

OPTICON

Gun-type Laser Barcode Scanner

OPR 3201



The OPR 3201 is a gun-Type laser barcode scanner that uses a short-wavelength red laser beam to enhance the visibility of scanning lines. The decoded text of barcode images is output through an RS-232C, USB, or Wedge interface.

Specifications Manual

All information subject to change without notice.

Document History

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1. Abstract

This manual provides specifications for the OPR 3201 Gun-type Laser Barcode Scanner.

2. Overview

The use of a short-wavelength red laser beam enhances the visibility of scanning lines.

The decoded text of barcode images is output through an RS-232C, USB, or Wedge interface, depending on the specification.

The OPR 3201 offers auto trigger options.

This product complies with RoHS.

Supported symbologies:

Linear (1D)

- JAN/UPC/EAN, incl. add-on
- Codabar/NW-7
- Code 11
- Code 39
- Code 93
- Code 128
- GS1-128 (EAN-128)
- GS1 Databar (RSS)
- IATA
- Industrial 2of5
- Interleaved 2of5
- ISBN-ISMN-ISSN
- Matrix 2of5
- MSI/Plessey
- S-Code
- Telepen
- Tri-Optic
- UK/Plessey

Postal

- Chinese Post
- Korean Postal Authority Code

2D

- Composite Codes
- MicroPDF417
- PDF417

3. Physical Features

3.1. Dimensions

W 56.0 x D 108.1 x H 148.6 mm

3.2. Weight

78.0 g \pm 5 g (max.), excluding the cable

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: -5 to 50° C

Humidity: 5 to 95%

4.2. Charging Temperature

Temperature: 0 to 40° C

4.3. Storage Temperature and Humidity

Temperature: -20 to 60° C

Humidity: 5 to 95%

4.4. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	3,000 lx
Fluorescent light	3,000 lx
Sunlight	50,000 lx

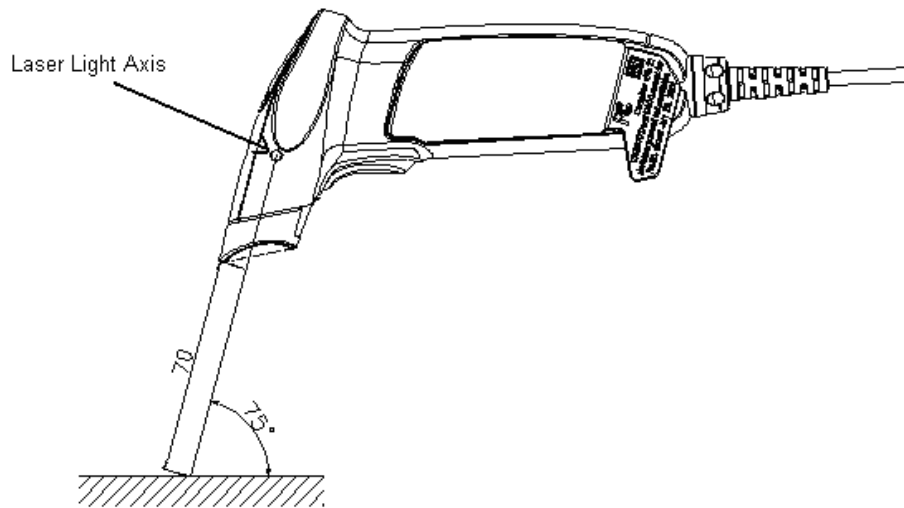


Figure 1: Ambient light immunity

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	9-digit Code 39
Quiet zone:	10 mm
N/W ratio:	1:2.5
Distance:	70 mm
Angle (see note below):	$A = 0^\circ \beta = 15^\circ \gamma = 0^\circ$
Curvature:	$R = \infty$
Power supply voltage:	6.0 V (RS-232C) 5.0 V (Wedge/USB)

Direct light or specular reflection from a light source should be prevented from entering the acceptance area.

Note: α , β and γ respectively represent pitch, skew and tilt. Please see section 8 for how these values are defined.

5. Controls

Item	Specifications
ASIC	ARM7TDMI
SDRAM	64 KB
Flash ROM	8 MBits (512 K × 16 bits)

6. Electrical Specifications

6.1. Configuration

The OPR 3201 consists of a laser module (which includes a scan mirror, a coil, and a photo diode), a decode and communication section (which decodes scanned data and carries out signal processing), a 3.3 V power supply, an interface (which outputs decoded data), a buzzer, LEDs, and a trigger key.

The OPR 3201 RS-232C model operates on a DC 6.0 V power supply fed from the dedicated adapter. USB and Wedge models operate on bus power, so those models do not use an adapter.

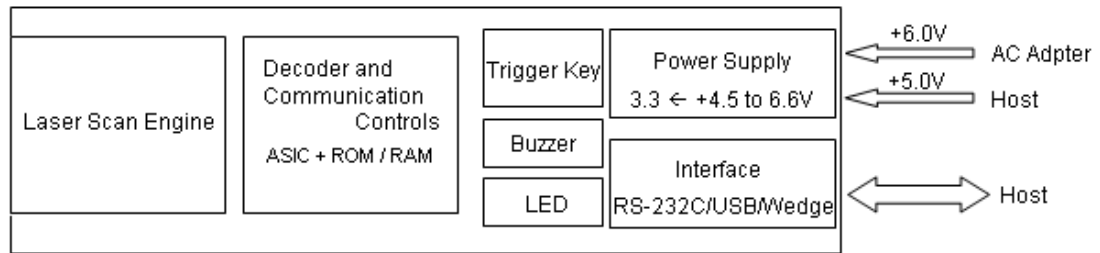


Figure 2: OPR 3201 configuration

6.2. Electrical Characteristics

Interface	Parameter	Min	Typ	Max	Unit	Notes
RS-232C	Operating voltage	4.5	6.0	6.6	V	
	Operating current	—	100	160	mA	100 mA—Laser: ON, Buzzer: OFF 160 mA—Laser: ON, Buzzer /LED:ON
	Rush current	—	550	600	mA	Power supply voltage: 6.0 V
	Stand-by current	—	35	65	mA	Auto trigger OFF/ON
USB Wedge	Operating voltage	4.5	5.0	5.5	V	
	Operating current	—	100	160	mA	100 mA—Laser: ON, Buzzer: OFF 160 mA—Laser: ON, Buzzer /LED:ON
	Rush current	—	450	500	mA	Power supply voltage: 5.0 V
	Stand-by current	—	35	65	mA	Auto trigger OFF/ON

Conditions

Connect 1Ω resistance to a power supply line in series and measure the current by the voltage between both ends of resistance.

Power supply voltage is measured at a connector terminal area.

The current value depends on the interface type and host computer to which the device is connected.

6.3. AC Adapter

The OPR 3201 with RS-232C serial interface is shipped with a dedicated AC adapter “Universal AC Adapter Kit.” Plug connectors can be changed for each region. See diagrams below.

Item		Specification
Model Name		SFP0602000P-PSE
Dimensions		47.5 (W) × 28.0 (D) × 75.0 (H) mm
DC output cable length		1.8m
Input specifications	Voltage range	AC 90 to 265 V
	Supply current	0.5 A max
Output Specifications	Voltage range	5.7 to 6.3 V
	Maximum current	2 A max
Operating temperature		0 to 40°

6.3.1. AC Input

Dimensions: 47.5 (W) × 28.0 (D) × 75.0 (H) mm (except protruding portion)

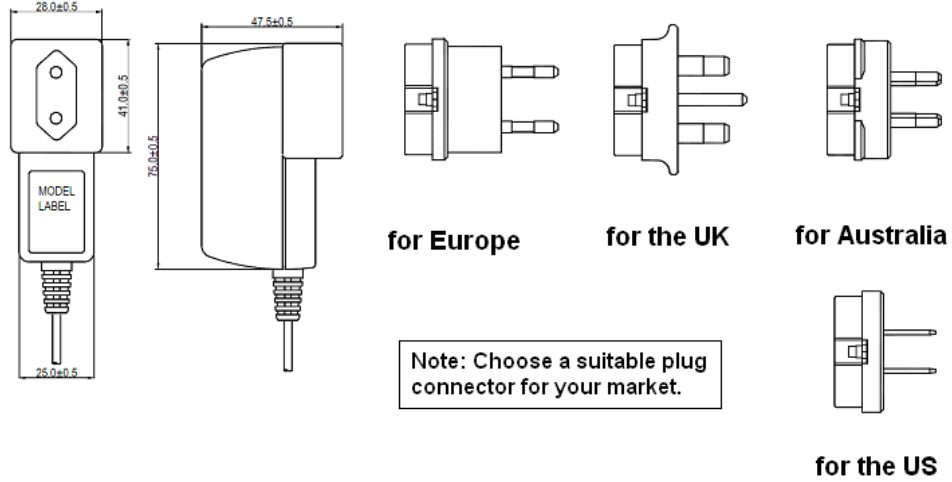


Figure 3: AC adapter 1

6.3.2. DC Output

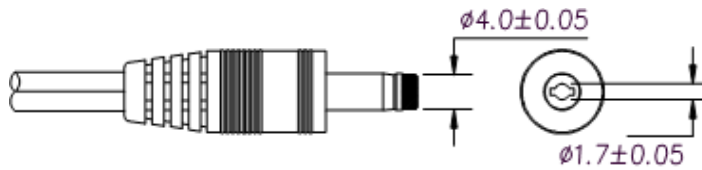


Figure 4: AC adapter 2

7. Optical Specifications

7.1. Laser Scan Specifications

Parameter	Specification	Unit
Light-emitting element	Red laser diode	—
Emission wavelength	650 ±10 (25° C)	nm
Light output	1.0 or less	mW
Scanning method	Bi-directional scanning	—
Scanning speed	100 ±20	scans/s
Scan angle	Scan angle: 54 ±5	°
	Read angle: 44 (Min)	°

Notes:

Refer to chapter 16, “Trigger and Read Options,” to read about the scan modes.

Refer to chapter 8, “Technical Specifications,” to read about scanning performance.

7.1.1. Tilt of Laser Scan Line

Laser scanning tilt is the vertical difference between both ends of a laser scan line. Measure it in the middle of the laser scan line.

- Up to 0.92° angle in vertical direction from the scan origin (mirror motor).
- Up to 2.46 mm when measured at a point 150 mm from the scan origin.

7.1.2. Curvature of Scan

The maximum difference between the laser scan line and the line between both ends of the laser scan line. Measure it in the middle of the laser scan line.

- Up to 1.27° angle in vertical direction from the scan origin (mirror motor).
- Up to 3.3 mm curvature when measured at a point 150 mm away from the scan origin.

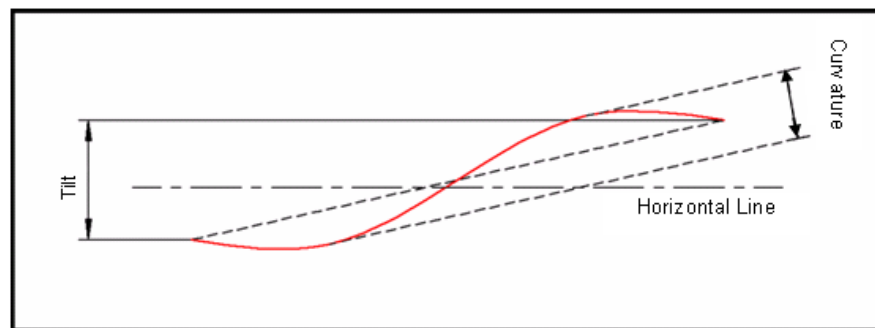


Figure 5: Laser scan tilt and curvature

8. Technical Specifications

The conditions for technical specifications are as follows, unless otherwise specified in each section.

Conditions

Ambient temperature and humidity:	Room temperature (5 to 35° C) Room humidity (45% to 85% RH)
Ambient light:	500 to 900 lx
Background:	Barcode = black Space = white Margin = white Background of label = black
Power supply voltage:	6.0 V (RS-232C) 5.0 V (USB and Wedge)
Decoding test:	Approve the performance when decoding is successful in all ten tests. (Decoding is deemed successful when completed in 0.5 seconds or less.)

8.1. Print Contrast Signal (PCS)

0.45 or higher (over 70% of reflectivity of space and quiet zone).

$$PCS = \frac{\text{Reflectance of white bar} - \text{Reflectance of black bar}}{\text{Reflectance of white bar}}$$

Scanning performance may decline if dirt or scratches mar the optical window. Keep the optical window clean.

8.2. Minimum Resolution

0.127 mm

8.3. Scan Area and Resolution

8.3.1. Depth of Field

The depth of field is measured from the edge of the scanner. The scanning range is within the circular arc centered on the scan origin.

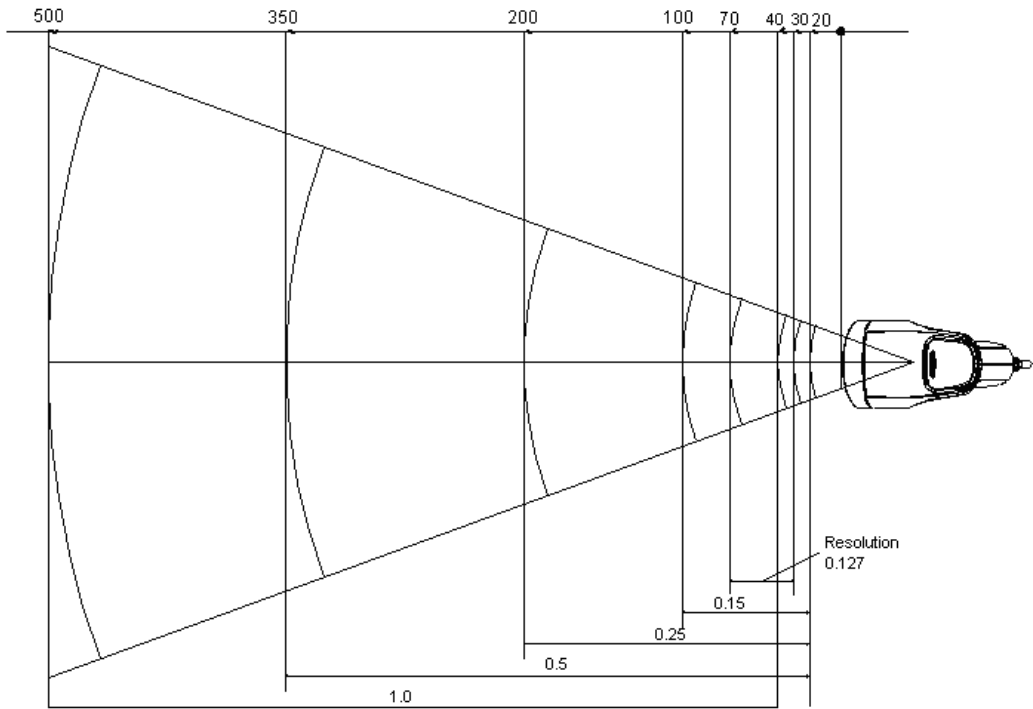


Figure 6: Depth of field

Symbology	Resolution	Decode Depth (mm)	PCS
Code 39	1.0 mm	40–500	0.9
Code 39	0.5 mm	20–350	0.9
Code 39	0.25 mm	20–200	0.9
Code 39	0.15 mm	20–100	0.9
Code 39	0.127 mm	30–70	0.9

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

- N/W Ratio 1:2.5
- Angle $\alpha = 0^\circ, \beta = 15^\circ, \gamma = 0^\circ$
- Curvature R = ∞

Resolution	Symbology	PCS	Quiet Zone	Digit
1.0 mm	Code 39	0.9	25 mm	1
0.5 mm	Code 39	0.9	18 mm	3
0.25 mm	Code 39	0.9	10 mm	8
0.15 mm	Code 39	0.9	7 mm	10
0.127 mm	Code 39	0.9	5 mm	4

8.4. Pitch, Skew, and Tilt

Pitch Angle: $\alpha \leq \pm 35^\circ$

Skew Angle: $\beta \leq \pm 50^\circ$

Dead Zone: $\beta \leq \pm 8$

Tilt Angle: $\gamma \leq \pm 20^\circ$

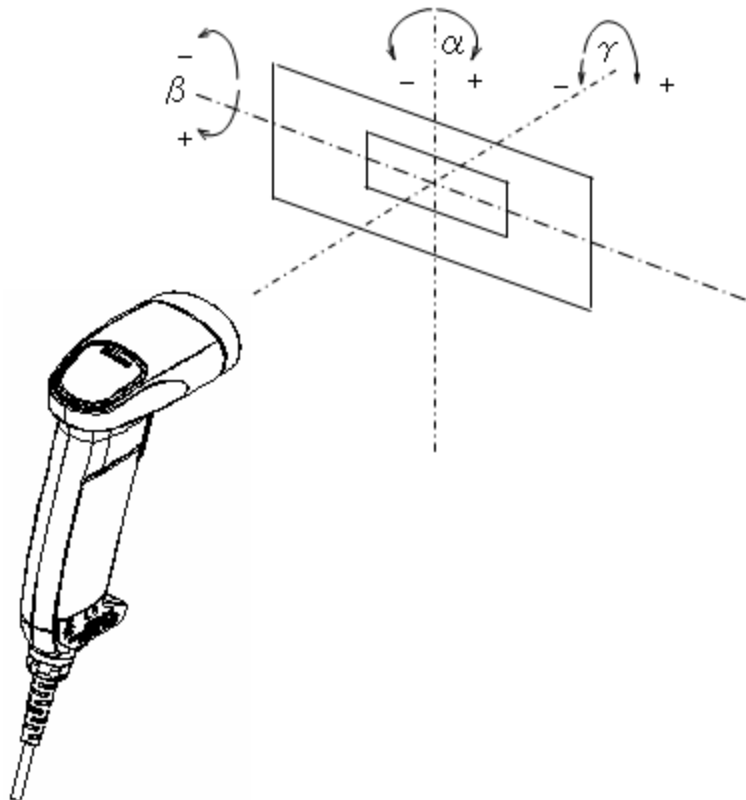


Figure 7: Pitch

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

- Distance** 70 mm from the edge of the scanner
- Label** **Pitch, Skew Angle, Dead Zone**
 PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code 39,
 Quiet Zone = 10 mm, N/W Ratio = 1:2.5
- Tilt Angle**
 PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm
- Angle** **Pitch Angle:** Skew Angle: $\beta = +15^\circ$, Tilt Angle: $\gamma = 0^\circ$
Tilt Angle: Pitch Angle: $\alpha = 0^\circ$, Skew Angle: $\beta = +15^\circ$
Skew Angle, Dead Zone: Pitch Angle: $\alpha = 0^\circ$, Tilt Angle: $\gamma = 0^\circ$
- Curvature** $R = \infty$

8.5. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when $R \geq 15$ mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when $R \geq 20$ mm.

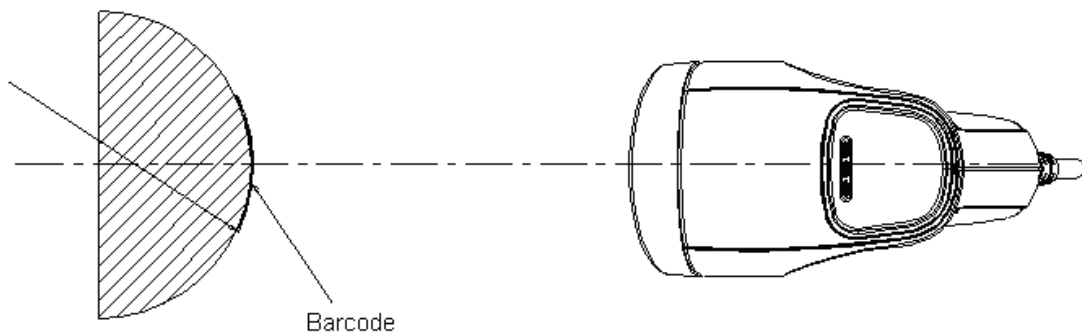


Figure 8: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

- PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm
- Distance** 70 mm from the edge of the scanner
- Angle** Skew Angle $\beta = +15^\circ$

9. Interface Specifications

9.1. RS-232C Interface Spec

9600 bps to 115.2 kbps

9.1.1. Settings and Communication

Reading the menu barcodes in section 11.1 can set the RS-232C interface default.

Parameter	[U2] setting
Baud rate	9600 bps
Start/stop bits	1 bit
Data bits	8 bits
Parity bits	No parity
Handshaking	No handshake
Flow control time out	Indefinitely

Communication settings can be configured by scanning corresponding menu barcodes.

9.1.2. 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

9.1.3. Interface Circuit

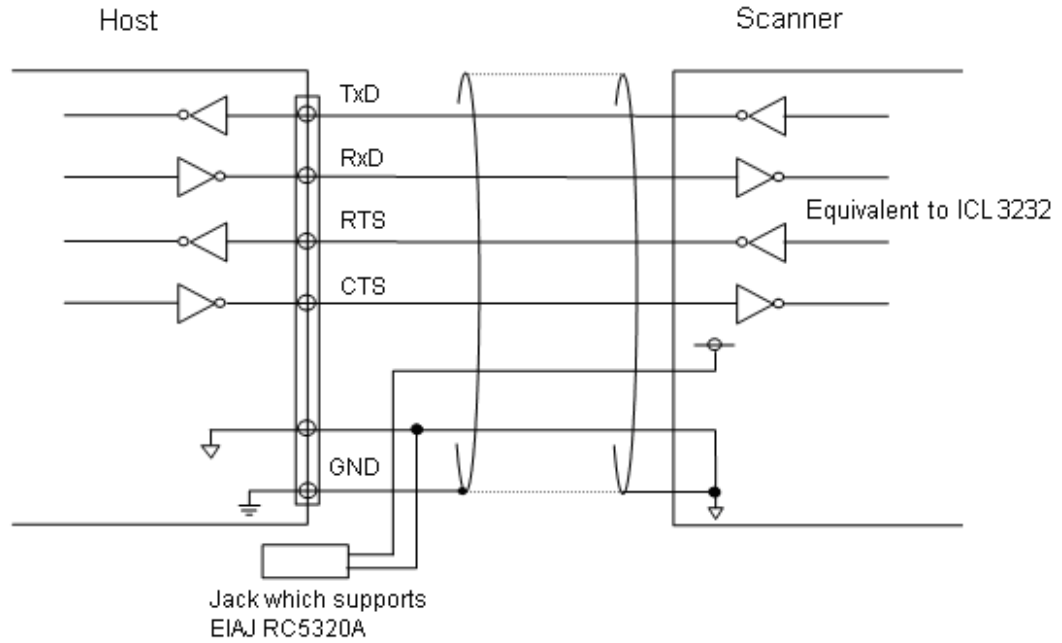


Figure 9: Interface circuit

9.1.4. Character Format

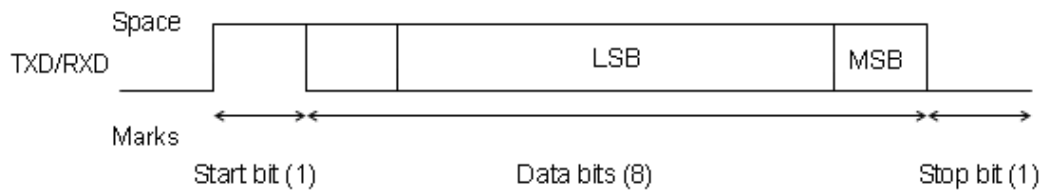


Figure 10: Character format (same for both sending and receiving)

9.1.5. Communication Format

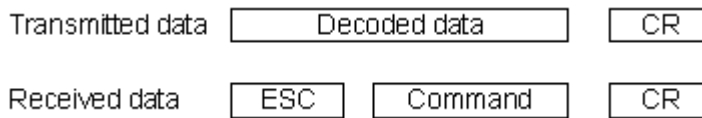


Figure 11: Communication format

9.1.6. Handshaking

Select handshaking options using the menu or command listed below.

Handshaking	Menu/Command
No handshake	P0
BUSY/READY	P1
MODEM	P2
ACK/NAK	P3
ACK/NAK NO RESPONSE	P4
ON/OFF	ZG

a) No Handshaking

The scanner attempts the communication regardless of the state of the host computer.

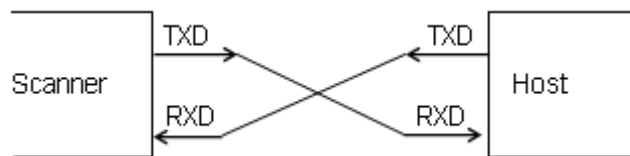


Figure 12: No handshaking

b) BUSY/READY

The scanner 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.

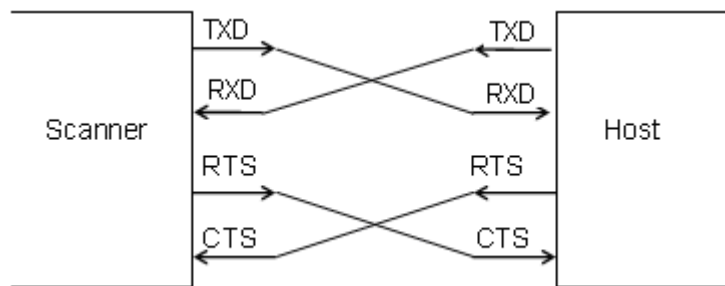


Figure 13: Busy/Ready communication

The scanner stays ON (is able to receive data) except during certain parts of the process, such as receiving data (buzzer command execution), transmitting data, and menu processing. The scanner checks the CTS line before transmitting data. When it is ON, the scanner transmits data. When it is OFF, the scanner waits for it to turn ON within a set time. The scanner will abort transmission with an error indication (buzzer) when the CTS line is not ON

within a specified period. The Flow Control time-outs are as follows, and the default setting is “indefinitely” (I0).

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

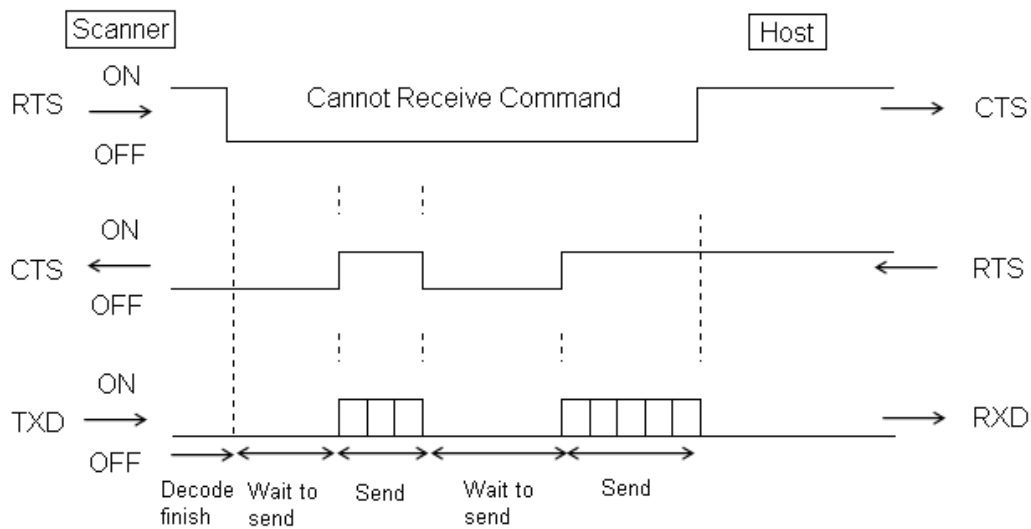


Figure 14: Cannot receive command

CTS, TXD signal timing

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



Figure 15: Signal timing

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

c) MODEM

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

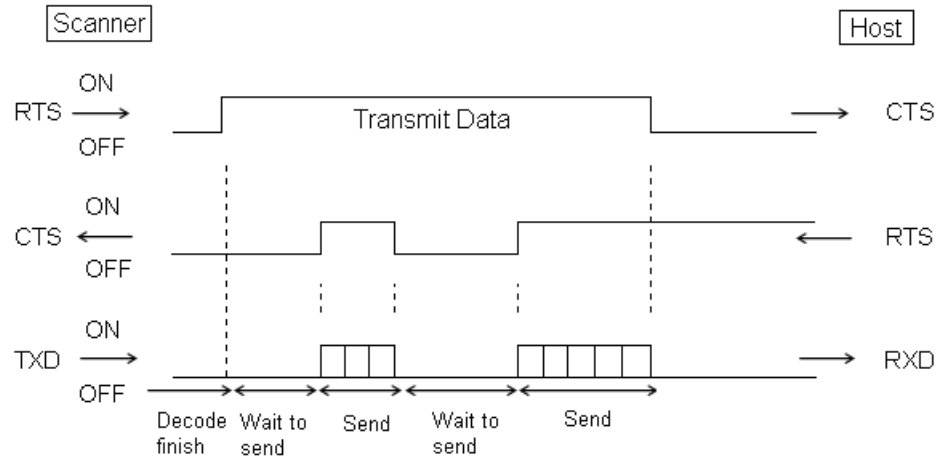


Figure 16: Modem transmit data

d) XON/XOFF CONTROL**During data transmission**

While this configuration is enabled, the OPR 3201 keeps on sending data until it receives a control code XOFF (ASCII DC3, Hex13). It stops the data transmission once it receives the control code XOFF (ASCII DC3, Hex13). It re-starts sending the data when it receives a control code XON (ASCII DC1, Hex11).

During data reception

While this configuration is enabled, the OPR 3201 sends a control code XOFF (ASCII DC3, Hex13) to the host if the remaining buffer capacity for data reception gets low. When the buffer empties after the completion of buffer processing, the OPR 3201 sends a control code XON (ASCII DC1, Hex11) to the host and re-starts processing the received data.

If any of the following occurs, the scanner sends a control code XOFF (ASCII DC3, Hex13) to the host while it is processing the data reception.

- RS-232C interface—When the remaining buffer capacity becomes smaller than 16 bytes.
- USB-VCP interface—When the remaining buffer capacity becomes smaller than 128 bytes.

e) ACK/NAK

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

ACK response—Action: The scanner completes transmission with the good-read buzzer and returns to the initial state.

NAK response—Action: The scanner sends the data again and waits for the response from the host.

DC1 response—Action: The scanner returns to waiting for the trigger, if it has a trigger (the initial state).

None response—Action: The scanner sounds the error buzzer and returns to the initial state.

ACK/NAK timeout is 100 ms.

ACK/NAK timeout is 100 ms.

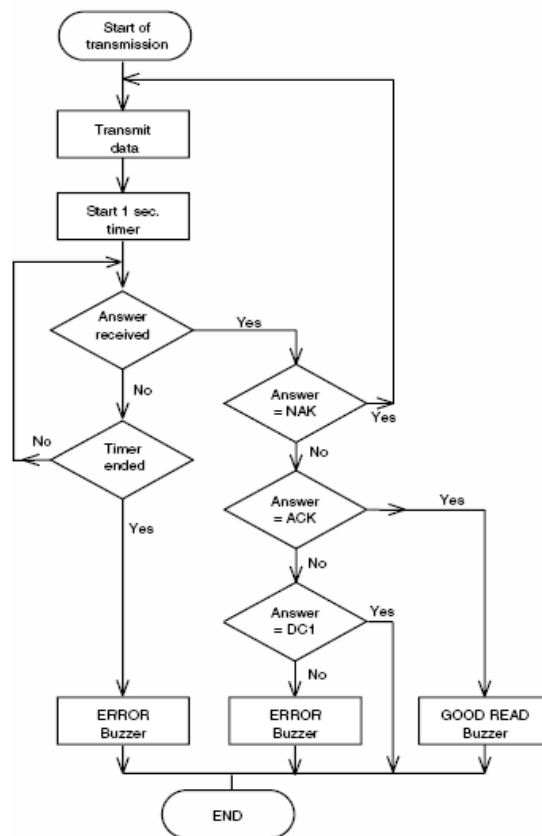


Figure 17: ACK/NAK

f) ACK/NAK NO RESPONSE

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

ACK/NAK timeout is 100 ms.

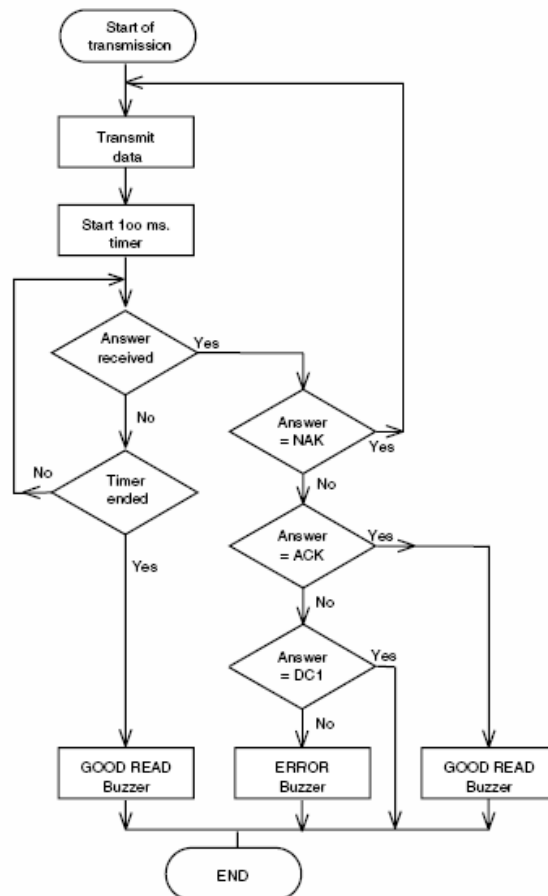


Figure 18: ACK/NAK—No response

9.2. USB-HID and USB-VCP Interface Specifications

9.2.1. Settings

Reading the menu barcodes in section 11.1 can set the USB interface default. The interface is full-speed USB, 12 Mbps (HID/VCP) and low-power bus-powered. For USB-VCP support, a driver must be installed on the host.

9.2.2. Interface Circuit

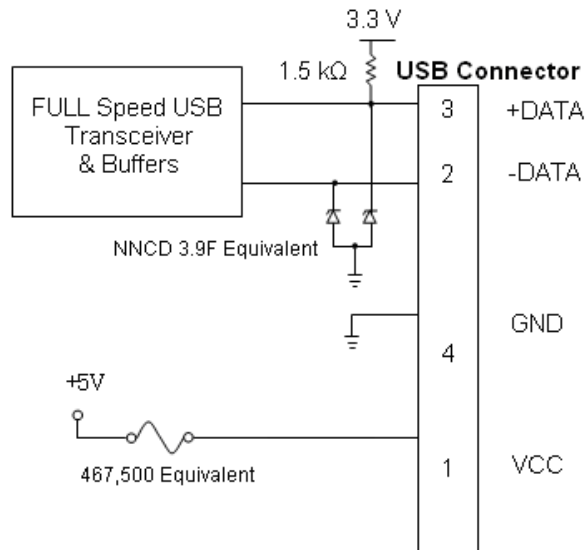


Figure 19: Interface circuit

Do not use the keyboard while the scanner is transmitting the data to the host. Doing so may cause data transactions to fail.

9.3. Wedge Interface Specification

9.3.1. Settings

Reading the menu barcodes in section 11.1 can set the Wedge interface default.

10. Cable and Connector

10.1. RS-232C Cable

(Standard specification)

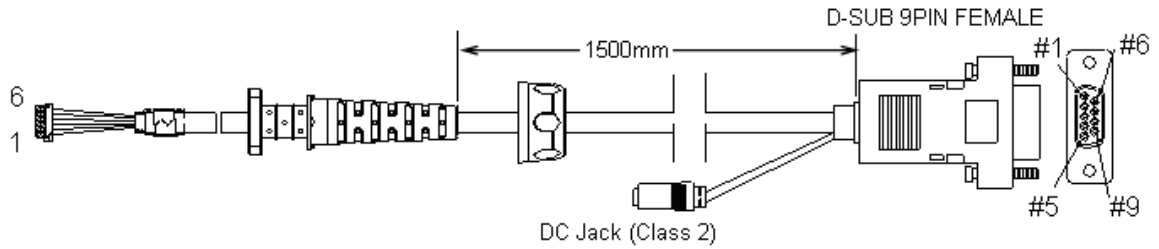


Figure 20: RS-232C cable

Type:	Straight
Diameter:	$\Phi 4.8 \pm 0.5 \text{ mm}$
Length:	1500 +50 -0 mm
Cores:	6 insulated wires, 1 conductive wire
Weight:	Approximately 40 g

10.1.1. Connector

D-sub 9-pin female

Power supply: DC jack, EIAJ RC5320A (voltage Class 2)

10.1.2. Pin Assignment

Pin No	Signal Name	Remarks
1	(NC)	Not connected
2	TxD	
3	RxD	
4	Connected to pin 6	
5	GND	
6	Connected to pin 4	
7	CTS	
8	RTS	
9	(NC)	Not connected

10.2. USB Cable

(Standard specification)

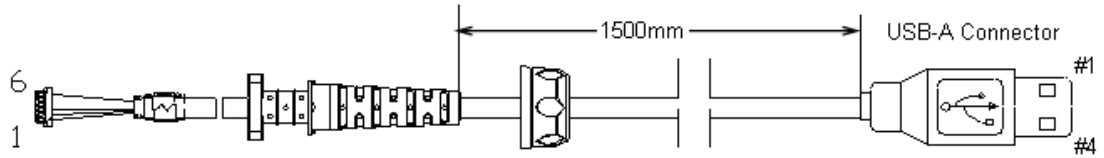


Figure 21: USB cable

Type:	Straight
Diameter:	$\Phi 4.8 \pm 0.5$ mm
Length:	1500 +50, -0 mm
Cores:	4 insulated wires, 1 conductive wire
Weight:	Approximately 40 g

10.2.1. Connector

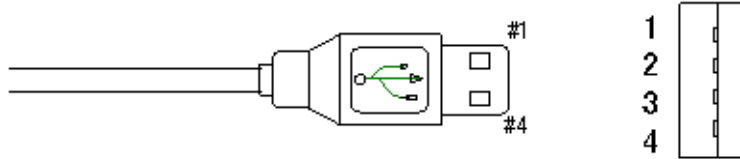


Figure 22: USB "A" connector

Contact Number	Signal Name
1	VCC
2	-DATA
3	+DATA
4	GND

10.3. Wedge Cable

(Standard specification)

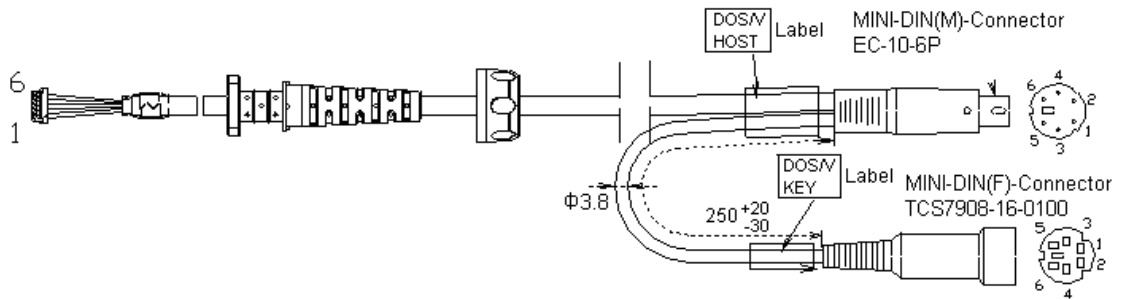


Figure 23: Wedge cable

Type:	Y cable
Diameter:	$\Phi 4.8 \pm 0.5$ mm
Length:	1500 +50, -0 mm
Cores:	6 insulated wires, 1 conductive wire
Weight:	Approximately 50 g

10.3.1. Connector

a) Host Connector

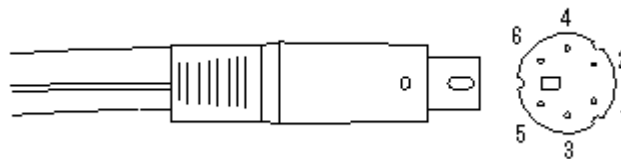


Figure 24: Host connector

Contact Number	Signal Name
1	CPU_DATA
2	NC
3	GND
4	VCC
5	CPU_CLK
6	NC

b) Keyboard Connector

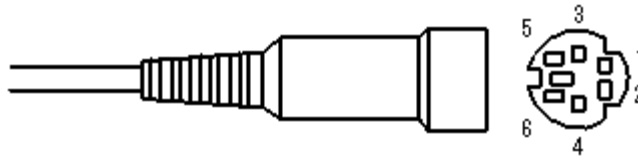


Figure 25: Keyboard connector

Contact Number	Signal Name
1	KEY_DATA
2	NC
3	GND
4	VCC
5	KEY_CLK
6	NC

- Do not turn the adapter ON or OFF while using the keyboard, as doing so may cause malfunctions.
- Do not use the keyboard or attempt a scanning operation before the operating system on the host computer is fully activated.

11. Default Settings




11.1. Set Default Interface

Scan the following menu barcodes to return to the default settings.




RS-232C

Functions	Menu labels	Menu codes
SET		ZZ
RS-232C		U2
END		ZZ

USB-HID

Functions	Menu labels	Menu codes
SET	 z z	ZZ
USB-HID	 s u	SU
END	 z z	ZZ





USB-VCP

Functions	Menu labels	Menu codes
SET	 z z	ZZ
USB-VCP	 c 0 1	C01
END	 z z	ZZ

Wedge (with external keyboard)

Functions	Menu labels	Menu codes
SET	 z z	ZZ
AT-Wedge	 u b	UB
Keyboard layout: with keyboard	 k m	KM
END	 z z	ZZ

Wedge (without external keyboard)

Functions	Menu labels	Menu codes
SET	 z z	ZZ
AT-Wedge	 u b	UB
Keyboard layout: without keyboard	 k l	KL
END	 z z	ZZ

11.2. Default Settings 1: Readable Codes

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Other
UPC-A	■	X	■	■	—	CR	
UPC-A Add-on	X	X	■	■	—	CR	
UPC-E	■	X	■	■	—	CR	
UPC-E Add-on	X	X	■	■	—	CR	
EAN-13	■	X	■	■	—	CR	
EAN-13 Add-on	X	X	■	■	—	CR	
EAN-8	■	X	■	■	—	CR	
EAN-8 Add-on	X	X	■	■	—	CR	
Chinese Post 2of5	X	X	■	X	—	CR	
Codabar / NW-7	■	X	■	X	—	CR	Not transmit ST/SP
Code 11	X	X	X	■	—	CR	
Code 39	■	X	■	X	—	CR	Not transmit ST/SP
Code 93	■	X	X	■	—	CR	
Code 128	■	X	X	■	—	CR	
GS1-128 (EAN/UCC-128)	X	X	X	■	—	CR	
GS1 DataBar (RSS) (all, incl. CC-A/B); Limited/Expanded	X	X	■	■	—	CR	
IATA	■	X	■	X	—	CR	
Industrial2of5	■	X	■	X	—	CR	
Interleaved2of5	■	X	■	X	—	CR	
Korean Postal Code (Code 3of5)	X	X	X	■	—	CR	
Matrix2of5	X	X	■	X	—	CR	
MicroPDF417	X	X	—	—	—	CR	
PDF417	X	X	—	—	—	CR	
MSI/Plessey	■	X	■CD1	■CD1	—	CR	
S-Code	■	X	■	X	—	CR	
Telepen	■	X	X	■	—	CR	
Trioptic	■	X	—	—	—	CR	Not transmit ST/SP
UK/Plessey	■	X	■	■	—	CR	

Notes:

In the “Reading” column, “■” means “Enable reading” and “X” means “Disable reading.”

In the “Transmit code length” column, “■” means “Transmit code length” and “X” means “Do not transmit code length.”

In the “Transmit CD” column, “■” means “Transmit check digit” and “X” means “Do not transmit check digit.”

In the “Calculate CD” column, “■” means “Calculate check digit” and “X” means “Do not calculate check digit.”

“—” means “not supported.”

In the “Prefix” column, “—” means “there is no prefix setting.”

11.3. Default Settings 2: Read Options, Trigger, Buzzer

Item		Default Setting
Setting the number of characters		Fixed length OFF all codes
Read mode		Multiple read
Multiple read reset time		500 ms
Add-on wait mode		500 ms
Multiple label read		Disable
Multiple column read		Disable
Redundancy	Default option ([X0] setting)	Read 1 times, redundancy = 0
	Other options ([X1 .. X3] setting) ([BS .. BW] setting)	Read 2 times, redundancy = 1 for the following symbologies and lengths: <ul style="list-style-type: none"> ● Code 11 with length <= 5 ● Code 39 with length <= 5 ● IATA, Industrial 2of5, Interleaved 2of5 with length <= 8 ● MSI/Plessey with length <= 4 ● NW-7 (Codabar) with all lengths
Trigger switch		Enable
Trigger repeat		Disable
Auto trigger		Disable
Read time		2 seconds (when trigger enabled)
Margin check		Normal
Buzzer duration		50 ms
Buzzer tone		Single tone (3 kHz)
Buzzer loudness		Maximum
Buzzer transmission		Before transmission
Startup buzzer		Enable
Good read LED		Indicator duration 200 ms

11.4. Default Settings 3: Communication Settings

11.4.1. Default Settings 3A: Serial Communication Settings— RS-232C

Parameter	“U2” Default Setting
Baud rate	9600 bps
Parity bits	No parity
Data length	8 bits
Stop bits	1 bit
Handshaking	None
ACK/NAK	None
Flow Control time out	Infinite
ACK/NAK timeout	1 second
Command header	ESC or STX
Command terminator	CR or ETX
ACK/NAK for RS232 Comm.	None

11.4.2. Keyboard Communication Settings—USB

Parameter	“SU”/“C01” Settings
Scanner power: Max power descriptor	100mA
Keyboard *1	US Keyboard
Vendor ID	0x65a (OPTOELECTRONICS)
Transmit Enter key output*1	Enable
Transmit Execution key output*1	Disable
Transmit Tab key output*1	Disable
Transmit Arrow right key output*1	Disable

11.4.3. Keyboard Communication Settings—Wedge

Parameter	“UB” Settings
Transmit Enter key output as a suffix	Enable
Transmit Execution key output as a suffix	Disable
Transmit Tab key output as a suffix	Disable
Transmit Arrow right key output as a suffix	Disable
Delay after transmission	10 ms
Scan code	Scan code set 2 (keyboard)
Select keyboard	US keyboard emulation

12. Serial Number and Labeling

The serial number shown below is affixed to the scanner.

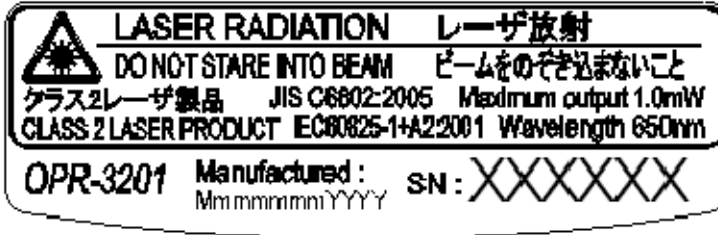


Figure 26: Serial number label

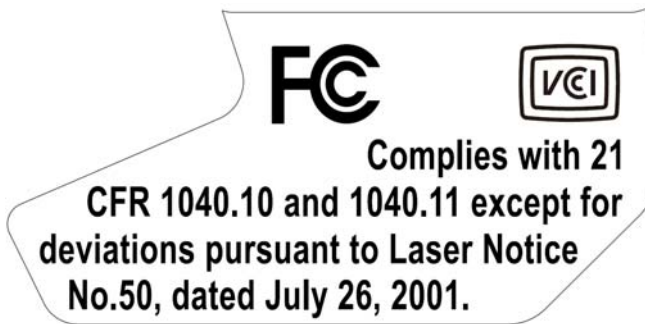


Figure 27: FCC compliance label



Figure 28: CE compliance label

13. Packaging Specifications

13.1. Individual Packaging Specification

Put the scanner in a protective foam bag and place it in an individual packing box.

Size of the package (after assembly: (W) 255 x (D) 120 x (H) 105 mm

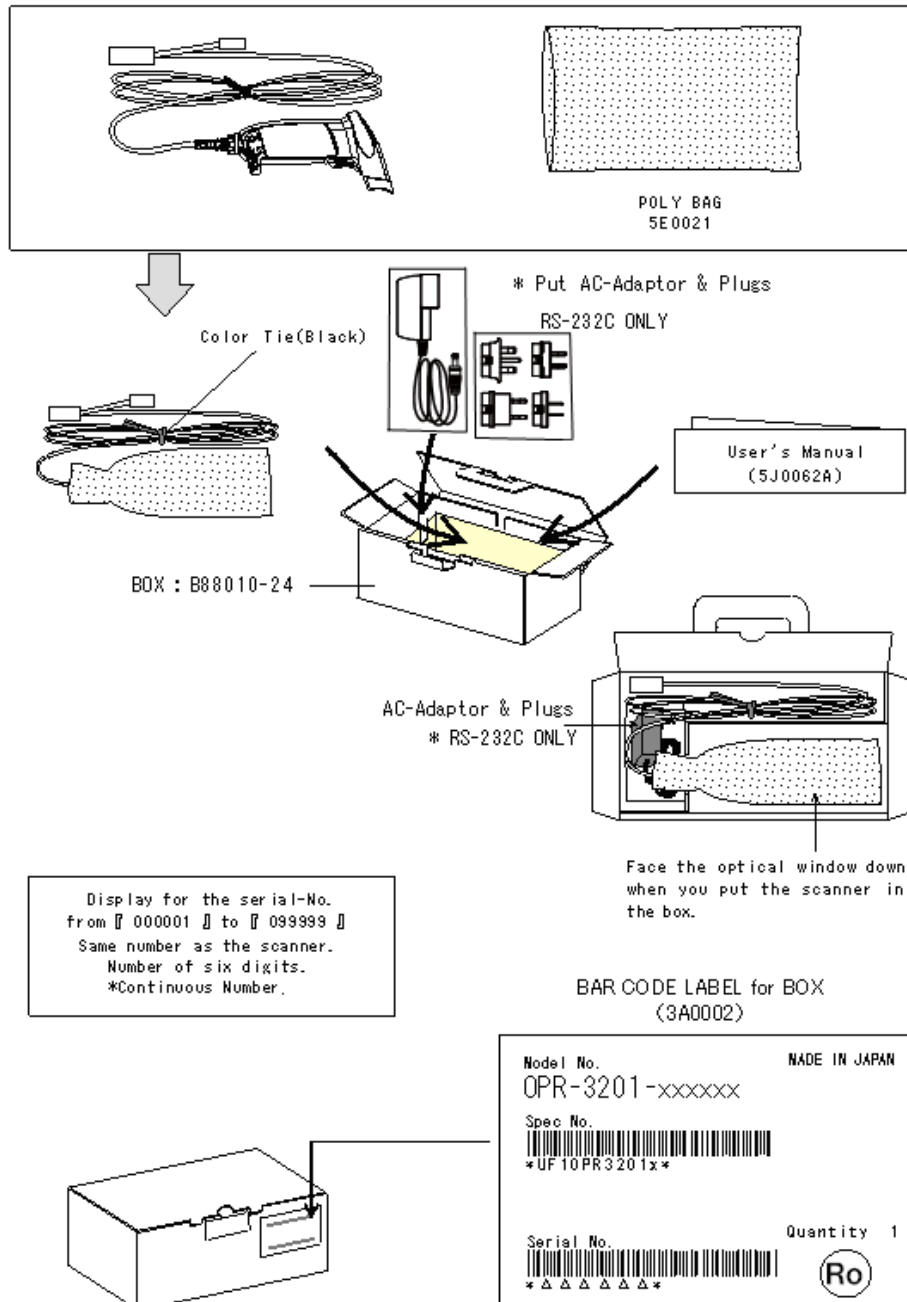


Figure 29: Individual packaging

13.2. Collective Packaging Specification

Size of the package (after assembly): (W) 255 x (D) 120 x (H) 105 mm

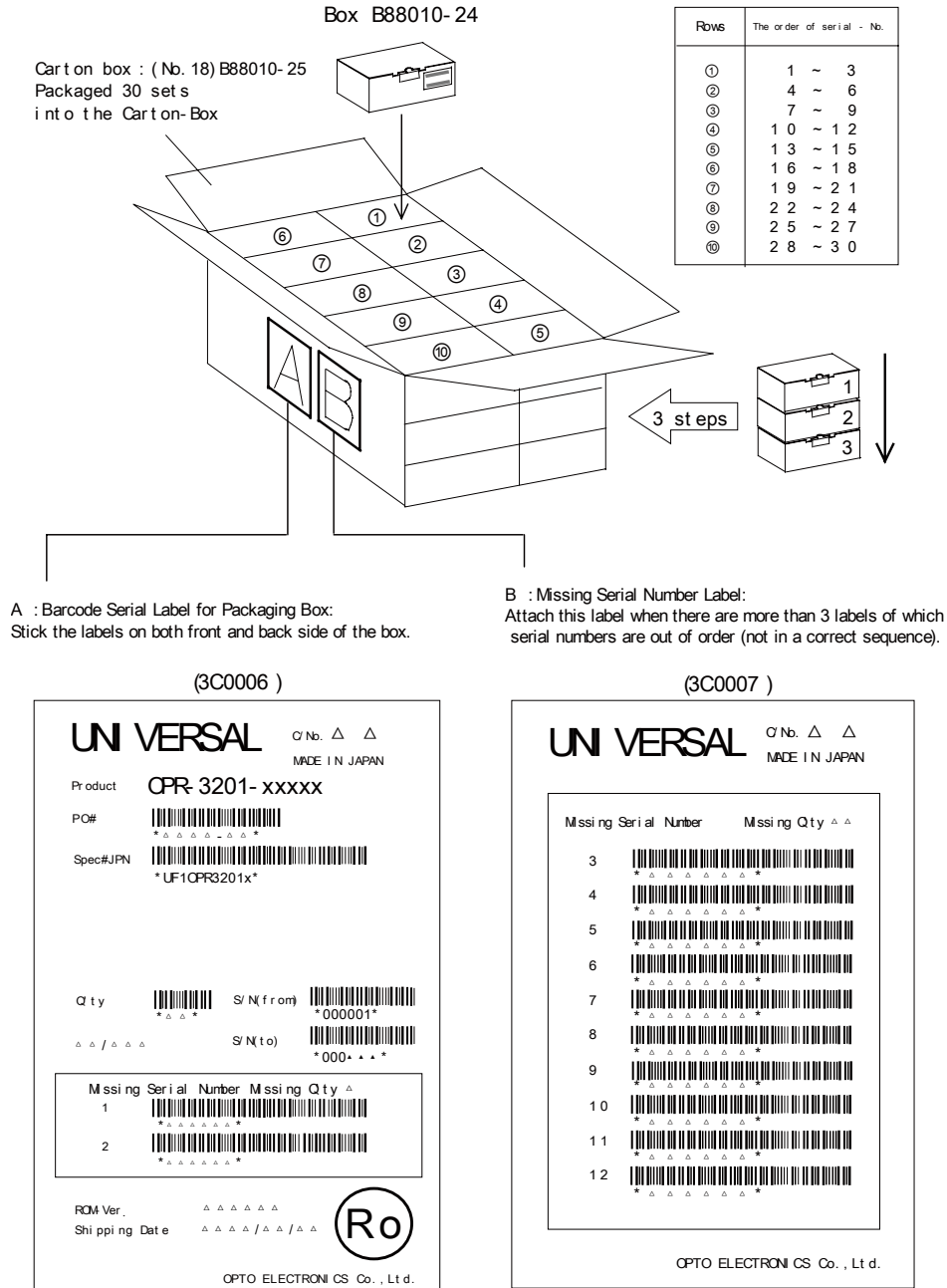


Figure 30: Collective packaging

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.

14. Durability

14.1. Static Electricity

Air discharge:	±10 kV max. (No malfunction) ±15 kV max. (No destruction)
Contact discharge:	±6 kV max. (No malfunction) ±15 kV max. (No destruction)
Measurement environment:	Use electrostatic testing device compliant with IEC 61000-4-2 Built up and discharged 15 kV of static electricity on the scanner surface 50 times.
Discharge resistance:	330 Ω
Capacitor charging:	150 pF

14.2. Shock

14.2.1. Drop Test (without packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop the scanner from a height of 150 cm onto a concrete floor (three times in each of 5 angles).

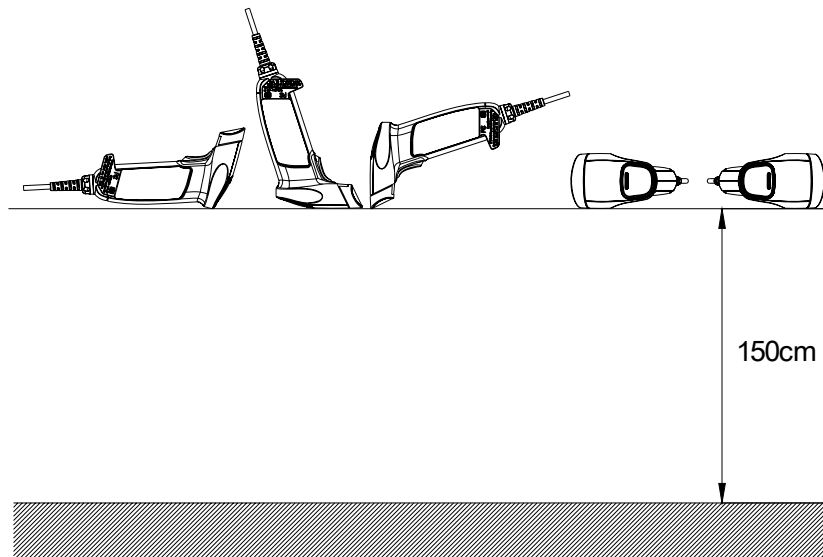


Figure 31: Drop test

14.2.2. Drop Test (with individual packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop an individually packaged scanner from a height of 150 cm onto a concrete floor once on its 1 corner, 3 edges, and 6 sides (10 total drop tests).

14.3. Vibration Strength (without packaging)

No malfunction occurred after the following vibration test.

Vibration test: Increase the frequency of the vibration from 10 Hz to 100 Hz with accelerated velocity 19.6m/s^2 (2G) for 30 minutes (60 minutes for one cycle) in non-operating state. Repeat this routine in each X, Y, Z directions.

14.4. Vibration Strength (with individual packaging)

No malfunction occurred after the following vibration test.

Vibration test: Increase the frequency of the vibration from 10 Hz to 100 Hz with accelerated velocity 19.6m/s^2 (2G) for 30 minutes (60 minutes for one cycle) in non-operating state. Repeat this routine in each X, Y, Z directions.

14.5. Dust and Drip Proof

IEC IP42

Dust Prevention

Level	Details
4	Prevention of objects larger than 1 mm. Most wires, screws, etc.

Water Prevention

Level	Details
2	Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.

14.6. Cable Strength

No malfunction occurred after the following cable strength test.

Affix the scanner to an immovable object, then pull it with a static load of 24.5 N (2.5 kgf) for 1 second. Carry out this test 20 times.

14.7. Cable Bending Test

No malfunction occurred after the following cable bending test.

Add a load of 4.9 N (500 gf) to a cable then bend it at an angle of 90 degrees to both right and left. Repeat this bending test for 1 million times.

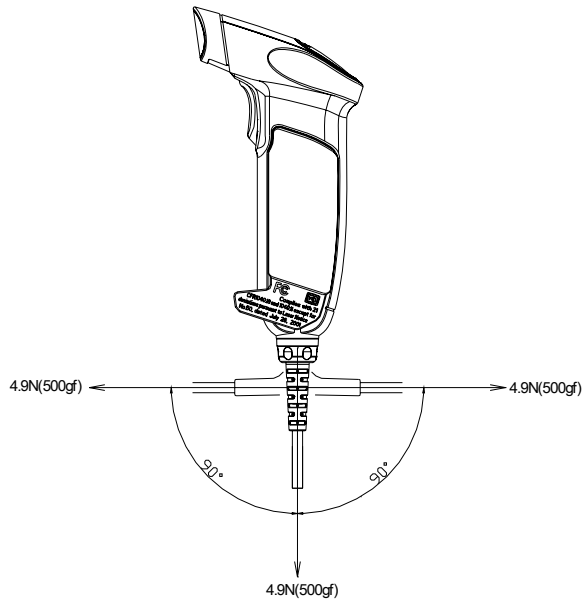


Figure 32: Cable bending test

15. Reliability

MTBF (Mean Time Between Failures) of this product is 10,000 hours.

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.

16. Trigger and Read Options

16.1. Auto Trigger Overview

The OPR 3201 has an optional auto trigger setting, which starts barcode reading after detecting a change in reflection in the detection area. When auto trigger is used, the scanner starts barcode reading after detecting a change in reflection in the detection area. The scanner will be triggered if the sensors detect changes in brightness in the detection area.

Auto trigger distance: 50 ±10 mm from the edge of the scanner.

Conditions

Moving speed	100 ±10 mm/s (direction is not specified)
Angle	Skew Angle, excluding Pitch Angle and Dead Zone, is specified in section 0.
Environmental temperature and humidity	Room temperature and humidity
Environmental illuminance	500 to 900 lx
Conditions for the auto trigger	<ol style="list-style-type: none"> 1. Barcode sheet: OPTOELECTRONICS Test Sheet (white) Background: OPTOELECTRONICS Test Sheet (black) 2. Barcode sheet: OPTOELECTRONICS Test Sheet (black) Background: OPTOELECTRONICS Test Sheet (white)

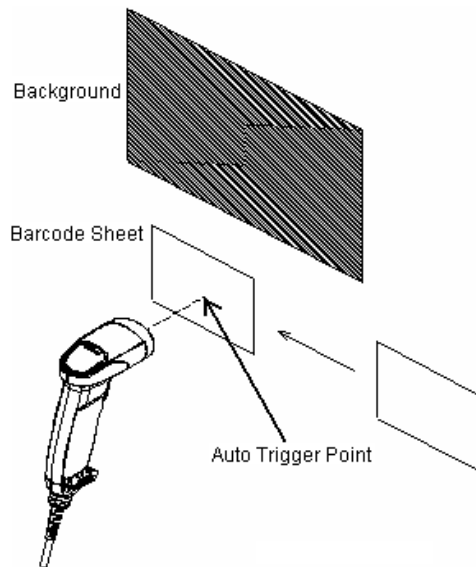


Figure 33: Auto trigger operation

16.2. Stand Detection

Enabled: This option automatically enables auto trigger when the reader is inserted into a stand.

Disabled: The reader auto trigger function behaves the same whether it is in or out of the stand.

Descriptions in parentheses show menu IDs.

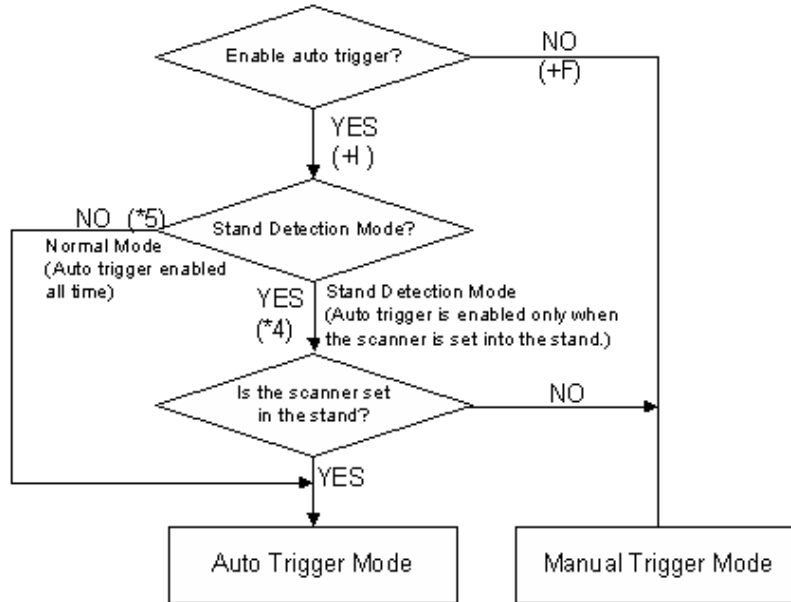


Figure 34: Auto trigger configuration diagram

16.3. Auto Trigger Settings

16.3.1. Enable when Scanner Inserted in Stand

Enable auto trigger only when the scanner is inserted into the stand.

Functions	Menu labels	Menu codes
SET		ZZ
Enable auto trigger		+1
Enable auto trigger stand detection		*4
END		ZZ

(If the scanner is removed from the stand, auto trigger is disabled and the scanner should be triggered manually.)

16.3.2. Enable Auto Trigger All the Time

This option enables auto trigger all the time.

Functions	Menu labels	Menu codes
SET	 z z	ZZ
Enable auto trigger	 + I	*1
Disable auto trigger stand detection	 * 5	*5
END	 z z	ZZ

16.3.3. Only Trigger Manually

This is the default setting.

Functions	Menu labels	Menu codes
SET	 z z	ZZ
Disable auto trigger	 + F	+F
Disable auto trigger stand detection	 * 5	*5
END	 z z	ZZ

A lead switch and a magnet is used for stand detection operation. Therefore, auto trigger may be activated when there is a magnetic substance nearby.

17. Regulatory Compliance

17.1. Laser Safety

The scanner emits laser beams.

JIS C6802: 2005: Laser class 2

IEC 825-1/EN 60825-1: Laser class 2

FDA CDRH Laser class II. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24, 2007.

Class II laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

17.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

17.3. 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.

17.4. RoHS

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

18. Safety

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

18.1. Shock

Do not throw or drop the scanner.

Do not place heavy objects on the cables.

18.2. Temperature Conditions

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

Do not pour boiling water on the scanner.

Do not throw the scanner into the fire.

Do not forcibly bend the cables at low temperatures.

18.3. Foreign Materials

Do not immerse the scanner in liquids.

Do not subject the scanner to chemicals.

18.4. Other

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

Do not disassemble this product.

Do not place the product near a radio or a TV receiver, as the scanner may cause reception problems.

The scanner may be damaged by voltage drops.

The scanner may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.

19. Mechanical Drawing

Dimensions: 56.0 (W) × 108.1 (D) x 148.6 (H) mm (except protruding portion)

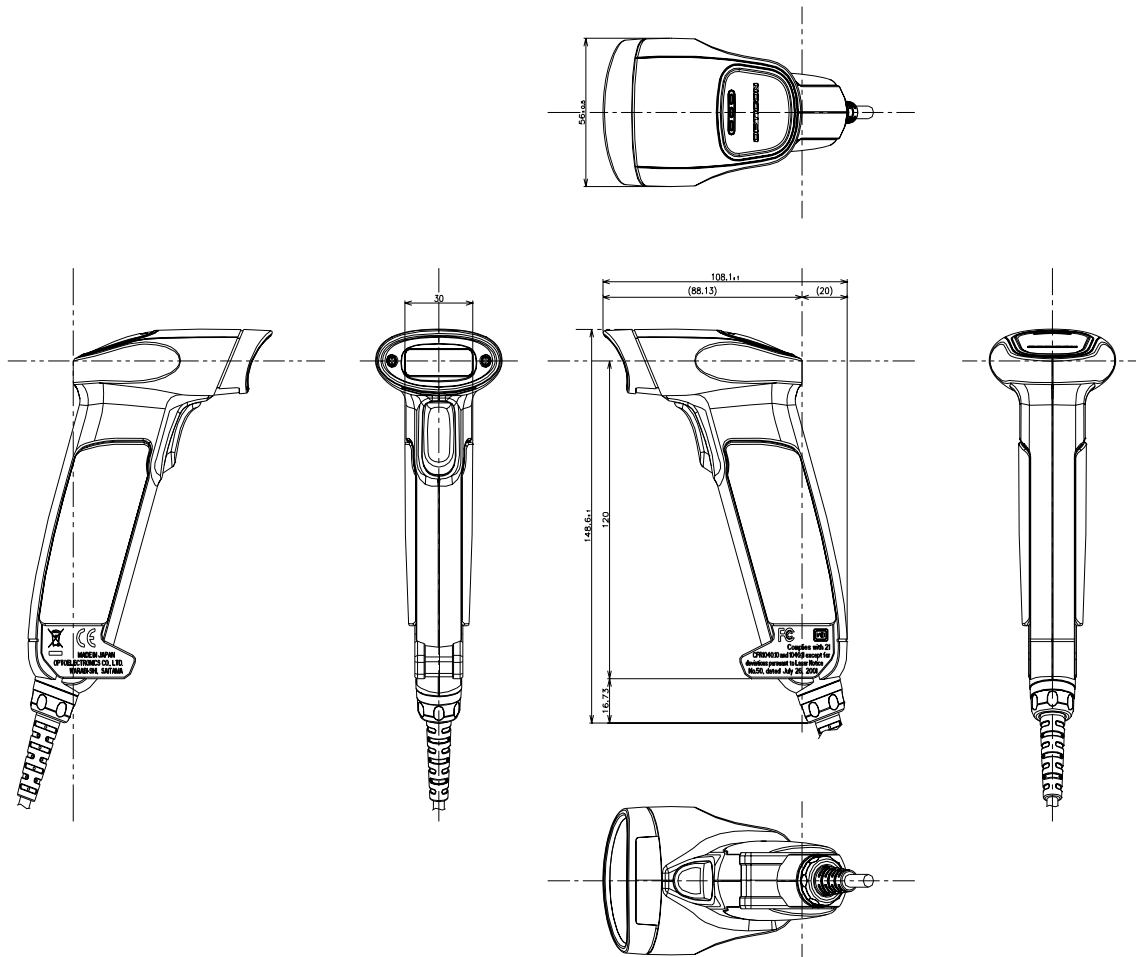


Figure 35: Mechanical drawing