

Series 3000
STK3494/3494
User's Manual

Preface

This user guide for the STK3494/3494 provides the information you need to install,



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setup, operate and maintain your unit.

This User Guide is divided as follows:

- Chapter 1:** Features
- Chapter 2:** Installation
- Chapter 3:** Hardware and General configuration
- Chapter 4:** Host Connections
- Chapter 5:** Network Information
- Chapter 6:** Gateway Configuration
- Chapter 7:** Device Configuration
- Chapter 8:** Session Access
- Chapter 9:** AS/400 System Configuration
- Chapter 10:** SNMP Management

- Appendix A:** Error codes
- Appendix B:** Specifications

NOTE: IIS reserves the right to change specification without prior notice, in line with policy of constant product improvement.

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1.1 Features

This chapter provides background information on the 3494 Controller and its main features.

The Model 3494 controller is compatible and interchangeable with IBM 5494 Remote Control Unit. It provides a number of connection options which include Twinax, Token Ring and Ethernet.

The Model 3494-STK is part of the StackLink family of rack mounted products that includes hubs, Twinax concentrators and Network management modules.

The 3494 controller basic model supports 28 Twinax devices. Additional device support options include one of the following: 28 additional Twinax devices via an externally attachable expansion unit (for a total of 56 Twinax devices), 80 Token Ring devices, or 80 Ethernet devices. The 3494-STK model is designed to allow on-site installation of Token-Ring or Ethernet adapters.

One communication port allows either X.25 or SDLC WAN connection. The LAN connections can either be used for host attachment or gateway communication.

Main Features

The main features of the 3494 Model are listed below, followed by an explanation of each feature.

- Remote workstation attachment
- Local processing for nonprogrammable workstations
- Support for programmable workstations
- Twinaxial workstation attachment
- Communication network interface options
- Wide area network (WAN) communication
- Local area network (LAN) communication (Token Ring and Ethernet)
- Multiple sessions on nonprogrammable workstations
- Multiple hosts
- Attachment to SNA sub-area network
- Logical connection continuous retries
- Automatic configuration on the AS/400
- Alternate AS/400 system support
- AS/400 performance monitor support
- 5250 enhanced user workstation support
- Mouse functions

Features

- Double-byte character set graphic field support
- Simple Network Management Protocol (SNMP)
- Flexible configuration options
- System expandability (can be implemented in the field)

Remote workstation attachment

Attachment of workstation located in remote sites to one or more AS/400s located in a central location.

The 3494 manages information exchanges with the AS/400 system over a communication network.

Local processing for non-programmable workstations

A non-programmable workstation (NWS) is a workstation which is incapable of processing information on its own. Twinaxially attached workstations and printers are examples of NWSs.

The 3494 can process keystrokes and field entries locally without communicating with the AS/400. This processing improves the response time for accepting and processing keystrokes. When the information is ready for transmission to the AS/400, the 3494 manages the flow of information over the communication network.

Support for programmable workstations

A programmable workstation (PWS) is a workstation which is capable of processing information independently of the AS/400 and can also exchange information with the AS/400. PCs running Client Access/400 are examples of PWSs. The 3494 supports attachment of PWSs and manages the SNA LU 6.2 sessions established. Session can either be PWS initiated or Host initiated.

Twinaxial workstation attachment

Twinax attachment is provided for either 28 devices expandable to 56 devices via a Twinax expansion adapter.

Communication network interface options

The 3494 provides communications to the AS/400 through a variety of network interfaces allowing communication to different types of networks.

Wide area network (WAN) communication

The 3494 supports SDLC and X.25 communication using V.24, V.35 and X.21 interfaces:

V.24 Adapter: The V.24 communication card can

Remote workstation attachment

Attachment of workstation located in remote sites to one or more AS/400s located in a central location.

The 3494 manages information exchanges with the AS/400 system over a communication network.

send/receive information on each SNA communication line at speeds up to 19.200 Kbps.

V.35 Adapter: The V.35 communication card can send/receive information on the SNA communication line at 64 Kbps. The adapter conforms to CCITT V.35 standard. It is recommended that the adapter be used for communication speeds above 19.200 Kbps.

X.21 Adapter: The X.21 communication card can send/receive information on the SNA communication line at 64 Kbps.

Local area network (LAN) communication (Token Ring and Ethernet)

The 3494 attaches to the LAN using the following configurations:

AS/400 Attachment Configuration: This configuration allows the 3494 to communicate with AS/400 systems using a LAN. The 3494 and AS/400 system can be on the same LAN or on separate LANs that are connected using bridges.

Gateway Configuration: This configuration allows PWSs connected to the LAN to attach to the AS/400 through the 3494. This configuration is referred to as LAN Gateway configuration since the 3494 serves as a gateway between the LAN-attached workstations and the AS/400.

Gateway and AS/400 Attachment Configuration: The 3494 controller can be configured to support both AS/400 attachment and Gateway attachment. The same Ethernet adapter can be used for both configurations.

Ethernet Adapter: The Ethernet adapter working in a Gateway configuration, enables up to 80 PWSs per adapter.

Token Ring Adapter: Token-Ring adapter working in a Gateway configuration, enables up to 80 PWSs.

Multiple sessions on non-programmable

Each terminal NWS device can support up to four session simultaneously. These session can be directed to either the same or different AS/400 systems. Using a predefined key

Features

Remote workstation attachment	<p>Attachment of workstation located in remote sites to one or more AS/400s located in a central location.</p> <p>The 3494 manages information exchanges with the AS/400 system over a communication network.</p>
workstations	<p>sequence allows the user to switch between sessions on-line.</p>
Multiple hosts	<p>The 3494 supports connections of up to eight different AS/400 systems, using either WAN or LAN connections.</p>
Attachment to SNA Sub area Network	<p>The 3494 can communicate with an AS/400 system through an SNA Sub area network. All 3494 functions are supported, you can attach to the SNA Sub area network using any of the protocols and physical interfaces provided.</p>
Logical connection continuous retries	<p>The 3494 allows you to configure the controller to allow continuous retries after communication with the AS/400 have been lost.</p>
Automatic configuration on the AS/400	<p>The APPC controller description can be automatically created by the AS/400 system when using a LAN connection to the AS/400. This capability also allows automatic configuration on the AS/400 of the RWS controller and the device descriptions of the 3494 attached NWSs. NWSs (display or printers) that are attached to the 3494 via Twinax do not have to be configured if the OS/400 operating system is at least Version 3 release 1.</p>
Alternate A/S400 System Support	<p>Each AS/400 connections can have up to three alternate configuration. This allows the user to end a connection with one AS/400 and establish a new connection with one of the alternate AS/400.</p>
AS/400 performance monitor support	<p>The 3494 supports the Performance Monitor, an AS/400 function that enables the AS/400 to request that the 3494 measures and reports information on the response time of NWSs attached to it.</p>
5250 enhanced user workstation support	<p>The user interface for NWSs attached to the 3494 provide the user with enhanced display features. These include among others Pop-Up window generation, Placement of error messages such as Menu bars, Scroll bars, inside windows.</p>
Mouse functions	<p>The 3494 provides mouse function support for displays with a mouse attached.</p>

Remote workstation attachment	<p>Attachment of workstation located in remote sites to one or more AS/400s located in a central location.</p> <p>The 3494 manages information exchanges with the AS/400 system over a communication network.</p>
Double-byte character set graphic field support	<p>The 3494 supports double-byte languages such as Japanese, Chinese. SI/SO placed in extended character buffer is not supported.</p>
SNMP (Simple Network Management Protocol)	<p>SNMP (Simple Network Management Protocol) agent functionality, allows SNMP management of the Model 3494 and its devices, in Token-Ring and Ethernet attachment. The SNMP manager can control and monitor statistics counters, node port status, status of the devices and communication lines. The Controller sends the manager alerts called TRAPs, if there are any unusual events it should be informed of such as downed or problematic lines.</p>
Flexible configuration options	<p>Two options are available:</p> <p>Configuration on NWS</p> <p>The 3494 can be configured from attached NWS, by a user friendly utility program which can be run directly from the 3494. The utility program can be accessed by pressing the UTIL button on the front panel of the 3494 controller and then pressing ALT-Test sequence on the keyboard. This will display the 3494 initial configuration screen.</p> <p>Configuration from a PC</p> <p>The 3494 can also be configured from a PC using a user-friendly windows based application program.</p>
System expandability	<p>The 3494 can easily be expanded to accommodate the rapid changes in the LAN /WAN environments. As your system expands so can the 3494 controller saving you time and money.</p>

2Installation

This chapter provides a step by step explanation on how to install your controller and software and begin working with the controller. Note that the differences in 3494 and STK3494 design affects the cable connections and the availability of on-site installation of the Ethernet and Token-Ring adapters.

2.1 Before you Begin

Read the following sections carefully. Be sure you have the complete 3494 package and the necessary equipment and that all the environmental and safety conditions are fulfilled.

3494 Controller Package

- 3494 Controller
- 3494 system diskette
- 3494 Users Manual
- Power Cord
- Twinax cable
- Communication interface cable
- For STK3494: rack modules connection cable

Equipment

Depending on your installation, you may need the following:

- Modem or DCE
- Twinaxial Adapter kit
- For STK3494: Token-Ring Adapter kit or
 - Ethernet Adapter kit

Environmental Requirements

1. The 3494 controllers should be installed indoors where it is dry, reasonably cool and clean, but otherwise it is not sensitive to environmental conditions or position as long as the specifications, described below, are adhered to.
2. Its location should be convenient for access to cable channels. It should be installed where it will not be subjected to extreme vibrations, dust, or fumes which could damage the disk drives.
3. Enough clear space should be left at the front and back of the controller to allow the free circulation of air and easy access.
4. Communication cables may be connected to the rear of the unit, therefore at least three feet (approx. 1 m) clearance should be allocated behind the controller to allow cables to be accessed and boards to be replaced.
5. Be sure the power receptacle is properly grounded and that your Twinax cable and cable installation comply with Twinax standards.

2.2 Connecting the Cables

This section describes how to connect all cables.

2.2.1 General Instructions

Refer to the following illustration of the controller back panel when following the instructions for the connections of the cables.

- Route unshielded cables carefully in order to avoid noise sources such as fluorescent lights.
- Cable connectors should be tightly sealed and secured.
- It is recommended that the controller be switched off while cables are being inserted or removed.

ATTENTION!! Before connecting the communication cables, turn off the power to the 3494 unit and to the modem and unplug the power cables from the outlets.

3494 Model

Connect the communication cable as follows:

- a. Turn off the power to the 3494 unit and to the modem and unplug the power cables from the outlets.
- b. Connect the supplied communication cable between the 3494 Rear Panel LINE connector and the appropriate connector on your modem.
- c. Reconnect your modem and 3494 unit power cables to properly grounded power source outlets. Turn the modem and controller ON.

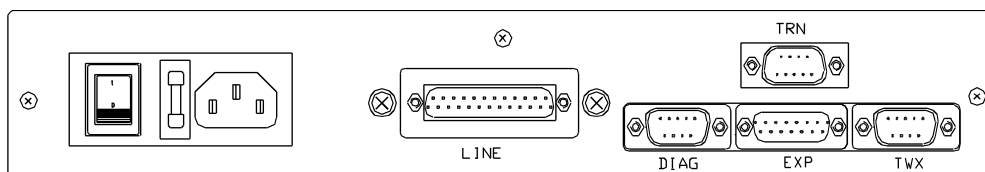
NOTE: Pre-terminated modem cable is supplied as part of your order. The DB-25 to DB-25 cables are supplied for RS-232 communication option. If you specified other communication options in your order (V.35 or X.21), the appropriate modem cable is provided.

2. Connect the Twinx cable as follows:

Connect the 4289 multiplexer cable to the DB9 connector on the TWX connector.

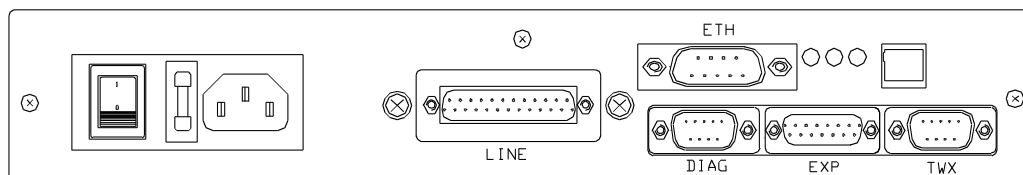
If you are using the external Twinx expansion unit, connect the expansion cable to the EXP connector on the controller rear panel, and the multiplexer cable to the DB9 connector on the Twinx expansion unit.

3. Connect the Token-Ring adapter cable (where applicable) as follows:



Connect the Token-Ring cable to the DB9 connector on the TRN connector on the controller rear panel.

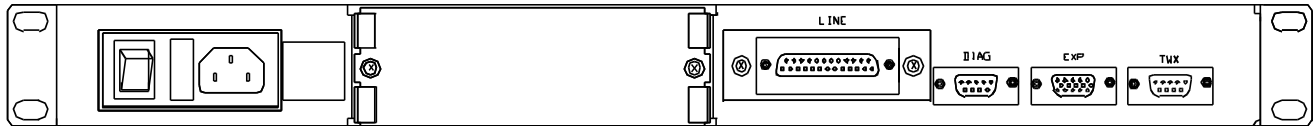
4. Connect the Ethernet adapter cable as follows:



5. For Twisted pair cable make sure that your cable connector is appropriately wired for standard 10 Base-T adapter cards. Insert the RJ-45 plug on the end the twisted pair cable into the adapter connector.

6. For AUI cable locate the adapters AUI connector and move the slide latch to the open position. Connect the AUI cable to the AUI connector on the adapter then move the slide latch to the closed position to lock the cable in place

STK3494 Model



1. Connect the communication cable as follows:

- a. Turn off the power to the 3494 unit and to the modem and unplug the power cables from the outlets.
- b. Connect the supplied communication cable between the 3494 Rear Panel LINE connector and the appropriate connector on your modem.
- c. Reconnect your modem and 3494 unit power cables to properly grounded power source outlets. Turn the modem and controller ON.

NOTE: Pre-terminated modem cable is supplied as part of your order. The DB-25 to DB-25 cables are supplied for RS-232 communication option. If you specified other communication options in your order (V.35 or X.21), the appropriate modem cable is provided.

2. Connect the Twinx cable as follows:

Connect the 4289 multiplexer cable to the DB9 connector on the TWX connector.

If you are using the external Twinx expansion unit, connect the expansion cable to the EXP connector on the controller rear panel, and the multiplexer cable to the DB9 connector on the Twinx expansion unit.

3. Connect the Token-Ring adapter cable (where applicable) as follows:

To install the Token-Ring adapter card refer to Adapter Installation Procedure (section 2.2.2).

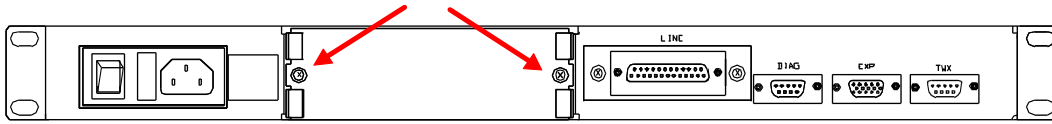
Connect the Token-Ring cable to the DB9 connector on the TRN connector on the controller front panel.

4. Connect the Ethernet adapter cable (where applicable) as follows:

To install the Ethernet adapter card refer to Adapter Installation Procedure (section 2.2.2).

For Twisted pair cable make sure that your cable connector is appropriately wired for standard 10 Base-T adapter cards. Insert the RJ-45 plug on the end of the twisted pair cable in the connector on the front panel.

2.2.2 Adapter Installation Procedure



To install the adapter:

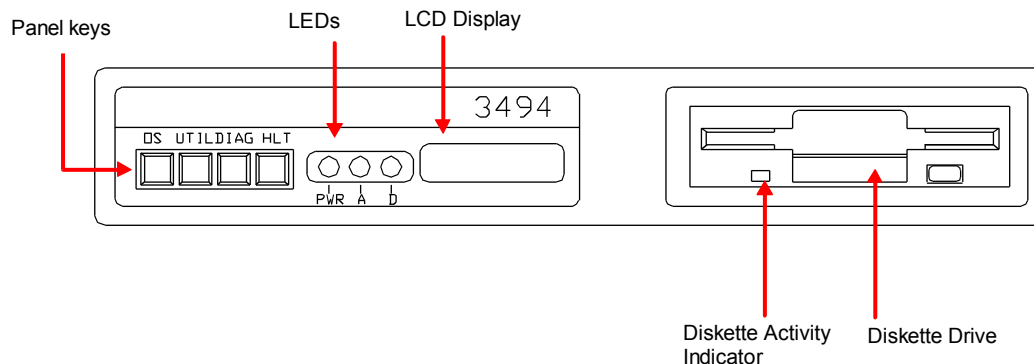
1. Power off the controller and disconnect the power cord and all external cables.
2. Unscrew the two screws on the back panel slot that the adapter will be fitted into. Refer to the above figure. It is not necessary to open the controller housing. Save the top screws for reuse later.
3. Insert the adapter card by sliding it through the guide.
4. Secure the adapter with two screws already on the adapter panel. Refer to the above figure.
5. Connect the power cord and other external cables that were disconnected at Step 1.
6. Power on the controller.

2.3 Loading the Software

This section describes the front panel interfaces and the procedure for loading the setup menus.

2.3.1 Front Panel

The front panel provides status information and allows direct control of the controller activities. This section explains the functions of the LEDs and panel keys. Note that the front panel illustrated below, is of the 3494. The STK3494 front panel looks slightly different, however, the functions are the same.



Diskette Activity The green diskette activity indicator on the front of the controller

Indicator: comes on when the disk drive is active. Do not remove the diskette from the drive when the indicator light is on.

Panel LED's: The three front panel LEDs indicate communication line activity:

- PWR** Communication is occurring
- A** Active Sync line
- D** Token-Ring/Ethernet line is active.

Display When the controller is initialized, (or the OS button is pressed), the controller executes a self-test diagnostics which is stored in ROM. The LEDs should all light and then should flash. Also the ALPHANUMERIC display should light. The currently running diagnostics test is displayed on the ALPHNUM display.

If the diskette has been inserted in the disk drive, the operating system should load automatically. At the conclusion of the diagnostics and loading operation, the ALPHNUM display should show “* 3494 *”, “3494 E” (for Ethernet) or “3494 T” (for Token-Ring).

Should an error occur during start-up, an error code will begin flashing on the display. Refer to Appendix-A for a description of the error codes.

ATTENTION: Do not remove the diskette while the controller is loading the operating system.

Panel Keys Four panel keys provide system override functions; three are used to load a different stand-alone application from the System diskette, while the fourth -- the **HALT** key, stops Controller operation.

ATTENTION: Do not press any of these keys while the Controller is engaged in host communications. Advise the users in session that the system is going down before pressing any of these keys.

Key	Function
OS	Switch loads the operating system from the diskette. Pressing this button boots the operating system for normal use. The controller runs a diagnostic self-test routine. The controller is ready to operate when the model number is displayed [* 3494 *].
UTIL	Loads SET-UP menus. Pressing this button loads the SET-UP menus used to configure the Controller.
DIAG	To be used by service personnel only.

HALT Do not use this key without authorization. Pressing this key causes the Controller to halt all operations.

2.3.2 Booting and Rebooting the Controller

The Controller is booted from the System diskette. Diagnostics are automatically executed when power is applied and will also run if either **OS** or **UTIL** front-panel keys are depressed. If an error occurs, a code is displayed on the front panel.

1. Insert the System diskette in the drive and power on the Controller (the power switch is at the back).
2. The Controller runs a diagnostics self-test program and loads the operating system from the diskette. This operation lasts approximately 1 minute. Once loaded correctly, ***3494***, ***3494 E*** (for Ethernet) or ***3494 T*** (for Token-Ring) appears on the character display.
3. **To reload the system**, simply ensure that the System diskette is in the drive and press the **OS** key on the front panel.

NOTE: Do not remove the diskette while the operating system is being loaded.

2.4 To Begin the Configuration

The 3494 controller enables Communication between the workstations and AS/400 hosts, using SDLC, X.25 Token-Ring or Ethernet protocols. In order to establish communication between the controller and AS/400, both controller and AS/400 attributes must be configured to match. The configuration is performed first on the AS/400 side and then on the controller side from the setup menu.

The following AS/400 and controller attributes must be defined:

- a. Network.
- b. Line description.
- c. Advanced program-to-program communication (APPC) Controller description
- d. Remote workstation (RWS) Controller description.
- e. System mode description.

Device descriptions.

The Controller Setup menus are used to perform the controller configuration. Setup menu access and configuration procedures are described in the following section.

2.5 Controller Setup Menu

Acquire the necessary information for your configuration from your system subscription worksheets. The attributes listed in the previous section are defined in the controller via the setup menu.

To access the Setup menu

1. Power-on the Controller.
2. Press the **UTIL** key on the front panel.
3. Wait for the controller to successfully complete the loading procedure. [***UTIL***] or [**SETUP ERR**] is displayed on the front panel.
4. Enter **ALT+TEST** sequence, or a corresponding sequence from the keyboard (see the page 5-4 "Keying Function -- Keying Sequence."
5. The Setup menu is displayed.
6. Select the desired option and press **ENTER**.
7. The controller Setup menu appears.

Setup Menu Description

The Setup menu displays all the necessary configuration options. It varies depending on your hardware configuration.

	CONTROLLER	SETUP	MENU
SETUP :	1. Hardware configuration	2. General information	3. Host connection
	4. Controller configuration	5. Network information	6. Gateway configuration
	7. Device configuration	8. SNMP configuration	
FILE :	9. File description	10. Save configuration file	11. Reset controller configuration to factory defaults
RESTART :	12. Restart controller (IML)		

Select option : 1

F1=KeysHelp PRINT=Hardcopy F3=Exit

To enter a menu option, type the option number in the Select Option field and press Enter. Each time you conclude a menu option configuration the Setup menu is automatically reaccessed and the following option is selected.

It is recommended to read the following section on key functions as well as the detailed on-line help available on each screen. To access the on-line help press the **Help** key on the keyboard.

A brief description of each option group is given in the following page.

Setup Menu Options

Hardware Configuration	Enables the user to define the type of adapters installed in the controller. Pressing F5 will automatically configure the adapters according to the current controller configuration. In the event of a mismatch the user defined configuration and the current adapters in the controller a CARD SETUP ERROR message will be displayed when rebooting the controller. If this occurs you should reconfigure the adapter settings.
General	<p>The initial screen allows you to define the maximum number of sessions that can be assigned to each PU. The latter value depends on the OS/400 version you are working with.</p> <p>Page forward to define the keyboard language,</p> <p>The last screen allows you to configure the Controller for Local Print by entering the port number and station address to which the printer is connected.</p>
Host Connection	<p>This option enables you to define the communication lines to the AS/400.</p> <p>The controller supports one serial communication lines configured either as SDLC or X.25, and one Ethernet or Token-Ring line. If communication line to the host is either switched or leased, select SDLC. If communicating over a Packet_Switched Public Data Network, select X.25</p>
Controller Configuration	<p>This option allows you to define the number of PU's and the line type for each defined PU.</p> <p>The controller consists of eight PU subsystems. A corresponding APPC controller description must be defined in the AS/400.</p>
Network Information	This option allows you to define the network parameters required for communication between the AS/400 system and the Controller.
Gateway	This option is only available if a Token Ring or Ethernet adapter is installed. It is used to define

the gateway parameters for Token Ring and/or Ethernet.

Device Configuration

Enables the user to remap physical devices to logical PU sessions.

SNMP Configuration

Activates the SNMP agent functionality, allows SNMP management of the controller and its devices.

File Description

Use to enter a short description of the file or notes that may be helpful. For example, "Controller Setup for ABC company, SDLC, Address 03".

Save Configuration

Saves all modified parameters, on the diskette.

Reset to factory defaults

Resets controller to default parameters

Restart controller (IML)

Restarts the controller. The revised configurations are enabled on the next IML - from the main menu select the option Restart Controller (IML) or press the **OS** button located on the front panel of the controller.

2.5.1 Keying Functions

To enable user friendly interface with the Controller, several keys are set aside for the following functions: paging through the menus, quick access to main menu groups and to Help screens, and saving modified options.

In Setup, all the AS/400 editing keys may be used.

Key	Description												
HELP	Display in-context Help screens. If the cursor is on a specific field, the help instructions for that specific field will be displayed.												
PF3:	Returns to the main menu where you may continue to define parameters. However, using PF3 key to exit the current screen, changes will not be saved.												
PF7 and PF8:	Page backwards and forward through the same menu screens. And saves all field changes.												
ENTER:	Store the data in the memory, and return you to the current page; or, if the option entails additional screens, it goes on to the next screen. To save entered data on the diskette, use the option "Save the Configuration Parameter."												
[alt]+[test]:	Displays Model 3494 Setup menu. This sequence differs with the various keyboard types as detailed in the following chart:												
	<table border="1"> <thead> <tr> <th>Keyboard Type</th> <th>Key Sequence</th> </tr> </thead> <tbody> <tr> <td>83 KB including IBM typewriter equivalent</td> <td>CMD, Backspace</td> </tr> <tr> <td>IBM typewriter data entry blank key in upper right-hand corner</td> <td>CMD,</td> </tr> <tr> <td>102/ 103/ 122 KB</td> <td>ALT + TEST</td> </tr> <tr> <td>IBM PC, PC XT and portable PC Kbs. character backspace</td> <td>F2</td> </tr> <tr> <td>IBM PS/2</td> <td>ALT + PAUSE</td> </tr> </tbody> </table>	Keyboard Type	Key Sequence	83 KB including IBM typewriter equivalent	CMD, Backspace	IBM typewriter data entry blank key in upper right-hand corner	CMD,	102/ 103/ 122 KB	ALT + TEST	IBM PC, PC XT and portable PC Kbs. character backspace	F2	IBM PS/2	ALT + PAUSE
Keyboard Type	Key Sequence												
83 KB including IBM typewriter equivalent	CMD, Backspace												
IBM typewriter data entry blank key in upper right-hand corner	CMD,												
102/ 103/ 122 KB	ALT + TEST												
IBM PC, PC XT and portable PC Kbs. character backspace	F2												
IBM PS/2	ALT + PAUSE												

3 Hardware and General Configuration

Begin your configuration by defining two functions: Types of adapters installed in the controller and general controller parameters. General controller parameters include options such as number of LSIDs per PU, keyboard language, and local printer. These functions are defined via two separate options accessed from the Setup menu: Hardware Configuration and General information.

This chapter describes these configuration procedures.

3.1 Hardware Configuration

The controller adapter configuration is accomplished via the controller Hardware Configuration option. To access it, choose **1. Hardware Configuration** from the Setup menu.

The following screen appears:

```
ADAPTERS CONFIGURATION
TOP VIEW OF 3494 CONTROLLER  i-----i
                             i Diskette i
i-----i
i                                     i
i             M A I N   C A R D       i
i                                     i
i-----i
i Optional i i                       i
i Card     i i                       i
i-----i i i-----i
1 Token-Ring          i
2 Ethernet            i
3 Empty               i
Select options :     i
                    2
                    _

F5= Auto configuration
HELP=Help  F1=KeysHelp  PRINT=Hardcopy  F7=Previous  F8=Next  F3=Exit
```

The adapter can be defined either automatically or manually.

Automatic adapter configuration is accomplished by pressing **F5**. This option automatically reads and defines the adapters installed in your controller. Clearly this option is not used if you are configuring a diskette for another controller.

To define the adapter manually, type the corresponding adapter type number below the slot.

ATTENTION!!!

In the event of a mismatch between the defined board configuration and the installed boards on the controller, the message "CARD SETUP ERROR" will be displayed on every terminal when the controller is rebooted. In response to this, reconfigure the adapter settings.

3.2 General Parameters Configuration

The General Information menu enables you to define the following:

- LSIDs per PU
- Controller serial number
- Master language
- Local print option

To access this menu group, select **2. General Information** from the Setup menu.

3.2.1 Number of LSIDs per PU

An LSID session is a logical session of either a terminal or printer as viewed from the AS/400. Each session has a unique device description on the AS/400. All NWS devices for a specific PU are grouped together under a remote workstation controller description called 'RWS'.

The AS/400 can support up to 28 sessions per PU with OS/400 V2.2 and up to 56 sessions per PU with OS/400 V2.3. The default is 56.

NOTE: Changing the 'Maximum number of LSIDs per PU' field resets the PU/LSID maps to the default settings.

```
NUMBER OF LSIDs PER PU
Maximum number of LSIDs per PU ( 28 0 , 56 1 ) █
WARNING !   Changing the ' Maximum number of LSIDs per PU ' field
            resets the twinax adapter map and the LSID map .
            ( See Devices configuration )
```

```
CONTROLLER SERIAL NUMBER
3494 serial number ( 0 - 9 , A - Z ) 00 - _____
```

3.2.2 Serial Number

Each Controller has a unique serial number located on its underside. This is the number sent to the AS/400 system when establishing sessions.

Values = all alphanumeric characters (upper case), in the form XX-XXXXX, the default value being 00-00000.

Define the Number of LSIDs per PU and controller serial number according to the above explanations, and press Enter to access the Language Configuration screen.

3.2.3 Controller Language

The "Master" or "Default" language, will be used by workstations that are not specifically programmed with another language (to program the devices with another language, see **Chapter 7- Device Configuration**).

M A S T E R K E Y B O A R D L A N G U A G E C O N F I G U R A T I O N

Master keyboard language 00

	SUPPORTED	KEYBOARD	LANGUAGES
Austria/Germany	20	Greek	32
Austria/Germany (mul)	21	Hebrew	33
Belgium (mul)	07	Icelandic	2B
Brazil	3C	Icelandic (mul)	2C
Canada/US	00	Italy	10
Canada/US (mul)	22	Italy (mul)	11
Canadian French	08	Japanese/Kanji (mul)	37
Canadian French (mul)	09	Korea	38
Cyrillic	31	Latin America	0E
Denmark	0A	Latin America (mul)	0F
Denmark (mul)	0B	Latin 2	34
Finland	0C	Netherlands	2D
Finland (mul)	0D	Netherlands (mul)	2E
France (AZERTY)	04	Norway	16
France (AZERTY mul)	05	Norway (mul)	17
		Portugal	18
		Portugal (mul)	19
		Simplified Chinese	3A
		Spain	1C
		Spain (mul)	1D
		Sweden	1E
		Sweden (mul)	1F
		Swiss French (mul)	28
		Swiss German (mul)	2A
		Traditional Chinese	39
		Turkish	36
		United Kingdom	12
		United Kingdom (mul)	13
		Yugoslav (mul)	2F

Refer to the table for keyboard codes and be sure to verify that all codes used in the controller configuration are supported by the attached AS/400 system.

3.2.4 Local Printer Setting

You may connect a printer to the Controller and print hard-copies of each configuration and setup screen by pressing the **Print** key. The local printing feature is only applicable to the controller **SET UP** Utility.

L O C A L P R I N T P R I N T E R S E T T I N G

Port number (0 - 7 , space) . . .

Station address (0 - 6 , space) . . .

To configure the print screen define the following parameters:

1. Enter the Twinax port number to which the printer is connected or a space to leave blank.
2. Enter the station address of the printer (0-6 or a space to leave blank).

4Host Connections

This chapter provides explanations on how to configure controller lines and PU connections to the host.

4.1Line Definitions

4.1.1Introduction

The controller can be connected to the AS/400 via SYNC or LAN. A SYNC line runs either SDLC or X.25 protocols. A LAN connection runs LLC protocol. These connections can be either to the same or different AS/400.

The controller supports up to 2 line connections:

- ◆1 SYNC lines
- ◆1 Token Ring or Ethernet connection.

To connect the control unit (CU) to the network carry out the following two procedures:

1. Define the line types via which communication with the AS/400 occurs. The options available depend on the definitions in the "Hardware configuration" menu group.
2. Configure the line description for each selected line type:

The parameters of each of the defined lines should be configured according to the line descriptions in the AS/400. Refer to chapter 9, for more details on how to define and configure the line in the AS/400.

4.1.2 Defining Line Types

from the Setup menu. The Line Connection screen appears:

```
          H O S T   C O N N E C T I O N   L I N E S   T Y P E

i-----i
i       i
i       i
i       i----- Line 1 ----->Select option: 1   Available options
i       i
i       i
i       i
i       i
i       i
i       i
i Controller i
i       i
i       i
i       i
i       i
i       i----- Line 2 ----->Select option: 2   Available options
i       i
i       i
i       i
i-----i
                                     1 SDLC
                                     2 X.25
                                     3 Disable

                                     1 Token-Ring
                                     2 Disable
```

The communication lines displayed on the screen reflect the hardware configuration as detailed in the table below. Dto access the line description screens where the line parameters are defined.

Line #	Line type	Protocols
1	Sync	SDLC or X.25
2	Token Ring or Ethernet	

NOTE: If the communication line to the host is either switched or leased, select SDLC, if communicating over a packet-switched public data network select X.25. If you select Token Ring line, the option for Token Ring Gateway will not be available. This restriction does not apply when selecting Ethernet line.

4.1.3 Line Description

4.1.3.1 SDLC Line Description

If the Sync line was defined as SDLC, an SDLC Parameter Configuration menu will appear. Define the parameters, referring to the parameter descriptions below, and press **ENTER**.

AS / 4 0 0 S D L C C O M M U N I C A T I O N



```
Data encoding . . . . . ( NRZ  0 , NRZI  1 ) 0
DTE/DCE . . . . . ( DTE  0 , DCE  1 ) 0
Line speed ( for DCE only ) ( 1050  0 , 1200  1 , 2000  2 ,
                             2400  3 , 4800  4 , 9600  5 ,
                             19200 6 , 38400 7 ) . . . . . 0
Maintain the RTS signal on at all times ( No  0 , Yes  1 ) 0
```

- Data Encoding** Select the method of data encoding to be used:
- NRZI - Non-return to zero Inverted recommended for analog modems or DCEs.
- NRZ - Non-return to zero. Recommended for digital DCEs
- The field must match the line description in the AS/400 system configuration. Refer to your modem documentation determine the best method. The default value is NRZ.
- DTE/DCE** This determines if the controllers connection functions as a Data Terminal Equipment (DTE) or Data Communication Equipment (DCE).
- If the modem connects the controller to the line, the parameter should be set to DTE. If this setting is incorrect the controller will not communicate with the host system.
- Line Speed** This is relevant for DCE only, specifying the appropriate baud rate.
- RTS On/Not On at all times** Request to Send signal on at all times,(or not on at all times). Maintain RTS signal on at all times if your modem is set for full-duplex mode.
- The default value is NO.

4.1.3.2X.25 Line Description

X.25 information is transmitted in packets. These packets consist of a header that contains the control data and the destination address, and the data field that is transparent to the network.

The X.25 line description, consists of a screen in which packet parameters are defined to ensure the smooth flow of information. The limitations imposed on the size of packets and on the line communication, is affected by the line type.

NOTE: Some of the parameters' definitions depend on your network subscription and the options you want to make use of. The chosen values should match the ones in the AS/400 System line description.

If the Sync line was defined as X.25, an X.25 Parameter Configuration menu will appear. Define the parameters, referring to the parameter descriptions below, and press **ENTER**.

```
AS / 4 0 0   X . 2 5   C O M M U N I C A T I O N

      Line  2

Packet level sequence numbering ( Modulo 8  0 , Modulo 128  1 )  1
Link window size . . . . . (  1 - 7  ) . . . . . 7
Flow control negotiation . . ( not permitted 0 , permitted 1 ) 1

Manual options . . . . . ( not all 0 , all 1 ) . . . . . 1

Number of retries . . . . . (  000 - 250 ) . . . . . 010
Link level - transmit timeout (  01 - 60  sec ) . . . . . 03
Diagnostic code format . . . ( SNA 0 , ISO 1 ) . . . . . 0

DTE/DCE . . . . . ( DTE 0 , DCE 1 ) . . . . . 0

Line speed ( for DCE only ) . . ( 1050 0 , 1200 1 , 2000 2 ,
                                2400 3 , 4800 4 , 9600 5 ,
                                19200 6 , 38400 7 ) . . . . . 0

? = Help  F1 = KeysHelp  PRINT = Hardcopy  F7 = Previous  F8 = Next  F3 = Exit
```

Packet Level Sequence Numbering The packet sequence numbering scheme used by your network, this will depend on your X.25 network subscription. The default value =Modulo 128, refer to Control Negotiations.

- [0] = Modulo 8
- [1] = Modulo 128

Link Window Size The maximum number of frames that can be sent by the Controller without receiving an acknowledgment from the network. valid retries are (1-7).

Default Values = 7

Flow Control Allows the user to change the Packet Size and the Packet

Negotiation	<p>Window Size from call to call. If you permit <i>Control Negotiation</i>, then you must also allow for all the <i>Manual Options</i>. This depends on your network subscription. The default value is permitted</p> <p>[1] = permitted [0] = not permitted</p>
Manual Options	<p>Allows the operator to change, on a call to call basis, all or some of the options when manually initiating a circuit connection (This on applies to SVC). These options include flow control negotiation parameters and reverse charging, and others. If <i>Not All Manual Options</i> is selected, the operator is allowed only to change the <i>initiation type</i>, <i>logical channel ID</i>, and the <i>password</i> during manual circuit initiation.</p> <p>If ALL Manual Options are allowed, the user can modify all the configuration parameters.</p>
Number of Retries	<p>The number of times the Controller should retry to establish connection with the AS/400 system after connection failure. The value can range from 0 no retries to 250. The default value = 10</p>
Link level transmit Time Out	<p>The amount of time the controller will wait to receive an acknowledgment form the AS/400, before considering a connection failure. The values can range between Xmit Time-out 01 and 60 seconds. The default value is 3 attempts.</p>
Diagnostic Code Format	<p>The format of diagnostic codes to be used by the Controller.</p> <p>[0] = System Network Architecture (SNA) extended format diagnostic codes. [1] = International Standard Organization (ISO) diagnostic codes.</p> <p>The value depends on your network subscription and must match the AS/400 system line description.</p>
DTE/DCE	<p>This indicates whether the controllers connection functions as a Data Terminal Equipment (DTE) or Data Communication Equipment (DCE).</p> <p>If the modem connects the controller to the line, the parameter should be set to DTE. If this setting is incorrect the controller will not communicate with the host system.</p>

Line Speed This is relevant for DCE only, specifying the appropriate baud rate.

4.1.3.3 Token Ring Line Description

The Controller can be configured as either Token-Ring Attachment or Gateway -- not as both. If you are configuring the Controller in Token-Ring Attachment, you cannot configure it as Gateway.

The following screen is accessed when Line-2 is enabled as Token-Ring, in the Line Type Selection menu. Define the parameters, referring to the parameter descriptions below, and press **ENTER**.

```
AS / 400 TOKEN - RING COMMUNICATION

Line 2

Data Transfer Rate . . . . ( 4MBPS 0 , 16MBPS 1 ) . . . . █
Normal or Early Release . . ( NORMAL 0 , EARLY 1 ) . . . . 0
3494 connection number . . ( 0-9 , A-F ) . . . . 4000 00000000
Response timer . . . . . ( 01 - 20 ) . . . . . 01
Inactive timer . . . . . ( 01 - 99 ) . . . . . 30
Receive acknowledgment timer ( 001 - 255 ) . . . . . 030
Retry counter . . . . . ( 01 - 99 ) . . . . . 08
```

Data Transfer Rate The Data Transfer Rate can be either 4 or 16 Mbps. Default is 16 Mbps.

Normal or Early Release This depends on the ring configuration. Default is Normal

3494 Connection Number This is the 12-digit MAC address assigned to the controller's Token-Ring adapter. Enter the last 8 hexadecimal characters of the Token Ring address the first four positions are 4000. Valid characters are 0 - 9, and A - F (upper case).

TR Response Timer	Maximum time allotted to receive an appropriate response from the host system. The minimum value must be the total number of possible frame delays in the system. Valid value = [1 to 20] seconds; default = [1 second].
TR Inactive Timer	Maximum time that the network or host system may be inactive before it is considered inoperative. The minimum value must be ten times the response timer value. Valid values are 1 to 99 seconds, default value = 30.
TR Receive Acknowledgment Timer	Maximum time that the Controller is allowed to send acknowledgments to the attached host system. Valid values = [1 to 255] milliseconds; default value = 30.
TR Retry Count	Maximum number of retries to perform checkpoint procedure, after the <i>Response Time</i> has past the limit. <i>[Response Time X Retry Count]</i> total must allow for error detection and recovery. Valid values = [1 to 99]; default = [8].

4.1.3.4 Ethernet Line Description

The 3494 supports Ethernet attachment and Gateway topology. Ethernet Gateway is defined in separate menu groups. The first is accessed from the Setup menu -- Host Connection option; the second from the Setup menu -- Gateway Configuration option.

Define the parameters, referring to the parameter descriptions below, and press **ENTER**.

Host Connections

A S / 4 0 0 E T H E R N E T C O M M U N I C A T I O N

Line 2

```
Address format . . . . . ( Ethernet 0 , Token-Ring 1 ) 0
3494 connection number . . ( 0-9 , A-F ) . . . . . 0200 00000000

Response timer . . . . . ( 01 - 20 ) . . . . . 01

Inactive timer . . . . . ( 01 - 99 ) . . . . . 30

Receive acknowledgment timer ( 001 - 255 ) . . . . . 030

Retry counter . . . . . ( 01 - 99 ) . . . . . 08
```

Address Format

The address can either be entered in Ethernet format (0) or Token Ring format (1) the default value is Ethernet format (0).

Connection Number

This is the 12-digit MAC address of the controller's Ethernet adapter Enter the last 8 hexadecimal characters of the connection number, the first four positions are 0200 (Ethernet address format) or 4000 (Token Ring address format). Valid characters are 0 - 9, and A - F (upper case). This address is assigned by your system manager and administrated locally.

Response Timer

Maximum time allotted to receive an appropriate response from the workstation. The minimum value must be the total number of possible frame delays in the system. Valid value = [1 to 20] seconds; default = [1 second].

Inactive Timer

Maximum time that the network or workstation may be inactive before it is considered inoperative. The minimum value must be ten times the response timer value. Valid values are 1 to 99 seconds, default value = 30

Receive Acknowledgment

Maximum time that the Controller is allowed to send acknowledgments to the

attached workstation. Valid values = [1 to 255] milliseconds; default value = 30

Retry Counter

Maximum number of retries to perform checkpoint procedure, after the *Response Timer* has timed out. the value is the Response Time (X) Retry counter = Total. The total must allow for error detection and recovery. Valid values are 1 to 99 retries; default value is = 8

4.2PU Connections to Host

The Model 3494 Controller supports up to eight logical PUs. At least one PU should be defined for each line connection assigned to the AS/400. The number of devices per line can be increased by defining more than one PU for a line.

The PU connections to host are configured as follows:

- Assign each PU a specific communication line (X.25, SDLC, Token Ring or Ethernet)
- Assign each PU an address

Assigning the PU Communication Lines

1. Access the 3494 Main Setup menu.
2. Select the Controller Configuration option. The following screen appears:

```

          P U   L I N E   I N F O R M A T I O N

i-----i
i   i   PU 1   i----->Select option: █   Available options
i   i-----i
i C i   PU 2   i----->Select option: 5   1 Line 1 SDLC
i O i-----i                               2 Line 2 Token-Ring
i N i   PU 3   i----->Select option: 5   3 Disable
i T i-----i
i R i   PU 4   i----->Select option: 5
i O i-----i
i L i   PU 5   i----->Select option: 5
i L i-----i
i E i   PU 6   i----->Select option: 5
i R i-----i
i   i   PU 7   i----->Select option: 5
i   i-----i
i   i   PU 8   i----->Select option: 5
i-----i

```

3. To enable a PU, define the line number to which it is connected. If you do not wish to enable a particular PU, define it as Disable.

- Page forward to display each PU and its assigned line as illustrated by the following screen:

```
                C O M M U N I C A T I O N

i-----i
i   i  PU 1  i-----i
i   i-----i           i----- Line 1  SDLC
i C i  PU 2  i-----i
i O i-----i
i N i  PU 3  i
i T i-----i
i R i  PU 4  i
i O i-----i
i L i  PU 5  i
i L i-----i
i E i  PU 6  i
i R i-----i
i   i  PU 7  i
i   i-----i
i   i  PU 8  i
i-----i
```

- Assign each PU an address according to the following section.

Assigning PU Addresses

Define each PU with the address assigned to it at the AS/400 system location. The address should match the *Station Address* as defined in the AS/400 APPC Controller attributes.

```
                P U   A D D R E S S E S

i-----i
i   i  PU 1  i----- Line 1  SDLC -----> Address ( 01 - FE ) 02
i   i-----i
i C i  PU 2  i
i O i-----i
i N i  PU 3  i
i T i-----i
i R i  PU 4  i
i O i-----i
i L i  PU 5  i
i L i-----i
i E i  PU 6  i
i R i-----i
i   i  PU 7  i
i   i-----i
i   i  PU 8  i
i-----i
```

If the line type is X.25, the Station Address is derived from the last five digits of the *Exchange Identifier* in the APPC Controller description. Valid entries are hexadecimal values 01 to FE.

PU's defined for the same line must have consecutively ascending addresses, starting with the primary PU address. The multiple PU addresses are configured automatically by typing

in the primary PU address and pressing **ENTER**. If the PU subsystem is disabled, the address value is ignored.

4.2.1 Special Parameters for X.25 PU's

The following parameters may be either entered here, or included in the Open/Call/Answer commands (depending on the Virtual circuit type chosen) entered from the SYSTEM_REQUEST command entry line from the terminal initiating communication with the host.

X.25 COMMUNICATION PU PARAMETERS

```

      PU 2                               Line 1 X.25

Packet size /bytes/ . . . ( 64 0 , 128 1 , 256 2 , 512 3 ) . . . █
Virtual circuit type . . ( PVC only 1   SVC answer only 2
                        SVC call 3   SVC both         4 ) . . . 1
Reverse charging accepted ( No 0 , Yes 1 ) . . . . . 0
Packet window size . . . ( 2 - F ) . . . . . 2

```

Packet Size

The number of bytes allowed in the data field of the packet.

For SVCs, this parameter configures the maximum size of call packets accepted by the controller - it sets the limit on variable packet sizes.

For PVCs, the packet size value is not negotiable and remains constant at the value selected.

0 = 64-byte packet

1 = 128-byte packet

2 = 256-byte packet

3 = 512-byte packet

Virtual Circuit Type

This is the type of connection:

[1] = PVC only. Permanent Virtual Circuit; emulates "End to End" connection.

[2] = SVC Ans. Incoming calls only; choose this option ONLY if you do not intend to place any calls to the Host.

[3] = SVC Calls. Outgoing calls only. Choose this option only if you do not intend to receive incoming calls from the host system.

[4] = SVC both. Incoming and outgoing calls.
Analogous to "point to point" switched line

Reverse Charging Accepted

Determines if the DTE will accept reverse charge call from the network.

This parameter is valid, ONLY if Manual Options is set to YES.

Packet Window Size

Limits the maximum number of packets that can be sent without receiving an acknowledgment, so that the DTE is not sent more information than it can queue. The Packet Window Size value, depends on the packet sequence numbering scheme (Packet Numbering).

For SVCs, the value selected limits the window sizes.
For PVCs, windows size is constant at the value selected.

Values: [2 - 7]: Packet for Mod.8.
 [2 - F]: Packet for Mod.128

5 Network Information

The Network Information parameters define the network names and connection numbers required for communication between the AS/400 system and the controller. Refer to your network subscriptions sheets for the required information.

The Network Information Configuration procedure consists of two parts: Network Information screen and AS/400 System Configuration Parameters.

Define a set of Network Information screens for each of the PUs assigned to the controller. For example, if the controller was assigned three PUs then three sets of Network Information and AS/400 System configuration screens will be available. The corresponding PU number is displayed on the screens.

Define the AS/400 System information screen with the names and connection number required for the controller to communicate with the host.

The parameters displayed on the screens vary slightly depending on the type of line assigned to the particular PU.

5.1 Network Information Configuration Procedure

Configure the Network Information by defining network parameters that are required for communication between the Twinax controller and the AS/400 system. Note that some parameters must be specifically defined for the PUs that were assigned X.25, Token-Ring or Ethernet attachment line types.

To configure the Network information:

1. Access the Setup menu.
2. Enter option (5) Network Information. The Network Information screen appears.
3. Define the parameters referring to the parameter definitions provided in this chapter.
4. Page forward to access the AS/400 System configuration menus. Define the parameters for each AS/400 system you want to configure. Each PU can support up to four (4) AS/400 systems.
5. If you assigned the controller more than one PU, page forward to access the following set of Network Information configuration menus.

5.2 Network Information Screen

This is the first screen accessed when option **(5) Network Information** is selected from the Setup menu. Define the parameters according to the provided explanations. The screen below illustrates an SDLC screen. This screen is given as an example since it includes the most common parameters. Other parameters unique to specific line types or attachments are listed following the SDLC parameters.

```

      NETWORK      INFORMATION

      PU  1          Line 1  SDLC

Default network name      ( 0-9,A-Z,$,#,@,& )  █
3494 logical unit ( LU ) name ( 0-9,A-Z,$,#,@,& )  _____
3494 control point ( CP ) name ( 0-9,A-Z,$,#,@,& )  _____
Default mode name        ( 0-9,A-Z,$,#,@,& )  QRMTWSC
Logical connection retry parameters:
    Retry counter      ( 000 - 255 ) . . . . . 010
    Retry interval    ( 00 - 60 ) . . . . . 06
  
```

Refer to your network subscription and match the parameters according to the following table:

AS/400 Parameter	Controller Parameter
RWS Attributes - Remote location name	3494 LU name (Local Unit)
APPC Attributes -- Remote CP name	3494 CP name (Control Point)
One for the mode names defined in the AS/400	Default Mode name

Default Network Name The name used when either the AS/400 Network name or the 3494 Network name is not provided. It should match the 'Local Network ID' as defined in the AS/400 network attributes. This is a required parameter.

Valid characters are @,#,\$,&, 0-9, A-Z (Upper case) up to 8 characters.

Controller LU Name The name assigned to this controller at the AS/400 system location. It should match the *Remote Location Name* defined in the **AS/400 REMOTE WORKSTATIONS CONTROLLER** attributes.

Valid characters are @, #, \$, &, 0-9, A-Z (Upper case) up to 8 characters

Controller CP Name The Control Point Name depends on whether the Advanced Program to Program communication controller (APPC) and the Remote Workstation Controller (RWS) are defined as the same AS/400 system. If the APPC and the RWS are defined from the same system, the CP name is one and the same, if not , the CP name differs from the LU name

Valid characters are @, #, \$, &, 0-9, A-Z (Upper case) up to 8 characters.

Default Mode Name The name used when the Mode name of the AS/400 System is not defined. The entry must be identical to a mode description name in the AS/400.

The default mode name is QRMTWSC

Valid characters are @, #, \$, &, 0-9, A-Z (Upper case) up to 8 characters.

**Logical Connection
Retry Counter** The number of times the Controller should retry to establish connection with the AS/400 system after connection failure. Enter a value from 0 - 254, or 255 for UNLIMITED retries.

The default value is 10 retries]

**Logical Connection
Retry Interval** The time lapse between retries to establish connection. Enter a value in the range 0 (0 seconds) to 60 (ten minutes).

The default value is 6 (1 minute)

For X.25 line connection

If the PU was assigned an X.25 line type in the Controller Configuration PU Selection menu, then the following parameter will appear on the Network Information menu screen.

Connection Number If you intend to initiate SVC calls from the controller or want to verify incoming SVC calls using a network address, an entry is required here. For X.25 - The Network Address of the AS/400 System. Up to 15 numeric characters (0-9).

For Token Ring line connection

If the PU was assigned a Token Ring line type in the Controller Configuration PU Selection menu, then the following parameter will appear on the Network Information menu screen.

SAP Enter the Service Access Point (SAP) for the controller. The value is in hexadecimal ranging from x'04' to x'FC', in multiples of 04. For example, valid values could be x'04', x'08', x'0C', x'10', and so on.

For Ethernet Attachment

If the PU was assigned an Ethernet attachment, type in the Controller Configuration PU Selection menu, then the following parameter will appear on the Network Information menu screen.

SAP Enter the Service Access Point (SAP) for the controller. The value is in hexadecimal ranging from x'04' to x'FC', in multiples of 04. For example, valid values could be x'04', x'08', x'0C', x'10', and so on.

NOTE: Each Ethernet adapter has a unique MAC address. Since each Ethernet adapter is capable of supporting several PU's and a Gateway, they must be differentiated by using the SAP address.

The currently defined SAP addresses are displayed on the screen. Use other addresses.

5.3 AS/400 System Configuration

The **AS/400 SYSTEM INFORMATION** parameters enable you to define the Controller with the AS/400 system information.

There are two sets of identical screens. System 1 screen is for the primary AS/400 system; Systems 2/3/4 are for optional AS/400 Systems. The following information specifies the names and connection numbers required for the controller to communicate with the host. You must configure the section for the primary AS/400 system. Configuring sections for additional AS/400s systems 1 to 3 allows you to connect the controller to other AS/400 systems.

Refer to your network subscription and match the parameters according to the following table. Use the On-line Help and the parameter definitions provided in the table below.

AS/400 parameter	Controller parameter
NETWORK ATTRIBUTES - Def. Local location	AS/400 LU name
NETWORK ATTRIBUTES - Local network ID	AS/400 network name
RWS CONTROLLER - Remote network ID	3494 network name

The screen below illustrates an SDLC screen. This screen is given as an example since it includes the most common parameters. Other parameters unique to specific line types or attachments are listed following the SDLC parameters.

```

NETWORK INFORMATION
  PU 3 Line 1 SDLC
AS/400 system 1
AS/400 LU name ( 0-9,A-Z,$,#,@,& ) . . . 
AS/400 network name ( 0-9,A-Z,$,#,@,& ) . . . 
3494 network name ( 0-9,A-Z,$,#,@,& ) . . . 
Mode name ( 0-9,A-Z,$,#,@,& ) . . . 
AS/400 system 2
AS/400 LU name ( 0-9,A-Z,$,#,@,& ) . . . 
AS/400 network name ( 0-9,A-Z,$,#,@,& ) . . . 
3494 network name ( 0-9,A-Z,$,#,@,& ) . . . 
Mode name ( 0-9,A-Z,$,#,@,& ) . . . 

```

NOTE: If the values defined in the Network Information screen are default values, then after defining the AS/400 LU Name, you may press enter and the other default values will automatically be defined (this is the case, only for default values).

AS/400 LU Name	<p>The name of the Primary AS/400.</p> <p>Valid characters are @, #, \$, &, 0-9, A-Z (upper case). Up to 8 characters</p> <p>Refer to the chapter 'Controller Line Configuration' under the section 'AS/400 System Information' for tables showing the AS/400 vs. the matching Controller parameters.</p>
AS/400 Network Name	<p>The name of the network to which the Primary AS/400 is attached. If this field is not defined, the 'Default Network Name' previously defined is used by the controller.</p> <p>Valid characters are @, #, \$, &, 0-9, A-Z (upper case). Up to 8 characters.</p>
Controller Network Name	<p>The name of the network to which the controller is attached when it communicates with the AS/400. If this field is not defined, the 'Default Network Name' previously defined, is used by the controller.</p> <p>Valid characters are @, #, \$, &, 0-9, A-Z (upper case). Up to 8 characters.</p>
Mode Name	<p>The name must match the name defined in the Primary AS/400.</p> <p>Valid characters are @, #, \$, &, 0-9, A-Z (upper case). Up to 8 characters.</p> <p>The following parameters may either be entered here or, included in the Open/Call/Answer commands (depending on the Virtual circuit type chosen) entered from the SYSTEM_REQUEST command entry line from the terminal initiating communication with the Host.</p>

For X.25 Connection

Connection Number	If you intend to initiate SVC calls from the controller or want to verify incoming SVC calls using a network address, an entry is required here. For X.25 - The Network Address of the AS/400 System. Up to 15 numeric characters (0-9).
Password	This is the X.25 network connection password. This is relevant for SVC circuit types that include outgoing calls. This password must match the configured password on the AS/400 System. All alphanumeric keyboard characters are valid, up to 8 characters. If fewer than 8 characters are entered, enter 0 for the remaining spaces.
Logical Channel identification	This value is used to override the configuration value for this circuit request only. This value is 0001 unless changed. Valid characters are 0-9 in the range '0001' to '4095'.

For Token-Ring Attachment

Connection Number	This parameter MUST be defined for Token Ring communication, this is the AS/400 Token-Ring adapter's MAC address. Enter the 12-character hexadecimal Token-Ring address. Valid characters are 0-9, and A-F (upper case).
AS/400 system SAP	Enter the Service Access Point (SAP) for the AS/400. The value is in hexadecimal ranging from x'04' to x'FC', in multiples of 04. For example, valid values could be x'04', x'08', x'0C', and so on. Valid characters are 0-9 and A-F (upper case). Configuring for more than one AS/400 system (systems 2-4) is optional
Maximum Out	Enter the Maximum Out value for the AS/400. This value is the maximum number of frames sent by the controller before waiting for an acknowledgment. The minimum value must be at least twice the Maximum In value Valid values are 2-8 frames. Default is '2'

Maximum In Enter the Maximum In value for the AS/400. This value is the maximum number of frames received by the controller before it sends an acknowledgment.
Valid values are 1-4 frames. Default is 1.

For Ethernet Attachment

Address format The address could be entered in Ethernet format (0) or Token-Ring format (1). Default is Ethernet format.

Connection Number This parameter MUST be defined for Ethernet communication, this is the AS/400 Ethernet adapter's MAC address.
Enter the 12-character hexadecimal Ethernet address Valid characters are 0-9, and A-F (upper case).

AS/400 SAP Enter the Service Access Point (SAP) for the AS/400. The value is in hexadecimal ranging from x'04' to X 'FC', in multiples of 04.
For example, valid values could be x'04', x'08', x'0C', and so on.
Valid characters are 0-9 and A-F (upper case). Configuring for more than one AS/400 system (systems 2-4) is optional

Maximum Out Enter the Maximum Out value for the AS/400. This value is the maximum number of frames sent by the controller before waiting for an acknowledgment. The minimum value must be at least twice the Maximum In value
Valid values are 2-8 frames. Default is 2

Maximum In Enter the Maximum In value for the AS/400. This value is the maximum number of frames received by the controller before it sends an acknowledgment
Valid values are 1-4 frames. Default is 1.

6 Gateway Configuration

The 3494 Controller supports gateway configuration for Token Ring or Ethernet attachment. The LAN adapter (Ethernet or Token-Ring) enables support of up to 80 PWSs.

REMINDER: The Controller can be configured as either Token-Ring line or Gateway - not as both. To define it as Gateway ensure that it is DISABLED as Token-Ring line in the Line Type Selection screen (see Chapter 3).

6.1 Token Ring Gateway

For Token Ring Gateway configuration access the 3494 - Setup menu and enter **option (6) Gateway Configuration**. The Gateway menu appears. Define the parameters according to the given parameter explanations.

```

T O K E N   -   R I N G   G A T E W A Y

Slot 2

3494 PU                ( 1 ) . . . . . 1
Clock rate . . . . . ( 4MBPS 0 , 16MBPS 1 ) . . . . 1
Normal or Early Release . . ( NORMAL 0 , EARLY 1 ) . . . . 0
3494 Token-Ring address . . ( 0-9 , A-F ) . . . 4000 00000000
3494 SAP . . . . . ( 04 - FC by step 4 ) . . . . 04
Response timer . . . . . ( 01 - 20 ) . . . . . 01
Inactive timer . . . . . ( 01 - 99 ) . . . . . 30
Receiver acknowledgment timer ( 001 - 255 ) . . . . . 030
Retry counter . . . . . ( 01 - 99 ) . . . . . 08
Maximum out . . . . . ( 2 - 8 ) . . . . . 2
Maximum in . . . . . ( 1 - 4 ) . . . . . 1

```

PU number Specifies the Physical Unit (PU) which the Token-Ring attached PWSs are connected to. Since PC support devices are not assigned sessions and are not displayed in the PU/LSID map, this parameter is added to specify the PU which the PC's are connected to. Enabled PU's are displayed near the parameters.

Valid values are 1 to 8. Default is 1. Select an active PU.

Data Transfer rate The Data Transfer Rate can be either 4 or 16 MB Per Second. Default is

Gateway Configuration

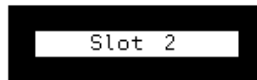
	16MBPS
Normal or Early release	Depends on the ring configuration - ask the system manager. Default is NORMAL
Token-Ring address	This is the 12 digit MAC address of the controller's Token Ring adapter. Enter the last 8 hexadecimal characters of Token-Ring address. The first 4 positions of the address are 4000. Valid characters are 0-9 and A-F (upper case). The address is assigned by the System Manager and administered locally.
SAP	Enter the Service Access Point (SAP) for the Controller. The value is in hexadecimal ranging from x'04' to X 'FC' (in multiples of 04). For example, valid values could be x'04', x'08', x'0C', x'10', and so on. Valid characters are 0-9 and A-F (upper case).
Response Timer	This value is the maximum time allotted to receive an appropriate response from the workstation. The minimum value must be the total number of possible frame delays in a system. Valid values are 1-20 seconds. Default is 1.
Inactive Timer	This value is the maximum time that the Token-Ring/Ethernet network or workstations may be inactive before it is considered inoperative. The minimum value must be ten times the Response Timer value. Valid values are 1-99 seconds. Default is 30 .
Receiver Acknowledgment Timer	This value is the maximum time that the controller is allowed to send acknowledgments to the attached workstation. Valid values are 1-255 milliseconds. Default is 30.
Retry counter	This value is the maximum number of retries to perform the checkpoint procedure, including retransmission, after the Response Timer has expired. The combination of the Response Timer value and the Retry Counter must allow for error detection and recovery on the network. Valid values are 1-99 retries. Default is 8.
Maximum Out	This value is the maximum number of frames sent by the controller before waiting for an acknowledgment. The minimum value must be the

Maximum In value times 2. Valid values are 2-8 frames. Default is 2.

Maximum In This value is the maximum number of frames received by the controller before it sends an acknowledgment. Valid values are 1-4 frames. Default is 1

6.2 Ethernet Gateway

For Ethernet Gateway configuration access the 3494 - Setup menu and enter **option (6) Gateway Configuration**. The Gateway menu appears. Define the parameters according to the given parameter explanations.



```

3494 PU . . . . . ( 1 ) . . . . . 1
Ethernet address format . . . ( Ethernet 0 , Token-Ring 1 ) . 1
3494 Ethernet address . . . . ( 0-9 , A-F ) . . . . .4000 00000000
3494 SAP . . . . . ( 04 - FC by step 4 ) . . . . . 04

Response timer . . . . . ( 01 - 20 ) . . . . . 01
Inactive timer . . . . . ( 01 - 99 ) . . . . . 30

Receiver acknowledgment timer ( 001 - 255 ) . . . . . 030

Retry counter . . . . . ( 01 - 99 ) . . . . . 08
Maximum out . . . . . ( 2 - 8 ) . . . . . 2
Maximum in . . . . . ( 1 - 4 ) . . . . . 1

```

PU number Specifies the Physical Unit which the PC is connected to. Since PC support devices are not assigned sessions and are not displayed in the PU/LSID map, this parameter is added to specify the PU which the PC is connected to. Enabled PU's are displayed near the parameters.

Valid values are 1 to 8. Default is 1. Select an active PU.

Address format The address could be entered in Ethernet format (0) or Token-Ring format (1).

Default is Ethernet format.

- Ethernet address** This is the 12-digit MAC address of the controller's Ethernet adapter. The address is assigned by the System Manager and administered locally.
- Enter the last 8 hexadecimal characters of Ethernet address. The first 4 positions of the address are 0200 (Ethernet format) or 4000 (Token-Ring format).
- Valid characters are 0-9, and A-F (upper case).
- SAP** Enter the Service Access Point (SAP) for the Controller. The value is in hexadecimal ranging from x'04' to X 'FC', in multiples of 04. For example, valid values could be x'04', x'08', x'0C', x'10', and so on.
- Valid characters are 0-9 and A-F (upper case).
- NOTE:** Each Ethernet adapter has a unique MAC address. Since each Ethernet adapter is capable of supporting several PU's and a Gateway, they must be differentiated by using the SAP address.
- Use other addresses than the defined SAP addresses which are displayed on the screen.
- Response Timer** This value is the maximum time allotted to receive an appropriate response from the workstation. The minimum value must be the total number of possible frame delays in a system. Valid values are 1-20 seconds. Default is 1.
- Inactive Timer** This value is the maximum time that the Token-Ring/Ethernet network or workstations may be inactive before it is considered inoperative. The minimum value must be ten times the Response Timer value.
- Valid values are 1-99 seconds. Default is 30.
- Receiver Acknowledgment Timer** This value is the maximum time that the controller is allowed to send acknowledgments to the attached workstation.
- Valid values are 1-255 milliseconds. Default is 30.
- Retry counter** This value is the maximum number of retries to perform the checkpoint procedure, including retransmission after the Response Timer has expired. The combination of the Response Timer value and the Retry Counter must allow for error detection and recovery on the network. Valid values are 1-99 retries. Default is 8.
- Maximum Out** This value is the maximum number of frames sent by the controller before waiting for an acknowledgment. The minimum value must be

the Maximum In value times 2.

Valid values are 2-8 frames. Default is 2.

Maximum In

This value is the maximum number of frames received by the controller before it sends an acknowledgment.

Valid values are 1-4 frames. Default is 1

7 Device Configuration

The Model 3494 controller supports Twinax devices. It enables you to define the following attributes for the Twinax devices attached to the controller: location, type, language, and PU sessions of the devices. Two types of device configurations are available: default and manual. Using default configuration the system automatically identifies connected Twinax devices and maps them while manual configuration enables a more flexible configuration procedure.

This chapter will describe the Twinax devices configuration procedure.

7.1 Twinax Device Configuration Procedure

1. Access the device configuration screen by selecting **7. Device Configuration** from the Main menu.

The following screen is displayed:

TWINAX ADAPTER MAP / LSID MAP																	
Workstation Address																	
i	Port	i	0	i	1	i	2	i	3	i	4	i	5	i	6	i	
i	00	i	█	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	01	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	02	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	03	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	04	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	05	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	06	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
i	07	i	T	—	i	T	—	i	T	—	i	T	—	i	T	—	i
PU 1			disabled				disabled				disabled						
0 1 2 3 4 5 6			0 1 2 3 4 5 6				0 1 2 3 4 5 6				0 1 2 3 4 5 6						
0	█	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
1	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
7	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
TWINAX device			PU / LSID = 1 / 00														
			F4 remap				Enter details				F5 auto configuration						
											F6 RESE						

The Twinax Adapter Map in the upper half of the screen illustrates the exact location of the devices on each adapter and port, as well as the Keyboard Language assigned to each one.

Up to seven Twinax devices can be connected to each port. Eight ports are displayed, each row representing a Twinax port and each column a Twinax address.

The lower part of the screen is the LSID Map that shows virtual mapping of devices for each PU.

2. You may either use the default configuration or manually define the devices connected to the controller.

In "Default" mapping, the controller defines the Twinax devices as "T" -- undetermined Twinax device types, and assigns them the master language.

The manual method is used to define individual devices with different characteristics (device type, language, additional sessions) than those defined by default. To define the devices using manual configuration, read the section below on Manual Configuration.

Manual Device Configuration Procedure

Manual device configuration enables you to do the following:

- a. Specify the device type.
- b. Assign it a language other than the master language.
- c. Assign it a session other than the default session.
- d. Assign it up to three additional sessions.

Each Device field in the Twinax Adapter Map consists of two parts; device type and Keyboard Country Code. The Keyboard Country Code field is not relevant if the device is a printer.

To define the Device Type field

Place the cursor on the desired port address field and type in the appropriate letter according to the following definitions:

Letter	Definition
--------	------------

T	undetermined Twinax device type
D	display or display emulation
E	display running a file transfer application
P	printer
<space>	= a device without a defined session

Entering space:

- a. When the default session is free, then pressing <space> resets the device definition to "T" (undetermined).
- b. When the default session is occupied by another device, then pressing <space> leaves the present device without a session.

To define a device keyboard language

To define the device language as other than the Master KB language refer to the Device Language Definition section.

To view the Twinax devices that are currently attached to your controller, press PF5 on the keyboard. The system automatically identifies any Twinax devices connected to the ports, maps them on to the adapter map and assigns them primary sessions in the default LSIDs.

7.2 Device Language Definition

Up to four different languages can be defined per controller; manually mapping the devices, allows you more flexibility in choosing their address and language. You can define different language tables for specific workstations. If you do not define the language for a device, it is automatically assigned the default language assigned to the Controller.

To define the KB Country language for a device

1. Move the cursor up to the desired field and enter the desired KB Country Code.
Refer to the restrictions in the following section and the list on the following page.
2. After you have completed your entries, press **ENTER** to register your choices.

Restrictions in defining languages

1. Language categories.

Keyboard languages fall into two categories: Type-1 and Type-2.

Type-2 category, consists of the following languages: Greek, Cyrillic, Hebrew and Japanese KANJI-M. *Type-1 category*, consists of all the other languages

If the Master keyboard language is Type-1, the maximum number of additional keyboard languages is three Type-1 keyboard languages, or one Type-2 keyboard language.

If the Master keyboard language is Type-2, the maximum number of additional keyboard languages is two Type-1 keyboard languages, or one Type-2 keyboard language.

NOTES:

a. Keyboard translation codes.

Keyboard translation codes are not used if the device is a printer.

b. Displayed language code.

Keyboard language code is not displayed on the Twinax maps if the device uses the master keyboard language.

7.3 Mapping Device Sessions

The 3494 Controller supports up to eight PU's. Up to four PU's may be configured on a single Adapter Map/LSID Map screen. Each PU must be enabled in the PU Address screen.

Below is a partial display showing the LSID Map located on the lower part of the screen. Use the F2 key (next PU) to access the adapter map/ LSID map screen for the remaining PU's.

```

      PU 1
      0 1 2 3 4 5 6
0  D T T T T T T T
1  T T T T T T T
2  T T T T T T T
3  T T T T T T T
4  T T T T T T T
5  T T T T T T T
6  T T T T T T T
7  T T T T T T T
TWINAX device      PU / LSID = 1 / 00
      F4 remap      Enter details      F5 auto configuration      F6 RESE
```

Each PU is assigned an LSID Map. The letters in these fields represent the following:

Letter Represents

- "T" undetermined Twinax device mapped into its default PU session
- "D" primary display session
- "d" secondary display session
- "P" printer session
- "E" primary session of a device that allows file transfer
- "e" secondary session of a device that allows file transfer
- "." unassigned session

7.3.1 Default Mapping

All Twinax devices are mapped by default to all the sessions in consecutive PUs.

7.3.2 Remapping Devices

Devices can be remapped into different LSID addresses in any of the enabled PU's. In addition to a primary session, each display can be assigned three secondary sessions. Secondary sessions need not be restricted to the same PU as the primary session.

Note: Press **ENTER** after all the modifications for a specific device have been completed.

To remap a device

1. Position the cursor on a device in the adapter map, and type "D", "E" or "P" according to the type of device.
2. Press **PF4** to enter and activate the LSID maps. The cursor will jump to the lower half of the screen -- the LSID Map.
3. To remap a primary session, type "M" on the location of the new PU session that you want to assign that device, and press **ENTER**. The screen will be redisplayed with the appropriate mappings.
4. To add a secondary session, type "C" on the location of the new PU session that you want to assign that device, and press **ENTER**. The screen will be redisplayed with the appropriate mappings.
5. To delete current setting, position cursor on the session you want to erase, press the Space-Bar and press **ENTER** to return to the Adapter map.

To view mapping for a specific device

Press **ENTER**, while the cursors positioned in the device field. Appropriate fields in the PU maps will be displayed in reverse image and the list of PU's and LSID's for the sessions will be displayed at the bottom of the screen.

Restrictions for Remapping Sessions

When Remapping device session or assigning secondary sessions, keep the following restrictions in mind:

1. A secondary session is not available for a Printer Auto detect device.
2. "T" devices cannot be remapped since by definition they represent devices assigned default sessions.

8 Session Access

This chapter describes how to access the host via SDLC and X.25 line connections, and Token-Ring and Ethernet attachment. The host access procedure varies according to the type of communication line. Included in this chapter, is the procedure for changing hosts.

If any errors occur during communication an error code display on the screen. This code identifies the type of failure or status condition. For a description of the errors, refer to Appendix A - Error Identification.

8.1 SDLC Host Communication

SDLC host communication enables communication via switched and non-switched lines.

To establish SDLC line type host communication:

1. Power on all the devices connected to the remote Controller.
2. Insert the operating diskette in the Controller and turn on the Controller.
3. Have the host system operator bring the Control Unit on-line.
4. Determine if your communication line is switched or non-switched and proceed as follows:
 - for a *non-switched* line follow the instructions in step-5.
 - For a *switched* line, follow the instructions in and follow the instructions for Manual Dialing in the following sections
1. If the logon screen is displayed within approximately two minutes, then your communication procedure is complete - no further action is necessary.
 - * If you were not able to logon, repeat the procedure starting with step 1.
 - * If an error message is displayed, refer to Appendix A - Error Messages.

Manual Dialing Procedure

Follow these steps to dial up the host site manually.

1. Set the mode switch on your modem to the "TALK" position.
2. Lift the handset from the telephone and dial up the host site number.
3. When the host site is ready, you will hear the answer tone.
4. Set the mode switch on your modem to the data position.
5. Hang up the handset.
6. The procedure is now complete. The logon screen will be displayed on your workstation

NOTE: If the logon screen does not appear verify that your Controller is on-line.

8.2X.25 Line Communication

This section describes the three methods used for establishing X.25 communication from the 3494: PVC, SVC Call, and SVC answer. For each method, there are essential parameters and optional ones which, if allowed by the Setup, can be used to override the Setup information.

To establish X.25 line type host communications:

1. Use the SYS REQ command to issue the initiation type.
2. [Hx] will be displayed at the top of the screen. [Hx] represents the last AS/400 host System that you established communications with.
3. If necessary, change the AS/400 system identifier [Hx], to specify the system you want to establish communication with; [H1, H2, H3, H4]

NOTE: Insert a comma between successive parameters on the system request line. After the last promoters on the System Request line is entered, press ENTER

8.2.1PCV

For Single PVC operation with NO manual options:

No operator action is required to initiate communication following power-on, or to re-establish communication following successful network link error recovery.

For Single PVC operation WITH manual options:

Initiate communication with the SYS REQ command, and continue with the following procedure. The operator options entered for link initialization, are saved and used to re-establish communication following network link error recover without further operator action.

NOTE: After the last parameter is entered on the system request line, press ENTER.

Initiate PVC with a SYS REQ command.

Only the FIRST parameter listed below is essential. The other parameters are optional.

1. **Enter [O]** in the first space of the system request line (required parameter).
* Insert a comma between successive parameters
2. **To select the logical channel:**
If your network subscription provides more than one logical channel, type [L] followed by a three character hexadecimal code to identify the logical channel to be used.
Values = Hexadecimal values [001 to FFF].
3. **If *Control Negotiation* is enabled, the following options are available:**

- a. Change the packet size - type [P] followed by the new packet size.
Values = [064, 128, 256 or 512].
- b. To change the packet window size - type [W] followed by a two digit code.
Code values = [02 to 07] for modulo 8
 [02 to 15] for modulo 128

8.2.2SVC Calls

Initiate the SVC call with the SYS REQ command.

For SVC calls, the first two parameters listed below, are essential. The *password* is only required if it is included in the host configuration; the other parameters are optional.

If the *Network Address* and *Password* parameters have been preconfigured in the Controller setup, they do not have to be entered in the System Request line.

1. **Enter [C] in the first space** of the system request line (required character).
2. **To enter network address:** (Enter only if it was not preconfigured in the controller setup). If this parameter is preconfigured in the Controller setup, it does not have to be defined in the System Request line.

Enter [N] or [T] followed by the host network address.

Values = [1 to 15] numeric characters

OPTION: If you want your 3494 network address included in the outgoing call request, enter: [-] (dash), followed by the local network address of the 3494.

NOTE: If your network does not conform to CCITT Recommendation X.25 for the facility selection codes for closed user group an/or reverse charging, you must use the general facility selection procedure (parameter "F" to select these facilities

3. **To enter a password:** (Enter only if it was not preconfigured in the controller setup).
Enter: [X] followed by the password. The *password* must be defined, if it was entered in the host line configuration.

Value = [1 through 8] alphanumeric characters.

4 To enter a logical channel:

If your network subscription provides more than one logical channel, type [L] followed by a three character hexadecimal code to identify the logical channel to be used.

Valid logical channel values = Hexadecimal values [001 to FFF].

For SVC, WITH Manual Options, the following additional options are available :

5. If you are using the *closed user Group*,

enter [U] followed by a two digit *closed user group ID*.

6. If you are using *reverse charging*,

enter: [R]

7. To select other optional facilities, enter [F] followed by two characters that identify the facility, and two or more characters for a parameter code. Values = [0 to 9, A to F]

Examples:

a). To select a specific throughput class facility, enter: F02, followed by two hexadecimal digits [0 to 9, A to F]

b). To select an *RPOA*, enter [F44] followed by a four digit code representing the *RPOA* you want to use.

NOTE: After the last parameter is entered on the system request line, press ENTER.

* Insert a comma between successive parameters.

8. If *Control Negotiation* is enabled, the following options are available:.

a) Change the packet size - type [P] followed by the new packet size.

Values = [064, 128, 256 or 512].

b) To change the packet window size - type [W] followed by a two digit code.

Code values = [02 to 07] for modulo 8 to 15] for modulo 128

For single SVC Answer with NO manual options:

No operator action is required to initiate communication following power-on or to re-establish communication following successful network link error recovery.

For single SVC Answer WITH manual options:

Initiate communication following power-on, with the SYS REQ command; The SYS REQ command instructs the controller to wait for a call from the host

The operator options entered for link initialization, are saved and used to re-establish communication following network link error recovery without further operator action.

Only the first parameter listed below is required. The *Network Address* is only required if you want the 3494 to answer calls that originate from that address. *Password* is only required if you want the 3494 to answer calls that include this password. If this is required, the password must also be included in the host configuration.

1. **Enter [A] on the first space in the system request line.** Only this character is essential. All other characters (detailed below) are optional.
2. **To enter a network address:** (Enter only if it was not preconfigured in the controller setup). When this parameter is entered, the controller answers only calls originating from that address.

ATTENTION: If the parameters Network Address and Password are preconfigured in the Controller setup, they do not have to be entered in the System Request line.

Type [N] followed by the host Network Address.

Value = from 1 to 15 numeric characters.

3. To enter a password:

(Enter only if it was not preconfigured in the controller setup). When this parameter is entered, the controller answers only calls that include this password.

Type [X] followed by a password.

Password value = [1 to 8 alphanumeric characters].

4 To define a logical channel:

If your network subscription provides more than one logical channel, type [L] followed by a three character hexadecimal code to identify the logical channel to be used.

Valid logical channel values = Hexadecimal values [001 to FFF].

If you have PVCs and SVCs in the same network subscript, specify the LP to assure correct operation.

5. If Control Negotiation is enabled, the following options are available:

- a. Change the packet size - type [P] followed by the new packet size.

Values = [064, 128, 256 or 512].

- b. To change the packet window size - type [W] followed by a two digit code.

Code values = [02 to 07] for modulo 8

[02 to 15] for modulo 128

NOTE: * After the last parameter is entered on the system request line, press ENTER.

* Insert a comma between successive parameters.

8.2.3Detach

This command is used to terminate a "waiting for call" condition on the Controller. If an ANSWER command is issued, but a call has not yet been received, you can issue a DETACH command to terminate the ANSWER mode.

Enter [D] on the system request line.

8.2.4Token Ring

If it is configured for Token-Ring, the Model 3494 Twinax Controller automatically begins communication with the AS/400 system.

8.2.5Ethernet

If configured for Ethernet, the Model 3494 Twinax Controller automatically begins communication with the AS/400 system.

8.2.6Changing the AS/400 System

The Model 3494 Twinax Controller can work alternatively with up to four AS/400 system hosts. To establish communication with a different host from the one you are configured for follow these steps:

1. Your communication session must OFF or ended.
2. Press **SYS-REQ** to display the parameter [H1/H2/H3 or H4].
3. Choose the same number defined in ht Controller configuration for this host, and press **ENTER**.
4. Access host according to line type.

9AS/400 System Configuration

In order for the AS/400 system to communicate with the Twinax Controller, two separate configuration processes must take place: one, is the Controller configuration described in previous chapters; the other is the AS/400 system configuration that is described in this chapter. The AS/400 system configuration consists of matching certain attributes in the AS/400 system with those of the Controller.

This chapter describes the Controller and AS/400 system attributes that must be matched, commands used in AS/400 system configuration, and examples of matching system and controller configurations for various line types.

9.1AS/400 Attributes to Configure

The AS/400 host configuration is divided into six groups of attributes:

- a. Network attributes
- b. Line description (SDLC, X.25, Token Ring or Ethernet).
- c. Advanced Program to Program communication (APPC) control unit description.
- d. Remote Workstation (RWS) control unit description.
- e. Mode description
- f. Non-programmable (NWS) device description.

Some of the matching attributes will be configured automatically by the AS/400 as needed, while others must be configured manually.

Attributes configured automatically by the AS/400:

1. APPC device description for the APPC controller.
2. APPC device description for each PWS attached to the Model 3494.
3. Virtual controller for PWS workstation function.
4. Display devices for PWS WSF display sessions (attached to virtual controller).
5. Printer devices for PWS WSF printer sessions (attached to virtual controller).
6. APPC Controller (automatically created only in Token-Ring and Ethernet attachment)
7. RWS Controller and device descriptions are automatically created for AS/400 version 3.1 OS/400 or higher.

Attributes configured manually:

1. Line type.
2. APPC Controller
3. RWS Controller.
4. Device description for each NWS attached to the RWS controller.

To view the modes defined in the AS/400 System:

1. Type "WRKMODD", to display the modes.
2. Choose Option-5, to view the attributes of each displayed mode.

The following table lists the matching AS/400 and Controller attributes.

AS/400 Attributes	Controller Attributes
1. Local network ID	AS/400 network name
2. Default Local location	AS/400 LU name
3. Remote control point	3494 control point (CU) name
4. Remote location name	3494 logical unit (LU) name
5. One of the mode names defined in the AS/400	Default Mode name, and AS/400 System mode name

AS/400 parameters required for the 3494 Controller configuration comprise of the following three types:

1. Communication Information.
2. Network Addresses (X.25, Ethernet and Token-Ring only)
3. APPN Information

9.1.1 Mode Description

The MODE name determines:

- number of NWS sessions
- maximum frame size
- pacing value

The mode name "QRMTWSC", is supplied by IBM Version 2 Release 2. It defines 28 NWS sessions and pacing value of seven.

If you want to create a new Mode, type the command: CRTMODD

ParameterValue

MODD (Mode description name)	NEWMODE
LCLCTLSSN	The number of Non-Programmable workstations supported by the Controller.
MAXSSNt	
Value = [LCLCTLSSN + 1]	

9.2 How to Work with the AS/400 Configuration

9.2.1 Useful AS/400 commands

Use	To
DSPNETA	display AS/400 System network attributes
WRKCFGSTS_ *LIN (LINE name)	display AS/400 System line descriptions
WRKHDWPRD	determine the location of the AS/400 System line or hardware
WRKCFGSTS_ *CTL (APPC name)	display AS/400 System APPC Controller descriptions
WRKCFGSTS_ *CTL (RWS name)	display AS/400 System remote workstation controller descriptions

9.2.2 Commands for AS/400 System Definition

Definition	AS/400 System Command
SDLC line	CRTLINS DLC
Token-Ring line	CRTLINTRN
Ethernet line	CRTLINETH
X.25 line	CRTLINX25
APPC controller	CRTCTLAPPC
Remote workstation controller	CRTCLRWS
Devices (displays)	CRTDEV DSP
Devices (printers)	CRTDEV PRT

9.2.3 Communication Information

Communication Line Type	AS/400 Parameter	Located in AS/400
SDLC	NRZI data encoding	Line description
	Duplex	Line description
	Station address	APPC description
X.25 For PVC For SVC	Station address	APPC description
	Default packet size	Line description
	Modulus	Line description
	Default window size	Line Description
	Logical channel ID	APPC/Line description
	Logical channel ID	Line description
Token-Ring/Ethernet Attachment	Line speed	Line description

9.2.4 Network Addresses

Communication Line Type	3494 Parameter	AS/400 Parameter	Location in AS/400
X.25 PVC	Host network address	Local network address	Line description
X.25 SVC	Host network address	Local network address	Line description
	Local network address	Connection number	APPC description
Token-Ring and Ethernet	Connection number	Local adapter address	Line description
	3494 Connection number	Remote adapter address	APPC description

9.2.5 APPN Information

3494 Parameter	AS/400 Parameter	Location in AS/400
Default network name	Local Network ID	Network Attributes
AS/400 LU name	Default local location	Network Attributes
Default mode name	Default mode	Network Attributes

The following two AS/400 parameters should be the same if the APPC controller and remote workstations (RWS) controller are on the same AS/400 System. Otherwise, a remote configuration list must be defined in the AS/400 System.

3494 Parameter	AS/400 Parameter	Location in AS/400
3494 logical unit name	Remote location name	RWS description
3494 control point name	Remote control point	APPC description

9.2.6 AS/400 Configuration for Support of Host-initiated PWS Sessions

To allow LU sessions initiated by the AS/400 with a PWS attached to a 3494 controller (the AS/400 sends the BIND request to the PWS), the LU and CP names for each PWS must be configured according to one of the following:

- a. The LU name of the PWS is equal to the CP name of the PWS
 - b. The LU name of the PWS is equal to the CP name of the PWS, plus one additional character.

For example, if the CP name of the PWS is PWSCPN, the LU name can also be PWSCPN, or PWSCPNx, where x is any valid LU name character.

NOTE: The PWS must initiate the twinaxial, token ring or Ethernet link to the controller before the latter can forward BIND request to the PWS.

In the AS/400 system that initiated the LU session with the PWS, create an entry in the remote configuration list to correlate the remote location name and remote control point.

To access the Remote Configuration List Entry screen on the AS/400 system, complete the following steps:

1. Type **WRKCFGL *APPNRMT** on the command line.
2. Press **Enter**. The screen appears.
3. Type **2** next to the list called QAPPNRMT.
4. Press **Enter**. The Change Configuration List screen appears.

Enter the values for the following configuration parameters:

Remote location	PWS LU name
Remote network ID	PWS network ID
Local location	AS/400 LU name
Remote control point	3494 control point name
Control point network ID	3494 network ID

NOTE: You must create an AS/400 remote configuration list entry for each PWS that runs applications that use host-initiate LU sessions.

9.3 Examples of AS/400 System Configurations

9.3.1 Example of SDLC AS/400 Configuration

a. Network Attributes

The AS/400 network attributes are created automatically by the AS/400 system. You may view them and with proper authorization, modify them.

Type the command: DSPNETA (to display Network attributes)

Type the command: CHGNETA (to modify Network attributes - authorized users only)

Parameter	Value
Current system name:	INT (can be anything)
Local network ID:	APPN
Local control point name (<i>see note</i>):	XXXXXXXXXX
Default local location (<i>see note</i>):	XXXXXXXXXX
Default mode:	QRMTWSC
APPN mode type:	*ENDNODE
Maximum number of intermediate sessions:	200
Route addition resistance:	128

It is recommended to define with the same string, both the Local Control Point Name and the Default Local Location Name.

b. SDLC Line Description

Type the command: CRTLINS DLC

Parameter	Value
LIND (Line Description)	SDLCLine
RSRCNAME (Resource name)	LIN011
ROLE (Data link role)	*PRI
NRZI (Data encoding)	*NO
MAXCTL (Maximum controllers)	254
LINESPEED	19200
MAXFRAME (Maximum frame size)	521
DUPLEX	*FULL

c. (APPC) Control Unit Description Example

Type the command: CRTCTLAPPC

Parameter	Value
CTLD (Controller Description)	SDLCAPPC
LINKTYPE (Link type)	*SDLC
APPN (APPN-capable)	YES
LINE (Attached nonswitched line)	SDLCLine
MAXFRAME (Maximum frame size)	521
RMTNETID (Remote network identifier)	*NETATR
RMTCPNAME (Remote Control Point)	SDLCCP
EXCHID (Exchange identifier)	07300002
STNADR (Station address)	02
EXCHID (Exhchange identification)	07300002
Node Type	*LENNODE

d. Remote Workstation (RWS) Controller Description

Remote workstations are workstations that are located more than 1525 meters from an AS/400 system. By making use of the Model 3494 Twinax Controller, workstations in different buildings, different cities or even different countries can access an AS/400 system.

Type the command: CRTCTLRWS

Parameter	Value
CTLD (Controller description)	SDLCRWS
TYPE (Controller type)	3494
MODEL (Controller model)	2
LINKTYPE (Link type)	*NONE
RMTLOCNAME (Remote location name)	SDLCCP
RMTNETID (Remote network identifier)	*NETATR

e. Mode Description

Type the command: CRTMODD

The mode name QRMTWSC is supplied by IBM Version 2 Release 2.

Parameter	Value
MODD (Mode description name)	NEWMODE
LCLCTLSSN The number of dependable workstations supported by the Controller.	
MAXSSNt	[LCLCTLSSN + 1]

f. Non-Programmable Workstations (NWS) device description.

Non-programmable workstation are devices such as printers or terminals, which are incapable of processing information on their own. The Controller manages the flow of information from the Non-programmable devices, over the communication network.

For NWS - Displays

Use the CRTDEV DSP command to create the displays' description.

Parameter	Value
DEV D (Device description name)	DSPOO
DEVCLS (Device class)	*RMT
TYPE (Device type)	3477
MODEL (Device model)	FG
LOCADR (Local location address)	00
CTL (Attached controller)	SDLCRWS
DROP (Drop line at signoff)	*NO

For NWS - Printers

Use the CRTDEV PRT command to create the printers' description.

Parameter	Value
DEV D (Device description name)	PRTO6
DEVCLS (Device class)	*RMT
TYPE (Device type)	5224
MODEL (Device model)	1
LOCADR (Local location address)	06
CTL (Attached controller)	SDLCRWS
FORMFEED	*CONT

9.3.2 Example of X.25 AS/400 Configuration

a. Network Attributes Example

The AS/400 network attributes are created automatically by the AS/400 system. You may view them and with proper authorization, you may also modify them.

Type the command: DSPNETA (to display Network attributes)

Type the command: CHGNETA (to modify Network attributes - authorized users only)

```

Current system name:          INT (can be anything)
Local network ID:            APPN
Local control point name (see note):  XXXXXXXXX
Default local location (see note):  XXXXXXXXX
Default mode:                QRMTWSC
APPN mode type:              *ENDNODE
Maximum number of intermediate sessions:  200
Route addition resistance:    128

```

It is recommended to define with the same string, both the Local Control Point Name and the Default Local Location Name.

b. X.25 Line Description

Type the command: CRTLINX25

Parameter	Value
LIND (Line Description)	X25LINE
RSRCNAME (Resource name)	LIN011
LGLCHLE	*PVC
NETADR	111111
LINESPEED	19200
Default packet size:	
Transmit value	128
Receive value	*transmit
Modulus	128

c. APPC Control Unit Description

Type the command: CRTCTLAPPC

Parameter	Value
CTLD (Controller Description)	X25APPC
LINKTYPE (Link type)	*X25
APPN (APPN-capable)	YES
LINE (Attached nonswitched line)	X25LINE
MAXFRAME (Maximum frame size)	521
RMTNETID (Remote network identifier)	*NETATR
RMTCPNAME (Remote Control Point)	X25CP
EXCHID (Exchange identifier)	07300022 (last 2 digits must match CU address)
NETLVL (X.25 network level)	1980
LGLCHLID (Logical channel ID)	001
STNADR (Station address)	22
NODE TYPE	*LENNODE

d. Remote Workstation (RWS) Controller Description

Type the command: CRTCTLRWS

Parameter	Value
CTLD (Controller description)	X25RWS
TYPE (Controller type)	3494
MODEL (Controller model)	2
LINKTYPE (Link type)	*NONE
RMTLOCNAME (Remote location name)	X25CP

f. Non-programmable Workstations (NWS) device description.

Non-programmable workstations are devices such as printers or terminals, which are incapable of processing information on their own. The controller manages the flow of information from the Non-programmable devices, over the communication network.

For NWS - Displays

Use the CRTDEV DSP command to create the displays' description.

Parameter	Value
DEV D (Device description name)	DSPOO
DEVCLS (Device class)	*RMT
TYPE (Device type)	3477
MODEL (Device model)	FG
LOCADR (Local location address)	00
CTL (Attached controller)	X25RWS
DROP (Drop line at signoff)	*NO

For NWS - Printers

Use the CRTDEV PRT command to create the printers' description.

Parameter	Value
DEV D (Device description name)	DSPO6
DEVCLS (Device class)	RMT
TYPE (Device type)	5224
MODEL (Device model)	1
LOCADR (Local location address)	06
CTL (Attached controller)	X25RWS
FORMFEED	*CONT

9.3.3 Example of Token-Ring AS/400 Configuration

a. Network Attributes Example

The AS/400 network attributes are created automatically by the AS/400 system. You may view them and with proper authorization, you may also modify them.

Type the command: DSPNETA (to display Network attributes)

Type the command: CHGNETA (to modify Network attributes - authorized users only)

Parameter	Value
Current system name:	INT (can be anything)
Local network ID:	APPN
Local control point name (<i>see note</i>):	XXXXXXXXX
Default local location (<i>see note</i>):	XXXXXXXXX
Default mode:	QRMTWSC
APPN node type:	*ENDNODE
Maximum number of intermediate sessions:	200
Route addition resistance:	128

It is recommended to define both the Local Control Point Name and the Default Local Location Name, with the same string.

b. Token-Ring Line Description

Type the command: CRTLINTRN

Parameter	Value
LIND (Line Description)	NLINE
RSRCNAME (Resource names)	LIN011
MAXCTL (Maximum controllers)	40
LINESPEED	4M
ADPTADR (Adapter address)	400000000000
MAXFRAME (Maximum frame size) 1994	
AUTO CRT CTL	*YES

Because AUTO CRT CTL is set to [YES], the APPC Controller will be created automatically by the system.

d. Remote Workstation (RWS) Controller Description

Type the command: CRTCTLRWS

Parameter	Value
CTLD (Controller description)	NRWS
TYPE (Controller type)	3494
MODEL (Controller model)	2
LINKTYPE (Line type)	*NONE
RMTLOCNAME (Remote location name)	TRNCP
RMTNETID (Remote network identifier)	APPN

f. Non-programmable Workstations (NWS) device description.

The NWS device descriptions consists of display and printer configuration.

For NWS - Display configuration

Use the CRTDEVDSP command to create the displays' description.

Parameter	Value
DEVD (Device description name)	DSPOO
DEVCLS (Device class)	*RMT
TYPE (Device type)	3477
MODEL (Device model)	FG
LOCADR (Local location address)	00
CTL (Attached controller)	TRNRWS
DROP (Drop line at signoff)	*NO

For NWS - Printers configuration

Use the CRTDEVPRT command to describe the printers.

Parameter	Value
DEVD (Device description name)	TRPRT06
DEVCLS (Device class)	*RMT
TYPE (Device type)	5224
MODEL (Device model)	1
LOCADR (Local location address)	06
CTL (Attached controller)	TRNRWS

FORMFEED

CONT

9.3.4 Example of Ethernet AS/400 Configuration

a. Network Attributes

The AS/400 network attributes are configured automatically by the AS/400 system. They may be viewed and modified (by an authorized user).

Type the command: DSPNETA (to display Network attributes)

Parameter	Value
Current system name:	SYSNAME
Local network ID:	NETID
Local control point name (<i>see note</i>):	XXXXXXXX
Default local location (<i>see note</i>):	XXXXXXXX

It is recommended to define both the Local Control Point Name and the Default Local Location Name with the same string.

b. Ethernet Line Description

Type the command: CRTLINETH

Parameter	Value
LIND (Line Description)	ENLIN03
RSRCNAME (Resource names)	LIN03
ADPTADR (Local Adapter address)	400000000000
ETHSTD (Ethernet standard)	*ALL
LINKSPEED (Link speed)	10M

Type CRTLINETH to create AS/400 system line description, WRKCFGSTS *LIN to display AS/400 system line description, WRKHDWPRD to determine location of AS/400 system line or hardware.

C. APPC Controller Description

Type the command: CRTCTLRWS

Parameter	Value
CTLD (Controller description)	EN3494
LINKTYPE (Link type)	*LAN
SWLINLST (Switched line list)	ENLIN03
RMTNETID (Remote network identifier)	*NETATR
RMTCPNAME (Remote control point)	EN3494CP
ADPTARD (LAN remote adapter address)	02003494E000
EXCHID (Exchange identifier)	07300000
APPN (APPN capable)	*YES
NODETYPE (APPN node type)	*LENNODE
DSAP (LAN DSAP)	04
SSAP (LAN SSAP)	04

The format for the EXCHID parameter is 0730000, where X'073' is the block number assigned to the 3494 and 00000 is used for Ethernet,

d. Remote Workstation Controller description.

Use the CRTCTLRWS command to create remote workstation controller description. WRKCFGSTS *CTL command to display remote workstation controller description.

Parameter	Value
CTLD (Controller description)	EN3494RWS
TYPE (Controller type)	3494
MODEL (Controller model)	*1
LINKTYPE (Link type)	*NONE
RMTLOCNAME (Remote location)	EN3494CP
LCLLOCNAME (Local location)	*NETATR
RMTNETID (Remote network identifier)	*NETATR

Select 2 if your 3494 contains a 3494 LAN adapter

e. Mode description

Use the DSPMODD command to displays the mode name description.

Parameter	Value
MODD (Mode description)	QRMTWSC

f. Attached Displays description.

Use the CRTDEV DSP command to create description of displays attached to the 3494. Use WRKCFGSTS *DEV to display description for displays.

Parameter	Value
DEVD (Device description)	DISP3196
DEVCLS (Device class)	*RMT
TYPE (Device type)	3196
LOCADR (Local location address)	0B
CTL (Attached controller)	EN5494RWS
LCLLOCNAME (Local location)	*NETATR
RMTNETID (Remote network identifier)	*NETATR

10SNMP Management

SNMP (Simple Network Management Protocol) agent functionality, allows SNMP management of the Model 3494 and its devices, in Token-Ring and Ethernet attachment. The SNMP manager can control and monitor statistics counters, node port status, status of the devices and communication lines. The Controller sends the manager alerts called TRAPs, if there are any unusual events it should be informed of such as downed or problematic lines.

The set of variables that controller supports is called MIBs (Management Information Base). The MIB consists of several parts including the Standard MIBII, specified as part of the SNMP, and the Private MIB that is specifically defined for particular applications.

Private MIBs enable the manager to recognize and graphically display the 3494 controller, and its device attachment. The display consists of graphical representation of each controller slot indicating its activity, and its port assignment.

When configuring for SNMP management, the IP address and Subnet address are essential parameters and must be defined; the rest of the parameters are optional.

10.1TCP/IP Network Description

Define each LAN according to its class and internet structure, taking into account its expected development. The network IP address consists of 32 binary bits divided into four groups of 8-bits each. The groups provide the following information: *Class type*, *Network* and *Host* address.

Class type

The first three address bits determine the *Class type*. The network is classified according to its size and expected growth structure into: Class A, Class B or Class C. The IP address allocates a number of bits for the local network address and a number of bits for the host address. The partition of the host and local network address bits depend on the class type.

Class A	0	netid	hostid		
Class B	1	0	netid	hostid	
Class C	1	1	0	netid	hostid

Class A internet consists of few networks with many hosts. Accordingly, its address consists of three network-bits and fifteen host-bits, allowing up to 8 networks with 8192 hosts per network.

Class B internet is an intermediate network and is assigned an equal number of bits for networks and hosts--8-bits each. This allows it develop up to 256 networks with 256 hosts per network.

Class C internet is expected to develop into many small networks with a few hosts on each. It is assigned 15 network-bits and 3 host-bits.

Netid

Let the *Netid* be represented by: $[a\ b\ c, d\ e\ f, g\ h\ i, j\ k\ l]$

For Class A: $a\ b\ c \neq 0$, unless the value of the *Slot IP Address* is $[0.0.0.0]$
 $0 < a\ b\ c < 127$

The following *Slot IP Addresses* are invalid: All $[abc.255.255.255]$,
all $[abc.0.0.0]$.

For Class B $128 \leq a\ b\ c \leq 191$

The following *Slot IP Addresses* are invalid: $[128.0.0.0]$, $[191.255.0.0]$,
 $[abc.def.255.255]$, $[abc.def.0.0.]$, $[128.0.ghi.jkl]$, $[191.255.ghi.jkl]$

For Class C: $192 \leq a\ b\ c \leq 223$

The following *Slot IP Addresses* are invalid: $[192.0.0.0]$, $[223.255.255.0]$,
all $[192.0.0.jkl]$, all $[223.255.255.jkl]$, $[abc.def.ghi.0]$

This screen includes several parameters that describe the TCP/IP Local Area Network. Be sure to define *Slot IP Address* and *Subnet Mask* since they do not have default values. As you define each parameter, its value will accumulate in the Controller's memory; the Controller will save the values only after you've defined all the parameters. Special messages will indicate the undefined fields.

Configuring for SNMP agent functionality

1. Access the SNMP Configuration menu by entering the SNMP Configuration option from the 3494 Setup menu.
2. Enable Controller SNMP agent monitoring, and define the essential parameters.
3. Define the number of IP gateways (only if the SNMP manager must be accessed via a router).
4. For each of the number of gateways assigned, define the essential parameters Gateways IP Address, and Gateways Net ID.
5. Define the relevant SNMP manager parameters (optional).
6. If you want TRAPs sent to the manager under specific conditions, enable either one or both groups of TRAPs.

10.1.1 Essential Parameters Configuration

SNMP	Configuration
Activate SNMP agent functionality (No 0 , Yes 1)	<u>1</u>
IP address	<u>192.9.201.7</u>
Subnet mask	<u>255.255.255.0</u>
Number of IP gateways (0 - 6)	<u>3</u>

SNMP Configuration

Activate SNMP Agent Functionality

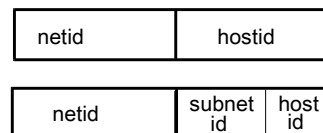
Allows full device control and monitoring.
 Y (1) = Activate to obtain full monitoring and control of device.
 N (0) = Don't activate. The device cannot be managed. The manager is aware of its existence but it cannot monitor or control it.

IP Address

A unique Internet Address (IP). The *IP Address* of this UDP/IP board, must be different from the IP address of any host that is connected to the TCP/IP network. The address consists of a 15 numeric character string divided into four groups of up to three characters each; the groups are separated from each other by a dot.
 The four groups represent the four octaves of binary numbers that make up the IP address--the binary form being translated to decimal form. Each group consists of a decimal number valued between [000] and [255] that complies with the *Class* restrictions.

Subnet Mask

Subnetting is an addressing system that further divides the *hostid* part of the IP address into a *physical subnet* part and a *host* address part. This is a hierarchical addressing method in which one network address is used for several physical network addresses.



Wherever *Subnetting* is used, *Subnet-masking* must also be used. Define the *net* and *subnet* IDs of the slot LAN, by setting bits in the *netid* and *subnet id* part as '1,' and those in the host address part as '0,' *subnet masking* can reveal whether two hosts actually belong to the same physical network.

Number of IP Gateways

This number is usually "0" unless the manager is in another LAN and must be accessed via a router.

Up to six IP-gateways (routers) can link the slot with other networks that have a different *netid* address part. This parameter defines the number of gateways, each of which is defined in the following screen. Value = [0 - 6]

10.1.2SNMP Gateway Definition Screen

This screen defines the parameters for each of the IP gateways (routers) that you assigned the network in the previous screen. If NO gateways were assigned, this screen will not be displayed.

There are two kinds of gateways: NET-Gateways and Smart Gateways.

1. NET-Gateways route datagrams to specific networks whose IDs (*netid*) are known. Each NET-Gateway definition in the local network must include the following:
 - a. IP-gateway name
 - b. IP-gateway address
 - c. The specific network ID to which this IP gateway can route datagrams.

Note 1: A NET-Gateway may route to several networks. Enter a different line for each network with the same name, the same IP address and the specific network ID.

Note 2: Two different NET-Gateways cannot be routing to the same network.

2. Smart-Gateways can route datagrams to any network. Thus, each smart-gateway definition in the local area network, must include the following:
 - a. IP-gateway name
 - b. IP-gateway address

Note: Each smart-gateway must have a distinct IP address.

SNMP Gateway Configuration		
Gateway name (0-9, a-z, A-Z)	Gateway IP address	Gateway Net ID
g1	192.9.201.1	191.9.200.0
g2	192.9.201.2	191.9.200.0
g3	192.9.201.3	191.9.200.0

Gateway definition screen

- Gateway Name** This is an optional parameter naming a Gateway (physically connected to the LAN of the Slot) whose IP address is known. Value = up to 16 alphanumeric case insensitive characters.
- Gateway IP address** The *netid* of the gateway-IP address and the *netid* of the slot IP address must be the same since the gateways listed here, and the TCP/IP cards are connected to the same local Network. If this local Network is a Subnet, then the *subnet ids* must also be the same.
Value = Four groups of three decimal numbers, the groups being separated by dots. Adhere to the class type and address restrictions.
- Gateway NET ID** The ID of the physically connected network to which this Gateway can route datagrams.
Note: If it is a *smart* gateway (one that knows to route to any remote network), enter [0.0.0.0]
If this gateway connects subnets, enter the *netid*, including the *subnet ID*.

10.1.3SNMP Manager Configuration

The SNMP Manager Configuration screen is used to define an SNMP community for controlling the access to the SNMP variables in the Management Information Base (MIB) of this SNMP agent. The MIB variables include the entire MIB2 variables along with the controllers private MIB variables. Each of the communities must be defined by a case sensitive name, that is compared to each manager's access requests.

Additional qualifications can optionally be imposed by the source IP address of an SNMP request message. Specifying a community must match one of the IP addresses of that community. If no IP address is defined for a community, access will be allowed from any source IP address. If the addresses are defined for a community, then only messages originating from one of those IP addresses will be accepted.

NOTE: This is an optional screen. Define this screen only if specific limitations are requested; for example, limited access of controlled data to specific communities. If fields are left blank, no limits for SNMP is requested.

10.1.4 Trap Destination Configuration

The TRAP Community name and TRAP IP Address, define the destination for receiving SNMP TRAP messages generated.

SNMP Manager Configuration

Community name (0-9, a-z, A-Z)	Read only 1 Read-write 2	Limited	IP address
1 _____	<u>1</u>	IP1 0.0.0.0 3 0.0.0.0	IP2 0.0.0.0 4 0.0.0.0
2 _____	<u>1</u>	IP1 0.0.0.0 3 0.0.0.0	IP2 0.0.0.0 4 0.0.0.0
3 _____	<u>1</u>	IP1 0.0.0.0 3 0.0.0.0	IP2 0.0.0.0 4 0.0.0.0
4 _____	<u>1</u>	IP1 0.0.0.0 3 0.0.0.0	IP2 0.0.0.0 4 0.0.0.0

TRAP DESTINATION CONFIGURATION

Trap community name (0-9, a-z, A-Z)	Trap IP address
1 public	192.9.201.161
2 public	192.9.201.100
3 _____	0.0.0.0
4 _____	0.0.0.0

SNMP Manager Configuration

Community Name This string defined in this field, is compared to each manager's access request.

**Read only/
Read-Write** Defines the type of access permitted; read or read-write.
1 = Access is limited to Read only requests.
2 = Access allowed to Read/Write.

Limited IP Address Defines the IP Address for the community. Only messages originating from those IP addresses will be accepted.
A unique Internet Address (IP). The *IP Address* of this TCP/IP board, must be different from the IP address of any host that is connected to the TCP/IP network. The address consists of a 15 numeric character string divided into four groups of up to three characters each; the groups are separated from each other by a dot.

The four groups represent the four octaves of binary numbers that make up the IP address--the binary form being translated to

decimal form. Each group consists of a decimal number valued between [000] and [255] that complies with the *Class* restrictions.

NOTE: Defining the IP address as "0.0.0.0." allows access from any source IP address of that community.

TRAP Community Name

The name used by the TRAP receiving station, to query the agent.

Value = Case sensitive, alphanumeric 17 character string.

TRAP IP Address

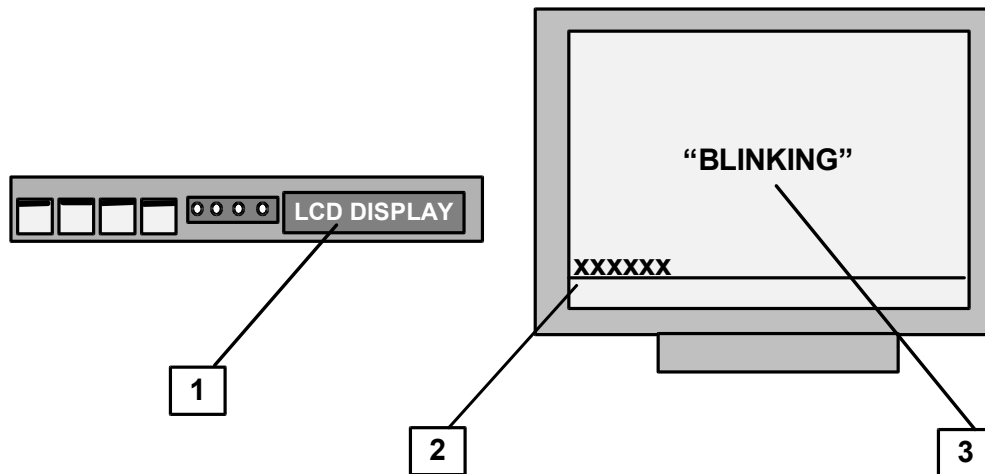
The address of the station receiving the TRAP messages. Four different types of names can be used.

Appendix A. Error Codes

Where and when are Error Codes Displayed ?

Error codes are displayed in the following locations:

1. On the LCD display, on bootup and during operation
2. On the NWS devices error lines
3. As blinking messages on the terminal screen, after the boot-up procedure is completed.



Error codes are displayed under the following circumstances:

- The 3494 runs power-on diagnostics when the it is switched ON, the **OS** key is pressed, and the **UTIL** key is pressed. During this time, status and error codes (if errors are detected) are displayed on the front-panel alphanumeric display.
- On successful completion of the diagnostics routine, the 3494 loads the operating system software from the system diskette.
- If the diagnostics routine ends routinely and the software is loaded successfully, the characters [*3494*] will appear on the alphanumeric display. However, if the process appears to end prematurely, and if a hexadecimal code is displayed (for more than 30 seconds), an error has occurred in the process, and the system stops.
- **ATTENTION!!!** The displayed error code identifies the type of error. Make note of the exact error code and consult the appropriate section for an explanation of the error and suggested actions

1. Messages Common to FIRMWARE, BOOTER, LOADER, SYSTEM

The following Error messages, have the same error ID that prevents saving the error message onto the disk. This ID is not displayed on the front panel; instead, a short message is displayed to identify the whole message.

In addition, these messages, can be displayed during one or more of the separate programs that run on the controller. In order to know which program displayed the error message, the program name is displayed right after the short message which identifies the whole message.

The programs names are:

"FW" - Identifies the firmware

"LOADER" - Identifies the system loader

"SYS" - Identifies the main system or the utilities

"BOOTER" - Identifies communication problems

DSK INIT : I/O error accrued while initiating system disk

Error message:"DSK INIT:X1.Error in init drive X2.Codes:X3,X4,X5,X6,X7."

Parameters : X1- Current program: "FW" or "LOADER" or "SYS".

X2 - Drive name of system disk: 'A' for diskette,
'C' for harddisk.

X3 -X7 - Codes: 5 internal disk error codes.

DRIVE : Error accrued while trying to work with drive.

Error message:"DRIVE :X1.Unable to select drive X2.Codes:X3,X4,X5,X6,X7."

Parameters : X1 - Current program: "FW" or "LOADER" or "SYS".

X2 - Drive name of system disk: 'A' for diskette,
'C' for harddisk.

X3 -X7 - Codes: 5 internal disk error codes.

FL OPEN : Error accrued while trying to open file or file was not found on disk.

Error message:"FL OPEN :X1.Error in opening file X2 or file not found in drive X3.Codes:X4,X5,X6,X7,X8."

Parameters : X1- Current program: "FW" or "LOADER" or "SYS".

X2 - File name: One of the system files.
X3 - Drive name of system disk: 'A' for diskette,
'C' for harddisk.

X4 - X8 - Codes: 5 internal disk error codes.

FL READ : Error accrued while trying to read file from disk.

Error message:"FL READ :X1.Error in reading file X2.Read X3 from X4 sectors

Parameters :

- n- Slot number (hexadecimal number).
- X1 - Current program: "FW" or "LOADER".
- X2 - The main command.
- X3 - The slot reply.

2. Loading Errors

These errors are displayed on the LCD display. Setup errors also appear on the terminal as "blinking" messages.

If the 3494 stops during a program power-on or the software loading phase, the most common problem is a loading error which is normally due to diskette problems such as:

- Diskette contains incompatible software
- Diskette is damaged or corrupted
- Diskette is write protected

In these situations try replacing the operating system diskette with either a new copy or your backup copy and reload the operating system.

2.1 Setup Errors

The message 'SETUP ERR' displayed on the front panel LCD display, can be caused by two types of problems: card setup error, or incompatible setup file:

In case of a card setup error, the following message is displayed on all terminals:

CARDS SETUP ERROR: USE CONFIGURATION UTILITY TO CORRECT THE HARDWARE SETUP

This type of error is a hardware mismatch which can be worked around; you can still configure the controller from the main menu by doing the following:

1. Be sure the controller is booted via the UTIL option and select the following menus:
Device configuration / Adapter configuration
2. Define the correct adapters installed in your controller; and reset the controller to enable the changes.

In case of an incompatible setup file, the following message is displayed on all terminals:

INCOMPATIBLE SETUP FILE: USE CONFIGURATION UTILITY TO LOAD DEFAULT PARAMETERS

To resolve this type of error:

1. Be sure the controller is booted via the UTIL option and select the following menus:
Device configuration / Adapter configuration

2. Enter the Setup/Utilities function and load the default configuration.

3. Abort and Slot XX Errors

These error types are displayed on the LCD display as ABTXXXX or SLOTXXX . Abort errors are critical software error. To solve the problem, perform memory dump according to the following procedure:

1. Press DIAG front panel key and record the scrolled message.
2. Insert an empty formatted diskette into the 1.44Mb disk drive.
3. Press the DIAG front panel key. The message 'S A V I N G' will be displayed on the front panel LCD display. Wait until this message disappears and the ABORT message reappears (this may take up to 15 minutes).
4. Remove the diagnostics diskette from the drive and replace it with the system diskette.
5. Reboot the controller.
6. Send the information recorded on the diagnostics diskette to your technical support.

4. Error Codes

Error Codes are four or six digit hexadecimal codes that may appear on the error line in your terminal workstation display during operation.

Error code ranges

Refer to the Error Code Range Chart below, and then go the appropriate chart.

Error Code Range	Description of Error Code and Suggested Response
0000 to 003F	An operator error occurred during an entry operation. Locate the exact code and follow the instructions. See Operator Entry Errors Codes
0040 to 005F	An error occurred on the communication network during controller/host communication. Check the modems, cables, line and connections to the host system.
0060 to 0069	An operation error occurred when trying Ideographic Support. See Ideographic Support Error Codes.
0070 to 007F	An operator error occurred. See Text Entry Assist Error Codes while using the text processing function.
0090 to 009F	A display station operator Error Codes. See Host Support System caused an error that involves the host system.
100000 to 10FFFF	A display station operator attempted to enter an incorrect or invalid, X.25 command or parameters from the keyboard. See X.25 Error Codes
110000 to 1FFFFF	An error was detected by the DTE or DCE X.25 Network. See sections Call Systems and try to re-establish the communications.
400000 to 400900	Linking errors.
400A00 to 411300	XID Errors
420000 to 441200	LU6.2 Errors
540404 to 540408	LAN AS/400 attachment errors

0000 to 0038, Operator Entry Error Codes

Refer to the following Operator Entry Error Code Chart if the code displayed is in the range from 0000 through 003F. Note the following:

1. If an operator entry error occurs, further input tasks are suspended until the problem is resolved. The error might be an invalid key, input or a entering data at too high a rate.
2. In some applications you can press the HELP key to get more information about the nature of the error.
3. To recover from the error, press the Error Reset key at the operator workstation involved. The **FIELD-**, **FIELD+**, or **FIELD EXIT** key to blank all of the field.

Operator Entry Error Code Chart

Error Code	Error Description and Suggested Recovery
0000	HELP Key Not Allowed.
0001	Keyboard Overrun. Entering information at too high a rate.
0002	Invalid Scan Code.
0003	Invalid Command/PF Key
0004	Data Not Allowed in This Field
0005	Cursor in Protected Area of Display.
0006	Key Following SYS REQ Key Not Valid.
0007	Mandatory Enter Field - Must Enter Data
0008	This Field Must Have Alphabetic Characters
0009	This Field Must Have Numeric Characters
0010	Only Characters 0 Through 9 Permitted.
0011	Key For Sign Position of Field Not Valid.
0012	Insert mode--no room to insert data.
0013	Insert Mode - Only Data Keys Permitted
0014	Mandatory Fill Field - Must Fill to Exit
0015	Modulo 10 or 11 Check Digit Error. You entered data into a self-check field.
0016	F - Key Not Valid in this field

Error Identification

0017	To recover - press the ERROR RESET key. Enter data to the end of the field or move the cursor to the start of the field and use
0018	Key Used to exit this field not valid
0019	DUP or FIELD-MARK keys not permitted in this field
0020	Function key not valid for right adjust field
0021	Data must be entered in this field.
0022	Status of field not known
0023	Hex Mode - Entry not valid
0024	Decimal Field - Entry Not Valid
0026	F-Key Entry Not Valid
0027	The key pressed is undefined and therefore cannot be used.
0029	Diacritic Character not valid.
0031	Data Buffer overflow
0032	MSR data error
0033	MSR data received was secured and this field was not specified for secured data.
0034	MSR data exceeds length of field. Data received from card exceeds length of field.
0035	MSR Error. Card incorrectly inserted or damaged.
0036	Cursor Select not allowed in field-exit required state.
0037	This is a non-selectable field - you've pressed cursor select.
0038	Light Pen and MSR Use Not Allowed.

0040 to 005F Communication Network Errors

0042R eceive Clock Failure This error indicat es that the receiv e clock signal becam e inactiv e during	Modem or DCE is not ready or not functioning properly. Data Set Ready (DSR) Line Inactive (Model 01); DCE Not Ready (Model 02) This error indicates that the modem or DCE was not ready during required intervals of normal operation. The operating state of the modem or DCE is checked at different times, depending on the specific link-level protocol in use.
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<p>data transf er. 00443 0- Secon d Timeo ut (switc hed line only). Indicat es that no valid data has been receiv ed for 30 secon ds. The DTR signal goes inactiv e to discon nect the line 0045D CE Will Not Activa te (X.25 only) Indicat es that either a Disco nnect mode (DM) or a DISCO NNEC T</p>	
--	--

Error Identification

<p>(DISC) comm and was receiv ed during the link setup seque nce.Ca use Code Descri ption and Sugge sted Recov ery 0040</p>	
<p>00460 041Idle conditi on detecte d (X.25 only). This error indicat es that the receive line was idle for 15 or more contigu ous bit- times.</p>	<p>Frame Reject Received. The control unit received an FRMR from the network, indicating that an error was detected in the last frame transmitted. The error log entry of this code includes three sense bytes, which preserve the contents of the FRMR I-field.</p>
<p>0047</p>	<p>Unexpected Disconnect Mode (DM) or DISCONNECT (DISC) Command Received. Indicates that either a Disconnect mode (DM) or a DISCONNECT (DISC) command was received while in information transfer state.</p>
<p>0048</p>	<p>Unexpected Unnumbered Acknowledgment (UA) Frame Received. The control unit received a UA frame while in information transfer state.</p>
<p>0049</p>	<p>An SABME was received while the controller was in information transfer state.</p>
<p>0050</p>	<p>Ready For Sending (RFS) Error. This error occurs when either the RFS line is inactive for up to 30 seconds while the RTS line is active or the RFS line is active when the RTS line</p>

	is inactive. (except during V.25 bis call establishment).
0051	Transmit Clock Failure. The transmit clock failed during a transmit operation.
0052	Transmit Hardware Error. The link adapter hardware failed to complete a transmit operation within 30 seconds, but no transmit clock or other DCE signal failure was detected.
0053	Expiration of Retry Count (X.25 only). No acknowledgment of a transmission was received within allowed timeout. (Timeout retry count (N2) and retry interval (T1) are specified in CSU Field 7)
0054	Frame Reject Sent. The control unit has sent a link-level FRMR response to the host system after receiving an invalid SDLC or LAPB command. Sense bytes S1, S2 and S3 preserve the contents of the FRMR I-field.

0060 to 0069 Ideographic Errors

0060	Ideographic or Bidirectional support error. Invalid data or key pressed. To correct error, press Error-Reset at the work station and if it is an Ideographic error, this field only accepts double-data characters--enter the correct data.
0061	Ideographic or Bidirectional support error. Invalid data or key pressed. To correct error, press Error-Reset at the work station and if it is an Ideographic error, this field only accepts alphanumeric data--enter the correct data.
0062	The cursor is not in position to change the data type. Press Error-Reset and re-attempt.
0063	Invalid Ideographic character entered in Alternate Entry mode. Press Error-Reset.
0064	The keyboard mode does not support the key pressed. Press Error-Reset.
0065	The cursor is in a column reserved for shift-out or shift-in characters. Press Error-Reset.
0066	This is not a data character and therefore, cannot be repeated. Press Error-reset.
0067	The workstation extension character RAM is full. Press Error-Reset.
0068	The output data stream to the 3030 is not valid for extension characters. Press Error-Reset.
0069	Ideographic or Bidirectional support error. Ideographic error--The extension characters to the 3030 are undefined; Bi-directional error--a terminating character cannot be inserted. Press Error-Reset.

0070 to 0078, Text Entry Assist Error Codes

If you are using the Display Write program and an error code in the range 0070 through 007F is displayed, refer to the following Text Entry Assist Error Code Chart for a detailed description of the problem and a suggested recovery action.

Text Entry Assist Error Code Chart

Error Code	Description and Suggested Recovery
0070	Word Wrap/Carrier Return Error. To recover - press the Error Reset key. For more information, press the Help key.
0071	Command Conflict. To recover - press the Error Reset key. Try the operation again when the operation in progress is complete.
0072	Key Not Valid For Cursor Position. To recover - press the Error Reset key. Move the cursor to the correct position and try again.
0073	Invalid Attempt To Delete. To recover - press the Error Reset key. Press the general prompt command key to delete or replace instruction and format change characters. For more information, press the Help key.
0074	Invalid Entry During General Prompt. To recover - press the Error Reset key
0075	Character Not Found. To recover - press the Error Reset key. Try the operation again when the operation in progress is complete.
0076	Continuous Insert Mode Failed To recover - press the Error Reset key. Wait until the host system processes the text on the screen and try again.
0077	Function Key Selection Not Valid. To recover - press the Error Reset key.
0078	Required Scale Line Not Defined to Control Unit There is an error in the application program. No scale line is defined for this line.

0097 to 0099 Host Support Error Codes

Refer to the following chart if the error code displayed is in the range from 0097 through 0099.

Note: When one of these codes is displayed, the required host support will not be available.

Host Support Error Code Chart

Error Code	Description and Suggested Recovery
0097	Test Request Function Not Supported. Contact host system operator and determine why the function is not supported.
0098	Undefined Hardware Error To recover - press the Error Reset key.
0099	Host Support Not Currently Available To recover - press the Error Reset key.

100000 to 101D00 X.25 Error Codes

When a keyboard entry error occurs while in X.25 Communication mode, a six-digit error code between 100000 and 10FFFF is displayed. Error codes along with a short description and suggested recovery action(s) are listed below:

For errors 100200 - check the system configuration. If the settings match, press the **ERROR RESET** key, check options and repeat the operation. Refer to Host Access Section for procedure on restarting communications. If this too fails, call your System Operator.

Error Code	Description and Suggested Recovery
100000	Previous CALL command in progress. Wait until the previous call is complete, or an error code other than 100000 is displayed.
100100	Virtual circuit already established. Wait for the virtual circuit to be detached before trying CALL/OPEN commands. It is possible to communicate over one virtual circuit at a time.
100200	ANSWER command entered for a PVC - Permanent Virtual Circuit`.
100300	CALL command entered for a PVC - Permanent Virtual Circuit
100400	Invalid logical channel ID. (Less than 3 characters long)
100500	Invalid logical channel ID. (Not a hexadecimal value between 001 and FFF).
100600	Invalid password. (More than 8 characters)

Error Identification

100700	Invalid Host Network Address. (TO network address exceeds 15 digits)
100800	Invalid Host Address. (FROM network address exceeds 15 digits)
100900	Invalid Host Network Address
100A00	Attempt to enter manual options or flow control negotiation from the keyboard with these parameters disabled.
100B00	Facility option entered incorrectly. (Characters entered are not hexadecimal - 0 through 9 or A through F)
100C00	Invalid packet window size option. (Less than 02)
100D00	Invalid packet window size option. (Greater than 07 with Modulo 8 specified)
100E00	Invalid packet window size option. (Greater than 15 with Modulo 128 specified)
100F00	Packet size not equal to 064, 128, 256 or 512.
101000	Invalid closed user group option. (Does not contain two decimal digits)
101100	Invalid control character entered.
101200	Host network address missing a CALL command.
101300	First control character (A, O, C or D) has already been entered.
101400	Network address was entered for a permanent virtual circuit (PVC).
101500	Password option was entered for a permanent virtual circuit (PVC)
101600	Invalid password option. (All not alphanumeric characters)
101800	Invalid password option. (All not alphanumeric characters)
101900	The Q or the E option was selected with the ANSWER command.
101A00	F or R control character entered for an ANSWER command or a PVC. [F=Facility; R=Reversed charging].
101B00	The Q or the E option was selected with the ANSWER command.
101C00	CALL entered for an answer-only SVC.
101D00	OPEN entered for an answer-only SVC

DTE Diagnostic Codes

SNA Code	ISO Code	Description and Suggested Recovery
00		Normal Initialization or Termination
01		Invalid LLC Type
10		Packet type invalid
11		Packet type invalid for state r1
12		Packet type invalid for state r2
13		Packet type invalid for state r3
14		Packet type invalid for state p1
15		Packet type invalid for state p2
16		Packet type invalid for state p3
17		Packet type invalid for state p4
18		Packet type invalid for state p5
19		Packet type invalid for state p6
1A		Packet type invalid for state p7
1B		Packet type invalid for state d1
1C		Packet type invalid for state d2
1D		Packet type invalid for state d3
20		DCE Timer Expired
21		DCE Incoming call timer expired
22		DCE Clear Indication timer expired
23		DCE Reset indication timer expired
24		DCE Restart indication timer expired
30		DTE Timer Expired
31	31	DTE Call request Timer expired. Report problem to host system operator.
32	32	DTE Clear request timer expired Report problem to host system operator.
33		DTE Reset request timer expired
34		DTE Restart request timer expired
40		Unassigned
50		QLLC General error
51		Undefined C-field Code.
52		Unexpected C-field
53		Missing I-field
54		Undefined I-field
56		Frame Reject Received
57		Header Invalid
58		Data Received in wrong state

Error Identification

59		Time-out condition
60		PSH General error
61		Sequence error
62		Header too short
63		PSH format invalid
64		Command undefined
65		Protocol invalid
66		Data received in wrong
69		Time-out condition
70		General PAD error
71		PAD Access facility failure
72		SDLC FCS Error
73		SDLC Time-out.
74		SDLC Frame Invalid.
75		I-field too long.
76		SDLC Sequence error.
77		SDLC Frame aborted..
78		SDLC FRMR Received
79		SDLC Response invalid.
7B		Invalid Packet type.
7F		PAD Inoperable
80		Product specific
90		Network specific.
91		DDX-P RNR Packet Received
A0		Packet not allowed.
A1		Invalid "M" bit Packet sequence
A2		Invalid Packet type received
A3		Invalid Packet on PVC
A4		Unassigned LC
A5		Diagnostic Packet Received
A6	26	Packet too short. Ensure that the packet size entered in the configuration or entered manually, matches the network subscription.
A7	27	Packet too long. Ensure that the packet size entered in the configuration or entered manually, matches the network subscription.
A8		Invalid GFI
A9		Not identifiable
AA		Not supported
AB	01	Invalid Ps. Report the error to the network service representative.
AC	02	Invalid Pr Report the error to the network service representative.
AD		Invalid `D' bit Received
AE		Invalid `Q' bit Received
B0		DTE specific NPSI Gate/Date

B1		No LU-to-LU session
C0		DTE specific general
C1		Termination pending
C2		Channel Inoperative
C3		Unauthorized interrupt confirmation
C4		Unauthorized interrupt request
C5		PU (PVC) Not available
C6		Inactivity time-out
D0	F4	General Resources. Retry the operation. Other applications may operate
D1		Buffers depleted
D2	F5	PIU too long Retry the operation. Other applications may operate
E0	69	Local Procedure General error Report the error to the host system
E1		Packet with LC=0 not received
E2		Restart or Diagnostic Packet on LCI ±'0'
E3		Incoming call received on wrong LC
E4		Facility not subscribed
E5		Packet does not Restart, or Diag on LCI='0'
E6	42	Facility parameters not supported. Report the error to the host system operator.
E7	41	Facility not supported. Report the problem to the host system operator.
E8	46	Unexpected calling DTE. Ensure that the network address is correct. Retry the operation. Report the problem to the host system operator if
E9		Invalid 'D' bit request
EA		Reset indication on virtual call
EB		Invalid protocol identifier
EC		Connection identifier mismatch
ED		Missing Cause/Diagnostic code
F0-FF		Remote procedure general error
00		No additional information
20		Packet not allowed

1100ff or 1180ff System Reference Codes

The 3494 issued a Clear Request packet after detecting an error; [ff] is the DTE Diagnostic Code for the previous list of codes.

1200ff or 1280ff System Reference Codes

The 3494 issued a Reset Request packet after detecting an error; [ff] is the DTE Diagnostic Code for the previous list of codes.

DCE Diagnostic Codes

Error Code	Description and Suggested Recovery
00	No additional information
01	Invalid packet send sequence number (PS)
02	Invalid packet receive sequence number (PR)
10	Packet type invalid
11	Packet type invalid for state r1
12	Packet type invalid for state r2
13	Packet type invalid for state r3
14	Packet type invalid for state p1
15	Packet type invalid for state p2
16	Packet type invalid for state p3
17	Packet type invalid for state p4
18	Packet type invalid for state p5
19	Packet type invalid for state p6
1A	Packet type invalid for state p7
1B	Packet type invalid for state d1
1C	Packet type invalid for state d2
1D	Packet type invalid for state d3
20	Packet Not Allowed
21	Unidentifiable packet
22	Call on one way logical channel
23	Invalid packet type on a PVC
24	Packet on unassigned logical channel
25	REJECT not subscribed to
26	Packet too short
27	Packet too long

28	Invalid general format identifier
29	Restart with non-zero in bits 1-4, 9-16 0
2A	Packet type not compatible with facility
2B	Unauthorized interrupt confirmation
2C	Unauthorized interrupt
30	Timer Expired
31	Timer expired for incoming call
32	Timer expired for clear indication
33	Timer expired for reset indication
34	Timer expired for restart indication
40	Call setup Problem
41	Facility code not allowed
42	Facility parameter not allowed
43	Invalid called address
44	Invalid calling address
50	Call clearing problem
51	Non-zero address length field
52	Non-zero facility length field
60	Not Assigned
70	Not Assigned
80-FF	Reserved for Network Specific Diagnostics

DCE 18ccdd Cause Codes

An 18ccdd Cause code is issued when the data circuit-terminating equipment issues a Clear indication packet after detecting an error.

[18] General error category.

[cc] Cause code.

[dd] Diagnostic code.

The cause codes listed are defined by CCITT Recommendation X.25.

Cause	Description and Suggested Recovery
00	Call clearing originated at host system. Report the error to the host system operator.
01	Host busy. Wait. Then retry the operation.
03	Invalid facility request. Ensure that the facility request was entered correctly and retry the operation. If the error recurs, report the problem to the network service representative.
05	Network congestion. Wait. Then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.

Error Identification

09	Out of order - host not ready.
	Wait. Then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator
0B	Access to the host not allowed. Ensure that the correct network address for the host system has been entered. Then retry the operation. If the problem persists, report the error to the host system operator
0D	Unrecognized host network address. Make sure that you entered the correct network address for the host system. Then retry the operation. If the problem continues, report the error to the host system operator
11	Error at the host system. Report the error to the host system operator. Include the diagnostic code (dd).
13	Controller error. Look at the diagnostic code (dd). Retry the operation. If the error recurs, report it to the person who planned the procedures.
15	Recognized Private Operating Agency (RPOA) out of order. Make sure that the correct RPOA facility is selected or select a different RPOA. If the error recurs, report the problem to the host system operator.
19	Reverse charging not subscribed. Ensure that the correct host system address and the correct number for the reverse charge has been entered. Retry the operation. If the error recurs, report the problem to the host system operator
21	Incompatible destination. Ensure that the correct address has been entered. If the address is correct, report the problem to the host system operator.
29	Fast select not subscribed. Ensure that call establishment is correct. This facility should not be selected.
80-FF	Call clearing originated at host system. Report the error to the host system operator.

DCE 19ccdd Cause Codes

An [19ccdd] Cause code is issued, when the data circuit-terminating equipment issues a Reset indication packet after detecting an error.

[19] General error category.

[cc] Cause code.

[dd] Diagnostic code.

The cause codes listed are defined by CCITT Recommendation X.25. When any of these codes are displayed, contact your supervisor. The job will have to be restarted. To restart communications.

Cause Code	Description and Suggested Recovery
00	Reset originated at host system. Report the error to the host system operator.
01	Out of order. Disconnected host system. Wait. Then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.
03	Error at the host system. Report the error to the host system operator. Include the diagnostic code (dd).

05	Controller error. Check the diagnostic code. (dd). Retry the operation. If the error recurs, report it to the person who planned the procedures.
07	Network congestion. Wait. Then retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.
09	Remote DTE operational. Normal condition at startup. Not an error.
0F	Network operational. Normal condition at startup. Not an error.
11	Incompatible destination. Ensure that the correct address has been entered. If the address is correct, report the problem to the host system operator.
1D	Network out of order. Retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.
80-FF	Reset originated at host system.

DCE 1Accdd Cause Codes

An **[1Accdd]** Cause code is issued when the data circuit-terminating equipment issues a Restart after detecting an error.

[1A] General error category.

[cc] Cause code.

[dd] Diagnostic code.

The cause codes listed are defined by CCITT Recommendation X.25. When any of these codes are displayed, contact your supervisor. The job will have to be restarted.

Cause Code	Description and Suggested Recovery
00	DTE (host) originated. Not an error.
01	Local procedure error. Check the diagnostic code (dd). Then retry the operation. If the error recurs, report the problem to the network planner.
03	Network congestion. Retry the operation. If the error recurs, report the problem to the network service representative and the host system operator.
07	Network is operational. Normal startup condition. Not an error.
7F	Registration/Cancellation confirmed. Not an error.

1BCC00, System Reference Codes

A restart request packet was issued by the 3494 after detecting an error.

[CC] is the cause code. A description of each code follows:

SNA Cause Code	ISO Cause Code	Description
11	11	Unsolicited Restart Confirmation received.
	3434	Restart Confirmation packet not received within 200 seconds.
A5	A5	Diagnostic packet received.
A6	A6	Packet too short
A7	A7	Packet too long
A8	28	Invalid GFI (Restart Indication/Confirmation only)
E2	29	LCID is not equal to 0 on Restart Indication/Confirmation
E5	24	LCID=0 on non-Restart/Diagnostic packet

400000 - 400900, Linking Errors

Error Code	Description and Suggested Recovery
400000	A connection attempt is in progress - wait for logon screen
400100	Failed connection - Retry.
400200	Data entered in wrong format. [H] must be first.
400300	You have selected the wrong AS/400 System to disconnect from - correct
400400	The Controller is not configured for the selected AS/400 System.
400500	Incorrect command for the first configuration.
400600	Invalid request format.
400700	Connection number is not configured for the selected AS/400 System.
400800	Link already exists.
400900	Controller is already establishing link.

410000 - 411300 XID Errors

The following errors are due to mismatching in the AS/400 programming or 3494 configuration

410000	A XID exchange protocol error occurred. If it does not correct itself in 1 minute then there may be a configuration problem.
410100	XID command length error: 29 bytes > I-field > 255 bytes. The XID-field and I-field lengths do not match.
410200	XID command contained an unsupported I-field format.
410300	The XID command exchange state indicators are set to "not supported".
410400	SDLC link protocol was not specified.
410500	Asynchronous balanced mode support.
410600	An ALS is secondary.
410700	Maximum BTU length less than 265 bytes.
410800	An SDLC profile that is either invalid or not supported.
410900	A maximum I-frame's outstanding value that is invalid or not supported.
411200	Error received by the AS/400 System from the Controller.
411300	An XID command that did not originate from an AS/400 System is received by the Controller.

420000 - 470200, LU6.2 Errors

420000	Timeout occurred during CNOS exchange. Restart communications
420100	Unacceptable values contained in the CNOS reply. Check AS/400 System configuration - verify mode configuration
4203xx	An abnormal CNOS GDS reply was returned by the AS/400 System. System configuration problem.
421000	Controller received a negative response to a CNOS BIND. Check System configuration.
4211xx	Controller received an UNBIND of type XX. Check configuration.
421200	Error in establishing a LU6.2 CNOS session between the Controller and the System. This can be a normal termination, or a configuration problem.
4311xx	Error in the Controller session establishment or progress. Verify System or Controller configuration. The 3494 received UNBIND of type XX.
431200	Error in the Controller session establishment or progress. The 3494 received FMH7 for termination. This could be a normal termination, or a configuration problem
4321xx	Error during LU6.2 Controller session establishment or progress. UNBIND of type xx was sent by the Controller, indicating a system problem.
438900	The System did not accept the 3494 request to connect
438904	Controller description was not defined in the AS/400 System.
438905	Connection request rejected because the Controller description was already active.
438908	Controller description was varied offline.
438909	Controller recovery is pending.
438910	Controller recovery is canceled.
438911	Controller description is in a fail state.
438912	AS/400 System has an internal error.
439900	Invalid data received from AS/400 System.
4411xx	AS/400 problem caused the Controller to receive an xx type UNBIND on a DWS session.
441200	The Controller received an FMH7 indicating abnormal session termination of a DWS session.
4421xx	UNBIND type xx sent by Controller or DWS session indicates a network or System AS/400 problems.
470100	A BIND request with an incorrect ODAI value was received. The communication link to the AS/400 System was deactivated.
470200	A BIND request with an incorrect SIDH/SIDL value was received. The communication link to the AS/400 was deactivated.

520000 to 520003, Copy-To-Printer Codes

Refer to the following Copy-to-Printer Error Code Chart if the error code displayed is from the series 52000x.

Copy-to-Printer Error Code Chart

Error	Description and Suggested Recovery
520000	The 3494 did not find a printer available for local copy-to-printer operation. To recover, Make sure your printer is powered on, is on-line, and has been configured in the 3494 setup menu. Retry the operation.
520001	The device at the address selected for the copy-to-printer operation is not a printer. Your configuration information may be incorrect. Return to the 3494 physical configuration menus and verify port and address information. Retry the operation.
520002	The designated printer is busy, powered off, or in an error condition, or no device is powered at this site. To recover, If the designated printer is busy, wait for it to complete the current task and try again. Otherwise correct the error condition and try again.
520003	The 3494 unit lost communication with the local printer during the print operation. To recover, CReset originated at host system.heck cables, connections and retry the operation.80-FF.

LAN AS/400 Attachment Errors

540404	No AS/400 response to the 3494 TEST command. Communication problems. Controller will continue sending the TEST commands until the AS/400 responds or the operator initiates a disconnect.
540405	No AS/400 response to the 3494 XID3 command. Communication problems. Controller will continue sending the XID3 commands until the AS/400 responds or the operator initiates a disconnect.
540407	LAN frames transmission error. LAN data link is disconnected. The controller continues to send the TEST commands to the LAN to reestablish communications.
540408	Failed command to Ethernet adapter.

Appendix B. Specifications

Physical and Environmental Characteristics for 3494 (non-stackable)

Dimensions (H x W x D)	2.75" x 11.75" x 3.25" (7 cm x 30 cm x 35 cm)
Weight	9 lbs (4.1 Kg)
Power	40 Watts
Voltage	115/220V - $\pm 10\%$ @ 50-60 Hz
Current	0.6 A
Operating Temperature	50°F to 104°F (10°C to 40°C)
Non-operating Temperature	32°F to 144°F (0°C to 50°C)
Relative Humidity	20% to 80% (non-condensing)

Physical and Environmental Characteristics for STK3494 (stackable)

Rack Mount	1EIA in a standard 19" rack
Dimensions (H x W x D)	1.713" x 19" x 12.8" (4.35 cm x 48.26 cm x 32.51 cm)
Weight	35 lbs (15.9 Kg)
Power	40 Watts
Voltage	115/220V - $\pm 10\%$ @ 50-60 Hz
Current	0.6 - 0.3 A
Operating Temperature	50°F to 104°F (10°C to 40°C)
Non-operating Temperature	32°F to 144°F (0°C to 50°C)
Relative Humidity	20% to 80% (non-condensing)

Regulatory Agencies

Product Safety

- Underwriter Laboratories (UL) for United States Safety. UL 478 5th Edition
- Canadian Standards Association (CSA) for Canadian Safety. CSA C22.2 220
- IEC Certification through TUV Rhineland for European Safety. IEC 950/EN 60 950

Specifications

Emissions

- Federal Communications Commission (FCC) for United States Emissions Part 15, Subpart J, Class A. EN 55022-Class A

European

- CE Mark

Appendix C. Reader Remarks

Model 3494/3494-STK Twinax Controller, User's Manual
Publication No. B000408970-03

Overall, how would you rate this manual?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied
Overall satisfaction				

How satisfied are you with the information in this manual?

Accurate				
Complete				
Easy to find				
Easy to understand				
Well organized				
Applicable to your tasks				

Thank You!

Features

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