

100G QSFP 高速光模块在交换机上无法完整显示诊断信息故障分析

案例内容

现有一块 100G QSFP 高速光模块，在实机使用时，交换机显示的诊断信息如下图所示：

```
<HUAWEI> dis int tran ver
100GE1/0/1 transceiver information:
-----
Common information:
Transceiver Type           :100GBASE_LR4_Lite
Connector Type             :LC
Wavelength (nm)           :1310
Transfer Distance (m)      :2000(9um/125um SMF)
Digital Diagnostic Monitoring
Vendor Name                 :
Vendor Part Number         :
Ordering Name              :
-----
Manufacture information:
Manu. Serial Number        :
Manufacturing Date         :2022-4-29
Vendor Name                 :
-----
Alarm information:
LOS Alarm
Non-Huawei-Ethernet-Switch-Certified Transceiver
-----
Diagnostic information:
Temperature (Celsius)      :0.00
Voltage (V)                :0.00
Bias Current (mA)          :73.50|0.00 (Lane0|Lane1)
                           :0.00|0.00 (Lane2|Lane3)
Bias High Threshold (mA)   :130.99
Bias Low Threshold (mA)    :1.00
Current RX Power (dBm)     :-40.00|-40.00(Lane0|Lane1)
                           :-40.00|-40.00(Lane2|Lane3)
Default RX Power High Threshold (dBm) :7.00
Default RX Power Low Threshold (dBm)  :-9.90
Current TX Power (dBm)     :2.45|-40.00 (Lane0|Lane1)
                           :-40.00|-40.00(Lane2|Lane3)
Default TX Power High Threshold (dBm) :7.00
Default TX Power Low Threshold (dBm)  :-5.90
-----
```

上图可见，该模块为一块 100G 2 公里的高速光模块，在交换机控制台中，该模块的温度及电压均显示为 0。交换机无法读取到光模块的正确诊断信息。这会给查找故障的运维人员带来困扰。

处理过程

在 QSFP+/QSFP28 等高速型号中，内部存储设备更加复杂，但保留了通用逻辑：一个区域有通用信息，一个区域有制造商信息，一个区域有 DDM 值。如下图所示：



北京溢德通达科技有限公司

Beijing Bui-Net Systems.

地址：北京市海淀区上地信息路甲 28 号科实大厦 C 座 12A-3 室

From	To	Content	Nb. of bytes	Type
2-Wire Serial Address 1010000x				
Lower Page 00h				
0	2	ID and Status	3	Read-Only
3	21	Interrupt Flags (Clear on read)	19	Read-Only
22	33	Free Side Device Monitors	12	Read-Only
34	81	Channel Monitors	48	Read-Only
82	85	Reserved	4	Read-Only
86	99	Control	14	Read/Write
100	106	Free Side Interrupt Masks	7	Read/Write
107	110	Free Side Device Properties	4	Read-Only
111	112	Assigned to PCI Express	2	Read/Write
113	116	Free Side Device Properties	4	Read-Only
117	118	Reserved	2	Read/Write
119	122	Optional Password Change	4	Write-Only
123	126	Optional Password Entry	4	Write-Only
127	127	Page Select Byte	1	Read/Write
Upper Page 00h				
128	128	Identifier	1	Read-Only
129	191	Base ID Fields	63	Read-Only
192	223	Extended ID	32	Read-Only
224	255	Vendor Specific ID	32	Read-Only
Page 01h (Optional)				
128	255	Reserved (previously for SFF-8079 support)	128	Read-Only
Page 02h (Optional)				
128	255	User EEPROM Data	128	Read/Write
Page 03h (Optional)				
128	175	Free Side Device Thresholds	48	Read-Only
176	223	Channel Thresholds	48	Read-Only
224	229	Tx EQ, Rx Output and TC Support	6	Read-Only
230	241	Channel Controls	12	Read/Write
242	251	Channel Monitor Masks	10	Read/Write
252	255	Reserved	4	Read/Write
Pages 04h-1Fh (Optional)				
128	255	Vendor Specific	128	Read/Write
Pages 20h-21h (Optional)				
128	255	PAM-4 and WDM Features	128	Read/Write
Pages 22h-7Fh (Optional)				
128	255	Reserved	128	Read/Write
Pages 80h-FFh (Optional)				
128	255	Vendor Specific	128	Read/Write

模块厂家的编写模块内部固定固件时，套用主芯片厂家的常规编码方式来固定和读取诊断信息。但某些方案的光模块并不适用该方式，需要一码一方案。

经过我司工程师查找资料，在重新编译光模块内部固件后，在华为和 H3C 交换机上均可正常显示电压和电流诊断信息。其结果如下图所示：

华为交换机显示的诊断信息：



北京溢德通达科技有限公司

Beijing Bui-Net Systems.

地址：北京市海淀区上地信息路甲 28 号科实大厦 C 座 12A-3 室

Diagnostic information:

Temperature (Celsius)	:35.14
voltage (V)	:3.24
Bias Current (mA)	:82.50 0.00 (Lane0 Lane1)
	0.00 0.00 (Lane2 Lane3)
Bias High Threshold (mA)	:130.99
Bias Low Threshold (mA)	:1.00
Current RX Power (dBm)	:2.38 -40.00 (Lane0 Lane1)
	-40.00 -40.00(Lane2 Lane3)
Default RX Power High Threshold (dBm)	:7.00
Default RX Power Low Threshold (dBm)	:-9.90
Current TX Power (dBm)	:2.54 -40.00 (Lane0 Lane1)
	-40.00 -40.00(Lane2 Lane3)
Default TX Power High Threshold (dBm)	:7.00
Default TX Power Low Threshold (dBm)	:-5.90

H3C 交换机显示的诊断信息:

Current diagnostic parameters:

[module]	Temp.(jāC)	Voltage(V)			
38	38	3.28			
[channel]	Bias(mA)	RX power(dBm)	TX power(dBm)		
1	73.50	-36.96	2.46		
2	0.00	-40.00	-40.00		
3	0.00	-40.00	-40.00		
4	0.00	-40.00	-40.00		
Alarm thresholds:					
	Temp.(jāC)	Voltage(V)	Bias(mA)	RX power(dBm)	TX power(dBm)
High	80	3.63	130.99	7.00	7.00
Low	-10	2.97	1.00	-9.90	-5.90

结论与总结

光模块的固件信息及其复杂，其通用方案并不具有完全通用性，需要一案一固件。关于固件编写的详细内容，可参照 [SFP/SFP+/SFP28/QSFP+/QSFP28 光模块固件升级通用指导文件](#)。

如有任何问题，可随时联系 BRO-WAY。

文档编号：BD-2023-05