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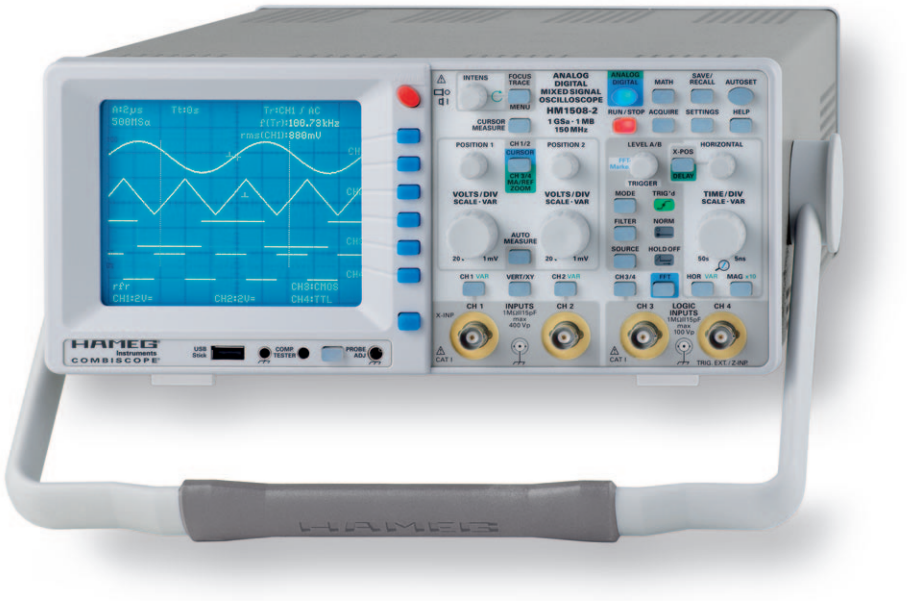
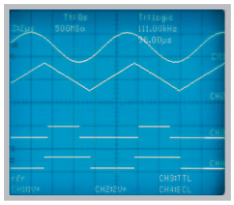
HAMEG Instruments

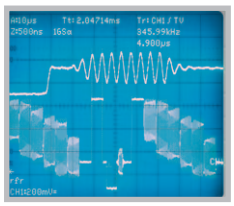
150 MHz Mixed Signal CombiScope®
HM1508-2



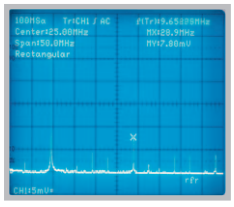
DSO mode:
4-channel display of 2 analog and 2 logic signals.



DSO mode: Signal portion expanded with zoom (color burst in one line of a composite video signal).



Frequency Analysis with FFT.



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

1 MPt memory per channel allows Memory Zoom up to 50,000:1

Frequency spectrum display with FFT

4 channels (2 analog, 2 logic inputs), Time Base 50 s/cm – 5 ns/cm

Pre/Post Trigger -100 % to +400 %

8-Bit Low Noise Flash A/D Converters

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

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

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

Analog mode: as HM1000-2, but 150 MHz

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

150 MHz Mixed Signal CombiScope® HM1508-2

Valid at 23 °C after a 30 minute warm-up period

Vertical Deflection

Channels:	
Analog:	2
Digital:	2 + 2 Logic Channels
Operating Modes:	
Analog:	CH 1 or CH 2 separate, DUAL (CH 1 and CH 2 alternate or chopped), Addition
Digital:	Analog Signal Channels CH 1 or CH 2 separate, DUAL (CH 1 and CH 2), Addition Logic Signal Channels: CH 3 and CH 4
X in XY-Mode:	CH 1
Invert:	CH 1, CH 2
Bandwidth (-3 dB):	2 x 0 – 150 MHz
Rise time:	‹ 2.3 ns
Overshoot:	max. 1 %
Bandwith limiting (selectable):	about 20 MHz (5 mV/cm - 20 V/cm)
Deflection Coefficients (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:	
Input Impedance:	1 MΩ II 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
Digital mode only:	
Logic Channels:	CH 3, CH 4
Select. switching thresholds:	TTL, CMOS, ECL
User definable thresholds:	3
within the range:	-2 V to +3 V
Analog mode only:	
Auxiliary input:	CH 4: 100 V (DC + peak AC)
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 - 250 MHz
Level control range:	from Peak- to Peak+
Normal (without peak):	
Min. signal height:	5 mm
Frequency range:	0 - 250 MHz
Level control range:	–10 cm to +10 cm
Operating modes:	Slope/Video/Logic
Slope:	positive, negative, both
Sources:	CH 1, CH 2, alt. CH 1/2 (≥ 8 mm), Line, Ext.
Coupling:	**AC:** 10 Hz-250 MHz **DC:** 0-250 MHz **HF:** 30 kHz–250 MHz **LF:** 0 -5 kHz Noise Rej. switchable
Video:	pos./neg. Sync. Impulse
Standards:	525 Line/60 Hz Systems 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:	CH 4 (0.3 V_{pp}, 150 MHz)
Coupling:	AC, DC
Max. input voltage:	100 V (DC +peak AC)
Digital mode:	
Logic:	AND/OR, TRUE/FALSE
Source:	CH1 or 2, CH3 and CH4
State:	X, H, L
Pre/Post Trigger:	-100 % to +400 % related to complete memory
Analog mode	
2nd Trigger	
Min. signal height:	5 mm
Frequency range:	0 - 250 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:	0.5 s/cm - 50 ns/cm (1-2-5 sequence)
Time base B:	20 ms/cm – 50 ns/cm (1-2-5 sequence)
Accuracy A and B:	± 3 %
X Magnification x10:	to 5 ns/cm
Accuracy:	± 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 (1-2-5 sequence)	
Refresh Mode:	20 ms/cm - 5 ns/cm
with Peak Detect:	20 ms/cm – 2 ms/cm (min. Pulse Width 10 ns)
Roll Mode:	50 s/cm – 50 ms/cm
Accuracy time base	
Time base:	50 ppm
Display:	± 1 %
MEMORY ZOOM:	max. 50,000:1
Bandwidth X-Amplifier:	0 - 150 MHz (-3 dB)
XY phase shift ‹ 3°:	‹ 100 MHz

Digital Storage

Sampling rate (real time):	Analog channels: 2 x 500 MSa/s, 1 GSa/s interleaved; Logic Channels: 2 x 500 MSa/s
Acquisition (random sampling):	10 GSa/s
Bandwidth:	2 x 0 - 150 MHz (random)
Memory:	1 M-Samples per channel
Operating modes:	Refresh, Average, Envelope/ 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), Pulse
Delay:	1 Million x 1/Sampling Rate to 4 Million x 1/Sampling Rate
Display refresh rate:	max.170/s at 1 MPts
Display:	Dots (acquired points only), Vectors (partly interpolated), optimal (complete memory weighting and vectors)
Reference Memories:	9 with 2 kPts each (for recorded signals)
Display:	2 signals of 9 (free selectable)

FFT Mode

Display X:	Frequency Range
Disaplay Y:	True rms value of spectrum
Scaling:	Linear or logarithmic
Level display:	dBV, V
Window:	Square, Hanning, Hamming, Blackmann
Control:	Center frequency, Span
Marker:	Frequency, Amplitude
Zoom (frequency axis):	x10

Operation/Measuring/Interfaces

Operation:	Menu (multilingual), Autoset, help functions (multilingual)
Save/Recall (instrument parameter settings):	9
Signal display:	max. 4 signals or 4 traces
analog:	CH 1, 2 (Time Base A) in combination with CH 1, 2 (Time Base B)
digital:	CH 1, 2 and CH 3, 4 or ZOOM or Reference or Mathematics
USB Memory-Stick:	
Save/Recall external:	
Instrument settings and Signals:	CH 1, 2 and CH 3, 4 or ZOOM or Reference or Mathematics

Screen-shot:	as Bitmap
Signal display data (2k per channel):	Binary (SCPI-Data), Text (ASCII-Format), CSV (Spread Sheet)
Frequency counter:	
6 digit resolution:	› 1 MHz – 250 MHz
5 digit resolution:	0.5 Hz – 1 MHz
Accuracy:	50 ppm
Auto Measurements:	
Analog mode:	Frequency, Period, Vdc, Vpp, Vp+, Vp-
also in digital mode:	V_{rms}, V_{avg}
Cursor Measurements:	
Analog mode:	Δt, 1/Δt (f), t_r, ΔV, V to GND, ratio X, ratio Y
plus in digital mode:	V_{pp}, V_p+, V_p-, V_{avg}, V_{rms}, pulse count
Resolution Readout/Cursor:	1000 x 2000 Pts, Signals: 250 x 2000
Interfaces (plug-in):	USB/RS-232 (HO720)
Optional:	IEEE-488, Ethernet/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 ±10 %, CAT II
Power consumption:	47 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, 4 Probes 10:1 with attenuation ID, Windows Software for control and data transfer
Optional accessories: HO730 Dual-Interface Ethernet/USB, HO740 Interface IEEE-488 (GPIB), HZ70 Opto-Interface (with optical fiber cable)