

STANDARD

9318-3

First edition  
1990-12-15

---

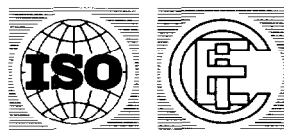
---

## Information technology — Intelligent Peripheral Interface

### Part 3:

Device generic command set for magnetic and optical disk drives

*Technologies de l'information — Interface pour les périphériques intelligents —  
Partie 3: Jeu de commandes génériques appareil pour les disques magnétiques et optiques*



Reference number  
ISO/IEC 9318-3 : 1990 (E)

## Contents

	Page
Foreword .....	xxvii
Introduction .....	xxviii
1 Scope .....	1
2 Normative reference .....	2
3 Definitions and conventions .....	3
3.1 Definitions .....	3
3.2 Conventions .....	5
4 Logical interface characteristics .....	6
4.1 Operations .....	6
4.1.1 Commands .....	6
4.1.1.1 Command types .....	6
4.1.1.2 Command stacking .....	6
4.1.1.2.1 Individual .....	6
4.1.1.2.2 Queued .....	7
4.1.1.3 Command execution order .....	7
4.1.2 Operation responses .....	8
4.1.2.1 Interrupts .....	8
4.1.2.2 Response types .....	9
4.1.2.2.1 Command completion response .....	9
4.1.2.2.2 Transfer Notification Response (optional) .....	9
4.1.2.2.3 Asynchronous response .....	9
4.1.2.2.4 Imbedded data response (optional) .....	9
4.1.2.3 Response handling .....	9
4.1.3 Physical interface error recovery considerations .....	10
4.1.3.1 Recovery from unsuccessful Slave Status octet .....	10
4.1.3.2 Recovery from bad parity on the Slave Status octet .....	10
4.2 Operation sequences .....	11
4.2.1 Slave procedures .....	11
4.2.2 Basic steps .....	11
4.2.2.1 Transmit Command packet to slave .....	11
4.2.2.2 Poll interrupts .....	12
4.2.2.3 Receive Response packet from slave .....	12
4.2.2.4 Transfer of data between master and slave .....	12
4.2.3 Operation sequence examples .....	13
4.2.3.1 Example of facility selection and individual commands .....	13
4.2.3.2 Example of facility selection and queued commands .....	13
4.2.3.3 Example of slave selection. ....	14
4.2.3.4 Example of slave selection and slave control of Bus .....	14
4.3 Multiplexed data transfers (optional) .....	15
4.3.1 Physical interface Pause and Continue (optional) .....	15
4.3.2 Slave pause and master Continue .....	15
4.3.2.1 Implicit continue .....	16
4.3.2.2 Explicit continue .....	16
4.3.3 Slave control of Pause and Continue .....	16
4.3.4 Master control of Pause and Continue .....	16
4.3.5 Uses of multiplexing .....	17
4.3.5.1 One paused transfer per facility .....	17

© ISO/IEC 1990

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

4.3.5.2 One paused transfer per slave	17
4.3.5.3 Multiple paused transfers per slave	17
4.3.6 Anticipated pause	17
4.3.6.1 Master stays selected	17
4.3.6.2 Master deselects	18
4.3.7 Unanticipated pauses by the slave	18
4.3.8 Unanticipated pauses by the master	18
4.3.9 Multiplexed transfer mode identification	18
4.4 Data groupings	18
4.4.1 PhysicalBlocks	19
4.4.2 DataBlocks	19
4.4.3 Extents	19
4.4.4 Partitions	19
4.4.4.1 Slave-defined partitions	20
4.4.4.1.1 Data partition	20
4.4.4.1.2 Maintenance partitions	20
4.4.4.2 Master-defined partitions	20
4.4.4.2.1 Data partitions	20
4.4.4.2.2 Maintenance partitions	20
4.4.5 Alternate data areas	20
4.4.6 Physical groups	20
4.5 Media addressing definitions	21
4.5.1 Absolute addressing	21
4.5.2 Physical addressing	21
4.5.3 Logical addressing	22
4.5.4 Media defect management considerations	22
4.6 Interface addressing definitions	23
4.6.1 Actual Addresses	23
4.6.2 Selection Addresses	23
4.6.3 Command Addresses	23
4.6.4 Facility Address	24
4.6.5 Synonym Addresses (optional)	24
4.6.6 Alias Addresses (optional)	24
4.6.7 Partition parameters	25
4.6.8 Communication addresses (optional)	25
4.6.9 Address examples	26
4.7 Slave and facility conditions	26
4.7.1 Interface conditions	27
4.7.1.1 P-Available	27
4.7.1.2 Not P-Available	27
4.7.1.3 Operational	27
4.7.1.4 Not Operational	28
4.7.1.5 P-Busy	28
4.7.1.6 Not P-Busy	28
4.7.1.7 L-Available	28
4.7.1.8 Not L-Available	28
4.7.1.9 L-Busy	28
4.7.1.10 Not L-Busy	28
4.7.2 General conditions	28
4.7.2.1 Active	28
4.7.2.2 Inactive	28
4.7.2.3 Status Pending	29
4.7.2.4 Reset	29
4.7.3 Operating status	29
4.8 Multiple ports (optional)	30
4.8.1 Slave switching	30
4.8.1.1 Physical switch	31
4.8.1.2 Logical switch	31
4.8.1.3 Mixed switch types	32
4.8.2 Facility switching	32

4.8.3 Slave static switching	33
4.8.3.1 Disabling a slave port	33
4.8.3.2 Enabling a slave port	33
4.8.4 Facility static switching	33
4.8.4.1 Disabling a facility	34
4.8.4.1.1 Disabling a facility at a slave port	34
4.8.4.1.2 Disabling a facility at a facility port	34
4.8.4.2 Enabling a facility	34
4.8.4.2.1 Enabling a facility at a slave port	34
4.8.4.2.2 Enabling a facility at a facility port	35
4.8.5 Slave dynamic switching	35
4.8.5.1 Neutral Mode	35
4.8.5.2 Switched Mode	35
4.8.5.3 Implicitly switched	35
4.8.5.4 Explicitly switched	36
4.8.6 Facility dynamic switch	36
4.8.6.1 Facility neutral mode	36
4.8.6.1.1 Facility neutral mode at the slave port	36
4.8.6.1.2 Facility neutral mode at the facility port	36
4.8.6.2 Facility switched mode	36
4.8.6.2.1 Facility switched mode at a slave port	37
4.8.6.2.2 Facility switched mode at a facility port	37
4.8.6.3 Implicitly switched facilities	37
4.8.6.3.1 Implicitly switched facilities at a slave port	37
4.8.6.3.2 Implicitly switched facility at a facility port	37
4.8.6.4 Explicitly switched facilities	37
4.8.6.4.1 Explicitly switched facilities at a slave port	38
4.8.6.4.2 Explicitly switched facilities at a facility port	38
4.8.7 Allegiances	38
4.8.7.1 Multiple allegiances	38
4.8.7.2 Explicit group allegiance	38
4.8.8 Alternate port notification of changes	38
4.9 Reset	38
4.9.1 External reset	38
4.9.2 Internal reset	39
4.10 Bus octets	39
4.10.1 Facility selection & request facility interrupts octets	39
4.10.2 Bus Control octet	39
4.10.3 Bus Acknowledge octet	39
4.10.4 Master Status octet	40
4.10.4.1 Bit definitions	40
4.10.4.2 Valid combinations	40
4.10.5 Slave Status octet	41
4.10.5.1 Bit definitions	41
4.10.5.2 Valid combinations	42
4.10.6 Request interrupts octet	42
4.10.7 Selective Reset Control octet	42
4.11 ATTENTION IN signal	43
4.12 Information transfers	43
4.12.1 Packet transfer conventions	43
4.12.2 Bit significance conventions	44
4.12.3 Octet significance conventions	44
4.12.4 Command and Response packet conventions	44
4.12.5 Data transfer conventions	45
5 Message packet structure	46
5.1 Conventions	46
5.1.1 General organization	46
5.1.2 Parameters	46
5.1.2.1 Parameter documentation	46

5.1.2.2	Parameter length	47
5.1.2.3	Parameter ID	47
5.1.3	Message packet representation in the document	47
5.2	Operation Command packets	48
5.2.1	Fields in Command packets	48
5.2.1.1	Packet Length	48
5.2.1.2	Command Reference Number	48
5.2.1.3	Slave Address	48
5.2.1.4	Facility Address	49
5.2.1.5	Opcode	49
5.2.1.6	Modifier octet	50
5.2.1.7	Parameters	50
5.2.2	Basic Command Message packet	50
5.2.3	Command packet parameter requirements	52
5.2.3.1	Control Command packet	52
5.2.3.2	Position Command packet	52
5.2.3.3	Transfer and Other Transfer Command packet	52
5.2.3.4	Combination Transfer Command packet (optional)	52
5.2.3.5	Diagnostic Command packet	52
5.2.4	Transferring parameters as data	52
5.2.4.1	Writing	52
5.2.4.2	Reading	52
5.2.4.3	Example	53
5.2.4.3.1	General	53
5.2.4.3.2	Specific	54
5.3	Operation Response Message packets	54
5.3.1	Fields In Response packets	54
5.3.1.1	Packet Length	54
5.3.1.2	Command Reference Number	54
5.3.1.3	Slave address	54
5.3.1.4	Facility address	54
5.3.1.5	Opcode	55
5.3.1.6	Modifier	55
5.3.1.7	Response Type	55
5.3.1.8	Major Status	55
5.3.1.9	Parameters	55
5.3.2	Basic Response packet	56
5.3.3	Response packet parameter requirements	56
5.3.3.1	Control Response packet	56
5.3.3.2	Position Response packet	56
5.3.3.3	Transfer and Other Transfer Response packet	56
5.3.3.4	Combination Transfer Response packet (optional)	56
5.3.3.5	Diagnostic Response packet	56
5.3.3.6	Asynchronous Response packet	56
5.3.3.7	Transfer Notification packet (optional)	57
5.3.3.8	Imbedded Data Response packet (optional)	57
5.4	Status	58
5.4.1	Major Status	58
5.4.2	Substatus	58
5.4.2.1	Intervention Required (ID='x4')	59
5.4.2.1.1	Not P-Available	59
5.4.2.1.2	Not Ready	59
5.4.2.1.3	Not P-Available transition	59
5.4.2.1.4	Not Ready transition	59
5.4.2.1.5	Physical Link failure	59
5.4.2.1.6	Attribute Table may be corrupted	59
5.4.2.1.7	Addressee Busy	60
5.4.2.2	Alternate Port exception (ID='x5')	60
5.4.2.2.1	Priority Reserve issued	60
5.4.2.2.2	Attributes updated	60

5.4.2.2.3	Initialization completed	60
5.4.2.2.4	Format completed	60
5.4.2.2.5	Facility switched to another port	60
5.4.2.2.6	Slave Diagnostic in progress	61
5.4.2.2.7	Slave Diagnostic terminated	61
5.4.2.3	Machine Exception (ID='x6')	61
5.4.2.3.1	Addressee no longer busy	61
5.4.2.3.2	P-Available transition	62
5.4.2.3.3	Ready transition	62
5.4.2.3.4	Operation timeout	62
5.4.2.3.5	Physical Interface check	62
5.4.2.3.6	Slave-Initiated reset	62
5.4.2.3.7	Environmental error	62
5.4.2.3.8	Power fail alert	62
5.4.2.3.9	Data Check (on raw data)	62
5.4.2.3.10	Uncorrectable Data Check (on perfect data)	62
5.4.2.3.11	Fatal error	62
5.4.2.3.12	Hardware write protected	63
5.4.2.3.13	Queue full	63
5.4.2.3.14	Command failure	63
5.4.2.3.15	Read access violation	63
5.4.2.3.16	Write access violation	63
5.4.2.3.17	Data overrun	63
5.4.2.3.18	Reallocation space exhausted	63
5.4.2.3.19	End of media detected	63
5.4.2.3.20	End of extent detected	63
5.4.2.3.21	Unexpected master action	63
5.4.2.3.22	Error Log full	64
5.4.2.3.23	Defect Directory full	64
5.4.2.3.24	Logical link failure	64
5.4.2.3.25	Position lost	64
5.4.2.4	Command Exception (ID='x7')	64
5.4.2.4.1	Invalid Packet length	65
5.4.2.4.2	Invalid Command Reference Number	65
5.4.2.4.3	Invalid Slave Address	65
5.4.2.4.4	Invalid Facility Address	65
5.4.2.4.5	Invalid selection address	65
5.4.2.4.6	Invalid Opcode	65
5.4.2.4.7	Invalid Modifier	65
5.4.2.4.8	Invalid Extent	65
5.4.2.4.9	Out of context	65
5.4.2.4.10	Invalid parameter(s)	65
5.4.2.4.11	Missing parameter(s)	66
5.4.2.4.12	Reserved value not equal to zero	66
5.4.2.4.13	Invalid combination	66
5.4.2.4.14	Not at initial position	66
5.4.2.5	Command Aborted (ID='x8')	66
5.4.2.5.1	Command Aborted	66
5.4.2.5.2	Command sequence terminated	66
5.4.2.5.3	Unexecuted command from terminated sequence	67
5.4.2.5.4	Command chain terminated	67
5.4.2.5.5	Unexecuted command from terminated chain	67
5.4.2.5.6	Command order terminated	67
5.4.2.5.7	Unexecuted command from terminated order	67
5.4.2.6	Conditional Success (ID='x9')	68
5.4.2.6.1	Logging data appended	68
5.4.2.6.2	ABORT received: No Command Active	69
5.4.2.6.3	ABORT received: Status Pending	69
5.4.2.6.4	ABORT received: Not Operational	69
5.4.2.6.5	Anticipated error	69

5.4.2.6.6	Anticipated data error	69
5.4.2.6.7	Reallocation required	69
5.4.2.6.8	Reallocation discontinuity	69
5.4.2.6.9	Defect Directory threshold exceeded	69
5.4.2.6.10	Error retry performed	69
5.4.2.6.11	Data retry performed	69
5.4.2.6.12	Motion retry performed	70
5.4.2.6.13	Data correction performed	70
5.4.2.6.14	Soft error	70
5.4.2.6.15	Release of an unreserved addressee	70
5.4.2.6.16	Request Diagnostic Control command	70
5.4.2.6.17	Error Log request	70
5.4.2.6.18	Non-Interchange volume	70
5.4.2.6.19	Retention required	70
5.4.2.6.20	End of Media Warning (EMW)	70
5.4.2.6.21	Statistics update requested	71
5.4.2.6.22	Parameter update requested	71
5.4.2.6.23	Asynchronous event occurrence	71
5.4.2.6.24	Master-Terminated transfer	71
5.4.2.7	Incomplete (ID='xA')	71
5.4.2.7.1	Command may be resumed	71
5.4.2.7.2	COPY source space empty	72
5.4.2.7.3	Response packet truncated	72
5.4.2.7.4	Select Subservient slave	72
5.4.2.7.5	Connect unsuccessful	72
5.4.2.7.6	Disconnect unsuccessful	72
5.4.2.7.7	Connect Identifier already assigned	72
5.4.2.7.8	Link not connected	72
5.4.2.7.9	Beginning of Media (BOM) detected	72
5.4.2.7.10	End of Media Warning (EMW)	72
5.4.2.7.11	End of extent detected	72
5.4.2.7.12	Block length difference	73
5.4.2.7.13	Unrecorded media	73
5.4.2.7.14	Data length difference	73
5.4.2.7.15	Block not found	73
5.4.2.8	Successful	73
5.4.2.9	Message/Microcode Exception (ID='x3')	73
5.4.2.9.1	Microcode Data not accepted	74
5.4.2.9.2	Request Master to IML Slave	74
5.4.2.9.3	Slave Unable to IML	74
5.4.2.9.4	Message	74
5.4.2.9.5	Microcode Execution error	74
5.4.2.9.6	Failure message	74
5.4.2.9.7	Port Disable pending	74
5.4.2.9.8	Port Response	74
5.4.2.9.9	Facility status	74
5.4.3	Extended substatus	75
5.5	Common parameters	75
5.5.1	Transfer Notification parameter (optional)	75
5.5.2	Command Extent parameter	76
5.5.2.1	Count	76
5.5.2.2	Data Address	76
5.5.3	Response Extent parameter	76
5.5.3.1	Residual Count	77
5.5.3.2	Data Address	77
5.5.4	Combination Command Extent parameter (optional)	77
5.5.4.1	Slave address	78
5.5.4.2	Facility address	78
5.5.4.3	Modifiers	78
5.5.4.4	Count	78

5.5.4.5 Data Address	78
5.5.5 Combination Response Extent parameter (optional)	79
5.5.5.1 Slave address	79
5.5.5.2 Facility address	79
5.5.5.3 Modifiers	79
5.5.5.4 Residual Count	79
5.5.5.5 Data Address	79
5.5.5.6 Major Status	80
5.5.5.7 Substatus	80
5.5.6 Access Key parameter (optional)	80
5.5.7 Reserved	80
5.5.8 Reserved	80
5.5.9 Invalid Parm parameter (optional)	80
5.5.9.1 Displacement of parameter in error	80
5.5.9.2 Displacement of field in error	81
5.5.10 Missing Parm parameter (optional)	81
5.5.11 Data Address parameter (optional)	81
5.5.12 Block Size parameter (optional)	82
5.5.13 Transfer	82
5.5.13.1 Verify	82
5.5.13.2 Volume	83
5.5.13.3 Certify	83
5.5.13.4 Stop on Data Error	83
5.5.13.5 Compare	83
5.5.13.6 Threshold	83
5.5.13.7 Suppress Incorrect Length Indication	84
5.5.13.8 Response conditions (octet 3 bits 7-4)	84
5.5.14 Encapsulation parameter (optional)	84
5.5.15 Partition parameter (optional)	84
5.5.15.1 Disk Partitions	85
5.5.15.2 Tape Partitions	85
5.5.16 Stop On Discontinuity parameter (optional)	87
5.5.16.1 Cylinders	87
5.5.16.2 Tracks	87
5.5.16.3 Access boundary	87
5.5.16.4 Discontiguous Defect reallocation	87
5.5.16.5 Bands	87
5.5.16.6 Time	87
5.5.16.7 Discontinuity Time	87
5.5.17 Imbedded Data parameter (optional)	88
6 Control commands	89
6.1 NOP	89
6.1.1 Command packet	89
6.1.2 Response packet	89
6.1.3 Description	89
6.2 FACILITY OPERATION	90
6.2.1 Command packet	90
6.2.2 Response packet	90
6.2.3 Description	90
6.2.4 Parameter 3D - Encapsulation parameter	90
6.3 ATTRIBUTES	91
6.3.1 Command packet	91
6.3.2 Response packet	91
6.3.3 Description	91
6.3.4 Parameters	93
6.3.4.1 Parameters 3A, 3E, 50	93
6.3.4.1.1 Data Address (common) parameter	94
6.3.4.1.2 Partition (common) parameter	94
6.3.4.1.3 Vendor ID parameter	94

6.3.4.2 Parameters 51-58 .....	95
6.3.4.2.1 Size of Disk DataBlocks parameter .....	95
6.3.4.2.2 Size of Disk PhysicalBlocks parameter .....	95
6.3.4.2.3 Total Number of Disk DataBlocks parameter .....	96
6.3.4.2.4 Total Number of Disk PhysicalBlocks parameter .....	96
6.3.4.2.5 DataBlock Sizes Supported parameter .....	96
6.3.4.2.6 PhysicalBlock Sizes Supported parameter .....	96
6.3.4.2.7 Size of Physical Groups parameter .....	96
6.3.4.2.8 Hard Disk Formats parameter .....	96
6.3.4.3 Parameters 59-5A .....	97
6.3.4.3.1 Attributes Table conditions parameter .....	97
6.3.4.3.2 Pad with Fill Characters parameter .....	97
6.3.4.4 Parameters 5B-5D .....	98
6.3.4.4.1 Disk Partition Definition parameter .....	98
6.3.4.4.2 Synonym Definition parameter .....	98
6.3.4.4.3 Alias Definition parameter .....	98
6.3.4.5 Parameters 5E-5F .....	99
6.3.4.5.1 Multi-Port Characteristics parameter .....	99
6.3.4.5.2 Physical Disk Configuration parameter .....	99
6.3.4.6 Parameters 60-63 .....	100
6.3.4.6.1 DataBlock Interleave parameter .....	100
6.3.4.6.2 Transfer Rate parameter .....	101
6.3.4.6.3 PhysicalBlock Performance Characteristics Supported parameter .....	101
6.3.4.6.4 Current PhysicalBlock Performance Settings parameter .....	101
6.3.4.7 Parameters 64-65 .....	102
6.3.4.7.1 Physical Interface Attributes parameter .....	102
6.3.4.7.2 Addressee Configuration parameter .....	102
6.3.4.8 Parameter 66 - Slave Configuration (bit significant) .....	103
6.3.4.9 Parameter 67 - Slave Configuration (fields) .....	105
6.3.4.10 Parameter 68 - Facilities Attached to Slave .....	106
6.3.4.11 Parameters 69-6A .....	108
6.3.4.11.1 Parameter 69 .....	108
6.3.4.11.2 Command Supported parameter .....	108
6.3.4.12 Parameter 6B - Masks of octets supported .....	109
6.3.4.13 Parameters 6C-6D .....	110
6.3.4.13.1 Request Parm parameter .....	110
6.3.4.13.2 Parm Length parameter .....	111
6.3.4.14 Parameter 6E - Slave Reconfiguration (bit-significant) .....	111
6.3.4.15 Parameter 6F - .....	113
6.4 REPORT ADDRESSEE STATUS .....	114
6.4.1 Command packet .....	114
6.4.2 Response packet .....	114
6.4.3 Description .....	114
6.4.4 Parameters 50-53 .....	115
6.4.4.1 Port Mask parameter .....	115
6.4.4.2 Condition parameter .....	116
6.4.4.3 Media Status parameter .....	116
6.4.4.4 Vendor Unique Status parameter .....	116
6.5 PORT ADDRESS .....	116
6.5.1 Command packet .....	116
6.5.2 Response packet .....	116
6.5.3 Description .....	116
6.6 PATH CONTROL .....	118
6.6.1 Command packet .....	118
6.6.2 Response packet .....	118
6.6.3 Description .....	118
6.6.4 Parameters 50-51 .....	119
6.6.4.1 Port Mask parameter .....	119
6.6.4.2 Path Control Mask parameter .....	119
6.7 ATTENTION CONTROL .....	119

6.7.1 Command packet	119
6.7.2 Response packet	120
6.7.3 Description	120
6.7.4 Interrupts Mask parameter	120
6.8 OPERATING MODE	121
6.8.1 Command packet	121
6.8.2 Response packet	121
6.8.3 Description	121
6.8.4 Parameters 3E, 50-51	122
6.8.4.1 Partition (common) parameter	122
6.8.4.2 Response Conditions parameter	122
6.8.4.3 Disk Modes parameter	122
6.9 ABORT	123
6.9.1 Command packet	123
6.9.2 Response packet	123
6.9.3 Description	123
6.9.4 Parameters 50-54	124
6.9.4.1 Command Reference Number parameter	124
6.9.4.2 Alternate Port Commands parameter	124
6.9.4.3 Facility Address parameter	125
6.9.4.4 Alternate Port parameter	125
6.9.4.5 Facility Reset parameter	125
6.10 ACCESS PERMITS	125
6.10.1 Command packet	125
6.10.2 Response packet	126
6.10.3 Description	126
6.10.4 Parameters 31-32, 35, 3A, 3E, 50-51	127
6.10.4.1 Command Extent (common) parameter	127
6.10.4.2 Response Extent (common) parameter	128
6.10.4.3 Access Key (common) parameter	128
6.10.4.4 Data Address (common) parameter	128
6.10.4.5 Partition (common) parameter	128
6.10.4.6 Port Mask parameter	128
6.10.4.7 Access Protection parameter - protection modifiers	128
6.11 RESUME	129
6.11.1 Command packet	129
6.11.2 Response packet	129
6.11.3 Description	129
6.11.4 Parameters 50-51	130
6.11.4.1 Command Reference Number parameter	130
6.11.4.2 Alternate Port Commands parameter	130
6.12 PORT RESPONSE	130
6.12.1 Command packet	130
6.12.2 Response packet	131
6.12.3 Description	131
6.12.4 Parameters 50-51	131
6.12.4.1 Port Mask parameter	131
6.12.4.2 Response Information Transfer parameter	131
6.13 ANTICIPATED ACTION	131
6.13.1 Command packet	131
6.13.2 Response packet	132
6.13.3 Description	132
6.13.4 Parameters 3D, 50	132
6.13.4.1 Expected Conditions parameter	132
6.13.4.2 Encapsulation parameter	132
6.14 OPERATOR DISPLAY	133
6.14.1 Command packet	133
6.14.2 Response packet	133
6.14.3 Description	133
6.14.4 Parameters 50-53	134

6.14.4.1 Identifier parameter .....	135
6.14.4.2 Length parameter .....	135
6.14.4.3 Mode parameter .....	135
6.14.4.4 Timing parameter .....	136
6.14.4.5 Normal message parameter .....	137
6.14.4.6 Alternate message parameter .....	137
7 Position commands .....	138
7.1 Reserved .....	138
7.2 POSITION CONTROL .....	138
7.2.1 Command packet .....	138
7.2.2 Response packet .....	138
7.2.3 Description .....	138
7.2.4 Parameters 31, 32, 35, 3A, 3E .....	139
7.2.4.1 Command Extent (common) parameter .....	139
7.2.4.2 Response Extent (common) parameter .....	139
7.2.4.3 Access Key (common) parameter .....	139
7.2.4.4 Data Address (common) parameter .....	139
7.2.4.5 Partition (common) parameter .....	139
7.3 REPORT POSITION .....	140
7.3.1 Command packet .....	140
7.3.2 Response packet .....	140
7.3.3 Description .....	140
7.3.4 Parameters 32, 35, 3A, 3E .....	140
7.3.4.1 Response Extent (common) parameter .....	140
7.3.4.2 Access Key (common) parameter .....	141
7.3.4.3 Data Address (common) parameter .....	141
7.3.4.4 Partition (common) parameter .....	141
7.4 Reserved .....	141
7.5 REPORT DISCONTINUITY .....	141
7.5.1 Command packet .....	141
7.5.2 Response packet .....	141
7.5.3 Description .....	141
7.5.4 Parameters 31-32, 35, 3A, 3E-3F, 6C-6D .....	142
7.5.4.1 Command Extent (common) parameter .....	142
7.5.4.2 Response Extent (common) parameter .....	142
7.5.4.3 Access Key (common) parameter .....	143
7.5.4.4 Data Address (common) parameter .....	143
7.5.4.5 Partition (common) parameter .....	143
7.5.4.6 Stop on Discontinuity (common) parameter .....	143
7.5.4.7 Request Parm parameter .....	143
7.5.4.8 Parm Length parameter .....	143
8 Transfer commands .....	144
8.1 READ .....	144
8.1.1 Command packet .....	144
8.1.2 Response packet .....	144
8.1.3 Description .....	144
8.1.4 Parameters .....	146
8.1.4.1 Parameters 31-32, 35, 3A, 3C, 3E-3F .....	146
8.1.4.1.1 Command Extent (common) parameter .....	146
8.1.4.1.2 Response Extent (common) parameter .....	146
8.1.4.1.3 Access Key (common) parameter .....	146
8.1.4.1.4 Data Address (common) parameter .....	146
8.1.4.1.5 Transfer (common) parameter .....	146
8.1.4.1.6 Partition (common) parameter .....	147
8.1.4.1.7 Stop on Discontinuity (common) parameter .....	147
8.1.4.2 Parameters 50-53 .....	147
8.1.4.2.1 Skip Mask parameter .....	147
8.1.4.2.2 Information Transfer Size Override parameter .....	147

8.1.4.2.3 Master Termination Permitted parameter .....	148
8.1.4.2.4 Boundary Gather parameter .....	148
8.2 READ RAW DATA .....	148
8.2.1 Command packet .....	148
8.2.2 Response packet .....	148
8.2.3 Description .....	148
8.2.4 Parameters 31-32, 35, 3A, 3C, 3E-3F .....	149
8.2.4.1 Command Extent (common) parameter .....	149
8.2.4.2 Response Extent (common) parameter .....	149
8.2.4.3 Access Key (common) parameter .....	149
8.2.4.4 Data Address (common) parameter .....	149
8.2.4.5 Transfer (common) parameter .....	149
8.2.4.6 Partition (common) parameter .....	149
8.2.4.7 Stop on Discontinuity (common) parameter .....	150
8.3 READ REPLICATED DATA .....	150
8.3.1 Command packet .....	150
8.3.2 Response packet .....	150
8.3.3 Description .....	150
8.3.4 Parameters 31-32, 35, 3A, 3C, 3E, 50 .....	151
8.3.4.1 Command Extent (common) parameter .....	151
8.3.4.2 Response Extent (common) parameter .....	151
8.3.4.3 Access Key (common) parameter .....	151
8.3.4.4 Data Address (common) parameter .....	151
8.3.4.5 Transfer (common) parameter .....	151
8.3.4.6 Partition (common) parameter .....	151
8.3.4.7 Range Count parameter .....	151
8.4 SEARCH .....	152
8.4.1 Command packet .....	152
8.4.2 Response packet .....	152
8.4.3 Description .....	152
8.4.4 Parameters .....	153
8.4.4.1 Parameters 02, 31-32, 35, 3A, 3E .....	153
8.4.4.1.1 Continuation of Preceding (common) parameter .....	153
8.4.4.1.2 Command Extent (common) parameter .....	153
8.4.4.1.3 Response Extent (common) parameter .....	153
8.4.4.1.4 Access Key (common) parameter .....	154
8.4.4.1.5 Data Address (common) parameter .....	154
8.4.4.1.6 Partition (common) parameter .....	154
8.4.4.2 Parameter 50 - Set String Search parameter .....	154
8.4.4.3 Parameter 51 - Boolean Operator parameter .....	155
8.4.4.4 Parameter 52 - Set Multiple Key Search parameter .....	155
8.4.4.5 Parameter 53 - Report Search parameter .....	156
8.5 WRITE .....	157
8.5.1 Command packet .....	157
8.5.2 Response packet .....	157
8.5.3 Description .....	157
8.5.4 Parameters 31-32, 35, 3A, 3C, 3E-3F, 50-52 .....	158
8.5.4.1 Command Extent (common) parameter .....	158
8.5.4.2 Response Extent (common) parameter .....	158
8.5.4.3 Access Key (common) parameter .....	158
8.5.4.4 Data Address (common) parameter .....	158
8.5.4.5 Transfer (common) parameter .....	159
8.5.4.6 Partition (common) parameter .....	159
8.5.4.7 Stop on Discontinuity (common) parameter .....	159
8.5.4.8 Skip Mask parameter .....	159
8.5.4.9 Information Transfer Size Override parameter .....	159
8.5.4.10 Master Termination Permitted parameter .....	159
8.6 WRITE PATTERN .....	159
8.6.1 Command packet .....	159
8.6.2 Response packet .....	159

8.6.3	Description	160
8.6.4	Parameters 02, 31-32, 35, 3A, 3C, 3E, 50, 6C	160
8.6.4.1	Continuation of Preceding (common) parameter	160
8.6.4.2	Command Extent (common) parameter	160
8.6.4.3	Response Extent (common) parameter	160
8.6.4.4	Access Key (common) parameter	160
8.6.4.5	Data Address (common) parameter	161
8.6.4.6	Transfer (common) parameter	161
8.6.4.7	Partition (common) parameter	161
8.6.4.8	Pattern parameter	161
8.6.4.9	Request Parm parameter	161
8.7	FORMAT	161
8.7.1	Command packet	161
8.7.2	Response packet	161
8.7.3	Description	162
8.7.3.1	Interleave considerations	163
8.7.3.2	Defect List considerations	163
8.7.4	Parameters	164
8.7.4.1	Parameters 31-32, 35, 3A-3C, 3E-3F	164
8.7.4.1.1	Command Extent (common) parameter	164
8.7.4.1.2	Response Extent (common) parameter	164
8.7.4.1.3	Access Key (common) parameter	165
8.7.4.1.4	Data Address (common) parameter	165
8.7.4.1.5	Block Size (common) parameter	165
8.7.4.1.6	Transfer (common) parameter	165
8.7.4.1.7	Partition (common) parameter	165
8.7.4.1.8	Stop On Discontinuity (common) parameter	165
8.7.4.2	Parameters 50-54	166
8.7.4.2.1	Number of PhysicalBlocks per Track parameter	166
8.7.4.2.2	PhysicalBlock Interleave Factors parameter	166
8.7.4.2.3	PhysicalBlock Interleave Table parameter	167
8.7.4.2.4	Transfer Rate parameter	167
8.7.4.2.5	DataBlock Interleave parameter	167
8.7.4.3	Parameters 56-58	168
8.7.4.3.1	Track Defects List parameter	168
8.7.4.3.2	Sector Defects List parameter	168
8.7.4.3.3	Hard Disk Formats parameter	168
8.7.4.4	Parameters 5A, 6C	169
8.7.4.4.1	Ccell Defects List parameter	169
8.7.4.4.2	Request Parm parameter	169
9	Combination commands	170
9.1	COPY	170
9.1.1	Command packet	170
9.1.2	Response packet	170
9.1.3	Description	170
9.1.4	Parameters 33-35, 3A, 3C, 3E, 50	172
9.1.4.1	Combination Command Extent (common) parameter	172
9.1.4.2	Combination Response Extent (common) parameter	172
9.1.4.3	Access Key (common) parameter	172
9.1.4.4	Data Address (common) parameter	173
9.1.4.5	Transfer (common) parameter	173
9.1.4.6	Partition (common) parameter	173
9.1.4.7	Extended Modifiers parameter	173
9.2	COMPARE SLAVE DATA	174
9.2.1	Command packet	174
9.2.2	Response packet	174
9.2.3	Description	174
9.2.4	Parameters 33-35, 3A, 3E, 50	175

9.2.4.1	Combination Command Extent (common) parameter	175
9.2.4.2	Combination Response Extent (common) parameter	175
9.2.4.3	Access Key (common) parameter	175
9.2.4.4	Data Address (common) parameter	175
9.2.4.5	Partition (common) parameter	176
9.2.4.6	Extended Modifiers parameter	176
9.3	COMPARE DATA	176
9.3.1	Command packet	176
9.3.2	Response packet	176
9.3.3	Description	176
9.3.4	Parameters 31-35, 3A, 3E, 50	177
9.3.4.1	Command Extent (common) parameter	177
9.3.4.2	Response Extent (common) parameter	177
9.3.4.3	Combination Command Extent (common) parameter	177
9.3.4.4	Combination Response Extent (common) parameter	178
9.3.4.5	Access Key (common) parameter	178
9.3.4.6	Data Address (common) parameter	178
9.3.4.7	Partition (common) parameter	178
9.3.4.8	Extended Modifiers parameter	178
9.4	REALLOCATE	178
9.4.1	Command packet	178
9.4.2	Response packet.	178
9.4.3	Description	178
9.4.4	Parameters	179
9.4.4.1	Parameters 31-32, 35, 3A, 3E	179
9.4.4.1.1	Command Extent (common) parameter	180
9.4.4.1.2	Response Extent (common) parameter	180
9.4.4.1.3	Access Key (common) parameter	180
9.4.4.1.4	Data Address (common) parameter	180
9.4.4.1.5	Partition (common) parameter	180
9.4.4.2	Parameters 50, 55	180
9.4.4.2.1	Defect parameter	180
9.4.4.2.2	Defective DataBlock parameter	181
9.4.4.2.3	Defective lists management	181
9.5	ALLOCATE RESTORE	181
9.5.1	Command packet	181
9.5.2	Response packet	181
9.5.3	Description	182
9.5.4	Parameters	182
9.5.4.1	Parameters 31-32, 35, 3A, 3E	182
9.5.4.1.1	Command Extent (common) parameter	182
9.5.4.1.2	Response Extent (common) parameter	182
9.5.4.1.3	Access Key (common) parameter	183
9.5.4.1.4	Data Address (common) parameter	183
9.5.4.1.5	Partition (common) parameter	183
9.5.4.2	Parameters 50, 55	183
9.5.4.2.1	Defect parameter	183
9.5.4.2.2	Defective DataBlock parameter	183
9.5.4.2.3	Defective lists management	183
9.6	SHADOW READ	184
9.6.1	Command packet	184
9.6.2	Response packet	184
9.6.3	Description	184
9.6.4	Parameters 33-35, 3A, 3C, 3E, 51, 52	185
9.6.4.1	Combination Command Extent (common) parameter	185
9.6.4.2	Combination Response Extent (common) parameter	185
9.6.4.3	Access Key (common) parameter	185
9.6.4.4	Data Address (common) parameter	185
9.6.4.5	Transfer (common) parameter	186
9.6.4.6	Partition (common) parameter	186

9.6.4.7	Information Transfer Size Override parameter	186
9.6.4.8	Master Termination Permitted parameter	186
9.7	SHADOW WRITE	186
9.7.1	Command packet	186
9.7.2	Response packet	186
9.7.3	Description	186
9.7.4	Parameters 33-35, 3A, 3C, 3E, 51, 52	187
9.7.4.1	Combination Command Extent (common) parameter	187
9.7.4.2	Combination Response Extent (common) parameter	187
9.7.4.3	Access Key (common) parameter	188
9.7.4.4	Data Address (common) parameter	188
9.7.4.5	Transfer (common) parameter	188
9.7.4.6	Partition (common) parameter	188
9.7.4.7	Information Transfer Size Override parameter	188
9.7.4.8	Master Termination Permitted parameter	188
9.8	SHADOW RESTORE	188
9.8.1	Command packet	188
9.8.2	Response packet	188
9.8.3	Description	189
9.8.4	Parameters 33-35, 3A, 3C, 3E	189
9.8.4.1	Combination Command Extent (common) parameter	189
9.8.4.2	Combination Response Extent (common) parameter	189
9.8.4.3	Access Key (common) parameter	190
9.8.4.4	Data Address (common) parameter	190
9.8.4.5	Transfer (common) parameter	190
9.8.4.6	Partition (common) parameter	190
10	Other Transfer commands	191
10.1	READ VERIFY	191
10.1.1	Command packet	191
10.1.2	Response packet	191
10.1.3	Description	191
10.1.3.1	High Margins modifier	192
10.1.3.2	Volume modifier	192
10.1.4	Parameters 31-32, 35, 3A, 3C, 3E	192
10.1.4.1	Command Extent (common) parameter	192
10.1.4.2	Response Extent (common) parameter	192
10.1.4.3	Access Key (common) parameter	192
10.1.4.4	Data Address (common) parameter	192
10.1.4.5	Transfer (common) parameter	192
10.1.4.6	Partition (common) parameter	193
10.2	READ AT FIRST AVAILABLE DATA	193
10.2.1	Command packet	193
10.2.2	Response packet	193
10.2.3	Description	193
10.2.4	Parameters 31-32, 35, 3A, 3C, 3E-3F, 50-51	194
10.2.4.1	Command Extent (common) parameter	194
10.2.4.2	Response Extent (common) parameter	194
10.2.4.3	Access Key (common) parameter	194
10.2.4.4	Data Address (common) parameter	194
10.2.4.5	Transfer (common) parameter	195
10.2.4.6	Partition (common) parameter	195
10.2.4.7	Stop On Discontinuity parameter	195
10.2.4.8	Read at First Data parameter	195
10.2.4.9	Information Transfer Size Override parameter	195
10.3	READ FROM BUFFER	195
10.3.1	Command packet	195
10.3.2	Response packet	195
10.3.3	Description	196
10.3.4	Parameters 31-32, 35, 3A, 3C, 3E, 50	196

10.3.4.1	Command Extent (common) parameter	197
10.3.4.2	Response Extent (common) parameter	197
10.3.4.3	Access Key (common) parameter	197
10.3.4.4	Data Address (common) parameter	197
10.3.4.5	Transfer (common) parameter	197
10.3.4.6	Partition (common) parameter	197
10.3.4.7	Buffer Address parameter	197
10.4	READ FACILITY DATA TO BUFFER	198
10.4.1	Command packet	198
10.4.2	Response packet	198
10.4.3	Description	198
10.4.4	Parameters 31-32, 35, 3A, 3C, 3E, 50	199
10.4.4.1	Command Extent (common) parameter	199
10.4.4.2	Response Extent (common) parameter	199
10.4.4.3	Access Key (common) parameter	199
10.4.4.4	Data Address (common) parameter	199
10.4.4.5	Transfer (common) parameter	199
10.4.4.6	Buffer Address parameter	199
10.5	READ PHYSICAL DATA AND ECC	200
10.5.1	Command packet	200
10.5.2	Response packet	200
10.5.3	Description	200
10.5.4	Parameters 31-32, 35, 3A, 3C, 3E	201
10.5.4.1	Command Extent (common) parameter	201
10.5.4.2	Response Extent (common) parameter	201
10.5.4.3	Access Key (common) parameter	201
10.5.4.4	Data Address (common) parameter	201
10.5.4.5	Transfer (common) parameter	201
10.5.4.6	Partition (common) parameter	201
10.6	READ PHYSICAL HEADER	202
10.6.1	Command packet	202
10.6.2	Response packet	202
10.6.3	Description	202
10.6.4	Parameters 31-32, 35, 3A, 3E	202
10.6.4.1	Command Extent (common) parameter	203
10.6.4.2	Response Extent (common) parameter	203
10.6.4.3	Access Key (common) parameter	203
10.6.4.4	Data Address (common) parameter	203
10.6.4.5	Partition (common) parameter	203
10.7	READ IPL	203
10.7.1	Command packet	203
10.7.2	Response packet	203
10.7.3	Description	203
10.7.4	Parameters 31-32, 35, 3A, 3E	204
10.7.4.1	Command Extent (common) parameter	204
10.7.4.2	Response Extent (common) parameter	204
10.7.4.3	Access Key (common) parameter	204
10.7.4.4	Data Address (common) parameter	204
10.7.4.5	Partition (common) parameter	204
10.8	READ PHYSICAL HEADER AND ECC	205
10.8.1	Command packet	205
10.8.2	Response packet	205
10.8.3	Description	205
10.8.4	Parameters 31-32, 35, 3A, 3E	206
10.8.4.1	Command Extent (common) parameter	206
10.8.4.2	Response Extent (common) parameter	206
10.8.4.3	Access Key (common) parameter	206
10.8.4.4	Data Address (common) parameter	206
10.8.4.5	Partition (common) parameter	206
10.9	WRITE TO BUFFER	207

10.9.1	Command packet	207
10.9.2	Response packet	207
10.9.3	Description	207
10.9.4	Parameters 31-32, 35, 3A, 3C, 3E, 50	208
10.9.4.1	Command Extent (common) parameter	208
10.9.4.2	Response Extent (common) parameter	208
10.9.4.3	Access Key (common) parameter	208
10.9.4.4	Data Address (common) parameter	208
10.9.4.5	Transfer (common) parameter	208
10.9.4.6	Partition (common) parameter	209
10.9.4.7	Buffer Address parameter	209
10.10	WRITE BUFFER TO FACILITY	209
10.10.1	Command packet	209
10.10.2	Response packet	209
10.10.3	Description	209
10.10.4	Parameters 31-32, 35, 3A, 3C, 3E, 50	210
10.10.4.1	Command Extent (common) parameter	210
10.10.4.2	Response Extent (common) parameter	210
10.10.4.3	Access Key (common) parameter	210
10.10.4.4	Data Address (common) parameter	210
10.10.4.5	Transfer (common) parameter	210
10.10.4.6	Partition (common) parameter	210
10.10.4.7	Buffer Address parameter	211
10.11	WRITE PHYSICAL DATA AND ECC	211
10.11.1	Command packet	211
10.11.2	Response packet	211
10.11.3	Description	211
10.11.4	Parameters 31-32, 35, 3A, 3E	212
10.11.4.1	Command Extent (common) parameter	212
10.11.4.2	Response Extent (common) parameter	212
10.11.4.3	Access Key (common) parameter	212
10.11.4.4	Data Address (common) parameter	212
10.11.4.5	Partition (common) parameter	212
10.12	WRITE PHYSICAL HEADER	213
10.12.1	Command packet	213
10.12.2	Response packet	213
10.12.3	Description	213
10.12.4	Parameters 31-32, 35, 3A, 3E	214
10.12.4.1	Command Extent (common) parameter	214
10.12.4.2	Response Extent (common) parameter	214
10.12.4.3	Access Key (common) parameter	214
10.12.4.4	Data Address (common) parameter	214
10.12.4.5	Partition (common) parameter	214
10.13	LOAD SLAVE IML	215
10.13.1	Command packet	215
10.13.2	Response packet	215
10.13.3	Description	215
10.13.4	Parameters 31-32, 3E	216
10.13.4.1	Command Extent (common) parameter	216
10.13.4.2	Response Extent (common) parameter	216
10.13.4.3	Partition (common) parameter	216
10.14	ERASE	217
10.14.1	Command packet	217
10.14.2	Response packet	217
10.14.3	Description	217
10.14.4	Parameters 31-32, 35, 3A, 3E	218
10.14.4.1	Command Extent (common) parameter	218
10.14.4.2	Response Extent (common) parameter	218
10.14.4.3	Access Key (common) parameter	218
10.14.4.4	Data Address (common) parameter	218

10.14.4.5 Partition (common) parameter .....	218
10.15 WRITE PHYSICAL HEADER AND ECC .....	219
10.15.1 Command packet .....	219
10.15.2 Response packet .....	219
10.15.3 Description .....	219
10.15.4 Parameters 31-32, 35, 3A, 3E .....	220
10.15.4.1 Command Extent (common) parameter .....	220
10.15.4.2 Response Extent (common) parameter .....	220
10.15.4.3 Access Key (common) parameter .....	220
10.15.4.4 Data Address (common) parameter .....	220
10.15.4.5 Partition (common) parameter .....	220
11 Diagnostic commands .....	221
11.1 PERFORM SLAVE DIAGNOSTICS .....	221
11.1.1 Command packet .....	221
11.1.2 Response packet .....	221
11.1.3 Description .....	221
11.1.4 Parameters 31-32, 50-53, 6C .....	222
11.1.4.1 Command Extent (common) parameter .....	222
11.1.4.2 Response Extent (common) parameter .....	222
11.1.4.3 Diagnostic Number parameter .....	222
11.1.4.4 Diagnostic Function List parameter .....	222
11.1.4.5 Diagnostic Action Code parameter .....	222
11.1.4.6 Vendor Unique parameter .....	223
11.1.4.7 Request Parm parameter .....	223
11.2 PERFORM FACILITY DIAGNOSTICS .....	223
11.2.1 Command packet .....	223
11.2.2 Response packet .....	223
11.2.3 Description .....	223
11.2.4 Parameters 31-32, 50-53, 6C .....	224
11.2.4.1 Command Extent (common) parameter .....	224
11.2.4.2 Response Extent (common) parameter .....	224
11.2.4.3 Diagnostic Number parameter .....	224
11.2.4.4 Diagnostic Function List parameter .....	225
11.2.4.5 Diagnostic Action Code parameter .....	225
11.2.4.6 Vendor Unique parameter .....	225
11.2.4.7 Request Parm parameter .....	225
11.3 READ DEFECT LIST .....	225
11.3.1 Command packet .....	225
11.3.2 Response packet .....	225
11.3.3 Description .....	225
11.3.4 Parameters .....	226
11.3.4.1 Parameters 31-32, 3E, 55-57 .....	226
11.3.4.1.1 Command Extent (common) parameter .....	227
11.3.4.1.2 Response Extent (common) parameter .....	227
11.3.4.1.3 Partition (common) parameter .....	227
11.3.4.1.4 Defective DataBlock parameter .....	227
11.3.4.1.5 Track Defects List parameter .....	227
11.3.4.1.6 Sector Defects List parameter .....	227
11.3.4.2 Parameters 58, 5A, 6C-6D .....	228
11.3.4.2.1 Variable Size Sectors parameter .....	228
11.3.4.2.2 Cell Defects List parameter .....	228
11.3.4.2.3 Request Parm parameter .....	228
11.3.4.2.4 Parm Length parameter .....	228
11.4 WRITE DEFECT LIST .....	229
11.4.1 Command packet .....	229
11.4.2 Response packet .....	229
11.4.3 Description .....	229
11.4.4 Parameters .....	230
11.4.4.1 Parameters 31-32, 3E, 55-57 .....	230

11.4.4.1.1 Command Extent (common) parameter .....	230
11.4.4.1.2 Response Extent (common) parameter .....	230
11.4.4.1.3 Partition (common) parameter .....	231
11.4.4.1.4 Defective DataBlock parameter .....	231
11.4.4.1.5 Track Defects List parameter .....	231
11.4.4.1.6 Sector Defects List parameter .....	231
11.4.4.2 Parameters 58, 5A, 6C .....	231
11.4.4.2.1 Variable Size Sectors parameter .....	231
11.4.4.2.2 Cell Defects List parameter .....	232
11.4.4.2.3 Request Parm parameter .....	232
11.5 READ ERROR LOG .....	232
11.5.1 Command packet .....	232
11.5.2 Response packet .....	232
11.5.3 Description .....	232
11.5.4 Parameters 31-32, 50, 6C-6D .....	233
11.5.4.1 Command Extent (common) parameter .....	233
11.5.4.2 Response Extent (common) parameter .....	233
11.5.4.3 Error Log parameter .....	233
11.5.4.4 Request Parm parameter .....	233
11.5.4.5 Parm Length parameter .....	233
11.6 WRITE ERROR LOG .....	234
11.6.1 Command packet .....	234
11.6.2 Response packet .....	234
11.6.3 Description .....	234
11.6.4 Parameters 31-32, 50, 6C .....	235
11.6.4.1 Command Extent (common) parameter .....	235
11.6.4.2 Response Extent (common) parameter .....	235
11.6.4.3 Error Log parameter .....	235
11.6.4.4 Request Parm parameter .....	235
11.7 DIAGNOSTIC CONTROL .....	236
11.7.1 Command packet .....	236
11.7.2 Response packet .....	236
11.7.3 Description .....	236
11.7.4 Parameters 31-32, 50-53, 6C .....	237
11.7.4.1 Command Extent (common) parameter .....	237
11.7.4.2 Response Extent (common) parameter .....	237
11.7.4.3 Diagnostic Number parameter .....	237
11.7.4.4 Diagnostic Function List parameter .....	237
11.7.4.5 Diagnostic Action Code parameter .....	237
11.7.4.6 Vendor Unique parameter .....	238
11.7.4.7 Request Parm parameter .....	238
12 Command summary .....	239
12.1 Control commands .....	239
12.2 Position commands .....	240
12.3 Transfer commands .....	240
12.4 Combination commands .....	241
12.5 Other transfer commands .....	242
12.6 Diagnostic commands .....	243

## Annexes

	Page
Annex A .....	244
A.1 Interface levels .....	244
A.2 Concepts .....	244
A.2.1 Relationship of master, slave, and facility .....	244
A.2.2 Relationship of facilities and partitions .....	245
A.2.3 Command structure .....	245
A.3 Application environments .....	246
A.3.1 Control of facilities by the master .....	246
A.3.2 Shared Control of Facilities .....	246
A.3.3 Control of Facilities by the Slave .....	246
Annex B .....	247
B.1 Informative references .....	247
B.2 Equivalent ANSI standards .....	247
Annex C .....	248
C.1 FORMAT command .....	248
C.2 REALLOCATE command .....	249
C.3 ALLOCATE RESTORE command .....	250

## Figures

	Page
Figure 1 — Hierarchy of Slave Conditions .....	27
Figure 2 — Physical Switch .....	31
Figure 3 — Logical Switch .....	32
Figure 4 — Valid Combinations of the Master Status Octet .....	40
Figure 5 — Valid Combinations of Slave Status Octet .....	42
Figure 6 — Octet Transfer Positions .....	43
Figure 7 — Bit Positions .....	44
Figure 8 — Octet Positions .....	44
Figure 9 — Sequence of Octet Transfers .....	44
Figure 10 — Parameter Documentation .....	46
Figure 11 — Modifier octet .....	50
Figure 12 — Basic Command packet in SOM Representation .....	50
Figure 13 — Basic Command packet in DOM Representation .....	51
Figure 14 — Parameter List for 17-Octet Transfer .....	51
Figure 15 — Parameter List for 18-Octet Transfer .....	51
Figure 16 — Example of Defect List parameters .....	53
Figure 17 — Example of Defect List parameters as Naked Data .....	54
Figure 18 — Basic Response packet .....	56
Figure 19 — Types of Substatus and Responses .....	58
Figure 20 — Command packet for NOP .....	89
Figure 21 — Response packet for NOP .....	89
Figure 22 — Command packet for FACILITY OPERATION .....	90
Figure 23 — Response packet for FACILITY OPERATION .....	90
Figure 24 — Command packet for ATTRIBUTES .....	91
Figure 25 — Response packet for ATTRIBUTES .....	91
Figure 26 — Command packet for REPORT ADDRESSEE STATUS .....	114
Figure 27 — Response packet for REPORT ADDRESSEE STATUS .....	114
Figure 28 — Port Mask parameter .....	115
Figure 29 — Command packet for PORT ADDRESS .....	116
Figure 30 — Response packet for PORT ADDRESS .....	116
Figure 31 — Command packet for PATH CONTROL .....	118
Figure 32 — Response packet for PATH CONTROL .....	118
Figure 33 — Mask Octet Examples .....	118
Figure 34 — Command packet for ATTENTION CONTROL .....	119
Figure 35 — Response packet for ATTENTION CONTROL .....	120
Figure 36 — Command packet for OPERATING MODE .....	121
Figure 37 — Response packet for OPERATING MODE .....	121
Figure 38 — Command packet for ABORT .....	123
Figure 39 — Response packet for ABORT .....	123
Figure 40 — Command packet for ACCESS PERMITS .....	125
Figure 41 — Response packet for ACCESS PERMITS .....	126
Figure 42 — Command packet for RESUME .....	129
Figure 43 — Response packet for RESUME .....	129
Figure 44 — Command packet for PORT RESPONSE .....	130
Figure 45 — Response packet for PORT RESPONSE .....	131
Figure 46 — Command packet for ANTICIPATED ACTION .....	131
Figure 47 — Response packet for ANTICIPATED ACTION .....	132
Figure 47' — Command packet for OPERATOR DISPLAY .....	133
Figure 48' — Response packet for OPERATOR DISPLAY .....	133
Figure 48 — Command packet for POSITION CONTROL .....	138
Figure 49 — Response packet for POSITION CONTROL .....	138
Figure 50 — Command packet for REPORT POSITION .....	140
Figure 51 — Response packet for REPORT POSITION .....	140

Figure 52 — Command packet for REPORT DISCONTINUITY .....	141
Figure 53 — Response packet for REPORT DISCONTINUITY .....	141
Figure 54 — Command packet for READ .....	144
Figure 55 — Response packet for READ .....	144
Figure 56 — Command packet for READ RAW DATA .....	148
Figure 57 — Response packet for READ RAW DATA .....	148
Figure 58 — Command packet for READ REPLICATED DATA .....	150
Figure 59 — Response packet for READ REPLICATED DATA .....	150
Figure 60 — Command packet for SEARCH .....	152
Figure 61 — Response packet for SEARCH .....	152
Figure 62 — Command packet for WRITE .....	157
Figure 63 — Response packet for WRITE .....	157
Figure 64 — Command packet for WRITE PATTERN .....	159
Figure 65 — Response packet for WRITE PATTERN .....	159
Figure 66 — Command packet for FORMAT .....	161
Figure 67 — Response packet for FORMAT .....	161
Figure 68 — Command packet for COPY .....	170
Figure 69 — Response packet for COPY .....	170
Figure 70 — Command packet for COMPARE SLAVE DATA .....	174
Figure 71 — Response packet for COMPARE SLAVE DATA .....	174
Figure 72 — Command packet for COMPARE DATA .....	176
Figure 73 — Response packet for COMPARE DATA .....	176
Figure 74 — Command packet for REALLOCATE .....	178
Figure 75 — Response packet for REALLOCATE .....	178
Figure 76 — Command packet for ALLOCATE RESTORE .....	181
Figure 77 — Response packet for ALLOCATE RESTORE .....	181
Figure 78 — Command packet for SHADOW READ .....	184
Figure 79 — Response packet for SHADOW READ .....	184
Figure 80 — Command packet for SHADOW WRITE .....	186
Figure 81 — Response packet for SHADOW WRITE .....	186
Figure 82 — Command packet for SHADOW RESTORE .....	188
Figure 83 — Response packet for SHADOW RESTORE .....	188
Figure 84 — Command packet for READ VERIFY .....	191
Figure 85 — Response packet for READ VERIFY .....	191
Figure 86 — Command packet for READ AT FIRST AVAILABLE DATA .....	193
Figure 87 — Response packet for READ AT FIRST AVAILABLE DATA .....	193
Figure 88 — Command packet for READ FROM BUFFER .....	195
Figure 89 — Response packet for READ FROM BUFFER .....	195
Figure 90 — Command packet for READ FACILITY DATA TO BUFFER .....	198
Figure 91 — Response packet for READ FACILITY DATA TO BUFFER .....	198
Figure 92 — Command packet for READ PHYSICAL DATA AND ECC .....	200
Figure 93 — Response packet for READ PHYSICAL DATA AND ECC .....	200
Figure 94 — Command packet for READ PHYSICAL HEADER .....	202
Figure 95 — Response packet for READ PHYSICAL HEADER .....	202
Figure 96 — Command packet for READ IPL .....	203
Figure 97 — Response packet for READ IPL .....	203
Figure 98 — Command packet for READ PHYSICAL HEADER AND ECC .....	205
Figure 99 — Response packet for READ PHYSICAL HEADER AND ECC .....	205
Figure 100 — Command packet for WRITE TO BUFFER .....	207
Figure 101 — Response packet for WRITE TO BUFFER .....	207
Figure 102 — Command packet for WRITE BUFFER TO FACILITY .....	209
Figure 103 — Response packet for WRITE BUFFER TO FACILITY .....	209
Figure 104 — Command packet for WRITE PHYSICAL DATA AND ECC .....	211
Figure 105 — Response packet for WRITE PHYSICAL DATA AND ECC .....	211
Figure 106 — Command packet for WRITE PHYSICAL HEADER .....	213
Figure 107 — Response packet for WRITE PHYSICAL HEADER .....	213
Figure 108 — Command packet for LOAD SLAVE IML .....	215
Figure 109 — Response packet for LOAD SLAVE IML .....	215
Figure 110 — Command packet for ERASE .....	217
Figure 111 — Response packet for ERASE .....	217

Figure 112 — Command packet for WRITE PHYSICAL HEADER AND ECC .....	219
Figure 113 — Response packet for WRITE PHYSICAL HEADER AND ECC .....	219
Figure 114 — Command packet for PERFORM SLAVE DIAGNOSTICS .....	221
Figure 115 — Response packet for PERFORM SLAVE DIAGNOSTICS .....	221
Figure 116 — Command packet for PERFORM FACILITY DIAGNOSTICS .....	223
Figure 117 — Response packet for PERFORM FACILITY DIAGNOSTICS .....	223
Figure 118 — Command packet for READ DEFECT LIST .....	225
Figure 119 — Response packet for READ DEFECT LIST .....	225
Figure 120 — Command packet for WRITE DEFECT LIST .....	229
Figure 121 — Response packet for WRITE DEFECT LIST .....	229
Figure 122 — Command packet for READ ERROR LOG .....	232
Figure 123 — Response packet for READ ERROR LOG .....	232
Figure 124 — Command packet for WRITE ERROR LOG .....	234
Figure 125 — Response packet for WRITE ERROR LOG .....	234
Figure 126 — Command packet for DIAGNOSTIC CONTROL .....	236
Figure 127 — Response packet for DIAGNOSTIC CONTROL .....	236

## Tables

	Page
Table 1 — Different Ways of Multiplexing Transfers .....	18
Table 2 — Manufacturer's Original Flaw Map and Slave's Defect List .....	23
Table 3 — Table of Equivalents for Slave .....	26
Table 4 — Possible Combinations of Request Interrupts Bits .....	29
Table 5 — Substatus parameters for Intervention Required .....	59
Table 6 — Substatus parameters for Alternate Port exception .....	60
Table 7 — Substatus parameters for Machine Exception .....	61
Table 8 — Substatus parameters for Command Exception .....	64
Table 9 — Substatus parameters for Command Aborted .....	66
Table 10 — Substatus parameters for Conditional Success .....	68
Table 11 — Substatus parameters for Incomplete .....	71
Table 12 — Substatus parameters for Message/Microcode Exception .....	73
Table 13 — Transfer Notification parameter .....	75
Table 14 — Command Extent parameter .....	76
Table 15 — Response Extent parameter .....	76
Table 16 — Combination Command Extent parameter .....	78
Table 17 — Combination Response Extent parameter .....	79
Table 18 — Access Key parameter .....	80
Table 19 — Invalid Parm parameter .....	80
Table 20 — Missing Parm parameter .....	81
Table 21 — Data Address parameter .....	81
Table 22 — Block Size parameter .....	82
Table 23 — Transfer parameters .....	82
Table 24 — Encapsulation parameter .....	84
Table 25 — Partition parameter .....	84
Table 26 — Stop on Discontinuity parameters .....	87
Table 27 — Imbedded Data parameter .....	88
Table 28 — Facility Operation parameter 3D .....	90
Table 29 — Attributes parameters 3A, 3E, 50 .....	93
Table 30 — Attributes parameters 51-58 .....	95
Table 31 — Attributes parameters 59-5A .....	97
Table 32 — Attributes parameters 5B-5D .....	98
Table 33 — Attributes parameters 5E-5F .....	99
Table 34 — Attributes parameters 60-63 .....	100
Table 35 — Attributes parameters 64-65 .....	102
Table 36 — Attributes parameter 66 .....	103
Table 37 — Attributes parameter 67 .....	105
Table 38 — Attributes parameter 68 .....	106
Table 39 — Attributes parameters 69-6A .....	108
Table 40 — Attributes parameter 6B .....	109
Table 41 — Attributes parameters 6C-6D .....	110
Table 42 — Attributes parameter 6E .....	111
Table 43 — Attributes parameter 6F .....	113
Table 44 — Report Addressee Status parameters 50-52 .....	115
Table 45 — Path Control parameters 50-51 .....	119
Table 46 — Attention Control parameter 50 .....	120
Table 47 — Operating Mode parameters 3E, 50-51 .....	122
Table 48 — Abort parameters 50-54 .....	124
Table 49 — Access Permits parameters 31-32, 35, 3A, 3E, 50-51 .....	127
Table 50 — Resume parameters 50-51 .....	130
Table 51 — Port Response parameters 50-51 .....	131
Table 52 — Anticipated Action parameters 3D, 50 .....	132
Table 53 — Operator Display parameters 50-53 .....	134

Table 53a — Position Control parameters 31, 32, 35, 3A, 3E .....	139
Table 54 — Report Position parameters 32, 35, 3A, 3E .....	140
Table 55 — Report Discontinuity Parms 31-32, 35, 3A, 3E-3F, 6C-6D .....	142
Table 56 — Read parameters 31-32, 35, 3A, 3C, 3E-3F .....	146
Table 57 — Read parameters 50-53 .....	147
Table 58 — Read Raw Data parameters 31-32, 35, 3A, 3C, 3E-3F .....	149
Table 59 — Read Replicated Data parameters 31-32, 35, 3A, 3C, 3E, 50 .....	151
Table 60 — Search parameters 02, 31-32, 35, 3A, 3E .....	153
Table 61 — Search parameter 50 .....	154
Table 62 — Search parameter 51 .....	155
Table 63 — Search parameter 52 .....	155
Table 64 — Search parameter 53 .....	156
Table 65 — Write parameters 31-32, 35, 3A, 3C, 3E-3F, 50-52 .....	158
Table 66 — Write Pattern parameters 02, 31-32, 35, 3A, 3C, 3E, 50, 6C .....	160
Table 67 — Format parameters 31-32, 35, 3A-3C, 3E-3F .....	164
Table 68 — Format parameters 50-54 .....	166
Table 69 — Format parameters 56-58 .....	168
Table 70 — Format parameters 5A, 6C .....	169
Table 71 — Copy parameters 33-35, 3A, 3C, 3E, 50 .....	172
Table 72 — Compare Slave Data parameters 33-35, 3A, 3E, 50 .....	175
Table 73 — Compare Data parameters 31-35, 3A, 3E, 50 .....	177
Table 74 — Reallocate parameters 31-32, 35, 3A, 3E .....	179
Table 75 — Reallocate parameters 50, 55 .....	180
Table 76 — Allocate Restore parameters 31-32, 35, 3A, 3E .....	182
Table 77 — Allocate Restore parameters 50, 55 .....	183
Table 78 — Shadow Read parameters 33-35, 3A, 3C, 3E, 51, 52 .....	185
Table 79 — Shadow Write parameters 33-35, 3A, 3C, 3E, 51, 52 .....	187
Table 80 — Shadow Restore parameters 33-35, 3A, 3C, 3E .....	189
Table 81 — Read Verify parameters 31-32, 35, 3A, 3C, 3E .....	192
Table 82 — Read at First Avail Data Parameters 31-32, 35, 3A, 3C, 3E-3F, 50-51 .....	194
Table 83 — Read From Buffer parameters 31-32, 35, 3A, 3C, 3E, 50 .....	196
Table 84 — Read Facility Data To Buffer Parameters 31-32, 35, 3A, 3C, 3E, 50 .....	199
Table 85 — Read Physical Data And ECC parameters 31-32, 35, 3A, 3C, 3E .....	201
Table 86 — Read Physical Header parameters 31-32, 35, 3A, 3E .....	202
Table 87 — Read IPL parameters 31-32, 35, 3A, 3E .....	204
Table 88 — Read Physical Header And ECC parameters 31-32, 35, 3A, 3E .....	206
Table 89 — Write to Buffer parameters 31-32, 35, 3A, 3C, 3E, 50 .....	208
Table 90 — Write Buffer To Facility Parameters 31-32, 35, 3A, 3C, 3E, 50 .....	210
Table 91 — Write Physical Data and ECC parameters 31-32, 35, 3A, 3E .....	212
Table 92 — Write Physical Header parameters 31-32, 35, 3A, 3E .....	214
Table 93 — Load Slave IML parameters 31-32, 3E .....	216
Table 94 — Erase parameters 31-32, 35, 3A, 3E .....	218
Table 95 — Write Physical Header And ECC parameters 31-32, 35, 3A, 3E .....	220
Table 96 — Perform Slave Diagnostics parameters 31-32, 50-53, 6C .....	222
Table 97 — Perform Facility Diagnostics parameters 31-32, 50-53, 6C .....	224
Table 98 — Read Defect List parameters 31-32, 3E, 55-57 .....	226
Table 99 — Read Defect List parameters 58, 5A, 6C-6D .....	228
Table 100 — Write Defect List parameters 31-32, 3E, 55-57 .....	230
Table 101 — Write Defect List parameters 58, 5A, 6C .....	231
Table 102 — Read Error Log parameters 31-32, 50, 6C-6D .....	233
Table 103 — Write Error Log parameters 31-32, 50, 6C .....	235
Table 104 — Diagnostic Control parameters 31-32, 50-53, 6C .....	237

This is a preview of ISO/IEC 9318-3:1990. [Click here to purchase the full version from the ANSI store.](#)

## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 9318-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 9318 consists of the following parts, under the general title *Information technology — Intelligent Peripheral Interface*:

- *Part 1: Physical level*
- *Part 2: Device specific command set for magnetic disk drives*
- *Part 3: Device generic command set for magnetic and optical disk drives*
- *Part 4: Device generic command set for magnetic tape drives*

Annex A forms an integral part of this part of ISO/IEC 9318. Annexes B and C are for information only.

## Introduction

This part of ISO/IEC 9318 does not replace any existing standard, but it does complement other Intelligent Peripheral Interface (IPI) standards (see clause 2).

This part of ISO/IEC 9318 provides a definition of the device-generic portion of a series of standards called the Intelligent Peripheral Interface (IPI), a high performance, general-purpose parallel peripheral interface. This part of ISO/IEC 9318 responds to an industry market need (expressed both by users and manufacturers) to limit the increasing costs in hosts associated with changes in peripherals.

The first five clauses of this part of ISO/IEC 9318 contain material that is useful across all classes of devices that the device-generic command sets can support. Clauses 6 to 12 are oriented to particular device classes and in this document are intended for use with Magnetic and Optical disks.

- Clause 1 describes the scope.
- Clause 2 lists the normative reference.
- Clause 3 provides descriptions and conventions.
- Clause 4 describes the environment-of-use and projected application areas.
- Clause 5 describes the Message Packet structure used for commands and responses.
- Clause 6 describes Control commands.
- Clause 7 describes Position commands.
- Clause 8 describes the most generic Transfer commands.
- Clause 9 describes the Combination Transfer commands, which require a minimum of two sets of extents.
- Clause 10 describes the other Transfer commands, which are more device specific than those in clause 8.
- Clause 11 describes the Diagnostic commands.
- Clause 12 summarizes the commands defined in the document.

# Information technology - Intelligent Peripheral Interface -

## Part 3:

## Device generic command set for magnetic and optical disk drives

### 1 Scope

This part of ISO/IEC 9318 describes the Logical Level 3 (generic level) Interface for magnetic and optical disk drives. See clause 6 of ISO/IEC 9318-1 for an explanation of the levels.

The physical, electrical, and configuration characteristics and the transmission protocol of this interface are in accordance with ISO/IEC 9318-1. The interface is capable of handling data rates from 0 to at least 10Mocets/s, depending on driver and receiver classes.

The purpose of this part of ISO/IEC 9318 is to facilitate the development and utilization of an intelligent interface which permits the interconnection of multiple peripheral types such as disk, tape, communications, to a controller.

This part of ISO/IEC 9318 does not replace any existing standard, but it does complement other Intelligent Peripheral Interface (IPI) standards (see clause 2).

This part of ISO/IEC 9318 provides a definition of the device-generic portion of a family of standards called the Intelligent Peripheral Interface (IPI), a high performance, general-purpose parallel peripheral interface.

The intent of the IPI is to isolate the host (CPU), both hardware and software, from changes in peripherals by providing a "function-generic" command set to allow the connection of multiple types of peripherals (disks, printers, tapes, communications). To smooth the transition from the current methods to the generic approach, the IPI supports device-specific command sets to aid in bridging the gap between the two approaches.

To accomplish this set of goals, the design of the IPI includes device-specific and device-generic command sets, both utilizing a common physical bus. The device-specific command set provides:

- device-oriented control;
- physical data addressing;
- timing critical operations;
- lower device cost.

The device-generic command set provides a higher level of functionality and portability. It includes:

- host/device independence;
- logical data addressing;
- timing independence;
- command queuing capability.

A system is not restricted to the use of one level of command set or the other. It is possible that both levels of command sets will be utilized with a given system's architecture to balance such parameters as system performance, cost, and peripheral availability. It is also possible for the host to provide for migration from device-specific to device-generic levels while still retaining the same physical interface.