

field. The contents of any user input field may be either accepted or modified.

Various keys may be used to **move the cursor** between and within user input fields; these keys are listed on the lower right-hand side of the screen. Data may then be entered in any user input field. The keys that may be used to insert and delete characters within a user input field are also listed on the lower right-hand side of the screen.

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.

After entering the last character in a user input field, or when an attempt is made to move the cursor to another field, the value in the field is checked for validity (e.g., a numeric field must contain a numeric value). If the value is not valid, the cursor remains in the field along with the last valid value, an error message is displayed, and the terminal "bell" is sounded. The bell is also sounded if an attempt is made to move the cursor in a manner that is not allowed.

The **function keys** labelled at the bottom of the screen may be used to perform the indicated function. The **function key number** is included with each label; the label is approximately positioned over the corresponding key on an H/Z-19 terminal.

The **Function:** user input field occurs on all screens and has a special meaning. If a numeric value other than zero is entered in this field and the cursor is then moved to another field, the action taken is the same as if the function key with the same number as the field value had been keyed. This feature is useful for CRT terminals without function keys.

The **Sense/ECC data:** status field appears on all screens. It contains information from the XEBEC controller regarding any error conditions detected during the last command sent to the controller. If an error occurs, the sense and ECC burst error length data is decoded and an appropriate error message is displayed.

The **Exit prog** function key (#7) is provided on this screen and screen #2 (the main screen); it returns control to the operating system.

The **Port:**, **Drive:** and **Controller:** user input fields must be correct for the installed SASI interface board, XEBEC controller, and hard disk drive before using either of the following function keys. For single winchester systems both the drive and controller number will be zero (0).

The **Check cntlr** function key (#5) is provided on all screens; it verifies proper operation of the XEBEC controller by sending diagnostic commands to the controller. The disk drive is not accessed. This should be chosen when first setting up the system to be certain connections to Xebec from Host adapter and all operations are correct. It should also be chosen when the

system develops any problems to help isolate the trouble.

The **Read table** function key (#6) is provided on this screen and screen #2 (the main screen); it attempts to read initialization data and the partition table from the boot track on the hard disk, and then accesses screen #2 (the main screen).

SECOND SCREEN - MAIN SCREEN

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XEBC Hard Disk Partitioning Utility - Copyright 1983 UltiMeth Corporation
Function: _          V$$$$.$$$$/$[$:$$]
  Port: @@H   Drive: @   Controller: @       Sense/ECC data: @@ @@@@@@ @@
Error-len: __   Heads: @   Cylinders: @@@@ .....
.....................................................................

#  Name      Cat  WP  Origin  Size  Category codes: 0 = Unused  1 = Spare
0  _____ -   -   _____  _____  2 = Heath CP/M  3 = MMS CP/M  4+ = HDOS
1  _____ -   -   _____  _____  WP codes: 0 = Read/Write  1 = Read only
2  _____ -   -   _____  _____
3  _____ -   -   _____  _____
4  _____ -   -   _____  _____  --- Cursor/Editing Key Functions: ---
5  _____ -   -   _____  _____  Cursor keys: Unshifted: [Shifted:]
6  _____ -   -   _____  _____  <-      Prev char(BS) [Prev field]
7  _____ -   -   _____  _____  ->      Next char [Next field(CR)]
8  _____ -   -   _____  _____  ^       Up same field [Prev line]
9  _____ -   -   _____  _____  v       Down same field [Next line(LF)]
10 _____ -   -   _____  _____  HOME    First field [Last field]
11 _____ -   -   _____  _____  TAB     Alternate begin/end field
12 _____ -   -   _____  _____  Editing keys:
13 _____ -   -   _____  _____  ERASE (to field end)  IC Insert char
14 _____ -   -   _____  _____  DEL     Clear prev char  DC Delete char

1Write 2Format 3Gen 4Check 5Check          6Read 7Exit 8Start
 track options MMS  drive cntlr          table prog over
  
```

This screen is accessed by keying the **Read table** function key in the previous screen, screen #1 (the program entry screen), or by keying the "Exit screen" function key in screen #3 (the formatting screen).

The **Error-len**: user input field may have a value from "1" to "11"; it is used by the controller when a data error is detected during a read. If the number of data bits in error is greater than the **Error-len** field value, then the controller will report the error as a hard error; otherwise, the controller will attempt to determine the proper value for the data bits in error. It is recommended that this field be set to a low value (such as "1", "2", or "3"). If hard errors are subsequently detected, increase the value slightly. If the field is set to a value much greater than 5, the likelihood greatly increases that the controller will incorrectly determine the proper value for any data bits detected in error. This procedure allows media failures of the disk drive to be detected early, while still allowing for the recovery of data from the disk drive.

The user may partition the hard disk drive into up to 15 partitions. The information about partitions are stored in a **partition table**, along with the hard disk master boot program, on the boot track (normally track zero). The partition table contains 15 partition entries, numbered 0

to 14 - the partition number is only used during booting. Each partition table entry may be either unused (assigned a category code of zero), or used by a particular operating system: Heath CP/M (assigned a category code of 2), Magnolia Microsystems CP/M (assigned a category code of 3, but not supported at this time), or HDOS (assigned a category code of 4, 5, 6, or 7). A partition table entry may also be used to reserve disk space for future use (assigned a category code of 1).

The size and position of each partition on the hard disk are specified in **cylinders**. A cylinder consists of all of the tracks that can be read without moving, or seeking, the read/write heads in the disk unit. For example, on a hard disk drive with six heads, a cylinder contains six tracks. A track contains 32 256-byte sectors, or 8K of data - thus, on a hard disk drive with six heads, a cylinder contains 48K of data. The **Heads** and **Cylinders** status fields display the number of heads and cylinders on the hard disk drive being used. These values are fixed for each of the two systems presently being offered by Quikdata, and for this reason another winchester cannot be used.

Each partition may have: A 10-character name, assigned by the user; A category code, which specifies the operating system which will use the partition; A write-protect flag; An origin, or starting cylinder position for the partition; and a size of the partition in cylinders. The order of partition table entries is only significant within a category code. When each operating system reads the partition table, it ignores all entries that do not have the category code that it is searching for.

The **Check drive** function key (#4) is provided on all screens except screen #1 (the program entry screen). It quickly verifies that the disk drive is functioning by reading one sector on each track on the disk drive. The entire disk drive must be formatted for this function to complete without error. This should be performed when setting up a new system to check for proper drive and system operation.

The **Start over** function key (#8) is provided on this screen and screen #3 (the formatting screen). It causes screen #1 (the program entry screen), to be displayed on the console again.

The **Gen MMS** function key (#3) regenerates the Magnolia Microsystems partition table from the UltiMeth partition table and is advised not to be used since it is not supported at this time (although it may work). The Magnolia Microsystems partition table has a different format and is also recorded on the boot track. If Magnolia Microsystems CP/M is being used on the hard disk, this function should normally be activated before the boot track is written (function key #1), whenever:

1. The origin or size of any category 3 partition is changed;
2. The order or number of category 3 entries are changed; or
3. The value for the **Error-len:** field is changed.

The **Write track** function key (#1) checks the partition table for correct values (no overlapping or out-of-bounds partition boundaries). If the values are valid, the partition table and the hard disk master boot program are written onto the boot track, and the program then returns control to the operating system.

The **Format options** function key (#2) accesses screen #3 (the formatting screen). This screen will be discussed next.

SCREEN THREE - FORMAT OPTIONS

```
XEBEC Hard Disk Formatting Utility - Copyright 1983 UltiMeth Corporation
Function: _ V$$$$.$$$$/$$[$:$$]
  Port: @@H   Drive: @   Controller: @   Sense/ECC data: @@ @@@@@@ @@
  Error-len: @@   Heads: @   Cylinders: @@@@
.....
Action code: _   1 = Format cylinder zero
                 2 = Format alternate boot track: _
```

```
4Check 5Check      6Perform 7Exit 8Start
  drive cntlr      action  screen over
```

The **alternate boot track**: user input field specifies the alternate track to be used (only 1, 2, or 3 may be specified) when track zero is defective. This normally will not be used. It is a valuable safety feature built in. Normally a winchester cannot have any defects on track 0, since that is always where the boot information and/or system information is stored. If this track goes bad, that's the end of the winchester. With this scheme, if track 0 goes bad on one of our winchesters, you can specify an alternate track to be used, resulting in not having to junk an otherwise good winchester drive.

The **Perform action** function key (#6) causes the action specified in the **Action code**: user input field to be performed. Please note the following conditions for formatting the boot track:

1. Formatting cylinder zero should only be done when a new disk drive is installed, or when repeated problems are encountered in reading tracks 0, 1, 2, or 3. Formatting cylinder zero erases and resets any alternate boot track specified. The partition table must subsequently be rewritten.
2. Formatting an alternate boot track should only be done when repeated problems are encountered in reading track zero, and when reformatting cylinder zero does not solve the problem. The partition table must subsequently be rewritten.

The **Exit screen** function key (#7) accesses screen #2 (the main screen).

BOOTING OFF QUIKSTOR - BOOT SCREEN

When all the partitions have been set up and the winchester has been properly INIT'd and SYSGEN'D under HDOS, or FORMATted and PUTSYS'd in CP/M, you are ready to boot off the QUIKSTOR. When you boot off the H8 or H89 and specify the H67 boot device and port, the BOOT SCREEN will appear on your terminal.

```

XEBC Hard Disk Partition Master Boot - Copyright 1983 UltiMeth Corporation
V$$$$.$$$$/$$[$:$$]
Sense/ECC data: @@ @@@@@@ @@
# Name          Cat  WP  Origin  Size  Port: @@H  Drive: @  Controller: @
0 @@@@@@@@@@@@ @   @   @@@@   @@@@
1 @@@@@@@@@@@@ @   @   @@@@   @@@@
2 @@@@@@@@@@@@ @   @   @@@@   @@@@
3 @@@@@@@@@@@@ @   @   @@@@   @@@@
4 @@@@@@@@@@@@ @   @   @@@@   @@@@
5 @@@@@@@@@@@@ @   @   @@@@   @@@@
6 @@@@@@@@@@@@ @   @   @@@@   @@@@
7 @@@@@@@@@@@@ @   @   @@@@   @@@@
8 @@@@@@@@@@@@ @   @   @@@@   @@@@
9 @@@@@@@@@@@@ @   @   @@@@   @@@@
10 @@@@@@@@@@@@ @   @   @@@@   @@@@
11 @@@@@@@@@@@@ @   @   @@@@   @@@@
12 @@@@@@@@@@@@ @   @   @@@@   @@@@
13 @@@@@@@@@@@@ @   @   @@@@   @@@@
14 @@@@@@@@@@@@ @   @   @@@@   @@@@
Error-len: @@
Category codes:  0 = Unused
                  1 = Spare
                  2 = Heath CP/M
                  3 = MMS CP/M
                  4+ = HDOS
WP codes:  0 = Read/Write
            1 = Read only
  
```

"M" provides this menu

Enter partition to boot: Function:

```

.....
                4Check 5Check          6Perform          8Return
                  drive cntlr         boot              to ROM
  
```

This screen is accessed when the hard disk master boot program is unable boot a valid boot partition, because:

1. A boot command string was keyed whose value was either an **M**, an **m**, or an invalid partition number, or a valid partition number whose category code is not appropriate for booting; or
2. The boot partition number was defaulted to the switches on the SASI interface board, which contained either 15, or a partition number whose category code is not appropriate for booting, which is the usual reason for it to appear.

The **Perform boot** function key (#6) causes the the partition specified in the **partition to boot:** user input field to be booted if that partition contains a bootable operating system.

Lastly, the **Return to ROM** function key (#8) returns control to the computer's boot ROM.