Bay Networks

Product Announcement

BayStack 303 and BayStack 304 Ethernet Switches

Summary

Bay Networks announces the release of the BayStack™ 303 and BayStack 304 10+100 Ethernet Switches. These new products provide low-cost, high-performance solutions for desktop and segment switching applications. As the latest members of the extensive BayStack family of shared, switched, routing and remote access products, the BayStack 303 and BayStack 304 switches deliver the inherent advantages of plug-and-play interoperation with other BayStack products. Customers can create complete networking solutions that are cost-effective, scalable for the future, and easy to use and manage.

The BayStack 303 Ethernet Switch offers 24 switched 10BASE-T ports, and one configurable autosensing switched 10BASE-T/100BASE-TX port. Additionally, it has one Media Dependent Adapter (MDA) slot that supports either an autosensing half- or full-duplex 10BASE-T/100BASE-TX port or a half- or full-duplex 100BASE-FX port (see Figure 1).

The BayStack 304 Ethernet Switch is functionally equivalent to the BayStack 303 switch, aside from the fact that it offers fewer switched 10BASE-T ports. The BayStack 304 switch has 12 switched 10BASE-T ports, one configurable autosensing switched 10BASE-T/100 BASE-TX port, plus one MDA slot for an optional autosensing half- or full-duplex 10BASE-T/100BASE-TX port or a half- or full-duplex 100BASE-FX port.

The BayStack 303 switch dramatically improves network performance and provides the higher port density required for desktop switching applications. Its "24+2" configuration, coupled with an aggressive low price, positions the BayStack 303 as the ideal desktop switching solution. The switch provides dedicated, low-cost 10 Mbps Ethernet connections to each end user, while offering an onboard 100BASE-TX port for high-speed server connections, and a 100BASE-FX MDA port for fiber uplinks to network centers.

The BayStack 304 switch can be used to complement the BayStack 303 switch, or as a standalone solution. With its low cost, 12 switched 10 Mbps ports and two switched 100 Mbps ports, the BayStack 304 switch represents the most attractive entry point for segment switching on the market. It is ideal for microsegmenting wiring closets because it offers the right port density at the right price.

Configuration and management support for the BayStack 303 and BayStack 304 Ethernet switches is provided through an easy-to-use console interface (out-of-band) or through Telnet (in-band) support.
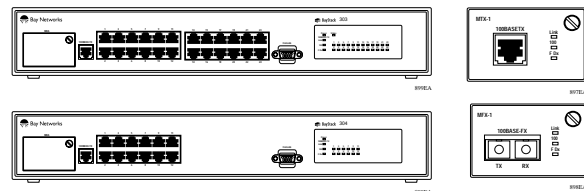

Figure 1: BayStack 303 (top) and 304 (bottom) Ethernet Switches and their autosensing 10BASE-T/100BASE-TX and 100BASE-FX MDAs (right). (Note: MDAs are not shown to scale.)

The BayStack 303 and BayStack 304 switches are fully compatible with the entire BayStack family. Coupled with the BayStack 350, 28200 and 28115/ADV switches, they constitute the most flexible switch family on the market.

Key Product Features and Highlights

- Provides 12 or 24 switched 10BASE-T ports and one configurable, autosensing half- or full-duplex 10BASE-T/100 BASE-TX switched port.

- Support for one configurable, autosensing half- or full-duplex 10BASE-T/100BASE-TX or 100BASE-FX switched MDA port.

- The 100BASE-FX MDA port is ideal for creating a fiber uplink to network centers.

- Half-duplex operation on 10BASE-T switched ports supports connections to existing 10 Mbps workstations and shared media hubs.

- Full-duplex operation on the 10BASE-T/ 100BASE-TX autosensing ports provides connections to servers or backbone switches.

- Store-and-forward frame switch design prevents errored frames that can consume valuable network bandwidth from propagating through the switch.

- Offers full 802.1D-compliant MAC Layer frame forwarding.

- Includes IEEE 802.1D-compliant Spanning Tree Protocol (STP) support for redundant network design.

- Provides significant aggregate throughput with minimum-sized Ethernet frames. BayStack 303 switch: 420,000 packets per second (pps); BayStack 304 switch: 380,000 pps.

- Full-wire speed forwarding rate supported on all 10BASE-T ports.

- Support for 1023 MAC addresses per switch.

- Provides protection against broadcast or multicast storms.

- Password-protected Telnet support for in-band switch configuration and management.

- RS-232 console port supports out-of-band switch configuration and management.

- Provides SNMP manageability through any port; supports Bridge MIB (RFC 1493) and MIB II (RFC 1213).

- Supports 4 RMON groups.

- Includes Flash memory for nonvolatile storage of switching software image and system configuration information.

- TFTP support allows remote switch software image downloads.

- Multiple international language interfaces supported in console user interface.

- Front panel LEDs provide real-time system and port status at a glance.

- Slim 1.7 in. rack unit design minimizes use of rack space.

BayStack 303 and BayStack 304 Ethernet Switch Applications

Introduction

With the advent of web-based corporate Internets and intranets, rapid increases in the processing power in workstations and servers, the proliferation of bandwidth-hungry groupware applications and integrated multimedia applications, many organizations are facing the challenge of providing new network services to address their need for additional bandwidth and increased workgroup performance.

From a pure bandwidth perspective, the challenge to the network is to carry more of the same traffic and to adapt as the bandwidth volume increases. There are two basic approaches that attack the bandwidth problem and cost-effectively boost Ethernet workgroup performance: desktop switching and segment switching.

High-performance Pentium-based workstations with EISA or PCI bus architectures can generate from 250 to 1000 Mbps of network traffic, a staggering 25-100:1 mismatch to the shared 10 Mbps LANs that many customers have deployed. By providing dedicated 10 Mbps links to each end user, the competition for bandwidth typical of 10 Mbps shared media LANs is completely eliminated.

The BayStack 303 switch provides 10 Mbps of dedicated bandwidth at every port, increasing end user performance and maximizing bandwidth at a breakthrough price.

Segmentation is the process of breaking up shared media LANs into smaller segments, then reconnecting the segments by adding a switch. This gives each segment a full 10 Mbps of bandwidth, increasing the effective bandwidth available to the entire workgroup. Most companies prefer this approach because the switch investment can be amortized across the greatest number of end users.

Segmentation also supports configurations in which most end users are connected to shared media hubs, with a few power users connected to dedicated desktop switch ports. Ideal for budget-conscious customers, the BayStack 304 increases bandwidth economically without requiring the purchase of a 24-port switch.

BayStack 303 Ethernet Switch Applications

Despite the higher incremental investment, there is growing interest in deploying dedicated 10 Mbps desktop switches to replace shared media hubs at the wiring closet level. Use of this type of switch provides dedicated 10 Mbps connectivity to selected power users and makes way for the eventual upgrade of all end users. Upgrading from 10BASE-T shared media to 10BASE-T desktop switching can add significant costs, therefore the key criteria for deploying a desktop switch is low per-port cost. Desktop switch prices should be compared on a per-port rather than per-chassis basis.

The BayStack 303 switch achieves superior performance in desktop switching at a breakthrough price. Based on a proven architecture that extends frame switching of Layer 2 Media Access Control (MAC) frames across all ports, the switch offers 24 switched 10BASE-T ports for desktops, and one port for switched 10 BASE-T/100BASE-TX for a server, plus one switched 10BASE-T/100BASE-TX or 100BASE-FX MDA port for a backbone uplink. The BayStack 303 switch is ideal for providing low-to-medium density desktop switching in mid-tier wiring closets (see Figure 2).

In the workgroup, client/server applications place a heavy load on the network. If several users are involved in heavy computational work, a BayStack 303 switch is required to alleviate the network congestion. The switch provides the server with a high-speed, switched 100BASE-TX connection (fat pipe) and connects end-users to dedicated, switched 10BASE-T ports, making the upgrade to full 10 Mbps switching fast, simple, and seamless.
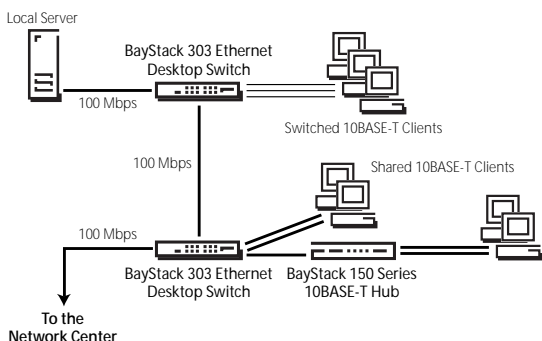

Figure 2 : BayStack 303 low-to-medium density desktop switching for 10BASE-T+100BASE-TX networks.

In large enterprise environments , where BayStack 303 switches are installed for end-user connectivity, network managers can cost-effectively increase port count by aggregating high-speed links from multiple BayStack 303 switches using a BayStack 350T or 350F Autosense Switch. This scalable solution starts with 24 ports and can be expanded in increments of 24 ports, enabling a low-latency, high-throughput architecture to be created.
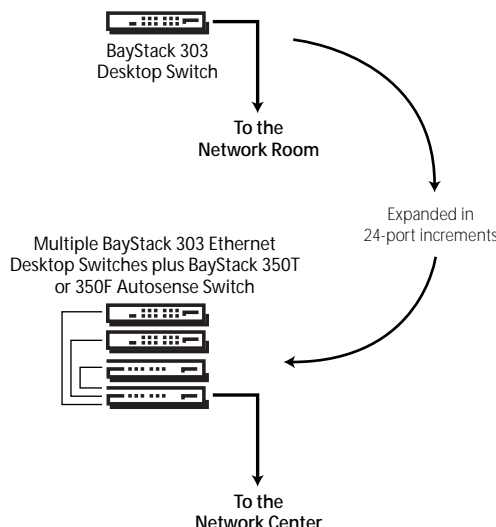

Figure 3 : BayStack 303 high density desktop switching for 10BASE-T+100BASE-TX networks.

The BayStack 303 switch is also ideal for smaller networks with one or two shared media hubs and a small number of high-bandwidth power users. In this application, the BayStack 303 switch acts as a hybrid desktop/segment switch, which is made possible by the large number of MAC addresses supported.

BayStack 304 Ethernet Switch Applications

Ethernet switches have made network segmentation more manageable and affordable by combining multiple bridges into a single low-cost multiport bridge, known as a "Layer 2 switch." The segmentation model for improving performance can now be implemented by simply re-connecting individual hubs or segments to a switch port, thereby instantly increasing the amount of aggregate bandwidth and overall workgroup performance.

With a median population served from a given wiring closet of approximately 100 end users, wiring closets typically have about five to eight shared media hubs consisting of one to three segments. Improving performance through segmentation usually means providing a dedicated port for each of those shared hubs. Because few wiring closets house more than 12 shared media hubs, switches with a high port count tend to have several unused ports.

Using a desktop switch to do the job of a segment switch is usually an expensive proposition. Designed specifically for this type of wiring closet installation, the BayStack 304 switch provides a smaller number of low-cost switched 10BASE-T ports, delivering an economical segmentation solution.

With its 12-port configuration, the BayStack 304 switch is able to address the segmentation needs of most wiring closets with several ports to spare. These additional ports are ideal for providing dedicated bandwidth to a few power users. Cost-effective segment switching for 10BASE-T departmental workgroups is the leading application for the BayStack 304 switch (see Figure 4).
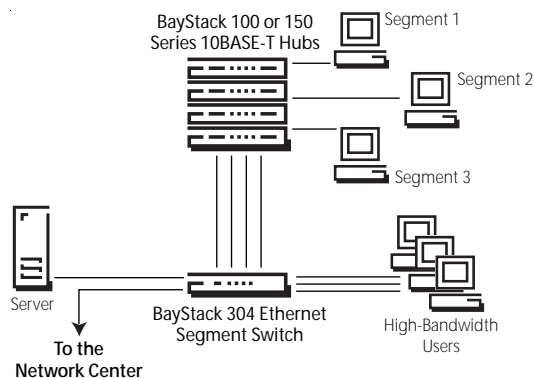

Figure 4: BayStack 304 Ethernet switch segmenting 10BASE-T workgroup LANs.

Once network performance in a client/server network is improved through segmentation, there is a good chance that the server will become the next network bottleneck. The congestion point can move if the entire network design is not considered. To avoid this problem, the BayStack 304 provides up to two high-speed 100 Mbps ports, allowing simultaneous high-capacity connections to a server as well as a network center uplink.

BayStack 303 and 304 Ethernet Switch Features

The BayStack 303 and BayStack 304 Ethernet switches are simple, low-cost, practical solutions that dramatically improve network performance with a limited, incremental investment. Both models are "plug, play, and forget" devices, with a number of built-in features that even the most sophisticated network manager will appreciate.

10BASE-T and 100BASE-TX ports

The BayStack 303 and BayStack 304 Ethernet switches provide RJ-45 10BASE-T ports (24 for Model 303 and 12 for Model 304) and an RJ-45 10/100BASE-TX port. All of these connectors are wired for MDI-X pin-outs, allowing connections to be made to end stations by using straight-through patch cables. For connecting to a conventional Ethernet hub or switch, a crossover cable is required unless an MDI connection exists on the associated port of the device. The RJ-45 10BASE-T jacks accept standard Category 3, 4, or 5 copper unshielded twisted pair (UTP) cable connections. The 10 Mbps ports operate in half-duplex mode only and each port has an associated LED that indicates the link status of the line.

Both the BayStack 303 and BayStack 304 switches have one built-in 10/100BASE-TX port designed to operate at either 10 Mbps or 100 Mbps, depending on the connected device. The RJ-45 10/100 Mbps jack accepts only Category 5 cable. This port supports the IEEE 802.3u autonegotiation standard to automatically detect the speed of the attached device, and to distinguish between half or full-duplex transmission modes. As a result, this port adapts to one of the following four speeds and modes:

- 10BASE-T half-duplex
- 10BASE-T full-duplex
- 100BASE-TX half-duplex
- 100BASE-TX full-duplex

Port speed is automatically reflected by the LEDs.

10BASE-T/100BASE-TX and 100BASE-FX Media Dependent Adapters (MDA)

As an option, the MDA slot may be populated with either a 10BASE-T/100BASE-TX copper MDA or with a 100BASE-FX fiber MDA. Both of these MDAs distinguish between the half-duplex or full-duplex transmission modes of the connected device. The 10BASE-T/100BASE-TX MDA also autosenses link speed.

The 100BASE-FX MDA is primarily used for fiber-based uplinks from network centers or to servers when multimode fiber is installed. This adapter accepts standard SC connections using 62.5/125 micron fiber optic cable. The 100BASE-FX MDA does not support single mode fiber.

Spanning Tree Protocol

The BayStack 303 and BayStack 304 Ethernet Switches support the Spanning Tree Protocol (STP) as specified in the ANSI/IEEE 802.1D (ISO/IEC 10038) Media Access Control Bridges standard. STP is implemented to detect and eliminate logical loops in a Layer 2 bridged or switched network. When multiple paths exist, the Spanning Tree algorithm autoconfigures the network and places some of the bridge ports on standby to form a network with the most efficient traffic paths and to avoid the continual looping of frames. If a path fails, the protocol reconfigures the network to activate standby ports and bring up redundant paths to maintain network operations. Spanning Tree Protocol (STP) can be disabled on the entire switch, but not on a per-port basis. STP is enabled by default.

Concurrent RMON on Every Port

Bay Networks shared media hubs provide administrators with a wealth of management information and planning tools. The BayStack 303 and BayStack 304 switches extend these capabilities by supporting four groups of RMON on each port. These RMON MIB groups are: Alarms, Events, History and Statistics.

Communications Port

The communications port is an RS-232 serial port with a DB-9 male connector. BayStack 303 and BayStack 304 switches support out-of-band connections to an ASCII terminal or to a workstation running terminal emulation software. By connecting a terminal to the communications port, users can view the switch's diagnostic messages during the boot process, and access set-up menus that enable network administrators to configure the switch for network operation.

TFTP Support

Software upgrades are provided by Bay Networks in the form of image files that are downloaded into the Flash memory of the switch. The BayStack 303 and BayStack 304 switches support Trivial File Transfer Protocol (TFTP) for remote download of future enhancements or upgrades of switching software into the non-volatile Flash memory.

BayStack 303 and BayStack 304 Ethernet Switch System Management and User Interface

The BayStack 303 and BayStack 304 Ethernet Switches can be configured and managed by three different options: console interface, Telnet, and any SNMP applications.

The following sections describe and contrast the three management and configuration options.

Multi-lingual Console Interface

The out-of-band (OOB) direct console interface can be used to set up basic configuration parameters such as the initial IP address, default gateway, and community strings required for SNMP support. Any VT100-compatible terminal or PC running terminal emulation software is able to access this menu-driven interface.

The console interface also supports menu display in seven different languages: Chinese, English, French, German, Italian, Japanese, and Spanish.

The initial screen offers a choice of languages and the choice is saved in NVRAM. The console interface provides complete configuration and management for the BayStack 303 and BayStack 304 switches.

Telnet Interface

In-band configuration and management of the BayStack 303 and BayStack 304 switches are supported through Telnet. Once an IP address has been configured for the switch through the console interface, a user can Telnet into the

switch for day-to-day operation. The same menu-driven screens used by the console are displayed. The switches support two Telnet sessions in addition to a local console connection. Although console and Telnet sessions can take place at the same time, only one user can change configuration of the switch at a given time. Telnet sessions are password-protected. The local console interface port is used to set, remove or change Telnet passwords.

SNMP Support

Simple Network Management Protocol (SNMP) is supported by BayStack 303 and BayStack 304 Ethernet Switches through implementation of the industry-standard TCP/IP-based network equipment MIBs, including MIB II (RFC-1213) and the Spanning Tree-related MIB, i.e., Bridge MIB (RFC-1493). The SNMP implementation supports public and private community strings, and up to four trap destinations.

Technical Specifications

Network Protocols
Ethernet
Fast Ethernet

Standards Supported
802.1d
802.3i 10BASE-T
802.3u 100BASE-T

Switch Configuration
BayStack 303 Switch
24 10 Mbps ports
One 10BASE-T/100BASE-TX port
One optional 10BASE-T/100BASE-TX or
100BASE-FX MDA port
BayStack 304 Switch
12 10 Mbps ports
One 10BASE-T/100BASE-TX port
One optional 10BASE-T/100BASE-TX or
100BASE-FX MDA port

Electrical Specifications
Input current: 1.5 to 0.6 amps
Input voltage (rms): 90 to 250 VAC @ 47 to 63 Hz
Power consumption: 60 W maximum

Environmental Specifications
Operating temperature: 0° to 40° C (32° to 104° F)
Storage temperature: –25° to 70° C (–13° to 158° F)
Operating humidity: 85% maximum relative humidity, noncondensing
Storage humidity: 95% maximum relative humidity, noncondensing
Operating altitude: 3024 m (10,000 ft)

Physical Specifications
Height: 2.77 in. (7.03 cm)
Depth: 13.55 in. (34.42 cm)
Width: 17.5 in. (43.8 cm)

Performance Specifications
Aggregate throughput (64-byte packets):
BayStack 303: 420,000 packets per second (pps), learned unicast traffic
BayStack 304: 380,000 pps, learned unicast traffic
Switched 10 Mbps port forwarding rate: 14,880 pps
Switched 100 Mbps port forwarding rate: 148,810 pps
Latency: Less than 25 microseconds for minimum length packets

Hardware Architecture
Processor: 68340
EEPROM: 2 KB (nonvolatile)
Processor DRAM: 2 MB
Buffer pool: 1 MB EDO DRAM—shared buffer (2 MB)
Flash memory: 1 MB
Address table: 1023 addresses

Electromagnetic Immunity
RF susceptibility: IEC801-3, Level 2
Electrostatic discharge (ESO): IEC801-2, Level 2/3
Electrical Fast Transitions (EFT/B)IEC801-4, Level 1/2

Electromagnetic Emissions
FCC Class A digital devices
EN 55 022 (CISPR 22), Class A
VCCI Class 1 ITE

Safety Agency Approvals
UL Listed
CSA Certified
TUV Licensed
ANSI/NFPA 70 National electrical code; article 110-16, 110-17, 110-18

Questions and Answers

The following are frequently asked questions regarding the BayStack 303 and BayStack 304 Ethernet Switches.

How does the BayStack 303 switch differ from the BayStack 304 switch?

The BayStack 303 switch offers high port density at a breakthrough low per-port price, with desktop switching or hybrid desktop/segment switching as its target applications. In contrast, the BayStack 304 switch offers low port density at a low unit price, with segment switching as its target application.

Do the 10 /100 Mbps ports autosense for speed?

Yes, only the 10/100 Mbps ports autosense for speed. Automatic speed detection is part of the 100BASE-T standard called "autonegotiation." This autonegotiation standard allows a station to support 10/100 Mbps and half/full duplex today, and possibly optional flow control in the future.

Can the 10 Mbps ports run at full-duplex ?

No, only the 100 Mbps port(s) support full-duplex operation.

When would you ever run half-duplex between switches if you can full-duplex?

You wouldn't. However, if you are connecting to a Fast Ethernet repeater, you do not have a choice. You must run half-duplex (CSMA/CD).

Do the BayStack 303 and 304 switches support cut-through switching?

No, BayStack 303 and 304 switches do not support cut-through switching. They support store-and-forward switching for both 10 and 100 Mbps operation. When a frame moves between a 10 Mbps port and a 100 Mbps port , it must be buffered to avoid an underflow condition. Store-and-forward mode also helps eliminate the propagation of CRC errors, filters, runts, and bad frames.

How is the software image downloaded to the BayStack 303 and BayStack 304 switches?

Software downloads are required to upgrade software with enhanced functionality or to replace a software image that may have been corrupted in Flash memory. The TFTP protocol, initiated through the console interface, is used to download the new image from a remote TFTP server. Future software releases will provide runtime image download capability and enable users to initiate the download process through Telnet or SNMP.

What is BayStack 303 and BayStack 304 switch pricing and availability?

The BayStack 303 Ethernet Switch lists for US $2,350, or US $94 per port, and will be available in quantity by mid-July. The BayStack 304 Ethernet Switch lists for US $1,625 or US $125 per port, and also will be available in quantity by mid-July.

How do I link multiple BayStack 303 or BayStack 304 switches together?

There are two ways to connect BayStack 303 or BayStack 304 switches: one or more 100 Mbps full-duplex (200 Mbps) links between switches; or one or more 100 Mbps full-duplex (200 Mbps) links between a BayStack 303 or 304 switch and a BayStack 350 Autosense Switch, where the BayStack 350 switch is used to aggregate links from multiple BayStack 303 or 304 switches.

Do the BayStack 303 and 304 switches support the Redundant Power Supply Unit (RPSU)?

No. Customers that require the option of adding redundant power should consider the BayStack 301, 28200, 28115/ADV or 28104/ADV switches.

Do the BayStack 303 and 304 switches support VLANs?

No. Support for VLANs is not provided in these switches. In the majority of applications this feature is not required. Customers that require VLANs should use the BayStack 301 or 350 switches.

Do the BayStack 303 and BayStack 304 switches support conversation steering?

No. Support for conversation steering is not provided in these switches.

Ordering and Availability Information

Bay Networks will be accepting orders for the BayStack 303 and 304 Ethernet switches in late June. Volume shipments begin later in mid-July.

Order Number	Description	U.S. List Price
AL2001?04*	BayStack Model 303 24+1 Ethernet Switch with one MDA slot	$2,350
AL2001?05*	BayStack Model 304 12+1 Ethernet Switch with one MDA slot	$1,625
AL3133001	Model MTX-1 100BASE-TX Media Dependent Adapter(MDA) for BayStack 303/304 switches	$345
AL3133002	Model MFX-1 100BASE-FX Media Dependent Adapter(MDA) for BayStack 303/304 switches	$745

* Note: The seventh character (?) of the switch order number MUST be replaced with the proper code to indicate desired product nationalization:

"A" – No power cord included.
"B" – European "Schuko" power cord common in Austria, Belgium, Finland, France, Germany, The Netherlands, Norway and Sweden.
"C" – Power cord commonly used in the United Kingdom and Ireland.
"D" – Power cord commonly used in Japan.
"E" – North American power cord.
"F" – Australian power cord, also commonly used in New Zealand and the People's Republic of China.

Warranty Information
Bay Networks provides a one-year warranty for hardware from date of delivery to the end-user. Warranty service is provided under a "return to factory" repair or exchange program and can be obtained by calling your local reseller or contacting Bay Networks directly.

Service and Support
Bay Networks provides a wide range of support services under the Bay Networks Service program. Included in these offerings are telephone support, installation, parts exchange, software maintenance and a host of other contract maintenance and consulting programs. Please contact your local product reseller or Bay Networks for more details on these support programs. To contact the Bay Networks service sales desk, please call (508) 436-8880.

Technical Assistance for Installed Products
Support for installed Bay Networks products is available from your local product reseller or through the Bay Networks Technical Response Center (TRC) Contract Hotline. The TRC contract hotline can be reached in the U.S. and Canada by calling 800-473-4911, in Europe by calling 011-33-92-966-968, in Asia Pacific by calling 011-61-2-9927-8800, and worldwide by calling (408) 764-1000. Technical information is available using the InfoFACTS fax-on-demand system in the U.S. and Canada by calling (800) 786-3228 and internationally by calling (408) 764-1002. Technical information can also be found in the Bay Networks forum on CompuServe or on the Bay Networks Worldwide Web home page at http://www.baynetworks.com.

Corporate Headquarters
Bay Networks, Inc.
4401 Great America Parkway
Santa Clara, CA 95054
Tel: (408) 988-2400
Fax: (408) 988-5525

Bay Networks, Inc.
8 Federal Street
Billerica, MA 01821
Tel: (508) 670-8888
Fax: (508) 436-3436