

SPECIFICATION

TO : Panasonic Industrial Europe GmbH

MODEL NAME : DVD MULTI DRIVE

MODEL No. (CUSTOMER) :

MODEL No. (MKE) : SW-9573-CPN

DATE : July 2, 2004

DATE: _____

APPROVED BY: _____

F/W ver.:

ORIGINATOR : *H. Fukuda*

DATE: *July 2, 2004*

CHECK : *H. Watanabe*

DATE: *July 2, 2004*

APPROVAL : *Y. Takeuchi*

DATE: *July 2, 2004*

CHECK : *Y. Takada*

DATE: *July 2, 2004*

APPROVAL : *M. Yano*

DATE: *July 2, 2004*

SALES : *[Signature]*

DATE: *July 2, 2004*

Matsushita Kotobuki Electronics Industries, Ltd.

Storage Products Business Unit

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1.0 Introduction

This specification applies to DVD-RAM/-R/-RW, +R/+RW and CD-R/RW drive SW-9573-CPN that is delivered to Panasonic Industrial Europe GmbH.

This document describes the specification on the SW-9573-CPN DVD MULTI drive with ATA Packet Interface, packaging and shipping.

2.0 General Specification

The SW-9573-CPN can play the following types of disc:

- | | |
|------|---|
| CD: | CD-Audio
CD-ROM (mode 1 and mode 2)
CD-ROM XA (mode 2, form 1 and form 2)
CD-I (mode 2, form 1 and form 2)
CD-I Ready
CD-I Bridge
CD-R
CD-RW
Photo CD
Video CD
Enhanced Music CD (CD Plus)
CD-TEXT |
| DVD: | DVD-5
DVD-9
DVD-10
DVD-R (3.95G/4.7G)
DVD-RAM (2.6G/4.7G)
DVD-RW
+R
+RW |

The SW-9573-CPN can operate in CAV mode for CD discs, and can operate in CAV mode for DVD discs, and can write in CLV or Z-CLV mode for DVD-RAM/-R/-RW, +R/+RW and CD-R/RW discs.

The SW-9573-CPN supports the following DVD/CD discs and writing methods.

- | | | |
|------|--|---|
| DVD: | DVD-RAM (bare/cartridge discs)
DVD-R 4.7GB for General (Ver.2.0)
DVD-RW (Ver.1.1)

+R

+RW | Random Access
Disc at Once, Incremental
Disc at Once, Incremental,
and Restricted Overwrite
Sequential Recording
Multi-Session
Random Write |
| CD: | CD-R, CD-RW | Disc at Once
Session at Once
Track at Once
Fixed/Variable packet writing
Multi-session |

The SW-9573-CPN has audio circuits and analog audio line out in the integrated I/F connector located on the rear of the drive, but does not have the ADPCM audio circuit.

The MPEG data is not decoded.

CD-DA data can be transferred via IDE I/F.

The outline mechanical dimensions of SW-9573-CPN are as follows.

H: Typical 41.3 mm (exclude Front Panel)

W: Typical 146 mm (exclude Front Panel)

D: Typical 196 mm (exclude Front Panel)

The SW-9573-CPN is a tray type drive that accept to load either 120 mm disc or 80 mm disc for reading and writing. When the 120 mm disc is mounted vertical orientation, certainly attach the disc to the rib on the tray. The 80 mm disc should be loaded on the drive that is mounted horizontal orientation.

The SW-9573-CPN is designed only for discs, which are marked, by CD logo, CD-R logo, CD-RW logo and DVD logo. Don't insert any other abnormal shaped discs (These discs will not be able to be loaded or ejected).

3.0 Performance and Functional Specification

3.1 Key Feature

3.1.1 Data Format

This DVD-RAM/R/RW, +R/+RW and CD-R/RW drive (SW-9573-CPN) is capable of reading and writing, decoding and encoding Error Correction Code in real time and transferring over the IDE interface, the industry standard data format for compact discs in the following formats:

1. CD-DA as defined by “Red Book”.
2. CD-ROM data in Mode 1 & Mode 2 as defined by “Yellow Book”.
3. CD-ROM XA data Form 1 & Form 2.
4. Discs containing combinations of Formats 1, 2 and 3 above in accordance to the current ISO and CD-ROM XA standards.
5. CD-I as defined by “Green Book”, CD-I Bridge & CD-I Ready.
6. Single & multiple session discs as defined by “Orange Book Part 2/3”.
7. CD Rewritable discs as defined by “Orange Book Part 3”.
8. Video CD as defined by “White Book”.
9. Enhanced Music CD as defined by “Blue Book”.
10. CD-TEXT mode.
11. DVD disc as defined by “DVD Specification for Read-only Disc Ver. 1.0”.
12. DVD-R disc as defined by “DVD Specification for Recordable Disc Ver. 2.0”.
13. DVD-RW disc as defined by “DVD Specification for Re-Recordable Disc Ver. 1.1”.
14. DVD-RAM disc as defined by “DVD Specification for Rewritable Disc Ver. 2.1”.
15. +R disc as defined by “DVD+R 4.7Gbytes Basic Format Specification Version 1.11”.
16. +RW disc as defined by “DVD+RW 4.7Gbytes Basic Format Specification Version 1.2”.

3.1.2 Error Correction

The SW-9573-CPN is capable of performing real time error correction on the industry standard data format for a disc in the following formats:

1. CD-DA standard Red Book audio
2. CD-ROM data in Mode 1
3. CD-ROM data in Mode 2
4. CD-ROM data in Mode 2, Form 1
5. CD-ROM data in Mode 2, Form 2
6. Discs containing combinations of Formats 1, 2, 3, 4 and 5 above in accordance to current ISO and CD-ROM XA standards.
7. DVD: RAM, ROM, R, RW standards
8. +R, +RW standards

3.1.3 IDE Interface

The SW-9573-CPN has an IDE Interface that conforms to the ATA Packet interface for DVD-ROM/RAM/R/RW, +R/+RW and CD-ROM/R/RW.

The IDE interface shall also comply with ANSI ATA/ATAPI-6.

3.1.4 Transfer Rate

	Read	Write
DVD-ROM (single layer)	5.0X ~ 12X CAV 6 925 Kbyte/s ~ 16 620 Kbyte/s	- -
DVD-ROM (dual layer)	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	- -
DVD-R (4.7G)	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	4X ~ 8X Z-CLV 5 540 Kbyte/s ~ 11 080 Kbyte/s
DVD-R (3.95G)	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	- -
DVD-RW	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	4X CLV 5 540 Kbyte/s
DVD-RAM (2.6G)	1X Z-CLV 1 385 Kbyte/s	- -
DVD-RAM (4.7G)	5X Z-CLV 6 925 Kbyte/s	5X Z-CLV 6 925 Kbyte/s
+R	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	4X ~ 8X Z-CLV 5 540 Kbyte/s ~ 11 080 Kbyte/s
+RW	3.3X ~ 8X CAV 4 570 Kbyte/s ~ 11 080 Kbyte/s	4X CLV 5 540 Kbyte/s
CD-ROM (*1)	13.8X ~ 32X CAV 2 070 Kbyte/s ~ 4 800 Kbyte/s	- -
CD-R (*1)	13.8X ~ 32X CAV 2 070 Kbyte/s ~ 4 800 Kbyte/s	12X ~ 24X Z-CLV 1 800 Kbyte/s ~ 3 600 Kbyte/s
CD-RW (*1) (Ultra Speed RW)	10.3X ~ 24X CAV 1 545 Kbyte/s ~ 3 600 Kbyte/s	12X ~ 16X Z-CLV 1 800 Kbyte/s ~ 2 400 Kbyte/s
DVD-Video	8X CAV	- -
CD-DA	24X CAV	- -

Note (*1): in case of mode 1 form 2 data

3.1.5 Disc Access Indicator

The SW-9573-CPN has a Green LED on the Front Panel, and it indicates “Busy”.

3.1.6 Data Buffer

The SW-9573-CPN has a data buffer which is implemented as a ring buffer.
The buffer has a size of 2 Mbyte.

3.1.7 Load Eject Mechanism

The SW-9573-CPN has a motor powered tray to load and unload disc. The tray can be operated by the Eject button or START/STOP UNIT command through the IDE interface. And the drive has a 2 mm diameter pin hole for the emergency tray eject.

3.1.8 Audio Feature

The SW-9573-CPN can play audio via a Line Out connector located out the rear of the drive. Volume control is provided by software control.

3.1.9 CD-DA Audio on I/F Feature

CD-DA digital is available through the IDE interface and an error flag can be transferred with CD-DA data. The CD-DA digital data has all normal CD-DA error correction, interpolation and de-emphasis performed prior to being transmitted on the IDE bus. In case of writing, on the other hand, the CD-DA digital data, which is transmitted on IDE bus, is encoded by normal CD-DA error correction and then added Sub-code data according to circumstances prior to being written on the CD-R/RW media.

3.1.10 CD-R/RW media

All CD-R media must conform to Compact Disc Recordable (Orange Book Part 2) provided by Philips Electronics N.V.

All CD-RW media must conform to Compact Disc Rewritable (Orange Book Part 3 and Part 3 Volume 2) provided by Royal Philips Electronics.

3.1.11 Writing Method

The SW-9573-CPN supports the following writing methods.

CD:

- Disc at Once
- Session at Once
- Track at Once
- Multi-session
- Fixed/Variable packet writing

DVD:

DVD-RAM	Random Access
DVD-R 4.7Gbyte for General (Ver.2.0)	Disc at Once, Incremental
DVD-RW (Ver.1.1)	Disc at Once, Incremental, & Restricted Overwrite
+R	Sequential Recording
	Multi-Session
+RW	Random Write

3.2 Performance

3.2.1 Data/Audio Capacity

CD:

Data Capacity	Mode 1	703 Mbyte
	Mode 2	797 Mbyte
Playing Time	79 min and 58 s	

Note: Data Capacity and Playing Time depend on Linear velocity and Track pitch of the disc.
Maximum Data capacity for writing depends on each CD-R/RW media vender and Data format.

DVD:

Data Capacity	Single Layer	4.7Gbyte
	Dual Layer	8.5 Gbyte
	Single Layer Double Side	9.4 Gbyte
	DVD-RAM	2.6 Gbyte
		4.7 Gbyte
	DVD-R	3.95 Gbyte
		4.7 Gbyte
	DVD-RW	4.7 Gbyte
	+R	4.7 Gbyte
	+RW	4.7 Gbyte

Note: Data Capacity and Playing Time are dependent on Liner Velocity and track pitch of the disc.

3.2.2 Transfer Rate (Burst Rate)

PIO	Mode 4	16.67 Mbyte/s
Multiword DMA	Mode 2	16.67 Mbyte/s
Ultra DMA	Mode 2	33.33 Mbyte/s
	Mode 4	66.67 Mbyte/s

3.2.3 Access Time

CD: (Disc: MNSU-005)

Random (*1)	CAV mode	Typical	150 ms
		Average max.	200 ms
Full Stroke (*2)	CAV mode	Typical	290 ms
		Average max.	380 ms

Notes (*1): Average of Data read over the whole area from 00 min 02 s block to 59 min 58 s 74 block, more than 2 000 times including latency and layered error correction time.

(*2): From 00 min 02 s 00 block to 59 min 58 s 74 block, more than 2 000 times including latency and layered error correction time.

DVD-5: (Disc: MKE-D551)

Random (*3)	CAV mode	Typical	160 ms
		Average max.	210 ms
Full Stroke (*4)	CAV mode	Typical	310 ms
		Average max.	400 ms

Notes (*3): Average of Data read over the whole area from starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 23197F), more than 2 000 times including latency and layered error correction time.

(*4): From starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 23197F), more than 2 000 times including latency and layered error correction time.

DVD-RAM (2.6G): (Disc: LM-DB26)

Random (*5)		Typical	250 ms
		Average max.	350 ms
Full Stroke (*6)		Typical	390 ms
		Average max.	590 ms

Notes (*5): Average of Data read over the whole area from starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 12998F), more than 2 000 times including latency and layered error correction time.

(*6): From starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 12998F), more than 2 000 times including latency and layered error correction time.

DVD-RAM (4.7G): (Disc: LM-HB47J)

Random (*7)	Typical	270 ms
	Average max.	380 ms
Full Stroke (*8)	Typical	930 ms
	Average max.	1 900 ms

Notes (*7): Average of Data read over the whole area from starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 22211F), more than 2 000 times including latency and layered error correction time.

(*8): From starting data recorded area (LBA: 0) to maximum data recorded area (LBA: 22211F), more than 2 000 times including latency and layered error correction time.

3.2.4 Spin Up and Spin Down Time

Spin Up Time		
From loading to ready (Not include disc-loading time.)	Typical	15 s (CD, DVD-5)
	Max.	20 s (CD, DVD-5)
From standby mode to ready	Typical	4 s
	Max.	7 s
Spin Down Time	Typical	4 s
	Max.	6 s

Test Disc: CD: MNSU-005 DVD-5: MKE-D551

4.0 Audio Specification (CD-Audio)

4.1 Analog Audio

4.1.1 General

Number of Channels	2 (Stereo)
Sampling Frequency	44.1 kHz
Quantization	16 bit [linear]

4.1.2 Line out

Output Levels	0.65 V [rms] ($R_L=47\text{ k}\Omega$)
Frequency Response	20 Hz ~ 20 000 Hz ($\pm 3\text{ dB}$)
Signal to Noise Ratio	Min. 75 dB
Distortion	Max. 0.1 % (at 1 kHz)
Channel Separation	Min. 65 dB (at 1 kHz)

5.0 Environmental

5.1 Temperature (Ventilation 0.13 m³/min ~ 0.19 m³/min)

Operating	+5 °C ~ +45 °C
Non-Operating	-30 °C ~ +60 °C

5.2 Humidity

Operating (non-condensing)	10 % RH ~ 80 % RH
Non-Operating (non-condensing)	5 % [RH] ~ 90 % [RH]

Note: Max. wet bulb temp. is 29 °C.

5.3 Vibration

5.3.1 Operating

The SW-9573-CPN meet the uncorrectable error rate specification (described in section 7.1 exclude CD-DA) with continuous sine wave vibration at following frequency range, magnitude and direction specified below.

5 Hz ~ 500 Hz (Sweep rate is 1 octave/min)	Read: 1.96 m/s ² {0.2 G} [peak] (Along X, Y and Z axis)
	Write: 0.98 m/s ² {0.1 G} [peak] (Along X, Y and Z axis)

5.3.2 Non-Operating

The SW-9573-CPN will withstand continuous sine wave vibration at a frequency range, magnitude and direction specified below.

5 Hz ~ 500 Hz (Sweep rate is 1 octave/min)	9.8 m/s ² {1.0 G} [peak] (Along X, Y and Z axis)
---	--

5.4 Shock

5.4.1 Operating

The SW-9573-CPN meet the uncorrectable error rate specification (described in section 7.1 exclude CD-DA) with a half sine wave shock at magnitude, interval and direction specified below.

11 ms half sine wave (Input interval is 10 s)	Read: 49.0 m/s ² {5.0 G} [peak] (Along X, Y and Z axis)
	Play Audio: 9.8 m/s ² {1.0 G} [peak] (Along X, Y and Z axis)
	Write: 4.9 m/s ² {0.5 G} [peak] (Along X, Y and Z axis)

5.4.2 Non-Operating

The SW-9573-CPN will withstand shock with a half sine wave shape at magnitude, interval and direction specified below.

11 ms half sine wave	490 m/s ² {50 G} [peak] (Along X, Y and Z axis)
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5.5 Acoustic Noise

Microphone location is 1 m above the drive.

Access mode	Max. 50 dB	(A filter)
-------------	------------	------------

6.0 Power Requirements

6.1 Source Voltage

Voltage	+5 V [DC]	+12 V [DC]
Tolerance	±5 %	±10 %
Ripple	100 mV _[P-P]	200 mV _[P-P]

6.2 Current

	+5 V [DC]		+12 V [DC]	
	CD	DVD	CD	DVD
	max. (typ.) [mA]	max. (typ.) [mA]	max. (typ.) [mA]	max. (typ.) [mA]
Hold track	700 (600)	800 (700)	850 (500)	860 (620)
Read	700 (600)	800 (700)	1 000 (500)	1 630 (680)
Write	950 (800)	1 000 (900)	2 200 (400)	2 300 (700)
Seeking	700 (600)	760 (670)	1 400 (750)	1 150 (850)
Spin-Up	760 (600)	750 (600)	1 670 (400)	1 750 (310)
Stand by	- (100)	- (120)	- (70)	- (70)
Sleep	- (50)	- (50)	- (70)	- (70)

Used Test Disc for Measurement CD: MNSU-005, DVD: MKE-D551

Notes: max. ; Measuring peak current whose pulse width is more than 2 ms.

7.0 Reliability and Serviceability

7.1 Uncorrectable Error Rates

The SW-9573-CPN will meet the following error rates when reading from the following condition disc.

CD which has a maximum block error rate of 3 in 10^2 .

Mode 1	Less than 1 in 10^{12}
Mode 2 Form 1	Less than 1 in 10^{12}
Mode 2 Form 2	Less than 1 in 10^9
CD Audio	Less than 1 in 10^9

DVD which has a maximum 280 PI errors in 8 ECC blocks

Less than 1 in 10^{12}

7.2 Seek Error Rate

Seek Error Rate	Less than 1 in 10^6
-----------------	-----------------------

7.3 Design Life

Traverse mechanism	2 000 000 seek or more (full stroke) (*1)
Tray loading mechanism	30 000 cycle or more

(*1) The 3 s of time interval between each seeks should be taken

7.4 Mean Time Between Failures (MTBF)

MTBF is defined as following condition:

Read and Access duty is 10 % of POH.

MTBF	50 000 POH
------	------------

7.5 Mean Time To Repair (MTTR)

MTTR	30 min
------	--------

8.0 Mechanical Specification

8.1 Drive Unit

8.1.1 Outer Dimensions

Height of drive	Typical 41.3 mm (exclude Front Panel)
Width of drive	Typical 146.0 mm (exclude Front Panel)
Depth of drive	Typical 196.0 mm (exclude Front Panel)

8.1.2 Weight

Weight of drive	Typical 1.18 kg
-----------------	-----------------

8.1.3 Mounting Orientation

Horizontal

The SW-9573-CPN will be capable of orientation when mounted within $\pm 5^\circ$ of the (left to right) horizontal position. In addition, the drive will be capable of operating with up to $\pm 5^\circ$ tilts applied to the front to back dimension.

Vertical

The SW-9573-CPN will be capable of operating with up to $\pm 5^\circ$ tilts applied to the front to back dimension.

Drive upper frame is facing the gravity direction:	less than 0°
Drive lower frame is facing the gravity direction:	less than 5°

8.1.4 Color

Tray	Ivory B-W-4
Bezel	Ivory B-W-4
Tray escutcheon	Ivory B-W-4
Eject button	Ivory B-W-4

8.2 Connector

The SW-9573-CPN has a combined Power/IDE Interface/Jumper/Audio out connector. It consists of a 4-pin Power connector, a 40-pin Interface connector, a 6-pin Master/Slave Jumper, a 4-pin Analog audio connector and a 2-pin Digital audio connector as shown below.

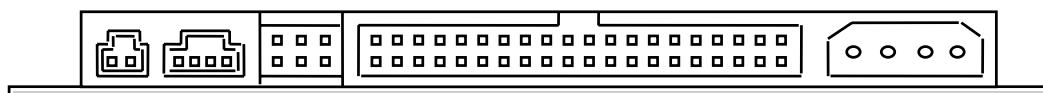


Figure 1 – Combined Power/IDE/Jumper/Audio Connector

8.2.1 Power Connector

The power connector is a four-conductor male plug. The pin assignments are shown Figure 2.

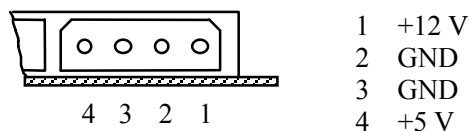


Figure 2 – Power Connector

Recommended part numbers for the mating connector to 18 AWG cable are shown below.

Connector (4 pin)	AMP 1-480424-0 or equivalent
Contacts (loose piece)	AMP 60619-4 or equivalent
Contacts (strip)	AMP 61117-4 or equivalent

8.2.2 IDE connector

The I/O connector is a 40-pin connector as shown Figure 3 with pin assignments as shown in Table 1. The connector is keyed to prevent the possibility of installing it upside down. A key is provided by the removal of pin 20.

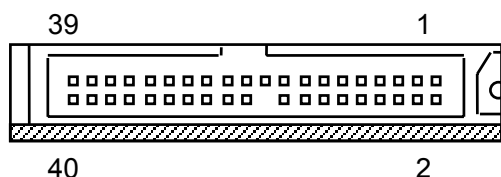


Figure 3 – IDE Connector

Recommended part numbers for the mating connector are shown below.

Connector (40 pin)	3M 3417-7000 or equivalent
Strain relief	3M 3448-2040 or equivalent
Flat cable (standard 28 AWG)	3M 3665-40 or equivalent
Flat cable (standard 28 AWG)	3M 3517-40 (shielded) or equivalent

8.2.3 Master/Slave Jumper

The drive has a 6-pin jumper to enable CSEL, Master and Slave modes. The default shipping state is Master.

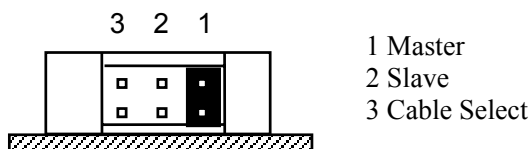


Figure 4 – Jumper

8.2.4 Analog Audio Connector

The Analog Audio Connector is a four-conductor male plug. The pin assignments are shown Figure 5.

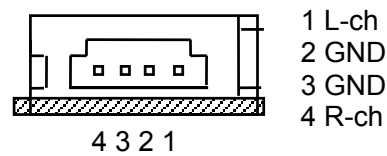


Figure 5 – Analog Audio Connector

Recommended part numbers for the mating connector are shown below.

Connector (4 pin)	Molex 70066 “C” or “G” or equivalent
	70400 “C” or “G” or equivalent
	70430 “C” or “G” or equivalent

8.3 Load/Eject Mechanism

Tray Insertion Force	Typical 8.0 N	
Emergency Eject Force	Typical 11.0 N	
Tray Open Time	Typical 1.0 s	Max. 3.0 s
Tray Close Time	Typical 1.0 s	Max. 3.0 s

9.0 Agency/Safety Certifications

9.1 Safety

UL/cUL (UL60950/CSA 22.2 no.60950-00)
TUV (EN60950: 2000)
SEMKO (EN60950: 2000)
CB IEC60950: 1999(No.3)

9.2 Electromagnetic Compatibility (EMC)

CE Marking (EMC Directive 89/336/EEC)
EN55022 (CISPR Pub.22)
EN55024

EN61000-4-2:	Test Specification	: 4 kV for contact discharge 8 kV for air discharge
EN61000-4-3:	Test Specification	: 3 V/m Modulation: AM 80 % 1 kHz
EN61000-4-4:	Test Specification	: AC 1 kV DC 0.5 kV I/F 0.5 kV (Min. 1 min)
EN61000-4-5:	Test Specification	: AC line to line 1 kV line to ground 2 kV (Min. 1 min)
EN61000-4-6:	Test Specification	: 3 V [rms] Modulation: AM 80 % 1 kHz
EN61000-4-8:	Test Specification	: 1 A/m 1 min
EN61000-4-11:	Test Specification	: Min. 10 s (3 times)

9.3 Laser Safety

21 CFR Subchapter J as a Class 1 laser device
IEC 60825-1/EN60825-1

10.0 IDE Interface Description

10.1 Interface signals

Table 1 – Interface signals description

SIGNAL	Pin	I/O	Description
RESET-	1	I	Drive reset
GROUND	2	—	
DD7	3	I/O	Drive data bus - bit 7
DD8	4	I/O	Drive data bus - bit 8
DD6	5	I/O	Drive data bus - bit 6
DD9	6	I/O	Drive data bus - bit 9
DD5	7	I/O	Drive data bus - bit 5
DD10	8	I/O	Drive data bus - bit 10
DD4	9	I/O	Drive data bus - bit 4
DD11	10	I/O	Drive data bus - bit 11
DD3	11	I/O	Drive data bus - bit 3
DD12	12	I/O	Drive data bus - bit 12
DD2	13	I/O	Drive data bus - bit 2
DD13	14	I/O	Drive data bus - bit 13
DD1	15	I/O	Drive data bus - bit 1
DD14	16	I/O	Drive data bus - bit 14
DD0	17	I/O	Drive data bus - bit 0
DD15	18	I/O	Drive data bus - bit 15
GROUND	19	—	
(KEYPIN)	20	—	
DMARQ	21	O	DMA request
GROUND	22	—	
DIOW-	23	I	Drive I/O write
GROUND	24	—	
DIOR-	25	I	Drive I/O read
GROUND	26	—	
IORDY	27	O	I/O channel ready
SPSYNC: CSEL	28	—	
DMACK-	29	I	DMA acknowledge
GROUND	30	—	
INTRQ	31	O	Drive interrupt
IOCS16-	32	O	Drive 16-bit I/O
DA1	33	I	Drive address bus -bit 1
PDIAG-	34	I/O	Passed diagnostics
DA0	35	I	Drive address bus -bit 0
DA2	36	I	Drive address bus -bit 2
CS0-	37	I	Drive chip select 0
CS1-	38	I	Drive chip select 1
DASP-	39	I/O	Drive active/drive 1 present
GROUND	40	—	

10.2 DC Characteristics

Table 2 – IDE Interface DC characteristics

Parameter	Signal Level	
	Low	High
Input Voltage	0.0 V[DC] ~ 0.8 V[DC]	2.0 V[DC] ~ 5.25 V[DC]
Input Current Sink	4 mA [DC]	
Hysteresis	0.2 V[DC][typ]	
Output Voltage	0.0 V[DC] ~ 0.5 V[DC]	2.4 V[DC] ~ 5.25 V[DC]
Output Current		-0.4 mA[min]
Note: Cable capacitive loading is 40 pF max.		

11.0 IDE commands

11.1 IDE ATA(Task File) commands

Table 3 – ATA commands

Command	Op. Code
ATAPI SOFT RESET	08h
CHECK POWER MODE	E5h
EXECUTE DRIVE DIAG	90h
IDLE IMMEDIATE	E1h
NOP	00h
PACKET COMMAND	A0h
ATAPI IDENTIFY DEVICE	A1h
SET FEATURES	EFh
SLEEP	E6h
STANDBY IMMEDIATE	E0h

11.2 IDE ATAPI Commands

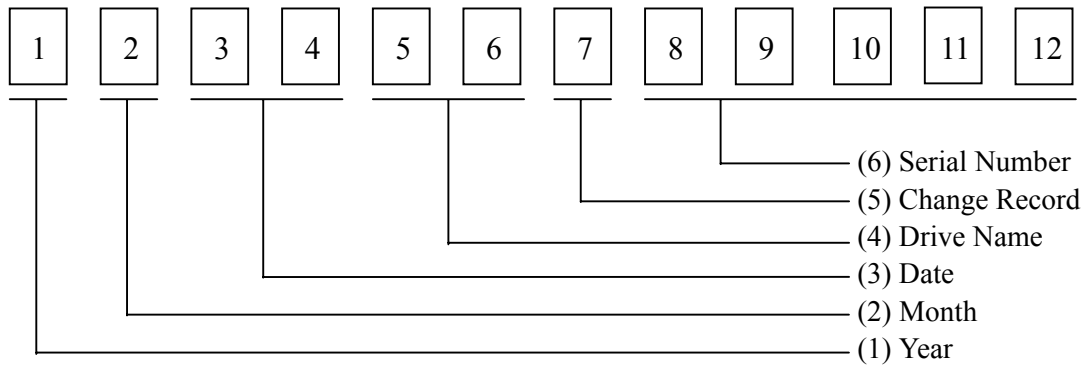
Table 4 – ATAPI Commands (1/2)

Command Description	Op. Code
BLANK	A1h
CLOSE TRACK/RZONE/SESSION/BORDER	5Bh
FORMAT UNIT	04h
GET CONFIGURATION	46h
GET EVENT STATUS NOTIFICATION	4Ah
GET PERFORMANCE	ACh
INQUIRY	12h
MECHANISM STATUS	BDh
MODE SELECT (6)	15h
MODE SELECT (10)	55h
MODE SENSE (6)	1Ah
MODE SENSE (10)	5Ah
PAUSE/RESUME	4Bh
PLAY AUDIO (10)	45h
PLAY AUDIO (12)	A5h
PLAY AUDIO MSF	47h
PREVENT/ALLOW MEDIUM REMOVAL	1Eh
READ (10)	28h
READ (12)	A8h
READ BUFFER	3Ch
READ BUFFER CAPACITY	5Ch
READ CD/DVD CAPACITY	25h
READ CD	BEh
READ CD MSF	B9h
READ DEFECT DATA	37h
READ DISC INFORMATION	51h
READ DVD STRUCTURE	ADh
READ FORMATTED CAPACITY	23h
READ HEADER	44h
READ SUB-CHANNEL	42h
READ TOC/PMA/ATIP	43h
READ TRACK/RZONE INFORMATION	52h
REPAIR RZONE	58h
REPORT KEY	A4h
REQUEST SENSE	03h
REZERO UNIT	01h
RESERVE TRACK/RZONE	53h
SCAN	BAh
SEEK (6)	0Bh
SEEK (10)	2Bh

Table 4 – ATAPI Commands (2/2)

Command Description	Op. Code
SEND CUE SHEET	5Dh
SEND DVD STRUCTURE	BFh
SEND KEY	A3h
SEND OPC INFORMATION	54h
SET CD/DVD SPEED	BBh
SET READ AHEAD	A7h
SET STREAMING	B6h
START/STOP UNIT	1Bh
STOP PLAY/SCAN	4Eh
SYNCHRONIZE CACHE (FLUSH)	35h
TEST UNIT READY	00h
VERIFY (10)	2Fh
VERIFY (12)	AFh
WRITE (6)	0Ah
WRITE (10)	2Ah
WRITE (12)	AAh
WRITE AND VERIFY (10)	2Eh
WRITE AND VERIFY (12)	AEh
WRITE BUFFER	3Bh
WRITE LONG	3Fh

12.0 Manufactured Number



(1) Year

Ex. 2004 → 4 2005 → 5

(2) Month

Ex.

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	2	3	4	5	6	7	8	9	X	Y	Z

(3) Date

Date is indicated by 2 figures.

(4) Drive Name

Ex. SW-9573-CPN → WQ

(5) Change Record (Drive Rev.)

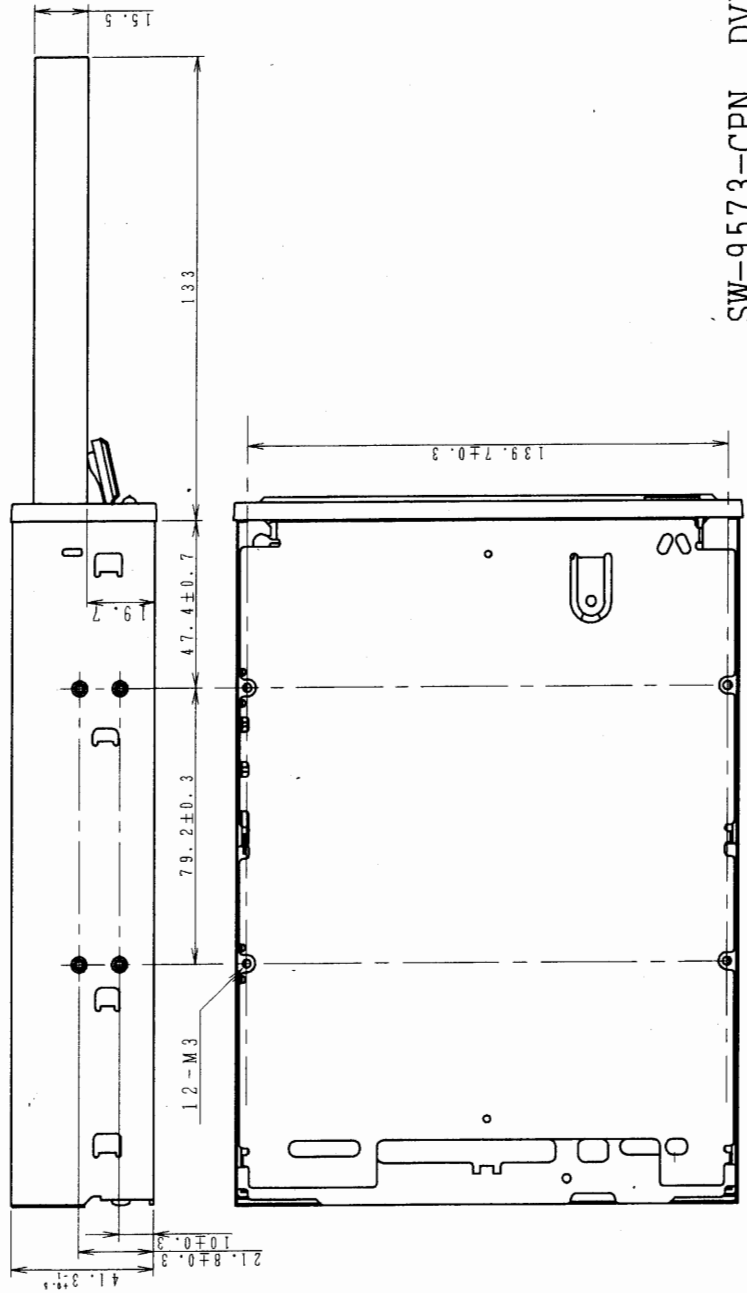
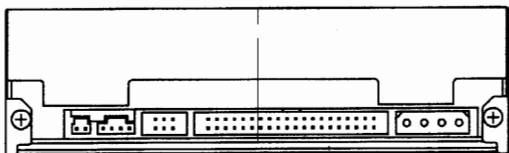
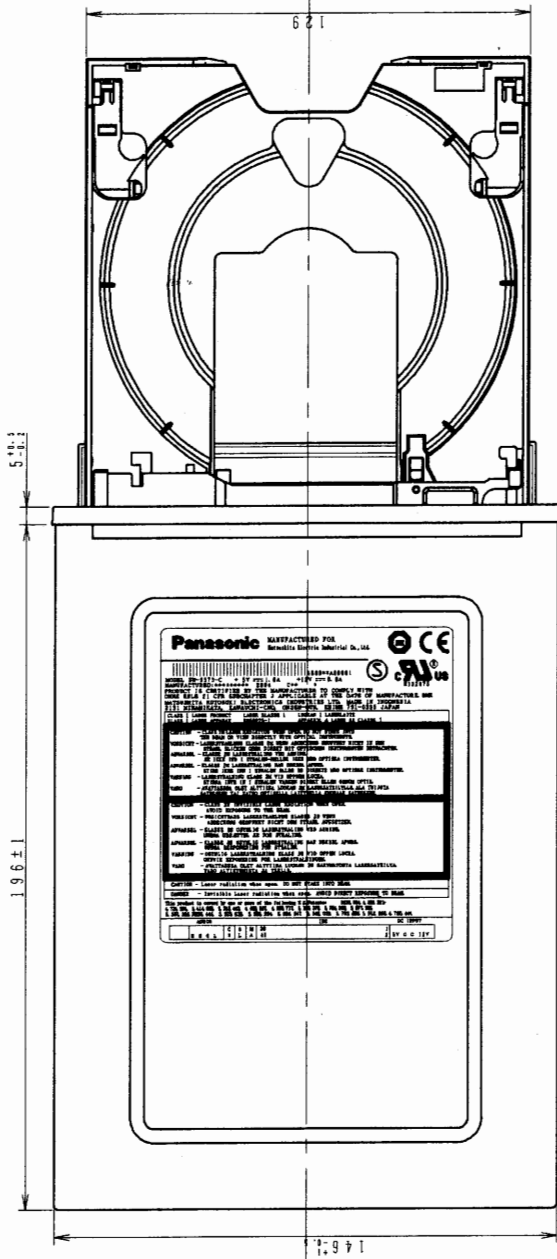
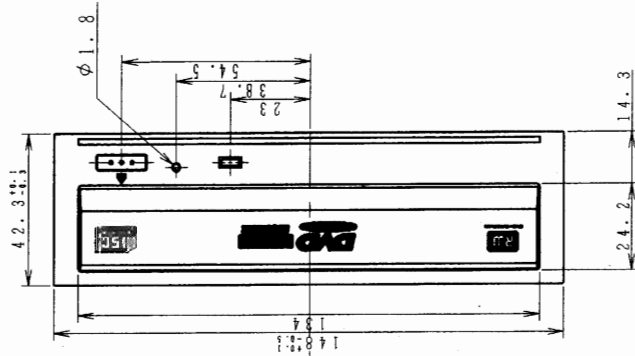
One capital letter of an alphabet is assigned A to Z.
Now change record is "A".

(6) Serial Number

From 00001 to 99999.

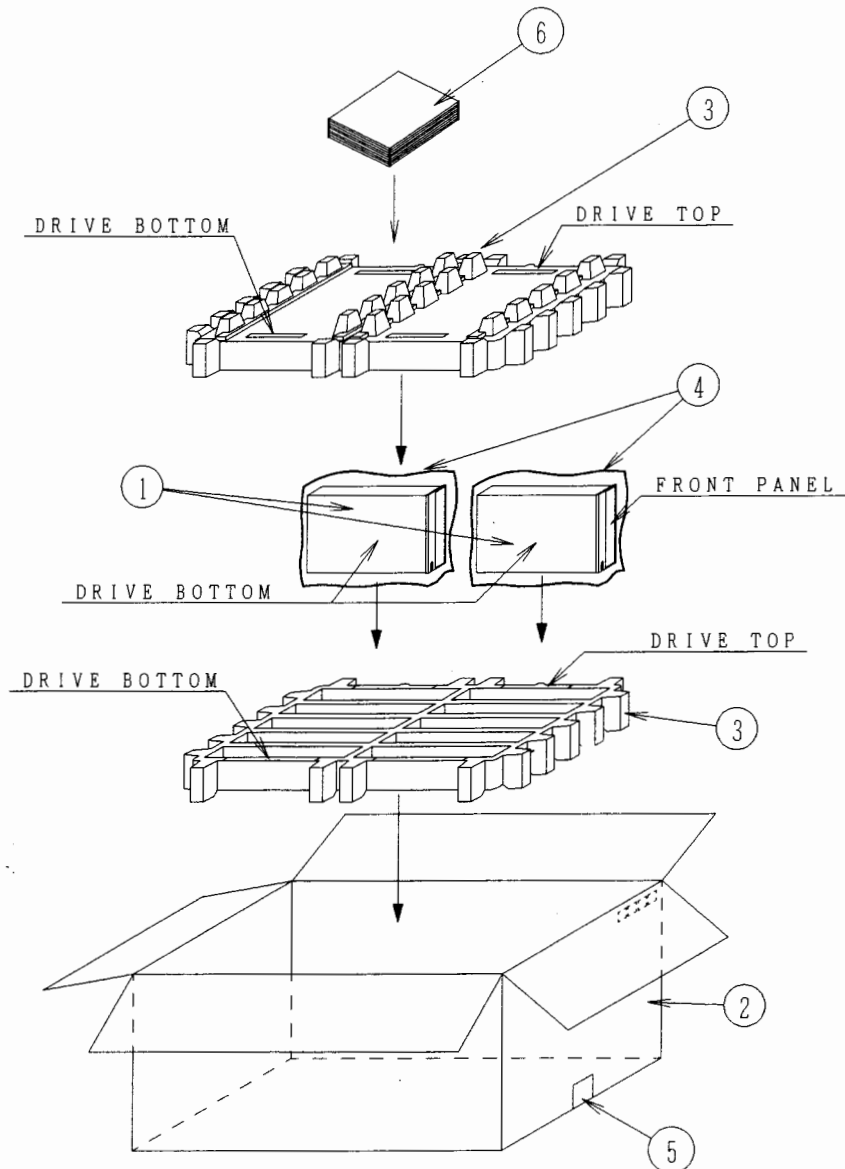
13.0 Accessories

Safety Manual: LMQT00638 (QTY: 10/10)



BULK PACKAGING

- ① DVD-ROM&CD-R/RW DRIVE
- ② 10PACK PACKAGE BOX
- ③ CUSHION
- ④ ANTISTATIC BAG
- ⑤ POLYPROPYLENE TAPES
- ⑥ SAFETY MANUAL (QTY:10/10)



OUTER DIMENSIONS

561mm x 382mm x 289mm

GROSS WEIGHT

12.4 kg

