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Racal Instruments™ 1830

LXI Source/Measure Switch System

If you use automated test equipment for design validation or manufacturing, you now have a highly cost-effective modular test-system platform.

The Racal Instruments™ 1830 Source/Measure Switch System provides superior functionality to other modular systems, but it's much easier to use and costs less.

The 1830 helps you lower your cost of test and accelerate your test system integration and development with its many connectivity options and software tools.

Key Features

- **Nine slot mainframe configurable with nine available signal and power switching plug-ins**
- **Scalable measurement performance and four embedded instrument options for high throughput**
- **Powerful application embedding with integral scripting engine**
- **Two 7.5 digit DMM options for standard DMM measurements or source/measure capability with up to 80 k measurements per second**
- **LXI, USB and GPIB with support for popular software environments for easy test system integration**
- **Optional ActivATE™ Test Platform for applications development**
- **Made in the USA**

Product Information

Truly Scalable Test System Architecture

Should your test system need increased capacity in the future, it is essential to design it around a platform that can grow as your needs change. Switching configurations are expandable through the use of the signal raceway to as large as an 8x162 or 4x324 matrix or up to a 576 channel multiplexer.

Switching solutions include matrix and multiplexer as well as power and discrete. Up to four instruments can be installed internally and fully connected to switch channels via the signal raceway allowing for channel and throughput scalability to factors of nine and four. If different measurement types or ranges are needed, throughput is further increased as time consuming range and function changes are avoided.

Designed for Making High Quality Measurements

The measurements themselves are what really matter in any test and measurement system. The 1830 has an internal signal raceway to remove cabling and parasitics, providing the high quality switching paths and instrumentation to make more and better measurements a reality.

Advanced Switching and Instrumentation Capability

The 1830 Source/Measure Switch delivers unprecedented density and flexibility in a LXI/GPIB/USB box. The 1830 accommodates up to nine switch plug-ins providing a scalable switching solution. The plug-ins are easy to install by hand directly at the rear of the instrument, allowing ease of maintenance and upgradeability. The 1830 also includes a rich set of enhanced switching and instrumentation features that are accessible both remotely via a test program and locally via embedded scripts.

Support for Popular Software Environments and Connection Options

The 1830 includes USB-2, LXI, Ethernet, and GPIB connectivity for quick and easy connection to your host controller. Software drivers are included for popular test environments. Drivers based on the Microsoft Visual Studio® and .NET frameworks are provided for the ActivATE™ Test Platform development system. IVI-COM drivers are provided for NI's LabVIEW™ or Microsoft's Visual C++® development systems. IVI-C drivers are provided for NI's LabWindows™/CVI development system.

Optional ActivATE™ Test Platform

The ActivATE™ Test Platform is available at a bundled price with the 1830 for test system designers who like the simplicity and power of the Visual Basic® development system and who need an integrated development environment, including a powerful test executive, debugging capability and who like using the .NET™ framework from Microsoft for developing software.

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Product Information

continued

Industry Leading Feature Set

The 1800 Series Source/Measure Switch continues the tradition of the Racal Instruments product line by offering the most comprehensive feature set in the industry:

- Trigger router, sequencer with scan operations for powerful application embedding
- Path level switching at IVI and local SCPI level
- Web Page access with LXI Class C
- Truly scalable switching and instrumentation
- Rich measurement capability with future road map
- Advanced signal raceway supports parallel measurement

LXI Web Page Control

The 1830 Source/Measure Switch implements Class C LXI, which includes automated discovery and web page control using a browser either locally or remotely. The web page allows you to monitor whatever the instrument is doing in real-time from your PC, from wherever you happen to be. The web page also allows you to control the instrument either graphically or with SCPI commands. You can even write and download a test script.

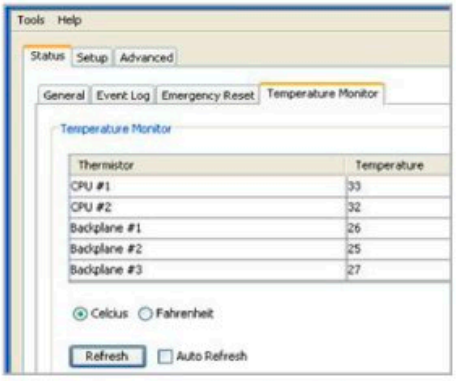


Figure 1: 1830 System Web Controls

Test Sequencing

The optional ActivATE™ Test Platform provides instrument drivers, interactive control panels (update during test program execution), a test routine debug/development environment for the Visual Basic® development system (full and script) and C# languages with an integrated sequencer included. Harnessing the programming power of the Microsoft .NET™ framework, the ActivATE™ test platform is sure to boost the productivity of test program developers.

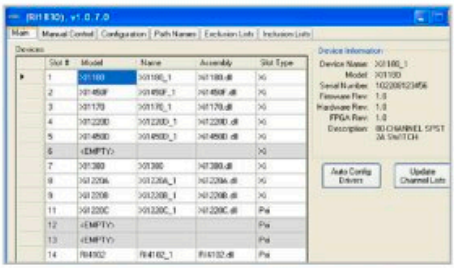


Figure 2: ActivATE™ Control for 1830

Scalable Measurement Capability

The 1830 Source/Measure Switch delivers unprecedented scalability, allowing your system to be tailored to your precise requirements. The optional 4102 7.5 Digit Source/Measure Meter delivers 30 different measurement operations plus five source modes, all of which can be used in conjunction with the measurement modes to create complex measurements.

Instruments Portfolio

The 1830 Source/Measure Switch System offers many switching, DMM and arbitrary waveform generator options for the most commonly used applications, with more being developed. Current available options include:

Switching

- **1170:** 52-Channel SPDT, 2 A, 300 V
- **1180:** 80-Channel SPST, 2 A, 300 V
- **1220A/B/C/D:** 16 A Switch in 24 SPST, 12 SPDT, 6 SP4T, or 2 SP12T
- **1380:** 64-Channel Multiplexer/Scanner, 2 A, 300 V, expands via signal raceway
- **1450D/F:** 4x36 or 8x18 Matrix, 2 A, 300 V, expands via signal raceway

DMM

- **4101:** 7.5 digit Digital Multimeter
- **4102:** Source/Measure 7.5 digit Versa Multimeter

Arbitrary Waveform Generator

- **3166:** Dual/Quad Channel Arbitrary Waveform Generator

Automatic Scanning

When a 4101 or 4102 multimeter is installed in an 1830, the UUT can be connected to multiple test points for temperature, strain, voltage, or current scanning and more. The 1830 backplane uses a signal raceway to make the connections with no external wiring required. This simplifies test development while it reduces external cabling and the overall length of cable that a signal must pass through on its way to being measured.

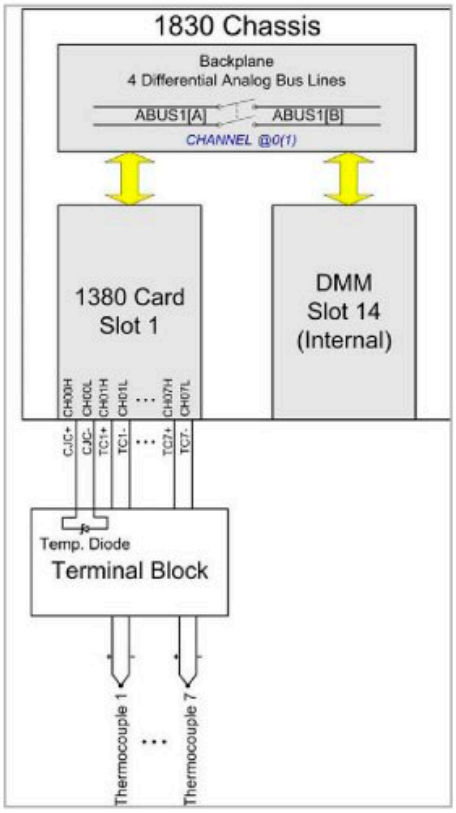
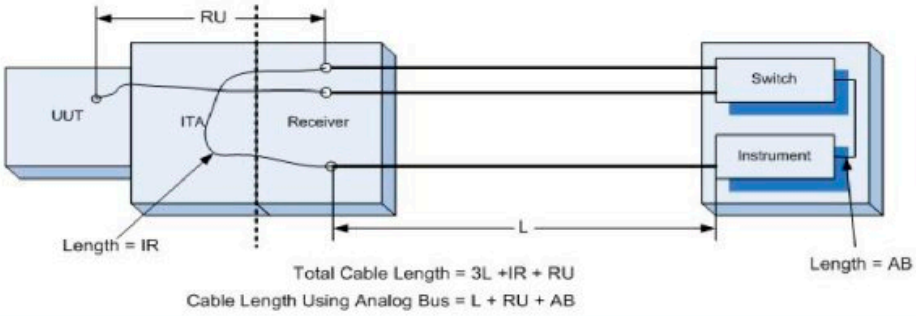


Figure 3: Thermocouple Scan Diagram

Reduced Cabling Solution

The 1830 Source/Measure Switch System provides reduced external wiring inside the Interface Test Adapter (ITA), reducing the overall length of the measurement path. The internal signal raceway measurement path can be used to reduce signal path >2/3 for improved signal integrity. The example below shows that wiring to switches and instruments are also reduced.



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Specifications

Note: The EADS North America Test and Services policy is one of continuous development and improvement. Consequently, the equipment may vary in detail from the description and specifications in this publication.

General Characteristics

Alarm Capability

- Monitor Mode, Channels in a Scan List, Measurements Outside of Pre-set Limits

Timestamp Capability

- Type: Trigger Events and associated measurements
- Accuracy: ±10 µs

Real Time Clock

- Type: Trigger Events and associated measurements
- Accuracy: ±5 ppm

State Machine Capability

- Type: Scanned measurements using embedded scripting language (SCPI)
- I/O: Read/write capability via USB interface, .CSV data format
- Channel Lists: Lists may contain channel sequences and measurements to be performed on the channels. Each channel in a sequence can have its own measurement type, range, aperture, and signal conditioning
- Parallel Operation: If there is more than one measurement instrument installed in the system, scan measurements may be taken in parallel.
- Scan Operation: Scan modes are compatible with internal and external instruments (for external instruments there must be a trigger port that can be controlled by the system as well as a measurement ready signal. System can store timestamps for external measurement device although not measurements.)
- Timestamps: Each measurement in a scan can be time-stamped as an option.

Scaling

- Analog channels, Alarms, Monitoring channels

System Management

- Firmware Upgrades: via LAN port
- Data File I/O: via USB interface

Signal Raceway

Single-Ended Signal Raceway

- Channels: 16
- Characteristic Impedance: 50 Ω
- Bandwidth:
  Bank A: 90 MHz
  Bank B: 170 MHz
  Bank A to B: 50 MHz
- Current: 1 A
- Voltage: 150 V (Pollution degree 1 and 2)
- Banks: 2 (5 left slots and 4 right slots), banks may be joined together, which reduces the channel count to 8

Differential Signal Raceway

- Channels: 8
- Characteristic Impedance: 50 Ω
- Bandwidth:
  Bank A: 75 MHz
  Bank B: 220 MHz
  Bank A to B: 50 MHz
- Current: 2 A
- Voltage:
  300 V (Pollution degree 1)
  250 V (Pollution degree 2)
- Banks: 2 (5 left slots and 4 right slots), banks may be joined together, which reduces the channel count to 4

Triggering Characteristics

Trigger Source

- External
- Internal: 10 µs to 99 h, 10 µs resolution, 1 to 50,000 counts or continuous
- Intra-System: Internal instruments and switches can send and receive triggers from each other via internal trigger bus

Interface

Rear Panel I/O

Control Port Interfaces

- USB 1.1 Full Speed Type B port
- GPIB port (IEEE-488.2)
- LAN port: RJ-45 (LXI Class C)
- RS-232: Factory debug port

Instrument I/O

- Trigger In: BNC, TTL
- Trigger Out: BNC, TTL
- Instrument Trigger In/Out: Per slot configurable trigger router

Indicators

- LAN Status

Front Panel I/O

- USB 2.0 Full Speed Type A port
- Indicators
- LAN Status
- Power

Maximum Overall Power Dissipation

- Ambient 0-45 C: 225 W
- Ambient 45-50 C: 80 W

Total Available Slot Power (not to exceed 200 W)

- 120 W Maximum
  +24 V at 5 A
  +12 V at 5 A
  -12 V at 3 A
- 80 W Maximum
  +5 VDC at 16 A
  +3.3 VDC at 8 A

Power Supply

- Input Voltage: Universal 90 V to 250 V
- Input Frequency: 47 to 63 Hz
- Power Consumption: 100 VA (typical), 350 VA (maximum)

Software

Operating System

- Runs on RedHat Linux to ensure full compliance with LXI and emerging network protocols

Native Language

- SCPI & SCPI scripting

Driver Support

- IVI (C and COM), LabVIEW™

Test Executive/GUI

- ActivATE™ (optional)

Web Page

- Accessed via LXI bus

Environmental

Temperature

- Operating: 0° C to 50° C
- Storage: -40° C to 71° C

Relative Humidity

- 80% RH at 40° C

Emissions/Immunity

- EN61326: 2006 Class B

Safety

- EN61010-1: 2001
- Pollution degree 1: 300 V
- Pollution degree 2: 250 V
- I/O Not for connection directly to mains power

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Specifications
continued

Material Handling
- RoHS*

LXI Conformance
- Class C

Analog Bus Switching Time
- <10 ms (includes settling time)

Rated Switch Operations
- Bus Relays
- Mechanical: 1 X 10^8
- Electrical: 200,000 @ 300 V_{rms}/ 0.416 A – 125 VA

MTBF (MIL-STD-217FN2)
- TBD

Relay Operations Counter
- Running total of operations stored in on-board non-volatile memory

Mechanical

Plug-In Slots
- 9 user-accessible switch or instruments slots
- 4 factory-installed options

Dimensions
- 17" (W) x 13.8" (D) x 5.25" (H)

Weight:
- 22 lbs 4 oz

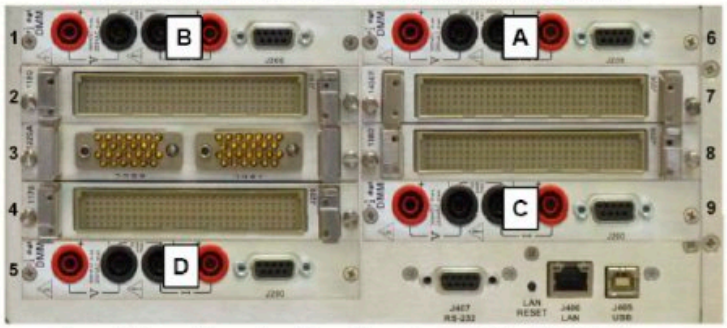
Thermal Monitoring
- Proportional fan speed controller and two thermal sensors to control fan speed

* 4101, 4102 DMM option Category 9 exemption

CE The CE Mark indicates that the product has completed and passed rigorous testing in the area of RF Emissions and Immunity to Electromagnetic Disturbances, and complies with European electrical safety standards.

Ordering Information

9 Signal and Power-Switching Plug-Ins



4 Factory-Installed Options

A
B
C
D

If you'd like a different configuration, please call the EADS factory.

Ordering Scheme: Banana-Jack DMM Interface Configuration

408157-ABCD : Racal Instruments™ 1830
3U Source/Measure Switch System

408157-ABCD[abcd]

1st factory-installed option code
2nd factory-installed option code
3rd factory-installed option code
4th factory-installed option code

Note 1: "-ABCD" corresponds to plug-in slots 6, 1, 9, 5, as shown on the left above

Note 2: "[abcd]" is optional coding reserved for factory use

To create the part #, substitute the Option Code for A, B, C, and D in the part number.

Internal Card Type	Option Code (A, B)	Description
N/A	0	Empty
4101	1	7.5 Digit Multimeter
4102	2	7.5 Digit Versa-Multimeter
4105	3	5.5 Digit Multimeter

Part Number Ordering Examples:

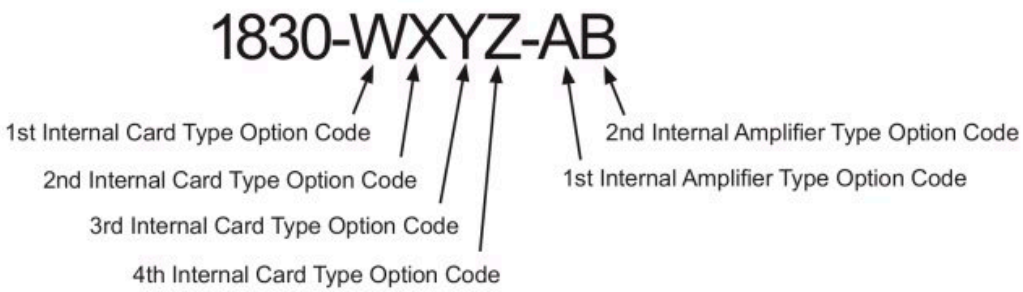
408157-1200	1830 with a 4101 (option 1) installed in slot 6, and a 4102 (option 2) installed in slot 1
408157-2210	1830 with a 4102 (option 2) installed in slot 6, a 4102 (option 2) installed in slot 1, and a 4101 (option 1) installed in slot 9

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Ordering Information
continued

Ordering Scheme: Multiple Internal Card Configuration

1830-WXYZ-AB : Racal Instruments™ 1830
3U Source/Measure Switch System



To create the 1st section of the part #, substitute the Internal Card Type Option Code (single digit letter, "0" for nothing installed) for W, X, Y, and Z in the part number.

Internal Card Type	Option Code (W, X, Y, Z)	Description
N/A	0	Empty
4101	A	7.5 Digit Multimeter
4102	B	7.5 Digit Versa-Multimeter
4105	C	5.5 Digit Multimeter
2105	D	Dual 14-bit Digitizer Module

To create the 2nd section of the part #, substitute the Internal Amplifier Type Option Code (double-digit letter, "0" for nothing installed) for A and B in the part number.

Internal Card Type	Option Code (A, B)
N/A	0
0 to 45 V, 0.2 A	1
0 to 45 V, 2 A	2
0 to 290 V, 0.03 A	3
0 to 290 V, 0.3 A	4
0 to 0.8 A current	5

Part Number Ordering Examples:

1830-AB00-20	1830 with a 4101 (option A), a 4102 (option B), and a "0 to 45 V, 2 A" Amplifier (option 2)
1830-BBD0-40	1830 with 2-4102s (option B), a 2105 (option D) and a "0 to 290 V, 0.3 A" Amplifier (option 4)
1830-BBAD-32	1830 with 2-4102s (option B), a 4101 (option A), a 2105 (option D), a "0 to 290 V, 0.03 A" Amplifier (option 3), and a "0 to 45 V, 2 A" Amplifier (option 2)

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Ordering Information

continued

Switch Plug Ins:

405322 : Racal Instruments™ 1170
52-Channel SPDT, 2 A Switch Plug-In

405323 : Racal Instruments™ 1180
80-Channel SPST, 2 A Switch Plug-In

405324-001 : Racal Instruments™ 1220A
24-Channel SPST, 16 A Switch Plug-In

405324-002 : Racal Instruments™ 1220B
12-Channel 1x2, 16 A Switch Plug-In

405324-003 : Racal Instruments™ 1220C
6-Channel 1x4, 16 A Switch Plug-In

405324-004 : Racal Instruments™ 1220D
2-Channel 1x12, 16 A Switch Plug-In

405325 : Racal Instruments™ 1380
64-Channel 2 A Scanner/Multiplexer Plug-In

405361-001 : Racal Instruments™ 1381A-2
52-channel, 2-wire, Reed Scanner/ Multiplexer Plug-in

405361-002 : Racal Instruments™ 1381A-4
26-channel, 4-wire, Reed Scanner/ Multiplexer Plug-in

405631-003 : Racal Instruments™ 1381B-2
104-channel, 2-wire, Reed Scanner/ Multiplexer Plug-in

405361-004 : Racal Instruments™ 1381B-4
52-channel, 4-wire, Reed Scanner/ Multiplexer Plug-in

405331 : Racal Instruments™ 1450D
4x36 2 A Latching Switch Matrix Plug-In

405330 : Racal Instruments™ 1450F
8x18 2 A Latching Switch Matrix Plug-In

Internal DMMs or Digitizers:

Please see the ordering information on the previous page for instructions on how to order the DMM and digitizer options

Arbitrary Waveform Generators Plug-ins:

405356-210 : Racal Instruments™ 3166-210
Dual Channel Arbitrary Waveform Generator (10 V_{pk-pk})

405356-220 : Racal Instruments™ 3166-220
Dual Channel Arbitrary Waveform Generator (20 V_{pk-pk})

405356-410 : Racal Instruments™ 3166-410
Quad Channel Arbitrary Waveform Generator (10 V_{pk-pk})

Accessories:

408174 : Rack Mount Kit for the 1830 Source/ Measure Switch

408190 : Card Shield Kit for the 1830 Source/ Measure Switch

(For the options' accessories, please see the Data Sheets for those options)

Software Packages:

970100 : ActivATE™ Test Platform Single Developer License, Debug, Execution Environment (Special 1830 Bundle)

970105 : ActivATE™ Test Platform Multiple Developer License (>4), Debug, Execution Environment (Special 1830 Bundle)

970200 : ActivATE™ Test Platform Runtime License

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