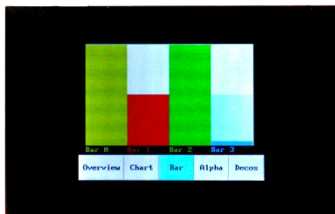


SEA 4912

2.4" Display Module Kit™



Part No.: 61000135



S·E·A Science & Engineering
Applications Datentechnik
GmbH

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Getting Started

General



The safety ratings and specifications in this document are specific to the SEA 4912 module and may differ for other components in the system. To determine the safety ratings and specification of the entire system refer to each component in the system.

Before starting to work with the SEA 4912 module please read this document and the software manual carefully. If there are any questions about operating the module or if any term is not understood, please contact the vendor before using the module.



Ensure that you use the latest version of the manuals: Check the Support/Downloads area on the S.E.A. website <http://www.sea-gmbh.com> for updates and get the latest version if available.



Refer to the software manual for details on programming and integration of the SEA 4912 module.



Refer to the appropriate National Instruments™ documentation for details on National Instruments hardware.

We believe that all information in this manual is accurate. The document has been carefully reviewed for technical accuracy. In the event of techni-

cal or typographical errors, we reserve the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult the vendor if errors are suspected.

End User License Agreement (EULA)

Before operating the SEA 4912 and the provided software you have to agree to the terms and conditions (EULA). This agreement is part of the software installation procedure. In addition, the terms and conditions are available through the LabVIEW menu after installation (Tools > SEA > `product name` > Legal Information). If you do NOT agree you can send back the hardware and software package within a period of two weeks after delivery. In this case S.E.A. will refund the product price and shipping costs.

Safety Guidelines

To protect persons against any harm and the module from damage, the operation of the SEA 4912 module is only allowed according to the rules described in this document.

Operator Protection



Hot or Cold Surface The metallic surface of the module might become hot or cold as well. Touching the surface may result in bodily injury. Do not dismount the module from the chassis during operation. Wait until the module temperature has reached 20 °C.



Do not insert or remove the module from the system or connect/disconnect wires or connectors to/from the module unless power has been switched completely off. Make sure working in an ESD safe environment.



Do not open or disassemble the module or other hardware parts. Guarantee is void if the seal is broken!



Use only isolated power supplies with a nominal voltage of 12 VDC, made for use with CompactRIO systems.

Safety Critical Applications



The module is not failure tolerant and therefore not suitable for use in safety critical applications.



Do not use the module for medical applications or any live supporting apparatus.

Hazardous Locations



The module is suitable for use in non hazardous locations only. Keep the module always away from hazardous locations and explosive areas.



Protect the module from thunderstorm and lightning strikes or other electrical hazards.



Use the module only in dry areas. Do not operate the module in bath areas, kitchens etc., where water or vapor can be getting in contact with the module or cables.

Hazardous Voltages

A voltage is hazardous when higher than 25 V_{RMS} or 60 VDC to earth ground according to IEC 60364-4-41 (SELV). If the module specifications allow to connect hazardous voltages to the module, take the following precautions, when connecting hazardous voltages to the module:



Make sure that only qualified personnel wires hazardous voltage adhering to local electrical standards.



Do not mix hazardous voltage circuits and human-accessible circuits on the same module.



The module must not be operated in high voltage areas.

Prerequisites

The SEA 4912 display module kit consists of the components as follows:

- SEA 4912 2.4" display module (61000126)
- Mounting kit: frame (61000129), clamp bracket (61000132) fittings (washer and nuts)
- Printed hardware manual

For operation further components are required (not included with the module kit):

- Power cable (61000011), mandatory for operation
- Serial communication cable (61000056), mandatory for operation
- Software driver - available as download from the support area on <http://www.sea-gmbh.com>
- Device with a RS-232 interface, capable to run LabVIEW programs, i.e. CompactRIO system or a PC
- Power supply with an output voltage between 7 and 30 VDC and output current of 1 A

Mounting SEA 4912

The SEA 4912 comes along with a kit to mount the display on plates like door or wall of a control cabinet. The plate needs to be cut out to host the display incl. the frame. For the dimensions please refer to the document SEA 4912_Dimensions.pdf or to the *Specifications* section.

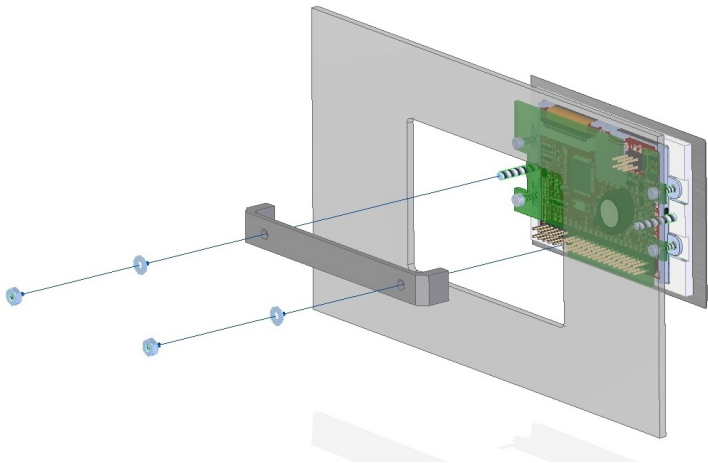


Fig. 1: Mounting

Follow the steps below to mount the display kit, refer to Fig. *Mounting* above:

1. Make a cut off in the hosting plate, where the module is to be placed.
2. Insert the module (with frame) from the front side into the prepared cut off.
3. Insert the clamp bracket from the back side on the threaded rods of the module's frame and tighten the clamp bracket with the frame using the enclosed washer and nuts.

Connecting SEA 4912

The SEA 4912 module provides sockets that need to be properly connected by the user (refer to Fig. *Connectors* below): power supply (1) and serial communication port (2). Optionally, general purpose IOs can be accessed through a terminal block (3). Finally, audio files can be played using the internal speaker (4). The DIP switches (5) are for internal purposes only and shall be set to OFF for regular operation. Refer to the subsequent sections for further details to particular socket.

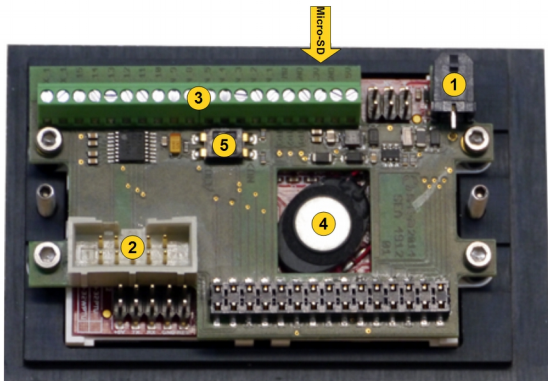


Fig. 2: Connectors

Power Supply (1)

For operation of the SEA 4912 module it is mandatory to supply power through this connector. Connect the module with an adequate power source using the enclosed power cable. The module's accepted input voltage range is from 7 to 30 VDC. For the polarity of the power connector on the board refer to Fig. *Power Connector*.

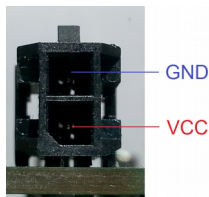


Fig. 3: Power Connector



Check the polarity of the wires before powering up the module. Please note that the module's voltage range may possibly differ from the actual CompactRIO controller voltage range. Do NOT rely on the cable colours to assume polarity.

Serial Port (2)

For operation of the SEA 4912 module it is mandatory to connect a device with a RS-232 interface to this connector (see Fig. *Serial Port*). Connect the module with an adequate device using the enclosed serial communication cable. An adequate device is capable of running a LabVIEW application that controls the display. This can be a CompactRIO, Single-Board RIO with controller, PC or others. The pinout of the serial port is according to Tab. 1:

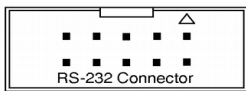


Fig. 4: Serial Port

Pin No.	Meaning
3	Tx (out)
5	Rx (in)
9	GND

Tab. 1: Serial Port – Pinout



Wait at least 5 sec. after power up the module before starting to communicate via the serial port.

General Purpose IOs (3)

The usage of general purpose IOs is optionally. The module provides a terminal block to access the general purpose IOs (see Fig. *GPIOs*). The pinout of the terminal block is according to Tab. 2:

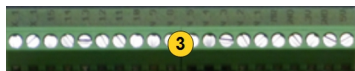


Fig. 5: GPIOs

PIN	Purpose
PIN_1	General purpose input (up to 5V) or output (3.3V)
PIN_2	General purpose input or output (3.3V)
PIN_3	Special purpose input or output: LO level switches OFF (HI switches ON) the display and the Micro-SD slot. When set to

	output switching is done internally, when set to input switching through an external circuit.
PIN_4	General purpose input (up to 5V) or output (3.3V)
PIN_5	General purpose input (up to 5V) or output (3.3V)
PIN_8	General purpose input (up to 5V) or output (3.3V)
PIN_9	General purpose input (up to 5V) or output (3.3V)
PIN_10	General purpose input (up to 5V) or output (3.3V)
PIN_11	General purpose input (up to 5V) or output (3.3V)
PIN_12	General purpose input (up to 5V) or output (3.3V)
PIN_13	General purpose input (up to 5V) or output (3.3V)
PIN_14	General purpose input (up to 5V) or output (3.3V)
PIN_15	General purpose input (up to 5V) or output (3.3V)
GND	Ground
5V	5V output
3.3V	3.3V output with max. 20mA
MR	Master reset input
RX_1	Reserved for future use

Tab. 2: GPIOs - Pinout



The Master Reset (MR) input is internally pulled up to 3.3V via a 10K resistor. In order to trigger reset the MR input has to be pulled to GND. For this an open collector circuit type is strictly recommended.

After a master reset is performed wait at least 5 sec. Before re-establish the serial communication.

Speaker (4)

The SEA 4912 can playback audio files using the internal speaker. The audio files need to be located on an Micro-SD memory card inserted into the respective slot, refer to Fig. *Connectors* on page 11. The Micro-SD memory card as well as the audio file have to satisfy the restrictions given in the *Sound* section of the *Specifications* chapter. Please note that the internal speaker is small and therefore not very loud by nature.

Specifications

The following specifications are typical for the operating temperature range unless otherwise noted.

Display Characteristics		
Type	True Colour LCD-TFT with resistive touch	
Size	inches	2.4
Resolution	pixel	320 x 240
Viewing Area	mm	36.72 x 48.96
Brightness	cd/m ²	150
General Purpose IOs		
Number and Type of IOs	12 (+1), separately configurable as input or output	
Voltage Level	V	3.3 (HI level when output) or 5 (accepted when input)
Sound ¹		
Speaker	Ohm	8

¹ Audio files must be stored in the Micro-SD memory card

File Source	Micro-SD Memory Card, FAT16 or FAT, ≤ 4 GB	
Audio File Type	WAV, 8.3 file format	
Audio File Characteristics	kHz	16 ¹ , mono
Power Requirements²		
Operating Voltage Range Typical	VDC	7 to 30 12
<u>Operating Current (at 12V)</u> Typical Peak	mA	75 78
Physical Characteristics		
Weight (incl. mounting kit)	g	ca. 80
<u>Dimensions</u> Overall (incl. mounting kit) Mounting Hole	mm	88 x 56 x 21 78 x 50
Environmental Conditions		

1 Min. 12 kHz, max. 22 kHz

2 The exact power consumption is dependant on the active communication standard as well as the antenna and reception quality.

Environment Type	Indoor only	
Operating Temperature	°C	-15 to +65
Storage Temperature	°C	-30 to +70
Operating Humidity	% ³	10 to 90
Maximum Altitude	m	2000

Tab. 3: Specifications

Electromagnetic Compatibility



This product is conform with the following European Union Directives:

- Directive 2004/108/EC (EMC)
- Directive 2006/95/EC (LVD)

3 RH, noncondensing

Maintenance

Only use a clean and dry cloth to wipe the SEA 4912. The SEA 4912 is not water resistant and should not be operated in humid environments.

The SEA 4912 does not contain any components, which have to be maintained.



Opening the SEA 4912 will destroy the heat conductors and will void warranty.

Contact and Support

Address

S.E.A. Datentechnik GmbH
Muelheimer Strasse 7
53840 Troisdorf
Germany

Support channels

1. website: <http://www.sea-gmbh.com>
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