Rev	Date	Modified by	Description
A0	2023		

Product Specifications

40G QSFP Electrical Passive Loopback

PN: EQ4X-LB

Features

- Customizable power consumption
- Custom Memory Maps
- Supports 40Gb/s total data rate
- Full SFF-8436 MSA Comp
- Hot-pluggable MSA foot print
- Compliant with SONET, SDH, GBE, FC
- MSA Compliant EEPROM
- Power Consumption Different Option
- Internal Attenuation Different Option

Applications

- QSFP Port/System
- Server blade testing
- ITU-T Recommendation G.957 (STM-1, 4 & 16)
- Ethernet IEEE 802.3 (Gigabit, 10 Gigabit and 40 Gigabit Ethernet)
- SDR, DDR and QDR
- SONET, SDH, GBE, FC Support, Infiniband

Description

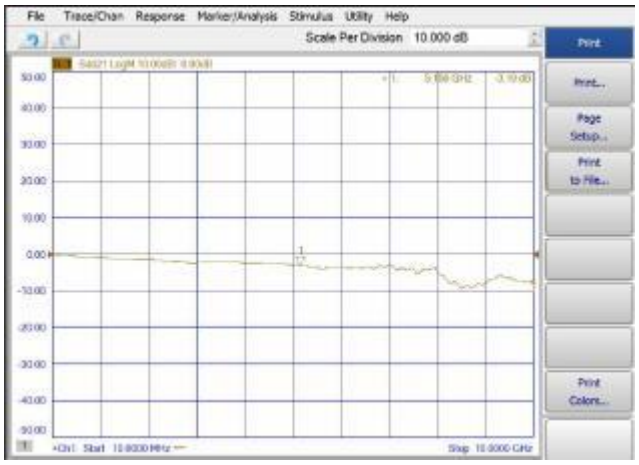
QSFP/QSFP+ Passive Electrical Loopback is used for testing QSFP/QSFP+ transceiver ports in board level test. By substituting for a full-featured QSFP/ QSFP+ transceiver, the electrical loopback provides a cost-effective low loss method for QSFP/QSFP+ port testing.

The loopback module is packaged in a standard MSA housing compatible with all QSFP/QSFP+ 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

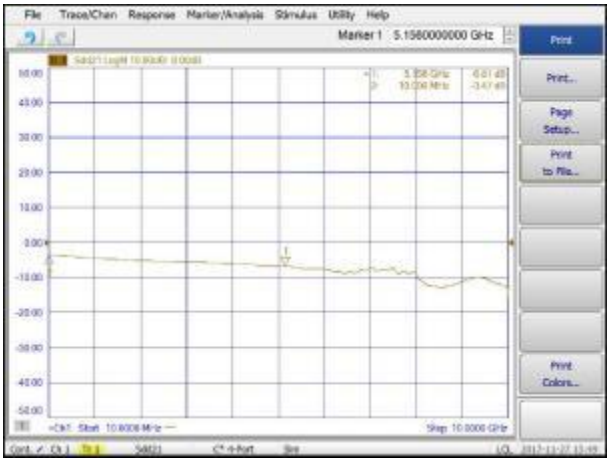
exercise QSFP/QSFP+ ports during R&D validation, production testing, and field testing.

Recommended Operation Condition

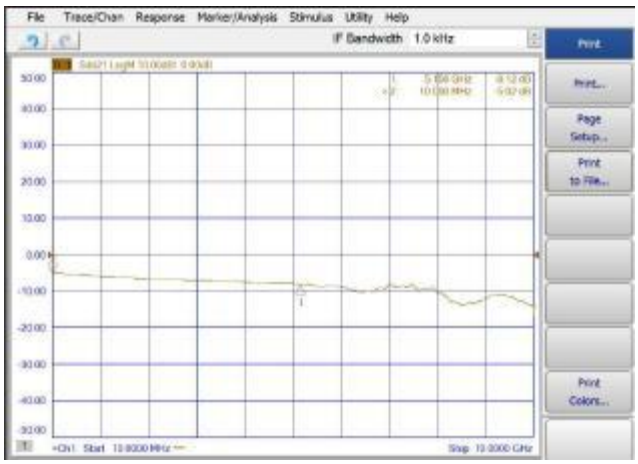
Parameter	Symbol	Notes/Conditions	Min	Type	Max	Units
Operating Temperature	TA		-20		85	°C
+3.3V Supply Voltage	VCC	Main Supply Voltage	3.15	3.3	3.45	V
Data Rate		Guaranteed to work at 10.3125Gbps per lane	0		40	Gbps
Input/ Output Load Resistance	RL		90	100	110	Ω
Durability Cycles				50		Times
Power Level 0		0 V			0	W
Power Level 1		0.3A			1	
Power Level 2		0.45 A			1.5	
Power Level 3		0.6 A			2	



SDD21-0dB (Transmit Insertion Loss)



SDD21-3.5dB (Transmit Insertion Loss)



SDD21-5dB (Transmit Insertion Loss)

Host board Connector Pinout

Figure 1: MSA compliant Connector

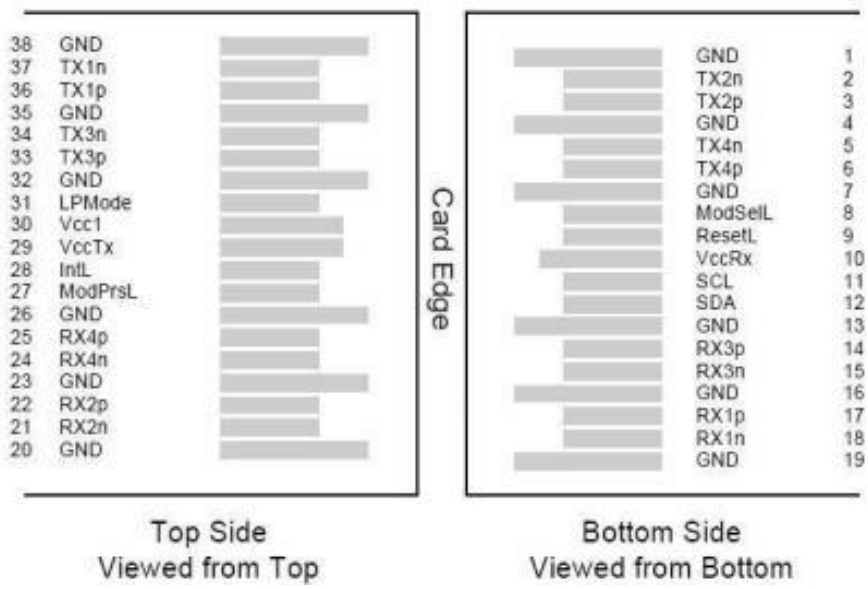


Figure 2: Pin Definitions

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	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock
12	LVCMOS-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	ModPrsL	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

Memory Map

The memory map is structured as a single address and multiple page approaches, according to the QSFP+ SFF-8436 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)

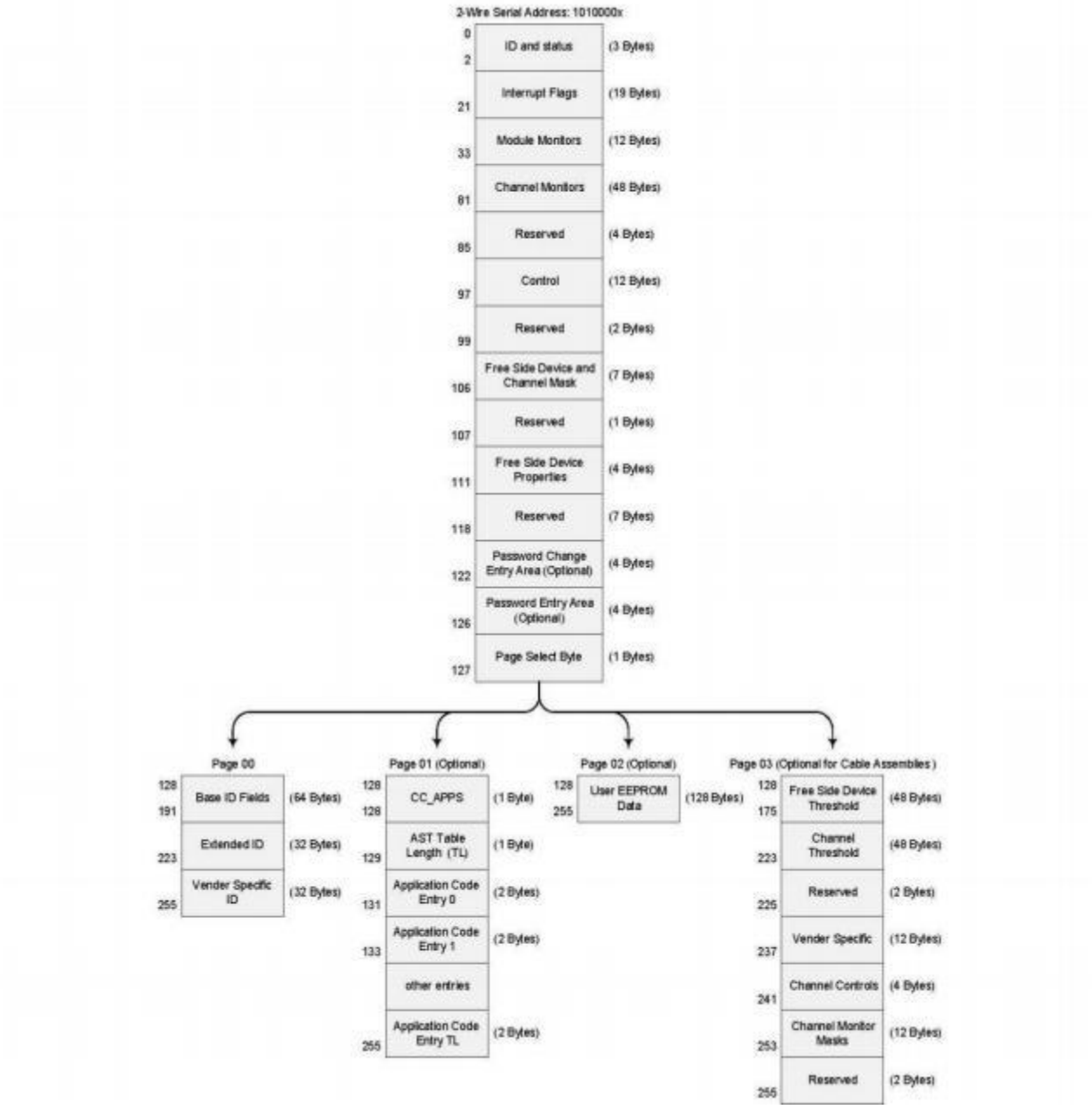


Table 2 - EEPROM Serial ID Memory Contents (Page00)

Part Number		EQ4X-LB		
Device 0xPage00				
DATA Address (DEC)	DATA Address (HEX)	Value (HEX)	Name of Field	Description
128	80	0x0D	Identifier	QSFP+
129	81	0x00	Ext. Identifier	
130	82	0x80	Connector Type	Vendor Specific
131	83	0x08	Specification Compliance	40GBASE-CR4
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	0x67	BR, Nominal	10.3GBs
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	etu
149	95	0x30		
150	96	0x47		
151	97	0x74		

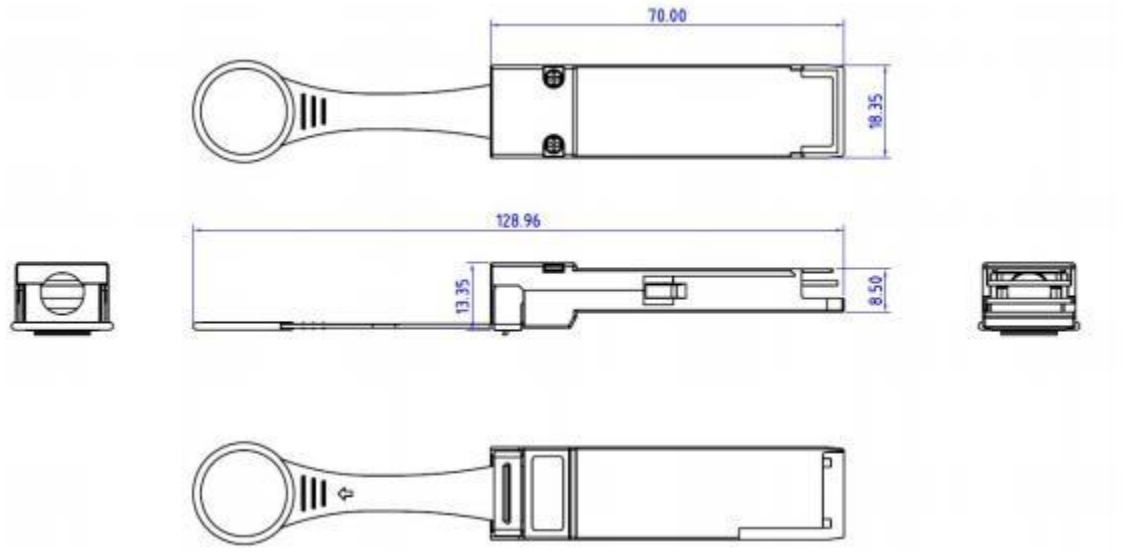
152	98	0x65		
153	99	0x6B		
154	9A	0x20		
155	9B	0x20		
156	9C	0x20		
157	9D	0x20		
158	9E	0x20		
159	9F	0x20		
160	A0	0x20		
161	A1	0x20		
162	A2	0x20		
163	A3	0x20		
164	A4	0x00	Extended Module code Values	Unspecified
165	A5	0x00	Vendor OUI	Unspecified
166	A6	0x00		
167	A7	0x00		
168	A8	0x43	Vendor PN	etu ***
169	A9	0x41		
170	AA	0x42		
171	AB	0x2D		
172	AC	0x51		
173	AD	0x53		
174	AE	0x46		
175	AF	0x50		
176	B0	0x2D		
177	B1	0x4C		
178	B2	0x42		
179	B3	0x30		
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 Copper cable Attenuation	
187	BB	0x00		
188	BC	0x00	Wavelength tolerance	Unspecified
189	BD	0x00		
190	BE	0x55	Max case Temp.	85℃
191	BF	0x00	CC_BASE	
192	C0	0x00	Options	
193	C1	0x00		
194	C2	0x00		
195	C3	0x00		
196	C4	0x53	Vendor SN	S1808010001
197	C5	0x31		
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		
214	D6	0x30		

215	D7	0x38	Date Code	180801
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	Reserved	
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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