OPTICON

Communication Cradle

CRD 7734

The CRD 7734 is a communication and charging cradle designed for the OPL 7734 scanner. This cradle receives data from the OPL 7734 via wireless communication and complies with IEEE802.15.4.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	CRD 7734	**Specification Number:**	SS07035
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Date:	2007-05-21		

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Packaging

The packing materials are recyclable. We recommend that you save all packing material to use should you need to transport your cradle or send it for service. Damage caused by improper packaging during shipment is not covered by the warranty.

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1. Abstract

This manual provides specifications for the CRD 7734 communication cradle.

2. Overview

The CRD 7734 is a communication and charging cradle designed for the OPL 7734 scanner. This cradle receives data from the OPL 7734 via wireless communication and complies with IEEE802.15.4.

Data can be transmitted through an RS-232C or USB interface.

The lithium-ion battery built into the OPL 7734 cradle can be charged by setting the OPL 7734 in this cradle.

The CRD 7734 complies with RoHS.

3. Physical Features

3.1. Dimensions

W 80.0 x D 116.5 x H 50.76 mm

3.2. Weight

110 g (max.) excluding the AC adapter and cable

3.3. Color

Black

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: 0 to 40° C

Humidity: 25 to 85%

4.2. Storage Temperature and Humidity

Temperature: -20 to 60° C

Humidity: 20 to 90%

5. Controls

Item	Name	Specifications	Remarks
Control Section	CPU	16 bits CMOS CPU	
	Clock Frequency	14.74 MHz	
External Memory	FLASH ROM	256 KB	for BIOS/DATA
	SRAM	32 KB (no back-up)	for WORK/DATA
Wireless Section	Frequency	2400 MHz to 2483.5 MHz	
	Wireless spec.	IEEE 802.15.4 compliant	
	Transmission power	-3 dBm (0.5 W)	
	Comm. distance	30 m	May differ depending on the environments.
	Baud rate	115.2 kbps	
	Antenna	1/4λ (surface-mounted type)	

6. Electrical Specifications

Scanner power charge: DC 6 V

6.1. AC Adaptor

6.1.1. Input Specifications

Parameter	Value	Remarks
Power supply voltage	DC 6 V/750 mA	
Current consumption	125 mA (max.) 400 mA (max.)	When not charging the scanner. When charging the scanner.

6.2. Operating Indicators

6.2.1. LED Indicator

The cradle uses three types of LEDs to indicate its status.

LED	Position	Color	Indications
Power LED	Left	Red	LED lights when the main power supply is on.
Transmission LED	Center	Green	LED blinks while data is in the communication line.
		Red	LED blinks when the cable is detached, the host is waiting for data transmission, and when the COM port is closed. The LED does not react when there is no DTR signal in the line when using RS-232C. If using USB, port will not be closed unless COM control setting is configured to hardware flow.
Scanning ID	Right	Blue	Led lights when the cradle ID is registered. It blinks while the registration is in process.

6.2.2. Specification

LED	Position	Color	Blinking Period
Data Comm.	Center	Green	200 ms
		Red	500 ms
Cradle ID	Right	Blue	500 ms

7. Communication Settings

7.1. Baud Rate Settings

7.1.1. If DIPSW1 is OFF

Receive baud rate setting information from the scanner and configure the settings.

7.1.2. If DIPSW1 is ON

Use software on the host to configure the settings through RS-232C interface.

CTS Line	DSR Line	Baud Rate
Edge	0 pulses	115.2 kbps
Edge	1 pulse	57.6 kbps
Edge	2 pulses	38.4 kbps
Edge	3 pulses	19.2 kbps
Edge	4 pulses	9600 bps
Edge	5 pulses	4800 bps
Edge	6 pulses	2400 bps

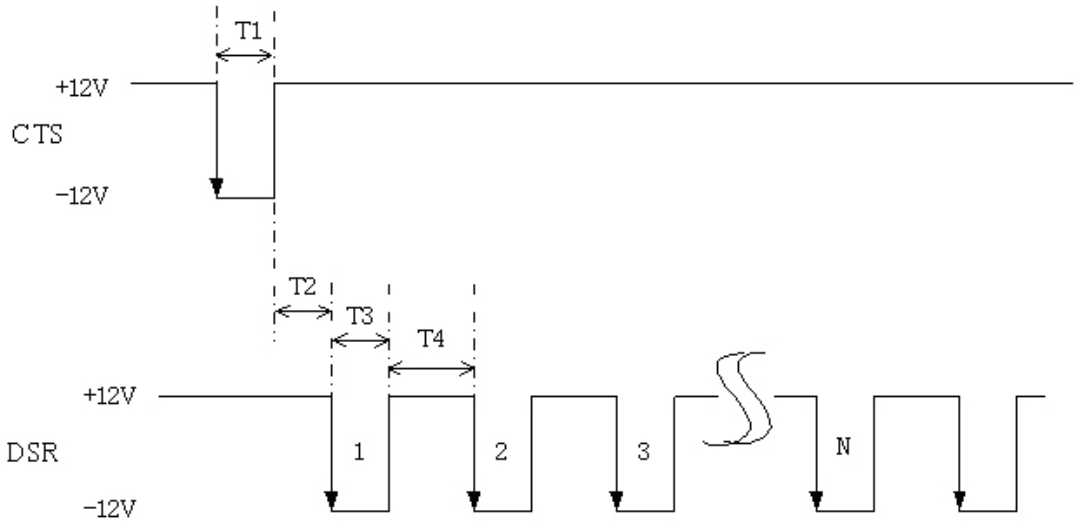

Figure 1: Baud rate settings

Please refer to the *Lite Link Control* specification manual from Parallax, Inc. for details.

7.1.3. Configuration Using DIP Switches

- DIPSW1: Configure baud rate settings to LITE LINK CONTROL. This setting is only enabled when using the RS-232C interface.
- DIPSW2: For manufacturing use only. Do not use this setting.
- DIPSW3: For manufacturing use only. Do not use this setting.
- DIPSW4: Disable the host to detect DTR signals.
- DIPSW5: Default setting. The settings of FLASH are set to the default.
- DIPSW6: Configure to the software upgrade mode. This setting will enable you to change the software using the RS-232C interface.

DIPSW settings are available only when the cradle is turned ON.

All settings are configured to OFF by default.

To set the DIP switches:

Parameter	DIP Switch					
	SW1	**SW2**	**SW3**	**SW4**	**SW5**	**SW6**
LITE LINK CONTROL	ON	X	X	X	OFF	OFF
Manufacturing Only	X	ON	X	X	OFF	OFF
Manufacturing Only	X	X	ON	X	OFF	OFF
IGNORE DTR	X	X	X	ON	OFF	OFF
INITIAL SETUP	X	X	X	X	ON	OFF
DOWNLOAD MODE	X	X	X	X	X	ON

X = N/A

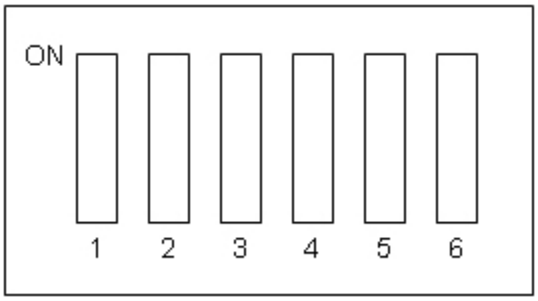

Figure 2: DIP switch diagram

8. Interface Specifications

The wireless interface of the CRD 7734 complies with IEEE802.15.4.

- Communication configuration: Maximum of 8 cradles to 1 cradle
- Operation mode in communication: peer to peer
- Encryption: Encryption available in CTR mode

The CRD 7734 supports RS-232C and USB interfaces.

The CRD 7734 acknowledges the interface automatically by monitoring the interface power supply.

8.1. RS-232C Interface

8.1.1. Settings and Communication

DIPSW5 of the CRD 7734 is set to ON by default.

Parameter	Setting
Baud rate	9600 bps
Start/stop bits	1 bit
Data bits	8 bits
Parity bits	No parity
Handshaking	BUSY/READY
ACK/NAK	No ACK/NAK
CTS timeout	Indefinitely

You can change the communication condition using the menu barcode.

a) Signal Level

Signal Name	I/O	RS-232C Level (V)	
		Mark/OFF	Space/ON
TxD	OUT	-5 to -15	+5 to +15
RxD	IN	-3 to -15	+3 to +15
RTS	OUT	-5 to -15	+5 to +15
CTS	IN	-3 to -15	+3 to +15
DSR	IN	-3 to -15	+3 to +15

b) Interface Circuit

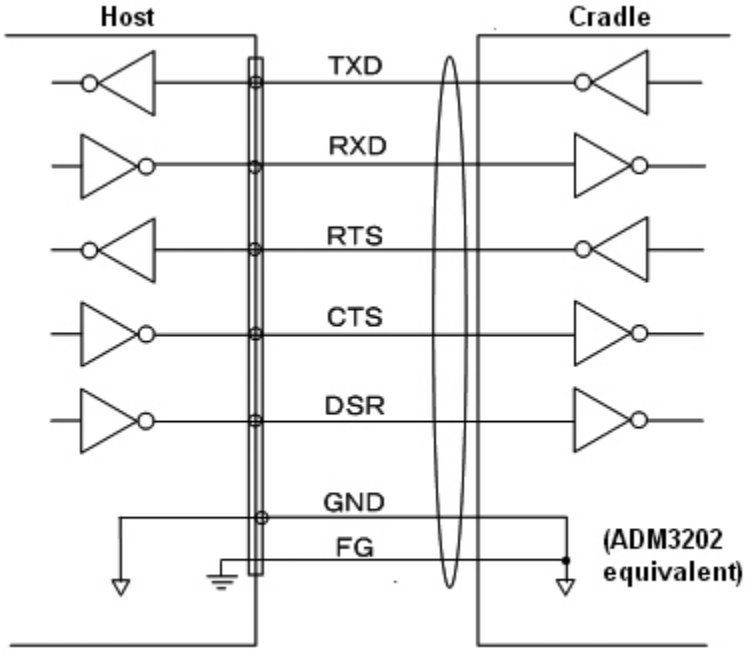

Figure 3: Interface circuit

c) Character Format

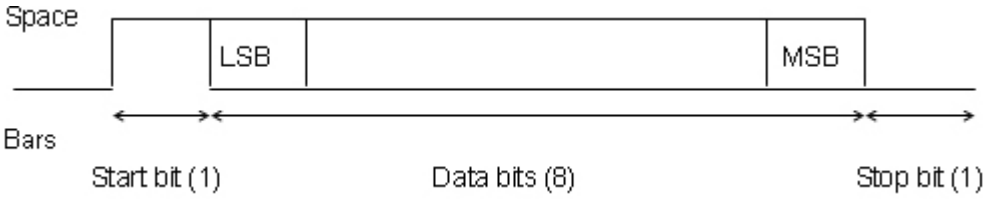

Figure 4:Character format (same for both sending and receiving)

d) Communication Format

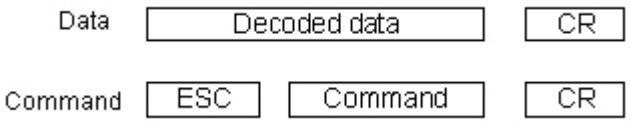

Figure 5: Communication format

8.1.2. Handshaking

Communication settings on the cradle can be configured by using the menu or command listed below. Information on communication settings configuration is sent from the cradle to the cradle.

Wireless interface flow control can be configured in the same way

Handshaking	Menu/Command
No handshake	P0 (Default)
BUSY/READY	P1
MODEM	P2
NO ACK/NAK	P5 (Default)
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4

a) No Handshaking

The cradle attempts the communication regardless of the state of the host computer. RTS is always enabled for the cradle.

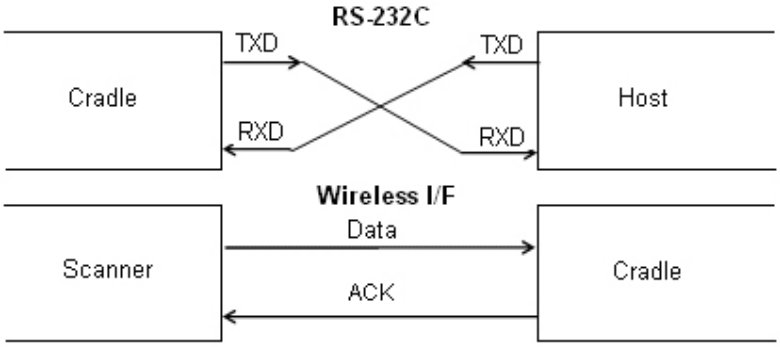

Figure 6: No handshaking

b) BUSY/READY

The cradle and the host computer notify each other of their state and whether they can receive data with BUSY/READY through an RTS line. They can communicate state to each other through a CTS line when connected as in the following figure.

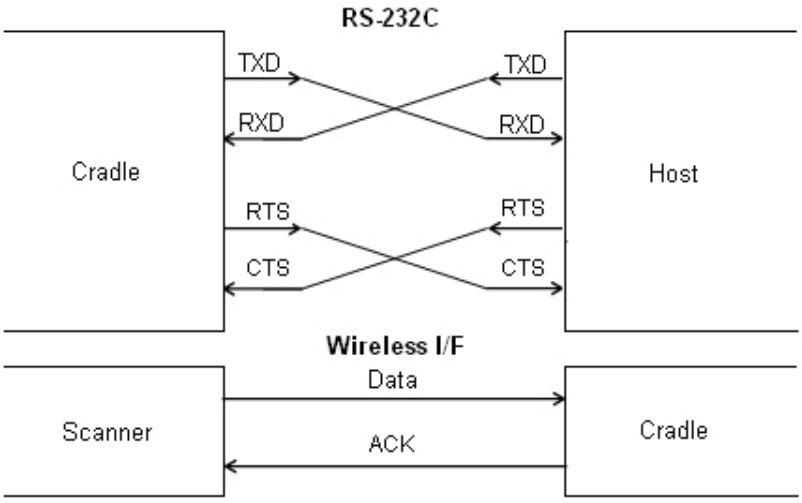

Figure 7: Busy/Ready

The cradle stays ON (is able to receive data) except while it is transmitting data via IrDA or RS-232C interfaces. The cradle checks the CTS line before transmitting data. When it is ON, the cradle transmits data. When it is OFF, the cradle waits for it to turn ON within a set time. When the CTS line is not ON within a specified period, the cradle will blink the red LED to indicate it. The Flow Control timeouts are as follows, and the default setting is “indefinitely“ (I0). (The communication LED is not blinking.)

Flow Control Time Out	Menu/Command
Indefinitely	I0
100 ms	I1
200 ms	I2
400 ms	I3

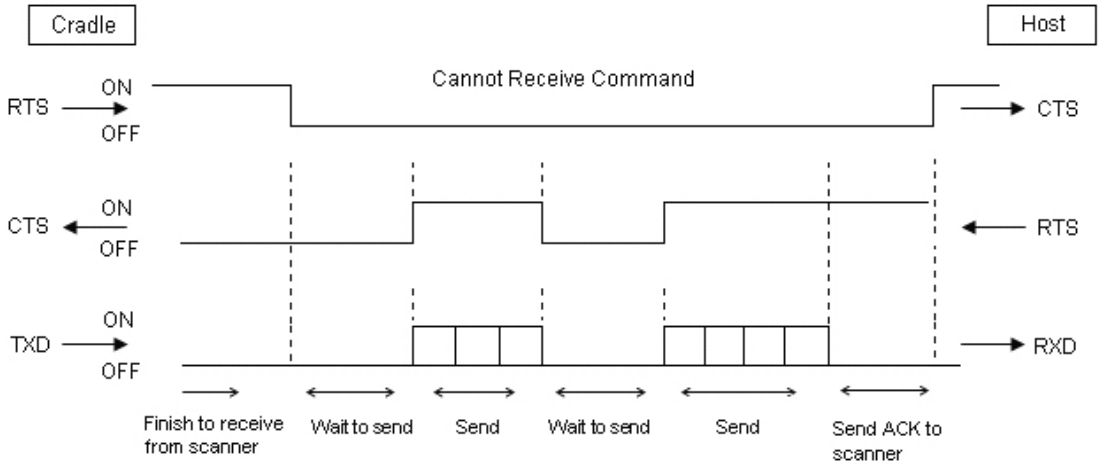

Figure 8: Handshake: Busy/Ready

CTS, TXD Signal Timing

When the CTS line (RTS signal of the host) is turned OFF while sending a TXD signal, the cradle transmits one character and waits. When the CTS signal is turned ON while transmitting a character, the character will be transmitted.

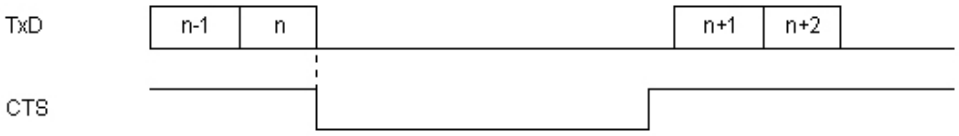

Figure 9: Signal timing

Note: When using loopback (wire connection) for RTS, CTS line of the cradle in this setting, *No handshake* is not enabled.

c) MODEM

The cradle turns CTS line ON before transmitting data. Other processes are the same as BUSY/READY.

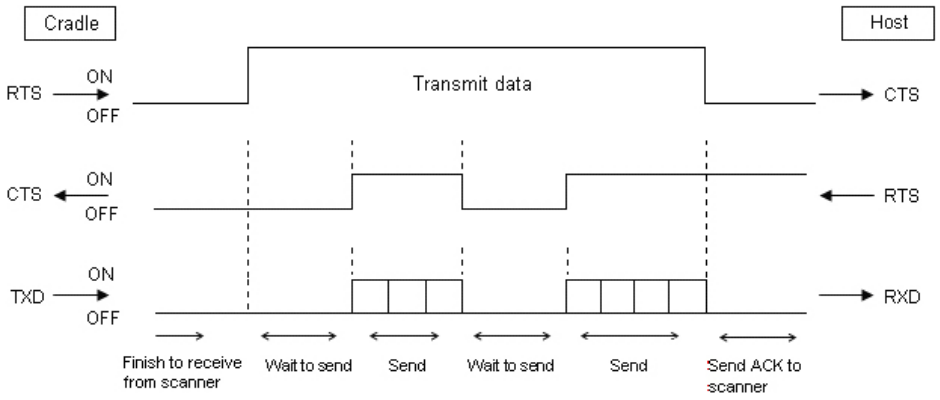

Figure 10: Handshake: Modem

d) No ACK/NAK

After data has been transmitted, the cradle transmits ACK to the host to notify the transmission status on the wireless communication line.

* Between the cradle and the host: No control.

ACK/NAK Protocol	Control Level	Notes
	Scanner and Host	Regardless of the host status.

Data Transmission Status	Cradle	Scanner
OK	Center LED: Green Light Blinks	Green Light with GR Buzzer
	ACK Transmission	Receive ACK
NG	Center LED: Red Light Blinks	Red Light with NG Buzzer
	NAK Transmission	Receive NAK

* Between the cradle and the host: BUSY/READY or MODEM

ACK/NAK Protocol	Control Level	Notes
	Scanner, Cradle and Host	Monitors CTS line of the host.

CTS Line Status	Cradle	Scanner
OK	Center LED: Green light blinks	Green light with GR buzzer
	ACK transmission	Receive ACK
NG	Center LED: Red light blinks	Red light with NG buzzer
	Timeout transmission	Receive timeout

e) ACK/NAK

After data has been transmitted, the cradle expects to receive one of the following responses from the host:

ACK/NAK Protocol	Control Level	Notes
	Scanner, Cradle and Host	Monitors response from the host.

Response	Cradle	Scanner
ACK	Center LED: Green light blinks	Green light with GR buzzer
	ACK transmission	Receive ACK
NAK	Center LED: Red light blinks	Red light with NG buzzer
	NAK transmission	Receive NAK
DC1	Center LED: Red light blinks	Green light
	DC1 transmission	Receive DC1
Timeout	Center LED: Red light blinks	Red light with ERROR buzzer
	Timeout transmission	Receive timeout

ACK/NAK timeout	Menu / Command
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7

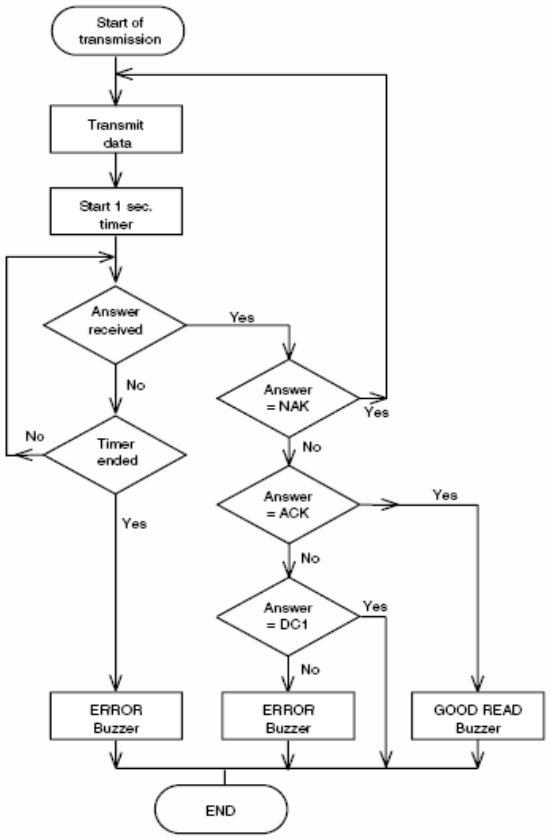

Figure 11: ACK/NAK

f) ACK/NAK NO RESPONSE

When no response from the host is received within the setting time, the cradle assumes an ACK response, and returns to the initial state without the error buzzer. The other actions are the same as ACK/NAK.

Response	Cradle	Scanner
Timeout	Center LED: Green light blinks	Green light with GR buzzer
	ACK transmission	Receive ACK

ACK/NAK timeout	Menu / Command
Indefinitely (default)	XI4
100 ms	XI5
500 ms	XI6
1000 ms	XI7

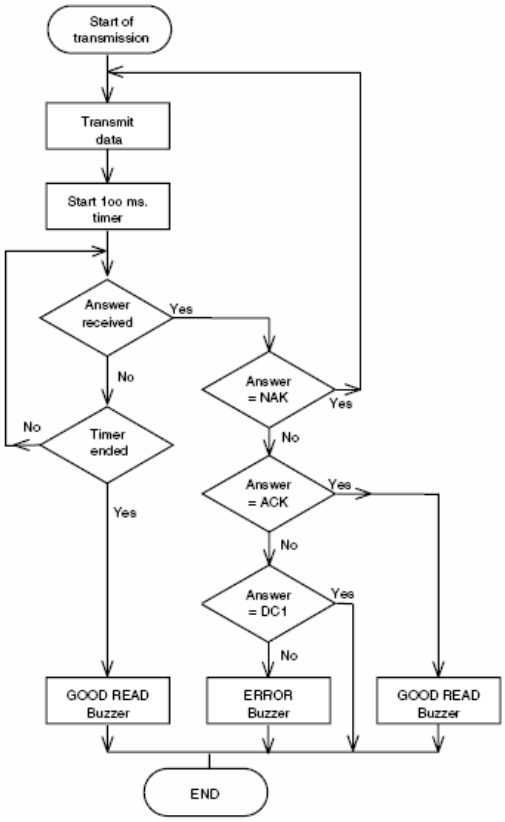

Figure 12: ACK/NAK—No response

8.2. USB Interface Specifications

The CRD 7734 supports a USB 1.1 full-speed interface. (Use EEPROM ver. 1.1)

To use the USB interface, it is necessary to install the virtual COM port (VCP) driver manufactured by Future Technology Devices Intl. Ltd. on the host computer.

The application on the host computer communicates data by accessing the VCP. The VCP is supported by the following operating systems:

- Microsoft Windows 98/98SE
- Microsoft Windows 2000/ME/XP/Vista
- MacOS 10.3

Please refer to the instruction manual for detailed guidelines for installing the VCP driver.

The USB interface does not support USB bus power.

8.2.1. Interface Circuit

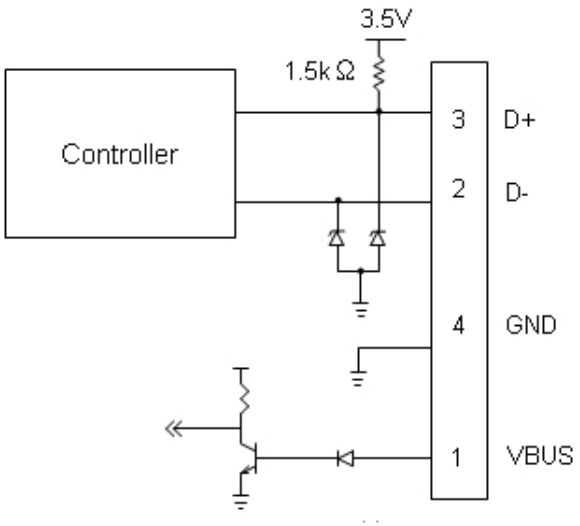

Figure 13: Interface circuit

8.3. IEEE 802.15.4

8.3.1. Radio Equipment

The electromagnetic wave absorption (2.4 GHz) used by this product is also shared by various other devices. Therefore, baud rate and communication distance may be negatively impacted, or their communications may be disconnected, by other devices using the same absorption rate.

Baud rate and communication distance are affected by obstacles, wave conditions, or a device at the other end.

This product is equipped with an antenna. Bringing this product too close to a metallic object may affect communication. Anticipated interference distance is 10 m or less.

8.3.2. Frequency Band

This product uses the 2.4 GHz frequency band. Scientific, medical, and industrial devices, including microwaves, wireless security (camera) systems and W-LAN use the same frequency band as this scanner. Other radio stations also use this frequency for mobile object identification, including local private radio stations that require a license (for example, manufacturing lines at factories), specific power-saving radio stations requiring no license, and amateur radio stations.

Interference from other devices may affect the communication speed or communication range of this cradle or vice versa.

9. Cable and Connector

A dedicated RS-232C cable and a dedicated USB cable will be packaged with the CRD 7734.

9.1. RS-232C Cable

Cable model no.: B04009-05

9.1.1. Pin Assignment

Pin	Signal	Remarks
1	RTS	Flow control output
2	CTS	Flow control input
3	TXD	Data transmission to the host
4	RXD	Data transmission from the host
5	NC	Open (not connected)
6	GND	
7	NC	Open (not connected)
8	DSR	Detection of interface
9	NC	Open (not connected)
10	NC	Open (not connected)
–	FG	

9.1.2. Connector

10-pin modular jack

9.2. USB Cable

Cable model no.: B03006-11

9.2.1. Connector

USB Type B Connector

9.2.2. Pin Assignment

Pin	Signal	Comment
1	VBUS	Interface detection
2	-DATA	
3	+DATA	
4	GND	

10. Serial Number and Labeling

The following labels are affixed to the specified location on the cradle.

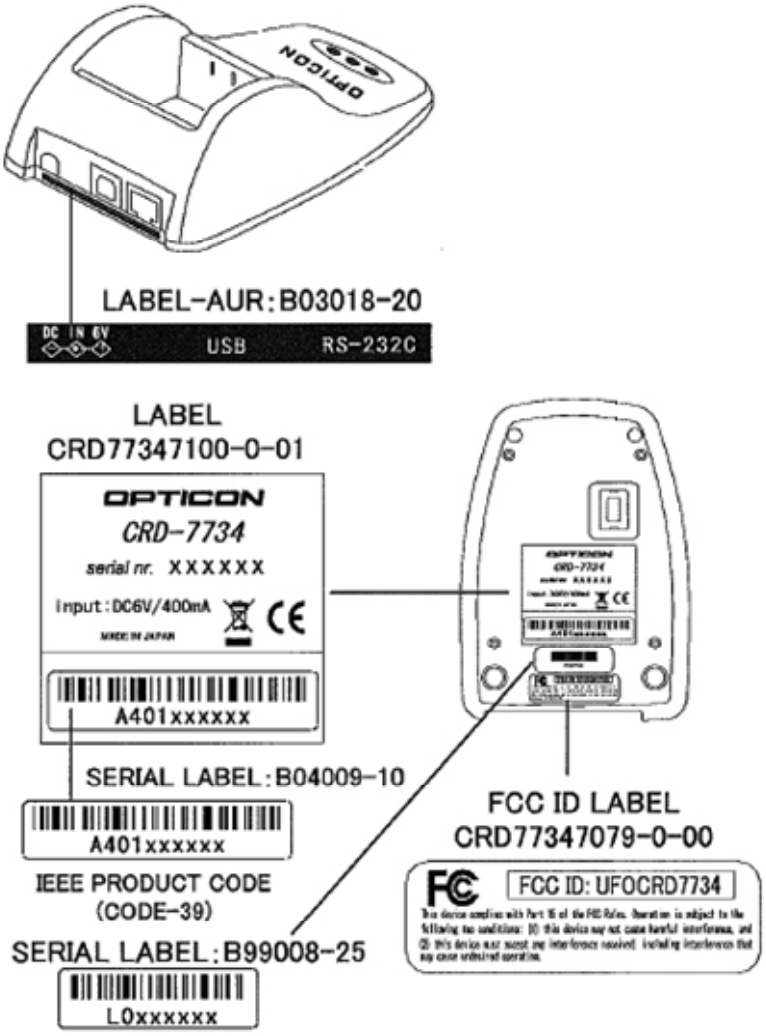

Figure 14: Labeling (for OF1CR7734N)

11. Packaging Specifications

11.1. Individual Packaging Specification

Put the cradle in a protective foam bag and place it in an individual packing box with the accessories.

Size of the package (after assembly: (W) 165 x (D) 110 x (H) 80 mm.

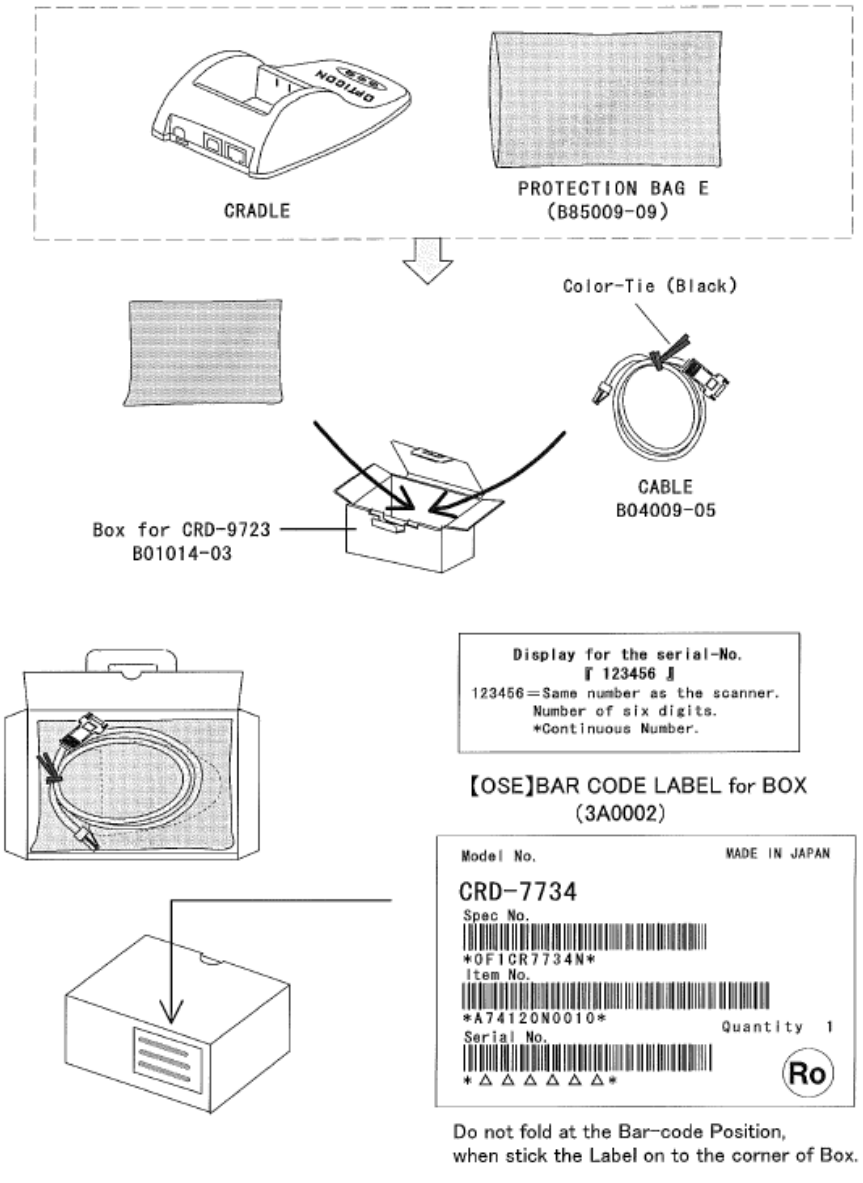

Figure 15: Individual packaging

11.2. Collective Packaging Specification

Put 30 individually packaged cradles in one collective packing box.

Size of the package (after assembly: (W) 600 x (D) 400 x (H) 450 mm.

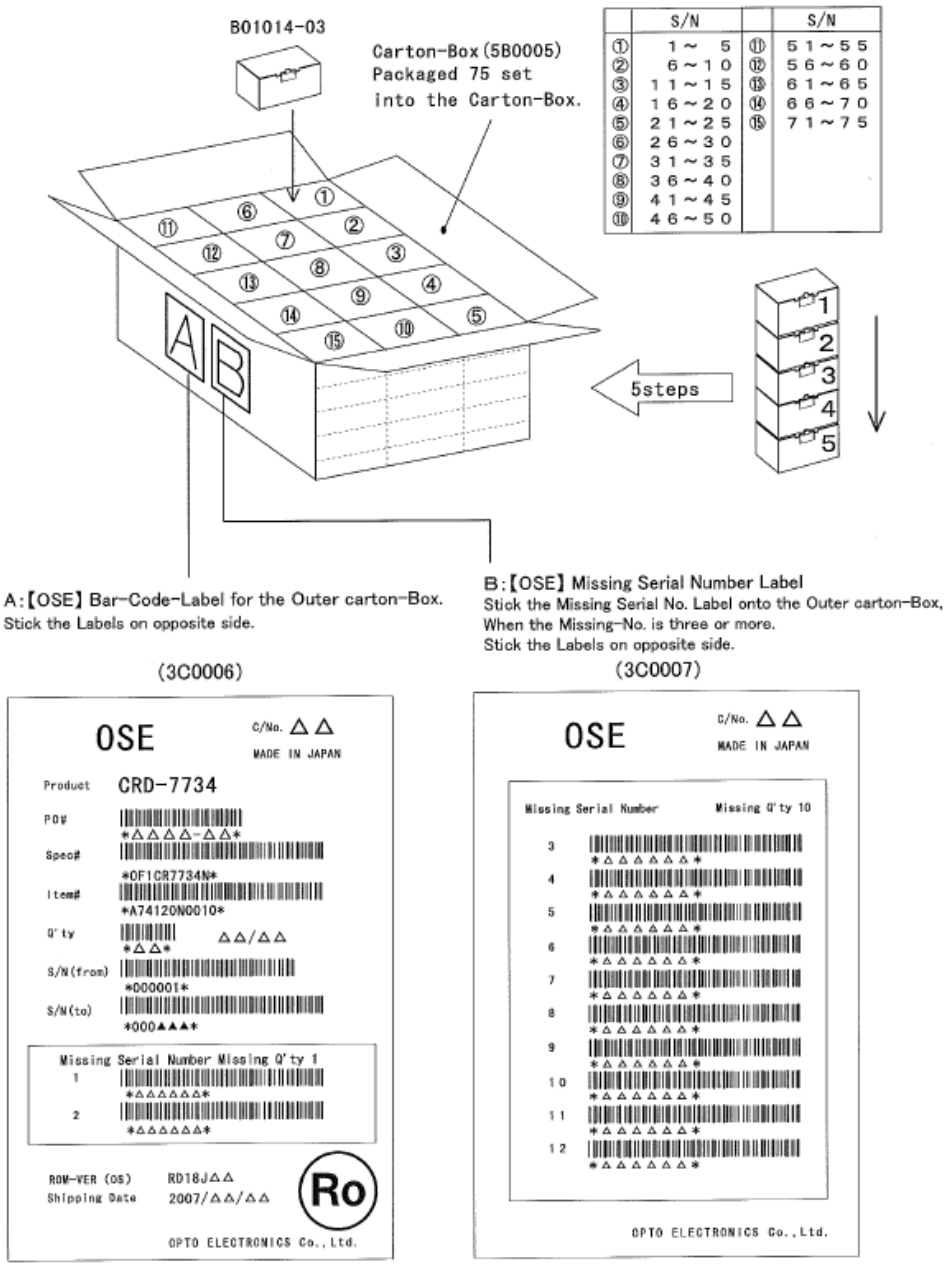

Figure 16: Collective packaging

Note: The “RO” mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC). However, this document does **not** have any legal weight in the European Union.

12. Durability

12.1. Static Electricity

Air discharge (No malfunction): ±8 kV max.

Air discharge (No destruction): ±15 kV max.

Indirect discharge (No malfunction): ±8 kV max.

Conditions

Measurement environment:	Use electrostatic testing device compliant with IEC 61000-4-2 Built up and discharged 15 kV of static electricity on the cradle surface 50 times.
Discharge resistance:	330 Ω
Capacitor charging:	150 pF

12.2. Shock

12.2.1. Drop Test (without packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop the cradle from a height of 75 cm onto a concrete floor (once on each of 6 sides).

Conditions

- Tested units with scratches or dents on the casing pass the drop test.
- All tested units must operate correctly without malfunctions.

13. Reliability

MTBF (Mean Time Between Failures) of the current-carrying parts is 62,100 hours.

The power supply terminals have an expected MTBF of 1,000,000 contacts.

The estimate of MTBF and product life cycle is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

The MTTR (Mean Time To Repair) of this product is one hour.

14. Regulatory Compliance

14.1. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

14.2. EMC

EN55022

EN55024

VCCI Class B: This is a Class B product, to be used in a domestic environment based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Please install and use the equipment according to the instruction manual.

FCC Part 15 Subpart B Class B: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

14.3. RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC.

14.4. R&TTE

This cradle conforms to the following standards of the Radio and Telecommunications Terminal Equipment (R&TTE) directive from the EU.

EN300 328

EN301 489

14.5. Radio Law

The cradle qualifies as radio equipment for low-power radio stations (2.4 GHz band advanced data communication systems) as specified in the Radio Law 38-24-1.

The cradle has obtained the Certification for Construction Design of Specified Radio Equipment. It does not have a radio station license in Japan.

The following activities are prohibited under the Radio Law:

- Remodeling and disassembly
- Peeling off the certificate label

15. Safety

Handle this product carefully. Do not deliberately subject it to any of the following.

15.1. Shock

Do not throw or drop the scanner.

Do not drop or put heavy items on this product or its cable.

15.2. Temperature Conditions

Do not use the cradle at temperatures outside the specified range.

Do not use near heat sources such as radiators, heat registers, stoves, or other types of devices that produce heat.

Do not use in areas exposed to direct sunlight for long periods of time.

Do not pinch or forcibly bend the cable, especially at very low temperature.

15.3. Foreign Materials

Do not use the cradle near water or other liquids, as well as in extremely high humidity.

Do not immerse the cradle in liquids.

Do not use in dusty environments.

Do not subject the cradle to chemicals.

Do not insert foreign substances into the device.

15.4. Other

Do not plug/unplug the connectors before disconnecting the power.

Do not attempt to disassemble, modify or update this device.

Do not use near microwaves, medical devices, or RF-emitting devices.

The cradle may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc. Do not use in the reach of blinking lights such as CRT.

The cradle may be damaged by voltage drops.

16. Mechanical Drawings

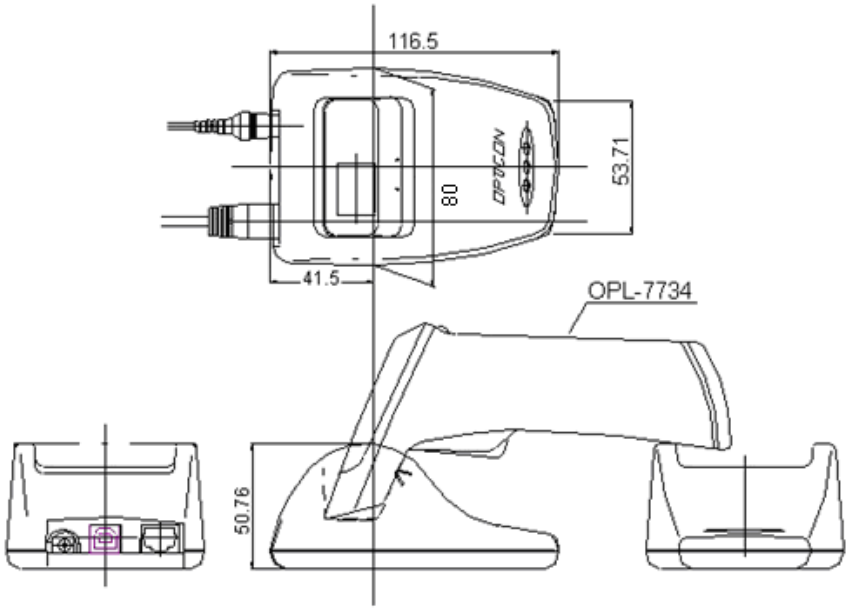

Figure 17: Mechanical drawing

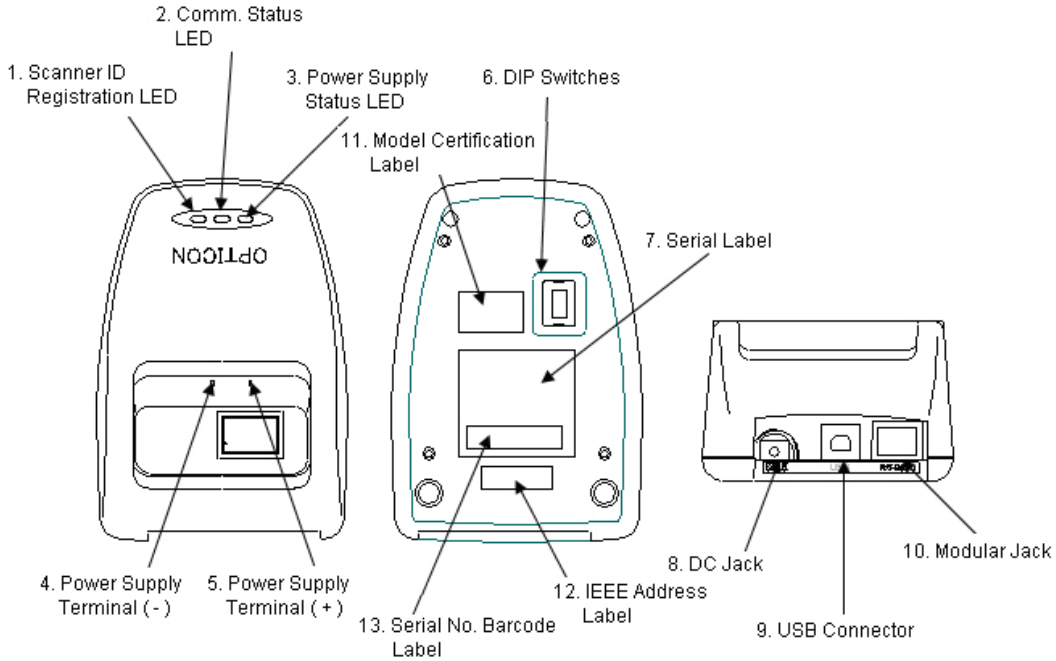

Figure 18: Detailed view