

232 Monitor Plus

Installation and Operation Manual

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TRADEMARKS USED IN THIS MANUAL

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Overview of the 232 Monitor Plus

Figure 1 on page 3 shows the many ways you can use the 232 Monitor Plus.

- 1 Troubleshoot printers to eliminate handshaking problems.
- 2 Determine transmission quality of a leased line.
- 3 Remotely operate the 232 Monitor Plus from any ANSI-standard CRT terminal.
- 4 Flag cables with broken wires
- 5 Troubleshoot terminals.
- 6 Monitor data transmission.

NOTE: Both connectors on the right side are connected on all pins. So you may elect to only attach one side via a "Y" cable to avoid disrupting circuits.

Using This Manual

This *Installation and Operation Manual* provides detailed information about the commands and submenus available in the View Mode, and describes the values allowed in the Configure Menu.

The 232 Monitor Plus Keyboard

Each key of the 232 Monitor Plus can serve three distinct functions. Thus, there are three ink colors on most of the key labels:

- RED= Main text (keys that appear on a standard keyboard)
- GREEN=Subtext
- WHITE=Upper text (commands)

Brackets [] on the Screen

To conserve screen space, the 232 Monitor Plus references *command keys* (the white "upper" text on a key) by the letter of the alphabet that resides on the same key (the key's red letter). The alphabet letter is placed in brackets [] to indicate it is a reference to the command that shares the key with the alphabet letter.

For example, the command

PULSE CAPTURE

would appear on screen as the letter U enclosed in brackets, as shown below:

[U]

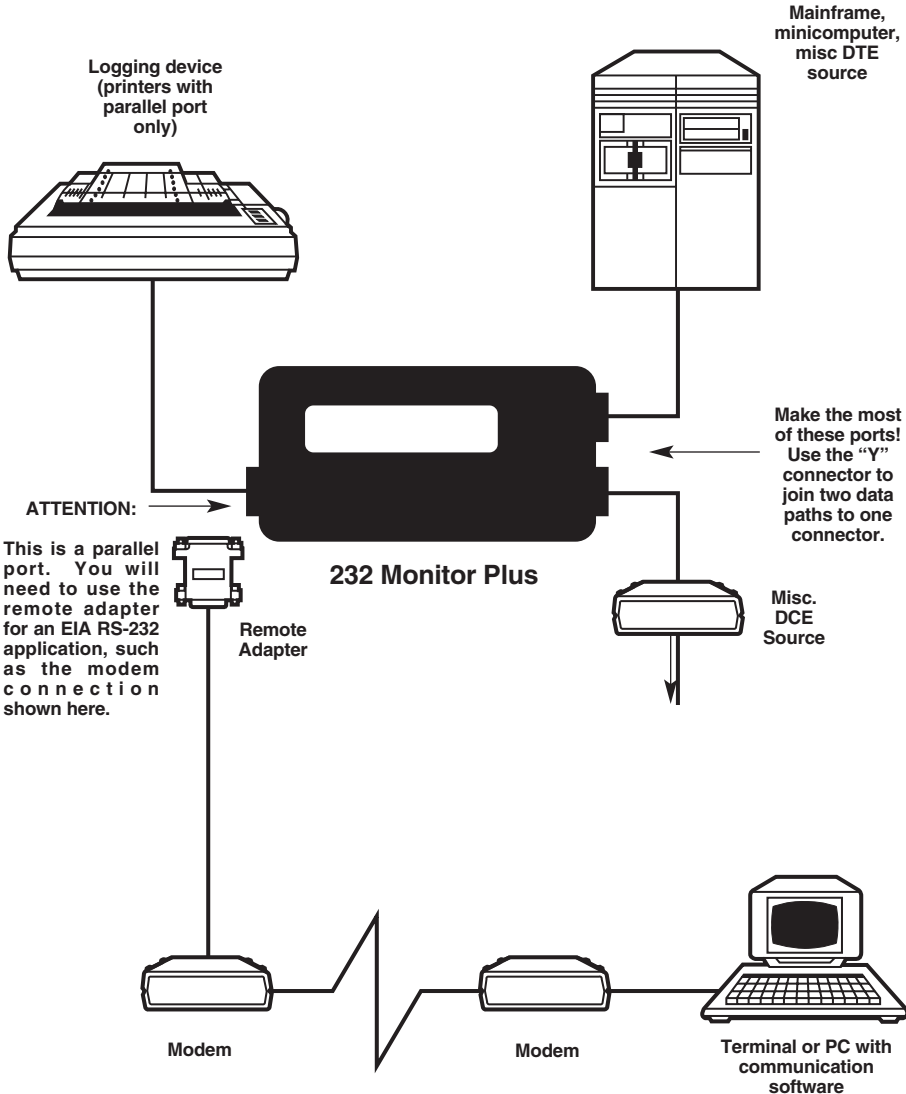


Figure 1. A sample configuration with the 232 Monitor Plus.

Quick Reference

Before You Start, Read Me First!

Make the best use of your time and this device: read the rest of this *Installation and Operation Manual*. This Quick Reference section is intended to accompany you in the field. It is not meant as a substitute for the rest of the information in the manual. Also, please read the following information about the unit's battery and the power switch.

Alkaline battery and the power switch

When storing the 232 Monitor Plus for more than several days, turn the main power switch to the OFF position (slide to the right). This eliminates all current consumption from the battery. A fully charged battery will last for about three (3) months if the main power switch is left in the on position. Memory is preserved for one (1) full year (even when the main power switch is in the off position).

How to start the 232 Monitor Plus

Make sure that the main power switch is in the ON position (slide to the left). Push the POWER ON key (lower right of the keyboard).

Proper shutdown

1. Push the [RESET/SHUTDOWN] key.
2. Press the [START/STOP] key.
3. The computer shuts down: it turns off and preserves memory and option settings.

Setting automatic shutdown to save battery life

The 232 Monitor Plus can shut itself off automatically after a user specified number of minutes without activity. To enable this option:

1. Push the [MENU] key.
2. Push and hold the [PAGE DOWN] key until the *auto off* option appears.
3. Push the ↓ key until the *auto off* option flashes.
4. Enter the number of minutes to delay before shutdown. For example, enter the number 10 to force the unit to shutdown after 10 minutes without data entry or keyboard activity.
5. If you make a mistake, push the ← key to delete erroneous input.
6. Push [MENU] to exit the menu.

The unit will now shutdown after the set number of minutes pass without data or keyboard activity.

How to transmit and capture data

1. Push the [OUTPUT SERIAL] key.
2. Push the [START/STOP] key to start output.

The 232 Monitor Plus will begin to transmit data and capture the transmitted data. Any returned data on the RD line will be placed in the RD buffer.

3. Push the [START/STOP] key to end this process.

For more information, see *Chapter 1, View Mode*.

Production capture of data

1. Use the 3-connector ribbon cable.
2. Attach the single-male connector on this cable to the female connector on the upper-right-side of the unit.

It's not necessary to run data through the unit. Both right-side connectors work for monitoring.

3. Attach the other end of this cable to a working circuit.
4. If the baud rate, word size, and parity of the data stream match the current settings, the 232 Monitor Plus will start capturing and viewing data.
5. If you get framing errors, push [A] to autoconfigure TD on the 232 Monitor Plus.

Peruse captured data

1. Push the [PAGE UP] key anytime during the data capture process. The scrolling action stops and cursor movement will freeze.

The cursor may now be manipulated with the four arrow keys (↑ ↓ ← →), and the HOME, END, PAGE UP, and PAGE DOWN keys. You may also press the period (.) key to execute a GOTO command; this will allow you to go to a specific buffer location.

2. When the default menu option enabling status is set, the value of the data directly under the cursor position is shown in binary, decimal, and hexadecimal radices.
3. Press [RETURN] to resume full speed scrolling or press [END] two times to get to the end of the buffer.
4. When scrolling, push [←] to slow the scrolling rate and [→] to speed the scrolling rate. The variations in scrolling do not affect the data capture process.
5. To go to the beginning of the capture buffer, press [HOME] two times.

Advanced features: STATUS key

The status display is normally enabled.

1. Push the status key to show the cursor location and character values.
2. Push the [STATUS] key a second time to show the current state of the modem interface leads.
3. Push [STATUS] a third time and the state of each signal (when selected character was received) is shown.

For more information about status screens, see *Chapter 1, View Mode*, p.18.

How to exercise a parallel printer

1. Attach the 25-pin ribbon cable to the left-side connector.
2. Attach the other end of the cable to a parallel printer.
3. Push [P] for print parallel.
4. Push [START/STOP] to begin printing.
5. Push [START/STOP] to stop printing.

Examining captured data in HEX

With data in the buffer, press [H] and the entire screen will change to HEX representation. Return to Text display by pushing [H] again.

Create or edit a string

1. Push [E] for edit.
2. To create string 1, type the string of character. Use the cursor key to edit your string.
3. Push [START/STOP] to exit the editor.

Strings are used:

- to start and stop triggers
- as custom output strings
- as timer triggers
- as buffer search patterns.

For more information about editing strings, see *Chapter 1, View Mode*, pp. 8–9.

Quick Setup

Before You Start, Read Me First!

Make the best use of your time and this device: read the rest of this manual. This Quick Setup section is not meant as a substitute for the information in rest of the manual. Please read the Quick Reference section on **page 4** for information about the unit's battery and power switch.

Getting started

1. Insert RS-232 cables into the supplied Y-connector.
2. Insert the Y-connector into either connector on the right side of the 232 Monitor Plus.
3. Flip main power switch on.
4. Press POWER key on.
5. Data should appear on the screen. You should now be in View Mode.

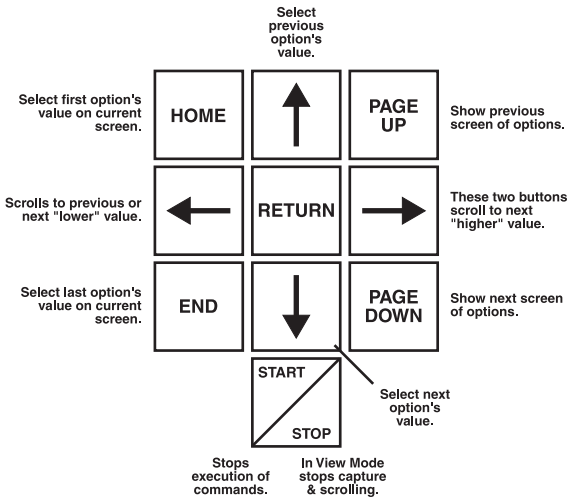
When in View Mode, you can:

- Wait for transmitted data to appear.
- Turn off the unit (SHUTDOWN then STOP).
- Press HELP to get more information.
- Execute any commands (e.g. Autoconfigure TD, Status).
- Switch to the Configure Menu mode to set communications parameters.

There are 35 command keys set in *white text*. Push HELP in View Mode to see the command keys listed. For more information, see pp.6-18

Setting Options & Values

Several command keys open sub-menus; each submenu offers options followed by values. Setting the values and scrolling through options is done primarily by using the arrow keys, and the PAGE UP, PAGE DOWN, HOME, END and RETURN keys. (see the illustration below). When in an options menu a selected option value is depicted in reverse video. To increment the value, press RETURN or →. To highlight a different value, use the keys as shown in the illustration below.



Configuration Menu

Used to set communications and other parameters; four screens in all. Scroll through the parameters using the up ↑ and down ↓ arrow keys. To get to the next set of parameters press PAGE DOWN. To change the value of a parameter, press RETURN.

Baud

64000*	14400	1243
56000*	9600	1200
48000*	4800	600
57600	2400	300
38400	2000	150
19200	1800	

*NOTE: Synchronous data only.

Stop Bits 1, 1.5, 2

The number of stop bits set to read in async mode.

Data Bits 8, 7, 6, 5

The number of data bits set to read.

Parity Odd, Even, None

The parity set to read. Choosing Odd or Even assumes an extra bit at the end of the data bit.

Mode Async, Monosync, BSC (bisync),
SDLC, Isochronous

- Async is for asynchronous transmissions.
- Monosync and BSC are byte-oriented sync protocols. Monosynchronous uses an 8-bit sync character; BSC uses two 8-bit sync characters.
- SDLC is a bit-oriented sync protocol that uses an 8-bit flag (hexadecimal 7E) to mark the beginning and end of message envelopes.
- Isochronous is a clocked async mode that allows asynchronous data to be sent over synchronous circuits.

Code ASCII, EBCDIC, IPARS, BAUDOT

The way you would like to view your data.

Sync Char 1 (hex value)

In monosync mode this byte is used as a pad character on all transmission—output, loop, and answerback options. To learn how to enter hex values, see 1.3, *Entering Integers and Hex Values*.

Sync Char 2 (hex value)

Refers to the second synchronous characters in BSC mode or the receive synchronous character in Monosync mode. To learn how to enter hex values, see 1.3, *Entering Integers and Hex Values*.

NOTE: Sync character one and two are loaded automatically in SDLC mode.

Data encoding NRZ, NRZI, FMO, FM1

These are the four data encoding methods.

- NRZ is used in sync and async applications.
- NRZI, FMO (biphase space) and FM1 (biphase mark) are all used in various sync applications.

Ig Mul Syn Char Yes, No

(Ignore multiple synchronous characters)
If you select “Yes”, this tells the unit not to capture synchronous characters. If you select “No”, this tells the unit to capture all synchronous characters.

Drop Sync RTS/CD Yes, No

Select “Yes” to drop synchronization when the Monitor detects Ready To Send or Carrier Detect.

Resync Char None, (hex value)

Selecting “None” has no effect on synchronization. Setting a (hex value) means synchronization is dropped when this character is received.

Resync On Char On, Off

Selecting “On” drops synchronization when it detects Ready To Send or Carrier Detect.

Log Events No, 1Fill, Cont.

Used to keep a log of certain events. See *Time Events* (p. 19, *Chapter One*) on how to view the log.

- “No” means you do not want to keep a log.
- “1Fill” means to fill the log buffer once (when log buffer is full, stop collecting logs).
- “Continuous” means you want to continue capturing logs, and when the buffer is full, to clear logs to make room for newer logs.

Quick Reference/Quick Setup

Status Messages Normal, Long, None, Short

Notifies you of events when “Normal” is selected; e.g., END OF BUFFER. Turn them off (None), view briefly (Short), or linger on the screen (Long).

Idle Display On, Off

“On” displays “Waiting for data” on power up.

Error Messages Fatal, Warn, None

NOTE: When the 232 Monitor Plus is turned on, it will always pass data through itself, even if it cannot recognize speed or other configuration parameters.

Fatal—the Monitor stops receiving at certain hardware errors (a change in line speed, etc.); press any key to begin receiving again. You can enter Configure Menu and change a parameter.

Warn—a message will appear at certain hardware errors, but receiving will continue.

None—suppresses error messages.

Suppress Capture Off, RD, TD, Both

Choose whether you want data captured as follows:

Off	Capture data from both lines
RD	Don't capture RD data.
TD	Don't capture TD data.
Both	Disables capture on both lines. Useful when collecting modem control transitions and hardware handshake changes.

Auto Off (min) (value)

Setting a value means the unit will turn itself off after it has been idle for (*value*) number of minutes.

Display Mode Compressed, Expanded

Compressed—data line characters displayed sequentially to conserve display space.

Expanded—data line characters followed by a blank to facilitate reading at high speeds.

Buffer One fill, Continuous

One Fill—stop collecting data when buffer is full.

Continuous—continue to fill the buffer and discard the oldest data on a first-in/first-out basis.

Exclude Off, Control Data, Text Data

Off—has no effect on capture.

Control Data—the control data will be excluded from the capture (in other words, only the data between the start text character (STX) and the end text character (ETX) will be captured.)

Text Data—text data will be excluded from the capture; in other words, the data between the start text character (STX) and the end text character (ETX) will not be captured.

Start Txt Char (value)

See “Exclude” above. Specify the STX character.

End Txt Char (value)

See “Exclude” above. Specify the ETX character.

Remote Off, On

Insert this unit into an RS-232 circuit, then turn on remote with this menu function to take remote control of this unit. Useful for loopback tests when you don't have an assistant in the remote location.

Remote Baud 57600, 19200, 9600, 4800, 2400, 1200

Communication rate with the remote Monitor Plus.

Invert Rec. Bits Yes, No

Yes—inverts the sense of all incoming bits.

SDLC Status Yes, No

Yes—displays status of SDLC.

CRC Preset Zeros, Ones

Presets the value of CRCs to “ones” and “Zeros”.

SDLC Search Node Search Node All, Node number (hex value)

Choosing “All” (0) captures all nodes. Setting a specific Node number allows you to specify one SDLC node in a loop or polled circuit.

SDLC Search Disable, Enable

Choose enable to go ahead and search for the node specified above in SDLC Search Node.

TABLE OF CODES

Screen	A	B	C	D	E	F	G	H	I	J	K	L	M
ASCII	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D
EBCDIC	C1	C2	C3	C4	C5	C6	C7	C8	C9	D1	D2	D3	D4
IPARS	31	32	33	34	35	36	37	38	39	21	22	23	24
BAUDOT*03	19	0E	09	01	0D	1A	14	06	0B	0F	12	1C	

Screen	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
ASCII	4E	4F	50	51	52	53	54	55	56	57	58	59	5A
EBCDIC	D5	D6	D7	D8	D9	E2	E3	E4	E5	E6	E7	E8	E9
IPARS	25	26	27	28	29	12	13	14	15	16	17	18	19
BAUDOT*0C	18	0E	0F	0A	05	10	14	1E	13	10	15	11	

Screen	a	b	c	d	e	f	g	h	i	j	k	l	m
ASCII	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D
EBCDIC	81	82	83	84	85	86	87	88	89	91	92	93	94
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT	—	—	—	—	—	—	—	—	—	—	—	—	—

Screen	n	o	p	q	r	s	t	u	v	w	x	y	z
ASCII	6E	6F	70	71	72	73	74	75	75	77	78	79	7A
EBCDIC	95	96	97	98	99	A2	A3	A4	A5	A6	A7	A8	A9
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT	—	—	—	—	—	—	—	—	—	—	—	—	—

Screen	0	1	2	3	4	5	6	7	8	9	#	%	\$
ASCII	30	31	32	33	34	35	36	37	38	39	23	25	24
EBCDIC	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	7B	7D	5B
IPARS	0A	01	02	03	04	05	06	07	08	1B	3C	30	—
BAUDOT**16	17	13	01	0A	10	15	07	06	18	14			O9

Screen	.	/	:	;	?	<	>	()	[]	{	}
ASCII	2E	2C	3A	3B	3F	3C	3E	28	29	5B	5D	7B	7D
EBCDIC	4B	6B	7A	5E	6F	4C	6E	4D	5D	AD	BD	8A	9B
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT**1C	0C	0E	1E	19	—	—	0F	12	—	—	—	—	—

Screen	=	&	!	*	+	/	@	-	`		"
ASCII	3D	24	21	2A	2B	2F	40	5F	60	7C	22
EBCDIC	7E	50	5A	5C	4E	61	7C	60	—	4F	7F
IPARS	0E	—	—	—	2C	11	20	1A	—	—	—
BAUDOT**0F	1A	—	—	—	—	—	—	03	—	—	11

Screen	Space	←	→	—	^	'	CR	LF
ASCII	20	7E	7F	—	5E	27	OD	OA
EBCDIC	40	—	—	6D	—	—	OD	25
IPARS	1C	—	—	—	—	—	OC	—
BAUDOT**04		—	—	—	—	—	08	02

BAUDOT *After an SI (1F) character
 BAUDOT **After an SO (1B) character.
 HEX FF will always appear as a c.

2. View Mode

2.1 Introduction

Turn on the 232 Monitor Plus and you are in View Mode. Here's what you can do in this mode:

- Wait for transmitted data to appear.
- Turn off the unit (Press SHUTDOWN, then STOP).
- Press HELP to get more information (see the section on HELP in this chapter or press the HELP key to find out more about this option).
- Execute any commands (e.g., Autoconfigure TD, Status).
- Switch to the Configure Menu mode to set communications parameters.

This chapter explains commands. Chapter 2 covers the Configure Menu. Chapter 3 describes how to operate the Monitor from a remote terminal.

The 232 Monitor Plus has over 35 command keys. Command keys use *white text* to identify their respective command functions. Press HELP while in the View Mode to see all of the command keys listed. They are also listed alphabetically, starting on page 6.

2.2 Setting Options and Values

Several command keys, when pressed, open their respective sub-menus; each submenu offers options followed by values. Setting the values and scrolling through options is done primarily by using the arrow keys, and the PAGE UP, PAGE DOWN, HOME, END, and RETURN keys. Refer to Figure 2.

When you are in an options menu a selected option value is depicted in reverse video (it is "highlighted"). To increment the value of that option, press RETURN or →. To highlight a different option's value, use the keys shown in Figure 2.

2.3 Entering Integers or Hex Values Directly

Some values call for an integer or a hex value. Here are some hints for entering values directly from the keyboard:

- Enter 923, for example, by pressing the keys 9-2-3.
- Or you can increase the value one integer at a time by pressing RETURN. For example, if 919 is on the screen, press RETURN four times to increase the value to 923.

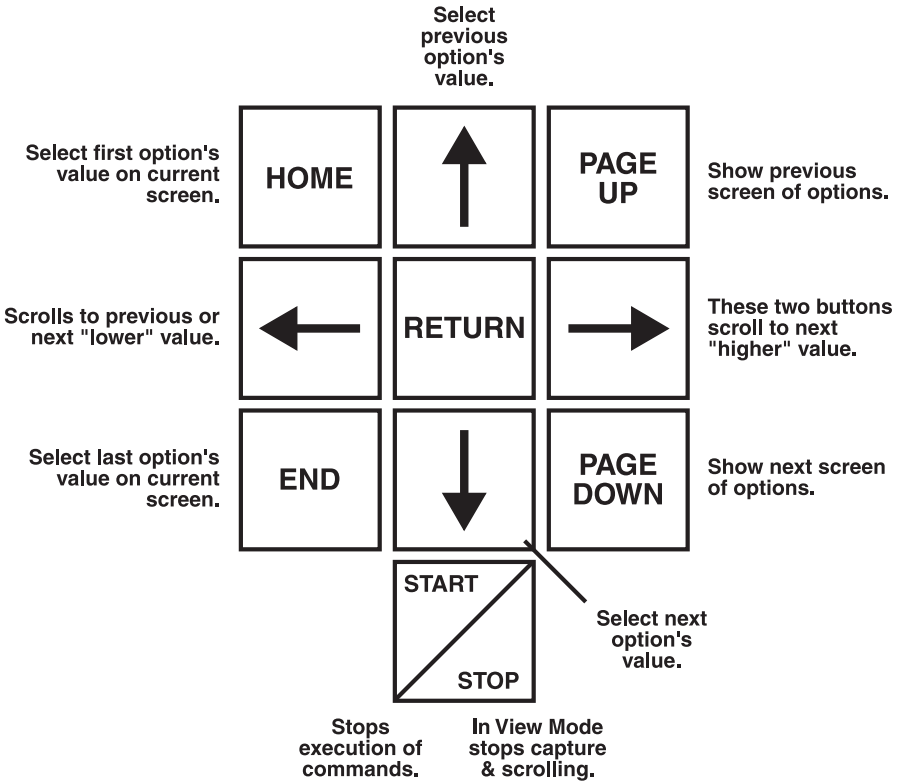


Figure 2. The option value keyboard. Use these keys, located on the far right of the 232 Monitor Plus keyboard, to move through submenus and to set option values.

- Press ← to delete the low-order character. For example, to change 923 to 943:
 1. press ← to see 92 _
 2. then press ← to see 9__.
 3. press 4 and 3 to get 943.

With the START/STOP key, you can execute all commands, stop the execution of a command, and exit most submenus.


```

Chars sent          999 Block Errors          9
Chars recv         9 Bit Errors            9
Rec in sync        9 Blocksize
Elap second        7 Error Free Sec        %
BERT:              *% BLERT:              %
Average trip time per block (ms)
                    TEST COMPLETED
Press START/STOP to end test.
    
```

DTR, DSR

The form of handshaking you want. After you press STOP to stop the BERT test, a report will display. It will look something like the screen sample shown above. Interpret the results as follows:

Chars Sent

The total number of characters sent, up to 999,999,999.

Chars recv

The total number of characters received, up to 999,999,999.

Rec in sync

Total number of characters received that are the same as those sent.

Elap second

Total elapsed time the test took to complete (in seconds).

BERT

Percentage of bit errors to total bits transmitted.

Average trip time per block (ms)

An average of the amount of time in

milliseconds it took for one block to make the loop (in milliseconds).

Block Errors

Number of blocks received that contained at least one error.

Bit Errors

Total number of bits received in error.

Blocksize

Each of the patterns available from the previous screen (FOX, FOX2, ASCII, etc.) is a different length.

Blocksize is the number of bytes in the pattern that you chose (a pattern is also known as a "block").

Error Free Sec

Percentage of the total time (100%) that the transmission had no errors.

BLERT

Percentage of block errors to total received.

CLEAR BUFFER [C]

Permanently deletes all data in the buffers.

CTL LOCK

A toggle switch that locks the control switch (CTL) on. Press CTL LOCK again to disengage.

DISPLAY EVENTLOG [D]

The 232 Monitor Plus can be set to keep a log of the following information (See the section on Log Events in *Chapter 2, Configure Menu*):

Buffer location
Channel (RD or TD)
Date
Time

for any or all of the following events:

Start trigger	Stop trigger
Framing error	CRC error
Parity error	

If Log Events is set at “ON” in the Configure Menu, press [D] to open

the following screen:

The highlighted location is selected. Read across to find the event, and the channel, time, and date of that event. Use the ↑ and ↓ keys to scroll through location/events. Once you have highlighted a location/event you would like to examine, press STOP and you will be viewing that precise location in the capture buffer.

To see more events press either PAGE DOWN or PAGE UP.

EDIT STRINGS [E]

This command opens a line editor. The line editor enables you to create one or two 80-byte ASCII strings (string1 and string2) by typing in bytes (characters, etc.) from the keyboard. When your string is finished, press Start/Stop to exit the line editor.

You may also enter non-printing ASCII characters; these are set in green text on the keypad—DC1, ETB, ENQ, DC2, etc. Hold down the CTL key (or press CTL LOCK) and then press the keys. Refer to the

Locat.	Event	Chan.	Time	Date
nnnn				
[CLEAR], [PG], [ARROW], [STOP]				

```

UPARROW =del          PAGEUP=Clear
DOWNARROW=ASC/HEX
PAGEDOWN =STRING1/STRING2
SIZE: 0      LOC: 0      DEC: 0      HEX: 0

```

green text on the keys to see the nonprinting codes.

NOTE: The key between V and B on the keyboard enters a space.

The Edit Strings screen works as follows:

↑ —deletes the byte with the cursor under it. If you hold it down for one second or more it will delete successive bytes to the right of the cursor, until all bytes are gone; then it will begin deleting to the left of the cursor until those bytes are deleted.

Page Up —clears (*deletes*) the entire string.

↓ —toggles the editor between hexadecimal and current “Code” as set in the Configure Menu (e.g., ASCII).

Page Down —toggles between string1 and string2. The current string is highlighted—when string1 is highlighted, it

means you are creating string1. Press F4 to create/highlight string2.

Strings are used in the 232 Monitor Plus as follows:

- **As triggers.** When you set a Start Trigger, the 232 Monitor Plus can be set to wait until it sees this trigger in incoming data before it begins collection—or set to stop collection with a Stop Trigger.
- **As straight output.** In addition to the factory-set strings, the 232 Monitor Plus provides for output. You can create your own string to output for the OUTPUT, BERT, or PRINT functions.

When your string is finished, press Start/Stop to exit the line editor.

END

This key moves the cursor to the end of the screen in View Mode. Press it again to move to the end of the buffer (i.e., the end of the last

screen of data). When a menu is showing, this key moves the cursor to the last option on the menu.

EXPAND COMPRESS [7]

Displays data in View Mode, at 30 characters per line in EXPAND mode and 40 in COMPRESS mode.

NOTE: Graphic characters (such as HEX) won't display in COMPRESS mode.

F-KEYS

There are four “F” (function) keys on the right side of the keyboard. The F-keys are described below:

[↑] — F1

All of the F-keys are programmed to serve different functions, depending on what screen or menu is on the display.

- In Edit Strings mode, the F1 key deletes the byte with the cursor under it (the current byte).
- In View Mode, F1 moves the cursor up one complete line.
- In any menu, F1 highlights (*selects*) the previous option on the menu.

PAGE UP — F2

- In Edit Strings mode, F2 clears (*deletes*) the entire string.
- In View Mode, F2 scrolls up one page (a page is one full display of data).
- In screens showing multiple

menus, F2 displays the previous menu.

[↓] — F3

- In Edit Strings mode, F3 toggles the editor between hexadecimal and current “Code” as set in Configure Menu (e.g., ASCII).
- In View Mode, F3 moves the cursor down one line.
- In screens showing multiple menus, F3 displays the next menu.

PAGE DOWN — F4

- In Edit Strings mode, F4 toggles between string1 and string2.
- In View Mode, F4 scrolls down one page (a page is one display full of data).
- In screens showing multiple menus, F4 displays the next menu.

FORCE CAPTURE [F]

This key forces the 232 Monitor Plus to begin capturing all data. The command is applicable in any synchronous mode when the synchronous character is unknown or when it is not known whether a clock signal is present on pins 15 and 17.

```
Enter capture address < >
```

NOTE: All bits will be captured without regard to byte boundaries.

GOTO LOCATION [>]

In View Mode, press [>] and you will see the screen shown above.

Type the location in the buffer you would like to see. For example, type 6 if you would like the cursor to be placed on the sixth character in the TD buffer. Once there, press ↓ to get to the sixth character of the RD buffer.

HELP

The 232 Monitor Plus has complete onboard documentation for a variety of topics. Press HELP and you will be offered a list of topics. You can scroll through these topics with PAGE UP and PAGE DOWN.

To find out more about any of the topics, press the first letter of the topic. For example, press Q for Questions. If there is more than one topic that begins with that letter (i.e., several of the topics start with “S”), press and hold down that letter and all of the topics beginning with that letter will scroll.

To exit the HELP menu or any of the detailed HELP explanations press STOP.

You may print the onboard Help

text by using the Output [O], Prints [P], or Report [R] options.

HOME AND HOME2

- The key moves the cursor to the beginning of the current screen (position 0) in View Mode. Press HOME again to move to the beginning of the buffer (position 0, screen 1)
- When a menu is showing, HOME moves the cursor to the first option in the menu.
- In the HELP menu, HOME displays the first HELP screen.

HEX TEXT [H]

Press [H] to toggle between displaying data in the current mode (ASCII, BAUDOT, etc.) and hex code. To see characters in binary or decimal, place the cursor on the character and press STATUS.

LOAD CONFIG 1 [1]

LOAD CONFIG 2 [2]

LOAD CONFIG 3 [3]

The 232 Monitor Plus allows you to save up to three sets of system communication parameters. See SAVE CONFIG for more information on saving configurations.

To recall configurations 1, 2, or 3

from within the View Menu, press [1], [2], or [3], respectively. The 232 Monitor Plus will set itself to the chosen configuration. Press RESET and then [D] to set the 232 Monitor Plus to the default configuration (the factory-set communication values).

MENU [']

MENU toggles between the View Mode and the Configure Menu.

MODEM CTL MASK [M]

A *modem control mask* is a template created to match a particular set of modem control signals. The modem control masks can be used to start/stop a timer or begin/end data capture.

When the 232 Monitor Plus senses modem control signals identical to the masks you set up, it will start or stop the timer. See the descriptions for the commands SET TRIGGER (p. 16) and TIME EVENTS (p. 19) for more information on masks.

If you are in the View Mode, press [M] to create or edit a modem control signal mask (see the sample screen below). The highlighted value is selected. To select the value of a different modem control signal,

press → or ← . Set the values by pressing RETURN.

Values may be:

himatches a high signal

lomatches a low signal

??wildcard;matches any signal

Once the mask is set, press STOP to return to the View Menu. At this point you can use your masks by pressing [5] for SET TRIGGER or [6] for TIME EVENTS and scrolling to the appropriate values.

OUTPUT SERIAL [O]

Press [O] to move down into the Output Submenu. (See the sample screen at the top of p. 13.) You can transmit data from this screen via pin 2 on the right-side DB25 (male) connector.

Interpret the screen as follows:

Pattern

The test pattern you want to output.

HEX 00-FF	String1	RD Buffer
Spaces (00)	String2	TD: buffer
Mark (FF)	Hex Rpt	ASCII set
Fox	HEX Rpt+Signl	511 BERT
Fox2	Help Rpt	

EDIT MASKS—arrow keys to move, [return] to toggle values, [STOP] to end

	START MASK		STOP MASK
	RS CS DS DC DT RI		RS CS DS CD DT RI
lo	lo lo lo lo lo lo		hi hi hi hi hi hi

status screen (See STATUS, p.18).

PAGE DOWN F4

See F4 (p.10).

PAGE UP F2

See F2 (p.10).

REPORTS [R]

Press [R] to see the Reports sub-menu (Screen 1 below; you will encounter a total of three screens in the Reports submenu.) You have three options, described below.

[1]

Outputs all data from the buffer in your choice of notation.

[2]

Outputs all data from the buffer in your choice of notation and includes the changes in line signals.

[3]

Outputs all of the text from the 232

Monitor Plus help facility.

After you press [1], [2], or [3], you receive a prompt asking you to direct the report you have chosen to a specific port for output (see Screen 2 below). Your choices are:

[O]

Will output through both serial ports on the right side of the 232 Monitor Plus.

[P]

Will output through the parallel port on the left side of the 232 Monitor Plus.

After you press [O] or [P] you will see the Screen 3, shown at the top of the next page.

Interpret the screen as follows:

Available reports are:

- 1)All captured data in TEXT and HEX
- 2)Same as 1 plus Modem Interface History
- 3)Printout of HELP text

Hit [1] [2] or [3]

Screen 1. Reports submenu.

Report can be directed to left parallel port, or either serial port on the right

Hit [O] for serial or [P] for parallel

Screen 2. Port selection for report output.

factory settings by pressing the RESET key, and then [D]).

To save and recall communication settings on the 232 Monitor Plus:

1. Set the parameters you would like to save.
2. Press START/STOP to leave the Configure Menu and go to the View Menu.
3. Press SAVE CONFIG [Y] and

```
Enter configuration number to save
1-3=user defined
hit [RETURN] when done
```

see the following message on the prompt line.

4. Press a number from 1-3.
5. Press RETURN.
6. The configuration is saved.

See LOAD CONFIG (pp. 11-12) for more information.

SET DATE [V]

Pressing [V] allows you to set the internal clock on the Monitor Plus.

You must enter two digits each for hours/minutes/seconds and day/month/year.

SET TRIGGER [5]

Once you've created an edit string or modem control mask, it can act as a trigger to begin data collection. Press SET TRIGGER and you get the screen shown below.

Interpret the screen as follows:

```
Start Trigger      Off, String1-TD,
                  String1-RD, Modem Ctl
                  Mask1
```

When you set the value to anything besides "Off," the 232 Monitor Plus will actively search all incoming data for that value. When it finds a match, it will begin collecting data.

```
String1-TD
232 Monitor Plus will look for
string1 on the TD line trigger.
```

```
String1-RD
232 Monitor Plus will look for
string1 on the RD line.
```

```
Modem Ctl Mask1
232 Monitor Plus will look for the
high or low states of the RS, CS, DS,
CD, DT, and RI lines. When they
```

```
Start Trigger      OFF OR      StopTrigger      None
Stop Trigger      OFF
```

```
LEFT/RIGHT ARROWS to set flashing values.
UP/DOWN ARROWS to change selection. PAGE
UP/DN for next page. [START] to continue.
Hit [START/STOP] to continue.
```

match the state you have set with [M], the 232 Monitor Plus will begin capturing data.

SHIFT 1 BIT RIGHT [4]

This key shifts all data in the capture buffer one bit to the right. This option is useful in conjunction with FORCE CAPTURE.

SHIFT LOCK

A toggle switch that locks the shift switch (SHIFT) on. Press SHIFT LOCK again to disengage.

SHUTDOWN

To execute a proper power-down-and-off procedure, press SHUTDOWN and then STOP to turn the 232 Monitor Plus off. This option ensures the preservation of the Monitor Plus memory and option settings.

NOTE: The 232 Monitor Plus can be set to turn itself off automatically. See Auto Off in the Configure Menu.

SRCH RD STRING 1 [Z]

This option immediately searches contents of the RD capture buffer, looking for a match of string1 and places the cursor on that character. Press STATUS to view the location found.

SRCH TD STRING 1 [S]

This option immediately searches contents of the TD capture buffer, looking for a match of string1 and places the cursor on that character. Press STATUS to view the location found.

START/STOP

Use the START/STOP key to begin and end a variety of activities on the 232 Monitor Plus. Table 1 below

Table 1. START/STOP Key and its related functions.

Press START/STOP while...	and the 232 Monitor Plus will...
<ul style="list-style-type: none"> • in the Help Menu or in a detail help screen • performing a BERT test • in the Configure Menu • in the Output Menu • in Timer Menu • in terminal emulation • printing 	<ul style="list-style-type: none"> • leave Help Menu and re-enter View Mode. • end the test. • return to View Mode. • begin outputting • begin/end timer function. • return to View Mode. • stop printing.

lists the functions and actions associated with the START/STOP key and how to initiate them.

STATUS

Three separate status screens provide information about the data in the buffer. While you are in the status screens, you may change the location of the cursor at any time with PAGE UP, PAGE DOWN, SEARCH, and the arrow keys.

As your screen captures data it shows the data on the five reverse-video lines of the liquid crystal display (LCD). Press the STATUS key once

Locat.	Size	Binary	DEC	HEX
51	103	101001	83	53

and the last two lines of the LCD become status lines with a variety of dynamic information:

The first time you press STATUS, you see these two status lines. They tell you the location of the cursor in the buffer—in this example, the cursor is at the fifty-first character—and the total size, in bytes—here 103 bytes of data in the buffer. It also displays the current byte (the one the cursor is on) in the following codes: binary (101001), decimal (83), and hexadecimal (53).

Pressing STATUS a second time also shows the current location of the cursor in the buffer and the amount of data in the buffer, but further

Locat.	Size	RS	CS	DS	CD	DT	RI
51	103	lo	lo	lo	hi	lo	lo

shows the current state of six modem control signals, “hi” being high and “lo” being low:

Pressing STATUS a third time drops into “historical mode”. In this

Locat.	Size	RS	CS	DS	CD	DT	RI
51	103	*lo	lo	lo	hi	lo	lo

mode, you are no longer capturing new data; the screen displays data already captured: Once again, you see the current location of the cursor in the buffer, the amount of data in the buffer, and the state of six modem control signals—“hi” equals high and “lo” equals low—when that particular byte was captured.

If you press STATUS a fourth time you return to a regular data screen (no status lines at the bottom).

SUPPRESS CAPTURE [K]

Press SUPPRESS CAPTURE and the

Hit [T] or [R] to suppress TD or RD capture or [B] to suppress BOTH
Hit [O] (off) to re-enable all capture

232 Monitor Plus will display the following screen:

Press...	to not capture data on...
[T]	the TD line
[R]	the RD line
[B]	both lines.

Pressing [O] will capture data on both lines.

TERMINAL EMULATE [T]

The Monitor Plus can be made to function as (emulate) a terminal. Press [T] and from that point on, the Monitor Plus will output each letter you type as you type it. It will transmit on pin 2 of either serial connector on the right side of the unit. Transmitted and received characters are stored in the buffer.

```

Start Clock          Stop
Clock
Timer Func

PGUP, PGDOWN, END, HOME, &
arrows to set values,
    
```

TIME EVENTS [6]

Press **TIMER** to move into the Timer Submenu.

First, create your Start Trigger and Stop Trigger with **EDIT STRINGS** (p.8) and **SET TRIGGER** (p.16). Next, use the Time Events option to specify the lines the Monitor Plus should monitor (looking for the appropriate string) to start and stop the timer. The timer measures, to the thousandth (.000) of a second, the interval between the Start and Stop Triggers.

Start Clock

You may tell the clock to start when it senses any of the following events.

String1-TD
 Begins timing on the TD line when the 232 Monitor Plus receives a string identical to the contents of string1.

String1-RD
 Begins timing on the RD line when the 232 Monitor Plus receives a string identical to the contents of string2.

ModemStrt Mask
 Begins timing when the modem control signals match the modem control signal mask, see [M] .

Any data TD
 Begins timing on the TD line when the 232 Monitor Plus receives its first character.

Any data RD
 Begins timing on the RD line when the 232 Monitor Plus receives its first character.

Stop Clock

You may tell the clock to stop when it senses any of the following events.

String1-TD
 Stops timing on the TD line when the 232 Monitor Plus receives a string identical to the contents of string1.

String1-RD
 Stops timing on the RD line when the 232 Monitor Plus receives a string identical to the contents of string2.

ModemStrt Mask
 Stops timing when the modem control signals match the modem control signal mask, see [M] .

Any data TD
 Stops timing on the TD line when the 232 Monitor Plus receives its first character.

Any data RD

232 MONITOR PLUS

Stops timing on the RD line when the 232 Monitor Plus receives its first character.

Timer Func Once, Continuous
Times events once, or over and over again as they happen. Note that the timing of many events will present a statistical average of all of the events.

XMIT BREAK [X]

Transmits a break sequence (250ms of all bits on).

3. CONFIGURE MENU

The Configure Menu is used to set the communications and other parameters of the 232 Monitor Plus. There are four screens in all.

Scroll through the parameters by using the up arrow ↑ and down arrow ↓ keys.

To get to the next set of parameters press PAGE DOWN.

To change the value of a parameter, press RETURN.

Baud

These are the various speeds (bits per second) or baud rates the 232 Monitor Plus can be set to accept.

64000*	14400	1243
56000*	9600	1200
48000*	4800	600
57600	2400	300
38400	2000	150
19200	1800	

*NOTE: Synchronous data only.

Stop Bits 1, 1.5, 2

The number of stop bits the 232 Monitor Plus can be set to read in asynchronous mode.

Data Bits 8, 7, 6, 5

The number of data bits the 232 Monitor Plus can be set to read.

Parity Odd, Even, None

The parity the Monitor can read. Choosing Odd or Even assumes an extra bit at the end of the data bit. If parity is wrong, View Mode displays a parity-error message.

Mode Async, Monosync, BSC (bisync), SDLC,

Isochronous

The various modes the 232 Monitor Plus can recognize.

- Async is for asynchronous transmissions.
- Monosync and BSC modes are byte-oriented synchronous protocols. Monosynchronous uses an 8-bit sync character; BSC uses two 8-bit sync characters.
- SDLC is a bit-oriented synchronous protocol that uses an 8-bit flag (hexadecimal 7E) to mark the beginning and end of message envelopes.
- Isochronous is a clocked asynchronous mode that allows asynchronous data to be sent over synchronous circuits.

Code **ASCII, EBCDIC,
IPARS, BAUDOT**

The way you would like to view your data.

Sync Char 1 **(hex value)**

In monosync mode this byte is used as a pad character on all transmission—output, loop, and answerback options. To learn how to enter hex values, see *Section 1.3, Entering Integers and Hex Values*.

Sync Char 2 **(hex value)**

Refers to the second synchronous characters in BSC mode or the receive synchronous character in Monosync mode. To learn how to enter hex values, see *Section 1.3, Entering Integers and Hex Values*.

NOTE: Sync characters 1 and 2 are loaded automatically in SDLC mode.

Data encoding **NRZ, NRZI,
FM0, FM1**

These are the four data encoding methods:

- NRZ — used in both synchronous and asynchronous applications.
- NRZI, FM0 (biphase space) and FM1 (biphase mark) — all used in various synchronous applications.

Ig Mul Syn Char **Yes, No**

(Ignore multiple synchronous characters)

If you select “Yes,” you tell the 232 Monitor Plus not to capture synchronous characters. This is useful when the sending device sends more than one synchronous character and you have no need of saving the extra characters.

If you select “No,” you tell the 232 Monitor Plus to capture all synchronous characters.

Drop Sync RTS/CD **Yes, No**

Select “Yes” to drop synchronization when the Monitor Plus detects Ready To Send or Carrier Detect.

Resync Char **None, (hex value)**

Selecting “None” has no effect on synchronization.

Setting a (*hex value*) means that synchronization is dropped when this character is received. To learn how to enter hex values, see *Section 1.3, Entering Integers and Hex Values*.

Resync On Char **On, Off**

Selecting “On” drops synchronization when the 232 Monitor Plus detects Ready To Send or Carrier Detect.

Log Events **No, 1Fill, Cont.**

The 232 Monitor Plus can be set to keep a log of certain events. See *Chapter 1, Time Events* (p. 19) to learn how to view the log.

- Setting “No” means you do not want to keep a log.
- Setting “1Fill” means you want to fill the log buffer once (and when the log buffer is full, to stop collecting logs).
- “Continuous” means you want to continue capturing logs (and when the buffer is full, to clear logs to make room for newer logs).

Status Messages

**Normal, Long,
None, Short**

The 232 Monitor Plus will notify you of certain events when “Normal” is selected; e.g., END OF BUFFER.

If you find the Status Messages annoying you can turn them off (None) or view them briefly (Short). To let them linger on the screen, choose Long.

Idle Display **On, Off**

“On” mode displays “Waiting for data” message on power-up. “Off” mode doesn’t display this message.

Error Messages **Fatal, Warn, None**

NOTE: When the Monitor is turned on, it will always pass data through itself, even if it cannot recognize speed or other configuration parameters.

If you choose “Fatal,” the Monitor will stop receiving at certain hardware errors (a change in line speed, etc.). Press any key to begin receiving again. You can enter Configure Menu and change a parameter before returning to View Mode.

If you choose “Warn,” a message will appear at certain hardware errors, but receiving will continue.

If you find the Error Messages annoying (for example, when watching a line that changes speed in normal operation), you may suppress them by selecting “None.”

Suppress Capture **Off, RD, TD, Both**

Choose whether you want data to be captured as follows:

- Off** Capture data from both lines
- RD** Don’t capture RD data.
- TD** Don’t capture TD data.
- Both** Don’t capture on either line. (This option is useful when you are collecting modem control transitions and you want to capture only hardware handshake changes.)

Auto Off (min) (value)

Setting a value means the 232 Monitor Plus will turn itself off after it has been idle for (*value*) number of minutes.

Display Mode Compressed, Expanded

In “Compressed” mode each data line character is displayed without spaces. You can use this option to conserve display space.

This is an example of compressed mode.

In “Expanded” mode each data line character is followed by a space to facilitate reading at high speeds.

This is an example of expanded mode.

Buffer One Fill, Continuous

If “One Fill” is chosen, the Monitor Plus will stop collecting data when the buffer is full.

If “Continuous” is chosen, the Monitor Plus will continue to fill the buffer and discard the oldest data on a first-in/first-out basis.

Exclude Off, Control Data, Text Data

“Off” has no effect on capture.

If you choose “Control Data,” then the control data will be excluded from the capture. In other words, only the data between the start-text character (STX) and the end-text character (ETX) will be captured.

If you choose “Text Data,” then the text data will be excluded from the capture. In other words, the data between the start-text character (STX) and the end-text character (ETX) will not be captured.

Start Txt Char (value)

See “Exclude” above. Specify the character you want to use as the STX.

End Txt Char (value)

See “Exclude,” above. Specify the character you want to use as the ETX.

Remote Off, On

Set the 232 Monitor Plus in an RS-232 circuit (see *Section 3.0, Remote Control*). Then turn on remote with this menu function to take remote control of your 232 Monitor Plus.

This option is very useful for loopback tests when you don’t have an assistant in the remote location.

Remote Baud **57600, 19200, 9600,
4800, 2400, 1200**

The baud rate at which you want to communicate with the remote 232 Monitor Plus.

Invert Rec. Bits **Yes, No**

“Yes” inverts the sense of all incoming bits.

SDLC Status **Yes, No**

Use “Yes” to display the status of SDLC, and “No” to not display the status of SDLC.

CRC Preset **Zeros, Ones**

“Ones” presets the value of CRCs to ones; “Zeros” presets it to zeroes.

SDLC Search Node

Search Node All, Node number (hex value)

Choosing “All” (0) captures all nodes. Setting a specific Node number allows you to specify one SDLC node in a loop or polled circuit. To learn how to enter hex values, see *Section 1.3, Entering Integers and Hex Values*.

SDLC Search **Disable, Enable**

Choose Enable to go ahead and search for the node specified above in SDLC Search Node.

4. REMOTE CONTROL

The 232 Monitor Plus can be operated remotely from a terminal on an RS-232 circuit. This is especially useful when testing the quality of lines over long distances.

Set the 232 Monitor Plus in place, then initiate loop tests from a remote location. Error reports will appear simultaneously at the 232 Monitor Plus and on the remote terminal's screen.

For remote control of your 232 Monitor Plus, you will need the special adapter that came with your unit. The adapter is configured as DTE; it transmits on pin 2 and receives on pin 3.

For remote operation of your 232 Monitor Plus follow these steps; refer to Figure 3.

1. Attach the special remote connector to the parallel port on the left side of the 232 Monitor Plus.

CAUTION

The port on the left side of the 232 Monitor Plus is a parallel output port. Attaching an RS-232 circuit without the special remote connector might destroy the circuit.

2. Connect any RS-232 circuit to this remote connector.
3. Access the 232 Monitor Plus Configure Menu (press the MENU command key [~] to move to the Configuration Menu).

NOTE: The MENU command key lets you toggle between the View and Configuration Menu modes.

4. Once in the Configure Menu, turn the Remote function "On." Refer to *Section 2.0, Configuration Menu*, (p.24).

5. Go to any ANSI CRT terminal on the RS-232 circuit. If you are running a terminal emulation program, set the program to ANSI.

If necessary, enter CON (connect) from within the terminal emulation program. You may be prompted by the modem to enter the CON command, depending on your equipment setup or the order in which you made all of the connections up to this point.

6. Your remote session has begun. You will now see everything on the remote terminal's screen that appears on the 232 Monitor Plus screen.
7. You can access all of the 232 Monitor Plus functions from the remote terminal (see *Appendix A, Remote Terminal Information* for more information).
8. See *Appendix A* for a cross-reference of various terminal keys to the Monitor Plus keys.

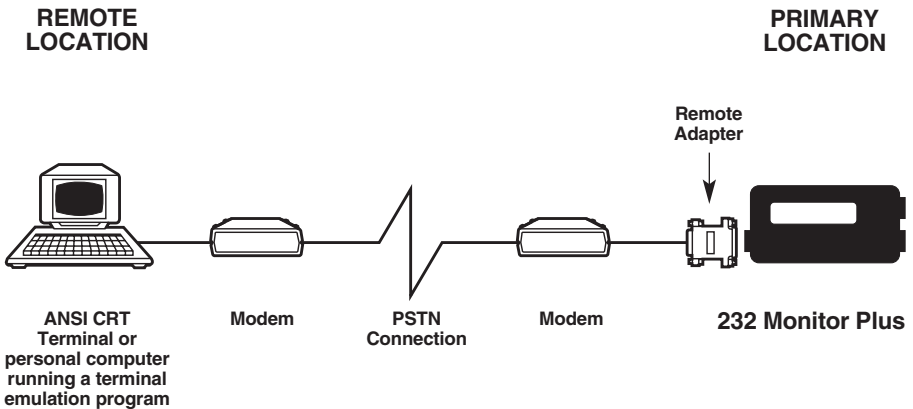


Figure 3. A sample configuration for remote operation of the 232 Monitor Plus.

APPENDIX A: REMOTE TERMINAL INFORMATION

ANSI Terminal Function Keys

These are the function keys for a DEC™ VT-type terminal keypad.

F1 HELP.....(PF1)	F5 MENU.....(4)
F2 START/STOP.....(PF2)	F6 STATUS.....(5)
F3 PAGE UP.....(7)	F7 LOGOUT.....(1)
F4 PAGE DOWN.....(8)	F8 RESET.....(2)

VT100™ Key ANSI Mode	ProComm® Key ANSI Mode	Codes from Terminal	232 Monitor Plus Equivalent
PF1	F1	ESC,O,P	HELP
PF2	F2	ESC,O,Q	START/STOP
7 (<i>keypad</i>)	F3	ESC,O,w	PAGE UP
8 (<i>keypad</i>)	F4	ESC,O,x	PAGE DOWN
4 (<i>keypad</i>)	F5	ESC,O,t	MENU
5 (<i>keypad</i>)	F6	ESC,O,u	STATUS
1 (<i>keypad</i>)	F7	ESC,O,q	LOGOFF REMOTE
2 (<i>keypad</i>)	F8	ESC,O,r	RESET (RESTART)
Cti-H	HOME	Cti-H/ESC,[,H	HOME
Cti-E	END	Cti-E/ESC,[,K	END
↑	↑	ESC,[,A	↑
↓	↓	ESC,[,B	↓
→	→	ESC,[,C	→
←	←	ESC,[,D	←

REMOTE ONLY COMMAND

Cti-C	Cti-C	Cti-C	ENTER REMOTE COMMAND MODE
-------	-------	-------	------------------------------

Most terminal emulation programs (for example, ProComm®) require that you set the program to ANSI mode.

A true VT102™ terminal will be set by the 232 Monitor Plus to ANSI mode. If it is not in ANSI mode, the function keys F3-F8 will behave unpredictably.

APPENDIX B: NONPRINTING ASCII CODES

Key	Abrv.	Name	Description
0	.	NUL Null	Filler, often used while awaiting carriage return on slow printers.
1	A	SOH Start of Heading	First character of a heading in information transmission.
2	B	STX Start of Text	Terminates heading and signals start of the text.
3	C	ETX End of Text	Signals end of text; often used to ask for ACK from sending device.
4	D	EOT End of Transmission	When time-sharing, logs terminal off.
5	E	ENQ Enquiry	Asks remote station for identification.
6	F	ACK Acknowledge	Used by remote to answer Affirmative to host. Opposite of NAK.
7	G	BEL Bell	Sounds a bell.
8	H	BS Backspace	Moves cursor back one space without erasing.
9	I	HT Horizontal Tab	Sets print position to preset horizontal tab.
10	J	LF Line Feed	Moves print position down one line.
11	K	VT Vertical Tab	Sets print position to preset vertical tab.
12	L	FF Form Feed	Advances to next page or screen.
13	M	CR Carriage Return	Moves print head or cursor to left margin.
14	N	SO Shift Out	Shifts into an alternate character set.
15	O	SI Shift In	Used after Shift Out to return to standard ASCII character set.

Key	Abrv.	Name	Description	
16	P	DLE	Data Link Escape	Shifts into a different set of control codes.
17	Q	DC1	Device Control 1	A variable.
18	R	DC2	Device Control 2	A variable.
19	S	DC3	Device Control 3	A variable.
20	T	DC4	Device Control 4	A variable.
21	U	NAK	Negative ACK	Used by remote to answer Negative to host. Opposite of ACK.
22	V	SYN	Synchronous Idle	Used as a “pad” in certain types of synchronous serial transmissions.
23	W	ETB	End Trans. Block	Signals end of block sent by host.
24	X	CAN	Cancel	Disregard last line of data and return to mutually agreed restart point.
25	Y	EM	End of Medium	Signals last character on this medium.
26	Z	SUB	Substitute	Sometimes used as a fill character in fixed-length fields; also used to indicate garbled data.
27	[ESC	Escape	Often used to break a transmission or to introduce special sequences of control characters.
28	\	FS	File Separator	Allows files to be sorted by character lower than “space” in collating sequence.
29]	GS	Group Separator	Similar to FS.
30	=	RS	Record Separator	Similar to FS.
31	-	US	Unit Separator	Similar to FS. Lowest order of separators, not counting SP.

APPENDIX C: TABLE OF CODES

Screen	A	B	C	D	E	F	G	H	I	J	K	L	M
ASCII	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D
EBCDIC	C1	C2	C3	C4	C5	C6	C7	C8	C9	D1	D2	D3	D4
IPARS	31	32	33	34	35	36	37	38	39	21	22	23	24
BAUDOT*03	19	0E	09	01	0D	1A	14	06	0B	0F	12	1C	

Screen	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
ASCII	4E	4F	50	51	52	53	54	55	56	57	58	59	5A
EBCDIC	D5	D6	D7	D8	D9	E2	E3	E4	E5	E6	E7	E8	E9
IPARS	25	26	27	28	29	12	13	14	15	16	17	18	19
BAUDOT*0C	18	0E	0F	0A	05	10	14	1E	13	10	15	11	

Screen	a	b	c	d	e	f	g	h	i	j	k	l	m
ASCII	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D
EBCDIC	81	82	83	84	85	86	87	88	89	91	92	93	94
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT	—	—	—	—	—	—	—	—	—	—	—	—	—

Screen	n	o	p	q	r	s	t	u	v	w	x	y	z
ASCII	6E	6F	70	71	72	73	74	75	75	77	78	79	7A
EBCDIC	95	96	97	98	99	A2	A3	A4	A5	A6	A7	A8	A9
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT	—	—	—	—	—	—	—	—	—	—	—	—	—

Screen	0	1	2	3	4	5	6	7	8	9	#	%	\$
ASCII	30	31	32	33	34	35	36	37	38	39	23	25	24
EBCDIC	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	7B	7D	5B
IPARS	0A	01	02	03	04	05	06	07	08	1B	3C	30	—
BAUDOT**16	17	13	01	0A	10	15	07	06	18	14			O9

Screen	.	,	:	;	?	<	>	()	[]	{	}
ASCII	2E	2C	3A	3B	3F	3C	3E	28	29	5B	5D	7B	7D
EBCDIC	4B	6B	7A	5E	6F	4C	6E	4D	5D	AD	BD	8A	9B
IPARS	—	—	—	—	—	—	—	—	—	—	—	—	—
BAUDOT**1C	0C	0E	1E	19	—	—	—	0F	12	—	—	—	—

Screen	=	&	!	*	+	/	@	-	`		"
ASCII	3D	24	21	2A	2B	2F	40	5F	60	7C	22
EBCDIC	7E	50	5A	5C	4E	61	7C	60	—	4F	7F
IPARS	0E	—	—	—	2C	11	20	1A	—	—	—
BAUDOT**0F	1A	—	—	—	—	—	—	03	—	—	11

Screen	Space	←	→	_	^	'	CR	LF
ASCII	20	7E	7F	—	5E	27	0D	0A
EBCDIC	40	—	—	6D	—	—	0D	25
IPARS	1C	—	—	—	—	—	0C	—
BAUDOT**04	—	—	—	—	—	—	08	02

BAUDOT *After an SI (1F) character

BAUDOT **After an SO (1B) character.

HEX FF will always appear as a c.

APPENDIX D: SAMPLE ASCII HEX PRINTOUT

Page number:01

code: ASCII

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15

0000 Td

Rd 54 68 69 73 20 69 73 20 52 44 20 64 61 74 61 20 ← *This is RD*

data

DS HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
DT LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CD LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CS HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
RS LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
RI LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO

16 Td

Rd 77 69 74 68 20 43 54 53 20 61 6E 64 20 44 53 52 ← *with CTS and*

DSR

DS HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
DT LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CD LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CS HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
RS LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
RI LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO ~~LG~~ ←

32 Td

61 6E 64 20 74 68 69 73 20 69 73 20

and this

is

Rd 20 68 69 20 ← *hi*

DS HI HI HI HI LO LO LO LO LO LO LO LO LO LO LO X
DT LO LO LO LO HI HI HI HI HI HI HI HI HI HI HI X
CD LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO

```

CS HI HI HI HI LO LO LO LO LO LO LO LO LO LO LO LO X
RS LO LO LO LO HI HI HI HI HI HI HI HI HI HI HI X
RI LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
48 Td 54 44 20 64 61 74 61 20 77 69 74 68 20 44 54 52 TD data with
DTR

```

```

Rd
DS LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
DT HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
CD LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CS LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO
RS HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI HI
RI LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO LO

```

```

64 Td 20 61 6E 64 20 52 54 53 20 68 69 21 and RTS
hi!

```

```

Rd
DS LO LO LO LO LO LO LO LO LO LO LO LO LO
DT HI HI HI HI HI HI HI HI HI HI HI HI HI HI
CD LO LO LO LO LO LO LO LO LO LO LO LO LO LO
CS LO LO LO LO LO LO LO LO LO LO LO LO LO LO
RS HI HI HI HI HI HI HI HI HI HI HI HI HI HI
RI LO LO LO LO LO LO LO LO LO LO LO LO LO LO

```

NOTE: The text running through the right margin is the ASCII translation of the HEX values (bold numbers) in the chart. For example, the first four HEX numbers in the first line (54 68 69 73), when translated, form the word *This* in the right margin.

NOTE: X at far right indicates changes in signals.

APPENDIX E: BATTERIES

General Information

Your 232 Monitor Plus uses two batteries (both included). The primary battery is a 9-volt alkaline cell. Alkaline batteries will provide the longest and most reliable service. Should you decide to use a rechargeable Nicad battery instead, we recommend that you carry a charged spare: A Nicad battery can deliver only about 40% of the capacity of a fresh alkaline battery. When the battery is running low you will receive a BATTERY LOW warning message on the screen. You must then change your battery or plug in the AC adapter. You may plug in the 232 Monitor Plus external power supply at any time—even if the unit is in use.

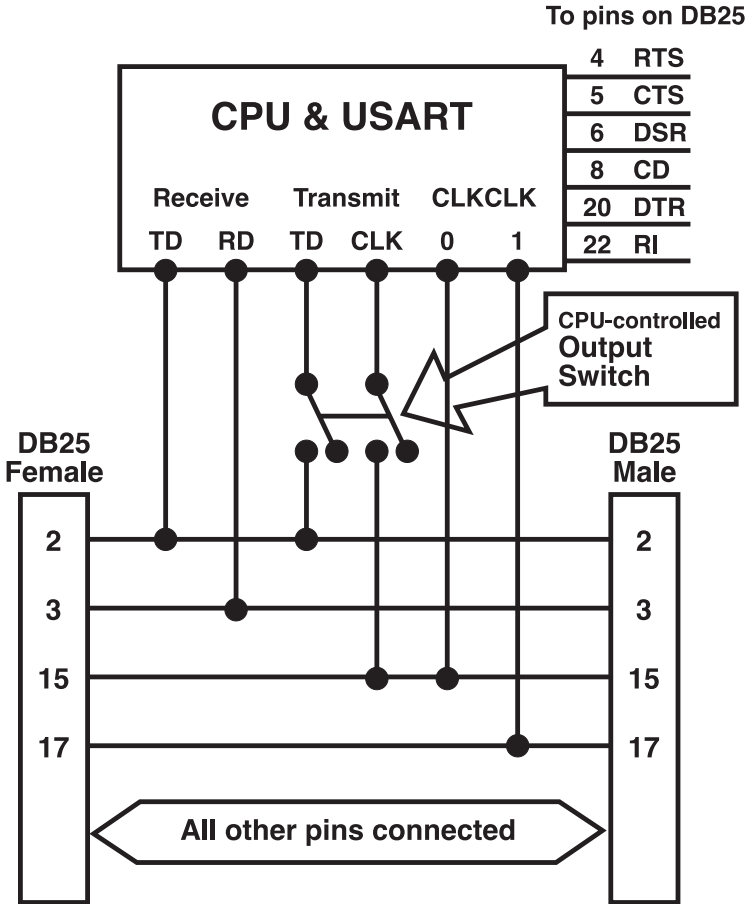
The second battery contained in this device is a lithium cell, used to preserve memory and menu configuration. It should provide five to ten years of reliable power supply. It is time to replace the lithium cell when you notice that the 232 Monitor Plus can no longer retain (“remember”) either memory or memory configuration (or both).

Replacing the Lithium Cell

Place the 232 Monitor Plus face down on a soft cloth and remove the five (5) cover screws. Remove the back cover. Carefully remove the circular lithium cell from its holder, using the tip of a small screwdriver to lift the battery up and out of its holder. Replace it with a BR-2325-type lithium battery or its equivalent (3.0V only). Gently refit the cover to the case and replace the five cover screws.

APPENDIX F:

232 MONITOR PLUS SCHEMATIC DIAGRAM





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