

Digital oscilloscopes DOX2025B Two channels - 25MHz - 500MSP/s

I wo channels - 25MHz - 500MSP/s

DOX2070B

Two channels - 70MHz - 1GSP/s

DOX2100B Two channels - 100MHz - 1GSP/s



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General instructions

Introduction	 You have just acquired a two-channel digital oscilloscope: DOX2025B, 25 MHz, 500 MSP/s DOX2070B 70 MHz, 1 GSP/s DOX2100B, 100 MHz, 1 GSP/s
	Your oscilloscope has functions for applications in production, education, maintenance, services, and research and development. We thank you for your choice and for your confidence in the quality of our products
	This device is compliant with safety standard NF EN 61010-1 concerning electronic measuring instruments; it is a class 1 device that must be connected to the protective earth by its power cord.
	For best results, read this manual carefully and observe the precautions for use. Failure to observe the warnings and/or instructions for use may damage the device and/or its components, thereby endangering the user.
Precautions and safety measurements	 This device is designed for use: indoors, in an environment of pollution level 2, at an altitude below 2000m, at a temperature between 0°C and 40°C at a relative humidity below 80% up to 31°C. It can be used for measurements on 300V CAT-II circuits and can be
	supplied by a 300V CAT-II network.
definition of the measurement categories	Overvoltage category II corresponds to devices intended to be connected to building circuits. It applies both to equipment connected via plugs and to equipment connected permanently. <i>Eg: Measurements made on the low-voltage supply circuits of household appliances, hand tools, and similar equipment.</i>
	Overvoltage category III corresponds to equipment intended to be incorporated in building circuits. This type of equipment can include wall outlets, fuse boards, and some mains installation control equipment. <i>Eg: Distribution panels (including secondary meters), disconnects, wiring, including cables, busbars, junction boxes, disconnect switches, outlets on the fixed installation, industrial devices, and other equipment such as motors permanently connected to the fixed installation.</i>
	Overvoltage category IV corresponds to equipment installed at the point of entry or near the origin of a building's power supply, between the entry into the building and the main distribution frame. This type of equipment can include power meters and primary overvoltage protection devices. <i>Eg: Measurements on systems installed upstream of the main fuse or circuit-breaker of the electrical installation of a building.</i>
before use	Observe the environmental and storage conditions.
during use	 Read attentively all notes preceded by the A symbol. Connect the device to an outlet having an earthing contact. Take care not to obstruct the ventilation ports. As a safety measure, use only the appropriate cables and accessories - those supplied with the device or models approved by the manufacturer. When the device is connected to the measurement circuits, never touch an unused terminal.

General instructions (cont'd)

Symbols marked on the instrument

Warning, risk of danger.

Refer to the operating instructions for information about the nature of the potential danger and the actions to be taken to avoid such dangers.

Sorting of wastes for the recycling of electrical and electronic equipment.

In compliance with Directive WEEE 2002/96/CE: must not be treated as household waste.



Earth terminal





European conformity



CE

Hazardous voltage switch





Warranty

This device is warranted against defects of materials and workmanship for a period of 3 years, as stated in the general terms of sale. During this period, only the manufacturer may repair the device. The manufacturer reserves the right to repair or replace the device or any part thereof. If the device is sent back to the manufacturer, the costs of carriage will be borne by the customer. This warranty does not apply in the following cases:

- improper use of the device or use in conjunction with incompatible equipment
- modification of the device without the explicit permission of the manufacturer's technical staff
- use by a person not authorized by the manufacturer
- adaptation to a particular use not anticipated in the design of the device or in the instructions for use
- shocks, falls, or floods.

Servicing

For all repairs before or after expiry of warranty, please return the device to your distributor.

Maintenance

- Power down the instrument.
- Clean it with a damp cloth and soap.
 - Never use abrasive products or solvents.
- Dry it before using it again.

Description of the instrument

Front panel



Back







1. Trigger status:

- **Set**: The oscilloscope is in pre-trigger data acquisition. All triggers are ignored in this status.
- **Ready**: All pre-trigger data have been acquired and the oscilloscope is ready to accept a trigger.
- **Trig'd**: The oscilloscope has detected a trigger and is in post-trigger data acquisition.
- **Stop**: The oscilloscope stops the acquisition.
- Auto: The oscilloscope is in "Auto" mode and triggers acquisitions even in the absence of a triggering event.
- **Scan**: The oscilloscope acquires and displays data continuously in Roll mode.
- 2. USB key detected
- 3. Displays the position in the internal memory of the window displayed.
- 4. Indicates the horizontal position of the trigger, to change it turn the horizontal position button
- 5. Indicates that the LAN interface (rear panel) is active or not
- 6. Displays the trigger level icon
- 7. Displays the channel icon
- 8. Displays the input coupling icon
- 9. Displays the vertical scale of the track
- **10.** Indicates the status of the bandwidth limitation filter. The letter "B" indicates that the bandwidth is limited to 20MHz.
- **11.** The display shows the calibration of the main time base
- 12. Displays the trigger type
- **13.** Indicates the horizontal position of the Trigger relative to the center of the screen
- 14. Indicates the trigger level in Volts
- **15.** Indicates the frequency of the trigger source signal

Description of the instrument (cont'd)

Menu and command buttons and keys



Channel keys (CH1, CH2)	Press one of the channel keys, CH1 or CH2, to activate it (ON) or deactivate it (OFF) and access the menu used to configure the channel. When the channel is active, the corresponding channel button is lit.	
MATH	Displays the Math menu.	
REF	Displays the "REF trace" menu. You can use this menu to save and recall four or two reference traces in internal memory.	
HORI MENU	Displays the Horizontal menu used to choose the Delayed or Normal operating mode and select the acquisition memory depth.	
TRIG MENU	Displays the Trigger menu. You can use the Trigger menu to choose the type of trigger (Edge, Pulse, Video, Slope, Alternate) and parameterize the triggering.	
SET TO 50%	Press to stabilize the signal rapidly. The oscilloscope defines the trigger level automatically half-way between the minimum and maximum levels of the source signal. This function is especially useful when the trigger source is a signal that is not displayed, such as EXT TRIG	
FORCE	Forces an acquisition whether or not a triggering event is present.	
SAVE/RECALL	Displays the Save/Recall menu used to save and retrieve up to 20 configurations of the oscilloscope or up to 20 traces in internal memory, or on a USB key (in which case the capacity depends on the USB key). You can also retrieve the Factory configuration, save traces to a CSV file, and save or print a screen grab.	

Description of the instrument (cont'd)

Displays the Acquisition menu. You can use the Acquisition menu to parameterize the Sampling mode (sample, peak detection, mean).		
Displays the Measurement menu.		
Displays the Cursor menu. The "Adjust" knob is used to set the position of the active cursor. The cursors remain displayed (unless the "Type" option is "Off") after you exit from the Cursor menu, but they can no longer be set.		
Opens the Display menu. The Display menu is used to configure the graticule and the shapes representing the traces, the persistence, and the intensity.		
Gives access to the Utility menu. The Utility menu is used to configure such oscilloscope options as the sound, the language, the counter, etc. It also serves to look up the status of the system and to update the software.		
Loads the "Default Setup" of the oscilloscope.		
Gives access to the internal help function.		
Automatically configures the oscilloscope in order to produce a display appropriate to the signals present on the inputs.		
Acquisition of signals continuously, or stop acquisition. Note: If acquisition of the signal is stopped (using the "RUN/STOP" button or "SINGLE"), the S/div knob stretches or compresses the signal.		
Enables a single acquisition and then STOPs.		
Input connectors for the display of signals.		
Input connector for an external trigger source. Choose the "Ext" or "Ext/5" trigger source in the Trigger menu.		
Connections of the internal generator used for probe compensation.		
This can be used with many functions, for example to adjust the Hold-Off, move the cursors, set the pulse width, define the video line, set the high and low frequency limits of the filters, set the X and Y masks with the Pass/Fail function, etc The "Adjust" knob is used to select the location of the setup, trace, and image files during a save/recall, and to choose menu options.		

Getting started

Check of operation

In order to check the proper operation of the oscilloscope, perform the following operations:

Steps

1. Power up the oscilloscope.

Press "Default Setup" to load the default configuration of the oscilloscope. The default attenuation of the probe is 1X.



2. Set the switch of the probe to 1X and connect the probe to channel CH1. Turn to the right to lock. Connect the end of the probe and the crocodile clip of the earthing cable to the 1kHz probe compensation signal output terminals.



3. Press "AUTO" to display the 1kHz square wave with a peak-to-peak amplitude of approximately 3V.



4. Press the "CH1" key to unselect channel CH1. Press the "CH2" key to activate channel CH2 and repeat steps 2 and 3 to display the square-wave probe compensation signal on channel CH2.

Getting started (cont'd)

Probe

A guard around the probe body protects your fingers from electric shocks.



Connect the probe to the oscilloscope, then connect the crocodile clip of the earthing cable of the probe to the earth reference potential of the circuit to be tested before making a measurement.

Note:

In order to avoid an electric shock while using the probe, keep your fingers behind the guard on the probe body.
In order to avoid an electric shock while using the probe, do not touch the metallic parts of the probe head when the probe is connected on a voltage source. Connect the probe to the oscilloscope, then connect the ground cable to the earth of the circuit to be tested before making a measurement.

Attenuation of the probe

The probes can have different attenuation factors that modify the vertical scale of the oscilloscope. Press the corresponding channel key (CH 1 or CH2) and select the coefficient that corresponds to the attenuation factor of your probe.

Note: The default probe coefficient is 1X.

Make sure that the attenuation switch of the probe is set to the same attenuation factor as the oscilloscope. The probes supplied with the oscilloscope have two attenuation coefficients: 1X and 10X.

Note:

When the attenuation switch is set to 1X, the probe limits the bandwidth of the oscilloscope to approximately 6MHz (depending on the characteristics of the probe). To use the full bandwidth of the oscilloscope, be sure to set the switch of the probe to 10X.

Getting started (cont'd)

Compensation Method used to compensate the probe (in the X10 position) manually to of the probe couple it to the input channel:



- Steps 1. Set the probe factor in the channel CH1 menu to 10X. Set the switch of the probe to 10X and connect the probe to channel CH1 of the oscilloscope.
 - 2. Connect the probe tip to "PROBE COMP 3V" and the crocodile clip of the earthing cable of the probe to the "PROBE COMP" earth. Activate channel CH1 and then press the "AUTO" button.
 - 3. Check the shape of the signal displayed.



4. As the case may be, adjust your probe by acting on the variable capacitor, using the screwdriver provided, so as to obtain "Correct Compensation". Repeat the operation as many times as necessary or when you change probes.

Note : For more details, refer to the directions for use of the probes provided with the oscilloscope

Functional description AUTOSET

AUTOSET

The DOX2000B digital oscilloscope has an "AUTOSET" function that is used to automatically configure the device to produce a display appropriate to the signals present on the inputs.

After starting an AUTOSET, if necessary, select the desired signal waveform from among the 4 available:



Autoset function menu

Option	Description
Multi cycles	Autoset and display of the signal for several cycles.
Monocycle	Autoset and display of a single cycle of the signal.
	Autoset and display of the rising edge.
Falling edge	Autoset and display of the falling edge.
Cancel config.	Restores the previous configuration of the oscilloscope.

The Autoset defines the triggering source and the display of the channels to satisfy the following conditions:

- If the signals on the inputs are of different frequencies, the priority channel is the one in which the signal has the lower frequency.
- If no signal is detected, it is the channel having the lower index (CH1) that is displayed.
- If no signal is found and no channel is activated, the oscilloscope displays and uses channel CH1.

Functional description AUTOSET (cont'd)

Autoset function

Function menu	Values	
Acquisition mode	Sample	
Display format	Y-T	
Type of display	Dots for a video signal; Vectors for an FFT spectrum; otherwise unchanged	
Vertical coupling	DC or AC depending on the input signal	
Bandwidth limit	Bandwidth limiter inactive (full band)	
V/div	Adjusted	
VOLTS/DIV adjustment	Coarse (in hops, 1 2 5 staging)	
Signal inverted	Inactive	
Horizontal position	Centre	
S/div	Adjusted	
Type of trigger	Edge	
Source of trigger	Autodetection of the input channel signal	
Trigger edge	Rising	
Trigger mode	Auto	
Trigger coupling	DC	
Hold-Off	Minimum	
Trigger level	Adjusted to 50%	

Factory configuration

When it leaves the factory, the oscilloscope is configured for normal use; this is the "default configuration". To restore this configuration, press the "DEFAULT SETUP" button. The parameterizing of the options, buttons, and commands may be modified when you use the "DEFAULT SETUP" button; see appendix B.

The DEFAULT SETUP button does not modify the following parameters:

- Language option
- Saved reference signal files
- Saved configuration files
- The display contrast
- The calibration data

Functional description

I - VERTICAL System

The buttons, knobs, and keys of the vertical keypad are used to display the signals and to adjust the vertical sensitivity and position.



1. Channels CH1 CH2

page 1

Option	Values	Instructions
Coupling	DC	DC passes the AC and DC components of
		the input signal.
	AC	AC blocks the DC component of the input
		signal and attenuates the AC components
	GND	below 10Hz.
		GND disconnects the input signal.
BW limit	ON	Limits the bandwidth to reduce high
	OFF	frequency noise <20MHz
Volts/Div	Coarse	Selects the resolution of the Volts/Div knob
		Coarse adjustment in hops, 1-2-5 staging.
	Fine	Continuous fine adjustment of the sensitivity.
Probe	0.1x,0.2x, 0.5x,1x,2x,	To be adjusted to the attenuation coefficient
	5x,10x,20x,50x,100x,	of the probe used, to incorporate it in the
	200x, 500x,1000x,	vertical sensitivity.
	2000x,5000x,10000x	
Next page	Page 1/3	Access to the second page of the menu.

page 2	Option	Values	Instructions
	Inversion	ON	Activates inversion.
		OFF	Deactivates inversion.
	Digital filter		Press this button to access the "Digital Filter
			Menu" (cf. table 2-5)
	Next page	Page 2/3	Access to the second page of the menu.

Digital filter

Option	Values	Instruction	
Digital filter Act.		Activates the digital filter.	
Digital filler	Deact.	Deactivates the digital filter.	
ta f c		Config. as LPF (Low Pass Filter).	
Turne	tf	Config. as HPF (High Pass Filter).	
гуре	tf	Config. as BPF (Band Pass Filter).	
	baf	Config. as BSF (Band Stop Filter).	
Upper limit		Turn the "Adjust" knob to adjust the upper limit.	
Lower limit		Turn the "Adjust" knob to adjust the lower limit.	
Return		Return to the main digital filter menu.	



limitation, DOX2025B DOX2070B DOX2100B

The sinusoidal signal > 20MHz is attenuated.

• Pressing "CH1"→"BW Limit"→ "Off" deactivates the "Bandwidth limiter". The sinusoidal signal > 20MHz is not attenuated.

The image shows a sinusoidal signal at 20MHz (yellow trace) displayed with theBP band limiter (BW) "On" (the blue trace is obtained with the BW "Off"):



3. Adjustment of the The vertic vertical sensitivity sensitivity

The vertical scale can be adjusted in Coarse and Fine mode; the vertical sensitivity band is from 2mV/div to 10V/div.

For example, for CH1:

• Pressing "CH1" \rightarrow "Volts/ Div" \rightarrow "Coarse" \rightarrow Volts/div, the default value.

The vertical sensitivity can be adjusted in hops in a 1-2-5 staging from 2mV/div, 5mV/div, and 10mV/div up to 10V/div.

• Pressing "CH1"→"Volts/Div"→"Fine" → Volts/div. This parameter allows continuous adjustment of the vertical sensitivity.



4. Parameterizing the probe attenuation

From the Channel menu, select the probe coefficient corresponding to the attenuation factor of the probe. To compensate a probe attenuation factor of 10:1, the probe coefficient must be set to 10X, in order to incorporate the attenuation factor of the probe in the vertical sensitivity.



- 5. Invert the For example, on CH1: signals
 - Press "CH1"→ "Next Page" "page 1/3" →"Invert" → "On":



- 6. Using the digital filter filter
 • Press "CH1" → "Next Page page 1/3" → "Filter", to access the Digital Filter menu. Choose "Filter Type", then select "Upp. Limit " or "Low. Limit " and turn the "Adjust" knob to adjust it.
 - Press "CH1" \rightarrow "Next Page page1/3" \rightarrow "Filter" \rightarrow "Off", to deactivate the Digital Filter function.



- 7. Choosing the unit, V or A
- Press "CH1"→ "Next Page page3/3"→ "Unit" → Then Select the vertical unit, Volt or Ampere.

2. Buttons of the vertical mode	
Vertical position knobs	 Use the "Vertical position" knobs to move the traces up or down on the screen.
	2. While you adjust the vertical position of the trace, the value "Volts Pos = " is displayed at bottom left on the screen.
	3. Press the "Vertical position" knob to reset the vertical position to zero.
Volts/div knobs	 Use the "Volts/div" knobs to adjust the vertical sensitivity. If you turn the "Volts/div" knob clockwise or anticlockwise, the oscilloscope increases or reduces the sensitivity.
	2. You can press the "Volt/div" to alternate between "Coarse" and "Fine" adjustments. In the "Coarse" mode the vertical sensitivity varies in 1-2-5-staged hops. In the "Fine" mode the vertical sensitivity varies continuously.

3. Using REF

The reference command stores the traces. The reference function is available once a source trace has been stored.

REF	function	menu
-----	----------	------

Option	Values	Instruction
Source	CH1 CH2	Choice of trace to be stored.
REFA		Choice of the location of storage or
REFB		restoration of a trace.
Save		Stores a source trace at the chosen location.
REFA/REFB	On	Recalls the reference trace to the screen.
	Off	Deactivates the reference trace.



REF A "Off "



Steps 1. Press the "REF" button to access the REFerence menu.

- 2. Press the "Source" button to choose the source channel, CH1 or CH2.
- 3. Turn the vertical "POSITION" and "Volt/div" knobs to adjust the vertical position and sensitivity to suitable values.
- 4. Press the "REF A" (or REF B) button to choose the storage location.
- 5. Press the "Save" button.
- 6. Select REF A (or REF B) "ON" to display the reference trace on screen.

Functional description I - VERTICAL system / MATHematics function

4. MATH menu MATH displays the results of +, -, *, /, and FFT operations on channels CH1 and CH2.

Press the MATH key to access the MATHematics menu.



Menu	Function	Values	Description
	Operation	+, -, *, FFT	Choice of the MATHematics function.
	Invert	On	Invert the MATH trace.
		Off	Deactivate the inversion of the MATH trace.
	• ు ⊸.‡		Turn the adjust knob to adjust the vertical position of the MATH trace
	ಲ∼‡∿		Turn the adjust knob to adjust the vertical scale of the MATH channel.

Instruction Operation		Values	Description
	+	CH1+CH2	CH1 is added to CH2.
-	-	CH1-CH2	CH2 is subtracted from CH1.
		CH2-CH1	CH1 is subtracted from CH2.
	*	CH1*CH2	CH2 is multiplied by CH1.
	1	CH1/CH2	CH1 is divided by CH2.
		CH2/CH1	CH2 is divided by CH1.
	FFT	Fast Fourier Tr	ansform.



FF

Functional description I - VERTICAL System / MATHematics function (cont'd)

1) FFT process The FFT process mathematically converts a signal in the time domain into its components in the frequency domain. It is possible to measure the amplitude and frequency of the spectral components.

FFT function Instructions FFT option Values page 1 Source CH1, CH2 Selection of the source channel for the calculation of the FFT. Window Hanning Selection of the type of FFT window Hamming Rectangular Blackman **ZOOM FFT** 1X Horizontal zoom of the FFT display. 2X 5X 10X Page 1/2 Access to the second page of the FFT menu. Next page

T function	Option FFT	Values	Instructions
page 2	Scale	Vrms	The vertical scale is in Vrms
		dBVrms	The vertical scale is in Vrms dB
	Display	Split Full screen	Half-screen display of the FFT Full-screen display of the FFT
	Next page	Page 2/2	Return to the first page of the FFT menu.

Procedure To use the FFT, choose the source signal (time domain):

- Press the AUTO button to display a YT signal and choose the Multi-cycle signal representation.
- Turn the "POSITION" knob so as to centre the YT signal vertically on the screen (zero divisions).
- Turn the horizontal "POSITION" knob to centre the part of the YT signal to be analysed on the 18-division screen. The oscilloscope calculates the FFT using the 1024 central points of the time-domain signal.
- Turn the "Volts/div" knob so as to keep the trace on the screen.
- Turn the "S/ div" knob until the desired resolution of the FFT spectrum is reached.

Steps To display the FFT correctly:

- 1. Press the "MATH" button.
- 2. Set the "Operation" option to FFT.
- 3. Press the "Source" button to choose channel "CH1" or "CH2".
- 4. Set the sweep coefficient "S/div" so as to obtain a sampling frequency (parameter displayed alongside of the "Hz/div" scale factor of the FFT) of at least twice the frequency of the input signal.

Functional description I - VERTICAL system / MATHematics function (cont'd)

2) Display of the FFT spectrum

Press the MATH button to display the Math menu. Use the options to select the Source channel, the Window, and the FFT Zoom factor. Only one FFT can be displayed at a time. You can choose "Full Screen" or "Split Screen" in the "Display" option to display the FFT full screen, or to display the signal and its FFT simultaneously on two half screens.



3) Selection of the FFT window

The FFT window reduces the peaks of the FFT spectrum. The FFT assumes that the YT signal continues to infinity. With a whole number of cycles, the YT signal begins and ends at the same amplitude and the signal is free of irregularities. A non-integer number of cycles of the YT signal gives starting and ending points at different amplitudes. The transition between the starting and ending points creates a discontinuity of the signal that causes high-frequency transients.

Window	Specialization	Correct test content
Rectangular	Better frequency resolution, worse amplitude resolution. This is equivalent to no window.	Pulses or symmetrical transients. Sine waves of equal amplitude at fixed frequency. Broad-band random noise with a spectrum that varies rather slowly.
Hanning Hamming	Better frequency resolution and less good precision in amplitude than Rectangular. Frequency resolution is slightly better with Hamming than with Hanning.	Sinusoidal, periodic, and narrow-band random noise. Pulses or asymmetrical transients.
Blackman	Better amplitude resolution, worse frequency resolution.	Signals at single frequency, to find higher harmonics

Functional description I - VERTICAL system / MATHematics function (cont'd)

4) Zoom and
positioning
of an FFT spectrumYou can use the zoom and the cursors to select measurements
of the FFT spectrum. The oscilloscope has an "FFT Zoom" option to effect a
horizontal zoom; use this option button to choose "1X", "2X", 5X", or "10X".

5) Measurement of the FFT spectrum using cursors *Amplitude* It is possible to make two measurements on the FFT spectral components: the amplitude (in dB or V) and the frequency in Hz $\,$

- 1. Enter a sinusoidal signal in channel 1 and press the "AUTO" button, then choose the Multi cycles option.
- 2. Press the "MATH" button to display the "MATH" menu.
- 3. Press the "Operation" button and choose "FFT"
- 4. Press the "Source" button and choose "CH1"
- 5. Press the "CH1" button to display the CH1 menu.
- 6. Turn the "S/div" knob to adjust the sampling frequency (at least twice the frequency of the input signal).
- 7. For an FFT display in full screen mode, press the CH1 button again to remove the display of the channel 1 signal.
- 8. Press the "CURSOR" button to display the "Cursor" menu.
- 9. Press the "Cursor Mode" button and choose "Manual".
- 10. Press the "Type" button and choose "Voltage"
- 11. Press the "Source" button and choose "MATH"
- 12. Press the "CurA" button, turn the "Adjust" knob to move Cursor A to the highest-amplitude component of the FFT signal.
- 13. Press the "CurB" button, turn the "Adjust" knob to move Cursor B to the lowest-amplitude component of the FFT signal.
- 14. The amplitude difference (ΔV) is displayed at top left on the screen.



Functional description I - VERTICAL system / MATHematics function (cont'd)

Frequency

- 1. Press the CURSOR button
- 2. Press the "Cursor Mode" button and choose "Manual".
- 3. Press "Type" and choose "Time".
- 4. Press "Source" and choose "MATH".
- 5. Press "CurA", turn the "Adjust" knob to place Cursor A on the spectral component having the highest amplitude.
- 6. The value of "CurA = " displayed at top left on the screen corresponds to the frequency of the signal on input CH1.



Functional description II - HORIZONTAL system

HORIZONTAL menu

The "HORIZONTAL" keypad contains one key and two knobs.



Horizontal menu

	Option	Values	Description		
	Delayed	On Off	Activate this fu display the sigr base at the top to the delayed screen. Deactivate this main time base	nction to simu hal according t of the screen time base at th function to dis e.	Itaneously to the main time and according he bottom of the splay only the
	MemDepth	Normal Long mem	Normal memory depth (40kpts or 32Kpts for DOX2025B). Long memory depth, up to 2Mpts (DOX2070B/2100B only).		ts or 32Kpts for Mpts
Note	Memory depth	Channel mode	Sampling rate	Normal Memory	Long Memory
	DOX2070B	Single channel	1Gsa/s	40kpts	not supported
	DOX2100B	Single channel	500MSa/s or less	20kpts	2Mpts
		Double channel	500MSa/s or less	20kpts	1Mpts
	DOX2025B	Per channel 50	00MSa/s or less	32Kpts	

Functional description II - HORIZONTAL system (cont'd)

Buttons of the horizontal mode

Duttons of the nonzon	
	The horizontal commands serve to adjust the sweep coefficient and the horizontal position of the traces.
Horizontal "POSITION" button	1. Adjusts the horizontal position of the traces (the position of the trigger with respect to the centre of the screen). The time resolution of this command depends on the sweep coefficient selected.
	2. To reset the horizontal position to zero, press the "POSITION" button.
S/div knob	1. Used to adjust the sweep coefficient. If acquisition of the signal is stopped (use of the RUN/STOP or SINGLE button), turn the S/div knob to stretch or compress the trace.
	2. Choose the T/div coefficient of the main or delayed time base. When the Window Zone is active, the width of the window zone is modified by adjusting the time base of the window.
Display the Roll mode	When the S/div command is set to 100ms/div or more, and the trigger mode is Auto, the oscilloscope enters the Roll acquisition mode. In this mode, the signal is refreshed from left to right. In ROLL, there is no trigger or control of the horizontal position.
Window zone	Use the Window Zone option to define the segment of trace to be observed in detail. The slowest time base of the Window (zoomed) cannot be slower than the main time base.
	You can turn the Horizontal Position and SEC/DIV controls to enlarge or shrink the signals in the Window Zone.
Delayed	Use the "Delayed" option to define the portion (window) of the complete trace to be observed in detail. The sweep coefficient of the "Window" time base cannot be less than the sweep coefficient of the "Main" time base. You can turn the "Horizontal Position" knob to move the "Window Zone", and the "S/div" control to enlarge or shrink the Window. "M" means main time base, "W" means time base of the zoomed Window.



Steps

To display a segment of the trace in detail:

- 1. Press the "HORI MENU" button to display the "Horizontal Menu".
- 2. Turn the "S/div" knob to modify the main time base.
- 3. Press the "Delayed" option button and choose "On".

TRIGGER mode

The trigger symbol T indicates the instant at which the triggering event (Trigger) occurred.

The DOX2000 oscilloscopes have five types of trigger: Edge, Video, Pulse, Slope, Alternate



- "TRIG MENU" button: Press the "TRIG MENU" button to display the "Trigger Menu".
- "LEVEL" knob: The LEVEL knob is used to set the voltage level corresponding to the triggering point. Press the "LEVEL" knob to force the triggering level to zero.
- "SET TO 50%" key: Use the "SET TO 50%" button to stabilize the signal rapidly. The oscilloscope automatically sets the triggering level to midway between the minimum and maximum voltage levels of the source signal. This function is useful when using the EXT TRIG triggering source, which is not displayed on the screen.
- "FORCE" key: Use the FORCE button to force an acquisition whether or not a triggering event is present. This function is useful for example in the "Single" or Normal mode.
- Pre-trig/Post-trig/Trig-Delayed: The data before and after the triggering event. If trigger symbol T is at the centre of the screen, the portion of the traces corresponding to the first 9 divisions id the pre-trig and the next 9 divisions the post-trig.
 This function is very useful because you can observe the samples that preceded the triggering event. Everything to the right of the triggering point belongs to the post-trig. The total pre- and post-trig time depends on the sweep coefficient chosen.

Trigger SOURCE The trigger source can be the signal present on input CH1 or CH2, on the EXT TRIG input, or the AC line source (available only for the "Edge" type trigger).

1. EDGE

Edge Trigger	Option	Values	Description
Menu	Туре	Edge	The rising or falling edge of the source signal is used for triggering.
	Source	CH1 CH2	The triggering source is active whether or not the channel is displayed.
		EXT	The EXT TRIG source is not displayed. The EXT source uses the signal on the EXT TRIG input. The triggering level range is between -1.2V and +1.2V.
		EXT/5	Identical to the EXT option, but the signal is attenuated by a factor of 5. The triggering range is multiplied by 5, and is between +6V and -6V.
		AC	A signal derived from the mains supply is used as triggering source. The trigger coupling is set to DC and the triggering level to 0V.
	Slope	[4][⊅] ┿	Triggering on the rising edge of the source signal. Triggering on the falling edge of the source signal. Triggering on the rising and falling edges of the source signal.
	Mode	Auto	The trace is refreshed even in the absence of a triggering event.
		Normal	The trace is refreshed when the triggering condition is satisfied and waits for the next triggering event when the condition is not satisfied.
		Single	The oscilloscope acquires a signal when the triggering condition is satisfied, and then stops.
	Set Up		Access to the "Trigger Configuration Menu".

Trigger Config	Option	Values	Description
Menu	Coupling	DC	Passes all components of the signal
		AC	Blocks the DC components and attenuates AC signals below 50Hz.
		Low- pass filter LF	Attenuates the high-frequency components above 150kHz.
		High- pass filter HF	Blocks the DC component and attenuates low frequency components below 7kHz.
	Hold-Off		Use the "adjust" knob to adjust the Hold-Off time (sec); the value is displayed.
	Hold-Off Reset		Reset the Hold-Off time to 100ns.
	Return		Return to the first page of the "Main Trigger menu".



- Steps 1. Configure the type
 - 1) Press the "TRIG MENU" key to display the "Trigger" menu.
 - 2) Press the "Type" option key and choose "Edge".
 - 2. Configure the Triggering source

To select the source, press the "Source" button to choose "CH1", "CH2", "EXT", "EXT/5", or "AC Line".

3. Configure the Slope

Press the "Slope" button to choose " _ , " 📜 " or " 斗 ".

4. Configure the triggering mode (Trigger)

Press the "Trigger mode" key to choose "Auto", "Normal", "Single".

Auto: The trace is refreshed even if the triggering condition is not satisfied.

Normal: The trace is refreshed when the triggering condition is satisfied and waits for the next triggering event when the condition is not satisfied.

Single: The oscilloscope acquires a signal when the triggering condition is satisfied, then stops.

5. Configure the Trigger coupling

a. Press the "Set Up" key to access the "Trigger Configuration" menu.

b. Press the "Coupling" key to choose "DC", "AC", "HF Reject", or "LF Reject".

2. PULSE

Use the pulse width to trigger on abnormal pulses.

Pulse trigger

page 1

Option		Values	Description
Туре		Pulse	Select the type and width of the triggering pulse.
Source		CH1	Choose the triggering
		CH2	source.
		EXT	
		EXT/5	
When	Ţ	(Positive pulse width less than the value set) (Positive pulse width greater than the value set)	Choose the type of pulse and the condition to be satisfied to obtain a triggering event
	_F [*] 7	(Positive pulse width equal to the value set) (Negative pulse width	
	F=₹	(Negative pulse width greater than the value set)	
	┨╴	(Negative pulse width greater than the value set)	
Configur	e the	20.0ns to 10.0s	The adjust knob is used to
width	┠╍		adjust the pulse width.



Pulse trigger, page 2

Option	Values	Description
Туре	Pulse	Selection of the pulse corresponding to the triggering condition.
Mode	Auto Normal Single	Choose the type of triggering. The normal mode is suitable for most applications of triggering on pulse width .
Set Up		Access the "Trigger Configuration Menu".



Steps 1. Choose the type

- 1) Press the "TRIG MENU" key to display the "Trigger" menu.
- 2) Press the "Type" option key and choose "Pulse"

2. Configure the condition

Press the "When" key to choose the "It", "Fil", "Fil", "IF, "Is" or"

3. Adjust the Pulse width

Turn the "Adjust" knob to adjust the width of the pulse.

3. VIDEO triggering

To trigger on the fields or the lines of standard video signals.

Video trioror			
video trigger	Option	Values	Instructions
page 1	Туре	Video	To choose the type of video, choose AC coupling; you can then trigger on NTSC, PAL, and SECAM video signals.
	Source	CH1 CH2	Choose the triggering signal input source.
		EXT EXT/5	Ext and Ext/5 use the EXT TRIG input signal as source.
	Polarity	└└ (normal)	Normal triggers on the negative edge of the sync pulse.
		(inverted)	Inverted triggers on the positive edge of the sync pulse.
	Sync	All lines Line num Odd Fr Even Fr	Choose the appropriate video triggering: All lines – Line number – Odd frame – Even frame

Video trigger

page 2

Option	Values	Instructions	
Туре	Video	When you choose the type of video, choose AC coupling; you can then trigger on NTSC, PAL, and SECAM video signals.	
Standard	NTSC Pal/Secam	Choose the video standard for the synchronization and the number of lines.	
Mode	Auto	Use this mode to let the acquisition run in the absence of a valid trigger. This mode functions with the time base of 100ms/div and less.	
	Normal	Use this mode when you want to see only valid triggered signals. When you use this mode, the oscilloscope displays the trace only in the presence of a triggering event.	
	Single	For a single acquisition, press the "SINGLE" key.	
Set-Up		Access to the "Trigger Configuration Menu".	



Steps 1. Configure the type

- 1) Press the "TRIG MENU" key to display the "Trigger" menu.
- 2) Press the "Type" key and choose "Video"

2. Configure the polarity

Press the "Polarity" option key to choose "", " T " or " T.".

3. Configure the synchronization

1) Press the "Sync" key to select "All lines", "Line Num", "Odd Fr", or "Even Fr".

2) If you choose "Line Num", you can use the "Adjust" knob to program the line number.

4. Configure the standard

- 1) Press the "Next Page" key (page 2/2).
- 2) Press the "Standard" key and choose "PAL/SECAM" or "NTSC".

4. SLOPE

Triggering on a positive or negative slope according to the configuration.

Trigger on Slope page 1

Option	Values	Instruction
Туре	Slope	Triggering on the duration of the positive or negative slope.
Source	CH1 CH2 EXT EXT/5	Choose the triggering source.
When	┹ ᆋ ᆋ ᡶ ᡫ [Choose the triggering condition.
Time	も	Adjust the duration of the slope with the "Adjust" knob. The adjustment range is from 20ns to 10s.



Trigger on Slope	Option	Values	Instruction
page 2	Туре	Slope	Triggering on the positive or negative
<i> </i> ≁• 5 -			slope
	Vertical	Choose the triggering level to be	Choose the triggering level to be adjusted
			by the "LEVEL" knob. You can adjust
			"LEVEL A", "LEVEL B", or both at once.
		<u> </u>	
		*	
	Mode A		In this mode the trace is refreshed even in the
			absence of a valid trigger. This mode functions
			with time bases of 100ms/div and loss
		N I I	
		Normai	Use this mode when you want the trace to be
			displayed only on valid triggering events. In this
			mode, the trace is refreshed only in the presence
			of triggering event.
		SINGLE	To allow only one acquisition.
	Set-Up		Access to the "Trigger adjustment" menu.



- *Steps* 1. Inject the signal on CH1 or CH2.
 - 2. Press the "AUTO" key.
 - 3. Press the "TRIG MENU" key to access the "Trigger Menu".
 - 4. Press the "Type" key and choose "Slope".
 - 5. Press the "Source" key and choose "CH1" or "CH2".
 - 6. Press the "When" key to choose " → + ", " → + ", " → + ", " → + ", " → + ", " → + ", " → + ", " → + ", "
 - 7. Press the "Time" key and turn the "Adjust" knob to adjust the duration of the slope.
 - 8. Press the "Next Page" key to go to the second page (2/2) of the "Slope Trigger Menu".
 - 9. Press the "Vertical" key to choose the triggering level to be adjusted.
 - 10. Turn the "LEVEL" knob.

5. ALTERNATE triggering

When you use alternate triggering the triggering source is alternately channel CH1 and channel CH2. With this mode, you can observer two asynchronous signals at the same time. You can choose different types of trigger for two vertical signals. The types available are edge, pulse, video, and slope. The data on the signals of the two channels are displayed at bottom right on the screen.



Trigger on l	Edg	e
pa	ge	1

Option	Values	Instructions	
Туре	Alternate	In this mode the triggering source comes alternately from channels CH1 and CH2. This mode is used to observe asynchronous signals.	
Source	CH1	Configure triggering source CH1	
	CH2	Configure triggering source CH2	
Mode	Edge	Choose "Edge" as type of triggering	
	Ŀ	Trigger on rising edge.	
Siope	-	Trigger on falling edge.	
	t↓	Trigger on rising and falling edges.	
Set-Up		Access to the "Trigger Configuration Menu".	
Trigger on Pulse page 1	Option	Values	Instructions
----------------------------	--------	----------------------------	---
	Туре	Alternate	In this mode, the triggering source comes alternately from channels CH1 and CH2. This mode is used to observe asynchronous signals.
	Source	CH1 CH2	Configure triggering source CH1 Configure triggering source CH2
	Mode	Pulse	Choose Pulse as type of triggering
	When	나 더 다 다 다 다	Triggering condition: Choose the type of Pulse and the Pulse width condition.

Trigger o	n Pulse
	page 2

Option	Values	Description
Configure the width	20,0ns ~10,0s	The "Adjust" knob is used to adjust the pulse width.
Set-Up		Access to the "Trigger Configuration Menu"

on Video	Option	Values	Instructions
page 1	Туре	Alternate	The triggering source comes alternately from channels CH1 and CH2. This mode is used to observe asynchronous signals.
	Source	CH1 CH2	Configure triggering source CH1 Configure triggering source CH2
-	Mode	Video	Choose Video as type of triggering.
	Polarity	(normal) (inverted)	Normal: triggers on the negative edge of the sync pulse. Inverted: triggers on the positive edge of the sync pulse.

Trigger on Video

Trigger

page 2

Option	Values	Instructions
Sync	Line number All lines Odd Fr Even Fr	Choose the appropriate video sync: Line Number – All Lines – Odd Frame – Even Frame
Standard	NTSC Pal/Secam	Choose the video standard for synchronization and the number of lines.

Trigger on Slope	Option	Values	Instructions
page 1	Туре	Alternate	The triggering source comes alternately from channels CH1 and CH2. This mode is used to observe asynchronous signals.
	Source	CH1 CH2	Configure triggering source CH1 Configure triggering source CH2
	Mode	Slope	Choose Slope as type of triggering
	When	┵ ╫╴╫╴╫╴╫ ┺	Choose the triggering condition of the slope trigger.

Trigger	on	Slo	ре

page 2

Option	Values	Instructions
Time	や	Turn the "Adjust" knob to adjust the duration of the slope. The range of adjustment is from 20ns to 10s.
Vertical	₩ ₩ ₩ ₩ ₩	Choose the triggering level to be adjusted by the "LEVEL" knob. You can adjust "LEVEL A", "LEVEL B", or both at once.
Set-Up		Access to the "Trigger Configuration Menu".

- **Steps** To obtain a stable display in the case of two asynchronous signals, follow the instructions below:
 - 1. Inject asynchronous signals on channels CH1 and CH2.
 - 2. Press the "AUTO" key.
 - 3. Press the "TRIG MENU" key to access the "Trigger Menu".
 - 4. Press the "Type" key and choose "Altern" (Alternate).
 - 5. Press the "Channels" key and choose "CH1-CH2".
 - 6. Press the "Source" key and choose "CH1".
 - 7. Press the "CH1" key and turn the "S/div" knob to optimize the display of the CH1 signal.
 - 8. Press the "Mode" key to choose "Edge", "Pulse", "Slope" or "Video".
 - 9. Choose "Edge" as trigger mode.
 - 10. Press the "Source" key and choose "CH2".
 - 11. Press the "CH2" key and turn the "S/div" knob to optimize the display of the CH2 signal.
 - 12. Repeat steps 8 and 9.

COUPLING

Use the coupling appropriate to the triggering source signal.

To choose the coupling of the trigger, first press the "TRIG MENU" key to choose the triggering mode - "edge", "pulse", video" or "slope" -, then choose in the "Set Up" menu the coupling of triggering source CH1 or CH2.

Horizontal POSITION

The "Horizontal Position" button is used to adjust the time interval between triggering event T and the centre of the screen. The "Horizontal POSITION" knob is used to adjust the part of the signal displayed before and after triggering event T. The horizontal position reference is the centre of the screen, the "Position" is positive in the left-hand part of the screen and negative in the right-hand part.

SLOPE & TRIGGERING THRESHOLD

The "Slope" and "Triggering Level" commands are used to define the trigger.

The choice of polarity of the "Slope" ("Edge" type trigger only) determines triggering on the rising or falling edge of a signal.

The "LEVEL" knob controls the vertical position of the triggering threshold on the edge.



Note:

- Use the SINGLE button when you want to capture a single signal.
- The coupling of the triggering source does not affect the coupling bandwidth of the channel displayed on screen.
- Normal polarity is used for positive video, which has negative sync pulses. For negative video, which has positive sync pulses, use the inverted polarity.

HOLD-OFF

Use Hold-Off to obtain a stable display with complex signals, such as pulse trains, for example. The Hold-Off time is the time interval between the detection of a valid triggering event and the time when the oscilloscope is ready to detect another triggering event. The oscilloscope will not trigger during the Hold-Off time; the triggering circuit is disabled during this time. In the case of a "pulse train", set the Hold-Off equal to the width of the pulse train; this will allow triggering on the first pulse of the train and mask subsequent pulses.



- Steps To adjust the Hold-Off time:
 - 1. Press the "TRIG MENU" key to display the "TRIG Menu".
 - 2. Press the "Type" key to choose the type of trigger.
 - 3. Press the "Set Up" key to access the "Trigger Configuration Menu".
 - 4. Press the "Hold-Off" key. Turn the "Adjust" knob to adjust the Hold-Off time so as to obtain a stable signal.
 - 5. Change the Hold-Off time until the trace stabilizes.
 - *Note:* Use Hold-Off to stabilize the trace in the case of complex periodic signals.

Acquisition menu

During the acquisition of a signal, the oscilloscope converts it to digital format and displays a trace. The acquisition mode determines how the signal is digitized. The time base range determines the duration of recording and the elementary acquisition pitch.

Press the "ACQUIRE" key.



Configuring	Option	Values	Instructions
acquisition	Acquisition	Sample	Used for the precise sampling and display of most signals.
		Peak detection	To view the noise and reduce aliasing.
		Mean	Used to reduce the noise, random or not, of the signal displayed.
		Mean 4, 16, 32, 64, 128, 256	Choose the averaging coefficient
	Sinx/x	On Off	Use "Sin" interpolation Use "Linear" interpolation
	Mode	Equ Time Real Time	Set the Sampling mode to Equivalent Time (Equivalent Time Sampling). Set the Sampling mode to Real Time (Real Time Sampling).
	TxEchan (Sa Rate)		Display the sampling rate.

- Sample The oscilloscope samples the signal at regular intervals to construct the trace. In general, this mode gives an accurate representation of the signal.
 - Advantage You can use this mode to reduce random noise.
 - **Disadvantages** The "sample" mode does not capture the rapid variations of the signal (glitches) that may occur between two successive samples. Aliasing may result, and short pulses may not be detected. In the presence of a pulse having a low width (glitch), you must use the "Peak detection" mode.



- Peak detectionThe Peak Detection mode captures the minimum and maximum values of a
signal between two successive samples.
 - *Advantage* With this mode, the oscilloscope can capture short pulses (or glitches) that might have escaped detection in the "sample" mode.
 - *Drawback* The trace thickness (noise) will be larger in this mode.



Averaging The oscilloscope performs several acquisitions, determines the mean, and displays the resulting trace.

Advantage





Mode

Equivalent time sampling ETS The equivalent time sampling (ETS) mode can reach a horizontal resolution of 20ps (equivalent to 50GSa/s). This mode is suited to the observation of repetitive signals.

Real time sampling RTS The highest real time sampling (RTS) rate is 1GSa/s (DOX2100B & DOX2070B).

Time baseThe oscilloscope digitizes the traces through the acquisition of an input signal at
precise points. The time base is used to control the trace sampling rate.

Use the "S/div" knob to adjust the time base coefficient scale that suits you.

Undersampling Aliasing occurs when the sampling rate of the oscilloscope is not fast enough to reconstruct a trace precisely. When this happens, the oscilloscope displays a signal having a lower frequency than the input signal, or displays an unstable signal.



Steps Configure the sampling format

Press the "Acquisition" key or turn the "Adjust" knob and choose one of the following sampling modes: "Sample", "Peak Detection", or "Averaging".

Configure the averaging

If you choose the "Averaging" mode, you can use the "Mean" button and choose "4", "16", "32", "64", "128" or "256".

Configure the interpolation function

Press the "Sinx/x key" to choose Sinx or interpolation x.

"Sinx" corresponds to sinusoidal interpolation:





"X" corresponds to "linear" interpolation:

Configure the Sampling mode

Press the "Mode" key and choose "Real Time" (Real Time Sampling, RTS) or "Equivalent Time" (Equivalent Time Sampling, ETS).

Sampling rate

Adjust the time base coefficient by turning the "T/div" knob of the HORIZONTAL keypad; the corresponding sampling rate is displayed at bottom right on the screen.

Run control

ſ	SINGLE
-	NEOWTHON
1	RUN

Run/Stop Press the "RUN/STOP" key to start (RUN) the continuous acquisition of signals. Press this key again to stop the acquisition.

Single Press the "SINGLE" button to select the "Single" mode. In "SINGLE" mode, pressing the RUN/STOP key sets the acquisition function to "ready": a triggering event then causes a single acquisition to be performed and displayed; the oscilloscope then changes to STOP.

In SINGLE mode, when you press the "RUN/STOP" button to start a single acquisition, the oscilloscope executes the following steps:

- 1. Acquisition of the Pre-Trig samples, which on the screen are the part of the signal to the left of the triggering point.
- 2. Acquisition of the Pre-Trig samples is continuous while waiting for the triggering event.
- 3. Detection of the triggering event.
- 4. After the triggering event, the acquisition of samples continues until the recording memory is filled; this is the post-trig, which on the screen is the part of the trace to the right of the triggering point.
- 5. The newly acquired signal is displayed. Then the acquisition is STOPped; the "RUN/STOP" key must be pressed again to restart the sequence.

Functional description V - DISPLAY system

Configuration of the display

Press the "DISPLAY" key.





Display

page :

Option	Values	Description
Туре	Vectors	"Vectors": joins two adjacent samples by a line segment. Dots: displays all points acquired.
	Dots	
Persistence	Off 1 sec 2 sec 5 sec Infinite	Defines how long the display of the sample acquired is held.
Intensity	◆	Defines the intensity of the display of the trace.
Brightness	Intensity>	Configures the brightness of the graticule.



Functional description V - DISPLAY system (cont'd)

Display	Option	Values	Instructions
page z	Format	YT XY	The YT format displays the voltage (vertical scale) vs time (horizontal scale). The XY format displays a dot for each couple of samples acquired simultaneously in channels CH1 = X and CH2 = Y.
	Screen	Normal Reversed	Change to normal mode. Change to reversed colour mode.
	Graticule		Display the graticules and axes on screen. Deactivate the graticules. Deactivate the graticules and axes.
	Display menu	2 sec 5 sec 10 sec 20 sec Infinite	Definition of the duration of display of the menu to the right of the screen.
	Next page	Page 2/3	Press this key to access the second page of the "Display" menu.



Functional description V - DISPLAY system (cont'd)

Display	Ontion	Values	Instructions			
page 3	Interface	Classical	Configure the display style			
pagee	interrace	Modern	Configure the display style	•		
		Traditional				
		Simple				
	Next page	Page 3/3	Press this button to return	to the first page.		
Steps	1. Configure th	he type of display				
	1) Press the "	DISPLAY" key to o	display the "Display" menu.			
	2) Press the "	'Type" key and cho	oose "Vectors" or "Dots".			
	2. Configure t	he remanence				
	Press the "Pe	ersistence" key to c	hoose "Off", "1 Sec", "2 Sec	c", "5 Sec",		
	or "Infinite". I	his option is used	to display certain special sig	inals.		
	3. Configure the	e intensity	n the "Adjust" knoh te edjus	tthe		
	intensity of the	ensity key and tur	IT THE AUJUST KHOD TO AUJUS			
	4. Configure th	e Brightness				
	Press the "Bri	ightness" kev and	turn the "Adiust" knob to adi	ust the		
	brightness of	the graticule.				
	5. Configure th	ne display format				
	1) Press the "	'Next Page" key to	display the second display	menu.		
	2) Press the "	2) Press the "Format" key and choose "YT" or "XY".				
	6. Configure th	6. Configure the screen				
	Press the "Sc	Press the "Screen" key and choose "Normal" or "Reversed" to define the				
	background colour of the screen.					
	Droce the "Sh	7. Configure the graticule				
	display or not	display the gratic				
	8 Configure th	ne menu display	ne.			
	Press the "Me	enu Display" kev to	choose "2 sec", "5sec", "1()sec", "20sec"		
	or "Infinite" to	or "Infinite" to define the duration of display of the menu.				
	9. Configure "Interface" (skin)					
	Press the "Interface" (skin) key or turn the "Adjust" knob to choose					
	"Classical", "N	Modern", "Tradition	al", or "Simple".			
	Trig'd	·~~~	······································	DISPLAY		
				Туре		
			Λ	Dots		
			$\Lambda z \pm \pm \Lambda \pm \pm 1$	Distant		
				Persist		
		A	\wedge \square	5 sec		
		/	Λ Λ	Intensity		
	1	- Annone -		Ð		
		V V		100%		
				Brightness		
	S. S. S.			Ð		
				46%		
				Next Page		
			🗂 = 600.082KHz	Page 1/3		

Vrms=136.0mV M250ns MPos:250.0ns

Vpp=1.07V CH1== 200mV Freq=****

Functional description V - DISPLAY system (cont'd)

X-Y format

The XY format is used to analyse phase differences between signals using Lissajous figures. The XY format plots the voltage in channel CH1 (horizontal X axis) against the voltage in channel CH2 (vertical Y axis). The oscilloscope uses the triggerless acquisition mode and displays the data in the form of dots.

The "XY" mode accepts sampling rates ranging from 25KSa/s to 250MSa/s (1-2.5-5 staging).

- Channel CH1 "Volt/div" and horizontal "POSITION" X, configuration of the horizontal scale and position.
 - Channel CH2 "Volt/div" and vertical "POSITION" Y, configuration of the vertical scale and position.
 - Turn the "S/div" knob to adjust the sampling rate
 - The following functions are not available in "XY" mode:
 - XY of a real signal and of a trace obtained by mathematical calculation
 - Cursor
 - Control of trigger
 - Horizontal position knob
 - Vector type display
 - XY with the ≤100ms/div Time Base (Scan mode) or a sampling rate ≤12.5kSPS

Note: The Autoset function automatically restores the YT format.

The oscilloscope displays waveforms, in other words variations of the signal amplitude (voltage) as a function of time.

The oscilloscope also displays the vertical and horizontal ranges and the results of cursor and automatic measurements.

Scale measurement This method allows a rapid visual estimate. For example, you can observe the amplitude of the signal and determine approximately that it is slightly greater than 100mV. You can estimate the amplitude by simple measurements, by counting the major and minor divisions of the graticule and multiplying by the range. For example, if you count five major divisions between the minimum and maximum values of a signal, and if the vertical range is 100mV/div., then it is easy to calculate its peak-to-peak amplitude: 5 div. x 100mV/div. = 500mV.

Measurements by Three modes: Manual, Track (cursors attached to the trace), and Auto Press the "CURSORS" key.



1. Manual cursor	Option	Values	Description
	Mode	Manual	This mode is used to configure the
			measurement by cursors manually.
	Туре	Voltage	Use the cursor to measure the amplitude ΔV of
			the voltage signal.
		Time	Use the cursor to measure the period or
			frequency of the signal, ΔT and $1/\Delta T$.
	Source	CH1 – CH2	Choose the reference channel for the
		MATH	measurements.
		REFA - REFB	
	Cur A		Select CurA and turn the "Adjust" knob to adjust
	P		it.
	Cur B		Select CurB and turn the "Adjust" knob to adjust
	も		it.

When this mode is active, the screen displays two parallel horizontal or vertical cursors to measure the voltage or the time. The "Adjust" knob is used to move the cursors. Make sure that you have selected the right reference for the measurements.

• Voltage cursor: The voltage cursors take the form of horizontal lines on the screen. The position of a cursor is in Volts

• **Time cursor**: The time cursors take the form of vertical lines on the screen. The position of a cursor is in seconds.

• **Moving a cursor**: Use the "adjust" knob to move cursors A and B. To be able to move a cursor, you must first select it. When a cursor is moved, the value corresponding to the vertical and(or) horizontal position of the cursor is displayed to the left of the screen.

- *Steps* 1. Press the "CURSORS" key to display the measurement by cursors menu.
 - 2. Press the "Mode" key and choose "Manual".
 - 3. Press the "Type" key and choose "Voltage" or "Time".
 - 4. Press the "Source" key and choose "CH1", "CH2", "MATH", "REFA", "REFB" as reference source for the measurements.
 - 5. Choose "CurA" and turn the "Adjust" knob to adjust cursor A.
 - 6. Choose "CurB" and turn the "Adjust" knob to adjust cursor B.
 - 7. The values of the measurements are displayed at top left on the screen:

If the type of measurement configured is "Voltage", the values are in V:

- The voltage difference between Cursor A and Cursor B: ΔV

If the type of measurement configured is "Time", the values are in S:

- The time difference between Cursor A and Cursor B: ΔT
- The inverse of ΔT is in Hz: 1/ ΔT



	Option	Values	Description
Track mode	Cursor mode	Track	The "Track" mode allows measurement by cursors attached to the trace.
	Cursor A	CH1 - CH2 NONE	Select the channel attached to Cursor A.
	Cursor B	CH1 - CH2 NONE	Select the channel attached to Cursor B.
	Cur A		Select Cursor A and turn the "Adjust" knob to adjust it.
	Cur B		Select Cursor B and turn the "Adjust" knob to adjust it.

The "Track" mode displays two crossed cursors attached to the trace. You can adjust only the horizontal position of the crossed cursor selected, by turning the "Adjust" knob. The oscilloscope displays the values at top left on the screen.

- Steps 1. Press the "CURSOR" key to display the cursor menu.
 - 2. Press the "Mode" key and choose "Track".
 - 3. Press the "Cursor A" key to choose the attached channel.
 - 4. Press the "Cursor B" key to choose the attached channel.
 - 5. Select "Cur A" and turn the "Adjust" knob to move Cursor A horizontally.
 - 6. Select "Cur B" and turn the "Adjust" knob to move Cursor B horizontally.
 - 7. The measurement values are displayed at top left on the screen:
 - $A \rightarrow T$: The horizontal position of Cursor A (Time cursor).
 - $A \rightarrow V$: The vertical position of Cursor A (Voltage cursor).
 - $B \rightarrow T$: The horizontal position of Cursor B (Time cursor).
 - $B \rightarrow V$: The vertical position of B (Voltage cursor).
 - ΔT : The time interval between Cursors A and B.
 - $1/\Delta T$: The reciprocal of the time interval between Cursors A and B, in Hz
 - ΔV : The voltage difference between Cursors A and B.



3	Auto	mode
э.	Auto	moue

This mode	makes	automatic	measurements.
1110 1110000	mancoo	aatomatio	mousuremente.

Option	Values	Description
Cursor mode	Auto	Configures the cursor mode.

Steps

- 1. Press the "CURSORS" key to display the "Cursor Measurement" menu.
 - 2. Press the "Cursor Mode" key and choose "Auto".
 - 3. Press the "MEASURE" key to access the "auto cursor measurement mode" menu and choose the parameter to be measured.



Automatic Press the measurements

Press the "MEASURE" key to open the Automatic measurements menu:



Three types of automatic measurement are available:

- Voltage measurement
- Time measurement
- Delay measurement

32 measurement parameters are available.

Automatic Measurements

Option	Instructions
1. VOLTAGE	Press this key to access Voltage
	measurements.
2. TIME	Press this key to access Time measurements.
3. DELAY	Press this key to access Delay
	measurements.
4. ALL	Press this key to access All measurements
MEASUREMENTS	menu.
5. RETURN	Press this key to access the home page of the
	automatic measurements menu.



1. Automatic VOLTAGE Measurements	Option	Values	Instructions
	Source	CH1 CH2	Choose the reference channel for the Voltage measurements.
	Туре	Vmax, Vmin, Vpp, Vamp, Vtop, Vbase, Cycle Mean, Mean, Cycle Vrms, Vrms, ROVShoot, FOVShoot, RPREShoot, FPREShoot	Press the "Type" key or turn the "Adjust" knob to choose the type of Voltage measurement.
			Icon corresponding to the type of measurement selected.
	Return		Return to the first page of the automatic measurements menu.

2. Automatic TIME measurements

Option	Values	Instructions
Source	CH1 CH2	Choose the reference channel for the Time measurements.
Туре	Rise Time Fall Time Freq Period BWidth +Width -Width +Duty -Duty	Press the "Type" key or turn the "Adjust" knob to choose the type of Time measurement.
		Icon corresponding to the type of measurement selected.
Return		Return to the first page of the automatic measurements menu.

3. Automatic DELAY Option Values Instructions **Measurements** Source CH1-CH2 Reference channels for the delay measurement. Туре Phase FRR FRF FFR FFF Press the "Type" key or turn the LRR LRF LFR LFF "Adjust" knob to choose the type of Delay measurement. WW \$7.5 \$7.5 Icon corresponding to the type of delay measurement selected. Return Return to the first page of the

4. All measurements

Option	Values	Description	
Source	CH1 CH2	Choose the reference channel for the measurements.	
Voltage	On	Activates "all voltage measurements".	
	Off	Deactivates "all voltage measurements".	
Time	On	Activates "all time measurements".	
	Off	Deactivates "all time measurements".	
Delay	On	Activates "all delay measurements".	
	Off	Deactivates "all delay measurements".	
Return		Return to the main "all measurements menu".	

automatic measurements menu.

Types of	Types of	Description
measurement	measurement	
	I JUL Vmax	The maximum positive peak of the signal.
	<u> <u></u> <u></u></u>	The minimum negative peak of the signal.
	I Vpp	Absolute difference between the maximum and minimum peaks of the signal.
	T T Vtop	Value of the high plateau of the signal.
	<u>∗</u> Vbase	Value of the low plateau of the signal
	≭ििः Vamp	Difference between Vtop and Vbase.
	± [⊷] ∽∽ Vavg	Arithmetic mean of the first cycle of the signal.
	Mean	Arithmetic mean over the whole signal.
	້ ມ Crms	RMS value of the first cycle of the signal.
	*∿∿∿ Vrms	RMS value of the whole signal.
	ROVShoot	Defined as (Vmax-Vtop)/Vamp after a rising edge.
	FOVShoot	Defined as (Vmin-Vbase)/Vamp after a falling edge.
	RPREshoot	Defined as (Vmin-Vbase)/Vamp before a rising edge.
	FPREshoot	Defined as (Vmax-Vtop)/Vamp before a falling edge.
		Rise time measures the time between 10% and 90% of the first rising edge of the signal.
	Fall time	Fall time measures the time between 90% and 10% of the first falling edge of the signal.
	_±⊔⊔± Bwid	The duration of a pulse train. Measured on the whole signal.
	_ _ f +Wid	+Width, time interval between the first rising edge and the next falling edge at 50% of Vamp.
	- ₩id	-Width, time interval between the first falling edge and the next rising edge at 50% of Vamp.
	- f ₊t-「 +Duty	+Duty is the ratio of the width of the positive pulse to the period of the signal.
	- Teff - Duty	- Duty is the ratio of the width of the negative pulse to the period of the signal.
	WW Phase	The phase lead or lag between the signals present on channels CH1 and CH2, expressed in degrees, where 360° represent one cycle of the signal.
		The time interval between the first rising edge of source CH1 and the first rising edge of source CH2
	عارية <u>معرية</u> FRF	The time interval between the first rising edge of source CH1 and the first falling edge of source CH2
	 ±ررئد FFR	The time interval between the first falling edge of source CH1 and the first rising edge of source CH2
		The time interval between the first falling edge of source CH1 and the first falling edge of source CH2
		The time interval between the first rising edge of source CH1 and the last rising edge of source CH2
	ゴル流 LRF	The time interval between the first rising edge of source CH1 and the last falling edge of source CH2
	LFR	The time interval between the first falling edge of source CH1 and the last rising edge of source CH2
	」現 」で、第1 LFF	The time interval between the first falling edge of source CH1 and the last falling edge of source CH2

Steps Voltage measurements

- 1. Press the "MEASURE" key to display the "Automatic Measurements" menu.
- 2. Press the first key at the bottom to access the "second measurement menu".
- 3. Choose the type of measurement. If you press the "Voltage" key, the "Voltage measurement" menu is displayed on screen.
- 4. Press the "Source" key to choose the source channel of the measurement, "CH1" or "CH2".
- 5. Press the "Type" key to select the type of measurement. The icon and the corresponding value are displayed under the type of measurement.
- 6. Press the "Return" key to access the home page of the "automatic measurements" menu. The last type of measurement chosen and the corresponding value will be displayed at bottom right on the home page.

You can display the other types of measurement in the same way.

Remark: On the "MEASURE" home screen, five types of measurement can be displayed at most.



Steps Time measurement

- 1. Press the "MEASURE" key to display the "Automatic Measurements" menu.
- 2. Press the bottom key to access the second page of the Automatic measurements menu.
- 3. Press the "All" key to access the "All measurements" menu.
- 4. Press the "Source" key to choose the reference channel.
- 5. Press the "Time" key and choose "On". Subsequently, all time measurements will be displayed on the screen.



SAVE

Functional description VII - STORAGE system

The "SAVE/RECALL" key corresponds to the Storage function.

5 types of data:

- Set-up Parameters
- Curve
- Image
- CSV
- Factory



You can save in internal memory and retrieve on screen up to 20 configurations of the oscilloscope and 20 traces. The host USB port on the front panel of the oscilloscope is used to save configuration data, traces, screen grabs, CSV files to a USB key. The saved configurations and traces can be retrieved on the screen of the oscilloscope. The screen grabs and the CSV files cannot be retrieved on the oscilloscope, but can be opened using the appropriate PC software.

1. "Save All" Screen

Directories

The "SAVE ALL" screen is broken down into Directories or Files:





1.1 Recall of files

The "Load" key can be used to restore your configuration files. When you have selected the file in question and it is highlighted in the main zone of the screen, press the "Load" key to restore the configuration from the USB flash memory.

Note: The "Load" button is deactivated when BMP or CSV files are selected.

The directories and files have "Rename" and "Return" keys on Page 2/2. Use these keys to rename a file or directory, or to exit from the "SAVE/RECALL" screen.



1.2 Creation of directories and files

- The "New File" menu is identical to the "New Directory" menu. Only its title changes. The "InputChar" key adds the chosen character at the cursor position in the Name field.
- Move the cursor in the name field using the " \rightarrow " and " \leftarrow " buttons.
- Turn the Adjust knob to browse the selection of characters. When the desired character is highlighted, press the Adjust knob or press the "InputChar" button to add it at this position in the Name field.
- Additional selections for "Return", "Delete", and "Reset" are available to facilitate entry and can be accessed by the Adjust knob in the same way.
- Press the "Confirm" button (when the field name is complete) to save the file in memory. When the "Confirm" button has been used, a "Data Store Success!" message appears briefly and the new file or directory appears on your USB flash memory.

2. Save and Recall of the configuration

The whole configuration is stored in non-volatile memory. When you restore the configuration, the oscilloscope will be in the mode from which the configuration was saved.

The oscilloscope saves the current configuration if you wait three seconds after the last change before powering it down. The oscilloscope loads this configuration when next powered up.

2.1 Save/Recall the configurations of the device



	A REAL PROPERTY OF A REAL PROPER	
Option	Values	Description
Туре	Set-up parameters	Oscilloscope configuration "Save/Recall" menu
Record on	Device	Save the configuration in the internal memory of the oscilloscope.
Config	No.1 to No.20	Press the "Configuration" button or turn the "Adjust" knob to choose the location.
SAVE		Run the save
RECALL		Restore the configuration



Functional description

VII - STORAGE system (cont'd)

Save steps	 Example: Save the configuration corresponding to a "Dots" type display in the internal memory of the oscilloscope. 1. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu. 2. Press the "Type" key and choose "Set-ups". 3. Press the "Save To" key and choose "Device". 4. Press the "Set-up" key and choose "No. 1". 5. Press the "DISPLAY" key to view the "Display" menu. 6. Press the "Type" key and choose "Dots". 7. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu. 8. Press the "Save" key.
Recall steps	 If you want to restore Saved configuration "No. 1". Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu. Press the "Type" key and choose "Set-ups". Press the "Save To" key and choose "Device". Press the "Parameters" key or turn the "Adjust" knob to choose "No. 1". Press the "Load" (Recall) key.

2.2 Save the set-up to a USB key

Option	Values	Instructions
Туре	Set-up parameters	Set-up Save/Recall menu.
Save To	File	Save the configuration to USB flash memory.
Save		Go to the Save/Recall interface



Save steps	Save the "Dots" type Display configuration to a USB key:	
	 Press the "SAVE/RECALL" key and choose "Parameters". 	
	 Insert the USB flash memory in the port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately 5 seconds). 	
	3. Press the "Save" key and choose "Folder".	
	4. Press the "Save" key to access the Save/Recall interface.	
	5. Press the "New folder" key	
	6. Press the "Delete folder" key to delete a folder	
	7. Press the "Modify" key to modify a folder.	
	8. Press the "New file" key to create a new file	
	9. Press the "Delete file" key to delete a file	
	 Press the "next page" key, then the "Rename" key, to change the name of the file or of the directory. 	
	11. Turn the "Adjust" knob to choose the folder, then press "Confirm" to save the configuration to the USB memory.	
Steps in Restoration	To restore a configuration saved to a USB key:	
	1. Press the "SAVE/RECALL" key	
	 Insert the USB key in the host USB port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately 5 seconds). 	
	3. Press the "Type" key and choose "Parameters".	
	4. Press "Load" and choose "Folder".	
	5. Press "Save" to display the Save/Recall interface	
	Choose the file and press the "Load" key (after approximately five seconds a "Read data success" message is displayed). The configuration has been restored from the USB memory.	

2.3 Restore the Factory configuration (or Default configuration)

This option restores the factory configuration:

Option	Values	Instructions
Туре	Factory	To select the "factory" configuration.
	Load	To load the "Factory" configuration.



3.Backup and Restoration of Traces

3.1 Save/Restore traces on the device

Option	Configuration	Instructions
Туре	Waveform	Trace Save/Recall menu.
Save to	Device	Save the traces in the internal memory of the oscilloscope.
Curve	No.1 to No.20	Press the "Curve" key or turn the "Adjust" knob to choose the location.
Save	Save	Run the backup
Recall	Recall	Restore a trace from the internal memory of the oscilloscope.



Save	Save traces in internal memory:
------	---------------------------------

- Steps 1. Inject a sinusoidal signal on channel 1 and press the "Auto" key.
 - 2. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu.
 - 3. Press the "Type" key and choose "Curves".
 - 4. Press the "Record" key and choose "Device".
 - 5. Press the "Curve" key or turn the "Adjust" knob to choose "No. 1".
 - 6. Adjust "Volts/div" or "S/div" if necessary to optimize the display of the trace.
 - 7. Press the "Save" button.
- **Restore** To restore the signals:

Steps 1. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu.

- 2. Press the "Type" key and choose "Curves".
- 3. Press the "Record" key and choose "Device".
- 4. Press the "Curve" key or turn the "Adjust" knob to choose "No. 1".
- 5. Press the "Load" key.

3.2 Save/Restore Traces in USB flash memory

Option	Configuration	Description
Туре	Curves	Save/Recall menu.
Save to	Folder	Save the trace to the USB key.
Save		Run the backup.



Save

To save a trace in USB flash memory:

Steps

- 1. Inject a signal on channel CH1 and press the "AUTO" key.
- 2. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu.
- 3. Press the "Type" key and choose "Curves".

4. Insert the USB key in the host USB port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately five seconds).

- 5. Press the "Save To" key and choose "Folder".
- 6. Press the "Save" key to access the Save/Recall interface.

7. Create a file and then press the "Confirm" button (after approximately five seconds a "Save data success" message is displayed on screen). The trace has been saved in the USB flash memory.

To restore a signal from the USB flash memory: Restore

Steps 1. Press the "SAVE/RECALL" key.

2. Press the "Type" key and choose "Curves".

3. Insert the USB key in the host USB port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately five seconds).

- 4. Press the "Save" key and choose "Folder".
- 5. Press the "Load" button to access the Save/Restore interface.

6. Choose the desired file and press the "Load" button (after approximately five seconds, a "Read data success" message is displayed). The trace has been restored from the USB memory.

3.3 Save an Image

A screen grab can be saved to a USB flash memory, but cannot be restored. It can be displayed using the appropriate PC software.

Option	Values	Description
Туре	Image (Picture)	Screen grab Save/Recall menu.
Print key	Save the picture	When the USB flash memory is connected to the oscilloscope (the icon of the USB flash memory is displayed at the top of the screen), choose "Save picture" and press the "Save" button to access the Save/Recall interface.
Save		Go to the Save/Recall interface.



- Steps 1. Select the screen grab.
 - 2. Press the "SAVE/RECALL" key to display the "SAVE/RECALL" menu.
 - 3. Press the "Type" key and choose "Picture".
 - Insert the USB key in the host USB port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately five seconds).
 - 5. Press the "Save" key and choose "Print Image".
 - 6. Press the "Save" key to access the "Save/Recall" interface.
 - Name the screen grab and then press the "Confirm" key (after approximately five seconds a "Save data success" message is displayed on screen). The image has been saved to the USB flash memory.

3.4 Save/Recall CSV

Option	Values	Description
Туре	CSV	Menu for backup of CSV files on USB flash memory.
Lg data (Data Depth)	Screen (Displayed)	Store only the signal displayed on screen in the CSV file.
	Memory (Maximum)	Stores maximum signal data in the CSV file.
Backup of Parameters	On Off	Used to save or not save the parameters in the CSV file.
Save		Display the Save/Restore interface.



Steps

- 1. Press the "SAVE/RECALL" key to open the "SAVE/RECALL" menu.
 - 2. Press the "Type" key and choose "CSV".
 - Insert the USB key in the host USB port of the oscilloscope and wait for the oscilloscope to initialize the USB flash memory (approximately 5 seconds).
 - 4. Press the "Lg data" key (Data Depth) and choose "Screen" (Displayed) or "Memory" (Maximum).
 - 5. Press the "Para Save" key and choose "On" or "Off".
 - 6. Press the "Save" key to open the Save/Recall interface.
 - 7. Name the CSV file to be saved. Then press the "Confirm" key (after approximately five seconds a "Save data success" message is displayed on screen). The CSV file has been saved to the USB key.
Functional description VIII - UTILITY 1/4

UTILITY Press the "UTILITY" key.

	Menu	
Cursors	Acquire	Save Recall
		\square

Utility page 1

F		
Option	Values	Instructions
System Status		Displays the hardware and software configuration of the oscilloscope.
Sound	¢K Av	Press to activate the sound.
Countor	On	Activate the frequency counter.
Counter	Off	Deactivate the frequency counter.
	English	English
	French	French
Language	German	German
	Spanish	Spanish
	Italian	Italian
Next page	Page 1/4	Press this key to go to the second page.



Utility	Option	Values	Instructions
page 2	Auto-Cal Calibration.		Automatic calibration.
	Run the Self-Test	Test screen Test keypad Test LED	Start the screen test program Start the keypad test program Start the LED test program
	Print Setup		Access the print setup menu.
		Printer	The oscilloscope is connected to the printer by a USB cable. When you use the printing function, select the "Printer" option. The printing icon is displayed at the top of the screen.
	Back USB	USBTMC (Computer)	The oscilloscope is connected to the computer by a USB cable. When you run the "EasyScopeX" PC software, choose " USBTMC ". The computer icon is displayed at the top of the screen.
	Next page	Page 2/4	Press this key to go to the third page.



Utility	Option	Values	Instructions
page 3	Firmware update		You can update the firmware of the oscilloscope from a USB flash memory (this takes approximately 2 minutes).
	Pass/Fail		Press this key to access the Pass/Fail menu.
	Record		Press this button to access the Signal Recording menu.
	I/O adjustment		Press this key to access the "I/O Adjustment" menu (See table below).
	Next page	Page 3/4	Press this key to go to the next page.

I/O adjustment

menu

Option	Valeurs	Description
IP Setting		Configure the IP address and complete the IP, MASK and Gate Way fields, switch between fields and validation with universal "Toggle" button Manual IP or parametrable DHCP search



Utility	Option	Values	Description
page 4 Screen Saver		1 min 2 min	Configure the hold-off time for the
		5 min 10 min	changeover to screen saver
		15 min 30 min	
		1 hour 2 hours	
		5 hours Off	



System status

Press the "**System Status**" key of the "**UTILITY**" menu to display the hardware and software configuration of the oscilloscope.

Instruction

StartupTimes	
	7
Software Versi	ion
	6.02.01.07
HardwareVersi	ion
	D-65-3.1
Product Type	
	DOX2025B
Serial No.	
	NDS1MDBX1R1211

Option	Instructions
Startup Times	Displays the number of power ups.
Software Version	Displays the embedded software version.
Hardware Version	Displays the hardware version.
Product Type	Displays the model name.
Serial No.	Displays the serial number.

Languages

5 languages are available.

Press the "Utility" key \rightarrow "Language" to choose the working language.



Printing a hardcopy

Étapes 1. Insert a USB stick into the USB Host connector on the front of the oscilloscope.

Wait for "USB flash drive In!" to appear on the screen and the "USB stick" icon



2. Press the "Print" key and wait for Store Data Success! " appears on the screen



The "DOX00001.BMP" screen shot has been saved in the "BMP" directory of the USB flash drive. You can open this image on a PC with image processing software such as Paint.

Functional description VIII - UTILITY system 2/4

Auto - Cal

The auto-calibration procedure is used to optimize the precision of acquisition of channels CH1 and CH2. You can run this procedure at any time, e.g. if the ambient temperature varies by more than 5°C, or after the device has been in operation more than thirty minutes.

Before starting the "Auto-Calibration", you must disconnect the probes and leads from the input BNCs. Then press the "Utility" key and choose "Auto Cal." to start the auto-calibration procedure, following the instructions displayed on screen.



Self-Test

Steps

1. Test of screen

Select "Test screen" to start the test of the LCD screen. The message "Press 'SINGLE' Key to continue, Press 'RUN/STOP' Key to exit" is displayed; press the "Single" button to start the test.



2.	Test	of	key	oad
----	------	----	-----	-----

Choose "Test keypad" to access the keypad test interface. The rectangles represent the keys on the front panel. The seven rectangles flanked by arrows represent the knobs on the front panel. The square below these seven rectangles represents the switches built into these knobs. Test all of the knobs and their switches. Also check that the backlit keys operate correctly.

Note:

- At the start of the "keypad test" all of the keys are white on a black ground.
- The keys that are white have not been tested.
- The keys that have been tested are green.
- The bottom of the screen displays the message "Press 'RUN/STOP' Key Three Times to exit" to indicate that the "RUN/STOP" key must be pressed three times in a row to exit from the keypad test.



3. LED test

Select "Test LED" to access the key backlight LED test interface. The message "Press 'SINGLE' key to continue, Press RUN/STOP Key to Exit" is displayed. Press the "Single" key repeatedly to test, one by one, the backlight LEDs. When a key is lit, the corresponding rectangle is coloured green.



Functional description VIII - UTILITY 3/4

Update of the	Update of the "Firmware" from a USB key.			
Embedded Software	The embedded sof key. This takes about the set of the s	ftware of the cout two minute	scilloscope can be updated directly from a USB es.	
Steps	1. Connect the US port on the front	B key contain panel of the c	ing the new "Firmware" version to the host USB scilloscope.	
	2. Press the UTILI	TY key to acc	ess the "Utility" Menu.	
	3. Press the "Next	Page" key to	access the third page of the "Utility" menu.	
	4. Press the "Upda	ate Firmware"	key.	
	5. Press the "SING the instructions	GLE" key to sta on screen.	art the update of the embedded software, then follow	
	6 Power down the oscilloscope, then power it back up and check that the firm has in fact been updated. When the firmware has been updated, an auto- calibration must be run.			
	Note: Do not powe	er down the os	cilloscope during the update.	
Pass/Fail	The "Pass/Fail" fur pattern (or Mask). rated "Pass": if not	nction is used If the real time	to compare the evolution of the real time signal to a signal matches the predefined pattern, the signal is	
Pass/Fail menu		, the signal is	rated "Fail".	
nago 1	Option	, the signal is Values	rated "Fail". Instruction	
paye i	Option Enable Test	, the signal is Values On	rated "Fail". Instruction Activate the Pass/Fail test	
page i	Option Enable Test	, the signal is Values On Off	rated "Fail". Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function	
page i	Option Enable Test Source	, the signal is Values On Off CH1	rated "Fail". Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test.	
page i	Option Enable Test Source	, the signal is Values On Off CH1 CH2	rated "Fail". Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test.	
page i	Option Enable Test Source Operate	, the signal is Values On Off CH1 CH2 ►	rated "Fail". Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test. Press to run the Pass/Fail test.	
page i	Option Enable Test Source Operate	, the signal is Values On Off CH1 CH2	rated "Fail". Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test. Press to run the Pass/Fail test. Press to stop the Pass/Fail test.	
page i	Option Enable Test Source Operate Msg Display	, the signal is Values On Off CH1 CH2 ▶ On	Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test. Press to run the Pass/Fail test. Press to stop the Pass/Fail test. Activate the display of the number of passes rated Pass or Fail.	
page i	Option Enable Test Source Operate Msg Display	, the signal is Values On Off CH1 CH2 ▶ ■ On Off	Instruction Activate the Pass/Fail test Deactivate the Pass/Fail function Select the Source channel for the Pass/Fail test. Press to run the Pass/Fail test. Press to stop the Pass/Fail test. Activate the display of the number of passes rated Pass or Fail. Deactivate the display of information about the number of Pass/Fail results.	



Deee/ F e ² /	Option	Values	s Instruction
rass/rall menu	Outout	Doop Tr	Stop when a Pass condition is detected.
page 2	Output	Pass Fa	Stop when a Fail condition is detected.
		On	Stop the test on a departure from the pattern.
	Stop On Output	Off	Continue the test after a departure from the
F			pattern.
F	Mask Setting		Access the "Mask configuration" menu.
	Next page	Page 2	Return to the first page of the Pass/Fail monu.
L	Next page	raye zi	Z Retuin to the first page of the Pass/Pair field.
Configuration of the Pass/Fail	CHI=	500mV	M 100 Jis M Pos 0.00 Jis CP2 760 mV
mask	Option	Values	Instruction
Configuration of	Mask in X		Turn the "adjust" knob to adjust the allowed
lile Pass/Fall mask page 1	\rightarrow		horizontal range of variation of the signal. <0.04div-
mask page i	xdiv		4.00div>
	Mask in Y		
	(\mathbf{t})		I urn the "adjust" knob to adjust the allowed vertical
	ydiv		range of variation of the Signal. <0.0401v-4.0001v>
	Create Mask		Generate the Pass/Fail test mask.
	Location	Internal External	Choose the mask storage location.
	Next page	Page 1/2	Access the second page of the "Mask Configuration" menu.
		5 - 508 al = 534	PASSIFAL Valid.test On Source CH2 Operate Visu Msg On Page_Suv. Page 12

Pass/Fail mask Option		Values	Instruction
rass/rail liask	Save		Store the mask configuration.
configuration page 2	Load		Restore the mask configuration.
	Return		Return to the main mask configuration menu.
	Last page	Page 2/2	Return to the first page of the "Mask Configuration" menu.



Run the Pass/Fail test

Steps 1. Press the UTILITY key to access the "Utility" menu.

- 2. Press the "Page after 1/4" key.
- 3. Press the "Page after 2/4" key to access the third page of the "Utility" menu.
- 4. Press the "Pass/Fail" key to access the "Pass/Fail" menu.
- 5. Press the "Activate test" key and choose "On"
- 6. Press the "Source" key to choose the source channel for the test.
- 7. Press the "Page after 1/2" key to access the second page of the "Utility" menu.
- 8. Press the "Mask Configuration" key to access the first page of the "Mask" menu.
- 9 Press the "X Mask" key and turn the "Adjust" knob to adjust the horizontal value of the allowed range.
- 10. Press the "Y Mask" key and turn the "Adjust" knob to adjust the vertical value of the allowed range.
- 11. Press the "Create mask" key to create the mask. You can also access the next page of the "Mask" menu to restore the saved mask.
- 12. Go to the second page of the "Pass/Fail" menu. Press the "Stop On" key to configure the option to Stop on Pass or Fail.
- 13. Go to the first page of the "Pass/Fail" menu. Press the "Operate" key 🕨 to run the pass/fail test.

Functional description

VIII - UTILITY 4/4

Record mode

The Record mode is used to record up to 2500 frames of 2.5 kpoints with time base ranges from 50ms/div to 2.5ns/div. The Record mode is the complement of the Recorder mode, which for its part is suited to slow signals and operates with time base ranges from of 100ms/div to 50s/div.

The Record mode is used to record the signals of channel CH1 or CH2 with a maximum record length of 2500 points. Recording can for example be triggered by an output of the pass/fail test signal, which makes this function very useful for recording slow signals for long periods without having to observe them continuously.

Option	Values	Instruction
	1. Record	Select Recorder mode
Mode	2. Replay	Select replay mode.
	3. Off	Exit from the signal recorder mode.
Source	CH1 CH2 Pass/Fail-OUT	Choose the source channel for recording.
Interval	も	Set the time interval between frames.
End frame	や	Maximum number of frames
Use	● (Record) ■ (Stop)	Press to start recording. Press to stop recording.

Signal recorder: Record signals at the defined rate.



Steps

- 1. Press the UTILITY key to access the "Utility" menu.
- 2. Press the "Next Page" key to access the third page of the "Utility" menu.
- 3. Press the "Record" key to open the "RECORD" menu.
- 4. Press the "Mode" key and choose "Record".
- 5. Press the "Source" key to choose the input signal channel.
- 6. Choose "Interval" and turn the "Adjust" knob to adjust the time interval between two successive frames.
- 7. Choose "End frame" and turn the "Adjust" knob to adjust the maximum number of frames to be recorded.
- 8. Press "• of the "Use" option to record the signal.

Reading: Read the current record, or read saved records.

Recorder

The Recorder mode is the complement of the Record mode, suited to slow signals, with time base ranges from 100ms/div to 50s/div Recorder allows the continuous recording of signals in real time. The oscilloscope can therefore record the signals and read them back to display them again on the

screen (Replay). It is equivalent to a Scan mode slow signal recorder (ROLL) with time base ranges from 100ms/div to 50s/div. The Recorder has a maximum internal recording memory depth of 7M or 2500 2.5-kpoint frames.

Signal recorder menu

Option	Description
1. Record	Capture the signal continuously
2. Replay	Read and display the recorded signal (the display scrolls from right to left)
3. Option	Parameterize the recorder.
Return	Exit from the record function.







Replay menu Restore a recorded signal

Option	Description
Restart	Start the reading and display of the recorded frames
Previous	Read the previous frame of the recording
Next	Advance to the next frame of the recording
Return	Exit from the Replay mode





Parameterizing	Option	Values	Description
the Recorder	Viewer	Full screen Half screen	Recording and reading of channels in full- screen mode Recording and reading of channels in half-screen mode CH1 is displayed at the top of the screen, CH2 at the bottom of the screen
	Record	Continuou s Single	The recorder captures the signal in the channel continuously; the most recent part of the signal overwrites the oldest part. The recorder stops when its memory reaches 6M.
	Replay	By point By frame	During replay, the signal is refreshed from left to right on the screen During replay, the signal on the screen will be completely refreshed according to the capture time of each frame
	Return		exit from the recorder parameterizing interface



Steps 1. Press the "UTILITY" key to access the "Utility menu".

- 2. Press the "Next Page" button to access the fourth page of the "Utility menu".
- Press the "Save" button to access the manual recording.
 Press the "Option" key to select the parameter
- 5. Press the "Save" button to enter the Save menu and then press the "Start" button to start recording the signal

6. When the signal recording is complete, press the "Play" button to view the recorded signal.

Remote control	
Remote control	There are two remote control methods:
User-programmable	The user can control the oscilloscope using Standard Commands for Programmable Instruments (SCPI). See the Programming Guide for more information about the commands and the programming. The user can control the oscilloscope remotely using EasyScopeX or SX- DOX PC software. National Instruments Corporation's "Measurement & Automation Explorer" software can also be used to control the oscilloscope.
Using the PC software provided by METRIX	The oscilloscope can communicate with a PC via its USB device port. This part explains how to use EasyScopeX to control an oscilloscope remotely via the USB interface.
Control via USB	Use a USB cable to connect the oscilloscope (USB device port) to a PC (USB host port) running EasyScopeX software.
Installing the USB device	Set the "Back USB" interface on the oscilloscope to USBTMC. If you have installed the EasyScopeX or N.I. software, a dialogue box will be displayed on the PC the first time you connect the oscilloscope. Install the "USB Test and Measurement Device" program as explained on screen. The steps are so follows:
	Fermer
Rechercher l'appareil	Start the EasyScopeX software, click on "add device" to start the search, the following dialog box will be displayed. Then click "Add" to open the instrument then select the type of communication: USB or VXI11 // Ethernet for DOX2000B.
	Connect Device01.C The connected devices are list below : USB0::0xF4EC::0xEE3A::NEU00002130019::INSTR USBTMC VX11

cancel

Add

Remote control (cont'd)

Check the instrument

The information concerning the device found is displayed. The following image is an example. The serial number of the device and information concerning the USB interface are displayed.

evice Na	Status	Bus Type	Address	Serial	
DOX2025B	Alive	USBTMC	USB0::0	NDS1	
OX2025B	Alive	USBTMC	USB0::0	NDS1	
⊐. USB0::0xF	4EC::0xEE3	A::NDS1MDB	X1R1211::IN	ISTR	
USB0::0xF	4EC::0xEE3	A::NDS1MDB	X1R1211::IN	ISTR	
··· USB0::0xF	4EC::0xEE3 Command	A::NDS1MDB s	X1R1211::IN	ISTR	
USB0::0xF	4EC::0xEE3 Command	A::NDS1MDB s	X1R1211::IN	ISTR	
USB0::0xF Send (Trace Ch	4EC::0xEE3 Command Jannel1 Jannel2	A::NDS1MDB s	X1R1211::IN	ISTR	
USB0::0xF Send (Trace Ch Screen	4EC::0xEE3 Command Jannel1 Jannel2 In Capture	A::NDS1MDB s	X1R1211::IN	ISTR	
	4EC::0xEE3 Command annel1 annel2 Copture Configura	A::NDS1MDB s	X1R1211::IN	ISTR	

Test communication

Send Command

Click on "Send Command" and from the keypad enter the SCPI command "*IDN?"; press the "Enter" key to send the command. The EasyScopeX software will send the command, accept the data sent by the instrument in response to the SCPI command, and, in our case, display the information about the instrument:



Send Command

sends SCPI commands to the oscilloscope

WaveTrace

recovers traces (sets of points acquired)

Screen Capture captures screens

Scope Configuration

For more details, we invite you to look up the help file of the EasyScopeX software.

Messages / Help

Embedded Help function

The oscilloscope has a help function in English ("GB") that you can use when you need help working with the device.

Press the "HELP" key to access the embedded help, then press the keys for which you want to view the help information.

Note: To view the help for the SINGLE or RUN/STOP key, you must press the kevs immediately after pressing the HELP key, because otherwise, if the help text of a key is longer than one page, the SINGLE key is used to view the next help page, and the RUN/STOP key the previous help page.

All of the sub-menus of each main menu have their own help pages. Note: If you want to view the help pages of sub-menus several pages long, you must press the "HELP" button to exit from the on-line help, go to the next page of the sub-menu, then press the "HELP" button again and the sub-menu option button to view the corresponding help page.



Messages / Help (cont'd)

Messages

- **Trig level at limit!**: Indicates that the Trigger Level, adjustable by the Trig level knob, has reached a limit.
- Horizon position at limit!: Indicates that the horizontal position, adjustable by the horizontal position knob, has reached a limit.
- Volts/Div at limit!: Indicates that the vertical range has already reached the minimum of 2mV/div or the maximum of 10V/div.
- Volts position at limit!: Indicates that the vertical position has reached a limit.
- Sec/Div at limit!: Indicates that the time base range, S/div, has reached a limit.
- Hold-Off time at limit!: Indicates that the Hold-Off time, adjustable by the adjust knob, has reached a limit
- Function isn't useable!: Indicates that the function is not compatible with this operating mode.
- **No signal!**: This message is displayed upon completion of the Autoset when there is no signal.
- Adjust at limit!: This message is displayed when the pulse width adjustment (by the adjust knob) has reached the minimum of 20.0ns or the maximum of 10.0s.
- Location Empty!: This message is displayed if you press the restore key and no Trace or Configuration is stored at this location.
- USB Flash Drive Plug In!: This message is displayed when you insert a USB Flash Drive in the USB host port.
- USB Flash Drive Pull Out!: This message is displayed when you disconnect the USB flash memory.
- Store Data Success!: This message indicates a "Successful Save" of the configuration, of the Trace, or of the image to the internal memory of the oscilloscope or to the USB key.
- Read Data Success!: This message indicates a "Successful Recall" of the configuration or of the trace from the internal memory of the oscilloscope or from the USB flash memory.
- Please set Back USB to printer!: This message is displayed if the "S/div" knob is pressed with "Printing" configured to "Print Picture" and the "Back USB" option set to "USBTMC".
- USB Flash Drive isn't connected!: This message is displayed when the USB key is not inserted in the USB host port and the "Save to" option is set to "File" or the "Printing" option is set to "Save Picture" in the "Save/Restore" menu and you press the "Save" key or the "S/div" knob.
- **Record Wave Success**!: This message is displayed at the end of successful recording of traces.

Messages / Help (cont'd)

Diagnostics

Steps 1. After power up ("ON"), the screen of the oscilloscope displays nothing:

- Check the connection of the power cord.
- Make sure that the device is in fact on.
- Then restart the oscilloscope.
- If the oscilloscope still fails to operates, contact METRIX
- CHAUVIN-ARNOUX division.
- 2. The oscilloscope displays no trace after a signal is injected on the inputs:
 - (1) Check the lead of the probe.
 - (2) Check the connecting cable.
 - (3) Check the probe with Probe Output Adjust.
 - (4) Check whether the unit tested generates the signal or not.
 - (5) Inject the signal again.
- 3. The voltage displayed is 10 times as large as/smaller than the true voltage:

Check that **the probe factor of the channel** matches the attenuation factor of the probe

4. The signal displayed is unstable:

(1) Check **that the triggering source chosen** corresponds to the channel displayed.

(2) Check that **the triggering mode chosen** is suited to the type of signal observed (for example, for a video signal, use the "Video" trigger mode).

(3) Try changing the trigger "coupling" to "Low-pass Filter" or

"High-pass Filter", to avoid interference with **the triggering** by **highor low-frequency noise.**

5. You press the "RUN/STOP" key but nothing is displayed.

Check whether the triggering mode is "normal" or "single", and check that the triggering level is between the max and min peaks of the signal. If it is, select "SET TO 50%", otherwise set the trigger to "Auto" or use the "Autoset" button to set it to automatic.

6. The signal is refreshed slowly when acquisition is in "Averaging" or if the "Remanence time" is too long.

This is normal with these parameters

7. The signal is displayed in steps

(1) This phenomenon is normal. If the time base is too slow, turn the adjust knob in order to increase the horizontal resolution and improve the display.

(2) If the type of display is "Vectors", change it to "Dots" to improve the display.

Technical characteristics

The oscilloscope must have operated continuously for thirty minutes at the service temperature. You must run the Auto-calibration from the "Utility" menu if the service temperature varies by more than 5°C. The oscilloscope must be within the factory calibration range. All specifications are guaranteed except those marked "tvpical"

Inputs	DOX2025B	DOX2070B	DOX2100B	
Input coupling	AC, DC, GND			
Input impedance		1 MΩ ±2% 18 pF ±3 pF		
Max. voltage at input	300	300 V (DC+AC Pk) 300 Vmax CAT II		
Ch to Ch insulation (both channels with the same V/div configuration)	>100:1 to 12.5MHz	>100:1 to 35MHz	>100:1 to 50MHz	
Probe attenuator	1X, 10X			
Probe attenuator configuration factors	0.1x,0.2x,0.5x,1x,2x,5x,10)x,20x,50x,100x,200x,500x,10	000x,2000x,5000x,10000x	

Vertical system	DOX2025B	DOX2070B	DOX2100B
Vertical sensitivity	2mV/div10 V/div. (order 1-2-5)		
Range of variation of the vertical position	2mV - 200mV: ±1.6V 206mV - 10V: ±40V		
Vertical resolution		8 bit	
Number of Channels		2	
Analog bandwidth	25MHz	70MHz	100MHz
Single bandwidth	25MHz	70MHz	100MHz
Flatness of the Bandwidth on the BNC input	DC-10% of the nominal BW: ±1dB 10%-50% of the nominal BW: ±2dB 50%-100% of the nominal BW: +2dB/-3dB		
Low frequency limit to -3dB with AC coupling		≤10Hz	
Noise: Pk-Pk for a 3K recording	≤ 0.6 div. for a mean of 10 Pk-Pk readings, 2mV to 10V/div ranges ≤ 0.7 div. for a mean of 10 Pk-Pk readings, with fine adjustment of the range		
SFDR with the harmonics (measurement by FFT)		≥ 35dB	
Accuracy of DC gain for a signal of amplitude 6 div.	± 4.0% ±	: 5mV/div. to 10 V/div. in fixed 5.0%: 2mV/div. variable gain	gain ranges ranges
Accuracy of the DC measurements: all ranges: ≤100mV/div.	± [3% * (measurement + offset) +1% * offset + 0.2 div. +2mV]		
Accuracy of the DC measurements: all ranges: > 100mV/div.	± [3% * (measurement + offset) +1% * offset + 0,2 div. +100mV]		
Rise time	< 7.0ns	< 5.0ns	< 3.5ns
Overshoot (Typical) (with pulse tr = 500ps)	<10% with probe or BNC input with 50 Ohm through termination		
Skew between channels (same V/div range)	< 4ns	< 4ns	< 1ns
Math operation		+, - , *, /, FFT	
FFT	Type of Wind	ow: Hanning, Hamming, Black	kman, Rectangular
		Number of sampling points: 7	1024
Bandwidth	(Note: The Bandwidth	20MHz ±40% is limited to less than 10MHz	when a probe is used at X1)

Technical characteristics (cont'd)

Horizontal system	DOX2025B	DOX2070B	DOX2100B	
Real time sampling frequency	Per channel : 500MSa/s	Single Channel: 1GSa/s Two Channels: 500MSa/s (when the time base is faster than 100ns/div.)	Single Channel: 1GSa/s Two Channels: 500MSa/s (when the time base is faster than 100ns/div.)	
Equivalent time sampling rate	50 GSa/s max.	50 GSa/s max.	50GSa/s max.	
Display of the measurements	MAIN, WINDOW, WINDOW ZOOM, ROLL, X-Y			
Accuracy of the time base	±100 ppm measurement of a 1ms time interval			
Horizontal ranges	5ns/div 50s/div.	2,5ns/div 50s/div.	2,5ns/div 50s/div.	
Scan mode	Scan: 100ms/div 50s/div. (1-2-5 staging)			

Memory depth	Channel mode	Sampling rate	<u>Normal</u> Memory (*)	Long Memory
DOX2070B & DOX2100B	Single Channel	1Gsa/s	40kpts	Not supported
only	Single Channel	500MSa/s or less	20kpts	2Mpts
	Two Channels	500MSa/s or less	20kpts	1Mpts
DOX2025B	Single Chanel	500MSa/s	32kpts	

Trigger system	
Types of triggering	Edge, Pulse, Amplitude, Video, Slope, Alternative
Source of triggering	CH1, CH2, EXT, EXT/5, AC Line
Modes of Operation of the triggering	Auto, Normal, Single Scan mode (Roll) for ranges from 100ms/div. to 50s/div.
Trigger coupling	AC, DC, LF rej, HF rej
Hold-Off	10ns – 1.5s
Range of variation of the triggering level	CH1, CH2: ±6 divisions from the centre of the screen EXT: ±1.2V EXT/5: ±6V
Displacement of the trigger	Pre-trigger: (Memory depth/(2*sampling)) Deferred trigger: 260 div.
Accuracy of the triggering level (Typical) applicable to signals of which the rise and fall times are > 20ns	Internal: ±(0.2 div. × V/div.)(less than ±4 div. from the centre of the screen) EXT: ±(6% of the value +40mV) EXT/5: ±(6% of the value +200mV)
Triggering sensitivity	2mV to 10V/div ranges (1-2-5 staging): 1 div.: DC - 10MHz 1.5 divisions: 10MHz - max. of BW
	EXT: 200mVpp DC - 10MHz 300mVpp 10MHz - max. BP
	EXT/5: 1Vpp DC - 10MHz 1.5Vpp 10MHz - max. BP
Pulse triggering	(>, <, =) Positive pulse width, $(>, <, =)$ Negative pulse width
	Range of pulse widths 20ns - 10s
Video triggering	Signal formats supported: PAL/SECAM, NTSC
	Trigger condition: odd frame, even frame, all lines, line no.
Slope triggering	(>, <, =) Positive slope, $(>, <, =)$ Negative slope
	Time: 20ns-10s
Alternate triggering	CH1 trigger type: Edge, Pulse, Amplitude, Video, Slope
	CH2 trigger type: Edge, Pulse, Amplitude, Video, Slope

Technical characteristics (cont'd)

X-Y mode	
X-Y inputs	CH1 (X)/CH2 (Y)
Phase error	± 3 degrees
Range of sampling rates in XY	XY mode sampling rate:
mode	12,5kSa/s ~ 250MSa/s (MemDepth: Normal)
	500,5kSa/s ~ 250MSa/s (MemDepth: LongMem)

Equipment frequency counter	
Reading resolution	6 Bytes
Accuracy	± 0.01%
Range of operating frequencies of the meter	With DC coupling, the range of operating frequencies of the meter is from 10Hz to the max frequency of the bandwidth.
Type of signal	All triggering source signals that generate triggering events (except: "pulse width" trigger and "video" trigger).

Control panel function	
Auto Set	Self-adjustment of the Vertical and Horizontal systems and of the trigger
Backup/Restoration	Internal backup capacity: 2 REFerences, 20 configurations, 20 Traces. Possibility of saving traces and configurations to external USB flash memory.

Measurement system	
Automatic measurements (32 types)	Vpp, Vmax, Vmin, Vamp, Vtop, Vbase, Vavg, Mean, Crms, Vrms, ROVShoot, FOVShoot, RPREShoot, FPREShoot, Rise time, Fall time, Freq, Period, +Wid, -Wid, +Dut, -Dut, BWid, Phase, FRR, FRF, FFR, FFF, LRR, LRF, LFR, LFF
Measurements by cursor	Modes: Manual, Track, and Auto

General characteristics

Display system	
Display unit	LCD, Colour, TFT, 7 inches (177.8mm diagonal)
Resolution	800 horizontal pixels by 480 vertical pixels
Colours	24 bits colours
Display contrast	150:1 (typical)
Backlighting intensity	300nit (typical)
Display of Traces	8 x 18 div.
Trace display modes	Dots, Vector
Remanence	None, 1 sec, 2 sec, 5 sec, Infinite
Display of menu	2 sec, 5 sec, 10 sec, 20 sec, Infinite
Screen saver	None, 1mn, 2mn, 5mn, 10mn, 15mn, 30mn, 1h, 2h, 5h
Skin	Classical, Modern, Traditional, Succinct
Signal interpolation	Sin(x) , x
Colour model	Normal, reversed
Language	English, French, German, Spanish, Italian

Environment	
Temperature	Reference temperature 18°C to 28°C Service temperature: 0°C to +40°C Storage temperature: -20°C to +60°C Indoor use
Cooling	By fan
Humidity	In service: < 80% RH up to 31°C Storage: < 80% RH up to 31°C
Altitude	In service: < 2,000m Storage: < 12.000m

Mains power	
Mains voltage	Nominal range in service 100-240 VAC, Auto-selection
Frequency	50 Hz to 60 Hz (100 – 240 VAC) 400 Hz (100 – 120 VAV)
Consumption	50W max.
Fuse	1.25A/250V 5 x 20mm
Power cord	Removable

Safety	Compliant with standard NF EN 61010-1
Insulation	Class 1
Pollution index	2
Power supply overvoltage category	300V CAT-II
Input overvoltage category	300V CAT-II

Technical characteristics (cont'd)

CEM	
	This device is designed in conformity with the EMC standards in force, and its compatibility has been tested per standard NF EN 61326-1.

European CE directives	
	The CE marking indicates conformity with the European "Low voltage", "EMC", "WEEE" and "RoHS" directives.

Mechanical	
Dimensions	Length 323.1mm Width 135.6mm Height 157mm
Weight	2.385kg
Materials	ABS, VO (self-extinguishing)
Ingress protection	IP20

Packaging	
Dimensions	389 x 228 x 265mm

Accessories	
included	User guide on CD ROM
	EasyScopeX PC software
	Getting started guide
	Safety data sheet
	Power cord
	USB A/B cable and ETHERNET
	2 probes
DOX2070B only	 HX0074 : Demo card and its manual instructions
options	Differential probe
	- single MX 9030
	- double MTX 1032 (consult us)

Appendix: Default Setup

Menu or system	Options, knobs or buttons	Default setup
CH1, CH2	Coupling	DC
	BW limit	Off
	Volts/div	Coarse
	Probe	1X
	Invert	Off
	Filter	Off
	Volts/div	1.00V
MATH	Operation	CH1+CH2
	CH1 Invert	Off
	CH2 Invert	Off
	FFT operation:	
	Source	CH1
	Window	Hanning
	FFT Zoom	1X
	Scale	dBVrms
	Display	Split
	Window	Main
	Position	0.00µs
HORIZONTAL	Sec/div	500µs
	Window Zone	50.0µs
	Trigger knob	level
	Туре	Off
CURSOR	Source	CH1
CURSOR	Horizontal (voltage)	+/-3.2divs
	Vertical (time)	+/-5divs
MEASURE	Source	CH1
	Туре	average
ACQUIRE	three mode options	Sampling
	Averages	16
	Sampling mode	Real Time
DISPLAY	Туре	Vectors
	Persist	off
	Grid	
	Intensity	60%
	Brightness	40%
	Format	YT
	Menu Display	infinite

Characteristics

	Туре	Setups
SAVE/RECALL	Save To	Device
	Setup	No.1
REF	REFA/REFB	REFA
	Source	CH1
	REFA	off
	REFB	off
UTILITY	Sound	on
	Counter	On
	Back USB	Computer
	Pass/Fail	off
	Record	off
	RS-232 Baud	9600
	Туре	edge
	Source	CH1
	Slope	Rising
TRIGGER (edge)	Mode	Auto
	Coupling	DC
	LEVEL	0.00V
TRIGGER (pulse)	Туре	pulse
	Source	CH1
	When	=
	Set Pulse Width	1.00ms
	Mode	Auto
	Coupling	DC
TRIGGER (Video)	Туре	Video
	Source	CH1
	Polarity	Normal
	Sync	All Lines
	Standard	NTSC
	Mode	Auto
	Туре	Slope
TRIGGER	Source	CH1
(Slope)	Time	1.00ms
	Mode	Auto
TRIGGER (Alternative)	Туре	Alternative
	Source	CH1
	Mode	Edge
	Coupling	DC