

To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 04-219r0 SAT SPC-3 ATA Information VPD page

Revision history

Revision 0 (8 July 2004) First revision

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

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.

For non-ATAPI devices, the translator returns information about itself, not the device being translated, in standard INQUIRY data VENDOR IDENTIFICATION, PRODUCT IDENTIFICATION, and PRODUCT REVISION LEVEL fields (proposed by 04-218).

For ATAPI devices, standard INQUIRY data is passed directly from the ATAPI device itself and should not be modified by the SAT layer. The SAT translator can intercept the INQUIRY command and add this VPD page, allowing the IDENTIFY PACKET DEVICE information to also be retrieved. The VENDOR IDENTIFICATION, PRODUCT IDENTIFICATION, and PRODUCT REVISION LEVEL fields identifying the SAT translator are included since they are not available in the standard INQUIRY data. This means they are present twice for non-ATAPI devices. Adding a VPD page requires modifying accesses to the Supported VPD Pages VPD page 00h.

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	Reserved							
3	PAGE LENGTH (552)							
4	Reserved							
7								
8								
15	SAT VENDOR IDENTIFICATION							
16								
31	SAT PRODUCT IDENTIFICATION							
32								
35	SAT PRODUCT REVISION LEVEL							
36								
40	SIGNATURE							
41								
43	Reserved							
44								
555	IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA							

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, and shall start with the string "SAT: ".

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 certain task file registers after the last power-on reset, hardware reset, software reset, or EXECUTE DEVICE DIAGNOSTIC command. Table 2 defines the signature field.

Table 2 — SIGNATURE field

Byte\Bit	7	6	5	4	3	2	1	0
0	SECTOR COUNT							
1	LBA LOW							
2	LBA MID/BYTE COUNT LOW							
3	LBA HIGH/BYTE COUNT HIGH							
4	DEVICE							

Editor's Note 1: should the Error register be included too? Should the complete SATA Register device-to-host FIS contents be included in case other registers ever pick up some meaning?

Table 3 lists common SIGNATURE field values.

Table 3 — Common signature values (informative)

Field	Non-ATAPI device	ATAPI device
SECTOR COUNT	01h	01h
LBA LOW	01h	01h
LBA MID/BYTE COUNT LOW	00h	14h
LBA HIGH/BYTE COUNT HIGH	00h	EBh
DEVICE	00h	00h

The IDENTIFY DEVICE OR IDENTIFY PACKET DEVICE DATA field contains:

- if the ATA device is not an ATAPI device, the IDENTIFY DEVICE data (see ATA/ATAPI-7 V1);
- if the ATA device is an ATAPI device, the IDENTIFY PACKET DEVICE data (see ATA/ATAPI-7 V1); or
- if the ATA 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 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.

Editor's Note 2: this could be too disruptive when native command queuing is being used, since the queue has to be flushed before IDENTIFY DEVICE can be issued. Perhaps two VPD pages should be defined, one that retrieves the current contents (and force such flushing), another that just returns the last retrieved data (e.g. from the IDENTIFY DEVICE sent during discovery)?

Editor's Note 3: Is it safe to assume the IDENTIFY DEVICE data size is fixed at 512 bytes, or should a length field be added?
