

## 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 50MS/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 MS/s sampling
500 kS/s, 12 bit continuous streaming
50 MHz bandwidth
128 KSamples 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 MS/s	500 kS/s
HS4 DIFF-25	25 MS/s	250 kS/s
HS4 DIFF-10	10 MS/s	100 kS/s
HS4 DIFF-5	5 MS/s	50 kS/s

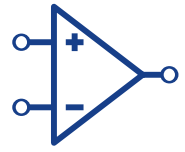
### Package contents

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	CDROM with Multi Channel software and drivers
1	Instrument manual
1	Software manual

## Safe measuring using differential inputs

The Handyscope HS4 DIFF is a four channel automotive 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/Miscellaneous/DifferentialInputs](http://www.tiepie-automotive.com/Articles/Miscellaneous/DifferentialInputs)

## 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 jack, on which application specific test points, clamps or probes can be plugged. The Measure lead TP-C812B is very flexible, uses shrouded banana jacks 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

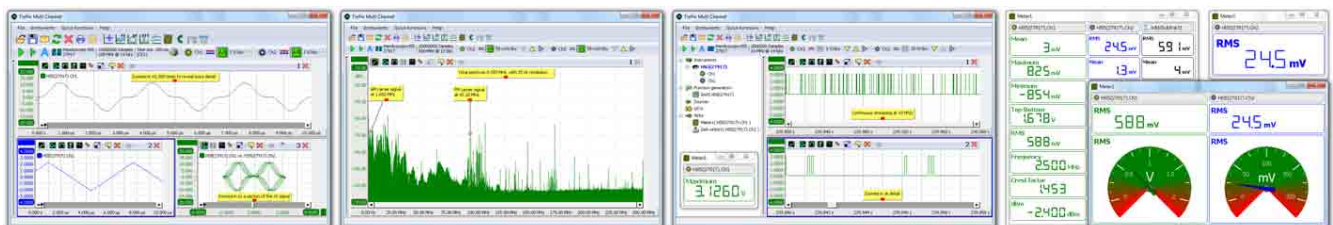
Increase the input range of your Handyscope HS4 DIFF. The **Differential attenuator TP-DA10** is a differential 1:10 attenuator, specially designed to be used with the Handyscope HS4 DIFF. The Differential attenuator TP-DA10 is placed directly on the input of the instrument and the measuring lead on 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](http://www.tiepie.com/software)

## Specifications

Acquisition system	
Number of input channels	4 analog, isolated BNC
Type	Differential
Resolution	12, 14, 16 bit user selectable
DC Accuracy	0.3 % of full scale $\pm$ 1 LSB
Ranges	$\pm$ 200 mV to $\pm$ 80 V full scale
Coupling	AC/DC
Impedance	2 M $\Omega$ / 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 2 V to 8 V ranges : 20 V 20 V to 80 V ranges : 200 V
Common Mode Rejection Ratio	-48 dB
Bandwidth (-3dB)	50 MHz
AC coupling cut off frequency (-3dB)	$\pm$ 1.5 Hz
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 MS/s 25 MS/s 10 MS/s 5 MS/s
14 bit	3.125 MS/s 3.125 MS/s 3.125 MS/s 3.125 MS/s
16 bit	195.3 kS/s 195.3 kS/s 195.3 kS/s 195.3 kS/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 kS/s 250 kS/s 100 kS/s 50 kS/s
14 bit	480.8 kS/s 250 kS/s 99.2 kS/s 50 kS/s
16 bit	195.3 kS/s 195.3 kS/s 97.7 kS/s 48.8 kS/s
Sampling source	
Internal	Quartz
Accuracy	$\pm$ 0.01 %
Stability	$\pm$ 100 ppm over -40 °C to 85 °C
Time base aging	$\pm$ 5 ppm per year
External	LVTTTL, on auxiliary connectors
Input range	100 MHz $\pm$ 2 %
Memory	128 KiSamples 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 KiSamples (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)
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)
I/O connectors	
Channel 1...4	Isolated BNC
USB	fixed cable with USB 2.0 and USB 1.1 type A connector
Extension connector	D-sub 25 pins female

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 98/ME/2000/XP/Vista/7/8/10

Operating Environment	
Ambient temperature	0 °C to 55 °C
Relative humidity	10 % to 90 % non condensing

Storage Environment	
Ambient temperature	-20 °C to 70 °C
Relative humidity	5 % to 95 % non condensing

Certifications and Compliances	
CE mark compliance	Yes
RoHS	Yes

Package	
---------	--



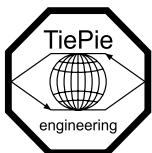
Convenient carry case	Carry case BB451
Instrument	Handyscope HS4 DIFF
Probes	4 x Measure lead TP-C812B, BNC -> 4 mm banana jack
Accessoires	4 x Differential attenuator TP-DA10 external power cable for second USB port
Software	Windows 98/2000/ME/XP/Vista/7/8/10 on CD
Drivers	Windows 98/2000/ME/XP/Vista/7/8/10 on CD
Manual	instrument manual and software user's manuals color printed on paper and digital on CD
Total package weight	Approx. 3 kg

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

Measure lead	
Connectors	
Instrument side	isolated female BNC connector
Test point side	red and black 4 mm shrouded banana jacks
Bandwidth	4 MHz
Safety	CAT III, 1000 V, double isolated
Dimensions	
Total length	3000 mm
Length to split	1800 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

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 one year. This warranty includes:	

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



This information is subject to change without notice. Copyright © 2016 TiePie engineering. All rights reserved. Revision 1.0, August, 2016.