The Myricom ARC Series of Network Adapters with DBL

Financial Trading's lowest latency, most full-featured market feed connections

Drive down system-level Tick-To-Trade latency with CSPi's Myricom® ARC Series of 10 gigabit network adapters. They surpass all other full-featured adapters, with industry-leading Receive+Send latency plus advanced capabilities to accelerate your application software.

Choose the Model That Matches Your Requirements

The ARC network adapters are FPGA-based PCIe cards with extreme low-latency firmware and tightly-integrated acceleration software that runs on your server. Three ARC product classes offer a choice of capabilities. See Table 1 for a feature comparison.

Driving Latency Close to Zero

All ARC adapters minimize latency by exploiting the parallel processing capabilities of powerful FPGAs and integrated software to:

- Select the desired portions of a multi-cast market feed

- Optimize the PCIe communication with the application server

- Move data into DMA buffers set up as rings, so your application never waits but is continually fed with data

- Bypass kernel stacks, moving selected packets directly to user space

- Pre-populate outbound stacks to accelerate orders

Hardware Acceleration for Applications that use A/B Arbitration

If your application uses A/B arbitration you can offload that function to the ARC adapter hardware, gaining a reduction in software overhead and removing significant traffic from your server's shared DRAM subsystems. The adapter's specialized FPGA firmware can arbitrate the A and B sides of multiple feeds for both fiber and microwave sources, effectively implementing 4-way arbitration. Turning on hardware-based A/B arbitration adds zero latency to the adapter's receive path.

KEY FEATURES

- **10GbE network adapters lead the industry in system-level Tick-To-Trade Latency**

- Tightly integrated FPGA firmware and server software combine to accelerate trading applications

- A/B arbitration in hardware for up to 4 sources per feed

- Precise hardware timestamps on both ingress and egress packets

- Support for Linux and Windows

- FPGA-based architecture enables continual enhancements

- Industry's best customer support

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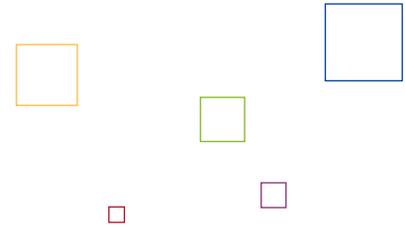
Precise Hardware Timestamps

The ARC adapters are able to track latency in real-time with less effort and more accuracy than expensive packet capture devices, using precise hardware timestamps on both ingress and egress packets. This unique capability allows your application to calculate latency without needing to tag TCP/IP orders with UDP sequence numbers, for simplified trading performance verification.

Precise timestamping also prepares systems for compliance with the detailed reporting defined by the 2017 MiFID II regulations. By implementing both Receive and Send timestamps in the Myricom ARC Series hardware, trades can meet the transparency requirements while still executing with extreme low-latency.

Configuration Flexibility and Future Enhancements

Only Myricom network adapters support both Windows and Linux. They also can be used with either Intel or IBM Power Architecture systems, allowing you to maintain future flexibility and avoid being locked into any one vendor or architecture.

Our ARC Series FPGA-based designs enable a steady stream of enhancements without lengthy and complex ASIC design cycles. Features are added regularly with firmware upgrades, quickly responding to new market requirements. New adapter designs are created using straightforward migrations to next generation FPGAs with more performance and firmware capacity.

The industry's most reliable and responsive customer support

At every level of our organization, CSPi is committed to customer success. We respond quickly, providing information to address most questions without delay.   For complex situations, we'll do whatever it takes to solve your technology issue.

Market-leading latency, unique functions and flexibility

The ARC Series network adapters are the lowest-latency full-feature market feed connections available today. They compresses Tick-To-Trade latency at multiple points in the trading application process. Unique capabilities include hardware-based A/B arbitration and hardware timestamping for ingress and egress packets. The adapters' FPGA-based architecture enables frequent firmware enhancements and a credible roadmap to future technology.

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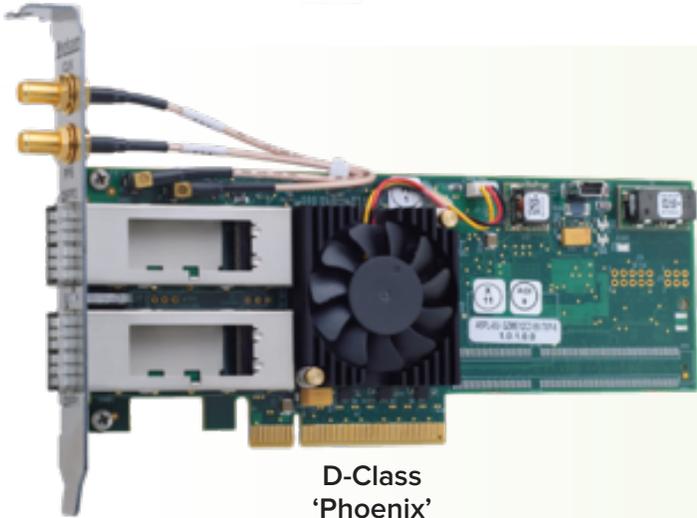
**D-Class
'Phoenix'**

Cost effective, low-latency market feed connection

Windows and Linux support

Features
- A/B arbitration
- Precise Receive and Transmit timestamps
- Selected multi-cast packets put in targeted DMA rings
- Enables three options for kernel stack bypass
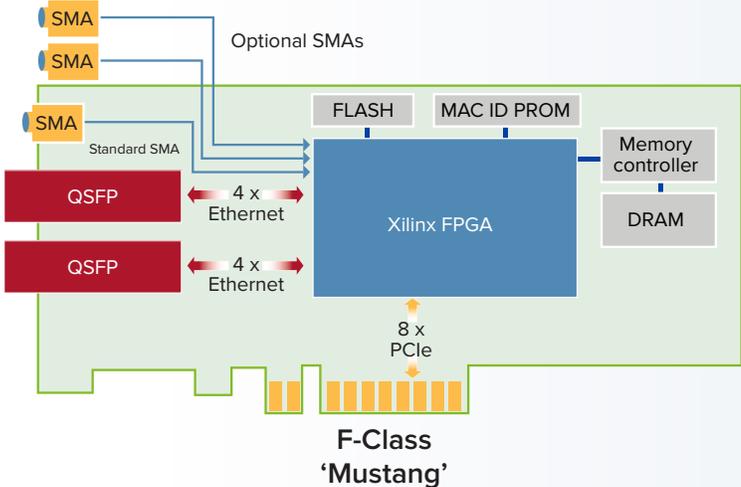- Prepopulates outbound stacks
- Optional timing kit

**E-Class
'K35'**

Market's lowest latency full featured adapter

Linux support (Windows in Q4 2016)

All Phoenix features, plus
- Standard timing kit
- Large FPGA to enable a stream of future enhancements from CSPi

SMA
SMA
Optional SMAs
SMA
Standard SMA
FLASH
MAC ID PROM
Memory controller
QSFP
4 x Ethernet
Xilinx FPGA
DRAM
QSFP
4 x Ethernet
8 x PCIe

**F-Class
'Mustang'**

K35 performance and features, plus
- Capacity in the FPGA for both CSPi enhancements and user-developed firmware
- On-board memory subsystem
- 40 GbE capable

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ARC NETWORK ADAPTER FAMILY
- KEY SPECIFICATIONS

Bus Interface	PCI Express Gen 3, 8 lanes wide
Form Factor	Low-profile PCI Express x8 add-in card. Ships with a standard height faceplate installed; low profile faceplate in the box. The optional timing kit has a standard height faceplate with coax connectors installed.
Environmental	CSPi recommends that adapters be installed into servers that provide some air flow over the PCIe slots (very common). Use in an office or computer room environment.
DBL Endpoints	Support for 16 simultaneous rings (DBL endpoints). The size of each ring is limited by the amount of available host memory. Support for up to 511 simultaneous UDP multicast groups open per Ethernet port (1022 per board).
Packets Per Second	Every adapter optimized for ultra-low latency will bump into a maximum packet-per-second rate when the packets hit Intel's PCIe implementation. That maximum depends upon the Intel chip on the other end of the PCIe bus. Generally expect to achieve the rate of a single 10 Gbit Ethernet port (14.88 M PPS dependent on packet size). The typical usage model, of one port ingress and one port egress, supports dropless operation.
On-board clock tick precision	±1 nanosecond when measuring latency using the on-board oscillator. The process associating timestamps with packets has a ±5 nanoseconds of uncertainty.
Timestamp stability	Timestamp stability is determined by the on-board oscillator (a Vectron VT 804 TCXO) or by any optional, user-provided 10 MHz clock.
IEEE 1588	Myricom time stamps are captured in a manner that allows IEEE-1588 software implementations to deliver highly accurate, synchronized time.
Ping-Pong latency	1.31µ is the minimum latency for a 1-byte-payload UDP 1/2 roundtrip using the E-Class adapter. For a full set of more meaningful latency measurements see the Tick-To-Trade Latency application note.
Passive Copper Cable Length	Retimers, included on the adapter, support a 7 meter target specification with a quality, passive, copper cable. Not all passive cable specifications support this length. Using a QSFP to SFP+ adapter may also limit cable length.
Operating Systems	Support for all major Linux distributions as well as Windows 2008R2 and newer.
Virtualization	Myricom adapters are compatible with all popular virtual environments, provided that users assign the adapter to a single virtual machine. The alternative, sharing an adapter, conflicts with delivering high performance.
Connections	D-Class: Dual SFP+ 10GbE ports (configured as a dual QSFP with bundled SFP+ adapters) E-Class: Dual SFP+ 10GbE ports F-Class: Dual QSFP 4x10GbE ports
REGULATORY APPROVALS, COMPLIANCE	
Emissions	Emissions and safety authorities do not certify board-level products. They certify complete systems with all boards installed. To minimize risk for OEM customers, CSPi uses a third-party certification organization to test its Myricom adapters installed into a generic PC. Final test reports are available to customers. We meet US, Canadian, and European emissions, Class A.
Compliance	RoHS (Reduction of Hazardous Substances)
Country of Origin	USA
OTHER DETAILS	
Cables and transceivers	Contact your Account/Sales representative for more information on cables and transceivers that are compatible with each adapter.
Warranty and add-on support	One year for hardware defects and 90 days for software defects. 90 days of "getting started" telephone and email support, as well as any software upgrades shipped within that window. Refer to the support datasheet for options extending the 90-day window.

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