

General Description

Accelight AQP40C-C-30 optical transceiver is designed for 40G Ethernet links over 30km single mode fiber. It is compliant with QSFP+ Multi-Source Agreement (MSA), CWDM4 MSA and IEEE 802.3ba.

The transmitter integrates 4- Distributed Feedback Laser (DFB) with center wavelength of 1271 nm, 1291nm, 1311nm and 1331 nm. The 4 optical signals are multiplexed into one single mode fiber for 40Gbps optical transmission. On the receive side, the four lanes of optical data streams are optically de-multiplexed into 4 10G CWDM channels and each data channel is recovered by a PIN photo-detector and trans-impedance amplifier.

It's a hot pluggable module with a serial EEPROM that allows the user to access the monitoring and configuration data via a Two Wire Serial interface (I²C).



Product Features

- 4 DFB based CWDM lanes with optical Mux/DeMux integrated
- up to 11.1 Gbps per lane for 30km transmission over SMF
- Duplex LC connector
- Electrically hot-pluggable
- I²C interface with integrated Digital Diagnostics Monitoring
- Case operating temperature range: 0°C to 70°C
- 3.3V single Power Supply with power dissipation < 3.5 W

Applications

- 40G Ethernet
- Data center and LAN

Standards Compliance

- QSFP+ MSA
- IEEE 802.3ba
- SFF-8436
- RoHS Compliant

Absolute Maximum Rating

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3		Vcc+0.3	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0	25	70	°C	Without air flow
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Power Supply Current	ICC	-		1060	mA	
Data Rate	BR		10.3125	11.1	Gbps	Each channel
Transmission Distance	TD		-	30	km	
Coupled fiber	Single mode fiber					9/125um SMF

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Wavelength Assignment	λ_0	1264.5	1271	1277.5	nm	
	λ_1	1284.5	1291	1297.5	nm	
	λ_2	1304.5	1311	1317.5	nm	
	λ_3	1324.5	1331	1337.5	nm	
Signaling Speed per lane	BR		10.3125		Gbps	
Total Output. Power	P _{OUT}			8.3	dBm	
Average Launch Power Per lane	P _{AVG}	-2		2.3	dBm	
Spectral width (-20dB)	σ			1	nm	
SMSR		30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Average launch Power off per lane	P _{off}			-30	dBm	

40G QSFP+ CWDM4 30km Transceiver

RIN	RIN			-128	dB/Hz	
Output Eye Mask definition	Compliant with IEEE 802.3ba					
Receiver						
Lane_0 Center Wavelength	λ_0	1264.5	1271	1277.5	nm	
Lane_1 Center Wavelength	λ_1	1284.5	1291	1297.5	nm	
Lane_2 Center Wavelength	λ_2	1304.5	1311	1317.5	nm	
Lane_3 Center Wavelength	λ_3	1324.5	1331	1337.5	nm	
Signaling Speed Per Lane	BR		10.3125	11.1	Gbps	
Unstressed Receiver Sensitivity (OMA)	R _{XSENS}			-12	dBm	1
Input Saturation Power (Overload)	Psat	2.3			dBm	
Receiver Reflectance	R _r			-26	dB	

Notes:

1. Measured with a PRBS 2³¹-1 test pattern, @10.3125 Gbps, BER<10⁻¹².

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage	V _{cc}	3.135	3.3	3.465	V	
Supply Current	I _{cc}			760	mA	
Transmitter						
Input differential impedance	Z _{in}	90	100	110	Ω	1
Differential data input swing	V _{in,pp}	180		1000	mV	
Transmit Disable Voltage	V _D	V _{cc} -1.3		V _{cc}	V	
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} +0.8	V	2
Transmit Disable Asserty Time				10	us	
Receiver						
Differential data output swing	V _{out,pp}	300		850	mV	3
Differential Output Impedance	Z _{out}	90	100	110	Ω	
Data output rise time	T _r	28			ps	4
Data output fall time	T _f	28			ps	4
LOS Fault	V _{LOS fault}	V _{cc} -1.3		V _{cc} HOST	V	5

LOS Normal	VLOS norm	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to Tx data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20-80%.
5. Loss of Signal is LVTTTL. Logic 0 indicates normal operation while logical 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20Hz to 150Mhz up to specified value applied through the recommended power supply filtering network.

Pin Assignment

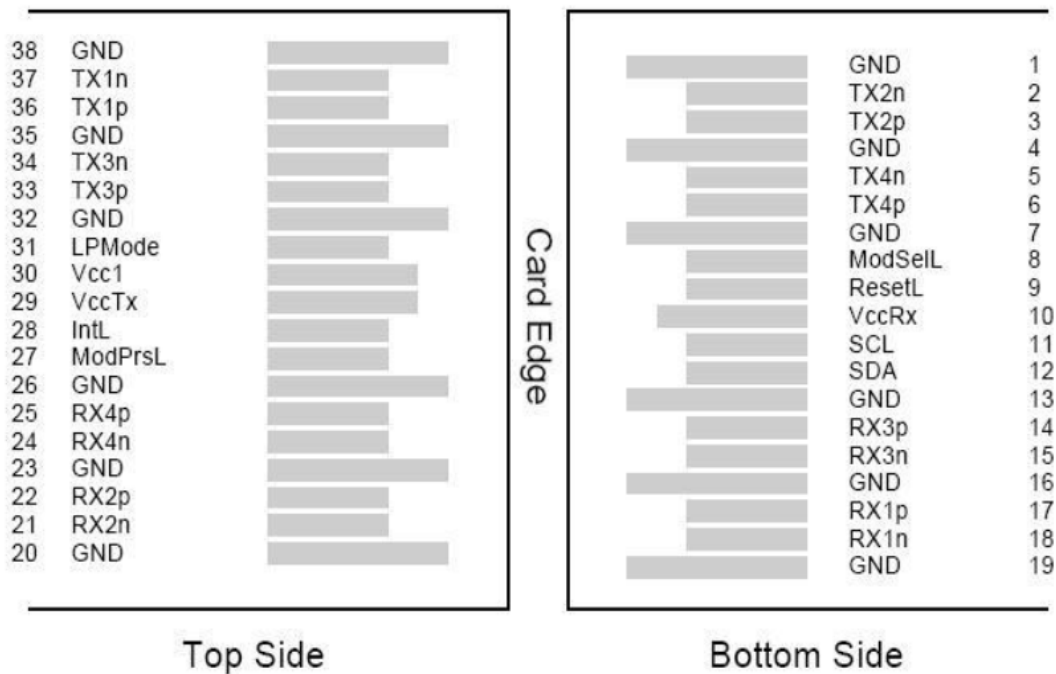


Figure 1 Pin out of connector block on host board.

Pin	Logic	Symbol	Name/Description	NOTE
1		GND	Transmitter Ground (Common with Receiver Ground)	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
4		GND	Transmitter Ground (Common with Receiver Ground)	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
7		GND	Transmitter Ground (Common with Receiver Ground)	1

40G QSFP+ CWDM4 30km Transceiver

8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	3.3V Power Supply Receiver	2
11	LVC MOS-I/O	SCL	2-Wire serial Interface Clock	
12	LVC MOS-I/O	SDA	2-Wire serial Interface Data	
13		GND	Transmitter Ground (Common with Receiver Ground)	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Transmitter Ground (Common with Receiver Ground)	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Transmitter Ground (Common with Receiver Ground)	1
20		GND	Transmitter Ground (Common with Receiver Ground)	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Transmitter Ground (Common with Receiver Ground)	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Transmitter Ground (Common with Receiver Ground)	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	3.3V power supply transmitter	2
30		Vcc1	3.3V power supply	2
31	LVTTL-I	LPMODE	Low Power Mode, not connect	
32		GND	Transmitter Ground (Common with Receiver Ground)	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Transmitter Ground (Common with Receiver Ground)	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

Mechanical Dimensions

