

ISO/IEC 17344:2009-06 (E)

Information technology - Data interchange on 120 mm and 80 mm optical disk using +R format - Capacity: 4,7 Gbytes and 1,46 Gbytes per side (recording speed up to 16X)

Contents		Page
Foreword		viii
Introduction		ix
1	Scope	1
2	Conformance	1
2.1	Optical disk	1
2.2	Generating system	1
2.3	Receiving system	2
2.4	Compatibility statement	2
3	Normative references	2
4	Terms and definitions	2
5	Conventions and notations	4
5.1	Representation of numbers	4
5.2	Names	5
6	Abbreviated terms	5
7	General description of the optical disk	6
8	General Requirements	7
8.1	Environments	7
8.1.1	Test environment	7
8.1.2	Operating environment	7
8.1.3	Storage environment	7
8.1.4	Transportation	7
8.2	Safety requirements	8
8.3	Flammability	8
8.4	Light fastness	8
9	Reference Drive	8
9.1	Optical system	8
9.2	Optical beam	9
9.3	Read channel 1	9
9.4	Disk clamping	9
9.5	Rotation of the disk	10
9.6	Wobble channel (Read channel 2)	10
9.7	Tracking channel (Read channel 2)	11
9.8	Reference servo systems	11
9.8.1	Normalized servo transfer function	11
9.8.2	Reference Servo for Axial Tracking	11
9.8.3	Reference Servo for Radial Tracking	12
10	Dimensional characteristics	14
10.1	Reference Planes	14

10.2	Overall dimensions	15
10.3	First transition area	15
10.4	Second transition area	16
10.5	Clamping Zone	16
10.6	Third transition area	16
10.7	Information Zone	16
10.8	Rim Area	17
10.9	Remark on tolerances	17
11	Mechanical characteristics	17
11.1	Mass	17
11.2	Moment of inertia	17
11.3	Dynamic imbalance	17
11.4	Axial runout	17
11.4.1	Tracking requirements at the Reference velocity (CLV)	17
11.4.2	Tracking requirements at 3 000 RPM (CAV)	18
11.5	Radial runout	18
11.5.1	Tracking requirements at the Reference velocity (CLV)	18
11.5.2	Tracking requirements at 3 000 RPM (CAV)	19
12	Optical characteristics in the Information Zone	19
12.1	Index of refraction	19
12.2	Thickness of the substrate	19
12.3	Reflectivity	20
12.4	Birefringence	20
12.5	Angular deviation	20
13	Data format	21
13.1	Data Frames	21
13.1.1	Identification Data (ID)	22
13.1.2	ID Error Detection Code (IED)	22
13.1.3	RSV	23
13.1.4	Error Detection Code (EDC)	23
13.2	Scrambled Frames	23
13.3	ECC Blocks	24
13.4	Recording Frames	25
13.5	Modulation and NRZI conversion	26
13.6	Physical Sectors	27
13.7	Layout of a Recording UNit (RUN)	28
13.7.1	Recording Unit position	29
13.8	d.c. component suppression control	29
14	Track format	30
14.1	Track shape	30
14.2	Track path	31
14.3	Track pitch	31
14.4	Track layout	31
14.4.1	ADIP information	31
14.4.2	Physical format information in ADIP	34
15	General description of the Information Zone	56
16	Layout of the Information Zone of a Single-session disk	56
16.1	Physical Sector Numbers (PSNs)	56
17	Inner Drive Area	57
17.1	Initial Zone	58
17.2	Inner Disk Test Zone	58
17.3	Count Zone Run-in	58
17.4	Inner Disk Count Zone	58
17.5	Inner Disk Administration Zone	59
17.6	Table of Contents (TOC) Zone	59
17.6.1	Table of Contents Blocks	60
17.6.2	Recorded Area Indicators (optional)	62
18	Lead-in Zone	63
18.1	Guard Zone 1	63
18.2	Reserved Zone 1	63
18.3	Reserved Zone 2	63
18.4	Inner Disk Identification Zone	64

18.5	Reserved Zone 3	64
18.6	Reference Code Zone	64
18.7	Buffer Zone 1	64
18.8	Control Data Zone	64
18.8.1	Physical format information	64
18.8.2	Disk manufacturing information	66
18.8.3	Content provider information	66
18.9	Buffer Zone 2	66
19	Data Zone	67
20	Lead-out Zone	67
20.1	Buffer Zone 3	67
20.2	Outer Disk Identification Zone	67
20.3	Guard Zone 2	67
21	Outer Drive Area	68
21.1	Outer Disk Administration Zone	68
21.2	Outer Disk Count Zone	68
21.3	Outer Disk Test Zone	69
21.4	Guard Zone 3	69
22	Multi-session Layout	69
22.1	Intro	70
22.1.1	Buffer Zone A	71
22.1.2	Inner Session Identification Zone	71
22.1.3	Session Control Data Zone	71
22.1.4	Buffer Zone B	71
22.2	Data Zone	71
22.3	Closure	71
22.3.1	Buffer Zone C	71
22.3.2	Outer Session Identification Zone	71
23	Sequential recording in Fragments	71
23.1	Opening a Session	72
23.1.1	Incomplete Fragment	72
23.1.2	Reserved Fragments	72
23.1.3	Recording User Data in Fragments	73
23.1.4	Closing a Fragment	73
23.2	Closing a Session	74
23.2.1	Lead-in/Intro Zone	74
23.2.2	Closure Zone	74
23.3	Finalizing the disk	75
24	Assignment of Logical Sector Numbers (LSNs)	75
25	Disk Control Blocks	75
25.1	General format of Disk Control Blocks	75
25.2	Format of the Session DCB (SDCB)	77
25.2.1	Session Items	79
26	General	80
27	Method of testing	81
27.1	Environment	81
27.2	Reference Drive	81
27.2.1	Optics and mechanics	81
27.2.2	Read power	81
27.2.3	Read channels	81
27.2.4	Tracking	81
27.3	Definition of signals	81
28	Characteristics of the groove signals	82
28.1	Phase depth	82
28.2	Push-pull signal	82
28.3	Track Cross signal	83
28.4	Normalized wobble signal	83
28.5	Characteristics of the wobble	83
29	Method of testing	83
29.1	Environment	83
29.2	Reference Drive	84

29.2.1	Optics and mechanics	84
29.2.2	Read power	84
29.2.3	Read channels	84
29.2.4	Tracking	84
29.2.5	Scanning velocity	84
29.3	Write conditions	84
29.3.1	Write pulse waveform	84
29.3.2	Write power	85
29.3.3	Write power dependency on wavelength	86
29.3.4	Write power window	86
29.4	Measurement conditions	87
30	Characteristics of the recorded signals	87
30.1	Channel bit length	87
30.2	Definition of signals	87
30.2.1	High frequency signals (HF)	87
30.2.2	Modulated amplitude	87
30.2.3	Signal asymmetry	88
30.2.4	Normalized Slicing Level jump	88
30.2.5	Jitter	88
30.2.6	Track Cross signal	89
30.3	Read stability	89
31	Additional testing conditions	89
31.1	Test environment	89
31.1.1	Optics	89
31.2	Definition of signals	89
31.2.1	Modulated amplitude	90
31.2.2	Signal asymmetry	90
31.2.3	Jitter	90
31.2.4	Track Cross signal	90
31.2.5	Differential phase tracking error signal	90
31.2.6	Tangential push-pull signal	91
32	Quality of the recording layer	92
32.1	Defects	92
32.2	Data errors	92
33	Method of testing	93
33.1	Environment	93
33.2	Reference Drive	93
33.2.1	Optics and mechanics	93
33.2.2	Read power	93
33.2.3	Read channels	93
33.2.4	Error correction	93
33.2.5	Tracking	93
34	Minimum quality of a Recording Unit	94
34.1	Tracking	94
34.2	User-written data	94
Annex A (normative) 80 mm +R disk		95
Annex B (normative) Structure for Extended format information in the Data Zone		98
Annex C (normative) Measurement of light reflectivity		101
Annex D (normative) Measurement of birefringence		103
Annex E (normative) Measuring conditions for operation signals		106
Annex F (normative) Measurement of the differential phase tracking error		109
Annex G (normative) The write pulse wave form for testing		113
Annex H (normative) 8-to-16 Modulation		121

Annex I (normative) Optimum Power Control and Recording Conditions	130
Annex J (informative) Running OPC	133
Annex K (informative) Wavelength dependency	134
Annex L (informative) Explanation about the usage of the reference servos	138
Annex M (informative) Measurement of the groove wobble amplitude	145
Annex N (informative) Light fastness of the disk	147
Annex O (informative) Transportation	148
Annex P (informative) Video Content Protection System	149
Annex Q (informative) How to use the Physical format information in ADIP	150
Annex R (informative) Values to be implemented in Existing and Future Specifications	152
Bibliography	155