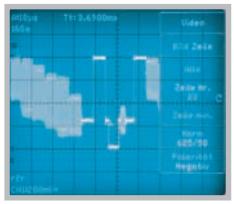
HAMEG Instruments

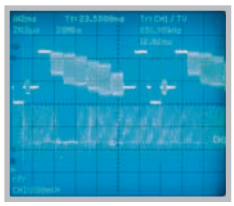
# 100 MHz Analog-/Digital CombiScope HM1008

NEW

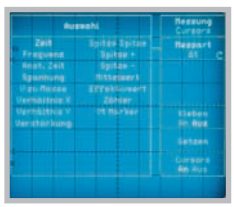
Either PAL or NTSC: Line triggering with line counter



Digital Mode: TV field and zoomed display of one selected line



Cursor measurement choices in digital mode



Analog Mode: see HM1000

Two Channels

**1 GSa/s Real Time Sampling, 10 GSa/s Random Sampling**

8-Bit Low Noise Flash A/D Converters

Pre-/Post-Trigger -100 % to +400 %

Time Base 50 s/cm – 5 ns/cm

**1 MPts memory per channel allows zoom up to 40,000:1**

Acquisition modes: Single Event, Refresh, Average, Envelope, Roll, Peak-Detect

RS-232 Interface, optional: RS-232/USB, IEEE-488, Ethernet

Signal display: Yt and XY;
Interpolation: Sinx/x, Pulse, Dot Join (linear)

inclusive RS-232 optional IEEE-488 optional USB optional TCP/IP

# 100 MHz Analog / Digital CombiScope HM1008

Technical description

## Vertical Deflection

| | |
|---|---|
| **Channels:** | |
| **Analog:** | 2 |
| **Digital:** | 2 |
| **Operating Modes:** | |
| **Analog:** | CH 1 or CH 2 separate, DUAL (CH 1 and CH 2 alternate or chopped), Addition |
| **Digital:** | CH 1 or CH 2 separate, DUAL (CH 1 and CH 2), Addition |
| **Y in XY-Mode:** | CH 1 |
| **Invert:** | CH 1, CH 2 |
| **Bandwidth (-3 dB):** | 2 x 0 - 100 MHz |
| **Rise time:** | ‹ 3.5 ns |
| **Overshoot:** | max. 1 % |
| **Deflection Coefficient(CH 1, 2):** | 14 calibrated steps |
| 1 mV – 2 mV/cm (10 MHz) | ± 5 % (0 - 10 MHz (-3 dB)) |
| 5 mV – 20 V/cm | ± 3 % (1-2-5 sequence) |
| variable (uncalibrated): | › 2.5 : 1 to › 50 V/cm |
| **Inputs CH 1, 2:** | |
| **Impedance:** | 1 MΩ // 15 pF |
| **Coupling:** | DC, AC, GND (ground) |
| **Max. Input Voltage:** | 400 V (DC + peak AC) |
| **Y Delay Line (analog):** | 70 ns |
| **Measuring Circuits:** | Measuring Category I |
| Analog mode only: | |
| **Auxiliary input:** | |
| **Function (selectable):** | Extern Trigger, Z (unblank) |
| **Coupling:** | AC, DC |
| **Max. input voltage:** | 100 V DC +peak AC |

## Triggering

| | |
|---|---|
| Analog and Digital Mode | |
| **Automatic (Peak to Peak):** | |
| **Min. signal height:** | 5 mm |
| **Frequency range:** | 10 Hz - 200 MHz |
| **Level control range:** | from Peak- to Peak+ |
| **Normal (without peak):** | Slope/Video |
| **Min. signal height:** | 5 mm |
| **Frequency range:** | 0 - 200 MHz |
| **Level control range:** | –10 cm to +10 cm |
| **Operating modes:** | Slope/Video |
| **Slope:** | positive, negative, both |
| **Sources:** | CH 1, CH 2, alt.1/2, Line, Ext. |
| **Coupling:** | **AC:** (10 Hz-200 MHz)<br>**DC:** (0-200 MHz)<br>**HF:** (30 kHz–200 MHz)<br>**LF:** (0-5 kHz)<br>Noise Rej. switchable |
| **Video:** | pos./neg. Sync. Impulse |
| **Standards:** | 525 Line/60 Hz Systems<br>625 Line/50 Hz Systems |
| **Field:** | even/odd/both |
| **Line:** | all/line number selectable |
| **Source:** | CH 1, CH 2, Ext. |
| **Indicator for trigger action:** | LED |
| **External Trigger via:** | Auxiliary Input |
| **Coupling:** | AC, DC |
| **Max. input voltage:** | 100 V DC +peak AC |
| Digital mode | |
| **Pre/Post Trigger:** | -100 % to +400 % related to complete memory |
| Analog mode | |
| 2nd Trigger | |
| **Min. signal height:** | 5 mm |
| **Frequency range:** | 0 - 200 MHz |
| **Coupling:** | DC |
| **Level control range:** | –10 cm to +10 cm |

## Horizontal Deflection

| | |
|---|---|
| Analog mode | |
| **Operating modes:** | A, ALT (alternating A/B), B |
| **Time base A (Sequence):** | 0.5 s/cm - 50 ns/cm (1-2-5 sequence) |
| **Time base B (Sequence):** | 20 ms/cm – 50 ns/cm (1-2-5 sequence) |
| **Accuracy A and B:** | ± 3 % |
| **X-Mag. x10:** | to 5 ns/cm |
| **Accuracy X x10:** | ± 5 % |
| **Variable time base A/B:** | cont. 1:2.5 |
| **Hold Off time:** | var. 1:10 LED-Indication |
| **Bandwidth X-Amplifier:** | 0 - 3 MHz (-3 dB) |
| **X-Y phase shift ‹ 3°:** | ‹ 220 kHz |
| Digital mode | |
| **Time base range (sequence)** | |
| **Refresh Mode:** | 20 ms/cm - 5 ns/cm (1-2-5 sequence) |
| **with Peak Detect:** | 20 ms/cm – 50 ns/cm (1-2-5 sequence) |
| **Roll Mode:** | 50 s/cm – 50 ms/cm (1-2-5 sequence) |
| **Accuracy time base** | |
| **Time base:** | 50 ppm |
| **Display:** | ± 1 % |
| **MEMORY ZOOM:** | max. 40,000:1 |
| **Bandwidth X-Amplifier:** | 0 - 100 MHz (-3 dB) |
| **X-Y phase shift ‹ 3°:** | ‹ 100 MHz |

## Digital Storage

| | |
|---|---|
| **Acquisition (real time):** | 2x 500 MSa/s, 1 GSa/s interleaved |
| **Acquisition (random sampling):** | 10 GSa/s |
| **Bandwidth:** | 2 x 0 - 100 MHz (random) |
| **Memory:** | 1 M-Samples per channel |
| **Operating modes:** | Refresh, Average, Envelope/<br>Roll: Free Run/Triggered, Peak-Detect |
| **Resolution (vertical):** | 8 Bit (25 Pts/cm) |
| **Resolution (horizontal):** | |
| **Yt:** | 11 Bit (200 Pts/cm) |
| **XY:** | 8 Bit (25 Pts /cm) |
| **Interpolation:** | Sinx/x, Dot Join (linear) |
| **Delay:** | 1 Million * 1/Sampling Rate to<br>4 Million * 1/Sampling Rate |
| **Display refresh rate:** | max.170/s at 1 MPts |
| **Display:** | Yt, XY (acquired points only), Interpolation, Dot Join |
| **Reference Memories:** | 9 with 2 kPts each (for recorded signals) |
| **Display:** | 2 signals of 9 (free selectable) |

## Operation/Measuring/Interfaces

| | |
|---|---|
| **Operation:** | Menu (multilingual), Autoset, help functions (multilingual) |
| **Save/Recall (instrument parameter settings):** | 9 |
| **Signal display:** | max. 4 traces |
| **analog:** | CH 1, 2 (Time Base A) in combination with CH 1, 2 (Time Base B) |
| **digital:** | CH1,2 and ZOOM or Reference or Mathematics) |
| **Frequency counter:** | |
| **6 digit resolution:** | ›1 MHz – 200 MHz |
| **5 digit resolution:** | 0.5 Hz – 1 MHz |
| **Accuracy:** | 50 ppm |
| **Auto Measurements:** | |
| **Analog mode:** | Frequency/Period/Vdc/Vpp/Vp+/Vp- |
| **add. in digital mode:** | $V_{rms}/V_{avg}$ |
| **Cursor Measurements:** | |
| **Analog mode:** | ΔV, Δt, 1/Δt (f), V to GND, ratio X, ratio Y |
| **add. in digital mode:** | Pulse count, Vt to Trigger, Peak to Peak, Peak+, Peak- |
| **Resolution Readout/Cursor:** | 1000 x 2000 Pts, Signals: 250 x 2000 |
| **Interfaces (plug-in):** | RS-232 (HO710) |
| **Optional:** | IEEE-488, Ethernet, Dual-Interface RS-232/USB |

## Mathematic functions

| | |
|---|---|
| **Number of Formula Sets:** | 5 with 5 formulas each |
| **Sources:** | CH 1, CH 2, Math 1-Math 5 |
| **Targets:** | 5 math. memories, Math 1-5 |
| **Functions:** | ADD, SUB, 1/X, ABS, MUL, DIV, SQ, POS, NEG, INV |
| **Display:** | max. 2 math. memories (Math 1-5) |

## Display

| | |
|---|---|
| **CRT:** | D14-375GH |
| **Display area (with graticule):** | 8 cm x 10 cm |
| **Acceleration voltage:** | approx. 14 kV |

## General Information

| | |
|---|---|
| **Component tester** | |
| **Test voltage:** | approx. 7 $V_{rms}$ (open circuit), approx. 50 Hz |
| **Test current:** | max. 7 $mA_{rms}$ (short circuit) |
| **Reference Potential :** | Ground (safety earth) |
| **Probe ADJ Output:** | 1 kHz/1 MHz square wave signal 0.2 $V_{pp}$ (tr ‹ 4 ns) |
| **Trace rotation:** | electronic |
| **Line voltage:** | 105 – 253 V, 50/60 Hz, CAT II |
| **Power consumption:** | 42 Watt at 230 V, 50 Hz |
| **Protective system:** | Safety class I (EN61010-1) |
| **Weight:** | 5.6 kg |
| **Cabinet (W x H x D):** | 285 x 125 x 380 mm |
| **Ambient temperature:** | 0° C ...+40° C |

**Accessories supplied:** Line cord, Operating manual, 2 Probes 10:1 with attenuation ID, Windows Software for control and data transfer
**Optional accessories:** Dual-Interface RS-232/USB HO720,Ethernet HO730 IEEE-488 (GPIB) HO740, Opto-Interface (with optical fiber cable) HZ70