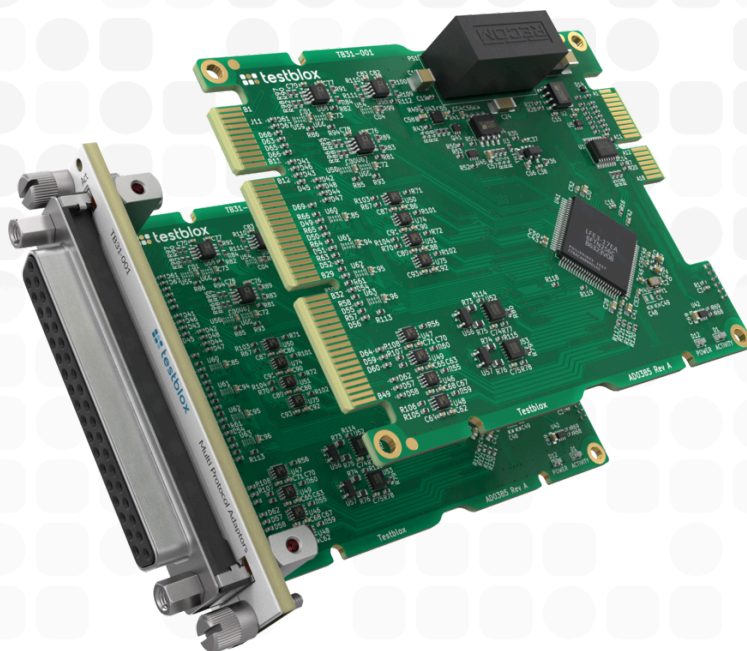




Testblox TB31-001

Multi-protocol communication: SPI, I²C, UART, RS485



The TB31-001 is a multi-protocol communication module in the Testblox family. It connects a device under test to SPI, I²C, UART and RS485 buses from inside the fixture, without separate or custom communication hardware.

All interfaces share one programmable logic level. Nothing on the DUT side is connected until the host has set it, and the DUT side is isolated from the backplane ground.

Functionality

- 2 SPI ports, master or slave, 8 chip selects
- 2 I²C controllers with interrupt inputs
- 2 UARTs with RTS/CTS flow control
- 2 RS485 ports with switchable termination
- Programmable logic level: 1.8/2.5/3.3/5 V
- Isolated from backplane ground



Specifications

General	
Supported interfaces	SPI, I2C/I3C, UART, RS485
Logic Levels, Vdigital	1.8V / 2.5V / 3.3 V / 5 V ¹

I ² C controller	
Number of interfaces	2
Maximum I ² C speed mode	Fast mode plus (1 MHz)
Configurable pull-up resistor value	3.3 kΩ, 1.2 kΩ, 0.9 kΩ and no pull-up
Interrupt pins (SMBus alert compatible)	Yes

RS485	
Number of interfaces	2
Duplex modes	2x half-duplex or 1x full-duplex
Maximum baudrate	5 Mbits/s (TBC)
Controllable termination resistor	120 Ω

Isolation	
Channel-to-earth (backplane ground)	
Isolation working voltage	250 V continuous
Isolation Barrier Bleeder Resistance	10 MΩ

Mechanical	
Size (w x d x h)	90 x 69 x 15.3 mm
Weight	30 g

SPI master/slave	
Number of interfaces	2
Number of chip select output pins (total)	8
Number of chip select input pins (total)	2 ²
Maximum SPI clock frequency	7.8 MHz (TBC)

UART	
Number of interfaces	2
Flow control:	CTS and RTS
Maximum baudrate	5 Mbits/s (TBC)

Power supply	
Supply voltage	24 VDC ±5%
Rated power	2 W

Environmental	
Operating temperature	0°C to +55°C
Indoor / Outdoor	Indoor use only
Altitude	< 5000 m over sea level (TBC)

Compliance	
CE marked	
EMC compliant	
RoHS compliant	
REACH compliant	
WEEE compliant	

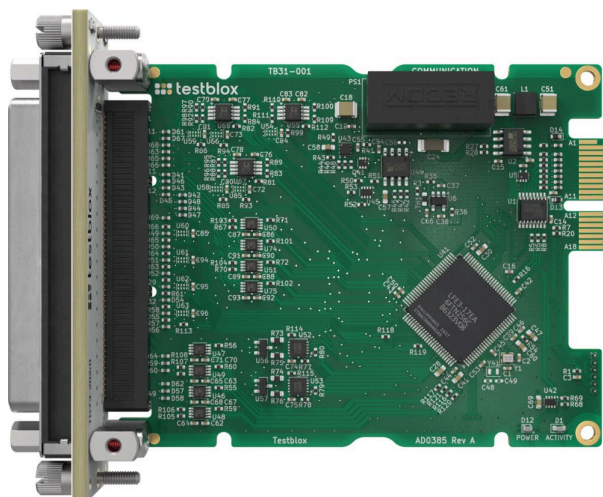
¹ Logic Level is programmable and all interfaces share the same logic level. Inputs are always 5V tolerant

² One overlaps with a chip select output pin



Product Order Codes

Testblox Communication module	TB31-001
Single-Module USB-C Backplane	TB92-001
Three-Module Horizontal USB-C Backplane	TB94-003-001
Four-Module Vertical USB-C Backplane	TB94-004-001

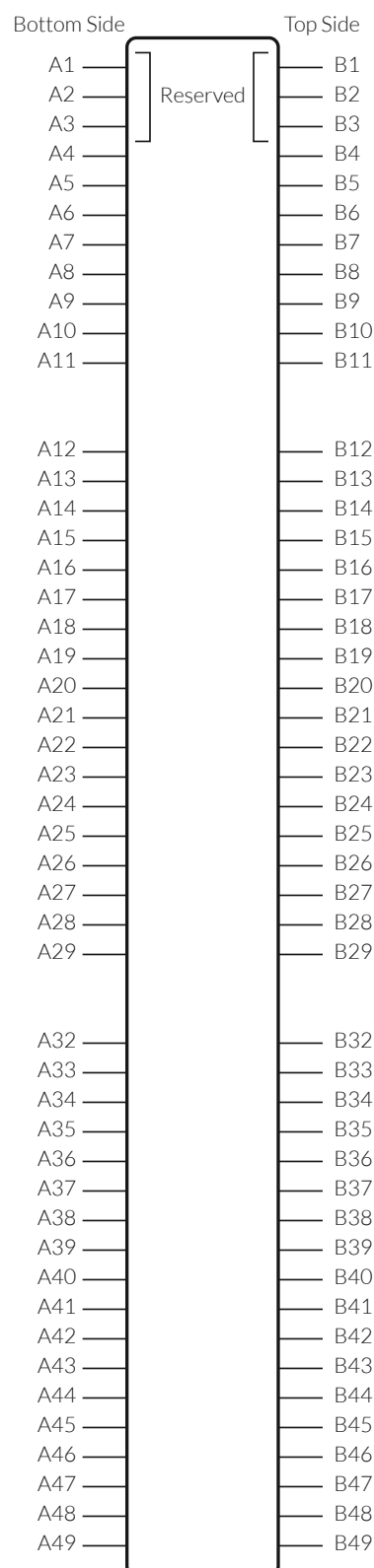




Pinout - Front Edge Connector

Pinout for Front Edge Connector - TB31-001

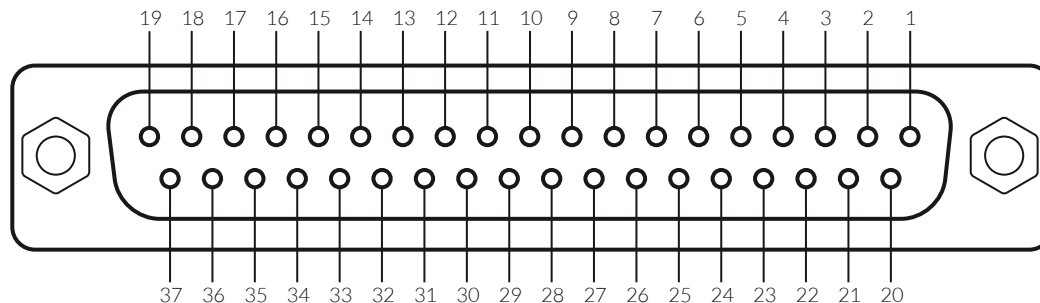
Pin A1 - RESERVED	Pin B1 - RESERVED
Pin A2 - RESERVED	Pin B2 - RESERVED
Pin A3 - RESERVED	Pin B3 - RESERVED
Pin A4 - I2C2_SDA	Pin B4 - I2C2_SCL
Pin A5 - I2C2_SDA	Pin B5 - I2C2_SCL
Pin A6 - nI2C2_INT	Pin B6 - nI2C1_INT
Pin A7 - nI2C2_INT	Pin B7 - nI2C1_INT
Pin A8 - UART1_TX	Pin B8 - I2C1_SDA
Pin A9 - UART1_TX	Pin B9 - I2C1_SDA
Pin A10 - UART1_RX	Pin B10 - I2C1_SCL
Pin A11 - UART1_RX	Pin B11 - I2C1_SCL
Pin A12 - UART1_RTS	Pin B12 - GND
Pin A13 - UART1_RTS	Pin B13 - GND
Pin A14 - UART1_CTS	Pin B14 - nSPI_CS_2
Pin A15 - UART1_CTS	Pin B15 - nSPI_CS_2
Pin A16 - UART2_TX	Pin B16 - nSPI_CS_IN1
Pin A17 - UART2_TX	Pin B17 - nSPI_CS_IN1
Pin A18 - UART2_RX	Pin B18 - nSPI_CS_8
Pin A19 - UART2_RX	Pin B19 - nSPI_CS_8
Pin A20 - UART2_RTS	Pin B20 - nSPI_CS_7
Pin A21 - UART2_RTS	Pin B21 - nSPI_CS_7
Pin A22 - UART2_CTS	Pin B22 - nSPI_CS_6
Pin A23 - UART2_CTS	Pin B23 - nSPI_CS_6
Pin A24 - GND	Pin B24 - nSPI_CS_5
Pin A25 - GND	Pin B25 - nSPI_CS_5
Pin A26 - RS485_1_A	Pin B26 - nSPI_CS_4
Pin A27 - RS485_1_A	Pin B27 - nSPI_CS_4
Pin A28 - RS485_1_B	Pin B28 - nSPI_CS_3
Pin A29 - RS485_1_B	Pin B29 - nSPI_CS_3
Pin A32 - RS485_2_A	Pin B32 - nSPI_CS_2
Pin A33 - RS485_2_A	Pin B33 - nSPI_CS_2
Pin A34 - RS485_2_B	Pin B34 - nSPI_CS_1
Pin A35 - RS485_2_B	Pin B35 - nSPI_CS_1
Pin A36 - GND	Pin B36 - SPI2_MISO
Pin A37 - GND	Pin B37 - SPI2_MISO
Pin A38 - GND	Pin B38 - SPI2_MOSI
Pin A39 - GND	Pin B39 - SPI2_MOSI
Pin A40 - GND	Pin B40 - SPI2_SCK
Pin A41 - GND	Pin B41 - SPI2_SCK
Pin A42 - GND	Pin B42 - GND
Pin A43 - GND	Pin B43 - GND
Pin A44 - GND	Pin B44 - SPI1_MISO
Pin A45 - GND	Pin B45 - SPI1_MISO
Pin A46 - GND	Pin B46 - SPI1_MOSI
Pin A47 - GND	Pin B47 - SPI1_MOSI
Pin A48 - GND	Pin B48 - SPI1_SCK
Pin A49 - GND	Pin B49 - SPI1_SCK



Pinout Diagram for Front Edge Connector

Pinout - Using 37-pin D-type Interface Board

Pinout for 37-pin D-type Interface Connector - TB73-202	
Pin 1 - SPI1_SCK	Pin 20 - RS485_2_B
Pin 2 - SPI1_MOSI	Pin 21 - RS485_2_A
Pin 3 - SPI1_MISO	Pin 22 - RS485_1_B
Pin 4 - GND	Pin 23 - RS485_1_A
Pin 5 - SPI2_SCK	Pin 24 - GND
Pin 6 - SPI2_MOSI	Pin 25 - UART2_CTS
Pin 7 - SPI2_MISO	Pin 26 - UART2_RTS
Pin 8 - nSPI_CS_1	Pin 27 - UART2_RX
Pin 9 - nSPI_CS_2	Pin 28 - UART2_TX
Pin 10 - nSPI_CS_3	Pin 29 - UART1_CTS
Pin 11 - nSPI_CS_4	Pin 30 - UART1_RTS
Pin 12 - nSPI_CS_5	Pin 31 - UART1_RX
Pin 13 - nSPI_CS_6	Pin 32 - UART1_TX
Pin 14 - nSPI_CS_7	Pin 33 - nI2C2_INT
Pin 15 - nSPI_CS_8	Pin 34 - I2C2_SDA
Pin 16 - nSPI_CS_IN1	Pin 35 - I2C2_SCL
Pin 17 - nSPI_CS_2	Pin 36 - nI2C1_INT
Pin 18 - GND	Pin 37 - I2C1_SDA
Pin 19 - I2C1_SCL	

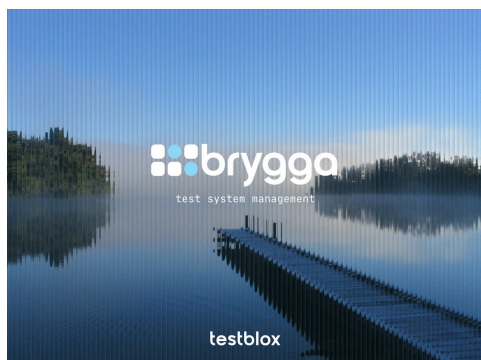


**37-pin Female D-type Connector
as viewed from front of module**



About Testblox

Testblox is an integrated, modular instrumentation platform designed specifically for automated functional test. Its playing-card-sized modules can be embedded inside standard test fixtures, bringing measurement, switching, power, and I/O closer to the device under test. This reduces rack space, cabling, and overall system complexity while providing the reliability and support expected in production ATE.



The Testblox portfolio includes analog and digital I/O, digital multimeters, power supplies, DUT communication, and a broad selection of switching modules, including multiplexers, matrices and general-purpose relays. Electrically isolated modules help prevent ground loops and simplify integration. Engineers can control Testblox systems using Brygga Test Management Software, Python, LabVIEW or C#, with a consistent software model across the platform.

Modules can be used individually with a single-module backplane or combined together with three- or four-module backplanes to create a test system tailored to the application. DUT signals are available directly from each module's front-edge connector or through standard D-sub cabling.

Testblox is a multi-vendor platform developed through complementary expertise. Testblox AB provides the core architecture, backplanes, system software and selected I/O; Wireflow contributes multifunction I/O and power-supply technology; and Pickering Interfaces contributes switching and measurement expertise. Together, they deliver specialist instrumentation through a common form factor, electrical interface and software workflow.

Designed and manufactured in Europe, Testblox modules are backed by a three-year warranty and a commitment to more than 20 years of hardware availability — providing a compact, cost-effective platform built for long-term automated test.

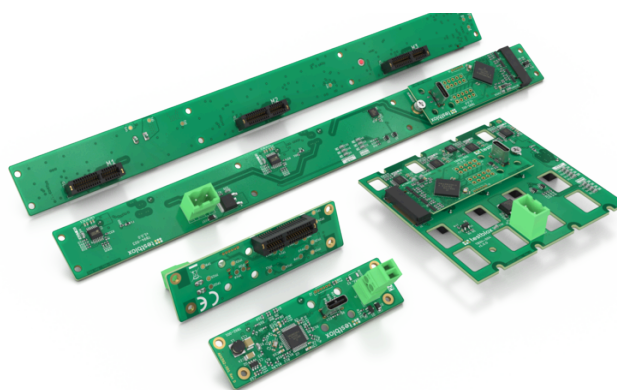
For more information, visit: www.testblox.com





Testblox Backplanes

Every Testblox system requires a backplane. Choose a one-, three- or four-module backplane to bring compact measurement, switching, power and I/O into your test fixture, with a USB-C connection to the host computer.



Backplane	Part Number	Typical Use
Single-Module USB-C Backplane	TB92-001	A single instrument in a compact fixture
Three-Module Horizontal USB-C Backplane	TB94-003-001	A low-profile arrangement of instruments
Four-Module Vertical USB-C Backplane	TB94-004-001	More instruments within a small footprint

USB communication and system power

Control the system using USB Full Speed at 12 Mbit/s through a USB Type-C connector. All backplanes use an external 24 V supply through a pluggable screw terminal. Check the selected backplane datasheet for power requirements; the system is not powered by the USB-C connection.

Mounting inside the fixture

Testblox mounting accessories support and retain modules while allowing individual modules to be removed for maintenance. Choose the mounting accessory to suit the backplane and the fixture connection method. You are also free to print your own with the files available on testblox.com. DUT signals connect through each module's front-edge connector or an available D-sub front panel.

Accessory	Application
TB82-003	Module guides for the Three-Module Horizontal Backplane
TB82-001	Module guides for one module in the Four-Module Vertical Backplane
TB82-002	Module guides for four modules in the Four-Module Vertical Backplane



Before ordering, check module count, fixture clearance, DUT connectors, power budget and required mounting accessories. Refer to the individual module specifications for module-to-backplane isolation ratings.

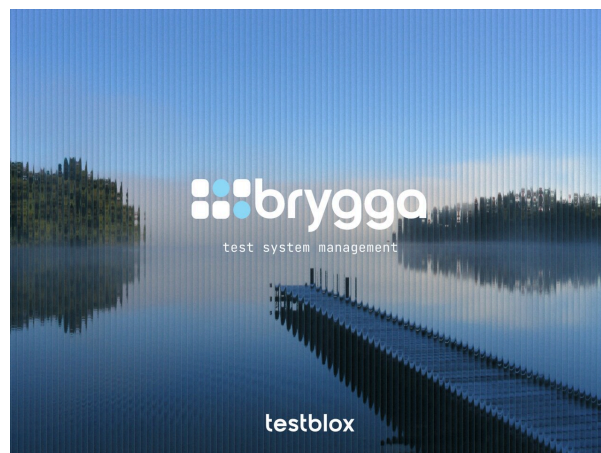


Testblox Software

Use Brygga Test Management Software to discover, configure and interactively test your Testblox system, then use the APIs and module simulation to develop your automated test application.

Brygga system setup and interactive control

Bring up hardware without writing code. Brygga Test Management Software combines system discovery, configuration, module test panels and firmware management in one test system management interface, helping you check connections and exercise instruments before automating a test.



Task	What you can do with Brygga
Discover and locate	Automatically discover connected backplanes and modules. Activate module front panel LEDs to match software entries to physical hardware.
View the system	See backplanes, installed modules, slot positions and connection status together.
Name and configure	Assign hardware and channel aliases shared with the API. Set module ranges, channels, limits and start-up states where supported.
Measure and control	Use module-specific test panels to take measurements, control outputs and operate switches without writing software.
Update firmware	Identify available firmware updates and install them on selected systems or modules.

APIs for automated test development

Integrate Testblox into your own test software using drivers, APIs and example programs. Windows and Linux support, together with Python, NI LabVIEW and C# integration, lets you use familiar development tools. Hardware and channel aliases assigned in Brygga carry through to the API, helping you use recognizable names in your test code. Refer to the software documentation for supported operating-system versions and module-specific functionality.

Module simulation

Configure simulated modules offline and develop your application before the hardware arrives. Simulation is intended to provide representative signal data, so you can exercise configuration, API calls and application logic while fixture development continues.

Software downloads and documentation: testblox.com/software



Testblox Support & Services

Testblox combines a three-year warranty, long-term hardware availability and technical support to help you build and maintain production test systems throughout their working life.

Three year warranty and long term availability

Testblox modules are backed by a three-year warranty and a commitment to more than 20 years of hardware availability. This helps protect your test system investment and reduces the disruption associated with premature product obsolescence.

Contact Testblox to discuss lifecycle requirements, product availability and support for your application. Refer to the published warranty terms for coverage and the process for arranging service.



Technical help from setup to troubleshooting

Use the Testblox technical support forums to ask questions, share solutions and discuss hardware, software and system integration. For an issue that needs direct assistance, or includes confidential application information, contact the support team by email.

Contact or resource	Where to go
Technical support forums	https://forum.testblox.com/
Technical support and service enquiries	support@testblox.com
Product information	https://testblox.com/

Help us resolve your issue

Include the module and backplane order codes, serial numbers, software and firmware versions, host operating system, and a short description of the problem. Attach relevant error messages, logs and a simple example that reproduces the issue. Keep confidential data out of public forum posts.

