

Date: Sept. 12, 2000

To: T10 Committee (SCSI)

From: George Penokie (IBM)

Subject: Bidirectional data transfers in SAM-2

Overview

SCSI currently does not allow data to be transferred in both direction (data out and data in) within a single I/O Process. This restriction is built into several levels of the SCSI architecture as follows:

- No currently defined SCSI command requires data to be transferred in both directions.
- SAM limits data transfers in a single I/O process to a single direction.
- Some of the protocols limit the data transfers to a single direction. (e.g., the SPI standards only define a single pointer per I/O process for data transfers).

Recently there has been a discussion on the reflector that indicates being able to transfer data in both directions during an I/O process would be beneficial. It was pointed out that some, if not all, the serial protocols already allow bidirectional data transfers. There was also several statements as to perceived inability of the SAM-2 standard to be changed to allow bidirectional transfers. However, this proposal is just that. The changes which would be required to SAM-2 follow.

SAM-2 changes to allow bidirectional data transfers

In clause 5 the following sentence should be deleted:

An SCSI command shall not allow both the **Data-In Buffer** and the **Data-Out Buffer** arguments.

in clause 5.3.1 the following:

The model requires unidirectional data transfer. That is, the execution of an SCSI command shall not require the transfer of data for that command both to and from the application client.

Should be changed to:

The model allows bidirectional data transfer. That is, the execution of an SCSI command may require the transfer of data for that command both to and from the application client. For a SCSI command that requires bidirectional data transfer the application client buffer shall consist of a data-in buffer and a data-out buffer.

The title of figure 29 should be changed from:

Model for buffered data transfers

to

Model for data-in and data-out buffered data transfers

In clause 5 the following statement should be added:

The target may assume the content of the data-out buffer does not change during the lifetime of the task.

Summary

The above changes would allow the definition of commands that would require protocols to handle bidirectional data transfers. This proposal does not, however, make any suggestions as to how to change SPI-4

so it would allow bidirectional data transfers. So if such commands are defined they would not work on all protocols without further change to those protocols.