

OEM Manual



PhotoniQ Series

*FEM482M / FEM582M
64 Channel OEM Front End Expansion Modules*



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General Safety Precautions

Use Proper Power Source

The FEM482M and FEM582M are powered directly from the PhotoniQ main board with a +5V power source. Use with any other power source may result in damage to the product.

Operate Inputs within Specified Range

To avoid electric shock, fire hazard, or damage to the product, do not apply a voltage to any input outside of its specified range.

Electrostatic Discharge Sensitive

Electrostatic discharges may result in damage to the FEM. For these reasons, the FEM board and PhotoniQ main board are intended to be operated in a user's conductive instrument enclosure.

Do Not Operate in Wet or Damp Conditions

To avoid electric shock or damage to the product, do not operate in wet or damp conditions.

Do Not Operate in Explosive Atmosphere

To avoid injury or fire hazard, do not operate in an explosive atmosphere.

Product Overview

The FEM482M / FEM582M front end expansion modules allow users of Vertilon's PhotoniQ IQSP482M / IQSP582M sixty-four channel data acquisition systems to cost effectively expand the number of data acquisition inputs from 64 to 128 or greater. Implemented as a single daughtercard for the IQSP482M / IQSP582M main board, the FEM482M / FEM582M connects to the PhotoniQ's FEM interface mating pads for power and communication. Complete control of the FEM's functionality and acquisition process is accomplished through the PhotoniQ interface to the PC.

This guide is intended to be used as a supplement to the PhotoniQ User Manual. It primarily contains information and specifications relating to mechanical data for the described products. The user should refer to the PhotoniQ User Manual for all other information such as performance specifications, functionality descriptions, software interfaces, and file formats. The PhotoniQ OEM Manual should also be used as an added reference.

Features

- Integrates with Vertilon's IQSP482M / IQSP582M OEM data acquisition systems
- Adds 64 additional PhotoniQ-type data acquisition channels
- Utilizes Vertilon's standard Sensor Interface Board (SIB) connection system
- Low profile does not greatly increase the system's overall form factor

Ordering Information

The FEM front end expansion modules are available in two standard speed/dynamic range configurations as shown in the table below. A PhotoniQ IQSP482M / IQSP582M is required for use. The specifications below are for a 128 channel system built with a PhotoniQ and a single FEM module.

Model Number	Dynamic Range	Number of Channels	Event Pair Resolution	Maximum Trigger Rate	Maximum Signal	Noise (RMS)
FEM482M	16 bit	64	8.0 usec	100 KHz	2000 pC	30 fC
FEM582M	14 bit	64	4.5 usec	200 KHz	500 pC	55 fC

Table 1: Ordering Information

Electrical Interface

The photo below shows a FEM582M printed circuit board. The FEM482M is similar in appearance.

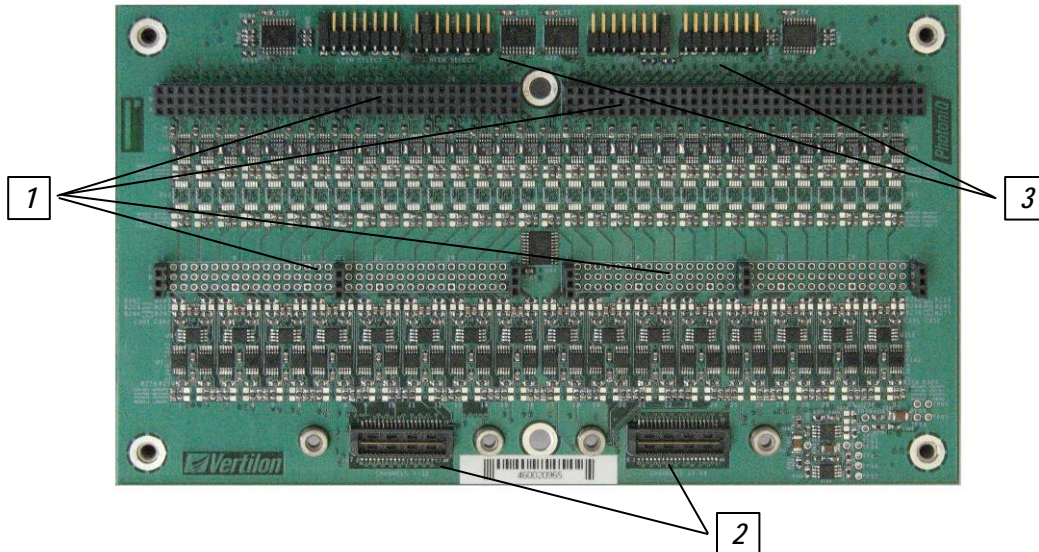


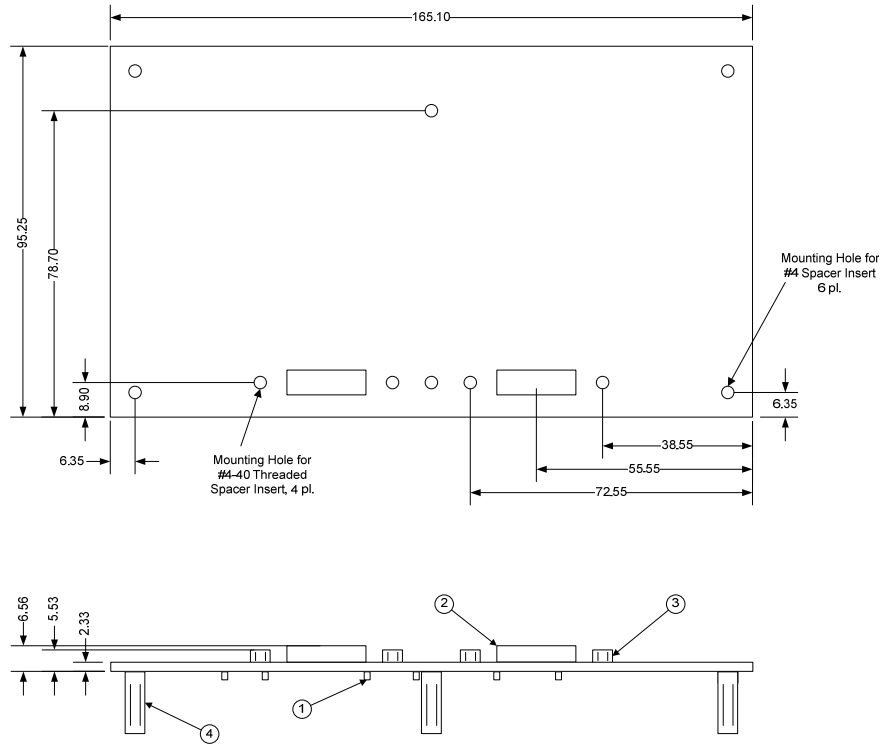
Figure 1: FEM Printed Circuit Board

1. **Mating Connectors for Additional FEMs:** Connectors for stackable front end module (FEM482M / FEM582M). An additional 64 input channels are added with each stacked FEM482M / FEM582M. The mating connector to the IQSP482M / IQSP582M main board is located on the bottom of the FEM printed circuit board.
2. **Sensor Interface Board (SIB) Connectors:** Connectors to SIB cables for connection to the Sensor Interface Boards. The cables carry the additional 64 input channels over individual coaxial lines. Control and monitor lines are also carried on the SIB cables.
3. **Configuration Jumpers:** Jumpers for selecting the FEM operational modes.

Sensor Interface Board Connectors

The connections to the sensor interface boards (SIB) that hold the sensors (either multi-anode PMTs, silicon photomultiplier arrays, or avalanche photodiode arrays) are made through specialized cables that connect between the boards and the SIB connectors on the FEM modules. Through these small form factor connectors (Samtec Part Number: QTE-020-01-L-D-A), thirty-two low noise, parallel, coaxial connections are made to the input channels from the SIB. The pinout for this connector is given in the PhotoniQ User Manual. Connection to the first 64 input channels is made using the SIB connectors on the PhotoniQ main board. Each FEM module supports 64 additional channels. The connectors on the PhotoniQ and FEM modules are identical so that the primary and secondary input channels can be freely swapped.

Mechanical Information



- Notes: Item #1: Represents electrical components on bottom of PCB.
Item #2: Height is 9.65 mm with cable installed, 2 places.
Item #3: Press fit #4-40 threaded spacer, 3.20 mm length, 4 places.
Item #4: Press fit #4 spacer, 15.875 mm length, 6 places.
All dimensions in millimeters.

Figure 2: FEM Printed Circuit Board Dimensions



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