IT-600 Series

Hardware Manual

(Version 1.00)

CASIO Computer Co., Ltd.

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Editorial Record

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Preface

A newest PDA-style industrial data terminal with four models (IT-600M30, IT-600M30C, IT-600M30R, and IT-600M30CR) made available offers IP54 level of dust and water-splash proof compliant with the IEC60529 standard, and the shock resistance to withstand a fall from up to 1.2 meters. The pocket-sized and portable IT-600 series comes with various noteworthy features including the following.

- Built-in high performance laser scanner capable of reading industry standard symbologies
- A wide range of wireless communications via either Bluetooth® or WLAN (IEEE802.11b/g)
- Rugged casing to allow use in extreme environments
- Original CASIO digital technology enables capturing of images in all light conditions.
- Microsoft® Windows® CE 5.0 offers reliable and real time capabilities.
- Superb quality VGA resolution color screen
- miniSD card slot for extra storage
- Compliant with the European Union's Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment directive ("RoHS")

In this manual, the hardware specifications of the IT-600 series and its dedicated options are described in detail. For references related to the software and the programming libraries refer to the respective manuals available separately.

1. Overview Of The Products

1.1. Features

Supporting the outstanding development environment
- Windows®CE 5.0 as the built-in OS
- Visual Studio .NET 2003 (Windows®CE .NET Utilities v 1.1 for Visual Studio .NET 2003)
- eMbedded Visual C++ 4.0

Compatibility to various communication systems
- Built-in ultra-small WLAN module with the capability of IEEE802.11b and IEEE802.11g standards
- High speed infrared communication with IrDA Ver1.3
- Bluetooth® Version 1.2
- Serial interface with USB version 1.1 (Host/Client)

Small size, light weight (improved portability)
- Dimensions: Approx. 82 (W) x 166 (D) x 23 (H) mm
- Weight: Approx. 290 g

Improved resistance to environment
- Resistance to fall impact: 1.2 m in height
- Dust/Water-splash proof : IP54 (compliant with IEC60529 International Standard)

Capable of scanning industrial standard bar code symbologies
- Readable bar code symbologies : UPC-A/E, EAN, NW-7, CODE39, CODE93, CODE128/EAN128, ITF, MSI, Industrial 2of5, IATA, RSS-14, RSS Limited, RSS Expanded

Outstanding performance/Large memory
- High-performance CPU Intel® PXA270 Application Processor (Max. 520 MHz)
- Large-capacity memory RAM   : 64 MB
                          F-ROM   : 128 MB (user area; approximately 60 MB)

Aiming to a full compliance with the "Restriction of the use of certain Hazardous Substances in electronic equipment (RoHS)" set mandatory on July 1 2006
The following products have been assembled with devices, components and parts manufactured using Lead (Pb) free solder.
- IT-600M30
- IT-600M30C
- IT-600M30R
- IT-600M30CR

1.2. Available Models

Table 1.1

Model	Memory		Color touch panel display	Digital camera	Bluetooth module	WLAN module
	RAM	FROM				
IT-600M30	64 MB	128 MB	Yes	No	Yes	No
IT-600M30C	64 MB	128 MB	Yes	Yes	Yes	No
IT-600M30R	64 MB	128 MB	Yes	No	Yes	ETSI
IT-600M30CR	64 MB	128 MB	Yes	Yes	Yes	ETSI

1.3. Options

The table 1.2 shows the dedicated options available for the IT-600 series.

Table 1.2

Product	Model	Description
Cradle	HA-D60IO	USB Cradle (with Host/Client)
Battery pack	HA-D20BAT	Lithium-ion battery pack (1,850 mAH)
	HA-D21LBAT	Large-capacity lithium-ion battery pack (3,700 mAH)
Battery charger	HA-D30CHG	Cradle-type Charger
	HA-D32DCHG	Dual Battery Charger
Laser Redirection Attachment	HA-D50BN	Change the laser emission to downward at 60 degree.
CF Card Extension Unit	HA-D94CFU	For CF memory card on the back of IT-600
AC adaptor	AD-S42120AE	For HA-D60IO and HA-D32DCHG. Input from 100VAC to 240VAC
	AD-S15050AE	For HA-D30CHG. Input 100 to 240VAC (with US power cord)
Cable	DT-380USB	USB cable for cradle, cable length 2.0 m

1.4. Accessories

The following accessories are accompanied in each individual carton box of IT-600 series.

Table 1.3

Name	Q'ty	Remark
User's guide	1	In English and Chinese (in simplified Chinese characters)
Stylus	1	
Large-capacity battery pack cover	1	Required when HA-D21LBAT is installed.
Neck strap	1	
Touch screen protective sheet	1	

1.5. External Views
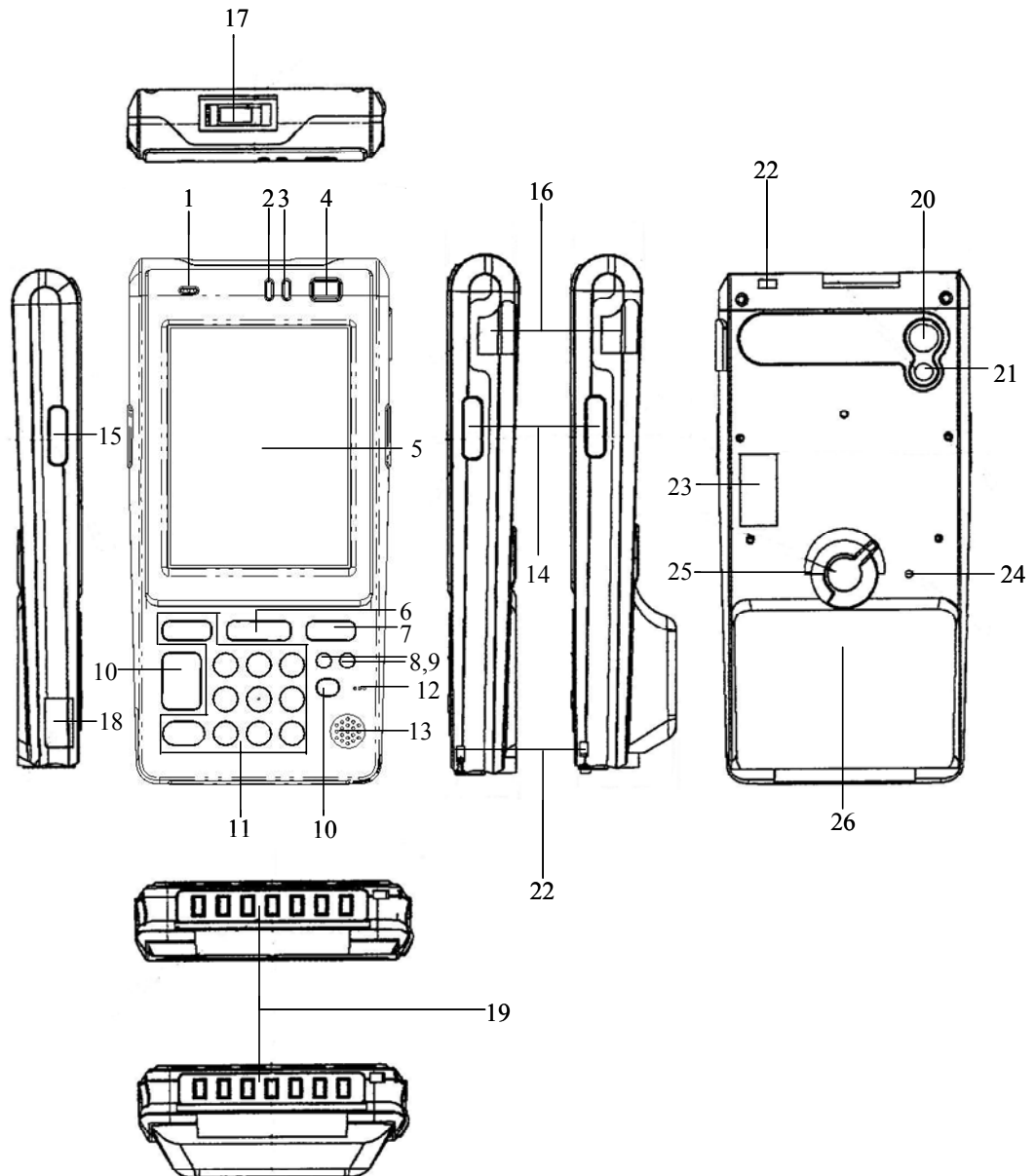
1.5.1. IT-600

Fig 1.1

See Table 1.4 for the descriptions for each referenced part on the Handheld Terminal.

Table 1.4   Names of parts

No.	Name	Description
1	Buzzer	Sounds a buzzer.
2	Indicator 1	Orange : Charging the battery pack. Green : Charging the battery pack complete. Red : Battery pack is abnormal or the surrounding temperature is out of the range.
3	Indicator 2	Flashes in blue when operating via Bluetooth or in orange when operating via WLAN. Lights in green when reading a bar code successfully or in red when alarming (programmable).
4	Power Key	Turns the power on and off.
5	Touch Screen	Displays text and operating instructions. Also used to operate the Handheld Terminal and enter data using stylus provided.
6	Center Trigger Key	Used to perform bar code reading. Can be assigned an arbitrary function.
7	Execute Key	Press when finishing entering numerical values or when moving to the next step.
8	Text Key	Press when switching to the text input mode.
9	Fn Key	Used to make various settings in combination with the numeric keys or when starting a pre-registered application.
10	CLR Key	Used to clear one letter to the left of the input key.
11	Numeric Keys	Used to enter numbers or letters.
12	Microphone	Used to input a sound including voice.
13	Speaker	Alarms and voice messages are output here. Voice messages are not output from the speaker when a headset is connected to the headset jack. (The sound of camera shutter is always output from the speaker.)
14	Trigger R Key	Used to perform bar code reading.
15	Trigger L Key	Used to perform bar code reading.
16	Headset Jack	A separately sold headset can be connected here.
17	Reader Port	Emits a laser that reads bar codes.
18	IR Port	Used for communication with another Handheld Terminal.
19	Power Supply/Charge Terminals	Used to supply power to the Handheld Terminal and to charge the battery pack from Cradle and Cradle-type Charger.
20	Digital Camera	Used to capture photographs, images.
21	LED Light	Used to light up an object when capturing with the digital camera.
22	Strap Holes	Used to attach the strap.
23	Extension Port	Provided for future extension.
24	Reset Switch	Used to reset the Handheld Terminal.
25	Battery Pack Cover Lock Switch	Used to lock the battery cover and to release.
26	Battery Pack Cover	Used to cover the battery compartment that holds the battery inside.

1.5.2. HA-D60IO

The following external views show the HA-D60IO (USB Cradle). Refer to Table 1.5 for each referenced part on the HA-D60IO.

Views
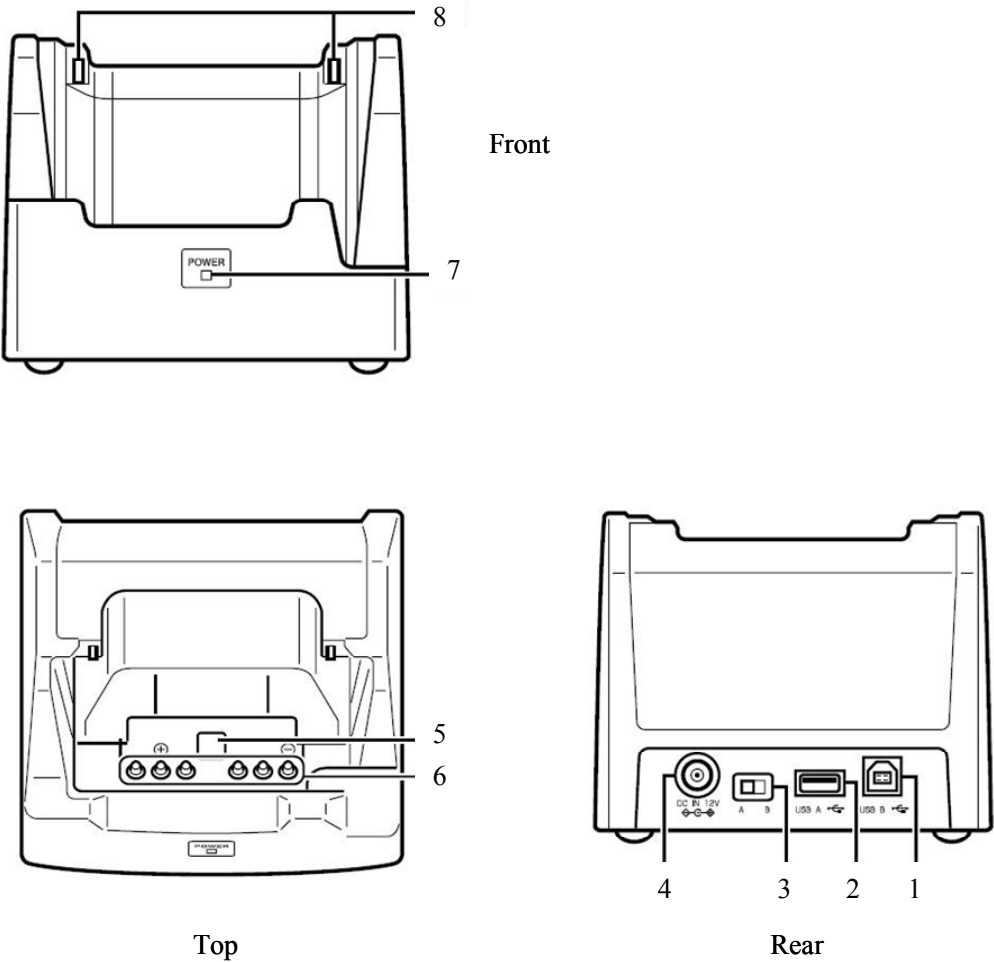
Fig 1.2

Table 1.5   Names of parts

No.	Name	Description
1	USB Client Port	Used to transfer system data and file data (download, upload) by connecting the Cradle to a PC using a USB cable (DT-380USB). A dedicated driver must be installed in the PC before connecting the Cradle to the PC.
2	USB Host Port	Used to connect a corresponding USB peripheral device.
3	Selector Switch	Used to switch between the USB host port and USB client port.
4	AC Adaptor Jack	Connect the dedicated AC adaptor here.
5	Terminal Detect Switch	This switch detects when the Handheld Terminal is mounted correctly on the Cradle.
6	Power Contacts	Power is supplied to the Handheld Terminal via these contacts.
7	Power Indicator Lamp	This lamp indicates the power status and the mounting status of the Handheld Terminal. Off : Handheld Terminal is mounted. Green : Power on and the Handheld Terminal is mounted correctly.
8	Mount Hooks	These hooks are used to stabilize the Handheld Terminal when mounting it on the cradle.

1.5.3.   HA-D32DCHG (Dual Battery Charger)

The following external views show the HA-D32DCHG (Dual Battery Charger). Refer to Table 1.6 for each referenced part on the HA-D32DCHG.

Views

Right   Top   Left

Bottom
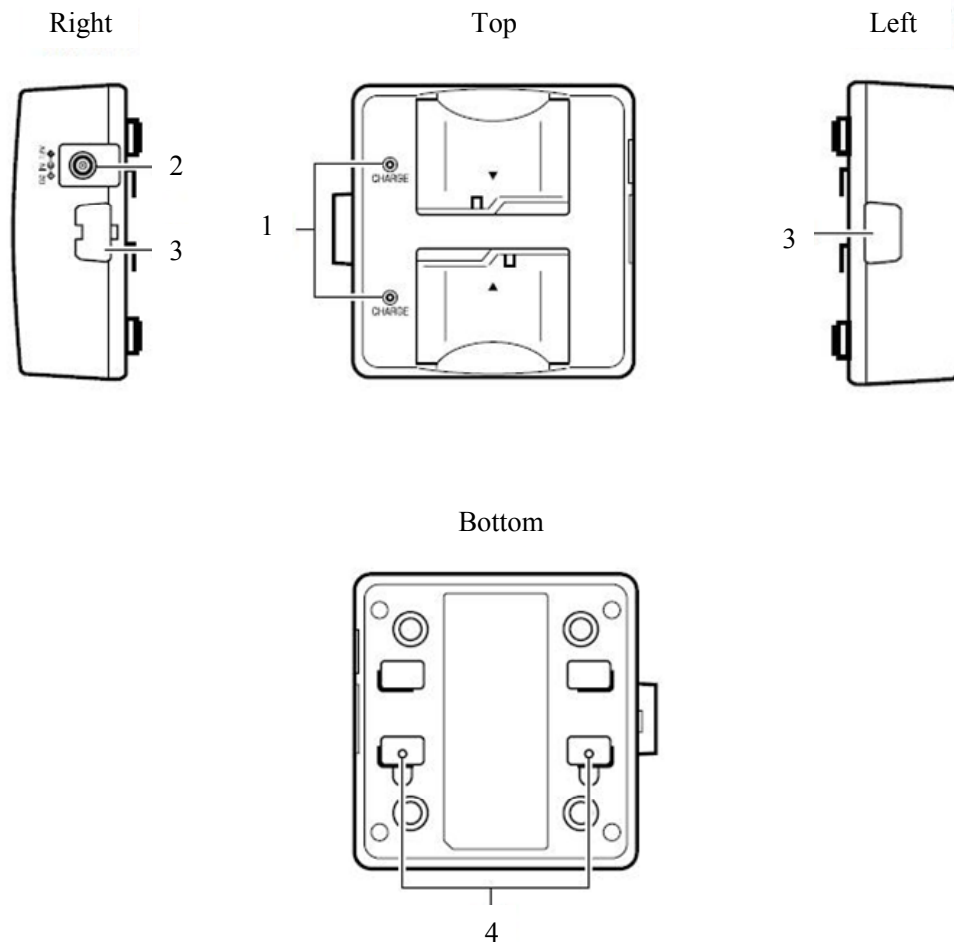
Fig 1.3

Table 1.6   Names of parts

No.	Name	Description
1	Charge indicator lamps	These lamps indicate the charge status of each battery pack. Off : Not charging Red : Charging Red Flashing : Battery pack problem Green : Charging complete
2	AC adaptor jack	Used to connect the dedicated AC adaptor here.
3	Dual battery charger connection port	Used to connect another Dual Battery Charger at side.
4	Connection bracket attachment holes	The connection bracket attaches here when you connect another Dual Battery Charger.

1.5.4.   HA-D30CHG (Cradle-type Charger)

The following external views show the HA-D30CHG (Cradle-type Charger). Refer to Table 1.7 for each referenced part on the HA-D30CHG.

Views

Front

Top   Rear
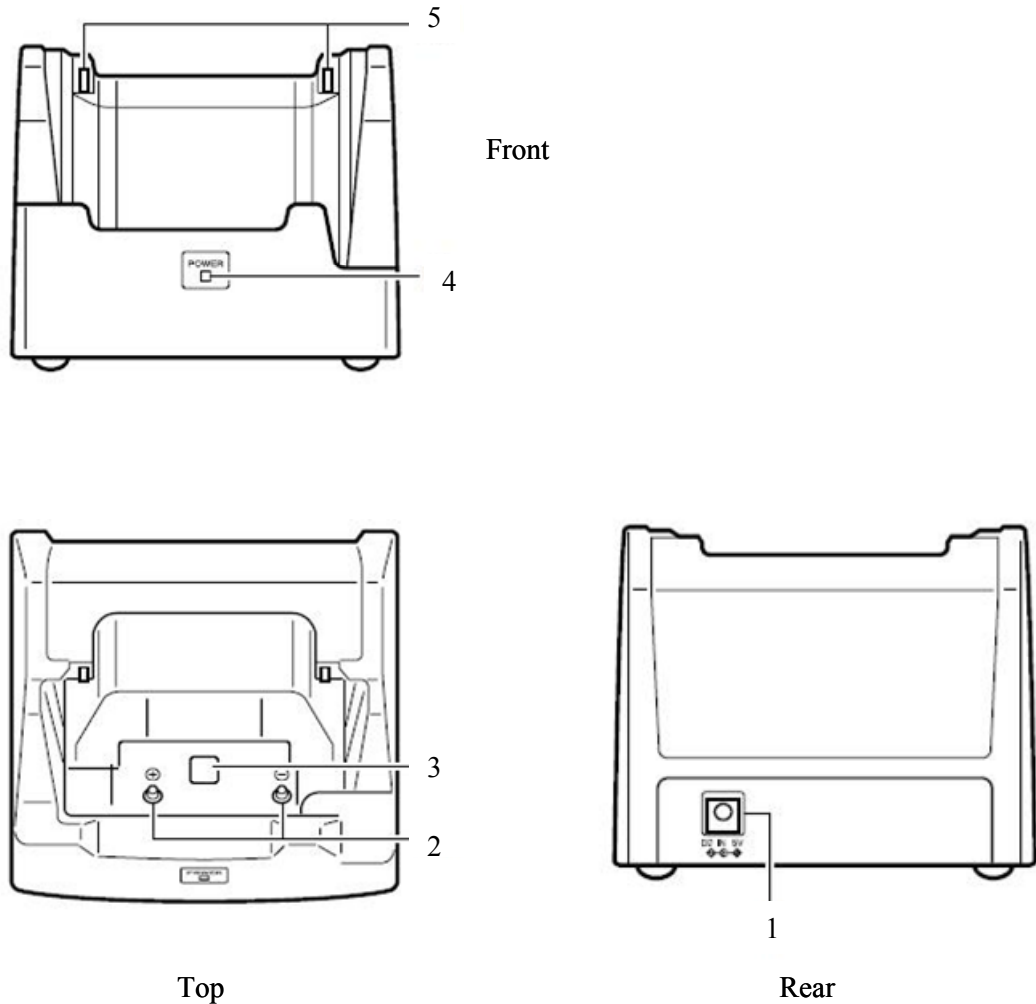
Fig 1.4

Table 1.7   Names of parts

No.	Name	Description
1	AC Adaptor Jack	Connect the AC adaptor here.
2	Terminal Detect Switch	This switch detects when the Handheld Terminal is mounted correctly on the charger.
3	Power Contacts	Power is supplied to the handheld Terminal via these contacts.
4	Power Indicator Lamp	This lamp indicates the power status and the mounting status of the Handheld Terminal. Off : Handheld Terminal is not mounted. Green : Power is on and the handheld Terminal is mounted correctly.
5	Mount Hooks	These hooks are used to stabilize the Handheld Terminal when mounting it on the charger.

1.5.5. HA-D50BN (Laser Redirection Attachment)

View

Fig 1.5

1.5.6. Device Configuration Diagram
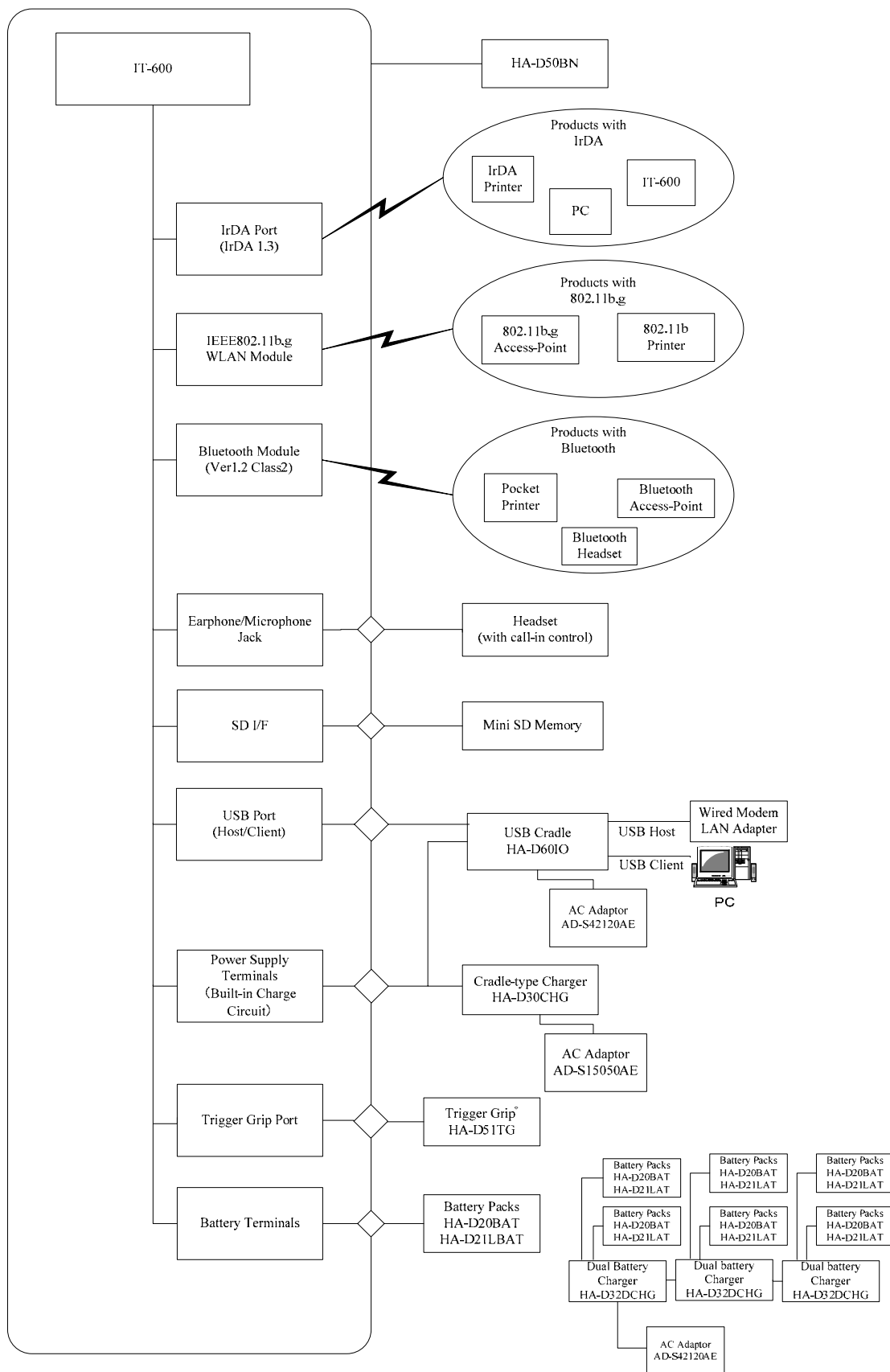
Fig 1.6

2. Hardware Specifications

2.1. IT-600
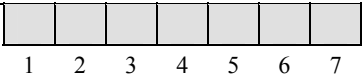
Table 2.1

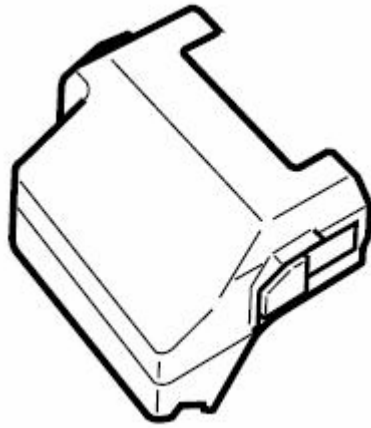| Item		Specification	Remark
CPU, Memory			
	CPU	Intel® PXA270 Application Processor	Operating clock; max 520 MHz
	RAM	64 MB	
	FROM	128 MB (user area; approx. 60 MB)	
Scanner			
	Type	Semi-conductor laser light	
	Wave Length	650±10 nm	
	Optical Output	<1 mW	
	No. of scannings	100±20 times per second	
	Resolution	0.127 mm (minimum)	
	PCS	0.45 (minimum)	
	Readable distance	Approximately 40 to 300 mm	Without HA-D50BN
		Approximately 0 to 200 mm	With HA-D50BN
	Readable width	Max. 40 mm	When the distance is at 40 mm.
		Max. 250 mm	When the distance is at 300 mm.
		Max. 60 mm (contact scanning)	When HA-D50BN is attached.
	Daylight for scanning	50,000 Lux or less	
	Readable 1D bar code symbologies	UPC-A, UPC-E, EAN, NW7, Code39, ITF, MSI, Industrial 2of5, Code93, Code128, IATA, EAN128, RSS-14, RSS Limited, RSS Expanded	
Vibrator		Yes (for indications of scanning completion, VoIp call-in)	
Display			
	Display device	3.7-inch transflective TFT color LCD	65,536 colors
	No. of dots	480 (h) x 640 (w)	
	Dot pitch	0.117 (h) x 0.117 (w) mm	
	Display font	Scalable font	
	Backlight	LED	
Indicator			
	LED	1pc x LED (2 colors), 1pc x LED (3 colors)	Left: battery charge status Right: programmable

Continue.

Input			
	Keyboard	Numeric (Alphabet) keys, CLR key, Execute key, Fn key, Text key, Cursor key	
	Control keys	Power ON/OFF key, Reset switch	
	Trigger keys	Trigger R key, Trigger L key, Center trigger key	
	Touch panel	Yes	
Infrared communication interface			
	Standard	IrDA ver.1.3 compatible	
	Communication process	Half duplex	
	Synchronization	Start-stop, frame method	
	Baud rate (in bps)	9,600/19,200/38,400/57,600/115,200/4M	
	Comm. range	0 (contact) to 0.3m	
WLAN			
	Standard	IEEE 802.11b, IEEE802.11g compatible	
	Modulation	DS: IEEE802.11b DS/OFDM (*): IEEE802.11g	
	Frequency range	IEEE802.11b: 2.400 to 2.4835 GHz IEEE802.11g: 2.400 to 2.4835 GHz	
	Baud rate	IEEE802.11b: 11 Mbps (maximum) IEEE802.11g: 54 Mbps (maximum)	
	Comm. range	IEEE802.11b: 50 m (indoor) to 150 m (outdoor) IEEE802.11g: 50 m (indoor) to 150 m (outdoor)	Vary depending on the environment
	Number of channels	13	Three channels are available at the same time.
	Output power	10±1dBm	
	Other feature	Roaming between Access-Points	
Bluetooth			
	Standard	Bluetooth® Specification Ver.1.2	Not operable concurrently with WLAN operation.
	Comm. range	Approx. 3 m	Vary depending on the environment
	Output power	Max. 3 dBm (PowerClass 2)	
USB			
	Host	Baud rate	Full speed (12 Mbps)	
			Low speed (1.5 Mbps)	
		Power to an external device	5V±5% (maximum 500 mA)	See note on page 17.
	Client	Baud rate	Full speed (12 Mbps)	
Extension port		Connector for HA-D94CFU or for HA-D51TG	Not applicable to IT-600M30R, M30CR.

Continue.

SD card slot		miniSD memory card	In the battery compartment.
Terminals for USB cradle	Layout	1 2 3 4 5 6 7	
	Description	See Table 2.2	
Headset jack		4 poles in rounded shape	
Speaker		Monaural	
Microphone		Monaural	
Digital camera			
Number of pixels		Approximately 1,000,000 pixels	
Device		1/4.5-type CCD color	
Aperture		F3.5/F7.0 (2 steps switchover)	
Focal distance		f = 3.29 mm (fixed)	
Image capture range		30 cm to ∞	
LED light			
Brightness		3300 mcd	
Power			
Operation		Lithium-ion battery pack (HA-D20BAT or HA-D21LBAT)	
Memory backup		Lithium battery (rechargeable) on board	
Battery capacity		HA-D20BAT 1,850 mAH HA-D21LBAT 3,700 mAH	

* ; Orthogonal frequency-division multiplexing (OFDM) is a transmission technique based upon the idea of frequency-division multiplexing (FDM).

Continue.

Operating period	IT-600M30/M30C	IT-600M30R/M30CR	
	Approx. 11 hours (with HA-D20BAT)*1 Approx. 22 hours (with HA-D21LBAT)*1	Approx. 10 hours (with HA-D20BAT)*2 Approx. 20 hours (with HA-D21LBAT)*2	*1 based on the ratio of "standby:calculation:scan" at 20:1:1 when the CPU speed is set to auto power save mode and the backlight is turned off. *2 based on the ratio of "standby:scan:calculation:wireless" at 20:1:1:1 when the CPU speed is set to auto power save mode and the backlight is turned off.
Memory back up period	RAM : Approx. 10 minutes, Clock : Approx. 72 hours		Lithium battery pack is fully charged. At room temperature.
Battery pack charge period	Approximately 4 hours for HA-D20BAT Approximately 7 hours for HA-D21LBAT		The power on the terminal is turned off. At room temperature The dedicated AC adaptor is used to power the terminal via battery charger or cradle.
Memory backup battery charge period	Approximately 4 days		Time period until when the battery is fully charged. Battery pack is being installed. At room temperature.
Memory backup battery rated capacity	10 mAh		
Method to charge memory backup battery	Power supply by cradle	Yes	
	By battery pack (when terminal's power on)	Yes	
	By battery pack (when terminal's power off)	Yes	

- Terminal layout and the description

Table 2.2
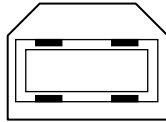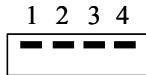
Terminal no.	Signal	Description	Direction
1	V BUS	Power from USB cradle	OUT/IN (see note)
2	V CRADLE	Power supply/Charge to terminal	-
3	D +	USB D +	IN/OUT
4	NC		-
5	USB_ID	Switch-over between USB host and USB client	IN
6	D -	USB D -	IN/OUT
7	GND	GND	-

Note:

When the selector switch on the HA-D60IO is set to "USB Host", this terminal is used to output the power ON/OFF control signal issued by the IT-600 to the cradle. Or, when it is set to "USB Client", the terminal is used to input the USB power (V BUS) from the cradle to the IT-600.

2.2. HA-D60IO

Table 2.3

Item			Specification	Remark
USB	Standard		USB Ver.1.1 compatible	
	Baud rate		Max. 12 Mbps (maximum)	
	Connector		 USB connector B type	1 VBus 2 – Data (D -) 3 + Data (D+) 4 GND
			 USB connector A type	1 VBus 2 – Data (D -) 3 + Data (D+) 4 GND
Power from AC adaptor	Input voltage		DC 12V ±5%	
	Current consumption		DC12V approx. 1.6A	When supplying power and transmitting data.
	Plug		EIAJ RC-5320A type 4	Center; +
	AC adaptor		AD-S42120AE	
Power	USB host	Standard	USB Ver. 1.1 compatible	
		Baud rate	12 Mbps (maximum) 1.5 Mbps (minimum)	
		Power to external device	5V±5% maximum 500 mA	
	USB client	Standard	USB Ver. 1.1 compatible	
		Baud rate	12 Mbps (maximum)	
		Layout	See Fig 2.1.	
		Description	See Table 2.4	
	Charge/Power supply terminals	Output voltage	DC5V±10%	
		Output current	2,500 mA (maximum)	
		Output current	Constant voltage method	With current limitation control
		Battery charge time	Approx. 4 hours (for HA-D20BAT) Approx. 7 hours (for HA-D21LBAT)	

• Terminal layout

1 2 3   4 5 6
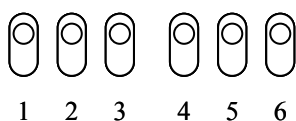
Fig 2.1

• Terminal layout and the description

Table 2.4

Terminal no.	Signal	Description	Direction
1	V BUS	Power from USB cradle	OUT/IN (see note)
2	V CRADLE	Power supply/Charge to IT-600	-
3	D +	USB D +	IN/OUT
4	USB_ID	Switch-over between USB host and USB client	IN
5	D -	USB D -	IN/OUT
6	GND	GND	-

Note:

When the selector switch on the HA-D60IO is set to "USB Host", this terminal is used to receive the power ON/OFF control signal issued by the IT-600. Or, when it is set to "USB Client", the terminal is used to output the USB power (V BUS) to the IT-600.
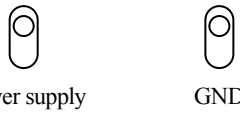
2.3. HA-D32DCHG

Table 2.5

Item		Specification	Remark
Battery charge	Charge method	Constant voltage constant current	
	Charge period	Approx. 2 hours (for 1 pc x HA-D20BAT)	At room temperature
		Approx. 4 hours (for 1 pc x HA-D21LBAT)	
		Approx. 3.5 hours (for 2 pcs x HA-D20BAT)	
		Approx. 7 hours (for 2 pcs x HA-D21LBAT)	
Required power supply		AD-S42120AE (dedicated AC adaptor)	
Consumption current		Approx. 0.8 A (with single HA-D32DCHG)	
		Approx. 2.4 A (with three HA-D32DCHGs connected.)	
Operating temperature		Approx. 0 to 40 ºC	
Operating humidity		30 to 80 %RH	
No. of the chargers to be connected		3 pcs x HA-D32DCHG (maximum)	

2.4. HA-D30CHG

Table 2.6

Item		Specification	Remark
Input from AC adaptor	Input voltage	DC 5V±5%	
	Consumption current	DC5V approx. 2.5 A	
	Plug	EIAJ RC-5320A type 3	Center pin; +
	AC adaptor	AD-S15050A	Dedicated AC adaptor
Terminal layout		Power supply GND	
Power supply/Charge	Output voltage	DC5V±10%	
	Output current	2500 mA (maximum)	
	Charge method	Constant voltage	With current limitation control
	Charge period	Approx. 4 hours (for HA-D20BAT)	
		Approx. 7 hours (for HA-D21LBAT)	

2.5. HA-D20BAT/HA-D21LBAT

HA-D20BAT (Battery Pack)

Table 2.7

Item	Specification	Remark
Nominal capacity	1850 mAh	
Nominal voltage	3.7 V	
Dimensions	Approx. 52.5(W) x 40(L) x 13.5(H) mm	
Weight	Approx. 46g	
Accessory	Soft case	

HA-D21LBAT (Large-capacity Battery Pack)

Table 2.8

Item	Specification	Remark
Nominal capacity	3700 mAh	
Nominal voltage	3.7 V	
Dimensions	Approx. 52.5 (W) x 40 (L) x 25 (H) mm	
Weight	Approx. 86g	
Accessory	Soft case	

2.6. HA-D50BN

Table 2.9

Item	Specification	Remark
Angle of laser beam emission	60 º downward	
Dimensions	Approx. 91.2 (W) x 63.15 (L) x 45.9 (H) mm	
Weight	Approx. 60g	

3. Product Identification And Reference Numbers

On the back of the IT-600 and the options, there is a bar code and numbers printed on label as shown in Fig 3.1. This bar code is represented by 15 digits of Code128 symbology and by alphanumeric characters beneath the bar code. The numbers from 1 to 9 in the figure represent identification and references of each terminal. The numbers from 10 to 15 represent a manufacturing reference which is reserved by the manufacturer. See the figure below for each meaning.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Serial number of the terminal in 5 digits

Manufacturing references (reserved by the manufacturer)

Check digit

Production month of the year (1 to 9, A,B,C)

Production year (last digit only. Ex. 1 represents the year 2001.)

Model number (two digits in alphanumeric)

A8: IT-600M30
A9: IT-600M30C
AA: IT-600M30R
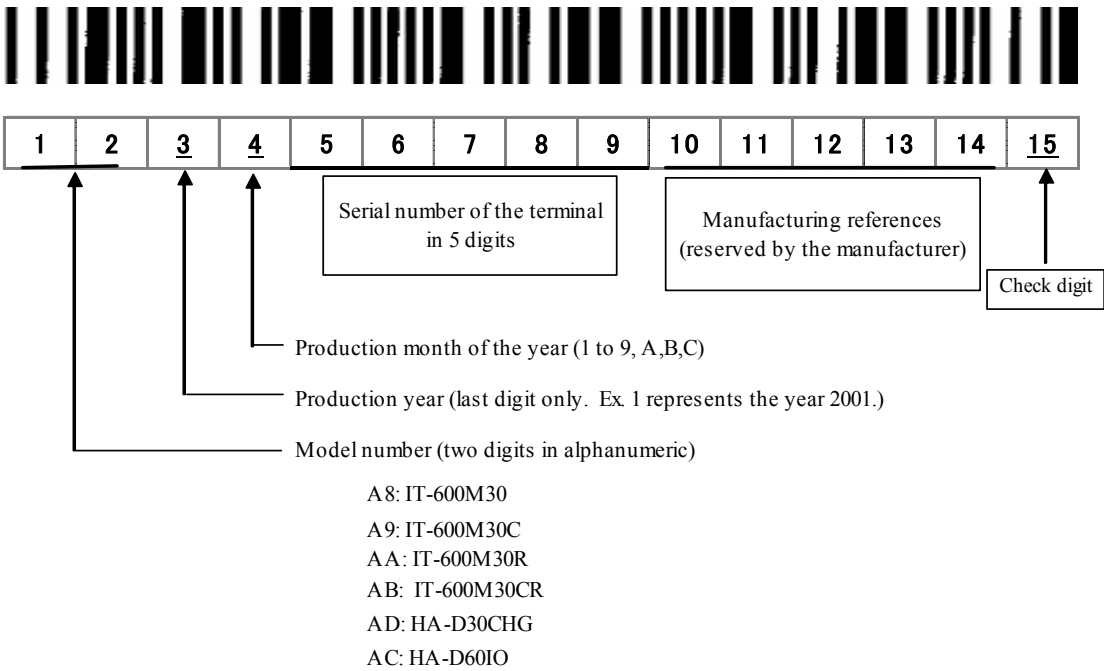AB: IT-600M30CR
AD: HA-D30CHG
AC: HA-D60IO

Fig 3.1

4.　Quality References

This chapter will describe about references of the IT-600 and its dedicated options concerned with environmental performance, compliance, mechanical and electric durability, etc.

4.1.　Environmental Performances

4.1.1.　IT-600

Table 4.1

Item		Specification	Condition
Temperature			
	Operation	-10 ℃ to 50 ℃	0 to 40 ℃ for charging battery pack
	Non-operation	-20 ℃ to 60 ℃	
Humidity			
	Operation	10 % to 80 %RH	No condensation
	Non-operation	5 % to 90 %RH	
Storage			
	Temperature	-20 ℃ to 60 ℃	
	Humidity	5 % to 90 %RH	No condensation.
Dust and water-splash proof			
		IP54 level	Compliant with IEC60529 standard

4.1.2.　HA-D60IO

Table 4.2

Item		Specification	Condition
Temperature			
	Operation	0 ℃ to 40 ℃	
	Non-operation	-20 ℃ to 60 ℃	
Humidity			
	Operation	30 % to 80 %RH	No condensation
	Non-operation	10 % to 90 %RH	
Storage in carton box			
	Temperature	-20 ℃ to 60 ℃	
	Humidity	10 % to 90 %RH	No condensation
Dust and water-splash proof			
		Not applicable	

4.1.3.　HA-D32DCHG

Table 4.3

Item		Specification	Condition
Temperature			
	Operation	0 ℃ to 40 ℃	
	Non-operation	-20 ℃ to 60 ℃	
Humidity			
	Operation	30 % to 80 %RH	No condensation
	Non-operation	10 % to 90 %RH	
Storage in carton box			
	Temperature	-20 ℃ to 60 ℃	
	Humidity	10 % to 90 %RH	No condensation
Dust and water-splash proof			
		Not applicable	

4.1.4.　HA-D30CHG

Table 4.4

Item		Specification	Condition
Temperature			
	Operation	0 ℃ to 40 ℃	
	Non-operation	-20 ℃ to 60 ℃	
Humidity			
	Operation	30 % to 80 %RH	No condensation
	Non-operation	10 % to 90 %RH	
Storage in carton box			
	Temperature	-20 ℃ to 60 ℃	
	Humidity	10 % to 90 %RH	No condensation
Dust and water-splash proof			
		Not applicable	

4.1.5. HA-D50BN

Table 4.5

Item		Specification	Condition
Temperature			
	Operation	-10 ℃ to 50 ℃	
	Non-operation	-20 ℃ to 60 ℃	
Humidity			
	Operation	10 % to 80 %RH	No condensation
	Non-operation	5 % to 90 %RH	
Storage in carton box			
	Temperature	-20 ℃ to 60 ℃	
	Humidity	90 %RH or less	No condensation
Dust and water-splash proof			
		Not applicable	

4.2. Electrical Performances

4.2.1. IT-600

Table 4.6

Item		Specification	Remark
Power consumption			
	DC1.8A		- IT-600M30R
	DC1.9A		- IT-600M30, IT-600M30CR
	DC2.0A		- IT-600M30C
Anti-static strength			
	Malfunction	±4 KV	- 150 pF, 330ohm
	Destruction	±12 KV	

4.2.2. HA-D60IO

Table 4.7

Item		Specification	Remark
Input voltage		DC12V±5%	
Anti-static strength			
	In contact	±6 KV	- 150 pF, 330 ohm
	In air	±8 KV	
Power interruption		10 millisec. or less	
Line noise strength			
	Malfunction	1,000 V	- Pulse frequency: 5KHz
			- Burst cycle: 300 millisec.
			- Number of pulses: 75
			- Burst interval: 15 millisec.

4.2.3. HA-D32DCHG

Table 4.8

Item		Specification	Remark
Consumption current			
		Approx. 0.03 A	- While the battery pack is not being installed.
		Approx. 0.8 A	- While the battery pack is installed and it is being charged.
Input voltage		DC12V±5%	
Anti-static strength			
	In contact	±6 KV	- 150 pF, 330 ohm
	In air	±8 KV	
Line noise strength			
	Malfunction	1,000 V	- Pulse frequency: 5KHz - Burst cycle: 300 millisec. - Number of pulses: 75 - Burst interval: 15 millisec.

4.2.4. HA-D30CHG

Table 4.9

Item		Specification	Remark
Input voltage		DC5V±5%	
Anti-static strength			
	In contact	±6 KV	- 150 pF, 330 ohm
	In air	±8 KV	
Power interruption		10 millisec. or less	
Line noise strength			
	Malfunction	1,000 V	- Pulse frequency: 5 KHz - Burst cycle: 300 millisec. - Number of pulses: 75 - Burst interval: 15 millisec.

4.3. Mechanical Performances

4.3.1. IT-600

Table 4.10

Item		Specification	Condition
Resistance to drop impact (height)		120 cm	- Onto concrete floor. - One time on each of the 6 sides and 4 corners.
Resistance to impact			
	Height of drop	70 cm (in individual carton box)	- 1 cycle on each of the 6 sides and 1 corner.
		70 cm (in master carton)	
Resistance to vibration		1.5 G	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 30 minutes

4.3.2. HA-D60IO

Table 4.11

Item		Specification	Condition
Resistance to vibration		1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 30 minutes - While the power is turned on and IT−600 is not being mounted.
Resistance to vibration (in carton box)		1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes
Resistance to drop impact			
	In bare condition	70 cm	- 1 cycle on each of the 6 sides - 6 faces, 1 corner and 3 edges - Onto P tile floor.
	In individual carton	70 cm or less	
	In master carton	50 cm or less	

4.3.3. HA-D32DCHG

Table 4.12

Item	Specification	Condition
Resistance to vibration	1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes - While the power is being turned off.
Resistance to vibration (in carton box)	1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes
Resistance to impact		
In bare condition	70 cm	- 1 cycle on each of the 6 sides
In individual carton	70 cm or less	- 6 faces, 1 corner and 3 edges
In master carton	60 cm or less	- On to concrete floor.

4.3.4. HA-D30CHG

Table 4.13

Item	Specification	Condition
Resistance to vibration	1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes - While the power is turned on and IT-600 is not being mounted.
Resistance to vibration (in carton box)	1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes
Resistance to impact		
In bare condition	70 cm	- 1 cycle on each of the 6 sides
In individual carton	70 cm or less	- 6 faces, 1 corner and 3 edges
In master carton	50 cm or less	- On to concrete floor.

4.3.5. HA-D50BN

Table 4.14

Item		Specification	Condition
Resistance to vibration		1.5 G or less	- 10 to 55 Hz - In X,Y, and Z directions - Reciprocally for 15 minutes - With HA−D50BN being attached on IT−600.
Resistance to impact			
	In bare condition	120 cm	- 1 cycle on each of the 6 sides - 6 faces, 1 corner and 3 edges - On to concrete floor. - With HA−D50BN being attached on IT−600.
	In individual carton	70 cm or less	- 1 cycle on each of the 6 sides - 6 faces, 1 corner and 3 edges - On to concrete floor.
	In master carton	70 cm or less	

4.4. Reliability

4.4.1. IT-600

Table 4.15

Item			Specification	Condition
Service life				
	Backlight		15,000 hours	
	LCD		50,000 hours	
	Touch panel key input		800,000 times	- With 8.60° rubber with load of 250 g applied
	Writing on touch panel		100,000 Katakana characters	- With 0.8R polyacetar stylus with load of 250 g applied
	Discharge/charge cycle longevity of battery pack		500 times	- Standard /Large-capacity battery - 50% or more of the initial capacity
	Battery pack storage period (recommended)		One year or less	- In the range of temperature between −25 ºC and 30 ºC - At 80% charge level
	Discharge/charge cycle longevity of memory backup battery		20,000 times	- Memory backup for a period of 10 minutes
			40 times	- Memory backup until the cut-off voltage level
	Plug in/unplug the connector	miniSD card	5,000 times	
	Digital camera		7,250 hours	
	LED light		1,000 hours	- Until when the brightness becomes 50%
	Vibrator		300,000 cycles	- One cycle; 0.5s ON, 0.5s OFF
	Key input durability	Reset switch	1,000 times	
		Trigger keys	1,000,000 times	
		Keys (except the Trigger keys)	500,000 times	
	Mounting/removing durability	Battery pack	5,000 times	
		On Cradle-type charger	10,000 times	
		On USB cradle	10,000 times	
MTBF				
	Electronic parts		45,381 hours	- Main PCB

4.4.2. HA-D60IO

Table 4.16

Item		Specification	Condition
MTBF for electronic parts		20,000 hours	
Installing and removing	USB client port's connector	500 times	
	USB host port's connector	500 times	
Mounting IT-600 and removing		45,000 times	
Switching	Selector switch (USB Host or USB Client)	500 times	One reciprocal switching as one time
Installing AC adaptor to and removing from	AC adaptor jack	1,500 times	

4.4.3. HA-D32DCHG

Table 4.17

Item		Specification	Condition
MTBF for electronic parts		50,000 hours	
Mounting a battery pack and removing		5,000 times	
Connecting to the joint connector and removing from		250 times	
Installing AC adaptor to and removing from	AC adaptor jack	1,500 times	

4.4.4. HA-D30CHG

Table 4.18

Item		Specification	Condition
MTBF for electronic parts		20,000 hours	
Mounting IT-600 on and removing from		45,000 times	
Connecting to the joint connector and removing from		250 times	
Installing AC adaptor to and removing from	AC adaptor jack	1,500 times	

4.4.5. HA-D50BN

Table 4.19

Item	Specification	Condition
Attaching HA-D50BN on IT-600 and removing from	2,000 times	

4.5. Compliance

4.5.1. IT-600

Table 4.20

Model	EMC EN55022: 1998	EMI EN55024: 1998	Safety EN60950	WLAN Type Approval EN 300.328-2 EN 301.489-17 EN50371	Bluetooth Type Approval	Laser EN60825-1:1996 (IEC60825-1:1997 Class 2)
IT-600M30	Yes	Yes	Yes	No	Yes	Yes
IT-600M30C	Yes	Yes	Yes	No	Yes	Yes
IT-600M30R	See note	See note	Yes	Yes	Yes	Yes
IT-600M30CR	See note	See note	Yes	Yes	Yes	Yes

Note:

IT-600M30R and IT-600M30CR are compliant with the respective criteria set on the EN55022 and EN55024 standards. The WLAN type approval requires both the models to meet the EN55022 and EN55024 standards.

4.5.2. HA-D60IO

Table 4.21

Model	EMC EN55022:1998	EMI EN55024:1998	EN61000-3
HA-D60IO	Yes	Yes	Yes

4.5.3. HA-D32DCHG

Table 4.22

Model	EMC EN55022:1998	EMI EN55024:1998
HA-D32DCHG	Yes	Yes

4.5.4. HA-D30CHG

Table 4.23

Model	EMC EN55022:1998	EMI EN55024:1998	EN61000-3
HA-D30CHG	Yes	Yes	Yes