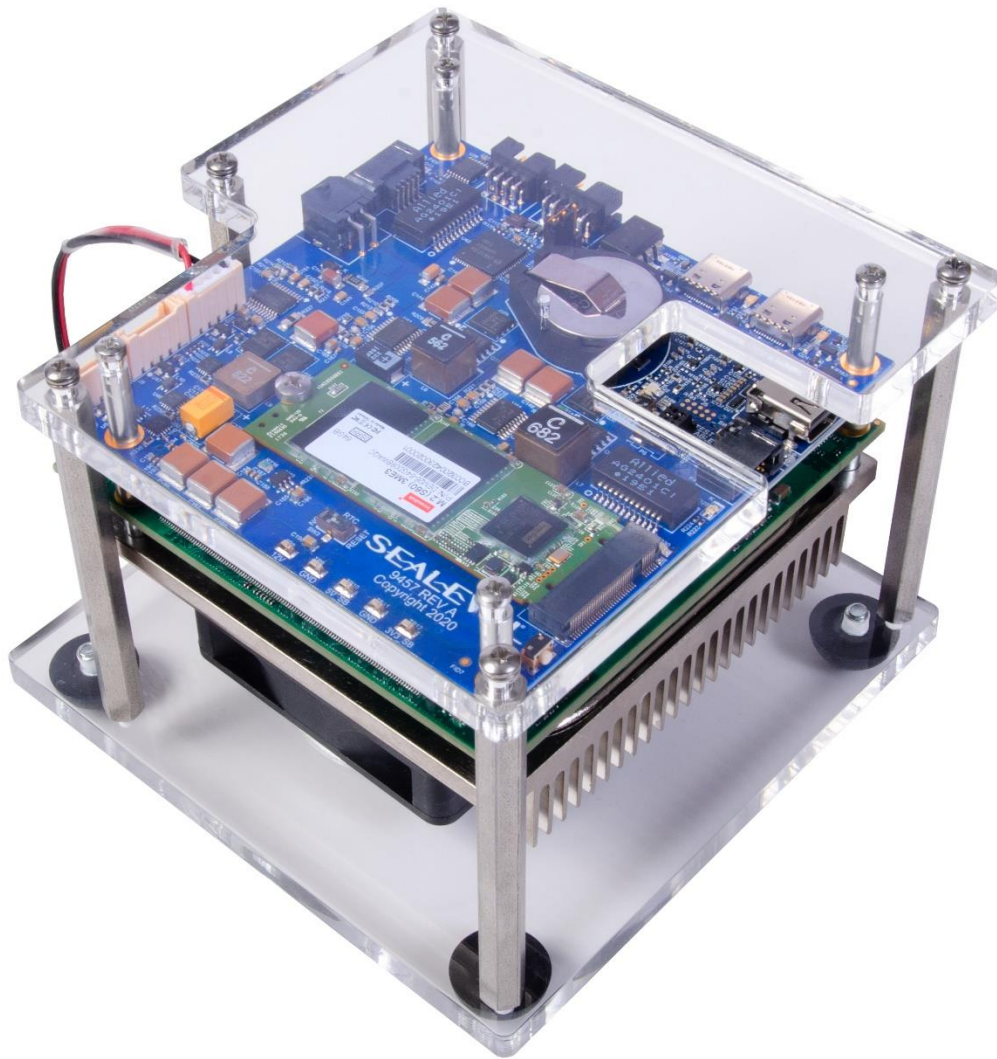


COM Express Compact Type 6 Evaluation Board

User Manual | 12009-001-KT



SEALEVEL®

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Introduction

Get your COM Express project off to a fast start with Sealevel's 12009 COM Express Compact Type 6 Evaluation Board. The 12009-001-KT supports Compact Type 6 COM Express modules and provides the smallest COM Express Type 6 footprint available. Standard features include two Gigabit Ethernet, two USB 3.0 Type C, three USB 2.0, four GPIO ports, one RS-232, one UART interface, one M.2 SATA SSD slot, and one Mini DisplayPort. Specific features are COM Express module dependent.

Sealevel's 12009-001-KT simplifies software development and prototyping while the target application carrier board is designed. Take advantage of Sealevel's carrier board development services for the fastest time to market. Our extensive library of proven I/O circuits including serial, analog, and digital functionality simplifies the design process and can be easily optimized to meet the specific I/O count, voltage ranges and connector types required for your application.

The 12009 COM Express Compact Type 6 Evaluation Board is an off-the-shelf Computer on Module (COM) containing the functionality common to most industrial computing systems (processor, memory, graphics, USB, Ethernet, etc.) with a custom carrier board that includes application specific I/O and interface connectors. This combination provides the benefits of a full custom design while reducing the time, cost, and risk of full custom system design.

COM architecture offers significant technical and business advantages including:

- Fast Time to Market
- Scalability for Easy Upgrade
- Superior Application Specific I/O
- Flexible Mechanical Configuration
- Shock and Vibration Resistant
- Extended Operating Temperature Range
- Long Term Availability and Support
- Lifecycle Management and easy technology refresh

Sealevel has partnered with the leading COM Express module manufacturers to ensure our customers benefit from the best in the industry. This manual will focus on the higher-level features of the 12009-001-KT carrier board interfaces and I/O.

Features

- Designed for the congatec® conga-TC370 COM Express family
- 0°C to 70°C wide operating temperature range
- (2) Gigabit (10/100/1000BaseT) Ethernet Headers
- (2) USB 3.0 Type-C Connectors
- (3) USB 2.0 Headers
- (4) GPIO Headers
- (1) RS-232 Header
- (1) UART Interface
- (1) Mini DisplayPort Connector
- (1) M.2 SATA SSD Interface
- Onboard LED indicators for power and COM activity
- Real-time clock
- 21VDC input with locking 4-position Molex Micro-Fit connector
- 95mm x 95mm dimensions
- Includes carrier board, DOM module, demonstration enclosure, and cables



Before You Get Started

What's Included

The 12009 COM Express Type 6 Evaluation Board is shipped with the following items. If any of these items are missing or damaged, please contact Sealevel at 864.843.4343 for a replacement.

- **Carrier board, COM module, and plexiglass demonstration enclosure**
- **128GB M.2 SSD Installed**
- **5V Fan with 5 Pin Molex Connector Cable Installed in Enclosure (P/N: CA807)**
- **SeaLATCH Panel Mount USB Type A Female to Molex 4 Pin Connector (P/N: SL-PM/x2)**
- **Power Supply (P/N: TR168-US Providing 60W, 21V)**

Cables

- **Mini DisplayPort Male to HDMI Male Cable (Audio Support) 3ft length (P/N: CA828)**
- **Molex Connector to 2 DB9 Connectors (P/N: CA772)**
- **10 Position Connector to RJ45 Ethernet Port (P/N: CA774/x2)**
- **Power Button and LED (P/N: CA775)**
- **5 Pin to 4 Pin Molex, 14.00" Long (P/N: CA471/x2)**
- **10 Position Connector to Flying Leads, 11.81" Long (P/N: CA833)**

Advisory Conventions



Warning

The highest level of importance used to stress a condition where damage could result to the product, or the user could suffer serious injury.



Important

The middle level of importance used to highlight information that might not seem obvious or a situation that could cause the product to fail.



Note

The lowest level of importance used to provide background information, additional tips, or other non-critical facts that will not affect the use of the product.

Technical Specifications

| Environment & MTBF | |
|----------------------------------------|--------------------------------------------|
| Operating Temperature | 0 to 70 °C (32 to 158 °F) |
| Storage Temperature | -40 to 105 °C (-40 to 221 °F) |
| Humidity | 10 to 90% R.H. Non-Condensing (Both) |
| Mean Time Between Failure ¹ | 430,286 hours at 25° C ambient |
| Mechanical | |
| Board Length / Envelope | 3.74 inches (95 mm) / 4.80 inches (122 mm) |
| Board Width / Envelope | 3.74 inches (95 mm) / 4.96 inches (126 mm) |
| Board Height / Envelope | 1.18 inches (30 mm) / 1.19 inches (30 mm) |
| Weight ² | 1.69 lbs. / 0.73 kg |
| Power Consumption | |
| Typical Power Draw ³ | 9.6W |
| Nominal Supply Voltage | +21 VDC |
| Nominal Current Draw | 450mA |

1. Telecordia SR-332 method used.
2. Weight includes the enclosure and cabling for the fan. All other cabling and power supply are not included.
3. Typical power consumption can vary depending on COM Express Module, memory capacity, OS/software activity and peripheral devices. Input power (J7) is current limited by a 5A fuse.

Digital I/O

Detailed pinout and wiring information is available in the [P2 Header Digital I/O Section](#).

| Digital Inputs | 4 Channels |
|------------------------------------------------------------------|------------------------------------------------------------------------------|
| High-level Input Voltage (V_{IH}) | 2.02v – 5.50v |
| Low-level Input Voltage (V_{IL}) | 0.00v – 0.80v |
| Push Pull Outputs | 2 Channels |
| High-level Output Voltage (V_{OH}) VCC 3.3v: VCC 5.0v: | Depends on J4 VCC selection. 2.8v – 3.3v 4.5v – 5.0v |
| Low-level Output Voltage (V_{OL}) VCC 3.3v: VCC 5.0v: | Depends on J4 VCC selection. 0.0v – 0.25v 0.0v – 0.35v |
| Darlington (Open Collector) Output | 1 Channel |
| Contact Voltage | 60VDC max |
| Max Continuous Collector Current | 500mA |
| Max Peak Pulse Current | 2000mA |
| Form A – Solid Relay Output | 1 Channel |
| Normal Output Voltage ¹ | 21.0v |
| Output Voltage Range ² | 20.0v – 30.0v |
| Maximum Output Current ³ | 1500mA |

1. Sourced directly from the protected input power.
2. Depends on the input voltage (J7) provided to the device.
3. Be aware of the 5A current limit on the power input (J7) because load drawn from this output will be reflected in the overall input current.

Technical Descriptions

COM Express Module Options

The 9457 carrier board is compatible with the Compact form factor Type 6 COM Express modules powered by 8th generation Intel® Core™ SOC processor up to 4cores. COM Express is a widely supported implementation of Computer on Module (COM) design. The COM Express architecture reduces the complexity, cost and time required for custom computer system design by combining the processing, memory, video, Ethernet, and USB functionality in a small, highly integrated module. COM Express modules install on a carrier board that provides the application specific I/O and external connectors best suited for the system requirements.

Our COM Express carrier boards leverage Sealevel's I/O and communication expertise, providing carrier board and full system solutions as rapidly as possible. Common I/O features include serial, analog and digital I/O. Sealevel's extensive library of proven I/O circuits can be included to meet a specific I/O count, voltage range, and connector type.

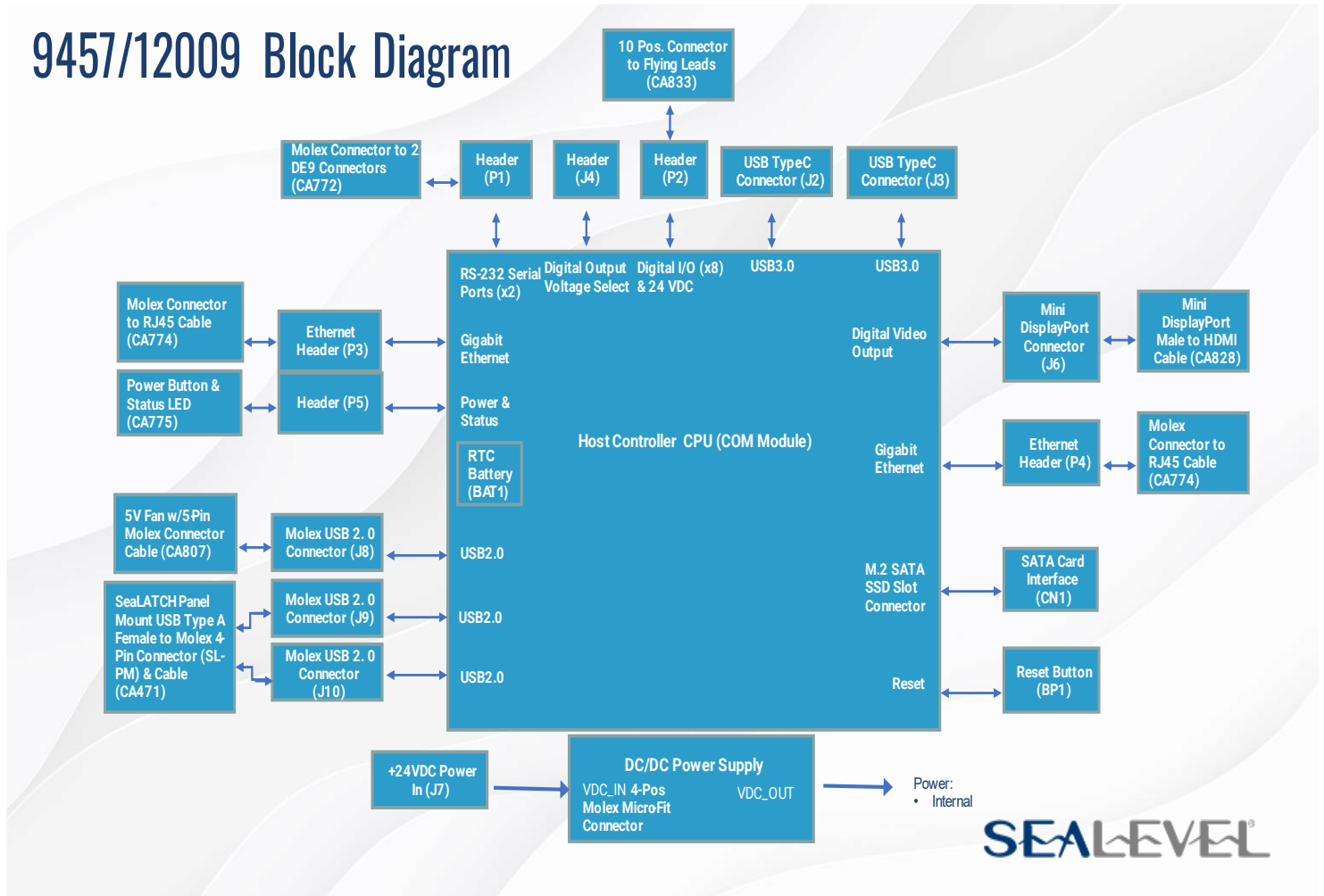
The 9457 carrier board is available in the following configurations:

| Sealevel Part Number | COM Express Module | COM Express Module Description | RAM |
|----------------------|--------------------------------------|---------------------------------------------------------------------------------------------------|-----|
| 105809 | conga-TC370/i38145UE | COM Express Type 6 Compact module with Intel® Core™ i3-8145UE and 8GB dual channel DDR4 2400 MT/s | 8GB |

Customer-Specified Block Diagram

The customer-specified block diagram is shown below with added board reference designators (component addresses). These designators correspond to the board connectors and diagrams on the following pages.

9457/12009 Block Diagram



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Header Connectors

Input Power Connector (J7)

All necessary system voltages are generated from a single 21 VDC input via a 4-position Molex connector. The design includes power protection circuits for under/over voltage and reverse voltage.



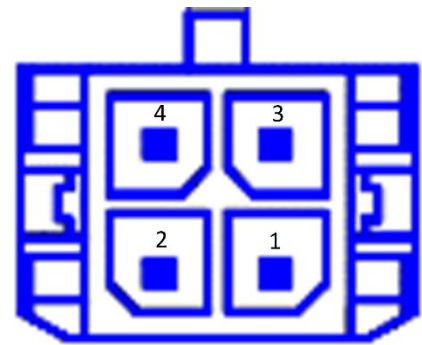
The power input is protected by a 5A current limiter.



Load from on digital output 4 (Form A) will contribute to the overall 5A max DC current rating.

| Reference Designator | PIN | Signal |
|----------------------|-----|--------|
| J7 | 1 | VIN |
| | 2 | GROUND |
| | 3 | VIN |
| | 4 | GROUND |

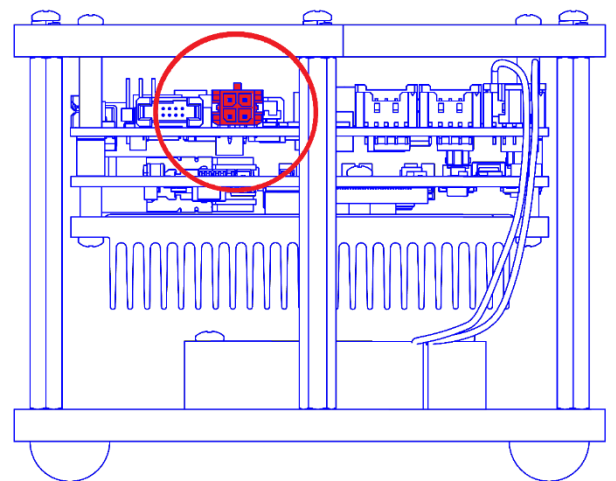
Wiring Diagram for Header (J7)



Power Connector Header (J7)
Drawing

| | |
|----------------------------------------------|-------------------|
| Rated Input Voltage | 21 VDC |
| Acceptable System Input Voltage | 20.5 VDC – 31 VDC |
| DC Current Rating (21V Nominal) ¹ | 350 mA - 450 mA |

1. May be higher depending on COM Express module, input voltage, OS, load, and connected devices.



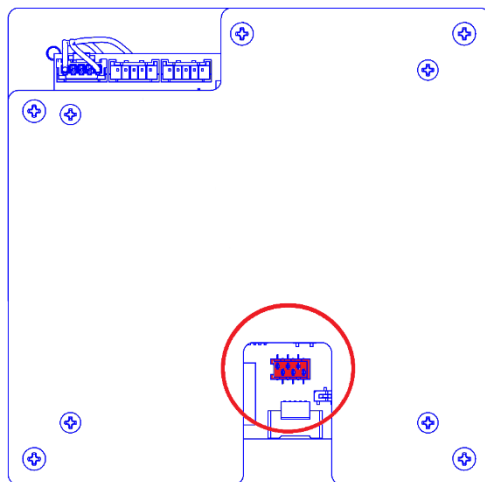
Power Connector Header (J7) Location

Header (P5) - Power Button & Status LEDs

The system can be powered by an external power switch and provides for two external status LEDs on a Tyco Micro-Match 6-pin header connector ([TE Connectivity Part#7-2178711-6](#)). Mating connector is [TE Connectivity Part# 2178712-6](#).

| Pin | Signal | Notes |
|-----|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1 | GROUND | |
| 2 | External Power Button EXT_PWR_BT_N | Ground (pin 1) with momentary switch Hold for >1 second to activate (Pulled up on board with 1 second debounce) |
| 3 | System Power LED Anode 5V_S5 | 5 V Power, 1 K Ω resistor to power external LED |
| 4 | System Power LED Cathode N/C | When system module is powered, Sink pin to enable external LED by providing path to Ground |
| 5 | 5V_S5 | 5 V Power, 1 K Ω resistor to power external LED |
| 6 | PWR_LED | |

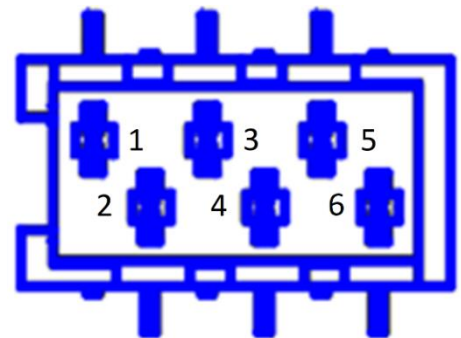
Wiring Diagram for Header (P5)



**Button and Status LED Indicator
Header (P5) Location**



**Notch
location**



**Button and Status LED Indicator
Header (P5) Drawing**



Make sure that the latch on the CA775 aligns with the notch on the lefthand side of the P5 connector.

Header (P2) - Digital I/O & 21 VDC

The system has four digital inputs and four digital outputs available on Molex Milli-Grid 10-pin header connector ([Molex Part# 878331019](#)). Digital I/O is addressed via Sealevel SeaMAX software. Mating connector is [Molex Part# 0511101060](#).

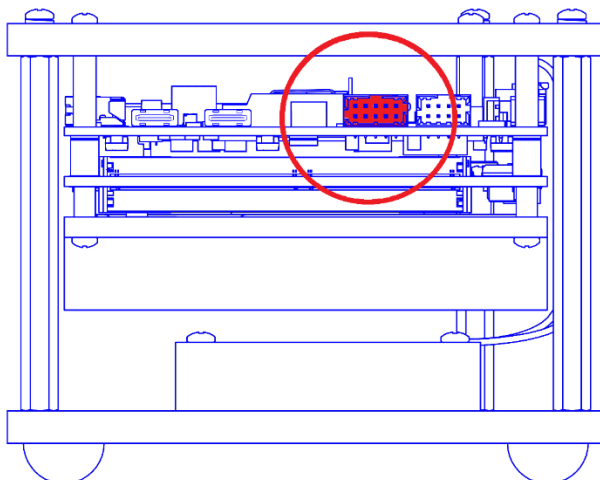
To view the I/O specifications, see the [Digital I/O](#) section under Technical Specifications.



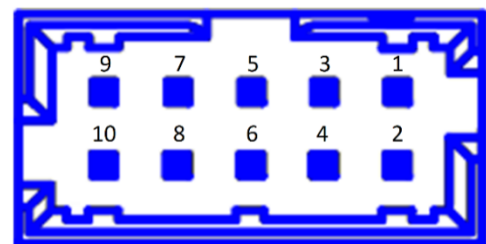
The Digital I/O is not isolated from the main system power. If using a secondary power supply, it must share the same ground reference as the main system power (J7).

| Pin | Signal | Type | Notes |
|-----|------------------|----------------------------------------|-------------------------------------------|
| 1 | Digital Output 1 | Push-Pull Output (TTL Compatible) | Selectable for 3.3v or 5.0v drive via J4. |
| 2 | Digital Input 1 | General Purpose Input (TTL Compatible) | Requires external 3.3v - 5.0v. |
| 3 | Digital Output 2 | Push-Pull Output (TTL Compatible) | Selectable for 3.3v or 5.0v drive via J4. |
| 4 | Digital Input 2 | General Purpose Input (TTL Compatible) | Requires external 3.3v - 5.0v. |
| 5 | Digital Output 3 | Open-Collector | Sinks to GND. Darlington Transistor. |
| 6 | Digital Input 3 | General Purpose Input (TTL Compatible) | Requires external 3.3v - 5.0v. |
| 7 | Digital Output 4 | Solid State Relay | Sourced from J7 Power Supply Input. |
| 8 | Digital Input 4 | General Purpose Input (TTL Compatible) | Requires external 3.3v - 5.0v. |
| 9 | GND | | |
| 10 | 21 VDC Output | Unswitched Power Source | Sourced from J7 Power Supply Input. |

Wiring Diagram for Header (P2)



Digital I/O Header (P2) Location

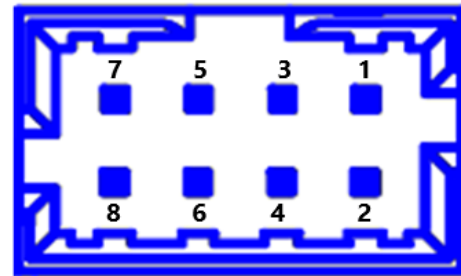


Digital I/O Header (P2) Drawing

Header (P1) - Serial Ports

The carrier board has two serial ports intended for debugging purposes. Port 1 is a standard RS-232 serial port, while Port 2 is a CMOS serial port. Transmit, Receive, and Ground are available on a Tyco Micro-MaTch 6-pin header connector ([TE Connectivity Part# 7-2178711-6](#)). Modem control signals are not implemented. The serial ports are derived from the COM Express module and are enumerated by the operating system via the standard Intel serial port driver. Mating connector is [TE Connectivity Part# 2178712-6](#).

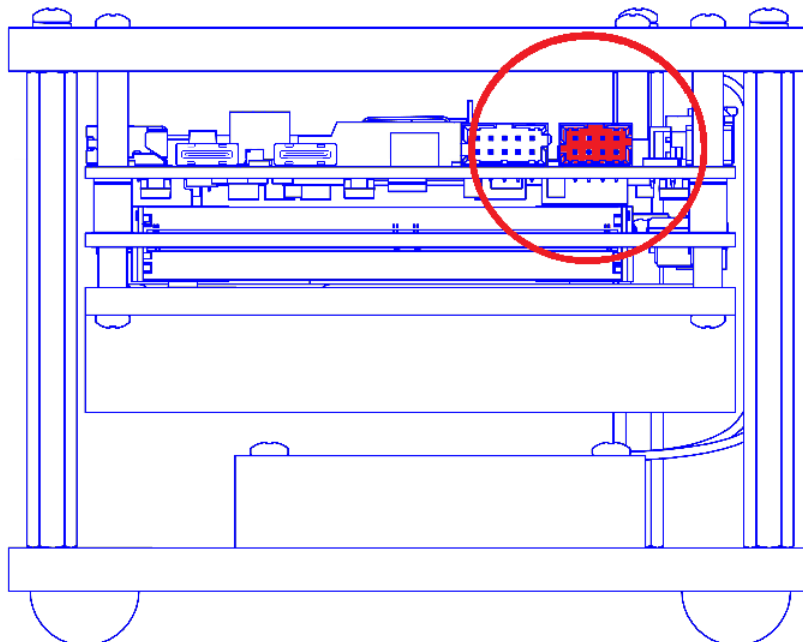
| Pin | Signal | Notes |
|-----|--------|-----------------------------|
| 1 | TX 1 | Port 1 Transmit (RS232) |
| 2 | RX 1 | Port 1 Receive (RS232) |
| 3 | GND | Ground |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | TX 2 | Port 2 Transmit (3.3V CMOS) |
| 8 | RX 2 | Port 2 Receive (3.3V CMOS) |



Serial Ports Header (P1) Drawing



Do not connect an RS232 device to the CMOS port. RS232 signal levels exceed that of CMOS and therefore may damage the CMOS port.



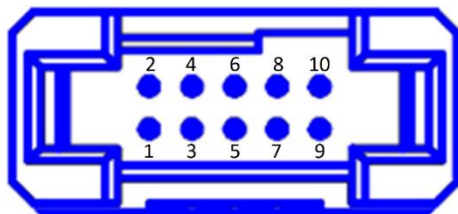
Serial Ports Header (P1) Location

Ethernet Headers (P3 & P4) - Gigabit Ethernet

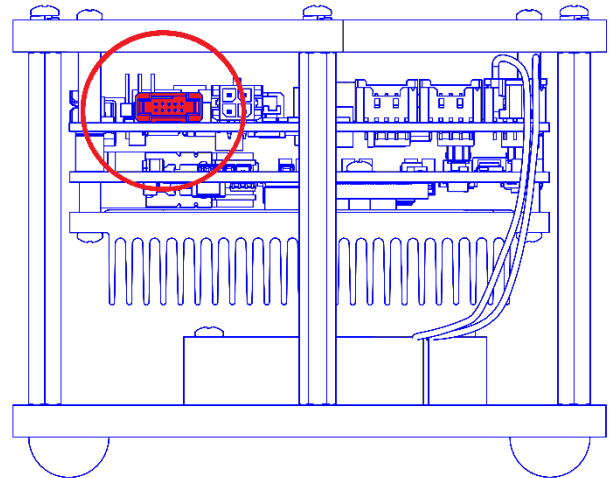
The carrier board has two Gigabit Ethernet (10/100/1000) network ports on Samtec Tiger Eye ([Samtec Part# TFM-105-02-L-DH-TR](#)) latching headers with LED status indicators for link and activity on the PCB. One Gigabit Ethernet port is derived from the COM Express module while the other is an Intel I210IT PCIe NIC on the carrier board. Mating connector is [Samtec Part# SFSDT-05-28-G-03.25-S](#)

| Reference Designator | PIN | Signal |
|----------------------|-----|--------------|
| P3 | 1 | NIC1 0A P |
| | 2 | NIC1 0A N |
| | 3 | NIC1 1A P |
| | 4 | NIC1 1A N |
| | 5 | NIC1 2A P |
| | 6 | NIC1 2A N |
| | 7 | NIC1 3A P |
| | 8 | NIC1 3A N |
| | 9 | GROUND |
| | 10 | GROUND |
| P4 | 1 | GBE0 MDI0A P |
| | 2 | GBE0 MDI0A N |
| | 3 | GBE0 MDI1A P |
| | 4 | GBE0 MDI1A N |
| | 5 | GBE0 MDI2A P |
| | 6 | GBE0 MDI2A N |
| | 7 | GBE0 MDI3A P |
| | 8 | GBE0 MDI3A N |
| | 9 | GROUND |
| | 10 | GROUND |

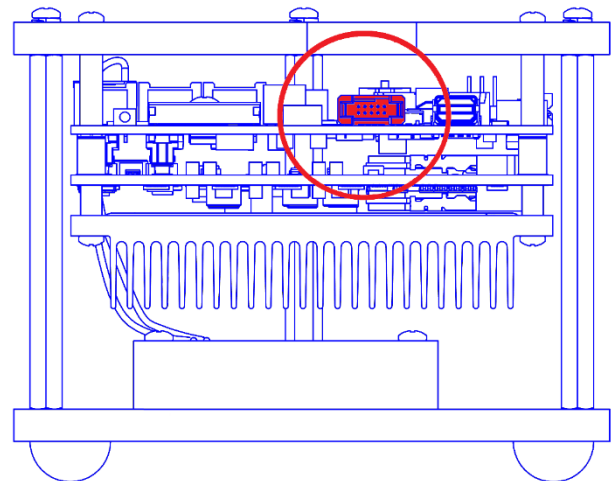
Wiring Diagram for Header (P3 & P4)



Ethernet NIC Header (P3 & P4)
Drawing



Ethernet NIC Header (P3) Location

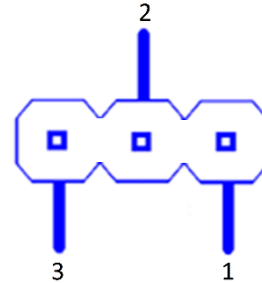


Ethernet NIC Header (P4) Location

Header (J4) – Drive Voltage Level

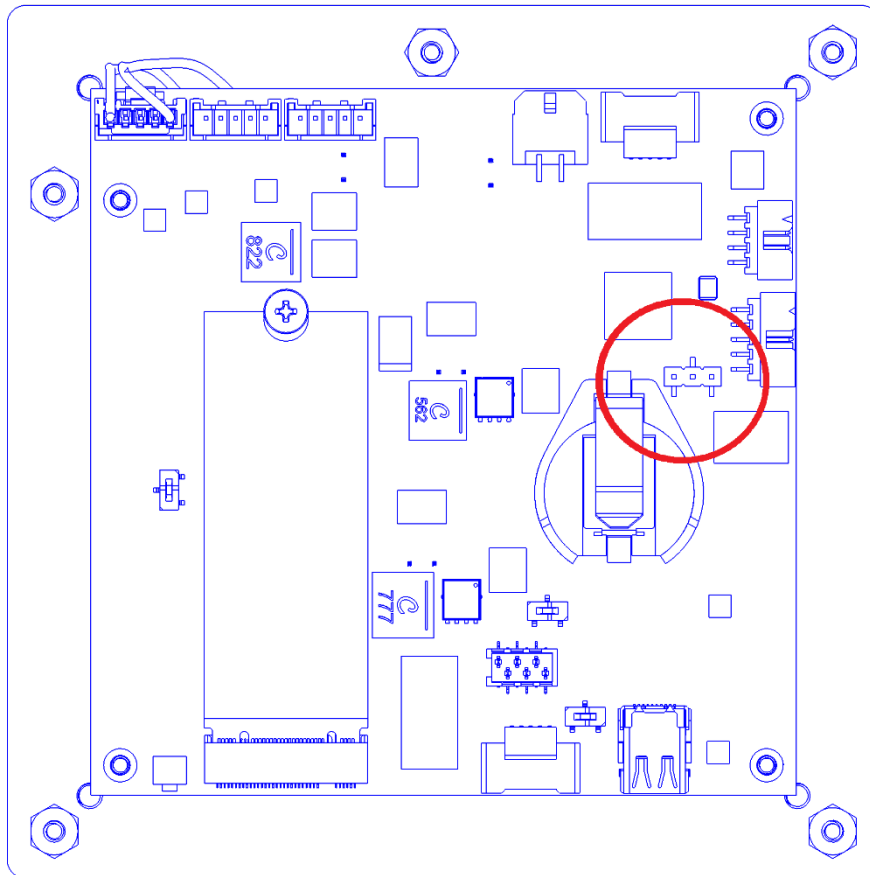
The 3-position header (J4) is used to select the drive voltage level (3.3 V or 5 V) for the two push-pull digital outputs (OUT1A, OUT2A). With the supplied shunt, you can short Pin 1 and Pin 2 (of J4) to produce a 5 V drive voltage on the push-pull outputs. Alternatively, you can use the shunt to short Pin 2 and Pin 3 (of J4) to produce a 3.3 V drive voltage on the push-pull outputs.

| Reference Designator | PIN | Signal |
|----------------------|-----|-----------------------------------------------|
| J4 | 1 | 5V_S0 |
| | 2 | PUSH-PULL DIGITAL OUTPUT SUPPLY VOLTAGE (VCC) |
| | 3 | 3V3_S0 |



Wiring Diagram for Header (J4)

Drive Voltage Level Header (J4) Drawing

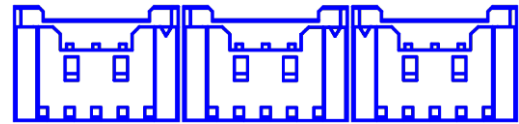
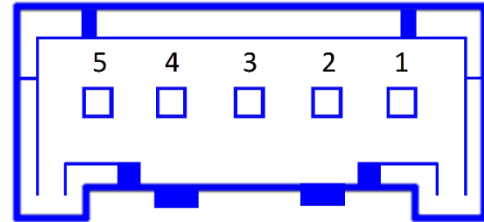


Drive Voltage Level Header (J4) Location

USB 2.0 Headers (J8, J9, & J10) - USB2.0 Ports

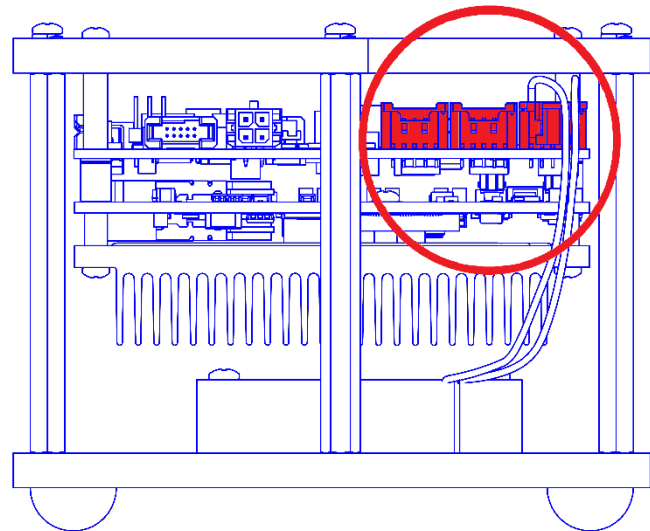
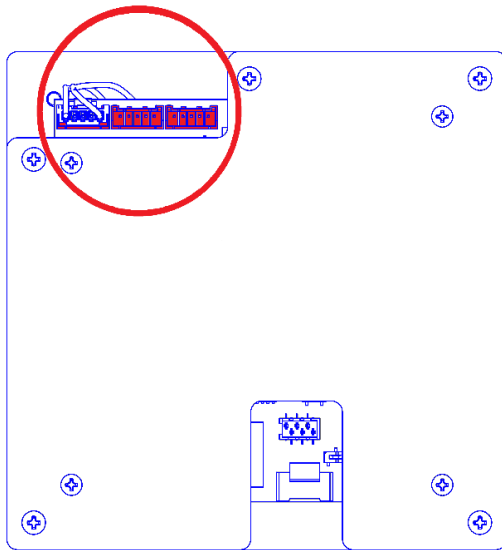
Three standard USB 2.0 ports are available on rugged latching headers. These ports are derived from the COM Express module. One is required to power the fan.

| Reference Designator | PIN | Signal |
|----------------------|-----|---------|
| J8 | 1 | VBUS |
| | 2 | USB2B_N |
| | 3 | USB2B_P |
| | 4 | GND |
| | 5 | SHIELD |
| J9 | 1 | VBUS |
| | 2 | USB3B_N |
| | 3 | USB3B_P |
| | 4 | GND |
| | 5 | SHIELD |
| J10 | 1 | VBUS |
| | 2 | USB5B_N |
| | 3 | USB5B_P |
| | 4 | GND |
| | 5 | SHIELD |



**USB 2.0 Headers (J8, J9, & J10)
Drawings**

Wiring Diagram for USB 2.0 Headers (J8, J9, & J10)

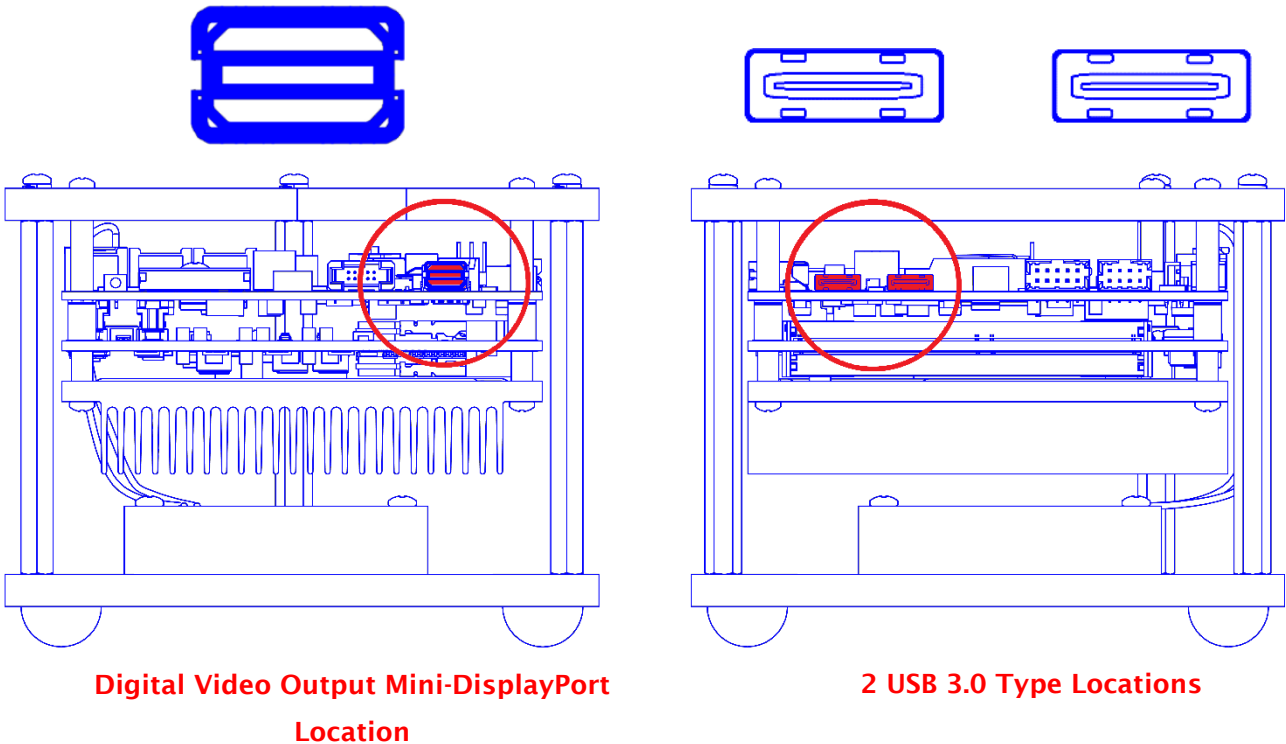


USB 2.0 Headers (J8, J9, & J10) Location

Port Connectors

The following I/O connectors use industry standard pin outs for maximum compatibility. All other connectors use non-standard or custom pin outs and are detailed after the following table.

| Function | Connector Type |
|----------------------|------------------|
| Digital Video Output | Mini-DisplayPort |
| USB 3.0 Device | USB Type C |



Mini DisplayPort (J6) - Video Output

The carrier board includes a Mini DisplayPort connector. The graphics capabilities are dependent on the COM Express module installed.

USB Type C (J2 & J3) - USB3.0 Ports

The carrier board includes two standard USB 3.0 ports on reversible type C connectors. These ports are derived from the COM Express module.

M.2 Connector (CN1) – For Solid-State Disk

The carrier board has a single M.2 SATA SSD connector for adding solid-state disk storage. The M.2 connector is located on the bottom of the carrier board, adjacent to the RTC Battery. The carrier board can support type 2242, and 2260 M.2 SSD modules. The maximum capacity and throughput are dependent on the M.2 SSD module and COM Express module installed.

Additional Features

RTC Battery (BAT1)

The carrier board includes a non-rechargeable, long-life Lithium battery (3V CR2450N) for maintaining RTC/CMOS settings.

Onboard Status LEDs

The carrier board includes several status LEDs to show system status or alert to potential problems. The LED location on the board and their functions are detailed in the table below.

| LED | Signal | Notes |
|-----|-----------------------------|---------------------------------------------------|
| D25 | Computer Power On | Lights green when system is powered on |
| D30 | SATA Activity | Pulses green to show M.2 SATA SSD activity |
| D24 | Board Controller Heartbeat | Pulses green to confirm system heartbeat |
| D22 | Board Controller Power Good | Lights green to confirm acceptable DC input range |
| D23 | Computer Boot Problem | Lights red if there is a boot-related issue |

Switch (SW1) – Test Enable

The switch (SW1) is used for manufacturing testing and debugging purposes. The switch is shipped in the Normal position and should not be changed in the field.

Switch (SW2) – AT Mode

The switch (SW2) is used for manufacturing testing and debugging purposes. The switch is shipped in the position that is NOT AT Mode and should not be changed in the field.

Switch (SW3) – RTC Reset

The switch (SW3) is used for manufacturing testing and debugging purposes. The switch is shipped in the NORMAL position. Moving the switch to RST (Reset) position will disconnect the battery from the COM Express module, thus clearing RTC/CMOS settings.

System Operation

Power States

The 12009-001-KT is designed to operate in four Power States as defined by ACPI.

S0 – Fully powered and operational

S3 – Suspended to memory (known as sleep in Windows)

S4 – Suspended to disk (known as Hibernate in Windows)

S5 – Powered down in standby (Windows Shutdown)

The system can transition from S0 to any of the three listed standby states (S3, S4, or S5) by either software command or an external Power Button (connected to Header P4). The system can then be awoken from either listed sleep/standby state by holding the Power Button for >3 seconds. The system can also be awoken from S3 or S4 with a USB input device such as a HID compliant keyboard or mouse.



The fan will remain on after the shutdown of the 12009-001-KT. You may safely disconnect the fan when the 12009-001-KT is powered down and reconnect it when ready to use the 12009-001-KT.



For a USB device to be used to wake the computer, it must be present when the computer enters the sleep state and must remain connected for the duration of the sleep state.

External Power Button

An external power button (connected to Header P5, pins 1 & 2) can be used to turn the system on, shut the system down or place the computer in sleep states S3 or S4 (depending on OS support and configuration). The power button can also wake the system up from sleep states S3 or S4.

The power button has a one-second hardware debounce/delay built in to prevent an accidental shutdown. This delay is always present so the power button must be held for >1 second before system power up, power down, sleep or wake occurs.

Reset Button (BP1)

Centered below the SSD, the dual stage reset button provides two functions.

- 1) Holding the switch for at least 1 second and releasing within 5 seconds will perform a hard reset of the COM Express module only.
- 2) Holding the switch for at least 5 seconds and releasing will perform a full hardware reset of the entire system (CPU included).



Any momentary press of the switch for less than 1 second will be ignored.

Hardware Installation

Most items for the 12009-001-KT will come pre-installed. The below cables will need to be connected and/or reconnected upon arrival:

- 5V Fan with 5 Pin Molex Connector Cable Installed in Enclosure (P/N: CA807)
- Molex Connector to 2 DB9 Connectors Cable (P/N: CA772)
- 10 Position Connector to RJ45 Cable (P/N: CA774/x2)
- Power Button and LED Cable (P/N: CA775)



Make sure that the latch on the CA775 aligns with the notch on the lefthand side of the P5 connector.

- 5 Pin to 4 Pin Molex Cable, 14.00" Long (P/N: CA471/x2)
- 10 Position Cable Assembly Rectangular Socket to Cable, 11.81" Long (P/N: CA833)
- SeaLATCH Panel Mount USB Type A Female to Molex 4 Pin Connector (P/N: SL-PM/x2)
- Power Supply (P/N: TR168-US Providing 60W, 21V)

Software Installation

At Sealevel Systems, we preinstall all required software needed for the 12009-001-KT. If for some reason you need to reinstall any software or drivers, you can find what you need at the below links:

1. [SeaMAX - Windows Download](#)
2. [Software: SeaCOM - Windows - Sealevel](#)



The below links require a free congatec account.

3. [congatec conga-TC370](#)
4. [congatec - Intel HD Graphics Driver](#)
5. [congatec - Trusted Execution Engine](#)
6. [congatec - Intel Chipset](#)

SeaMAX Application Suite

SeaMAX Overview

The SeaMAX Suite is a collection of configuration/diagnostic utilities and software libraries that enable rapid application development. The SeaMAX API, included in the SeaMAX Suite, provides a common API for Sealevel data acquisition devices. SeaMAX is designed to simplify application development by requiring little knowledge of the underlying communication protocols of these devices and replacing low-level programming. SeaMAX is available in an unmanaged library and a wrapper library that provides an interface to the API from managed code.

The SeaMAX API documentation, installed with SeaMAX, explains the usage and API references, including function calls and enumerations. Sealevel digital and analog I/O modules supported by SeaMAX software are designed to work with third-party applications via the SeaMAX API. To help simplify application development, the complete API documentation and code samples are automatically installed with the SeaMAX Suite and can be found in Windows by clicking Start → All Programs → Sealevel SeaMAX → Documentation.

For convenience, Sealevel offers [SeaMAX API documentation](#) on our website.

SeaMAX Windows Installation

Launch the SeaMAX installation package and follow the instructions presented onscreen for your operating system. Once SeaMAX software is installed on your host PC you can proceed with configuring your device. You will need the tools installed during the configuration process.



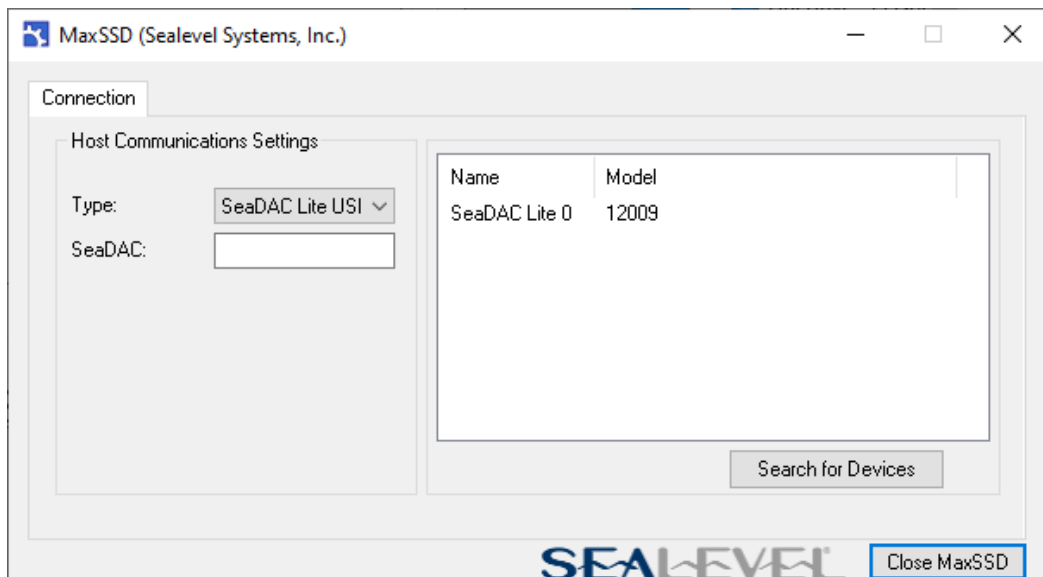
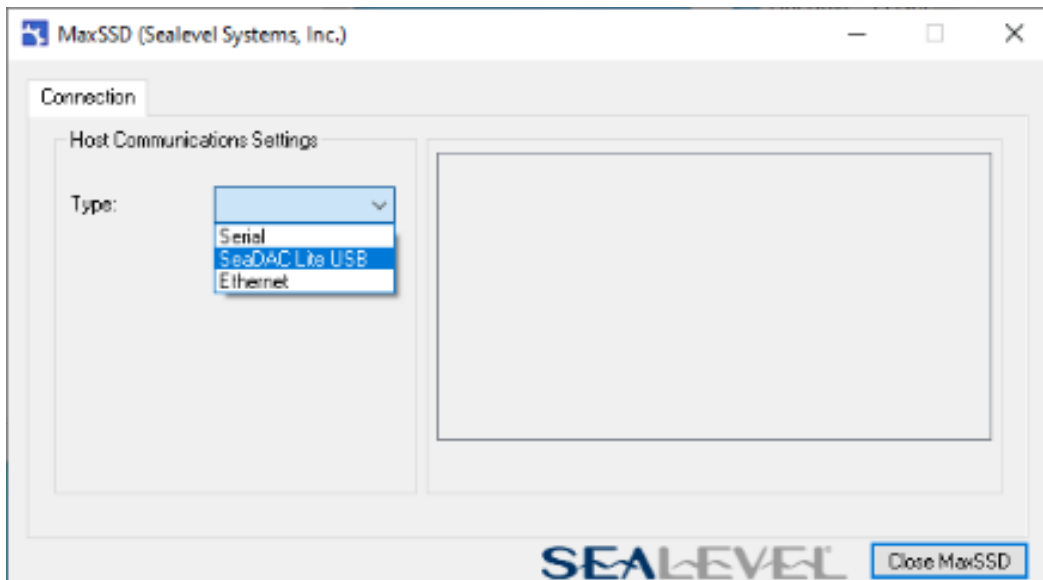
To install Sealevel software, you must log in as an administrator or have administrator privileges.

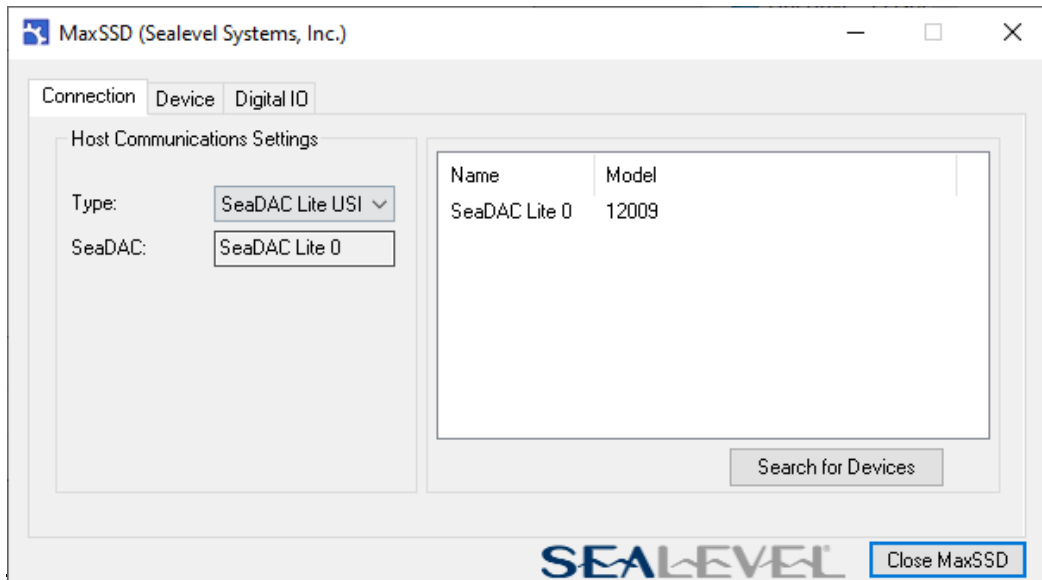
MaxSSD Configuration & Diagnostic Utility

The Sealevel Systems configuration utility, MaxSSD, is designed to simplify the installation, configuration, and diagnostics of Sealevel I/O modules, including the 9457 carrier board. MaxSSD is a Microsoft Windows application and has been tested with Microsoft Windows 10 operating system. On the prototype version of the 12009-001-KTsystem, the MaxSSD Windows utility is installed on the desktop.

MaxSSD Connection Tab

When you run the MaxSSD utility, it will default to the “Connection” tab. Under the Type drop-box, you can select Serial, SeaDAC Lite USB, or Ethernet. The digital I/O on the 9457 carrier board installs as a custom “SeaDAC Lite USB” device, so select this option. MaxSSD will automatically search for SeaDAC Lite devices and display any found on the right side of the window. Double click on the “SeaDAC Lite 0” device on the right side to connect to the I/O. The Device and Digital I/O tabs will appear after connecting.





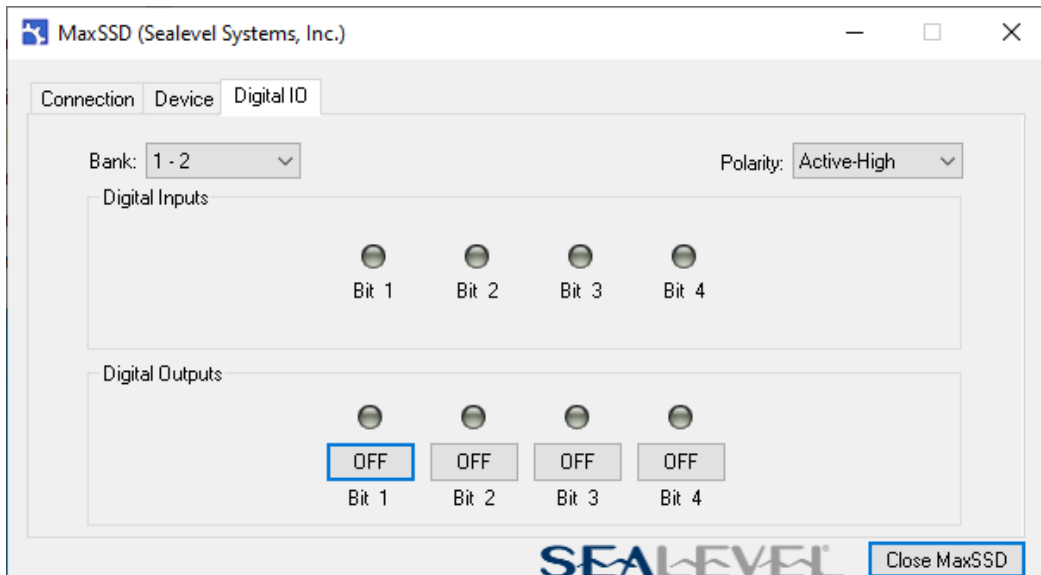
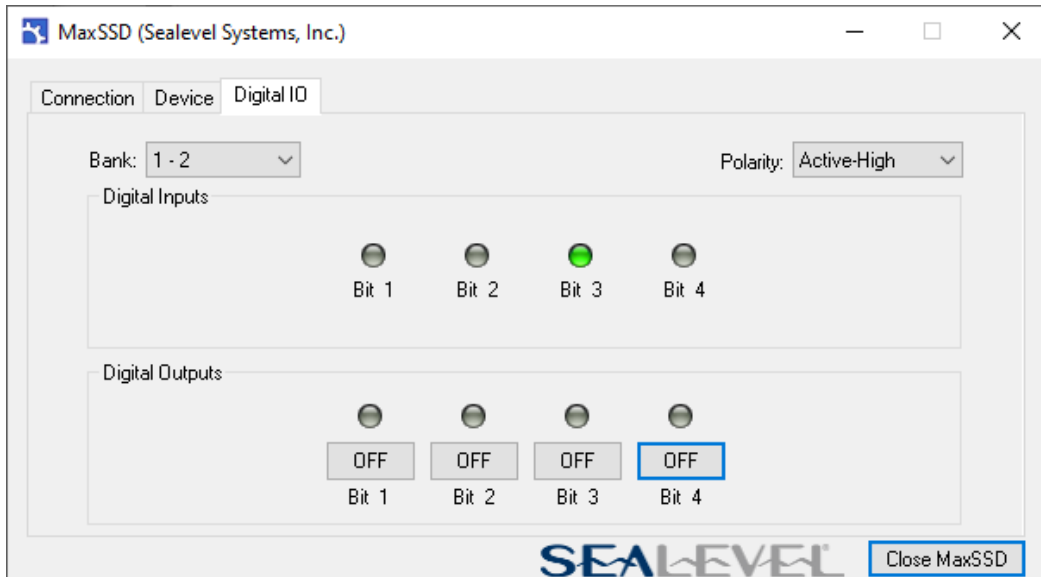
MaxSSD Device Tab

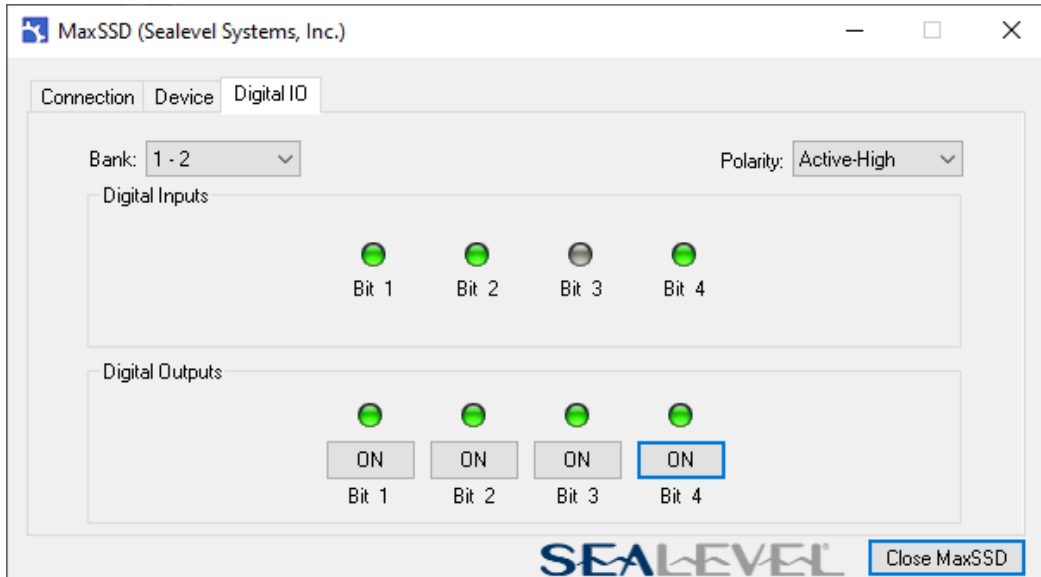
After you have selected the “SeaDAC Lite 0” device on the Connect tab, the Device and Digital I/O tabs will appear. MaxSSD will automatically change to the Device tab and display the relevant Device Description. The 9457 carrier board does not offer configurable communication settings.



MaxSSD Digital I/O Tab

Select the Digital I/O tab after you have successfully connected to the 9457 on the Connect tab. This tab displays the current input and output status in an intuitive and usable manner. Both inputs and outputs are displayed under Bank "1 - 2". The status LEDs will update automatically, allowing you to actively monitor external signals. The output relays can be triggered using the On/Off button below each output LED.





MaxSSD I/O Map

The following table shows the MaxSSD name for each Digital I/O bit along with its corresponding function. The connector and pin designation for each I/O bit is also shown.

| MaxSSD Name | Function | Connector |
|--------------|--------------------------|-----------|
| Input Bit 1 | TTL Voltage-Level Input | P2 Pin 2 |
| Input Bit 2 | TTL Voltage-Level Input | P2 Pin 4 |
| Input Bit 3 | TTL Voltage-Level Input | P2 Pin 6 |
| Input Bit 4 | TTL Voltage-Level Input | P2 Pin 8 |
| Output Bit 1 | TTL Voltage-Level Output | P2 Pin 1 |
| Output Bit 2 | TTL Voltage-Level Output | P2 Pin 3 |
| Output Bit 3 | Open Collector Output | P2 Pin 5 |
| Output Bit 4 | 21V Power Output | P2 Pin 7 |

Appendix A – Troubleshooting Serial Communication Issues

The serial port should provide years of trouble-free service. However, in the event that it appears to be functioning incorrectly, the following tips can eliminate most common problems without the need to call Technical Support.

Ensure that the Sealevel Systems SeaCOM software has been installed on the machine, so that the necessary files are in place to complete the installation. To confirm installation, click on the Windows 'Start' button and then select 'All Programs.' You should see the 'SeaCOM' program folder listed.

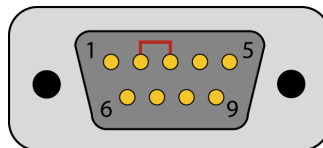
Check to make sure that USB support is enabled and functioning properly in the operating system. The presence of the 'Universal Serial Bus controllers' listing in Device Manager will confirm that USB support is enabled in Microsoft Windows 10 operating system.

While Device Manager is open, locate the COM ports (described under 'Verifying Installation' in the Installation and Configuration section of this manual).

Locate the COM ports for your device in Device Manager (described under 'Verifying Installation' in the Installation and Configuration section of this manual).

Troubleshooting/Verification for Asynchronous Serial Products

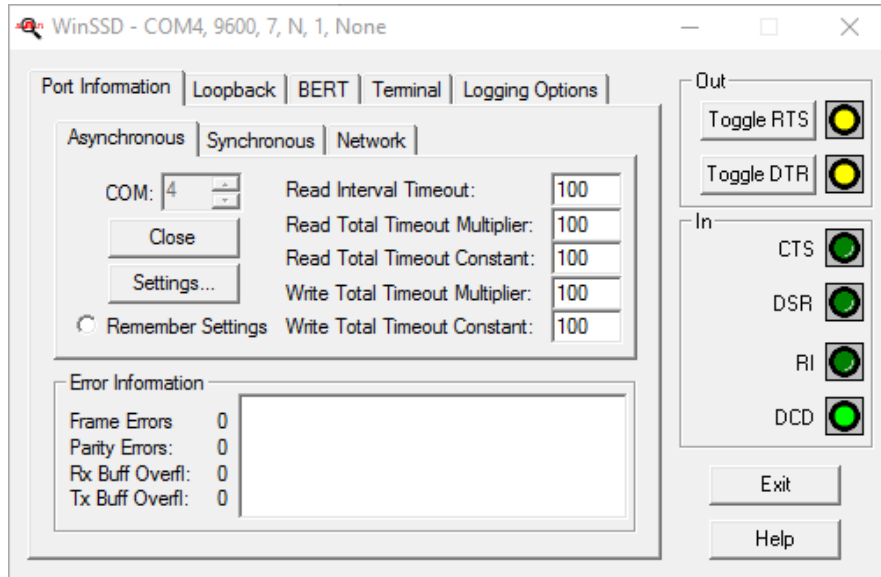
1. Once you have confirmed that the serial adapter COM ports are listed in Device Manager, use the Sealevel WinSSD utility to verify communications. Detailed help is included in the WinSSD utility.
2. If you have a loopback plug, put it on the adapter connector. If you do not have a loopback plug, you can use female jumper wires to make the connection to verify the functionality.
3. Connect pin number 2 (Receive) & 3 (Transmit) as shown in this graphic:



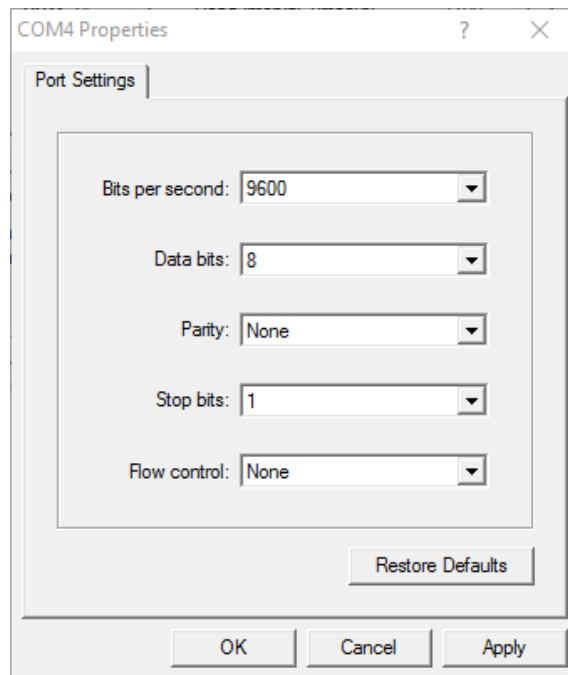
If you do not have a loopback plug or jumper wires handy, you can use a metal device, such as a knife, screwdriver, key, or paperclip, to short pins 2 and 3.

4. To test communications, launch the WinSSD utility in the SeaCOM folder in the 'Start' menu.
5. On the 'Port Information' tab, select the associated COM port and click the 'Open' button.
6. This will first open the COM port. From this tab the port can also be closed (See image below).

7. Click the 'Settings' button to open the COM Port Properties dialog box. This will allow the Port Settings to be altered.

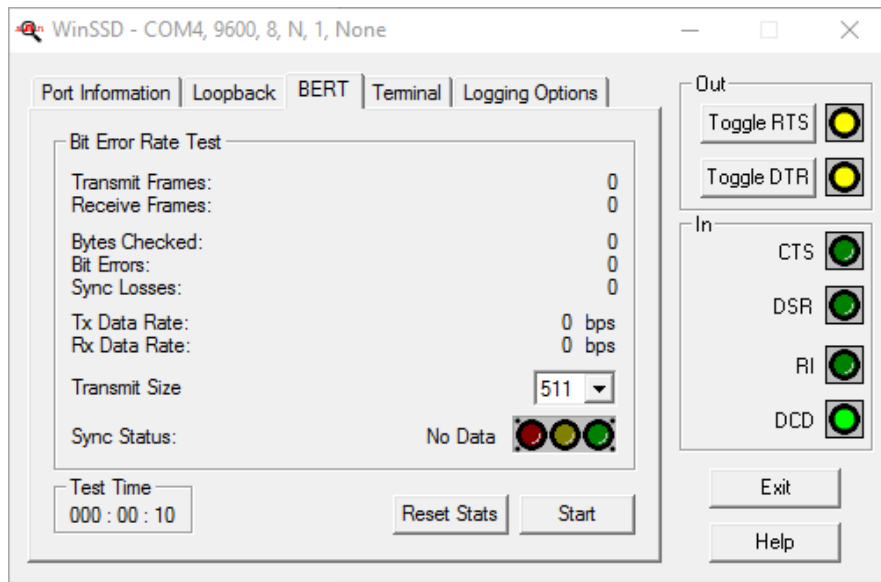


8. Change your parameters to 9600 bits per second, 8 data bits, no parity, 1 stop bit, and no flow control, as pictured below.

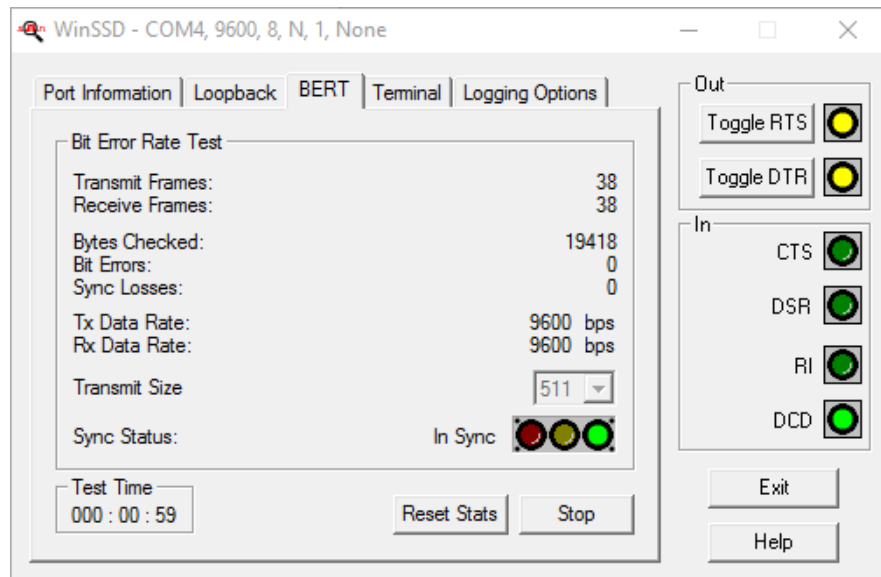


9. Click 'Apply' and 'OK'.
10. In the main WinSSD window, click on the 'BERT' tab (Bit Error Rate test).

11. Click on the 'Start' button.



12. If the COM port is properly working, the Sync Status green light will glow, and the Transmit Frames and Receive Frames will increase. The Tx and Rx Data Rates will show the calculated data rate.



13. This verifies that the adapter is working properly. You can continue testing this port with different configurations or proceed with testing other ports, if necessary.

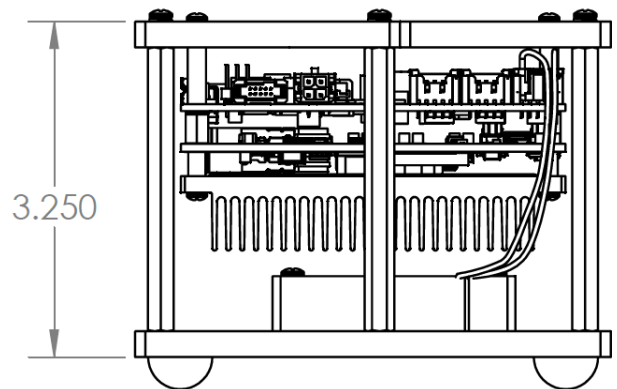
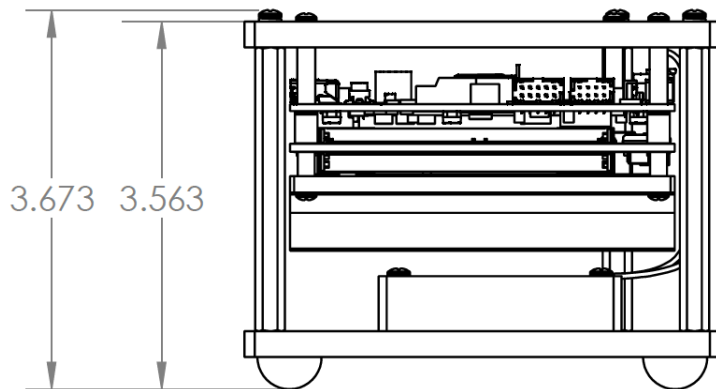
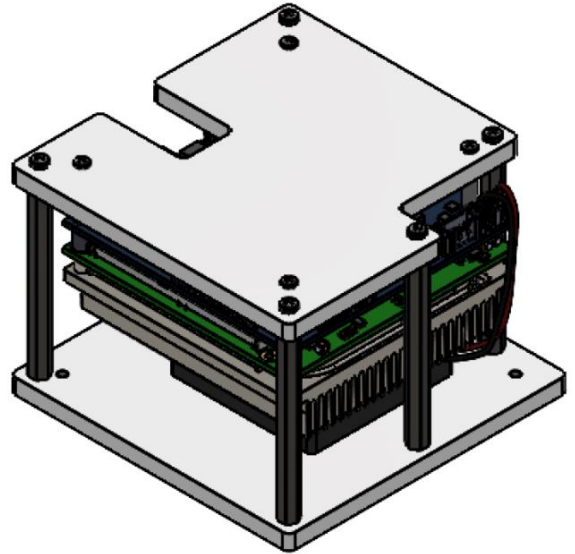
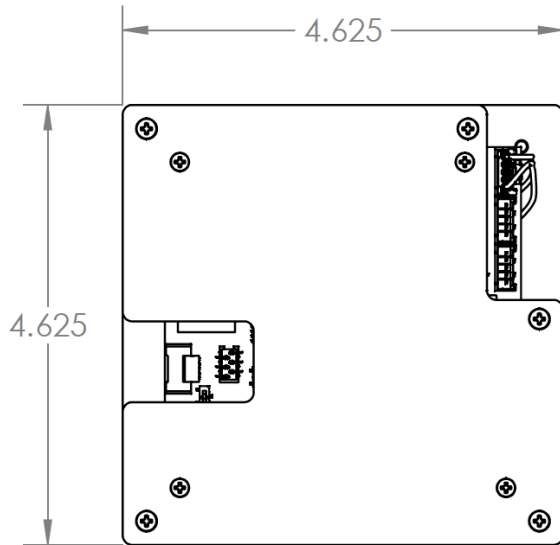
Appendix B – How To Get Assistance

Please refer to: [Appendix A](#) – Troubleshooting Guide prior to calling Technical Support.

1. Begin by reading the Trouble Shooting Guide in Appendix A. If assistance is still needed, please see below.
2. When calling for technical assistance, please have your user manual and current adapter settings. If possible, please have the adapter installed in a computer ready to run diagnostics.
3. Sealevel Systems provides an FAQ section on its web site. Please refer to this to answer many common questions. This section can be found at <http://www.sealevel.com/faq.asp>.
4. Sealevel Systems maintains a web page on the Internet. Our home page address is www.sealevel.com. The latest software updates, and newest manuals are available via our web site.
5. Technical support is available Monday to Friday from 8:00 AM to 5:00 PM Eastern Time. Technical support can be reached at (864) 843-4343 or support@sealevel.com.

RETURN AUTHORIZATION MUST BE OBTAINED FROM SEALEVEL SYSTEMS BEFORE RETURNED MERCHANDISE WILL BE ACCEPTED. AUTHORIZATION CAN BE OBTAINED BY CALLING SEALEVEL SYSTEMS AND REQUESTING A RETURN MERCHANDISE AUTHORIZATION (RMA) NUMBER.

Appendix C – Mechanical Drawing



Appendix D – Handling Instructions

Electrostatic Discharges (ESD)

A sudden electrostatic discharge can destroy sensitive components. Proper packaging and grounding rules must therefore be observed. Always take the following precautions:

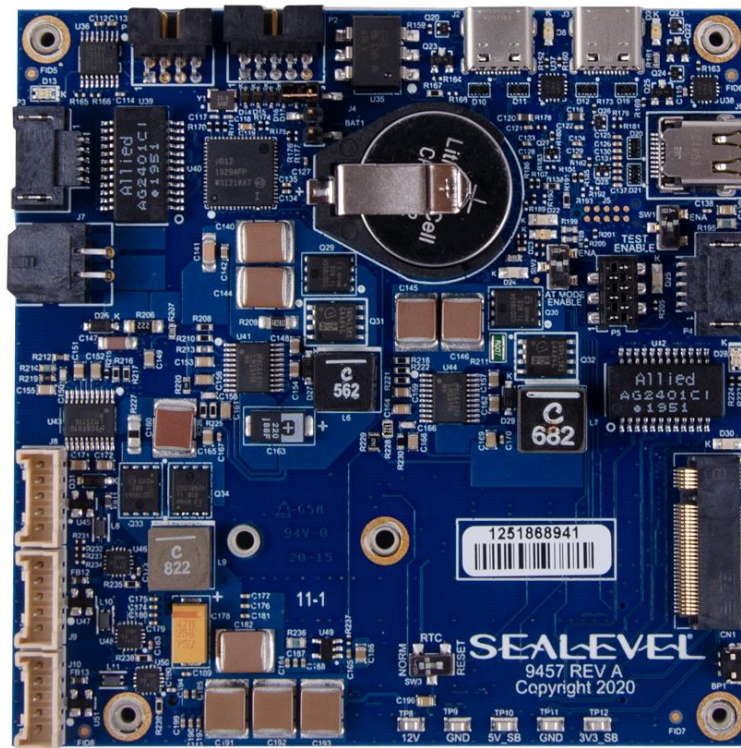
- Transport boards and cards in electrostatically secure containers or bags.
- Keep electrostatically sensitive components in their containers, until they arrive at an electrostatically protected workplace.
- Only touch electrostatically sensitive components when you are properly grounded.
- Store electrostatically sensitive components in protective packaging or on anti-static mats.

Grounding Methods

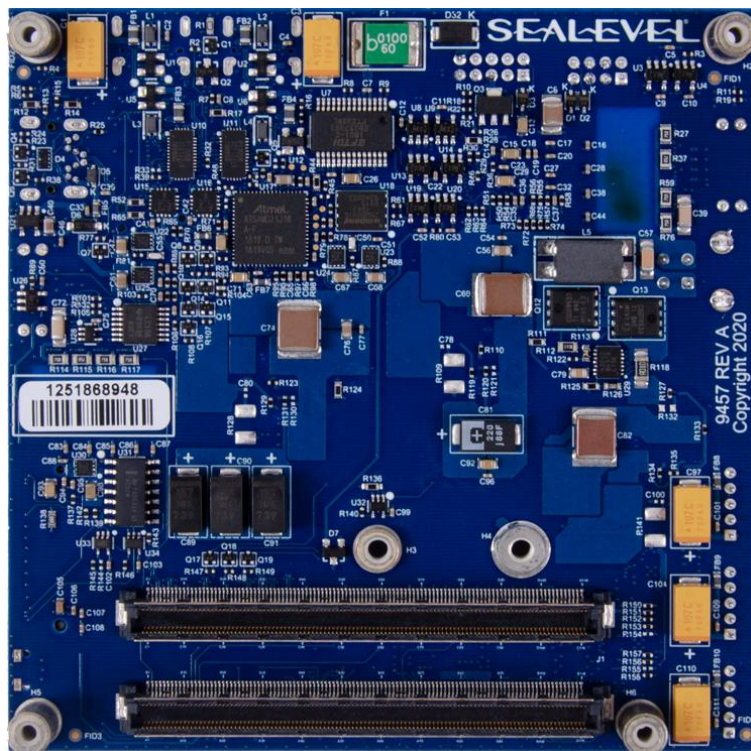
The following measures help to avoid electrostatic damages to the device:

- Cover workstations with approved antistatic material. Always wear a wrist strap connected to a properly grounded workplace.
- Use antistatic mats, heel straps, and/or air ionizers for more protection.
- Always handle electrostatically sensitive components by their edge or by their casing.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting and removing connectors or connecting test equipment.
- Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools such as cutters, screwdrivers, and vacuum cleaners that are conductive.

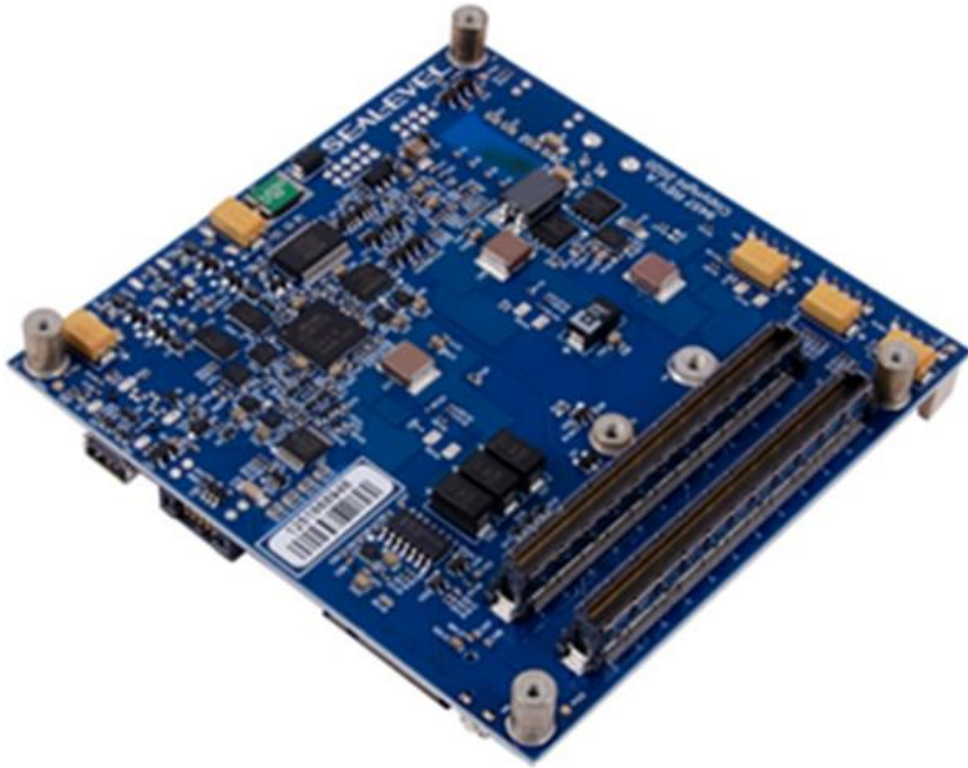
9457 Top View



9457 Bottom View



9457 Additional Views



Appendix F – Compliance Notices

Federal Communications Commission (FCC) Statement



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. 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.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in such case the user will be required to correct the interference at the user's expense.



Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high quality shielded cabling to maintain compliance with FCC/EMC directives.

UL 94V0

All Sealevel Systems Printed Circuit boards are built to UL 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Warranty

Sealevel's commitment to providing the best I/O solutions is reflected in the Lifetime Warranty that is standard on all Sealevel manufactured I/O products. We are able to offer this warranty due to our control of manufacturing quality and the historically high reliability of our products in the field. Sealevel products are designed and manufactured at its Liberty, South Carolina facility, allowing direct control over product development, production, burn-in and testing. Sealevel achieved ISO-90012015 certification in 2018.

Warranty Policy

Sealevel Systems, Inc. (hereafter "Sealevel") warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship for the warranty period. In the event of failure, Sealevel will repair or replace the product at Sealevel's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect, abuse, accidents, or acts of nature are not covered under this warranty.

Warranty service may be obtained by delivering the Product to Sealevel and providing proof of purchase. Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Sealevel, and to use the original shipping container or equivalent. Warranty is valid only for original purchaser and is not transferable.

This warranty applies to Sealevel manufactured Product. Product purchased through Sealevel but manufactured by a third party will retain the original manufacturer's warranty.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found are subject to repair/retest charges. A purchase order or credit card number and authorization must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

How to obtain an RMA (Return Merchandise Authorization)

If you need to return a product for warranty or non-warranty repair, you must first obtain an RMA number. Please contact Sealevel Systems, Inc. Technical Support for assistance:

| | |
|-----------|----------------------------------------------------------------|
| Available | Monday – Friday, 8:00AM to 5:00PM EST |
| Phone | 864-843-4343 |
| Email | support@sealevel.com |

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