

**Proposed  
Draft**

**Serial ATA  
International Organization**

**Version 2  
27 April 2015**

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**Serial ATA Revision 3.2 Technical Proposal 070  
Title : Retire ICC Field in SEND / RECEIVE FPDMA  
QUEUED**

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## Document History

Version	Date	Comments
0	2 April 2015	Initial release.
1	6 April 2015	Added list of subcommands for each affected command, as reviewed in the Digital Workgroup teleconference on this date.
2	27 April 2015	Member review, changed TPR D196 to TPR070. Changes from 27 April teleconference: <ul style="list-style-type: none"><li>• Make ICC field retired, rather than obsolete</li><li>• Modify introductory material accordingly</li><li>• Add missing ')' in both tables</li><li>• Fix punctuation in list of subcommands</li></ul>

## Introduction

HGST originally proposed adding command deadlines, partly embodied in the Isochronous Command Completion (ICC) field in the following queued commands:

- a) NCQ NON-DATA;
- b) READ FPDMA QUEUED;
- c) WRITE FPDMA QUEUED;
- d) RECEIVE FPDMA QUEUED;and
- e) SEND FPDMA QUEUED.

In NCQ NON-DATA, the ICC field is Reserved and thus has no effect.

While READ / WRITE FPDMA QUEUED have been incorporated in ACS-3 and ACS-4, SEND / RECEIVE FPDMA QUEUED have not. Recent discussions have failed to reveal any use cases for limiting the execution time of a SEND or RECEIVE FPDMA QUEUED command. To the contrary, we have uncovered potential problems, such as how this enables setting a deadline on (sub)commands which should not be interrupted.

The subcommands defined in SATA-IO 3.2 for SEND FPDMA QUEUED and RECEIVE FPDMA QUEUED are:

- a) RECEIVE FPDMA QUEUED:
  - A) READ LOG DMA EXT;and
- b) SEND FPDMA QUEUED:
  - A) DATA SET MANAGEMENT;
  - B) HYBRID EVICT; and
  - C) WRITE LOG DMA EXT.

It does not appear to be useful to set a command deadline on any of these commands.

This proposal retires the ICC field in RECEIVE FPDMA QUEUED and SEND FPDMA QUEUED.

[editor note: Existing text is black includes TPR060 and TPR061. New text is marked as underlined in blue color. Material to be deleted ~~is red with strikethrough markings.~~]

## Changes to Serial ATA 3.2

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### 13 Application layer

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#### 13.6 Native Command Queuing (optional)

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##### 13.6.7 RECEIVE FPDMA QUEUED

###### 13.6.7.1 RECEIVE FPDMA QUEUED definition

The 512 Byte Block DMA IN subcommands make use of this transport command. The RECEIVE FPDMA QUEUED command supports LBA mode only and uses 48 bit addressing only. The format of the command is defined in Figure 367.

*Editor's note: TPR061 added the following sentence.*

Some RECEIVE FPDMA QUEUED subcommands are processed as sequential NCQ commands (see 4.1.1.xyz).

###### 13.6.7.2 Inputs

*Editor's note: TPR060 changed LBA(47:0) and Auxiliary(31:0) to Subcommand Specific.*

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)	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)	<del>ICC(7:0)</del> Retired							
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)	65h							

**Figure 367 – RECEIVE 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).

Editor's note: TPR060 changed Subcommand, LBA, and Auxiliary field definitions to Subcommand Specific (see 13.6.7.5)

Subcommand Subcommand specific (see 13.6.7.5)

LBA Subcommand specific (see 13.6.7.5)

~~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 13.6.7.5)

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## 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)	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)	<del>ICC(7:0)</del> Retired							
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)

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<<End of changes. >>