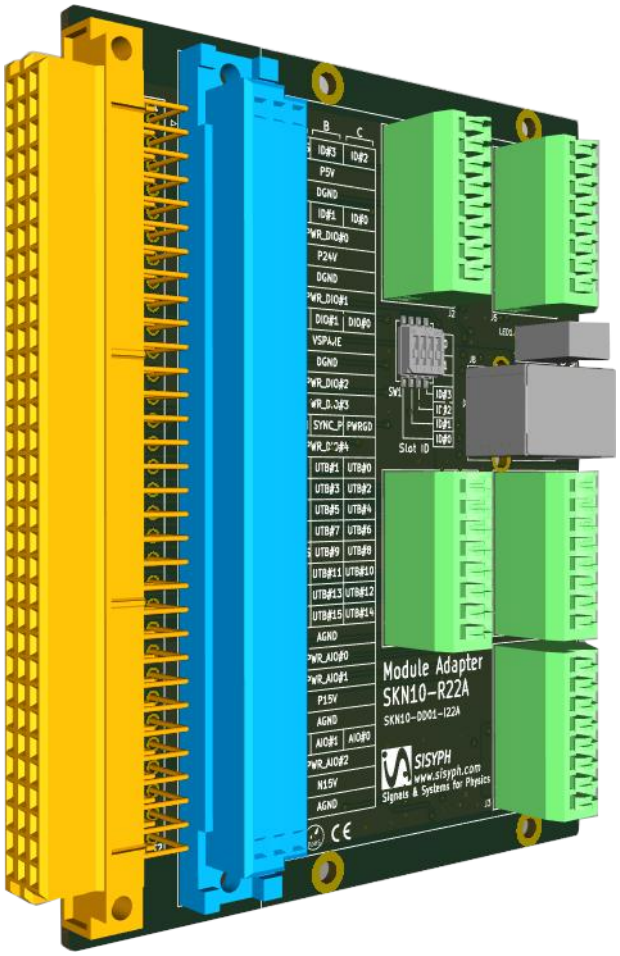
User's Guide

SKN10
Stand-Alone Module Adapter

SK-Series Modules



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Certification

Signals and Systems for Physics certifies that this product met its published specifications at the time of shipment.

Warranty

This *Signals and Systems for Physics* product is warranted against defects in materials and workmanship for a period of one (1) year from the date of shipment.

Service

Do not install substitute parts or perform any unauthorized modifications to this instrument. For warranty service or repair, this product must be returned to a *Signals and Systems for Physics* authorized service facility. Contact *Signals and Systems for Physics* before returning this product for repair.

Information in this document is subject to change without notice.

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General Information

Scope

This document provides the user with information on how to operate the SKN10 *Stand-Alone Module Adapter* module.

Safety and Preparation for Use

Because of the variety of uses for the SKN10 *Stand-Alone Module Adapter*, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The SKN10 *Stand-Alone Module Adapter* is not designed, intended, or sold for use in hazardous environments requiring fail-safe operation, including without limitation, operation of nuclear facilities, aircraft or spacecraft control systems, and life support or weapons systems. The user must assure that any failure or misapplication of the SKN10 *Stand-Alone Module Adapter* cannot lead to a consequential failure of any interconnected equipment that could lead to loss of life or limb, or property damage.

The illustrations, charts, and discussions shown in this manual are intended solely for purposes of example. Since there are many variables and requirements associated with any particular control application, *Signals and Systems for Physics* does not assume responsibility or liability for actual use based upon the examples shown in this publication.

Do not install substitute parts or perform any unauthorized modifications to this instrument.

The SKN10 *Stand-Alone Module Adapter* is designed to be used with an SK-Series modular instrument. Do not turn on the power to the adapter or apply voltage inputs to the module until the module is completely mated and locked in place. Do not exceed the specified voltages at any input or output connector.

Specifications and Related Documentation

Complete information (specifications, datasheet, programming guide, block diagram . . .) is available online. These additional documents can be downloaded from the product page at www.sisyph.com.

Contents

1 Getting Started

This section provides the user with the necessary information to get started quickly with the SKN10 *Stand-Alone Module Adapter*. Each part of the adapter's top side is explained in the following sections. Circled numbers beginning a paragraph help the user to locate these parts on the adapter (see Fig 1).

1.1 Overview

The SKN10 *Stand-Alone Module Adapter* was primary designed for use with SK-Series modular instruments. These modules can be operated stand-alone or within a platform where several modules can be assembled to configure a specific control or measurement system. Indeed, SPK-Series platforms accommodate up to eight instruments and provide power, clock synchronization, communications, and module status. In order to operate a single instrument stand-alone, *Signals and Systems for Physics* provides the user with the SKN10 Stand-Alone Module Adapter. It is very convenient for wiring all required power supplies, module's I/O or communications interfaces.

1.2 DIN41612 Connectors

Two DIN41612 connectors are provided for the connection of the modular instrument. All required lines for a stand-alone operation are routed to dedicated interfaces for the connection of power supplies, USB cable, timebase... Because all I/O lines of the instrument are both routed the primary and secondary connectors, the unused one can be used as test interface without alter the operation by installing small pins or oscilloscope probes into its pins' holes. For instance, some factory tests are performed in such manner.

1.2.1 Primary Connector

(1A) The primary connector is the preferred way to connect a stand-alone module. In this case, the adapter and the modular instrument belong to the same X-Y plane.

1.2.2 Secondary Connector

(1B) The secondary connector provides a second way to connect the module, in such case, the module and the adapter planes are orthogonal.

1.2.3 Pin Assignments

(1C) The pin assignments of the DIN41612 connectors are given to help the user to locate a pin. These indications are helpful when probing some signals during the operation.

1.3 Indicators

Two indicators are used to provide minimal information about the activity of the communications.

1.3.1 I2C Activity (I2C)

(3) Any activity of the I2C interface will cause this indicator to flash green.

1.3.2 USB Activity (USB)

(3) Any data coming from or going to the host interface through the USB interface will cause this indicator to flash green.

1.4 USB Receptacle

(2) Connect the USB cable to this receptacle for the communications with the host controller over the USB interface.

1.5 Terminal Blocks

1.5.1 Power Supply

Two groups of terminal blocks are provided to wire the module to the power supply sources. Only voltages required by the instrument have to be connected, their respective terminal blocks can be left open otherwise.

CAUTION - *Because the modular instrument uses some power supplies without any local post-regulation circuitry, always use clean, well regulated power sources with adjustable current limitation.*

(4A) Two pairs of terminal blocks are provided to wire the ±15 V power supplies and their ground lines. One pair of terminal blocks should be used for each voltage source.

(4B) One pair of terminal blocks is provided to connect the earth (chassis ground) to the instrument for grounding the mechanical parts. *For safety reason, always wire the module to the local earth.*

(4B) The +5 V and +24 V power supplies have to be wired using their respective pair of terminals.

(4B) The **VS** terminal blocks pair refers to the Spare Voltage lines. This pair is either assigned to the −5 V or to a specific power supply. When a −5 V power supply is required for the operation, it must be wired using this pair of terminals. Some modules might also use the **VS** power lines to connect a specific voltage source, for instance −24 V. Always refer to the instrument's documentation for detailed information on required power supplies.

1.5.2 I2C interface and Timebase

(5) Some instruments may use an I2C interface bus for the communications with the host controller. In this case, both data and clock lines have to be wired to their respective terminal blocks (**SDA**, **SCL**). Since the SKN10 features digital isolators installed on these lines, a +5 V power supply have to be also wired (**VCC**, **GND**) for proper operation. This power supply must be provided by the host controller to preserve isolation.

(5) SPK-Platforms are designed to distribute a synchronization timebase of 10 MHz to the modular instruments *via* the (**SYNP**, **SYNN**) backplane lines. The instrument may use this differential pair to synchronize the clock of its microcontroller. When operating stand-alone, the instrument module automatically switches the 10-MHz clock to an internal source when the synchronization is not detected. In order to restore the synchronization of the module with an external timebase, the external clock source has to be wired using the dedicated terminal blocks.

1.5.3 User Terminal Blocks

(6A) (6B) Sixteen dedicated pins of the module's DIN41612 connector are assigned to instrument's specific I/O. Each module may use these pins to make some signals accessible from the rear-side. This can be useful when the module is assembled into a SPK-Platform, *e.g.* for connecting some signals to the rear-panel of the platform. These pins are referred as User's Terminal Blocks (**UTB**) in the documentation. In order to maintain the access to **UTB** pins when operating stand-alone, the SKN10 provides 16 terminal blocks, divided according to whether they refer to an even or odd pin. Refer to the instrument documentation for the UTB pins' assignments.

1.6 On-Board Settings

1.6.1 Slot ID Switches

(7) Four digital lines are used by the module to retrieve the number of the slot (0 to 15) where the module is mated. This number is used, for instance, to set the module's slave address when an I2C interface bus is used for the communications with the master controller. Because these lines are coded by the platform hardware, no such identification are available when the instrument operates stand-alone operation. When this functionality is required by the application, the SKN10 provides the user with four switches to assign a virtual slot number.

2 Operating the Stand-Alone Module Adapter

Refer to the *Functional Block Diagram* online for graphical information and to the *Datasheet* for detailed specifications.

2.1 Connecting the Power Supplies

Caution – *Misapplication of power may cause circuit damage.*

The required power supplies must be connected using the dedicated terminal blocks. Refer to the instrument datasheet for detailed information on the power consumption. The SKN10 Stand-Alone Module Adapter does not any current limitation circuitry.

Caution - *Because the modular instrument uses some power supplies without any local post-regulation circuitry, always use clean, well regulated power sources with adjustable current limitation.*

2.2 Remote Control Over the USB Interface

The SKN10 features an USB-to-UART bridge chip for the communications between the host controller and the instrument. The UART lines from the chip are routed to the modular instrument's communications lines through the DIN41612 connectors. Digital isolators are installed on these lines to prevent common-mode and ground-loop noise coupling.
Unless otherwise noted in the datasheet of the instrument, the stand-alone module should use the standard UART format for SK-Series instruments, which is 9600 baud, 8-bit data with 1 stop-bit and no flow control.

In order to communicate with the instrument, connect the host to the adapter using a simple USB cable and configure the COM of the host port according to the required UART format.

3 Accessories and Related Products

This chapter describes related products and accessories that are available for use with the SKN10 *Stand-Alone Module Adapter*. These optional parts must be ordered separately.

3.1 USB Cable

One (1) cable is required for the communications with the host controller over the USB interface. If any USB 2.0 cable (type A male to type B male) can be used, the cable length should be limited to 1 meter. This cable can be also ordered from Sisyph (P/N SCM841).

4 Figures

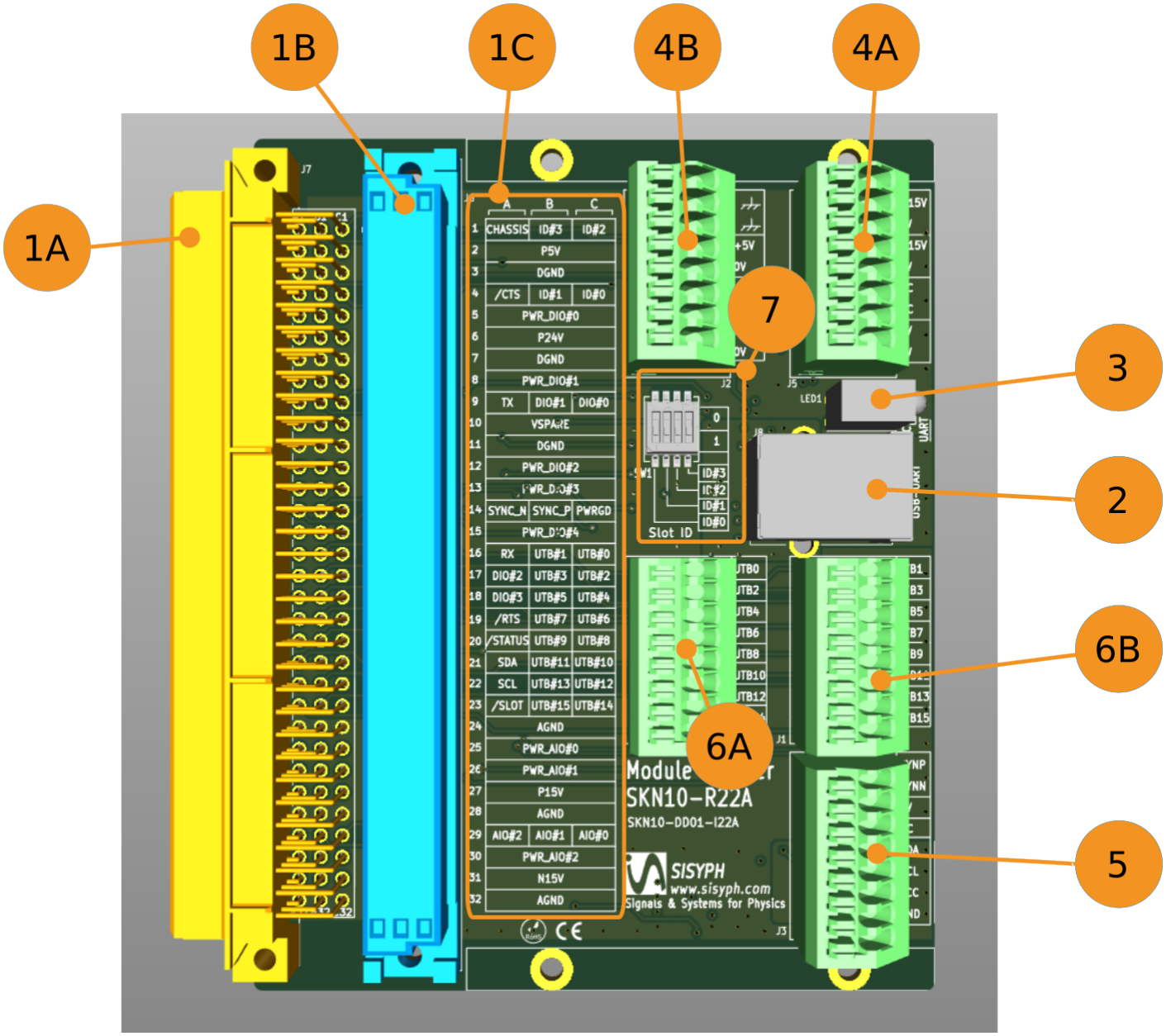

Figure 1: View of the SKN10's top side. Circled numbers refer to features detailed in the Section 1.

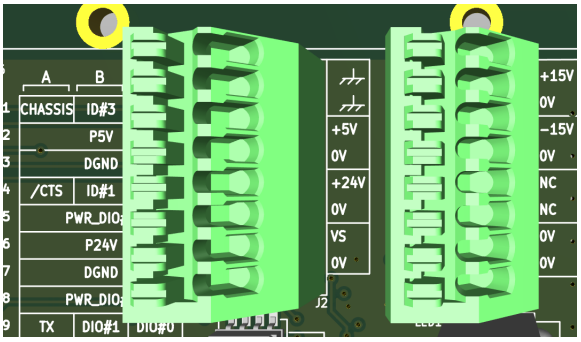

Figure 2: Power supply terminal blocks. These interfaces are used to wire the module to the power supply units.

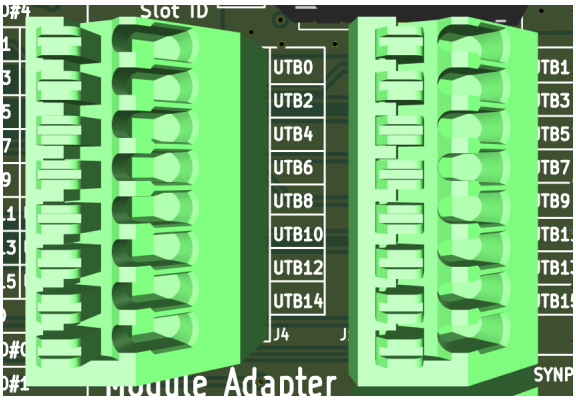

Figure 3: User's terminal blocks. These interfaces are used to wire the specific I/O lines of the instrument.

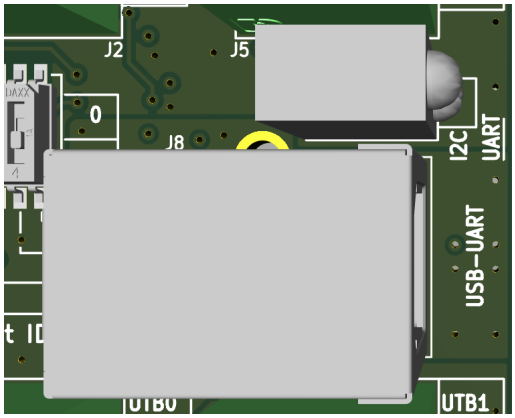

Figure 4: USB receptacle. The host computer is connected to the module using this receptacle.

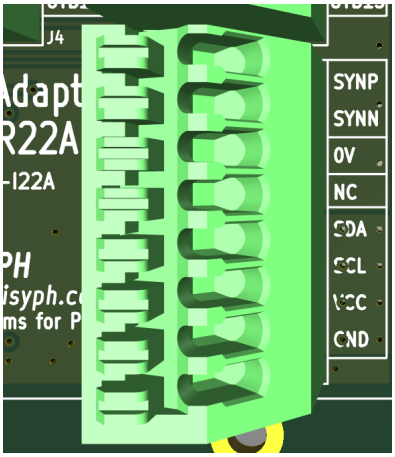

Figure 5: I2C and timebase terminal blocks. Both I2C communications lines and 10-MHz clock signals are wired to the instrument using these receptacles.

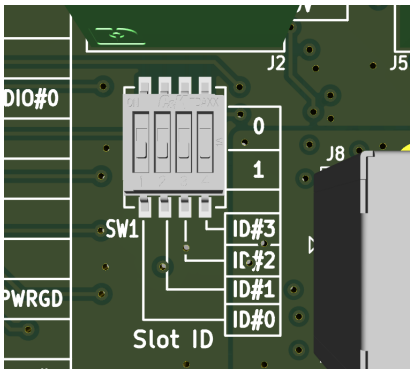

Figure 6: Slot ID switches. A virtual slot number can be assigned using the four dedicated switches.

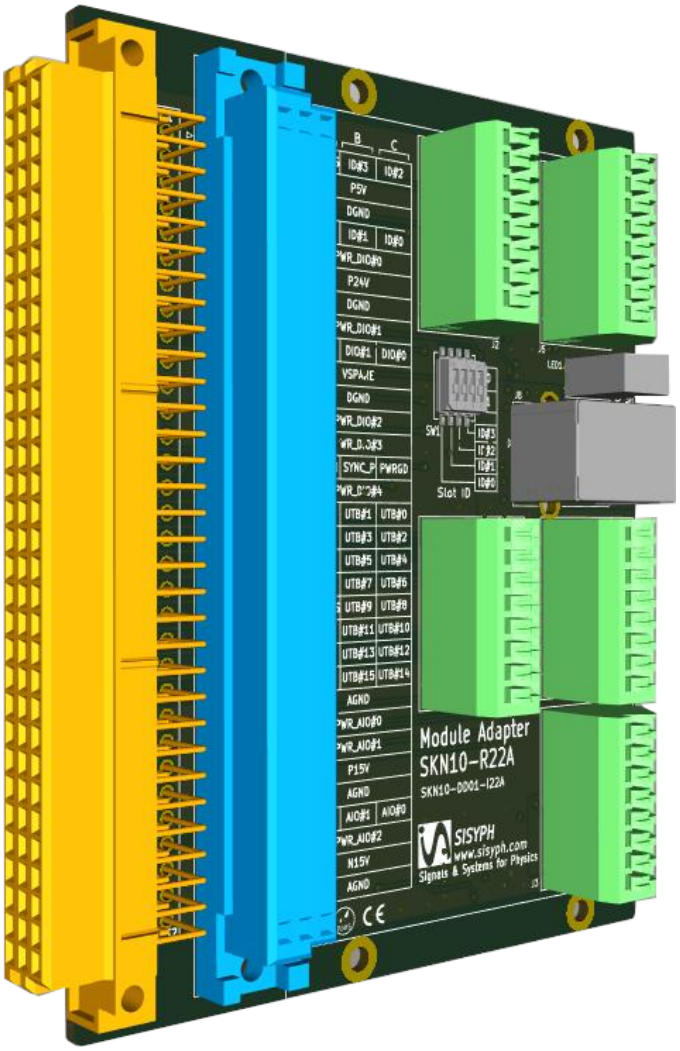

Figure 7: View of the SKN10's left side. The primary connector (orange) is the preferred interface for the connection of the modular instrument, but the secondary connector (blue) can be also used. The unused DIN41612 allows the installation of probes for test.

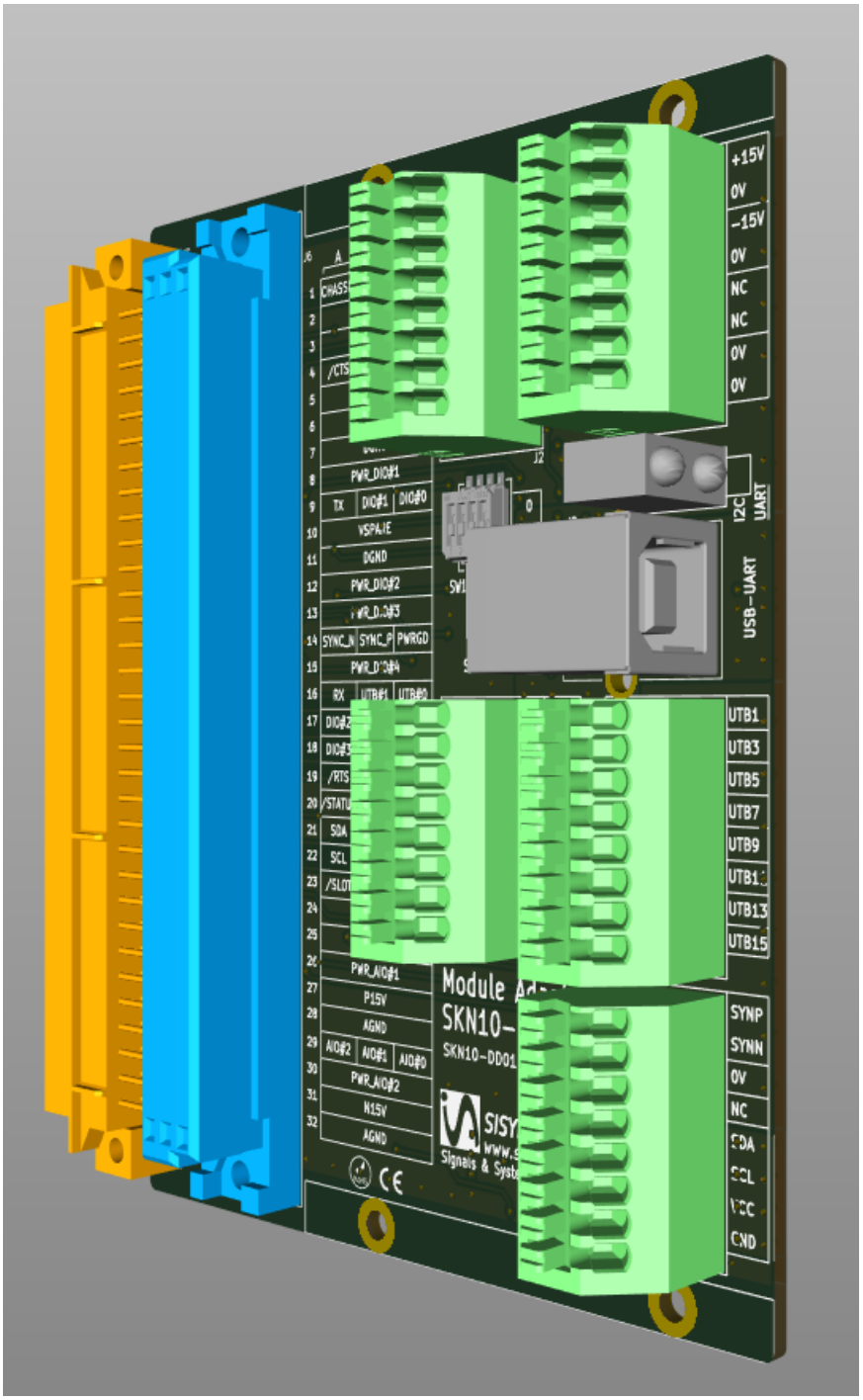

Figure 8: View of the SKN10's right side. Terminals blocks are used for the connection of the power supplies. Additional modules lines (10-MHz clock or specific I/O) are also wired using terminal blocks. The communications with the host computer are allowed through USB or I2C interfaces.

5 Document Revision History

5.1 Version Number

This document is identified by SKN10-SU02-P24A.

5.2 Revision History

P24A (2024-06-19)

Initial version.