SYNCHRONY®

IAN-150

Powerful, Internetworking Frame Relay Access Switch (I-FRAS) Integrated Packetized Voice and Data Switching

SYNCHRONY

Up to 60 voice ports, 12 serial ports and 2 LAN ports

Voice over Frame Relay and Voice over IP

Extensive protocol support

Standards-based voice compression

Fully Year 2000 Compliant

If you are looking for a flexible, cost-effective, and high performance branch office solution for your business-critical networks, you won't find a better product than the SYNCHRONY Integrated Access Node, IAN-150.

Branch offices share many of the same networking challenges as larger sites. However, they call for devices with fewer connections to make highly efficient use of expensive links to headquarters, and provide extensive remote management capabilities– which is exactly what the IAN-150 offers!

The IAN-150 provides an innovative solution for branch network consolidation through its use of EXPRESS SWITCHING® for QoS (Quality of Service), traffic prioritization, improved response time for high priority traffic and bandwidth efficiency. It offers broad support for wide area networking protocols and services, giving you the most for your telecommunications dollar.

The IAN-150 enables you to gracefully migrate to distributed computing. The IAN-150 consolidates your LAN and legacy traffic—including TCP/IP, IPX, SNA/SDLC, 3270 Binary Synchronous Communications (BSC), asynchronous and Burroughs Poll Select (BPS) onto a single wide area network, proving the old adage that great things really do come in small packages.

INTEGRATED PACKET VOICE AND DATA

The IAN-150 provides true integration of voice and data over existing data facilities, whether leased line, frame relay or IP. Utilizing the unused bandwidth for transport of voice between branch offices significantly reduces costs associated with per minute charges. The IAN-150 supports a full suite of legacy traffic at a branch office, providing frame relay and X.25 switching, leased line, and ISDN transport.

The IAN-150 consolidates LAN and host-based networks onto one wide area backbone. Consolidating remote office networks is just one way TimePlex can help you control costs. The IAN-150 also provides extensive support for IBM traffic, remote management capabilities and TimePlex's patented EXPRESS SWITCHING architecture for prioritizing traffic through your network.

Voice Over Frame Relay and Voice Over IP

Different networks have different requirements. The IAN-150 provides the capability of transmitting packetized voice over either frame relay or IP networks. If your network requirements change, the IAN-150 is ready to change without requiring costly hardware upgrades.

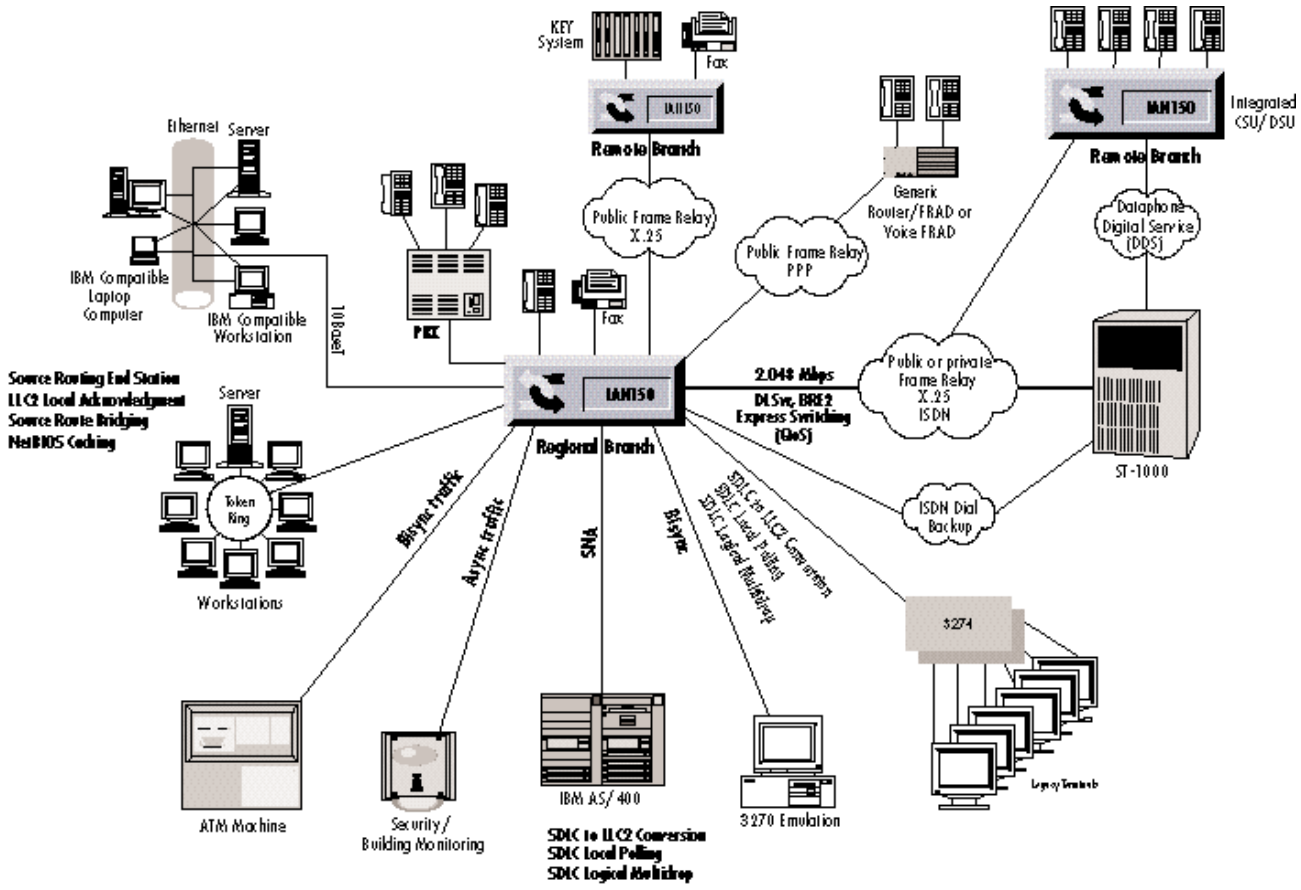


Figure 1
Branch Network Consolidation using the SYNCHRONY IAN-150

Standards-Based Voice Compression: G.711, G.729A, G.723.1, G.726, G.727

High quality voice compression algorithms provide near toll quality voice while minimizing bandwidth requirements. A wide range of speeds is available to meet any requirement from uncompressed voice at 64 kbps down to as low as 5.33 kbps. Use of standard algorithms ensures interoperability between differing vendors voice equipment.

FRF.11 and FRF.12 Compliance

Frame Relay Forum specification FRF.11 defines a method for transmitting multiple logical channels over a single frame relay PVC. This multiplexing of data and voice channels over a single PVC reduces facilities cost and reduces implementation time.

Packetized voice systems send voice samples in small frames to reduce latency across the network. When both voice and data are present on the line simultaneously, large data frames can unacceptably delay the voice. To prevent this from occurring, the IAN-150 fragments large data frames into smaller segments. FRF.12 specifies the standard procedure to perform thi fragmentation. IAN-150's conformance with FRF.12 allows data that has been fragmented in a generic FRAD to be reassembled in the IAN-150.

Call-By-Call Switching Using Dialed Digits

Call by call switching inside the network eliminates the necessity to establish point to point connections between each location. The IAN-150 routes each call based on the DTMF digits dialed by the user. The network itself acts as a distributed tandem switch, reducing the overall number of connections required.

Modem Relay and Fax Relay up to 14.4 kbps

Voice compression algorithms typically do not respond well to steady analog tones produced by fax machines and modems. To mitigate this effect the IAN-150 incorporates a fax and modem relay function that terminates the fax or modem call in the IAN-150 and transports it across the network as a digital data signal. At the distant end the IAN-150 re-modulates the fax or modem signal and forwards it to the destination. The end result is reliable fax or modem transmission at rates up to 14.4 kbps.

VOICE Traffic Shaping

Typical frame relay networks are often designed as a "hub and spoke" where one central site has connections to a number of smaller branch sites. Often, the speed of the connection at the central site is higher than the speed of the branch site to which it is connected. While this is not a great concern in data networks, it can have a significant impact on voice quality.

The IAN-150 implements a sophisticated traffic shaping algorithm to limit the data flow from the high-speed end of the circuit to a rate equal to the lower-speed at the distant end. The result is high quality voice regardless of the amount of simultaneous data.

EXPRESS SWITCHING® Technology-Pioneered by TimePlex

The IAN-150 uses EXPRESS SWITCHING to maintain the performance of legacy applications in an integrated LAN/ voice/ legacy network. EXPRESS SWITCHING, pioneered by TimePlex, transports a mix of traffic (data, voice and video), optimizing bandwidth utilization while ensuring conformance to assigned quality of service criteria.

EXPRESS SWITCHING has three key attributes:

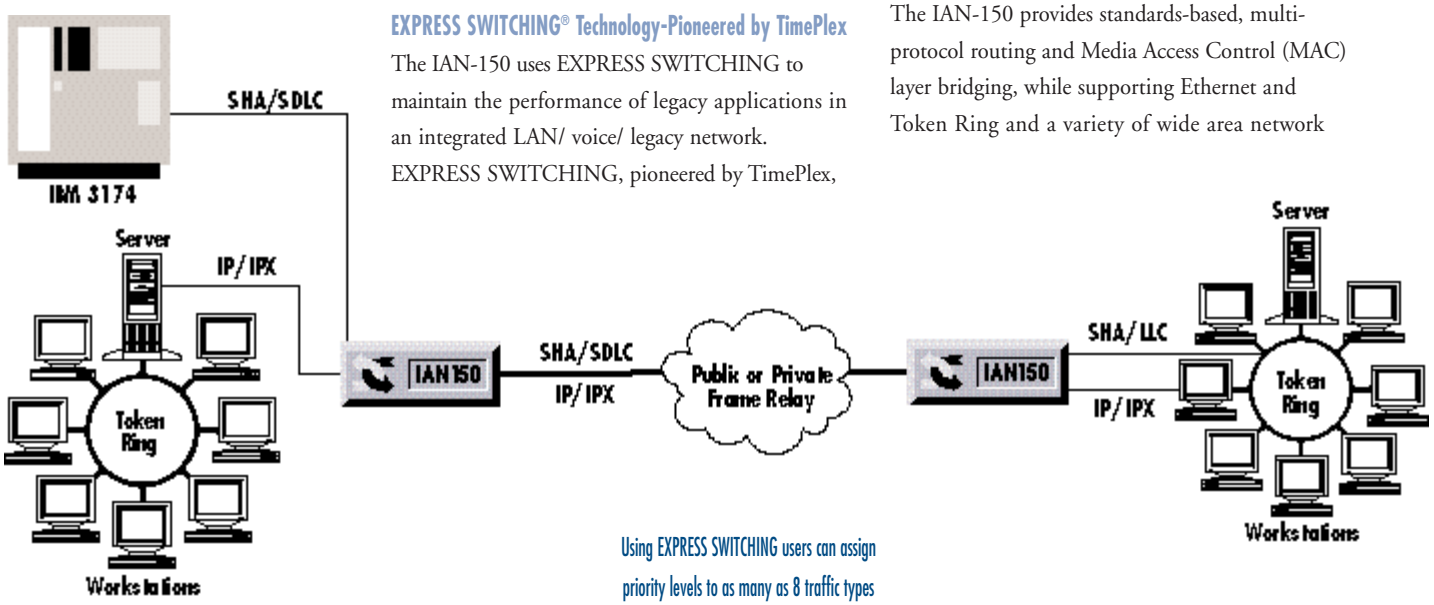
- Consolidation of LAN, voice and legacy traffic on a single multi-protocol network
- Prioritization of individual voice and data streams by port, by protocol, by workstation or by application
- Low end to end delay

EXPRESS SWITCHING allows a network manager to assign a certain Quality of Service to individual voice and data streams on an end-to-end basis, improve response time for priority traffic, reduce bandwidth required to support a given set of applications, improve application performance using the same bandwidth and improve network resiliency. In essence, EXPRESS SWITCHING allows business-critical applications to share the same network on a non-interfering basis with other less critical traffic.
At intermediate nodes, layer 2 switching improves end-to-end responsiveness, by reducing processing delay.

High-performance, Standards-Based, Multiprotocol Routing and Bridging Software Suite

The IAN-150 provides standards-based, multi-protocol routing and Media Access Control (MAC) layer bridging, while supporting Ethernet and Token Ring and a variety of wide area network

Figure 2
Traffic Prioritization



Using EXPRESS SWITCHING users can assign priority levels to as many as 8 traffic types

interface types including X.25, frame relay (UNI/NNI), leased line and ISDN, at speeds up to 2.048 Mbps. Any protocol can be bridged transparently for total enterprise connectivity. The IAN-150 performs routing and bridging concurrently, adhering to a wide range of industry communication standards.

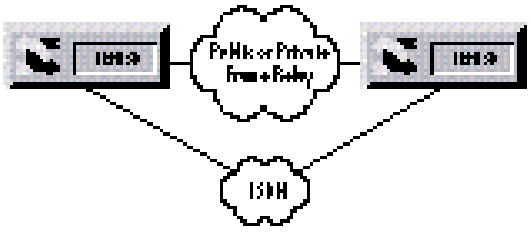
Traffic Prioritization

The IAN-150 allows traffic to be sorted into seven priority categories as part of EXPRESS SWITCHING. These priorities can be assigned based on source or destination addresses, incoming ports, Frame Relay PVCs or protocols. To effectively support voice, multimedia applications and the mix of Internet and SNA traffic types, simple priorities are not enough. There are many cases where a particular application should have a higher priority, but not at the exclusion of all other priorities. The IAN-150 allows rate restrictions at each priority level so that each priority can be assigned a not-to-exceed limit.

Network Resiliency

The IAN-150 has 1:N backup capability to provide network resiliency. If a primary port fails, traffic is routed over an alternate line and when the primary facility is restored, traffic is automatically returned to the primary path. Backup may be initiated by port failure, Frame Relay PVC failure or X.25 circuit failure.

Figure 3
Disaster and Recovery



ISDN dial back-up is available for nodes that do not have alternate paths. The ISDN interface supports Frame Relay and X.25 protocols in multi-node configurations. The backup and the primary port do not have to be on the same node, allowing a very flexible design.

Sophisticated Protocol Spoofing

The IAN-150 supports protocol spoofing allowing legacy protocols i.e.: SDLC, 3270 BSC (Binary Synchronous Communication), and BPS (Burroughs Poll Select) to take advantage of new network transport techniques without burdening the wide area network with idle polls. Along with spoofing idle polls, the IAN-150 also spoofs the information frames and takes responsibility for delivery. Spoofing reduces bandwidth usage and eliminates time-outs caused by typical variations in WAN delays.

In addition to providing access to network technologies such as Frame Relay, the overall response time can be reduced by using a protocol spoofed system over traditional leased lines as the IAN-150 enables the speed at each remote site to match the traffic and speed capabilities of the attached DTE. Additionally, increasing the polling rate at the remote site can dramatically reduce the poll-to-response propagation delays without impacting the central site FEP (Front End Processor).

Bridging Support

The IAN-150 supports, on a frame by frame basis, Transparent, Source Route and Source Route Transparent (SRT) bridging for IEEE 802.3 Ethernet or IEEE 802.5 Token Ring LANs. The IAN-150 uses Source Route Transparent and Spanning Tree Algorithm (STA/P 802.1d) standards. Translational bridging is also supported. For bridging over the WAN, Bridge Relay Element (BRE2) performs all of the special functions to successfully forward both transparent and source route bridged frames over point-to-point serial lines and packet-switched facilities, using Frame Relay

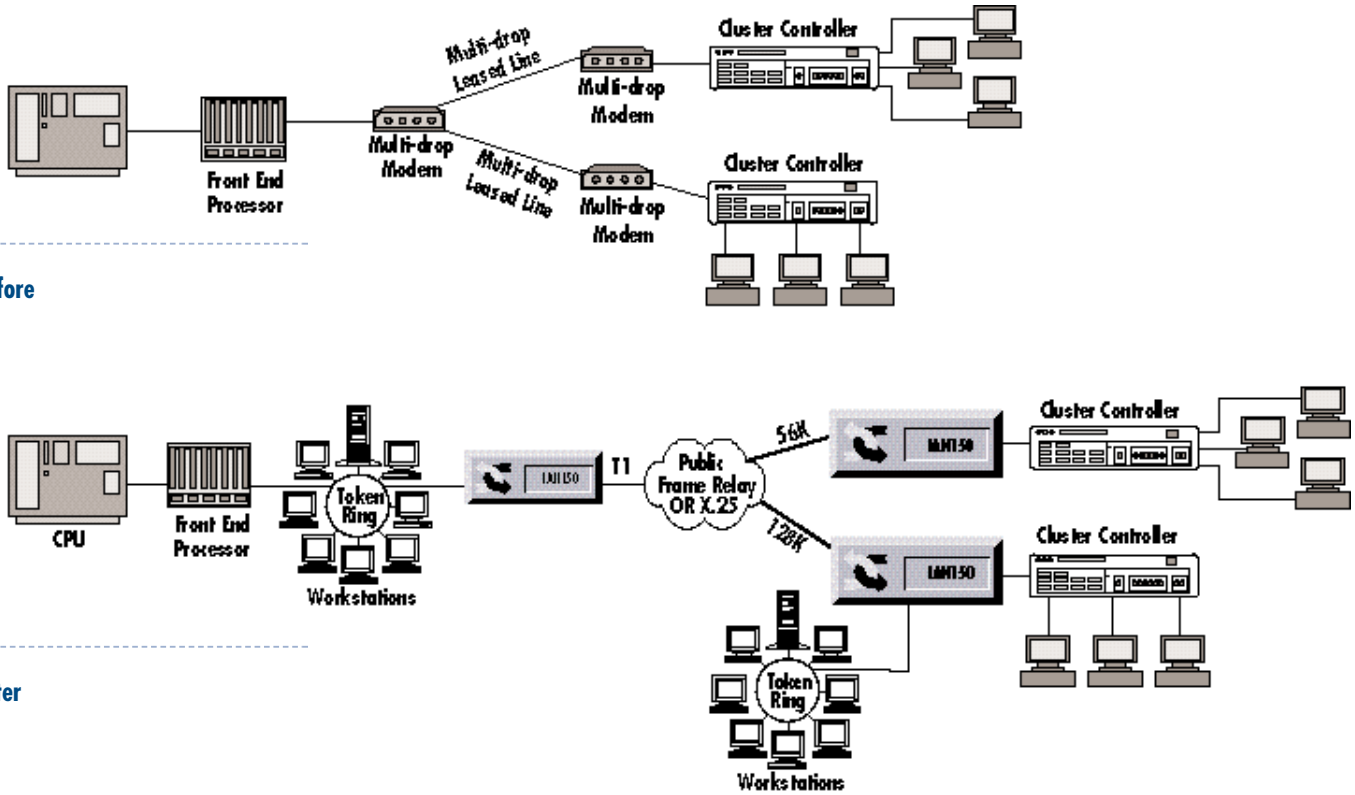


Figure 4
Benefits of public frame relay service utilizing the IAN-150 versus multi-drop private line

format transport mechanism. The IAN-150 has the ability to learn about new bridges when they are added to the network and new routes when the topology changes. BRE2 runs over the frame relay Data Link layer directly. This gives the user the capability to configure remote bridging using either UDP/IP encapsulation or to configure directly over the Data Link layer.

Efficient IPX

In an extended IPX internetwork with multiple LANs, NetWare Servers and WAN links, frequent SAP and RIP broadcasts can have a serious impact on performance. The Remote SAP and Remote RIP features in the IAN-150 reduce network overhead—an issue of particular concern when dealing with lower speed WAN facilities. Instead of simply re-broadcasting each SAP table received from a local LAN to all attached LANs, the IAN-150 builds and maintains a table of advertisements and forwards only those entries that indicate a change in the availability of a particular service. The entire contents of the table are transmitted periodically to accommodate new listeners or compensate for lost updates. This "change state" approach drastically reduces broadcast overhead in large networks.

Remote RIP works very much the same way. Instead of re-broadcasting all RIP broadcasts received from local NetWare Servers, the IAN-150 builds and maintains an IPX RIP table and routinely forwards updates on only those routes whose status has changed.

SUPPORT FOR IBM TRAFFIC

IBM traffic support is a key strength of the IAN-150. It supports a full suite of features not found on most FRADs, such as, DLSw, LLC2 local acknowledgment, SDLC to LLC2 conversion, NetBIOS caching, LLC2 prioritization, SDLC local polling, Source Route Bridging, Source Route Transparent and Source Route End Station.

Data Link Switching (DLSw)

First developed by IBM and later proposed as a standard, Data Link Switching (DLSw) transports SNA and NetBIOS traffic over the WAN using Data Link Layer switching and TCP/IP encapsulation. TimePlex was one of the first companies to implement DLSw, the IBM-compatible working version of the DLSw standard.

LLC2 Local Acknowledgment

Local acknowledgment of LLC2 frames improves bandwidth utilization of WAN links and reduces the probability of SNA sessions being lost due to timeouts caused by WAN delays.

SDLC to LLC2 Conversion

Front-end processors and hosts traditionally use serial SDLC ports to connect to remote controllers. Today, Token Ring interfaces offer a much less costly alternative, but many controllers either cannot accept, or are not yet equipped with Token Ring interfaces. The IAN-150 solves this problem by converting SDLC from IBM cluster controllers to LLC2 traffic for transport over the WAN. The IAN-150 is able to spoof the SDLC connection and convert the data to LLC2, and encapsulate it in frame relay. The data is switched over the WAN via frame relay and, at the destination, Token Ring generates MAC (Media Access Control) and Source Routing information and delivers the data to the LAN.

NetBIOS Caching

NetBIOS devices communicate via broadcasts. By building and maintaining a table associating NetBIOS names with addresses, the IAN-150 forwards NetBIOS frames directly to their destination, dramatically reducing broadcast data sent over the WAN and improving bandwidth efficiency.

LLC Prioritization

The IAN-150 allows you to prioritize individual traffic flows. For example, time-sensitive LLC2 traffic can be prioritized over bursty LAN traffic to reduce the probability of LLC2 time-outs.

PU2.1 Enhancements

PU2.1 type devices can communicate with other PU2.1 devices via the IAN-150. This feature enables simple point-to-point or multidrop SDLC network migration to X.25 and frame relay backbones. When PU2.1 devices are connected, it is possible to perform master/slave negotiation with the XID field. The predefined HPAD will default to the attached PU2.1 as the primary controller. This saves the IBM devices from having to be preprogrammed to fixed primary or secondary modes of operation. The new network provides the benefit of efficient usage of tariffed WAN links, using spoofing and acknowledgments performed by the IAN-150's PAD functionality.

IP MULTICAST

The IAN-150 has the capability to intelligently route IP multicast messages. This capability allows the IAN-150 to provide access to variety of multicast applications. The IP multicast capability of the IAN-150 to simultaneously distribute/broadcast messages to multiple locations results in bandwidth and time efficiency. The IAN-150 can be used in conjunction with the MFTP (Multicast File Transfer Protocol) applications. IP Multicast can be enabled or disabled on a per-port basis. The multicast clients can dynamically enter or leave the groups.

X.25 SWITCHING

IAN-150 can help you migrate your existing X.25 network to newer WAN technologies such as ISDN and Frame Relay. Legacy X.25 devices can be supported with essentially no changes to your

existing network because the IAN-150 will emulate the X.25 network. The IAN-150 supports X.25 access and switching. Closed User Groups (CUG), Hunt Groups, Call-redirection upon link failure, and a wide-variety of other X.25 features are supported.

ISDN BASIC RATE INTERFACE

The ISDN option for the IAN-150 supports National ISDN (NI-1), Euro-ISDN, NET3 and the French variant of NET3. Calls may be made over ISDN circuits when traffic demands the bandwidth. This reduces the number of leased lines required in a network. Both "U" and "S" interfaces are available.

INTEGRATED DSU/CSU FUNCTIONALITY

The IAN-150 has optional integrated interface cards, which provide 56/64 kbps Dataphone Digital Services (DDS), T-1, and E-1 termination capabilities. These interface cards provide DSU/CSU functionality converting customer's data stream to bipolar format for transmission. They provide network protection and diagnostic capabilities such as loop back testing, signal timing and line conditioning. The DDS interface supports both 64 k clear channel and 56 k dedicated throughput. The T-1 and E-1 interfaces support Nx56 k and Nx64 k channels.

CRYPTO RESYNC

In the event of a data link failure, or the loss of synchronization, the IAN-150 will automatically, without operator intervention, resync the attached encryption unit to reset the encryption code.

COMPRESSION AND ENCRYPTION

The IAN-150 supports standards-compliant encryption and compression. FRF.9 is used to compress LAN and Legacy traffic across public Frame Relay networks. A secret-key algorithm is used to encrypt data to provide data confidentiality. The encryption algorithm uses a 32-bit key and thus is exportable to most nations and applications while providing a level of security adequate for commercial applications. The STAC® LZS (version 4) algorithm is used for compression. Compression and encryption can be enabled or disabled on a per PVC basis.

SNMP-BASED NETWORK MANAGEMENT

The IAN-150 can be managed using the following:

- Locally via ASCII terminal
- Remotely via Telnet
- Remotely via SNMS+ and SNMP-based network management platforms such as NetView for AIX, HP OpenView, or SunNet Manager
- MIB-II compliant
- HTML based web-browser interface

Using SNMS+ (HP OpenView compatible application) users can display graphical representation of an IAN-150. The user interface has the capability to fully access and control all configuration and status information on remote nodes. Network managers can configure ports, view throughput for various protocols and check port status on each port of the IAN-150 via a GUI based interface. Users can double check on a particular slot or port and get information about the traps applicable to that slot or port.

COMPREHENSIVE SECURITY

- Authentication via PAP
  - 1024 dial-up PPP accounts for single-user or SOHO network applications
- Built-in packet filtering
- Five levels of console access via administration passwords

EASE OF USE

The IAN-150 user interface screens provide intuitive set-up of even the most difficult legacy protocols. The default parameters used most often are set for the "Novice" level and the "Expert" level can configure any parameter.

DESIGNED WITH FLASH EEPROM TECHNOLOGY

Flash EEPROM technology allows new software revisions to be downloaded remotely via TFTP, eliminating the need for on-site technical expertise.

RFC COMPLIANCE

RFC 768 - User Datagram Protocol

RFC 791 - Internet Protocol

RFC 792 - Internet Control Message Protocol

RFC 793 - Transmission Control Protocol

RFC 854 - Telnet Protocol Specification

RFC 950 - Internet Standard Subnetting Procedure

RFC 1058 - Routing Information Protocol

RFC 1075 - Distance Vector Multicast Routing Protocol (DVMRP) version 1 & 3, with m-routed 3.8 enhancements

RFC 1112 - Internet Group Management protocol (IGMP) version 1, with Host extensions for IP Multicasting

RFC 1134 - Point-to-Point Protocol: A proposal for multi-protocol transmission of datagrams over Point- to-Point links

RFC 1144 - Compressing TCP/IP Headers for Low-Speed Serial Links

RFC 1155 - Structure and Identification of Management Information for TCP/IP-based Internets

RFC 1157 - A Simple Network Management Protocol (SNMP)

RFC 1166 - Internet Numbers

RFC 1171 - Point-to-Point Protocol for the transmission of multi-protocol datagrams over Point-to-Point links

RFC 1172 - Point-to-Point Protocol (PPP) initial configuration options

RFC 1212 - Concise MIB Definitions

RFC 1213 - Standard Interface MIB for Network Management of TCP/IP-based Internets: MIB-II

RFC 1215 - A Convention for Defining Traps for use with the SNMP

RFC 1256 - ICMP Router Discovery Messages

RFC 1294 - Inverse Address Resolution Protocol (IARP)

RFC 1315 - MIB (Management Information Base) for Frame Relay DTEs

RFC 1332 - The PPP Internet Protocol Control Protocol (IPCP)

RFC 1334 - PPP Authentication Protocols

RFC 1381 - LAPB MIB

RFC 1434 - Data Link Switching: Switch-to-Switch Protocol

RFC 1471 - PPP Link Control Protocol MIB (except PPP test MIB group)

RFC 1473 - PPP IP Network Control Protocol MIB

RFC 1490 - Multiprotocol Interconnect over Frame Relay (also known as Boundary Area Networking by IBM)

RFC 1493 - Bridge MIB

RFC 1525 - Source Routing MIB

RFC 1552 - The PPP Internetwork Packet Exchange Control Protocol (IPXCP)

RFC 1570 - PPP LCP Extensions

RFC 1583 - OSPF Version 2

RFC 1618 - PPP over ISDN

RFC 1643 - EtherLike MIB

RFC 1661 - Point-to-Point Protocol

RFC 1662 - PPP in HDLC like framing

RFC 1700 - Assigned Numbers

RFC 1757 - Remote Network Monitoring MIB (RMON) (partial compliance)

RFC 1812 - Requirements for IP Version 4 Routers

RFC 1878 - Variable Length Subnet Table for IPv4

RFC 1945 - Hypertext Transfer Protocol - HTTP/1.0

RFC 1989 - PPP Link Quality Monitoring

RFC 2236 - Internet Group Management protocol (IGMP) version 2, with Host extensions for IP Multicasting

SYNCHRONY

[The IAN-150]

SYSTEM DESCRIPTION

Packaging

Desktop and rack mountable

Architecture

BASIC UNITS

IAN-150-011: 1 Ethernet, 1 Serial
IAN-150-012: 1 Token Ring, 1 Serial
IAN-150-013: 3 Serial
IAN-150-014: 1 Ethernet, 3 Serial
IAN-150-015: 1 Token Ring, 3 Serial
IAN-150-016: 1 Ethernet, 1 Token Ring, 3 Serial

EXPANSION OPTIONS

IAN-EXP-01: 2 Serial ports (up to 2.048 Mbps)
IAN-EXP-02: 1 port ISDN BRI/S (2B+D)
IAN-EXP-03: 1 Ethernet port
IAN-EXP-04: 1 Token Ring port (4/16 Mbps)
IAN-EXP-05: 1 Serial port
IAN-EXP-06: 1 56/64 k DSU/CSU port
IAN-EXP-07: 2 FXS ports, 1 Serial port
IAN-EXP-07A: 2 FXS ports
IAN-DB-FXS-2: 2 FXS ports
IAN-DB-E&M-2: 2 E&M ports (Type I, II, & V)
IAN-DB-FXO-2: 2 FXO ports
IAN-DB-T1: 1 port T1 (Supports up to 24 channels)
IAN-DB-E1-BAL: 1 port balanced E1 (Supports up to 31 channels
IAN-DB-E1-UBAL: 1 port unbalanced E1 (Supports up to 31 channels

IAN-DB-DSP-1: DSP card (support for 4 voice channels)
IAN-DB-DSP-1A: DSP card (support for 4 voice channels with G-729A and G-723-1 licenses)
IAN-DB-DSP-3: DSP card (support for 12 voice channels)
IAN-DB-SER-1: 1 serial port
IAN-DB-IUSC-4: IUSC card (support for 4 serial ports)
IAN-DB-ISDN-U: 1 port ISDN BRI/U (1 64 k B-channel)
IAN-DB-ISDN-S: 1 port ISDN BRI/S (1 64 k B-channel)
IAN-DB-DDS: 1 56/64 k DDS Port
IAN-EXP-CHAS: Expansion chassis with 11 I/O-slots

CAPACITY

Ethernet Ports: Up to 2 10BASE-T

Token Ring Ports: Up to 2-UTP (RJ45)

Serial Ports: Up to 12 (can be any mix of local or network ports)

1 ISDN BRI "U" or "S"

1 56/64 kbps DSU/CSU

Serial port support via interface module (WPM); Wide-Area Personality Module, in the following configurations:

- V.28 DTE (EIA-232)
- V.28 DCE (EIA-232)
- V.35 (DTE only*)
- V.11 (DTE only*; EIA-449, EIA-422, and X.21)
- MIL-STD-188

MEMORY

5 MB of Flash memory and 16 MB of DRAM memory (**standard** on the motherboard)

Wide Area Protocols

Frame Relay (UNI/NNI and EXPRESS SWITCHING)

X.25 (Access & Switching)

Integrated ISDN BRI (NI-1, NET3, and French variant of NET3)

PPP (Async. & Sync. With PAP)

Integrated 56/64 kbps DSU/CSU

Protocols Supported

NETWORK LAYER PROTOCOLS

TCP/IP, IPX

IP STACK PROTOCOLS

ARP, UDP, Proxy ARP, BOOTP, DHCP, IGMP

ROUTING PROTOCOLS

OSPF, RIP, EGP, IPX OC, IPX SAP, DLSw, DVMRP

LEGACY PROTOCOLS

SNA/SDLC/QLLC, Asynchronous, 3270 BSC, Burroughs Poll Select, Bit Oriented Protocols, Character Oriented Protocol, SDLC-to-LLC conversion, SDLC-TPAD and HPAD, FRF.3 (BNN; Routed Mode RFC1490 and BAN; Bridged Mode RFC1490), X.3, X.28, X.29, and X.25

BRIDGING SUPPORT

Transparent

Source Route

Translational

Spanning Tree (STA/P)

BRE2

NETWORK MANAGEMENT SUPPORT PROTOCOLS

SNMP

Remotely via TELNET

Locally via ASCII terminal

TFTP

HTTP

SIZE

Desktop dimensions:

- Height: 1.93 in (4.9 cm)
- Width: 19 in (48.3 cm)
- Depth: 13.3 in (33.8 cm)
- Weight: 11 lbs. (5 kg)

Power Requirements

Voltage: 90-132/180-264 VAC Auto-Sensing

Frequency: 47-63 Hz

Current: .5/.25 amp

Power: 30 watts

Heat Dissipation 615 BTU/hour

Environmental Requirements

Ambient operating temperature from 0° to 45° C

Relative humidity: 10% to 90% (-10° C to 28° C- non-condensing)

Altitude to 10,000 ft (3050 m)

Regulatory Approvals

EMC

- FCC part 15, Subpart B, Class A (US & Canada)
- EN55022 Class A, CISPR22 (Europe) VCCI (Japan)
- Immunity Test (IEC1000-4-2, and IEC 1000-4-3, and IEC 1000-4-4) (Europe)

Safety

- UL1950 (UL-C included)
- EN60950 (TUV Rhineland GS-Germany)

Telcom

- FCC Part 68 (US)
- IC CS-03 (Canada)
- CTR1/NET1, CTR2/NET2, CTR3 (Europe)

*DCE Interface is supported via a crossover cable.

Visit our website: www.timeplex.com


TimePlex Group