

Browave Corporation

Investors Conference Call 2025

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Date: Mar 18th, 2025

BROWAVE CORPORATION

Disclaimer



The information disclosed herein includes market forecasts and the company's future strategic direction. However, this information is still subject to uncertainties and unknown risks associated with various influencing factors, and actual results may differ significantly. The company has no obligation to publicly update or revise the content.

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Outline



- Sales Revenue Results in 2024
- Market Overview – Fiber-Optic Communication
- Market Scale Projection – AI & Data Centers
- Optical Transceivers Market Trends
- CPO Potentials – Future Applications in AI & Data Centers
- CPO Market Scale Projection
- Browave's CPO Technologies Highlights
- Browave's Strategic portfolio in CPO/Transceivers
- Browave's Product Development Focus
- Summary

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Sales Revenue Results in 2024



In millions of New Taiwan Dollar

	CY2024
Revenue	1,941
Gross Profit	279
Gross Profit (%)	14.4%
Operating Income	(5)
Operating Income (%)	-0.3%
Income before Income Tax	489
Net Income	463
EPS (Unit: dollar)	5.75

2024 Market Dynamics

(1). AI/Data Centers:

Optical Fiber Harness's strong growth lied in the FR and DR transceiver for 800G/AI servers. While in Jumper/Cable sector, both platforms of single-mode fiber (SMF) & multimode fiber(MMF) have long been the focused business development. However, the changes of end-user's architecture application in AI servers/switches led to a delay of transition from copper to optical fiber, which flattened the demand this year.

(2). Telecom:

The rollout of U.S. BEAD Act and the end-customer's destocking both did not meet industry's expectations, plus next-gen WDM products for CATV were with flat demand.

While in PON/FTTH market, the BRANCH category grew differently in high/low channel count products, and the divergence in telecom carriers' deployments plan made the overall demand mixed and flat in this sector.

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Revenue Results – by Product Group & Territory



Revenue Proportion by Product Group	
WDM	**29%**
Branch	**30%**
OIN	**36%**
AMP	**5%**

Revenue by Geography	
Americas	**40%**
Europe	**12%**
Asia	**48%**

By Product Category

WDM	AI/Data Centers: Fiber Harness based devices for FR type transceivers
	CATV fiber broadband: passive optical devices and modules.
Branch	Advanced PON/FTTH splitters in both high/low channel, 1x64ch and 1x8ch.
	AI/Data Centers: Fiber Harness based devices for DR type transceivers
OIN	AI/Data Centers' jumpers/cables applied to 800G/1.6T servers
AMP	Telecom market's optical device is the focus.

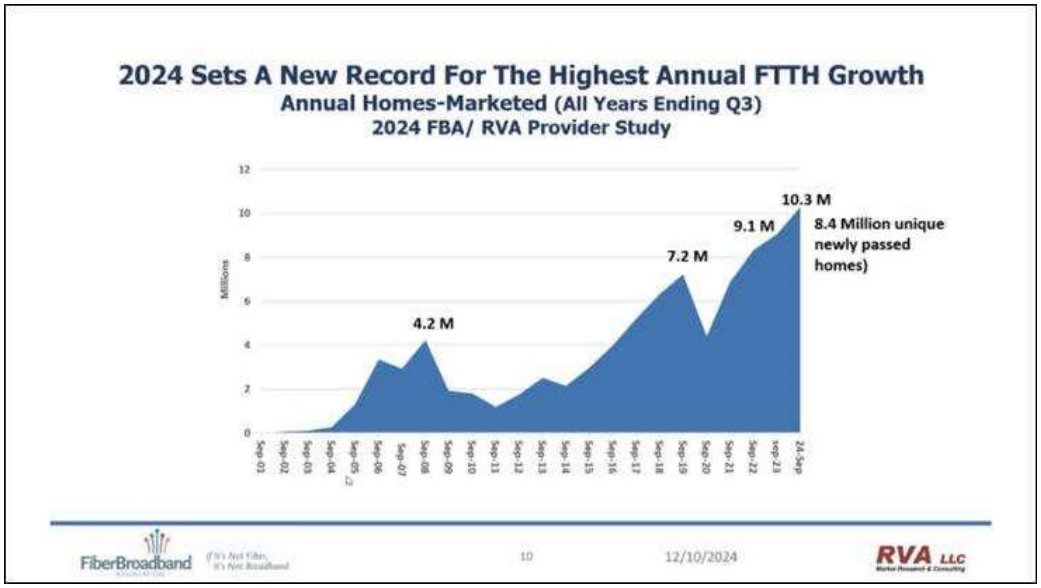
By Geography

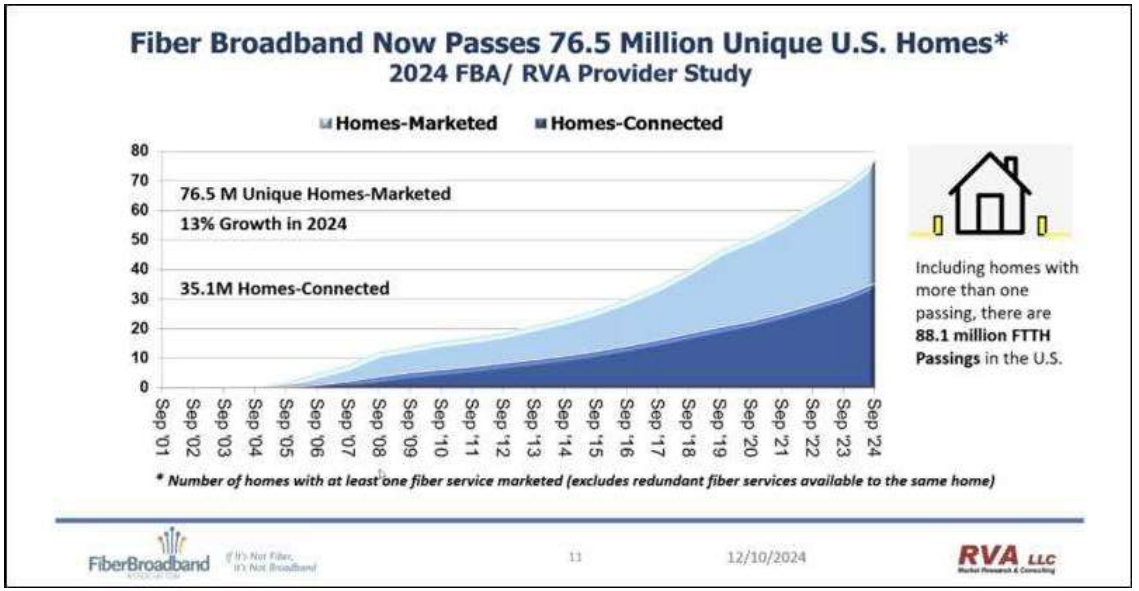
The Americas & Asia account for the vast majority in revenue.

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Market Overview
Fiber Deployments Top Another Record in 2024







(Source: Fierce/RVA)

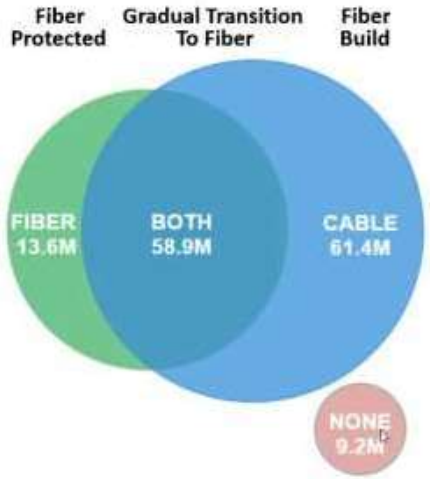
The U.S. added 10.3M new households in 2024, compared to 9.1M new households in 2023, achieving a 13% growth. Of the 10.3M new households, 8.4M were fiber broadband internet equipped at the time of purchase. The total number of fiber broadband-accessible households is now 76.5M, while 35.1M households currently using fiber broadband.

Market Review – Fierce Competition in Fiber Cables



FTTH's Main Competition (HFC Cable) Is Starting To Bleed

Status Of Fiber To HFC Competition
U.S. Homes, New Street Research, Dec 2023



Two-Year Net Adds Among Churning or New Users
All Provider Sizes, FBA/ RVA Consumer Study, April 2024

Areas Fiber Available:

	Churn in	Churn out	Net	New User
Fiber	57%	16%	41%	45%
DSL	6%	23%	-17%	2%
HFC	21%	54%	-33%	35%
Fixed Wireless	13%	1%	12%	10%
Mobile Wireless	2%	3%	-1%	8%
Geo Sat	1%	4%	-3%	0%
Leo Sat	0%	0%	0%	0%

Areas Fiber Not Available:

	Churn in	Churn out	Net	New User
Fiber	0%	0%	0%	0%
DSL	4%	37%	-33%	8%
HFC	54%	51%	4%	58%
Fixed Wireless	27%	2%	25%	12%
Mobile Wireless	8%	7%	1%	18%
Geo Sat	3%	4%	-1%	1%
Leo Sat	4%	0%	4%	1%

(Mobile Wireless included when the primary method used at home.)

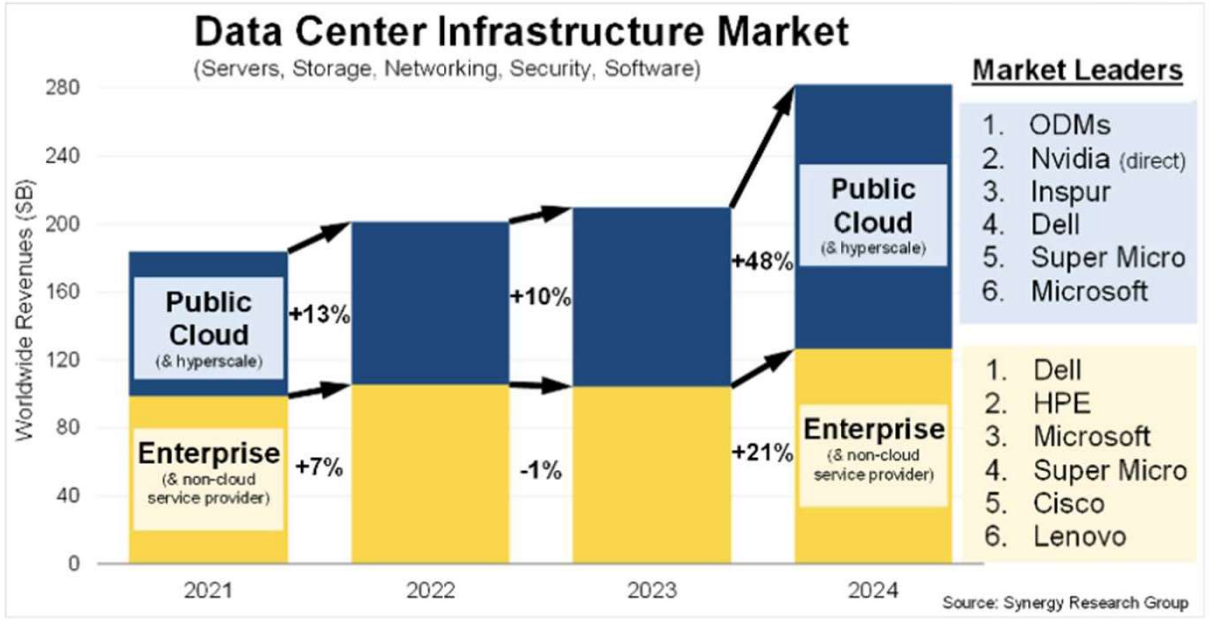
Public cable companies lost 265,000 Internet customers in Q3 2024.
RVA does not believe DOCSIS 4.0 will significantly stem this trend.

(Source: Fierce/RVA)

The FTTx(Fiber) and HFC(Hybrid Fiber/Coax；Cable solution) continues to compete with each other in the U.S. market. The RVA data indicated that in the past two years fiber camp gained 41% growth in homes, while the HFC experienced a 33% drop.

Market Scale Projection – AI & Data Centers



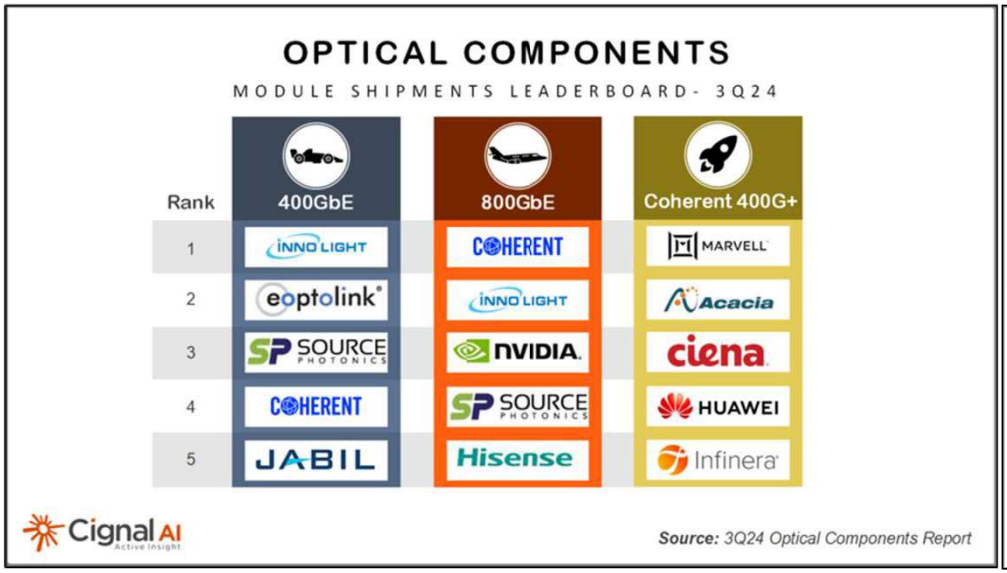


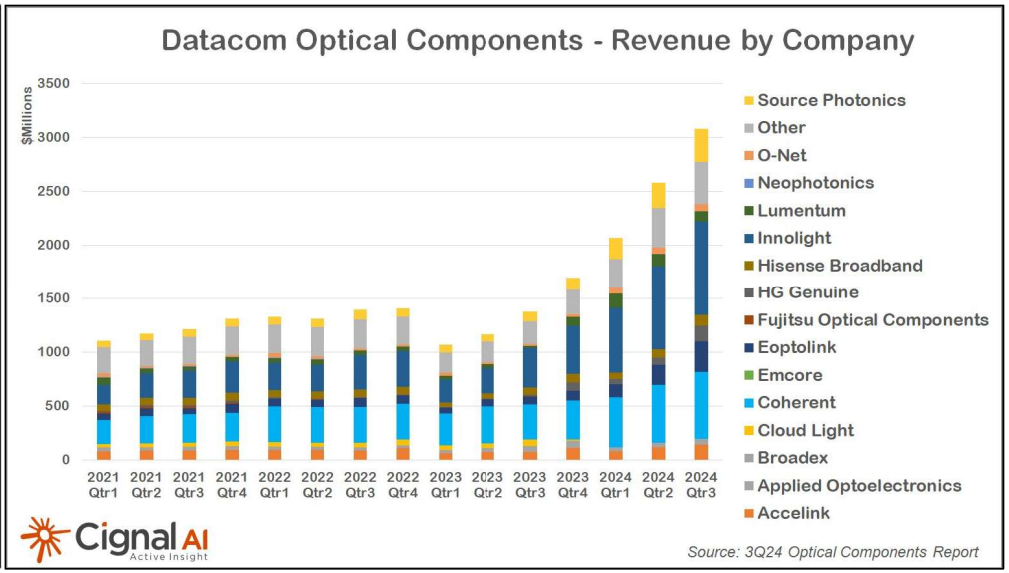
(Source: Synergy Research Group)

Data Center Infrastructures Surges

The data center infrastructures expansion hit an all-time high 34% in 2024. The surge primarily came from public clouds sector, which even accounted 55% of the overall market. Meanwhile, in the enterprise cloud sector, unlike years of low demand, it experienced an outstanding 21% growth as well. Sparked by the generative AI, the market continues to double down on massive investments in both public/enterprise cloud infrastructure.

Optical Transceivers Market Trends – AI Boom

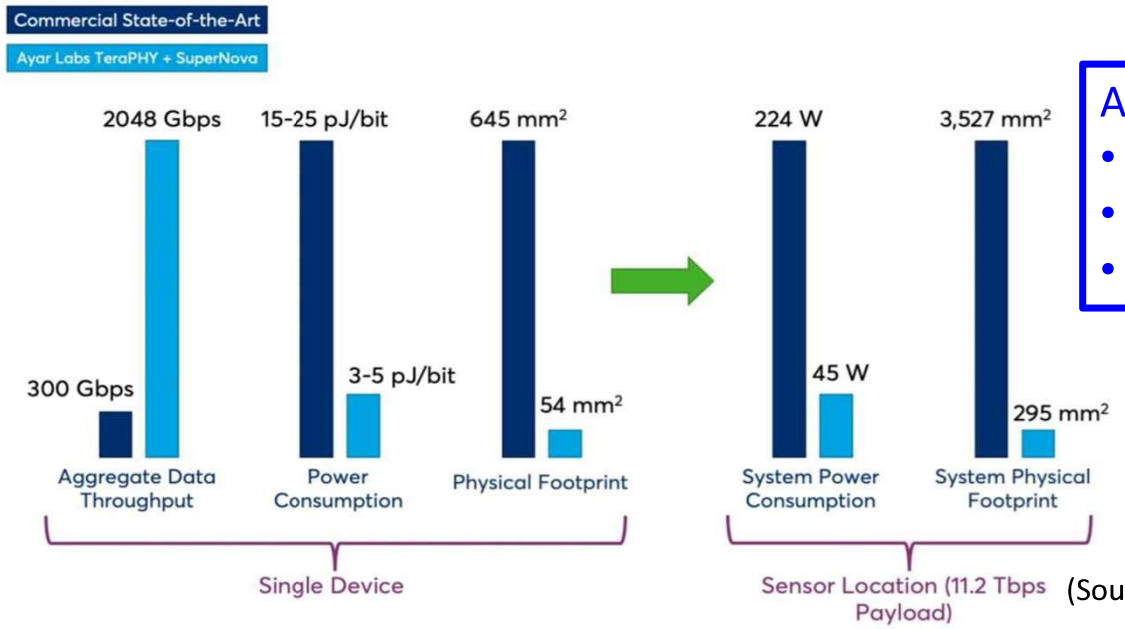




(Source: Cignal AI)

In 2024, the shipment value of optical transceivers surpassed US$9B. The shipment volume of 400G & 800G transceivers has grown nearly four times over the past 12 months, reaching over 20M units in 2024. The growth of 800G transceivers has peaked, with a slowdown in the Q3 2024, and set to transit to 1.6T 200G/lane transceivers. The market size is expected to expand from US$9B in 2024 to nearly US$12B by 2026.

CPO Potentials – Future Applications in AI & Data Center



(Source: Ayar Labs)

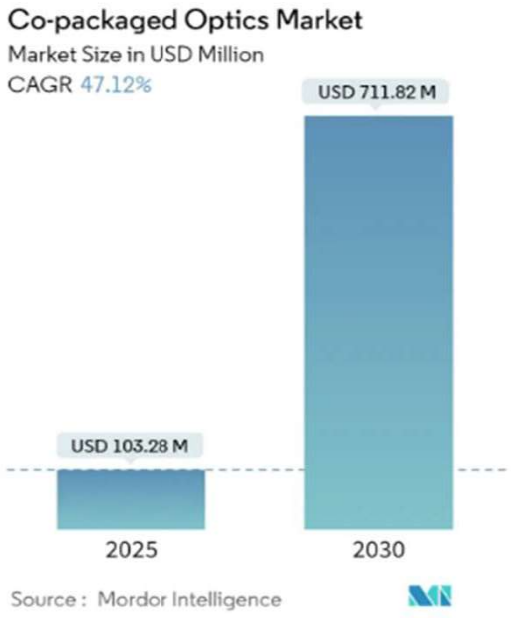
Advantages of CPO

- High Bandwidth Density
- Reduced Latency
- Lower Power Consumption

Co-Packaged Optics (CPO) can leverage fiber-optic links to solve the issues electrical links have by shortening the circuit distance. At its simplest level, CPO integrates the optical modules with switch chips and turn the signals to optical to interconnect within the package, meanwhile minimizing the length of the electrical links. This not only helps improve insertion loss and increase bandwidth density but also significantly reduces power consumption and costs.

CPO Market Scale Projection





Study Period	2019 - 2030
Market Size (2025)	USD 103.28 Million
Market Size (2030)	USD 711.82 Million
CAGR (2025 - 2030)	47.12 %
Fastest Growing Market	Asia Pacific
Largest Market	North America
Market Concentration	Low

Major Players

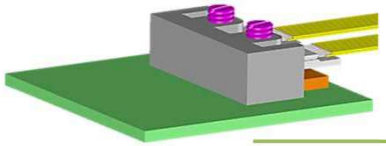
BROADCOM, AyarLabs, intel, IBM, CISCO

*Disclaimer: Major Players sorted in no particular order

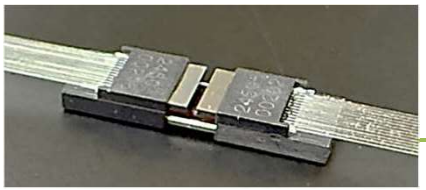
(Source: Mordor Intelligence)

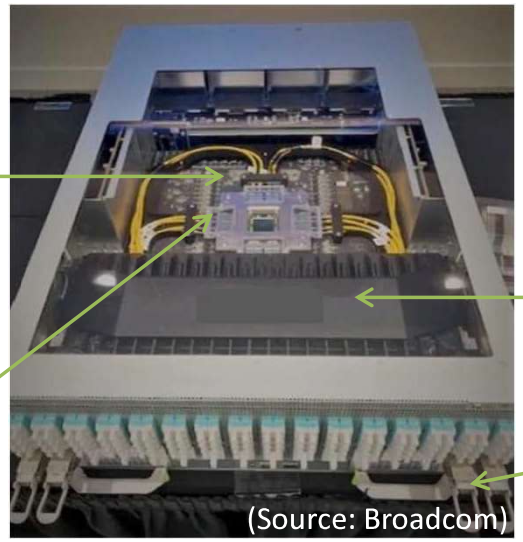
To meet the needs for advanced computing infrastructures that AI modules required; meanwhile achieving high bandwidth, low latency, and low power consumption, the top AI chip & networking companies have developed their own CPO products. The market projection is US$103.3M in 2025, reaching US$711.8M by 2030, with a CAGR of 47%.

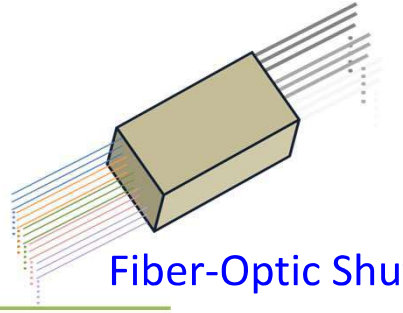
Browave's CPO Technologies Highlights



Fiber Harness: Detachable FAUs







Fiber-Optic Shuffle Module



Fiber-Optic Kits
- PMF Collimator for ELS
- Fiber Harness: PMF Collimator for ELS

Browave's technology in CPO primarily focuses on the Optical I/O, including Fiber Harness/Fiber-Optic Kits (FAUs etc.) and Fiber-Optic Shuffle Module. Browave develops & adopts advanced optical fiber arrays, including polarization-maintaining fibers (PM fibers), bare fiber polishing, two-dimensional fiber arrays, other innovative designs, and external laser source (ELS) related products. These are all key development areas for Browave.

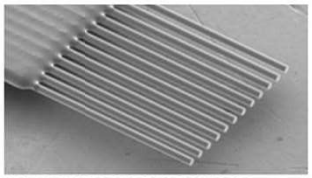
Browave's Strategic portfolio in CPO/Transceivers

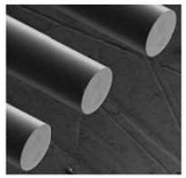


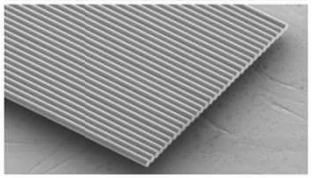
Fiber Array Unit for CPO

Application:

- Fiber ribbon for V-groove attachment
- Collimator array for detachable connector
- PMF Collimator array with isolator for ELS coupler

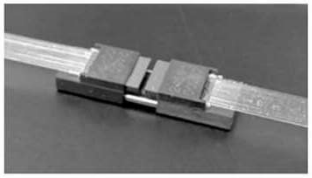






Fiber ribbon without 250um coating

- Up to 32 fibers
- Fiber pitch: 127um / 250um
- Fiber protrusion length: min 3mm
- Fiber protrusion consistency: 20um
- Both polish and mechanical cleaving are available
- PMF is available



Detachable collimator array

- Up to 12 fibers
- Fiber pitch: 250um by PPS ferrule
- Coupling IL: max 0.7dB



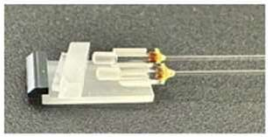
PMF collimator with isolator

- Up to 16 fibers
- Fiber pitch: 250um
- Coupling IL from laser: ~2dB (depends on mode field of laser)

Fiber Harness for 800G/1.6T

Application:

- For 800G/1.6T Transceiver and Interconnection
- Fiber Harness for QSFP, QSFP-XD, OSFP, OSFP-XD
- 2xDR4, DR8, 2xFR4, 2xFR2



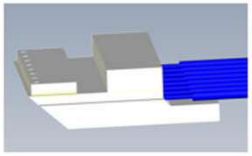
2xFR4 Integrated WDM Array

- 4ch/8ch, CH Grid 20nm / 10nm
- ±20um Z-tolerance for PD align
- Output Beam angle 0~9° +/- 0.5°
- CH Insertion Loss < 1.0dB



DR8 Integrated Fiber Array

- 4ch/8ch FA with 12MT/16MT/24MT
- RX FA – 42.5°+/-0.2°
- TX FA - Isolator Assembled
- Length Tolerance <+/-0.2mm



DR8, 8ch RX FA w/ Lens Array

- RX FA – 42.5°+/-0.2°
- ±20um Z-tolerance for PD align
- Output Beam angle 0~9° +/- 0.5°
- CH Insertion Loss < 0.5dB



Interconnection Fanout Cable

- Duplex LCs vs MPO 12ch/24ch
- LSZH, OFNR and OFNP Cables
- RoHS Compliance
- Telcordia GR-1435 / GR-326 / GR-2866 Compliance

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Browave's Product Focus – Optical Interconnects in AI switches & Broadband Cloud



- Application to AI/DC switches – Browave's CPO (Co-Packaged Optics) product portfolio, including Fiber Harness/Fiber-Optic Kits and Fiber-Optic Shuffle Module , is expected to complete qualification in the H2 2025, and entering production in 2026.
- Application to AI/DC switches – Browave's 800G/1.6T Fiber Harness lineup. The development focus is on high-speed optical transceiver platforms in type of DR and FR, with an expected ramp-up in the H2 2025 and the North American market accounts for the majority.
- Customized applications to AI/DC switches – 800G/1.6T Jumpers/Cables. The main development focuses on multimode fiber(MMF)/single-mode fiber (SMF) platforms, so does the production ramp-up.
- Applications to next-gen PON/FTTH – The focus this year will be on BRANCH optical modules. In addition to high-channel count products (1x64ch) used in urban network deployments, low-channel products (1x8ch) for rural network deployments will also be significant targets.
- Application to next-gen CATV networks – multi-system operators (MSOs) in the cable TV industry are strengthening their competition with telecom operators by investing in upgrading their HFC networks to DOCSIS 4.0. This will lead to an increased demand for WDM/BRANCH modules, primarily focusing on DWDM modules.

Summary



- **AI/Data Center Market:**
  For AI server applications, the 800G Fiber Harness products focuses on high-volume deployment in the FR and DR platforms. Additionally, the jumper/cable product group focuses on MMF & SMF platforms as the main development, with the primary volume growth in the MMF and SM platforms. However, the changes of end-user's architecture application in AI servers/switches led to a delay of transition from copper to optical fiber, which flattened the demand this year.
- **Telecom Market:**
  The rollout of U.S. BEAD Act and the end-customer's destocking both did not meet industry's expectations, plus next-gen WDM products for CATV were with flat demand. While in PON/FTTH market, the BRANCH category grew differently in high/low channel count products, and the divergence in telecom carriers' deployments plan made the overall demand mixed and flat in this sector.
- **Outlook for 2025:**
  In applications to AI/DC servers, the CPO lineup, including Fiber Harness/Fiber-Optic Kits and Fiber-Optic Shuffle Module, is expected to complete qualification in the H2 2025 and enter mass production in 2026. The 800G/1.6T Fiber Harness group for AI/DC servers/switches will primarily aim for DR and FR platforms that high-speed transceivers adopt, with an expected production ramp-up in the H2 2025 and the North American market accounts for the majority.
- **Browave's CPO Technology:**
  Browave's CPO technology focuses on Optical I/O, with the main products including Fiber Harness/Fiber-Optic Kits and Fiber-Optic Shuffle Module. The technology utilizes cutting-edge optical fiber arrays, including polarization-maintaining fibers, bare fiber polishing, two-dimensional fiber arrangements, along with innovative designs, as well as external laser source (ELS) related products. These are Browave's key development items.

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