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To: T10 CAP Working Group  
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 Date: September 9, 2008  
 Subject: UAS Clause 4 (Model)

Table 1 —

Revision	Date	Description
0	14-Jul-2008	Initial Revision
1	15-Jul-2008	Added clarification on operation during data transfers

## 1 Related documents

UASr1, USB Attached SCSI revision 1  
 USB-2, Universal Serial Bus Revision 2.0

## 2 Introduction

This proposal defines the model clause for UAS. The model clause describes to 4 pipe configuration for USB 2 and

## 3 Proposed additions to UAS

The following text replaces clause 4 of UAS and adds to the definition of terms as follows:

### Add to definition of terms:

Pipe - A logical abstraction representing the association between a logical function in a device and an application client.

USB endpoint - A collection of characteristics describing a pipe.

USB interface - a USB interface describes one or more USB endpoints.

USB device - A USB device contains one or more USB interfaces and at least one control endpoint.

UAS domain - A UAS domain consists of one USB initiator port and one or more USB target ports.

UAS target device - A UAS target device is a USB device which attaches to a UAS initiator, contains one or more UAS target ports and a control endpoint.

UAS initiator - A UAS initiator is an initiator which contains one or more UAS initiator ports.

UAS target port - A UAS target port is a USB interface which contains two bulk-in endpoints and two bulk-out endpoints.

UAS initiator port - A UAS initiator port is a logical entity capable of communicating with a USB target port.

## 4 Model

### 4.1 USB

#### 4.1.1 Overview

USB devices implementing this standard shall support full or high speed operation as defined by the USB-20 specification. The minimum configuration for a UAS target is one Control pipe, two Bulk-in pipes, and two Bulk-out pipes. Figure 1 describes the relationships of the pipes in a UAS target.

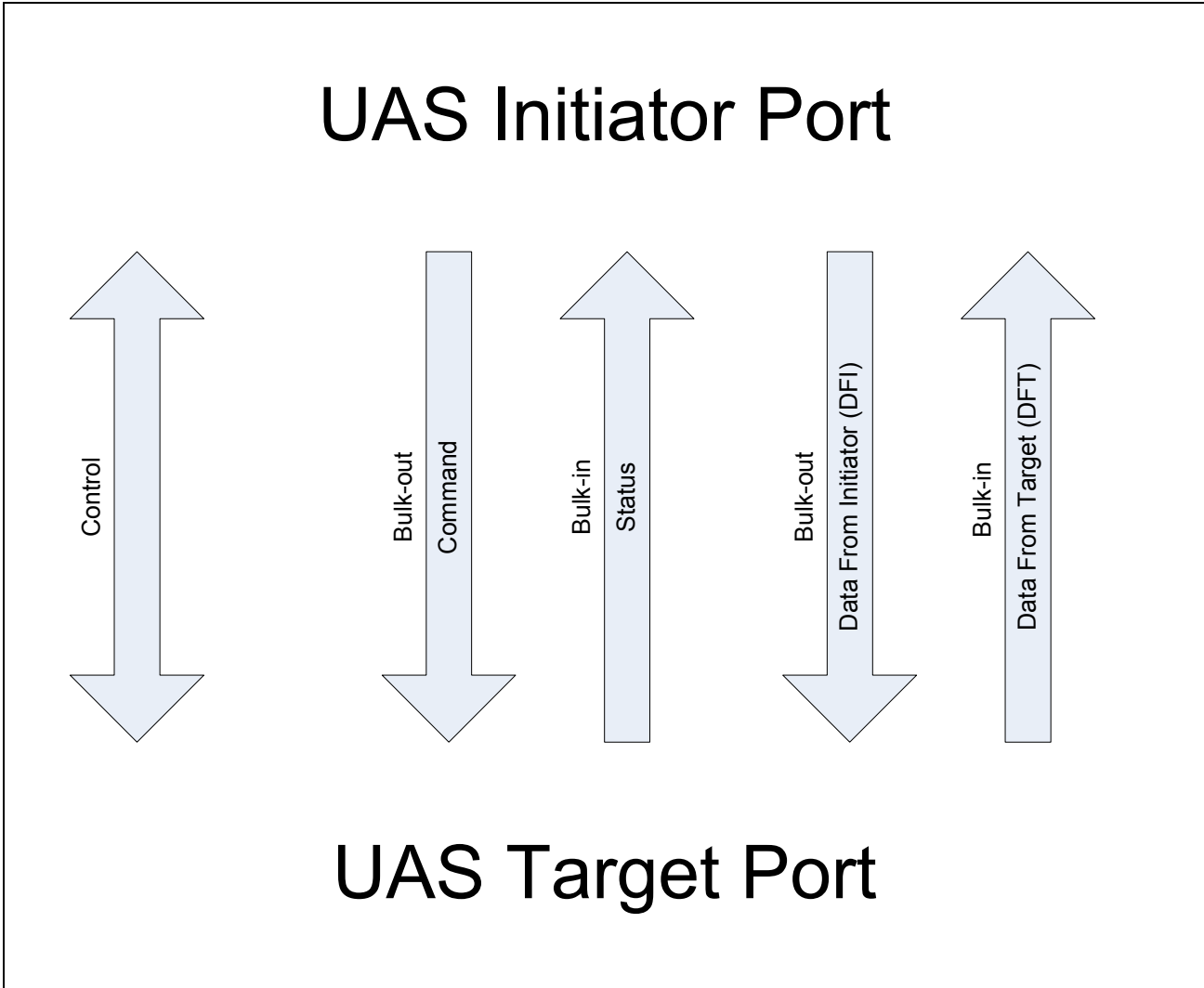


Figure 1 — USB Model

The Control pipe is a required by USB-20, and is not used by this standard.

The USB target receives IUs from the USB initiator using the Command pipe and responds with IUs using the Status pipe.

The Data-in pipe and the Data-out pipe transmit data between the UAS initiator port and the UAS target port.

### 4.1.2 Data Transfers

The five pipe model described in 4.1.1xxx enables the USB device to process commands and return status during data transfers. If the target is transferring data on the DFI or DFT pipes, it shall also be capable of processing Command IUs or Task Management IUs. If the target's queue is full, the shall return a Response IU using the Status pipe. The Response IU may be returned while data is transferred on the DFI or DFT pipes.

Once the target returns a Read Ready IU or a Write Ready IU on the status pipe, it shall be ready to send or receive all the data for the indicated request. After the last byte of data is transferred, the target shall return a Status IU on the Status pipe to indicate command completion. After the command is complete, the associated DFI or DFT pipe is may be used to transfer data for another command.

### 4.1.3 UAS Domain

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[Editor's Note 1: See SAS-2 4.1.9](#)

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### 4.1.4 Task Management Model

#### 4.1.5 Addressing

#### 4.1.6 Resets

##### 4.1.6.1 USB Reset

USB Bus Reset (Treated as a SCSI bus reset) indicates hotplug event (I\_T Nexus Loss)

##### 4.1.6.2 SCSI Resets

###### 4.1.6.2.1 Hard Reset (Power Reset)

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[Editor's Note 2: see SAS-2 4.4.2](#)

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###### 4.1.6.2.2 Logical Unit Reset (Task Management Function)

Does does effect USB.

###### 4.1.6.2.3 Target Reset

Not in SAS, Not currently in UAS, Obsolete in SAM-4. Do we need to carry this like SPC-4 does?

###### 4.1.6.2.4 I\_T Nexus Reset (Task Management Function)

###### 4.1.6.2.5 Device Internal Reset

#### 4.1.7 I\_T Nexus Loss

I\_T Nexus Loss indicates that the USB target port was disconnected from the USB initiator port. The device shall process this event in the same manner as a hard reset.