SAS 1.1 External connector pin assignment change T10/03-315r0

Date: September 9, 2003
To: T10 Technical Committee
From: Alvin Cox (alvin.cox@seagate.com)
Subject: SAS 1.1 External connector pin assignment change

The following proposal is made to achieve a common pinout between SAS and SATA for external connectors and to provide technical benefits regarding layout and future transmission speed margin. SAS and SATA ii will use a similar or same external connector. Transmission levels and AC coupling requirements are common between the two specifications.

There are following are justifications supporting the pinout change for the SAS external connector:

1. Signal crossover can be achieved within the cable rather than on the PCB.
2. PCB layout is greatly simplified and can reduce the number of layers required on the system or backplane PCB, thus reducing cost and complexity of implementation.
3. SATA has rejected the SAS pinout and will locate the Rx and Tx pairs together rather than at opposite locations on the connector. If SAS does not change, the cable assemblies for SAS and SATA will not interchange.
4. Some hosts buss adapters are designed to support both SAS or SATA modes by determining what is connected to them during the initiation phase. If SAS and SATA external connector pinouts are different, such devices will not provide as much flexibility to the market.
5. 6Gbps applications will benefit from the simplified PCB layout between the IC and the connector.

Reasons to not support the change:

1. Locating TX next to Rx will have greater near-end crosstalk.
2. Designs may exist that have incorporated the original SAS pinout.

The effect to SAS 1.0 needs to be determined. This is a major change to the specification in that the proposal requires a cable that is not interchangeable/interoperable with the existing 1.0 specification.

The original and modified Table 22's are included below. No other part of the specification changes.

Existing Table 22:

Table 22. Physical link usage in SAS external connector

Signal	Signal pin to use based on number of physical links supported by the cable			
	One	Two	Three	Four
Rx 0+	S1	S1	S1	S1
Rx 0-	S2	S2	S2	S2
Rx 1+	N/C	S3	S3	S3
Rx 1-	N/C	S4	S4	S4
Rx 2+	N/C	N/C	S5	S5
Rx 2-	N/C	N/C	S6	S6
Rx 3+	N/C	N/C	N/C	S7
Rx 3-	N/C	N/C	N/C	S8
Tx 3-	N/C	N/C	N/C	S9
Tx 3+	N/C	N/C	N/C	S10
Tx 2-	N/C	N/C	S11	S11
Tx 2+	N/C	N/C	S12	S12
Tx 1-	N/C	S13	S13	S13
Tx 1+	N/C	S14	S14	S14
Tx 0-	S15	S15	S15	S15
Tx 0+	S16	S16	S16	S16
SIGNAL GROUND	G1-G9			
CHASSIS GROUND	Housing			
Note: N/C: Not connected				

Proposed Table 22:

Table 22. Physical link usage in SAS external connector

Signal	Signal pin to use based on number of physical links supported by the cable			
	One	Two	Three	Four
Tx 3+	N/C	N/C	N/C	S1
Tx 3-	N/C	N/C	N/C	S2
Rx 3-	N/C	N/C	N/C	S3
Rx 3+	N/C	N/C	N/C	S4
Tx 2+	N/C	N/C	N/C	S5
Tx 2-	N/C	N/C	S6	S6
Rx 2-	N/C	N/C	S7	S7
Rx 2+	N/C	N/C	S8	S8
Tx 1+	N/C	S9	S9	S9
Tx 1-	N/C	S10	S10	S10
Rx 1-	N/C	S11	S11	S11
Rx 1+	N/C	S12	S12	S12
Tx 0+	S13	S13	S13	S13
Tx 0-	S14	S14	S14	S14
Rx 0-	S15	S15	S15	S15
Rx 0+	S16	S16	S16	S16
SIGNAL GROUND	G1-G9			
CHASSIS GROUND	Housing			
Note: N/C: Not connected				