

## LPHKLCxx-K40C(I)

SFP+ 10Gb/s CWDM 40km DDMI , Without CDR

### PRODUCT FEATURES

- Up to 11.3Gbps Data Links
- Cooled CWDM EML laser transmitter and PIN/TIA receiver
- Maximum link length of 40km on 9/125um SMF
- Hot-pluggable SFP+ footprint
- Duplex LC receptacles
- Low power dissipation
- RoHS compliant and lead-free
- Support Digital Diagnostic Monitor interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C

### APPLICATIONS

- 10GBASE-ER/EW Ethernet
- 10Gb/s Fibre Channel
- CPRI option 2 through 8

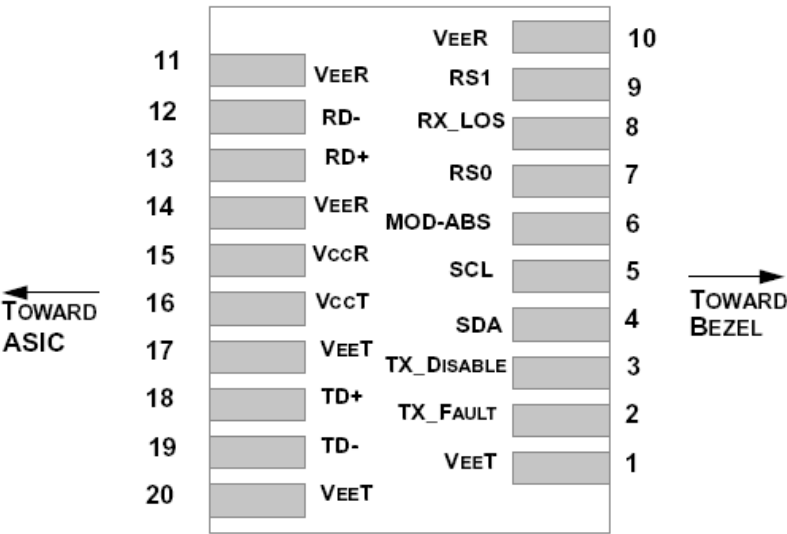
### Compliance

- SFF-8431 and SFF-8432
- SFF-8472
- ROHS

Ordering information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance (km)	Fiber Type	DDMI	Connector	Temp
LPHKLCxx-K40C	10.3125	CWDM	40	SMF	YES	LC	0℃~70℃
LPHKLCxx-K40I	10.3125	CWDM	40	SMF	YES	LC	-40℃~85℃
xx: It's for Channel							
xx	Wavelength(nm)	Clasp Color	xx	Wavelength(nm)	Clasp Color		
47	1470	Gray	55	1550	Yellow		
49	1490	Purple	57	1570	Orange		
51	1510	Blue	59	1590	Red		
53	1530	Green	61	1610	Brown		

I. Pin Diagram



Pinout of Connector Block on Host Board

II. Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault.	2
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	3
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	4

5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	4
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	4
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic "0" indicates normal operation.	5
9	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out (CML). AC Coupled	
13	RD+	Receiver Non-inverted DATA out (CML). AC Coupled	
14	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

## Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T<sub>FAULT</sub> is an open collector/drain output, which is pulled up with a 4.7kΩ – 10kΩ resistor on the host board, but is grounded inside the SFP+ cable plug.
3. Laser output disabled on T<sub>DIS</sub> > 2.0V or open, enabled on T<sub>DIS</sub> < 0.8V.
4. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD\_ABS pull line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

### III. Absolute Maximum Ratings

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Maximum Supply Voltage	V <sub>cc</sub>	-0.5		3.6	V	
Storage Temperature	T <sub>S</sub>	-40		85	°C	1
Case Operating Temperature	T <sub>OP</sub>	0		70	°C	Commercial
		-40		85		Industrial
Relative Humidity	RH	0		85	%	2

Notes:

- 1.Limited by the fiber cable jacket, not the active ends.
- 2.Non-condensing.

### IV. Optical Characteristics (T<sub>OP</sub> = 0°C to 70°C, V<sub>CC</sub> = 3.3 ± 5% Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
<b>Transmitter</b>						
Center Wavelength	λ <sub>c</sub>	λ-6.5		λ+6.5	nm	
Spectral Width(-20dB)	P <sub>m</sub>			1	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P <sub>avg</sub>	0		4	dBm	
Extinction Ratio	ER	9			dB	
Return Loss		12			dB	
Transmitter OFF Output Power	P <sub>off</sub>			-30	dBm	
Transmitter and Dispersion Peralty	TDP			2	dB	
<b>Receiver</b>						
Center Wavelength	λ <sub>c</sub>	1260		1600	nm	
Receiver Sensitivity, Average Power				-16	dBm	
Receiver Saturation Power	P <sub>sat</sub>			0	dBm	
Loss of Signal Assert	P <sub>A</sub>	-30			dBm	
Loss of Signal De-assert	P <sub>D</sub>			-18	dBm	
LOS Hysteresis	P <sub>D</sub> - P <sub>A</sub>	0.5			dB	

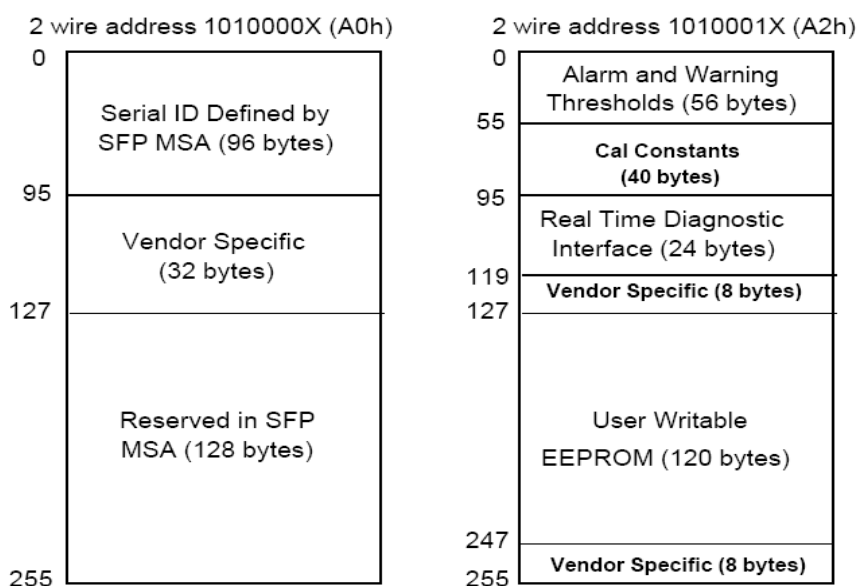
## V. Electrical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
Supply Current	I <sub>CC</sub>			450	mA	
<b>Transmitter</b>						
Input differential impedance	R <sub>in</sub>		100			1
Differential data input swing	V <sub>in</sub> , pp	200		1000	mV	
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>CC</sub>	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	
<b>Receiver</b>						
Differential data output swing	V <sub>out</sub> , pp	400		800	mV	2
LOS Fault	V <sub>LOS_fault</sub>	2		V <sub>CC</sub>	V	3
LOS Normal	V <sub>LOS_norm</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V	3
Power Supply Noise Tolerance	V <sub>CCT</sub> /V <sub>CCR</sub>	Per SFF-8431			mVpp	

Notes:

1. Connected directly to TX data input pins.AC coupling from pins into laser driver IC.
2. Into 100Ω differential termination.
3. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

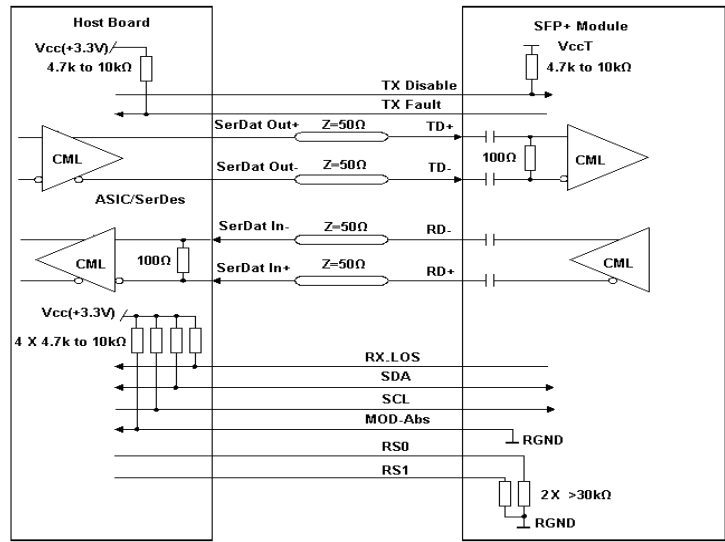
## VI. Digital Diagnostic Memory Map



Digital Diagnostic Monitoring Information

Parameter	Unit	Accuracy
Case Temperature	°C	±3
Supply Voltage	V	±3%
Tx Bias Current	mA	±10%
Tx Rx Optical Power	dB	±3

VII. Recommended Interface Circuit



VIII. Mechanical Dimensions

