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FROM: Peter Johansson

TO: T10 SBP-3 working group

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RE: Configuration ROM for SBP-3 plug control registers

At the working group meeting in Huntington Beach, I suggested that the isochronous transport facilities of SBP-3 could be used with simple devices, *e.g.*, printers or scanners, without modification of their command sets if there were a mechanism to associate an isochronous channel (and, optionally, speed and maximum data payload, in the case of an output stream) with the data to be transferred.

A proposal for the addition of a Plug_Control_Register entry to configuration ROM follows. In cases where only such entry is present for a particular data transfer direction, the *direction* bit the command block ORB would uniquely identify the appropriate plug control register. For example, an isochronous scanner would obtain channel number, transmission speed and maximum data payload per isochronous period from the identified output plug control register (oPCR) while an isochronous printer would obtain channel number, only, from the identified input plug control register (iPCR). Connection management procedures specified by IEC 61883-1 would be used by the initiator to program the plug control registers with the pertinent information.

I think the proposal has two merits: a) it makes simple isochronous data transfer operations (for which there is at most one stream in either direction) possible within the framework of SBP-3 without modification of device command sets and b) it enables bridge silicon/firmware to convert an unmodified SCSI or ATAPI product into an isochronous SBP-3 product.

7.7 Directory entries

This standard defines configuration ROM entries that may appear in a unit directory or logical unit directories dependent upon the unit directory or both, as specified by the table below.

Directory entry	Unit directory	Logical unit directory	Inherited
Specifier_ID	Required	Prohibited	
Version	Required	Prohibited	
Revision	Optional	Prohibited	
Command_Set_Spec_ID	Optional [1]	Optional [1]	Yes
Command_Set	Optional [1]	Optional [1]	Yes
Command_Set_Revision	Optional	Optional	Yes
Firmware_Revision	Optional	Optional	No
Management_Agent	Required	Prohibited	
Unit_Characteristics	Required	Prohibited	
Reconnect_Timeout	Optional	Prohibited	
Fast_Start	Optional	Optional	Yes
Plug_Control_Register	Optional	Optional	Yes
Logical_Unit_Directory	Optional	Prohibited	
Logical_Unit_Number	Optional [2]	Required	
Unit_Unique_ID	Optional	Prohibited	

For entries that may appear in a logical unit directory, the rightmost column in the table specifies whether or not the value of the entry is implicitly inherited from the parent unit directory if it is not present in the logical unit directory. In addition to the directory entries described above, unit directories and any of their dependent directories may contain entries permitted by IEEE Std 1212-2001.

The command set of each of a target's logical units shall be identified by either explicit or inherited values of Command_Set_Spec_ID and Command_Set entries. If the unit directory contains one or more Logical_Unit_Number entries, both entries shall be present in the unit directory. If the unit directory contains one or more Logical_Unit_Directory entries, the logical units defined in each directory may inherit their command set from the Command_Set_Spec_ID and Command_Set entries in the parent unit directory or these entries may be present in the logical unit directory. If either of these entries is omitted from a logical unit directory, it shall be present in the parent unit directory.

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[1] These entries may not be omitted altogether but shall be present in one of the combinations described below.
[2] A target shall have at least one Logical_Unit_Number entry, whether in a unit directory or a logical unit directory.

7.7.11a Plug_Control_Register entry

The Plug_Control_Register entry is an optional entry in either the unit directory or a dependent logical unit directory that, if present (or inherited), associates a plug control register with a logical unit. There may be more than one Plug_Control_Register entry within a unit directory or a logical unit directory. Figure 60a shows the format of this entry.

most significant			least significant
31_{16}	reserved	i	plug_index
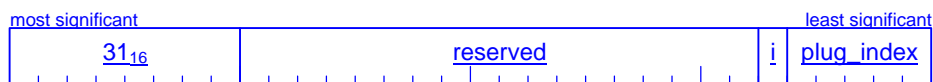
Figure 60a – Plug_Control_Register entry format

31_{16} is the concatenation of *key_type* and *key_value* for the Plug_Control_Register entry.

The *direction* bit (abbreviated as *d* in the figure above) shall be zero when *plug_index* refers to an input plug control register (iPCR) and one when *plug_index* refers to an output plug control register (oPCR).

The *plug_index* field shall, in combination with the *direction* bit, identify a plug control register. The address of the plug control register, within node space, is obtained from the formula $FFFF\ F000\ 0980_{16}$ - (128 * *direction*) + (4 * (*plug_index* +1)). Plug control registers are specified by IEC 61883-1 and draft standard IEEE P1394.1.

NOTE – The *isochronous* bit in a command block ORB (see 5.1.2) controls whether or not data associated with the ORB is transferred isochronously. When *isochronous* is one, if (for the logical unit to which the ORB is signaled) there is one and only one Plug_Control_Register entry whose *direction* bit matches the *direction* bit in the ORB, the Plug_Control_Register entry uniquely identifies the plug control register from which additional isochronous stream information is obtained. In the case of an oPCR, this includes channel number, speed and maximum data payload; an iPCR describes only the channel number.