

**From:** Gerry Houlder, Seagate Technology <gerry.houlder@seagate.com>  
**Subj:** SAS-2: Add minimum number of dwords after Identify frame  
**Date:** Aug. 8, 2007

---

Seagate has performed simulations that indicate following an Identify frame with another frame (either an Open frame or another Identify frame) can result in not recognizing the Identify frame even if there were no transmission errors. This condition doesn't occur in systems today but might in the near future with higher performance designs or a requirement to transmit 3 Identify frames.

The problem can be resolved by requiring non-deletable primitives to be sent after each Identify frame. Today's systems meet this requirement but SAS-2 doesn't specify that any dwords are required between frames. This proposal adds a requirement that 3 dwords that are not deletable shall be sent after each Identify frame. I believe this requirement is met by specifying "idle dwords".

**Proposed changes for SAS-2, rev. 10: (additions in [blue](#))**

**7.9.4.2 SL\_IR transmitter and receiver**

The SL\_IR transmitter receives the following messages from the SL\_IR state machines indicating primitive sequences, frames, and dwords to transmit:

- a) Transmit IDENTIFY Address Frame;
- b) Transmit HARD\_RESET; and
- c) Transmit Idle Dword.

Upon receiving a Transmit IDENTIFY Address Frame message, the SL\_IR transmitter shall transmit:

- 1) [SOAF](#);
- 2) [Data Dwords](#);
- 3) [EOAF](#); and
- 4) [at least 3 idle dwords](#).

NOTE - Phys compliant with previous versions of this standard were not required to transmit idle dwords after EOAF.

The SL\_IR transmitter sends the following messages to the SL\_IR state machines:

- a) HARD\_RESET Transmitted; and
- b) IDENTIFY Address Frame Transmitted.

The SL\_IR receiver sends the following messages to the SL\_IR state machines indicating primitive sequences and dwords received from the SP\_DWS receiver (see 6.9.2):

- a) SOAF Received;
- b) Data Dword Received;
- c) EOAF Received;
- d) ERROR Received;
- e) Invalid Dword Received; and
- f) HARD\_RESET Received.

The SL\_IR receiver shall not require reception of any idle dwords after an IDENTIFY Address Frame.

The SL\_IR receiver shall ignore all other dwords.