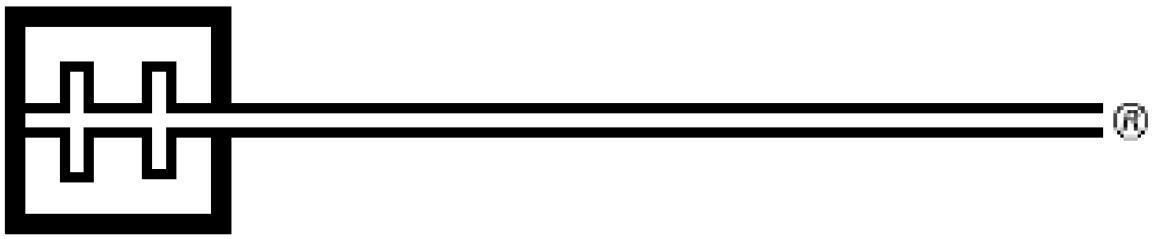
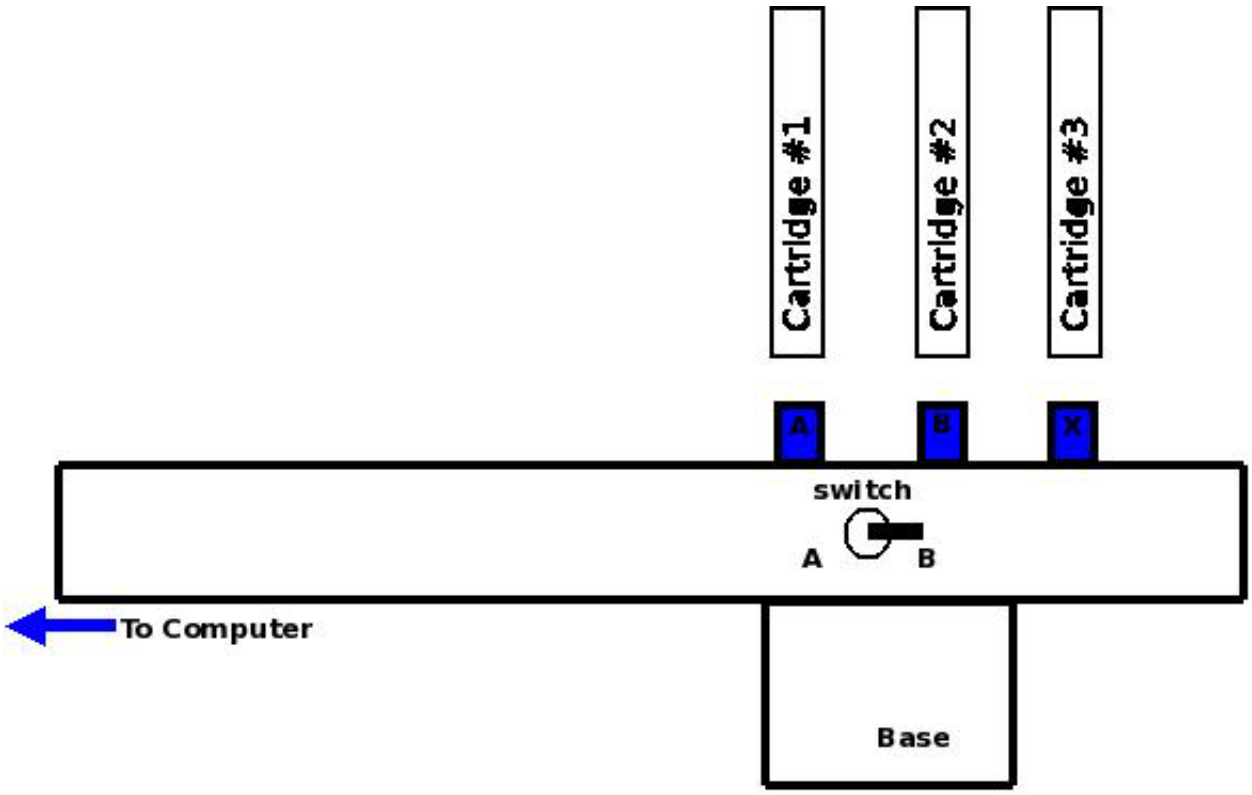


Howard Medical Company
1690 N. Elston
Chicago, Illinois 60622 (312) 278-1440

SLOT-PAK III


Cartridge #1
Cartridge #2
Cartridge #3
A
B
X
switch
A
B
To Computer
Base

HOWARD MEDICAL COMPUTERS
1690 NORTH ELSTON AVENUE
CHICAGO,IL 60622
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INSTRUCTIONS FOR THE HOWARD SLOT-PAK III

Thank you for purchasing the HOWARD MEDICAL SLOT-PAK III. It was designed to give you more enjoyment and expandability with your Color Computer 1,2, or 3. The Slot-Pak III allows the use of a floppy disk controller, a hard drive controller, and a Tandy RS232 Serial Pak, among others.

OPERATION

The slots are numbered beginning on the end closest to the computer as slot A, slot B, and slot X. Slots A and B are switchable through software POKE commands or via the mini-switch on the side of the case. Products designed for use with the TANDY Multi-Pak Interface will operate properly with the SLOT-PAK III by simply plugging your floppy disk controller into slot B and the other device into slot A. Slot X is used for any device that does not require slot switching (self-decoding), such as the TANDY RS232 Serial Pak or a Speech Sound Pak. Slots A and B can also be used for self-decoding Paks. A floppy disk controller (if used) should be used in slot B. Because the slots on the SLOT-PAK III are not keyed, it is possible to put a PAK in backwards. When installing a PAK, ALWAYS put in the PAK with the LABLE SIDE of the PAK facing the COMPUTER and ALWAYS TURN OFF ALL POWER TO YOUR SYSTEM WHEN INSERTING OR REMOVING THE SLOT-PAK FROM YOUR COMPUTER OR PAKS FROM THE SLOT-PAK III.

SLOT SWITCHING VIA SOFTWARE:

To select slot A type POKE 65407,0 [enter]
To select slot B type POKE 65407,17 [enter]

NOTE: On the CoCo 1 and 2, if you are running DISK BASIC (controller in slot B) and switch to slot A, the computer may hangup. Simply press and release the RESET button on the right rear of the computer and the computer will sign on with EXTENDED BASIC. To start the program in a hardware PAK (RS232, DC Modem Pak, Floppy Disk Controller, etc.) Type:

EXEC 49152 [enter] (CoCo 1 or 2)
EXEC 57360 [enter] (CoCo 3)

SLOT SWITCHING VIA HARDWARE:

Push the mini toggle switch located on the side of the SLOT-PAK III towards the slot you wish to select (A or B). Press and release the RESET button located on the right rear of your computer. To start the program in a hardware PAK (RS232, DC Modem Pak, Floppy Disk Controller, etc.) Type:

EXEC 49152 [enter] (CoCo 1or2)
EXEC 57360 [enter] (CoCo 3)

NOTE: Because the CoCo 3 runs BASIC from RAM (Random Access Memory), it will appear that the slot switching has not occurred when switching away from the Floppy Disk Controller. The EXEC 57360 will start the program in the now selected hardware PAK. To restart Disk Basic, simply type EXEC 49152 [enter] after having switched back to the Disk Controller slot (this works for ALL Color Computers).

12 VOLT POWER

The SLOT-PAK III requires 12 Volts D.C. to operate. The AC-12 adapter is ideal for the SLOT-PAK III as it supplies the needed voltage and the needed current (amperage) to power the SLOT-PAK III and most plug-in PAKs. The adapter plugs into the jack on the side of the SLOT-PAK III and into any nearby wall outlet. Other methods of obtaining +12 volts are possible (such as tapping the power supply of your disk drive). These methods are highly dependent on the owner's skill hence we DO NOT encourage their use. Using any method of supplying +12 volts other than the AC-12 adapter will VOID YOUR WARRANTY!

NOTE: When powering up your system some problems may occur (left-shifted characters, drives running, etc.). This is normal and will not harm your system. Should this occur, simply press and release the RESET button on the right rear of your computer and the system will return to normal.

TECHNICAL NOTES

The following are comments made by Marty Goodman (Rainbow contributing Editor) regarding the workings of the SLOT-PAK III. They are intended to clarify how it works.

All addresses mentioned hereafter are in HEX. All byte values mentioned for those addresses are also in HEX. This is specified by using the $ symbol in front of such numbers. Note that in BASIC one can specify a HEX number by preceding the number with the characters "&H". Thus if I refer to Poking $FF7F with $11, that would be written in BASIC as
POKE $HFF7F,$H11.

SLOT SELECTION

The SLOT-PAK III mimics the old Radio Shack Multi-Pak Interface in that its slot number A will function as if it were EITHER slot 1 or slot 3 and its slot number B will function as if it were EITHER slot 2 or slot 4. Slot X of the SLOT-PAK III is reserved for devices that DO NOT have ROMs in them or that do not use input/output port addresses in the range $FF40 through $FF5F. A good example of such a device would be the Tandy or Orion RS232 PAKs. A typical configuration of the SLOT-PAK III would be to have a floppy disk controller in slot B, a hard drive host adapter in slot A, and an RS232 PAK in slot X.

The SLOT-PAK III has a write-only port at address $FF7F, much like its predecessor, the Tandy Multi-Pak Interface (MPI). The old Tandy MPI would switch the *SCS, *CTS, and *CART lines from the CoCo to go to only ONE of the four slots using either a hardware switch on the box or the software port at $FF7F. The SLOT-PAK III has both the hardware switch for slot selection of A or B and the software port switching which is quite similar to that of the Tandy MPI. The first two bits (D0 and D1) of any byte written to $FF7F would determine which slot the *SCS line of the CoCo would point at. 00 meant slot 1, 01 meant slot 2, 10 meant slot 3, and 11 mean slot 4. Similarly, the fifth and sixth bits (D4 and D5) of any word written to $FF7F would select the slot where the *CTS and *CART lines were connected. Note that data bits D2, D3, D6, and D7 are NOT USED in the Tandy MPI software based slot select circuitry. By convention, when one writes of values to be put into $FF7F for slot selection, one sets those unused bits to ZEROs. Thus, to send the *SCS line and *CTS + *CART lines to slot 4, you'd type POKE &H77F7,&H33. To send the *SCS line to slot 1 and the *CTS and *CART lines to slot 3 you'd type POKE &HFF7F,&H20.

On the SLOT-PAK III only the *SCS line and *CTS lines are switched. The *CART line is NOT switched, but rather is run to ALL THREE SLOTS. This is equivalent to "strapping the *CART line", a hardware modification commonly done by OS9 users to the Tandy MPIs. The "strapped" *CART line which the SLOT-PAK III provides makes for more reliable operation of interrupt controlled devices under OS9. Unfortunately, it also makes the SLOT-PAK III incompatible with auto-start ROM-PAKs.

The *SCS line is active low for address range $FF40 through $FF5F for reads and writes. It is used to decode the I/O ports for the Floppy Disk controller, and often used by Hard Drive host adapters as well. It is also used by Disto/CRC in their "mini expansion bus" add-ons, such as their mini-bus based EPROM programmer and parallel port/real-time clock. Note that Disto/CRC makes TWO types of add-on RS232 ports. One is stand alone card, the other is a "mini-bus" card that fits inside their Super Disk Controllers. The stand alone card will not work in the SLOT-PAK III because it requires a negative 12 volt connection which the SLOT-PAK III does not provide. The Super Controller based add-on RS232 board must NOT be used in slot X of the SLOT-PAK III, but rather is best placed in slot B of the SLOT-PAK III.

The SLOT-PAK III uses only the low order bit (bit D0) to select where the *SCS line goes. Placing a 0 in the low order bit of $FF7F will select slot A of the SLOT-PAK III. Placing a 1 in that bit will select slot B. Data Bits D1,D2 and D3 are ignored. The result of this is that software that selects EITHER slot 1 or slot 3 of the Tandy MPI will select slot A of the SLOT-PAK III.

The *CTS line is switched by Data Bit 4 of the port at $FF7F. Much like the *SCS line, if that bit is set to 0, then the *CTS line is sent to slot A. If that bit is set to 1, then the *CTS line is sent to slot B. Data Bits D5, D6, and D7 are not used. To send the *SCS line to slot A and the *CTS line to slot B, type POKE &H77F7,&H01.

The *CTS line from the CoCo is active low FOR READS ONLY in address range $C000 through $FFEF on the CoCo 1 and 2, and for the range of $C000 through $FDFF on the CoCo 3. It is typically used to select ROM based software in the hardware packs, such as the DISK EXTENDED BASIC software, or the software inside ROMPak games. Note that to operate most normal CoCo floppy disk controllers, you must have both the *SCS and the *CTS lines pointing at the slot with the disk controller card, because most CoCo Floppy Disk Controller cards use BOTH the *SCS line (to talk to the floppy disk controller chip to cause the drive to read and write data) AND also use the *CTS line to read the DISK BASIC software in a ROM located on the floppy disk controller card. Under OS9, the *CTS line is virtually never used. Note that you cannot use the *CTS to decode a port to which you wish to WRITE. The *CTS line is NOT ACTIVE during the write cycle of the CoCo.

Should you have any questions regarding this, or any product sold by Howard Medical, please write to us or call us at the address given at the top of these instructions.