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To:  SCSI-2 Optical Working Group
     and Accredited Standards Committee X3T9.2

From:  Paul Boulay
       Optical Storage International (LMS / OSI)
       4425 ArrowsWest Drive
       Colorado Springs, CO 80907
       (303) 593-4323

   and

       John Hoy and Jim Harper
       Optotech Inc.
       740 Wooten Road
       Colorado Springs, CO 80915
       (303) 570-7500

Subject:  UPDATE BLOCK COMMAND
          Proposed command for WORM and Optical Device Types

Update Block Command

    Peripheral Device Type:  WORM, Optical Devices
    Operation Type Code:     Optional
    Operation Code:          Group 1 (Op Code 3Dh)

    Command Description Block:

| BIT BYTE | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | Operation Code (3Dh) | | | | | | | |
| 1 | Logical Unit Number | | | Reserved | | | | RelAdr |
| 2 | (MSB) | Logical Block Address | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | Logical Block Address | | | | | | | (LSB) |
| 6 | Reserved | | | | | | | |
| 7 | | | | | | | | |
| 8 | Transfer Length | | | | | | | |
| 9 | Vendor Unique | Reserved | | | | | Flag | Link |

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The Update Block command logically replaces data on the media with new data.

The Logical Block Address specifies the first block to be logically updated.

The Transfer Length gives the number of consecutive blocks to be updated. A transfer length of zero results in no data transfer but will not result in an error and the media shall not be modified.

Transfer lengths beyond one are optional. If the target does not support the requested Transfer Length, it shall respond with a CHECK CONDITION ending status and post an ILLEGAL REQUEST Sense Key without altering the media.

Logical Block Addresses may be repeatedly updated. A Write command to an block previously updated shall post a BLANK CHECK Sense Key if EBC is set to one.

If Enable Blank Check is set to one, the target shall ensure that only previously written blocks are updated. Command termination with CHECK CONDITION status and a BLANK CHECK Sense Key results from an Update Block command which addresses a unwritten sector.

If Enable Blank Check is set to zero, the target may optionally restrict the update operation to previously written blocks.

The physical blocks used to provide the logical update facility of this command shall not be removed from the users logical address space. The Update Blocks command shall be terminated with CHECK CONDITION and a Sense Key of MEDIA ERROR shall be posted if no more replacement sectors are available.

If this command is implemented by a target it shall also provide a means for the initiator to determine when replacement data is being transferred by a Read command. (Via a RECOVERED ERROR Sense Key. This replacement announce function may be selected or suppressed with Mode Select.)

Update Block to User Space Command

    Peripheral Device Type:    WORM, Optical Devices
    Operation Type Code:       Optional
    Operation Code:            Group 5 (Op Code BDh suggested)

    Command Description Block:

```
=====================================================================
 BIT :  7  :  6  :  5  :  4  :  3  :  2  :  1  :  0  :
BYTE :     :     :     :     :     :     :     :     :
=====================================================================
  0  :            Operation Code (BDh)                :
-----+-----------------------+-----------+------+------+
  1  : Logical Unit Number   :  Reserved      :UserSp:RelAdr:
-----+-----------------------+-----------+------+------+
  2  : (MSB)        Logical Block Address             :
-----+----                                         ---+
  3  :                                                :
-----+----                                         ---+
  4  :                                             ---+
-----+----  Logical Block Address                     :
  5  :                                       (LSB) :
-----+----                                         ---+
  6  : (MSB)    Replacement Block Address            :
-----+----                                         ---+
  7  :                                             ---+
-----+----                                         ---+
  8  :                                             ---+
-----+----   Replacement Block Address          (LSB):
  9  :                                                :
-----+---------------------------------------+------+------+
 10  :               Transfer Length                 :
-----+-----------------+---------------------+------+------+
 11  :Vendor Unique:         Reserved         : Flag : Link :
=====================================================================
```

    The Update Block command logically replaces data on the media
with new data.

    The Logical Block Address specifies the first block to be
logically updated.

    The Transfer Length gives the number of consecutive blocks to
be updated. A transfer length of zero results in no data transfer
but will not result in an error and the media shall not be
modified.

    Transfer lengths beyond one are optional. If the target does
not support the requested Transfer Length, it shall respond with
a CHECK CONDITION ending status and post an ILLEGAL REQUEST Sense
Key without altering the media.

    A User Space (UserSp) bit of zero indicates that the User
Address Space is not to be used to contain the replacement data
for the updated blocks. The Update Blocks command shall be
terminated with CHECK CONDITION and a Sense Key of MEDIA ERROR
shall be posted if no more replacement sectors are available.

    A User Space bit of one indicates that User Address Space is to
be used to contain the replacement data and that the Logical
Block Address of the area is Replacement Block Address.

    The Replacement Block Address specifies the first address of an
area of the User Address Space to be used to contain the replace-
ment data for the updated blocks. Command termination with CHECK
CONDITION status and a BLANK CHECK Sense Key results if the
specified replacement area has non-blank blocks. Once used as
replacement blocks these addresses become inaccessable for direct
Read operations.

    Logical Block Addresses may be repeatedly updated. A Write
command to an block previously updated shall post a BLANK CHECK
Sense Key if EBC is set to one.

    If Enable Blank Check is set to one, the target shall ensure
that only previously written blocks are updated. Command termina-
tion with CHECK CONDITION status and a BLANK CHECK Sense Key
results from an Update Block command which addresses a unwritten
sector.

    If Enable Blank Check is set to zero, the target may optionally
restrict the update operation to previously written blocks.

    If this command is implemented by a target it shall also
provide a means for the initiator to determine when replacement
data is being transferred by a Read command. (Via a RECOVERED
ERROR Sense Key. This replacement announce function may be
selected or suppressed with Mode Select.)

*Notes to reviewers:*

*This is a joint proposal of the OSI and Optotech representatives
to the SCSI-2 Optical Working Group but does not represent an
endorsement by either OSI or Optotech.*

*The 10 byte format of this command was proposed to the January 19
- 20 Optical Working Group meeting in Colorado Springs. Sugges-
tions made during the discussion of the Relocate Block command
proposal are reflected in this draft. The name of the command has
been changed to better reflect its logical result.*

*As specified this leaves several aspects undefined. For instance,
with EBC set to zero and block N blank, what is the result of
Update Block ( N ) then Read ( N ). Or Update Block ( N ), Write
( N ) then Read ( N ). Each implementation will need to define
these areas.*