

CAPTURE™

OPERATING INSTRUCTIONS



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THE CAPTURE® SYSTEM

CAPTURE is a new way to produce program disks and cartridges that has a broad range of uses. CAPTURE can back up programs and data quickly and easily. It will make an archival disk which when rebooted, restores the computer to its CAPTURE'd state.

CAPTURE also provides a simple, foolproof method of making auto-start cartridges. Using the PROMENADE C1® EPROM programmer and any of the CPR family of cartridge kits, even complex software can be put in cartridge form.

HOW TO USE CAPTURE

1. Turn off your computer.
2. Plug your CAPTURE cartridge into your computer's expansion port.
3. Plug your PROMENADE C1 into the USER port if you are going to make a cartridge. Note - you don't need your PROMENADE if you are only going to use the disk drive.
4. Turn on your computer. It will come up in BASIC as usual.
5. Press the button on your CAPTURE cartridge.
6. Press the RETURN key to proceed to the CAPTURE MAIN MENU.
7. Choose Option 2 - PRE-CONFIGURE RAM. You are now returned to BASIC.
8. Bring the computer to the state you wish to CAPTURE. This can mean just about anything from loading and running a program in BASIC to using a complex control program in an industrial application. Whatever the computer is doing at a given instant, whatever information it contains can be CAPTURE'd.
9. When the computer is doing the thing you wish to CAPTURE, press the CAPTURE button.
10. Type a carriage return to proceed to the CAPTURE MAIN MENU.
11. Choose the desired option and continue.

THE CAPTURE MAIN MENU

The main menu presents you with five options. We will discuss each of these in turn.

1. DISPLAY RAM USAGE

Choose this option by pressing the 1 key and a carriage return. You will see displayed an array of numbers and letters. What these mean is this: When you press the CAPTURE button,

one of the things CAPTURE does is to go out and check computer ram. CAPTURE deals with memory in 2k (2048 byte) sections we call 'pieces'. Any piece that contains a byte that is not \$FF (255 decimal) is marked as 'used'. Each ram piece is designated by the high byte of its starting location (given in hexadecimal) for example:

Ram from \$2000-27FF is piece 20

Ram from \$A800-AFFF is piece A8

The ram usage map is simply a list of ram pieces CAPTURE has marked as 'used'.

2. PRE-CONFIGURE RAM

When you choose this option, CAPTURE writes a \$FF character to each memory location from 2048 on up, and then returns you to BASIC.

3. MAKE PROGRAM DISK

When you choose this option you are asked to provide a file name, a device number, and a drive number. Enter a file name of up to 12 characters. You may use the 'delete' key to edit your entry. CAPTURE enters device '8' and drive '0' for you. If you wish to change to device '9' or drive '1' use the delete key and re-enter the new value. You can also save your disk drive's ram as a separate file on your disk. Enter 'Y' in response to the question. Now put a formatted disk in your drive and enter a carriage return to make your disk.

4. MAKE PROGRAM CARTRIDGE

Choose this option to make a cartridge using any of the CPR family of cartridge kits. Be sure you have familiarized yourself with the use of the PROMENADE C1 as a separate piece of equipment, just as you already know how to use your disk drive. Specific information concerning cartridge making is packed with each CPR kit.

5. LOAD AND EXECUTE DISK PROGRAM

This option provides a convenient way of providing future enhancements of the way CAPTURE operates. When you choose this option, you are asked to enter a program name. CAPTURE then loads the desired program from disk and executes it automatically. Bear in mind that these are special enhancement programs designed to work only with CAPTURE.

SUGGESTIONS FOR USING CAPTURE

The first question that comes to mind is : "When should I CAPTURE?" There is no universal answer. To help the user answer this question, two things should be kept in mind:

1. All necessary information about the state of the computer and its input/output devices at the instant of CAPTURE will be saved on disk or cartridge.
2. When rebooted, the disk or cartridge will restore the computer to its CAPTURE'd state. A running program will continue from the point of capture as if nothing had happened.

Here's an example of the use of CAPTURE:

A bridge designer uses a complicated program to aid in his work. The program is mostly in BASIC, about 30k plus 4k of machine language routines in C000. Each time he uses the program, he first enters information concerning his set-up, printing options, etc. Next he enters information about the way the program is to run, the types of calculations it will make and so on. Next he enters information about the specific work at hand - the kind of bridge to be built, the length of the span, soil conditions, materials of construction, etc. Next he enters detailed information concerning the specific job to be done, etc, etc.

Each time he uses the program he goes through this whole procedure of loading and entering, then finally executing his program. There are several places it would be useful to CAPTURE this program.

First, CAPTURE the raw program just after it has been loaded, but not yet RUN. In fact, load the program, type RUN but omit the carriage return which would bring execution. Now CAPTURE. What this accomplishes is this: The time required to get the program loaded is reduced by more than half.

Second, CAPTURE the program after it is running and the system information has been entered. Now, when booted the computer will already 'know' these things.

Third, CAPTURE the program after the job specific information has been entered. Now when booted, the computer will already know all about the job at hand, saving our bridge designer a great deal of work.

Fourth, CAPTURE after the program has produced its results. Now when booted, the computer in effect will have already completed its work and the results will be available for display, printing, modification, etc.

One can easily see there is no single answer to "When should I CAPTURE?" The answer really is: "WHENEVER THE COMPUTER CONTAINS PROGRAM AND DATA THE USER WOULD LIKE TO SAVE AND RESTORE QUICKLY AND EASILY."

USING THE CAPTURE'D DISK

After CAPTURE, your disk will contain several files:

1. DR.NAME If you have saved disk drive ram.
2. BT.NAME The preliminary boot program.
3. CT.NAME }
4. NB.NAME } Secondary boot programs.
5. FB.NAME }
6. IO.NAME The INPUT/OUTPUT information file.
7. 00.NAME }
8. 08.NAME } Ram files for all 'used' ram.
- etc.

To boot your disk, type:

```
LOAD"BT.NAME",8,1 <CR>
```

Everything happens automatically from that point. If you have just one CAPTURE'd program on the disk, then:

```
LOAD"B*",8,1 will do the trick.
```

If you have omitted the drive ram as well, then:

```
LOAD"*",8,1 is all that is necessary.
```

The raw disk you have produced may be altered further if desired. For example, one can combine the RAM files into as few as two, even when all 64k of RAM have been saved.

The ram files are exact. These are the data in ram at the instant of CAPTURE with the exception of 3 bytes: the CAPTURE'd program counter and processor status have been pushed onto the stack.

USING YOUR CARTRIDGE

To use the cartridge you have made, simply plug it into the expansion port (with power off) and turn on your computer.

If you have more than one program on your cartridge, then a menu will be displayed allowing you to select the one you want to boot. If you have chosen the 'suicide' option, then once your program has booted the cartridge disappears and can no longer be accessed by the computer. In non-suicide mode the cartridge can be called back by the computer at a later time without the necessity of a reset.

WHAT'S IN THE CARTRIDGE

CPR family cartridges use one 'CORE' EPROM and one or several 'DATA' EPROMs. These EPROM's are 8,16, or 32k in capacity each.

The CORE EPROM contains boot program information and 1k of information for each specific program on the cartridge. An 8k CORE EPROM can support seven separate programs in the cartridge, 16k CORE will accommodate 14 and so on.

The DATA EPROM's contain ram information only.

Be sure to keep EPROM's belonging to a CPR cartridge together as a set, and be sure to install data EPROM's in their proper places.

LOOKING AT YOUR CAPTURE'D DISK

If you wish to study the information you've captured, you'd best use a monitor program such as MICROMON. All ram data files have a 'SAVED from' address of \$0800 (2048) even though they may belong somewhere else. The IO file also has the \$0800 'SAVED from' address. It is described in detail in Appendix A.

EXPERIMENTING

When you boot your CAPTURE'd disk, only those files having the proper name will be booted. Therefore, you can easily leave out or incorporate new information by renaming files. A couple of examples:

You've CAPTURE'd a BASIC program and now you want to add a monitor program at \$C000. To accomplish this simply save your monitor on the CAPTURE'd disk with the name:

C0.NAME

where NAME is the same as you've used for the main program.

Now, when you boot, the monitor will be brought in along with the rest of your program. Be sure to save an exact multiple of 2k bytes.

Suppose you've CAPTURE'd a game with great music but when booted from the CAPTURE'd disk, the program is mute. You can remedy this by loading the IO file and changing the SID volume control register value from 0 to a desired volume level. Now save the altered IO file under a temporary name; and then simply change names to cause your new file to be booted instead of the original. Remember the IO file is exactly \$300 (768 decimal) bytes long.

FUTURE ENHANCEMENTS TO CAPTURE

Enhancements and upgrades of CAPTURE can be provided in three ways:

1. Program disks with special programs using the LOAD-EXECUTE option described above.
2. Supplemental programs that operate on the raw data on your CAPTURE disk.
3. Upgrade EPROM's that can be installed in your CAPTURE cartridge.

The first supplemental disk (available first quarter, 1986) will include programs to condense CAPTURE disk files, and to make cartridges with useful new capabilities.

USING NON-1541 DISK DRIVES

CAPTURE'd disks can be made on non-1541 drives that are DOS compatible. They will boot successfully, too, but boot time will be much greater. The reason is that CAPTURE's built in fast loading capability works only with the 1541. Using the MSD dual drive: if the source disk is in drive "0" and your CAPTURE disk is in drive "1" then leave the door on drive "0" shut while the CAPTURE disk is being written.

MAKING A DISK STEP BY STEP

1. Install CAPTURE and turn on the power.
2. Hit the CAPTURE button.
3. Press RETURN.
4. Choose PRE-CONFIGURE RAM option.
5. LOAD and RUN your program in the normal way.
6. Continue program execution to the desired point.

7. Hit the CAPTURE button.
8. Press RETURN.
9. Choose MAKE PROGRAM DISK option.
10. Insert a formatted disk in the drive. Type in a "D" and a carriage return.
11. When all disk operation ceases and you are returned to the MAIN MENU your disk is finished.
12. Continue with CAPTURE operations as desired.

APPENDIX A THE IO FILE

RELATIVE ADDRESS	CONTENTS
\$000 - 00F	Reserved
010	CPU Accumulator
011	X Register
012	Y Register
013	SP Stack Pointer
014	SR Status Register
015	PC Low
016	PC High
017	Reserved
018	Reserved
019	Reserved
01A	CIA #1 \$80 = Clock Running, \$00 = No
01B	CIA #1 \$80 = Alarm Set, \$00 = Not Set
01C	CIA #2 \$80 = Clock Running, \$00 = No
01D	CIA #2 \$80 = Alarm Set, \$00 = Not Set
01E	VIC D011 - Stored Value
01F	VIC D012 - Stored Value
020 - 03F	SID CHIP - D400 - D41E
040 - 06F	VIC CHIP - CAPTURE'D Values
070 - 07F	CIA #1 - CAPTURE'D Values
080 - 08F	CIA #1 - Latched Values
090 - 09F	Reserved
0A0 - 0AF	CIA #2 - CAPTURE'D Values
0B0 - 0BF	CIA #2 - Latched Values
0C0 - 0CF	Reserved
0D0 - 0DF	Reserved
0E0 - 0ED	Reserved
0F0 - 0FF	Program Name Padded with \$FF's
100 - 2FF	Color Ram
	Low Nibble = D800 - D9FF
	High Nibble = DA00 - DBFF

APPENDIX B CONDENSING RAM FILES

If you wish you can combine a number of ram files into a single file. This will reduce the length of the directory and will reduce loading time somewhat by reducing head travel. Files to be combined must be "touching", that is, they must occupy contiguous ram. The file 00.NAME must be left apart.

As an example, we will combine three files into one. We assume we have a monitor and DOS wedge active. The three files to be combined are A0,A8 and B0.

```

STEP 1  L"B0*",08      (From the monitor)
2      T0800,0FFF,1800
3      L"A8*",08
4      T0800,0FFF,1000
5      L"A0*",08
6      S"A0C",08,0800,2000
7      X      (Exit to BASIC)
8      @S0:A*      (Scratch A ram files)
9      @S0:B0*      (Scratch B0 file)
10     @R0:A9.NAME=0:A0C      (Renames A0C file so as to
                                include it in boot process).
```

A supplemental program to do this automatically will be available 1st quarter,86.

INTENDED USE

CAPTURE is intended for the purpose of generating archival disks or cartridges only.

NOTICE OF COPYRIGHT

CAPTURE® is a trademarked product of Jason-Ranheim Company. It contains copyrighted software which may not be reproduced or used for any but its intended purpose. IN ADDITION: PROGRAM DISKS AND PROGRAM CARTRIDGES GENERATED USING THE CAPTURE® SYSTEM CONTAIN SOFTWARE PORTIONS WHICH ARE THE COPYRIGHTED PROPERTY OF JASON-RANHEIM COMPANY AND MAY NOT BE REPRODUCED OR SOLD. License is hereby granted to the original purchaser of CAPTURE to use these generated products for his own archival purposes.

LIMITED WARRANTY

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NOTES

With some programs you may find it necessary to reset your disk drive after CAPTURE'ing and prior to writing the CAPTURE disk.

IO file locations \$08D and \$0BD contain the interrupt enable register of CIA #1 and CIA #2 OR'ed with \$80.