

PORTABLE OSCILLOSCOPE

Model OX 7102-C

Note: All images show a four channel (OX 7104-C) unit; this unit has only two channels (OX 7102-C).



Five complementary tools in one: Oscilloscope, Multimeter, FFT Analyzer, Harmonic Analyzer and Recorder

Sampling rate 1 GS/s in one-shot and 25 GS/s in ETS with memory depth of 2.5k per channel in "oscilloscope" mode

Two independent, 8000-count, TRMS, 50kHz, digital multimeters

Color LCD touch screen

33 direct command keys and "Windows-like" menus on screen

Multi-interface communication connector: RS-232, Centronics and Ethernet with web server



Field testing is quick and easy thanks to the Model OX 7102-C's hand strap and the use of ProbiX Smart Probes, some of which have control buttons, with user defineable functions, right on the probes themselves.

AEMC Instruments, a world leader in electrical test and measurement instruments, proudly introduces the first self-contained portable four-isolated-channel 600V Cat. III oscilloscope on the market. Featuring five complimentary tools in one — an Oscilloscope, FFT Analyzer, TRMS Multimeter, Harmonic Analyzer and a Recorder — all in a rugged and ergonomic hand-held instrument, the Model OX 7102-C is the perfect tool for both laboratory and field testing.

Ease of use of the instrument is facilitated through 33 specialized keys for direct access to commonly used functions. Ideal for field use, the Model OX 7102-C utilizes the patented new **ProbiX** system of “plug and play” accessories, individual isolation of each of the measurement channels, a range of remote management capabilities based on the Ethernet link with WEB server, a number of built-in instruments, including a four channel TRMS multimeter.

The large 360 x 240 full color LCD screen provides detailed graphical and alphanumeric representations of all measurement and also functions as a touch screen. Using the convenient stylus, the various “Windows-like” menus can be opened or pulled down and executed. The stylus can also be used for direct action on graphic elements such as cursors, trigers, etc..

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FEATURES

- Five complementary tools in one: Oscilloscope, Multimeter, FFT Analyzer, Harmonic Analyzer and Recorder
- Sampling rate 1 GS/s in one-shot and 25 GS/s in ETS – memory depth of 2.5k per channel in “oscilloscope” mode
- Two isolated measurement channels, 600V Cat III up to eight curves on screen
- Real-time FFT analysis standard and calculation functions on the channels
- Two independent, 8000-count, TRMS, 50kHz, digital multimeters
- Color LCD touch screen
- 33 direct command keys and “Windows-like” menus on screen
- Multi-interface communication connector: RS-232, Centronics and Ethernet with web server
- Stylus for touch screen menu/function access and manipulating graphic elements on screen
- ProbiX smart probes with user defineable control buttons and adaptors for a variety of sensor types, also includes work area lighting

APPLICATIONS

- On-site contractor maintenance – industrial or electronic
- “Internal” plant maintenance Installations and start-up
- Industrial Process
- Quality control
- Research and laboratory – engineers or technicians



Windows-like menus can be pulled down and executed with the convenient stylus

CONSTRUCTION



Note: All images show a four channel (OX 7104-C) unit; this unit has only two channels (OX 7102-C).

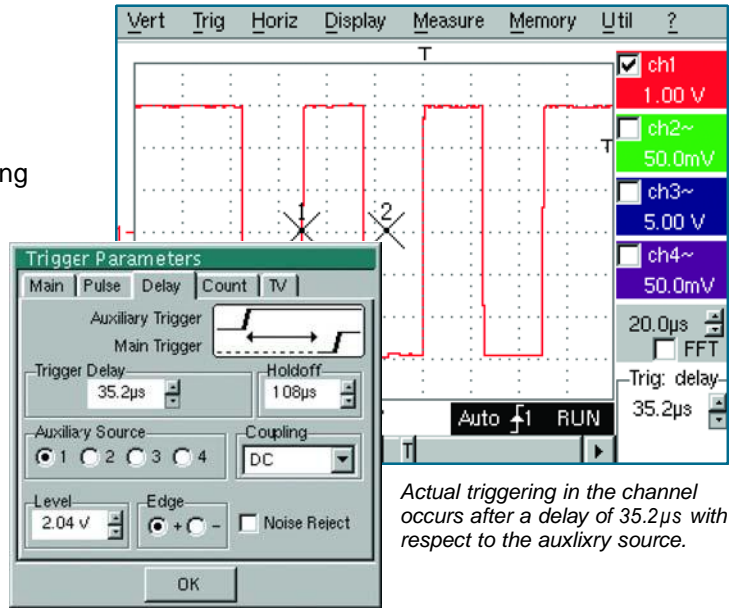


OSCILLOSCOPE

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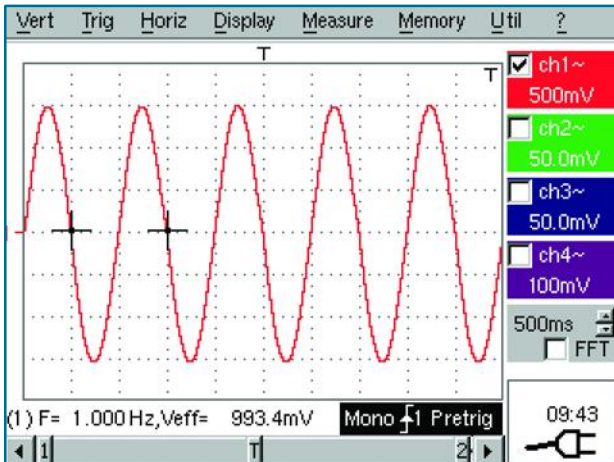
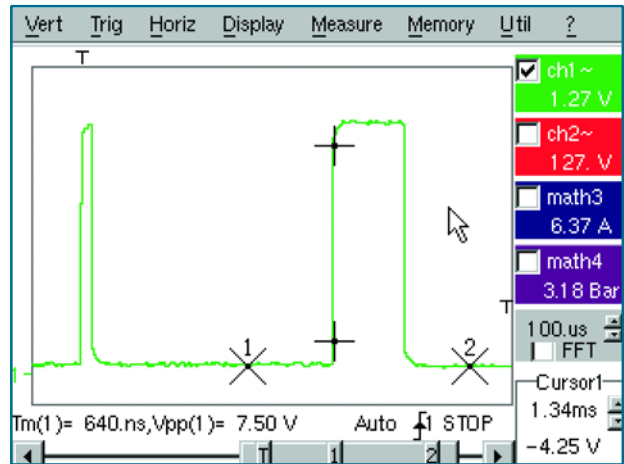
Complex triggering functions to record only what is necessary

The AEMC Instruments Model OX 7102-C is the first oscilloscope in this category to offer sophisticated triggering functions that go beyond primary triggering on a front or even on a pulse duration. The delay mode allows observation of any event with maximum resolution, even if it occurs long after the actual triggering, in order to check the content of digital frames, for example. Finally, triggering can also be associated with a TV signal.

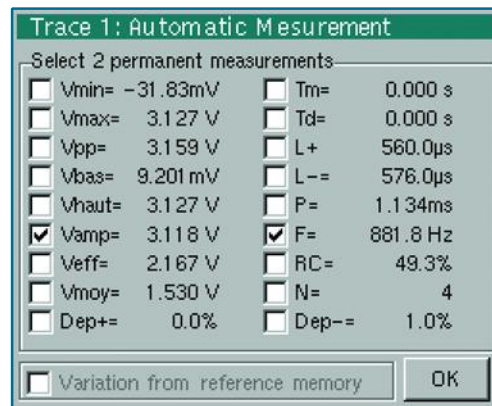


Complete automatic measurements for precise analysis

The automatic measurements window displays, in a single gesture, all of the 18 parameters of a signal. For an unambiguous analysis, two markers identify the portion of the signal where the first automatic measurement was made. A specific measurement zone can then be selected by outlining it with manual cursors, for a reliable and more precise result. A direct comparison of two waveforms is performed by checking "difference from reference memory", so as to display these 18 parameters of the signal in the form of differences.

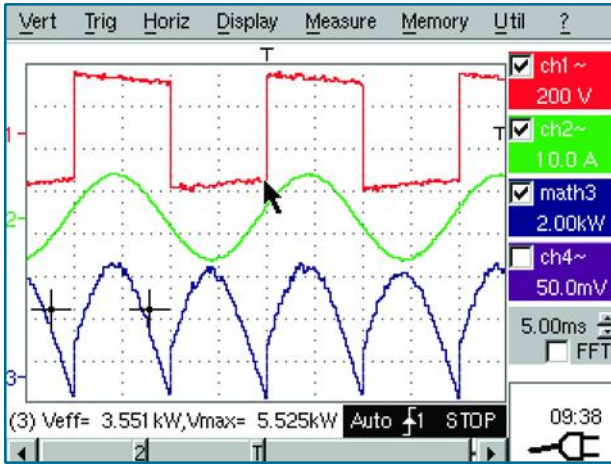


If mathematical functions, scales, or physical units are defined, these measurements allow for them in order to avoid any error of interpretation by a direct reading. This makes a practically infinite number of current and power measurements available with 4-digit resolution, thanks to the 12-bit converter.

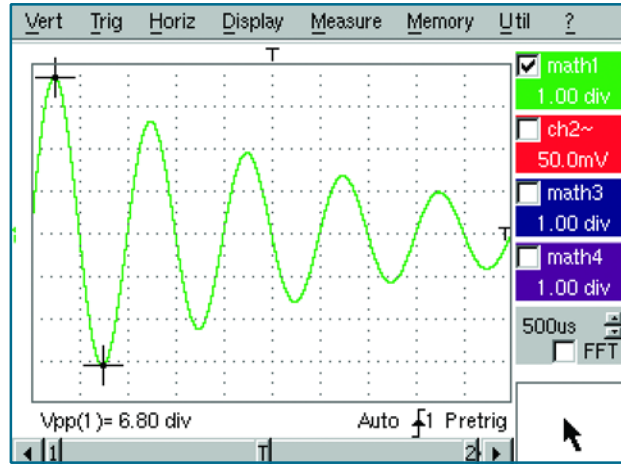


MATH functions

In oscilloscope mode, the math functions (1, 2, 3, and 4) can be used to define, for each of the traces, a mathematical function and vertical scaling with the definition of the true physical unit. The real-time on-screen display capacity of the mathematical editor is 4 calculated trace results, on which all cursor-selected and automatic measurements remain available. It is therefore possible to examine such waveforms as power, for example ($U \times I$), and make all associated measurements. Many operators are available, for example $+$, $-$, \times , $/$, and also **sine**, **cosine**, **exponent**, **logarithm**, **square root**, etc., giving access to your particular applications.



When two channels are multiplied, the result can be displayed to scale, with its physical unit (W, for example), together with the original curves, here the current and the voltage.



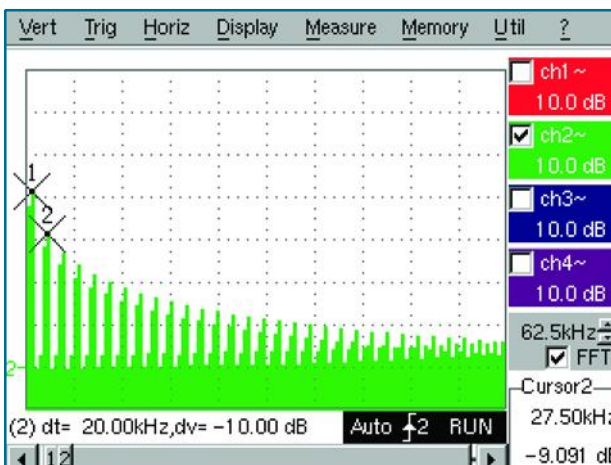
Many complex functions can be edited, including the simulation of a trace from its mathematical equation, and therefore the model of an expected result. All functions created can be stored practically without limit and retrieved for later use.

Real-time Fast Fourier Transform (FFT) for frequency analysis of signals

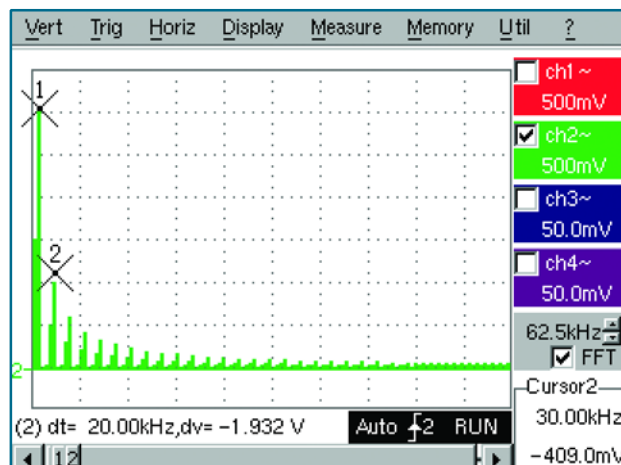
The FFT is used to calculate, at 2,500 points, the discrete representation of a signal in the frequency domain from its representation in the time domain. It is often a powerful means to an effective diagnostic in an analysis of signal quality:

- measurement of the various harmonics and distortion of a signal,
- analysis of impulse response,
- the search for a noise source in logical circuits,
- and much more

Several weighting windows are available, along with 2 representation modes, linear and logarithmic (scale in dB). The two cursors can then be used to make precise measurements of frequency spikes, levels, and attenuations, taking advantage of the 80dB dynamic range allowed by the 12-bit / 1-GS/s conversion. The autoset makes it easier to obtain an optimum spectral representation on which a graphic zoom can be applied in order to analyze all details of the spectrum.



FFT with a Hanning window and a logarithmic scale



FFT with a rectangular window and a linear scale

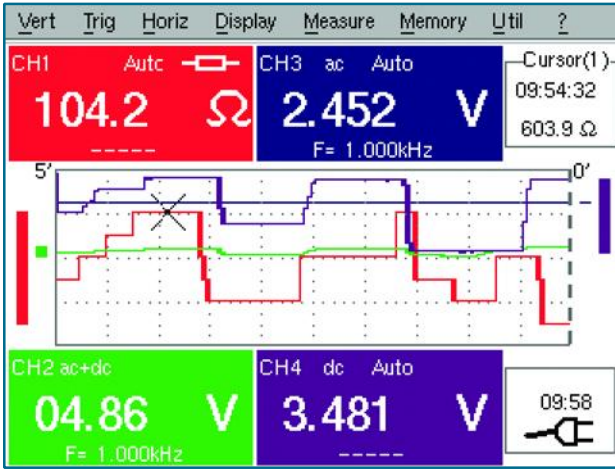


MULTIMETER

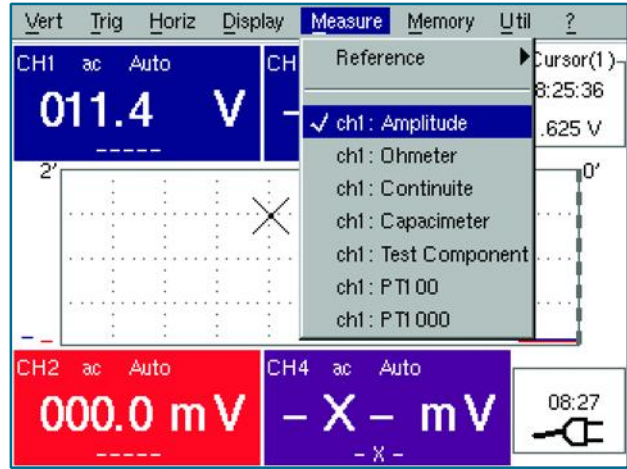
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Two Channel TRMS Digital Multimeter

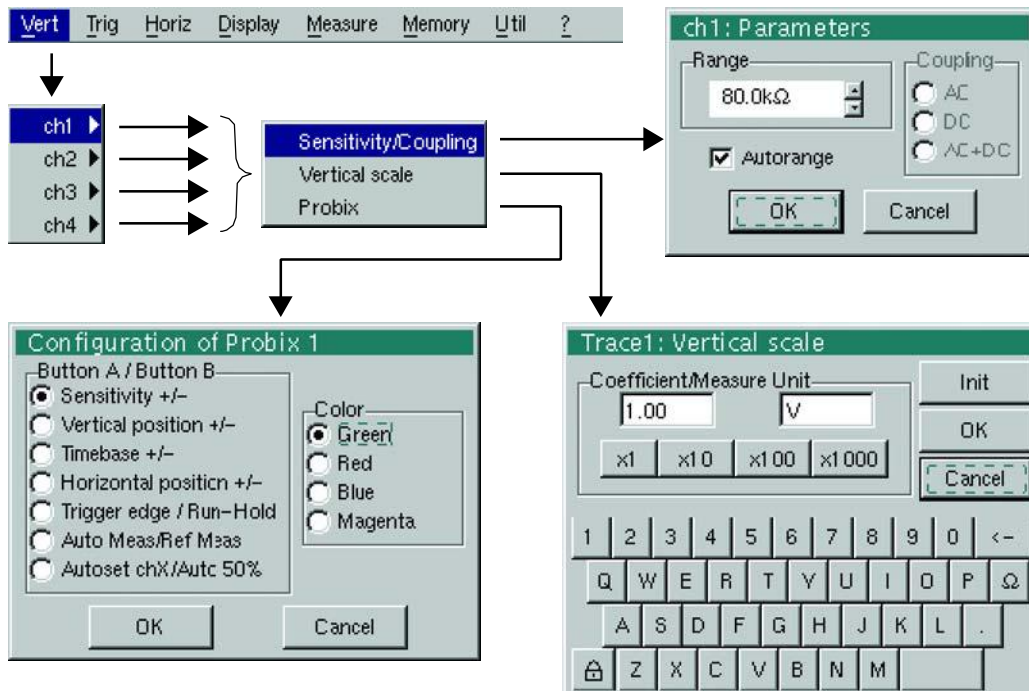
As in the four "instrument" modes, a single press on the specialized key gives access to the multimeter. The Model OX 7102-C includes a two-channel TRMS digital multimeter – the basic instrument for all diagnostics – to make measurements of amplitude (AC and DC voltage and current, power, thermocouples, etc.), resistance, continuity, and capacitance and to test components. The PT 100 and PT 1000 configurations can be used to measure a temperature based on the 100 and 1000 Ω resistive sensors. Here again, all types of sensors used provide scaling and the use of their true physical unit for the greatest possible convenience and efficiency.



Values for each of the four multimeters are displayed simultaneously, both alphanumerically and graphically.



Parameters for each of the four TRMS multimeters can be selected on screen using the stylus and "Windows-like" menus.



With the stylus and on-screen "Windows-like" menus, each of the four multimeters can be configured quickly and easily. Set the measurement parameters, vertical scale and configure the probes for each channel independently.

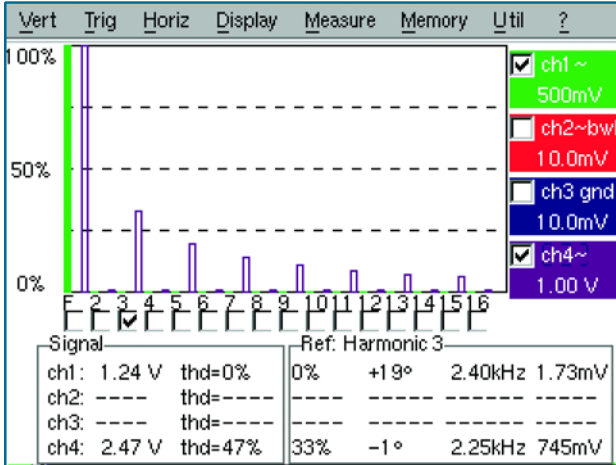


ANALYZER

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Harmonic Analyzer (optional)

Harmonic analysis is a basic function for all users in the fields of power distribution, electrical engineering, and power electronics. With the optional Harmonic Analysis software installed, the Model OX 7102-C can display the first 32 orders of signals having fundamental frequencies between 40 Hz and 5 kHz. It is possible to display the harmonic analyses of all four channels simultaneously, in real-time.



The result of the harmonic analysis is displayed in bargraph form. The status zone indicates:

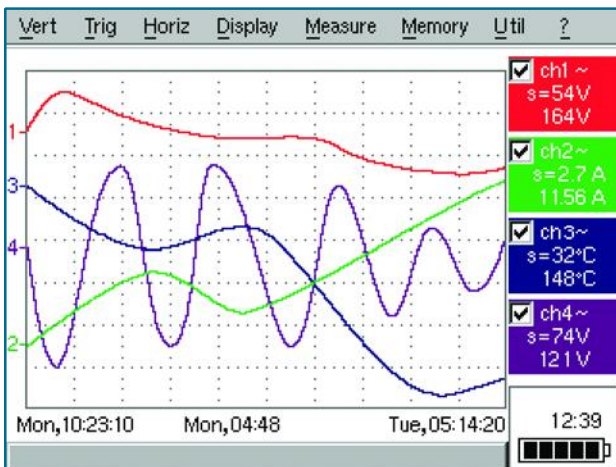
- the total RMS voltage of the signal in V, the harmonic factor in %
- for the selected harmonic or fundamental, the value in % of the fundamental, the phase in ° with respect to the fundamental, the frequency in Hz, the RMS voltage in V.



RECORDER

Two Channel High-Speed Digital Recorder (optional)

For all professional users who must track variations of physical or mechanical phenomena, a high-speed digital recorder, with sample rates up to as little as 500µs between two measurements and recording times up to an entire month, can be incorporated into the instrument in the form of a software module. The Recorder offers the ability to monitor thresholds and tolerance windows with triggering of long-term storage of the phenomenon observed (50,000 measurements) and the automatic capture of successive time-stamped faults (50 1,000-measurement windows). The analysis can be performed on the instrument itself (even mathematical calculations using values from more than one channel) or standard ".TXT" files exported to a spreadsheet.



Thanks to the Probix system, the Model OX 7104-C manages a great variety of sensors (voltage, current, temperature, 0-10V, 4-20mA, etc.) and displays the signals in their original physical magnitude (scale and unit). The measurement cursors (the last acquisition and the mobile cursor) can be used with the zoom to perform a fine analysis of the signals being acquired or already acquired.

FUNCTIONAL DISPLAYS

Instrument menus for all functions plus on-line help

Display of Trace Parameters or Math Function parameters or Memory, in the color of the trace

Value of time based coefficient (s/div) in Oscilloscope Mode or Frequency (Hz/div) in FFT mode

Context sensitive display area showing current adjustments

Position and movement of manual cursors

Position and movement of time trigger

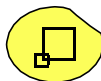
Display of selected trace

Automatic measurement cursor

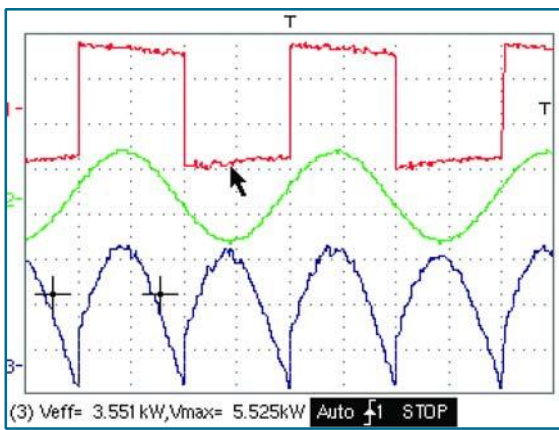
Manual measurement cursor

Cursor measurements

Menus can be opened and graphic elements can be moved using the cursor.



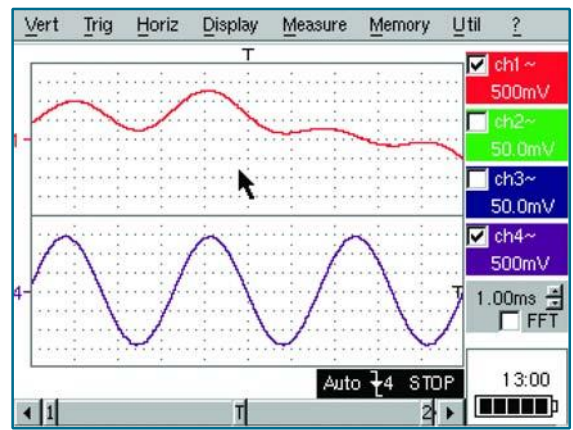
Full Screen Display Function



The FULL SCREEN feature provides full screen display of waveforms, without other information or menus, at the push of a button



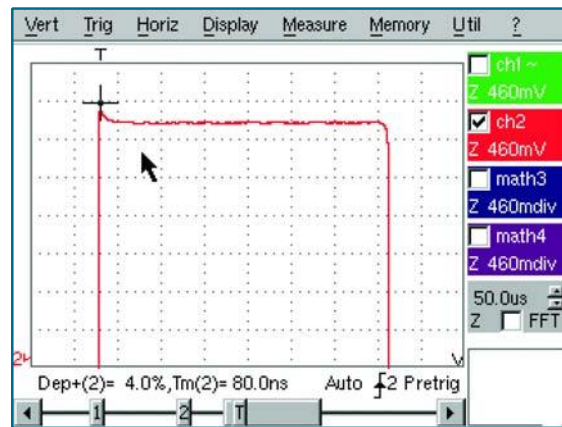
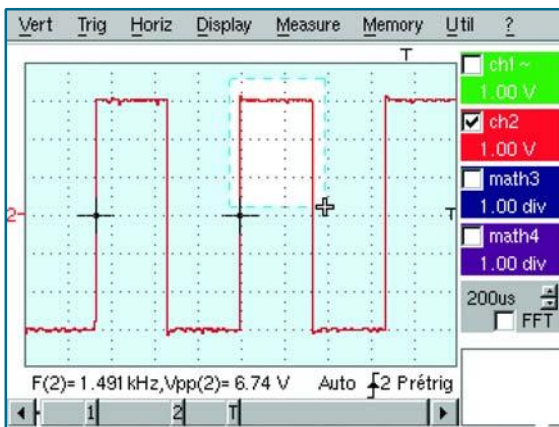
Full Trace Display Function



The FULL TRACE feature activates horizontal splitting of the display screen display, allowing you to view waveforms from independent channels separately.



Zoom Function



The ZOOM feature allows you to zoom in on an area of a waveform for a more detailed view. Simply trace a rectangle around the area to be zoomed with the stylus. The display updates to show the zoomed area. The sensitivity, time base and horizontal and vertical alignment values are recalculated automatically.

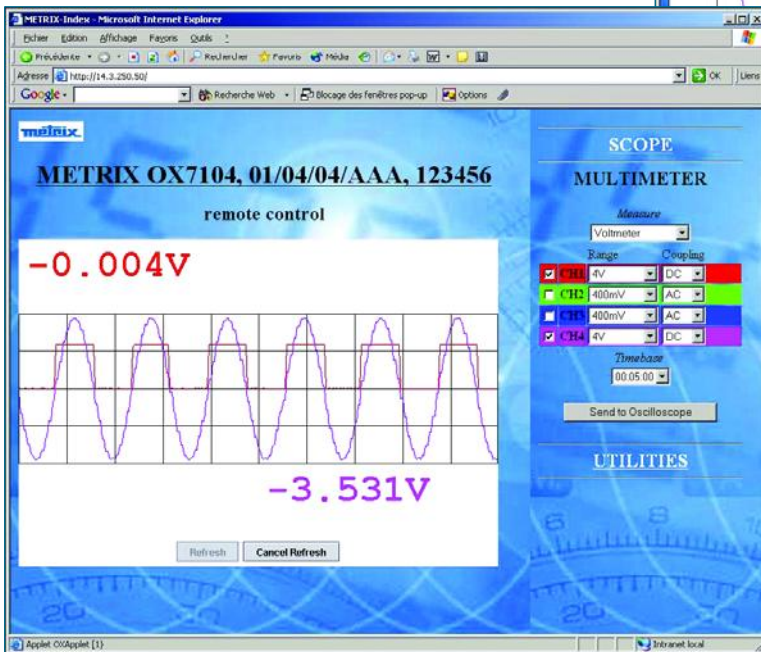
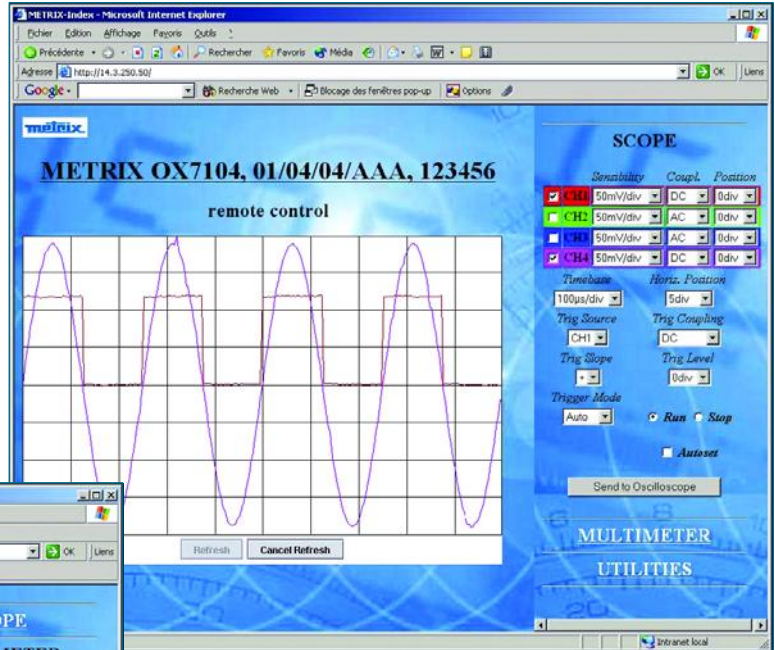
SPECIFICATIONS

| MODEL | OX 7102-C |
|--|---|
| INTERFACE | |
| Screen Specifications | Color 5 x 7" LCD (115 x 86mm) 320 x 240 – CCFL backlighting |
| Display Mode | Vectors with interpolation |
| No of Curves on Screen | Four curves and four references – Split screen and full screen modes (tracing zone 110 x 74) |
| Front Panel Control | 32 direct shortcuts |
| Screen Control | Touch screen - "Windows-like" menus and graphic commands |
| Languages | Five complete languages, menus and on-line help (English, French, German, Spanish, Italian) |
| VERTICAL | |
| Bandwidth | Bandwidth 100Mhz |
| Channels | Two isolated channels |
| Input Impedance | 1M \pm 0.5% |
| Maximum Permanent Input Voltage | 600V Cat. III – Derating -20dB/decade at 100kHz |
| Vertical Sensibility | 16 ranges from 2.5mV to 200V/div |
| Accuracy | \pm 1.5% |
| Vertical Zoom | x5 maximum |
| Probe Factors | 1 / 10 / 100 / 1 000 or scaling to any value – Definition of the measurement unit |
| HORIZONTAL | |
| Time Base Speed | 35 ranges from 1ns/div to 200s/div |
| Accuracy | \pm 1.5% |
| Horizontal Zoom | x10 maximum |
| TRIGGERING | |
| Mode | Auto, trigger, single, Auto 50% |
| Source | CH1, CH2, CH3, CH4 |
| Type | Front, pulse or delay (20ns/340s), count (2/16384) or TV (525 or 625 lines) |
| Coupling | AC, DC, HFR, LFR, noise reduction – Hold-off adjustable from 40ns to 1s |
| Sensitivity | 0.6 div to 1KHz / 1.5 div to 150MHz |
| DIGITAL MEMORY | |
| Maximum Sampling Speed | 25 GS/s in ETS - 1 GS/s in one-shot (on each channel) |
| Vertical Resolution | 12 bits |
| Memory Capacity per Channel | "TRC" approx. 10kB, "TXT" approx. 20kB |
| User Memory | 1 MB |
| Other Modes | Envelope mode (Factors from 2 to 64) |
| XY Mode | Between two from the four curves – math functions and cursors |
| OTHER FUNCTIONS | |
| Autoset | Complete autoset at less than 3s, with recognition of channels – Frequency > 30Hz |
| FFT Analyzer and Math Functions | FT, +, -, x, / - Editor of mathematical functions |
| Cursors | Two or three cursors : V and T simultaneous or Phase Resolution 12 bits, display four digits |
| Automatic Measurements | 18 level or time measurements, phase measurements – Resolution 12 bits, display four digits |
| MULTIMETER | |
| AC, DC, AC + DC voltage | From 400.0mV to 600.0VRMS or 800.0Vdc - Accuracy V_{DC} 0.5 % R+ 5D – bandwidth 50kHz |
| Resistance | 80.00 to 32.00M - Precision 0.5 % R+ 5D - Rapid 10-ms continuity test |
| Other Measurements | Capacities 5.000nF to 50.00mF/Frequency 200.0MHz - Diode test 3.3V |
| RECORDER (option) | |
| Acquisition Rate | Sampling interval from 500 μ s to 10mn |
| Duration of Recording | From 25s to 34 days 16h 20mn |
| Acquisition Mode | Conditional on thresholds or windows – Normal or "50-faults" acquisition |
| Operation | Timestamped graphic recording, conversion and units of physical quantities, measurement using cursors and search for events, standard file format usable in spreadsheets (.TXT) |
| HARMONIC ANALYZER (option) | |
| Analysis Span | Even or odd orders up to 31, or first 16 orders |
| Operation | Permanent display: total RMS value and harmonic factor – Order selected: % F, phase, freq, VRMS |
| GENERAL SPECIFICATIONS | |
| Configurations Memories | Unlimited - ".CFG" file size approx. 1kB |
| Ethernet Network Printing (standard) RS-232 or Centronics (options) | 11 black and white or color drivers : IBM Proprinter, Epson ESC/P, Canon HP PCL, Seiko DPU411, Postscript Image files: ".BMP" 10kB, ".GIF" approx. 5kB (storage in memory transfer by RS-232 or Ethernet) |
| Communication | Local via Ethernet 10 MB or RS 232 (option) - Remote via 10 MB Ethernet and web server "Sx-Metro" application software for PC (option) |
| Power Source | 9.6V/3.8 A/h battery pack - Approx. 4h between charges - Adjustable power-saving switching Multi-voltage 98-254V / 47-63Hz - Fast charge in 2 hours (oscilloscope off) |
| Dimensions | 10.25 x 7.25 x 2" (261 x 185 x 53mm) |
| Weight | 4.2 lbs (1.9kg with batteries) |

SOFTWARE

Note: All images show a four channel (OX 7104-C) unit; this unit has only two channels (OX 7102-C).

The ETHERNET interface and its WEB server offer new ways of working and communicating, local or remote, with a convenience and effectiveness that will quickly make them necessities. All that is needed for communication is that the other equipment (printer, PC, etc.) should have, like the OX 7102-C, an IP address. Thus, even on the road, you can print results on a network printer, exchange files between the OX and a computer. You can also monitor the instrument remotely from any PC, display the traces in real time, and control it using the instrument panel. Whether locally or at a distance, these transfer and exchange operations are simple and rapid and do not require special software on the computer, thanks to the WEB server.



In the oscilloscope and multimeter modes, the web server ensures unparalleled effectiveness, very simply, with no need to install software on the local or remote PC.

These portable oscilloscopes, tools for industrial and electronic maintenance, therefore for the first time eliminate the traditional problems of printing, backups, and the documentation of traces. The distance between the place of troubleshooting and the office becomes virtual.

Application Image

Technician viewing data in real time from remote location on a PC

PROBIX SYSTEM

ProbiX
Smart Probes & Adaptors



The **PROBIX** system is your assurance that using the instrument will be not only rapid but also, more importantly, error-free, which is critical for devices used for troubleshooting. For unfailing compatibility, the connection of BNCs and of standard cords is always possible using the safety adaptors provided. An interchangeable plastic ring is used to match the colour of the accessory to the colour of its channel. Power is supplied and the sensors calibrated directly, from the oscilloscope. Some accessories even have three control buttons accessible on the probe itself.

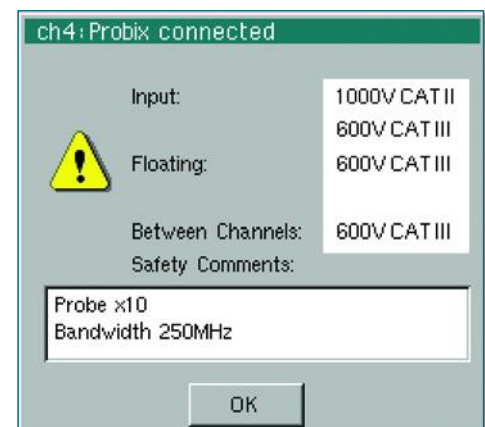
Automatic recognition of sensors and connection accessories:

ProbiX probes and adaptors are recognized immediately when connected. The instrument not only identifies them, but also informs itself of their characteristics. Active safety is built in, notably in the form of safety information and recommendations concerning the accessory used. A pop-up screen displays:

- the maximum input voltage
- the maximum voltage to ground
- the maximum voltage between channels
- the type of sensor being used
- the use of a suitable safety lead

Configuration of the channels and management of the sensors:

The coefficients, scales, and units of the sensors and the channel configurations are managed automatically. The first two control buttons of the probes are used to directly modify the adjustment parameters of the channel to which they are connected or to copy functions of the front panel of the oscilloscope. The third button is specific to the accessory. On voltage probes, for example, it controls the lighting of the measurement zone. When the connection is made, all preferred parameters stored in the accessories (assignments of buttons 1 and 2, colour) are automatically reactivated. They can be modified using the ProbiX "pop-up" shown opposite.



ACCESSORIES

Model OX 7102-C Kit includes: Oscilloscope; two PROBIX 1/10 Probes, 250 MHz, 100V; two PROBIX BNC Adapters; one PROBIX 4mm Banana Plug Adapter; one US line charger (115V, 60HZ); one battery pack, NiMH 19.6V – 3.8Ah; one set of test leads, 1.5m, 1000V Cat. III with test probes attached (4mm tips); one crossed ethernet cable; one straight ethernet cable; data processing and analysis software; one RS-232/9-contact D-SUB cable; carrying case and user manual.

Model OX 7102-C Power Kit includes: Oscilloscope; two PROBIX 1/10 Probes, 250 MHz, 100V; two PROBIX BNC Adapters; three PROBIX 4mm Banana Plug Adapters; one US line charger (115V, 60HZ); one battery pack, NiMH 19.6V – 3.8Ah; one set of test leads, 1.5m, 1000V Cat. III with test probes attached (4mm tips); one crossed ethernet cable; one straight ethernet cable; data processing and analysis software; one RS-232/9-contact D-SUB cable; one harmonic analyzer, firmware upgrade on CD-ROM; one recorder function, firmware upgrade on CD-ROM; three PROBIX current probes, 20mA to 20A, 100kHz; one PROBIX PRHX7, K thermocouple adapter; three set of two leads, 1.5m long with alligator clips; carrying case and user manual.



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| ORDERING INFORMATION | CATALOG NO. |
|--|-------------|
| Portable Oscilloscope Model OX 7102-CK (Two x 100MHz, Color – Kit) | 2124.50 |
| Portable Oscilloscope Model OX 7102-CK (Two x 100MHz, Color – Power Kit) | 2124.53 |
| Accessories (Optional) | |
| Software, Data Retrieval Processing | 2124.70 |
| Harmonic Analyzer, Firmware – upgrade on CD-ROM | 2124.71 |
| Recorder Function, Firmware – upgrade on CD-ROM | 2124.72 |
| PROBIX PRHX1, 1/10 Probe, 250MHz, 1000V Cat. II (600V Cat. III) | 2124.73 |
| PROBIX PRHX4, BNC Adapter | 2124.74 |
| PROBIX PRHX5, 50 \wedge Adapter | 2124.75 |
| PROBIX Banana Plug (4mm) Adapter | 2124.76 |
| PROBIX Current Probe, 20mA to 20A, 100kHz | 2124.77 |
| PROBIX PRH7, K thermocouple Adapter | 2124.78 |
| Carrying Case, Aluminum with foam cut-outs | 2124.79 |
| Straight Ethernet Cable | 2124.80 |
| Crossed Ethernet Cable | 2124.81 |
| RS-232 Adapter/CENTRONICS | 2124.82 |
| RS-232 Cable/9-pin SUB-D cable | 2124.83 |
| Set of two color-coded leads (1.5m) (black and red, 4mm straight, 4mm right angle) with color-coded safety alligator clips (black and red) | 2124.84 |



Call the AEMC® Instruments Technical Assistance Hotline for immediate consultation with an applications engineer: **(800) 343-1391**

Chauvin Arnoux®, Inc. d.b.a AEMC® Instruments • 200 Foxborough Blvd. • Foxborough, MA 02035 USA • (800) 343-1391 • (508) 698-2115 • Fax (508) 698-2118
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