Using the IBM Keyboard Adapter

by Bob Puppo

INTRODUCTION

Your new keyboard adapter allows you to use any IBM or compatible external keyboard with your CoCo 1, 2, or 3. The unit fits entirely within your CoCo. Once installed, it allows the new keyboard to function exactly like the built in CoCo keyboard while allowing full use of the extra keys, function keys, remote reset, and many other features. This unit has been tested with several IBM keyboards including after market and third party keyboards. It is known to function correctly with the standard XT/AT type keyboards and also the "enhanced" 101 key XT/AT type keyboards. If it is an XT/AT then make sure that the keyboard is the type that has a switch for XT/AT mode rather than the type that 'senses' what type it is. Some old style keyboards may not function properly.

Thank you!

Bob Puppo

While reasonable efforts have been made in the preparation of this document and design of the adapter to insure accuracy and safety, Bob Puppo assumes no liability resulting from any errors or omissions within the adapter or this document. Proceed at your own risk.

INSTALLATION

1. Remove all the screws on the bottom of your CoCo and set them aside.

2. Open up the case (NOTE: this may void your warranty), unplug and remove the built in keyboard.

3. If you intend to leave the standard CoCo keyboard in the unit you'll need to cut a hole in the computer case to route the external keyboards cable through. A good place is the cooling slots on the bottom. Using a knife, remove several of the plastic pieces from the slots to open up an area big enough for the cable and connector to go through. Alternately, you can cut a small slot in the edge of the casing to allow the cable to pass through. Either way is acceptable.

4. Remove the adapter from its packaging and place it in the area below the built in keyboard and slightly to the right with the ribbon cable facing the back of the computer.

WARNING - Pay careful attention to the following steps failure to do so may result in damage to the interface, equipment or YOU!

5. Connect the black wire with the alligator clip to the nearest ground on the CoCo circuit board. A good place for this is on the spring connector that touches the bottom of the built in keyboard.

6. Connect the red wire with the alligator clip to the cathode (the side with the band) of D1. This diode can be found on the circuit board near the transformer cage.

7. Connect the remaining wire with the clip connector to the RESET* line of the 6809 CPU. A good place on the CoCo 3 circuit board is the anode of D12 (the side without the band), which is located in the upper right of the board just below the reset switch. For CoCo 1 and 2 machines, see the enclosed drawings.

8. Plug the ribbon cable into the socket on the CoCo circuit board where the built in keyboard cable was connected. Make sure that the cable is firmly seated within this connector.

9. Plug in your external keyboard connector.

10. At this point you can either leave the built in keyboard out of the unit, or replace it back inside. DO NOT connect both the built in keyboard's ribbon cable and the ribbon cable from the adapter. If you place the built in keyboard back inside the case, fold its ribbon cable underneath it and close the case and replace all the screws.

ABOUT KEYBOARD MAPPING

Because OS9 and Basic differ in the way certain characters are obtained from the keyboard (e.g. [,], ,), and the IBM keyboard has these symbols on single keys, the interface must know which operating system it is working under so it can interpret the key into the correct multiple key sequence. When using OS9 the interface must also know if your using level 1 or level 2 because they use different control keys. When the interface has the correct information it automatically maps all the keys into there correct positions. This allows your keyboard to look like a COCO 1,2 keyboard or a COCO 3 keyboard depending on the application. This is normally taken care of for you by the auto-boot menu but the modes can be changed on the fly by using the command key (see below).

THE COMMAND KEY F10

The F10 key initiates all special keyboard functions except reset. The following is a list of the functions:

F10-1	**set keyboard to OS9 level 1 mode**
F10-2	**set keyboard to OS9 level 2 mode**
F10-3	**set keyboard to BASIC mode**
F10-4	**toggle built in keyboard repeat**
F10-F3 thru F9	**open function key buffer**
F10-A thru Z	**display keyword**

KEY REPEAT

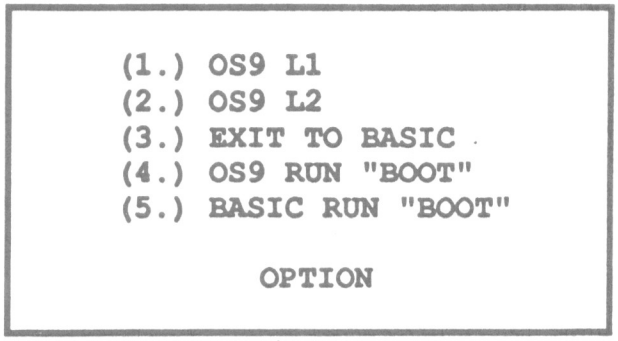
The interface supports key repeat which is disabled on power up. Pressing the F10-4 key sequence will toggle key repeat on and off. This option is most useful in RSDOS BASIC because it will provide key repeat that was not previously available except in certain applications programs.

KEYWORD MACROS

Built into the keyboard adapter are a number of DISK BASIC and OS9 keywords. The keyword displayed depends on the mode (BASIC or OS9) you are in. This feature saves time by cutting down on the amount of characters you have to type. To use the macros. you simply need to press the F10 key and then the letter key that corresponds to the keyword desired. See the Mode description for a list of keywords for each mode.

USING THE INTERFACE

After the installation of your keyboard interface is complete, you can power up the CoCo. The Adapter will display an auto-boot menu. When the auto-boot menu is displayed any selection can be made. If no key is pressed for 5 seconds the interface will configure itself for OS9 Level II and issue a DOS command (option 1). The auto-boot menu looks like this:



Here is a description of each selection:

Option	Description
1	map the keyboard for OS9 LII and execute DOS command
2	map the keyboard for OS9 LI and execute DOS command
3	map the keyboard for BASIC and exit to BASIC
4	map the keyboard for OS9 LI and execute RUN "*"
5	map the keyboard for BASIC and execute RUN "*"

Option 4 is for users who do not have the DOS command and are using the two disk boot procedure. Option 5 is for automatic loading of basic utilities and can also be entered by pressing the space bar. It is not a good idea to have the disk drive door closed when power is applied, but to close it immediately afterward since there is a pause before the auto-boot sequence begins

After becoming familiar with the interface the menu may become annoying or you may wish to override it. In either case, pressing and holding any valid menu option key on power up will suppress display of the menu and execute the desired function.

Auto Boot ROM compatibility

For those who have or will purchase products with there own AUTO BOOT code (diskmaster, B&B auto boot) action must be taken to insure these different products will not interfere with each other. If you notice any difficulties when using your interface with these products press and hold the space bar on power up. This will disable the menu and configure the keyboard for OS9 LII.

OS-9 LI AND LII MODES

The "OS-9 LII mode" will automatically be enabled if the auto-boot routine is allowed to time out, so there is no need to worry about enabling it yourself.

While in the OS-9 mode, a number of OS-9 commands are available within the interface in the same manner as BASIC keywords are available in the RSDOS BASIC mode. Pressing the F10 key and the letter key that corresponds to the command desired will send that command to the screen as if you had typed it in yourself. The list below gives all the commands available in the macros:

E - ECHO	S - SAVE	B - BACKUP	W - WCREATE
R - RENAME	D - DISPLAY	M - MAKDIR	G - FREE
T - TMODE	F - FORMAT	A - ATTR	H - HELP
U - UNLINK	K - KILL	N - MONTYPE	Z - DEINIZ
I - IDENT	L - LOAD	P - PROCS	V - Displays Version #
O - OS9GEN	X - XMODE	C - COPY	

In addition to all the above features, all the keys that are available with the IBM style keyboard are also available while in the OS9 mode. For example, there is no need to press Ctrl-, (comma) to get a " " or a Ctrl-8 for a "[". Also, the numeric keypad will function as such when the NUM LOCK key is activated as will the CAPS LOCK key.

There are some special instances where a key will not function exactly as you might think. The table below outlines what codes are actually seen by your CoCo when the key indicated is pressed:

Key	Output Code	ASCII Code
ins (Insert)	Ctrl-Right Arrow	$11
Del (delete)	Ctrl-Left Arrow	$10
Page Up	Shift-Up Arrow	$0C
Page Down	Shift-Down Arrow	$0A

NOTE: These output codes were designed to be compatible with many current OS9 applications programs that use these key sequences for cursor movement.

Esc	End-of-File (EOF)
Home	Clear (switches windows in OS9 Level II)
Tab	Acts as a Right Arrow key
End	Same as BREAK on the CoCo

If you have Keven Darlings SCF line editor hack (available in the public domain), give the **Ins** and **Del** keys a try instead of Ctrl-Right Arrow and Ctrl-Left Arrow. Neat Huh !!

RSDOS (BASIC) MODE

The keyboard matrix is configured as a COCO 3 keyboard and will work correctly on a COCO 1,2 or 3. While in the RSDOS BASIC mode, a number of BASIC commands are available within the interface as keywords. Pressing the F10 key and the letter key that corresponds to the command desired will send that command to the screen as if you had typed it in yourself. The list below gives all the commands. Keywords available in this mode:

Q - EXEC	**P - PMODE**	**K - KILL**
W - WRITE#	**A - AUDIO**	**L - LOAD"**
E - EDIT	**S - SAVE**	**C - COPY**
R - RENAME"	**D - DATA**	**B - BACKUP**
T - TIMER	**F - FREE**	**N - NEW**
U - UNLOAD	**G - GOTO**	**M - MID$(**
I - INPUT	**H - HEX$(**	**V - displays Adapter**
O - OPEN	**J - JOYSTK(**	**version**

NOTE: The scroll lock key echoes a shift-@ to pause the screen in this mode.

Remote Reset

Remote Reset allows you to reset the Color Computer from your keyboard. This is equivalent to pressing the reset button at the rear of the machine. To perform a regular RESET press **Ctrl-Alt-Del** together and the machine will be reset, the interface however will continue to hold the present mode and any data in the function key buffer. To perform a cold reset press **Ctrl-Alt-Ins** together and the machine will be reset twice, the first time with **Ctrl-Alt** keys down and then a regular reset, The interface will be reset and the auto-boot menu will be displayed.

PROGRAMMING THE FUNCTION KEYS

All the function keys, except for F1 and F2, which function exactly the same as on the CoCo 3 keyboard, can be programmed to output a sequence of key presses just like macro key functions used in many different programs.

To program a function key, press F10 and the function key to be programmed. A message "function key buffer open " will appear on your screen. You can then type in any sequence of keystrokes including ENTER. To close the buffer and end the programming session, simply press that same function key again.

To clear a function key of any macro, simply open the buffer for that key and close it again without entering anything.

NOTE: There is a 60 character buffer that holds the programmed macros for ALL the function keys. Therefore, you cannot have a total of more than 60 characters in all the function key macros. If you attempt to go beyond that limit, an error message will be printed on your screen. The buffer cannot be saved nor can the function keys be programmed from the computer.

MISCELLANEOUS

The following keys are not supported and they are ignored by the adapter:

Sys Req	
Pause	**(only on the Enhanced 101 key boards)**
F11	**" "**
F12	**" "**

The End

SECTION III. DISASSEMBLY/ASSEMBLY

3.1 Disassembly

1. Disconnect power and remove signal cables from the unit.
2. Remove cartridge from slot (if applicable).
3. Turn the unit over and place it on a soft surface to prevent damage to the keyboard or top cover.
4. Loosen and remove the six (four screws S1 and two longer screws S2) mounting screws which attach the base to the top cover. (Figure 3-1)
5. Disconnect the cable from the wire connector which is attached to the keyboard (Figure 3-2).

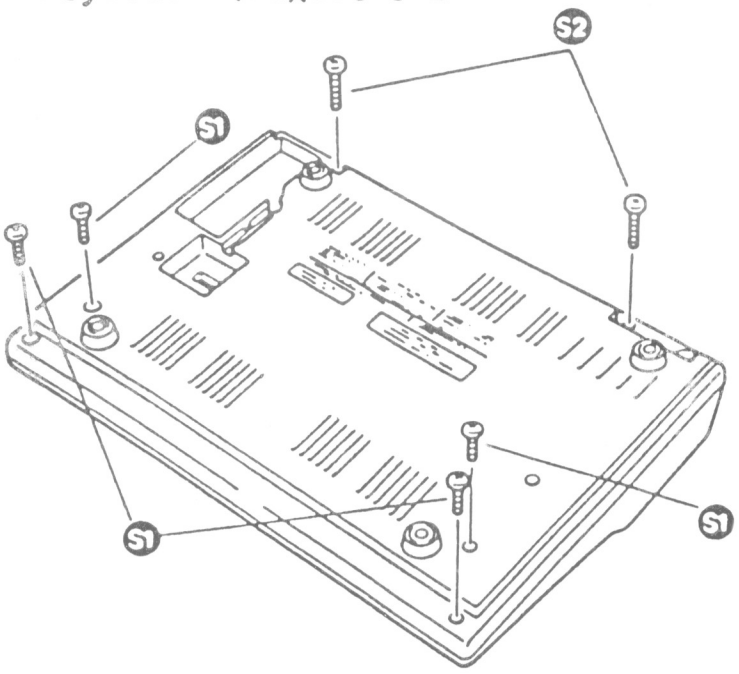


Figure 3-1. Removal of Top Cover

3.2 Assembly

1. Assemble the Color Computer 3 in reverse order of disassembly.
2. But first place Interface Board inside COCO to the right of center standoff.
3. Connect Mylar Cable to wire connector which was attached to the keyboard.
4. Connect Red, Black, and White wire (refer to PCB Drawing.)
5. Continue with assembly but do not reconnect CoCo Keyboard.

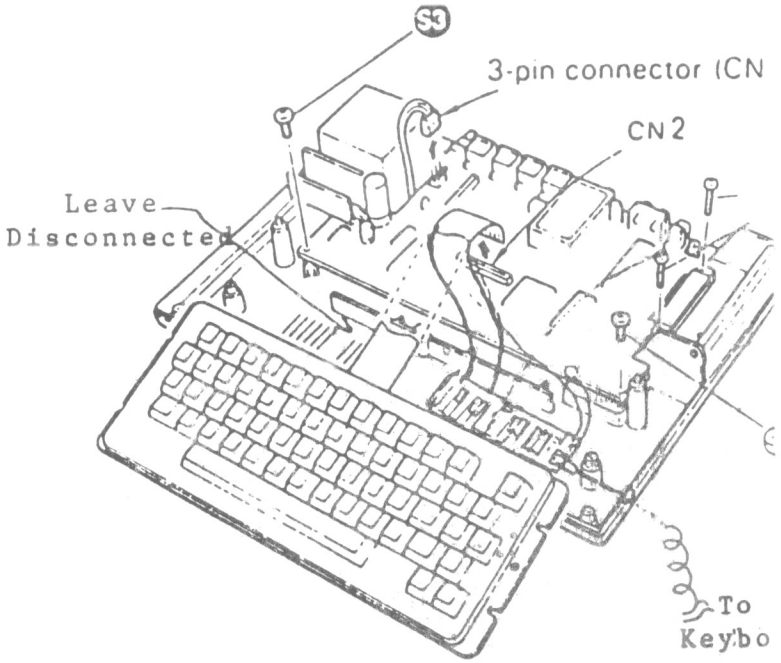


Figure 3-2. Removal of Main PCB

6. Remove CoCo Keyboard and set aside for assembly.

P.C. Board View