

**NOTA TÉCNICA**

Nº 55 FNDE - DOCUMENTA

0085.536-15-6

**1. Objetivo**

Visando atender às exigências previstas no item 4, subitem 4.1.5 do CADERNO DE INFORMAÇÕES TÉCNICAS do edital de **Pregão Eletrônico nº 71/2013**, a empresa **POSITIVO INFORMÁTICA S.A.**, contratada para execução do **Processo Administrativo nº 23034.000302/2013-19 - Ata de registro de preços (ARP) nº 51/2014** do referido pregão, solicita, por intermédio do documento COM ADV 146/2015 de 10 de abril de 2015 Anexo I, atualização tecnológica de periféricos, a saber: Gravador de CD/DVD-RW marca Panasonic, NAND Flash SSD marca NETCOM e o Ventilador marca AKASA.

No intuito de verificar equivalência ou superioridade dos periféricos ofertados com os entregues anteriormente, a empresa classificada em primeiro lugar, forneceu os equipamentos, que servirão de amostra e base para os testes de atualização.

Assim, nos termos do edital, a equipe técnica da Diretoria de Tecnologia, com o propósito de analisar se os periféricos são aderentes aos requisitos técnicos exigidos no edital, realizou a análise visual e técnica, bem como procedeu com testes para averiguação da conformidade das amostras e suas respectivas documentações.

**2. Apresentação**

Encerrada a fase da análise visual, procedeu com a inspeção técnica dos periféricos, comparando itens como: interface, capacidade de armazenamento, modelo, velocidade e outros.

Abaixo tabelas com a relação das observações e comparações:

| Item Gravador de CD/DVD-RW          | Amostra (Atual)        | Amostra (Proposta)     |
|-------------------------------------|------------------------|------------------------|
| <b>Marca</b>                        | Panasonic              | Panasonic              |
| <b>Modelo</b>                       | UJ8C0                  | UJ8E0                  |
| <b>Tipo de unidade</b>              | Interna                | Interna                |
| <b>Velocidade de leitura de CD</b>  | 24x                    | 24x                    |
| <b>Velocidade de leitura de DVD</b> | 8x                     | 8x                     |
| <b>Interface de comunicação</b>     | SATA                   | SATA                   |
| <b>Cor</b>                          | Preta                  | Preta                  |
| <b>Dimensões</b>                    | 128 x 129 x 12.7 mm    | 128 x 129 x 12.7 mm    |
| <b>Compatibilidade</b>              | DVD, CD-ÁUDIO e CD-ROM | DVD, CD-ÁUDIO e CD-ROM |

| Item NAND Flash SSD                | Amostra (Atual)        | Amostra (Proposta)     |
|------------------------------------|------------------------|------------------------|
| <b>Tipo</b>                        | NAND Flash MLC interno | NAND Flash MLC interno |
| <b>Marca</b>                       | KingSpec               | NETCOM                 |
| <b>Modelo</b>                      | KSD-SA18.6-XXXMJ       | B100C0                 |
| <b>Tamanho em polegadas</b>        | 1.8"                   | 1.8"                   |
| <b>Capacidade de armazenamento</b> | 16GB                   | 16GB                   |
| <b>Unidade de armazenamento</b>    | SSD                    | SSD                    |
| <b>Interface SATA</b>              | Possui                 | Possui                 |

| Item Ventilador              | Amostra (Atual)    | Amostra (Proposta) |
|------------------------------|--------------------|--------------------|
| <b>Fabricante</b>            | SUNON              | AKASA              |
| <b>Modelo</b>                | MB60251V1-000C-A99 | DFB602512H         |
| <b>Velocidade de rotação</b> | 4500RPM            | 4300RPM            |
| <b>Fluxo de ar</b>           | 23.5 CFM           | 25.4 CFM           |
| <b>Tensão nominal</b>        | 12V                | 12VDC              |
| <b>Nível de ruído</b>        | 33.5 Db            | 34.0 Db            |

### 3. Procedimentos

Conforme estabelecido no **item 4, subitem 4.1.5 do CADERNO DE INFORMAÇÕES TÉCNICAS**, a aprovação das amostras constitui quesito fundamental para a aceitabilidade dos periféricos.

Visando verificar a equivalência ou superioridade dos periféricos ofertados aos entregues anteriormente, foram realizados testes para atualização tecnológica, os quais foram divididos em 4 (quatro) etapas, a saber:

- **Etapa 1: Montagem e instalação dos periféricos entregues como amostra:**
  - Abertura dos volumes e conferência das quantidades;
  - A Licitante, sob orientação dos técnicos do FNDE, procederá com a montagem e instalação dos periféricos.
- **Etapa 2: Análise da proposta e da documentação técnica:**
  - Análise da proposta do licitante e dos documentos técnicos (manuais, declarações, certificações, etc.). Neste ato será verificado se o que consta na proposta da licitante está de acordo com o que foi exigido no Termo de Referência;
  - Também será verificada a veracidade das declarações e das certificações.
- **Etapa 3: Inspeção visual dos periféricos:**
  - Verificação do modelo e marca dos componentes.
- **Etapa 4: Análise técnica das amostras:**
  - Seguiu os procedimentos descritos no ENCARTE "B" (Caderno de Testes).

#### 4. Análise técnica dos periféricos:

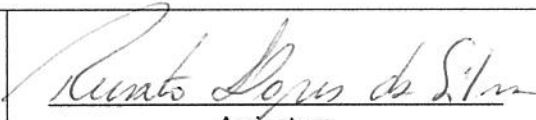
As especificações técnicas dos periféricos foram verificadas seguindo os itens e procedimentos descritos no **ENCARTE "B" (Caderno de Testes)**.

Após a verificação das declarações e certificações das amostras, foi realizada a inspeção visual, técnica, instalação e configuração dos periféricos.

#### 5. Conclusão

Após todos os testes verificou-se que, do ponto de vista técnico, o Gravador de CD/DVD-RW marca Panasonic, o NAND Flash SSD marca NETCOM e o Ventilador marca AKASA, atendem às exigências do edital, estando, portanto, aprovados pela equipe técnica para servir como referência dos periféricos que deverão ser entregues pela empresa classificada em primeiro lugar.

#### 6. Aprovação

|                   |                                                                   |                                                                                                     |
|-------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <u>24/04/2015</u> | <b>Renato Lopes da Silva</b><br>Técnico Responsável               | <br>Assinatura    |
| <u>24/04/2015</u> | <b>Tiago Hamilton de Oliveira da Silva</b><br>Técnico Responsável | <br>Assinatura  |
| <u>04/05/15</u>   | <b>Rene de Lima Barbosa</b><br>Diretor de Tecnologia              | <br>Assinatura |



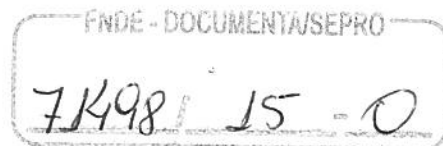
## Anexo I





COM ADV 146/2015.

Curitiba, 10 de abril de 2015.



Ao

**FUNDO NACIONAL DE DESENVOLVIMENTO DA EDUCAÇÃO – FNDE**

**Diretoria de Tecnologia – DIRTE**

**Coordenação-Geral de Tecnologia, Inovação e Processos – CGTEC.**

Att.: Sr. René Lima Barbosa – CGTEC/DIRTE .

Ref.: Pregão Eletrônico nº 71/2013 – Processo Administrativo nº 23034.000302/2013 - 19 – Ata de Registro de Preços (ARP) nº 51/2014.

Assunto: Apresentação de amostra final para atualização tecnológica referente ao Item 1 – Computador Interativo para fornecimento à ARP supra citada.

Prezado Senhor,

1. A par de cumprimentá-lo cordialmente, a POSITIVO INFORMÁTICA vem através da presente missiva informar que, em função das constantes atualizações tecnológicas que o mercado da tecnologia da informação está sujeito e pelo tempo demandado entre o certame e a devida adjudicação, se faz necessária a atualização tecnológica para os seguintes itens: SSD, marca: KINGSPEC, modelo: KSD-SA18; VENTILADOR, marca: SUNON, modelo: MB60251V1-000C-A99 e ODD, marca: PANASONIC, modelo: UJ8C0 originalmente ofertados.

**CGCOM/DIRAD/FNDE**

Recebido em, 05/05/2015

Às: 15:35

Assinatura





# POSITIVO

2. Desta feita, a POSITIVO INFORMÁTICA propõe que os fornecimentos a serem realizados para atendimento à ARP supracitada, sejam feitos com o SSD, marca: NETCOM, modelo: B100C016G; VENTILADOR, marca: AKASA, modelo: DFB602512H e ODD, marca: PANASONIC, modelo: UJ8E0 em sua versão atualizada, o qual atende a todas as exigências editalícias, sem ressalvas, conforme demonstram os Comparativos Técnicos (DOC. nº 01, DOC. nº 2 e DOC. nº 3) e catálogos técnicos contendo os modelos originalmente ofertados e as alterações propostas (DOC nº 04, DOC. nº 5, DOC. nº 6, DOC. nº 7, DOC. nº 8, DOC. nº 9), anexos à esta missiva e complementares às amostras que serão protocoladas junto a esta solicitação, para realização de testes e parecer.

3. Vale o esclarecimento que, a POSITIVO INFORMÁTICA S.A, na qualidade de também fabricante do novo equipamento ofertado, garante a perfeita compatibilidade destes componentes com todos os demais periféricos e componentes referentes à homologação já realizada e informa que a atualização proposta atende a todas as exigências do edital, sem nenhum ônus adicional ao FNDE, e se coloca à disposição para qualquer esclarecimento adicional que se faça necessário.

4. Diante das informações apresentadas, aguardamos o mais breve possível o de acordo formal de V.Sª quanto ao requerido para que possamos programar a atualização dos equipamentos para atendimento das futuras aquisições através desta ARP, pelo que aproveitamos o ensejo para reafirmar o compromisso da POSITIVO INFORMATICA S.A. com esta Respeitável Instituição, reiterando nossos votos de estima e elevado apreço.

Atenciosamente,

POSITIVO INFORMÁTICA S/A.  
Daniel Padilha Garrido.  
Representante Legal.



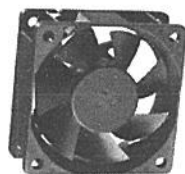
Comparativo Ventilador - MB60251V1-000C-A99 x DFB602512H

|   | Descrição             | MB60251V1-000C-A99 | DFB602512H |
|---|-----------------------|--------------------|------------|
| 1 | Velocidade de Rotação | 4500 RPM           | 4300 RPM   |
| 2 | Fluxo de ar           | 23.5 CFM           | 25.4 CFM   |
| 3 | Tensão Nominal        | 12V                | 12V        |
| 4 | Nível de ruído        | 33.5 Db            | 34.0 Db    |
| 5 | Fabricante            | SUNON              | AKASA      |



SUNON.

60x60x25 mm



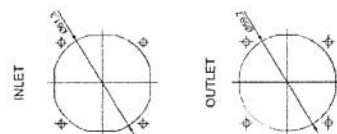
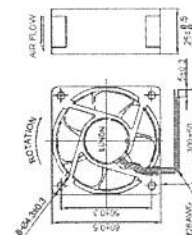
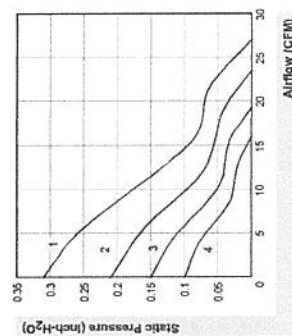
16.0~27.0 CFM

## ■ 产品规格

| 型号                 | 转速<br>RPM | 功率<br>(WATTS) | 电压<br>(VDC) | 电流<br>(mA) | 风量<br>(CFM) | 风压<br>(Inch-H <sub>2</sub> O) | 噪音<br>(dB(A)) | 重量<br>(g) | 曲线 |
|--------------------|-----------|---------------|-------------|------------|-------------|-------------------------------|---------------|-----------|----|
|                    |           |               |             |            |             |                               |               |           |    |
| MB60251VX-000C-A99 | 5200      | 2.40          | 12          | 200        | 27.0        | 0.31                          | 36.5          | 57.0      | 1  |
| MB60251V1-000C-A99 | 4500      | 1.50          | 12          | 125        | 23.5        | 0.21                          | 33.5          | 57.0      | 2  |
| MB60251V2-000C-A99 | 3800      | 0.89          | 12          | 74         | 19.3        | 0.15                          | 29.0          | 57.0      | 3  |
| MB60251V3-000C-A99 | 3100      | 0.60          | 12          | 50         | 16.0        | 0.10                          | 21.0          | 57.0      | 4  |
| MB60252VX-000C-A99 | 5200      | 2.64          | 24          | 110        | 27.0        | 0.31                          | 36.5          | 57.0      | 1  |
| MB60252V1-000C-A99 | 4500      | 1.68          | 24          | 70         | 23.5        | 0.21                          | 33.5          | 57.0      | 2  |
| MB60252V2-000C-A99 | 3800      | 1.16          | 24          | 48         | 19.3        | 0.15                          | 29.0          | 57.0      | 3  |
| MB60252V3-000C-A99 | 3100      | 0.77          | 24          | 32         | 16.0        | 0.10                          | 21.0          | 57.0      | 4  |

| 型号                 | 转速<br>RPM | 功率<br>(WATTS) | 电压<br>(VDC) | 电流<br>(mA) | 风量<br>(CFM) | 风压<br>(Inch-H <sub>2</sub> O) | 噪音<br>(dB(A)) | 重量<br>(g) | 曲线 |
|--------------------|-----------|---------------|-------------|------------|-------------|-------------------------------|---------------|-----------|----|
|                    |           |               |             |            |             |                               |               |           |    |
| EB60251S1-000C-999 | 4500      | 1.62          | 12          | 135        | 23.5        | 0.21                          | 33.5          | 57.0      | 2  |
| EB60251S2-000C-999 | 3800      | 1.07          | 12          | 89         | 19.3        | 0.15                          | 28.0          | 57.0      | 3  |
| EB60251S3-000C-999 | 3100      | 0.77          | 12          | 64         | 16.0        | 0.10                          | 21.0          | 57.0      | 4  |
| EB60252S1-000C-999 | 4500      | 1.80          | 24          | 75         | 23.5        | 0.21                          | 33.5          | 57.0      | 2  |
| EB60252S2-000C-999 | 3800      | 1.16          | 24          | 48         | 19.3        | 0.15                          | 29.0          | 57.0      | 3  |
| EB60252S3-000C-999 | 3100      | 0.84          | 24          | 35         | 16.0        | 0.10                          | 21.0          | 57.0      | 4  |

## ■ 风量 / 风压特性曲线



\*以上产品如有定制化设计需求请与SUNON销售人员联系。  
\*以上规格如有变更恕不另行通知，最新产品信息请以SUNON网站(www.sunon.com)公告为主。



**Comparativo ODD - UJ8C0 x UJ8E0**

|   | <b>Descrição</b>    | <b>UJ8C0</b>              | <b>UJ8E0</b>              |
|---|---------------------|---------------------------|---------------------------|
| 1 | Armazenamento Ótico | DVD-RW / CD-RW            | DVD-RW / CD-RW            |
| 2 | Tipo de Unidade     | Interna ao gabinete       | Interna ao gabinete       |
| 3 | Compatibilidade     | CD-ROM, CD-AUDIO, DVD-ROM | CD-ROM, CD-AUDIO, DVD-ROM |
| 4 | Fabricante          | PANASONIC                 | PANASONIC                 |



SPECIFICATIONS  
FOR REWRITABLE DVD DRIVE

DATE OF ISSUE July 17. 2013

MODE UJ8E0ADPS2-B

Rev. 1.01

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DATE :

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| Approval<br>(Engineer) | (Sales)          | (Planning)       | (QA)             | (Legal)          | Design           |
|------------------------|------------------|------------------|------------------|------------------|------------------|
| <i>H. Ichida</i>       | <i>H. Ichida</i> | <i>H. Ichida</i> | <i>H. Ichida</i> | <i>H. Ichida</i> | <i>H. Ichida</i> |

| Model Number : UJ8E0ADPS2-B                    |            |           |            |                    |             |                     |                               |  |  | PAGE   |
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|                                                |            |           |            |                    |             |                     |                               |  |  | 2 / 29 |
| History                                        |            |           |            |                    |             |                     |                               |  |  |        |
| Parts No. : (PPRD) UJ8E0ADPS2-B (Customer) N/A |            |           |            |                    |             |                     |                               |  |  |        |
| Spec Rev.                                      | ECN Number | Date      | Drive Rev. | FW Rev.<br>HW Rev. | Box<br>Rev. | Phase in<br>/Period | Comments                      |  |  |        |
| 0.5                                            | N/A        | 2013.6.14 | A          | FW 1006<br>HW 1.00 | -           | Sample              | (FW: 1006=1.00)               |  |  |        |
| 1.00                                           | N/A        | 2013.6.19 | A          | FW 1.00<br>HW 1.00 | -           | MP                  | Official Release              |  |  |        |
| 1.01                                           | N/A        | 2013.7.17 | A          | FW 1.00<br>HW 1.00 | -           | MP                  | Update Safety label KC number |  |  |        |
|                                                |            |           |            |                    |             |                     |                               |  |  |        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
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| Model Number : UJ8E0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PAGE<br>4 / 29 |
| <p>1.Applications</p> <p>a) This specification describes the general specs and performance of DVD Multi Drive UJ8E0.</p> <p>b) In case major modification to improve performance and in the event that the device does not perform as specified, the stipulation requires that modification and solution should be made with mutual discussion, following the stipulations stated in this specification.</p> <p>c) Some components which are different in appearance and performance may be mixedly used owing to multiple sourcing and owing to common use with different models caused by decreased production quantity.</p> <p>d) Product to be marked which is compatible HHS Class 1 Standard in the USA.</p> <p>e) In the process of manufacturing of the products including packaging, any materials related ozone destructive items are not used at all.</p> <p>f) PPRD in this document stands for Panasonic Precision Devices Co., Ltd.</p> <p>g) Special clause.<br/>We will endeavor to do our best for maintaining the control of quality, however,</p> <p>1) We want you to confirm the safety of the product in which PPRD product is incorporated.<br/>If there is a problem with our product, be requested to advice the problem before shipment to the market.<br/>:Be requested to do the test for confirmation of the product which installs PPRD product, following applicable rules and regulations.<br/>:Be requested to confirm the safety from abnormal usage under the condition installed.<br/>:Be requested to confirm the safety for reliable test under the condition installed.</p> <p>2) Be requested to provide necessary information how to use and how to install to the customers with the expectation that minimize unexpected accident from unexplained specification in this stipulation.</p> <p>3) In case, owing to the quality problem from this product, if there is a possibility to endanger the life of the user or property, please be requested to take double safety counter-measures by having enough tolerance over the assured specification and performance stated in this spec. from the point of product liability issue.</p> <p>4) Transcription and duplication of this document without prior consent is prohibited.</p> <p>5)Our trademark "Panasonic" shall not be printed on any products according to our mutual consultation between customer and Panasonic.</p> |                |

| Model Number : UJ8E0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | PAGE<br>5 / 29 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|
| <p>2. Features</p> <p>1) Built-in Type for PC</p> <p>2) Read speed<br/>           DVD-ROM : Max. 8X CAV<br/>           CD-ROM : Max. 24X CAV</p> <p>3) Maximum Write speed<br/>           CD-R : Max. 24X CAV<br/>           CD-RW : 4X CLV<br/>           High Speed CD-RW : 10X CLV<br/>           Ultra Speed CD-RW : Max. 16X Zone CLV<br/>           DVD-R : Max. 8X CAV<br/>           DVD-R DL : Max. 6X Partial CAV<br/>           DVD-RW : Max. 6X Zone CLV<br/>           DVD+R : Max. 8X CAV<br/>           DVD+R DL : Max. 6X Partial CAV<br/>           DVD+RW : Max. 8X Zone CLV<br/>           DVD-RAM : 3X-5X Partial CAV (4.7GB)</p> <p>4) Support Buffer Underrun Free Recording</p> <p>5) Single +5V Power Supply</p> <p>6) The media for write check<br/>           CD-R : TAIYO YUDEN Co., Ltd., Mitsubishi Kagaku Media Co., Ltd.,<br/>           CD-RW : Mitsubishi Kagaku Media Co., Ltd.<br/>           HS CD-RW : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD-R : TAIYO YUDEN Co., Ltd.<br/>           DVD-R DL : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD-RW : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD+R : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD+R DL : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD+RW : Mitsubishi Kagaku Media Co., Ltd.<br/>           DVD-RAM : Panasonic Corporation.</p> <p>7) Access Speed<br/>           DVD-ROM SL 180ms (Typ.) (Random)<br/>           CD-ROM 150ms (Typ.) (Random)</p> <p>3. Write Speed<br/>           The drive adjusts the write speed to the disc characteristics.<br/>           The optimal write speed to the disc may not be the maximum write speed.</p> |  |                |

Model Number : UJ8E0ADPS2-B

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4. Specifications

| NO  | Item                                                                                                                                                                                                                          | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Condition                                                                                                          |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 4-1 | Power Supply<br>1. Operating Voltage<br>2. Power Consumption                                                                                                                                                                  | DC 5 V +/- 0.25V<br>Peak<br>1600 mA (Max.)<br><br>Read (CD) 1100 mA (typ.)<br>Read (DVD) 950 mA (typ.)<br>Write 1350 mA (typ.)<br>Standby 50 mA (typ.)                                                                                                                                                                                                                                                                                                                                                                                        | Except inrush current<br>(Less than 1ms)<br>CD(TCD-002)<br>DVD(KME-DVD001)<br>CD-R/DVD-RMax. Write<br>Slumber mode |
|     | 3. Ripple<br>Drive<br>1. Transfer Rate<br>(1) Read<br>DVD-ROM<br>CD-ROM<br>(2) Write<br>CD-R<br>CD-RW<br>HS-RW<br>US-RW<br>CD 8cm media<br>DVD-R<br>DVD-R DL<br>DVD-RW<br>DVD+R<br>DVD+R DL<br>DVD+RW<br>DVD-RAM<br>DVD (8cm) | 100 mVp-p Max.<br><br>Max 8X(CAV) (Max. 10800 kB/s)<br>Max 24X(CAV) (Max. 3600 kB/s)<br>8X(CLV) / 12X.16X(ZCLV) / MAX 24X(CAV)<br>4X(CLV)<br>4X.8X.10X(CLV)<br>8X.10X(CLV) / Max. 16X(ZCLV)<br>4X(CLV)<br><br>2X(CLV) / 4X.6X.8X (ZCLV) / Max. 8X(CAV)<br>2X(CLV) (CLV) .MAX.3.3x-6X (PCAV)<br>1X(CLV) (CLV) .MAX.4X. 6X (ZCLV)<br>2.4X(CLV) / 4X.6X.8X(ZCLV) / Max. 8X(CAV)<br>2.4X(CLV) (CLV) .MAX.3.3x-6X (PCAV)<br>2.4X(CLV) / 3.3X.6X.8X(ZCLV)<br>2X(CLV) / 3X(CLV) / 3X-5X(PCAV)<br>2X(CLV) / 2.4X(CLV)<br><br>150 Mbyte/s<br><br>0.5MB | DVD-R for General<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>4.7 / 9.4 GB                      |
| 4-2 | (3) SATA Interface                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |
|     | 2. Buffer Memory                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |
|     | 3. Error Rate<br>(1) CD-ROM(with ECC)<br>(without ECC)                                                                                                                                                                        | less than 10 <sup>-12</sup> bit<br>less than 10 <sup>-9</sup> bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <Access Time><br>using PPRD's original test<br>program                                                             |
|     | (2) DVD-ROM                                                                                                                                                                                                                   | less than 10 <sup>-12</sup> bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |
|     | 4. Access Time                                                                                                                                                                                                                | DVD-ROM 180 ms typ (Random)<br>CD-ROM 150 ms typ (Random)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | DVD(KMEDVD001)<br>CD(TCD-002)                                                                                      |
|     | 5. Start up Time                                                                                                                                                                                                              | less than 15s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Except Multi Session<br>and Writable Media                                                                         |
|     | 6. Stop Time                                                                                                                                                                                                                  | less than 6s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                    |
|     | 7. Acoustic Noise                                                                                                                                                                                                             | less than 50 dBA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                    |
|     | 8. Regional Code                                                                                                                                                                                                              | "None"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ISO/JIS7779 (ANSI)                                                                                                 |
|     | 9. Inquiry Data                                                                                                                                                                                                               | "DVD-RAM UJ8E0"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |

| Model Number : UJ8E0ADPS2-B |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PAGE                                                   |
|-----------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
|                             |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 7 / 29                                                 |
| 4. Specification (continue) |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Condition                                              |
| 4-3                         | Applicable disc        | C D: CD-ROM(12cm,8cm)<br>CD-R,CD-RW<br>DVD: DVD-ROM,DVD-R,DVD-R DL<br>DVD-RAM,DVD-RW<br>DVD+R, DVD+R DL,DVD+RW                                                                                                                                                                                                                                                                                                                                                                                      | Except abnormal shaped Disc<br>DVD-RAM,DVD-RW for CPRM |
| 4-4                         | Applicable disc format | CD: CD-DA,CD-ROM,CD-ROM XA<br>PhotoCD(multiSession)<br>Video CD,CD-Extra(CD+),CD-text<br>Hybrid SACD<br>DVD: DVD-VIDEO, DVD-ROM,<br>DVD-R(4.7GB),<br>DVD-RW(Ver.1.1/1.2), DVD-RAM<br>DVD+R, DVD+R DL, DVD+RW<br>DVD-R DL(Format1/4)                                                                                                                                                                                                                                                                 | CD Layer only<br><br>Format 1 Write support            |
| 4-5                         | Slope                  | 15 degree(Any direction)<br>90 + 35 / -5 degree                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Horizontal<br>Vertical : wing side is up.              |
| 4-6                         | Dimensions, Weight     | 128 x 129 x 12.7 mm ( W x D x H )<br>(except protrusion)<br>155g +/- 10g                                                                                                                                                                                                                                                                                                                                                                                                                            | Upper cover-AL<br>Bottom cover-AL                      |
| 4-7                         | Eject                  | Soft Eject (with emergency eject hole)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |
| 5. Appearance               |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Condition                                              |
| 5-1                         | Appearance             | <ul style="list-style-type: none"> <li>- Any remarkable scratches, stains, sink mark, haze and burrs which degrade cosmetic are not allowed.</li> <li>- We may not accept it as custom components except front bezel.</li> <li>- No discoloration is allowed.</li> <li>- No contamination or objection lens or pick-up cover are allowed.</li> <li>- Marginal one will be judged by limitation samples which mutually agreed by both parties.</li> <li>- Front bezel Green LED indicator</li> </ul> |                                                        |
| 6. Reliability              |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Condition                                              |
| 6-1                         | Temperature            | Operating guarantee : 5 to 50°C<br>Non operating : -20 to 60°C<br><div>             Recommended position of temperature measurement<br/>             in the case drive is built in to the PC<br/>             (at the point *** in the right figure)           </div> Operating guarantee temperature : 55°C                                                                                                                                                                                        |                                                        |
| 6-2                         | Humidity               | Operating guarantee : 10 to 80% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The maximum wet-bulb temperature is 31°C               |
| 6-3                         | MTBF                   | Non operating : 5 to 90% RH<br>60,000h (Duty : 20 %)                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |
| 6-4                         | MTTR                   | 30min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                        |

| Model Number : UJ8E0ADPS2-B                                                                                                                                                                                                                           |                                                                                                                                          |                                                                                                                                                                                                                                                                                | PAGE                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
|                                                                                                                                                                                                                                                       |                                                                                                                                          |                                                                                                                                                                                                                                                                                | 8 / 29                                               |
| 7. Safety                                                                                                                                                                                                                                             |                                                                                                                                          |                                                                                                                                                                                                                                                                                |                                                      |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                     | Specification                                                                                                                                                                                                                                                                  | Condition                                            |
| 7-1                                                                                                                                                                                                                                                   | Safety                                                                                                                                   | UL /cUL (UL 60950-1 / CSA C22.2 No. 60950-1)<br>TUV (EN 60950-1)<br>CE Marking (EMC Directive 2004/108/EC)<br>EN 55022<br>EN 55024                                                                                                                                             | Rated voltage : 5.0V<br>Rated current : 1.6A         |
| 7-2                                                                                                                                                                                                                                                   | EMC                                                                                                                                      |                                                                                                                                                                                                                                                                                |                                                      |
| 7-3                                                                                                                                                                                                                                                   | LASER                                                                                                                                    | 21 CFR Subchapter J (Class 1 laser product)<br>IEC 60825-1/EN 60825-1 (Class 1 laser product)                                                                                                                                                                                  |                                                      |
| <b>Note</b> : This model is compliant to HHS and EN60825-1 as Class 1 Laser, so information of laser must be presented in user instruction or operation manual which is supplied to end user.<br>Information for laser : Refer to the attached sheet. |                                                                                                                                          |                                                                                                                                                                                                                                                                                |                                                      |
| 8.Shock/Vibration                                                                                                                                                                                                                                     |                                                                                                                                          |                                                                                                                                                                                                                                                                                |                                                      |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                     | Specification                                                                                                                                                                                                                                                                  | Condition                                            |
| 8-1                                                                                                                                                                                                                                                   | Shock<br>1.Operating<br>2.Non Operating                                                                                                  | :Read<br>:Write<br>19.6m/s <sup>2</sup> (2.0 G) (11ms X,Y,Z) :CD-DA<br>58.8m/s <sup>2</sup> (6.0 G) (11ms X,Y,Z) :CD-ROM/DVD-ROM/BD-ROM<br>4.9m/s <sup>2</sup> (0.5 G) ( 11ms X,Y,Z)<br>588m/s <sup>2</sup> (60.0 G) (11ms X,Y,Z)<br>1960m/s <sup>2</sup> (200 G) ( 2ms X,Y,Z) | CD-ROM/DVD-ROM/BD-ROM<br>possibility of rely at read |
| 8-2                                                                                                                                                                                                                                                   | Vibration<br>1.Operation<br>2.Non Operating                                                                                              | :Read<br>:Write<br>1.96m/s <sup>2</sup> (0.2 G) ( 5 ~ 500Hz )<br>0.98m/s <sup>2</sup> (0.1 G) ( 5 ~ 500Hz )<br>19.6m/s <sup>2</sup> (2.0 G) (10 ~ 500Hz X,Y,Z 2h )                                                                                                             |                                                      |
| 9.Life                                                                                                                                                                                                                                                |                                                                                                                                          |                                                                                                                                                                                                                                                                                |                                                      |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                     | Specification                                                                                                                                                                                                                                                                  | Condition                                            |
| 9-1                                                                                                                                                                                                                                                   | Life<br>1.Laser (at 25°C)<br>2.Spindle Motor<br>3.Feed Motor<br>4.FPC<br>(Feed Motor)<br>5.Disc Insertion<br>6.Eject Button<br>7.Loading | 2000 h<br>3000 h<br>current alteration within 30 % from initial<br>250,000 times<br>current alteration within 30 % from initial<br>250,000 times<br>10,000 times<br>10,000 times<br>10,000 times                                                                               |                                                      |

|                                                                                                           |        |                                           |
|-----------------------------------------------------------------------------------------------------------|--------|-------------------------------------------|
| Model Number : UJ8E0ADPS2-B                                                                               |        | PAGE<br>9 / 29                            |
| 10. Interface<br>10-1. Connector<br>(1) Connector layout                                                  |        |                                           |
|  <p>Back side view</p> |        |                                           |
| (2) Connector pin assignment                                                                              |        |                                           |
| Interface description (signal)                                                                            |        |                                           |
| Pin                                                                                                       | Signal |                                           |
| S1                                                                                                        | Gnd    |                                           |
| S2                                                                                                        | A+     | Differential signal pair A                |
| S3                                                                                                        | A-     |                                           |
| S4                                                                                                        | Gnd    |                                           |
| S5                                                                                                        | B-     | Differential signal pair B                |
| S6                                                                                                        | B+     |                                           |
| S7                                                                                                        | Gnd    |                                           |
| Interface description (power)                                                                             |        |                                           |
| Pin                                                                                                       | Signal |                                           |
| P1                                                                                                        | DP     | Device Present ( 1KΩ pull down )          |
| P2                                                                                                        | +5V    |                                           |
| P3                                                                                                        | +5V    | 5V power                                  |
| P4                                                                                                        | MD/DA  | Manufacturing Diagnostic/Device Attention |
| P5                                                                                                        | Gnd    |                                           |
| P6                                                                                                        | Gnd    |                                           |
| *1 : See 23/29 page                                                                                       |        |                                           |
| DC Characteristics                                                                                        |        |                                           |
| Parameter                                                                                                 |        | Signal Level                              |
|                                                                                                           |        | min typ max                               |
| Signal Detection Threshold (mV)                                                                           |        | 50 100 200                                |
| Tx Differential Output Voltage (mV)                                                                       |        | 400 500 600                               |
| Rx Differential Input Voltage (mV)                                                                        |        | 325 400 600                               |
| Tx Pair Differential Impedance (ohm)                                                                      |        | 85 100 115                                |
| Rx Pair Differential Impedance (ohm)                                                                      |        | 85 100 115                                |

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10. Interface (continue)  
10-2. SATA command

Packet Commands Supported by Drives

|     |                                |     |                                  |
|-----|--------------------------------|-----|----------------------------------|
| 00h | TEST UNIT READY                | 53h | RESERVE TRACK/RZONE              |
| 01h | REZERO UNIT                    | 54h | SEND OPC INFORMATION             |
| 03h | REQUEST SENSE                  | 55h | MODE SELECT(10)                  |
| 04h | FORMAT UNIT                    | 58h | REPAIR RZONE                     |
| 08h | READ(6)                        | 5Ah | MODE SENSE(10)                   |
| 0Ah | WRITE(6)                       | 5Bh | CLOSE TRACK/RZONE/SESSION/BORDER |
| 0Bh | SEEK(6)                        | 5Ch | READ BUFFER CAPACITY             |
| 12h | INQUIRY                        | 5Dh | SEND CUE SHEET                   |
| 15h | MODE SELECT(6)                 | A1h | BLANK                            |
| 1Ah | MODE SENSE(6)                  | A3h | SEND KEY                         |
| 1Bh | START/STOP UNIT                | A4h | REPORT KEY                       |
| 1Eh | PREVENT/ALLOW MEDIUM REMOVAL   | A5h | PLAY AUDIO(12)                   |
| 23h | READ FORMAT CAPACITIES         | A7h | SET READ AHEAD                   |
| 25h | READ CAPACITY                  | A8h | READ(12)                         |
| 28h | READ(10)                       | AAh | WRITE(12)                        |
| 2Ah | WRITE(10)                      | ACH | GET PERFORMANCE                  |
| 2Bh | SEEK(10)                       | ADh | READ DVD STRUCTURE               |
| 2Eh | WRITE AND VERIFY(10)           | AEh | WRITE AND VERIFY(12)             |
| 2Fh | VERIFY(10)                     | AFh | VERIFY(12)                       |
| 35h | FLUSH (SYNCHRONIZE) CACHE      | B6h | SET STREAMING                    |
| 37h | READ DEFECT DATA               | B9h | READ CD MSF                      |
| 38h | WRITE BUFFER                   | BAh | SCAN                             |
| 3Ch | READ BUFFER                    | BBh | SET CD SPEED                     |
| 42h | READ SUB-CHANNEL               | BDh | MECHANISM STATUS                 |
| 43h | READ TOC/PMVA/TIP              | BEh | READ CD                          |
| 44h | READ HEADER                    | BFh | SEND DVD STRUCTURE               |
| 45h | PLAY AUDIO(10)                 | E8h | READ MICROCODE                   |
| 46h | GET CONFIGURATION              | EAh | WRITE MICROCODE                  |
| 47h | PLAY AUDIO MSF                 | F5h | SYNCHRONIZE MICROCODE            |
| 4Ah | GET EVENT /STATUS NOTIFICATION |     |                                  |
| 4Bh | PAUSE/RESUME                   |     |                                  |
| 4Eh | STOP PLAY/SCAN                 |     |                                  |
| 51h | READ DISC INFORMATION          |     |                                  |
| 52h | READ TRACK/RZONE INFORMATION   |     |                                  |

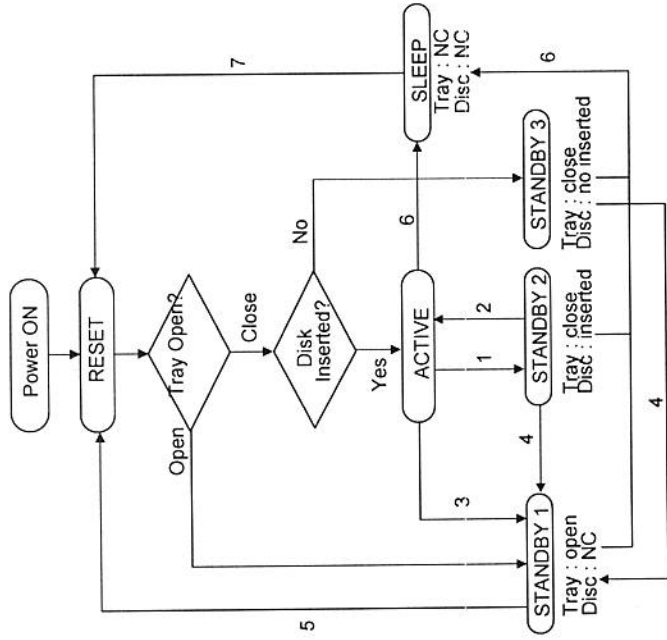
ATA Commands Supported by Drives

|     |                           |     |                   |
|-----|---------------------------|-----|-------------------|
| E5h | CHECK POWER MODE          | 00h | NOP               |
| 08h | DEVICE RESET              | A0h | PACKET            |
| 90h | EXECUTE DEVICE DIAGNOSTIC | EFh | SET FEATURES      |
| A1h | IDENTIFY PACKET DEVICE    | E6h | SLEEP             |
| E1h | IDLE IMMEDIATE            | E0h | STANDBY IMMEDIATE |

10-3. Zero Power : support

11. Power Management

11-1. Status Changes



• Electrical status in a drive is same at STANDBY1,2,3

- 1: At first host executes reset sequence after power is supplied. If a disc is attached and a tray is closed, the drive status becomes ACTIVE Mode. And next If host doesn't execute command for certain time(default 30 sec) a disc stops, and changes STANDBY Mode. In the case of receiving ATAPI command(Standby Immediate),the drive status changes STANDBY Mode soon.
- 2: In the case of STANDBY Mode at the status that a disc is attached and a tray is closed, if the drive receives command from host, the drive status changes ACTIVE Mode soon.
- 3: In the case of ACTIVE Mode, a disc is stopped and a tray is opened by ATAPI eject command or pushing eject button at front bezel. And next the drive status change STANDBY Mode again.

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11.Power Management (continue)

11-1. Status Changes (continue)

- 4: In the case of STANDBY Mode, a disc is stopped and a tray is opened by ATAPI eject command or pushing eject button at front bezel. And next the drive status change STANDBY Mode again.
- 5: In the case of STANDBY Mode at the status that a tray is opened, this drive executes reset sequence by closing a tray. And next If a disc is attached, the drive spin a disc and changes ACTIVE Mode.
- 6: In the case of ACTIVE or STANDBY mode, this drive goes into Sleep mode immediately after receiving of Sleep Command.  
The only way to recover from SLEEP mode is with a software reset or hardware reset.
- 7: The drive status can recover by hard or soft reset(in the case of SSP disable).  
And next the drive status becomes the same sequence with reset status.
- 8: In the case of SSP enable, the drive goes into STANDBY mode immediately after receiving of soft reset.

ACTIVE Mode

At first a disc is attached and a tray is closed after power is supplied. And next the drive checks itself. If this check finished perfectly, the drive spin a disc and read TOC.  
ACTIVE Mode stands for this status that the drive finish reading TOC.  
So laser, spindle motor, and sled motor active.

STANDBY Mode

This mode is a low current consumption mode.  
STANDBY Mode stands for this status that only SATA interface active. So laser, spindle motor, and sled motor doesn't active.

SLEEP Mode

This mode is a low current consumption mode.  
SLEEP Mode stands for this status that all system(laser, spindle motor, sled motor, SATA interface) doesn't active. The drive can recover by hard/soft reset.

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|--------------------------------------------------------------------|--------------------------------------------------|-----------------|
| 12. Serial ATA Features<br>12-1. Serial ATA Features Specification |                                                  |                 |
| NO                                                                 | Item                                             | Specification   |
| 12-1                                                               | HIPM<br>(Host Initiated link Power Management)   | Support         |
| 12-2                                                               | DIPM<br>(Device Initiated link Power Management) | Support         |
| 12-3                                                               | AN<br>(Asynchronous Notification)                | Support         |
| 12-4                                                               | SSP<br>(Software Setting Preservation)           | Support         |
| 12-5                                                               | SSC<br>(Spread Spectrum Clocking)                | Support         |

Partial Timer : 10ms  
Slumber Timer 30ms  
(time after a drive handles the last command)

\*Both host controller and optical drive need to support HIPM ,DIPM and AN mode to utilize them.

12-2. Link Power Management State

Serial ATA interface power states are controlled by the device and host controller.  
The interface power states are defined as below.

PHYRDY

The Phy logic and main PLL are both on and active. The interface is synchronized and capable of receiving and sending data.

PARTIAL

The Phy logic of SATA interface is powered, but is in a reduced power state.  
Power dissipation in this mode is less than the PHYRDY mode, but more than the SLUMBER mode.  
The exit latency from this state shall be no longer than 10 us.

SLUMBER

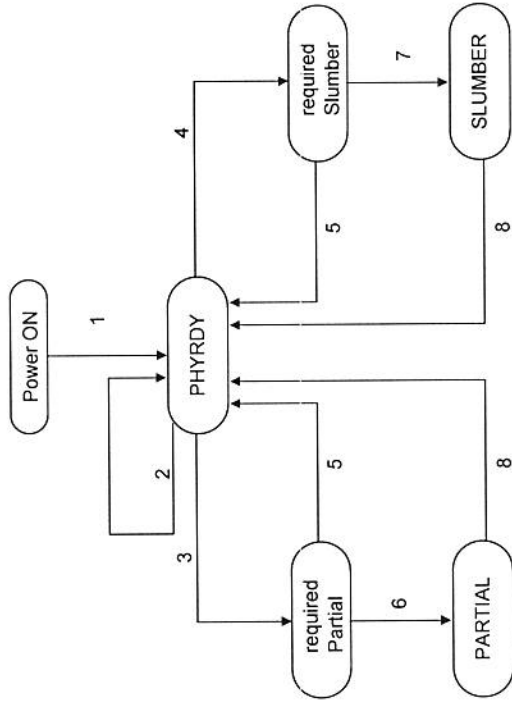
The Phy logic of SATA interface is powered, but is in a reduced power state.  
Power dissipation in this mode is less than the PARTIAL mode.  
The exit latency from this state shall be no longer than 10 ms.

| Model Number : UJ8E0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | PAGE<br>14 / 29 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------|
| 12. Serial ATA Features (continue)<br>12-3 HIPM( Host Initiated link Power Management )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                 |
| <p>HIPM is a method which controls Serial ATA interface power states by host controller. Logical Unit supports this feature. Host shall issue IDENTIFY PACKET DEVICE before initiate power management transition requests, and check the response data whether HIPM is supported or not.</p> <p>12-4. HIPM State Changes</p>                                                                                                                                                                                                                                                                         |  |                 |
| <pre> graph TD     PowerON([Power ON]) -- 1 --&gt; PHYRDY([PHYRDY])     PHYRDY -- 2 --&gt; reqPartial([required Partial])     PHYRDY -- 3 --&gt; reqSlumber([required Slumber])     reqPartial -- 4 --&gt; PARTIAL([PARTIAL])     reqSlumber -- 4 --&gt; SLUMBER([SLUMBER])     PARTIAL -- 5 --&gt; PARTIAL     PARTIAL -- 7 --&gt; SLUMBER     SLUMBER -- 6 --&gt; SLUMBER     </pre>                                                                                                                                                                                                               |  |                 |
| <p>1: A power-on or hard reset always returns the Interface Power State to the PHYRDY state from any state.</p> <p>2: In the case of required Partial, the drive receive PMREQ_P from host.</p> <p>3: In the case of required Slumber, the drive receive PMREQ_S from host.</p> <p>4: If the drive issues PMNAK, the status changes into PHYRDY.</p> <p>5: If the drive issues PMACK, the status changes into PARTIAL.</p> <p>6: If the drive issues PMACK, the status changes into SLUMBER.</p> <p>7: If the drive or host issues COMWAKE(or COMRESET/COMINIT), the status changes into PHYRDY.</p> |  |                 |

12. Serial ATA Features (continue)  
12-5. DIPM ( Device Initiated link Power Management )

DIPM is a method which controls Serial ATA interface power states by the Logical Unit. The Logical Unit has internal timers, Partial Timer and Slumber Timer , and the timer provide for the Logical Unit to change Interface Power State without direct HOST request. The disabled/enabled of DIPM can be switched by using SET FEATURE command.

12-6. DIPM State Changes



- 1: A power-on or hard reset always returns the Interface Power State to the PHYRDY state from any state.
- 2: If the drive received command, the drive keep PHYRDY state and resets the Partial/Slumber Timer.
- 3: If the drive is set DIPM Enable and the Partial timer reaches zero, the drive issues PMREQ\_P.
- 4: If the drive is set DIPM Enable and the Slumber timer reaches zero, the drive issues PMREQ\_S.
- 5: If the drive received PMNAK from Host, the status changes into PHYRDY.
- 6: If the drive received PMACK from Host, the status changes into PARTIAL.
- 7: If the drive received PMACK from Host, the status changes into SLUMBER.
- 8: If the drive or host issues COMWAKE(or COMRESET/COMINIT), the status changes into PHYRDY. If the drive changes Interface Power State from PARTIAL to SLUMBER, the drive issues COMWAKE to enter PHYRDY state. And then, the drive requests to change the state into SLUMBER

12. Serial ATA Features (continue)  
12-7. AN ( Asynchronous Notification )

Asynchronous notification is a mechanism for a device to send a notification to the host that the device requires attention. A few examples of how this mechanism could be used include indicating media has been inserted in an device.

12-8. SSP ( Software Setting Preservation )

When a device is enumerated, software configures the device using SET FEATURES and other commands. These software settings are often preserved across software reset but not necessarily across COMRESET. In Parallel ATA, only commanded hardware resets may occur, thus legacy mode software only reprograms settings that are cleared for the particular type of reset it has issued. In Serial ATA, COMRESET is equivalent to hardware reset and a noncommanded COMRESET may occur if there is an asynchronous loss of signal. Since COMRESET is equivalent to hardware reset, in the case of an asynchronous loss of signal some software settings may be lost without legacy mode software knowledge. In order to avoid losing important software settings without legacy mode driver knowledge, the software settings preservation ensures that the value of important software settings is maintained across a COMRESET. Software settings preservation may be enabled or disabled using SET FEATURES with a subcommand code of 06h. The feature is enabled by default.

The software settings that is preserved across COMRESET are listed below.  
SET FEATURES (Set Transfer Mode): PIO, Multiword, and UDMA transfer mode settings established by the SET FEATURES command with subcommand code of 03h.

12-9. SSC ( Spread Spectrum Clocking )

The technique of modulating the operating frequency of a signal slightly to spread its radiated emissions over a range of frequencies. This reduction in the maximum emission for a given frequency helps meet radiated emission requirements.

13. Spindle Control  
13-1. Normal disc

| Disc Type                | Sector Format                        | CD-ROM/CD-R    | CD-RW          | CD-R         | CD-RW        |
|--------------------------|--------------------------------------|----------------|----------------|--------------|--------------|
| Audio Only Disc          | CD-DA (Data read)<br>(Auto play)     | Closed Session | Closed Session | Open Session | Open Session |
|                          |                                      | Max 20X CAV    | Max 20X CAV    | 8X CLV       | 8X CLV       |
|                          |                                      | Max 12X CAV    | Max 12X CAV    | -            | -            |
| Data Only Disc           | Mode1/Mode2Form1<br>(CD-ROM PhotoCD) | Max 24X CAV    | Max 24X CAV    | 8X CLV       | 8X CLV       |
|                          | Mode2Form2<br>(VideoCD)              | Max 20X CAV    | Max 20X CAV    | 8X CLV       | 8X CLV       |
| Mixed disc<br>(CD-extra) | Mode1/Mode2Form1                     | Max 24X CAV    | Max 24X CAV    | 8X CLV       | 8X CLV       |
|                          | Mode2Form2                           | Max 20X CAV    | Max 20X CAV    | 8X CLV       | 8X CLV       |
|                          | CD-DA (Data read)<br>(Audio play)    | Max 20X CAV    | Max 20X CAV    | 8X CLV       | 8X CLV       |
|                          | Data Read                            | Max 12X CAV    | Max 12X CAV    | 4X CLV       | 4X CLV       |

| Disc type           | Condition | Spindle control |             | Remark |
|---------------------|-----------|-----------------|-------------|--------|
|                     |           | 12cm media      | 8cm media   |        |
| DVD-ROM Single      | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-ROM Dual        | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-Video           | Data Read | Max 4X CAV      | Max 4X CAV  |        |
| DVD-R (4.7G)        | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-R DL            | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-RW (Ver1.1/1.2) | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-R               | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-R DL            | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-RW              | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-RAM             | Data Read | Max 3X-5X PCAV  | Max 2X ZCLV |        |

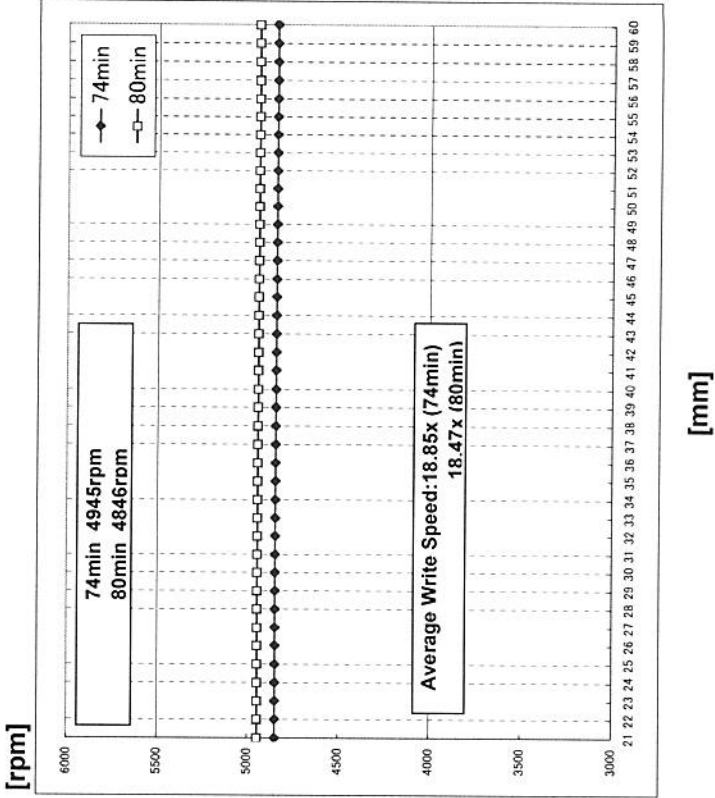
13-2. Spindle motor control  
(1) at playing CD-ROM

| Linear Velocity | at 24XCAV | at 12XCAV | Remarks                                                 |
|-----------------|-----------|-----------|---------------------------------------------------------|
| 1.2m/s < 1.3m/s | 4979 rpm  | 2490 rpm  | at 1.2m/s<br>proportion to linear velocity (1.2~1.3m/s) |
| 1.3m/s          | 5413 rpm  | 2697 rpm  | more than 1.3m/s                                        |

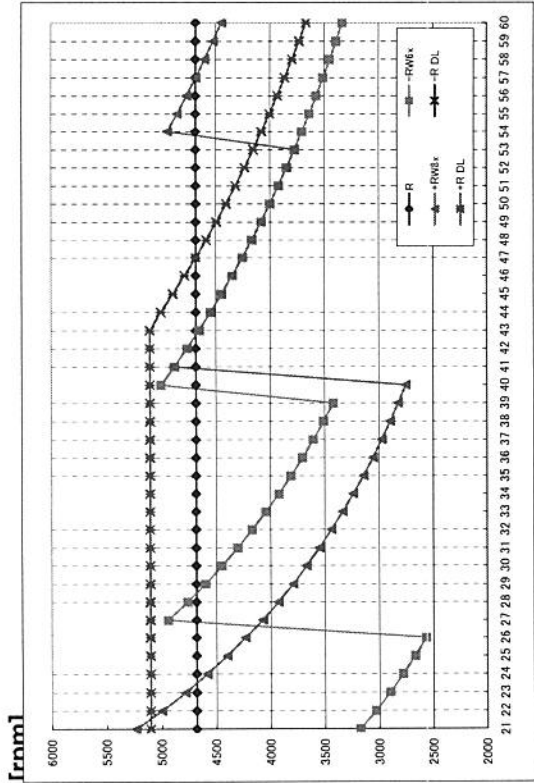
(2) at playing DVD-ROM

| Disc         | at 2.5XCAV | at 4XCAV | at 6XCAV | at 8XCAV |
|--------------|------------|----------|----------|----------|
| Single layer | 1480 rpm   | 2369 rpm | 3551 rpm | 4735 rpm |
| Dual layer   | 1628 rpm   | 2605 rpm | 3907 rpm | 5210 rpm |

(3) CD-R Write (Max 24XCAV)



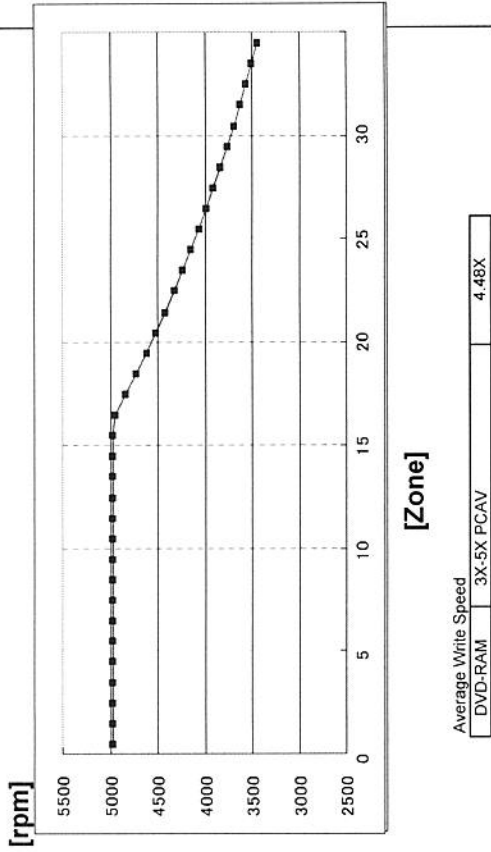
(4) DVD±R Write ( Max.8X CAV ) DVD-RW ( Max.6X ZoneCLV )  
DVD+RW Write ( Max.8X Zone CLV ) , DVD±R DL Write (Max.6X PCAV)



[mm]

| Average Write Speed |                 |
|---------------------|-----------------|
| DVD-R               | 8X CAV          |
| DVD+R               | 8X CAV          |
| DVD-RW              | 2X-4X-6X ZCLV   |
| DVD+RW              | 3.3X-6X-8X ZCLV |
| DVD-R DL            | 3.3X-6X PCAV    |
| DVD+R DL            | 3.3X-6X PCAV    |
|                     | 5.8X            |
|                     | 5.8X            |
|                     | 4.86X           |
|                     | 4.78X           |
|                     | 5.37X           |
|                     | 5.37X           |

(5) DVD-RAM(Max.3x-5x Partial CAV)



[Zone]

| Average Write Speed |            |
|---------------------|------------|
| DVD-RAM             | 3X-5X PCAV |
|                     | 4.48X      |

14. Dimension  
Refer to the following pages.
15. Notes
- a) This pickup is precisely assembled at our specialized assembly line. Please be requested not to disassemble or adjust this pickup.

b) Storage

1) Keep away from hot and high humidity environment.

2) Store them under the condition of not receiving abnormal shock from outside, by having static and dust protecting measures.

3) Keep the dust cover for the protection from dust.

c) Handling

1) Keep away from strong shock such as dropping.

2) Never touch objective lens.

3) Be careful not to be dusted on the objective lens.

4) In case, dust is on the objective lens, sweep away the dust with clean air.

5) Worker involved should be secured with "ground".

6) Workshop and tool must be grounded securely.

7) Never be so close with magnetic material since actuator portion holds strong magnet circuit. ( Iron dust, screws, iron-pins in driving area cause problems )

8) Don't push the cover of the Drive.

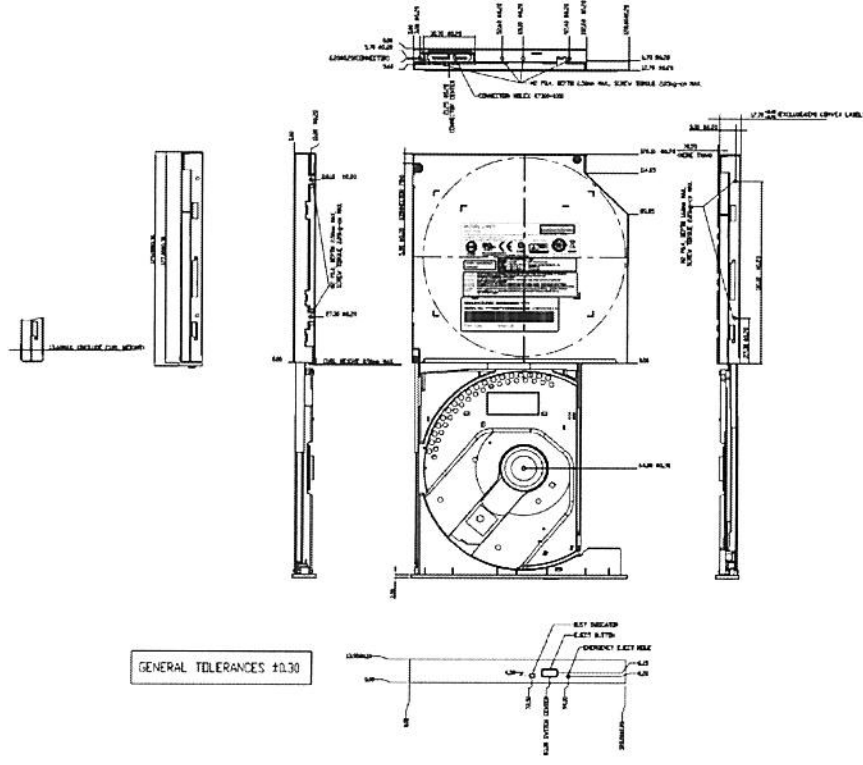
9) Fragile. Handle with care.

d) Installation of a drive  
Torque for tightening screws must be equal to or less than 0.2Nm(2kgf-cm).when a drive is fixed with,
- KOK-B3-001-T6 Issue 5Panasonic Precision Devices Co.,Ltd
- Model Number : UJ8E0ADPS2-B

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16. Information for Laser / UJ8E0 series
- Information For the User
- This product utilizes a laser.  
CAUTION : Use of control, adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.  
Do not open covers and do not repair yourself. Refer servicing to qualified personnel.
- Laser properties of the Drive  
Laser Class Class 1 (HHS and IEC 60825-1)  
Wavelength for CD 785 nm  
for DVD 661 nm
- Location of Labeling
- A top-down view of a rectangular drive unit. A rectangular label is affixed to the center of the unit. A line points from the 'Location of Labeling' text to the label. The label contains various safety and technical markings, including CE, a laser warning symbol, and text in multiple languages.
- CAUTION CLASS 3B VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO THE BEAM.  
ATTENTION CLASSE 3B RAYONNEMENT LASER VISIBLE ET INVISIBLE CAS DOUVRETURE.  
VORSICHT KLASSE 3B SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG. WENN ABDECKUNG GEÖFFNET.  
ADVARSEL KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING. UNDGÅ UDSETTELSE FOR STRÅLING.  
ADVARSEL KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING NÅR DENSEL ÅPNES. UNNGÅ EKSPONERING FOR STRÅLEN.  
VARNING KLASSE 3B SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STRÅLEN ÄR FÄRLIG.  
VARO! LUOKAN 3B NÄKYVÄLLÄ JA NÄKYMÄTTÖMÄLLÄ LASERSÄTEYLLE.  
AVATTIÄESSÄ OLET ALTITINA LUOKAN 3B NÄKYVÄLLÄ JA NÄKYMÄTTÖMÄLLÄ LASERSÄTEYLLE.  
注意 通和秋 警告 存在 3B 类可见及不可见激光辐射危险 请勿直视激光束
- KOK-B3-001-T6 Issue 5Panasonic Precision Devices Co.,Ltd

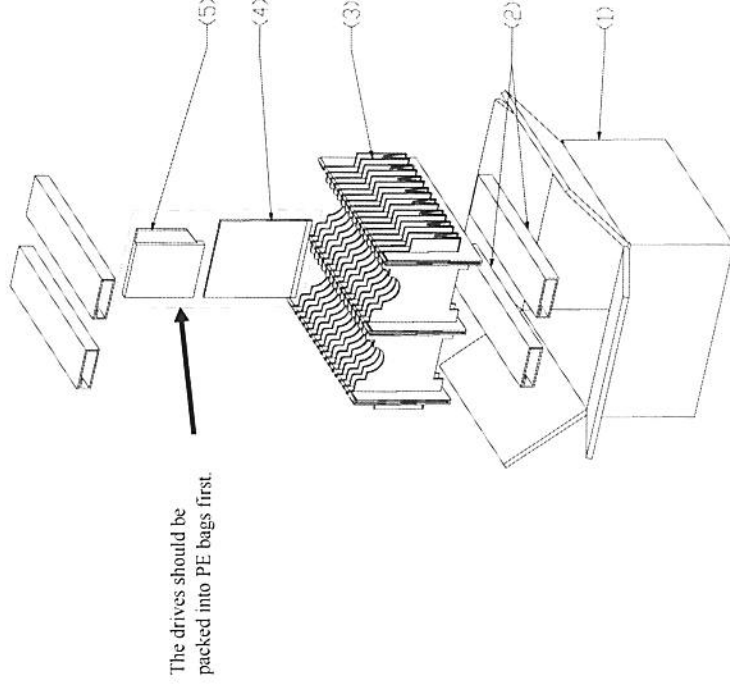
## 17. Drive Circuit (MD/DA)

### 1. Outline

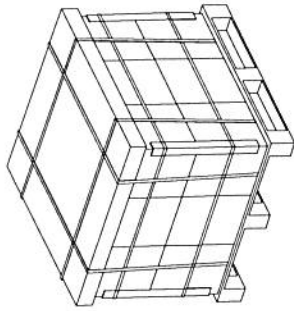


### 2. Packing Specification

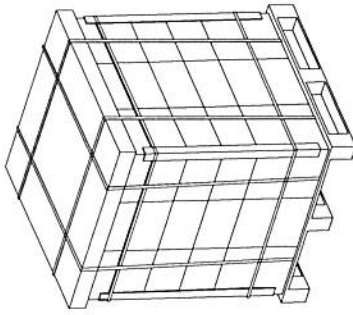
- 2-1. Carton Box
- Outline of carton: 352 mm (L) \* 342 mm (W) \* 196 mm(H)
- 30 drives in one package
- G.W. per package: 5.75 kg
- (1) Carton
- (2) Cushion bottom: 2 set per carton
- (3) Cushion: 1 set per carton
- (4) PE bag: 30 sets per carton
- (5) Optical Drive: 30 sets per carton
- (6) Cushion top: 2 sets per carton



2-1. Shipping Pallet

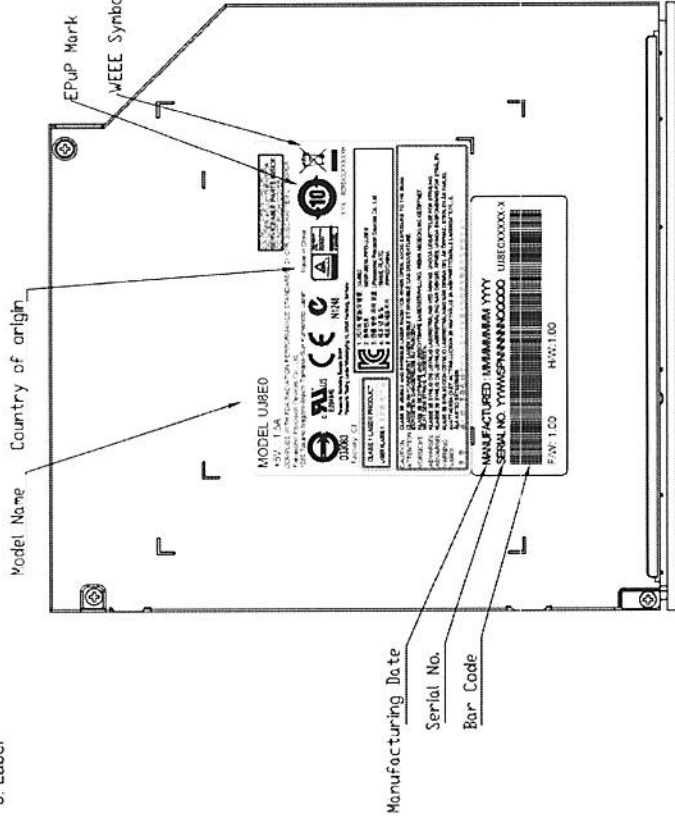


Outline of Sea PALLET  
1.10 m (L) \* 1.10 m (W) \* 0.95m (H)  
1080 drives in one PALLET  
G.W. per PALLET: 240 kg



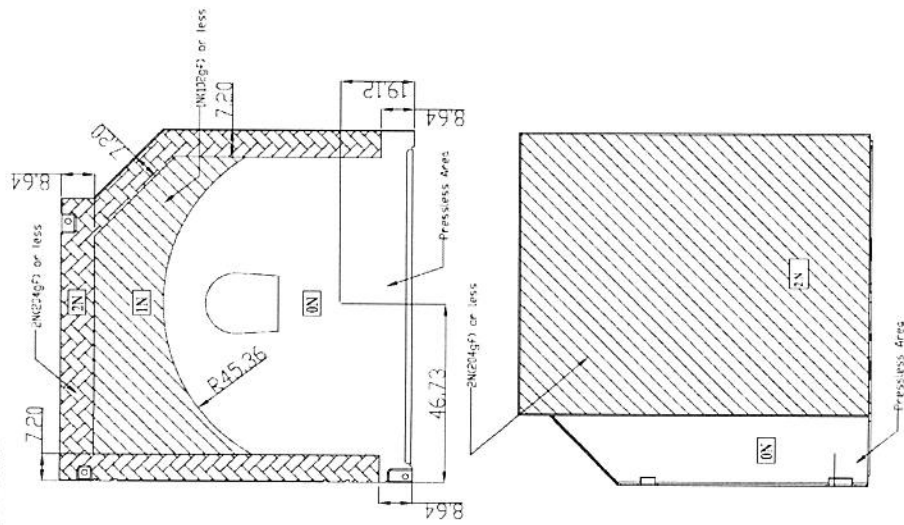
Outline of AIR PALLET  
1.10 m (L) \* 1.10 m (W) \* 1.35m (H)  
1620 drives in one PALLET  
G.W. per PALLET: 346 kg

3. Label



Model Number : UJ8E0ADPS2-B

#### 4. Loading Specification







| Model Number : UJ8C0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PAGE<br>3 / 31 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <p style="text-align: center;"><u>Contents</u></p> <p>1. Applications</p> <p>2. Features</p> <p>3. Write Speed</p> <p>4. Specifications</p> <p>5. Appearance</p> <p>6. Reliability</p> <p>7. Safety</p> <p>8. Shock/Vibration</p> <p>9. Life</p> <p>10. Interface</p> <p>11. Power Management</p> <p>12. Serial ATA Features</p> <p>13. Spindle Control</p> <p>14. Dimension</p> <p>15. Notes</p> <p>16. Information for Laser</p> <p>17. Drive Circuit (MD/DA)</p> <p>18. Attached Sheets</p> |                |

| Model Number : UJ8C0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | PAGE<br>4 / 31 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <p>1. Applications</p> <p>a) This specification describes the general specs and performance of DVD Multi Drive UJ8C0.</p> <p>b) In case major modification to improve performance and in the event that the device does not perform as specified, the stipulation requires that modification and solution should be made with mutual discussion, following the stipulations stated in this specification.</p> <p>c) Some components which are different in appearance and performance may be mixedly used owing to multiple sourcing and owing to common use with different models caused by decreased production quantity.</p> <p>d) Product to be marked which is compatible HHS Class 1 Standard in the USA.</p> <p>e) In the process of manufacturing of the products including packaging, any materials related ozone destructive items are not used at all.</p> <p>f) PPRD in this document stands for Panasonic Precision Devices Co., Ltd.</p> <p>g) Special clause.<br/>We will endeavor to do our best for maintaining the control of quality, however,</p> <p>1) We want you to confirm the safety of the product in which PPRD product is incorporated.<br/>If there is a problem with our product, be requested to advice the problem before shipment to the market.<br/>:Be requested to do the test for confirmation of the product which installs PPRD product, following applicable rules and regulations.<br/>:Be requested to confirm the safety from abnormal usage under the condition installed.<br/>:Be requested to confirm the safety for reliable test under the condition installed.</p> <p>2) Be requested to provide necessary information how to use and how to install to the customers with the expectation that minimize unexpected accident from unexplained specification in this stipulation.</p> <p>3) In case, owing to the quality problem from this product, if there is a possibility to endanger the life of the user or property, please be requested to take double safety counter-measures by having enough tolerance over the assured specification and performance stated in this spec. from the point of product liability issue.</p> <p>4) Transcription and duplication of this document without prior consent is prohibited.</p> <p>5) Our trademark "Panasonic" shall not be printed on any products according to our mutual consultation between customer and Panasonic.</p> |                |

| Model Number : UJ8C0ADPS2-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | PAGE<br>5 / 31 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------|
| <p>2. Features</p> <p>1) Built-in Type for PC</p> <p>2) Read speed<br/>DVD-ROM :Max 8X CAV<br/>CD-ROM :Max 24X CAV</p> <p>3) Maximum Write speed<br/>CD-R :Max 24X Zone CLV<br/>CD-RW :4X CLV<br/>High Speed CD-RW :10XCLV<br/>Ultra Speed CD-RW :Max 16X Zone CLV<br/>DVD-R :Max 8X CAV<br/>DVD-R DL :Max 6X Zone CLV<br/>DVD-RW :Max 8X Zone CLV<br/>DVD+R :Max 8X CAV<br/>DVD+R DL :Max 6X Zone CLV<br/>DVD+RW :Max 8X Zone CLV<br/>DVD-RAM :3X-5X PCAV ( 4.7GB)</p> <p>4) Support Buffer Underrun Free Recording</p> <p>5) Single +5V Power Supply</p> <p>6) The media for write check<br/>CD-R :TAIYO YUDEN Co.,Ltd., Mitsubishi Kagaku Media Co., Ltd.,<br/>CD-RW :Mitsubishi Kagaku Media Co., Ltd.<br/>HS CD-RW :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD-R :TAIYO YUDEN Co., Ltd.<br/>DVD-R DL :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD-RW :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD+R :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD+R DL :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD+RW :Mitsubishi Kagaku Media Co., Ltd.<br/>DVD-RAM :Panasonic Corporation.</p> <p>7) Access Speed<br/>DVD-ROM SL 180ms (Typ.) (Random)<br/>CD-ROM 150ms (Typ.) (Random)</p> <p>3. Write Speed<br/>The drive adjusts the write speed to the disc characteristics.<br/>The optimal write speed to the disc may not be the maximum write speed.</p> |  |                |

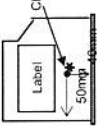
Model Number : UJ8C0ADPS2-B

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4. Specifications

| NO  | Item                                                                                                                                                                                                                 | Specification                                                                                                                                                                                                                                                                                                                                                                                                                 | Condition                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 4-1 | Power Supply<br>1. Operating Voltage<br>2. Power Consumption                                                                                                                                                         | DC 5 V +/- 0.25V<br>Peak<br>1600 mA (Max.)<br><br>Read (CD)<br>1100 mA (typ.)<br>Read (DVD)<br>950 mA (typ.)<br>Write<br>1350 mA (typ.)<br>Standby<br>50 mA (typ.)                                                                                                                                                                                                                                                            | Except inrush current<br>(Less than 1ms)<br>CD(TCD-002)<br>DVD(KME-DVD001)<br>CD-R/DVD-RMax. Write<br>Slumber mode |
|     | 3. Ripple                                                                                                                                                                                                            | 100 mVp-p Max.                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                    |
| 4-2 | Drive<br>1. Transfer Rate<br>(1) Read<br>DVD-ROM<br>CD-ROM<br>(2) Write<br>CD-R<br>CD-RW<br>HS-RW<br>US-RW<br>CD 8cm media<br>DVD-R<br>DVD-R DL<br>DVD-RW<br>DVD+R<br>DVD+R DL<br>DVD+RW<br>DVD-RAM<br>DVD 8cm media | MAX 8X CAV (MAX 10800 kB/s)<br>MAX 24X CAV (MAX 3600 kB/s)<br><br>8X (CLV) , MAX 24X (CAV)<br>4X (CLV)<br>10X (CLV)<br>24x (CLV)<br>4xCLV<br>2X(CLV),MAX.4x,6x,8X (ZCLV), 8X(CAV)<br>2X (CLV) ,MAX.3.3x-6X (PCAV)<br>1X, 2X (CLV) ,MAX.4X, 6X (ZCLV)<br>2.4X(CLV),MAX.4x,6x,8X(ZCLV),8X(CAV)<br>2.4X (CLV) ,MAX.3.3x-6X (PCAV)<br>2.4X(CLV) , MAX.4x, 6x, 8x(ZCLV)<br>2X, 3X(CLV) , 3x-5x(PCAV)<br>2X(CLV), 2.4X(CLV), 3x RAM | DVD-R for General<br><br><br><br><br><br><br><br><br><br><br><br><br>4.7 / 9.4 GB                                  |
|     | (3) SATA Interface                                                                                                                                                                                                   | 150 Mbyte/s                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |
|     | 2. Buffer Memory                                                                                                                                                                                                     | 0.75MB                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                    |
|     | 3. Error Rate<br>(1) CD-ROM(with ECC)<br>(without ECC)<br>(2) DVD-ROM                                                                                                                                                | less than 10 <sup>-12</sup> bit<br>less than 10 <sup>-9</sup> bit<br>less than 10 <sup>-12</sup> bit                                                                                                                                                                                                                                                                                                                          | <Access Time><br>using PPRD's original test<br>program                                                             |
|     | 4. Access Time                                                                                                                                                                                                       | DVD-ROM 190 ms typ.(Random)<br>CD-ROM 180 ms typ.(Random)                                                                                                                                                                                                                                                                                                                                                                     | DVD(KMEDVD001)<br>CD(TCD-002)                                                                                      |
|     | 5. Start up Time                                                                                                                                                                                                     | less than 15s                                                                                                                                                                                                                                                                                                                                                                                                                 | Except Multi Session<br>and Writable Media                                                                         |
|     | 6. Stop Time                                                                                                                                                                                                         | less than 6s                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                    |
|     | 7. Acoustic Noise                                                                                                                                                                                                    | less than 50 dBA                                                                                                                                                                                                                                                                                                                                                                                                              | ISO/JIS7779 (ANSI)                                                                                                 |
|     | 8. Regional Code                                                                                                                                                                                                     | "None"                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                    |
|     | 9. Inquiry Data                                                                                                                                                                                                      | "DVD-RAM UJ8C0"                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |

| Model Number : UJ8C0ADPS2-B |                        |                                                                                                                                                                                                                                                                                                                                                                                                                           | PAGE                                                                                  |
|-----------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                             |                        |                                                                                                                                                                                                                                                                                                                                                                                                                           | 7 / 31                                                                                |
| 4. Specification (continue) |                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                             | Condition                                                                             |
| 4-3                         | Applicable disc        | C.D: CD-ROM(12cm,8cm)<br>CD-R,CD-RW<br>DVD: DVD-ROM,DVD-R,DVD+R DL<br>DVD-RAM,DVD-RW<br>DVD+R, DVD+R DL,DVD+RW                                                                                                                                                                                                                                                                                                            | Except abnormal shaped Disc                                                           |
| 4-4                         | Applicable disc format | CD: CD-DA,CD-ROM,CD-ROM XA<br>PhotoCD(multiSession)<br>Video CD,CD-Extra(CD+),CD-text<br>Hybrid SACD<br>DVD: DVD-VIDEO, DVD-ROM,<br>DVD-R(4.7GB),<br>DVD-RW(Ver.1.1/1.2), DVD-RAM<br>DVD+R, DVD+R DL, DVD+RW<br>DVD-R DL(Format1/4)                                                                                                                                                                                       | CD Layer only<br><br>Format 1/4 Write support                                         |
| 4-5                         | Slope                  | Horizontal (15degree ; Any direction)                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |
| 4-6                         | Dimensions, Weight     | 128 x 129 x 12.7 mm (W x D x H)<br>(except protrusion)<br>155g +/- 10g                                                                                                                                                                                                                                                                                                                                                    | Upper cover-AL<br>Bottom cover-AL                                                     |
| 4-7                         | Eject                  | Soft Eject (with emergency eject hole)                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
| 5. Appearance               |                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                             | Condition                                                                             |
| 5-1                         | Appearance             | - Any remarkable scratches, stains, sink mark, haze and burrs<br>which degrade cosmetic are not allowed.<br>- We may not accept it as custom components except front bezel.<br>- No discoloration is allowed.<br>- No contamination or objection lens or pick-up cover are allowed.<br>- Marginal one will be judged by limitation samples which mutually<br>agreed by both parties.<br>- Front bezel Green LED indicator |                                                                                       |
| 6. Reliability              |                        |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |
| NO                          | Item                   | Specification                                                                                                                                                                                                                                                                                                                                                                                                             | Condition                                                                             |
| 6-1                         | Temperature            | Operating guarantee : 5 to 50°C<br>Non operating : -20 to 60°C<br><br>Recommended position of temperature measurement<br>in the case drive is built in to the PC.<br>(at the point *** in the right figure)<br>Operating guarantee temperature : 55°C                                                                                                                                                                     |  |
| 6-2                         | Humidity               | Operating guarantee : 10 to 80% RH<br>Non operating : 5 to 90% RH                                                                                                                                                                                                                                                                                                                                                         | The maximum wet-bulb<br>temperature is 31°C                                           |
| 6-3                         | MTBF                   | 60,000h (Duty : 20 %)                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |
| 6-4                         | MTTR                   | 30min                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |

| Model Number : UJ8C0ADPS2-B                                                                                                                                                                                                                           |                                                                                                                                      |                                                                                                                                                                                                                                                               | PAGE                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
|                                                                                                                                                                                                                                                       |                                                                                                                                      |                                                                                                                                                                                                                                                               | 8 / 31                                                         |
| 7. Safety                                                                                                                                                                                                                                             |                                                                                                                                      |                                                                                                                                                                                                                                                               |                                                                |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                 | Specification                                                                                                                                                                                                                                                 | Condition                                                      |
| 7-1                                                                                                                                                                                                                                                   | Safety                                                                                                                               | UL / cUL (UL 60950-1<br>/ CSA C22.2 No. 60950-1)<br>TUV (EN 60950-1)<br>CE Marking (EMC Directive 2004/108/EC)<br>EN 55022<br>EN 55024                                                                                                                        | Rated voltage : 5.0V<br>Rated current : 1.6A                   |
| 7-2                                                                                                                                                                                                                                                   | EMC                                                                                                                                  |                                                                                                                                                                                                                                                               |                                                                |
| 7-3                                                                                                                                                                                                                                                   | LASER                                                                                                                                | 21 CFR Subchapter J (Class 1 laser product)<br>IEC 60825-1/EN 60825-1 (Class 1 laser product)                                                                                                                                                                 |                                                                |
| <b>Note</b> : This model is compliant to HHS and EN60825-1 as Class 1 Laser, so information of laser must be presented in user instruction or operation manual which is supplied to end user.<br>Information for laser : Refer to the attached sheet. |                                                                                                                                      |                                                                                                                                                                                                                                                               |                                                                |
| 8. Shock/Vibration                                                                                                                                                                                                                                    |                                                                                                                                      |                                                                                                                                                                                                                                                               |                                                                |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                 | Specification                                                                                                                                                                                                                                                 | Condition                                                      |
| 8-1                                                                                                                                                                                                                                                   | Shock                                                                                                                                |                                                                                                                                                                                                                                                               | CD-DA<br>CD-ROM/DVD-ROM/BD-ROM<br>possibility of retry at read |
|                                                                                                                                                                                                                                                       | 1. Operating : Read<br>2. Non Operating : Write                                                                                      | 19.6m/s <sup>2</sup> (2.0 G) (11ms X,Y,Z) : CD-DA<br>58.8m/s <sup>2</sup> (6.0 G) (11ms X,Y,Z) : CD-ROM/DVD-ROM/BD-ROM<br>4.9m/s <sup>2</sup> (0.5 G) ( 11ms X,Y,Z)<br>588m/s <sup>2</sup> (60.0 G) (11ms X,Y,Z)<br>1960m/s <sup>2</sup> (200 G) ( 2ms X,Y,Z) |                                                                |
| 8-2                                                                                                                                                                                                                                                   | Vibration                                                                                                                            |                                                                                                                                                                                                                                                               |                                                                |
|                                                                                                                                                                                                                                                       | 1. Operation : Read<br>2. Non Operating : Write                                                                                      | 1.96m/s <sup>2</sup> (0.2 G) ( 5 ~ 500Hz )<br>0.98m/s <sup>2</sup> (0.1 G) ( 5 ~ 500Hz )<br>19.6m/s <sup>2</sup> (2.0 G) (10 ~ 500Hz X,Y,Z 2h )                                                                                                               |                                                                |
| 9. Life                                                                                                                                                                                                                                               |                                                                                                                                      |                                                                                                                                                                                                                                                               |                                                                |
| NO                                                                                                                                                                                                                                                    | Item                                                                                                                                 | Specification                                                                                                                                                                                                                                                 | Condition                                                      |
| 9-1                                                                                                                                                                                                                                                   | Life                                                                                                                                 |                                                                                                                                                                                                                                                               |                                                                |
|                                                                                                                                                                                                                                                       | 1. Laser (at 25°C)<br>2. Spindle Motor<br>3. Feed Motor<br>4. FPC (Feed Motor)<br>5. Disc Insertion<br>6. Eject Button<br>7. Loading | 2000 h<br>3000 h<br>250,000 times<br>current alteration within 30 % from initial<br>250,000 times<br>current alteration within 30 % from initial<br>10,000 times<br>10,000 times<br>10,000 times                                                              |                                                                |

10. Interface  
10-1. Connector  
(1) Connector layout



Back side view

(2) Connector pin assignment

| Interface description (signal) |        |
|--------------------------------|--------|
| Pin                            | Signal |
| S1                             | Gnd    |
| S2                             | A+     |
| S3                             | A-     |
| S4                             | Gnd    |
| S5                             | B-     |
| S6                             | B+     |
| S7                             | Gnd    |

| Interface description (power) |        |
|-------------------------------|--------|
| Pin                           | Signal |
| P1                            | DP     |
| P2                            | +5V    |
| P3                            | +5V    |
| P4                            | MD/DA  |
| P5                            | Gnd    |
| P6                            | Gnd    |

\*1 : See 23/31 page

DC Characteristics

| Parameter                            | Signal Level |     |     |
|--------------------------------------|--------------|-----|-----|
|                                      | min          | typ | max |
| Signal Detection Threshold (mV)      | 50           | 100 | 200 |
| Tx Differential Output Voltage (mV)  | 400          | 500 | 600 |
| Rx Differential Input Voltage (mV)   | 325          | 400 | 600 |
| Tx Pair Differential Impedance (ohm) | 85           | 100 | 115 |
| Rx Pair Differential Impedance (ohm) | 85           | 100 | 115 |

10. Interface (continue)  
10-2. SATA command

Packet Commands Supported by Drives

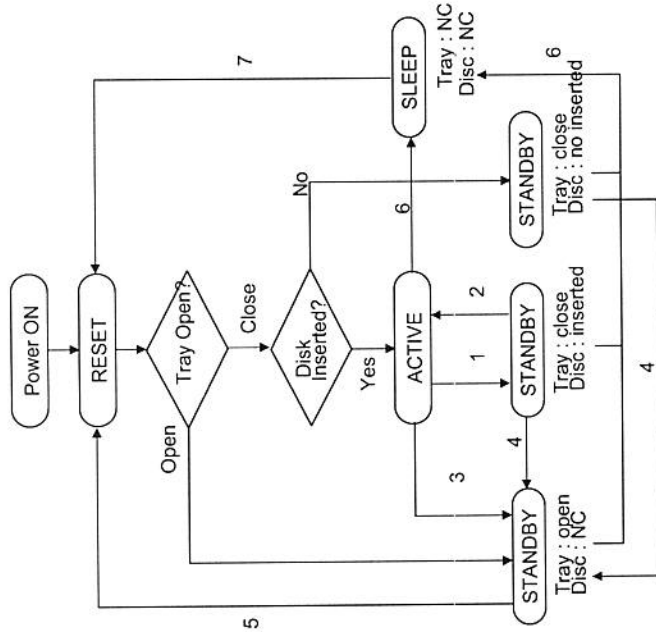
|     |                                |      |                                  |
|-----|--------------------------------|------|----------------------------------|
| 00h | TEST UNIT READY                | 53h  | RESERVE TRACK/RZONE              |
| 01h | REZERO UNIT                    | 54h  | SEND OPC INFORMATION             |
| 03h | REQUEST SENSE                  | 55h  | MODE SELECT(10)                  |
| 04h | FORMAT UNIT                    | 56h  | REPAIR RZONE                     |
| 08h | READ(6)                        | 5Ah  | MODE SENSE(10)                   |
| 0Ah | WRITE(6)                       | 5Bh  | CLOSE TRACK/RZONE/SESSION/BORDER |
| 0Bh | SEEK(6)                        | 5Ch  | READ BUFFER CAPACITY             |
| 12h | INQUIRY                        | 5Dh  | SEND CUE SHEET                   |
| 15h | MODE SELECT(6)                 | A1h  | BLANK                            |
| 1Ah | MODE SENSE(6)                  | A3h  | SEND KEY                         |
| 1Bh | START/STOP UNIT                | A4h  | REPORT KEY                       |
| 1Eh | PREVENT/ALLOW MEDIUM REMOVAL   | A5h  | PLAY AUDIO(12)                   |
| 23h | READ FORMAT CAPACITIES         | A7h  | SET READ AHEAD                   |
| 25h | READ CAPACITY                  | A8h  | READ(12)                         |
| 28h | READ(10)                       | AAh  | WRITE(12)                        |
| 2Ah | WRITE(10)                      | ACH  | GET PERFORMANCE                  |
| 2Bh | SEEK(10)                       | ADh  | READ DVD STRUCTURE               |
| 2Eh | WRITE AND VERIFY(10)           | AEnh | WRITE AND VERIFY(12)             |
| 2Fh | VERIFY(10)                     | AFh  | VERIFY(12)                       |
| 35h | FLUSH (SYNCHRONIZE) CACHE      | B6h  | SET STREAMING                    |
| 37h | READ DEFECT DATA               | B9h  | READ CD MSF                      |
| 38h | WRITE BUFFER                   | BAh  | SCAN                             |
| 3Ch | READ BUFFER                    | BBh  | SET CD SPEED                     |
| 42h | READ SUB-CHANNEL               | BDh  | MECHANISM STATUS                 |
| 43h | READ TOC/PMMA/TIP              | BEh  | READ CD                          |
| 44h | READ HEADER                    | BFh  | SEND DVD STRUCTURE               |
| 45h | PLAY AUDIO(10)                 | E8h  | READ MICROCODE                   |
| 46h | GET CONFIGURATION              | EAh  | WRITE MICROCODE                  |
| 47h | PLAY AUDIO MSF                 | F5h  | SYNCHRONIZE MICROCODE            |
| 4Ah | GET EVENT /STATUS NOTIFICATION |      |                                  |
| 4Bh | PAUSE/RESUME                   |      |                                  |
| 4Eh | STOP PLAY/SCAN                 |      |                                  |
| 51h | READ DISC INFORMATION          |      |                                  |
| 52h | READ TRACK/RZONE INFORMATION   |      |                                  |

ATA Commands Supported by Drives

|     |                           |     |                   |
|-----|---------------------------|-----|-------------------|
| E5h | CHECK POWER MODE          | 00h | NOP               |
| 08h | DEVICE RESET              | A0h | PACKET            |
| 90h | EXECUTE DEVICE DIAGNOSTIC | EFh | SET FEATURES      |
| A1h | IDENTIFY PACKET DEVICE    | E6h | SLEEP             |
| E1h | IDLE IMMEDIATE            | E0h | STANDBY IMMEDIATE |

Model Number : UJ8C0ADPS2-B

11. Power Management  
11-1. Status Changes



\* Electrical status in a drive is same at STANDBY 1,2,3

- 1: At first host executes reset sequence after power is supplied. If a disc is attached and a tray is closed, the drive status becomes ACTIVE Mode. And next If host doesn't execute command for certain time(default 30 sec) a disc stops, and changes STANDBY Mode. In the case of receiving ATAPI command(Standby Immediate),the drive status changes STANDBY Mode soon.
- 2: In the case of STANDBY Mode at the status that a disc is attached and a tray is closed, if the drive receives command from host, the drive status changes ACTIVE Mode soon.
- 3: In the case of ACTIVE Mode, a disc is stopped and a tray is opened by ATAPI eject command or pushing eject button at front bezel. And next the drive status change STANDBY Mode again.

Model Number : UJ8C0ADPS2-B

11. Power Management (continue)  
11-1. Status Changes (continue)

- 4: In the case of STANDBY Mode, a disc is stopped and a tray is opened by ATAPI eject command or pushing eject button at front bezel. And next the drive status change STANDBY Mode again.
- 5: In the case of STANDBY Mode at the status that a tray is opened, this drive executes reset sequence by closing a tray. And next If a disc is attached, the drive spin a disc and changes ACTIVE Mode.
- 6: In the case of ACTIVE or STANDBY mode, this drive goes into Sleep mode immediately after receiving of Sleep Command.  
The only way to recover from SLEEP mode is with a software reset or hardware reset.
- 7: The drive status can recover by hard or soft reset(in the case of SSP disable).  
And next the drive status becomes the same sequence with reset status.
- 8: In the case of SSP enable, the drive goes into STANDBY mode immediately after receiving of soft reset.

ACTIVE Mode

At first a disc is attached and a tray is closed after power is supplied. And next the drive checks itself. If this check finished perfectly, the drive spin a disc and read TOC.  
ACTIVE Mode stands for this status that the drive finish reading TOC.  
So laser, spindle motor, and sled motor active.

STANDBY Mode

This mode is a low current consumption mode.  
STANDBY Mode stands for this status that only SATA interface active. So laser, spindle motor, and sled motor doesn't active.

SLEEP Mode

This mode is a low current consumption mode.  
SLEEP Mode stands for this status that all system(laser, spindle motor, sled motor, SATA interface) doesn't active. The drive can recover by hard/soft reset.

12. Serial ATA Features

12-1. Serial ATA Features Specification

| NO   | Item                                               | Support | Specification                                                                                  |
|------|----------------------------------------------------|---------|------------------------------------------------------------------------------------------------|
| 12-1 | HIPM<br>( Host Initiated link Power Management )   | Support |                                                                                                |
| 12-2 | DIPM<br>( Device Initiated link Power Management ) | Support | Partial Timer : 10ms<br>Slumber Timer 30ms<br>(time after a drive handles<br>the last command) |
| 12-3 | AN<br>( Asynchronous Notification )                | Support |                                                                                                |
| 12-4 | SSP<br>( Software Setting Preservation )           | Support |                                                                                                |
| 12-5 | SSC<br>( Spread Spectrum Clocking )                | Support |                                                                                                |

\*Both host controller and optical drive need to support HIPM ,DIPM and AN mode to utilize them.

12-2. Link Power Management State

Serial ATA interface power states are controlled by the device and host controller.  
The interface power states are defined as below.

PHYRDY

The Phy logic and main PLL are both on and active. The interface is synchronized and capable of receiving and sending data.

PARTIAL

The Phy logic of SATA interface is powered, but is in a reduced power state.  
Power dissipation in this mode is less than the PHYRDY mode, but more than the SLUMBER mode.  
The exit latency from this state shall be no longer than 10 us.

SLUMBER

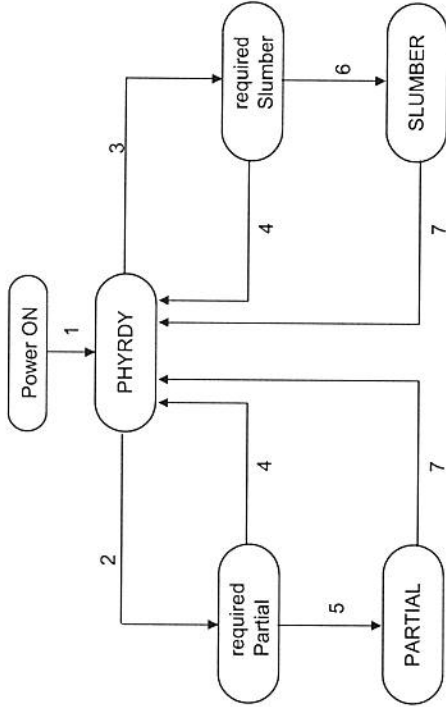
The Phy logic of SATA interface is powered, but is in a reduced power state.  
Power dissipation in this mode is less than the PARTIAL mode.  
The exit latency from this state shall be no longer than 10 ms.

12. Serial ATA Features (continue)

12-3.HIPM( Host Initiated link Power Management )

HIPM is a method which controls Serial ATA interface power states by host controller. Logical Unit supports this feature. Host shall issue IDENTIFY PACKET DEVICE before initiate power management transition requests, and check the response data whether HIPM is supported or not.

12-4. HIPM State Changes

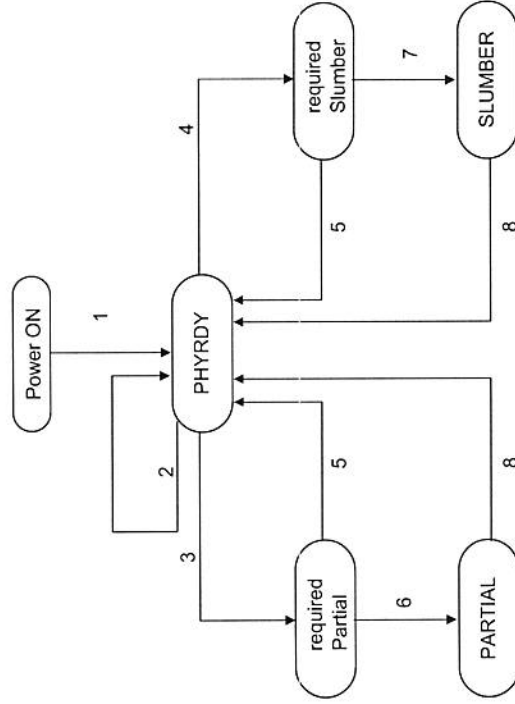


- 1: A power-on or hard reset always returns the Interface Power State to the PHYRDY state from any state.
- 2: In the case of required Partial, the drive receive PMREQ\_P from host.
- 3: In the case of required Slumber, the drive receive PMREQ\_S from host.
- 4: If the drive issues PMNAK, the status changes into PHYRDY.
- 5: If the drive issues PMACK, the status changes into PARTIAL.
- 6: If the drive issues PMACK, the status changes into SLUMBER.
- 7: If the drive or host issues COMWAKE(or COMRESET/COMINIT), the status changes into PHYRDY.

12. Serial ATA Features (continue)  
12-5. DIPM ( Device Initiated link Power Management )

DIPM is a method which controls Serial ATA interface power states by the Logical Unit. The Logical Unit has internal timers, Partial Timer and Slumber Timer, and the timer provide for the Logical Unit to change Interface Power State without direct HOST request. The disabled/enabled of DIPM can be switched by using SET FEATURE command.

12-6. DIPM State Changes



- 1: A power-on or hard reset always returns the Interface Power State to the PHYRDY state from any state.
- 2: If the drive received command, the drive keep PHYRDY state and resets the Partial/Slumber Timer.
- 3: If the drive is set DIPM Enable and the Partial timer reaches zero, the drive issues PMREQ\_P.
- 4: If the drive is set DIPM Enable and the Slumber timer reaches zero, the drive issues PMREQ\_S.
- 5: If the drive received PMNAK from Host, the status changes into PHYRDY.
- 6: If the drive received PMACK from Host, the status changes into PARTIAL.
- 7: If the drive received PMACK from Host, the status changes into SLUMBER.
- 8: If the drive or host issues COMWAKE(or COMRESET/COMINIT), the status changes into PHYRDY. If the drive changes Interface Power State from PARTIAL to SLUMBER, the drive issues COMWAKE to enter PHYRDY state. And then, the drive requests to change the state into SLUMBER

12. Serial ATA Features (continue)  
12-7. AN ( Asynchronous Notification )

Asynchronous notification is a mechanism for a device to send a notification to the host that the device requires attention. A few examples of how this mechanism could be used include indicating media has been inserted in an device.

12-8. SSP ( Software Setting Preservation )

When a device is enumerated, software configures the device using SET FEATURES and other commands. These software settings are often preserved across software reset but not necessarily across COMRESET. In Parallel ATA, only commanded hardware resets may occur, thus legacy mode software only reprograms settings that are cleared for the particular type of reset it has issued. In Serial ATA, COMRESET is equivalent to hardware reset and a noncommanded COMRESET may occur if there is an asynchronous loss of signal. Since COMRESET is equivalent to hardware reset, in the case of an asynchronous loss of signal some software settings may be lost without legacy mode software knowledge. In order to avoid losing important software settings without legacy mode driver knowledge, the software settings preservation ensures that the value of important software settings is maintained across a COMRESET. Software settings preservation may be enabled or disabled using SET FEATURES with a subcommand code of 0bh. The feature is enabled by default.

The software settings that is preserved across COMRESET are listed below.  
SET FEATURES (Set Transfer Mode): PIO, Multiword, and UDMA transfer mode settings established by the SET FEATURES command with subcommand code of 03h.

12-9. SSC ( Spread Spectrum Clocking )

The technique of modulating the operating frequency of a signal slightly to spread its radiated emissions over a range of frequencies. This reduction in the maximum emission for a given frequency helps meet radiated emission requirements.

13. Spindle Control

13-1. Normal disc

| Disc Type                | Sector Format                                         | CD-ROM/CD-R                | CD-RW                      | CD-R         | CD-RW        |
|--------------------------|-------------------------------------------------------|----------------------------|----------------------------|--------------|--------------|
| Audio Only Disc          | CD-DA (Data read)<br>(Audio play)                     | Closed Session             | Closed Session             | Open Session | Open Session |
|                          |                                                       | Max 20X CAV<br>Max 12X CAV | Max 20X CAV<br>Max 12X CAV | 8xCLV        | 8xCLV        |
| Data Only Disc           | Mode 1/Mode2Form1<br>(CD-ROM PhotoCD)<br>(Audio play) | Max 24X CAV                | Max 24X CAV                | x8CLV        | x8CLV        |
|                          | Mode2Form2<br>(VideoCD)                               | Max 20X CAV                | Max 20X CAV                | 8xCLV        | 8xCLV        |
| Mixed disc<br>(CD-extra) | Mode1/Mode2Form1<br>(Audio play)                      | Max 24X CAV                | Max 24X CAV                | x8CLV        | x8CLV        |
|                          | Mode2Form2                                            | Max 20X CAV                | Max 20X CAV                | 8xCLV        | 8xCLV        |
|                          | CD-DA (Data read)<br>(Audio play)                     | Max 20X CAV<br>Max 12X CAV | Max 20X CAV<br>Max 12X CAV | 8xCLV        | 8xCLV        |
|                          | Data Read                                             | Max 12X CAV                | Max 12X CAV                | -            | -            |
| 8cm CD                   |                                                       | Max 12X CAV                | Max 12X CAV                | 4xCLV        | 4xCLV        |

| Disc type          | Condition | Spindle control |             | Remark |
|--------------------|-----------|-----------------|-------------|--------|
|                    |           | 12cm media      | 8cm media   |        |
| DVD-ROM Single     | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-ROM Dual       | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-Video          | Data Read | Max 4X CAV      | Max 4X CAV  |        |
| DVD-R(4.7G)        | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-R DL           | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-RW(Ver1.1/1.2) | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD+R              | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD+R DL           | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD+RW             | Data Read | Max 8X CAV      | Max 4X CAV  |        |
| DVD-RAM            | Data Read | Max 3X-5X PCAV  | Max 2X ZCLV |        |

13-2. Spindle motor control

(1) at playing CD-ROM

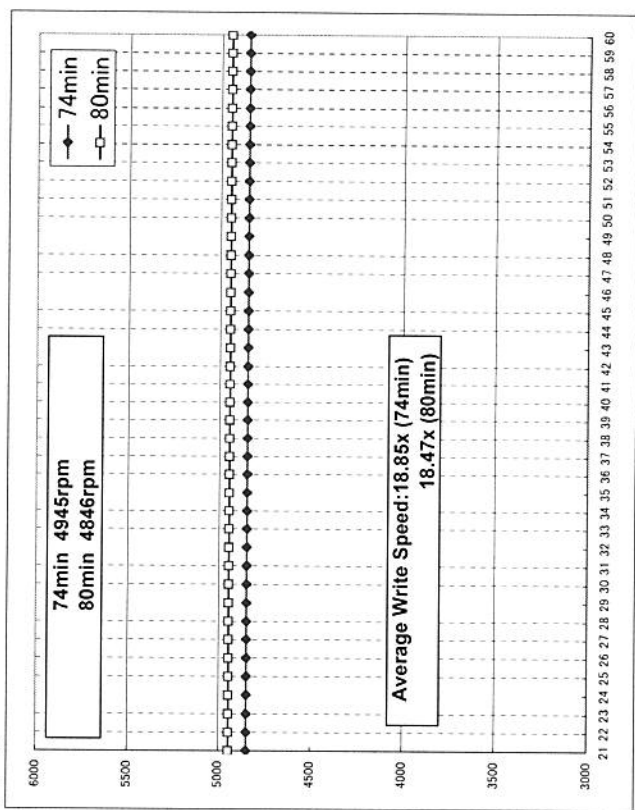
| Linear Velocity | at 24XCAV | at 12XCAV | Remarks                                                 |
|-----------------|-----------|-----------|---------------------------------------------------------|
| 1.2m/s <1.3m/s  | 4979 rpm  | 2490 rpm  | at 1.2m/s<br>proportion to linear velocity (1.2~1.3m/s) |
| 1.3m/s          | 5413 rpm  | 2697 rpm  | more than 1.3m/s                                        |

(2) at playing DVD-ROM

| Disc         | at 2.5XCAV | at 4XCAV | at 6XCAV | at 8XCAV |
|--------------|------------|----------|----------|----------|
| Single layer | 1480 rpm   | 2369 rpm | 3551 rpm | 4735 rpm |
| Dual layer   | 1628 rpm   | 2605 rpm | 3907 rpm | 5147 rpm |

(3) CD-R Write (Max 24xCAV)

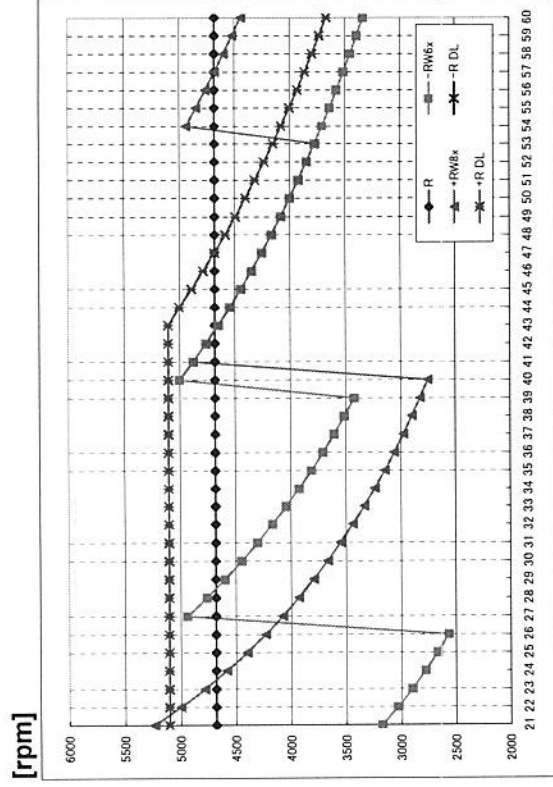
[rpm]



[mm]

Model Number : UJ8C0ADPS2-B

(4) DVD  $\pm$  R Write ( MAX.8x CAV ) DVD-RW(Max.6x ZoneCLV)  
DVD+RW Write ( Max.8x Zone CLV ) , DVD  $\pm$  R DL Write(Max.6x PCAV)

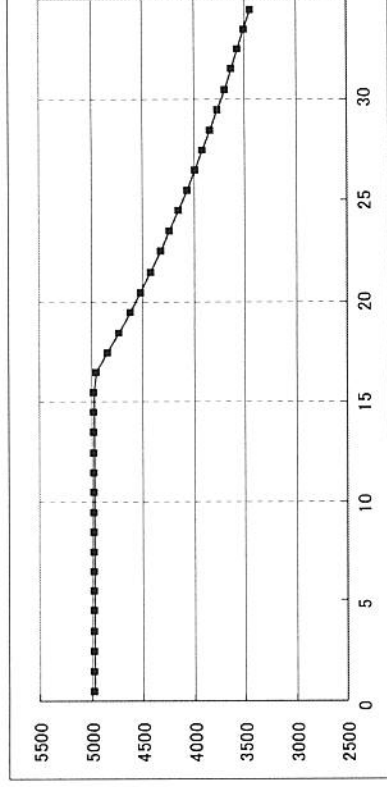


| Average Write Speed |                 |
|---------------------|-----------------|
| DVD-R               | 8x CAV          |
| DVD+R               | 8x CAV          |
| DVD-RW              | 2x-4x-6x ZCLV   |
| DVD+RW              | 3.3x-6x-8x ZCLV |
| DVD-R DL            | 3.3x-6x PCAV    |
| DVD+R DL            | 3.3x-6x PCAV    |
|                     | 6.2x            |
|                     | 6.2x            |
|                     | 4.86x           |
|                     | 4.78x           |
|                     | 5.37x           |
|                     | 5.37x           |

Model Number : UJ8C0ADPS2-B

(5) DVD-RAM(Max.3x-5x Partial CAV)

[rpm]



Average Write Speed

|         |            |       |
|---------|------------|-------|
| DVD-RAM | 3x-5x PCAV | 4.48x |
|---------|------------|-------|

- 14.Dimension  
Refer to the following pages.
- 15.Notes
- a) This pickup is precisely assembled at our specialized assembly line. Please be requested not to disassemble or adjust this pickup.

b) Storage

1) Keep away from hot and high humidity environment.

2) Store them under the condition of not receiving abnormal shock from outside, by having static and dust protecting measures.

3) Keep the dust cover for the protection from dust.

c) Handling

1) Keep away from strong shock such as dropping.

2) Never touch objective lens.

3) Be careful not to be dusted on the objective lens.

4) In case, dust is on the objective lens, sweep away the dust with clean air.

5) Worker involved should be secured with "ground".

6) Workshop and tool must be grounded securely.

7) Never be so close with magnetic material since actuator portion holds strong magnet circuit. (Iron dust, screws, iron-pins in driving area cause problems.)

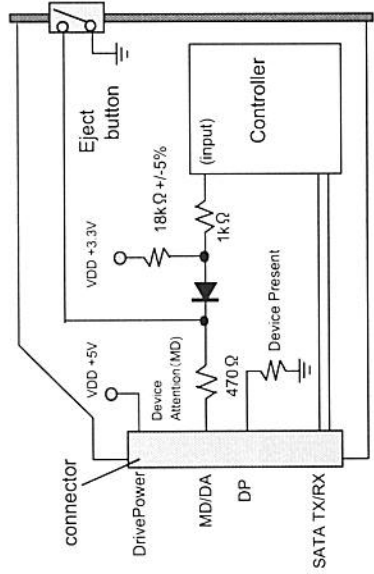
8) Don't push the cover of the Drive.

9) Fragile. Handle with care.

d) Installation of a drive  
Torque for tightening screws must be equal to or less than 0.2Nm(2kgf-cm),when a drive is fixed with.
- KOK-B3-001-T6 Issue 5    Panasonic Precision Devices Co.,Ltd
- Model Number : UJ8C0ADPS2-B

PAGE  
22 / 31
16. Information for Laser / UJ8C0 series
- Information For the User
- This product utilizes a laser.  
CAUTION : Use of control, adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.  
Do not open covers and do not repair yourself. Refer servicing to qualified personnel.
- Laser properties of the Drive  
Laser Class Class 1 (HHS and IEC 60825-1)  
Wavelength            for CD        783 nm  
                              for DVD      661.5 nm
- Location of Labeling
- A line drawing of a rectangular drive unit. A rectangular label is shown on the front face, slightly offset to the right. A dashed line points from the 'Location of Labeling' header to the label.
- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| CAUTION CLASS 3B RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE DE LA BOÎTE. EXPOSITION DANGEREUSE AU FEAUX-LASER. NE PAS TOUCHER LES PARTIES INTERNES. NE PAS DÉMONTÉR LA BOÎTE.                                                                                                                                                                                                                                                                                                                         | DO NOT OPEN THE CASE. NO USER ADJUSTMENT OR SERVICEABLE PARTS INSIDE. DO NOT DIS-ASSEMBLY COVER. |
| ADVARSEL KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UDENÅR UDSETTET FOR STRÅLING. ADVARSEL KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING. IKKE RØR STRÅLEN. VARNING KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÖPPNING. STRÅLEN ÄR FARLIG. VARNING KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÖPPNING. STRÅLEN ÄR FARLIG. VARNING KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÖPPNING. STRÅLEN ÄR FARLIG. VARNING KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÖPPNING. STRÅLEN ÄR FARLIG. | CLASS 1 LASER PRODUCT<br>LASER KLASSE 1<br>1类激光产品                                                |
- KOK-B3-001-T6 Issue 5    Panasonic Precision Devices Co.,Ltd

17. Drive Circuit (MD/DA)



When you use the function of DA, please contact us for discussion.

添付資料  
(Attached Sheets)

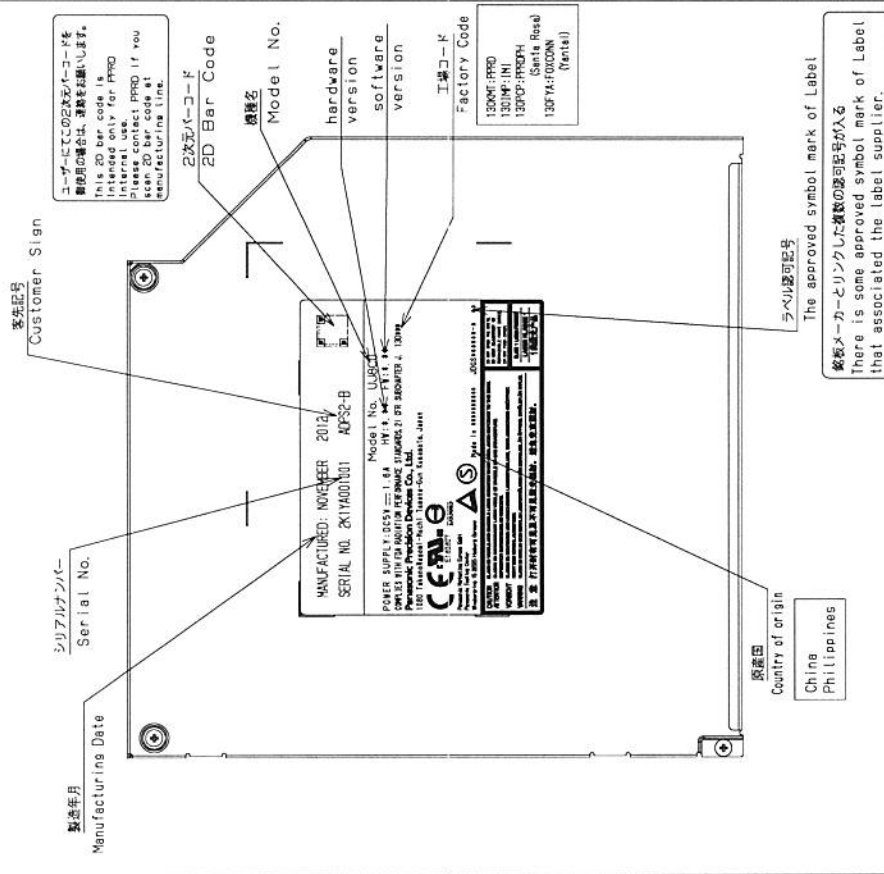
目次  
(Content)

1. 外觀図 (Outline)
2. 包装仕様 (Packaging specification)
3. 銘板 (Label)
4. 押圧分布図 (Loading Specification)



### 3-1 銘板の印刷内容

Printout contents of the label



### 3-2 シリアルNo. / 製造年月 表示内容

Contents of serial No. and Manufacturing date

- (例) 2 K 1 Y 4 0 0 1 0 0 1 \*\*\*\*\* 7  
(EX) 1 2 3 4 5 6
- \*製造年月は省略せずに記入すること  
Fill manufacturing date completely.  
(例) NOVEMBER 2012
1. 製造年番号 (西暦年の末2桁)  
Manufacturing Year  
(the last no. of year)
2. 製造月番号 (アルファベット)  
Manufacturing Month No.  
(alphabet)  
A:1 B:2 C:3 D:4 E:5 F:6  
G:7 H:8 I:9 J:10 K:11 L:12
3. 製造日区分 (アルファベット)  
Manufacturing Day No. (see below)
- |                   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
|-------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Manufacturing Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Character         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
- |                   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Manufacturing Day | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Character         | H  | J  | K  | L  | M  | N  | P  | O  | R  | S  | T  | U  | V  | W  | X  |
4. 工場記号 (アルファベット)  
Factory Sign (alphabet)  
V: 豊田 (Toyoda)  
H: IMI  
W: PROPH (Santa Rosa)  
Y: FOXCONN (Foxconn)
5. サフィックス記号 (アルファベット)  
Suffix No. (alphabet)  
A~Z
6. 製造番号 (6桁)  
Manufacturing No. (6-digit)  
001001000000
7. 客先記号  
Customer Sign
8. 製造月  
Manufacturing Month  
1A: JANUARY 7A: JULY  
2A: FEBRUARY 8A: AUGUST  
3A: MARCH 9A: SEPTEMBER  
4A: APRIL 10A: OCTOBER  
5A: MAY 11A: NOVEMBER  
6A: JUNE 12A: DECEMBER
9. 製造年 (4桁のアラビア数字)  
Manufacturing Year (4digit Arabian No.)



## 4-2 押圧分布図

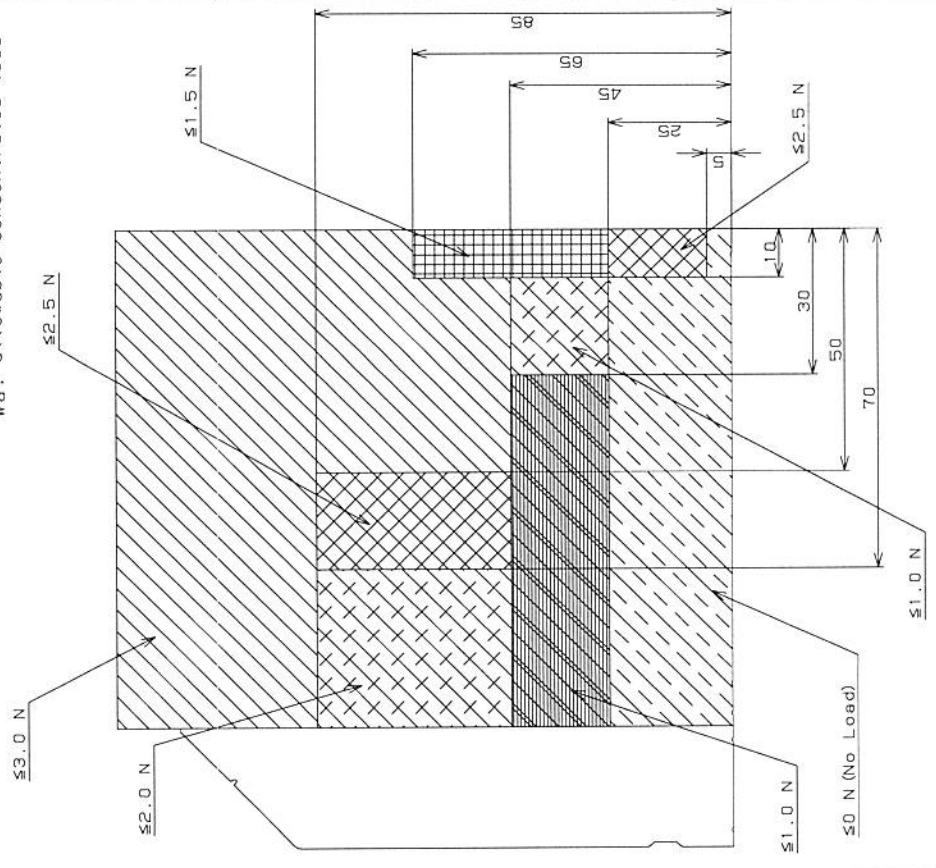
(Loading Specification to the Bottom Cover)

Maximum concentrated loads the drive can withstand.

AL (t=0.6)

|                                                                                     |                           |                                                                                     |                                      |
|-------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|--------------------------------------|
|  | $Wa \leq 3.0 \text{ [N]}$ |  | $Wa \leq 1.5 \text{ [N]}$            |
|  | $Wa \leq 2.5 \text{ [N]}$ |  | $Wa \leq 1.0 \text{ [N]}$            |
|  | $Wa \leq 2.0 \text{ [N]}$ |  | $Wa \leq 0 \text{ [N]}$<br>(No Load) |

$Wa$ : allowable concentrated load



**Comparativo SSD - KSD-SA18 x B100C016G**

|   | Descrição                   | KSD-SA18 | B100C016G |
|---|-----------------------------|----------|-----------|
| 1 | Capacidade de armazenamento | 16GB     | 16GB      |
| 2 | Tecnologia MLC              | Sim      | Sim       |
| 3 | Fabricante                  | KINGSPEC | NETCOM    |



## KSD-SA18.6-XXXMJ

**(Based on NAND Flash 1.8" SATA SSD)**

**Datasheet**

**Rev 1.0**

Aug.2013



Issue:

Check:

Approve:

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## 1. Introduction

### 1.1 Overview

KingSpec's SATAIII SSD (Solid State Drive) is a high performance and high reliability storage device based on NAND Flash technology that designed to solve the bottleneck of computing system by traditional hard disk drives. KingSpec's SATAIII SSD doesn't have a moving parts and it has a same host interface and same physical dimension with Hard Disk Drive, So it can be drop-in replaced with the hard disk drives without anything. With a high performance and low power consumption, KingSpec's SATAIII SSD can be a good storage device for NB and Tabletop PC .

KingSpec's SATAIII SSD purely consists of semiconductor devices and NAND flash memories, which give rugged features against shock and vibration use in extreme environment such as PC an increased MTBF. Further more, KingSpec's SATAIII SSD has highly advanced flash memory management algorithm to guarantee higher performance and data integrity.

### 1.2 Feature

- Performance  
External Transfer Rate(Host Transfer Rate):6Gbps  
Sequential Data Read/Write:

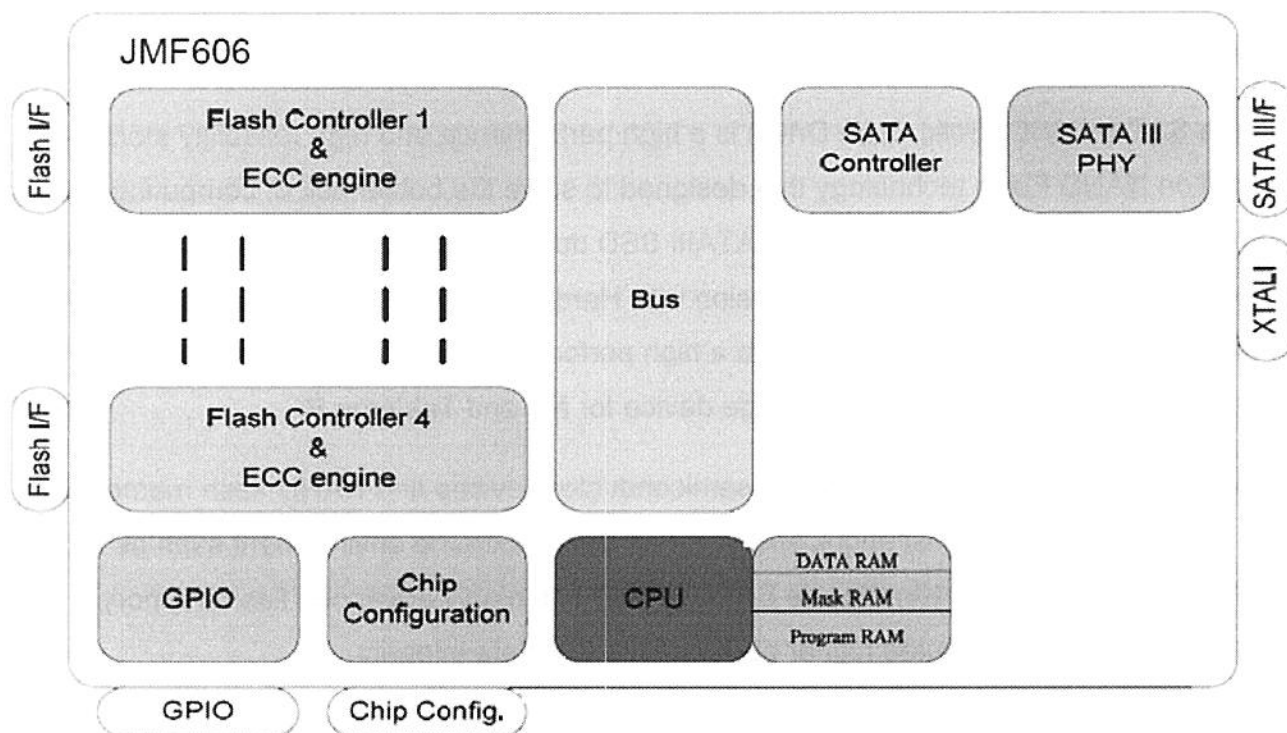
|             |       |        |        |        |        |        |        |         |         |
|-------------|-------|--------|--------|--------|--------|--------|--------|---------|---------|
| Density     | 2GB   | 4GB    | 8GB    | 16GB   | 16GB   | 32GB   | 32GB   | 64GB    | 128GB   |
| Channel     | 1CH   | 1CH    | 2CH    | 2CH    | 4CH    | 2CH    | 4CH    | 4CH     | 4CH     |
| Speed(MB/s) | 77/38 | 107/11 | 207/22 | 205/25 | 376/44 | 304/50 | 397/51 | 494/104 | 495/191 |

Form factor: 1.8-inch (70.0mm x 60.1mm x 8.3mm)

Interface standard: Serial ATA Revision 3.0

- Input voltage:5V (±5%)
- Commercial operating temperature range form 0 to +70℃
- Flash management algorithm: static and dynamic wear-leveling, bad block management algorithm
- Supports dynamic power management and SMART (Self-Monitoring, Analysis and Reporting Technology), NCQ, TRIM;
- ECC (Error Correction Code): Supports BCH 8/16/24/40 bits ECC
- Write endurance: >8 years @ 100GB write/ day(32GB)
- Read endurance: unlimited
- Data retention: 10 years
- MTBF:1,000,000 Hours

## 2. Block Diagram

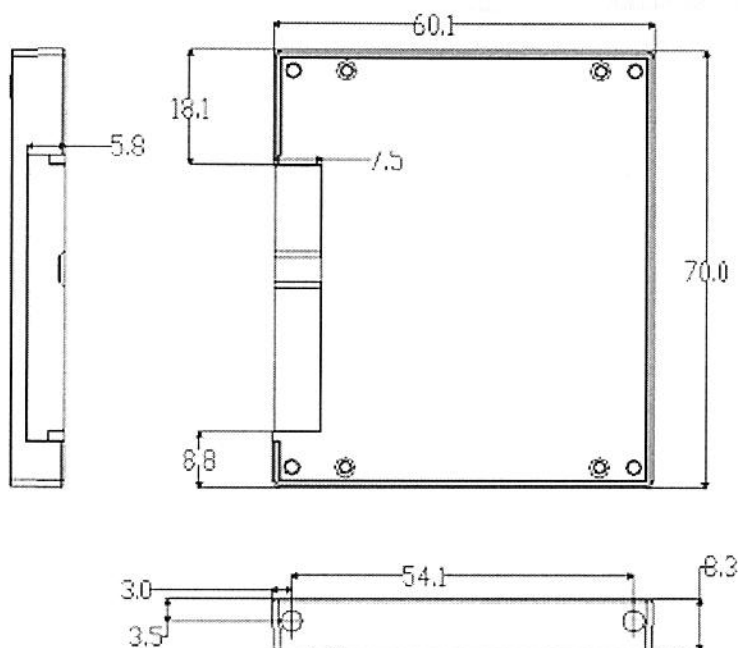


### 3. Product Specifications

#### 3.1 Physical Specifications

Tabel 1 Physical dimensions and weight

| Model     | Height (mm) | Width (mm)  | Length (mm) | Weight(g) |
|-----------|-------------|-------------|-------------|-----------|
| 1GB~128GB | 8.3+/-0.25  | 60.1+/-0.25 | 70.0+/-0.25 | TBD       |



## 3.2 Interface

The interface of KingSpec's SSD complies with the standard serial ATA revision 3.0:

- ① Host Transfer Rate is 6.0Gb/s
- ② PIO mode 0,1,2,3,4
- ③ DMA mode 0,1,2
- ④ UDMA mode 0,1,2,3,4,5,6

## 3.3 Performance Testing

### 3.3.1 Maximum Data Transfer Rate:

- Maximum sustained read: 495MB/s
- Maximum sustained write: 105MB/s

#### Note:

- 1) . CPU: Intel® Core (TM) i5-2400 CPU @ 3.10GHz  
Chipset: Intel® Z68 Express Chipset  
Memory: Kingston KHX1600C9D3C1K2/4GX  
OS: Microsoft Windows 7 Professional 64-bit  
AHCI Driver: Server Express Chipset SATA AHCI Controller  
BIOS Settings: AHCI Mode
- 2) . Test Program: CrystalDiskMark3\_0\_0
- 3) . Test Drive: KSD-SA18.6-064MJ

### 3.3.2 IO Performance:

**Tabel 2 IO Performance Values For 1.8" SATA MLC SSD**

| Access Type      | IOPS                |        |
|------------------|---------------------|--------|
|                  | Operation unit size |        |
|                  | 512Byte             | 4KByte |
| Sequential Read  | 12180               | 9208   |
| Sequential Write | 42901               | 21291  |
| Random Read      | 12249               | 9000   |
| Random Write     | 63                  | 700    |

- 1) . CPU: Intel® Core (TM) i5-2400 CPU @ 3.10GHz  
Chipset: Intel® Z68 Express Chipset  
Memory: Kingston KHX1600C9D3C1K2/4GX  
OS: Microsoft Windows 7 Professional 64-bit  
AHCI Driver: Server Express Chipset SATA AHCI Controller  
BIOS Settings: AHCI Mode
- 2) . Test Program: Iometer2008
- 3) . Test Drive: KSD-SA18.6-064MJ

### 3.3.3 Access Time:

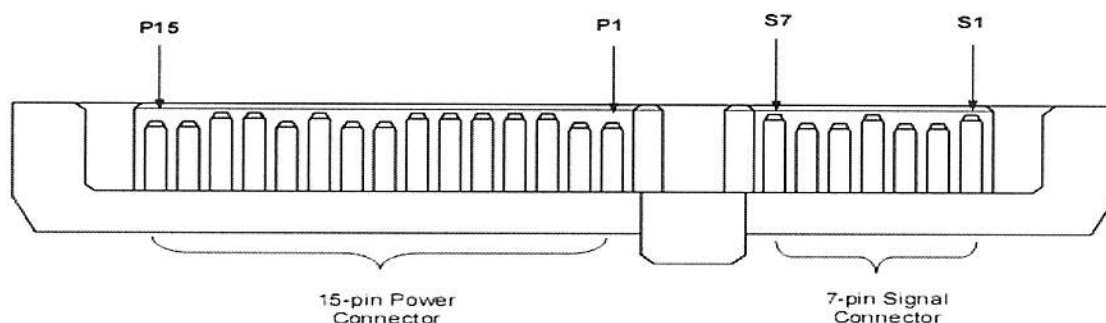
- 1) CPU: Intel® Core (TM) i5-2400 CPU @ 3.10GHz  
Chipset: Intel® Z68 Express Chipset  
Memory: Kingston KHX1600C9D3C1K2/4GX  
OS: Microsoft Windows 7 Professional 64-bit  
AHCI Driver: Server Express Chipset SATA AHCI Controller  
BIOS Settings: AHCI Mode
  - 2) . Test Program: HD Tune Pro 3.50
  - 3) . Test Drive: KSD-SA18.6-064MJ
- Random access time: 0.15 msec

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## 4. Interface Description

### 4.1 Pin Assignment

The following diagram identifies the pin location of Kingspec SATA SSD.



### 4.2 Pin Description

**Tabel 3 SATA Connector Pinout**

| Signal |             |                                                               |
|--------|-------------|---------------------------------------------------------------|
| Pin#   | Signal Name | Description                                                   |
| S1     | GND         | 2 <sup>nd</sup> mate                                          |
| S2     | A+          | Differential signal pair A<br>From physical layer electronics |
| S3     | A-          |                                                               |
| S4     | GND         | 2 <sup>nd</sup> mate                                          |
| S5     | B-          | Differential signal pair B<br>From physical layer electronics |
| S6     | B+          |                                                               |
| S7     | GND         | 2 <sup>nd</sup> mate                                          |
| Power  |             |                                                               |
| P1     | V33         | NC                                                            |
| P2     | V33         | NC                                                            |
| P3     | V33         | NC                                                            |
| P4     | GND         | 1 <sup>st</sup> mate                                          |
| P5     | GND         | 2 <sup>nd</sup> mate                                          |
| P6     | GND         | 2 <sup>nd</sup> mate                                          |
| P7     | V5          | 5V Power,pre-charge, 2 <sup>nd</sup> mate                     |
| P8     | V5          | 5V Power                                                      |
| P9     | V5          | 5V Power                                                      |
| P10    | GND         | 2 <sup>nd</sup> mate                                          |
| P11    | DAS/DSS     | Device Activity Signal/Disable Staggered spinup(Unused)       |
| P12    | GND         | 1 <sup>st</sup> mate                                          |
| P13    | V12         | NC                                                            |
| P14    | V12         | NC                                                            |
| P15    | V12         | NC                                                            |

## 5. Product Trait

### 5.1 Environment Specification

Table 4 Environmental Specifications

|             |           |
|-------------|-----------|
| Features    | Operating |
| Temperature | 0~70℃     |
| Humidity    | 5-95%     |

### 5.2 Power Specification

Recommended DC Operating Voltage: 4.75V~5.25V

Table 5 Power Consumption

| Parameter               |                  | Typical | Unit |
|-------------------------|------------------|---------|------|
| Standby                 |                  | 0.5     | W    |
| Idle                    |                  | 1.5     | W    |
| 4KByte<br>Sample Data   | Sequential Read  | 0.48    | W    |
|                         | Sequential Write | 0.94    | W    |
|                         | Random Read      | 0.48    | W    |
|                         | Random Write     | 0.95    | W    |
| 512KByte<br>Sample Data | Sequential Read  | 0.47    | W    |
|                         | Sequential Write | 0.59    | W    |
|                         | Random Read      | 0.47    | W    |
|                         | Random Write     | 0.96    | W    |

**Note:**

1. The power consumption can differ depending on the disk capacity and the type of flash memory being used
2. The test drive: KSD-SA18.6-064MJ
3. Supply voltage: 5V±5%

### **5.3 Reliability Specification**

#### **Wear-leveling**

KingSpec's SATAIII SSD support both static and dynamic wear-leveling, These two algorithms guarantee all type of flash memory at same level of erase cycles to improve lifetime limitation of NAND based storage

#### **Endurance**

Write endurance: >8 years @ 100GB write/ day(32GB)

Read endurance: unlimited

#### **ECC**

ECC (Error Correction Code): Supports BCH 8/16/24/40 bits ECC

#### **Bad block management algorithm**

This algorithm replaces bad blocks with new ones from available spares on media error conditions.

#### **MTBF**

MTBF(Mean Time between Failures) of KingSpec's SSD: 1, 000, 000 hours

#### **Data retention**

Data retention at 25°C of KingSpec's SSD:>10 years

## 6. Electrical Characteristics

### 6.1 Absolute Maximum Rating

| Parameter                 | Symbol               | Condition | Min  | Max      | Unit |
|---------------------------|----------------------|-----------|------|----------|------|
| Analog power supply       | AVDDH                |           | -0.5 | 6        | V    |
| Digital I/O power supply  | DVDD                 |           | -0.5 | 6        | V    |
| Digital I/O input voltage | V <sub>IOI</sub>     |           | -0.4 | DVDD+0.4 | V    |
| Storage temperature       | T <sub>STORAGE</sub> |           | -40  | 130      | °C   |

### 6.2 Recommended Power Supply Operation Conditions and Temperature

| Parameter                      | Symbol         | Condition                                      | Min | Typical | Max | Unit |
|--------------------------------|----------------|------------------------------------------------|-----|---------|-----|------|
| Operation digital power supply | G3V3           |                                                | -5% | 3.3     | +5% | V    |
|                                | FVDD           |                                                |     | 3.3/1.8 |     |      |
|                                | C1V2           |                                                | -5% | 1.25    | +5% | V    |
| Operation analog power supply  | AS1V2          |                                                | -5% | 1.25    | +5% | V    |
|                                | AS3V3          |                                                | -5% | 3.3     | +5% | V    |
| Ambient operation temperature  | T <sub>A</sub> | For commercial spec.                           | 0   |         | 70  | °C   |
| Ambient operation temperature  | T <sub>A</sub> | For industry spec.                             | -40 |         | 85  | °C   |
| Junction temperature           | T <sub>J</sub> |                                                |     |         | 125 | °C   |
| Case operation temperature     | T <sub>C</sub> | For commercial spec and base on T <sub>A</sub> |     |         | 95  | °C   |
| Case operation temperature     | T <sub>C</sub> | For industry spec and base on T <sub>A</sub>   |     |         | 105 | °C   |
| TFBGA 288 ball                 | θJC            |                                                |     |         |     | °C/W |

### 6.3 Recommended External Clock Source Conditions

| Parameter                | Symbol | Condition | Min | Typical | Max | Unit |
|--------------------------|--------|-----------|-----|---------|-----|------|
| External reference clock |        |           |     | 25      |     | MHz  |
| Clock Duty Cycle         |        |           | 45  | 50      | 55  | %    |

#### 6.4 Power Supply DC Characteristics (SATA Idle mode)

| Power supply: PC's SATA 5V input |                    |           |     |         |     |      |
|----------------------------------|--------------------|-----------|-----|---------|-----|------|
| Parameter                        | Symbol             | Condition | Min | Typical | Max | Unit |
| Digital Power Supply             | I <sub>PV33</sub>  | 3.3V      |     |         | TBD | mA   |
|                                  | I <sub>OV12</sub>  | 1.2V      |     |         | TBD | mA   |
| SATA Analog Power Supply         | I <sub>ASV33</sub> | 3.3V      |     |         | TBD | mA   |
| SATA Analog Power Supply         | I <sub>ASV12</sub> | 1.2V      |     |         | TBD | mA   |

#### 6.5 Power Supply DC Characteristics (SATA Active mode)

| Power supply: PC's SATA 5V input |                    |           |     |         |     |      |
|----------------------------------|--------------------|-----------|-----|---------|-----|------|
| Parameter                        | Symbol             | Condition | Min | Typical | Max | Unit |
| Digital Power Supply             | I <sub>PV33</sub>  | 3.3V      |     |         | TBD | mA   |
|                                  | I <sub>OV12</sub>  | 1.2V      |     |         | TBD | mA   |
| SATA Analog Power Supply         | I <sub>ASV33</sub> | 3.3V      |     |         | TBD | mA   |
| SATA Analog Power Supply         | I <sub>ASV12</sub> | 1.2V      |     |         | TBD | mA   |

#### 6.6 I/O DC Characteristics

| Parameter           | Symbol          | Condition | Min | Typical | Max | Unit |
|---------------------|-----------------|-----------|-----|---------|-----|------|
| Input low voltage   | V <sub>IL</sub> |           |     |         | 0.8 | V    |
| Input high voltage  | V <sub>IH</sub> |           | 2.4 |         |     | V    |
| Output low voltage  | V <sub>OL</sub> |           | 1.5 |         |     | V    |
| Output high voltage | V <sub>OH</sub> |           |     |         | 3.3 | V    |

#### 6.7 Power Sequence (No DEVSLP)

| Parameter                                 | Symbol | Condition | Min | Typical | Max | Unit |
|-------------------------------------------|--------|-----------|-----|---------|-----|------|
| Time interval between 3.3V and 1.2V/1.8V  | T01    |           | -2  | 0       | 2   | ms   |
| Time interval between last power and RSTn | T02    |           | 150 | 200     | 250 | ms   |

**6.8 Power Sequence ( DEVSLP )**

| Parameter                                 | Symbol | Condition | Min | Typical | Max | Unit |
|-------------------------------------------|--------|-----------|-----|---------|-----|------|
| Time interval between 3.3V and 1.2V/1.8V  | T01    |           | -2  | 0       | 2   | ms   |
| Time interval between last power and RSTn | T02    |           | 12  | -       |     | ms   |

**7.Command Descriptions****7.1 Support ATA Command**

This table with the following paragraphs summarizes the ATA command set.

Command table

| Command Name                 | Code | PARAMETERS USED |    |    |    |    |    |
|------------------------------|------|-----------------|----|----|----|----|----|
|                              |      | SC              | SN | CY | DR | HD | FT |
| CHECK POWER MODE             | E5h  | X               | X  | X  | O  | X  | X  |
| EXECUTE DIAGNOSTICS          | 90h  | X               | X  | X  | O  | X  | X  |
| FLUSH CACHE                  | E7h  | X               | X  | X  | O  | O  | X  |
| IDENTIFY DEVICE              | ECh  | X               | X  | X  | O  | X  | X  |
| IDLE                         | E3h  | O               | X  | X  | O  | X  | X  |
| IDLE IMMEDIATE               | E1h  | X               | X  | X  | O  | X  | X  |
| INITIALIZE DEVICE PARAMETERS | 91h  | O               | X  | X  | O  | O  | X  |
| READ DMA                     | C8h  | O               | O  | O  | O  | O  | X  |
| READ DMA EXT                 | 25h  | O               | O  | O  | O  | O  | X  |

|                           |            |   |   |   |   |   |   |
|---------------------------|------------|---|---|---|---|---|---|
| READ FPDMA QUEUED         | 60h        | O | O | O | O | O | X |
| READ LOG DMA EXT          | 47h        | O | O | O | O | O | X |
| READ LOG EXT              | 2Fh        | O | O | O | O | O | X |
| READ MULTIPLE             | C4h        | O | O | O | O | O | X |
| READ SECTOR(S)            | 20h or 21h | O | O | O | O | O | X |
| READ VERIFY SECTOR(S)     | 40h or 41h | O | O | O | O | O | X |
| RECALIBRATE               | 10h        | X | X | X | O | X | X |
| SECURITY DISABLE PASSWORD | F6h        | X | X | X | O | X | X |
| SECURITY ERASE PREPARE    | F3h        | X | X | X | O | X | X |
| SECURITY ERASE UNIT       | F4h        | X | X | X | O | X | X |
| SECURITY FREEZE LOCK      | F5h        | X | X | X | O | X | X |
| SECURITY SET PASSWORD     | F1h        | X | X | X | O | X | X |
| SECURITY UNLOCK           | F2h        | X | X | X | O | X | X |
| SEEK                      | 7xh        | X | X | O | O | O | X |
| SET FEATURES              | EFh        | O | X | X | O | X | O |
| SET MULTIPLE MODE         | C6h        | O | X | X | O | X | X |
| SLEEP                     | E6h        | X | X | X | O | X | X |
| SMART                     | B0h        | X | X | O | O | X | O |
| STANDBY                   | E2h        | X | X | X | O | X | X |
| STANDBY IMMEDIATE         | E0h        | X | X | X | O | X | X |
| WRITE DMA                 | CAh        | O | O | O | O | O | X |
| WRITE DMA EXT             | 35h        | O | O | O | O | O | X |
| WRITE FPDMA QUEUED        | 61h        | O | O | O | O | O | X |
| WRITE LOG DMA EXT         | 57h        | O | O | O | O | O | X |
| WRITE LOG EXT             | 3Fh        | O | O | O | O | O | X |
| WRITE MULTIPLE            | C5h        | O | O | O | O | O | X |
| WRITE SECTOR(S)           | 30h or 31h | O | O | O | O | O | X |

**Note:**

O = Valid, X = Don't care

SC = Sector Count Register

SN = Sector Number Register

CY = Cylinder Low/High Register

DR = DEVICE SELECT Bit (DEVICE/HEAD Register Bit 4)

HD = HEAD SELECT Bit (DEVICE/HEAD Register Bit 3-0)

FT = Features Register

## 7.2 ATA COMMAND SPECIFICATIONS

### IDENTIFY DEVICE (ECh)

This commands read out 512Bytes of drive parameter information. Parameter Information consists of the arrangement and value as shown in the following table. This command enables the host to receive the Identify Drive Information from the device.

Identify device information default value

| Word  | Value | F/V                                                                                                                                                     | Description                                             |
|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 0     | 0040h | F 15 0 = ATA device<br>X 14-8 Retired<br>F 7 1 = removable media device<br>X 6 Obsolete<br>X 5-3 Retired<br>F 2 Reserved<br>X 1 Retired<br>F 0 Reserved | General configuration bit-significant information:      |
| 1     | XXXXh | X                                                                                                                                                       | Number of logical cylinders                             |
| 2     | C937h | V                                                                                                                                                       | Specific configuration                                  |
| 3     | 00XXh | X                                                                                                                                                       | Number of logical heads                                 |
| 4-5   | XXXXh | X                                                                                                                                                       | Retired                                                 |
| 6     | XXXXh | X                                                                                                                                                       | Number of logical sector per logical track              |
| 7-8   | XXXXh | V                                                                                                                                                       | Reserved for assignment by the CompactFlash_Association |
| 9     | 000Eh | X                                                                                                                                                       | Retired                                                 |
| 10-19 | XXXXh | F                                                                                                                                                       | Serial number (20 ASCII characters)                     |
| 20-21 | XXXXh | X                                                                                                                                                       | Retired                                                 |
| 22    | 003Fh | X                                                                                                                                                       | Obsolete                                                |
| 23-28 | XXXXh | F                                                                                                                                                       | Firmware revision (8 ASCII characters)                  |

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|       |       |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------|-------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27-46 | XXXXh | F                                    | Model number (40 ASCII characters)                                                                                                                                                                                                                                                                                                                                                                                        |
| 47    | 8000h | F<br>F<br>F                          | 15-8 80h<br>7-0 00h = Reserved<br>01h = Maximum number of 1 sectors on READ/WRITE MULTIPLE commands                                                                                                                                                                                                                                                                                                                       |
| 48    | 4000h | F                                    | Reserved                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 49    | 2F00h | F<br>F<br>F<br>F<br>F<br>F<br>F<br>X | Capabilities<br>15-14 Reserved for the IDENTIFY PACKET DEVICE command.<br>13 1 = Standby timer values as specified in this standard are supported<br>0 = Standby timer values shall be managed by the device<br>12 Reserved for the IDENTIFY PACKET DEVICE command.<br>11 1 = IORDY supported<br>0 = IORDY may be supported<br>10 1 = IORDY may be disabled<br>9 1 = LBA supported<br>8 1 = DMA supported.<br>7-0 Retired |
| 50    | 4000h | F<br>F<br>F<br>X<br>F                | Capabilities<br>15 Shall be cleared to zero.<br>14 Shall be set to one.<br>13-2 Reserved.<br>1 Obsolete<br>0 Shall be set to one to indicate a device specific Standby timer value minimum.                                                                                                                                                                                                                               |
| 51-52 | 0000h | X                                    | Obsolete                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 53    | 0007h | F<br>F<br>F<br>X                     | 15-3 Reserved<br>2 1 = the fields reported in word 88 are valid<br>0 = the fields reported in word 88 are not valid<br>1 1 = the fields reported in words 70:64 are valid<br>0 = the fields reported in words 70:64 are not valid<br>0 1 = the fields reported in words 58:54 are valid<br>0 = the fields reported in words 58:54 are not valid                                                                           |
| 54-58 | XXXXh | X                                    | Obsolete                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 59    | 0000h | F<br>V<br>V                          | 15-9 Reserved<br>8 1 = Multiple sector setting is valid<br>7-0 xxh = Setting for number of sectors that shall be transferred per interrupt on R/W Multiple command                                                                                                                                                                                                                                                        |
| 60-61 | XXXXh | F                                    | Total number of user addressable sectors                                                                                                                                                                                                                                                                                                                                                                                  |
| 62    | 0000h | X                                    | Obsolete                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 63    | 0007h | F<br>V<br>V<br>V<br>F                | 15-11 Reserved<br>10 1 = Multiword DMA mode 2 is selected<br>0 = Multiword DMA mode 2 is not selected<br>9 1 = Multiword DMA mode 1 is selected<br>0 = Multiword DMA mode 1 is not selected<br>8 1 = Multiword DMA mode 0 is selected<br>0 = Multiword DMA mode 0 is not selected<br>7-3 Reserved                                                                                                                         |

|       |       |   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------|-------|---|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |       | F | 2    | 1 = Multiword DMA mode 2 and below are supported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|       |       | F | 1    | 1 = Multiword DMA mode 1 and below are supported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|       |       | F | 0    | 1 = Multiword DMA mode 0 is supported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 64    | 0003h | F | 15-8 | Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|       |       | F | 7-0  | Advanced PIO modes supported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65    | 0078h | F |      | Minimum Multiword DMA transfer cycle time per word                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 66    | 0078h | F |      | Manufacturer's recommended Multiword DMA transfer cycle time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 67    | 0078h | F |      | Minimum PIO transfer cycle time without flow control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 68    | 0078h | F |      | Minimum PIO transfer cycle time with IORDY flow control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 69-74 | 0000h | F |      | Reserved (for future command overlap and queuing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 75    | 0000h | F |      | Queue depth<br>15:5 Reserved<br>4:0 Maximum queue depth - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 76    | xh    | F |      | Serial ATA Capabilities<br>15:13 Reserved for Serial ATA<br>12 1 = Supports NCQ priority information<br>11 1 = Supports Unload while NCQ commands are outstanding<br>10 1 = Supports the SATA Phy Event Counters log<br>9 1 = Supports receipt of host initiated power management requests<br>8 1 = Supports the NCQ feature set<br>7:4 Reserved for Serial ATA<br>3 1 = Supports SATA Gen3 Signaling Speed (6.0Gb/s)<br>2 1 = Supports SATA Gen2 Signaling Speed (3.0Gb/s)<br>1 1 = Supports SATA Gen1 Signaling Speed (1.5Gb/s)<br>0 Shall be cleared to zero |
| 77    |       |   |      | Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 78    | xh    |   |      | Serial ATA features supported<br>15:7 Reserved for Serial ATA<br>6 1 = Device supports Software Settings Preservation<br>5 Reserved for Serial ATA<br>4 1 = Device supports in-order data delivery<br>3 1 = Device supports initiating power management<br>2 1 = Device supports DMA Setup auto-activation<br>1 1 = Device supports non-zero buffer offsets                                                                                                                                                                                                     |

|    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0 Shall be cleared to zero                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 79 | xh    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Serial ATA features enabled<br>15:7 Reserved for Serial ATA<br>6 1 = Software Settings Preservation enabled<br>5 Reserved for Serial ATA<br>4 1 = In-order data delivery enabled<br>3 1 = Device initiated power management enabled<br>2 1 = DMA Setup auto-activation enabled<br>1 1 = Non-zero buffer offsets enabled<br>F 0 Shall be cleared to zero                                                                                                                                                                                                            |
| 80 | 01FEh | F 15 Reserved<br>F 14 Reserved for ATA/ATAPI-14<br>F 13 Reserved for ATA/ATAPI-13<br>F 12 Reserved for ATA/ATAPI-12<br>F 11 Reserved for ATA/ATAPI-11<br>F 10 Reserved for ATA/ATAPI-10<br>F 9 Reserved for ATA/ATAPI-9<br>F 8 Reserved for ATA/ATAPI-8<br>F 7 1 = supports ATA/ATAPI-7<br>F 6 1 = supports ATA/ATAPI-6<br>F 5 1 = supports ATA/ATAPI-5<br>F 4 1 = supports ATA/ATAPI-4<br>F 3 Obsolete<br>X 2 Obsolete<br>X 1 Obsolete<br>F 0 Reserved                                                                                                            | Major version number 0000h or FFFFh = device does not report version<br>15 Reserved<br>14 Reserved for ATA/ATAPI-14<br>13 Reserved for ATA/ATAPI-13<br>12 Reserved for ATA/ATAPI-12<br>11 Reserved for ATA/ATAPI-11<br>10 Reserved for ATA/ATAPI-10<br>9 Reserved for ATA/ATAPI-9<br>8 Reserved for ATA/ATAPI-8<br>7 1 = supports ATA/ATAPI-7<br>6 1 = supports ATA/ATAPI-6<br>5 1 = supports ATA/ATAPI-5<br>4 1 = supports ATA/ATAPI-4<br>3 Obsolete<br>2 Obsolete<br>1 Obsolete<br>0 Reserved                                                                    |
| 81 | 0021h | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Minor version number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 82 | 0068h | X 15 Obsolete<br>F 14 1 = NOP command supported<br>F 13 1 = READ BUFFER command supported<br>F 12 1 = WRITE BUFFER command supported<br>X 11 Obsolete<br>F 10 1 = Host Protected Area feature set supported<br>F 9 1 = DEVICE RESET command supported<br>F 8 1 = SERVICE interrupt supported<br>F 7 1 = release interrupt supported<br>F 6 1 = look-ahead supported<br>F 5 1 = write cache supported<br>F 4 Shall be cleared to zero to indicate that the PACKET Command feature set is not supported.<br>F 3 1 = mandatory Power Management feature set supported | Command set supported.<br>15 Obsolete<br>14 1 = NOP command supported<br>13 1 = READ BUFFER command supported<br>12 1 = WRITE BUFFER command supported<br>11 Obsolete<br>10 1 = Host Protected Area feature set supported<br>9 1 = DEVICE RESET command supported<br>8 1 = SERVICE interrupt supported<br>7 1 = release interrupt supported<br>6 1 = look-ahead supported<br>5 1 = write cache supported<br>4 Shall be cleared to zero to indicate that the PACKET Command feature set is not supported.<br>3 1 = mandatory Power Management feature set supported |

|    |       |   |      |                                                                                            |
|----|-------|---|------|--------------------------------------------------------------------------------------------|
|    |       | F | 2    | 1 = Removable Media feature set supported                                                  |
|    |       | F | 1    | 1 = Security Mode feature set supported                                                    |
|    |       |   | 0    | 1 = SMART feature set supported                                                            |
| 83 | 5000h | F | 15   | Command sets supported.<br>Shall be cleared to zero                                        |
|    |       | F | 14   | Shall be set to one                                                                        |
|    |       | F | 13-9 | Reserved                                                                                   |
|    |       | F | 8    | 1 = SET MAX security extension supported                                                   |
|    |       | F | 7    | Reserved                                                                                   |
|    |       | F | 6    | 1 = SET FEATURES subcommand required to spinup after power-up                              |
|    |       | F | 5    | 1 = Power-Up In Standby feature set supported                                              |
|    |       | F | 4    | 1 = Removable Media Status Notification feature set supported                              |
|    |       | F | 3    | 1 = Advanced Power Management feature set supported                                        |
|    |       | F | 2    | 1 = CFA feature set supported                                                              |
|    |       | F | 1    | 1 = READ/WRITE DMA QUEUED supported                                                        |
|    |       | F | 0    | 1 = DOWNLOAD MICROCODE command supported                                                   |
| 84 | 4000h | F | 15   | Command set/feature supported extension.<br>Shall be cleared to zero                       |
|    |       | F | 14   | Shall be set to one                                                                        |
|    |       | F | 13-2 | Reserved                                                                                   |
|    |       | F | 1    | 1 = SMART self-test supported                                                              |
|    |       | F | 0    | 1 = SMART error logging supported                                                          |
| 85 | 0008h | X | 15   | Command set/feature enabled.<br>Obsolete                                                   |
|    |       | F | 14   | 1 = NOP command enabled                                                                    |
|    |       | F | 13   | 1 = READ BUFFER command enabled                                                            |
|    |       | F | 12   | 1 = WRITE BUFFER command enabled                                                           |
|    |       | X | 11   | Obsolete                                                                                   |
|    |       | V | 10   | 1 = Host Protected Area feature set enabled                                                |
|    |       | F | 9    | 1 = DEVICE RESET command enabled                                                           |
|    |       | V | 8    | 1 = SERVICE interrupt enabled                                                              |
|    |       | V | 7    | 1 = release interrupt enabled                                                              |
|    |       | V | 6    | 1 = lock-ahead enabled                                                                     |
|    |       | V | 5    | 1 = write cache enabled                                                                    |
|    |       | F | 4    | Shall be cleared to zero to indicate that the PACKET Command feature set is not supported. |
|    |       | F | 3    | 1 = Power Management feature set enabled                                                   |
|    |       | V | 2    | 1 = Removable Media feature set enabled                                                    |
|    |       | V | 1    | 1 = Security Mode feature set enabled                                                      |
|    |       |   | 0    | 1 = SMART feature set enabled                                                              |
| 86 | 5000h | F | 15-9 | Reserved                                                                                   |
|    |       | F | 8    | 1 = SET MAX security extension enabled by SET MAX SET PASSWORD                             |
|    |       | F | 7    | See Address Offset Reserved Area Boot, INCITS TR27:2001                                    |
|    |       | F | 6    | 1 = SET FEATURES subcommand required to spin-up after power-up                             |
|    |       | V | 5    | 1 = Power-Up In Standby feature set enabled                                                |
|    |       | V | 4    | 1 = Removable Media Status Notification feature set enabled                                |
|    |       | V | 3-1  | 1 = Advanced Power Management feature set enabled                                          |
|    |       | F | 0    | 1 = DOWNLOAD MICROCODE command supported                                                   |

|        |       |   |                                                                                                                                                                        |
|--------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 87     | 4000h | F | Command set/feature default.                                                                                                                                           |
|        |       | F | 15 Shall be cleared to zero                                                                                                                                            |
|        |       | F | 14 Shall be set to one                                                                                                                                                 |
|        |       | F | 13-2 Reserved                                                                                                                                                          |
|        |       | F | 1 1 = SMART self-test supported                                                                                                                                        |
|        |       | F | 0 1 = SMART error logging supported                                                                                                                                    |
| 88     | xh    | V | 15-14 Reserved                                                                                                                                                         |
|        |       | V | 13 1 = Ultra DMA mode 5 is selected<br>0 = Ultra DMA mode 5 is not selected                                                                                            |
|        |       | V | 12 1 = Ultra DMA mode 4 is selected<br>0 = Ultra DMA mode 4 is not selected                                                                                            |
|        |       | V | 11 1 = Ultra DMA mode 3 is selected<br>0 = Ultra DMA mode 3 is not selected                                                                                            |
|        |       | V | 10 1 = Ultra DMA mode 2 is selected<br>0 = Ultra DMA mode 2 is not selected                                                                                            |
|        |       | V | 9 1 = Ultra DMA mode 1 is selected<br>0 = Ultra DMA mode 1 is not selected                                                                                             |
|        |       | F | 8 1 = Ultra DMA mode 0 is selected                                                                                                                                     |
|        |       | F | 0 = Ultra DMA mode 0 is not selected                                                                                                                                   |
|        |       | F | 7-6 Reserved                                                                                                                                                           |
|        |       | F | 5 1 = Ultra DMA mode 5 and below are supported                                                                                                                         |
|        |       | F | 4 1 = Ultra DMA mode 4 and below are supported                                                                                                                         |
|        |       | F | 3 1 = Ultra DMA mode 3 and below are supported                                                                                                                         |
|        |       |   | 2 1 = Ultra DMA mode 2 and below are supported                                                                                                                         |
|        |       |   | 1 1 = Ultra DMA mode 1 and below are supported                                                                                                                         |
|        |       |   | 0 1 = Ultra DMA mode 0 is supported                                                                                                                                    |
| 89     | 0000h | F | Time required for security erase unit completion                                                                                                                       |
| 90     | 0000h | F | Time required for Enhanced security erase completion                                                                                                                   |
| 91     | 0000h | V | Current advanced power management value                                                                                                                                |
| 92     | 0000h | V | Master Password Revision Code                                                                                                                                          |
| 93     | 0000h | X | Hardware reset result                                                                                                                                                  |
| 94-126 | 0000h | V | Reserved                                                                                                                                                               |
| 127    | 0000h | F | Removable Media Status Notification feature set support                                                                                                                |
|        |       | F | 15-2 Reserved                                                                                                                                                          |
|        |       |   | 1-0 00 = Removable Media Status Notification feature set not supported<br>01 = Removable Media Status Notification feature supported<br>10 = Reserved<br>11 = Reserved |
| 128    | 0001h | F | Security status                                                                                                                                                        |
|        |       | V | 15-9 Reserved                                                                                                                                                          |
|        |       | F | 8 Security level 0 = High, 1 = Maximum                                                                                                                                 |
|        |       | F | 7-6 Reserved                                                                                                                                                           |
|        |       | F | 5 1 = Enhanced security erase supported                                                                                                                                |
|        |       | V | 4 1 = Security count expired                                                                                                                                           |
|        |       | V | 3 1 = Security frozen                                                                                                                                                  |

|         |       |   |                                                  |                        |
|---------|-------|---|--------------------------------------------------|------------------------|
|         |       | V | 2                                                | 1 = Security locked    |
|         |       | V | 1                                                | 1 = Security enabled   |
|         |       | F | 0                                                | 1 = Security supported |
| 129-159 | 0000h | X | Vendor specific                                  |                        |
| 160-254 | 0000h | X | Reserved                                         |                        |
| 255     | 0000h | X | Integrity word<br>15-8 Checksum<br>7-0 Signature |                        |

Key:

F/V = Fixed/variable content

F = the content of the word is fixed and does not change. For removable media devices, these values may change when media is removed or changed.

V = the contents of the word is variable and may change depending on the state of the device or the commands executed by the device.

X = the content of the word may be fixed or variable.

## SET FEATURES (EFh)

This command set parameter to Features register and set drive's operation. For transfer mode, parameter is set to Sector Count register. This command is used by the host to establish or select certain features.

Features register value and settable operating mode

| Value | Function                                                   |
|-------|------------------------------------------------------------|
| 02h   | Enable write cache                                         |
| 03h   | Set transfer mode based on value in Sector Count register. |
| 55h   | Disable read look-ahead feature                            |
| 82h   | Disable write cache                                        |
| 90h   | Disable use of SATA feature                                |
| AAh   | Enable read look-ahead feature                             |

## 8. Ordering Information

### KSD-SA18.6-XXXMJ

KSD: Kingspec SSD

SA: SATA Interface

18: 1.8" inch

.6: Controller is JMF606

XXX: Density

| XXX | Density |
|-----|---------|
| 001 | 1GB     |
| 002 | 2GB     |
| 004 | 4GB     |
| 008 | 8GB     |
| 016 | 16GB    |
| 032 | 32GB    |
| 064 | 64GB    |
| 128 | 128GB   |

M: Based on MLC NAND Flash

J: SSD Controller is JMicron

