

ISO/IEC 14776-321:2002-08 (E)

Information technology_ - Small Computer System Interface-3 (SCSI-3)_ - Part_321: SCSI-3 Block Commands_(SBC)

CONTENTS

- FOREWORD 8
- INTRODUCTION 9
- 1 Scope10
- 2 Normative references12
 - 2.1 Normative reference overview12
 - 2.2 Approved references12
 - 2.3 References under development12
- 3 Definitions, symbols and abbreviations13
 - 3.1 Definitions13
 - 3.1.1 Definitions specific to direct access devices13
 - 3.1.2 Definitions specific to optical memory block devices and to write-once block devices15
 - 3.2 Symbols and abbreviations15
 - 3.3 Keywords16
 - 3.4 Conventions17
- 4 General17
- 5 SCSI block device models18
 - 5.1 Direct-access device type model18
 - 5.1.0 General18
 - 5.1.1 Removable medium18
 - 5.1.2 Logical blocks19
 - 5.1.3 Ready state19
 - 5.1.4 Power conditions19
 - 5.1.5 Initialization21
 - 5.1.6 Medium defects22
 - 5.1.7 Cache memory22
 - 5.1.8 Reservations23
 - 5.1.9 Seek(10)25
 - 5.1.10 Notched devices25
 - 5.1.11 Rotational position locking25
 - 5.1.12 Relative addressing25
 - 5.1.13 Error reporting25
 - 5.1.14 Examples26
 - 5.1.15 Model for XOR commands27
 - 5.2 Model for optical memory block devices36
 - 5.2.0 General36
 - 5.2.1 Defect management37
 - 5.2.2 Error reporting37
 - 5.3 Model for write-once block devices38
 - 5.3.0 General38
 - 5.3.1 Logical blocks38
 - 5.3.2 Initialization39
 - 5.3.3 Physical medium defects39
 - 5.3.4 Error reporting39
- 6 Commands for block devices40

6.1	Commands for direct-access block devices overview.....	40
6.1.1	Commands for direct-access block devices	40
6.1.2	FORMAT UNIT command.....	42
6.1.3	LOCK UNLOCK CACHE command.....	50
6.1.4	PRE-FETCH command.....	51
6.1.5	READ(6) command	52
6.1.6	READ(10) command	53
6.1.7	READ CAPACITY command.....	54
6.1.8	READ DEFECT DATA(10) command.....	55
6.1.9	READ LONG command.....	57
6.1.10	REASSIGN BLOCKS command.....	58
6.1.11	REBUILD command	60
6.1.12	REGENERATE command.....	62
6.1.13	SEEK(10) command.....	63
6.1.14	SET LIMITS(10) command	64
6.1.15	START STOP UNIT command.....	65
6.1.16	SYNCHRONIZE CACHE command.....	67
6.1.17	VERIFY command.....	68
6.1.18	WRITE(6) command.....	69
6.1.19	WRITE(10) command.....	70
6.1.20	WRITE AND VERIFY command.....	70
6.1.21	WRITE LONG command	71
6.1.22	WRITE SAME command	72
6.1.23	XDREAD command.....	73
6.1.24	XDWRITE command.....	74
6.1.25	XDWRITE EXTENDED command.....	75
6.1.26	XPWRITE command	76
6.2	Commands for optical memory block devices	77
6.2.0	General.....	77
6.2.1	ERASE(10) command	79
6.2.2	ERASE(12) command	80
6.2.3	MEDIUM SCAN command.....	81
6.2.4	READ(12) command	83
6.2.5	READ DEFECT DATA(12) command.....	84
6.2.6	READ GENERATION command	85
6.2.7	READ UPDATED BLOCK(10) command.....	86
6.2.8	SET LIMITS(12) command	87
6.2.9	UPDATE BLOCK command.....	88
6.2.10	VERIFY(10) command.....	89
6.2.11	VERIFY(12) command.....	90
6.2.12	WRITE(10) command.....	91
6.2.13	WRITE(12) command.....	91
6.2.14	WRITE AND VERIFY(10) command	92
6.2.15	WRITE AND VERIFY(12) command	93
6.3	Commands for write-once block devices.....	94
7	Parameters for block devices	96
7.1	Parameters for direct-access block devices.....	96
7.1.1	Diagnostic parameters	96
7.1.2	Log parameters.....	101

7.1.3	Mode parameters	103
7.1.4	Parameters for optical memory block devices	129
7.1.5	Parameters for write-once block devices	132
Annex A (informative)	XOR command examples	133
A.1	XOR annex overview	133
A.2	Storage array controller supervised XOR operations	133
A.2.1	Update write operation	133
A.2.2	Regenerate operation	134
A.2.3	Rebuild operation	135
A.3	Third-party XOR operations	136
A.3.1	Update write operation	136
A.3.2	Regenerate operation	137
A.3.3	Rebuild operation	138
A.4	Hybrid subsystem XOR operations	139
A.4.1	Regenerate operation	139
A.4.2	Rebuild operation	140
Bibliography	142
Figure 1	– SCSI standards – General structure	11
Figure 2	– SCSI power conditions flow control (automatic switching)	20
Figure 3	– SCSI power conditions flow control (controlled switching)	21
Figure 4	– Power conditions flowchart	119
Figure A.1	– Rebuild operation	134
Figure A.2	– Regenerate operation	135
Figure A.3	– Rebuild operation	136
Figure A.4	– Update write operation	137
Figure A.5	– Regenerate operation	138
Figure A.6	– Rebuild operation	139
Figure A.7	– Regenerate operation	140
Figure A.8	– Rebuild operation	141

Table 1 – Sample error conditions	26
Table 2 – Sample error conditions	38
Table 3 – Sample error conditions	39
Table 4 – Commands for direct-access block devices	40
Table 5 – FORMAT UNIT command.....	42
Table 6 – FORMAT UNIT parameter list.....	43
Table 7 – DEFECT LIST HEADER.....	44
Table 8 – FORMAT UNIT defect descriptor format and requirements	45
Table 9 – DEFECT DESCRIPTOR – Block format.....	47
Table 10 – DEFECT DESCRIPTOR – Bytes from index format.....	47
Table 11 – DEFECT DESCRIPTOR – Physical sector format	48
Table 12 – Initialization pattern descriptor	48
Table 13 – Initialization pattern modifier.....	49
Table 14 – Initialization pattern type.....	49
Table 15 – LOCK UNLOCK CACHE command	50
Table 16 – PRE-FETCH command.....	51
Table 17 – READ(6) command	52
Table 18 – READ(10) command	53
Table 19 – READ CAPACITY command.....	54
Table 20 – READ CAPACITY data	55
Table 21 – READ DEFECT DATA(10) command	55
Table 22 – READ DEFECT DATA(10) defect list	56
Table 23 – READ LONG command	57
Table 24 – REASSIGN BLOCKS command.....	58
Table 25 – REASSIGN BLOCKS defect list	59
Table 26 – REBUILD command	60
Table 27 – PORT CONTROL field.....	61
Table 28 – REBUILD and REGENERATE parameter data	61
Table 29 – SOURCE DESCRIPTOR format	62
Table 30 – REGENERATE command.....	63
Table 31 – SEEK(10) command.....	64
Table 32 – SET LIMITS(10) command	64
Table 33 – START STOP UNIT command.....	65
Table 34 – POWER CONDITIONS	66
Table 35 – SYNCHRONIZE CACHE command.....	67
Table 36 – VERIFY command.....	68
Table 37 – WRITE(6) command.....	69
Table 38 – WRITE(10) command.....	70
Table 39 – WRITE AND VERIFY command.....	71
Table 40 – WRITE LONG command	72
Table 41 – WRITE SAME command	73
Table 42 – XDREAD command.....	74
Table 43 – XDWRITE command	74

Table 44 – XDWRITE EXTENDED command.....	75
Table 45 – XPWRITE command	77
Table 46 – Commands for optical memory block devices	78
Table 47 – ERASE(10) command	80
Table 48 – ERASE(12) command	81
Table 49 – MEDIUM SCAN command	81
Table 50 – MEDIUM SCAN parameter list.....	82
Table 51 – READ(12) command	84
Table 52 – READ DEFECT DATA(12) command	84
Table 53 – READ DEFECT DATA(12) list header	85
Table 54 – READ GENERATION command	85
Table 55 – Maximum generation data block	86
Table 56 – READ UPDATED BLOCK(10) command	86
Table 57 – SET LIMITS(12) command	87
Table 58 – UPDATE BLOCK command.....	88
Table 59 – VERIFY command.....	89
Table 60 – VERIFY(12) command.....	90
Table 61 – WRITE(10) command.....	91
Table 62 – WRITE(12) command.....	92
Table 63 – WRITE AND VERIFY(10) command	92
Table 64 – WRITE AND VERIFY(12) command	94
Table 65 – Commands for write-once block devices.....	95
Table 66 – Diagnostic page codes	97
Table 67 – Translate address page – SEND DIAGNOSTIC	97
Table 68 – Translate address page – RECEIVE DIAGNOSTIC	98
Table 69 – Device status page – SEND DIAGNOSTIC	99
Table 70 – Device status page – RECEIVE DIAGNOSTIC.....	100
Table 71 – SYNCHRONIZATION field	100
Table 72 – Log page codes.....	101
Table 73 – Format status log page.....	102
Table 74 – Direct-access medium-type codes	103
Table 75 – Device specific parameter	103
Table 76 – Mode page codes.....	104
Table 77 – Caching page.....	105
Table 78 – Demand read retention priority and write retention priority.....	106
Table 79 – Flexible disk page	109
Table 80 – Examples of transfer rates	110
Table 81 – PIN 34 field	111
Table 82 – PIN 4 field	112
Table 83 – PIN 1 field	112
Table 84 – Format device page.....	113
Table 85 – Reporting of default sector formatting support	115
Table 86 – Reporting of changeable sector formatting support	115

Table 87 – Medium types supported page	115
Table 88 – Notch page	116
Table 89 – Power condition page	118
Table 90 – Read-write error recovery page	119
Table 91 – Error recovery bit definitions	121
Table 92 – Combined error recovery parameter descriptions	122
Table 93 – Rigid disk device geometry page	125
Table 94 – Rotational position locking	126
Table 95 – Verify error recovery page	127
Table 96 – XOR control mode page	128
Table 97 – Diagnostic page codes	129
Table 98 – Log page codes	129
Table 99 – Optical memory medium-type codes	130
Table 100 – Optical memory block device specific parameter	130
Table 101 – Optical memory density codes	131
Table 102 – Mode page codes	131
Table 103 – Optical memory page	132