

DT-X5 Series

Hardware Manual

(Version 1.04)

CASIO Computer Co., Ltd.

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September 2006

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Preface

A new industrial handheld terminal has been developed. CASIO introduces the DT-X5 series of handheld terminal with built-in SH-3 (32-bit RISC type) Processor, high speed laser scanner and diverse wireless LAN communications via Bluetooth as standard and IEEE802.11b WLAN (model dependent). Running under Microsoft Windows CE .NET4.1 operating system, the rugged DT-X5 is designed specifically for industrial applications.

This reference manual will explain about the hardware specifications and the details for the Laser integrated models (DT-X5M10E, DT-X5M10R) and the C-MOS imager integrated models (DT-X5M30E, DT-X5M30R, DT-X5M30U) and the dedicated options only.

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. Overview

1.1 Features

Incorporates .NET technology

- Uses WindowsCE .NET 4.1 operating system.
- Makes effective use of .NET resources developed by other parties.
- Employment of Embedded OS makes it possible to build a flexible WindowsCE system.

Enhanced communicating functions

- Built in Bluetooth Ver 1.1 module.
- The transfer rate of the Wireless LAN (model dependent) is 5 Mbps, which is the maximum rate of communication for peer-to-peer connection with PC over IEEE802.11b.
- The following protocol stacks are available for Bluetooth interface:
GAP (Generic Access Profile), SDP (Service Discovery Profile), SPS (Serial Port), Dialup Network, File Transfer.
- Security function (WEP 128 bits)

Superb reading capability

- With the installed high speed laser scanner (DT-X5M10E, DT-X5M10R) it is possible to read any industrial 1D bar code symbologies.
- Multi-step read function.
- With the installed C-MOS imager (DT-X5M30E, DT-X5M30R, DT-X5M30U) it is possible to read the most widely used 2D symbologies as well as the industrial standard 1D symbologies.

Support of outstanding development environment

Ample Microsoft development tools provided for easy application development and an advanced debug environment.

1.2 Available Models and Options

Table 1.1 Models of DT-X5 series

Model	Wireless LAN		Scan Engine		Operating battery
	IEEE802.11b	Bluetooth	Laser	C-MOS	
DT-X5M10E	No	Yes	Yes	No	Lithium-ion/ Alkaline
DT-X5M10R	ETSI	Yes	Yes	No	Lithium-ion
DT-X5M30E	No	Yes	No	Yes	Lithium-ion/ Alkaline
DT-X5M30R	ETSI	Yes	No	Yes	Lithium-ion
DT-X5M30U	No	Yes	No	Yes	Lithium-ion/ Alkaline

- IEEE802.11b : WLAN module (compliant with IEEE802.11b) is integrated as standard.
 Bluetooth : Bluetooth Version 1.1 module is integrated as standard
 C-MOS : Capable to scan 1D/2D symbologies and to capture images.
 Laser : Capable to scan 1D symbologies.
 Lithium-ion : Lithium-ion battery pack (HA-A20BAT or DT-5025LBAT only)
 Alkaline : AA-size alkaline battery (x 2 pcs)

Table 1.2 Options

Model	Product	Remark
HA-A61IO	Bridge Satellite Cradle	
HA-A60IO	Bridge Basic Cradle	
HA-A34AT	Battery Charger Car Mount Unit	
HA-A30CHG	Cradle-type Battery Charger	
DT-5022CHG	Dual Battery Charger	
HA-A20BAT	Battery Pack	1,700 mAH, 3.7V
DT-5025LBAT	Large-capacity Battery Pack	3,400 mAH, 3.7V
AD-S42120AE	AC Adaptor	Input range; 100 to 240 VAC
AD-S45150AU	AC Adaptor	Input range; 100 to 230VAC. With US power cord. For DT-5022CHG
AD-S45150AE	AC Adaptor	Input range; 100 to 230VAC, With European and US power cords. For DT-5022CHG
MPC-577ADPE	AC Adaptor	See note.
MPC-577ADPG		
DT-827CAC	Car Power Cable	
DT-891WH	Wall Mount Unit	
DT-887AXA	RS-232C cross cable	Cable length; 1.5 m, 9-pin male
DT-882RSC	RS-232C cross cable	25-pin male
DT-883RSC	RS-232C cross cable	25-pin female
DT-888RSC	RS-422 modular cable	Cable length; 1.0 m
DT-380USB	USB cable	Cable length; 2.0 m

Note:

MPC-577ADPE and MPC-577ADPG are phased out as of August 2006. The successor models are AD-S45150AE and AD-S45150AG.

The accessories in the table below are accompanied as accessory in each individual carton box of DT-X5.

Table 1.3 Accessory

Product	Q'ty	Remark
AA size Alkaline battery	2	For DT-X5M10E, M30E and M30U only
Alkaline battery holder	1	For DT-X5M10E, M30E and M30U only
Wrist strap	1	
Large-capacity battery pack cover	1	For DT-5025LBAT
Battery pack cover	1	For DT-X5M10E, M30E and M30U only
User's guide	1	in English and Chinese

1.2.1 Options And Interfaces

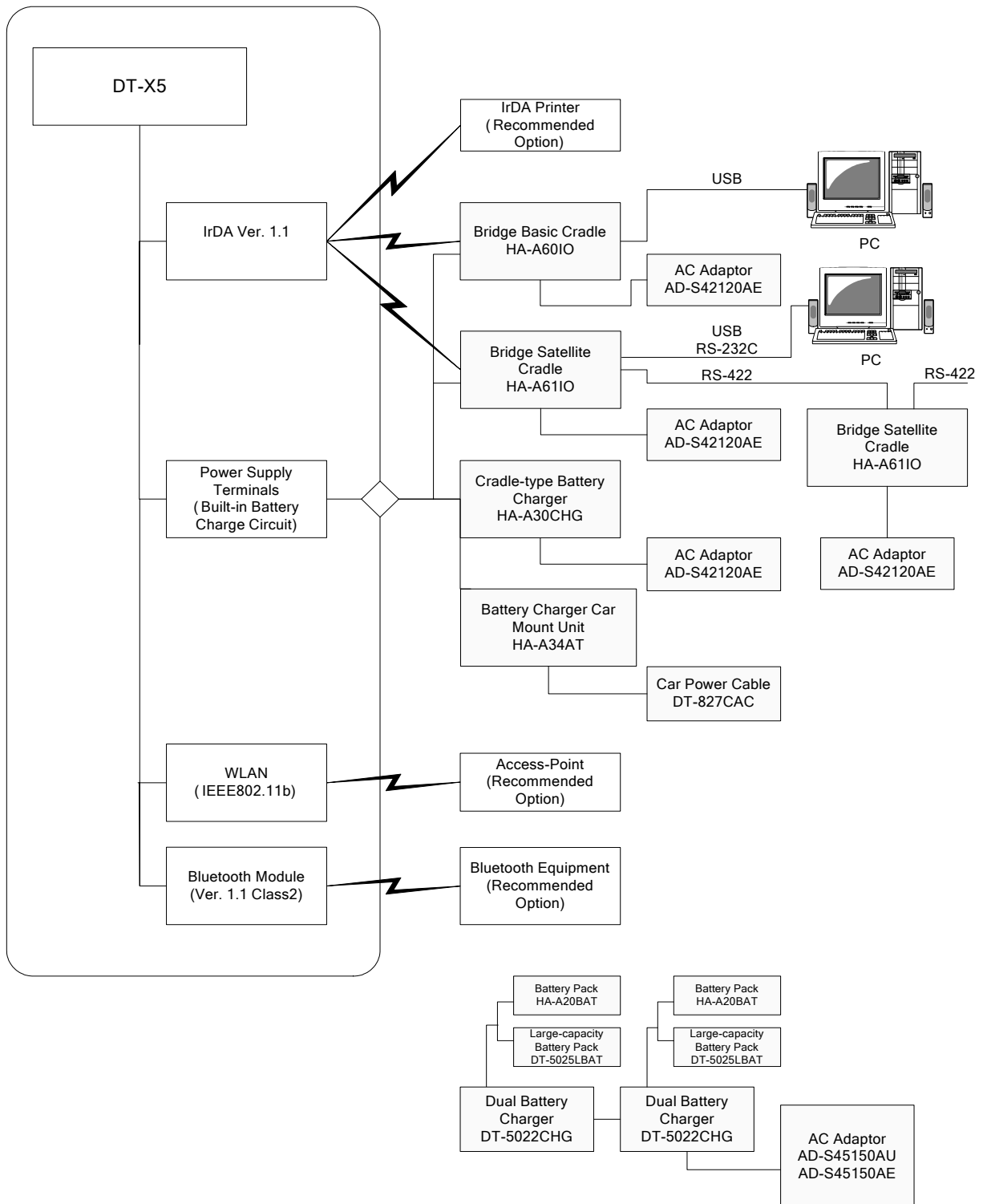


Fig. 1.2

1.3 General Guide

Views for DT-X5M10E, DT-X5M10R

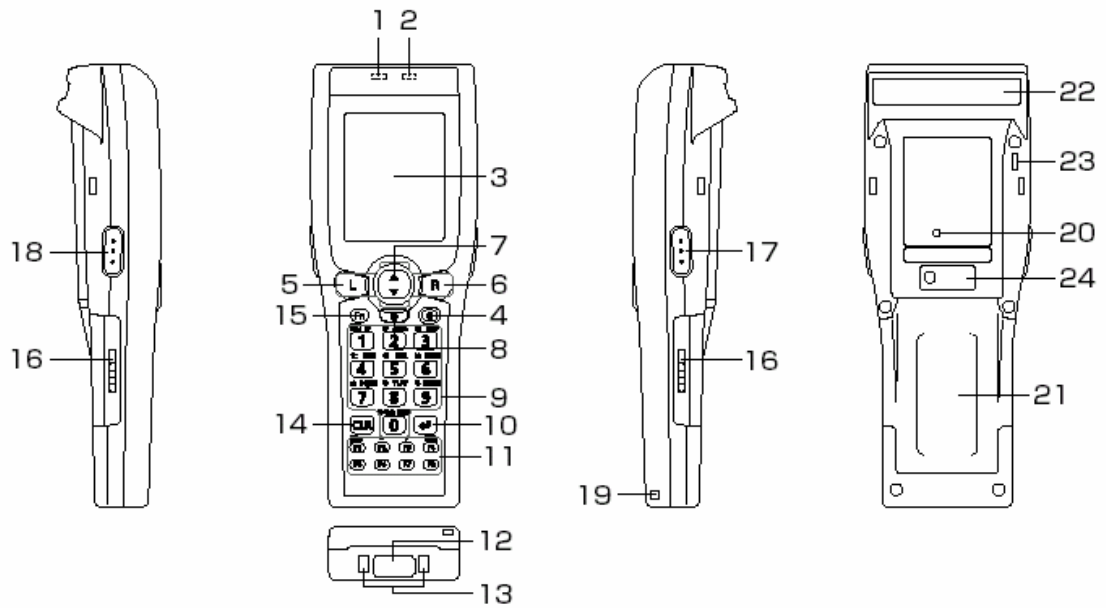


Fig. 1.3

Note:

The front view in Fig. 1.3 is for all the models of DT-X5 series.

Views for side and back of DT-X5M30E, DT-X5M30U and DT-X5M30R

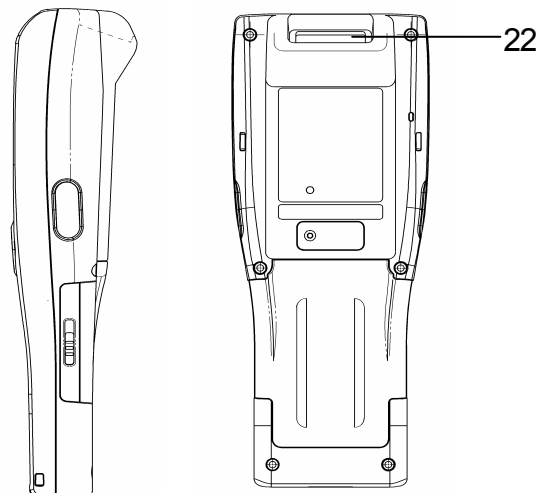


Fig. 1.4

Refer to Table 1.4 “Names of parts” in the following page for each part and its description.

Table 1.4 Names of parts

No.	Name	Description
1	Indicator 1	This indicator is green when charging is completed, and red during charging.
2	Indicator 2	This indicator is green when the bar code has been read successfully, and red when a reading error has occurred.
3	LCD panel	Displays text, operating instructions and so forth.
4	Power key	Switches the power on and off (press for about one second).
5	L key	This is pressed to move the cursor to the left.
6	R key	This is pressed to move the cursor to the right.
7	Cursor key	This functions in mainly the same manner as the cursor keys on a PC. It is used when selecting items or scrolling the screen up and down and so on.
8	Multi key	This can be set to perform arbitrary functions.
9	Numeric keys	These are pressed to input numbers and letters.
10	ENT key	This is pressed after entering a value or when advancing to the next step.
11	Function keys	These keys can be assigned functions other than the functions for reading bar codes. They are initially assigned the following default settings. F1 : Deletes one characters to the left. F2 : Inputs a hyphen (-). F3 : Inputs a period (.). F4 : Toggles to switch between numbers and alphabets (uppercase). F5 : Inputs a space. F6 : Functions similar to the Tab key on a PC. Used to move items for input or selection. F7 : Functions similar to the Tab key on a PC. Used to move items for input or selection (but moves the opposite to F6.) F8 : Not set.
12	IR port	This port is used for IR communication with another terminal or the Bridge Satellite Cradle.
13	Power contacts	Contact points for supplying power from the Bridge Satellite Cradle and Cradle-type Battery Charger.
14	CLR key	This is pressed to clear the contents of all key inputs.
15	Fn key	This is used to make various settings or start up preliminary registered applications by pressing in combination with a function key or numeric key. Fn and 1 keys : Switches the backlight on and off. Fn and 2 keys : Darkens the contrast. Fn and 3 keys : Lightens the contrast.
16	Battery pack cover lock switches	Slide these switches when opening and closing the battery cover.
17	R Trigger key	This key is used to read bar codes. It is also pressed when performing a full reset.
18	L Trigger key	This key is used to read bar codes. It is also pressed when canceling a full reset.
19	Wrist strap hook	This is used when attaching the wrist strap.
20	Reset switch	This is pressed to reset the terminal.
21	Battery pack cover	Covers the compartment that holds the battery pack or AA size alkaline batteries.
22	Bar code reader port	Laser light is emitted from this port to read bar codes (Laser scanner integrated models only). LED lights are emitted from this port to read bar codes and stacked 2D codes (C-MOS integrated models only).
23	Buzzer	Produces a buzzer tone.
24	Maintenance connector cover	This is used when performing maintenance and repairs. This cover should normally not be opened.

1.3.1 HA-A34AT Battery Charger Car Mount Unit

View

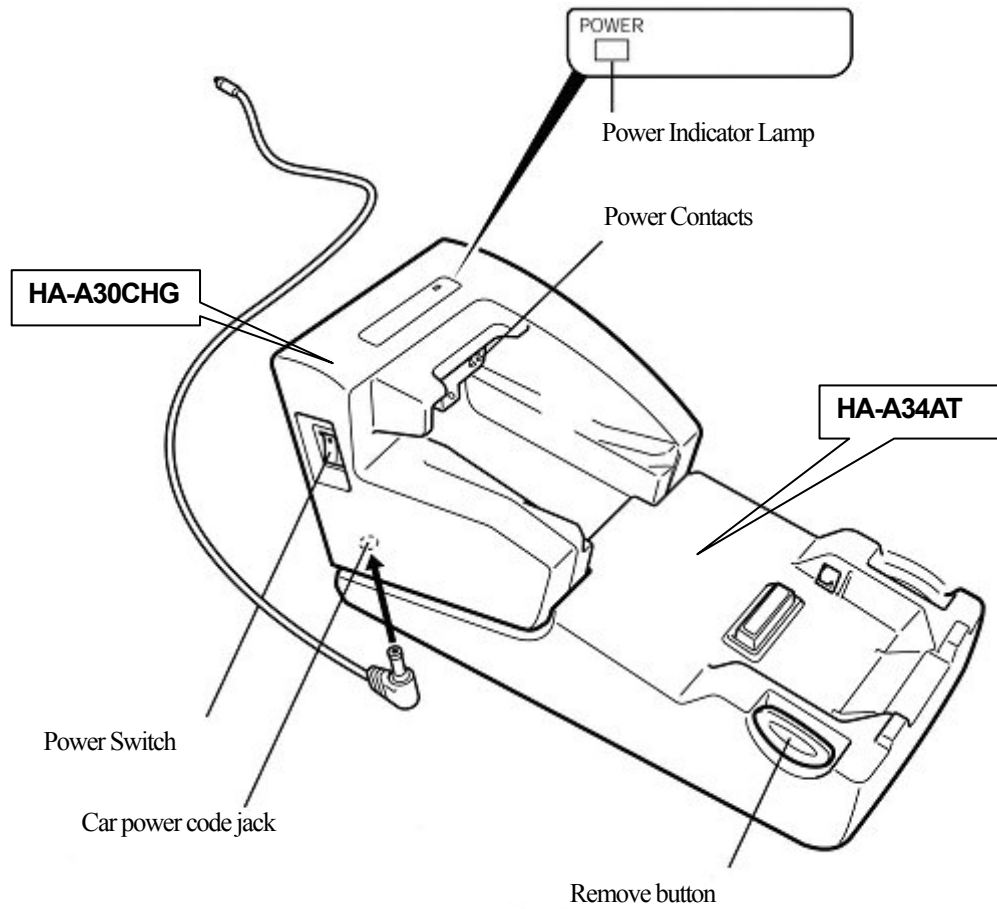


Fig. 1.5

Note:

The view in Fig. 1.5 shows HA-A34AT (Battery Charger Car Mount Unit) with HA-A30CHG (Cradle-type Battery Charger) integrated to it.

1.3.2 HA-A61IO and HA-A60IO Cradles

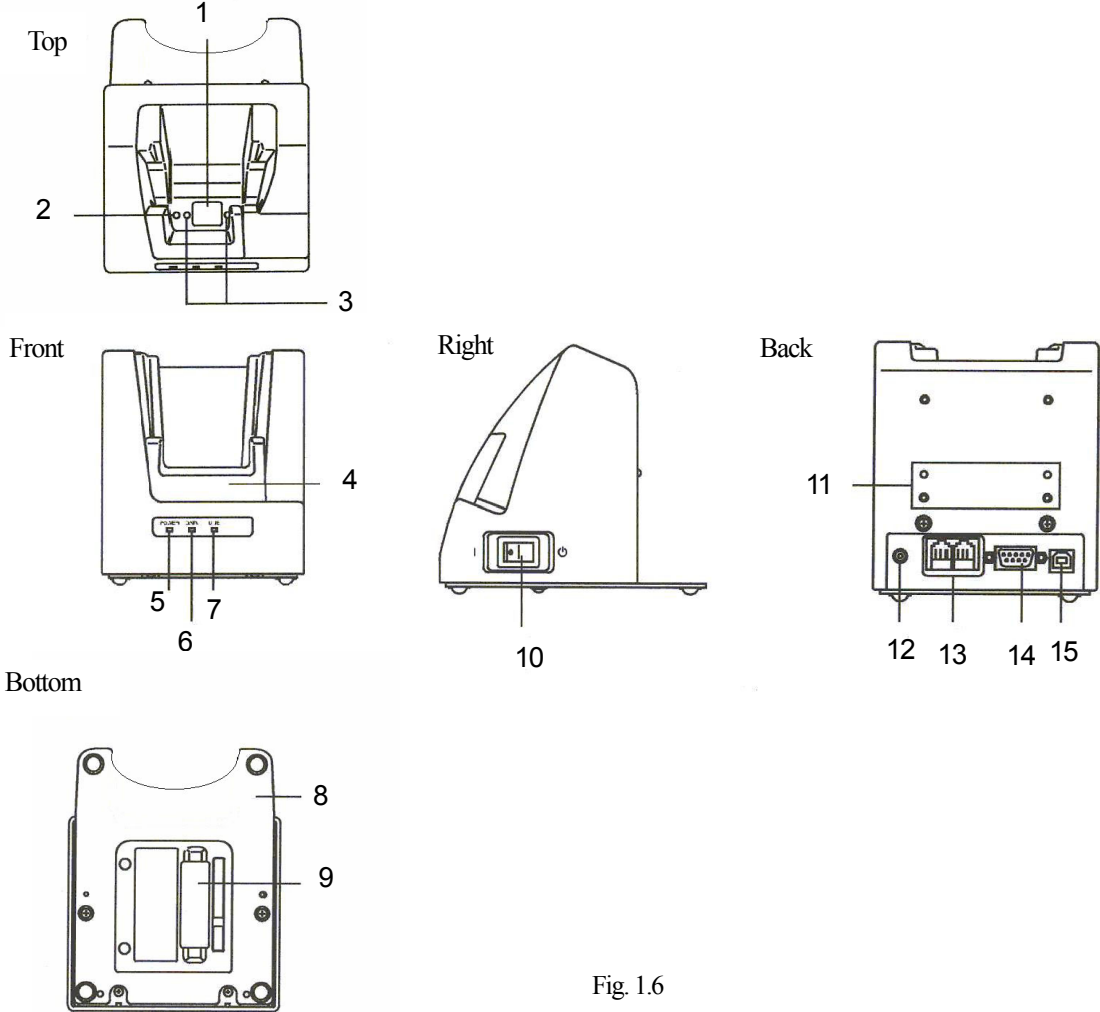


Fig. 1.6

Refer to Table 1.5 “Names of parts” in the following page for each part name and its description.

Table 1.5 Names of parts

No.	Part Name	Description
1	IR port	This port transfers data with the terminal IR port non-contact communication.
2	Terminal detect switch	This switch detects when the terminal is not seated correctly on the Cradle.
3	Power contacts	Power is supplied to the terminal via these contacts.
4	Fall protector	This is a removal attachment that prevents the terminal from tipping over and falling.
5	Power indicator lamp	This lamp indicates the mounting status of the terminal. Off : Power off Green : Power on, the terminal mounted correctly Red : Power on, the terminal not mounted
6	Communication indicator lamp	This lamp shows when the terminal is performing communication. Off : No communication being performed Green flashing : Communication in progress Red : Problem with a connection between two Bridge Satellite Cradles
7	System status indicator lamp	This lamp indicates whether the system is operating normally. Regardless of whether or not the terminal is mounted this lamp indicates the system status and whether or not a communication operation with the system can be performed. Off : System is not operating. Green : System is operating.
8	Desktop unit	This is the base when using the Cradle in a desktop configuration. Remove the desktop unit in the case of a wall mount configuration.
9	DIP switches (HA-A61IO only)	Use these switches to configure the Bridge Satellite Cradle as required.
10	Power switch	Turns the power on and off.
11	Wall mount unit fastening plate	The holes in this plate accept screws that secure the wall mount unit in place.
12	AC adaptor jack	Connect the AC adaptor here sold separately to supply power.
13	RS-422 port (HA-A61IO only)	This port is used when connecting to another Bridge Satellite Cradle.
14	RS-232C port (HA-A61IO only)	This port accepts connection of an RS-232C cable for connection to a computer for transfer of system data and file data. Use of the RS-232C port requires installation of a special driver on the PC.
15	USB port	This port accepts connection of a USB cable for connection to a computer for transfer of system data and file data. Use of the USB port requires installation of a special driver on the PC.

1.3.3 DT-502CHG Dual Battery Charger

Views

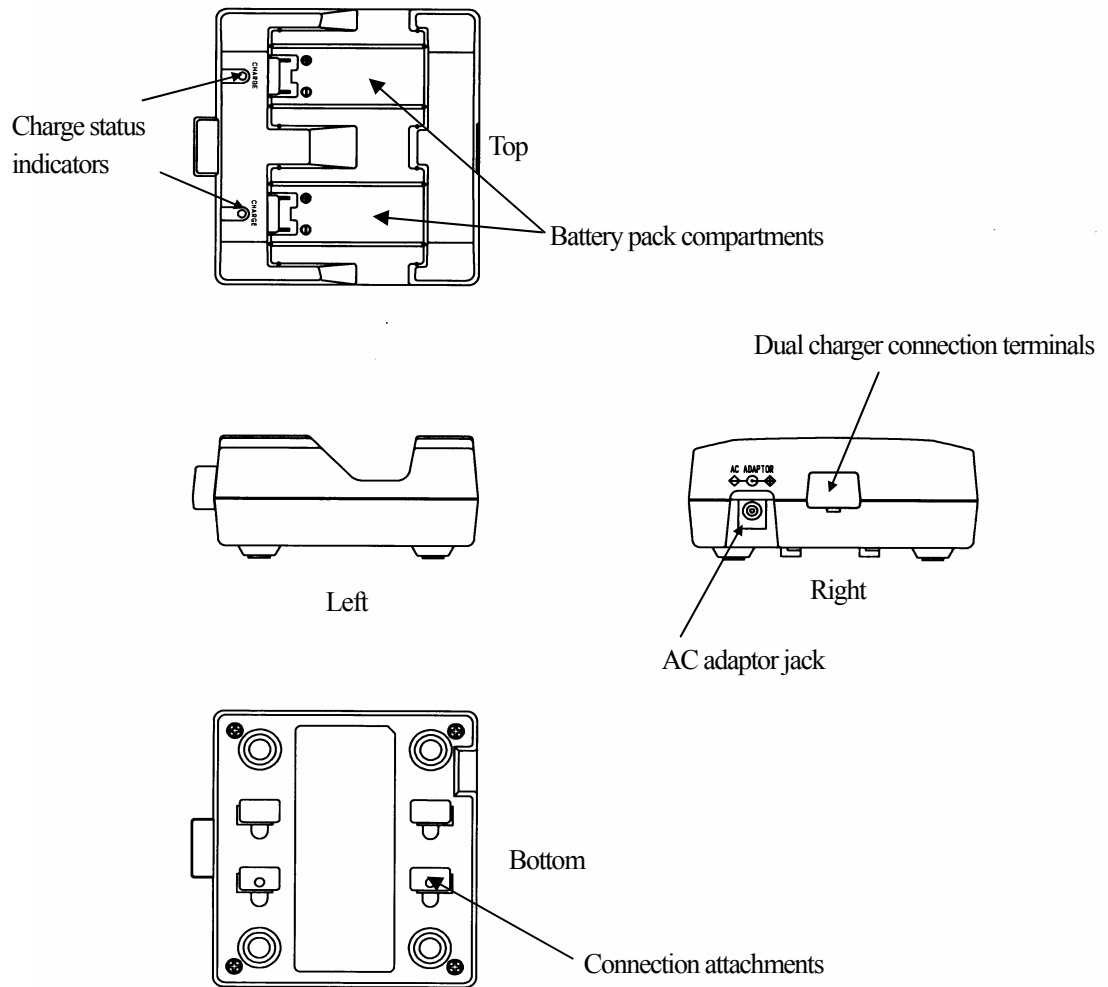


Fig. 1.7

1.3.4 HA-A20BAT and DT-5025LBAT Battery Packs

Views

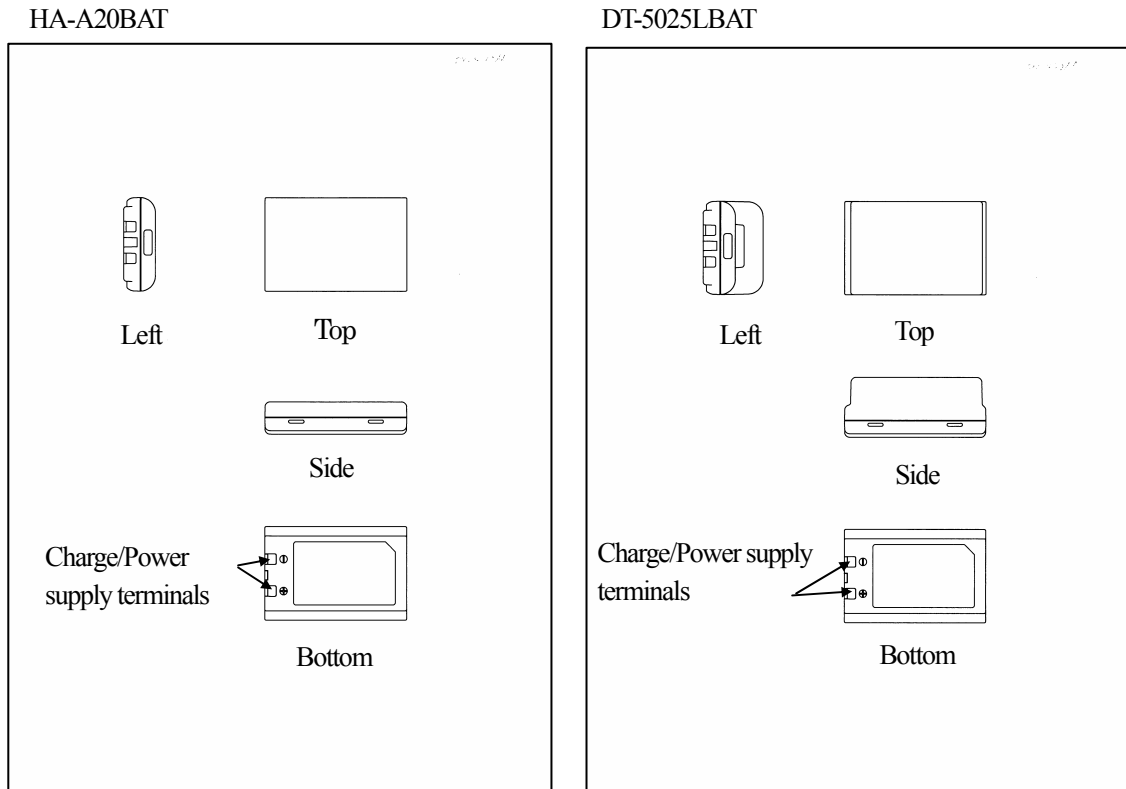


Fig. 1.8

2. Hardware Specifications

2.1 DT-X5

Table 2.1

Item	Specification	Remark
CPU, Memory		
CPU	SH3 (32-bit RISC type)	
Operating system	Microsoft® Windows® CE .NET Ver. 4.1	
RAM	16 MB (user area: approx. 7.5 MB)	
FROM (OS)	32 MB	
FROM (Storage)	32 MB (user area: approx. 30 MB)	
Laser scanner		
Method	Semi-conductor laser	
Laser emitting window	Redirected downward at 60 degrees	
Wave length	650±10 nm	
Output power	Less than 1 mW	
Scanning speed	100±20 scans per second	
Resolution	0.127 mm	
PCS	0.45 or more	
Depth	0 (contact) to 400 mm	
Readable width	355 mm at 400 mm	See Chapter 2.1.1 on page 22.
Readable symbologies		See Table 2.3 on page 20.
Ambient light immunity	Indoor 3,000 (fluorescent) Lux or less Outdoor 80,000 Lux or less	
C-MOS imager		
Method	300,000 pixels, monochrome	
Emitting window	Redirected downward at 20 degree	
Resolution	1D: 0.15 mm Stacked: 0.169 mm	
PCS	1D: 0.45 or greater Stacked 2D: 0.45 or greater	
Depth	1D: 40 to 410 mm Stacked 2D: 50 to 250 mm	
Readable width	240 mm at 410 mm	See Chapter 2.1.2 on page 24.
Readable symbology	Stacked code symbologies.	See Table 2.4 on page 21.
Display		
Display device	Monochrome FSTN LCD	
No. of dots	128 (w) x 160 (h)	
Dot pitch	0.3 (w) x 0.3 (h) mm	
Scale	4 grades	
Display fonts	Tahoma, Courier New, CA gothic, Winding, MS gothic	
Backlight	LED	
Indicator		
Confirmation /Status	2 pcs x LED in red and green	

Continue.

Input		
Keyboard	Cursor up-and-down key, L and R keys, Ten keys (0 to 9), Fn key, Multi key, Function keys (F1 to F8)	
Control keys	Power key, Reset switch	
Trigger keys	2 pcs (on the left and right sides)	
IrDA		
Standard	IrDA Version 1.1	
Method	Half-duplex	
Synchronization	Start/stop, frame synchronization	
Baud rate	9600, 115200, 4 Mbps	
Comm. range	0 (contact) to 0.3 m	
WLAN		
Standard	IEEE802.11b	
Modulation	Direct sequence spread spectrum	“DSSS”
Frequency range	2,400 to 2,483.5 MHz	For DT-X5M10R, DT-X5M30R
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 with multiple Access-Points	
Bluetooth		
Standard	Bluetooth Version 1.1	
Comm. range	Approx. 5 m	Note 1
Output power	Maximum 3 dBm (PowerClass 2)	
Wake-up function	Available	
Buzzer		
Sound pressure	75 dB or more	
Vibrator		
	Available	
Power		
Operating battery	Lithium-ion battery pack x 1 pc or AA-size alkaline battery x 2 pcs	See Table 2.2.
Memory backup battery	Lithium battery (rechargeable) on board	
Battery life	See Table 2.2.	
Battery capacity	HA-A20BAT: 1,700 mAH DT-5025LBAT: 3,400 mAH	
Backup period (Operating battery and memory backup battery)	Power with AA-size Alkaline battery RAM: Approx. 120 days RTC : Approx. 145 days Power with HA-A20BAT RAM: Approx. 100 days RTC : Approx. 125 days Power with DT-5025LBAT RAM: Approx. 175 days RTC : Approx. 200 days	Conditions; - Lithium-ion battery pack (HA-A20BAT or DT-5025LBAT) is fully charged. - AA-sized alkaline batteries are brand new. - The memory backup battery is fully charged. - The surrounding temperature is room temperature. Note 2

Continue.

Lithium-ion battery pack charge time	HA-A20BAT : Approx. 5 hours DT-5025LBAT : Approx. 10 hours	Conditions; - The power switch is turned off. - The lithium-ion battery pack is a brand new. - The surrounding temperature is at room temperature.
Memory backup battery charge time	Approx. 4 days	Conditions; - Lithium-ion battery pack is installed. - The surrounding temperature is at a room temperature.
Dimensions		
	Approx. 54 (W) x 179 (D) x 21.4 (H) mm	Note 4
Weight		
DT-X5M10E, M30E, M30U	Approx. 245 g	Note 5
DT-X5M10R, M30R	Approx. 250 g	

Notes:

1. Concurrent use of WLAN communication and Bluetooth communication is not recommended.
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. Backup for both data in RAM and the RTC (built-in clock) will commence when the battery pack (either HA-A20BAT or DT-5025LBAT) runs down.
4. Any protruding part on the terminal is not measured.
5. Each weight includes the lithium-ion battery pack (HA-A20BAT) installed. The strap is excluded.

Table 2.2 Operating hours by model

Model	WLAN IEEE802.11b	Scan engine	Battery	Operating hour	Operating mode
DT-X5M10E	No	Laser	Alkaline batteries	Approx. 200	Scanning 2 times per 10 seconds.
			HA-A20BAT	Approx. 90	
			DT-5025LBAT	Approx. 180	
DT-X5M10R	Yes	Laser	HA-A20BAT	Approx. 90	Scanning 2 times per 10 seconds
			DT-5025LBAT	Approx. 180	
			HA-A20BAT	Approx. 15	Wait : RF : scan = 6.5:2:1.5
			DT-5025LBAT	Approx. 30	
			HA-A20BAT	Approx. 20	Wait: RF: scan: calculation = 20:1:1:1
			DT-5025LBAT	Approx. 40	
DT-X5M30E, DT-X5M30U	No	C-MOS	Alkaline batteries	Approx. 42	Scanning 2 times per 10 seconds.
			HA-A20BAT	Approx. 40	
			DT-5025LBAT	Approx. 80	
DT-X5M30R	Yes	C-MOS	HA-A20BAT	Approx. 40	Scanning 2 times per 10 seconds.
			DT-5025LBAT	Approx. 80	
			HA-A20BAT	Approx. 15	Wait : RF : scan = 6.5:2:1.5
			DT-5025LBAT	Approx. 30	
			HA-A20BAT	Approx. 20	Wait: RF: scan: calculation = 20:1:1:1
			DT-5025LBAT	Approx. 40	

Notes:

- The durations of time in “Operating hour” for DT-X5M10R have been measured in the WLAN configuration with Cisco Aironet 1100 Access-Point. These time durations may become different if other Access-Point is employed.
- The durations of time in “Operating hour” are measured under the conditions that new battery pack (or new alkaline batteries) is used, the surrounding temperature is at 25 °C and the dedicated test program is used.
- In the low temperature, the operating hour powered by battery tends to be shorter.

Table 2.3 Readable 1D bar code symbolologies

Symbology	Output format/Append function	C-MOS imager	Laser scanner
EAN8/JAN8	2-digit/5-digit addon	Yes	Yes
EAN13/JAN13	2-digit/5-digit addon	Yes	Yes
UPCA	NS output 2-digit/5-digit addon	Yes	Yes
UPCE	NS output UPCA conversion 2-digit/5-digit addon	Yes	Yes
Code39	Start/stop output ASCII conversion	Yes	Yes
Codabar (NW7)	Start/stop bit output	Yes	Yes
Interleaved 2of5 (ITF)		Yes	Yes
Code93		Yes	Yes
Code128	Code sets A/B	Yes	Yes
	Code set C	Yes	Yes
MSI (Plessey)		Yes	Yes
IATA		Yes	Yes
Code11		Yes	No
RSS-14	Standard/Truncated	Yes	Yes
RSS Limited		Yes	Yes
RSS Expanded	Standard	Yes	Yes
ISBT		Yes	No
Industrial2of5 (IDF)		No	Yes

Table 2.4 Readable 2D stacked code symbologies

Symbology	Output format/Append function	C-MOS imager	Laser scanner
Code49		Yes	No
PDF417		Yes	No
MicroPDF		Yes	No
Codablock F		Yes	No
EAN8/13 Composite		Yes	No
RSS Composite		Yes	No
UCC/EAN128 Composite		Yes	No
TLC39		Yes	No
RSS-14 (Stacked type)	Stacked/ Stacked Omnidirectional	Yes	No
RSS Expanded (Stacked type)	Stacked	Yes	No

2.1.1 Reference for Laser Scanner Performance

Reference of the laser scanner performances below for the DT-X5M10E/DT-X5M10R is provided as a guide to be utilized by the user. The user can refer to these reference values in the table for his or her specific business application. All the reference values have been came out from the assessment tests carried out under the basic performance conditions below. However, it does not necessarily imply that the values are guaranteed and optimum to any kind of business applications. They are intended for use by the user as a reference only.

Table 2.5

		Symbology	Specification	Remark
Depth				
	Code39	0.127 mm	0 to 50 mm	
		0.15 mm	0 to 60 mm	
		0.25 mm	0 to 150 mm	
		0.33 mm	0 to 200 mm	
		0.5 mm	0 to 300 mm	
		1.0 mm	0 to 400 mm	
Read angles				
Pitch	Code39	0.25 mm	±40 degree	
Skew	Code39	0.25 mm	±60 degree	
Dead-zone	Code39	0.25 mm	±8 degree	Skew and pitch direction
Tilt	Jan 13 digits	0.26 mm	±35 degree	
Curb				
	JAN 8 digits	0.26 mm	R≥15 mm	
	JAN 13 digits	0.26 mm	R≥20 mm	
PCS				
			0.45 or more	
Ambient light immunity				
Sunlight			80,000 Lux or less	
Laser beam swing angle				
	Code39	0.25 mm	44 degree	
Scanning width				
			60 mm	At contact
			355 mm	At 400 mm depth

Basic scanning conditions:

Test chart	: Dedicated test pattern
PCS	: 0.9 or greater
Depth	: 80 mm from the laser emission port
Pitch angle	: 0 degree
Skew angle	: 15 degree
Tilt angle	: 0 degree
Surrounding temperature	: 25°C
Surrounding illumination	: 500 to 900 Lux.
Background of the bar code	: Black

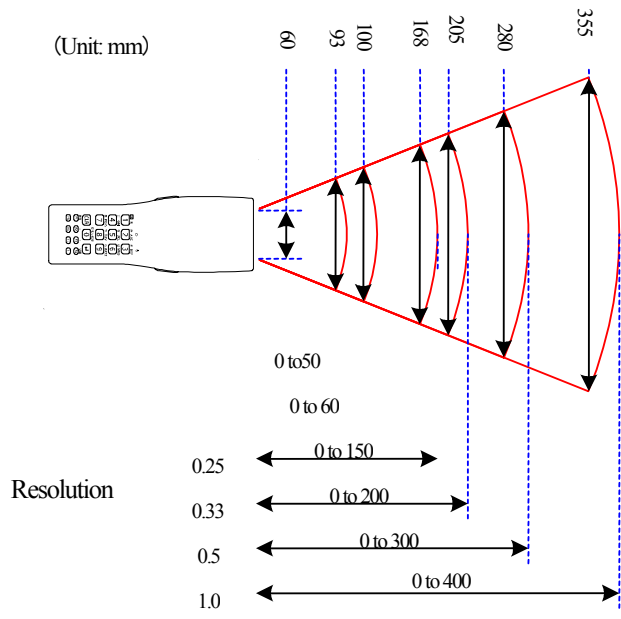


Fig. 2.1

2.1.2 Reference for C-MOS Imager Performance

Reference of the C-MOS imager performances below for the DT-X5M30E, DT-X5M30R and DT-X5M30U is provided as a guide to be utilized by the user. The user can refer to these reference values in the table for his or her specific business application. All the reference values have been came out from the assessment tests carried out under the basic performance conditions below. However, it does not necessarily imply that the values are guaranteed and optimum to any kind of business applications. They are intended for use by the user as a reference only.

Table 2.6

1D/2D	Symbology	Resolution	Range (mm)	No. of read digits			Remark
				A: Maximum (close)	B: Recommended	C: Maximum	
1D	Code39	6 mil (0.15 mm)	70 to 195	12	12	21	
		8 mil (0.20 mm)	60 to 135	5	12	22	
		10 mil (0.254 mm)	50 to 165	5	10	20	
		13 mil (0.33 mm)	60 to 200	5	10	19	
		15 mil (0.38 mm)	40 to 210	2	8	17	
		20 mil (0.5 mm)	70 to 260	2	8	16	
	40 mil (1.0 mm)	90 to 410	2	5	12		
	UPC	13 mil (0.33 mm)	60 to 200	11	11	11	
2D (Stacked)	PDF417	6.6 mil (0.168 mm)	60 to 115	97	100	1000	ECL4
		8 mil (0.20 mm)	60 to 135	95	100	1000	ECL4
		10 mil (0.254 mm)	50 to 165	100	100	1000	ECL4
		15 mil (0.38 mm)	70 to 210	52	50	1000	ECL4
		20 mil (0.5 mm)	80 to 250	50	50	1000	ECL4
Angle							
Pitch	Liner (Code39 10 mil (0.25 mm))		±35°	At 110 mm from the LED emission port.			
	Stacked (PDF417 10 mil (0.25 mm))		±35°	At 110 mm from the LED emission port.			
Skew	Liner (Code39 10 mil (0.25mm))		±40°	At 110 mm from the LED emission port.			
	Stacked (PDF417 10 mil(0.25 mm))		±40°	At 110 mm from the LED emission port.			
Dead zone	Pitch/Skew		±5°(Pitch, Skew)	At 110 mm from the LED emission port.			
Tilt	Liner (Code39 10 mil (0.25 mm))		360°	At 110 mm from the LED emission port.			
	Stacked (PDF417 10 mil (0.25 mm))		360°	At 110 mm from the LED emission port.			
PCS							
	Liner (Code39 10 mil (0.25 mm))		0.45 or greater				
	Stacked (PDF417 10 mil (0.25 mm))		0.45 or greater				
Surrounding illumination							
	100 to 100,000 Lux.						
Visible angle							
	V Angle = 26° H Angle = 35°						
Operating temperature (Image sensor)							
	High temperature 50°C						
	Low temperature -10°C						

Basic scanning conditions:

Test chart	: Dedicated test pattern (1D, 2D Stacked)
Resolution	: 1D 0.25 mm / 2D 0.5 mm
PCS	: 0.9 or greater
Read judgment	: 7 times per 10 scans First Decode
Depth	: 110 mm from the LED emission port
Pitch angle	: $\alpha = 0$ degree
Skew angle	: $\beta = 10$ degree
Tilt angle	: $\gamma = 0$ degree
Surrounding temperature	: 25 °C
Surrounding humidity	: 30 to 50%
Surrounding illumination	: 450 to 550 Lux.
Background of the symbol	: White
Conditional Judgment	: Readable 7 times or more per 10 scanning

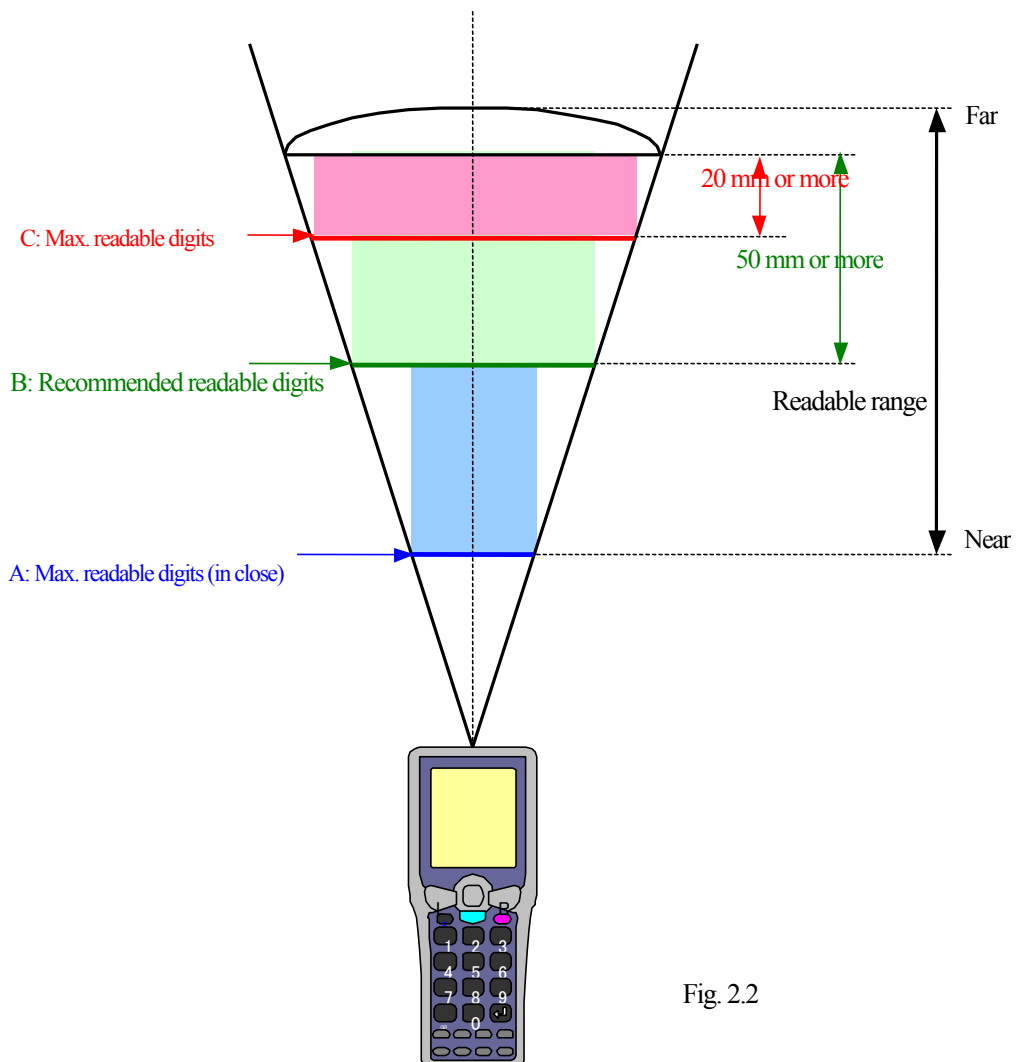
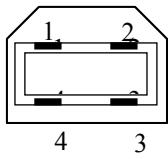
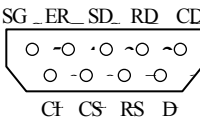
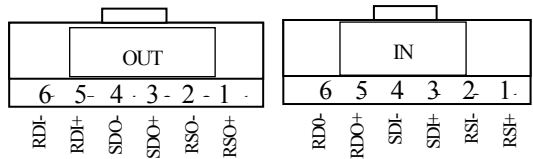



Fig. 2.2

2.2 HA-A60IO, HA-A61IO

Table. 2.7

Item		Specification	Remark	
Interface	IrDA	Standard	IrDA Ver. 1.1 compatible	
		Comm. method	Half duplex	
		Synchronization	Start/stop method	
		Comm. speed	4 Mbps (maximum)	
	USB	Standard	USB Ver. 1.1 compatible	
		Comm. speed	12 Mbps (maximum)	
		Connector	 USB connector type B	1. VBus 2. -Data (D-) 3. +Data (D+) 4. GND
	RS-232C	Comm. method	Full duplex	Applicable to HA-61IO only.
		Synchronization	Start/stop method	
		Comm. speed	115.2 Kbps	
		Connector	 D-Sub 9-pin (Male)	
	RS-422	Comm. method	Full duplex	Applicable to HA-A61IO only.
		Synchronization	Start/stop method	
		Comm. speed	115.2 Kbps	
		Connector	 RJ-45 compatible (6 pins)	
Display	Status LED	No. of LEDs	3 (HA-A61IO) 2 (HA-A60IO)	
		No. of display colors	2 (red, green)	
		Display content	System operation status ("LINE") Comm. status ("DATA") Power status ("POWER")	Refer to Chapter 2.6 "Status Indication With LEDs".
Input	DIP switch (HA-A61IO only)	8 switches	See page 30.	
	Detection switch for DT-X5	Push switch		
Power	Input from AC adaptor	Input voltage	DC 12V±5%	
		Consumption current	DC 12V Approx. 3.5A	While supplying power or transmitting data.
		Plug	EIAJ RC-5320A Class 4	Center pin: plus
	Charge/supply power	AC adaptor	AD-S42120AE	
		Output voltage	DC 5V±10%	
		Output current	1,500 mA (maximum)	
		Charge method	Constant voltage	With curb function on current
		Charge time	Approx. 4.0 hours Approx. 8.0 hours	For HA-A20BAT For DT-5025LBAT

Continue.

		Power contact		The illustration of the power contact on the left is viewed at the front of the cradle.
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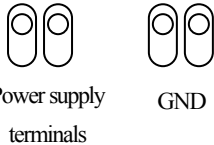
Weight/Dimensions

Table 2.8

Model no.	Configuration		Specification
HA-A61IO	Weight	In desktop state	Approx. 530 g
		In wall mount state	Approx. 620 g
	Dimensions	In desktop state	Approx. 110 (W) x 125 (D) x 128 (H) mm
		In wall mount state	Approx. 110 (W) x 148 (D) x 153 (H) mm
HA-A60IO	Weight	In desktop state	Approx. 520 g
		In wall mount state	Approx. 610 g
	Dimensions	In desktop state	Approx. 110 (W) x 125 (D) x 128 (H) mm
		In wall mount state	Approx. 110 (W) x 148 (D) x 153 (H) mm

2.3 HA-A34AT

Table 2.9

Item		Specification	Remark	
Display	Status LED	No. of LEDs	1	
		No. of display colors	2	
		Display content	Power status ("POWER")	
		Indicates the status of terminal being mounted on the charger. OFF : Power is off. Flashing in green : Power is on and the terminal is mounted on the charger. Flashing in red : Power is on but the terminal is not mounted on the charger.		
Input	Detection switch for the terminal	Push switch		
Power	Input from AC adaptor	Input voltage	DC 12V/24V±5%	
		Consumption current	DC 12V : Approx. 1,400 mA	While supplying power.
			DC 24V : Approx. 700 mA	
		Plug	EIAJ RC-5320A Class 4	Center: plus
	Power cord	DT-827CAC		
	Charge/supply power	Output voltage	DC 5V±10%	
		Output current	2,500 mA (maximum)	
		Charge method	Constant voltage	With curb function on current
		Charge time	Approx. 4.0 hours	For HA-A20BAT
			Approx. 8.0 hours	For DT-5025LBAT
Power supply terminals			The illustration of the power supply terminals on the left is viewed at the front of the charger.	

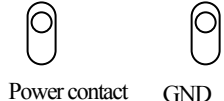
Weight/Dimensions

Table 2.10

	Specification	Remark
Weight	Approx. 840 g	When configured with HA-A30CHG
Dimensions	Approx. 111 (W) x 243 (D) x 104 (H) mm	When configured with HA-A30CHG

2.4 HA-A30CHG

Table 2.11

Item		Specification	Remark	
Display	Status LED	No. of LEDs	1	
		No. of display colors	2	
		Display content	Power status ("POWER")	
Input	Detection switch for DT-X5		Push switch	
Power	Input from AC adaptor	Input voltage	DC 12V±5%	
		Consumption current	Approx. 3.5A	
		Plug	EIAJ RC-5320A Class 4	
		AC adaptor	AD-S42120AE	
	Charge/Power supply	Output voltage	DC5V±10%	
		Output current	1,500 mA (maximum)	
		Charge method	Constant voltage	
		Charge time	Approx. 4 hours	For HA-A20BAT
			Approx. 8 hours	For DT-5025LBAT
		Power contact		The illustration of the power contact on the left is viewed at the front of the charger.

Weight/Dimensions

Table 2.12

Configuration		Specification	Remark
Weight	In desktop configuration	Approx. 510 g	
	In wall-mount configuration	Approx. 600 g	
Dimensions	In desktop configuration	Approx. 110 (W) x 125 (D) x 128 (H) mm	
	In wall-mount configuration	Approx. 110 (W) x 148 (D) x 153 (H) mm	See note.

Note:

The dimensions include the DT-891WH Wall Mount Unit attached to HA-A30CHG

2.5 DIP Switch Setting for HA-A61IO

The DIP switch is located on the rear side of the Bridge Satellite Cradle. 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.

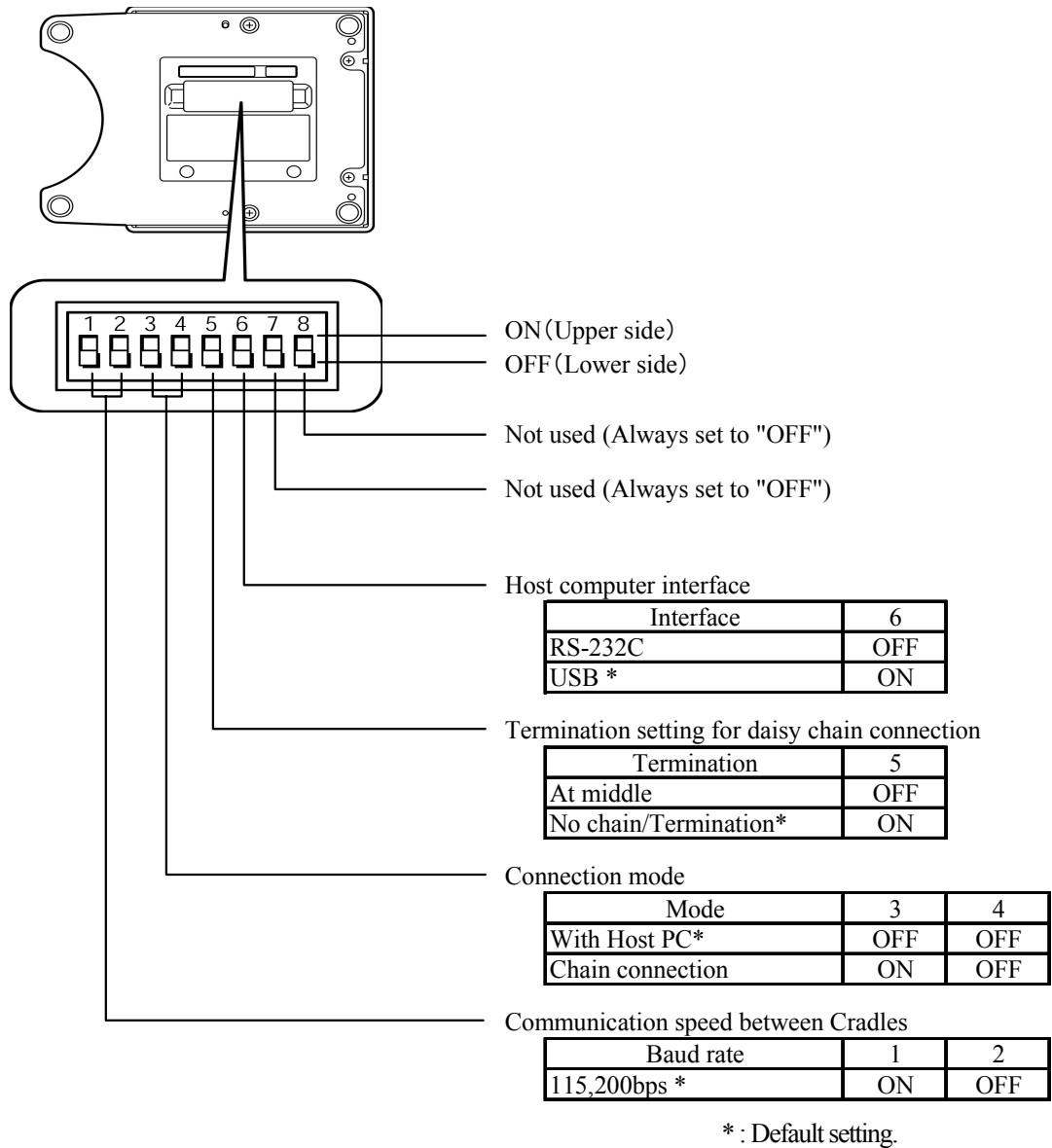


Fig. 2.3

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.

2.6 Status Indications with LEDs

Various operational statuses on the HA-A61IO can be displayed using the LEDs. The following table describes LED modes and their meanings.

Table 2.13

	Item	Specification	Remark
LED			
Power status indicator (POWER)	Power off.	Off	2-color LED
	Power is on and the terminal is mounted correctly.	Green	
	Power is on but the terminal is not mounted correctly.	Red	
Comm. status indicator (DATA) (HA-A61IO only)	No communication being performed.	Off	2-color LED
	Communication is in progress.	Green	
	Problem with a connection between two Bridge Satellite Cradles.	Red	
Line status indicator (LINE)	System is not operating.	Off	2-color LED
	System is operating.	Green	

2.7 DT-5022CHG

Basic Block

Table 2.14

Item	Specification	Remark
Basic function		
Rechargeable battery pack		
HA-A20BAT	Battery pack (1,700 mAh)	Dedicated batteries only.
DT-5025LBAT	Large-capacity size battery pack (3,400 mAh)	
AC adaptor		
AD-S45150AU	Input; 100 to 230VAC	With US power cord
AD-S45150AE	Input; 100 to 230VAC	With European power cord

Interface Block

Table 2.15

Item	Specification	Remark
Input terminals for joint block		
1: VIN2	Rated DC16V Input voltage 8 to 20V	
2: VIN3	Rated DC16V Input voltage 8 to 20V	
3: NC	NC	
4: GND	GND	
Output terminals for joint block		
1: VOUT1	DC16V	Output terminal from 1 st unit when AC adaptor is used.
2: VOUT2	DC16V	Output terminal from 2 nd unit
3: NC	NC	
4: GND	GND	
No. of joint-able units	3 units (x DT-5022CHG)	

Power Supply Block

Table 2.16

Item	Specification	Remark
Input		
Rated voltage	DC 16V	
Input voltage	DC 8.0 to 20V	
Rated output		
Rated output voltage	DC 4.22V	
Rated output current	DC 1,600 mA	
Input consumption current		
Input consumption current	0.65 A	When input voltage is at 16V.
Charge output terminal CH1		
PIN1: +	4.22V±30mV	
PIN2: -	GND	
Charge output terminal CH2		
PIN1: +	4.22V±30mV	
PIN2: -	GND	
Input terminal		
DC jack	Rated DC16V, input voltage DC 8.0 to 20.0V	

Battery Charge Block

Table 2.17

Item		Specification	Remark
Charge control			
Output voltage		DC4.22V±30mV	
Charge current (standard mode)		DC1,600mA±10%	
Charge current (standby mode)		DC160±40mA	
Full charge detection current		DC120±30mA	
Voltage control	Full charge detection voltage	4.1V	
	Re-charge detection voltage	4.0V	
Re-charge detection voltage		DC4.0±0.1V	
Input voltage		DC8.0 to 20V	
Timer			
Charge timer (standby mode)		90 minutes	
Charge timer (standard mode)		720 minutes	
Trickle charge timer		120 minutes	
Charge hour			
HA-A20BAT		Approx. 2.5 hours (for 1 pack) Approx. 5.0 hours (for 2 packs at same time)	At 0 to 40 °C
DT-5025LBAT		Approx. 5.0 hours (for 1 pack) Approx. 10.0 hours (for 2 packs at same time)	At 0 to 40 °C
Temperature control		Not available	
No. of charge outputs		1	
Operation mode			
Battery pack mount detection			
Battery pack not mounted		LED OFF, charge output OFF	
Battery pack mounted		LED ON in red, charge output OFF	
Check on battery pack		LED ON in red, charge output OFF	
Battery charge (standby mode)		LED ON in red, charge output ON	
Battery charge (standard mode)		LED ON in red, charge output ON	
Wait mode in trickle charge		LED ON in green, charge output OFF	
Charge in trickle mode		LED ON in green, charge output ON	
Charge completed		LED ON in green, charge output OFF	
Charge abnormal end		LED flash in red, charge output OFF	
Other			
Priority order of battery charging		Order in mounted order	

Weight/Dimensions

Table 2.18

Item	Specification	Remark
Weight	Approx. 154 g	
Dimensions	100 (L) x 110 (W) x 49 (H) mm	

2.8 HA-A20BAT, DT-5025LBAT

Table 2.19

Item	Specification		Remark
	HA-A20BAT	DT-5025LBAT	
Rated capacity	1,700 mAh	3,400 mAh	0.2C discharge
Rated voltage	3.7V	3.7V	0.2C discharge
Discharge end voltage	2.75V	2.75V	
Standard charge current	1.0 CA (=1.55A) 0 to 40 °C	1.6A 0 to 50 °C	
Charge voltage	4.2±0.05V	4.2±0.05V	
Charge hour (standard mode)	2.5 hours	5.0 hours	Charge on DT-5022CHG
Weight	Approx. 45 g	Approx. 87g	
Dimensions	57 (L) x 37 (W) x 13 (H) mm	57 (L) x 37 (W) x 24 (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.

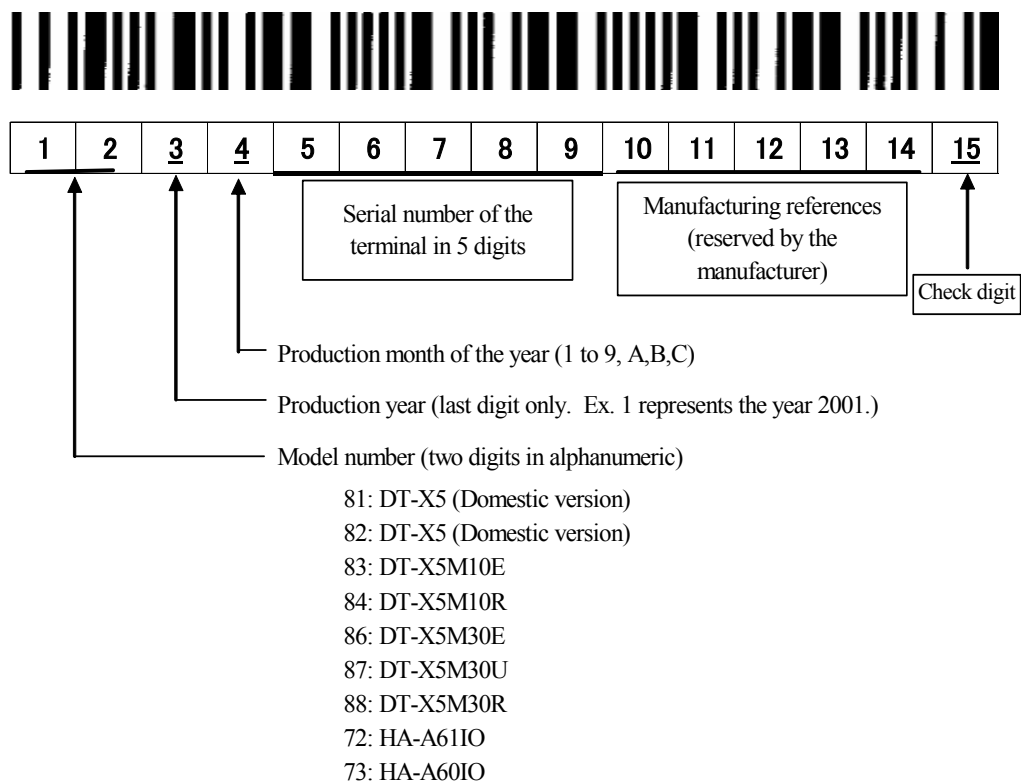


Fig. 3.1

4. Quality References

This chapter describes about references of the DT-X5 and its dedicated options concerned with environmental performance, compliance, mechanical and electric durability, etc.

4.1 Environmental Performances

4.1.1 DT-X5

Table 4.1

Item	Specification	Condition
Temperature		
Operation	-20 °C to 50 °C	0 to 40 °C while mounting on Cradle.
Non-operation	-20 °C to 70 °C	
Humidity		
Operation	10 % to 80 %RH	No condensation
Non-operation	5% to 90 %RH	No condensation
Storage in carton box		
Temperature	-20 °C to 60 °C	
Humidity	90 %RH or less	
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 coding 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.

4.1.2 HA-A60IO, HA-A61IO, HA-A30CHG

Table 4.2

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

4.1.3 HA-A34AT

Table 4.3

Item	Specification	Condition
Temperature		
Operation	0 °C to 40 °C	
Storage	-40 °C to 85 °C	
Humidity		
Operation	30% to 80%RH (No condensation)	
Storage	30% to 95%RH (No condensation)	
Storage in carton box		
Temperature	-10 °C to 50 °C	
Humidity	30% to 90%RH	

4.1.4 DT-5022CHG

Table 4.4

Item	Specification	Condition
Temperature		
Operation	0 to 40 °C	
Non-operation	-10 to 50 °C	When battery is not charged.
Storage	-10 to 55 °C	With carton box
Humidity		
Operation	20 % to 90 %RH (no condensation)	
Storage	20 % to 90 %RH (no condensation)	With carton box

4.1.5 HA-A20BAT, DT-5025LBAT

Table 4.5

Item	Specification	Condition
Temperature		
Operation	0 to 40 °C	
Non-operation	-5 to 50 °C	When battery is not charged.
Storage	-10 to 55 °C	With carton box
Humidity		
Operation	20 % to 90 %RH (no condensation)	
Storage	20 % to 90 %RH (no condensation)	With carton box

4.2 Electrical Performances

4.2.1 DT-X5

Table 4.6

Item	Specification	Remark
Power consumption	DC1.1A/3.0V to 5V	For DT-X5M10E
	DC1.3A/3.0V to 5V	For DT-X5M30E/DT-X5M30U
	DC1.4A/3.7V to 5V	For DT-X5M10R
	DC1.6A/3.7V to 5V	For DT-X5M30R
Anti-static strength		
Malfunction	±4 KV (contact), ±8 KV (in air)	Compliant with EN6100-4-2
Destruction	±12 KV	

4.2.2 HA-A60IO, HA-A61IO, HA-A30CHG

Table 4.7

Item	Specification	Remark
Current consumption	Approx. 0.02 A/DC12V (HA-A60IO)	When the terminal is not mounted on.
	Approx. 0.15 A/DC12V (HA-A61IO)	
	Approx. 0.02 A/DC12V (HA-A30CHG)	
	Approx. 0.9 A/DC12V (HA-A60IO)	While supplying power, or transmitting data.
	Approx. 1.0 A/DC12V (HA-A61IO)	
	Approx. 0.9 A/DC12V (HA-A30CHG)	
Input voltage	DC12V±5% (HA-A60IO)	DC24V for HA-A30CHG is only when HA-A34AT Battery Charger Car Mount Unit is attached to it.
	DC12V±5% (HA-A61IO)	
	DC12 or 24V±5% (HA-A30CHG)	
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 milliseconds No. of pulses: 75 pcs Burst period: 15 milliseconds
Power interruption	10 milliseconds or less	

4.2.3 HA-A34AT

Table 4.8

Item	Specification	Remark
Consumption current	DC 12V : Approx. 1,400 mA	While supplying power.
	DC 24V : Approx. 700 mA	
Voltage	DC 12V/24V±5%	
Anti-static strength		
Malfunction	±6 KV	150 pF, 330 ohm
Destruction	±12 KV	

4.2.4 DT-5022CHG

Table 4.9

Item	Specification	Remark
Anti-static strength		ESD method: 250 pF, 100 ohm
Malfunction	±5 KV	Probe: Finger type
Destruction	±10 KV	Polarity: ±

4.2.5 HA-A20BAT, DT-5025LBAT

Table 4.10

Item	Specification	Remark
Anti-static strength		ESD method: 250 pF, 100 ohm
Malfunction	±5 KV	Probe: Finger type
Destruction	±10 KV	Polarity: ±

4.3 Mechanical Performances

4.3.1 DT-X5

Table 4.11

Item	Specification	Condition
Resistance to drop impact (height)		
In bare condition	180 cm	Onto concrete, one time on each of the 6 sides and 4 corners.
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	70 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

4.3.2 HA-A60IO, HA-A61IO, HA-A30CHG

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 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 DT-5022CHG

Table 4.13

Item	Specification	Condition
Resistance to vibration	1 G or less	10 to 55 Hz In X, Y, and Z directions Reciprocally for 30 minutes
Resistance to vibration (in package)	2 G or less	10 to 55 Hz In X, Y, and Z directions Reciprocally for 15 minutes
Resistance to impact		
In bare condition	75 cm	6 faces, 1 corner and 3 edges
In individual carton box	75 cm or less	6 faces, 1 corner and 3 edges

4.3.4 HA-A20BAT, DT-5025LBAT

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 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 P-tile.

4.4 Reliability

4.4.1 DT-X5

Table 4.15

Item	Specification	Remark/Condition
Service life		
Backlight	10,000 hours	At half-life period
Laser scanner	10,000 hours	
C-MOS imager	70,000 hours	
Trigger keys	1,000,000 times	For each trigger key
Other keys	500,000 times	
Mounting/removing of the terminal to/from the Cradle	10,000 times	
MTBF	62,413 hours	Electronic parts only
MTBF (WLAN module)	27,000 hours	
Charging and discharging cycle of battery pack	300 times or more	Applicable to HA-A20BAT and DT-5025LBAT (see notes)

Note:

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

- The remained capacity of battery pack at the 300 cycles is approximately 58% of the full capacity.
- The surrounding temperature is 20 °C.
- The discharge current is 1.6A constant current.

4.4.2 HA-A60IO, HA-A61IO, HA-A30CHG

Table 4.16

Item	Specification	Remark/Condition	
MTBF for electronics parts	50,000 hours		
Mounting/removing the terminal to/from Cradle	20,000 times		
Switch	Power switch	5,000 times	
	DIP switch	10 times	For HA-A61IO only
No. of ON/OFF times of the connector	USB	500 times	
	RS-232C	500 times	For HA-A61IO only
	RS-422	100 times	For HA-A61IO only
No. of ON/OFF times of the power jack	1,500 times		

4.4.3 DT-5022CHG

Table 4.17

Item	Specification	Remark
MTBF	210,000 hours or more	MIL-HDBK217F
Protection from short	Internal circuit is protected from a short between the charge terminals	

4.5 Compliance

4.5.1 DT-X5

EMC, EMI, Safety, WLAN /Bluetooth type approvals

Table 4.18

Model	Compliance Standard				
	Europe				
	EN301.489-17 (EMI,EMS)	EN60950 (Safety)	EN60825 (Laser)	EN300.328-2 (Bluetooth, WLAN)	EN50371 EN50361 EN50360 (SAR)
DT-X5M10E	Yes	Yes	Yes	Yes	Yes
DT-X5M10R	Yes	Yes	Yes	Yes	Yes
DT-X5M30E	Yes	Yes	Yes	Yes	Yes
DT-X5M30R	Yes	Yes	Yes	Yes	Yes

Columns in gray color: not applicable.

Table 4.19

Model	Compliance Standard		
	USA		
	FCC Part 15B Class B	UL60950-1	FCC Part 15 sub part C + SAR
DT-X5M30U	Yes	Yes	Yes

4.5.2 HA-A60IO, HA-A61IO, HA-A30CHG

Table 4.20

	Compliance Standard	
	Europe	USA
	EMC	EN55022:1998+A1:2000 Class B EN55024:1998+A1:2001 Class B
Safety	EN60950	UL60950 3 Edition: 2000

4.5.3 AD-S42120AE, AD-S45150AU, AD-S45150AE

Table 4.21

Safety	Compliance Standard	
	Europe	USA
	EN60950 (1991) 2 nd edition	UL1950 3 Edition

5. Cable Specifications

5.1 For Chain Connection and Short Length

Length; 1 meter or less

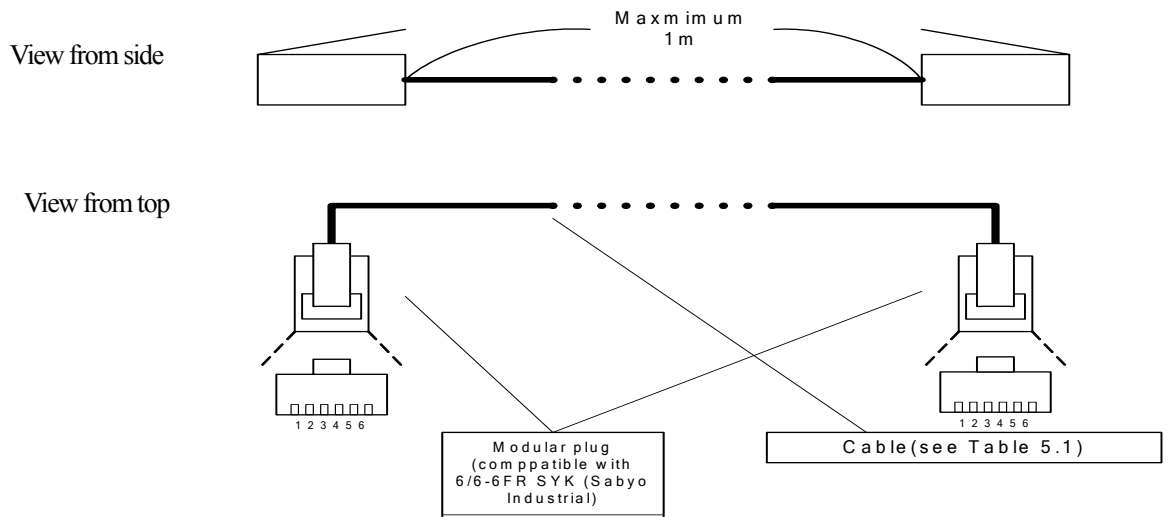


Fig. 5.1

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	$\phi 4.3 \pm 0.1 \text{ mm}$
Characteristics	Conductance resistance	0.12ohm /m or less
	Insulation resistance	50Mohm or more

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

Wiring

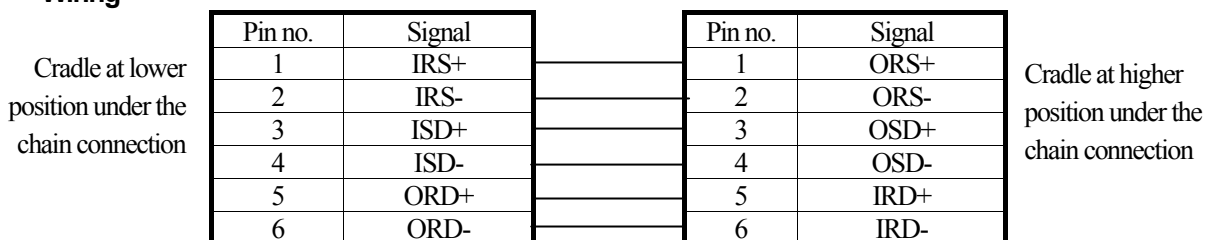


Fig. 5.2

5.2 For Chain Connection and Long Length

Length; 1 meter or longer

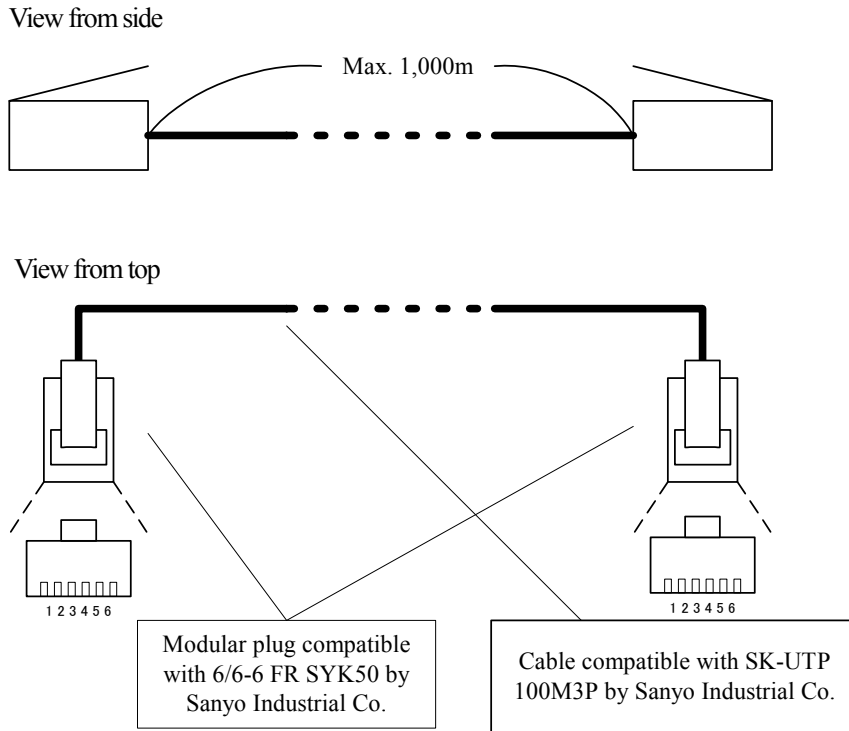


Fig. 5.3

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

Wiring

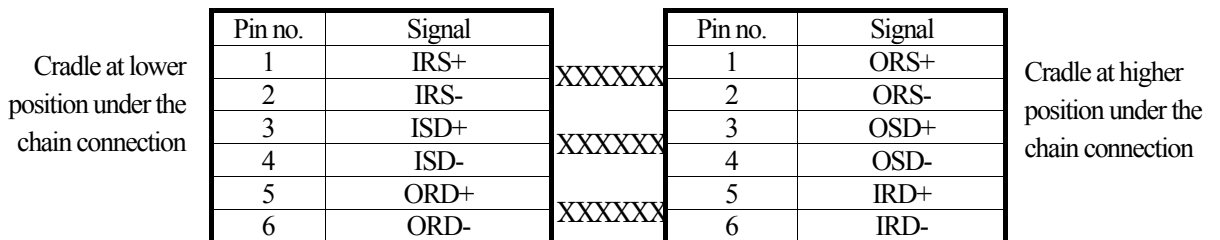


Fig. 5.4

6. Precautions

6.1 Handling Precautions

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

- If the DT-X5 is to be stored over holidays (including Saturday and Sunday), replace the battery pack (or AA-size alkaline batteries) 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 inserted), 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 or AA-size alkaline batteries before storage. This can minimize overly discharging the installed battery and minimize consumption of the memory backup battery.
- Do not store the removed battery pack or AA-size alkaline batteries at high temperature. Otherwise, it will discharge at an accelerated rate. Note that the capacity after the battery if it is not used for 10 days at 60°C will be 65%, and that after 20 days at 60°C will be 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 they 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 DT-X5. 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 DT-X5. Check the polarity. If the battery pack is connected 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 DT-X5 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 the AC adaptor with an 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. 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 DT-X5 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 charging 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 DT-X5, remove the battery pack, and then contact a CASIO distributor.
- Memory protection
 1. Contents of the DT-X5 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 or AA alkaline batteries, always refer to the user's guide. Improper battery replacement may lead to unexpected loss or alteration of data.
- Place of installation
 1. Do not place the DT-X5 in an environment with a significant amount of moisture or dust. Otherwise, a fire or electric shock may occur.
 2. Do not use the DT-X5 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 DT-X5 in an unstable situation, such as on a wobbling platform or shelf. It may fall and cause personal injury.
 4. Do not throw the DT-X5 into a fire. This may cause a fire or personal injury due to explosion of the terminal.

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