

2CH wlan Digital Storage Oscilloscope

Protocol



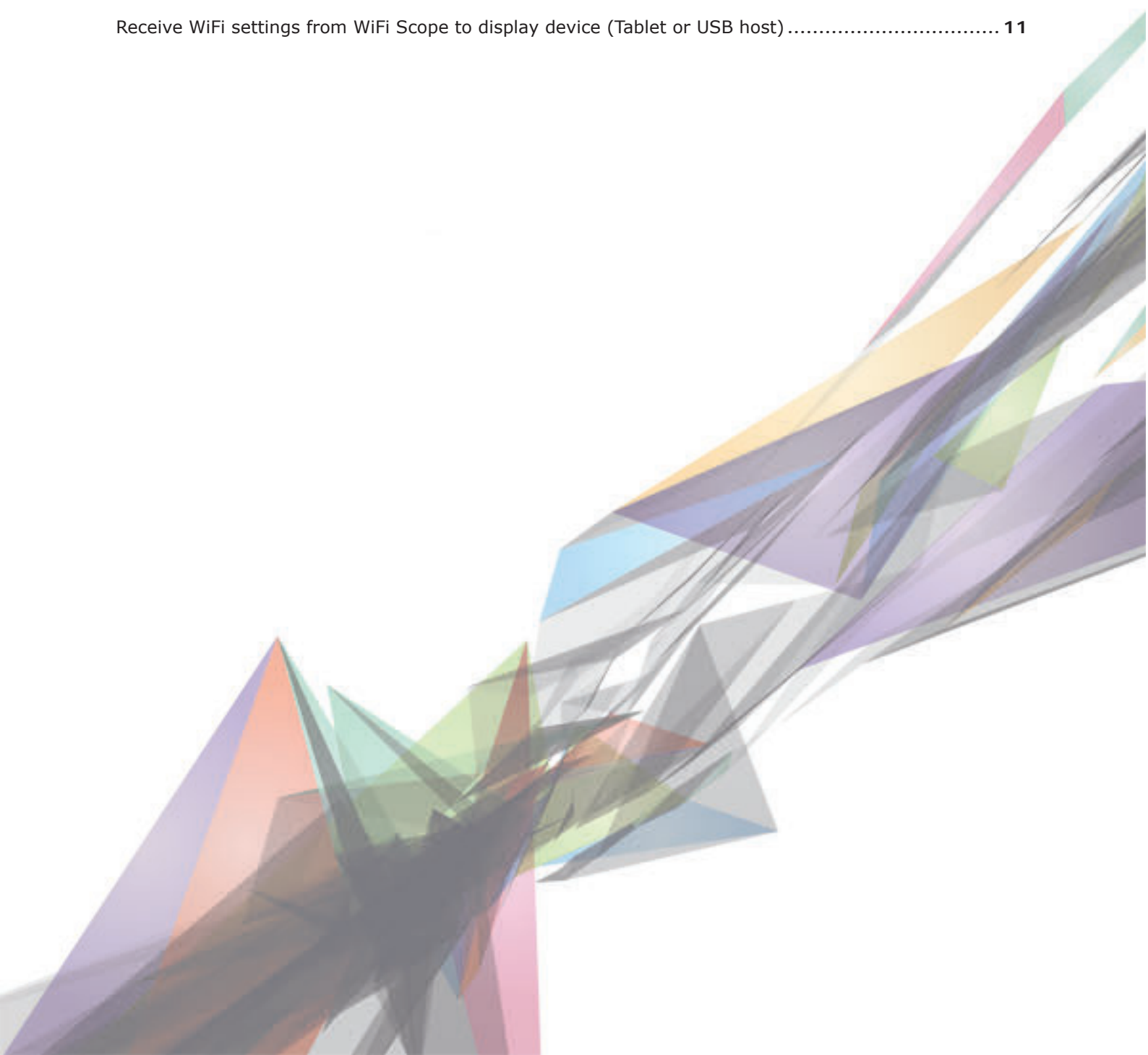


Velleman® nv has been an important wholesaler and developer of electronics for over 36 years. Our warehouses contain more than 18 000 different products of 50 brands. The distribution network includes more than 1700 distributors in well over 85 countries. Velleman® nv has built up an excellent service reputation towards retailers. To meet the ever increasing growth, Velleman® nv expanded with new offices and showrooms as well as a new warehouse of 35 000m³ equipped with the latest in order picking technology. This represents an investment of over € 5 500 000.



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Send 'wifi settings request' from display device (Tablet or USB host) to WiFi Scope

<STX>
<Wifi-settings-request-cmd> <Data_length_low_byte> <Data-length-high-byte>
<0> <0>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Data length: 8

Wifi settings request command: 0x0A

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Send 'wifi settings' from display device (Tablet or USB host) to WiFi Scope

<STX>
<Wifi-settings-cmd> <Data-length-low-byte> <Data-length-high-byte>
<0> <0>
<Wifi-channel-low-byte> < Wifi-channel-high-byte>
<SSID-char1> <SSID-char2> <SSID-char3> ... <SSID-char32>
<Password-char1> <Password-char2> <Password-char3> ... <Password-char32>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Data length: 74

Wifi settings command: 0x0B

Wifi channel: 1...13

SSID: Up to 32 characters (not used characters = 0)

Remark: At least one character must be used. Only the following characters are allowed: 0...9, a...z, A...Z, _ and -

Password: Up to 32 characters (not used characters = 0)

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Send 'start calibration' from display device (Tablet or USB host) to WiFi Scope

<STX>
<Start-calibration-cmd> <Data-length-low-byte> <Data-length-high-byte>
<0> <0>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Data length: 8

Start calibration command: 0xCA

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Send 'status request' from display device (Tablet or USB host) to WiFi Scope

<STX>
<Status-request-cmd> <Data-length-low-byte> <Data-length-high-byte>
<0> <0>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Data length: 8

Status request command: 0x10

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Send 'settings' from display device (Tablet or USB host) to WiFi Scope

<STX>
<Settings-cmd> <Data-length-low-byte> <Data-length-high-byte>
<0> <0>
<CH1-input-coupling> <CH1-V/div> <CH1-Yposition>
<CH2-input-coupling> <CH2-V/div> <CH2-Yposition>
<Timebase> <Trigger-level> <Trigger-setting> <reserved>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Data length: 18

Settings command: 0x11

CHx input coupling:

AC	0	DC	1	GND	2
----	---	----	---	-----	---

CHx V/div:

Off	0	0.2 V/div	7
20 V/div	1	0.1 V/div	8
10 V/div	2	50 mV/div	9
4 V/div	3	25 mV/div	10
2 V/div	4	10 mV/div	11
1 V/div	5	5 mV/div	12
0.5 V/div	6		

CHx Yposition: 3...252 (3 = top / 128 = center / 252 = bottom of screen)

Timebase:

1 μs/div	0	2 ms/div	10
2 μs/div	1	5 ms/div	11
5 μs/div	2	10 ms/div	12
10 μs/div	3	20 ms/div	13
20 μs/div	4	50 ms/div	14
50 μs/div	5	0.1 s/div	15
0.1 ms/div	6	0.2 s/div	16
0.2 ms/div	7	0.5 s/div	17
0.5 ms/div	8	1 s/div	18
1 ms/div	9		

Trigger level: 3...252 (3 = top / 128 = center / 252 = bottom of screen)

Trigger settings:

Bit 1 & 0	Trigger mode (00 = Normal / 01 = Auto / 10 = Once)
Bit 2	Trigger slope (0 = rising edge / 1 = falling edge)
Bit 3	Trigger channel (0 = ch1 / 1 = ch2)
Bit 4	Run/Hold (0 = run / 1 = Hold)
Bit 5	Reserved
Bit 6	Reserved
Bit 7	Autorange (0 = autorange off / 1 = autorange on)
Bit 8...15	Reserved

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Remark:

Setting the autorange:

- The Y-position and trigger level is forced to the center position.
- Triggermode is set to auto mode.
- The timebase and V/div will be automatically set to fit the waveform on screen.
- The V/div will be automatically set for the channels to fit the waveform on screen.

Into autorange:

Changing the Y-position, trigger level, trigger mode, V/div or Timebase must switch the autorange off

Send 'sample data request' from display device (Tablet or USB host) to WiFi Scope

<STX>

<Sample-data-request-cmd> <Data-length-low-byte> <Data-length-high-byte>

<0> <0>

<CHKSUM>

<ETX>

Start of transmission: STX = 0x02

Data length: 8

Sample data request command: 0x12

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Receive scope settings from WiFi Scope to display device (Tablet or USB host)

<STX>
<Status-cmd> <Data-length-low-byte> <Data-length-high-byte>
<0> <0>
<CH1-input-coupling> <CH1-V/div> <CH1-Yposition>
<CH2-input-coupling> <CH2-V/div> <CH2-Yposition>
<Timebase> <Trigger-level> <Trigger-settings> <Module-status>
<CHKSUM>
<ETX>

Start of transmission: STX = 0x02

Settings command: 0x20

Data length: 18

CHx V/div:

Off	0	0.2 V/div	7
20 V/div	1	0.1 V/div	8
10 V/div	2	50 mV/div	9
4 V/div	3	25 mV/div	10
2 V/div	4	10 mV/div	11
1 V/div	5	5 mV/div	12
0.5 V/div	6		

CHx Yposition: 3...252 (3 = top / 128 = center / 252 = bottom of screen)

Timebase:

1 µs/div	0	2 ms/div	10
2 µs/div	1	5 ms/div	11
5 µs/div	2	10 ms/div	12
10 µs/div	3	20 ms/div	13
20 µs/div	4	50 ms/div	14
50 µs/div	5	0.1 s/div	15
0.1 ms/div	6	0.2 s/div	16
0.2 ms/div	7	0.5 s/div	17
0.5 ms/div	8	1 s/div	18
1 ms/div	9		

Trigger level: 3...252 (3 = bottom / 128 = center / 252 = bottom of screen)

Trigger settings:

Bit 1 & 0	Trigger mode (00 = Normal / 01 = Auto / 10 = Once)
Bit 2	Trigger slope (0 = rising edge / 1 = falling edge)
Bit 3	Trigger channel (0 = ch1 / 1 = ch2)
Bit 4	Run/Hold (0 = run / 1 = Hold)
Bit 5	Reserved
Bit 6	Reserved
Bit 7	Autorange (0 = autorange off / 1 = autorange on)

Module status:

Bit 0 Charger Power-Good status

Bit 1 Charge Status 2

Bit 2 Charge Status 1

Status	Bit 2 (Stat 1)	Bit 1 (Stat 2)	Bit 0 (PG)
No USB power present	High	High	High
No battery present	High	High	Low
Low battery	Low	High	High
Temperature fault	Low	Low	Low
Charging complete	Low	High	Low
Charging	High	Low	Low

Bit 3 0

Bit 4 Calibrating (0 = off / 1 = busy)

Bit 5 Low battery (1 = low battery)

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Receive scope sample data from WiFi Scope to display device (Tablet or USB host)

<STX>

<Sample-data-cmd> <Data-length-low-byte> <Data-length-high-byte>

<Offset-low-byte> <Offset-high-byte>

<CH1-input-coupling> <CH1-V/div> <CH1-Yposition>

<CH2-input-coupling> <CH2-V/div> <CH2-Yposition>

<Timebase> <Trigger-level> <Trigger-settings> <Module-status>

<Sample-1-ch1> <Sample-1-ch2> <Sample-2-ch1> <Sample-2-ch2> ... <Sample-n-ch1> <Sample-n-ch2>

<CHKSUM>

<ETX>

Start of transmission: STX = 0x02

Settings command: 0x21

Data length: 18 + (2 x number of samples/channels)

Offset: X- position of sample buffer

CHx V/div:

Off	0	0.2 V/div	7
20 V/div	1	0.1 V/div	8
10 V/div	2	50 mV/div	9
4 V/div	3	25 mV/div	10
2 V/div	4	10 mV/div	11
1 V/div	5	5 mV/div	12
0.5 V/div	6		

CHx Yposition: 3...252 (3 = top / 128 = center / 252 = bottom of screen)

Timebase:

1 µs/div	0	2 ms/div	10
2 µs/div	1	5 ms/div	11
5 µs/div	2	10 ms/div	12
10 µs/div	3	20 ms/div	13
20 µs/div	4	50 ms/div	14
50 µs/div	5	0.1 s/div	15
0.1 ms/div	6	0.2 s/div	16
0.2 ms/div	7	0.5 s/div	17
0.5 ms/div	8	1 s/div	18
1 ms/div	9		

Trigger level: 3...252 (3 = top / 128 = center / 252 = bottom of screen)

Trigger settings:

- Bit 1 & 0 Trigger mode (00 = Normal / 01 = Auto / 10 = Once / 11 = Roll)
- Bit 2 Trigger slope (0 = rising edge / 1 = falling edge)
- Bit 3 Trigger channel (0 = ch1 / 1 = ch2)
- Bit 4 Run/Hold (0 = run / 1 = Hold)
- Bit 5 Reserved
- Bit 6 Reserved
- Bit 7 Autorange (0 = autorange off / 1 = autorange on)

Module status:

- Bit 0 Charger Power-Good status
- Bit 1 Charge Status 2
- Bit 2 Charge Status 1

Status	Bit 2 (Stat 1)	Bit 1 (Stat 2)	Bit 0 (PG)
No USB power present	High	High	High
No battery present	High	High	Low
Low battery	Low	High	High
Temperature fault	Low	Low	Low
Charging complete	Low	High	Low
Charging	High	Low	Low

- Bit 3 0
- Bit 4 Calibrating (0 = off / 1 = busy)
- Bit 5 Low battery (1 = low battery)

Sample buffer : Channel 1 & channel 2 samples (3 = top / 128 = center / 252 = bottom of screen)

For all timebase settings: 50 samples/div except for 1µs/div: 10 samples/div and for 2µs/div: 20 samples/div

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

Receive WiFi settings from WiFi Scope to display device (Tablet or USB host)

```
<STX>  
<Status-wifi-settings-cmd> <Data-length-low-byte> <Data-length-high-byte>  
<0> <0>  
<Wifi-channel-low-byte> <Wifi-channel-high-byte>  
<SSID-char1> <SSID-char2> <SSID-char3> ... <SSID-char32>  
<Password-char1> <Password-char2> <Password-char3> ... <Password-char32>  
<Build-digit1> <Build-digit2> <Build-digit3> <Build-digit4>  
<Wifi-Firmware-version-char1> <Wifi-Firmware-version-char2> ... <Wifi-Firmware-version-char16>  
<CHKSUM>  
<ETX>
```

Start of transmission: TX = 0x02

Data length: 94

Status Wifi settings command: 0x22

Wifi channel: 1...13

SSID: Up to 32 characters (not used characters = 0)

Password: Up to 32 characters (not used characters = 0)

Build: 4 characters for scope firmware build

Version: Up to 16 characters for wifi module scope firmware version

Checksum: CHKSUM = 8-bit two's complement of sum of all previous bytes

End of transmission: ETX = 0x0A

WiFi Scope 2 channels 10MS/s

WFS210

Features

- two independent channels
- high sensitivity: up to 0.2mV
- full auto setup function
- signal markers
- hold function
- probe x1/x10 function
- DVM readouts
- fully documented protocol
- Li-ion rechargeable battery included

Specifications

- input range: 5mV to 20V/div (12 steps)
- timebase: 1 μ s to 1s/div
- max. 30Vpp input
- bandwidth: 2 x 10MHz (-3dB at selected ranges)
- real time sample rate: 2 x 10MS/s
- input impedance: 1Mohm
- input coupling: AC,DC and GND
- AD resolution: 8 bit
- sample buffer: 4K/channel
- readouts: DC, AC+DC, True RMS, dBm, Vpp, Vmin, Vmax.
- power consumption (battery): 160mA (max.)
- battery: Li-ion 3.7V 1800mAh
- USB charge current: 5V/500mA max.
- weight: 180g (0,39lb)
- dimensions: 100 x 100 x 35mm / 3.9 x 3.9 x 1.4"



Minimum system requirements:

- iOS (*)
- Android™ 4.0 (*)
- Windows XP or higher (*)
- Tablet or PC

(*) iOS is a trademark of Apple Inc.

(*) Android is a trademark of Google Inc.

(*) Windows is a registered trademark of Microsoft Corporation in the United States and other countries.



The Velleman WFS210 is the world's first wlan dual channel digital storage oscilloscope geared towards tablet computers. The WFS210 is a compact, portable battery powered fully featured two channel oscilloscope. Instead of a built-in screen it uses your tablet (iOS, Android™ or PC(Windows)) to display the measurements. Data exchange between the tablet and the oscilloscope is via wlan.





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