

Quick Start

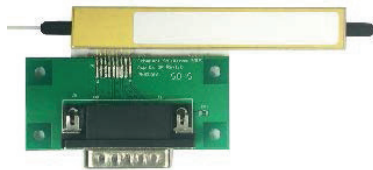
IQABC MATRIQ USER GUIDE

Step 1.

Preparing the IQ modulator.

If you are using an OIF compliant LiNbO3 IQ-modulator, solder the bias control pins to the supplied IQABC adaptor board.

Alternatively, carefully insert the OIF modulator bias pins to a plug-in type adaptor board supplied.



The IQABC adaptor board comes in either single polarization or dual polarization versions to match your IQ modulator. If your modulator is not OIF compliant, you can use the IQABC's custom break-out cable instead of the adaptor boards, which can be purchased separately.

Step 2.

Installing the IQABC MATRIQ instrument.

Caution:

- To ensure maximum power and to avoid erroneous readings always inspect fiber end faces. Make sure they are cleaned before inserting into any port.
- Ensure that the input power to the IQ modulator minus the insertion loss of the IQ modulator at max-max-max biasing condition is less than 10 dBm.

Note: Any RF signal pattern or format with a driving level up to $1.8 \times V_{pi}$ (pk-pk) is compatible with the instrument. To maximize performance, we recommend operating around a $1.6 \times V_{pi}$ (pk-pk) driving level.

Important: You must use the external power supply that has been supplied by Quantifi Photonics with the unit. Any attempt to use a different external power supply may cause product damage and will void your warranty.

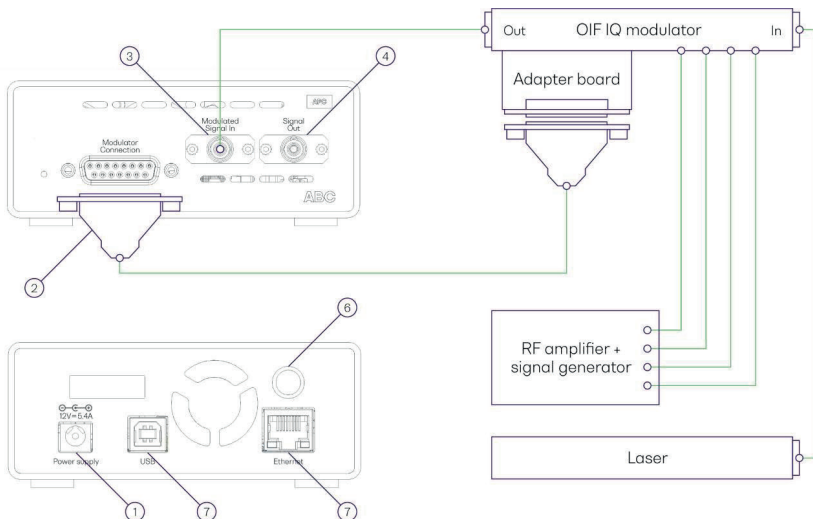
To connect the IQABC 1000 Series MATRIQ instrument, follow the steps below:

1. With the IQABC MATRIQ instrument power on/off button set to OFF, connect the power cord.
2. Connect the IQ modulator mounted on an adapter board to the instrument, using the supplied adaptor board cable.
3. Connect the output fiber of the modulator to the Modulated Signal In optical port of the instrument.
4. The Signal Out port of the instrument can be connected to your optical modulation analyzer.
5. Turn on the laser output that is connected to the input of the IQ modulator.
6. Turn on the IQABC MATRIQ instrument.
7. Insert an Ethernet / USB cable and note down the IP address as displayed on the rear LCD screen.

Once the installation is completed, the instrument will start optimizing your IQ modulator's biases regardless of the RF signal application.

Important: After powering on the IQABC MATRIQ, please wait at least **2 minutes** before attempting to communicate with the instrument. This will allow the instrument enough time to finish boot procedures and initialize the communication server.

Note: When both Ethernet and USB cables are connected to the instrument, the IP displayed on the LCD will alternate between the USB and Ethernet IP addresses.



Step 3.

Installing the latest software on the client computer.

Set up the computer you will use to connect with the instrument by installing the Cohesion Operator software package. The package is included on the USB drive that we provide with your instrument.

Insert the USB drive on the computer. Alternatively, you can download the Cohesion Operator software package from quantifiphotonics.com.

Double-click **CohesionOperator-<version>.exe** and follow the prompts.

The installation wizard will install required drivers, applications, and desktop icons on the computer.



Cohesion Operator

Step 4.

Communicating with the IQABC MATRIQ instrument.

You can control all available Quantifi Photonics instruments through CohesionUI, a web-based graphical user interface, or with SCPI commands.

To communicate with an instrument:

Open the Cohesion Operator application on the client computer, for example by double-clicking the desktop icon.

Select the instrument – the IP address of the instrument is displayed on the LCD screen on the back of the instrument (e.g. 10.10.10.89).

Click **Connect** to validate the IP address and collect instrument information.

Click **Open SCPI Command Console** to work with SCPI commands.

Click **Open CohesionUI** to work with the graphical user interface.

Important: If another Quantifi Photonics instrument is already connected to the client computer via USB, consult the user manual on configuring the Ethernet / USB IP address for multi-instrument control.

Step 5.

Initializing the IQABC MATRIQ instrument.

Once successfully connected to the IQABC instrument and Cohesion UI is running, click the FORCE CALIBRATE button in CohesionUI to perform the DC bias scan and start the Automatic Bias Control (ABC).

The bias voltage value and the operation mode of each bias of the IQ modulator can be configured through CohesionUI. The status color below the bias heading represents the progress of the bias optimization.

- Green – Indicates that the algorithm has found the optimal position.
- Orange – Indicates that the bias voltage is being optimized and may change.

To trigger a re-evaluation of the current state of the modulator and to adjust its operation accordingly, click the FORCE CALIBRATE button.

The screenshot displays the IQABC-1001 control interface. At the top, a green header bar shows the instrument name 'IQABC-1001' and a status bar with '1001 CSL-000000 HW0.01.081 W0.00.00' and a green 'ACTUAL | SET VALUE' indicator. Below the header, a navigation menu on the left includes 'HOME', 'MODULES', 'SETTINGS', and 'INFO'. The main area features a 'CONTROL' tab with sub-tabs for 'CONTROL', 'ADVANCED', 'HISTORY', and 'SCANS'. The interface is organized into six columns, each representing a different bias channel: GLOBAL MODE, OUTPUT POWER, and three columns for bias settings (XI, XQ, XP, YI, YQ, YP). Each bias column has a 'BIAS' field with a numerical value and a 'MODE' field with an 'AUTO' button. The 'OUTPUT POWER' field shows '-2.00 dBm'. A 'FORCE CALIBRATE' button is located at the top right of the bias settings columns. The status bar at the bottom left shows a red 'X' icon.

GLOBAL MODE	OUTPUT POWER	FORCE CALIBRATE
XI	XQ	XP
BIAS: 2.800 V	BIAS: -7.563 V	BIAS: -6.362 V
MODE: AUTO	MODE: AUTO	MODE: AUTO
YI	YQ	YP
BIAS: 10.000 V	BIAS: -10.889 V	BIAS: 5.556 V
MODE: AUTO	MODE: AUTO	MODE: AUTO

Step 5 Continued.

Initializing the IQABC MATRIQ instrument.

To check the status of the DC scan calibration, click the SCANS tab button. If the plots look similar to the image below, then the DC scan is successful and you can now turn on and supply the RF drive signal to the modulator.

Note: The POWER plots of XP and YP may not show a sinusoidal curve, and this is normal.



If the plots do not look clean and sinusoidal/square as shown in the image above, please check:

1. The laser is connected to the modulator input and is turned on.
2. The laser power is set to approximately 13dBm of optical power. The correct operating input power range will vary as modulators and IQABC can operate with a range of input optical powers. The 13dBm value is intended to give a rough indication of what the power level can be for a normal operation of the IQABC. Please check the
3. The RF drive signal is turned off.
4. The modulator bias pins are correctly soldered / plugged in to the adaptor board and check for the pin conductivity.

Once the above conditions are satisfied, click the FORCE CALIBRATE button and check the DC scans. When good DC scans are seen, you can apply the RF drive signal and adjust the laser power appropriately.

Test. Measure. Solve.

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with innovative solutions.

To find out more, get in touch with us today.

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