

QUIKSTOR-15

**15 MEGABYTE
WINCHESTER**

for H/Z H8 & H89 COMPUTERS

OPERATION MANUAL

QUIKDATA, INC.

2618 PENN CIRCLE
SHEBOYGAN, WI 53081
(414) 452-4172

QUIKSTOR OPERATORS MANUAL

Boot S:0

MODEL QS-15

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S/N QS15- 6601-2015

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WARRANTY & GENERAL INFORMATION

Dear Customer:

Thank you for your purchase of our **QUIKSTOR** winchester unit. We value your business and look forward to serving you again. We back all our products all the way, and we will not leave you stranded when looking for support or advise. Our reputation has grown mainly by word of mouth. We do very little advertising - we don't have to. We have a reputation to protect and live up to, and will continue to give you all needed support to get you going and to keep you going. Any questions, feel free to write or call during our normal business hours: 10AM to 5PM M-Thu, 10AM to 3PM Friday. Nights and Sundays as we are available.

Upon receiving this order, inspect the shipping container and the contents. If any damage is noted to the contents, or any rough handling is noted with the package, report it at once to the carrier, and save the package and contents with all packing materials. This may be necessary for return and/or to settle insurance claims. To minimize shipping damage we try to ship the Quikstor units when possible, by Federal Express. Federal costs a little more, but they handle the packages much better than UPS. They also have a 2 day delivery.

If you have a problem upon receipt, call us immediately and we'll let you know if you should contact the carrier, if you have not already done so.

If problems develop later and you must return an item be sure to call us for advise and authorization. Then be sure it is properly packaged and send it insured for its value via Federal if possible, otherwise UPS or First Class mail.

WARRANTY: All our hardware products carry a full 90 day parts and labor warranty. If you have a problem during this time period we will either replace the merchandise upon receipt of returned merchandise, or repair it and ship out within 48 hours. In most cases, emergency shipping can be scheduled for 24 hour receipt from your call.

After the 90 days we continue to offer full service, support and low repair rates when needed.

All software is covered by our one year warranty. Any defects in software will be updated free during the first year period from purchase. Additional future updates will be made available at nominal charges. Our software warranty offers additional coverage which may not be covered in our subcontractors warranties. We will be limited to coverage only for replacement or updated software. See License agreement for more information.

No warranty, service or support will be offered without registration being properly filled out and returned.

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Serial No. QS15- _____

LICENSE AGREEMENT

Thank you for selecting the QUIKSTOR QS-15, 15 megabyte hard disk unit for your H/Z computer. We believe that the QS-15 is an outstanding product that will give you years of trouble free service. We appreciate your confidence in Quikdata and our products.

This sheet contains the QUIKSTOR limited use Software and Document license agreement and describes our warranty and update policy. When you have read this license agreement and have agreed to its terms, please complete and sign the license acknowledgement sheet and return at once. When this agreement is signed and returned to QUIKDATA, INC., this will be the agreement between us governing the use of the HDOS and CP/M software utilities and drivers for the 15 megabyte hard disk drive unit.

Grant of License. QUIKDATA, INC., hereby grants to you and you accept a license to use the provided software, documentation and any supplied related materials delivered with this license agreement, for a single individual user only. A company or corporation, for instance, does not constitute a single user. You agree that you will not transfer or sub-license your rights under this agreement, and Quikdata, Inc., reserves the right to sell or give licenses to use the QUIKSTOR software and documentation to other persons and firms.

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Your Agreement. You agree not to copy the Materials received from Quikdata, Inc., in whole or in part, except for backup or archive purposes. No more than five (5) copies may be in existence under this license agreement at any time.

Limited Warranty. Quikdata, Inc. warrants the magnetic diskette on which the QUIKSTOR files are recorded, as well as related printed materials, to be free from defects in materials or faulty workmanship, in normal use and service for a period of ninety (90) days from the effective day of this agreements. If, during this period, a defect in the diskette should appear, the diskette may be returned to Quikdata, Inc., for replacement without charge, provided that you have returned your limited use acknowledgement sheet.

EXCEPT FOR THE WARRANTY DESCRIBED IN THIS PARAGRAPH, THERE ARE NO WARRANTIES EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ALL SUCH WARRANTIES ARE EXPRESSLY AND SPECIFICALLY disclaimed.

Liability. You agree that regardless of the form of any claim, Quikdata's liability for any damages to you or to any other parts shall not exceed the license fee paid for the materials.

IN NO EVENT SHALL QUIKDATA, INC., BE RESPONSIBLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES OR LOST PROFITS, EVEN IF QUIKDATA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Updates. If the version of QUIKSTOR software that you have received contains any 'bugs' we will work on them and include repair any known 'bugs' in the next release of the software, which you will receive free of charge during the first year period. After this time, you will be notified of any software updates, which will be made available to you at a modest charge. All updates which are provided to you shall become part of the Materials and be governed by the terms of this license agreement.

Governing Law. This License Agreement is to be governed by and interpreted in accordance with the laws of the State of Wisconsin. If any provision of this license agreement in any way contravenes the Laws of the State or jurisdiction in which this license agreement is to be performed, such provisions shall be deemed to be deleted and, if any term of this license agreement shall be declared by final adjudication to be legal or contrary to public policy, it shall not affect the validity of any other term or provision of this license agreement.

Attorney's Fees. Failure to uphold the terms of this agreement will result in Quikdata Computer Services, Inc., to take any and all legal action necessary. In addition, the software authors, Dean Gibson of UltiMeth Corporation, and Ray Livingston of Livingston Logic Labs, have claims on the software they produced and have full rights to pursue any copyright violations with Quikdata, Inc., or individually. If any legal action is brought by either party to this license agreement against the other party regarding the subject matter of this license agreement, the prevailing party shall be entitled to recover, in addition to any other relief, reasonable attorney's fees and expenses.

Whole Agreement. This license agreement constitutes the entire software, document and Materials license agreement between you and Quikdata, Inc.

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QUIKSTOR

15-MEG SUBSYSTEM SPECIFICATIONS

Our 15 megabyte (formatted) hard disk subsystems are adaptable to either the Heath/Zenith H8 or H89 computer systems. Please note that any winchester hard drive unit is very delicate. The drive technology uses a "flying" head which never makes contact with the disk surface, but floats slightly above the surface. Never subject this unit to any type of shock or rough handling. When the unit is in operation, it must be level and on a hard rigid surface. It must not be subject to any vibrations, i.e. don't knock the unit while in operation, or you could damage the hard disk surface.

Drive unit comes complete with cabinet, fan, power supply, cable, drive controller and all else needed for host computer interface - software and computer host adapter card extra.

HARD DRIVE UNIT: Tandon TM503 5 1/4" rigid disk drive or equivalent

ROTATION SPEED: 3600 RPM

HEAD POSITIONING: Split band open loop rotary positioning system

TRACK TO TRACK STEP TIME: 2 milliseconds plus 15 ms head settling time

Heads positioned to track 000 at power up

START/STOP: 15 seconds maximum to reach operating speed from power on

15 seconds for disk to stop rotating after power down

Solenoid operated mechanical brake provided for rapid spindle deceleration and to preclude possibility of head or disk damage during shipping

CAPACITY: 19.14 MB unformatted (15 MB formatted) per drive

3.19 MB unformatted per surface

10.4 KB per track

PLATTERS: 3

ACTIVE DATA SURFACES: 6

TRACK DENSITY: 345 TPI

CYLINDERS: 306

TRACKS: 1836

READ/WRITE HEADS: 6

MEDIA: 3 lubricated 5 1/4" platters providing 6 recording surfaces

SECTOR SIZE: 256/512 bytes - setup for 256 bytes

RELIABILITY: 11000 power-on hours

COMPONENT LIFE: 5 Years

No Preventative maintenance required

POWER REQUIREMENTS: 5V 1.2A max; 12V 5A motor start (12 seconds), 2A max running

CONTROLLER INTERFACE CARD: S1410 Xebec controller

HOST ADAPTER CARD: H89 - MMS 77320 SASI, H67 Heath card; H8 - H37/67 Heath card

OPERATING CPU'S: H89 Z80, 2 or 4MHZ; H8 Z80 Required, 2 or 4 MHz

OPERATING SYSTEMS SUPPORTED: Heath HDOS 2.0, Heath CP/M 2.2.03

PARTITIONS: User selectable and definable - supports both CP/M and HDOS simultaneously with up to fifteen user definable partitions (all of which can be bootable)

WARRANTY 90 days minimum all parts and labor

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QUIKSTOR - 15 MEG WINNIE

FEATURES

Our QUIKSTOR 15 meg subsystem supports the following features:

15 Megabyte total formatted storage, 19 megabyte unformatted

Heath/Zenith H8 and H89 computers supported

Version available to support Magnolia Microsystems CP/M and controller

User defined partitions for both Heath CP/M and HDOS residing simultaneously

Any standard Heath (or Magnolia drive, in the case of MMS CP/M systems) system drive can be used to load/unload and backup the hard disk

Both Heath HDOS and Heath CP/M software drivers available

Operates with any Z80 CPU and supports both 2 and 4 MHz (MMS version 2 MHz only)

HDOS control port for both the H8 and H89 can be set at 270/274Q (in addition to the standard 170/174Q) to allow more system controllers

Full support offered by Quikdata, Inc.

Compact 5" winchester unit operating with minimum power requirements and heat dissipation

Subsystem includes drive, cabinet with power supply, fan, cable, Xebec S1410 controller

Software drivers designed for very fast and efficient operation

Interface to host system via several host adapter cards readily available:

H8 - use Heath H37/67 card - can be addressed at 170 or 270

H89 - use Heath H67 card, or MMS 77320 SASI card which also has 3 serial ports

Lowest cost/megabyte

Highly reliable

QUIKDATA COMPUTER SERVICES INC. 6501-2015 9-29-83

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QUIKSTOR Price sheet/ Order blank

The 15 meg QUIKSTOR units are shipping from stock, ready to plug in and go. Use this order blank (or copy) to indicate your desires. Check appropriate spaces.

ABOUT YOUR SYSTEM

COMPUTER SYSTEM: H8 H89 note: H8 requires Z80 CPU card
OPERATING SYSTEMS USED: HDOS CP/M MMS CP/M
CPU SPEED: 2 MHz 4 MHz
CPU BOARD: Heath Trionyx DG TMSI Other _____
PRESENT SYSTEM CONTROLLER(S): H17 100K H17 400K H37 H37/67 H67
 H47 MMS Other _____

NOTE: The MTR90 monitor ROM or equivalent is required for operation in the H89; This includes the Magnolia 444-84B, the UltiMeth MTR4K, the Kres Monitor ROM, or the Heath MTR90. The Magnolia 444-84B ROM set is included if you purchase the MMS 77320 SASI interface card with three serial ports. For the H8 Heath's PAM37 ROM is required, which is supplied with the WH8-37 controller board (which supports the hard disk SASI interface, plus H37 floppy).

ABOUT YOUR ORDER

- \$1495 15 Meg Winchester hard disk subsystem - no software or host adapter
- \$149 HDOS and CP/M Hard disk driver software with utilities (package price)
- \$225 MMS 77320 SASI host adapter for H89 with 3 serial ports (includes monitor)
- \$149 Heath H67 host adapter for H89 (no serial ports)
- \$250 Heath H37/67 controller/ SASI host adapter for H8 (if available)
- \$ 25 Shipping & Handling - required for all hard drive orders

\$ _____ Total (note: add WI 5% sales tax for orders in the state of Wisconsin)

NOTE: Please supply FEDERAL servicable address where possible. Add \$25 extra for AIR MAIL shipping via US Postal Service. Whenever possible we will ship 2nd day Federal.

NAME M H E C _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE (____) _____ - _____ HOURS: _____

PHONE (____) _____ - _____ HOURS: _____

PREVIEW

Thank you for your purchase of **QUIKSTOR**, model **QS-15**, our 15 megabyte hard disk system. If you take your time to read through this manual (at least once before you even do anything - please!) and follow the documentation step by step, you should have your system up and running in a relatively short time.

This unit was designed from state of the art technology, and is made available complete with software and host adapter boards for both the H89 and H8 Heath/Zenith computers. Installation is simple and straight forward. This unit when installed per documentation should provide the end user with up to fifteen various user definable partitions, including both CP/M and HDOS. You are able to boot from any SYSGENed partition (either HDOS and/or CP/M), or access the hard drive partitions from any properly set up system floppy drive.

NOTE: THE HARD DISK UNIT USES WINCHESTER TECHNOLOGY. THE 6 HEADS NEVER CONTACT THE SURFACE OF THE 3 PLATTERS, BUT ACTUALLY "FLY" ABOVE THE SURFACE. THE UNIT MUST BE RESTING ON A FIRM HARD SURFACE WHICH IS NOT SUBJECT TO VIBRATIONS OF ANY KIND! IF THE HARD DISK UNIT IS BUMPED OR JARRED DURING OPERATION CAUSING THE HEADS TO BANG OR "CRASH", FATAL RESULTS MAY OCCUR! Keep in mind that the disk is rotating at 3600 RPM. Even when not in use, the unit must not be subject to any undue shock or vibrations.

Now that you have decided where to set the unit up, the next step is to connect the 40 pin SASI cable to the host adapter card (incorrectly called a controller card by some) in your computer. Installation of both hardware and software is covered in separate sections of this manual. If you have any questions during installation or testing, feel free to call or write. We've made the process of installation as easy as possible, and have tried to detail every step. It is possible we may have missed something. If you find something confusing, please call it to our attention so we may investigate it and update our manuals.

Please note that both this documentation and both HDOS and CP/M software are protected by copyright laws of the United States of America. A great deal of time and money have gone into the development of this package. You have purchased this package for a single end user system. With this in mind, please keep the software and documentation to yourself and do not allow either software or documentation to be copied or distributed in any form. Any violation of this will be considered willful infringements of U.S. copyright laws which will result in prosecution to the full extent of the law. We keep accurate records of all sales made - any software or documentation in the hands of unauthorized personnel will be able to be traced back to the original purchasers!

GENERAL SYSTEM CONSIDERATIONS

This section was written for the second revision of this manual from things learned from the first revision. Quikdata's QUIKSTOR hard disk system is sold to work on a **standard** Heath/Zenith H8 or H89 computer system. By standard, we mean the way it comes from the factory either assembled or in kit form.

TLB ROM It is important to emphasize that the Terminal Logic Board (TLB) in the H19 and H89 must have the standard Heath Terminal ROM installed. There are many other ROMs on the market with various features. The majority of them have removed the ANSI code - we are using ANSI code in our software, thus if the main TLB Terminal ROM has been changed, you will not be able to run XBCPART to partition your system, nor will you be able to get the BOOT partition table up. If you have the WATZMAN ROM, the ULTRA ROM, or probably any other ROM, remove it and re-install the stock Heath ROM on the TLB. We cannot and will not take responsibility for any other vendor's incompatibilities.

SOFTWARE CONFIGURATION Make certain that your 2.2.03 CP/M is properly configured for both upper and lower case characters. Also be certain that your 2.0 HDOS is configured for both upper and lower case characters. Additionally, under HDOS, your terminal width must be set to a value greater than 80. It's best to set this and leave it at 255. This can easily be accomplished from the HDOS prompt as follows:

```
SET TT: WIDTH 255
```

If this is not done and you have the width set for 80 characters or less, the partition table will not come up properly, as some lines will attempt to 'wrap around', messing up the entire screen.

CABLE ORIENTATION The ribbon cable used for the disk drives and our hard disk unit must be plugged into the controller card in the proper direction. For the H89 systems, pin 1 is always up. For the H8 pin 1 is always to the left. The pin 1 position of the drive cables can be identified by a stripe along the ribbon cable edge and/or a dot or mark on the connector.

4MHZ OPERATION The Trionyx H8 CPU board supports both 2 and 4 MHz operation with a simple jumper change or via software. If you use the jumper method, you will boot at either 2 or 4 MHz depending on the jumper. I placed a switch on my H8's left side which is connected to the Trionyx CPU speed selector whereby throwing the switch up will cause the H8 to boot at 2 MHz, and throwing the switch down will cause the H8 to boot at 4 MHz. The software provided with your hard disk system will operate and boot at both 2 and 4 MHz with the proper systems.

For the H89, if you wish to BOOT at 4 MHz, you will require a monitor ROM such as the UltiMeth MTR-4K or the Kres equivalent. In addition, the CPU board must have been modified to support 4MHz operation. The easiest 4MHz modification to use is booting at 2MHz and switching to 4MHz after boot. This can easily be accomplished by the Kres 2/4 MHz H89 modification. Presently, the only technically sound modification on the market as of this writing is the Kres 2/4 MHz board.

QUICK CHECK

All **QUIKSTOR** winchester units shipped have the CP/M XEBIOS files already PIPped onto the first CP/M partition. As the unit arrives it will already be partitioned either according to our 'standard' which is 10 megabytes on 2 CP/M partitions and 5 megabytes on 4 HDOS partitions, or according to what you indicated when placing your order.

The HDOS partitions (if desired) will all have been INITIALized and SYSGENed, so you can install the host adapter card in your computer, plug in the system, configure your CPU DIP switch if necessary, install new monitor ROM if required, and BOOT directly off of HDOS. Like the CP/M partition, the HDOS partitions will have all distribution files already PIPped onto them.

The following shows the default partition assignment unless otherwise specified:

PARTITION #	NAME	START CYL	SIZE CYL	SIZE MEGS
0	CP/M 0	1	100	5 Megs
1	CP/M 1	101	100	5 Megs
2	HDOS 0	201	25	1.2 Megs
3	HDOS 1	226	25	1.2 Megs
4	HDOS 2	251	25	1.2 Megs
5	HDOS 3	276	25	1.2 Megs

BOOTING QUIKSTOR

Whether you repartition the drive or not, BOOTing is the same. Boot off the H67 device will cause the partition/boot table to appear. Simply enter the partition number you want to BOOT from, and hit the 'BLUE' key. The system will now boot the desired partition. Remember, under HDOS you must type SPACES the first time through after SYSGENing the partition. Under CP/M you may also have to type SPACES if you are set for auto CONFIGUR the first time through.

These conveniences have been provided to allow you to quickly bring up your unit and see it operate. You may at any time change any or all of the partitions, INIT or FORMAT, and SYSGEN those you want BOOTable and you'll be all set to go.

H89 HARDWARE INSTALLATION

There is not much involved in installing the host adapter card in the H89 computer. Be sure the power is turned off and the computer is unplugged from the electrical outlet. Remove the top cover and remove the accessory mounting bracket from the right side of the CPU board. If you do not already have the power supply upgrade in your computer, you may wish to obtain the Heath H89 to H90 power supply upgrade kit and install it. This will provide heat sinks on all the regulators of the power supply heatsink, and replace 5 volt regulator U101 with a 78H05 heavy duty regulator.

In addition, if you do not have a MONITOR 90 or equivalent monitor ROM in your H89, remove the CPU board and install the MONITOR at this time. The known MONITOR ROM equivalents at this time are the Heath MTR90, the UltiMeth MTR4K, and the Magnolia 444-84B, as summarized in the table below. Thus if you purchased the Magnolia SASI 77320 controller you will have received the Magnolia Microsystems equivalent to the Heath MTR90 ROM set.

MONITOR ROM	PART NUMBER	U516 - SECONDARY ADDRESS DECODER
HEATH MTR-90	444-84 or 444-142	444-83
UltiMeth	MTR-4K	444-83
MAGNOLIA	444-84B	444-83
KRES	KMR-100	444-83

The monitor ROM is located at U518. The Heath MTR-90 is a 4K ROM, either P/N 444-84, or 444-142. If you have Heath MTR-89 p/n 444-62 or MTR-88 p/n 444-40 this will have to be replaced. In addition, you will need to have the associated secondary address decoder IC, 444-83, located at U516. If you already have the Heath MTR-90, the UltiMeth 4K ROM, or the Magnolia 444-84B ROM installed, you will already have the proper IC installed.

Please note that the MTR90 or equivalent ROM is a 4K ROM which installs at location U518. If you have this ROM or are installing it, you will no longer need a ROM located at U519, as this was part of the old "split" 2K set. If U519 presently contains a ROM you probably do not have the correct monitor ROM set and it must be replaced. If you have the MTR-90 set or equivalent, you can remove U519 as it is no longer used.

If you must install a new ROM set, refer to the Heath, Magnolia, or UltiMeth documentation for complete documentation instructions on the ROM installation. This is a simple procedure and only requires some ROM and jumper changes.

Before testing the system, be certain that you have followed all instructions exactly. Double check all your work to be sure everything is correct. Assuming that this is all correct and you have the proper monitor ROM set installed, replace the CPU board and see if the unit still gives two beeps on power up. If not, turn the unit off at once! Go back and again check all your installation and be sure everything is correct, i.e., jumpers in the proper places, ROM pins properly seated (be certain no pins are bent under the ROMs, and the ROMs are properly orientated with the pin 1 marking).

Once proper operation of the monitor is verified by two beeps at power up, all you need to do is install the SASI card, of which there are currently two choices: the Heath H67 card or the Magnolia 77320 card.

The Heath H67 card will give you the standard SASI bus interface that you require, and that's it. The Magnolia 77320 card will give you the standard SASI interface plus three serial ports identical to the Heath 3 port serial I/O card. This is the one to use if your right hand slots of the H89 are full or getting full, as you can then have the 77320 serving both functions; the SASI interface and the serial interface. This will allow you to pull out your present three port serial board to recover a space.

PORT DEFINITIONS AND CONFIGURATIONS

The ports chosen for operation of your disk controller and SASI adapter card must be properly set up for each device. This is accomplished on switch SW501 on the H89 CPU board. This status switch defines 1) which controller board is on port 7CH, 2) which controller board is on 78H, 3) which BOOT device will be the default device, and various other information. The switch settings may vary, depending on the monitor ROM you are using, and the disk controller card you are using. Please refer to the installation instructions for the monitor ROM you are using and properly set SW501 for the system you have. If you have purchased the Magnolia 77320 SASI board, you will have received in the package the MAGNOLIA MICROSYSTEMS MONITOR EPROM 444-84B manual which defines these settings. More on this in a bit.

You must have at least one disk controller card and drive installed in addition to the QUIKSTOR Winchester - you have to be able to load and unload data and software to and from the hard disk.

There are only two ports you can use on the H89 at one time for disk controllers and the SASI adapter card. Port 7CH (174 Octal) and port 78H (170Q). Refer to the table below for port summary information. Remember, H is for hex, while Q is for octal.

CONTROLLER CARD	PORT(S)	REMAINING PORT FOR HARD DISK
H17 (H88-1)	7CH (174Q)	78H (170Q)
H37	78H (170Q)	7CH (174Q)
H47	7CH (174Q) 78H (170Q)	78H (170Q) 7CH (174Q)
MMS77316	38H (070Q)	78H (170Q) and 7CH (174Q)

() If you have the H17 (H88-1) 5" HARD SECTOR CONTROLLER, the associated port must always be set to 7C Hex (174 Octal), leaving port 78H (170Q) available for the SASI card.

() If you have the H37 5" SOFT SECTOR CONTROLLER, the associated port must always be set to 78H (170Q), leaving port 7CH (174Q) available for the SASI card.

() If you have the H47 8" SOFT SECTOR CONTROLLER, the associated port may be either 78H (170Q), or 7CH (174Q). The other port will be left for the SASI card.

() If you have the Magnolia 77316 DD SOFT SECTOR CONTROLLER, you can still have the SASI card at one port and either the H17, H37 or H47 card installed (most logical choice is H17 since the 77316 cannot emulate it), since the Magnolia card uses its own special port. In this

event, you should be using the software that came with the MMS 77320 card and probably should not be reading this!

Whichever combo you have, be sure to note it and write it down, as you will need to know the ports for setting up the software and partitions. Check off the space before the configuration you are using as listed above so you will be able to refer to it later. Then write it in the following space.

DISK CONTROLLER _____ PORT _____

SASI HOST ADAPTER _____ PORT _____

SW501 SWITCH SETTING 0 () 1 () 2 () 3 () 4 () 5 () 6 () 7 () - enter 1 for ON or 0 for OFF.

ANY SASI INTERFACE CARD

Whether you use the Heath Z67 or Magnolia 77320 card, both have a default dip switch. This determines the default BOOT partition when BOOTing the hard disk. If the switch is set to any value other than 15 (and this is not recommended for the H8 as you have no way of entering partition "command strings" to boot off different partitions) you will automatically BOOT from that partition (i.e. 0 to 14) if you do not enter a "command string" to the monitor ROM when booting. For the H89 computer, please refer to your Monitor ROM documentation as to how to enter a "command string"; the "command string", if present, contains an explicit boot partition number.

Normally you want to set the dip switches located on the SASI interface card to the rear of the computer for either card. For the Magnolia card, the switches would be ON (or 1); for the H/Z Z67 card the switch settings would be OFF (or 0). This will cause the boot menu to come up every time and allow you to choose your partition.

In addition, either card has a jumper arrangement for selecting the port address of the card. This must be set for the SASI address as determined in the above steps and by the monitor ROM.

The SASI card can plug into either of the two left bus positions at the right side of the computer in most cases. The left slot is P504 and P510, the center is P505 and P511, and the right which should not normally be used is P506 and P512. **NOTE** when using the H/Z Z67 card for address 7C: Per page 9 in the Heath documentation for the Z67 card, note that if you wish to use their Z67 card for port 7CH (174Q), it must be plugged in the right hand slot (P506 and P512), and jumper the Z67 for 7C on both FLPY and DKS jumpers. If that slot is occupied, it can be placed in one of the other two slots, if FLPY is jumped for 78H and DKS is jumped for 7CH. If you have a Magnolia card, you need not worry about this.

The SASI 40 pin ribbon cable connecting the QUIKSTOR hard drive sub-system plugs into the SASI card with pin 1 (stripe or marked edge of cable) to the top of the system. Before plugging this cable in, be certain the system works and you have gone through the FINAL CHECK & ASSEMBLY instructions in this section.

Next we'll look at the two different host adapters and describe any differences and special features and settings.

HEATH/ZENITH H/Z67 INTERFACE CARD

Position the interface card so it is lying flat in front of you, component side up, 40 pin SASI connector to the right, and bus edge connectors to the left. All positions will be referenced to this layout. If you are using the H/Z 67 SASI interface card, set the J4 (ODD/EVEN) to the ODD (right) position. Set the RESET jumper (32US 4US) to the 32US (right) position. Near the edge connector you'll find a set of jumpers. J1 DSK is for the Winchester - this selects the SASI address. To select 7CH, position it to the right, to select 78H, position it to the left. The next jumper, J2 FLPY should be in the same position as the J1 DSK jumper. The next jumper set is the INT jumper for setting interrupts. Position this jumper on the right most connector in the 4-5 position. The left row has nothing installed. For BOOT partition table upon BOOT, set the dip switches on this board toward the left (bus edge connector).

If you ordered the card from us it will be properly set up for your system when it is shipped.

MAGNOLIA 77320 SASI/SERIAL CARD

NOTE: If you purchased the 77320, you will have a box of goodies. All you are concerned with for this particular system is the SASI interface documentation, the MONITOR EPROM 444-84B documentation, the Monitor ROM package and the interface card itself. The rest of the documentation and software should be put away. You may want this should you ever convert to the Magnolia 77316 double density controller package. Then you can run this system using the supplied Magnolia software for CP/M only, which will properly interface to the 77316 Magnolia double density controller.

If you purchased the Magnolia card, remove your Heath serial I/O card and note the position of the cables attached to it and mark them if necessary. You will find four interrupt jumpers: DTE, DCE, DCE-LP, and SASI. Set the DTE (modem port 330, the DCE (auxiliary port 320), and the DCE-LP (line printer port 340) to correspond to the Heath card you removed. Set the SASI interrupt jumper to the OFF position. Next set the SASI port address jumpers to either 7C or 78 as determined in a previous step, depending on the disk controller card you are using and the monitor ROM installed on your CPU board.

Now install the I/O lines on the appropriate connectors as shown on page 6 of the Magnolia MMS 77320 SASI-bus INTERFACE manual included with your 77320 SASI interface card set. When the card is installed, replace the top accessory bracket to hold the cards in place, and after going through the FINAL CHECK, plug the QUIKSTOR 40 pin Winchester cable into the 40 pin male connector on the card, with the stripe or mark facing up.

If you do not already have a MTR-90 or equivalent ROM set, you can follow the supplied Magnolia documentation and install and test the Magnolia monitor ROM set. If you already have MTR-90 or equivalent ROM set installed, simply store both the Magnolia EPROM documentation and monitor ROMs away for possible future use.

FINAL CHECK & ASSEMBLY

Before powering up the computer, **double check all work** that was done. In particular, pay attention to any jumper positions to be sure they are correct. Check that any installed ROMs are positioned with pin 1 in the proper place, and that the ROMs are inserted properly in the IC sockets - not offset by a position, or having a pin bent out or under. Be certain that the interface board is properly positioned and not plugged in one position up or down from what it should be. Failure to spot this before turning on the computer can damage the ROM, interface card and/or the computer.

For the initial check, do not have the 40 pin SASI cable plugged into the interface card. If you

are certain all installation is correct, power up the computer and be sure everything works as before, i.e., you get two "beeps" on power up. If it does not, immediately turn off the computer and check all work. If it does, plug the 40 pin SASI interface cable with position 1 (marked end of cable) into the interface card. Again, be certain that this plug is not a position up or down on the male connector. Install the computer top - you are all finished with the H89 SASI installation.

Be sure to have the winchester unit on a firm hard surface that will not be subject to vibrations (bumping table, having printer on table, etc.). I have mine on the floor under the desk which the computer is located on.

Now proceed to the software installation.

H8 HARDWARE INSTALLATION

The only board presently available to support any hard disk on the H8 is the WH8-37 card. This card contains both a 5" soft sector H37 compatible floppy controller interface, and a standard SASI interface bus. Since this card has both interfaces built in, and CP/M only supports two devices, I assume 99% of the users will only have this card installed - not the H47 or H17.

To use this interface card with the H8 computer, **a Z80 CPU must be used.** Any Z80 should work - since I have used the Trionyx Z80 card and the Heath Z80 card, and my H8 systems are up and running with these cards, I am in the position to support the Heath and Trionyx Z80 CPU cards only. I will try to support all configurations, but since I do not have them, it may be a trick. The only difference should be because of different monitor ROMs used. With the WH8-37 card you also get the PAM-37 Panel Monitor ROM set, which should be installed on the CPU you are using. Disregard the CPU board manufacturers instructions for CPU status switch settings and follow the PAM-37 documentation instead. **NOTE:** The Trionyx CPU card status switch SW3 is equivalent to the Heath CPU port status switch with a few exceptions. 1) Heath labels their switch 0 through 7, while Trionyx labels theirs 1 through 8. Thus Heath's 0 position corresponds to Trionyx's 1 position, etc. Also Heath's switch ON (1) and OFF (0) is opposite Trionyx switch labeling. Therefore if the PAM-37 documentation says set the Heath CPU positions 0 and 1 to 00, you would set Trionyx 1 and 2 to 11, etc.

Follow all preparation and installation instructions in the Heath instruction manual for the Z-67 interface, WH-8-37. For the H8 you must set all dip switch positions on the WH-8-37 card to the left position in order to get the BOOT partition table when BOOTing your system. Follow the included PAM-37 documentation for setting your switch settings for default ports and port assignments. Also, if a Z80 CPU other than the Heath Z80 CPU is being used, check that it is properly set up and configured according to the Z80 vendor's settings (except for the PAM-37 monitor ROM). If in doubt, call the vendor.

Please note that if the H17 card is being used, it **must** be set to port 7C (174Q), and the SASI (Z67) must be set to 78C (170Q). If you have the H37 card only, the Z67 interface must be set at "1 0" (port 174Q, 7CH), and the Z37 interface portion must be set at "0 0" (port 170Q, 78H), as outlined in the PAM-37 manual. You will also need to set the default BOOT device per PAM-37 instructions (SW3 on CPU board). Below is a table summary of the ports.

CONTROLLER CARD	PORT(S)	REMAINING PORT FOR HARD DISK
H17	7CH (174Q)	78H (170Q)
WH8-37 '37 part	78H (170Q)	7CH (174Q)
H47	78H (170Q)	7CH (174Q)

Make a note of the controllers and port assignments as you will need these later.

DISK CONTROLLER _____ PORT _____

Z67 SASI CONTROLLER WH8-37 PORT _____

This is basically all you need to do, as the 15 meg winchester unit plugs directly in, just as the Z67 would have done.

Please proceed to software installation for your system.

SET-UP & PARTITION: AN INTRODUCTION

This package is the result of considerable effort expended in various phases for an easy to use winchester hardware package for the H8 and H89 H/Z computer system, including hardware interfacing, software interfacing and documentation. The unit can be set up with the Heath HDOS operating system, the Heath CP/M operating system, or both. We are presently working on an HDOS interface for those using the Magnolia Microsystems version of CP/M with their double density 77316 controller, to allow both the Magnolia CP/M (or CP/M+) and Heath's HDOS to reside on the same hard disk (expected to be out 2nd quarter '84). Both 2 and 4 MHz CPU's are supported by this package. The units are all tested, initialized, and set up at our labs for standard partitions (to be later explained) prior to shipping. Ports are set up and all else, so getting your hard disk up the first time should be painless. This will help in you getting up a 'standard' system in a short period of time, and with little effort. You can at any time change the partitions.

WINCHESTER CONCEPTS

Like a floppy, a Winchester disk consists of a round surface(s) coated with a magnetic oxide material which can be magnetized. While a floppy drive allows you to insert and remove the media, the Winchester is a sealed unit enclosed in a chamber within your hard drive cabinet. The Winchester's storage capacity greatly exceeds that of any floppy disks. Because of this, it is divided into separate storage areas called 'partitions'.

The software and data on a 'partition' can be accessed similarly to that stored on a floppy. For most practical purposes, a single Winchester partition can be thought of as a floppy disk as far as software storage is concerned.

There are a few differences. The Winchester's rigid platter cannot be removed like a floppy disk can. The Winchester is also much faster and more reliable than a floppy. Where the Floppy disk is a fixed size (per diskette and controller), the Winchester's partitions can be set by the user during the PARTitioning.

You can BOOT off a floppy, you can also BOOT off of any SYSGENed partition on the Winchester. When your system is properly set up, you will be able to continue to BOOT off any of your floppy drives, and also any of the Winchester partitions - the default device specified by the CPU switch setting. You can assign your SASI HOST ADAPTER card switch setting to boot a 'default' partition, or by setting the switch setting to '15', the BOOT PARTITION menu will always come up and give you the choice of BOOT partition.

PARTITIONS

What's all this talk about partitions? Don't let the term scare you. When you work with floppy drives, you have 100K, 500K, or perhaps a maximum size of about 1 megabyte. With relatively small sizes such as this, you don't have to worry about size management of files, or too many files to fit on the directory. When you have a Winchester of 15 megabytes or so, it's very large compared to a floppy. If you had only one 15 meg Winchester partition you could not have more than one operating system. When your directory would become "full" you may still have 13 megs left on the disk, but too bad - as far as the directory is concerned, the disk is full. Want to think about backing up one 15 meg surface?

The partition utility XBCPART (HDOS and CP/M versions included), divides the physical Tandon Winchester disk into up to 15 user partitions or "logical drives" for the selected operating system(s) you have chosen under XBCPART. The unit is already set up as follows unless another scheme was specified upon ordering the unit:

PARTITION #	OPERATING SYSTEM	SIZE
0	CP/M-A:	4.8 Megs
1	CP/M-B:	4.8 Megs
2	HDOS-SY0:	1.2 Megs
3	HDOS-SY1:	1.2 Megs
4	HDOS-SY2:	1.2 Megs
5	HDOS-SY3:	1.2 Megs

Besides these logical "drives", you can further have up to 15 USER NUMBERS or User areas under CP/M to further sub-divide the CP/M partitions. Consult your CP/M manual for additional information on user numbers.

CLUSTER SIZE

Depending on the size of the partitions, there is always a 'minimum size' for a file to occupy, known as a **cluster** under HDOS. A cluster is a group of sectors which is the smallest size available for a file. This value varies depending on the 'disk' size. For instance, on a SS SD 100K disk, the cluster size would be two sectors. On a very large partition, the cluster size may be more than 20 sectors. This means, if you have a one sector file, although it will only occupy one physical sector on the hard drive, the directory logs it off as twenty sectors for instance. If you do, for instance, a CAT SY1:/ALL, you will see the actual disk sectors taken by each file. A CAT SY1:, for instance, will show you the same files, but with their actual file size. When HDOS is assigned to over 50 cylinders for a partition, the CAT command may show an incomplete space remaining. This is because only 4 digits were allocated when HDOS was designed and 5 digits are needed to show the free sectors on a large partition. It's no big deal, but you should be aware of this. Once there are a few files on the disk, the number will drop down below 9999, which will then accurately be displayed. When checking the size on an empty partition, you may see something like 8734, which is really 18734. Some examples of HDOS cluster sizes are listed:

CYLINDER SIZE	APPROX MEGABYTES	CLUSTER SIZE
100	5	76
75	3 3/4	58
50	2 1/2	38
25	1 1/4	20
20	1	16

CP/M also has a limitation of a maximum number of directory entries which depends on the size of the partition, and allows up to 8 megabytes per partition (not true for CP/M+). The HDOS directory depends on the size selected, but at 1.2 Megabytes, the cluster size is 20 sectors. Listed below are cluster sizes and directory sizes for CP/M:

0 to 255K = 1K minimum per file
 256K to 2 megabytes = 2K minimum per file
 2 megabytes to 8 megabytes = 4K minimum per file

0 to 255K partition = 64 maximum directory entries
 256K to 512K partition = 128 maximum directory entries
 512K to 2 Megabyte partition = 256 maximum directory entries
 2 Megabyte to 8 Megabyte partition = 512 maximum directory entries

To calculate the partition size from the number of allocated cylinders, note the following:

1 cylinder = 6 tracks. Each track holds 8K storage.
Therefore, each cylinder will hold 48K storage.

Thus, for the default CP/M partitions of 100 cylinders, you get 48000K storage, or 4.8 megabytes.

For the default HDOS partitions of 25 cylinders, you get 1200K storage, or 1.2 megabytes.

For a rough estimate, simply assume 20 cylinders is equal to one Megabyte.

To calculate the sector/cluster size of your HDOS partitions, use the following formula:

$((\# \text{ CYLINDERS}) * (\# \text{ HEADS}))/8$

Will give you a value. Take this value, round it up to the next highest even integer value, and that is the number of sectors taken by each cluster, which is the minimum sector size for any file. For example, this unit has 6 heads. The standard HDOS partitions are set up with a size of 25 cylinders. Therefore:

$((25) * (6))/8 = 150/8 = 18.75$, rounded up to 20

Thus as set up, your minimum sectors/HDOS cluster is 20.

Under CP/M, you can easily see your pertinent data as to maximum directory entries and all the pertinent disk STATUS by using the CP/M command:

STAT DSK:

XBCPART

The QUIKSTOR partitioning utility, XBCPART (named XBCPART.COM under CP/M and XBCPART.ABS under HDOS) was written by Dean Gibson of UltiMeth Corp. It is a very clever menu driven utility which makes partitioning very easy and user friendly. You are allowed to set up a maximum of 15 partitions and define these in any combinations you desire.

Special features were taken into consideration in the programming efforts to make this a very powerful, yet easy to use utility. Some of the special features of XBCPART include:

- * User friendly menu-driven utility.
- * Set "standard" partitions for CP/M and HDOS to help the beginner get his system up without much hassle.
- * User definable partitions supporting any combination of up to 15 partitions, each BOOTable if properly set up and SYSGENed.
- * User settable options such as host adapter port.

This utility initializes the BOOT CODE on the hard disk, and writes out the partition table on the hard disk. After this, you can access the hard disk from any other system drive both under HDOS and CP/M. Before you use any partition, that partition must be INITIALized for HDOS or FORMATted for CP/M. If you further desire to BOOT off the hard disk, you must also SYSGEN the hard disk partitions you will want to boot from - more on this latter.

Once the partitions are set up, BOOTing the hard disk will cause a menu to come up, allowing you to select which partition, 0 to 15, that you want to BOOT from (Note: the default switches

must be set for 15 on the SASI host adapter card in order for the menu to come up and allow you to choose your partition upon each BOOT - refer to the hardware installation section for your system within this manual). When you BOOT the hard disk, the drive selects for a very short time and the BOOT CODE is read into the computer memory. After this point, the system "knows" where each partition is, and what operating system it contains.

Please note, that whenever running XBCPART, **BE SURE YOU HAVE BACKED UP ANYTHING ON THE HARD DISK YOU MAY WANT TO HAVE SAVED**, as XBCPART may cause you to lose any and all data on the hard disk unit. This is especially true if you are changing partition sizes. When the software is properly set up, you can use any system disk to load or backup the hard disk. Although the hard disk units are very reliable it is important to back up all data on the disk at frequent intervals so if something goes wrong you can load it back in. Ever lose the data on a 100K disk? Just think of losing 15 megs! It's rare indeed, but could happen.

We will now take a look at the partition program, XBCPART.COM, which runs under CP/M, and explain how to use it. Please note the unit is already set up for the default conditions and partitions as shown on the screen examples. If you leave the drive as shipped to you, you will be all set up and ready to run with the default partitions and parameters, to run XBCPART.COM. Partitions are already FORMATTed under CP/M and INITIALized under HDOS. If you want to use the 'standard' partitions and use the unit as shipped, you can skip the partition program and skip the INIT and FORMATting. Simply set up the system, SYSGEN, and go.

XBCPART.COM PARTITION INSTALLATION including sample SCREENS

(Note: This discussion applies to both the CP/M and HDOS versions of XBCPART). When you first mount your system CP/M disk (to which you have copied from the CP/M QUIKSTOR installation disk the file XBCPART.COM to partition your drive), simply invoke the main partition program by typing:

XBCPART

The first screen will come up and look like this:

```
XEBC Hard Disk Partitioning Utility V3804A
Port: 78H   Drives: 0   Controller: 0
Copyright 1983 UltiMeth Corporation

--- Keypad Editing Functions ---
Key: Unshifted:   (Shifted:)
<-  Prev char(BS) (Begin Field(TAB))
->  Next char     (End Field(TAB))
^   Prev field    (Prev line)
v   Next field(CR) (Next line(LF))
HOME First line   (Last line)
DEL  Backspace, space, backspace
IC   Insert char
DC   Delete char

Read   Clear   Exit
track Field   prog

f5     era     red
```

When the screen comes up, the cursor is sitting in a reverse video field, PORT, which defaults to 78H. Depending on the other controller(s) in your system, this may or may not be the correct value. Generally, when using the H17 disk controller card with the SASI card, the H17 will occupy 7C, while the SASI interface will occupy 78. When using the H37 double density controller, it will usually be set for 78, leaving 7C for the SASI interface. Refer to the PORT DEFINITIONS AND CONFIGURATIONS section under HARDWARE INSTALLATION for your system. Also refer to your disk drive controller card instructions.

Note that this port value is not stored, it must be entered each time this program is run. This value simply tells the software the port to access the SASI controller which has the hard drive connected - each time this program is run.

The next field is Drive, which defaults to 0, and next is Controller, which defaults to 0. For the QS-15 configuration, these **must** be left as is; they are always 0 (zero), but were provided for possible future expansion.

Let's describe the editing key functions. As shown on the right hand side of both screen displays, the keypad in the normal (unshifted) mode has the following effect on the screen: To move the cursor to the previous character hit the left arrow or BACK SPACE key; right arrow moves you to the next character; up arrow moves you to the previous protected field, while the down arrow moves you to the next field, as will also the RETURN key. Hitting the HOME key will take you back to the first line of the screen. The DELete key will delete the character at the cursor and cause the cursor to back up one position. The IC key when depressed will allow you to insert a character at the cursor position in the field, while the DC key will allow you to delete a character at the cursor position in the field. This is as simple to use as any editor like PIE.

Likewise, the keys when the SHIFT key is held down have different functions. The shifted left arrow will take position the cursor to the beginning of the field the cursor is in, while the shifted right arrow key will take you to the end of that particular field. The shifted up arrow will take you to the previous line, while the shifted down arrow will take you to the next line (so will the LINE FEED key). The shifted HOME key will take you to the last line. This is a lot harder to write up and explain than it is to actually use it. Experiment and play around with the function keys to get a feel for what they do.

You'll notice on the bottom of the screen directly above the function keys are the labels Read Track (f5), Clear Field (erase), and Exit prog (red). Partitioning is very easy and straight forward. Simply hit the f5 key to read the track. You will now see a different screen similar to that shown:

XEBEC Hard Disk Partitioning Utility V3804A

Copyright 1983 UltiMeth Corporation

Port: 78H Drive: 0 Controller: 0

Heads: 6 Cylinders: 306 Seek-type: 4

Precomp-cyl: 306 Reduce-cyl: 306

#	Name	Cat	WP	Origin	Size	Category codes:
0	CPM 0	2	0	1	100	0 = Unused 1 = Spare
1	CPM 1	2	0	101	100	2 = Heath CP/M 3 = MMS CP/M 4-7 = HDOS
2	HDOS 0	4	0	201	25	WP codes: 0 = Read/Write 1 = Read only
3	HDOS 1	4	0	226	25	--- Keypad Editing Functions: --- Key: Unshifted: (Shifted) <- Prev char(BS) (Begin field(TAB)) -> Next char (End field(TAB)) ^ Prev field (Prev line) v Next field (Next line(LF)) HOME First line (Last line) DEL Backspace, space, backspace IC Insert char DC Delete char
4	HDOS 2	4	0	251	25	
5	HDOS 3	4	0	276	25	
6		0	0	0	0	
7		0	0	0	0	
8		0	0	0	0	
9		0	0	0	0	
10		0	0	0	0	
11		0	0	0	0	
12		0	0	0	0	
13	Spares	1	0	0	1	
14	Spares	1	0	301	5	

Write track

Read track

Clear Field

Check data

Exit prog

Start over

keys--f1

f5

era

blu

red

white

You will now note that the cursor is flashing on the reverse video protected field '6' on Heads. (NOTE: you will not hurt anything by bringing up the screens and experimenting as long as you do not press the F1 function key. When this key is pressed, whatever is shown on the screen will be written out to the hard disk). Wherever you see reverse video on your screen, these values can be edited. Please note for your QUIKSTOR model QS-15, the defaults should be left alone. That is, The drive you have, as can be checked on your spec sheet, does have 6 heads and 306 cylinders. The seek type for that drive is 4, and the precomp and reduce values should be left as they are.

For your information, a cylinder can be defined as all the tracks which can be accessed without moving the heads. Think of looking at the winchester from the top and cutting through all platters, one track width directly under the heads. You would end up with a cylinder consisting of 3 platters with a read/write head on each side of each platter. As a general rule, the number of tracks in a cylinder is equal to the number of heads. For the Xebec 1410 controller there are 32 sectors/track, at 256 bytes/sector. Each track therefore contains 8192 bytes, or 8K. Therefore, a cylinder comprises 6 tracks, for a total of 192 sectors. At 8K bytes per track, each cylinder can store 48K bytes.

For some definitions, **Cat** is the Category assigned to the partition. The partition can be unused (0), a spare (1), a Heath CP/M partition (2), or an HDOS partition (4 through 7). **WP**, write protect code will be explained more below, but briefly, allows you to write protect a partition. If you try to PIP a file to the partition or create data or programs on the partition, you will get an error message. **Origin** is the starting cylinder of the partition, and **Size** is the number of cylinders allocated to the partition. Always start with cylinder 1 for your first origin, leaving cylinder 0 as a 'spare'. The origin plus the size gives you the next partition's origin. For example, we start with cylinder 1, and allocate 100 cylinders. The next available cylinder is 101, and so on.

Back to the discussion. The rest of the screen allows you to change and define partitions any way you want. If you leave as is, you will have two CP/M partitions (0 and 1) which is logical A: and B: partitions, with just under 5 megs per partition. Please note that the category code is 2, for Heath CP/M, and the Write Protect code (WP) is always set to zero in the defaults for allowing both read and writes to the drive. To write protect a partition you simply would set this value to 1, which makes it read only. (Please note that the Write Protect code is a software check only. It is possible to have your WP set to read only, and because of an electronic malfunction, lightning, etc., you could still erase parts of your disk. Again, be sure to back up your hard disk even if you have it set for read only!) The first partition (partition 0) starts at origin 1, and occupies 100 cylinders, thus the next starting position would be cylinder 101 as can be seen. If you are not careful and overlap these boundaries, the XBCPART program will give you an error message, and you'll have to find and correct your error. The same discussion follows for the second partition (1) CPM 1.

Next you will see four HDOS partitions (2, 3, 4, 5), which are logical HDOS SY0: to SY3: partitions, each about 1.2 megs in size, which is about the same as the Z47 size. These occupy partitions 2 through 5, each with a category code of 4 indicating an HDOS partition. WP code, origin and size follows from the above discussion.

You will note two 'spares'. It is advisable, though not necessary, to leave the 'spares' in. Basically, if a cylinder goes bad (which is most likely to happen if the unit was jarred with the heads positioned over a certain cylinder, or if power is lost with the heads over a certain cylinder), it could be allocated to a 'spare' cylinder. This feature is not presently supported, but may be in future updates.

You can leave these values as they are, or use the editing key functions as described on the right side of the table on the screen to change any value(s). Just be certain to double check and

decide if that is actually what you want to do before you save the partition code by writing it back out to the disk. Don't be alarmed if you screw it up, since all you have to do is bring in XBCPART and do it over again if you ever want to change anything; but keep in mind, you are liable to lose all data on the hard disk - be sure it is backed up before you run this partition program and write the data on the disk. As long as you don't hit the f1 key to write the data, you're OK. If you bring up XBCPART and read the track (first screen, remember) it will show you what you have set up.

Well, anyway, let's assume you want the default values as given, or you have already changed them. Now simply hit the f1 key to write the partition table out to the disk. When you do this, you should see the select light (depending on the revision, either red or green) on the hard disk front panel light up for a short period of time. If you did not, 1) you either were not watching, 2) have the port address set wrong, 3) do not have the hard drive turned on, 4) do not have the unit connected properly, or 5) have some major problems - recheck all your work, go back to the beginning and start over, cross your fingers and pray.

After this has been successfully accomplished, you will get the CP/M prompt back (or HDOS prompt if partitioning under HDOS), and your partitioning is all finished. Now the drive can be INITIALized for HDOS, and/or FORMATted for CP/M. It can then be SYSGEN'ed and will be all ready to use. Note: If the default values are acceptable, you can skip the partitioning program, FORMATting under CP/M, and INITIALizing under HDOS. Simply SYSGEN the unit and go. The unit is shipped partitioned, FORMATted and INITIALized to the default values.

To **BOOT** from the unit, simply BOOT from the Z67 boot. This will cause the partition/boot table to come up. Enter the appropriate partition you wish to BOOT (this partition must have been SYSGENed), and press the BLUE key.

SOFTWARE INSTALLATION

You have been supplied with all needed software to bring your hard disk up and use it. You will have received the proper disk format for your distribution media, depending on the system you specified when placing your order. For any supplied format, all files will be present on all disk formats distributed. As development continues on this project, some of this software may be revised and updated. In that event, if you have filled in your software registration cards and returned them, you will receive a free software update along with the necessary documentation changes automatically within a years time. After that, you will have to pay a modest charge for any updates.

HDOS SOFTWARE

The HDOS software supplied consists of three files: DKXBC.DVD is the actual hard disk device driver; DVDDKGEN.ABS is the utility for specifying the maximum number of HDOS partitions; and XBCPART.ABS is an HDOS partition utility, which is identical to its CP/M counterpart - except it is used under HDOS.

It is assumed that you are familiar with the HDOS utilities and commands required to carry out the needed steps. If not, please review and/or study your HDOS manual to become familiar at the **very minimum** with the following commands and utilities:

INIT	SYSGEN	SET
FLAGS	PIP	MOUNT
DISMOUNT	RENAME	

PREPARATION OF SYSTEM DISK

There are several ways you can INIT and SYSGEN your QUIKSTOR Winchester drive under HDOS. The below procedure is one way. You may follow this, or use another method. If you are not familiar with HDOS its utilities and operations, you would be wise to follow this presented procedure.

(1) INITIALize an HDOS floppy disk with your present SY floppy driver. As this disk is being built, it should as much as possible contain the SYSTEM files from the original Heath distribution disks, and will be hereinafter be referred to as the **SYSTEM FLOPPY DISK**. Although various SYSCMD type modifications and other user installed patches and mods may work, they will not be supported. It is strongly suggested that the first time through you use the standard Heath files wherever possible to avoid any possible conflicts. After this, when everything is verified to be working properly and you are familiar with the unit setup, you may want to go back and do this again, only with your patched or SYSCMD files.

(2) Run SYSGEN/MIN to create an operating system environment on your **SYSTEM FLOPPY DISK**. When running SYSGEN, be sure your destination disk is your **SYSTEM FLOPPY DISK**. Again, use the Heath distribution files (with exception of the SY: driver perhaps - if you are already using an UltiMeth driver - if not, you MUST use the Heath driver: no others will be supported).

(3) Copy the following files (using PIP for multi-drive systems, or ONECOPY for single drive systems) onto the SYSTEM disk from the Heath distribution HDOS disks:

INIT.ABS	SYSGEN.ABS	FLAGS.ABS
ERRORMSG.SYS	SET.ABS	

(4) Now BOOT your **SYSTEM FLOPPY DISK** in your SY0: floppy drive. Remember you will have to **type spaces** the first time through to get your system to recognize the console baud rate. Until this is done, the system will have appeared to have died. Subsequent BOOTs will not require this. If you do not want to use the DATE, and have the DATE presented at every boot, you can SET HDOS NODATE. Refer to your HDOS 2.0 manual page 2.45 for more SET options.

(5) The QUIKSTOR distribution disks you received have been distributed to you in the requested format for the drives and controller you are using on your system. Using either PIP (multiple drives) or ONECOPY (single drive system) copy the three files present (XBCPART.ABS, DVDDKGEN.ABS and DKXBC.DVD) from the QUIKSTOR distribution disk to your **SYSTEM FLOPPY DISK**.

(6) If you do a CAT (or DIR) on your SYSTEM FLOPPY DISK, you will see the file DKXBC.DVD present. RENAME this file to DK.DVD, since a valid device driver must have only two letters before the delimiter (period):

```
RENAME DK.DVD=DKXBC.DVD
```

(7) RESET the computer, and again BOOT off your SYSTEM FLOPPY DISK. This time the DK.DVD hard disk device driver will be recognized as a legal driver - all ready to use.

This disk now contains all the needed files to INIT and SYSGEN the hard disk, copy files to and from it, and access it.

DVDDKGEN.ABS

This is the utility used to set the maximum number of partitions (logical drives) you will be using with your DKXBC.DVD device driver. If you run DVDDKGEN (you don't have to, but will then use the full 2K memory for buffering as explained below, since it will default to the maximum number of 7, being eight partitions, or 'logical drives'), it should be run before you INITIALize the winchester with the DKXBC driver. The maximum value is 7 (which is how it is set when shipped to you), since you are allowed up to eight devices per driver (example: DK0: to DK7:). Please keep in mind that each unit number requires an additional 256 bytes of RAM, since HDOS allocates 256 bytes of memory for each possible disk drive, up to the maximum specified in the device driver. Thus, if you set this value to 3, you will use up an additional 1K RAM beside the space for the device driver itself. If you set this value to the maximum value of 7, you use up 2K RAM. Therefore, if you choose to use four HDOS partitions as provided on this default, you should set the number to 3. If you only want to end up with only a SY0: and SY1: (from DK0: and DK1:), you should specify 1.

The way to use this utility is as follows: When you have the driver copied on your HDOS SYSTEM FLOPPY DISK renamed DK.DVD, (explained in the next section under DKXBC.DVD), be sure you also have a copy of DVDDKGEN.ABS on the disk. Now simply type the maximum drive number as follows:

```
DVDDKGEN DKn:
```

where 'n' is the maximum number you will want. For our default having SY0: through SY3: (on hard disk, but starts out on your SYSTEM FLOPPY DISK as DK0: through DK3:), the maximum number would be 3, thus

```
DVDDKGEN DK3:
```

will take care of it. INIT the HDOS partitions with the DKXBC driver (INIT DK0:, INIT DK1:, etc.). That's all there's to it.

Note to advanced users: Keep in mind that with HDOS you can have up to seven active device drivers, each which may reference a maximum of eight units. Suppose you want to have all HDOS on the winchester and no CP/M. You could have, say, 10 HDOS partitions on the hard disk Set up two SY.DVD device drivers. Give one a category number of 4, for instance (see XBCPART documentation), and the other a category number of, say 5 for an example. Now you could run DVDDKGEN for each driver.

This will give you two hard device drivers (assuming you have copied two copies and given them the two above names) each being able to access 5 "drives". (Please note that you **must never** access a particular partition with two different drivers as the results could be fatal. You cannot predict where you will end up and what will happen. You could very easily damage your files on a partition). Use some logic to do this, keeping in mind you are simply treating the partitions as 'individual floppy drives'.

You could reduce your cylinder size to 20 for just under 1 meg storage per drive, which would give you a sector cluster size of 16 instead of 20. I will not go into all the details here, I just wanted to show you that it can be done.

XBCPART.ABS

XBCPART.ABS is a partition program identical to its CP/M counterpart. It allows you to change any and all partitions and parameters under HDOS just like the XBCPART.COM did under CP/M. It does not matter whether you use the CP/M or HDOS version, both will achieve the same end result. Again, be certain you back up your unit before using any partitioning utility, this one included.

Now we'll look at the last of the HDOS software, the actual device driver DKXBC.DVD.

HDOS SOFTWARE - DKXBC.DVD DRIVER

The HDOS software driver you received on your HDOS distribution disk is called DKXBC.DVD. This is the driver for under HDOS which will allow you to access the Winchester drive from your system drive, or allow you to SYSGEN and BOOT the Winchester. The driver has been designed to be very fast, compact and efficient. This driver supports several features, including operation at both 2 and 4 MHz CPU speeds and switchable 2/4 MHz CPU's. Your floppy driver, however, may not work at 4MHz. Thus if you want to use 4MHz for all, you'll have to either use a SPEED utility (Trionyx and Kres both provide these) or use DKH17V3.DVD for the H17/400K drives.

The DKXBC driver is used just like any other standard HDOS independent device driver. If you are not familiar with HDOS device drivers and their operation, please take the time **now** to read your HDOS manual and become familiar with them.

It is assumed that you already have your hard disk unit partitioned. If not, you must partition it, or you will not be able to INITIALize or SYSGEN it.

The first thing you must do is copy the supplied DKXBC.DVD driver to your main system disk and rename it to DK.DVD. Depending on your drive configuration, this will have to be done using either PIP (for multiple drive systems) or ONECOPY (for a single drive system). Again, if you are not familiar with these utilities, please take the time **now** to read your HDOS manual and acquaint yourself with their operation. As an example, suppose you have mounted your QUIKSTOR HDOS distribution disk on SY1:. Using PIP do the following:

```
PIP SY0:DK.DVD=SY1:DKXBC.DVD
```

Now type BYE and re-BOOT the system to get the DK.DVD recognized.

Use the SET command to check the settable options for the hard disk driver as follows:

```
SET DK: HELP
```

You will see the following options:

Port nnnQ	= 170Q/78H	Port Address
Drive n	= 0	Drive Number
Controller n	= 0	Controller Number
Category n	= 4	Partition Category

In most cases you will not need to alter these settings. If you are using port 78H (170Q) for your floppy controller, you will have to change the hard disk controller port to 7CH (174Q). The drive number is only for future expansion and must be left set for 0. This will be used in the future if more than one hard drive is connected to the controller. It is not currently supported. Likewise, the controller number should be left set to 0. The category partition code can be any value from 4 to 7 for supporting multiple driver copies to reference more than one DK: driver (with different names) for those wishing more than the maximum of 8 HDOS partitions.

To change the port, for instance, the standard HDOS SET command is used as follows:

```
SET DK: PORT 174Q
```

That's all that is involved in the SET options. The drive number, controller number and category

number must be left as is for this system.

Now that the driver is properly set up, you can INITIALize the HDOS hard drive partitions. If you left the partitions as shipped or use the default partitions as supplied, you will have HDOS on four partitions, being 2, 3, 4 and 5, for logical HDOS partitions of SY0:, SY1:, SY2:, and SY3:. Keep in mind, that the driver on your SYSTEM FLOPPY DISK is DK.DVD, but will be SY.DVD: on the hard disk when SYSGENed, since SYSGEN switches the names when SYSGENning a drive (or partition) on the non-SY: disl. Thus, you must INITIALize all these partitions as in this example:

INIT DK0:

As you INITIALize the surfaces you should see the hard disk drive select light come on for a period of time during each INIT. If this does not occur, you have some problems and better check over all your work.

Once you have INITIALized your partitions, you may now SYSGEN one or more of the partitions. Assuming you have all the needed files on your SYSTEM disk, type in the following:

SYSGEN/MIN

Respond DK0: (or DK1:, or DK2:, or DK3:) for destination drive and the default of SY0: for the source drive. While SYSGENing is taking place, you should see the hard drive select as the files are being copied over. When the SYSGEN takes place, the DK.DVD (previously DKXBC.DVD) hard driver is transferred and renamed as SY.DVD on the hard disk, while your present system SY.DVD driver is copied over and renamed DK.DVD. Thus your floppies will now be accessed from the hard drive as DK.DVD and the hard drive will be accessed as SY:. This is because the system BOOTable drive must always be SY:.

Now all you must do is BOOT your hard disk system. The method of doing this will be different depending on how your default CPU switches are set and the monitor ROM you are using. Consult the monitor ROM documentation to find how to select and BOOT the Winchester drive. When you BOOT the Winchester drive the first time (BOOT for Z67 to bring up partition table, enter HDOS partition number you which to BOOT, hit 'BLUE' key), the select light will come on for an instant and the system will appear to have died because it is waiting for "Type Spaces to determine Baud Rate". Simply hit the space bar several times, and the system should BOOT up.

Once BOOTed, you can treat it as any HDOS drive - the only difference is it will be much faster and hold more data. You can now copy (PIP) files from your Winchester drive to your floppies and vice versa. Just reference your drives properly as SY: and DK:.

That's all there is to installing and using the DKXBC.DVD HDOS device driver.

XEBIOS (c)

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PRODUCT DESCRIPTION

XEBIOS(c) is a replacement for the standard Heath/Zenith CP/M 2.2X03 BIOS which provides complete support for the Xebec S-1410 Winchester disk controller, allowing use of any Seagate ST-506 compatible Winchester drive with up to 16 Megabytes capacity, as well as the standard H-17, H-37, and H-47 disk systems. Disk partitioning is totally user configurable, allowing up to 15 partitions of any size from 16 Kilobytes to 8 Megabytes. Any partition may be BOOTed, and any two partitions may be accessed at any given time. XEBIOS leaves completely intact all features of the standard Heath/Zenith CP/M 2.2.03 system and also adds several significant enhancements.

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INTRODUCTION

XEBIOS(c) is a replacement for the standard Heath/Zenith CP/M 2.2X03 BIOS which provides complete support for the Xebec S-1410 Winchester disk controller provided in the QUIKSTOR package, allowing use of any Seagate ST-506 compatible Winchester drive with up to 16 Megabytes capacity, as well as the standard H-17, H-37, and H-47 disk systems. Disk partitioning is totally user configurable, allowing up to 15 partitions of any size from 16 Kilobytes to 8 Megabytes. Any partition may be booted, and any two partitions may be accessed at any given time. XEBIOS leaves completely intact all features of the standard H/Z CP/M system and also adds several significant enhancements. The significant features of XEBIOS are:

* The BIOS.SYS file supplied with XEBIOS is operable at any CPU clock speed up to 4 Mhz with NO PATCHING! Since CPU speed is measured and all pertinent timing constants calculated on each call to the disk drivers, XEBIOS will even work with the new software switchable 4 Mhz conversions now being offered by several suppliers (Please read the disclaimer on 4 Mhz operation at the end of this document.)

* XEBIOS also contains the famous LLL "BIOS-80" drivers for the H-17 disk system, allowing use of any combination of 40 track and 80 track single and double sided 5" drives with the standard H-17 controller, providing up to 400K per disk while maintaining 100% compatibility with the standard 100K format. Also supports reading of 40 track disks in 80 track drives.

* XEBIOS supports ALL Heath/Zenith disk formats for the H-17, H-37, and H-47, including "extended" density for up to 1.25 megabytes per disk!

* MOVCPMXE is supplied to allow generation of ANY size CP/M system from 32K to 64K. In addition, the famous CP/MUG "ZCPR" Z-80 CCP is integrated into MOVCPMXE. The CP/MUG XDIR program is also supplied to provide detailed directory listings showing file sizes, and free space remaining on disk.

* Includes FORMATXE and ASSIGNXE formatting and partition assignment utilities for formatting partitions, and assigning a partition to a particular logical drive.

INSTALLATION

Installation of XEBIOS is very simple, but does require that the user be familiar with the CP/M operating system and it's utilities, and that all directions be followed EXACTLY. ALL CP/M files MUST be copied from your CP/M 2.2.03 distribution disks. ALL XEBIOS files MUST be copied from your XEBIOS distribution disk(s). In the following instructions, when a reference is made to a Heath/Zenith or CP/M utility, refer to the Heath documentation if you are not ABSOLUTELY CERTAIN how to operate that utility. Neither Livingston Logic nor Quikdata, Inc., CANNOT and WILL NOT take responsibility for educating the user in how to operate his computer or it's operating system and related programs. The following instructions are VERY easy to follow provided you have READ and UNDERSTOOD all of the Heath documentation, and you follow these instructions TO THE LETTER. If you have trouble, refer to the section entitled "IN CASE OF DIFFICULTY" near the end of this document.

NOTE - XEBIOS may, from time to time, be revised or updated. In order to avoid having to frequently update this printed documentation, any minor changes or revisions will be documented on the diskette itself. Before proceeding, check the diskette for any files having the ".DOC" extension. If such a file is present (it may not be) please take a few minutes to read it before proceeding with the installation.

1 - Before proceeding, be sure you have the following items on hand:

- a - Heath/Zenith CP/M 2.2.03 Distribution Disks I, II & III
- b - XEBIOS Distribution Disks
- c - One blank diskette

Also ensure the following conditions are met:

- a - Console BAUD rate MUST be 9600
- b - CPU clock MUST be 2 Mhz

It is assumed that the ENTIRE XEBIOS setup procedure will be carried out using a 2 Mhz CPU clock speed. If this is NOT the case, and you experience problems, DO NOT call for help. Due to the large number of 4 Mhz conversions, BIOS modifications, and other possible incompatible hardware and software products on the market, neither Quikdata, Inc., nor LLL CANNOT AND WILL NOT PROVIDE ASSISTANCE IN BRINGING UP A SYSTEM WHICH CONTAINS ANY NON-HEATH HARDWARE OR SOFTWARE PRODUCTS. If you have ANY problems, refer to the "IN CASE OF DIFFICULTY" section near the end of this document.

2 - **FORMAT** the blank diskette, and then **SYSGEN** it with a **32K CP/M system!** (For example, if you have the H37, to **SYSGEN** a 32K system you would **MOVCPM37 32**, then **SYSGEN** taking the source from memory by simply hitting **RETURN** for source. **MOVCPMxx** builds the **SYSTEM** in memory. If you take the system from the source drive you will get the exact system that is on the source drive.) Refer to your Heath/Zenith CP/M documentation for details on the use of **FORMAT**, **MOVCPM**, and **SYSGEN**. This disk will be referred to as the "**XEBIOS system disk**" throughout the remainder of this document.

3 - Depending on which floppy system you are using, copy one of the following **BIOS.SYS** files from your **XEBIOS Distribution Disk(s)** onto your **XEBIOS system disk** and rename it to **BIOS.SYS**:

XEBIOS17.SYS - for Winchester and H-17 disks

XEBIOS37.SYS - for Winchester and H-37 disks

XEBIOS47.SYS - for Winchester and H-47 disks

(again, for the Z37 version, you would **PIP XEBIOS37.SYS** to your **XEBIOS system disk**. Then **REN BIOS.SYS=XEBIOS37.SYS**)

4 - Using **PIP**, copy the following files from your **XEBIOS Distribution Disk(s)** onto your **XEBIOS system disk**:

BOOTXE.COD	BOOTXE.REL	SDT80.REL	BLDRXE.COD
BLDRXE.REL	CONFIGXE.HEX	BOOTZ80.COD	BOOTZ80.REL
XEBIOS.SUB	FORMAT80.HEX	MOVCPMXE.HEX	SDT80.HEX
MOVCPM80.HEX			

5 - Using **PIP**, or any other suitable means, copy the following files from your Heath/Zenith CP/M Distribution Disk(s) onto your **XEBIOS system disk**:

SUBMIT.COM	XSUB.COM	DDT.COM	FORMAT.COM
MOVCPM17.COM	MOVCPM37.COM	SYSGEN.COM	CONFIGUR.COM

6 - Reset your computer and re-boot CP/M from your **XEBIOS system disk**. If your system appears to 'die', it is because **CONFIGUR** is being run. Simply type spaces and **CONFIGUR** will complete. If this happens, for now just answer **YES** to the '**STANDARD SYSTEM?**' prompt of **CONFIGUR**.

7 - Run the **SUBMIT** file **XEBIOS.SUB** by typing from the "A" prompt:

SUBMIT XEBIOS

8 - After a few minutes, the "A" prompt will return, and you should then have the following files on the disk:

MOVCPMXE.COM MOVCPM80.COM FORMAT80.COM CONFIGXE.COM

9 - It is now time to configure **XEBIOS** to the hardware in your system. To do this, **CAREFULLY** read the the Heath/Zenith **CONFIGUR** and **MOVCPM** documentation, and the following sections on **CONFIG80**, **FORMAT80**, **FORMATXE**, **MOVCPM80**, **MOVCPMXE**, **XECONFIG**, and **ASSIGNXE** before proceeding to the next steps.

10 -Run **CONFIGXE** to configure the terminal, printer and other system parameters to the hardware in your system.

11- If you are using any double sided or 96 tpi drives on your H-17 controller, run **CONFIG80** to configure the **BIOS** for these drives.

12- If you wish, at this point you can run MOVCPMxx (where XX would be 17, 37, or 47 depending on your system) to re-SYSGEN your XEBIOS system disk with a maximum size system. This can be done as explained above, but this time again using the H37 for an example, MOVCPM37, and then SYSGEN, again taking the system from memory, not from the disk. You can also at this point copy any files you may need to transfer your XEBIOS system disk files and others onto the Quikstor Winchester.

This completes the floppy disk **SETUP** portion of the XEBIOS installation procedure. Refer to the section **PUTTING CP/M ON QUIKSTOR** located at the end of this section, for instructions of getting CP/M files and the SYSTEM on the winchester. Please read the following sections carefully before attempting to partition and format any partitions.

XEBIOS UTILITY PROGRAMS

The following utilities are provided with XEBIOS:

MOVCPMXE.COM - A MOVCPM program for generating bootable partitions.

FORMATXE.COM - A partition formatting utility.

ASSIGNXE - A partition assignment utility for assigning winchester partitions to logical CP/M drives.

CONFIGXE - A modified Heath/Zenith CONFIGUR for XEBIOS.

MOVCPM80.COM - A MOVCPM program for all H-17 disk formats supported by BIOS- 80.

FORMAT80.COM - A disk formatting utility for the H-17 system which allows formatting of double sided and 80 track disks.

CONFIG80.COM - A system configuration utility similar to CONFIGUR and used to specify the type of drive at each physical drive address in the H-17 system.

The following items are public domain software provided through the CP/MUG library. These programs are provided at no charge, and no support will be provided, except the documentation given below.

XDIR.COM - An enhanced directory listing program which displays an alphabetically sorted directory listing complete with the size of each file.

FINDBAD.COM - A non-destructive disk test and bad block lockout utility.

ZCPR - A CCP (console command processor) replacement which provides several new and useful system commands, as well as enhancing the user interface.

MOVCPMXE is a MOVCPM program for the hard disk. It allows relocation of the CP/M system to any memory size from 32K to 64K. It is functionally and operationally IDENTICAL to the Heath/Zenith MOVCPM, with the following exceptions:

1 - MOVCPMXE replaces the standard CP/M CCP with the ZCPR Z-80 CCP. This adds several new and useful commands, and improves the user interface to CP/M. See the section on ZCPR for more details on the expanded capabilities of this new CCP.

2 - MOVCPMXE has been written so it "chains" itself to SYSGEN, so that SYSGEN is executed automatically when MOVCPMXE is done. This is accomplished by automatically (you don't have to worry about it) placing a copy of SYSGEN above MOVCPMXE, and then executing it rather than simply exiting to the CCP after system relocation. This makes it unnecessary to explicitly run SYSGEN following a MOVCPM, as MOVCPMXE runs SYSGEN for you!

Note that MOVCPMXE still leaves a "saveable" system image in memory, so that SYSGEN can still be used as before. If you wish to save a system image, simply type from the CP/M "A:" prompt:

SAVE 38 CPMxx.COM

where xx is the CP/M system size. In addition, you may still wish to use SYSGEN to copy a system from one partition to another, without using MOVCPMXE at all. Be sure to **copy the file BIOS.SYS** from the floppy to the Winchester, or there will be no BIOS on the disk! This will prevent you from BOOTing from the winchester unit.

FORMATXE allows you to format (initialize) partitions. This consists of writing all of the sector headers to all tracks in the partition, clearing the CP/M directory area, and writing the disk "label" into the boot sector. When **FORMATXE** is run, it will display a table of the names and sizes of all available CP/M partitions, and then prompt you for the name of the partition you wish to **FORMAT**. Simply enter the name of the partition followed by a **RETURN**. If the partition entered is a valid CP/M partition, you will be prompted to verify your intention to **FORMAT** that partition, as once formatting has begun, **ALL** data from that partition **WILL BE LOST!!** Be **VERY SURE** you know what you are doing **BEFORE** formatting a partition and backup any software on the hard disk as necessary.

Note that CP/M does **NOT** permit a single partition larger than 8 Megabytes. Attempting to **FORMAT** a partition larger than 8 Megabytes will cause an error message to be printed, and the **FORMAT** will not take place. Also note that **FORMATting** large partitions can take up to 10 minutes, so be patient. As long as the drive activity LED is on, you can assume everything is alright.

ASSIGNXE allows you to specify which partitions will be assigned to which logical CP/M drives. Any two partitions may be accessed at any given time. You **MAY NOT** assign the same partition to more than one logical CP/M drive at a time, as this could cause a loss of data. **ASSIGNXE** also will not allow you to assign a non-CP/M partition. A partition **MUST** be **FORMATTed** **BEFORE** it can be assigned. Attempting to **ASSIGN** an unformatted partition will result in a **BDOS SELECT** error when the partition is first accessed.

The logical CP/M drive names are as follows when you have booted from the Winchester drive:

A: First Winchester Partition
B: Second Winchester Partition
C:-E: Floppy Drives 0-2

When booted from the H-17 or H-37, the logical drive names are as follows:

A:-C H-17 or H-37 Drives 0-2
D: First Winchester Partition
E: Second Winchester Partition

When booted from the H-47, the logical drive names are as follows:

A:-B: H-47 Drives 0-1
C: First Winchester Partition
D: Second Winchester Partition

When you first boot XEBIOS, **partitions 0 and 1** will be loaded in automatically, provided they are valid CP/M partitions (see the section on XEBIOS PATCHES to change these default partitions). If your winchester is set up for CP/M being the first two partitions, 0 and 1, you will not need to run **ASSIGNXE**. This is why we ship the winchesters with 0 and 1 as the CP/M partitions. If any other partition is used for CP/M, you will be required to run **ASSIGNXE** after boot in order to access the other winchester partitions. This can be accomplished by a command line in **CONFIGXE**.

ASSIGNXE can be run in two ways:

- 1) Typing "ASSIGNXE" will simply display all available CP/M partitions and their sizes.
- 2) Typing "ASSIGNXE d:=partname" will cause partition "partname" to be assigned to CP/M drive "d:", providing partition "partname" is a valid CP/M partition, AND drive "d:" is a valid winchester logical drive.

For example, suppose you have booted from the Winchester:

ASSIGNXE (Look at the available partitions)

Name	Size
CPM ASM	1600K
CPM BACKUP	4800K
CPM BASIC	2462K
CPM GAMES	1048K

ASSIGNXE B:=CPM GAMES (Make "CPM GAMES" Drive B:)

ASSIGNXE A:=CPM BASIC (Make "CPM BASIC" Drive A:)

Note that in order to change the assignment on drive A:, the NEW partition MUST be SYSGENed, or the system WILL CRASH!!

CONFIGXE is a modified H/Z CONFIGUR for use with XEBIOS. The standard CONFIGUR MUST NOT BE USED WITH XEBIOS. XECONFIG works in EXACTLY the same way as CONFIGUR, so refer to the H/Z documentation for details of its operation.

MOVCPM80 works in the same manner as the H/Z MOVCPM17, except that SYSGEN is "chained" to MOVCPM80 in the same way as MOVCPMXE, so SYSGEN is automatically executed when MOVCPM80 is exited.

FORMAT80 is a modified Heath FORMAT, and operates in EXACTLY the same manner except that it will FORMAT 80 track and double sided H-17 disks. If the BIOS has been configured by CONFIG80 with any double sided H-17 drives, you will be asked whether you wish the disks in those drive FORMatted in single or double sided format.

NOTE - There is an undocumented feature of the Heath/Zenith FORMAT program which allows for "FAST" formatting of H-17 disks by skipping the media check which is normally performed. If you wish to use this option, simply type "FORMAT F" or "FORMAT *" to enter FORMAT.

CONFIG80 works in much the same way as CONFIGUR. It is used for specifying the type of drive located at each physical drive address on the H-17 controller. The parameters which may be entered are:

Track Density - May be either 48 for 40 track drives, or 96 for 80 track drives. Note that only the first digit needs to be entered (either 4 or 9).

Number of Sides - May be either "1" for single sided drives, or "2" for double sided drives.

Step Rate - May be any value from 4 mSec to 40 ms in increments of 2 ms. Enter a carriage return after inputting the step rate.

Once all desired changes are entered, enter either "X", "Y", or "Z" to write the new BIOS back to the disk and re-enter CP/M. The "X", "Y", and "Z" commands work in exactly the same way as under CONFIGUR.

XDIR is a utility which provides a greatly enhanced disk directory display. It will display all files on a disk, sorted in alphabetical order, with the size in Kbytes of each file, as well as a count of the number of files on the disk, number of directory entries used, number of directory entries left, total disk size in Kbytes, total space occupied by files, and total remaining space. XDIR is run with a command line of the same format as the standard CP/M DIR command:

XDIR	will give a display of ALL files on the currently selected drive.
XDIR C:	will give a display of ALL files on drive C:.
XDIR B:*.COM	will give a display of all .COM files on drive B:.
XDIR E:A*.*	will give a display of all files on drive E: with names which start with "A".

FINDBAD is a non-destructive disk test and bad sector lockout program. FINDBAD can be run on ANY disk, at ANY time. It WILL NOT alter ANY data or files on the disk. FINDBAD reads the ENTIRE disk, including system and directory areas, to locate any unreadable sectors. If a bad sector is found, the following actions will be taken:

1 - If the bad sector is in the system or directory area of the disk, an error message will be displayed on the console warning the user of a bad system or directory sector.

2 - If the bad sector is in the file area of the disk, an error message will be displayed giving the number of the CP/M allocation block containing the bad sector. That block will then be allocated to the file (UNUSED).BAD so that it cannot be used by any other file operations. If the bad sector is already allocated to a file, it is NOT UN-allocated from the file, so that all remaining sectors of the file can still be read.

It is a good idea to run FINDBAD on a regular basis to keep track of the integrity of your disks. Should FINDBAD locate a bad sector on a system track, that disk will not be bootable, and cannot be SYSGENed, but should be otherwise usable. Should FINDBAD locate a bad directory sector, ALL files should be IMMEDIATELY copied to another disk, and the bad disk (in the case of a floppy) should be discarded. Bad sectors in the file area of the disk can be left allocated to the file (UNUSED).BAD, with no ill effects. However, any disk which shows a large number of bad sectors should be discarded.

It is **very strongly recommended** that FINDBAD be run on the CP/M winchester partitions right after FORMATting the first time (this has already been done by us before shipping - do it again if you change partitions or re-FORMAT) to lock out any bad sectors that may be present. This will prevent many future headaches. It is very improbable that any winchester will have no bad sectors, because of the large number of sectors on a winchester. A few bad sectors is no cause for alarm. If the number is considerable, however, contact Quikdata for advise.

ZCPR is the Z-80 Console Command Processor prepared by members of the CP/M Users Group. It is a greatly enhanced CCP containing all of the features of the Digital Research CCP, as well as several new ones. The commands available are:

Familiar Commands:		New Commands:	
DIR	ERA	GO	GET
REN	USER	JUMP	DFU
TYPE	SAVE	LIST	

The "Familiar Commands" operate in exactly the same manner as with the standard CCP, with the following exceptions:

ERA - Will display the names of all files ERASed.
REN - If the new file already exists, you will be asked if it should be deleted before performing the REName.

TYPE - The file will be displayed on the console a screen (24 lines) at a time, and wait for a character from the console before scrolling to the next screen. This makes searching for something in a file much easier, since you needn't use CTL-S to stop the scrolling.

SAVE - The size of the area to be SAVED can be optionally specified in CP/M sectors (128 bytes) rather than in pages (256 bytes). In addition, if the specified file already exists, you will be asked if it should be deleted before performing the SAVE.

USER - The current user number is always displayed in the system prompt following the drive identifier.

Examples:

ERA B:*.BAK - will cause ALL files with the .BAK extension on drive B: to be erased. The name of each file will be displayed on the console in DIR format as it is ERASed.

REN C:OLDFILE.NEW=C:NEWFILE.OLD - will cause the file NEWFILE.OLD on drive C: to be renamed to OLDFILE.NEW. If the file OLDFILE.NEW already exists on drive C:, you will see the message: Delete File?

If you respond with a "Y", then the existing OLDFILE.NEW will be deleted before renaming NEWFILE.OLD to OLDFILE.NEW.

TYPE TXTFILE.TXT - will cause the file TXTFILE.TXT to be displayed a page at a time on the console. It will wait for a character from the console before going to the next page.

TYPE TXTFILE.TXT P - will cause the file TXTFILE.TXT to be displayed on the console WITHOUT pausing between pages. This is the same effect given by the standard CCP.

SAVE 4 JUNK.COM - will cause 4 PAGES (1024 bytes) of memory starting at address 0100H to be saved to the file JUNK.COM.

SAVE 4 JUNK.COM S - will cause 4 SECTORS (512 bytes) of memory starting at 0100H to be save to the file JUNK.COM.

USER 5 - will cause the system prompt to change from "A>" to "A5>".

The "New Commands" operate as follows:

LIST - works exactly like the standard TYPE command, except that the specified file is sent to the system LST: device.

DFU - specifies the default user number to be used in command searches discussed below. The default user is normally 0.

GET - allows a file to be loaded into any location in memory. This can be very useful in certain assembly language debugging operations.

GO - causes a direct CALL to any location in memory. This command, along with the GET command, allows execution of programs which operate at some address other than 0100H. Any program entered in this way can simply execute a RET instruction to return control directly to the CCP without doing a warm boot, providing the CCP is not overwritten, and the CCP stack is preserved.

JUMP - same as the GO command, except this command causes a direct JUMP to a memory location rather than a CALL. Return from any program entered with this command MUST be by a warm boot.

Examples:

LIST TXTFILE.TXT - will caused the file TXTFILE.TXT to be printed on the system LST: device.

DFU 3 - sets the current default user to 3. See the section below on command searches for details.

GET 4000 B:ALPHA.BET - causes the file ALPHA.BET from drive B: to be loaded into memory starting at address 4000H.

GO 4000 - causes a CALL to location 4000, beginning execution of whatever program is located there.

JUMP 4000 - causes a JUMP to location 4000, beginning execution of whatever program is located there.

COMMAND SEARCHES

One of the most useful features of ZCPR is its "heirarchical search" capability. Suppose you are logged onto drive B:, under user 5 and you enter the following:

```
B5> MBASIC
```

If MBASIC.COM is located on your A: drive, or on drive B: under a different user, you will get the message:

```
MBASIC?
```

which is the CCP's way of saying it couldn't find MBASIC.COM on your B: drive. ZCPR, however, would have found MBASIC.COM, even though it is NOT on the currently logged drive. ZCPR will search several places for a .COM file before giving up, while the standard CCP will search the current drive under the current user number only. ZCPR will search in the following order:

First:	On the current drive, under the current user number
Second:	On the current drive, under the default user number
Third:	On drive A:, under the default user number

The default user number can be set with the "DFU" command described above.

Suppose we go back to the above example. You are logged onto drive B:, under user 5. The file you wish to load is on drive A: under user 3. With ZCPR you could enter the following:

```
B5> DFU 3  
B5> MBASIC
```

And MBASIC.COM would be loaded from drive A: user 3. The search would take place as follows:

First:	Search drive B: under user 5 - can't find it
Second:	Search drive B: under user 3 - can't find it
Third:	Search drive A: under user 3 - found it

With the standard CCP, you would have to first select drive A:, then switch to user 3, then enter the command. When MBASIC finally loaded, drive A: would be the default drive.

In most cases, all operations take place under user 0, so there is no need to use the DFU command, as 0 is already the default user. This means that you need not worry about what drive you're logged onto when you try to load a program from drive A:, ZCPR will find it. You will find this to be a very convenient feature.

PATCHING XEBIOS

There are currently three "configuration" bytes within the XEBIOS BIOS.SYS files. These three locations control the default port address for the XEBEC controller, and the two default partitions which are loaded automatically on each cold boot. Future updates to XEBIOS will provide an automatic means of patching these bytes. At present, however, they must be patched manually using DDT. To ease the process, XEPATCH.SUB is supplied.

The port selection logic for the XEBEC controller works as follows:

1 - If the system is COLD booted from the winchester drive, the port address used will ALWAYS be that passed to the boot loader by the monitor ROM. In this way, the winchester can be booted from any port address, with no changes required in the BIOS or boot loaders. Note, however, that booting from any ports other than the standard Heath/Zenith ports (170Q and 174Q), may require a modified monitor ROM, depending on your particular system configuration. Refer to your monitor ROM documentation for details on available boot ports.

2 - If the system is COLD booted from ANY floppy drive, the port address for the XEBEC controller will be obtained in one of two ways:

a - In the "as-delivered" state, XEBIOS will examine the port address used by the floppy boot device, and use the OTHER remaining Heath standard port. Therefore, if the floppies are booted from port 170Q, the winchester drive will be assigned to port 174Q. If the floppies are booted from port 174Q, the winchester drive will be assigned to port 170Q. This provides complete compatibility with ALL Heath/Zenith disk systems.

b - If the MODEB5 bit in the BIOS MODE byte is set to 1, the winchester will ALWAYS be assigned to the port stored in location ALTPORT in the BIOS. In this way, the winchester drive can be FORCED to operate at ANY port address. This option MUST be enabled to operate from a non-Heath port when booting from ANY floppy system. In the distribution XEBIOS, ALTPRT is set to 0A8H, but MODEALT is set to 0, so the winchester ALWAYS defaults to one of the two Heath ports.

The default partition bytes set which partitions will be automatically assigned when the system is booted. In the distribution XEBIOS, these are set to partitions 0 and 1. It is suggested that you use XBCPART to configure partitions 0 and 1 to your two default partitions. It is much easier to re-define partitions with XBCPART than it is by patching XEBIOS.

In any case, when XEBIOS is booted from floppies, BOTH default partitions will automatically be assigned to the two logical drives corresponding to the winchester drive. ASSIGNXE may be used at any time to change the two active partitions to any valid CP/M partitions on the drive.

When XEBIOS is booted from the winchester, the boot partition is ALWAYS assigned to logical drive A:. If the boot partition IS one of the default partitions, then the remaining default partition is assigned to logical drive B:. If the boot partition is not one of the default partitions, then default partition 0 will be assigned to logical drive B:.

To change any of the default parameters described above, proceed as follows:

1 - Be sure the following files are on your A: drive:

BIOS.SYS (MUST be XEBIOS)	XEPATCH.SUB
XEPATCH.HEX	SUBMIT.COM
XSUB.COM	DDT.COM
STAT.COM	

2 - Run XEPATCH.SUB by typing a command line in the following form:

SUBMIT XEPATCH defpart0 defpart1 modeflag altport, where:

defpart0 is the number IN HEX of default partition 0

defpart1 is the number IN HEX of default partition 1

modeflag is the value to place in MODEB5. Must be 0 or 1

altport is the alternate port address IN HEX.

Note that if modeflag is 0, then altport is ignored, and need not be supplied.

As an example:

SUBMIT XEPATCH 2 4 1 A8 will set partitions 2 and four as the default partitions, set MODEB5, so that all non-boot accesses to the winchester will be through port A8.

SUBMIT XEPATCH 1 8 0 will set partitions 1 and 8 as the default partitions, and clear MODEB5, so that ONLY the standard Heath ports will be used.

Invalid partition numbers, or an invalid modeflag will generate an error message, and no changes will be made to the BIOS.SYS.

NOTES ON 4 MHZ OPERATION

A number of 4 Mhz conversions have become available in the past several months for the H-89 computer. Unfortunately, they vary widely in their completeness and technical correctness. For the most part, these are poorly executed "quick and dirty" conversions, and little or no consideration has been given to any compatibility problems which might arise with existing hardware and software. Because of this, Livingston Logic, as well as many other vendors, have been experiencing a large increase in the number of complaints from customers who have installed these conversions. To date, NOT ONE of these complaints has proved valid. Tracking down such problems has begun taking up a great deal of our time, when, in fact, the problem is NOT ours! With the wide variety of different conversions and clock switching schemes available at the present time, it is simply not possible to provide software which will work in all cases. For this reason, we are forced to take the following position:

- 1 - LLL CANNOT and WILL NOT provide ANY assistance, either hardware or software, to anyone converting ANY system to 4 Mhz operation.
- 2 - LLL CANNOT and WILL NOT provide ANY support for any customer experiencing any problems with our products when operated in any system with any 4 Mhz conversion installed, whether the problem also occurs at 2 Mhz or not.

For the benefit of those who STILL wish to convert their systems to 4 Mhz, we would strongly recommend the KRES Engineering conversion as the most complete, professional and technically competent conversion. All LLL products have been verified as working with the KRES conversion. However, the above policies STILL apply.

IN CASE OF DIFFICULTY

If you experience any difficulties in setting up and running XEBIOS and it's utilities, PLEASE do the following BEFORE requesting assistance:

- 1 - READ and RE-READ ALL DOCUMENTATION, including the Heath/Zenith CP/M documentation. Be sure you understand EVERYTHING you are doing.
- 2 - Start the procedure over again FROM THE BEGINNING. Be VERY SURE that you follow all directions TO THE LETTER!! DON'T SKIP STEPS!! DON'T ASSUME THAT YOU KNOW ENOUGH TO LEAVE OUT OR MODIFY ANY STEPS!!
- 3 - If you are still experiencing trouble, have someone else try the procedure, preferably someone with more CP/M experience and knowledge.
- 4 - If, at this point you're STILL having trouble, GO BACK TO STEP 1 AND DO IT ALL ONE MORE TIME!!
- 5 - If you've made it this far and you're STILL having trouble, then write down, in as much detail as possible, EXACTLY what the problem is, any symptoms or problems, EXACTLY WHEN and HOW the problem manifests itself, and EXACTLY what the configuration of your system is, including both HARDWARE and SOFTWARE. Mail this letter, and, if possible, a bootable disk exhibiting the problem, to the address on the front page of this document. Include a postage

paid return envelope.

Livingston Logic has established a reputation as a supplier of high quality, reasonably priced hardware and software for Heath/Zenith computers. It is our policy to provide as much support as is practical, and we are always happy to receive any comments or suggestions which our customers may have regarding the quality of our products or documentation, as well as any suggestions as to possible new products or improvements to existing products. We will also do whatever we can, within reason, to solve any problems which may occur, provided the customer has read and understood ALL supplied and suggested documentation, has followed all instructions faithfully, has made a reasonable effort to verify and isolate the problem, and has supplied enough information about any such problem for us to attempt to duplicate the problem on our systems. Most importantly, **DO NOT** phone for assistance unless you have **BOTH** your computer and our documentation in front of you when you call.

Our experience with customer complaints/problems has been:

- 1 - Over 60% simply did not take the time to read and understand the documentation, and made little or no effort to isolate or verify the problem before calling for help. In many cases, we have been called upon to provide VERY BASIC information about the operation of the computer or the operating system. This is NOT our responsibility!
- 2 - Roughly 30% have problems with hardware, other software, or simply have not properly configured the hardware of software correctly.
- 3 - In the last year, an increasing number of problems have centered around 4 Mhz operation. In EVERY case, the problem has been found to be either a hardware caused malfunction due to an improperly executed conversion violating one or more hardware timing requirement, or some feature of the conversion which by it's very nature makes it incompatible with ANY standard disk driver.
- 4 - Far less than 1% have legitimate problems with "bugs", defective distribution media, or other manufacturing problems.

Because of the recent increase in the number of calls falling into the first three categories above, we have been forced to adopt the following policy regarding alleged "bugs":

- 1 - Reports of suspected "bugs" MUST be made in writing, stating the exact nature of the bug, ALL hardware and software in use at the time of the problem, and all pertinent system configuration information (step rates, drive makes and models, etc).
- 2 - The original distribution disk MUST BE RETURNED for inspection, along with the selling dealers name and purchase date.
- 3 - If possible, a bootable disk which exhibits the problem should also be returned with the report.
- 4 - Should we determine that a bug or problem does exist, we may or may not provide a correction, as we see fit. We may or may not incorporate any such fixes in future releases of the software. Any such updates may or may not be available at a reduced rate. Any such updates may or may not be announced in such publications as H-SCOOP, BUSS, and local club newsletters.

LLL has always tried very hard to maintain compatibility with other existing products, both hardware and software, and we have often updated our products to take advantage of some new products features, or enhance compatibility. Unfortunately, this attitude is not shared by most sellers, and, as a results incompatibilities may arise, particularly with products developed AFTER the release of ours. For this reason, we DO NOT provide ANY products on a trial basis, and we further make NO warranties as to compatibility or suitability of any of our products for any purpose whatsoever. All products are sold strictly on an "as is" basis. When incompatibilities are found, we may or may not update our product to provide compatibility, and we may or may not offer any such updates at a reduced rate.

LLL CANNOT and WILL NOT provide ANY of the following services, except on a prepaid hourly basis at our current consulting rate:

- 1 - Assistance in the installation, configuration debugging, or operation of ANY other companies products.
- 2 - Assistance in the location and identification of general system hardware or software problems.
- 3 - Assistance in the modification of any of our products for any purpose.
- 4 - General advice, technical information, or any other information not directly related to the operation of one of our products.

Further, any correspondence relating to the following subjects will not be acknowledged:

- 1 - Conversion of any system to 4 Mhz operation.
- 2 - Hardware or software problems which occur with 4 Mhz operation.
- 3 - Operation of ANY 80 track drive within the H-89 enclosure.

SUGGESTED ENHANCEMENTS

The use of the XDIR utility can be enhanced by using it in place of the standard CCP DIR command. To do this, a simple patch must be applied to the CCP in MOVCPMCOM. The patch location depends on whether or not you have installed the ZCPR Z-80 CCP.

These patches change the DIR intrinsic command to CAT, so that now when you type DIR, the CCP will load and execute the program DIR.COM. Typing CAT will result in a normal intrinsic directory listing.

To Patch MOVCPMXE.COM do the following from the CP/M "A" prompt:

```
REN DIR.COM=XDIR.COM
DDT MOVCPMXE.COM
DDT VERS 2.2
NEXT PC
3400 0100
-SABF
0ABF 43 44
0AC0 41 49
0AC1 54 52
0AC2 20 .
-CTRL C (enter a control C to exit)
SAVE 51 MOVCPMXE.COM
```

To Patch MOVCPM80.COM do the following from the CP/M "A: prompt:

If you HAVE NOT installed ZCPR, proceed as follows:

```
REN DIR.COM=XDIR.COM
DDT MOVCPM80.COM
DDT VERS 2.2
NEXT PC
3400 0100
-SD10
0D10 43 44
0D11 41 49
0D12 54 52
0D13 20 .
-CTRL C (enter a control C to exit)
SAVE 51 MOVCPM80.COM
```

If you HAVE installed ZCPR, proceed as follows:

```
REN DIR.COM=XDIR.COM
DDT MOVCPM80.COM
DDT VERS 2.2
NEXT PC
3400 0100
-SABF
0ABF 43 44
0AC0 41 49
0AC1 54 52
0AC2 20 .
-CTRL C (enter a control C to exit)
SAVE 51 MOVCPM80.COM
```

PUTTING CP/M ON QUIKSTOR

You now have a floppy disk (XEBIOS system disk) with all needed files on it. If you have not copied the needed files such as STAT, SYSGEN, PIP, XBCPART, etc., do it now. Once you have this disk ready, boot off of it and be sure the winchester is plugged in, connected, turned on and ready to go. When and if in doubt on any of the following procedures, be sure to take time to read the appropriate documentation so you know what you are doing.

1) Be certain the winchester has already been **PARTITIONED** already with XBCPART, and it has at least one CP/M partition. If not, take the time to read the partition documentation and partition the winchester.

2) **FORMAT** all CP/M partitions on the winchester using **FORMATXE**.

3) **ASSIGN** the partitions using **ASSIGNXE**. For example, suppose your floppy drives are A:, B: and C:, and the winchester CP/M partitions are D: and E:. Using **ASSIGNXE**, you would assign D: and E: as follows:

```
ASSIGNXE D:=CPM 0
ASSIGNXE E:=CPM 1
```

This of course assumes that CPM 0 and CPM 1 are valid partition names from your partition table.

You should now be able to access your winchester. For example, if D: has been assigned to the CP/M 0 partition, doing a **DIR D:** should cause the winchester to be accessed and a message "NO FILE" to be displayed.

4) Run **FINDBAD** to test and lock out any bad sectors on the winchester partition. You would do this as follows:

```
FINDBAD D:      to test the first partition, and
FINDBAD E:      to test the second partition.
```

5) It is now time to create a **CP/M system** on the winchester. To do this, be sure you can still access the winchester partition you wish to be able to boot from. Do a **DIR** or something, and if you can't access it, use **ASSIGNXE** again. Now run **MOVCPMXE** which will link to **SYSGEN**. This will cause the BIOS for the winchester to be created. For destination drive, specify your winchester partition, D: in this example. After **MOVCPMXE** is run it will be necessary for you to copy the **BIOS.SYS** file onto the winchester, or upon booting you'll find that a message "CAN'T OPEN BIOS.SYS" will appear. Since usually the **BIOS.SYS** is **STATED** to **\$SYS**, it can't be seen in the directory nor directly **PIPED** without using the "R" switch. Thus if you booted from the "A:" floppy and the winchester partition is "D:", a command like the following will copy not only the **BIOS.SYS** file, but all the files on the disk. You may as well do that since you'll probably want them all on anyway:

```
PIP D:=A:*. * RV
```

will copy all files including system files and will verify them. Note again that we are here assuming "D:" to be the assigned winchester partition we are concerned with.

6) Now **RESET** the system and **BOOT** to bring up the winchester boot table. Select the CP/M partition number from the menu and push the 'BLUE' key under the displayed message "**perform boot**" on the bottom center of the boot table. The CP/M partition should now boot from the winchester.

If you did not obtain the above results and cannot boot from the winchester, be sure to go over all hardware and software installation and try everything again.

Q & A ON QUIKSTOR WINCHESTER SYSTEMS

What is the capacity of Quikstor, QS-15?

The 5" winchester drive is actually a 19 megabyte drive which formats down to 15 megabytes.

What is the physical size of the unit?

The outside dimensions of the Quikstor cabinet is 5 1/2" high, 8 1/2" wide, and 15 1/2" long.

Will the unit work on an H8 and an H89?

The Quikstor unit was designed to work both on the H/Z H89 and Heath H8 computers. The H8 must have a Z80 CPU. An 8080 will not work since maskable interrupts are not available.

What about the Z100 series of computers?

The H8 and H89 computers require only a 'host adapter' card. The winchester Xebec controller card which connects via SASI bus to the computer's host adapter card is contained inside the Quikstor cabinet. The Z100, on the other hand, has the whole works inside the Z100 machine and does not require the Xebec controller. The Quikstor should work on the Z100 if the Xebec card is removed and cables are connected between the Z100 and Quikstor. In addition, the Z100 winchester software from Zenith will handle up to 32 megabyte drives. In the future we do plan to offer an upgrade kit for the Quikstor's sold for H8's and H89's to allow use with the Z100. It presently is a low priority project.

Does the unit support both HDOS and CP/M, and are the partitions bootable?

Quikstor will allow up to 15 user defined partitions, which can be HDOS 2.0 or CP/M 2.2.03 or any combination of the two. In addition, each partition is bootable once it has been SYSGENed. Magnolia CP/M with HDOS support (including CP/M+ will be available soon, as will 25 meg units).

In addition to the Quikstor, what else is needed?

In addition to the winchester subsystem, the software and documentation package is required. This is actually the user operator manual and contains complete instructions for hardware and software installation and use. It also contains, on the disk format you request, the CP/M and HDOS software that is required. The only additional item required is the computer host adapter card. For the H8 computer the WH8-37 card is required. This card provides both H37 floppy support and SASI winchester support. Unfortunately, this card is no longer made by Heath. The best place to obtain it is the 'used classifieds' market.

For the H89 one of two cards can be used. The H/Z-67 card from Heath is a SASI interface card and can be used. The Magnolia 77320 SASI card can also be used. The main difference, is the Magnolia card also has three serial ports, identical to the standard Heath card. This allows you to remove the serial card and free a space. The host adapter does require one of the right hand bus slots of the H89.

What modifications are needed to operate at 4MHz?

None. Both the HDOS and the CP/M software have been designed to work at both 2 and 4 MHz, and with switchable CPU's. Because of the many different 4MHz mods on the market, most of which are not correct, we will not support 4Mhz. You go 4MHz on your own. In addition to 2/4 MHz operation, the CP/M has built in ZCPR and BIOS-80 for H17 formats. The HDOS is used as a standard HDOS device driver. My units have been operatingly flawlessly at 4MHz - both on the H8 and H89.

What versions of operating systems will the Quikstor software support?

The CP/M BIOS provides support for either Quikstor and H17, Quikstor and H37 or Quikstor and H47. It requires CP/M 2.2.03. The HDOS driver is for use only under HDOS 2.0. No plans are being made for CP/M 2.2.04, since this release adds little to v2.2.03, except support for the bi-sync H89 card.

I have an H17 and an H37. How do I transfer my files?

Obviously, the H37 format is the most practical to have 'on line' with the winchester, since it can hold more data. This is, of course, advantageous for both the loading and the unloading of the winchester. Since you can't have more than one format used with the winchester because of addressing problems, use the H37. Before you do that, however, using Heath's MAKEBIOS (see REMark issues 26 and 27 for an easier way on doing it), configure a BIOS for your H17 and H37. Then transfer all your H17 files to your H37 format. Remove the H17 card, and bring the winchester/37 back on line. Now simply PIP all files over.

What about backup?

Backup is accomplished the standard floppy(s) on your system. The Quikstor winchester unit can occupy address 170Q (78H) or 174Q (7CH). This leaves the alternate address available for a floppy system. That system can be either an H17, H37 or H47. The exception to this is when the Quikstor is used with the Magnolia CP/M and the Magnolia 77316 double density board. Then you can have the SASI with the winchester, the H17 card, and the Magnolia DD controller supporting both 5" and 8" double density drive systems. We are not at this time planning tape backup or any other kind of backup. Writtin in the Partition table and the HDOS software is the means for using two Quikstor winchester units together. This could allow, for instance, using one to back up the other. We are not supporting it at this time, and should you want to experiment, you're totally on your own. It does work, however, because we've talked to one who is using it.

Obviously, besides backup the floppies are used to load the winchester. Standard "PIP" type operations are used, and the winchester partition(s) is treated just like a floppy - only very much faster!

Is the unit hard to set up and use?

No. Documentation is clear and straight forward. We also have the unit fully INITIALIZED and FORMATTED when shipped out, with the HDOS partitions ready to boot. If not specified, the partitions are set up as follows when shipped:

CP/M partition A	5 megabytes
CP/M partition B	5 megabytes
HDOS partition 0	1.2 megabytes
HDOS partition 1	1.2 megabytes
HDOS partition 2	1.2 megabytes
HDOS partition 3	1.2 megabytes

If you want a different partition scheme, let us know so we can set it up before shipping. The user can at any time re-partition the winchester.

What about the warranty?

Quikdata has always had an excellent warranty policy and the winchester unit is no exception. Standard 90 days on parts and labor, and full service and support after the 90 days. Quick replacement of needed parts if necessary.

What is the availability?

Shipping is generally from stock. Most orders are shipped within 48 hours of receipt.

Any plans for other units?

We will be introducing a 25 meg unit probably 2nd quarter '84.

APPENDIX A
PRECAUTIONS

In order to get the most reliable operation from your QUIKSTOR winchester unit, follow these precautions.

Don't operate or store the unit in environments with temperatures below 60 degrees F or above 80 degrees F.

Don't subject unit to any shock or vibrations at any time - especially during operation. Situate the unit where vibrations will be at a minimum. If you have room on the floor under the desk or table where the computer is situated, this will be best. Cable extensions of a few extra feet can be ordered if you cable is not long enough. The unit should not be placed on a table where a printer is located, as an operating printer causes vibration.

Don't restrict air flow to the unit. This unit requires ample air circulation to keep itself from over heating.

Line filters, spike suppressors, hash filters recommended on this unit, and on all computer equipment. Use of line filtering units will prevent unwanted electrical 'noise' from entering the equipment, which could result in possible component damage.

Beware of static electricity. Computer equipment is very susceptible to static electricity. The best prevention for static electricity is having ample humidity in the room.

Every six months or so remove cover from the unit (turned off, of course) and blow out dust.

Don't ever operate this, or any other computer equipment when a lightning storm is in progress, or is eminent. In case of earthquakes, floods, fire, theft and the like, I hope you have good insurance on your equipment.

APPENDIX A
DIAGNOSTIC SOFTWARE

We hope you will never need to be executing the instructions in this appendix, but it may happen. Before we ship a drive, we run a program written by Magnolia Microsystems, Inc., INITSASZ. Dean Gibson has modified this program to work with the Quikstor hard disk system. The test runs only under CP/M, and will test both the Xebec 1410 controller (top board in the Quikstor hard disk unit) and the hard disk drive unit itself.

Sometimes the common carrier used to transport these drives is not as gentle as they should be, and the drive may arrive not working. There may also be cases where the drive fails after in use for some time. In any event, if the problem can be narrowed down, you will be in a better position to know what the problem is, and we will be in a better position to serve you. It is with this in mind that we distribute the Magnolia software with instructions on its use. Although it was actually not written for diagnostics, it does the job quite well. Any questions or problems, contact us for support, not Magnolia. They were nice enough to allow Quikdata to distribute this software with a royalty agreement. Do not distribute these files in any way or form, they are the copyright property of Magnolia Microsystems, Inc., in Seattle WA. Many thanks to Brad Gjerding of Magnolia for the rights to distribute this. Until 10/83, only we had this software - it was not being distributed with the drives.

THIS SOFTWARE WILL DESTROY ALL DATA ON THE DISK! BEFORE EXECUTING THESE FILES, PLEASE BE CERTAIN TO BACK UP YOUR DISK! NEITHER QUIKDATA, INC., NOR MAGNOLIA MICROSYSTEMS, INC., WILL TAKE ANY RESPONSIBILITY FOR LOST DATA CAUSED BY EXECUTING THIS PROGRAM!

The files on your CP/M disk used for this program were distributed by Magnolia for their hard disk system under the name **INITSASI.COM** and the associated hex file for the particular drive in use - **M320C819** in this case. Dean Gibson modified to **.COM** file to work with our systems, and gave it the name **initsasz.COM**. I renamed it so the end user could associate with it better to **TEST.COM**.

To execute the program, be sure both **RUN.COM** and **TEST.HEX** is on your bootable CP/M disk. Boot the disk and type in the following command exactly as it appears:

RUN TEST

The program will load and begin to execute. A menu will appear with four options:

- 1) Test Controller
- 2) Format and Initialize Drive
- 3) Test Drive (Drive must be formatted)
- 4) Exit to CP/M

To test your system, proceed as follows:

1) From the menu, execute option 1. The winchester drive select light should flash very briefly, and if the Xebec 1410 controller in the Quikstor Winchester unit checks out, it will respond with **No Errors**, Press RETURN to continue. Do just that. If the program either hangs up, or comes back with an error message, you will not be able to carry the test any farther. In this event, either the Xebec controller is bad (call us for support), or there is a loose cable.

Remove the cover of the Quikstor unit and be sure all plugs and cables are in place - if not, take care of it. Also, be sure the Quikstor front "ON" light is illuminated - if not, it may indicate a blown fuse or a power supply problem.

If that is all in order, please contact us for assistance. We will probably send you down a new Xebec controller board.

2) If step 1 went OK, the menu should now appear again after you pressed the RETURN key to continue. Now execute menu selection 2. This will automatically carry you through steps 2 and 3 of the menu, which check the entire drive electronics and media surface out.

During this process you would see the following:

```
TESTING CONTROLLER ... No Errors
INSPECTING DRIVE ...
  Drive has (has not) been previously initialized and may contain data.
  Continuing will DESTROY any data on the drive.
  Do you want to DESTROY the data? (Y or N) N (defaults to NO)
```

If you answered Y for YES, the process of testing the drive will begin, and you will see the following, or something similar:

```
INSPECTING DRIVE ... Any existing data Destroyed
FORMATTING DISK ... Time (expect xx-xx): nn Verifying track mmm
TESTING DRIVE ... Time (expect xx-xx)
WRITING INITIALIZATION DATA ...
CLEARING DIRECTORIES ...
```

Press RETURN to continue

The disk is first formatted. The value on your screen will slowly increment to a time of about 102. Next the tracks are verified. As this takes place, the track numbers will rapidly increment to about 1835. After this the drive test number will slowly increment to about 19. The next two steps, Writing Initialization data and Clearing Directories are quite rapid, and everything is over. Press RETURN to continue, choose option 4 to exit to CP/M, and you're all finished.

All results in this test should be written down exactly as they appeared for future reference in consultation. In fact, whenever something out of the ordinary happens, write it down and record it exactly as it happened with all pertinent details. This will greatly help in troubleshooting later, should it be necessary.

If the entire test went well, try the unit again. Be sure to check the obvious, such as hard drive plugged in, fuse good, turned on; check the computer host adaptor board (be sure it is plugged in to the buss properly and firmly and the drive cable is plugged in properly and firmly).

This completes the diagnostic software routines. If you are having problems with the drive right after receiving it, go back and re-check all your work and installation procedures: both hardware and software.

PROBLEMS?

It is our wish that you never have any problems with your Quikstor winchester unit. It is, however, made of both electronic and mechanical parts, and they do tend to fail. In the event that you experience problems with your unit, or even if you want to add suggestions to the manual or to procedures, make your notes here. For problems, record all the information you can, such as: computer type, amount memory, operating system being used, exact partition table values, noted problem, exactly record any error messages received, etc. Then if you do require assistance and you must call us for help, we will be in a better position to help knowing all the answers.

PROBLEM LOG NOTES