

## 10G SFP+ to SFP+ Direct Attach Cable Specification

### HTDC-PP96-xx01MB

#### **Feature**

- ◆ Support for multi-gigabit data rates up to 10.3125Gbps
- ◆ Hot-pluggable SFP 20 PIN footprint
- ◆ SFF-8431 and SFF-8432 compliant
- ◆ Copper link length up to x (x=1~7m)
- ◆ I/O Connector designed for high speed differential signal applications
- ◆ Improved Pluggable Form Factor (IPF)
- ◆ Compliant for enhanced EMI/EMC performance
- ◆ Compatible to SFP+ MSA
- ◆ Temperature Range: 0~70°C
- ◆ RoHS compliant
- ◆ Low power consumption <1 W

#### **Applications**

- ◆ 10G Ethernet

#### **Standards**

- ◆ SFF-8431 SFF-8432

#### **Description**

The Hirundo' s HTDC-PP96-xx01MB SFP+ Direct Attach Cables are designed for use in 10Gigabit Ethernet links. They are electrically compliant with the SFF-8431, and the mechanical SFP+ plug is compatible with SFF-8432. Various choices of wire gauge are available from 30 to 24 AWG with various choices of cable length (up to 7m).

## 1. Ordering Information

Table 1.1 Ordering Information

Part No.	Specifications						Application
	Package	Data rate	Wire gauge	Cable lengthr	Temp	Others	
HTDC-PP96-xx01MB <sup>[1]</sup>	SFP+	10.31Gbps	30 to 24 AWG	up to 7m	0~70 °C	LSZH	10G Base CR
<b>PN</b>	HTDC-PP96-xx01MB <sup>[1]</sup>						
<b>Description</b>	10G SFP+ to SFP+ Direct Attach Cables,30 to 24 AWG, up to 7m, 0-70°C						
<b>SAP No</b>	-						
<b>Customer PN</b>	-						

**Notes:**

1. Refer to Chapter 7 Ordering Information

## 2. Revision History

Table 2.1 Revision History

Version	Initiated	Reviewed	Approved	Date
V1.0	Leo	Virgil	LiuSJ	2020-10-15

## 3. Absolute Maximum Ratings

Table 3.1 Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	T <sub>s</sub>	°C	-40	+85
Power Supply Voltage	V <sub>cc</sub>	V	-0.5	4.0
Case Operating Temperature	T <sub>A</sub>	°C	0	70
Bit Rate	BR	Gbps		10.3125
Bit Error Ratio	BER			10 <sup>-15</sup>

## 4. Electrical Characteristics

Table 4.1 Electrical Specifications

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Supply Voltage	VCC	V	3.14		3.46	
Supply Current	ICC	A			0.31	
Power Consumption	Pc	W			1	
<b>Transmitter</b>						
Signaling rate per lane		Gbps		10.3125		
Input Differential Impedance	R <sub>IN</sub>	Ω		100		
Differential data input swing	V <sub>IN</sub>	mVp-p	180		700	
Transmit Disable Voltage	V <sub>D</sub>	V	2		Vcc	
Transmit Enable Voltage	V <sub>EN</sub>	V	Vee		Vee+ 0.8	
<b>Receiver</b>						
Differential data output swing	V <sub>OUT</sub>	mVp-p	300		850	
Data output rise time, fall time	t <sub>r</sub>	ps			28	
LOS Fault	V <sub>LOS fault</sub>	V	2		V <sub>CCHOST</sub>	
LOS Normal	V <sub>LOS normal</sub>	V	Vee		Vee+0.8	
Power Supply Noise Tolerance	VccT/VccR	mVpp	Per SFF-8431 Rev 4.1			
<b>IIC communication</b>						
IIC Clock frequency	-	KHZ	100		400	

## 5. Pin Assignment and Pin Description

### 5.1 SFP+ Pin Assignment

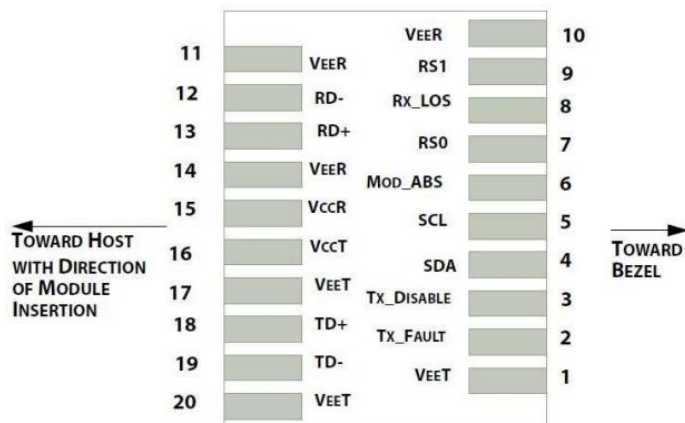


Figure 1 Electrical Pin-out Details

## 5.2 SFP+ Pin Description

**Table 5.1 Pin Description**

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module	
8	LOS	Receiver Loss of Signal Indication	
9	RS1	Rate select1: module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter non-inverted data out put	
19	TD-	Transmitter inverted data out put	
20	VeeT	Module transmitter ground	1

**Notes:**

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host\_Vcc on the host board.

## 6. Mechanical Design Dimensions

The connector is compatible with the SFF-8432 specification.

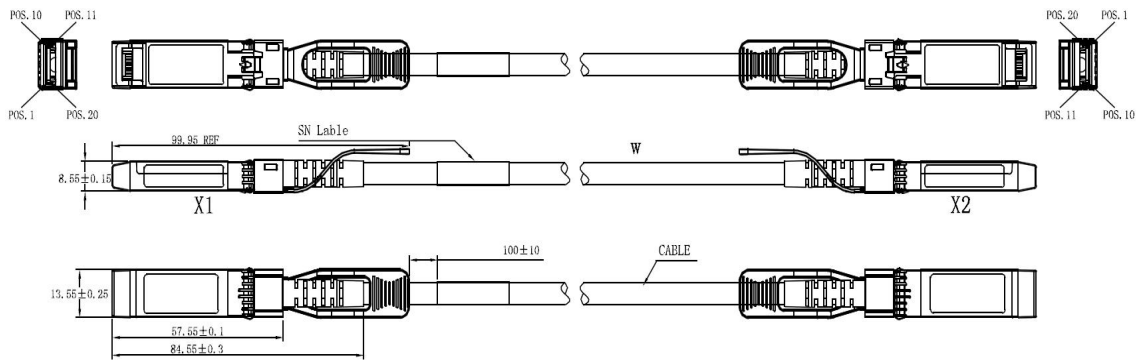


Figure 2 Mechanical Design Dimensions

Table 6.1 Length and related Cable AWG

Length (m)	Cable AWG
1	30
2	30
3	30
4	26
5	26
6	24
7	24

## 7. Ordering Information

Table 7.1 Ordering Information

Part Number	Description
HTDC-PP96-3001MB	10G SFP+ 1m 30AWG DAC Cable
HTDC-PP96-3002MB	10G SFP+ 2m 30AWG DAC Cable
HTDC-PP96-3003MB	10G SFP+ 3m 30AWG DAC Cable
HTDC-PP96-2604MB	10G SFP+ 4m 26AWG DAC Cable
HTDC-PP96-2605MB	10G SFP+ 5m 26AWG DAC Cable
HTDC-PP96-2406MB	10G SFP+ 6m 24AWG DAC Cable
HTDC-PP96-2407MB	10G SFP+ 7m 24AWG DAC Cable

## **8. For More Information**

Hirundo Optics Inc

2nd floor, building-6, #16 Xinfu Road South Cable industrial park Rongli Ronggui street  
Shunde district Foshan City, Guangdong province, China;

Zip Code: 528300

Tel. 0757-26619220

<http://www.hirundo-link.com/>