Proposed Draft

Serial ATA International Organization

Version 1
28 July 2014

Serial ATA Revision 3.2 Technical Proposal 062
Title : SEND/RECEIVE FPDMA Queued Cleanup

Author Information

Author Name	Company	Email address
Ralph Weber	Western Digital	Ralph.Weber@WDC.com

Workgroup Chair Information

Workgroup (Phy, Digital, etc…)	Chairperson Name	Email address
Digital	James Hatfield	James.C.Hatfield@seagate.com

Document History

Version	Date	Comments
0	25 July 2014	Initial release.
1	28 July 2014	Incorporated changes requested by 28 July call. Member review. Changed TPR D189 to TPR062.

Introduction

“Oh what a tangled web we weave …”
- Mistakenly attributed to William Shakespeare
- but really Sir Walter Scott, Marmion, Canto vi. Stanza 17

Sometime ago, I was asked to define a support bit for NCQ READ LOG DMA EXT, but that ball appears to have been dropped.

More recently, efforts to have ACS-4 catch up with the pace of SEND/RECEIVE FPDMA QUEUED changes unearthed another bug.

Thus was this document forged.

Because this document duplicates content from D188 (now TPR061) replicated text is shown in underlined green, removed text is in ~~red strikeout~~, and inserted text is in underlined blue.

1 Technical Specification Changes

1.1 Figure 372

I cannot make heads or tails out of one row in figure 372.

- The DATA SET MANAGEMENT subcommand and HYBRID EVICT subcommand reserve the entire LBA field.
- The WRITE LOG DMA EXT subcommand copies the entire LBA from the original.

13.6.8 SEND FPDMA QUEUED

13.6.8.1 SEND FPDMA QUEUED definition

The 512 Byte Block DMA OUT subcommands make use of this transport command. The SEND FPDMA QUEUED command supports LBA mode only and uses 48 bit addressing only. The format of the command is defined in Figure 372.

13.6.8.2 Inputs

Field	7	6	5	4	3	2	1	0
Features(7:0)	Sector Count(7:0)							
Features(15:8)	Sector Count(15:8)							
Count(7:0)	TAG					Reserved		
Count(15:8)	PRIO(1:0)		Res	Subcommand				
LBA(7:0)	~~LBA(7:0)~~ Subcommand Specific							
LBA(15:8)	Subcommand Specific							
LBA(23:16)	Subcommand Specific							
LBA(31:24)	Subcommand Specific							
LBA(39:32)	Subcommand Specific							
LBA(47:40)	Subcommand Specific							
ICC(7:0)	ICC(7:0)							
Auxiliary(7:0)	Subcommand Specific							
Auxiliary(15:8)	Subcommand Specific							
Auxiliary(23:16)	Subcommand Specific							
Auxiliary(31:24)	Subcommand Specific							
Device(7:0)	Res	1	Res	0	Reserved			
Command(7:0)	**64h**							

Figure 372 – SEND FPDMA QUEUED command definition

Sector Count The number of 512 byte blocks to be transferred, 0000h indicates that 65 536 512 byte blocks are to be transferred.

TAG The TAG value shall be assigned by host software to be different from all other TAG values corresponding to outstanding commands. The assigned TAG value shall not exceed the value specified in IDENTIFY DEVICE data Word 75.

PRIO The Priority (PRIO) value shall be assigned by the host based on the priority of the command issued. The device shall make a best effort to complete High priority requests in a more timely fashion than Normal and Isochronous priority requests. The device shall make a best effort to complete each Isochronous request prior to its associated deadline (see Table 105).

Subcommand Subcommand specific (see 13.6.8.5)

~~LBA Subcommand specific (see 13.6.8.5)~~

ICC The Isochronous Command Completion (ICC) field shall be assigned by the host based on the intended deadline associated with the command issued. By

default, if deadline is expired, the device shall continue to complete the command as soon as possible.

Auxiliary — Subcommand specific (see 13.6.8.5)

1.2 Add support bit for RECEIVE FPDMA QUEUED FEATURES field copying

This is the long-lost bit definition addition. Actually, all worked out well because D188 got the first crack at defining bits in this log.

13.7.6 NCQ send and receive log (13h)

13.7.6.1 NCQ send and receive log overview

To determine the supported SEND FPDMA QUEUED and RECEIVE FPDMA QUEUED subcommands and their respective features, host software may read log 13h.

This log shall be supported if the SEND FPDMA QUEUED and RECEIVE FPDMA QUEUED command is supported (i.e., IDENTIFY DEVICE data Word 77 bit 6 is set to one.)

Dword	Bits	Description
0	Subcommands Supported	
	31..2	Reserved
	1	Supports HYBRID EVICT (see 13.7.6.2)
	0	Supports Data Set Management(see 13.7.6.3)
1	Data Set Management	
	31..1	Reserved
	0	Supports Trim (see 13.7.6.4)
2	Supports Read Log	
	31..3 ~~1~~	Reserved
	2	Supports Read Log Features field encapsulation (see 13.7.6.n)
	1	Supports Sequential Read Log (see 13.7.6.a)
	0	Supports Read Log (see 13.7.6.5)
3	Supports Write Log	
	31..2 ~~1~~	Reserved
	1	Supports Sequential Write Log (see 13.7.6.b)
	0	Supports Write Log (see 13.7.6.6)
4..127		Reserved

Figure 383 – NCQ SEND and RECEIVE log (13) data structure definition

Editor's note: TPR061 added Sequential Read Log and Sequential Write Log bits.

…

13.7.6.n Supports Read Log Features field encapsulation

If the Supports Read Log Features field encapsulation bit is set to one, then the device supports copying the READ LOG DMA EXT Features field to the RECEIVE FPDMA QUEUED inputs (see 13.6.7.6.2). If the Supports Read Log Features field encapsulation bit is cleared to zero, then the device does not copy the READ LOG DMA EXT Features field to the RECEIVE FPDMA QUEUED inputs as defined in a previous revision of this specification (i.e., SATA revision 3.2).

If the Supports Read Log Features field encapsulation bit is set to one, then the Supports Read Log bit (see 13.7.6.5) shall be set to one.