

To: X3T9.2 Committee (SCSI)

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Subject: SDA Commands and Mode Pages

1.0 Overview

To control and configure a SCSI-3 Disk Array several new commands and mode pages are required. This proposal defines those commands and mode pages.

<<Editors Note: This pass and only contains an outline of the commands and mode pages GOP>>

2.0 Extents

2.1 P-extent

All P-extents contain the following information:

- Physical Logical Unit Identifier (P-LUI) 2 bytes
- Start P-LBA 4 bytes
- Number of P-LBAs 4 bytes
- Number of Bytes per P-LBA 2 bytes

Note:For variable block length device types the number of bytes per P-LBA field shall be set to zero.

2.2 PS-extent

All PS-extents contain the following information:

- Physical Logical Unit Identifier (P-LUI) 2 bytes
- Start PS-LBA 4 bytes
- Number of PS-LBAs 4 bytes
- Number of Bytes per PS-LBA 2 bytes

Note:For variable block length device types the number of bytes per P-LBA field shall be set to zero.

3.0 Maintenance Operations

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| 3.1 Report P-LUI Command

| This command would send the following parameter list:

- | -Physical Logical Unit Identifier (P-LUI) (R) 2 bytes
- | -Peripheral Device Type (1 per P-LUI) 1 byte
- | -Replaceable Unit (1 per P-LUI) 1 bit

Note: Any parameters indicated by a (R) may be repeated. Any parameters indicated by a (S) shall only occur once per service request.

3.2 Report P-LUI Geographic Location Command

The CDB would contain the following:

-Physical Logical Unit Identifier (P-LUI) 2 bytes

This command would return the following parameter list:

-Geographic Location Variable

3.3 Set P-LUI Geographic Location Command

The CDB would contain the following:

-Physical Logical Unit Identifier (P-LUI) 2 bytes

This command would send the following parameter list:

-Geographic Location Variable

3.4 Report Physical Space Command

The CDB would contain the following:

-Report assigned/unassigned physical space 1 byte

This command would return the following parameter list:

-P-extent (R) 12 bytes
-Peripheral Device Type (1 per P-extent) 1 byte
-State of the P-extent (1 per P-extent) 1 byte

3.5 Exchange P-LUI Command (Immediate bit in CDB)

The CDB would contain the following:

-Old P-LUI (S) 2 bytes
-New P-LUI (S) 2 bytes

3.6 Remove P-LUI Command

The CDB would contain the following:

-P-LUI (S) 2 bytes

3.7 Exchange P-extent Command (Immediate bit in CDB)

This command would send the following parameter list:

- Old P-extent (S) 12 bytes
- New P-extent (S) 12 bytes

3.8 Set Method of Reporting Informational Exception Conditions Mode Page

A SDA mode page would contain the following:

- Method of Reporting Informational Exceptions (S) 1 byte

4.0 Redundancy Group Operations

4.1 Create/Modify Redundancy Group Command (Immediate bit in CDB)

This command would send the following parameter list:

- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes
- Recalculate check data (S) 2 bits
- Preserve protected space (S) 2 bits
- Set protected space to known value (S) 9 bits
- Redundancy Type Identifier (S) 1 byte
- Granularity of Units (bit, byte, logical block, etc.) (S) 1 byte
- P-Extent (R) 12 bytes
- Start check data interleave P-LBA (1 per P-extent) 4 bytes
- Number of units of check data (1 per P-extent) 4 bytes
- Number of units of user data (1 per P-extent) 4 bytes

4.2 Report Redundancy Groups Command

The CDB would contain the following:

- Report all R-LUIs (Yes/No) (S) 1 bit
- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes

This command would report the following parameter list:

- Redundancy Group Logical Unit Identifier (R-LUI) (R) 2 bytes
- Redundancy Type Identifier (1 per R-LUI) 1 byte
- Granularity of Units (bit, byte, etc.) (1 per R-LUI) 1 byte
- State of the Redundancy Group (1 per R-LUI) 1 byte
- P-Extent (x per R-LUI) 12 bytes
- Start Check Data Interleave P-LBA (1 per P-extent) 4 bytes
- Number of units of check data (1 per P-extent) 4 bytes
- Number of units of user data (1 per P-extent) 4 bytes

4.3 Report Unassigned Redundancy Group Space Command

The CDB would contain the following:

- Report all unassigned R-LUIs (Yes/No) (S) 1 bit
- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes

This command would report the following parameter list:

- Redundancy Group Logical Unit Identifier (R-LUI) (R) 2 bytes
- Redundancy Type Identifier (1 per R-LUI) 1 byte
- State of the Redundancy Group (1 per R-LUI) 1 byte
- PS-Extent (x per R-LUI) 12 bytes

4.4 Delete Redundancy Group Command

The CDB would contain the following:

- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes

4.5 Recalculate Check Data Command (Immediate bit in CDB)

The CDB would contain the following:

- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes

4.6 Verify Check Data Command (Immediate bit in CDB)

The CDB would contain the following:

- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes

4.6.1 Verify Check Data Mode Page

A SDA mode page would contain the following:

- Enable/Disable Continuous Verification (S) 1 bit

4.7 Control Generation of Check Data Mode Page

A SDA mode page would contain the following:

- Redundancy Group Logical Unit Identifier (R-LUI) (S) 2 bytes
- Enable/Disable Check Data (S) 1 bit

| 4.8 Rebuild P-extent Command (Immediate bit in CDB)

This command would send the following parameter list:

- P-extent (S) 12 bytes
- Redundancy Group Logical Unit Identifier (R-LUI) (R) 2 bytes

| 4.9 Rebuild P-LUI Command (Immediate bit in CDB)

| This command would send the following parameter list:

- | -P-LUI (S) 2 bytes
- | -Redundancy Group Logical Unit Identifier (R-LUI) (R) 2 bytes

5.0 Volume Set Operations

5.1 Create/Modify Volume Set Command (Immediate bit in CDB)

This command would send the following parameter list:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes
- PS-extent Stripe Length (S) 4 bytes
- PS-extent Interleave Depth (S) 4 bytes
- Granularity of Units (bit, byte, logical block, etc.) (S) 1 byte
- PS-extent (R) 12 bytes
- User Data Stripe Depth (1 per PS-extent) 4 bytes
- Increment/Decrement PS-LBA Count (1 per PS-extent) 4 bytes

5.2 Report Volume Sets Command

The CDB would contain the following:

- Report all V-LUIs (Yes/No) (S) 1 bit
- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes

This command would report the following parameter list:

- Volume Set Logical Unit Identifier (V-LUI) (R) 2 bytes
- PS-extent Stripe Length (1 per V-LUI) 4 bytes
- PS-extent Interleave Depth (1 per V-LUI) 4 bytes
- Granularity of Units (bit, byte, etc.) (1 per V-LUI) 1 byte
- State of the Volume Set (1 per V-LUI) 1 byte
- PS-extent (x per V-LUI) 12 bytes
- User Data Stripe Depth (1 per PS-extent) 4 byte
- Increment/Decrement PS-LBA Count (1 per PS-extent) 1 bit

5.3 Delete Volume Set Command

The CDB would contain the following:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes

| 5.4 Recalculate V-LUI Check Data Command (Immediate bit in CDB)

The CDB would contain the following:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes

| This command would send the following parameter list:

- | -Start V-LBA (S) 4 bytes
- | -Number of V-LBAs (S) 4 bytes

| 5.5 Verify V-LBA Check Data Command (Immediate bit in CDB)

The CDB would contain the following:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes

| This command would send the following parameter list:

- | -Start V-LBA (S) 4 bytes
- | -Number of V-LBAs (S) 4 bytes

5.5.1 Verify Check Data Mode Page (Immediate bit in CDB)

A SDA mode page would contain the following:

- Enable/Disable Continuous Verification (S) 1 bit

5.6 Control Generation of Check Data Mode Page

A SDA mode page would contain the following:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes
- Enable/Disable Check Data (S) 1 bit

5.7 Control Write Operations Mode Page

A SDA mode page would contain the following:

- Volume Set Logical Unit Identifier (V-LUI) (S) 2 bytes
- Enable/Disable Write Operations (S) 1 bit

6.0 Spare Operations

6.1 Create/Modify P-extent Spare Command (Immediate bit in CDB)

This command would send the following parameter list:

- Spare Logical Unit Identifier (S-LUI) (S) 2 bytes
- P-Extent (S) 12 bytes
- Redundancy Group Logical Unit Identifier (R-LUI) (R) 1 bytes
- Associated P-Extent (R) 12 bytes

6.2 Report P-extent Spare Command

The CDB would contain the following:

- Report all P-extent Spares (Yes/No) (S) 1 bit
- Spare Logical Unit Identifier (S-LUI) (S) 2 bytes

This command would send the following parameter list:

- Spare Logical Unit Identifier (S-LUI) (R) 2 bytes
- P-Extent (1 per S-LUI) 12 bytes
- State of the spare (1 per S-LUI) 1 byte
- Redundancy Group Logical Unit Identifier (R-LUI)(x per S-LUI) 2 bytes
- Associated P-Extent (x per S-LUI) 12 bytes

6.3 Create/Modify P-LUI Spare Command (Immediate bit in CDB)

This command would send the following parameter list:

- Spare Logical Unit Identifier (S-LUI) (S) 2 bytes

- P-LUI (S) 2 bytes
- Redundancy Group Logical Unit Identifier (R-LUI) (R) 2 bytes
- Associated P-LUI (R) 2 bytes

6.4 Report P-LUI Spare Command

The CDB would contain the following:

- Report all P-LUI Spares (Yes/No) (S) 1 bit
- Spare Logical Unit Identifier (S-LUI) (S) 2 bytes

This command would send the following parameter list:

- Spare Logical Unit Identifier (S-LUI) (R) 2 bytes
- P-LUI (1 per S-LUI) 2 bytes
- State of the spare (1 per S-LUI) 1 byte
- Redundancy Group Logical Unit Identifier (R-LUI)(x per S-LUI) 2 bytes
- Associated P-LUI (x per S-LUI) 2 bytes

6.5 Delete Spare Command

The CDB would contain the following:

- Spare Logical Unit Identifier (S-LUI) (S) 2 bytes