RomWBW Architecture

N8VEM Project

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Contents

Background

The Z80 CPU architecture has a limited, 64K address range. In general, this address space must accommodate a running application, disk operating system, and hardware support code.

All N8VEM Z80 CPU platforms provide a physical address space that is much larger than the CPU address space (typically 512K or 1MB). This additional memory can be made available to the CPU using a technique called bank switching. To achieve this, the physical memory is divided up into chunks (banks), typically 32K each. A designated area of the CPU's 64K address space is then reserved to "map" any of the physical memory chunks. You can think of this as a window that can be adjusted to view portions of the physical memory in 32K blocks. In the case of N8VEM platforms, the lower 32K of the CPU address space is used for this purpose (the window). The upper 32K of CPU address space is assigned a fixed 32K area of physical memory that never changes. The lower 32K can be "mapped" on the fly to any of the 32K banks of physical memory at a time. The only constraint is that the CPU cannot be executing code in the lower 32K of CPU address space at the time that a bank switch is performed.

By cleverly utilizing the pages of physical RAM for specific purposes and swapping in the correct page when needed, it is possible to utilize substantially more than 64K of RAM. Because the N8VEM project has now produced a very large variety of hardware, it has become extremely important to implement a bank switched solution to accommodate the maximum range of hardware devices and desired functionality.

General Design Strategy

The design goal is to locate as much of the hardware dependent code as possible out of normal 64KB CP/M address space and into a bank switched area of memory. A very small code shim (proxy) is located in the top 256 bytes of CPU memory. This proxy is responsible for redirecting all hardware BIOS (HBIOS) calls by swapping the "driver code" bank of physical RAM into the lower 32K and completing the request. The operating system is unaware this has occurred. As control is returned to the operating system, the lower 32KB of memory is switched back to normal (bank 0).

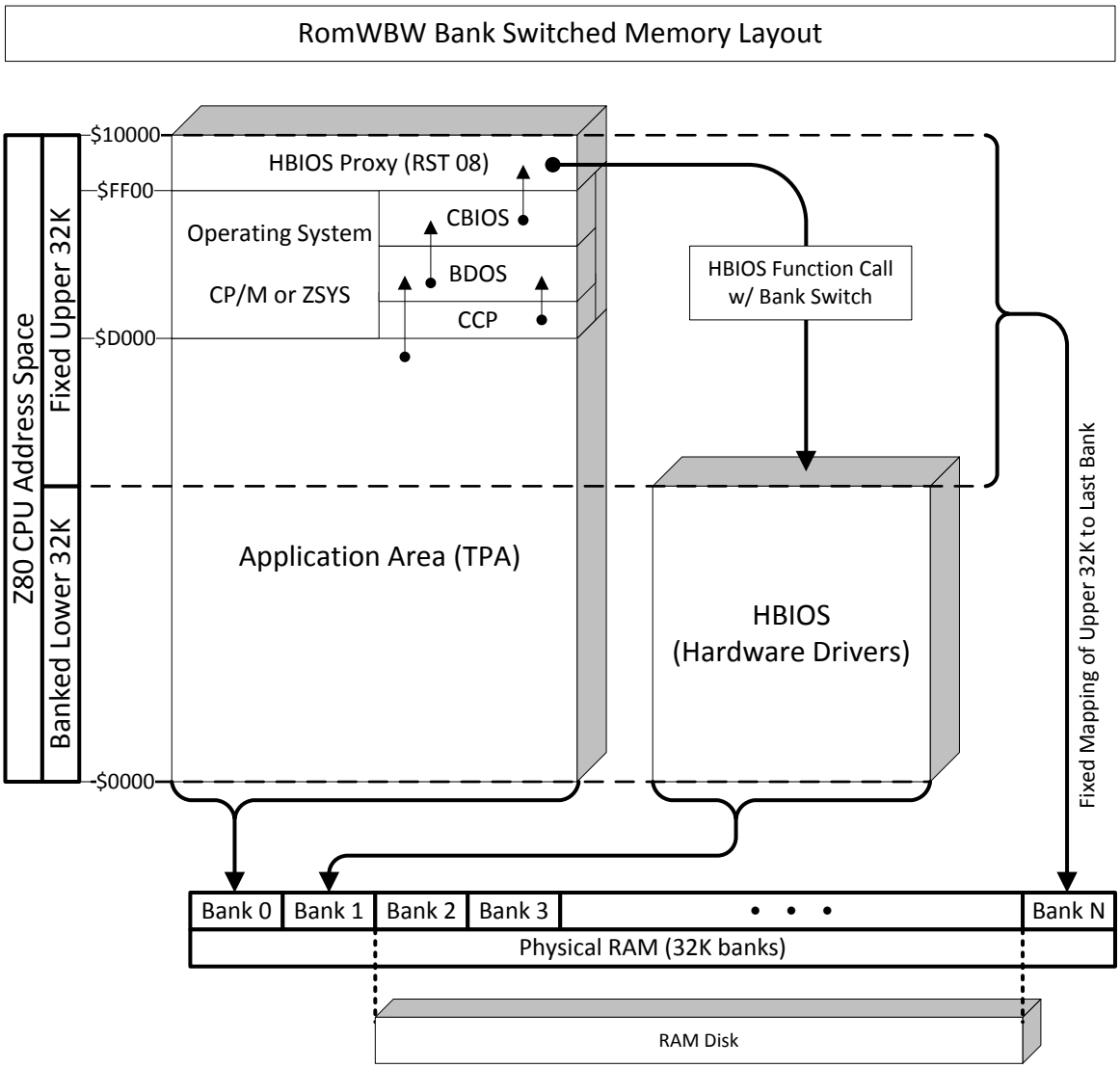
HBIOS is completely agnostic with respect to the operating system (it does not know or care what operating system is using it). The operating system makes simple calls to HBIOS to access any desired hardware functions. Since the HBIOS proxy occupies only 256 bytes at the top of memory, the vast majority of the CPU memory is available to the operating system and the running application. As far as the operating system is concerned, all of the hardware driver code has been magically implemented inside of a tiny 256 byte area at the top of the CPU address space.

Unlike some other Z80 bank switching schemes, there is no attempt to build bank switching into the operating system itself. This is intentional so as to ensure that any operating system can easily be adapted without requiring invasive modifications to the operating system itself. This also keeps the complexity of memory management completely away from the operating system and applications.

There are some operating systems that have built-in support for bank switching (e.g., CP/M 3). These operating systems are allowed to make use of the bank switched memory and are compatible with HBIOS. However, it is necessary that the customization of these operating systems take into account the banks of memory used by HBIOS and not attempt to use those specific banks.

Note that all code and data are located in RAM memory during normal execution. While it is possible to use ROM memory to run code, it would require that more upper memory be reserved for data storage. It is simpler and more memory efficient to keep everything in RAM. At startup (boot) all required code is copied to RAM for subsequent execution.

Runtime Memory Layout



System Boot Process

A two phase boot strategy is employed. This is necessary because at cold start, the CPU is executing code from ROM in lower memory which is the same area that is bank switched.

Phase 1 of booting copies phase 2 code to upper memory and jumps to it to continue the boot process.

Phase 2 of booting manages the setup of the RAM page banks as needed. In the case of a hardware startup, phase 2 just copies the code from ROM page 1 into RAM page 1 and executes the loader. In the case of an application startup (.com file used to load a new copy of the system), phase 2 copies the first 32KB of the application memory space into RAM page 1 and executes the loader.

See 'bootrom.asm' for the implementation of the ROM (hardware) startup. See 'bootapp.asm' for the implementation of the application based startup.

Notes

1. Size of ROM disk and RAM disk will be decreased as needed to accommodate RAM and ROM memory bank usage for the banked BIOS.

2. There is no support for interrupt driven drivers at this time. Such support should be possible in a variety of ways, but none are yet implemented.

3. There are still some places in the CBIOS where it is manipulating memory banks directly. This is inappropriate and will eventually be corrected.

Driver Model

The framework code for bank switching also allows hardware drivers to be implemented mostly without concern for memory management. Drivers are coded to simply implement the HBIOS functions appropriate for the type of hardware being supported. When the driver code gets control, it has already been mapped to the CPU address space and simply performs the requested function based on parameters passed in registers. Upon return, the bank switching framework takes care of restoring the original memory layout expected by the operating system and application.

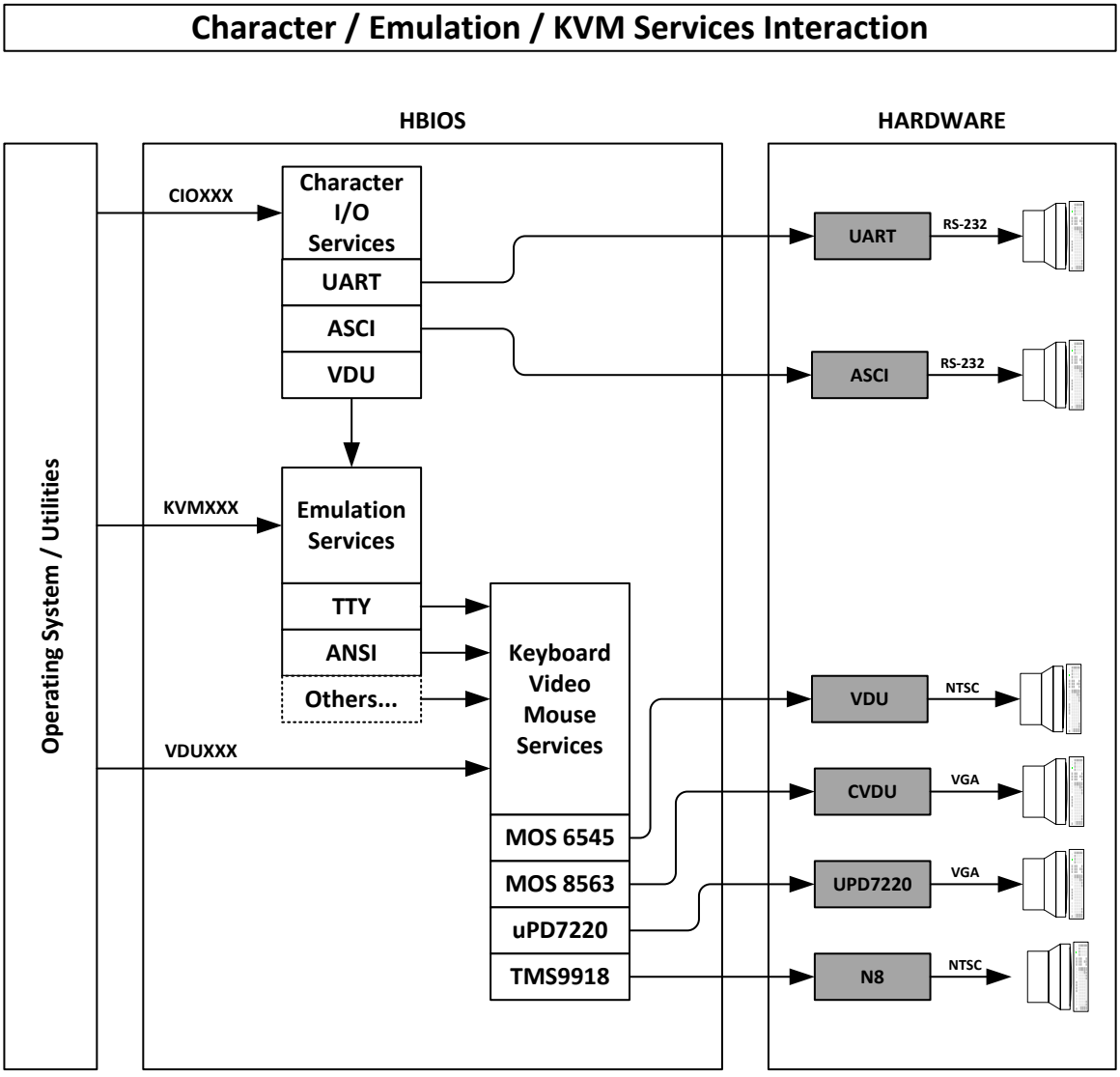
However, the one constraint of hardware drivers is that any data buffers that are to be returned to the operating system or applications must be allocated in high memory. Buffers inside of the driver's memory bank will be swapped out of the CPU address space when control is returned to the operating system.

If the driver code must make calls to other code, drivers, or utilities in the driver bank, it must make those calls directly (it must not use RST 08). This is to avoid a nested bank switch which is not supported at this time.

Character / Emulation / KVM Services

In addition to a generic set of routines to handle typical character input/output, HBIOS also includes functionality for managing built-in video display adapters. To start with there is a basic set of character input/output functions, the CIOXXX functions, which allow for simple character data streams. These functions fully encompass routing byte stream data to/from serial ports. Note that there is a special character device called "KVM" which stands for Keyboard/Video/Mouse. When characters are read/written to/from the KVM character device, the data is actually passed to a built-in terminal emulator which, in turn, utilizes a set of KVM functions (such as cursor positioning, scrolling, etc.).

The following diagram depicts the relationship between these components of HBIOS video processing:



Normally, the operating system will simply utilize the CIOXXX to send and receive character data. The Character I/O Services will route I/O requests to the specified physical device which is most frequently a serial port (such as UART or ASCI). As shown above, if the KVM device is targeted by a CIOXXX function,

it will actually be routed to the Emulation Services which implement TTY, ANSI, etc. escape sequences. The Emulation Services rely on the Video Services as an additional layer of abstraction. This allows the emulation code to be completely unaware of the actual physical device (device independent). Video Services contains drivers as needed to handle the available physical video units.

Note that the Emulation and Video Services API functions are available to be called directly. Doing so must be done carefully so as to not corrupt the "state" of the emulation logic.

Before invoking CIOXXX functions targeting the KVM device, it is necessary that the underlying layers (Emulation and KVM) be properly initialized. The Emulation Services must be initialized to specify the desired emulation and specific physical KVM device to target. Likewise, the KVM Services may need to be initialized to put the specific video hardware into the proper mode, etc.

HBIOS Reference

Invocation

HBIOS functions are invoked by placing the required parameters in CPU registers and executing an RST 08 instruction. Note that HBIOS does not preserve register values that are unused. However, it does not modify the Z80 alternate registers or IX/IY.

Normally, applications will not call HBIOS functions directly. It is intended that the operating system makes all HBIOS function calls. Applications that are considered system utilities may use HBIOS, but must be careful not to modify the operating environment in any way that the operating system does not expect.

In general, the desired function is placed in the B register. Additional registers are used as defined by the specific function. Register A should be used to return function result information. A=0 should indicate success, other values are function specific.

Some functions utilize pointers to memory buffers. Such memory buffers are required to be located in the upper 32K for CPU RAM address space. This requirement significantly simplifies the HBIOS proxy and improves performance by avoiding "double copies" of buffers.

Function Overview

Character Input/Output (CIO)	Character Input – CIOIN Character Output – CIOIN Character Input Status – CIOIST Character Output Status – CIOOST Character I/O Configuration – CIOCFG
Disk Input/Output (DIO)	Disk Read – DIORD Disk Write – DIOWR Disk Status – DIOST Disk Media – DIOMED Disk Identify – DIOID Disk Get Buffer Address – DIOGETBUF Disk Set Buffer Address – DIOSETBUF
Real Time Clock (RTC)	RTC Get Time – RTCGETTIM RTC Set Time – RTCSETTIM RTC Get NVRAM Byte – RTCGETBYT RTC Set NVRAM Byte – RTCSETBYT RTC Get NVRAM Block – RTCGETBLK RTC Set NVRAM Block – RTCSETBLK
Emulation (EMU)	Emulation Initialization – EMUINI Emulation Query – EMUQRY Emulation Input – EMUIN Emulation Output – EMUIN Emulation Input Status – EMUIST Emulation Output Status – EMUOST
Keyboard/Video/Mouse (KVM)	KVM Initialize –KVMINI KVM Query –KVMQRY KVM Set Cursor Style –KVMSCS KVM Set Cursor Position –KVMSCP KVM Set Character Attribute –KVMSAT KVM Set Character Color –KVMSCO KVM Write Character –KVMWRC KVM Fill –KVMFIL KVM Scroll –KVMSCR KVM Keyboard Status –KVMKST KVM Keyboard Flush –KVMKFL KVM Keyboard Read –KVMKRD
System (SYS)	System Get Configuration – SYSGETCFG System Set Configuration – SYSSETCFG System Banked Memory Copy – SYSBNKCPY System Get Version – SYSGETVER

Character Input/Output (CIO)

Character input/output functions require that a character device/unit be specified in the C register. The upper nibble (upper 4 bits) specify the device (such as UART). The lower nibble specifies the unit of the device (0=first port, 1=second port, etc.)

The KVM device is a virtual device code that will route characters in/out via the currently active KVM device (see EMUINI function).

The currently supported devices/units are:

Device		**Unit**
0	UART	Unit = Port
1	ASCI	Unit = Port
2	PropIO VGA	N/A
3	ParPortProp VGA	N/A
F	KVM	N/A

Character Input – CIOIN ($00)

Input B=$00 (function) C=Device/Unit	Output A=Status (0=OK, 1=Error) E=Character input
Wait for a single character to be available at the specified device and return the character in E. Function will wait indefinitely for a character to be available.	

Character Output – CIOOUT ($01)

Input B=$01 (function) C=Device/Unit E=Character to output	Output A=Status (0=OK, 1=Error)
Wait for device/unit to be ready to send a character, then send the character specified in E.	

Character Input Status – CIOIST ($02)

Input B=$02 (function) C=Device/Unit	Output A=Status: # characters in input buffer
Return the number of characters available to read in the input buffer of the device/unit specified. If the device has no input buffer, it is acceptable to return simply 0 or 1 where 0 means there is no character available to read and 1 means there is a character available to read.	

Character Output Status – CIOOST ($03)

Input	Output
B=$03 (function) C=Device/Unit	A=Status: output buffer space available

Return the space available in the output buffer expressed as a character count. If a 16 byte output buffer contained 6 characters waiting to be sent, this function would return 10, the number of positions available in the output buffer. If the port has no output buffer, it is acceptable to return simply 0 or 1 where 0 means the port is busy and 1 means the port is ready to output a character.

Character Config – CIOCFG ($04)

Input	Output
B=$04 (function) C=Speed E=Framing/Parity	A=Status: 0=Success, otherwise failure

Not yet implemented.

Sets the speed and framing of the character stream. Register C specifies the speed. Register E specifies the framing and parity characteristics.

Disk Input/Output (DIO)

Disk input/output functions require that a disk device/unit be specified in the C register. The upper nibble (upper 4 bits) specify the device (such as IDE). The lower nibble specifies the unit of the device (0=master, 1=slave, etc.)

The currently supported devices/units are:

Device		Unit
0	Memory Disk	Unit 0 = ROM, Unit 1 = RAM
1	Floppy Disk	Unit 0 = Primary, Unit 1 = Secondary
2	IDE Disk	Unit 0 = Master, Unit 1 = Slave
3	ATAPI Disk (not implemented)	Unit 0 = Master, Unit 1 = Slave
4	IDE Disk	Unit 0 = Master, Unit 1 = Slave
5	SD Card	N/A
6	PropIO SD Card	N/A
7	ParPortProp SD Card	N/A
8	SIMH HDSK Disk	Unit 0-7 = SIMH emulated hard disk 0-7

The currently defined media types are:

Media ID	Value	Format
MID_NONE	0	No media installed
MID_MDROM	1	ROM Drive
MID_MDRAM	2	RAM Drive
MID_HD	3	Hard Disk (LBA)
MID_FD720	4	3.5” 720K Floppy
MID_FD144	5	3.5” 1.44M Floppy
MID_FD360	6	5.25” 360K Floppy
MID_FD120	7	5.25” 1.2M Floppy
MID_FD111	8	8” 1.11M Floppy

Disk Read – DIORD ($10)

Input	Output
B=$10 (function) C=Device/Unit HL=Track D=Head E=Sector	A=Status (0=OK, 1=Error)

Read a single 512 byte sector into the buffer previously specified buffer area (seeDIOSBA).

For a hard disk device, only LBA addressing is supported. In this case, HL will contain the high 16 bits of the LBA block number and DE will contain the low 16 bits of the LBA block number.

Disk Write – DIOWR ($11)

Input	Output
B=$11 (function) C=Device/Unit HL=Track D=Head E=Sector	A=Status (0=OK, 1=Error)
Write a single 512 byte sector from the buffer previously specified buffer area (seeDIOSBA). For a hard disk device, only LBA addressing is supported. In this case, HL will contain the high 16 bits of the LBA block number and DE will contain the low 16 bits of the LBA block number.	

Disk Status – DIOST ($12)

Input	Output
B=$12 (function) C=Device/Unit	A=Status (0=OK, 1=Error)
Return the current status of the specified device.	

Disk Media – DIOMED ($13)

Input	Output
B=$13 (function) C=Device/Unit	A=Media ID
Return a media identifier that describes the media format of the current media in the device. If the device supports multiple media types, the media will be examined to determine the specific media format currently installed.	

Disk Identify – DIOID ($14)

Not implemented

Disk Get Buffer Address – DIOGETBUF ($18)

Input	Output
B=$18 (function) HL=Buffer Address	A=Status (0-OK, 1=Error)
Get the current buffer address used for disk read/write calls.	

Disk Set Buffer Address – DIOSETBUF ($19)

Input	Output
B=$19 (function) HL=Buffer Address	A=Status (0-OK, 1=Error)
Set the buffer address to be used for subsequent disk read/write calls. Contents of any prior buffer location are not retained. The new buffer area is not initialized. The buffer must be located in high memory (top 32K).	

Real Time Clock (RTC)

The Real Time Clock functions provide read/write access to the clock and related Non-Volatile RAM.

The time functions (RTCGTM and RTCSTM) require a 7 byte date/time buffer of the following format. Each byte is BCD encoded.

Offset	Contents
0	Year (00-99)
1	Month (01-12)
2	Date (01-31)
3	Hours (00-24)
4	Minutes (00-59)
5	Seconds (00-59)
6	Day of Week (00-06)

The KVM functions are provided as a common interface to CRT/Keyboard devices. Not all video devices will include keyboard hardware. In this case, the keyboard functions should return a failure status.

RTC Get Time – RTCGETTIM($20)

Input	Output
B=$20 (function) HL=Time Buffer Address	A=Status: 0=Success, otherwise failure
Read the current value of the clock and store the date/time in the buffer pointed to by HL.	

RTC Set Time – RTCSETTIM($21)

Input	Output
B=$21 (function)	A=Status: 0=Success, otherwise failure
Set the current value of the clock based on the date/time in the buffer pointed to by HL.	

RTC Get NVRAM Byte – RTCGETBYT($22)

Input	Output
B=$22 (function) C=Index	A=Status: 0=Success, otherwise failure E=Value
Read a single byte value from the Non-Volatile RAM at the index specified by C. The value is returned in register E.	

RTC Set NVRAM Byte – RTCSETBYT($23)

Input	Output
B=$23 (function) C=Index	A=Status: 0=Success, otherwise failure E=Value
Write a single byte value into the Non-Volatile RAM at the index specified by C. The value to be written is specified in E.	

RTC Get NVRAM Block – RTCGETBLK($24)

Input	Output
B=$24 (function) HL=Buffer	A=Status: 0=Success, otherwise failure
Read the entire contents of the Non-Volatile RAM into the buffer pointed to by HL. HL must point to a location in the top 32K of CPU address space.	

RTC Set NVRAM Block – RTCSETBLK($25)

Input	Output
B=$25 (function) HL=Buffer	A=Status: 0=Success, otherwise failure
Write the entire contents of the Non-Volatile RAM from the buffer pointed to by HL. HL must point to a location in the to p32K of CPU address space.	

Emulation (EMU)

The Emulation functions allow setting up the desired emulation (terminal type) as well as the target physical device for emulation. It is not possible to maintain multiple independent emulation states for different physical devices – emulation must be reinitialized to target a new physical device.

Emulation Initialization –EMUINI ($30)

Input	Output
B=$30 (function) C=KVM Device/Unit E=Terminal Type	A=Status: 0=Success, otherwise failure
Selects the actual KVM device/unit to be targeted for emulation.. Register C is set to the KVM device/unit to be selected. Register E specifies the terminal emulation to be used (0=TTY, 1=ANSI).	

Emulation Query –EMUQRY ($31)

Input	Output
B=$31 (function)	A=Status: 0=Success, otherwise failure C=KVM Device/Unit E=Terminal Emulation
Returns current information about the active emulation session. Register C is set to the KVM device/unit currently targeted. Register E returns the terminal emulation in use (0=TTY, 1=ANSI).	

Emulation Input – EMUIN ($32)

Input	Output
B=$32 (function)	A=Status (0=OK, 1=Error) E=Character input
Wait for a single character to be available at the emulation target device and return the character in E. Function will wait indefinitely for a character to be available.	

Emulation Output – EMUOUT ($33)

Input	Output
B=$33 (function) E=Character to output	A=Status (0=OK, 1=Error)
Wait for emulation target device/unit to be ready to send a character, then send the character specified in E.	

Emulation Input Status – EMUIST ($34)

Input	Output
B=$34 (function)	A=Status: # characters in input buffer
Return the number of characters available to read in the input buffer of the emulation target device/unit specified. If the device has no input buffer, it is acceptable to return simply 0 or 1 where 0 means there is no character available to read and 1 means there is a character available to read.	

Emulation Output Status – EMUOST ($35)

Input	Output
B=$35 (function)	A=Status: output buffer space available
Return the space available in the output buffer expressed as a character count. If a 16 byte output buffer contained 6 characters waiting to be sent, this function would return 10, the number of positions available in the output buffer. If the emulation target device has no output buffer, it is acceptable to return simply 0 or 1 where 0 means the port is busy and 1 means the port is ready to output a character.	

Keyboard/Video/Mouse (KVM)

The KVM functions are provided as a common interface to Keyboard/Video/Mouse devices. Not all KVM devices will include keyboard hardware. In this case, the keyboard functions should return a failure status.

The KVM functions require that a KVM device/unit be specified in the C register. The upper nibble (upper 4 bits) specifies the device. The lower nibble specifies the unit (not currently used).

The currently defined video devices are:

KVM ID	Value	Device
KVM_NONE	0	No video device
KVM_VDU	1	ECB VDU board
KVM_CVDU	2	ECB Color VDU board
KVM_7220	3	ECB uPD7220 video display board
KVM_N8	4	TMS9918 video display built-in to N8

Keyboard/Video/Mouse Initialize –KVMINI ($40)

Input	Output
B=$40 (function) C=Device/Unit E=Video Mode (device specific) HL=Character Bitmap (optional)	A=Status: 0=Success, otherwise failure

Performs a full (re)initialization of the specified video device. The screen is cleared and the keyboard buffer is flushed. If the specified KVM supports multiple video modes, the requested mode can be specified in E (set to 0 for default/not specified). Mode values are specific to each KVM.

HL may point to a location in memory with the character bitmap to be loaded into the KVM video processor. The location MUST be in the top 32K of the CPU memory space. HL must be set to zero if no character bitmap is specified (the KVM video processor will utilize a default character bitmap).

Keyboard/Video/Mouse Query –KVMQRY ($41)

Input	Output
B=$41 (function) C=Device/Unit HL=Character Bitmap Data (optional)	A=Status: 0=Success, otherwise failure C=Video Mode D=Row Count E=Column Count HL=Character Bitmap Data (zero if none)

Return information about the specified video device. C will be set to the current video mode. DE will return the dimensions of the video display as measured in rows and columns. Note that this is the **count** of rows and columns, not the **last** row/column number.

If HL is not zero, it must point to a suitably sized memory buffer in the upper 32K of CPU address space that will be filled with the current character bitmap data. It is critical that HL be set to zero if it does not point to a proper buffer area or memory corruption will result. The video device driver may not have the ability to provide character bitmap data. In this case, on return, HL will be set to zero.

Keyboard/Video/Mouse Set Cursor Style –KVMSCS ($42)

Input	Output
B=$42 (function) C=Device/Unit D=Start/End pixel E=Style	A=Status: 0=Success, otherwise failure

If supported by the video hardware, adjust the format of the cursor such that the cursor starts at the pixel specified in the top nibble of D and end at the pixel specified in the bottom nibble of D. So, if D=$08, a block cursor would be used that starts at the top pixel of the character cell and ends at the ninth pixel of the character cell.

Register E is reserved to control the style of the cursor (blink, visibility, etc.), but is not yet implemented.

Adjustments to the cursor style may or may not be possible for any given video hardware.

Keyboard/Video/Mouse Set Cursor Position –KVMSCP ($43)

Input	Output
B=$43 (function) C=Device/Unit D=Row E=Column	A=Status: 0=Success, otherwise failure

Reposition the cursor to the specified row and column. Specifying a row/column that exceeds the boundaries of the display results in undefined behavior. Cursor coordinates are 0 based (0,0 is the upper left corner of the display).

Keyboard/Video/Mouse Set Character Attribute –KVMSAT ($44)

Input	Output
B=$44 (function) C=Device/Unit E=Character Attribute Code	A=Status: 0=Success, otherwise failure
Assign the specified character attribute code to be used for all subsequent character writes/fills. This attribute is used to fill new lines generated by scroll operations. Refer to table XXX for a list of the available color codes. Note that a given video display may or may not support any/all attributes.	

Keyboard/Video/Mouse Set Character Color –KVMSCO ($45)

Input	Output
B=$45 (function) C=Device/Unit E=Color Code	A=Status: 0=Success, otherwise failure
Assign the specified color code to be used for all subsequent character writes/fills. This color is also used to fill new lines generated by scroll operations. Refer to table XXX for a list of the available color codes. Note that a given video display may or may not support any/all colors.	

Keyboard/Video/Mouse Write Character –KVMWRC ($46)

Input	Output
B=$46 (function) C=Device/Unit E=Character	A=Status: 0=Success, otherwise failure
Write the character specified in E. The character is written starting at the current cursor position and the cursor is advanced. If the end of the line is encountered, the cursor will be advanced to the start of the next line. The display will **not** scroll if the end of the screen is exceeded.	

Keyboard/Video/Mouse Fill –KVMFIL ($47)

Input	Output
B=$47 (function) C=Device/Unit E=Character HL=Count	A=Status: 0=Success, otherwise failure
Write the character specified in E to the display the number of times specified in HL. Characters are written starting at the current cursor position and the cursor is advanced by the number of characters written. If the end of the line is encountered, the characters will continue to be written starting at the next line as needed. The display will **not** scroll if the end of the screen is exceeded.	

Keyboard/Video/Mouse Scroll –KVMSCR ($48)

Input	Output
B=$48 (function) C=Device/Unit E=Scroll distance (# lines)	A=Status: 0=Success, otherwise failure
Scroll the video display by the number of lines specified in E. If E contains a negative number, then reverse scroll should be performed.	

Keyboard/Video/Mouse Keyboard Status –KVMKST ($49)

Input	Output
B=$49 (function) C=Device/Unit	A=Status: # key codes in keyboard buffer
Return a count of the number of key codes in the keyboard buffer. If it is not possible to determine the actual number in the buffer, it is acceptable to return 1 to indicate there are key codes available to read and 0 if there are none available.	

Keyboard/Video/Mouse Keyboard Flush –KVMKFL ($4A)

Input	Output
B=$4A (function) C=Device/Unit	A=Status: 0=Success, otherwise failure
If a keyboard buffer is in use, it should be purged and all contents discarded.	

Keyboard/Video/Mouse Keyboard Read –KVMKRD ($4B)

Input	Output
B=$4B (function) C=Device/Unit	A=Status: 0=Success, otherwise failure E=Key code read
Read next key code from keyboard. If a keyboard buffer is used, return the next key code in the buffer. If no key codes are available, wait for a keypress and return the key code. Note that this function returns the **key code** that was read, not an ASCII character. See table ??? for the key codes and their meanings. Key codes must be appropriately mapped for case, control, etc. before being used.	

System (SYS)

Get Configuration – SYSGETCFG ($F0)

Input	Output
B=$F0 (function) C=Config Version (not implemented) DE=Destination address	A=Status: 0=Success, otherwise failure
Copies the 256 byte block of configuration data into the destination memory address specified in DE. The destination memory address must be in high memory (upper 32K). At present, you will need to consult the source code for information on the contents of the configuration block.	

Set Configuration – SYSSETCFG ($F1)

Input	Output
B=$F1 (function) C=Config Version (not implemented) DE=Source address	A=Status: 0=Success, otherwise failure
Loads a 256 byte block of configuration data into the BIOS from the source memory address specified in DE. The source memory address must be in high memory (upper 32K). At present, you will need to consult the source code for information on the contents of the configuration block. NOTE: At present, the effects of this function are undefined. The BIOS will not dynamically adapt to a changed configuration.	

Banked Memory Copy – SYSBNKCPY ($F2)

Input	Output
B=$F2 (function) DE=Destination address HL=Source address IX=Count of byte to copy	A=Status: 0=Success, otherwise failure

The function will select the requested memory bank into the lower 32K of CPU address space. Then it executes a memory copy from the source address (DE) to the destination address (HL) of count bytes (IX). It then restores the default bank (application memory) to the lower 32K.

The function does not know or care if you are copying to or from or within a bank. It simply selects the bank and performs the copy. To copy "from" a bank, you would specify a source in the lower 32K and a destination in the upper 32K. To copy "to" a bank, you would specify a source in the upper 32K and a destination in the lower 32K.

It is also possible to copy memory around within a bank by specifying a source and destination in the lower 32K.

WARNING: The memory copy is performed from low byte to high byte, so be careful of a memory copy where the source range overlaps the destination range.

WARNING: directly manipulating memory banks can easily corrupt critical areas of the system.

Get Version – SYSGETVER ($F3)

Input	Output
B=$F3 (function)	A=Status: 0=Success, otherwise failure DE=Version

This function will return the HBIOS version number. The version number is returned in DE. High nibble of D is the major version, low nibble of D is the minor version, high nibble of E is the patch number, and low nibble of E is the build number.

Memory Layout Detail

ROM Page 0

Loc	Org	Size	Source	Contents
0000	0000	0100	pgzero.asm	Page Zero
0100	0100	0100	bootrom.asm	ROM Bootstrap
0200	0100	0200	syscfg.asm	System Configuration
0400	8400	0C00	loader.asm	Loader
1000	1000	3000	romfill.asm	Filler
4000	C000	1000	dbgmon.asm	Debug Monitor
5000	D000	0800	<ccp>	Command Processor (CCP, ZCPR, etc.)
5800	D800	0E00	<dos>	Disk Operating System (BDOS, ZSDOS, etc.)
6600	E600	1900	<osbios>	OS BIOS (CBIOS, ZBIOS)
7F00	FF00	0100	hbfill	Filler for HBIOS Proxy

ROM Page 1

Loc	Org	Size	Source	Contents
0000	0000	0100	pgzero.asm	Page Zero
0100	0100	0100	bootrom.asm	Reserved (unused)
0200	0200	0200	syscfg.asm	System Configuration
0400	0400	0C00	loader.asm	Reserved (unused)
1000	1000	7000	bnk1.asm	Bank 1 HBIOS Extension (drivers)

COM File Image

Loc	Org	Size	Source	Contents
0100	0100	0100	bootapp.asm	Application Bootstrap
0200	0200	0200	syscfg.asm	System Configuration
0400	8400	0C00	loader.asm	Loader
1000	1000	7000	bnk1.asm	Bank 1 HBIOS Extension (drivers)
8000	C000	1000	dbgmon.asm	Debug Monitor
9000	D000	0800	<ccp>	Command Processor (CCP, ZCPR, etc.)
9800	D800	0E00	<dos>	Disk Operating System (BDOS, ZSDOS, etc.)
A600	E600	1900	<osbios>	OS BIOS (CBIOS, ZBIOS)

RAM Page 0 (Applications)

Loc	Org	Size	Contents
0000	0000	0100	Page Zero
0100	0100	7F00	Application (TPA)

RAM Page 1 (HBIOS Extension – Drivers)

Loc	Org	Size	Contents
0000	0000	0100	Page Zero
0100	0100	0100	Reserved (unused)
0200	0200	0200	System Configuration (dynamic)
0400	0400	0C00	Command processor cache area
1000	1000	7000	HBank 1 BIOS Extension (drivers)

RAM Page N (Fixed 32K Upper Memory Area)

Loc	Org	Size	Contents
8000	8000	4000	TPA (continued from lower memory)
C000	C000	1000	TPA/Debug Monitor
D000	D000	0800	Command Processor (CCP, ZCPR, etc.)
D800	D800	0E00	Disk Operating System (BDOS, ZSDOS, etc.)
E600	E600	1900	OS BIOS (CBIOS, ZBIOS)
FF00	FF00	0100	HBIOS Proxy (HiMem Stub)