AUTOMOTIVE ETHERNET MARKET GROWTH OUTLOOK

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AGENDA

• What is the Outlook?

• What is Shaping my Thinking?
  • Driving Forces for Ethernet
  • Headwinds Against Ethernet

• So What is the Forecast?
  • What has Changed & Why?

• Conclusions & Recommendations for Growth

• Q&A
WHAT IS THE OUTLOOK?
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• Automotive Ethernet will grow significantly from its current low base
• It will be used across different applications
• The availability of standards-based solutions for both 100Mbps and 1Gbsp speeds will help drive adoption (BUT with a caveat)
• There remains uncertainty over the pace of adoption....

• The direction of travel is clear. The speed of travel is less clear
WHAT IS SHAPING MY THINKING?
TWO KEY-WORDS THAT ARE SHAPING AUTOMOTIVE ETHERNET

Autonomous

Recalls
MOVE TO AUTONOMY IS HAPPENING

- Common need of all emerging autonomous vehicle systems is the need for a **reliable, high-speed communications network**
GLOBAL GROWTH AREAS: ADAS AND HEV/EV

• Growth outside of ADAS and HEV/EV is comparatively weak. These two systems areas are the major growth drivers. More risk to HEV/EV forecast than for ADAS. Most ADAS risk is on the upside, in the event of more legislation.
Media stories on re-calls are out-pacing those on autonomous driving / ADAS by around 5:1 over the last year on a leading news site!
HEADWINDS FOR ETHERNET

• Conservative industry – **Recalls hurt!**
  • Often prefers to ring the very last out of old technology before making the jump to new technology
  • Continues to “architect around” bandwidth issues
  • Sometimes happy to take certainty of a known solution, even if emerging solutions offer the potential of lower cost or greater functionality

• There have been **reasons/excuses to prevaricate** and not make a firm commitment
  • Concerns over IP licensing issues for existing solutions. Now largely resolved?
  • Some still not convinced over EMC/EMI issues at 100Mbps. Interest in multiple physical layers at Gbps speeds
  • Move to create IEEE-standardized version at 100Mbps is good – but has also given some a reason to delay decision making again
  • Some applications / customers are still waiting to see how the 1Gbps RTP IEEE standardization goes before making any firm commitments
  • **Auto industry is inherently strongly risk averse!**
SO WHAT IS THE FORECAST?
• Assumptions:
  • ~60% of global production in 2020 to feature Ethernet Diagnostics Port
  • ~10% of Backup cameras to be Ethernet in 2020
  • ~40% of surround view systems to be Ethernet in 2020
  • ~25% of other cameras (e.g. front for LDWS etc.) to be Ethernet in 2020
  • ~10% of RADARs for be Ethernet in 2020
  • ~20% of premium audio & 5% of mid-range audio to be Ethernet in 2020
  • BMW plus one other to start using Ethernet as backbone by 2020 – BMW in lead and other only just emerging
WHAT HAS CHANGED & WHY?

- **Short/medium-term** (out to 2016) has typically seen forecast reduced. Assumptions on others joining BMW were **too optimistic**
  - Concerns over IP/licensing and EMC/EMI (regardless of how “real” they were) kept others from rapid adoption

- **Longer term** (2018 onwards) has typically seen **forecast increased**
  - Ethernet only realistically-proposed mass-market solution for high-bandwidth data
  - ADAS/Autonomous becoming FAR more important than in was in 2012. Increasing interest in “Ethernet-enabled architecture” rather than just single-solutions
  - IEE standardization for both 100 Mbps and Gbps will bring benefits
CONCLUSIONS & RECOMMENDATIONS
CONCLUSIONS

• **Automotive Ethernet demand WILL grow**
  - The only realistically proposed solution for high-bandwidth connectivity in vehicles

• Exact timings of mass-market demand **still unclear** with many still “sitting on the fence” as to exactly what they will adopt and when
  - CAAGR of socket demand over 2015 to 2020 is around 100%
  - Means that delay/advance of market by one year could halve/double demand from expected values!

• **Prompt and consensual conclusion to IEEE standardization** efforts highly important to remove uncertainties and increase confidence

• **Wider range of semiconductor solutions is needed**...and coming
  - Integration of PHY into other semiconductor devices will be highly important in achieving mass-market adoption
  - Current silicon prices typically seen as hampering wider-scale adoption – but these are widely expected to fall as more vendors enter market
RECOMMENDATIONS FOR GROWTH

• Increase openness as much as possible
  • Automotive Ethernet is essentially a non-competitive, enabling technology amongst car makers, yet there are still huge amounts of secrecy abounding
  • OPEN Alliance has been a good thing – but could do with more of the “Open”, especially in the public domain (only ONE press release in 2014 ?!?)
  • Ultimately it is up to car makers to break the chicken/egg cycle of few suppliers/high prices and low-demand by publicly committing. BMW has made a lead. Others should dare to follow. There will be benefits

• Avoid hype
  • All proponents want to talk a market up – that is understandable
  • However – overly optimistic forecasts can often back-fire. If you need faster than 100% CAAGR over 2015-2020 to build a business case & support then something is wrong!

• Ensure the right people, suitably empowered are working with IEEE
  • These may not always be the strongest technology evangelists
  • IEEE-type processes require strong technical grasp, negotiation and compromise, not dogma & politics. Representing your company’s interests is fine. Doing that to the detriment of the common good is not. It will come back to hurt everyone
ANY QUESTIONS?