DT-930 Series
Hardware Manual

(Version 1.02)

CASIO Computer Co., Ltd.

December 2006

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Editorial Record

Manual Version no.	Date edited	Page	Content
1.00	May 2006		Original version
1.01	July 2006	11	Table 4.1 in Chapter 4.1 “Hardware” has been updated.
		14	Table 4.4 in Chapter 4.5 “Environment” has been updated.
1.02	December 2006	all	The explanation about the dedicated models and options compliant with the Chinese RoHS requirement is added.

1. Product Overview

Applications developed for existing the CASIO DT-900 series handheld terminal widely known as the prominent model amongst logistics and distribution business can be ported into the new DT-930 series. The new series has been designed and developed for software compatibility with the DT-900 series in mind.

Handheld Operability

Table 1.1

	DT-930M51E, M51E-CN	DT-930M50E, M50E-CN
Dimensions	173 (D) x 69 (W) x 31.6 (H) mm	180 (D) x 69 (W) x 40.2 (H) mm
Weight	Approx. 210 g	Approx. 225 g
Operating hour	Approx. 200 hours with AA-size alkaline battery x 2 pcs	
	Approx. 30 hours with lithium-ion battery pack	

Note:
The dimensions in the table above are values measured for each largest part on the respected models.

Improved Compatibility and Development Environment

- Compatibility with application software for the DT-900 series
- Supports Multi-drop protocol communication software used by the DT-700 series
- Supports FLINK protocol communication software used by the DT-900 series

Improved Durability and Resistance

- Drop proof : Fall from a height of 1.8 m
- Water-splash proof : Conforms to IP54 level of IEC60529 standard

Systematization

- OS : µITRON version 2.0
- Infrared high-speed communication : IrDA Ver 1.1 and Casio original infrared communication
- 2-way power supply source : Lithium-ion rechargeable battery and two AA-size alkaline batteries

Improved Ease of Operation

- High resolution display (compatible with DT-900)
  128 x 64 dots and easy-to-see icons
  9 different font modes (6x6, 8x8, 10x10, 6x12, 12x12, 8x16, 16x16, 10x20, 20x20 dots)
- Measures for adjacent bar codes
  Laser beam swing angle control
- Ease of key operation
  Multi-function keys and side trigger keys

Basic Performance

- High-performance CPU
  CPU: SH1 32-bit RISC
- Large-capacity memory
  Main RAM (D-RAM) ---------- 4 MB
  Executable code + user data storage memory (F-ROM) ----- 16 MB

2. External Views

2.1 DT-930M51E, DT-930M51E-CN

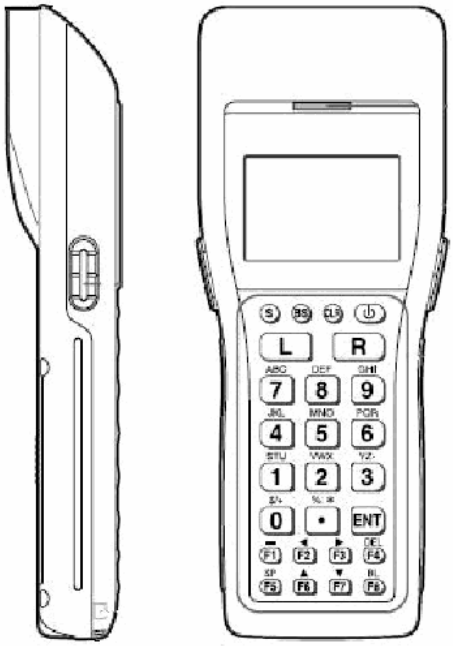


Fig. 2.1

2.2 DT-930M50E, DT-930M50E-CN

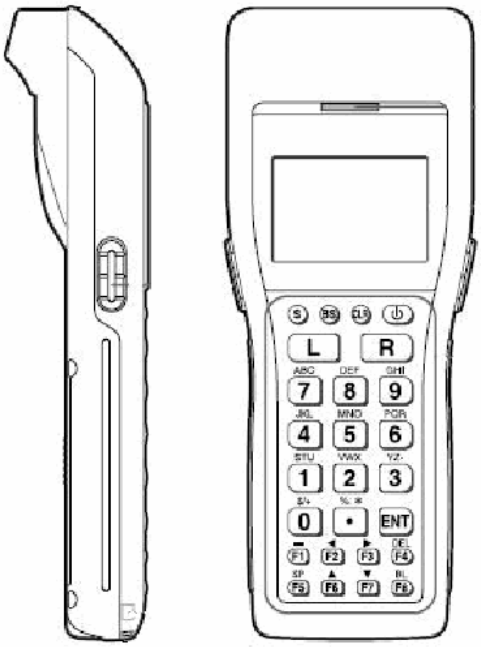


Fig. 2.2

2.3 DT-964IOE, DT-964IOE-CN Satellite Cradle

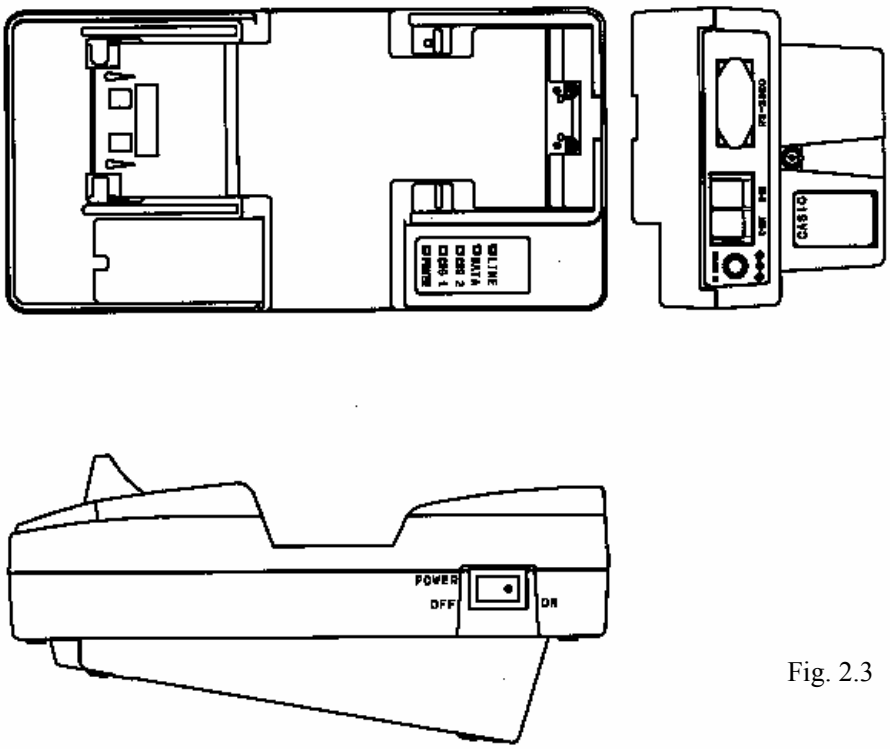


Fig. 2.3

2.4 DT-923LIB, DT-923LIB-CN Battery Pack

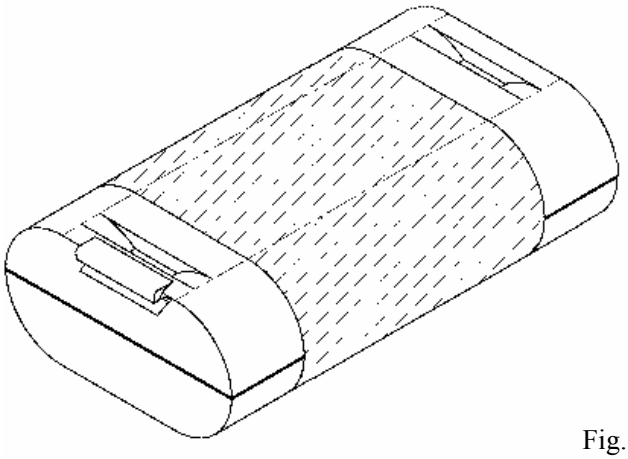


Fig. 2.4

3. System Configuration

3.1 Available Models

Table 3.1

Model No.	Reader Port
DT-930M50E	Angle shape (downward at 60º)
DT-930M50E-CN (See note.)	
DT-930M51E	Straight shape
DT-930M51E-CN (See note.)	

Note:
A note about the compliance with the Chinese "RoHS" requirement is accompanied in the carton box, the RoHS compliant seal is affixed on the body and the seal of the packing material recycle marking is affixed on the carton box.

3.2 Accessories

Table 3.2

Item	Quantity	Remark
AA-size (LR6) alkaline battery	2 pcs	
Wrist strap	1 pc	
Desktop guides L and R	1 set	
Wall mount guides L and R	1 set	
Backup battery (CR2032)	1 pc	
User's guide	1 pc	in English and Chinese
"RoHS" compliance indicator	1 pc	A note about the compliance with the Chinese "RoHS" requirement. This model dependant note is accompanied only in the models that are denoted with "-CN". See Tables 3.1.

3.3 Consumable Items

Table 3.3

Item	Specification
AA-size alkaline battery	LR6
Button-type lithium battery (for memory backup)	CR2032

3.4 Options

Table 3.4 List of the options

Model No.	Product	Specification / Remark
DT-964IOE	Satellite Cradle	
DT-964IOE-CN		See note.
DT-960IOE	Basic Cradle	
DT-960IOE-CN		See note.
HA-E60IO	Bridge Basic Cradle	
HA-E60IO-CN		See note.
DT-969CHGE	Cradle-type Battery Charger	
DT-969CHGE-CN		See note.
DT-923LIB	Battery pack	Lithium-ion battery pack
DT-923LIB-CN		Lithium-ion battery pack. See note.
DT-9020ADP-GS	AC adaptor	Input 230VAC For DT-960IOE and DT-969CHGE
DT-9020ADP-US		Input 120VAC For DT-960IOE and DT-969CHGE
AD-S42120AE	AC adaptor	Input 120VAC to 230VAC. For DT-964IOE
AD-S42120AE-CN		Input 120VAC to 230VAC. For DT-964IOE. See note.
AD-S15050AE	AC adaptor	Input 120VAC to 230VAC. For HA-E60IO
AD-S15050AE-CN		Input 120VAC to 230VAC. For HA-E60IO. See note.
DT-782RSC	RS-232C cable	Cross cable for DT-960IOE 14-pin/25-pin male
DT-783RSC	RS-232C cable	Cross cable for DT-960IOE 14-pin/25-pin female
DT-787AX	RS-232C cable	Cross cable for DT-960IOE 14-pin/19-pin female
DT-881RSC	RS-232C cable	Straight cable for DT-964IOE 9-pin female/25-pin male
DT-882RSC	RS-232C cable	Cross cable for DT-964IOE/PC 9-pin female/25-pin male
DT-883RSC	RS-232C cable	Cross cable for DT-964IOE/PC 9-pin female/25-pin female
DT-887AXA	RS-232C cable	Cross cable for DT-964IOE/PC 9-pin female/9-pin female
DT-887AXA-CN		Cross cable for DT-964IOE/PC 9-pin female/9-pin female. See note.
DT-788RSC	RS-485 cable	Cable for DT-960IOE (connection under daisy-chain)
DT-888RSC	RS-422 cable	Cable for DT-964IOE (connection under daisy-chain)
DT-380USB	USB cable	Cable for HA-E60IO
DT-891WH	Wall mount unit	Wall mount unit for HA-E60IO

Note:

A note about the compliance with the Chinese “RoHS” requirement is accompanied in the carton box, the RoHS compliant seal is affixed on the body and the seal of the packing material recycle marking is affixed on the carton box.

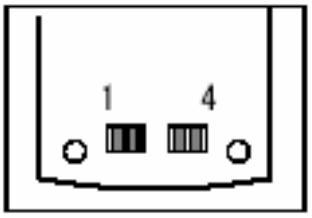
4. General Specifications

4.1 Hardware

Table 4.1 DT-930 hardware specifications

Block		Item			Specification	Remark
CPU and memory						
	CPU	SH1 (32-bit RISC type)				
		Clock frequency 4.92, 2.46, 1.23 MHz				
	RAM	4 Mbytes				
	F-ROM	16 Mbytes				
Clock Calendar		Clock			Year, month, day, hour, minute, second, day of the week/leap year	with auto self-start function
Buzzer		Built-in chip			CB-09FP	
		Sound volumes	Step/Setup		4 steps (loud, middle, low, off), Software setup	
			Max. volume		75 dB or more	
Display		LCD panel	Type		STN with phase compensation film	
			No. of dots		128 x 64 dots	
			Dot pitch		0.33 x 0.38 mm	
		Displayed character types			ANK/JIS Level I, II Kanji, Extra, User-defined characters	
		No. of characters	6-dot	6x6 dots	210 characters	21 digits x 10 lines
				6x12 dots	105 characters	21 digits x 5 lines
				12x12 dots	50 characters	10 digits x 5 lines
			8-dot	8x8 dots	128 characters	16 digits x 8 lines
				8x16 dots	64 characters	16 digits x 4 lines
				16x16 dots	32 characters	8 digits x 4 lines
			10-dot	10x10 dots	72 characters	12 digits x 6 lines
				10x20 dots	36 characters	12 digits x 3 lines
				20x20 dots	18 characters	6 digits x 3 lines
		Icons			Shift, low operating battery voltage, low memory backup battery voltage	
		Contrast adjustment			16-step electronic control	
		Backlight			LED	
Input		Power key, Numeric keys, Function keys, L, R keys	Type		Rubber-sealed contact type	
			Location		Front	
		INIT key	Type		Push-in type	
			Location		On the rear side	
		Trigger key	Type		Rubber-sealed contact type	
			Location		Right and Left sides	
Laser scanner		Method			Semi-conductor laser	
		Wave length			650±10 nm	
		Laser output			<1 mW	
		Number of scans			100±20 scans per second	
		Resolution			0.127 mm or more	
		PCS			0.45 or more	
		Readable depth	Straight		0 to 450 mm	
			Angle		0 to 400 mm	
		Readable width	Straight		65 mm max. (at depth of 0 mm)	
			Angle		60 mm max. (at depth of 0 mm)	
			Straight		390 mm max. (at depth of 450 mm)	
			Angle		360 mm max. (at depth of 400 mm)	

Continue.

Laser scanner		Resistance to external disturbance	Filament bulb/luminescent tube 3,000 Lux or less		
			Sunlight 80,000 Lux or less		
		Readable bar code symbologies	EAN, UPCA, UPCE, NW7, ITF, MSI, Industrial 2of5, Code39, Code93, Code128, EAN128, IATA		
		LED for confirmation	In green color		
Communication					
	IrDA	Communication mode	IrDA Ver. 1.1 compatible and Casio original infrared communication		
		Synchronization	Async, Frame		
		Protocol	Half-duplex		
		Baud rate (bps)	2400, 9600, 19200, 38400, 57600, 115200, 4M		
	Bluetooth	Standard	Bluetooth Specification Ver.1.2		
		Profile	Serial profile		
		Communication range	Approx. 5m		
		Output power	3dBm (Power Class2)		
Power supply					
	Operating battery	Battery type	Standard	Option	
			AA-size alkaline battery x 2	DT-923LIB Lithium-ion battery pack x 1	
		Nominal voltage	DC 1.5 V x 2	DC 3.6 V	
		Operating hours (Note 1)	Approx. 200	Approx. 50	
		Backup period (with only operating battery (Note 2)	5.0 months	1.5 months	
		Charge period (Note 3)		Approx. 6 hours	
	Memory backup battery	Battery type	Button-type lithium battery (CR2032) x 1		
		Backup hours (with only memory backup battery)	1 month		
	Low battery voltage warning	Type	Function	Operation status	
		LB0 (operating battery)	Absence of battery	Forced OFF	
		LB1 (operating battery)	Battery used	Operable	
		LB2 (memory backup battery)	Battery used or not present	Backup not possible	
	Power contacts	Layout of terminals	Pin No. 1 VCHG	Recharging Terminal 4.2V, 300 mA max.	
			Pin No.2 XIRCNT	Basic cradle control signal	
			Pin No.3 VADP	Power supply terminal 5 V, 400 mA max.	
			Pin No.4 GND	Ground	
					

Notes:

1. At ambient temperature 25ºC, and scanning twice in every 10 seconds.
2. At ambient temperature 25ºC, and with fully charged Lithium-Ion battery pack (or two new AA-size alkaline batteries).
3. At ambient temperature 25ºC, with a brand new battery pack (DT-923LIB), and the power on the DT-930 terminal has been kept shut down while charging the battery pack.

4.2 Key Layout

The following illustration shows the keyboard viewed from the front on the terminal. Two trigger keys are located on the left and right sides.

Fig. 4.1 Key layout

4.3 Compliance

Table 4.2 List of the applicable compliance standards

	Standard	Remark
EMI	EN55022:1998+A1:2000+A2:2003	FCC Part 15 Subpart B compatible
EMS	EN55024:1998+A1:2001+A2:2003	
Safety	EN60950-1	UL60950 compatible
Bluetooth type approval	EN300.328-1, EN300.328-2 EN301.489-1, EN300.489-17	FCC Part 15 Subpart C, RSS-210 compatible
Laser	EN60825	FDA compatible

Table 4.3 explains about the compliance with the required Chinese standards for all models of DT-930 series.

Table 4.3

Model	CCC		
	GB4943-2001	GB9254-1998	GB17625.1-2003
DT-930M50E-CN	Yes	Yes	Yes
DT-930M51E-CN	Yes	Yes	Yes

4.4 Electrical

Table 4.4

Item		Specification	Remark
Power consumption		0.7 W	
Power supply		LR6 alkaline dry cell x 2	
		Lithium-ion battery pack	
Static-electricity strength			
	Malfunction	±5 KV	Compliant with EN61000-4-2
	Destruction	±10 KV	
Noise radiant intensity		CE marking	

4.5 Environment

Table 4.5 Recommended environment for operation and storage

Item		Specification	Remark
Temperature			
	Operation	-20 ºC to 50 ºC	0 ºC to 40 ºC with cradle
	Storage	-20 ºC to 70 ºC	
Humidity			
	Operation	10% to 80% RH	No condensation
	Storage	90% RH or less	
Dust and water-splash proof		Conforms to IP54 level	IEC60529 standard

4.6 Impact Durability

Table 4.6

Item	Specification	Remark
Resistance to vibration	1.5 G or less	Conditions: • At frequency between 10 and 55 Hz • In the X,Y, and Z directions • Reciprocally for 30 minutes
Shock-proof	180 cm	Fall onto concrete slab from height of 180 cm

4.7 Reliability

Table 4.7

Item		Specification	Remark
MTBF of electronic parts		20,000 hours	
Backlight		5,000 hours	Until the brightness of the backlight becomes half-value of the full brightness.
Laser scanner		10,000 hours	
Key			
	Power switch	300,000 times	
	Trigger key	1,000,000 times	Right and Left sides
	Other keys	300,000 times	
Battery compartment lid		5,000 times	Including the lock button
Power supply section			
	Installing and removing the operating battery pack (or AA-size alkaline batteries)	5,000 times	
Mounting and removing the terminal on/from cradle		5,000 times	

5. Cables

5.1 Signal and Wiring

- **DT-881RSC (Straight)**

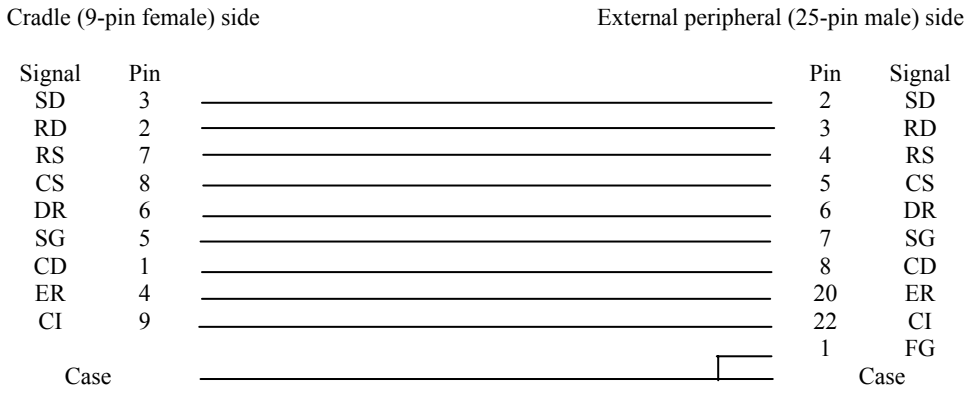


Fig. 5.1

- **DT-882RSC (Cross)**

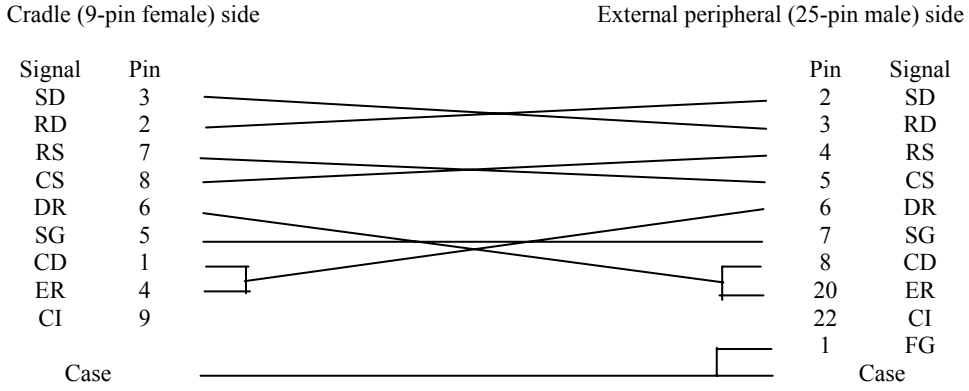


Fig. 5.2

- **DT-883RSC (Cross)**

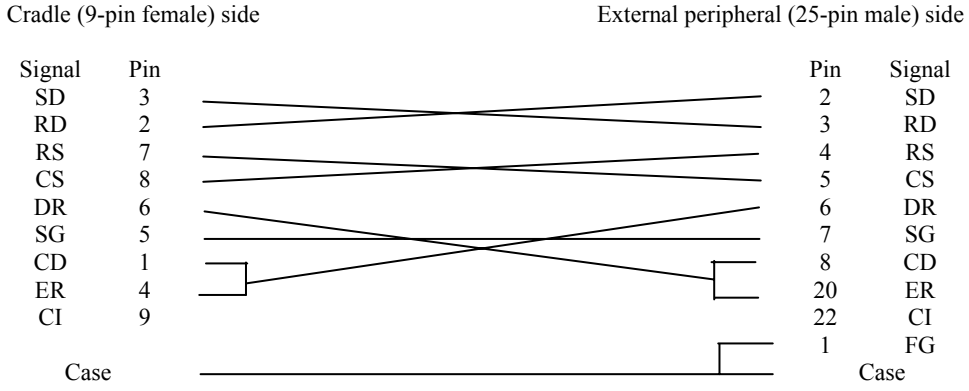


Fig. 5.3

- **DT-887AXA, DT-887AXA-CN (Cross)**

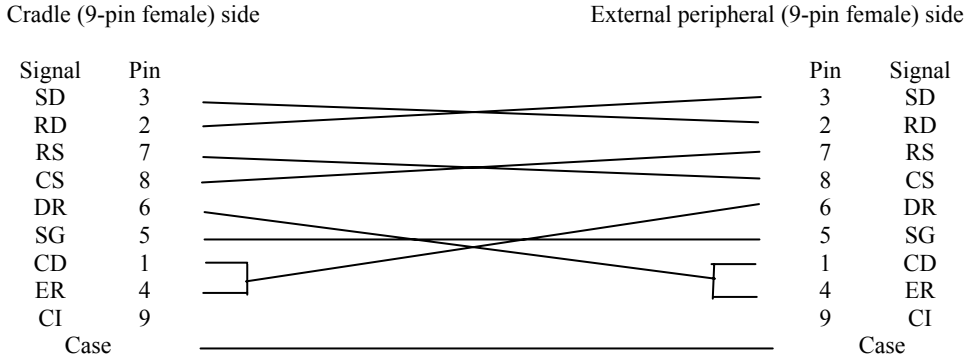


Fig. 5.4

- **DT-888RSC (Cross for RS-422)**

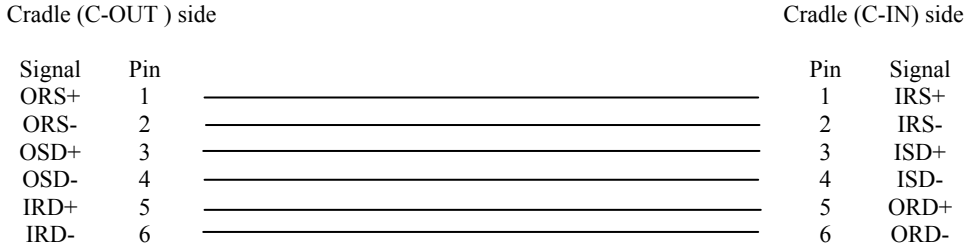


Fig. 5.5

- **DT-782RSC (Cross)**

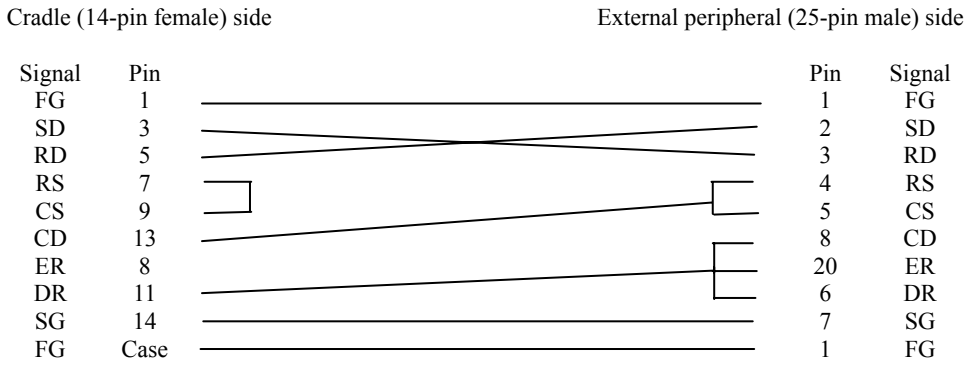


Fig. 5.6

- **DT-783RSC (Cross)**

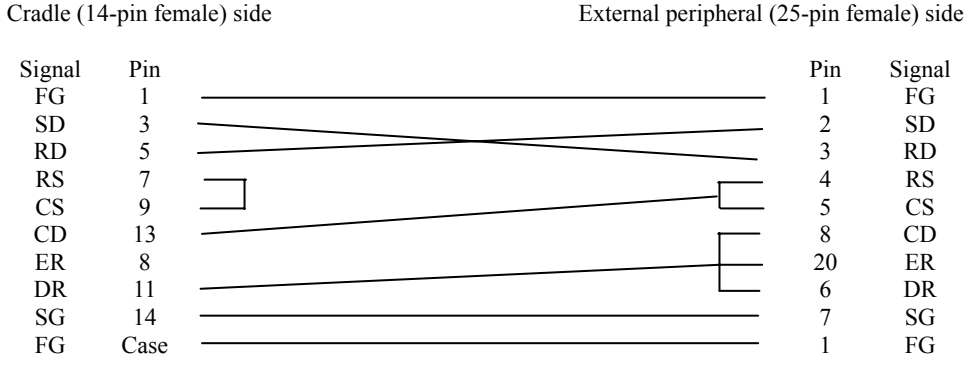


Fig. 5.7

- **DT-787AX (Cross)**

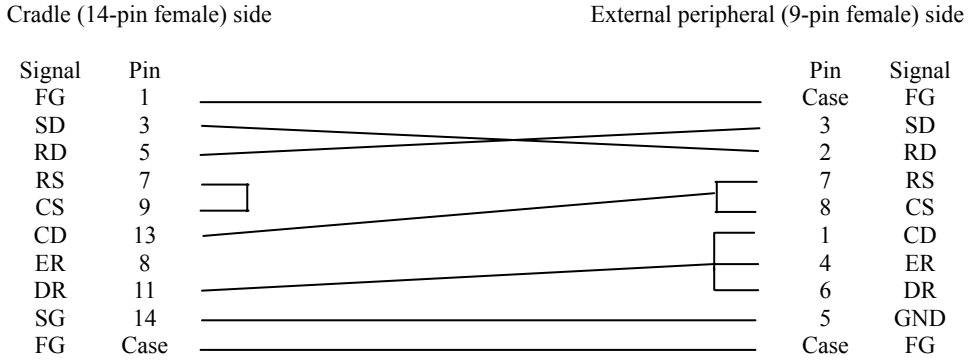


Fig. 5.8

- **DT-788RSC (Cross for RS-485)**

Fig. 5.9

6. DT-960IOE, DT-960IOE-CN Basic Cradle

The DT-960IOE (and DT-960IOE-CN) Basic Cradle is a cradle dedicated for DT-930. It facilitates non-contact data transfer between a PC and the terminal, and if multiple cradles are chain-connected, each cradle facilitates connecting the terminal mounted on the cradle to a single PC. It has an RS-232C interface for connection to PC and an IR interface using the CASIO original protocol for connection to the terminal. Also, it can supply power to the mounted terminal.

6.1 Features at a Glance

- Casio original protocol optical communication with the terminal.
- Chain links multiple Basic Cradles. The RS-485 driver/receiver is integrated to connect a maximum of sixteen DT-960IOEs with a total line length of 1 Km.
- Power supply capability to the terminal. The built-in circuit has a capability of supplying power to the terminal preventing the battery power from being consumed by the terminal during communication.
- Wall mount configuration or desk top configuration is possible.

6.2 External Views

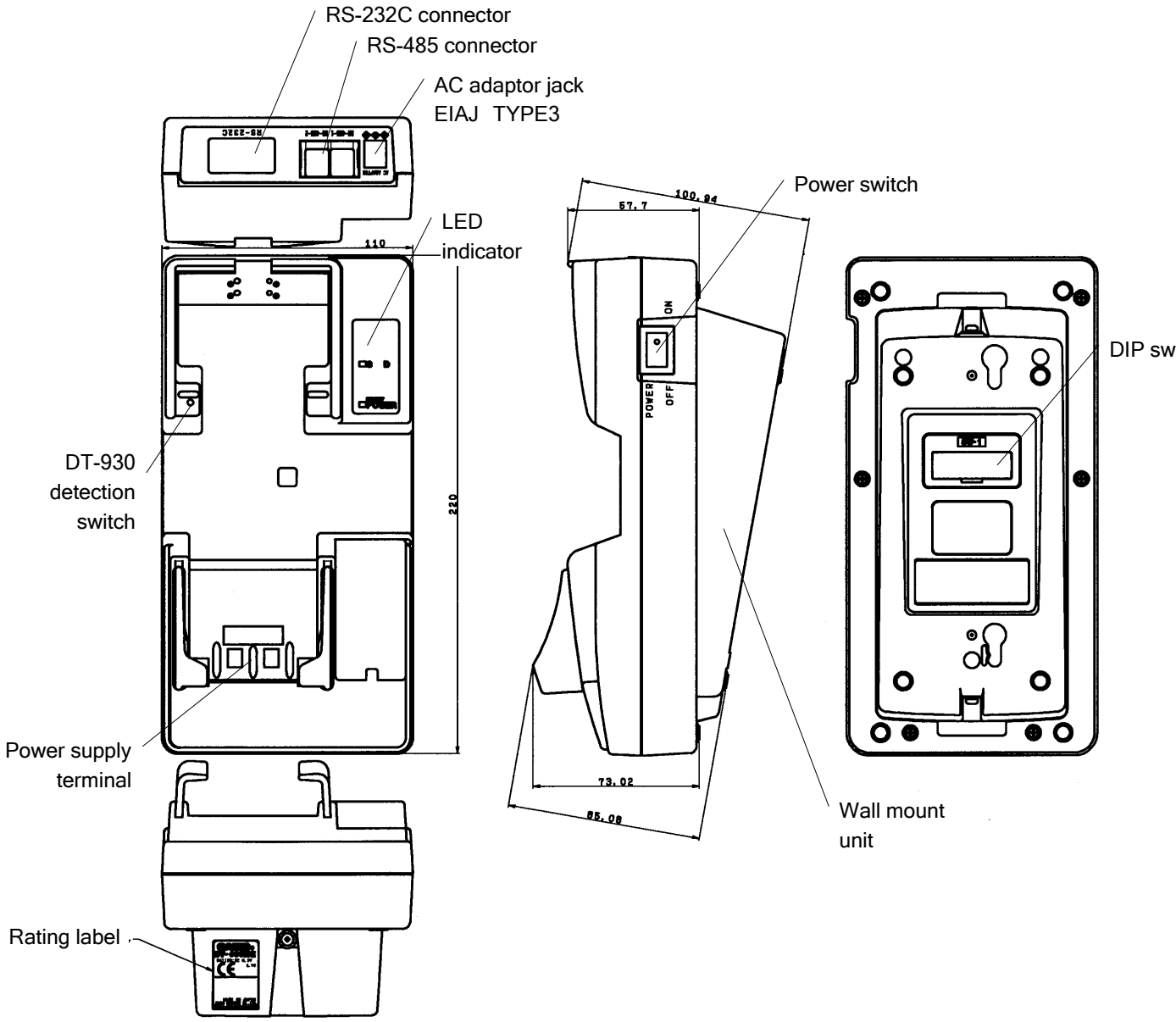


Fig. 6.1

Note:
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6.3 Dimensions and Weight

Table 6.1 Dimensions and weight

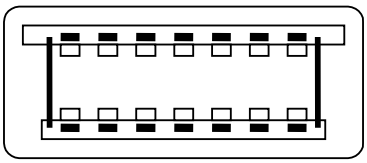
Item	Specification
Desk top configuration	110 (W) mm x 220 (D) mm x 100 (H) mm
Wall mount configuration	110 (W) mm x 220 (D) mm x 110 (H) mm
Weight	Approx. 355 g (see notes)

Notes:

- If the hook and cover for wall mounting are used, the product weight is increased by approximately 10 g.
- If the nose guide for straight opening is used, the product weight is increased by approximately 5 g.

6.4 Hardware Specifications

Table 6.2

Block	Item		Specification				Remark
I/F	I/F to DT-930	Protocol	Original Ir Interface (IrDA device)				IR comm. only by contact.
		Synchronization	Start and stop bits				
		Method	Half duplex				
		Data format	Data bit : 8				Fixed
			Stop bit : 1				
			Parity bit : none				
		Baud rate (bps)	2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K				
		I/F level	Mark : LED off				Pulse width of ON is fixed irrespective of communication speed.
			Space: LED on (pulse width 1.6 microseconds approx)				
		Usage	Connecting DT-930				
	I/F to Host PC	Protocol	RS-232C				
		Synchronization	Start and stop bits				
		Method	Half duplex				
		Data format	Data length : 8 bits				
			Stop bit : 1				
			Parity bit : none				
		Baud rate (bps)	2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K				
		I/F level	SD	Mark -15 to –5V			
				Space +15 to 5 V			
			RD	Mark -3 V or less			
				Space +3 V or more			
		Connector	Pin number and signal 13 1  14 2				14-pin female
			Pin 1	FG	Pin 2	Not used	
			Pin 3	SD	Pin 4	Not used	
			Pin 5	RD	Pin 6	Not used	
			Pin 7	RS	Pin 8	ER	
			Pin 9	Not used	Pin 10	Not used	
			Pin 11	Not used	Pin 12	Not used	
			Pin 13	CD	Pin 14	SG	
		Usage	P/C, Modem, Printer, etc.				
I/F	Chained Connect. I/F	Protocol	RS-485				Max. length is 1 Km.
		Synchronization	Start and stop bits				
		Method	Half duplex				
		Data format	Data bit : 8				Fixed
			Stop bit : 1				
			Parity bit : none				
		Baud rate (bps)	2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K				

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 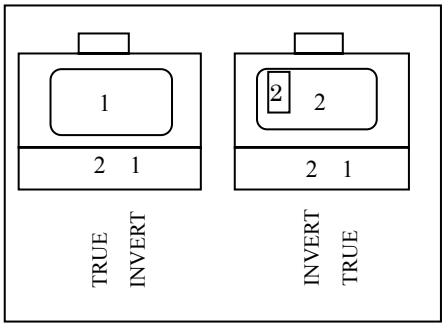

6 wired modular connectors</td><td>Logic level
Mark: high
Space: low</td></tr>
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<tr><td></td><td></td><td>Usage (example)</td><td colspan="5">DT-960IOE Basic Cradle, DT-964IOE Satellite Cradle, etc.</td><td></td></tr>
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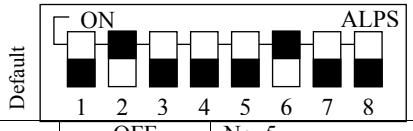
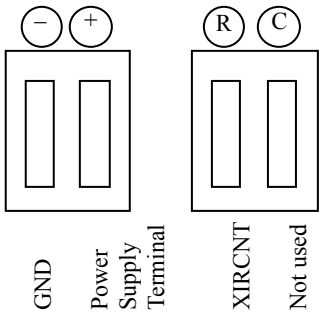
<tr><td></td><td></td><td></td><td>19200</td><td>OFF</td><td>ON</td><td>OFF</td><td></td></tr>
<tr><td></td><td></td><td></td><td>38.4 K</td><td>ON</td><td>ON</td><td>OFF</td><td></td></tr>
<tr><td></td><td></td><td></td><td>57.4 K</td><td>OFF</td><td>OFF</td><td>ON</td><td></td></tr>
<tr><td></td><td></td><td></td><td>115.2 K</td><td>ON</td><td>OFF</td><td>ON</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Prohibited</td><td>OFF</td><td>ON</td><td>ON</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Prohibited</td><td>ON</td><td>ON</td><td>ON</td><td></td></tr>
<tr><td></td><td></td><td>RS-232C RS/ER signals ON/OFF</td><td>Switch</td><td>4</td><td>5</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>RS</td><td>ON</td><td>-</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>ER</td><td>-</td><td>ON</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Termination</td><td>Switch</td><td>6</td><td colspan="2" rowspan="4"></td><td rowspan="11">No. 8 is not used</td></tr>
<tr><td></td><td></td><td></td><td>In middle position</td><td>OFF</td></tr>
<tr><td></td><td></td><td></td><td>At the end position</td><td>ON</td></tr>
<tr><td></td><td></td><td>Chain connection</td><td>Switch</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td>Yes</td><td>OFF</td><td colspan="2" rowspan="3"></td></tr>
<tr><td></td><td></td><td></td><td>No</td><td>ON</td></tr>
<tr><td></td><td></td><td colspan="5">DIP switch setting (default at factory)
 
</td><td rowspan="5">Nos. 2 and 6 must be set to ON.</td></tr>
<tr><td></td><td></td><td>No. 1</td><td>OFF</td><td>No. 5</td><td colspan="2">OFF</td></tr>
<tr><td></td><td></td><td>No. 2</td><td>ON</td><td>No. 6</td><td colspan="2">ON</td></tr>
<tr><td></td><td></td><td>No. 3</td><td>OFF</td><td>No. 7</td><td colspan="2">OFF</td></tr>
<tr><td></td><td></td><td>No. 4</td><td>OFF</td><td>No. 8</td><td colspan="2">OFF</td></tr>
<tr><td></td><td>Power switch</td><td colspan="2"></td><td colspan="3">Seesaw switch</td><td></td></tr>
<tr><td></td><td>Terminal detection switch</td><td colspan="2"></td><td colspan="3">Push switch</td><td></td></tr>
<tr><td>Indicators</td><td>READY/POWER</td><td colspan="2">DT-930 is being mounted.</td><td colspan="2">Red</td><td></td><td>2-color LED (Power LED)</td></tr>
<tr><td></td><td></td><td colspan="2">DT-930 is not being mounted.</td><td colspan="2">Green</td><td></td><td></td></tr>
<tr><td></td><td>SD</td><td>While communicating</td><td colspan="2">OK</td><td colspan="2">Green in flashing</td><td>2-color LED (green is used) SD LED</td></tr>
<tr><td>Power supply</td><td>Input voltage</td><td colspan="2"></td><td colspan="3">DC 9.5V±5%</td><td></td></tr>
<tr><td></td><td>Current consumption</td><td colspan="2"></td><td colspan="3">300 mA (max.) when supplying power to DT-930</td><td></td></tr>
<tr><td></td><td>Applicable plug type</td><td colspan="2"></td><td colspan="3">EIAJ RC5320 type 3</td><td>Center pin : +</td></tr>
</table>

Continue.

	AC adaptor	Input AC230V	DT-9020ADP-G	
		Input AC120V	DT-9020ADP-U	
	Power supply block	Output voltage	5V±10%	
		Output current	300mA	
		Excess current Protection	Drop-type excess current protection circuit (600mA or more)	
	Terminal block	Layout of terminals	GND -	
			Power supply +	
			XIRCNT R	
			Not used C	
				

6.5 Electric

Table 6.3

Item	Specification		Remark
Power consumption	2.7 W		When dedicated adaptor is used.
Input voltage	DC 9.5 V ±5%		"EIAJ RC5320 type 3" plug
AC adaptor	DT-9020ADP-G	AC220-240V 50/60Hz	Input conditions: Voltage: ±10% of rated voltage Frequency: ±1Hz of rated frequency
	DT-9020ADP-U	AC100-120V 50/60Hz	
Line noise	Malfunction at 700V		Pulse width: 100 to 800 nanoseconds Cycle: 10 to 35 msec. (variable) Polarity: +, -
Instantaneous power line off	Malfunction at 10 msec. or less		
Insulation voltage	DT-9020ADP-G	AC1,500V for 1 min.	Tested with DT-9020ADP-G and DT-9020ADP-U
	DT-9020ADP-U	AC1,000V for 1 min.	
Insulation resistance	DT-9020ADP-G	50Mohm at DC500V	
	DT-9020ADP-U	50Mohm at DC500V	
Leak current	DT-9020ADP-G	3.5 mA or less	
	DT-9020ADP-U	1.0 mA or less	
Terminal noise voltage	In compliance with EN55022		Tested with DT-9020ADP-G
Noise radiation electric field	In compliance with EN55022		Tested with DT-9020ADP-G

6.6 Environment

Table 6.4

Item	Specification		Remark
Temperature	Operation	0 ºC to 40 ºC	
	Storage	-10 ºC to 50 ºC	
Humidity	Operation	30% to 80%RH	At 40ºC. No condensation
	Storage	30% to 90%RH	
Electrostatic	Malfunction at 5 KV		Conditions: Equivalent human body resistance: 100 ohm Equivalent human body capacity: 250 pF Frequency of application : 10 times Period of application : 0.3/0.3 seconds
	Destruction at 10 KV		

6.7 Impact Durability

Table 6.5

Item	Specification	Remark
Shock-proof (in height)	30 cm or less	
Local impact	1 Kg	at 6 specified positions
Overall impact	20 Kg	
Resistance to vibration	0.15 G	Conditions: In X,Y, Z directions 10 to 55 Hz 30 minutes

6.8 Reliability

Table 6.6

Item		Specification
MTBF		67,000 hours
Switch	Power switch	3,000 times
	Terminal detection switch	20,000 times
	DIP switch	50 times
Connection/removing of the connector	RS-232C	500 times
	RS-485	500 times
	DC jack	500 times
Mounting and removing terminal on/from cradle		20,000 times
Mounting and removing of battery pack into/from the compartment	Charging spring	5,000 times

Notes:

- The above MTBF figure has been calculated based on each MTBF of electronic parts employed.
- The above figure does not apply to the dedicated AC adaptors.

6.9 Compliance

Table 6.7

Standard		Remark
Radio interference	EN55022:1994, A2:1997 Class B CISPR Pub.22:1993, A2:1996 Class B	Tested with DT-9020ADP-G.
Electromagnetic compatibility generic immunity	EN50082-1: 1997	Tested with DT-9020ADP-G.
Safety	EN60950	Applicable to DT-9020ADP-G and DT-9020ADP-U.

6.10 Chain Connection

6.10.1 Configurations and Operating Conditions

Basic Cradle and Host P/C (with external device connected)

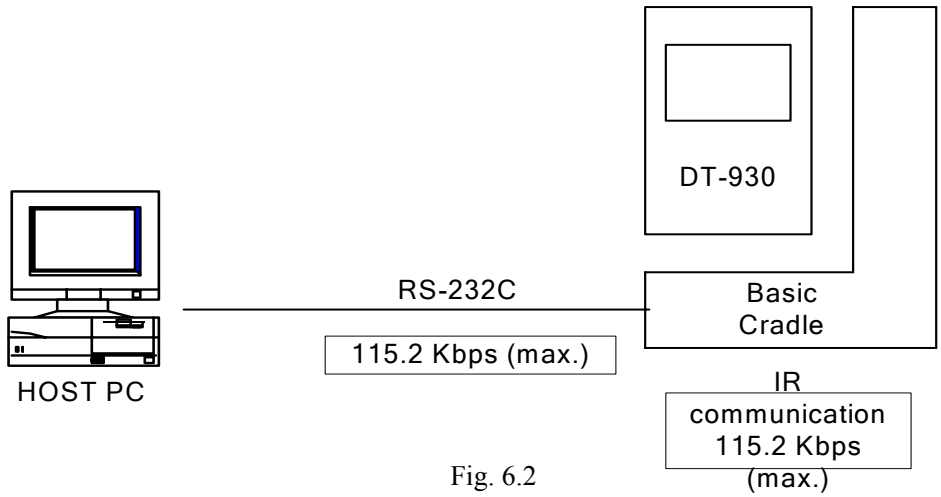


Fig. 6.2

DIP Switch Setting

Table 6.8

No.	Use of Switch	Destination	Switch	Setting	Remark
1	Baud rate switching 0	To GA	IRSPEED0	ON	115.2 Kbps
2	Baud rate switching 1	To GA	IRSPEED1	OFF	
3	Baud rate switching 2	To GA	IRSPEED2	ON	See note.
4	RS	To GA	RS	OFF	
5	ER	To GA	ER	OFF	
6	Chain termination setting	To RS-485 LINE	ENDSW	ON	
7	Use of chain connection	To GA	RS-485	ON	

Note:
This baud rate must be reduced if the line quality is poor.

Basic Cradles and Host P/C

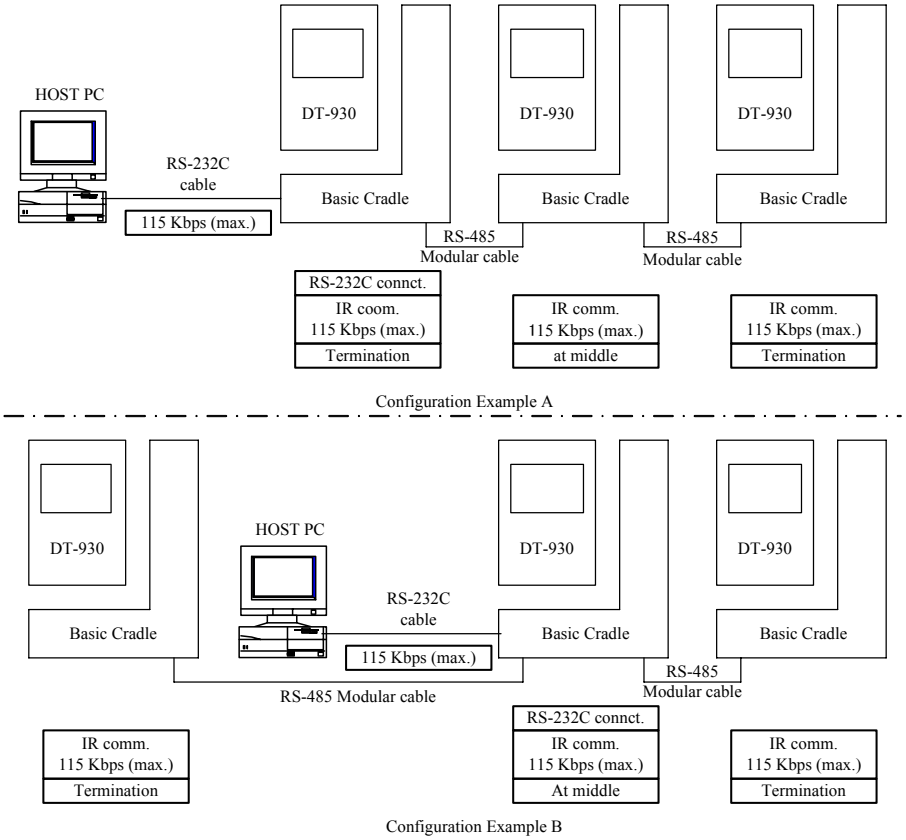


Fig. 6.3

DIP Switch Setting

Table 6.9

No.	Use of Switch	Destination	Switch	Setting			Remark
				RS-232C connection	Middle of chain	End of chain	
1	Baud rate switching 0	To GA	IRSPEED0	ON	ON	ON	115.2 Kbps See note.
2	Baud rate switching 1	To GA	IRSPEED1	OFF	OFF	OFF	
3	Baud rate switching 2	To GA	IRSPEED2	ON	ON	ON	
4	RS	To GA	RS	OFF	OFF	OFF	
5	ER	To GA	ER	OFF	OFF	OFF	
6	Chain termination setting	To RS-485 LINE	ENDSW	-	OFF	ON	
7	Use of chain connection	To GA	RS-485	OFF	OFF	OFF	

Note:

This baud rate must be reduced if the line quality is poor.

Multiple Basic Cradles

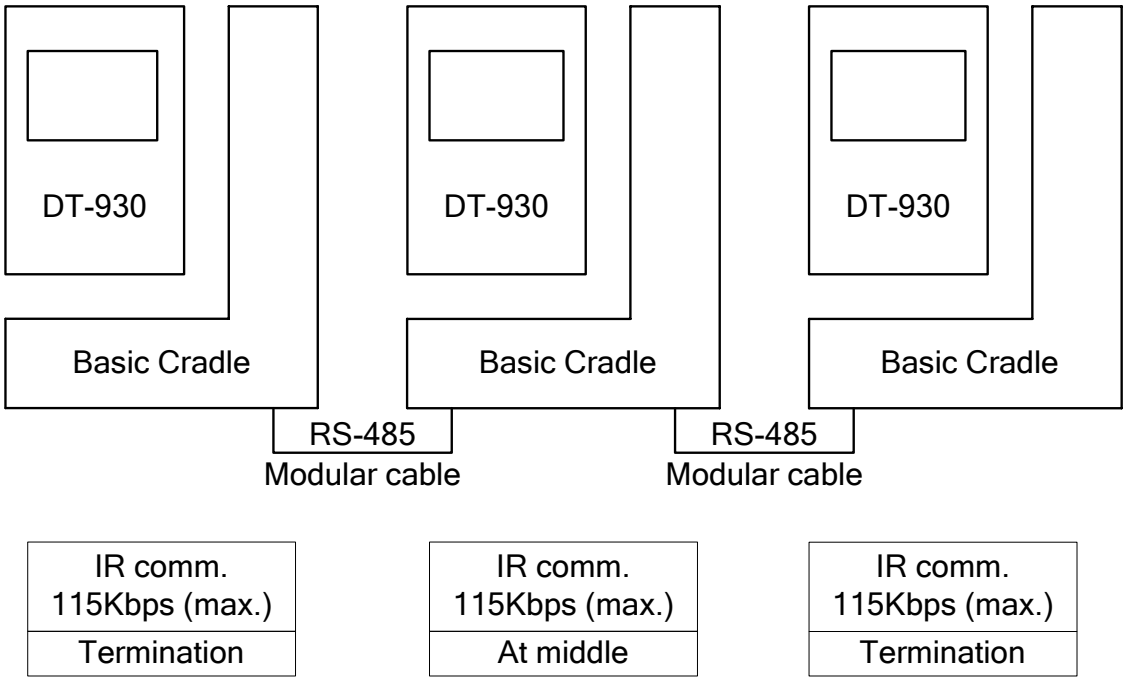


Fig. 6.4

DIP Switch Setting

Table 6.10

No.	Use of Switch	Destination	Switch	Setting		Remark
				Middle of chain	End of chain	
1	Baud rate switching 0	To GA	IRSPEED0	ON	ON	115.2 Kbps See note.
2	Baud rate switching 1	To GA	IRSPEED1	OFF	OFF	
3	Baud rate switching 2	To GA	IRSPEED2	ON	ON	
4	RS	To GA	RS	OFF	OFF	
5	ER	To GA	ER	OFF	OFF	
6	Chain termination setting	To RS-485 LINE	ENDSW	OFF	ON	
7	Use of chain connection	To GA	RS-485	OFF	OFF	

Note:
This baud rate must be reduced if the line quality is poor.

6.10.2 Cable Specifications

Cable for Chain Connection (short distance)

A cable for the chain connection within distance of 1 meter or less (between DT-960IOE and DT-960IOE) is available as option. The model number of the cable is DT-788RSC (cable length: 1 m).

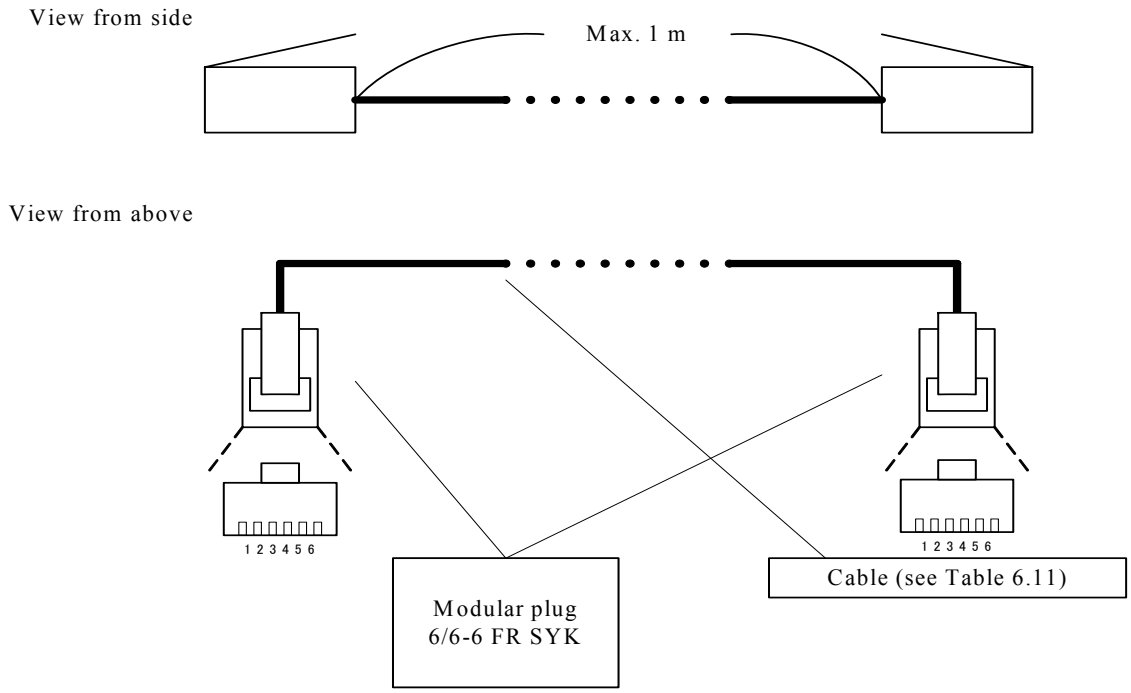


Fig. 6.5

Table 6.11

Cable		
Core wire	Conductive	20/0.1 A
	Insulation	Semi-rigid P.V.C
	Finish form	20/0.1 A
Sheath	Insulation	P.V.C
	Finish O.D.	φ4.3 ±0.1 mm
Characteristics	Conductive resistance	0.12 ohm/m or less
	Insulation resistance	50 Mohm or greater

Wiring of the cable (cross cable)

Cradle at downstream side

Pin no.	Signal
1	
2	
3	TRUE
4	INVERT
5	
6	

Cradle at upper stream side

Pin no.	Signal
1	
2	
3	INVERT
4	TRUE
5	
6	

Fig. 6.6

Cable for Chain Connection (long distance)

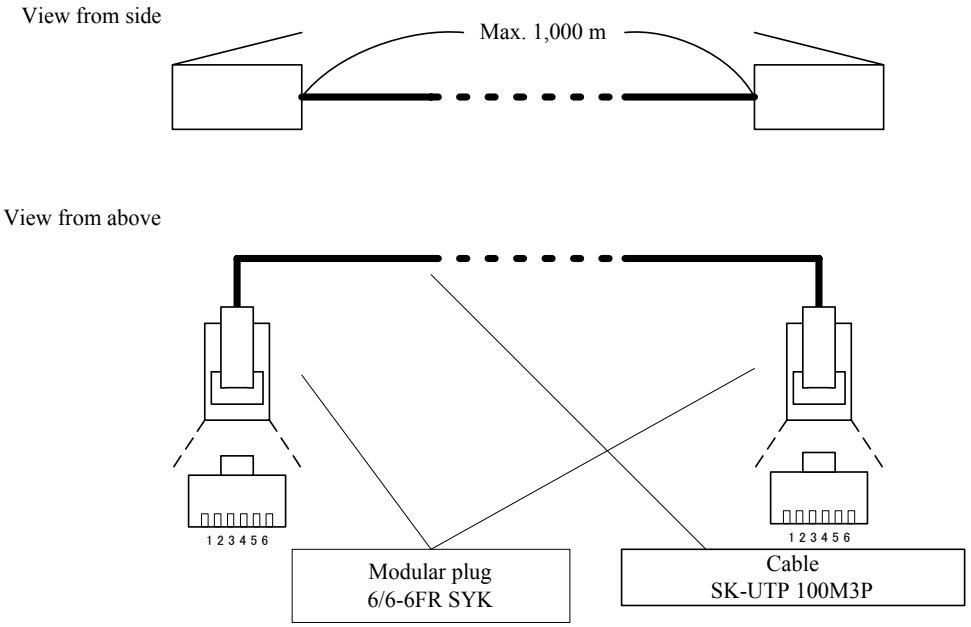


Fig. 6.7

Wiring of the cable (cross and twist pair)

Cradle at downstream side

Pin no.	Signal
1	
2	
3	TRUE
4	INVERT
5	
6	

XXXXXXXXXXXX

Cradle at upper stream side

Pin no.	Signal
1	
2	
3	INVERT
4	TRUE
5	
6	

Fig. 6.8

6.10.3 Notes about Chain Connection

Cable layout

Take the followings into consideration when routing the cables from each Cradle:

- Compression, extension, bending due to heavy load
- Attachment to a movable part
- Routing over a sharp edge
- Routing near a strong electric field

Note:

Improper routing of a cable may cause a cable fault or a short circuit, damaging proper communication.

Do not route cables near precision equipment (measuring equipment, etc.), a radio or television receiver, or wireless equipment. If cables are routed near such a piece of equipment, it may be subject to electrical interference.

Precautions to be observed when manufacturing cables

- If the CASIO cables cannot be used, and custom-made cables are required instead, use the manufacturer-specified cramping tool to cramp the modular connector and cable. Note that defective cramping may damage communication.
- Cables for Basic Cradle are designed for cross-type connection. Note that the number of core wires and connection method are different from those for the DT-964IOE Satellite Cradle.

7. DT-964IOE, DT-964IOE-CN Satellite Cradle

The DT-964IOE (and DT-964IOE-CN) Satellite Cradle is a cradle dedicated for DT-930. It facilitates non-contact data transfer between a PC and the terminal, and, if multiple cradles are chain-connected, each cradle facilitates connecting the terminal mounted on the cradle to a single PC. It has an RS-232C interface for connection to PC and an IrDA interface for connection to the terminal. Also, it can supply power to the mounted terminal.

7.1 Features at a Glance

- IrDA Ver. 1.2 optical communication with the terminal
- Chain links multiple Satellite Cradles. The integrated RS-422 driver/receiver is used to connect a maximum of eight units of DT-964IOE with a total cable length of 1 Km.
- Power supply capability. The circuit has a capability of supplying power to the terminal, preventing the battery being consumed by the terminal.
- Capability of charging battery pack. The cradle can charge the battery pack being installed in the terminal or a single battery pack placed in the spare battery compartment on the cradle. A period of approximately five hours is required to fully charge the battery in the compartment.
- Wall mount configuration or desk top configuration. The wall mount unit allows the cradle to be hung on a wall.

7.2 External Views

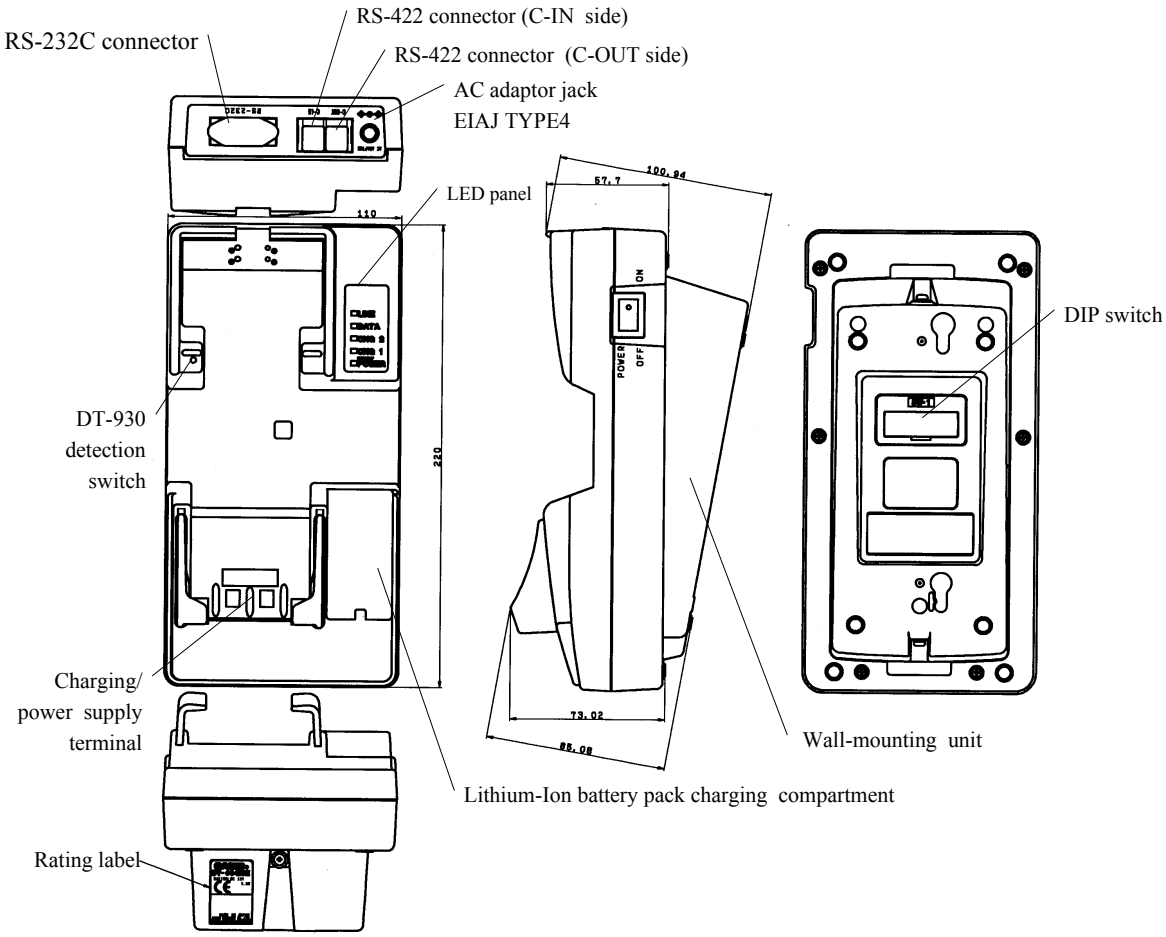


Fig. 7.1

Note:
If this page is not printed properly, change the printer graphic property from "Vector Graphic" to "Raster Graphic".

7.3 Dimensions and Weight

Table 7.1 Dimensions and weight

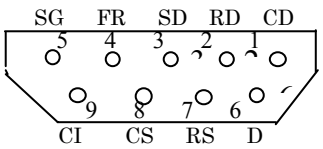
Item	Specification
Desktop configuration	110 (W) mm x 220 (D) mm x 100 (H) mm
Wall mount configuration	110 (W) mm x 220 (D) mm x 110 (H) mm
Weight	500 g (approx.) (see notes)

Notes:

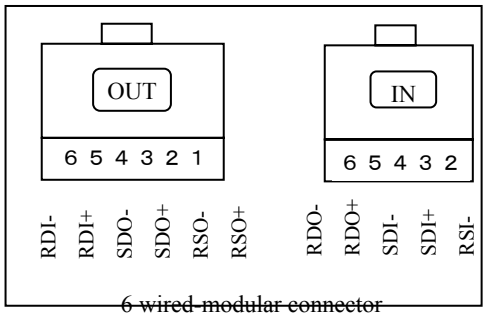
- If the hook and cover for wall mounting are used, the product weight is increased by approximately 10 g.
- If the nose guide for straight opening is used, the product weight is increased by approximately 5 g.

7.4 Hardware Specifications

Table 7.2

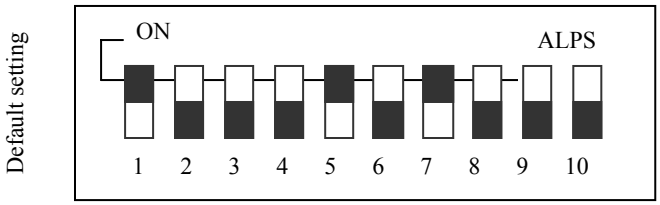
Block	Item		Specification				Remark
Gate Array	Device		SH7020				By HITACHI
	No. of bits		32 bits RISC				
	Operating frequency		18.432 MHz				Built-in MASKROM is not used.
Memory	SRAM	Device	SRM2B256SLMX-70				2 pcs (16-bit)
		Capacity	32 Kbytes				
		Access time	70 nanoseconds				
	EEPROM (MASK ROM)	Device	M27C1024-10L1				Erasable with ultra-violet light
		Capacity	128 Kbytes				Use the IC socket to update the firmware.
		Access time	100 nanoseconds				
I/F	I/F to DT-930	Protocol	Original Ir Interface (IrDA device) Conforms to Ver. 1.2				By contact method only.
		Synchronization	Start/Stop bit				
		Method	Half duplex				
		Data format	Data bit : 8				Fixed
			Stop bit : 1				
			Parity bit : none				
		Baud rate (bps)	9600, 38.4K, 115.2 K				Bit switch/setting of IrCOMM
		I/F level	Mark : LED off				On-pulse width is fixed irrespective of the transmission rate.
			Space: LED on (pulse width 1.6 microseconds approx.)				
		Usage	Connecting DT-930				
	I/F to Host PC	Protocol	RS-232C				
		Synchronization	Start and stop bits				
		Method	Full duplex/Half duplex				
		Data format	Data length : 8 bits				Bit switch/setting of IrCOMM
			Stop bit : 1				
			Parity bit : none				
		Baud rate (bps)	2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K				
		I/F level	SD	Mark -15 to –5V			
				Space +15 to 5 V			
			RD	Mark -3 V or less			
				Space +3 V or more			
		Connector (example)	 DSUB 9 pin (male)				D-sub 9-pin (male) connector
			Pin no. 1	CD	Pin no. 2	RD	
			Pin no. 3	SD	Pin no. 4	ER	
			Pin no. 5	SG	Pin no. 6	D	
			Pin no. 7	RS	Pin no. 8	CS	
			Pin no. 9	CI			
		Usage (example)	PC, Modem, Printer				

Continue.

<table>
<tr><th>Block</th><th colspan="2">Item</th><th>Specification</th><th>Remark</th></tr>
<tr><td rowspan="13"></td><td rowspan="13">Chain I/F</td><td>Protocol</td><td>RS-422</td><td>Max. length 1 Km</td></tr>
<tr><td>Synchronization</td><td>Start and stop bits</td><td>Same specification as I/F to DT-930.</td></tr>
<tr><td>Method</td><td>Half duplex</td><td></td></tr>
<tr><td rowspan="3">Data format</td><td>Data bit : 8</td><td rowspan="3">Fixed</td></tr>
<tr><td>Stop bit : 1</td></tr>
<tr><td>Parity bit : none</td></tr>
<tr><td>Baud rate (bps)</td><td>9600, 38.4K, 115.2K</td><td>Bit switch/Setting of IrCOMM</td></tr>
<tr><td>I/F level</td><td>±2 to 5 V (differential voltage)</td><td>Logic level
Mark: high
Space: low</td></tr>
<tr><td>Connector</td><td> 

6 wired-modular connector
<table>
<tr><th colspan="2">OUT</th><th colspan="2">IN</th></tr>
<tr><td>No. 1</td><td>RSO+</td><td>No. 1</td><td>RSI+</td></tr>
<tr><td>No. 2</td><td>RSO-</td><td>No. 2</td><td>RSI-</td></tr>
<tr><td>No. 3</td><td>SDO+</td><td>No. 3</td><td>SDI+</td></tr>
<tr><td>No. 4</td><td>SDO-</td><td>No. 4</td><td>SDI-</td></tr>
<tr><td>No. 5</td><td>RDI+</td><td>No. 5</td><td>RDO+</td></tr>
<tr><td>No. 6</td><td>RDI-</td><td>No. 6</td><td>RDO-</td></tr>
</table></td><td>6-wire modular connector</td></tr>
<tr><td>Usage (example)</td><td>Basic Cradle</td><td></td></tr>
<tr><td rowspan="15">Switch</td><td rowspan="15">DIP Switch</td><td rowspan="5">Host PC I/F baud rate setting</td><td>Switch no.</td><td>1</td><td>2</td></tr>
<tr><td>38.4 Kbps</td><td>OFF</td><td>OFF</td></tr>
<tr><td>115.2 Kbps</td><td>ON</td><td>OFF</td></tr>
<tr><td>No setting</td><td>OFF</td><td>ON</td></tr>
<tr><td>Setting prohibited</td><td>ON</td><td>ON</td></tr>
<tr><td rowspan="5">Communication mode switchover</td><td>Switch</td><td>3</td><td>4</td></tr>
<tr><td>Active host connect.</td><td>OFF</td><td>OFF</td></tr>
<tr><td>Passive chain connect.</td><td>ON</td><td>OFF</td></tr>
<tr><td>Through download</td><td>OFF</td><td>ON</td></tr>
<tr><td>Setting prohibited</td><td>ON</td><td>ON</td></tr>
<tr><td rowspan="3">Termination</td><td>Switch no.</td><td colspan="2">5</td></tr>
<tr><td>In between</td><td colspan="2">OFF</td></tr>
<tr><td>At the end</td><td colspan="2">ON</td></tr>
<tr><td rowspan="9">Host PC I/F baud rate setting</td><td>Switch no.</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>2400 bps</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>4800 bps</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>9600 bps</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>19.2 Kbps</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>38.4 Kbps</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>57.6 Kbps</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>115.2 Kbps</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>Test mode</td><td>ON</td><td>ON</td><td>ON</td></tr>
</table>

Continue.

<table>
<tr><td rowspan="11">Switch</td><td rowspan="9">DIP switch</td><td colspan="2">Flow control</td><td>Switch no.</td><td>9</td><td>10</td><td></td></tr>
<tr><td colspan="2"></td><td>No protocol</td><td>OFF</td><td>OFF</td><td></td></tr>
<tr><td colspan="2"></td><td>XON/XOFF</td><td>ON</td><td>OFF</td><td></td></tr>
<tr><td colspan="2"></td><td>RS/CS</td><td>OFF</td><td>ON</td><td></td></tr>
<tr><td colspan="2"></td><td>Host P/C connection</td><td>ON</td><td>ON</td><td></td></tr>
<tr><td colspan="4">DIP switch setting (default at factory)
 
</td><td colspan="2">Set nos. 1, 5, and 7 to ON</td></tr>
<tr><td colspan="4"><table>
<tr><td>No. 1</td><td>ON</td><td>No. 6</td><td>OFF</td></tr>
<tr><td>No. 2</td><td>OFF</td><td>No. 7</td><td>ON</td></tr>
<tr><td>No. 3</td><td>OFF</td><td>No. 8</td><td>OFF</td></tr>
<tr><td>No. 4</td><td>OFF</td><td>No. 9</td><td>OFF</td></tr>
<tr><td>No. 5</td><td>ON</td><td>No. 10</td><td>OFF</td></tr>
</table></td><td></td></tr>
<tr><td colspan="3">Power switch</td><td colspan="2">Seesaw switch</td><td></td></tr>
<tr><td colspan="3">Terminal detection switch</td><td colspan="2">Push switch</td><td></td></tr>
<tr><td rowspan="12">Indication</td><td rowspan="2">READY/POWER</td><td colspan="2">DT-930 is being mounted.</td><td>Red</td><td colspan="2">2-color LED
Power LED</td></tr>
<tr><td colspan="2">DT-930 is not being mounted.</td><td>Green</td><td colspan="2">Power LED</td></tr>
<tr><td rowspan="3">CHG1</td><td colspan="2">While charging</td><td>Red</td><td colspan="2" rowspan="3">2-color LED
(green is used)
CHG1 LED</td></tr>
<tr><td colspan="2">Charging is complete.</td><td>Green</td></tr>
<tr><td colspan="2">Charging ends abnormally.</td><td>OFF</td></tr>
<tr><td rowspan="4">CHG2</td><td colspan="2">While charging</td><td>Red</td><td colspan="2" rowspan="4">2-color LED
Turns off after charging operation has been attempted (On if red). CHG2 LED</td></tr>
<tr><td colspan="2">Wait to charge</td><td>Red</td></tr>
<tr><td colspan="2">Charging is complete.</td><td>Green</td></tr>
<tr><td colspan="2">Charging ends abnormally.</td><td>OFF</td></tr>
<tr><td rowspan="4">DATA</td><td rowspan="2">Communication braked</td><td>OK</td><td>OFF</td><td colspan="2" rowspan="4">2-color LED
DATA LED</td></tr>
<tr><td>NG</td><td>Red</td></tr>
<tr><td rowspan="2">While communicating</td><td>OK</td><td>Green flashing</td></tr>
<tr><td>NG</td><td>Red</td></tr>
<tr><td rowspan="2">LINE</td><td colspan="2">Not used/Negotiation</td><td>OFF</td><td colspan="2" rowspan="2">LINE LED</td></tr>
<tr><td colspan="2">During use</td><td>Red</td></tr>
<tr><td rowspan="14">Power supply</td><td colspan="2">Input voltage</td><td colspan="2">DC12V±5%</td><td></td></tr>
<tr><td colspan="2">Power consumption</td><td colspan="2">600 mA (max.) (120 mA if not charging)</td><td>While charging DT-930</td></tr>
<tr><td colspan="2">Applicable plug</td><td colspan="2">EIAJ RC5320 type 4</td><td>Center pin : positive</td></tr>
<tr><td colspan="2">Applicable AC adaptor</td><td colspan="2">AD-S42120AE</td><td>AC input; 100VAC to 230VAC</td></tr>
<tr><td rowspan="13">Charging module</td><td>Specifications</td><td colspan="2">BC-9801C</td><td></td></tr>
<tr><td>Input voltage</td><td colspan="2">6.5 to 15V</td><td></td></tr>
<tr><td>Power consumption</td><td colspan="2">5 VA or less</td><td></td></tr>
<tr><td rowspan="3">Objective battery</td><td colspan="2">DT-923LIB</td><td></td></tr>
<tr><td colspan="2">Nominal voltage DC3.6 V</td><td></td></tr>
<tr><td colspan="2">Nominal capacity 540 mAh</td><td></td></tr>
<tr><td>Charging specification</td><td colspan="2">Output voltage 4.1V±50 mV</td><td></td></tr>
<tr><td rowspan="3">Output current</td><td colspan="2">During charging 300±30 mA</td><td>3.0V <Battery voltage ≤ 4.1V</td></tr>
<tr><td colspan="2">During charging 30±12 mA</td><td>2.6V <Battery voltage ≤ 3.0V</td></tr>
<tr><td colspan="2">In the check mode 300±30 mA</td><td></td></tr>
<tr><td>Current to check if charging is complete</td><td colspan="2">30±12 mA</td><td></td></tr>
<tr><td>Voltage to check if recharging is complete</td><td colspan="2">3.9±0.1 V</td><td></td></tr>
</table>

Continue.

Power supply	Charging module	Voltage to check battery anomaly	2.6V±0.1 V	
		Dark current	4.3 µA	
		Charging time	Approx. 5 hours	At ambient temperature
	Power supply block	Output voltage	DC5V±10%	
		Output current	300 mA	
		Excess current protection	Drop type excess current protection circuit (600 mA or greater)	
	Terminal block	Connector	AXZ99002009 (by Matsushita Electric Works)	2 pcs
		Layout of terminals		
			GND -	
			Power supply terminal +	
			Not used R	
			Charging terminal C	

7.5 Electric

Table 7.3

Item	Specification	Remark
Power consumption	7.2 W	With applicable AC adaptor
Available power supply	DC 12V±5%	With EIAJ RC5320 type 4 plug
AD-S42120AE	Input rating: AC100 to 230V, 50/60 Hz	
Line noise strength	Malfunction at 700 V	Pulse width : 100 to 800 nanoseconds Frequency : 10 to 35 milliseconds (variable) Polarity : +, -
Instantaneous power line off	Malfunction after 10 milliseconds or less	
Terminal noise voltage	Conform to EN55022	
Noise radiation electric field	Conform to EN55022	

7.6 Environment

Table 7.4

Item	Specification	Remark
Temperature	Operation 0 ºC to 40 ºC	
	Storage -10 ºC to 50 ºC	
Humidity	Operation 30% to 80%RH	At 40 ºC, no condensation.
	Storage 30% to 90%RH	
Electrostatic	Malfunction at 5 KV	Conditions: Equivalent human body resistance: 100 ohm Equivalent human body capacity: 250 pF Frequency of application: 10 times Period of application: 0.3/0.3 seconds
	Destruction at 10 KV	

7.7 Impact Durability

Table 7.5

Item	Specification	Remark
Shock-proof (in height)	30 cm or less	at 6 specified faces
Local impact	1 Kg	at specified position
Overall impact	20 Kg	
Resistance to vibration	0.15 G	Conditions: in X, Y, Z directions 10 and 55 Hz 30 minutes

7.8 Reliability

Table 7.6

Item		Specification
MTBF		48,000 hours
Switch	Power switch	3,000 times
	Terminal detection switch	20,000 times
	DIP switch	50 times
Connection/removing of the respective connectors	RS-232C	500 times
	RS-422	500 times
	DC jack	500 times
Mounting and removing terminal on/from cradle	DT-930 power supply/charging terminals	20,000 times
Installing and removing battery pack in/from the compartment	Charging spring	5,000 times

Notes:

- The above MTBF figure has been calculated based on each MTBF of the electronic parts employed.
- The above figure does not apply to the AC adaptors.

7.9 Compliance

Table 7.7

Standard		Remark
Radio interference	EN55022:1994, A2:1997 Class B CISPR Pub.22:1993, A2:1996 Class B	Tested with AD-S42120AE
Electromagnetic compatibility generic immunity	EN50082-1: 1997	Tested with AD-S42120AE
Safety	EN60950	Applicable only to AD-S42120AE

7.10 Chain Connection

7.10.1 Configurations and Operating Conditions

Satellite Cradle and Host P/C (with external device connected)

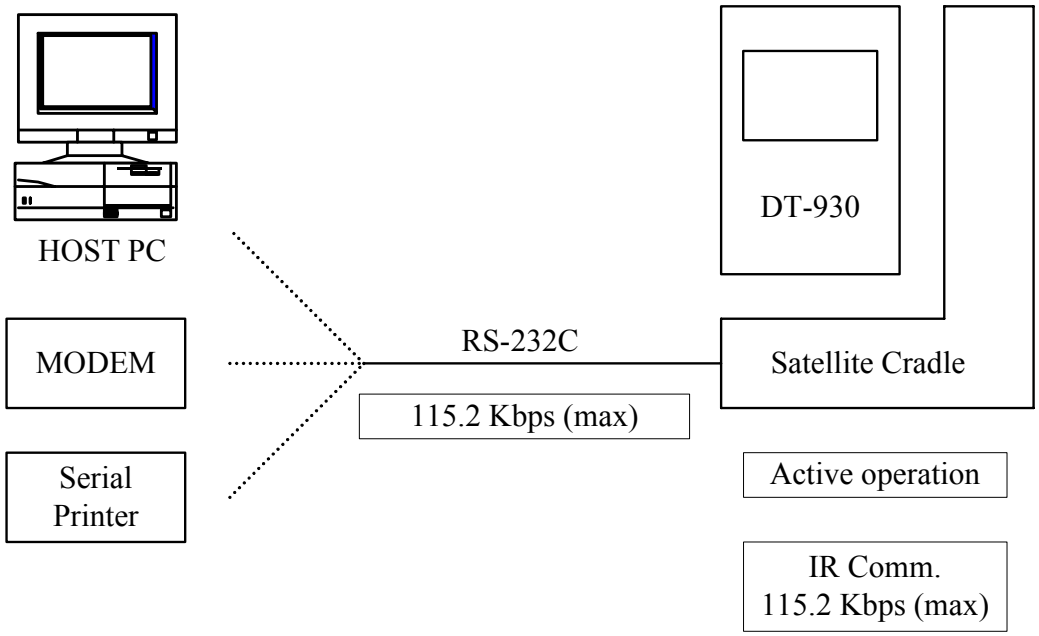


Fig. 7.2

DIP Switch Setting

Table 7.8

No.	Use of Switch		Destination	Switch	Setting	Remark
1	Baud rate switching 0	DT-930 and Cradle	To GA/to CPU PB6	IRSPEED0	ON	115.2Kbps
2	Baud rate switching 1	DT-930 and Cradle	To GA/to CPU PB7	IRSPEED1	OFF	Note 1
3	Mode switching 0		To GA/to CPU PA13	MODE0	OFF	Active operation
4	Mode switching 1		To GA/to CPU PA14	MODE1	OFF	
5	Termination switching		To GA/to CPU PA15	ENDSW	ON	
6	Baud rate switching 0	Cradle and P/C	To CPU PB0	PCSPEED0	Note 2	
7	Baud rate switching 1	Cradle and P/C	To CPU PB1	PCSPEED1		
8	Baud rate switching 2	Cradle and P/C	To CPU PB2	PCSPEED2		
9	Flow control 0		To CPU PB3	FLOWSEL 0		
10	Flow control 1		To CPU PB5	FLOWSEL 1		

Notes:

1. This baud rate must be reduced if the line quality is poor.
2. Make the appropriate DIP switch settings for the connected PC.

Satellite Cradle and Host P/C

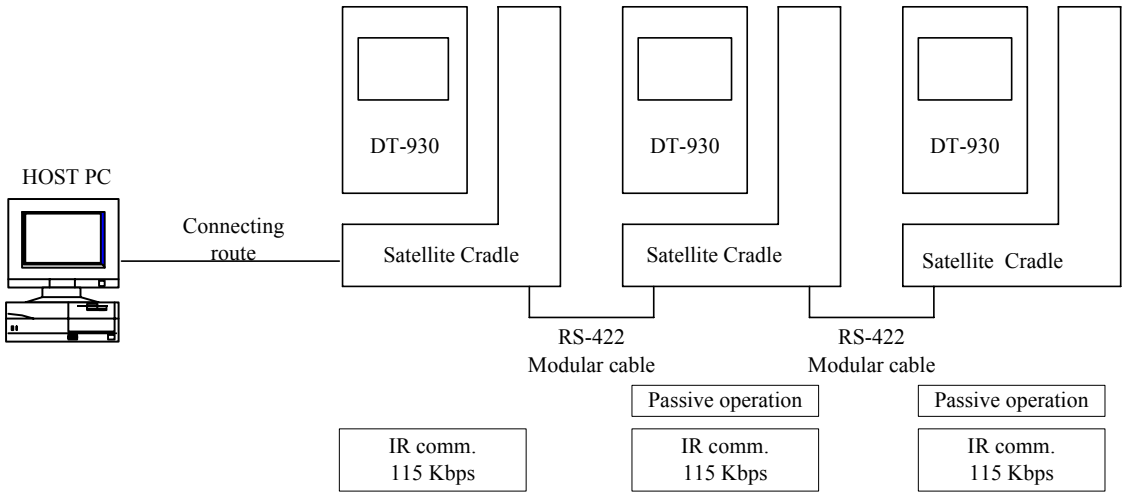


Fig. 7.3

DIP Switch Setting

Table 7.9

No.	Use of Switch		Destination	Switch	Setting		Remark
					In middle	At end	
1	Baud rate switching 0	DT-930 and Cradle	To GA/to CPU PB6	IRSPEED0	ON	ON	115.2Kbps
2	Baud rate switching 1	DT-930 and Cradle	To GA/to CPU PB7	IRSPEED1	OFF	OFF	Note 1
3	Mode switching 0		To GA/to CPU PA13	MODE0	ON	ON	Passive Operation
4	Mode switching 1		To GA/to CPU PA14	MODE1	OFF	OFF	
5	Termination switching		To GA/to CPU PA15	ENDSW	OFF	ON	
6	Baud rate switching 0	Cradle and P/C	To CPU PB0	PCSPEED 0	Do not care		Note 2
7	Baud rate switching 1	Cradle and P/C	To CPU PB1	PCSPEED 1			
8	Baud rate switching 2	Cradle and P/C	To CPU PB2	PCSPEED 2			
9	Flow control 0		To CPU PB3	FLOWSEL 0			
10	Flow control 1		To CPU PB5	FLOWSEL 1			

Notes:

1. This baud rate must be reduced if the line quality is poor.
2. This setting is invalid during passive operation.

Multiple Satellite Cradles and Host P/C

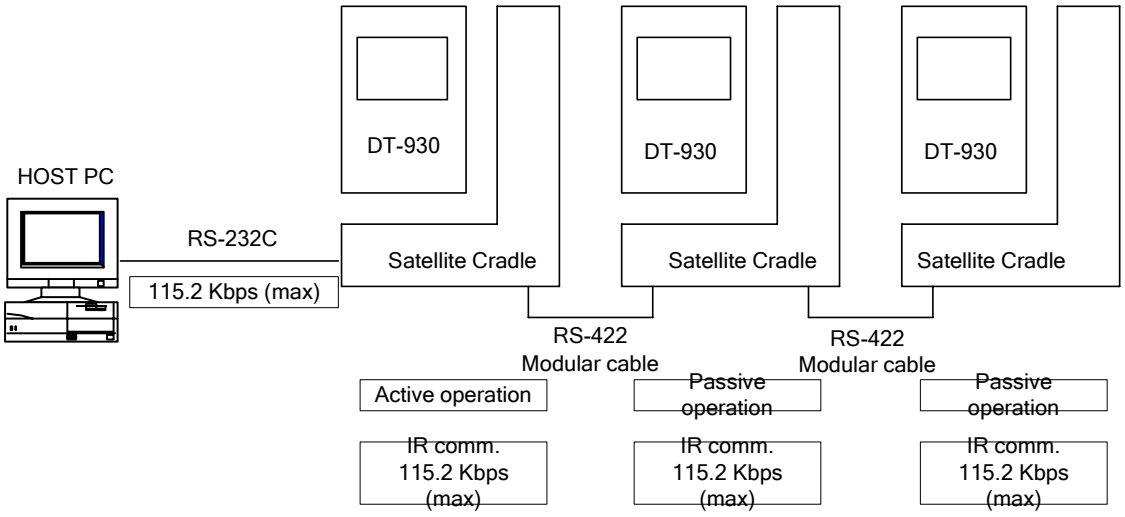


Fig. 7.4

DIP Switch Setting

Table 7.10

No.	Use of Switch		Destination	Switch	Setting			Remark
					Active	Passive		
						In middle	At end	
1	Baud rate switching 0	DT-930 and Cradle	To GA/to CPU PB6	IRSPEED0	ON	ON	ON	115.2Kbps
2	Baud rate switching 1	DT-930 and Cradle	To GA/to CPU PB7	IRSPEED1	OFF	OFF	OFF	Note 1
3	Mode switching 0		To GA/to CPU PA13	MODE0	OFF	ON	ON	
4	Mode switching 1		To GA/to CPU PA14	MODE1	ON	OFF	OFF	
5	Termination switching		To GA/to CPU PA15	ENDSW	OFF	OFF	ON	
6	Baud rate switching 0	Cradle and P/C	To CPU PB0	PCSPEED 0	Note 2	Do not care.		
7	Baud rate switching 1	Cradle and P/C	To CPU PB1	PCSPEED 1				
8	Baud rate switching 2	Cradle and P/C	To CPU PB2	PCSPEED 2				
9	Flow control 0		To CPU PB3	FLOWSEL 0				
10	Flow control 1		To CPU PB5	FLOWSEL 1				

Notes:

1. This baud rate must be reduced if the line quality is poor.
2. Make the appropriate DIP switch settings for the connected PC.

For Downloading

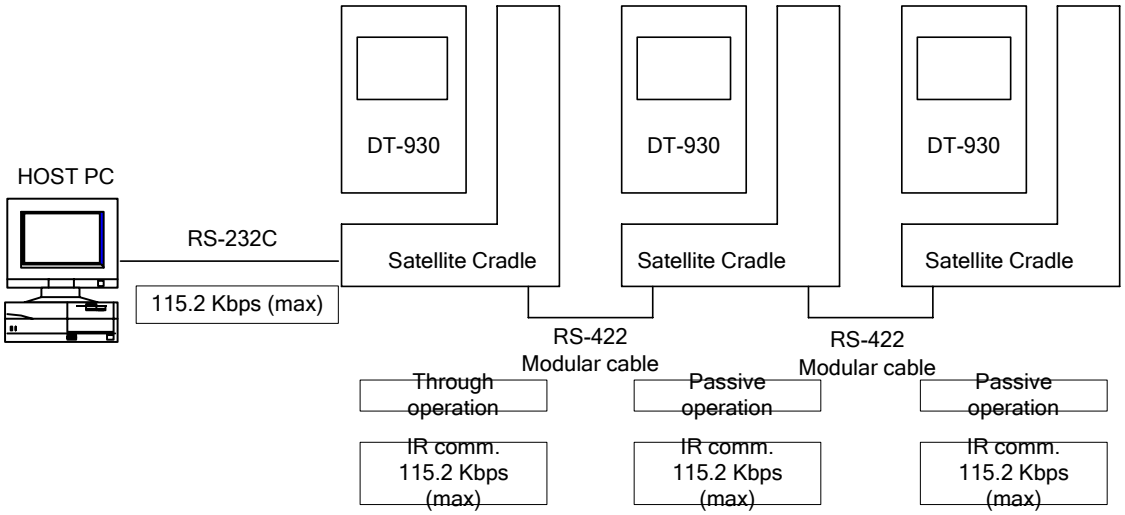


Fig. 7.5

DIP Switch Setting

Table 7.11

No.	Use of Switch		Destination	Switch	Setting			Remark
					Through	Passive		
						In middle	At end	
1	Baud rate switching 0	DT-930 and Cradle	To GA/to CPU PB6	IRSPEED0	ON	ON	ON	115.2Kbps
2	Baud rate switching 1	DT-930 and Cradle	To GA/to CPU PB7	IRSPEED1	OFF	OFF	OFF	Note 1
3	Mode switching 0		To GA/to CPU PA13	MODE0	OFF	ON	ON	
4	Mode switching 1		To GA/to CPU PA14	MODE1	ON	OFF	OFF	
5	Termination switching		To GA/to CPU PA15	ENDSW	OFF Note 4	OFF	ON	
6	Baud rate switching 0	Cradle and P/C	To CPU PB0	PCSPEED0	Note 3	Do not care. Note 2		
7	Baud rate switching 1	Cradle and P/C	To CPU PB1	PCSPEED1				
8	Baud rate switching 2	Cradle and P/C	To CPU PB2	PCSPEED2				
9	Flow control 0		To CPU PB3	FLOWSEL0				
10	Flow control 1		To CPU PB5	FLOWSEL1				

Notes:

1. This baud rate must be reduced if the line quality is poor.
2. Make the appropriate DIP switch settings for the connected PC.
3. This setting is invalid during the passive operation.
4. Set to on if only one cradle is used.

7.10.2 Cable Specifications

Cable for Short Distance (1 m or less)

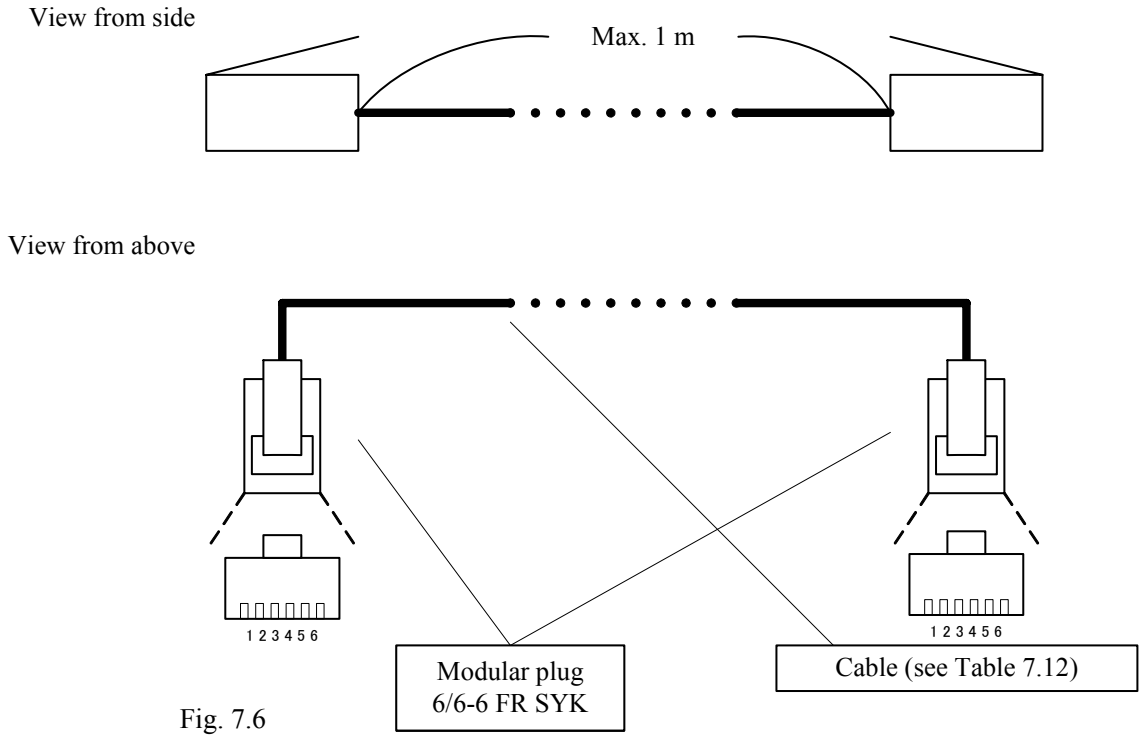


Fig. 7.6

Table 7.12

Cable		
Core wire	Conductive	20/0.1 A
	Insulation	Semi-rigid P.V.C
	Finish form	20/0.1 A
Sheath	Insulation	P.V.C
	Finish O.D.	φ4.3±0.1 mm
Characteristics	Conductive resistance	0.12 ohm/m or less
	Insulation resistance	50 Mohm or greater

Wiring of the cable (straight connection, pin-to-pin)

Cradle at downstream side

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

Cradle at upper stream side

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

Fig. 7.7

Cable for Chain Connection

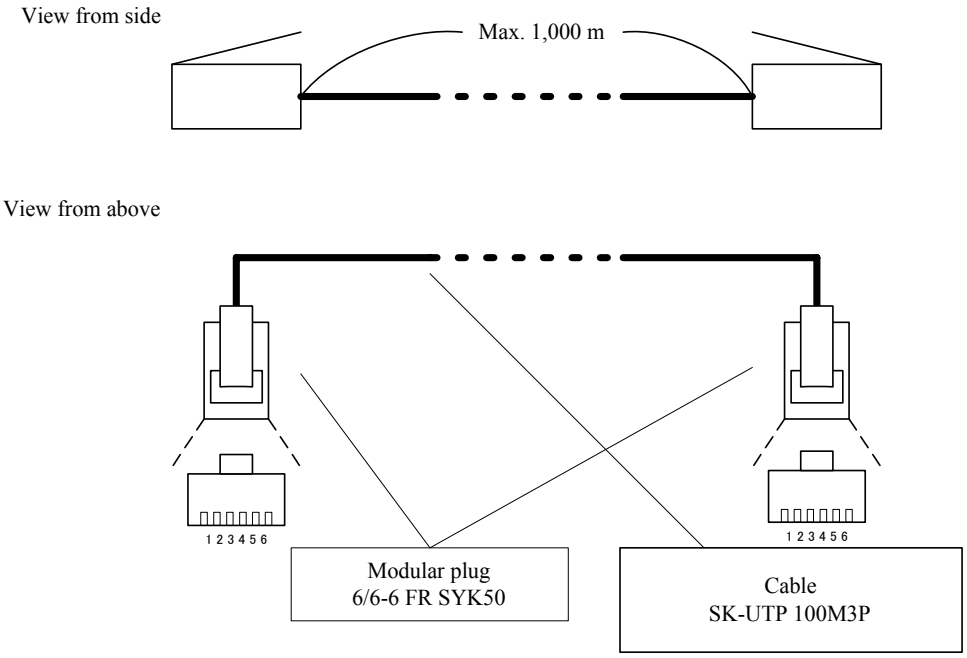


Fig. 7.8

Wiring of the cable (straight connection, pin-to-pin)

Cradle at downstream side

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

Cradle at upper stream side

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

Fig. 7.9

7.10.3 Precautions

Cable Layout

Take the following into consideration when routing the cables leading from each Cradle:

- Compression, extension, bending due to heavy load
- Attachment to a movable part
- Routing over a sharp edge
- Routing near a strong electric field
  Note:
  Improper routing of a cable may cause a cable fault or a short circuit, damaging proper communication.

Do not route cables near precision equipment (measuring equipment, etc.), a radio or television receiver, or wireless equipment. If cables are routed near such a piece of equipment, it may be subject to electrical interference.

Precaution to be observed when manufacturing cables

- If CASIO cables cannot be used, and custom-made cables are required, use the manufacturer-specified cramping tool to cramp the modular connector and cable. Note that defective cramping may damage communication.

8. HA-E60IO, HA-E60IO-CN Bridge Basic Cradle

The HA-E60IO (and HA-E60IO-CN) Bridge Basic Cradle is a cradle dedicated for DT-930. It facilitates non-contact data transfer between PC and the terminal. Also, it can supply power to the mounted terminal.

8.1 Features at a Glance

- IrDA Ver. 1.1 optical communication with DT-930. 4Mbps high speed communication by CASIO original protocol.
- Capability of supplying power to DT-930. The built-in circuit has a capability of supplying power to the mounted terminal when the dedicated AC adaptor (AD-S15050A) is connected. Note however that the battery installed in the mounted terminal is not charged.
- Capable to supply power via USB bus. The terminal mounted on the cradle can be powered via USB bus.
- Wall mount configuration possible. The wall mount unit (DT-891WH) available as option allows the cradle to be hung on a wall.

8.2 External Views

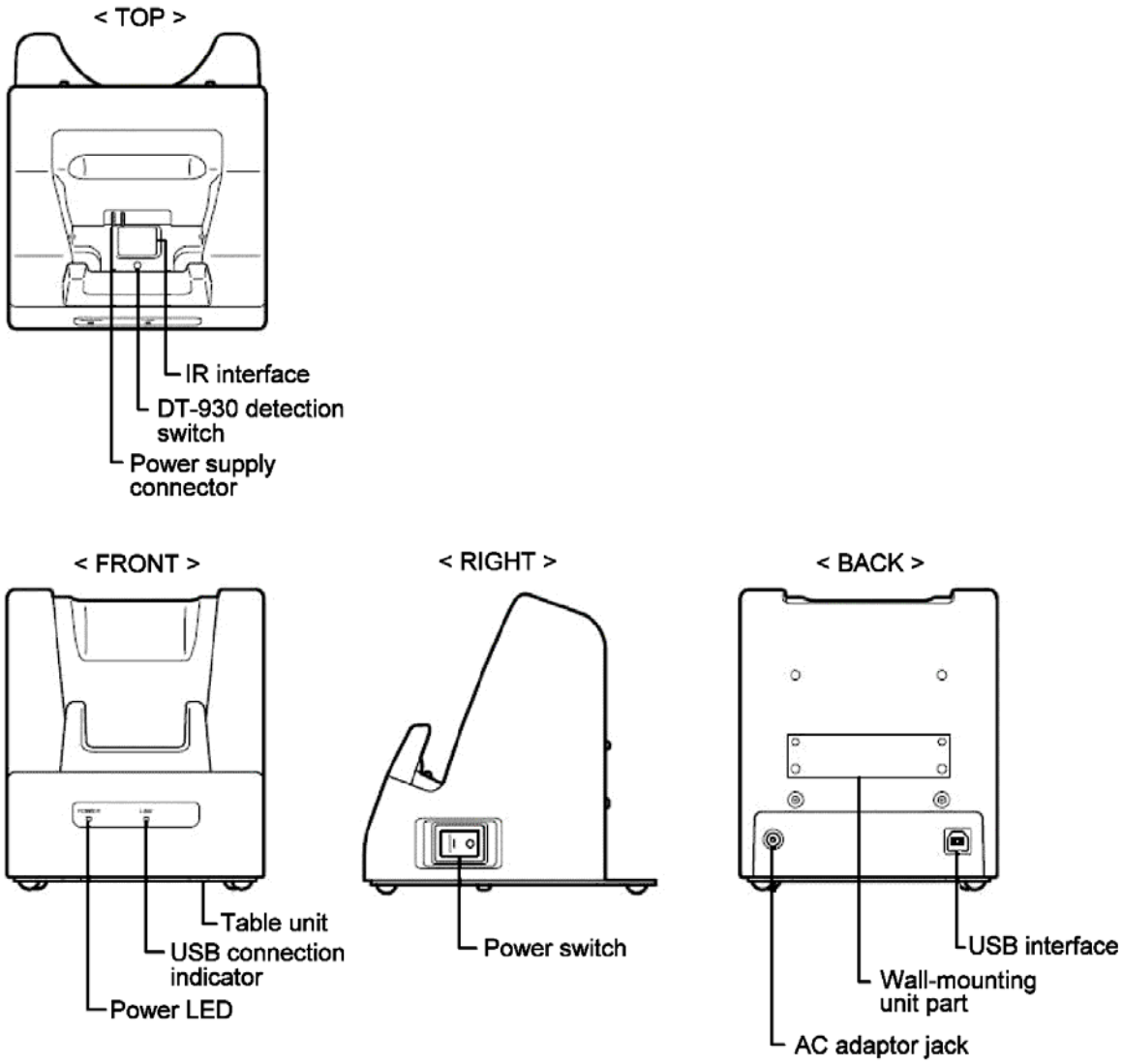


Fig. 8.1

Note:
If this page is not printed properly, change the printer graphic property from "Vector Graphic" to "Raster Graphic".

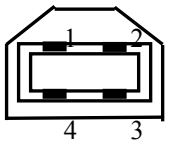
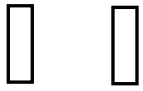
8.3 Dimensions and Weight

Table 8.1 Dimensions and weight

Item		Specification
Desktop configuration		110 (W) mm x 125 (D) mm x 128 (H) mm
Wall mount configuration		110 (W) mm x 148 (D) mm x 154 (H) mm
Weight	Desktop configuration	Approx. 510 g
	Wall mount configuration	Approx. 590 g

8.4 Hardware Specifications

Table 8.2

Block	Item		Specification		Remark
I/F	I/F to DT-930	Protocol	Original Ir Interface (IrDA device) Conforms to Version 1.1		
		Synchronization	Asynchronous, Frame synchronous		
		Method	Half duplex		
		Baud rate (bps)	4Mbps (Max.)		
	I/F to Host PC	Protocol	USB Ver. 1.1 conformity		
		Baud rate (bps)	12Mbps (MAX)		
		Connector	 USB connector B type		
			Pin no. 1	VBus	
			Pin no. 2	-Data (D-)	
			Pin no. 3	+Data (D+)	
			Pin no. 4	GND	
Power supply block	AC Adaptor Input	Input voltage	DC5V±5%		
		Applicable AC adaptor	AD-S15050A		
	Power supply	Output voltage	5 V		Only with AC Adaptor
		Output current	0.6 A		
		Connector			
	Consumption	AC Adaptor	1.0 A		Power supply and communication
		USB Bus power	0.4 A		Only communication

8.5 Electric

Table 8.3

Item		Specification	Remark
Power consumption		1.0 A	With applicable AC adaptor
Available power supply			
	AD-S15050A	DC 5V±5%	
Electrostatic		Contact : ±6 KV	Conditions: 150 pF, 330 ohm
		Non contact : ±8 KV	
Line noise strength		Malfunction at 1000V	Pulse frequency : 5KHz Burst cycle : 300 milliseconds No. of pulses : 75 Burst term : 15 milliseconds
Instantaneous power line off		Malfunction after 10 milliseconds or less	

8.6 Environment

Table 8.4

Item		Specification	Remark
Temperature	Operation	0 to 40 ºC	
	Storage	-20 to 60 ºC	
Humidity	Operation	30 to 80%RH	No condensation.
	Storage	10 to 90%RH	

8.7 Impact Durability

Table 8.5

Item	Specification	Remark
Shock-proof (height of fall)	70 cm	
Resistance to vibration	1.5 G or less	Conditions: in X, Y, Z directions 10 and 55 Hz 30 minutes, without communication

8.8 Reliability

Table 8.6

Item		Specification
MTBF		50,000 hours
Connecting and removing of the respective connectors	USB	260 times
	AC Adaptor	500 times
Mounting and removing the terminal on/from cradle		20,000 times

Notes:

- The above MTB figure has been calculated based on each MTBF of the electronic parts.
- The above figure does not apply to the AC adaptor.

8.9 Compliance

Table 8.7

Standard		Remark
EMC	EN55022:1998+A1:2000+A2:2003 Class B	
	EN55024:1998+A1:2001+A2:2003	
	EN61000-3-2:2000	
	EN61000-3-3:1995+A1:2001	

9. DT-969CHGE, DT-969CHGE-CN Cradle-type Battery Charger

The DT-969CHGE (and DT-969CHGE-CN) Cradle-type Battery Charger is a battery charger dedicated to DT-930. It has capability of charging battery pack and supplying power to the terminal, as well as charging a spare battery pack in the spare battery compartment.

9.1 Features at a Glance

- Charging battery pack and supplying power to DT-930. It has integrated charge circuit to charge the battery pack and to supply power preventing battery's power being consumed by the terminal. A period of approximately five hours is required to fully charge the battery pack.
- Charge a battery pack in the spare battery compartment. For detail about the method, refer to DT-930 series User's Guide.
- Wall mount configuration possible. The wall mount unit allows the charger to be hung on wall.

9.2 External Views

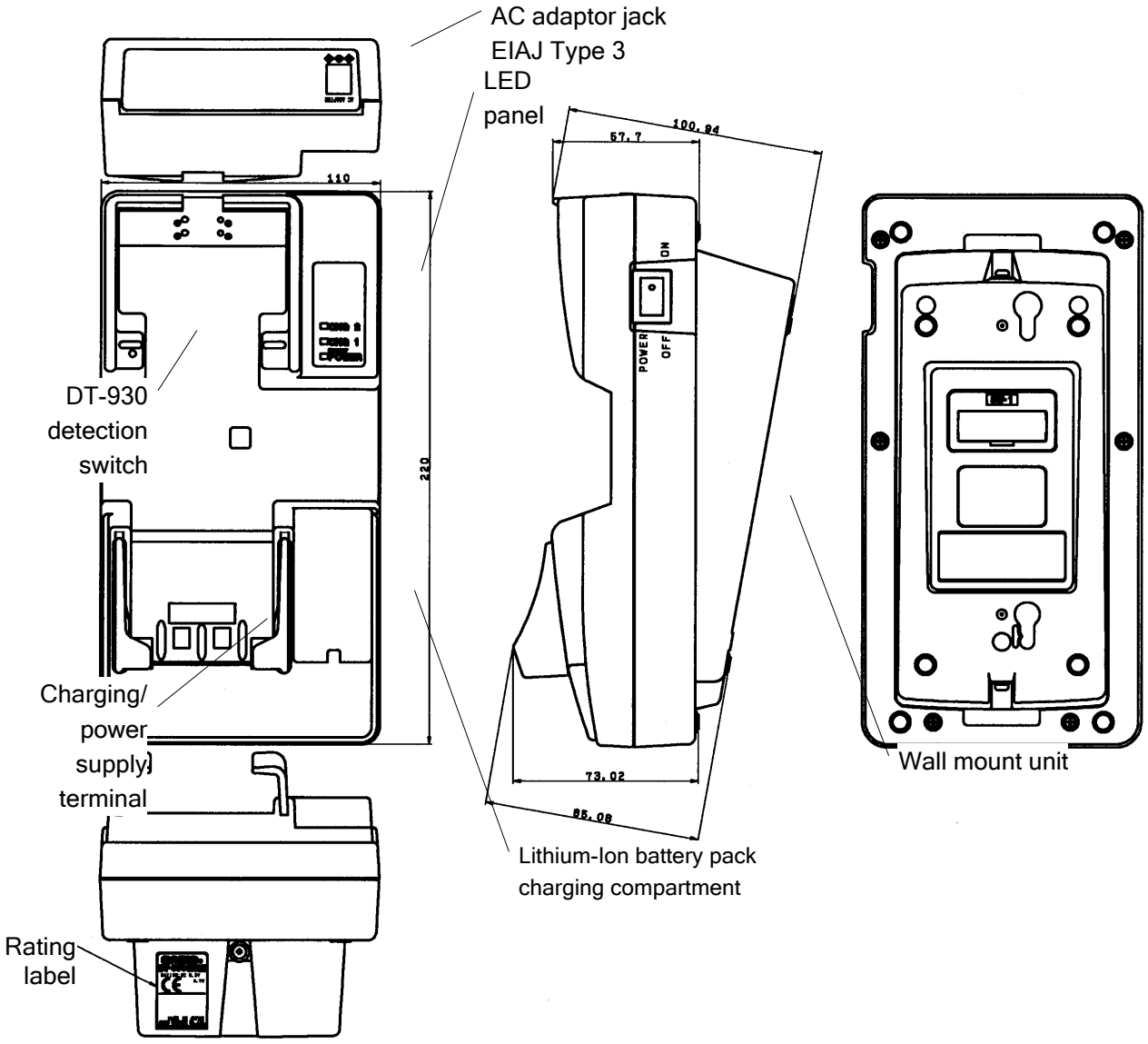


Fig. 9.1

Note:
If this page is not printed properly, change the printer graphic property from "Vector Graphic" to "Raster Graphic".

9.3 Dimensions and Weight

Table 9.1 Dimensions and weight

Item	Specification
Desktop configuration	110 (W) mm x 220 (D) mm x 100 (H) mm
Wall mount configuration	110 (W) mm x 220 (D) mm x 110 (H) mm
Weight	Approx. 390 g (see notes)

Notes:

- If the hook and cover for wall mounting are used, the product weight is increased by approximately 10 g.
- If the nose guide for straight opening is used, the product weight is increased by approximately 5 g.

9.4 Circuit Block Diagram

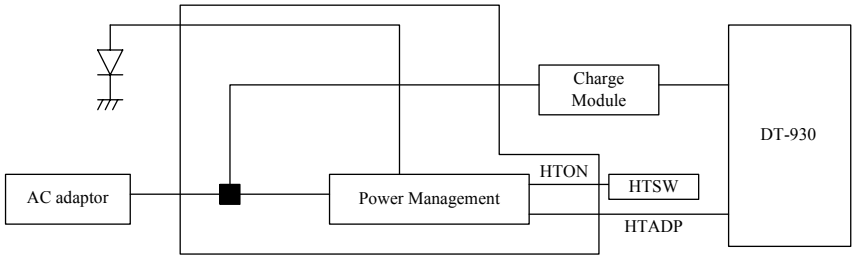
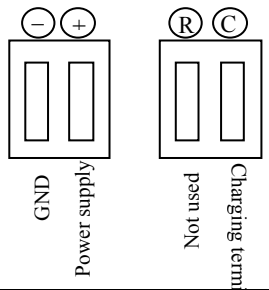


Fig. 9.2

9.5 Hardware Specifications

Table 9.3

Item				Specification		Remark
Switch block	Power switch			Seesaw switch		
	Terminal detection switch			Push switch		
Indicators block	READY/POWER	When terminal is not mounted			Red	2-color LED Power LED
		When terminal is mounted			Green	
	CHG1	While charging			Red	2-color LED CHG1 LED
		When charging is complete.			Green	
		Charging ends abnormally			Off	
	CHG2	While charging			Red	2-color LED (while charging the battery in DT-930) CHG2 LED
		Wait for charging			Red	
		When charging is complete.			Green	
		Charging ends abnormally			Off	
Power block	Input voltage			DC9.5V±5%		
	Power consumption current			600 mA (max.) (25 mA when not charging)		When charging the battery in DT-930
	Applicable plug			EIAJ RC5320 type 3		Center pin : +
	Applicable AC adaptors			DT-9020ADP-G		Input; AC230V
				DT-9020ADP-U		Input; AC120V
	Charge module	Specification		BC-9801C		
		Input voltage		6.5 to 15 V		
		Power consumption		5 VA or less		
		Battery pack		DT-923LIB		
				Rated voltage 3.6 V		
				Rated capacity 540 mAH		
		Charge spec.		Output voltage 4.1V±50 mV		
		Output current		When charging 300±30mA		3.0V < battery voltage ≤ 4.1V
				When charging 30±12 mA		2.6V < battery voltage ≤ 3.0V
				When checking 300±30 mA		
		Charge complete detection current		30±12 mA		
		Charge detection voltage		3.9V±0.1V		
	Abnormal battery detection			2.6V±0.1V		
	Dark current			4.3µA		
	Charge period			5 hours		At ambient temperature
	Power supply block	Output voltage		5V±10%		
		Output current		300 mA		
		Excess current protection		Drop-type excess current protection circuit (600 mA or more)		
	Terminal block	Connector		AXZ99002009		2 pcs
		Terminal layout				
				GND	-	
				Power supply	+	
				Not used	R	
				Charging terminal	C	

9.6 Electric

Table 9.4

Item		Specification		Remark
Power consumption		5.7 W		With applicable AC adaptor
Available power supply		DC 9.5V±5%		With EIAJ RC5320 type 3 plug
	DT-9020ADP-G	Input: AC 220 to 240V, 50/60 Hz		Input conditions: Voltage: ±10% of rated input voltage Frequency: ±1 Hz of rated input frequency
	DT-9020ADP-U	Input: AC 100 to 120V, 50/60 Hz		
Line noise strength		Malfunction at 700 V		Pulse width : 100 to 800 nanoseconds Frequency : 10 to 35 milliseconds (variable) Polarity : +, -
Instantaneous blackout		Malfunction after 10 msec. or less		
Insulation voltage		DT-9020ADP-U	AC1000V for 1 min.	
		DT-9020ADP-G	AC1500V for 1 min.	
Insulation resistance		DT-9020ADP-U	50Mohm at DC500V	
		DT-9020ADP-G	50Mohm at DC500V	
Leak current		DT-9020ADP-U	3.5mA or less	
		DT-9020ADP-G	1mA or less	
Terminal noise voltage		Conform to EN55022		Tested with AC adaptor DT-9020ADP-G
Noise radiation electric field		Conform to EN55022		Tested with AC adaptor DT-9020ADP-G

9.7 Environment

Table 9.5

Item	Specification		Remark
Temperature	Operation	0 to 40 ºC	
	Storage	-10 to 50 ºC	
Humidity	Operation	30 to 80%RH	At 40 ºC, no condensation.
	Storage	30 to 90%RH	
Electrostatic	Malfunction at 5 KV		Conditions: Equivalent human body resistance: 100ohm Equivalent human body capacity: 250 pF Frequency of application: 10 times Period of application: 0.3/0.3 seconds
	Destruction at 10 KV		

9.8 Impact Durability

Table 9.6

Item	Specification	Remark
Shock-proof (height of fall)	30 cm or less	At 6 specified faces
Local impact	1 Kg	At specified positions
Overall impact	20 Kg	
Resistance to vibration	0.15 G	Conditions: In X, Y, Z directions 10 and 55 Hz 30 minutes

9.9 Reliability

Table 9.7

Item		Specification
MTBF		70,000 hours
Switch	Power switch	3,000 times
	Terminal detection switch	20,000 times
Connecting/disconnecting AC adaptor	DC jack	500 times
Mounting and removing the terminal on/from cradle	DT-930 power supply/charging terminals	20,000 times
Installing and removing the battery pack in/from the compartment		5,000 times

Notes:

- The above MTBF figure has been calculated based on each MTBF of the electronic parts employed.
- The above figure does not apply to the AC adaptors.

9.10 Compliance

Table 9.8

Standard		Remark
Radio interference	EN55022:1994, A2:1997 Class B CISPR Pub.22:1993, A2:1996 Class B	Tested with DT-9020ADP-G.
Electromagnetic compatibility generic immunity	EN50082-1: 1997	Tested with DT-9020ADP-G.
Safety	EN60950	Applicable only to DT-9020ADP-G and DT-9020ADP-U

10. Product Identification and Reference Numbers

On the back of the DT-930 and the dedicated option, there is a bar code and numbers printed on label as shown in Fig. 10.1. This bar code is represented by 15 digits of Code128 symbology and by alphanumeric characters beneath the bar code. The numbers from 1 to 9 in the figure represent identification and references of each terminal. The numbers from 10 to 15 represent a manufacturing reference which is reserved by the manufacturer. See the figure below for each meaning.

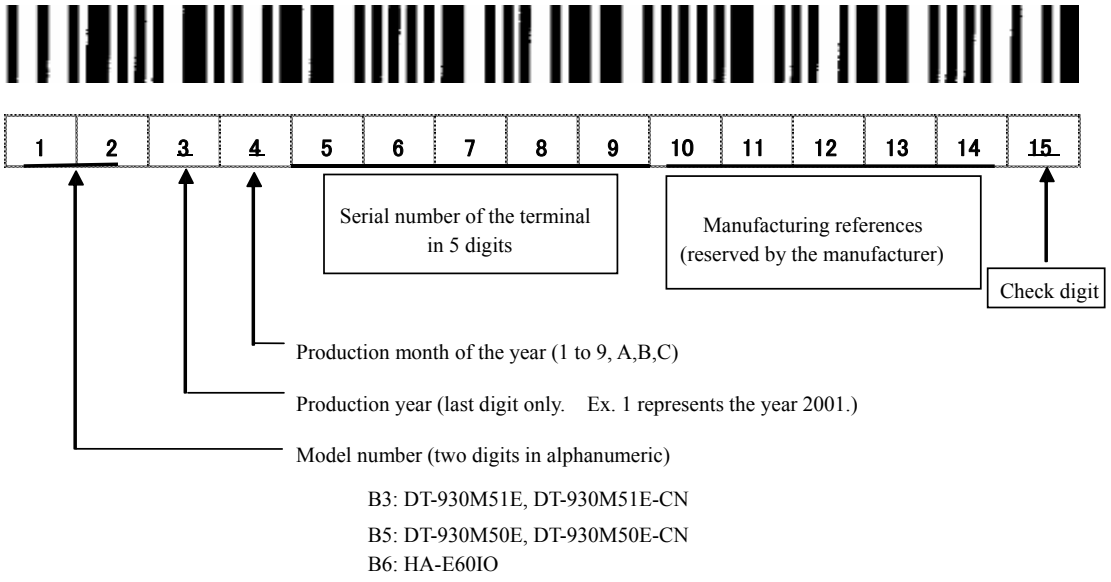


Fig. 10.1