

To: T10 Technical Committee  
From: Robert Sheffield, Intel (robert.i.sheffield@intel.com)  
Date: 17 January 2005  
Subject: 05-039r1 SAS-1.1: Fix ACK/NAK Balance Checking

**Revision history**

Revision 0 (17 January 2005) First revision  
Revision 1(17 January 2005) Changed “i.e.” to “e.g.”

**Related documents**

sas1.1-r07 - Serial Attached SCSI 1.1 revision 7

**Overview**

The descriptions of the transport layer target and initiator receive data state machines attempt to add checking of the data offset in received data frames. There are problems with the required checking for retry data frames (i.e. CHANGING DATA POINTER bit set).

- a) The ST\_ITS6:Receive\_Data\_In state description requires that the initiator verify the data offset of a retry frame is the same as the last ACK/NAK balance point. The initiator has no way to know when the target port last saw an ACK/NAK balance point. The recommendation is to delete this requirement.
- b) The ST\_TTS5:Receive\_Data\_Out state in the ST\_TTS (target transport server) state machine requires the target to verify a retry frame uses the data offset of the last ACK/NAK balance point. But subclause 9.2.4.5.2, DATA frame with transport layer retries, specifies to retry from the last XFER\_RDY. If the target is checking according to spec, it will flag an error anytime the last ACK/NAK balance point does not match the last XFER\_RDY offset. The recommendation is to change the description of the ST\_TTS5:Receive\_Data\_Out state in the ST\_TTS (target transport server) state machine to verify that the retry frame has the same data offset as the last XFER\_RDY frame.

## Suggested changes

### 9.2.6.2.3.7 ST\_ITS6:Receive\_Data\_In state

#### 9.2.6.2.3.7.1 State description

If this state receives a Data-In Arrived message from the ST\_IFR state machine, then this state shall verify the DATA frame received with the message as follows:

- 1) If the data offset was not expected (~~i.e., the CHANGING DATA POINTER bit is set to one and the value in the DATA OFFSET field is not set to a data offset associated with a previous ACK/NAK balance, or e.g.,~~ the CHANGING DATA POINTER bit is set to zero and the value in the DATA OFFSET field is not set to the value in the DATA OFFSET FIELD in the previous DATA information unit plus the number of bytes in that information unit), then this state shall send a Reception Complete (Data Offset Error) message to the ST\_IFR state machine;
- 2) If the length of the information unit DATA field (i.e., the length of the information unit) plus the length of read data previously received is greater than that specified by the command (i.e., by the CDB delivered in the COMMAND frame), then this state shall send a Reception Complete (Too Much Read Data) message to the ST\_IFR state machine;
- 3) If the length of the information unit DATA field (i.e., the length of the information unit) is zero, then this state shall send a Reception Complete (Incorrect Data Length) message to the ST\_IFR state machine.

<text omitted>

### 9.2.6.3.3.6 ST\_TTS5:Receive\_Data\_Out state

#### 9.2.6.3.3.6.1 State description

If this state receives a Data-Out Arrived message from the ST\_TFR state machine, then this state shall verify the DATA frame received with the message as follows:

- 1) If the data offset was not expected (i.e., the CHANGING DATA POINTER bit is set to one and the value in the DATA OFFSET field is not set to a data offset associated with a previous ~~ACK/NAK balance;~~ [XFER\\_RDY frame](#), or the CHANGING DATA POINTER bit is set to zero and the value in the DATA OFFSET field is not set to the value in the DATA OFFSET FIELD in the previous DATA information unit plus the number of bytes in that information unit), then this state shall send a Reception Complete (Data Offset Error) message to the ST\_TFR state machine;
- 2) If first burst is enabled and the length of the information unit DATA field is greater than the amount indicated by the FIRST BURST SIZE field in the Disconnect-Reconnect mode page (see 10.2.6.1.5), or if an XFER\_RDY frame was sent requesting the write data and the length of the information unit DATA field plus the length of the write data previously received is greater than that specified by the XFER\_RDY frame, then this state shall send a Reception Complete (Too Much Write Data) message to the ST\_TFR state machine;
- 3) If the length of the information unit DATA field is zero, then this state shall send a Reception Complete (Information Unit Too Short) message to the ST\_TFR state machine.