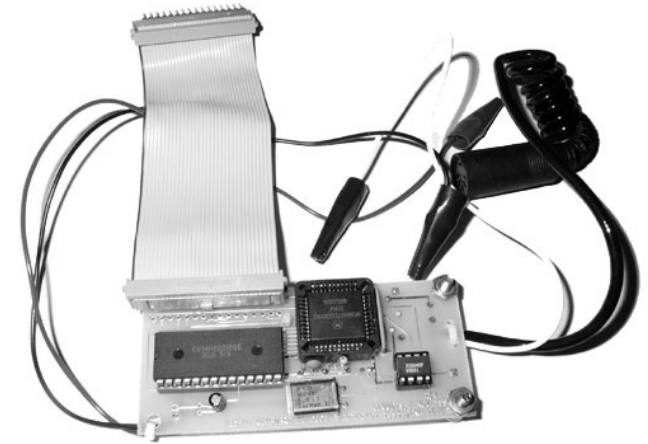
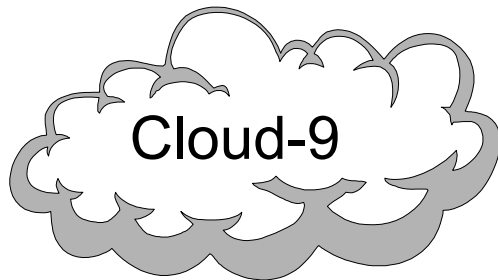


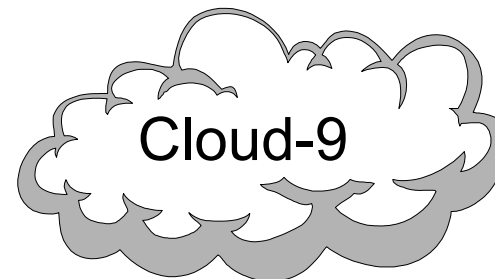
AT Keyboard Interface User Manual



Manual Revision 1.2 - June 18, 2002



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Special thanks to Dana Peters for his permission to use his design.

Both Key Maps

PC key	CoCo key
ESC	Break
F11	F1
F12	F2
PrintScn	Clear
Tab	Right arrow
Backspace	Left arrow
Pause	Unused
Ctrl Alt Del	RESET

Keyboard LEDs

Key	On	Off
Scroll Lock	CoCo key map mode	PC key map mode
Num Lock	Keypad generates	Keypad gives macros, arrows
Caps Lock	Alpha Keys shifted (PC key map)	Alpha keys not shifted

Special thanks to Dana Peters for making such a wonderful interface and allowing the community to benefit from his hard work. If you have any problems with the installation please contact Cloud-9.

Key Map References

CoCo Key Map

PC Key	CoCo Key
[@
]	Clear
-	:

PC Key Map

PC key	CoCo key
`	Shift @
~	Ctrl 3
^	Ctrl 7
_	Ctrl -
Shift Caps	Shift 0
[Ctrl 8
]	Ctrl 9
{	Ctrl ,
}	Ctrl .
\	Ctrl /
	Ctrl 1

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1. Congratulations!

Thank you for purchasing the AT Keyboard Interface, another one of the fine products offered by Cloud-9. This product was designed to be used with the Radio Shack TRS-80 Color Computer 2, and the Tandy Color Computer 3.

The interface connects to the CoCo via the standard keyboard connector. Because it emulates a real CoCo keyboard at the hardware level, no special software drivers are required. This also ensures the PC keyboard will work with all software, even those programs which access the hardware directly (many do). Besides providing ordinary keyboard facilities, the interface also sports a few extra features. The extra keyboard keys can be used as programmable macro keys. The macros can be re-defined at any time using the keyboard, and are stored indefinitely. The ability to reset the computer via the CTRL ALT DELETE key sequence is also provided to perform a CoCo RESET. This interface can connect to the CoCo 2 and 3 and any 101-key PC "AT" keyboard. Please note that the older 84-key XT keyboards are not supported.

the recording. The recording will also stop if the sequence exceeds 32 bytes in length. To erase a macro, simply press shift macrokey twice to record a null macro. To play a macro, press macrokey. The keys are played back at a predetermined rate which cannot be adjusted. The playback is not affected by the state of the keyboard caps lock when invoked; the state of the keyboard caps lock is significant only when the macro is recorded. In contrast, the state of the CoCo caps lock does not affect the recording, but it is significant when the macro is played back. Note that while recording a macro, it is best to avoid key roll-over in order to reduce the number of bytes needed to store the macro. Roll-over occurs when while typing quickly you press a second key before releasing the first one. Because of how the keys are stored when a macro is recorded, a two key sequence without roll-over takes 2 bytes, where as with roll-over, the same sequence takes 4 bytes.

The 32 byte limit is exceeded much more easily if overlapping key sequence information is unnecessarily stored due to roll-over. As a rule of thumb, type slowly when recording macros.

Keyboard Reset

Another desirable feature of the interface is the ability to reset the CoCo via the CTRL ALT DELETE key combination. Pressing SHIFT CTRL ALT DELETE CAUSES the interface to hold down the CoCo's CTRL And ALT keys while resetting. This is useful for forcing a cold restart on the CoCo 3.

(BASIC) or CTRL 0 (OS-9) to toggle the computer's caps lock state. Note that keyboard caps lock is not effective in CoCo key map mode. Use SHIFT 0 to toggle BASIC's caps lock state while in CoCo key map mode.

Macro Keys

One of the best features of this interface is its ability to use the extra keys on the AT keyboard as macro keys. A pre-recorded sequence of keystrokes can be associated with each macro key. The sequence is re-played whenever the key is hit. This is especially useful for commonly used commands, and for defining application specific key combinations for the named keys such as INSERT and PAGE UP. The macro sequences are re-definable at any time through the keyboard, and are saved indefinitely. Each of the 16 available macro keys can have up to 32 keystrokes stored. The sequence is stored exactly as typed, including overlapping keystrokes (one key held down while another is pressed).

The timing of keystrokes is not stored, so the keys are replayed at a fixed rate regardless of the delay between keystrokes when recorded. The macro keys are F1 through F10, and the keys INSERT, DELETE, HOME, END, PAGE UP, and PAGE DOWN.

To define a macro key, perform the following steps:

1. Press shift macrokey.
2. Type the sequence of characters you want recorded.
3. Press shift macrokey again.

The macro keys pressed in the first and third steps must match for the sequence to be stored (as a guard against accidentally re-defining a macro). You cannot use macro key while recording another macro. An attempt to do so will stop

2. Installation

The following is a step by step instruction guide on how to install your new AT Keyboard Interface board into your system. Before you start, make sure that you have the AC power plug removed from the wall. If a multi-pack is present, make sure that the power is removed from it and it removed from the CoCo's cartridge port. Make sure that you have a static free area when performing this installation.

Required Tools

1. Phillips screwdriver

The interface plugs right into the CoCo's mylar keyboard connector.

1. Remove all screws on the bottom of the computer. Note that the shorter screws are removed from the front of the computer by the keyboard.
2. Remove the keyboard from its mounting position and motherboard connection.
3. Plug the interface into the mylar keyboard connector so that it is closest to the front of the CoCo's case. Inspect the pins to ensure they are aligned with the contacts on the mylar connector. The AT keyboard connector's jack will be face the CoCo's cartridge port.

4. (optional) Plug the CoCo keyboard into the pass-through connector on top of the interface. Ensure that the conductive strips on the mylar film line up with the pins on the connector. By using the passthrough, both PC and CoCo keyboards can be used at the same time.
5. Plug in the AT keyboard into the DIN connector on the interface board. Route the cable to exit out the cartridge port.
6. The red alligator clip goes to +5V. On a CoCo III this is most readily available on a large resistor which stands away from the circuit board (R19, far left side of the circuit board; connect to the pin nearest the front of the CoCo).
7. The black alligator goes to ground. The metal RF shield near the joystick connectors on the CoCo III's circuit board. If you're not sure, ask someone who knows as a mistake here could damage the interface and/or the CoCo!
8. The white wire alligator clip connects to the CoCo's reset button. On the CoCo 3, the rightmost pin on the top of the reset button is where the clip should go.
9. Close the cover and replace the screws that were removed in Step #1. Watch the screw lengths. Route the AT keyboard cable out along the front right side of the CoCo.

Operation

Key maps

If you take a close look at both a CoCo and AT keyboard, you will soon realize that there is a distinct difference in the layout of non-alphabetic keys. Because of this, the interface supports two different modes of operation: PC key map and CoCo key map. The two modes can be toggled between using the SCROLL LOCK key. When the SCROLL LOCK LED is off, the interface is in PC key map; when it is on, CoCo key map is in effect. In PC key map, the interface maps the keys based what is printed on the AT keyboard's keycaps. For example, pressing SHIFT 2 will generate the @ character. When in CoCo key map, pressing the same keys will generate the " character. The CoCo key map maintains a one-to-one correspondence of PC keys with CoCo keys based partly on their physical layout. This is useful for games which depend on the CoCo's layout of keys, or for users who can't quite teach their fingers a different key layout.

Num Lock

The NUMLOCK key toggles the state of the corresponding keyboard LED, and changes the behavior of the keypad keys. When the NUMLOCK LED is on, the keypad keys behave the same as the keys "0"- "9" and ".". When NUMLOCK is off, the keypad keys behave the same as the arrow keys and macro keys to the keypad's immediate left.

Caps Lock

In PC key map mode, pressing the CAPSLOCK key toggles the keyboard's caps lock state. While the keyboard's caps lock is on, the interface will automatically press SHIFT whenever an alphabetic character is typed. Note that this doesn't affect the computer's caps lock state. Press SHIFT CAPSLOCK