



OPERATING INSTRUCTIONS

Personal Computer

Model No. **CF-52** series



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Getting Started

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Appendix

Introduction

Thank you for purchasing this Panasonic product. For optimum performance and safety, please read these instructions carefully.

■ Terms and illustrations in these instructions

CAUTION :	Conditions that may result in minor or moderate injury.
NOTE :	Useful and helpful information.
Enter :	Press [Enter] key.
Fn + F5 :	Press and hold [Fn] key, and then press [F5] key.
 (Start) - [All Programs]:	Click  (Start), and then click [All Programs].
 :	Page in these Operating Instructions or in the Reference Manual.
 :	Reference to the on-screen manuals.

- Some illustrations are simplified to help your understanding and may look different from the actual unit.
- If you do not log on as an administrator, you cannot use some functions or cannot display some screens.
- Refer for the latest information about optional products to the catalogs, etc.
- In these instructions, the names and terms are referred as follows.
 - “Genuine Windows® 7 Professional 32-bit Service Pack 1” and “Genuine Windows® 7 Professional 64-bit Service Pack 1” as “Windows” or “Windows 7”
 - DVD MULTI drive as “CD/DVD drive”
 - Circular media including DVD-ROM and CD-ROM as “discs”

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Read Me First

Important Safety Instructions

<Only for model with modem>

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.

SAVE THESE INSTRUCTIONS

19-E-1

Information to the User

<Only for model with wireless LAN/Bluetooth>

This product and your Health

This product, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by this product however is far much less than the electromagnetic energy emitted by wireless devices like for example mobile phones.

Because this product operates within the guidelines found in radio frequency safety standards and recommendations, we believe this product is safe for use by consumers. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature.

In some situations or environments, the use of this product may be restricted by the proprietor of the building or responsible representatives of the organization. These situations may for example include:

- Using this product on board of airplanes, or
- In any other environment where the risk of interference to other devices or services is perceived or identified as harmful.

If you are uncertain of the policy that applies on the use of wireless devices in a specific organization or environment (e.g. airports), you are encouraged to ask for authorization to use this product prior to turning on the product.

Regulatory Information

We are not responsible for any radio or television interference caused by unauthorized modification of this product. The correction of interference caused by such unauthorized modification will be the responsibility of the user. We and its authorized resellers or distributors are not liable for damage or violation of government regulations that may arise from failing to comply with these guidelines.

26-M-1

Lithium Battery

Lithium Battery!

This computer contains a lithium battery to enable the date, time, and other data to be stored. The battery should only be exchanged by authorized service personnel.

Warning! A risk of explosion from incorrect installation or misapplication may possibly occur.

15-E-1

CD/DVD Drive Caution

CAUTION!

THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS, ADJUSTMENTS 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.

12-E-1

The following label is put on the bottom of the computer.



12-1-1

Models for Europe

<Only for model with a “CE Ⓢ” mark on the bottom of the computer>



Declaration of Conformity (DoC)

“Hereby, Panasonic declares that this Personal Computer is in compliance with the essential requirements and other relevant provisions of the Directive 1999/5/EC.”

Hint:

If you want to get a copy of the original DoC of our above mentioned products, please contact our web address: <http://www.doc.panasonic.de>

Authorised Representative:

Panasonic Testing Centre
Panasonic Marketing Europe GmbH
Winsbergring 15, 22525 Hamburg, Germany

Network connection of Wired Modem.

The terminal equipment is intended for connection to the following public network;
In all the countries of European Economical Area and Turkey;
- Public Switched Telephony Networks

Technical Features of Wired Modem.

The terminal equipment includes the following features;

- DTMF dialing
- Maximum bitrate receiving mode: 56 kbit/s
- Maximum bitrate sending mode: 33.6 kbit/s

Indication of the countries where WLAN is intended to be used:

AT BE BG CH CY CZ DE DK EE ES
FI FR GB GR HU IE IS IT LT LU
LV MT NL NO PL PT RO SE SI SK TR

18-25-E-1

<Only for model with a “CE” mark on the bottom of the computer>



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18-E-1

This equipment requires minimum 20 cm spacing from all person's body (excluding extremities of hands, wrist and feet) in directions of the back and both sides of the LCD display during wireless modes of operation.

60-E-1

Models for UK

For your safety, please read the following text carefully.

This appliance is supplied with a molded three pin mains plug for your safety and convenience. A 3 ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 3 ampere and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained. A replacement fuse cover can be purchased from your local dealer.

If the fitted molded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

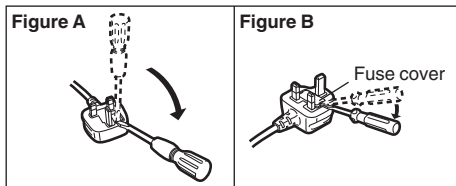
There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

How to replace the fuse

The location of the fuse differs according to the type of AC mains plug (figures A and B).

Confirm the AC mains plug fitted and follow the instructions below. Illustrations may differ from actual AC mains plug.

Open the fuse cover with a screwdriver and replace the fuse and close or attach the fuse cover.



8-E-1

Precautions

THIS PRODUCT IS NOT INTENDED FOR USE AS, OR AS PART OF, NUCLEAR EQUIPMENT/SYSTEMS, AIR TRAFFIC CONTROL EQUIPMENT/SYSTEMS, AIRCRAFT COCKPIT EQUIPMENT/SYSTEMS, MEDICAL DEVICES OR ACCESSORIES^{*1}, LIFE SUPPORT SYSTEMS OR OTHER EQUIPMENTS/DEVICES/SYSTEMS THAT ARE INVOLVED WITH ENSURING HUMAN LIFE OR SAFETY. PANASONIC WILL NOT BE RESPONSIBLE FOR ANY LIABILITY RESULTING FROM THE USE OF THIS PRODUCT ARISING OUT OF THE FOREGOING USES.

^{*1} As defined by the European Medical Device Directive (MDD) 93/42/EEC.

Panasonic cannot guarantee any specifications, technologies, reliability, safety (e.g. Flammability/Smoke/Toxicity/Radio Frequency Emission, etc) requirements related to aviation standards and medical equipment standards that differ from the specifications of our COTS (Commercial-Off-The-Shelf) products.

This computer is not intended for use in medical equipment including life-support systems, air traffic control systems, or other equipment, devices or systems that are involved with ensuring human life or safety. Panasonic cannot be held responsible in any way for any damages or loss resulting from the use of this unit in these types of equipment, devices or systems, etc.

This computer has been designed so as to minimize shock to the LCD and hard disk drive, the leakage of liquid (e.g., water) on to the keyboard, etc., but no warranty is provided against such trouble. Therefore, as a precision instrument, be extremely careful in the handling.

If a Malfunction or Trouble Occurs, Immediately Stop Use

If a Malfunction Occurs, Immediately Unplug the AC Plug and the Battery Pack

- This product is damaged
- Foreign object inside this product
- Smoke emitted
- Unusual smell emitted
- Unusually hot

Continuing to use this product while any of the above conditions are present may result in fire or electric shock.

- If a malfunction or trouble occurs, immediately turn the power off and unplug the AC plug, and then remove the battery pack. Then contact your technical support office for repair.

Do Not Touch This Product In a Thunderstorm If Connected with the AC Cable or Any Other Cables

Electric shock may result.

Do Not Connect the AC Adaptor to a Power Source Other Than a Standard Household AC Outlet

Otherwise, a fire due to overheating may result. Connecting to a DC/AC converter (inverter) may damage the AC adaptor. On an airplane, only connect the AC adaptor/charger to an AC outlet specifically approved for such use.

Do Not Do Anything That May Damage the AC Cord, the AC Plug, or the AC Adaptor

Do not damage or modify the cord, place it near hot tools, bend, twist, or pull it forcefully, place heavy objects on it, or bundle it tightly.

Continuing to use a damaged cord may result in fire, short circuit, or electric shock.

Do Not Pull or Insert the AC Plug If Your Hands Are Wet

Electric shock may result.

Clean Dust and Other Debris of the AC Plug Regularly

If dust or other debris accumulates on the plug, humidity, etc. may cause a defect in the insulation, which may result in a fire.

- Pull the plug, and wipe it with a dry cloth.

Pull the plug if the computer is not being used for a long period of time.

Insert the AC Plug Completely

If the plug is not inserted completely, fire due to overheating or electric shock may result.

- Do not use a damaged plug or loose AC outlet.

Do Not Place Containers of Liquid or Metal Objects on Top of This Product

If water or other liquid spills, or if paper clips, coins, or foreign matter get inside this product, fire or electric shock may result.

- If foreign matter has found its way inside, immediately turn the power off and unplug the AC plug and remove the battery pack. Then contact your technical support office.

Do Not Disassemble This Product

You may receive an electric shock, or foreign matter may enter and result in a fire.

Keep SD Memory Cards Away from Infants and Small Children

Accidental swallowing will result in bodily injury.

- In the event of accidental swallowing, see a doctor immediately.

Do Not Place This Product on Unstable Surfaces

If balance is lost, this product may fall over or drop, resulting in an injury.

Avoid Stacking

If balance is lost, this product may fall over or drop, resulting in an injury.

Do Not Leave This Product in High Temperature Environment for a Long Period of Time

Leaving this product where it will be exposed to extremely high temperatures such as near fire or in direct sunlight may deform the cabinet and/or cause trouble in the internal parts. Continued use in such a resulting condition may lead to short-circuiting or insulation defects, etc. which may in turn lead to a fire or electric shocks.

Do Not Block the Ventilation Hole (Exhaust)

Using this product wrapped in cloth or on top of bedding or a blanket can block the ventilation hole and cause heat to build up inside, possibly resulting in a fire.

Hold the Plug When Unplugging the AC Plug

Pulling on the cord may damage the cord, resulting in a fire or electric shock.

Do Not Move This Product While the AC Plug Is Connected

The AC cord may be damaged, resulting in fire or electric shock.

- If the AC cord is damaged, unplug the AC plug immediately.

Use Only the Specified AC Adaptor With This Product

Using an AC adaptor other than the one supplied (supplied with the unit or one sold separately as an accessory) may result in a fire.

Do Not Subject the AC Adaptor to Any Strong Impact

Using the AC adaptor after a strong impact such as being dropped may result in electric shock, short circuit, or fire.

Take a Break of 10-15 Minutes Every Hour

Using this product for long periods of time may have detrimental health effects on the eyes or hands.

Do Not Look into the CD/DVD Drive

Looking directly at the internal laser light source may result in damage to eyesight.

Do Not Use Discs That Are Cracked or Deformed

Because the discs rotate at high speeds, damaged discs may break apart causing injury.

- Discs that are not round and discs that have been repaired using adhesives are similarly dangerous, and so should not be used.

Do Not Turn the Volume Up to Loud When Using Headphones

Listening at high volumes that overstimulate the ear for long periods of time may result in loss of hearing.

Do Not Connect a Telephone Line, or a Network Cable Other Than the One Specified, into the LAN Port

If the LAN port is connected to a network such as the ones listed below, a fire or electric shock may result.

- Networks other than 1000BASE-T, 100BASE-TX or 10BASE-T
- Phone lines (IP phone (Internet Protocol Telephone), Telephone lines, internal phone lines (on-premise switches), digital public phones, etc.)

Do Not Use This Product in Close Contact With Your Body For a Long Period of Time

- Depending on the direction of the computer or the way you hold the computer, your hands and body will be more exposed to the hot wind.
- Using this product with exposing the skin to the heat source of this product or AC adaptor for a long period of time can cause a low-temperature burn.

Do Not Expose Yourself or Other Persons to the Hot Wind from the Ventilation Hole (Exhaust) for a Long Period of Time.

Low-temperature burns may result.

Covering the ventilation hole (exhaust) with your hand or other object can cause heat to build up inside, possibly resulting in burns.

<Only for model with modem>**Use the Modem With a Regular Telephone Line**

Connection to an internal phone line (on-premise switches) of a company or business office, etc. or to a digital public phone or use in a country or area not supported by the computer may result in a fire or electric shocks.

- Do not place the computer near a television or radio receiver.
- Keep the computer away from magnets. Data stored on the hard disk may be lost.
- This computer is not intended for the display of images for use in medical diagnosis.
- This computer is not intended for a use with connection of medical equipment for the purpose of medical diagnosis.
- Panasonic shall not be liable for loss of data or other incidental or consequential damages resulting from the use of this product.

Interface Cable

Use of an interface cable longer than 3 m is not recommended.

11-E-1

Precautions (Battery Pack)

Do Not Use With Any Other Product

The battery pack is rechargeable and was intended for the specified product. If it is used with a product other than the one for which it was designed, electrolyte leakage, generation of heat, ignition or rupture may result.

Do Not Charge the Battery Using Methods Other Than Those Specified

If the battery is not charged using one of the specified methods, electrolyte leakage, generation of heat, ignition or rupture may result.

Do Not Throw the Battery Pack into a Fire or Expose It to Excessive Heat

Generation of heat, ignition or rupture may result.

Avoid Extreme Heat (Near the Fire, in Direct Sunlight, for Example)

Electrolyte leakage, generation of heat, ignition or rupture may result.

Do Not Insert Sharp Objects into the Battery Pack, Expose It to Bumps or Shocks, Disassemble, or Modify It

Electrolyte leakage, generation of heat, ignition or rupture may result.

- If this product is subjected to a strong impact, stop using it immediately.

Do Not Short the Positive (+) and Negative (-) Contacts

Generation of heat, ignition or rupture may result.

- Do not place the battery pack together with articles such as necklaces or hairpins when carrying or storing.

Do Not Use This Product With a Battery Pack Other Than the One Specified

Use only the specified battery pack (□ page 9) with your product. Use of battery packs other than those manufactured and supplied by Panasonic may present a safety hazard (generation of heat, ignition or rupture).

When the battery pack has deteriorated, replace it with a new one

Continued use of a damaged battery pack may result in heat generation, ignition or battery rupture.

CAUTION:




Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

58-E-1

- Do not touch the terminals on the battery pack. The battery pack may no longer function properly if the contacts are dirty or damaged.
- Do not expose the battery pack to water, or allow it to become wet.
- If the battery pack will not be used for a long period of time (a month or more), charge or discharge (use) the battery pack until the remaining battery level becomes 30% to 40% and store it in a cool, dry place.
- This computer prevents overcharging of the battery by recharging only when the remaining power is less than approx. 95% of capacity.


- The battery pack is not charged when the computer is first purchased. Be sure to charge it before using it for the first time. When the AC adaptor is connected to the computer, charging begins automatically.
- Should the battery leak and the fluid get into your eyes, do not rub your eyes. Immediately flush your eyes with clear water and see a doctor for medical treatment as soon as possible.

NOTE

- The battery pack may become warm during recharging or normal use. This is completely normal.
- Recharging will not commence if internal temperature of the battery pack is outside of the allowable temperature range (0 °C to 50 °C) (→  Reference Manual "Battery Power"). Once the allowable range requirement is satisfied, charging begins automatically. Note that the recharging time varies based on the usage conditions. (Recharging takes longer than usual when the temperature is 10 °C or below.)
- If the temperature is low, the operating time is shortened. Only use the computer within the allowable temperature range.
- This computer has a high temperature mode function that prevents the degradation of the battery in high temperature environments. (→  Reference Manual "Battery Power") A level corresponding to a 100% charge for high temperature mode is approximately equivalent to an 80% charge level for normal temperature mode.
- The battery pack is a consumable item. If the amount of time the computer can be run by using a particular battery pack becomes dramatically shorter and repeated recharging does not restore its performance, the battery pack should be replaced with a new one.
- When transporting a spare battery inside a package, briefcase, etc., it is recommended that it be placed in a plastic bag so that its contacts are protected.
- Always power off the computer when it is not in use. Leaving the computer on when the AC adaptor is not connected will exhaust the remaining battery capacity (→  Reference Manual "LAN").

Specifications

This page provides the specifications for the basic model. The model number is different according to the unit configuration.

- To check the model number:
Check the bottom of the computer or the box the computer came in at the time of purchase.
- To check CPU speed, memory size and the hard disk drive (HDD) size:
Run the Setup Utility (→  *Reference Manual* "Setup Utility") and select [Information] menu.
[Processor Speed]: CPU speed, [Memory Size]: Memory size, [Hard Disk]: Hard disk drive size

■ Main Specifications

Model No.	CF-52VACBYDE	
CPU/Secondary cache memory	Intel® Core™ i5-3360M Processor (3 MB ^{*1} cache, up to 2.8 GHz) with Intel® Turbo Boost Technology	
Chip Set	Mobile Intel® QM77 Express Chipsets	
Video controller	AMD Radeon™ HD7750M	
Main Memory ^{*2}	4 GB ^{*1} , DDR3L SDRAM (16 GB ^{*1} Max.)	
Video Memory	512 MB ^{*1} dedicated (<32-bit> 1915 MB ^{*1} Max., <64-bit> 2283 MB ^{*1} Max./4331 MB ^{*1} with extended memory) ^{*3}	
Hard Disk Drive	500 GB ^{*4} (Serial ATA) Approx. 15 GB ^{*4} is used as a recovery partition. (Users cannot use this partition.)	
CD/DVD Drive	DVD MULTI Drive built-in, Buffer underrun error prevention function: Supported	
Continuous Data Transfer Speed ^{*5*6}	Reading ^{*7}	●DVD-RAM ^{*8} : 5X (Max.) ●DVD-R ^{*9} : 8X (Max.) ●DVD-R DL: 8X (Max.) ●DVD-RW: 8X (Max.) ●DVD-ROM: 8X (Max.) ●+R: 8X (Max.) ●+R DL: 8X (Max.) ●+RW: 8X (Max.) ●High Speed +RW: 8X (Max.) ●CD-ROM: 24X (Max.) ●CD-R: 24X (Max.) ●CD-RW: 24X (Max.) ●High-Speed CD-RW: 24X (Max.) ●Ultra-Speed CD-RW: 24X (Max.)
	Writing ^{*10}	●DVD-RAM ^{*8} : 5X (Max.) ●DVD-R ^{*9} : 8X (Max.) ●DVD-R DL: 6X (Max.) ●DVD-RW: 6X (Max.) ●+R: 8X (Max.) ●+R DL: 6X (Max.) ●+RW: 4X (Max.) ●High Speed +RW: 8X (Max.) ●CD-R: 24X (Max.) ●CD-RW: 4X ●High-Speed CD-RW: 10X ●Ultra-Speed CD-RW: 24X (Max.)
Supported Discs/Format	Reading	●DVD-ROM (Single Layer, Dual Layer) ●DVD-Video ●DVD-R ^{*9} (1.4 GB, 3.95 GB, 4.7 GB) ^{*4} ●DVD-R DL (8.5 GB) ^{*4} ●DVD-RW (Ver.1.1/1.2 1.4 GB, 2.8 GB, 4.7 GB, 9.4 GB) ^{*4} ●DVD-RAM ^{*8} (1.4 GB, 2.6 GB, 2.8 GB, 4.7 GB, 5.2 GB, 9.4 GB) ^{*4} ●+R (4.7 GB) ^{*4} ●+R DL (8.5 GB) ^{*4} ●+RW (4.7 GB) ^{*4} ●High Speed +RW (4.7 GB) ^{*4} ●CD-Audio ●CD-ROM (XA compatible) ●CD-R ●Photo CD (multiple session compatible) ●Video CD ●CD-EXTRA ●CD-RW ●High-Speed CD-RW ●Ultra-Speed CD-RW ●CD-TEXT
	Writing	●DVD-RAM ^{*8} (1.4 GB, 2.8 GB, 4.7 GB, 9.4 GB) ^{*4} ●DVD-R ^{*9} (1.4 GB, 4.7 GB for General) ^{*4} ●DVD-R DL (8.5 GB) ^{*4} ●DVD-RW (Ver.1.1/1.2 1.4 GB, 2.8 GB, 4.7 GB, 9.4 GB) ^{*4} ●+R (4.7 GB) ^{*4} ●+R DL (8.5 GB) ^{*4} ●+RW (4.7 GB) ^{*4} ●High Speed +RW (4.7 GB) ^{*4} ●CD-R ●CD-RW ●High-Speed CD-RW ●Ultra-Speed CD-RW
Display Method	15.4 WUXGA type (TFT) (1920 × 1200 dots)	
Internal LCD	65,536/16,777,216 colors (800 × 600 dots / 1024 × 768 dots / 1280 × 768 dots / 1600 × 1200 dots / 1680 × 1050 dots / 1920 × 1080 dots / 1920 × 1200 dots) ^{*11}	
External Display ^{*12}	65,536 / 16,777,216 colors (800 × 600 dots / 1024 × 768 dots / 1280 × 768 dots / 1600 × 1200 dots / 1920 × 1080 dots / 1920 × 1200 dots)	
Wireless LAN ^{*13}	Intel® Centrino® Advanced-N 6235 (→ page 12)	
Bluetooth ^{*14}	→ page 12	
LAN	IEEE 802.3 10Base-T / IEEE 802.3u 100BASE-TX / IEEE 802.3ab 1000BASE-T	
Modem ^{*15}	Data: 56 kbps (V.92) FAX: 14.4 kbps	
Sound	WAVE and MIDI playback, Intel® High Definition Audio subsystem support	
Security Chip	TPM (TCG V1.2 compliant) ^{*16}	

Specifications

■ Main Specifications

Card Slots	PC Card Slot	x 1, Type I or Type II, Allowable current 3.3 V: 400 mA, 5 V: 400 mA	
	ExpressCard Slot	x 1, ExpressCard/34 or ExpressCard/54	
	SD Memory Card Slot ^{*17}	x 1	
	Contact Smart Card Slot ^{*18}	x 1	
RAM Module Slot		x 2, DDR3L SDRAM, 204-pin, 1.35 V, SO-DIMM, PC3-10600 Compliant	
Interface		USB Ports x 4 (USB 2.0 x 2 + USB 3.0 x 2) ^{*19} / Serial Port (Dsub 9-pin male) / Modem Port (RJ-11) ^{*15} / LAN Port (RJ-45) / External Display Port (VGA) (Mini Dsub 15-pin female) / IEEE1394a Interface Connector (4-pin) ^{*20} / Microphone Jack (Miniature jack, 3.5 DIA) / Headphone Jack (Miniature jack, 3.5 DIA, Impedance 32 Ω, Output Power 4 mW × 2, Stereo) / Expansion Bus Connector (Dedicated 100-pin female)	
Keyboard / Pointing Device		87 or 88 keys / Touch Pad	
Fingerprint Reader ^{*21}		Array Size : 248 x 4 pixels, Image Size : 248 x 360 pixels, Image Resolution : 508 DPI	
Power Supply		AC adaptor or Battery pack	
AC Adaptor		Input: 100 V - 240 V AC, 50 Hz/60 Hz, Output: 15.6 V DC, 7.05 A	
Battery Pack		Li-ion 10.8 V, Typical 6750 mAh / Minimum 6300 mAh	
Operating Time ^{*22}		Approx. 4 hours	
Charging Time ^{*23}		Approx. 2 hours	
Power Consumption ^{*24}		Approx. 60 W ^{*25} / Approx. 100 W (maximum when recharging in the ON state)	
Physical Dimensions (W × D × H) (including the carrying handle)		355.7 mm × 286.8 mm × 50.7 - 51.9 mm	
Weight (including the carrying handle)		Approx. 3.4 kg	
Environment	Operating	Temperature	5 °C to 35 °C
		Humidity	30% to 80% RH (No condensation)
	Storage	Temperature	-20 °C to 60 °C
		Humidity	30% to 90% RH (No condensation)

■ Software

Installed OS ^{*26}	Genuine Windows® 7 Professional 32-bit Service Pack 1 / Genuine Windows® 7 Professional 64-bit Service Pack 1
Pre-installed Software	Adobe Reader, PC Information Viewer, Intel® PROSet/Wireless Software ^{*13} , Bluetooth Stack for Windows® by TOSHIBA ^{*14} , Wireless Switch Utility, Wireless Connection Disable Utility ^{*13} ^{*27} , Hotkey Settings, Battery Recalibration Utility, Infineon TPM Professional Package ^{*16} ^{*27} , Protector Suite 2011 ^{*21} ^{*27} , Aptio Setup Utility, PC-Diagnostic Utility, Roxio Creator LJB, Cyber-Link PowerDVD 10, Concealed Mode Utility, Recovery Disc Creation Utility, Hard Disk Data Erase Utility ^{*28} , Dashboard for Panasonic PC, Quick Boot Manager, Power Plan Extension utility

■ Wireless LAN*13

Data Transfer Rates	IEEE802.11a : 54/48/36/24/18/12/9/6 Mbps (automatically switched)*29 IEEE802.11b : 11/5.5/2/1 Mbps (automatically switched)*29 IEEE802.11g : 54/48/36/24/18/12/9/6 Mbps (automatically switched)*29 IEEE802.11n*30 : (HT20)GI*31 = 400ns: 150/130/115/86/72/65/57/43/28/21/14/7 Mbps (automatically switched)*29 GI*31 = 800ns: 130/117/104/78/65/58/52/39/26/19/13/6 Mbps*29 (HT40)GI*31 = 400ns: 300/270/240/180/150/135/120/90/60/45/30/15 Mbps (automatically switched)*29 GI*31 = 800ns: 270/243/216/162/135/121/108/81/54/40/27/13 Mbps*29
Standards Supported	IEEE802.11a / IEEE802.11b / IEEE802.11g / IEEE802.11n
Transmission Method	OFDM system, DS-SS system
Wireless Channels Used	IEEE802.11a : Channels 36/40/44/48/52/56/60/64/100/104/108/112/116/120/124/128/132/136/140 IEEE802.11b/IEEE802.11g : Channels 1 to 13 IEEE802.11n : Channels 1-13/36/40/44/48/52/56/60/64/100/104/108/112/116/120/124/128/132/136/140
RF Frequency Band	IEEE802.11a : 5.18 GHz - 5.32 GHz, 5.5 GHz - 5.7 GHz IEEE802.11b/IEEE802.11g : 2.412 GHz - 2.472 GHz IEEE802.11n : 2.412 GHz - 2.472 GHz, 5.18 GHz - 5.32 GHz, 5.5 GHz - 5.7 GHz

■ Bluetooth*14

Bluetooth Version	4.0 Classic mode / Low Energy mode
Transmission Method	FHSS system
Wireless Channels Used	Channel 1 to 79 / Channel 0 to 39
RF Frequency Band	2.402 GHz - 2.480 GHz

*1 1 KB = 1,024 bytes / 1 MB = 1,048,576 bytes /
1 GB = 1,073,741,824 bytes

*2 Memory size of the factory default depends on the model.
You can physically expand the memory up to 16 GB, but the total amount of usable memory available will be less depending on the actual system configuration.

*3 A segment of the main memory is allotted automatically depending on the computer's operating status. The size of the Video Memory cannot be set by the user. The size of Video memory is allotted depending on the operating system.

*4 1 MB = 1,000,000 bytes / 1 GB = 1,000,000,000 bytes. Your operating system or some application software will report as fewer GB.

*5 Data transfer speeds indicate values measured by Panasonic Corporation. The data transfer rate of DVD per 1X speed is 1,350 KB/s. The data transfer rate of CD per 1X speed is 150 KB/s.

*6 Performance of CD-R, CD-RW, DVD-RAM, DVD-R, DVD-R DL, DVD-RW, +R, +R DL, and +RW cannot be guaranteed depending on writing status and recording format. Also, some data cannot be played back depending on the disc, settings, and environment being used.

*7 If an unbalanced disc (e.g., a disc with which the balance has been displaced from the center) is inserted, the speed may become slower if there are large vibrations while the disc is rotating.

*8 Only non-cartridge type or removable cartridge type can be used.

*9 DVD-R is compatible with 4.7 GB (for General) playback. DVD-R (for Authoring) playback is compatible with discs recorded using Disc-at-Once recording.

*10 Depending on the disc, the writing speed may become slower.

*11 A 16,777,216 color display is achieved by using the dithering function.

*12 Display may be impossible using some connected external displays.


*13 Only for model with wireless LAN.

*14 Only for model with Bluetooth.

*15 Only for model with modem.

*16 Only for model with TPM.

For information on TPM, refer to the Installation Manual of "Trusted Platform Module (TPM)" by the following procedure.

Click  (Start) and input "c:\util\drivers\tpm\index.hta" in [Search programs and files] and press **Enter**.

Specifications

- *17 This slot is compatible with High-Speed Mode. Operation has been tested and confirmed using Panasonic SD/SDHC/SDXC Memory Cards with a capacity of up to 64 GB. Operation on other SD equipment is not guaranteed.
- *18 Only for model with Smart Card slot.
- *19 Does not guarantee operation of all USB-compatible peripherals.
- *20 Only for model with IEEE 1394a interface.
- *21 Only for model with Fingerprint reader.
- *22 Measured with LCD brightness : 60 cd/m^2
Varies depending on the usage conditions, or when an optional device is attached.
- *23 Varies depending on the usage conditions, CPU speed, etc.
- *24 Approx. 0.5 W when the battery pack is fully charged (or not being charged) and the computer is off.
<When using with 115 V AC>
Even when the AC adaptor is not connected to the computer, power is consumed (Max. 0.2 W) simply by having the AC adaptor plugged into an AC outlet.
<When using with 240 V AC>
Even when the AC adaptor is not connected to the computer, power is consumed (Max. 0.3 W) simply by having the AC adaptor plugged into an AC outlet.
- *25 Rated power consumption. 23-E-1
- *26 Operations of this computer are not guaranteed except for the pre-installed OS and the OS which is installed by using the Recovery disc. Some parts of the software in the Recovery disc may not be installed depending on a model.
- *27 Must be installed before use.
- *28 Perform on the recovery partition. (If this software can not be performed on the recovery partition, perform from the recovery disc)
- *29 These are speeds specified in IEEE802.11a+b+g+n standards. Actual speeds may differ.
- *30 Available when set to "AES".
- *31 Only available when HT40 enabled by the computer and access point which associated supports HT40.



As an ENERGY STAR[®] Partner, Panasonic Corporation has determined that this product meets ENERGY STAR[®] guidelines for energy efficiency. By enabling available power management settings, Panasonic computers enter a low-power sleep mode after a period of inactivity, saving the user energy.

Outline of the International ENERGY STAR[®] Office Equipment Program

The international ENERGY STAR[®] Office Equipment Program is an international program that promotes energy saving through the use of computers and other office equipment. The program backs the development and dissemination of products with functions that effectively reduce energy consumption. It is an open system in which business proprietors can participate voluntarily. The targeted products are office equipment such as computers, displays, printers, facsimiles, and copiers. Their standards and logos are uniform among participating nations.

22-E-1

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