

Issued Date	2013.09.09	GHB0N (FTS)		1/22
Revised Date	2013.11.13		Rev R1.0	

SPECIFICATIONS
OF
H/H Super Multi DVD Writer
Model GHB0N.AFCK101
for
Fujitsu Technology Solutions GmbH

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Hitachi-LG Data Storage, Inc.

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Revision History

No.	Date	Brief description	Note
1	2013 09.09	[1 st release]	T1.0
2	2013 11.13	1 page – Change Product name 7 page – Add SATA Product Capability 8 page – Change write speed 9 page – Change read speed 10 page – Change Automatic Acoustic Management 19 page – Add Application Software 20page –Change the color name 22page – Change Appendix4	R1.0

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0. Attention -To export this product-

The Shipment of this product is limited by the rules of export in each country.

The proper procedures should be taken when exporting this product.

1. Features

1.1 General

- (1) Half-height Internal 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) Large buffer memory 0.5MB
- (5) Buffer Under-run prevention function embedded
- (6) Power loading and power eject of a disc. Bare media loading
- (7) MTBF: 100 000 POH
- (8) Vertical and Horizontal installable
- (9) Compliance with RoHS/ Pb Free production
- (10) Silent Play function supported

1.2 Supported disc formats

- (1) Reads data in DVD-ROM
- (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) Reads DVD-R / RW / RAM with CPRM

1.3 Supported write method

- (1) DVD-R: Disc at Once and Incremental Recording
- (2) DVD-R DL: Disc at Once, Format 4 (Layer Jump Recording)
- (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 145 ms
(1/3 stroke) CD-ROM 120 ms
- (2) Write speed:
- DVD-R 2x, 4x CLV, 8xPCAV, 16x CAV
 - DVD-R DL 2x, 4xCLV, 8x ZCLV
 - DVD-RW 1x, 2x, 4x, 6x CLV
 - DVD-RAM (Ver.2.2) 2x, 3x, 5x ZCLV (12x media : not support)
 - DVD+R 2.4x, 4x CLV, 8x PCAV, 16x CAV
 - DVD+R DL 2.4x, 4x CLV, 6x, 8x ZCLV
 - DVD+RW 2.4x, 4x, 6x CLV, 8x ZCLV
 - CD-R 16x CLV, 32x, 40x PCAV, 48x CAV
 - CD-RW 4x, 10x, 16x CLV, 24x ZCLV
- (3) Read speed:
- DVD-R/RW/ROM(SL/DL) 16x/13x/16x/12x max.
 - DVD-R DL 12x max.
 - DVD-RAM (Ver.1.0/2.2) 2x ZCLV / 5x PCAV
 - DVD- Video (CSS Compliant Disc) 16x/12x max. (Single/Dual layer)
(6x for playback)
 - DVD+R/+RW 16x / 13x max.
 - DVD+R DL 12x max.
 - CD-R/RW/ROM 48x/40x/48x max.
 - CD-DA (DAE: Ripping/Play) 24x/ 10x max.
 - 80 mm CD 10x max.
- (4) Sustained Transfer rate: DVD-ROM 22.16 Mbytes/s (16x) max.
CD-ROM 6000 kB/s (40x) max.
- (5) Burst Transfer rate: SATA, Ultra DMA Mode 5
Multi word DMA Mode2, PIO Mode 4
- (6) Multimedia MPC-3 compliant

1.5 Audio

- (1) 16 bit digital data output through ATA interface

*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
(SATA): 1.5 Gbps = 1.5×10^9 bit/s = 150 MB/s (1B = 10 bits/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:	4.7 GB (Single Layer) 8.5 GB (Dual Layer)
	DVD-R:	4.7 GB (Ver. 2.1 for General: read & write) (DL) 8.5 GB (Ver. 3.0)
	DVD-RW:	4.7 GB (Ver. 1.2/ Rev 1.0, 2.0, 3.0)
	DVD-RAM:	1.46 GB/side, 4.7 GB/side (Ver. 2.2)
	DVD+R:	4.7 GB (Ver. 1.3) (DL) 8.5 GB (Ver. 1.2)
	DVD+RW:	4.7 GB (Vol. 1/Ver.1.3, Vol. 2/Ver.1.0)
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

only)	(1) DVD-R/RW	Disc at Once, Incremental Recording, Restricted Overwrite (DVD-RW)
	(2) DVD-R DL	Disc at Once (DAO), Format 4(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), Tack 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
	2048 bytes/block
	CD (Yellow Book)
	2048 bytes/block (Mode1 & Mode2 Form1)
	2336 bytes/block (Mode2)
	2328 bytes/block (Mode2 Form2)
	2352 bytes/block (CD-DA)

2.5 SATA Product Capability

Feature Support

Asynchronous Signal Recovery	Support
Software Settings Preservation	Support
Interface Power Management (device initiated)	Support
Interface Power Management (host initiated)	Support
Asynchronous Notification	Support
Spread Spectrum Clocking (SSC)	Support
COMRESET treatment during SSP active	same as software reset

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3. Drive performance

3.1 Host interface

T13 ATA/ATAPI-8, MMC-6, INF-8090i v8

3.2 Write Speed

<Write>	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)	4x CLV	5.54
	-R (1-8x)	4x CLV, 5-8x*1 PCAV	5.54 6.93-11.08
	-R(1-16x)	5-8x PCAV, 6-16x CAV	6.93-11.08, 8.31-22.16
(8cm)		4x CLV	5.54
	DVD-R DL (2-4x)	4x CLV	5.54
	-R DL (2-8x)	4x CLV, 4+6+8x*2 ZCLV	5.54, 5.54 + 8.31+11.08
-R DL (8cm)		4x CLV	5.54
	DVD-RW (1x)	1x CLV	1.385
	-RW (1-2x)	2x CLV	2.77
	-RW (2-4x)	4x CLV	5.54
	-RW (2-6x)	4x, 6x CLV	5.54, 8.31
	-RW (8cm)	2x CLV	2.77
	DVD-RAM (Ver.2.2) (2x)	2x ZCLV	2.77 (w/o Verify)
	-RAM (3x)	3x ZCLV	4.16 (w/o Verify)
	-RAM (5x)	5x ZCLV	6.93 (w/o Verify)
	-RAM (6-12x)	not support	
	-RAM (8cm)	2x ZCLV	2.77 (w/o Verify)
	DVD+R (2.4x)	2.4x CLV	3.32
	+R (2.4-4x)	4x CLV	5.54
	+R (2.4-8x)	4x CLV, 5-8x PCAV	5.54, 6.93-11.08
	+R (2.4-16x)	5-8x PCAV, 6-16x CAV	6.93-11.08, 8.31-22.16
	+R (8cm)	4x CLV	5.54
	DVD+R DL (2.4x)	2.4x CLV	3.32
	+R DL (2.4-8x)	4x CLV, 4+6+8x ZCLV	5.54, 5.54 + 8.31+11.08
	+R DL (8cm)	2.4x CLV	3.32
	DVD+RW (2.4x)	2.4x CLV	3.32
	+RW (2.4-4x)	4x CLV	5.54
	+RW (2.4-8x)	6x CLV, 6+8x ZCLV	8.31, 8.31+11.08
+RW (8cm)	4x CLV	5.54	
	DVD+RW DL (2x)	Not support	
	CD-R	16x CLV, 21-32x PCAV 21-40x PCAV 48x CAV	2,400 kB/s 3,150-4,800 3,150-6,000 7,200
	CD-R (8cm)	16x CLV	2,400 kB/s
	CD-RW (MS:1,2,4x)	4x CLV	600
	-RW(HS:4-10x)	10x CLV	1500
	-RW (US:8-24x)	16x CLV, 16+24x ZCLV	2,400, 2,400+3,600
	-RW(US+:8-32x)	16x CLV, 16+24x ZCLV	2,400, 2,400+3,600
CD-RW (8cm)	4x, 10x CLV	600, 1,500 kB/s	

* Rotational speed (CLV, ZCLV)

DVD-R/RW/ROM, +R/RW	1x: Approx. 1390 (Inside) - 580 r/min (Outside)
DVD-RAM Ver. 2.2	2x: Approx. 3250 (Inside) - 1380 r/min (Outside)
CD-R/RW/ROM	1x: Approx. 500 (Inside) - 210 r/min (Outside)

*1) "-": continuous change, for CAV, PCAV

*2) "+": change by step for ZCLV

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3.3 Read Speed

<Read> Media (Media Speed) Read Speed Transfer rate Rotational speed
(DVD: Mbytes/s, CD: kB/s) (Approx. r/min)

3.3.1 Data , DVD-Video, Video Format and CD-DA

- AAM High

DVD-ROM SL	6.6 - 16x CAV	9.14- 22.16 Mbytes/s	9,360 r/min
DVD-ROM DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD+R	6.6 - 16x CAV	9.14- 22.16	9,360
DVD-R	6.6 - 16x CAV	9.14- 22.16	9,360
DVD+R DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD-R DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD+RW	5.4 - 13x CAV	7.48- 18.00	7,670
DVD-RW	5.4 - 13x CAV	7.48- 18.00	7,670
FTS : CD-R/ROM*1	20 - 48x CAV	3,000- 7,200 kB/s	9,660 r/min
FJ : CD-R/ROM*1	17 - 40x CAV	2,590- 6,000 kB/s	8,050 r/min
CD-RW	17 - 40x CAV	2,590- 6,000	8,050

- AAM Middle(Default)

DVD-ROM SL	5.0 - 12x CAV	6.92- 16.62 Mbytes/s	7,050 r/min
DVD-ROM DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD+R	5.0 - 12x CAV	6.92- 16.62	7,050
DVD-R	5.0 - 12x CAV	6.92- 16.62	7,050
DVD+R DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD-R DL	5.0 - 12x CAV	6.92- 16.62	7,750
DVD+RW	5.4 - 13x CAV	7.48- 18.00	7,670
DVD-RW	5.4 - 13x CAV	7.48- 18.00	7,670
CD-R/ROM*1	13.3 - 32x CAV	1,995 - 4,800 kB/s	6,480 r/min
CD-RW	13.3 - 32x CAV	1,995 - 4,800	6,480

- AAM Low

DVD-ROM SL	3.3 - 8x CAV	4.57 - 11.08 Mbytes/s	4,750 r/min
DVD-ROM DL	3.3 - 8x CAV	4.57 - 11.08	5,200
DVD+R	3.3 - 8x CAV	4.57 - 11.08	4,750
DVD-R	3.3 - 8x CAV	4.57 - 11.08	4,750
DVD+R DL	3.3 - 8x CAV	4.57 - 11.08	5,200
DVD-R DL	3.3 - 8x CAV	4.57 - 11.08	5,200
DVD+RW	3.3 - 8x CAV	4.57 - 11.08	4,750
DVD-RW	3.3 - 8x CAV	4.57 - 11.08	4,750
CD-R/ROM*1	10 - 24x CAV	1500- 3600 kB/s	4,860 r/min
CD-RW	10 - 24x CAV	1500- 3600	4,860

- No change by AAM setting

DVD-RAM (Ver. 1.0)	2x ZCLV	2.77 Mbytes/s	4,780-2,020 r/min
-RAM (Ver. 2.x)	3 - 5x PCAV	4.16- 6.93	4,880-3,450
-RAM (8cm)	3 - 5x PCAV	4.16- 6.93	4,880-3,450
CD-DA (Ripping)	10 - 24x CAV	1,500- 3,600 kB/s	4,860 r/min
CD-DA (Audio Play)	4.2 - 10x CAV	630- 1,500	1,900
CD (8cm)	6.6 - 10x CAV	990 - 1,500	3,240

*1) Fully recorded CD-R should be used.

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3.4 Burst transfer rate

SATA Gen.1 1.5 G bps

3.5 Access time (Random)

DVD-ROM	145 ms typ. * (Note 1)
DVD-ROM DL	220 ms typ. * (Note 1)
CD-ROM	125 ms typ. * (Note 1)
DVD-RAM (Ver.2.2)	270 ms typ.

Note :

1) Average access time is the typical value of more than 2000 times including latency and error correction time.

Test Disc: DVD-ROM: ALMEDIO TDV-520 / TDR-820
 DVD-ROM DL: ALMEDIO TDV-540 / TDR-840
 CD: ALMEDIO TCDR-701 / 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, Load time without Multi-session

Spin up time (Time to drive ready mode from standby mode)
 5 s typ.

Load time (Time to drive ready mode from tray loading)

DVD-ROM	10 s typ.
DVD-R	22 s typ. (Disc At Once, Ver. 2.0 for General)
DVD-RW	22 s typ. (Disc At Once, Ver. 1.2)
DVD-RAM	40 s typ. (60 s Limit)
DVD+R/RW	22 s typ.
CD-ROM	10 s typ.
DVD±R DL	22 s typ.

3.8 Data buffer capacity 0.5 MB

3.9 Automatic Acoustic Management(AAM)

Performance Level	Sector Count Register	CD	DVD	BD
Low	80h	20x - 24x	6x - 8x	X
Medium (default)	82h	32x	12x	
Max speed (FTS)	FEh	48x	16x	
Max speed(Fujitsu)	FAh	40x	16x	

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4. Environmental conditions

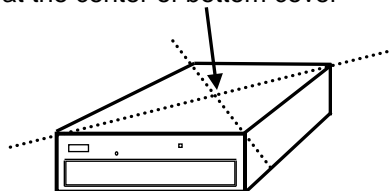
4.1 Ambient temperature

Operating 5 °C to 50 °C **
 Storage / Transportation -30 °C to 60 °C

** Note1) Criteria is "No write failure and No read failure" under 50degC.

Note2) Each test Media uses standard media of production line

4.2 Approval temperature rise 62 °C max. at the center of bottom cover



4.3 Temperature gradient 10 °C/h

4.4 Relative humidity

Operating 10 % to 80 % (Non-Condensing)
 Storage / Transportation 10 % to 90 % (Non-Condensing)

4.5 Dew point temperature restrictions Less than 29 degC

4.6 Altitude

Operating 0 m to 3000 m
 Non-operating 0 m to 12000 m

4.7 Vibration

(1) Operating :

Read : No unrecoverable error
 Audio: 3.43 m/s² (0.35 G)
 Data: 3.43 m/s² (0.35 G)
 (10 - 500) Hz Sine sweep, 1 Oct/min
 at X(left and right), Y(back and front), Z(top and bottom) axis.
 Write : No recording stop
 CD-R/RW: 2.94 m/s² (0.3 G)
 DVD±R/RW: 0.98 m/s² (0.1 G)
 (10 - 500) Hz sine sweep , 1oct/min
 at X(left and right), Y(back and front), Z(top and bottom) axis.

(2) Non-Operating : No damage must result

19.6 m/s² (2 G)
 (10 - 500) Hz sine sweep , 1 Oct/min
 at X(left and right), Y(back and front), Z(top and bottom) axis.
 40 min/axis.

4.8 Shock

(1) Operating

Read : No unrecoverable error
 Audio: 19.6 m/s² (2 G)
 Data: 58.8 m/s² (6 G)
 11 ms , 1/2 sine wave (5 time shocks , 6 s between shocks)
 at X(left and right), Y(back and front), Z(top and bottom) axis
 Write : No recording stop
 CD-R/RW: 9.8 m/s² (1 G)
 DVD±R/RW: 4.9 m/s² (0.5 G)
 11 ms , 1/2 sine wave (5 time shocks , 6 s between shocks)
 at X(left and right), Y(back and front), Z(top and bottom) axis

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(2) Non-Operating : No damage after shock
140 G
2 ms, 1/2 sine wave
at X(left and right), Y(back and front), Z(top and bottom) axis

4.9 Drop impact

Less than 60 cm, No performance and physical damage
Note: Bulk package, 1 corner, 3 edges, 6 faces.

5. Quality and Reliability

5.1 MTBF 100 000 Power On Hours (POH)

- Assumption : Used in a normal office environment at room temperature.
- POH per year : 3000
- ON / OFF cycles per year : 600
- Operating duty cycle : 20 % of power on time (Seek: 5 % of operating time)

5.2 Tray cycle test : 30000 times

No degeneration in the mechanical part after test
(1cycle ; one loading and one ejecting)

5.3 Actuator mechanism : 1 000 000 full stroke seek

5.4 MTTR (Mean Time To Repair) : 0.5 h

5.5 Component life : 5 years or 2000 h of Laser radiating time

Assumption: Used in a normal office environment

6. Electro Static Discharge susceptibility (ESD)

0 to 5 kV With no user detectable data read errors
From 5 kV to 8 kV No catastrophic failure or damage
* Test conditions : $C = 150 \text{ pF}$, $R = 330 \text{ ohms}$, 50 times discharge except connector

7. Power requirements

7.1 Source voltage

+ 5 V +/- 5 % tolerance, less than 100 mVp-p Ripple voltage
+12 V +/- 10 % tolerance, less than 100 mVp-p Ripple voltage

7.2 Current

Idle (Hold track state)	+ 5 V DC	0.9 A typ.	< 1.0 A max.
	+12 V DC	0.5 A typ.	< 1.0 A max.
Write (Active)	+ 5 V DC	1.3 A typ.	< 1.5 A max.
	+12 V DC	1.5 A typ.	< 2.0 A max.
Read (Active)	+ 5 V DC	1.2 A typ.	< 1.5 A max.
	+12 V DC	0.9 A typ.	< 1.5 A max.
Seek (Access)	+5 V DC	1.0 A typ.	< 1.5 A max.
	+12 V DC	1.2 A typ.	< 2.0 A max.

7.3 Standby

Sleep mode (No disc) 1.0 W typ.

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8. Acoustic noise

Less than 50 dB, A scale, at 0.5 m away from the drive and 0.45m height away

- Note :
1. Disc : Less than imbalance 0.3×10^{-4} Nm
 2. Installation : Horizontal
 3. Ambient temperature : Normal temperature
 4. Except loading, unloading and seek

9. Dimensions

External dimensions (W x H x D)	(146 x 41.3 x 165) mm (w/o Bezel, Refer to Section 14.)
Front bezel (W x H x D)	(148 x 42 x 5) mm

10. Mass

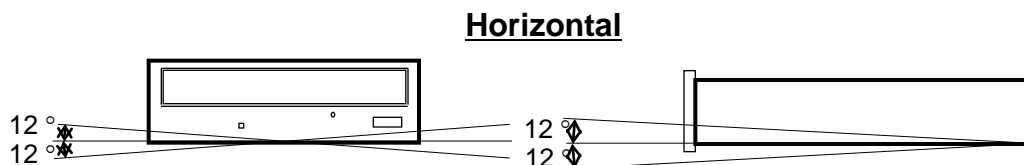
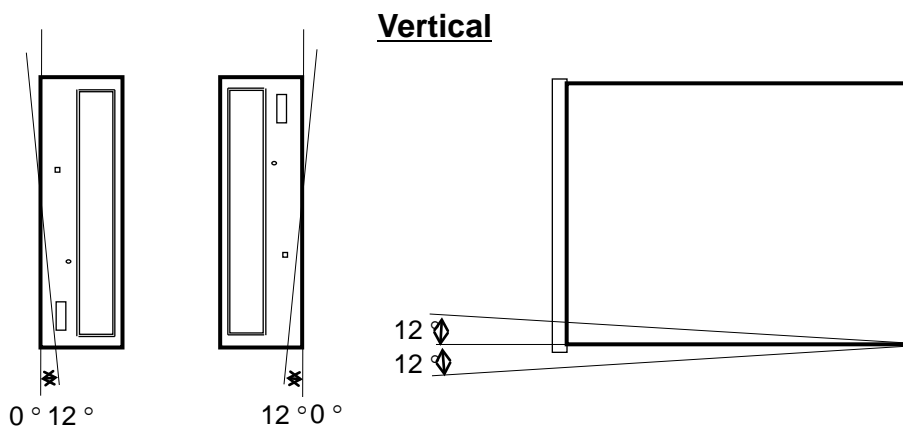
640 ± 30 g

11. Mechanical

11.1 Disc loading

Tray type, Auto loading

11.2 Mounting requirements



-Note-

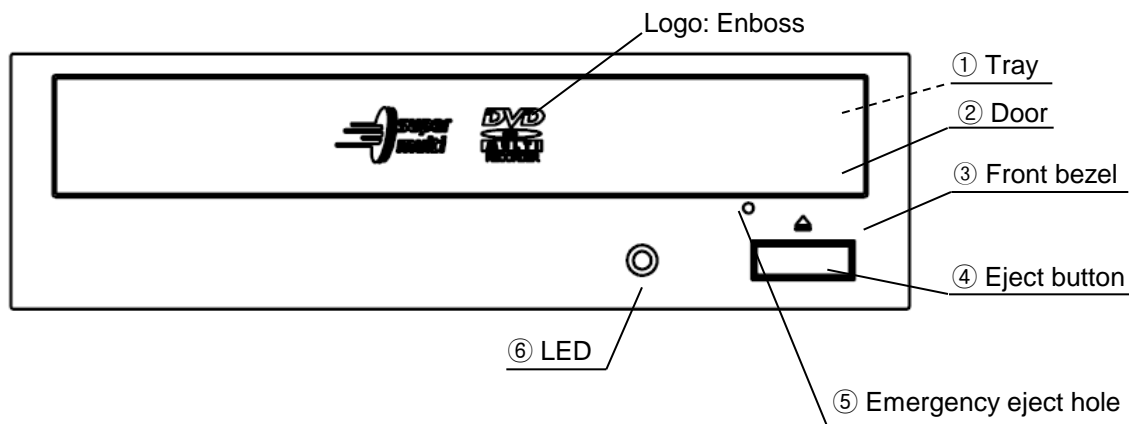
Operation with postures other than the above drawings is not guaranteed.

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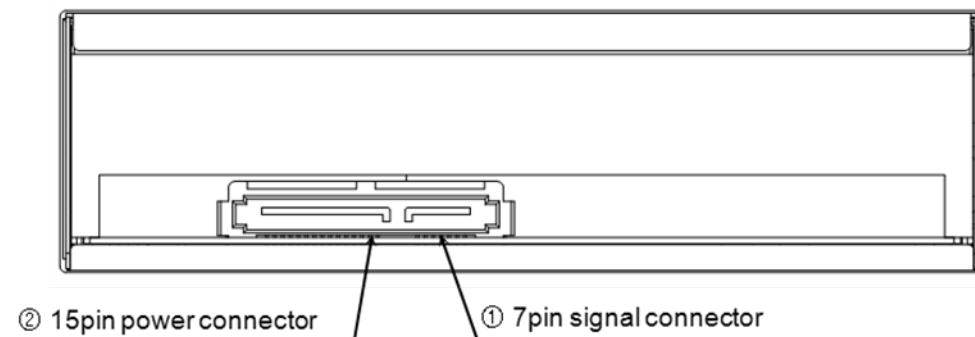
12. Controls and Functions

12.1 Front side

Refer to Appendix 1. for Front design (Logo, color, material, etc.)



12.2 Rear side



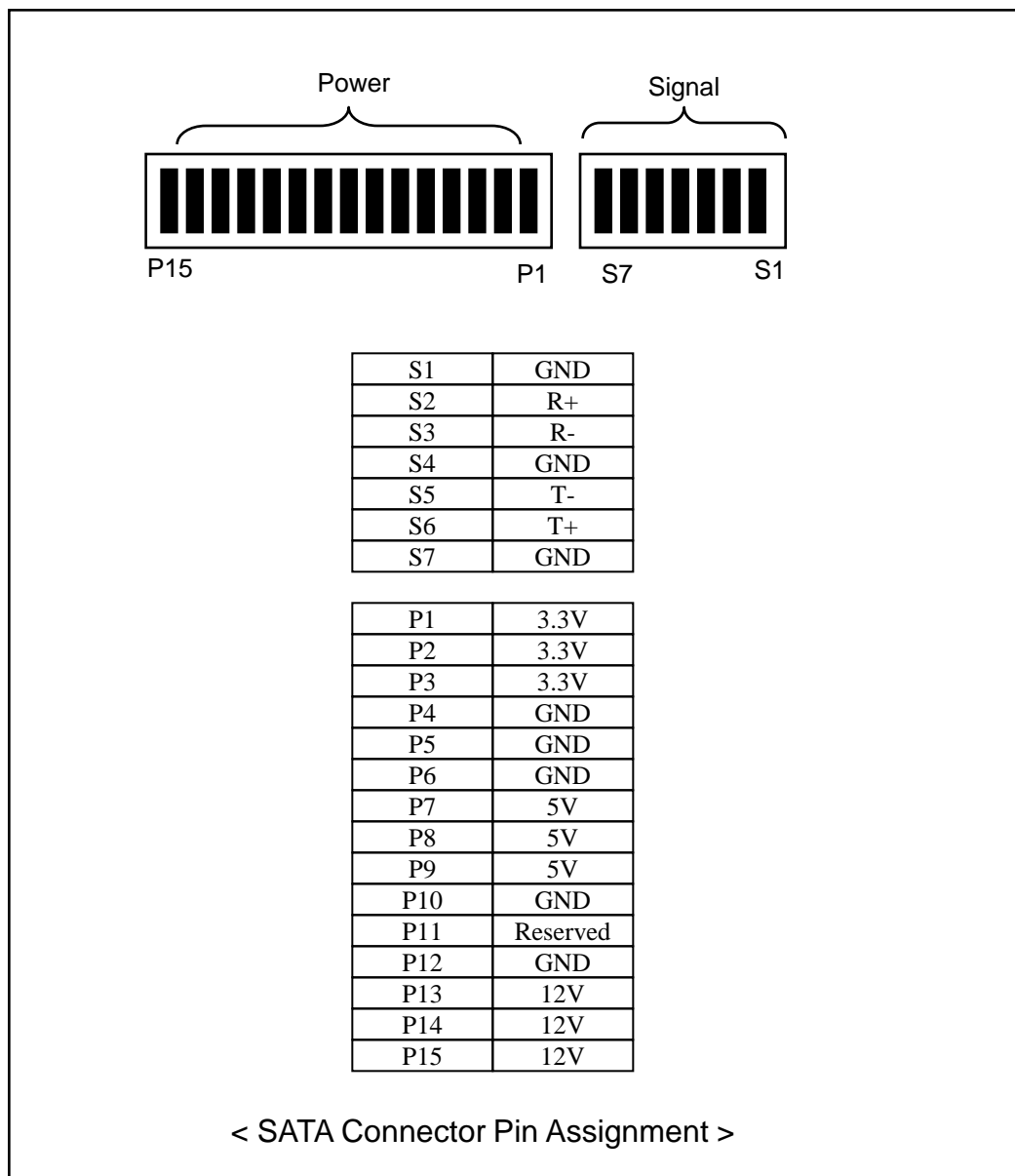
< Rear view >

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13. Connector Pin define

SATA Drive consist of two connector .
 First , Power connector supply 5 V and 12 V Power .
 3.3 V was not supplied .

Second , Signal Connector has 2 pairs .



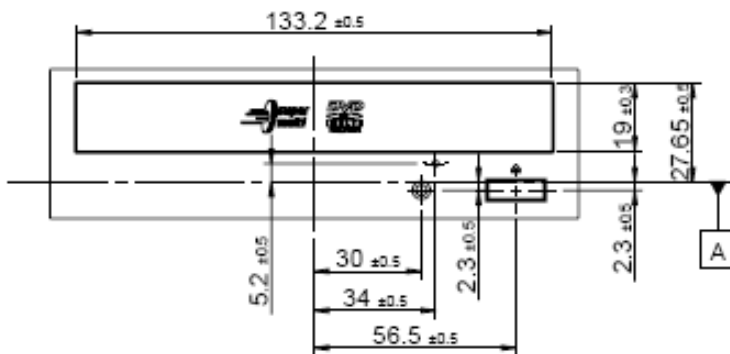
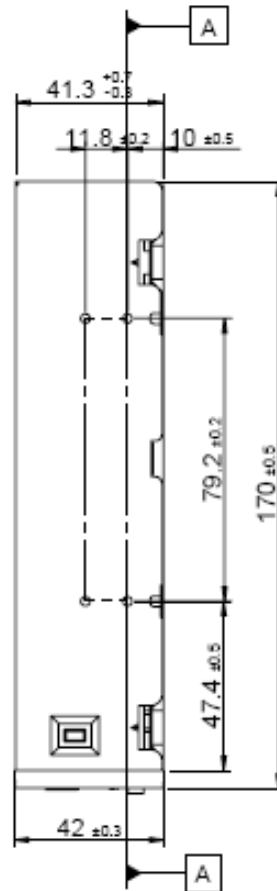
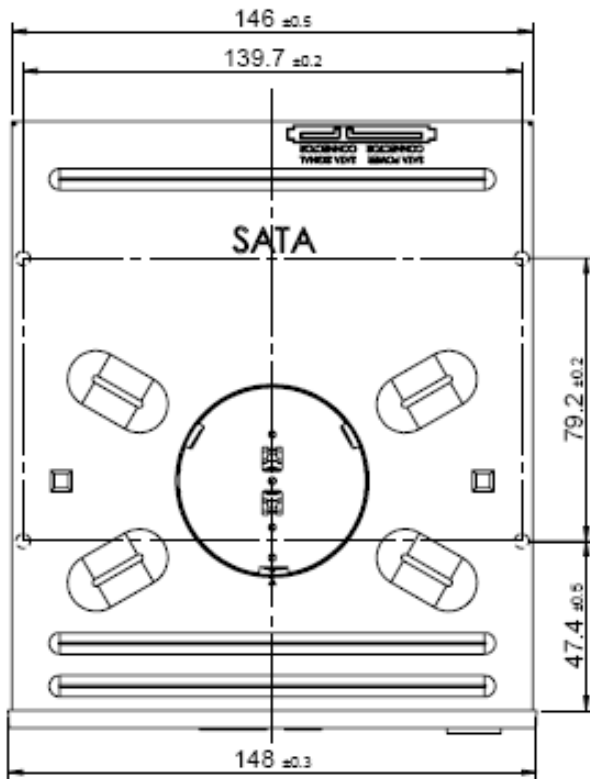
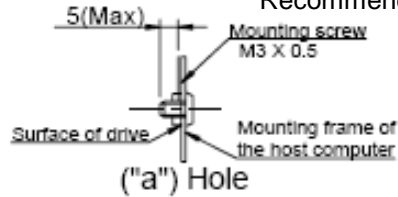
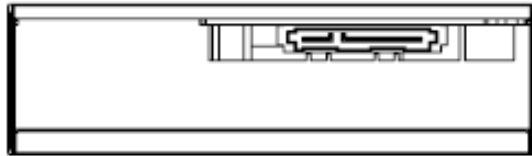
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14. Mechanical dimensions

Mechanical Drawing (Front & Back of Drive)

Unit: mm Allowance: +/- 0.5 unless otherwise stated

Host bracket recommend
holes size: 3.2~3.5mm
Torque spec.
MIN. 4Kgf, Max. : 7Kgf
Recommend spec: 5~6Kgf.



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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

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) LOG SELECT	4Ch
(9) LOG SENSE	4Dh
(10) MECHANISM STATUS	BDh
(11) MODE SELECT (10)	55h
(12) MODE SENSE (10)	5Ah
(13) PAUSE/RESUME	4Bh
(14) PLAY AUDIO (10)	45h
(15) PLAY AUDIO (12)	A5h
(16) PLAY AUDIO MSF	47h
(17) PLAY AUDIO TRACK RELATIVE (10)	49h
(18) PLAY AUDIO TRACK RELATIVE (12)	A9h
(19) PREVENT ALLOW MEDIUM REMOVAL	1Eh
(20) READ (10)	28h
(21) READ (12)	A8h
(22) READ BUFFER	3Ch
(23) READ BUFFER CAPACITY	5Ch
(24) READ CAPACITY	25h
(25) READ CD	BEh
(26) READ CD MSF	B9h
(27) READ DISC INFORMATION	51h
(28) READ DVD STRUCTURE	ADh
(29) READ FORMAT CAPACITIES	23h
(30) READ HEADER	44h
(31) READ SUB-CHANNEL	42h
(32) READ TOC/PMA/ATIP	43h
(33) READ TRACK/RZONE INFORMATION	52h
(34) REPAIR RZONE	58h
(35) REPORT KEY	A4h
(36) REQUEST SENSE	03h
(37) RESERVE TRACK/RZONE	53h

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< Command >	< Code >
(38) REZERO UNIT	01h
(39) SCAN	BAh
(40) SEEK	2Bh
(41) SEND CUE SHEET	5Dh
(42) SEND DVD STRUCTURE	BFh
(43) SEND KEY	A3h
(44) SEND OPC INFORMATION	54h
(45) SET CD SPEED	BBh
(46) SET READ AHEAD	A7h
(47) SET STREAMING	B6h
(48) START/ STOP UNIT	1Bh
(49) STOP PLAY/SCAN	4Eh
(50) SYNCHRONIZE CACHE	35h
(51) TEST UNIT READY	00h
(52) VERIFY(10)	2Fh
(53) VERIFY(12)	AFh
(54) WRITE(10)	2Ah
(55) WRITE(12)	AAh
(56) WRITE AND VERIFY(10)	2Eh
(57) WRITE AND VERIFY(12)	Aeh
(58) WRITE BUFFER	3Bh

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16. Regulations and Standards

16.1 Safety

The product will satisfy the safety standards outlined below.

UL:	UL 60950-1 First Edition
CSA:	CSA C22.2 No. 60950-1-03
TÜV:	EN 60950-1 / EN60825-1
SEMKO:	EN 60950-1 / EN60825-1

16.2 EMC / EMI

The product complies with applicable technical requirements as specified below

FCC Part15 Class B
CE Marking,
C-Tick Mark
Taiwan EMC (BSMI)
VCCI

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 & Application Software

17.1 Operating System

Windows VISTA x86/x64
Windows 7 x86/x64
Windows 8 x86/x64
Windows 8.1 x86/x64

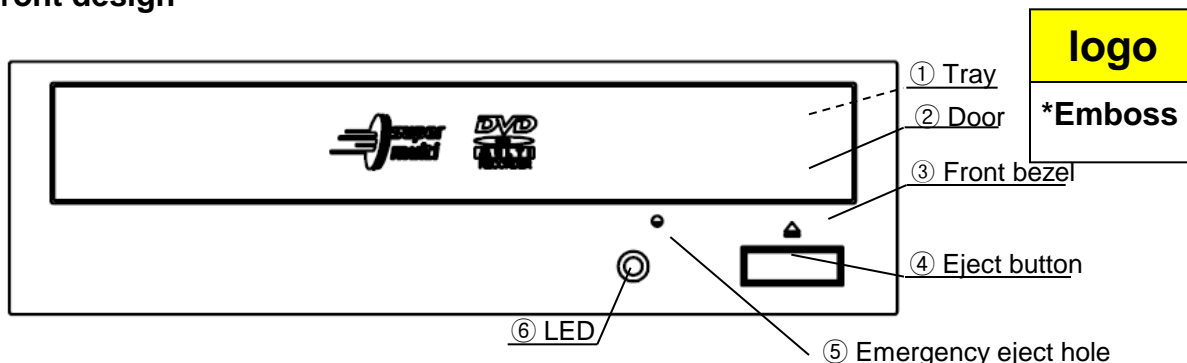
17.2 Application Software

CyberLink Power2Go

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Appendix 1. Front design, RPC and others

1. Front design



	Part	Color	Material	Note/Flammability
1	Tray	Black	PBT + ABS	UL94 V-2
2	Door Tray	Satin Black	PC + ABS	UL94 V-0
3	Front bezel	Satin Black		
4	Open/Close button	Satin Black		
6	Busy indicator (LED light color)	Green	-	UL94 HB

2. Chassis

Top cover	Steel
Bottom cover	Steel

3. RPC (Regional Playback Control) No Region (Phase2)

4. Drive serial number:

Drive serial number is stored in EEPROM and can be got with GET CNFIGURATION CMD (Feature 0108h).
Drive serial number between Label and EEPROM must be match.

Appendix 2. Caution

- We can't guarantee about dirt in the state without a bezel or a tray panel. The guarantee environment of dirt is a thing under the environment of 0.15 mg/m³.**

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Appendix 3. Rating Label

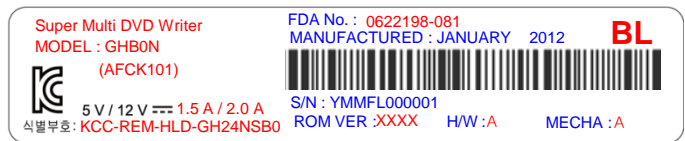
FTS LABEL INFORMATION

Standard Label



LABEL SIZE : Ø57 x 0.1(t)
Label P/N : MEZ64812519

Barcode Label



LABEL SIZE : 80(W) x 16(H) x 0.1(t)
Printing Information : Blue, Red Part
Label P/N : MEZ64588001

* Label Detail Printed Information *

1. Product Name : **Super Multi DVD Writer**
2. Model Name : **MODEL : GHB0N**
Suffix : (AFCK101)

3. Ampere : **5 V / 12 V = 1.5 A / 2.0 A**

You must have A SPACE before the "SI UNIT". → Voltage, Ampere, Hz

Ex > X.X A / X.X A

4. KC No : **KCC-REM-HLD-GH24NSB0**
5. MANUFACTURED : **JANUARY 2012**
6. ROM VER : **XXXX**

Please apply the latest F/W version,
 which should be shown in SWO by the F/W engineer.

7. Hardware Version : **H/W : A**
8. MECHA Version : **MECHA:A**
9. Barcode of Information (39 Code)

S/N : YMMFL000001

- Y : Year (2010 : 0, 2011 : 1, 2012 : 2...)
- MM : Month
- FL : Factory Line Code
- 000001 : Serial Number

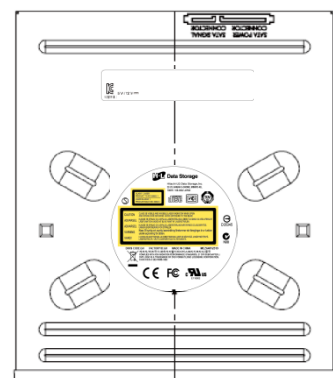
10. FDA No. **0622198-081**

11. Bezel Color : **BL**

AN : Anthracite bezel color

BL : Satin Black bezel color

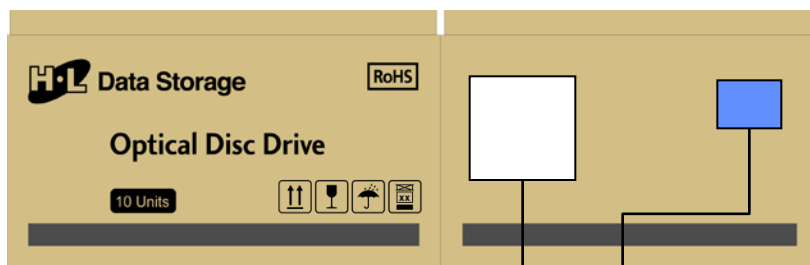
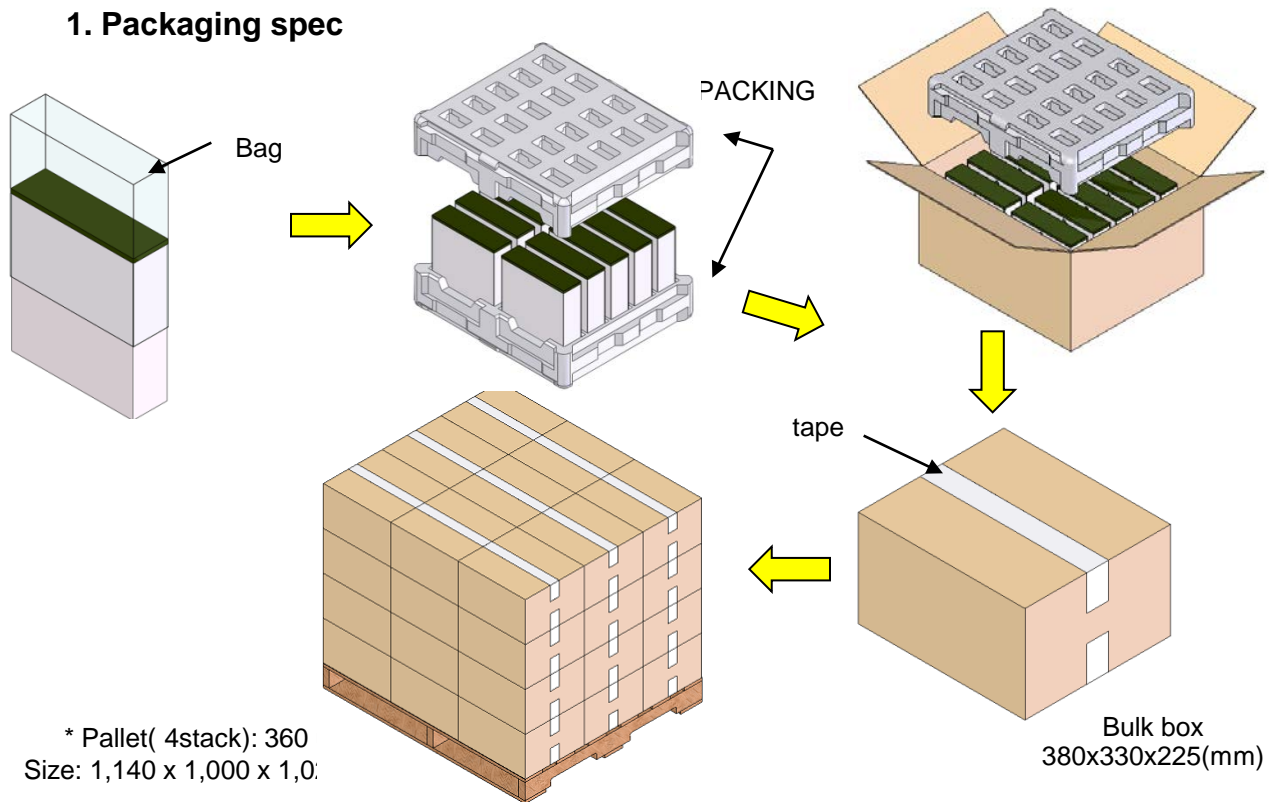
Attachment position of the label



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Appendix 4. Packaging Spec

1. Packaging spec



Area of box label

Destination label(Only HPEM)

Box Label



Box Label Spec

- #0. MES Barcode
- #1. Product Name:
- #2. Model Name
- #3. Customer P/N: Refer to the PR
- #4. Origin: