LPHKLB31-K10C(I)

SFP+ 10Gb/s 1310nm 10km DDMI

PRODUCT FEATURES

- Up to 10.3125Gbps Data Links
- 1310nm DFB laser transmitter and PIN/TIA receiver
- Maximum link length of 10km 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℃ to +70℃

Industrial:-40℃ to +85℃

APPLICATIONS

- 10GBASE-LR/LW Ethernet
- 8G/10G Fibre Channel
- CPRI option 7A，option 8
- Other Optical Links

Compliance

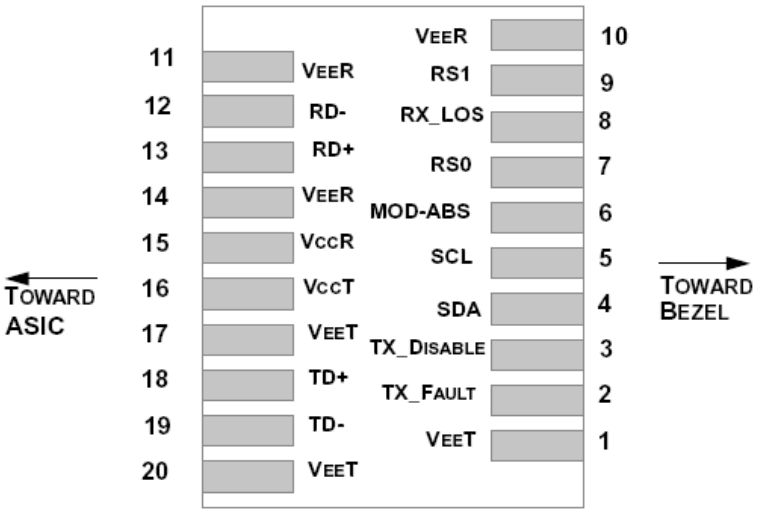
- SFP MSA
- SFF-8472
- IEEE802.3ae
- ROHS

LinkPro™

Ordering information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance（km）	Fiber Type	DDMI	Connector	Temp
LPHKLB31-K10C	10.3125	1310	10	SMF	YES	LC	0℃~70℃
LPHKLB31-K10I	10.3125	1310	10	SMF	YES	LC	-40℃~85℃

I. Pin Diagram



Pinout of Connector Block on Host Board

II. Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic “0” indicates normal operation.	5
9	RS1	No connection required	
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	

14	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	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_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} 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_{DIS} >2.0V or open, enabled on T_{DIS} <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	Vcc	-0.5		3.6	V	
Storage Temperature	TS	-40		85	℃	
Case Operating Temperature	TOP	0		70	℃	Commercial
		-40		85		Industrial
Relative Humidity	RH	0		85	%	1

Notes1: Non-condensing.

IV. Optical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter						
Center Wavelength	λc	1290	1310	1330	nm	
Spectral Width(-20dB)	Pm			1	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pavg	-8.2		0.5	dBm	
Extinction Ratio	ER	3.5			dB	
Return Loss		12			dB	
Transmitter OFF Output Power	POff			-30	dBm	
Receiver						
Center Wavelength	λc	1260		1600	nm	
Receiver Sensitivity, Average Power				-14.4	dBm	1
Receiver Saturation Power	Psat			0.5	dBm	
Loss of Signal Assert	P_A	-30			dBm	
Loss of Signal De-assert	P_D			-16	dBm	
LOS Hysteresis	P_D- P_A	0.5			dB	

Notes1. Measured with a PRBS 2^31-1 test pattern, @10.3125Gb/s, BER<1E-12 .

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

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			300	mA	
Transmitter						
Input differential impedance	Rin		100			1
Differential data input swing	Vin, pp	200		1000	mV	
Transmit Disable Voltage	V_D	2		V_{CC}	V	
Transmit Enable Voltage	V_{EN}	Vee		Vee+0.8	V	
Receiver						
Differential data output swing	Vout, pp	200		1000	mV	2
LOS Fault	V_{LOS_fault}	2		Vcc	V	3
LOS Normal	V_{LOS_norm}	Vee		Vee+0.8	V	3
Power Supply Noise Tolerance	V_{CCT}/V_{CCR}	Per SFP MSA			mVpp	

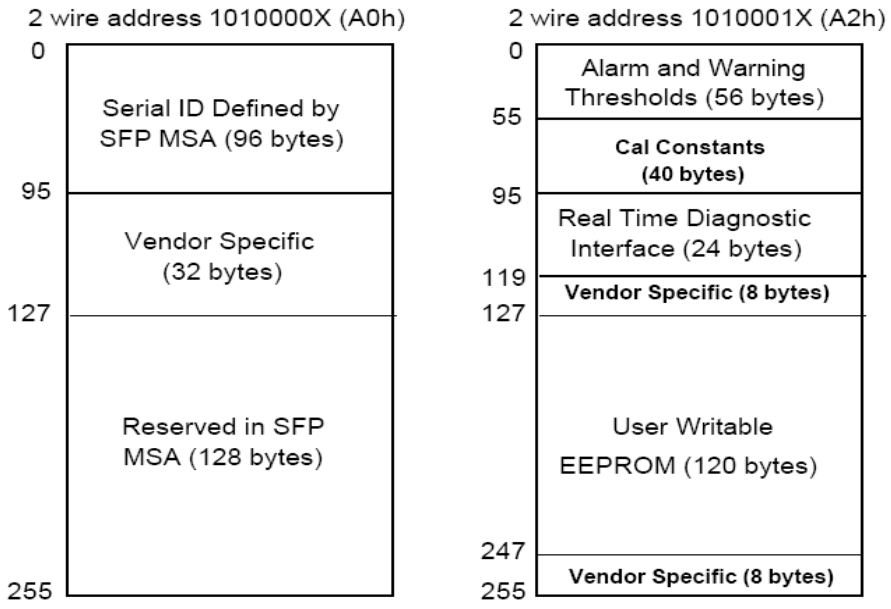
Notes:

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 LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

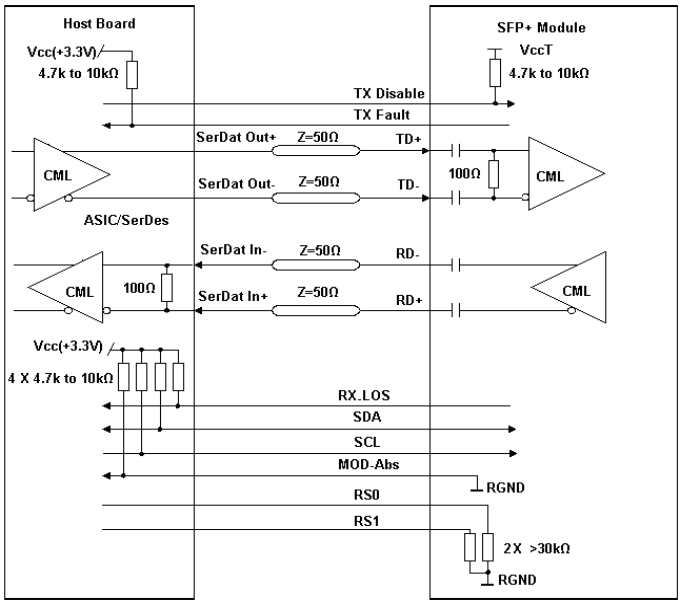
VI. Digital Diagnostic Memory Map



VII. Digital Diagnostic Monitoring Information

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

VIII.Recommended Interface Circuit



IX. Mechanical Dimensions