Multiple communication options for your workstations

IBM 5494 Remote Control Unit

• **Lets you access up to four hosts simultaneously**

• **Connects multiple protocols, including TCP/IP and IPX, over the Frame Relay-Token-Ring bridge**

• **Lets you manage your 5494 from anywhere in your network**

• **Supports LAN-attached printers**

• **Lets you activate backup configuration changes from diskette**

The 5494 is the remote communications controller for the AS/400® system. It manages the operation of workstations that are attached to the 5494 and provides the connection to the AS/400. The 5494 can attach to an AS/400 system through wide area connections (SDLC, Frame Relay, X.21 and X.25), Ethernet or Token-Ring LANs.

Product Overview

New functions give the 5494 increased operational flexibility to support a customer's remote computing requirements while protecting existing investments in the 5494 and attached devices.

The 5494 is useful in environments where:

• Workstations are located beyond the maximum distance allowed to attach to the AS/400 local workstation controller

• Nonprogrammable workstations require access to an AS/400 system through a Token-Ring or Ethernet network connection

• Remote locations have both 5250 twinaxial-attached workstations, and Token-Ring- or Ethernet-attached workstations requiring communication to an AS/400 system using supported communications functions

• The Frame Relay-Token-Ring bridge feature enables the 5494 to support source-route bridging of Token-Ring traffic across the Frame Relay connection to a bridge partner or an AS/400 system. Examples of bridge partners include:

  - An IBM 2216 Nways Multiaccess Connector

  - An IBM 2210 Nways Multiprotocol Router

  - A PC running RouteXpander/2

  A Token-Ring LAN-attached PC running TCP/IP is an example of a device that would be bridged by the 5494.

• With the Level 3.2 functional upgrade, users receive several enhancements:

  - Universally administered LAN address. For Token-Ring and Ethernet adapters you can use the adapter's universally administered address rather than enter a LAN address during configuration.

  - Time and date synchronization. 5494 error messages can be correctly synchronized to match the time and date of the AS/400 system.

  - Load configuration from diskette. You can place loadable configurations on a system diskette for quicker activation of a backup host link.

  - DOS/V support. The 5494 Utility Program can now be run under DOS/V, the latest DOS used in Japan and other Far Eastern countries.

  - LAN printer support. IBM 3130 and 3935 Token-Ring-attached printers are now supported by the 5494.

  - Local controller function. This enhancement maintains functional consistency between devices that are attached locally or remotely with OS/400® V3R2 and V3R7 local controller functions.

5494s communicating with an AS/400 system with OS/400 V3R2 or OS/400 V3R7 installed should have 5494 Level 3.2 installed in order to maintain maximum functional consistency between local and remote workstations.

The IBM 5394 Remote Control Unit continues to be available for those AS/400 customers who do not need the additional features of the 5494, or those customers who need a remote control unit to communicate with an IBM System/36™, System/38™, AS/Entry, or AS/400 Advanced 36 system without OS/400 support.

New enhancements give the 5494 increased operational flexibility to support your remote computing requirements, while protecting your existing investments in the 5494 and attached devices. New enhancements include a new Frame Relay-Token-Ring bridge feature, an IBM 5494 Level 3.2 functional upgrade and support for wireless and ISDN environments. And the 5494 can now be managed by the Nways Campus Manager LAN for AIX Version 2.

The base 5494 supports the attachment of up to 28 twinaxial devices. An additional 28 twinaxial devices are supported with the 5494 Twinaxial Expansion Kit installed. With a Token-Ring or Ethernet adapter installed the 5494 supports up to 80 attached devices, of which 56 can be connected by twinaxial cable.

Connectivity

The base 5494 Model EXT allows twinaxial attachment for up to 28 nonprogrammable or programmable devices (workstations and printers). It also provides communication access to an AS/400 system, using an EIA 232, a V.35 or an X.21 interface cable. Protocols supported include SDLC, X.21, X.25 and Frame Relay. Many other protocols can also be bridged.

By adding the twinaxial expansion kit (see Figure 1), the 5494 easily expands to provide attachment for up to 56 workstations. This kit contains an adapter and a second, twinaxial, 4-port connector to accommodate attachment of 28 additional workstations.

The 5494 supports IBM Token-Ring or Ethernet LANs by installing a Token-Ring or Ethernet adapter (see Figure 2). When used as a LAN gateway, the 5494 supports up to 80 SNA-attached devices, including programmable workstations and printers. You can have all of these devices connected directly to the LAN or some devices attached to the LAN and others to the twinaxial ports.

The Frame Relay-Token-Ring bridge feature enables the 5494 to support source-route bridging of Token-Ring traffic across the Frame Relay connection to an AS/400 system or bridge partner, such as the IBM 2210 Nways Multiprotocol Router or a PC running RouteXpander/2. A Token-Ring LAN-attached PC running TCP/IP is an example of a device that can be bridged by the 5494. The maximum device limit of 80 does not apply to bridged non-SNA devices.

Flexibility

The 5494 can also be LAN-connected to an AS/400 system (see Figure 3). In this configuration all twinaxial-attached devices go through the 5494 and over the LAN. This configuration allows LAN access for nonprogrammable workstations and extends the 1524-m (5000-ft) twinaxial cable limitation. LANs can be bridged locally or remotely. Twinaxial-attached devices benefit from the speed of the LAN in either a local or remote location.

When interim microcode changes or fixes are sent from the AS/400 through the network to the 5494, the 5494 automatically checks to see if it has the latest changes and applies the updates if needed. And the 5494 can also pass on any microcode updates to compatible devices that are attached at the remote site.

Functionality

The 5494 provides access to your AS/400 system for remote workstation users. In addition to providing functional capabilities for nonprogrammable workstations, the 5494 offers multiple communication options for both nonprogrammable and programmable workstations. With the 5494 users get the same capabilities as if they were locally attached to the AS/400 system.

In APPN or SNA subarea networks, the 5494 can be configured to support up to four AS/400 systems (see Figure 4). This enables single-session terminals to access any one of the AS/400 systems and multiple-session termi-nals to access up to four AS/400 systems at the same time. Of course programmable workstations can still communicate with any AS/400 system on the network.

The 5494 Level 3.2 functional upgrade supports bridging of non-SNA protocols to a bridge partner, supports LAN-attached printers, offers additional flexibility in changing primary hosts or routing to an AS/400 system and offers enhanced network management facilities.

Usability

The front panel of the 5494 contains a 21-key keypad and a 16-position LCD that provide direct management capabilities. Together they can be used to check device status, input date and time parameters, look up and display error codes or run concurrent diagnos-tics. By accessing these functions directly from the 5494, you can elimi-nate the need, in most cases, for a workstation to be installed close to the controller.

But you can accomplish these tasks, and others, remotely because you can now access the 5494 from any pro-grammable workstation in the network, using the 5494 Utility Program.

Using the Utility Program the 5494 can be managed from a PC or PS/2 com-puter, providing it has access to the 5494. This access is secured through a password. Additional capabilities include changing configuration parameters and resetting and restarting the 5494.

During operation the 5494 recognizes changes in all attached devices. The 5494 automatically recognizes device address changes and, without operator intervention, passes this information to the AS/400 system affected. No reconfiguration is necessary to add or move devices.

Extended solutions

You can use the following products with the IBM 5494 for extended function:

- IBM 2210 Nways Multiprotocol Router for network routing

- IBM 2217 Nways Multiprotocol Con-centrator for network routing

- IBM 2480 Ethernet Access Point for wireless applications

- IBM 8227 Wireless LAN Entry Access Point for wireless applications

- IBM 5308 ASCII to 5250 Connection for remote ASCII dial-in

- IBM 5299 and IBM 6299 Multiconnectors for TTP and hub applications

Reliability

The reliability of the 5494 helps increase your system availability. All communication cables have built-in auto-wrap capability for problem resolution.

The AS/400 system and the 5494 are designed to work together to promote fast problem detection and resolution. From a single source of maintenance and error correction circuitry, through pre-release testing and trained specialists, the highest level of reliabil-ity and system availability is ensured.

Continuous-retries support lets you establish communication with your AS/400 system automatically.

The 5494 works with Performance Tools/400 to capture remote response times and pass the information to the AS/400.

The 5494 provides the same functional capabilities as the AS/400 local workstation controller—right down to the latest InfoWindow II functions of shared addressing, fax, video and mouse support.

The 5494 also supports applications using Enhanced User Interface (EUI). EUI allows user programs for nonprogrammable displays to have functional capability found in PC and OS/2 screen applications, such as scroll bars, windows and help screens. This capability can increase user productivity in many data-entry activities.

Features

The IBM 5494 is designed for flexible growth. To protect your hardware investments each new release is synchronized with upcoming AS/400 capability enhancements. Today the 5494 includes Frame Relay attachment and bridging support, concurrent host access and much more.

With concurrent host access the 5494 communicates with up to four preconfigured AS/400 systems. This provides nonprogrammable worksta-tions and printers access to a choice of AS/400 systems in an APPN or SNA subarea network. Multiple-session terminals can access all preconfigured AS/400 systems simultaneously.

The 5494 also lets you use additional configurations stored on a system diskette, for quicker activation of a backup computer link. And it provides LAN printer support, including support for IBM 3130 and 3935 Token-Ring-attached printers.

Best of all the 5494 Model EXT is extendable. You can integrate enhance-ments that will extend your options and capabilities in remote computing.

1. *IBM 5494 Remote Control Unit*
2. *4-port twinaxial connector*
3. *Twinaxial Expansion Kit (FC 1200)*
4. *NWS (display station)*
5. *Printer*
6. *PWS (PC)*
7. *RS/6000® system*
8. *Modem/DCE*
9. *Interfaces: EIA 232 V.35 or X.21*
   Protocols: SDLC X.21 or X.25
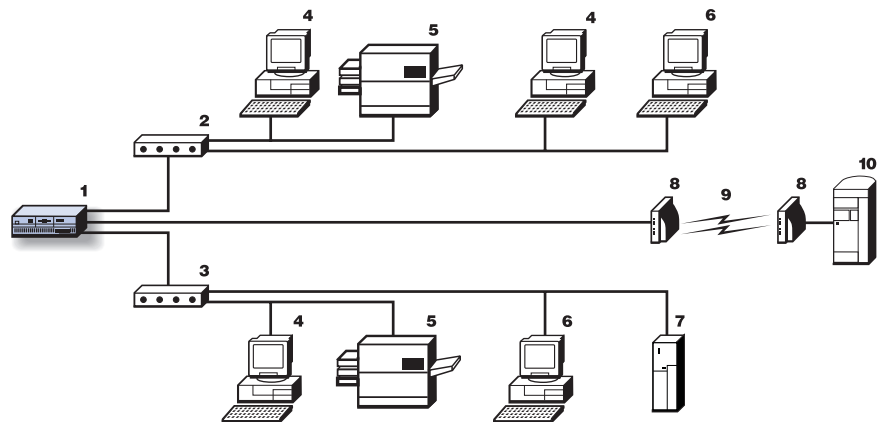10. *AS/400 system*

Figure 1. Twinaxial-attached workstations connected through the 5494 to an AS/400 system

1. IBM 5494 Remote Control Unit

2. Token-Ring or Ethernet LAN

3. 4-port twinaxial connector

4. RS/6000 system

5. 3130 or 3935 printer (Token-Ring only)

6. PWS (PS/2)

7. PWS (PC)

8. NWS (display station)

9. Printer

10. Modem/DCE

11. Interfaces: EIA 232 V.35 or X.21,
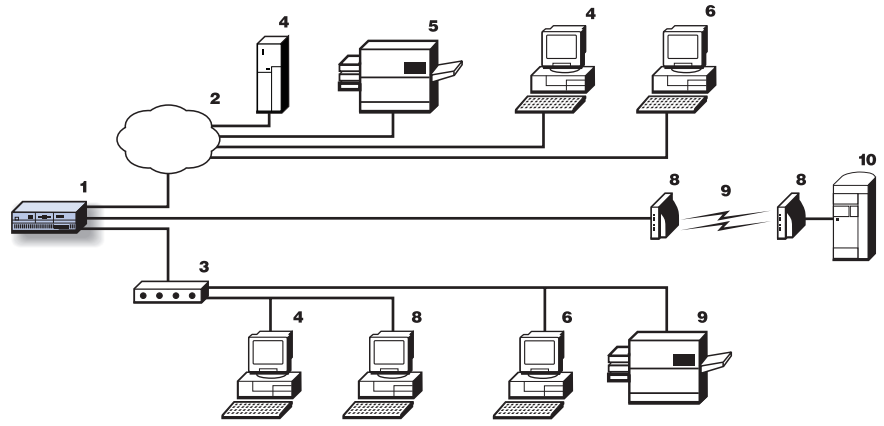   Protocols: SDLC X.21 or X.25

12. AS/400 system

Figure 2. Gateway configuration including both twinaxial-attached and LAN-attached workstations connected through the 5494 to an AS/400 system

1. IBM 5494 Remote Control Unit

2. 4-port twinaxial connector

3. Twinaxial Expansion Kit (FC 1200)

4. NWS (display station)

5. Printer

6. PWS (PC)

7. RS/6000 system

8. Token-Ring or Ethernet LAN

9. PWS (PS/2)

10. AS/400 system

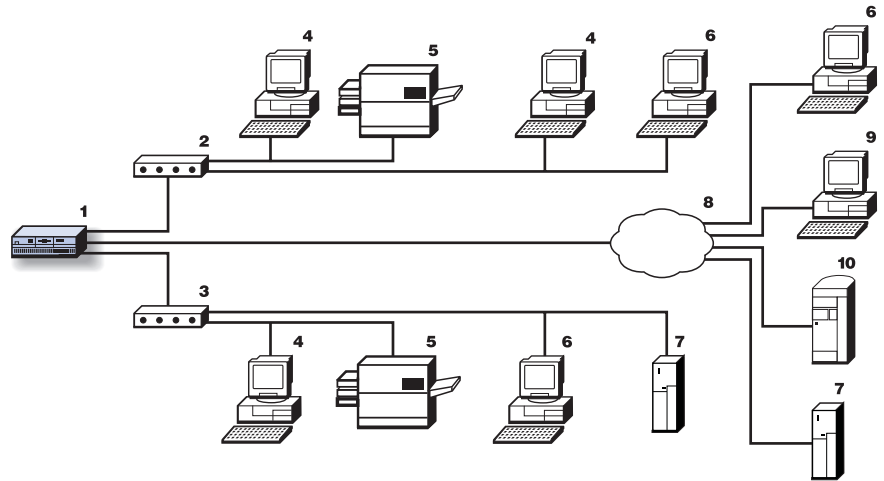Figure 3. Configuration with twinaxial-attached workstations connected to an AS/400 system through the 5494 and a LAN

1. IBM 5494 Remote Control Unit

2. APPN or SNA subarea network

3. AS/400 system

4. 4-port twinaxial connector

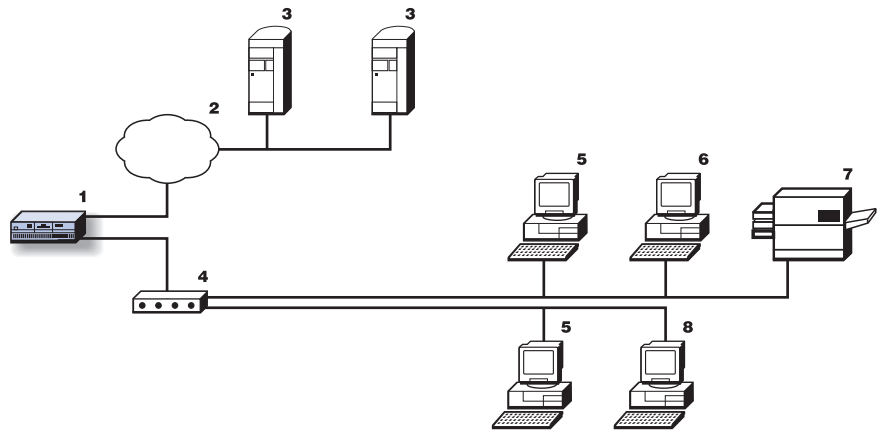5. NWS (display station)

6. PWS (PS/2)

7. Printer

Figure 4. Twinaxial-attached workstations accessing multiple AS/400 host systems (up to four AS/400 systems can be preconfigured in the 5494)

Choosing a communications interface

Network type	Interface				
	EIA 232	CCITT V.35	CCITT X.21	Token Ring	Ethernet
Public switched telephone network	X				
V.25bis auto dial	X				
Broadband analog		X			
Point-to-point high-speed private lines		X			
Digital Data Service using DSU	X	X			
Point-to-point leased lines	X	X			
Multipoint leased lines	X	X			
ISDN using TA (IBM 7820)	X	X			
Frame Relay		X	X		
Bridging of TCP/IP, IPX and other protocols over Frame-Relay		X	X	X	
X.21	X	X	X		
X.25	X	X	X		
Token-Ring				X	
Ethernet					X
Communication speeds	Maximum 19.2 Kbps	Maximum 128 Kbps	Maximum 128 Kbps	4 or 16 Mbps	10 Mbps

5494 release-level functions by AS/400 OS/400 version and release

Refer to the following chart to coordinate 5494 function availability by microcode release level and the required AS/400 and OS/400 version and release prerequisite.

Functional capability by 5494 release level	OS/400 V2R1.1	V2R2	Code V2R3	V3R1	Level V3R6	V3R2	V3R7
5494 R3.2							
Frame Relay-Token-Ring bridge				IP, IPX	IP	IP, IPX	IP, IPX
Nways Campus Manager					Y		Y
Load configuration from diskette	Y	Y	Y	Y	Y	Y	Y
Time-date synchronization	Y	Y	Y	Y	Y	Y	Y
DOS-V support	Y	Y	Y	Y	Y	Y	Y
5494 R3.1							
Frame Relay			Y	Y	Y	Y	Y
Concurrent host attachment	Y	Y	Y	Y	Y	Y	Y
Vital product data					Y	Y	Y
Video delivery					Y	Y	Y

5494 R3.0

Remote access management of 5494	Y	Y	Y	Y	Y	Y	Y
SNA backbone RPQ in base code	Y	Y	Y	Y	Y	Y	Y
Ethernet connect to AS/400		Y	Y	Y	Y	Y	Y
Ethernet gateway	Y	Y	Y	Y	Y	Y	Y
Auto-configuration of workstation on AS/400				Y	Y	Y	Y
Support of 80 SNA LAN devices standard	Y	Y	Y	Y	Y	Y	Y
3489 support: fax, image, shared access				Y	Y	Y	Y

5494 R2.0

Maximum RU size of 1024				Y	Y	Y	Y	Y
EUI support (348x, others)				Y	Y	Y	Y	Y
Continuous retries for session establishment	Y	Y	Y	Y	Y	Y	Y
Concurrent diagnostics through password-enabled utility program	Y	Y	Y	Y	Y	Y	Y
AS/400 host-initiated bind for LU 6.2	Y	Y	Y	Y	Y	Y	Y
Farsi language support				Y	Y	Y	Y	Y
Up to 56 twinaxial-device support				Y	Y	Y	Y	Y

5494 R1.1

SNA alerts	Y	Y	Y	Y	Y	Y	Y
Response Time Monitor support		Y	Y	Y	Y	Y	Y
Workstation customization	Y	Y	Y	Y	Y	Y	
Up to 128 Kbps for X.21 and V.35	Y	Y	Y	Y	Y	Y	Y

- The 5494 can now be managed by the Nways® Campus Manager LAN for AIX V 2.0 using the APPN topology application through an AS/400 system running OS/400 V 3 R 6 or later.

  The AS/400 acts as a proxy agent to the 5494 (the 5494 does not contain SNMP support). Through Nways Campus Manager LAN, the customer can display status and location of the 5494 and the attached nonprogrammable workstations throughout the network. The result is enhanced network management for all remote nonprogrammable workstations.

- Additional 5494 communication cables can be ordered using feature codes. If desired, up to two communication cables can be shipped with the 5494 in the single-carton container.

- The 5494 memory expansion feature must be installed in order to run the Frame Relay-Token-Ring bridge feature.

5494 Model EXT Remote Control Unit Specifications

Specifications	Height:	140 mm (5.5 in.)
	Width:	440 mm (17.3 in.)
	Depth:	430 mm (16.9 in.)
	Weight:	11.8 kg (26 lb)

| **Operating environment** | 10° to 40.6° C (50° to 105° F) temperature; 8% to 80% relative humidity; 26.7° C (80° F) maximum wet-bulb temperature |

| **Programming requirements** | • For IBM Application System/400®: IBM Operating System/400®, V2R1.1 or higher |
| | • For PWS: IBM PC Support/400, V2R1 or higher or IBM PC Client Access/400 or OS/2® Extended Edition, R 1.3 or higher or OS/2, V 2.x, and Communications Manager/2, V 1.0 or higher |

Input voltage requirements	100 to 127 V or 200 to 240 V; 50/60 MHz; 1-phase
Heat output	26 kcal/hour (103.2 BTU/hr)
Power consumption	37 watts

5494 Model EXT Hardware Configurator	**Description**	**FC**	
Standard features			
Voltage	• High voltage 220 V	0801	
	• Low voltage 110 V	0802	
Power cord		*4.3 m (14 ft)*	*1.8 m (6 ft)*
	• Standard 220 V	1901	—
	• Standard 110 V	8016	8013
	• Twist lock 110 V	8011	8014
	• Hospital 110 V	8012	8015
Communications cable*	• EIA 232D, V.24, V.28	1850	
	• CCITT V.35	1853	
	• CCITT X.21	1855	
*Additional cables can be ordered; see Optional features.			
Optional features			
Twinaxial Expansion Kit		1200	
Provides additional 4-port connector, which expands attachable twinaxial devices from 28 to 56			
Adapters and features	• Token-ring adapter	1100	
(choose one Token-Ring or	• Frame-Relay-Token-Ring bridge	1150	
Ethernet adapter if required)	FCs 1100 and 2600 are prerequisites.		
	• Ethernet adapter	1500	
	• Ethernet AUI cable	1505	
	This cable is required to attach an Ethernet adapter to an Ethernet LAN when 10BASE5 (thick) Ethernet coaxial cable is used for the LAN; FC 1500 is a prerequisite.		
	• Memory expansion feature	2600	

Notes: Additional communication cables can be ordered from the communications cable list in the previous section. This table lists U.S. feature numbers; in other countries the feature numbers may vary.

Quantity of devices supported with various options

	5494 Model EXT		5494 Model EXT with either a Token-Ring or Ethernet LAN adapter	
Maximum number of twinaxial devices	Standard 28	Optional 56[1]	Standard 28	Optional 56
LAN-connected PWSs	[2]	[2]	80[3]	80[3]

Notes: [1] Requires a 5494 Model EXT Twinaxial Expansion Kit FC 1200

[2] Requires a 5494 Model EXT LAN adapter: either 5494 Token Ring Adapter FC 1100 or 5494 Ethernet Adapter FC 1500

[3] 80 is the maximum number of total SNA devices supported by a 5494

5494 Remote Control Unit Model EXT	FC
Token-Ring Adapter	1100
Frame Relay-Token-Ring bridge	1150
Twinaxial Expansion Kit	1200
Ethernet Adapter	1500
Ethernet AUI Cable	1505
Level 3.2 Functional Upgrade	
Level 3.2 Functional Upgrade with Manuals	1700
Memory Expansion Feature	2600
Additional Cable EIA 232-D (V.24/V.28)	3050
Additional Cable CCITT V.35	3053
Additional Cable CCITT X.21	3055

Key Customer Benefits

- Facilitates AS/400 communication with remote workstations

- Supports up to 28 directly attached, twinaxial devices and is extendable to 56 with the installation of the IBM Twinaxial Expansion Kit

- Can be used as a gateway for a remote Ethernet LAN or attached to an AS/400 system through an Ethernet adapter and an Ethernet network

- Can be used as a gateway for a remote Token-Ring LAN or attached to an AS/400 system through a Token-Ring adapter and a Token-Ring network

- Can be used as a Frame Relay-Token-Ring bridge that allows non-SNA protocols to access other parts of the network through a Frame Relay connection

- Allows access to 4 different hosts in an APPN or SNA subarea network for nonprogrammable workstations

- Works with the AS/400 system in providing microcode fixes to be downloaded to the 5494 and attached, capable devices

- Allows user access from anywhere in the network for configuration changes and other remote management activities including running diagnostics, checking device status and system reset and restart

Supplementary Information

Information on the IBM 5494 Remote Control Unit is available at:
www.raleigh.ibm.com/549/549prod.html