Sun™ Quad FastEthernet™

Just the Facts

Sun microsystems®

Sun™ Quad FastEthernet™ Positioning

Why Use Sun™ Quad FastEthernet™?

The growing importance of LAN's and the increasing demand for data in a variety of forms (voice, data, video) are fueling the need for high bandwidth networks. To continue to support business operations, information systems (IS) managers have extended existing networks with the integration of Fast Ethernet to provide needed performance enhancement. Fast Ethernet offers an easy migration path from 10BASE-T Ethernet to 100 Mbps Fast Ethernet with minimal cost and service disruption.

100BASE-T Fast Ethernet preserves the widely used core UTP wiring infrastructure while providing a seamless migration to higher performance workstations and desktops at less than half the cost. Sun™ Quad FastEthernet™ provides the performance of 100BASE-T and the higher density of 4 independent ports. The combination of high performance and high density of ports provides IS managers and network administrators with scalable bandwidth and multi-homing options not available in other networking products.

What is Fast Ethernet?

Fast Ethernet, 100BASE-T, is an extension to the existing 10 Mbps 10BASE-T standard. 100BASE-T offers backward compatibility to the more than 100 million nodes in the Ethernet installed base. It supports existing 10BASE-T networking protocols, media, and standards, making it cost effective and easy to deploy. Providing a tenfold increase in performance at less than half the cost makes Fast Ethernet a valuable resource to departments eager to protect their investment in Ethernet while delivering the performance required by power users and applications.

Sun has led the industry in the development and evangelism of Fast Ethernet technology. As a founding member of the Fast Ethernet Alliance, Sun has worked with other industry leaders to define Fast Ethernet specifications and standards and increase user awareness of the technology. Sun's SMCC Networking Computing Group chaired the IEEE 802.3u 100BASE-T group in writing the standard. It was approved in June 1995 and is now part of the IEEE 802.3 standard.

The Sun Quad FastEthernet Product

Sun Microsystems introduces the low cost, high density 10/100 Fast Ethernet Network Interface card with four high performance 10/100 Mbps auto-negotiating ports. The Quad FastEthernet (QFE) adapter provides the server and network with unprecedented performance in a single wide SBus interface card. QFE will also provide trunking support, supplying the Sun customer up to 400 Mbps full duplex and load balancing across discrete links.

When used with a trunking capable switch loaded with Trunking software, QFE can provide aggregate bandwidth up to 800 Mbps to multimedia and other high network bandwidth applications. QFE is IEEE 802.3u capable with 32/64 bit SBus support. QFE provides performance solutions to network bottlenecks. QFE takes advantage of four channels with independent Media Access Control (MAC) IP addresses for multi-homing configurations as a single IP address mode when trunking is used, or any combination of the 4 ports.

QFE trunking software delivers “fat pipe” performance that is transparent to the application layer by distributing the traffic across multiple Fast Ethernet links. QFE in turn creates high speed, flexible solutions allowing multi-homing and trunking for dedicated bandwidth to servers and switching resources required by high performance servers and desktops in the switched environments.

Key Messages

The key messages to remember about Sun's Quad FastEthernet are: High speed/high density; trunking capable, and network flexibility.

- High speed/high density. Sun's Quad FastEthernet network interface card is a low cost, high-performance networking solution. It combines the performance of 100BASE-TX with the high density of four ports per SBus slot.
- Low cost. Fast Ethernet is a low cost alternative to more expensive high-performance networking technologies such as ATM or FDDI.
- Trunking capable. Software providing trunking support supplies 400 Mbps aggregate fat pipe performance.
- Network flexibility. Quad FastEthernet's four 10/100 Mbps auto-negotiating ports are compatible with both 10 Mbps and 100 Mbps networks. The multiple ports, each with its own MAC address provide multi-homing options not available in other networking products.

Sun Quad FastEthernet Features and Benefits

Sun's Quad FastEthernet networking interface card provides customers with the following benefits:

Features	Benefits
– Four 10/100BASE-TX channels	– Provides high bandwidth
– Auto-negotiating 10/100 Mbps ports	– Compatible with both 10 Mbps and 100 Mbps Ethernet – Protects existing investment in 10 Mbps, eases migration to 100 Mbps
– Multiple IDs with local MAC IP storage	– Supports multi-homing – Provides network redundancy
– Trunking capabilities	– Provides 800 Mbps aggregate fat pipe performance
– Single-wide SBus network adapter	– Conserves SBus slots
– IEEE 802.3u compliant	– Ensures compatibility and interoperability

Target Markets

Customers targeted for the Quad FastEthernet fall into the following categories:

- Current SBus Quad Ethernet Controller (SQEC) customers and customers with multiple Ethernet interfaces
- New customers who require additional bandwidth. The Quad FastEthernet network interface card supplies high-performance bandwidth for up to four Ethernet connections.
- New and existing Sun customers in switched network environments where fat pipe trunking is a clear performance enhancement
- New and existing Sun customers where network topology require multi-homing capabilities
- Customers with high-bandwidth applications, including real-time graphics and video, multimedia, imaging, and computer modeling

Networking at Sun

Sun's tagline, "The Network is the Computer™" has become a reality as more and more companies accept distributed or network computing. At the same time, existing networks have become bandwidth constrained due to the immense popularity of the Internet/Intranet, bandwidth-hungry applications and extremely fast processors such as Sun's own UltraSPARC.

Sun has always been a leader in networking. Sun has developed LAN/WAN interfaces including Fast Ethernet and ISDN and built them into Sun systems. ONC+™ and NFS™ are part of Solaris™ and available on every system. Federated Services, Common Open Software Environment (COSE), and NEO™ services continue to add strength to the Solaris distributed computing environment.

Sun supports high speed networking technologies including both ATM and Ethernet. By incorporating the appropriate combination of high speed technologies, Sun customers reap the benefits of very effective corporate networks.

Quad FastEthernet (QFE) continues the Sun tradition of state-of-the-art networking products. QFE puts four Fast Ethernet channels on a single card thus providing not only higher density but also saving precious SBus slots. QFE provides a low-risk upgrade for customers requiring more bandwidth in the future.

Technology Overview

With an existing installed base of 100+ million Ethernet nodes, Ethernet is the world's most popular method of networking computers. However, the growing importance of LANs and increasing demand for data are fueling the need for higher bandwidth networks.

Increasing numbers of users combined with bandwidth-hungry applications are making network bottlenecks all too common. This need for higher bandwidth has spawned an intense interest in defining the next generation of networking technology. Fast Ethernet, a natural extension of the existing IEEE 802.3 Ethernet standard, stands out as the logical choice.

Fast Ethernet Technology

100 BASE-T Fast Ethernet consists of five component specifications: The Media Access Control (MAC) Layer, the Media Independent Interface (MII), and the three physical layers supporting the most widely used cabling types. Each of these components was designed to preserve compatibility with 10 Mbps Ethernet and existing installations.

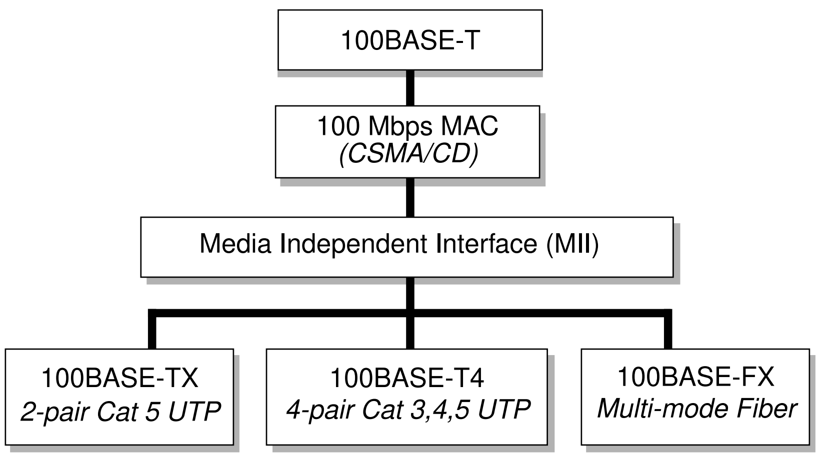

Figure 1. The Fast Ethernet Architecture Allows Scalable Performance up to 100 Mbps.

Features and Benefits

Fast Ethernet provides the following features and benefits:

Features	Benefits
– 100-Mbps network bandwidth	– Provides ten times the capacity of Ethernet
– Cost-effective migration to higher speed	– Minimizes cost of change, compared to ATM or FDDI
– ANSI 802.3u standard	– Ensures high level of interoperability with other vendor's products
– Extension of existing Ethernet standards	– Minimizes disruption and risk – Maximizes investment protection in expertise, existing applications, and wiring infrastructure

Key Facts

- Fast Ethernet is Ethernet, only faster
- A high-speed networking technology offering speeds of 100 Mbps
- Low cost alternative to FDDI and ATM
- Backward compatible protocols, media and standards
- Easy migration to higher bandwidth

Tech Facts

- ANSI 802.3u compliant
- 100-Mbps network bandwidth
- 2-pair Category 5 UTP wiring

Integrating Sun™ Quad FastEthernet™ into the Network

Sun's Quad FastEthernet™ (QFE) can be implemented in the shared or switched environment by connecting to 10BASE-T or 100BASE-T Fast Ethernet switches or hubs. QFE interoperates with all hubs and switches that comply with the 10BASE-T and 100BASE-T standards.

Full Duplex Ethernet and Trunking

Full duplex is defined as the transmission of data in both directions at the same time. Ethernet was originally designed with a single-wire (coax) as the transmission medium and a bus topology. Transmission of data was half duplex: It could either be sent or received at any given time. The introduction of twisted pair wiring—with separate wires for sending/receiving data—removed the half duplex restriction.

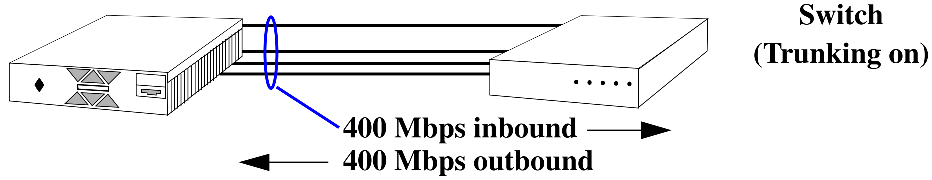

Figure 2. Server with Quad FastEthernet Connected to Ethernet Switch.

Full duplex Ethernet requires twisted pair wiring and an Ethernet switch. The twisted pair wiring medium includes two separate channels (wires) for sending and receiving data. This allows data to be sent and received simultaneously. A switch ensures that collisions are eliminated between the two Ethernet stations (for example, the server with QFE and the Ethernet switch). This allows data to be sent and received continuously.

When attached to an Ethernet switch, each port on the Quad FastEthernet can provide two 100 Mbps streams for simultaneous and continuous transmit and receive. This doubles the theoretical bandwidth for each port from 100 Mbps to 200 Mbps.

Trunking is defined as combining multiple links in parallel to form a single, high speed logical link. Trunking software (available August 97) will allow the four 100 Mbps lines (full duplex) of the Quad FastEthernet to be “trunked” together to create one logical link with a theoretical transmission rate of 800 Mbps.

Full Integration Configuration

The four ports of the Quad FastEthernet NIC can be used independently. In this example, two ports are trunked together to provide 200 Mbps full duplex transmission to a trunking switch. A third port is used to connect to a legacy switch at 10 Mbps. The remaining port is used to connect at 10/100 Mbps to a router, providing access to the wide area network.

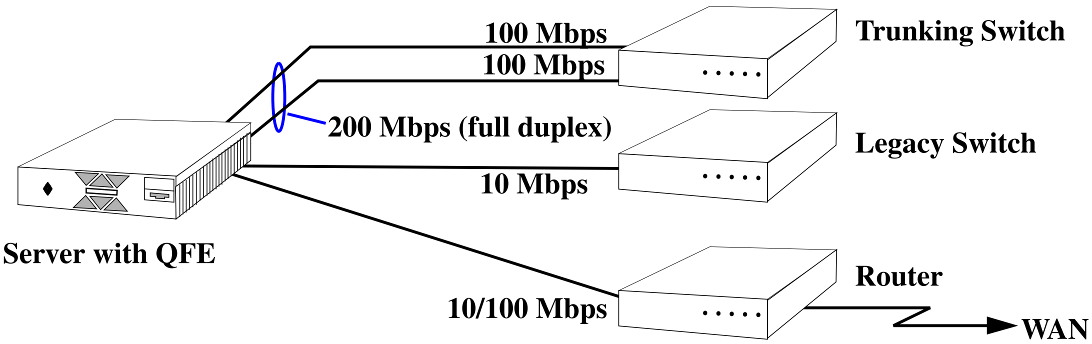

Figure 3. Example Configuration for Server with Quad FastEthernet.

Key Facts

- High speed and high density
- Auto-negotiation capability supports both 10/100 Mbps
- Trunking support for fat pipe options
- Multi-homed hosts
- Low cost alternative to high speed technologies

Tech Facts

- Four 10/100 Mbps auto-negotiating Ethernet ports on a single-wide SBus card
- Trunking software supplies 400 Mbps full duplex bandwidth
- Supports 10 Mbps (10BASE-T) or 100 Mbps (100BASE-TX) Ethernet via RJ-45 connector
- For 10 Mbps, 2-pair Category 3 or better UTP is supported; for 100 Mbps, 2-pair Category 5 UTP is required.
- Preserves Ethernet MAC and CSMA/CD layers
- Individual MAC addresses support multiple domain/IP networks
- Supports 64-bit SBus up to 25 MHz and up to 64-byte bursts
- **Standards**
  – 100-Mbps Ethernet conforms to 100BASE-TX IEEE 802.3u standard
  – 10-Mbps Ethernet conforms to 10BASE-T IEEE 802.3 standard
- **Hardware requirements**
  – One CPU per Quad FastEthernet port is recommended for maximum throughput
  – For systems running at 200 MHz or greater, a minimum of two CPUs per Quad FastEthernet adapter card is recommended
- **Software requirements**
  – Supported on Solaris™ 2.5 and later releases
- **Platforms supported**
  – SPARCstation™ 5, SPARCstation 10, SPARCstation 20, SPARCserver™ 6x0, SPARCserver 1000, SPARCcenter™ 2000(E), Sun™ Ultra™ 140, 10, 170E 200E, Ultra™ 2 and Enterprise Servers with SBus I/O

Ordering Information

Quad FastEthernet will be available for both SBus and PCI-based platforms.

Order Number	Components
605-1587-01	• Quad FastEthernet for SBus
605-1594-01	• Quad FastEthernet for PCI

Availability

- Quad FastEthernet SBUS will be available in April 1997.
- Quad FastEthernet PCI will be available in July 1997.
- Trunking support will be available in August 1997.

SunSpectrum℠ System Support Program

SunSpectrum℠ is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs—ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. SunSpectrum provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris™ operating system software, and telephone support for Sun™ software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value it represents. Customers should check with their local SunService℠ representative for program/feature variance and availability in their area.

FEATURE	SUNSPECTRUM℠ PLATINUM℠ Mission-Critical Support	SUNSPECTRUM℠ GOLD℠ Business-Critical Support	SUNSPECTRUM℠ SILVER℠ Systems Support	SUNSPECTRUM℠ BRONZE℠ Self Support
Systems Features				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
Account Support Features				
Service account management team	Yes	No	No	No
Personal technical account support	Yes	Yes	No	No
Account support plan	Yes	Yes	No	No
Software release planning	Yes	No	No	No
On-site account reviews	Monthly	Semi-annual	No	No
Site activity log	Yes	Yes	No	No
Coverage / Response Time				
Standard telephone coverage hours	7 x 24	7 x 24	8–8, M–F	8–5, M–F
Standard on-site coverage hours	7 x 24	8–8, M–F	8–5, M–F	N/A
Seven day x 24 hour telephone coverage	Yes	Yes	Option	No
Seven day x 24 hour on-site coverage	Yes	Option	Option	N/A
Customer-defined priority setting	Yes	Yes	Yes	No
– Urgent (phone/on-site)	Live transfer/ 2 hour	Live transfer/ 4 hour	Live transfer/ 4 hour	4 hour/NA
– Serious (phone/on-site)	Live transfer/ 4 hour	2 hour/next day	2 hour/next day	4 hour/NA

FEATURE	SUNSPECTRUM℠ PLATINUM℠ Mission-Critical Support	SUNSPECTRUM℠ GOLD℠ Business-Critical Support	SUNSPECTRUM℠ SILVER℠ Systems Support	SUNSPECTRUM℠ BRONZE℠ Self Support
– Not critical (phone/on-site)	Live transfer/ customer convenience	4 hour/ customer convenience	4 hour/ customer convenience	4 hour/NA
Additional contacts	Option	Option	Option	Option
Enhanced Support Features				
Mission-critical support team	Yes	Yes	No	No
Sun Vendor Integration Program (SunVIP™)	Yes	Yes	No	No
Software patch management assistance	Yes	No	No	No
Field change order (FCO) management assistance	Yes	No	No	No
Remote Systems Diagnostics				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
Software Enhancements and Maintenance Releases				
Solaris enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
Internet and CD-ROM Support Tools				
SunSolve℠ license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier℠ service	Yes	Yes	Yes	Yes

Glossary

10BASE-T	10-Mbps Ethernet.
100BASE-T	100-Mbps Ethernet. See Fast Ethernet.
ANSI	American National Standards Institute.
ATM	Asynchronous Transfer Mode. A new high-speed networking protocol.
COSE	Common Open Software Environment.
CSMA/CD	Carrier Sense Multiple Access with Collision Detection.
Fast Ethernet	IEEE standard for 100 Mbps Ethernet.
FDDI	Fiber Distributed Data Interface. A 100 Mbps fiber-optic LAN technology.
Gateway	A communications device or program that passes data between networks having similar functions but dissimilar implementations.
IEEE	Institute for Electrical and Electronic Engineers.
Internet	A global network of networks that connects all kinds of computers using the Internet protocol, enabling them to share services and communicate.
Intranet	The application of Internet technologies on internal corporate networks.
LAN	Local area network.
MAC	Media Access Control.
NFS™	Network File System.
ONC+™	Open Network Computing.
QFE	Quad FastEthernet. Sun's 4-port 10/100 Mbps networking interface card.
Router	A system that provides access among multiple networks.
SQEC	SBus Quad Ethernet Card. Sun's 4-port 10 Mbps networking interface card.
WAN	Wide area network.

Materials Abstract

All materials are available on SunWIN, except where noted.

Collateral	Description	Purpose	Distribution	Token # or Comac order #
Product literature				
– *Sun™ Quad FastEthernet™ Network Interface Card*	Datasheet	Sales tool	SunWIN, Comac	62979 DE732-0
– *Sun Quad FastEthernet Just the Facts*	Reference Guide for Quad FastEthernet	Training	SunWIN, Reseller web	66857
References				
– *Sun Intro—Sun Quad FastEthernet SBus Network Interface Card 4/1/97*	Introduction e-mail on QFE	Sales tool	SunWIN, Reseller web	TBD