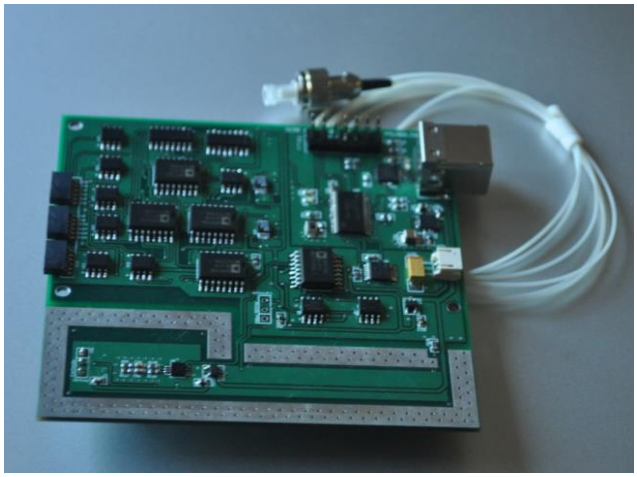
D0158 DP QPSK Modulator Bias Controller Specifications 2014-12



DP QPSK-Modulator Bias Controller model D0158 is a device specially designed to control the bias positions for DP QPSK-modulator used for 80Gbit QPSK or QAM applications. DQPSK (Differential quadrature phase-shift key) modulator can improve optical transmission properties such as total reach, dispersion tolerance, or spectral efficiency. Since the DP QPSK modulator is a combination of 2 phase modulators and 4 Mach-Zehnder modulators, there are six bias points requiring control. YY Labs' DP QPSK modulator bias controller D0158 has been developed especially for this kind of device.

YY Labs' DP QPSK modulator bias controller is a full-function miniature OEM version of the Modulator Bias Controller (MBC) family. It simultaneously sets the first and second modulators of each QPSK modulator at Null points and the third modulator of each QPSK modulator at quad point. The slope of each point is selectable from the computer.

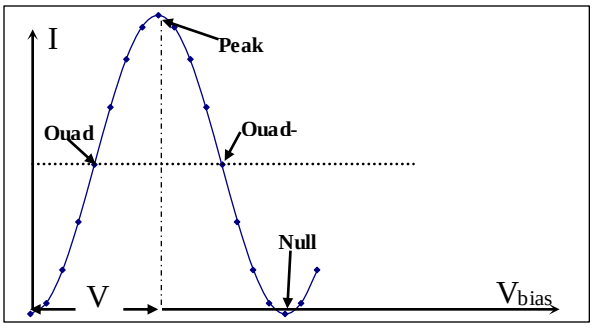


Figure 1. Modulator working function

Features of DP-QPSK-MBC (DP-QPSK/QAM MBC D0158)

- Six modulators can be controlled with one controller
  (1^{st}, 2^{nd} modulator of each QPSK modulator at Null/peak mode, the 3^{rd} at Quad);
- User selectable locking slope (NULL ↔ PEAK) through USB interface;
- One photodiode is integrated in the controller.
- With both single-end and differential bias outputs
- Three operation modes: DQPSK ,QAM or Arbitrary-waveform
- All settings are remote 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" * 3.37" * 0.65").

Table 1. D0158 DP-QPSK MBC Specifications

PARAMETERS	MIN	TYP	MAX	UNITS
Optical Performance				
Detector Input Power[1]	-25		-10	dBm
Optical wavelength	1000		1650	nm
Electrical Performance				
Bias voltage (Differential)	-25		25	V
Bias voltage (Single End)	-12.5		12.5	V
Null Mode Extinction Ratio[2]		25	40	dB
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		4K		Hz
Power Supplies				
Positive Power Voltage	14.5	15	15.5	V(DC)
Negative Power Voltage	-15.5	-15	-14.5	V(DC)
Positive Power Current		130		mA(DC)
Negative Power Current		60		mA(DC)
General				
Operating temperature	0		70	Degree C
Storage Temperature	-40		+85	Degree C
Dimension	3.57x3.37x0.65 inch			
Weight	0.2 lb			

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 distinction ratio will be close but not exceed the distinction ratio of the modulator.
3. Optical Modulation Index = amplitude of modulation/V_{π}.

DP-QPSK/QAM-D0158 Layout

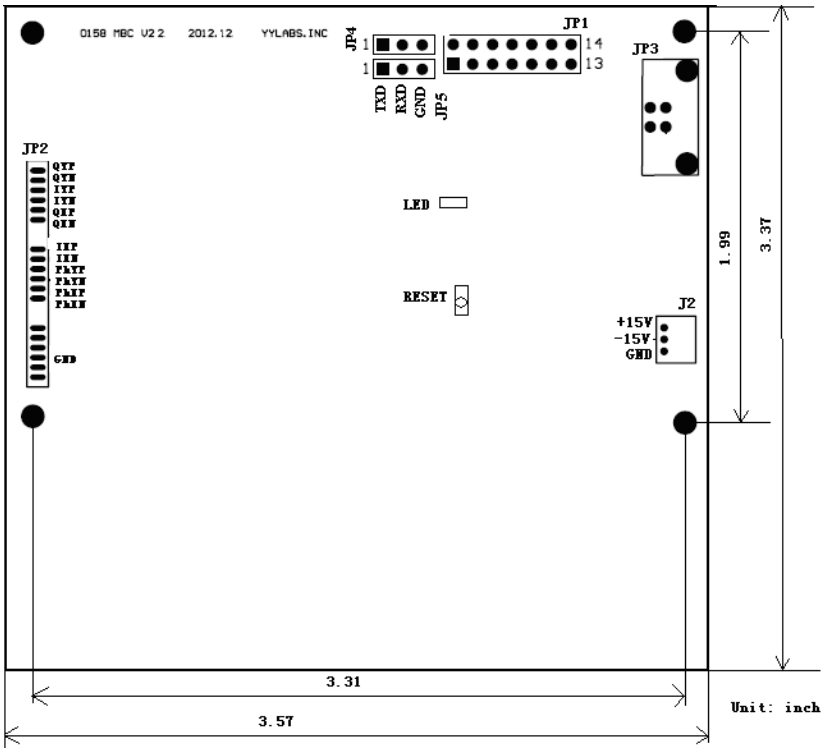


Figure 2. Layout of D0158 MBC

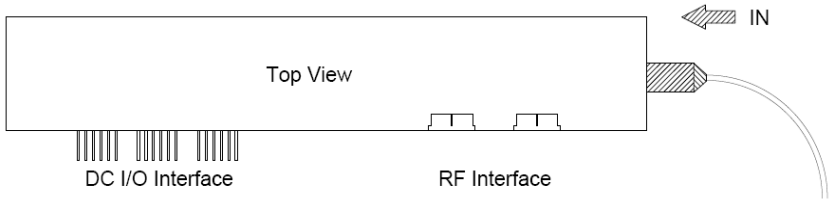


Figure 3. Location of the datum and envelope related Dimensions of related DP QPSK modulator

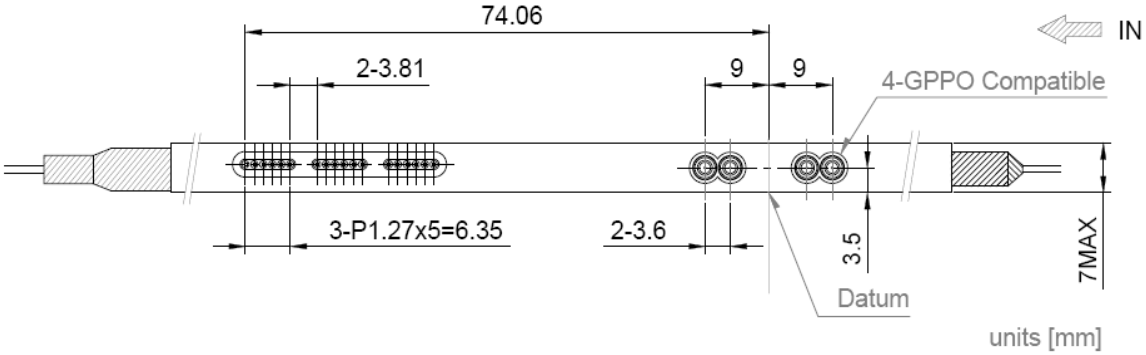


Figure 4. Mechanical specification of DC and GPPO RF interfaces

The pin-out of the Connector of the D0158 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 interfaces and 18 low-speed pins is shown in Figure 3. The low-speed pins are grouped in groups of 6 pins.

The pin numbering starts with the first high-speed data interface connector nearest to the input and the pin number increases towards the opposite side. The electrical interface grouping, ordering and functions of commercially available modulators are listed in Table-1.

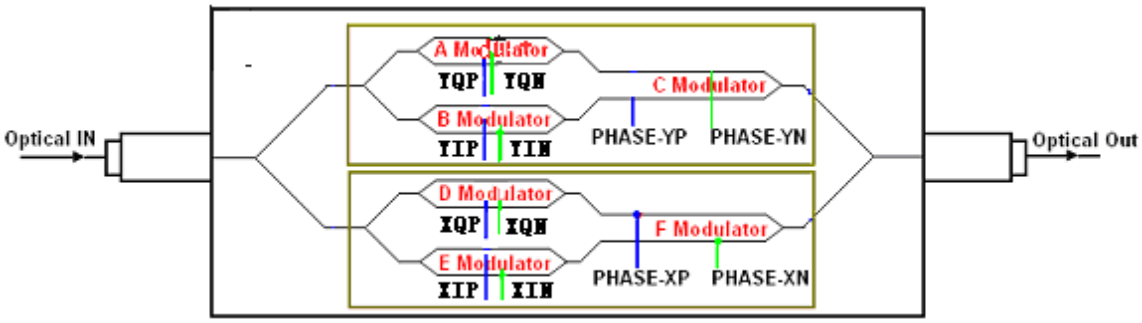


Figure 5. DP QPSK modulator numbering for D0158 MBC