

LOW REFLECTION TEST CD-R

For Checking CD Players and CD Drives

SCD-4321A/ -4322A/ -4323A/ -4324A Eccentricity

SCD-4325A Vertical deviation

SCD-4326A Defects

SCD-4327A Scratches

1. Purpose of use, Features

These are Test Discs designed for confirmation of various kind of operation and playback ability of CD Drives etc., when playing low reflection CD-R discs. The reflection ratio of the material disc is managed as 56%.

Disc format is ISO9660 CD-ROM Mode1.

It is recorded data of 117 files (approximately 676Mbytes) from Block Number 23 to 329861.

File data are consist of Block Number (hex), Block Number (BCD), CD Time (BCD), CD Time (ASCII), M-sequence data and Check Sum.

File data is processed from address information of disc, location on a disc conforms to Block Number address.

It is available to confirm the particular block reading by accessing file.

For details, refer to 3. Details of file location and 8. File construction.

Features of respective discs

- SCD-4321A/ -4322A/ -4323A/ -4324A are Eccentricity discs. It is available to use for confirmation of tracking servo ability, evaluation, measurement and adjustment.
- SCD-4325A is Vertical Deviation disc. It is available to use for confirmation of focus servo ability and evaluation, measurement and adjustment.
- SCD-4326A is Defects disc. It is simulated stains, dust etc. adhered on the surface of a disc. It is available to use for read and playback operation, evaluation, measurement and adjustment. Black Bands are processed from 0.4mm to 1.0mm width. It is available to check with respect to each 0.2mm step. In Fingerprints area, size of microscopic dots are managed.
- SCD-4327A is Scratches disc. It is simulated missing pieces of information by scratches on the surface of a disc. It is available to use for read and playback operation, evaluation, measurement and adjustment. Scratches are processed 14 steps with respect to each from 0.4 to 3.0mm width. It is available to check with respect to each 0.2mm step.

2. Specifications

- Disc type : CD-R Low Reflection Disc 700Mbytes 80min
- Outer diameter : 120 ± 0.3 mm
- Center hole diameter : 15.0 +0.1/ -0 mm *1
- Substrate thickness : 1.2 +0.3/ -0.1 mm
- Scanning velocity : 1.2 m/sec (for reference)
- Track pitch : 1.50 μ m (for reference)
- Reflectivity/ Rtop : 56 ± 3 % (User data area, except Index 0)
- Data area : ≤ φ 111.7 mm (for reference)
- Recorded capacity : 675, 864, 576 Bytes (Block 0 ~ 330011, including Post gap)
- User data area : 23 ~ 329, 861Block
- Format : ISO9660 CD-ROM Mode1
- Disc layout (3. Refer to Details of File location)

Lead In	System Area 0~15	ISO 9660 16~22	User Data *2															Post Gap 150	Lead Out
			A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q		
			23~															~329861	

*1 This is a value that center hole is unprocessed.

For details, please refer to the specifications of Eccentricity disc (SCD-4321A ~ SCD-4324), Vertical deviation disc (SCD-4325A)

*2 User Data A to S are File groups those first letter are the same.

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3. Details of file location

(1) File name, Start Block No., Block length, File size and Start Radius of file

Volume name  Root directory
TCDR100W

File	Start Block No.	Block Length	File Size Byte	Start * Radius mm
A005.dat	23	244	499712	24.81
A01.dat	267	488	999424	24.85
A02.dat	755	977	2000896	24.92
A03.dat	1732	1465	3000320	25.07
A05.dat	3197	2441	4999168	25.29
A10.dat	5638	4883	10000384	25.66
A20.dat	10521	9766	20000768	26.37

B005.dat	20287	244	499712	27.74
B01.dat	20531	488	999424	27.77
B02.dat	21019	977	2000896	27.84
B03.dat	21996	1465	3000320	27.97
B05.dat	23461	2261	4630528	28.17
B10.dat	25902	4883	10000384	28.50
B20.dat	30785	9766	20000768	29.14

C005.dat	40551	244	499712	30.38
C01.dat	40795	488	999424	30.41
C02.dat	41283	977	2000896	30.47
C03.dat	42260	1465	3000320	30.60
C05.dat	43725	2441	4999168	30.78
C10.dat	46166	4883	10000384	31.08
C20.dat	51049	9766	20000768	31.67

D005.dat	60815	244	499712	32.82
D01.dat	61059	488	999424	32.84
D02.dat	61547	977	2000896	32.90
D03.dat	62524	1465	3000320	33.01
D05.dat	63989	2441	4999168	33.18
D10.dat	66430	4883	10000384	33.46
D20.dat	71313	9766	20000768	34.01

E005.dat	81079	244	499712	35.08
E01.dat	81323	488	999424	35.11
E02.dat	81811	977	2000896	35.16
E03.dat	82788	1465	3000320	35.27
E05.dat	84253	2441	4999168	35.42
E10.dat	86694	4883	10000384	35.68
E20.dat	91577	9766	20000768	36.20

F005.dat	101343	244	499712	37.21
F01.dat	101587	488	999424	37.23
F02.dat	102075	977	2000896	37.28
F03.dat	103052	1465	3000320	37.38
F05.dat	104517	2441	4999168	37.53
F10.dat	106958	4883	10000384	37.78
F20.dat	111841	9766	20000768	38.26

G005.dat	121607	244	499712	39.22
G01.dat	121851	488	999424	39.24
G02.dat	122339	977	2000896	39.29
G03.dat	123316	1465	3000320	39.39
G05.dat	124781	2441	4999168	39.53
G10.dat	127222	4883	10000384	39.76
G20.dat	132105	9766	20000768	40.22

H005.dat	141871	244	499712	41.13
H01.dat	142115	488	999424	41.16
H02.dat	142603	977	2000896	41.20
H03.dat	143580	1465	3000320	41.29
H05.dat	145045	2441	4999168	41.43
H10.dat	147486	4883	10000384	41.65
H20.dat	152369	9766	20000768	42.09

File	Start Block No.	Block Length	File Size Byte	Start * Radius mm
J005.dat	162135	244	499712	42.96
J01.dat	162379	488	999424	42.98
J02.dat	162867	977	2000896	43.03
J03.dat	163844	1465	3000320	43.11
J05.dat	165309	2441	4999168	43.24
J10.dat	167750	4883	10000384	43.46
J20.dat	172633	9766	20000768	43.88

K005.dat	182399	244	499712	44.72
K01.dat	182643	488	999424	44.74
K02.dat	183131	977	2000896	44.78
K03.dat	184108	1465	3000320	44.86
K05.dat	185573	2261	4630528	44.99
K10.dat	188014	4883	10000384	45.19
K20.dat	192897	9766	20000768	45.60

L005.dat	202663	244	499712	46.40
L01.dat	202907	488	999424	46.42
L02.dat	203395	977	2000896	46.46
L03.dat	204372	1465	3000320	46.54
L05.dat	205837	2441	4999168	46.66
L10.dat	208278	4883	10000384	46.86
L20.dat	213161	9766	20000768	47.25

M005.dat	222927	244	499712	48.03
M01.dat	223171	488	999424	48.05
M02.dat	223659	977	2000896	48.09
M03.dat	224636	1465	3000320	48.17
M05.dat	226101	2441	4999168	48.28
M10.dat	228542	4883	10000384	48.47
M20.dat	233425	9766	20000768	48.85

N005.dat	243191	244	499712	49.61
N01.dat	243435	488	999424	49.63
N02.dat	243923	977	2000896	49.66
N03.dat	244900	1465	3000320	49.74
N05.dat	246365	2441	4999168	49.85
N10.dat	248806	4883	10000384	50.04
N20.dat	253689	9766	20000768	50.40

P005.dat	263455	244	499712	51.13
P01.dat	263699	488	999424	51.15
P02.dat	264187	977	2000896	51.19
P03.dat	265164	1465	3000320	51.26
P05.dat	266629	2441	4999168	51.37
P10.dat	269070	4883	10000384	51.55
P20.dat	273953	9766	20000768	51.91

Q005.dat	283719	244	499712	52.62
Q01.dat	283963	488	999424	52.63
Q02.dat	284451	977	2000896	52.67
Q03.dat	285428	1465	3000320	52.74
Q05.dat	286893	2441	4999168	52.84
Q10.dat	289334	4883	10000384	53.02
Q20.dat	294217	9766	20000768	53.37

R005.dat	303983	244	499712	54.06
R01.dat	304227	488	999424	54.07
R02.dat	304715	977	2000896	54.11
R03.dat	305692	1465	3000320	54.18
R05.dat	307157	2441	4999168	54.28
R10.dat	309598	4883	10000384	54.45
R20.dat	314481	9766	20000768	54.79

S005.dat	324247	244	499712	55.46
S01.dat	324491	488	999424	55.48
S02.dat	324979	977	2000896	55.51
S03.dat	325956	1465	3000320	55.58
S05.dat	327421	2441	4999168	55.68

* Start radius is numerical design value, actual value may differ.

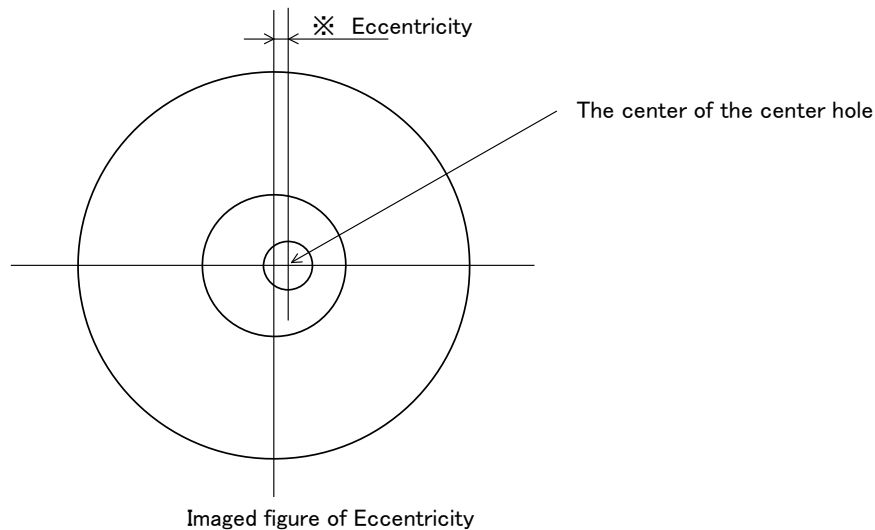
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4. Specifications of SCD-4321A~SCD-4324A, Eccentricity discs

- Center hole diameter : $15 +0.04/ -0$ mm
- Eccentricity

Model name	Eccentricity μm ※	Description
SCD-4321A	70 ± 5	For testing the maximum value specified inn CD Specifications
SCD-4322A	140 ± 5	-
SCD-4323A	210 ± 5	-
SCD-4324A	280 ± 5	-

※) We define Eccentricity here is the distance from the center of the center hole to the center of the trac circle that the most inner pit of the disc plots. Therefore, the Eccentricity of this table is indicated as 0



5. Specifications of SCD-4325A, Vertical deviation disc

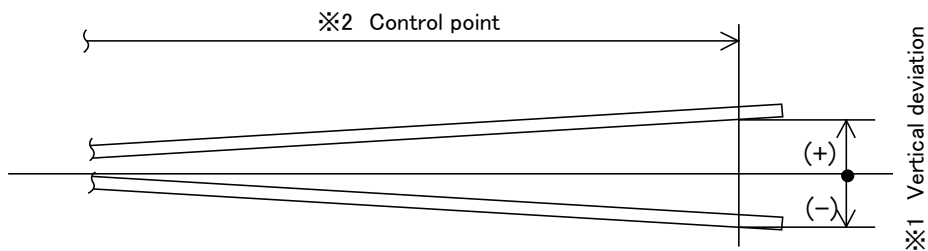
- Center hole diam₁ : $15 +0.04/ -0$ mm
- Eccentricity : $\leq 10 \mu\text{m}$
- Vertical deviation

Model name	※1 Deviation mm	Dividing deviation mm		※2 Control point mm
SCD-4325A	1.0 ± 0.05	(+)	0.5 ± 0.05	$\phi 110$
		(-)	-0.5 ± 0.05	

※1) We define Vertical deviation here is the difference between max. and min. shift value of the recorded lay at the control point of $\phi 110\text{mm}$ in vertical direction when a disc rotating one revolution.

Therefore, the Vertical deviation of this table is indicated as p-p.

※2) The location of the control point $\phi 110\text{mm}$ is the head position of S005.dat (Block number 324247).

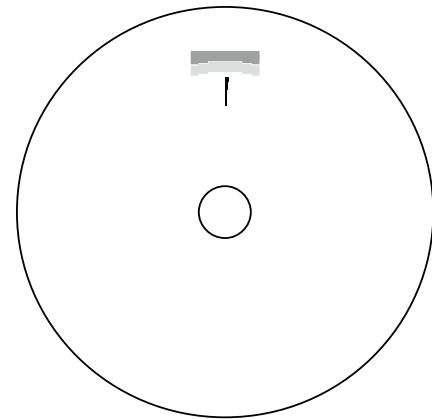


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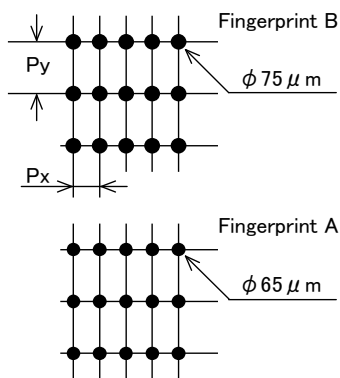
6. Specifications of SCD-4326A, Defects disc

- Black Bands are processed 4 steps from 0.4mm to 1.0mm width.
- In Fingerprints area, size of microscopic dots are managed.

File group	Files	Defects
A	-	-
B	-	-
C	C20.dat~D02.dat	Black band width 0.4 mm
D	D20.dat~E02.dat	Black band width 0.6 mm
E	E20.dat~F02.dat	Black band width 0.8 mm
F	F20.dat	Black band width 1.0 mm
G	-	-
H	H20.dat	Fingerprint A
J	J005~J20.dat	Fingerprints A or B
K	K20.dat	Fingerprint B
L	-	-
M	-	-
N	-	-
P	-	-
Q	-	-
R	-	-
S	-	-

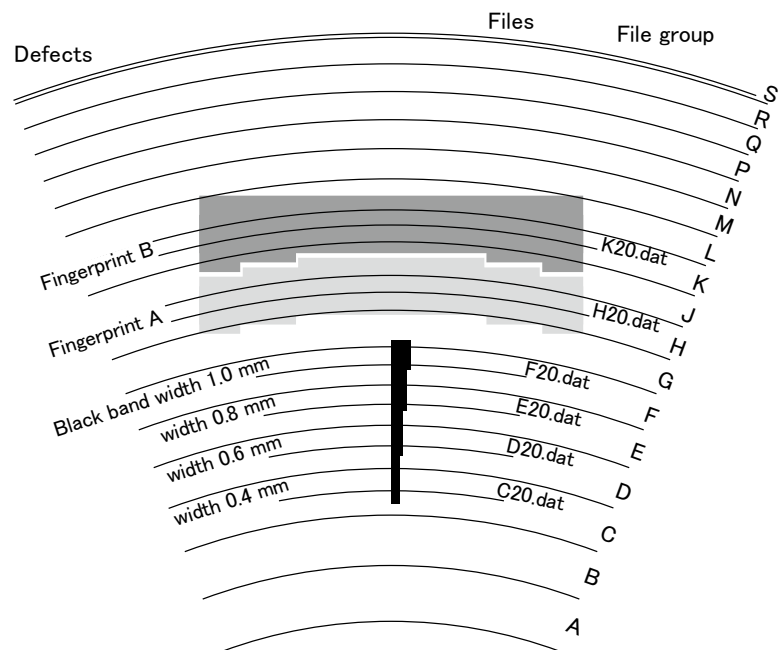


Imaged figure of defects (read-out side)



Clearance of respective dots mm
 Tangential direction : Px=0.125
 Radial direction : Py=0.25

Details of Fingerprints



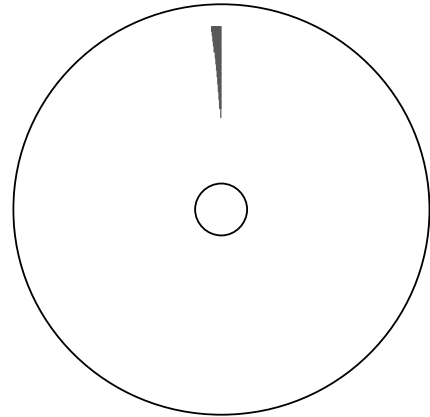
Locations of Defects and Data files

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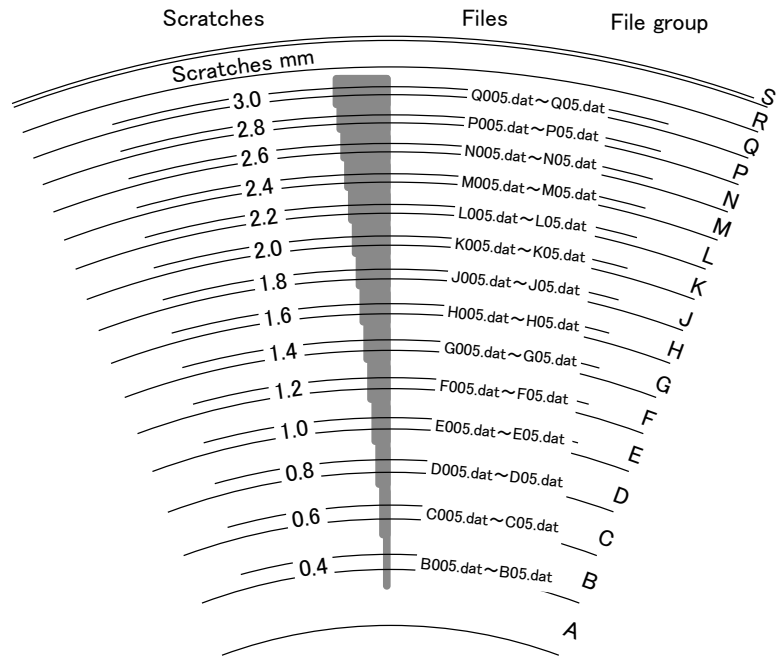
7. Specifications of SCD-4327A, Scratches disc

- Scratches are processed as staircase type from 0.4 to 3.0mm width with each 0.2mm step.

File group	Files	Scratches width mm
A	-	-
B	B005.dat ~ B05.dat	0.4
C	C005.dat ~ C05.dat	0.6
D	D005.dat ~ D05.dat	0.8
E	E005.dat ~ E05.dat	1.0
F	F005.dat ~ F05.dat	1.2
G	G005.dat ~ G05.dat	1.4
H	H005.dat ~ H05.dat	1.6
J	J005.dat ~ J05.dat	1.8
K	K005.dat ~ K05.dat	2.0
L	L005.dat ~ L05.dat	2.2
M	M005.dat ~ M05.dat	2.4
N	N005.dat ~ N05.dat	2.6
P	P005.dat ~ P05.dat	2.8
Q	Q005.dat ~ Q05.dat	3.0
R	-	-
S	-	-



Imaged figure of Scratches (read-out side)



Locations of Scratches and Data file

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8. File Data construction

(1) File data are recorded with described block length, consisting 2048Bytes as CD-ROM 1 Block.

Block No., Time code, M-sequence data, Check Sum and specific ASCII code are recorded.

Group	Byte Number In User Data	Contents	Code
A	0	LSB	Binary
	1	Sequential Block Number	
	2	MSB	ASCII
	3	Character Code " " (20h)	
	4	LSB	BCD
	5	Sequential Block Number	
	6	MSB	ASCII
	7、8	Character Code " " (20h)	
	9	MSB	BCD
	10	Block Number	
	11	LSB (min : sec : Block)	ASCII
	12	Character Code " " (20h)	
	13	MSB	ASCII
14	LSB	Minute	
15		Character Code "m" (6Dh)	
16	MSB	Second	
17	LSB		
18		Character Code "s" (73h)	
19	MSB	Block	
20	LSB		
21		Character Code "f" (66h)	
22、23		Character Code " " (20h)	
B	24	M-Sequence($2^{32}-1$)Data	Binary
C	2043		
	2044、2045	Character Code " " (20h)	ASCII
D	2046	LSB	Binary
	2047	MSB	

MSB = Most Significant Byte , LSB = Least Significant Byte

File Block length

File Name	Block Length
*005.dat	244
*01.dat	488
*02.dat	977
*03.dat	1465
*05.dat	2441
*10.dat	4883
*20.dat	9766

* means A~S,

S10.dat and S20. dat do not exist.

(2) Generation of M-sequence data

- The following function is used for the generation polynomial equation that generates M-sequence data.

Polynomial = 1E0000401h

The data notation adopts the method of making MSB to the left and LSB to the right.

- The default value of M-sequence data is used Sequential Sector Number +1 of each sector, the direction of bit shift move to lower bit.

Sequential Block Number = (Min x 60 + Sec) x 75 + Block +1 - 150

※ "150" in above calculating formula is the value of "2sec x 75Block" of Pregap.

(3) Generation process of M-sequence data

- The primitive polynomial equation is shifted by 1 bit to the lower bit and the result is stored into IFED (32bits data).
IFED = F0000200h
- 32bits Work Register is stored with the Sequential Sector Number +1.
- If the LSB of the work register is 1, then Flag LSBF=1, else, flag LSBF=0.
- The data in register is shifted by 1 bit to the lower bit bringing 0 into MSB.
(The data of LSB is cleared off.)
- If LSBF=1, the work register is Exclusive-ORed with the IFED and replaced by the result.
If LSBF=0, the work register is left unchanged.
- The work register is ANDed with "FFFF", in order to get the lower 16bits as the 2 bytes of the result.
The lower bytes of the result is stored into the lower address.
- Keeping the work register unchanged, return to process No.3 for the next address value. This process is repeated 1009 times to generate the user data in sector.

(4) Calculation of Check Sum

In order to check data within the User Data, Check Sum is recorded in the last 2 Bytes (16bits) of this area. The Check Sum is achieved by considering 16 bits as 1 word in the User Data and accumulating all the words besides the Check Sum Bytes, and taking the lower 16 bits (2 bytes) as the result. The lower bytes of this result stored into Byte Number 2046 of the User Data, and the higher Bytes into 2047.

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<Proper handling of the disc>

Do not write on the surface with a pen and others, nor put a sticker on it.

Do not expose the disc to direct sunlight, nor leave it in the place of high temperature and high humidity.

After playing, store the disc in its own case.

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