X3T9.2/90-128

to: Members of the SCSI Committee
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re: Illegal message handshaking

BACKGROUND:

Message handshaking was originally architected such that an illegal or invalid message would receive immediate feedback. The theory was that MESSAGE OUT messages, except IDENTIFY, would occur infrequently, and always as exception processes. Synchronous request, Bus Device Reset, etc. are appropriate SCSI-1 examples. An invalid message was to be noted by the target changing the bus phase to MESSAGE IN, and handshake a MESSAGE REJECT message to the initiator.

With the advent of automated command sequencing, it was discovered that it is often inconvenient to process the IDENTIFY message immediately, and sense information for "invalid bits in identify message" (3D 00) was born. This was the first time that a message with invalid bits created a check condition instead of a MESSAGE REJECT response.

SCSI-2 has created additional high performance message sequences beyond IDENTIFY which can be sent for each command. These are the two-byte command queue control messages. When coupled with the IDENTIFY message, a three byte sequence results which could conceivably occur on almost every command. NCR's request for further disconnect control through the message system in SCSI-3 is an additional case where multiple-byte messages can occur as a typical command stream.

PROBLEM:

It is becoming increasingly difficult to handle these main-stream messages in an automated sequence when the message must be processed for validity before changing to the command phase. It is impossible to do so with serial SCSI.

RESOLUTION:

I would suggest a mechanism which allows MESSAGE OUT phase sequences of 3-bytes (IDENTIFY plus 20-2F 2-byte messages) to be classified as high-speed sequences which can be followed directly by the command phase.

It is expected that new messages will be added which likewise are part of typical high-speed command sequencing. Space for these messages should also be allocated within the 20-2F range.

ERROR REPORTING:

It is still possible for reserved and unsupported messages in the range of 20-2F to be sent. They must be detected such that a check condition can be sent and appropriate sense generated. Instead of generating a unique sense for each condition, I would suggest a global INVALID MESSAGE OUT sense, with the appropriate byte noted by the field pointer. The structure is orthogonal with Command and Parameter error detection and may also serve as a basis for Serial SCSI implementations.

CONCLUSION:

The current message system mechanism of reporting message errors hampers rather than enhances system performance. It is necessary to develop an alternate mechanism for handling routine high-speed message sequences such that error processing need not occur on-line. This mechanism would enhance parallel-bus performance and is certainly required for serial implementations.