CSX User's Manual

Version 0.27 beta

Legal Information

I neither condone nor encourage illegal and unscrupulous behavior, such as modification of copyrighted software, or of illegal redistribution and/or reverse engineering of Flash Applications or Certificates; CSX is in no way designed for any such purposes.

CSX does not utilize any part of any operating system copyrighted by Texas Instruments presently in existence. Any similarities are purely coincidental and can be attributed to: (a) Generic low-level routines that have been well-known for years, (b) Vestiges of the TI-OS reamaining after the installation process, or (c) Portions of CSX that have been incorporated into a version of TI-OS.

Table Of Contents

Overview

CSX is a third-party operating system for the TI-83 Plus graphing calculator. It should also work on the TI-83 Plus Silver Edition, and there is a small but not zero chance of it working on the TI-84 Plus and TI-84 Plus Silver Edition.

CSX in its current form has the following features:

- File management system, supporting extensions and long filenames.
- Ability to run assembled Z80 programs
- Ability to link to and receive files from a computer.
- A hex editor.

CSX runs primarily as a command-line interpreter, in a format that may be familiar to users of TI's 68k line of calculators.

Installation

Launch your preferred link softaware. I have only had experience using TI Graph Link 83+, but I presume that other options such as TiLP will work fine.

If your calculator is currently running a version of TI-OS, locate the file CSX.8XU and send it over. If currently running a version of CSX or another operating system, you must first force an OS load by removing and re-inserting a battery while pressing [DEL].

The calculator screen will now show "Receiving Calculator Software..." and a percentage indicator. Ignore it. Keep your attention on the progress bar shown by the computer.

When the bar is filled, immediately yank a battery. This is to interrupt the validation process which will erase CSX if left to run to completion.

Disconnect the link cable, and replace the battery. Congrats! You' re good to go.

Operation

ON Key

The [ON] shift key allows you to change the display contrast or shut off the calculator.

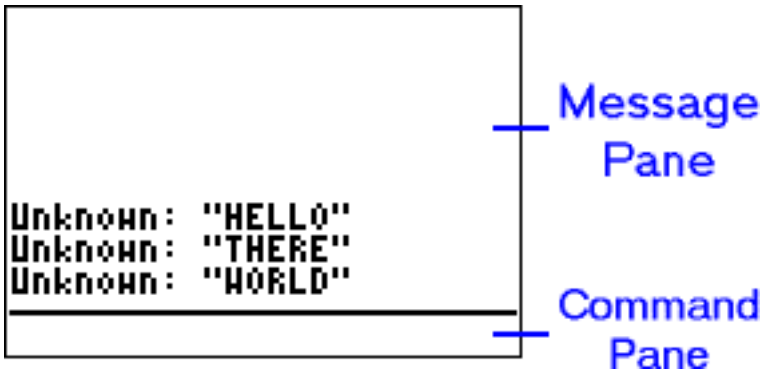
[ON] + UP	Increase contrast
[ON] + DOWN	Decrease contrast
[ON] + [2nd]	Power off

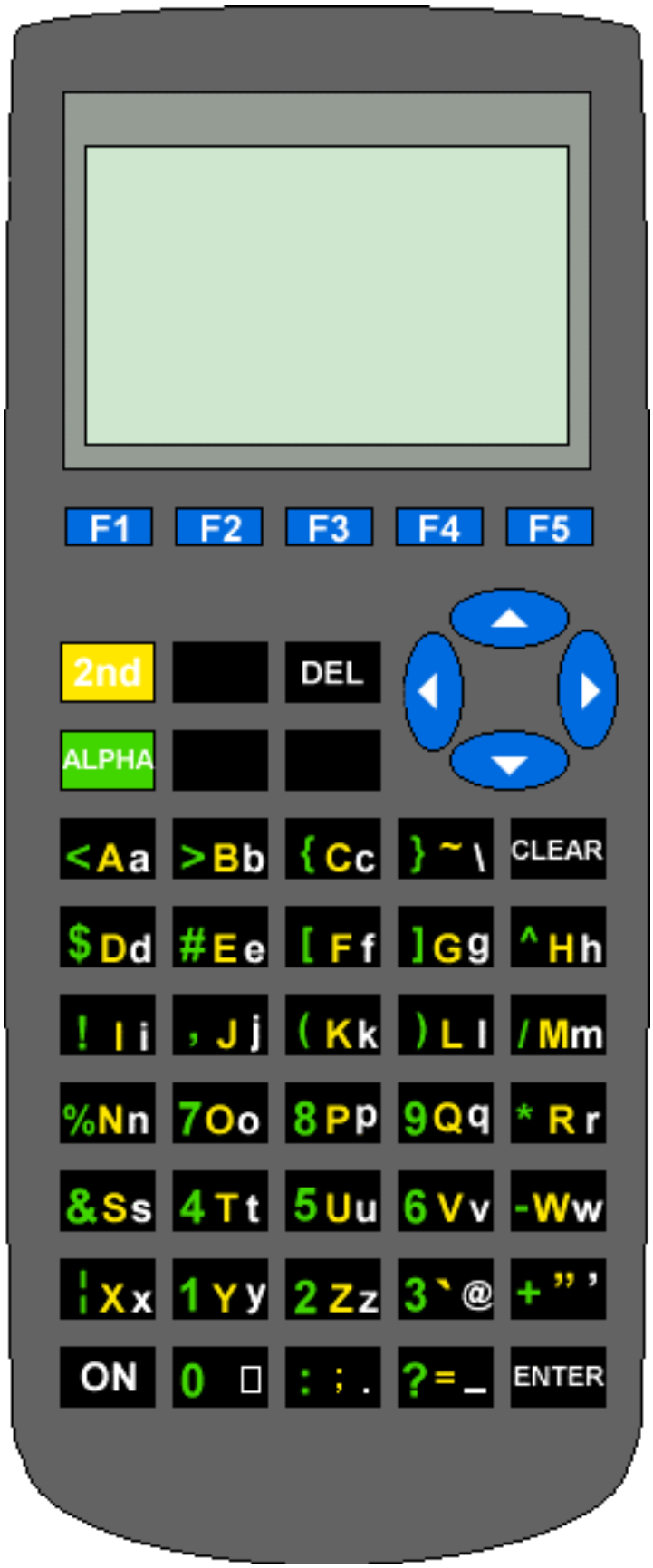
Automatic Power Saver

If the calculator stays idle for approximately 3 minutes, it will automatically power down to conserve battery life. Press [ON] to turn the calculator back on and continue where you left off.

Console

The picture below shows the console, which is where normal operation takes place. The console is divided into two panes, separated by a horizontal line. The upper pane is called the message pane and contains messages and other output from past commands. The lower pane is called the command pane, and is where commands are typed in.





Entering Commands

This mock-up of the obverse of a TI-83 Plus shows which keys to type to input which characters.

White indicates the key is pressed alone.

Yellow indicates the key is pressed while holding down the [2nd] shift key.

Green indicates the key is pressed while holding down the [ALPHA] shift key.

Pressing [DEL] will erase the rightmost character.

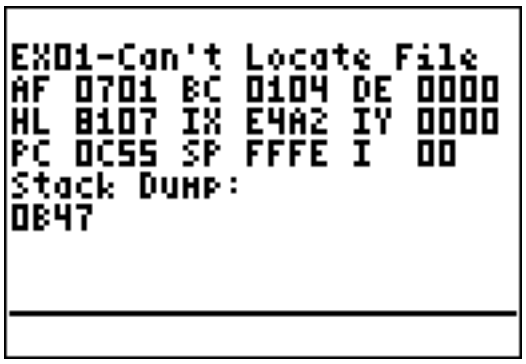
Pressing [CLEAR] will erase the entire command line.

When finished typing in the command, press [ENTER]. Now, either of two things will happen: either what you typed is recognized as a valid CSX command, or the console will show an "Unknown" error. (See Appendix A for valid CSX commands)

The command pane has a maximum input of sixty-four characters. Since there is only enough screen space to display twenty-four, characters will scroll off to the left if necessary. If all the visible characters have been deleted, the display will "snap-back" to show more if possible.

Exceptions

Sometime, CSX will find itself in an unrecoverable error condition (e.g. a specified file does not exist). In such cases, an exception will be thrown to prevent a serious crash resulting in data loss. When an exception occurs, CSX will immediately return to the console with a message describing the exception in detail.



Shown will be the exception ID number and the description. According to the above picture, the exception that was thrown had an ID of "01" and indicates that a file couldn' t be located. Following is a display of the contents of the Z80 register set and stack at the time of the exception. This information can be very useful for developers.

If an exception occurs while a program is running, the text `UNHANDLED EXCEPTION` will be displayed as well.

A list of exceptions and IDs can be found in Appendix B.

Transmitting Files

New in Version 0.27 is the ability to receive files stored on a personal computer using a link cable. It is hoped that there will eventually exist a specialized program designed to handle CSX' s file formats and link protocols. Until that time, existing link software must be used. As a consequence, all CSX files on a computer are stored as TI-83 Plus programs (extension 8XP). Currently, the only linking software that has been tested and verified is TiLP for Windows.

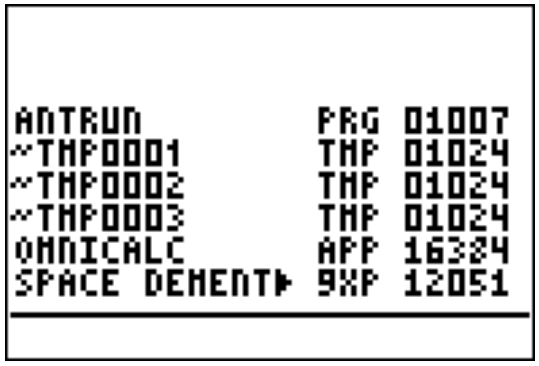
To engage link mode, use the **`link`** command. The console will now show the text `Receiving...` Transfer the file to be sent using the link software being used. If the file was transmitted, the text `Transmission Successful` should appear. If not you will receive one of many potential exceptions (*see Appendix B: Exception Codes*).

There is no way to send files from the calculator to a computer.

Note: Only one file at a time may be sent.

File/Memory Management

To get a listing of all files stored on the calculator, use the **`list`** command. All files on the calculator will be displayed, including their file sizes. Up to nine files will be displayed per "page". If there are more, press a key to step through each page of the listing. If a filename is too long to be displayed, it will be shortened and indicated with a black triangle.



To delete a file, use the command **`kill`** ***`filename`***, where ***`filename`*** is the name of the file, including extension, that you want to delete. There will be no confirmation, and once deleted a file is gone forever.

To display the total free RAM, use **`mem`**.

Running Programs

CSX can execute Z80 assembly programs. These programs are stored on the calculator as files with the extension PRG. To run a program, use the command **run *progname***, where ***progname*** is the name of the program *with the extension*.

Be a aware that future versions of CSX are very likely to cause programs to become incompatible and crash. For this reason there is no real SDK for CSX yet.

Applications

Hex Editor

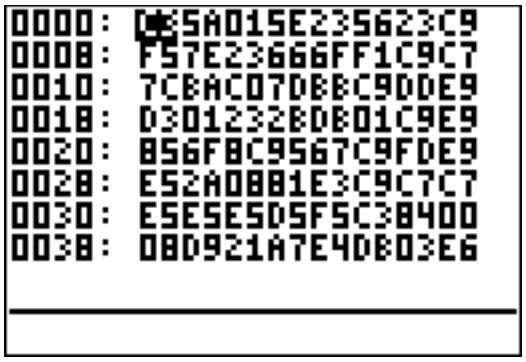
Overview

The Hex Editor application allows you to view the memory of the TI-83 Plus as either numbers or characters.

Warning:
It is very easy to lose data or crash the system with the Hex Editor. Do not use it if you do not know exactly what you are doing.

To launch the Hex Editor, enter the **`hex`** command. A starting address may be passed as an argument. If you want to the memory at $2000, enter **`hex 2000`**. If the argument is omitted, the memory display will default to $0000

You will now be shown a hex dump of a section of memory. One of the dumped bytes will be displayed in reverse video. This is the cursor, and you can move it around using the arrow keys.



Note: Sometimes moving the cursor will cause the memory dump to alter. This is most likely because you are viewing RAM in use by the Hex Editor application.

Modes

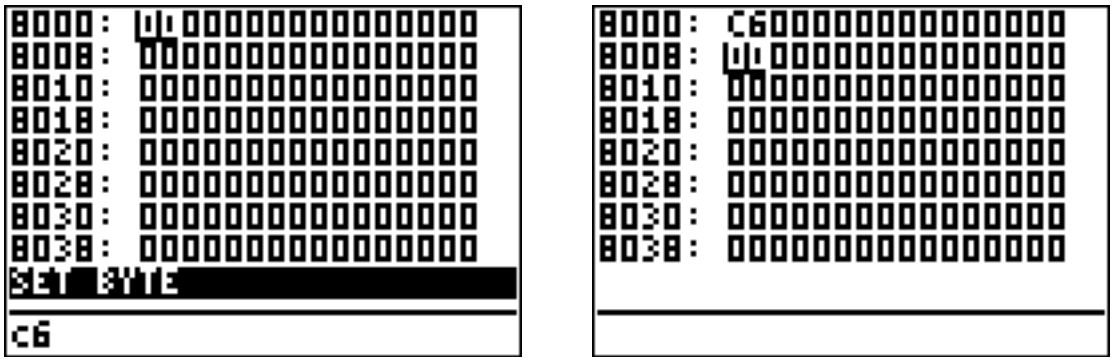
The Hex Editor operates in either of two modes: ASCII or HEX. In HEX mode (the default), the memory dump will be formatted as hexadecimal values. In ASCII mode, the memory dump will be formatted as ASCII characters.

Commands

Key	Command	Description
ENTER	Set Byte	Set the value of the memory location under the cursor.
C	Compare Memory	Compare two memory blocks.
E	Enter String	Set contiguous memory locations to a string.
F	Fill Memory	Set contiguous memory locations to a single value.
G	Go To Address	Set the start address of the memory display.
K	Page Up	Move memory display back one screen.
L	Page Down	Move memory display forward one screen.
M	Switch Mode	Toggle between ASCII and HEX modes.
P	Set Flash Page	Set the Flash page mapped to $4000 - $7FFF.
Q	Quit	Quit the Hex Editor Application.
S	Search	Search Logical memory for a string.

Set Byte

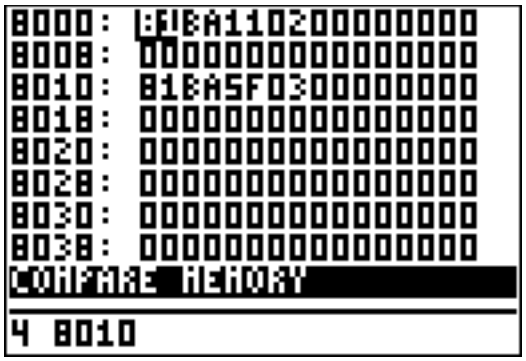
Set Byte assigns a value to the memory location under the cursor. When [ENTER] is pressed, "SET BYTE" will be displayed below the memory dump and the command pane becomes active. If currently in HEX mode, type an 8-bit hexadecimal value and press [ENTER]. If currently in ASCII mode, type in one character and press [ENTER]. The screen will immediately update to show the modified byte.

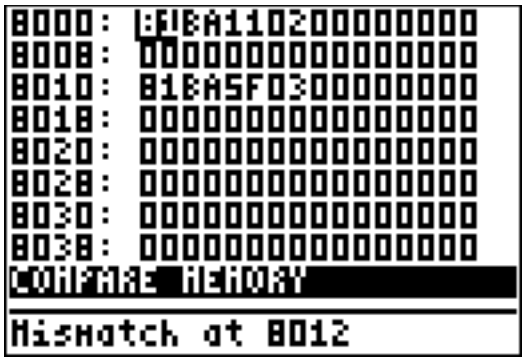


Note: If "SET BYTE" does not appear, then the cursor is in the ROM address range ($0000 - $7FFF). Move the cursor to RAM space)

Compare Memory

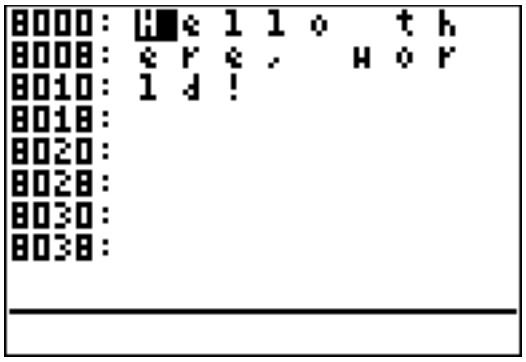
Compare Memory compares two blocks of memory byte-by-byte until either a mismatch is found, or both blocks have been fully compared. When [C] is pressed, "COMPARE MEMORY" will be displayed below the memory dump and the command pane becomes active. Type in the amount of bytes as a 16-bit hexadecimal number, a space, then an address as a 16-bit hexadecimal number, then press [ENTER]. Two memory blocks of the input size will then be compared: the one beginning at the address of the cursor, and the one beginning at the address input. If both blocks are equivalent, "Memory Matches" will be displayed. Otherwise, the address of the mismatching byte in the memory block that began at the input address will be shown. Press a key and the memory dump will move to the address of the mismatching byte in the memory block that began at the cursor position.





Enter String

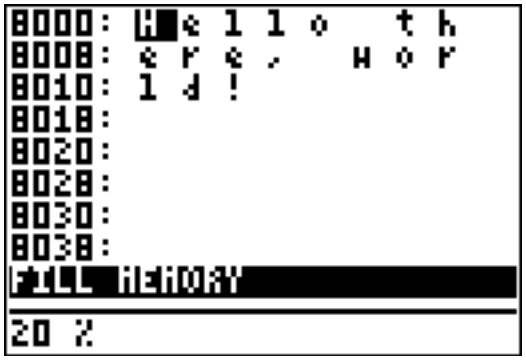
Enter String assigns a hex or ASCII string to contiguous memory locations, beginning with the address under the cursor. When [E] is pressed, "ENTER STRING" will be displayed below the memory dump and the command pane becomes active. If currently in HEX mode, type in a string of up to 64 hexits and press [ENTER]. If currently in ASCII mode, type in a string of up to 64 characters and press [ENTER]. Operation will terminate prematurely if an invalid hexit is entered, or if ROM would be written to.

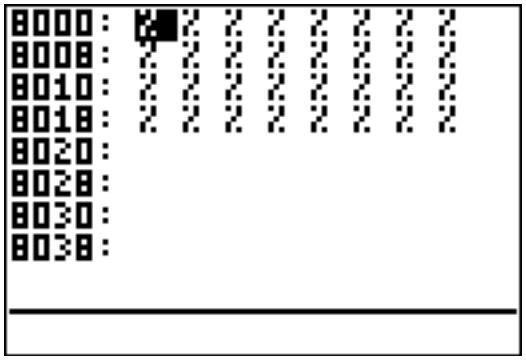


Note: If "ENTER STRING" does not appear, then the cursor is in the ROM address range ($0000 - $7FFF). Move the cursor to RAM space)

Fill Memory

Fill Memory assigns a single value to contiguous memory locations, beginning with the address under the cursor. When [F] is pressed, "FILL MEMORY" will be displayed below the memory dump and the command pane becomes active. Type in the amount of bytes as a 16-bit hexadecimal number, a space, then either an 8-bit hexadecimal value if currently in HEX mode, or a single character if currently in ASCII mode, then press [ENTER}. Operation will terminate prematurely if ROM would be written to.





Note: If "FILL MEMORY" does not appear, then the cursor is in the ROM address range ($0000 - $7FFF). Move the cursor to RAM space)

Go To Address

Use Go To Address to move the memory display to a specific address. When [G] is pressed, "GO TO ADDRESS" will be displayed below the memory dump and the command pane becomes active. Type in the address as a 16-bit hexadecimal number and press [ENTER]. The memory display will immediately update.

Page Up

Page Up moves the starting address of the memory dump backward 64 bytes (one screen).

Page Down

Page Down moves the starting address of the memory dump forward 64 bytes (one screen).

Switch Mode

Switch Mode toggles between ASCII and HEX modes.

Set Flash Page

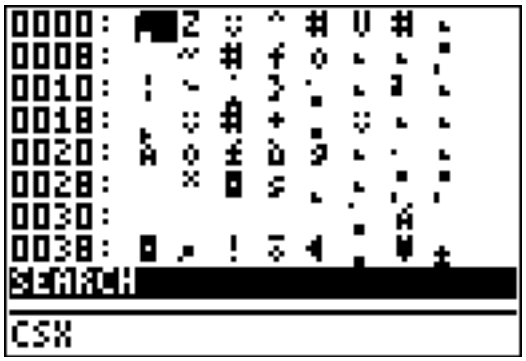
Set Flash Page will set the Flash page mapped to the $4000 - $7FFF address range. When [P] is pressed, "SET FLASH PAGE" will be displayed below the memory dump and the command pane becomes active. Type in the page as an 8-bit hexadecimal number and press [ENTER].

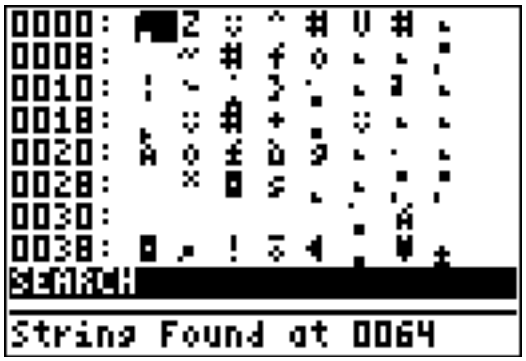
Quit

Press [Q] to instantly exit from the Hex Editor application and return to the Console.

Search

Search will examine all logical memory for a string. When [S] is pressed "SEARCH" will be displayed below the memory dump and the command pane becomes active. If currently in HEX mode, type in a string of up to 64 hexits and press [ENTER]. If currently in ASCII mode, type in a string of up to 64 characters and press [ENTER]. The address of the first byte of the matching string will be displayed. Press a key and the memory dump will move to that address.





Appendix A —CSX Commands

CSX is case-insensitive in interpreting commands.

`cls`
Clears the screen. Handy for hiding all those embarrassing "Unknown ..." errors.

`info`
OS information. Gives the current version number, build date, author name, and author contact e-mail.

`hex [address]`
Launch Hex Editor application. See the Applications section.

`kill` ***`filename`***
Deletes the file named *filename* if it exists.

`run` ***`filename`*****`.prg`**
Runs the program *filename*. Any file with an extention of PRG is a valid program.

`list`
Displays a listing of all files with extensions and sizes in bytes. If a filename is too long it will be truncated with a black triangle.

`mem`
Displays the amount of free RAM available.

Appendix B — Exception Codes

ID	Description	Probable Causes
00	Can' t Create File	There was insufficient memory to create a file.
01	Can' t Locate File	The name of an inexistant file was specified.
02	Transmission Error	When transmitting, either the calculator or the PC took too long. When transmitting, the link cable was removed or loosened. The link cable was not inserted when transmission was engaged.
03	File Exists	An attempt was made to create a file with the name of an existing file.
04	Out Of Memory	There was not enough free memory available to complete the operation.
05	Bad Link Checksum	Bad data was transmitted. Usually caused by electrical interference or a bad connection.