

# CX85 NUMERICAL KEYPAD

## User's Guide

Every effort has been made to ensure the accuracy of the product documentation in this manual. However, because Atari, Inc. is constantly improving and updating the computer software and hardware, we are unable to guarantee the accuracy of the printed material after the date of publication and disclaim liability for changes, errors or omissions.

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**Important Information:** Like any electrical appliance, this ATARI Home Computer equipment uses and produces radio frequency energy. If it's not installed and used properly according to the instructions in this guide, the equipment may cause interference with your radio and television reception.

It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC rules. These rules are designed to provide reasonable protection against such interference when the equipment is used in a residential setting. However, there is no guarantee that interference will not occur in a particular home or residence.

If you believe this equipment is causing interference with your television reception, try turning the equipment off and on. If the interference problem stops when the equipment is turned off, then the equipment is probably causing the interference. With the equipment turned on, you may be able to correct the problem by trying one or more of the following measures:

- Reorient the radio or television antenna.
- Reposition the equipment in relation to the radio or television set.
- Move the equipment away from the radio or television.
- Plug the equipment into a different wall outlet so the equipment and the radio or television are on different branch circuits.

If necessary, consult your Atari Retailer or an experienced radio-television technician for additional suggestions.



Your numerical keypad is the ideal tool for entering numbers into your ATARI® 800™ Home Computer. Styled after a standard 10-key adding machine, the keypad is instantly familiar and easy to use.

Accompanying the keypad is a special handler program on diskette. This program enables your computer to accept data from the keypad. Keys on the keypad may be redefined by altering the keypad handler program.

This booklet is divided into two sections. The first section tells you how each of the keys can be used, how to hook up the keypad, and how to load the keypad handler. The second section tells you how to alter the keypad handler program to redefine the keys.

### Connecting Your ATARI CX85 Numerical Keypad

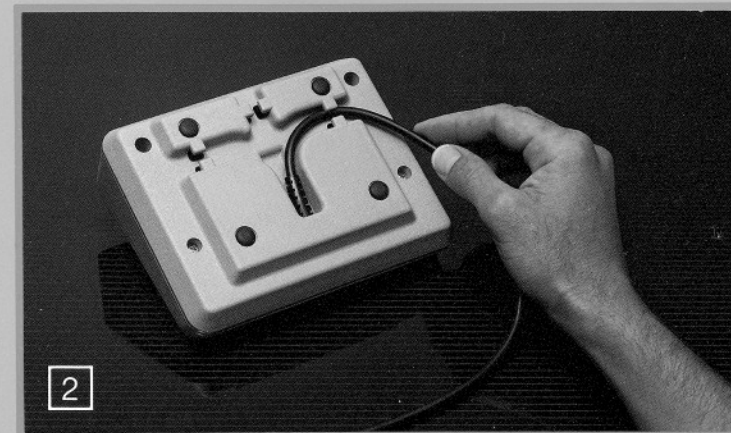
1 To connect your numerical keypad, insert its plug into controller jack 2 on the front of your ATARI 800 Computer.

2 The cord guides on the bottom of the keypad allow you to place the keypad conveniently to the left, to the right, or directly in front of your computer.

3 After booting your program diskette (page 6), use the keypad to enter numbers, decimal amounts, and other types of numerical information, as well as to move the cursor.

NOTE: Your numerical keypad will work with The Bookkeeper by Atari and VisiCalc\*. It may not work with other Atari programs or other programs written for ATARI Home Computers.


\*VisiCalc is a trademark of VisiCorp.




## Using the Keypad

### FUNCTION KEYS


#### UP ARROW

Corresponds to **CTRL**  on your computer console and moves the cursor up one line.


#### DOWN ARROW

Corresponds to **CTRL**  and moves the cursor down one line.

#### RIGHT ARROW

Corresponds to **CTRL**  and moves the cursor one space to the right.

#### LEFT ARROW

Corresponds to **CTRL**  and moves the cursor one space to the left.



### NUMERICAL KEYS

These keys, arranged like those on a 10-key adding machine, are used to make any type of numerical entry.

#### - (MINUS)

Use this key when entering negative numbers or negative values.

#### + ENTER

Corresponds to the **RETURN** key on your computer keyboard. Pressing **+ ENTER** causes the computer to recognize an entry you've made.

Any key held down more than 1/2 second automatically begins repeating.



You can label the function keys using the plastic overlay accompanying your numerical keypad. Use a pencil when writing on the overlay, so that the labels can be changed if you choose to re-define the keys. The overlay is not required when using the keypad with The Bookkeeper.

## Using the Keypad Handler Program

Accompanying your ATARI CX85 Numerical Keypad is a diskette containing a keypad handler program. The handler tells your computer to accept input from the keypad as if it were the console keyboard.

This particular version of the keypad handler allows you to use "auto-booting" programs: those programs that load automatically from diskette into your computer's memory when your computer is first turned on. The instructions on this page tell you how to load the handler program.

You'll need an ATARI 800 Home Computer and an ATARI 810™ Disk Drive. These should be correctly cabled together. If you're using a printer with an ATARI 850™ Interface Module, the interface module must be turned off. It may be turned on after you load the keypad handler; however, the RS-232 ports cannot be used.

## Loading the Keypad Handler

- 1 Turn your disk drive on.
- 2 When the BUSY light goes out, remove the keypad diskette from its protective sleeve and insert it in the disk drive. If you have an ATARI 850 Interface Module, it must be turned off.
- 3 Turn your computer on. The handler program loads automatically and the following message appears on your television screen:  
The keypad handler is loaded. Insert your program diskette in drive #1 and press RETURN.
- 4 When the BUSY light goes out, remove the keypad diskette from the disk drive and replace it in its protective cover.
- 5 Insert your auto-booting program diskette and press **RETURN**. Your program can now accept entries from the keypad just as it would from the number keys on your console keyboard. If you have an ATARI 850 Interface Module, you can turn it on now, to enable printing.

## Troubleshooting

If at any time you have problems using the numerical keypad, try these simple steps:

**Check the connection.** Your keypad plug may not be seated snugly or it may have been pulled loose while you were using the keypad. Push it firmly but gently back into place.

**Check the pins.** Pull out the plug and look at the nine pins in controller jack 2 on the front of your computer. If any of them are bent or broken, you'll need to take your computer to an ATARI Factory-Authorized Service Center for repair.

**Try a game.** Any two-player joystick game will do. Check to see whether a joystick plugged into controller jack 2 will work. If it doesn't, the port is probably faulty and your computer may need servicing. If it does work, you'll need to take your ATARI CX85 Numerical Keypad to an ATARI Service Center for repair.

**Check your interface module.** Your ATARI 850 Interface Module must be turned off when you load the keypad handler program and your auto-booting program. You may have left it on. Try loading the handler program again with the interface module off. It may be turned on once your auto-booting program is loaded.

**Call Atari.** Our toll-free Customer Service number is staffed weekdays, 9:00 to 5:00 (Pacific time). Just dial 800-538-8543 (800-672-1404 in California) or check under "Computers" in the Yellow Pages of your telephone directory for the name of an ATARI Service Center near you.

## For the Programmer

The functions of your ATARI CX85 Numerical Keypad are fully programmable. By making adjustments to the keypad handler, you may redefine the keypad's numerical and function keys to represent any single key or combination of keys on your ATARI 800 Home Computer.

You'll need to know how to program in ATARI BASIC and have a copy of the Master Diskette II (Model CX8104), which contains the Disk Operating System Version II (DOS II). Familiarity with the operation of DOS II is recommended; refer to *An Introduction to the Disk Operating System* and the *ATARI DOS II Reference Manual* as needed.

You can make the adjustments you want using ATARI BASIC, or the ATARI Macro Assembler and Program-Text Editor™. If you wish to redefine keys for use with ATARI Microsoft BASIC, you'll also have to use the ATARI Macro Assembler to relocate the handler in memory.

If you plan to make adjustments to the keypad handler in assembly language, please refer to the *ATARI CX85 Numerical Keypad Technical Reference Notes* (included in this package).

## Copy the Files

Before you make any adjustments to the keypad handler, load your current version of DOS and duplicate the supplied program diskette onto a blank, formatted diskette. You may want to make several copies for various purposes. In any case, make at least one backup copy. You'll want to preserve the program diskette supplied with your keypad for future use. Whenever you make a copy of the Keypad handler diskette, use the DOS "N" command to create a MEM.SAV file on the diskette.

## Contents of the Keypad Handler Diskette

The diskette supplied with your keypad contains two operable versions of the keypad handler program. The first version, discussed on page 6, resides in the first five sectors of the diskette, has no filename, and will not appear on the disk directory.

The second operable version of the keypad handler has the filename KEYPAD.OBJ and must be loaded using a DOS "L" command, followed by pressing **SYSTEM RESET** to run the language cartridge. KEYPAD.OBJ is the version of the handler to which changes may be made from ATARI BASIC.

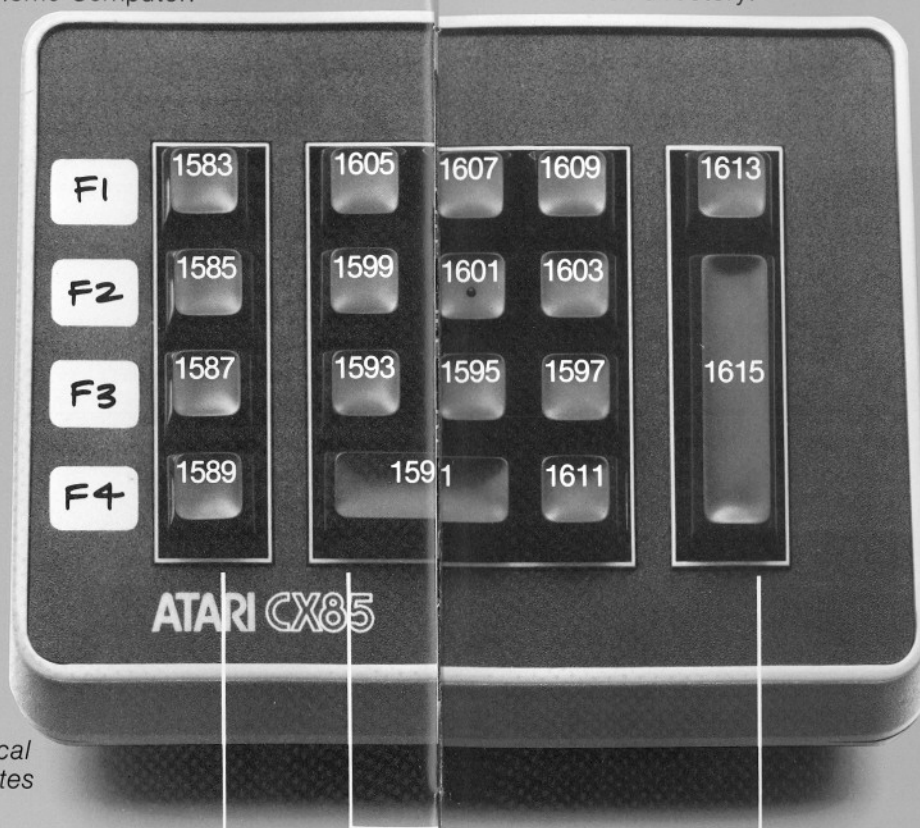
Another filename that will appear on the disk directory is KEYPAD.SRC. This file contains the source code. Changes to the source code are made using the ATARI Program-Text Editor. A listing of the source code KEYPAD.SRC is printed in the *ATARI CX85 Numerical Keypad Technical Reference Notes*.

## Key Definition

The keys on your numerical keypad are defined under program control by one of the two keypad handlers. If you're using the auto-booting version, the keys are defined as detailed on pages 4-5; no adjustments may be made to this version. The version that can be changed is KEYPAD.OBJ. The initial function key definitions for KEYPAD OBJ. are as follows:

F1 = RETURN; F2 = DELETE BACK S; F3 = [:\*]; F4 = :[/].

The + ENTER key is initially defined to generate a plus (+) symbol on the screen.



Function Keys

Numerical Keys

## Determining Keycodes for Keys on Your Computer's Keyboard

To redefine a key, you have to replace the old keycode with a new keycode. To discover the keycode for any key or combination of keys on the ATARI Computer keyboard, type in the following line of ATARI BASIC:

```
10 PRINT PEEK (764):GOTO 10
```

Then type RUN. Now the keycode value for each key pressed will be displayed on your TV screen. To get another value, press another key. To clear the display, press **BREAK**.

## Some Rules of the Game

Here are some important rules to keep in mind while you're redefining the keypad handler for your own purposes.

- 1 Numerical keys may be redefined to operate as single keys or shift and control key combinations on the keyboard.
- 2 Numerical keys may *not* be redefined to operate as the function keys **START**, **SELECT**, **OPTION**, and **BREAK**.
- 3 Function keys on the keypad may be redefined to operate as *any* single key or combination of keys on the keyboard, *including* **START**, **SELECT**, **OPTION**, and **BREAK**.
- 4 None of the keys on the keypad may be made to operate as **SYSTEM RESET**.
- 5 A method for changing the keypad function keys to operate as **START**, **SELECT**, **OPTION**, or **BREAK** is built into the keypad handler routine. If you POKE any of the four function keys (F1, F2, F3, or F4) with the decimal value 255 or the hexadecimal value FF, it's automatically referred to a vector table that redefines it as follows:

F1 = <b>BREAK</b>	F3 = <b>SELECT</b>
F2 = <b>OPTION</b>	F4 = <b>START</b>

- 6 The keypad handler loads into memory page six (6). Because ATARI Microsoft BASIC also makes use of memory

page six, the handler must be relocated in memory prior to use with the ATARI Microsoft BASIC. You can do this by changing the originating address in the source code with the ATARI Macro Assembler and Program-Text Editor and then reassembling the code.

## Key Redefinition From ATARI BASIC

- 1 Make sure that an ATARI BASIC cartridge is in the left cartridge slot of your computer and load your current version of DOS from diskette.
- 2 Select the "L" (Binary Load) command from the DOS menu. When the filename is requested, type in:  
KEYPAD.OBJ
- 3 Press **SYSTEM RESET** to run BASIC—*do not* use the "B" (Run Cartridge) command.
- 4 Note the POKE location on the illustration for each key you wish to change.
- 5 Determine the decimal value for each new keycode using the program on page 10.
- 6 Use the POKE command to change the value of each key you want to redefine. If you choose to make a key inoperative, POKE the value 192 into the Keycode location.
- 7 Summon DOS and use the "K" (Binary Save) command to save the new keypad handler. Be sure to give the file a unique name followed by the extension .OBJ. The START,END,INIT values are 600,6FF,600. To use your new keypad handler, turn your computer off, then on again to reboot the diskette.
- 8 Use steps 1 through 3 to load the new handler each time you want to use it. Make sure you use the new filename to load the handler. An alternative to this is to copy the new handler onto another diskette and rename it AUTORUN.SYS using DOS commands. With that name, it will load automatically from diskette when your computer is turned on. In addition, create a MEM.SAV file on the diskette using the "N" command in DOS. This allows you to use DOS more than once while programming without having to reload your keypad handler.