



Programmable Quality Monitor for optical fiber communication

INTRODUCTION

PQM is a Very Large Scale Integrated circuit (VLSI). It behaves an optical passive, high speed, high sensitivity and wide input dynamic range optical-electrical converter. Its input is optical intensity or optical power and its output is an analog voltage which is proportional to the optical input.

As a passive optical device, a PQM never generate any optical noise to affect the normal operation of the optical fiber system it is attached.

Its high speed performance has two meanings: optically it can interface to high Baud rate optical fiber communication up to 2.5 Gb/s, electrically when the optical intensity changes, the PQM can response it in mili second order.

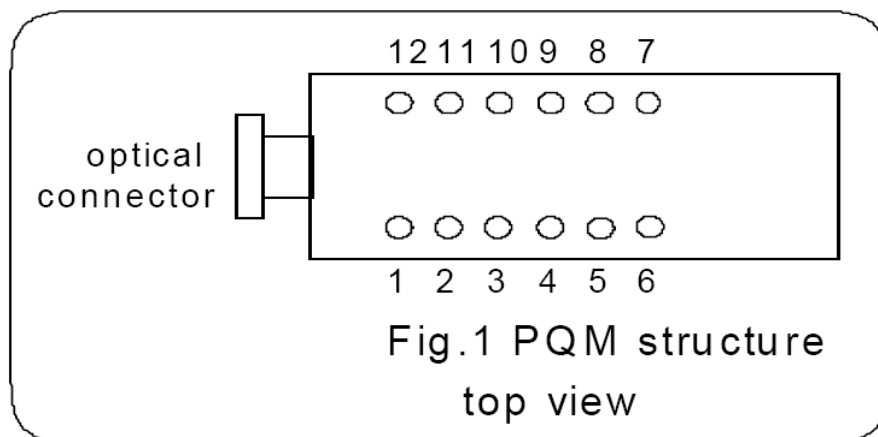
An PQM can output an analog voltage about 0.4 V when the input optical power is as low as -42 dBm.

An PQM has four programmable gain level and the dynamic range is 1000 (30 dB) so that it can handle the full optical power range of any optical fiber communication system with association of a simple 90 to 10 or 99 to 01 optical power splitter without any saturation.

Based on these excellent features, the PQM is an ideal sensor for optical fiber communication quality monitor and management systems.

MAIN APPLICATIONS

- optical fiber communication quality monitor and management systems.
- high resolution hand held wavelength meter.
- high speed optical sensor.





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STRUCTURE

A PQM is a 12 pin device. Its optical interface can be FC, ST or pigtail. The 12 pin arrangement is shown in Fig.1

PIN DESCRIPTION

pin 1: +5V
 pin 2: active low gain control signal G2
 pin 3: +12V
 pin 4: OSC, reference clock input. The frequency required is shown in Table 1.
 pin 5: active low gain control signal G1
 pin 6: analog output
 pin 7: matching resistor R, the resistance required is shown in Table 1.
 pin 8: matching capacitor C, the capacitance required is shown in Table 1.
 pin 9: active low gain control signal G4
 pin 10: -5V
 pin 11: active low gain control signal G3
 pin 12: 0V

PQM model name	PQM-0.15-xx	PQM-2.5-xx
reference clock frequency	15 MHz	125 MHz
R	100 ohm	100 ohm
C	100 pF	51 pF

Table 1

The four gain control pins G1,G2,G3 and G4 are active low with 1M ohm internal pull up resistors.

The gain control performance is listed in Table 2.

G1	G2	G3	G4	Gain (V/mW)
0	1	1	1	>5
1	0	1	1	>50
1	1	0	1	>500
1	1	1	0	>5000

Table 2

The logic levels of the control pins are compatible to CMOS circuit.

WAVELENGTH

PQM can operate for both of 1310 nm and 1550 nm.

OUTPUT VOLTAGE

PQM has the output voltage from 0 to 5 V, but the output range of 0.4 V to 4 V is recommended to avoid non linearity.

DARK VOLTAGE

The dark voltage is defined as the analog voltage output from a PQM when no light input.

The dark voltage is less than 50 mV.

POWER CURRENT

The currents for +5V, -5V and 12 V are less than 5 mA.

POWER VOLTAGE REGULATORS



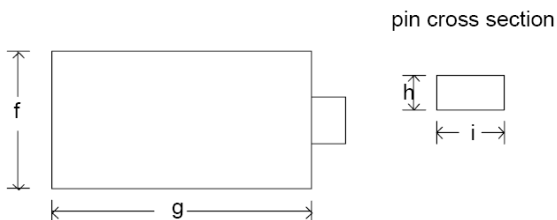
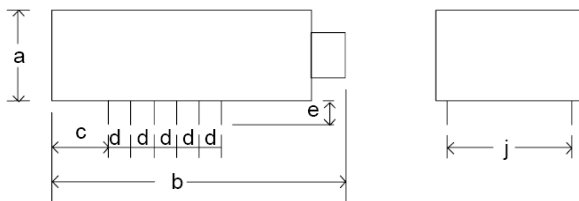
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As a high sensitivity device, independent +5V and -5V voltage regulators are recommended. +12 V can be shared with logic circuit.

DIMENSION

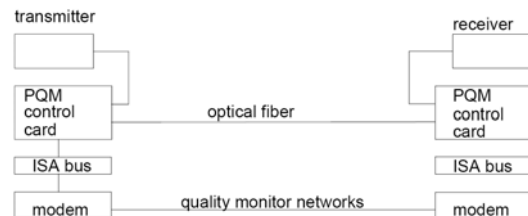
The dimension of PQM is shown in Fig. 2

	Metric	Inch
a	13 mm	0.5"
b	43 mm	1.7"
c	10 mm	0.4"
d	2.54 mm	0.1"
e	5.5 mm	0.22"
f	25 mm	1"
g	37 mm	1.45"
h	0.25 mm	0.01"
i	0.5 mm	0.02"
j	17.18 mm	0.7"

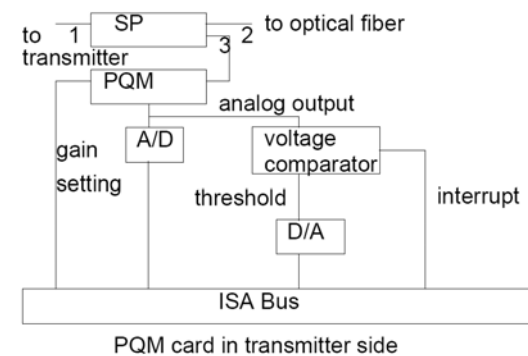


APPLICATIONS

The following optical circuit and the system block diagram are recommended for an optical fiber communication quality monitor and management system.



The block diagram of PQM control card is shown below, the structure of the PQM control card in transmitter side and in receiver side is identical except the optical power splitter.



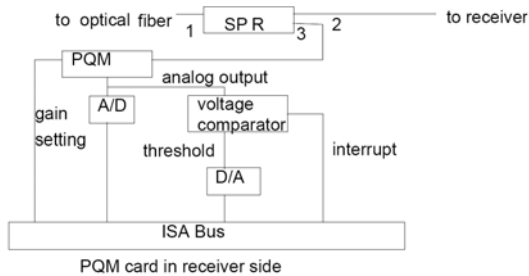
SPT is the optical power splitter in transmitter side, the splitter ratio is terminal 1 to 2: 0.99 and terminal 1 to 3 : 0.01

SPR is the optical power splitter in receiver side, the splitter ratio is



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terminal 1 to 2: 0.9 and terminal 1 to 3 :
0.1.



ENVIRONMENT

- Temperature: operation:-20 to +70 C
- Storage: -40 to +85 C
- Humidity: up to 85%, no condense

ORDERING INFORMATION

PQM-Baud rate-xx

Baud rate: 015=155 Mb/s
2.5=2.5 Gb/s

xx=FC: FC type optical connector
xx=ST: ST type optical connector
xx=SP: 900 micro pigtail optical fiber*

*the pigtail type (0.9 mm or 3mm) and length should be specified

The data sheets are subjected to modification without notification.