SALLAND Engineering
Test Technology Center

ADVANTEST

User Manual

SiConic / PSV-box / Model EK810PS1

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LIABILITY DISCLAIMER

The product described in this manual is warranted in accordance with the terms set forward in applicable quotations or purchase orders. Product performance is affected by configuration, application, software control, and other factors. The suitability of this product for a specific application must be determined by the customer and is not warranted by Advantest.

Advantest shall not be liable for any special, incidental, or consequential damage.

Information in this manual is intended to be accurate and reliable. However, Advantest assumes no responsibility for any errors which may appear in this document, nor does it make any commitment to update the information contained herein.

1 General information

The SiConic PSV-box model EK810PS1 is a fully integrated benchtop test system containing all hardware needed for post silicon validation of digital integrated circuits with high-speed interfaces like: PCI Express Gen3/4, USB3.2 Gen1, 1Gb Ethernet and several general purpose I/O interfaces like JTAG, (Q)SPI, and I2C. The instrument operates under the control of an external workstation.

The Advantest SmartTest test development environment on the PC workstation provides an easy-to-use graphical interface with configuration, test -and measurement tools for the PSV-Box. The PC workstation communicates with the PSV-Box over a 10Gb Ethernet interface.

Read this manual thoroughly before using the Advantest SiConic PSV-box model EK810PS1. This manual contains safety precautions for general and service personnel. It also contains descriptions of the PSV-Box instrument and its accessories. And basic descriptions on how to install, operate, maintain and service the instrument.

1.1 General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to the product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For the correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel should remove the cover for adjustments, maintenance, service or repair.

1.1.1 To avoid fire or personal injury.

Use proper power cord. Use only the power cord provided with the product and certified for the country of use. See items “Mains power cable” in table **3.1** below for ordering information of the correct cable.

Do not use another power cable and do not use the provided power cord for other products.

Ground the product. The product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Do not disable the power cord grounding connection.

Observe all terminal ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Fire risk is part of the single fault condition risk assessment made for UL/IEC61010-1 Safety certification. Consult the product manual for further ratings information before making connections to the product.

Do not apply a potential to any terminal that exceeds the maximum rating of that terminal.

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position equipment so that it is difficult to reach the power plug; it must always remain accessible to the user to allow for quick power cutoff if needed.

Connect and disconnect properly. Do not connect or disconnect cables while they are connected to a voltage source. Move the power switch to the OFF position before removing the power plug.

Use only cables and adapters supplied with the product or indicated by Advantest to be suitable for the product.

Do not operate without covers. Do not operate the product with covers or panels removed.

Avoid exposed circuitry. Do not touch exposed connections and components when power is present.

Do not operate with suspected failures. If you suspect that there is damage to the product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about the safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Before use, inspect cables and adapters for mechanical damage and replace them when damaged. Do not use cables or adapters if they are damaged.

Use only Advantest specified replacement parts.

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Provide proper ventilation. Refer to the installation instructions for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

Provide a safe working environment. Always place the product on a stable surface in a location where cables and adapters can safely be laid out.

Use care when lifting and carrying the product to prevent dropping it. The product is **not** provided with handles for lifting and carrying. Carry the instrument with 2 people. Table 1.2.5 specifies the net weight of the instrument excluding externally connected cables and PCIe extension boards.

Keep product surfaces clean and dry. Remove the cables before you clean the product. Inspect the instrument as often as operating conditions require. To clean the exterior surface, follow the steps in chapter 6.1.

CAUTION. Avoid getting moisture inside the unit during external cleaning. Use only enough cleaning solution to dampen the cloth or swab. To avoid damage to the instrument, do not expose it to sprays, liquids, or solvents, and do not use any abrasive or chemical cleaning agents.

1.1.2 Terms in this manual

These terms may appear in this manual:

WARNING. Warning statements identify conditions or practices that could result in injury or loss of life.

CAUTION. Caution statements identify conditions or practices that could result in damage to the product or other property.

1.1.3 Symbols and terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

The following symbol(s) may appear on the product:

CAUTION / WARNING	PROTECTIVE GROUND (EARTH)	Power OFF	Power ON	Alternating current	Warning; Electricity

Refer to chapter 10 to find the location of the markings on the instrument.

1.1.4 Compliance information

This section lists the electromagnetic compliance (EMC), safety, and environmental standards with which the instrument complies.

1.1.5 EMC compliance

1.1.5.1 EC Declaration of Conformity – EMC

Meets intent of Directive 2004/30/EU for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

NEN-EN-IEC 61326-1:2021. EMC requirements for electrical equipment for measurement, control, and laboratory use.[1 2 3]

- CISPR 11:2024. Radiated and conducted emissions, Group 1, Class A
- IEC 61000-4-2:2008. Electrostatic discharge immunity
- IEC 61000-4-3:2020. RF electromagnetic field immunity
- IEC 61000-4-4:2012. Electrical fast transient/burst immunity
- IEC 61000-4-5:2014+AMD1:2017. Power line surge immunity
- IEC 61000-4-6:2023. Conducted RF immunity
- IEC 61000-4-11:2020. Voltage dips and interruptions immunity
- EN 61000-3-2:2018+AMD2:2024. AC power line harmonic emissions
- EN 61000-3-3:2013+AMD2:2021. Voltage changes, fluctuations, and flicker

A copy of the Declaration of Conformity to the essential requirements is included in chapter 12 but may also be obtained directly from our EU contact:

**Address t.b.d.

1. The product is intended for use in non-residential areas only. Use in residential areas may cause electromagnetic interference.
2. Emissions which exceed the levels required by this standard may occur when this equipment is connected to a test object.
3. To ensure compliance with the EMC standards listed here, only interface cables provided for the product should be used.

1.1.5.2 US/CAN Declaration of Conformity – FCC/ISED

This device complies with Part 15 of the FCC Rules / Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Canadian Compliance (Industry Canada) CAN ICES-3(A)/NMB-3(A)

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to CFR 47 Part 15 B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

FCC Listing: FCC ID: 2BDQ2-EK810PS1

A copy of the Declaration of Conformity to the essential requirements is included in chapter 14 but may also be obtained directly from our US contact:

**Address t.b.d.

1.1.6 Safety compliance

1.1.6.1 EU Declaration of Conformity – Low Voltage

Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:

Low Voltage Directive 2014/35/EU.

- NEN-EN-IEC 61010-1:2010. Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General Requirements.

1.1.6.2 U.S. nationally recognized testing laboratory listing

- UL 61010-1:2023. Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General Requirements.

1.1.6.3 Canadian certification

- CAN/CSA-C22.2 No. 61010-1:2023. Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General Requirements.

1.1.6.4 Equipment type

Test and measuring equipment.

1.1.6.5 Safety class

Class 1 – grounded product.

1.1.6.6 Pollution degree description

A measure of the contaminants that could occur in the environment around and within a product. Typically, the internal environment inside a product is considered the same as the external. Products should be used only in the environment for which they are rated.

- Pollution Degree 1. No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.
- Pollution Degree 2. Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
- Pollution Degree 3. Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
- Pollution Degree 4. Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.

1.1.6.7 Pollution degree rating

Pollution Degree 2 (as defined in NEN-EN-IEC 61010-1:2010). Rated for indoor, dry location use only.

1.1.6.8 IP rating

IP20 (as defined in IEC 60529:1989).

1.1.6.9 Acoustic noise emission

The PSV Box can be used without hearing protection.

DECLARED DUAL-NUMBER NOISE EMISSION VALUES
in accordance with ISO 4871

	Operating mode: Maximum FAN speed
Measured A-weighted sound power level, L_{WA} (ref 1 pW) in decibels	61.8
Uncertainty, K_{WA}, in decibels	1.5
Measured A-weighted sound pressure level, L_{PA} (ref 20µPa) at the operator's position, in decibels	53.8*
Uncertainty, K_{PA}, in decibels	1.5
Values determined according to noise test code given in DIN EN ISO 3741:2011-01 NOTE - The sum of a measured noise emission value and its associated uncertainty represented an upper boundary of the range of values which is likely to occur in measurements.	

*Calculated for a distance of 1 meter from the instrument placed on a flat surface.

1.1.6.10 Overvoltage category descriptions

Mains power supply circuits in the product may be rated as one of the following categories (see specific ratings marked on the product and in the manual).

- Category II. Circuits directly connected to the building wiring at utilization points (socket outlets and similar points).
- Category III. In the building wiring and distribution system.
- Category IV. At the source of the electrical supply to the building.

NOTE. Only mains power supply circuits have an overvoltage category rating. Other circuits within the product do not have either rating.

1.1.6.11 Mains overvoltage category rating

Overvoltage Category II (as defined in NEN-EN-IEC 61010-1:2010).

1.1.6.12 Factory insulation test

Each individual product has been subjected to a high voltage insulation test as defined in annex F of NEN-EN-IEC 61010-1:2010 before the product leaves the factory. The validity of the protective earth connection is also verified during this test.

1.1.7 Environmental impact

Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid the release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

1.1.7.1 Europe RoHS3 compliance and equipment recycling.

This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2011/65/EU and 2015/863 ("RoHS 3") on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Product Recycling section of the Advantest Web site (www.advantest.com).

1.1.7.2 China RoHS2 compliance

People's Republic of China Electronic Industry Standard SJ/T 11364-2014 (China RoHS2)

中华人民共和国中国电子行业标准 SJ/T11364-2014（中国 RoHS2）

Environmentally Friendly Use Period 环保使用期限

The year number in the centre of the label indicates the Environmentally Friendly Use Period, which is required to mark on the electronic information product sold in China

according to the China RoHS regulations.

本标志中表示的年数是根据《电子信息产品污染控制管理办法》（2006 年 2 月 28 日）以及《电子信息产品污染控制标识要求》（2006 年 11 月 6 日）制定的、适用于在中华人民共和国境内销售的电子信息产品的环保使用期限。

产品 / Product:	PSV-Box

零件名称 / Part Name	有毒有害物质或元素 / Hazardous Substances					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
电路模块 / PCB Assembly BRD.PSV.CCB.01	X	O	O	O	O	O
电路模块 / PCB Assembly BRD.PSV.BCM.01	X	O	O	O	O	O
电路模块 / PCB Assembly BRD.PSV.PWR.01	X	O	O	O	O	O
电路模块 / PCB Assembly BRD.PSV.GPIO.01	X	O	O	O	O	O
电路模块 / PCB Assembly BRD.PSV.TPS.01	O	O	O	O	O	O
电源模块 / Power supply module	X	O	O	O	O	O
COMe 模块 / module	X	O	O	O	O	O
机箱（如适用）/ Enclosure (if applicable)	O	O	O	O	O	O
包装 / Packaging	O	O	O	O	O	O
此表依照 SJ/T11364 规定制定 This table is prepared in accordance with the provisions of SJ/T 11364-2014						

o =	指明产品所有均质材料包含的有害物质要低于 GB/T26572 限定的要求 Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572
x =	指明产品所用的至少一种均质材料包含的有害物质高于 GB/T26572 限定的要求 Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

1.1.7.3 REACH compliance

t.b.d.

1.2 Operating overview

This document contains information for the SiConic PSV-Box product. Refer to the Theory of operation and Diagnostic test sections for complete operating information.

1.2.1 General usage

The PSV-box is intended for indoor use only. Preferably in ESD safe laboratory environment.

CAUTION. Prevent undesired Electrostatic discharges along the connectors.

1.2.2 Power source

The instrument operates from a single-phase power source with the neutral conductor at or near earth-ground. It is intended for only ground-referenced measurements. A protective ground connection through the grounding conductor in the power cord is essential for safe operation.

Power the unit on by connecting the supplied power cord to the rear-panel power entry connector. Push the power button next to the power entry connector to turn it on. To power the unit off, push the power button next to the power entry connector again. To remove power completely, disconnect the power cord from the rear-panel of the instrument.

WARNING. To reduce the risk of fire and shock, ensure that the mains supply voltage fluctuations do not exceed 10% of the operating voltage range.

1.2.3 Power specifications and clearance requirements

Characteristic	Description
Source voltage and frequency	100 V to 240 V, 50 Hz or 60 Hz
Power consumption	Less than 600 W

The instrument must be positioned on its feet, observing the following clearance requirements. Before operating, ensure that the ambient temperature is between +20 °C to +35 °C (+68 °F to +95 °F).

- Sides: 50 mm (2 in)
- Front & Rear: 50 mm (2 in)

CAUTION. To ensure proper cooling, keep both ends of the instrument clear of obstructions.

1.2.4 Environmental specifications

Characteristic	Description
Temperature range	
Operating	+20 °C to +35 °C
Non-operating	-40 °C to +70 °C
Humidity	
Operating (noncondensing)	+30 °C: 50% to 80%
Non-operating (noncondensing)	< +65 °C: < 90%
Altitude	
Operating	Up to 2,000 meters (6,562 feet)
Non-operating	Up to 5,000 meters (16,404 feet)

1.2.5 Instrument specifications

General	Description

Instrument type	Digital test and measuring equipment
Nominal supply voltage	115 V (60 Hz) / 230V (50 Hz)
Maximum current	5.3A (115V) / 2.62 A (230V)
External fuse rating	10A Time-Lag 5x20mm (2 fuses)[1]
Sound pressure level	< 55dB (L_{PA})
Impact rating	< 92cm drop inside packaging
Weight	6.7 kg ±0.1kg
MTBF	> 5000 hours
RoHS & REACH compliance	Up to at least 3/6/2043

[1]Recommended replacement fuse: SCHURTER SPT 5x20 10AT Order No: 0001.2514

1.2.6 Interface specifications

General	Description
Front panel PCI Express	PCIe Gen4
Number of connections	4 NovaRay® bulkhead
PCIe lanes	4 Tx/Rx per connection
Data rate	Up to 16 GT/s
PCIe power	1.0 A per connection (12 Vdc)
Internal PCI Express	PCIe Gen3
Number of connections	2 slots
PCIe lanes	4 Tx/Rx per slot
Data rate	Up to 8 GT/s
PCIe power	75W per slot (12 Vdc) + 75W via 6pin power connector
USB	USB3.2 Gen1
Number of connections	2 USB-C
Data lanes	2x1 per connection
Data rate	5 Gbps
USB power	1.5 A per connection (5 Vdc)
DUT Ethernet	1000BASE-T
Number of connections	1 RJ-45
Data lanes	4 bidirectional pairs
Data rate	4x 250 Mbps
Back panel WS Ethernet	10GBASE-T
Number of connections	1 RJ-45
Data lanes	4 bidirectional pairs
Data rate	4x 2.5 Gbps
GPIO	Digital 0.9 V to 4.5 V
Number of connections	4 FCF8-10
Interfaces	I2C, QSPI (G4 only) {JTAG, SPI, SWD, UART-Tx/Rx, GPIO1/2} (G1 to G3)
Data rates	I2C 400 kHz, {JTAG, QSPI, SPI} 15 MHz
RELAY OUTPUT	Hi-Z contact
Number of connections	1 D-Sub9
Interfaces	4 Isolated Hi-Z contact
Current rating	4x 1.0 A

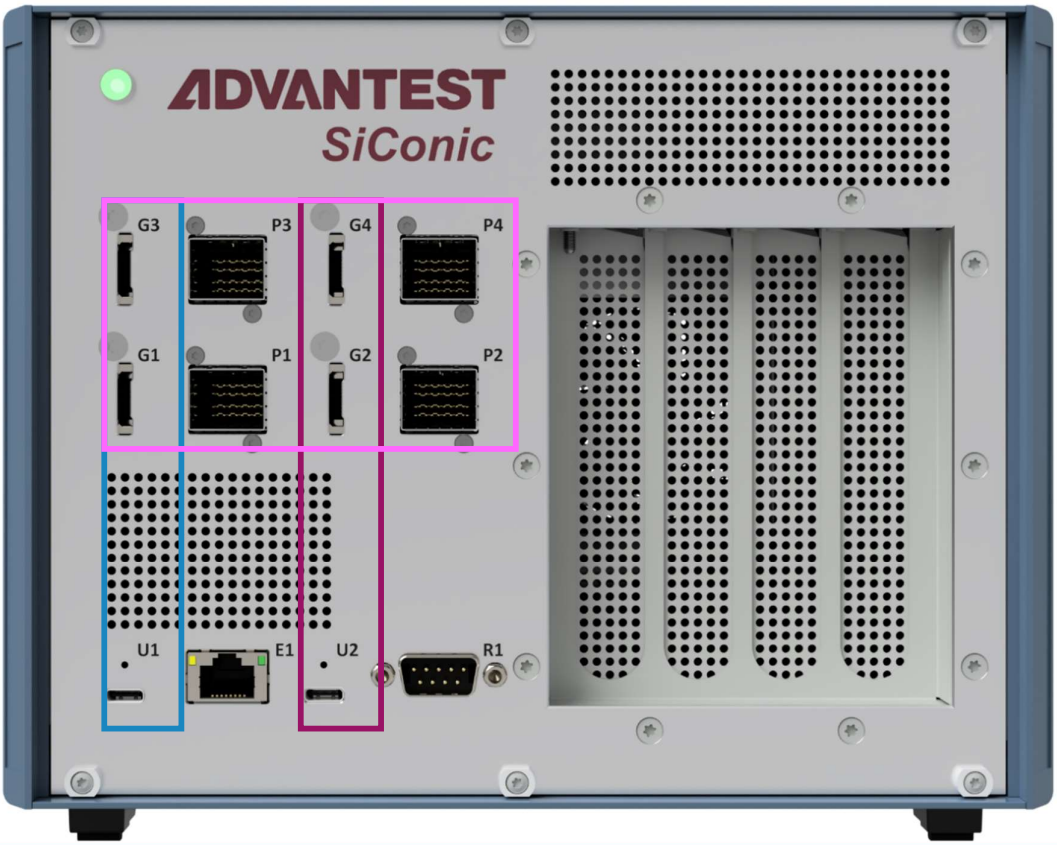
1.2.7 Absolute Maximum ratings

Characteristic	Min.	Max.	Unit
PCIe extension Voltage	11.7	12.9	V
PCIe extension Power (2 times available)		75 (150*)	W
PCIe Voltage	11.7	12.9	V
PCIe Current (4 times available)		1.0	A
USB-C Voltage		5.0	V
USB-C Current (2 times available)		1.6	A
GPIO Voltage	0.9	4.5	V
GPIO Current		0.05	A
Relay Current		1.0 peak ac, dc	A
Storage Temperature	-40 °C	+70 °C	°C

*150W total when the 6pin power connector is also connected to the PCIe DUT card.

1.2.8 Front panel interfaces

The front panel is divided into easy-to-use functional areas.



On the right side, 4 PCIe slots for placing PCIe extension boards. On the left side the following interfaces:

Reference	Description
	Power LED
G1, 3: U1:	GPIO Logic 0.9V to 4.5V USB3.2 Gen1 C
G2, 4: U2:	GPIO Logic 0.9V to 4.5V USB3.2 Gen1 C
P1 - 4:	PCIe Gen4 x 4 lanes
E1:	Ethernet 1Gbps
R1:	Isolated open contact outputs

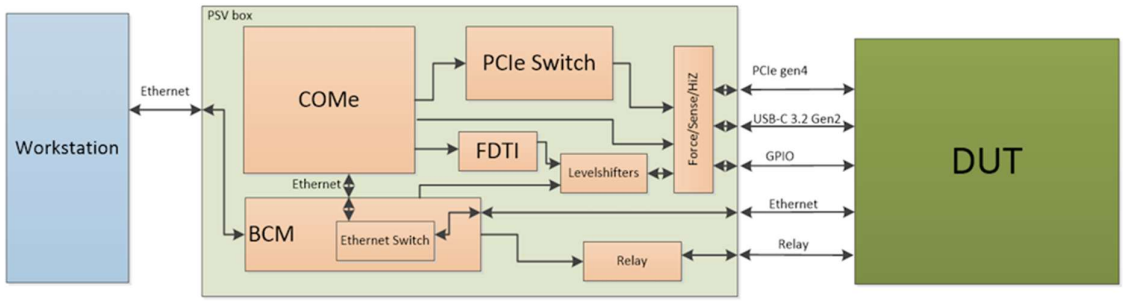
1.2.9 Back panel interfaces

The back panel contains the following interfaces:

Reference	Description
Upper right	Main power entry with fuse holder Power ON/OFF switch
Lower right	PC workstation Ethernet 10Gbps
Reset	BCM reset push button

2 Theory of operation

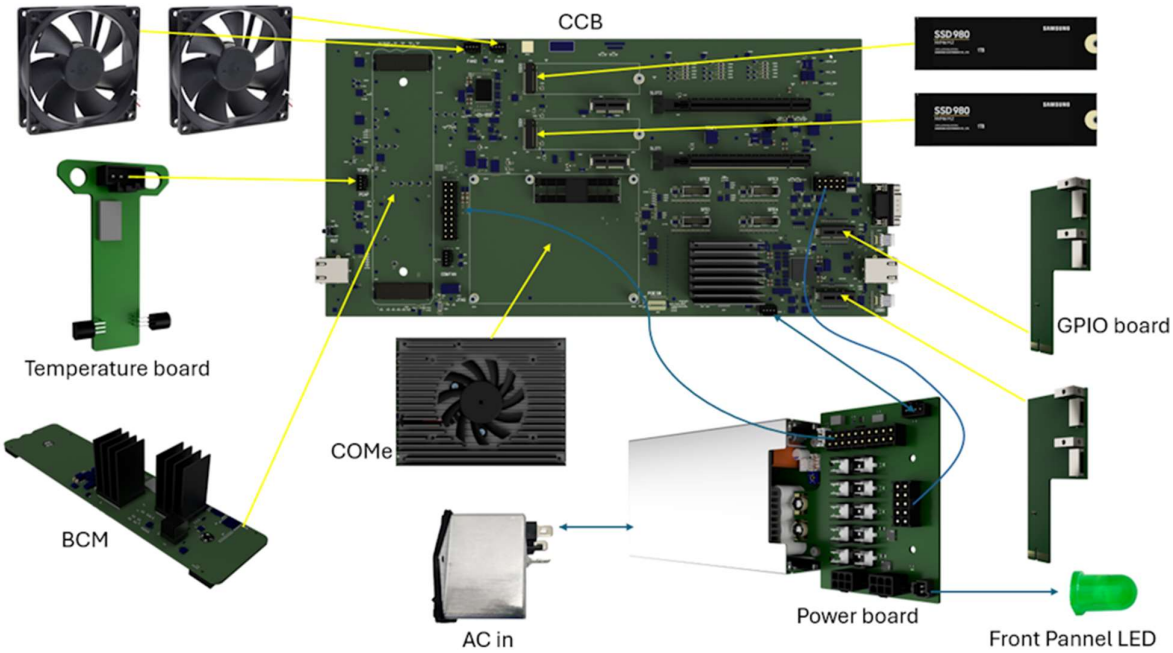
The PSV-box is controlled by a PC workstation via ethernet communication. The picture below shows a basic overview of the setup.



2.1 Introduction

The PSV-box is a versatile test equipment designed for comprehensive testing and validation of various interfaces on electronic devices and components. This chapter provides an overview of the theory of operation of the PSV-box, explaining its key components, communication interfaces, and the overall workflow.

2.2 System Architecture



2.2.1 PC Workstation

The PSV-box is controlled by an external PC workstation, which communicates with the box via a 10GbE Ethernet connection. This PC workstation acts as the user interface and issues commands to the box for running tests and configuring the equipment.

2.2.2 BCM (Board Control Module)

The BCM inside the PSV-Box is responsible for configuring and managing other hardware parts within the box. The BCM ensures that components are properly initialized and controlled during test procedures or shut down when not in use.

2.2.3 COM Express (Computer-on-module)

The COMe inside the PSV-Box is responsible for executing test procedures. It coordinates the test processes, communicates with the workstation, and controls the test hardware within the box.

2.2.4 Ethernet Connectivity

The BCM provides a high-speed 10 Gigabit Ethernet connection between the COMe and the external workstation. This ensures fast and reliable data transfer between the PC workstation and the test equipment.

2.2.5 Device Under Test (DUT)

The BCM also provides a 1 Gigabit Ethernet connection to the DUT. This allows for seamless communication between the DUT and the test equipment, enabling the execution of various test procedures and data exchange.

2.2.6 PCIe Support

The PSV-box is equipped with multiple PCIe capabilities, providing high-speed data transfer for PCIe devices. It features four external connectors, each supporting x4 PCIe Gen4 lanes, and two internal PCIe slots, both supporting x4 PCIe gen3 lanes. Each slot is provided with two 75W 12V power supply sources.

2.2.7 USB 3.2

The PSV-box is equipped with 2 USB-C interfaces for connection to the DUT. Each interface supports USB3.2 Gen1 with data rates up to 5 Gbps, ensuring compatibility and high-speed data transfer with a wide range of devices.

2.2.8 Multi-interface GPIO

The PSV-box is equipped with four GPIO connectors that support various communication protocols, including JTAG, UART, SWD, I2C, SPI, MDIO and general GPIO signals. The fourth GPIO connector supports QSPI communication.

2.2.9 Relay outputs

The PSV-Box is equipped with a Dsub-9 connector that provides four multi-purpose isolated Hi-Z contacts for controlling external DUT test equipment.

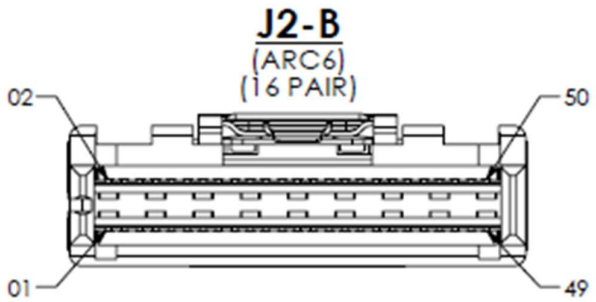
2.2.10 Continuity check

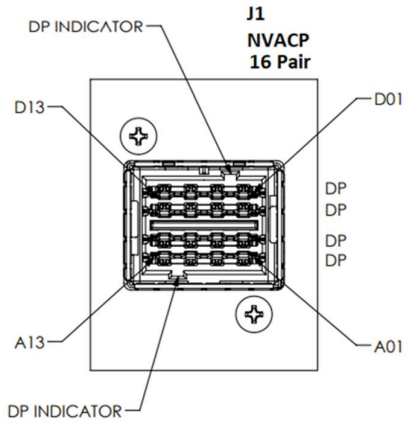
The PSV-box is equipped with force and sense capability on all DUT connections. This feature enables the PSV-Box to self-diagnose internal and DUT test connections before every test.

2.2.11 Hi-Z DUT disconnect

The PSV-box is equipped with Hi-Z disconnect switches on all DUT connections. This feature enables the PSV-Box to self-diagnose internal connections while the DUT is physically connected and electrically connect -and disconnect the DUT before and after testing.

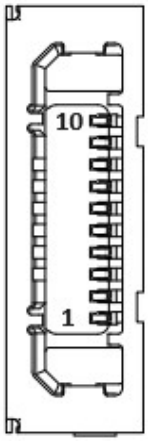
2.3 PCIe connector pinout

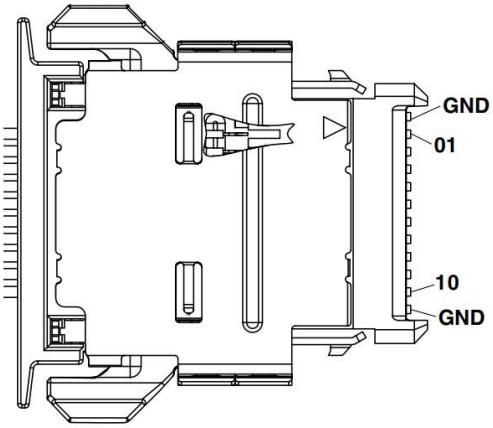




J1	Name	J2-B	J1	Name	J2-B	J1	Name	J2-B	J1	Name	J2-B
A01	GND	1	B01	GND	25	C01	GND	2	D01	GND	26
A02	TX1+	3	B02	REFCLK+	27	C02	Not Used	4	D02	RX1+	28
A03	TX1-	5	B03	REFCLK-	29	C03	Not Used	6	D03	RX1-	30
A04	GND	7	B04	GND	31	C04	GND	8	D04	GND	32
A05	TX2+	9	B05	WAKE#	33	C05	Not Used	10	D05	RX2+	34
A06	TX2-	11	B06	WAKE#	35	C06	Not Used	12	D06	RX2-	36
A07	GND	13	B07	GND	37	C07	GND	14	D07	GND	38
A08	TX3+	15	B08	PERST#	39	C08	Not Used	16	D08	RX3+	40
A09	TX3-	17	B09	PERST#	41	C09	Not Used	18	D09	RX3-	42
A10	GND	19	B10	GND	43	C10	GND	20	D10	GND	44
A11	TX4+	21	B11	Power 12V	45	C11	Not Used	22	D11	RX4+	46
A12	TX4-	23	B12		47	C12	Not Used	24	D12	RX4-	48
A13	GND	25	B13	GND	49	C13	GND	26	D13	GND	50
ALL GROUNDS ARE COMMON AND CONNECTED TO CABLE SHIELD											
CHASSIS GND CONNECTED TO METAL HOUSINGS AND OUTER CABLE BRIAD											

2.4 GPIO connector pinout





Pin	Name	Protocol	Pin	Name	Protocol	Pin	Name	Protocol
01	TMS	JTAG	01	CS	SPI	01		
02	TDI	JTAG	02	DO	SPI	02		
03	TDO	JTAG	03	DI	SPI	03	SDA	I2C
04	TCK	JTAG	04	CLK	SPI	04	SCL	I2C
05	TRST	JTAG	05			05		
06	STST	JTAG	06			06		
07	TX	UART	07			07		
08	RX	UART	08			08		
09	IO1	GPIO	09			09		
10	IO2	GPIO	10			10		

3 Cables and optional accessories

Testing with the PSV-box requires special cables and adapter boards which make testing easier and more versatile.

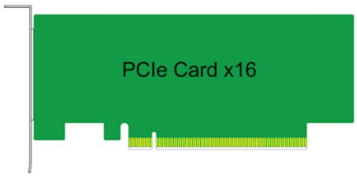
3.1 Cables

Name	Order Number	Manufacturer Number	Technical Specifications	Image
Mains power cable	EK102-902	MAG.DE CB-N-1-5M	250Vac / 16A 5mtr	
Mains power cable	EK102-903	MAG.DE CB-N-US-5M	125Vac / 10A 5mtr	
PCIe cable (Novaray)	EK810-61652	SAMTEC NR-NVACE-DP-5-4-0.5-A-1-1	56 Gbps NRZ 16x 100Ω Diff pair 0.5mtr	
PCIe cable (ARF6)	EK810-61653	SAMTEC HDR-230595-01-NVACE	28 Gbps NRZ 16x 100Ω Diff pair 0.65mtr	
GPIO cable (FSC8)	EK810-61621	SAMTEC HDR-232686-01-FCF8	5 Gbps 10x Signal/GND coaxial pair 1.8A (single pin only) 1mtr	
USB-C Cable	EK810-61602	STARTECH USB31CCTLKV1M	USB 3.2 Gen1 2x 5 Gbps, 100 W 1mtr Harness	

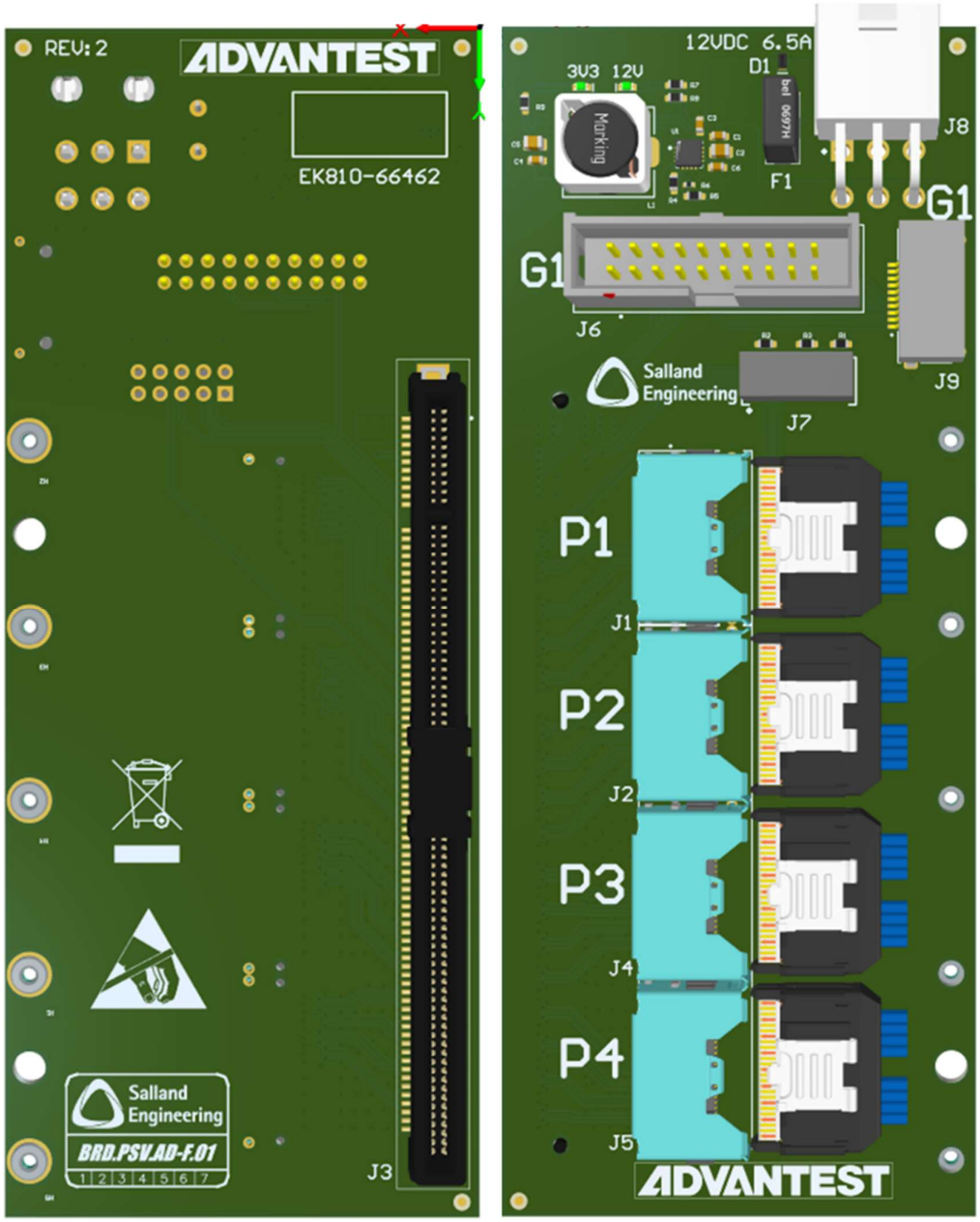
Ethernet DUT cable	EK810-61691	AMPHENOL MP-6ARJ45 SNNB-003	CAT6a S/FTP 2x RJ45 Male 3ft	
Relay Cable (D-Sub9)	EK810-61631	STARTECH MXT1001MBK	D-SUB9 1:1 Male to Female 1mtr	
Ethernet workstation cable	EK810-61692	AMPHENOL MP-6ARJ45 SNNK-010	CAT6a 500MHz S/FTP 2x RJ45 Male 10ft	
Flat Ribbon JTAG-GPIO cable	EK810-61623	SAMTEC HCSD-10-D-12.00-01-N	Flat ribbon cable 1:1 2x IDC Socket 12inch	
Flat Ribbon Relay control cable	EK810-61624	SAMTEC HCSD-04-D-12.00-01-N	Flat ribbon cable 1:1 2x IDC Socket 12inch	

3.2 PCIe Female Adapter board (EK810-66462)

The female adapter board enables the PSV-Box to test DUT's with a CEM (Card Electromechanical specification) card edge formfactor:
The adapter board simplifies utilizing all four PCIe Gen4 connections simultaneously. The adapter board supports four PCIe type ARF6 cables with 4 PCIe lanes each and convert them into a standard 16 PCIe lane female connector.

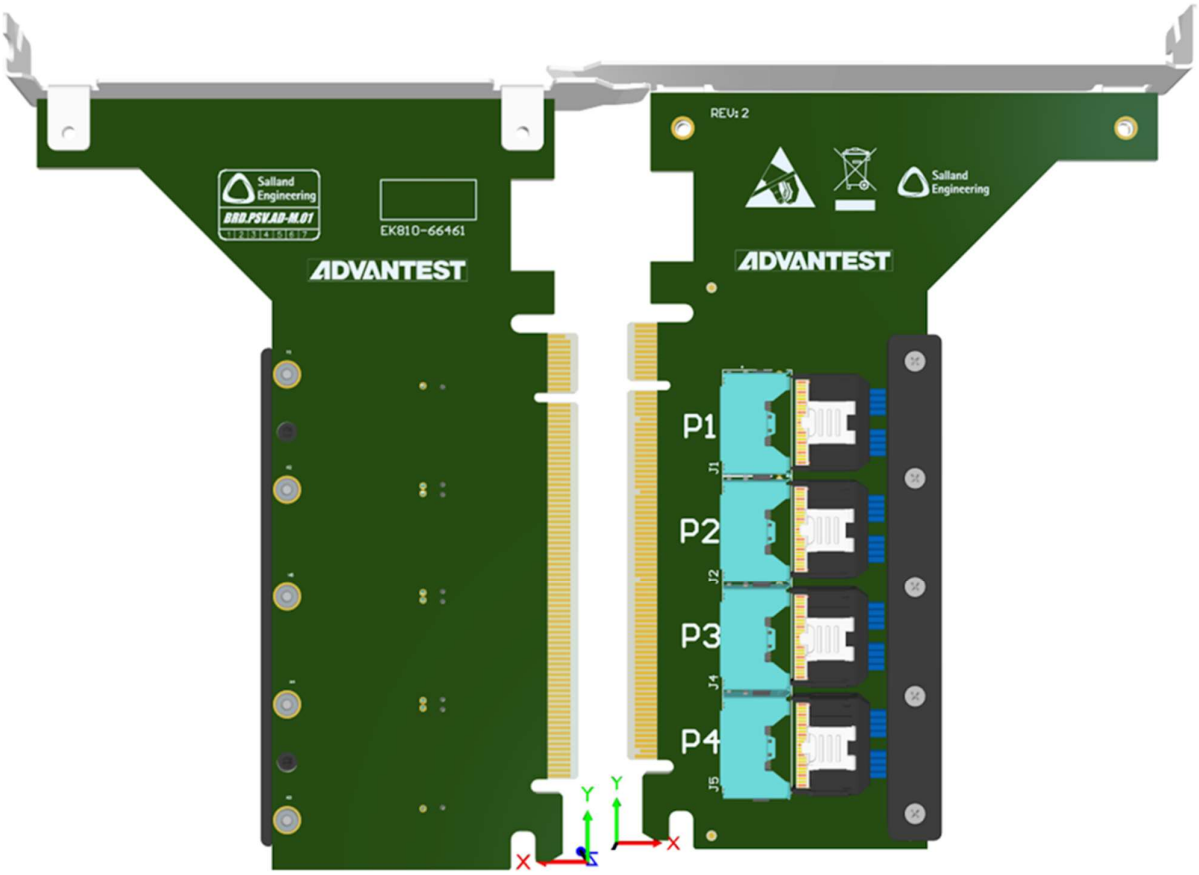


To meet the power requirements of 16 lane PCIe devices, the adapter Board can be connected to an external power supply to comply with the 75W supply specification for 16 PCIe lane connectors.
For further ease of use the board also supports one GPIO connector that converts it to a standard 100mil pitch pin header.



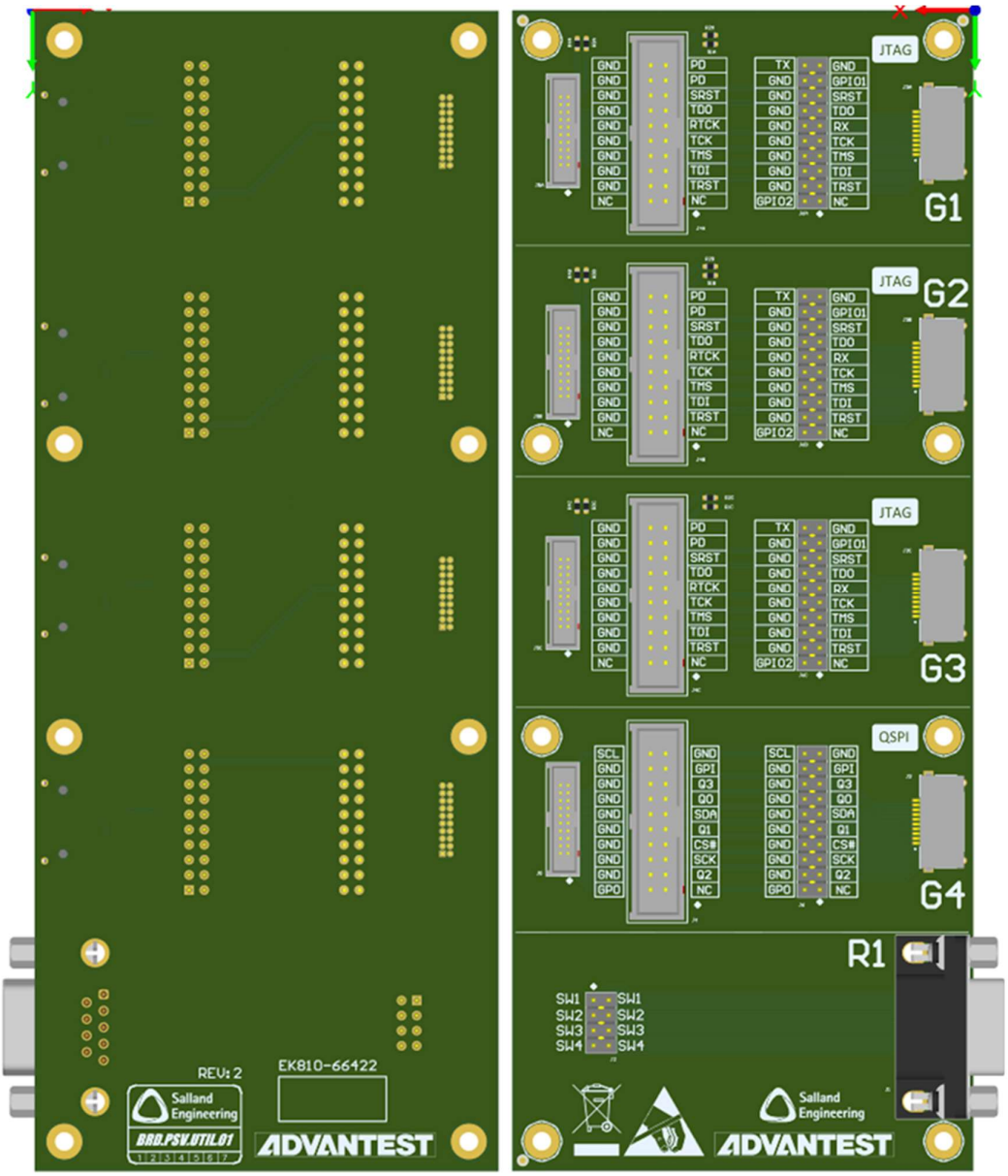
3.3 PCIe Male Adapter board (EK810-66461)

The male adapter board enables the PSV-Box to test DUT's with a PCIe CEM connector. The adapter board simplifies utilizing all four PCIe Gen4 connections. The adapter board supports four PCIe type ARF6 cables with 4 PCIe lanes each and convert them into a standard 16 PCIe lane female connector.



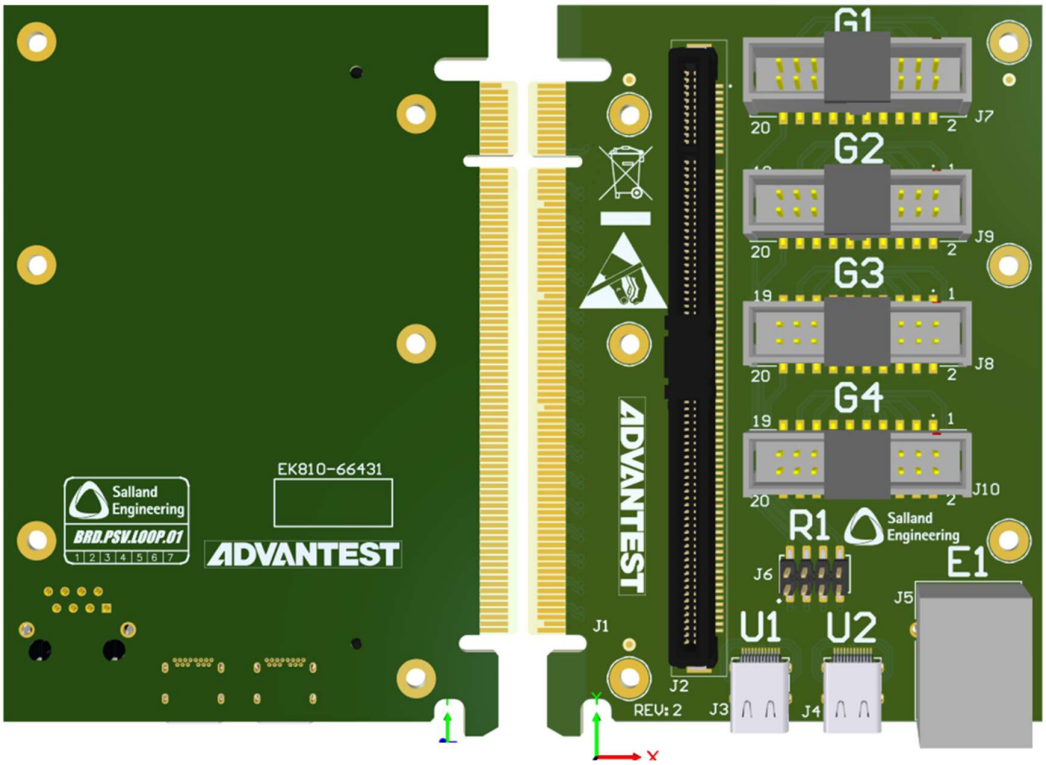
3.4 Utility board (EK810-66422)

The Utility board enables converting all four FCF8 GPIO connections simultaneously into easy-to-use 100mil and 1mm pitch pin headers. For ease of use, 3 types of pin headers are provided for each GPIO connection, with annotation of GPIO signal names next to the corresponding pins. The adapter board also converts the D-Sub9 relay connection into an 8pin, 100mil pitch pin header. The adapter board provides a generic solution for the user to fan out the PSV-Box GPIO signals.



3.5 Loopback board (EK810-66431)

The Loopback board is a diagnostic tool of the PSV-box. Together with the other adapter boards, the loopback board provides a way to self-diagnose all front panel interfaces of the PSV-Box. Five IDC flat cables are provided with this board to connect it directly to the Utility board.



4 Installation

4.1 Test setup

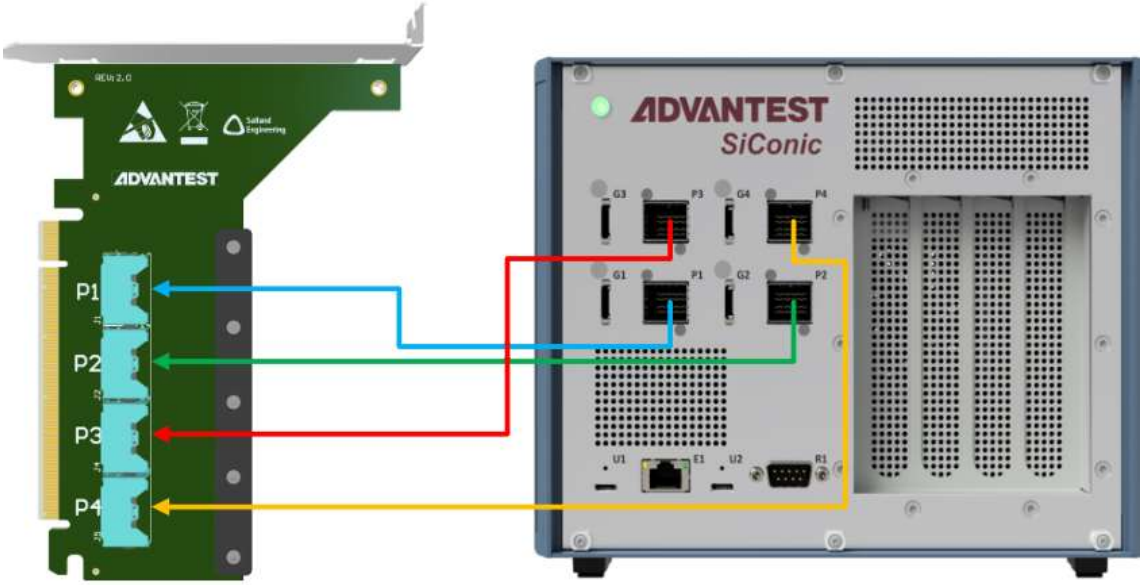
To test an external device, the PSV-Box must be set up according to the type of interface that you want to test. As an example, follow the steps below for testing a 16 lane PCI express Gen4 connection on a DUT:

1. Read this user manual before using the PSV-box.

CAUTION. Take good notice of the safety instructions in chapter 1.1.

2. Make sure the PSV-Box power switch on the back of the instrument is turned off.
3. Connect mains AC power cable to the back of the instrument.
   Either use the supplied cable or a compatible and certified cable for your local mains voltage.
4. Connect the ethernet connection on the back of the instrument to the workstation.
   Either use the supplied cable no: EK810-61692 or a compatible shielded Cat6a cable.
5. Connect the instrument to the DUT as shown in the test setup picture below:
   Use 4 of the supplied PCIe test cables no. EK810-61653 to connect the instrument to the Male PCIe adapter board no: EK810-66461. Make sure to plug the PCIe connectors into sockets with matching markings. Eg: P1 to P1, P2 to P2 etc. Then push the adapter board into the CEM compatible slot of the DUT.
6. Startup the PC workstation and start the appropriate test environment.
7. Power on the PSV-Box and wait until the PC workstation connects to the instrument.
8. Make sure the DUT is powered correctly and then turn it on.
9. Initiate the appropriate test setup configuration tool.

Test setup for other interfaces is similar, except for the appropriate test cables and adapter boards used.



4.2 Replacing external fuses

The primary mains power fuses are accessible on the outside of the PSV-Box. Only trained personnel may replace these fuses. Only Advantest approved 10A 250VAC 5x20mm Time-Lag cartridge fuses must be placed.

CAUTION. Follow the instruction below to avoid electric shock and personal injury.

1. Make sure the PSV-Box power switch on the back of the instrument is turned off.
2. First disconnect every interface cable on the front and back of the instrument.
3. Then disconnect the mains AC power cable on the back of the instrument.
4. Locate the fuse holder on the back of the instrument.

5. Use a small screwdriver to lift the fuse holder forward until its bents to the right.

6. Remove both fuses.
7. Replace both fuses with an identical fuse as specified by Advantest.
8. Push the fuse holder back in the case until it is flush with the front of the power connector.
9. Reconnect the mains AC power cable and turn the power switch on.
10. Check if the fans spin up and the LED on the front panel lights up.

11. Reconnect the ethernet connection to the PC workstation and check if a connection to the PSV-Box can be established. In case a connection cannot be restored, have the PSV-Box inspected by qualified service personnel.

4.3 Installing a PCIe card

The PSV-Box can be extended with up to two full size PCI express cards with dual slot width. These cards must be installed inside the instrument case. Only trained personnel may (re)place these cards.

The CEM compatible slot connectors allow for mounting any size PCIe card edge connector, but functionally support only 4 lane PCIe Gen3 cards. Follow the steps below to install a PCIe card:

1. Read this user manual before using the PSV-box.

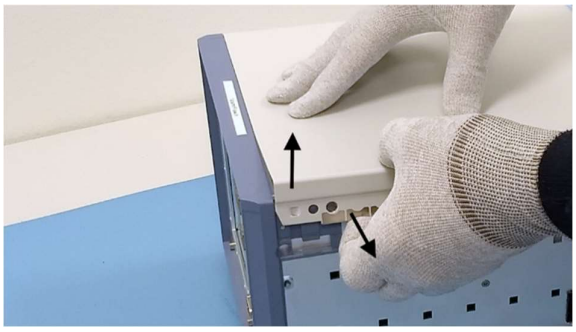
CAUTION. Take good notice of the safety instructions in chapters 1.1 and 7.1.

2. Make sure the PSV-Box power switch on the back of the instrument is turned off.
3. Disconnect mains AC power cable on the back of the instrument.
4. Gather your tools and components:
   - The PCIe card you want to install.
   - An anti-static wristband.
   - A plastic prying tool. (around 5mm wide, 1mm long)
   - A Torx T20 head screwdriver.
5. Prepare your work area:
   - Ensure that you are working on a non-static surface to prevent electrostatic discharge.
   - Ground yourself with the anti-static wristband and tighten it to make sure it makes good skin contact.
6. Open the PSV-box case:
   - Use the plastic prying tool to gently pull off the two side panels from the PSV-box.

   - Having the side panels removed. Unscrew the four screws on both sides of the top panel with the T20 head screwdriver.

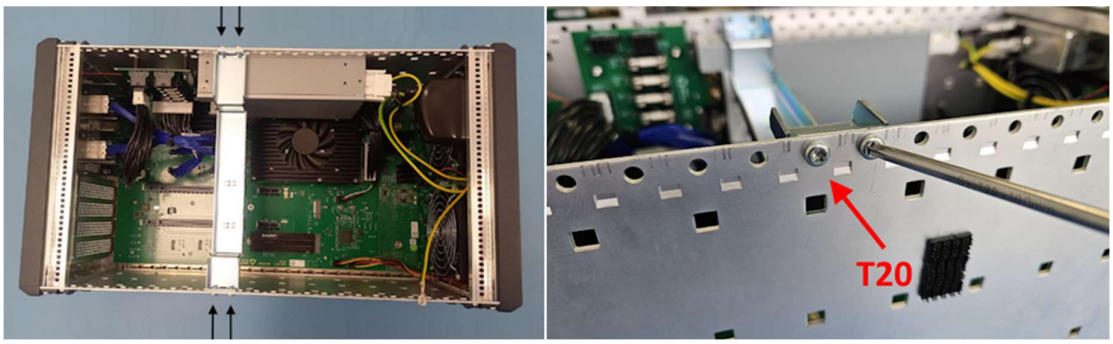
- Lift all four corners of the top panel by lifting the corner out and up. Having all four corners lifted, use some reasonable force to gently pull off the top panel.

CAUTION. Use gloves to remove the top cover carefully, because when ESD clips are sharp.



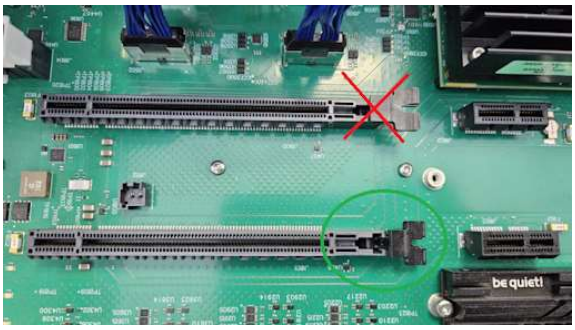
CAUTION. Do not remove the ground wire from the top cover. It is plenty long to place the panel aside the instrument.

7. Remove the PCIe card retaining bracket with the T20 head screwdriver.

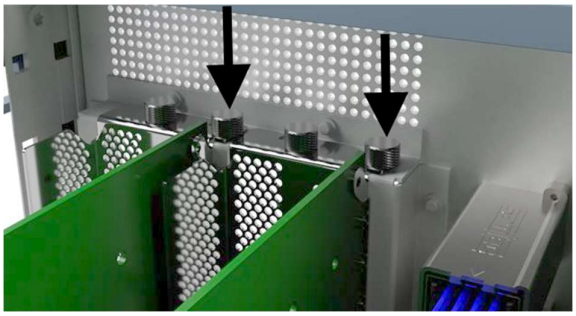


8. Remove the PCIe slot cover. Depending on the PCIe card, one or two PCIe metal covers need to be removed to be able to place the card. Removed the cover by taking out the thumbscrew. This can be done by hand. Save the screw, this will later be used to secure the card.

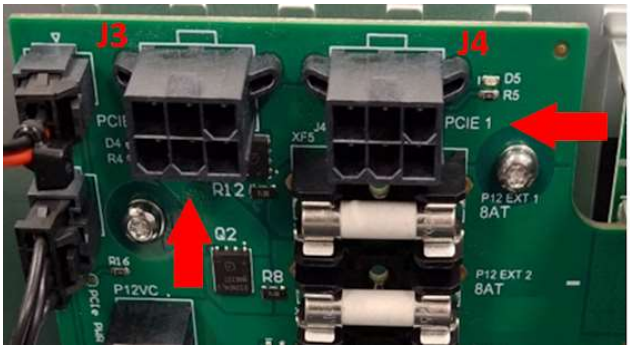
9. Place the PCIe card:
    - Make sure the hinge of the PCIe slot is pushed back.

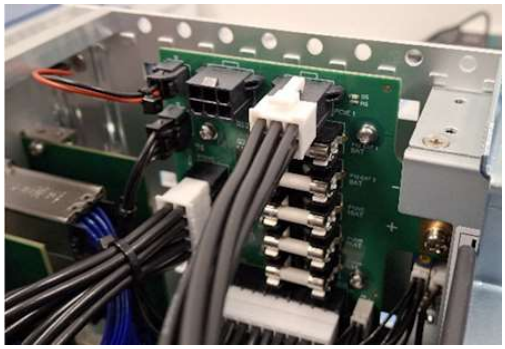


    - Carefully align the PCIe card with the slot. Make sure the edge connector lines up with the slot.
    - Gently but firmly push the PCIe card into the slot. You may need to apply some force to ensure it is properly seated. The card's metal bracket should be flush with the box.
10. Secure the card. If there's a screw hole in the card’s metal bracket, use the thumbscrew you removed earlier to secure the card to the box. This helps hold the card in place and prevents it from wiggling.

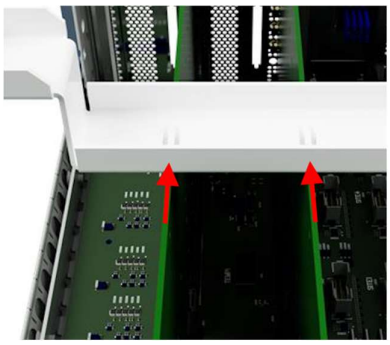
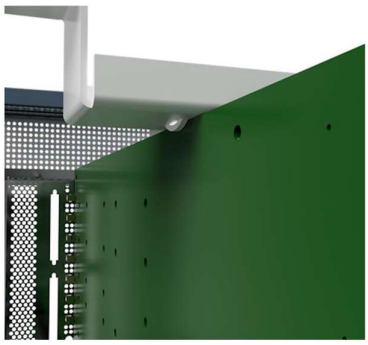
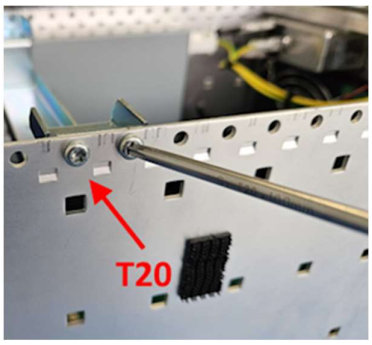


11. Connect any power cables if necessary. Some PCIe cards require additional power connections. Two 6pin ATX power connections are available on the Power board on the side of the PSV-Box to connect to an external power connector of the PCIe card. there Labeled J3/PCIe2 and J4/ PCIe1 on the power board.





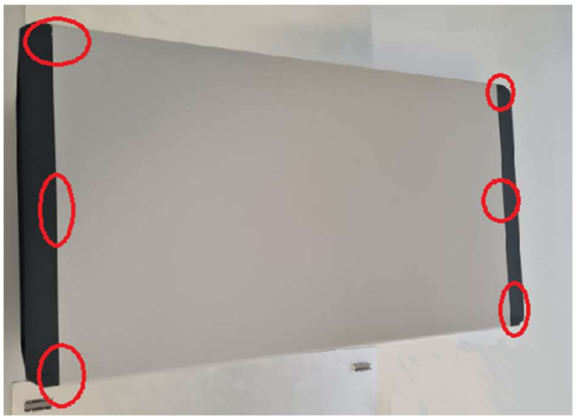
12. Place back the PCIe card retaining bracket with the T20 head screwdriver. Take care to place the PCIe card between the card guides on the bracket.

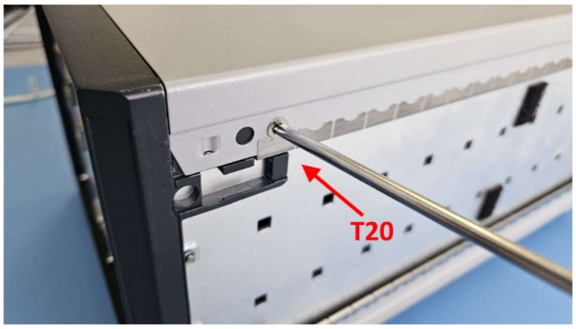
13. Close the PSV-box:

CAUTION. Make sure that the ground wire remains connected to the top cover.

- Place the cover on top of the box and push down on all four corners and on the top and bottom middle edge. The top cover must be flush with the frame of the box.



- Having placed the Top cover. Secure it with four screws. Two on each side of the top panel with the T20 head screwdriver.



- Click both side panels back into place. Both side panels must be flush with the frame of the box.

5 Operation

The PSV-Box requires a PC workstation with Advantest Smartest 8 software to operate. The PC workstation communicates with the PSV-Box via the 10GbE Ethernet connection on the back side of the instrument. This PC workstation acts as the user interface and issues commands to the PSV-Box for running tests and configuring the equipment.

5.1 Test environment

The following test scenarios have been developed in Smartest 8 for the PSV-Box:

- Diagnostic tests
- Performance tests

Refer to the PSV-Box Smartest manual ref: [ADV_STM] for the operation instructions.

6 Maintenance

The PSV-Box requires only minimal maintenance. Any qualified user must inspect the instrument before using it and as often as operating conditions require. Inspect for cleanliness of the outside surfaces and for excessive dust inside connector sockets and vent holes or inside the instrument. Clean immediately when outside surfaces are not clean, or dust is visible.

6.1 Cleaning

Remove the cables before you clean the product. To clean the exterior surface, perform the following steps:

1. Remove loose dust on the outside of the instrument with a lint-free cloth. Use care to avoid rubbing dust into the ventilation holes.
2. Use a soft cloth dampened with water to clean the instrument. Use an aqueous solution of 75% isopropyl alcohol for more efficient cleaning.

CAUTION. Avoid getting moisture inside the unit during external cleaning. Use only enough cleaning solution to dampen the cloth or swab. To avoid damage to the instrument, do not expose it to sprays, liquids, or solvents, and do not use any abrasive or chemical cleaning agents.

Excessive dust inside the instrument and connector sockets may only be removed by trained personnel with the help of clean compressed air.

6.2 Firmware updates

The PSV-Box does not need regular firmware updates. But in case firmware updates become available for the PSV-Box. The unit can be sent back to an Advantest service center for updating internal firmware, please refer to chapter 9.2 for information on how to ship the instrument.

7 Service

7.1 Service safety summary

The Service safety summary section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this Service safety summary and the General safety summary before performing any service procedures.

WARNING; HAZARDOUS VOLTAGE ENCLOSED.
Disconnect power before opening.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

To avoid electric shock. Do not touch exposed connections. Do not perform internal service or adjustments of the product unless another person capable of rendering first aid and resuscitation is present.

Use care when servicing with power on. Dangerous voltages or currents may exist in the product. Disconnect power and disconnect cables before removing protective panels or replacing parts.

CAUTION. Moving fans, hot surfaces and sharp edges may become accessible when the instrument is opened.

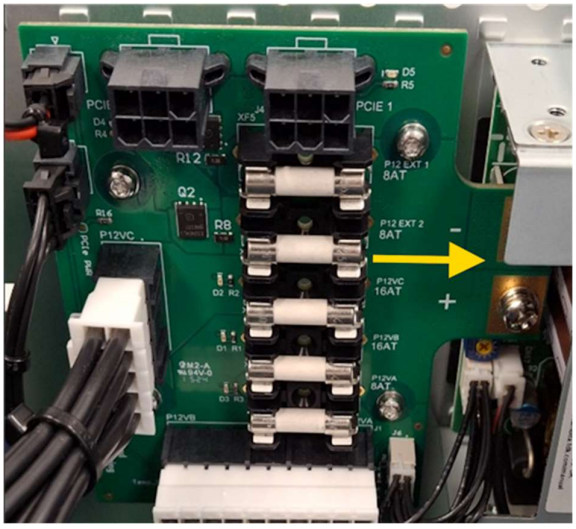
Allow for a 5-minute cooldown period before opening and wear gloves for protection.

Verify safety after repair. Always recheck ground continuity and mains dielectric strength after performing a repair.

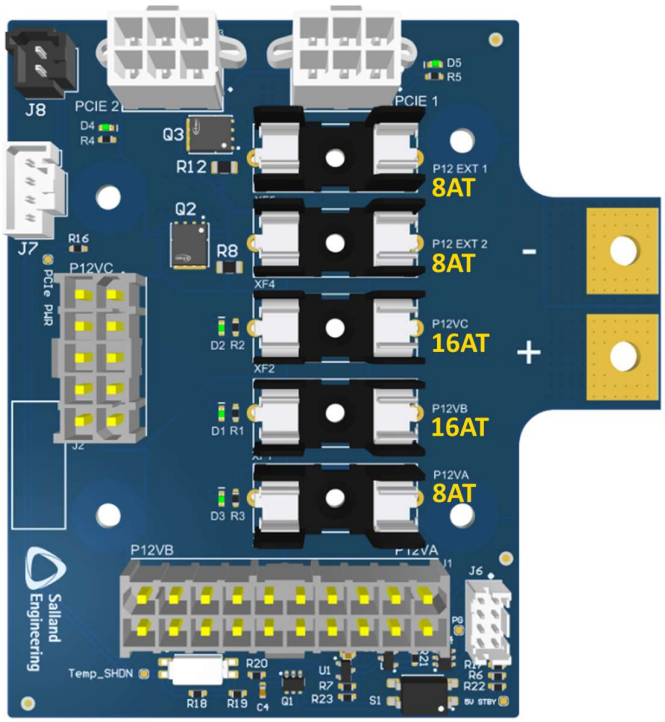
7.2 Replacing internal fuses

Replacing of internal fuses may only be performed by qualified service personnel. To access the internal fuses, follow the instructions in chapter 4.3 to open the PSV-Box instrument.

The main power supply is mounted Inside, to the side of the PSV-box. The power distribution board is directly mounted on the secondary side of the main power supply.



All secondary fuses are mounted on the power distribution board. From top to bottom the fuse ratings are 8A, 8A, 16A, 16A and 8A as shown in the illustration below. The voltage level on the secondary side is 12Vdc.



Power distribution board fuses.

When one of the fuses must be replaced. Only Advantest approved 8A or 16A 250VAC 5x20mm Time-Lag cartridge fuses must be placed.

CAUTION. Before replacing a fuse, investigate the possible root cause of breaking of the fuse.

Follow the steps below to investigate the root cause of why the fuse was ruptured:

1. Start by locating the ruptured fuse by performing a continuity test with a multimeter on each fuse.
2. Remove the fuses that fail the continuity test.
3. For each fuse that was removed, perform a resistance measurement between the load side of the fuse holder on the power distribution board and a GND point on the CCB base board. Measure at least for 5 seconds to allow for capacitors to charge, before deciding on a final measurement value.
4. In case a resistance measurement shows a value less than 12Ω, do not replace the fuse and continue with removing the CCB board for diagnostic testing and servicing.
5. In case a resistance measurement shows a value much higher than 12Ω, it is safe to replace the fuse and continue investigation of the root cause while powering on the instrument.
6. Disconnect all secondary power cables from the power distribution board.
7. Connect a multimeter to the secondary output of the power supply module to measure the output voltage.
8. Make sure the PSV-Box power switch on the back of the instrument is turned off.

CAUTION. Note the safety instructions in chapters 1.1 and 7.1 and put on your personal protection gear.

9. Connect mains AC power to the back of the instrument.
   Either use the supplied cable or a compatible and certified cable for your local mains voltage.

10. Turn on the power switch on the back of the instrument.
11. Measure the secondary output voltage. The measurement value should be in the range of 11.7 to 12.9 Volt.
12. Turn off the power switch on the back of the instrument and disconnect the AC mains power.
13. If the voltage value is outside the correct voltage range, continue with replacing the power supply module.
14. If the voltage value is within the correct voltage range, reconnect all secondary power cables to the power distribution board and continue investigation of the root cause while powering on the instrument.
15. Make sure the PSV-Box power switch on the back of the instrument is turned off.

CAUTION. Note the safety instructions in chapters 1.1 and 7.1 and put on your personal protection gear.

16. Connect mains AC power to the back of the instrument.
    Either use the supplied cable or a compatible and certified cable for your local mains voltage.
17. Turn on the power switch on the back of the instrument.
18. Measure and check all voltages on the CCB board as shown in table: 7.2.1
19. In case one of the voltages is outside the specified voltage range, turn the instrument off and continue with removing the CCB board for diagnostic testing and servicing.
20. If all voltage values are within the correct voltage range, turn the instrument off and continue with performing a diagnostic test as described in chapter 8.1.

7.2.1 CCB voltage value ranges

Voltage bus	Nominal value	Minimum value	Maximum value
+12VA_BP	12	11.7	12.9
+12VB_BP	12	11.7	12.9
+12VC_BP	12	11.7	12.9
+5V0_SBY	5	4.8	5.2
+3V3_SBY	3.3	3.15	3.45
+0V9_D	0.9	0.8	1
+0V9_A	0.9	0.8	1
+1V8_D	1.8	1.7	1.9
+1V8_A	1.8	1.7	1.9
-11V	-11	-10	-12
+3V3_PCIE_Ext	3.3	3.15	3.45
+12V_COM1	12	11.7	12.9
VCC_PIN	1.8	1.7	1.9
VCC_PERST	1.8	1.7	1.9
+3V3_D	3.3	3.15	3.45
+1V1_D	1.1	1	1.2

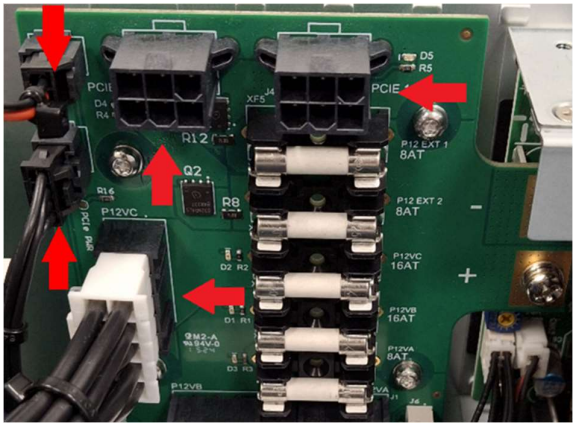
7.3 Replacing the Power supply module

Replacing of power supply module may only be performed by qualified service personnel. To access the internal Power supply, follow the instructions in chapter 4.3 to open the PSV-Box instrument.

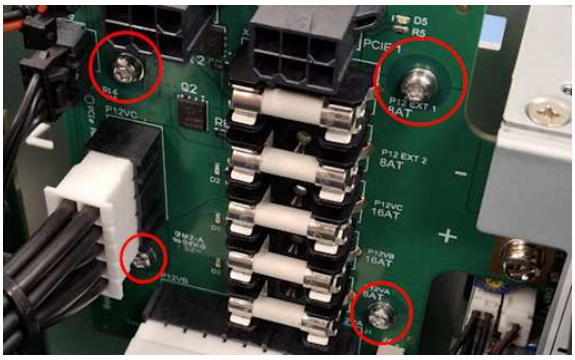
After opening he box the following steps should be followed to replace the power supply:

1. Inside the box. Disconnect the AC going into the power supply by squeezing the taps and pulling it out.

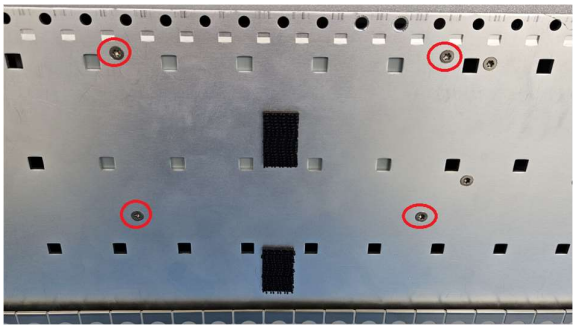
2. Remove the PCIE 1 and 2 external cables if they are used. Remove the P12VC cable, the PCIe PWR cable and the front panel LED cable.



3. Remove the 4 torx screws at the front of the power board. Be careful with the spacers between the power board and the screws.



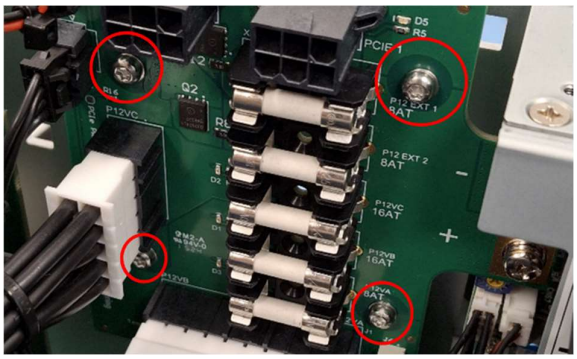
4. Remove the 4 screws from the outside of the PSV-box, holding the power supply. While holding the power supply with one hand. After the last screw the power supply can be taking out and the last power cable can be removed.



5. When placing the power board on the new supply. Make sure to also install back the spacer and spring washer.

6. Once the power board is linked to the power supply, you can connect the 20Pin power connector within the PSV-box. Subsequently, the power supply can be inserted into the box, and the 4 screws previously removed can be reinserted.

7. After remounting the power supply. The four screws on the power board can be replaced. Make sure to also place the spacer between the power board and the screw. The P12VC cable can be placed back. (if the PCIEext power was used, it must be placed back too).

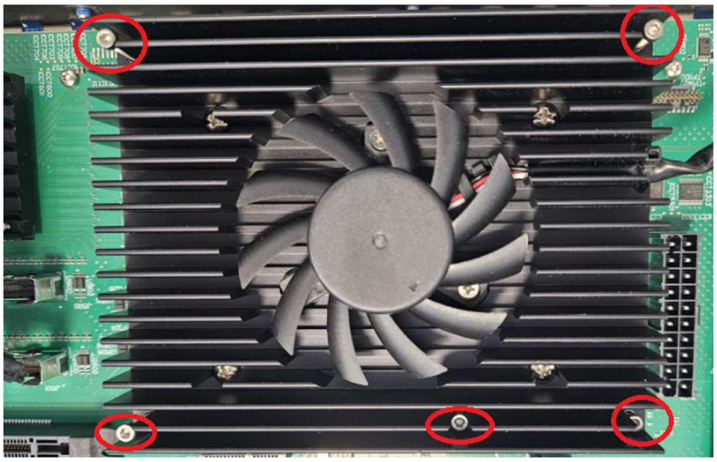


8. Connect the AC power cable

9. Close the box. Using the description in chapter 4.3 – 13.

7.4 Replacing the COMe module

1. Open the box, Using the description of 4.3 – 1 through 7
2. Remove the power supply as described in chapter 7.3.
3. Cut the cable ties holding the COMe fan cable and disconnect the fan cable from the CCB.
4. Also remove the 20pin power cable from the CCB.
5. Unscrew the 5 Allen screws on top of the COMe.

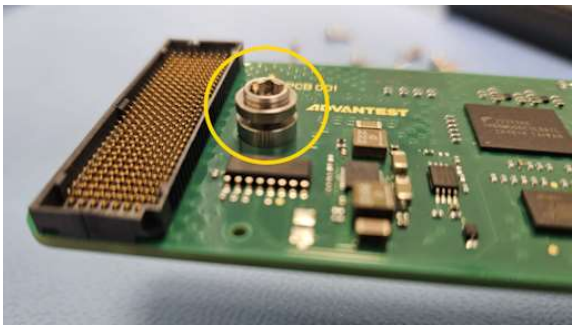


6. The COMe can now be lifted out and replaced.
7. Reverse steps 6 to 1 to place a new COMe module.
8. Close the box. Using the description in chapter 4.3 – 13.

7.5 Replacing the BCM module

1. Open the box, Using the description of 4.3 – 1 through 7
2. Also remove the bottom cover, the same way as removing the top cover.
3. From the underside of the PSV-Box, remove the 2 screws and rings on the underside of the BCM.

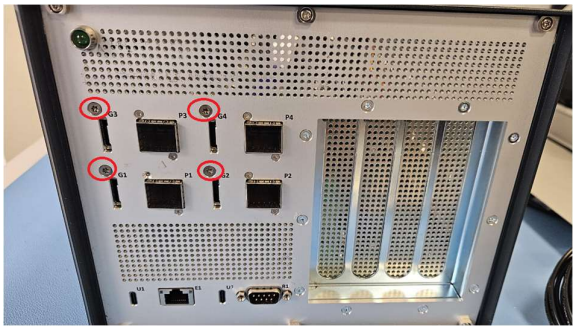
4. The BCM can be removed by turning the Allen screw in the same holes where the 2 screw were removed from. This will push the BCM from its connectors.



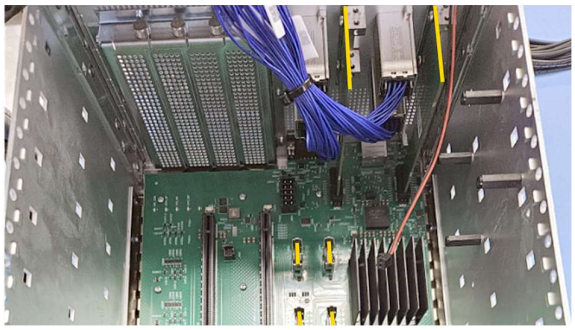
5. Make sure this part is screwed completely in before placing the BCM on the CCB.

7.6 Replacing the CCB board

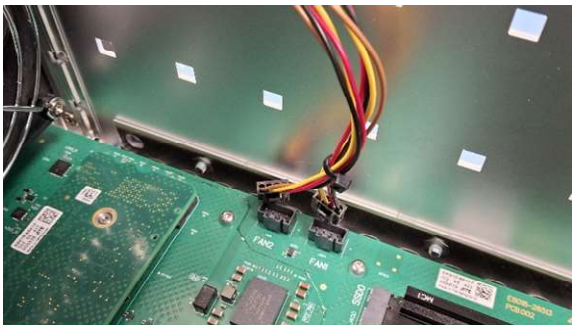
1. Open the box, Using the description of 4.3 – 1 through 7
2. Remove the power supply as described in chapter 7.3.
3. Remove the COMe module as described in chapter 7.4.
4. Remove the BCM as described in chapter 7.5.
5. Remove the 4 torx screws in the front panel



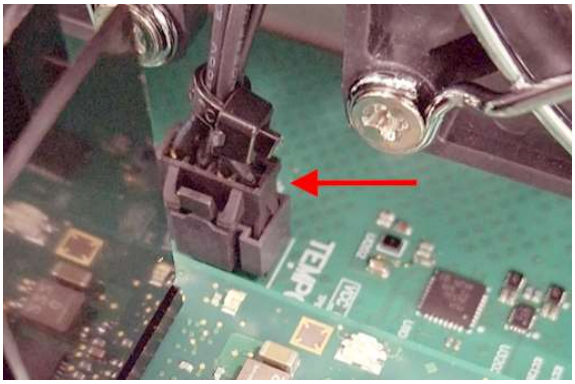
6. Lift out the 2 GPIO boards.
7. Disconnect the 4 PCIe cables from the CCB.



8. Disconnect the 2 fan cables from the CCB.

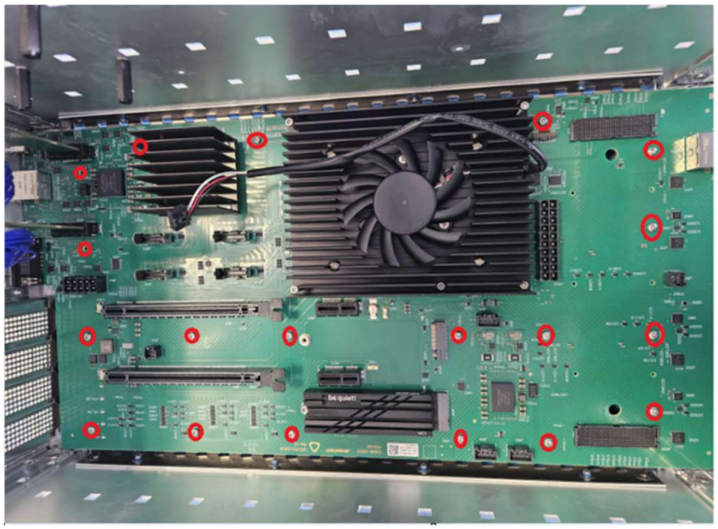


9. Disconnect the temperature sensor board cable from the CCB.



10. Remove the back panel by taking out the 6 torx screws.

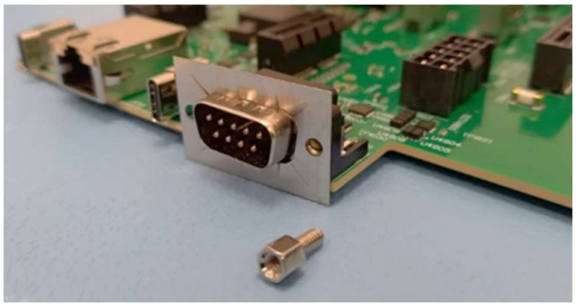
11. Remove all mounting screws off the CCB board, there are 17 in total.



12. The CCB can now be lifted and pulled back from the front panel to remove it.

Placing back the CCB

1. When sliding in a new CCB, make sure to place the D-SUB EMI/RFI Gasket between the R1 connector and the front panel.



2. Reverse steps 12 to 1 to place a new CCB board.

8 Troubleshooting

This chapter provides a troubleshooting lookup table with anticipated or known problems that might arise when using the PSV-Box instrument. If a problem cannot be solved with the help of this chapter, then have the instrument inspected by qualified service personnel.

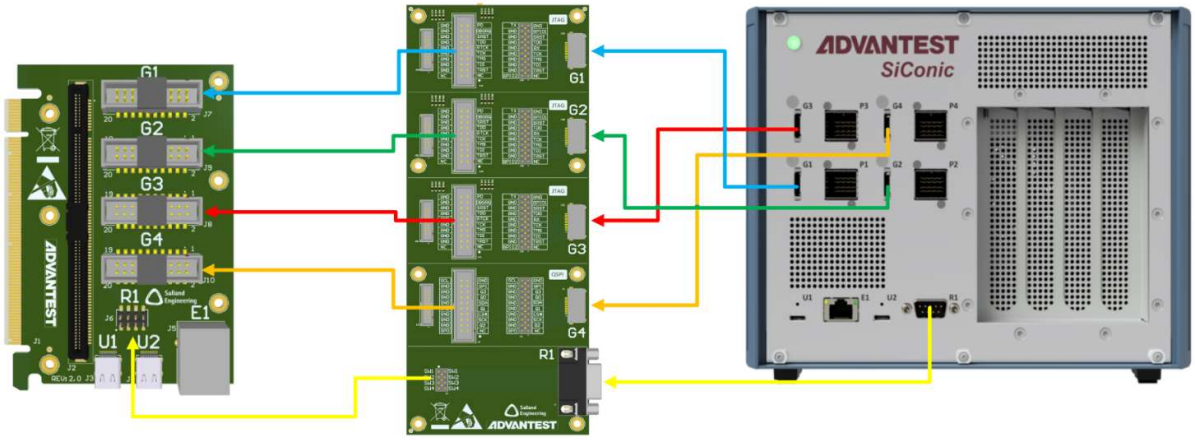
If the instrument needs to be sent back to an Advantest service center, please refer to chapter 9.2 for information on how to ship the instrument.

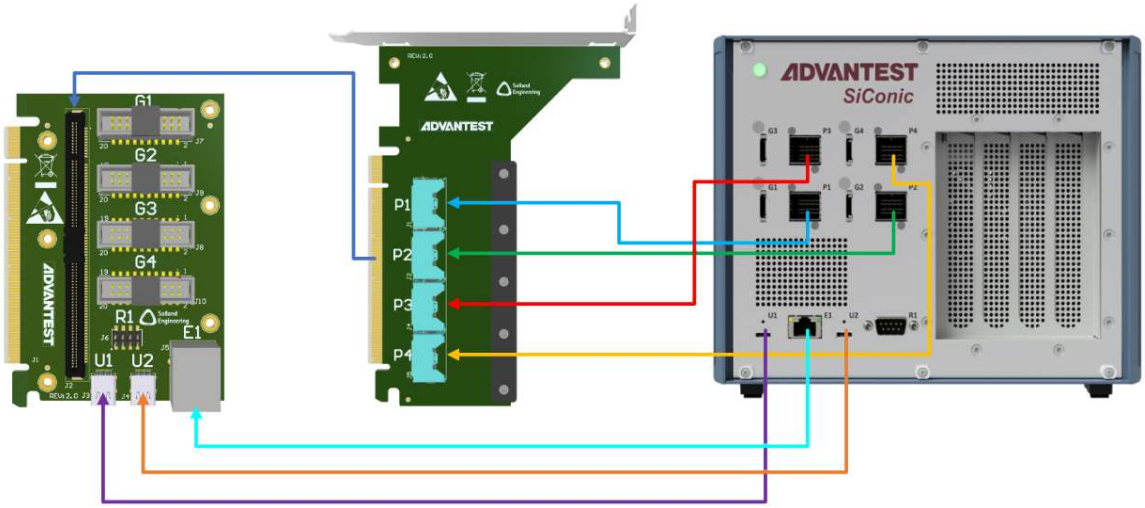
If a problem arises while using the instrument and it still can connect to the workstation, always run diagnostic tests first, to verify if the instrument is working correctly before troubleshooting the problem.

8.1 Diagnostic test

8.1.1 Diagnostic test setup

The diagnostic self-test is part of the PSV-Box test environment on the workstation. First prepare the diagnostic test hardware as described in the previous chapter and as shown in the illustration below. Then follow the next steps to initiate the diagnostic tests.





To perform a diagnostic test, connect four PCIe cables between from the PSV-Box to a Male or Female PCIe adapter board. Then plug the adapter board into the CEM PCIe connector of the loopback board.

Connect four GPIO cables from PSV-box to the utility board. Then use 4 GPIO IDC20 flat cables to connect the utility board to the loopback board.

Connect the D-Sub9 from the PSV-Box to the one on the utility board. Then connect the RELAY IDC8 cable between the utility -and the loopback board.

Connect two USB-C cables from the PSV-box to the loopback board.

Connect a Cat6 Ethernet cable from the PSV-Box to the loopback board.

Connect a Cat6a Ethernet cable from the PC workstation to the back of the PSV-Box. Then power up the laptop followed by powering on the PSV-Box.

8.1.2 Diagnostic test connections

PSV-Box	Adapter board	Utility board	Loopback board	Cable used
P1	P1			EK810-61653
P2	P2			EK810-61653
P3	P3			EK810-61653
P4	P4			EK810-61653
	PCIe CEM		PCIe CEM	
G1		G1		EK810-61621
G2		G2		EK810-61621
G3		G3		EK810-61621
G4		G4		EK810-61621
		G1 IDC20	G1 IDC20	EK810-61623
		G2 IDC20	G2 IDC20	EK810-61623
		G3 IDC20	G3 IDC20	EK810-61623
		G4 IDC20	G4 IDC20	EK810-61623
R1		R1		EK810-61631
		R1 IDC8	R1 IDC8	EK810-61624
U1			U1	EK810-61602
U2			U2	EK810-61602
E1			E1	EK810-61691

8.1.3 Diagnostic test execution

The diagnostic tests must be run on the workstation. It can be run in the Advantest Smartest 8 software environment as referenced in manual ref: [ADV_STM].

8.2 Troubleshooting table

Problem	Possible reasons	Solutions
Front panel LED does not light up.	AC mains power missing. Mains fuse ruptured.	Check if AC mains power socket has live power. Check or replace external mains fuses.
Fans do not spin up after power on.	AC mains power missing.	Check if the front panel LED light's up. If it does not light up, continue from there. If it does light up, contact the Advantest service center.
PC workstation cannot connect to the instrument.	IP addresses of the PSV-Box are incorrect. Ethernet cable wrong type or broken.	Check and correct the IP addresses in the test environ-ment to the ones on the PSV-Box label. If they are the same, power cycle the instrument. Replace the Cat6a Ethernet cable and power cycle the instrument. If contact cannot be restored, contact the Advantest service center.

9 Warranty

***Legal text t.b.d.*

Manufacturer	Advantest Europe GmbH
Address	Herrenberger Str. 130 71034 Boeblingen Germany TEL: +49-7031-4357-000 FAX: +49-7031-4357-497

9.1 Instrument identification labels

9.2 Instrument shipment

Before returning the instrument. Make sure that:

- Instrument and cables do not appear to have been damaged.
- Operating instructions have been followed.
- Diagnostic self-test has been executed.
- Fuses have been checked.

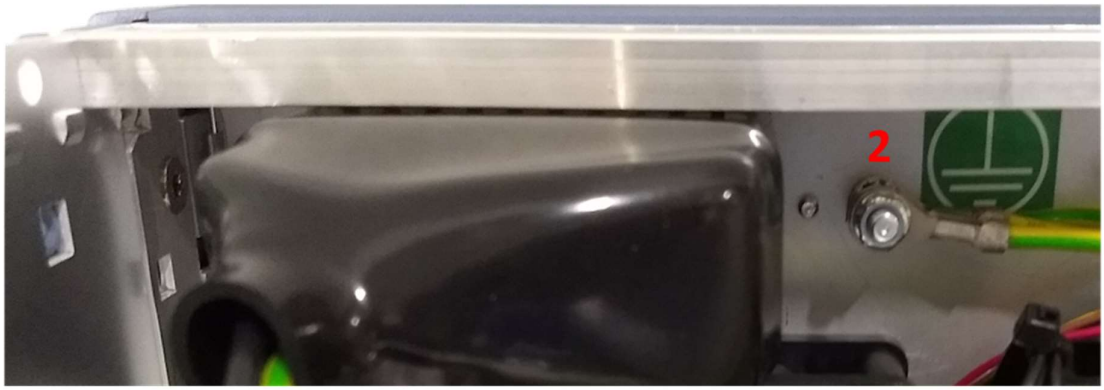
Use the original packaging and label as shown below, for returning the instrument.

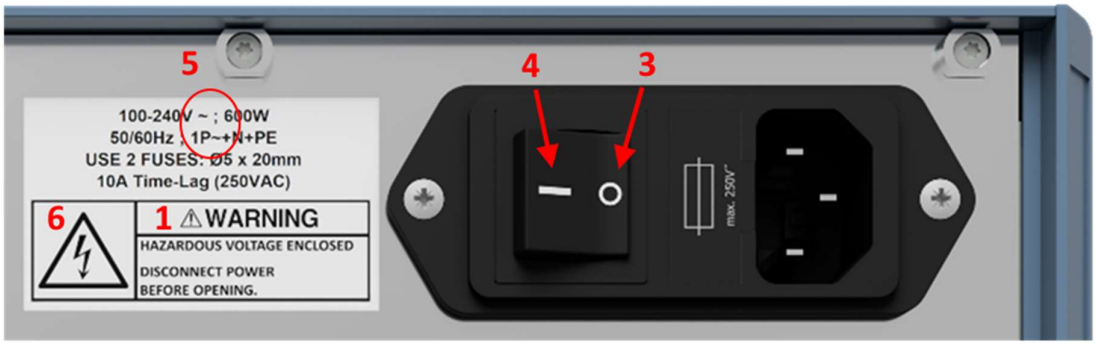
10 Data plate & markings

SiConic / PSV-box / Model EK810PS1 data plate

SiConic / PSV-box / Model EK810PS1 Front panel identification

SiConic / PSV-box / Model EK810PS1 markings





⚠	1. Generic Caution/Warning symbol
⏚	2. Earth point symbol (On the back panel inside the housing)
○	3. Mains power Off symbol
|	4. Mains power On symbol
~	5. Mains AC symbol
⚡	6. Hazardous Voltage symbol

Disconnect the power cord before opening the instrument to prevent shock hazard.

11 PSV-Box revision status

The following table contains all current software and hardware revisions as of 24-6-2024.

Part	Type	Model number	Revision
COMe	BIOS	68008-0000-35-1DV1	BID7E908.009 03/05/2024
SSD0	Linux OS	980 PCIe 3.0 NVMe M.2	Ubuntu 22.04.2 LTS Kernel 5.15.0-60-generic
CCB	Carrier BIOS	W25Q512JVEIQ	BID7E908.009 03/05/2024
CCB	PCIe Switch firmware	PEX88032B0-DB	20240515_E8018-PCIESW-F0_b5ceccbd.bin
BCM	FPGA firmware	XC7Z020-1CLG484C	20240625_EK806-U0000_ac7d4361.bin
BCM	ETH Switch firmware	BCM53162XMB1ILFBG	20240515_E8018-ETHSW-U0_b5ceccbd.bin
BCM	ETH PHY firmware	BCM84891LMB0IFEBG	20240515_E8018-PHY-LONGFIN-U0_b5ceccbd.bin
COMe	ASSY	68008-0000-35-1DV1	Rev.1.0.0
CCB board	ASSY	EK810-66423	Rev.2.0
BCM board	ASSY	E8018-66414	Rev.3.0
PWR board	ASSY	BRD.PSV.PWR.01	Rev.3.0
GPIO board	ASSY	BRD.PSV.GPIO.01	Rev.3.0
TPS board	ASSY	BRD.PSV.TPS.01	Rev.2.0
ADPT-Male board	ASSY	EK810-66461	Rev.2.0
Loopback board	ASSY	EK810-66431	Rev.2.0
Utility board	ASSY	EK810-66422	Rev.2.0

12 CE Declarations of Conformity

13 US Declarations of Conformity

14 Canadian Declarations of Conformity