

Chapter 2

Monitor



MONITOR

INTRODUCTION

Monitor is the 1374 software facility for debugging and monitoring control unit operation. Field support personnel should use Monitor to gather error data and to examine system operation.

Monitor is accessed from coax display stations attached to the control unit or from an ASCII terminal attached to the maintenance port. Only one terminal may access Monitor at any one time.

Two Monitor modes are available: Basic and Applications. Basic Monitor resides in system ROM and contains basic commands for microprocessor and memory control. Applications Monitor, which is loaded with operational software, provides more sophisticated monitoring.

Basic Monitor is for offline operation only. Applications Monitor may be used online, but system performance may be affected. The commands for either version are identical for coax or ASCII terminals. Only the method of activating Monitor varies between the terminal types.

If your control unit is operational, Applications Monitor is the resident Monitor mode and provides the most useful commands. Applications Monitor also provides access to several Basic commands. Usually, field support personnel do not access Basic Monitor if Applications Monitor is available.

However, if the 1374 system has faulted with an error code indication, ROM-based Basic Monitor may be the only accessible Monitor mode. Applications Monitor commands cannot be accessed from Basic Monitor.

The most commonly used Monitor commands for field support are I(nspect) and D(isplay). These commands provide access to memory contents, information line status, network configuration, and error logs.

These commands supply important system information for remote maintenance, since LCP cannot be activated from a remote terminal. Some Monitor commands described in this section are intended for system debugging and have minimal field application.

NOTE: Because it provides powerful monitoring capability during online operation, Applications Monitor should be used with caution. Some commands affect device access, while other commands alter controller memory contents. Since Applications Monitor can cause serious degradation of response times (possibly to the point of causing errors), limit its use to testing.

MONITOR

TERMINAL OPERATION

Monitor may be accessed from an ASCII display terminal connected directly or remotely (via a modem) to the maintenance port. Four baud rates are supported: 9600, 2400, 1200, and 300. The default baud rate is 1200. Press the Break key once for 2400, twice for 9600, three times for 300 baud, and four times to return to 1200 baud.

Monitor is activated from an ASCII device on the diagnostic port by pressing Control and D keys on the ASCII terminal keyboard.

Monitor may also be used from any coax display station attached to the control unit. To activate Monitor from a coax device, press Alt, left Shift, and ~ (tilde) simultaneously. Then press Enter to display the Monitor prompt. To exit the Monitor mode, press the Reset key.

SCREEN FORMAT

The screen prompts are different for each Monitor mode: 1> 1====> for Applications, 1>COMMAND: for Basic. The entire screen contents are available for output, except for the operator information area, which is not active in Monitor mode.

With a coax device, scrolling is not performed. Data occupying more than one screen area wraps to the screen top and overlays previous data. If a command that displays a large block of information is to be executed, clear the screen first and then issue the command. With ASCII devices, scrolling is performed.

DISPLAYING THE SOFTWARE REVISION LEVEL

Applications Monitor provides revision level information for Monitor and operational software. The Monitor version level (VX.X) appears on the ASCII maintenance port device during the software load process.

```
MONITOR V4.0
>
> - AUTOSTART AT 00A0:07B0
  - AUTOSTART AT 0080:07C0
>RUN0
```

Figure 2-1. Monitor Version Level - Maintenance Port

The operational software level and revision date appear on the command menu. The model number of the control unit and the operating mode are also shown.

EDITING FUNCTIONS

The following keyboard characters and character sequences provide editing and control functions in Monitor.

3270 Terminal	ASCII Terminal	Function
<-	Backspace	Delete last character
ENTER	RETURN	Interpret & process previous characters as Monitor command
ALT S	CONTROL S	Stop outputting the current datastream to the display
ALT Q	CONTROL Q	Start sending output data
-	CONTROL D	Direct control to ASCII
ATTN 10	ESCAPE 10	Initiate Processor control
ATTN 50	ESCAPE 50	Initiate Token Ring Adapter control
ATTN 61	ESCAPE 61	Initiate Async Adapter control
ALT, Tilde, & L SHFT	-	(3 keys together) Direct Monitor control to 3270 terminal

Table 2-1. Monitor Editing and Control Characters

Two digits are required to select an individual processor with an Escape sequence. The first digit specifies the processor type while the second digit – in the case where multiples of the same processor type are installed in the control unit (e.g., more than one Asynchronous Adapter). In the case where three AA PWBs were installed in a control unit, they would be numbered 0, 1, and 2, with the first (or left-most) being numbered 0. In the previous example, the ATTN 61 accesses the 2nd (from the left) AA PWB. The processor type identifiers are shown in Table 2-2.

Identifier	Processor Type
0	Empty Slot
1	System Services Processor (PROC)
2	Coax IOC
3	Channel IOC
4	Reserved
5	Token Ring Adapter
6	Asynchronous Serial IOC
7-31	Reserved

Table 2-2. Processor Type Identifiers

MONITOR

COMMAND FORMAT

Monitor commands consist of a command mnemonic and parameters, including NUMBERS, SYMBOLS, ADDRESSES, and/or ADDRESS RANGES. Space delimiters are not required, but are accepted. Alphabetic characters may be entered in upper or lower case.

In the command descriptions, the required command parameters are shown in {}; optional parameters are enclosed in []. These braces and brackets are *not* command characters.

NUMBERS (num)

Numbers may be either decimal or hexadecimal. Hexadecimal is the default base. The BASE command sets the numeric base. If the base is hex, the last two digits entered form a byte value; the last four digits form a word value.

SYMBOLS (sym)

Symbols consist of a consecutive sequence of 1-15 alphanumeric characters. The first character must be alphabetic.

ADDRESSES (addr)

Addresses consists of either a segment register mnemonic and an offset value, or a segment value and an offset value. The four mnemonics for segment registers are:

- CS – Code Segment
- DS – Data Segment
- EX – Extra Segment
- SS – Stack Segment

The formats for specifying an ADDRESS are:

sr:oooo	segment register mnemonic:offset value
ssss:oooo	segment value:offset value
oooo	offset value (use previously selected segment value)

ADDRESS RANGE (range)

Address range consists of an address (segment:offset) followed by an optional length indicator (Lxx). The length indicator (xx) defines the number of bytes in the range.

For example, "3000:0120 L20" indicates an address range starting at segment 3000, an offset of 0120, and extending 20 bytes.

Basic Monitor mode assumes a default length of 128 if no length parameter is specified. In Applications Monitor mode, the default value is the last "L" range used (set to 128 on power up).

BASIC MONITOR

The command prompt for the ROM-based Basic Monitor is 1>COMMAND:. This prompt appears immediately following execution of a command.

The commands listed in the next table are available in Basic Monitor mode. The BASE, D, and E commands may also be used in Applications Monitor.

Command	Description
BASE	Sets numeric and character bases
D	Displays memory contents
E	Enters data into memory
L	Loads processor
R	Register displays

Table 2-3. Basic Monitor Commands

The maximum number of characters that may be entered into a Monitor command line is 78.

ERROR MESSAGES

The following error messages appear if the command format is incorrect, where XXXX is the command.

"XXXX*INVALID COMMAND" – (Command not recognized.)

"XXXX*SYNTAX ERROR" – (Command recognized but syntax incorrect.)

"XXXX*UNDEFINED" – (Command recognized, but argument invalid.)

When a command that does not display information is issued, the message 1> – OK (or similar response) appears on the screen to indicate execution.

If the Basic Monitor is to be activated from Applications Monitor, the Applications HALT command must first be issued to force a fault condition. Ignore the error message and register data on the screen.

MONITOR

ACTIVATING BASIC MONITOR FROM APPLICATIONS MONITOR

```
1> 1====> HALT

1>EDAC ERROR
AX=0002 BX=02D8 CX=0003 DX=0000 SP=02D8 BP=02E2 SI=12F9 DI=0001
DS=7727 ES=0122 SS=01E9 CS=01E9 IP=02DA FLAGS=F293
1>COMMAND: _

1>CONTROL UNIT DIAGNOSTICS -- V1.0.0

====> _
```

Figure 2-2. Using the Halt Command

NOTE: The Halt command terminates normal 1374 operations.

BASIC MONITOR COMMANDS

BASE {sym}

Sets the number base or character set to be used for selected command input and output. The defaults are hexadecimal and ASCII.

sym= H for hexadecimal
D for decimal
A for ASCII
E for EBCDIC
I for IBMCODE

D [range]

Displays the contents of the memory location defined by the optional range parameter. Initial default values for the range parameter are: segment = DS, offset = 0000, and length = 128. For subsequent D commands, the default segment is set to the segment selected by the previous D command, the default offset is set to the location immediately following the last entry displayed by the previous D command, and the default length is set to the length defined by the previous D command.

NOTE: If an extraordinary long length is selected, it may take an inordinate amount of time to display the contents of the selected memory and complete the execution of this command. Once the D command has been issued, it cannot be terminated until it has completed.

Ensure that the address requested, including the starting address and length, exists. Selecting a non-existent address causes a MEMORY BUS TIMEOUT error from which there is no recovery.

The memory contents are displayed in the form:

segment: offset bytes ASCII translation

The numeric values appear in hexadecimal regardless of the base setting. Each numeric value is also translated into its equivalent character for the character set defined by the BASE command. If no BASE command has been defined, the system defaults to the EBCDIC character set. Numeric values with no equivalent character are translated into a period. These translations (and/or periods) appear at the end of each line.

```

1>COMMAND:D 1000:0 L30
1>
1000:0000 41 42 43 00 00 00 00 00 - 00 00 00 00 00 00 00 00 ABC....
1000:0010 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
1000:0020 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
1>COMMAND: _
    
```

Figure 2-3. Basic Monitor D Command Example

E {addr} [num1 num2]

Enters the numbers: num1 num2 (byte values separated by spaces) into memory starting at the specified address. If the numbers are omitted, the contents of the memory at the specified address are shown.

NOTE: Specifying a non-existent address causes a MEMORY BUS TIMEOUT error from which there is no recovery.

Figure 2-4 shows an example of the E command. The D command is also shown to illustrate the new memory contents.

MONITOR

```
1> 1==> COMMAND:E 1000:0 41 42
1> - OK
1>COMMAND:_

1>COMMAND:D 1000:0 L30
1>

1000:0000 41 42 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 AB.....
1000:0010 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
1000:0020 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
1>COMMAND:_
```

Figure 2-4. Basic Monitor E Command Example

L {sym}

Loads the processor with programs from the diskette. In the field, this command is used to execute a software dump for problem analysis. The name of the file to be loaded is sym. An example of the L DUMP command is shown next. This screen appears when the control unit detects a fault and tries to load the dump software from the dump diskette, and finds that the dump diskette is not installed. After the dump diskette has been installed in the diskette drive, enter the L DUMP command.

```
1>COMMAND:FAULT
1>
L DUMP*FILE MISSING

FAULT 8002
AX=0002 BX=02D8 CX=0003 DX=0000 SP=02D8 BP=02E2 SI=12F9 DI=0001
DS=780A ES=010D SS=01D3 CS=01D3 IP=02DA FLAGS=F293
DISASSEMBLY NOT RESIDENT

1>COMMAND = L DUMP
```

Figure 2-5. Basic Monitor L Dump Command Example

R [sym [num]]

Sets the contents of the processor register defined by the sym parameter to the value specified by the num parameter. If no num parameter is specified, the current contents of the register defined by the sym parameter appear. The sym parameter specifies the mnemonic of the desired register.

Figure 2-6 shows an example of the default R command at the top of the screen. Specific R command parameters are shown in the middle of the screen with an example of the altered register contents.

```

1>COMMAND:R
1>
AX=0002 BX=02D8 CX=0003 DX=0000 SP=02D8 BP=02E2 SI=12F9 DI=0001
DS=780A ES=010D SS=01D3 CS=01D3 IP=02DA FLAGS=F293
DISASSEMBLY NOT RESIDENT

1>COMMAND:R BX 1234
1>
BX: 1234 - DONE
1>COMMAND:R
1>
AX=0002 BX=1234 CX=0003 DX=0000 SP=02D8 BP=02E2 SI=12F9 DI=0001
DS=780A ES=010D SS=01D3 CS=01D3 IP=02DA FLAGS=F293
DISASSEMBLY NOT RESIDENT

1>COMMAND:_

```

Figure 2-6. Basic Monitor R Command Example

APPLICATIONS MONITOR

The Applications Monitor prompt is 1> XX=> (where XX is a one or two digit number). The Enter or Return key must be pressed to request the prompt before entering a command.

Applications Monitor, which is loaded with the system software, provides several commands in addition to the BASE, D, and E Basic Monitor commands. The Applications Monitor commands described in this section are shown in Table 2-4.

Command	Description
BASE	Set numeric and character bases
C	Contacts 1374 port with reset
D	Displays memory contents
E	Enters data into memory
FAULT	Faults Processor, dumps memory
HALT	Exit to Basic Monitor
I	Inspects buffers, tables, etc.
L	Logical unit select
P	Port select
T	Trace points turned on or off
X	Tests device subsystem
S=PUxx	Select physical unit under dual host operation

Table 2-4. Applications Monitor Commands

The maximum character length for command lines is 19.

MONITOR

Applications Monitor first attempts to compare a given command with its command set. If the command is not recognized, it is passed to the Basic Monitor. If the Basic Monitor cannot interpret this command, an error message is generated.

Inputting a Basic command not supported by Applications Monitor causes a NOT RESIDENT error message to appear. A syntax error or invalid command is indicated by four question marks -- 1>?????. Other errors are self-defined, such as: 1>INVALID INSPECT REQUEST.

The HALT command may be issued from Applications Monitor to access Basic Monitor mode.

```
1> 1==>
1>
Type: SNA, Remote, 1R 40s01rm4 Rel: Prod_4.0 , 02/12/89 10:21

I=INSPECT control block
  I = AAB J = SCSB O = APB M = CCB x
  A = ACB          B = DEV IMAGE BFR
  D = DCB          E = ERROR LOG
  I = A1B          K = LKB (pu=1)
  L = LU-LU HSCB  N = NETWORK TABLE
  P = PUCB (pu=1) S = SSCP-LU HSCB
  T = TRACE PTS   X = PUCP-PU HSCB
  Y = SSCP-PU HSCB
Z=TOKENS
T=TRACE -/Yxx/Nxx
P=PORT xx
L=LU xx
S=PU xx
C=CONTACT
X=TEST Cxx/Dxx/Axxxx
  C=COMMAND
  D=DATA
  A=ADDRESS
A=ACTIVATE LINK II n
```

Figure 2-7. Applications Monitor Menu

NOTE: The Applications Monitor menu contains commands in addition to those shown in the previous table. These additional commands are for advanced troubleshooting and are not described in this manual.

APPLICATIONS MONITOR COMMANDS

BASE {sym}

Sets the number base or character set to be used for selected command input and output. The default number base is hexadecimal, and the default character set is ASCII.

sym= H for hexadecimal
 D for decimal
 A for ASCII
 E for EBCDIC
 I for IBMCODE

C

Sends a contact request to the 1374 device driver subsystem which resets the currently selected device port (see P command). After the request is completed, a response message of CONTACT ++ appears.

E {addr} [num1 num2]

Enters the values defined by num1, num2, (up to two byte values separated by spaces) into memory beginning at the specified address. If num values are not defined, the contents of the memory at the specified address appear.

Figure 2-8 shows an example of the E command. The D command is also shown to illustrate the new memory contents.

```

1> 1====> COMMAND:E 1000:0 41 42
1> - OK
1>COMMAND: _

1>COMMAND:D 1000:0 L30
1>

1000:0000 41 42 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 AB.....
1000:0010 00 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
1000:0020 00 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....

1>COMMAND: _
  
```

Figure 2-8. Monitor E Command Example

FAULT

Forces the Processor to fault and attempts to load the dump diskette. The L command in Basic Monitor performs the same function. FAULT terminates all 1374 sessions.

HALT

Stops the Processor without faulting or dumping. A parity error fault (displayed as EDAC) is generated and control is passed to the Basic Monitor. HALT terminates all 1374 sessions. Reset the control unit by powering it off and back on or by pressing the IML button to return to operational control.

MONITOR

I {par1 [par2]}

Inspects the contents of the subject indicated by par1.

NOTE: Inspect command parameters in addition to those described next appear on the Applications Monitor menu. Those parameters are for advanced testing and troubleshooting and are not described here.

- par1 = D Device Control Block
- = B Device Image Buffer
- = T Trace Point Table
- = N Network Configuration Table
- = E Event/Error Log Table
- = A Line Adapter Control Block (ACB)
- = K SNA Link Control Block (LKB) or BSC Line Control Block (LCB)
- = L LU-LU Half-Session Control Block
- = P SNA Physical Unit Control Block (PUCB) or Non-SNA Control Block (PSNCB)
- = S SSCP-LU Half-Session Control Block
- = X PUCP-PU Half-Session Control Block
- = Y SSCP-PU Half-Session Control Block
- = 8 [LSA] Inspect local storage, where LSA defines the address and channel adapter as follows:

I 8 [0000 aaaa aaaa aa0h]

Inspect local storage at address "aaaa aaaa aa" for High-Speed Channel Adapter 0h, where h indicates the number of the HCA (always 0).

- = 8 [SCB] Inspect subchannel control block and history, where SCB defines the control block and channel adapter as follows:

I 8 [ssss ssss 0000 001h]

Inspect subchannel "ssss ssss" control block for High-Speed Channel Adapter 1h, where h indicates the number of the HCA (always 0).

For example, command "I 8 A002" inspects subchannel control block and history for subchannel A0, channel adapter 0.

The Physical Unit (PU) defaults to PU1 when inspecting the LKB, UCB, PUCP-PU HSCB, and the SSCP-PU HSCB. The Logical Unit (LU) of the current port is used when inspecting the SSCP-LU HSCB, LU-LU HSCB, or DIB and the current port is used when inspecting the SDVB, PSNCB, and DCB.

For the Asynchronous Adapter, the I command parameters are:

- par1 = A Asynchronous Adapter Control Block
- = P Asynchronous Protocol Control Block
- = S SCS Control Block

The Asynchronous device port number needs to be defined before the "I" command can be used. To obtain the port number, subtract 32 from the port number of the desired Asynchronous port. Asynchronous port numbers range from 32 to 55 (for a maximum of 24 ports). Use this number for the Asynchronous device port command.

I B [par2]

Displays the contents of the device buffer currently defined for the port selected by the P command.

Figure 2-9 shows a standard feature terminal without extended attributes (each byte represents a character). The amount of buffer space shown on a screen panel depends on the terminal model and its features. Extended features require two bytes per character.

```

1> 1====> I B
1>Address = 0F19:0000

0000 FC 00 00 00 20 23 00 00 - 00 00 00 00 00 00 00 00 ....03.....
0010 00 00 00 00 00 00 00 00 - AB AB AD AA F0 F2 F3 25 .....LINK...5....
0020 20 25 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 05.....
0030 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0040 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0050 B3 87 88 92 10 88 92 10 - 93 87 84 10 85 88 91 92 ...This is the first
0060 93 10 8B 88 8D 84 10 8E - 8D 10 93 87 84 10 83 84 .....line on the dev
0070 95 88 82 84 10 80 93 10 - 8F 8E 91 93 10 23 00 00 ...ice at port 3....
0080 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0090 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
00A0 A0 8D 83 10 93 87 84 10 - 92 84 82 8E 8D 83 00 00 And the second.....
00B0 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
00C0 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
00D0 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
00E0 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
00F0 A0 8D 83 10 93 87 84 10 - 93 87 88 91 83 00 00 00 And the third.....
0100 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0110 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0120 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....

```

Figure 2-9. Monitor IB Command Example

MONITOR

IE

Lists the last 10 errors or events detected by the control unit.

```
1> 1====> I B
1>
TIME      CHK/STAT PARAMETERS
-----
00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000
00305709 02070000 010000A4 00000001 2E000000
00434103 02070000 010200A4 00000001 2E000000
00435900 02070000 010300A4 00000001 2E000000
00441906 02070000 010800A4 00000001 2E000000
00493501 02070000 010100A4 00000001 2E000000
00494603 02070000 010600A4 00000001 2E000000
01013109 02070000 010600A4 00000001 2E000000
```

Figure 2-10. Monitor IE Command Example

The information appears in the following format:

Time: hhmmsstt -- hours, minutes, seconds, tenths
Chk/Stat: ccccssss -- check error code, sense code
Parameters: ppddiiii iiiiiii iiiiiii
 where: pp = physical unit (01 or 02)
 dd = device number
 ii = internal use codes

The check error code information is displayed on line 25 of the terminal. The sense code information is sent to the host.

IN

Displays the current 1374 port configuration. Contact your next level of support for bit breakdown.

```
1> 1====> IN
1>Address = 012A:0218
0000 01 AC A9 00 00 00 00 00 - 01 AC A9 00 00 00 00 00.....
0010 00 00 00 00 00 01 A4 08 00 - 00 00 00 00 00 00 00.....
0020 01 A4 08 00 00 00 00 00 - 07 A4 08 00 00 00 00 00.....
0030 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00.....
—
```

Figure 2-11. Monitor IN Command Example

L {num}

Selects the logical unit specified by the hexadecimal num parameter.

P {num}

Assigns the hexadecimal number specified by the num parameter as the port to be used for subsequent commands. After this command is executed, the response "PORT ++" appears.

T {par1}[par2]

Turns on/off selected internal trace points defined by par1. Trace points for a given port can be specified by entering the optional port number parameter (par2).

par1 = -	Turn off all trace points.
= Yxx	Turn on the trace point xx.
= Nxx	Turn off the trace point xx.
par2=	Port Number

X {par1}

Sends a test request to the 1374 Device Driver subsystem. The Device Driver then interacts with the Coax Protocol Driver to perform the activity indicated by par1:

par1 = Cxx	Send the command code xx.
= Dxx	Send the data byte xx.
= Axxxx	Send the address value xxxx.

S=PUxx

Selects the physical unit under dual host operation. Valid parameters for xx are 1 and 2, with the default being 1. When not operation under dual host, 1 is the only valid parameter.

