

Remote Access Sales Guide

Third Edition, Spring 1997



Purpose.

This sales guide contains the information needed to be successful selling IBM remote access products. It has been created to provide an easy-to-use reference tool that guides you through the selling process for these products.

Acknowledgments.

The following individuals contributed their technical expertise to the development of this guide: Paul Nelson, Jay Greenman and Darryl Levo. This Sales Guide was created by the Business Development Group, Inc., San Antonio, Texas ((800) 869-7721). BDG specializes in the development of custom training and sales support programs for companies in the computer, networking and telecommunications fields.

Additional Guides.

This networking hardware sales guides is one of six in a series. Other guides include the *ATM Sales Guide*, *Bridge/Router Sales Guide*, *LAN Hub Sales Guide*, *LAN Switch Sales Guide*, and *Network Adapter Sales Guide*. To obtain copies of this *Remote Access Sales Guide* or any of the guides, call or send your requests with quantity desired, a complete address and phone number to:

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Table of Contents

Breadth of Products 1.1

Environment

 Remote Access 2

 Market Trends 2

 Remote Users 3

 Evolution of Remote Access 4

 Challenges of Remote Access 4

 IBM Solution 5

IBM 8235 Product Family

Models 051/052, 021/022, 031/032

 Product Information 6

 Network Management Software 8

 Products and Options 19

 Target Market 20

 Handling Sales Objections 20

 Q's and A's 22

 Sales Tools 22

 Competition 23

 Selling Points 25

140 DIALs Switch

 Product Information 26

 Products and Options 29

 Target Market 30

 Handling Sales Objections 30

 Q's and A's 30

 Sales Tools 31

 Competition 32

 Selling Points 35

 SmoothStart Service 36

Complementary Mobile Products

 ISA 28.8/14.4 Kbps Data/Fax Modem 37

 PCMCIA 33.6 (V.34)/14.4 Kbps Data/Fax Modem 38

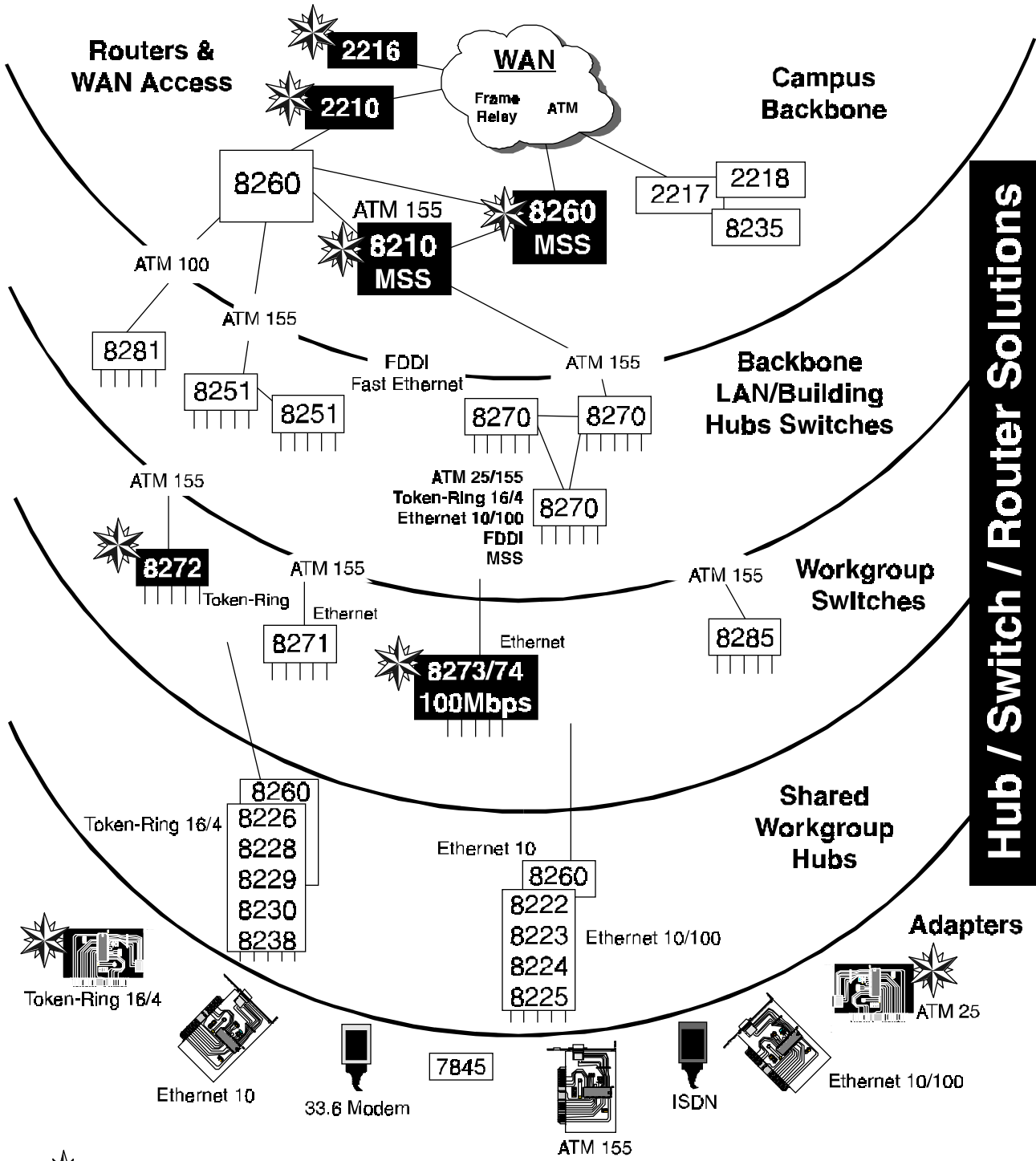
 WaveRunner Digital Modem 39

Appendix

 References 42

 Glossary 43

IBM Networking Portfolio Highlights



Hub / Switch / Router Solutions

 Indicates industry leading technology

PLUS: End-to-end integrated Network Management, extensive education, service and support

Environment

Remote Access

Remote LAN access is the ability to access a LAN through a dedicated RLA (Remote LAN Access) server over standard analog or digital (ISDN) telephone lines. Remote users have access to all network resources just as if they were a node on the local network. Remote access connects traveling workers, telecommuters, branch offices and corporate networks to the information sources they require. It is the fastest growing segment of the networking market -- in fact, more than 80% of organizations with LANs now use remote access to improve productivity and speed project completion. Remote access comprises three basic operations:

- **Dial-In.** The ability for remote users to dial in to the corporate LAN and work with the applications and data on the LAN as if they were actually in the office. By dialing in, they become a node on the LAN. Using a PC (or Mac or UNIX workstation) with a modem to access the remote access server, employees can connect from any location in the world that has analog, switched digital or wireless connections.

Dial-in services may also include the ability to access the Internet from either home or the office or to use the corporate intranet (private LANs integrated with the Internet) to offer information connectivity. Internet Service Providers (ISPs) require products and services usable by their dial-in users.

- **Dial-Out.** The ability for LAN-attached PC users to access a shared modem and phone line as if it were locally attached to their computer. IBM extends the concept of shared dial-out to include the ability to send faxes using Delrina's WinFax Pro software, or connect to the Internet.
- **LAN-to-LAN.** The ability to link remote sites in a routing connection over analog or digital phone circuits. Support should be optimized for slow links, including cost-saving measures such as software data compression, Tariff Management™ and automatic termination of idle connections.

Market Trends

According to IDC (December 1996), the remote LAN access market is expected to grow from \$2.5 billion in 1996 to \$4.5 billion in 1997 and \$8.7 billion in 2000. There are several reasons that remote access is becoming so important:

- **Social/Organization Drivers.** The need to access the corporate database from remote locations has been fueled by such trends as the increase in mobile computing, telecommuting, sales force automation, work-at-home programs, home business and branch office connectivity.

- **Technological Drivers.** Improvements and lower costs in dial-up connectivity (such as high-speed modems, ISDN connectivity and wireless communications) have played a role in making remote access more cost-effective and more convenient. Also fueling the demand for remote access is the increasing use of the Internet, corporate intranet, and on-line services and bulletin boards for support and general information distribution.
- **Legislation.** National legislation has indirectly contributed to the increased demand for remote access. The Clean Air Act amendments of 1990 require 13 key cities to achieve drastic reductions in commuter traffic. The legislation specifically requires those cities' employers with more than 100 employees to develop plans for improving their passenger-per-vehicle commuting ratios. Many companies are implementing work-at-home strategies to meet this requirement. The Family and Medical Leave Act is another example of legislative influence. Employees at home on leave can use remote access to perform necessary work.

Remote Users

The remote user is anyone who spends significant time away from the office and has a daily need to access people, tools and data via the company communication system. Most remote users fall into one of four major categories:

- **Mobile.** The mobile employee is the insurance adjuster, circuit court judge, salesperson, UPS driver -- the user already versed in the use of the ThinkPad computer, pager and cellular phone. In a perfectly fashioned mobile environment, mobile employees can work anywhere, anytime and still be as in touch as people in the central office.
- **Telecommuter.** The telecommuter is an office employee who splits the work week between a traditional office and an at-home office. This user typically uses stationary technology -- desk phone, desktop workstation, full-size printer. There are more than 10 million employees in the United States who work all or at least part of their work week in their homes, at a customer site or on the road. The number of telecommuters in the United States will grow to 50 million by the year 2000.
- **Alternate Work Site.** An alternate work site employee spends the day at an established work location that is outside the home but not at the company's central office. More and more companies are setting up alternate work sites in productivity centers strategically positioned near main highways or airports. Such centers provide shared desks, team-meeting rooms, office supplies, copying equipment and clerical support.
- **After-Business-Hours Home Users.** According to IDC, 76% of employees accessing their companies' LANs remotely are conducting business from home after regular business hours, but are typically in the office during the day. These employees may also be accessing the Internet from home.

All of these categories are mushrooming. Already there are more than 300,000 remote offices in the United States. A recent survey indicates that 92% of executives whose firms offer telecommuting options agree that the trend benefits companies as well as employees. A State of California pilot program found that telecommuting increases productivity by 10% to 30%. Moreover, some employers have experienced a reduction of office space needs by as much as 33%.

In addition, the number of people accessing the Internet is increasing rapidly. By the year 2000, estimates are that 245 million users will have Internet access. Of these, 130 million will be individual users dialing into a selected Internet Service Provider. The remaining 115 million users will access the Internet through their companies, who have purchased a license. At least 35 million of these business users will access the Internet remotely as a telecommuter or after-business-hours user.

Evolution of Remote Access

Remote access methods have evolved from terminal emulation to application-specific access, remote control, and remote node access.

Approach	Example	Description
Terminal Emulation	BBS, CompuServe	Remote users simulate a dumb terminal session with a mainframe. This approach is suited to character-based, host-centric legacy systems, not to graphically oriented client/server systems.
Application-Specific	cc:Mail Remote	Remote users can access a single network application. This approach does not allow simultaneous access to multiple network resources.
Remote Control	pcANYWHERE	The remote user's computer acts as a dumb terminal to a LAN-connected PC. This is best suited for character-oriented or text-based computing; it performs poorly with graphics-based interfaces (such as Windows and/or OS/2). It requires a dedicated PC for each dial-in session and is not scalable to large numbers of users. In addition, there is no centralized management or security.
Remote Node	IBM 8235	The remote workstation becomes a node on the LAN. This approach offers centralized management and security and is highly scalable to support thousands of users. Users work with their familiar client/server applications as if locally connected. It is well-suited for graphics-based interfaces.

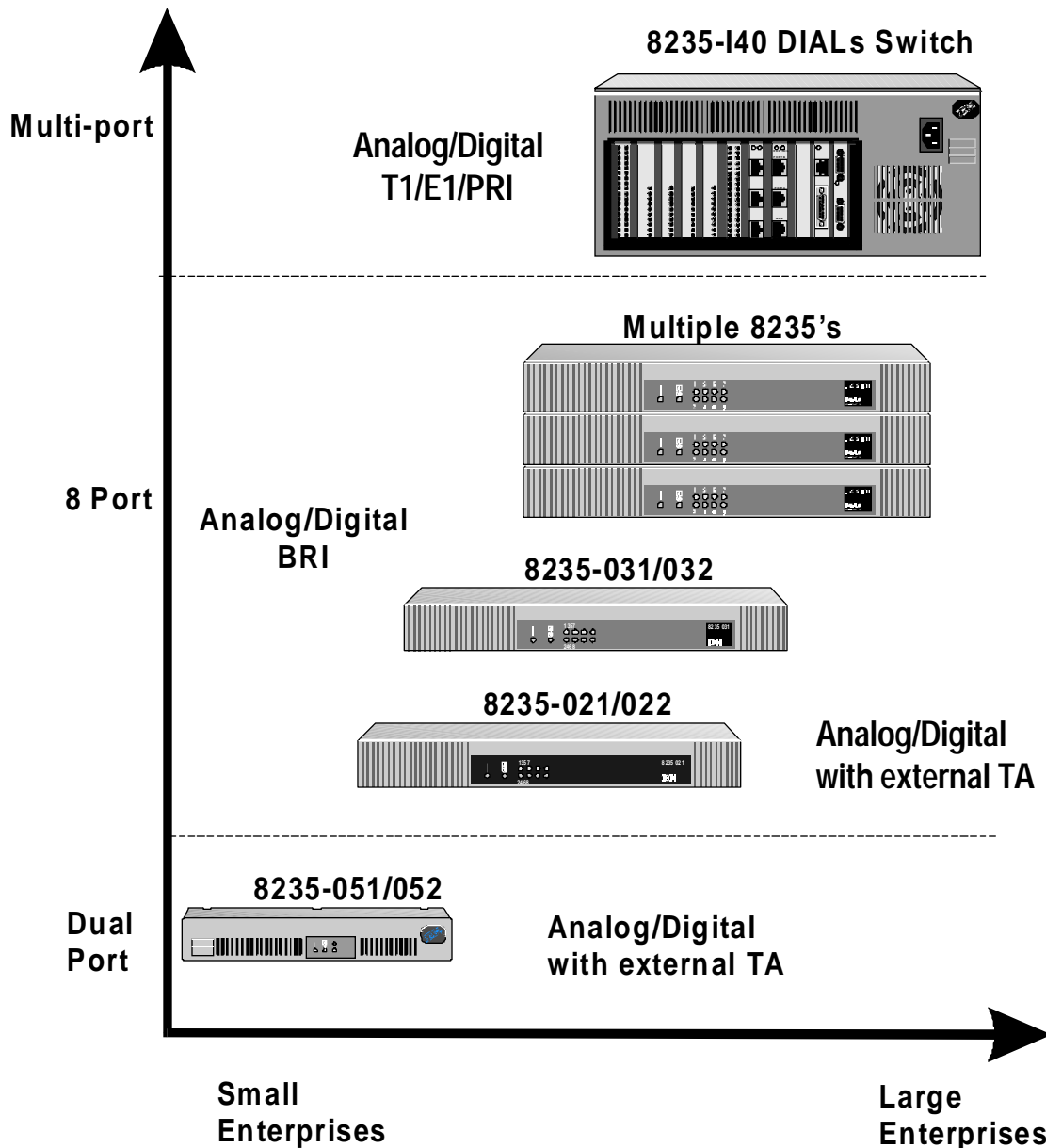
Challenges of Remote Access

Although the remote access market is growing rapidly, the recurring operational costs that accompany the use of such products can be quite high. The two largest components of recurring remote access costs for corporations and ISPs are line charges and user support (installation, configuration, and problem-solving) expenses, which together amount to 85% of the total cost of maintaining a remote access setup.

IBM Solution

IBM is committed to meeting the continuing challenges of campus networks. In response to the rapidly growing remote access market and the concerns about costs, interoperability, and scalability that many network managers and individual users within that market have, IBM now offers a complete line of 8235 Dial-In Access to LANs (DIALs) servers to cover an array of access sites from the very small to the very large. IBM thus presents solutions for a wide range of customer needs, all having consistent client access, smart communication features, robust security provisions, and investment protection.

8235 DIALs Family



IBM 8235 Product Family**Product
Description**

The IBM 8235 Dial-In Access to LANs (DIALs) family of servers are dedicated multiport, multiprotocol remote LAN access hardware devices. They support remote PC users dialing in to applications the same way users access applications from workstations directly attached to a Token-Ring or Ethernet LAN. The 8235 combines remote access, dial-up routing, and modem pooling in a single device that is simpler, less expensive, and requires less space than multiple device solutions. All of the 8235 DIALs models have similar functions and common management, and support the same remote access clients. Customers can use standard dial-up telephone lines or digital networks to remotely access LAN resources.

The IBM 8235 family is based on the award-winning LanRover products from Shiva Corporation. IBM's expertise and testing capabilities in large complex networks, in Token-Ring technology, in OS/2 technology, and in IBM networking protocols have significantly enhanced the excellent remote LAN access technology of these Shiva products. The technology incorporated into IBM's 8235 products has won the following awards:

1996 Awards

Editor's Choice -- *Network Computing* (October);
Tester's Choice -- *DataComm Magazine* (October);
Editor's Choice -- *PC Magazine* (August);
Reader's Choice -- *NetWare Solutions* (June);
Product of the Year -- *Networking Industry* (June);
Reader's Choice -- *LAN Times* (May);
Analyst's Choice -- *PC Week* (April);
Editor's Choice -- *PC Magazine UK* (April);
Corp. IT Excellence Award -- *PC Week* (March);
Product of the Year -- *PC Magazine* (January).

The 8235 DIALs servers supports dial-in from remote sites, dial-out to off-site services, fax-out and LAN-to-LAN dial-up or leased line connections.

8235 Models

Seven models of the IBM 8235 currently are available:

- **Models 051** (Token-Ring) and **052** (Ethernet) are 2-port models of the IBM 8235, and provide a low-cost remote LAN access solution for small office environments needing no more than two simultaneous connections. They are functionally equivalent to the Models 021 and 022. They are approximately half the size of the 021/022, and are fully compatible with other DIALs servers and clients.

- **Models 021** (Token-Ring) and **022** (Ethernet) offer eight standard asynchronous RS-232 ports. These models support externally attached V.34bis modems with connect speeds of 33.6 Kbps and V.42bis (4X) compression with port speeds up to 115 Kbps, or asynchronous ISDN terminal adapters supplying 2 channel aggregation (via MLP), with speeds up to 115.2 Kbps per port. These models are best for corporations and networks having a maximum of 24-48 dial-in ports or where the customer's preference is individual phone lines versus multiplexed (T1/ISDN PRI) lines.

- **Models 031** (Token-Ring) and **032** (Ethernet) are advantageous because they feature integrated V.34bis modems, serial cards and ISDN BRI adapters. The V.34 **modem** supports connect speeds up to 33.6 Kbps and speeds at the asynch port up to 115.2 Kbps with V.42bis data compression and V.42 error correction. The **serial cards** also support port speeds up to 115.2 Kbps. With these serial cards, some or all of the ports on the 8235 Models 031/032 and the earlier 011/012 can be configured to attach external asynchronous terminal adapters for digital services such as Basic Rate ISDN or Switched 56. In addition to modems and serial cards, integrated ISDN BRI adapters can be installed in Models 031 and 032.

The IBM 8235 Models 031/032 have eight slots providing eight simultaneous sessions. Four ISDN adapters provide support for the eight sessions. Since each B channel on an ISDN adapter will support one user, the four adapters will support eight users (2 x Bs per adapter; 4 adapters = 8 users). ISDN BRIs can be mixed with V.34 modems as follows:

<u>BRI</u>	<u>ANALOG (V.34 modem)</u>
0	8
1	6
2	4
3	2
4	0

- The **IBM 8235-I40 DIALs Switch** supports high speed analog and digital connections like T1/E1 and primary rate ISDN to accommodate the largest number of users with the smallest number of network connections. This high capacity switch integrates ISDN and analog remote access, a remote access server, and remote routing functions in a single multiprocessor box. It is ideal for central sites having hundreds of dial-in users, including corporations and Internet Service Providers. In its first release, the I40 DIALs Switch can support over 70 simultaneous mixed analog and ISDN sessions using T1/PRI circuits. Its second release will support over 100 simultaneous sessions.

The I40 is the newest member of the 8235 family of DIALs servers. See page 26 for additional details.

8250/8260 Modules The 8235 Models 021 and 022 DIALs Server functions can be purchased as a feature module for the IBM 8250 or 8260 multiprotocol hubs. For more information, see the *IBM LAN Hub Sales Guide*.

Network Management Software

The 8235 server/switch family can be configured and managed using any one of five methods:

- **8235 Management Facility.** The 8235 is best configured and managed by the 8235 Management Facility, a Windows-based application that allows an administrator to configure and manage single or multiple 8235s on the LAN from any authorized, LAN-attached workstation. Installation requires a LAN-attached workstation running Windows 3.x, Win OS/2, or Windows 95 and loaded with the NetWare 3.x client code. (The client shell is unnecessary if there are no Novell servers on the network.) The Management Facility uses either IP or IPX to communicate with the 8235s. When IPX is running, the 8235s broadcast their presence on the network via Novell IPX protocol SAPs. Internally, the 8235 DIALs server has a virtual LAN that all remote workstations dial into as virtual on-LAN nodes. This virtual LAN has an IPX and IP router, a bridge for NetBIOS and 802.2 protocol network traffic.
- **SNMP Management.** The 8235 DIALs provides SNMP support. Working with BOOTP, the 8235 DIALs can be configured and managed by an SNMP network managed station.

- **Operating System Shell.** All IBM 8235 DIALs parameters can be set via the operating system shell, accessible through any of the 8235 DIALs' serial ports via an ASCII terminal (or dial-up). This interface can be used in special situations (for example, at times when the LAN management network is unavailable). This parameter-set capability can be disabled on a per port basis for security reasons. The operating system also can be accessed via a Telnet session to the 8235 DIALs server.
- **Nways Manager for Windows.** This integrated suite of network management applications works seamlessly with the IBM NetView for Windows management platform to remotely control and monitor IBM networking devices. It provides integrated fault, configuration and performance management functions for IBM bridges, routers, hubs and switches. It also provides basic management functions for other SNMP components.
- **Nways Campus Manager LAN for AIX.** This is an integrated suite of network management applications that enables complete management of Ethernet, Token-Ring or FDDI-based networks composed of IBM hubs, switches, bridges and concentrators. It also provides complete management of IBM routers.

IBM 8235 Servers

Models 051/052, 021/022, 031/032

IBM 8235 Models 051/052, 021/022, and 031/032 are fixed port servers requiring one phone line per port. The 8235 I40 DIALs Switch is a concentrator that uses one T1/E1 line to support many users. It shares many of these features and will be considered separately in this Sales Guide.

Software Release 4.5

IBM DIALs Software Release 4.5 is now shipped with all IBM 8235 DIALs models and offers the following support:

- **Dial-in** using the following clients:
 - DIALs for OS/2[®], DOS, Windows 3.1, Windows for Workgroup 3.11 (shipped with the IBM 8235)
 - ARA 2.0 supporting AppleTalk on Ethernet
 - Macintosh and UNIX/AIX[®]-based workstations using SLIP or PPP
 - Windows 95 and Windows NT 3.5
 - Telnet for dumb terminals

- **Dial-out** for DOS, Windows 95, Windows NT, and OS/2-based asynchronous dial-out applications using the 8235 Dial-Out client software. OS/2 dial-out, using IP protocol on the LAN, is also provided as an alternative to using IPX.
- **LAN-to-LAN** routing for IP, IPX and AppleTalk (on Ethernet) protocols with connection established from Windows-based LAN workstations using the 8235 LAN connect software.

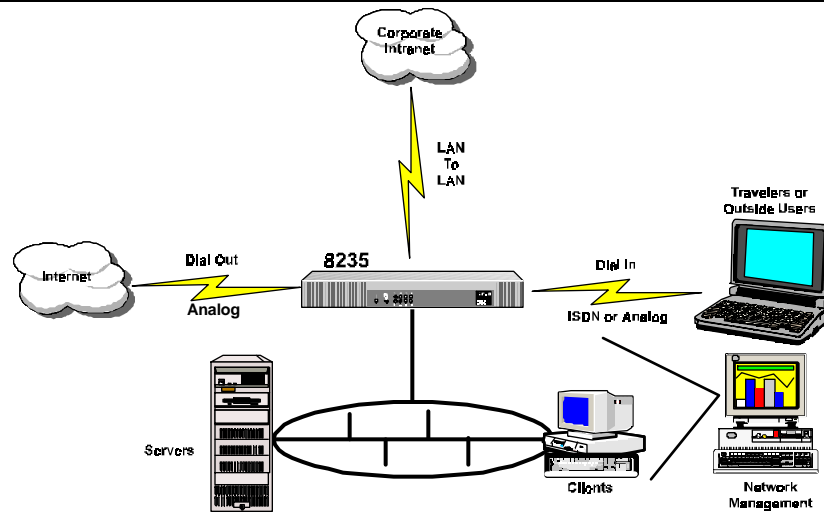
The 8235 client software is licensed to users as a chargeable option.

Positioning

The IBM 8235 servers are high performance, modular remote access devices that enable corporations to link telecommuters (client-to-LAN) and remote offices (LAN-to-LAN) to headquarter's LANs and public networks with all the functionality and ease-of-use of a direct network connection. Remote users can get to the office network from any location using either analog or digital dial-up phone service. The combination of analog and ISDN technology and the 8235's multiprotocol remote-adapted routing technology deliver superior performance, secure and transparent access to critical corporate information and business processes, support for open industry standards, unique telephony line charge or Tariff Management™, and ease of deployment.

**Software
Release 4.5
(3/97)**

Software Release 4.5 is a total end-to-end solution designed from the ground up to support bursty, irregular, multiprotocol traffic characteristic of dial-in mobile workers, stationary telecommuters, and branch offices. Release 4.5 adds significantly to the already high performance of the 8235 servers. RADIUS enhancements across all models provide better interoperability with other RADIUS environments and improved information for management and accounting. The V.34bis modems can be upgraded with flash ROM speed to 33.6 Kbps, allowing improved performance over standard V.34 modems. For network users, the new Powerburst option available for all models improves dial-in performance for IPX file-system-based activities. New T1/E1 adapters for the I40 switch allow users to take advantage of higher speed transmissions for dial-in mobile users.



Remote Access Environment

Features/Functions The general features of the IBM 8235 servers, Models 051/052, 021/022, and 031/032 are in the following table. New features specific to Software Release 4.5 are in a separate table on Page 18.

Feature	Function
Ease of Use	No retraining or application change to connect from OS/2, Windows, Windows 95, DOS, Macintosh, or UNIX environments.
Easy Growth Options	The 8235 offers incremental expansion as remote access requirements grow. Additional 8235 servers can be stacked in a compact rack, and added to the network with no disruption to users. Users can be added at any time without additional licensing.
Easy Installation	<p>Installation in less than 30 minutes if Windows and IBM 8235 management software are installed. A client installation scripting utility enables network managers to establish defined defaults that make client installation and deployment easier. Automated installation is provided through:</p> <ul style="list-style-type: none"> • An intelligent client setup program that includes a "Connection File Wizard" that walks the user through the installation and modifications to client software. • Automatically detects attached communications adapters. • Allows network managers to build a sample configuration and rapidly replicate that configuration to large numbers of similar clients. • Client event logging applications provides extensive troubleshooting information. Log information can be displayed to the screen or to a file.

Feature	Function
X.25 Configuration Options	Simplify the call setup for X.25 users and allow latency to be tolerated on PPP connections in X.25 environment.
Transparent User Interface	Remote user works as if directly attached to the network with full access to all network resources. Retaining the familiar user environment increases productivity.
High Performance	Supports speeds of up to 115.2 Kbps. All 8 serial port speeds can operate simultaneously at the rated speed. Special filtering and compression techniques improve performance.
Multiprotocol Support	Protocols supported include AppleTalk for ARA 2.0 on Ethernet LANs and NetBIOS, NetBEUI, 802.2/LLC, IPX (VLMs and NETX supported), TCP/IP, PPP and SLIP on both Token-Ring and Ethernet networks.
DHCP Support	Support for Dynamic Host Configuration Protocol automates the assignment of TCP/IP addresses by a DHCP server.
Terminal Server Support	The 8235 provides terminal server support by a shell command allowing dumb terminals to connect to a host with the Telnet protocol.
Source Routing	Supports source routing for large, bridged networks.
VxD Windows Client	<p>The client software has been rearchitected to enable support for:</p> <ul style="list-style-type: none"> • Windows Virtual Device Driver VxD that only uses 2 K of client's conventional DOS memory (versus 34 K) • Multilink PPP protocol (MLP) • Channel aggregation (2B) • STAC 4.0 compression • Port driver for internal ISDN adapters (digital modems, TAs). • High performance driver support for ISDN ISA/PCMCIA cards. • New port driver programming interface (API) • Virtual connections • New intelligent setup facility • Easy client installation scripting • Client event logging applications
Enhanced Compression	Support for STAC Electronic's 4.0 data compression improves performance in noncompressed environments, such as ISDN TA or X.25 PAD.

Feature	Function
Packet Fragmentation	Allows a default packet size to be configured by determining which packets will be fragmented for more efficient distribution over aggregated communications links.
Delta Technology	Specialized remote adaptive routing protocols optimize bandwidth by preventing unnecessary traffic from being sent over slow WAN connections by only sending the changes.
Software Upgrades	8235 servers can be upgraded via software without having to change ROMs or disconnect the 8235s from the network.
Warranty	One year warranty for hardware.
Dial-In Dial-Out/Fax Out Feature	Function
Dial-In and Dial-Out	In addition to providing dial-in network access, any modem attached to (or integrated with) the 8235 servers can also be used for shared dial-out access to bulletin boards, on-line information services, or for network routing LAN-to-LAN capability in which one 8235 server calls another (or the 8235 I40 DIALs Switch) to create an internetwork (with graphical user interface).
OS/2 Dial-Out	OS/2 and OS/2 Warp LAN users can dial-out through an 8235 modem pool.
IP Dial-Out	Allows Windows 3.X users to dial-out over a WinSock-compatible TCP/IP stack.
Third-Party Client Support	Dial-in access from Windows 95, Windows NT 3.5, and Apple's ARA 2.0.
Fax-Out Support	The 8235 supports the use of WinFax PRO 4.0 and WinFax Lite4.0 software to extend dial-out modem and line pooling to the LAN fax users. Faxes can be sent right from the desktop.
Power Switching	Allows MS-Windows 3.x users to switch back and forth between communications adapters. Perfect for employees that use one type of communications adapter when working at home (ISDN) and another adapter (V.34 modem) when traveling.

Dial-In Dial-Out/Fax Out Feature	Function
OS/2 Shuttle	Enables OS/2 users to determine at shutdown if the next access will be local or remote. Allows the proper files to be loaded at next boot.
Persistent Connections	Option allows the server to re-establish the connection in the event of an unexpected line drop.
LAN-to-LAN Feature	Function
Timed LAN-to-LAN Connections	Enables the scheduling of LAN-to-LAN connections by the network administrator.
LanConnect Applets	Allows for scripting of on-demand LAN-to-LAN connections.
ISDN Feature	Function
Dial-In Channel Aggregation	The ability to use more than one communications channel per connection. By aggregating both 64 Kbps ISDN B-channels, users can take advantage of 128 Kbps dial-in connections. Fast 128 Kbps data transfer rates reduce "large file" transfer times.
8235 BRI Module	<ul style="list-style-type: none"> • 2B+D with V.110 & V.120 rate adaption • S/T interface version is available • BRI modules can be monitored from IBM MF Configuration setup, revisions and troubleshooting can all be managed remotely.
Port Driver	<ul style="list-style-type: none"> • Provides support for internal client ISDN terminal adapters like the IBM WaveRunner. • Internal ISDN adapters eliminate the async-to-sync conversion overhead required by external terminal adapters.
Internal Client PC ISDN ISA/PCMCIA Card Support	Provides support for the ISA and PCMCIA versions of client ISDN cards.
API	Facilitates the development of drivers for third-party ISDN terminal adapters and digital modems.

ISDN Feature	Function
Virtual Connections	The ability to automatically suspend and resume a physical connection while spoofing network protocols, routing and applications. The physical connection is brought up only on-demand. Users are charged only for productive communications, thus saving as much as 80% of the line charges compared with systems that require the line to be connected for the entire session.
Floating Virtual Connections	Resumes a suspended virtual connection on a port other than the port on which the original virtual connection was established. It can reduce the need to dedicate ports to specific users.
Juggling Virtual Connections	Allows for more suspended circuits than there are ports on the 8235. Maximizes utilization of the server communications ports.
Piggybacking Updates	A virtual connection synchronizing mechanism that enables routing messages to be sent across the link only when the link is open for real data traffic.
Timed Updates	A virtual connection synchronizing mechanism that enables a suspended virtual connection to be resumed at a specified interval to allow routing update messages to be sent across the link.
Triggered Updates	A virtual connection synchronizing mechanism that enables routing update messages to be sent across the link only when there is a RIP or SAP database change.
Spoofing	The ability for a device to determine what is not "meaningful" traffic when a virtual connection is suspended. Rather than establishing the connection, the device responds to the source of the traffic with the response that would have been generated by the intended destination device.

Security Feature	Function
<p>Multitiered Security</p>	<p>Offers several security features:</p> <ul style="list-style-type: none"> • user passwords (encrypted) and password change ability by users • password aging • centralized 8235 user lists • callback before network connection • administrator password to protect configuration files • maximum connection time control • forced/timed disconnect • NetWare Bindery • integrated support of Security Dynamics, Inc., SecurID™ card and ACE™ server • Blockade for the IBM 8235 (from Blockade Systems Corp.) eliminates the need to define, audit and maintain userids and passwords in the 8235. Instead, as a remote user logs onto an 8235, their userid and password are routed to the mainframe and authenticated there using standard RACF or ACF2. • Challenge Handshake Authentication Protocol (CHAP) support for PPP connections • API for TTY-based authentication • user-defined dial-in banner
<p>SPAP Security Dialog</p>	<p>Facilitates use of third-party security devices. The new SPAP extensions describe a dialog box and retrieve the appropriate security (Challenge/Response) information.</p>
<p>TACACS+ Security</p>	<p>Enables IBM remote access server support for TACACS+ extended authentication.</p>
<p>RADIUS Authentication</p>	<p>Enables IBM remote access server support for RADIUS Username/ Password and Challenge/ Response authentication.</p>
<p>Security</p>	<p>Provides support for agent software from Security Dynamics and AssureNet Pathways. Centralized authentication supported.</p>

Management Feature	Function
Centralized Management	Network managers have several management options to better fit into their preferred environment. See p. 8 for detailed information.
Management Facility Link	Allows the 8235 to appear on topology maps (IP or IPX). IBM Management Facility can be launched via an icon.
PC Server Management	Protocols and features can be managed via IP or IPX protocols by a Windows-based or WIN/OS2 IBM management facility.
SNMP Management	Support for MIB-II.
Activity Log	<p>The 8235 DIALs management software keeps an activity log including:</p> <ul style="list-style-type: none"> • date and time of call • which port used • which user made the call • connection speed and length of call • hardware and firmware versions of each 8235 • memory usage status of each 8235 • uptime statistics of each 8235 • individual port status of each 8235
Client Event Logging	<p>Events can be displayed on the screen and/or saved in a text file. The logged events include:</p> <ul style="list-style-type: none"> • Buffer allocation/management • PPP events and state transitions • PPP negotiations options • All frames transmitted and received • Multilink (MLP) • Compression • Network protocol decoding (basic IPX, IP and NetBEUI frames)
HP OpenView IBM	Enables the 8235 to be discovered by HP OpenView Windows.
IP Download	IBM MF will be able to download new code images and configurations when running over either IP or IPX protocol stack.

Release 4.5 Features

Many new features were provided with Release 4.5 of the 8235. They include:

- Expanded RADIUS security support
- Powerburst™ option for improved performance
- New features for ISPs and network managers

Feature	Function
Traffic Control	Special filtering and compression techniques reduce the amount of network traffic
Transmission Speed	The new V.34bis modems improve performance with a flash ROM modem card upgrade to 33.6 Kbps.
Powerburst™	This feature offers improved performance for file-system-based activities and applications in Netware environments. This offers users a solution for problems arising from low bandwidth and/or high latency. By eliminating redundant data transmission, Powerburst also solves problems associated with application behavior. This is an optional feature on all 8235 models.
Shell Login	Customization options for shell login eases the Internet Service Provider's job of supporting their clients.
Domain Naming Service	DNS support eases the network manager's load with easy maintenance of a database of domain names and IP addresses.
Dial-In	Netware 32-bit client support has been added to Release 4.5.
Dial-Out	New dial-out clients include: <ul style="list-style-type: none"> • Windows 95 • Windows NT • OS/2 WARP using IP protocol on the LAN
Routing	LAN-to-LAN routing of TCP/IP, IPX and AppleTalk
Management	New management facilities include: <ul style="list-style-type: none"> • Nways Manager for Windows • Nways Campus Manager for LAN

Feature	Function
Security	<p>RADIUS support has be added to all models. The new release features:</p> <ul style="list-style-type: none"> • RADIUS accounting • Support for standard RADIUS attributes • Support for Framed-IP address, NAS-Port, Filter-ID, Framed-Route <p>These enhancements provide better interoperability with other RADIUS environments and improved information for management and accounting.</p>
IP Filtering	<p>Adds another security option in IP environments. Allows users to:</p> <ul style="list-style-type: none"> • permit and/or deny access to IP hosts based on destination IP address • set filters for dial-in and LAN-to-LAN • filters can be defined by users or phonegroup
ISDN	<ul style="list-style-type: none"> • Support for CAPI 2.0 for Windows 3.x clients (for EMEA) • Support for ISDN Terminal Adapters

8235 Products and Options for Models 051/052, 021/022 and 031/032

Description
At Release 4.5
8235 Token-Ring 2 Port, uses external modems/TA's
8235 Ethernet 2 Port, uses external modems/TA's
8235 Token-Ring 8 Port, uses external modems/TA's
8235 Ethernet 8 Port, uses external modems/TA's
8235 Token-Ring 8 Port, uses internal modems/BRI/Serial card features
8235 Ethernet 8 Port, uses internal modems/BRI/Serial card features
Software Key for Powerburst Option for 2-port model
Software Key for Powerburst Option for 8-ports model
Release 4.5 Upgrades
for 8235 Token-Ring models (2 MB memory required)
for 8235 Ethernet models (2 MB memory required)
Memory Upgrades
for 8235 Model 001, memory upgrade to 2MB
for 8235 Model 002, memory upgrade to 2MB
for 8235 Models 011, 012, 021, 022, memory upgrade to 2MB
FEATURE ADAPTERS FOR MODELS 031/032 and 011/012
Single ISDN S/T Basic Rate Adapter (without NT1)
High Speed (115.2 Kbps) Serial Card (single)
V.34 28.8 Kbps Modem (single)

Target Market The IBM 8235 is targeted at any organization with one or more LAN's that needs to provide remote LAN access, telecommuting capabilities, dial-out capabilities, or LAN-to-LAN connection. These are usually organizations with remote offices, field agents, sales representatives, or employees who travel or work at home. These workers need to access their applications and/or headquarter data from locations that have dial-up telephone service.

Reseller Support Resellers interested in pre-sale assistance and information for IBM networking hardware products, please feel free to send inquiries to our NETeam Support Center for Business Partners via e-mail. The address is neteam@vnet.ibm.com and the phone number is **1-800-426-7472**.

**Handling Sales
Objections**

Why is a hardware solution better than a software solution for remote access?
A hardware approach fits well into an existing wiring environment and is quickly installed (less than 20 minutes). On the other hand, a software implementation requires that a dedicated server be installed. This is more complicated and more time-consuming. When another remote access server is required, it is easier to use the hardware approach since the configuration of the first server is then simply duplicated.

Why should I buy this product from IBM instead of from Shiva?

IBM and Shiva both have the best product for Remote LAN Access. In addition, IBM has:

- SNA, NetBios, Token-Ring, large complex network expertise and has identified numerous problems and fixes for the 8235 in complex network environments.
- IBM ships the OS/2 client with the 8235. Shiva customers must buy the OS/2 client code (one OS/2 license for each LAN Rover) from IBM.
- IBM has an 8235 (Models 021/022) module for IBM 8250/8260 Hubs. Fully configured, 14 x 8235's can be installed in a Hub, giving 112 remote users concurrent access to a LAN.
- IBM adds development content. For example, IBM has announced Token-Ring for the 8235 Model I40 Switch and Nway's Manager for Windows.
- IBM has worldwide service support. Seven days, 24 hours is standard.
- IBM 8235 is priced competitively with the Shiva LanRover.
- IBM Models 031/032 are more flexible than the LanRover. For example, customers can configure the 8235's eight ports with a mix of V.34 modems, ISDN Basic Rate Interface adapters or serial cards.
- IBM offers the only end-to-end mobile solution in the marketplace.
- IBM provides technical support during and after installation at no charge via an 800 number. Shiva charges for technical support.
- IBM, unlike Shiva, does not charge extra for overnight parts delivery.

What are the five key points I should remember about the IBM 8235?

1. The 8235 supports the widest range of **PROTOCOLS** in the industry.
2. The 8235 supports the widest range of **SECURITY** offerings in the industry.
3. The 8235 can support all the major **OPERATING SYSTEMS**, (OS/2, Win 3.1, Win 95, Win NT, DOS, Macintosh, UNIX/AIX.)
4. The 8235 has a wide range of **FEATURES** including dial-in, dial-out, and LAN-to-LAN.
5. The 8235 is a **FAMILY** of products for any remote access solution. (05x, 02x, 03x, I40)

Comparing internal modems to external modems: Why are internal modems so much more expensive?

An internal v.34 modem solution is much easier to install, manage and maintain when compared to external modems. When external modems are used, twice as many cables are needed. In addition to phone lines, a power supply is also necessary for each modem as well as modem cables to connect to the 8235. If multiple 8235s are being used, the external solution becomes very confusing with all the additional cabling. Internal modems do not require physical space and are much easier to manage.

With any modem (internal or external), the possibility of error is always present. A benefit of the internal solution is that if an error should occur, or a line gets dropped, the 8235 will pick up on the fault immediately and notify the administrator in two ways; first, the management software will display the error, and second, the 8235 LED light will turn from green (indicating no error) to orange (indicating an error). With an 8235 configured with external modems, the only way to find the faulty modem is to individually test each modem one by one. This can take considerable time and effort when dealing with multiple 8235s considering you need to test each modem, recheck all the connections and eliminate any faulty wiring.

Competition

The following tables provide information about how to sell against the 8235's major competitors.

	Weaknesses	Selling Against
3Com Access Builder	<ul style="list-style-type: none"> • 6 port configurations are limited to 57.6 Kbps connections • Windows dial-in client is weak • only Telnet dial-out support (no support for Windows/ Mac dial-out) • no support for importing user lists one at a time for each server • charges separately for client licenses • no roaming dial-back security • difficult to add/edit modem init strings • client unstable (plagued by interrupt problems and other operability bugs) • command-line interface for configuration of higher level functions • security features are optional • no support for TACACS and no hierarchical security system • loading client drivers locks out PC serial port • no data compression or delta-routing • no inactivity timeouts • nonscalable solution 	<ul style="list-style-type: none"> • 8235 supports 115.2 Kbps • 8 ports simultaneously support high speed connections on 8235 • 8235 robust client • 8235 supports dial-in, dial-out and LAN-to-LAN routing • 8235 configuration can be copied to another server • no extra charges for client licenses • multitiered security options • 8235 strong management options • 8235 supports a broad range of clients • easy expansion of the 8235 • STAC 4.0 data compression • improved performance through delta-based routing updates and unique proxy filtering • user-configurable inactivity timeouts • 8235 supports either external or internal V.34 modems and ISDN BRI modems • 8235 has 802.2 support • 2-port models available for branch/small office/home office
Cisco Systems 25XX	<ul style="list-style-type: none"> • limited dial-in protocol support • most are installed as terminal servers rather than remote access servers • no client software • non-modular hardware • no integrated modem or multiport ISDN • no bundled GUI manager • no internal activity log support • limited security and authentication • fixed AUI Ethernet port • no vehicle for downloading new IOS firmware from any Cisco management system • compression only used in LAN-to-LAN connections between Cisco routers • supports only telnet for dial-out • no NetBEUI or LLC support 	<ul style="list-style-type: none"> • 8235 supports a wide range of protocols • 8235 is based on industry-leading remote access server software • 8235 supports up to 115.2 Kbps • 8235 provides dial-out for most PCs and workstations over multiple protocols • 8235 includes bundled client • 8235 offers easy expansion • 8235 offers internal BRI modules • 8235 offers internal GUI-based management or SNMP management • firmware from IBM downloads directly from PC or Mac-based workstations and BOOTP • 8235 supports an internal activity log, Syslog and SNMP traps • 8235 has multitiered security options • 8235 supports RJ-45, BNC and AUI connectors • data compression is interoperable between remote node and LAN-to-LAN connections

	Weaknesses	Selling Against
DCA RLN	<ul style="list-style-type: none"> no dial-out or LAN-to-LAN support primarily a software-based solution - requires third-party hardware (modem and PC) bridges rather than routes, which can cause performance problems lacks centralized remote management no Win95 or Windows NT support no support for NetWare Bindery user name/password authentication no dial-back security support IP-based installation option is difficult to use charges separately for client licenses 	<ul style="list-style-type: none"> 8235 offers dial-in, dial-out and LAN-to-LAN support 8235 is a complete solution 8235 bridges only those protocols that must be bridged 8235 offers strong management options including remote management 8235 supports broad range of clients 8235 supports NetWare Bindery 8235 offers multitiered security no extra charges for 8235 clients 8235 supports STAC compression
Microcom LANExpress	<ul style="list-style-type: none"> no AppleTalk support no LAN-to-LAN support no support for NetWare Bindery user name/password authentication Ethernet preconfigured for BNC; 10BASE-T requires jumper reset bridges rather than routes no management support for Telnet charges separately for GUI client no ISDN support (all configurations preconfigured with V.fast modems) LEDs don't show usage or activity requires TSR, consuming memory no PPP support only BOOTP for IP address assignment limited security 	<ul style="list-style-type: none"> 8235 offers dial-in, dial-out and LAN-to-LAN support 8235 supports broad range of clients 8235 supports NetWare Bindery 8235 supports RJ-45, BNC and AUI connectors uses remote adapted routing 8235's strong management options no separate charges for clients supports ISDN and Switched-56 uses a VxD implementation for Windows clients offers PPP support Supports DHCP for IP address assignment extensive security and authentication services
Microsoft Remote Access Server (RAS)	<ul style="list-style-type: none"> dial-in support limited to routing of IP, IPX and NetBEUI bridging no dial-out or LAN-to-LAN support RAS function runs on Windows NT server, requiring expensive hardware 	<ul style="list-style-type: none"> 8235 supports a broad range of clients and protocols 8235 offers dial-in, dial-out, and LAN-to-LAN connections 8235 is a complete remote access solution
Novell NetWare Connect	<ul style="list-style-type: none"> lacks PPP support software-based solution -- requires third-party hardware requires installation of NetWare server, which can interfere with performance difficult installation and poor documentation no simultaneous remote control/remote node sessions dial-in limited to routing IP, IPX, and AppleTalk no support for V.32bis or V.fast no Windows dial-out support no LAN-to-Lan support client software weak; no support for saving multiple phone numbers client software interferes with loading other Windows communications applications 	<ul style="list-style-type: none"> 8235 supports PPP and SLIP 8235 is a complete solution 8235 supports a broad range of clients 8235 supports up to 115.2 Kbps including ISDN 8235 offers easy installation and excellent documentation 8235 offers dial-in, dial-out and LAN-to-LAN support

	Weaknesses	Selling Against
Telebit NetBlazer	<ul style="list-style-type: none"> • Lan-to-LAN is primary focus • lacks support for application layer spoofing • requires an external serial port to get to 16 ports • client is DOS-only and requires a TSR • client is prone to random disconnects and system crashes 	<ul style="list-style-type: none"> • 8235 offers dial-in, dial-out and LAN-to-LAN support • 8235 supports protocol layer and application spoofing • 8235 is a scalable solution • 8235 supports a broad range of clients and protocols • 8235 client is stable
Xylogics Annex	<ul style="list-style-type: none"> • limited dial-out support • no support for Windows NT, Windows 95 or other multiprotocol PPP clients • no NDIS support • IPX, ARAP, IP routing and TN3270 are optional • self-boot feature is an option • no Token-Ring or NetBEUI support • upgraded in only 18 or 36 port increments • no simultaneous multiprotocol on LAN-to-LAN • difficult to configure • supports SLIPX (nonstandard protocol) • no internal modems or ISDN supports 	<ul style="list-style-type: none"> • 8235 offers dial-in, dial-out and LAN-to-LAN support • 8235 supports a broad range of clients and protocols • 8235 supports both ODI and NDIS drivers • 8235 supports the largest number of protocols • 8235 default is self-boot and auto-configure • 8235's security and management • 8235 supports Ethernet, Token-Ring and AppleTalk networks • 8235 multiprotocol support is offered on LAN-to-LAN and dial-in connections • 8235 offers GUI interface for easy configuration • 9235 supports PPP and SLIP • 8235 offers integrated V.34 and ISDN modems

Key Selling Points When selling the IBM 8235, the following points should be emphasized:

- High speed performance with choice of modems
- Wide client support (including Windows NT and Windows 95)
- Wide range of protocols supported by the 8235
- Dial-in, dial-out and LAN-to-LAN support
- Ease of installation and ease of use
- Wide range of security options
- Range of management options
- Transparent access provided
- Easy expansion options
- Low cost per port
- Based on Shiva's award winning technology

IBM 8235 I40 DIALs Switch

Product

Description

The **IBM 8235-I40 DIALs Switch** is a high-performance remote access platform for high-volume analog and ISDN call termination via T1/E1 and Primary Rate Interface (PRI) lines. It supports aggregated connections through channelized T1/E1 and primary rate ISDN to accommodate the largest number of users with the smallest number of network connections. This high capacity switch integrates ISDN and analog remote access, a remote access server, and remote routing functions in a single multiprocessor box, while maintaining the award-winning 8235's dial-in functionality.

Positioning

The 8235 I40 DIALs Switch provides a fully integrated solution for mission-critical, large-scale remote access applications. It is ideal for central sites having hundreds of dial-in users, including corporations and Internet Service Providers. In addition to providing "simple" remote access for employees, companies are deploying intranets, giving information connectivity to all enterprise users. At the same time, Internet Service Providers are outgrowing the functionality of currently available solutions, and are searching for additional products and services for their dial-in customers.

Analog access is currently the dominant remote access method, but ISDN is becoming the access method of choice for many commuters. The DIALs Switch offers automatic call discrimination between analog and digital incoming calls, and easy upgradability from analog to ISDN service.

The dial-in and dial-out features of the 8235 I40 DIALs Switch are identical to those offered on the 8235 Models 051/052, 021/022, and 031/032, plus it has the following additional features:

Feature	Function
Multiprocessor Architecture	Separate processors for line handling, modem functions, routing, and control. Each function is performed in parallel. A dedicated processor and memory on each T1/E1 module and modem module yields a total of 200 MIPS of aggregate power, allowing key tasks to be done simultaneously rather than serially. Tasks are offloaded to individual processors, removing CPU bottlenecks.
Modular Design	There are 8 user slots for single and dual T1/E1 interfaces and 12-port digital modem modules. ISA and PCI expansion adapters can be added for additional capacity or new communication services. The 133 Mbps PCI routing module has a Motorola 68030 processor.

Feature	Function
Configuration Features	Can be configured with either single or dual cards supporting either ISDN Primary Rate connections or T1/E1 lines (with or without CSU/DSU), or a quad T1/PRI, analog-only card, or a dual-line E1/PRI card up to 6 modem cards, each with 12 v.34bis digital modems, can support up to seventy two 64 Kbps asynchronous connections.
Simultaneous Sessions	Designed to handle over 100 sessions at full performance. The first release supports over 70 mixed analog and ISDN sessions if using T1/PRI circuits (78 if using E1/PRI circuits).
Automatic Call Discrimination	The Smart Detect [™] call discrimination function allows users to access the 8235 with a single number for both ISDN and analog connections. (See <i>Optional Interfaces</i> below.)
MVIP Switching Bus	High-speed MVIP (16 Mbits/sec.) switching bus supports 256 full-duplex channels at 64 Kbps, and allows seamless internal switching of incoming serial data across the multiple WAN interfaces without having to access main memory.
Low Latency	Low latency of the I40 eliminates the use of a serial controller to convert the incoming slow serial data stream to a high speed parallel stream. This results in superior performance when fully loading the switch with incoming high speed (28.8 Kbps) analog calls.
Standard Interfaces	Ethernet and Token-Ring, plus 2 DB-9 RS-232 serial ports for attaching an asynchronous terminal.
Optional Interfaces	<ul style="list-style-type: none"> • ISDN PRI, including T1 at 1.544 Mbps and E1 at 2 Mbps • Channelized T1 <p>With the PRI interface, multiple telephone calls can be carried on a single cable:</p> <ul style="list-style-type: none"> • Analog and digital calls are delivered to the I40 Switch within a B channel of an ISDN PRI interface. • Analog calls are switched to the modems, from where user data is switched to the multi-protocol routing engine for transmission into the corporate LAN. • ISDN BRI calls are connected directly to the routing engine, bypassing the modems. • Complexity is greatly reduced, as there is now just one cable for a large number of calls. The PRI interface replaces large groups of separate telephone lines coming into the corporate center; the 12-port modem card replaces large banks of individual modems with one module of integrated hardware.

Feature	Function
Investment Protection	The I40 DIALs Switch has slots available for future expansion. Customers can be assured of investment protection and upgradability.
CPU Module Memory	4 MB Flash, 1 MB SRAM, 8 MB DRAM.
Seamless Migration	<ul style="list-style-type: none"> • Easy migration from analog to ISDN dial-in technology: merely plug a PRI line into the T1/PRI interface card. • High-speed MVIP (16 Mbits/sec.) switching bus supports 256 full-duplex channels at 64 Kbps, allowing for seamless internal switching of incoming serial data.
Security and Accounting	<ul style="list-style-type: none"> • RADIUS, a growing de-facto standard for security and accounting, provides user profiles and accounting information on a central platform, easing security management complexity. Programming extensions can be added to tailor security and accounting to specific needs. Model I40 has new accounting support based on the RADIUS+ accounting protocol • NetWare Bindery • TACACS, TACACS+ • Third-party security devices: SecurID, AssureNet Pathways Blockade systems • Other: Dialback, SPAP/CHAP/PAP
Network Management	<p>Enterprise network management is available from either a UNIX or Windows platform:</p> <ul style="list-style-type: none"> • Windows: IBM Management Facility (see p. 8 for details) • UNIX: IBM Manager, launchable from either UNIX or HP/OpenView. IBM UNIX Manager, with a GUI interface, allows configuration files to be edited and downloads software and configurations to the I40 Switch over TCP/IP. The application can update multiple devices simultaneously; IBM Monitor, running under HP OpenView, monitors statistics and problem visibility. It logs and displays statistics on session activity, T1/E1 lines, ports, protocol stacks, and the system. • SNMP: Support from an SNMP management station via the MIB extensions is available for the I40 DIALs Switch. • Line terminal interface: Network management is possible with a UNIX shell command via Telnet; with an asynchronous terminal plugged into one of the two serial console ports on the I40 Switch CPU card; or via a modem plugged into a serial console port.

New I40 Release 4.5 Features	
Feature	Function
Digital Modem Card	DMC feature for the I40 is improved with a flash ROM modem speed upgrade to 33.6 Kbps, with 12 modems per card in the I40
Call-Originate	New dial-out functions are supported for the I40
WAN Service Options	Provides support for three new WAN adapters for the I40: <ul style="list-style-type: none"> • Quad T1 Adapter for analog sessions only • Dual E1/PRI Adapter for E1 service with PRI ISDN for analog/digital session • Dual T1/PRI Adapter with software configurable CSU/DSU

8235 I40 Products and Options

Description
8235 DIALs Switch, base model (without CPU/LAN)
Ethernet Feature (includes CPU)
Token-Ring Feature (includes CPU)
FEATURE ADAPTERS
8235 DIALs Switch Single T1/PRI Adapter with CSU/DSU
8235 DIALs Switch Single T1/PRI Adapter without CSU/DSU
8235 DIALs Switch Dual T1/PRI Adapter with CSU/DSU
8235 DIALs Switch Dual T1/PRI Adapter without CSU/DSU
8235 DIALs Switch Dual T1/PRI Adapter with software-selectable CSU/DSU
8235 DIALs Switch Quad T1 (analog only) Adapter with software-selectable CSU/DSU
8235 DIALs Switch E1/PRI Adapter (Non-U.S.)
8235 DIALs Switch Digital Modem Card (12 modems)
Release 4.5 Software upgrade
Software Key for Powerburst option

Target Market The 8235 I40 DIALs Switch should be directed toward medium and large organizations with many analog and ISDN dial-in users, small and mid-size Internet Service Providers, and other on-line service providers.

Handling Sales Objections

What are the five key points I should remember about the IBM 8235?

1. The 8235 supports the widest range of **PROTOCOLS** in the industry.
2. The 8235 supports the widest range of **SECURITY** offerings in the industry.
3. The 8235 can support all the major **OPERATING SYSTEMS**, (OS/2, Win 3.1, Win 95, Win NT, DOS, Macintosh, UNIX/AIX.)
4. The 8235 has a wide range of **FEATURES** including dial-in, dial-out, and LAN-to-LAN.
5. The 8235 is a **FAMILY** of products for any remote access solution (05x, 02x, 03x, I40).

Looking at the competition, how does the 8235 compare at price per port?

The IBM 8235 is priced competitively, however the 8235 has much more functionality compared to the competition. Ascend comes from an ISP and Telco background where price per port is one of the major concerns in remote access. With the effort to keep price per port down, there is less effort spent in the refinement of the technology. IBM considers functionality to be the key issue. With the IBM 8235 technology, there is increased performance (more users), better security, higher reliability, more protocols supported and reliable, money saving tariff management features (virtual connections). Analysis of the competition shows possible lower cost per port with much less functionality and reliability when compared to the IBM 8235.

Q's and A's

Q) When did the Token-Ring feature of the I40 DIALs Switch become available?
A) In November 1996.

Q) Why are virtual connections important?

A) Virtual connections are perhaps the key element in reducing the cost of operating an ISDN remote access system. With virtual connections, a physical connection is made on demand so users are only charged for productive connection times. This allows line charges to be cut as much as 80% when compared to the cost of a line being connected for an entire session.

Q) Describe some of the new accounting features of the RADIUS security system.

A) RADIUS accounting allows the I40 DIALs Switch to collect call accounting information such as: time/date record created; number called; customer ID; phone number of caller; type of service; connection parameters (network protocol, link speed, etc.); user parameters (user ID); connection parameters (call duration, disconnect reason, suspend time, frames sent/received, bytes sent/received).

Q) Why is the I40 DIALs Switch considered part of the IBM 8235 product family?

A) The I40 DIALs Switch contains all of the dial-in features of the other 8235 models: 021/022, 031/032, and 051/052. In addition, it is designed to handle a large number of incoming calls via T1 and PRI lines, while the other 8235 models have only ISDN BRI and analog capabilities.

Sales Tools

The following literature is available for the IBM I40 DIALs Switch:

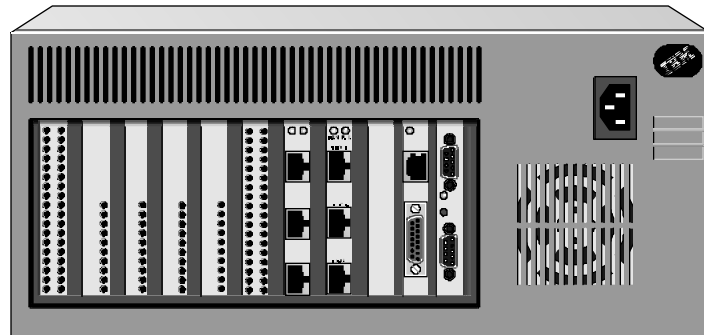
<i>8235 Model I40 Switch (spec sheet)</i>	<i>G224-4490-02</i>
<i>8235 Dial-In Access to LANs (DIALs) (brochure)</i>	<i>G224-4430-01</i>
<i>8235 Concepts and Implementation (Red Book)</i>	<i>SG244-816</i>
<i>IBM SmoothStart Services for 8235 I40 DIALs Switch</i>	<i>SPS8235</i>
<i>I40 Sales Guide</i>	<i>MKTTOOLS</i>

Available at 1 (800) IBM-4FAX are:

<i>8235 Model I40 Switch (spec sheet)</i>	<i>G224-4490-02</i>
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These tools are also available from the IBM Web site:

<http://www.raleigh.ibm.com/new/neshome.html>



8235 I40 DIALs Switch

Competition

The following tables provide information about how to sell against the 8235 I40's

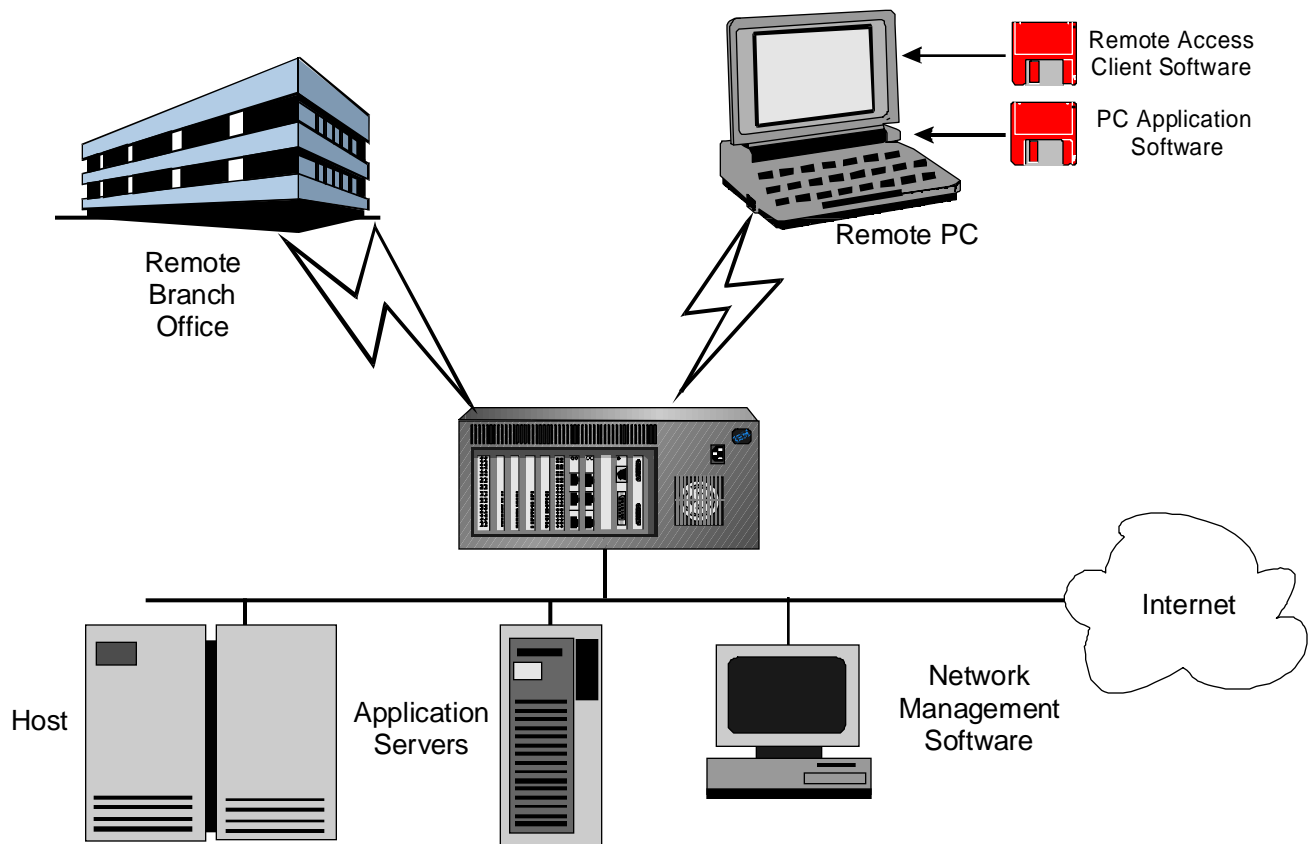
IBM 8235 Model I40	major competitors:	USR Total Control Hub
Built from scratch as a high density remote access server.		A modem rack. Components such as PRI and remote access added with separate vendor cards that fit into the rack.
Parallel computing model on a modular platform with card level subsystems.		Multiple processors with non-integrated approach that has no central coordination of processors or resource management.
Modular architecture allows easy integration of new technologies such as 100Mbps or ADSL.		Technologies may be added via more cards, but does not imply real integration or sharing of resources across cards.
Multi processor: 68060 CPU card, 68040 modem card, 68020 PRI/BI card.		Multi processor: 486 NMC card, 486 NS card. No processor on modem card.
Data path 8 to 32 bits.		Data path 8 to 32 bits.
Ethernet and Token-Ring.		Ethernet and Token-Ring.
Packet filtering at LAN card.		No packet filtering at LAN card.
DSP modems send parallel (8 bits) data directly to bus.		DSP modems send parallel (8 bits) data directly to bus.
Standard TDM bus (MVIP) and 1 Gbps packet bus (PCI).		TDM and 1 Gbps packet bus.
Shared memory.		Non-shared memory.
Designed for 120+ mixed ISDN/Analog concurrent connections. Currently supports: <ul style="list-style-type: none"> 72 Analog concurrent connections 96 Mixed ISDN/Analog connections STAC compression on modem card 	Designed to handle 48 concurrent modem connections. Currently supports: <ul style="list-style-type: none"> 48 Analog connections 92 total mixed ISDN/Analog connections Compression done in software 	
MLP for LAN to LAN; MLP for Client; IPX/SPX spoofing; IP spoofing for PING and Telnet.		MLP for LAN-to-LAN; No MLP for client; No IPX/SPX spoofing; No IP spoofing.
Only routing update changes sent.		No remote adapted routing.
Virtual connections (line cost control).		No virtual connections.
4 th Generation proven client.		3 rd party client from Stampede.
Unlimited license.		Chargeable.
Single user virtual connection designed to keep dial-up link down saving call costs.		No single user virtual connection.
Win 95, 3.x, WFW, NT, OS/2 & DOS, any PPP client.		Win 3.x client, Win 95, NT.
Proved PPP implementation with 15-20 million licenses in MS Explorer, MS Exchange, Netscape PB, Xcellenet RemoteWare and Farralon Timbuktu.		PPP implementation has some market presence.
Roaming, fixed and automatic dialback.		Fixed dialback only.
Multilink Call Control Protocol (MCCP).		No MCCP.
Software Developers Kit (SDK) for client integration into user applications.		No SDK.
4 th generation GUI management.		Command line by connecting to each card individually, optional GUI manager \$4,000.
Internal database supports 3000+ users including associated parameters.		Maximum of 60 users per NetServer card (managed separately).
Integrated modem management.		Separate hub manager layered on Novell NMS.
All I40's and user lists can be centrally managed.		No central hardware or user list management.
MIB extensions to modem level, performance, accounting and session information.		Limited SNMP support.
Activity logger via I40, SNMP or syslog, includes client connection logger.		Syslog connection logger, no client connection logger.
Software upgrade via graphical 8235 mgt. facility or TFTP.		Software upgrade via individual manager, no TFTP.
HP Openview support.		No HP Openview support.
Security – Radius, TACACS+, Security Dynamics, SecureNet Pathways, Netware Bindery, Server (I40) user list; Central server (I40) user list.		Total Control Security Server.
PCI/MVIP bus facilitates easy integration of new technologies.		Loosely integrated third party components make it difficult to manage technology/feature changes.
CPU card facilitates processor and memory upgrades.		Fixed memory.
Add capacity when required.		Analog connections limited to 48.

IBM 8235 Model I40	Ascend Max 4000/4004
Built from scratch as a high density remote access server.	The MAX was originally designed for access to video applications. Remote access technology was added as an after thought. Relatively new IPX implemented poorly.
Parallel computing model on a modular platform with card level subsystems.	A single processor architecture.
Modular architecture allows easy integration of new technologies such as 100Mbps or ADSL.	No upgrade path, fixed memory, 10Mbps Ethernet, WAN and compression done in hardware.
Multi processor: 68060 CPU card, 68040 modem card, 68020 PRI/BI card.	Single processor Intel i960 CPU.
Data path 8 to 32 bits.	Data path 1 to 16 bits.
Ethernet and Token-Ring.	Ethernet.
Packet filtering at LAN card.	Packet filtering at main CPU.
DSP modems send parallel (8 bits) data directly to bus.	DSP Modems send serial (1 bit) data to controller then bus.
Standard TDM bus (MVIP) and 1 Gbps packet bus (PCI).	Proprietary bus.
200 MIP aggregate.	30 MIPS.
Shared memory.	Fixed non-shared memory.
Designed for 120+ mixed ISDN/Analog concurrent connections. Currently supports: <ul style="list-style-type: none"> 72 Analog concurrent connections 96 Mixed ISDN/Analog connections STAC compression on modem card 	Designed for 96 mixed ISDN/Analog concurrent connections. Currently supports: <ul style="list-style-type: none"> 72 Analog concurrent connections (48 analog on 4000) 96 Mixed ISDN/Analog connections Separate STAC chip which requires hardware upgrade to change
MLP for LAN to LAN; MLP for Client; IPX/SPX spoofing; IP spoofing for PING and Telnet.	MP+ (Proprietary); No MLP for client; IPX/SPX spoofing; No IP spoofing.
Only routing update changes sent.	Entire routing table sent.
Virtual connections (line cost control).	No Virtual connections.
4 th Generation proven client.	3 rd party client from Funk Systems.
Unlimited license.	Chargeable.
Single user virtual connection designed to keep dial-up link down saving call costs.	No single user virtual connection.
Win 95, 3.x, WFW, NT, OS/2 & DOS , any PPP client.	Win 3.x client, Win 95, NT.
Proved PPP implementation with 15-20 million licenses in MS Explorer, MS Exchange, Netscape PB, Xcellenet RemoteWare and Farralon Timbuktu.	PPP implementation has no market presence and does not conform fully to RFC1570.
Roaming, fixed and automatic dialback.	Fixed dialback only.
Multilink Call Control Protocol (MCCP).	No MCCP.
Software Developers Kit (SDK) for client integration into user applications.	No SDK.
4 th generation GUI management.	VT100 terminal emulation.
Internal database supports 3000+ users including associated parameters.	Maximum of 30 users on box, anymore requires external TACACS or Radius database.
All I40's and user lists can be centrally managed.	No central hardware or user list management.
MIB extensions to modem level, performance, accounting and session information.	Limited SNMP support.
Activity logger via I40, SNMP or syslog, includes client connection logger.	Syslog connection logger, no client connection logger.
Software upgrade via graphical 8235 MGT. FACILITY or TFTP.	Software upgrade via terminal and Xmodem or TFTP.
HP Openview support.	No HP Openview support.
Security – Radius, TACACS+, Security Dynamics, SecureNet Pathways, Netware Bindery, Server (I40) user list, Central server (I40) user list.	Radius, TACACS+, Limited via Radius or TACACS+.
PCI/MVIP bus facilitates easy integration of new technologies.	No upgrade path and proprietary bus.
LAN card allows simple upgrade to fast Ethernet or Token-Ring.	Fixed Ethernet port.
CPU card facilitates processor and memory upgrades.	CPU and memory fixed.
WAN card facilitates integration of various WAN links, Frame Relay due out in 1997.	Fixed WAN interface.
Add capacity when required.	Limited to 96 connections.

IBM 8235 Model I40	Cisco AS5200
Built from scratch as a high density remote access server.	A 2500 router re-engineered to provide 3 slots, one for dual PRI and two for modems made by Microcom although this is now in doubt as Cisco acquired modem technology from Telebit.
Parallel computing model on a modular platform with card level subsystems.	Single processor architecture apart from a STAC chip on the motherboard.
Modular architecture allows easy integration of new technologies such as 100Mbps or ADSL.	No clear upgrade path to other technologies.
Multi processor: 68060 CPU card, 68040 modem card, 68020 PRI/BI card.	Single processor: 68030 CPU.
Data path 8 to 32 bits.	Data path 1 to 16 bits.
Ethernet and Token-Ring.	Ethernet.
Packet filtering at LAN card.	Packet filtering at main CPU.
DSP modems send parallel (8 bits) data directly to bus.	DSP modems send serial (1 bit) data to controller then bus.
Standard TDM bus (MVIP) and 1 Gbps packet bus (PCI).	Proprietary bus.
200 MIP aggregate.	30 MIPS.
Shared memory.	Fixed non-shared memory.
Designed for 120+ mixed ISDN/Analog concurrent connections Currently supports: <ul style="list-style-type: none"> 72 Analog concurrent connections 96 Mixed ISDN/Analog connections STAC compression on modem card 	Designed for 48 mixed ISDN/Analog concurrent connections Currently supports: <ul style="list-style-type: none"> 48 Analog concurrent connections 48 Mixed ISDN/Analog connections STAC compression on main CPU with socket for future STAC chip
MLP for LAN-to-LAN; MLP for Client; IPX/SPX spoofing; IP spoofing for PING and Telnet.	MLP for LAN-to-LAN; No MLP for Client; IPX/SPX spoofing; No IP spoofing.
Only routing update changes sent.	Entire routing table sent.
Virtual connections (line cost control).	No Virtual connections.
4 th Generation proven client.	3 rd party client from Network Tele Systems.
Unlimited license.	Part unlimited, part chargeable.
Single user virtual connection designed to keep dial-up link down saving call costs.	No single user virtual connection.
Win 95, 3.x, WFW, NT, OS/2 & DOS , any PPP client.	Win 3.x, WFW, DOS. Uses native Win 95 native & NT RAS clients which has limited functionality.
Proved PPP implementation with 15-20 million licenses in MS Explorer, MS Exchange, Netscape PB, Xcellenet RemoteWare and Farralon Timbuktu.	PPP client limited market presence.
Roaming, fixed and automatic dialback.	Fixed dialback only.
Multilink Call Control Protocol (MCCP).	No MCCP.
Software Developers Kit (SDK) for client integration into user applications.	No SDK.
4 th generation GUI management.	Command Line. CiscoWorks optional extra.
Internal database supports 3000+ users including associated parameters.	Limited user database, supports user name/password only. Requires TACACS/Radius for user maintenance.
Integrated modem management.	Modems managed separately.
All I40's and user lists can be centrally managed.	No central hardware or user list management.
MIB extensions to modem level, performance, accounting and session information.	Limited SNMP support, RMON for Ethernet statistics.
Activity logger via I40, SNMP or syslog, includes client connection logger.	SNMP or syslog connection logger, no client connection logger.
Software upgrade via graphical 8235 MGT. FACILITY or TFTP.	Software upgrade via TFTP.
HP Openview support.	HP Openview support.
Security – Radius, TACACS+, Security Dynamics, SecureNet Pathways, Netware Bindery, Server (I40) user list, Central server (I40).	Radius, TACACS+.
PCI/MVIP bus facilitates easy integration of new technologies.	Proprietary bus means longer development cycle for new technologies.
LAN card allows simple upgrade to fast Ethernet or Token-Ring.	Fixed Ethernet port.
CPU card facilitates processor and memory upgrades.	CPU fixed.
WAN card facilitates integration of various WAN links, Frame Relay due out in 1997.	Fixed WAN interface.
Add capacity when required.	Limited to 48 connections.

Key Selling Points The following points should be emphasized when selling the I40 DIALs Switch:

- Integrates ISDN and analog access via a single phone number
- Ability to deal efficiently and effectively with large numbers of high-speed connections
- Smart Detect™ automatic call discrimination switches data transparently
- Complete solution for Internet Service Providers
- Supports wide range of client platforms and protocols
- Scalable architecture with 8 slots for customer-installable modules
- Easy migration paths to Fast Ethernet, FDDI and ATM, as well as to frame relay
- RADIUS security - the de-facto standard for security and accounting, plus a host of other security options
- Network management from a choice of Windows and UNIX platforms, or via Telnet or SNMP
- Industry standard PCI and MVIP architecture
- Superior architecture for maximum performance when fully loaded
- SmartPath installation service available



IBM SmoothStart Service for 8235 I40 DIALs Switch

Product Description

IBM SmoothStart services are installation services designed to help customers get their remote access solutions up and running in the quickest and most economical manner possible. Available for IBM or non-IBM hardware and software, SmoothStart provides:

- Quick and efficient installation and configuration
- Reduced need for customers to acquire new skills and resources
- Training for customer's staff on use and maintenance of equipment

By utilizing SmoothStart, customers get a more complete solution and free their staff to perform profit generating activities. SmoothStart provides:

- Installation planning
- Software installation
- Software configuration
- SmoothStart installation record
- Staff training

IBM services specialists can:

- Install the server software on a PC to manage the IBM 8235
- Install client software on a remote PC or laptop
- Invoke security features to help limit access to authorized users
- Establish connectivity between the remote PC and the IBM 8235
- Provide training to the designated customer representative

For more information call Express Services at 1-800-IBM-4YOU.

ISA 28.8/14.4 Kbps Data/Fax Modem

Features

The ISA 28.8/14.4 Kbps Data/Fax modem offers the following features:

- Support for IBM Rapid Resume systems with Wake-Up on Ring, allowing unattended communication operations, even if the PC has been powered off.
- Hardware data compression and error control for maximum throughput and reliable data transfers.
- Externally accessible and marked DIP switches for easy set-up and reconfiguration (ISA).
- Extensive feature set that includes Hayes AutoSynch™, MNP™10 error control, and Group 3, Class I and II fax support.
- QuickLink II Fax for DOS/Windows.
- Rugged metal case with external volume control, serial cable, and 9 to 25-pin adapter all included.
- On-line reference documentation.
- Windows 95 support

Products and Options

Description
ISA 28.8 (V.34)/14.4 Data/Fax Modem
External 28.8 (V.34)/14.4 Data/Fax Modem

Sales Tools

The following product spec sheet is available at 1-800-IBM-4FAX.

ISA 28.8 (V.34)/14.4 Kbps Data/Fax Modem Document # 1784

PCMCIA 33.6 (V.34)/14.4 Data/Fax Modem

Features

The PCMCIA 33.6/14.4 Data/Fax modem offers the following features:

- Cellular-ready, it directly attaches to many popular cellular phones with separately purchased cable kits. MNP10 error control maintains high data throughput on the cellular connection.
- Single cable hook-up between the modem and the wall jack. Special cable design gives you a choice to "lock" cable in place or friction fit
- Extensive feature set that includes data compression, Hayes AutoSynch, error control, and Group 3, Class I and II fax support
- DOS, Windows, and OS/2 driver support with on-line reference information.
- Flash ROM for software only upgrades
- QuickLink II Fax for DOS/Windows
- Technical support 24 hours/day, 7 days/week
- Plug and Play enabled
- Patented locking mechanism
- Competitively priced
- Netscape Navigator support
- Windows 95, Windows NT support
- 30 hours free Internet time
- Lifetime Limited Warranty on the modem adapter (90 days on the cable)

Products and Options

Description
PCMCIA 33.6 (V.34)/14.4 Data/Fax Modem
Modem to FJ11 Cable (spare)
Cellular Cable Kits:
Motorola
Nokia 2120, AT&T 6650
NEC 110/120/180, AT&T 3610
NEC P700/701
Mitsubishi 3500/4000, Diamondtel 20x/22x
OKI 1325/1335/1375
OKI 1145/1150, AT&T 3760

Sales Tools

The following product spec sheet is available at 1-800-IBM-4FAX.

PCMCIA 33.6 (V.34)/14.4 Kbps Data/Fax Modem

Document # 2957

WaveRunner Digital Modem

Product Description

The IBM WaveRunner is an internal adapter that allows a PC or PS/2 to communicate with ISDN Data Terminal Equipment (DTE) at speeds up to 128 Kbps. It comes in full-size versions for ISA or PCMCIA. All of the full size versions support both Windows 3.1, Windows 95 or OS/2 2.1 or higher. All models attach to ISDN Basic Rate Interface telephone service lines through an NT1. In addition, the PCMCIA model can also attach to analog "Plain Old Telephone Service" lines. With the PCMCIA model, the user would most likely use the ISDN functions when available and would use the analog functions at a speed of 33.6 when an ISDN line is not available such as in a hotel room.

Features

The features of the WaveRunner models include:

- **Standards-based.** The WaveRunner will communicate with other V.120 ISDN adapters (regardless of vendor) over ISDN at digital speeds up to 64 Kbps on 1 B channel and up to 128 Kbps on 2 B channels. WaveRunner, through the Win ISDN interface and TCP/IP software products from vendors such as NetManage and FTP Software, will support standard PPP and MLP connections. ISDN networks in the US, Canada, Europe and Japan are supported as is Windows 95.
- **Modem/fax emulation.** In addition to its ISDN capability, the WaveRunner can interoperate with analog modems and G3 fax equipment over ISDN. This feature provides the user with the flexibility to experience the speed and reliability of ISDN with other ISDN devices while retaining interoperability with existing analog and fax equipment.
- **Digital Signal Processor.** Based on the Mwave™ (from IBM Microelectronics) Digital Signal Processor, the WaveRunner's functions are primarily software-based rather than hardware-based. This means that additional functionality can be gained by software updates, preserving the customer's investment.
- **Com Port Emulation.** The WaveRunner functions as a standard com/serial port at speeds up to 64 Kbps over ISDN. This exclusive function allows existing communications packages to enjoy the speed and reliability of ISDN. The throughput of com/serial port applications is maximized by using com port accelerators. WaveRunner includes a Windows com port accelerator. OS/2 versions are available on the IBM PC Company BBS.
- **Auto-Sensing Modem/Digital Selection.** WaveRunner automatically interprets incoming D (signaling) channel messages to select analog or digital transmission mode for incoming calls.

- **TCP/IP Support.** WaveRunner supports the TCP/IP Serial Line Internet Protocol (SLIP) and will work with commonly available TCP/IP packages. It will also interoperate with Network Express, Combinet and Teleos Ethernet bridges using the RFC 1294 standard for frame relay encapsulation. Through the WinISDN Application Programming Interface, WaveRunner also supports Ascend Ethernet bridges using PPP. The Ascend bridge is very popular with Internet Access providers. The WinISDN interface will allow MLP support for multiple link connections to Internet access providers.
- **Fax Emulation.** The WaveRunner supports the exchange of standard Group III facsimile with fax machines connected to analog lines. It also includes Trio DataFAX™ Lite software for Windows that allows users to send and receive faxes directly through the WaveRunner adapter. WaveRunner also supports the CLASS II fax interface used by other popular fax programs.
- **Switched-56 Support.** The WaveRunner also interoperates with Switched-56 equipment over ISDN.
Note: Refer to the December 1, 1994 announcement about software enhancements. Free software upgrades are available via the IBM PC Company BBS ((919) 517-0001).

7845 Network Terminator Extended

Every ISDN BRI line requires a Network Terminator to connect the ISDN customer premises equipment (whether it be a data adapter or an ISDN phone) to the ISDN service line from the telephone company. IBM's 7845 Network Terminator Extended is such a product and more. The 7845 is another unique and exclusive IBM product. In addition to functioning as a standard network terminator, it can also be configured to support an ISDN adapter such as WaveRunner on one B channel, while also supporting a standard analog phone (or a whole house full of phones) on the other B channel. Using the 7845 NT Extended with WaveRunner allows a user to use one B channel for data and one B channel for analog phone service. With the 7845, a single ISDN line can provide the business voice service and business data capability required by the telecommuters and it leaves the family's current analog phone service intact.

The 7845 is configured using an attached analog phone. It provides standard analog support as well as a number of custom calling features such as speed dialing, redial, call hold/return, call retrieve, call waiting and conference calling. The 7845 also comes with a rechargeable battery so that phone service continues via the ISDN line during a power outage.

Products and Options

Description
WaveRunner Digital Modem, ISA bus
WaveRunner Digital Modem, PCMCIA
7845 Network Terminator Extended
WaveRunner Digital Modem, PCMCIA and 7845 Network Terminator Extended (special promotion)
WaveRunner Digital Modem ISA and 7845 Network Terminator Extended (special promotion)

Sales Tools

The following product spec sheet is available at 1-800-IBM-4FAX.

<i>WaveRunner ISDN or 33.6K Analog Modem</i>	Document # 2969
<i>7845 ISDN Network Terminator Extended</i>	Document # 1518

Competitive Advantage

The WaveRunner's competitive advantage is its ability to interoperate with other ISDN devices using commonly available communications packages while retaining the ability to continue to operate with existing analog modem or fax destinations. Customers already using modems and the standard modem packages can move to ISDN's speed and reliability for remote LAN access while still using the same communications packages and still being able to communicate with the same analog and fax destinations.

Another competitive advantage is its Digital Signal Processor which is software upgradable as demonstrated by the free software enhancements to be made available to current WaveRunner customers via the IBM PC Company BBS or via our Internet FTP site. Most other competitive products are hardware-based. By providing updates in software, IBM protects the user's investment in hardware.

References

Sales Guides For information on additional IBM networking products, please consult the following IBM Sales Guides.

- Network Adapter Sales Guide
- LAN Hub Sales Guide
- LAN Switch Sales Guide
- Bridge/Router Sales Guide
- ATM Sales Guide

Reseller Support Resellers interested in pre-sale assistance and information for IBM networking hardware products, please feel free to send inquiries to our NETeam Support Center for Business Partners via e-mail. The address is **neteam@vnet.ibm.com**. The NETeam phone number is **1-(800)-426-7472**.

Glossary

Access Lines	Lines used to access services within the network cloud (analog, BRI, PRI, T1).
Access Mode	In remote access, it refers to the three ways to access information (dial-in, LAN-to-LAN, and dial-out).
Aggregation	Bandwidth aggregation is the ability to establish more than one communications channel per connection.
Asynchronous	A method of transmission in which the time intervals between characters do not have to be equal. Start and stop bits are added to coordinate the transfer of characters.
Augmentation	Bandwidth augmentation is the ability to add another communications channel to an already existing communications channel.
Backbone	The part of the communications network intended to and built to carry the bulk of traffic. Provides connectivity between subnetworks in an enterprise-wide network.
Bandwidth	Term used to describe the rated throughput of a given network medium or protocol.
Bandwidth Reservation	This is an innovative method of allocating scarce bandwidth resources on serial lines using PPP. It provides some guarantee that various types of traffic have fair access to outbound serial link bandwidth when more traffic must be sent than the link can currently send.
B Channel	Bearer channel. A Basic Rate Interface line contains two B channels which can transmit information at 64 Kbps and are used for both voice and data transmissions.
Bonding	A type of inverse multiplexing performed at the circuit level, where the data stream is sliced into equal portions, regardless of the content of the data stream, and each portion is transmitted over an available circuit. At the receiving end the data stream is reassembled in the proper order.
BRI	Basic Rate Interface. A BRI line, often referred to as 2B+D, is an ISDN-to-user connection that consists of two B channels and one D (data channel). As many as eight digital devices and 64 telephone numbers can be supported by a single BRI line.

CHAP	Challenge Handshake Authorization Protocol. Password protection protocol that describes how to authenticate incoming data calls. Password is encrypted over access line.
Compression	Data compression increases the amount of data that can be carried across WAN connections in a given time.
CPE	Customer Premises Equipment. A general term for communications equipment at a customer's site.
CSU	Channel Service Unit. A device used to connect a digital connection, such as a T1 being delivered from the phone company, to network access equipment located on the customer premises. The CSU regenerates the digital signal to boost clarity and remove background noise. Some devices also include an integrated CSU/DSU.
D Channel	Data channel. A BRI line contains one D channel that is used for call setup and user data. Common to all ISDN lines, D channels operate at 16 Kbps on a BRI line and 64 Kbps on a PRI line.
DHCP	The Dynamic Host Configuration Protocol provides a framework for passing configuration information to hosts and also provides management of IP addresses.
Dial-In	A mode for remote users to access information. To the user the network is what's remote.
Dial-Out	A mode for locally connected LAN users to access shared communications equipment to dial up remote information.
Digital Modem	A term used to describe an adapter that can support digital communications lines (i.e., ISDN).
DSU	Data Service Unit. A device used to connect a computer to a digital phone line to allow for fully digital communications.
E1	European equivalent of a T1 circuit. An E1 line has a transmission rate of 2.048 Mbps over 32 channels.
Floating Virtual Connection	(FVC). The ability to resume a virtual connection on a port other than the port on which the original virtual connection was established.
Fractional T1	Service offering data rates between 64 Kbps and 1.544 Mbps in specified intervals of 64 Kbps. T1 service is ordered, but less than the full 24 channels is delivered.

Frame Relay	Frame relay switching is a form of packet switching that uses smaller packets and requires less error checking.
Inverse Multiplexing	Inverse multiplexing equipment receives a high-speed input and breaks it up for the network into multiple 56 or 64 Kbps signals so that it can be carried over switched digital services, then recombines the multiple signals into a single integrated transmission at the receiving end.
ISDN	Integrated Services Digital Network. International telecommunications standard for transmitting voice, video and data over a digital line. It uses 64 Kbps circuit-switched B channels to carry voice and data and uses a separate D channel to carry control signals via a packet-switched network.
ITU	International Telecommunications Union. The ITU defines the ISDN transmission protocols that are accepted mass communications standards.
Leased Line	A telephone circuit rented for exclusive use 24 hours a day, seven days a week. The connection exists between two predetermined points and cannot be switched to other locations.
Juggling Virtual Connection	(JVC) The ability to have more suspended virtual connections than there are ports on the 8235.
LAN-to-LAN	An access mode for connecting remote LAN sites.
MIB	Management Information Base. A directory listing the logical names of all information resources residing in a network and pertinent to the network's management. A key element of SNMP management systems.
Multilink PPP	(MLP) A standard method for splitting, recombining and sequencing packets across multiple data links to form a single aggregate channel. Originally developed to exploit multiple ISDN B-channels, but equally applicable to sync links. Also referred to as packet inverse multiplexing.
Multiplexing	Putting multiple signals on a single channel.
NT-1	Network terminator. The NT-1 is the interface between the BRI or PRI connection and the digital devices that use ISDN.
NT-2	Network Termination Type 2. Devices that provide customer site switching, multiplexing and concentration (PBXs, computer, terminal controllers).

Packet Fragmentation	The ability to configure a default packet size over which packets will be fragmented for more efficient distribution over aggregated communications links.
Piggybacking	The process of carrying acknowledgments within a data packet to save network bandwidth. A spoofing synchronizing mechanism where routing update messages are sent across the link only when the link is open for real data traffic.
POP	Point of Presence. A central office or service access point for a network service provider (such as an internet service provider).
Power Switching	A capability of the Release 4.0 client setup program to quickly switch between communications adapters.
PPP	Point-to-Point Protocol. Serial communications protocol for WANs defined by the Internet Engineering Task Force in 1991.
PRI	Primary Rate Interface. A PRI line consists of 23 B channels and one 64 Kbps D channel, often referred to as 23B+D. In Europe and the Pacific Rim countries, PRI lines consist of 30 B channels and one D channel and are often called 30B+D.
PSTN	Public Switched Telephone Network. The telecommunications network commonly accessed by all of us virtually every day when we make a telephone call.
RADIUS	Remote Access Dial-In User Security. A security system administered by a centralized database that contains password and access information as well as user configuration profiles.
Rate Adaption	Algorithms used to map a user's actual bit transfer rate to the 64 Kbps speed of the B-channel.
Remote Adapted Routing	The adaptation of backbone routing techniques that take into account: slow-line communications links, intermittent connections, security, chatty routing protocols, management and user ergonomics.
Roaming Dial-Back	The ability of the 8235 to dial-back the user at a roaming location.
SLIP	Serial Line IP. A protocol that allows a computer to use the Internet protocols with a standard telephone line and a high-speed modem. SLIP is being superseded by PPP.
Spoofing	A method by which the client and/or router filters network traffic to keep unnecessary traffic from going over the WAN link.

SR	Source Route Bridging is a method of forwarding frames through a bridged network in which the source station identifies the route that the frame will follow. Used in Token-Ring and FDDI networks.
S/T Interface	The four-wire ISDN circuit between the customer's network termination equipment (NT1) and the customer's data/voice equipment.
Suspended Virtual Connection (SVC)	The mode of a virtual connection where the communications line is dropped and the connection sites are actively spoofing.
Switched-56	A communications technology that transfers information at 56 Kbps. Switched-56 lines can only connect to Switched-56 services and circuits.
Synchronous	A transmission system in which characters are synchronized by the transmission of initial sync characters and a common clock signal.
T1	High speed communications technology analogous to a PRI line in that it can carry 24 x 64 Kbps lines simultaneously.
Terminal Adapter	A device that provides a link between a PC or a telephone and an ISDN line.
Virtual Circuit	A logical end-to-end connection between two points.
Virtual Connection	A connection set up between two points that appears to the user to be available as a dedicated connection. This "phantom" connection can be maintained indefinitely or can be ended at will. The three states of a virtual connection are up, down or suspended.
X.25	A CCITT standard for the protocols and message formats that define the interface between a terminal and a packet switching network.