	APPLICATION		REVISION			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED	
		A	First Preliminary	3/31/78	*cur*	
		B	SECOND PRELIMINARY	04/28/78	*cur*	
		C	FINAL	05/09/78	*cur*	

8800b HARD DISK BOOT LOADER/TURNKEY MONITOR PROM

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8800b HARD DISK BOOT LOADER/TURNKEY MONITOR PROM

PURPOSE

To modify the current Hard Disk Boot Loader prom to
recgonize and display the error conditions detected
by version 4.0 and higher Hard Disk Controller firmware.

This will be accomplished by replacing the current
Hard Disk Boot Loader prom (MITS PN: 103239) with a
two prom set that combines the functions of the Hard
Disk Boot Loader and Turnkey Monitor proms.

IMPLEMENTATION

The 8800b Hard Disk/Turnkey Loader will consists
of two fundamental blocks:

    a) Boot Loader,
    b) Turnkey Monitor.

The two blocks will rely upon each other for support
and are therefore inseparable.

The prom set will have two distinct starting points:
One will be the loader, the other the Turnkey monitor.
Each starting point will be on a 256 byte boundry, and
will therefore be able to be addressed directly with
Turnkey autostarting circuitry.

1. TURNKEY MONITOR

The Turnkey Monitor portion will prompt the user with
a dot (.) indicating it is ready for a command. All
data and addresses are specified in HEXIDECIMAL. Invalid
commands are ignored. The following commands are allowed:

  1.a) M -- MEMORY EXAMINE AND CHANGE
     By specifying a valid memory address, the user may
  examine and optionally change any memory location.

  1.b) J -- JUMP TO ADDRESS
     By specifying a valid memory address, the user may
  transfer program controll to any location in memory.

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1.c) L -- HARD DISK BOOT LOADER
     This option will automatically transfer controll to
to the Hard Disk Boot Loader for execution.

2. HARD DISK BOOT LOADER
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     The bootloader portion will load a system image from
the Hard Disk and will generate the following messages:
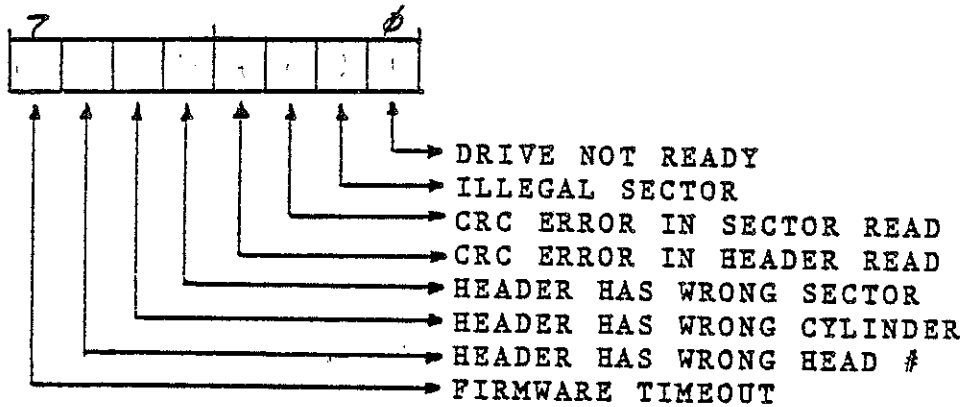
  2.a) -- LOADING
     The loader has actually started operating upon the
disk and is attempting to bring in the system image.

  2.b) -- LOAD ERROR:dd
           RESET CTL

     An error has occured during loading. The contents of
:dd, HEX digits, specifies the error byte that was
returned by the controller firmware. Program controll
will transfer to the Turnkey Monitor portion of the prom
for user intervention after the error message is printed.

    2.c.1)   The HEX error byte :dd defines the
actual error(s) that occured. The bit positions within
the error word detail the errors in the following
way:

→ DRIVE NOT READY
→ ILLEGAL SECTOR
→ CRC ERROR IN SECTOR READ
→ CRC ERROR IN HEADER READ
→ HEADER HAS WRONG SECTOR
→ HEADER HAS WRONG CYLINDER
→ HEADER HAS WRONG HEAD #
→ FIRMWARE TIMEOUT

     Each one of the error conditions has the following
probable meaning:

        DRIVE NOT READY -- Something has caused the disk
          drive to go off line since the LOADING message
          was issued. The LOADING message will not be
          issued until the drive is on line and ready.
          The DRIVE NOT READY message can also occur
          before the LOADING message if the drive
          is not ready.

        ILLEGAL SECTOR -- A sector read operation

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was issued that did not reference a sector
between 0-23. As the loader does not issue
such a command, this would more than likely
indicate severe memory or hardware problems
in the system.

CRC ERROR IN SECTOR READ -- A CRC error was
detected while reading the 256 data bytes in
a given sector.

CRC ERROR IN HEADER READ -- A CRC error was
detected while reading a sector header. This
could have occured after issuing a Read Sector
command, or a Seek Cylinder command, as
both commands cause a header to be read to
verify position.

HEADER HAS WRONG SECTOR -- A Sector
read command was issued for a specific sector
but the header read indicated that this was
not the desired sector. Position error.

SECTOR HAS WRONG CYLINDER -- A Seek Cylinder
command was issued for a specific cylinder
but the header read indicated that this was
not the desired cylinder. Position error.

HEADER HAS WRONG HEAD # -- A Seek Cylinder
command or Read sector command was
issued for a specific head number (0,1), but
the header read indicated that this was
not the desired head (wrong side of platter).

FIRMWARE TIMEOUT -- The controller firmware
did not respond to a command within a certain
length of time (aprox. 1.6 seconds).

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