U.S. Semiconductors & Semiconductor Capital Equipment

ECOC Takeaways: Mixed Bag of Technologies as Customer Roadmaps Diverge

We spent our time walking the booths and meeting with companies. Please see our takeaways below.

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Volume CPO timing is aligning more with the turn of the decade (if not later) and NPO solutions are starting to fill in the gap. We think that, like CPO, the "late 2027" that many are quoting in industry is not for volume and 2028 will be the real transition year. Technology transitions generally take longer than initially advertised, although scale-up CPO seems to be the biggest delta vs. prior industry guidance. We walked away feeling like pluggables and re-timed/re-driven electrical connections continue to have more runway and that each accelerator platform will offer a variety of solutions across CPO/NPO/electrical at scale. We spent most of our conversations talking about 1) the content and deployment styles of NPO, 2) limitations to market deployments due to supply, 3) defining scale-in and understanding the timeline for deployment, 4) OCS, Coherent-Lite, and ZR+ deployments. For our covered companies, we walk away most positive on MTSI due to the incremental content in NPO (SMTC seeing a 4x increase in TIA and driver content vs. 200G/lane pluggables), saw a SAM raise from COHR at the launch of PhotonLink, and got incremental color from LITE on some product targets.

NPO Comes in All Shapes and Sizes, CPO Moves Further to the Right: NPO seems real as an intermediate step to CPO with almost all the companies we met with talking to a broad range of solutions. Earliest deployment schedules have NPO in the 2H of CY27, but from our conversations it seems that 2028 is more likely. There will be multiple different flavors and solutions for NPO with hyperscalers experimenting with different deployment types and supply chains. The two discussed deployment types are using an ELS on the faceplate or using an ILS, which is an integrated laser within the optical engine. The ELS form factor is more serviceable and one provider pointed to it coming to market first. The integrated laser uses a lower power laser but can be harder to service as the server still needs to open. We saw both proprietary solutions as well as the open CPX standard, but the message was that we are still in early days of discussions, which means 2028 is the likely volume launch of the technology. Each NPO solutions needs a set of multi-channel TIAs and driver solutions that represent hundreds of dollars per server.

COHR sized a CPO/NPO SAM of $30B by 2030, up from their prior $15B SAM. At PhotonLink event, the company talked to over 10 engagements with NPO customers, while LITE talked about 5 engagements (3 using embedded lasers and 2 using ELS). CPO also seems to be delayed again from our conversations, and we continue to think it comes closer to the end of the decade.

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Market Remains Tight in Lasers and Perhaps DSPs: The choke points we heard about was InP supply and DSP capacity because of shortages of leading-edge wafers at TSMC. One supplier believes industry ports are at around 100M in CY26 and will get up to 200M in CY27, up from the prior estimate from OFC of 80M in CY26 and 160M in CY27. Industry conversations suggest 1.6T transceivers will price at or below $1000 with existing 800G transceivers holding in flat around $400. LITE sees steps higher in component pricing in CY28 and CY29 for agreements that are actively being signed today.

Scale-In on the Come, the Next Big Opportunity: As optics move inside the rack, the next step after NPO/CPO is scale-in optics. Scale-in refers to chip to chip connections across the board using an optical interconnect. The initial application is for connecting HBM/memory to the accelerator. HBM is necessary today for its high bandwidth and needs to sit on the same substrate in order to facilitate the bandwidth requirements, which limits the amount that can be deployed due to shoreline. With a photonic interconnect, memory could sit farther away on the board (potentially de-spec to LPDDR) and still see high bandwidth. The initial timeline is set in 2029/2030 and we would assume it comes following CPO.

Scale-in would add a significant amount of optical connections and could use microVCSELs or microLEDS. There will also likely be an ELS style deployment using CW lasers. MicroVCSELs generally have higher speed and range vs. microLEDs, which are generally denser.

OCS Expands into the Rack: OCS orders increasing with customer base expanding beyond GOOG/MSFT/Oracle. The 1RU rack OCS solution is not for GOOG and likely a new hyperscaler. LITE is ramping more capacity with an ODM but openly notes that GOOG will likely need to multi-source due to very high volumes.

Key Meeting Takeaways

LITE

- The $40 in FY28 raise is based on continued success and orders for the OCS solution. LITE's MEMS based solution is taking share at their largest customer vs. the internal solution and seeing continued order growth for the 6D torus program. The $40 in EPS guidance includes the targeted CPO ramp, but NPO is completely incremental.
- Believes their OCS solution is lower cost and provides higher reliability than competing solutions. Sees the current OCS rack attach as 11 racks for one OCS system. Thinks a second merchant solution will eventually come into the market as customers generally like to at least dual source.
- 1RU OCS rack solution sounds like a broadening of the customer set.
- Working on five total NPO engagements with three using ILS and the other two engagements using ELSs. Expects to ship revenue in 2H FY28.
- Expects to ship $50M-$100M in scale-out CPO revenue in the December quarter.
- Sees scale-in as another big opportunity for optics where you can disaggregate HBM from the compute block and use optical interconnects. VCSELs are one such solution that can be applied here.
- Negotiating LTAs for laser supply for CY28 and CY29 and still sees potential jumps in pricing. Scale-across solutions (pump lasers) also have the potential to see price increases.

- NVDA will have access to 50% of the Greensboro facility at fixed pricing. NVDA has the option to secure the remaining supply if they choose to but need to give LITE lead time. In the meantime, LITE can sign other customers for that capacity and are looking to get them signed up.

- Sees the potential for Coherent-Lite transceivers to come into the DC in late 27 or early CY28. Coherent-Lite is seemingly driven by one large hyperscaler today (we think GOOGL).

COHR

- Updated SAM at PhotonLink event to $60B base business and $30B from PhotonLink products in NPO/CPO. This compares to the last SAM for new products of $20B which included CPO/NPO, OCS, multi-rail, and thermal solutions and the rest of the business at $50B. COHR moved OCS, multi-rail, and thermal solutions into the base business bucket. To summarize, NPO/CPO expanded from $15B TAM to $30B TAM and the base business TAM increased by $10B with $5B from rebucketing and $5B incremental.

    - CPO/NPO make up almost all of the $30B TAM. Chip to chip can be an incremental opportunity to the $30B if it ramps in CY29 or CY30.

- COHR's PhotonLink content opportunity is up to $15k per 100T chip.

- Showed/talked to a mix of solutions including ultra-high power CW lasers for scale-out and scale-up using ELS, high power CW laser (70-100mW) for NPO, VCSEL arrays for fiber array, and high density VCSEL array for multicore fiber.

- For CPO, the deployment form factor is an UHP CW laser in an external laser module. COHR has greater than 10 customer engagements today. Total content opportunity for a 100T solution is up to $15k. Expects revenue for scale-out solutions in Q4 CY26 and revenue for scale-up solutions in 2H CY27. COHR currently has an anchor customer and LTA secured.

- For NPO, the form factor is either a VCSEL Array or CW laser integrated inside the NPO module or an UHP CW laser ELS. The company has >10 engagements. Total content opportunity for a 100T solution is up to $15k. Expects revenue in the 2H of CY27. COHR has an anchor customer and LTA secured for a CW laser solution.

    - Thinks external laser solutions will be adopted before the integrated laser solutions. Not a big difference in content for COHR between the two solutions.

- For Chip to Chip (scale-in), the form factor is either a VCSEL Array or CW laser, or an UHP CW laser ELS. COHR currently has > 5 engagements and expects revenue in CY29/CY30.

- Seeing solid interest across the OCS portfolio across multiple use cases (scale-up, scale-out, and potentially scale-across). One customer is driving using OCS for scale-up in racks but have interest at multiple customers. Believes there will be more MEMS based suppliers that enter the market overtime and that liquid crystal technology will be more unique to COHR.

MRVL

- Believes NPO will come with different solutions, and it is an intermediary solution on the path to CPO. MRVL will only sell their light engine paired with a MRVL switch or a MRVL ASIC. They will sell discrete TIAs and drivers and will support the open CPX spec.

- Believes they will have similar share on 1.6T DSPs compared to 800G. Solutions are already qualified and supply has already been secured for ramps.

- Sees scale-in as a big opportunity where "laserless" tech will intersect the market. Working on both microLED and microVCSEL solutions and say they each can be suited for different applications. Believes microVCSEL has a higher speed and better range while microLED generally is a denser solution. Scale-in will be a massive number of connections so need additional solutions outside of InP based products in order to meet potential demand.

CRDO

- Demoed a 1.6T ZeroFlap Optic solution. Showed active monitoring of link health across several verticals (temperature, link flaps, etc) enabled by their DSP, associated hardware, and PILOT software. Expects to be on par with price vs. competitors at 1.6T.
- Noted one of the most common errors you encounter with fiber optics is fiber contamination, which is dust making its way onto components.
- Also demoed the DustPhotonics PIC.

SMTC (not covered)

- Thinks at least 50% of the market will remain pluggables with the other 50% split amongst CPO/NPO.
- Hyperscalers will each have their own sku and flavor of NPO initially before it converges further down the line. Replaceability and serviceability are reasons to keep pluggables. NPO is generally harder to replace vs. other solutions.
- NPO can leverage existing technologies and manufacturing vs CPO needing an entirely new process. Believes that CPO is getting pushed out further to the right.
- Have 4x the TIA and Driver content in an NPO module at 200G/lane vs. a typical optical module.
- SMTC has a good CMOS process for TIAs and Drivers where they think they can differentiate vs. competitors using GaAs.
- Historically was in the mid-teens for 800G single mode fiber TIA share but now over 50%.

