

Date: 6 March 2006
To: T10 Technical Committee
From: Steve Johnson and Ralph Weber
Subject: SAS-2 Zoning-related SMP functions

Summary

Changes are proposed that replace the ZONE BROADCAST address frame proposed in 06-019r2 and 06-029r1 by a combination of two new SMP functions: SMP CHANGE and SMP ORIGINATE BROADCAST PRIMITIVES.

WARNING: This proposal only defines the SMP functions. New revisions of 06-019, 06-029, and proposals derived from them are expected to define the models for using these SMP functions.

Referenced Documents

SAS-2 revision 2	(http://www.t10.org/ftp/t10/drafts/sas2/sas2r02.pdf)
SAS-2 Zoning [06-019r2]	(http://www.t10.org/ftp/t10/document.06/06-019r2.pdf)
Zoning Changes [06-029r1]	(http://www.t10.org/ftp/t10/document.06/06-029r1.pdf)

Revision History

Prior to the preparation of this proposal, the SMP functions described herein were part of 06-029r1. This proposal separates the SMP functions so they can be referenced by new revisions of 06-019, 06-029, or proposals spawned from those works.

- r0 Initial revision
- r1 Change SEND BROADCAST PRIMITIVES to ORIGINATE BROADCAST PRIMITIVES as agreed during the 26 January conference call
- r2 Removed the CHANGE SMP function definition so that ORIGINATE BROADCAST PRIMITIVES can be approved for incorporation with 06-122r2 and made other changes requested by the 6 March SAS Protocol working group (minutes in 06-124) which properly align this proposal with the content of 06-122r2.

Changes between r0 and r1/r2 are marked with change bars.

Overview

Many SAS Protocol Working Group discussions about the 06-019 proposed ZONE BROADCAST address frame have been dominated by complaints about it.

- Flow Control
- Non-Deterministic Behavior
- Insufficient Information in Broadcast
 - resulting in extra message traffic to discover the rest of the story
- Frame Size
- Frame versus Primitive Signal usage

Every attempt to address these issues produced greater complexity. This proposal an SMP ORIGINATE BROADCAST PRIMITIVES request/response which is part of the response to these issues.

The SMP ORIGINATE BROADCAST PRIMITIVES request/response is designed to allow the origination of BROADCAST primitives to be confined to a zone group.

The SMP ORIGINATE BROADCAST PRIMITIVES request/response is sent:

- from a supervising device whose exact nature depends on the configuration model adopted for SAS-2,
- to an expander to which devices (both end devices and non-zoning expanders) that should receive the specified BROADCAST primitive are connected.

Changes Proposed in SAS-2 revision 2

10.4.3 SMP functions

10.4.3.1 SMP function request frame format

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The FUNCTION field specifies which SMP function is being requested and is defined in table 190. If the value in the FUNCTION field is not supported by the SMP target port, it shall return a function result of UNKNOWN SMP FUNCTION as described in table 192.

Table 190 — SMP functions (FUNCTION field)

Code	SMP Function	Description	Reference
...			
83h - 84h	Reserved for general SMP output functions {and planned for usage in pending proposals}		
85h	ORIGINATE BROADCAST PRIMITIVES	Originate specified BROADCAST primitive on the ports in the specified zone group or zone groups	10.4.3.cc
86h - 8Fh	Reserved for general SMP output functions		
...			

10.4.3.cc ORIGINATE BROADCAST PRIMITIVES function

The ORIGINATE BROADCAST PRIMITIVES function requests that the specified BROADCAST primitive be originated on all the ports that are in one or more specified zone groups, with the exception of the port on which the ORIGINATE BROADCAST PRIMITIVE function was received (see 4.9.5). This SMP function shall be supported by SMP target ports in zoning expander devices (see 4.9). Other SMP target ports shall not support this SMP function.

Table cc1 defines the request format.

Table cc1 — ORIGINATE BROADCAST PRIMITIVES request

Byte/ Bit	7	6	5	4	3	2	1	0
0	SMP FRAME TYPE (40h)							
1	FUNCTION (85h)							
2	Reserved							
3	REQUEST LENGTH ((n - 7) / 4)							
4	Reserved				BROADCAST PRIMITIVE			
5	Reserved							
6	Reserved							
7	NUMBER OF ZONE GROUPS							
Zone groups								
8	ZONE GROUP (first)							
	:							
	:							
	ZONE GROUP (last)							
DWORD ALIGNMENT BYTES (0 to 3 bytes)								
n-4								
n-3	(MSB)							
n	CRC							
	(LSB)							

The SMP FRAME TYPE field shall be set to 40h.

The FUNCTION field shall be set to 85h.

The REQUEST LENGTH field specifies the number of dwords that follow not including the CRC field.

The BROADCAST PRIMITIVE field (see table cc2) specifies the type of BROADCAST primitive (see 7.2.5.4) that shall be originated on each port in the specified zone groups.

Table cc2 — BROADCAST PRIMITIVE field

Code	Description
000b	BROADCAST (CHANGE) primitive
001b	BROADCAST (RESERVED CHANGE 0) primitive
010b	BROADCAST (RESERVED CHANGE 1) primitive
011b	BROADCAST (SES) primitive
100b	BROADCAST (EXPANDER) primitive
101b	BROADCAST (RESERVED 2) primitive
110b	BROADCAST (RESERVED 3) primitive
111b	BROADCAST (RESERVED 4) primitive

The NUMBER OF ZONE GROUPS field specifies the number of zone groups in which the specified BROADCAST primitive is to be originated.

Each ZONE GROUP field specifies one zone group in which the specified BROADCAST primitive shall be originated on each participating port. Zone group values between 128 and 255, inclusive, are reserved.

The DWORD ALIGNMENT BYTES field shall be composed of zero to three bytes containing zeros. The number of bytes the DWORD ALIGNMENT BYTES field shall be equal to the next multiple of for larger than the number of zone groups minus the number of zone groups.

The CRC field is defined in 10.4.3.1.

Table cc3 defines the response format.

Table cc3 — ORIGINATE BROADCAST PRIMITIVES response

Byte/ Bit	7	6	5	4	3	2	1	0	
0	SMP FRAME TYPE (41h)								
1	FUNCTION (85h)								
2	FUNCTION RESULT								
3	REQUEST LENGTH (00h)								
4	(MSB)				CRC				
7									(LSB)

The SMP FRAME TYPE field shall be set to 41h.

The FUNCTION field shall be set to 85h.

The REQUEST LENGTH field shall be set to 00h.

The FUNCTION RESULT field is defined in 10.4.3.2.

The CRC field is defined in 10.4.3.1.