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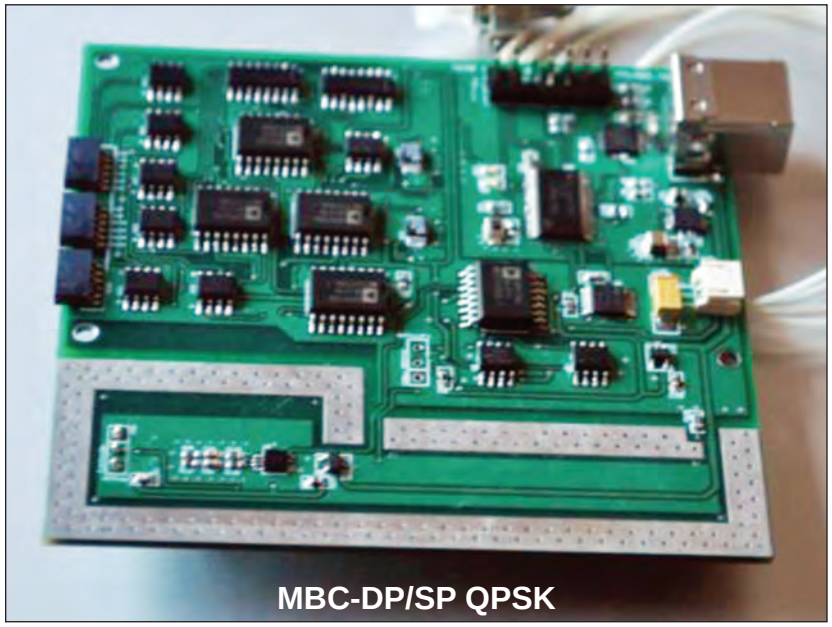
MODULATOR BIAS CONTROLLER - DP/SP QPSK

PRELIMINARY



Features

- Six modulators can be controlled with one controller (1st, 2nd modulator of each QPSK modulator at Null/peak mode, the 3rd at Quad)
- User selectable locking slope (NULL ↔ PEAK) through USB interface
- One photodiode is integrated in the controller.
- With both single-ended and differential bias outputs
- Three operation modes: DQPSK, QAM or Arbitrary-waveform
- All settings are remotely controllable through USB computer interface, or UART
- User can select automation mode or manual mode; user may stop the pilot tone for any or all modulators and manually tune the bias through USB computer interface
- Read back the input power to the PDs and the bias voltages through GUI
- Read back the firmware version through GUI
- Low profile (3.57″ x 3.37″ x 0.65″)

Product Description

The DP and SP QPSK-Modulator Bias Controllers are devices specially designed to control the bias positions for QPSK-modulators used for 100Gbit QPSK or QAM applications. DQPSK (Differential quadrature phase-shift key) modulators can improve optical transmission properties such as total reach, dispersion tolerance, or spectral efficiency. Since the QPSK modulators are a combination of 2 phase modulators and 4 Mach-Zehnder modulators, there are six bias points requiring control. OZ Optics' QPSK modulator bias controllers has been developed especially for this kind of device.

The OZ Optics QPSK modulator bias controllers are full-function miniature OEM versions of the Modulator Bias Controller (MBC) family. They simultaneously set the first and second modulators of each QPSK modulator at Null points, and set the third modulator of each QPSK modulator at the quad point. The slope of each point is selectable from the computer.

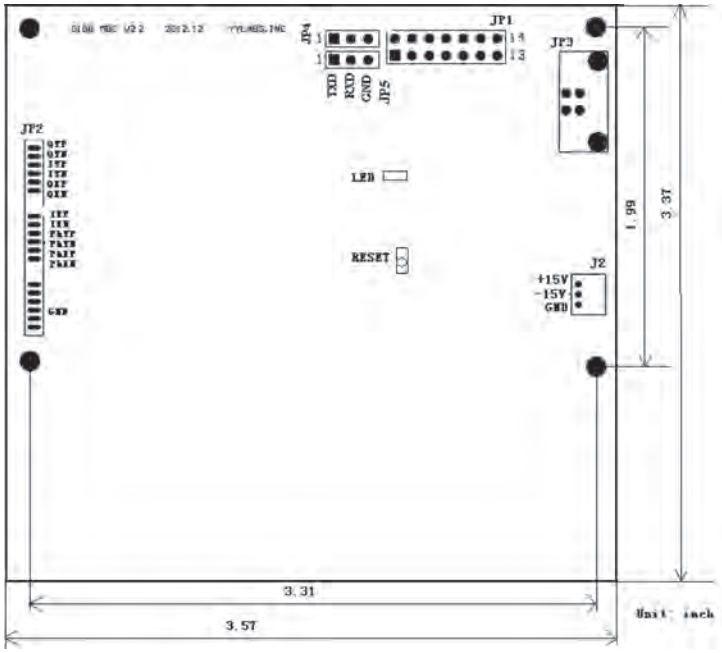


Figure 1. Layout of MBC-DP/SP QPSK

Specifications

Parameters	Min.	Typ.	Max.
Optical Performance			
Detector Input Power[1] (dBm)	-25		-10
Optical Wavelength (nm)	1000–1650		
Electrical Performance			
Bias Voltage (Differential) (V)	-25		25
Bias Voltage (Single End) (V)	-12.5		12.5
Null Mode Extinction Ratio[2] (dB)		25	40
Locking Slope	Positive or Negative		
Locking Mode	4 Null (Peak) positions, Quad+ or (Quad-) position		
Pilot Tone			
Modulation Depth (QUAD)[3] (%)		0.1	
Modulation Depth (NULL) (%)			0.1
Pilot Tone Frequency (Hz)		4000	

Parameters	Min.	Typ.	Max.
Power Supplies			
DC Positive Power Voltage (V)	14.5	15	15.5
DC Negative Power Voltage (V)	-15.5	-15	-14.5
DC Positive Power Current (mA)		130	
DC Negative Power Current (mA)		60	
General			
Operating Temperature (°C)	0–70		
Storage Temperature (°C)	-40–85		
Dimension (inch)	3.57 x 3.37 x 0.65		
Weight (lb)	0.2		

1 For a given input, detection power refers to the coupled optical power to the photodiode of MBC when the modulator output is at its minimum attenuation (The detection power does not describe the detected power at locking status). In this case, if the modulator output power is 0 dBm, 1% coupler was used, the detection power should be -20 dBm.

2 The extinction ratio will be close to but not exceed the extinction ratio of the modulator.

3 Optical Modulation Index = amplitude of modulation/Vπ.

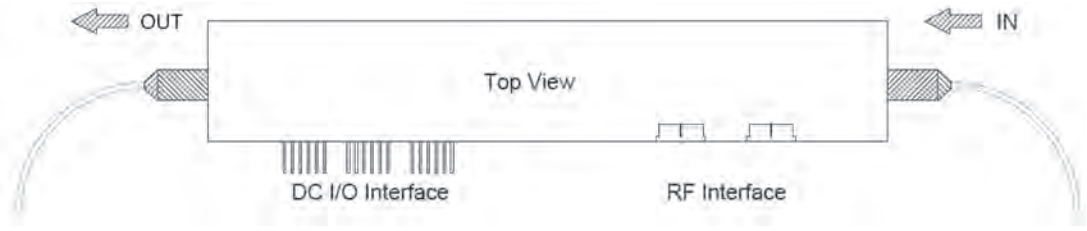


Figure 2. Location of the datum and outline of related DP QPSK modulator

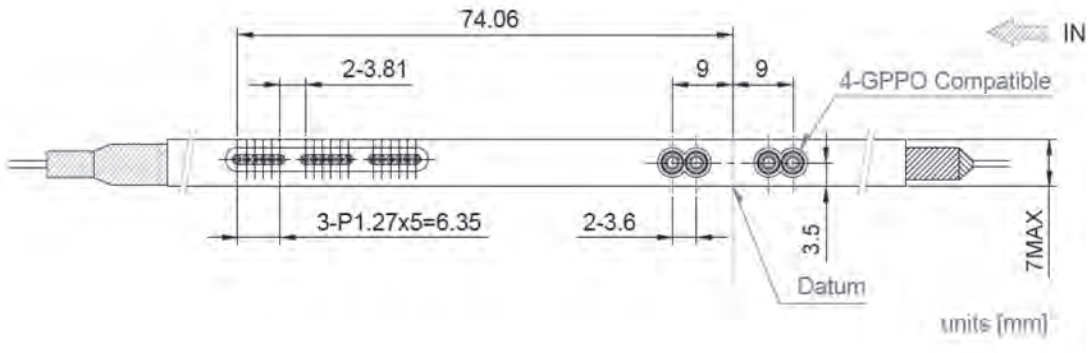


Figure 3. Mechanical specification of DC and GPPO RF interfaces

The pin-out of the connector of the MBC is made according to the OIF-2009 specification. The DP-QPSK modulator can be directly plugged into the connector. The mechanical specification of the DP-QPSK modulator with four GPPO high-speed 28 interfaces and 18 low-speed pins is shown in figure 4. The low-speed pins are grouped in groups of 6 pins.

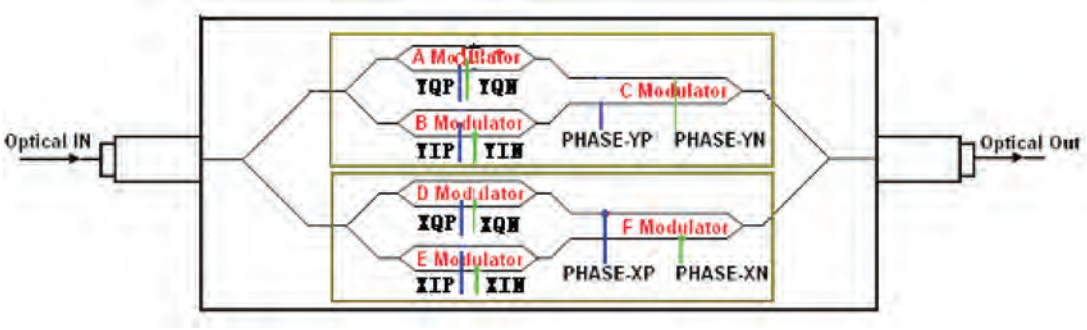


Figure 4.

Part Number

MBC-QPSK-POL-X

POL = Polarization
DP = Dual Polarization
SP = Single Polarization

X = Connector code:
3U = FC/UPC
3A = FC/APC
SCU = SC/UPC
SCA = SC/APC
LCU = LC/UPC
LCA = LC/APC