Windows HTML Help (*.chm) format file, available here[20]
Service Guide		Functional test, interface test, performance test, disassembly procedure, troubleshooting Available here. (70 pages).	Verification, calibration etc. Available here (57 pages)
Educator's Training Kit			For physics/EE students, , the Educator's Training Kit is quite informative and specifically highlights functions in this instrument. Available here (96 pages)
Other	Lots of white papers, application notes, etc.		Lots of white papers, application notes, etc.
Datasheet / specifications document	Available here	Available here	Available here
Product brochure	Available here (Version 06.00)		Available here

User interface

Screen and graphical UI

Screen	10.1" (1280 × 800 pixel) 1 0 Mpixel Glossy[21]	10.1" (1024x600) 0.611 Mpixel Matte Backlight adjustable Display > Backlight. M303	7" (800x480) 0.32 Mpixel Matte
Touch screen	Capacitive touch Gestures: Touch/select, Swipe, Drag, Pinch, Two finger swipe[22]	Capacitive touch Gestures: Touch/select, Swipe, Drag, Pinch, Draw	
Languages	13 languages (FW1.203) Setup > Language. M198	10 languages Utility > Menu > System Setting > Language. M63,330	15 languages
Trigger indicator LEDs	Triggered	Ready, Triggered	
Screen/ control UI	++ (but some misses)	+ (but some misses)	No touch screen, a bit cumbersome menu structure
Toolbar	User-definable with 8 out of 24 icons selectable		
Undo, Redo	Undo: Reverses last actions step by step Redo: Recovers the undone steps in reverse order		
Menu History	Displays all menus used during the current session		
Other	QuickAccess: up to 10 parameters can be changed any moment in their own movable window (FW02.101)		

[16] https://www.rohde-schwarz.com/webhelp/RTB_HTML_UserManual_en/Content/welcome.htm
[17] See for instance the pictures on page 68, 84, 97
[18] https://www.rohde-schwarz.com/webhelp/RTB_HTML_UserManual_en/Content/welcome.htm
[19] Example: detailed description of all training signals on p.818 of Programming Guide.
[20] https://www.keysight.com/nl/en/assets/9018-17471/help-files/9018-17471.chm
[21] Those that do not like a glossy display, can consider adding a matte screen protector (the other way round is not possible).
[22] In history segments.

Help mode	Extensive context-based help Screen shortcut	**Book style help pages** Utility > Help	Extensive context-based help 3 second button push
UI responsiveness (buttons, controls and screen)	High. Responsiveness seems totally unrelated to system load.	Medium, somewhat sluggish. Under significant load, the instrument can become unresponsive to front panel controls[23]	High. Generally, responsiveness seems totally unrelated to system load. sometimes temporary hickups after entering slow USB flash drive
Experienced hangs/glitches	Extremely rare, none experienced since FW02 300	Infrequent hangs in UI when doing more advanced settings	None experiences.

Trace display

Temperature map waveform colour	Temperature, Fire, Rainbow, Individual per channel For A, R, M Vertical > Channel. M62	Rainbow Only global Display > Color Grade. M306	*"Signal detail is displayed using 256 levels of intensity."*
Trace intensity	{0-100%} INTENSITY Display > Intensities. M194	{0-100%} Default for front-panel dial UNIVERSAL Display > Intensity. M303	{0-100%} PUSH TO SELECT
Inverse Brightness	Supported Display. M194		
Persistence	Fully variable {50 ms to 12.8 s, ∞} Display. M193	{1, 5, 10, 30s, ∞} Display > Persistence. M306	Fully variable {100 ms to 60s, ∞} DISPLAY > Persistence. M86
Display types	{Vectors, dots} Display. M194	{Vectors, dots} Display > Type. M304	
Custom trace colour (Analog, Math, Ref)	R, M (not A) Individual colour per channel, also for math (FW02.300) and ref Individual colour per math channel Ref. M106,62	A (1.3.7R5), R, M Individual colour per channel, also for math and ref For A, LED buttons change colour accordingly Display > Color setting. M306	

Labels and annotations

		SIGLENT	KEYSIGHT TECHNOLOGIES
Analogue channel labels	Full text (8char) 39 presets[24] Vertical > Label. M63-64	Full text (20char) No presets	Full text (10 char) 75 presents
Digital channel labels	Full text (8char) 38 presets ("Clock", "MOSI", etc.) Logic > Label. M275	Full text (8char) (input is truncated[25]) Preset "ADR[0-15]" Preset "DATA[0-15]"	
Reference channel labels	Full text (8char) 7 presets Ref > Label. M106	Full text (20char) No presets	Full text (10 char) 75 presents
Math channel labels (scales)	Library of 76 scales (V, A, Ω, etc.) Math > Label	21 scales that adapt to input channels (e g.: V A=W)	9 scales that adapt to input channels (e.g.: V A=W)
Serial bus labels	Full text (8char) 15 presents (specific for busses) Decode > Label. M217		Fixed label (according to chosen serial protocol)
Parallel bus labels	Full text (8char) 15 presents (specific for busses) Decode > Label. M217		Full text (10 char) 75 presents "AnalogBus"
Label readability	Labels small but well readable	Analogue labels poorly readable Digital labels almost unreadable (no shadow)	
Screen annotation	Text (50+ characters), pencil drawings, colours Screen shortcut.M182		Text, 10 lines of 30 characters each, 10 colours, inverted
Keyboard options for label or annotations entry	Onscreen keyboard USB keyboard PC keyboard in web interface	Onscreen keyboard USB keyboard PC keyboard in web interface	Rotary dial USB keyboard (FW2.10) Not via PC keyboard in web interface
Other	In edit window, the input field shows last entered label (for any channel), not current label of selected channel		Only upper case. Check for annotations

[23] Confirmed by others, see here.
[24] Preset set for analogue channels is different from that for digital channels.
[25] The input field does not have a character limit. But after hitting enter, it becomes clear that all character beyond position 8 are discarded.

Grid customizability

		SIGLENT	KEYSIGHT TECHNOLOGIES
Grid divisions shown	12 horizontal, 10 vertical	10 horizontal, 8 vertical	10 horizontal, 8 vertical
Grid area occupied by menus	Pop-up icon bar takes 5% (½ div horizontal) of screen surface Pop-up settings menu takes 22% (2.5 div. horizontal) of screen surface Menu auto-hide: 8 seconds (for multi-option menus)	Pop-up settings menu takes 14% (2.5 div. horizontal) of screen surface. With Embedded mode activated, the waveform screen is compressed and no div are lost. (1.3.7R5) Display > Menu Style. M303 Menu auto-hide - Variable {Off, 3, 5, 10, 30, 60s) Display > Hide Menu. M303	16% of the screen is always occupied by the menus. Does not cost horizontal divisions but makes the waveform area small on the already small screen. There is a Menu auto-hide (0-60s) but that brings the default menu in view so still taking space Utility > Options > Menu Timeout
Grid display	Grid types: • Lines: full line grid; H&V centre lines have tick marks • Recticle: grid crosshairs plus H&V centre lines with tick marks • Off Display > Grid. M195 Grid intensity (0-100%) Display > Intensities > Grid. M194	Grid types: • Full: dashed line grid; H&V centre lines with tick marks; 25% and 75% dashed horizontal lines • Light: H&V centre lines with tick marks; 25% and 75% dashed horizontal lines (no horizontal divisions visible) • No grid Display > Grid. M303 Grid Intensity (0-100%) Display > Graticule. M42	Grid intensity (0-100%) DISPLAY > Grid > Intensity. M87 Fixed grid type: full line grid; H&V centre lines have tick marks Specific grid type for analogue video (Institute of Radio Engineers) DISPLAY > Grid > Intensity. M86 ANALYZE >Features >Video >Grid
Grid track	When activated, grid moves horizontally and vertically with waveform repositioning Display > Grid > Track grid. M196		
Grid axis values	Horizontal and vertical values on the grid axis {On, Off} Values and units ("e.g., 40mV" or "–400 µs") switch automatically with selected channel. Display > Grid > Annotation. M196	Horizontal and vertical values on the grid axis {On, Off} (FW 1.3.9R4) Values and units ("e.g., 40mV" or "–400 µs") switch automatically with selected channel. With four digits after the period this is not so readable Modes {moving, fixed} Display > Axis label settings (missing in manual)	No axis values shown

Other customizability

Device name	Can be changed (for screen prints and device information fields) (FW02.400)		
LED lights/buttons brightness	Brighness (0-100%) Front panel button INTENSITY Display > Intensities. M194	Brightness (0-100%) Display > LEDlight. M303	
Screen saver		Screen goes black after set time (Off, 1, 5, 10, 30, 60 min.) Utility > System Setting > Screen saver. M88	
Date/time	Supported. Time display on screen can be disabled (FW02 300) Screen shortcut Setup. M88	Supported Screen shortcut Utility > Menu > System Setting > Date/Time. M88	Supported UTILITY > Options > Clock.
Sound	Can be set at trigger event Trigger. M86 Can be set at violation of mask Mask > Actions. M154 General control events, e.g. changing the measurement type in the "Measure" menu. Via SCPI command. M466	Can be set at violation of mask Analyze > Mask test. M257 General buzzer sound {On, Off} Utility > Menu > System Setting > Sound. M330	

Acquisition system & memory

		SIGLENT	KEYSIGHT TECHNOLOGIES
Analogue channel sample resolution (ADC)	10-bit ADC 16-bit high-res decimation "mode", Does not require repetitive signals. [limited in bandwidth[26]] S.4, 68	8-bit ADC[27] 10-bit "mode" using oversampling[28] Maximum bandwidth approx. 100MHz.]Its workings are comparable to what other scopes call a 'High-Res' acquisition mode.] [Does not require repetitive signals.] Acquisition > Menu. M82. ENOB enhancement at lower bandwidth (see ERES at Math section) M222	8-bit ADC High Resolution Acquisition "Mode", claimed to be equivalent to up to 12 bits at 20 µs/div time base setting. Does not require repetitive signals. M140
Analogue channel sample rate (ADC)	2.5GSa/s (interleaved 2ch mode) 1.25 GSa/s (normal)	2 GSa/s (interleaved 2ch mode) 1 GSa/s (normal)	2 GSa/s interleaved 2ch mode) 1 GSa/s (normal)
Available bandwidth in series	70, 100, 200, 300 MHz (All possible via software upgrades)	100, 200, 350 MHz 500MHz (two channels only) (All possible via software upgrades)	70, 100, 200 MHz (All possible via software upgrades)
Digital channel sample rate	1.25 GSa/s every channel	Up to 500 MSa/s	
Analogue channel memory depth (per channel)	10 Msample 20 Msample (interleaved 2ch mode)	100 Msample 200 Msample (interleaved 2ch mode) (Both half for 10-bit mode)	1 Msample 2 Msample (interleaved 2ch mode)
Digital channel memory depth (per channel)	10 MSa every channel	"Up to" 50 MSa every channel	
Segmented memory depth	160Msample	Not specified ?!?	Not specified ?!?
Waveform update rate	Up to 300,000 wfm/s in fast segmentated memory mode[29] Up to 60,000 wfm/s S.5	Up to 500,000 wfm/s in Sequence mode S.1 Up to 120,000 wfm/s S.4 Reduce waveform update rate {Fast, Slow} Acquire > Menu. M82.	Up to 200,000 wfm/s[30] (FW2.10) S.12

Channels

Analogue channels

		SIGLENT	KEYSIGHT TECHNOLOGIES
Input impedance	1 MΩ	1 MΩ, 17pF 50 Ω	1 MΩ
Max voltage at channel input (Vpp)	400Vpp	400Vpp	200 Vpk
Channel overload warning	Yes (positive, negative)		
Probe Attenuation	4 presets; Fully variable (100µ to 10M) (equals 10^{-4} ~ 10^{7}) (V02.3) Vertical > Channel > Probe Channel shortcut menu. M65	3 presets; Fully variable (0.000001 to 1000000) (equals 10^{-6}~10^{6}) automatic x10 probe sense for supported probes Channel shortcut menu. M67	16 presets (0.1X to 10,000X) (100m to 10M) in 1-2-5 sequence (equals 10^{-1}~10^{7})
Channel BW limit modes	20 MHz (also any value via math LPF) Vertical > Channel Channel shortcut menu. M60	20 MHz, 200 MHz	20 MHz (also any value via math LPF)
Coupling	DC, AC, GND Channel shortcut menu. M60	DC, AC, GND AC : 5Hz HPF S10	DC, AC
Vertical scale / Sensitivity (@ 1MΩ)	1 mV/div to 5 V/div	500 µV/div – 10 V/div (50 Ω: 500 µV/div – 1 V/div)	1 mV/div to 10 V/div (500 µV/div mode is digital zoom[31])

[26] Precise specs not provided, but the manual mentions this mode works "if the waveform sample rate is less than the ADC sample rate". M68.
[27] See
https://www.eevblog.com/forum/testgear/high-resolution-adc-converters-in-oscilloscopes-(8-bit-10-bit-12-bit-14-bit)/
[28] Https://www.eevblog.com/forum/testgear/siglent-sds2000x-plus-coming/
[29] Specification, p. 17: "continuous recording of waveforms in acquisition memory without interruption due to visualization; blind time between consecutive acquisitions less than 2.5 µs".
(up to 300 000 waveforms/s)
[30] Specifications are inconsistent. "≥ 200,000 waveforms/sec" (p.12), "Up to 200,000 waveforms/sec update rate" (p. 5)
[31] Instrument has 500 µV/div mode but the specifications (p.12) mention "500 µV/div is a 2X digital magnification of 1 mV/div setting."

	1 2 3 4 Front-panel dial VERTICAL SCALE Vertical > Channel. M61	Front-panel dial Vertical V-mV Screen channel shortcut	
Auto scale	Per channel: Autoscale (V02.101) Channel shortcut menu. M58 For all channels: Autoset AUTOSET Deeper check	For all channels: Auto Setup AUTO SETUP Acquire > Auto Setup	For all channels: Autoscale AUTO SCALE. M24
Vertical position	Front-panel dial VERTICAL ▼▲ 1 2 3 4 Vertical > Channel. M61	Front-panel dial Vertical s-nS Screen channel shortcut	Front-panel dial VERTICAL ▼▲
Vertical position setting[32]	Position and Offset are simultaneously available in as menu items. The vertical rotary dial behaviour can be switched between the above modes (FW02.202) Vertical[33]. M57 While this is by no means a hidden menu, it is one not many people will ever visit at all because all of us will use the channel buttons [1-4], which are handy shortcuts but don't bring you to the top-level hierarchy in this menu.	{Position, Offset} Utility > Menu > Reference position. M337 Is placed in a bit odd position in the menu system (not a menu related to the vertical system)	Offset (in Volt)
(De)skew (time compensation)	-500 to 500ns 1 2 3 4 Vertical > Channel Channel shortcut menu. M61-62	-100 to 100ns 1 2 3 4	-100 to 100ns
Invert	Yes 1 2 3 4 Vertical > Channel. M61	Yes 1 2 3 4	Yes
Channel hide	No (but inactive channel can be used for trigger, math, etc.)	Yes (hidden channel can trigger but inactive channel cannot trigger) (FW1 3.5R5) Screen channel shortcut 1 2 3 4	No (but inactive channel can be used for trigger, math, etc.)
Copy settings to another channel		**Yes ('Fast apply to")** Screen channel shortcut	
Vertical scale units displayed on screen	V, A (attenuation adjusts) 1 2 3 4 Vertical > Channel > Probe. M66	V, A (attenuation adjusts) 1 2 3 4	V, A (attenuation adjusts)
Turning analogue channel into digital (for Boolean logic)	Yes Threshold, hysteresis 1 2 3 4 Vertical > Channel > Threshold. M64		
Zero adjust (compensate for different ground levels of DUT)	Yes 1 2 3 4 Vertical > Channel. M61-62		

Digital channels

		SIGLENT	KEYSIGHT TECHNOLOGIES
Digital channels	16 channels	16 channels	
Predefined logic levels	TTL , CMOS 5.0 V, CMOS 3 3 V, CMOS 2.5 V, ECL, Custom Logic. M274	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, Custom Screen (digital) channel shortcut	
Custom level	–2 V to +8 V in 10 mV steps Logic. M274	–10V to +10V in 1mV steps	
Hysteresis	{Low, Medium, High} Logic. M276, 80		
Display modes digital channels	Individual per channel, show 8 ch. as small block or large block, move as block	Fixed block; position and height of block can be set via menu (not vertical position rotary!)	

Reference waveforms

		SIGLENT	KEYSIGHT TECHNOLOGIES
	REF References	REF	

[32] For Position (in div) the entire wave goes up or down on the screen. For Offset (in Volt): When AC wave is superimposed on, say, 8V DC, then this allows to put 8V at centre line and zoom in or out while the wave stays in position.
[33] Is in the top-level vertical menu (so tap the vertical icon at right hand size of screen).

Number	4	4	2
Copy source (Analog, Digital, Math)	4A, 5M (specs: also D, R, spectrum)	4A, 16D, 2M	4A, 1M
Disk load/save	Load, Save From internal or external (See section Save and Recall below for details)	Save, Recall Only to external (See section Save and Recall below for details)	Save, Recall Only to external (See section Save and Recall below for details)
Other			Skew (takes hundreds of turns to get to the extremes)
			Scale and offset via menu (unlike math that can use rotary button)

Math channels (excl. FFT)

		SIGLENT	KEYSIGHT TECHNOLOGIES
	MATH Math > Menu	MATH Math > Menu	
Math channels	5 channels (FW02.202)	2 channels	1 channel
Source (Analog, Math) (Zoom)	4A, (5-1M), constant No D	4A, (2-1)M (Zoom) No D (constant possible via formula editor)	4A
Total functions (excl. FFT)	19 (see below)	18 (see below)	5 (see below)
Filters	LPF (0-300MHz) (FW02.300) HPF (0-300MHz) (FW02.300)	No	LPF (0-70MHz)
Tracking	Period, Freq, PW, Duty cycle (FW02.400)	No	No
Formulae editor	No	Basic formulae editor. Supports • 16 math functions as indicated in the below table with 'FE' • the four analogue channels, the four zoom channels, the Math functions F1 and F2 • Pi, e, and own constants • Parenthesis • FFT[34] Almost no information in manual, actual working not so clear.[35]	No
Labels / scales of result	Library of 75 scales (V, A, Ω, etc.)	21 scales that adapt to input channels (e.g.: V.A=W)	9 scales that adapt to input channels (e.g.: VxA=W)
Other functions	11 trace colours Save & load math sets with up to 5 formularies (See section Save and Recall below for details);	Gate, Full text label (20char) check seems inconcistent with above.	

Overview of all Math Functions

Series	Symbol	Function inputs		SIGLENT (FE: operator available in formulae editor)	KEYSIGHT TECHNOLOGIES
Addition	+	2	Y	Y (FE)	Y
Subtraction	–	2	Y	Y (FE)	Y
Multiplication	X	2	Y	Y (FE)	Y
Division	/	2	Y (special treatment to prevent infinity)	Y (FE)	Y (divide by zero shown as zero result)
Identity (*"Y" "Output of the trace itself"*)	y			Y	
Absolute value	|y|		Y	Y (FE)	
Inverse	-y		Y	Y (Negation)	
Sign				Y (1.3.5R3) (FE)	
Reciprocal	1/x		Y (special treatment of second input is small to prevent infinity)		
Square	y^2		Y		
Square root	√		Y	Y(FE)	

[34] Basically starts FFT view like in the regular FFT function, but can be used to do FFT on, say, "C1+6" or "C3/C1). The RTB can do the same thing as you can select a math channel (made with own calculation) as input to FFT.

[35] Experimenting with it is a bit of a mixed experience. It seems to light up red if a formula is not allowed but at the same time, "F1=F1/2" or "F1=C1+C2/F1" is allowed, while these are recursive formulae.

Common Log.	lg or Log(10)		Y	Y(FE)	
Natural Log.	ln or Log(e)		Y	Y(FE)	
Exponential	e^x			Y(FE)	
Exponential10	10^x			Y(FE)	
Derivate (differential)	f' or d/dt		Y (const.) (FW02.202)	Y (Differential Interval Dx) (FE)	
Integral	∫dt		Y (time range via V-marker cursor) (FW02.202)	Y (DC Offset, time range via Gate values) (FE)	
Low Pass	LPF		BW: 0Hz to 300 MHz 2nd order infinite impulse response filter (IIR)		BW: 0Hz to 70 MHz 4th order Bessel-Thompson filter
Hight Pass	HPF		BW: 0Hz to 300 MHz 1st order infinite impulse response filter (IIR)		
Track Period			Upper Level (UL); Hyst, Edge (FW02.400)	[No track functions in Math, but track is available in measurements]	
Track Frequency					
Track Pulse Width					
Track Duty Cycle					
Average *("Averages multiple traces [in time] and displays the resulting trace")*		2		Y (#, count, reset) (FE)	
ERES *("Average adjacent data into a point and rebuilds the trace") (removes HF noise)*				Y (enhanced bits 0.5 to 3) (FE)	
Interpolate *("Produce more points in the trace using sin(x)/x algorithm") (called 'Intrp' in formulae editor)*				Y (Upsample Coef.) (FE: 'Intrp') (1.3.7R5)	
Total functions (excl. FFT)			**19**	**18**	**5**

Horizontal system & trigger

Horizontal mode XT

		SIGLENT	KEYSIGHT TECHNOLOGIES
Acquire mode * decimation mode: sample rate > ADC rate ** arithmetic mode: consecutive acquisitions	**Sample,** **Peak Detect *** **High Resolution *** **Average (2-100k) **** Envelope ** Envelope+ Peak Detect Nx (samples per acq) selectable {1-13k} Screen shortcut Acquisition. M55	Sample ("normal") Peak Acquire, Menu. M83 Has 10-bit acquisition mode, whose workings are comparable to what other scopes call a 'High-Res acquisition mode. It uses oversampling[36] and maximum bandwidth is approx. 100MHz. Acquisition > Menu. M82. Also, averages are an available function in the math channel.	Sample ("normal") Peak Detect High Resolution Average (2-64k) ACQUIRE > Time Mode > Acq Mode
Horizontal Time scale X(t) (time base range)	1ns /div to 500s/div Front-panel dial HORIZONTAL SCALE Screen shortcut Horizontal > Time Scale. M68	1 ns/div – 1000 s/div (0.5 ns/div – 1000 s/div if 500 MHz bandwidth option installed) Only in 1-2-5 steps, no fine control[37]	5 ns/div to 50 s/div Front-panel dial HORIZONTAL SCALE
Roll	Roll (default 500ms/div, selectable 50ms/div to 500s/div) (FW02.000) Start position left Math available (except HPF, LPF and tracking) Acquisition. M69	Roll (50 ms/div and slower) Start position right Math disabled Acquire, Roll	Roll (50 ms/div and slower) Start position right Math disabled ACQUIRE > Time Mode > Rol. M41
Interpolation modes (when there are less ADC sample points than screen values needed)	Sin(x)/x, Linear, S&H Acquisition. M70	Sin(x)/x (Sinc), Linear (x) Acquire > Menu. M82	Not specified

[36] Https://www.eevblog.com/forum/testgear/siglent-sds2000x-plus-coming/

[37] Cannot be set to in-between values (say, 12ms/div), also net when entering manual values via screen calculator input. Can be an issue to get exactly a wave into view, or a specific sequence in a serial bus decode.

Offset positions	Check PS. Activate grid axis to see what you are doing!	Offset mode selectable in Utility > Menu > Reference position. M337 PS. Activate grid axis (default off) to see what you are doing!	
Reference point position	Left (~10%), Centre (50%), Right (~90%) Horizontal. M54		Left (~10%), Centre (~50%), Right (90%) ACQUIRE > Rime Ref Center. M36

Horizontal mode XY

		SIGLENT	KEYSIGHT TECHNOLOGIES
	App > XY. M163	Acquire, XY Mode	ACQUIRE > Time Mode > XY. M43
Number of simultaneous Y channels shown	2	1	1
Sources	4A (any analogue channel)	Input hardwired Ch1-Ch2	Input hardwired C1-Ch2
Simultaneous time domain (XT) traces shown	Yes, in two separate grids		
Trigger and time base functions	Present[38]		Horizontal scale adjusts sample rate OHF check
Trace intensity control ('Z-axis'; 'blanking')	[not specified or documented in manual, but possible via SCPI remote commands, with limitations [39]]		Yes, via ext. trigger input. If above threshold of 1.4V, trace is blanked
Allows use of cursors measurements	Two horizontal and two vertical cursors	Two horizontal and two vertical cursors	Two horizontal and two vertical cursors

Zoom

		SIGLENT	KEYSIGHT TECHNOLOGIES
Type of zoom	Horizontal, Vertical (FW02.202) ZOOM Screen shortcut	Horizontal, Vertical ZOOM Front-panel dial Zoom (click) Acquire, Zoom. M92	Horizontal — magnification glass — Front-panel dial HORIZONTAL SCALE
Select horizontal zoom area	Draw zoom area Pinch zoom trace Timebase dial (position & scale) Menu with numerical values	Pinch zoom trace Timebase dial (position & scale) Menu with numerical values	Timebase dial (position & scale)
Select vertical zoom area	Draw zoom area Pinch zoom trace Vertical dial (position & scale) Menu with numerical value	Pinch zoom trace Vertical dial (position & scale) Menu with numerical values	
Split screen	Selectable windows size	Fixed windows (⅓ and ⅔)	Fixed windows (about ½ and ½)

Trigger system

		SIGLENT	KEYSIGHT TECHNOLOGIES
Source	4A, 16D, Ext., AC Line, 2 Serial Dedicated source button with colour code	4A, 16D, Ext., AC Line, 2 serial (varies by trigger type)	4A, Ext., AC Line, Wavegen, Wavegen Modulation
Ext. trigger in	Front (dedicated) Sensitivity 300mV, level -5/5V, max. 300 V (RMS), max. 400 V (Vp)	Back (dedicated) Max. 1 5Vrms; max. 7.5Vrms with EXT/5 attenuator	Back (dedicated) Max 30 Vrms, 40 Vpk
Channel selection	Always (on, off)[40]	When active or hidden (not off)	Always (on, off)[41]
Trigger mode	Auto, Normal	Auto, Normal	Auto, Normal

[38] This means that if the timebase is set such that only a part of a waveform is shown in the time domain graphs, then the XY graph will only show those parts of the traces.
[39] The RTB responds to the same Z-mode commands (`DISPlay:XY:ZSOurce`, `DISPlay:XY:ZMODe`, `DISPlay:XY:ZTHReshold`) as the RTM and HMO series (see the R&S RTM2000 manual page 464). These commands allow to turn the Z mode on, select the blanking input channel, and choose analog or digital control (the latter with a selectable threshold). There are some observed limitations. In analogue mode, it seems from min to max channel values there are four equal zones in which brightness goes from low to high. In digital mode, the threshold can be set from -100 to +100 (different from the RTM) but value 0 puts the threshold at the minimum channel value (next to negative overload) and other values dont change this behavior. Having this said, this is not a claimed or documented feature, so we should not complain. After some experimentation it s useful for those that need it.
[40] Digital channels available while logic probe connected
[41] Digital channels available while logic probe connected

	AUTO/NORM Trigger > Trigger type. M76	AUTO , NORM Trigger > Auto Trigger > Normal	
Trigger start and stop	Run, Stop, Single Force trigger RUN/STOP (R/G LED) SINGLE (white LED) FORCE TRIGGER Screen shortcut	Run, Stop, Single RUN/STOP (R/G LED) SINGLE (G LED) Trigger > Single	Run, Stop, Single Force trigger RUN/STOP (R/G LED) SINGLE (Orange LED) FORCE
Trigger types	6 (see below)	10 (see below)	7 (see below)
Type: Edge	{Rise, fall, alternate} Trigger > Trigger type. M76	{Rise, fall, alternate} Trigger > Menu. M101	{Rise, fall, alternate, either} M101
Type: Pulse width	Polarity {> < = ≠ inside outside} Delta Δ Threshold Hysteresis Trigger > Trigger type. M78	Polarity {> < inside outside} Trigger > Menu. M105	Polarity {> < inside}
Type: Video	Polarity, 5SD 3HD video standards, 3 interlace modes, line select Trigger > Trigger type. M80	Polarity, 4SD 4HD video standards, custom standard, 2 interlace modes, line select Trigger > Menu. M106	Polarity, 4 SD video standards, 3 interlace modes, line select ANALYZE >Features >Video > Standard Supports auto setup ANALYZE >Features >Video > Auto Setup
Type: Pattern	Up to 20 bits (4A 16D) {AND, OR} State: {H, L, don't care} {True, False, Goes True, Goes False} Analogue channels thresholds Time limitation {> < = ≠ inside outside} with Δ Trigger > Trigger type. M82	{AND, OR, NAND, NOR} State: {H, L, don't care} Goes Tru for OR and NAND, To False for AND and NOR Time limit range (AND and NOR only) Check in practice	"State"
Type: Serial	Supported Trigger > Trigger type. M342	Supported Trigger > Menu.	Supported
Type: Timeout	Supported (FW1.203) Trigger > Trigger type. M85		
Type: Edge within vertical window		"Window" Trigger > Menu. M111	
Type: Runt		Polarity, {> < inside outside}, upper time value Trigger > Menu. M116	
Type: Interval		Supported Trigger > Menu. M114	
Type: Dropout		Supported Trigger > Menu. M114	
Type: Setup and hold			Supported
Type: Slope (Rise/fall time)		Supported Trigger > Menu. M102	Supported
Trigger Zone		Trigger zone Trigger > Zone. M124-130	
Hold-off	For all trigger types (FW02.000) Time. Trigger > Trigger type. M76	For all trigger types except video and serial. By Time (8ns to 30s; 8ns step) By # of events (1 to 10^8) Trigger > Menu. M120-121	Time
Trigger coupling	AC, DC Trigger > Coupling. M77	DC, AC (AC: 20Hz HPF, Ext. trig: 8 Hz HPF) Trigger > Menu. M122	AC, DC (AC: 10Hz HPF) (DC ext. trigger: 50Hz) TRIGGER > Coupling. M124
LF Reject	15kHz HPF[42] Trigger > Coupling. M77	1.2MHz HPF (EXT trig: 33kHz HPF) Trigger > Menu (part of Coupling menu)). M122, S11	50kHz HPF (ext. 50Hz) TRIGGER > Coupling > M124
HF Reject	5kHz LPF[43] Trigger. M77	600kHz LPF (EXT trig: 967kHz LPF) Trigger > Menu (part of Coupling menu)). M122, S11	50kHz LPF TRIGGER > Coupling > Reject. M124
Noise reject	Yes (extends the hysteresis to avoid unwanted trigger events)[44] Trigger. M77, 334	Yes (increases the trigger hysteresis) Trigger > Menu. M122	Yes (adds additional hysteresis to the trigger circuitry) TRIGGER > Coupling > Reject. M124

[42] Inconsistent with Specifications (p.5): "LF reject (attenuates < 50 kHz (meas.)"
[43] Inconsistent with Specifications (p.5): "HF reject (attenuates > 50 kHz (meas.)"
[44] Manual page 334 also mentions additional 100 MHz LPF.

BNC pulse out (For pulse amplitude and with see IO/connections, above)	**BNC pulse out ("AUX", front side)** **Shared connector, settings via:** Trigger. M86	BNC pulse out ("Auxiliary Out", front side) (Output of Auxiliary Out connector is Trigger, except when Mask analysis is activated)	BNC pulse out ("GEN OUT"), front side) Shared connector, settings via: UTILITY > Options > Auxilary. M242-243
Actions on mask (other than BNC Pulse out)	Sound Screenshot Save waveform Save all channels to references Trigger. M86 (FW02.300)	BNC pulse out ("Auxiliary Out") see (Output of Auxiliary Out connector is Trigger, except when Mask analysis is activated)	

Tools

Cursor

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Cursor CURSOR	All settings in Cursor > Menu CURSOR	All settings CURSOR
Mode	• Manual (H, V, H+V) • Track (H+V) ("V-Marker"[45])	• **Manual (H, V, H+V)** • **Track (H+V)** • Measure (linked to a selected position in measure mode) (FW 1.3.9R4)	• Manual (H+V) • Track (H+V) • Binary[46] • Hex[47]
Source (Analog, Digital, Math, Ref) (Zoom)	4A, 16D, 5M, 4R	4A, 16D, 2M, 4R	4A, M, FFT, 2R
Different source for X1 and X2	Yes (FW02.400)	Yes	Yes
Cursor control rotary dial	Multifunctional dial	Multifunctional dial	**Dedicated dial**
Track scaling (when time base or vertical scale is changed)	Selectable ("Track Scaling")	Selectable separately for X and Y ("CursorX Ref", ("CursorY Ref)	
Coupling of cursor lines	Via "Coupling" {Off, On}	Via "X2-X1" or "Y2-Y1"	Via "X1-X2 Linked" or "Y1-Y2" Linked"
Measurement results in cursor mode	7 measurements: t1, t2, Δt, V1, V2, ΔV and ΔY/ΔX (in kV/s) (FW02.000)	7 measurements: t1, t2, Δt, V1, V2, ΔV and 1/ΔX (in MHz)	6 measurements: t1, t2, Δt, V1, V2, ΔV
Position of measurement results	Overlay of waveform	Overlay of waveform or movable table	Table (bottom)
Unit definition			X units {Sec., Hz., Phase[48], Ratio[49]} Y units {Base, Ratio[50]}

[45] V-Marker is in Type menu.
[46] Logic levels of displayed waveforms at the current X1 and X2 cursor positions are displayed in binary. The display is color coded to match the color of the related channel's waveform. Meaning: 1 is higher than trigger level, 0 is lower than trigger level.
[47] Logic levels of displayed waveforms at the current X1 and X2 cursor positions are displayed in hexadecimal. Meaning: 0x8 is higher than trigger level, 0X0 is lower than trigger level.
[48] With phase, X cursor = 360°.
[49] With ratio, X cursor is 100%.
[50] With ratio, Y cursor is 100%.

Measure

Location on instrument		SIGLENT	KEYSIGHT TECHNOLOGIES
	All settings in Measure MEASURE	All settings in Measure > Menu MEASURE	All settings MEASURE
Regular measure positions	6 (FW02.400) Shown in columns (6 next to each other) Shown in rows (6 vertical) when statistics on	5 in M1 mode Shown in columns (5 horizontal) Shown in rows (5 vertical) when statistics on 12 in M2 mode Shown in 4:3 matrix Shown in rows (12 vertical) when statistics on	4 Shown in columns (4 horizontal) Statistics display comes in addition to regular measurements, in in rows (4 vertical)
Quick measurement	9 measurement overlay with live trace (Quick Meas) QUICK MEASURE	Table with 12 measurements Menu > Simple	Table with 26 measurements (Snapshot All) Can be assigned to "Quick Action" button via UTILITY > Quick Action > Quick Measure All. M169,249
Source (Analog, Digital, Math, Ref) (Zoom)	4A, 16D, 5M, 4R	4A, 16D, 2M, 4R, 4Z, 4ZA, 16ZD History S13	4A, M, (FFT: 6 only)
Measurement types	40 (incl. 2 in-between channel delays) M123	63 (inc. 10 in-between channel delays)	30
Functions		Trend, gates . Track Plot (FW 1.3.9R4) TBA	
Histogram		Small histogram for each measurement position, one histogram can be zoomed	
Link measurements to trace display		In Cursor Measure Mode, H and V cursors show relevant measure points (gate positions, selected edges, rise time, duty cycle., etc.)	H and V cursors show relevant measure points (gate positions, selected edges, rise time, duty cycle., etc.)
Threshold settings for relevant measurements	Lower, Middle and /or Upper Level can be set manually (e.g., 10%, 50% 90%).@@@	Lower, Middle and /or Upper Level can be set manually (e.g., 10%, 50%, 90%), or in voltages. (1.3.7R5) @@@	Lower, Middle and /or Upper Level can be set manually (e.g., 10%, 50%, 90%), or in voltages. ANALIZE > Feature > Measure thresholds. M175
Statistics	5 (Value, Min, Max, Mean, SD) + count (from FW02.400) @@@	6 (Value, Min, Max, Mean, PP, SD) + count	5 (Value, Min, Max, Mean, SD) + count (from FW02.12) MEASURE > Statisistics Option to show standard deviation/mean ("Relative σ") (which is a dimensionless value) MEASURE > Statisistics > Relative σ
Statistics – Count limit		1-1024, ∞ @@@	1-2000, ∞ (from FW02.12) MEASURE > Statisistics > Max Count
Reset statistics	CLEAR SCREEN M45 Via icon shown right of statistics table, or touch any setting or button that affects measurements	CLEAR SWEEPS M208 Via 'reset statistics' icon	MEASURE > Statisistics > Reset Statisctics
Increment statistics			Incremental statistics add the currently measured waveform to the collected statistical data (only when acquisition is stop and segments are off) MEASURE > Statisistics > Increment Statistics
Save measurements and statistics	Save measurements and statistics set to file (CSV) (See below at Save and Recall section)		
Other	No global on/off for measurements display (only for individual positions)		

Overview of all measurement types

				SIGLENT	KEYSIGHT TECHNOLOGIES
	Measurement types	Dimen-sion	40 (inc. 2 in-between channel delays) NEW 33	63 (inc. 10 in-between channel delays) NEW 58	30 NEW 33
orizontal (time)	Frequency	Hz	Frequency	Freq	Frequency (Freq)
	Period	S	Period	Period	Period
	Duty Cycle +	%	Duty Cycle +	+Duty	+ Duty Cycle (+ Duty)
	Duty Cycle –	%	Duty Cycle –	–Duty	– Duty Cycle (– Duty)
	Pulse Width +	S	Pulse Width +	+Width	+ Width
	Pulse Width –	S	Pulse Width –	–Width	–Width
	Burst Width	S	Burst Width		
	Rise Time	S	Rise Time	Rise Time; 10-90%Rise[51]	Rise Time (Rise)
	Fall Time	S	Fall Time	Fall Time; 90-10%Fall	Fall Time (Fall)
	Slew rate+	MV/s	Slew rate+ (FW02.000)	PSlope (FW 1.3.9R4)	
	Slew rate-	MV/s	Slew rate- + (FW02.000)	NSlope (FW 1.3.9R4)	
	Delay to Trigger	S	Delay to Trigger (FW02.400)	Delay (same?)	
	Time from trigger to each rising edge[52]	S		T@M	
	Time of max value	S		Time@max	
	Time of min value	S		Time@min	
	Difference between two consecutive periods	S		CCJ	
	X at Min Y	S			X at Min Y (X@Min)
	X at Max Y	S			X at Max Y (X@Max)
Horizontal delay between two channels	Delay	S	"Delay" Settings on either channel: {Rising, Falling} (**) (4 combinations)[53]	"FRFR", "FRFF", etc. Settings on either channel: {Rising, Falling} {First, Last } (8 combinations)	"Delay" Settings on either channel: {Rising, Falling} (4 combinations) (did not get falling edges working)
	Phase	°deg	Phase (**)	Phase	Phase (degrees)
	Skew	S		Skew	
Vertical (amplitude)	Peak to Peak	V	Peak Peak	Pk-Pk	Peak-Peak (Pk-Pk)
	Peak +	V	Peak +	Max	Maximum (Max)
	Peak –	V	Peak –	Min	Minimum (Min)
	Amplitude (top to base)	V	Amplitude	Amplitude	Amplitude (Ampl)
	Top Level	V	Top Level	Top	Top
	Base Level	V	Base Level	Base	Base
	Mean Value	V	Mean Value	Mean	Average Full Screen (Avg-FS)
	Mean Value First Cycle	V	Mean Cycle	Cycle Mean	Average – Cyc (Avg-Cyc) (N cycles)
	Median (50% above 50% below)	V		Median	
	Median First Cycle	V		Cycle Median	
	RMS Value	V	RMS Value	RMS	DC RMS Full Screen (DC RMS – FS)
	RMS Value First Cycle	V	RMS Cycle	Cycle RMS	DC RMS – N Cycles (DC RMS – Cyc) (N cycles)
	RMS Value AC only (σ-Std. Deviation)	V	σ-Std. Deviation	Stdef	AC RMS Full Screen (Std. Deviation) (AC RMS – FS)
	RMS Value AC only (σ-Std. Deviation) First Cycle	V	σ-Std. Dev. Cycle	Cycle Stdef	AC RMS – N Cycles (AC RMS – Cyc) (N cycles)
	Crest Factor	ratio	Crest Factor		
	Level at trigger	V		L@T	
	Pos. Overshoot	%	Pos. Overshoot	ROV	Overshoot (Over)[54]
	Neg. Overshoot	%	Neg. Overshoot	FOV	
	Overshoot before a falling edge	%		Preshoot(FPRE)	Preshoot (Pre)[55]
	Overshoot before a rising edge	%		Preshoot(RPRE)	
Counting	# of positive pulses on display	Cnt.	Positive Pulse	Ppulses	Positive Pulse Count (+ Pulse Count)
	# of negative pulses on display	Cnt.	Negative Pulse	Npulses	Negative Pulse Count (– Pulse Count)
	# of rising edges on display	Cnt.	Positive Slope	Rising Edges	Rising Edge Count (Rise Edge)
	# of falling edges on display	Cnt.	Negative Slope	Falling Edges	Falling Edges Count (Fall Edge)
	# of edges in a waveform	Cnt.		Edges	
	# of cycles in a periodic waveform	Cnt.		Cycles	
	Bit Rate	Mbps			Bit Rate

[51] The first variant measures between low threshold and high threshold (which can be manually set, like the other scopes, see above). The second variant is between 10% and 90%, which overlaps with the first variant.
[52] Creates multiple values in a single trace. So, if there are three edges after the trigger on the screen, the values may be 1µS, 2µS and 3µS. The histogram function can show these clearly. The shown "Value" is the last one (3µS) and the average would be 1.5 µS.
[53] Older FW02.300 had 36 combinations.
[54] The edge that is closest to the trigger is measured (which can be seen by the shown X cursor). To switch between positive and negative overshoot, change the trigger.
[55] The edge that is closest to the trigger is measured (which can be seen by the shown X cursor). To switch between rising edge and falling edge, change the trigger.

	Counter trigger level crossings during gate time	Hz			Counter
Area	.. waveform above zero	Wb[56]		+Area@DC	
	.. waveform below zero	Wb		-Area@DC	
	.. waveform	Wb		Area@DC	
	Absolute area of the waveform	Wb		AbsArea@DC	
	.. waveform above average	Wb		+Area@AC (1.3.7R5)	
	.. waveform below average	Wb		-Area@AC (1.3.7R5)	
	.. above average minus area of the waveform below average	Wb		Area@AC (1.3.7R5)	
	.. above average add area of the waveform below average	Wb		AbsArea@AC (1.3.7R5)	

DSOX xheck Counter check in manual

Digital Voltmeter (DVM)

Location on instrument		SIGLENT	KEYSIGHT TECHNOLOGIES
	App > Meter Quick Toolbar > Meter M165; S7		ANALYZE > Feature > DMM M196; S7,717 DVM standard since FW2.10
Positions (shown simultaneous)	4 positions		2 (one selected voltage plus frequency)
	3 digits		3 digits
Scale	Via analogue channel settings		• Via analogue channel settings[57] • Auto range mode for inactive channels (channel must not be selected for trigger)
Source (Analog)	4A, active or inactive		4A, active or inactive
Measurements	DC, AC, ACrms, DC+ACrms (shown DC measurements are wrong when channel itself is set to AC coupling, no warning[58])		DC, DCrms, ACrms (DC only when channel set to DC, otherwise automatic switch to AC) (Frequency shown simultaneously)
Other			Also works for disabled channels
Bandwidth (voltage measurements)	BW=1MHz		20 Hz to 100 kHz (for RMS) (warning when outside range)
Display	Display colour adapts to channel. Show in overlay window than can be moved.		Large readout seven-segment readout style. Display colour adapts to channel. • While in analysis mode: Results shown in overlay window (transparency selectable).[59] Small analogue scale showing measurement extrema over last 3 seconds. • While not in analysis mode: results shown left bottom.

[56] See discussion at https://electronics.stackexchange.com/questions/562058/siglent-sds1104x-e-integrate-function-units-of-measure
[57] But asynchronous from oscilloscope's acquisition system.
[58] This suggests the DVM is located after the AC coupling capacitor of the channels. While this is apparently also the case for the DSOX, that device takes a better approach: it disables the DVM DC mode when the channel is coupled AC (and if the DVM was already on DC before the channel was put into AC, it switches the DVM back to AC).
[59] When switching from Analysis to Measurement menu, there is weird interference with measurement window.

Frequency counter

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	App > Counter. M167, S7	Analysis > Counter. M264, S14	ANALYZE > Feature > DVM. M196, S7,17
Implementation	Separate from DMM (Separate freq. counter in Measurements) (Separate freq. track in Math)	(Trigger frequency is shown on the screen independent of the counter) (Separate freq. counter in Measurements)	Part of DMM (results shown simultaneously with voltage) (Separate freq. counter in Measurements) (Separate event counter with gate in Measurements)
Modes	Frequency, Period (shown simultaneous)	**Freq, Period, Totalizer**	Frequency
Inputs	**4A, trigger, ext. trigger** **(Independent of DMM)** **(Independent of channel selected for trigger[60])**	4A (Independent of channel selected for trigger but only works if trigger (level) for that channel is properly set[61]) Also works for serial trigger (1.3.7R5)	4A (Same channel as DMM) (Only works when channel is also selected for trigger[62], but independent of proper trigger level)
Digits	6 digits	**7 digits**	5 digits
Measurement rate	[Not specified]	100 times/second	[Not specified]
Totalizer gate / trigger modes		Totalizer can count rising or falling edges Gate mode: Voltage level, Polarity Trigger "After Edge" mode: Rising or falling edges (on gate channel); Level	
Statistics		Statistics (for Freq. and Period) (Value, Mean, Min, Max, Stdef, Count[63])	
Range	Up to scope bandwidth (350MHz), (limited if trigger filter is set)	Not specified	check (In Measurement Module, counter is up to scope bandwidth; 70MHz)

Bus decode

Serial bus decode

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Protocol PROTOCOL	All settings in Analysis > Decode DECODE	
Bundle protocols	SPI, I²C, UART, CAN, LIN	SPI, I²C, UART, CAN, LIN	SPI, I²C, UART, CAN, LIN
Optional		FlexRay, MIL-STD-1553B, I2S, CAN FD Manchester[64], SENT (1.3.7R5)	
Source	4A, 16D (not M or R!!)	4A, 16D (not M or R!!)	4A
Simultaneous decode buses	1 bidirectional[65] 2 unidirectional	**2 bidirectional**	1 bidirectional
Settings	**Extensive (threshold, timing)**	Standard	Standard
Base display format	**{Bin, Hex, Dec, Oct, ASCII[66]}** (non-valid ASCII values shown as HEX)	{Bin, Hex, Dec, ASCII} (Affects addresses as well) (non-valid ASCII values shown as garbage)	UART: {Hex, Bin, ASCII} Others protocols: only {Hex}

[60] In the FW02.400 manual (p. 167) it is called the "Trigger Counter" and the screenshot also shows this at the icon, suggesting its use is limited for the channel serving as trigger. But on the instrument, the text at the icon is different (just counter) and when used, it can just measure the frequency of any channel, whether selected for trigger or not.
[61] Alternatively, a "Level" setting van be used in the counter menu which is linked to the trigger level setting for that channel (if moved, trigger level moves, if trigger level moved, this level moves).
[62] If user selects other channel for trigger, the frequency counter automatically changes to voltmeter for the selected channel.
[63] Here, count represents is how many frequency data points have been gathered for the statistical analysis.
[64] Implemented without serial trigger function.
[65] If a bidirectional bus is used (e.g. UART RX/TX or SPI MOSI/MISO), two bus decoders are occupied. S9.
[66] If a value is observed that does not correspond to an valid ASCII character, then the instrument shows the HEX value instead.

Number of lines shown simultaneous in tabular form ('table', 'lister')	Variable, up to 20 lines shown (scroll option to see more)	Variable, up to 7 lines shown (scroll option to see more)	(Lister since FW2.10) Fixed 9 lines shown (scroll option to see more)
Refresh rate decoded screen display	Very fast	Very fast	Very fast
Refresh rate tabular form ('table', 'lister')	Low (observed as approximately 2 times per second)	Medium (observed as approximately 6 times per second)	Very fast (observed as more than 25 times a second)
Relation to trigger module	All serial trigger information shown in same screen as decode.	Protocol settings copy to and from trigger	xx
Other	Compact display of bits above protocol decode (also when channels off)		
Automatic threshold determination	Yes	No	check
Label Lists	Label list (Protocol Translation Table) for I²C, CAN and LIN can be loaded from file. Examples provided. (FW1 203)		

UART protocol decoding

		SIGLENT	KEYSIGHT TECHNOLOGIES
UART protocol settings	TBA		
UART triggering	TBA		
UART searching			

I²C protocol decoding

		SIGLENT	KEYSIGHT TECHNOLOGIES
I²C protocol protocol settings	Threshold {manual, auto}[67] Speeds supported: high-speed, fast mode plus, fast mode, and standard mode. M229	TBA	{7 bit, 8 bit} not in manual ANALYZE >Features >Serial, mode I2C, Addr Size. M287
I²C triggering	● Start or stop condition ● Repeated start condition ● Bytes with missing acknowledge bit ● Specific address and data conditions .. Read or wrirte .. Slave address length {7,10} .. Specific address .. Data pattern (up to 24 bits of "0" "1" "don't care"); offset up to 4096 bytes.		
I²C searching			

SPI protocol decoding

		SIGLENT	KEYSIGHT TECHNOLOGIES
SPI protocol settings	Word size {1-32 bit} Bit order {MSB, LSB} CS enabled: {High, Low} CS disabled: Idle Time CLK {Rise, Fall} MOSI and MISO {High, Low} Threshold {manual, auto}[68] M222	TBA	Word size {4 to 16} Bit order {MSB, LSB} Display graphic info and values ANALYZE >Features >Serial, mode SPI. M303
SPI triggering	• Frame Start		

[67] For both analogue and digital channels, thresholds can be set and the threshold can be automatically determined.
[68] For both analogue and digital channels, thresholds can be set and the threshold can be automatically determined.

	• Frame End • Specified bit in msg (1 to 32k) • Specified bit pattern in msg (max 32 bit pattern, up to 32k offset)		
SPI searching	•		

CAN protocol decoding

	M244–257	SIGLENT M151–154 (3.6 pages)	KEYSIGHT TECHNOLOGIES ANALYZE >Features >Serial, mode CAN. M277–285
Supported CAN protocol versions	CAN version 2 0A and 2.0B M245	[unspecified][69]	CAN version 2.0A and 2.0B M279
Bus speed (baud rate)	manual from 100b/s to 2Mb/s; 10 presets	manual from 5kb/s to 1Mb/s; 10 presets	Manual form 10 kb/s to 4Mb/s[70]; 15 presets
Polarity	{Active High, Active Low}	[71]	{CAN_H, CAN_L, Differential L-H, Differential H-L, Rx,Tx, } M278–279
Threshold	Auto determine, manual[72]	Manual	Manual
Sample point[73]	25 to 90%		7 presets (from 60% to 87 5%)
CAN triggering	• **Start of frame** • **End of frame** • **Frame** *combination of* .. FRAME TYPE { Data , Remote , Data or Remote , Error , Overload } .. ID TYPE { 11bit , 29bit , any") • **Identifier** *combination of* .. FRAME TYPE { Data , Remote , Either } .. ID TYPE { 11bit , 29bit) .. Specific identifier for the 11 or 29 bits ID in HEX or in BIN, supports wildcards (don t care) for individual bits and for HEX digits .. Compare (> < = ≠) ... A user Symbolic ID[74] • **Identifier and data** Options as for ID above, combined with a data pattern up to 32 bits, supports wildcards (don t care) for individual bits and for HEX digits • **Error** Error type { Stuff bit , Form , Acknowledge , CRC } Any combination of these errors can be selected. *(see also two error frame types above)*	• **Start** (of frame) • (Data frame) **ID** *combination of*[75] .. ID TYPE {'11bit', '29bit'} .. Specific identifier for the 11 or 29 bits in HEX or BIN, does not support wildcards • **Remote** (frame ID) Options as for ID above • **ID + Data** Options as for ID above, combined with a data pattern of up to 16 bits, does not support wildcards. Cannot specify frame type (data or remote). • **Error** [error type not specified or selectable[76]]	• SOF - **Start of Frame** • **Remote Frame ID** (RTR) .. ID TYPE {'11bit', '29bit'} .. Specific identifier for the 11 or 29 bits in HEX or BIN, supports wildcards (don t care) for individual bits and for HEX digits • **Data Frame ID** (not RTR) *Options as for Remote Frame ID above* • **Remote or Data Frame ID** *Options as for Remote Frame ID above* • **Data Frame ID and Data** *Options as for Remote Frame ID above, a* data pattern up to 32 bits, supports wildcards (don t care) for individual bits and for HEX digits. Cannot use data filter for remote frames • **Error** Error type { Error Frame , All Errors , Acknowledge Error , Overload Frame } M280
CAN searching[77]	• **Search Frame** Start of frame End of frame Overload Error (frame) Data ID 11 bit Data ID 29 bit Remote ID 11 bit • **Search Error** { Stuff bit , Form , Acknowledge , CRC } Any combination of these errors can be selected. In a bus table, each error is then identified by type. • **Search Identifier** Same settings as Identifier at trigger section • **Search ID & data** Same settings as Identifier & data at trigger section • **Search ID & error** Combines the settings as Identifier at trigger section with the settings at Error , above.		
Other			CAN bus statistics on bus quality and efficiency. Shows total CAN frames, flagged error frames, overload frames, and bus utilization

[69] From testing I infer that both CAN version 2.0A and 2.0B are supported.
[70] Fractional user-defined baud rates between 4 Mb/s and 5 Mb/s are not allowed.
[71] The CAN bus setting have no polarity option, but the user can change invert the associated channel to achieve a polarity switch.
[72] For both analogue and digital channels, thresholds can be set and the threshold can be automatically determined.
[73] Position of the sample point within the bit, in percent of the horizontal bit time.
[74] If the user loaded a Label List (see above), then the trigger menu allows to select the names in that list, like "Ignition" or "Valve".
[75] There is also a "Curr ID Byte" setting but this is not additional selection criteria but determines the byte changed by the rotary control (of you do not want the direct entry mode).
[76] Manual only notes "Error—The oscilloscope triggers on the error frame." M152.
[77] In contrast to trigger, search can identify/show *all* events that meet the set criteria.

LIN protocol decoding

		SIGLENT	KEYSIGHT TECHNOLOGIES
LIN protocol settings		TBA	Show parity not in manual ANALYZE >Features >Serial, mode LIN. Baud rate: 6 presets (2400 b/s to 625 kb/s) and user defined (up to 625kb/s) Threshold Sample point: 7 presents from 60% to 87.5%) Sync break {11, 12, 134 clocks} ANALYZE >Features >Serial, mode LIN. > Signals. M285
Supported LIN protocol versions	v1.3, v2.x, SAE J602; mixed traffic is supported S16	**v1.3, v2.0** S13	**v1 3, v2.x**
	1.2/2.4/4.8/9.6/10.417/19.2 kbps or user- selectable in range from 1 kbps to 2.5 Mbps		
LIN triggering			
LIN searching			

Parallel bus decode

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Protocol PROTOCOL	All settings: select digital channels, then Bus	Analysis > Features > Analog Bus ('ABUS') *Uses the analogue channels, with individual threshold*
Busses, word size	2 bus, 1-16 bit	2 bus, 1-16 bit	1 bus, 1-4 bit
Base display format	{Bin, Dec, Oct, Hex, ASCII}	{Bin, Dec, Unsigned Dec, Hex}	{Hex, Bin}
Screen position	Flex position & height	Flex position	Fixed
Support for clocked busses	Yes. Bus word size up to 15 bit (leaving 1 bit for CLK) or up to 14 bit (leaving 2 bits for CLK and CS[78])		
Routing support for busses	Allows flexible routing of each of the 16 digital channels	Allows flexible routing of each of the 16 digital channels	
Hight of bus display	Flexible (from 1 to 13 characters vertically)	Fixed (1 character vertically)	
Maximum number of values than can be shown horizontally[79]	48 for 2 char HEX (0 thru FF) 48 for 3 char DEC (0 thru 255) 48 for 5 char DEC (0 thru 65,535) 14 for 16 char BIN (0 thru ,,,,,,,,,,,,,,,)	19 for 2 char HEX (0 thru FF) 19 for 3 char DEC (0 thru 255) 19 for 5 char DEC (0 thru 65,535) 5 for 16 char BIN (0 thru ,,,,,,,,,,,,,,,)	
Number of lines shown simultaneous in tabular form ('table', 'lister')	20 lines shown (scroll option to see more) Lines show frame#, timing (abs or rel), and up to 16 char value		
Bus labels (repeated from above)	Yes		

[78] CS = Chip Select.

[79] For this test an 8 bit bus is configured, so values can vary from 0 to 127 (3 three digits). For a 16 but bus (values 0 thru 65,535) the results are the same.

Analyses

Mask (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in APP > Mask App > Mask	All settings in Analysis > Mask	TBA
Mask	See page8 secs	Yes (80,000 Pass / Fail decisions each second.) on BNC	TBA
BNC pulse out (For pulse amplitude and with see IO/connections, above)	BNC pulse out ("AUX", front side) Pulse on check Mask > Actions. M154 Output settings AUX connector: Setup > Aux out. M27,177/178 Mask > Actions. M 154	BNC pulse out ("Auxiliary Out") Pulse on {Pass, Pail} see above (Output of Auxiliary Out connector is Trigger, except when Mask analysis is activated)	TBA
Actions on mask (other than BNC Pulse out)	• Sound • Stop acquisition • Screenshot • Save waveform Mask > Actions. M154	• Sound ('beep') • Stop acquisition '(Stop on Fail') • Screenshot ('Capture on fail') • Failure to history (The above are not mutually exclusive operations, i.e., you can combine them.) TBA	TBA
		Advanced polynom graphic mask editor	

Bode plots (Frequency Response Analysis) (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in APP > Bode App > Bode	All settings in Analysis > Mask	ANALYZE > Features > Frequency Response Analysis
	Available (FW02.202)		TBA
Bode	A & ϕ Dual I think	, table	TBA
Number of measured simultaneous DUT outputs	dual pair of tracking gain and phase cursors	3 DUT check Traces can be turned on and off Trace Visibility M298	One
Signal source	Internal wave generator	Internal wave generator of external (compatible) Siglent SDG series connected signal generators via LAN or USB	Internal wave generator
Selectable channels for DUT in and out	4A	4A	4A
	10 Hz to 25 MHz S17	10 Hz to 120 MHz Mode: Linear, Logarithmic	10 Hz to 20 MHz S17
DUT input amplitude levels	20 mV to 5 V into high Z 10 mV to 2.5 V into 50 Ω S17		1 mVpp to 9 Vpp into 50-Ω S17
Amplitude zones profile (e.g. for testing sensitive circuits and/or high dynamic range)	check. Up to 16 points/zones	Supports Vari-level and automatic gain. You can have 4 Vari-level profiles (curves) predefined and saved. I don't recall if there is any preset point limit on curve complexity. TBA	
Channel gain (adapts to possible overload channel)		"Channel gain. When it is set to Auto, the oscilloscope will automatically adapt the vertical scale according to the signal amplitude. When it is set to Hold, it will always keep the currently selected vertical scale. If signals overload the selected range in Hold mode, the data may not accurately represent the physical test." M293	
Vertical scale (frequency)		Gain {Vpp, Vrms, dBV, dBu, dBm or Arbitrary dB} in Vout mode or {Linear or Logarithmic} in ratio Vout/Vin mode. M296 Phase in degrees or rad M297	gain (logarithmic, dB) phase (linear, degrees)
Horizontal scale (frequency)			Logarithmic

Auto or manual scale	Auto-scale and manual scaling and positioning	Manual, auto set (for amplitude and phase independently) . M296	Auto-scaled during test with user-defined scaling after test
Sweep modes	single sweep or repeated sweep	{Simple, Vari-level} Singe sweep (FW 1.3.9R4)	
	Amplitude zones, waveform view		waveform view
Test points	10 points to 500 points per decade		1 to 1000 points
Amplitude profile	Yes: You can then define different amplitudes for different frequency; useful when testing sensitive circuits, where the amplitude gets too high. Up to 16 points	Bode plot (FRA) it supports Vari-level and automatic gain.. You can have 4 Vari-level profiles (curves) predefined and saved. I don't recall if there is any preset point limit on curve complexity. TBA	
Measurement results		5 measure modes (Upper cutoff frequency, Lower cutoff frequency, Bandwidth, Gain margin, Phase margin)	
Measurement results table		Measurement results table for each scanning point	
Sweep:			
Markers / cursors		, X and Y cursors,	A single pair of tracking gain and phase markers at user-defined frequency setting S17
Other			The graph is particularly nice looking Autoscale Load of output can be set (on Ω) so shown value best match the actual amplitude S17
Save and recall		Yes M300 aap	

FFT (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in APP > FFT App > FFT	All settings in Analysis > Mask	
	Yes	Yes up to 2 Mpts	Yes
		Markers, auto peak	
		Length 2 Mpts, 1 Mpts, 512 kpts, 256 kpts, 128 kpts, 64 kpts, 32 kpts, 16 kpts, 8 kpts, 4 kpts, 2 kpts Window Rectangular, Blackman, Hanning, Hamming, Flattop Display Full Screen, Split, Exclusive Mode Normal, Max hold, Average Tools Peaks, Markers	

Power Analysis (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument		All settings in Analysis > Power Analysis	
		Power quality, Current Harmonics, Inrush current, Switching loss, Slew rate, Modulation, Output ripple, Turn on/turn off, Transient response, PSRR, Efficiency	

Signal generators

Function generator

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Gen GEN	All settings in Utility > Awg Menu AWG	

			WAVE GEN
Basic waveforms	Sine SinC Rectangle (=square) Pulse (Duty Cycle, Edge Time) Triangle (Symmetry (FW02.400)) Ramp (Polarity) ARB (see below) Exponential (Polarity) [Noise as DC+Noise] DC	Sine Square (Duty Cycle) Ramp (Symmetry) Pulse (Pulse Width) Noise (StDev, Mean) ARB (see below)	Sine Square (Duty Cycle) Ramp (Symmetry) Pulse (Pulse width) Noise DC No ARB
DC offset	For all waveforms	For all waveforms except noise	For all waveforms
Invert	For all waveforms except DC		For all waveforms except DC
Add noise	For DC		Add noise {0-66%) for all waveforms except DC and Noise)
ARB waveforms: upload	TRF files (such as saved as a reference waveform) CSV files (such as saved as a regular waveform)	Yes (USBflash drive or EasyWave PC software)[80]	
ARB waveforms: presets		45 and 2 custom	
ARB waveforms: copy from trace	Supported, can copy any active analogue, math or reference channel. Graphic 'cut waveform' editor (FW02.202).	Yes (S15). Need to check	
Modulation	For all waveforms Mod. type {AM, FM, ASK, FSK} Mod. Function {Sine, Rectangle, Triangle, Ramp} Mod. Frequency Mod. Deviation		For Sine, Ramp Modulation type {AM, FM, FSK) Mod. Function {Sine, Square, Ramp} Mod. Frequency (for AM, FM) Mod. Deviation (for AM, FM) Hop Freq (for FSK) FSK Rate (for FSK)
Burst	Check for which waveforms (FW02.202) Yes (# cycles, idle time, start phase, trigger {Const./Manual})		
Sweep	Check for which waveforms Start Freq., Stop Freq., Sweep Time, Sweep {Linear, Log, Triangle}		
Max frequency sine/square/ARB	25/10/10 MHz	50/10/5 MHz	20/10/- MHz
Max amplitude (PP) 1MHz sine into open circuit	5Vpp	6Vpp [81]	12Vpp[82]
Logic level settings			Logic presets for all waveforms {TTL, CMOS 5.0, CMOS 3.3, CMOS 2.5, ECL)
Output definition (for showing correct amplitude and offset)	High-Z, 50Ω	High-Z, 50Ω	High-Z, 50Ω
Resolution, sample rate, waveform memory	14 bit, 250 MSa/s, 16 kpts	14 bit, 125 MSa/s, 16 kpts	check
Other		Over voltage protection {On, Off} when output higher than 4V) Current limit. S15.	
Other		Zero Adjust automatic calibration	

[80] In the device menu, there is USB and Channel . The latter is probably to retrieve stored waveforms but I get the error File does not exist". Probably one must first create a waveform using the EasyWave PC software and then store them on the device using this software.
See also manual p. 313.

[81] Yet, in Bode plot, the aplitude is apparently up to 24Vpp. See https://siglentna.com/wp-content/uploads/dlm_uploads/2021/10/SDS2000X-Plus-Firmware-Revision-Record-And-Upgrade-Instructions.pdf

[82] The manual states 5Vpp but on the device one can select up to 20Vpp

Pattern generator

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Patt. Gen.		HELP, Training Signals
Number of output pins	4 pins (bits)		1 pin
Square wave	1 pin; Frequency (up to 500kHz) (or Period), Polarity, Duty Cycle		
Digital counter	4 pin counter (0000 0001 0010 etc.) Frequency (up to 50MHz) Direction (Up, Down)		
Arbitrary pattern	4 bits Bit time, Period Burst function (# bursts, idle time between) Pattern length up to 2048 symbols Build-in graphical draw tool Trigger (1 shot or repeat) Load/safe patterns in SCP format (remote commands format; command for pattern is on p.555 of manual). User utility allows Excel creation[83] User utility allows Excel creation[84]		
Burst	[part of arbitrary pattern, see above]		• Burst of digital pulses that occur every 50 µs • Burst of 6 digital pulses (plus infrequent glitch) that occurs once every 80 µs
Manual	Manual setting of the 4 pins		
UART	2 pins (Rx, Tx) 9600 Bit/s, 115.2 kBit/s, 1 MBit/s		
SPI	4 pins (Clk, Mosi, Miso, CS) 100, 250 kBit/s, 1 MBit/s		
I²C	2 pints (SCL, SDA) 100, 400, 1000, 3400 kBit/s		
CAN	2 pin (CAN-H, CAN-L) 50, 100 kBit/s, 1 MBit/s		Training signal: 1 pin (CAN-L), 125 kbp DEMO signal: 1 pin (CAN-L), 125 kbp, very useful sequence[85]
LIN	2 pin (High, Low) 9.6, 10.417, 19.2 kBit/s		1 pin 19 2 kbs

Training signals, demo modes

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	APP > App > Demo		HELP, Training Signals HELP, Demo
Training signals	Serial protocols (8), using up to 4 wires (see Pattern Generator)		14 (glitches, bursts, distortion) 2 serial busses (CAN, LIN)
DEMO modes	Basic (3) Advanced (9) Serial protocol (6) Track (2) (FW02.400)		(Demo since FW2.10) Triggering (2) Math (2) Advanced features (4) Serial buses (2: CAN, LIN)

[83] See https://www.eevblog.com/forum/testgear/rohde-schwarz-rtb2002-rtb2004-question-importing-cvs-in-pattern-generator/
[84] See https://www.eevblog.com/forum/testgear/rohde-schwarz-rtb2002-rtb2004-question-importing-cvs-in-pattern-generator/
[85] This long training sequence (16 messages) that includes short (11 bit) and long (29 bit) ID, data and remote packets, and varying message lengths (1, 4, 5 and 8 bytes). Quasi randomly inserted over training sequences there are a variety of different errors (CRC error, bit stuffing error, NACK), very suitable for testing serial decoders. Apart from these frames where a NACK error is deliberately inserted, the ACK is already added (unlike most demo/training CAN signals on other oscilloscopes). Occasionally, the ASCII character sequence "!AGILENT" is shown, not "KEYSIGHT" ;-) Tip: because it s such a rich sequency, you will want to trigger it properly to a stead point. To do sone, you can trigger on a data frame with ID = 0x7F and first data byte 0xE4 and set trigger holdoff to 35ms.

Memory, history, search

Memory, segmented memory and history (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	@@	@@	@@
Analogue channel memory depth (per channel)	10 Msample 20 Msample (interleaved 2ch mode)	100 Msample 200 Msample (interleaved 2ch mode) (Both half for 10-bit mode)	1 Msample 2 Msample (interleaved 2ch mode) (FW2.10)
Total memory	40Msample (for channels) + 160 Msample segmented memory = 200 Msample B3	Total 400Msample	Total 4MSa
History	13,107 segments	Up to 90,000 frames Analyse > Menu > History All settings in Analysis > History HISTORY	
Segments		Acquire > Sequence. M89	Up to 500 (FW2.10)
	@@ In Acquisition memory at Sample etc the Nx Singlwe can set the number of samples into the memory. Acquisition. M69		
	@@ check record length in acquisition memory Acquisition. M67	Acquisition>Menu>	
Record memory depth	Setup > Language. M198	20k, 200k, 2M, 20M, 200M (half for four channel operation) Acquisition > Menu. M80-81	
Navigate		All settings in Analysis > Navigate NAVIGATE	

Search (events) (TBA)

		SIGLENT	KEYSIGHT TECHNOLOGIES
Location on instrument	All settings in Search SEARCH	All settings in Analysis > Search SEARCH	

Computer access and automatization

Web-based remote access

		SIGLENT	KEYSIGHT TECHNOLOGIES
Remote Front Panel	Remote Front Panel (full panel with screen & buttons) {fixed res, autoscale} Works well with iPads.	Remote Front Panel (screen only) Remote Front Panel does not work properly with Apple iPad (tested regular 10.5" as well as the 10.2" Pro and 12.9" Pro). All have truncation and/or compression problems.	Remote Front Panel (full panel with screen & buttons) Works well with iPads. Remote instrument control requires separate firmware install Slow screen update rate.
Live screen	Live screen {fixed res, autoscale}		Live screen fixed res
Screenprint	Resolution 1280×824 Auto refresh (6 time settings) {PNG, BMP} {Color, Greyscale} {Non-inverted, Inverted}	Resolution 1024×600 (Screenshots part of remote panel)	Via `Get Image:` PNG 800×503 Option for inverted (=printer friendly colours) Via `Save` menu also {PNG (24 bit), BMP (8 or 24 bit} {Color, Greyscale} {Non-inverted, Inverted}
Save waveform from instrument to PC *(See also section Save and Recall for saving to USB).*	Selectable: 4 analogue channels 2 digital sets (D0-D7; D8-D15) 4 Reference waves 5 Math waves File formats {TXT, CVS, BIN-MDB, BIN-LSB, FLT[86]-MSB, FLT-LSB} Type {Display Data, Acq. Mem} Possibility to save to instrument memory itself (instead of to a PC)	Waveform data is saved as *.BIN file. For Windows PC users, a "Convert_bin_to_csv" tool is provided, along with a Python source file and an unreadable read.me file (!). (1.3.5R3) Not clear which waveform is saved (regardless of wave activation, the file is 20MB in size).	(FW2.10) File formats: • CSV data (*.csv) • ASCII XY data (*.csv) • Reference Waveform data (*.h5)[87] {Ch1, Ch2, Ref} (No Ch.3, Ch.4, Math, Ref) • Multi Channel Waveform data (*.h5)[88] • Binary data (*.bin) (See @@ for details) Separate text file contains relevant instrument settings for saved data. For all the above formats, length is selectable.
Save other type of files from instrument to PC *(See also section Save and Recall for saving to USB).*	Setup Self-alignment Report		(FW2.10) Setup Lister data (=serial decode table) Mask Frequency Response Analysis Data
Upload from PC to instrument *(See also section Save and Recall recalling from USB).*	Setup Waveform to Reference 1-4.		(FW2.10) Any file type
SCPI Device Control (direct command entry screen)	SCPI Device Control List if commands is here in the online manual here.	SCPI Device Control	SCPI Device Control (Includes extensive HMTL Quick Reference Guide) (FW2.10)
Device I/O settings information	Extensive	Basic	Very extensive
LAN configuration	See & edit `Setup > Ethernet. M201`	See & edit `Utility > I/O setting > System Setting > LAN conf. M37`	See & edit. `UTILITY > I/O > Configure LAN. M234`
Password for Web Server		Can be set. `Utility > I/O setting > System Setting > Web Server. M334`	

[86] FLT is a Floating Point format.
[87] A format that can be recalled to one of the oscilloscope's reference waveform locations, or opened by the N8900A Infiniium Offline oscilloscope analysis software.waveform locations or read by the N8900A Infiniium Offline oscilloscope analysis software..
[88] A format that can be opened by the N8900A Infiniium Offline oscilloscope analysis software.

Computer software, automation interfaces

		SIGLENT	KEYSIGHT TECHNOLOGIES
Microsoft Windows application software	R&S InstrumentView. Download and analyze waveforms on the computer. Very extensive. No license needed.	No scope control software listed in manual or on download pages for this series.[89] (Siglent EasyWave software can be used to make ARB patterns for this instrument but is not general oscilloscope control software)	BenchVue. Connect, record results and visualize measurements across multiple instruments simultaneously. License included with instrument. Very extensive.
Instrument drivers	Drivers for IVI, LabVIEW, LabWindows, VXI, various computer platforms	IVI Driver	Drivers for IVI and MATLAB
USB device modes (USB-B connector on back panel)	• USB TMC (Test & Measurement Class.). For SCPI via VISA library. • USB VCP (Virtual Com Port). Supports any terminal program to send SCPI commands • USB MTP (Media Transfer Protocol) Screen shortcut Setup > USB. M204	USB TMC (Test & Measurement Class.). (S1) Utility > I/O setting > System Setting > USB ID (shows ID).	Communication to Keysight IO Libraries [I assume NI VISA] USB (USBTMC/488)
LAN	• For access to web server • For SCPI via VISA library. VXI-11 Port can be set in instrument (default 1024). The assigned VISA address is shown. Screen shortcut Setup > Ethernet. M201	• [For access to web server] • SCPI commands via NI-VISA, Telnet, or Socket. VNC number can be set (necessary when accessing more than two Siglent instruments through the web browser) Screen shortcut Utility > I/O setting > System Setting > LAN conf. M37	Communication to Keysight IO Libraries [I assume NI VISA) • HiSLIP LAN protocol • VXI-11 LAN protocol (FW2.10) • GPIB over LAN protocol • TCP/IP SOCKET protocol • TCP/IP TELNET protocol
Emulation modes		Tektronics emulation mode Not documented in manual[90] I Utility > Menu	
Network share storage		Network share storage (FW1.3.9R4). Stores on a Windows SMB mounted disk. It is fully supported for any save/recall operations. Not documented in manual Utility > Menu > System Settings > I/O > Net storage.	
			Remote Command Logging UTILITY > Options > Remote Log. M244

[89] Siglent has a Windows program called EasyScopeX , which controls a variety of their scopes. According the software documentation and revision history, those include the SDS1000, SDS1000X/X+, SDS1000X-E, and SDS2000/X , SDS1000X-U. The SDS2000X Plus series, however, is not mentioned as supported oscilloscope. Some people seem to have used it with this SDS2000X Plus (see https://www.eevblog.com/forum/testgear/siglent-sds2000x-plus-coming/1875/). I did a little but of testing, it starts up, some functions do work but others (like the remote virtual panel) do not seem to work well (even if it nicely confirms its talking to the X Plus model…). I assume this is the reason Siglent does not mention support for this software.

[90] Might be similar to the Tek mode in the Siglent SDS5000X, see here.

System

Save and recall

Device setup	Save, Load To and from internal or external File format: SET (instrument-specific[91]), based on SCPI commands Precise content of setup not specified[92] Setup files have small screenshot embedded for easy identification. These are visible in file manager in instrument when loading a file. SAVE/LOAD File > Setup. M177	Save, Load To and from internal (10 positions max) or external File format: XML (instrument-specific[93]), in XML style format Precise content of setup not specified[94] (I cannot reproduce the steps in Manual p.32 on the instrument…) Current setting can be saved as default set-up. SAVE/RECALL Utility > Save/Recall. M317, 319	Save, Load To and from internal (10 positions max) or external File format: SCP (instrument-specific[95]), in XML style format Saves the horizontal timebase, vertical sensitivity, trigger mode, trigger level, measurements, cursors, and math function settings SAVE/RECALL. P219
Waveform data (save)	Save To internal or external File formats {TXT, CSV[96], BIN-MDB, BIN-LSB, FLT[97]-MSB, FLT-LSB}. Source: • Selected waveform (4A, 16D) • All visible waveforms Choice of • Displayed waveform(s) • Acquisition Memory (for stopped acquisitions) • History Data (waveform plus CSV file with information about segments) Waveform data formats are discussed in detail, including examples, on p.180-182 of the manual; History & Segment files on p. 114-115 SAVE/LOAD File > Setup. M180 114 Waveforms can also be saved as a "Trigger Action" or a "Mask Action".	Save (3 formats) Only to external File formats: CSV, MAT (Matlab format), BIN Source (only for CSV and MAT): • Selected waveform (4A, 2M (1.3.7R5)). Not FFT • All visible waveforms (1.3.7R5) For BIN, I guess all data are saved ?!? For CVS, option to include the scope configuration parameter information (horizontal time base, vertical scale, etc.) `ParaSwitch` For BIN, a Windows-PC Bin2CSV Tool is available. This way, the file from instrument to PC can be smaller. SAVE/RECALL Utility > Save/Recall. M318	Save Only to external File formats: CSV, ASCII XY, BIN, H5 (single waveform/reference waveform[98]), H5 (Multi Channel Waveform data[99]) Detailed information on waveform formats is in manual on pages 266, 273, 274. Number of data points to be saved (`Length`); detailed explanation M221 If segmented memory is active {Selected segment only, All segments} `Setup Info` option saves additional setup information in a separate TXT file (vertical, horizontal, trigger, acquisition, math, and display settings). SAVE/RECALL. P220
FFT data	@@ check Possible to save FFT results	@@ check Since 1.3.9R4	
Reference waveforms	Save, Load To and from internal or external	Save, Load Only to external[101]	Save, Load Only to external File format: H5[104]

[91] This is a device specific format and files are not intended for analysis outside the instrument.
[92] But the file can be opened in a standard text editor and shows some 1400 comment lines of setup data.
[93] This is a device specific format and files are not intended for analysis outside the instrument.
[94] But the file can be opened in a standard text editor – there are roughly 3000 lines of XML language, a bit harder to understand by humans but might still be investigated.
[95] This is a device specific format and files are not intended for analysis outside the instrument. Yet, it is in an XML type of language so can be investigated.
[96] Files stored as *.CSV can be later loaded in the instrument again as reference waveforms.
[97] FLT is a Floating Point format.
[98] A format that can be recalled to one of the oscilloscope's reference waveform locations, or opened by the N8900A Infiniium Offline oscilloscope analysis software.waveform locations or read by the N8900A Infiniium Offline oscilloscope analysis software.
[99] A format that can be opened by the N8900A Infiniium Offline oscilloscope analysis software.
[101] Manual, p.320: *"*Save/Recall only supports saving Reference to external memory. However, the reference waveform itself can be saved to internal memory. See the chapter Reference for details."*
[104] A format that can be recalled to one of the oscilloscope's reference waveform locations, or opened by the N8900A Infiniium Offline oscilloscope analysis software.waveform locations or read by the N8900A Infiniium Offline oscilloscope analysis software.

	File formats: CSV (load only), TRF (instrument-specific[100]) Waveform files saved as CSV format can also be loaded as reference and are converted into TRF by the instrument Reference files have small screenshot embedded for easy identification. These are visible in file manager in instrument when loading a file. REF Reference. M187	File format: REF (instrument-specific[102]) Bit confusing and possible mismatch between instrument and manual. On the instrument it seems you can: - save a source (4A, 2M) into *.REF. - recall (load) a *REF file into REFA to REFD position But this is at odds with the manual.[103] SAVE/RECALL Utility > Save/Recall. M317	SAVE/RECALL. P222
Math sets (equation sets; formularies)	Load, Save To and from internal or external File format: FML (instrument-specific[105]) FML files are instrument-specific[106] To/from internal or external (sets with up to 5 formularies) MATH Math. M187, 101		
Statistics	Save To internal or external File format: CSV; content described on page 134 of manual. Save icon overlaps with other icon[107] Save button shown right of statistics table. M133		
Decoded busses (results table)	Save To internal or external File format: CSV Possible for any parallel or serial bus Protocol. 187, 216		Save Only to external File format: CSV SAVE/RECALL. M222
Search results	Save (CSV file) SEARCH Search. M117		
Screenshots	Save (PNG, BMP) To internal (FW02.300) or external File formats: PNG, BMP Resolution 1280×824 {Color, Greyscale} {Non-inverted, Inverted} Option to disable device logo in screenshot (FW02.300) Option to close all menu's before screenshot (so they do not mask the results) CAMERA[108] or SAVE/LOAD File > Screenshots. M187	Save Only to external File formats: PNG, BMP, JPG Resolution 1024×600 {Normal, Inverted} Print Area {Grid, Full} (FW 1.3.9R4) PRINT Utility > Print SAVE/RECALL Utility > Save/Recall. M318	Save Only to external File formats: PNG (24 bit), BMP (8 or 24 bit) Resolution 800x503 {Color, Greyscale} {Normal, Inverted} (Invert Grat) Setup Info option saves additional setup information in a separate TXT file ((vertical, horizontal, trigger, acquisition, math, and display settings). Save to USB or SAVE/RECALL. M19
Patterns (for pattern generator)	Load, Save To/from internal or external File format: SCP (remote commands format; command for		

[100] This is a device specific format and files are not intended for analysis outside the instrument.
[102] This is a device specific format and files are not intended for analysis outside the instrument.
[103] Manual (p.317) *states "The reference waveform data are saved to external memory with the *.ref file extension."* Bit I did not manage to do so.
[105] This is a device specific format and files are not intended for analysis outside the instrument.
[106] This is a device specific format and files are not intended for analysis outside the instrument.
[107] The SAVE icon overlaps with the R&S Menu logo on the right bottom. While one can still select either, one must take care.
[108] If only screen shot is selected in OneTouch, a simple screenshot is saved. If other file types are also selected, a ZIP is created with all files including the screenshot.

	pattern is on p.555 of manual). User utility allows Excel creation[109] Patt. Gen.		
Arbitrary waveforms (for signal generator	Load From internal or external File formats: - TRF files (such as saved as a reference waveform) - CSV files (such as saved as a regular waveform)		
Mask	Load, Save (MSK) To/from internal only[110] File format: MSK (instrument specific)[111] APP > Mask App > Mask. M147		Save, Load (MSK) To and from internal (4 positions max) or external File format: MSK (instrument specific)[112] SAVE/RECALL. P223
Bode plot results	Save To internal or external File format: CSV file Save button shown in bode plot control menu. M171	Yes M300	Save To external only Format: CSV File with Frequency Response. In the saved file, there are three data columns: frequency (Hz), gain (dB), and phase (degrees). SAVE/RECALL. P219
File Manager or similar functions	Copy between internal memory and USB drive Supported File > Setup[113] M187 For reference waveforms, the file can also be converted between file formats. PS if no USB flash drive inserted, the menu stays grey File > Refences. M187	Windows-like file manager available in the Save/Recall menu Icons and explanation somewhat unclear SAVE/RECALL Utility > Save/Recall. M323	
Saving multiple type of files at once	"OneTouch" allows to save any combination of the below at the same time when touching the "photo" button on the front panel: Setup, Waveform[114], Reference Waveforms, Search Results, Decoded Bus Data, Statistical Results. They are saved as up to 7 files in one ZIP container. File > Onetouch. M187		
Secure erase	Deletes all configuration and user data. Setup > Secure Erase. M187	Not discussed in the User Manual. Is in a weird spot in the menu structure. SAVE/RECALL Utility > Save/Recall > Recall	Performs a secure erase of all non-volatile memory in compliance with National Industrial Security Program Operation Manual (NISPOM) Chapter 8 requirements. SAVE/RECALL > Default/Erase / Secure Erase
Documentation on saved file formats.	Extensive information provided	Minimal or no information, often inconsistent with instrument	Extensive information provided
Free user memory (for local storage)	Approx. 370MB Setup > Memory Usage. M178	Approx. 73MB (but user can only save setup files internally, not even screenshots…) Can be seen in File Manager menu while loading/saving	
Other			File name entry is via rotary dial (keyboard is no option for saving to external memory as the USB slot is occupied)

[109] See https://www.eevblog.com/forum/testgear/rohde-schwarz-rtb2002-rtb2004-question-importing-cvs-in-pattern-generator/
[110] But can be copied with file manager to external storage.
[111] This is a device specific format and files are not intended for analysis outside the instrument.
[112] This is a device specific format and files are not intended for analysis outside the instrument.
[113] Even though this is in the Setup [file] menu, this function works for any type of file.
[114] Waveform is saved according settings possible in Waveform Save menu. These settings are shown in the OneTouch menu.

Other system features (TBA)

Self alignment / user calibration	Self alignment "The self-alignment aligns the data from several input channels vertically and horizon- tally to synchronize the timebases, amplitudes and positions." Can save log file. Setup > Self alignment. M196	Self-calibration "The self-calibration program can quickly calibrate the oscilloscope to reach the best working state and the most precise measurement. " Yes TBA Utility > Do Self Cal. M343	User Calibration "User Calibration performs an internal self-alignment routine to optimize the signal path in the oscilloscope. The routine uses internally generated signals to optimize circuits that affect channel sensitivity, offset, and trigger parameters." Follow key sequence explained on page 246 of user manual To display the user calibration status UTILITY > Service > User Cal Status. M247
Hardware test		Screen test LED test Keyboard/button test. Also fairly cool in its implementation Utility > Do Self-Test > Screen Test Utility > Do Self-Test > LED Test Utility > Do Self- Test > Keyboard Test M340-342	Hardware self-test Front panel self-test. Quite cool in its implementation; check the three function check of rotary dials! UTILITY > Service > Diagnostics / Hardware Self Test. M346 UTILITY > Service > Diagnostics / Front Panel Self Test. M246
Probe compensation	Extensive visually aided procedure [ ] [ ] [ ] [ ] > Probe Vertical > Channel > Probe Setup > Probe Adjust. M86, 461, 462	Via general auto-setup procedure, no specific procedure. AUTO SETUP. M32	Aided procedure. [ ] [ ] [ ] [ ] >Probe > Probe check. M26
Settings on power-on	From last session M34	[From last session] (Not discussed in manual)	[From last session] (Not discussed in manual)
Default setting	PRESET "Resets the instrument to the scope mode and to default state, without analyzing the signal. The user-defined configuration, measurements and other settings are removed and all channels and waveforms, except for channel 1, are disabled."	Default can be set as either: • Factory set-up • A saved user set-up DEFAULT Acquire > Default Saving user setup: SAVE/RECALL Utility > Save/Recall. M317 For both, the device pops up a screen window for confirmation. But you can also tap the button just twice.	Returns device to a default setup but 'leaving some user settings (not specified). Also described as bringing the "oscilloscope in a known operating condition" DEFAULT SETUP. M24 SAVE/RECALL > Default/Erase / Default Setup It is also possible to restore the device to factory setting via de SAVE/RECALL > Default/Erase / Factory Defaults. M225
Autoset	**Per channel:** Autoscale (V02.101) "Performs an autoset process for analog channels: analyzes the enabled analog channel signals, and adjusts the horizontal, vertical, and trigger settings to display stable waveforms" Channel shortcut menu. M58, 313 **For all channels:** Autoset See manual, page 51 for what Autoset exactly does. AUTOSET	For all channels: Auto Setup "The oscilloscope will automatically set the vertical scale, horizontal scale, and trigger level according to the input signal to get the optimum waveform display' (p. 63). "Press the Auto Setup button, and the oscilloscope will set the trigger type to Edge." (p. 101) Is also used for probe compensation (p. 32) Error in manual.[115] AUTO SETUP Acquire > Auto Setup. M58, 63	For all channels: Autoscale "to automatically configure the oscilloscope to best display the input signals." AUTO SCALE. M24
Print to external printer			Print to a USB of network-attached print. (FW2.10) The printer must support Direct PDF printing over USB/IPP (Internet Printing Protocol).[116]A standard PCL3 or PCL5 printer will not work. Various setting options SAVE/RECALL > Print. M229-232
Export crash log files			Export crash log files. Never needed this because it never crashed! UTILITY > Service > Diagnostics > Export Log. M246

Not yet in any of the above categories

	@@check also a clear button	CLEAR SWEEP Acquire > Clear sweep	

[113] Here, the manual, page 58, indicates "Trigger ->Auto Setup" but that is likely a mistake.
[116] See https://edadocs.software.keysight.com/kkbopen/which-printers-are-supported-by-the-infiniivision-oscilloscopes-588283271.html