User's Guide

Version 14.32

21 March 1994

0. LEGAL NOTICES

TABLE OF CONTENTS

1. INTRODUCTION

This document describes the features and functions of the CTS Monitor program (CTSMON) for the EXB-8200, EXB-8200SX, EXB-8500, EXB-8500c, EXB-8205, and EXB-8505. CTSMON is provided to EXABYTE customers to enable them to perform diagnostic, test, firmware upgrade, and configuration functions with the above Cartridge Tape Subsystem (CTS) products.

The CTS Monitor program communicates over an RS-232 connection from a PC to the diagnostic port on the CTS to get diagnostic dump information, load new firmware, and set configuration options that affect the way the CTS operates. Note that because of differences in the supported models of CTS, not all functions work with all drives. For example, configuration and firmware upgrades cannot be done over the serial port on the EXB-8200. Functions that don't work with the attached CTS will be shaded out on the menu or will return a message stating that the function is not available for that CTS.

2. INSTALLATION & CUSTOMIZATION

If you are familiar with DOS, PCs, and Exabyte CTS products, and don't want to spend a lot of time reading, refer the the Quick Start section, below. More detailed information on installation and customization follows that section.

2.1. QUICK START

Install the CTS Monitor by specifying the directory that you want to install the CTS Monitor to on the command line of CTSnnnn.EXE. The default installation directory is the current directory. For example, to install version 14.32 from A:\ to C:\CTSMON, type:

```
A:\CTS1432 C:\CTSMON
```

This will create the directory C:\CTSMON if it does not already exist, and extract the files CTSMON.EXE, CTSMON.HLP, CTSMON.DOC, CTSMON.PS, CTSMON.PIF, CTSMON.ICO, and CTSMON.NEW to that directory.

To start the CTS Monitor program from the DOS prompt, type:

```
CTSMON
```

Press F1 for help or Alt-D to read the online documentation.

To print a copy of the manual, copy CTSMON.PS to a **PostScript** printer, or if you don't have a PostScript printer, copy CTSMON.DOC to a printer.

2.2. HARDWARE REQUIREMENTS

To run the CTS Monitor program, you need:

- An IBM PC, XT, AT, PS/2 or compatible 80x86 based computer.
- An MDA, CGA, EGA, or VGA monitor.
- At least one serial port on COM1:, COM2:, COM3:, COM4:, or one of the eight PS/2 serial ports, hardware compatible with the IBM PC (8250, 16450, or 16550AFN UART). If your serial port has a 9 pin connector, you also need a 9 pin to 25 pin serial port adapter.
- A hard disk drive.
- A monitor cable (4-pin to RS-232, available from EXABYTE).
- At least 640 KBytes RAM (500 KBytes free).

In addition, the following options are helpful:

- An EGA or VGA display will result in much better performance than a CGA display, and allows you the option of viewing more information on the screen at once in 43 or 50 line mode.
- Additional memory in the form of EMS will substantially improve performance.
- A mouse allows for smoother menu operation.

2.3. HARDWARE INSTALLATION

Connect the Monitor cable to the serial port on the back of the computer and to the Monitor port on the back of the CTS. Exabyte sells a 25 pin to 4 pin adapter cable for this purpose. If your serial port has a 9 pin connector, you will also need a 9 pin to 25 pin adapter, which can be obtained at most computer and electronic stores.

2.4. SOFTWARE INSTALLATION

CTSMON is distributed in a set of four files:

- CTS*nnnn*.DOC — quick installation instructions,
- CTS*nnnn*.EXE — a decompression program,
- CTS*nnnn*.S00 — installation data for disk 1,
- CTS*nnnn*.S01 — installation data for disk 2 of 2 or disk 1 of 1,

where the *nnnn* is the version number of the program.

In the following instructions, the "**source directory**" refers to the directory where these four distribution files are stored. If the source directory happens to be a 360K floppy drive, the .S01 file must be on a separate diskette, otherwise all four files should be kept together. "**Destination directory**" means the directory that you want to install the CTS Monitor program files into.

To install the program files, execute CTS*nnnn*.EXE with a command line parameter of the destination directory. If no destination directory is specified on the command line, the current directory is used. For example, to install version 14.32 of the CTS Monitor program from two 360K floppy disks to C:\CTSMON, insert the disk with CTS1432.EXE and CTS1432.S01 on it in drive A: and type

```
A:CTS1432 C:\CTSMON
```

You may wish to add the directory containing the CTS Monitor program to your DOS path so that you can run it from any directory.

2.5. CUSTOMIZING CTSMON

To start up the CTS Monitor from the DOS prompt, type:

```
CTSMON
```

You can customize your installation by selecting **System**, then **Setup** from the menu. This allows you to:

- Specify default file locations
- Select a serial port other than COM1:
- Force the use of the PC BIOS for video writes
- Customize screen mode and colors

See the description of the Setup menu below for more information on the options available.

2.6. CGA & MONCHROME DISPLAYS

If you are experiencing "snow" on a CGA monitor, start the CTS Monitor program with the /S option on the command line or select Snow elimination from the System | Setup menu. Note that many CGA adapter cards turn off interrupts for extended periods of time, thus causing dropouts during high speed serial port communications. This causes much slower operation of the monitor when taking diagnostic dumps.

If you are having trouble reading an LCD or monochrome display, use the /M command line option or select Black & White under the System | Setup | Colors menu.

2.7. OPERATING ENVIRONMENT

The following sections describe some considerations with respect to your system software.

2.7.1. MEMORY MANAGEMENT AND SPEED

CTSMON will use EMS, if available. Be sure that the number of EMS handles available is equal to the number of bytes of EMS

divided by 16384. Lesser numbers may cause system hangs. See the documentation for your EMS driver for details. If you don't have EMS, but have a RAM disk, CTSMON performance will be improved if you set up the temporary files directory (System | Setup | Temporary files) on the RAM disk.

2.7.2. DOS ENVIRONMENT VARIABLES

The **PATH** environment variable is used to find data files, like CTSMON.HLP, when a file cannot be found in the current directory or in the directory where CTSMON.EXE was started.

COMSPEC is used to perform the System | OS shell command. If this variable does not specify the location and name of your command interpreter (normally COMMAND.COM), then this function will not work.

If there is no CTSMON.CFG file, and if a **TEMP** environment variable exists, it is used to determine where to put temporary files. If CTSMON.CFG exists, the TEMP environment variable is ignored. See System | Setup above.

2.7.3. RUNNING UNDER MICROSOFT WINDOWS

The CTS Monitor is not a Microsoft Windows application. However, some people have had good results running the CTS Monitor under Microsoft Windows 3.1 in 386 Enhanced mode. This kind of operation is dependent on:

- Manually avoiding serial port conflicts
- Having a fast enough computer to avoid dropouts on the serial port
- Assigning a high enough priority to ensure that high speed serial communications can occur.

The CTSMON.PIF file that comes with the CTS Monitor can be used for this purpose. CTSMON.ICO is a Microsoft Windows icon for the CTS Monitor. See your Windows documentation for information on the use of these files.

To use your mouse properly in the CTS Monitor while running under Windows 3.1 in 386 Enhanced mode, you may want to

edit the SYSTEM.INI file under the [NonWindowsApp] section to add the line:

```
MouseInDosBox=1
```

as well as ensuring that your mouse driver is installed in AUTOEXEC.BAT or CONFIG.SYS.

Note that running in a multitasking environment will slow down the operation of the CTS Monitor program.

2.7.4. RUNNING UNDER DESQVIEW

To run the CTS Monitor under DESQview, ensure that your setup allows enough RAM for CTSMON.EXE, and allows direct access to the serial ports. Do not allow the CTSMON.EXE window to be swapped out of RAM while it is active, since that would be incompatible with the serial port interrupt handling done by the CTS Monitor.

Note that running in a multitasking environment will slow down the operation of the CTS Monitor program.

2.7.5. DOS VERSIONS

CTSMON.EXE has been tested with MS-DOS 3.30, 4.01, 5.00, and 6.00, as well as DR-DOS 6.0 and the OS/2 2.0 DOS compatibility box. Other versions of DOS may work, but versions prior to 3.0 probably do not work.

When using DR-DOS 6.0, the disk cache must be configured not to do block writes, which will interfere with the high speed serial communications of the CTS Monitor program.

To find out what version of DOS you are running, type VER at the DOS prompt.

2.7.6. RUNNING UNDER THE OS/2 DOS BOX

This mode of operation might work. See your OS/2 manual for instructions on reserving a serial port for a DOS program. If you can't get the CTS Monitor to run in the OS/2 DOS box, try booting under regular DOS.

Note that running in a multitasking environment will slow down the operation of the CTS Monitor program.

3. RUNNING CTSMON

The CTS Monitor program is normally run as an interactive, menu driven application. It also has a command line interface to allow loading firmware and taking of diagnostic dumps to be done from a batch file.

To run CTSMON interactively, start it up by typing

```
CTSMON
```

3.1. SCREEN AREAS

The screen is divided into several areas. The top area contains a description of the currently highlighted menu entry, an arrow that points up or down, and a digital clock. The arrow points up when the control processor is running the main control program anda points down when it is stopped (running the monitor-only program). The digital clock shows the current time of day (24-hour format). The clock is updated at least once a minute while the program is running. This area might also display:

- **R** to indicate keystroke macro recording is in progress
- **P** to indicate that keystroke macro play back is in progress
- A small block to indicate the system is logging to the disk file CTSMON.LOG.

The second area of the screen is the Main Menu. Except for **Quit**, each item on the Main Menu has an associated pull-down menu.

Below the Main Menu is the message area or dialog window, where status and error messages are displayed.

3.2. USER INTERFACE BASICS

The CTSMON user interface is based on pull-down menus. You can select items on the menu using four methods:

- Using the arrow keys, move the wide bar cursor over the item, then press Enter to select it.
- Type the highlighted character in the menu item (the selection key).
- Move the mouse cursor over the item you want to select, and click the left mouse button.
- Press the shortcut key (shown to the right of the menu item name, if that menu item has a shortcut key). You can use a shortcut key without displaying the menu item first.

To back out of the current operation, a pull-down menu or data entry window, or to exit from the text file viewer, press **Esc**.

As each item on the menu is highlighted with the wide bar cursor, a help line appears at the top of the screen. This is a one-line description of that menu item.

While any menu or data entry screen is active, you can display help for that menu or screen by pressing the **F1** key.

If you are prompted for a yes or no answer, the default answer is indicated by an upper case letter, as in (y/N). If you want to answer yes, type **Y**. If you want to answer no, press any other key.

3.3. FILE NAME ENTRY

To enter the name of a file that exists on disk (when loading code or selecting a binary dump file to convert to a text dump, for example), you can type or edit the file name presented to you, including drive and path if necessary.

You can also use one or more wild card characters (? and *) in the file name, then press Enter. For example, you could enter A:*.BIN to see all of the files on drive A: with the .BIN extension.

When you leave a wild card in the file name, a file selection list appears on the screen. If you select the name of a directory in the list, a list of files in that directory that match that file specification is displayed. Likewise, if you select ".." in the list, you get a list of files matching your file specification, one level up in the directory.

3.4. SHORT CUT KEYS

Short cut keys allow you to go straight to a function without navigating throught the menu system.

The table below describes currently assigned short cut keys:

Key	**Function**
Alt-A	Options -- set EEPROM options
Alt-B	Breakpoint set
Alt-D	Doc file -- display CTSMON.DOC
Alt-E	XRAM display -- Examine External RAM.
Alt-G	Goto breakpoint
Alt-H	Help (same as F1)
Alt-J	Select next available serial port.
Alt-L	Load .BIN file.
Alt-N	Make code load tape (FEPROM contents only).
Alt-O	OS Shell. Type EXIT to return to CTSMON.
Alt-P	Print -- control background print function.
Alt-Q	Quit -- Exit CTS Monitor.
Alt-R	Run the CTS control processor main program.
Alt-T	sTop the CTS control processor main program.
Alt-V	Enter LEOT test mode.
Alt-X	Exit CTS Monitor program.
F1	Help
F2	Create dump file
F3	View text file
F4	Binary to text
F9	SCSI command/status trace
Alt-F1	Reset servo
Alt-F2	Load tape
Alt-F3	Unload tape
Alt-F4	Find LBOT
Alt-F5	Go track
Alt-F6	Stop tape
Alt-F7	rewind t o PBOT
Alt-F8	rewind Unload
Ctrl-F1	Display version information and memory status.
Ctrl-F2	Start keyboard recording to create a macro.
Ctrl-F3	Play back macro recorded earlier.
Ctrl-F4	Play back macro recorded earlier in a loop.
Ctrl-F5	Stop macro play back.
Ctrl-F6	Toggle logging to disk.
Ctrl-F7	Comment
Ctrl-F8	Select screen capture name.
Ctrl-F9	Capture screen to file.

3.5. COMMAND LINE SWITCHES

A file name on the command line means to load that .BIN file into the CTS.

Command line switches may be preceded either with a - or /, and may be upper or lower case.

/1 - /17 = Use serial port number 1 through 17:
- 0 = SERIAL 4
- 1 = COM1:
- 2 = COM2:
- 3 = COM3:
- 4 = COM4:
- 5 = SERIAL 5
- 6 = SERIAL 6
- 7 = SERIAL 7
- 8 = SERIAL 8
- 9 = SERIAL 3
- 10 = MSO 0
- 11 = MSO 1
- 12 = MSO 2
- 13 = MSO 3
- 14 = MSO 4
- 15 = MSO 5
- 16 = MSO 6
- 17 = MSO 7

/B Use BIOS for screen writes (eliminates CGA snow).
/C1 Use COM1:
/C2 Use COM2:
/C3 Use COM3:
/C4 Use COM4:
/D Dump to SNAPSHOT.85 and SNAPSHOT.TXT.
/Dfilename Dump to filename.85 and filename.TXT
/E Use EGA 43 line or VGA 50 line mode.
/M Force monochrome color mapping.
/S Use BIOS for screen writes (eliminates CGA snow).

*MSO means Multiple Serial Output Card, like the one from Personal computing Tools, Inc., configured on IRQ3. Bank 0 starts at 280H, and bank 1 starts at 2A0H. Use of 16550 AFN UARTs instead of 16450 UARTs will result in better performance.

The default settings for serial port and display mode settings are the same as what you used the last time you ran CTSMON.

These settings are stored in CTSMON.CFG. If CTSMON.CFG does not exist, the defaults are COM1:, fast screen writes (not using the BIOS), and allow color (don't force monochrome). If the specified serial port does not exist when the program is started, another serial port will be tried. These options can also be set with the System/Setup menu.

The following examples demonstrate how command line switches can be used:

`CTSMON /1`
Starts CTS Monitor on COM1:

`CTSMON /2`
Starts CTS Monitor on COM2:

`CTSMON /M`
Starts the CTS Monitor in monochrome mode.

`CTSMON /E`
Starts the monitor in 43 or 50 line color mode.

`CTSMON /DDUMP`
Starts CTS Monitor, creates dump files DUMP.85 and DUMP.TXT (or DUMP.DMP if the CTS is an EXB-8200 or EXB-8200sx), then exits.

`CTSMON 85C-0001.BIN`
Loads the code file 85C-0001.BIN, then exits.

`CTSMON /E /2`
Starts the monitor in 43-line or 50-line mode on COM2:.

3.6. DOS ERRORLEVEL EXIT CODES

If you use the CTS Monitor in a batch file or call it from another program, it is useful to know what the following ERRORLEVEL numbers mean:

0: Normal exit. No problem.
1: Command line confused or help requested.
2: Break pressed, program halted.
3: Out of memory.
4: Windowing function failure — out of memory.
5: COM port not found.

6: Window stack underflow (programming error).
7: Main menu definition or memory allocation error.
8: Program damaged — get a new copy! (CRC check failed).
9: Unable to write to output file. Disk full?
10: Array write out of bounds (programming error).
11: Window stack overflow (programming error).
12: Virtual array error! Not enough RAM or disk space!
13: Virtual array index out of range (programming error).
14: Dump failed.
15: Load failed.
16: Function not available on EXB-8200.
17: Memory corruption error.
18: Out of RAM.
19 to 255: Generic program error trap numbers.

3.7. TELEPHONE TRANSFER OF DATA

Dumps can be transferred to the Exabyte Technical Support Bulletin Board System (BBS) at 303-447-7100.

To transfer a dump file or a code load file over a modem requires a separate telecommunications program that supports a protocol like XMODEM, YMODEM, ZMODEM, or Kermit. To transfer the CTS Monitor program over a modem, it is better to transfer the CTSnnnn.EXE, CTSnnnn.S00, and CTSnnnn.S01 "install" program (actually just a self-extracting archive) than to transfer the individual pieces that make up the monitor. This saves on telephone connect time and keeps the files together.

The CTS Monitor program is *not* designed for remote connection to a CTS by way of modem. Line noise and communications delays may damage your CTS or firmware. It is possible, however, to use a remote connection type program like PC Remote or PC Anywhere to remotely operate a PC that is running CTSMON. If you do this, be careful not to connect CTSMON to the same port as the modem.

4. MAIN MENU

The Main menu contains seven options:

- System — CTS Monitor setup, customization, help, and keyboard macro functions.

- Firmware — load new firmware, set configuration options, make code load tapes, and make self test tapes.
- Dump — extract diagnostic dumps from a CTS and view them.
- eXamine — view various internals of the CTS.
- Control — send instructions to the CTS control processor.
- Servo — send instructions to the CTS servo processor.
- Quit — exit the CTS Monitor and return to the operating system.

4.1. SYSTEM

The System menu allows you to execute operating system commands, select the serial port, and do other CTS Monitor setup functions. It contains the following options:

- OS Shell — execute one or more DOS commands.
- COM port — select which serial port you want to use.
- Doc file — view the on line, plain ASCII text file version of this documentation.
- Help — use the hypertext style help system.
- Setup — set configuration options.
- Macros — record or play back timed keystrokes.
- Loopback test — check your serial port hardware.
- eXit — return to the operating system.

4.1.1. System I OS shell (Alt-O)

OS Shell leaves the CTS Monitor program active in memory while returning you to the DOS prompt. You can return to the CTS Monitor program with the EXIT command.

Do not install any TSR programs with the OS Shell command. TSR programs include commands like DOS PRINT that stay in memory when the program ends. If you want to print something without exiting the CTS Monitor, use the Print command under the Dump file menu.

The serial port is "live," and received characters will be buffered while the other command is executing.

Running another program that uses the serial port with "OS Shell" is NOT recommended. This could result in serial communications not functioning when you return to the CTS Monitor program.

The shortcut key to shell out to DOS is Alt-O.

If the program or command you are trying to run fails because not enough memory is available, quit the CTS Monitor to remove it from RAM, then try running the program or command again from the DOS prompt.

4.1.2. System I COM port

Use **COM port** if you have more than one supported serial port and want to switch to another. This brings up a submenu that allows you to select the serial port that you want to connect to.

Although many serial ports are supported, ***only one serial port can be used at one time***. If another serial port (for example, a mouse) is being used at the same time the CTS Monitor is communicating with the CTS, the other serial port must not use the same IRQ number. For example, using COM1: or COM3: while a mouse is on COM2: is OK, but using COM1: while a mouse is on COM3: is not. (See the table below for IRQ numbers.)

The CTS Monitor also supports nonstandard serial port configurations, such as the Multiple Serial Output Card (RS-232/8s or RS-232/8si) sold by Personal Computing Tools, Inc.

Note: Connecting the CTS Monitor to a serial port that is in use for a mouse may cause the computer to lock up.

4.1.2.1. COM1:/SERIAL 1, etc.

Select the port name that you would like to connect to. If it is not available, the CTS Monitor will reconnect to the port that it was last connected to.

4.1.2.2. MSO Card

This entry causes a pop up entry window to prompt you for the MSO port (0 to 23) that you want to connect to. If the port is available, CTS Monitor will connect to it. If not, CTS Monitor reconnects to the original port.

4.1.2.3. Next port (Alt-J)

This entry causes CTS Monitor to connect to the next available serial port. Serial ports are scanned in the following order:

COM1:
COM2:
COM3:
COM4:
SERIAL 5
SERIAL 6
SERIAL 7
SERIAL 8
MSO 0 through MSO 23
SERIAL 3
SERIAL 4

CTS Monitor skips over any of the above serial ports that are not present with an error message. Not all of the above serial ports can coexist in the same PC, so you should expect some missing serial ports.

By default, CTS Monitor connects to the serial port you connected to last time, unless you specify otherwise on the command line. If it finds no CTSMON.CFG and no port specified on the command line, it uses COM1.

4.1.3. System I Doc file (Alt-D)

"Doc file" allows you to read online documentation (this file).

You can read this document if the file CTSMON.DOC is available in the default directory, in the directory where CTSMON.EXE was started, or somewhere in your DOS search path. Press Alt-D from the main menu to read the documentation.

NOTE: Although you can print CTSMON.DOC, you will get higher quality hard copy of this document if you connect to a PostScript printer, then issue the DOS command
`COPY CTSMON.PS LPT1`

4.1.4. System | Help (F1)

"Help" brings up the help system, as does pressing F1.

The help displayed usually says something relating to what is on the screen. If you want to look at something different, select one of the highlighted topics on the screen to get you to another help screen. To select another topic, move the cursor to the topic you want and press Enter, or move the mouse cursor over the topic and click the left mouse button.

To exit the help system, press Esc.

4.1.5. System | Setup

Setup displays a submenu of customization options.

When CTS Monitor starts up, it looks for the CTSMON.CFG setup file in the current directory. If it doesn't find the file, it looks in the directory where the program was started from, then in all directories in your DOS path. If it finds the file, it uses that information to set up your system. It then scans the command line for options after reading the configuration file, so command line options override specifications in the configuration file.

When you change any option from this menu, the change is stored in that file. If you want to have one setup used all the time, no matter what directory you are running the CTS Monitor from, select all of your setup options from the directory where you keep CTSMON.EXE. Those options will then be used when you start up the monitor later, even if you start CTS Monitor from a different directory, unless there is a CTSMON.CFG file in that directory as well.

4.1.5.1. Temporary files

Temporary files allows you to determine where you want temporary files stored. In order of fastest to slowest, this should be (1) a RAM disk that has at least 384 KBytes free, (2) a hard disk, or (3) a floppy disk. The default value is the contents of the TEMP environment variable if there is no CTSMON.CFG file, or the current directory if there is no TEMP environment variable.

4.1.5.2. .BIN file directory

If you did not specify a directory for .BIN files during firmware load, you can use **BIN file directory** to specify where CTS Monitor looks for .BIN files.

4.1.5.3. Dump file directory

Dump file directory determines where dump files (.85 and .TXT) go when you don't specify a path when prompted for a file name to dump to.

4.1.5.4. Macro directory

Macro directory specifies the default location of keystroke macro files. See System | Macros, below.

4.1.5.5. Snow elimination is ON/OFF

Snow elimination causes all screen writes to go through the BIOS instead of writing directly to video RAM. Turn this function on if your display isn't working in CTS Monitor, or if you have a CGA monitor and see "snow" on your screen every time something changes (like the clock in the corner). Otherwise, leave this off for faster performance.

4.1.5.6. 43/50 line mode is ON/OFF

43/50 line mode allows you to take advantage of the EGA 43 line mode or the VGA 50 line mode to display more information on your screen. ON means use 43 or 50 line mode (depending on

the type of video display card you have). OFF means leave the video mode as it was (as long as the number of columns is 80). The default setting is OFF.

This option has no effect on MDA or CGA cards. If the display mode is set to 35, 40, 43, or 50 line mode before the CTS Monitor is started, it will stay in that mode regardless of this setting.

4.1.5.7. Colors

Colors brings up a submenu that allows you to set colors. If you are using a monochrome display, turn **Black & White** ON and select **Green colors**.

If you are using a color (CGA, EGA, or VGA) display, and don't like the default green colors, try **bLue colors**. If you don't like those, you can play with the other menu selections until you get a combination you like.

Color changes do not completely take effect until you quit and restart the CTS Monitor.

4.1.5.8. MSO serial Port address

CTSMON supports up to 24 nonstandard serial port addresses. Since they are nonstandard, you will probably have to reconfigure both the serial port card and the CTS Monitor to select IRQ and I/O Port addresses that do not conflict with other hardware in your computer.

When you select this menu item, a pop-up window prompts you for the MSO serial port number that you wish to modify. When you enter that number, another pop-up window appears that allows you to edit the current settings for that serial port.

You should select an IRQ value of 3 or 4, and an I/O port address that does not conflict with other PC hardware. If you wish to lock out a serial port so that it is not tried when the CTS Monitor cycles through serial ports, enter an I/O address of 0.

Caution

Make sure that no two devices in your PC use the same I/O port address, and that the serial port addresses configured with this option are accurate.

Also, avoid using the same IRQ at the same time, for example, for a mouse and a CTS.

The table below shows suggested serial port configuration values. Your hardware installation may require the use of different values if you have more than one MSO card. A port address of 0 disables that port.

NAME	IRQ	PORT ADDRESS (HEX)
COM1:	4	3F8
SERIAL 1	4	3F8
COM2:	3	2F8
SERIAL 2	3	2F8
COM3:	4	3E8
COM4:	3	2E8
SERIAL 3	3	3220
SERIAL 4	3	3228
SERIAL 5	3	4220
SERIAL 6	3	4228
SERIAL 7	3	5220
SERIAL 8	3	5228
MSO 0	3	280
MSO 1	3	288
MSO 2	3	290
MSO 3	3	298
MSO 4	3	2A0
MSO 5	3	2A8
MSO 6	3	2B0
MSO 7	3	2B8
MSO 8	3	2C0
MSO 9	3	2C8
MSO 10	3	2D0
MSO 11	3	2D8
MSO 12	3	220
MSO 13	3	228
MSO 14	3	230
MSO 15	3	238
MSO 16	3	240
MSO 17	3	248
MSO 18	3	250
MSO 19	3	258
MSO 20	3	300
MSO 21	3	308
MSO 22	3	310
MSO 23	3	318

4.1.6. System I Macros

To automate repetitive tasks, there is a keystroke macro recorder built into the CTS Monitor. Because many actions involving the monitor depend a great deal on timing, the keystroke recorder remembers not only which key was pressed, but how long of a delay there was since the last key was pressed. Times are recorded with a resolution of 54.95 milliseconds, and a maximum time interval of one day. Keystroke macros are recorded in binary files (6 bytes per key stroke) with a .KEY suffix. These files are *not* modifiable with a text editor. You may have as many macros of any size as you want.

This menu item also contains functions for logging CTS Monitor actions to disk and capturing the current screen to a disk file. These functions may also be useful outside the context of using keystroke macros.

Macros may be chained together. This means that one macro passes control to another macro. You can do this by selecting a macro to play back while recording a macro. The recording stops before the actual play back starts, so when the first macro is played again, it will start the second one up just as it quits.

Note that the keystroke recorder and player is just that — there is no provision for error detection. This means that you must put some thought into the macro recording process. To make reliable macros:

1. Begin the macro with about five **Esc**apes. This ensures that you are back to the main menu, giving you a predictable starting point. Because macro playback can be started from anywhere with a hot key (Ctrl-F3 or Ctrl-F4), you don't know what menu is active at the beginning of the play back process without this step.

2. Select menu items with the highlighted letters or hot keys, rather than with cursor movements and the Enter key. The starting position of the cursor when you run the macro may not match its starting position when you recorded the macros.

3. Use the Comment function to put reminders, comments, or prompts into a macro. While a macro is being played back,

both the macro and the keyboard are active. Therefore, you can pause for the user to enter some data.

4.1.6.1. Record begin/end (Ctrl-F2)

When you first select this option, you are prompted for the file name for storing the macro. The file name must end in .KEY. As soon as the file is opened, the keystroke (and time) recording begins. Macro recording continues until you select this function again, start up another macro, or quit the CTS Monitor program. An "R" on the display, next to the arrow, indicates that keystroke recording is in progress.

4.1.6.2. Play back once (Ctrl-F3)

When you select this function, you are prompted for the file name of the macro. A "P" will appear on the display next to the arrow to indicate that play back is in progress. To stop play back before the end of the keystroke macro file is reached, press Ctrl-F5.

4.1.6.3. Loop play back (Ctrl-F4)

This function is just like the Play back once function, except that the macro is played back for the number of times you specify at the prompt.

4.1.6.4. Stop macro (Ctrl-F5)

This function allows you to stop a macro before it is finished playing back.

The hot key, Ctrl-F5, is available for the same purpose.

4.1.6.5. Disk log ON/OFF (Ctrl-F6)

When you use a macro for an unattended test, you can record what went on while you were gone. When you turn disk logging on, the ASCII text file CTSMON.LOG is opened in the current directory, and much of what is written to the dialog window on the screen is written to this file. If the file already

exists, new entries are appended to the end of the file. Each time the file is opened, the date and time are written to the file.

When disk logging is on, a small square appears next to the clock on the display.

Note: If you are going to be running a macro repetitively, and you toggle disk logging on and off in the macro, be sure that you invoke this function an even number of times so that the disk logging will be on at the right times.

4.1.6.6. Comment (Ctrl-F7)

This function opens up a four-line text window on the screen for you to type any comment you want. The text window remains on the screen until you press Ctrl-Enter, Esc, or Enter from the last line of the text window. This can be used for adding comments to a macro file.

4.1.6.7. set capture File name (Ctrl-F8)

This function allows you to specify the name of the file that you want screen image files to be written to when you press the ~ key. The default name is CTSMON.CAP in the dump directory.

4.1.6.8. Grab screen to file (~)

Pressing ~ causes the contents of the current screen to be appended to the file specified with the Set Capture File Name function. You can also do this from this menu selection, but the menu will be written to the file as well. Line draw characters and other graphics characters will be written as they appear on the screen, so it is possible that some screen images may need to be filtered by another program before printing or importing to another program.

4.1.7. System | Loopback test

The loop back test is useful if you want to make sure that your PC serial port is functioning properly. To run the loop back test,

1. Unplug the serial port cable from the CTS.

2. Electrically connect pins 2 and 3 of the connector on the CTS end of the cable together using a small piece of wire.

3. Select the loop back test function, then press Y to confirm that you want to do the test.

The test sends 1024 randomly generated characters at 9600 baud and checks to see if they were received successfully. If they were, a message stating that the test passed will be displayed on the screen in a small over one second. If not, a message stating that the test failed will appear.

4.1.8. System | eXit (Alt-X or Alt-Q)

There are several ways to exit the CTS Monitor program. You can select "Quit" from the main menu or "eXit" from the System menu; you can press the shortcut keys Alt-X or Alt-Q; or you can press Ctrl-Break (hold the Ctrl key and press the Break key). The last method is intended as an unconditional exit, without regard to the condition of the CTS.

4.2. FIRMWARE

The **Firmware** menu allows you to load code updates to the CTS's firmware (from .BIN files) or to change configuration options. It also allows you to create special tapes for loading firmware or testing a CTS.

4.2.1. Firmware | Option setting (Alt-A)

Selecting **Option setting** loads the current selectable options from the CTS, then displays these options on the screen for you to change if you want. After setting options on screen, you can write them into the nonvolatile memory of the CTS. These changes go into effect after a power-on reset and stay in effect until they are changed with a MODE SELECT command.

The configuration options enable you to specify the power-on default values for:

Autosize the Tape
Buffered Mode

Button Action
Cartridge Type
Command Queuing
Default Density Reporting Code
Directory Support
Even Byte Disconnect
Gap Threshold
Lock Write Density to Power-up Value
Logical Block Size
Maximum Burst Size
Mode SEL/SENS
Monitor Data Compression
Motion Threshold
No Autoload
No Disconnect in Data Transfer
Prevent Media Removal
Reconnect Threshold
Report Actual Subproduct ID
Report Early Warning
Report Media Type
Request Sense Style
SCSI Bus Parity Checking
Sync Negotiate
Tape Density Legal at non-LBOT
True (areal) Density Selection
Write Delay Time
Write Mode

Note: Some options are not applicable to older versions of CTS firmware.

4.2.1.1. Autosize the Tape

Sets the operation of the tape autosize function. If set to N, the tape size is determined by the initial estimate at LBOT along with the setting of the Cartridge Type option. If set to Y, the tape is sized as tape motion proceeds.

4.2.1.2. Buffered Mode

Sets the buffer mode for write data. If set to Y, a write or write file mark command will complete with Good status when the data is written into the buffer; it does not indicate that the data

was successfully written to the tape. If set to N, completion is indicated after the data has been written to the tape. For write streaming, this must be set to Y.

You can override this power-on default option using the MODE SELECT command.

4.2.1.3. Button Action

Controls what the CTS does when the front panel button is pressed. Select one of the following:

Complete command, clr queue, write buf & EOD, rewind & eject
Abort command, clr queue, write buf & EOD, rewind & eject
Abort command, clr queue, write buf & EOD, eject w/o rewind

4.2.1.4. Cartridge Type

Specifies the type of cartridge that the CTS expects when loading a tape. Select one of the following:

15m/54m
Unknown
112m

You can override this power-on default option using the MODE SELECT command.

4.2.1.5. Command Queuing

Controls queuing option for the CTS. The CTS allows tape commands to queue when an immediate command is executing (including power-on self-test and tape loading), and allows non-tape commands to execute immediately. Select one of the following:

Queue new command
Busy (Send BUSY status when busy. No queuing)
Check Condition - Sense Key = Not Ready (No queuing)

4.2.1.6. Default Density Report Code

When set to Y, the EXB8500c never reports 00h for the Density Code; instead it reports the actual tape format (e.g., 14h, 15h, 8Ch, or 90h). Setting the Density Code in MODE SELECT to 00h will select the default tape format for the CTS.

When set to N, the EXB8500c reports 00h for the Density Code instead of the default tape format. Note that this option does not affect how the Density Code in MODE SELECT functions.

4.2.1.7. Directory Support

Configures operation of directory support by the CTS. Select from the following:

Directories allowed, without file marks
Directories allowed, including file marks
No directories allowed

4.2.1.8. Even Byte Disconnect

Select one of the following:

4-on	Sets the even byte disconnect boundary to a multiple of 4 and enables the even byte disconnect function.
4-off	Sets the even byte disconnect boundary to a multiple of 4 and disables the even byte disconnect function
2-on	Sets the even byte disconnect boundary to a multiple of 2 and enables the even byte disconnect function.
2-off	Sets the even byte disconnect boundary to a multiple of 2 and disables the even byte disconnect function.

The even byte disconnect function power-on default value can be overridden by the MODE SELECT command; the boundary value (2 or 4) ***cannot*** be overridden by the MODE SELECT command.

4.2.1.9. Gap Threshold

Specifies the gap threshold for the CTS. This value sets the maximum number of consecutive gap blocks that can be written on the tape.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x0 (0) to 0x7 (7).

You can override this power-on default option using the MODE SELECT command.

4.2.1.10. Lock Write Density to Power-up Value

Configures whether or not the host can change tape density with a MODE SELECT command.

If set to Y, the density may not be changed from the power-up default value. A MODE SELECT command to change density will be ignored.

If set to N, the host may select another density with a MODE SELECT command regardless of the power-up default setting.

4.2.1.11. Logical Block Size

Specifies the power-on default fixed block size. A value of 0 means variable block mode.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x0 (0) to 0x3C000 (245760). Block sizes lower than 0x400 (1024) bytes result in reduced performance.

You can override this power-on default option using the MODE SELECT command.

4.2.1.12. Maximum Burst Size

Specifies the maximum burst size. This is the maximum number of bytes that can be transferred across the SCSI bus (either to or from the CTS) before a disconnect is performed.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x0 (0) to 0xFFFF (65535).

You can override this power-on default option using the MODE SELECT command.

4.2.1.13. Mode SEL/SENS

Configures the operation of the MODE SELECT and MODE SENSE commands. Select one of the following:

8200 style (SCSI-1), no pages
8500 style, with length check in MODE SENSE
SCSI-2, without length check in MODE SENSE

Note: Depending on the firmware version and product identification, you might see a subset of those options, or additional options specific to your installation.

4.2.1.14. Monitor Data Compression

Configures compression mode processing. If set to N, compression is always done, regardless of a previous block enlarging. If set to Y, compression will automatically be turned off if a compressed block gets larger, and will be turned back on when a compressed block once again becomes smaller.

This option will be displayed only if the CTS is compression-capable.

4.2.1.15. Motion Threshold

Specifies the motion threshold for the CTS. The value is given in 4-KByte units. It specifies the number of bytes that must be present in the buffer before a write causes tape motion or the number of bytes available in the buffer before a read causes tape motion. The value can also be interpreted as a fractional part of 256 for the percentage of buffer space available for data.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x20 (32) to 0xD0 (208).

You can override this power-on default option using the MODE SELECT command.

4.2.1.16. No Autoload

Sets the no-autoload state of the CTS. If set to Y, the CTS will not load a tape that is inserted. Also, if the CTS is reset with a tape inserted, the tape will remain unloaded. Only the LOAD/UNLOAD command will load the tape. If set to N, the CTS will load an inserted tape automatically.

You can override this power-on default option using the MODE SELECT command.

4.2.1.17. No Disconnect in Data Transfer

If set to N, disconnects will be allowed in a data stream, which maximizes efficient use of the SCSI bus.

If set to Y, disconnects will not be allowed in the middle of a data stream. This option may be better in the case of a single-host, single-target SCSI bus.

You can override this power-on default option using the MODE SELECT command.

4.2.1.18. Prevent Media Removal

Allows you to prevent media removal. If set to Y, the front panel button is disabled and tape will not be ejected when an unload operation is performed.

You can override these power-on default options using the PREVENT/ALLOW MEDIUM REMOVAL command.

4.2.1.19. Reconnect Threshold

Specifies the reconnect threshold for the CTS. The value is given in 4-KByte units. It specifies the number of bytes that must be free in the buffer before a write operation causes the CTS to reconnect to the SCSI bus, or the number of bytes present in the buffer before a read operation causes the CTS to reconnect. The value can also be interpreted as a fractional part of 256 for the percentage of buffer space available for data.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x20 (32) to 0xD0 (208).

You can override this power-on default option using the MODE SELECT command.

4.2.1.20. Report Actual Subproduct ID

Configures reporting of the Subproduct ID field (bytes 24 to 31) in inquiry data. If set to Y, the normal bytes are reported (the name of the EEPROM). If set to N, this field is set to blanks.

4.2.1.21. Report Early Warning

Sets the status of reporting early warnings on **read** operations. For write operations, early warnings are reported after LEOT is passed on the tape. For read operations, reporting passing LEOT is optional. If set to Y, early reporting for read operations is enabled. If set to N, early reporting for read operations is disabled.

You can override this power-on default option using the MODE SELECT command.

4.2.1.22. Report Media Type

Controls reporting of media type in mode sense data. If set to Y, the media type is included in the sense data. If set to N, the media type is reported as zero (0) (SCSI-2).

4.2.1.23. Request Sense Style

Specifies the format for request sense data. This value sets the number of additional bytes of sense data that are returned. Select one of the following:

0x12 - Deferred error code never returned in byte 0 (8200)
0x14 - FSC not included
0x15 - Standard number of bytes (8500)

4.2.1.24. SCSI Bus Parity Checking

Enter Y to check for parity errors on the SCSI bus (recommended) or N to ignore parity errors (not recommended).

You can override this power-on default option using the MODE SELECT command.

4.2.1.25. Sync Negotiate

Configures operation of synchronous negotiation messages. Select from the following:

Synchronous negotiation messages accepted, not initiated
Synchronous negotiation messages rejected
Synchronous negotiation initiated by CTS after reset

4.2.1.26. Tape Density Legal at non-LBOT

Configures the legal density selection when not at LBOT.

If set to Y, the density required by MODE SELECT at non- LBOT is the same as the density returned by MODE SENSE. This is the density of the tape. MODE SENSE followed by MODE SELECT will always work without error in this mode.

If set to N, the density required by MODE SELECT at nonLBOT is the write density of the CTS. This may be different than the tape density. MODE SENSE followed by MODE SELECT may return error status due to an illegal attempt to change density.

4.2.1.27. True (areal) Density Selection

Configures how the Density Code is used with compression.

If set to Y, the density code selects only the true density (areal, i.e., bits per area). To change the format between densities 14 and 90 or 15 and 8C requires the use of page F. This option has no effect on a CTS that does not allow compression.

If set to N, the Density Code selects the compression format as well as the true density.

4.2.1.28. Write Delay Time

Specifies the write delay time in units of 100ms. This sets the maximum length of time that data remains in the buffer before the CTS writes it to tape. When the time is exceeded, the data is written. If set to zero (0), there is no maximum write delay time.

Enter the value in hexadecimal (0x...) or decimal. The legal range for this value is 0x0 (0) to 0x3FFF (16383).

You can override this power-on default option using the MODE SELECT command.

4.2.1.29. Write Mode

If the CTS is capable of compression operations, select one of the following:

8500 (15h format) - Compression capable - Disabled
8500c (8Ch format) - Normal compression
8200 (14h format) - Compression capable - Disabled
8200c (90h format) - Normal compression

If the CTS is not capable of compression operations, select one of the following:

8500 (15h format) - No compression/decompression capability
8200 (14h format) - No compression/decompression capability

4.2.2. Firmware | Load code from .BIN (Alt-L)

You can load firmware into the Flash EPROM (FEPROM) of a CTS in three ways:

- Use the CTS Monitor, CTS Monitor, CODELOAD, or 8POPS to load code from a .BIN file over the serial port.
- Load a special tape that contains instructions to the CTS to load its firmware from tape.
- Send the code over the SCSI bus using the Write Buffer command. See the CTS Interface User's Manual for details.

Using CTS Monitor to load firmware is the most reliable method, because this method doesn't require the present of good firmware in the FEPROM before the load begins. Thus, you can retry a code load operation if it fails. This is the only method that allows you to recover. Some versions of firmware do not support the tape or SCSI bus option.

Loading code from tape is the most convenient method. Simply insert the tape into the CTS while it is powered on and running, and the new firmware is automatically loaded with no further action needed on the SCSI bus or the monitor port. A firmware load tape can only be reused as a data tape on an EXB-8200 or EXB-8200SX.

Loading code from the SCSI bus is the fastest method because of the speed of the bus. The disadvantage of this approach is that it probably requires a different program for each computer and SCSI bus adapter combination. SCSI bus loads use .TAP files instead of .BIN files.

CTS firmware for loading by CTS Monitor (control and servo programs, and/or some of the EEPROM data) is distributed as a DOS file with the extension .BIN.

1. Select **Firmware,** then **Load code** from the menu. You are prompted for the name of the file containing the firmware.

2. Either edit the file name, or, if you leave any wild cards (* or ?) in the file name, select the file from a list of files matching that description. A prompt asks, "Are you sure," giving you a last chance not to change the firmware.

3. Enter "Y" to continue. Press any other key to leave your firmware unchanged.

4. Remove any data cartridge from the CTS before loading code. If the load fails for any reason (for example, a power failure), the servo mechanism may damage any tape left in the CTS. The CTS attempts to rewind and unload the tape before a load, but may not have enough time for a long rewind.

4.2.3. Firmware I Make code load tape

A firmware code load tape is a special tape that causes firmware and/or EEPROM configuration information to be loaded into a CTS simply by inserting the tape into the CTS.

To make a code load tape:

1. Unload any data cartridge currently in the CTS.

2. Ensure the CTS is idle (no SCSI bus activity).

3. Select the **Make code load tape** option from the Firmware menu.

4. Select the type of code load tape you want to make by answering "Y" or "N" to the three questions:
   Include control & servo FEPROM code?
   Include mode select defaults from CTS?
   Include vendor unique options from .BIN?

   If you include vendor unique options from a .BIN file, mode select defaults will also be loaded from that .BIN file unless you also select mode select defaults from CTS. Mode select defaults from the CTS can only be written to tape in combination with control & servo FEPROM code and/or vendor unique options from a .BIN file.

   If you want to make more than one code load tape with the same contents, enter the number you wish to make.

5. If you are making a code load tape that includes any vendor unique configuration information from a .BIN file on disk, enter the name of the .BIN file in response to the prompt. You can also enter a file specification that includes one or more DOS wild cards if you want to select the file from a list.

6. Insert a new blank tape in the CTS. A 15 meter tape is adequate, since less than one meter is actually used.

7. Wait for the tape to be ejected and a message to appear on the screen indicating if the operation was successful or not.

8. Label the code load tape with the version and type of firmware that is on it.

To copy a firmware load tape, first load the firmware from the tape by inserting the load tape into the CTS. Then follow the instructions above for creating a firmware load tape.

Once a tape is encoded as a firmware load tape, it cannot be used for a data tape unless it is first erased in an EXB-8200 or bulk erased since any attempt to do so with a CTS would result in a code load operation. Firmware load tapes can be overwritten with a new version of firmware, however.

If you don't have a .BIN file with your current version of firmware in it, then it is a good idea to make a code load tape with your current firmware on it before loading new code with CTS Monitor. That way you have a backup version of this level of firmware in case you need it for any reason.

4.2.4. MASS PRODUCING CODE LOAD TAPES

To produce large quantities of code load tapes, it is useful to use an EXB-10, EXB-10i, or EXB-10e Cartridge Handling System (CHS) in sequential mode to produce up to 10 at a time. To do this,

1. Set up the CHS in sequential mode following the instructions in its user's guide. Set up the CHS to cycle only once by turning the **loop** option **off** and the **restart** option on. This prevents the CHS from continuing to load code into the CTS forever after the tenth tape is loaded.

2. Load ten new tapes into the CHS and turn the CHS power on, but keep the CHS door open.

3. After the CTS power on sequence is complete (as indicated by the lights on the CTS), follow the instructions in the above section for starting the code load tape creation process, specifying the number of tapes you wish to write in step 4.

4. When you are prompted to insert the first tape, shut the CHS door. The CHS will load all ten tapes sequentially, then stop.

4.2.5. USING A CODE LOAD TAPE

Warning

Removing power or resetting the CTS while it is loading code into the Flash EPROM will result in an inoperable CTS. If this occurs, reload code using CTS Monitor. A reload from the code tape cartridge will not work.

1. Ensure that the CTS power is on and that the CTS is unloaded and idle.

2. Ensure that no SCSI bus reset will occur — disconnect the SCSI connector if it is accessible.

3. Insert the code tape and wait for it to be ejected. The CTS loads the new code from the tape to its buffer and verifies that the code load is good. If the code passes its checksum tests, the cartridge is ejected.

4. After the code is loaded in the FEPROM, the CTS executes a power-on reset. After this reset is complete, you can resume normal operation with the CTS. CTS Monitor is not required to load code with a code load tape, but if CTS Monitor is running, it indicates with a message when the load is complete.

4.2.6. Firmware l Fix bad head sync

This option is not normally needed. If the head sync value in your CTS EEPROM image (the first two bytes) gets corrupted to the extent that an automatic head sync tape will not function, use this menu selection to change the value to the default head sync value. After doing this, turn the CTS power off, then on. After the reset sequence, insert an automatic head sync setting tape into the CTS. This will restore proper operation.

If you use this menu selection when the head sync value is already legal, CTS Monitor does not change the head sync value and reports the current head sync value. If you want to ensure that the head sync is properly set, use an automatic head sync tape to reset the optimum value.

4.2.7. Firmware | Create self test tape

A self test tape is a special tape that causes the CTS to perform self diagnostics when inserted. To make a self test tape:

1. Ensure that the CTS is powered on, finished with its power-on self test, idle, unloaded, and has no SCSI bus activity going on.

2. Select **Create self test tape**. When prompted, answer "Y" to indicate that the CTS is ready.

3. When prompted, insert a blank data cartridge (15 Meter size is adequate) and wait for it to be ejected.

4.2.8. Firmware | Show contents of .BIN file

Select this option to find out what is in a .BIN file without loading it. CTS Monitor prompts you to choose the .BIN file, then displays the contents on the screen. You are also asked if you want to extract any release notes embedded in the .BIN file to a disk file.

4.3. DIAGNOSTIC DUMPS

There are two dump file formats: binary format and ASCII text. The binary format is a compact representation of all of the most important data in the CTS processors and can be used to reproduce the ASCII text format. The text format is a translation of part of the information in the binary dump to a readable ASCII format (though it contains hexadecimal). The EXB-8200 and EXB-8200sx dumps are available only in an ASCII format. All other dumps are available in both binary and ASCII format.

When sending a dump file back to Exabyte Corporation for analysis, send only the binary file. This file is required for Engineering analysis and the text format can be created from that. This saves disk space and modem time. (A binary file cannot be created from an ASCII file.)

NOTE: The process of creating a dump file might cause servo errors in your CTS. After creating a dump file, you might have

to power the CTS off and back on again to make it function normally.

Creating or translating a dump file has the side effect of placing the CTS Monitor program in analysis mode, so that functions in the Examine menu which do not involve the one megabyte buffer will refer to the static dump data instead of an attached CTS. In analysis mode, the run/stop arrow in the upper right hand corner of the display turns to a diamond.

4.3.1. Create dump file (F2)

The Create Dump File menu option prompts you for a base file name (drive, path, and name without extension). Do not enter an extension for the file name, it will be ignored. If the connected CTS is an EXB-8200 or EXB-8200sx, a single ASCII dump file is automatically created with a .DMP extension. If the connected CTS is an EXB-8500, EXB-8500c, EXB-8505, or EXB-8205, then two dump files are created. One of the files is a binary dump with the extension ".85", and the other is a text dump with the extension ".TXT". If either of these files already exists, you are asked if you wish to overwrite them.

When you create a new dump file with the **Create dump file** option, you are prompted for a problem description. This problem description is included in the dump file to help EXABYTE Technical Support organize dump files when they receive them for analysis.

While entering this description, you can use the following editing capabilities: arrow keys, Backspace, and the Insert toggle. Pressing Enter from the last of the four lines or Ctrl-Enter from any line completes the entry.

After the files are created, the text file displays on the screen. You can read through the file at your leisure, using the arrow keys and PgUp and PgDn keys. When you are done, press Esc. You can view the file again later with the View text file option.

If you don't want to wait for a dump to finish, you can interrupt the process with a keystroke, then answer Y to the pop-up prompt asking if you want to discard the dump.

4.3.2. Dump | View text file (F3)

The **View text file** option allows you to view a text dump (or other ASCII file) that was created previously. You can read through the file at your leisure, using the cursor keys and PgUp and PgDn keys. When you are done, press Esc.

While viewing a text file, you can use the following keys:

S	Search for specific text (case sensitive)
PgUp	Go up one page
PgDn, Enter or space bar	Go down one page
Home or Ctrl-PgUp	Go to top of file
End or Ctrl-PgDn	Go to bottom of file
Up arrow	Go up one line
Down arrow	Go down one line
Esc	Exit from the file viewer and return to the menu

4.3.3. Dump | Binary to text (F4)

This option allows you to create a text dump file (.TXT) from a binary dump file (.85), then view the text dump file. If the text dump file already exists, you are asked if you want to overwrite it. You will then be able to view the text dump with the arrow keys. When you are finished, press Esc. You can look at the text dump file later with the View Text File option.

4.3.4. Dump | Print file (Alt-P)

To print any plain ASCII text file (like CTSMON.DOC) to LPT1:, select this option and specify the file name that you want to print.

Printing occurs in the background while the CTS Monitor program waits for keyboard input. If you select this option right after starting up the CTS Monitor program, there will be a slight delay before printing starts while other background initialization tasks are completed. Only one file can be in the print queue at a time. If you exit the CTS Monitor program, all print activity is canceled.

If you want to stop a print job, you can either (1) exit the CTS Monitor, or (2) select the print option again (Alt-P), then answer Y when you are asked if you want to cancel the print job.

4.4. EXAMINE

Examine allows you to view items included in the dump files without taking the time for a complete dump.

4.4.1. eXamine I SCSI cmd/status trace (F9)

The SCSI trace table consists of five sections.

The first section is a compact, raw dump of the trace table. Interpretation of this table assumes that you are familiar with the firmware that generates it.

The second section lists the most recent SCSI commands and status replies, along with their corresponding host numbers.

The third section contains the last “action” CDB in its entirety. If there was no last “action” CDB, TEST UNIT READY (all zeros) is listed.

The fourth section contains the last CDB to return a Check Condition status, along with its sense key and fault symptom code. If there was no last command to return a Check Condition status, TEST UNIT READY (all zeros) is displayed, with a fault symptom code of zero.

The last section contains a more detailed trace of the CTS’s SCSI phases.

4.4.2. eXamine I XRAM display (Alt-E)

This command allows you to examine any range of control processor external memory and memory mapped I/O areas with addresses ranging from 0 to FFFFH.

If the range of addresses you specify is less than or equal to 1024 bytes, then the memory is read only once before it is displayed, and only the memory specified is read. This is significant when reading some of the memory mapped I/O locations.

If you specify more than 1024 bytes of memory to read, the memory is read in 1024 byte chunks, and the first screen of data is displayed as soon as that part of memory is read in. Memory continues to be read as you read the data, until it has all been read in. If you want to look at a part of the memory that hasn't been read yet, it will be read first, then the background reading will continue where it left off.

While looking at the XRAM display, you can use the following keystrokes:

PgUp	Go up one page
PgDn, Spacebar, or Enter	Go down one page
Home or Ctrl-PgUp	Go to the top of the buffer
End or Ctrl-PgDn	Go to the bottom of the buffer
Up arrow	Go up one line
Down arrow	Go down one line
Right arrow	Go right one byte
Left arrow	Go left one byte
g or G	Go to a hexadecimal address
F1	Help
Esc	Quit viewing external RAM

4.4.3. eXamine I Read SCSI chip register

This function allows you to read the contents of any register of the SCSI chip. Register addresses range from 0 to 1F hexadecimal.

4.5. CONTROL

This menu allows you to stop (sTop) and start (Run) the control processor main program manually. When the control processor stops, the CTS becomes inactive on the SCSI bus and sends basic data about its state (the "standard context") to the screen.

NOTE: When the control processor runs again, you might have to power the CTS off and then on again to make it function normally, depending on what happened while it was inactive.

All of the dump and examine functions automatically stop the control processor if needed, then (if it was running before) tell it

to run when the dump is done. The servo functions automatically stop, but do not restart, the control processor.

The control menu also contains functions to do LEOT and diagnostic testing and to set and use break points or trigger points. These functions typically require the help of an EXABYTE Technical Support representative.

4.5.1. Control l sTop (Alt-T)

This function stops the control processor main program (if it was running) and displays the state of the internal registers and RAM on the screen. If you are using EGA 43-line or VGA 50-line mode, 48 bytes of external RAM and 48 bytes of program memory (the boot PROM copyright message) also display.

When the control processor stops, the small arrow in the upper right corner of the screen (next to the clock) points down. On a color display, this arrow turns red. On a CGA or VGA display, the screen border turns red.

4.5.2. Control l Run (Alt-R)

This function causes the control processor to run again after it has been stopped either manually or automatically (for example, by issuing a servo command).

When the control processor is running, the small arrow in the upper right corner of the screen (next to the clock) points up. On a color monitor, it turns green. On a CGA or VGA display, the border turns green.

NOTE: When you start the control processor again, you might have to power the CTS off and then on again to make it function normally, depending on what happened while it was inactive.

4.5.3. Control l diZplay front/back

This function is active in EXB-8200/EXB-8200sx mode only.

Display was spelled with a Z to allow the same selection key to be used for this function as on the original EXB-8200 monitor. This function is only for the EXB-8200 and EXB-8200sx, which

cannot display the “front” (0-127) and “back” (128-255) internal RAM at the same time. Selecting this function toggles back and forth between the two.

NOTE: Never exit the CTS Monitor program with the “back” RAM displayed, as this will cause the CTS and Monitor to be out of sync the next time the monitor program is started up, and the dump function will not report correct data.

4.5.4. Control l LEOT test (Alt-V)

To test the way a driver program and the CTS interact at LEOT without actually writing all the way to LEOT, you can use this function to move the LEOT point to a spot closer to LBOT. The units of measure here are physical 1024-byte blocks on the tape (not logical blocks). Once a fake LEOT point is set with this function, the CTS must be reset to restore normal operation.

4.5.5. Control l Breakpoint set (Alt-B)

This function sets three break points (addresses in the control processor program to stop at when they are reached). After setting the break points, issue the Goto breakpoint command. This function is for debugging, and not for normal CTS operation. When a breakpoint is reached, a message is sent over the monitor port to the PC. Break point selection depends on the type of troubleshooting you are doing. This is designed for use by the firmware authors, but may be useful to end users trying to solve a specific problem with guidance from an EXABYTE Technical Support representative.

4.5.6. Control l trlgger set

This function sets three trigger points (addresses in the control processor program that cause a pulse to be sent out on monitor pin 4 when they are reached). After setting the trigger points, issue the Goto breakpoint command.

4.5.7. Control | Goto breakpoint (Alt-G)

After setting break points or trigger points, use this function to run the control processor with these break or trigger points enabled.

4.5.8. Control | start/stop Diagnostics

To run diagnostics from the serial port that cause the CTS to read and write with start/stop motions:

1. Insert a scratch data cartridge into the CTS.
2. Wait for the CTS to be idle, and ensure that no commands or reset signals come over the SCSI bus.
3. Select the Start/stop Diag menu item.
4. Press Y to confirm that the CTS is loaded and idle, then wait for one of the following responses:

   Y Yes, send diagnostics (from monitor) PASSED!
   U Unsuccessful (FAILED) diagnostic test!
   B Can't start operation until self test and autoload are done!
   E Can't write on tape — tape is write protected!

4.5.9. Control | strEaming diagnostics

This is the same as the **Control | start/stop Diagnostics** selection, except that the data transfer rate tested is higher and the test completes faster due to fewer stop/start motions.

4.5.10. Control | Fake cleaning needed

This function causes the CTS to simulate the internal timer condition where 30 hours of tape motion have passed and a cleaning tape needs to be inserted. To clear this condition, insert a cleaning tape or reset the CTS.

4.6. SERVO

The servo commands allow you to give basic motion commands to the CTS for emergency tape extraction, troubleshooting hardware, and testing.

NOTE: After using these functions, you must perform a power-on reset to continue normal operation of the CTS.

4.6.1. Servo | Reset servo (Alt-F1)

This command tells the servo processor to reset itself. For this command to work, the servo processor must be able to receive and process the command. This command does not reset the control processor, and will likely confuse the control processor if you attempt to continue normal operation after the servo reset.

4.6.2. Servo | Load tape (Alt-F2)

This command causes the CTS to load tape into the tape path from a cartridge that has been inserted.

4.6.3. Servo | Unload tape (Alt-F3)

This command causes the CTS to unload the tape without rewinding it first. This is useful if you suspect that your CTS is damaged and might cause tape damage during a rewind operation. Under normal operating conditions, unload operations at the beginning of tape cause less tape damage to the data area of the tape.

4.6.4. Servo | Find LBOT (Alt-F4)

When the tape is at PBOT, this command causes the CTS to move the tape forward to find the logical beginning of tape (LBOT).

4.6.5. Servo | Go track (Alt-F5)

This command causes the servo processor to go into CTS native tape format tracking (read) mode and move the tape forward at normal speed.

4.6.6. Servo | Stop tape (Alt-F6)

This command stops the tape motion.

4.6.7. Servo | rewind to PBOT (Alt-F7)

This command rewinds the tape to physical beginning of tape (PBOT).

4.6.8. Servo | rewind uNload (Alt-F8)

This command rewinds the tape to physical beginning of tape (PBOT), then unloads and ejects the data cartridge.

4.7. QUIT (Alt-Q)

This command is the same as System | eXit (Alt-X). Both menu items terminate the CTS Monitor program and return you to DOS.

5. ERROR MESSAGES

Program error messages are described below.

5.1. File Errors

The following errors relate to reading and writing disk files.

Error writing to output file (disk full?).
Unable to close [file name] ?!

The program was unable to write to a disk file for some reason. The most common reason is that the disk was full. To correct a

disk full error, shell out to DOS with ALT-O, delete any unneeded files, type EXIT to return to the monitor, then retry whatever you were doing. If the disk that filled up was a floppy disk, replace it.

***[file name]* is not a CTS binary dump file.**
Binary file format error!

Unrecognized dump file format. Get an upgrade to CTSMON.EXE. Unrecognized servo data format. File corrupted or CTSMON.EXE out of date. Command buffer size too large.

Unable to open *[file name]*
Unable to open *[file name]* to print.

File name may have been incorrectly entered or the file may not exist.

Error closing *[file name]*
Error flushing *[file name]* to disk.

Disk may be full, removed, write protected, or there may have been a network failure.

Bad servo data format.
File corrupted or CTSMON.EXE out of date.

These messages may appear while trying to translate a binary dump file (extension of .85) to an ASCII text file if the dump file was damaged or the input file really wasn't a binary dump file.

Unable to reopen *[file name]*

File wouldn't open, even though it was here a second ago . . . not likely unless the file was on a network or you are running multitasking system software.

5.2. Serial Communications Errors

The following errors pertain to failure to communicate on the serial port.

Trying to stop control processor again (*number*)...

Whenever the CTS Monitor program commands the main control program in the CTS to stop running and go into monitor mode, certain basic information is supposed to be sent back. If it is not received, then several more attempts are made. The most obvious cause of this problem is a possible bad connection between the PC and the CTS or that there is no power to the CTS. Other possible causes are that the CTS firmware and the CTS Monitor program are out of synchronization with each other. In this case, it may be necessary to restart the CTS Monitor program and/or do a power on reset of the CTS by cycling the poweroff, then on again.

Overrun error!
Parity error!
Framing error!
Break detected!
Receive error
Receive queue overrun error!
Break detected
Framing error
Parity error
Overrun error

These messages refer to the things that can go wrong with the serial communications between the PC and the CTS.

XRAM receive framing error! [number]

The CTS and CTS Monitor program are out of synchronization. While waiting for a framing character, CTS Monitor received a different character from the CTS. Restarting the CTS Monitor program and/or resetting the CTS may be required.

Requested COM port not found.
Connected to COM*n*:

The program couldn't switch to the serial port number you requested.

COM*n* not found!

The serial port noted could not be located a program start-up. If you have COM2: but not COM1:, use /2 on the CTSMON command line. DOS ERRORLEVEL = 5.

Dropout detected reading external RAM!

The CTS and monitor program are out of synchronization. A framing character was expected from the CTS, but nothing was received. Monitor program restart and/or resetting the CTS may be required.

5.3. Code Loading Errors

The following errors indicate a failure to load firmware, either due to a bad file format, wrong version of the CTS Monitor program, a hardware failure in the CTS, or a serial port failure.

Invalid code file header or wrong version of monitor.
.BIN file format not supported by this monitor.
File too short!
File validation failure

All of the above error messages indicate that the code load (.BIN) file that you attempted to load into the CTS was not valid. Either it was damaged, or it never was a valid code load file, or there has been a .BIN file format change and this version of the CTS Monitor program does not support it. No change to the CTS firmware is made if the .BIN file cannot be verified to be OK first.

Hardware error! Unable to complete erasure!
Servo program error! Unable to complete erasure!
TIME OUT ERROR! Unable to complete erasure!
0x01: Erase failed.
Erase failed.

These error messages indicate that an FEPROM or EEPROM erasure did not complete successfully. Your CTS might be nonfunctional. If retries do not correct the problem, you probably have a hardware problem. FEPROMS and EEPROMS both have a finite number of erase/program cycles that they can endure, and one of these parts may need to be replaced.

Loading address *[number]* **Dropout** *[number]*

While loading code or data into the CTS, the CTS failed to respond to the last packet sent, indicating that it probably did not get enough bytes in. If sending more bytes to the CTS does not unlock it, it will be necessary to reset the CTS (power off then on or press the tiny white button near the power connector

on the CTS) and restart the CTS Monitor program to retry the load operation.

Transfer failed – giving up.
Giving up.
Gave up after x:xx.

Too many errors were detected in the firmware download. Reset the CTS by cycling its power off then on, then try the firmware load again.

N: Transfer failed – giving up. Delay was *[number]*

The CTS got too many bad packets of data in a row.

A: *[number]* **retries.**

The CTS called the last data packet bad, and requested a retry.

0x02: Program operation failed.
Error sending end record.
Program operation failed.

Unable to program FEPROM or EEPROM — possible hardware failure.

0x04: FEPROM checksum error.

Firmware is damaged — reload it.

Configuration upload failure!
Configuration upload integrity check failure!

Something went wrong in trying to get the current configuration option information from the CTS. No changes will be made unless the existing options can be uploaded correctly, since part of the data must be downloaded again.

Option change failure.

EEPROM options were not correctly reprogrammed. It may be necessary to reload your default options from your EEPROM configuration file (85E-xxxxx.BIN), then try to change your configuration options from the menu again.

5.4. Memory Shortage Errors

The following errors indicate a lack of memory available to run the CTS Monitor program.

ERROR: Out of memory.

Program halted due to lack of memory (in the main 640K). This is possible if you "shell" out to the CTS Monitor from another program, if you have too many TSR programs resident, or if you are running some multitasking system software that didn't allocate at least 400K of RAM for the CTS Monitor. DOS ERRORLEVEL = 3.

ERROR: Windowing function failure.

The program couldn't open a new window on the screen, possibly due to the lack of memory. DOS ERRORLEVEL = 4.

Main menu definition or memory allocation error!

Give the program more room in your PC RAM. DOS ERRORLEVEL = 7.

5.5. Information Messages

The following messages do not necessarily indicate error conditions with the CTS Monitor program.

Action terminated by keystroke.

Some of the error recovery loops allow the current action to be terminated by hitting any key. This message means that whatever you were doing has terminated before finishing. It may be necessary to use several keystrokes or a Ctrl-Break to get out of some loops in a reasonable period of time. Interrupting some operations, like loading firmware, is not recommended in normal circumstances, since this could leave the CTS without any valid firmware and nonfunctional.

Clearing servo command in progress.
Clearing pending servo interrupt.
Checking for servo interrupt...

These messages may appear while the CTS Monitor is communicating with the servo processor in the CTS. They aren't really error messages, they just indicate that the servo processor may be busy with something else, like running through a reset sequence.

Break!

Program halted because someone pressed Ctrl-Break. DOS ERRORLEVEL = 2.

[file name] is in the print queue.
Printer is timed out.
Printer I/O error!
Printer is off line.
Printer is out of paper.
Printer is busy.
Please make sure printer power is on and printer is on line.

The preceding messages give the status of the background print job. One or more of them appear when you select the "Print file" menu option while a print job is active.

!: Lost sync uploading bulk data
@: Breakpoint reached
C: FEPROM CRC of firmware failure
H: Programmed Hang — see program counter
I: Primary interrupt from spare device?
O: Boot prom firmware is OBSOLETE — get new boot prom or older .BIN file P: Power on reset, FULL testing in progress
Q: CTS control processor OS task queue FULL
R: Tape drive reset
S: Stack over/underflow error
T: Firmware error: control processor timeout without vector V: Control processor OS error: Void link return
W: Watchdog timer time out
X: Monitor executing in monitor only mode
Z: unit self test done
b: Firmware hit a blue moon window!
h: Handshake went awry?
m: Mail linkage got executed
r: Handshake failure?
t: Hardware error — DPORT read transfer error
0xxx (x) received from drive!
0xxx received from drive!

The above indicate unsolicited characters sent from the CTS to the PC over the serial port. These messages convey information concerning the status of the CTS.

6. PROBLEM REPORTING

If you find a problem with the CTS Monitor software, or have a suggestion for an improvement, please contact Exabyte Technical Support at:

CTSMON Technical Support
EXABYTE CORPORATION
1685 38TH ST
BOULDER CO 80301-2630

BBS 303-447-7100
Voice 303-442-4333 or 800-442-4392

Explain the symptoms of the problem and write down the exact sequence of keystrokes and/or other significant information needed to reproduce the problem. Also, please indicate what hardware you are running the program on (type of CPU, graphics card, monitor, and so on.) and the contents of your CONFIG.SYS and AUTOEXEC.BAT.

7. INDEX

S

T

U

V

W

X

Y

Z