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| Issued Date | Jun. 23, 2016 | BU40N | | 1/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

SPECIFICATIONS
OF
UHD Blue-ray / DVD Writer
Model BU40N

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Checked by : J.C. Lim
Authorized by : J.W. Seo

** This specifications can be changed for improvement without prior notice.*

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|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 2/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

Revision History

| No | Date | Brief description | Note |
|----|------------|--|------|
| 1 | 2016.05.26 | 1 st release | T.00 |
| 5 | 2016.10.05 | Delete CD/DVD+ logo on main label on p25 | T.01 |
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|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 3/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

FW Revision History

| Before | After | No | Issue | Change |
|--------|-------|----|-------------------------|--------|
| - | xxxx | 1 | 1 st release | |
| | | | | |
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HW & Mecha Revision History

| Before | After | No | Issue | Change |
|--------|-------|----|---|--------|
| - | A A | 1 | 1 st release (H/W and Mecha ver.) | |
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|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 4/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

Table of contents

- 0. Attention
- 1. Features
 - 1.1 General
 - 1.2 Supported disc formats
 - 1.3 Performance
- 2. General description
 - 2.1 Applicable disc formats
 - 2.2 Writing method
 - 2.3 Disc diameter
 - 2.4 Data capacity
 - 2.5 SATA Product Capability
- 3. Drive performance
 - 3.1 Host interface
 - 3.2 Write speed
 - 3.3 Read speed
 - 3.4 Burst transfer rate
 - 3.5 Access time (Random)
 - 3.6 Data error rate
 - 3.7 Spin up time
 - 3.8 Data buffer capacity
- 4. Environmental conditions
 - 4.1 Ambient Temperature
 - 4.2 Approval temperature Rise
 - 4.3 Temperature Gradient
 - 4.4 Relative Humidity
 - 4.5 Dew point temperature restrictions
 - 4.6 Altitude
 - 4.7 Vibration
 - 4.8 Shock
 - 4.9 Drop impact
- 5. Quality and Reliability
 - 5.1 MTBF
 - 5.2 Tray Cycle Test
 - 5.3 Actuator Mechanism
 - 5.4 MTTR (Mean Time To Repair)
 - 5.5 Component life
- 6. Electro Static Discharge Susceptibility (ESD)

| | | | | |
|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 5/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

Table of contents

- 7. Power Requirements
 - 7.1 Source Voltage
 - 7.2 Current
- 8. Acoustic Noise
- 9. Dimensions
- 10. Mass
- 11. Mechanicals
 - 11.1 Disc Loading
 - 11.2 Mounting Requirements
 - 11.3 Installation conditions
- 12. Controls and Functions
 - 12.1 Front View
 - 12.2 Rear View
 - 12.3 Connector Pin Assignment
- 13. Mechanical Dimensions
- 14. Packaging
- 15. Supported Command List
 - 15.1 ATA Commands
 - 15.2 ATAPI Packet Commands
- 16. Regulations and Standards
 - 16.1 Safety
 - 16.2 EMC
 - 16.3 Laser safety
- 17. Supporting Operating System & Application Software
 - 17.1 Operating System
 - 17.2 Application Software (Data writing & Playback)
- 18. Caution
 - 18.1 Safety
 - 18.2 Dust
- 19. Production site
- Appendix 1. Customized specifications
- Appendix 2. Rating label Specification
- Appendix 3. Block Diagram
- Appendix 4. Key Components List

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| | | | | |
|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 6/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

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) 9.5mm Height Internal Ultra Slim BD/DVD writer Drive
- (2) CD-R/RW, DVD-R/RW/RAM, DVD+R/RW, DVD+/-R DL, BD-R(SL/DL/TL*/QL*, LTH*), BD-RE (SL/DL/TL) read and write compatible, CD Family, DVD-ROM, BD-ROM read compatible
- (3) Correspond to Serial ATA bus interface (SATA Revision 3.0/ 1.5 Gbps)
- (4) Large buffer memory 4MB
- (5) Buffer Under-run prevention function embedded
- (6) Drawer Type manual loading / Electrical Release.
- (7) Supports SATA Asynchronous Notification function
- (8) Vertical and Horizontal installable
- (9) Compliance with RoHS / Pb Free production
- (10) Silent Play function supported
- (11) AACS Bus Encryption support
- (12) Zero Power ODD function
- (13) BDXL media (BD multi-layer) read and write support

*LTH: BD-R SL Low to High disc, *TL: Triple Layers, *QL: Quad Layers

- (14) M-Disc DVD and BD Write/Read support

1.2 Supported disc formats

- (1) Reads data in each DVD-ROM, DVD-R(Ver. 2.0 for Authoring) and BD-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), DVD+RW, BD-R (SL/DL/TL/QL, LTH) and BD-RE (SL/DL/TL).
- (3) Reads data in 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) Reads and writes CD-R discs conforming to "Orange Book Part 2"
- (7) Reads and writes CD-RW discs conforming to "Orange Book Part 3"
- (8) Reads and writes DVD-R/RW/RAM with CPRM
- (9) Supports to read "CD layer" of Super Audio CD Hybrid type
- (10) Supports to read "AVCHD" format DVD disc
- (11) Supports to read and write "AVCREC" format DVD disc
- (12) Supports to read "DVD layer" of Hybrid Blu-ray disc
- (13) Supports to read UHD BD-ROM DL (50G/66G) and TL(100G) disc

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| | | | |
|--------------|---------------|--------------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | 7/26 |
| Revised Date | Oct. 18, 2016 | | |

1.3 Performance (outline)

(1) Write speed:

| | | |
|---------|------------|---------------------------------|
| BD-R | SL | 2x CLV, 4x PCAV, 6x CAV |
| | SL(M-DISC) | 2x CLV, 4x PCAV |
| | DL | 2x CLV, 4x PCAV, 6x CAV |
| | TL | 2x CLV, 4x PCAV |
| | QL | 2x CLV, 4x PCAV |
| | SL LTH | 2x CLV, 4x PCAV, 6x CAV |
| BD-RE | SL/DL/TL | 2x CLV |
| DVD-R | SL | 2x CLV, 4x PCAV, 8x CAV |
| | DL | 2x CLV, 4x, 6x ZCLV |
| DVD+R | SL | 2.4x CLV, 4x PCAV, 8x CAV |
| | SL(M-DISC) | 4x PCAV |
| | DL | 2.4x CLV, 6x ZCLV |
| DVD+RW | | 2.4x, 3.3x CLV, 4x, 6x, 8x ZCLV |
| DVD-RW | | 2x, 3x CLV, 4x, 6x ZCLV |
| DVD-RAM | | 2x, 3x CLV, 5x PCAV |
| CD-R | | 10x CLV, 16x PCAV, 24x CAV |
| CD-RW | | 4x, 10x CLV, 16x ZCLV |

(2) Read speed:

| | | |
|--------------------------------|------------------|----------------------|
| BD-ROM | SL/DL/UHD 50GB | 6x CAV |
| | UHD DL(66G) / TL | 6x PCAV |
| BD-R | SL/DL | 6x CAV |
| | TL/QL | 6x CAV |
| | SL LTH | 6x CAV |
| BD-RE | SL/DL | 6x CAV |
| | TL | 4x PCAV |
| BDMV(AACS Compliant Disc) | | 6x CAV (SL/DL) |
| DVD-ROM | SL/DL | 8x CAV |
| DVD-R | SL/DL | 8x CAV |
| DVD+R | SL/DL | 8x CAV |
| | SL(M-DISC) | 8x CAV |
| DVD-RW | | 8x CAV |
| DVD+RW | | 8x CAV |
| DVD-RAM | | 2x, 3x ZCLV, 5x PCAV |
| DVD-Video (CSS Compliant Disc) | | 8x CAV (SL/DL) |
| CD-R/RW/ROM | | 24x / 24x / 24x CAV |
| CD-DA | | 24x CAV |

(3) Sustained Transfer Max rate:

| | |
|-----|-----------------|
| BD | 26.97 MB/s (6x) |
| DVD | 11.08 MB/s (8x) |
| CD | 3.6 MB/s (24x) |

(4) Burst Transfer rate:

1.5Gbps (10b side)

1.2Gbps (8b side)

(5) Multimedia MPC-3 compliant

| | | | | |
|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 8/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

1.3 Performance (outline)

Definition

| Transfer Rate: | SPEED(MEDIA) | Transfer rate | UNIT |
|----------------|--------------|---------------|----------------------------------|
| | 1x (BD) | 4.495 | MB/s (= 2 ²⁰ bytes/s) |
| | 2x (BD XL) | 8.99 | |
| | 1x (DVD) | 1.385 | |
| | 1x (CD) | 0.15 | |

1.4 Audio

16 bit digital data output through SATA interface

2. General description

2.1 Applicable disc formats

BD

- BD-ROM (SL/DL) 25 GB / 50 GB (Ver.1.3)
- UHD BD-ROM 50 GB / 66 GB / 100 GB (Ver.2.0)
- BD-R (SL/DL) 25 GB / 50 GB (Ver.1.3)
- BD-R (TL/QL) 100 GB / 128 GB (Ver.2.0)
- BD-RE (SL/DL) 25 GB / 50 GB (Ver.2.1)
- BD-RE TL 100 GB (Ver.3.0)

DVD

- DVD-ROM(SL/DL) 4.7 GB / 8.5 GB (Ver.1.1)
- DVD-R 4.7 GB (Ver. 2.0 for Authoring: read only)
4.7 GB (Ver. 2.1 for General: read & write)
- DVD-R DL 8.5 GB (Ver. 3.0)
- DVD-RW 4.7 GB (Ver. 1.2/ Rev 1.0, 2.0, 3.0)
- DVD-RAM 4.7GB/side (Ver. 2.2)
- DVD+R 4.7 GB (Ver. 1.3)
- DVD+R 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)

-Note- DVD-R 3.95GB (Ver.1.0), DVD-RAM (2.6GB) are not supported.

| | | | | |
|--------------|---------------|--------------|-----------|-------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 9/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

2.2 Writing method

- | | |
|--------------------|---|
| (1) BD-R: | Sequential Recording Mode with/without Pseudo-Overwrite |
| (2) BD-RE: | Random Write, Sequential Recording Mode without Pseudo-Overwrite |
| (3) DVD-R SL: | Disc at Once (DAO), Incremental Recording |
| (4) DVD-R DL: | Disc at Once (DAO), Incremental Recording, Layer Jump Recording |
| (5) DVD-RW: | Disc at Once (DAO), Incremental Recording, Restricted Overwrite |
| (6) DVD+R (SL/DL): | Sequential Recording |
| (7) DVD+RW: | Random Write |
| (8) DVD-RAM: | Random Write |
| (9) CD-R/RW: | Disc at Once (DAO), Session at Once (SAO), Track at Once (TAO) and Packet Writing |

2.3 Disc diameter

120 mm
80 mm

2.4 Data capacity

| | |
|------------------------|--|
| User data / Block | |
| BD-R/RE/ROM | 2048 bytes/block |
| DVD-R/RW/RAM/ROM +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

SATA-IO Interoperability Testing

Test ID: TBD / Interop Revision : 1.4.

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 |
| ZERO Power ODD | Support |
| COMRESET treatment during SSP active | same as software reset |

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| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 10/26 |
| Revised Date | Oct. 18, 2016 | | |

3. Drive performance

3.1 Host interface

T13 ATA/ATAPI-8
MMC-6, INF-8090i v9

3.2 Write Speed

| Media (Media Speed) | Writing Speed | Transfer rate (MB/s) |
|---------------------|-------------------------------|-------------------------------|
| BD-R SL (2x) | 2x CLV | 8.99 |
| -R SL (4x) | 2x CLV, 2-4x PCAV | 8.99, 8.99-17.98 |
| -R SL (6x) | 2x CLV, 2-4x PCAV, 2.5-6x CAV | 8.99, 8.99-17.98, 11.24-26.97 |
| BD-R SL LTH (2x) | 2x CLV | 8.99 |
| -R SL LTH (4x) | 2x CLV, 2-4x PCAV | 8.99, 8.99-17.98 |
| -R SL LTH (6x) | 2x CLV, 2-4x PCAV, 2.5-6x CAV | 8.99, 8.99-17.98, 11.24-26.97 |
| BD-R DL (2x) | 2x CLV | 8.99 |
| -R DL (4x) | 2x CLV, 2-4x PCAV | 8.99, 8.99-17.98 |
| -R DL (6x) | 2x CLV, 2-4x PCAV, 2.5-6x CAV | 8.99, 8.99-17.98, 11.24-26.97 |
| BD-R TL (ALL) | 2x CLV, 2-4x PCAV | 8.99, 8.99-17.98 |
| BD-R QL (ALL) | 2x CLV, 2-4x PCAV | 8.99, 8.99-17.98 |
| BD-RE SL (1-2x) | 2x CLV | 8.99 |
| BD-RE DL (1-2x) | 2x CLV | 8.99 |
| BD-RE TL (1-2x) | 2x CLV | 8.99 |

| | | |
|-------------------|--------------------------------------|----------------------------------|
| DVD-R SL (2x) | 2x CLV | 2.77 |
| -R SL (4x) | 2x CLV, 3.3-4x PCAV | 2.77, 4.57-5.54 |
| -R SL (8x, 16x) | 2x CLV, 3.3-8x CAV | 2.77, 4.57-11.08 |
| DVD+R SL (4x) | 2.4x CLV, 3.3-4x PCAV | 3.32, 4.57-5.54 |
| +R SL (8x, 16x) | 2.4x CLV, 3.3-8x CAV | 3.32, 4.57-11.08 |
| DVD-R DL (4x) | 2x CLV, 2+4x ZCLV | 2.77, 2.77+5.54 |
| -R DL (8x) | 2x CLV, 2+4+6x ZCLV | 2.77, 2.77+5.54+8.31 |
| DVD+R DL (2.4x) | 2.4x CLV | 3.32 |
| +R DL (8x) | 2.4x CLV, 2.4+4+6x ZCLV | 3.32, 3.32+5.54+8.31 |
| DVD-RW (2x) | 2x CLV | 2.77 |
| -RW (4x) | 2x CLV, 2+4x ZCLV | 2.77, 2.77+5.54 |
| -RW (6x) | 3x CLV, 3+4x, 3+4+6x ZCLV | 4.15, 4.15+5.54, 4.15+5.54+8.31 |
| DVD+RW (4x) | 2.4x CLV, 2.4+4x ZCLV | 3.32, 3.32+5.54 |
| +RW (8x) | 3.3x CLV, 3.3+6x, 3.3+6+8x ZCLV | 4.57, 4.57+8.31, 4.57+8.31+11.08 |
| DVD-RAM (2x) | 2x ZCLV | 2.77 |
| -RAM (3x) | 3x ZCLV | 4.15 |
| -RAM (5x) | 3-5x PCAV | 4.15-6.93 |
| CD-R (ALL) | 10x CLV 10-16x PCAV 10-24x CAV | 1.5, 1.5-2.4 1.5-3.6 |
| CD-RW (MS : 1-4x) | 4x CLV | 0.6 |
| -RW (HS: 4-10x) | 10x CLV | 1.5 |
| -RW (US: 8-24x) | 10x CLV, 10+16x ZCLV | 1.5, 1.5+2.4 |
| -RW (US+: 8-32x) | 10x CLV, 10+16x ZCLV | 1.5, 1.5+2.4 |

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

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

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| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 11/26 |
| Revised Date | Oct. 18, 2016 | | |

3.3 Read Speed

3.3.1 Data

| Media | Reading Speed | Transfer rate (MB/s) |
|--------------------------------------|---------------------------------|---------------------------|
| BD-ROM SL BD-R SL | 2.5-6x CAV | 11.24-26.97 |
| BD-ROM DL BD-R DL UHD DL (50G) | 2.5-6x CAV | 11.24-26.97 |
| UHD DL (66G) UHD TL (100G) | 3.4-6x PCAV | 15.28-26.97 |
| BD-R SL LTH BD-R TL/QL | 2.5-6x CAV | 11.24-26.97 |
| BD-RE SL / DL | 2.5-6x CAV | 11.24-26.97 |
| BD-RE TL | 2-4x PCAV | 8.99-17.98 |
| DVD-ROM SL DVD±R SL | 3.3-8x CAV | 4.57-11.08 |
| DVD±R SL (8cm) | 3.3-5x CAV | 4.57-6.92 |
| DVD-ROM DL DVD±R DL | 3.3-8x CAV | 4.57-11.08 |
| DVD±R DL (8cm) | 3.3-5x CAV | 4.57-6.92 |
| DVD±RW | 3.3-8x CAV | 4.57-11.08 |
| DVD-RAM | 2x ZCLV 3x ZCLV 3-5x PCAV | 2.77 4.15 4.15-6.92 |
| DVD-RAM (8cm) | 2x ZCLV | 2.77 |
| CD-R / ROM | 10-24x CAV | 1.5-3.6 |
| CD-RW | 10-24x CAV | 1.5-3.6 |
| CD (8cm) | 6.8-10.5x CAV | 1.0-1.65 |

-Note- Read Speed: basically finalized discs specification.

3.3.2 Video and Audio Playback

| | | |
|----------------|-------------|-------------|
| BDMV (SL) | 2x CLV | 8.99 |
| BDMV (DL) | 2x CLV | 8.99 |
| DVD-Video (SL) | 1.6-4x CAV | 2.3-5.54 |
| DVD-Video (DL) | 1.6-4x CAV | 2.3-5.54 |
| CD-DA | 4-10x CAV | 0.6-1.5 |
| Video CD | 6.8-16x CAV | 1.0-2.4 |
| UHD 66G, 100G | 3.4-6x PCAV | 15.28-26.97 |

Rotational speed (CLV, ZCLV)

| | |
|---------------------------|--|
| BD-RE / R / ROM | 1x: Approx. 1,956 (Inside) - 810 r/min (Outside) |
| DVD-R / RW / ROM, +R / RW | 1x: Approx. 1,390 (Inside) - 580 r/min (Outside) |
| DVD-RAM | 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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| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 12/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

3.4 Burst transfer rate

SATA Gen.1 1.5 G bps

3.5 Access time (1/3 Stroke)

BD-ROM 250 ms typ. * (Note 1)
DVD-ROM 200 ms typ. * (Note 1)
CD-ROM 200 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-ROM: ALMEDIO TDR-820A
CD-ROM: LG LGDS-01A
BD-ROM: SONY BLX-103

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

3.6 Data error rate (Measured with 5 retries maximum)

BD-ROM/R/RE 10^{-12}
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

Spin up time (Time to drive ready mode from standby mode) :

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

Load time (Time to drive ready mode from disc insert. : Typ)

BD-ROM (SL/DL) 28s / 28s
BD-R (SL/DL/TL/QL) 28s / 35s / 45s / 45s
BD-RE (SL/DL/TL) 28s / 35s / 45s
DVD-ROM (SL/DL) 18s / 18s
DVD-R (SL/DL) 25s / 25s
DVD-RW 25s
DVD+R (SL/DL) 25s / 25s
DVD+RW 25s
DVD-RAM 35s
CD-ROM 15s

3.8 Data buffer capacity 4 MB

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|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 13/26 |
| Revised Date | Oct. 18, 2016 | | |

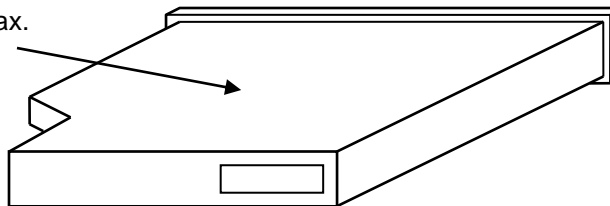
4. Environmental Conditions

4.1 Ambient Temperature

Operating Read 5 °C to 50 °C
 Write 5 °C to 45 °C
 Storage/Transportation -40 °C to 60 °C

4.2 Approval Temperature Rise

Center of Top Cover 56 °C max.



4.3 Temperature Gradient

10 °C/h

4.4 Relative Humidity

Operating Read 15 % to 85 % (Non-Condensing)
 Write 15 % to 80 % (Depend on the Temperature)
 Storage/Transportation 5 % to 90 % (Non-Condensing)

4.5 Dew point temperature restrictions

Less than 29 °C

4.6 Altitude

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

4.7 Vibration)

(1) Non-Operating: 19.6 m/s² (2.0 G) No physical and electrical damage. (No disc loaded)
 (10 to 500) Hz sine wave random, 1oct./min at Each of 3 directions¹⁾

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

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

4.8 Shock

(1) Non-Operating: 3920 m/s² (400 G) No damage after shock. (No disc loaded)
 2 ms at Each of 3 directions¹⁾
 588 m/s² (60 G) No damage after shock. (No disc loaded)
 11 ms 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.

| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 14/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

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 | 600 |
| | 10% of Power on time (Seek: 10% of operating time) |

5.2 Tray Open/Close Cycle Test

10,000 times

5.3 Access Aging

250,000 times (Full access)

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)

| | |
|---|-----------------------------------|
| 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 | |

7. Power Requirements

7.1 Source Voltage

+5V±5% Ripple Less than 100 mVp-p

7.2 Current

| | | |
|----------------------------------|---|--------------------------|
| Stand-By *1 | 40 mA typ. | (Slumber) |
| Continuous Read | 700 mA typ. | (CD-ROM 24x max. CAV) |
| | 800 mA typ. | (DVD-ROM 8x max. CAV) |
| Continuous Write | 800 mA typ. | (BD-ROM 6x max. CAV) |
| | 750 mA typ. | (CD-R 24x max. CAV) |
| | 750 mA typ. | (DVD+R 8x max. CAV) |
| | 1000 mA typ. | (DVD+/-R DL 6x max. CAV) |
| | 900 mA typ. | (BD-R 6x max. CAV) |
| Seek (Full) | 1000 mA typ., 2000 mA max. (DVD-RAM 5x max. PCAV) | |
| Spin UP (Spindle motor start up) | 1000 mA typ., 2000 mA max. (DVD-RAM 5x max. PCAV) | |
| Maximum Current | 2000 mA | |

-note- Inrush current within 1 ms is ignored.

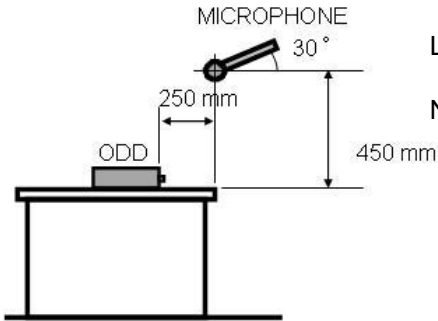
*1) If Zero Power function is supported, 0mA.

7.3 Rush Current

| | |
|---------|------------------------|
| Maximum | 3.0 A / less than 1 ms |
|---------|------------------------|

| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 15/26 |
| Revised Date | Oct. 18, 2016 | | |

8. Acoustic Noise



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

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

9. Dimensions

WxHxD 128 x 9.5 x 127 mm (Refer to Section 13.)

10. Mass

129 ± 7 g (Without Bezel)

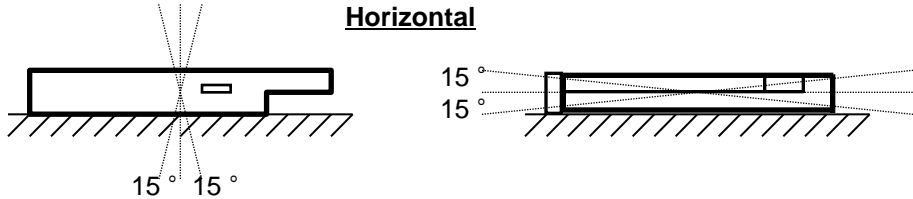
11. Mechanicals

11.1 Disc Loading

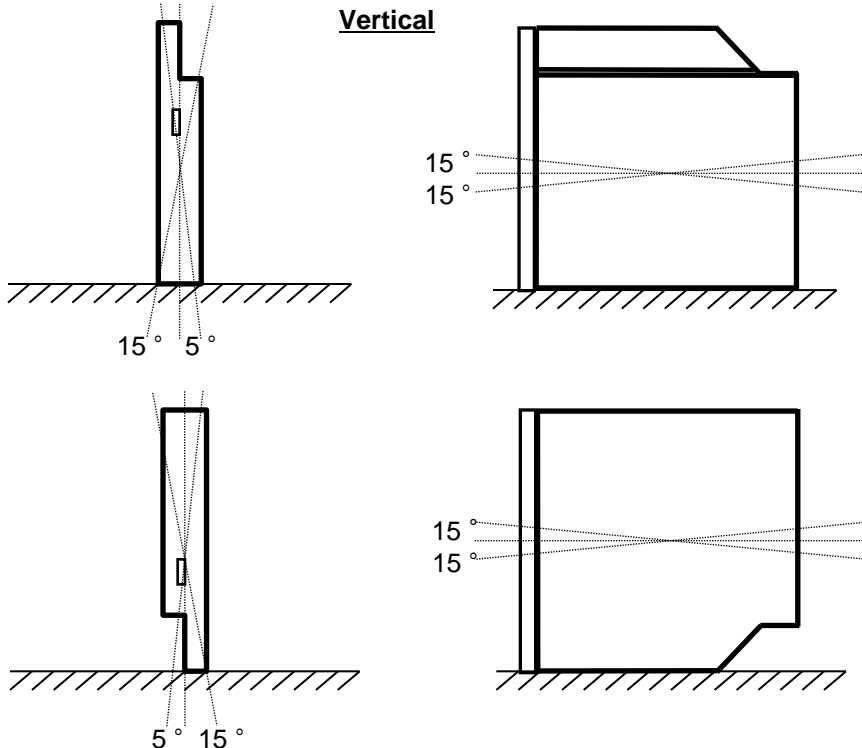
Drawer type manual load / Electrical release

11.2 Mounting Requirements

Horizontal



Vertical



-Note-

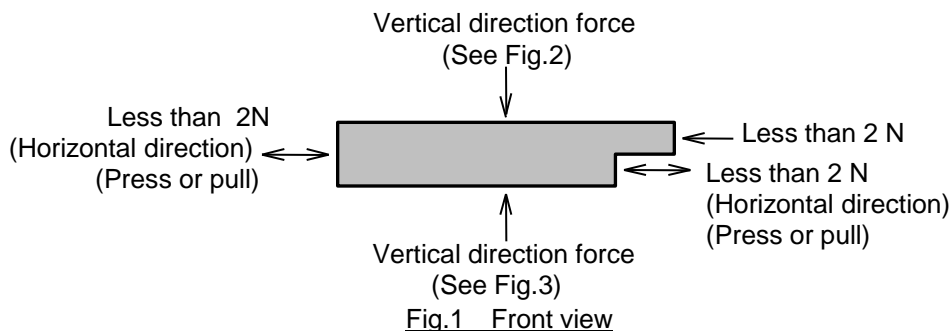
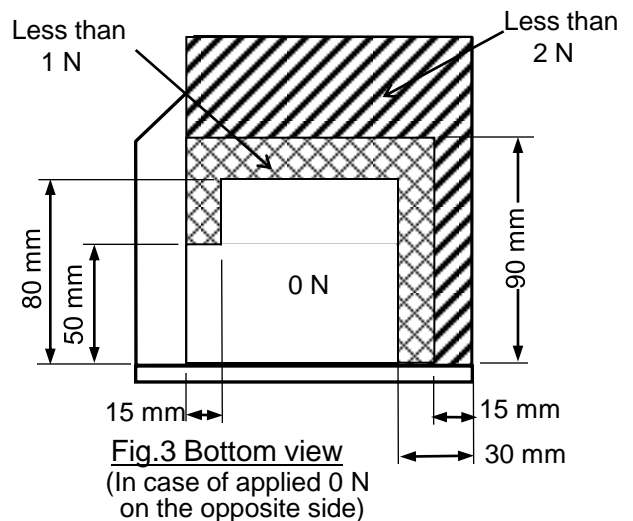
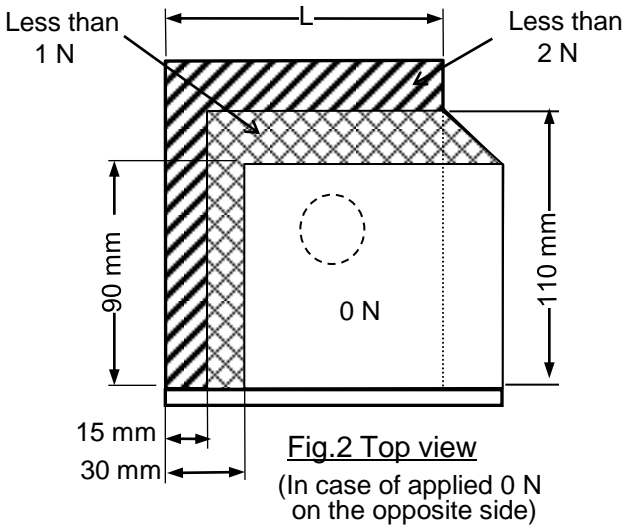
Operation with postures other than the above drawings is not guaranteed.

| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 16/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

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.

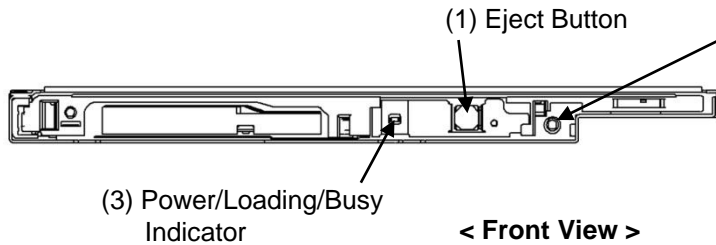
- (1) When mounting the equipment, use tapping screw holes located on the left and right both sides of the equipment.
 When using screws to fix the connector from the host computer to the equipment, use tapping screw holes located on the back side of the equipment.
 - Recommended screw tightening torque: 0.12 N·m
 - length of screws is shown in Chapter 13 Mechanical Dimensions.
- (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 mm (See Fig.1)
 - Recommended value for Top and bottom case : See Fig.1, Fig.2 and Fig.3 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 0.5 mm
 - Recommended clearance around the front bezel: more than 1 mm



| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 17/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

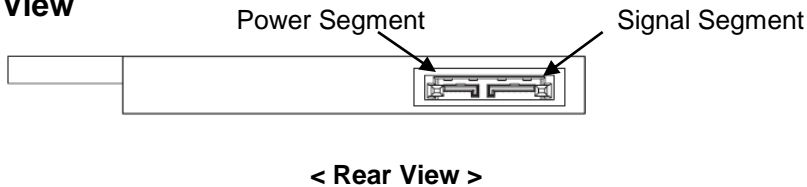
12. Controls and Functions

12.1 Front View

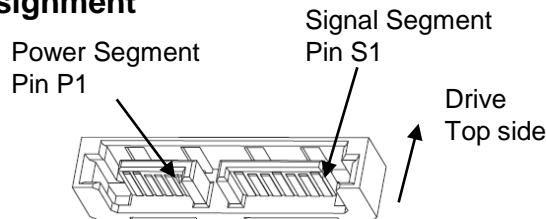


(2) Manual Emergency Eject Hole
 The emergency eject procedure should only be used to retrieve your disc if the drive fails to eject.
Caution : Shut down the power supply when this eject will be used.

12.2 Rear View



12.3 Connector Pin Assignment

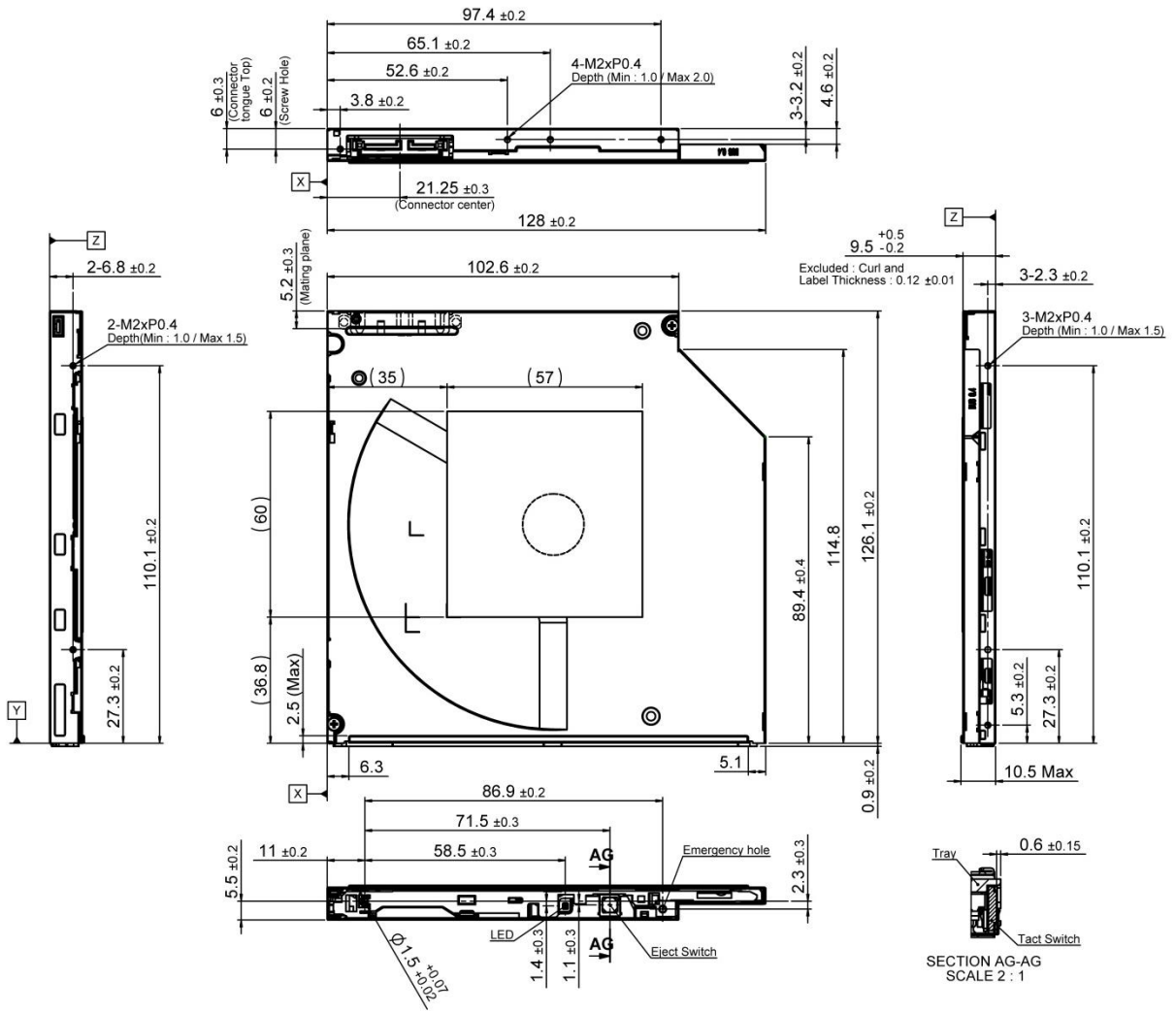


| | Pin | | Function | Cable Usage | Backplane Usage |
|----------------|-----|-----|--|----------------------|----------------------|
| Signal Segment | S1 | GND | | 1 st mate | 1 st mate |
| | S2 | A+ | Differential signal pair from host controller. | 2 nd mate | 2 nd mate |
| | S3 | A- | | 2 nd mate | 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 (For ZPO function) | 2 nd mate | 2 nd mate |
| | P5 | Gnd | | 1 st mate | 1 st mate |
| | P6 | Gnd | | 1 st mate | 1 st mate |

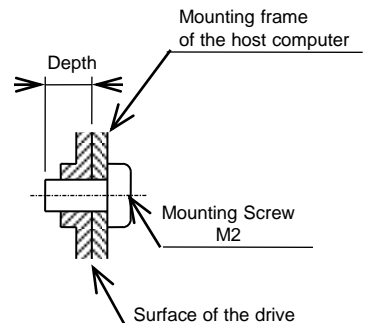
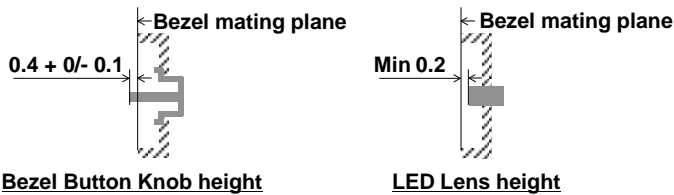
DA: connect to GND, when pushing Eject button

| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 18/26 |
| Revised Date | Oct. 18, 2016 | | |

13. Mechanical Dimensions



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



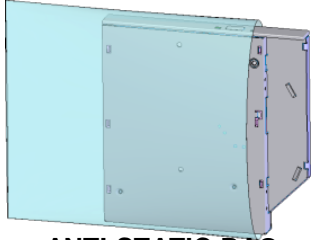
Notes

- 1.M2 tapped holes for installation (Clamping Torque 0.2 N-m MAX.)
- 2.Unless otherwise specified, dimensional tolerance are +/- 0.5 mm.
- 3.Bezel design has to follow GBAS Spec which is specified in SFF-8552

| | |
|--------------|---------------|
| Issued Date | Jun. 23, 2016 |
| Revised Date | Oct. 18, 2016 |

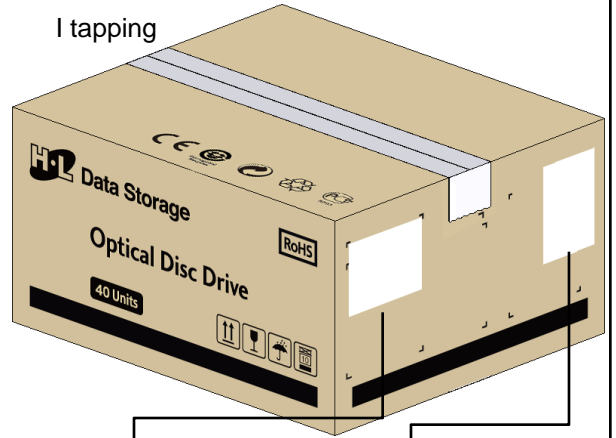
| |
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| Rev. T.01 |
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14. Packaging



ANTI-STATIC BAG

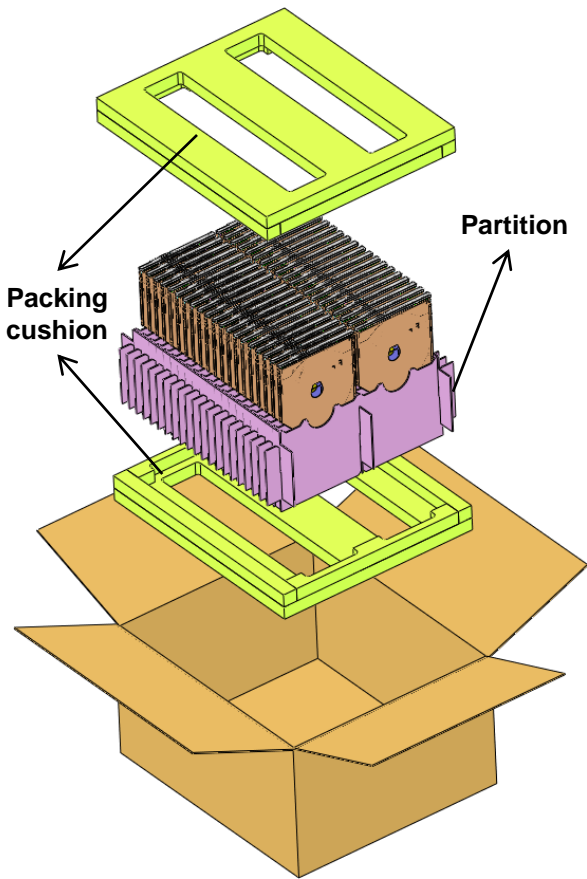
40units/box
386 x 335 x 195 (Outer size)



I tapping

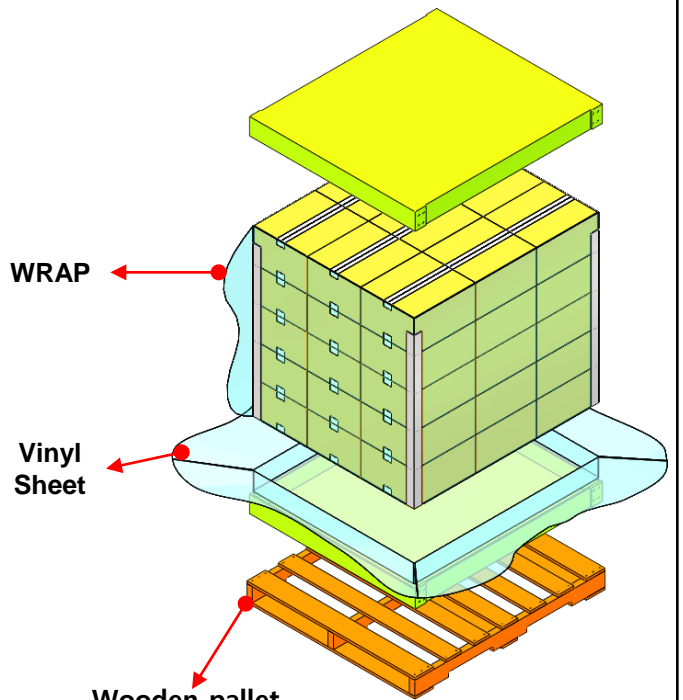
Area of box label
Size : 90 x 60

Area of destination label
(Only HEPM)



Partition

Packing cushion



WRAP

Vinyl Sheet

Wooden pallet

1,800 units/Pallet
1220 x 1070 x 1120(mm)

| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 20/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

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 |

Hitachi-LG Data Storage, Inc.

BU40N

21/26

Issued Date

Jun. 23, 2016

Revised Date

Oct. 18, 2016

Rev. T.01

| < 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) | A Eh |
| (58) WRITE BUFFER | 3Bh |

| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 22/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

16. Regulations and Standards

16.1 Safety

The product will satisfy the safety standards outlined below.

- UL: UL 60950-1 Second Edition
- C-UL: CSA C22.2 No. 60950-1-07 Second Edition
- TÜV: EN 60950-1 / EN60825-1
- SEMKO: EN 60950-1 / EN60825-1

16.2 EMC

The product complies with applicable technical requirements as specified below

- CE Marking
- RCM
- BSMI
- VCCI
- KCC
- FCC Part 15 Class B Digital Device
- ICES-003 Digital Apparatus

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

- 1) Windows Vista
- 2) Windows 7
- 3) Windows 8 & 8.1
- 4) Windows 10

17.2 Application Software (Data writing & Playback)

- (2) Power2Go (CyberLink)
- (3) PowerDVD BD (CyberLink)*

* Need BE (Bus Encryption) support to play BE BDMV disc

| | | | | |
|--------------|---------------|--------------|-----------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | | 23/26 |
| Revised Date | Oct. 18, 2016 | | Rev. T.01 | |

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(+ 5 V 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.

19. Production site

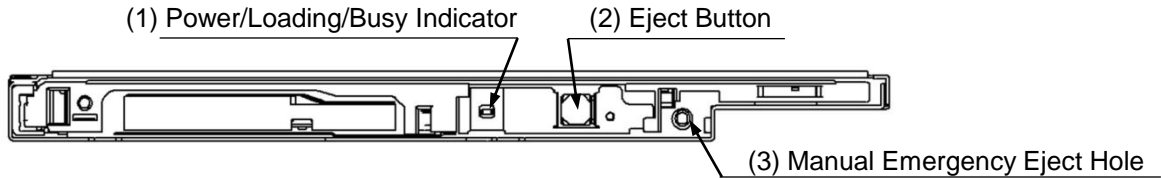
production site (HZ)

| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 24/26 |
| Revised Date | Oct. 18, 2016 | | |

Appendix 1. Customized specifications

1. Bezel, Tray and Indicator

Bezel: No bezel



| | Part | Color | Material | Flammability |
|---|-------------------------------|----------------------------|--|--------------|
| 1 | Bezel & Eject Button | - | - | - |
| 2 | Tray | Black | U-ONE Com Tech PPE+PS (UWF-02F70) LG Chemical PPE+PS (LUMILOY GN4356FH) | UL94V-1 |
| 3 | Power/Loading /Busy indicator | Green (LED light color) | --- | --- |

2. Chassis

| | |
|--------------|----------|
| Top cover | Aluminum |
| Bottom cover | Steel |

3. LED Blinking Specification

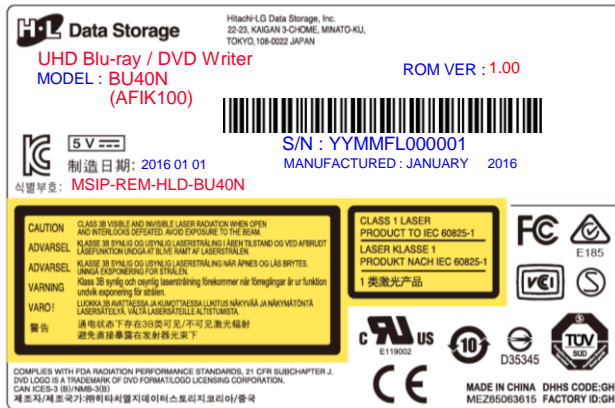
| | |
|------------------|----------|
| Disc recognition | Flashing |
| Load, Unload | Flashing |
| Playing audio | Flashing |
| Data access | On |
| Writing | Flashing |
| Polling command | Off |
| The others | Off |

4. Region Setting No region

| | | | |
|--------------|---------------|------------------------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N (MSI) | 25/26 |
| Revised Date | Oct. 18, 2016 | | |

Appendix 2. Rating Label

Taiwan 2nd-Tiers LABEL INFORMATION



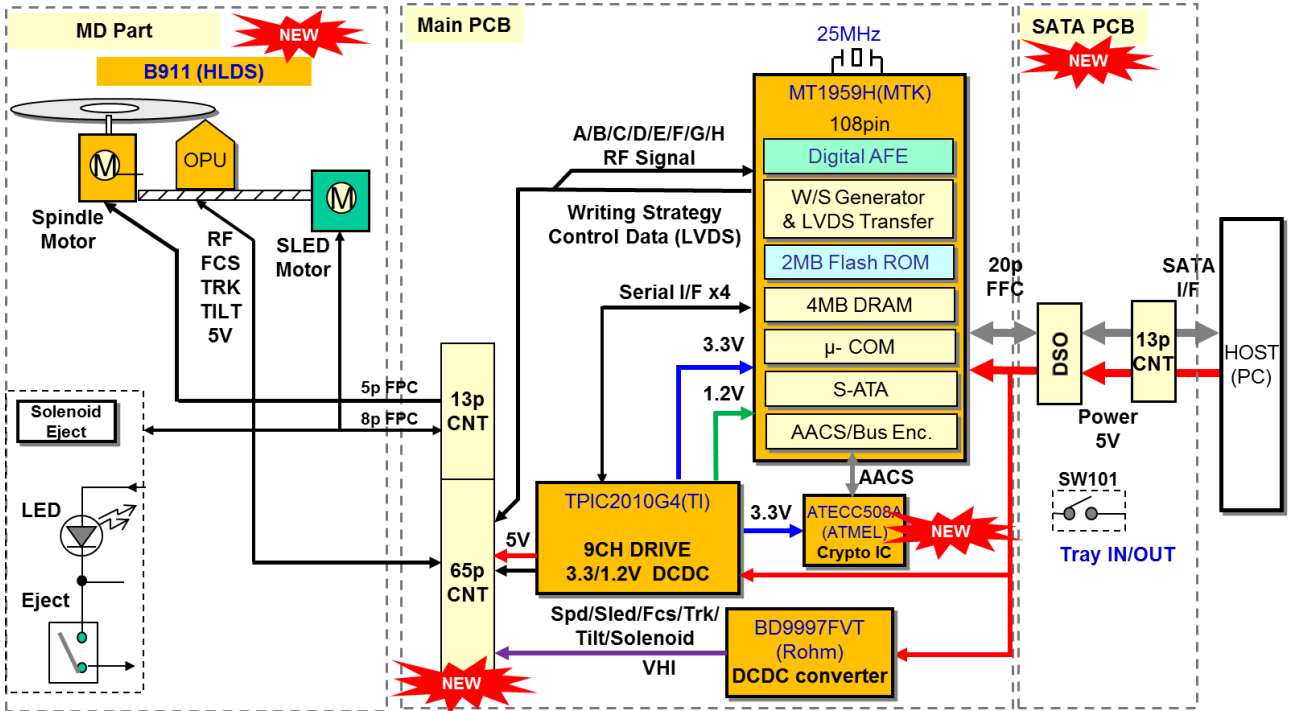
LABEL SIZE : 82(W) x 54(H) x 0.1(t)
Printing Information : Blue, Red Part
LABEL P/N : MEZ65063615

*** Label Detail Printed Information ***

1. Product Name : **UHD Blu-ray / DVD Writer**
2. Model name : **MODEL : BU40N**
3. Suffix : **(AFIK100)**
4. 制造日期 (YEAR, MONTH, DATE) : **2016 01 01**
5. KC No : **MSIP-REM-HLD-BU40N**
6. **ROM VER : 1.00**
DO NOT PRINT "XXXX" ON MAIN LABEL.
Please refer to the F/W section or SR PAGE
7. Barcode of Information (39Code)
S/N : YYMMFL000001
- **YY** : Year (2015 : 15, 2016 : 16, 2017 : 17...)
- **MM** : Month
- **FL** : Factory Line Code
- **000001** : Serial Number
8. **MANUFACTURED : JANUARY 2016**

| | | | |
|--------------|---------------|--------------|--------------|
| Issued Date | Jun. 23, 2016 | BU40N | 26/26 |
| Revised Date | Oct. 18, 2016 | | |

Appendix 3. Block Diagram



Appendix 4. Key Component List

| Components | Maker | Model Name/No | Remarks |
|-----------------|--------------|--------------------|---------------------------|
| OPU | HLDS | HLP-B911 | BDXL support |
| DSP | MTK | MT1959H | 4MB DRAM 2MB Flash ROM |
| Motor Driver IC | TI | TPIC2010G4 | with DCDC converter |
| Power LSI | ROHM | BD9997FVT | |
| Spindle Motor | HLDS (LGIT) | MSDS-W064A | |
| Sled Motor | Sankyo | MSCT016H05S | |
| | MOATECH | SPS-S07RG-207 | |
| SATA Connector | P-TWO | 121038-13241-3 | |
| | HON HAI | LN11131-B003-7H | |
| | AMPHENOL | SSATA-001-0226-2-3 | |
| | CROWN LUXURY | SLIM SATA 13P | |