Inexpensive, complete 12 bit USB mini DAQ lab — RedLab 1008, RedPack
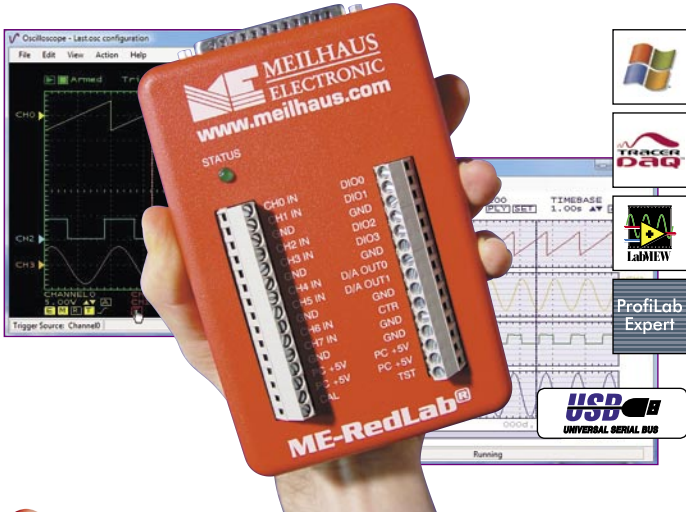

The RedLab 1008 is an inexpensive, complete USB mini DAQ lab in pocket size. It is the ideal alternative solution for simple DAQ and control applications with USB for a small budget. And it is a good solution vor education or experiment.

- 8 single-ended or 4 **differential** analog inputs.
- **12 bit A/D conversion** up to 1.2 kS/s, 8 kS/s up to 4000 values.
- Input range differential: ±20 V, ±10 V, ±5 V, ±4 V, ±2.5 V, ±2.0 V, ±1.25 V, ±1.0 V, programmable.
- **2 analog outputs**, 10 bit.
- 32 bit **event counter**.
- **24 digital I/O channels**, wired to a 37-pin D-sub connector. Expandable with **relays or opto-isolation** using the ME-UB series.
- 4 additional discrete **digital I/O channels** with screw terminals.
- USB 1.1 compatible.
- Size (mm): 157 (L) x 102 (W) x 40 (H).

- - - Ordering codes — RedLab 1008 - - -

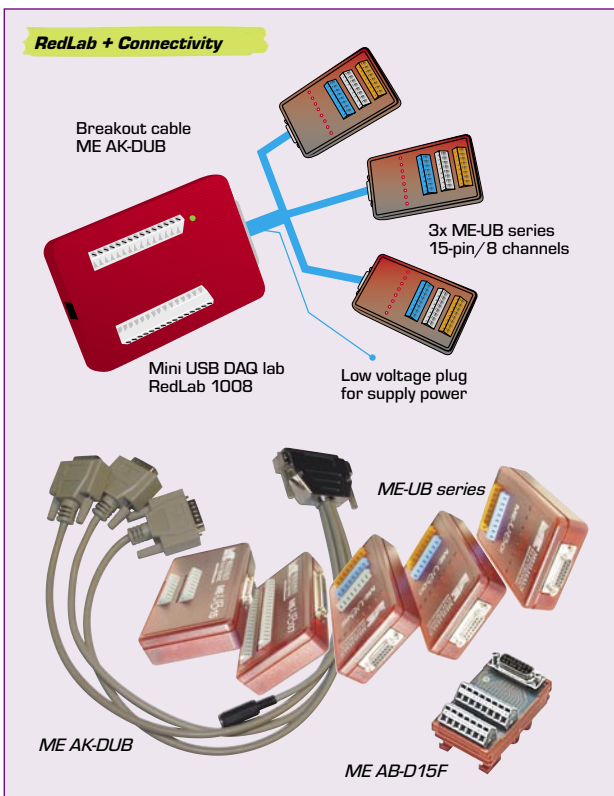| Model	Description	Scope of delivery:
RedLab 1008	Complete USB mini DAQ lab.	RedLab 1008, USB cable, screw driver, software and instructions for use on CD. RedPack 1008: ProfiLab-Expert[1]
RedPack 1008	RedLab 1008 bundled with software ProfiLab-Expert [1].	

- - - Accessory - - -

Model	Description
ME AK-D37/2	2 m **cable**. 37-pin D-sub female-male, 1:1 contacted. Connects RedLab 1008 to ME AB-D37F or ME-UB37.
ME AB-D37F	**Terminal block**. 37-pin D-sub female connector to spring terminals.
ME-UB37	**Terminal box**. 37-pin D-sub female connector to spring terminals. Can be plugged directly to the RedLab.
ME AK-DUB	**Cable**, connects 3 ME-UB boxes to aRedLab 1008: 37-pin D-sub female connector to 3x 15-pin D-sub malle connectors + mini phone jack for external power supply for the ME-UB boxes.
ME-UB series	**External expansion boxen**, with relays or opto-isolation. For the digital ports. Use in any combination: ME-UB15, ME-UBRE, ME-UBOI, ME-UBOO. The ME-UB15 can also be replaced by a terminal block ME AB-D15F.
MW17-GS/6	12 V/500 mA **power supply**/mains adaptor for ME-UBRE, ME-UBOO, ME-UBOI.
ME AB-D15F	**Terminal block**. 15-pin D-sub female connector to spring terminals. Can be used instead of ME-UB15, for digital ports.
ProfiLab-Expert	**Graphic software**. Available as an optional accessory or included in the bundle RedPack[1].

- - - Software included in package: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro.

1) ProfiLab-Expert may not support the full sample rate.

RedLab + Connectivity

Breakout cable ME AK-DUB

3x ME-UB series 15-pin/8 channels

Mini USB DAQ lab RedLab 1008

Low voltage plug for supply power

ME-UB series

ME AK-DUB

ME AB-D15F

- - - Specifications - - -

Analog inputs

Channels	8, individually configurable as 8 single-ended or 4 differential channels. Connectors: Screw terminals
Ranges	±20/±10/±5/±4/±2.5/±2.0/±1.25/±1.0 V
Rate	Max. 8 kS/s
Resolution	12 bit differential, 11 bit single-ended
Trigger	Source programmable external DIO0...DIO3

Analog outputs

Channels	2 voltage outputs: Screw terminals
Ranges	0...5 V
Rate	Software controlled 100 S/s (single channel),50 S/s (dual channel)
Resolution	10 bit

Digital I/O

Discrete I/Os	4, independently programmable as inputs or outputs (screw terminals), 5 V/TTL. Input, high: 3.0 V min., 15.0 V absolute max.; input, low: 0.8 V max.; output, no load: V_s - 0.4 V min., V_s typ; output, 1 mA load: V_s - 1.5 V. Protected with 1.5 kΩ serial resistor.
Port I/Os	24 I/O channels arranged in 4x 8 bit ports, each port programmable as inputs or outputs (type 82C55). All pins standard with pull-up to V_s via 47 kΩ. Input, high: 2.0 V min., 5.5 V absolute max.; input low: 0.8 V max., -0.5 V absolute min.; output high: (I_{OH}=-2.5 mA) 3.0 V min.

Counter

Channels	1 channel, event counter. Connector: Screw terminals
Resolution	32 bit
Frequency	Input frequency max. 1 MHz
Pulse width	High/low 500 ns min.
Voltage	Input low: 0 V min., 1.0 V max.; input high: 4.0 V min., 15.0 V max.

General

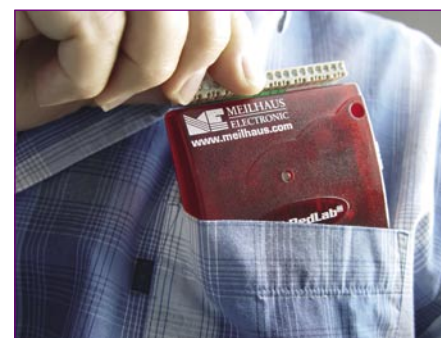|	
Size (mm)	~157 (L) x 102 (W) x 40 (H)
Power supply	Via USB
Interface	USB 1.1 low-speed; max. 3 m USB cable
Connector	Screw terminals, 37-pin D-sub male. USB: Type B
Environmental	Storage and operating temperature -40...85°C, 0...90% rel. humidity, non-condensing

Complete all-round pocket size DAQ labs — **RedLab 1208, 1408, 1608, RedPack**

The USB DAQ modules RedLab 1208, 1408 and 1608 fit into a vest pocket. At the same time they contain a complete mini DAQ lab each, either with 12, 14 or 16 bit A/D resolution and additional digital I/Os, which can be used for control or switching applications. Use the RedLabs in mobile applications or when there is shortage of space.

- RedLab 1208 and 1408: **12 bit or 14 bit** multi I/O **mini DAQ lab for USB:**
  - **8 single-ended or 4 differential** A/D channels.
  - 12 bit or 14 bit A/D conversion. Ranges up to **±20 V**.
  - 2 **D/A channels**, 10 bit (1208)/ 12 bit (1408) conversion.
  - **16 TTL/CMOS digital I/O channels.**
  - **32 bit event counters.**
- RedLab 1608: **16 bit** multi I/O **mini DAQ lab for USB:**
  - **8 simultaneous single-ended** A/D channels.
  - **16 bit A/D converter per chanel.** Input ranges up to ±10 V.
  - **8 discrete digital I/O channels.**
  - **32 bit event counter.**
- Screw terminals.
- Size (mm) only ~83 x 80 x 25.4.

- - - Software included in package: - - -
TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro.

1) ProfiLab-Expert may not support the full sample rate.

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1].

- - - Ordering codes and functions — RedLab 1x08 - - -

Model	Description	Analog inputs	Analog outputs	Digital I/O
RedLab 1208LS	12 bit mini DAQ lab, low-speed	8 single-ended (11 bit)/4 differential (12 bit), max. 8 kS/s (LS) or 50 kS/s (FS)	2. 10 bit	16 digital I/Os (TTL, 2x 8 bit ports)
RedLab 1208FS	12 bit mini DAQ lab, full-speed			
RedLab 1408FS	14 bit mini DAQ lab, full-speed	8 single-ended (13 bit)/4 diff. (14 bit), max. 48 kS/s	2. 12 bit	
RedLab 1608FS	16 bit mini DAQ lab, full-speed	8 single-ended, simultaneous 16 bit, max. 50 kS/s	-	8 discrete digital I/Os (CMOS)
Bundles with ProfiLab-Expert[1]:				
	RedPack 1208LS	RedPack 1208FS	RedPack 1408FS	RedPack 1608FS

Scope of delivery: RedLab 1x08, USB cable, screw driver, software and instructions for use on CD. RedPack 1x08: ProfiLab-Expert[1]

- - - Specifications - - -

Analog inputs	**RedLab 1208**	**RedLab 1408**	**RedLab 1608**
Number, Type	8 single-ended or 4 differential	8 single-ended or 4 differential	8 single-ended, simultaneous
A/D conversion	12 bit differential, 11 bit single-ended. LS: 50 S/s software controlled, 1.2 S/s continuous sampling, 8 kS/s burst scan in 4 k FIFO FS: 300 S/s software controlled, 50 kS/s continuous sampling	14 bit differential, 13 bit single-ended. 250 S/s software controlled (typ., depending on PC), 48 kS/s continuous sampling	16 bit, individual converter per channel. 0,6 S/s...50 kS/s (software controlled), 20 S/s...50 kS/s (burst scan in 32 k FIFO). 500 S/s (all channels, software controlled); max. 100 kS/s (in PC memory, depending on number of channels and depending on PC); max. 200 kS/s (burst scan in 32 k FIFO)
Input ranges	±20 V, ±10 V, ±5 V, ±4 V, ±2.5 V, ±2.0 V, ±1.25 V, ±1.0 V		±10 V, ±5 V, ±2.0 V, ±1.0 V
External trigger	1 TTL input	1 CMOS input	1 CMOS input
Analog outputs	**RedLab 1208**	**RedLab 1408**	**RedLab 1608**
Number	2	2	-
D/A conversion	10 bit. LS: 100 S/s (1 channel), 50 S/s (2 channels). FS: Software controlled 1000 S/s (1 channel), 500 S/s (2 channels); continuous 2 channels with simultaneous update 12.5 kS/s	12 bit. 250 kS/s (software controlled, 1 channel, typ., depending on PC), 10 kS/s (1 channel continuous), 5 kS/s (2 channels continuous, simultaneous update)	-
Output ranges	0...5 V	0...5 V	-
Digital I/O	**RedLab 1208**	**RedLab 1408**	**RedLab 1608**
Number, type	16 TTL/CMOS channels, arranged in 2x 8 bit ports, each port programmable as input or output		8 discrete CMOS channels, independent configuration as inputs or outputs
Counter	**RedLab 1208**	**RedLab 1408**	**RedLab 1608**
Number, type	32 bit event counter, TTL level		
Input frequency	max. 1 MHz		
General	**RedLab 1208**	**RedLab 1408**	**RedLab 1608**
Size (mm)	~ 83 x 80 x 25,4		
Power supply	From PC via USB		
Interface	USB 1.1 low-speed	USB 2.0 full-speed	USB 2.0 full-speed
	USB 1.1 and 2.0 compatible with Windows XP, 2000, 98SE/Me		
Connector	I/O: 2x 10 screw terminals, USB: Type B. cable to type A included in package (max. 3 m cable possible)		
Environmental	Operating temperature 0...70°C, storage temperature -40...85°C; 0...90% rel. humidity, non-condensing		

Measure and log temperatures with USB   RedLab TC and TEMP, RedPack

With RedLab TC and TEMP you can connect your temperature sensors to a PC via USB or Wireless USB. While the low-cost model TC supports thermocouples only, the TEMP variant can also be used with RTDs, thermistors or semiconductor sensors. The sensor type is selected via software. The models CF have an additional stand-alone data logger functionality with CompactFlash memory.

- 4 (AI) or 8 independent, differential input channels for **temperature measurement.**
- **RedLab TC supports:** Thermocouples type J, K, T, E, R, S, B, N. Linearization of measurement values, CJC as well as conversion to °C or °F directly in the module.
- **RedLab TEMP supports 4 sensor types:** Thermocouples (type J, K, T, E, R, S, B, N), RTDs (2-, 3-, 4-wire, eg. four 3-wire RTDs), thermistors, semiconductor temperature sensors. The 8 channels can also be operated with a mix of different sensor types without additional signal conditioning.
- **Models AI:** 4 universal single-ended/differential **analog inputs** with ranges ±10 V, ±5 V, ±2.5 V and ±1.25 V.
- **Precise 24 bit A/D converter.**
- Integrated sensor for environmental temperature (CJC/cold junction compensation).
- **8 additional digital I/O lines**.
- Plug'n'Play USB 2.0 (full-speed, USB cable included). Power supply from PC via USB.
- **Models CF: Data logger functionality** incl. 64 MB CompactFlash. Configuration and data download to a PC via USB. Otherwise stand-alone operation independently from PC (battery buffered, external power supply).
- **Models WLS: Wireless USB function.** Data transmission either via USB (power supply from PC via USB) or wireless USB (in this case power from external power supply, included). Wireless USB transmission: 802.15.4 wireless protocol. Distance up to ~40 m indoor and 730 m outdoor.

- - - Software included in package: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, also Vista). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro.

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1].

1) ProfiLab-Expert may not support the full sample rate.

Models for Ethernet available in section "Remote-I/O"!

- - - Ordering codes and functions			**RedLab TC and TEMP - - -**
Model	**Description**	**Chan.**	**Supported sensors and/or input ranges**
RedLab TC	Temperature DAQ box	8	Thermocouple J, K, T, E, R, S, B, N
RedLab TC AI	Temperature and voltage DAQ box	4+4	Thermocouple J, K, T, E, R, S, B, N and ±10 V, ±5 V, ±2.5 V and ±1.25 V
RedLab TC CF	Temperature logger	8	Thermocouple J, K, T, E, R, S, B, N
RedLab WLS-TC	Wireless temperature DAQ box	8	Thermocouple J, K, T, E, R, S, B, N
RedLab TEMP	Temperature DAQ box	8	Thermocouple J, K, T, E, R, S, B, N, RTDs (2-, 3-, 4-wire), thermistors, semiconductor temperature sensors
RedLab TEMP AI	Temperature and voltage DAQ box	4+4	Thermocouple J, K, T, E, R, S, B, N, RTDs (2-, 3-, 4-wire), thermistors, semiconductor temperature sensors and ±10 V, ±5 V, ±2.5 V and ±1.25 V
RedLab TEMP CF	Temperature logger	8	Thermocouple J, K, T, E, R, S, B, N, RTDs (2-, 3-, 4-wire), thermistors, semiconductor temperature sensors
RedLab WLS-TEMP	Wireless temperature DAQ box	8	Thermocouple J, K, T, E, R, S, B, N, RTDs (2-, 3-, 4-wire), thermistors, semiconductor temperature sensors
Bundled with ProfiLab-Expert[1]:	RedPack TC	RedPack TC AI	RedPack TC CF	RedPack WLS-TC
	RedPack TEMP	RedPack TEMP AI	RedPack TEMP CF	RedPack WLS-TEMP
Scope of delivery:	RedLab in one of the versions, USB cable, screw driver, software and instructions for use on CD. RedPack: ProfiLab-Expert[1]. Logger models CF: 64 MB CompactFlash memory card. CF and WLS: External power supply. **Note:** For the wireless USB transmission with the WLS models a RedLab WLS-IFC interface is required.			

Overview: Models of the RedLab TC and TEMP series

Key features overview

- - - Overview: The models of the RedLab TC and TEMP family - - -								
RedLab...	**TC**	**TC AI**	**TC CF**	**WLS-TC**	**TEMP**	**TEMP AI**	**TEMP CF**	**WLS-TEMP**
Inputs	8	4	8	8	8	4	8	8
Ranges	Thermocouples (type J, K, T, E, R, S, B, N)				Thermocouples (type J, K, T, E, R, S, B, N), RTDs (2-, 3-, 4-wire, eg. four 3-wire RTDs), thermistors, semiconductor temperature sensors			
Inputs[2]	-	4 se./diff,	-	-	-	4 se./diff,	-	-
Ranges	-	±10 V, ±5 V, ±2.5 V, ±1.25 V	-	-	-	±10 V, ±5 V, ±2.5 V, ±1.25 V	-	-
Resolution	24 bit							
Digital I/O	8							
USB	✔	✔	✔	✔	✔	✔	✔	✔
Wireless USB	-	-	-	✔	-	-	-	✔
CF[3]	-	-	✔	-	-	-	✔	-

2) se. = single-ended, diff. = differential.   3) Stand-alone logger with CompactFlash

Measure and log temperatures with USB   RedLab TC and TEMP, RedPack

- - - Specifications RedLab... - - -

Analog inputs	TC	TC CF	WLS TC	TC AI	TEMP	TEMP CF	WLS TEMP	TEMP AI
Temperatur inputs	8	8	8	4	8[4]	8[4]	8[4]	4
Input types and data	Differential inputs. Integrated temperature sensor for CJC. Module warm-up time min. 30 min							
	Thermocoulpes J, K, T, E, R, S ,B, N; ±0.080 V							
	-				RTDs (100 Ω PT); 0...0.5 V.			
	-				Thermistors (standard 2,252...30,000 Ω); 0...2 V.			
	-				Semiconductor sensors (TMP36 & aequivalent); 0...2.5 V			
Universal voltage inputs	-	-	-	4	-	-	-	4
Input types and data	Singel-ended or differential inputs. Input ranges ±10 V, ±5 V, ±2.5 V and ±1.25 V							
A/D converter	Four double 24 bit sigma-delta converters							
Isolation	Min. 500 VDC between signal connectors and USB interface							
Input data	Voltage max. ±25 V power-on, ±40 V or 15 V (AI universal channels) power-off. Impedance min. 5 GΩ/1 MΩ (power-on/off) or 10 GΩ/2.49 kΩ (power-on/off AI universal channels). Input coupling: DC							
Open TC detection	Automatic detection of open thermocouples in max. 3 s, if channel pair for thermocouples was configured							
Max. throughput rate	Depending on number of channels 2 S/s (1 channel) to 2 S/s per channel, total 16 S/s (8 channels). Analog inputs run continuously. Each channel is samples twice per second. Bandwidth (-3 dB) 50 Hz or 3 kHz (AI univer. channels)							
Digital I/O	TC	TC CF	WLS TC	TC AI	TEMP	TEMP CF	WLS TEMP	TEMP AI
Number	8 discrete, independently programmable as input or outputs							
Type and data	CMOS. Input high: 2.0 V min./5.5 V abs. max. Input low: 0.8 V max./-0.5 V abs. min. Output high (I_{OL}=2.5 mA): 0.7 V max. Ouput low (I_{OH}=-2.5 mA): 3.8 V min.							
Data logger	-	TC CF	-	-	-	TEMP CF	-	-
Models CF	Configuration, data transfer to PC via USB. Stand-alone operation, independently from PC: Logging to CompactFlash							
General	TC	TC CF	WLS TC	TC AI	TEMP	TEMP CF	WLS TEMP	TEMP AI
Size (mm)	~127 (L) x 88.9 (W) x 35.56 (H)							
Power supply	From PC via USB, max. 100 mA; models CF: Additional buffer battery. Model CF, WLS: External power supply.							
Interface	USB 2.0 full-speed, compatible with USB 1.1, 2.0; WLS additional: Wireless USB with 802.15.4 protocol							
Connectors	I/O: 2x 10 and 2x 16 screw terminals. USB: Type B. Cable to type A incl. models "CF": CompactFlash-Slot							
Environmental	Operating temperature 0...70°C, storage temperature -40...85°C, 0...90% rel. humidity non-condensing							

4) 2-wire with one sensor: 4 diff. channels. 2-wire with two sensors: 8 diff. channels. 3-wire with one sensor per channel pair: 4 diff. channels. 4-wire: 8 diff. channels.

Temperature measurement and wireless transmission   RedLab WLS series
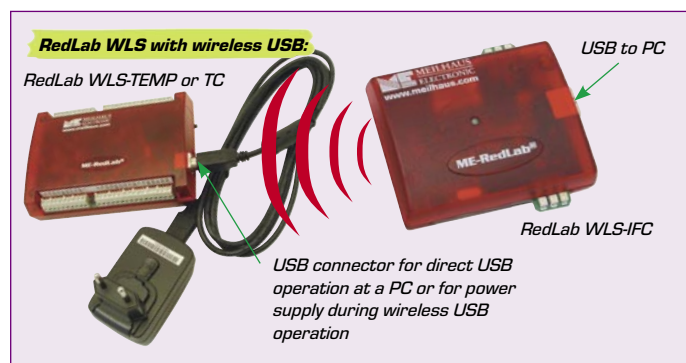

USB modules are a very handy and reliable solution for data acquisition: They allow the I/O hardware to move close to the sensor. Thus only insusceptible digital data has to be transmitted to the PC. But there may be cases where you want to get rid of any cables. With the RedLabs WLS you can chose from transmitting data to a PC via USB or via wireless USB. Simply add the wireless USB receiver RedLab WLS-IFC to the PC. You will notice the difference only in the distance of your transmission: It can be up to 730 m for wireless!

- Wireless USB interface modul/gateway at the PC for the RedLab WLS models.
- Supports RedLab WLS-TC and RedLab WLS-TEMP.
- For use with one oder more RedLab WLS module(s).
- All configuration settings via software.
- LED for communication status of the wireless transmission.
- **Communication via 802.15.4 wireless protokol.**
- Distance up to ~**40 m** indoor and **730 m** outdoor.
- **Power supply of the RedLab WLS-IFC from PC via USB**, no external supply required.
- RedLab WLS-IFC to PC: Plug'n'Play USB 2.0 (full-speed).

- - - Ordering code   RedLab WLS-IFD - - -

Model	Description
RedLab WLS-IFC	Interface module (gateway) from wireless USB to USB (host side/at PC)
Scope of delivery: RedLab WLS-IFC, USB cable	
Bundles:	
RedLab WLS-TC+IFC	RedLab WLS-TC + RedLab WLS-IFC
RedLab WLS-TEMP+IFC	RedLab WLS-TEMP + RedLab WLS-IFC

- - - Specifications - - -

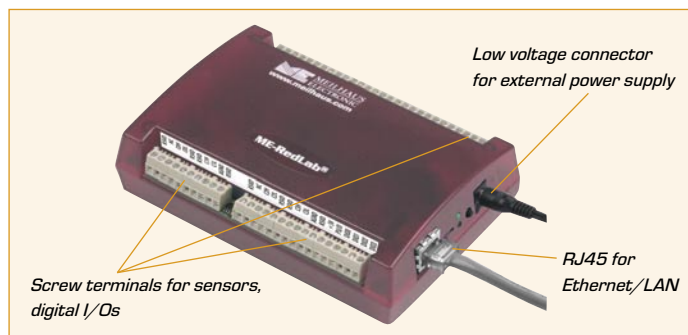| Functions	Interface/gateway from PC USB interface to wireless USB. Status LED for wireless communication
Wireless	802.15.4 protocol. Distance: Up to ~40 m indoor and 730 m outdoor
USB	2.0 full-speed. Versorgung from PC via USB
Size (mm)	~79 x 75 x 26,5

RedLab WLS with wireless USB:

RedLab WLS-TEMP or TC

USB to PC

RedLab WLS-IFC

USB connector for direct USB operation at a PC or for power supply during wireless USB operation

Versatile ethernet/LAN temperature measurement labs   RedLab WEB-TC and TEMP

With the modules RedLab WEB-TC and TEMP you can now connect temperature sensors to your PC via an ethernet/LAN network very easily! While the low-cost model TC supports thermocouples only, the TEMP variant can also be used with RTDs, thermistors or semiconductor sensors. The sensor type is selected via software.

- 8 independent, differential input channels for **temperature measurement.**
- **RedLab TC supports:**
  Thermocouples type J, K, T, E, R, S, B, N. Linearization of measurement values, CJC as well as conversion to °C or °F directly in the module.
- **RedLab TEMP supports 4 sensor types:**
  Thermocouples (type J, K, T, E, R, S, B, N), RTDs (2-, 3-, 4-wire, eg. four 3-wire RTDs), thermistors, semiconductor temperature sensors. The 8 channels can also be operated with a mix of different sensor types without additional signal conditioning.
- **Precise 24 bit A/D converter.**
- Integrated sensor for environmental temperature (CJC/cold junction compensation).
- **8 additional digital I/O lines**.
- Integrated **web server/web page**.
- External power supply (included in the scope of delivery).
- Also available: **Models for USB and wireless USB as well as data logger models** with CompactFlash (see **section USB- and mobile data acquisition**).

- - - Software included: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro

Low voltage connector for external power supply

Screw terminals for sensors, digital I/Os

RJ45 for Ethernet/LAN

- - - Ordering codes   RedLab WEB-TC/TEMP - - -

Model	Description
RedLab WEB-TC	Ethernet temperature DAQ box, 8 channels for thermocouples J, K, T, E, R, S, B, N
RedLab WEB-TEMP	Ethernet temperature DAQ box, 8 channels for thermocouples J, K, T, E, R, S, B, N, RTDs (2-, 3-, 4-wire), thermistors, semiconductor temperature sensors
Bundled with ProfiLab-Expert[1]:	
RedPack WEB-TC	Bundle with RedLab WEB-TC or TEMP and
RedPack WEB-TEMP	software ProfiLab-Expert

Scope of delivery: RedLab WEB in one of the versions, ethernet cable, external power supply, screw driver, software and instructions for use on CD. RedPack: ProfiLab-Expert[1].

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1]

1) ProfiLab-Expert may not support the full sample rate.

- - - Specifications RedLab... - - -

Analog inputs	RedLab WEB-TC	RedLab WEB-TEMP
Temperature inputs	8	8[2]
Input types and data	Differential inputs. Integrated temperature sensor for CJC. Module warm-up time min. 30 min	
	Thermocoulpes J, K, T, E, R, S ,B, N; ±0.080 V	
	-	RTDs (100 Ω PT); 0...0.5 V.
	-	Thermistors (standard 2,252...30,000 Ω); 0...2 V.
	-	Semiconductor sensors (TMP36 & aequivalent); 0...2.5 V
A/D converter	Four double 24 bit sigma-delta converters	
Isolation	Min. 500 VDC between signal connectors and USB interface	
Input data	Voltage max. ±25 V power-on, ±40 V power-off. Impedance min. 5 GΩ/1 MΩ (power-on/off). Coupling: DC	
Open TC detection	Automatic detection of open thermocouples in max. 3 s, if channel pair for thermocouples was configured	
Max. throughput rate	Depending on number of channels 2 S/s (1 channel) to 2 S/s per channel, total 16 S/s (8 channels). Analog inputs run continuously. Each channel is samples twice per second. Max. latency between sampling and transfer via ethernet ~0.5 s	
Digital I/O	**RedLab WEB-TC**	**RedLab WEB-TEMP**
Number	8 discrete, independently programmable as input or outputs	
Type and data	CMOS +5 V or +3.3 V mode. Input high: 4 V/2.64 V min./5.5 V abs. max. Input low: 1 V/0.66V max./−0.3 V abs. min. Output high (I_{OL}=-2.5 mA): 4.3 V/2.7 V max. Output low (I_{OH}=2.5 mA): 0.6 V max.	
General	**RedLab WEB-TC**	**RedLab WEB-TEMP**
Size (mm)	~127 (L) x 88.9 (W) x 35.56 (H)	
Power supply	External power supply (included)	
Interface	10Base-T ethernet/LAN (IEEE 802.3). Protocol IP, ARP, ICMP, DHCP, UDP, TCP, NBNS, HTTP	
Connectors	I/O: 2x 10 and 2x 16 screw terminals. Ethernet: RJ45	

4) 2-wire with one sensor: 4 diff. channels. 2-wire with two sensors: 8 diff. channels. 3-wire with one sensor per channel pair: 4 diff. channels. 4-wire: 8 diff. channels.

Analog output modules with digital I/O and counter   RedLab 31xx Series, RedPack
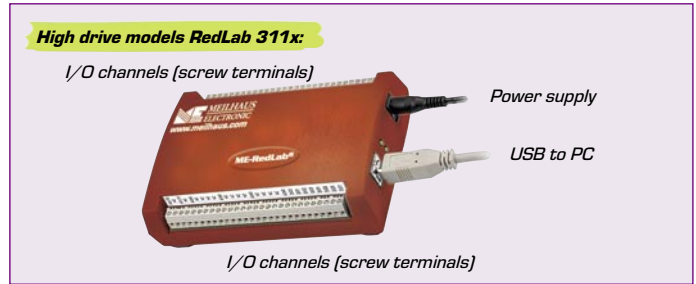

These RedLab series modules are intended for analog output. They haven't 4, 8 or 16 analog outputs with 16 bit resolution. A bidirectional synchronization pin allows to update the D/A converter outputs on multiple modules simultaneously. In addition there are 8 digital I/O channels and a 32 bit event counter

- Depending on model **4, 8 or 16** analog outputs.
- **Resolution 16 bit**.
- Output ranges **±10 V/0...10 V**, models with current outputs also **0...20 mA**.
- Additional **8 discrete CMOS digital I/O channels**.
- 32 bit event counter.
- Reliable screw terminals.
- Plug'n'Play **USB 2.0** (full-speed, USB cable included). Power supply via USB.
- High drive models: Power supply included.

- - - Software included in package: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro.

1) ProfiLab-Expert may not support the full sample rate.

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1].

High drive models RedLab 311x:

I/O channels (screw terminals)

Power supply

USB to PC

I/O channels (screw terminals)

- - - Ordering codes and functions   RedLab 31xx series - - -

Model	Analog outputs	Ranges	Digital I/O	Event counter	Scope of delivery
RedLab 3101	4, 16 bit	±10 V/0...10 V	8, CMOS	1x 32 bit	USB DAQ box, USB cable (type A-B), screw driver, CD with software/PDF user manual.
RedLab 3102	4, 16 bit	±10 V/0...10 V, 0...20 mA	8, CMOS	1x 32 bit	
RedLab 3103	8, 16 bit	±10 V/0...10 V	8, CMOS	1x 32 bit	
RedLab 3104	8, 16 bit	±10 V/0...10 V, 0...20 mA	8, CMOS	1x 32 bit	High drive modeld 3110, 3112, 3114: Power supply
RedLab 3105	16, 16 bit	±10 V/0...10 V	8, CMOS	1x 32 bit	
RedLab 3106	16, 16 bit	±10 V/0...10 V, 0...20 mA	8, CMOS	1x 32 bit	
RedLab 3110	4, 16 bit	±10 V/0...10 V, high drive	8, CMOS	1x 32 bit	
RedLab 3112	8, 16 bit	±10 V/0...10 V, high drive	8, CMOS	1x 32 bit	
RedLab 3114	16, 16 bit	±10 V/0...10 V, high drive	8, CMOS	1x 32 bit	

Bundles with ProfiLab-Expert[1]:

RedPack 3101	RedPack 3102	RedPack 3103	RedPack 3104	RedPack 3105	RedPack 3106
RedPack 3110	RedPack 3112	RedPack 3114			

Scope od delivery: RedLab 31xx, USB cable, screw driver, software and instructions for use on CD. High drive models RedLab 311x: Power supply. RedPack: ProfiLab-Expert[1].

- - - Specifications - - -

Models	3101	3103	3105	3102	3104	3106	3110	3112	3114
Description	16 bit analog output modules with 4, 8, 16 channels plus digital I/O						16 bit analog output modules with 4, 8, 16 high drive channels plus digital I/O		
Analog outputs	**3101**	**3103**	**3105**	**3102**	**3104**	**3106**	**3110**	**3112**	**3114**
Number	4	8	16	4	8	16	4	8	16
D/A convers.	16 bit, 100 kHz (depending on system)								
Range	±10 V/0...10 V (output current per output typ. ±3.5 mA)			±10 V/0...10 V (output current per output typ. ±3.5 mA), 0...20 mA			±10 V/0...10 V, high drive: Max. load per channel 40 mA (source/sink)		
Digital I/O	**3101**	**3103**	**3105**	**3102**	**3104**	**3106**	**3110**	**3112**	**3114**
Number	8 discrete, independently programmable as inputs or outputs								
Type and specs	CMOS. Input high: 2.0 V min./5.5 V abs. max. Input low: 0.8 V max./-0.5 V abs. min. Output high (I_{OL}=2.5 mA): 0,7 V max. Output low (I_{OH}=-2.5 mA): 3.8 V min.								
Event counter	**3101**	**3103**	**3105**	**3102**	**3104**	**3106**	**3110**	**3112**	**3114**
Number, type	1x 32 bit event counter								
General	**3101**	**3103**	**3105**	**3102**	**3104**	**3106**	**3110**	**3112**	**3114**
Size	(in mm) ~127 (L) x 88.9 (W) x 35.56 (H)								
Power supply	From PC via USB						Power supply 5 V/10 W		
Interface	USB 2.0 full-speed, compatible with USB 1.1, 2.0								
Connectors	I/O: 2x 28 screw terminals. USB: Type B. Cable to type A included								
	- (power supply from PC via USB)						Connector for power supply		
Environmental	Operation temperature 0...50°C, storage temperature -40...85°C, 0...90% relative humidity non-condensing								

Digital acquisition, control and switching with USB

RedLab 1024, RedPack
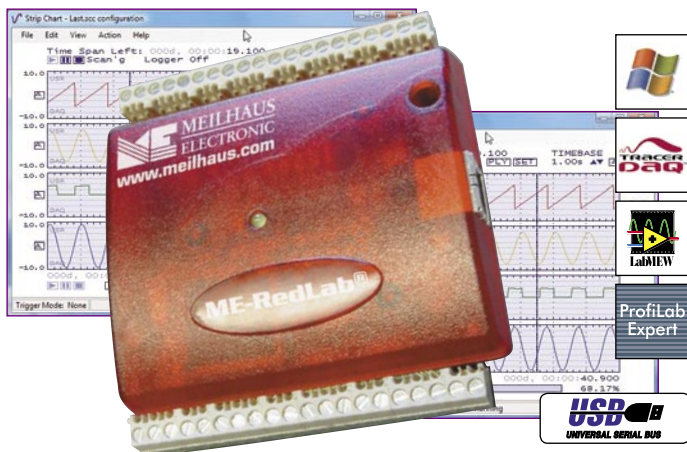
The RedLab 1024 lets you control digitale inputs and outputs via USB. For example, you can control switching operations or relays or acquire digital states. The unbeatable benefits of the module are its small, space-saving size, its easy installation and handling as well as its low price.

- Digital interface module for USB.
- **24 TTL/CMOS digital I/O channels** (82C55), arranged in three 8 bit wide ports.
- HLS: **High drive inputs/outputs** instead of TTL/CMOS 82C55.
- 32 bit **event counter**.
- Screw terminal connectors.
- Size (mm) only 83 x 80 x 25,4.

- - - Software included in package: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Option: TracerDAQ Pro.

1) ProfiLab-Expert may not support the full sample rate.

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1].

- - - Ordering codes and functions   RedLab 1224 - - -

Model	Description
RedLab 1224LS	USB digital box, 24 TTL/CMOS digital I/O channels
RedLab 1224HLS	USB digital box, 24 high drive digital I/O channels
Bundles with ProfiLab-Expert[1]:	
	RedPack 1224LS RedPack 1224HLS

Scope of delivery: RedLab 1224, USB cable, screw driver, software and instructions for use on CD. RedPack: ProfiLab-Expert[1]

- - - Specifications - - -

Digital inputs/outputs

Number	24 bidirectional input/output channels, arranged as 3x 8 bit wide ports or 2x 8 bit and 2x 4 bit wide ports; each port programmable as input or output
Version LS	82C55 TTL/CMOS; by default all lines are connected to V_s via a 47 kΩ resistor (standard). Optional pull-down to GND possible. Input high: 2.0 V min./5.5 V abs. max. Input low: 0.8 V max./-0.5 V abs. min. Output high: (I_{OH}=-2.5 mA) 3.0 V min.
Version HLS	HLS: High drive, 74ACT373 inputs/74FCT244 ouputs Internal 47 kΩ resistor, user configurable for pull-up or pull-down via external connector "port x pull-up/pull-down" to USB +5 V or GND. Ports A, B and C configurable independently. Input high: 2.0 V min./5.5 V abs. max. Input low: 0.8 V max./-0.5 V abs. min. Output high: (I_{OH}=-15 mA) 2.4 V min. Output low: (I_{OL}=64 mA) 0.55 V max. Max. current = 15 mA per output

Counter

Number, type	1x 32 bit event counter
Input frequency	Max. 1 MHz

General

Size (mm)	~83 x 80 x 25,4
Power supply	From PC via USB
Interface	USB 1.1 low-speed, USB 1.1 and 2.0 compatible with Windows XP, 2000, 98SE/Me
Connector	I/O: 2x 10 screw terminals, USB: Type B. Cable to type A included in package (max. 3 m cable possible)
Environmental	Operating temperature 0...70°C, storage temperature -40...85°C; 0...90% rel. humidity, non-condensing

RedLab Series Designs

Design	Mini	Midi	Special design RedLab WLS-IFC	Special design RedLab 1008
Size (mm, approx.)	83 x 80 x 25.4	127 x 88.9 x 35.56	79 x 75 x 26.5	157 x 102 x 40
Models	RedLab 1208, RedLab 1408, RedLab 1608, RedLab 1024	RedLab 4301, RedLab 4303, RedLab 3xxx, RedLab TC and TEMP (CF), RedLab WLS-TC and TEMP	RedLab WLS-IFC	RedLab 1008
I/O connectivity	2 rows of screw terminals	2 rows of screw terminals	-	2 rows of screw terminals, 37-pin D-sub

16 bit counter and timer box for USB — RedLab 430x, RedPack

Now you can build counter applications also with USB using the RedLabs 4301 and 4303. The RedLabs' 5 or 10 counters with 16 bit resolution can operate in the modes event counting, frequency measurement, frequency division, single-shot, square signal generation with symmetric or variable duty cycle (PWM/pulse width modulation).

- RedLab 4301: **5x 16 bit counters** up to 20 MHz.
  RedLab 4303: **10x 16 bit counters** up to 20 MHz.
- Counter chip type 9513.
- **Operating modes:** Event counting, frequency measurement, frequency division, single-shot, square signal generation with symmetric or variable duty cycle (PWM).
- **Interrupt control.**
- **8 digital inputs, 8 digital outputs.**
- Screw terminal connectors.
- Size (mm) 127 x 90 x 36.

- - - Software included in package: - - -

TracerDAQ (strip chart recorder and data logger). Universal Library (programming language support for Windows, Vista also). InstaCAL utility (for easy installation, calibration and test). Driver for LabVIEW. Optional or with RedPack: ProfiLab-Expert[1]. Optional: TracerDAQ Pro.

1) ProfiLab-Expert may not support the full sample rate.

- - - Accessory - - -

Model	Description
ProfiLab-Expert	**Graphic software.** Available as an optional accessory or included in the bundle RedPack[1].

- - - Ordering codes — RedLab 4301, 4303 - - -

Model	Description
RedLab 4301	Counter/digital box, 5x 16 bit counters up to 20 MHz, 8 digital inputs/8 digital output. TTL level.
RedLab 4303	Counter/digital box, 10x 16 bit counters up to 20 MHz, 8 digital inputs/8 digital outputs. TTL level.
RedPack 4301	RedLab 4301 bundled with ProfiLab-Expert[1]
RedPack 4303	RedLab 4303 bundled with ProfiLab-Expert[1]

Scope of delivery: RedLab 4301 or 4303, USB cable, screw driver, software and instructions for use on CD. RedPack: ProfiLab-Expert[1]

- - - Specifications - - -

Counters	
Number	5x (RedLab 4301) or 10x (RedLab 4303) 16 bit up/down counter (1x or 2x chip type 9513)
Level	5 V/TTL
Clock	Software selectable internal/external. Max. external input frequency 20 MHz.

Digital I/O	
Number	8 inputs and 8 outputs (74ACT373).
Level	5 V/TTL; input voltage at "1": 2.0 V min., 5.5 V absolute max., input voltage at "0": 0.8 V max., -0.5 V absolute min., output voltage at "1": min. 3.3 V at -24 mA (Vcc = 4.5 V), output voltage at "0": max. 0.8 V at 10 mA

General	
Size (mm)	˜127 (L) x 88.9 (W) x 35.56 (H)
Power supply	From PC via USB, power consumption max. 500 mA
Interface	2.0 full-speed, compatible with USB 1.1
Connector	I/O: 2x 28 screw terminals, USB: Type B. Cable to type A included in package (max. 3 m cable possible)
Environmental	Operating temperature 0...60°C, storage temperature -40...85°C; 0...90% rel. humidity, non-condensing

USB Connectors Type A and Type B

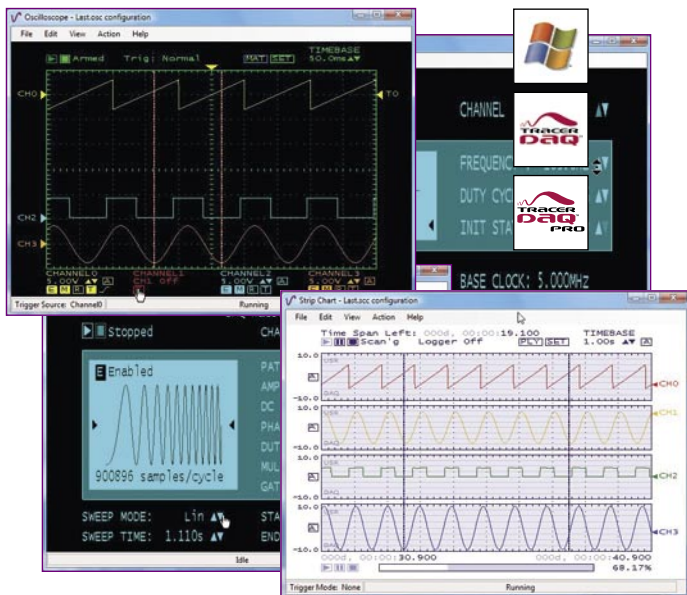USB type A connector - at a PC/notebook or hub

<< USB type A "extender"

USB type B connector - at an USB device (eg. MEphisto Scope)

Data acquisition, data dispay and data export with the RedLabs — TracerDAQ, TracerDAQ Pro


TracerDAQ is a ready-to-use software for data acquisition, data display and export with the RedLab series modules. It is easy and quick to use without any programming. The free version TracerDAQ is included in the scope of delivery of the RedLabs, the version Pro can be bought as an optional accessory. The version Pro offers even more software power for your RedLabs!

- For **Windows 2000, XP and Vista**.
- Operating modes selectable, depending on the functions offered by the RedLab model in use:
  - **Strip chart**: 8 channels in TracerDAQ, 32 channels in TracerDAQ Pro
  - **Oscilloscope**: 2 channels in TracerDAQ, 4 channels in TracerDAQ Pro.
  - **Function generator:** Sinus generator in TracerDAQ, function generator for standard and arbitrary waveforms in TracerDAQ Pro.
  - **Rate generator**: 1 channel in TracerDAQ, 20 channel in in TracerDAQ Pro.
- Ready-to-use **without any programming. Easy to use.**
- TracerDAQ is the fast way to measure data, display the values as a strip chart and to export data for example to Excel for further processing.
- Just select the channels for aqcuisition, the input range, the desired sample rate and start measuring.
- Also use TracerDAQ to generate analog signals or to operate modules with counters as a rate generator.
- TracerDAQ Pro offers even more professional functions, like support of more channels, additional device triggering, alarm functions and a mathematics module for data analysis.

- - - Ordering codes   TracerDAQ, TracerDAQ Pro - - -

Model	Description
TracerDAQ	Software for data acquisition, display and export with the RedLab series modules. Free, included in the scope of delivery of the modules.
TracerDAQ Pro	Professional version with extended functionality, optional.
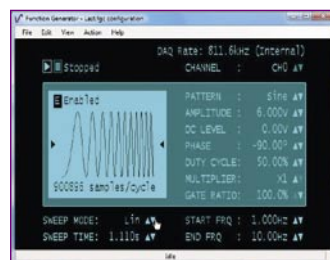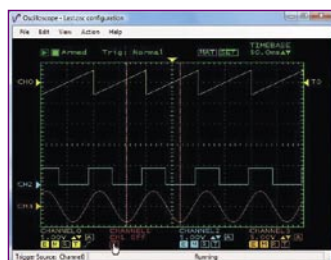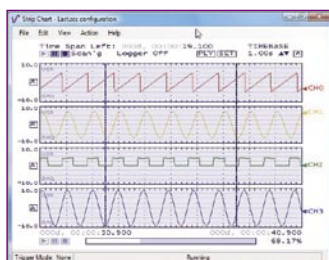
Strip chart recorder
Acquisition of waveforms, incl. data logger functionality, for one or more RedLabs. The strip chart recorder can be used with the USB, wireless USB and ethernet RedLab series modules to record voltage, temperature, digital signals and counter signals. It is easy to use: Simply click on the "interactive hotspots" within the display windows. You can access the most important parameters even during a measurement without having to open further dialogs.

Oscilloscope
Offers a graphic tool to record analog data from one or more devices. Just like the strip chart recorder, the oscilloscope display is interactive and allows you to set all parameters without having to open further dialogs.

Function generator
For periodic or single-shot output of analog waveforms with all RedLabs that have an analog output section. As an example, these analog signals can be used in tests: Analyze the reactions of a device under test supplied with a test signal.

Rate generator
Use to output serial square impulses with a defined frequency with the RedLabs 430x. Easy configuration - like in all other modes - with "interactive hotspots": You can set all parameters without having to open further dialogs.

- - - TracerDAQ and TracerDAQ Pro - - -

TracerDAQ (included)	TracerDAQ Pro (optional)
8 channel strip chart recorder	**32 channel strip chart recorder**
Sample rate up to max. device sample rate. 2 waveforms. 32 k vaules per channel.	Sample rate up to max. device sample rate. 8 waveforms. 1 M values per channel. Alarm and trigger functions etc.
2 channel oscilloscope	**4 channel oscilloscope**
Sample rate up to max. device sample rate. Channel triggering.	Sample rate up to max. device sample rate. Mathematic functions. DAQ/display window.
Sinus generator	**Function generator**
Output of a sinus signal on one channel, signal preview.	Output of various standard waveforms and arbitrary signals on 16 channels. Selectable duty cycle, phase, rate multiplier, gate ratio etc.
1 channel rate generator	**20 channel rate generator**
Output of a square signal on one channel, compatible with the counters of the RedLabs 430x.	Output of a square signal on 20 channels, compatible with the counters of the RedLabs 430x.