*Cost-effective, yet powerful router solution*

# IBM 2210 Nways Multiprotocol Router

***Highlights***

- ***An extensive range of connectivity, protocols and prices to link remote locations, branch offices and regional sites into a cohesive, cost-effective, multiprotocol network***
- ***New 2210 models providing a significantly lower price to implement either WAN or ISDN access for Ethernet LANs***
- ***Expanded connectivity with a family of new adapters including ISDN PRI, 25 Mbps ATM and 4- and 8-port WAN concentration, in addition to the ISDN BRI adapter***
- ***ATM Forum-compliant LAN Emulation and Classical IP facilitating the migration from today's LAN investments to ATM technology***
- ***High-Performance Routing (HPR) enabling the native transport of SNA traffic in a multiprotocol environment to provide an outstanding solution for the consolidation of SNA, TCP/IP and multiprotocol networks***

**Enterprise-wide network computing**

Corporate computing is evolving to network computing to enable employees throughout a corporation to collaborate as though they were in the same office and to help companies connect to their customers, suppliers and business partners. Network computing includes internal networks, or intranets, based on the Internet Protocol, links to the Internet or World Wide Web, and existing investments in multiprotocol LANs, ATM and switching technology and core business applications that rely on SNA.

**Access to network computing**

The IBM 2210 Nways™ Multiprotocol Routers provide an extensive range of connectivity, protocols and price granularity to enable you to cost-effectively implement network computing across a broad range of remote locations, branch offices and regional sites.

New entry models of the 2210 offer one Ethernet port and either one serial WAN port or one ISDN BRI port to provide the most economical 2210 solution for the smallest offices in your enterprise. The mid-range models of the 2210 offer one LAN port (Ethernet or token ring) and two

*2210 Model 1S4*



*2210 Model 128*



*2210 Model 12T*



*2210 Model 24M*



*IBM 2210 NWays Multiprotocol Routers*

***IBM 2210 Nways Multiprotocol Router Models at a Glance***

| Models | LAN | No. of WANs | ISDN BRI | Base Flash Memory | Base DRAM | Supports Adapter Features |
|---|---|---|---|---|---|---|
| 1S4[a] | Ethernet | 1 | Yes | 2 MB | 4 MB | No |
| 1S8[a] | Ethernet | 1 | Yes | 4 MB | 8 MB | No |
| 1U4[a] | Ethernet | 1 | Yes | 2 MB | 4 MB | No |
| 1U8[a] | Ethernet | 1 | Yes | 4 MB | 8 MB | No |
| 12T | Token-Ring | 2 | No | 4 MB | 4 MB | No |
| 12E | Ethernet | 2 | No | 4 MB | 4 MB | No |
| 127 | Token-Ring | 2 | Yes | 4 MB | 4 MB | No |
| 128 | Ethernet | 2 | Yes | 4 MB | 4 MB | No |
| 14T | Token-Ring | 4 | Optional[b] | 4 MB | 4 MB[c] | Yes[d] |
| 24T | 2 Token-Ring | 4 | Optional[b] | 4 MB | 4 MB[c] | Yes[d] |
| 24E | 2 Ethernet | 4 | Optional[b] | 4 MB | 4 MB[c] | Yes[d] |
| 24M | 1 Token-Ring & 1 Ethernet | 4 | Optional[b] | 4 MB | 4 MB[d] | Yes[d] |

Note: a. You can choose whether to configure the serial WAN port or the ISDN BRI port. Models 1U4 and 1U8 include a fully integrated NT1, incorporating the U interface.

b. With an ISDN BRI adapter installed in the adapter slot.

c. Nways Multiprotocol Routing Services requires a minimum of 8 MB of DRAM in 127, 128 and all x4x models.

d. Adapter Enablement Feature is prerequisite for all adapters.

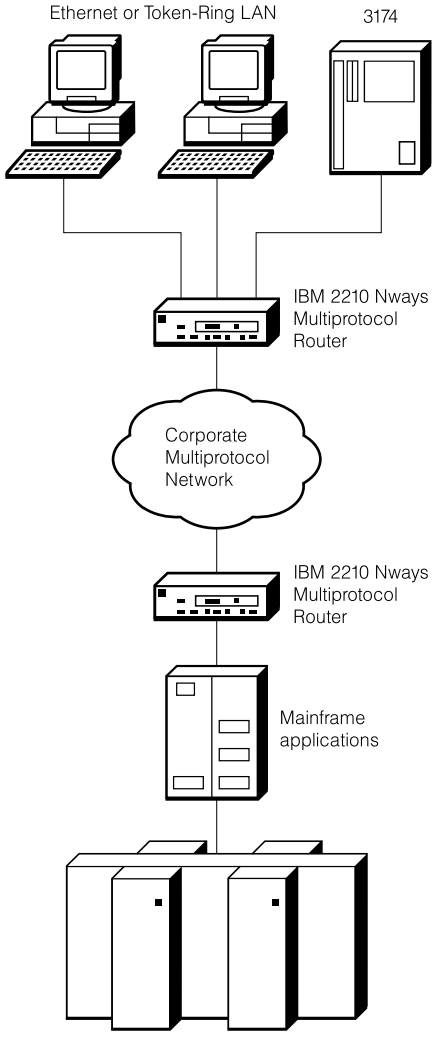
e. The standard WAN ports on the IBM 2210 will support any of these physical interfaces:

- EIA 232 D/V.24/V.28
- V.35
- V.36/EIA 449
- X.21.

***IBM 2210 Nways Multiprotocol Router Dimensions at a Glance***

| Model | Width | Depth | Height | Weight |
|---|---|---|---|---|
| 1Sx | 279.4 mm (11 in.) | 133 mm (5.25 in.) | 41.4 mm (1.63 in.) | 1.24 kg (2.75 lb) |
| 1Ux | 279.4 mm (11 in.) | 133 mm (5.25 in.) | 41.4 mm (1.63 in.) | 1.24 kg (2.75 lb) |
| 12x | 440 mm (17.3 in.) | 254 mm (10 in.) | 43.7 mm (1.74 in.) | 3.2 kg (7 lb) |
| 14T | 440 mm (17.3 in.) | 305 mm (12 in.) | 87.4 mm (3.48 in.) | 5.16 kg (11.4 lb) (without Adapter Enablement Feature) 5.57 kg (12.3 lb) (with Adapter Enablement Feature) |
| 24x | 440 mm (17.3 in.) | 305 mm (12 in.) | 87.4 mm (3.5 in.) | 5.16 kg (11.4 lb) (without Adapter Enablement Feature) 5.57 kg (12.3 lb) (with Adapter Enablement Feature) |

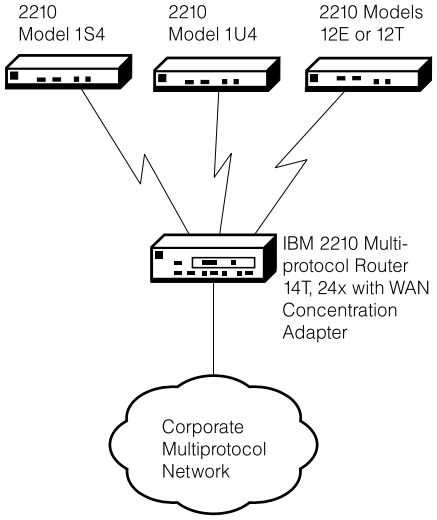
serial WAN ports for larger branch offices. Some mid-range models also provide a single ISDN BRI port. The high-end models of the 2210 double the connectivity and performance of the other models with up to two LAN ports and four serial WAN ports to support large branch offices and regional locations. In addition, the high-end models of the 2210 include an open adapter slot that supports any one of the following adapters: ISDN BRI, ISDN PRI, 25-Mbps ATM and four- and eight-port WAN concentration.



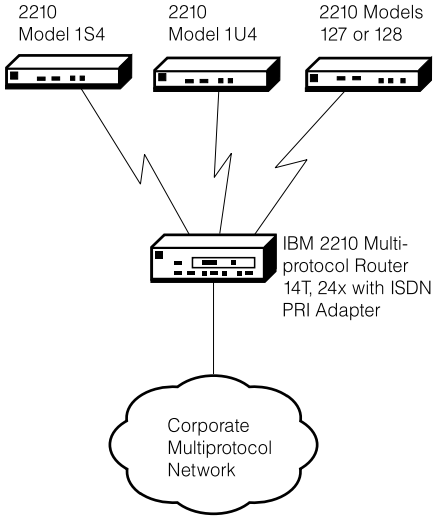

*Consolidate SNA and LAN multiprotocol networks*

**Many models, common function**

All models of the 2210 use a common set of software functions called *IBM Nways Multiprotocol Routing Services (Nways MRS)*. Nways MRS is a member of IBM's family of multiprotocol services products that includes the Nways Multiprotocol Access Services (Nways MAS) for the IBM 2216 Nways Multiaccess Connector and the Nways Multiprotocol Switched Services (Nways MSS) for the IBM 8210 Nways MSS Server and the IBM 8260 Nways MSS Module. Together, IBM's multiprotocol services products provide the benefits of switching, distributed routing, bridging and virtual LANs and enable the implementation of Switched Virtual Networking (SVN). It is IBM's comprehensive, high-performance framework to implement enterprise-wide network computing.




*WAN concentration for remote offices*

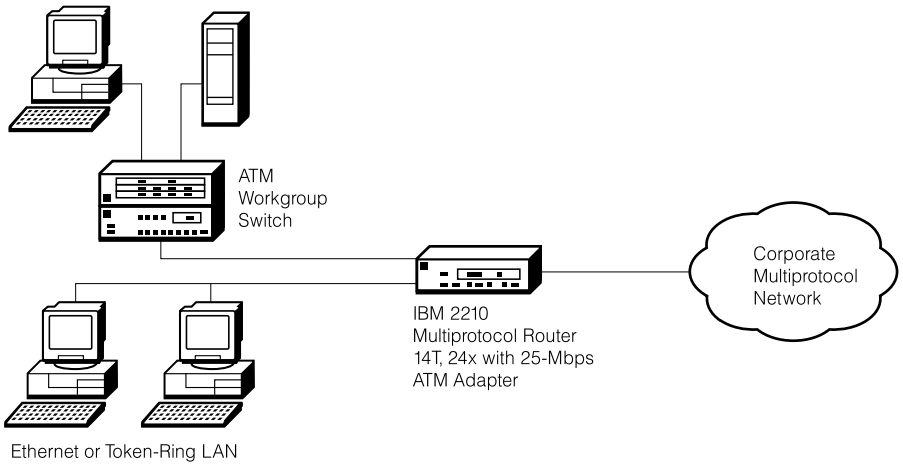



*ISDN concentration for remote offices*

**Nways Multiprotocol Routing Services (MRS)**

Nways MRS includes the following functions:

- All common routing protocols, including IP, IPX, AppleTalk, Banyan VINES, DECnet IV and DECnet V/OSI.
- IP routing that includes ICMP, TCP, UDP, RIP, OSPF V2, BGP-4, static routes, Multicast Extensions to OSPF (MOSPF), ARP, InARP and IP Access Controls.
- Advanced SNA support with APPN® Network Node (NN), APPN Intermediate Session Routing, High-Performance Routing (HPR), Dependant LU Requester (DLUR), Data Link Switching (DLSw, RFC 1795) including NetBIOS support, and LAN Network Manager.
- All common bridging techniques, including transparent, source-route, source-route transparent, source-route-to-transparent translational bridging and IP bridging tunnel.
- Support for 25-Mbps ATM with encapsulation over ATM for IP (Classical IP) and IPX, along with LAN Emulation Client to assist in migrating to ATM technology and lowering network management costs. LAN Emulation support for both bridged and ATM-attached workstations allows incremental installation of ATM adapters to support high-bandwidth requirements.
- V.25bis and ISDN switched network access with worldwide ISDN software options, WAN restoral and dial on demand.
- Complete data link control support for Frame Relay, PPP, X.25, SDLC, dial circuits, ATM, Ethernet and Token Ring. The frame relay support includes Frame Relay BAN that provides a bridging capability and additional functions with either DLSw or APPN. The APPN support includes both the Token-Ring (802.5) bridge encapsulation format as well as the Q.933 encoding for APPN traffic. The SDLC support includes primary and secondary link station support and support for multiple SNA physical unit types.
- WAN reroute is supported for recovery from Frame Relay, PPP or X.25 link failures.
- Bandwidth reservation to assist traffic priority is supported over Frame Relay, PPP, and dial connections.
- All models of the 2210 are shipped preloaded with the IBM Nways MRS licensed program. A variety of software packages allow you to choose functional capabilities based on your specific requirements. After installing your 2210, you can select additional functional packages located on the Internet. If you have IBM Nways Multiprotocol Routing Network Services, you can upgrade to Nways MRS at no charge, assuming you order a comparable functional package.




*Network access for a 25-Mbps ATM Workgroup*

**Standards-based interoperability**
Nways MRS is based on open, industry standards, vendor specifications and protocol implementations that conform to current Internet Engineering Task Force (IETF) Request for Comment (RFC) levels. In addition, IBM participates in industry initiatives such as the IETF, ATM Forum, IEEE, APPN Implementers Workshop (AIW) and the Network Interoperability Alliance. Thus, the protocol implementations in Nways MRS provide a full set of features to ensure network reliability, security and interoperability.

**Leverage existing investments**
To integrate existing networks, such as SNA, into an SVN environment requires the robust and comprehensive SNA implementations provided by Nways MRS. These SNA implementations in the 2210 protect your current investment and ensure a smooth migration path to the future. Nways MRS includes the following SNA capabilities:

- HPR to provide high-speed, native SNA transport with non-disruptive routing around failed connections and adaptive rate-based congestion control.
- DLUR to enable 3270 traffic to utilize HPR and APPN transports.
- Advanced Peer-to-Peer Networking® (APPN) Intermediate Session Routing (ISR) to provide the forwarding of session data to the next node along the path.
- APPN Network Node support to provide routing and directory services to Ethernet, Token-Ring and SDLC-attached end nodes.
- BAN support to enable end stations attached to the 2210 to make a direct connection via Frame Relay to a front-end controller such as the IBM 3745 Communications Controller or the IBM 3746 Nways Controller. A similar, direct connection can also be established between the 2210 and an IBM AS/400® system.
- DLSw to transport SNA and NetBIOS protocol traffic across IP networks via encapsulation.

Note: HPR, DLUR, APPN ISR and APPN Network node are not available on Models 1Sx and 1Ux.

***IBM 2210 Nways Multiprotocol Router at a Glance***

| | |
|---|---|
| **Serial interfaces** | EIA 232 D/V.24/V.28, V.35, V.36/EIA 449 and X.21 |
| **LAN interfaces** | Ethernet: IEEE 802.3 at 10 Mbps<br>Connections: AUI and 10BASE-T (RJ-45)<br>Token-Ring: IEEE 802.5 at 4 or 16 Mbps<br>Connections: 9-pin D-connector and RJ-45 |
| **Memory features** | 4-MB additional flash<br>8-MB DRAM expansion<br>16-MB DRAM expansion<br>32-MB DRAM expansion<br>*Note: Flash memory can be increased to 8 MB. DRAM is expanded by selecting a DRAM memory feature to replace the installed DRAM.* |
| **Adapter features** | 25-Mbps ATM interface<br>ISDN BRI<br>E1 120-Ohm ISDN PRI<br>T1/J1 ISDN PRI<br>4-Port WAN concentration<br>8-Port WAN concentration<br>*Note: The Adapter Enablement Feature is a prerequisite for installing any adapter.* |
| **Electrical requirements** | Automatically senses line voltage within an input range from 110–240 V AC at 50-60 Hz |
| **Operating environment** | Temperature: 10° to 40°C (50° to 104°F)<br>Relative humidity: 8% to 80%<br>Maximum wet-bulb temperature: 27°C (80°F)<br>Power supply: 19 watts (Models 1Sx and 1Ux)<br>35 watts (all other models) |
| **Heat output** | 35 BTUs/hr (Models 1Sx and 1Ux)<br>113 BTUs/hr without Adapter Enablement Feature (all other models)<br>137 BTUs/hr with Adapter Enablement Feature (all other models) |
| **2210 certifications** | Safety certifications: EN 60950, UL 1950, CSA 950<br>Electromagnetic compliance certification:<br>- FCC Class A (USA)<br>- VCCI Class 1 (Japan)<br>- ICES-003 Class A (Canada)<br>- European Community Mark of Community (CE Mark), for ClassB, CISPR 22 / European Standard EN 55022<br>*Note: The 2210 1Sx and 1Ux models comply with FCC Class B (USA) and ICES-003 Class B (Canada)* |
| **Warrenty** | One year |
| **Installaton** | All models can be placed on a flat surface, and all models except 1Sx and 1Ux can be mounted in a rack in a wiring closet. |
| **ISO 9000** | The IBM 2210 Nways Multiprotocol Router has been developed and manufactured in IBM facilities that are fully compliant, and have been registered, with the ISO 9000 standards. |

***IBM 2210 Nways Multiprotocol Router at a Glance (continued)***

| | |
|---|---|
| **Software** | IBM Nways Multiprotocol Routing Services (5765-B86)<br>Routing protocols:<br>- TCP/IP<br>- IPX<br>- AppleTalk 2<br>- Banyan VINES<br>- DECnet IV<br>- DECnet V/OSI |
| | SNA:<br>- APPN NN<br>- APPN ISR<br>- HPR<br>- DLUR<br>- DLSw (RFC 1795) including NetBIOS support<br>- SDLC primary and secondary<br>- SDLC Multiple SNA PU support<br>- LAN Network Manager (LNM) |
| | Bridging:<br>- Source-Route Bridging (SRB)<br>- Transparent Bridging (TB)<br>- Source-Route Transparent Bridging<br>- SRB-TB Translational Bridging<br>- IP Bridging tunnel |
| | ATM:<br>- ATM Forum UNI 3.1<br>- ATM Forum Interim Local Management Interface (ILMI)<br>- PVC and SVC<br>- RFC 1483 Encapsulation over ATM for IP (Classical IP–RFC 1577) and IPX<br>- LAN Emulation Client support to enable existing Ethernet and Token-Ring LAN applications to use ATM services<br>- Standard ATM MIB RFC 1695 |
| | Switched networks:<br>- V.25bis (PPP)<br>- ISDN BRI and PRI (PPP or Frame Relay)<br>- WAN restoral (PPP)<br>- WAN reroute from Frame Relay, PPP or X.25 link failures<br>- Dial on demand |
| | WAN data link controls:<br>- Frame Relay (RFC 1490) including BAN support<br>- PPP<br>- X.25 including X.25 DTE Transport (XTP) for X.25 over a TCP/IP network<br>- SDLC |
| | Bandwidth Reservation System |
| | EasyStart |

**Invest today—grow tomorrow**

All models of the IBM 2210 Nways Multiprotcol Router are shipped preloaded with IBM's Nways MRS licensed software. When you order a 2210, you select the model, software and memory options based on your unique connectivity and performance requirements. The mid-range and high-end models can be ordered with a minimum of 4 MB of flash memory and 4 MB of DRAM. The mid-range models have upgradable DRAM to either 8 MB or 16 MB, and a 32-MB upgrade is available for the high end models. The higher end models also provide field-upgradable flash to 8 MB.

Flexibility to accommodate future networking requirements is also provided by the open adapter slot available with the high-end 2210 models. The ATM adapter enables customers to begin to introduce switching into their networks and to integrate 25-Mbps ATM applications with existing LAN applications. Customers considering the increased use of dial services for backup and for remote offices with only occasional network access can utilize the ISDN BRI and PRI adapters. The new four- and eight-port WAN concentration adapters can provide potential cost savings if multiple physical links can be consolidated into a single, higher speed link.

### *2210 Nways ISDN BRI Adapter*



| | |
|---|---|
| **Characteristics** | 2 independent, 64-Kbps B-Channels for data<br>One 16-Kbps D-Channel for signaling |
| **Electrical interface** | S/T |
| **Connectors** | Box: RJ-45<br>Network: RJ-45 (ISO 8877) |
| **Number of ports** | 1 |
| **Signaling specifications** | Europe: EuroISDN (NET3, I-CTR3)<br>France: VN3<br>Japan: INS-64<br>Australia: TS 013<br>North America: National ISDN-1 (NI1—US)<br>National ISDN-2 (NI2—US)<br>AT&T #5 ESS switch<br>Nortel DMS-100 switch |

### *2210 Nways T1/J1 ISDN PRI Adapter*



| | |
|---|---|
| **Characteristics** | 23 independent 64-Kbps B-Channels for data<br>One 64-Kbps D-Channel for signaling |
| **Electrical interface** | Integrated DSU/CSU function |
| **Connectors** | Box: 26-pin, 3-row D-shell<br>Network: RJ-48 |
| **Number of ports** | 1 |
| **Signaling specifications** | Japan: INS1500<br>Australia: TS 014<br>North America: National ISDN-2 (NI2—US)<br>AT&T #4 ESS switch<br>AT&T #5 ESS switch<br>Nortel DMS-250 switch |

### *2210 Nways E-1 120-Ohm ISDN PRI Adapter*



| | |
|---|---|
| **Characteristics** | 30 independent 64-Kbps B-Channels for data<br>One 64-Kbps D-Channel for signaling |
| **Electrical interface** | Integrated DSU/CSU function |
| **Connectors** | Box: 26-pin, 3-row D-shell<br>Network: Flying lead |
| **Number of ports** | 1 |
| **Signaling specification** | Europe: EuroISDN (NET5, I-CTR4) |

### *2210 Nways 25-Mbps ATM Adapter*



| | |
|---|---|
| **Characteristics** | ATM Forum UNI 3.1<br>ATM Forum Interim Local Management Interface (ILMI)<br>PVC and SVC |
| **Electrical interface** | 25-Mbps ATM |
| **Connectors** | Box: RJ-45<br>Network: RJ-45 |
| **Number of ports** | 1 |

### *2210 Nways 4-Port WAN Concentration Adapter*



| | |
|---|---|
| **Characteristics** | Supports synchronous PPP traffic |
| **Electrical interface** | Based on WAN cable selected:<br>- EIA 232D/V.24/V.28<br>- V.35<br>- V.36/EIA 449<br>- X.21 |
| **Connectors** | Box: 26-pin miniature connector<br>Network: Dependent on electrical interface selected |
| **Number of ports** | 4 |

### *2210 Nways 8-Port WAN Concentration Adapter*



| | |
|---|---|
| **Characteristics** | Supports synchronous PPP traffic |
| **Electrical interfaces** | Based on WAN cable selected:<br>- EIA 232D/V.24/V.28<br>- V.35<br>- V.36/EIA 449<br>- X.21 |
| **Connectors** | Box: 26-pin miniature connector<br>Network: Dependent on electrical interface selected |
| **Number of ports** | 8 |

**Remote installation— quickly and easily**

Extending the corporate network to small, remote offices typically means that skilled technical personnel at a central location must install routers at distant locations that lack skilled resources. The 2210 has been designed to meet that challenge. The EasyStart function means the remote 2210 can be plugged in at a remote location and will find its configuration on a network server typically located at a central site. You can request through electronic mail that IP addresses be preconfigured in the 2210 at the time of manufacture.

All 2210 models also contain a service port supporting asynchronous communication for configuration and maintenance. All models support the industry's open network management standard, SNMP. Management of the system can be accomplished using SNMP managers such as IBM's SystemView for AIX® and HP OpenView. Management application support is provided by many of IBM's management programs including the new Nways Enterprise Manager and IBM's Campus Manager LAN for AIX products. You can also use IBM Nways Manager for Windows® for smaller networks, and LAN Network Manager is also available.

**For more information**

To find out more about the IBM 2210 Nways Multiprotocol Router and other high-performance IBM communications and networking products, contact your IBM representative or call IBM Direct at 1 800 IBM-CALL (1 800 426-2255). You can also access the IBM 2210 Home Page at http://www.raleigh.ibm.com/220/220prod.html.

Copies of this product specification sheet can be obtained from the IBM FAX Information Service by dialing 1 800 IBM-4-FAX (1 800 426-4329) in the U.S. or Canada or by dialing (415) 855-4329 outside the U.S. and Canada and requesting the document number 6247.



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Printed in the United States of America
10-96

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G325-3435-02