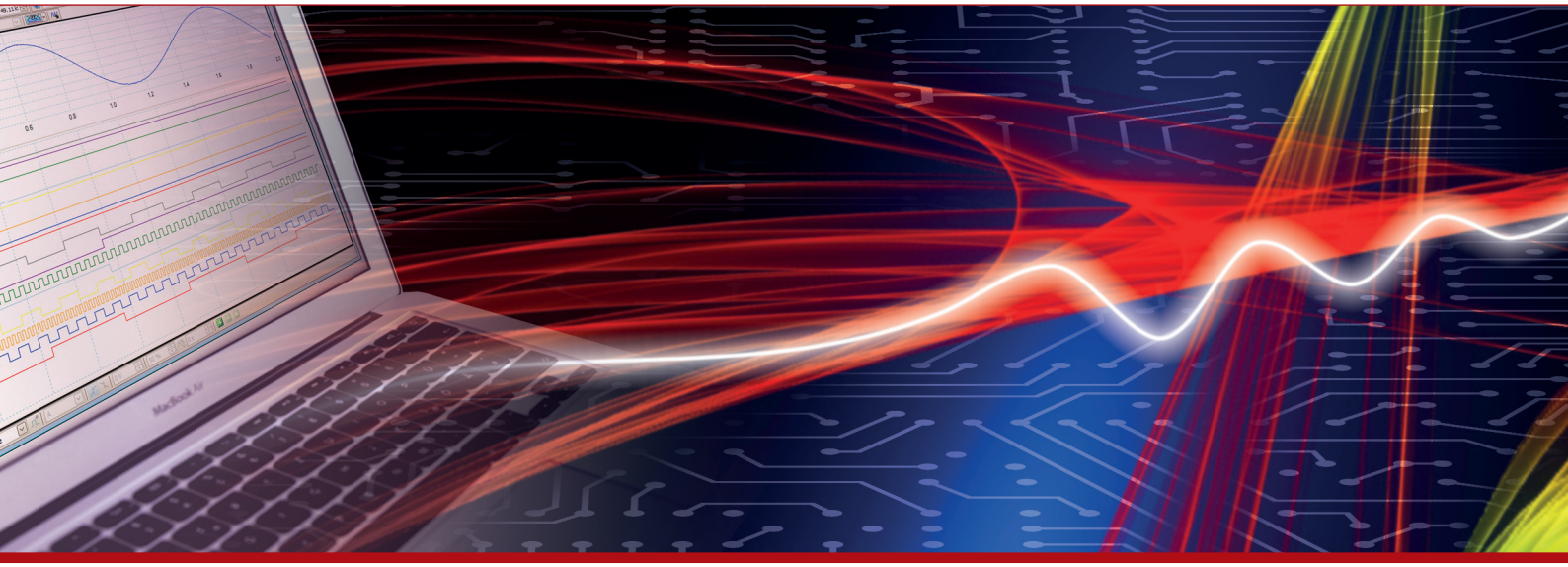
Product Datasheet - Technical Specifications



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Package contents (M520 and M570 family)

- USB oscilloscope – 1pc
- USB cable – 1pc
- installation leaflet – 1pc
- CD with software and user’s guide in pdf – 1pc

Package contents (M774 oscilloscope)

- USB oscilloscope – 1pc
- USB cable – 1pc
- Safety grounding cable – 1pc
- installation leaflet – 1pc
- CD with software and user’s guide in pdf – 1pc

Package contents (M595 oscilloscope)

- USB oscilloscope – 1pc
- USB cable – 1pc
- power adaptor
- installation leaflet – 1pc
- CD with software and user’s guide in pdf – 1pc

Package contents (EA500-0 control panel)

- EA500-0 control panel – 1pc
- USB cable – 1pc
- installation leaflet – 1pc
- CD with software and user’s guide in pdf – 1pc

Performance characteristics

M570 series performance characteristics

Vertical deflection system

No of divisions	8
No of pixels per division	32
Deflection factor range	10mV/div to 5V/div in 1-2-5 sequence
Accuracy	+- 2% of current value + 1 pixel
Resolution	8 bits (0,39%)
Frequency response (-3dB)	DC: 0 - 150 MHz, AC: 1.2Hz – 150 MHz
Step response rise time	max. 2.4 ns
Channel isolation	min. –60 dB
Resistance	1 MOhm +5 %, -2 %
Input resistance inaccuracy adjustment	Digital for absolute accuracy +- 2% of current voltage + 1 pixel
Capacitance	29 pF +- 1pF
Zero setting accuracy	+- 2% of the screen
Maximum input voltage	+- 200V at 100 kHz or less

Triggering

System type	Dual level
Trigger source for primary level	selectable Channel A, Channel B or external trigger input
Trigger source for secondary level	selectable Channel A, Channel B or external trigger input
Threshold setting	Channel A and Channel B on the whole display range. External fixed on about 1.5V
Slope selection	Leading or trailing edge independently on each source
Minimum trigger pulse period	5 ns
Minimum trigger pulse length	2.5 ns
Maximum voltage on external trigger input	–10V to +13V at 20 kHz or less
Adjustments	Digital filter with ability of setting the valid pulse length up to 131072*Ts for each level and counter of valid triggering events settable from 1 to 32768 for each level. HOLD-OFF settable up to 1048576*Ts with selectable AUTO mode, to sample proper amount of data before trigger. (Ts – actual real time sampling period)

Data acquisition system

No of divisions	10
No of pixels per division	50
Mode of operation	Sampling before and after trigger with continual selection of the trigger position
Record length	settable from 1024 to 1048576 (1M) samples for each channel
Time base range in 1:1 mode	5 ns/d to 100 ms/d in 1-2-5 sequence
Time base range using different ZOOM modes	625 ps/d to 204.8 s/d
Time base accuracy	0.01 % to 100ns/d, 0.5 % for 50ns/d to 5 ns/d
Real time sampling frequency	500 Hz to 100 MHz
Equivalent sampling frequency	500 Hz to 10 GHz
Display range with respect to trigger event	1048576 samples before and 1048576 samples after trig. event in length of 1048576 samples

Probe compensation generator

Output connector	BNC, together with External trigger input
Output impedance	1 kOhm to parallel with 10nF and approx. 50 Ohm serial
Output waveform	Pulse with 1:1 duty cycle
Frequency	1465 Hz
Output voltage (no load)	3.3V +- 5%

Power

Power source	USB interface via USB cable
Max current	USB1.1 – 350mA; USB2.0 – 450mA

Mechanical characteristics

Dimensions without feet and connectors	165 x 111 x 35 mm
Dimensions with feet and connectors	182 x 111 x 39 mm
Weight	520 g

M574 timebase ranges

No	REAL TIME	t/div 1:16	t/div 1:1	t/div 10:1	Max. ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.

1	no	10.24us	5ns	500ps	102.4us	100ps	10GHz
2	no	20.48us	10ns	1ns	204.8us	200ps	5GHz
3	no	40.96us	20ns	2ns	409.6us	400ps	2.5GHz
4	no	102.4us	50ns	5ns	1.024ms	1n	1GHz
5	no	204.8us	100ns	10ns	2.048ms	2n	500MHz
6	no	409.6us	200ns	20ns	4.096ms	4ns	250MHz
7	yes	1.024ms	500ns	50ns	10.24ms	10ns	100MHz
8	yes	2.048ms	1us	100ns	20.48ms	20ns	50MHz
9	yes	4.096ms	2us	200ns	40.96ms	40ns	25MHz
10	yes	10.24ms	5us	500ns	102.4ms	100ns	10MHz
11	yes	20.48ms	10us	1us	204.8ms	200ns	5MHz
12	yes	40.96ms	20us	2us	409.6MS	400ns	2.5MHz
13	yes	102.4ms	50us	5us	1.024s	1us	1MHz
14	yes	204.8ms	100us	10us	2.048s	2us	500kHz
15	yes	409.6ms	200us	20us	4.096s	4us	250kHz
16	yes	1.024s	500us	50us	10.24s	10us	100kHz
17	yes	2.048s	1ms	100us	20.48s	20us	50kHz
18	yes	4.096s	2ms	200us	40.96s	40us	25kHz
19	yes	10.24s	5ms	500us	102.4s	100us	10kHz
20	yes	20.48.s	10ms	1ms	204.8s	200us	5kHz
21	yes	40.96s	20ms	2ms	409.6s	400us	2.5kHz
22	yes	102.4s	50ms	5ms	1024s	1ms	1kHz
23	yes	204.8s	100ms	10ms	2048s	2ms	500Hz

M520 series performance characteristics

Vertical deflection system

No of divisions	8	
No of pixels per division	32	
Deflection factor range	10mV/div to 5V/div in 1-2-5 sequence	
Accuracy	+- 2% of current value + 1 pixel	
Resolution	8 bits (0,39%)	
Frequency response (-3dB)	M521, M522	DC: 0 - 60 MHz, AC: 1.2Hz - 60MHz
	M523, M524	DC: 0 - 120 MHz, AC: 1.2Hz – 120MHz
	M525, M526	DC: 0 – 150 MHz, AC: 1.2Hz – 150MHz
Step response rise time	M521, M522	max. 5.8 ns
	M523, M524	max. 2.9 ns
	M525, M526	max. 2.4 ns
Channel isolation	min. –75 dB	
Resistance	1 MOhm +5 %, -2 %	
Input resistance inaccuracy adjustment	Digital for absolute accuracy +- 2% of current voltage + 1 pixel	
Capacitance	30 pF +- 1pF	
Zero setting accuracy	+- 2% of the screen	
Maximum input voltage	+- 200V at 100 kHz or less	

Triggering

System type	Dual level
Trigger source for primary level	selectable Channel A, Channel B or external trigger input
Trigger source for secondary level	selectable Channel A, Channel B or external trigger input
Threshold setting	Channel A and Channel B on the whole display range. External fixed on about 1.5V
Slope selection	Leading or trailing edge independently on each source
Minimum trigger pulse period	5 ns
Minimum trigger pulse length	2.5 ns
Maximum voltage on external trigger input	–10V to +13V at 20 kHz or less
Adjustments	Digital filter with ability of setting the valid pulse length up to 131072*Ts for each level and counter of valid triggering events settable from 1 to 32768 for each level. HOLD-OFF settable up to 131072*Ts with selectable AUTO mode, to sample proper amount of data before trigger. (Ts – actual real time sampling period)

Data acquisition system

No of divisions	10	
No of pixels per division	50	
Mode of operation	Sampling before and after trigger with continual selection of the trigger position	
Record length	M521, 3, 5 M522, 4, 6	4096 samples for each channel 8192 samples for each channel
Time base range in 1:1 mode	M521, M522 M523, M524 M525, M526	10 ns/d to 100 ms/d in 1-2-5 sequence 5 ns/d to 100 ms/d in 1-2-5 sequence 2 ns/d to 100 ms/d in 1-2-5 sequence
Time base range using different ZOOM modes	M521 M522 M523 M524 M525 M526	1 ns/d to 400 ms/d 1 ns/d to 800 ms/d 500 ps/d to 400 ms/d 500 ps/d to 800 ms/d 200 ps/d až 800 ms/d 200 ps/d až 1.6 s/d
Time base accuracy	0.01 % to 100ns/d, 0.5 % for 50ns/d to 5 ns/d	
Real time sampling frequency	M521, M522 M523, M524 M525, M526	500 Hz to 50 MHz 500 Hz to 100 MHz 500 Hz to 200 MHz
Equivalent sampling frequency	M521, M522 M523, M524	500 Hz to 5 GHz 500 Hz to 10 GHz

	M525, M526	500 Hz to 20 GHz
Display range with respect to trigger event	M521, M523, M525 M522, M524, M526	4094 samples before and 63000 samples after trig. event in length of 4096 samples 8190 samples before and 63000 samples after trig. event in length of 8192 samples

Probe compensation generator

Output connector	BNC, together with External trigger input
Output impedance	1 kOhm to parallel with 10nF and approx. 50 Ohm serial
Output waveform	Pulse with 1:1 duty cycle
Frequency	1465 Hz
Output voltage (no load)	3.3V +- 5%

Power

Power source	USB interface via USB cable
Max current	USB1.1 – 350mA; USB2.0 – 450mA

Mechanical characteristics

Dimensions without feet and connectors	165 x 111 x 35 mm
Dimensions with feet and connectors	182 x 111 x 39 mm
Weight	520 g

M521 timebase ranges

No	REAL TIME	t/div 1:8	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
2	no	80ns	10ns	1ns	8.196us	200ps	5GHz
3	no	160ns	20ns	2ns	1.638us	400ps	2.5GHz
4	no	400ns	50ns	5ns	4.096us	1n	1GHz
5	no	800ns	100ns	10ns	8.192us	2n	500MHz
6	no	1.6us	200ns	20ns	16.38us	4ns	250MHz
7	no	4us	500ns	50ns	40.96us	10ns	100MHz
8	yes	8us	1us	100ns	81.96us	20ns	50MHz
9	yes	16us	2us	200ns	163.8us	40ns	25MHz
10	yes	40us	5us	500ns	409.6us	100ns	10MHz
11	yes	80us	10us	1us	819.2us	200ns	5MHz
12	yes	160us	20us	2us	1.638ms	400ns	2.5MHz
13	yes	400us	50us	5us	4.096ms	1us	1MHz
14	yes	800us	100us	10us	8.192ms	2us	500kHz
15	yes	1.6ms	200us	20us	16.38ms	4us	250kHz

16	yes	4ms	500us	50us	40.96ms	10us	100kHz
17	yes	8ms	1ms	100us	81.92ms	20us	50kHz
18	yes	16ms	2ms	200us	163.8ms	40us	25kHz
19	yes	40ms	5ms	500us	409.6ms	100us	10kHz
20	yes	80ms	10ms	1ms	819.2ms	200us	5kHz
21	yes	160ms	20ms	2ms	1.638s	400us	2.5kHz
22	yes	400ms	50ms	5ms	4.096s	1ms	1kHz
23	yes	800ms	100ms	10ms	8.192s	2ms	500Hz

M522 timebase ranges

No	REAL TIME	t/div 1:16	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
2	no	160ns	10ns	1ns	1.638us	200ps	5GHz
3	no	320ns	20ns	2ns	3.276us	400ps	2.5GHz
4	no	800ns	50ns	5ns	8.192us	1n	1GHz
5	no	1.6us	100ns	10ns	16.38us	2n	500MHz
6	no	3.2us	200ns	20ns	32.76us	4ns	250MHz
7	no	8us	500ns	50ns	81.92us	10ns	100MHz
8	yes	16us	1us	100ns	163.8us	20ns	50MHz
9	yes	32us	2us	200ns	327.6us	40ns	25MHz
10	yes	80us	5us	500ns	819.2us	100ns	10MHz
11	yes	160us	10us	1us	1.638ms	200ns	5MHz
12	yes	320us	20us	2us	3.276ms	400ns	2.5MHz
13	yes	800us	50us	5us	8.192ms	1us	1MHz
14	yes	1.6ms	100us	10us	16.38ms	2us	500kHz
15	yes	3.2ms	200us	20us	32.76ms	4us	250kHz
16	yes	8ms	500us	50us	81.92ms	10us	100kHz
17	yes	16ms	1ms	100us	163.8ms	20us	50kHz
18	yes	32ms	2ms	200us	327.6ms	40us	25kHz
19	yes	80ms	5ms	500us	819.2ms	100us	10kHz
20	yes	160ms	10ms	1ms	1.638s	200us	5kHz
21	yes	320ms	20ms	2ms	3.276s	400us	2.5kHz
22	yes	800ms	50ms	5ms	8.192s	1ms	1kHz
23	yes	1.6s	100ms	10ms	16.384s	2ms	500Hz

M523 timebase ranges

No	REAL TIME	t/div 1:8	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	40ns	5ns	500ps	409.6ns	100ps	10GHz
2	no	80ns	10ns	1ns	8.196us	200ps	5GHz
3	no	160ns	20ns	2ns	1.638us	400ps	2.5GHz
4	no	400ns	50ns	5ns	4.096us	1n	1GHz
5	no	800ns	100ns	10ns	8.192us	2n	500MHz
6	no	1.6us	200ns	20ns	16.38us	4ns	250MHz
7	yes	4us	500ns	50ns	40.96us	10ns	100MHz

8	yes	8us	1us	100ns	81.96us	20ns	50MHz
9	yes	16us	2us	200ns	163.8us	40ns	25MHz
10	yes	40us	5us	500ns	409.6us	100ns	10MHz
11	yes	80us	10us	1us	819.2us	200ns	5MHz
12	yes	160us	20us	2us	1.638ms	400ns	2.5MHz
13	yes	400us	50us	5us	4.096ms	1us	1MHz
14	yes	800us	100us	10us	8.192ms	2us	500kHz
15	yes	1.6ms	200us	20us	16.38ms	4us	250kHz
16	yes	4ms	500us	50us	40.96ms	10us	100kHz
17	yes	8ms	1ms	100us	81.92ms	20us	50kHz
18	yes	16ms	2ms	200us	163.8ms	40us	25kHz
19	yes	40ms	5ms	500us	409.6ms	100us	10kHz
20	yes	80ms	10ms	1ms	819.2ms	200us	5kHz
21	yes	160ms	20ms	2ms	1.638s	400us	2.5kHz
22	yes	400ms	50ms	5ms	4.096s	1ms	1kHz
23	yes	800ms	100ms	10ms	8.192s	2ms	500Hz

M524 timebase ranges

No	REAL TIME	t/div 1:16	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	80ns	5ns	500ps	819.2us	100ps	10GHz
2	no	160ns	10ns	1ns	1.638us	200ps	5GHz
3	no	320ns	20ns	2ns	3.276us	400ps	2.5GHz
4	no	800ns	50ns	5ns	8.192us	1n	1GHz
5	no	1.6us	100ns	10ns	16.38us	2n	500MHz
6	no	3.2us	200ns	20ns	32.76us	4ns	250MHz
7	yes	8us	500ns	50ns	81.92us	10ns	100MHz
8	yes	16us	1us	100ns	163.8us	20ns	50MHz
9	yes	32us	2us	200ns	327.6us	40ns	25MHz
10	yes	80us	5us	500ns	819.2us	100ns	10MHz
11	yes	160us	10us	1us	1.638ms	200ns	5MHz
12	yes	320us	20us	2us	3.276ms	400ns	2.5MHz
13	yes	800us	50us	5us	8.192ms	1us	1MHz
14	yes	1.6ms	100us	10us	16.38ms	2us	500kHz
15	yes	3.2ms	200us	20us	32.76ms	4us	250kHz
16	yes	8ms	500us	50us	81.92ms	10us	100kHz
17	yes	16ms	1ms	100us	163.8ms	20us	50kHz
18	yes	32ms	2ms	200us	327.6ms	40us	25kHz
19	yes	80ms	5ms	500us	819.2ms	100us	10kHz
20	yes	160ms	10ms	1ms	1.638s	200us	5kHz
21	yes	320ms	20ms	2ms	3.276s	400us	2.5kHz
22	yes	800ms	50ms	5ms	8.192s	1ms	1kHz
23	yes	1.6s	100ms	10ms	16.384s	2ms	500Hz

M525 timebase ranges

No	REAL TIME	t/div 1:10	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	20ns	2ns	200ps	204.8ns	50ps	20GHz
2	no	50ns	5ns	500ps	512ns	125ps	8GHz
3	no	100ns	10ns	1ns	1.024us	250ps	4GHz
4	no	200ns	20ns	2ns	2.048us	500ps	2GHz
5	no	500ns	50ns	5ns	5.12us	1.25ns	800MHz
6	no	1us	100ns	10ns	10.24us	2.5ns	400MHz
7	yes	2us	200ns	20ns	20.48us	5ns	200MHz
8	yes	5us	500ns	50ns	51.2us	12.5ns	80MHz
9	yes	10us	1us	100ns	102.4us	25ns	40MHz
10	yes	20us	2us	200ns	204.8us	50ns	20MHz
11	yes	50us	5us	500ns	512ms	125ns	8MHz
12	yes	100us	10us	1us	1.024ms	250ns	4MHz
13	yes	200us	20us	2us	2.048ms	500ns	2MHz
14	yes	500us	50us	5us	5.12ms	1.25us	800kHz
15	yes	1ms	100us	10us	10.24ms	2.5us	400kHz
16	yes	2ms	200us	20us	20.48ms	5us	200kHz
17	yes	5ms	500us	50us	51.2ms	12.5us	80kHz
18	yes	10ms	1ms	100us	102.4ms	25us	40kHz
19	yes	20ms	2ms	200us	204.8ms	50us	20kHz
20	yes	50ms	5ms	500us	512ms	125us	8kHz
21	yes	100ms	10ms	1ms	1.024s	250us	4kHz
22	yes	200ms	20ms	2ms	4.096s	500us	2kHz
23	yes	500ms	50ms	5ms	10.24s	1.25ms	800Hz
24	yes	1s	100ms	10ms	20.48s	2.5ms	400Hz

M526 timebase ranges

No	REAL TIME	t/div 1:20	t/div 1:1	t/div 10:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	40ns	2ns	200ps	409.6ns	50ps	20GHz
2	no	100ns	5ns	500ps	1.024us	125ps	8GHz
3	no	200ns	10ns	1ns	2.048us	250ps	4GHz
4	no	400ns	20ns	2ns	4.096us	500ps	2GHz
5	no	1us	50ns	5ns	10.24us	1.25ns	800MHz
6	no	2us	100ns	10ns	20.48us	2.5ns	400MHz
7	yes	4us	200ns	20ns	40.96us	5ns	200MHz
8	yes	10us	500ns	50ns	102.4us	12.5ns	80MHz
9	yes	20us	1us	100ns	204.8us	25ns	40MHz
10	yes	40us	2us	200ns	409.6us	50ns	20MHz
11	yes	100us	5us	500ns	1.024ms	125ns	8MHz
12	yes	200us	10us	1us	2.048ms	250ns	4MHz
13	yes	400us	20us	2us	4.096ms	500ns	2MHz
14	yes	1ms	50us	5us	10.24ms	1.25us	800kHz

15	yes	2ms	100us	10us	20.48ms	2.5us	400kHz
16	yes	4ms	200us	20us	40.96ms	5us	200kHz
17	yes	10ms	500us	50us	102.4ms	12.5us	80kHz
18	yes	20ms	1ms	100us	204.8ms	25us	40kHz
19	yes	40ms	2ms	200us	409.6ms	50us	20kHz
20	yes	100ms	5ms	500us	1.024s	125us	8kHz
21	yes	200ms	10ms	1ms	2.048s	250us	4kHz
22	yes	400ms	20ms	2ms	4.096s	500us	2kHz
23	yes	1s	50ms	5ms	10.24s	1.25ms	800Hz
24	yes	2s	100ms	10ms	20.48s	2.5ms	400Hz

M770 series performance characteristics

Vertical deflection system

No of divisions	8
No of pixels per division	32
Deflection factor range	10mV/div to 5V/div in 1-2-5 sequence
Accuracy	+- 2% of current value + 1 pixel
Resolution	8 bits (0,39%)
Frequency response (-3dB)	DC: 0 - 150 MHz, AC: 1.2Hz – 150 MHz
Step response rise time	max. 2.4 ns
Channel isolation	min. –60 dB
Resistance	1 MOhm +5 %, -2 %
Input resistance inaccuracy adjustment	Digital for absolute accuracy +- 2% of current voltage + 1 pixel
Capacitance	28 pF +- 1pF
Zero setting accuracy	+- 2% of the screen
Maximum input voltage	+- 200V at 100 kHz or less

Triggering

System type	Dual level
Trigger source for primary level	selectable Channel A, Channel B or external trigger input
Trigger source for secondary level	selectable Channel A, Channel B or external trigger input
Threshold setting	Channel A and Channel B on the whole display range. External fixed on about 1.5V
Slope selection	Leading or trailing edge independently on each source
Minimum trigger pulse period	5 ns
Minimum trigger pulse length	2.5 ns
Maximum voltage on external trigger input	–10V to +13V at 20 kHz or less
Adjustments	Digital filter with ability of setting the valid pulse length

	up to 131072*Ts for each level and counter of valid triggering events settable from 1 to 32768 for each level. HOLD-OFF settable up to 1048576*Ts with selectable AUTO mode, to sample proper amount of data before trigger. (Ts – actual real time sampling period)

Data acquisition system

No of divisions	10
No of pixels per division	50
Mode of operation	Sampling before and after trigger with continual selection of the trigger position
Record length	settable from 1024 to 1048576 (1M) samples for each channel
Time base range in 1:1 mode	5 ns/d to 100 ms/d in 1-2-5 sequence
Time base range using different ZOOM modes	625 ps/d to 204.8 s/d
Time base accuracy	0.01 % to 100ns/d, 0.5 % for 50ns/d to 5 ns/d
Real time sampling frequency	500 Hz to 100 MHz
Equivalent sampling frequency	500 Hz to 10 GHz
Display range with respect to trigger event	1048576 samples before and 1048576 samples after trig. event in length of 1048576 samples

Probe compensation generator

Output connector	BNC, together with External trigger input
Output impedance	1 kOhm to parallel with 10nF and approx. 50 Ohm serial
Output waveform	Pulse with 1:1 duty cycle
Frequency	1465 Hz
Output voltage (no load)	3.3V +- 5%

Power

Power source	USB interface via USB cable (power ground isolated from ground of measuring inputs)
Max current	470mA

Insulation specification

Maximum voltage between grounds	500Vp while the voltage [V] * frequency [Hz] factor must not exceed 50000 [V Hz]
Resistance	> 2 GOhm

Capacitance	cca 150pF

Mechanical characteristics

Dimensions without feet and connectors	165 x 111 x 35 mm
Dimensions with feet and connectors	182 x 111 x 39 mm
Weight	550 g

M774 timebase ranges

No	REAL TIME	t/div 1:16	t/div 1:1	t/div 10:1	Max. ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	10.24us	5ns	500ps	102.4us	100ps	10GHz
2	no	20.48us	10ns	1ns	204.8us	200ps	5GHz
3	no	40.96us	20ns	2ns	409.6us	400ps	2.5GHz
4	no	102.4us	50ns	5ns	1.024ms	1n	1GHz
5	no	204.8us	100ns	10ns	2.048ms	2n	500MHz
6	no	409.6us	200ns	20ns	4.096ms	4ns	250MHz
7	yes	1.024ms	500ns	50ns	10.24ms	10ns	100MHz
8	yes	2.048ms	1us	100ns	20.48ms	20ns	50MHz
9	yes	4.096ms	2us	200ns	40.96ms	40ns	25MHz
10	yes	10.24ms	5us	500ns	102.4ms	100ns	10MHz
11	yes	20.48ms	10us	1us	204.8ms	200ns	5MHz
12	yes	40.96ms	20us	2us	409.6MS	400ns	2.5MHz
13	yes	102.4ms	50us	5us	1.024s	1us	1MHz
14	yes	204.8ms	100us	10us	2.048s	2us	500kHz
15	yes	409.6ms	200us	20us	4.096s	4us	250kHz
16	yes	1.024s	500us	50us	10.24s	10us	100kHz
17	yes	2.048s	1ms	100us	20.48s	20us	50kHz
18	yes	4.096s	2ms	200us	40.96s	40us	25kHz
19	yes	10.24s	5ms	500us	102.4s	100us	10kHz
20	yes	20.48.s	10ms	1ms	204.8s	200us	5kHz
21	yes	40.96s	20ms	2ms	409.6s	400us	2.5kHz
22	yes	102.4s	50ms	5ms	1024s	1ms	1kHz
23	yes	204.8s	100ms	10ms	2048s	2ms	500Hz

M595 performance characteristics

Vertical deflection system

No of divisions	8
No of pixels per division	32
Deflection factor range	10mV/div to 5V/div in 1-2-5 sequence

Accuracy	+- 2% of current value + 1 pixel
Resolution	8 bits (0,39%)
Frequency response (-3dB)	DC: 0-300 MHz, AC: 1.6 Hz-300 MHz for ranges 10mV/d to 50mV/d DC: 0-350 MHz, AC: 1.6 Hz-350 MHz for ranges 100mV/d to 5V/d
Step response rise time	max. 1.2 ns for ranges 10mV/d to50mV/d max. 1 ns for ranges 100mV/d to 5V/d
Channel isolation	better than –40 dB
Resistance	1 MOhm +3 %, -1 %
Input resistance inaccuracy adjustment	Digital for absolute accuracy +- 2% of current voltage + 1 pixel
Capacitance	28 pF +- 1pF
Zero setting accuracy	+- 2% of range
Maximum input voltage	+- 200V at 100 kHz or less

Triggering

System type	Dual level
Trigger source for primary level	Channel A, channel B or external trigger input
Trigger source for secondary level	Channel A, channel B or external trigger input
Threshold setting	Channel A and Channel B on the whole display range. External fixed on about 1.5V
Slope selection	Leading or trailing edge independently on each source
Minimum trigger pulse period	3 ns
Minimum trigger pulse length	1.5 ns
Maximum voltage on external trigger input	–10V to +13V at 20 kHz or less
Adjustments	Digital filter with ability of setting the valid pulse length up to 131072*Ts for each level and counter of valid triggering events settable from 1 to 32768 for each level. HOLD-OFF settable up to 1048576*Ts with selectable AUTO mode, to sample proper amount of data before trigger. (Ts – actual real time sampling period)

Data acquisition system

No of divisions	10
No of pixels per division	50
Mode of operation	Sampling before and after trigger with continual selection of the trigger position
Record length	settable from 1024 to 32768 (32k) samples for each channel

Time base range in 1:1 mode	1 ns/div to 20 ms/div in1-2-5 steps
Time base range using different ZOOM modes	125 ps/div to 1.28 s/div
Time base accuracy	0.01 % to 20ns/div, 0.5 % for 10ns/div to 1 ns/div
Real time sampling frequency	2500 Hz to 500 MHz dual channel mode 2500 Hz to 1 GHz single channel mode
Equivalent sampling frequency	2500 Hz to 50 GHz
Display range with respect to trigger event	32768 samples before and 32768 samples after trig. event in length of 32768 samples

Probe compensation generator

Output connector	BNC, together with External trigger input
Output impedance	1 kOhm to parallel with 10nF and approx. 50 Ohm serial
Output waveform	Pulse with 1:1 duty cycle
Frequency	1465 Hz
Output voltage (no load)	3.3V +- 5%

Synchronization output

Output connector	BNC, together with External trigger input
Output waveform	Leading edge of about 3V high pulse

Power

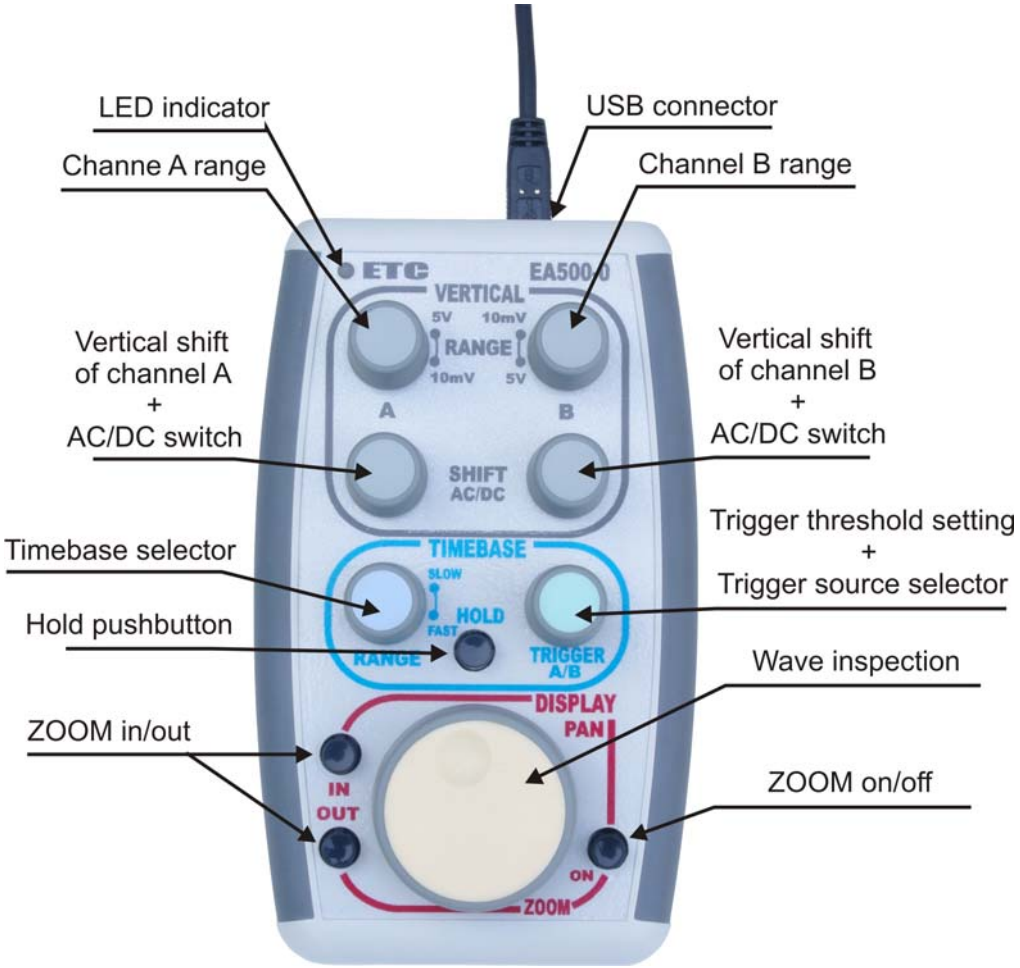
Power source	USB interface and auxiliary source 10V to 18V DC
Power consumption	USB: 0.85W (170mA), auxiliary: max. 7W

Mechanical characteristics

Dimensions without feet and connectors	165 x 111 x 35 mm
Dimensions with feet and connectors	182 x 111 x 39 mm
Weight	560 g

Timebase ranges of M595

No	REAL TIME	t/div 1:64	t/div 1:1	t/div 8:1	ACQ. TIME	SAMP. PERIOD	SAMP. FREQ.
1	no	64ns	1ns	125ps	-	20ps	50GHz
2	no	128ns	2ns	250ps	-	40ps	25GHz
3	no	320ns	5ns	625ps	-	100ps	10GHz
2	no	640ns	10ns	1.25ns	-	200ps	5GHz
3	no	1.28us	20ns	2.5ns	-	400ps	2.5GHz
4	yes for one channel	3.2us	50ns	6.25ns	32.768us	1n	1GHz
5	yes	6.4us	100ns	12.5ns	65.535us	2n	500MHz
6	yes	12.8us	200ns	25ns	131.07us	4ns	250MHz
7	yes	32us	500ns	62.5ns	327.68us	10ns	100MHz
8	yes	64us	1us	125ns	655.35us	20ns	50MHz
9	yes	128us	2us	250ns	1.3107ms	40ns	25MHz
10	yes	320us	5us	625ns	3.2768ms	100ns	10MHz
11	yes	640us	10us	1.25us	6.5535ms	200ns	5MHz
12	yes	1.28ms	20us	2.5us	13.107ms	400ns	2.5MHz
13	yes	3.2ms	50us	6.25us	32.768ms	1us	1MHz
14	yes	6.4ms	100us	12.5us	65.535ms	2us	500kHz
15	yes	12.8ms	200us	25us	131.07ms	4us	250kHz
16	yes	32ms	500us	62.5us	327.68ms	10us	100kHz
17	yes	16ms	1ms	100us	655.35ms	20us	50kHz
18	yes	128ms	2ms	250us	1.3107s	40us	25kHz
19	yes	320ms	5ms	625us	3.2768s	100us	10kHz
20	yes	640ms	10ms	1.25ms	6.5535s	200us	5kHz
21	yes	1.28s	20ms	2.5ms	13.107s	400us	2.5kHz


LED indicator
USB connector
Channe A range
Channel B range
ETC
EA5000
VERTICAL
5V
10mV
RANGE
10mV
5V
A
B
Vertical shift
of channel A
+
AC/DC switch
Vertical shift
of channel B
+
AC/DC switch
SHIFT
AC/DC
Trigger threshold setting
+
Trigger source selector
Timebase selector
TIMEBASE
SLOW
FAST
HOLD
RANGE
TRIGGER
A/B
Hold pushbutton
Wave inspection
DISPLAY
PAN
ZOOM in/out
IN
OUT
ZOOM on/off
ON
ZOOM