

Migrating to 2Gb/s Fibre Channel

FCA/FCLC

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Status of 1 Gb/s

- **Multiple vendors in production:**
 - **Host Adapters, Network Interface Cards**
 - **Hubs, Switches**
 - **JBOD/RAID Systems**
 - **Disk Drives**
- **Stability/Interoperability Proven**
- **Costs dropping, Volumes rising**
- **Customer solving High-End Storage and Networking problems**
- **Momentum growing exponentially**

The Need for 2 Gb/s

- **Natural Evolution:**
Double storage interface performance
- **Competition:**
SCSI, ATM, 1394, Sonet, Gigabit Ethernet
- **Bottlenecks:**
 - **Networking: Improve Link/Bus Speed Ratio**
 - **Storage: Host Adapter-to-RAID Subsystem**
 - **Proprietary Links: Faster is better (2.5 Gb/s)**
- **Media:**
Match available performance

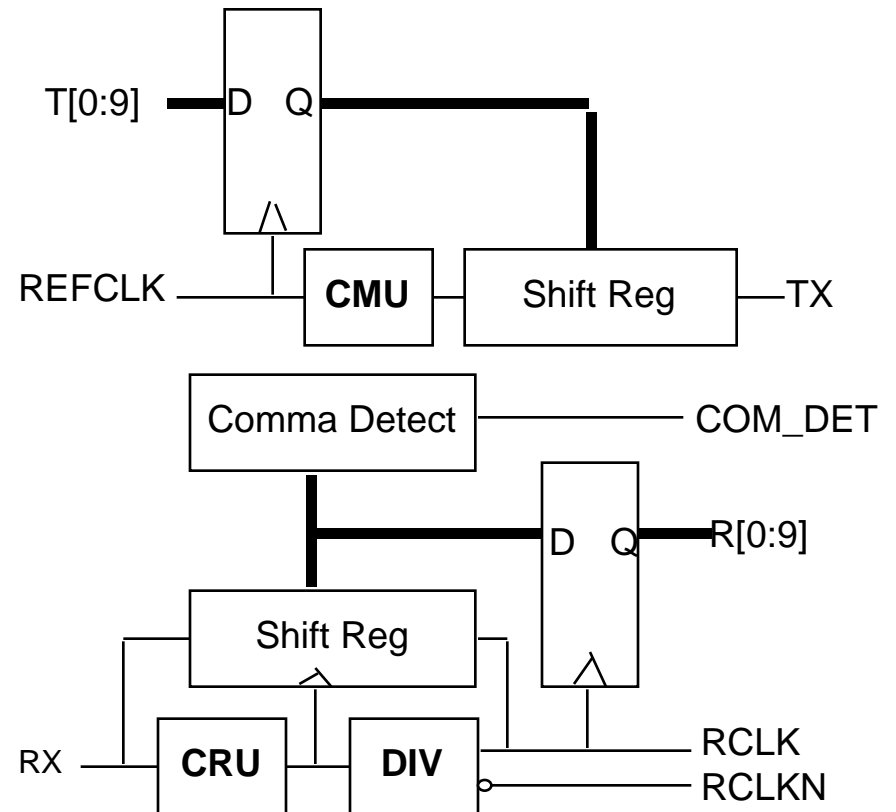
Applications

- **Fibre Channel @ 2.12 Gb/s**
 - **Host Adapter/RAID**
 - **Switches/Hubs/NICs**
- **Proprietary Links @ 2.5 Gb/s**
 - **Box-to-Box**
 - **Backplane**

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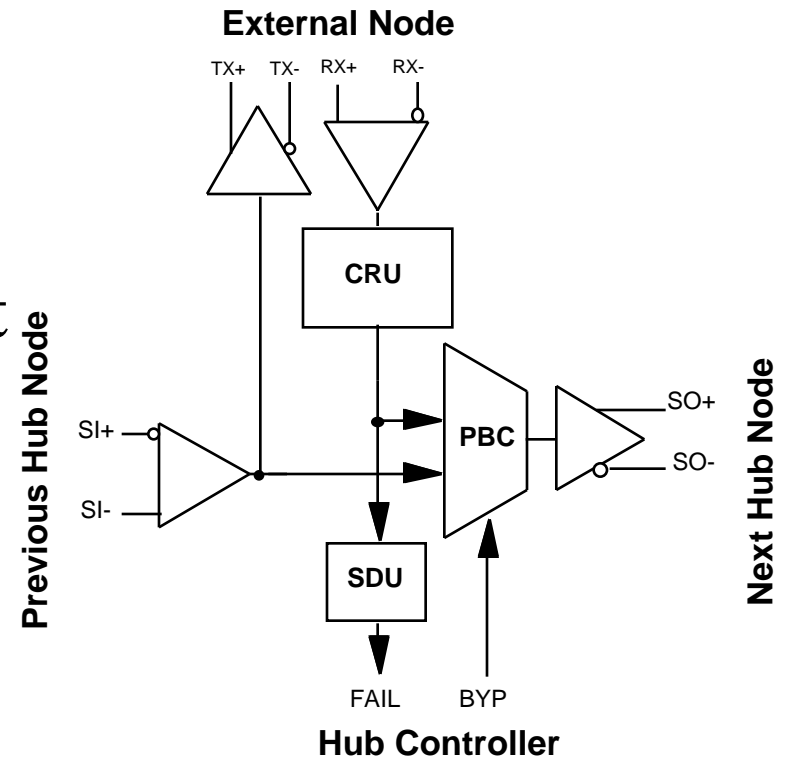
SerDes

- **Single Chip Tx/Rx**
- **10-bit SerDes**
 - **106.25 MHz Bus Speed**
 - **Industry standard pinout**
 - **64-pin, 10 or 14mm PQFP**
- **20-bit SerDes**
 - **53.125 MHz Bus Speed**
 - **Slower bus - Easier to use**



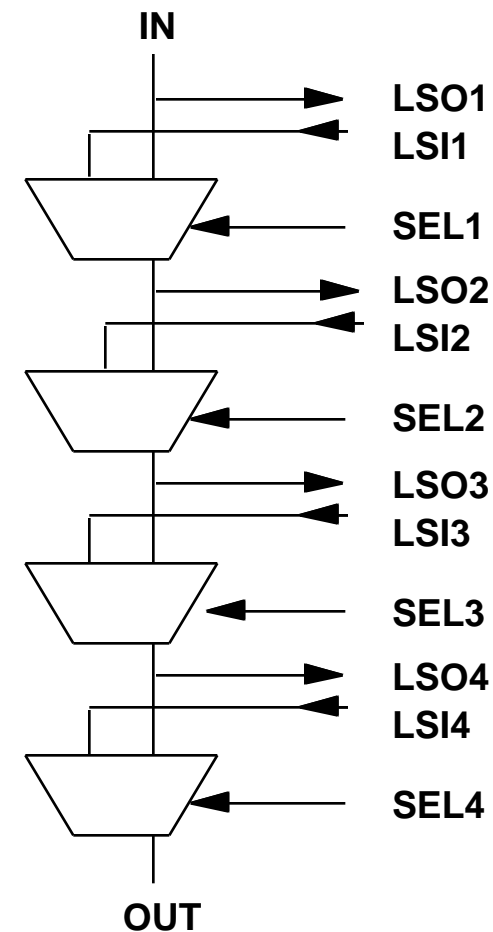
Repeaters

- Amplifies Signal
- Attenuates Jitter
- 1.06 Gb/s **C**lock **R**ecovery **U**nit
- Additional Features for Hubs
 - Embedded **P**ort **B**ypass **C**ircuit
 - Digital **S**ignal **D**etect **U**nit
- Used in Hubs and Disk Arrays



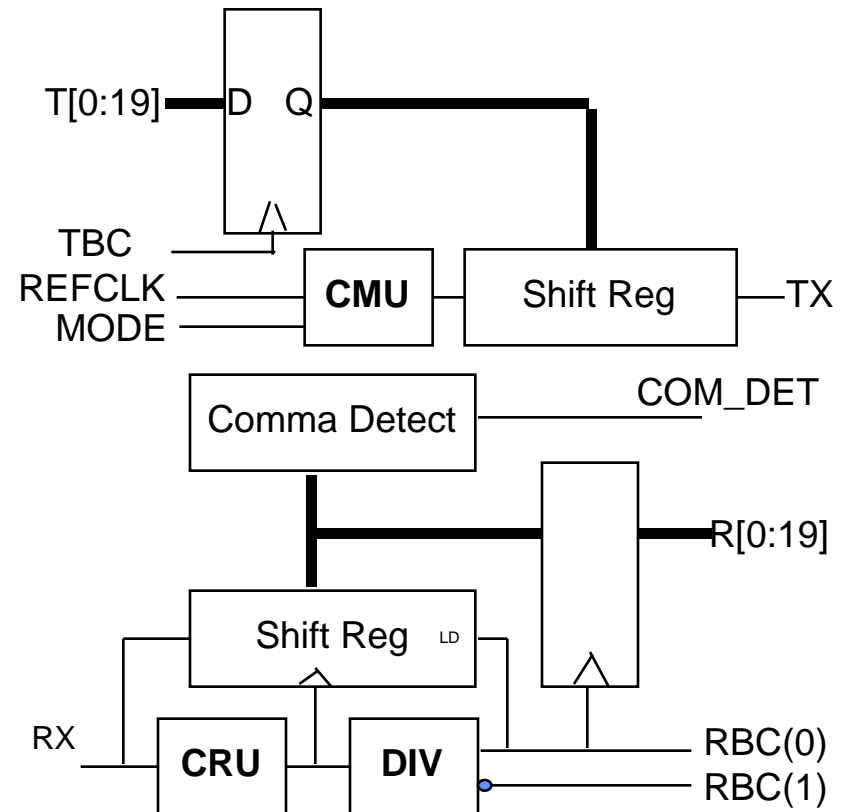
Port Bypass Circuits

- **Configures FC-AL Loops**
- **4 Muxes @ 1.06 Gb/s**
- **Cascadable**
- **Reduced part count**
- **Reduced jitter accumulation**
- **Used in Disk Arrays for hot insertion/removal**

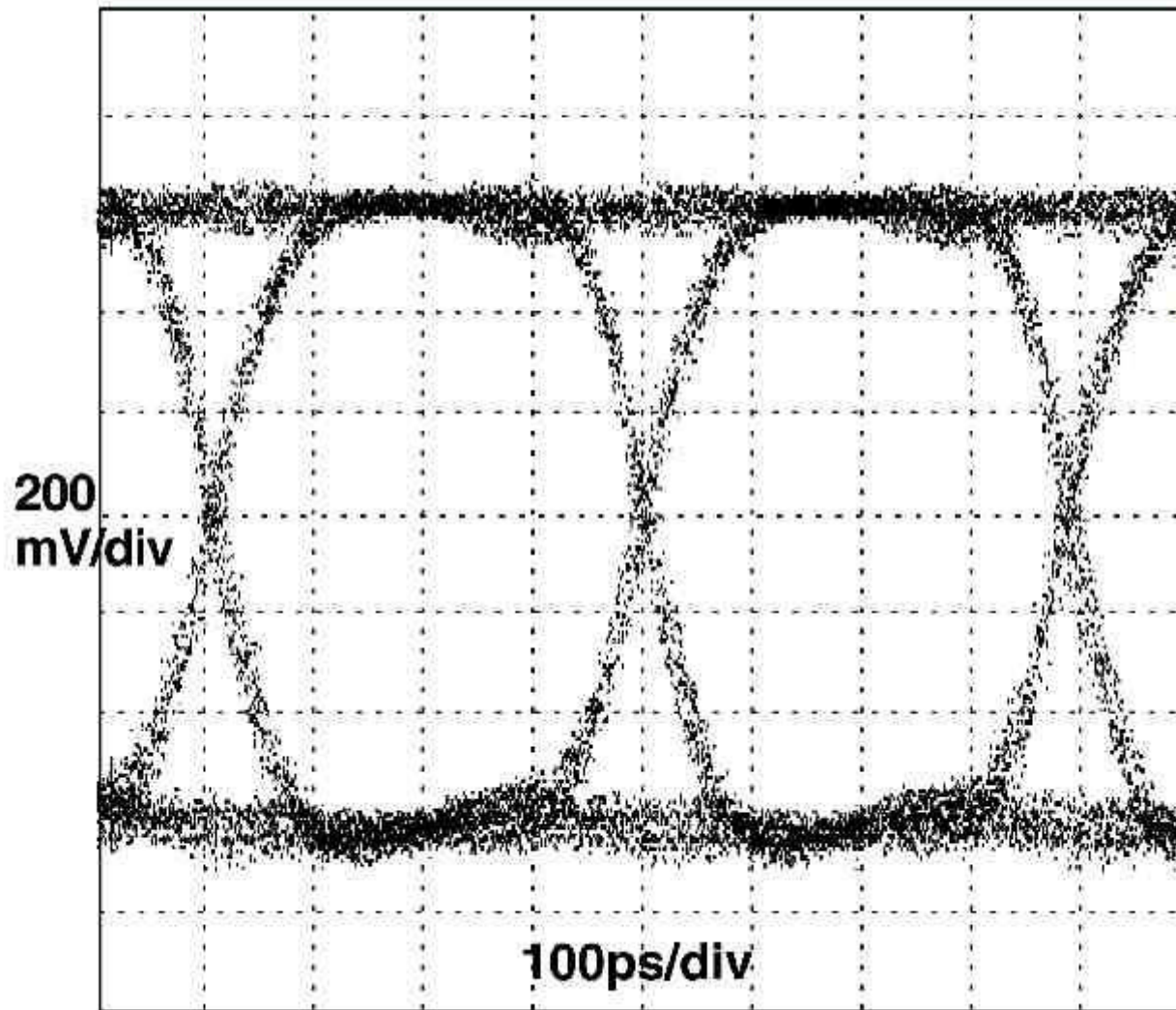


1/1.25 to 2/2.5 Gbps Transceiver

- **1.06/2.125 Gb/s Operation**
- **1.25/2.5 Gb/s Operation**
- **Dual Speed Operation via MODE select**
- **20-Bit TTL Interface**
- **Separate TBC/REFCLK**
- **Auto-Lock to REFCLK**
- **3.3V, 2.5W**
- **80-pin, 14x14mm PQFP**
- **Compatibility**
- **Upgradability**



2 Gb/s DataEye



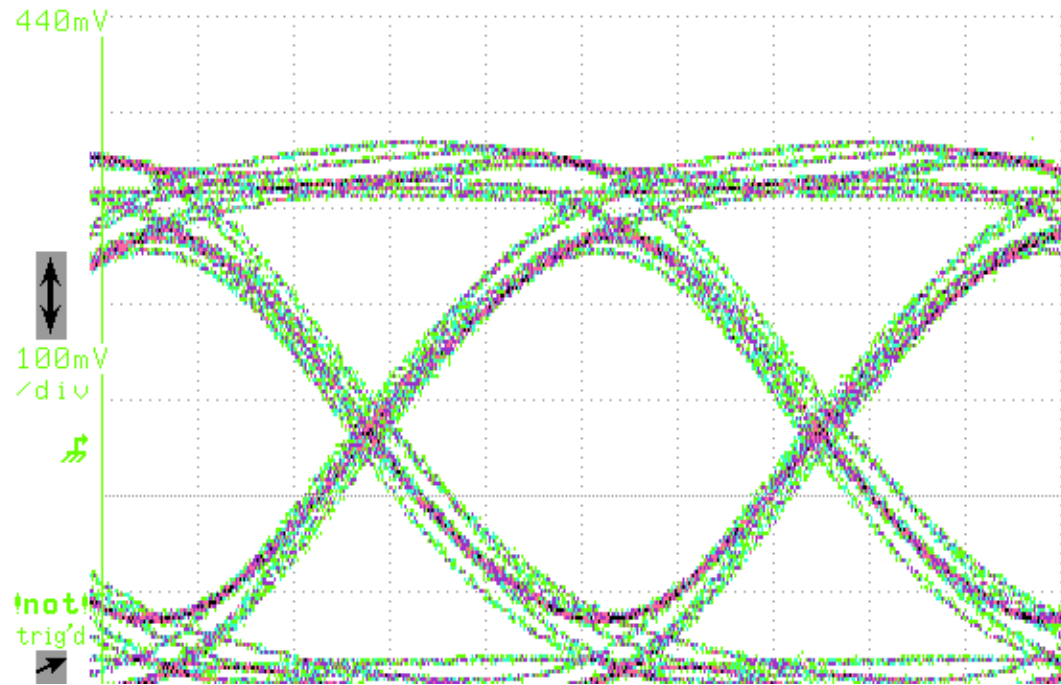
Transceiver Roadmap

- **AutoDetection:**
 - **Self configure for 2.12 vs 1.06 Gb/s**
 - **Change Bus Size: 10/20-bit**
 - **Change Bus Speed: 53/106 MHz**
 - **Link-Level State Machine**
- **10-bit Bus @ 212 MHz**
 - **I/O Type: LVTTTL, GTL, LVDS, ECL???**

2 Gb/s Media

- **All Existing Media Styles Will Work**
- **Copper Cable:**
 - **10 m Using Twinax**
 - **DB-9 and HSSDC Connector**
- **Fiber Optics**
 - **Short/Longwave**
 - **SingleMode/MultiMode**
 - **1x9 Module, MIA and GBIC**

2.125 Gb/s Data Eye



W.L. Gore Twinax Cable

The Lure of Dual Speed

- **Compatible Today, Upgradable Tomorrow!**
- **Customers Looking to the Future**
- **Vendors looking for Differentiation**
- **Don't slow 1 Gb/s Momentum**
- **Follow 10/100 Ethernet Model**
- **Cost of Future Upgradability**

Issues

- **Cost**
 - **Comparable in terms of \$/bandwidth**
 - **Datacom price model holds up to 2.5 Gb/s**
- **Ease of Implementation - Std SerDes Architecture**
- **Ease of Deployment**
 - **Backward compatibility thru auto-negotiation**
 - **Can be in Controller or SerDes**
 - **Controller could support auto-negotiation on-the-fly**

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Issues, cont'd

- **Time to Market Mitigators**
 - **Shared components - media, connectors, SerDes**
 - **Controller is main factor**
- **Market Timing is Good**
 - **Stay ahead of competing technologies**
 - **Show progress to marketplace**
- **Product Positioning**
 - **In Host Adapters, Switches, NICs, RAIDs first**
 - **Can demonstrate graceful migration path**

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Conclusion

- **2.12 Gb/s makes sense for Fibre Channel**
- **Eliminates bottlenecks**
- **Dual Mode speeds market acceptance**
- **Promotes future growth**
- **Physical Layer available mid'98**
- **Repeaters and Port Bypass Circuits will follow**