IT-10 Series

Hardware Manual

(Version 1.00)

CASIO Computer Co., Ltd.

March 2005

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Editorial Record

Manual Version no.	Date edited	Page	Content
1.00	March 2005		Original

Preface

The IT-10 is a new rugged PDA designed and built to be used for vertical applications (business specific applications) in severe business environment. The terminal is water-splash proof, dust proof and can withstand the inevitable rough handling that any vertical market device will suffer.

This reference manual will explain you in detail about the specifications of hardware, reliability, environment, compliance and etc. for the series including models, IT-10M20 and IT-10M20BR, and the dedicated options as well.

For software and library related references, refer to the respective reference manuals released on the CASIO WEB site at http://www.casio.co.jp/English/system/.

1. Product Overview

1.1 Features

Hardware and software features at a glance

- Uses Windows Mobile 2003 Second Edition Software for Pocket PC as the operating system.
- Withstand a drop from 1 meter, and IP54 level for dust and water-splash resistance (compliant with IEC60529 standard).
- Large 3.7-inch transflective VGA LCD (landscape or portrait mode is possible)
- Standard large capacity battery pack for up to 27 hours of continuous use
- CompactFlash and SDIO card slots for flexible system expansion in future possible.
- Auto-recovery tool to automatically back up and restore user data in case of accidental data corruption
- Bluetooth and Wireless LAN (compliant with IEEE802.11b) are integrated as standard for wireless LAN configuration (IT-10M20BR only).

1.2 Available Models And Options

Table 1.1 Available models

Model	RAM	IEEE802.11b	Bluetooth	Remark
IT-10M20	64 MB	No	No	
IT-10M20BR	64 MB	Yes	Yes	

Table 1.2 Options

Option	Product	Model no.	Remark
Cradle	Bridge Satellite Cradle	HA-C61IO	USB/RS-232C/RS-422
	Basic Cradle	HA-C60IO	USB/RS-232C
Battery	Battery Pack	HA-C21BAT	2,300 mAh, 3.7V
Battery Charger	Dual Battery Charger	HA-C32DCHG	4 hours to charge 2 battery packs.
AC adaptor	AC Adaptor	AD-S42120AE	DC output 12V
	AC Adaptor	AD-S15050AE	DC output 5V, 3A
Screen Protect Sheet	Screen Protect Sheet	HA-C90PS5	5 pcs in one pack
Communication Card Cover	Communication Card Cover	HA-C92TCV	
Cable	RS-232C cable	DT-887AXA	Length; 1.5 m, 9-pin male
	USB cable	DT-380USB	Length; 2.0 m
	RS-422 cable	DT-888RSC	Length; 1.0 m

The accessories in the table below are accompanied as accessory in each individual carton box of IT-10 series.

Table 1.3 Accessory

Product	Q'ty	Remark
Battery Pack	1	HA-C21BAT
Stylus	1	Attached to the terminal.
AC Adaptor	1	AD-S15050AE (with European and USA power cords)
CD-ROM	1	Pocket PC 2003 Premium License CD
User's Guide	1	English and Chinese

1.2.1 Options And Interfaces

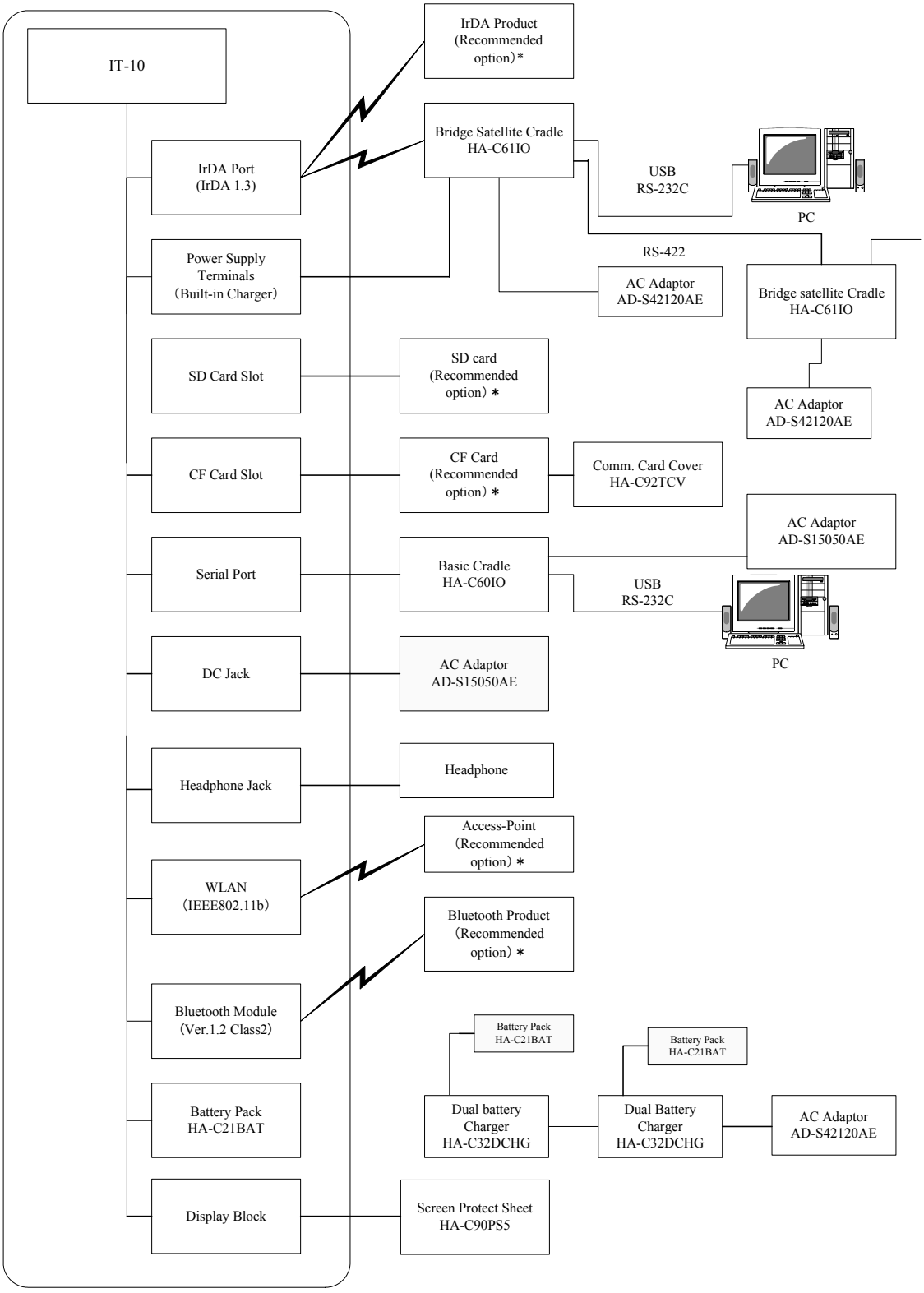
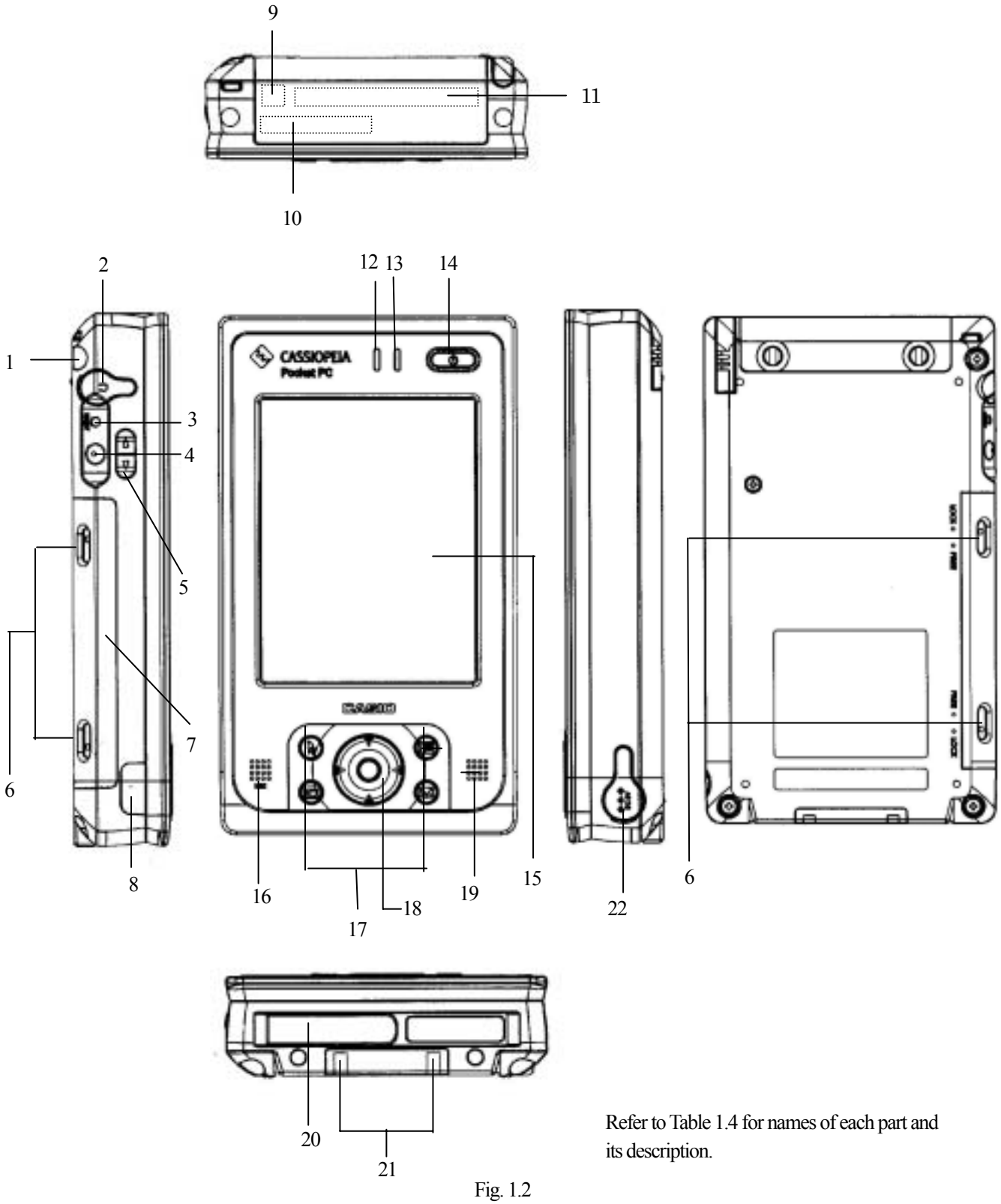


Fig. 1.2

1.3 General Guide

1.3.1 IT-10

External Views



Refer to Table 1.4 for names of each part and its description.

Fig. 1.2

Table 1.4 Names of parts

No.	Part Name	Description
1	Strap hole	A commercially available strap can be attached here.
2	Headphone jack	A commercially available earphones or headphones (with 3.5 mm in diameter) can be attached here. Remove the rubber cover to use it.
3	Reset switch	This switch resets the terminal, similar to turning off and on the power switch. Reset the terminal when some abnormality occurs, such as if the buttons or tap operations stop working.
4	Action button	This button operates as the Enter key on a computer. Also, it has several functions when the 5way cursor button is pressed at the same time.
5	UP/DOWN button	This button moves the cursor and similar items up and down on the screen.
6	Battery pack cover lock switch	Be sure to keep the lock switches locked. Locking the switches prevents the battery pack from falling out.
7	Battery pack cover	This is the cover for the battery pack.
8	IrDA port	This communication port is used data exchange via the IrDA interface.
9	Eject button	This button ejects a CF card (CompactFlash card) installed in the slot.
10	SD card slot	Either SD card or multimedia card can be inserted in this slot.
11	CF card slot	CF card (CompactFlash card) can be inserted in this slot.
12	Indicator lamp (left)	When the AC adaptor is connected to the terminal or the terminal is mounted on the Basic Cradle, the lamp turns on in orange indicating the battery pack is being charged, or in green indicating the battery pack is fully charged.
13	Indicator lamp (right)	The lamp blinks in green when CF card or SD card is being accessed. It also blinks in red for the alarm.
14	Power switch	Press this switch to turn on the power or off. Once the power is turned on, wait for 10 seconds or more to turn off the power.
15	LCD screen	The LCD screen displays information and stylus is used to enter information or operate on the screen.
16	Microphone	Direct voice sound here when recording on the Pocket Word or Memo screen.
17	Program buttons	Pushing one of the program buttons starts the program assigned to that button. The four default settings are, from the upper left, Menu, Calendar, Contents, and Inbox.
18	5way cursor button	This button moves the cursor and similar items up, down, left and right on the screen. Pressing the center of the button straight down performs the same operation as the Enter key.
19	Speaker	Sounds such as the alarm come out of the speaker. Sound does not come out when a set of earphones or headphones is connected to the headphone jack.
20	Serial connector	Peripheral device with RS-232C/USB interface can be connected to the connector. Remove the rubber cover and store it at the right side silo before use.
21	Power terminals	Terminals for supplying power from the Cradle.
22	Power adaptor port	The dedicated AC adaptor (AD-S15050AE) can be connected to this port.

1.3.2 HA-C60IO (Basic Cradle)

Views

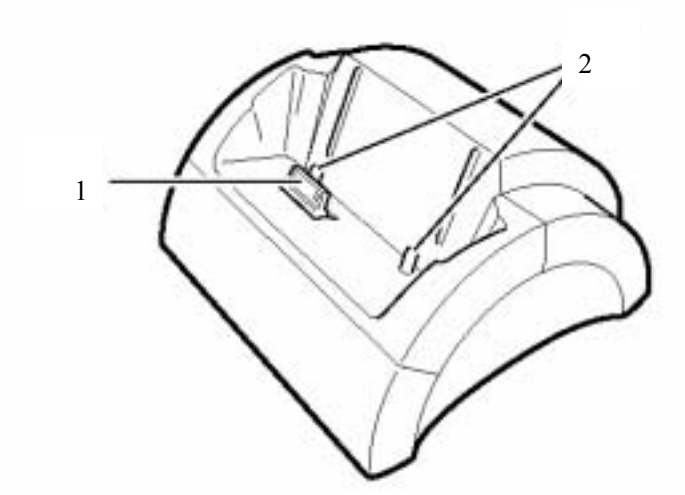


Fig. 1.3

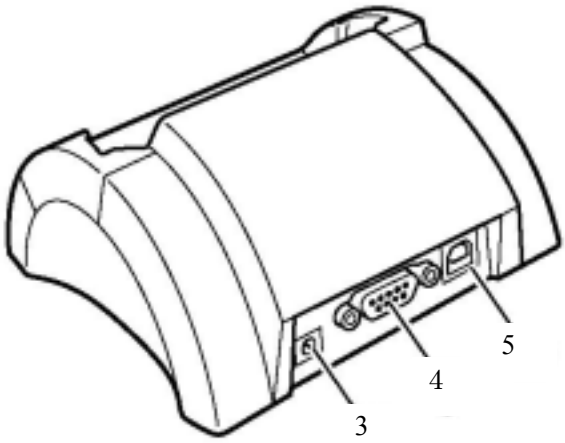


Fig. 1.4

Table 1.5 Names of parts

No.	Part Name	Description
1	Serial connector	This connector mates with the serial connector on the bottom of the terminal. The power is also supplied to the terminal via this connector.
2	Alignment pegs	Align the terminal with these two pegs when mounting it to the Basic Cradle.
3	Power adaptor port	Connect the dedicated AC adaptor (AD-S15050AE) here.
4	RS-232C port	This port is used when connecting to a PC for data transfer between the terminal and the PC via RS-232C interface.
5	USB port	This port is used when connecting to a PC for data transfer between the terminal and the PC via USB interface.

1.3.3 HA-C61IO (Bridge Satellite Cradle)

Views

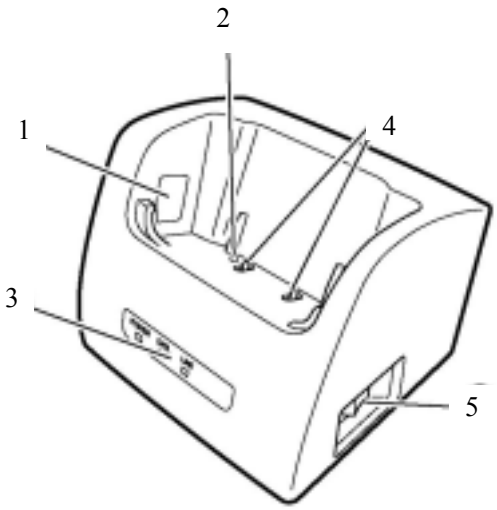


Fig. 1.5

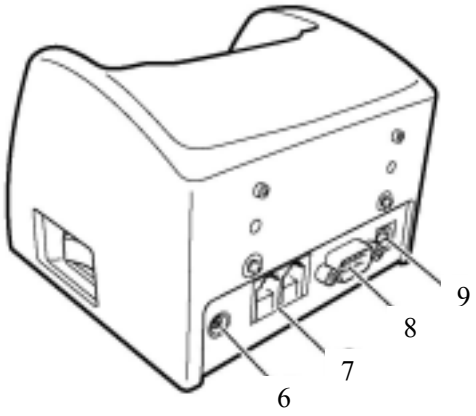


Fig. 1.6

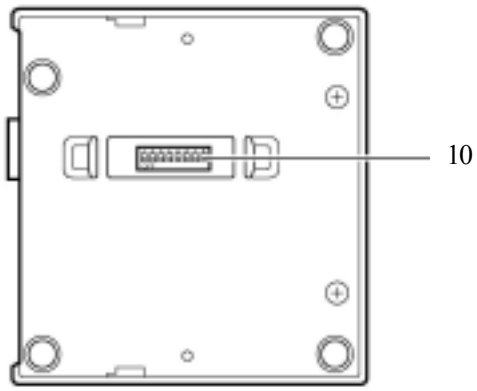


Fig. 1.7

Refer to Table 1.6 for names of each part and its description.

Table 1.6 Names of parts

No.	Part Name	Description
1	IrDA communication port	Align this port with the IrDA communication port of the terminal for data transfer via the IrDA interface.
2	Detection switch	This switch detects when the terminal is correctly mounted on the Bridge Satellite Cradle.
3	Status lamp	"POWER" Indicates the power status. Off : Power is off. Green : Power is on and the terminal is correctly mounted on the Cradle. Red : Power is on, but the terminal is not correctly mounted on the Cradle.
		"DATA" Indicates the communication status. Off : No communication. Flashing green : Communication between the terminal and a PC is established. Red : Connection problem in the Cradle.
		"LINE" Indicates the system status. Off : The system is not operational. Green : The system is operational.
4	Power terminals	These terminals supply power to the terminal mounted on the Cradle.
5	Power switch	Turns on the power on the Cradle.
6	Power adaptor port	Connect the dedicated AC adaptor (AD-S42120AE) to this port.
7	RS-422 ports	Use these two ports ("C-OUT" and "C-IN") when connecting up to eight Bridge Satellite Cradles in series.
8	RS-232C port	Use this port when connecting the terminal and a PC via the RS-232C interface.
9	USB port	Use this port when connecting the terminal and a PC via the USB interface.
10	DIP switches	Use these switches to configure the settings on the Cradle.

1.3.4 HA-C32DCHG (Dual Battery Charger)

View

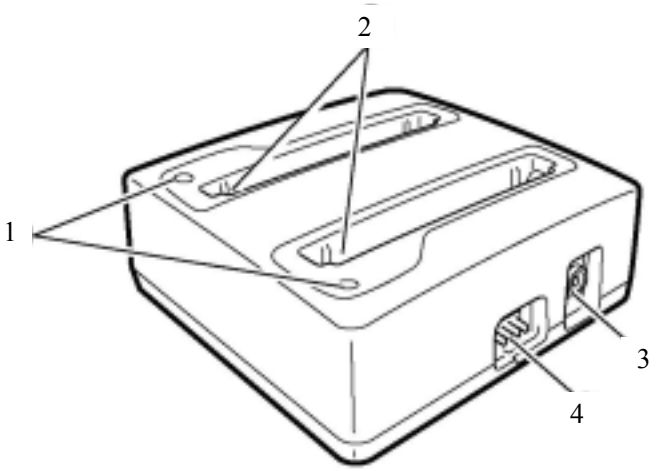


Fig. 1.8

Table 1.7 Names of parts

No.	Part Name	Description
1	Charging status indicator lamp	Indicates the battery charge status. Green : Charging is complete. Red : Charging continues. Flashing red : Problem in the charge operation. Flashing green : Idle mode waiting for a next charge Off : No battery pack is mounted.
2	Power terminals	These power terminals provide power to the mounted battery packs.
3	Power adaptor port	Connect the dedicated AC adaptor (AD-S42120AE) to this port.
4	Series connection terminal	Maximum 3 units of HA-C32DCHG can be connected in series connecting this terminal to the terminal on another HA-C32DCHG.

1.3.5 HA-C21BAT (Battery Pack)

View

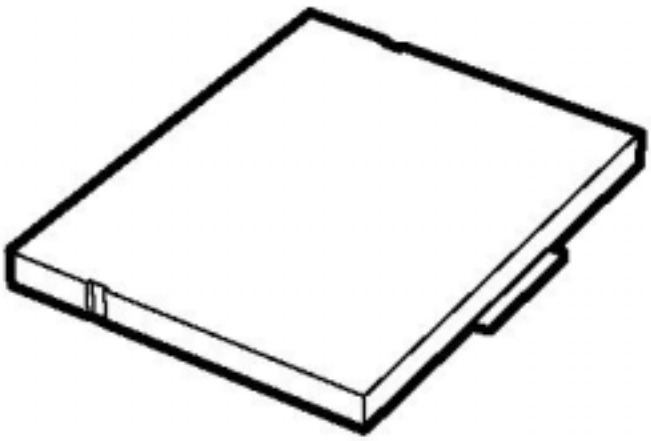


Fig. 1.9

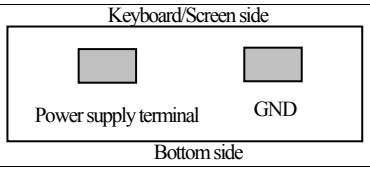
2. Hardware Specifications

2.1 IT-10

Table 2.1

Item		Specification	Remark
CPU, Memory			
	CPU	Intel PXA270 Processor (run at 416 MHz)	
	Operating system	Microsoft® Windows® Mobile 2003 Second Edition Software for Pocket PC	
	RAM	64 MB	
	FROM	64 MB (user area: approx. 20 MB)	
Display			
	Display device	3.7-inch transflective TFT color LCD	
	No. of dots	480 (w) x 640 (h)	
	Dot pitch	0.117 mm (w) x 0.117 mm (h)	
	Scale	65,536 colors	
	Display fonts	Scalable fonts	
	Backlight	LED	
	Visible angle	40° when backlight is ON	
		30° when backlight is OFF	
Indicator			
	Confirmation /Status	2 pcs x LED in red and green colors	
Input			
	Keyboard	Touchpanel	
		Software keyboard	
		Program keys (x 4), Action key, UP/DOWN keys, Cursor key	
	Switch	Power switch, Reset switch, Battery cover lock switches (x 2)	
IrDA			
	Standard	IrDA Version 1.3 compatible	
	Method	Half-duplex	
	Synchronization	Start/stop, frame synchronization	
	Baud rate	9600 bps, 115200 bps, 4 Mbps	
	Comm. range	0 (contact) to 0.3 m	
Wireless LAN (IT-10M20BR)			
	Standard	IEEE802.11b	
	Modulation	Direct sequence spread spectrum	(“DS”)
	Frequency range	2,400 to 2,483.5 MHz	
	Baud rate	11 Mbps (maximum)	
	Comm. range	150 m (outdoor), 50 m (indoor)	Note 1
	No. of channels	11 for FCC, 13 for ETSI	
	Output power	Minimum 12.5 dBm	
		Maximum 16.0 dBm	
	Other feature	Roaming between multiple Access-Points	
Bluetooth (IT-10M20BR)			
	Standard	Bluetooth Version 1.2	
	Comm. range	Approx. 3m	Note 1
	Output power	Maximum 3 dBm (PowerClass 2)	

Continue.

Serial interface				
	RS-232C	Synchronization	Start/stop, frame synchronization	
		Baud rate	300, 600, 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K	
		External output level	±5V	For communication with PC only, not available for external output.
	USB Host	Standard	USB Ver. 1.1 compatible	
		Baud rate	12 Mbps, 1.5 Mbps	
		External output power	5V±5%, Maximum 500 mA	
	USB Client	Standard	USB Ver. 1.1 compatible	
		Baud rate	12 Mbps	
	Connector		AXR51268 manufactured by Panasonic	Connector on IT-10
	Pin layout		See Fig. 2.1	
	Signal layout		See Table 2.2.	
SD card slot				
	Supported cards		SD (memory card), MMC, SDIO	
CF card slot				
	Specification		CompactFlash card Type I/II (3.3V)	
	Available power		3.3V±5%, Maximum 900 mA	
DC input				
	Input voltage		5V±5%	
	Consumption current		3A	
	Plug		EIAJ Type II	
	AC adaptor		AD-S15050AE	
Power terminals				
	Power terminals			The power from Cradle is supplied to the terminal via these power terminals.
Headphone jack				
	Stereo headphone jack		3.5 mm in diameter	
Speaker				
			Monaural	
Microphone				
			Monaural	
Power				
	Operating battery		Lithium-ion battery pack x 1 pc	HA-C21BAT battery pack
	Memory backup battery		NiMH battery (rechargeable) on board	Not replaceable
	Battery life		See Table 2.3.	
	Battery capacity		2,300 mAH	HA-C21BAT battery pack
	Backup period	Memory backup battery only	30 minutes or longer	- The memory backup battery is fully charged. - The surrounding temperature is at room temperature. Note 2
		Memory backup battery + Operating battery	One month or longer	- The battery pack (HA-C21BAT) is fully charged. Note 2

Continue.

	Battery pack charge time	Approx. 5 hours or less	Conditions; - The surrounding temperature is at room temperature. - The dedicated AC adaptor or Cradle is used to charge the battery pack.
	Memory backup battery charge time	Approx. 4 hours (when the power is provided via the dedicated AC adaptor or the Cradle.) Approx. 16 hours (when the power on the terminal is kept on.)	Conditions; - The battery pack (HA-C21BAT) is installed in the terminal. - The surrounding temperature is at room temperature.
Dimensions			
		Approx. 80 (W) x 140 (D) x 25 (H) mm	Note 3
Weight			
		Approx. 290 g	Note 4

Notes:

1. Concurrent use of Wireless LAN communication and Bluetooth communication is not recommended. The communication range may vary depending on the radio condition in air and/or the surrounding environment.
2. Each memory backup period will depend on the characteristic of the terminal itself, the surroundings including temperature, humidity. Thus, the periods described in Table 2.1 are recommended for use for reference only. They are not guaranteed figures.
3. Any protruding part on the terminal is not measured.
4. The weight includes the lithium-ion battery pack (HA-C21BAT) installed. The strap is excluded.

Pin layout for Serial Interface;

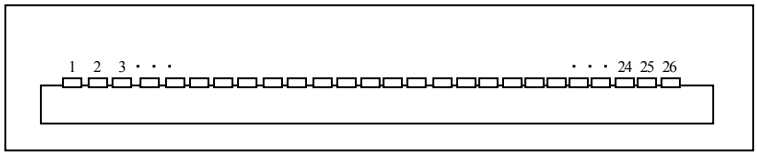


Fig. 2.1

Signal layout;

Table 2.2

Pin no.	Signal	Use	Direction of signal flow	Remark
1	CR CD2#	#2 for detecting the Cradle	IN	
2	RS232C CS	RS232C	IN	
3	RS232C CD	RS232C	IN	
4	RS232C ER	RS232C	OUT	
5	RS232C RS	RS232C	OUT	
6	RS232C DR	RS232C	IN	
7	GND	GND	-	See note.
8	USB Client D-	For USB Client	IN/OUT	
9	USB Client D+	For USB Client	IN/OUT	
10	USB Client PLU	For USB power	IN	
11	USB Host D-	For USB Host	IN/OUT	
12	USB Host D+	For USB Host	IN/OUT	
13	VBUS	For USB power	OUT	
14	ADP	Power for charging battery on the terminal	-	See note.
15	ADP	Power for charging battery on the terminal	-	See note.
16	ADP	Power for charging battery on the terminal	-	See note.
17	ADP	Power for charging battery on the terminal	-	See note.
18	RS232C RXD	RS232C	IN	
19	RS232C TXD	RS232C	OUT	
20	GND	-	-	See note.
21	GND	-	-	See note.
22	CRSEL0	For recognition of connected device	IN	
23	CRSEL1	For recognition of connected device	IN	
24	ADP	Power for charging battery on the terminal	-	See note.
25	ADP	Power for charging battery on the terminal	-	See note.
26	CR CD1#	#1 for detecting Cradle	IN	

Notes:

- Since the current at a peak level that flows through the interface reaches as high as 3A, all the "ADP" and "GND" pins in the table must be used.
- Metal frame of the connector must be connected to "GND" pins.

Table 2.3 Operating hours by model

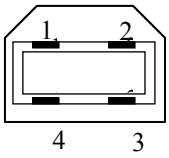
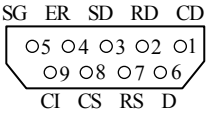
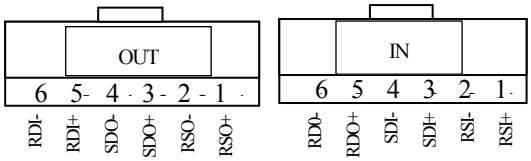
Model	IEEE802.11b and Bluetooth integrated	Operating hour	Operating condition and mode
IT-10M20	No	Approx. 27 hours	- The surrounding temperature is at room temperature. - The battery pack (HA-C21BAT) is a brand new and fully charged. - The backlight is turned off. - The IrDA setting is set to off. - The CPU speed setting is set to "Auto Mode". - The operating periodic ratio of calculation and idle with the display being turned on is 1:10.
IT-10M20BR	Yes		
IT-10M20BR	Yes	Approx. 14 hours	- The surrounding temperature is at room temperature. - The battery pack (HA-C21BAT) is a brand new and fully charged. - The backlight is turned off. - The IrDA setting is set to off. - The CPU speed setting is set to "Auto Mode". - The operating periodic ratio of idle with the display being turned on, RF and calculation is 10:1:1.

Notes:

- The durations of time in "Operating hour" for IT-10M20BR has been measured in the wireless LAN configuration with Cisco Aironet 1100 Access-Point. The time duration may become different if other Access-Point is employed.
- In the low temperature, the operating hour powered by battery tends to be shorter.

2.2 HA-C60IO/HA-C61IO

Table. 2.4

Item			Specification	Remark
Interface	IrDA	Standard	IrDA Ver. 1.1 compatible	Applicable to HA-C61IO only.
		Comm. method	Half duplex	
		Synchronization	Start/stop method	
		Comm. speed	4 Mbps (maximum)	
	USB	Standard	USB Ver. 1.1 compatible	1. VBus 2. –Data (D-) 3. +Data (D+) 4. GND
		Comm. speed	12 Mbps (maximum)	
		Connector	 USB connector type B	
	RS-232C	Comm. method	Full duplex	
		Synchronization	Start/stop method	
		Comm. speed	115.2 Kbps	
		Connector	 D-Sub 9-pin (Female)	
	RS-422	Comm. method	Full duplex	Applicable to HA-C61IO only.
		Synchronization	Start/stop method	
		Comm. speed	115.2 Kbps	
		Connector	 RJ-45 compatible (6 pins)	
Display	Status LED	No. of LEDs	3	Applicable to HA-C61IO only. Refer to Chapter 2.4 “Status Indication With LEDs”.
		No. of display colors	2 (red, green)	
		Display content	System operation status (“LINE”) Comm. status (“DATA”) Power status (“POWER”)	
Input	DIP switch		8 switches	Refer to Chapter 2.3 “DIP Switch Setting (For HA-C61IO). Applicable to HA-C61IO only.
	Detection switch for IT-10		Push switch	Applicable to HA-C61IO only.

Continue.

Power	Input from AC adaptor	Input voltage	DC 12V±5%	Applicable to HA-C61IO.
			DC 5V±5%	Applicable to HA-C60IO.
		Consumption current	DC12V Approx. 3.5A	Applicable to HA-C61IO. While supplying power to the terminal or transmitting data.
			DC5V Approx. 3.0A	Applicable to HA-C60IO. While supplying power to the terminal or transmitting data.
		Plug	EIAJ RC-5320A Class 4 (Center pin: plus) manufactured by Hoshiden Corp.	Applicable to HA-C61IO
			EIAJ RC-5320A Class 2 (Center pin: plus) manufactured by Hoshiden Corp.	Applicable to HA-C60IO.
		AC adaptor (Dedicated)	AD-S15050AE	Applicable to HA-C60IO.
			AD-S42120AE	Applicable to HA-C61IO.
	Charge/supply power	Output voltage	DC 5V±10%	
		Output current	2,200 mA (maximum)	Applicable to HA-C61IO.
			1,500 mA (maximum)	Applicable to HA-C60IO.
		Charge method	Constant voltage	With curb function on current
		Charge time	Approx. 5.0 hours or less	When HA-C21BAT is installed in the terminal.
		Power terminals	 Power terminal GND	- The illustration of the power terminals on the left is viewed at the front of the cradle. - Applicable to HA-C61IO.

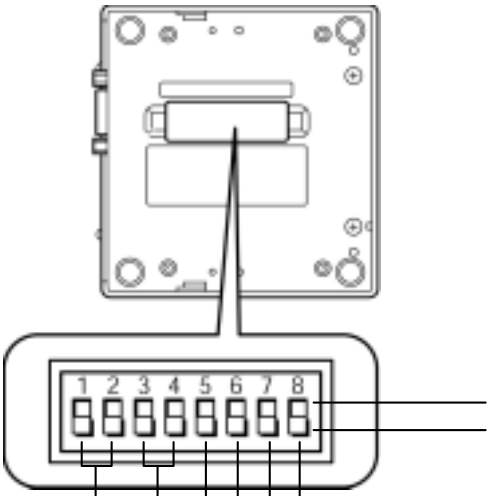
Weight/Dimensions

Table 2.5

Model no.		Specification
HA-C61IO	Weight	Approx. 380 g
	Dimensions	Approx. 110 (W) x 103 (D) x 87.5 (H) mm
HA-C60IO	Weight	Approx. 150 g
	Dimensions	Approx. 114 (W) x 107 (D) x 60.0 (H) mm

2.3 DIP Switch Setting (For HA-C61IO)

The DIP switch is located on the rear side of the Bridge Satellite Cradle (HA-C61IO). Change the ON/OFF settings according to your required system configuration. The new settings do not go into effect until the power switch is turned off and then back on again.



ON (Upper side)
OFF (Lower side)

Not used (always OFF)

Not used (always OFF)

Host Computer Interface

Switch Number	6
RS-232C	OFF
USB	ON *

Daisy Chain Termination

Switch Number	5
Intermediate Connection	OFF
Daisy Chain Off/Termination	ON *

Connection

Switch Numbers	3	4
Host Computer	OFF *	OFF *
Daisy Chain	ON	OFF

Inter-Cradle Data Rate (RS-422 Comm. speed)

Switch Numbers	1	2
115, 200 bps	ON *	OFF *

* : Default setting.

Fig. 2.2

Note:
Other DIP switch settings are used for testing and inspection purposes. Because of this, you should never use any DIP settings other than those described above.

2.4 Status Indications With LEDs

This chapter is not applicable to the HA-C60IO Basic Cradle.
Various operational statuses on the HA-C61IO can be displayed using the LEDs. The following table describes LED indication modes and their meanings.

Table 2.5

Item		LED mode	Description	Remark
LED				
	Power status indicator ("POWER")	Off	: Power off.	2-color LED
		Green	: Power is ON and the terminal is correctly mounted on the Cradle.	
		Red	: Power is ON but the terminal is not correctly mounted on the Cradle.	
	Comm. status indicator ("DATA")	Off	: No communication being performed.	2-color LED
		Green (Flashing)	: Communication is in progress.	
		Red (Flashing)	: Problem in the connection between two Bridge Satellite Cradles.	
	Line status indicator ("LINE")	Off	: The system is not operating.	
		Green (Flashing)	: The system is correctly operating.	

2.5 HA-C32DCHG

Table 2.6

Item		Specification	Remark
Charge method			
	Charge method	Constant-voltage and constant-current	With current limiter
	Charge period	Approx. 2 hours (with one battery pack mounted)	The surrounding temperature is at room temperature.
		Approx. 4 hours (with two battery packs mounted)	
Power		Supplied via dedicated AC adaptor (AD-S42120AE)	DC 12V±5%
Consumption current		Approx. 0.8 A	In single configuration
		Approx. 2.4 A	In configuration of three HA-C32DCHGs being connected
Operating temperature		0 to 40℃	
Operating humidity		30 to 80%	
Max. no. of connectivity		3 units of HA-C32DCHG	

Weight/Dimensions

Table 2.7

Item	Specification	Remark
Weight	Approx. 170 g	
Dimensions	100 (W) x 104 (D) x 42 (H) mm	

2.6 HA-C21BAT

Table 2.8

Item	Specification	Remark
Rated capacity	2,300 mAH	
Rated voltage	3.7V	
Charge period	Approx. 2.0 hours	When charging one battery pack at a time with HA-C32DCHG
	Approx. 4.0 hours	When charging two battery packs at a time with HA-C32DCHG
Operating temperature	Refer to the temperature for HA-C32DCHG in Table 4.4 when charge. Refer to the temperature for IT-10 in Table 4.1 when discharge.	
Operating humidity	Refer to the temperature for HA-C32DCHG in Table 4.4 when charge. Refer to the temperature for IT-10 in Table 4.1 when discharge.	
Weight	Approx. 60 g	
Dimensions	72.8 (W) x 58.0 (D) x 8.1 (H) mm	

3. Product Identification And Reference Numbers

On the back of the terminal and its options (major options only), there is a bar code and numbers printed on label as shown in Fig. 3.1 below.
This bar code is represented by 15 digits of Code128 and by alphanumeric characters beneath the bar code. The numbers from 1 to 9 in the figure represent identification and references of the terminal. The numbers from 10 to 14 represent a manufacturing reference which is reserved by the manufacturer. See the figure below for each meaning.

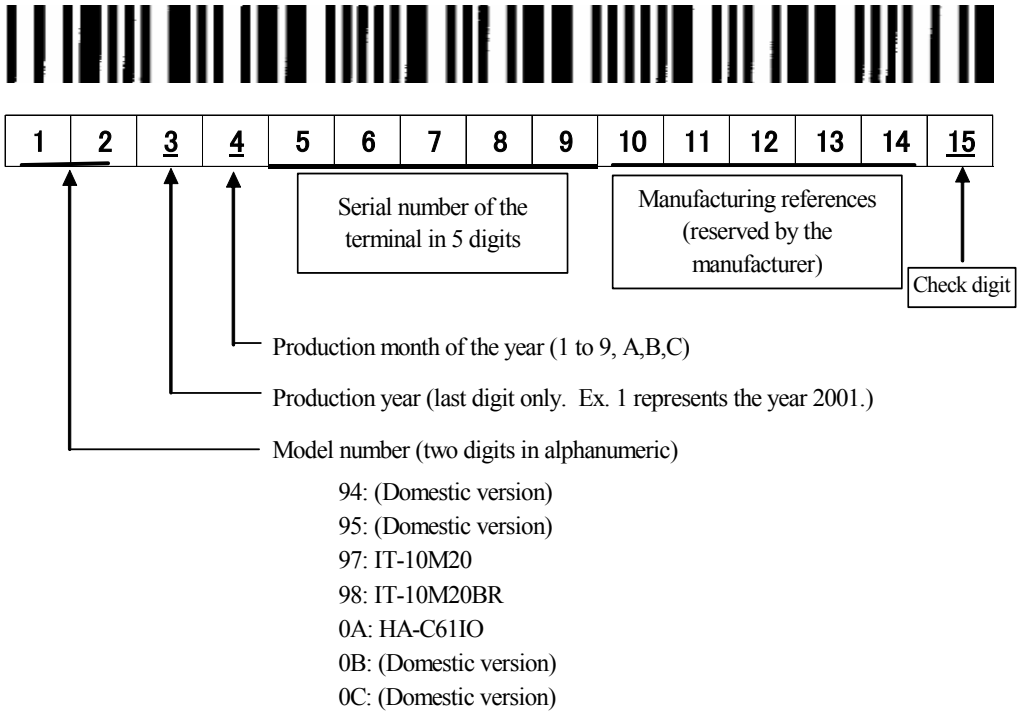


Fig. 3.1

4. Quality References

This chapter describes about quality references specially concerned with environmental performance, electric durability, mechanical durability, reliability, compliance and, etc. for the IT-10 series and its dedicated options.

4.1 Environmental Performances

4.1.1 IT-10

Table 4.1

Item		Specification	Condition
Temperature			
	Operation	0 to 40℃	
	Non-operation	-20 to 60℃	
Humidity			
	Operation	10 to 85 %RH	No condensation
	Non-operation	10 to 90 %RH	
Storage in carton box			
	Temperature	-20 to 60℃	
	Humidity	10 to 90 %RH	
Dust and water-splash proof			
		IP54 level (compliant with IEC60529) See "IP (Industrial Protection) code".	All covers on the terminal are closed while testing.

IP (Industrial Protection) code

A cording system to indicate the degrees of protection provided by an enclosure against access to hazardous parts, ingress of solid foreign objects, ingress of water and to give additional protection in connection with such protection. Elements of the IP54 level and their meanings are as follows.

IP5x

Represents dust proof to level 5. This level of IP code means that the terminal is protected against solid foreign objects including dust to penetrate the enclosure.

IPx4

Represents water-splash proof to level 4. No detrimental effect is observed even with exposure to water splashed from any direction.

"x" represents that a characteristic numeral is not required to be specified.

4.1.2 HA-C60IO

Table 4.2

Item		Specification	Condition
Temperature			
	Operation	0 to 40℃	
	Storage	-20 to 60℃	
Humidity			
	Operation	10 to 85%RH	No condensation
	Storage	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-C61IO

Table 4.3

Item		Specification	Condition
Temperature			
	Operation	0 to 40℃	
	Storage	-10 to 50℃	
Humidity			
	Operation	30 to 80%RH	No condensation
	Storage	30 to 90%RH	
Storage in carton box			
	Temperature	-10 to 50℃	
	Humidity	30 to 90%RH	No condensation
Dust and water-splash proof			
		Not applicable.	

4.1.4 HA-C32DCHG

Table 4.4

Item		Specification	Condition
Temperature			
	Operation	0 to 40℃	
	Non-operation	-20 to 60℃	When battery pack is not charged.
	Storage	-20 to 60℃	In carton box
Humidity			
	Operation	10 to 85 %RH	No condensation
	Storage	10 to 90 %RH	No condensation In carton box

4.1.5 HA-C21BAT

Table 4.5

Item		Specification	Condition
Temperature			
	Operation	Refer to the temperature for HA-C32DCHG in Table 4.4 when charge. Refer to the temperature for IT-10 in Table 4.1 when discharge.	
	Non-operation	Refer to the temperature for HA-C32DCHG in Table 4.4 when charge. Refer to the temperature for IT-10 in Table 4.1 when discharge.	
	Storage	-10 to 50℃	
Humidity			
	Operation	Refer to the humidity for HA-C32DCHG in Table 4.4 when charge. Refer to the humidity for IT-10 in Table 4.1 when discharge.	
	Storage	90 %RH or less	No condensation
Dust and water-splash			
		Not applicable.	

4.2 Electrical Durability

4.2.1 IT-10

Table 4.6

Item		Specification	Remark
Power consumption		5V, 2.7A	Applicable to IT-10M20.
		5V, 3.0A	Applicable to IT-10M20BR.
Anti-static strength			
	Malfunction	±4 KV (contact), ±8 KV (in air)	Compatible with EN6100-4-2
	Destruction	±12 KV	

4.2.2 HA-C60IO/HA-C61IO

Table 4.7

Item		Specification	Remark
Consumption current		Approx. 1.0 A/DC12V	- While supplying power to the terminal, or transmitting data to the terminal. - Applicable to HA-C61IO.
Input voltage		DC5V±5%	Applicable to HA-C60IO.
		DC12V±5%	Applicable to HA-C61IO.
Anti-static strength			
	Malfunction	±6 KV	150 pF, 330 ohm
	Destruction	±12 KV	
Line noise strength (Malfunction)		1,000 V	Pulse width: 5 KHz Burst cycle: 300 msec. No. of pulses: 75 pcs Burst period: 15 msec.
Power interruption		10 milliseconds or less	

4.2.3 HA-C32DCHG

Table 4.8

Item		Specification	Remark
Consumption current		Approx. 0.03A	When the battery pack is not mounted.
		Approx. 0.8A	When the battery pack is charged on the HA-C32DCHG.
Input		12V±5%	
Anti-static strength			
	Malfunction	±8 KV	150 pf, 330 ohm
	Destruction	±12 KV	
Line noise strength			
	Malfunction	1,000 V	Pulse width: 5 KHz Burst cycle: 300 msec. No. of pulses: 75 pcs Burst period: 15 msec.

4.2.4 HA-C21BAT

Table 4.9

Item		Specification	Remark
Anti-static strength			
	Malfunction	±10 KV	Compliant with IEC6100-4-2 standard (fully charged)
	Destruction	±13 KV	

4.3 Physical Durability

4.3.1 IT-10

Table 4.10

Item		Specification	Condition
Resistance to drop impact (height)			
	In bare condition	100 cm	Onto concrete, one time on each of the 6 sides and 4 corners. (with the CF being removed)
	In individual carton box	70 cm or less	Onto concrete, one time on each of the 6 sides, 1 corner, 3 edges.
	In master carton box	50 cm or less	
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 kept on (with the screen being turned on).

4.3.2 HA-C60IO/HA-C61IO

Table 4.11

Item		Specification	Condition
Resistance to vibration (in bare condition)		1.5 G or less	10 to 55 Hz In X,Y, and Z directions Reciprocally for 30 minutes
Resistance to vibration (in package)		1.5 G or less	10 to 55 Hz In X,Y, and Z directions Reciprocally for 30 minutes
Resistance to impact			
	In bare condition	70 cm	One time for 6 faces onto concrete surface
	In individual carton box	70 cm or less	One time for 6 faces, 1 corner and 3 edges
	In master carton box	50 cm or less	

4.3.3 HA-C32DCHG

Table 4.12

Item		Specification	Condition
Resistance to vibration (in bare condition)		1.5 G or less	10 to 55 Hz In X,Y, and Z directions Reciprocally for 30 minutes
Resistance to vibration (in package)		1.5 G or less	10 to 55 Hz In X,Y, and Z directions Reciprocally for 30 minutes
Resistance to impact			
	In bare condition	70 cm	6 faces, 1 corner and 3 edges
	In individual carton box	70 cm or less	6 faces, 1 corner and 3 edges
	In master carton box	60 cm or less	

4.3.4 HA-C21BAT

Table 4.13

Item		Specification	Condition
Resistance to vibration		2.0 G or less	10 to 55 Hz In X,Y, and Z directions Reciprocally for 30 minutes
Resistance to impact			
	In bare condition	100 cm	6 faces, 4 edges onto P-tile.
	In individual carton box	70 cm or less	6 faces, 3 edges, 1 corner onto concrete floor.
	In master carton box	70 cm or less	

4.4 Reliability

4.4.1 IT-10

Table 4.14

Item		Specification	Remark/Condition
Service life			
Backlight		10,000 hours	At half-life period 10 hours per day x 200 days per year x 5 years
Reset switch		1,000 times	
Power switch		100,000 times	
Battery cover lock switch		3,000 times	
Other keys		250,000 times	Excluding the power switch
Serial connector		5,000 times	
CF card connector		5,000 times	
SD card connector		5,000 times	
Mounting/removing the terminal to/from the Bridge Satellite Cradle		10,000 times	
Installing/removing the terminal to/from the Basic Cradle		10,000 times	
Installing/removing the battery cover		3,000 times	
Installing/removing the stylus to/from the silo		10,000 times	
Opening/closing the CF card slot cover		5,000 times	
MTBF	Electronics parts	40,000 hours	Main PCB
		30,000 hours	Batteries, switches, LCD module, excluding jacks
	LCD	100,000 hours	
Charging and discharging cycle of battery pack		500 times	Applicable to HA-C21BAT (see note.)

Note:

The number of the cycles is assumed with the conditions below.

- The remained capacity of battery pack at 300th cycle is approximately 60% of the full capacity.
- The surrounding temperature is at 23±2℃.
- The discharge current is 1.1A constant current.
- The discharge stops at 2.75V.
- The condition of the charge; 1.1A constant-current, charging for 5 hours with 4.20V constant-voltage

4.4.2 HA-C60IO/HA-C61IO

Table 4.15

Item		Specification	Remark/Condition
MTBF (electronics parts)		50,000 hours	Applicable to HA-C61IO.
		2,400,000 hours	Applicable to HA-C60IO.
Mounting/removing the terminal to/from Basic Cradle		10,000 times	Applicable to HA-C60IO.
Mounting/removing the terminal to/from Bridge Satellite Cradle		20,000 times	Applicable to HA-C61IO.
Switch	Power switch	5,000 times	
	DIP switch	10 times	Applicable to HA-C61IO.
No. of installing/removing the connector	USB	500 times	
	RS-232C	500 times	
	RS-422	100 times	Applicable to HA-C61IO.
No. of installing/removing AC adaptor to/from the power adaptor port		1,500 times	

4.4.3 HA-C32DCHG

Table 4.16

Item	Specification	Remark
MTBF (Electronics parts)	50,000 hours	
No. of installing/removing the battery pack to/from	5,000 times	
No. of connecting/removing the series connection terminal	250 times	
No. of installing/removing AC adaptor to/from the power adaptor port	1,500 times	

4.5 Compliance

4.5.1 IT-10

Table 4.17

Model	European Standards				
	EN55022, EN61000, EN55024 (EMI, EMS)	EN301.489-17 (EMI,EMS)	EN60950 (Safety)	EN300.328-2 (Bluetooth, WLAN)	EN50371 EN50361 EN50360 (SAR)
IT-10M20	Yes	No	Yes	No	No
IT-10M20BR	No	Yes	Yes	Yes	Yes

Table 4.18

Model	USA Standards		
	FCC Part 15B Class B	UL60950-1	FCC Part 15 sub part C + SAR
IT-10M20	Yes	Yes	No
IT-10M20BR	Yes	Yes	Yes

Note:

Consult CASIO Computer Co., Ltd. for other areas.

4.5.2 HA-C60IO/HA-C61IO

Table 4.19

	Compliance Standard	
	Europe	USA
EMC	EN55022:1998+A1:2000 Class B	FCC Part 15B Class B
	EN55024:1998+A1:2001 Class B	
Safety	EN60950	UL60950-1

4.5.3 AD-S42120AE/AD-S15050AE

Table 4.20

	Compliance Standard	
	Europe	USA
EMC	EN55022, EN55024, EN61000	FCC Part15B
Safety	EN60950	UL1950 3rd edition

4.5.4 HA-C21BAT

Table 4.21

	Compliance Standard
Safety	UL1642, UL2054

5. Cable Specifications

5.1 For Chain Connection And Short Length

Length; 1 meter or less

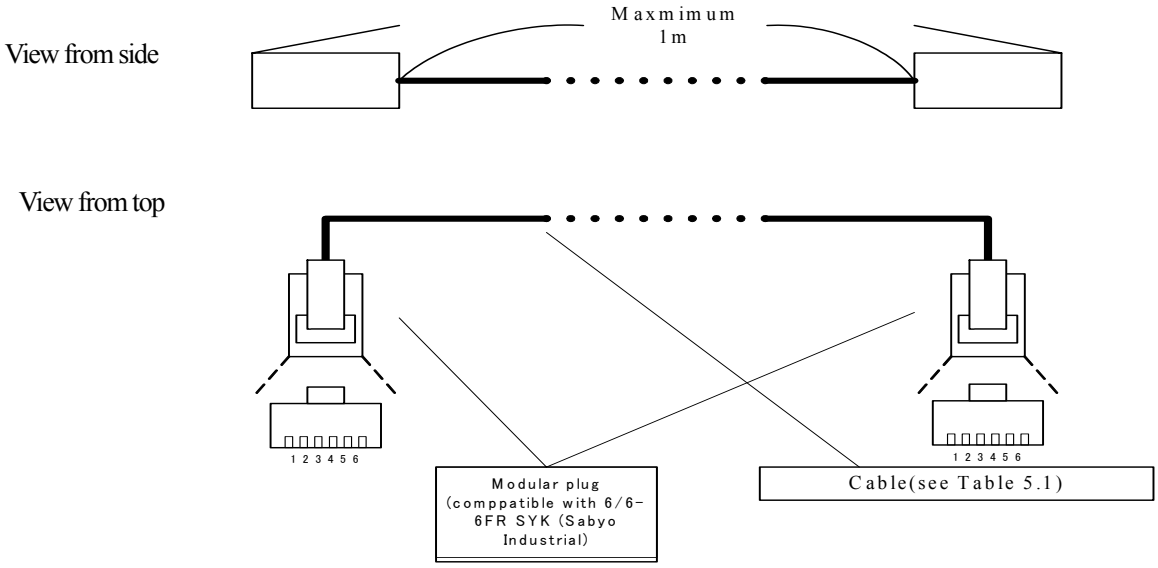


Fig. 5.1

Table 5.1 Specifications of the cable

Cable		
Core wire	Conductor	20/0.1A
	Insulator	Semi-hard material P.V.C.
	Finish of external shape	20/0.1A
Sheath	Insulator	P.V.C.
	Finish of external shape	ϕ 4.3±0.1mm
Characteristics	Conductance resistance	0.12Ω/m or less
	Insulation resistance	50MΩ or more

Pin layout diagram of cable for chain connection and short distance (pin-to-pin straight connection)

Wiring

Cradle at lower position under the chain connection

Pin no.	Signal	Pin no.	Signal
1	IRS+	1	ORS+
2	IRS-	2	ORS-
3	ISD+	3	OSD+
4	ISD-	4	OSD-
5	ORD+	5	IRD+
6	ORD-	6	IRD-

Cradle at higher position under the chain connection

Fig. 5.2

5.2 For Chain Connection And Long Length

Length; 1 meter or longer

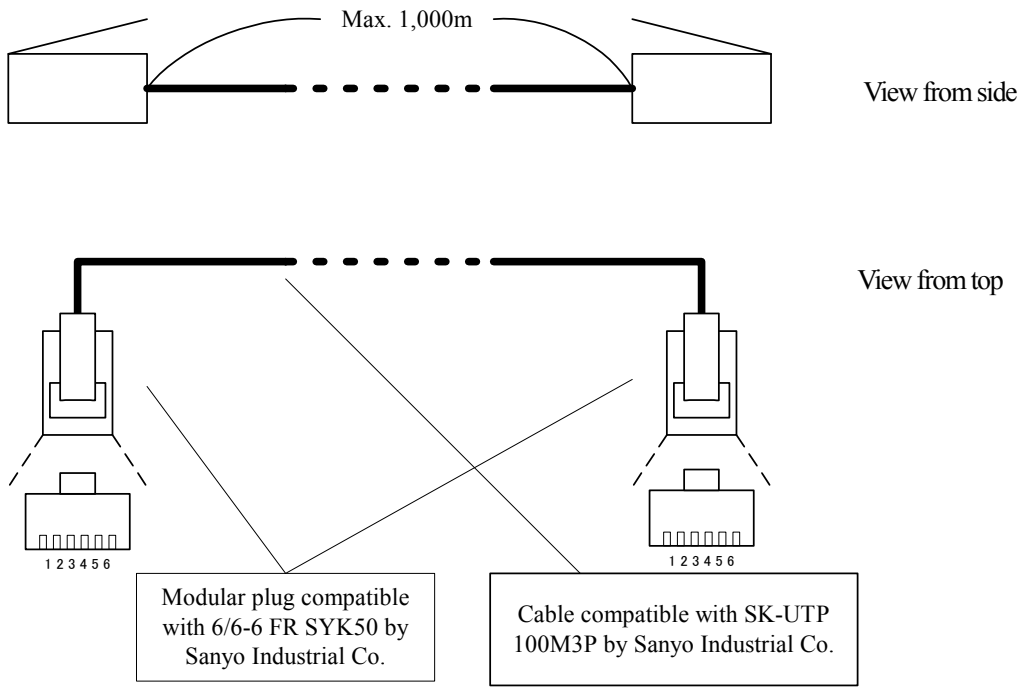


Fig. 5.3

Pin layout diagram of cable for chain connection and long distance (pin-to-pin straight/twist-pair connection)

Wiring

Cradle at lower position under the chain connection

Pin no.	Signal		Pin no.	Signal
1	IRS+	XXXXXX	1	ORS+
2	IRS-		2	ORS-
3	ISD+	XXXXXX	3	OSD+
4	ISD-		4	OSD-
5	ORD+	XXXXXX	5	IRD+
6	ORD-		6	IRD-

Cradle at higher position under the chain connection

Fig. 5.4

6. Precautions

6.1 Handling Precautions

Precautions for short-term storage (1 to 2 days)

- If the IT-10 is to be stored over holidays (including Saturday and Sunday), replace the battery pack with brand-new one before starting the holiday. This will conserve the built-in memory backup battery and ensure retention of data on the terminal.
- If there is a possibility of the above or operator error (e.g., a fully charged battery has not been installed), practice system operation that maintains a backup to avoid loss of data due to consumption of the batteries.

Precautions for long-term storage (over one week)

- Prior to long-term storage (over one week), always back-up data in the terminal to other memory storage device. In addition, remove the lithium-ion battery pack before storage. This can minimize overly discharging the installed battery pack and minimize consumption of the memory backup battery.
- Do not store the removed battery pack at high temperature. Otherwise, it will discharge at an accelerated rate. Note that the remaining capacity after the battery if it is not used for 10 days at 60°C will be approximately 65%, and that after 20 days at 60°C will be approximately 55%.

6.2 Safety

6.2.1 Battery Pack

- Never disassemble or retrofit the battery pack. The battery pack has safety mechanism and protection means incorporated to avoid hazards. Should it be damaged, the battery pack could become hot, generate smoke, explode, or ignite.
- Never contact the "+" and "-" terminals with metal objects such as a wire. Also, do not carry or store the battery with a metal necklace or hair pin. Otherwise, the battery pack may be short-circuited resulting in an excessive current and causing the battery to become hot, smoke, explode, or catch fire.
- Neither dispose of the battery pack into a fire nor heat it. The insulation may be burnt, the gas exhaust valve or safety mechanism may be damaged, or the internal electrolyte may ignite, causing the battery pack to become hot, smoke, explode, or ignite.
- Neither leave nor use the battery pack in a place with a high temperature (over 80 °C) or close to a fire or hot stove. Should the resin separator be damaged due to excessive heat, the battery pack may be short-circuited causing it to become heated, smoke, explode, or ignite.
- Do not soak the battery pack in fresh water or sea water. If the protection means incorporated in the battery pack is damaged, the battery pack may become hot, smoke, explode, or ignite.
- Do not attempt to charge the battery close to a fire, in direct sunlight, or in a car parked in the sun. A heated battery pack will trigger the internal hazard protection means to stop the charging function. Or, the protection means may be damaged and the battery may be charged with an excessive current or voltage, or have abnormal chemical reactions induced to cause it to become hot, smoke, explode, or ignite.
- Do not stick a pin or nail in the battery pack. Neither hit it with a hammer nor stamp it. If this is done, the battery pack may be broken or deformed resulting in a short circuit and causing it to become hot, smoke, explode, or ignite.
- Do not hit or throw the battery pack. If the protection means incorporated in the battery pack is damaged, the battery pack may be charged with an excessive current or voltage, or have abnormal chemical reactions induced to cause it to become hot, smoke, explode, or ignite.
- Never use a battery pack that is significantly damaged or deformed. It may become hot, smoke, explosion, or ignite.
- Do not attempt to solder anything directly on the battery pack surface. The insulation may be damaged or the gas exhaust valve or safety mechanism may be damaged, causing the battery pack to become hot, smoke, explode, or ignite.
- Do not use the battery pack in other device than the IT-10. The performance or service life of the battery pack may be reduced or abnormal current may flow to cause it to become hot, smoke, explode, or ignite.
- When charging the battery pack use only dedicated cradles or dedicated battery charger and its AC adaptor available from CASIO, at a temperature between 0°C and 40°C. If the battery pack is charged with battery chargers other than those specified by CASIO, it may be over-charged, or charged with an excessive current, or have abnormal chemical reactions induced, causing it to become hot, smoke, explode, or ignite.
- The battery pack has a specific polarity. Do not force it into the IT-10 battery compartment. Check the polarity. If the battery pack is installed backwards, it can be incorrectly charged and have an abnormal chemical reaction induced, causing it to become hot, smoke, explode, or ignite.
- If the internal electrolyte of the battery pack leaks and enters the eye, do not rub the eye. Rinse the eye with a sufficient amount of clean water, such as tap water, then immediately consult with a doctor. The electrolyte can cause eye damage.

6.2.2 General

- Be aware of abnormal conditions.
  If the IT-10 is continuously used in an abnormal condition, a fire or electric shock may occur. If there is an abnormality, immediately turn off the Power switch, and be sure to remove the batteries and then contact a CASIO distributor for repair.
- Supply Current/Voltage
  Do not use an AC adaptor with AC voltage not rated on the AC adaptor. Also, avoid drawing power from an outlet used for multiple devices. This may cause fire or an electric shock.
- Handling the power cable
  Do not damage, break, retrofit, bend, twist, or stretch the power cable. Also, do not place a heavy object on it or heat it. If this is done, the power cable may be broken and cause a fire or electric shock.
- AC adaptor
  Always use the dedicated AC adaptor (AD-S15050AE). If an AC adaptor that is not specified is used, the battery pack may explode, causing a fire or personal injury.
- Do not touch the AC adaptor with wet hands.
  This may result in an electric shock. Also, place the AC adaptor in a place where it is not subject to dust and water. Dust and dirt may cause fire and smoke, and water may cause an electric shock.
- About the electrolyte
  If the internal electrolyte of the battery leaks and enters the eye, rinse it with a sufficient amount of water, then consult with a doctor
- About the battery pack
  1. Do not place the battery pack in a microwave oven or high-pressure container. If this is done, the battery pack will be quickly heated or the contact seal may be broken causing it to become hot, smoke, explode, or ignite.
  2. If you are aware of an abnormal condition such as a smell, excessive heat, discoloration, deformation, etc., during use, charging and storage of the battery pack, immediately remove it from the IT-10 and do not use it anymore. If it continuously used without proper treatment, the battery pack may become hot, smoke, explode, or ignite.
  3. If charging cannot be completed even after the specified charging period, stop the charge operation. Otherwise, the battery pack may become hot, smoke, explode, or ignite.
  4. If the battery pack leaks or generates an abnormal smell, immediately remove it away from the fire. Otherwise, the electrolyte that has leaked may ignite causing smoke, an explosion, or fire.
  5. Do not disassemble the battery pack. Neither disassemble nor retrofit this terminal. Personal burns or injury may occur.
- About the power cable and AC adaptor
  1. Do not bring the power cable close to heating equipment such as stove. The cable coating may burn or melt, resulting in fire or electric shock.
  2. Do not bring the power cable close to a container filled with liquid. If the cable becomes wet or should the container be tipped over, a fire or electric shock may result.
  3. Do not unplug the AC adaptor by pulling the power cable by hand. The cable may be damaged causing a fire or electric shock. Always hold the plug of the cable.
  4. When cradle or battery charger is not used for an extended period of time, e.g. during absences, unplug the AC adaptor from the wall outlet.

- About the battery
  1. Do not attempt to disassemble or solder the battery. Also, do not heat or throw the battery into a fire.
  2. When the button-type battery (memory backup battery) used in this terminal is removed, exercise care so as not to accidentally swallow it. Remain aware of the danger to infants. Store the button-type battery in an infant-safe location. Should the battery be swallowed, immediately consult a doctor.
  3. If the battery is improperly used, the electrolyte may leak and soil other objects, resulting in fire and personal injury. Be sure to observe the following precautions:
  4. Make sure of the polarity (+, or -) of the battery when installing it.
  5. Do not leave this terminal unused for an extended period of time with the battery installed.
- About the battery pack

  Do not use the battery pack in a place where it will be exposed to static electricity. The battery pack may become hot, explode, or ignite.
- Avoid exposing it to water and foreign matter

  Should foreign matter (metal chips, water, liquid chemicals) enter inside the product, immediately turn off the IT-10, remove the battery pack, and then contact your CASIO distributor.
- Memory protection
  1. Contents of the IT-10 should always be backed up in personal computer to make a separate record from that on the terminal. The contents of the memory may accidentally be lost due to battery power consumption, etc. This also occurs when this terminal malfunctions or is repaired.
  2. When replacing the battery pack, always refer to the user's guide accompanied in the carton box. Improper battery replacement may lead to unexpected loss or alteration of data.
- Place of installation
  1. Do not place the IT-10 in an environment with a significant amount of moisture or dust. Otherwise, a fire or electric shock may occur.
  2. Do not use the IT-10 in the vicinity of a cooking table, humidifier, etc., where it will be subjected to oily smoke or vapor. Otherwise, a fire or electric shock may occur.
  3. Do not place the IT-10 in an unstable situation, such as on a wobbling platform or shelf. It may fall and cause personal injury.
  4. Do not throw the IT-10 into a fire. This may cause a fire or personal injury due to explosion of the terminal.