**Favoritodedal**

SPU Signal Processing Unit

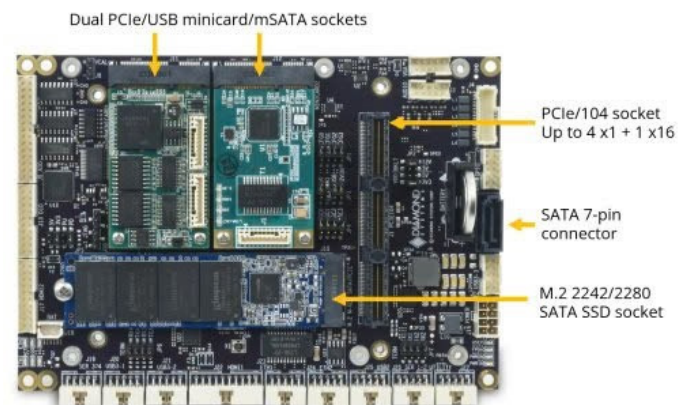For echo sounder equipment, calibration is needed for optimizing results in depth measurement.

The echo sounder is very sensitive for water condition like salt level and temperature condition so when the echo sounder is calibrated the results are optimized.

Echosounder calibration system SPU offers easy customization and quick availability for rugged calibration system due to its novel architecture that includes pre-integrated expansion connectors for easy addition of I/O, plus the use of COM Express modules to support flexible CPU choices.
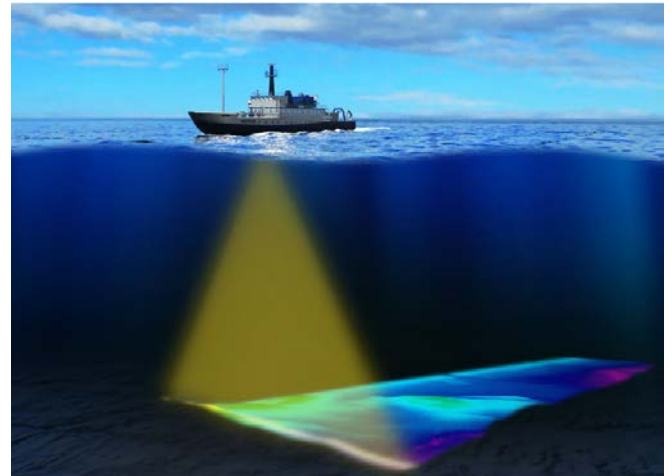
Overview

In addition to the standard signal processing features, SPU supports up to 3 I/O sensors with up to 110 additional I/O sensors without requiring any change to the enclosure or cabling. The elimination of custom enclosure and cabling design efforts dramatically reduces up-front costs and delivery times, and the resulting use of common components across multiple product configurations helps keep production costs down and facilitates the production of small quantities for pilot or small-run programs.

Dual PCIe/USB minicard/mSATA sockets

PCIe/104 socket
Up to 4 x1 + 1 x16

SATA 7-pin connector

M.2 2242/2280 SATA SSD socket

Features

- Form factor: rackmount case

- Perfect balance of performance and mobility

- Rugged design with Mil-Std compliance environment and EMC standards

- Super easy to use robust hardware

- Separate remote available / Master Slave setup with the same software setup

- Optional 19 inch rack for fixed setup

- Optional Win 10 computer program available

- UTP communication bus Echogram common protocol

- Unit can process data bus via RS232, RS485 and NMEA 2000, NMEA 0183

The COM is thermally coupled to the top surface of the enclosure with a conduction cooling heat spreader and mounting plate. (Heat spreader removed for illustration purposes, normally present in the open rectangle in the mounting plate).

The optional filtered 80-watt power supply is thermally coupled to the bottom surface of the enclosure using a conduction cooling mounting plate with thermal pads on both sides.

SPU is based on Express carrier board featuring a high level of I/O as well as multiple sockets for I/O expansion. The optional integrated data acquisition circuit provides high-accuracy analog I/O with autocalibration and programming library support. Dual minicard sockets and a PCIe/104 socket with PCIe x1 and x16 links (depending on the installed COM) enable feature upgrade with the widest range of I/O modules, from low-cost minicards up to high-performance graphics and 10Gb Ethernet, all without modifying the case or cables.

MIL-grade rugged power supply with MIL-STD-461, -704, and -1275 compatibility and 9-60VDC range. The supply is available with both isolated and non-isolated output configurations. As a cost and weight reduction alternative, a MIL-STD-461 filter circuit is built right into the connector board, eliminating the separate power supply for applications where 461 filtering alone is sufficient. Both the processor and power supply are direct-coupled to the enclosure for efficient conduction cooling.

System - On - Module configuration

Processor: Intel Core i5

Storage: M.2 2242/2280 size solid-state disk module with capacity up to 2TB

Wireless: Bluetooth ® v5.0

I/O Signal interface

The total number of flexible I/O expansion pins on SPU is 110. These are provided in multiple ways to enable maximum flexibility in external wiring.

One front panel I/O connector (J6) is reserved for internal cable connection to allow easy I/O expansion without redesigning the enclosure. J6 is accessed internally with 3 latching pin headers: 2 20-pin and 1 30-pin (total 70 I/O signals available). On models with data acquisition, the 30-pin and one 20-pin connector are connected to the DAQ circuit on the Jasper SBC, and the second 20-pin connector remains available.

Another 20-pin internal connector is available leading to 20 unused pins on I/O connector J3. This can be used to combine custom I/O with existing system I/O to reduce the number of external cables needed.

Two additional 10-pin internal connectors support up to 20 additional I/O signals. These connectors are normally tied to the GPIO and Audio signals on J4 and J3 respectively, but they can be repurposed by removing the internal patch cables and connecting expansion boards to them instead.

Data bus interface
Serial communication I/O: RS-232/422/485
Hi-speed digital: HDMI, GbE, USB, 3.0, USB 2.0

*Resistant to impact, vibration, shock, dust, and operates at high temperatures and harsh climate environments.

*Waterproof complies with IP53 standard.

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Block diagram

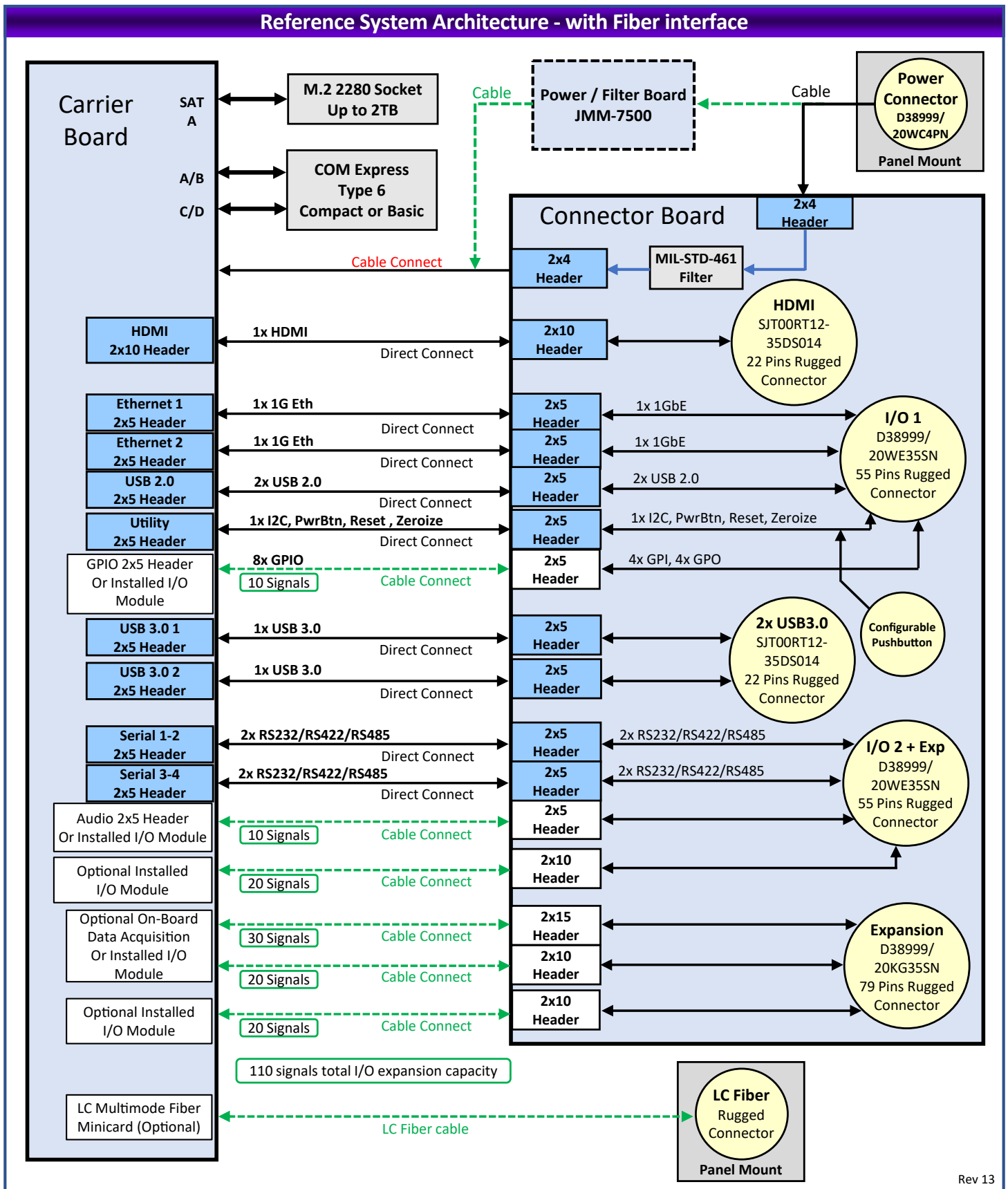### Reference System Architecture - with Fiber interface

Carrier Board

SAT A

A/B

C/D

M.2 2280 Socket Up to 2TB

COM Express Type 6 Compact or Basic

Cable

Power / Filter Board JMM-7500

Cable

Power Connector D38999/ 20WC4PN — Panel Mount

2x4 Header

Cable Connect

Connector Board

2x4 Header

MIL-STD-461 Filter

HDMI 2x10 Header

1x HDMI

Direct Connect

2x10 Header

HDMI SJT00RT12-35DS014 22 Pins Rugged Connector

Ethernet 1 2x5 Header

1x 1G Eth

Direct Connect

2x5 Header

1x 1GbE

Ethernet 2 2x5 Header

1x 1G Eth

Direct Connect

2x5 Header

1x 1GbE

USB 2.0 2x5 Header

2x USB 2.0

Direct Connect

2x5 Header

2x USB 2.0

Utility 2x5 Header

1x I2C, PwrBtn, Reset , Zeroize

Direct Connect

2x5 Header

1x I2C, PwrBtn, Reset, Zeroize

I/O 1 D38999/ 20WE35SN 55 Pins Rugged Connector

GPIO 2x5 Header Or Installed I/O Module

8x GPIO

10 Signals

Cable Connect

2x5 Header

4x GPI, 4x GPO

USB 3.0 1 2x5 Header

1x USB 3.0

Direct Connect

2x5 Header

USB 3.0 2 2x5 Header

1x USB 3.0

Direct Connect

2x5 Header

2x USB3.0 SJT00RT12-35DS014 22 Pins Rugged Connector

Configurable Pushbutton

Serial 1-2 2x5 Header

2x RS232/RS422/RS485

Direct Connect

2x5 Header

2x RS232/RS422/RS485

Serial 3-4 2x5 Header

2x RS232/RS422/RS485

Direct Connect

2x5 Header

2x RS232/RS422/RS485

I/O 2 + Exp D38999/ 20WE35SN 55 Pins Rugged Connector

Audio 2x5 Header Or Installed I/O Module

10 Signals

Cable Connect

2x5 Header

Optional Installed I/O Module

20 Signals

Cable Connect

2x10 Header

Optional On-Board Data Acquisition Or Installed I/O Module

30 Signals

Cable Connect

2x15 Header

20 Signals

Cable Connect

2x10 Header

Expansion D38999/ 20KG35SN 79 Pins Rugged Connector

Optional Installed I/O Module

20 Signals

Cable Connect

2x10 Header

110 signals total I/O expansion capacity

LC Multimode Fiber Minicard (Optional)

LC Fiber cable

LC Fiber Rugged Connector — Panel Mount

Rev 13

## Mass Storage and I/O Expansion

Mass Storage and I/O Expansion

Mass storage is provided by an M.2 2242/2280 size solid-state disk module with capacity up to 2TB. Additional storage can be provided with an add-on drive using the built-in SATA connector.

I/O expansion is readily accomplished with the use of PCIe / USB minicards as well as PCIe/104 I/O modules. The PCIe/104 socket supports up to 4 x1 links and 1 x16 link, depending on the installed COM. A Core i7 or lower performance COM will typically support 3-4 PCIe x1 links. A Xeon or higher COM will typically support the x1 links as well as the x16 link.

Direct-Coupled Connector Board Eliminates Cables

Internal cables are a leading cost, leadtime, and size driver for rugged systems, as well as usually the most failure-prone element in the design. With SPU, most I/O connectors are mounted on a circuit board that plugs directly into the main computer board and eliminates most internal cables. This design reduces cost, reduces failure, reduces size, increases ruggedness, and simplifies assembly. Attachment points are provided for optional dust caps for all connectors. The rightmost connector is on a breakaway portion of the circuit board and can be removed to support smaller systems that have lesser I/O requirements.

I/O Expansion Capabilities
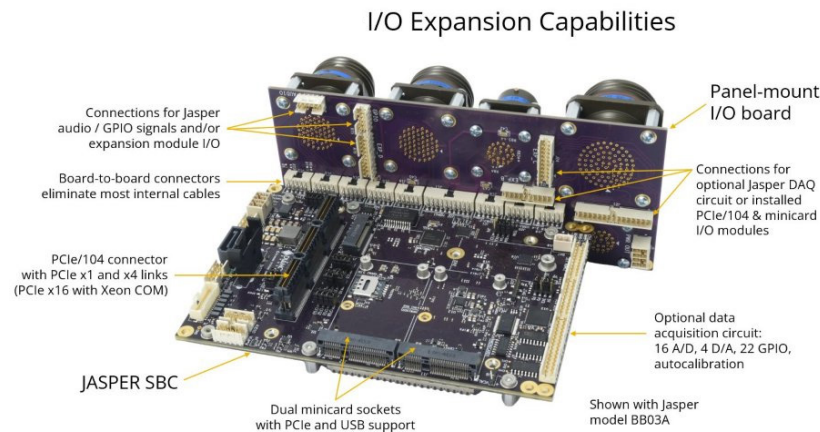
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Ordering infomation

SPU has a large number of standard configuration options. You can also customize it to add more I/O or make other changes. All the standard options are shown in our configuration worksheet. You can download the worksheet, fill it in, and submit it to us to request a quote.

Available options include:

- Data acquisition
- Choice of processor and RAM capacity
- Expansion I/O connector
- Integrated power supply
- Integrated SSD
- Operating system (Windows 10 / Ubuntu Linux)
- Custom I/O using PCIe minicard and PCIe104 modules

Option select and part number reference

	Single processing unit	Master-Slave configuration	Distributed Configuration	Master-Master Configuration
Carrier board	Base board JSP-BB0	Base board JSP-BB6-167	Base board JSP-BB0-289	Base board JSP-BB1-301
Processor and RAM	i5-12400F	i7-1365URE 32G	i7-1365URE 64G	i7-1185G7E-64
Signal connector layout	Serial, hi-speed interface, ethernet, USB, Bluetooth	Serial, hi-speed interface, ethernet, USB, Bluetooth	Serial, hi-speed interface, ethernet, USB, Bluetooth	Serial, hi-speed interface, ethernet, USB, Bluetooth
Power supply	Mil-std 24VDC, 48VDC	Mil-std 24VDC, 48VDC	Mil-std 24VDC, 48VDC	Mil-std 24VDC, 48VDC
Expansion I/O	Additional IO requirements can be customized per customer's instruments interface. Refer to supported instrument list.			
Wireless development kit		**RF test kit (included)** **Choice of Pickering or R&S**		**RF test kit (included)** **Choice of Pickering or R&S**

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Supported instrument	Model	Manufacturer
Sound velocity profiler	C-keel	Valeport
Magnetometer	Sea 'Sentinal	Marine Magnetics
Magnetometer	Seaspy 2	Marine Magnetics
Magnetometer	Seaspy 2	Marine Magnetics
Echosounder	Sonic 2022	R2 Sonic
GPS Geo 5T Handheld	Geo 5T	Trimble
GPS Garmin eTrax20	Garmin Etrax20	Garmin
GPS Receiver	Juno 5B	Trimble
GPS Receiver	Juno 3B	Trimble
GPS Receiver	DG14	Ashtech
DGPS Receiver	SPS 361	Trimble
DGPS Receiver	SPS 351	Trimble
DGPS Receiver	R131	Hemisphere
RTK GNSS system	RTK	Trimble
Digital total station	ZOOM 35-5 PRO A10	Geomax-Leica
Digital total station	Leica TS06	Leica
Digital total station	Leica TS02	Leica
Digital total station	Sokkia DT - 610	Sokkia
Digital total station	Leica NA728	Leica
Digital total station	Sokkia - C320	Sokkia
Single beam echosounder	OdomHydro trackI, II	Teledyne
Bottom profiler	4200	Edgetech
Sound Velocity Profiler and accessories	Midas SVP	Valeport
Sound Velocity Profiler and accessories	Base X2 Profiler AML	AML
Single beam echosounder	EA-400	Kongsberg
Multi-beam echosounder	EM 2040	Kongsberg
Single beam echosounder	Odom huydrotrack II	Teledyne
Single beam echosounder	MD2	Atlas
Single beam echosounder	EA500	Kongsberg
Single beam echosounder	Odom hydrotrack I	Teledyne
Multi-beam echosounder	Seabeam 3030	Elac Nautik
Multi-beam echosounder	Seabeam 1180	Elac Nautik
Single beam echosounder	DESO 35	Atlas
Single beam echosounder	Odom hyrotrack II	Teledyne
Multi-beam echosounder	Sonic 2022	R2 Sonic
Multi-beam echosounder	Seabeam 1180	Elac Nautik
Single beam echosounder	Bathy 2010PC	SyQwest
Single beam echosounder	Odom hydrotrack II	Teledyne
Multi-beam echosounder	EM 2040-07	Kongsberg
Single beam echosounder	DESO 35	Atlas
Single beam echosounder	Odom Hydrotracc II	Teledyne
Multi-beam echosounder	MD30	Atlas
Multi-beam echosounder	Fansweep 20 -100	Atlas
Multi-beam echosounder	Fansweep 20 - 200	Atlas
Single beam echosounder	Deso 35	Atlas
Single beam echosounder	Deso 350	Atlas
Single beam echosounder	OdomHydro trackI, II	Teledyne