

MTX 1052 & MTX 1054 digital recorder-analyser oscilloscopes  
 MTX 112 & MTX 162, Didascope and digital oscilloscope  
 MTX 1032 differential probes  
 MTX 1050 spectrum analyser



# in@BOX Series

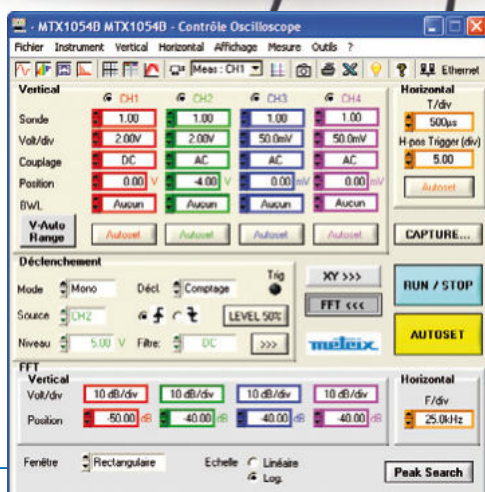
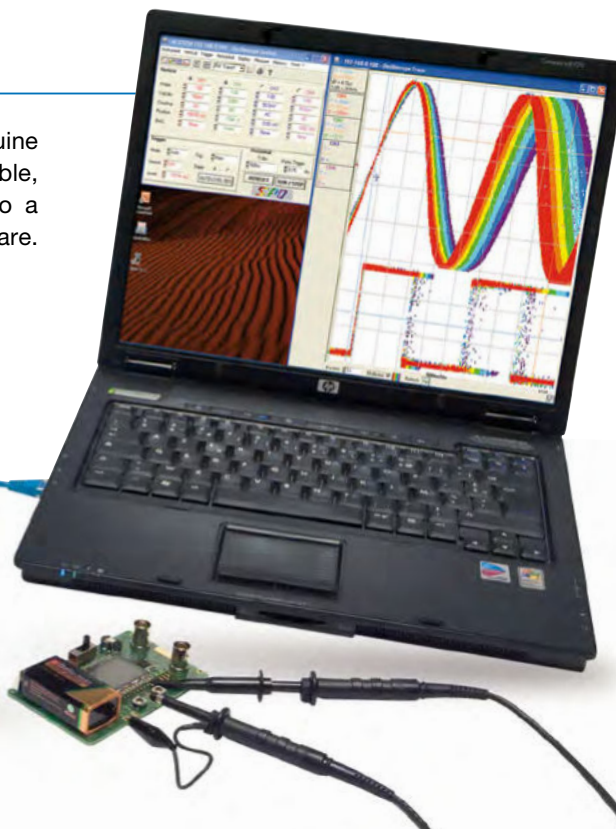


- **MTX 1052 & MTX 1054 oscilloscopes with FFT analysis, harmonic analysis and recording function**
  - 2 or 4 channels, 150 MHz or 200 MHz, vertical sensitivity 250  $\mu$ V – 100 V/div
  - Advanced trigger modes and SPO analysis
  - Communication with PC directly by USB or via Ethernet network (wired or WiFi depending on model)
- **MTX 162 compact, low-cost oscilloscope and MTX 112 differential oscilloscope (10 MHz, USB)**
  - 2 channels, 10 or 60 MHz, normal or remanent display (like an analogue oscilloscope)
  - Communication with PC directly by USB or via Ethernet network (wired or WiFi depending on model)
- **MTX 1032 differential probes for measuring signals not referenced to earth**
  - 2 isolated channels, input voltage 600 V and 600 Vrms in common mode
  - Attenuation 1/10 and 1/100
  - Bandwidth 50 MHz / BNC (MTX 1032-C) or 30 MHz / banana (MTX 1032-B)
- **MTX 1050 spectrum analyser (400 kHz to 1 GHz)**
  - Ideal for EMC prequalification tests with built-in FM demodulator
  - Direct communication with PC via USB

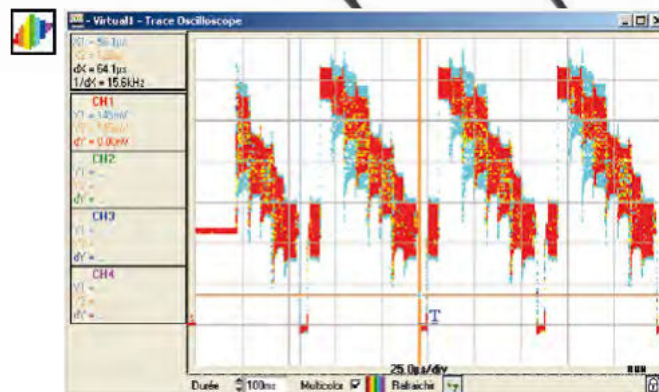
## SCOPEin@BOX Screenless Oscilloscopes and DIDASCOPEin@BOX

### PC ergonomics and environment

The **MTX-1052-PC**, **MTX 1054-PC** and **MTX 162** are genuine "oscilloscopes in a box". Compact, lightweight and stackable, these measurement instruments can be connected directly to a PC via a USB or Ethernet interface with dedicated PC software. New WiFi versions now allow wireless Ethernet communication.



► **SCOPEin@BOX, control panel**  
General commands



► **SCOPEin@BOX, display of "X(t)" traces in SPO mode**

Users benefit from all the PC's advantages in terms of **storage capacity** (the capacity of the PC) and display capabilities (minimum resolution 1024 x 768), allowing **more precise analysis of the curves**.

The functions are directly accessible from the menus and the "Windows" toolbar, via keyboard shortcuts or by using the mouse. Users control the oscilloscope with the "instrument" control panel, which contains all the standard commands for oscilloscopes. **Online help** is also available.

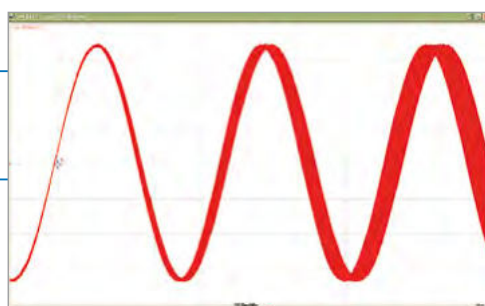
Multi-windowing means you can simultaneously display the traces, the zoom, the FFT analysis, the measurements, etc. In this way, users can choose among multiple combinations so that they have all the useful information available at a glance.

The **MTX 1052 & MTX 1054** are both equipped with the SPO (Smart Persistence Oscilloscope) display mode which combines the advantages of analogue and digital displays. You can use it to manage display and data acquisition simultaneously, making it possible to increase the acquisition rate up to several tens of thousands per second\*. With SPO, users can detect brief events, instabilities and untimely anomalies.

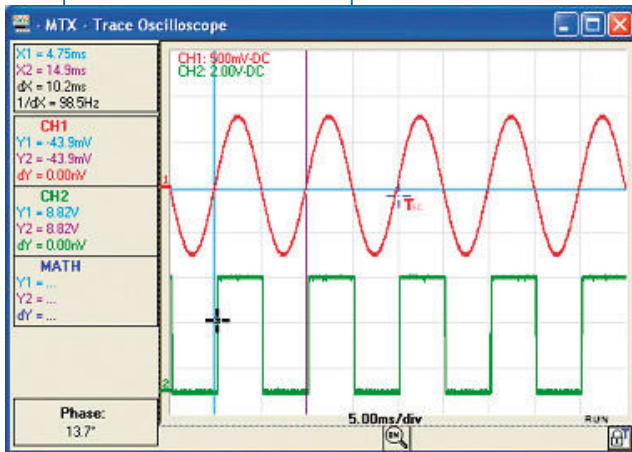
The **MTX 162**, a "double time-base" oscilloscope, offers normal or remanent display (like on an analogue oscilloscope).

\* Ageing of the samples is also possible in this mode.

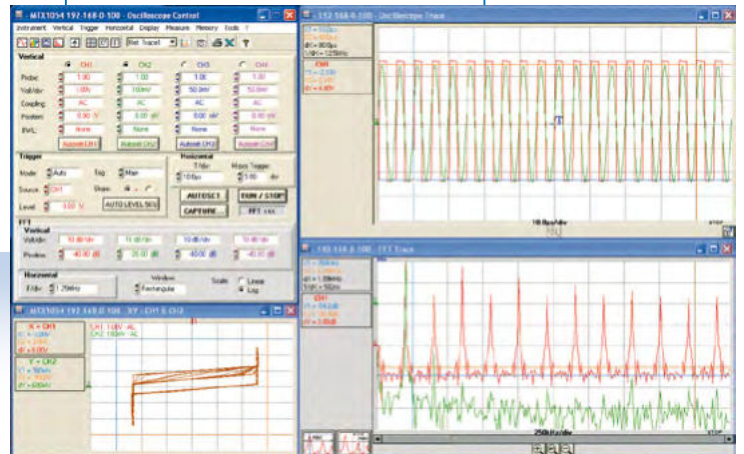
► **Remanent display of MTX 162**



► **MTX 162**  
display of traces



► **SCOPEin@BOX, simultaneous**  
"X(t)", "XY" and "FFT" display



### Functions

Each of these models offers functions which are rare on this type of instrument: real-time FFT analyser (lin/log), recorder or dedicated ROLL mode to simplify adjustments (MTX 162 and MTX 112), bandwidth limiters, simultaneous automatic measurements with markers and cursors, etc.

For simpler use, an **automatic** Autorange mode is available on all the **oscilloscopes with remote display**.

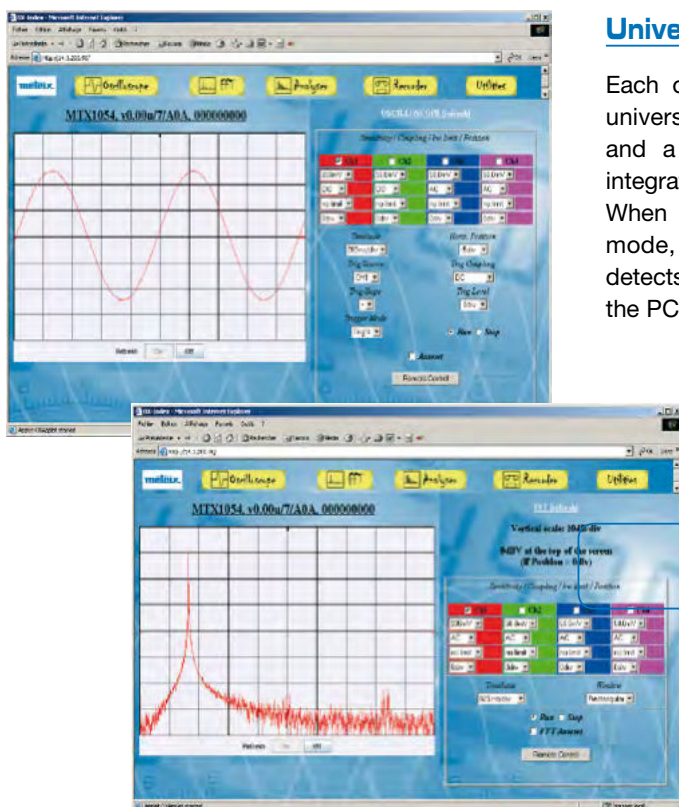
The Vertical Autorange function constantly adjusts the sensitivity on the signal amplitude.

The Horizontal Autorange function constantly calculates the time base to ensure the best possible display of the signal to be analysed. The **MTX 1052 & MTX 1054** offer extensive advanced triggering possibilities: edge, pulse width, TV signal, edge with delay or edge with event counter.

The **MTX 112** is a 600 V CAT II differential oscilloscope equipped with 2 channels with 2 safety banana plugs (+ and - inputs). It operates on a Plug and Play basis via the USB input with the 2 associated software products, DIDASCOPEin@BOX and SCOPEin@BOX\_LE.



► HX0112 demonstrator of the signals present in an AC-DC power supply



### Universal communication

Each oscilloscope is equipped with a universal USB communication mode and a 10 Mb Ethernet interface for integration in a local or remote network. When started up in **USB or Ethernet** mode, the software automatically detects the instruments connected to the PC or network.



"Unlimited" storage of the traces is possible simply by saving the files. Firmware upgrades are automatic. A click or two is all it takes to export the results into Excel or print them out in Word.

► **The "Web Server": remote control**  
without extra software

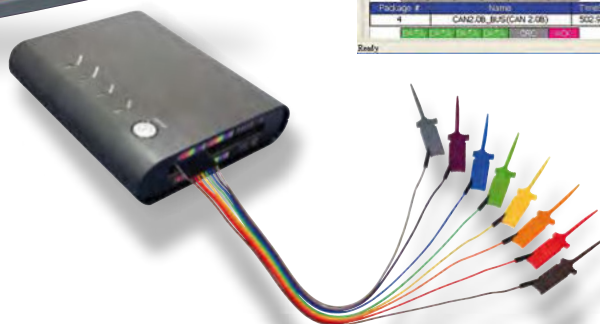
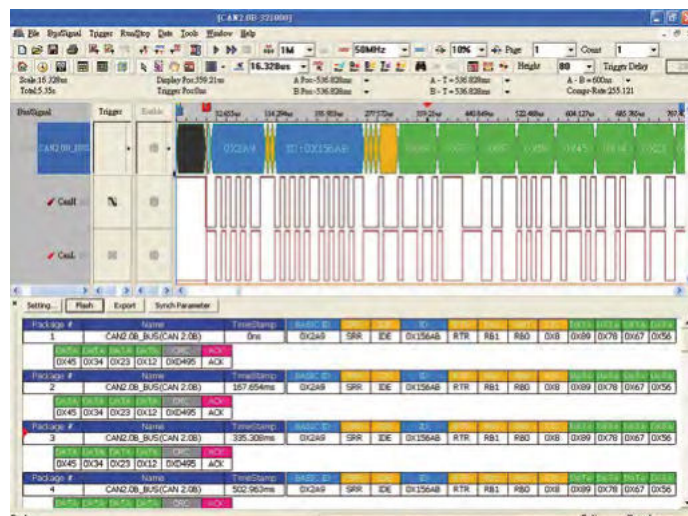
**WiFi** The "W" versions of the **SCOPEin@BOX** oscilloscopes benefit from built-in WiFi communication.

With the "Web server" available on the MTX 1052 & MTX 1054, you can control the instruments remotely without extra software and exchange files via FTP very simply.

## Logic analysis probe specially designed for BUS decoding!

When the **MTX 1052** and **MTX 1054** oscilloscopes are hooked up to the LX1600-PC 16-channel logic analyser, they can decode a wide range of buses: UART, I2C, SPI, CAN, LIN, Modbus, etc.

Oscilloscope acquisition can be synchronized on the basis of the trigger conditions for the logic analyser.



## MTX 1032 Differential Probes

The **MTX 1032-B** and **MTX 1032-C** differential probes are essential tools for viewing signals not referenced to earth on analogue or digital oscilloscopes. They can be used separately or hooked up to MTX oscilloscopes or to SCOPEin@BOX models (MTX 1052/ MTX 1054 or MTX 162). They then enable the oscilloscopes to display signals in differential mode up to 600 V / CAT III.

These laboratory-grade probes powered by the mains can operate with **coaxial/banana** cables, **oscilloscope probes** (MTX 1032-C) or banana leads. Their casing is specially designed to be stackable with the SCOPEin@BOX models.



	MTX 1032-B	MTX 1032-C
Channels	2 differential channels	
Measurement connection	Banana leads	BNC / banana cables or oscilloscope probes
Bandwidth / Rise time	30 MHz / 11.7 ns	50 MHz / 7 ns
Differential voltage input range	± 40 V to ± 400 V	
Attenuation	1/10 and 1/100 / < 10 mVp-p	
Electrical safety	IEC 61010-1 600 V CAT III	IEC 61010-1 600 V CAT II
EMC	NF EN 61326-1 (07/97) + A1 (10/98) + A2 (2001)	
Dimensions / Weight	270 x 250 x 63 mm / 1.2 kg or 19"/3U rack versions	

## MTX 1050 Spectrum Analyser

The MTX 1050 spectrum analyser is a compact, low-cost, "screenless" instrument. Lightweight, portable and suitable for general-purpose applications, the MTX 1050 is ideal for small or medium-sized businesses and technical education (engineering schools, technical colleges, etc.).

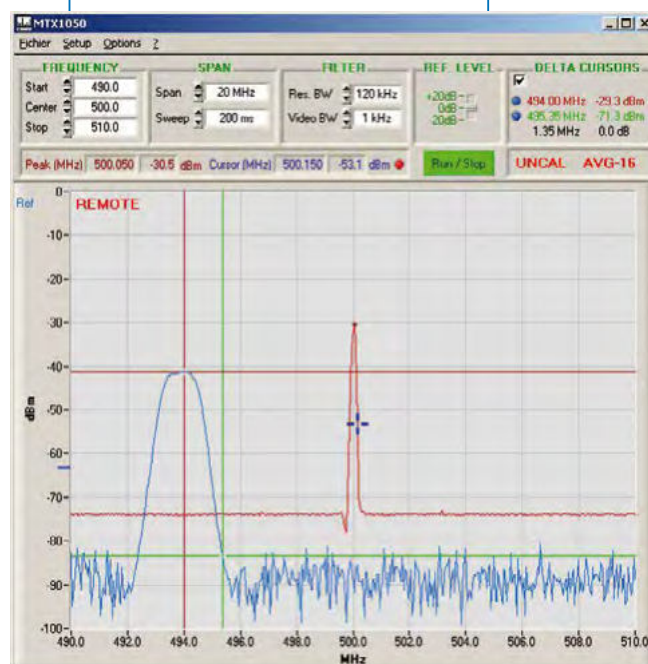
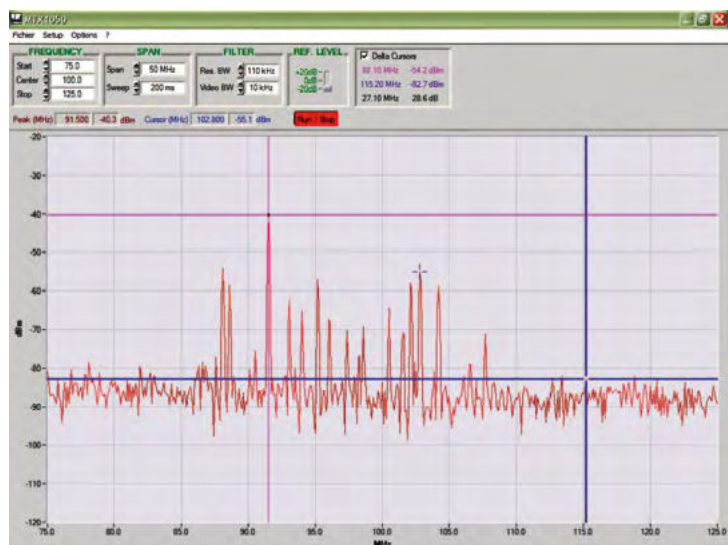
Economical and simple to operate, the **MTX 1050-PC** includes a Windows environment that makes it easy to take screenshots for reports or data transfer into Excel. The functions and ergonomics of the SCOPEin@BOX oscilloscopes make them perfect for use with the **MTX 1050** spectrum analyser. In addition, the instruments in the SCOPEin@BOX family are particularly easy to stack due to their dimensions and the positioning slots on the casing.

Alongside all the usual functions of a "traditional" spectrum analyser, the MTX 1050 also offers built-in FM demodulation.

The MTX 1050's advantages include high stability, with a frequency drift of only  $\pm 5$  ppm/year, and a wide dynamic range for measurement. It can measure 4 quantities simultaneously (Auto Peak, Marker and 2 Differential Cursors).



► Example of command and display screen



MTX 1050	
Display	Up to 5,000 sweep points for horizontal resolution
Frequency / Excursion	400 kHz to 1 GHz / Zero span, 1 MHz to 100 MHz/div (1-2-5 sequences)
Frequency drift	$\pm 5$ ppm/year
Analysis	6 sweep speeds, 3 analytical filters and 3 video filters
Detection modes	Peak (standard mode) or Q-Peak (EMC analysis; 1 s sweep, RBW 120 kHz)
Measurement dynamic range	-90 dBm to +20 dBm
Communication	USB "Plug & Play" as standard
Safety / Standards	IEC 61010-1 - Cat. II / NF EN 61326-1 : 98
Dimensions / Weight	270 (L) x 63 (H) x 215 (D) mm / 1.7 kg

## HX0082 & HX0083 Near-field Probes

The **HX0082** kit comprises 2 near-field probes (30 MHz – 3 GHz). The **proximity probe** is for measuring radiofrequency magnetic fields. It can be used up to 10 cm from the target.

The **contact probe** offers accurate measurements on chip floor-plans or printed-circuit traces.



The **HX0083** kit contains a 20 dB preamplifier for HX0082 near-field probes. This is designed to provide greater accuracy by amplifying signals close to the noise level.



	HX0083
Supply voltage	7.5 to 18 V
Current consumption	50 mA
Max. input voltage	25 V <sub>DC</sub>
Gain	20 dB
Noise	4.5 dB

## The spectrum analyser with its near-field probes: a dedicated EMC prequalification testing kit

These tests may take place throughout the product design and development phases. Prequalification tests help to **save time and ensure that the finished product will comply with the applicable standards**. Moreover, satisfactory results during these tests offer a better probability of successful EMC qualification later on. In this way, they avoid extra spending on modifying the product after failing the qualification tests.

These tests cover all the aspects that help to limit disturbances:

- **choice of the components** and their layout on a printed circuit board
- **reduction of cable lengths** and use of shielded cables if possible
- **separation of circuits/cables of different types** (e.g. analogue or digital)
- **verification of electrical continuity** (connections, welds, etc.)
- **verification of the floorplan and shielding, etc.**

This is not an exhaustive list. Any steps likely to reduce the electromagnetic fields should be investigated in order to optimize the product's operation.

The tests are divided into 2 main categories: **immunity tests** and **emission tests**. They are also carried out using 2 distinct modes: "**conducted mode**", which covers disturbances in cables or printed-circuit traces, and "**radiated mode**" which covers electromagnetic fields in the air.

## Use of near-field probes

The various fields measured by this type of probe help to locate the sources of high-frequency electromagnetic fields causing disturbances.

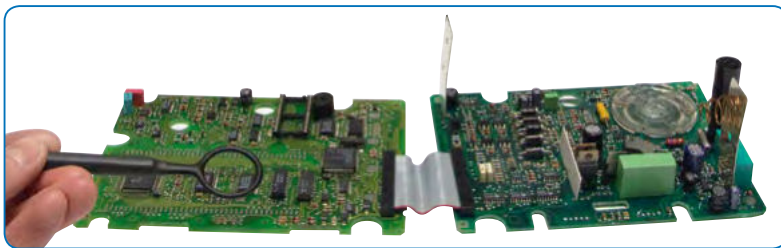
Active H-field probes work by observing the disturbance currents. Because they are not sensitive to outside disturbances, they can measure the intensity of the field directly associated with the currents flowing in the conductors.

**It is not necessary to disconnect the existing wiring to use them.** They are used with a spectrum analyser equipped with **Peak & Q-Peak detection modes**.

These modes are ideal for measurements in the context of EMC prequalification.

In "conducted mode", a **contact probe** will be used to detect any electromagnetic fields emitted vertically from flat surfaces (example 1). It allows precise measurements on specific areas (floorplan, trace, shielding, etc.). It is ideal for detecting disturbances emitted from surfaces which are difficult to access.

In "radiated mode", a **proximity probe** will be used to detect all the electromagnetic fields present in the space involved (example 2). For greater accuracy, these **HX0082** probes may be used with an **HX0083** (db) amplifier to reduce the noise floor level. This makes it possible to measure very slight disturbances.



- ▶ Below: using the contact probe with the amplifier connected directly to the MTX 1050.
- Above: using the proximity probe.



# MTX Virtual Series

	SCOPEin@BOX				DIDASCOPEin@BOX	
	MTX 1052B	MTX 1052C	MTX 1054B	MTX 1054C	MTX 162	MTX 112
<b>MAN-MACHINE INTERFACE</b>						
Display	Colour PC screen display / 8 x 10 div / Multi-windowing with up to 4 curves on screen / "Windows-like" interface & online help					
<b>OSCILLOSCOPE MODE</b>						
<b>Vertical deflection</b>						
Bandwidth	150 MHz	200 MHz	150 MHz	200 MHz	60 MHz	10 MHz
Number of channels	2 channels, class 1, common chassis earths		4 channels, class 1, common chassis earths		2 channels, class 1, common chassis earths	2 differential channels
Vertical sensitivity	2.5 mV – 100 V/div, up to 250 µV/div with vertical expansion				5 mV to 100 V/div	20 mV to 100 V/div
<b>Horizontal deflection</b>						
Sweep speed	35 calibres from 1 ns to 200 s/div				32 calibres from 5 ns to 100 s/div	29 calibres from 100 ms to 200 s/div
<b>Triggering</b>						
Mode	Auto, Triggered, One-shot ROLL, auto-level at 50 %					
Sources	CH1, CH2, EXT, mains		CH1 ... CH4, mains		CH1, CH2, mains	
Type	Edge, Pulse Width or Delay (40 ns-10.5 s), counting (2 - 16,384 events), TV (525 = NTSC, 625 = PAL/SECAM), Adjustable pretriggering from 0 to 100 %, Hold-off (40 ns-10.5 s)				Rising or falling edge, adjustable pretriggering from 0 to 100 %	
<b>Digital memory</b>						
Maximum sampling rate	Repetitive = 100 GS/s One-shot = 200 MS/s per channel	Repetitive = 100 GS/s One-shot = 100 MS/s per channel	Repetitive = 100 GS/s One-shot = 200 MS/s per channel	Repetitive = 100 GS/s One-shot = 100 MS/s per channel	Repetitive = 20 GS/s One-shot = 50 MS/s per channel	
Vertical resolution	10 bits (9 bits used)				8 bits	
Memory capacity	Depth = 50,000 points – storage capacity depends on PC configuration					
<b>SPO (Smart Persistence Oscilloscope)</b>						
Persistence duration	100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s and infinite				Analogue remanent mode	
Performance	Acquisition rate: 50 kwaveforms/s/channel, No. of samples acquired: 19 MS/s/channel				-	
<b>Measurement processing</b>						
FFT analyser & MATH functions	FFT, +, -, x, / - "Made-to-measure" function editor			FFT, +, -, x, /	FFT, +, -, x, /, XY	
Manual cursors	dv, dt, 1/dt, phase – cursors linked to trace or free					
Automatic measurements	2 or 19 measurements chosen among 19 + Automatic phase – On any type of curve - Markers and limits					
<b>RECORDER MODE</b>						
Duration / Sampling	Duration: 2 s to 31 days / Sampling interval: 40 µs to 53.57 s				Dedicated ROLL mode from 2 s to 33 min	-
<b>HARMONIC ANALYSER</b>						
Analysis range	Fundamental from 40 Hz to 1 kHz + 31 orders on 1 to 4 channels				-	-
Processing	Total RMS value, THD and selected order (%F, phase, frequency, VRMS)				-	-
<b>GENERAL SPECIFICATIONS</b>						
Memory & printing	"Unlimited" but depending on PC configuration / Via "Windows" environment					
Communication	USB, local or remote 10 Mb Ethernet*, WiFi*					
Power supply	100 to 240 V <sub>AC</sub> / 47-63 Hz – removable mains power cable					
Electrical safety	IEC 61010-1 / CAT II 300 V – EMC according to EN 61326-1				600 V CAT II	
Casing / Environment	270 x 213 x 63 mm – 1.8 kg or 19"/3U / Storage -20 °C to +60 °C - operation 0°C to 40 °C					
Warranty / Origin	3 years / France					

\* Depending on the model

## To order

**MTX1052B-PC:** digital analyser-oscilloscope, Ethernet, 2 channels, 150 MHz, colour, SCOPEin@BOX PC software, mains power cable, 1/1-1/10 voltage probes - 200 MHz 300 V (x 2), crossed Ethernet cable, straight Ethernet cable, USB A/B lead

**MTX1054B-PC:** digital analyser-oscilloscope, Ethernet, 4 channels, 150 MHz, colour, SCOPEin@BOX PC software, mains power cable, 1/1-1/10 voltage probes - 200 MHz 300 V (x 2), crossed Ethernet cable, straight Ethernet cable, USB A/B lead

**MTX1052CW-PC:** MTX1052B-PC - WiFi version, 200 MHz

**MTX1054CW-PC:** MTX1054B-PC - WiFi version, 200 MHz

**MTX1052B-RK:** MTX 1052B-PC oscilloscope - 19"/3U rack version

**MTX1054B-RK:** MTX 1052B-PC oscilloscope - 19"/3U rack version

**MTX2022W-P:** MTX1052CW-PC oscilloscope + LX1600-PC probe

**MTX2024W-P:** MTX1054CW-PC oscilloscope + LX1600-PC probe

**MTX112:** USB 10 MHz 2-channel oscilloscope, 1 mains power cable, 2 sets of Ø 4 mm leads with test probes, USB A/B cable, CD-Rom containing PC SCOPEin@BOX\_LE and DIDASCOPEin@BOX software, operating manual in 5 languages, bilingual programming manual and drivers

**MTX162UE:** MTX 162 oscilloscope delivered with 2 x 100 MHz probes (HX0210), standard USB A/B lead, removable mains power cable and a CD-ROM containing the PC software, operating manual in 5 languages, the programming manual and the drivers

**MTX162UEW:** MTX 162 WiFi oscilloscope delivered with 2 x 100 MHz probes (HX0210), standard USB A/B lead, removable mains power cable and a CD-ROM containing the PC software, operating manual in 5 languages, the programming manual and the drivers

**MTX1050-PC:** MTX 1050 spectrum analyser, USB communication cable, mains power cable, 1 CD-ROM containing the PC application software and the operating manual, FM antenna with BNC connection

**MTX1032-B:** differential probe, 2 x 50 MHz, delivered in casing with 2 BNC cables 20 cm long, 2 sets of PVC banana leads 1.10 m long, European mains lead, operating manual in 5 languages

**MTX1032-C:** differential probe, 2 x 30 MHz, delivered in casing with 2 BNC cables 20 cm long, 1 set of 2 shielded BNC-banana cables 2 m long, 2 crocodile wire grips for probes, 1 European mains lead, operating manual in 5 languages

**MTX1032-BRK:** MTX 1032-B differential probe - 19"/3U rack version

**MTX1032-CRK:** MTX 1032-C differential probe - 19"/3U rack version

**HX0090:** WiFi access point

**LX1600-PC:** Logic Analysis probe, USB A/B cable, test cables with associated wire grips, CD-Rom containing the SCOPEin@BOX-Logic Analysis PC software for use exclusively with SCOPEin@BOX oscilloscopes

**HX0112:** AC-DC power supply demonstrator for differential oscilloscopes delivered with operating manual on CD-Rom