



Application note

Generic connector pin outs to support the three different Non-MSA SFP.

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1 Overview

This application note provides a guideline to implement a 'generic' pin assignments (pin outs) to support the non-MSA SFPs.

As stated in the introduction, this application note focuses on the different non-MSA pin outs of the dual receiver, dual transmitter and transceiver. When equipment is built by a manufacturer and is intended to interwork with different type of SFP from different manufacturers the use of an industry standard is critical. To properly inter-operate, the host board and the SFP must support the same electrical levels, mechanical dimensions of the SFP/SFP+ and most importantly the connector's pin outs should not create any contention or malfunction.

Because the non-MSA pin outs aren't standardized, manufacturer should take more precaution before using non-MSA SFP in system.

In addition to the Embrionix connector pin outs, this application notes also provides a short list of compatible SFPs, contentions solution and a 'generic' one-pin-outs-fit-all to help manufacturers to use any type of non-MSA SFP in their system.

2 Pins definition

The following table define the pin type, direction. For a complete description of the pins please refer to any Embrionix non-MSA SFP datasheet.¹

Table 1. Non-MSA SFP pins definition

Pin Name	Description	Type	Direction
VEE	ground	Supply pins	--
VCC	+3.3V Supply	Supply pins	--
SCL	I ² C serial clock	Open drain	Input
SDA	I ² C serial data	Open drain	Bidirectional
RX1+	Receive channel 1	CML	Output
RX1-	Inverted Receive channel 1	CML	Output
RX2+	Receive channel 2	CML	Output
RX2-	Inverted Receive channel 2	CML	Output
TX1+	Transmit channel 1	CML	Input
TX1-	Inverted Transmit channel 1	CML	Input
TX2+	Transmit channel 2	CML	Input
TX2-	Inverted Transmit channel 2	CML	Input
RXx_Los	Receiver loss of signal	Open drain	Output
TXx_DIS	Transmitter disable	LVC MOS/LVTTL	Input
TX_FAULT (opt)	Transmitter fault	Open drain	Output

¹ www.embrionix.com/products

3 Transceiver pin outs

The following pin outs represent the non-MSA transceiver. The MSA transceiver should not be plugged in the 'generic' non-MSA pin outs include in this application note. Both versions are available from Embrionix.

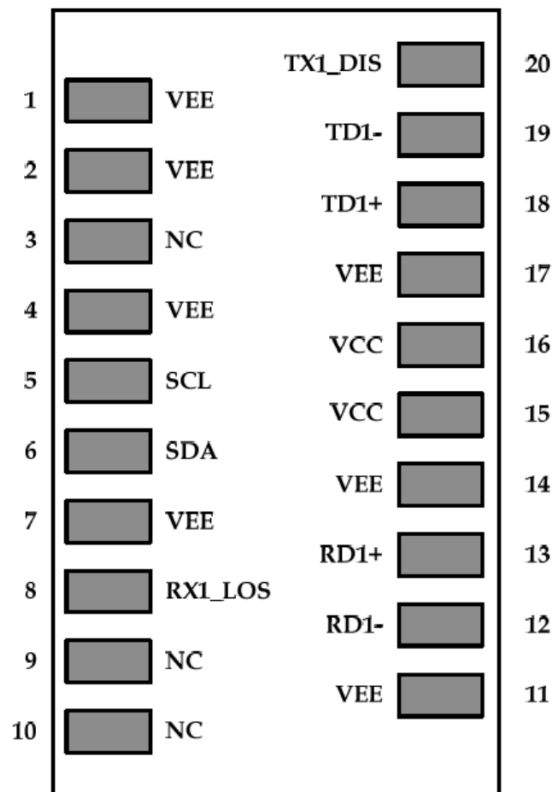


Figure 1. Non-MSA transceiver pins configuration

4 Dual receiver pin outs

The following pin outs represent the dual receiver SFP available from Embrionix and major video SFP vendor.

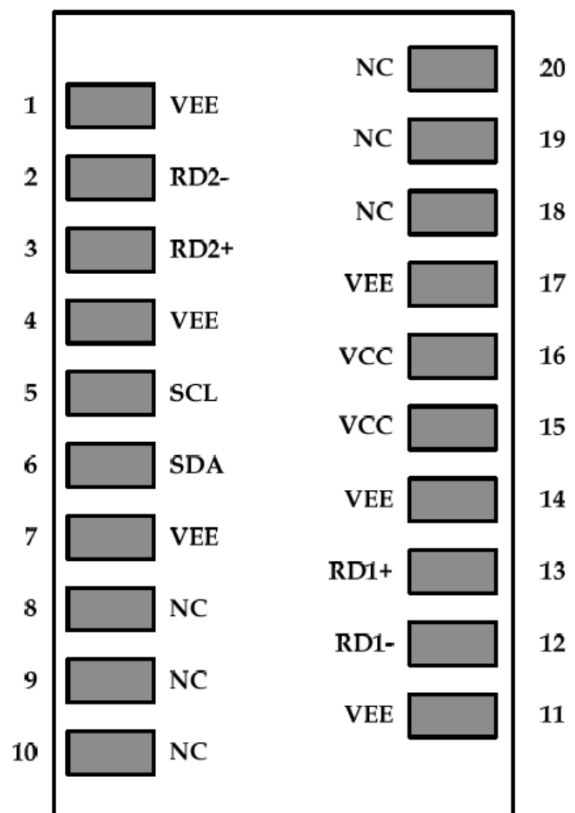


Figure 2. Dual receiver pins configuration

5 Dual transmitter pin outs

The following pin outs represent the dual transmitter SFP available from Embrionix and major video SFP vendor.

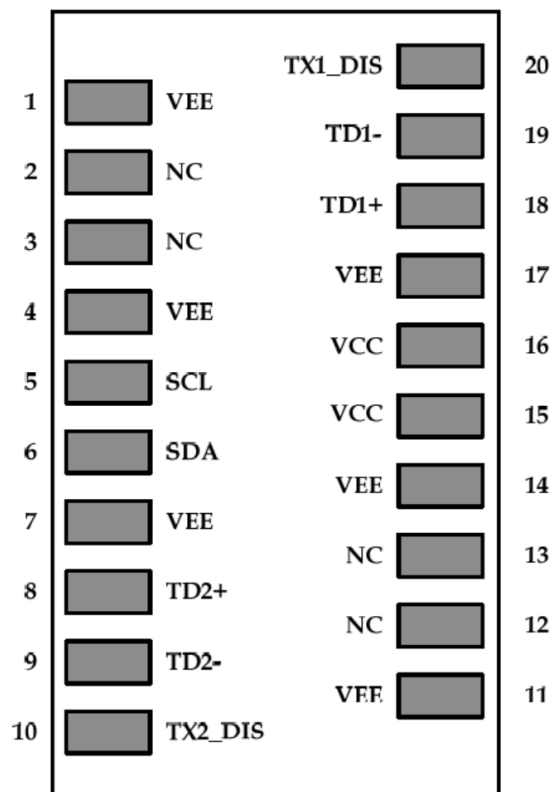


Figure 3. Dual transmitter pins configuration



6 Generic pin outs

As stated earlier, the 'generic' connector should inter-operate with the non-MSA transceiver, dual receiver and dual transmitter without affecting the performance of the system, without contention or short. The following table show the potential problem of the 'generic' connector.

The following section will explain various solutions to solve the contention problem. By using those solutions, the manufacturer will be able to use the 'generic' connector and will greatly simplify the board design.

Table 2. Embrionix Non-MSA SFP pin outs table

PIN#	Transceiver (Non-MSA)	Dual Receiver	Dual transmitter	Status
1	VEE	VEE	VEE	Good
2	VEE	Rx2-	NC	Caution
3	NC	Rx2+	NC	Good (AC coupling if pin 2 is AC coupled)
4	VEE	VEE	VEE	Good
5	SCL	SCL	SCL	Good
6	SDA	SDA	SDA	Good
7	VEE	VEE	VEE	Good
8	RX1_LOS	NC	Tx2+	Bad
9	NC	NC	Tx2-	Good
10	NC	NC	Tx2_DIS	Good (connect to logic on host)
11	VEE	VEE	VEE	Good
12	Rx1-	Rx1-	NC	Good
13	Rx1+	Rx1+	NC	Good
14	VEE	VEE	VEE	Good
15	VCC	VCC	VCC	Good
16	VCC	VCC	VCC	Good
17	VEE	VEE	VEE	Good
18	Tx1+	NC	Tx1+	Good
19	Tx1-	NC	Tx1-	Good
20	Tx1_DIS	NC	Tx1_DIS	Good

7 Pin#2 problem description

The pin 2 could create excessive current consumption if the input CML (or LVPECL, LVDS²) contains termination (in IC or onboard). The following picture shows the CML input current to ground.

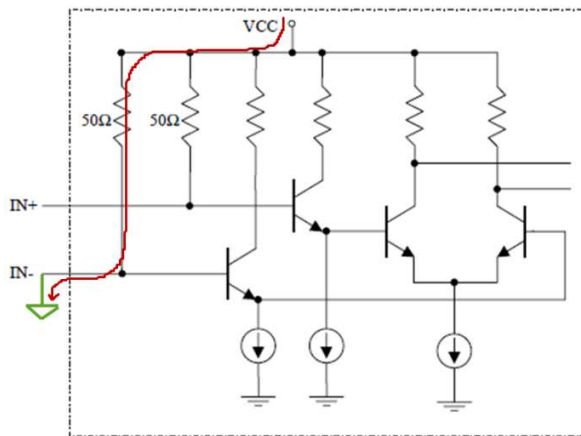


Figure 4. CML current consumption

8 Pin#2 solution

The easiest solution is to add AC-coupling capacitor (recommended value 4.7uF) between the SFP connector and the IC. The pin 3 should also have an AC-coupling capacitor, ideally place at the same place between the SFP connector and the IC.

² To connect the differential pair to LVPECL or LVDS, please ensure that the common mode voltage and swing are respected. Please validate with the specification.

9 Pin#8 problem description

The pin 8 is the more problematic problem. The pin should be connected to the semiconductor high speed output pin (CML, LVPECL, LVDS, etc...) in the case of the Dual transmitter and to a logic level (LVCMOS, LVTTTL) in the case of a Dual receiver. The RX1_LOS could be obtained by the I²C interface in the Embrionix Dual receiver SFP, the pin RX1_LOS is identical to the register 110 bit 1. The RX1_LOS as defined in the SFP multi source agreement is open drain and the pull-up resistor should be placed on the host.

10 Pin#8 Solution

Again, the easiest solution is to add AC-coupling capacitor (recommended value 4.7uF) between the SFP connector and the IC. The pin#9 should also have an AC-coupling capacitor.³

³ The Embrionix's SFP have internal AC-coupling capacitor of 4.7uF on high speed traces.

11 Final generic pin outs

The following schematic represent the generic pin outs to inter-operate with the dual transmitter, dual receiver and Non-MSA transceiver.⁴

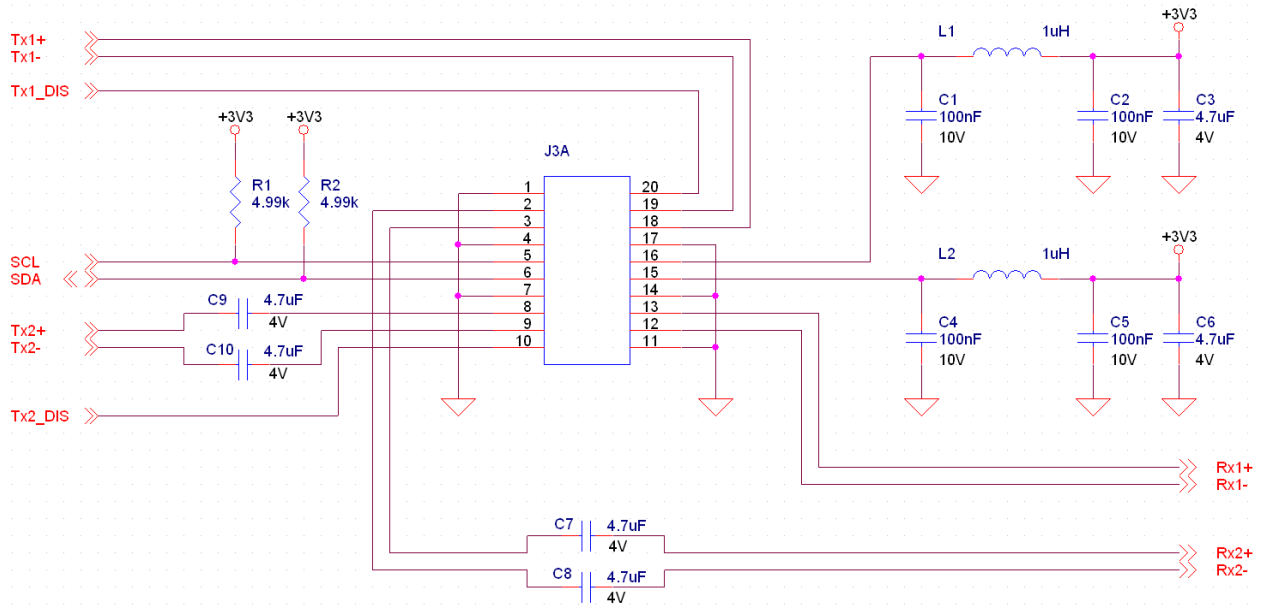


Figure 5. Generic connector pin outs schematic

⁴ Embrionix can supply basic schematic and layout symbols on demand.