

To: T13 Technical Committee  
From: Rob Elliott, HP (elliott@hp.com)  
Date: 16 January 2006  
Subject: T13/e05180r1 IEEE OUI tutorial for ATA

### **Revision history**

Revision 0 (1 December 2005) First revision

Revision 1 (16 January 2006) Split off into 3 separate files for ATA, FC, and SCSI. Incorporated comments from Jim Hatfield (Seagate), December 2005 T13 plenary meeting, and January 2006 T10 CAP WG meeting.

### **Related documents**

<http://standards.ieee.org/regauth/oui> - *IEEE Standards Association OUI and Company\_id Assignments*

<http://standards.ieee.org/regauth/oui/tutorials> - *IEEE Standards Tutorials: OUI and company\_id*. This page is supposed to link to tutorials for each standard using OUI/Company\_IDs.

<http://standards.ieee.org/regauth/oui/tutorials/fibreformat.html> - *New identifier formats based on IEEE registration*. Incorrectly posted as *Guidelines for Fibre Channel Use of the Company id* on the IEEE tutorial page. This is actually X3T11/96-467r2, the proposal to T11 that defined the NAA format, not the tutorial.

[http://standards.ieee.org/regauth/oui/tutorials/fibrecomp\\_id.html](http://standards.ieee.org/regauth/oui/tutorials/fibrecomp_id.html) - *Use of the IEEE Registration Authority assigned "company\_id" with the ANSI X3.230 FC-PH Fibre Channel specification and its extensions* February 24, 1997. This is the real Fibre Channel tutorial. However, a link to it is not available on the tutorial page, although the link is referenced by the FibreAlliance version of the Fibre Channel MIB (available at [http://www.fibrealliance.org/fb/mib/mib1\\_5.htm](http://www.fibrealliance.org/fb/mib/mib1_5.htm)).

X3T10/97-101r2 - *IEEE Tutorial for SCSI use of IEEE company\_id - Use of the IEEE Registration Authority assigned "company\_id" for SCSI-3 Primary Commands, SCSI Enclosure Services commands, and all SCSI extensions* - February 25, 1997. This SCSI tutorial is not posted on the IEEE site.

T10/spc4r02 - SCSI Primary Commands - 4 (SPC-4) revision 2

T11/05-190v3 - Fibre Channel Framing and Signaling - 2 (FC-FS-2) revision 0.9

T13/d1699r2-ata8-acs - AT Attachment - 8 ATA/ATAPI Command Set (ATA8-ACS) revision 2

T10/06-002r2 - IEEE OUI tutorial for SCSI

T11/05-802v1 - IEEE OUI tutorial for FC

T13/e05178r0 - Mandatory WWN in Identify Device Command

T13/e05181r0 - ATA8-ACS IDENTIFY PACKET DEVICE World Wide Name field

### **Overview**

The IEEE Standards Association Registration Authority web site is supposed to contain tutorials on every standard that uses IEEE OUI/Company\_ID values. However:

- a) the SCSI tutorial is not posted. There is one on the T10 web site from 1997 that is out of date;
- b) the Fibre Channel tutorial is not linked to by the site - the wrong document (the T11 proposal defining the format) is posted in its place. The tutorial is posted on the site if you know the filename, but it is from 1997 and is out of date; and
- c) an ATA tutorial does not exist. ATA/ATAPI-7 and -8 include an NAA format Worldwide Name field, which uses the IEEE OUI/Company\_ID.

### **Suggested tutorial content**

Add separate tutorials for SCSI and ATA, and update the Fibre Channel tutorial. This file contains the ATA tutorial.

# 1 ATA/ATAPI OUI/Company\_ID tutorial

## 1.1 Overview

ATA/ATAPI standards support an NAA format identifier in the IDENTIFY DEVICE command (see ATA8-ACS). The NAA IEEE Registered format identifier is shown in table 1.

**Table 1 — NAA IEEE Registered format**

Byte/Bit	7	6	5	4	3	2	1	0	
0	NAA (5h)				(MSB) (bit 23)				(bit 20)
1	(bit 19)	IEEE COMPANY ID						(bit 12)	
2	(bit 11)							(bit 4)	
3	(bit 3)			(LSB) (bit 0)	(MSB) (bit 35)				(bit 32)
4	VENDOR-SPECIFIC IDENTIFIER								
7									(LSB)

Bit 5 of byte 1, which serves as the UNIVERSALLY/LOCALLY ADMINISTERED ADDRESS bit, is set to zero.

Bit 4 of byte 1, which serves as the INDIVIDUAL/GROUP ADDRESS bit, is set to zero.

## 1.2 ATA commands

In the IDENTIFY DEVICE command, words (111:108) are a World Wide Name (WWN) field containing an NAA IEEE Registered identifier (see table 1 in 1.1).

NOTE 1 - In ATA standards, "word" means 2 bytes (i.e., 16 bits).

The IDENTIFY DEVICE data World Wide Name field is shown in table 2.

**Table 2 — IDENTIFY DEVICE data World Wide Name field (word-based view)**

Bit Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
108	NAA (5h)				(MSB) (bit 23)	IEEE COMPANY ID										(bit 12)
109	(bit 11)											(LSB) (bit 0)	(MSB) (bit 35)	(bit 32)		
110	(bit 31)	VENDOR-SPECIFIC IDENTIFIER														(bit 16)
111	(bit 15)															(LSB) (bit 0)

Bit 5 of word 0, which serves as the UNIVERSALLY/LOCALLY ADMINISTERED ADDRESS bit, is set to zero.

Bit 4 of word 0, which serves as the INDIVIDUAL/GROUP ADDRESS bit, is set to zero.

When viewed as bytes, the World Wide Name field looks like table 3.

**Table 3 — IDENTIFY DEVICE data World Wide Name field (byte-based view)**

Byte\Bit	7	6	5	4	3	2	1	0
216	(bit 19) IEEE COMPANY ID							(bit 12)
217	NAA (5h)				(MSB) (bit 23)	(bit 20)		
218	(bit 3)	(LSB) (bit 0)		(MSB) (bit 35)	VENDOR-SPECIFIC IDENTIFIER		(bit 32)	
219	(bit 11)	IEEE COMPANY ID						(bit 4)
220	(bit 23)	VENDOR-SPECIFIC IDENTIFIER						(bit 16)
221	(bit 31)							(bit 24)
222	(bit 7)							(LSB) (bit 0)
223	(bit 15)							(bit 8)

Bit 5 of byte 216, which serves as the UNIVERSALLY/LOCALLY ADMINISTERED ADDRESS bit, is set to zero.

Bit 4 of byte 216, which serves as the INDIVIDUAL/GROUP ADDRESS bit, is set to zero.

### 1.3 References

ATA/ATAPI standards:

ISO/IEC 14776-871, *AT Attachment-8 ATA/ATAPI Command Set (ATA8-ACS)* (INCITS T13/1699-D)

ATA/ATAPI standards are developed by the INCITS (<http://www.incits.org>) T13 committee (<http://www.t13.org>). ATA/ATAPI standards are published by ANSI (<http://www.ansi.org>) and ISO/IEC (<http://www.iso.int>). To obtain copies of these documents, contact Global Engineering at 15 Inverness Way, East Englewood, CO 80112-5704 at 303-792-2181 (phone), 800-854-7179 (phone), or 303-792-2192 (fax) or see <http://www.incits.org>.

Other documents:

*SCSI OUI/Company\_ID tutorial* by T10 for the IEEE Standards Association. Available at <http://standards.ieee.org/regauth/oui/tutorials/SCSI.html>.

*Fibre Channel OUI/Company\_ID tutorial* by T11 for the IEEE Standards Association. Available at <http://standards.ieee.org/regauth/oui/tutorials/FC.html>.