

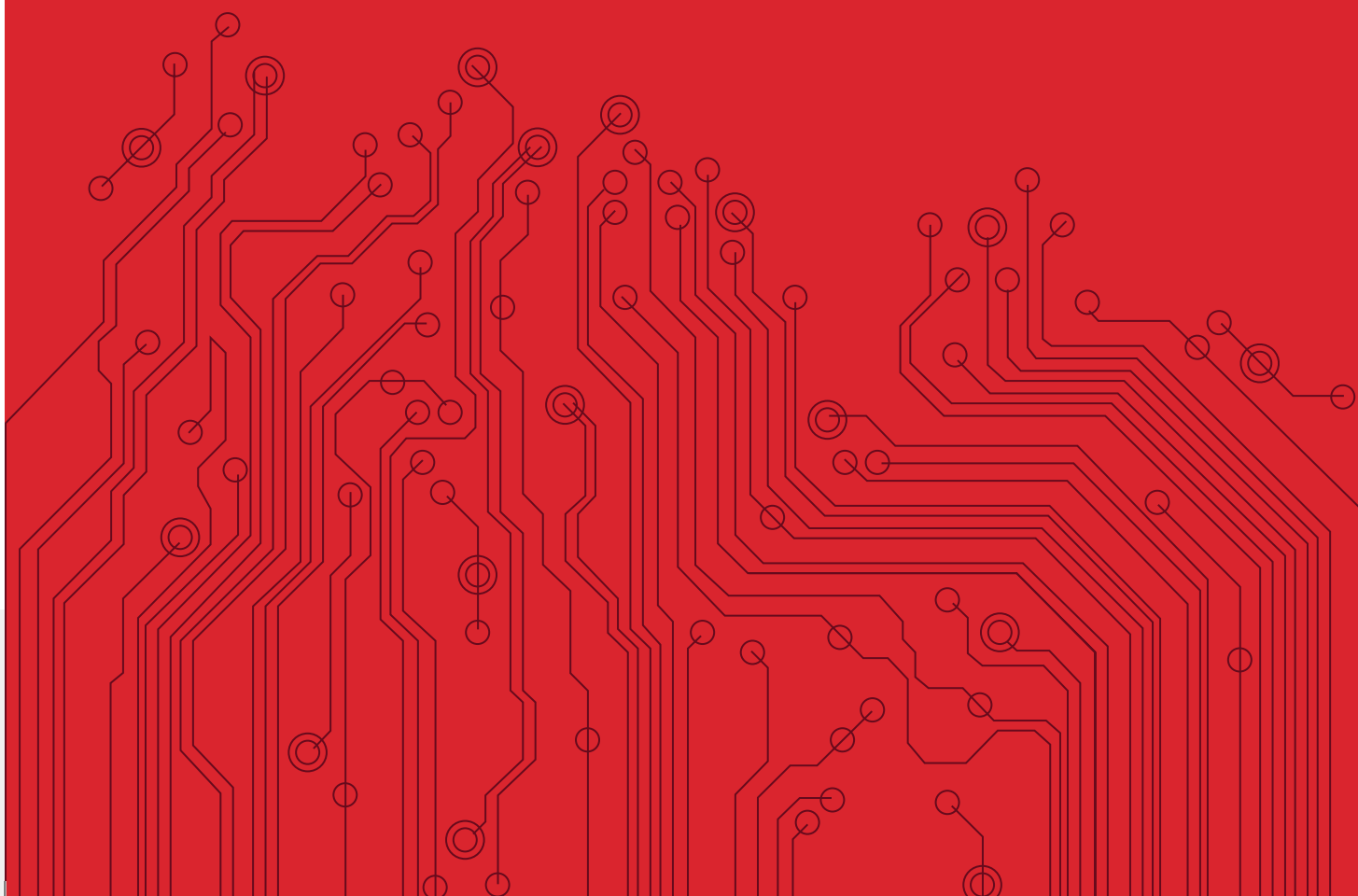
Red Pitaya STEMlab solutions are an indispensable part of equipment in Ham Radio Operators lab. With a single click STEMlab can be transformed into several **applications** like:

- **Software defined radio transceiver (SDR)**
- **CW & RTTY Skimmer Server**
- **Weak Signal Propagation Reporter (WSPR)**
- **Oscilloscope & Signal Generator**
- **Spectrum analyzer**
- **Logic analyzer**
- **Vector network analyzer / antenna analyzer**
- **Bode analyzer**
- **LCR meter**

STEMlab

Applications

[More details](#)



SDR transceiver

STEMlab coupled with SDR transceiver module and free of charge customized Power SDR STEMlab/HAMlab edition becomes a fully functional SDR transceiver with 160-10m band coverage and 10W of output power. It gives you an out of the box, affordable and high performance SDR transceiver solution. All you need is an antenna and you can start your Software Defined Radio experience!

- Receiver architecture: direct sampling / internal high performance 125Msps 14-bit A/D
- Receiver: 25KHz – 62,5MHz
- Transmitter: 160-10m 10W transmitter
- Rx pre-amp: 15/30dB
- Rx att: 12dB/24dB/36dB
- Antenna ports: 2
- Modulations: AM, FM, RTTY, CW, LSB, USB, DIGITAL (limited only by the application software)
- Software: Power SDR STEMlab/HAMlab edition



STEMlab SDR kit is available in four different options:

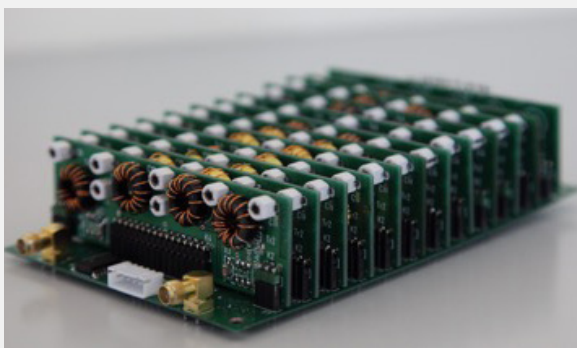
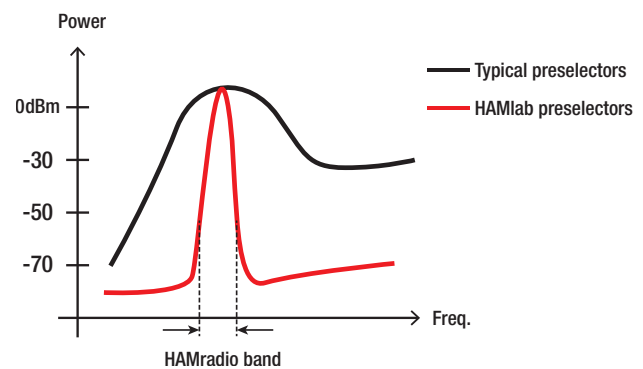
	STEMlab SDR transceiver module*	STEMlab SDR kit Basic	STEMlab SDR kit Pro	STEMlab SDR kit Ultimate
Receiver pre-amps and attenuators	✓	✓	✓	✓
160-10m 10W transmitter	✓	✓	✓	✓
STEMlab 125-14	✗	✓	✓	✓
Logic Analyzer PRO	✗	✗	✓	✓
Aluminium case	✗	✗	✓	✓
LCR meter extension	✗	✗	✗	✓
Price (in EUR without VAT)	299 EUR	549 EUR	599 EUR	859 EUR

* for those that already have Red Pitaya STEM 125-14.

SDR receiver pre-selectors

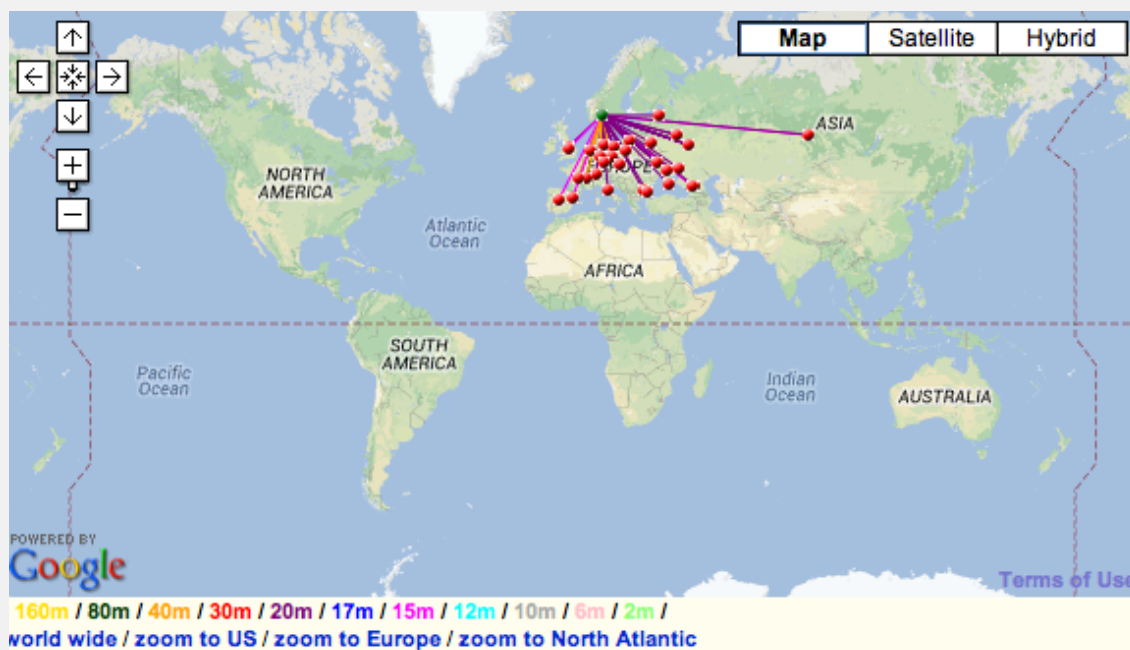
Optional

To even improve your receiver performance pre-selectors are available and can be optionally added on top of the STEMlab SDR kit!



- Simultaneous decoding of all CW or RTTY signals on up to 6 bands,
- Tunable frequency range from 0 Hz to 61.44 MHz
- Up to 192 kHz coverage on each band
- Replacement for QS1R

- To run this application
you need:
**STEMlab 125-14
Starter Kit**



Weak Signal Propagation Reporter (WSPR)

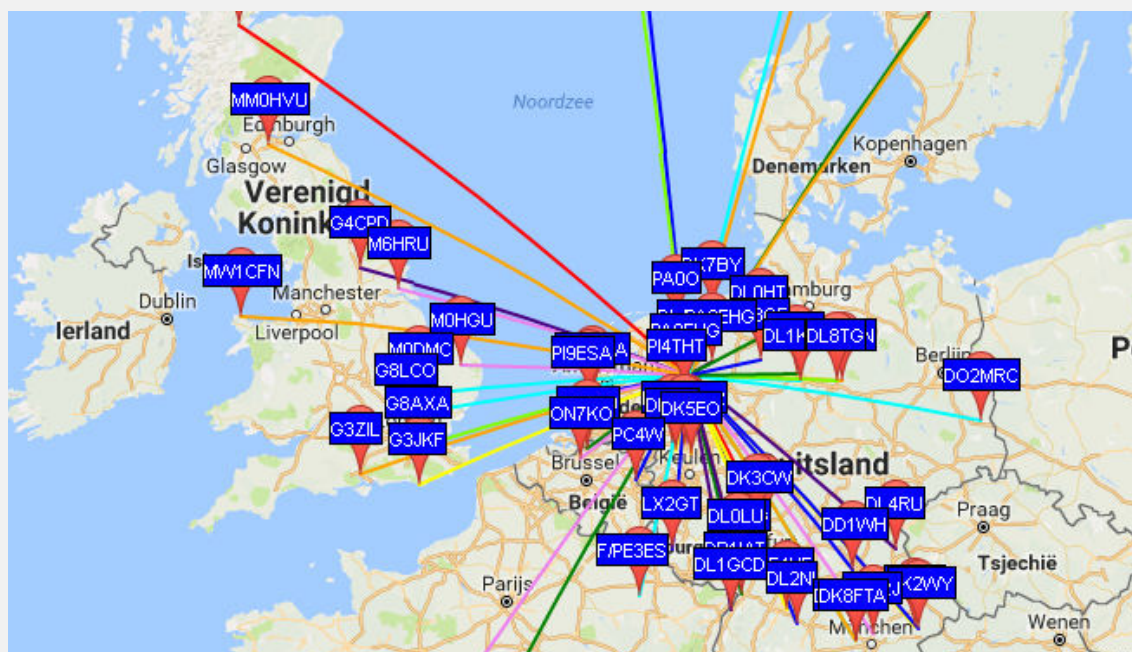
WSPR was designed for probing potential propagation paths with low-power transmissions. Stations with internet access can automatically upload their reception reports to a central database called WSPRnet, which includes a mapping facility.



- Simultaneously record WSPR signals from eight bands
- Transmitter can be enabled through configuration file
- Uploads decoded data to wsprrnet.org



To run this application
you need:
**STEMlab 125-14
Starter Kit**



Other Applications

Test & Measurement applications running on a credit card sized SoC (FPGA+CPU) based Open SW source **DAQ platform**

Oscilloscope & Signal Generator

- 2 channel Oscilloscope
- 50MHz of Bandwidth
- 14 bits of resolution
- 16k samples memory depth
- +-1V to +-20V input range
- DC Input coupling
- External trigger



To run this application you need:
STEMlab 125-14 Starter Kit

Spectrum Analyzer

- 2 channel
- 62,5MHz of Bandwidth
- 14 bits of resolution
- 16k DFT buffer
- Dynamic range -70/80 dBm
- Inputs noise level
- <-100/-119 dBm
- DC Input coupling



To run this application you need:
STEMlab 125-14 Starter Kit



Logic Analyzer PRO

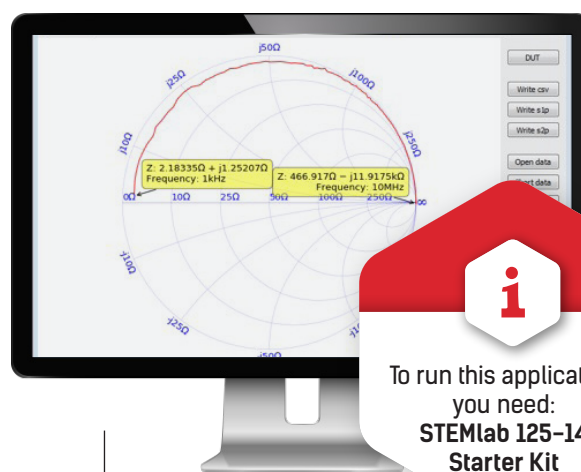
- Channels: 8
- Sampling rate (Max): 125Msps
- Max. Input freq: 50MHz
- Supporte bus protocols: I2C, UART, SPI
- Input voltage: 2.5V – 5.5V
- Overload protection: integrated
- Trigger types: Level, Edge, Pattern
- Level tresholds: 0.8V (low), 2.0V (high)
- Input impedance: 100k, 3pF



To run this application you need:
STEMlab 125-14 Starter Kit + Logic Analyzer PRO extension module

Vector network analyzer / antenna analyzer

- Frequency range: DC - 60MHz
- Ready to measure
- Antenna SWR, impedance, reflection measurements
- Characteristics of capacitors, coils, crystals



To run this application you need:
STEMlab 125-14 Starter Kit



Bode Analyzer

- Frequency span: 1Hz-50MHz
- Frequency resolution: 1Hz
- Excitation signal amplitude: 0-1V
- Excitation signal DC bias: 0-0.5V
- Resolution: 10/14 bit
- Max. Nr. Of steps/measurement: 1000
- Max. In. Amplitude: +-1V/+-20V



To run this application
you need:
**STEMlab 125-14
Starter Kit**

LCR meter

- Primary parameters: Z, L, C, R
- Secondary parameters: P, D, Q, E
- Selectable freq: 100Hz, 1kHz, 10kHz, 100kHz
- Impedance range: 10hm - 10MOhm
- DC Bias: 0.5 V
- Basic accuracy: 1%
- Input protection: Yes



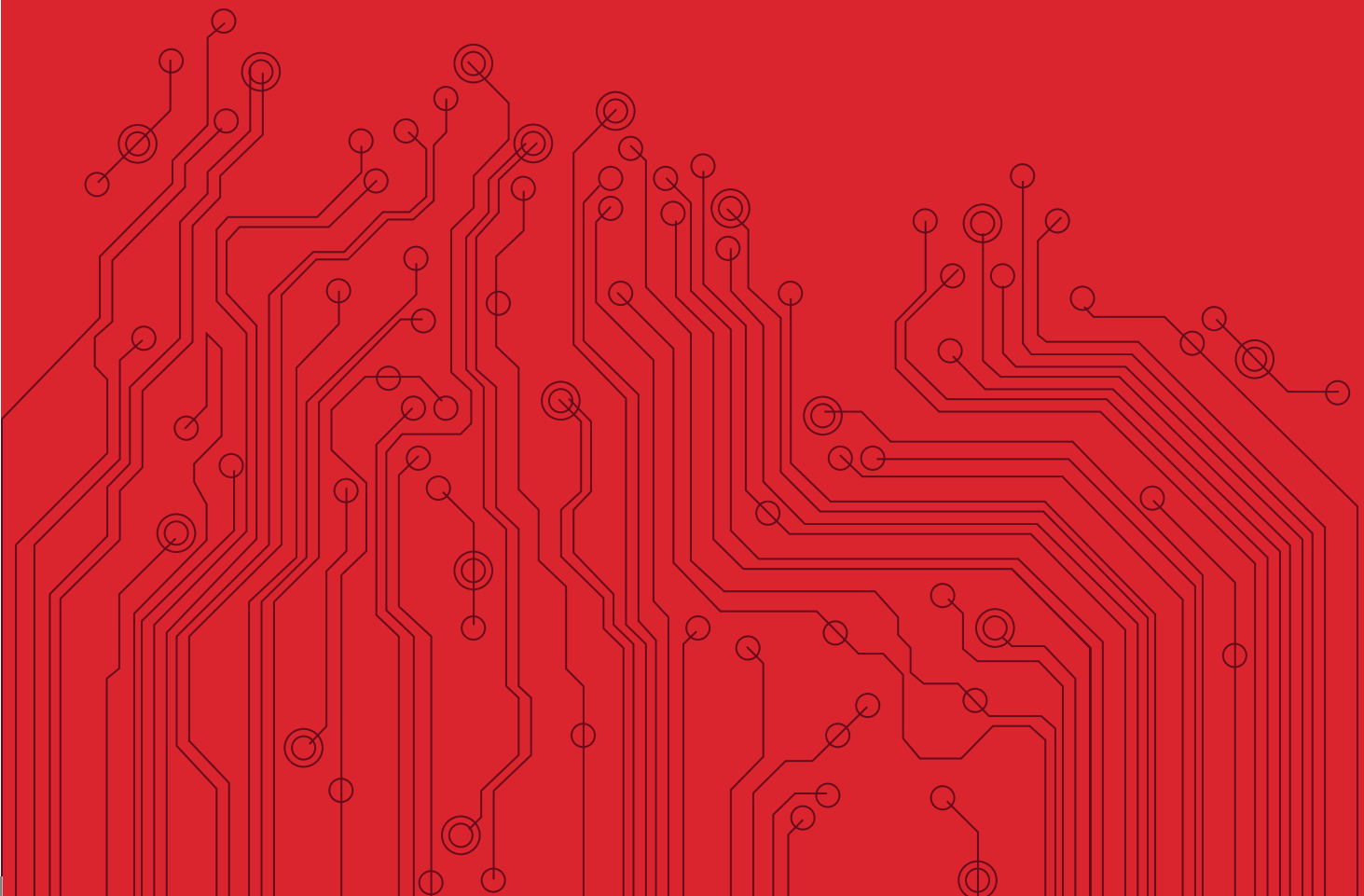
To run this application
you need:
**STEMlab 125-14
Starter Kit +
LCR meter
extension module**



STEMlab

Specifications

More information
about hardware itself

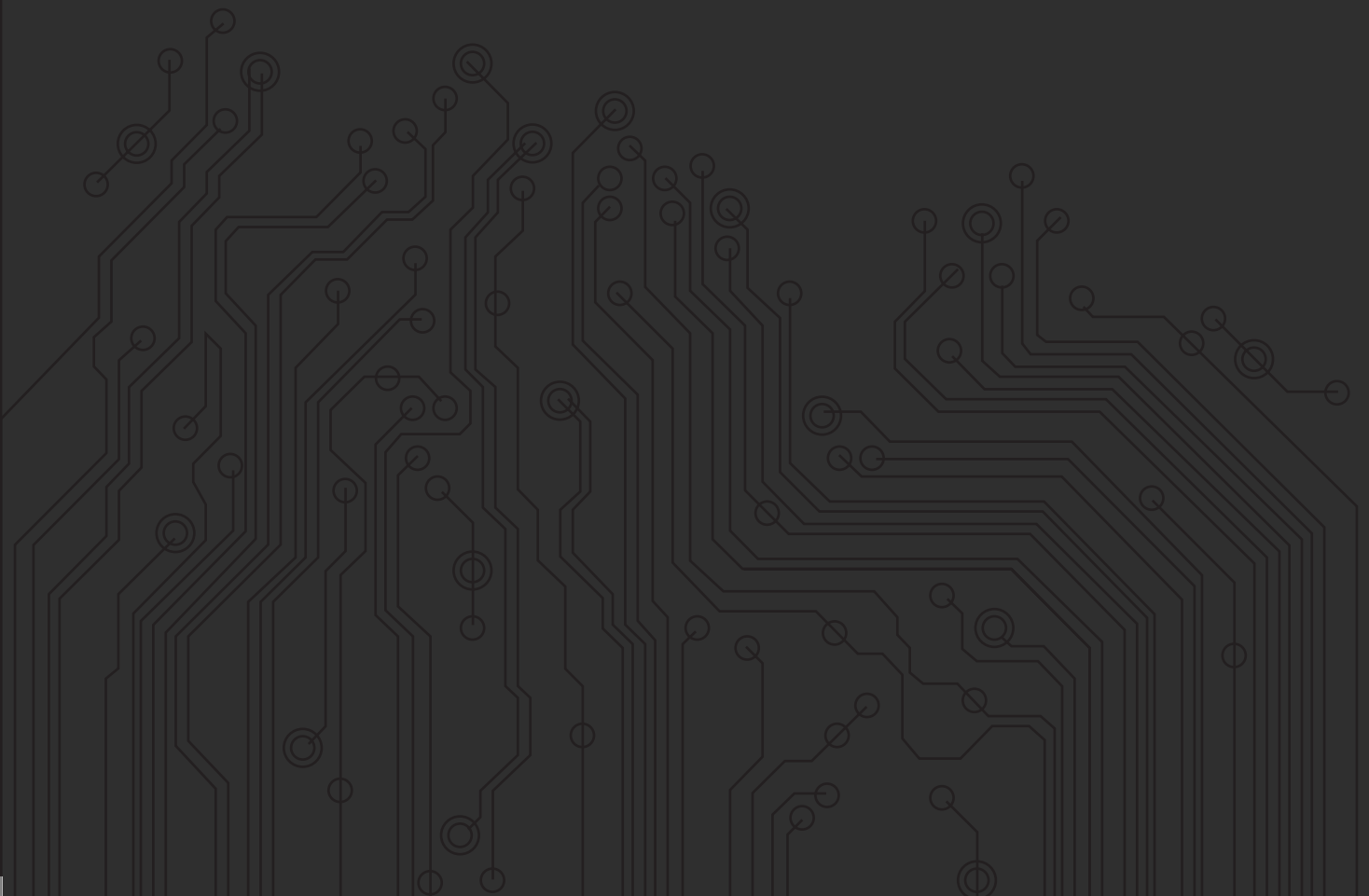


Specifications

	STEMlab 125-14
Basic	
Processor	Dual Core ArmCortex A9
FPGA	Xilinx Zynq 7010
RAM	512 MB (4Gb)
Connectivity	
Ethernet	1Gbit
USB	USB 2.0
WIFI	With Wi-Fi dongle
Synchronisation	With dasy chain connectors
RF Inputs	
Channels	2
Sample rate	125 MS/s
ADC resolution	14 bit
Ful scale voltage range	1M0hm/10pF
Absolute Max. Input volt range	30 V
Input ESD protection	Yes
Overload protection	Protection diodes
RF Outputs	
Channels	2
Sample rate	125 MS/s
DAC resolution	14 bit
Voltage range	+ - 1V
Load Impedance	50 Ohm
Output slew rate	200V/us
Short circuit protection	Yes
Extension connector	
Digital Ios	16
Analog Inputs	4
Analog inputs voltage range	0-3,5 V
Sample rate	100 kS/s
Resolution	12 bit
Analog Outputs	4
Analog Outputs voltage range	0-1,8V
Communication interfaces	I2C, UART, SPI
Available voltages	+5V, +3,3V, -4V

STEMlab

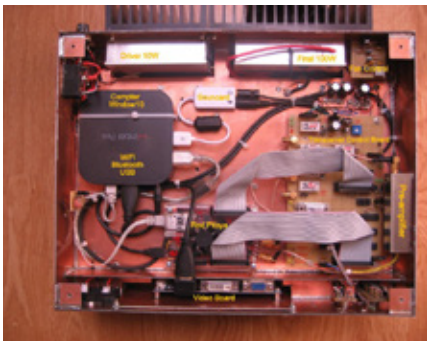
Community projects



Community projects:



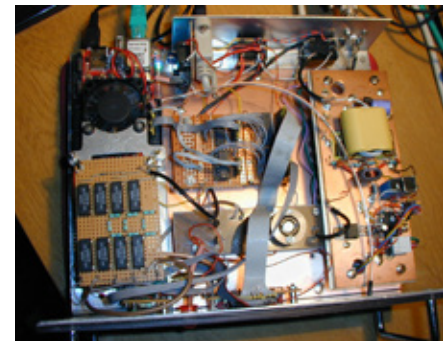
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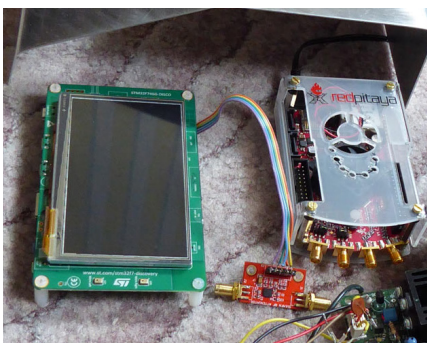
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<http://saure.org/cq-nrw/>



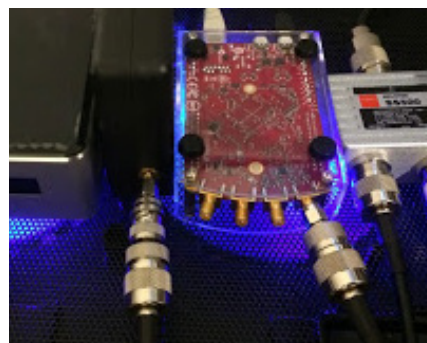
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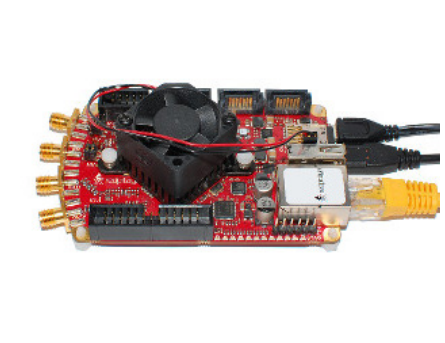
User: DH1AKF
<http://www.wkief.de>



User: Do4dxa
<https://3.bp.blogspot.com>

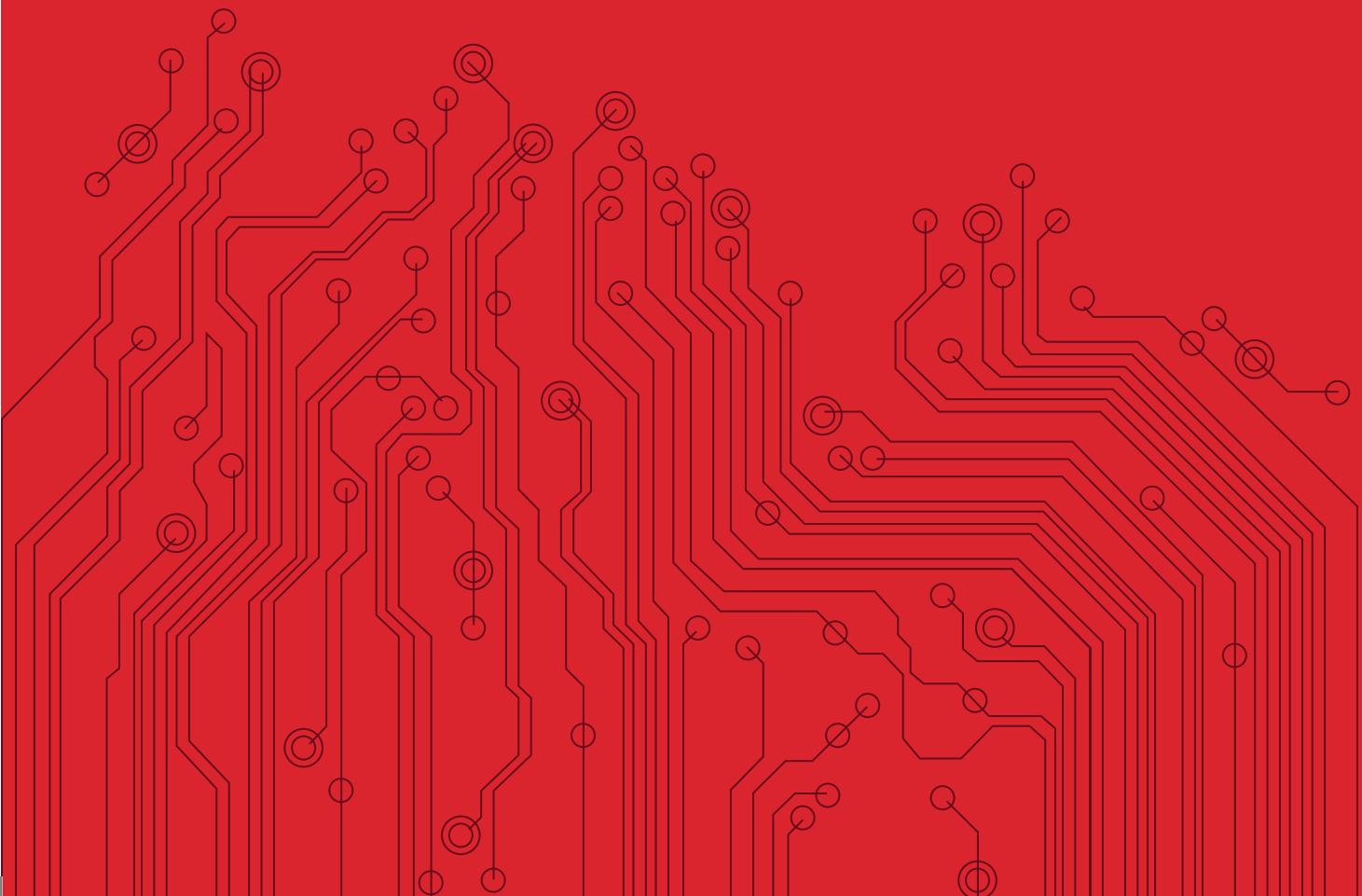


User: Pavel Demin
<http://pavel-demin.github.io/>



STEMlab

Recommended HW options for applications



Recommended HW options for applications :

	STEMlab 125-14 Starter kit	STEMlab 125-14 Diagnostic kit	STEMlab SDR transceiver module*	STEMlab SDR kit Basic	STEMlab SDR kit Pro	STEMlab SDR kit Ultimate
■ Applications						
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Weak Signal Propagation Reporter (WSPR)	✓	✓	✗	✓	✓	✓
Oscilloscope	✓	✓	✗	✓	✓	✓
Spectrum analyzer	✓	✓	✗	✓	✓	✓
Bode analyzer	✓	✓	✗	✓	✓	✓
Logic Analyzer	✗	✗	✗	✗	✓	✓
Vector network analyzer / antenna analyzer	✗	✗	✗	✗	✗	✓
LCR meter	✗	✗	✗	✗	✗	✓
■ Accessories						
Diagnostic	✗	✓	✗	✓	✓	✓
■ Cases						
Aluminium	✗	✓	✗	✓	✓	✓
■ Red Pitaya hardware						
STEMlab 125-14	✓	✓	✗	✓	✓	✓

* you need a STEMlab 125-14 Starter Kit module to operate it!!!

