

19 AMSDOS BIOS Facilities

AMSDOS uses the CP/M BIOS to access the disc. In order that a program running under AMSDOS may access the disc directly nine of the BIOS extended jumpblock routines are available.

The routines are accessed as external commands. To find the address of the required routines use KL FIND COMMAND. The command names are single control characters (Ctrl A ... Ctrl I) as these cannot be typed in from BASIC. An example of how to use these commands can be found in section 10.7.

N.B. The BIOS extended jumpblock itself is not available, indeed it does not exist in an AMSDOS environment.

The BIOS routines available and their command names are as follows:

SET MESSAGE	Ctrl A	(#01)
SET UP DISC	Ctrl B	(#02)
SELECT FORMAT	Ctrl C	(#03)
READ SECTOR	Ctrl D	(#04)
WRITE SECTOR	Ctrl E	(#05)
FORMAT TRACK	Ctrl F	(#06)
MOVE TRACK	Ctrl G	(#07)
GET DR STATUS	Ctrl H	(#08)
SET RETRY COUNT	Ctrl I	(#09)

The word at #BE40 contains the address of the disc parameter header vector. Disc parameter headers and extended disc parameter blocks may be patched as required. For more details on this see section 9.9.

When one of these routines fails (carry false) it returns an error number in the A register. This is referred to in the following pages as the 'error status byte'. If bit 7 of this byte is set then the error has already been reported to the user. Bit 6 is used to distinguish errors generated by the floppy disc controller from those generated by AMSDOS.

If bit 6 is zero then the error numbers are as follows:

#0E	the file is not open as expected.
#0F	hard end of file.
#10	bad command, usually caused by an incorrect filename.
#11	file already exists.
#12	file doesn't exist.
#13	directory is full.
#14	disc is full.
#15	disc has been changed with files open on it.
#16	file is read-only
#1A	soft end of file (explained in Appendix XIII).

Also V1.1 machines have error #00.

#00	user has hit escape
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If bit 6 is one then the error was detected by the floppy disc controller and the other bits are returned as follows:

bit 5	data error	- CRC error on data or ID field
bit 4	overrun error	
bit 3	drive not ready	- there is no disc in the drive
bit 2	no data	- can't find the sector
bit 1	not writable	- disc is write protected
bit 0	address mark missing	

In addition the routine may also return the address of the 'error status buffer'. The first byte of this is a count of the number of bytes received during the results phase of the μ PD765A disc controller, the following bytes are those received. For information on the meaning of these bytes see the manufacturer's documentation.

On the following pages are the interfaces to the intercepted routines:

BIOS: SET MESSAGE

(CTRL/A)

Enable or disable the disc error messages.

Action:

When disc error messages are enabled and an error occurs the BIOS will display error messages on the screen and interact with the user. When disabled no messages are displayed.

Entry conditions:

If messages are to be enabled:

A= #00

If messages are to be disabled:

A= #FF

Exit conditions:

A contains previous state.

HL and flags corrupt.

All other registers preserved.

Notes:

The default state is ENABLED.

Related entries:

SET RETRY COUNT

BIOS: SETUP DISC

(CTRL/B)

Set disc parameters.

Action:

Sets the values for the motor on, motor off, write current off and head settle times.
Sends a SPECIFY command to the floppy disc controller.

Entry conditions:

HL contains address of parameter block

Format of the parameter block:

bytes 0, 1	motor on timeout in 20 millisecond units.
bytes 2, 3	motor off timeout in 20 millisecond units.
byte 4	write current off time in 10 microsecond units.
byte 5	head settle time in 1 millisecond units.
byte 6	step rate time in 1 millisecond units.
byte 7	head unload delay (as per μ PD765A SPECIFY command).
byte 8	bits 7.. 1: head load delay, bit 0: non-DMA mode (as per μ PD765A SPECIFY command).

Exit conditions:

AF, BC, DE and HL corrupt.
All other registers preserved.

Notes:

The values given are used for both drives. When using two differing drives use the slower of the two times.

The default values are:

motor on timeout	50
motor off timeout	250
write current off time	175
head settle time	15
step rate time	12
head load time	1
head unload time	1
non-DMA mode	1

A motor on time of zero will lock the system up. A motor off time of zero will never turn the motor off.

The standard boot program calls this routine to reset some of the disc parameters as specified in the configuration sector, that is, motor on and off timeouts and the step rate.

Related entries

SELECT FORMAT
SET RETRY COUNT

BIOS: SELECT FORMAT

(CTRL/C)

Select a disc format.

Action:

This routine initializes the extended disc parameter block for the given format. Normally the BIOS automatically detects the format of a disc when SELDSK is called by looking at the sector numbers, but for programs such as formatters it is necessary to pre-set the format.

Entry conditions:

A contains first sector number of required format

#41 ⇒ system format

#C1 ⇒ data only format

#01 ⇒ IBM format

E contains drive number:

#00 ⇒ A:

#01 ⇒ B:

Exit conditions:

AF, BC, DE and HL corrupt.

All other registers preserved.

Notes:

Bytes 0..21 of the extended disc parameter block are completely reset, all previous values are lost. Bytes 22..24 (track, align flag, auto-select flag) are not affected. See chapter 2.15.

To set a non-standard format the user may patch the extended disc parameter block directly.

BIOS: READ SECTOR

(CTRL/D)

Read a sector from disc.

Action:

Read the specified sector into store.

Entry conditions:

HL contains address of sector buffer

E contains drive number

#00 ⇒ A:

#01 ⇒ B:

D contains track number

C contains sector number

Exit conditions:

If sector read OK:

Carry true.

A contains 0

HL preserved

If failed to read sector correctly:

Carry false.

A contains error status byte (as defined above).

HL contains address of error status buffer.

Always:

Other flags corrupt.

All other registers preserved.

Notes:

The sector buffer may lie anywhere in RAM, even under a ROM.

Related entries:

WRITE SECTOR

BIOS: WRITE SECTOR

(CTRL/E)

Write a sector to disc.

Action:

Write the required sector from store.

Entry conditions:

HL contains address of sector buffer

E contains drive number

#00 ⇒ A:

#01 ⇒ B:

D contains track number

C contains sector number

Exit conditions:

If sector written OK:

Carry true.

A contains 0.

HL preserved.

If failed to write sector correctly:

Carry false.

A contains error status byte as defined above.

HL contains address of error status buffer.

Always:

Other flags corrupt.

All other registers preserved.

Notes:

The sector buffer may be anywhere in RAM, even underneath a ROM.

Related entries:

READ SECTOR

BIOS: FORMAT TRACK

(CTRL/F)

Format an entire track.

Action:

Format a track.

Entry conditions:

HL contains address of header information buffer

E contains drive number

#00 ⇒ A:

#01 ⇒ B:

D contains track number

Format of header information:

sector entry for first sector

sector entry for second sector

...

sector entry for last sector

sector entry format:

byte 0: track number

byte 1: head number

byte 2: sector number

byte 3: $\log_2(\text{sector size})-7$

Exit conditions:

If track formatted OK:

Carry true.

A contains 0.

HL preserved.

If failed to format track correctly:

Carry false.

A contains error status byte as defined above.

HL contains address of error status buffer.

Always:

Other flags corrupt.

All other registers preserved.

Notes:

The extended DPB must be preset for the required format (see *SELECT FORMAT*)

Related entries:

SELECT FORMAT

BIOS: MOVE TRACK

(CTRL/G)

Move to specified track.

Action:

Move head to specified track without verifying the move.

Entry conditions:

E contains drive number

#00 ⇒ A:

#01 ⇒ B:

D contains track number

Exit conditions:

If moved to track OK:

Carry true.

A contains 0.

HL preserved.

If failed to move to the track:

Carry false.

A contains error status byte as defined above.

HL contains address of error status buffer.

Always:

Other flags corrupt.

All other registers preserved.

Notes:

This routine is intended as a diagnostic aid and need not normally be used because the read/write/format routines all seek to the correct track automatically.

Related entries:

None.

BIOS: GET DR STATUS

(CTRL/H)

Return status for specified drive.

Action:

This routine return status register 3 of the floppy disc controller as defined below for the specified drive:

bit 7	undefined	
bit 6	write protect	- The write protect line is true
bit 5	drive ready	- The ready line is true
bit 4	track zero	- The track zero line is true
bit 3	undefined	
bit 2	head address	- always zero
bit 1	unit select 1	- unit select 1, always zero
bit 0	unit select 0	- currently selected drive

Entry conditions:

A contains drive number

#00 ⇒ A:

#01 ⇒ B:

Exit conditions:

If carry true:

A contains drive status byte as defined above.

HL preserved.

If carry false:

HL contains address of error status buffer, second byte = Drive status byte as described above.

A corrupt.

Always:

Other flags corrupt.

All other registers preserved.

Notes:

This routine returns carry to indicate which set of exit conditions have occurred. No other meaning should be attached to the state of the carry.

Related entries:

SELECT FORMAT
READ SECTOR
WRITE SECTOR
FORMAT TRACK
MOVE TRACK

BIOS: SET RETRY COUNT

(CTRL/I)

Set the number of retries for reading/writing/formatting.

Action:

Sets the number of times an operation is retried in the event of an error.

Entry conditions:

A contains the new value for retry count.

Exit conditions:

A contains old value of retry count.

HL and flags corrupt.

All other registers preserved.

Notes:

The pattern of retries is as follows. Each 'Try' counts one. The retry pattern is repeated until either the operation succeeds or the number of tries has reached the retry count:

```
Try
Try
Move in one track and back again
Try
Move out one track and back again
Try
Move to inner track and back again
Try
Try
Move in one track and back again
Try
Move out one track and back again
Try
Move to outer track and back again
Repeat
```

The default value is 16, i.e. twice around the above loop.

Related entries:

READ SECTOR

WRITE SECTOR

FORMAT TRACK

