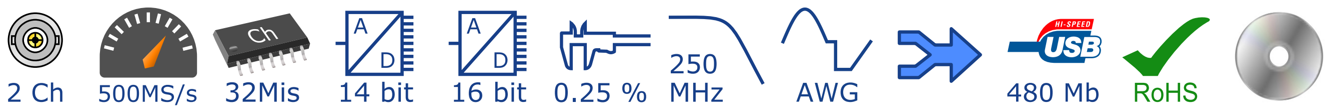
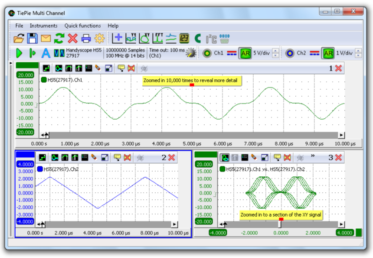
Handyscope HS5

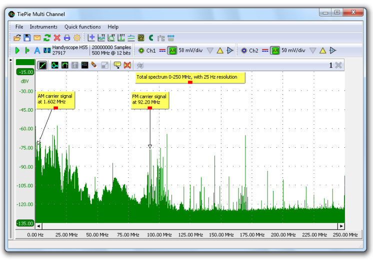
The world's best 500 MHz, 14 bit USB oscilloscope

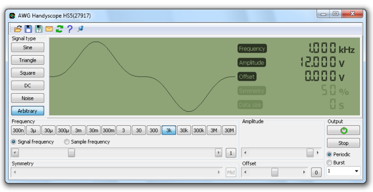
40 MHz Arbitrary Waveform Generator

Datasheet









Oscilloscope / Spectrum analyzer / Multimeter / Data logger
14 bit (0.006 %) resolution (16 bit enhanced resolution)
500 MS/s sampling
250 MHz bandwidth
32 MSamples memory per channel
20 MS/s continuous streaming
0.25 % DC vertical accuracy, 0.1 % typical
1 ppm timebase accuracy
USB powered

Arbitrary Waveform Generator
1 μHz to 40 MHz sine, square, triangular and arbitrary waves
240 MS/s, 14 bit, 64 MSamples arbitrary waves
0 to $\pm$12 V output (24 V_{pp})
1 ppm timebase accuracy
Spurious (non harmonic) <-75 dB
8 ns rise and fall time

Handyscope HS5, an unbeatable oscilloscope

This Best in class USB oscilloscope features:

- 14 and 16 bit High Resolution USB Oscilloscope, 256 times more amplitude resolution than an 8 bit oscilloscope, with super zoom up to 32 Million samples
- 250 MHz USB Spectrum analyzer
- High Performance Digital Multimeter (DMM)
- Protocol analyzer
- USB Arbitrary Waveform Generator

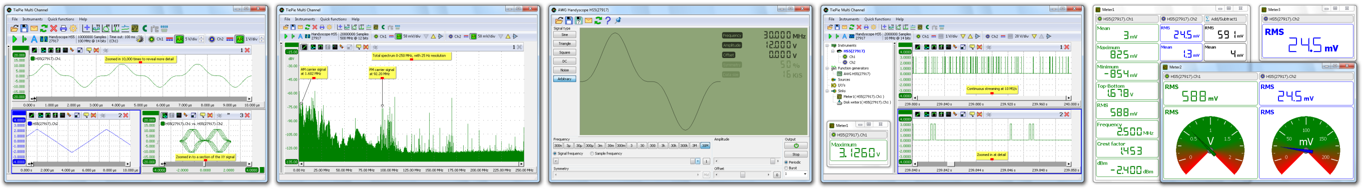
and provides the best that is available in industry, for a limited budget. The flexibility and quality that the Handyscope HS5 offers is unparalleled by any other oscilloscope in its class.

Models

The Handyscope HS5 is available in four different models with an extended memory option (XM) and with optional SureConnect connection test and resistance measurement (S).

Handyscope HS5 model		540	530	220	110	055
Maximum sampling rate		500 MS/s	500 MS/s	200 MS/s	100 MS/s	50 MS/s
Maximum streaming rate		20 MS/s	20 MS/s	10 MS/s	5 MS/s	2 MS/s
Record length per channel	standard model	128 KiS	128 KiS	128 KiS	128 KiS	128 KiS
	XM option	32 MiS	32 MiS	32 MiS	32 MiS	32 MiS
Maximum AWG frequency		40 MHz	30 MHz	20 MHz	10 MHz	5 MHz
AWG memory	standard model	256 KiS	256 KiS	256 KiS	256 KiS	256 KiS
	XM option	64 MiS	64 MiS	64 MiS	64 MiS	64 MiS

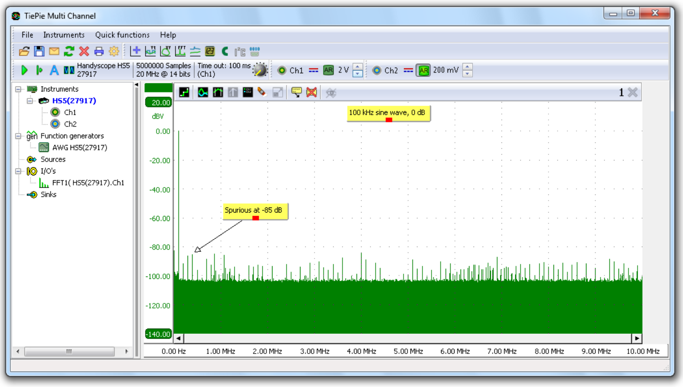
More instruments in the smallest package.



Containing five instruments, the Handyscope HS5 is the most powerful compact measuring instrument in industry. For a user not always measuring at the same location or one who needs more space at his desk, the Handyscope HS5 is the best instrument. Its compact and robust construction makes the Handyscope HS5 perfect for portable use in combination with a laptop computer.

Built-in extremely low distortion USB arbitrary waveform generator

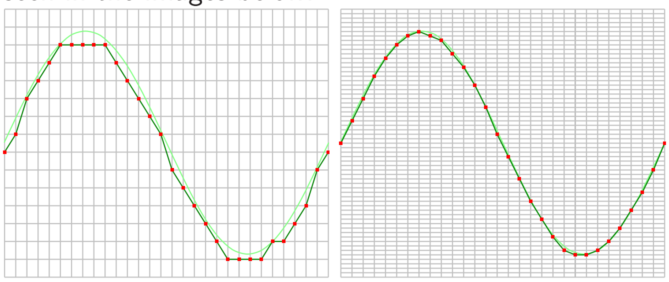
The Handyscope HS5 is the first High Resolution USB oscilloscope with a built-in 40 MHz signal generator. The built in USB Arbitrary Waveform Generator uses the latest techniques on signal synthesis, developed by TiePie engineering, giving the best signal fidelity in its class. An expensive stand-alone Arbitrary Waveform Generator is easily surpassed. With a spurious distortion as low as -85 dB at 100 kHz signal frequency, a very flat amplitude spectrum and a rise time of 8 ns, the created signals approach perfection. Combined with an output voltage of 24 V_{pp}, a resolution of 14 bit at 240 MS/s and a waveform buffer of 64 MSamples, this makes the Handyscope HS5 AWG truly a high quality generator. Standard signal shapes like sine wave, square wave, triangle, pulse, DC and noise are available. When a custom signal shape is required, this can be created in the 64 million samples large memory or by loading a previously measured signal from the oscilloscope.



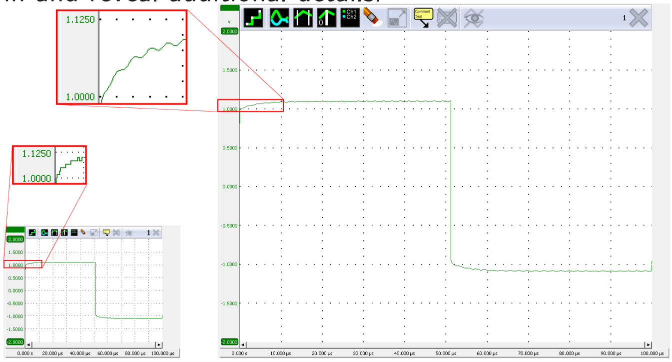
High amplitude resolution, 256 times more than a standard oscilloscope

A standalone oscilloscope usually has a low resolution of 8 or 9 bit, combined with a limited display of just 5.7" or 8.5", displaying the measured signals in their actual resolution. Zooming in will then not reveal more details.

The Handyscope HS5 has high resolutions of 14 and 16 bit, making it a truly high precision oscilloscope. With a high resolution, the original signal is sampled much more accurate, the quantization error is much lower. The effect of a higher resolution can be clearly seen in the images below:



To display a signal measured with the Handyscope HS5 High Resolution oscilloscope at the same level of detail as the standalone oscilloscope, the display can be 256 times larger. Viewing the signals on a 24" monitor immediately gives a very detailed impression of the signal. The smallest deviations are very well visible and because of the high resolution, it is still possible to zoom in and reveal additional details.



Shown are two displays, both showing a measurement of the same signal. The left display size corresponds to a size comparable to a standalone oscilloscope; at 8 bit resolution, zooming will not reveal more details. The right display corresponds to a maximized window on a standard PC screen; at 14 bit resolution, zooming will still reveal more details.

Industry's first 1 ppm oscilloscope

The time base of the Handyscope HS5 is 25 to 100 times better than the comparable instruments of the competition. With a time base accuracy of 1 ppm, frequency and timing can be measured very accurately.

Coupling multiple instruments to a large combined instrument does not affect the time base accuracy, the timing deviation between the coupled instruments is 0 ppm.

Combining multiple instruments for fully synchronized measuring

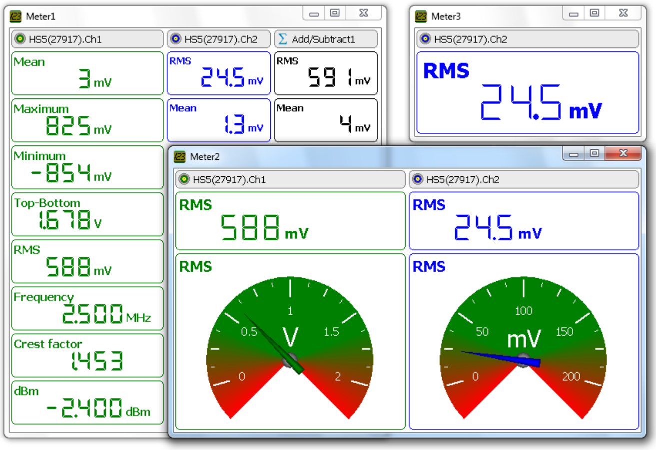
The Handyscope HS5 is equipped with a sophisticated synchronization bus, allowing to connect multiple Handyscope HS5's to each other, which then can be used as a combined instrument. One of the connected Handyscope HS5's will act as master, the others as slaves. All instruments will measure at the same sample frequency (0 ppm deviation!) Apart from the synchronization bus there are also a trigger bus and a detection bus system. Multiple Handyscope HS5's can be connected to each other using a coupling cable. The maximum number of instruments is only imited by number available USB ports.

When the Multi Channel software is started, the coupled Handyscope HS5's are identified (each Handyscope HS5 has a unique number) and automatically combined to a larger instrument. Both the synchronization bus and the trigger bus are automatically terminated at both ends with the correct impedance. Placing terminators is not required by the user. Combining the instruments is fully automatic. This unique possibility to create e.g. a 8 channel instrument is only available with the Handyscope HS5 and no other USB oscilloscope.

High performance USB digital multimeter

With the high resolution of 16 bits, the Handyscope HS5 can be used as a comprehensive and accurate high performance digital multimeter with good specifications (like e.g. RMS, peak-peak, Max, Min, Mean, Variance, Standard deviation, Frequency, duty cycle, Crest factor, Rise time, Fall time, dBm, etc.). Both numerical and gauge displays are available. The stable and very accurate time base of the Handyscope HS5 of 1ppm make very accurate frequency and time measurements possible. These qualities make an extra multimeter or frequency counter redundant and make the Handyscope HS5 unique in its class.

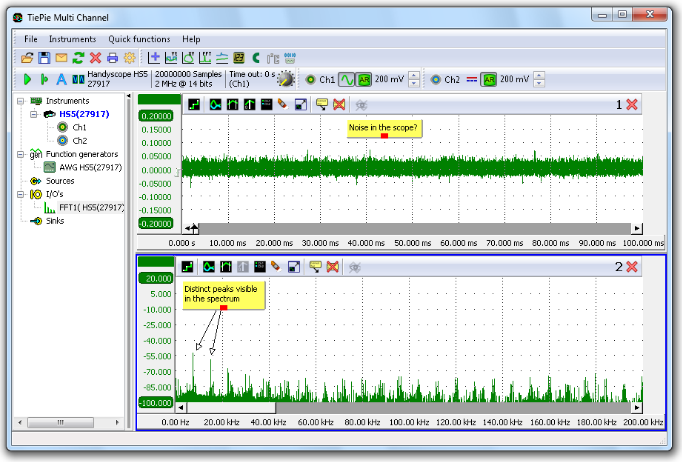
You can make as many displays as you want, in any size and different layouts.



Troubleshooting in the frequency domain

The Handyscope HS5 definitely brings an end to the idea that spectrum analyzers are expensive, hard to control and difficult to understand. The large flexibility of the spectrum analyzer makes it not just suitable for measuring high frequency signals of transmitters and receivers. A spectrum analyzer displays frequency along the X axis and along the Y axis the magnitude of the signal is displayed. This is called a frequency domain display.

When troubleshooting, usually an oscilloscope is used. But when the disturbance is small in amplitude and contains many frequencies, these signals are badly visible on an oscilloscope. They appear like noise signals. But, when these signals are viewed in the frequency domain, a much better overview is presented of the disturbance signals that are present and which frequencies they contain.



When e.g. measurements are performed on a system that contains switch mode power supplies, the disturbances caused by a power supply are easily detected by measuring in the frequency domain. The switch frequency of the switch mode power supply is measured by holding the probe close to the inductor of the power supply. This unique switch frequency is now known and can be stored in a reference channel. When this frequency is also measured at other locations in the system, the frequency is caused by the power supply. Precautions can be made to suppress the disturbing signal from the switch mode power supply. The suppression can be measured directly by the Handyscope HS5 USB spectrum analyzer. This method of troubleshooting is only possible (and unique for the Handyscope HS5) because the Handyscope HS5 contains:

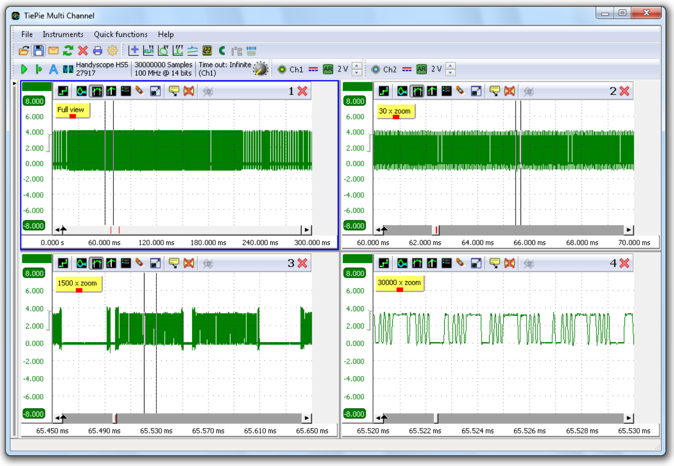
- 250 MHz bandwidth
- 14 and 16 bit resolution
- 32 Million samples memory
- very fast FFT calculations

Because the Handyscope HS5 measures a with very high resolution in the frequency domain, disturbances can be detected and analyzed at one tenth of a Hertz accuracy. Up to 16 million frequency components can be displayed in a graph. Because of the high resolution of the Handyscope HS5 (14 and 16 bit resolution and 32 MSamples), small disturbances can be easily detected. When a precaution is made to suppress the disturbance, its effectiveness can immediately be checked with the Handyscope HS5. With the high resolution and the large memory of the Handyscope HS5, a spectrum with a dynamic range of more than 120 dB can be measured. This is unique in its class. With this large dynamic range, distortion measurements can be well performed.

Mega deep memory of 32 MSamples per channel

When measuring at high sample rates, a long record length is a must, otherwise the acquisition buffer is full before the signal is measured. Where most oscilloscopes have 2.5 kSamples or 100 kSamples memory, the Handyscope HS5 has 32 MSamples memory per channel. This gives the user 300 to 10000 times more memory. The advantage of deep memory is that once-only fast phenomena can be measured accurately or complete serial communication signal blocks like CAN Bus signals can be measured all at once. In the USB spectrum analyzer, the deep memory gives the advantage that a large dynamic range is created which sets troubleshooting in the frequency domain as a new standard.

The unlimited super zoom feature of the Handyscope HS5 allows to zoom in up to one individual sample, no matter what record length was selected.



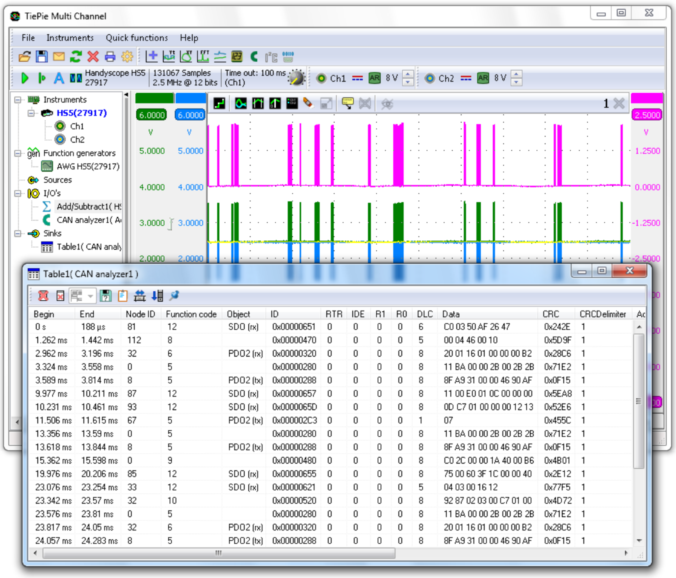
Shown is a 30 million samples long measurement. The same signal is shown four times in different zooming factors, the lower right graph shows just 0.01 ms of the total 300 ms, a zoom factor of 30000. It still provides enough detail for accurate signal analysis.

SureConnect connection test and resistance measurement

SureConnect connection test shows immediately whether the probe or clip actually makes electrical contact. No more doubt whether the probe doesn't make contact or there really is no signal. This is e.g. useful when surfaces are oxidized and the probe cannot get a good electrical contact or when back probing connectors in confined places. Simply activate SureConnect and you immediately know whether there is contact.

SureConnect is optionally available on the Handyscope HS5. Handyscope HS5 models with SureConnect come with resistance measurement on all channels. Resistances up to 2 MOhm can be measured. Resistance can be shown in meter displays and can also be plotted versus time in a graph, creating an Ohm scope.

Protocol analyzer



The various serial protocol analyzers of the Handyscope HS5 can be used to analyze and debug serial data buses. The data is displayed in an elaborate table with information on the serial data. Locating "wrong" data packets has become very easy. For each developer or service technician this is a welcome option. Protocol analyzers for CAN bus data, I^2C communication and various other serial data communications are available.

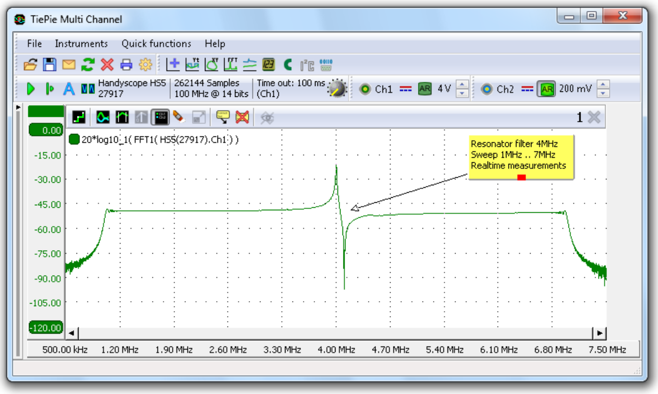
To the left, decoded CAN bus messages are shown.

Very fast 20 MSamples per second streaming Data logger

When unlimited deep memory is required, it is possible to stream the measured data directly to disk. The Handyscope HS5 is capable of streaming up to 20 million samples per second, at 14 bit resolution. Using streaming measuring, difficult problems can be measured easily and traced back and analyzed.

Scope and AWG synchronisation

With both the High Resolution USB oscilloscope and the USB arbitrary waveform generator in one unit, it is easy to perform a synchronized measurement. It is e.g. possible to perform a sweep and directly measure the frequency spectrum. In the shown measurement a sweep from 1 MHz to 7 MHz is generated and injected in a resonance filter of 4 MHz, the output is directly measured. This is a real time measurement. When the resonance filter is heated, the drop in resonance frequency is immediately visible.



Fast to work with the Handyscope HS5

By using set files and reference signals, a complex measurement can be performed quickly. A set file contains the setup of the Handyscope HS5. When a setup is made for a specific measurement, it can be saved on hard disk. A next time, this set file (with possible corresponding reference signals) can be read and the measurement can be performed again immediately and compared to the reference signal. Multiple reference signals can be included in a set file. Exchanging measured signals with colleagues who have a Handyscope HS5 is very easy. A lot of time can be saved by immediately using the correct instrument setup and reference signals. Troubleshooting becomes very effective. By storing all set files on a computer, a historical overview of signals becomes easy and unlimited available.

Ease of use

The convenient toolbars offer many ways to control the Handyscope HS5. The toolbars are fully customizable to meet the user's demands. The size of the toolbar buttons can be changed to simplify touch screen control. There are toolbars available for common operations like saving or recalling measurements, for each opened instrument, for each channel and for the quick functions. Using quick functions, complex measurements can be performed immediately by a single click.

- Create a new graph
- Create an Yt oscilloscope
- Create an XY oscilloscope
- Create a spectrum analyzer
- Create a data logger
- Create a CAN Bus analyzer
- Create an I^2C analyzer
- Create a serial analyzer

With the cursor measurements, individually for each graph, many signal properties can be determined.

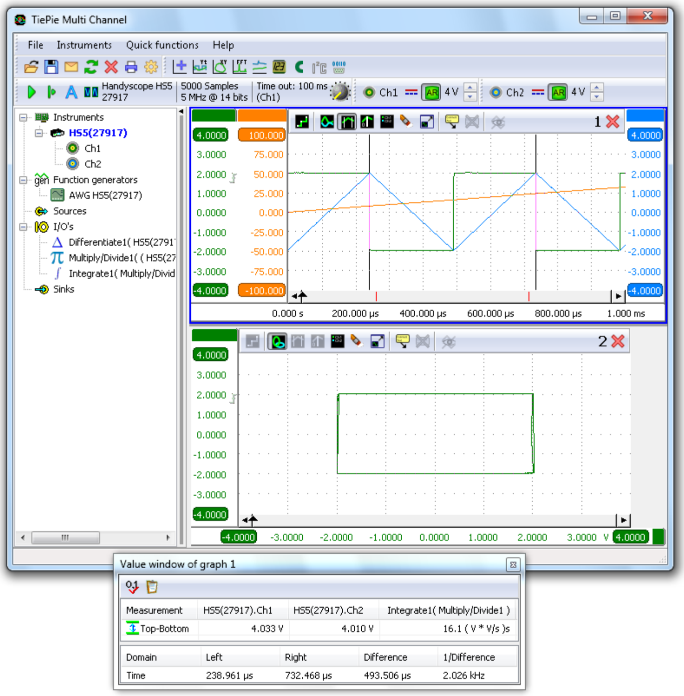
- The sample value at the left cursor
- The sample value at the right cursor
- The value difference between right and left cursor
- The slope between the cursors
- The maximum value between the cursors
- The minimum value between the cursors
- The top-bottom value between the cursors
- The RMS value between the cursors
- The mean value between the cursors
- The variance of the values between the cursors
- The standard deviation of the values between the cursors
- The frequency of the signal between the cursors
- The duty cycle of the signal between the cursors
- The crest factor of the signal between the cursors
- The rise time of the signal between the cursors
- The fall time of the signal between the cursors
- The dBm value of the signal between the cursors

Sophisticated mathematics for in-depth signal analysis

The Multi Channel software for the Handyscope HS5 offers a large variety of mathematical operations like e.g. adding, subtracting, multiplying, dividing, integrating, differentiating, determining the square root, determining the logarithm, etc. These mathematical operations are available in the form of processing blocks and can be used to process the measured signals and reference signals.

Besides the basic mathematical operations, there are also several processing blocks to perform other, more complex operations on the data, like determining minimum or maximum values, limiting to specified range, averaging, filtering, applying gain and offset, resampling etc.

Combining these mathematical processing blocks gives unrivaled possibilities in constructing complex mathematical operations to analyze your measurements thoroughly and obtain all the information you need from your data. The results of these operations can be displayed in one or more graphs, can be displayed in numeric displays, in tables and can be written to disk in various common file formats.



This measurement determines the area of an XY graph, using multiplying, integrating and differentiating I/O's. The area is indicated in the Value window: 16 V^2.

- Apply gain and offset to a signal
- Add or subtract signals
- Multiply or divide signals
- Determine the square root of a signal
- Determine the absolute value of a signal
- Differentiate a signal
- Integrate a signal
- Determine the logarithm of a signal
- Apply a low pass filter to a signal
- Average a number of consecutive measurements
- Limit the signal magnitude
- Resample a signal to a different size
- Collect streaming data blocks
- Perform a Fast Fourier Transform on a signal
- Determine the duty cycle of a signal

Education laboratory

The many measurement examples and technical explanations that are given on the TiePie engineering website give the beginning user much information on how to use the Handyscope HS5 and in what areas it can be used. Basic information on measuring is given. A must for the beginning user and a source of inspiration for the experienced measurement specialist. www.tiepie.com/classroom

The Handyscope HS5 gives the user an instrument with a high accuracy both in amplitude (up to 16 bit) and time and frequency (32 MSamples, 1 ppm). The integrated instruments make sure that most measurement problems can be solved and troubleshooting is limited to an absolute minimum. Are you working in research and development, manufacturing, service or education, the Handyscope HS5 is the instrument to deploy to visualize and analyze your signals. The Handyscope HS5 offers excellent and sophisticated measurement possibilities for an attractive budget for now and in the future.

Specifications

To achieve rated accuracy, allow the instrument to settle for 20 minutes. When subjected to extreme temperatures, allow additional time for internal temperatures to stabilize. Because of temperature compensated calibration, the Handyscope HS5 will settle within specified accuracy regardless of the surrounding temperature.

Oscilloscope

Acquisition system		
Number of input channels	2 analog	
CH1, CH2	BNC	
Maximum sampling rate	Depending on model	
Model 540, model 530	Measuring one channel	measuring two channels
8/12 bit	500 MS/s	200 MS/s
14 bit	100 MS/s	100 MS/s
16 bit	6.25 MS/s	6.25 MS/s
Model 220	Measuring one channel	measuring two channels
8/12 bit	200 MS/s	100 MS/s
14 bit	50 MS/s	50 MS/s
16 bit	3.125 MS/s	3.125 MS/s
Model 110	Measuring one channel	measuring two channels
8/12 bit	100 MS/s	50 MS/s
14 bit	20 MS/s	20 MS/s
16 bit	1.25 MS/s	1.25 MS/s
Model 110	Measuring one channel	measuring two channels
8/12 bit	50 MS/s	20 MS/s
14 bit	10 MS/s	10 MS/s
16 bit	625 kS/s	625 kS/s
Maximum streaming rate	Depending on model	
Model 540, model 530	Measuring one channel	measuring two channels
8 bit	40 MS/s	20 MS/s
12/14 bit	20 MS/s	10 MS/s
16 bit	6.25 MS/s	6.25 MS/s
Model 220	Measuring one channel	measuring two channels
8 bit	20 MS/s	10 MS/s
12/14 bit	10 MS/s	5 MS/s
16 bit	3.125 MS/s	3.125 MS/s
Model 110	Measuring one channel	measuring two channels
8 bit	10 MS/s	5 MS/s
12/14 bit	5 MS/s	2 MS/s
16 bit	1.25 MS/s	1.25 MS/s
Model 110	Measuring one channel	measuring two channels
8 bit	4 MS/s	2 MS/s
12/14 bit	2 MS/s	1 MS/s
16 bit	625 kS/s	625 kS/s
Sampling source		
Internal	TCXO	
Accuracy	±0.0001 %	
Stability	±1 ppm over 0 °C to 55 °C	
Time base aging	±1 ppm per year	
External	LVDS, on auxilary connectors	
Input range	10 MHz	
Memory		
Standard model	128 KiSamples per channel	
XM option	32 MSamples per channel 64 MSamples when measuring one channel	

BNC inputs CH1, CH2		
Type	Single ended	
Resolution	8, 12, 14, 16 bit user selectable	
DC Accuracy	0.25 % (0.1 % typical) of full scale ± 1 LSB	
Ranges	±200 mV to ±80 V full scale	
Coupling	AC/DC	
Impedance	1 MΩ / 25 pF	
Maximum voltage	200 V (DC + AC peak < 10 kHz)	
Maximum voltage 1:10 probe	600 V (DC + AC peak < 10 kHz)	
Bandwidth (-3dB)	Ch1	Ch2
at 75 % of full scale input	250 MHz	100 MHz
AC coupling cut off frequency (-3dB)	±1.5 Hz	
SureConnect	Optionally available (option S)	
Maximum voltage on connection	200 V (DC + AC peak <10 kHz)	
Resistance measurement	Optionally available (option S)	
Ranges	100 Ohm to 2 MOhm full scale	
Accuracy	3 %	
Response time (to 95 %)	<5 ms	

Trigger	
System	Digital, 2 levels
Source	CH1, CH2, digital external, OR, generator start, generator new period, generator stop
Trigger modes	Rising/falling/any edge, inside/outside window, enter/exit window, pulse width
Level adjustment	0 to 100 % of full scale
Hysteresis adjustment	0 to 100 % of full scale
Resolution	0.024 % (12 bits)/0.006 % (14/16 bits)
Pre trigger	0 to 32 MiSamples, 1 sample resolution
Post trigger	0 to 32 MiSamples, 1 sample resolution
Digital external trigger	
Input	Auxilary I/O connector
Range	0 to 2.5 V (TTL)
Coupling	DC
Jitter	depending on trigger source and sample frequency
Source = channel	≤ 1 sample
Source = External or Generator	
Sample frequency = 500 MS/s	≤ 8 samples
Sample frequency <500 MS/s	≤ 4 samples

Multi instrument synchronization	
Maximum number of instruments	Limited by number available USB ports
Synchronization accuracy	0 ppm

Probes	HP-9250	
Attenuation settings	X1	X10
Bandwidth	6 MHz	250 MHz
Rise time	58 ns	1.4 ns
Input impedance	1 MΩ (scope impedance)	10 MΩ (incl. 1 MΩ scope impedance)
Input capacitance	47 pF + scope capacitance	17 pF
Compensation range	-	10 to 35 pF
Working voltage (DC + peak AC)	300 V CAT I, 150 V CAT II	600 V CAT I, 300 V CAT II

Arbitrary Waveform Generator

Signal characteristics	
Sine	
Frequency range	Depending on model
Model HS5-540	1 µHz to 40 MHz
Model HS5-530	1 µHz to 30 MHz
Model HS5-220	1 µHz to 20 MHz
Model HS5-110	1 µHz to 10 MHz
Model HS5-055	1 µHz to 5 MHz
Amplitude flattness	Relative to 1 kHz, 20 V_{pp}
< 100 kHz	±0.1 dB
< 5 MHz	±0.15 dB
< 20 MHz	±0.3 dB
< 30 MHz	±0.4 dB
< 40 MHz	±1 dB
Spurious (non harmonic)	
< 100 kHz	-75 dB_c
100 kHz to 1 MHz	-70 dB_c
1 MHz to 10 MHz	-60 dB_c
10 MHz to 15 MHz	-55 dB_c
15 MHz to 20 MHz	-45 dB_c
20 MHz to 30 MHz	-35 dB_c
30 MHz to 40 MHz	-30 dB_c
Square	
Frequency range	Depending on model
Model HS5-540	1 µHz to 30 MHz, above 30 MHz not specified
Model HS5-530	1 µHz to 30 MHz
Model HS5-220	1 µHz to 20 MHz
Model HS5-110	1 µHz to 10 MHz
Model HS5-055	1 µHz to 5 MHz
Rise/fall time	8 ns
Overshoot	< 1 %
Variable duty cycle	0.01 % to 99.99 %
Asymmetry	< 0 % of period + 5 ns (@ 50 % duty cycle)
Jitter (RMS)	< 50 ps
Triangle	
Frequency range	Depending on model
Model HS5-540	1 µHz to 30 MHz, above 30 MHz not specified
Model HS5-530	1 µHz to 30 MHz
Model HS5-220	1 µHz to 20 MHz
Model HS5-110	1 µHz to 10 MHz
Model HS5-055	1 µHz to 5 MHz
Nonlinearity (of peak output)	< 0.01 %
Symmetry	0 % to 100 %, 0.1 % steps
Pulse	
Period	100 ns to 1000 s
Pulse width	15 ns to 1000 s
Variable edge time	20 ns to 1 s
Overshoot	< 1 %
Jitter (RMS)	< 50 ps
Noise	
Bandwidth (typical)	30 MHz
Arbitrary	
Frequency range	Depending on model
Model HS5-540, model HS5-530	1 µHz to 30 MHz
Model HS5-220	1 µHz to 20 MHz
Model HS5-110	1 µHz to 10 MHz
Model HS5-055	1 µHz to 5 MHz
Waveform pattern length	
Standard model	1 to 256 KiSamples
XM option	1 to 64 MiSamples
Sampling rate	Depending on model
Model HS5-540, model HS5-530	240 MS/s
Model HS5-220	200 MS/s
Model HS5-110	100 MS/s
Model HS5-055	50 MS/s
Rise/fall time	< 8 ns
Nonlinearity (of peak output)	< 0.01 %
Settling time	< 8 ns to 10 % final value
Jitter (RMS)	< 50 ps

Waveforms	
Standard	Sine, square, triangle, pulse, noise, DC
Built-in arbitrary	Exponential rise and fall, sin(x)/x, cardiac, haversine, lorentz, d-lorentz

System characteristics	
System	Constant Data Size
Output channel	1 analog, BNC
DAC resolution	14 bit
Output range	-12 to 12 V (open circuit)
Amplitude	
Range	0.12 V, 1.2 V, 12 V (open circuit)
Resolution	12 bit
Accuracy	0.4 % of range
DC offset	
Range	-12 to 12 V (open circuit)
Resolution	12 bit
Accuracy	0.4 % of range
Noise level	
0.12 V	900 μV_{RMS}
1.2 V	1.3 mV_{RMS}
12 V	1.5 mV_{RMS}
Coupling	DC
Impedance	50 Ω
Overload protection	Output turns off automatically when overload is applied. Instrument will tolerate a short circuit to ground indefinitely.
Memory	
Standard model	256 KiSamples
XM option	64 MiSamples
Operating modes	Continuous, triggered, gated
Sampling rate	Depending on model
Model HS5-540, model HS5-530	240 MS/s
Model HS5-220	200 MS/s
Model HS5-110	100 MS/s
Model HS5-055	50 MS/s
Sampling source	Internal TCXO
Accuracy	0.0001 %
Stability	±1 ppm over 0 °C to +55 °C
Time base aging	±1 ppm per year

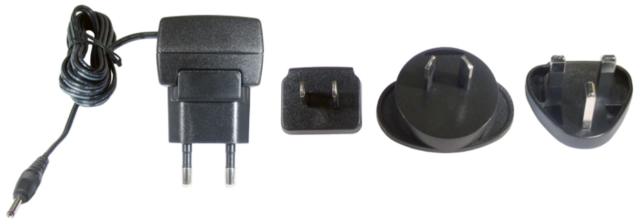
Burst	
Waveforms	Sine, square, triangle, noise, arbitrary
Count	1 to 65535
Trigger	Software, external

Sweep	only available on models with option XM
Waveforms	Sine, square, triangle, noise, arbitrary
Type	Linear, logarithmic
Direction	Up, down
Trigger	Software, external

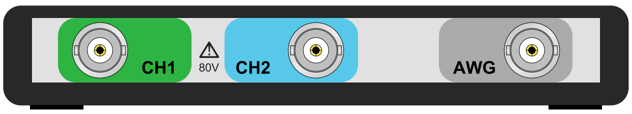
Modulation	
AM	
Carrier waveforms	Sine, square, triangle, arbitrary
Modulating waveforms	Sine, square, triangle, noise, arbitrary
Modulating frequency	2 mHz to 20 MHz
Depth	0.0 % to 100 %
Source	Internal
FM	
Carrier waveforms	Sine, square, triangle, arbitrary
Modulating waveforms	Sine, square, triangle, noise, arbitrary
Modulating frequency	2 mHz to 20 MHz
Peak deviation	DC to 20 MHz
Source	Internal
FSK	
Carrier waveforms	Sine, square, triangle, arbitrary
Modulating waveforms	50 % duty cycle square
Modulating frequency	2 mHz to 20 MHz
Peak deviation	1 µHz to 20 MHz
Source	Internal

General

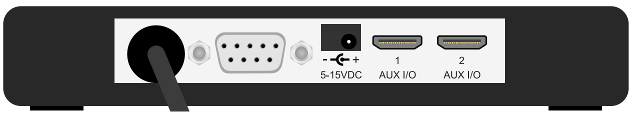
Power	
Power	From USB or external input
Consumption	5 V_{DC}, 2000 mA max
External power	From second USB port or power adapter
Power adapter	External
Input	110 to 240 V_{AC}, 50 to 60 Hz 0.85 A Max., 50 VA to 80 VA
Output	5.5 V_{DC}, 2.0 A
Dimension	
Height	30 mm / 1.2"
Width	45 mm / 1.8"
Length	75 mm / 3"
Replaceable mains plugs for	EU, US, AU, UK
Order number	TP-UE15WCP1-055200SPA



I/O connectors	
Front	



CH1, CH2	BNC
AWG	BNC
Rear	



USB	Fixed cable with USB type A plug, 1.8 m
Extension connector	D-sub 9 pins female
Power	3.5 mm power socket
Auxiliary I/O connectors 1 to 2	HDMI type C socket

Physical	
Height	25 mm / 1.0"
Length	170 mm / 6.7"
Width	140 mm / 5.2"
Weight	430 g / 15 ounce
USB cord length	1.8 m / 70"

Interface	
Interface	USB 2.0 High Speed (480 Mbit/s)

System requirements	
PC I/O connection	USB 1.1, USB 2.0 or newer
Operating System	Windows 2000/XP/Vista/7/8, 32 and 64 bits

Environmental conditions	
Operating	
Ambient temperature	0 to 55 °C
Relative humidity	5 to 90 % non condensing
Storage	
Ambient temperature	-20 to 70 °C
Relative humidity	5 to 95 % non condensing

Certifications and Compliances	
CE mark compliance	Yes
RoHS	Yes
EN 55011:2009/A1:2010	Yes
EN 55022:2006/A1:2007	Yes
EN 61000-6-1:2007	Yes
EN 61000-6-3:2007	Yes

Warranty	
Warranty	Three year standard, five years optional, covering all parts and labor, excluding probes

Accessories included	
Instrument	Handyscope HS5 : HS5-xxx-xx (see below)
Probes	2 x 1:1 / 1:10 : HP-9250
Accessories	Power adapter : TP-UE15WCP1-055200SPA USB power cable : TP-USB-PWR-P3.5
Software	For Windows 2000/XP/Vista/7/8
Drivers	For Windows 2000/XP/Vista/7/8
Manual	Instrument manual and software user's manual

Customer service

TiePie engineering instruments are designed, manufactured and tested to provide high reliability. In the unlikely event you experience difficulties, the TiePie engineering instruments are fully warranted for three years. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to the latest software at no charge

Ordering information

Handyscope HS5 Model	Order code
500 MS/s, 40 MHz AWG, 128 KiS, 3 year warranty	HS5-540
500 MS/s, 30 MHz AWG, 128 KiS, 3 year warranty	HS5-530
200 MS/s, 20 MHz AWG, 128 KiS, 3 year warranty	HS5-220
100 MS/s, 10 MHz AWG, 128 KiS, 3 year warranty	HS5-110
50 MS/s, 5 MHz AWG, 128 KiS, 3 year warranty	HS5-055

Available options for the Handyscope HS5 are:

- **XM**: With the extended memory option, 32 MiSamples memory per channel is available. Add **XM** to the order code.
- **S**: With the SureConnect option, connection test and resistance measurement are available on all channels. Add **S** to the order code.
- **W5**: With the extended warranty option, warranty is five years on parts and labor. Add -**W5** to the order code.

TiePie engineering
Koperslagersstraat 37
8601 WL Sneek
The Netherlands

Tel.: +31 515 415 416
Fax: +31 515 418 819
E-mail: sales@tiepie.nl
www.tiepie.nl