

## Post CNY Reality Check: AI, Legacy Tech, Tariffs & China

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### Asia Tech

Navigating The Noise

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- **AI complexity** has suppliers & customers frenzied keeping up with NVDA design changes.
- **NVDA** LT demand remains strong, but NT visibility on specific products limited and subject to above mentioned design changes and component availability.
- **CoWoS peaking in NT** first time we do not see capacity numbers for '25 and '26 increasing. TSM may be digesting capacity and/or awaiting construction of new AP mega fabs.
- **ASIC** GOOG & AMZN are more advanced and aggressive vs. MSFT & META; large opportunity but can the CSP's secure enough Tier 1 component supply or has NVDA locked it up?
- **HBM** innovation continues with customized base die for HBM; hybrid bonding remains a question as the technology is not yet mature.
- **Legacy Tech** remains muted. China stimulus driving better than expected 1Q 25 but doubt this drives strong replacement cycle.

# Highlights from 40 meetings in 10 days

## *The interesting things we learnt across the board*

- 1 GB200 delay; GB300 & Rubin pull in.** Chaos in the supply chain makes it difficult for both suppliers and customers to plan. Multiple design changes and large portion of new components drives up qualification time and lowers yields.
  - **Our take:** Underlying demand remains strong. Expect revenue, margin, growth hiccups as suppliers and customers contend with rapidly changing specs. Digestion periods should be expected.
- 2 ASIC's ramping.** Will there be multiple training and inference SKUs as the supply chain suggests? Or are CSP's working with multiple vendors to keep suppliers honest?
  - **Our take:** CSP's should control their own destiny and lower reliance on NVDA. But NVDA product cycles and relationships with key suppliers will make this difficult.
- 3 CoWoS equipment peaking in the near term?** Key suppliers expect a near-term pause as recent capacity additions are absorbed. The 75k in '25 and '125k in '26 targets remain unchanged, but this is the 1<sup>st</sup> time capacity projections haven't increased. Given 12+ month lead times, suppliers should have better visibility by now.
  - **Our take:** Not surprising-TSM is likely digesting recent capacity additions ahead of new AP mega fab ramps, while also benefiting from productivity gains as they move up the learning curve.
- 4 China SPE's making some noise.** There are a rising # of local players in China growing rapidly; its not just Naura and AMEC. Hwatsing (CMP), PNC (wet process clean) KingSemi (coater/developer), Beijing E-Town (dry etch) and Piotech (plasma CVD)
  - **Our take:** Small revenue base but growing faster than WFE. Will only take away a small amount of more profitable business; from the Intl vendors. KLA and ASML least exposed to competitive risk of the Big 5.
- 5 Legacy tech remains weak.** China subsidies are driving better than expected 1Q 25, but few expect this to last. Meanwhile, many companies tout high penetration rates for AI PC or AI Smartphone in '25 but there is no basis for this enthusiasm.
  - **Our take:** '25 could be repeat of '24 where 1H inventory restocking fizzled when end demand failed to materialize and inflated forecasts for on device AI won't occur with current hardware and software roadmaps.
- 6 What is next:** Co packaged optics (CPO), panel level packaging (PLP), silicon on integrated chip (SOIC). CPO should be MP in '27 or '28 and equipment for small pilot lines is expected to ship in '26 for TSMC. Foundry and OSAT are building PLP lines as soon as 2Q/3Q '25 with MP expected late '27. SOIC for chip to interposer ramps in 1H 27, but initial capacity is quite small, < 5k WSPM.
  - **Our take:** Roadmaps still not clear with many mini lines or pilot lines underway; timetable from equipment vendors are likely red herring's given extended R&D periods. TSMC and NVDA continue to push the bleeding edge.

# NVDA STRONG DEMAND, Design Changes Cloud the Picture

**NVDA supply chain is frantic** overall demand is very strong, and GPUs remain on allocation but push outs & pull ins on designs makes it difficult for suppliers and customers to forecast.

**Blackwell power consumption problems** may drive earlier Ruben pull in. This was not a widespread comment, but given prior tech issues its worth monitoring. NVDA has been quite aggressive on product cycles so possible Ruben pull in is driven by technology and not manufacturing problems.

**GB300 favored by CSP's** GB200 delays + ability to customize shifts demand to GB300 (3Q 25 launch) which will require 50% more HBM and 15% more liquid cooling technology.

**12-24 months visibility** however, purchase orders are only 6-12-months subject to specific product availability.

**Hon Hai getting 10-15% of their GB300 order** underscoring the long que for equipment.

**Tariffs negative for ODM server growth** US Cloud reversed course and now keeps L10 assembly in house, lowering \$ opportunity for Taiwan ODM with capacity in Mexico.

**ABF Substate growth accelerating** to 15-20% CAGR overall with AI up 40% with 60% OP margin.

## ASIC Lotsa Growth, Lotsa Noise Too

**MediaTek \$1B in '26** quite confident on the win with a major US cloud; incumbent supplier not willing to take certain lower value projects. Likely the overall ASIC opportunity is higher providing opportunities beyond tier 1 suppliers AVGO & MRVL.

**Socionext** working with US Cloud on 3 nm ARM CPU; customer has multiple ongoing projects handled by a mix of both internal and external resources.

**Aspeed volumes increase** on ASIC designs which are lower density vs. GPU and will require more units to achieve the desired compute needs.

**Taiwan suggests Alchip wins AWS Tranium 3** nothing corroborated from direct supplier, all hearsay but surprising as those with no skin in the game seem confident. Time will tell if AWS is playing MRVL and Alchip against each other for better pricing or if there are multiple SKUs.

**IC Test Socket** sampling with US cloud: expects meaningful contribution to 2H '25 / 1H '26.

**Current designs less complicated** compared to GPU but future designs will get more complicated increasing demand for higher end components.

## CoWoS Pause & Absorb?

**No change to TSMC capacity plans** 70-75k in '25 and 125k in '26 but visibility remains low.

**Output likely higher than expected** TSMC is ramping up the learning curve achieving better yields and higher productivity on its installed base. Equipment vendors are experiencing peak orders in the near term, which is unsurprising in this context.

**Yields for each product are quite high** but changing products necessitate time-consuming adjustments (changeover time, cleaning, new chemicals & recipes). Could be factor to monitor as the ASIC's ramp different products.

**1 year + lead times on new capacity** current order que is 5 months; manufacturing lead time is 3-4 months; qualification and test at equipment vendor and customer is 3-4 months. the foundry customer. Lead time for Rorze (6323 JP) wafer handling robots from are also 6-8 months not including the order que. Long lead times suggest equipment vendors “**should**” have better visibility on '26 orders; perhaps the above-mentioned productivity gains or TSMC awaiting new Mega AP fab is the factor.

**ASE bullish on CoWoS L** and willing to use its financial and technical lead to grab share vs. other OSAT.

**ACMR and KingSemi emerging as competitors** in China for cleanings steps but are only selling tools, not chemicals.

# HBM The main bottleneck for AI

**'25 shipments to double** and '26 demand 'up' but less visibility / more uncertainty as Hynix expect more competition from Samsung & MU with HBM 4.

**Samsung has struggled** to demonstrate competitiveness on speed, frequency and power consumption for 3e 12 hi but 'confident' they will be shipping in 3Q 25. They expect to catch up on HBM 4 using 1c node. Hynix HBM 4 will use existing front-end node and packaging process as 3e making for a smooth ramp.

**Hynix M15 expansion** will not be enough to meet HBM demand. HBM is currently 20-30% of their total DRAM wafer capacity and they are hesitant to add more.

**Hybrid Bonding Delayed** due to poor yields and ability for Hynix to use MRUMF packaging technology through 16 high in 2H '26. Samsung's TCNCF packaging technology is sufficient through 12 high with hybrid bonding required thereafter.

**Custom HBM 4e** will come in late '26 enabling GPU & ASIC customers to optimize for performance or power. Inference applications will require higher speeds. The custom market is expected to exceed the standard market.

**MU HBM ramp** gated by timing of new Singapore facility in '27; in ST will build 'mini lines' in Taiwan and Singapore Fab 10.

# Smartphone China subsidies driving BTE 1Q 25 but no structural drivers on the horizon

**China subsidies** driving better than expected 1Q 25; most suppliers seeing better trends.

**MediaTek '25 market outlook** units up low single digits but China stimulus could add another 1-200 basis points of growth.

**Lack of spec upgrades** roadmaps don't include necessary spec changes (NPU, casing, thermal) for on device AI.

**Memory modules & IC Assemblies** supplier wrote down inventory, indicating share shifts to China SP OEM / CXMT DRAM.

**BT Substrate supplier with 50%+ global share** shifting focus to PC & Server given higher opportunities for growth.

**SiC Battery** OPPO N5 & X8 adopting SiC battery to keep foldable phones thin.

**Xiaomi SoC:** product launch in '25 launch; competitive threat for QCOM, although Xiaomi will still need them for the modem.

## **PC Commercial upgrade cycle is the driver / AI remains a buzzword**

**'25 units + mid single digits** driven by commercial refresh; small benefit from China stimulus. Early view is '26 will be up low single digit s as well.

**Tariffs drove some pull in's** to 4Q 24 which may dampen overall '25 growth.

**AI PC** penetration rates of 30-40% for '25 are inflated; we lack the necessary apps or features to drive adoption. 10-20% is penetration is more realistic, but most vendors view Win 10 replacement cycles as the larger growth opportunity this year. Finally, GenAI applications have budget priority over PC's as well.

**QCOM ARM CPU** will not be a factor in current cycle as not enough software/peripheral support. Enterprise unwilling to adopt. Potential for QCOM to lower prices to stimulate AI PC demand.

**NVDA G10 not a threat to mainstream PC market (for now)** Will start as a niche product targeting workstations but lower priced versions with higher volumes expected over time. MediaTek's \$ content is low, limited to design work on the Grace CPU and selling connectivity, multimedia and PMIC IC's.

**AMD CPU share gains** likely as INTC unable to spend lots of marketing \$\$'s.

**IC Substrates** oversupply and weak demand leads to severe pricing pressure; leaders losing money.



## Thermal Structural growth / crowded market

**Bigger, hotter chips** continue to drive demand for innovative thermal solutions. IC's > 1500 watts will adopt integrated heat spreader + vapor chambers to dissipate heat.

**Thermal Interface Materials (TIM)** are critical for heat dissipation, sitting between the IC's and heat sinks. The technology roadmap continues to advance driving higher component ASP's and requiring upgraded CoWoS equipment for precise device mounting. TIM has progressed from thermal grease > gel based > metal > graphite film > liquid metal (used for Ruben which is 10x the cost of graphite film).

**Micro Channel Lid** will integrate heat sinks with liquid cooling systems, intensifying competition between Jentech and Asia Vital. I am betting that the vendor closest to the IC will emerge the winner.

**Air Cooling isn't dead** Liquid cooling is the trend for AI servers yet even as liquid penetration increases, legacy air cooling will still be used to cool power racks, HDD's and general compute servers.

**Quick Disconnect stampede** we can name 13 and counting major quick disconnect (QD) suppliers chasing the liquid cooling trend. These devices are relatively high ASP and growth for component manufactures but with relatively low margins.

**100% customized projects:** the lack of standards lengthens design and qualification cycle. Overprovisioning cooling distribution units (CDU) remains a trend as customers have different temperature thresholds to maintain.

## **SPE** Growth in '26 hinges on Samsung & INTC

**WFE flattish in '25 & '26 + double digits** China 'pausing' after pulling forward orders in '24; TSM continues to invest on 2nm, DRAM +10-20% and NAND +2x. '26 expected to be a 'very' good year driven by advanced logic from TSM, INTC & Samsung and legacy PC & SP recovery as on device AI takes hold.

**China sitting on unboxed tools** Tier 1 tool vendor suggests tools have been set up in Chinese fabs, not being operated. In addition, there are unboxed tools in warehouses that have not been recognized as revenue. Reminds me of the LED/MOCVD crash of 2012 -2013.

**US SPE engineers exit China** impacting CXMT's tech migration. CXMT may also just be digesting recent equipment as their orders > doubled in '24.

**China SPE vendors increasingly relevant** There are a rising # of local players in China growing rapidly; its not just Naura and AMEC. Hwatsing (CMP), PNC (wet process clean) KingSemi (coater/developer), Beijing E-Town (dry etch) and Piotech (plasma CVD) are all mentioned as legitimate competitors for the domestic market. The Chinese SPE vendors remain small and lag in tech but combined they they are 25-30% of AMAT's revenue base and taking away profitable business at the margin.

**Samsung Foundry** investments paused as they prove their 2 nm process and ramp customers. Will not chase unprofitable share.

## New Tech Roadmaps What are we doing more work on?

**Co packaged Optics MP in '27 or '28** suppliers ramping tools in '26 for pilot lines. Equipment vendors view this as a larger opportunity vs. CoWoS as it would be a new production process requiring different tools and chemicals. Initially optics will be integrated into the substrate, which is easier than embedding in the IC.

**Panel Level Packaging** Foundry & OSAT installing equipment 2H 25 with MP slated for 2H '26. Will be used for high end GPUs.

**BT Substrate targeting PC & Server** Mitsubishi Gas Chemical is the global leader in BT substrates, primarily used in smartphones, memory and consumer applications. They are now targeting AI chips with BT used as an insulating / build up layer for copper clad laminates and co packaged optics (CPO). BT resin is strong, thin, durable and prevents warping.

# Disclosures

12 month historical recommendation changes are available on request

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