User's Manual

Laser Terminal PHL 1700
Cradle IRU 1600

CAUTION: This user's manual may be revised or withdrawn at any time without prior notice.

Limited warranty and disclaimers
By opening the package of this product you agree to become bound by the liability and warranty conditions as described below.

Under all circumstances this manual should be read attentively, before installing and or using the product. In no event, Opticon Sensors Europe will be liable for any direct, indirect, consequential or incidental damages arising out of use or inability to use both the hardware and software, even if Opticon has been informed about the possibility of such damages.

A serial number appears on all Opticon products. This official registration number is strictly related to the device purchased. Make sure that the serial number appearing on your Opticon device has not been removed. Servicing by our Repair Department can only be carried out under warranty.

All Opticon products are warranted for a period of one year after purchase, covering defects in material and workmanship. Opticon will repair or, at its opinion, replace products that prove to be defective in material or workmanship under proper use during the warranty period.

Opticon will not be liable in case modifications are made by the customer. In such case the standard repair charge will be applicable. The standard charge for repair will also be applicable in case no defect is found at all. These rules also apply for products that are still under warranty. Therefore, you are advised to have the product specifications always at hand.

Trademarks used are property of their respective owners

CONTENTS

The general use and functioning of the terminal together with the cradle will be described in this manual.
The exact behavior of the terminal depends on the user application that is running. For instructions about applications please consult the documentation of that software.

Please read this manual carefully before using the terminal, to maximise the efficiency of this terminal.

1 INTRODUCTION

This terminal is a compact, programmable handheld terminal, and is well suited for a variety of indoor portable applications. It has a built-in laser scanner that can scan all popular bar code labels at varying distances.

User's applications can be downloaded to the terminal to adapt the terminal to the user's situation.

Operating power is supplied by the main battery. The main battery may consist of a rechargeable Ni-MH battery pack (to be charged in cradle), or dry cell batteries, either non-rechargeable or rechargeable (to be charged in an external charger).

The cradle can be equipped with a transceiver function only, for terminals with dry cell batteries, this will be sufficient. The cradle can also be equipped with both transceiver and charger. The charger is needed for terminals with a rechargable battery pack.

The IrDA interface on the terminal enables you to communicate with other devices that use IrDA communication, like portable computers, notebooks and organisers.

Additionally a RS232 cable can be used.
The RS232 cable can be used for direct communication between the (host) computer system and the terminal, for example to download software to the terminal.

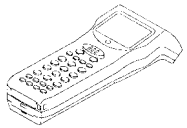
2 INSTALLATION

2.1 UNPACKING

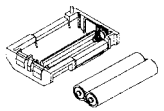
When you remove the packing, please check for any physical damage. We recommend that you save all packing material, as it should be used whenever you need to ship your terminal (eg. for service). Damage due to improper repacking is not covered by the warranty.

Apart from the terminal or cradle, additional items might be ordered and supplied.
If there are any missing parts please contact your supplier.

PHL1700: Terminal



Terminal,
can be delivered as:
- ☐ model with dry cell batteries
- ☐ model with rechargeable battery pack



Battery case,
depending on the model,
there are 2 options:

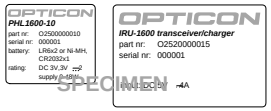
- ☐ Battery case with 2x AA-size dry cell penlite batteries

- ☐ NiMH rechargeable battery pack (1 x)

Backup battery

Hand strap

Do not remove the label !
On the back of every unit you will find a label. The label is attached by the manufacturer and includes information about the function it supports and a serial number.
Do not remove it.

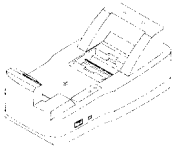


Additional items
only supplied if ordered

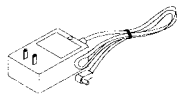
- ☐ RS232 download cable for terminal
- ☐ Modem cable for terminal
- ☐ Protective bag for terminal

- ☐ RS232 cable for cradle
- ☐ RS485 cable for cradle
- ☐ Modem cable for cradle

IRU1600: Cradle

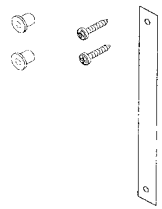


Cradle body:
can be delivered as:
- ☐ transceiver
- ☐ transceiver/charger



AC adaptor
depending on the model:
- ☐ 9V DC adaptor for transceiver
- ☐ 5V DC adaptor for transceiver/charger

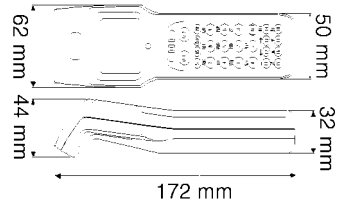
Wall mount panel + screws



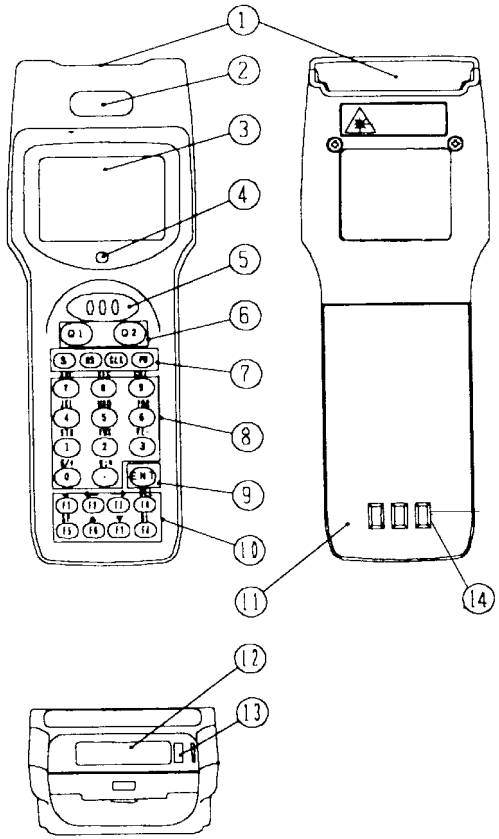
Walll mount spacer + screws + base plate

2.2 DETAILED VIEW

2.2.1 Dimensions of terminal



2.2.1 Details of terminal:



1. **Reading window**
   laser beam for barcode reading will be emitted from here
2. **Optical interface window**
   for infra red communication
3. **LCD Display**
   for displaying information
4. **LED indicator**
   can be used to indicate results, for example bar code reading /status of communication
5. **Trigger key** [definable by user's application]
   typical use: read key, switches laser beam on for barcode reading
6. **Quick keys** [definable by user's application]
   typical use: menu scroll keys or yes/no input
7. **Power key** [right key, NOT definable]
   for switching power On/Off
   Control keys [definable by user's application]
   for controlling basic functions
   typical use as below
   CLR : Cancel input
   BS : Back space
   S : Shift key
   "S"on the LCD display indicates the terminal is in the shift mode
8. **Character keys** [definable by user's application]
   typical use: for input of alpha-numeric and punctuation characters
9. **ENT key** [definable by user's application]
   typical use: for confirming input
10. **Function keys** [definable by user's application]
    user programmable keys, to be used together with shift key.
    typical use as shown on next page
11. **Battery case cover**
    for housing main battery
12. **RS-232C connector**
    for connecting external device, or for system expansion, through Opticon RS232 cable
13. **Hand strap pillar**
    for attaching hand strap.
14. **Charging contacts**
    only for the model with rechargeable battery pack.

Description of the function keys

In the shift mode, back light on/off, contrast adjustment, and cursor movement can be done by these keys.
The user's application can give different definitions to the keys

shift mode functions:	
F1 (-)	input minus sign
F2 (DEL)	delete one character
F3 (SP)	input space
F4 (BL)	toggle with back light
F5 (<--), F6 (-->)	move cursor
F7 (▲), F8 (▼)	adjust contrast

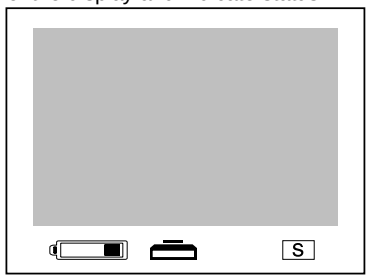
2.2.3 Display of terminal

The liquid crystal display of the terminal is typically used to show program prompts, instructions and data, as defined in the user's application.

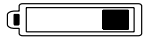
The display has the following default options:

Special purpose symbols in display:

The symbols will be shown in the bottom part of the display and indicate status.



Description of the display indicators

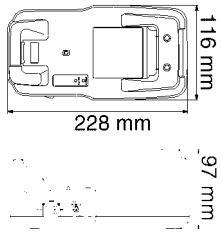
 *Main Battery indicator*
Off: Sufficient battery power
On: Battery low.
Replace battery immediately.

 *Backup Battery indicator*
Off: Sufficient battery power
On: Battery low.
Replace battery immediately.

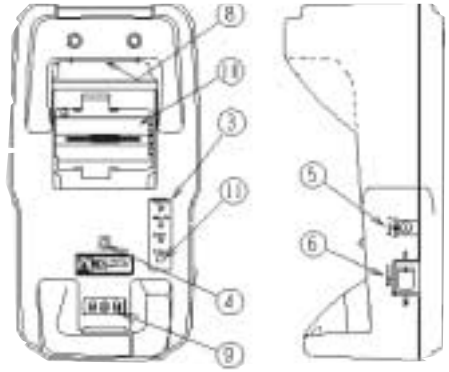
S *Alpha mode on*
(Shift-key activated)

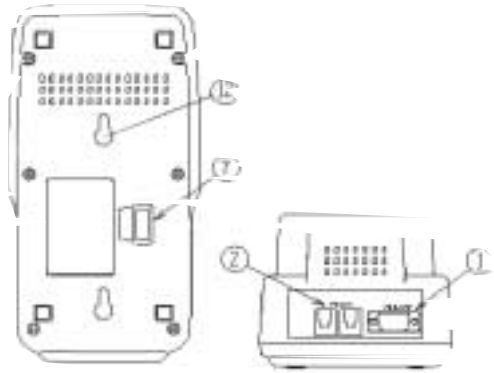
Backlight
The display is provided with a backlight. When the backlight is turned on, the power consumption increases. To extend the life time of your batteries use the backlight as little as possible.

2.2.4 Dimensions of the cradle



2.2.5 Details of cradle





1. **RS 232 C socket**
   for connecting to PC or modem, through Opticon RS232 cable

2. **RS 485 socket**
   for connecting another cradle in multi-drop RS485 network, through Opticon RS485 cable

3. **LED indicator**
   indicating status of:
   POWER red : power on
   green: terminal is on cradle
   SD/RD red : receive data
   green: send data
   BATT red : charging battery
   green: charging is ready
   BATT status is only for the model transceiver/charger

4. **Switch for terminal detection**
   to detect if a terminal is placed on the cradle

5. **DC input socket**
   input for AC adaptor

6. **Power switch**

7. **DIP switches**
   setting parameters of the infra red interface switches are located behind the cover

8. **Data Transmission**
   Interface for optical data transmission

9. **Contact for recharging**
   only for the model transceiver/charger

10. **Battery holder for recharging**
    quick charge NiMH pack
    only for the model transceiver/charger

11. **Refresh switch**
    refresh-discharge NiMH pack
    only for the model transceiver/charger

12. **Wall mounting holes**

2.3 HANDLING PRECAUTIONS

To avoid malfunctioning and to ensure years of trouble free operation, pay attention to the following:

General use

Do not use or leave the product in extremely hot areas - like direct sunlight, near a heater, or in a car - or in areas that are very cold, humid, moistured or dusty.

Do not expose the product to rain or water splash

Do not subject the the product to very strong impact, do not throw or drop the terminal from large heights.

Do not allow a mechanical shock to the product.

General cleaning instructions

Clean the exterior by wiping it with a soft, dry cloth. Do not use much water.

Do not use thinner, white spirit or other solvents. These can discolour the case and the keys and has a negative effect on the lifetime of the keys.

Use of the cradle
Do not place any other product than the PHL-type terminal in the cradle.

Cleaning of the cradle
Avoid touching the contacts in the cradle. The contacts must stay as clean as possible to maintain optimal charging capacity.
Do not use water when cleaning the cradle. This can cause malfunction in the chargers.

Use of the terminal

Operate the terminal keys by pressing them lightly with your fingertips or with something soft and round.
Pressing the keys with a sharp pointed object (for eg. a ball-point) can damage the keys.

Avoid temperature changes. Sudden temperature changes can cause condensation to form on the terminal. Using the terminal while condensation is present can cause malfunction. Always wait until the condensation clears naturally before attempting operation.

Do not leave the terminal in an area where static charge is accumulated, or near devices where electromagnetic emission is generated.

Do not place any objects on top of the terminal. Do not lay the terminal face down.
Doing so can cause accidental operation of the [PW] key or [ENTER] key, which can discharge your batteries or change settings you do not want to be changed.

Cleaning of the terminal
Clean the optical interface window periodically.

Maintenance

There are no user-serviceable parts inside the terminal or the cradle. So do not try to take it apart.
The manufacturer will not be liable for any damage caused by the customer.
In case of malfunction that can not be solved by the trouble-shooting instruction in the appendix, please consult our service department.

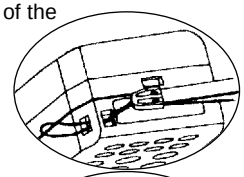
2.4 ASSEMBLY

Follow the next steps to make your terminal ready for installation in a system, that is described further in the manual.

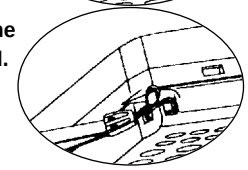
2.4.1. Terminal

To avoid drop use the hand strap.

- ☐ Fix the small cord of the strap around the pillar.
- ☐ Insert the handle in the thin loop.



⚠ **Do not swing the terminal around.**



Start with a full battery

- ☐ To be sure you start with a full battery, charge the battery pack according to the instructions in the next chapter.
- ☐ Click the battery pack into the terminal, as instructed in the next chapter.

2.4.2 Cradle

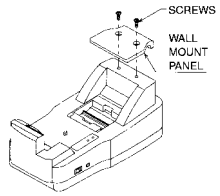
Place for mounting.

- ☐ **Place the cradle in normal office conditions.**
- ☐ **Avoid a place under strong light.** Otherwise IrDa communication may be disturbed.

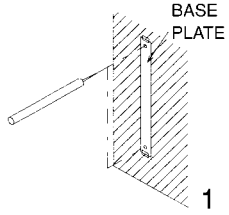
Wall mount panel
When the cradle is mounted on the wall, the wall mount panel will keep the terminal on its position. As a second function the panel will protect the IrDa window from both terminal and cradle from direct sunlight.

Wall mounting instructions

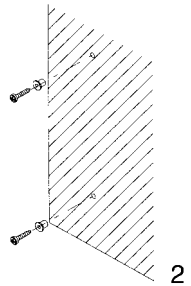
- ☐ First mount the wall mount panel on the cradle.

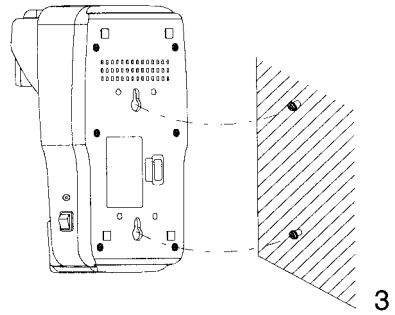


- ☐ Locate the place for mounting and attach the base plate by tape.
- ☐ Mark the position of the holes of the base plate. (ref. 1)



- ☐ Remove the base plate.
- ☐ Screw in the screws with spacers on the marked positions. (ref. 2)
- ☐ Align the body with its mounting holes to the spacers. (ref. 3)
- ☐ Slide down the body and fix it on the wall.





For power connection see next page.

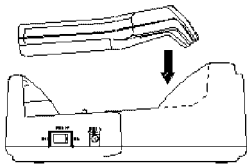
Power Connection

⚠ **Make sure that you use the right power supply.**
- ⚠ Use for the cradle with transceiver: 9V DC adaptor
- ⚠ Use for the cradle with transceiver/charger: 5V DC adaptor

- Attach the DC Jacket onto the body. Then connect the AC adapter to the outlet
- Power on the unit by the power switch
- Power indicator turns on, indicated by a red LED.
- When a terminal is placed, the LED turns into green

2.4.3. Terminal on cradle

Place the terminal on the cradle as shown in the illustration:



⚠ **Do not place any other product than the PHL-1700 terminal in the IRU-1600 cradle.**

2.5 INSTALLING, REPLACING AND CHARGING BATTERIES

Wrong use of batteries might cause serious damage to the terminal or to the cradle.

In order to avoid damage it is very important to take notice of the instructions.

⚠ **Follow the instructions for installing, changing and removing the batteries very strictly.**
The products are not warranted for damage, defects, malfunction or loss of data, resulting from incorrect use of batteries.

⚠ **Only use recommended batteries.**
When other batteries are used, defects or other problems can occur. Before installing (new) batteries, please make sure you are using the recommended batteries.

⚠ **Do not make a mistake regarding the polarity (+ , -) of the battery.**
The terminal will not work when the polarity is incorrect.

⚠ **Never remove the main battery pack while the terminal is turned on.**
Doing so can cause data in the terminal to be deleted.

⚠ **Insert full batteries before use of the terminal.**

⚠ **When you do not use the terminal for a long time, make sure the main battery has enough capacity.**
When there is not enough capacity the backup battery will be used up.

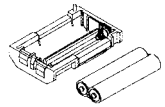
2.5.1 Required batteries

The terminal needs both main battery and backup battery for operation.

Main Battery
The main battery can consist of:

- Rechargeable Opticon battery pack (NiMH), to be recharged when placing the terminal PHL2700 in the cradle IRU2700.

- Dry cel Opticon batteries (Alkaline). To be used together with Opticon battery case for dry cell batteries. These batteries are not rechargeable.



- Other batteries. All batteries have to be used together with Opticon battery case for dry cell batteries. Batteries that are not supplied by Opticon must be AA-size and absolutely leakproof. If rechargeable batteries are used, they need to be recharged by a separate battery charging device.

Opticon recommends to use Opticon batteries (Opticon rechargeable battery pack or Opticon dry cell batteries) only.

Backup Battery
Use only one type of battery for backup:

- Backup battery: CR2032 Li (Lithium, button type).

2.5.2 When to replace or recharge the main battery?

There are 2 reasons for replacing (or charging) the main battery;

- as soon as possible after the battery indicator appears on the display.
- when you are not using the terminal for an extended period.

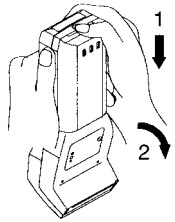
For instructions of (re)placing the main battery see paragraph 2.5.4 and 2.5.5.
For instructions for charging the rechargeable battery pack see paragraph 2.5.6.

2.5.3 When to replace the backup battery?

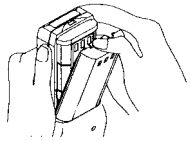
When low battery mark appears, replace the battery without delay.

For instructions of (re)placing the backup battery see paragraph 2.5.7.

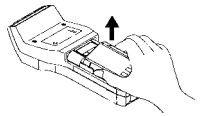
2.5.4 How to remove the main battery?



- Remove the battery case cover. Press the shaped part with some force, and pull it up.



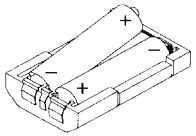
- Remove the entire battery case cover.



- To take the battery case out, pull one side.

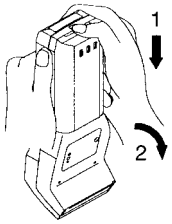
2.5.5 How to install the main battery

Before installing a battery case with penlite batteries:

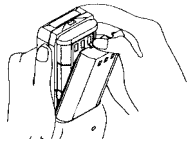


- Make sure you use the right battery size.
- Place 2 batteries in the battery holder aligning plus (+) and minus (-) ends as shown on the battery holder.

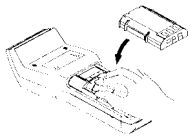
The instructions for installing the battery pack are also applicable for the battery holder with penlite batteries.



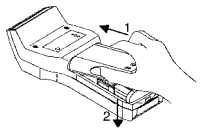
- Remove the battery case cover. Press the ⊏⊐ shaped part with some force, and pull it up.



- Remove the entire battery case cover.



- Make sure that the direction of the battery case is correct and put the battery case in.



- Fit battery case cover.

2.5.6 How to recharge the rechargeable battery pack in the cradle?

⚠ This is only possible for the terminal with rechargeable battery pack in a cradle with tranceiver/charger function.

There are 2 ways for recharging the rechargeable battery pack:

- By removing the battery pack out of the terminal and putting it in the battery holder of the cradle, i.e. charging separate battery pack in cradle's battery holder. Recharge time will be approx.1 hour.
- By placing the whole terminal (with battery pack in it) on the cradle, i.e. charging battery pack inside terminal. Recharge time will be approx.4 hours.

Charging separate battery pack in cradle's battery holder (transceiver/charger model)

Quick charge

- Place the rechargeable battery pack in the battery holder on the cradle.
- After checking the battery status (indicated by blinking green LED), the recharging starts (indicated by by a solid blinking red LED).
- After approx. 1 hour the charging is completed. (indicated by a solid blinking green LED)

Refresh discharge

A rechargeable battery has an so called 'memory effect', which deteriorates full charging when recharging is executed before the battery capacity becomes empty. When the memory effect is recognised, activate the refresh discharge. Use this feature sparingly, when too often used, it may damage the battery.

- Place the rechargeable battery pack in the battery holder on the cradle.
- Press the refresh switch and discharging starts (indicated by an orange LED)
- The discharge completes in approx. 4 hours, and the quick charge follows immediately.

Charging battery pack inside terminal (transceiver/charger model)

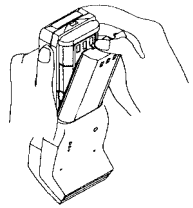
- Place the terminal in the cradle.
- The battery will be charged during approx. 4 hours.

The application in the terminal determines the indication of the charging procedure as (if applicable) shown to the user.

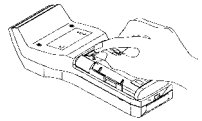
2.5.7 How to (re)place the backup battery in the terminal?

Make sure that the main battery is full enough while changing the backup battery.

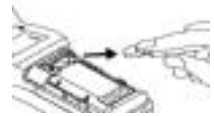
⚠ Only use CR2032 Li (Lithium, button type) battery.



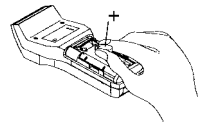
- Remove the battery case cover. Press the ⊏⊐ shaped part with some force, and pull it up.
- Remove the entire battery case cover.



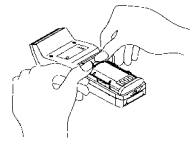
- Open the lid of the holder for the backup battery.



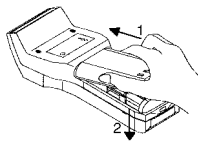
- If applicable: Remove old battery, using a pointed object for easy removal.



- Make sure that the positive side of the (new) backup battery is pointed upwards.



- Place the backup battery.
- Close the holder



- Close the battery case cover.

2.6 INSTALLING IN A SYSTEM

⚠ Exercise caution at all times when working with AC-powered equipment.

⚠ Turn off your devices before installation.

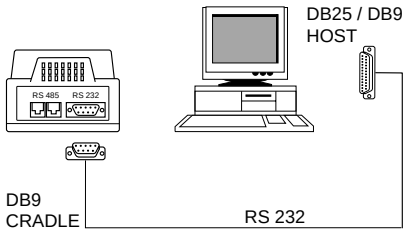
⚠ Because of the special pin-out of the connectors, use the cables supplied by the manufacturer.

⚠ When you need another cable for a certain device, that is not supplied, contact your supplier to purchase the right cable. In case another cable is used, take notice of the pin-out specifications further in this manual.

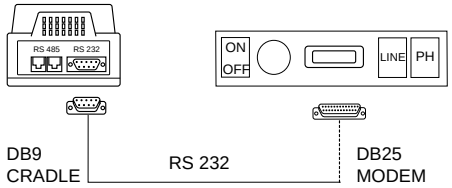
Connection sequence
for single cradle:

- Place the cradle in normal office conditions, avoid a place under strong light.
- Disconnect the power supply.
- Connect the interface cables.
- Connect the power supply.
- Place the terminal in the cradle.

2.6.1 Connect cradle to computer



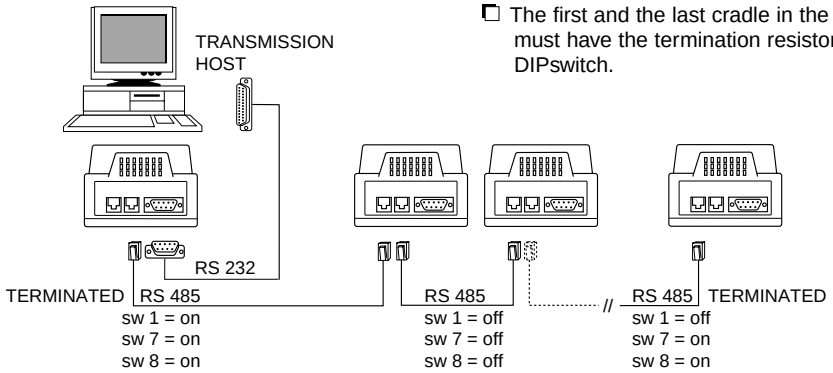
2.6.2 Connect cradle to modem



2.6.3 Connect network of cradles

Connection sequence
for cradle in network:

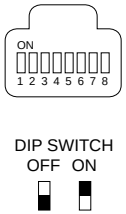
- Only 1 cradle in the network will be connected to the PC through one RS232 cable. On this cradle the DIPswitch for RS232 connection must be enabled. Through this connection all cradles can communicate to the PC.
- A maximum of 16 cradles can be connected in a network through RS485 cables. For the cradles that are not directly connected to the PC the DIPswitch for RS232 connection must be set to off.
- The first and the last cradle in the network must have the termination resistors set by DIPswitch.



2.6.4 Dip switch settings on cradle

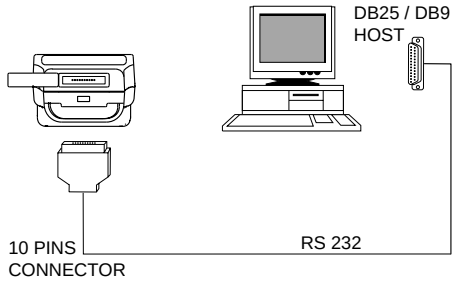
Setting the DIP switches on or off will result in enabled or disabled functions of the cradle.

- Open the cover of the DIP switches on the bottom of the cradle in order to reach the DIP switches.
- Turn the DIP switch ON by moving it up.
- Turn the DIP switch OFF by moving it down.

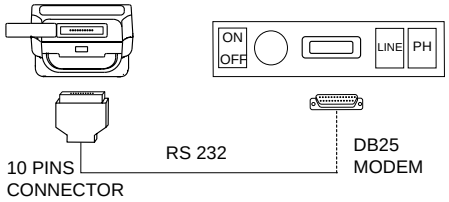


DIP SWITCH	FUNCTIONS	ON	OFF
SW 1	RS 232 ON for connection	in use	not in use
SW 2	SPARE	--	--
SW 3	SPARE	--	--
SW 4	SPARE	--	--
SW 5	SPARE	--	--
SW 6	SPARE	--	--
SW 7	RS485 TERMINATOR	in use	not in use
SW 8	RS485 TERMINATOR	in use	not in use

2.6.5 Connect terminal to computer



2.6.6 Connect terminal to modem



3 OPERATION OF THE TERMINAL

The functionality of the terminal is determined by software, the so-called user application, that is running on the terminal.

Usually, the terminal is not equipped with software and has no functionality. At first the user application must be loaded before the terminal can be used for barcode scanning.

Tools for developing a user application on the PC for use on the terminal, as supplied by Opticon are:

- Application Generator PotStar (Limited or Professional)
- C language: Microtec ANSI-C compiler and C library for handheld terminals.

The user application must be downloaded from the PC into the terminal. You can use the cradle, an RS232 cable or an infrared adapter for communication between the terminal and the PC. A program on the PC will send the user application to the terminal, where it is stored in FlashROM memory.

When the functionality of the terminal is defined by the application it is ready for operation.

In a typical application you will press the trigger key and scan a bar code label as described in the next chapter. Scanned data and data entered from the keyboard is stored in the terminal's RAM. The user application can use this data in subsequent steps.

The collected data can be transmitted to the PC for further processing. For data transmission you can use the cradle, an RS232 cable or an infrared adapter to connect the terminal to the PC.

4 SCANNING BAR CODES

⚠ **Please take care of the handling precautions.**

⚠ **Please make sure that the terminal is installed according to the installation instructions.**

⚠ **Never remove the main battery pack while the terminal is turned on.**
Doing so can cause data in the terminal to be deleted or corrupted.

4.1 Scan Position

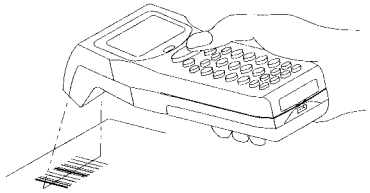
When reading a small bar code, decrease the distance between the terminal and the bar code. For larger bar codes, position the terminal so that the bar code fits into the laser beam. When reading a very high density bar code, decrease the distance between the terminal and the bar code. For a low density bar code, increase the distance between the terminal and bar code.

4.2 Reading the bar codes

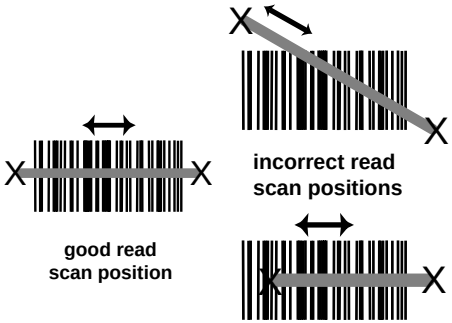
The scanning sequence is defined by the user's application. A typical sequence is:

- Press the [PW] key to turn power on.
- Check the display for the message: *READ BAR CODE*
- Point the terminal to the bar code and press the Trigger key.
- Point the laserbeam to the barcode as shown in the scan position illustration.
- The barcode will be read and the reading results will be indicated.

The terminal is a Class I laser product conforming to the strictest laser safety standards. However, we recommend that you avoid looking directly into the laser beam emitter, or pointing the laser beam directly into someone's eyes.



Fit the bar code in the laser beam from margin to margin and pass the scanner downward over the bar code, as shown in the scan position illustration.



A 'Good Read' means that the scanner has effectively recognised and decoded the bar code. In most cases, the application program will provide an indicator signal or a buzzer signal to indicate a good read to the user.

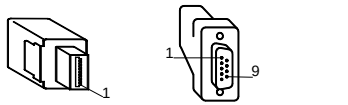
When the read is incorrect you can try again, paying attention to the instructions stated below.

4.3 If you have problems with the read operation

- Change the angle between the bar code and the terminal.
- Change the distance between the bar code and the terminal.
- If the bar code is larger than the laser beam, try moving the terminal a bit further away from the bar code.

5 PIN-OUT

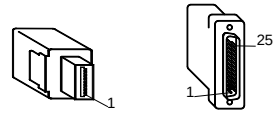
5.1



RS232 cable DB 9 female

Modular plug (10 pins)	Signal	DB 9 connector Female	Signal
1	DC IN	-	-
2	DC IN	-	-
3	TxD	2	RxD
4	RxD	3	TxD
5	RTS	8	CTS
6	CTS	7	RTS
7	DTR	6	DSR
8	DSR	4	DTR
9	GND	5	GND
10	GND	-	-

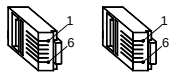
5.2



Modem cable DB 25 male

Modular plug (10 pins)	Signal	DB 25 connector Male	Signal
1	DC IN	-	-
2	DC IN	-	-
3	TxD	2	RxD
4	RxD	3	TxD
5	RTS	4	CTS
6	CTS	5	RTS
7	DTR	20	DSR
8	DSR	6	DTR
9	GND	7	GND
10	GND	-	-

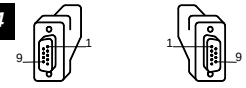
5.3



Network cable RS485

Modular plug (6P6)	Modular plug (6P6)	Signal
1	-	-
2	2	RD+
3	3	RD-
4	4	SD+
5	5	SD-
6	-	-

5.4



RS232 cable

DB 9 male (cradle)	Signal	DB 9 female (PC)	Signal	In/Out (cradle)	Note
3	TxD	2	RxD	OUT	-
2	RxD	3	TxD	IN	-
6 + 1	DSR	4	DTR	-	not used
5	GND	5	GND	-	-
4	DTR	6 + 1	DSR	OUT	ON (fixed)
8	CTS	7	RTS	-	not used
7	RTS	8	CTS	OUT	ON (fixed)

6 SPECIFICATIONS

6.1 SPECIFICATIONS TERMINAL

6.1.1 Electrical specifications

Main battery	☐ rechargeable pack: Ni-MH ☐ dry cell: Alkaline penlite ☐ optional: other 2 x AA-size penlite
Main battery operating time	☐ Ni-MH: When making every 5 seonds 1 scan with 1 sec laserbeam on and 0.2 sec. green LED on and 0.2 sec. buzzer on, operating time is: approx. 34 hours ☐ Alkaline: When making every 5 seonds 1 scan with 1 sec laserbeam on and 0.2 sec. green LED on and 0.2 sec. buzzer on, operating time is: approx. 67 hours ☐ Different operation conditions affect the operating time ☐ Use of other penlite batteries affect the operating time
Backup battery	Lithium (CR2032)
Backup battery operating time	If fully charged: 4 months backup time
Battery management	☐ Low voltage indicated on the terminal display. ☐ When battery is low the terminal switches off automatically.
Charging method	☐ Rechargeable Ni-MH pack in terminal via cradle ☐ Replacement Ni-MH pack in cradle

6.1.2 Optical specifications

Light source	650 nm visible laser diode
Scan rate	100 scans/sec
Decode rate	100 decodes/sec
Reading width	60 mm at 30 mm 98 mm at 100 mm
Resolution at PCS 0,9	0.15 mm (6mil)
Depth of field	0 - 140 mm (at PCS 0.9, res. 0.25)

6.1.3 Physical specifications

Dimensions (l x w x d)	172 x 62 x 44 mm
Case material	ABS
Weight	body (excl. battery): 180 g
Direct cable (optional)	RS232 - DB9 female

6.1.4 Functionality

Memory	☐ ROM: 32 kB ☐ FlashROM (for O/S and program): 256 kB ☐ fast RAM: 2kB ☐ battery backed up S-RAM (for data): 1 or 2 MB
Microprocessor	16-bit
Real time clock	Quartz RTC, time and date programmable, leap year handling, (accuracy ± 60 sec./month)
Display	☐ 96x48 Pixels graphic LCD with backlight ☐ Character fonts: 4/8 lines x 16 characters
Keyboard	☐ 27 keys total (26 keys user definable) ☐ 8 Function keys ☐ Alpha/Numeric mode
Trigger mode	Manual
Programming	Functionality is provided by user application. The application may be downloaded from PC via cable, com port or IrDA.
Interfaces supported	☐ RS232 by direct cable ☐ RS232 by cradle ☐ IrDA on terminal
Transmission speed	☐ RS232 direct cable: 2400 - 115200 baud ☐ RS232 cradle: 2400 - 38400 baud ☐ IrDA terminal: 2400 - 115200 baud

6.1.5 Environmental specifications

Temperature	☐ 0 - 50 °C in operation ☐ -10 - 60 °C in storage
Humidity (non condensing)	☐ 20 - 80 % in operation ☐ 20 - 90 % in storage
Shock: drop:	1.5 m drop onto concrete surface
Shock: vibration: cycle for X,Y,Z.	10 - 50 Hz with 1G for 30 min,
Ambient light rejection	☐ fluorescent 3.000 lux max. ☐ direct sun 50.000 lux max.
Emission	According to EN50081, part 1
Immunity	According to EN50082, part 1
Protection against dust and moisture	According to IEC529, IP 42
Safety, Laser class	According to IEC825, Class I laserproduct

6.1.6 Supported symbologies

Chinese Post 2of5
Codabar incl. ABC and CX
Code 39
Code 93
Code 128
EAN-8 incl. +2,+5
EAN-13 incl. +2,+5
IATA
Industrial 2of5
Interleaved 2of5
Italian Pharmaceutical
Laetus
Matrix 2of5
MSI/Plessey
UK/Plessey
S-Code
Telepen
UPC-A incl. +2,+5
UPC-E incl. +2,+5

6.2 SPECIFICATIONS CRADLE

6.2.1 Cradle models

☐ IRU-1600-S: datatransmission only
☐ IRU-1600-C: datatransmission / battery charging

6.2.2 Electrical specifications

Battery charging time (for IRU-1600-C)	☐ when battery in terminal: 4 hours extra charge with 70% nominal capacity ☐ when battery in spare battery slot: 1 hour full charge

6.2.3 Functionality

Interfaces supported	☐ RS232 ☐ RS485
Serial communication	☐ RS232 Baudrate: 1200 - 38400 ☐ RS485 Baudrate: 1200 - 38400
Transmission modes	☐ Half duplex RS232 ☐ Half duplex RS485
Parity	Odd, Even, None

6.2.4 Environmental specifications

Temperature	☐ 0 - 40 °C in operation ☐ -20 - 70 °C in storage
Humidity (non condensing)	☐ 30 - 85 % in operation ☐ 30 - 90 % in storage
Shock: vibration: cycle for X,Y,Z.	10 - 50 Hz with 1G for 30 min,
Emission	According to EN50081, part 1
Immunity	According to EN50082, part 1

6.2.5 Physical specifications

Dimensions (l x w x d)	228 x 116 x 97 mm (desk top type)
Case material	ABS
Weight	☐ IRU-1600-S (excl. cables): 500 g ☐ IRU-1600-C (excl. cables): 525 g
Standard connector	☐ RS232 - D Sub 9P Female ☐ RS485 - 6 pins modular plug

7 TROUBLE SHOOTING

This chapter contains information on solving problems you may encounter when using the terminal and/or cradle. If problems occur, first carry out some general checks, before verifying the problem with the descriptions in this chapter.

General checks:

- Make sure everything is installed properly
- Check the power supply of all devices
- Is the read window of the terminal clean?
- Is the optical window of the cradle clean?
- Are the bar code labels readable, eg. not damaged or poorly printed?

If the equipment still does not work after these checks have been performed, please verify if one of the problems described in this chapter applies to the problem you have with the scanner.

It is possible that you may not solve the problems, despite our descriptions. In this instance, please contact your dealer or Opticon.

When the terminal needs to be repaired, please ensure that the label with the serial number is still present. If sending the terminal or cradle, please use the original packing to minimise the chances of damage.

7.1 COMMUNICATION PROBLEMS

No communication from the cradle to the device, or data is transmitted distorted or corrupted.

Power indicator of the cradle is not green.

- Clean the optical interface window of the cradle and/or terminal, and try again.
- Check all cables.
  When the power indicator is still not green, the cradle needs service.

No data transmitted.

- The cradle will only work if connected to a PC.

Data is corrupted, or no data is transmitted.

- Is the proper baudrate selected?
  The computer needs the same baudrate as the terminal.
- Is the baudrate between the min. and max. value?
  For RS 232 : baudrate 1200 - 38400
  For RS 485 : baudrate 1200 - 38400

The terminal looses data when the battery pack is removed for a short period.

The backup battery is empty.

- Replace the Lithium CR2032 battery with a new one.

7.2 READ OPERATION PROBLEMS

When the terminal has a problem with reading the label:

The resolution of the bar code is too high.

- Decrease the distance between the bar code and the terminal.

The angle between the label and the terminal is too high.

- Change the angle between the bar code and the terminal.

The distance is too far or too close.

- Change the distance between the bar code and the terminal.

The bar code is larger than the laser beam.

- Try moving the terminal a bit further away from the bar code.

The read window is dirty.

- Clean the read window of the terminal.

The type of the bar code label is not enabled.

- Enable the bar code symbology in the application program.

7.3 BATTERY CHARGING PROBLEMS

When the terminal is placed in the cradle, the main battery is not charged.

Red LED indicator is not turned on.

- The battery pack in the terminal is not empty enough. The battery voltage has to be lower than 2.6 V.
- If the battery temperature reaches 45^{o}C, the charger will stop charging immediately. The cradle is waiting for the proper temperature (0-40^{o}C) and will then continue.
- The cradle needs a rechargeable battery pack to charge. When a battery holder for dry cell batteries Is used, the charger does not work at all.
- There is no contact between the terminal and the cradle. Try again to place the terminal properly, or clean the contacts.

Terminal is still not charged. Red LED indicator is turned on

- The charger for the terminal is probably defect. Take the battery pack out of the terminal and charge it in the battery pack charger. The cradle will need service, but can still operate for a while.

When a rechargeable battery pack is placed in the cradle, the main battery is not charged.

Green LED indicator is not turned on not flashing.

- The cradle needs a rechargeable battery pack to charge. When a battery holder for dry cell batteries is used, charger does not work at all.
- The battery voltage reaches 4 V. The voltage for charging should be between 2 - 4 V.

Green LED indicator keeps flashing.

- The battery is too cold or too warm.
  The cradle is waiting for the proper temperature (0-40^{o}C) and will then continue.

The rechargeable battery pack is still not charged. Red LED indicator keeps on.

- The charger for the battery pack is probably defect.
  Put the battery pack in the terminal and charge it in the terminal charger.
  The cradle will need service, but can still operate for a while.

Backupbattery is empty.

Indicator in the display of the terminal is on:

- Replace the Lithium CR2032 battery with a new one.

7.4 TERMINAL PROBLEMS

Terminal does not respond to keypresses, while the display stays on.

Message "Application halted" or "No application installed" is shown.

- There is no user's application for PHL1700 loaded in the terminal. Contact your supplier.

For example pressing the shift key does not toggle the shift indicator.

- There is a flaw in the application program. Disconnect the battery pack, and place it then back in.
  The terminal will be in off-state.
  Activate the system menu and restart the application, or download new application.
- If problems appears continously contact the supplier of the user's application.

Terminal gets no power, when pressing the powerkey.

The main battery is exhausted.

- Replace the battery pack, or charge the terminal in the cradle.

Laser stays off, when pressing the triggerkey.

Power is off.

- The triggerkey is no powerkey. Press the powerkey to get power.
- If the terminal is not used the scanner will switch off all functions. Press the powerkey to reactivate.

Laser temperature has become too high.

- The laser is switched off automatically, when thelaser temperature becomes above 50°C. Wait until the temperature has dropped.

Terminal does still not operate and needs a service
Send the terminal to your supplier for service, paying attention to the limited warranty.

7.5 CRADLE PROBLEMS

Indications on the cradle.

Power indicator of cradle is off

- No power supply. Check the adaptor. When the adaptor is good, the cradle needs service.

Cradle does still not operate and needs a service
Send the cradle to your supplier for service, paying attention to the limited warranty.

8 PRODUCT ORDERING INFORMATION

Apart from the terminal, additional items might be ordered.

	Article Code
Terminal	
PHL 1700-10 (1MB)	A73700R0010
PHL 1700-20 (2MB)	A73700R0030
Battery Pack for terminal	
Rechargeable Battery Pack	O2510000020
Dry Cell Battery Pack Assy (assy = case holder + penlite batteries)	O2510000030
Battery Case Holder	Q2510000060
Penlite Batteries	PBA30000010
Cables for terminal	
RS232 cable DB 9 female	O2500000020
Modem cable DB 25 male	O2500000030
Protective Bags for terminal	
Leather bag	O2510000050
Leather bag clip	O2510000060
Nylon bag	O2510000070
Software development tools	
Microtec ANSI-C cross compiler	O8010000010
C-library for handheld terminals	D4030000020
Application Generator Potstar Limited	D6010000010
Application Generator Potstar Professional	D6020000010

Apart from the cradle, additional items might be ordered.

	Article Code
Cradle	
IRU1600-S transceiver	O2520000010
IRU1600-C transceiver/charger	O2520000015
Power Supply for cradle	
5V DC adaptor for IRU1600-C	A50100N0020
9V DC adaptor for IRU1600-S	A50200N0020
Euro Cable	A79000N0030
Cables for cradle	
RS232 cable DB 9 female	O2520000020
Adapter DB25 female/DB9 male	P10AT000040
Modem cable DB 25 male	O2520000040
RS485 cable	O2520000050