

UNBALANCE TEST CD-ROM

For Checking CD Drives

TCD-773/ -774/ -775 (CD-ROM Mode1)

TCD-776/ -777/ -778/ -779 (ISO9660 CD-ROM Mode1)

1. Purpose of use, Features

These are Dynamic Unbalance Test Discs designed for confirmation of various kinds of operation, evaluation, measurement and adjustment of CD Drives. It is simulated Dynamic Unbalance by processing the weight sticker on label side of a disc. It is available to check mechanical vibration etc. caused by Dynamic Unbalance of a disc.

2. Specifications

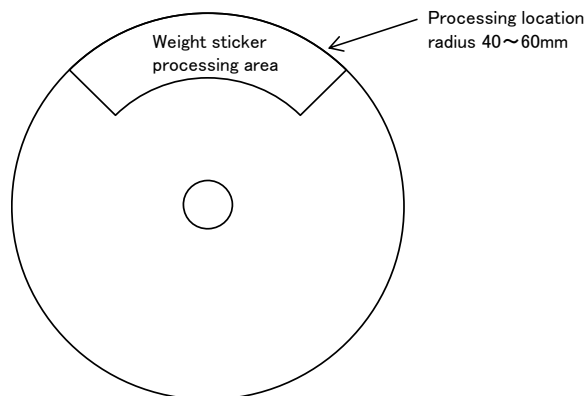
- Disc type : Unbalance CD-ROM Disc
- Material disc : TCD-700, TCD-770
- Format
 - TCD-700 : CD-ROM Mode1
 - TCD-770 : ISO9660 CD-ROM Mode1
- User data area
 - TCD-700 : 0 ~ 269, 999 Block
 - TCD-770 : 21 ~ 306, 899 Block
- Physical Characteristics *
 - Scanning velocity : 1.3 m/sec (for reference)
 - Track pitch : 1.6 μ m (for reference)
 - Radial tilt (β angle) : ± 0.6 deg 以下
 - Eccentricity : $\leq 70 \mu$ m(0-p)

note) Since it is used for various purposes, file system of TCD-700 is not ISO9660 File Format.

Unbalance

Model name	Unbalance g*cm	Material disc	Unbalance data attached	Description
TCD-773	1.00	TCD-700	○	It is specified Dynamic Unbalance shall be ≤ 0.7 g*cm in the CD Specifications. It is recommended to use TCD-774 or TCD-777 for testing complying with CD Specifications.
TCD-774	0.75	TCD-700	○	
TCD-775	0.50	TCD-700	○	
TCD-776	1.00	TCD-770	—	
TCD-777	0.75	TCD-770	—	
TCD-778	0.50	TCD-770	—	
TCD-779	0.30	TCD-770	—	

* Physical Characteristics comply with Compact Disc Read Only Memory System.



Imaged figure of Unbalance disc (label side)

Values in this sheet are measured by the equipments ALMEDIO-owned. Appearance and specifications are subject to change without notice.

3. Disc structure


(1) Disc layout

- TCD-700 (It is not ISO9660 File format)

Lead In	Pre Gap 150	User Data Area (270000Blocks)	Post Gap 150	Lead Out
		0~	~269999	~270149

- TCD-770 (ISO9660 File format)

Lead In	Pre Gap 150	System Area 0~15	ISO 9660 16~20	User Data Area (306879Blocks)	Post Gap 150	Lead Out
				21~		~306899

Volume name File name
 ISO9660  TCD770.dat
 (628,488,192 Bytes)

(2) Content

- TCD-700

Area	Type of content	User data	Block address Min : Sec : Block	Number of blocks	Sequential block number	Mode	Sub code	
							TNo.	Index
Lead In	Type A	-	-	-	-	1	00	-
Pre Gap	Type A	All '00'	00 : 00 : 00 00 : 01 : 74	150	-	1	01	00
User Data	Type B	Specified	00 : 02 : 00 60 : 01 : 74	270, 000	1 ~ 270, 000	1		01
Post Gap	Type A	All '00'	60 : 02 : 00 60 : 03 : 74	150	-	1		01
Lead Out	Type A	All '00'	-	-	-	1	AA	-

- TCD-770

Area	Type of content	User data	Block address Min : Sec : Block	Number of blocks	Sequential block number	Mode	Sub code	
							TNo.	Index
Lead In	Type A	-	-	-	-	1	00	-
Pre Gap	Type A	All '00'	00 : 00 : 00 00 : 01 : 74	150	-	1	01	00
System	Type A	All '00'	00 : 02 : 00 00 : 02 : 15	16	-	1		01
IS9660	Depend on the ISO9660 file system		00 : 02 : 16 00 : 02 : 20	5	-	1		01
User Data	Type B	Specified	00 : 02 : 21 68 : 13 : 74	306, 879	21 ~ 306, 899	1		01
Post Gap	Type A	All '00'	68 : 14 : 00 68 : 15 : 74	150	-	1		01
Lead Out	Type A	All '00'	-	-	-	1		AA

4. Structure of User data

(1) Data are recorded with described length, consisting 2048 bytes as CD-ROM 1 block.

Block No., Time code, M-Sequence data, Check Sum and specific ASCII data 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 (分、秒、ブロック)	ASCII
	12	Character Code " " (20h)	
	13	MSB	ASCII
	14	LSB Minute	
15	Character Code "m" (6Dh)		
16	MSB		
17	LSB Second		
18	Character Code "s" (73h)		
19	MSB		
20	LSB Block		
21	Character Code "f" (66h)		
22, 23	Character Code " " (20h)	ASCII	
B	24	M-Sequence($2^{32}-1$)Data	Binary
	2043		
C	2044, 2045	Character Code " " (20h)	ASCII
D	2046	LSB	Binary
	2047	MSB	

MSB = Most Significant Byte , LSB = Least Significant Byte

(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

※ The value "150" of above formula is 2 second x 75 Block of Pregap.

(3) Generation process of M-sequence data

① The primitive polynomial equation is shifted by 1 bit to the lower bit and the result is stored into IFED (32bits data).

IFED = F0000200h

② 32bits Work Register is stored with the Sequential Sector Number +1.

③ If the LSB of the work register is 1, then Flag LSBF=1, else, flag LSBF=0.

④ The data in register is shifted by 1 bit to the lower bit bringing 0 into MSB. (The data of LSB is cleared off.)

⑤ 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.

⑥ 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.

⑦ 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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5. Use data sample (Head 96 Bytes and End 32 Bytes of the sector)

(1) Head block of TCD-700

Block No. 000000 (000000h), 00min 02sec 00block *

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	ASCII	
0000	01	00	00	20	01	00	00	20	20	00	02	00	20	30	30	6D	□ 00m
0010	30	32	73	30	30	66	20	20	00	02	00	01	80	00	40	00	□	02s00f@.
0020	20	00	10	00	08	00	04	00	02	00	01	00	00	02	00	01	□
0030	80	00	40	80	20	C0	10	E0	08	F0	04	78	02	3C	01	1E	□	..@.....x.<..
0040	00	0D	80	06	40	03	A0	81	D0	C0	68	E0	34	F0	1A	78	□@.....h.4..x
0050	0D	3C	06	1C	03	0E	01	05	80	00	40	80	20	C0	10	E0	□	.<.....@. ...
:																		
07E0	4E	BF	A7	5F	D3	AD	E9	D4	74	68	3A	34	1D	1A	0E	0F	□	N.....th:4....
07F0	87	87	C3	C1	E1	62	70	B3	B8	D9	DC	6C	20	20	CD	6B	□bp....l.k

End block of TCD-700

Block No. 269999 (041EAFh), 60min 01sec 74block *

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	ASCII	
0000	B0	1E	04	20	00	00	27	20	20	60	01	74	20	36	30	6D	' \t 60m
0010	30	31	73	37	34	66	20	20	58	0F	AC	07	D6	83	EB	41		01s74f X.....A
0020	F5	22	7A	13	BD	09	DE	06	6F	03	B7	03	DB	03	ED	03		..z.....o.....
0030	F6	03	FB	01	FD	02	7E	03	BF	01	DF	82	6F	43	B7	23	~.....oC.#
0040	DB	93	ED	4B	F6	27	FB	93	FD	CB	FE	67	FF	B3	FF	DB		...K.'.....g....
0050	FF	EF	FF	75	FF	B8	7F	DE	3F	ED	9F	74	4F	38	27	1E		...u....?.t08'.
:																		
07E0	85	C0	42	E2	21	F1	90	FA	48	FD	A4	FE	52	FF	A9	7F		..B.!...H...R...
07F0	D4	3D	EA	1E	75	0F	BA	05	DD	02	6E	83	20	20	A9	2E		.=.u.....n. ...

(2) Head block of TCD-770

Block No. 000021 (000015h), 00min 02sec 21block *

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	ASCII	
0000	16	00	00	20	22	00	00	20	20	00	02	21	20	30	30	6D	□	... ". ...! 00m
0010	30	32	73	32	31	66	20	20	0B	00	05	02	02	03	81	01	□	02s21f
0020	C0	02	60	01	B0	00	58	00	2C	00	16	00	0B	00	05	02	□	...X.....
0030	02	03	81	01	C0	82	60	41	B0	20	58	90	2C	48	16	A4	□`A. X., H..
0040	0B	D2	5	6B	82	37	C1	1B	E0	8F	F0	47	F8	23	FC	91	□	...k.7....G.#..
0050	FE	48	7F	A4	3F	D0	1F	6A	0F	37	87	19	C3	8E	61	45	□	.H..?.j.7....aE
:																		
07E0	49	43	A4	23	D2	11	E9	88	74	C6	3A	E3	9D	F1	CE	FA	□	IC.#....t.:....
07F0	67	7D	B3	BC	59	5C	2C	AC	16	56	0B	AB	20	20	D0	B0	□	g}.¥¥,..V. ...

End block of TCD-770

Block No. 306899 (04AED3h), 68min 13sec 74block *

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	ASCII	
0000	D4	AE	04	20	00	69	30	20	20	68	13	74	20	36	38	6D	□	...i0 h.t 68m
0010	31	33	73	37	34	66	20	20	6A	57	B5	2B	DA	97	ED	4B	□	13s74f jW.+...K
0020	F6	27	FB	13	FD	0B	FE	07	FF	03	FF	03	FF	03	FF	03	□
0030	FF	03	FF	03	FF	03	FF	83	FF	C3	FF	63	FF	33	FF	1B	□c.3..
0040	FF	8F	FF	45	FF	A0	7F	D2	3F	EB	9F	77	CF	39	E7	1E	□	...E....?.w.9..
0050	73	0D	B9	04	5C	00	2E	00	17	00	0B	02	05	03	82	03	□	s...¥.....
:																		
07E0	1F	C4	0F	60	07	32	03	1B	81	8F	C0	45	E0	22	70	91	□	...`2....E."p.
07F0	B8	48	5C	A4	2E	52	17	A9	8B	56	45	A9	20	20	47	78	□	.H¥..R...VE. Gx

* 75blocks = 1sec

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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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