To:       T10 Technical Committee
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Subject: 04-219r2 SAT SPC-3 ATA Information VPD page

## Revision history

Revision 0 (8 July 2004) First revision
Revision 1 (29 July 2004) Incorporated comments from July 2004 SAT WG.
Revision 2 (23 August 2004) Incorporated comments from 12 August 2004 SAT teleconference.

## Related documents

T10/04-196r0 - SCSI to ATA Translation (SAT) revision 0.0 (Bob Sheffield, Intel)
T10/04-218r0 - SAT INQUIRY contents (Rob Elliott, HP)
T13/ata7v1r4b - ATA/ATAPI-7 volume 1 revision 4b
T10/spc3r19 - SCSI Primary Commands - 3 revision 19

## Overview

SCSI to ATA translators should return a VPD page containing the contents of the power-on signature and the results of an IDENTIFY DEVICE or IDENTIFY PACKET DEVICE command returned by the ATA device.

Presence of this VPD page is one indication that the logical unit represents an ATA device being mapped into SCSI. Software can use this page to obtain the full serial number, firmware revision, and model number strings for presentation to a user, since they don't have directly corresponding fields in the SCSI standard INQUIRY data.

The IDENTIFY DEVICE or IDENTIFY PACKET DEVICE data could also be retrieved via an ATA passthrough command, but that requires more effort on the part of software and does not provide a way to retrieve the power-on signature.

To further describe the SAT translator, VENDOR IDENTIFICATION, PRODUCT IDENTIFICATION, and PRODUCT REVISION LEVEL fields identifying the SAT translator are included. This information is available for ATA devices and ATAPI devices.

Adding a VPD page requires the SAT translator to modify accesses to the Supported VPD Pages VPD page 00h as well.

## Suggested changes to SPC-3

Request a VPD page code be assigned for the ATA Information VPD page (89h).

## Suggested changes to SAT [all text is new]

### 8.1.3.5 ATA Information VPD page

The ATA Information VPD page contains:

    a)   information about the SAT translator;
    b)   signature of the ATA or ATAPI device; and
    c)   IDENTIFY DEVICE or IDENTIFY PACKET DEVICE data from the ATA or ATAPI device.

Table 1 defines the ATA Information VPD page.

**Table 1 — ATA Information VPD page**

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | PERIPHERAL QUALIFIER | | | PERIPHERAL DEVICE TYPE | | | | |
| 1 | PAGE CODE (89h) | | | | | | | |
| 2 | (MSB) | | | | | | | |
| 3 | PAGE LENGTH (568) | | | | | | | (LSB) |
| 4 | Reserved | | | | | | | |
| 7 | | | | | | | | |
| 8 | SAT VENDOR IDENTIFICATION | | | | | | | |
| 15 | | | | | | | | |
| 16 | SAT PRODUCT IDENTIFICATION | | | | | | | |
| 31 | | | | | | | | |
| 32 | SAT PRODUCT REVISION LEVEL | | | | | | | |
| 35 | | | | | | | | |
| 36 | SIGNATURE | | | | | | | |
| 55 | | | | | | | | |
| 56 | COMMAND CODE | | | | | | | |
| 57 | Reserved | | | | | | | |
| 59 | | | | | | | | |
| 60 | IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA | | | | | | | |
| 571 | | | | | | | | |

The SAT VENDOR IDENTIFICATION field contains eight bytes of ASCII data identifying the vendor of the SAT translator. The data shall be left aligned within the field. The vendor identification string shall be one assigned by INCITS for use in the Standard INQUIRY data VENDOR IDENTIFICATION field. A list of assigned vendor identification strings is in SPC-3 and on the T10 web site (http://www.t10.org).

The SAT PRODUCT IDENTIFICATION field contains sixteen bytes of ASCII data as defined by the vendor of the SAT translator. The data shall be left-aligned within the field.

The SAT PRODUCT REVISION LEVEL field contains four bytes of ASCII data as defined by the vendor of the SAT translator. The data shall be left-aligned within the field.

The SIGNATURE field contains the contents of the task file registers after the last power-on reset, hardware reset, software reset, or EXECUTE DEVICE DIAGNOSTIC command. It follows the format of the initial SATA Device-to-Host Register FIS (see ATA/ATAPI-7 V3). Table 2 defines the SIGNATURE field.

**Table 2 — SIGNATURE field**

| Byte\Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------|---|---|---|---|---|---|---|---|
| 0 | FIS TYPE (34h) | | | | | | | |
| 1 | Reserved | INTERRUPT | Reserved | | PM PORT | | | |
| 2 | STATUS | | | | | | | |
| 3 | ERROR | | | | | | | |
| 4 | LBA LOW | | | | | | | |
| 5 | LBA MID | | | | | | | |
| 6 | LBA HIGH | | | | | | | |
| 7 | DEVICE | | | | | | | |
| 8 | LBA LOW EXP | | | | | | | |
| 9 | LBA MID EXP | | | | | | | |
| 10 | LBA HIGH EXP | | | | | | | |
| 11 | Reserved | | | | | | | |
| 12 | SECTOR COUNT | | | | | | | |
| 13 | SECTOR COUNT EXP | | | | | | | |
| 14 | Reserved | | | | | | | |
| 19 | | | | | | | | |

All fields within the SIGNATURE field are defined in ATA/ATAPI-7 V1 and ATA/ATAPI-7 V3.

Table 3 lists common signature values for fields within the SIGNATURE field.

**Table 3 — Common signature values (informative)**

| Field | ATA device | ATAPI device | Port multiplier | SEMB (present) | SEMB (not present) |
|-------|-----------|--------------|-----------------|----------------|---------------------|
| SECTOR COUNT | 01h | 01h | 01h | 01h | FFh |
| LBA LOW | 01h | 01h | 01h | 01h | FFh |
| LBA MID/BYTE COUNT LOW | 00h | 14h | 69h | 3Ch | FFh |
| LBA HIGH/BYTE COUNT HIGH | 00h | EBh | 96h | C3h | FFh |
| DEVICE | 00h | 00h | 00h | 00h | FFh |

The COMMAND CODE field contains the command code used to retrieve the data in the IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA field (e.g., ECh for IDENTIFY DEVICE (i.e., the ATA device type) or A1h for IDENTIFY PACKET DEVICE (i.e., the ATAPI device type) or 00h for other device types).

The IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA field contains:

a)   if the device is an ATA device, the IDENTIFY DEVICE data (see ATA/ATAPI-7 V1);
b)   if the device is an ATAPI device, the IDENTIFY PACKET DEVICE data (see ATA/ATAPI-7 V1);
c)   if the device is a Port multiplier device, 512 bytes each set to 00h;
d)   if the device is a present SEMB device, 512 bytes each set to 00h;
e)   if the device is a missing SEMB device, 512 bytes each set to 00h; or

    f)    if the device type is unknown or the IDENTIFY DEVICE or IDENTIFY PACKET DEVICE command
          fails, 512 bytes each set to 00h.

The data shall be presented with byte preservation (i.e., ATA byte n maps to SCSI byte n), as shown in table 4.

**Table 4 — IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA field**

| Byte | Contents |
|------|----------|
| 0 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 0 bits 7:0 (i.e., byte 0) |
| 1 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 0 bits 15:8 (i.e., byte 1) |
| 2 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 1 bits 7:0 (i.e., byte 2) |
| 3 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 1 bits 15:8 (i.e., byte 3) |
| ... | ... |
| 510 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 255 bits 7:0 (i.e., the SIGNATURE field) |
| 511 | IDENTIFY DEVICE or IDENTIFY PACKET DEVICE word 255 bits 15:8 (i.e., the CHECKSUM field) |

NOTE 1 Although the SERIAL NUMBER field (words 10 to 19), FIRMWARE REVISION field (words 23 to 26), and MODEL NUMBER field (words 27-46) contain ASCII characters, every other byte is swapped within them (see ATA/ATAPI-7 V1). For example, the SERIAL NUMBER field is interpreted as: {word 10 bits 15:8, word 10 bits 7:0, word 11 bits 15:8, word 11 bits 7:0, ...}, which corresponds to these bytes in the IDENTIFY DEVICE DATA field: {byte 21, byte 20, byte 23, byte 22, ...}.

Since some of the fields within the IDENTIFY DEVICE and IDENTIFY PACKET DEVICE data are variable (i.e., not fixed), the IDENTIFY DEVICE or IDENTIFY PACKET DEVICE command shall be sent to retrieve updated data whenever the ATA Information VPD page is requested.