

LPHKLCxx-K20C(E)

SFP+ 10Gb/s CWDM 20km DDMI

PRODUCT FEATURES

- Up to 11.3Gbps Data Links
- Stable CWDM DFB laser transmitter and PIN/TIA receiver
- Maximum link length of 20km 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

Extend: -20°C to +85°C

APPLICATIONS

- 10GBASE-LR Ethernet
- 10Gb/s Fibre Channel
- CPRI option 7A, option 8

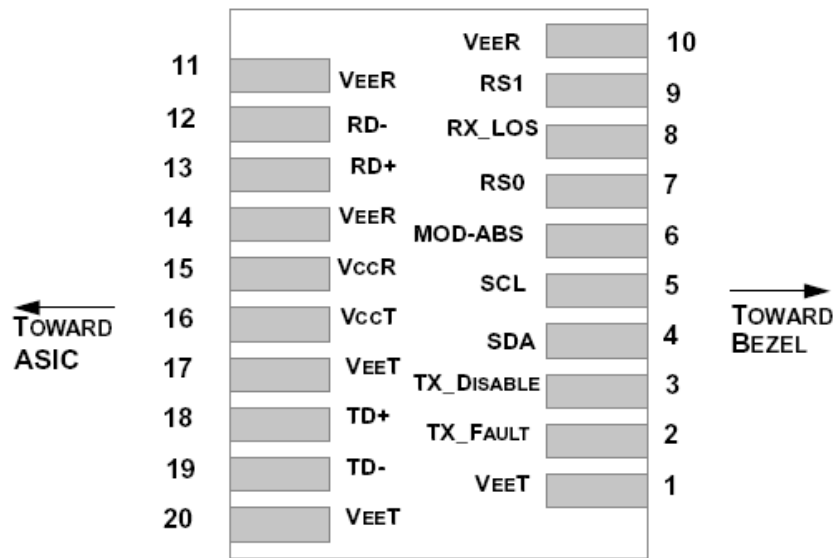
Compliance

- 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-K20C	10.3125	CWDM	20	SMF	YES	LC	0℃~70℃
LPHKLCxx-K20E	10.3125	CWDM	20	SMF	YES	LC	-20℃~85℃
xx: It's for CWDM Channels							
"xx"	Wavelength(nm)	Clasp Color Code	"xx"	Wavelength(nm)	Clasp Color Code		
27	1270	Gray	29	1290	Gray		
31	1310	Gray	33	1330	Purple		
35	1350	Blue	37	1370	Green		
39	1390	Yellow	41	1410	Orange		
43	1430	Red	45	1450	Brown		
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



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	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_{EER}	Receiver Ground (Common with Transmitter Ground)	
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 (CML). AC Coupled	
13	RD+	Receiver Non-inverted DATA out (CML). 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 4.7k Ω – 10k Ω 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 4.7k Ω – 10k Ω 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 4.7k Ω – 10k Ω 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 _{cc}	-0.5		3.6	V	
Storage Temperature	T _S	-40		85	°C	
Case Operating Temperature	T _{OP}	0		70	°C	Commercial
		-20		85		Extend
Relative Humidity	RH	0		85	%	1

Notes:

1.Non-condensing.

IV. Optical Characteristics (T_{OP} = 0°C to 70°C, V_{CC} = 3.3 ± 5% Volts)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Transmitter						
Center Wavelength	λ_c	$\lambda-6.5$		$\lambda+6.5$	nm	Commercial
		$\lambda-7.5$		$\lambda+7.5$		Extend
Spectral Width(-20dB)	P _m			1	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P _{avg}	0		5	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter OFF Output Power	P _{off}			-30	dBm	
Receiver						
Center Wavelength	λ_c	1260		1600	nm	
Receiver Sensitivity, Average Power				-14.4	dBm	
Receiver Saturation Power	P _{sat}			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		6	dB	

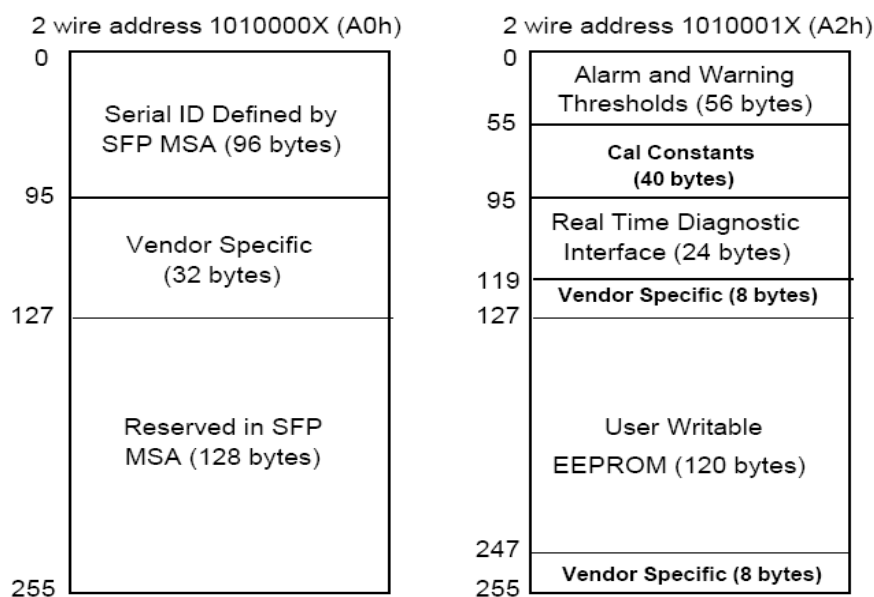
V. Electrical Characteristics (TOP = 0°C to 70°C, VCC = 3.3 ± 5% Volts)

Parameter	Symbol	Min	Type	Max	Unit	Ref.
Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Supply Current	I _{CC}			285	mA	
Transmitter						
Input differential impedance	R _{in}		100			1
Differential data input swing	V _{in} , pp	200		1000	mV	
Transmit Disable Voltage	V _D	2		V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	
Receiver						
Differential data output swing	V _{out} , pp	400		800	mV	2
LOS Fault	V _{LOS_fault}	2		V _{CC}	V	3
LOS Normal	V _{LOS_norm}	V _{EE}		V _{EE} +0.8	V	3
Power Supply Noise Tolerance	V _{CCT} /V _{CCR}	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.

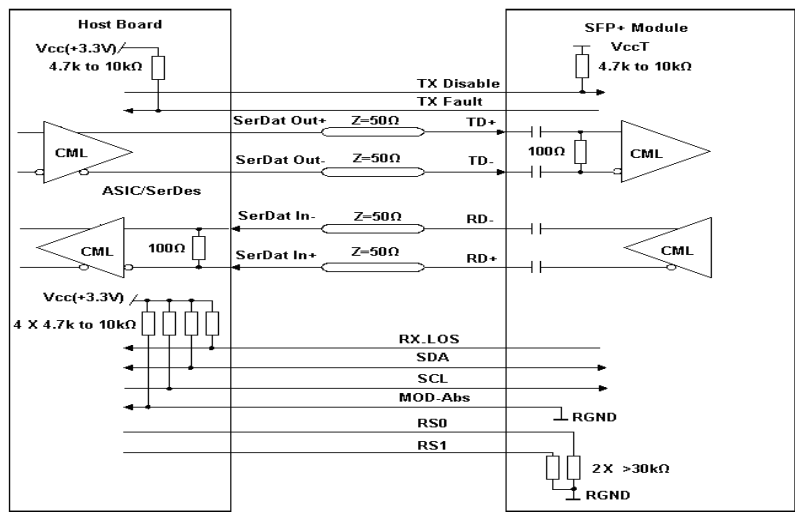
VI. Digital Diagnostic Memory Map



VII. Digital Diagnostic Monitoring Information

Parameter	Unit	Accuracy
Case Temperature	°C	±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

