

ISO/IEC 29642:2009-06 (E)

Information technology - Data interchange on 120 mm and 80 mm optical disk using +R W DL format - Capacity: 8,55 Gbytes and 2,66 Gbytes per side (recording speed 2,4X)

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	5
8	General Requirements	6
8.1	Environments	6
8.1.1	Test environment	6
8.1.2	Operating environment	7
8.1.3	Storage environment	7
8.1.4	Transportation	7
8.2	Safety requirements	7
8.3	Flammability	7
9	Reference Drive	7
9.1	Optical system	8
9.2	Optical beam	8
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)	10
9.8	Reference servo systems	10
9.8.1	Normalized servo transfer function	10
9.8.2	Reference Servo for Axial Tracking	11
9.8.3	Reference Servo for Radial Tracking	12
10	Dimensional characteristics	13
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
10.7.1	Sub-division of the Information Zone	17
10.7.2	Track mode	17
10.8	Rim area	18
10.9	Remark on tolerances	18
11	Mechanical characteristics	18
11.1	Mass	18
11.2	Moment of inertia	18
11.3	Dynamic imbalance	18
11.4	Axial runout	18
11.4.1	Tracking requirements at the Reference velocity (CLV)	18
11.5	Radial runout	19
11.5.1	Tracking requirements at the Reference velocity (CLV)	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	21
12.5	Angular deviation	21
13	Data format	21
13.1	Data Frames	22
13.1.1	Identification Data (ID)	22
13.1.2	ID Error Detection Code (IED)	23
13.1.3	RSV	23
13.1.4	Error Detection Code (EDC)	23
13.2	Scrambled Frames	24
13.3	ECC Blocks	25
13.4	Recording Frames	26
13.5	Modulation and NRZI conversion	27
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	31
14.1	Track shape	31
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	35
15	General description of the Information Zone	50
16	Layout of the Information Zone	51
16.1	Usage of the Data Zone	51
16.2	Physical Sector Numbers (PSNs)	52
17	Lead-in Zone	53
17.1	Initial Zone	53
17.2	Inner Disk Test Zone	53
17.3	Guard Zone 1	54
17.4	Reserved Zone 1	54
17.5	Reserved Zone 2	54
17.6	Inner Disk Identification Zone	54
17.7	Reserved Zone 3	55
17.8	Reference Code Zone	55
17.9	Buffer Zone 1	55
17.10	Control Data Zone	55
17.10.1	Physical format information	55
17.10.2	Disk manufacturing information	57
17.10.3	Content provider information	58

17.11	Buffer Zone 2	58
18	Data Zone	58
19	Middle Zones	58
19.1	Buffer Zones 3	59
19.2	Reserved Zones 4	59
19.3	Guard Zones 2	59
20	Outer Drive Areas	60
20.1	Reserved Zone 5	61
20.2	Outer Disk Test Zone	61
20.3	Guard Zone 3	61
21	Lead-out Zone	61
21.1	Buffer Zone 4	62
21.2	Inner Disk Test Zone	62
21.3	Final Zone	62
22	Assignment of Logical Sector Numbers (LSNs)	62
23	Formatting	62
23.1	Pre-formatting	63
23.1.1	Verification	63
23.2	Background formatting	63
23.2.1	Initialization	63
23.2.2	De-icing	63
23.2.3	Finalization	66
23.2.4	Verification (optional)	66
23.3	Sequential recording without formatting	66
24	Disk Control Blocks	68
24.1	General format of Disk Control Blocks	68
24.2	Format of the Formatting DCB (FDCB)	70
24.3	Format of the Write inhibit DCB (WDCB)	75
25	General	77
26	Method of testing	77
26.1	Environment	77
26.2	Reference Drive	77
26.2.1	Optics and mechanics	77
26.2.2	Read power	77
26.2.3	Read channels	77
26.2.4	Tracking	78
26.3	Definition of signals	78
27	Characteristics of the groove signals	79
27.1	Phase depth	79
27.2	Push-pull signal	79
27.3	Track Cross signal	79
27.4	Normalized wobble signal	79
27.5	Characteristics of the wobble	80
28	Method of testing	80
28.1	Environment	80
28.2	Reference Drive	80
28.2.1	Optics and mechanics	80
28.2.2	Read power	80
28.2.3	Read channels	80
28.2.4	Tracking	81
28.2.5	Scanning velocity	81
28.3	Write conditions	81
28.3.1	Write pulse waveform	81
28.3.2	Write power	81
28.3.3	Write power shift for layer L1 due to recording on layer L0	82
28.4	Measurement conditions	82
29	Characteristics of the recorded signals	82
29.1	Channel bit length	82
29.2	Definition of signals	82
29.2.1	High frequency signals (HF)	82
29.2.2	Modulated amplitude	83

29.2.3	Signal asymmetry	83
29.2.4	Normalized Slicing Level jump	83
29.2.5	Jitter	84
29.3	Read stability	84
30	Additional testing conditions	85
30.1	Test environment	85
30.1.1	Optics	85
30.2	Definition of signals	85
30.2.1	Modulated amplitude	86
30.2.2	Signal asymmetry	86
30.2.3	Jitter	86
30.2.4	Track Cross signal	86
30.2.5	Differential phase tracking error signal	86
30.2.6	Tangential push-pull signal	87
31	Quality of the recording layer	88
31.1	Defects	88
31.2	Data errors	88
32	Method of testing	89
32.1	Environment	89
32.2	Reference Drive	89
32.2.1	Optics and mechanics	89
32.2.2	Read power	89
32.2.3	Read channels	89
32.2.4	Error correction	89
32.2.5	Tracking	89
33	Minimum quality of a Recording Unit	90
33.1	Tracking	90
33.2	User-written data	90
Annex A (normative) 80 mm +RW DL disk		91
Annex B (normative) Structure for Extended format information in the Data Zone		96
Annex C (normative) Measurement of light reflectivity		99
Annex D (normative) Measurement of birefringence		101
Annex E (normative) Measuring conditions for operation signals		104
Annex F (normative) Measurement of the differential phase tracking error		107
Annex G (normative) The write pulse wave form for testing		111
Annex H (normative) 8-to-16 Modulation		116
Annex I (normative) Optimum Power Control		125
Annex J (normative) Logical to Physical address translation		130
Annex K (informative) Recommended access method for players		131
Annex L (informative) Measurement of the groove wobble amplitude		132
Annex M (informative) Transportation		134
Annex N (informative) Defect Management and Physical Formatting		135
Annex O (informative) Video Content Protection System		136
Annex P (informative) How to use the Physical format information in ADIP		137
Annex Q (informative) Values to be Implemented in Existing and Future Specifications		139
Bibliography		143