

To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 04-175r1 SAS-1.1 REPORT MANUFACTURER INFORMATION changes

Revision history

Revision 0 (26 May 2004) First revision

Revision 1 (8 July 2004) Incorporated comments from 14 June 2004 conference call - add a bit indicating the new fields are present and it is not all vendor-specific as in SAS-1, and add an 8 byte vendor-specific field.

Related documents

sas1r04 - Serial Attached SCSI 1.1 revision 4

Specification for Use of PCI IDs with Windows Operating Systems, Microsoft Corporation, 4 December 2001
(<http://www.microsoft.com/whdc/system/bus/PCI/pciidspec.mspx>)

Overview

SAS-1 defined four fields in the SMP REPORT MANUFACTURER INFORMATION function:

- a) Vendor ID (8 bytes)
- b) Product ID (16 bytes)
- c) Revision ID (4 bytes)
- d) Vendor-specific (20 bytes)

The first three are in ASCII string format like their corresponding fields in SCSI Standard INQUIRY data.

Expanders are usually used on boards where two types of information is equally important:

- a) ASIC information; and
- b) Board information.

To determine what vendor-specific SMP functions can be used, software (either HBA drivers or management software) needs to know the ASIC information, so it's important that such information be reported in standard fields.

For management software to determine what enclosure is being accessed (e.g. to display a picture of it to the user), board information is necessary.

Both kinds of information are needed for bug workarounds. A pure ASIC bug (e.g., some SMP function doesn't work right) can be addressed with knowledge of the ASIC. A board problem (e.g. physical link attached to phy 5 doesn't work) can be addressed with knowledge of the board.

This is the same issue the PCI SIG faced with device vs. subsystem IDs. Microsoft eventually demanded that both the device ID and subsystem device ID fields always be implemented for Windows compliance. They require that:

- a) **Vendor ID** describes the vendor of the ASIC.
- b) **Device ID** describes the ASIC. It must be unique per the Vendor ID and must change whenever the programming interface is modified.
- c) **Revision ID** describes the revision of the ASIC. It must be incremented for any change (namely software-invisible changes; software-visible changes bump the Device ID and reset this to 0).
- d) **Subsystem Vendor ID** describes the vendor of the board in which the ASIC is used.
- e) **Subsystem ID** describes the board in which the ASIC is used. It must change whenever the board is modified (even just changing the value of a resistor), letting software pin-point board-related workarounds without affecting all uses of the ASIC.
- f) There is no **Subsystem Revision ID** field defined; it must be merged into the Subsystem ID.

T10 does not normally reclaim vendor-specific fields, because vendors may have already used them. However, since SAS-1.1 is intended to carry bug fixes for SAS-1.0 and I believe most expander vendors are not committed to using the vendor-specific field as defined, I suggest that:

- a) the VENDOR IDENTIFICATION, PRODUCT IDENTIFICATION, and PRODUCT REVISION LEVEL fields be defined to carry board information, not ASIC information; and
- b) the vendor-specific field be considered a bug and upgraded to a set of standardized fields describing the ASIC - COMPONENT COMPANY ID, COMPONENT ID, and COMPONENT REVISION LEVEL field. These use binary rather than ASCII formats to save space, be easier to parse by software, and be less user-visible than the board information; and
- c) remaining vendor-specific bytes be made reserved rather than vendor-specific.

In the 14 July 2004 conference call, T10 didn't like the big-fix viewpoint and requested that a bit be added to a reserved field indicating that the vendor-specific fields are defined. Such a bit is reluctantly proposed for byte 8 bit 0 (there may be expanders unable to implement this, so software may just choose to ignore it and proceed based on detecting the marker fields).

Suggested changes

10.4.3.4 REPORT MANUFACTURER INFORMATION function

The REPORT MANUFACTURER INFORMATION function returns ~~vendor and product identification~~ information about the component (e.g., the expander device) containing the SMP target port and the subsystem (e.g., board or enclosure) containing that component. This SMP function may be implemented by any SMP target port.

Table 1 defines the request format.

Table 1 — REPORT MANUFACTURER INFORMATION request

Byte\Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (40h)								
1	FUNCTION (01h)								
2	Reserved								
3	Reserved								
4	(MSB)	CRC							
7							(LSB)		

The SMP FRAME TYPE field shall be set to 40h.

The FUNCTION field shall be set to 01h.

The CRC field is defined in 10.4.3.1.

Table 2 defines the response format.

Table 2 — REPORT MANUFACTURER INFORMATION response (part 1 of 2)

Byte\Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (41h)							
1	FUNCTION (01h)							
2	FUNCTION RESULT							

Table 2 — REPORT MANUFACTURER INFORMATION response (part 2 of 2)

Byte\Bit	7	6	5	4	3	2	1	0	
3	Reserved								
4	Ignored								
7	Ignored								
8	Reserved							SAS-1.1 FORMAT	
9	Ignored								
10	Ignored								
11	Reserved								
12	(MSB)	VENDOR IDENTIFICATION						(LSB)	
19	(LSB)								
20	(MSB)	PRODUCT IDENTIFICATION						(LSB)	
35	(LSB)								
36	(MSB)	PRODUCT REVISION LEVEL						(LSB)	
39	(LSB)								
40	LEADING MARKER (5h)				(MSB)				
41	COMPONENT COMPANY ID								
42	COMPONENT COMPANY ID								
43	(LSB)				TRAILING MARKER (Ah)				
44	(MSB)	COMPONENT ID						(LSB)	
45	(LSB)								
46	COMPONENT REVISION ID								
47	Reserved								
51	Reserved								
40-52	Vendor specific								
59	Vendor specific								
60	(MSB)	CRC						(LSB)	
63	(LSB)								

The SMP FRAME TYPE field shall be set to 41h.

The FUNCTION field shall be set to 01h.

The FUNCTION RESULT field is defined in 10.4.3.2.

A SAS-1.1 FORMAT bit set to one indicates that bytes 40 through 59 are as defined in this standard. A SAS-1.1 FORMAT field set to zero indicates that bytes 40 through 59 are vendor-specific as defined in the original version of this standard.

~~The VENDOR IDENTIFICATION field contains eight bytes of ASCII data identifying the vendor of the product. 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 PRODUCT IDENTIFICATION field contains sixteen bytes of ASCII data as defined by the vendor. The data shall be left aligned within the field.~~

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

The VENDOR IDENTIFICATION field contains eight bytes of ASCII data identifying the vendor of the subsystem (e.g., the board or enclosure) containing the component. 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 PRODUCT IDENTIFICATION field contains sixteen bytes of ASCII data identifying the type of the subsystem (e.g., the board or enclosure model number) containing the component, as defined by the vendor of the subsystem. The data shall be left aligned within the field. The PRODUCT IDENTIFICATION field should be changed whenever the subsystem design changes in a way noticeable to a user (e.g., a different stock-keeping unit (SKU)).

The PRODUCT REVISION LEVEL field contains four bytes of ASCII data identifying the revision level of the subsystem (e.g., the board or enclosure) containing the component, as defined by the vendor of the subsystem. The data shall be left-aligned within the field. The PRODUCT REVISION LEVEL field should be changed whenever the subsystem design changes (e.g., any component change, even including resistor values).

ASCII data fields (e.g., the VENDOR IDENTIFICATION field, the PRODUCT IDENTIFICATION field, and PRODUCT REVISION LEVEL field) shall contain only graphic codes (i.e., code values 20h through 7Eh). Left-aligned fields shall place any unused bytes at the end of the field (i.e., at the highest offset) and the unused bytes shall be filled with space characters (i.e., 20h).

All components on a subsystem should have the same values for their VENDOR IDENTIFICATION fields, PRODUCT IDENTIFICATION fields, and PRODUCT REVISION LEVEL fields.

NOTE 1 Application clients may use the VENDOR IDENTIFICATION field and PRODUCT IDENTIFICATION field to identify the subsystem (e.g., for a user interface). Application clients may use the VENDOR IDENTIFICATION field, PRODUCT IDENTIFICATION field, PRODUCT REVISION LEVEL field to perform workarounds for problems in a specific revision of a subsystem.

The LEADING MARKER field contains 5h.

The COMPONENT COMPANY ID field contains a 24-bit canonical form company identifier assigned by the IEEE identifying the vendor of the component (e.g., the expander device) containing the SMP target port. Information about IEEE company identifiers may be obtained from the <http://standards.ieee.org/regauth/oui> web site.

The TRAILING MARKER field contains Ah.

NOTE 2 The LEADING MARKER field and the TRAILING MARKER field serve to align the four bytes containing the COMPONENT COMPANY ID field with the four bytes containing the IEEE COMPANY ID field in a SAS address (see 4.2.2).

The COMPONENT ID field contains a 16-bit identifier identifying the type of the component (e.g., the expander device model number) containing the SMP target port, as defined by the vendor of the component. The COMPONENT ID field should be changed whenever the component's programming interface (e.g., the SMP target port definition) changes.

The COMPONENT REVISION LEVEL field contains an 8-bit identifier identifying the revision level of the component (e.g., the expander device) containing the SMP target port, as defined by the vendor of the component. The data shall be left-aligned within the field. The COMPONENT REVISION LEVEL field should be changed whenever the component changes but its programming interface does not change.

NOTE 3 Application clients may use the COMPONENT COMPANY ID field and the COMPONENT ID field to interpret vendor-specific information (e.g., vendor-specific SMP functions) correctly for that component. Application clients may use the COMPONENT COMPANY ID field, the COMPONENT ID field, and the COMPONENT REVISION LEVEL field to perform workarounds for problems in a specific revision of a component.

The vendor-specific bytes are defined by the vendor of the subsystem (e.g., the board or enclosure) containing the component.

The CRC field is defined in 10.4.3.2.