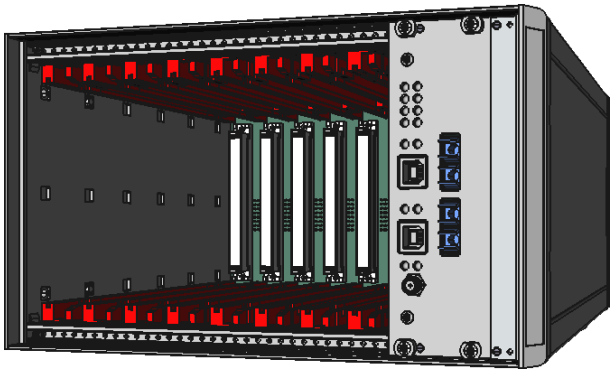
Datasheet

SPK-Platform *Brioude*
SK-Series Modular Instruments

SPK-Series Platform

Features

- Up to 16 SK-Series modular instruments
- USB and optical cables interfacing
- Remote interface monitoring
- Complete isolation from the host computer
- 10 MHz timebase
- Power supply monitoring
- Robust and compact design



View of the SPK42 Platform.

Applications

- Specific instrument assembly

General Description

Overview

SPK-Platform *Brioude* is a robust, flexible platform in which up to 2×8 modules of the SK-Series high performance instruments share the same compact backplane and remote computer interface. With the SK-Series modular instruments, the users get the functionality they need while avoiding the cost of unnecessary features. The SK-Series instruments are the right choice for configuring a custom system from a broad and growing selection of modules. Do not hesitate to contact *Signals and Systems for Physics* for designing specific modules you may require.

The SPK-Platform *Brioude* is based on desktop cases with EMC shielding providing electronics protection. This flexible and robust case can be converted from desktop to a 19" rack mount case. In accordance with IEC 60297-3-101, the SPK-Platform comes in different widths for accommodating from 5 to 16 single-wide modular instruments.
The SPK-Platform provides power input connectors, computer interfaces, clock synchronization, and individual module status.

User's Guide

The last version of the SPK-Platform *User's Guide* is available online at the product page.

Programming Guide

The SPK-Platform is equipped with the SK810 *Interfaces Controller* module to communicate with the remote PC. Its *Programming Guide*, which is also available online, provides a detailed description of the remote commands.

Backplane Interconnections

The modular instruments of the SK-series and the SK810 *Interfaces Controller* share the same backplane. Refer to the *Interconnections Diagram* available online for a synthetic presentation of the SBK-Series Backplanes used in the SPK-Platform-Platforms.

Communications

The SPK-Platform uses a link framework for communications between the instruments plugged into its backplane and the host computer. This operation is provided by the SK810 *Interfaces Controller* module, which is mounted into the master slot position. When a link is established, the Primary interface is linked to a single instrument : data bytes received from the Primary interface are relayed directly to the instrument and response data are relayed back to the Primary Interface. The Secondary interface, which can not be linked, remains available for regular commanding. Refer to the SK810 *User's Guide* for a detailed description of the operation.

Isolation

When communications are sent *via* optical cables, complete electrical isolation between the host PC and the instruments can be achieved. Likewise, digital isolators are used to reduce ground-loops induced noise resulting from connections between the USB ports and the remote computer. Because optical fiber is not susceptible to EMI, it can also eliminate the undesirable coupling of noise from the power lines on to the data lines and ensure error-free data transmission.

Timebase

The SPK-Platform-Platform provides a 10-MHz clock to the modules for optional synchronization. Indeed, by synchronizing clocks, low-frequency mixing products (beat tones) of independently running module clocks can be avoided. An external clock signal can be used instead of the internally generated one.

Power Supplies

All modules operate from various combinations of ±5 V, ±15 V and +24 V. These power supplies must be externally provided to the SPK-Platform-Platform through a rear panel DSUB connector. Only well regulated and filtered DC voltages sources should be used for preserving the performance of the modular instruments. Because no current-limitation is provided by the SPK-Platform-Platform, always use power supply units featuring this protection. The SPK-Platform-Platform provides the user with monitoring the power supply input voltages. An under-voltage detector operates from these measured values to determine whether a power supply's level is too low for a safe operation of the instruments.

Host Interfaces

Two interfaces can be used to communicate with the modular instruments installed in the SPK-Platform. The Primary Interface provides the user both with commanding the SPK-Platform with regular commands and linking the host computer with one instrument. The Secondary Interface, which can not be linked, is used for querying the SPK-Platform Platform's registers or for reconfiguring its operation. Both interfaces provide USB and optical ports for connecting the host computer.

Front-Panel Display

The front panel of the SPK-Platform Platform provides the user with minimal information about the status of the remote interfaces and the linked slot.

Specifications

Timebase[a]

Internal

Frequency	10 MHz.
Tolerance	±10 %.
Stability	±10 ppm/K.

External

Frequency	10 MHz.
Input Imp.	50 Ω, AC-coupled.
Input Level	+10 dBm.
Interface	Front-panel SMA connector.

Host PC Communications[a]

UART format[e]	9600 Baud or 115 200 Baud, 8-bit data, 1 stop-bit, No flow control.

Power Supplies

Input Voltages

Nominal Levels	±15 V, ±5 V and 24 V.
Interface	Rear-panel DSUB7W2 male connector.
Current	Application dependent. Externally limited.

Under-Voltage Monitoring[a]

Threshold	−10 % below the nominal level.

Backplane

Compatible w/	SK-Series modules and custom Euroboard modules[c].
Hor. pitch	4HP[d].

Number of slots[b]

SPK28-SB	5 instruments[b,d],
SPK42-SB	8 instruments[b,d],
SPK84-SB	8 instruments[b,d],
SPK84-DB	8 + 8 instruments[b,d].

[a] Refer to the SK810 Interfaces Controller *Datasheet* for the latest information.
[b] Applies to single-wide instruments (4HP). A double-wide instrument (8HP) occupies two slots.
[c] In accordance with the SK-Series pin assignments. Euroboard dimensions : 100 mm × 160 mm.
[d] Since 1 HP = 5.08 mm, the width of a single-wide (resp. double-wide) instrument is 20.32 mm (resp. 40.64 mm) .
[e] Applies both to USB and optical interfaces.

General Characteristics

The SPK-Series Platforms are designed to be operated in laboratory environment.

Operating Temperature

Range	+15 °C to +40 °C.

Host Interfaces[a,b]

USB Port	USB 2.0 type B receptacle (2x).
Optical Port	Avago Versatile Link, duplex, non-latching receptacle (2x).

Connectors

Instrum. Slots	DIN41612 96C female.
Timebase[a]	SMA, front-panel.
Power Input	DSUB7W2 male, rear-panel.
Power Output	DSUB7W2 female, rear-panel.
Spare	DSUB15 cutout, rear-panel.

Front Panel Indicators[a]

Pri. Interface	Error, Activity.
Sec. Interface	Error, Activity.
Linked Slot	SLOT#0 to SLOT#7.
Timebase Src	External input, internal clock.

Physical Properties

Height	128.4 mm (3U).
Width	SPK28 : 28 HP SPK42 : 42 HP SPK84 : 28 HP
Depth	SPK28-42 : 255.5 mm. SPK84 : 315.5 mm.
Weight	≈ 0 g. TBD
Panels Material	Anodized aluminium with rear conductive.
Shielding	Stainless steel and textile EMC contact strips.

Warranty

One (1) year parts and labor on defects.

[a] Refer to the SK810 Interfaces Controller *Datasheet* for the latest information.
[b] For SPK84-D, a second SK810 *Interfaces Controller* is required.

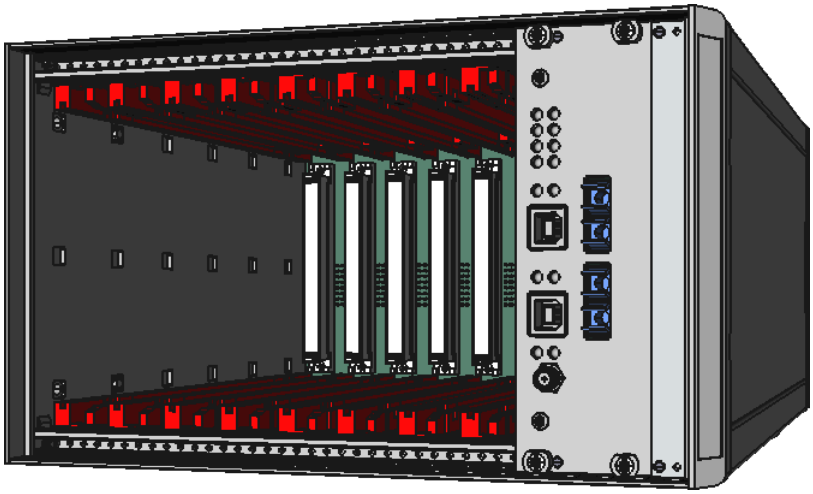


Figure 1: View of the SPK42 Platform. The SK810 *Interfaces Controller* module is inserted in its dedicated slot, which is always located at the rightmost position. Up to 8 single-wide instruments can be assembled into this platform.

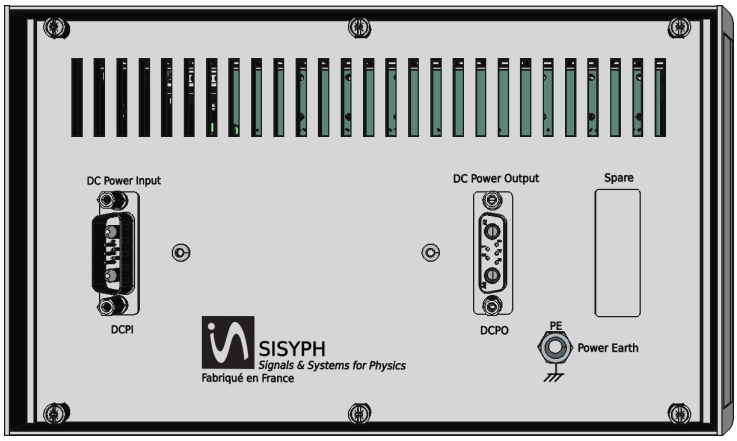


Figure 2: Rear-view of the SPK42 Platform. All SPK-Series Platforms present the same rear-panel. The power supply voltages are fed to the backplane through a DSUB7W2 male connector (DCPI). A female DSUB7W2 connector (DCPO) is provided for cascading a second platform. A Power Earth connection is also available through a 4-mm banana jack (PE). For customization purpose, a DSUB15 cutout (Spare) is also provided.

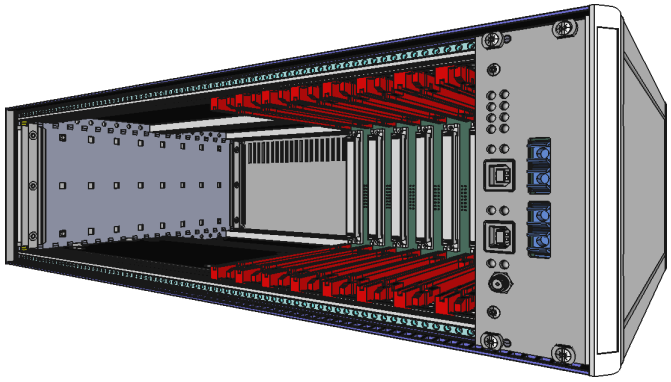


Figure 3: View of the SPK84-S Platform (single-backplane option). Only one SK810 *Interfaces Controller* module is used to communicate with up to 8 single-wide instruments. The unoccupied half-left is equipped (on demand) with an horizontal mounting plate (not clearly visible here). This free area can be used for customization purpose, *e.g.* for mounting heavy or optical components.

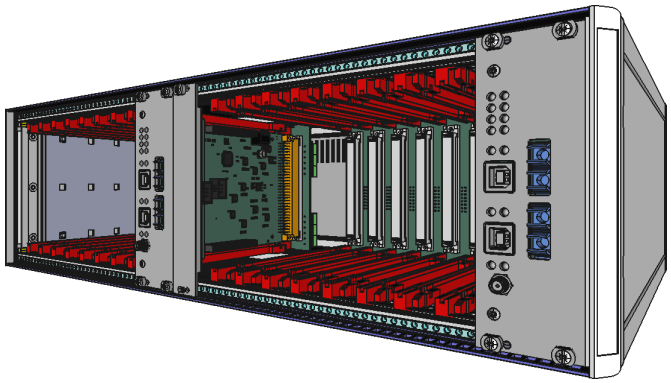


Figure 4: View of the SPK84-D Platform (dual-backplane option). Two SK810 *Interfaces Controller* modules are used here to communicate with up to 16 single-wide instruments. Since the SKP84-D is equipped with two distinct backplanes, it actually behaves like two SPK42 platforms assembled in a single case.

DIN41612 Connectors

The DIN41612 connectors carry all the power and communications lines between the SK810 *Interfaces Controller* and the modular instruments. Whereas instruments can be plugged into any available slot, the backplane rightmost slot position (Master position) is dedicated to the SK810 *Interfaces Controller*. Refer to the Figure 5 for the respective lines assignments. Detailed information is available online.

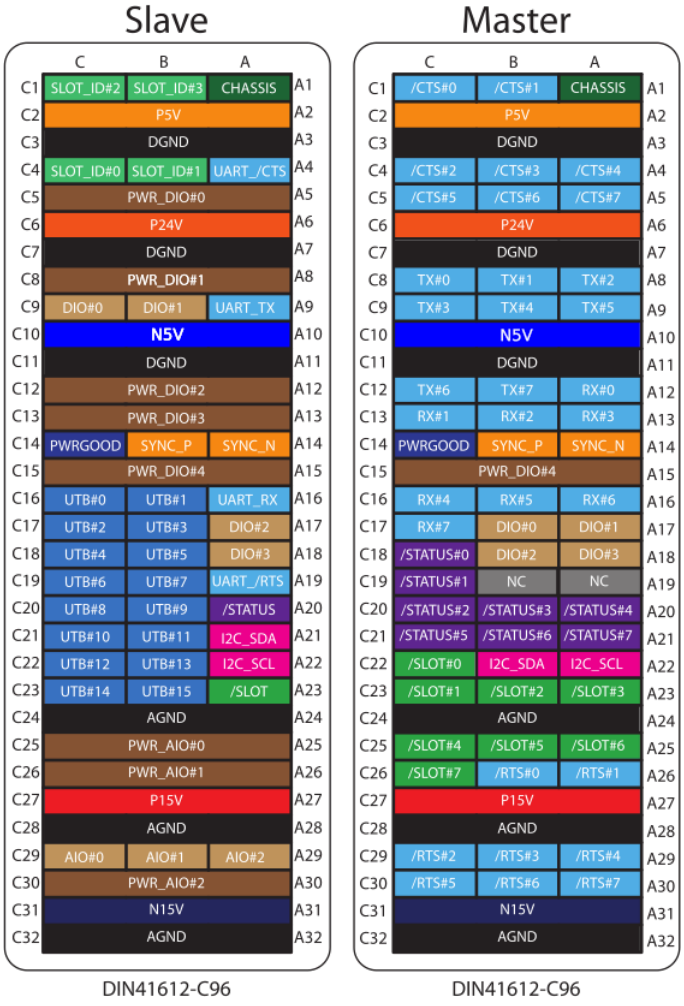


Figure 5: Pin assignments of the backplane connectors.

Ordering Information

SPK-Platform Platform

The SPK-Platform can be ordered with different options.

Ordering Code	Case Width Options
SPK28-x-x	28HP, up to 5 single-wide instruments can be assembled.
SPK42-x-x	42HP, up to 8 single-wide instruments can be assembled.
SPK84-x-x	84HP, up to 2×8 single-wide instruments can be assembled.

Ordering Code	Backplane Options
SPKxx-S-x	Case w/ one backplane (28- or 42-HP width).
SPKxx-D-x	Case w/ two independant backplanes (42-HP width).
SPKxx-N-x	No backplane, empty case.

Ordering Code	Communications Bridge Options
SPKxx-x-B	One (1) SK810 Interface Controller per backplane is included.
SPKxx-x-N	Platform w/o communications bridge module.

Ordering Code	Examples
SPK42-S-B	42HP-wide platform with one SK810 for accommodating up to 8 single-wide modules.
SPK84-S-B	84HP-wide platform with one SK810 for accommodating up to 8 single-wide modules.

Accessories

Accessories and optional parts described in this section are not included in the SPK-Platform's package and must be therefore ordered separately if required.

DC Power Input Cable

The DC input voltages are fed to the rear-panel DSUB7W2 connector through this cable (SCK131). Each end of this 1-m length cable is equipped with the mating DSUB7W2 plug.

DC-Power Input Adapter

The SCK132 *DC-Power Input Adapter* allows the user to power the SPK-Platforms with 3rd party power supply units, which are not equipped with the DSUB7W2 connector. The SCK132 features 5 pairs of terminal blocks for the input voltages and one (1) DSUB7W2 female receptacle for connecting the SCK131 cable. Note that the power adapter board can be directly plugged into the rear-panel mating connector without any DC-power cable. *Only well regulated and filtered DC voltages sources should be used for preserving the performance of the modular instruments.*

Filler Panels

Rear conductive aluminium filler panels can be used in place of missing modules. By filling these slots, the initial EMI shielding is preserved. These panels come in two widths (4HP and 8HP). They are equipped with two stainless steel sleeves, two collar screws and an EMI textile gasket.

Optical Cables

Two optical cables are required for connecting both Primary and Secondary Interfaces of one (1) SK810 *Interfaces Controller*. The standard length is 3 m or 10 m. Contact us for specific dimensions.

USB Cables

Two USB cables are required for connecting both Primary and Secondary Interfaces of one (1) SK810 *Interfaces Controller*. The standard length is 1 m.

USB-to-Optical Bridge

The SM301 *Nemausus* is an USB-to-optical bridge for connecting the fibres to the remote computer side. It is powered from the USB port used for the communications with the PC and features a pair of receptacles for the fibres (RX and TX), providing the user with connecting one optical cable to the SK810 *Interfaces Controller*. Two SM301 are required for connecting both Primary and Secondary Interfaces.

Ordering Code	Description
SCK131	1-m DC-power cable ended with 2 DSUB7W2 (male and female) connectors.
SCK132	DC-power input cable adapter for connecting 3rd party power supply units.
SAP304	4-HP filler panel (height 3U), EMI textile gasket and fixing screws included.
SAP308	8-HP filler panel (height 3U), EMI textile gasket and fixing screws included.
SCM071	3-m optical cable, single (RX,TX) pair, Broadcom MPN: HFBR-RMD003Z.
SCM072	10-m optical cable, single (RX,TX) pair, Broadcom MPN: HFBR-RMD010Z.
SCM841	USB 2.0 cable, type A male to type B male, 1 meter length, TPE jacket.
SM301 *Nemausus*	USB-to-Optical Bridge.

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Important Notice

Information in this document is subject to change without notice.

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