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SPECIFICATIONS
OF
Slim DVD Super Multi Drive
Model GT80N
(Standard)

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Revision History

No.	Date	Brief description	Note
1	2012.01.18	Tentative version	T.00

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1. Features

1.1 General

- (1) 12.7mm Height Internal Slim Super Multi Drive
- (2) CD-R/RW, DVD-R/RW/RAM/ +R/+RW +/-R DL read and write compatible, CD Family and DVD-ROM read compatible
- (3) Enhanced IDE (ATAPI) interface : SATA Interface
- (4) Buffer memory 0.75 MB
- (5) Buffer Under-run prevention function embedded
- (6) Running OPC (Optimize Power Control) circuit
- (7) Drawer Type manual Load / Electrical Release
- (8) Supports Power saving mode and Sleep mode
- (9) Vertical and Horizontal installable
- (10) Supports Zero Power Function

1.2 Supported disc formats

- (1) Reads data in each DVD-ROM, DVD-R (Ver.1.0, Ver. 2.0 for Authoring)
- (2) Reads and writes in each DVD-R (Ver. 2.1 for General), DVD-R DL (Dual Layer), DVD-RW, DVD-RAM (Ver.2.2), DVD+R, DVD+R DL (Double Layer), and +RW
- (3) Reads data in each CD-ROM, CD-ROM XA, CD-I, Video CD, CD-Extra and CD-Text
- (4) Reads data in Photo CD (Single and Multi session)
- (5) Reads standard CD-DA
- (6) Support to read Super Audio CD (Compatible layer in Hybrid type)
- (7) Reads and writes CD-R discs conforming to "Orange Book Part 2"
- (8) Reads and writes CD-RW discs conforming to "Orange Book Part 3"
- (9) CPRM (DVD-R/RW/RAM) supported

1.3 Supported write method

- (1) DVD-R: Disc at Once and Incremental Recording
- (2) DVD-R DL: Disc at Once , Incremental Recording and Format 4
- (3) DVD-RW: Disc at Once, Incremental Recording and Restricted Overwrite
- (4) DVD-RAM: Random Write
- (5) DVD+R: Sequential Recording
- (6) DVD+R DL Sequential Recording
- (7) DVD+RW: Random Write
- (8) CD-R/RW: Disc at Once, Session at Once, Track at Once and Packet Write

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1.4 Performance

- (1) Average access time: DVD-ROM 160 ms
(1/3 stroke) CD-ROM 140 ms
- (2) Write speed:
- DVD-R 4x PCAV, 8x CAV
 - DVD-R DL 2x CLV, 4x PCAV, 6x PCAV
 - DVD-RW 2x CLV, 4x, 6x ZCLV
 - DVD-RAM 2x, 3x CLV, 5x PCAV(Ver.2.2)
(12x Media: Not support)
 - DVD+R 4x PCAV, 8x CAV
 - DVD+R DL 2.4x CLV, 4x PCAV, 6x PCAV
 - DVD+RW 2.4x, 3.3x CLV, 4x ZCLV, 6x ZCLV, 8x ZCLV
(8x Speed disc: 3.3x CLV, 6x, 8x ZCLV)
 - CD-R 10x CLV, 16x ZCLV, 24x CAV
 - CD-RW 4x, 10x CLV, 16x ZCLV, 24x ZCLV
(High Speed: 10x CLV, Ultra Speed: 24x ZCLV)
- (3) Read speed:
- DVD-R/RW/ROM 8x/8x/8x max.
 - DVD-R DL 8x max.
 - DVD-RAM (Ver.2.2) 5x max
 - DVD-Video (CSS Compliant Disc) 4x max. (Single/Dual layer)
 - DVD+R/+RW 8x/8x max.
 - DVD+R DL 8x max.
 - CD-R/RW/ROM 24x/24x/24x max.
 - CD-DA (DAE) 24x max.
- (4) Sustained Transfer rate: DVD-ROM 11.08 Mbytes/s (8x) max.
CD-ROM 3,600 kB/s (24x) max.
- (5) Legacy data Transfer mode : ATA PIO Mode 0-4
ATA Multi Word DMA Modes 0-2
ATA Ultra DMA Mode 0-6
- (6) Support CD-Text read/write

1.5 Audio

- (1) 16 bit digital data output through ATA interface
- (2) Software Volume Control

*Definition

Transfer Rate: 1x (DVD) = 1.385 Mbytes/s, Mbytes/s = 10^6 bytes/s,
1x (CD) = 150 kB/s kB/s = 2^{10} bytes/s

Capacity: MB = 2^{20} bytes, kB = 2^{10} bytes

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2. General description

2.1 Applicable disc formats

<DVD>	DVD-ROM: 4.7GB (Single Layer) 8.5GB (Dual Layer)
	DVD-R: 3.95GB (Ver. 1.0: read only) 4.7GB (Ver. 2.0 for Authoring: read only) 4.7GB (Ver. 2.1 for General: read & write) (DL) 8.5GB (Ver. 3.0)
	DVD-RW: 4.7GB (Ver. 1.2/ Rev 1.0, 2.0, 3.0)
	DVD-RAM: 2.6GB/side (Ver.1.0) -> Not Support 4.7GB/side (Ver. 2.2)
	DVD+R: 4.7GB (Ver. 1.3) (DL) 8.5GB (Ver. 1.1)
	DVD+RW: 4.7GB (Vol.1 Ver.1.3)
	DVD-RW DL : Not support
<CD>	CD-ROM Mode-1 data disc CD-ROM Mode-2 data disc CD-ROM XA, CD-I, Photo-CD Multi-Session, Video CD CD-Audio Disc Mixed mode CD-ROM disc (data and audio) CD-Extra CD-Text CD-R (Conforming to "Orange Book Part 2": read & write) CD-RW (Conforming to "Orange Book Part 3": read & write)

2.2 Writing method

(1) DVD-R/RW	Disc at Once (DAO) Incremental Recording Restricted Overwrite (DVD-RW only)
(2) DVD-R DL	Disc at Once (DAO) Incremental Recording Layer Jump Recording
(3) DVD-RAM/+RW	Random Write
(4) DVD+R	Sequential Recording
(5) DVD+R DL	Sequential Recording
(6) CD-R/RW	Disc at Once (DAO) Session at Once (SAO) Track at Once (TAO) Packet Writing

2.3 Disc diameter

120 mm
80 mm

2.4 Data capacity

User data / Block	DVD-ROM/R/RW/RAM /+R/+RW 2,048 bytes/block
	CD (Yellow Book) 2,048 bytes/block (Mode1 & Mode2 Form1) 2,336 bytes/block (Mode2) 2,328 bytes/block (Mode2 Form2) 2,352 bytes/block (CD-DA)

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3. Drive performance

3.1 Host interface

T13 ATA/ATAPI-7
 MMC-6, SFF-8090i v7
 Serial ATA Revision 3.0 (RSG: complied UTD 1.4 Gen1)

3.2 Write Speed

Media (Media Speed)	Writing Speed	Transfer rate (DVD: Mbytes/s, CD: kB/s)
DVD-R (1-2x)	2x CLV	2.77 Mbytes/s
-R (1-4x)	3.3x-4x PCAV	4.58-5.54
-R (1-8x)	3.3x-4x PCAV, 3.3-8x CAV	4.58-5.54, 4.58-11.08
-R (1-16x)	3.3x-4x PCAV, 3.3-8x CAV	4.58-5.54, 4.58-11.08
-R (8cm)	2x CLV	2.77
DVD-R DL (4x)	2x CLV, 3.3x-4x PCAV	2.77, 4.58+5.54
DVD-R DL (8x)	2x CLV, 3.3x-4x PCAV, 3.3-6x PCAV	2.77, 4.58+5.54, 4.58-8.31
DVD-RW (1x)	1x CLV	1.385
-RW (1-2x)	2x CLV	2.77
-RW (2-4x)	2x CLV, 2+4x ZCLV	2.77, 2.77+5.54
-RW (2-6x)	2x CLV, 2+4x, 2+4+6x ZCLV	2.77, 2.77+5.54, 2.77+5.54+8.31
-RW (8cm)	2x CLV	2.77
DVD-RAM (2x)	2x CLV	2.77 (w/o Verify)
-RAM (2-3x)	3x CLV	4.16 (w/o Verify)
-RAM (2-5x)	3-5x PCAV	4.16-6.93 (w/o Verify)
-RAM (over 12x)	Not supported	
-RAM (8cm)	2x CLV	2.77 (w/o Verify)
DVD+R (2.4x)	2.4x CLV	3.32
+R (2.4-4x)	3.3x-4x PCAV	4.58+5.54
+R (2.4-8x)	3.3x-4x PCAV, 3.3-8x CAV	4.58+5.54, 4.58-11.08
+R (2.4-16x)	3.3x-4x PCAV, 3.3-8x CAV	4.58+5.54, 4.58-11.08
DVD+R DL (2.4x)	2.4x CLV	3.32
DVD+R DL(8x)	2.4x CLV, 3.3x-4x PCAV	3.32, 4.58+5.54
	3.3-6x PCAV	4.58-8.31
DVD+RW (2.4x)	2.4x CLV	3.32
+RW (2.4-4x)	2.4x CLV, 2.4+4x ZCLV	3.32, 3.32+5.54
+RW (3.3-8x)	3.3x CLV, 3.3+6+8x ZCLV	4.58, 4.58+8.31+11.08
CD-R	10x CLV, 10+16x ZCLV	1,500, 1,500+2,400
	24x CAV	3,600
CD-RW (MS)	4x CLV	600
-RW(HS)	10x CLV	1,500
-RW (US)	10 CLV, 10+16x ZCLV	1,500, 1,500+2,400
	10+16+24x ZCLV	1,500+2,400+3,600

* Rotational speed (CLV, ZCLV)

DVD-R/RW/ROM,+R/RW	1x: Approx. 1,390 (Inside) - 580 r/min (Outside)
DVD-RAM Ver.2.2	2x: Approx. 3,250 (Inside) - 1,380 r/min (Outside)
CD-R/RW/ROM	1x: Approx. 500 (Inside) - 210 r/min (Outside)

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3.3 Read Speed

Media (Media Speed)	Read Speed	Transfer rate (DVD: Mbytes/s, CD: kB/s)	Rotational speed (Approx. r/min)
DVD-ROM (Single Layer)	3.3 - 8x CAV	4.58 - 11.08 Mbytes/s	4,710 r/min
(Dual Layer)	3.3 - 8x CAV	4.58 - 11.08	5,180
DVD-Video* ¹	1.7 - 4x CAV	2.29 - 5.54	2,600
DVD-R (3.95GB/Data)	3.3 - 8x CAV	4.58 - 11.08	5,180
(3.95GB/Video Format)	1.7 - 4x CAV	2.29 - 5.54	2,600
(4.7GB/Data)	3.3 - 8x CAV	4.58 - 11.08	4,710
(4.7GB/VF)	1.7 - 4x CAV	2.29 - 5.54	2,600
DVD-R DL	3.3 - 8x CAV	5.58 - 11.08	5,180
DVD-RW (Data)	3.3 - 8x CAV	4.58 - 11.08	4,710
(VF)	1.7 - 4x CAV	2.29 - 5.54	2,600
(Video & Data)	1.7 - 4x CAV	2.29 - 5.54	2,600
DVD-RAM * ² (Ver. 2.2)	3 - 5x PCAV	4.16 - 6.93	4,880 - 3,450
DVD+R	3.3 - 8x CAV	4.58 - 11.08	4,710
DVD+R DL	3.3 - 8x CAV	4.58 - 11.08	5,180
DVD+RW	3.3 - 8x CAV	4.58 - 11.08	4,710
CD-ROM/PhotoCD	10 - 24x CAV	1,500 - 3,600 kB/s	4,860 - 5,200 r/min
CD-R/RW	10 - 24x CAV	1,500 - 3,600	4,860 - 5,200
CD-DA(DAE)	10 - 24x CAV	1,500 - 3,600	4,860 - 5,200
CD-DA (Audio Play)	4.3 - 10x CAV	650 - 1,500	2,020 - 2,360
CD-I/VideoCD	4.3 - 10x CAV	650 - 1,500	2,020 - 2,360

*1) DVD-Video: CSS, No CSS, Single Layer, Dual Layer are same as above.

*2) DVD-RAM: Data, Video Format are same as above.

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3.4 Burst transfer rate

SATA Gen.1 1.5 G bps (150MB/s)

3.5 Access time (1/3 stroke)

DVD-ROM	160 ms typ.* (Note 1)
DVD-RAM (Ver.2.2)	260 ms typ.
CD-ROM	140 ms typ. (Note 1)

Note :

1) Average access time is the typical value of more than 50 times including latency and error correction time.

Test Disc: DVD: ALMEDIO TDR-820A
CD: HITACHI HCD-1

*) Typical value defines a measured value in normal temperature (20 °C) and horizontal position.

3.6 Data error rate (Measured with 5 retries maximum)

DVD-R/RW/ROM/RAM	<10 ⁻¹²
DVD+R/+RW	<10 ⁻¹²
CD-R/RW/ROM	<10 ⁻¹² (Mode-1) <10 ⁻⁹ (Mode-2)

Condition: It is assumed that the worst case raw error rate of the disc is 10⁻³

3.7 Spin up time without Multi-session

DVD-ROM (SL)	11 s typ. (Time to drive ready mode from power on) 4 s typ. (Time to drive ready mode from sleep)
CD-ROM	11 s typ. (Time to drive ready mode from power on) 4 s typ. (Time to drive ready mode from sleep)

3.8 Data buffer capacity 0.75 MB

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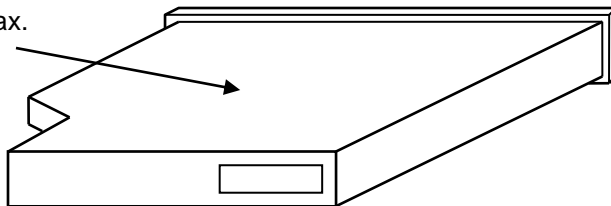
4. Environmental Conditions

4.1 Ambient Temperature

Operating	Read	5 to 50 °C
	Write	5 to 45 °C
Storage/Transportation		-30 to 60 °C

4.2 Approval Temperature Rise

Center of Top Cover	56 °C max.
---------------------	------------



4.3 Temperature Gradient

10 °C

4.4 Relative Humidity

Operating	Read	15% to 85% (Non-Condensing)
	Write	15% to 80% (Depend on the Temperature)
Storage/Transportation		10% to 90% (Non-Condensing)

4.5 Dew point temperature restrictions

Less than 29 °C

4.6 Altitude

Operating	0 to 3,000 m
Non-operating	0 to 12,000 m

4.7 Vibration

(1) Operating

Read:	1.96 m/s ² (0.2 G) No unrecoverable error 5 to 300 Hz sine wave sweep, 3 oct./min at Each of 3 directions ¹⁾
Write:	0.98 m/s ² (0.1 G) No recording stop 5 to 300 Hz sine wave sweep, 6 oct./min at Each of 3 directions ¹⁾

(2) Non-Operating: 9.8 m/s² (1.0 G) No physical and electrical damage. (No disc loaded)
5 to 300 Hz sine wave sweep, 1 oct./min at Each of 3 directions¹⁾

(3) Transportation: 8.04 m/s² (0.82 G) No damage must results. (Packed unit)
5 to 50 Hz random vibration for 20 min at Z-axis direction.

* ¹⁾ 3direction : X (left and right), Y (back and front), Z (top and bottom) axis

4.8 Shock

(1) Operating

Read:	49 m/s ² (5 G) No unrecoverable error (“Retries” are allowed.) 11 ms Half sine wave(5 time shocks, 5 s between shocks.) at Each of 3 directions ¹⁾
write:	1.96 m/s ² (0.2 G) No recording stop. 11 ms Half sine wave, at Each of 3 directions ¹⁾ (5 time shocks, 5 s between shocks.)

(2) Non-Operating: 980 m/s² (100 G) No damage after shock. (No disc loaded)
2 ms Half sine wave at Each of 3 directions¹⁾

* ¹⁾ 3direction : X (left and right), Y (back and front), Z (top and bottom) axis

4.9 Drop Impact

Less than 60 cm

Note: Bulk package, 1 Corner, 3 Edges, 6 Faces.

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5. Quality and Reliability

5.1 MTBF

Assumption:	60,000 Power On hours (POH)
-POH per year	Used in a normal office environment at room temperature.
-ON/OFF cycles per year	3,000
-Operating duty cycle	480
	10% of Power on time (Seek: 10% of operating time)

5.2 Tray Cycle Test

10,000 times tray open/close cycle test

5.3 Actuator Mechanism

1,000,000 full stroke seek

5.4 MTTR (Mean Time to Repair)

0.5 h

5.5 Component Life

Assumption:	5 years or 2,000h of Laser radiating time
	Used in a normal office environment

6. Electro Static Discharge Susceptibility (ESD)

Up to 6 kV(contact)	No user detectable data error
Up to 8 kV(contact)	No catastrophic failure or damage
Up to 10kV (Air)	No user detectable data error
Up to 15kV (Air)	No catastrophic failure or damage

** Test Conditions : C = 150pF, R = 330 ohms, 20 times discharge except Optical Pick-up block and Connector*

7. Power Requirements

7.1 Source Voltage

+5V±5% Ripple Less than 100 mVp-p

7.2 Current

DIPM on (Partial) *1	60 mA typ.
DIPM on (Slumber) *1	20 mA typ.
Continuous Read	750 mA typ. (CD-ROM 24x max. CAV)
	750 mA typ. (DVD-ROM 8x max. CAV)
Continuous Write	800 mA typ. (CD-R 24x CAV)
	750 mA typ. (DVD+R 8x CAV)
	800 mA typ. (DVD+/-R DL 6x ZCLV)
Seek	950 mA typ., 1.3 A max. (CD-ROM 24x max. CAV)
Spin UP(Spindle motor start up)	1.0 A typ., 1.6 A max. (CD-ROM 24x max. CAV)
Maximum Current	1.6 A

*1) If Zero Power Function is supported, 0 mA

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8. Acoustic Noise

Less than 50dBA at 0.25m away from Bezel and 0.45m height away (ISO7779 Seated Operator Position)

- Note :
1. Disc : Less than Unbalance 0.3g-cm
 2. Installation : Horizontal
 3. Ambient Temperature : Normal Temperature
 4. Except loading and unloading

9. Dimensions

WxHxD 128 x 12.7 x 127 mm (Refer to Section 13.)

10. Mass

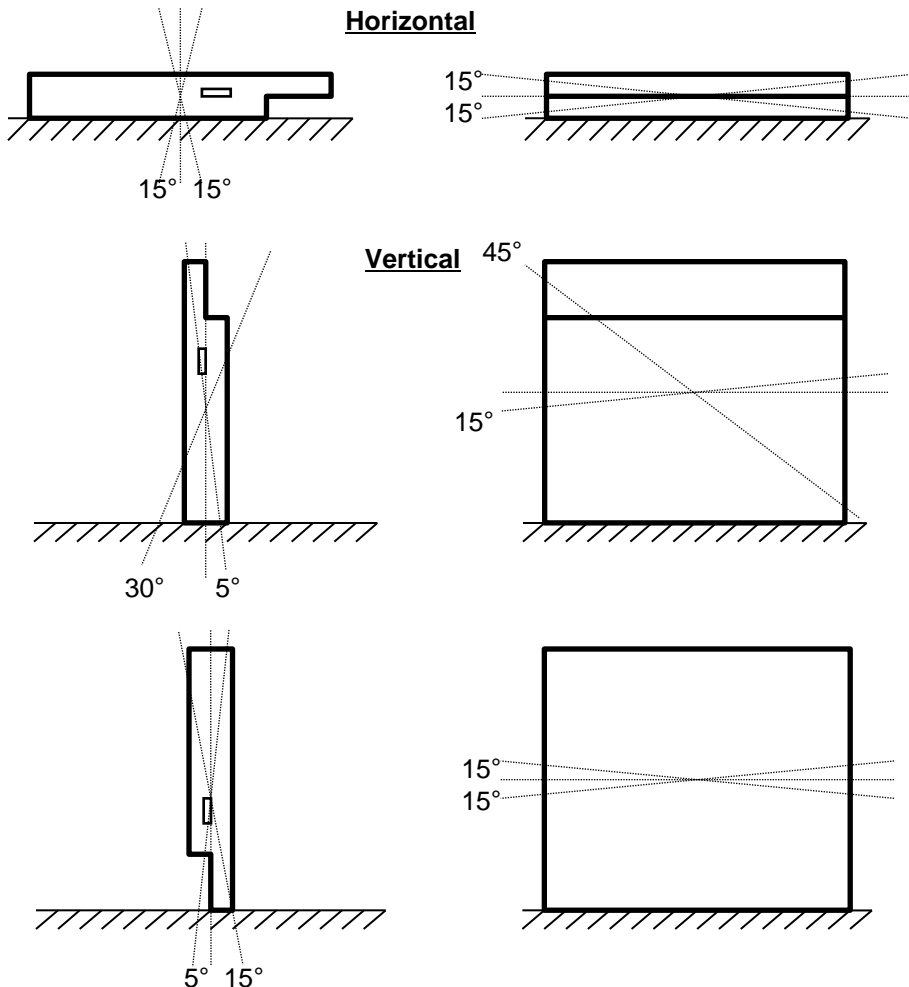
Max.140g (without bezel)

11. Mechanicals

11.1 Disc Loading

Drawer type manual load / Electrical release

11.2 Mounting Requirements



-Note-

Operation with postures other than the above drawings is not guaranteed.

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11.3 Installation conditions

If the drive is not installed under the following conditions, it may not operate properly or cause damage to the drive.

- (1) When mounting the equipment, use tapping screw holes located on the left and right both sides of the equipment.
 When using screws to fix the connector from the host computer to the equipment, use tapping screw holes located on the back side of the equipment.
 - Recommended screw tightening torque : 0.2N·m
 - Required screw depth : Max.1.5mm or Max.2.5mm
 (See Chapter 13 Mechanical Dimensions for detail.)
- (2) Do not apply an excessive force (press, pull or twist) to avoid distorting the equipment.
 - Recommended width of the mounting frame surface on left and right
 Dimension L : 102.6+0.2/-0.2mm (See Fig.1)
 - Recommended value for Top and bottom case : See Fig.1 and Fig.2 for detail.
 - After mounting the connector, do not apply excessive force the connector of the equipment in horizontal and/or vertical direction.
 - Tighten screws evenly.
 - Mounting frame surface contacted with the equipment must be flat.
- (3) Allow enough space as much as possible in all directions around the equipment so the equipment does not apply any vibration, mechanical shock, etc. from peripheral instruments.
 - For the maximum dimension of the equipment thickness
 Recommended clearance : more than 0.5mm.
 - Recommended clearance around the front bezel : more than 1mm .

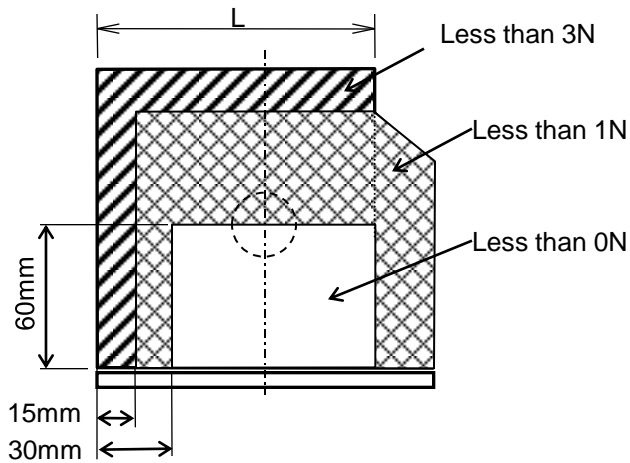


Fig.1 top view

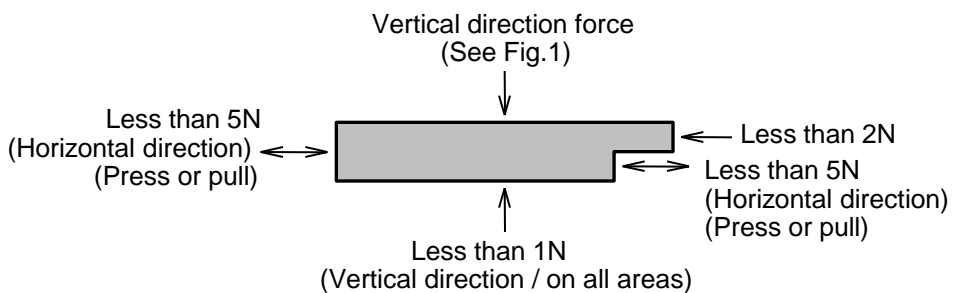
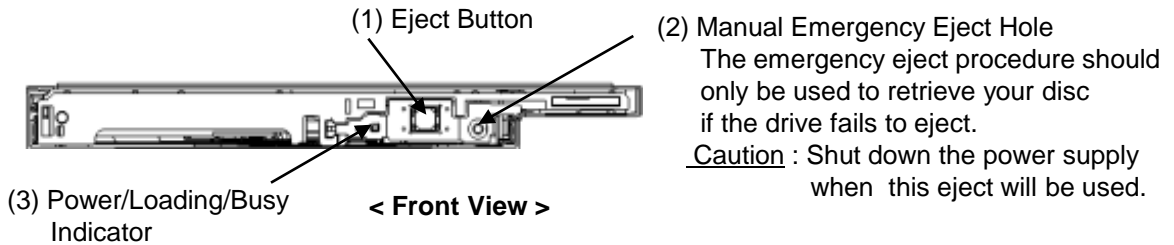


Fig.2 front view

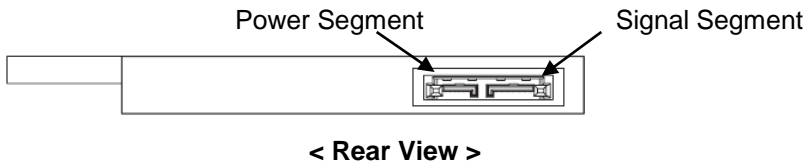
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12. Controls and Functions

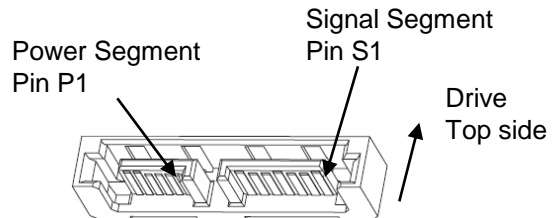
12.1 Front View



12.2 Rear View



12.3 Connector Pin Assignment



	Pin	Function		Cable Usage	Backplane Usage
Signal Segment	S1	GND		1 st mate	1 st mate
	S2	A+	Differential signal pair from host controller.	2 nd mate	2 nd mate
	S3	A-		2 nd mate	2 nd mate
	S4	GND		1 st mate	1 st mate
	S5	B-	Differential signal pair to host controller	2 nd mate	2 nd mate
	S6	B+		2 nd mate	2 nd mate
	S7	GND		1 st mate	1 st mate
Power Segment	P1	DP*	Device Present	Last mate	Last mate
	P2	+5V		2 nd mate	2 nd mate
	P3	+5V		2 nd mate	2 nd mate
	P4	DA*	Device Attention	2 nd mate	2 nd mate
	P5	GND		1 st mate	1 st mate
	P6	GND		1 st mate	1 st mate

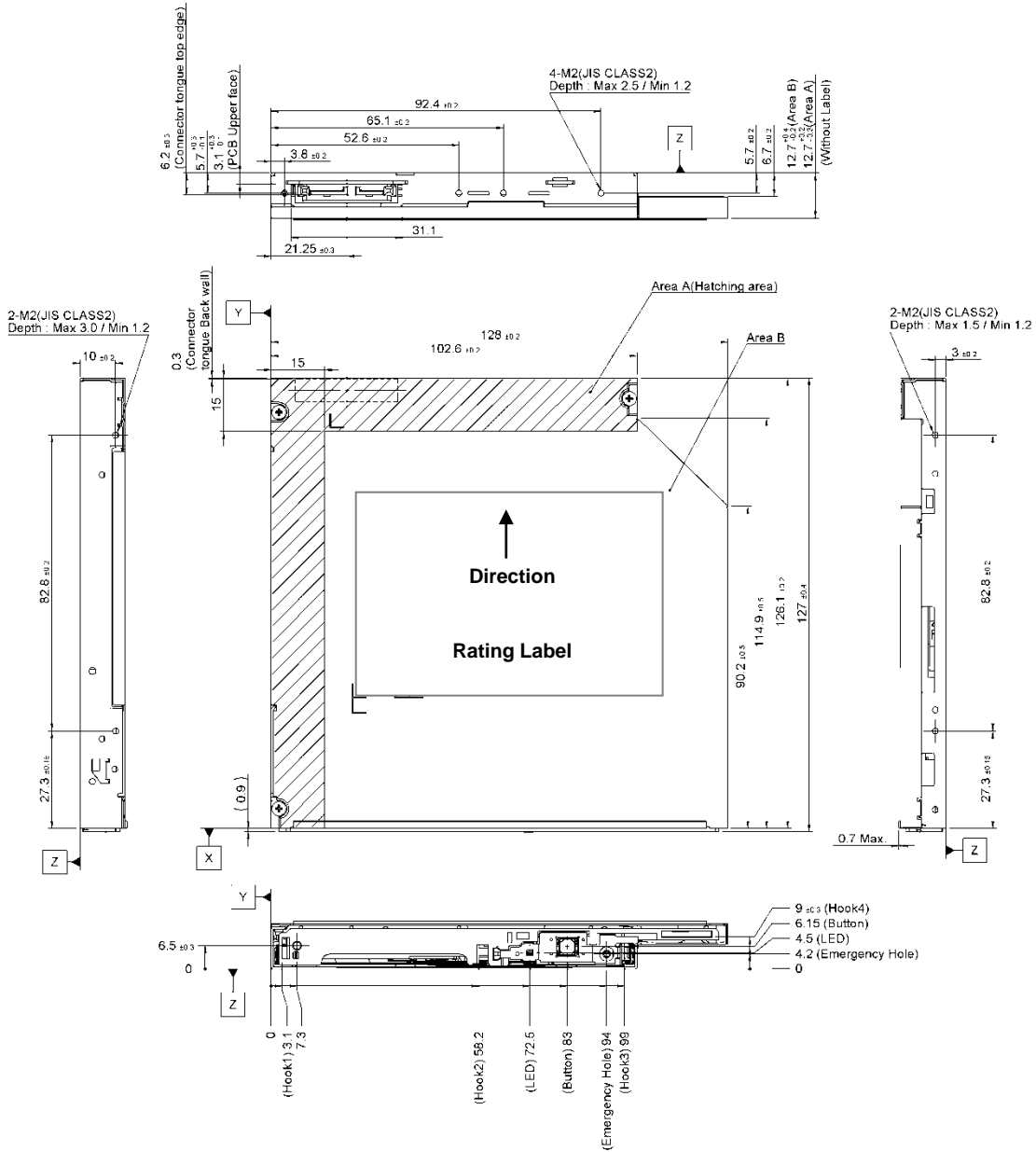
*Pull down DP pin with 1kohm(+/-10%) resistor in ODD.

*DA pin caution: Keep DA pin to be Pull-up for ZPO system or Open state for other system in Host side.

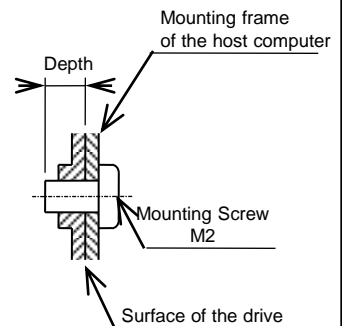
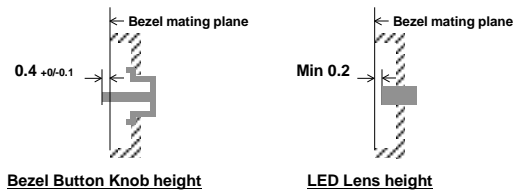
*DP pin caution: Keep DP pin to be Open state in Host side if no need Hot Swap.

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13. Mechanical Dimensions



*** Bezel design recommendation for Button & LED area**



Notes

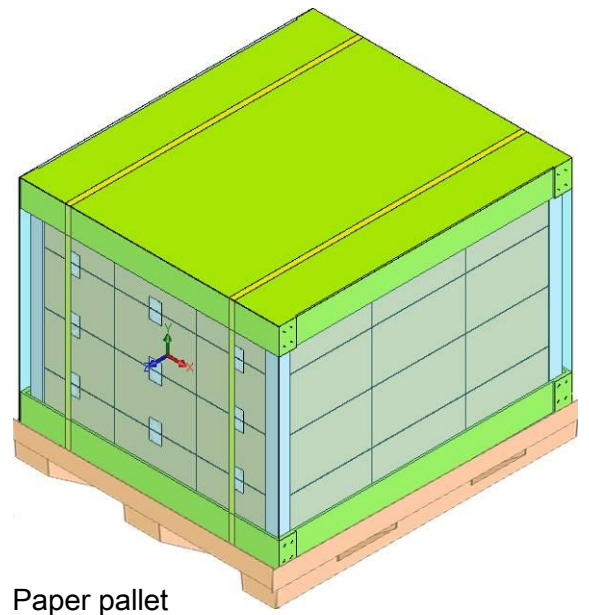
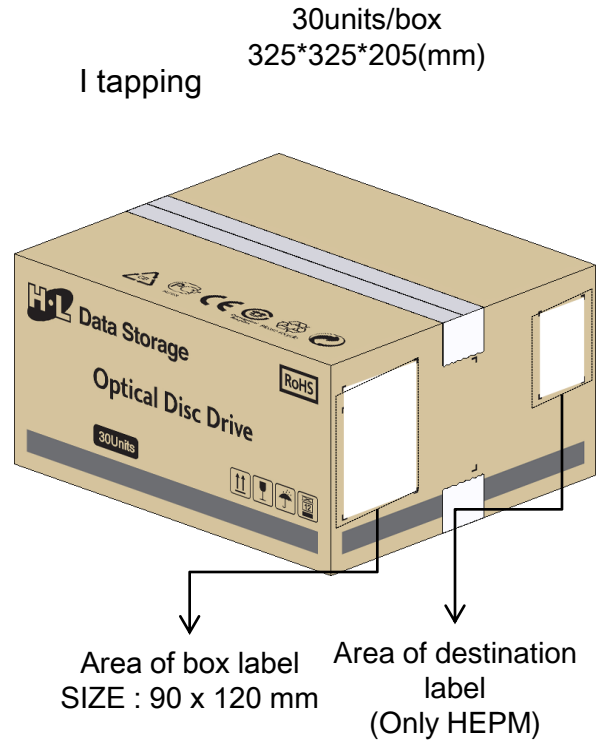
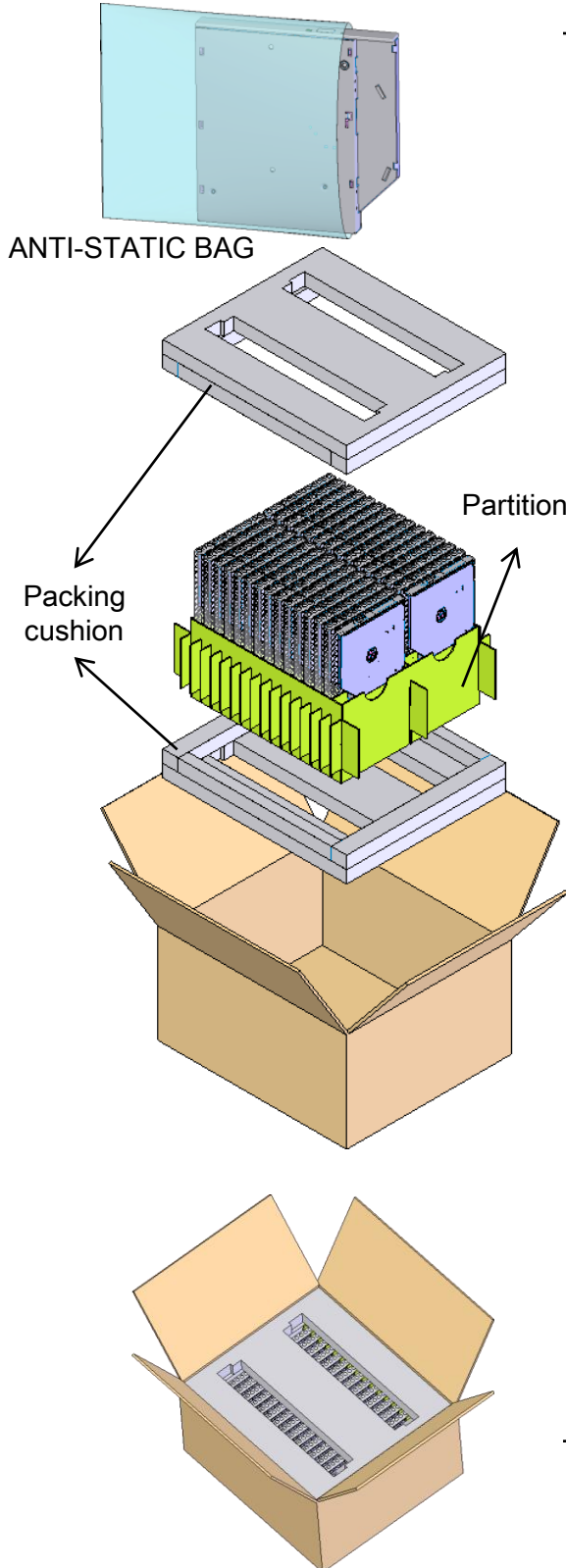
1. M2 tapped holes for installation (Clamping Torque 2.0kgf-cm MAX.)
2. Unless otherwise specified, dimensional tolerance are +/-0.5mm.
3. Bezel design has to follow GBAS Spec which is specified in SFF-8552

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14. Packaging



1,080units/Pallet
1,000*1000*960(mm)

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15. Supported Command List

15.1 ATA Commands

< Command >	< Code >
(1) ATAPI Packet Command	A0h
(2) ATAPI Soft Reset	08h
(3) Check Power Mode	E5h
(4) Execute Drive Diagnostics	90h
(5) Flush Cache	E7h
(6) Identify Packet Device	A1h
(7) Idle Immediate	E1h
(8) NOP	00h
(9) Set Features	EFh
(10) Sleep	E6h
(11) Standby Immediate	E0h
(12) Standby	E2h

15.2 ATAPI Packet Commands

< Command >	< Code >
(1) BLANK	A1h
(2) CLOSE TRACK/RZONE/SESSION/BORDER	5Bh
(3) FORMAT UNIT	04h
(4) GET CONFIGURATION	46h
(5) GET EVENT STATUS NOTIFICATION	4Ah
(6) GET PERFORMANCE	ACh
(7) INQUIRY	12h
(8) MECHANISM STATUS	BDh
(9) MODE SELECT (10)	55h
(10) MODE SENSE (10)	5Ah
(11) PAUSE/RESUME	4Bh
(12) PLAY AUDIO (10)	45h
(13) PLAY AUDIO (12)	A5h
(14) PLAY AUDIO MSF	47h
(15) PLAY AUDIO TRACK RELATIVE (10)	49h
(16) PLAY AUDIO TRACK RELATIVE (12)	A9h
(17) PREVENT ALLOW MEDIUM REMOVAL	1Eh
(18) READ (10)	28h
(19) READ (12)	A8h
(20) READ BUFFER	3Ch
(21) READ BUFFER CAPACITY	5Ch
(22) READ CAPACITY	25h
(23) READ CD	BEh
(24) READ CD MSF	B9h
(25) READ DISC INFORMATION	51h
(26) READ DVD STRUCTURE	ADh
(27) READ FORMAT CAPACITIES	23h
(28) READ HEADER	44h
(29) READ SUB-CHANNEL	42h
(30) READ TOC/PMA/ATIP	43h
(31) READ TRACK/RZONE INFORMATION	52h
(32) REPAIR RZONE	58h
(33) REPORT KEY	A4h

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< Command >	< Code >
(34) REQUEST SENSE	03h
(35) RESERVE TRACK/RZONE	53h
(36) SCAN	BAh
(37) SEEK	2Bh
(38) SEND CUE SHEET	5Dh
(39) SEND DVD STRUCTURE	BFh
(40) SEND KEY	A3h
(41) SEND OPC INFORMATION	54h
(42) SET CD SPEED	BBh
(43) SET READ AHEAD	A7h
(44) SET STREAMING	B6h
(45) START/ STOP UNIT	1Bh
(46) STOP PLAY/SCAN	4Eh
(47) SYNCHRONIZE CACHE	35h
(48) TEST UNIT READY	00h
(49) VERIFY(10)	2Fh
(50) VERIFY(12)	AFh
(51) WRITE(10)	2Ah
(52) WRITE(12)	AAh
(53) WRITE AND VERIFY(10)	2Eh
(54) WRITE BUFFER	3Bh

15.3 S-ATA function

SSC (Spread Spectrum Clocking)	Disable
CONT Primitive	Enable
Asynchronous signal recovery (Hot Plug)	Enable
Software Setting Preservation	Enable
Phy Event Counter	Enable
HIPM (Host Initiated Power Management)	Enable
DIPM (Device Initiated Power Management)	Enable
Asynchronous notification	Enable
BIST-L	Enable
BIST-TSA	Enable

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16. Regulations and Standards

16.1 Safety

The product will satisfy the safety standards outlined below.

- UL
- TUV
- SEMKO
- CB & IEC60825-1 Report
- FDA
- SONCAP
- NOM

16.2 EMC / EMI

The product complies with applicable technical requirements as specified below

- KCC
- BSMI
- CE
- FCC
- VCCI
- C-TICK
- GOST

16.3 Laser safety

The product will satisfy all the requirements for the laser specified below.

- Class 1 laser product comply with DHHS rules 21 CFR Subchapter J
- Class 1 laser product to EN60825-1 / IEC 60825-1

17. Supporting Operating System & Recording tool

17.1 Operating System

- Windows 7
- Windows Vista Home Basic, Home Premium, Business, Ultimate Edition
- Windows XP Home Edition, Professional, Media Center Edition
- Windows 2000 Professional

17.2 Writing Software

- (1) Digital Media (Roxio)
- (2) Nero (Ahead)
- (3) CD/DVD Maker (NTI)
- (4) CD File (NTI)

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18. Caution

To use the drive safely and properly, the following precaution should be reserved.

18.1 Safety

(1) Disassembling and Modification

The drive includes Laser Diodes.

The disc rotates at high speed when the power is supplied to the drive.

Do not disassemble or modify the drive when the power is supplied.

Also the modified drives should be under the responsibility of the company or the persons who modified it.(Firmware issue should be specified separately.)

(2) POWER

Do not use the power supply other than the specific voltage(+5V DC).

(3) Reserve the following instructions to avoid the electrical short or the damages.

- a) Do not dispose the drive to the water or the high humidity
- b) Do not open or remove the cover.
- c) Do not remove the front bezel.
- d) Do not let any liquid or foreign substances in the drive.
- e) Do not put heavy things on the drive.

(4) In the case of the failure

In case of the following conditions, turn off the SYSTEM including the Drive

And unplug the power supply cable of the SYSTEM from the wall outlet immediately.

- a) Do not disassemble or repair the drive by yourself.
- b) When some liquid or some foreign substances is in the drive.
- c) When the drives are wet by the water.
- d) When the drive is dropped
- e) When the performance of the drive is extremely degraded or when the drive does not work properly.

18.2 Dust

We can't guarantee about dirt in the state without a bezel.

The guarantee environment of dirt is a thing under the environment of 0.15 mg/m³.

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Appendix 1. Bezel and Tray, LED, Region

1. Bezel, Tray (No Bezel type)

	Part	Color	Material	Flammability
1	Bezel & Eject button	-	-	-
2	Tray	Black	ASAHIKASEI PPE+PS (XYRON X351V) Yoowon Com-Tech PPE+PS (UWF-02F15)	ULV-1

2. LED (Brightness and Current are typical value.)

Color	Green
Brightness	20mA 100mcd (LED spec.)
Actual current	17mA (measured by this model)

3. LED control

Power on, Disc Recognition:	Flashing
Load:	Flashing
Unload:	On
Data access/ read:	On
Writing:	On
Polling command:	Off
The others:	Off

4. Chassis

Top cover	Aluminum
Bottom cover	Aluminum

5. Region Setting: No Region

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LGE LABEL INFORMATION

Standard Label

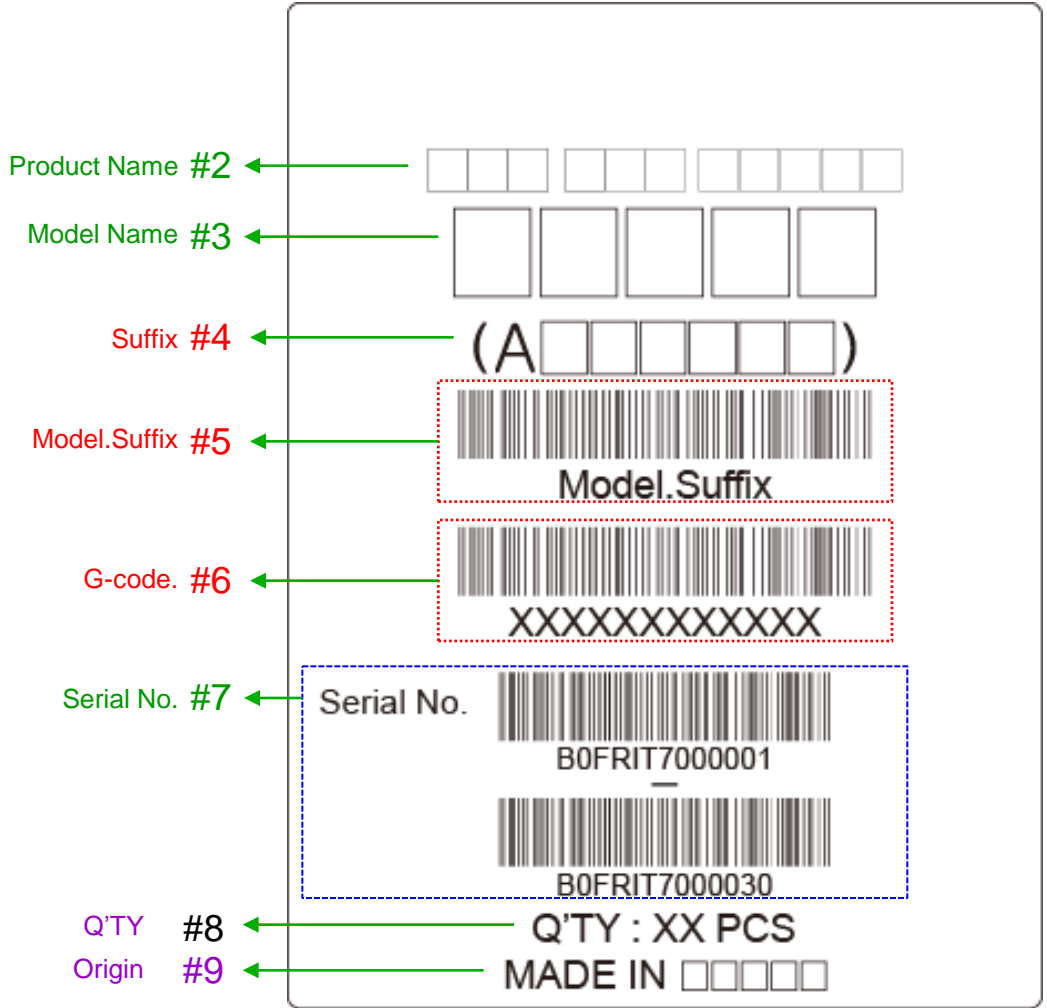
LABEL SIZE : 53(W) x 39(H) x 0.1(t)
LABEL P/N : MEZ62216908

Barcode Label Detail Printed Information

1. Product Name: **Super Multi DVD Rewriter**
2. Model name : **GT60N**
3. **MANUFACTURED: JANUARY 2010**
4. 制造日期 (YEAR, MONTH, DATE) : **2010 01 15**
5. Barcode of Information (Code : 39Code)
- **S/N: YMMFLXX000001**
Y : Year. (2010 : 0, 2011 : 1, 2012 : 2....)
MM : Month.
FL : Factory Line Code.
XX : Secret Code
000001 : Serial Number
6. ROM VER. : **XXXX**
DO NOT PRINT "XXXX" ON MAIN LABEL.
Please refer to the F/W section or SR PAGE.
7. KCC No (인증번호) : **XXX-XXXXXXX (B)**
8. RoHS

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**Appendix 3. Box label Specification
(Product of Malaysia)**



#6 G-code
*. Barcode Information
XXXXXXXXXXXXXX
- Code-39
Toshiba G-code : Refer to the PR or SR

#5 Model.Suffix
*. Barcode Information
Model.Suffix
- Code-39
Model.Suffix : Refer to the PR or SR

#7 Serial No.
*. Barcode Information
B0FRIT7000001
- Code-39
S/N : B0FRIT7000001
B : Place of product (Factory code)
O : Last figure of year
F : Manufacturing month symbol
RIT7 : HPEM code
000001 : Serial Number

#9 Origin
Producing Center
-. KOREA = MADE IN KOREA
-. LGEHZ = MADE IN CHINA
-. HPEM = MADE IN MALAYSIA