H8 28C256 Monitor ROM
January 28, 2020
PROPOSED

Background

This ROM upgrade to the v3.x H8-Z80-CPU board expands the ROM space and allows for online updating of ROM contents. This new ROM will replace the PAM37 and MMS monitor ROMs with one that combines the features of both, supporting the H8 Front Panel as well as a terminal attached to the console serial port.

The console support will follow the command (particularly Boot command) syntax introduced by Heath in their H89 monitors, and as extended by Magnolia Microsystems.

The H8 front panel support will expand on the PAM37 monitor operation.

Conventions

In examples in this document, underlined characters indicate what the user types, non-underlined characters indicate what the computer prints. The string "(cr)" is used to indicate pressing the RETURN (Enter) key.

Supported Features

Operating systems (boot): HDOS 2 and 3, Heath CP/M 2, MMS CP/M 2 and 3 (others TBD).

Boot devices: H17, H47, H37, H67, MMS77316, GIDE, WizNet, VDIP1

Console commands: Boot, Go, Memory test, PC, Substitute, Terminal mode, Version

Dropped Support

baud Rate command, auto-baud detect, and any other dependency on the H19 as the console terminal.

Boot support for MMS MagNET, Corvus, XComp, and REMEX devices.

Auto-boot.

New Commands

L – List boot modules available in ROM
A – Add (flash) new boot module
U – Upgrade (flash) entire ROM

DipSwitch definitions (H8-SW1):

7	6	5	4	3	2	1	0
Baud 0 = 9600 1 = 19.2K	Default Boot Device 0 0 0 = MMS77316 5" 0 0 1 = MMS77316 8" 0 1 0 = Device at 7CH/174Q 0 1 1 = Device at 78H/170Q 1 0 0 = reserved 1 0 1 = GIDE 1 1 0 = WizNet 1 1 1 = none			Port 78H/170Q 0 0 = H37 0 1 = H47 1 0 = H67 1 1 = unused		Port 7CH/174Q 0 0 = H17 0 1 = H47 1 0 = H67 1 1 = unused	

Console/Keypad operation

Only one source of command input may be active at a time. If command entry has been started on the console, and a key is pressed on the front panel, the console command will be aborted. Likewise, if a command sequence has begun on the front panel keypad, and a command key is pressed on the console, the front panel command will be aborted.

Booting (console)

Note that backspace, or other edit keys, do not function when entering commands. However, the DELETE key (ASCII "DEL", 7FH) may be used to cancel a command.

Full syntax

H8: Boot LL-D:string

1. The key 'B' starts the boot command. The monitor echoes "Boot " and waits for more characters.
    1.   RETURN may be pressed in order to boot the default device, or more characters may be entered to define the desired boot device, unit, etc.
2. The next character must be a letter, which selects the type of device to boot. One exception is the letter 'A' which selects whatever is defined as the default device.
    1. When a letter is entered, it will be echoed twice followed by a dash.
    2. RETURN may be pressed in order to boot unit 0, or more characters may be entered.
3. Next a digit is entered to define the unit. The exact definition of this digit ("unit") varies between different devices.
    1. RETURN may be pressed in order to boot the designated unit, or more characters may be entered.
4. Next the colon character (':') followed by an alpha-numeric string may be entered.
    1. Interpretation of this string depends entirely on the boot target.
    2. Some boot targets completely ignore this string.

Alternate syntax

H8: Boot NN(cr)

Instead of a letter, etc, the entry may be digits to define the physical drive number. Note that the physical drive number specifically defines a boot target, and no additional specifiers may be entered.

Booting (front panel)

Note, booting through the front panel does not permit specification of a boot string. Some boot features will not be available.

Universal boot

1. Press the "0" key to start the Universal Boot sequence.
2. Display shows "dEU" (for "device"). Press a key "0" through "5" to select the device. The device mnemonic will be displayed in the first 3 elements. Fixed-port devices will also display the port in the middle 3 elements.
3. If display shows "Por" (for "port"), select I/O port using "0" through "3". Port will be displayed in the middle 3 elements.
4. Display shows "Uni" (for "unit"), select the unit number using "0" through "9".

Boot will commence automatically after selecting the unit.

One-key boot

The primary or secondary boot device may be selected using the "1" and "2" keys, respectively. "Primary" is the device defined as the default boot device in the dipswitches SW1. "Secondary" is the device on the "other" port (174Q/170Q). TODO: define secondary independent of ports 174Q/170Q.

Boot Device Designations

Letter	Phy Drv	Device Descr.	Num Units	H8-FP key	Cmd String
A		(default device selection dictates parameters)			
B	0-2	H17	3	0	n/u
C	46-49	H37	4	3	n/u
D	5-8	H47	4	1	n/u
E	3-4	H67	2	2	n/u
F		Reserved			
G		MMS77314 REMEX(deprecated)			
H		MMS77314 Corvus (deprecated)			
I	29-32	MMS77316 8"	4		n/u
J	33-36	MMS77316 5.25"	4		n/u
K		MMS77317 XCOMP (deprecated)			
L		Reserved			
M	40	MMS77318 ramdisk	1		n/u
N		MMS77422 MagNET (deprecated)			
O		MMS77320 Ctrl 0	4		partition
P		MMS77320 Ctrl 1	4		partition
Q		Reserved (was MMS77320 Ctrl 2)			
R		Reserved (was MMS77320 Ctrl 3)			
S		Reserved (was MMS77320 Ctrl 4)			
T		Reserved (was MMS77320 Ctrl 5)			
U		Reserved (was MMS77320 Ctrl 6)			
V	41	VDIP1 (was MMS77320 Ctrl 7)	1	6	file/prog
W	60	WizNet	1	5	file/prog
X	70	GIDE	9 (partition)	4	segment/LUN
Y		Reserved			
Z		Reserved			

ROM Layout

The ROM contents is organized as follows:

0000-0FFF Core monitor
1000-17FF reserved
1800-1FFF H17 Floppy ROM
2000-end Boot Modules ...

The core monitor contains the code to enter and execute commands and perform basic system initialization and management. It also contains the code to search the boot modules. There are also some well-defined entry points into the core monitor, which may be used by boot modules or even standalone programs.

The boot modules area is a variable-length region that may extend to the physical end of the ROM. Each boot module has a header area that allows the core monitor to search through them and to match one to a given boot target. The modules contains basic information, such as strings to represent the device mnemonic and the number of units supported. It also contains the code necessary to boot from the device.