

1174-XR

Network Controller

Standard Features Manual

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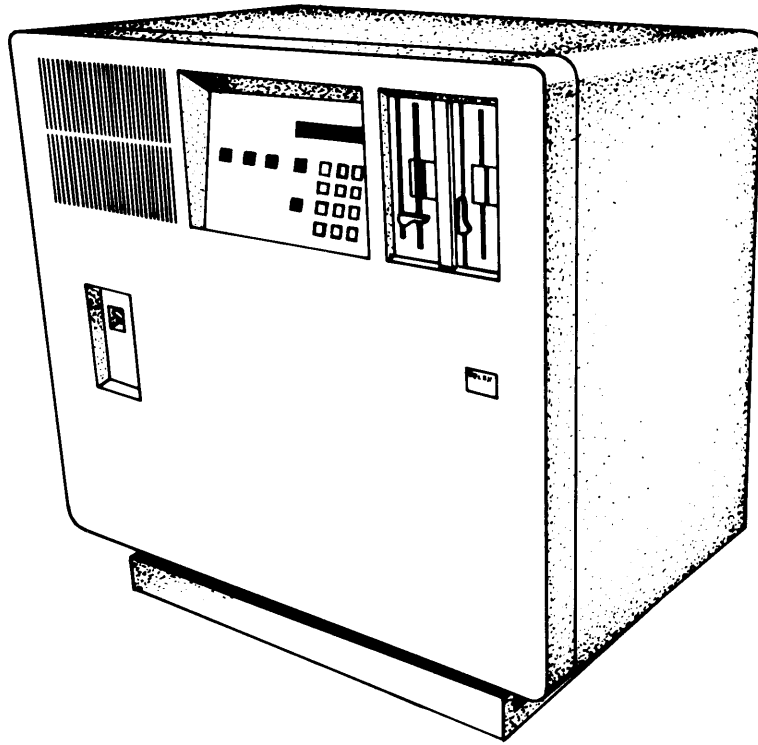
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This equipment complies with FCC regulations for EMI.

WARNING

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.



1174-XR Network Controller



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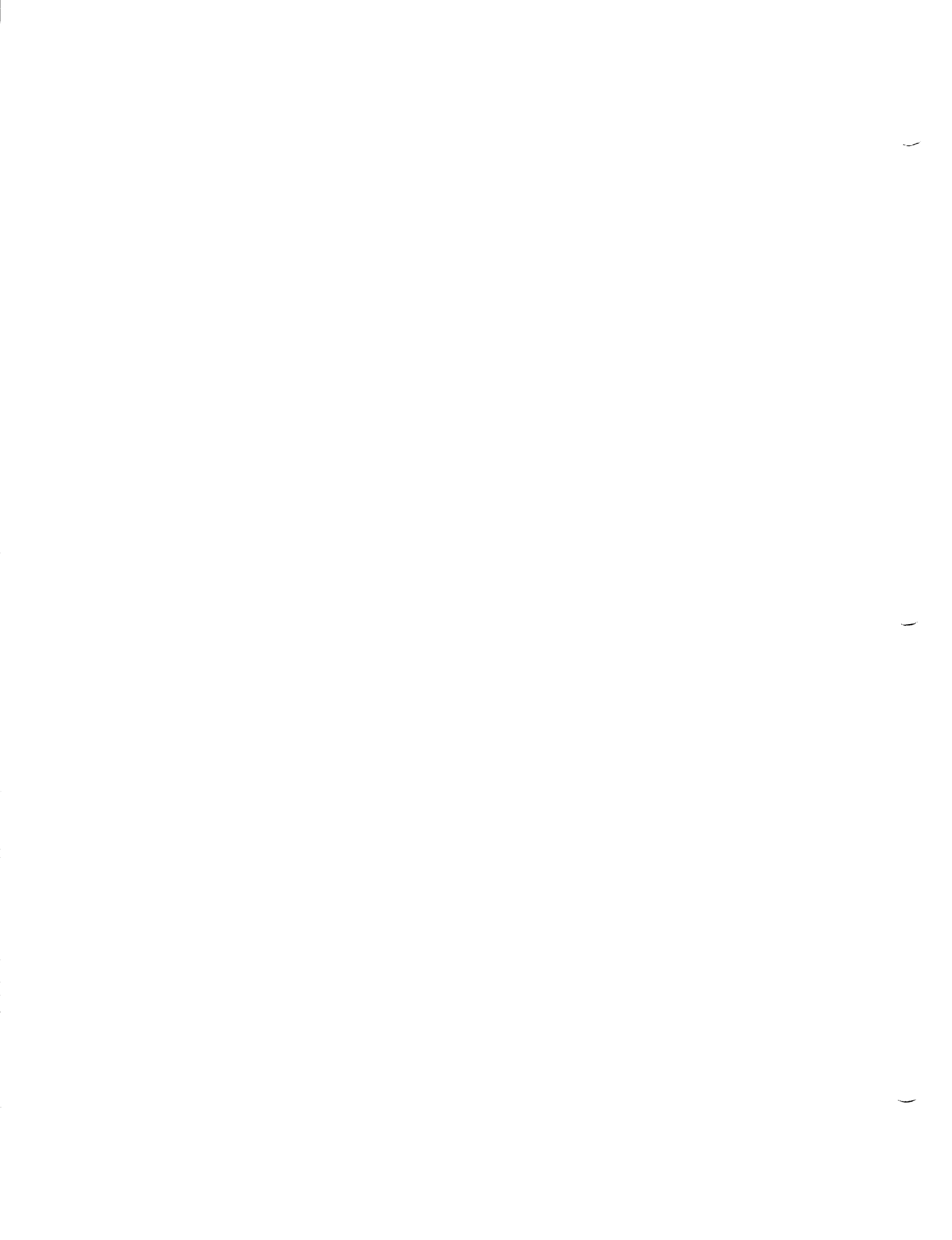
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Chapter 1

Introduction

INTRODUCTION

OVERVIEW OF THE 1174-XR NETWORK CONTROLLER

The Memorex Telex 1174-XR Remote Network Controller series allows you to connect a host CPU to printers and display terminals.

The 1174-01R permits multiple host connections with BSC and SDLC protocols. The 1174-01R supports functions compatible with the IBM 3174 Control Unit Model 1R.

The 1174-03R LAN Network Controller, currently under development, will enable Token Ring connection via a Token Ring interface. It will support functions compatible with the IBM 3174 Control Unit Model 3R.

The basic 1174-XR (hereafter referred to as 1174) allows the attachment of up to 32 coax devices. The enhanced function 1174 allows the attachment of up to 64 coax devices and 32 ASCII devices.

The basic 1174 has these functions and features:

- BSC and SDLC support
- Host loadable printer authorization matrix (PAM)
- Configurable primary language support
- Keyboard definition utility
- Entry assist
- Extended color/highlighting support
- 3180 partitioning
- Down stream loadable (DSL) support
- Distributed function terminal (DFT) support
- Local print buffering
- Response time monitor
- NetView support
 - SNA alert
 - RTM host support
 - Maintenance statistics

INTRODUCTION

- Problem determination and isolation software support
- Multiple logical sessions
- Magnetic card reader support
- 32 device support

You can order your 1174 with these optional features:

- Windowing
- ASCII host/device support
- Full MLS support
- 64 device support
- Multiple host support (up to 2)
- Memory upgrade (2 megabyte maximum) to support optional features

OVERVIEW OF THIS MANUAL

This manual contains descriptions and operating procedures for these standard features:

Multiple Logical Sessions – This feature lets you access concurrent host sessions from devices attached to the 1174.

Entry Assist - This feature provides you with a data entry, formatting and editing facility.

Response Time Monitor support – This feature allows you to record and display response time data. In an SNA environment, the 1174 can transmit response time data to the host.

SNA Alert – This feature allows the 1174 to transmit error and event information to the NetView operator. In addition, operators can send Alert information to call attention to unusual events.

Request Maintenance Statistics support – This feature enables the 1174 to transmit SNA summary error counts and configuration information to the NetView operator.

The manual also contains information about the controller's Bisynchronous Communication (BSC) and Systems Network Architecture (SNA) support features.

OTHER MANUALS

Additional manuals for the 1174 Network Controller are

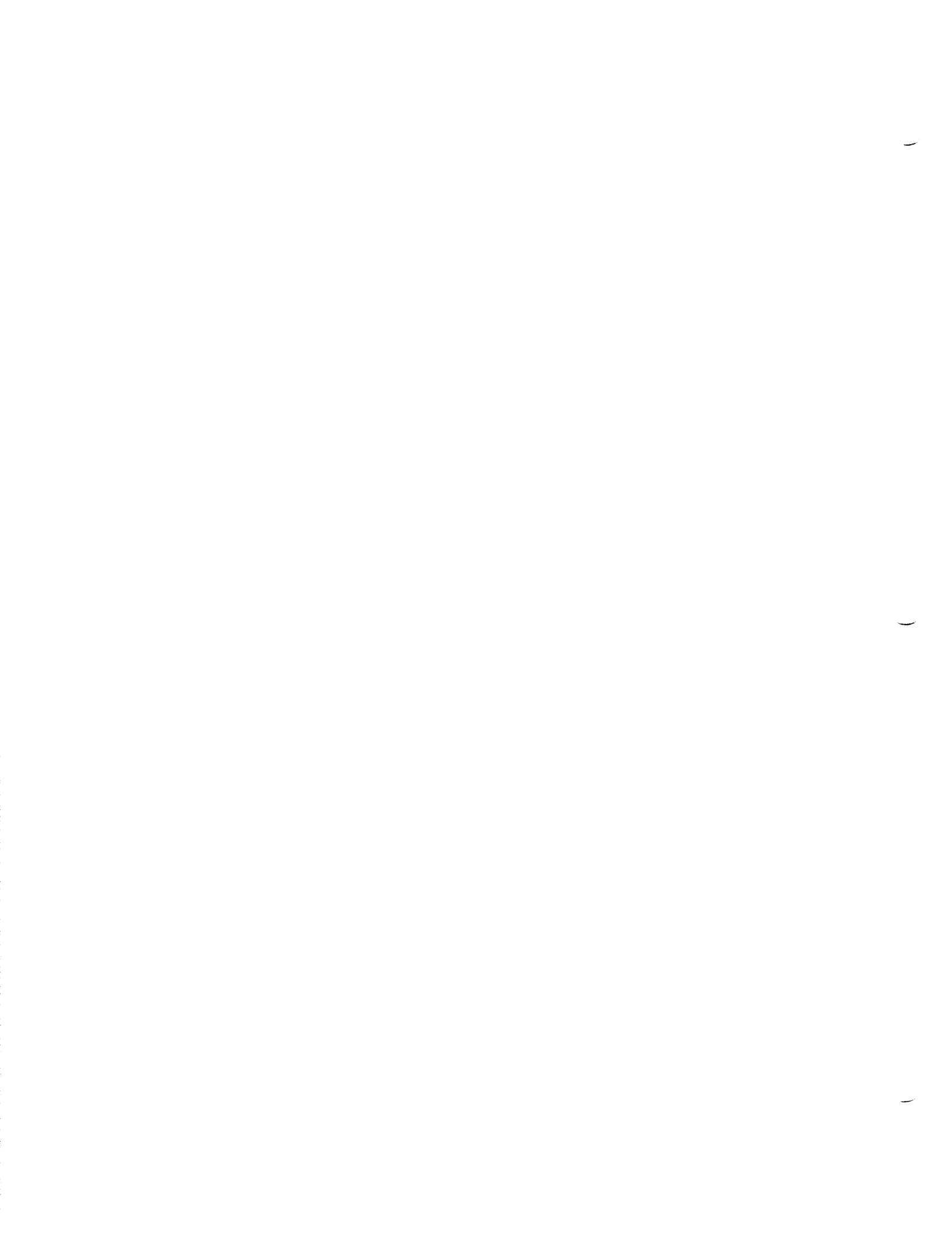
Installation and Configuration (700197-001)

Troubleshooting (700198-001)

Optional Features (700195-001)

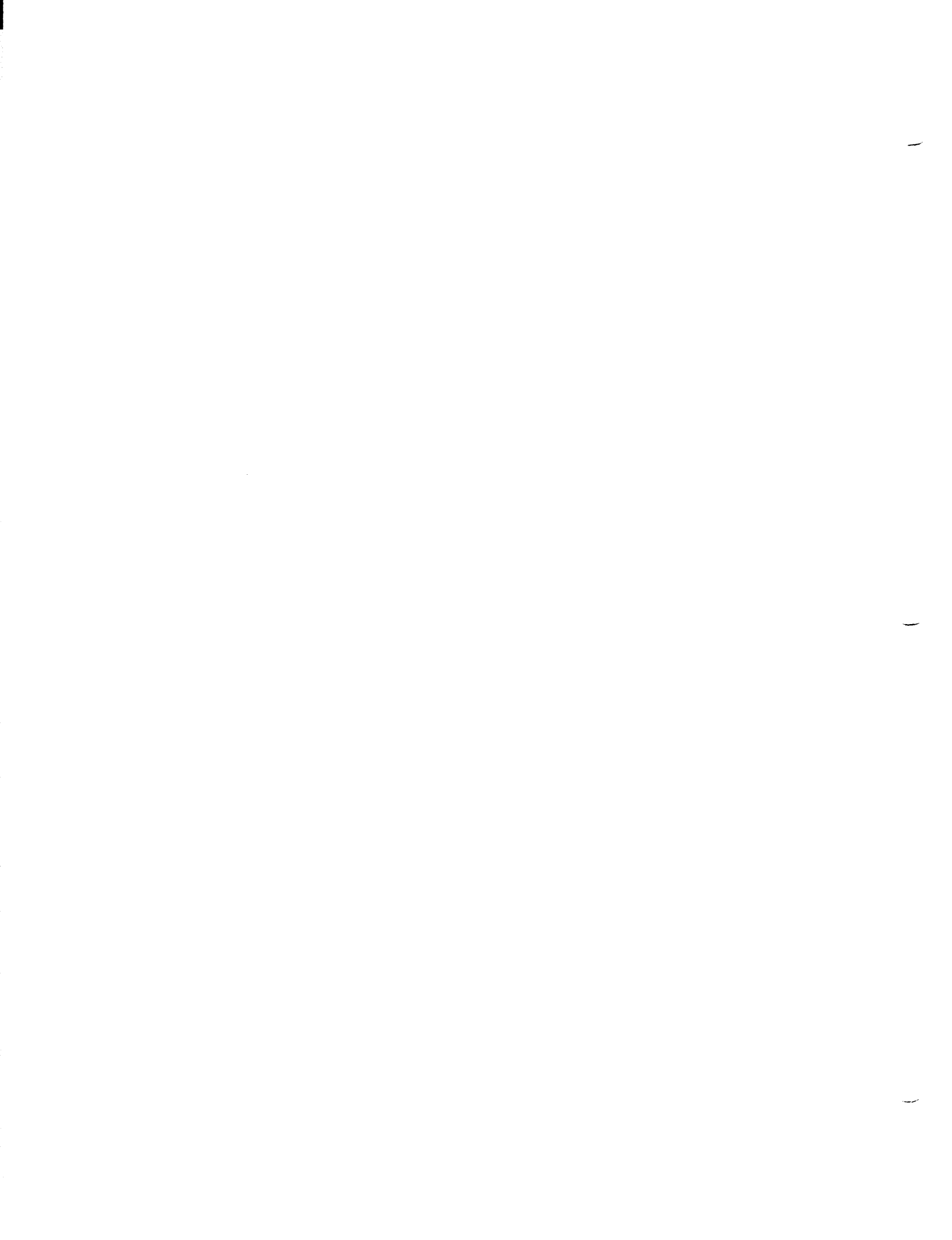
ASCII Device Support Keyboard Reference (700643-001)

Windowing Reference (700839-001)



Chapter 2

Multiple Logical Sessions



MULTIPLE LOGICAL SESSIONS

INTRODUCTION TO MLS

The controller's Multiple Logical Sessions (MLS) feature lets you use network terminals to access more than one host session at the same time. You can switch between sessions by means of simple keystrokes.

Each port on the 1174 can support up to five logical units (LU's), or sessions. Sessions on the port are labelled A through E, and you access them in that order. The port's sessions may be attached to different host channels, allowing display stations to switch easily from one host to another. The sessions can be attached to ASCII hosts or to 3270 hosts in any combination. Figure 2-1 shows sample sessions.

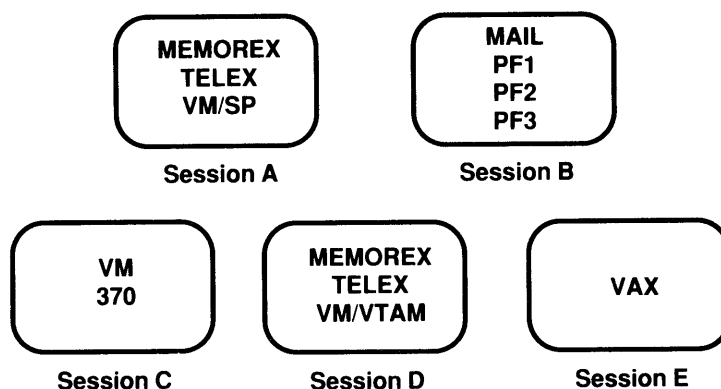


Figure 2-1. Sample Multiple Logical Sessions

The number of sessions allocated for each port, their logical unit address assignments, and their host assignments are specified during 1174 configuration on the LU Address Assignment panels. The *1174-XR Installation and Configuration Manual* tells you how to set up these MLS parameters. Default configuration values are in effect until other configuration values are set.

When the display station is first powered on, resources for all the configured sessions are requested. Resources are allocated in sequence for session A, session B, session C, session D, and finally session E. If resources are not available for one or more unallocated sessions, those sessions remain logically powered off, and program check 285 is displayed on the foreground session.

MULTIPLE LOGICAL SESSIONS

MLS SCREENS

While you are using the MLS feature, you can see one session at a time on your display station's screen, and the session takes up the full space allowed on the screen. The session you can see is called the foreground session. All other active sessions are called background sessions.

The optional Windowing feature, described in the *1174-XR Optional Features Manual* lets you set up windows on the display station that enable you to use the MLS feature to see up to five sessions at a time.

USING MLS

To switch sessions, press and hold the Alt key, then press the Insert key. This keystroke combination switches the terminal to the next active session on the port, without changing the current session.

Press Alt + Insert again to advance to the next session, and continue this combination to advance through the sessions in A, B, C, D, E order, then back to A. As you advance through the sessions, only sessions that have had resources allocated are displayed.

STATUS LINE INDICATORS

As shown in Figure 2-2, the foreground session is indicated on the display's status line with a lowercase letter. The letters "a" through "e" may appear for the foreground indicator, corresponding to sessions A through E. When you switch to a different foreground session, the indicator changes to match the session.

When an active background session is updated, an arrow appears on the status line beside the letter of the updated session. See Figure 2-3 for an example of this indicator. If more than one active session is updated at the same time, the session closest to the foreground session in the sequence has its letter displayed. For example, if A were the current session and sessions B and D were updated at the same time, the status line would display the arrow pointing to a "b."

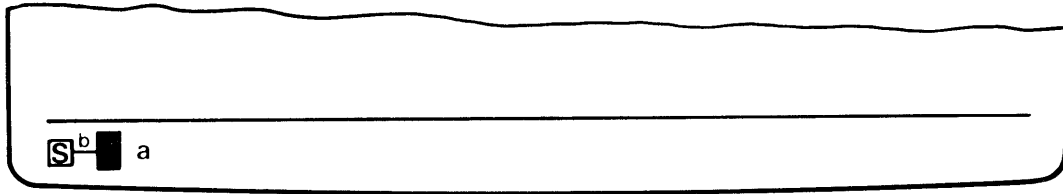


Figure 2-2. The Foreground Session Indicator

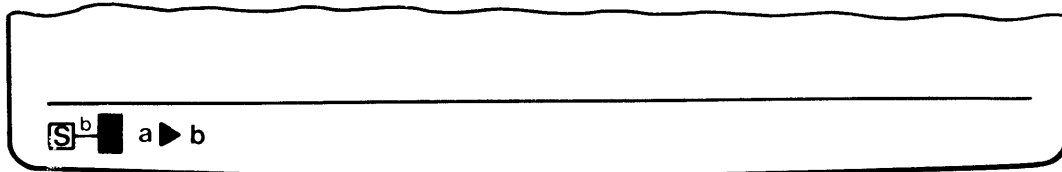


Figure 2-3. The Background Session Update Indicator

Chapter 3

Entry Assist

ENTRY ASSIST

OVERVIEW

The 1174's Entry Assist feature lets you perform data entry, formatting, and editing functions on attached, valid display terminals. Many data handling functions are added or made easier by the use of keys that are redefined in the Entry Assist Document mode. Entry Assist is a valuable aid when a job consists of a significant amount of text.

Entry Assist is activated on a display terminal when the operator enters Document mode. Entry Assist formatting, editing, and data entry functions remain active while the terminal is in Document mode, but cannot be used out of Document mode. However, data formatted during Document mode remains formatted when the display is switched out of Document mode, and the data may be transmitted to the host CPU with the format intact.

Because certain keys are redefined in Document mode, keytop labels (Memorex Telex P/N 19840-001) can be ordered to accompany the 1174. You can affix these labels to the appropriate keys as shown later in this chapter in the section titled "Installation."

REQUIREMENTS

For Entry Assist to operate on the 1174, certain display terminal and keyboard requirements must be met. These requirements are listed below.

Entry Assist can be used on any display terminal supported by the 1174, but the display terminals must be configured for 80 columns or less.

The following types of keyboards may be used with Entry Assist:

- Memorex Telex 88-key typewriter keyboard
- Memorex Telex 88-key APL keyboard
- Memorex Telex 88-key tripod keyboard
- Memorex Telex 102-key keyboard
- Memorex Telex 104-key keyboard
- Memorex Telex 122-key keyboard in emulation and native modes
- IBM typewriter keyboard

ENTRY ASSIST

- IBM APL keyboard
- IBM RPQ 8K 1038 keyboard

For the audible end-of-line function to work on the IBM 3278 and 3279 displays, the audible alarm feature must be installed.

DESCRIPTION

Each attached, valid display terminal may activate the Entry Assist feature by entering Document mode. (This mode, its access, and the other functions mentioned below are fully described in the section, "Entry Assist Functions," later in this chapter.) Document mode is entered and exited by pressing the Doc Mode (Document mode) key. Once in Document mode, the operator can display a rule at the bottom of the screen for setting margins, tabs, and the end-of-line alarm position. This rule is displayed in Change Format mode, which is entered by pressing the Chg Fmt (Change Format) key. (The Chg Fmt key is also used to hide the rule and leave Change Format mode.) Besides the format controls offered in Change Format mode, the following functions are available in Document mode:

- Screen margins
- Tabbing
- Audible alarm indicating the approach of the end of the line
- Cursor position display
- Word wrap (automatically moving an unfinished word to the next line when the word would extend beyond the right margin)
- Autorepeat word-forward and word-reverse cursor movement
- Autorepeat character deletion
- Autorepeat character-deleting backspace in Insert mode
- Word deletion

Once formats are established, further data entry takes place in Document mode with the entry and editing functions listed above. Once text is entered, it remains in the given format even if the format is changed later or the terminal is taken out of Document mode.

VALID IBM HOST EDITOR PROGRAMS

Entry Assist is designed for use with several IBM full-screen editing programs. These programs are used to handle text for correspondence, publications, programs, job control language (JCL), and other material. Entry Assist enhances the ability of the editing programs to format text for these types of material. The following is a list of some of the editing programs with which Entry Assist is designed to work:

- XEDIT
- DPPX Editor
- ICCF Editor
- IPDT OS/VS Editor
- PROFS PRPQ Editor
- IPDT VSE (edit functions)
- SPF, ISPF/PDF (edit functions)
- Display Editing System (IUP 5796-PJP)

Depending on the editing program in use, some aspects of Entry Assist may prove more useful than others. A given operating environment and individual preference will affect how Entry Assist is used. Some experimentation may be necessary to determine the most appropriate use of the Entry Assist functions with a particular editing program.

PREPARATION FOR USE

Before you attempt to use Entry Assist, you can affix keytop labels (P/N 19840-001) to the appropriate keyboard keys. For some IBM keyboards (such as the RPQ 8K 1038 keyboard), further preparation may be necessary, as detailed in *IBM 3270 Information Display System Entry Assist User's Guide*.

Figures 3-1 through 3-4 show proper placement of the keytop labels on the each keyboard. Use the following procedure to install the labels:

- Wash the keytops to which the labels will be affixed with a damp cloth and mild soap, then allow to dry thoroughly.
- Remove the labels from the sheet with a sharp pointed instrument (such as a knife). Be careful not to let the adhesive on the back of the label touch anything but the keytop.
- Place the label on the correct keytop or key face as indicated in Figures 3-1 through 3-4.
- Press each label down firmly. Installation of keytop labels is now complete.

ENTRY ASSIST

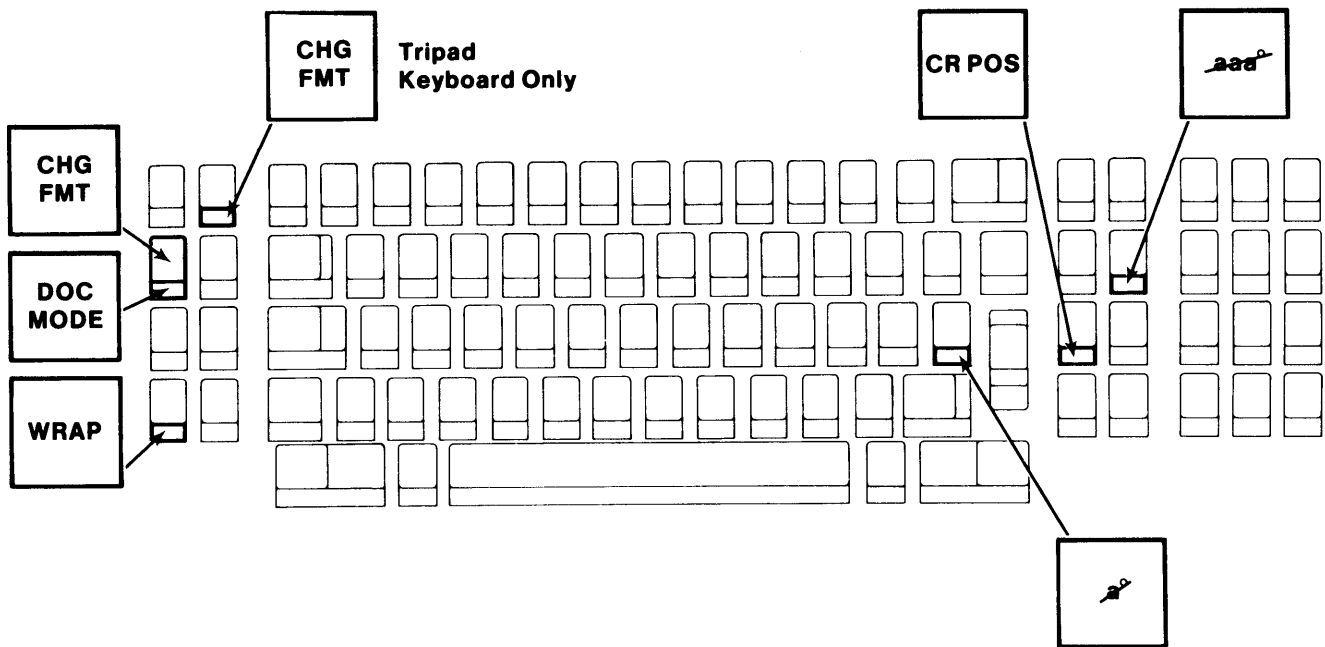


Figure 3-1. 88-Key Typewriter, APL, and Tripad Keyboard

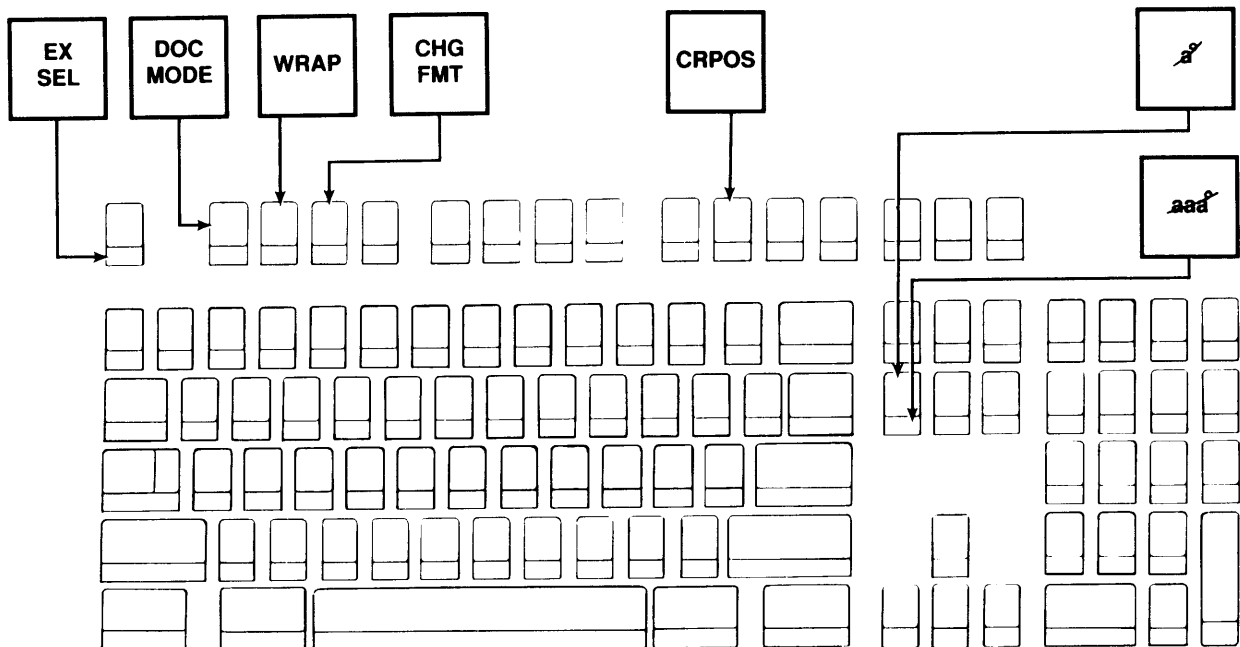


Figure 3-2. 102-Key Typewriter Keyboard

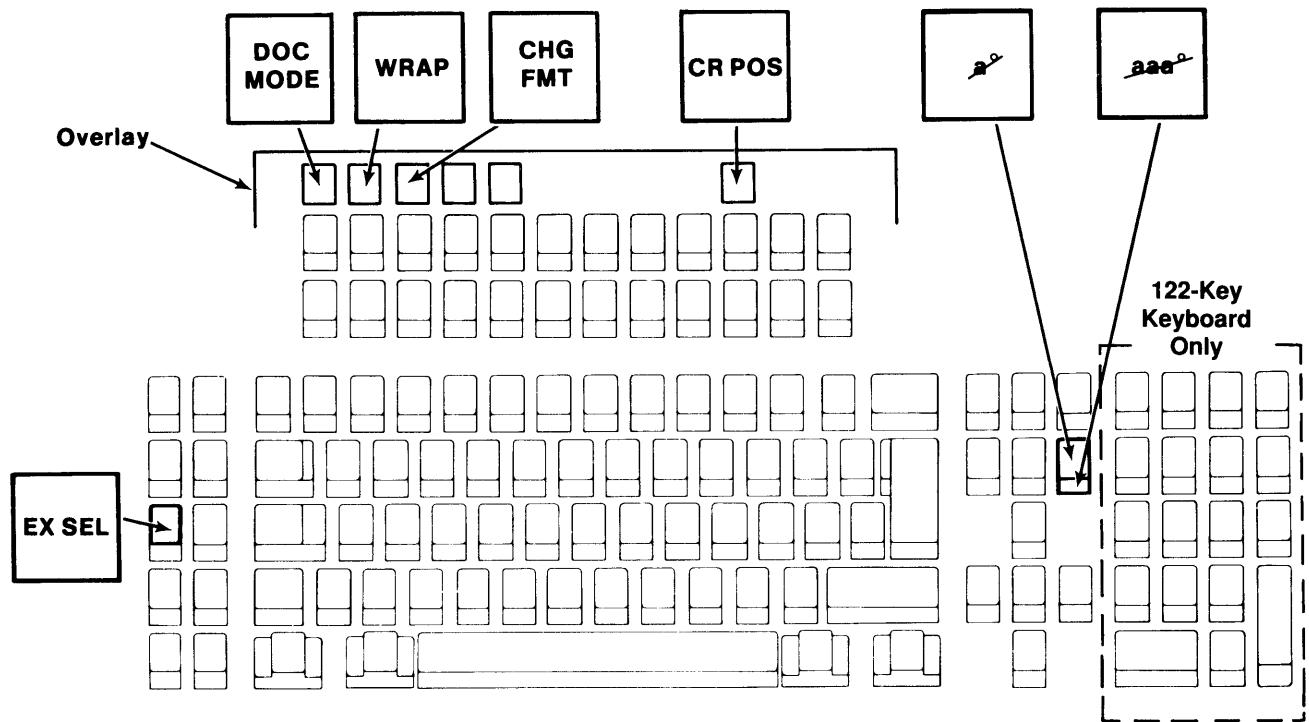


Figure 3-3. 122-Key Keyboard – Native Mode and 104-Key Keyboard

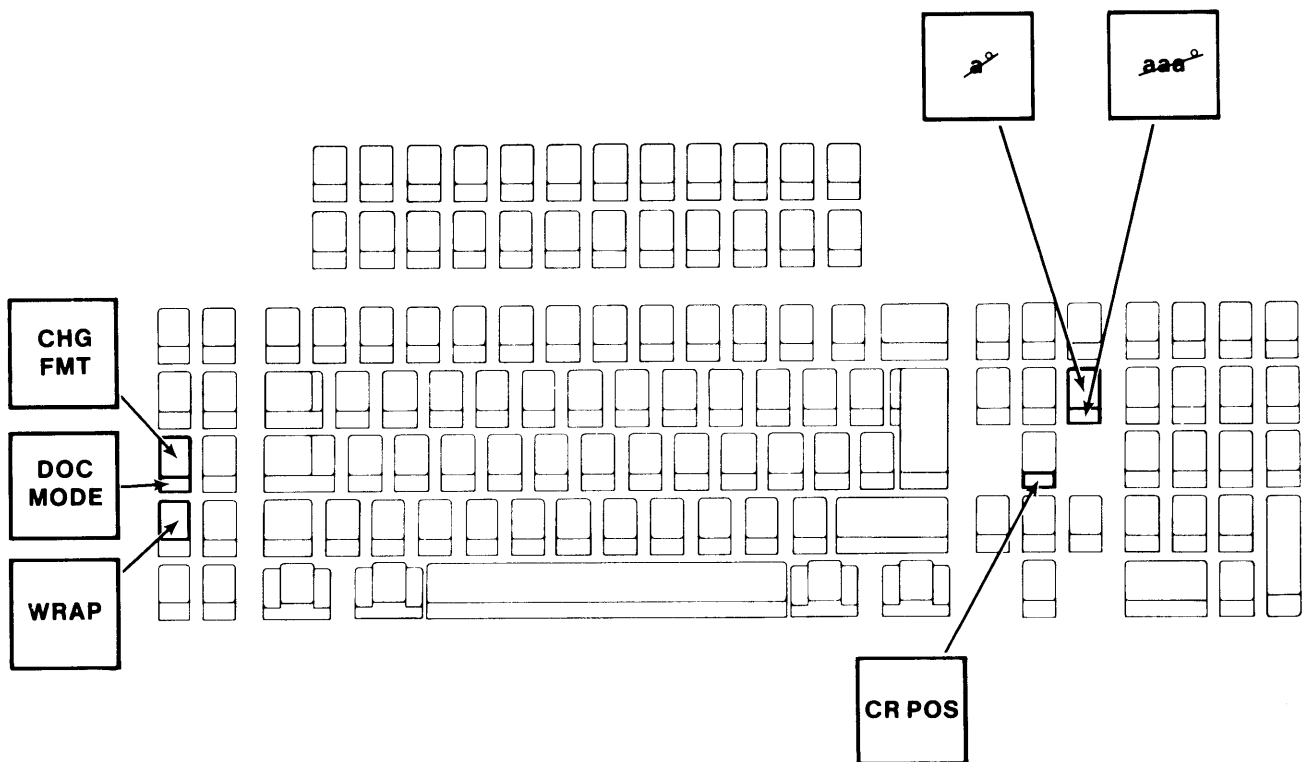


Figure 3-4. 122-Key Keyboard – Emulation Mode

ENTRY ASSIST FUNCTIONS

Entry Assist functions consist of formatting controls, and cursor movement and editing functions. Format controls are activated by entering Document mode, then pressing the Change Format (Chg Fmt) key. A format scale appears at the bottom of the screen, allowing various format parameters to be altered. Cursor movement and editing controls are given to certain keys upon entry into Document mode.

ENTERING DOCUMENT MODE

Document mode is the mode in which Entry Assist functions are enabled. The display is not placed in Document mode when first powered on. On most keyboards, use the Doc Mode key to place the display in Document mode or take it out of Document mode. Press the Ex Sel (Extended Select) key and then the Doc Mode key to access Document mode from the 122-key keyboard in native mode (refer to Figure 3-3).

When in Document mode, the display shows the DOC message on its status row. The DOC message disappears when the display is taken out of Document mode.

FORMAT CONTROLS

Once the display is in Document mode, press the Chg Fmt key to display the format scale. This scale appears at the bottom of the display screen. A cursor appears on the format scale in the same column position as the cursor in the display area (the display cursor's vertical position has no effect on the format scale cursor's position). Refer to Figure 3-5 for an example of the format scale.

To hide the format scale, simply press the Chg Fmt key again.

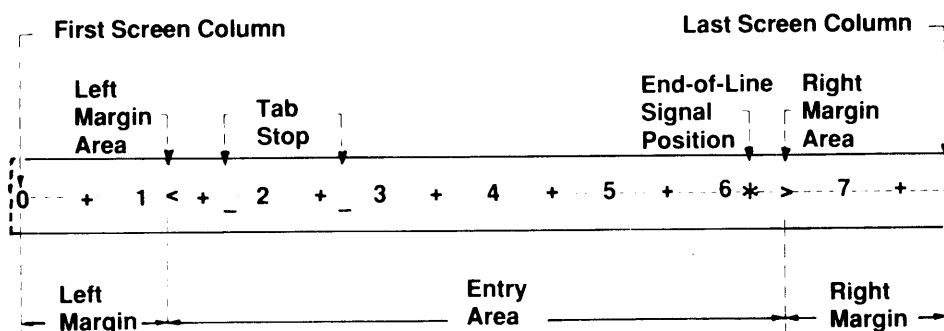


Figure 3-5. Example of the Format Scale

Use the Cursor Left and Cursor Right keys to move the format scale cursor to the desired position. Once the format scale cursor is in position, press the appropriate format function key. When a function key is pressed, the format scale cursor disappears and leaves in its place the appropriate format symbol. To make the cursor reappear, press the Cursor Left or Cursor Right key.

Note that all of the format parameters are saved whenever the display exits Document mode. The last values established for the format parameters before exiting Document mode are in effect when the display returns to Document mode. The following format parameters (shown as applicable with their corresponding format symbols) may be changed on the format scale:

- Left margin (<)
- Right margin (>)
- Tab stops (␣)
- End-of-line signal position (*)
- Alternate right margin (!)
- Format scale origin

LEFT AND RIGHT MARGINS

To set or move the left or right margin, move the format scale cursor to the desired position. Then press the less than (<) key for the left margin or the greater than symbol (>) key for the right margin. The symbol then appears on the format scale in the selected position. Only one left margin and one right margin can be defined on the format scale at a time.

When a margin is redefined, the previous margin symbol disappears and is replaced by the new symbol. Tab stops and the end-of-line signal marker are retained even if they are placed outside the new margins. If the new left margin is to the right of the old right margin, the right margin is moved to its default position (the far right scale position). If the new right margin is to the left of the old left margin, the left margin is moved to its default position (the far left scale position). The right margin cannot be entered in the left margin default position, and vice versa.

When data is entered between the margins, the cursor can be located over the left margin column, and data can be entered in this column. However, the cursor will wrap before it reaches the right margin column. Data cannot be entered in this column during normal typing.

Even though a margin is defined and the display is in Document mode, data still can be entered to the left of the left margin or the right of the right margin. The left and right margins are established to stop the cursor during normal data entry. However, the Cursor Left and Cursor Right keys allow you to move the cursor beyond the margins, where data can be entered and modified the same as between the margins.

ALTERNATE RIGHT MARGIN

The standard right margin remains in effect during Document mode whether the word wrap function (described later in this chapter) is active or not. However, some typing situations call for a margin release in which no right margin is observed.

If you wish to set up a right margin that can be disabled as needed, you can set up an alternate right margin. This parameter lets you have a right margin in effect when word wrap is on, but the right margin is ignored when word wrap is off.

When the alternate right margin is set and word wrap is turned off, the right side of the display limits the line length of data being entered. Once the text reaches the right side of the display, subsequent input appears on the next line. Word divisions are ignored. When word wrap is turned back on, the right margin previously in effect is reinstated.

To set an alternate right margin, place the format scale cursor over the right margin symbol, then press the Cursr Sel key. The greater than symbol turns into a broken vertical bar (|) indicating that the right margin is released when the word wrap function is turned off. To restore the standard right margin, place the cursor over the broken vertical bar and press Cursr Sel again. The greater than symbol returns to the format scale.

TAB STOPS

Setting tab stops on the format scale allows the tab keys to function as they do on a typewriter, treating the defined column positions as tab stops. Once they are set, tab stops are used in Document mode by pressing the Forward Tab (→) or Reverse Tab (←) key to move the cursor to the next tab stop to the right or left.

Tab stops are set by placing the format scale cursor in the desired position, then pressing the Forward Tab key. The format scale displays an underscore (_) in the new tab stop position unless a margin symbol or end-of-line signal symbol is in the selected position. Even if the tab stop symbol cannot be displayed in a position, the tab function is still in effect.

Up to 20 tab stops can be defined in any position on the format scale. Attempts to enter more than 20 tab stops will be ignored.

To clear a tab stop, place the format scale cursor on the tab stop symbol in question, then press the Delete Character (⌘) key. To clear all tab stops from the format scale at once, simply press the Clear key. All tab stop symbols will be removed from the format scale.

END-OF-LINE SIGNAL

The end-of-line signal requires the audible alarm feature to function. When the end-of-line signal is set, the display sounds the audible alarm as the cursor enters the selected column position. This function can be used to warn of the approach of the right margin, like the bell on a typewriter.

To set the end-of-line signal, place the format scale cursor in the desired position, and then press the asterisk (*) key. An asterisk is displayed in the selected position. The end-of-line signal function is then enabled and remains in effect during Document mode until the asterisk is removed.

To disable the end-of-line signal function, place the cursor over the asterisk, and then press the Delete Character key. The asterisk will disappear and the function will be disabled. If a tab stop is located at the end-of-line signal position, removing the asterisk also removes the tab stop.

THE FORMAT SCALE ORIGIN

The format scale numbers can be shifted such that the scale begins with position 1 instead of position 0. Tab stops, margins, and end-of-line signal positions are not shifted with respect to the screen when the scale numbers are shifted.

To change the scale origin, place the format scale cursor at the leftmost position on the scale. Then press the Cursr Sel key. The numbers on the line are shifted one space to the left. Pressing Cursr Sel again returns the origin to 0.

CURSOR MOVEMENT AND EDITING FUNCTIONS

Cursor movement and editing functions are active whenever the display is in Document mode. These functions are subject to the limitations imposed by the format parameters currently set on the format scale.

Cursor movement and editing functions available in Document mode are as follows:

- Word wrap
- Autorepeat cursor movement to next word
- Autorepeat cursor movement to previous word
- Delete word to the right
- Autorepeat deletion of character to the right
- Tab function

- Backtab function
- Backspacing with deletion
- New line function observing left margin
- Cursor position indicator

WORD WRAP

The Word Wrap function is turned on and off by the Wrap key (refer to Figures 3-1 through 3-4). This parameter, like other format parameters, is saved when the display is removed from Document mode, and returns to its last state when the display returns to Document mode. The Word Wrap (↵) symbol indicates that word wrapping is in effect. When the function is on, text entry is subject to word wrapping between the left and right margins.

Word wrapping occurs when a word being entered would extend beyond the right margin. When the character is entered that would go beyond the right margin, the entire word is moved down one line and to the left margin. If a space is entered in the position one character left of the right margin, the cursor is moved to the left margin of the next line without word wrapping. If the cursor is one space left of the right margin and the Dup key is pressed, the Dup character appears on the right margin and the Dup function works as defined outside of Document mode.

The positions previously occupied by the first part of the word are replaced by space characters. When a word is wrapped to the left margin of the next line, any null characters to the left of the left margin are changed to space characters to preserve the format when it is sent to the host CPU.

Word wrapping will not occur unless the entire row onto which the word is wrapped contains only nulls or spaces. In some cases word wrapping cannot occur. In these cases, input is inhibited and the status row shows the Too Much symbol (X †). The Reset key must be pressed for further entry. The following conditions prevent word wrapping:

- Word takes up the entire length of the line
- Text already exists on the next line
- Current line is the last line on the screen
- Next line begins with a protected field

If the display is in Insert mode and a word is inserted on a line, any word pushed beyond the right margin may be wrapped to the next line if the next line contains enough spaces after its last word or its margins contain enough nulls to make room for the wrapped word. If the word cannot be wrapped onto the next line, input is inhibited and the Too Much symbol is displayed on the status row.

MOVE CURSOR TO NEXT WORD (AUTOREPEAT)

To move the cursor to the next word, press and hold the Alt key. Then press the Cursor Right key. The cursor moves to the first character in the next word, or, if currently in a word at the end of a line, to the first space or null character following the current word. The cursor will not move into protected fields with this function.

The cursor will be moved to the next word regardless of the location of the margins. If text is located outside the margins, the cursor moves to the text without recognizing the margins. The cursor wraps to the next row only when there are no more words in the current row. When the last word is reached on the last row, the cursor is wrapped to the first word on the first row of the display.

Continuing to hold down the Alt and Cursor Right keys causes the function to repeat automatically.

MOVE CURSOR TO PREVIOUS WORD (AUTOREPEAT)

Press and hold the Alt key, and then press the Cursor Left key to move the cursor to the beginning of the current word (or, if already at the beginning of a word, to the beginning of the word to the left). If the cursor is located at the first word on a row, it is wrapped to the beginning of the last word on the previous row. If at the top left position on the screen, the cursor is wrapped to the beginning of the last word on the screen.

Continuing to hold down the Alt and Cursor Left keys causes the function to repeat automatically.

DELETE NEXT WORD

Pressing the Alt + Delete keys enables Document mode's Delete Word function which erases the character at the cursor location and the remainder of the word to the right of the cursor. If the cursor is on the first character of a word, the whole word is erased. If the cursor is on a space or null, only the space or null is erased. Punctuation and spaces following a word are also erased (unless only part of the word is erased, in which case the space or null remains).

When a word is deleted, the cursor remains in place and subsequent data on the line moves to the left. Shifting does not occur for attributes, characters to the right of attributes, or subsequent lines of data. If deletion is attempted on an attribute or a protected field, input is inhibited and the Go Elsewhere (**X+↔**) symbol is displayed on the status row. Press the Reset key to enable further entry.

AUTOREPEAT DELETE FUNCTION

The standard Delete Character key does not have the autorepeat function. However, in Document mode the autorepeat delete function is obtained by pressing and holding the Alt key, then pressing the Left and Right Brackets key (**⌋**). Holding these keys depressed allows the function to repeat automatically.

CURSOR TABBING

Pressing the Forward Tab key causes the cursor to move to the next unprotected tab stop. Intervening unprotected null characters are converted to space characters to preserve the format when data is transmitted to the host CPU. If the cursor reaches an unprotected attribute before it reaches a tab stop, it will stop at the attribute. If no tab stops and no attributes are defined, the cursor moves to the top left position on the screen.

If there are tabs or unprotected attributes on the screen, tabbing will not allow the cursor to wrap from the lower right corner of the screen to the upper left corner of the screen.

For some programs, the introduction of additional data (in the form of nulls being converted into space characters) may cause problems. Programs should be verified for use with the tab function in Entry Assist.

BACKTAB FUNCTION

The Cursor Backtab function works like the Forward Tab function except that the cursor is moved to the previous tab stop or the first unprotected character of the current or previous field. Pressing the Backtab (**⌊**) key causes a backtab operation. Nulls are not changed to spaces when a backtab operation is performed. The cursor will not wrap from the upper left corner of the screen to the lower right corner.

BACKSPACING WITH DELETION

Pressing the Backspace (**⌫**) key in Insert mode deletes the character to the left of the cursor and causes the cursor to move left one character space. Characters to the right of the cursor on the same line are moved one character to the left. Attributes and characters to the right of attributes are not moved.

If the cursor is located at the left margin when the Backspace key is pressed, input is inhibited and the Go Elsewhere (**✕→**) symbol appears on the status row. Press the Reset key to resume entry.

NEW LINE FUNCTION

Pressing the New Line (↵) key causes the cursor to move down one line and return to the established left margin. If the left margin is protected, the cursor moves to the first unprotected position to the right of the left margin. Unprotected null characters to the left of the left margin are converted to spaces as long as there are no fields between the nulls and the cursor.

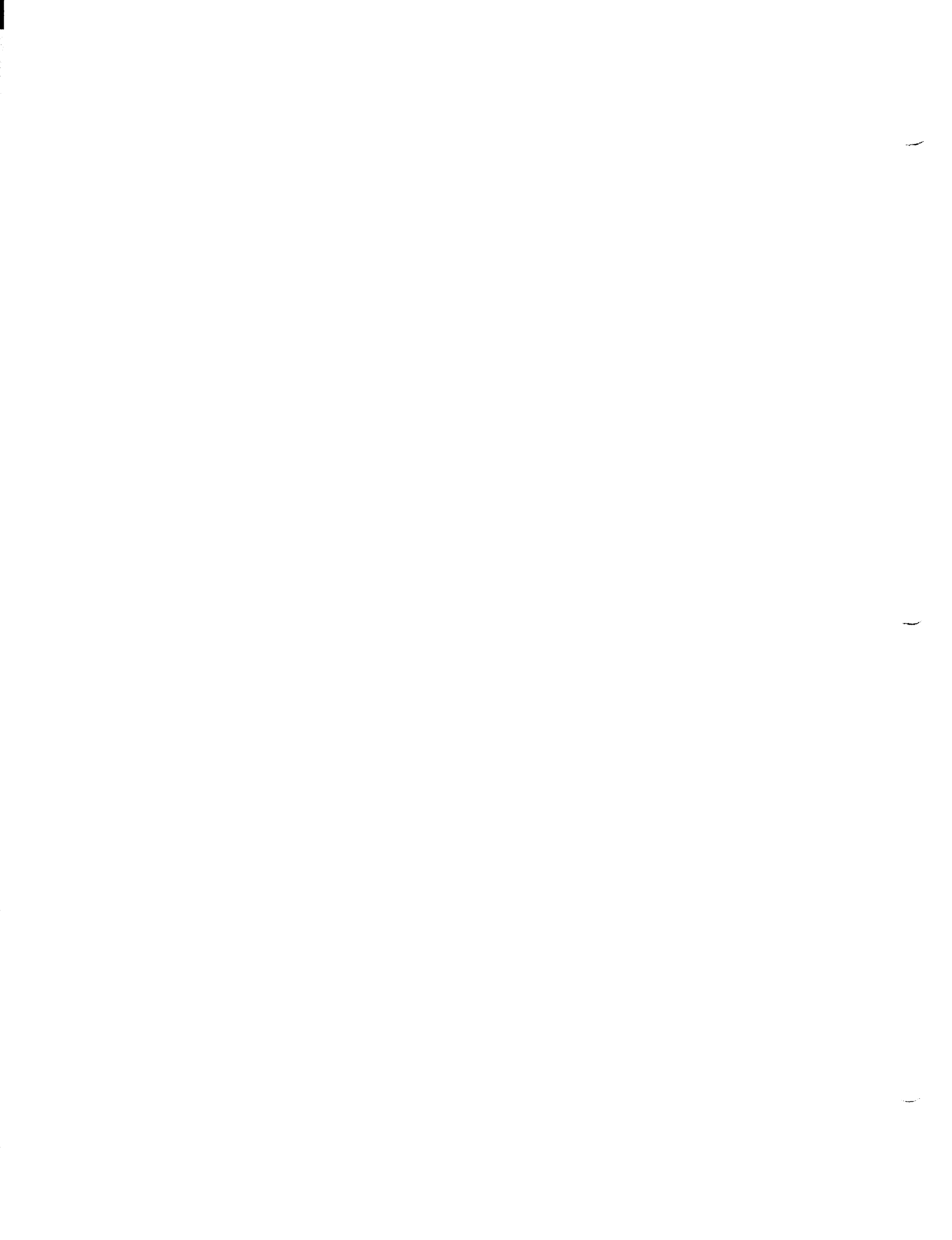
If the cursor is on the last row of the screen and the New Line key is pressed, the cursor is positioned on the first row of the screen.

If there are no unprotected locations between the margins, the cursor moves to the left margin of the first row on the screen.

CURSOR POSITION INDICATOR

Press and hold the Alt key, then press the Cursor Position (Cr Pos) key to display the cursor position indicator on the status row. The indicator displays only as long as the Alt key is held down. The indicator also disappears if another key is pressed.

The cursor position indicator appears in status row positions 75 through 80 and takes the form rr/cc, where rr is the row number (1 through 43) and cc is the column number (1 through 80).



Chapter 4

Binary Synchronous Communications



BINARY SYNCHRONOUS COMMUNICATIONS

HOST REQUIREMENTS

The 1174 supports Binary Synchronous Communication (BSC), a half duplex character-oriented data transmission protocol.

The 1174 communicates with the host through an appropriate data set and through one of these transmission control units:

- 2701
- 2703
- 3704
- 3705
- 3725
- Comparable Integrated Communication Adapter

The 1174 permits BSC to work with equipment that supports duplex and half duplex transmission.

The 1174 can support EBCDIC or ASCII transmission code sets with BSC. For the purpose of compatibility, all devices on a communication line must use the same code structure.

TEXT BLOCKING

The controller organizes inbound (to the host) data into text blocks. These are the rules:

- Maximum text characters per block = 256
- The 256-character block includes the following:
 - STX and ETX (or ETB) data link control characters for non-transparent data
 - DLE STX and DLE ETX (or DLE ETB) data link control characters for transparent data
 - Two address bytes, an aid key, and a 2-byte cursor location preceding the first data block in response to poll or read commands
 - Last block terminating with ETX

The block check characters that follow the ETX or ETB are not included in the 256-character total.

CONTROLLER OPERATING MODES

The BSC protocol operates in any of four states:

- Control mode
- Text mode
- Transparent mode
- Transparent monitor mode

Control mode – Control mode is initiated by the transmission or receipt of a valid EOT sequence. During control mode the controller monitors the communication line for a selection or poll addressing sequence that will place the controller in text mode.

Text mode – In text mode, the controller sends or receives non-transparent data. Depending on the direction of the transaction, the controller enters master or slave status. If the controller is sending a message, it is a master station. If the controller is receiving a message, it is a slave station.

Transparent mode – In transparent mode, the controller sends or receives transparent data which is contained between opening and closing flags. The flags signal the controller that the data is to be treated as a pure data stream and no response is to be made. The data sent or received must have EBCDIC code structure. Use of transparent mode allows for inbound and outbound movement of extended highlighting, color or programmed symbols. The controller can transmit inbound data in transparent mode if the inbound reply mode is extended field or character, and the inbound data stream includes structured fields.

So that they can be recognized as control structures, data link control characters transmitted during transparent mode operation must be preceded by DLE.

Transparent monitor mode – During transparent monitor mode, the controller is monitoring a transaction on the line between another controller and the host. The controller ignores all data contained in the transaction.

DATA LINK CONTROL CHARACTERS LIST

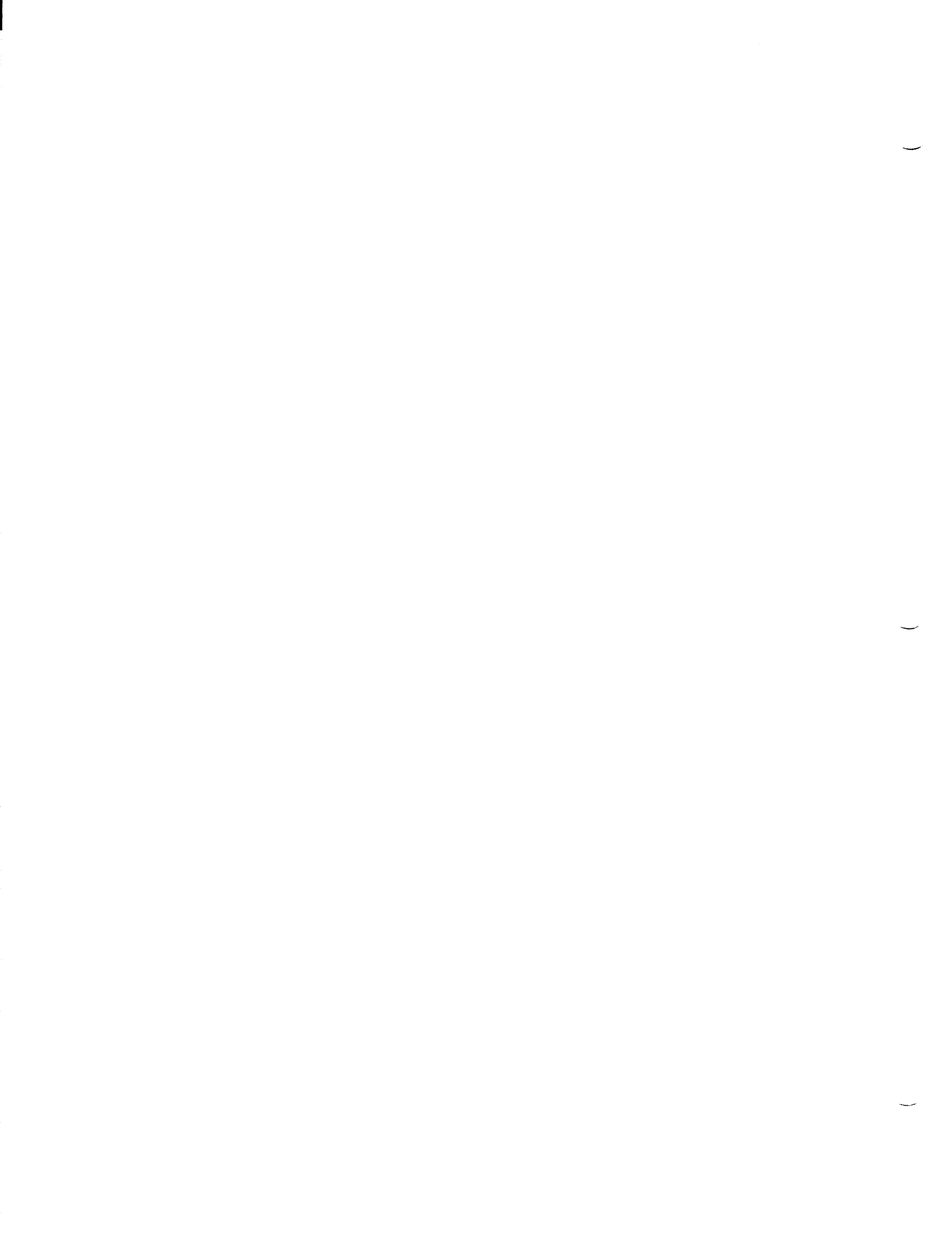
The table below shows the data link control characters transmitted between the host and the controller. EBCDIC and ASCII formats are shown also.

Data Link Control Characters	EBCDIC (Hex)	ASCII (Hex)
ACK 0 (2 bytes) – Even acknowledge	1070	1030
ACK 1 (2 bytes) – Odd acknowledge	1061	1031
DLE – Data Link Escape	10	10
ENQ – Enquiry	2D	05
EOT – End of Transmission	37	04
ESC – Escape	27	1B
ETB – End of Transmission Block	26	17
ETX – End of Text	03	03
ITB – End of Intermediate Transmission Block	1F	1F
NAK – Negative Acknowledgment	3D	15
RVI (2 bytes) – Reverse Interrupt	107C	103C
SOH – Start of heading	01	01
STX – Start of text	02	02
SYN – Synchronous idle	32	16
TTD – Temporary text delay	022D	0205
WACK – Wait before transmit	106B	103B

Figure 4-1. Data Link Control Characters

Chapter 5

Systems Network Architecture



SYSTEMS NETWORK ARCHITECTURE

SNA DEFINITIONS

Systems Network Architecture (SNA) is a communications protocol that enables synchronous transmission of data between logical units (LUs) that transmit or receive data. An LU is a logical entity associated with an end-user, e.g., a terminal connected to the 1174 or a host application program.

During 1174 SNA operation, communication occurs between a Primary Logical Unit (PLU) and a Secondary Logical Unit (SLU). The host contains the Primary Logical Unit (PLU), and the controller contains the Secondary Logical Units (SLUs). The SLU can be associated with a display terminal or printer.

The 1174 can support 1 to 254 SLUs, with addresses between 2 and 256.

Outbound data is data transmitted from the host to the 1174. Inbound data is data transmitted from the 1174 to the host.

SNA SESSIONS

An SNA session is a logical connection between the host and the 1174. Three types of sessions exist within the 1174:

- SSCP-PU
- SSCP-SLU
- PLU-SLU (known as LU-LU)

The host access method (VTAM, VTAME, TCAM) provides the System Services Control Point (SSCP) facility that enables the host PLU to communicate with an 1174 SLU.

An SSCP-PU session occurs between the access method and the 1174 physical unit (PU). Its purpose is to open the channel between the controller and the host.

The SSCP-SLU session occurs between the access method and an SLU contained within the 1174. Its purpose is to establish communication between the host and the SLU. The SSCP-PU session must precede this session.

SYSTEMS NETWORK ARCHITECTURE

The LU-LU session occurs between the host PLU and an SLU contained in the 1174. The above two sessions must precede this session. An LU-LU session is one of three types:

- Type 1 – The SLU's attached device is a printer whose data stream is an SNA character string (SCS), or is specified by the Data Stream Profile (DSP) of a Function Management Header Type 1 (FMH-1).
- Type 2 – The SLU's attached device is a display terminal whose data stream is in 3270 data stream compatibility (DSC) mode format.
- Type 3 – The SLU's attached device is a printer whose data stream is in 3270 DSC mode format.

SNA TRANSMISSION FORMATS

This section describes formats for data transmitted between the host and the 1174 under SNA protocol. Three portions of the transmission are discussed:

- Transmission header (TH)
- Request/response header (RH)
- Response/request unit (RU)

TRANSMISSION HEADERS

The transmission header (TH) contains information concerning the data's format, its mapping fields, and an expedited flow indicator.

The transmission header format is as follows:

TH0	Bit 0 - 3	Format ID (must be 0010)
	Bit 4	First in segment
	Bit 5	Last in segment
	Bit 6	Reserved
	Bit 7	Expedited flow indicator
TH1		Reserved
TH2		Destination address field
TH3		Origin address field
TH4, 5		Sequence number field

REQUEST/RESPONSE HEADERS

The Request/response header (RH) specifies the type of data being transmitted and contains SNA control indicators.

The Request/response header is defined as follows:

RH0	Bit 0	0 = request, 1 = response
	Bit 1, 2	00 = function management data RU 01 = network control RU 10 = data flow control RU 11 = session control RU
	Bit 3	Reserved
	Bit 4	Format indicator
	Bit 5	Sense data indicator
	Bit 6	First in chain
	Bit 7	Last in chain
RH1	Bit 0	Definite response type 1
	Bit 1	Reserved
	Bit 2	Definite response type 2
	Bit 3	Exception response indicator
	Bit 4, 5	Reserved
	Bit 6	Queued response indicator
	Bit 7	Pacing indicator
RH2*	Bit 0	Begin bracket
	Bit 1	End bracket
	Bit 2	Change direction
	Bit 3	Reserved
	Bit 4	Code select indicator
	Bit 5	Enciphered data indicator
	Bit 6	Padded data indicator
	Bit 7	Conditional end bracket

*RH2 is reserved on SNA responses.

RESPONSE/REQUEST UNITS

The Request/response unit (RU) contains the SNA command and/or data being transmitted. Those supported by the 1174 are shown in the following table.

SYSTEMS NETWORK ARCHITECTURE

Name	EBCDIC Code
ACTPU, activate physical unit	11
DACTPU, deactivate physical unit	12
ACTLU, activate logical unit	0D
DACTLU, deactivate logical unit	0E
Bind	31
Unbind	32
Clear	A1
SDT, start data traffic	A0
Cancel	83
Chase	84
LUSTAT, logical unit status	04
SHUTD, Shutdown	C0
SHUTC, Shutdown complete	C1
RTR, ready to receive	05
Bid	C8
Signal	C9
REQMS, request maintenance statistics	410304
RECFMS, record formatted maintenance stats	410384
Notify	810620
NMVT (alert)	41038D
NMVT (RTM)	41038D

SNA SENSE CODES

This section lists the SNA sense codes that may be returned to the host by the 1174.

Path Error X'80'

X'04'	Unrecognized DAF'
X'05'	LU not bound
X'07'	Segmenting error
X'08'	PU NOT active
X'09'	LU NOT active
X'0F'	Invalid OAF/DAF Combination

RH Error X'40'

X'06'	Exception response not allowed
X'07'	Definite response not allowed
X'0F'	Format indicator not allowed
X'11'	Incorrect specification of RU category

State Error X'20'

X'01'	Sequence number error
X'02'	Chaining error
X'03'	Bracket state error
X'04'	Direction error
X'05'	Data traffic reset

Request Error X'10'

X'01'	RU data error Bytes 2 and 3 after the sense code may contain a count that shows the location of the first byte in the RU chain that is causing the error. If the count is present, the high order bit of byte 2 will be set to 1. The remaining 15 bits will contain the offset into the SNA chain of the byte in error. Bytes 2 and 3 contain a value of 8001 if the data stream terminated without sufficient information to process SBA, SFE, RA, EUA, MF, or SA orders. If bytes 2 and 3 contain zeroes only, no additional information is available.
X'02'	RU length error
X'03'	Function not supported (invalid command)
X'05'	SCS parameter error
X'07'	Category not supported
X'07 0000001'	Invalid NS header
X'08'	Invalid FM header

Request Reject X'08'

X'01'	Resource not available LU type 2 – the authorization matrix does not permit a printer. LU type 1 or type 3 – bind reject because the printer is authorized only for local mode. LU type 1 – the pacing algorithm for outbound transmission is overloaded.
X'02'	Intervention required on principal device LU type 2 – the security keylock is in the On position LU type 1 or 3 – a printer condition has occurred, e.g., end of form, paper jam
X'05'	Session limit exceeded 1174 received bind for SLU already bound
X'07'	Subsidiary device temporarily not available
X'0A'	Bind reject – LU powered off The SSCP will not be notified when the device powers on.
X'0C'	Invalid REQMS
X'11'	LU1 print cancelled
X'13'	Bracket bid reject – no RTR
X'14'	Bracket bid reject – RTR to follow
X'15 0003'	Function active
X'1B	Receiver in transmit mode
X'1C'	Device has non-recoverable error
X'29'	Change direction required
X'2B'	Presentation space integrity lost

SYSTEMS NETWORK ARCHITECTURE

X'2D	SLU Busy
X'2E'	Intervention required at subsidiary device
X'2F'	Subsidiary device has a nonrecoverable error
X'31'	LU powered off
X'35'	Invalid parameter Bytes 2 and 3 contain a count that indicates the first byte of the request that has bad contents.
X'43	Definite response or CD required
X'45'	Bind reject – LU powered off. The SSCP will be notified when the device powers on.
X'4C'	Permanent insufficient resource Bytes 2 and 3 may contain a count that indicates the location of the byte in the chain that caused the error.
X'63'	Reference local character set identifier (LCID) not found

NETVIEW SUPPORT

The 1174 supports these NetView functions by transmitting information to the NetView operator:

RTM Statistics – The NetView program's session monitor collects response time data on command and displays it for the NetView operator. The 1174 provides RTM host support when using the SNA protocol and collects response time data for all sessions (including sessions on distributed function terminals).

The chapter titled "Response Time Monitor", later in this manual, gives additional information about RTM.

SNA Alert – The 1174's SNA Alert function generates messages that can be seen on NetView's hardware monitor component. The NetView operator can view all messages, or a portion of the messages. Filters specified by the display operator determine which messages will be displayed.

The chapter titled "SNA Alert", later in this manual, gives additional information about SNA Alerts.

Request Maintenance Statistics (REQMS) – The 1174 lets you use the REQMS command to request SNA summary error counts from the 1174 PU (Physical Unit) and transmits data for storage on the hardware monitor data base. The maintenance statistics can then be viewed by the NetView operator.

The chapter titled "Request Maintenance Statistics" provides more information about this feature.

NetView is a registered trademark of International Business Machines, Inc.

Chapter 6

Response Time Monitor



RESPONSE TIME MONITOR

OVERVIEW

Response Time Monitor (RTM) is a network management tool that measures and records response times of inbound host attention operations from 3270 sessions executing on the controller.

RTM records host response times for all control unit terminals (CUTs) attached to the 1174. RTM can also measure response times for DFT terminals that support the feature.

Before you can use the Response Time Monitor, you must enter the controller's configuration program, enable RTM, and specify the time intervals (boundaries) by which you wish the response times counted.

The RTM feature allows you to display response time logs on the display station attached to port 0 or on all display stations within your subsystem. No host programming is required for this operation.

If you are executing under SNA, you can write a host application program that enables the host to establish RTM boundaries, and to gather RTM information for a particular SNA LU at a Network Communication Control Facility (NCCF) terminal.

RTM DISPLAYS

The controller gives you two ways to look at RTM data:

Response time log – shows response time information for all sessions attached to the controller


Last transaction time indicator (LTTI) – shows the amount of time the host took to respond to the last inbound communication from this display.

Figures 6-1 and 6-2 show samples of these displays.

RESPONSE TIME MONITOR

Display RTM Logs										1174 Test Mode
										Host: A
@	DEF	CTR#1	BDY#1	CTR#2	BDY#2	CTR#3	BDY#3	CTR#4	BDY#4	OV
002	1	5100	1.0	4680	2.0	183	5.0	2	10.0	0
003 ?	1	1229	1.0	0	2.0	0	5.0	0	10.0	18,850
004p	1	0	1.0	0	2.0	0	5.0	0	10.0	0
005_	1	0	1.0	0	2.0	0	5.0	0	10.0	0
006*	2	713	1.0	342	2.0	49	5.0	0	10.0	0
007	1	0	1.0	0	2.0	0	5.0	0	10.0	0
008	1	0	1.0	0	2.0	0	5.0	0	10.0	0
009i	1	48	1.0	75	2.0	3,609	5.0	2	10.0	0

Figure 6-1. RTM Log

 : 15:24 means 15 minutes and 24 seconds


 : 33.5 means 33 and 5-tenths seconds

Figure 6-2. Last Transaction Time Indicator

RTM INFORMATION DISPLAY OPTIONS AND HOST SUPPORT

The controller's configuration program allows you to choose the extent to which you wish RTM information displayed within your network and whether or not the host can access RTM data.

If you are executing under BSC, no host support option is available. If you are executing under SNA, you can choose a host support option. A host application must be written before the host can access RTM data.

These are the host support and information display options:

- Response Time Monitor (RTM) disabled
- RTM on PORT 0 (NO Host Support)

With this option the RTM log can be displayed and reset and the Last Transaction Time Indicator (LTTI) displayed on the port 0 device only. The host CPU cannot retrieve RTM data.

- RTM on ALL ports (NO Host Support)

With this option the RTM information can be displayed and reset and the LTTI can be displayed on all attached devices. The host CPU cannot retrieve RTM data.

- RTM NO ports (w/Host Support)

RTM data cannot be displayed or reset by any attached devices. Only the host CPU can retrieve or reset RTM data.

- RTM on PORT 0 (w/Host Support)

Port 0 is allowed to display RTM log information and LTTI. The host CPU is allowed to retrieve and reset RTM data.

- RTM ALL ports (w/Host Support)

All ports are allowed to display RTM log information and LTTI. The host CPU is allowed to retrieve and reset RTM data.

NOTE: The last three options are not available on channels configured for BSC.

If host support is not available, you can reset the RTM logs from port 0 or for all ports depending on which configuration option you choose. Procedures given later in this section tell you how to reset the RTM log.

If you choose host support, you may not reset the RTM logs.

RTM BOUNDARIES AND OTHER RTM OPTIONS

The controller's RTM support feature gives 5 counters to each session executing in the network. During configuration, you must select a maximum time to be associated with each counter. This maximum time is the counter's boundary. Figure 6-3 shows the relationship between counters and sample boundaries.

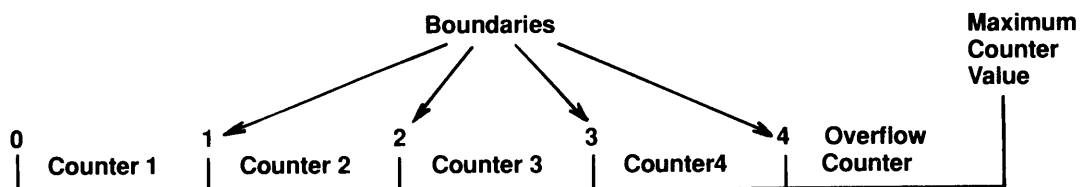


Figure 6-3. RTM Counters and Boundaries

RESPONSE TIME MONITOR

When a host transaction is ended, the response time is compared with the first counter in the series. If the response time is less than or equal to that counter's boundary, the counter is incremented. If the response time does not fit into the first counter, the response time is compared with the second counter, and so on through the series. If the response time does not fit into any of the boundaries, the fifth counter, an overflow counter is incremented.

Figures 6-4 and 6-5 show the configuration panels onto which you enter boundary times. The first panel shows RTM options for a network that executes under SNA; the second panel shows RTM options for a network that executes under BSC.

1174 Configuration	RTM (SNA) – CHANNEL A	LEVEL: X.X
RTM Boundary 1:	00 : 01 . 0	
RTM Boundary 2:	00 : 02 . 0	
RTM Boundary 3:	00 : 05 . 0	
RTM Boundary 4:	00 : 10 . 0	
RTM Measurement:	First Character	
RTM Enable Option:	OFF – until Host Enables	
RTM UNBIND Option:	NO Log on UNBIND	
RTM Counter Overflow:	NO Log on OVERFLOW	
RTM Alert Option:	NO RTM Alert Messages	
PF: 1=MENU	2=DEFAULT	5=BACK 6=FWD 7=SAVE 8=HELP

Figure 6-4. SNA Response Time Monitor Panel

1174 Configuration	RTM (NON-SNA) – CHANNEL A	LEVEL: X.X
RTM Boundary 1:	00 : 01 . 0	
RTM Boundary 2:	00 : 02 . 0	
RTM Boundary 3:	00 : 05 . 0	
RTM Boundary 4:	00 : 10 . 0	
RTM Measurement:	First Character	
PF: 1=MENU	2=DEFAULT	5=BACK 6=FWD 7=SAVE 8=HELP

Figure 6-5. BSC (NON-SNA) Response Time Monitor Panel

The fields on the two panels are described below.

RTM Boundaries – The four boundary items allow you to establish four times for the RTM.

Rules for setting the boundaries are:

- Boundary values must be entered in ascending order.
- Entries are made in minutes, seconds, and tenths of seconds. The maximum boundary value is 27:18.3 (27 minutes, 18.3 seconds).
- If any boundary other than boundary four is configured as the maximum value, the boundaries that follow must be configured to 00:00.0.
- At least one boundary must be defined.
- If less than four boundaries are defined, the entries must begin with “Boundary 1” and continue without skipping through the last entry.

RTM Measurement – This item allows you to select the parameter the RTM will use to end its measurement of a response time. All response time measurements begin with the depression of a host attention key. Choose one of three options:

- **First Character** – Choosing this parameter ends an RTM measurement when the first character is displayed on the screen after a host attention key is pressed.
- **Keyboard Unlocked** – Choosing this parameter ends an RTM measurement when the keyboard is reset for use after a host attention key is pressed.
- **Change Direction/End Bracket (CD/EB)** – In SNA operations, choosing this parameter ends an RTM measurement when a Change Direction (CD) or End Bracket (EB) is received.

NOTE: This option is not available on non-SNA channels.

RTM Enable Option – This function is available only for SNA. It allows you to choose the method with which the RTM feature will be enabled. Choose one of the following:

- OFF – until Host Enables
- ON at Control Unit IML

RTM UNBIND Option – This function is available only for SNA. Enabling this function causes the RTM feature to transmit RTM logs whenever an SNA session is unbound. Choose one of the following options:

- NO Log on UNBIND
- Log on UNBIND

RESPONSE TIME MONITOR

RTM Counter Overflow – This function is available only on channels that execute under SNA. Enabling the function causes the RTM feature to transmit RTM logs whenever an RTM counter overflows. Choose one of two options:

- No Log on OVERFLOW
- Log on OVERFLOW

RTM Alert Option – This function is available for SNA only. It causes an alert message to be transmitted when an RTM counter overflows. Two options are available:

- NO Alert Messages
- Send Alert if Counter Overflows

DISPLAYING THE RTM LOG

The following procedure shows you how to display RTM logs. Depending on your configuration choice, you can display the RTM log from the port 0 display station only, or from all display stations attached to the controller.

Follow these steps to display the RTM log.

- 1) Place the display station in Test mode by pressing the Alt + Test keys.

The Test mode main menu appears:

Main Menu		1174 Test Mode
Test	Description	
1	Terminal Test	
2	Display Configuration Panels	
3	Display Device Status	
4	Event Logs Menu	
5	Broadcast Message to Status Line	
6	Extended Attributes Demo	
7	Response Time Monitor Menu	
A	Operator Initiated Alert	
D	Online Diagnostics Menu	
P	Print Menu	
W	Window Configuration	
V	Vital Data	

Select Test: Depress Enter

Figure 6-6. Test Mode Main Menu

2) Type 7 to select the RTM menu.

This appears:

Response Time Monitor Menu		1174 Test Mode
Test	Description	
1	Display RTM Logs	
2	Clear RTM Logs	
Select Test:		Depress Enter

Figure 6-7. Response Time Monitor Menu

3) To display the RTM log for this host, type 1 next to Select Test and press Enter.

a) To display the RTM log for a different logical host, type 1,x

where: x designates the logical host. Allowable values are A and B.

b) The RTM Log panel (see Figure 6-8) appears.

c) Press your keyboard's Local Print key if you want to print the display.

To reset the RTM log, type 2 (or 2,x as described above).

Display RTM Logs										1174 Test Mode
										Host: A
@ = 002										
@	DEF	CRT#1	BDY#1	CTR#2	BDY#2	CTR#3	BDY#3	CTR#4	BDY#4	OV
002	1	5100	1.0	4680	2.0	183	5.0	2	10.0	0
003 ?	1	1229	1.0	0	2.0	0	5.0	0	10.0	18,850
004p	1	0	1.0	0	2.0	0	5.0	0	10.0	0
005_	1	0	1.0	0	2.0	0	5.0	0	10.0	0
006 *	2	713	1.0	342	2.0	49	5.0	0	10.0	0
007	1	0	1.0	0	2.0	0	5.0	0	10.0	0
008	1	0	1.0	0	2.0	0	5.0	0	10.0	0
009i	1	48	1.0	75	2.0	3,609	5.0	2	10.0	0
Press PA2 to advance through all LU's										

Figure 6-8. RTM Log

RESPONSE TIME MONITOR

The column headings of the RTM log are described below. The heading (@=nnn) at the top center shows the first LU number of the LUs currently being displayed.

Heading	Meaning
@	LU nnn = LU address p = Device is a printer (no counts are recorded) i = Distributed function terminal _ = Device never powered on ? = RTM disabled by the host for this device
DEF	Response time definition codes 1 = Time to first character on screen 2 = Time to keyboard usable by operator 3 = Time to change direction/end bracket * = Parameter set by the host * preceding the DEF code indicates that the definition has been changed by the host * following the DEF code indicates that the boundary values have been changed by the host
CTR#1	First counter (response time is equal to or greater than 0 and equal to or less than boundary #1 value)
BDY#1	First boundary in minutes and seconds
CTR#2	Second counter (response time is greater than boundary #1 value and equal to or less than boundary #2 value)
BDY#2	Second boundary
CTR#3	Third counter (response time is greater than boundary #2 value and equal to or less than boundary #3 value)
BDY#3	Third boundary
CTR#4	Fourth counter (response time is greater than boundary #3 value and equal to or less than boundary #4 value)
BDY#4	Fourth boundary
OV	Overflow (responses exceeding the value of boundary #4)

Figure 6-9. RTM Log Column Headings

DISPLAYING THE LAST TRANSACTION TIME INDICATOR

The procedure shown below tells you how to display the Last Transaction Time Indicator (LTTI). Depending on your configuration choice, you can display the LTTI from the port 0 display station only or from all display stations attached to the controller.

Follow these steps to display the LTTI.

- 1) Place the display station in Extended Select mode.
- 2) Press the LTTI key:
 - a) On the 122-key keyboard operating in native mode and on 104-key keyboards, press PF19.
 - b) On 102-key keyboards, press F11.
 - c) On 88-key, and 122-key keyboards operating in emulation mode, press PF11.

If your session is authorized to display RTM data, one of these appears in the operator information area at the bottom of the display:

 : 9:26 means 9 minutes and 26 seconds


 : 08.2 means 8 and 2-tenths seconds

Figure 6-10. Last Transaction Time Indicators

If your display station is not authorized to display RTM data, this appears in the operator information area:

 :

Figure 6-11. LTTI Unauthorized

- 3) To erase the LTTI from your display, Enter the Extended Select mode again, and again press the LTTI key.

RESPONSE TIME MONITOR

HOST INTERFACE FOR SNA

Within an SNA environment, host support is available to set RTM parameters and to collect and display RTM information at a Network Communication Control Facility (NCCF) operator station. An SNA application program can communicate with the controller to solicit RTM information from one logical unit (LU) or from all LUs with nonzero RTM data.

The SNA application program can reset RTM logs. It can also affect collection of RTM information by updating these parameters:

- Activate/deactivate RTM for one or all LUs (no RTM data is collected when RTM is not activated).
- Set RTM boundaries.
- Set RTM definition code.
- Enable/disable subsystem display of RTM logs and LTTI.
- Return unsolicited data when a session ends.
- Return unsolicited data when a counter overflows.

RTM DATA COLLECTION/RESET

RTM data for an LU can be collected only when the LU is in an LU-LU session and RTM is active for the LU. SSCP-LU transactions are not timed. If a counter overflow occurs, collection of RTM data for that LU stops until its RTM is reset.

RTM data is reset when these conditions occur:

- The controller receives an RTM request from the host that contains a reset indication in the request vector.
- The controller receives a host request that changes the boundaries or definition for that LU.
- The controller sends unsolicited RTM data to the host, e.g., unbind or counter overflow.

If unsolicited RTM transmission on UNBIND is not supported, the data associated with each LU may pertain to multiple LU-LU sessions. When RTM data returned to the host applies to multiple LU-LU sessions, a flag indicating this is set in the inbound transmission.

SOLICITED RTM INFORMATION

When the controller is customized to support the host interface for RTM, a request to the controller may be made on an SSCP-PU session that solicits RTM data. The host may solicit data for one LU or for all LUs with non-zero data.

Host requests directed to a specific LU must contain an SNA address list that gives the controller the LUs local address.

When the host requests non-zero RTM data from all LUs, only LUs with non-zero RTM data respond, or, if no LUs have collected data, the last LU configured responds.

UNSOLICITED RTM INFORMATION

The controller may be configured or enabled by the host to transmit unsolicited RTM information when an LU-LU session is unbound, or when an RTM counter overflows.

Once an unsolicited RTM data transmission is ended, RTM data for that LU is reset.

DISTRIBUTED FUNCTION TERMINAL (DFT) INTERFACE

The 1174 controller has an interface that enables distributed function terminals (DFT's) to support RTM. However, because DFTs perform their own keystroke and data stream processing, RTM support is also required within the DFT. Before you attempt to use RTM with a DFT within your network, you should check to see if RTM support is available within the device.

RTM data is maintained for the DFT like this: when the DFT comes online, the controller issues an instruction that contains the RTM definition and authorization to display the LTTI. The DFT then notifies the controller that a transaction is beginning. After it has received and processed the outbound data stream, the DFT notifies the controller that the transaction is ended

If it is authorized to do so, the controller updates the RTM log and the LTTI for the device. If it is authorized to do so, the DFT displays the LTTI.

The controller notifies the DFT of changes in authority or definition.

RESPONSE TIME MONITOR

NEGATIVE RTM RESPONSES

These negative responses can be returned from the host after a REQMS or NMVT request:

Negative Response	Meaning
1003 0001	Network services (NS) header is rejected for one of these reasons: a) Header is not REQMS or NMVT. b) Header is NMVT, but RTM is not supported.
1007 0001	NS header is invalid.
0815 0003	RTM/REQMS request already pending.
0835	Request contains an invalid parameter. Bytes 2 and 3 of the response show the location within the request of the error.

Figure 6-12. Negative RTM Responses

Chapter 7

SNA Alert



SNA ALERT

OVERVIEW

The 1174's SNA Alert function generates alert messages that can be viewed by the NetView operator on NetView's hardware monitor component. These Alert messages contain problem determination information about events or errors that have occurred in the 1174 or in one of its attached devices.

The 1174 also provides an operator-generated Alert support so that operators can call attention to unusual situations.

1174 AND HOST REQUIREMENTS

Before SNA Alert is used, it must be enabled in the 1174's configuration program. The *1174-XR Installation and Configuration Manual* tells how to do this.

If you wish to send operator-generated Alert messages, you must use a control unit terminal (CUT). Distributed function terminals (DFT's) do not support operator-generated Alerts.

The NetView program or Version 3, Release 1 or later, of the NPDA program is required at the host.

SNA ALERT OPERATION

If the 1174 is configured for the Alert function, problem determination information will be sent to the host for the following types of errors:

- Machine checks (2nn, 3nn, 6nn error codes)
- Program checks (4nn, 7nn error codes)
- Communication checks (5nn error codes)

Alerts are queued within the 1174 until the protocol allows them to be transmitted to the host. The maximum number of Alerts that may be queued with the 1174 is as follows:

- One machine check for each attached device
- One program check for each configured LU
- One communication check for each SDLC channel
- One operator-generated Alert for each SDLC channel

SNA ALERT

If an event occurs on a device, LU or channel that already has an Alert queued, the priority of the new event is compared against the priority of the old event. If the second event has higher priority, the first Alert is voided. If the second event has equal or lower priority, the second Alert is voided.

The 1174 is designed to transmit the maximum possible number of Alerts. NetView filtering determines which Alerts are significant.

OPERATOR GENERATED ALERT MESSAGES

Operator-generated Alert messages provide a means for a display operator to report unusual events to the NetView operator. This function is supported on all control unit terminals (CUTs) and on distributed function terminals (DFTs) operating in CUT mode.

During 1174 configuration, one of three options may be selected to enable or disable operator-generated Alert support. The three options are:

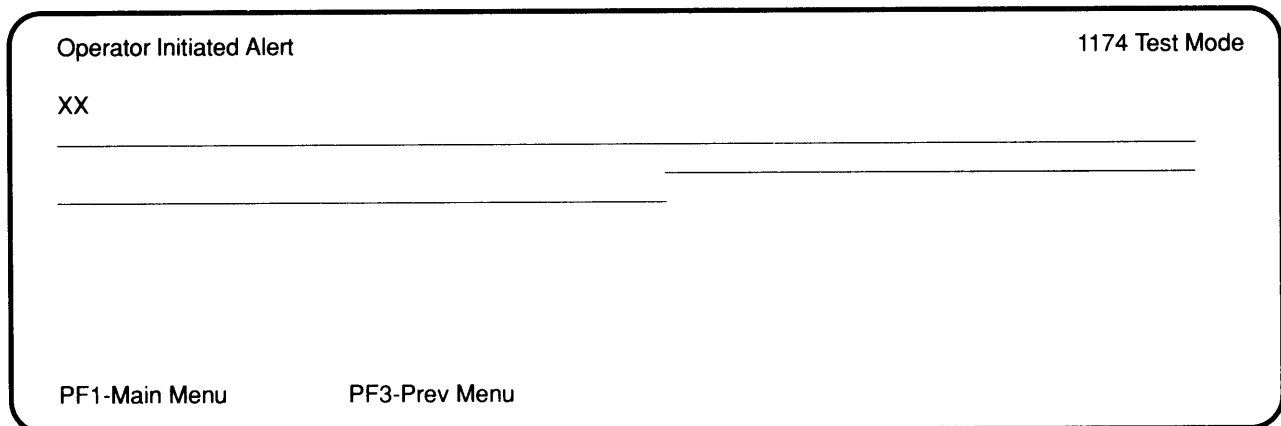
- Alert support with no operator-generated Alert capability
- Alert support with operator-generated Alert on port 0 only
- Alert support with operator-generated Alert on all ports

Authorized display stations can bring up the operator-generated Alert panel through the 1174 test mode facility as follows:

- Press the Alt + Test keys to place the display station in Test mode.
- Enter A next to Select Test. Press the Enter key.

If the display station is unauthorized, the operator unauthorized symbol **XX** is displayed in the operator information area.

If the display station is authorized, this panel appears:



The screenshot shows a rectangular panel with a black border. In the top-left corner, it says "Operator Initiated Alert". In the top-right corner, it says "1174 Test Mode". Below the top-left text, the letters "XX" are displayed. There are three horizontal lines across the middle of the panel, representing a text input area. At the bottom-left corner, it says "PF1-Main Menu". At the bottom-right corner, it says "PF3-Prev Menu".

Figure 7-1. Operator-Initiated Alert Panel

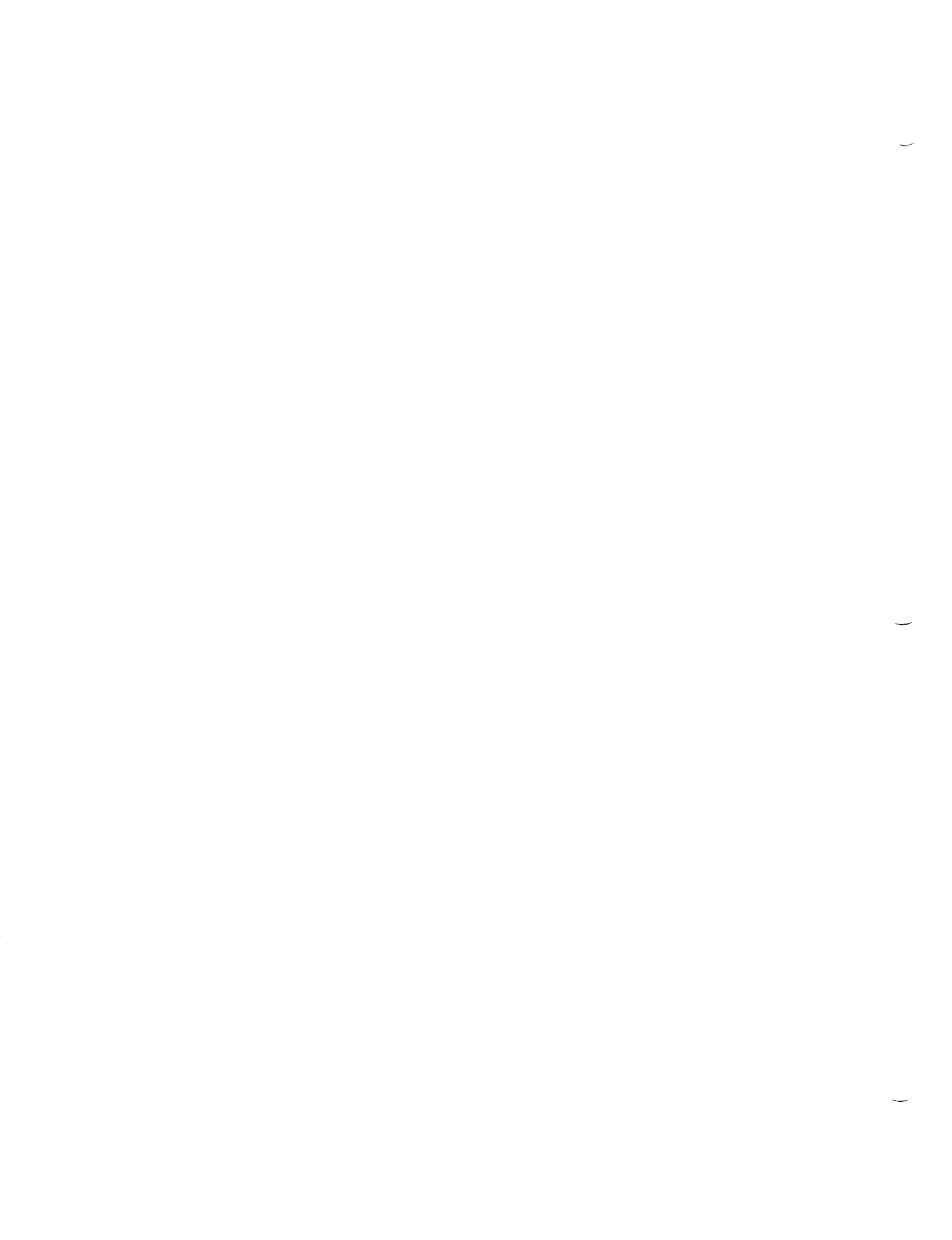
Once this panel is displayed, the display station operator can fill in the desired Alert message. Included in the Alert message is the installation-specified user-action code, a text message of up to 120-characters, and a maximum of three 8-digit qualifiers.

The user-action code (1-20 decimal required) correlates with one of the product-unique panels that can be defined in the NetView program. The text allows the operator to pass a message, such as a description of a problem or unusual situation, to the NetView operator. The qualifiers allow such things as an error code, phone number, etc.

When the Enter key is pressed, the Alert message will be formatted into a Network Management Vector Transport (NMVT) inbound request as long as the following conditions are met:

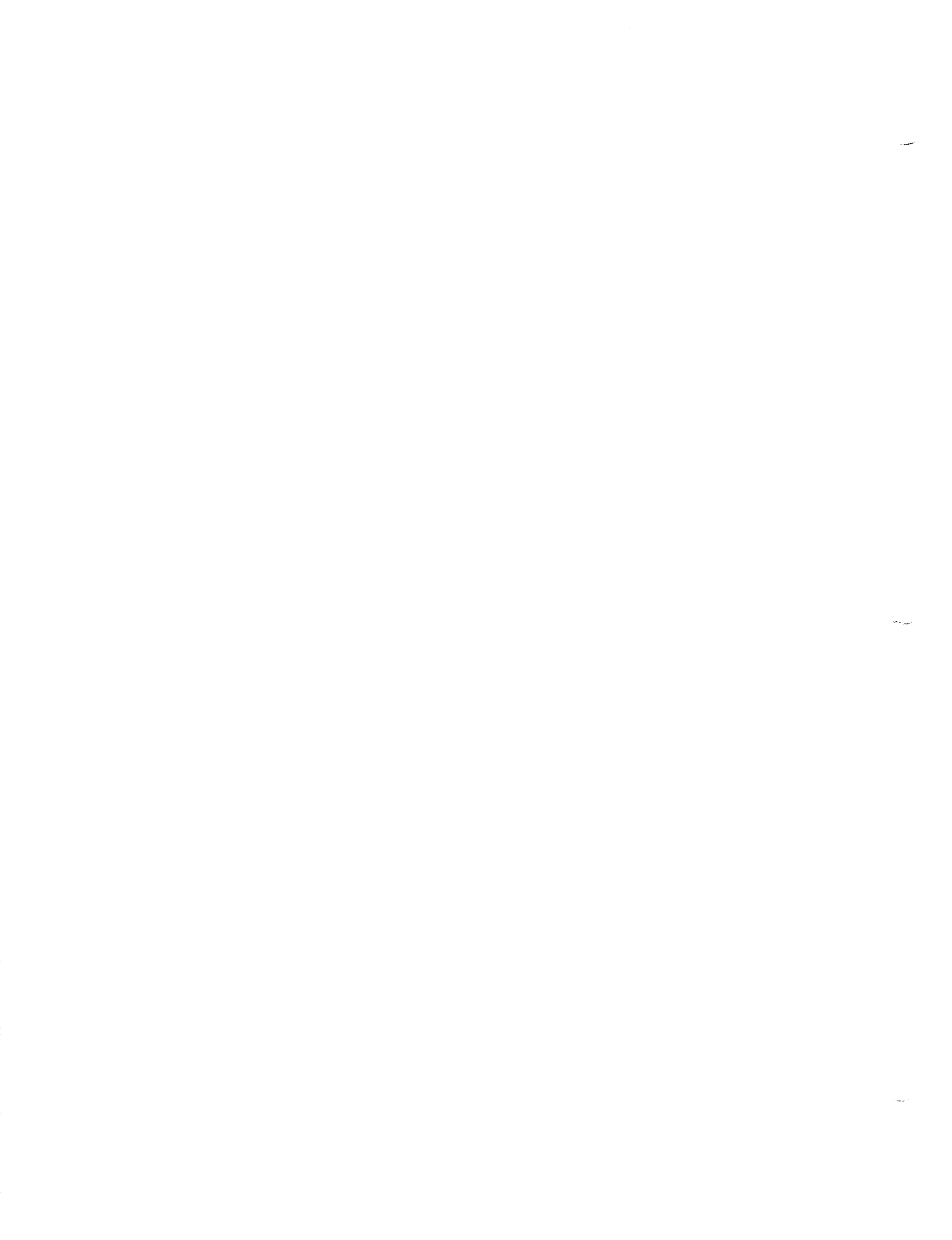
- The user-action code must be between 1 and 20 decimal. If it is not, the what number symbol is displayed in the operator information area.
- If another operator-generated Alert is already queued for transmission, the input inhibited and minus function symbols are displayed in the operator information area. The operator can press the Reset key and attempt the operation again if desired.
- If a communication check (5xx) is detected, a communications reminder will be displayed in the operator information area and the Alert message will not be sent inbound.

If the above conditions are met and the Alert message is queued for transmission, the Alert panel will be cleared from the display screen and a message will appear that indicates the Alert has been processed.



Chapter 8

Request Maintenance Statistics



REQUEST MAINTENANCE STATISTICS

OVERVIEW

Maintenance statistics and configuration information are kept within the 1174 and can be requested by NetView's Hardware Monitor via the REQMS command. The REQMS command requests SNA summary error counts and configuration information from the 1174 PU and stores the data on the hardware monitor data base. The maintenance statistics can then be viewed by the NetView operator.

RECFMS RESPONSE TYPES

Once the 1174 has received the REQMS command, the RECFMS (record formatted maintenance statistics) command is formatted with summary counts to send inbound to the host system. Four different RECFMS response types are currently supported:

Type 1 – Link Test Statistics

The link test statistics indicate the number of times the Test command was received and transmitted.

Type 2 – Summary Counters

The summary counter statistics record the number of machine checks, communication checks, and program checks that have occurred within the 1174.

Type 3 – Communication Adapter Data Error Counts

Type 3 statistics are kept for communication errors such as overruns, underruns, command rejects, etc.

Type 5 – 1174 Configuration and Patch Information

Two different formats are supported for type 5 maintenance statistics:

1) Format 1 – Configuration Information

Format 1 statistics simply return information inbound indicating the current configuration of the 1174.

REQUEST MAINTENANCE STATISTICS

2) Format 2 – 1174 RPQ and Patch Information

Format 2 statistics return information about any RPQ's or patches that are present. Null data returned for this type of RECFMS indicates that no RPQ's or patches are installed.

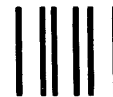


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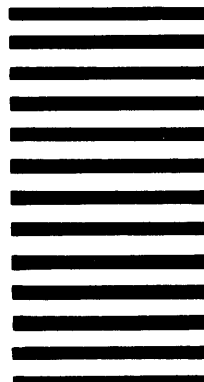
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