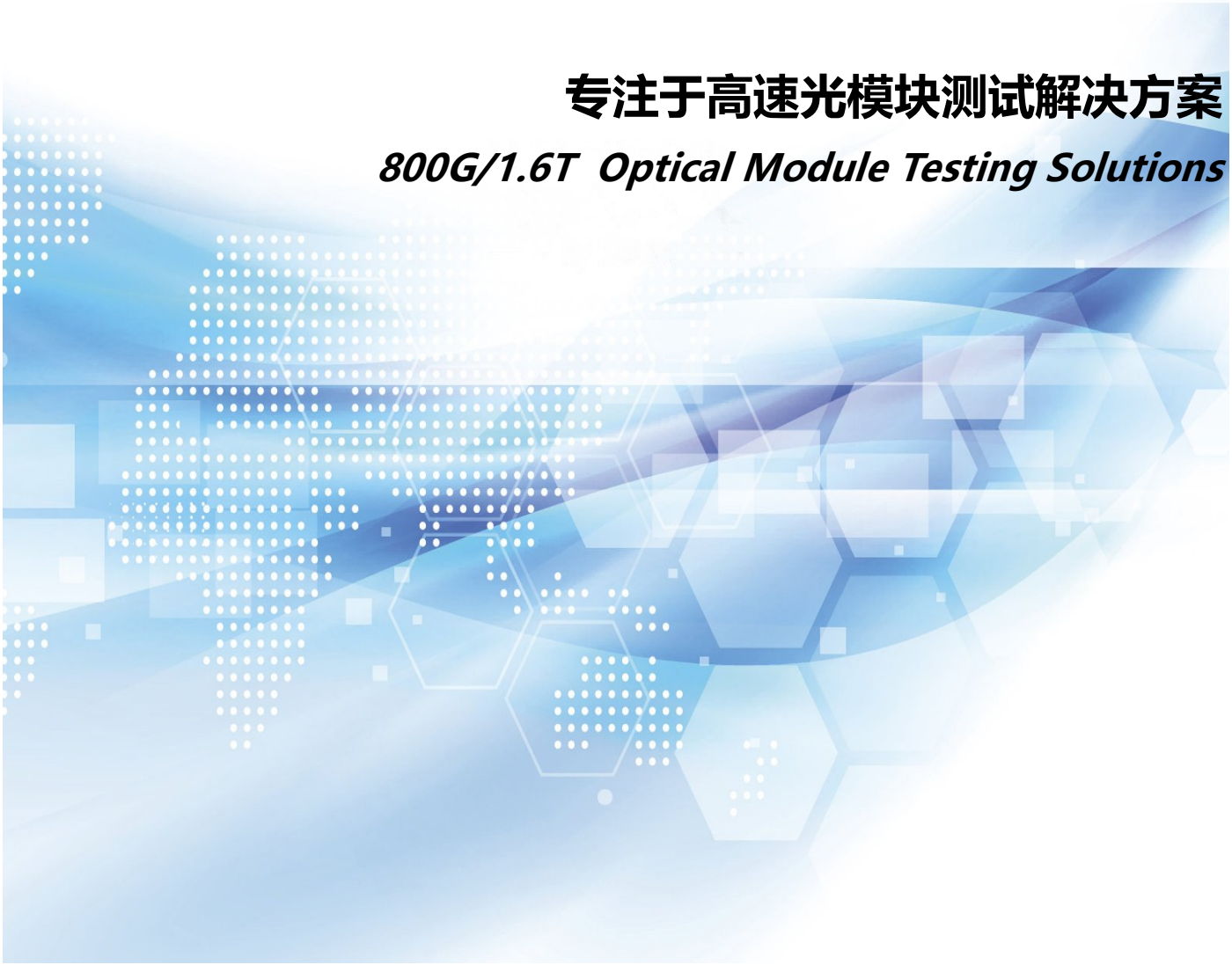
杭州铎联测控技术有限公司

Hangzhou DooLink Technology Co., Ltd

# 专注于高速光模块测试解决方案

## 800G/1.6T Optical Module Testing Solutions

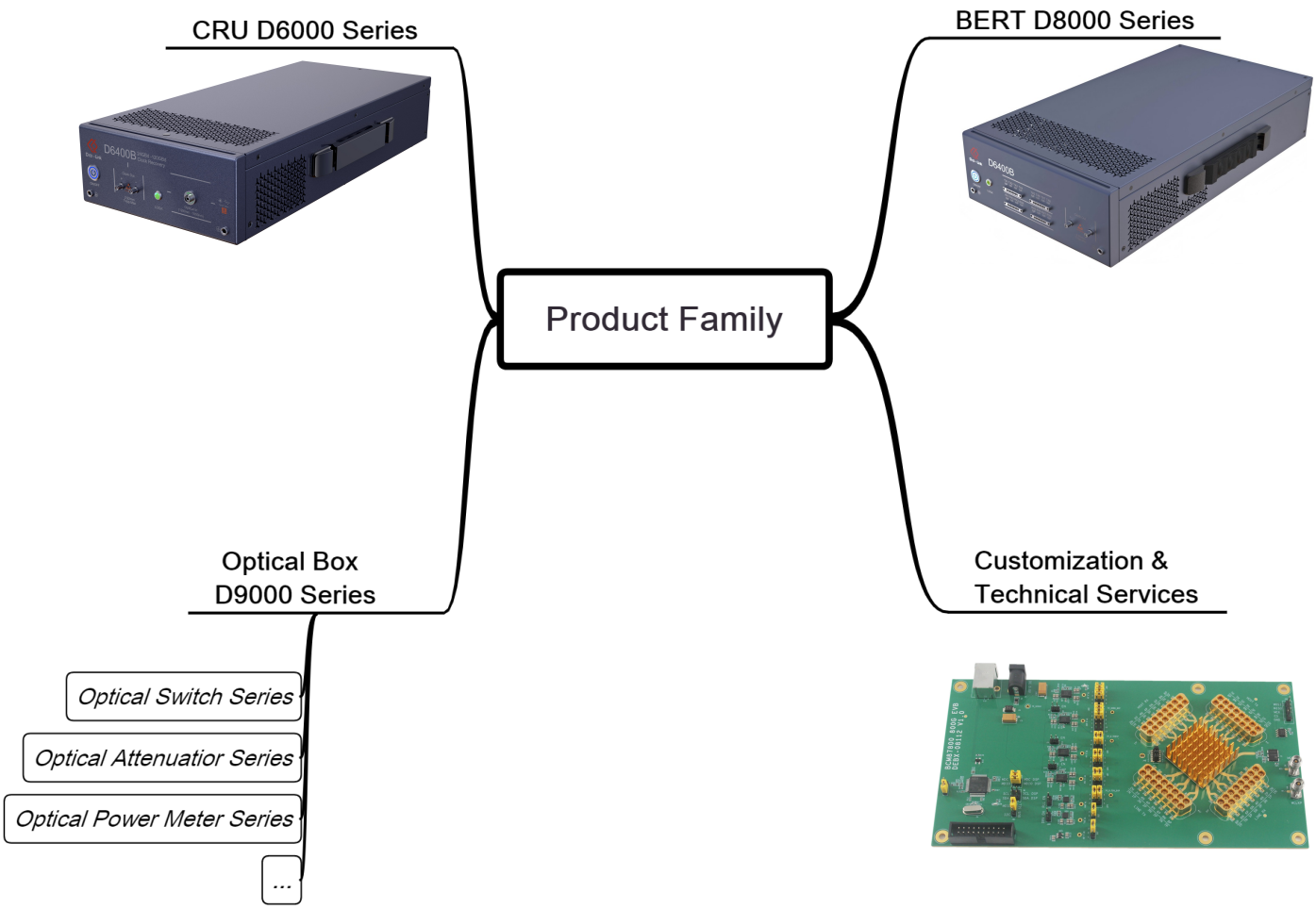


Connectivity & Testing Solutions

**杭州铎联测控技术有限公司**成立于 2023 年，是铎铎科技旗下专注于开发高速光通信测试测量仪器设备的公司，致力于提供行业领先的高速测试解决方案。

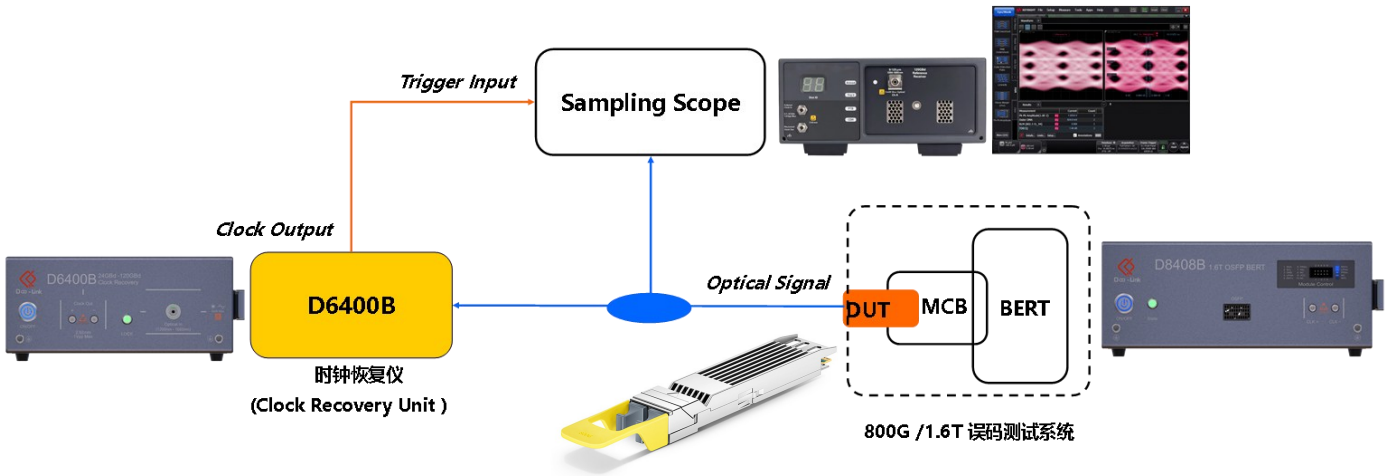
铎联测控基于高速光电的测试应用和深厚的行业经验，开发了高速光电测试设备，包括高达单通道 200Gbps 的高速误码仪、时钟恢复仪等，满足日益增长的高速信号完整性测试需求。

Hangzhou DooLink Technology Co., Ltd., established in 2023 , is a subsidiary of Doo-doo Technology focused on developing high-speed optical communication testing and measurement instrumentation. The company is focus on to providing industry-leading high-speed testing solutions.  Leveraging expertise in high-speed photoelectric testing applications and extensive industry experience, DooLink has developed high-speed pho-toelectric test equipment, including up to 200 Gbps/ lane BERT and Clock Recovery Units , addressing the growing demands for high-speed signal integrity testing.



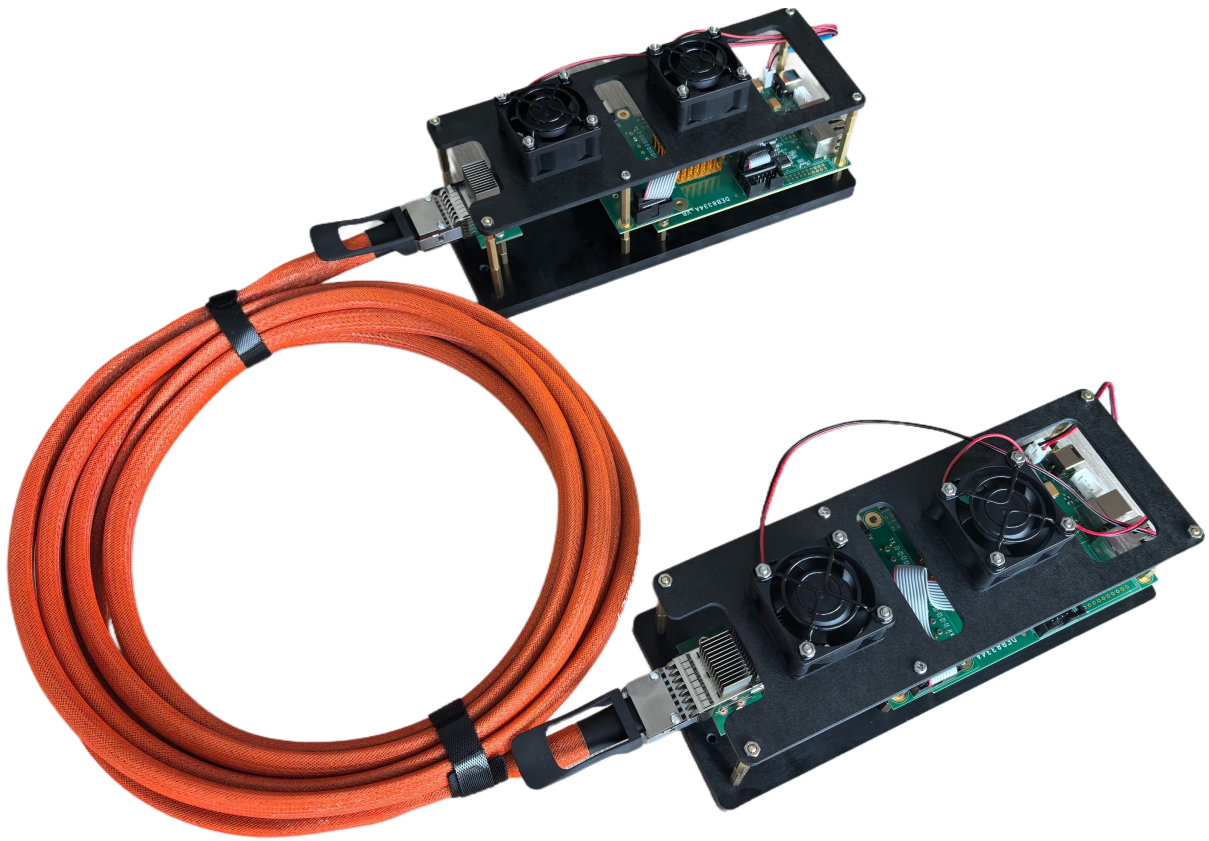
*铎联测控提供* ***1.6T*** *光电芯片和模块完整测试方案：* ***误码测试和眼图测试。***

*Doolink provide a complete test solution for 1.6T optoelectronic chips and Transceivers: Bit-Error Rate (BER) Test and Eye Diagram Test.*




1.6T 光模块测试系统

1.6T Optical Module Testing System



800G/1.6T AEC/DAC 误码测试系统

800G/1.6T  AEC/DAC Cable BER Testing System

# D6400B

## —— 200Gbps/lane 1.6T CDR

### 产品描述

**D6400B** 是台式超高速单光口光信号时钟恢复单元。支持 24~120GBd 速率下的 PAM4 信号时钟提取，应用于 1.6T 、800G 等光模块的时钟提取。产品具备高灵敏度，低固有抖动等特性，拥有出色的测量精度，可从闭合的眼图信号中恢复出干净的时钟信号，用于触发采样示波器进行 106.25GBd（1.6T 光模块）光眼图的指标测量。

D6400B is a benchtop ultra-high-speed clock recovery unit with a single optical input port. It supports PAM4 signal clock recovery over a baud-rate range of 24~120 GBd, and is designed for clock recovery in 1.6T and 800G optical modules. Featuring high sensitivity and low intrinsic jitter, the unit delivers exceptional measurement accuracy, recovering a clean clock from a fully closed eye diagram to trigger a sampling oscilloscope for optical eye diagram parameter measurements at 106.25 GBd (1.6T optical transceiver).




D6400B： 120Gbaud CRU

**D6400B 特点：**

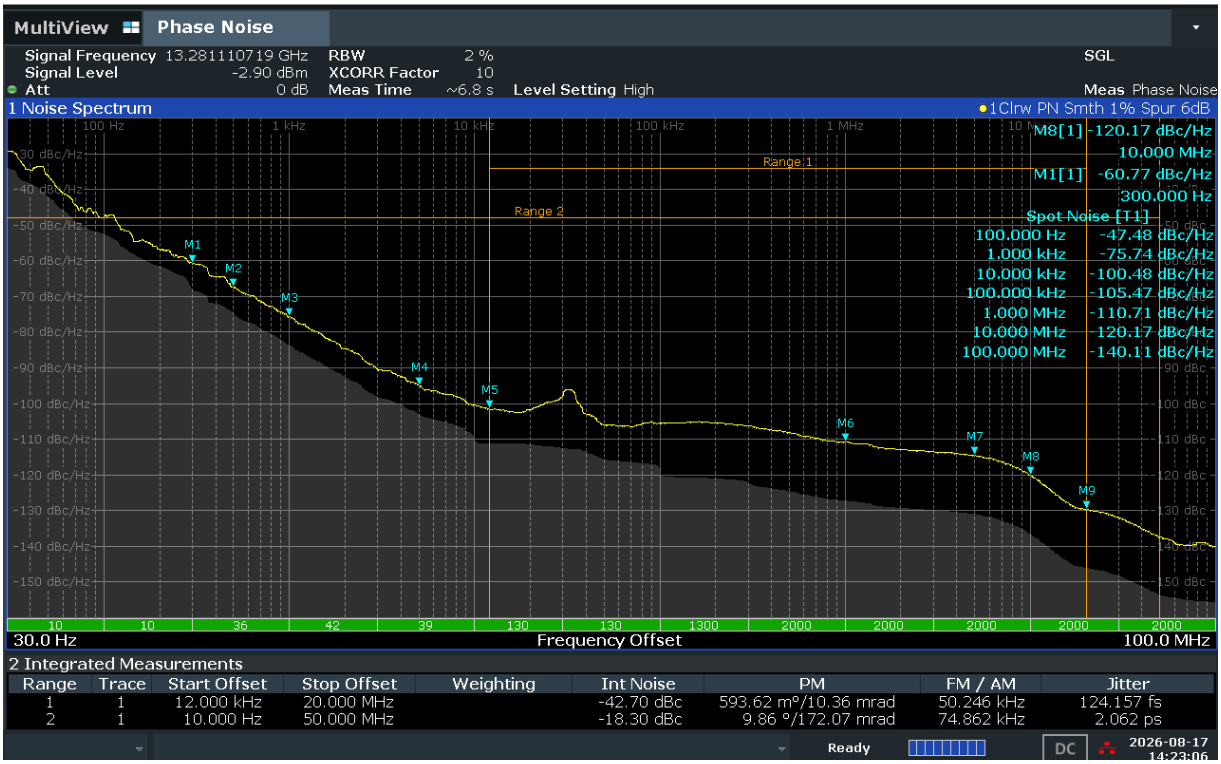
◇ 支持 24~120GBaud 工作速率 PAM4 信号时钟提取。
◇ 锁定速度快、支持全自动和手动锁定模式
◇ 波长范围： 1250~1650 nm。
◇ 分频比： 1/2、1/4、1/8、1/16、1/32。
◇ 时钟 RMS 抖动：<130 fs。
◇ 高灵敏度：<=-8 dBm@106.25 GBd PAM4/1310 nm。
◇ 时钟输出：差分双端口。

**D6400B Features：**

◇ Supports PAM4 signal clock extraction at operating baud rates of 24~120 GBaud.
◇ Fast lock acquisition, supports both fully automatic and manual lock modes.
◇ Wavelength range: 1250~1650 nm.
◇ Clock division ratios: 1/2, 1/4, 1/8, 1/16, 1/32.
◇ Clock RMS jitter: <130 fs.
◇ High sensitivity: ≤ - 8 dBm @ 106.25 GBd PAM4 / 1310 nm.
◇ Differential clock output.

## 参数列表

| **指标名称**Parameter | **指标参数**Specification | **备注**Remarks |
|---|---|---|
| 时钟恢复速率范围 Clock Recovery Rate Range | 24~120 GBd | |
| 支持调制类型 Supported Modulation | PAM4 | |
| 光接口 Optical Connector Type | 9/125 FC/UPC | |
| 波长范围 Input Wavelength Range | 1250 ~ 1650 nm | |
| 最大输入光功率 Max. Input Optical Power | >4.0dBm | |
| 电接口 Clock Output Electrical Interface | 2.92 mm female，50 Ω | |
| 接收机灵敏度 Receiver Sensitivity | <=-8 dBm@106.25 GBd | 1310 nm |
| 时钟输出幅度 Clock Output Amplitude | >=300 mVpp @106.25 GBd | |
| 时钟分频比 Recovered Clock Divider Ratio | 1/2、1/4、1/8、 1/16、1/32 | |
| 时钟输出特征阻抗 Clock Output Impedance | 50 Ω | |
| 环路滤波器带宽 Loop Filter Bandwidth | 4 MHz (typical) | |
| RMS 抖动 Recovered Clock Random Jitter | <130fs | |




Phase RMS Jitter：〈130fs@13.281GHz,12K~20MHz



Clock Eye: 150fs@13.281GHz

# D8408 Series

## ——8x224Gbps 1.6T BERT

### 产品描述

D8408 是应用于 400G~1.6T 高速串行信号误码测试的高性能比特误码分析仪(BERT)，可用 于物理层表征和一致性测试。凭借对 4 电平脉冲幅度调制(PAM4)支持，以及高达 113Gbaud 的符号率，覆盖了 400G/800G/1.6T。

The D8400 series is a high-performance Bit Error Rate Tester (BERT) designed for bit-error testing of high-speed serial signals at data rates from 400G to 1.6T. It is well suited for physical layer characterization and conformance testing. With support for 4-level Pulse Amplitude Modulation (PAM4) and symbol rates up to 113 GBaud, the D8400 covers 400G, 800G, and 1.6T applications.




D8408A： 8*224G 1.6T BERT (电口)




D8408B： OSFP224 1.6T BERT (光口)

## 产品特点及优势:

◇ 支持速率 26.125GBd/53.125GBd/90GBd/106.25GBd/113GBd PAM4 信号调制。

◇ 8 路最高 226Gbps、快速上升沿、低固有抖动;

◇ 支持硬件 PCS 层 FEC 编解码/FEC 纠错测试与分析;

◇ 支持 4 阶~13 阶，发射端的去加重调制;

◇ 触发信号支持分频时钟输出(2 分频 ~ 32 分频);

◇ 支持码型：PRBS7/9/11/13/15/16/23/31/49/58； PRBS7~31Q、SSPRQ、方波、LIN、用户自定义码型;

## D8408 Features :

◇ Rate range support 26.125GBd/53.125GBd/90GBd/106.25GBd/113GBd PAM4.

◇ 8 channels supporting up to 226 Gbps each, low intrinsic jitter.

◇ Support for hardware PCS layer FEC encoding/decoding and FEC testing and analysis.

◇ Support for 4 ~ 13-tap de-emphasis

◇ Support Trigger Clock (1/2~1/32).

◇ Supported patterns: PRBS7/9/11/13/15/16/23/31/49/58; PRBS7~31Q, SSPRQ, square wave, LIN, and user-defined.



## 参数列表

| | | |
|---|---|---|
| 码型发生器 | 输出类型 | PAM4 |
| | 终端类型 | 交流耦合，差分 |
| | 测试码型 | PRBS 7/9/10/11/13/15/16/20/31/49/58;<br>PRBS 7Q/9Q/11Q/13Q/15Q/16Q/23Q/31Q; |
| | | SSPRQ,JPO3A/JPO3B>,线形测试码型>,方波> |
| | | 用户自定义码型 |
| | 数据符号速率(GBd) | 26.125GBd\53.125GBd\90GBd\106.25GBd\113GBd |
| | 频率精度(典型值) | ±50 ppm |
| | 最大输出幅度(差分) | 600mVpp (2250mVpp可定制) @ 106Gbd |
| | 上升时间(20%-80%) | <10 ps |
| | 下降时间(20%-80%) | <10 ps |
| | 数据输出RMS抖动 | <300 fs |
| | 连接器 | SMPS 1*8, 50Ω 或者 OSFP224 (可选) |
| 时钟触发输出 | 输出幅度 | >300mVp-p |
| | 输出类型 | 交流耦合，差分 |
| | 分频比 | 2/4/8/16/32 |
| | 连接器 | 1.85 mm female,50 Ω |
| 误码分析 | 输入类型 | 差分PAM4 |
| | 终端类型 | 交流耦合，差分 |
| | 最大接收幅度 | 800mVp-p @106GBD |
| | 接收灵敏度(差分) | 100mVp-p |
| | 测试码型 | PRBS 7/9/10/11/13/15/20/23/31/49/58;<br>PRBS7Q/9Q/11Q/13Q/15Q/16Q>/23Q/31Q/SSPRQ |
| | 数据符号速率(Gbaud) | 26.125GBd/53.125GBd/90GBd/106.25GBd/113GBd |
| | 时钟模式 | 内置时钟恢复 |
| | 同步类型 | 自动同步(电平/相位) |
| | 连接器 | SMPS 1*8, 50Ω 或者 OSFP224 (可选) |
| FEC | FEC类型 | 硬件FEC |
| | 纠前纠后误码测试 | 支持 |
| | FEC余量测试 | 支持 |
| | 符号错误分布测试 | 支持 |

## Specification

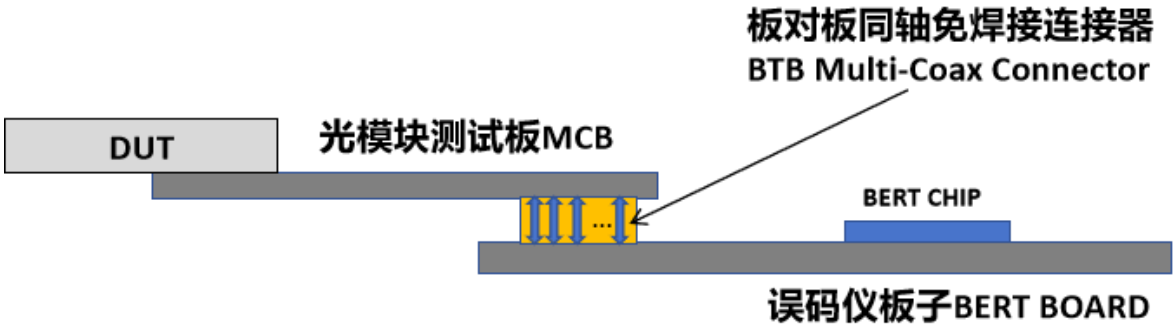
| | | |
|---|---|---|
| Pattern Generator | Data Format | PAM4 |
| | Terminiation | AC-Coupled，Differential |
| | Test Patterns | PRBS 7/9/10/11/13/15/16/20/31/49/58;<br>PRBS 7Q/9Q/11Q/13Q/15Q/16Q/23Q/31Q; |
| | | SSPRQ,JPO3A/JPO3B, Linear test pattern, Square wave |
| | | User defined pattern |
| | Data Rate (GBaud) | 26.125GBd\53.125GBd\90GBd\106.25GBd\113GBd |
| | Frequency Accuracy (Typ.) | ±50 ppm |
| | Max. Output Amplitude (Differential) | 600mVpp (2250mVpp customizable ) @ 106Gbd |
| | Rising/Falling time(20%-80%) | <10 ps |
| | Jitter RMS | <300 fs |
| | Connector | SMPS 1*8, 50Ω or OSFP224 (optional) |
| Sync Clock Output | Amplitude | >300mVp-p |
| | Terminiation | AC-Coupled，Differential |
| | Division Ratio | 2/4/8/16/32 |
| | Connector | 1.85 mm female, 50 Ω |
| Error Detector | Data Format | PAM4 |
| | Terminiation | AC-Coupled，Differential |
| | Max. Input Amplitude (Differential) | 800mVp-p @56GBd |
| | Sensitivity (Differential) | 100mVp-p |
| | Test Patterns | PRBS 7/9/10/11/13/15/16/20/31/49/58;<br>PRBS 7Q/9Q/11Q/13Q/15Q/16Q/23Q/31Q; |
| | Data Rate (Gbaud) | 26.125GBd/53.125GBd/90GBd/106.25GBd/113GBd |
| | Clock Recovery | Build-In |
| | Connector | SMPS 1*8, 50Ω or OSFP224 (optional) |
| FEC | FEC Type | Hardware FEC |
| | Pre-FEC / Post-FEC BER Test | Supported |
| | FEC Margin Test | Supported |
| | Symbol Error Distribution Test | Supported |

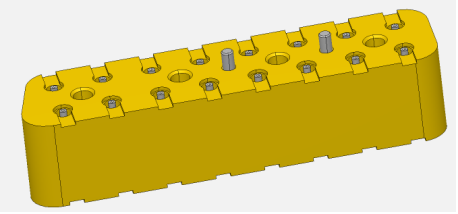
# 高速光模块误码一体集成测试系统

# All-in-One BER Test System for High-Speed Optical Modules

高速光模块误码测试系统集成了 **BERT**, **MCB** 和**电源通讯控制板**，简化 400\800G\1.6T 光模块误码测试系统的搭建。BERT 和 MCB 通过**板对板连接器（专利产品）进行免焊接互连**（方便 MCB 的更换），电源通讯控制板负责给 BERT 板和待测光模块供电，并支持把待测光模块的功耗、寄存器的读写以及误码率上报给上位机。

The high-speed optical module BER test system integrates BERT, MCB and power communication control board, simplifying the construction of 400\800G\1.6T optical module BER test system. BERT board and MCB are solderless connected through board-to-board multi-coax connectors (patented product) (to facilitate MCB replacement). The power communication control board is responsible for power supply to BERT board and the optical module DUT, and reports the DUT power consumption, register read and write, and BER of the optical module to the host computer.

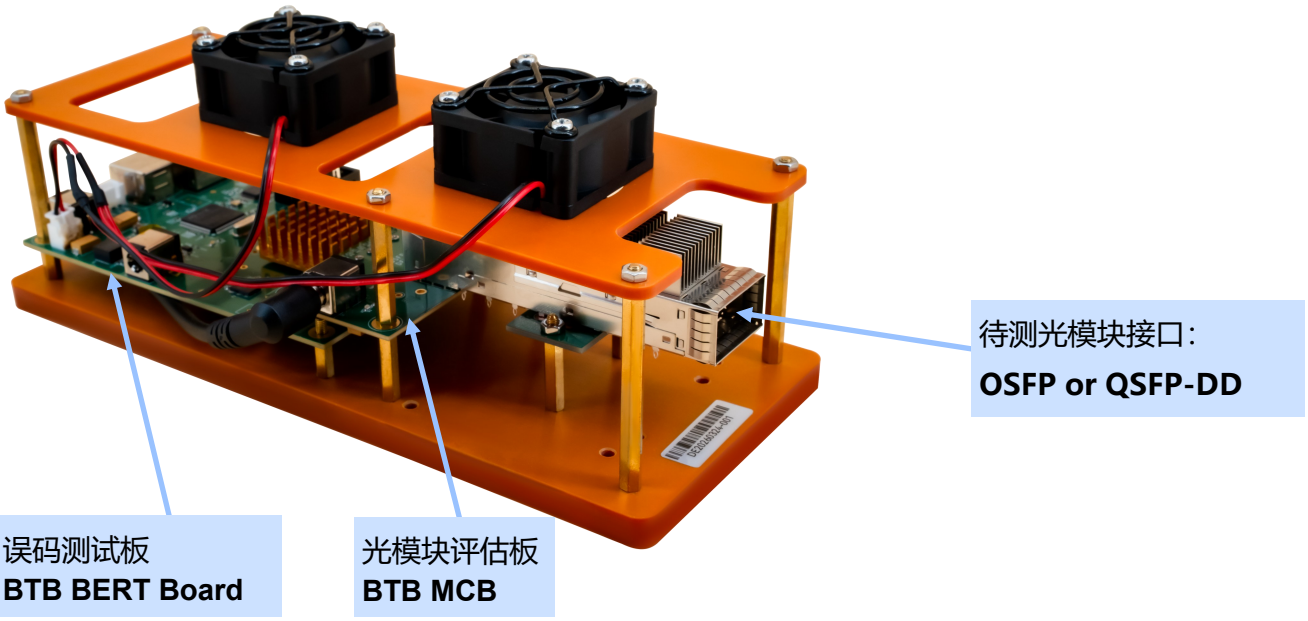


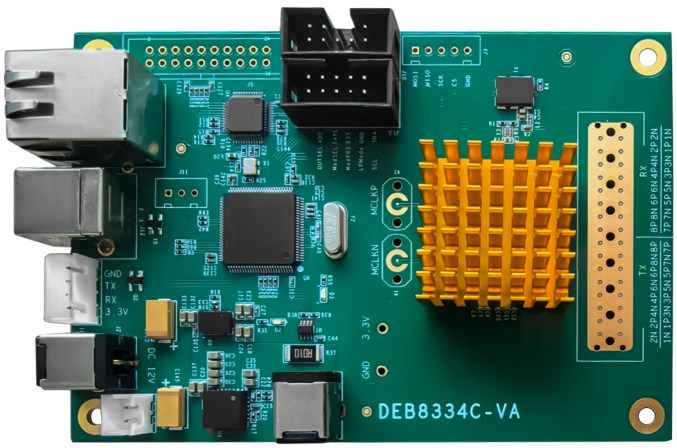



**专利产品 Patented Product: BTB Multi-Coax Connector**

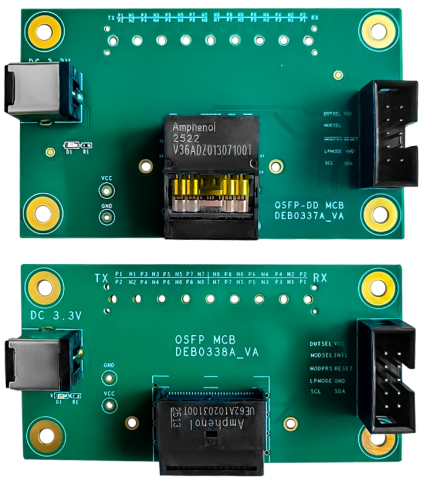
(专利号： ZL 2022 23314755.8)

## All-in-One BERT System for 800G/1.6T Optical Module




BTB BERT Board




BTB MCB

**测试系统特点：**

- ◇ MCB 和 BERT 通过 BTB 连接器免焊连接，省去了常规的线缆连接，降低成本。
- ◇ BTB 连接器免焊接的装配方式，可反复多次使用，方便后续 MCB 更换。
- ◇ MCB 可支持 QSFP-DD、OSFP 等多种接口形态。
- ◇ MCB 板上的光模块插座放置于板边缘，同时兼容后续的 TEC 或者热流仪三温测试方案。

**Test System Features：**

- ◇ The MCB and BERT are connected solderlessly via BTB RF connectors, eliminating the need for cable connections and reducing costs.
- ◇ The BTB connector features a high-frequency, pogo-pin structure that makes MCB replacement convenient.
- ◇ The MCB supports QSFP-DD and OSFP.
- ◇ The optical module socket is placed on the edge of the MCB board and is compatible with TEC fixtures or airflow test solutions.

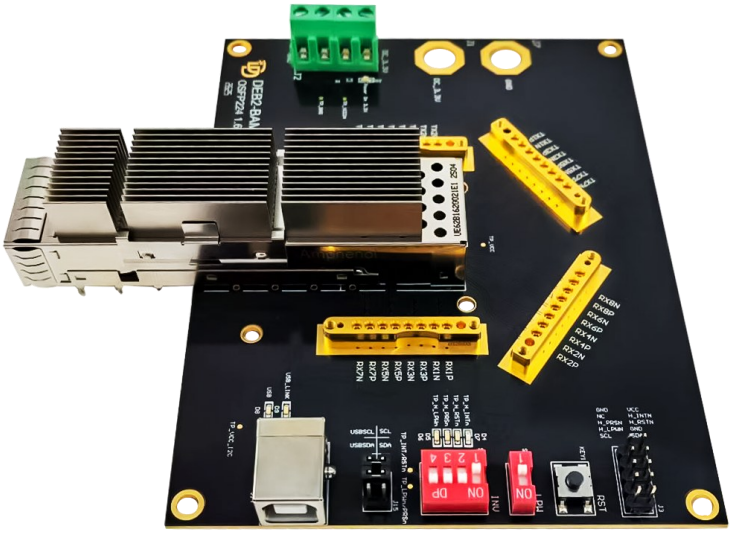
# 光模块测试评估板 DEB 系列

# Module Compliance Board DEB Series

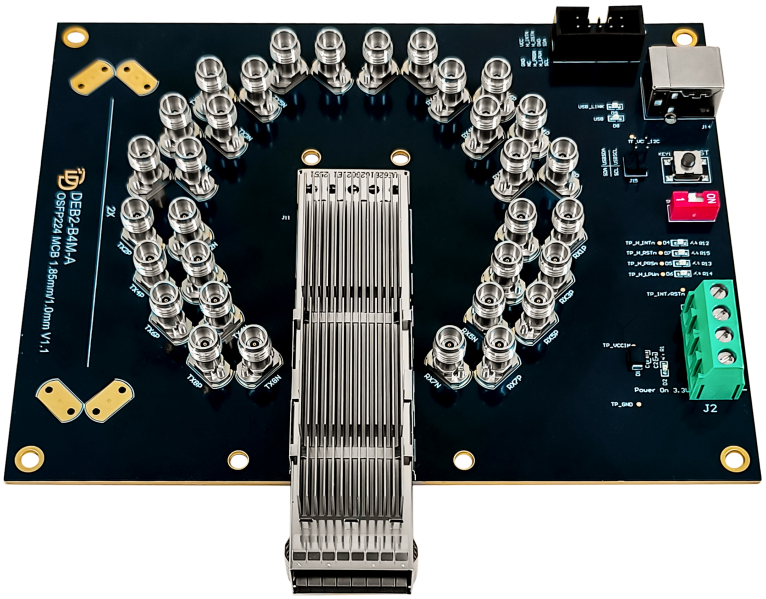
提供 SFP\QSFP\QSFP-DD\OSFP\OSFP-XD\NPO 等光模块评估测试板 MCB 和 HCB，速率支持 10Gbps~ 1.6Tbps 范围，满足常规光模块和交换机等的研发和生产验证测试。

The module compliance board (**MCB**) enables the serial communication between the bit error rate (BER) tester and the optical transceiver. And the host compliance board (**HCB**) enables the testing of system host ports.

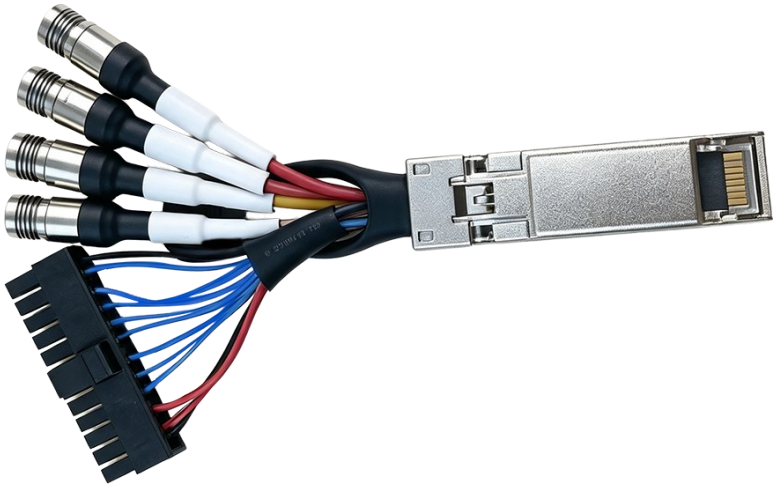
Doolink provides SFP\QSFP\QSFP-DD\OSFP\OSFP-XD and other optical module evaluation test board MCB and HCB, the rate supports 10Gbps~ 1.6Tbps range, to meet the development and production verification test of optical modules and switches.



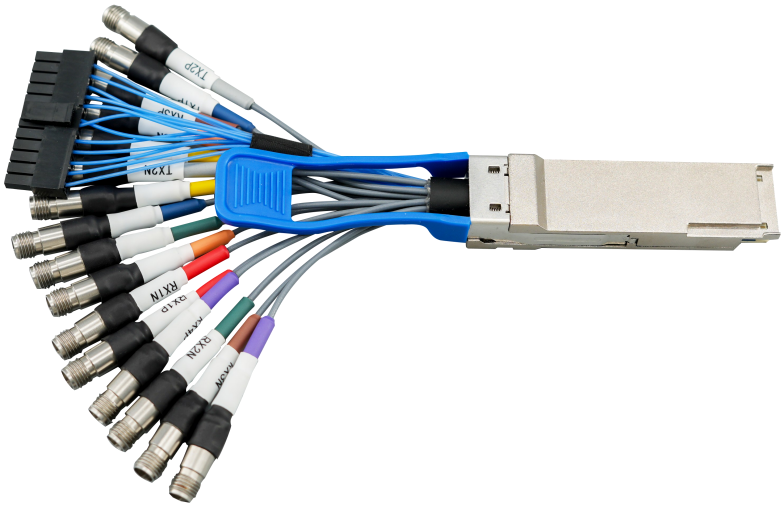
OSFP224 1.6T MCB (1x8 连接器版本)



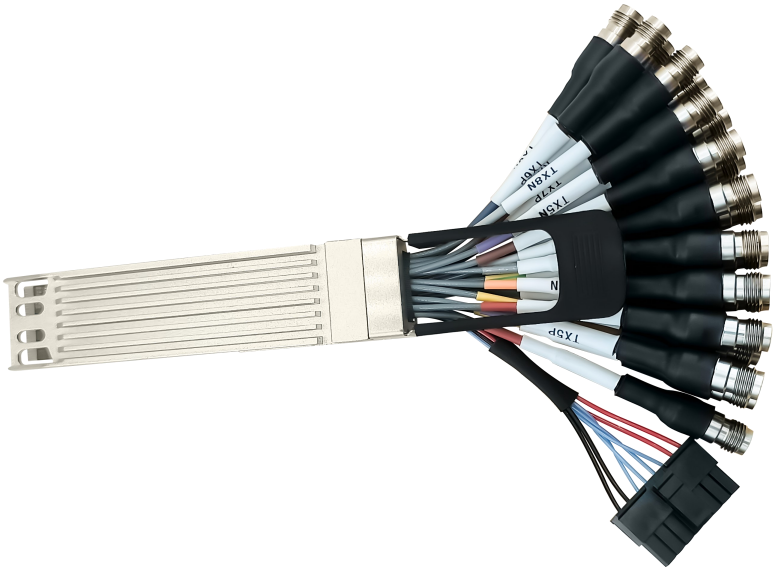
OSFP224 1.6T MCB （1.85mm 连接器版本）



SFP112  HCB (1.85mm 线缆低插损版本)



QSFP28/56/112  HCB (2.92mm/1.85mm 线缆低插损版本)

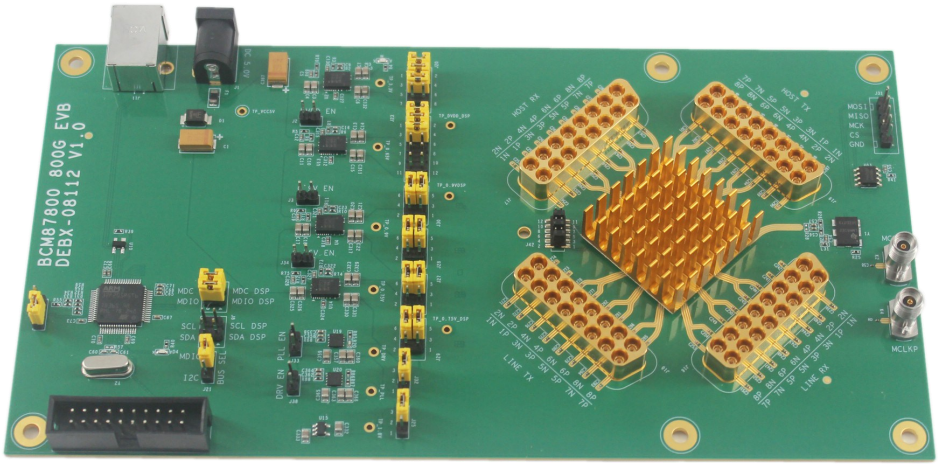


OSFP 800G HCB (1.85mm 线缆低插损版本)

# 技术服务 Technical Service

铎联测试专注于测试仪器与定制高速测试板的研发设计，为客户提供专业的高速测试夹具定制服务。依托三维电磁场仿真与多年高速信号完整性技术积累，我们能够在设计阶段对连接器焊盘、过孔、走线等关键结构进行精确仿真与优化，确保测试夹具在高速率应用下具备优异的电气性能与测试一致性。除成熟的标准产品外，面对差异化的独特应用场景，铎联测试基于丰富的项目经验，可提供从方案评估、仿真设计到样品交付的全流程定制化服务。

Doolink specializes in the R&D and design of test instruments and custom high-speed test boards, providing professional custom high-speed test fixture services. Leveraging 3D electromagnetic field simulation and years of accumulated expertise in high-speed signal integrity, we precisely simulate and optimize critical structures—connector pads, vias, and traces—at the design stage, ensuring excellent electrical performance and test consistency in high-data-rate applications. In addition to our mature standard product portfolio, Doolink, backed by extensive project experience, delivers end-to-end customization—from solution evaluation and simulation-based design to prototype delivery—for differentiated and unique application scenarios.



Doo-Link

# 杭州铎联测控技术有限公司

***High-Speed Connectivity & Testing Solutions***



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