A differential 4 channel, 50 MHz USB oscilloscope from TiePie engineering.

The **Handyscope HS4 DIFF** is a four channel differential USB oscilloscope with a maximum sampling speed of 50 MSa/s and 128 KSamples memory per channel. The differential input channels enable safely measuring, without risk of creating a short circuit through the oscilloscope. The **Handyscope HS4 DIFF** is delivered with a complete measurement software package that offers all you need for your measurement applications.

Key specifications

Oscilloscope / Spectrum analyzer / Voltmeter
12 bit resolution (14 and 16 bit enhanced resolution)
50 MSa/s sampling
500 kSa/s, 12 bit continuous streaming
50 MHz bandwidth
128 Kpoints memory per channel
0.3 % DC vertical accuracy
100 ppm timebase accuracy

Models

The Handyscope HS4 DIFF is available in 4 different models that distinguish in maximum sampling rate:

Model	Max. sampling speed	Max. streaming speed
HS4 DIFF-50	50 MSa/s	500 kSa/s
HS4 DIFF-25	25 MSa/s	250 kSa/s
HS4 DIFF-10	10 MSa/s	100 kSa/s
HS4 DIFF-5	5 MSa/s	50 kSa/s

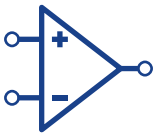
Package contents

The Handyscope HS4 DIFF models are delivered with:

Amount	Item
1	Carry case BT341
1	Handyscope HS4 DIFF
4	Measure lead TP-C812B
4	Differential attenuator TP-DA10
1	Instrument manual
1	Software manual

Safe measuring using differential inputs

The Handyscope HS4 DIFF is a four channel oscilloscope with **differential inputs**. With the differential inputs it is possible to measure four totally unrelated signals simultaneously. It is not possible to create a short circuit through the oscilloscope or through a second device connected to your computer and to the test subject, like e.g. a logic analyzer.



Differential inputs: no risk of damaging the test subject, the oscilloscope or the computer.

Read more at www.tiepie-automotive.com/articles/differential-inputs

Low noise differential measuring lead

The **Measure lead TP-C812B** is the only **low noise differential measure lead** in the market. It is designed to be used with the Handyscope HS4 DIFF. This 2 meter long measure lead splits in two individual ends of each 1.2 meter long. The BNC connector at one end plugs directly on the instrument. The two other ends each feature a single 4 mm banana plug, on which application specific test points, clamps or probes can be plugged. The Measure lead TP-C812B is very flexible, uses shrouded banana plugs and a heat and oil resistant silicone isolation.

The Measure lead TP-C812B is very insensitive to external interfering signals. The two ends can be placed up to two meters apart, while picking up very little interference. With a conventional oscilloscope with standard oscilloscope probes this is not possible. The maximum distance between the positive side and ground of a standard oscilloscope probe is usually limited to approximately 20 cm. The Measure lead TP-C812B for the Handyscope HS4 DIFF does not have this limitation and allows you to measure between points that are more than 2 meters apart, without picking up external interferences.

The unique Measure lead TP-C812B is your first requirement to measure between two distant points.

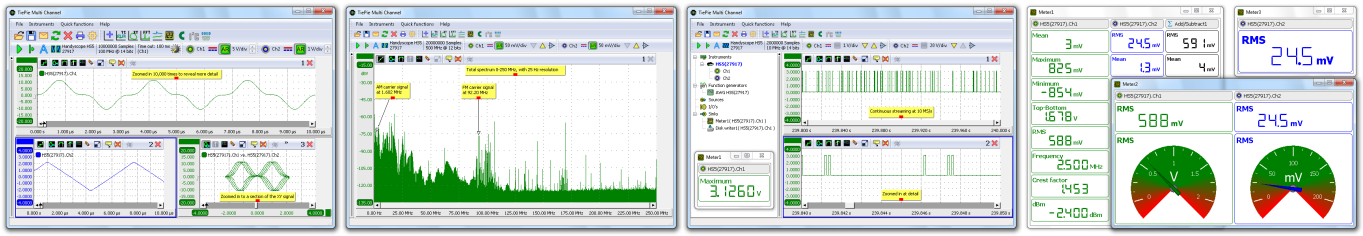
Differential attenuator

Increase the input range of your Handyscope HS4 DIFF. The Differential attenuator TP-DA10 is a differential 1:10 attenuator, specially designed to be used with the Handyscope HS4 DIFF. The Differential attenuator TP-DA10 is placed directly on the input of the instrument and the measuring lead on the other end of the attenuator.

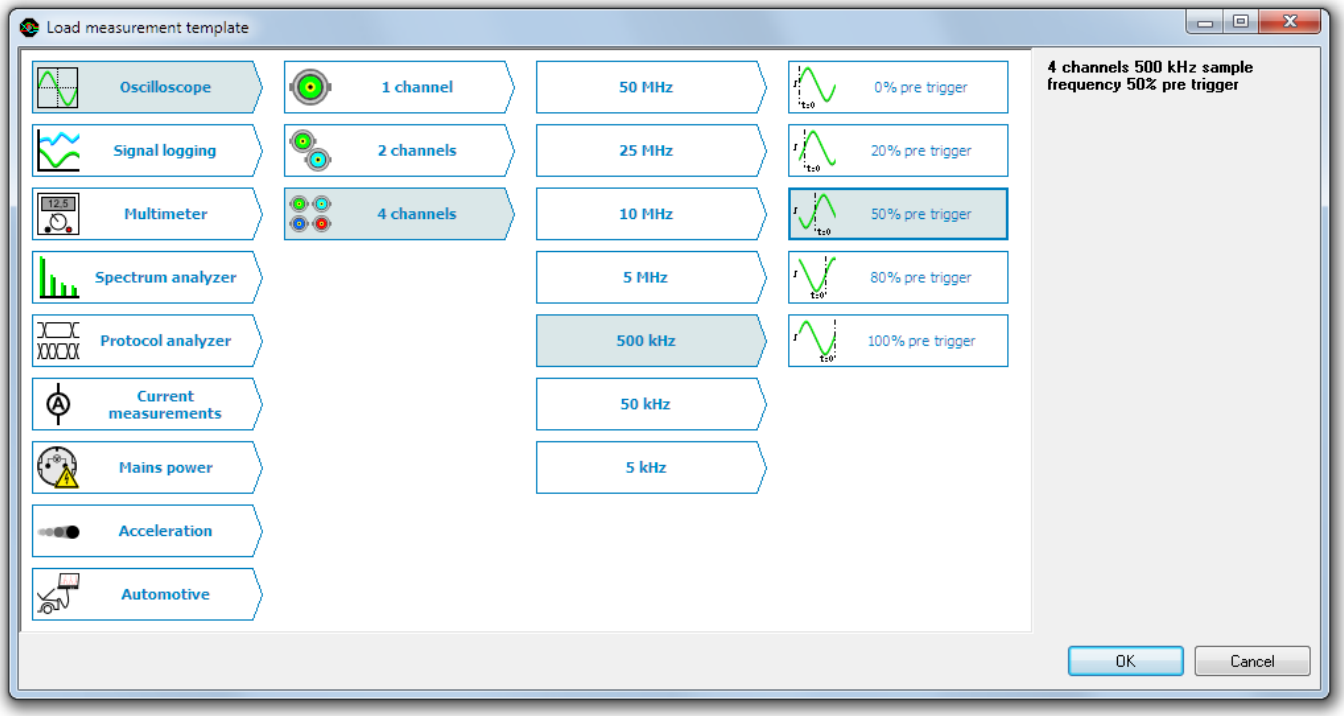
The Differential attenuator TP-DA10 is required when measuring high voltages, like e.g. mains voltage.

Multi Channel oscilloscope software

The Handyscope HS4 DIFF is standard delivered with the Multi Channel oscilloscope software, **the world's most versatile measuring software package.** Together with the Handyscope HS4 DIFF, it can be used as Oscilloscope, Spectrum analyzer, Data logger, Multimeter and Protocol analyzer.



When knowledge or experience are insufficient to setup a measurement instrument correctly and quickly, using **measurement templates** is a must. The TiePie engineering Multi Channel oscilloscope software provides a large amount of ready to use measurement templates. Most measurement templates are designed to allow performing an advanced measurement in just a few mouse clicks.



You select the measurement template from a tree structure and the instrument will be fully set up. A measurement template contains all settings for a specific measurement as well as additional information regarding the selected template, like e.g. how the instrument and/or accessories need to be connected. Templates can also contain reference signals that show what to expect. Just a few mouse clicks allow to perform a complex measurement. No need to worry or even know about the complex and difficult settings of the instrument itself, you can focus completely on the test subject you are working on.

Work efficiently and save your precious time using the unique measurement templates.

Read more about the Multi Channel oscilloscope software at www.tiepie.com/software

Specifications

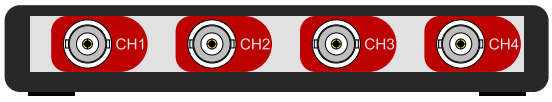
Acquisition system				
Number of input channels	4 analog, isolated BNC			
Type	Differential			
Resolution	User selectable via software			
Native	12 bit			
Enhanced	14, 16 bit			
DC Accuracy	0.3 % of full scale ± 1 LSB			
Bandwidth (-3dB)	50 MHz			
AC coupling cut off frequency (-3dB)	±1.5 Hz			
Noise				
200 mV range, 12 bit, 50 MSa/s	135 μV_{RMS}			
200 mV range, 16 bit, 195 kSa/s	50 μV_{RMS}			
Input ranges (full scale)	±200 mV ±400 mV ±800 mV	±2 V ±4 V ±8 V	±20 V ±40 V ±80 V	
Coupling	AC/DC			
Impedance	2 MΩ / 40 pF			
Maximum voltage	200 V (DC + AC peak < 10 kHz)			
Maximum voltage with 1:10 attenuator	300 V (DC + AC peak < 10 kHz)			
Maximum Common Mode voltage	200 mV to 800 mV ranges 2 V to 8 V ranges 20 V to 80 V ranges	2 V 20 V 200 V		
Common Mode Rejection Ratio	-48 dB			
Channel Isolation	500 V			
Channel Separation	-80 dB			
Maximum sampling rates	depending on model, on all channels simultaneously			
Model	HS4 DIFF-50	HS4 DIFF-25	HS4 DIFF-10	HS4 DIFF-5
12 bit	50 MSa/s	25 MSa/s	10 MSa/s	5 MSa/s
14 bit	3.125 MSa/s	3.125 MSa/s	3.125 MSa/s	3.125 MSa/s
16 bit	195.3 kSa/s	195.3 kSa/s	195.3 kSa/s	195.3 kSa/s
Maximum streaming rates	depending on model, on all channels simultaneously			
Model	HS4 DIFF-50	HS4 DIFF-25	HS4 DIFF-10	HS4 DIFF-5
12 bit	500 kSa/s	250 kSa/s	100 kSa/s	50 kSa/s
14 bit	480.8 kSa/s	250 kSa/s	99.2 kSa/s	50 kSa/s
16 bit	195.3 kSa/s	195.3 kSa/s	97.7 kSa/s	48.8 kSa/s
Sampling source				
Internal	Quartz			
Accuracy	±0.01 %			
Stability	±100 ppm over -40 °C to 85 °C			
Time base aging	±5 ppm per year			
External	LVTTL, on extension connector			
Input range	100 MHz ± 2 %			
Memory	128 Kpoints per channel			

Trigger	
System	Digital, 2 levels
Source	CH1, CH2, CH3, CH4, digital external, AND, OR
Trigger modes	Rising / falling edge, inside / outside window
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 128 Kpoints (full record length), 1 sample resolution
Digital external trigger	
Input	Extension connector
Range	0 to 3.3 V (TTL)
Coupling	DC

Interface	
Interface	USB 2.0 High Speed (480 Mbit/s) (USB 1.1 Full Speed (12 Mbit/s) and USB 3.0 compatible)

I/O connectors

Front



CH1 ... CH4	Isolated BNC

Rear

USB	Fixed cable with USB type A plug, 1.8 m
Extension connector	D-sub 25 pins female
Power	3.5 mm power socket

Power Requirements	
Power from USB port	500 mA max (2.5 W max)
Power via external power input	1500 mA max (7.5 W max)
Minimum voltage	4.5 VDC
Maximum voltage	14 VDC

Physical	
Instrument height	25 mm (1 inch)
Instrument length	170 mm (6.7 inch)
Instrument width	140 mm (5.2 inch)
Cord length	1.8 m (70 inch)
Weight	460 g (16 ounce)

System Requirements	
PC I/O connection	USB 2.0 High Speed (480 Mbit/s) (USB 1.1 Full Speed (12 Mbit/s) and USB 3.0 compatible)
Operating System	Windows 10 / 11

Environmental conditions	
Operating	
Ambient temperature	0 °C to 55 °C
Relative humidity	10 % to 90 % non condensing
Storage	
Ambient temperature	-20°C to 70 °C
Relative humidity	5 % to 95 % non condensing

Certifications and Compliances	
CE mark compliance	Yes
RoHS	Yes
EN 55011:2016/A1:2017	Yes
EN 55022:2011/C1:2011	Yes
IEC 61000-6-1:2019 EN	Yes
IEC 61000-6-3:2007/A1:2011/C11:2012	Yes

Differential attenuators TP-DA10

Attenuation settings	X10 differential
Bandwidth	25 MHz
Maximum input voltage	300 V (DC + peak AC)
Input impedance	10 MΩ / 15 pF
Input connector	female BNC
Output connector	male BNC
Dimensions	
Length	79 mm
Diameter	19 mm
Weight	30 g

Measure lead TP-C812B

Connectors	
Instrument side	isolated female BNC connector
Test point side	red and black 4 mm shrouded banana plugs
Bandwidth	4 MHz
Safety	CAT III, 1000 V, double isolated
Dimensions	
Total length	2000 mm
Length to split	800 mm
Length individual ends	1200 mm
Weight	100 g
Color	black
Certifications and compliances	
CE conformity	yes
RoHS	yes
Accessories	
Color coding rings	5 x 3 rings, various colors

Specifications (continued)

Package

Convenient carry case	Carry case BB451
Instrument	Handyscope HS4 DIFF
Measure leads	4 x Measure lead TP-C812B, BNC ->4 mm banana plug
Accessoires	4 x Differential attenuator TP-DA10 external power cable for second USB port
Drivers	For Windows 10 / 11 via website
Software	For Windows 10 / 11 via website
Software Development Kit	For Windows 10 / 11 and Linux, via website
Manual	instrument and software manuals
Total package weight	Approx. 3 kg

Warranty

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

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 two 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 HS4 DIFF Model	Order code
50 MSa/s, 2 year warranty	HS4-DIFF-50
25 MSa/s, 2 year warranty	HS4-DIFF-25
10 MSa/s, 2 year warranty	HS4-DIFF-10
5 MSa/s, 2 year warranty	HS4-DIFF-5

Available options for the Handyscope HS4 DIFF are:

- **W5**: With the extended warranty option, warranty is five years on parts and labor. Add **-W5** to the order code.

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