

Rev	Date	Modified by	Description
A0	2023		

## Product Specifications

### 100G QSFP28 Electrical Passive Loopback

**PN: EQ210X-LB**

#### Features

- Customizable power consumption
- Custom memory maps available
- Supports 100Gbps total data rate
- Hot-pluggable MSA footprint
- Full SFF-8665 MSA compliant
- Temperature range from -0°C to 70°C
- MSA Compliant EEPROM

#### Applications

- QSFP port/system testing
- Ethernet IEEE 802.3 (Gigabit, 10 Gigabit, 40 Gigabit, and 100 Gigabit Ethernet)
- SDR, DDR and QDR Infiniband Transmission
- SONET, SDH, GBE, Fiber Channel Support

#### Description

QSFP28 Electrical Passive Loopback has Excellent signal integrity, It is used for Economical and flexible 100Gbps QSFP28 port testing\Board level system testing and Power on validation.

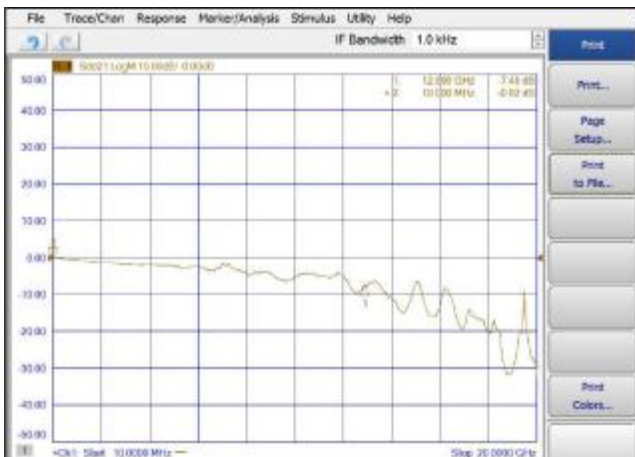
The loopback module is package in a standard MSA housing compatible with all QSFP+/QSFP28 ports. Transmit data from the host is electrically routed, (internal to the loopback module), to the receive data outputs and back to the host. It provides an economical way to exercise QSFP/QSFP+ ports during R&D validation, production testing, and field-testing.

## Recommended Operation Condition

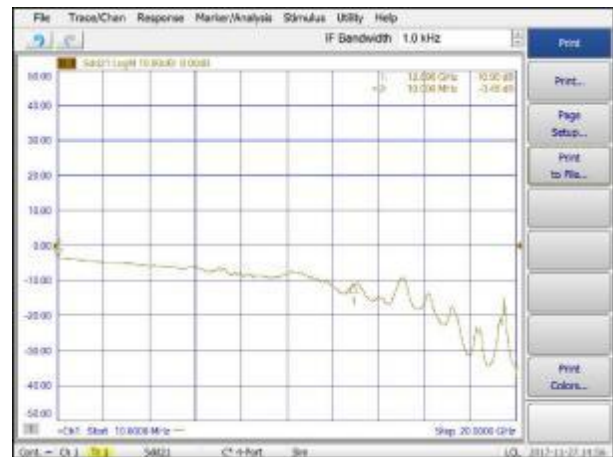
Parameter	Symbol	Notes/Conditions	Min	Type	Max	Units
Operating Temperature	TA	Note 1	W		80	°C
+3.3V Supply Voltage	VCC	Main Supply Voltage	3.00	3.3	3.60	V
Data Rate		Guaranteed to work at 28Gbps per lane	0		112	Gbps
Input/ Output Load Resistance	RL		90	100	110	Ω
Jitter		Note 2		33		
Power Level 0		0 A			0	W
1		0.3A			1	
2		0.45 A			1.5	
3		0.6 A			2	
4		0.75 A			2.5	
5		0.91 A			3	
6		1.06 A			3.5	

\*Note 1. Ambient temperature with a minimum of 100 linear feet per minute of airflow

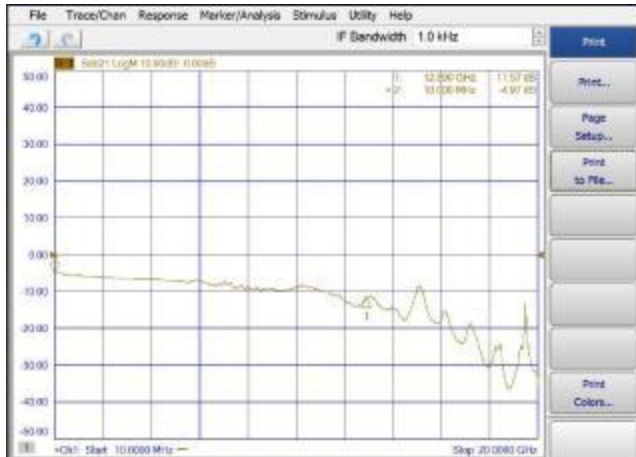
\*Note 2. Measured with 25G BERT and QSFP28 Host Test Board



**SDD12-0dB (Transmit Insertion Loss )**



**SDD21-3.5dB (Transmit Insertion Loss )**



SDD21-5dB (Transmit Insertion Loss )

## Host board Connector Pinout

Figure 1: MSA compliant Connector

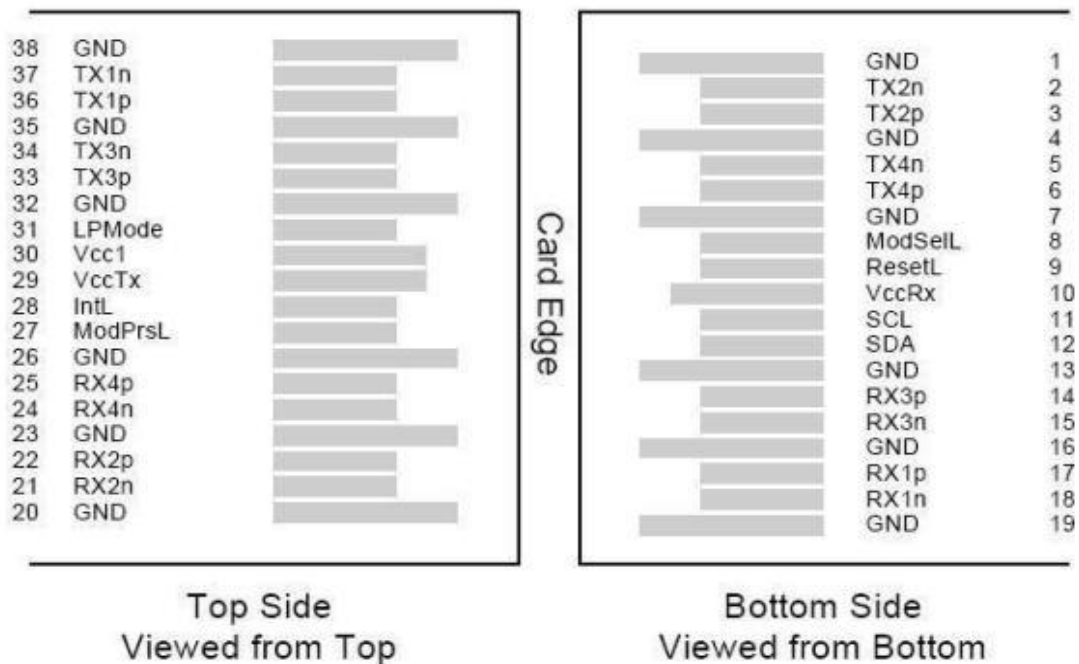


Figure 2: Pin Definitions

PIN	Logic	Symbol	Name/Description
1		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-Inverted Data output
4		GND	Ground
5	CML-I	Tx4n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-Inverted Data output

7		GND	Ground
8	LVTLL-I	ModSelL	Module Select
9	LVTLL-I	ResetL	Module Reset
10		VccRx	+3.3V Power Supply Receiver
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data
13		GND	Ground
14	CML-O	Rx3p	Receiver Non-Inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output
16		GND	Ground
17	CML-O	Rx1p	Receiver Non-Inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output
19		GND	Ground
20		GND	Ground
21	CML-O	Rx2n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-Inverted Data Output
23		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-Inverted Data Output
26		GND	Ground
27	LVTTL-O	Mod PrsL	Module Present
28	LVTTL-O	IntL	Interrupt
29		VccTx	+3.3 V Power Supply transmitter
30		Vcc1	+3.3 V Power Supply
31	LVTTL-I	LPMODE	Low Power Mode
32		GND	Ground
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Output
35		GND	Ground
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Output
38		GND	Ground

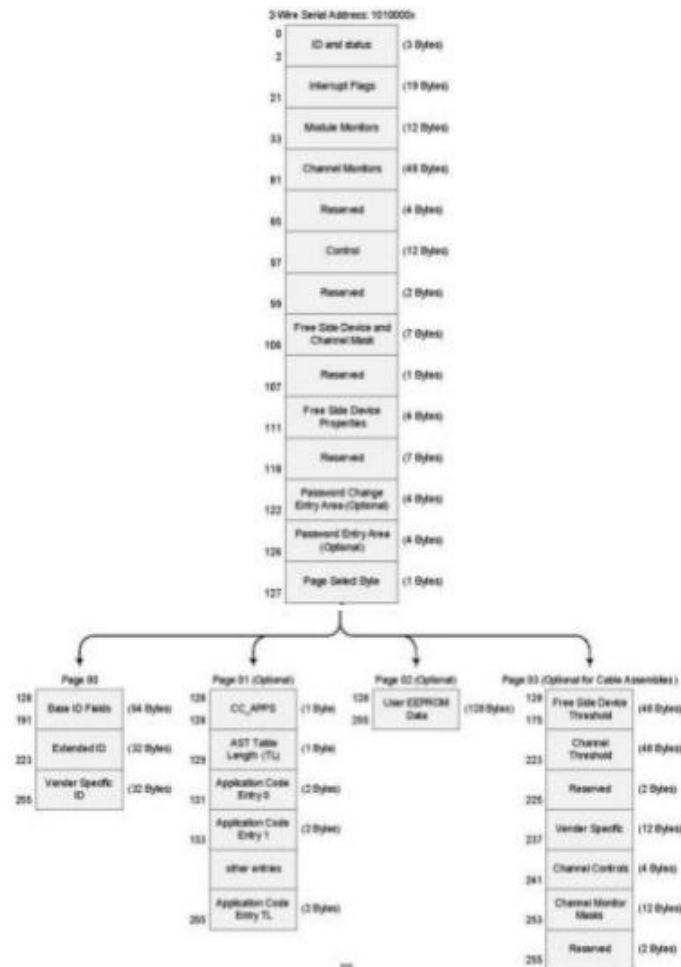
Notes:

- GND is the symbol for signal and supply (power) common for QSFP modules. All are common within the QSFP module and all module voltages are referenced to this potential otherwise noted. Connect these directly to the host board signal common ground plane
- Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP transceiver module in any combination.

## Memory Map

The memory map is structured as a single address and multiple page approaches, according to the SFF-8636 MSA specification as shown in the below. For more detailed description of this memory map or lower pages, please see our Memory Map document with flexible customization settings.

**Table 1. Memory Map (Specific Data Field Descriptions)**



**Table 2 - EEPROM Serial ID Memory Contents (Page00)**

Part Number		EQ210X-LB			
Device 0x Page00					
DATA Address (DEC)	DATA Address (HEX)	Value (HEX)	Name of Field	Description	
128	80	0x11	Identifier	QSFP28	
129	81	0x00	Ext. Identifier		
130	82	0x80	Connector Type	Vendor Specific	
131	83	0x80	Specification Compliance	The Extended Specification Compliance Codes are maintained in the Transceiver Management section of SFF-8024	
132	84	0x00			
133	85	0x00			
134	86	0x00			
135	87	0x41		Intermediate distance (I) Medium (M) Electrical inter-enclosure (EL)	
136	88	0x80		Electrical intra-enclosure	
137	89	0x80		Twin Axial Pair (TW)	
138	8A	0xF5		Fibre Channel Speed	
139	8B	0x05		Encoding	64B/66B
140	8C	0xFF		BR, Nominal	25.5GBs
141	8D	0x00	Rate Select Compliance	Unspecified	
142	8E	0x00	Length (SMF)	Unspecified	
143	8F	0x00	Length (OM3 50um)	Unspecified	
144	90	0x00	Length (OM2 50um)	Unspecified	
145	91	0x00	Length (OM1 62.5um)	Unspecified	
146	92	0x00	Cable Assembly Length (Copper or active cable)	Unspecified	
147	93	0x80	Device Technology	Transmitter technology	

148	94	0x31	Vendor Name	
149	95	0x30		
150	96	0x47		
151	97	0x74		
152	98	0x65		
153	99	0x6B		
154	9A	0x20		
155	9B	0x20		
156	9C	0x20		
157	9D	0x20		
158	9E	0x20		
159	9F	0x20		
160	A0	0x20		
161	A1	0x20		
162	A2	0x20		
163	A3	0x20		
164	A4	0x00	Extended Module code Values	Unspecified
165	A5	0x00	Vendor OUI	Unspecified
166	A6	0x00		
167	A7	0x00		
168	A8	0x43	Vendor PN	etu***
169	A9	0x41		
170	AA	0x42		
171	AB	0x2D		
172	AC	0x5A		
173	AD	0x51		
174	AE	0x50		
175	AF	0x2D		
176	B0	0x4C		
177	B1	0x42		
178	B2	0x30		
179	B3	0x20		
180	B4	0x20		

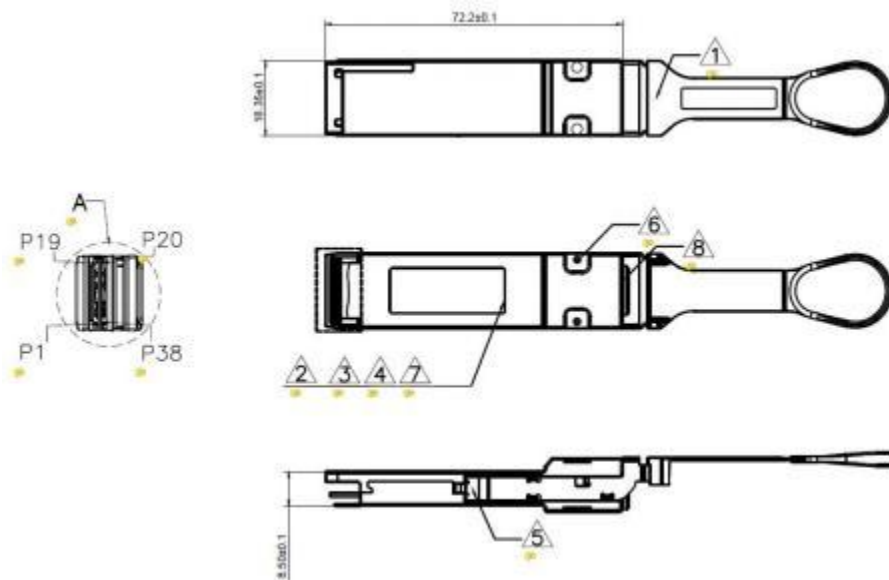
181	B5	0x20		
182	B6	0x20		
183	B7	0x20		
184	B8	0x30	Vendor Rev	01
185	B9	0x31		
186	BA	0x00	Wavelength or	
187	BB	0x00	Copper cable	
			Attenuation	
188	BC	0x00	Wavelength	Unspecified
189	BD	0x00	tolerance or Copper Cable Attenuation	
190	BE	0x55	Max case Temp.	85°C
191	BF	0x00	CC_BASE	
192	C0	0x0B	Link codes	100GBASE-CR4
193	C1	0x00	Options	Unspecified
194	C2	0x00		
195	C3	0x00		
196	C4	0x53		
197	C5	0x31	Vendor SN	S1808010001
198	C6	0x38		
199	C7	0x30		
200	C8	0x38		
201	C9	0x30		
202	CA	0x31		
203	CB	0x30		
204	CC	0x30		
205	CD	0x30		
206	CE	0x31		
207	CF	0x20		
208	D0	0x20		
209	D1	0x20		
210	D2	0x20		
211	D3	0x20		
212	D4	0x31		



213	D5	0x38	Date Code	180801
214	D6	0x30		
215	D7	0x38		
216	D8	0x30		
217	D9	0x31		
218	DA	0x20		
219	DB	0x20		
220	DC	0x00	Diagnostic Monitoring Type	Unsupported
221	DD	0x00	Enhanced Options	Unspecified
222	DE	0x00	BR, nominal	Unspecified
223	DF	0x00	CC_EXT	
224	E0		Vendor Specific	Unspecified
225	E1			
226	E2			
227	E3			
228	E4			
229	E5			
230	E6			
231	E7			
232	E8			
233	E9			
234	EA			
235	EB			
236	EC			
237	ED			
238	EE			
239	EF			
240	F0			
241	F1			
242	F2			
243	F3			
244	F4			
245	F5			

246	F6	
247	F7	
248	F8	
249	F9	
250	FA	
251	FB	
252	FC	
253	FD	
254	FE	
255	FF	

## Mechanical Specifications



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