## SPECIFICATIONS

**OF**

Slim DVD Super Multi Drive

**Model** GTC0N ATWA10B

For Afaster
## Revision History

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Brief description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2015.07.13</td>
<td>Regular version</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>2016.10.05</td>
<td>Delete CD/DVD+ logo on main label on p24</td>
<td>1.01</td>
</tr>
</tbody>
</table>
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1. Features

1.1 General

1. CD-R/RW, DVD-R/RW/RAW/ +R/+RW +/-R DL read and write compatible, CD Family and DVD-ROM read compatible
2. Enhanced IDE (ATAPI) interface : SATA Interface
3. Buffer memory 0.5MB
4. Buffer Under-run prevention function embedded
5. Walking OPC (Optimum Power Calibration) circuit
6. Drawer Type manual Load / Electrical Release
7. Supports Power saving mode and Sleep mode
8. Vertical and Horizontal installable
9. Supports Zero Power Function
10. Comply with PF(Phthalate Free)

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 data 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
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”
9. CPRM (DVD-R/RW/RAW) supported
10. Reads and writes data in DVD+R(M-DISC)

1.3 Supported write method

1. DVD-R: Disc at Once and Incremental Recording
2. DVD-R DL: Disc at Once, Incremental Recording and 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
1.4 Performance

(1) Average access time: DVD-ROM 160 ms
(Random access) 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 (M-DISC) 4x PCAV
- DVD+R DL 2.4x CLV, 4x PCAV, 6x PCAV
- DVD+RW 2.4x, 3.3x CLV, 4x ZCLV, 6x ZCLV, 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 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

*Definition

Transfer Rate: 1x (DVD) = 1.385 Mbytes/s, 1x (CD) = 150 kB/s
Mbytes/s = 10^8 bytes/s, kB/s = 2^10 bytes/s
Capacity: MB = 2^20 bytes, kB = 2^10 bytes
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) 8.5GB (Ver. 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) 8.5GB (Ver. 1.1)
- **(DL)** 4.7GB (Ver. 1.3)
- **DVD+RW:** 4.7GB (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)
### 3. Drive performance

#### 3.1 Host interface
T13 ATA/ATAPI-8  
MMC-6, SFF-8090i v8  
Serial ATA Revision 3.0 (RSG: complied UTD 1.4 Gen1)

#### 3.2 Write Speed

<table>
<thead>
<tr>
<th>Media (Media Speed)</th>
<th>Writing Speed</th>
<th>Transfer rate (DVD: Mbytes/s, CD: kB/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-R (1-2x)</td>
<td>2x CLV</td>
<td>2.77 Mbytes/s</td>
</tr>
<tr>
<td></td>
<td>-R (1-4x)</td>
<td>3.3x-4x PCAV</td>
</tr>
<tr>
<td></td>
<td>-R (1-8x)</td>
<td>3.3x-4x PCAV, 3.3-8x CAV</td>
</tr>
<tr>
<td></td>
<td>-R (1-16x)</td>
<td>3.3x-4x PCAV, 3.3-8x CAV</td>
</tr>
<tr>
<td></td>
<td>-R (8cm)</td>
<td>2x CLV</td>
</tr>
<tr>
<td>DVD-R DL (4x)</td>
<td>2x CLV, 3.3x-4x PCAV</td>
<td>2.77, 4.58+5.54</td>
</tr>
<tr>
<td>DVD-R DL (8x)</td>
<td>2x CLV, 3.3x-4x PCAV, 3.3-6x PCAV</td>
<td>2.77, 4.58+5.4, 4.58-8.31</td>
</tr>
<tr>
<td>DVD-RW (1-2x)</td>
<td>2x CLV</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>-RW (2-4x)</td>
<td>2x CLV, 2+4x ZCLV</td>
</tr>
<tr>
<td></td>
<td>-RW (2-6x)</td>
<td>2x CLV, 2+4x, 2+4+6x ZCLV</td>
</tr>
<tr>
<td></td>
<td>-RW (8cm)</td>
<td>2x CLV</td>
</tr>
<tr>
<td>DVD-RAM (2x)</td>
<td>2x CLV</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>-RAM (2-3x)</td>
<td>3x CLV</td>
</tr>
<tr>
<td></td>
<td>-RAM (2-5x)</td>
<td>3.5x PCAV</td>
</tr>
<tr>
<td></td>
<td>-RAM (over 12x)</td>
<td>Not supported</td>
</tr>
<tr>
<td></td>
<td>-RAM (8cm)</td>
<td>2x CLV</td>
</tr>
<tr>
<td>DVD+R (2.4x)</td>
<td>2.4x CLV</td>
<td>3.32</td>
</tr>
<tr>
<td></td>
<td>+R (2.4-4x)</td>
<td>3.3x-4x PCAV</td>
</tr>
<tr>
<td></td>
<td>+R (2.4-8x)</td>
<td>3.3x-4x PCAV, 3.3-8x CAV</td>
</tr>
<tr>
<td></td>
<td>+R (2.4-16x)</td>
<td>3.3x-4x PCAV, 3.3-8x CAV</td>
</tr>
<tr>
<td>DVD+R DL (2.4x)</td>
<td>2.4x CLV</td>
<td>3.32</td>
</tr>
<tr>
<td>DVD+R DL (8x)</td>
<td>2.4x CLV, 3.3x-4x PCAV</td>
<td>3.32, 4.58+5.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.3-6x PCAV</td>
</tr>
<tr>
<td>DVD+RW (2.4x)</td>
<td>2.4x CLV</td>
<td>3.32</td>
</tr>
<tr>
<td></td>
<td>+RW (2.4-4x)</td>
<td>2.4x CLV, 2.4+4x ZCLV</td>
</tr>
<tr>
<td></td>
<td>+RW (3.3-8x)</td>
<td>3.3x CLV, 3.3+6+8x ZCLV</td>
</tr>
<tr>
<td></td>
<td>CD-R</td>
<td>10x CLV, 10+16x ZCLV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3,600</td>
</tr>
<tr>
<td>CD-RW (MS)</td>
<td>4x CLV</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>-RW (HS)</td>
<td>10x CLV</td>
</tr>
<tr>
<td></td>
<td>-RW (US)</td>
<td>10 CLV, 10+16x ZCLV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,500, 1,500+2,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,500+2,400+3,600</td>
</tr>
</tbody>
</table>

* 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)
3.3 Read Speed

<table>
<thead>
<tr>
<th>Media (Media Speed)</th>
<th>Read Speed</th>
<th>Transfer rate (DVD: Mbytes/s, CD: kB/s)</th>
<th>Rotational speed (Approx. r/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-ROM (Single Layer)</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08 Mbytes/s</td>
<td>4,710 r/min</td>
</tr>
<tr>
<td>DVD-ROM (Dual Layer)</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08 Mbytes/s</td>
<td>5,180</td>
</tr>
<tr>
<td>DVD-Video*</td>
<td>1.7 - 4x CAV</td>
<td>2.29 - 5.54</td>
<td>2,600</td>
</tr>
<tr>
<td>DVD-R (3.95GB/Data)</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>5,180</td>
</tr>
<tr>
<td>(3.95GB/Video Format)</td>
<td>1.7 - 4x CAV</td>
<td>2.29 - 5.54</td>
<td>2,600</td>
</tr>
<tr>
<td>(4.7GB/Data)</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>4,710</td>
</tr>
<tr>
<td>(4.7GB/VF)</td>
<td>1.7 - 4x CAV</td>
<td>2.29 - 5.54</td>
<td>2,600</td>
</tr>
<tr>
<td>DVD-R DL</td>
<td>3.3 - 8x CAV</td>
<td>5.58 - 11.08</td>
<td>5,180</td>
</tr>
<tr>
<td>DVD-RW (Data)</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>4,710</td>
</tr>
<tr>
<td>(VF)</td>
<td>1.7 - 4x CAV</td>
<td>2.29 - 5.54</td>
<td>2,600</td>
</tr>
<tr>
<td>(Video &amp; Data)</td>
<td>1.7 - 4x CAV</td>
<td>2.29 - 5.54</td>
<td>2,600</td>
</tr>
<tr>
<td>DVD-RAM **(Ver. 2.2)</td>
<td>3 - 5x PCAV</td>
<td>4.16 - 6.93</td>
<td>4,880 - 3,450</td>
</tr>
<tr>
<td>DVD+R</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>4,710</td>
</tr>
<tr>
<td>DVD+R DL</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>5,180</td>
</tr>
<tr>
<td>DVD+RW</td>
<td>3.3 - 8x CAV</td>
<td>4.58 - 11.08</td>
<td>4,710</td>
</tr>
<tr>
<td>CD-ROM/PhotoCD</td>
<td>10 - 24x CAV</td>
<td>1,500 - 3,600 kB/s</td>
<td>4,860 - 5,200 r/min</td>
</tr>
<tr>
<td>CD-R/RW</td>
<td>10 - 24x CAV</td>
<td>1,500 - 3,600</td>
<td>4,860 - 5,200</td>
</tr>
<tr>
<td>CD-DA(DAE)</td>
<td>10 - 24x CAV</td>
<td>1,500 - 3,000</td>
<td>4,860 - 5,200</td>
</tr>
<tr>
<td>CD-DA (Audio Play)</td>
<td>4.3 -10x CAV</td>
<td>650 - 1,500</td>
<td>2,020 - 2,360</td>
</tr>
<tr>
<td>CD-I/VideoCD</td>
<td>4.3 -10x CAV</td>
<td>650 - 1,500</td>
<td>2,020 - 2,360</td>
</tr>
</tbody>
</table>

*1) DVD-Video: CSS, No CSS, Single Layer, Dual Layer are same as above.
*2) DVD-RAM: Data, Video Format are same as above.
### 3.4 Data transfer rate

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

### 3.5 Access time (Random access)

<table>
<thead>
<tr>
<th>Device</th>
<th>Access Time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-ROM</td>
<td>160 typ.*</td>
</tr>
<tr>
<td>DVD-RAM (Ver.2.2)</td>
<td>260 typ.</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>140 typ.</td>
</tr>
</tbody>
</table>

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: ALMEDIO TCDR-701

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

### 3.6 Data error rate

(Measured with 5 retries maximum)

<table>
<thead>
<tr>
<th>Device</th>
<th>Error Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-R/RW/ROM/RAM</td>
<td>&lt;10⁻¹²</td>
</tr>
<tr>
<td>DVD+R/+RW</td>
<td>&lt;10⁻¹²</td>
</tr>
<tr>
<td>CD-R/RW/ROM</td>
<td>&lt;10⁻¹² (Mode-1)</td>
</tr>
<tr>
<td></td>
<td>&lt;10⁻⁹ (Mode-2)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Device</th>
<th>Spin up Time (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD-ROM (SL)</td>
<td>11 typ.</td>
</tr>
<tr>
<td></td>
<td>4 typ. (Time to drive ready mode from sleep)</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>11 typ.</td>
</tr>
<tr>
<td></td>
<td>4 typ. (Time to drive ready mode from sleep)</td>
</tr>
</tbody>
</table>

### 3.8 Data buffer capacity

0.5 MB
4. Environmental Conditions

4.1 Ambient Temperature
- Operating Read: 5 to 50 ºC
- Operating Write: 5 to 45 ºC
- Storage/Transportation: -30 to 60 ºC

4.2 Approval Temperature Rise
- Center of Top Cover: 56 ºC max.

4.3 Temperature Gradient
- 10 ºC/h

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

4.5 Dew point temperature restrictions
- Less than 29 ºC

4.6 Altitude
- Operating: 0 to 3000 m
- Non-operating: 0 to 12000 m

4.7 Vibration
- (1) Operating
  - Read: 1.96 m/s² (0.2 G) No unrecoverable error
  - Write: 0.98 m/s² (0.1 G) No recording stop
- (2) Non-Operating: 9.8 m/s² (1.0 G) No physical and electrical damage. (No disc loaded)
- (3) Transportation: 8.04 m/s² (0.82 G) No damage must result. (Packed unit)
- * 1) 3direction : X (left and right), Y (back and front), Z (top and bottom) axis

4.8 Shock
- (1) Operating
  - Read: 49 m/s² (5 G) No unrecoverable error (“Retries” are allowed.)
  - Write: 1.96 m/s² (0.2 G) No recording stop.
- (2) Non-Operating: 98.0 m/s² (100 G) No damage after shock. (No disc loaded)
- * 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.
5. Quality and Reliability

5.1 MTBF
Assumption:
- POH per year: 3,000
- ON/OFF cycles per year: 480
- Operating duty cycle: 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 10 kV (Air)
No user detectable data error

Up to 15 kV (Air)
No catastrophic failure or damage

* Test Conditions: $C = 150 \text{pF}, R = 330 \text{ohms}$, 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

<table>
<thead>
<tr>
<th>Mode</th>
<th>Current (mA typ.)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>50</td>
<td>(No power management)</td>
</tr>
<tr>
<td>DIPM on (Partial)</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>DIPM on (Slumber)</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Continuous Read</td>
<td>750</td>
<td>(CD-ROM 24x max. CAV)</td>
</tr>
<tr>
<td>Continuous Write</td>
<td>800</td>
<td>(CD-ROM 8x max. CAV)</td>
</tr>
<tr>
<td>Spin UP (Spindle motor start up)</td>
<td>1.5 A max.</td>
<td></td>
</tr>
<tr>
<td>Maximum Current</td>
<td>1.5 A</td>
<td></td>
</tr>
</tbody>
</table>

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

*2) typ: Measured duration 10sec rms value.

*3) max: Excluded spike current <1ms duration
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 0.25 g·cm
2. Installation: Horizontal
3. Ambient Temperature: Normal Temperature
4. Except loading and unloading
5. bare drive condition

9. Dimensions

W x H x D 128 x 12.7 x 127 mm  (Refer to Section 13.)

10. Mass

Max. 160 g (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.
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 : 0.2 N·m
   ■ Required screw depth : Max.1.5 mm or Max.2.5 mm or Max.3.0mm
     (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 mm (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 0.5 mm.
   ■ Recommended clearance around the front bezel : more than 1 mm.

---

**Fig.1 top view**

<table>
<thead>
<tr>
<th>Force Limitation</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 N</td>
<td>60 mm</td>
</tr>
<tr>
<td>Less than 1 N</td>
<td>15 mm</td>
</tr>
<tr>
<td>Less than 0 N</td>
<td>30 mm</td>
</tr>
</tbody>
</table>

**Fig.2 front view**

<table>
<thead>
<tr>
<th>Force Limitation</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 N</td>
<td>Horizontal direction (Press or pull)</td>
</tr>
<tr>
<td>Less than 2 N</td>
<td>Horizontal direction</td>
</tr>
<tr>
<td>Less than 5 N</td>
<td>Horizontal direction (Press or pull)</td>
</tr>
<tr>
<td>Less than 1 N</td>
<td>Vertical direction / on all areas (Press or pull)</td>
</tr>
</tbody>
</table>
12. Controls and Functions

12.1 Front View

(1) Eject Button
(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.

(3) Power/Loading/Busy Indicator

< Front View >

12.2 Rear View

Power Segment
Signal Segment

< Rear View >

12.3 Connector Pin Assignment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Signal Segment Usage</th>
<th>Power Segment Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S2</td>
<td>A+</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S3</td>
<td>A-</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S4</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S5</td>
<td>B-</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S6</td>
<td>B+</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S7</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>S1</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Cable Usage</th>
<th>Backplane Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>DP*</td>
<td>Last mate</td>
<td>Last mate</td>
</tr>
<tr>
<td>P2</td>
<td>+5V</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>P3</td>
<td>+5V</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>P4</td>
<td>DA*</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>P5</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
<tr>
<td>P6</td>
<td>GND</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; mate</td>
</tr>
</tbody>
</table>

*Pull down DP pin with 1kohm(+/-10%) resistor in ODD.
*DA pin caution: Keep DA pin to be Pull-up for ZPO or External Eject support.
*DP pin caution: Keep DP pin to be Open state in Host side if no need Hot Swap.
13. Mechanical Dimensions

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.
14. Packaging

- **ANTI-STATIC BAG**

- **Packing cushion**

- **Partition**

- **I tapping**

- **Area of box label**
  - Size: 90 x 60

- **Area of destination label**
  - (Only HEPM)

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

- **1,800 units/Pallet**
  - 1220 x 1070 x 1120 (mm)
## 15. Supported Command List

### 15.1 ATA Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATAPI Packet Command</td>
<td>A0h</td>
</tr>
<tr>
<td>ATAPI Soft Reset</td>
<td>08h</td>
</tr>
<tr>
<td>Check Power Mode</td>
<td>E5h</td>
</tr>
<tr>
<td>Execute Drive Diagnostics</td>
<td>90h</td>
</tr>
<tr>
<td>Flush Cache</td>
<td>E7h</td>
</tr>
<tr>
<td>Identify Packet Device</td>
<td>A1h</td>
</tr>
<tr>
<td>Idle Immediate</td>
<td>E1h</td>
</tr>
<tr>
<td>NOP</td>
<td>00h</td>
</tr>
<tr>
<td>Set Features</td>
<td>EFh</td>
</tr>
<tr>
<td>Sleep</td>
<td>E6h</td>
</tr>
<tr>
<td>Standby Immediate</td>
<td>E0h</td>
</tr>
<tr>
<td>Standby</td>
<td>E2h</td>
</tr>
</tbody>
</table>

### 15.2 ATAPI Packet Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLANK</td>
<td>A1h</td>
</tr>
<tr>
<td>CLOSE TRACK/RZONE/SESSION/BORDER</td>
<td>5Bh</td>
</tr>
<tr>
<td>FORMAT UNIT</td>
<td>04h</td>
</tr>
<tr>
<td>GET CONFIGURATION</td>
<td>46h</td>
</tr>
<tr>
<td>GET EVENT STATUS NOTIFICATION</td>
<td>4Ah</td>
</tr>
<tr>
<td>GET PERFORMANCE</td>
<td>ACh</td>
</tr>
<tr>
<td>INQUIRY</td>
<td>12h</td>
</tr>
<tr>
<td>MECHANISM STATUS</td>
<td>BDh</td>
</tr>
<tr>
<td>MODE SELECT (10)</td>
<td>55h</td>
</tr>
<tr>
<td>MODE SENSE (10)</td>
<td>5Ah</td>
</tr>
<tr>
<td>PAUSE/RESUME</td>
<td>4Bh</td>
</tr>
<tr>
<td>PLAY AUDIO (10)</td>
<td>45h</td>
</tr>
<tr>
<td>PLAY AUDIO (12)</td>
<td>A5h</td>
</tr>
<tr>
<td>PLAY AUDIO MSF</td>
<td>47h</td>
</tr>
<tr>
<td>PLAY AUDIO TRACK RELATIVE (10)</td>
<td>49h</td>
</tr>
<tr>
<td>PLAY AUDIO TRACK RELATIVE (12)</td>
<td>A9h</td>
</tr>
<tr>
<td>PREVENT ALLOW MEDIUM REMOVAL</td>
<td>1Eh</td>
</tr>
<tr>
<td>READ (10)</td>
<td>28h</td>
</tr>
<tr>
<td>READ (12)</td>
<td>A8h</td>
</tr>
<tr>
<td>READ BUFFER</td>
<td>3Ch</td>
</tr>
<tr>
<td>READ BUFFER CAPACITY</td>
<td>5Ch</td>
</tr>
<tr>
<td>READ CAPACITY</td>
<td>25h</td>
</tr>
<tr>
<td>READ CD</td>
<td>BEh</td>
</tr>
<tr>
<td>READ CD MSF</td>
<td>B9h</td>
</tr>
<tr>
<td>READ DISC INFORMATION</td>
<td>51h</td>
</tr>
<tr>
<td>READ DVD STRUCTURE</td>
<td>ADh</td>
</tr>
<tr>
<td>READ FORMAT CAPACITIES</td>
<td>23h</td>
</tr>
<tr>
<td>READ HEADER</td>
<td>44h</td>
</tr>
<tr>
<td>READ SUB-CHANNEL</td>
<td>42h</td>
</tr>
<tr>
<td>READ TOC/PMA/ATIP</td>
<td>43h</td>
</tr>
<tr>
<td>READ TRACK/RZONE INFORMATION</td>
<td>52h</td>
</tr>
<tr>
<td>REPAIR RZONE</td>
<td>58h</td>
</tr>
<tr>
<td>REPORT KEY</td>
<td>A4h</td>
</tr>
<tr>
<td>&lt; Command &gt;</td>
<td>&lt; Code &gt;</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>(34) REQUEST SENSE</td>
<td>03h</td>
</tr>
<tr>
<td>(35) RESERVE TRACK/RZONE</td>
<td>53h</td>
</tr>
<tr>
<td>(36) SCAN</td>
<td>BAh</td>
</tr>
<tr>
<td>(37) SEEK</td>
<td>2Bh</td>
</tr>
<tr>
<td>(38) SEND CUE SHEET</td>
<td>5Dh</td>
</tr>
<tr>
<td>(39) SEND DVD STRUCTURE</td>
<td>BFh</td>
</tr>
<tr>
<td>(40) SEND KEY</td>
<td>A3h</td>
</tr>
<tr>
<td>(41) SEND OPC INFORMATION</td>
<td>54h</td>
</tr>
<tr>
<td>(42) SET CD SPEED</td>
<td>BBh</td>
</tr>
<tr>
<td>(43) SET READ AHEAD</td>
<td>A7h</td>
</tr>
<tr>
<td>(44) SET STREAMING</td>
<td>B6h</td>
</tr>
<tr>
<td>(45) START/STOP UNIT</td>
<td>1Bh</td>
</tr>
<tr>
<td>(46) STOP PLAY/SCAN</td>
<td>4 Eh</td>
</tr>
<tr>
<td>(47) SYNCHRONIZE CACHE</td>
<td>35h</td>
</tr>
<tr>
<td>(48) TEST UNIT READY</td>
<td>00h</td>
</tr>
<tr>
<td>(49) VERIFY(10)</td>
<td>2Fh</td>
</tr>
<tr>
<td>(50) VERIFY(12)</td>
<td>AFh</td>
</tr>
<tr>
<td>(51) WRITE(10)</td>
<td>2 Ah</td>
</tr>
<tr>
<td>(52) WRITE(12)</td>
<td>AAh</td>
</tr>
<tr>
<td>(53) WRITE AND VERIFY(10)</td>
<td>2 Eh</td>
</tr>
<tr>
<td>(54) WRITE BUFFER</td>
<td>3 Bh</td>
</tr>
</tbody>
</table>

### 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)***: Disable
- **DIPM (Device Initiated Power Management)***: Enable
- **Asynchronous notification***: Enable
- **BIST-L***: Enable
- **BIST-TSA***: Enable
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
CNAS

16.2 EMC / EMI

The product complies with applicable technical requirements as specified below

KC
BSMI
CE
FCC
VCCI
C-TICK
CU

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 8.1 x86/x64
Windows 8 x86/x64
Windows 7 x86/x64
Windows XP Home Edition, Professional, Media Center Edition
Windows Server 2012 x64, R2
Windows2008 Server x86/x64, R2
Windows2003 Server x86/x64

17.2 Recording tool

(1) Roxio Creator
(2) CD/DVD Maker (NTI)
(3) CD File (NTI)
(4) CyberLink (Power2Go)
(5) Nero (Ahead)
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.
Appendix 1. Bezel and Tray, LED, Region

1. Bezel, Tray (No Bezel type)

<table>
<thead>
<tr>
<th>Part</th>
<th>Color</th>
<th>Material</th>
<th>Flammability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bezel &amp; Eject button</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2 Tray</td>
<td>Black</td>
<td>LG Chemical PPE+PS (LUMILOY GN4356FH)</td>
<td>ULV-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-ONE Com Tech PPE+PS (UWF-02F70)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asahi KASEI PPE+PS (XYRON L544V)</td>
<td></td>
</tr>
</tbody>
</table>

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: Steel
- Bottom cover: Steel

5. Region Setting:

No Region
Appendix 2. Rating label Specification

Taiwan 2nd-Tiers LABEL INFORMATION

* Label Detail Printed Information *

1. Product Name: Super Multi DVD Writer
2. Model name: MODEL: GTC0N
3. Suffix: (ATWA10B)
4. 制造日期 (YEAR, MONTH, DATE): 2016 10 XX
5. KC No: KCC-REM-HLD-GTA0N
6. ROM VER: XXXX
   - 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
     - MM: Month
     - FL: Factory Line Code
     - 000001: Serial Number
8. MANUFACTURED: JANUARY 2016
## Appendix 3. FW Revision History

<table>
<thead>
<tr>
<th>Before</th>
<th>after</th>
<th>NO</th>
<th>Issue</th>
<th>Change</th>
</tr>
</thead>
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<td>-</td>
<td>1.00</td>
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### Appendix 4. HW/Mecha Revision History

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<th>after</th>
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<tr>
<td>-</td>
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<td>1</td>
<td></td>
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