To: T10 Technical Committee
From: Rob Elliott (elliott@hp.com) and Wayne Bellamy, HP (wayne.bellamy@hp.com)
Date: 30 October 2004
Subject: 04-218r5 SAT SPC-3 INQUIRY contents

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.
Revision 3 (25 August 2004) Removed port selector support. This includes removing the SAT protocol identifier, because a SAT would never return an identifier with ASSOCIATION=1 (target port) if it has no use for the relative target port identifier.
Revision 4 (10 September 2004) Incorporated comments from 26 August 2004 SAT WG meeting.
Revision 5 (29 October 2004) Incorporated comments from the September SAT WG meeting.

Related documents

T10/04-219r3 - SAT SPC-3 ATA Information VPD page (Rob Elliott, HP), incorporated into sat-r01
T13/ata7v1r4b - ATA/ATAPI-7 volume 1 revision 4b
T13/ata8-acs-r1a - ATA/ATAPI-8 Command Set (ATA8-ACS) revision 1a
T10/sat-r01 - SCSI to ATA Translation (SAT) revision 1
T10/spc3r21 - SCSI Primary Commands - 3 revision 21

Overview

It is difficult for the SCSI INQUIRY command to return VENDOR IDENTIFICATION (8 bytes), PRODUCT IDENTIFICATION (16 bytes), and PRODUCT REVISION LEVEL (4 bytes) field values based on ATA IDENTIFY DEVICE data. The fields in ATA IDENTIFY DEVICE that are possibly related are SERIAL NUMBER (20 bytes), FIRMWARE REVISION (8 bytes), and MODEL NUMBER (40 bytes). These 68 bytes do not fit into the 30 bytes of ASCII strings available in standard INQUIRY data:

a) There is no SERIAL NUMBER field in standard INQUIRY data (although it can be mapped into the Unit Serial Number VPD page as proposed in this proposal).
b) The ATA FIRMWARE REVISION field (8 bytes) is twice as big as the SCSI PRODUCT REVISION LEVEL field (4 bytes).
c) Although there is no VENDOR IDENTIFICATION field in ATA, the ATA model number often starts with a vendor name. There's no guarantee that it complies with a T10 vendor ID (8 bytes), though, which sometimes has to be abbreviated due to the 8 byte length.

If the ATA device returns a valid WWN, it should be translated into the Device Identification VPD page 83h.

ATAPI devices reply to SCSI INQUIRY commands themselves (delivered in ATA PACKET commands), so the SATL need not be involved in generating standard INQUIRY data for them.

Suggested changes to SAT

8 SCSI Primary Commands (SPC) Mapping

8.1 INQUIRY command (12h)

The SCSI INQUIRY command requests general information about a target or component LUN. INQUIRY and certain vital product data pages have translations.

8.1.1 Command Summary

For ATAPI devices, the INQUIRY command may be intercepted by the SATL to add the ATA Information VPD page (see x.x). Standard INQUIRY data and VPD pages other than the Supported VPD Pages VPD page and ATA Information VPD page shall be passed through unaltered.

For ATA devices, the SATA translator replies to the INQUIRY command itself. Table 1 summarizes how the INQUIRY command is translated.

Table 1 — INQUIRY cCommand summary

Support Method	Emulated
ATA Opcodes	ECh, ATA Identify Device Command ECh, ATA IDENTIFY DEVICE command A1h, ATA IDENTIFY PACKET DEVICE command
Supported Vital Product Data pages	00h, Supported VPD pages 80h, Unit Sserial Nnumber VPD page 83h, Device Identification VPD page 89h, ATA Information VPD page

8.1.2 SCSI INQUIRY CDB format and supported fields

A) CMDDT

This bit is now obsolete and is not supported. If set to one, return a CHECK CONDITION with SENSE KEY set to ILLEGAL REQUEST and ADDITIONAL SENSE CODE set to INVALID FIELD IN CDB.

B) EVPD

This bit must be set to request vital product data pages and the Page Code should indicate the page requested. Only two pages are supported currently: Supported VPD pages (00h) and Unit serial number (80h).

For ATA devices, the SATL shall support:

    a)   the EVPD bit, PAGE CODE field, ALLOCATION LENGTH field, and CONTROL byte; and
    b)   the ATA Information VPD page (see 8.1.3.xx from 04-219).

For ATAPI devices, the SATL shall pass through the INQUIRY CDB unaltered. The SATL may support the ATA Information VPD page (see 8.1.3.xx from 04-219). If it does so:

    a)   if the application client requests the Supported VPD Pages VPD page (see 8.1.3.2), the SATL shall alter the data to add the ATA Information VPD page code to the parameter data; and
    b)   If the application client requests the ATA Information VPD page, the SATL shall provide it.

8.1.3 Data Returned

Standard inquiryINQUIRY data or vital product VPD pages shall be returned depending on the request.

8.1.3.1 Standard INQUIRY data for translated ATA devices

...

D) VERSION

This field is set to 03h to indicate that is supports SCSI 3 SPC specification.

The VERSION field indicates the version of SPC to which the SATL complies (see SPC-3) (e.g., 05h for SPC-3).

W) VENDOR IDENTIFICATION

This 8 bytes field is created using the first 8 bytes of the 40-byte Model Number field from the device identify data retrieved from the device. Endianness is swapped to match the SCSI format.

The VENDOR IDENTIFICATION field contains the string "ATA" left-justified and filled with spaces as described in table 2.

Table 2 — VENDOR IDENTIFICATION field

Byte	Contents	
	Hexadecimal representation	ASCII representation
0	41h	'A'
1	54h	'T'
2	41h	'A'
3	20h	' '
...	...	...
7	20h	' '

.

X) PRODUCT IDENTIFICATION

~~This 16 bytes field is created using the bytes 8 though 23 of the 40 byte Model Number field from the identify data. Endianness is swapped to match the SCSI format.~~

The PRODUCT IDENTIFICATION field contains a representation of the first 16 bytes of the ATA device IDENTIFY DEVICE data MODEL NUMBER field, where each pair of bytes are swapped to create a valid ASCII string format as described in table 3.

Table 3 — PRODUCT IDENTIFICATION field

Byte	Contents
0	IDENTIFY DEVICE word 27 bits 15:8 (i.e., byte 1)
1	IDENTIFY DEVICE word 27 bits 7:0 (i.e., byte 0)
2	IDENTIFY DEVICE word 28 bits 15:8 (i.e., byte 3)
3	IDENTIFY DEVICE word 28 bits 7:0 (i.e., byte 2)
...	...
14	IDENTIFY DEVICE word 34 bits 15:8 (i.e., byte 15)
15	IDENTIFY DEVICE word 34 bits 7:0 (i.e., byte 14)

Y) PRODUCT REVISION LEVEL

~~This field is created using the 8 byte firmware revision field of the device Identify data. The lower 4 bytes are used and the upper 4 bytes are lost since SCSI supports only 4 bytes for revision number. Endianness is swapped to match the SCSI format.~~

The PRODUCT REVISION LEVEL field contains 20202020h (i.e., four ASCII spaces).

z) IUS/QAS/CLOCKING~~/Vendor descriptors/ and vendor specific parameters of standard inquiry INQUIRY data~~ fields are not supported.

aa) Version descriptors

Version descriptors shall be included for:

    a)   the SCSI architecture model standard (e.g., SAM-3);
    b)   this standard;
    c)   the SCSI primary commands standard (e.g., SPC-3);

d) the SCSI block commands standard (e.g., SBC-2);
e) if the SATL receives SCSI commands through a SCSI target port, the version of the transport protocol to which the SCSI target port was designed;
f) if the SATL sends ATA commands through a SAS STP initiator port, the version of SAS (e.g., SAS-1.1) to which the SAS initiator port was designed; and
g) the version of ATA/ATAPI (e.g., ATA/ATAPI-7) to which the ATA device claims compliance in the IDENTIFY DEVICE data MAJOR VERSION NUMBER field (i.e., word 80) and MINOR VERSION NUMBER field (i.e., word 81).

NOTE 1 The encodings used by T10 for INQUIRY version descriptors (see SPC-3) and T13 for IDENTIFY DEVICE major and minor version numbers (see ATA/ATAPI-7 V1) differ, and the two standards organizations may not define values for the same revisions.

...

8.1.3.2 Vital Product data - Supported VPD ~~pP~~ages VPD page

A) PERIPHERAL DEVICE TYPE

This bit field is set to 0 to indicate that a direct access device is connected.

B) PERIPHERAL QUALIFIER

This bit field is set to 0 to indicate that the specified peripheral device is currently attached to this logical unit.

C) PAGE CODE

This field is set to 0 to indicate 'supported VPD' pages page.

D) PAGE LENGTH

This field indicates the length of the supported VPD page list returned in number of bytes.

E) SUPPORTED VPD LIST

This list contains the page codes of the pages supported and is implemented in ascending order of page codes beginning with page code 00h.

For ATAPI devices, the SATL shall modify the Supported VPD Pages VPD page data returned by the ATAPI device to include any pages it adds (e.g., the ATA Information VPD page).

8.1.3.3 ~~Vital Product data -~~ Unit ~~Ss~~erial ~~Nn~~umber VPD page

~~A) PERIPHERAL DEVICE TYPE~~

~~This bit field is set to 0 to indicate that a direct access device is connected.~~

~~B) PERIPHERAL QUALIFIER~~

~~This bit field is set to 0 to indicate that the specified peripheral device is currently attached to this logical unit.~~

~~C) PAGE CODE~~

~~This field is set to 80h to indicate 'supported VPD' pages page.~~

~~D) PAGE LENGTH~~

~~This field indicates the length of the product serial number. Currently a 20-byte product serial number is being returned; hence the length is set to 20 bytes.~~

~~E) PRODUCT SERIAL NUMBER~~

~~The 20 byte field, serial number, found in the device identify data retrieved from the device shall be returned in this field. The serial number field shall be byte swapped to match the SCSI data format.~~

[All text that follows is new:]

4

Table 4 defines the Unit Serial Number VPD page (see SPC-3) returned by a SATL for an ATA device.

Table 4 — Unit Serial Number VPD page for SAT

Byte\Bit	7	6	5	4	3	2	1	0
0	PERIPHERAL QUALIFIER			PERIPHERAL DEVICE TYPE				
1	PAGE CODE (80h)							
2	Reserved							
3	PAGE LENGTH (n - 3)							
4	PRODUCT SERIAL NUMBER							
n								

The PAGE LENGTH field contains the number of bytes in the PRODUCT SERIAL NUMBER field, and shall be less than or equal to 20.

The PRODUCT SERIAL NUMBER field contains a representation of the SERIAL NUMBER field in the ATA IDENTIFY DEVICE data (i.e., words 10-19) last retrieved from the ATA device. Each pair of bytes in the SERIAL NUMBER field shall be swapped to create a valid ASCII string format in the PRODUCT SERIAL NUMBER field as described in table 5.

Table 5 — PRODUCT SERIAL NUMBER field

Byte	Contents
0	IDENTIFY DEVICE word 10 bits 15:8 (i.e., byte 1)
1	IDENTIFY DEVICE word 10 bits 7:0 (i.e., byte 0)
2	IDENTIFY DEVICE word 11 bits 15:8 (i.e., byte 3)
3	IDENTIFY DEVICE word 11 bits 7:0 (i.e., byte 2)
...	...

The PRODUCT SERIAL NUMBER field shall not end with one or more ASCII spaces (i.e., 20h). The PAGE LENGTH field shall be adjusted to account for any trailing spaces that are not used to form the PRODUCT SERIAL NUMBER field (e.g., if the SERIAL NUMBER field contains "1032547698BADCFEHGJI", the PAGE LENGTH field contains 20 and the PRODUCT SERIAL NUMBER field contains "0123456789ABCDEFGHIJ". If the SERIAL NUMBER field contains "<space><space>32547698BADCFE<space>G<space><space>", where "<space>" represents an ASCII space (i.e., 20h), the PAGE LENGTH field contains 17 and the PRODUCT SERIAL NUMBER field contains "<space><space>23456789ABCDEFG").

8.1.3.4 Device Identification VPD page

8.1.3.4.1 Device Identification VPD page overview

The SATL shall return the Device Identification VPD page (see SPC-3) as defined in table 6.

Table 6 — Device Identification VPD page for SAT

Byte\Bit	7	6	5	4	3	2	1	0
0	PERIPHERAL QUALIFIER			PERIPHERAL DEVICE TYPE				
1	PAGE CODE (83h)							
2	Reserved							
3	PAGE LENGTH (n - 3)							
4	Identification descriptor for logical unit							
	Identification descriptors for target port (if any)							
n								

The PERIPHERAL QUALIFIER field shall be set to 000b (i.e., currently connected).

The PERIPHERAL DEVICE TYPE field shall be set to 00h (i.e., direct-access block device).

The PAGE CODE field contains 83h.

The PAGE LENGTH field contains the length of the remaining bytes of the VPD page.

The identification descriptors are described in the rest of this subclause.

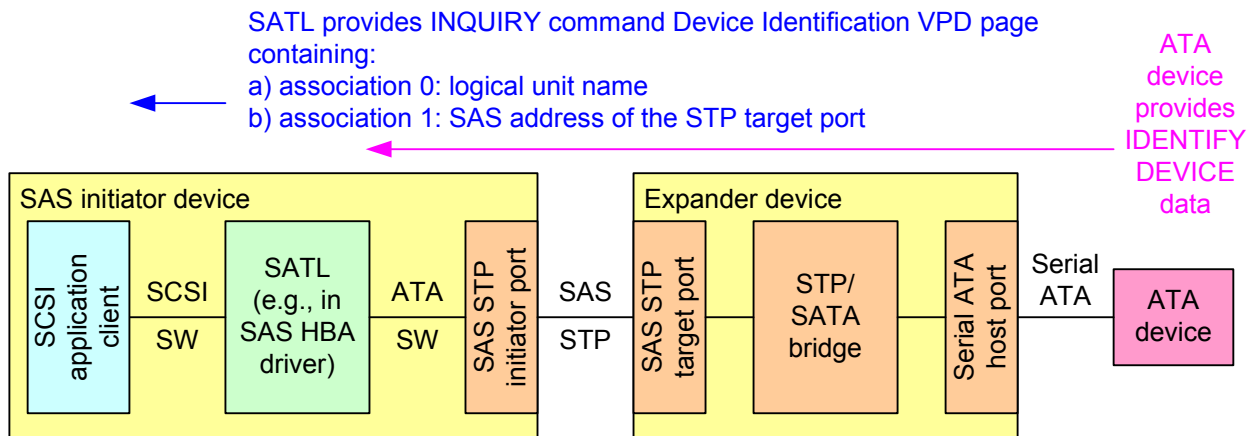Figure 1 shows the identification descriptors returned by a SATL in a SAS initiator device.

Figure 1 — SAS environment

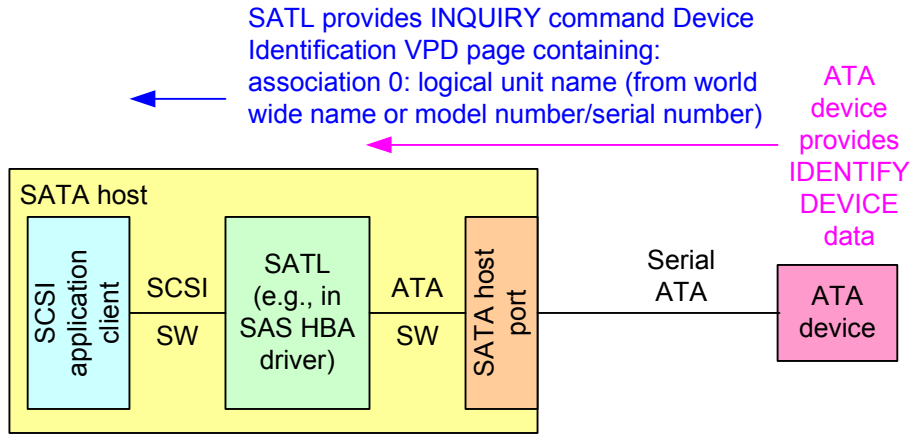Figure 2 shows the identification descriptors returned by a SATL in a SATA host.

Figure 2 — SATA environment

Figure 3 shows the identification descriptors returned by a SATL in a SCSI to ATA protocol bridge.
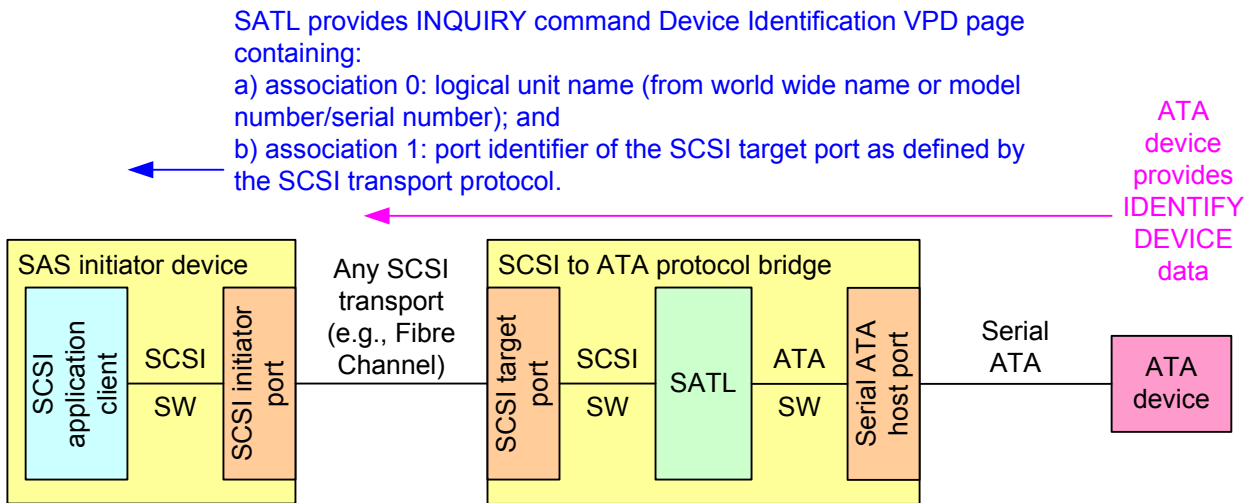

Figure 3 — SCSI to ATA protocol bridge environment

8.1.3.4.2 Logical unit name

If the ATA device returns word 87 bit 8 set to one in its IDENTIFY DEVICE data indicating that it supports the WORLD WIDE NAME field (i.e., words 108-111), the SATL shall include an identification descriptor containing a logical unit name as defined in table 7.

Table 7 — Logical unit name derived from world wide name

Byte\Bit	7	6	5	4	3	2	1	0
0	PROTOCOL IDENTIFIER				CODE SET (1h)			
1	PIV (0b)	Reserved	ASSOCIATION (0h)		IDENTIFIER TYPE (3h)			
2	Reserved							
3	IDENTIFIER LENGTH (08h)							
4	NAA				(MSB)			
5	IEEE COMPANY_ID							
6								
7				(LSB)	(MSB)			
8	VENDOR SPECIFIC IDENTIFIER							
11								(LSB)

The PROTOCOL IDENTIFIER field shall be set to 0h.

The CODE SET field shall be set to 1h (i.e., binary).

The PIV bit shall be set to 0b.

The ASSOCIATION field shall be set to 0h (i.e., logical unit).

The IDENTIFIER TYPE field shall be set to 3h (i.e., NAA).

The NAA field, IEEE COMPANY_ID field, and VENDOR SPECIFIC IDENTIFIER field shall be based on the IDENTIFY DEVICE data WORLD WIDE NAME field as described in table 8.

Table 8 — Fields in the logical unit name

Field		Contents
Field name	Specific bits in table 7	
NAA	Byte 4 bits 7:4	IDENTIFY DEVICE word 108 bits 15:12 [a]
IEEE COMPANY_ID	Byte 4 bits 3:0	IDENTIFY DEVICE word 108 bits 11:8
	Byte 5	IDENTIFY DEVICE word 108 bits 7:0
	Byte 6	IDENTIFY DEVICE word 109 bits 15:8
	Byte 7 bits 7:4	IDENTIFY DEVICE word 109 bits 7:4
VENDOR SPECIFIC IDENTIFIER	Byte 7 bits 3:0	IDENTIFY DEVICE word 109 bits 3:0
	Byte 8	IDENTIFY DEVICE word 110 bits 15:8
	Byte 9	IDENTIFY DEVICE word 110 bits 7:0
	Byte 10	IDENTIFY DEVICE word 111 bits 15:8
	Byte 11	IDENTIFY DEVICE word 111 bits 7:0
[a] This 4-bit field is required to be set to 5h by ATA/ATAPI-7 V1.		

If the ATA device returns word 87 bit 8 set to zero in its IDENTIFY DEVICE data indicating that it does not support the WORLD WIDE NAME field (i.e., words 108-111), the SATL shall include an identification descriptor containing a logical unit name as defined in table 9.

Table 9 — Logical unit name derived from model number and serial number

Byte\Bit	7	6	5	4	3	2	1	0
0	PROTOCOL IDENTIFIER				CODE SET (3h)			
1	PIV (0b)	Reserved	ASSOCIATION (0h)		IDENTIFIER TYPE (8h)			
2	Reserved							
3	IDENTIFIER LENGTH (68 or 83)							
4	SCSI NAME STRING							
71								

The PROTOCOL IDENTIFIER field shall be set to 0h.

The CODE SET field shall be set to 3h (i.e., UTF-8).

The PIV bit shall be set to 0b.

The ASSOCIATION field shall be set to 0h (i.e., logical unit).

The IDENTIFIER TYPE field shall be set to 8h (i.e., SCSI name string).

Discussion on "ata." vs "iqn." format options:

Unless the ATA device provides a WWN, there is no guaranteed worldwide unique identifier available from which a SCSI logical unit name can be created. ATA defines 40-byte MODEL NUMBER and 20-byte SERIAL NUMBER fields, but doesn't define a VENDOR ID field. The MODEL NUMBER and SERIAL NUMBER field pair are worldwide unique if and only if different manufacturers don't reuse the same model numbers. Although most vendors include a vendor ID at the start of the model number, no such requirement exists.

T13 could solve this by mandating that the MODEL NUMBER field:

    h)   start with a vendor identification string (e.g. an 8-byte T10 vendor ID, or a new T13 vendor ID if the 8-byte T10 IDs are deemed too short);
    i)   be left-aligned; and
    j)   be followed by an ASCII space (20h).

This would ensure the MODEL NUMBER and SERIAL NUMBER field pair are truly worldwide unique. However, this was discussed at the October T13 meeting and didn't seem to attract much support.

Barring that, any logical unit derived from the MODEL NUMBER and SERIAL NUMBER field is not 100% guaranteed to be worldwide unique.

In September, T10 suggested that the existing "iqn." prefix be used instead of a new "ata." prefix. The key advantage is to avoid conflict with iSCSI's "iSCSI device name" namespace. If iSCSI ever defined an "ata." prefix it might conflict with T10's definition.

However, "iqn." is required to be 100% worldwide unique, and SATL cannot provide such a guarantee. If "ata." is used, it would carry an implicit warning that it is not 100% worldwide unique.

SATL will only use "ata." for logical unit names (ASSOCIATION field set to 0h); the prefix will never show up as an iSCSI device name (reported with the ASSOCIATION field set to 2h). If iSCSI did define an "ata." iSCSI device name format, and it was used to form a logical unit name according to the T10 method, it would be concatenated with ",L,0x" and 16 hexadecimal digits: "<iSCSI device name,L,0xNNNNNNNNNNNNNNNN". As long as the SATL based logical unit names don't look like that, they won't conflict. For a conflict, the ATA MODEL NUMBER field would have to use all 40 bytes and end with "," and the SERIAL NUMBER field would have to be "L,0xNNNNNNNNNNNNNNNN" - not very probable.

Option 1 "ata.":

The SCSI NAME STRING field shall be set to "ata." concatenated with a representation of the IDENTIFY DEVICE data MODEL NUMBER field concatenated with a representation of the IDENTIFY DEVICE data SERIAL NUMBER field as described in table 10.

Table 10 — SCSI name string for ATA devices [option 2]

Byte	Contents	
	Source field name	**Source location**
0 to 3	"ata."	
4		IDENTIFY DEVICE word 27 bits 15:8
5		IDENTIFY DEVICE word 27 bits 7:0
6	MODEL NUMBER field	IDENTIFY DEVICE word 28 bits 15:8
...		...
5943		IDENTIFY DEVICE word 46 bits 7:0
44		IDENTIFY DEVICE word 10 bits 7:0
45		IDENTIFY DEVICE word 10 bits 15:8
46	SERIAL NUMBER field	IDENTIFY DEVICE word 11 bits 15:0
...		...
63		IDENTIFY DEVICE word 19 bits 7:0
64 to 67	00000000h (i.e., four ASCII NULLs)	

NOTE 2 The SCSI NAME STRING field is not guaranteed to be worldwide unique, since ATA/ATAPI-7 only requires the combination of the MODEL NUMBER field and SERIAL NUMBER field to be unique for a given manufacturer but defines no manufacturer identification field.

Option 2 "iqn.":

The SCSI name string shall consist of the following strings concatenated together as described in table 11:

1) "iqn.2004-11.org.t10:";
2) a representation of the IDENTIFY DEVICE data MODEL NUMBER field;
3) a representation of the IDENTIFY DEVICE data SERIAL NUMBER field; and
4) four bytes set to 00h (i.e., ASCII NULL bytes).

Table 11 — SCSI name string for ATA devices [option 2]

Byte	Contents	
	Source field name	**Source location**
0 to 19	"iqn.2004-11.org.t10:"	
20	MODEL NUMBER field	IDENTIFY DEVICE word 27 bits 15:8
21		IDENTIFY DEVICE word 27 bits 7:0
22		IDENTIFY DEVICE word 28 bits 15:8
...		...
59		IDENTIFY DEVICE word 46 bits 7:0
60	SERIAL NUMBER field	IDENTIFY DEVICE word 10 bits 7:0
61		IDENTIFY DEVICE word 10 bits 15:8
62		IDENTIFY DEVICE word 11 bits 15:0
...		...
79		IDENTIFY DEVICE word 19 bits 7:0
80 to 83	00000000h (i.e., four ASCII NULLs)	

[End of two options]

8.1.3.4.3 Target port identifier for SAS

If the ATA device is being accessed with a SAS STP initiator port, the SATL shall include a target port identifier as defined in table 12.

Table 12 — Target port identifier for SAS

Byte\Bit	7	6	5	4	3	2	1	0
0	PROTOCOL IDENTIFIER (6h)				CODE SET (1h)			
1	PIV (1b)	Reserved	ASSOCIATION (1h)		IDENTIFIER TYPE (3h)			
2	Reserved							
3	IDENTIFIER LENGTH (08h)							
4	SAS ADDRESS							
11								

The CODE SET field shall be set to 1h (i.e., binary).

The PIV bit shall be set to 1b.

The ASSOCIATION field shall be set to 1h (i.e., target port).

The IDENTIFIER TYPE field shall be set to 3h (i.e., NAA).

The SAS ADDRESS field shall be set to the SAS address of the STP target port providing the STP/SATA bridge functionality (i.e., the SAS address of the ATA device in the SAS domain)(e.g., see figure 1).

8.1.3.4.4 Target port identifier for other SCSI transport protocols

If the SATL is being accessed with a SCSI target port using another SCSI transport protocol (e.g, Fibre Channel FCP-3 or iSCSI)(e.g., see figure 3), the SATL shall include a target port identifier as defined by that SCSI transport protocol standard.

Suggested changes to SPC-3 or SPC-4

7.6.4.10 SCSI name string identifier format

If the identifier type is 8h (i.e., SCSI name string), the IDENTIFIER field has the format shown in table 303. The CODE SET field shall be set to 3h (i.e., UTF-8).

...

The null-terminated, null-padded (see 4.4.2) SCSI NAME STRING field contains a UTF-8 format string. The number of bytes in the SCSI NAME STRING field (i.e., the value in the IDENTIFIER LENGTH field) shall be no larger than 256 and shall be a multiple of four.

The SCSI NAME STRING field starts with either:

a) The four UTF-8 characters "eui." concatenated with 16, 24, or 32 hexadecimal digits (i.e., the UTF-8 characters 0 through 9 and A through F) for an EUI-64 based identifier (see 7.6.4.4). The first hexadecimal digit shall be the most significant four bits of the first byte (i.e., most significant byte) of the EUI-64 based identifier;

b) The four UTF-8 characters "naa." concatenated with 16 or 32 hexadecimal digits for an NAA identifier (see 7.6.4.5). The first hexadecimal digit shall be the most significant four bits of the first byte (i.e., most significant byte) of the NAA identifier; or

c) The four UTF-8 characters "iqn." concatenated with an iSCSI Name for an iSCSI-name based identifier (see iSCSI); or

d) The four UTF-8 characters "ata." concatenated with an ATA device model number and serial number (see SAT). This format shall only be used if the ASSOCIATION field is set to 0h (i.e., logical unit).

If the ASSOCIATION field is set to 0h (i.e., logical unit) and the SCSI NAME STRING field starts with the four UTF-8 characters "iqn.", the SCSI NAME STRING field ends with the five UTF-8 characters ",L,0x" concatenated with 16 hexadecimal digits for the logical unit name extension. The logical unit name extension is a UTF-8 string containing no more than 16 hexadecimal digits. The logical unit name extension is assigned by the SCSI target device vendor and shall be assigned so the logical unit name is worldwide unique.

If the ASSOCIATION field is set to 1h (i.e., SCSI target port), the SCSI NAME STRING field ends with the five UTF-8 characters ",t,0x" concatenated with two or more hexadecimal digits as specified in the applicable SCSI transport protocol standard (see 3.1.100).

If the ASSOCIATION field is set to 2h (i.e., SCSI target device), the SCSI NAME STRING field has no additional characters.