

# Force Unit Access Proposal

**To:** T13 Technical committee  
**From:** Nita Pan  
**Microsoft Corp.**  
**One Microsoft Way.**  
**Redmond, WA 98052**  
**Phone: 425-705-0877**  
**Fax: 425-936-7329**  
**Email: nitapan@Microsoft.com**  
**Date: June 12, 2002**

## 1.0 Introduction

The purpose of this proposal is to add support for Force Unit Access (FUA) in ATA disk drives. Force Unit Access allows the host software to designate certain writes to be written to the underlying media before the command returns. This capability is extremely important to a gamut of software applications including database and transactional systems to recover from a power failure or other non-media related failure. In the event of such failures these systems use the transaction logs in the media to return to a known good state. If these logs are in the device write cache they may be lost due to the failure and would render the system useless. FUA is very appropriate in these cases as the logs tend to be smaller and are written relatively infrequently. The increased device capacity, bigger write caches and the adoption of ATA based devices in higher end storage systems have made this requirement expedient.

## 2.0 Protocol

Command Execution:

Force Unit Access indicates that the target shall access the media in performing the command prior to its completion. A write command with FUA shall not complete until the logical blocks have actually been written to the media.

## 3.0 Proposed Changes

The following changes are proposed in the current ATA/ATAPI specification.

### 8.13 Identify Data

**Table 20 – IDENTIFY DEVICE Information (continued)**

Word	F/V	
84	F	x 1=Force unit access supported
87	V	x 1=Force unit access supported

8.13.45 Features/command sets supported

If bit x of word 84 is set to one, the device supports force unit access.

### 8.13.46 Features/command sets enabled

If bit x of word 87 is set to one, the device supports force unit access.

## 8.53 Write DMA FUA

### 8.53.1 Command code

XXh

#### 8.53.4 Inputs

Register	7	6	5	4	3	2	1	0
Features	na	na	na	na	na	na	na	na
Sector Count	Sector count							
Sector Number	Sector number or LBA							
Cylinder Low	Cylinder low or LBA							
Cylinder High	Cylinder high or LBA							
Device/Head	obs	LBA	obs	DEV	Head Number or LBA			
Command	XXh							

## 8.54 Write DMA EXT FUA

#### 8.54.4 Inputs

Register	7	6	5	4	3	2	1	0
Features	Current Previous (see note)	na	na	na	na	na	na	FUA
		Reserved						
Sector Count	Current Previous (see note)	Sector count (7:0)						
		Sector count (15:8)						
Sector Number	Current Previous (see note)	LBA (7:0)						
		LBA (31:24)						
Cylinder Low	Current Previous (see note)	LBA (15:8)						
		LBA (39:32)						
Cylinder High	Current Previous (see note)	LBA (23:16)						
		LBA (47:40)						
Device/Head		obs	LBA	obs	DEV	Reserved		
Command		35h						

Features Current –

Bit 0 is set to 1 if FUA is requested. It is set to 0 otherwise.

## 8.57 Write Multiple FUA

### 8.57.1 Command Code

XXh

#### 8.57.4 Inputs

Register	7	6	5	4	3	2	1	0
Features	na	na	na	na	na	na	na	na
Sector Count	Sector count							
Sector Number	Sector number or LBA							
Cylinder Low	Cylinder low or LBA							
Cylinder High	Cylinder high or LBA							
Device/Head	obs	LBA	obs	DEV	Head Number or LBA			
Command	XXh							

## 8.58 Write Multiple EXT FUA

### 8.58.4 Inputs

Register		7	6	5	4	3	2	1	0
Features	Current	na	na	na	na	na	na	na	FUA
	Previous (see note)	Reserved							
Sector Count	Current	Sector count (7:0) Sector count (15:8)							
	Previous (see note)								
Sector Number	Current	LBA (7:0) LBA (31:24)							
	Previous (see note)								
Cylinder Low	Current	LBA (15:8) LBA (39:32)							
	Previous (see note)								
Cylinder High	Current	LBA (23:16) LBA (47:40)							
	Previous (see note)								
Device/Head		obs	LBA	obs	DEV	Reserved			
Command		39h							

Features Current –

Bit 0 is set to 1 if FUA is requested. It is set to 0 otherwise.