

OPTICON

Laser Barcode Scanner

OPR 2001



The OPR 2001 is a handheld laser barcode scanner.

Specifications Manual

All information subject to change without notice.

Document History

Model Number:	OPR 2001	Specification Number:	SS07011
Edition:	1A	Original Spec Number:	SS06121
Date:	2007-02-14		

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1. Abstract

This manual provides specifications for the OPR 2001 laser barcode scanner.

2. Overview

The OPR 2001 is a handheld laser barcode scanner. The use of a short-wavelength red laser beam enhances visibility when scanning lines.

The OPR 2001 can be configured to scan both positive and negative barcodes. Scanned data is transferred via an RS-232C, USB, or Wedge interface. Auto-trigger settings are available.

The OPR 2001 complies with RoHS.

Supported symbologies:

Linear (1D)	Postal	2D
JAN/UPC/EAN, incl. add-on	Chinese Post	Composite Codes
Codabar/NW-7	Korean Postal Authority Code	MicroPDF417
Code 11		PDF417
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		

3. Physical Features

3.1. Dimensions

W 151.0 x D 56.0 x H 30.5 mm

3.2. Weight

60 grams max. (excluding cable weight)

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: -5° to +50° C

Humidity: 20 to 85% RH

4.2. Storage Temperature and Humidity

Temperature: -20° to +60° C

Humidity: 10 to 90% RH

4.3. 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

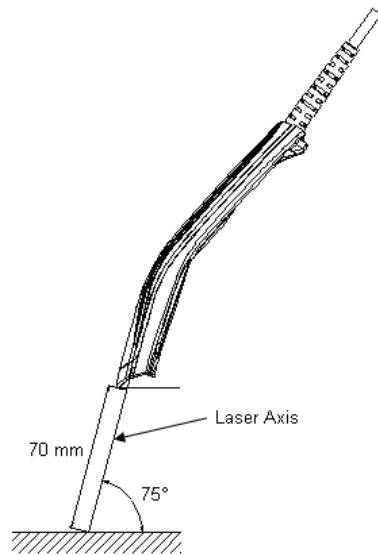


Figure 1: Ambient light immunity

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:	$\alpha = 0^\circ \beta = 15^\circ \gamma = 0^\circ$
Curvature:	$R = \infty$
Power Supply Voltage:	5.0 V

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

Note: α , β and γ respectively represent pitch, skew and tilt. Please see section 7 for how these values are defined.

5. Electrical Specifications

5.1. Electrical Characteristics: RS-232C

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_{DD}	4.5	6.0	6.5	V	
Operating current	I_{OP}	—	90	150	mA	No buzzer
Peak current	I_{PEAK}	—	550	600	mA	
Standby current	I_{PRE}	—	35	70	mA	
Startup time	T_D	—	100	—	ms	

5.2. Electrical Characteristics: USB, Wedge

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Power supply voltage	V_{DD}	4.5	5.0	5.5	V	
Operating current	I_{OP}	—	90	150	mA	No buzzer
Peak current	I_{PEAK}	—	450	500	mA	
Standby current	I_{PRE}	—	35	70	mA	
Startup time	T_D	—	100	—	ms	

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. Optical Specifications

6.1. Laser Scan Specifications

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

Notes:

Refer to chapter 15, “Trigger and Read Options,” to read about the scan modes.

Refer to chapter 7, “Technical Specifications,” to read about scanning performance.

6.1.1. Tilt of Laser Scan Line

Scanning tilt is the vertical difference between the ends of a laser scan line.

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

Measurement is done at the center of the laser scan line.

6.1.2. Curvature of Scan

Scanning curvature is the maximum difference between the laser scan line and the line between the ends of the laser scan line.

- Up to 1.17° in a vertical direction from the scan origin (mirror motor mirror).
- Up to 3.06 mm when measured at 150 mm from the scan origin.

Measurement is done from the center of the laser scan line.

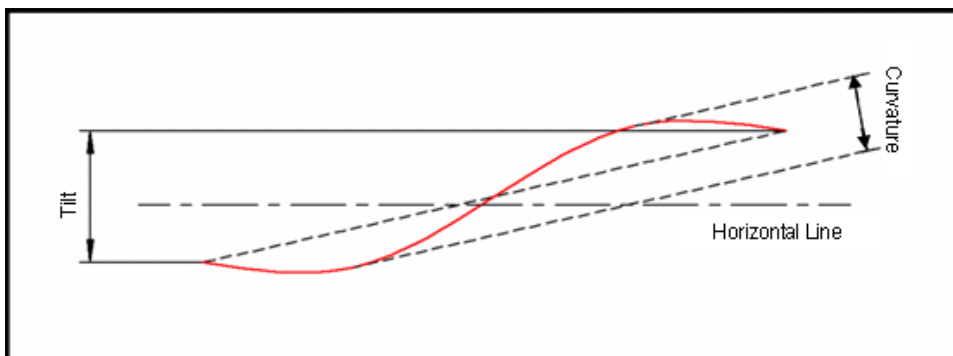


Figure 2: Laser scanning tilt and curvature

7. 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, 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.)

7.1. 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.

7.2. Minimum Resolution

0.127 mm

7.3. Scan Area and Resolution

7.3.1. 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.

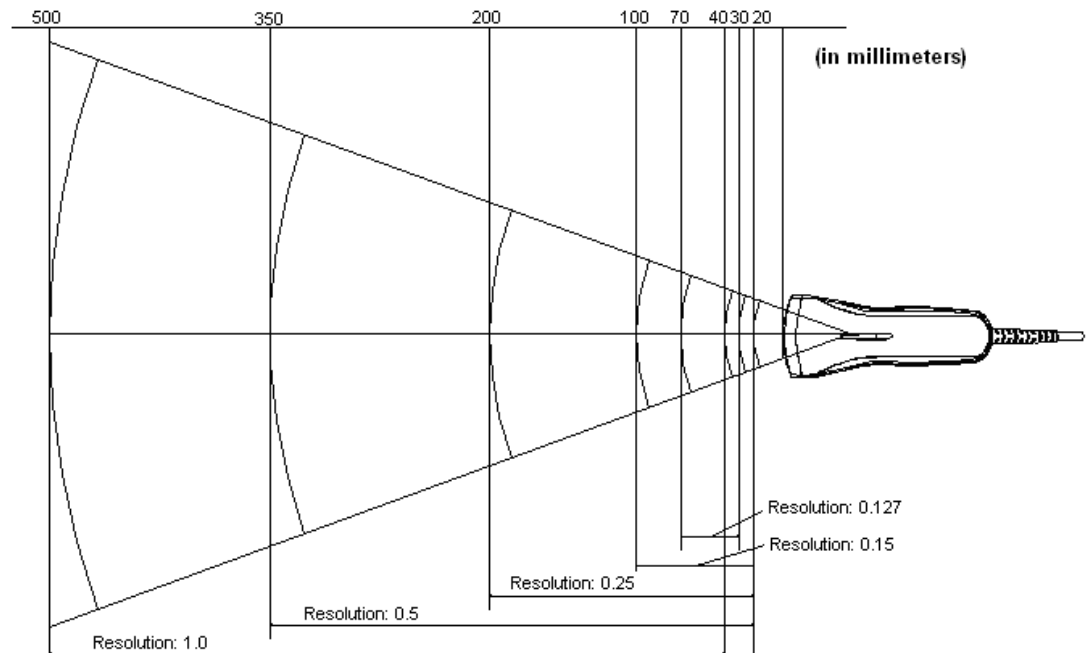


Figure 3: Depth of field

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: $R = \infty$

Resolution	Symbology	PCS	Quiet Zone	Digits
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

7.4. Pitch, Skew, and Tilt

7.4.1. Pitch Angle

Scanning performance is guaranteed when $\alpha = \pm 35^\circ$

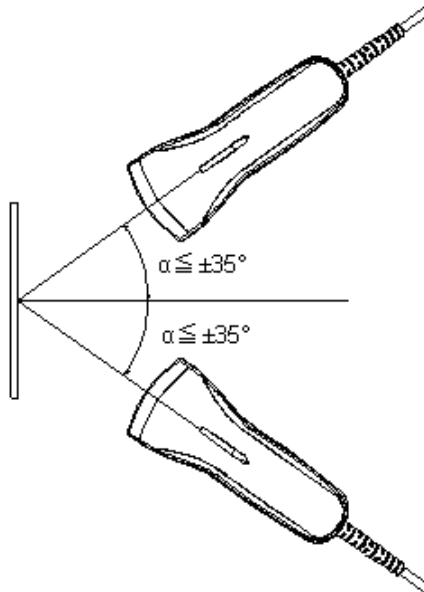


Figure 4: Pitch

7.4.2. Skew Angle and Dead Zone

Scanning performance is guaranteed when skew angle: $\beta \leq \pm 50^\circ$ (Excluding dead zone)

Dead zone: $\beta = \pm 8^\circ$ (There are some areas in which decoding fails due to specular reflection)

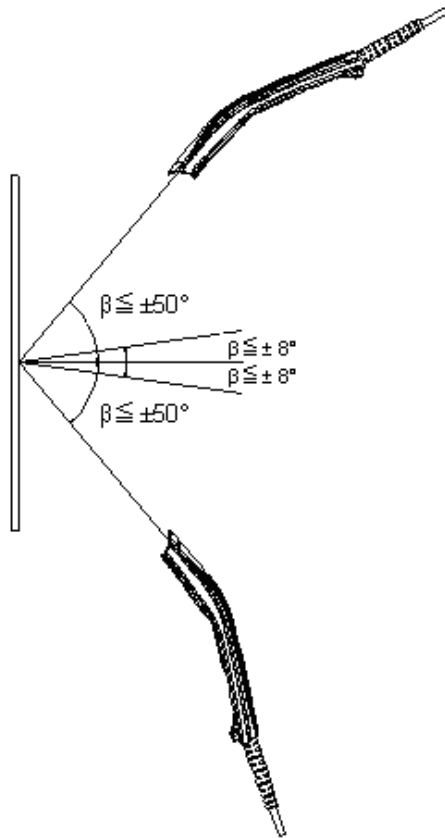


Figure 5: Skew angle and dead zone

7.4.3. Tilt Angle

Scanning performance is guaranteed when $\gamma \leq \pm 20^\circ$

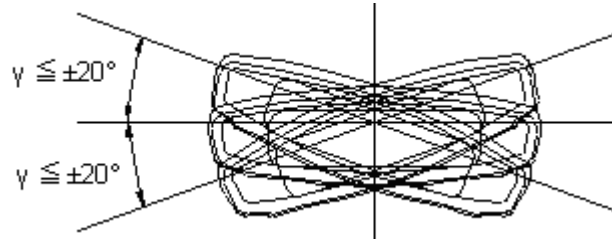


Figure 6: Tilt angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance:	70 mm from the front 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
Angles:	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:	$R = \infty$

7.5. Curvature

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

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

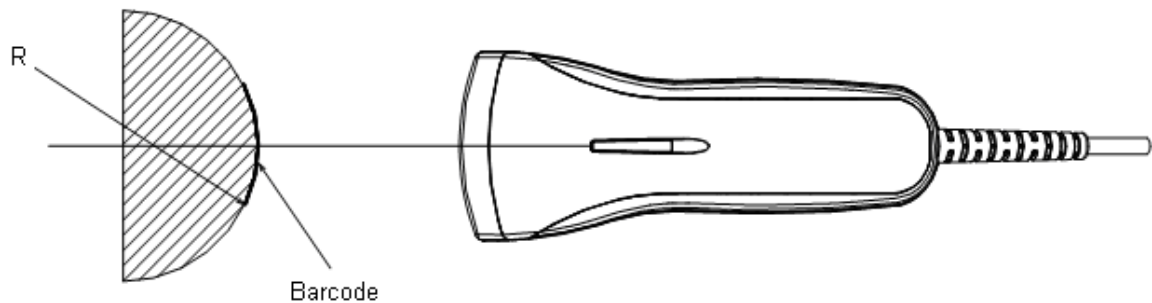


Figure 7: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm

Distance: 70 mm from the front edge of the scanner

Angle: Skew Angle $\beta = +15^\circ$

8. Interface Specifications

8.1. RS-232C Interface

8.1.1. Settings and Communication

Reading the menu barcodes in section 10.1 can set the RS-232C interface default.

Item	[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

You can change the communication condition using the menu barcode.

8.1.2. 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

8.1.3. Pin Assignment

Signal	Pin	Notes
NC	1	Open (not connected)
TXD	2	
RXD	3	
---	4	Connected to pin 6 with jumper cable.
GND	5	
---	6	Connected to pin 4 with jumper cable.
CTS	7	
RTS	8	
NC	9	Open (not connected)
FG	SHELL	Shield

Connector: D-sub, 9-pin, Female

Power supply: DC jack, EIAJ voltage Class 2

8.1.4. Interface Circuit

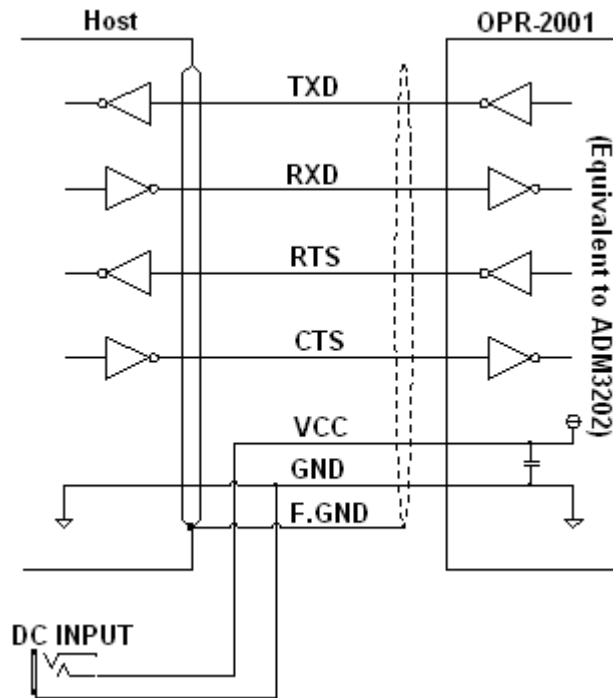


Figure 8: Interface circuit

8.1.5. Character Format

Uses the same format for both sending and receiving.

8.1.6. Character Format

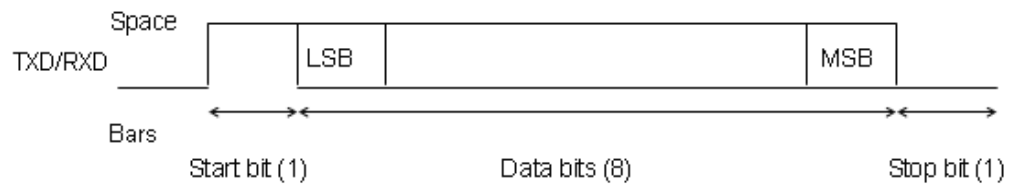


Figure 9: Character format (same for both sending and receiving)

8.1.7. Communication Format

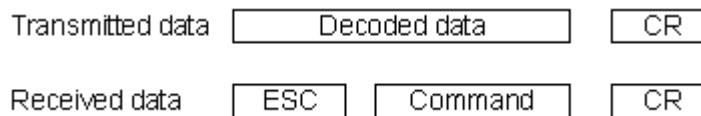


Figure 10: Communication format

8.1.8. 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

a) No Handshaking

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

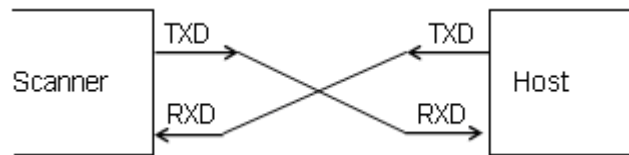


Figure 11: No handshaking

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.

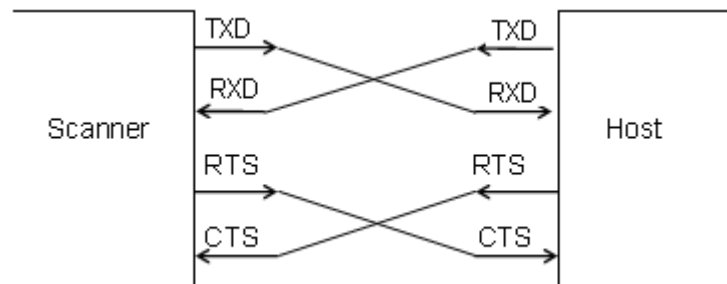


Figure 12: Busy/Ready communication

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

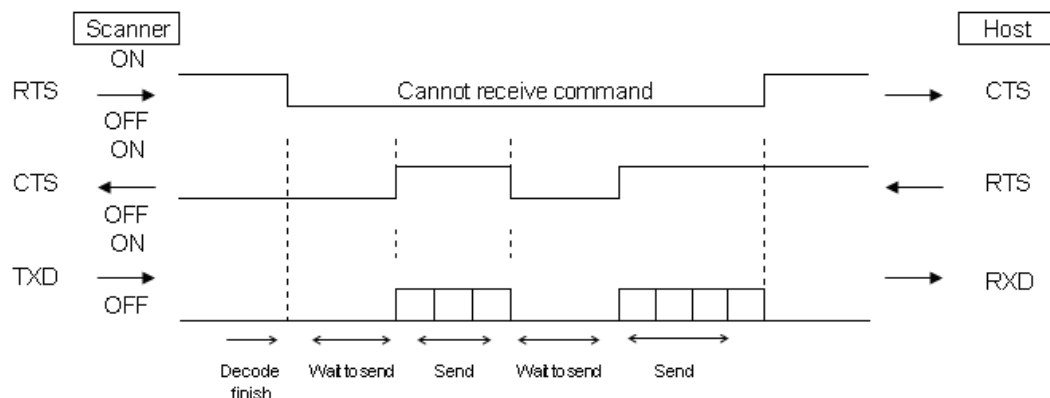


Figure 13: Cannot receive command

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 14: Signal timing

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

c) 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 can be set as follows using the menu or commands.

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

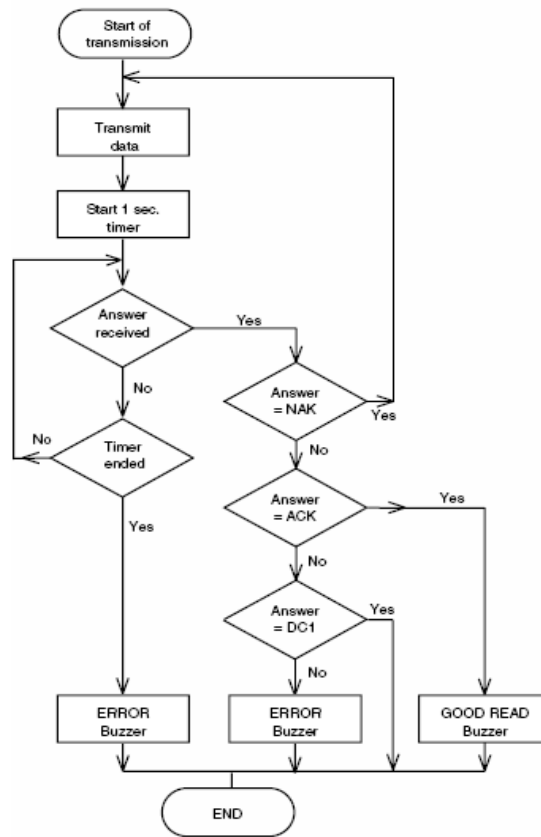


Figure 15: ACK/NAK

d) 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.

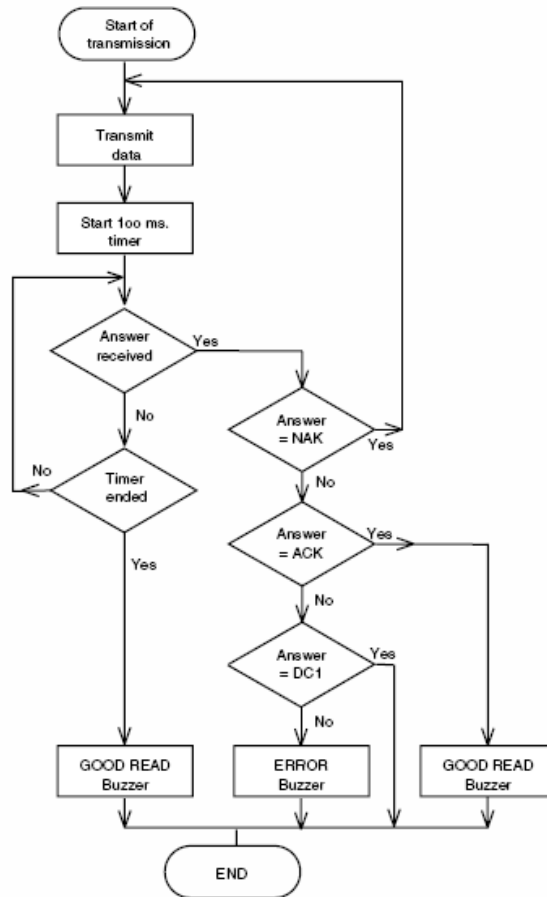


Figure 16: ACK/NAK—No response

8.2. USB-HID and USB-VCP Interface Specifications

There are two models that use a USB interface: HID (Human Interface Device Class) and COM (Communication Device Class). The USB-COM model is referred to as USB-VCP because a VCP (Virtual Communication Port) allows virtual serial communication and the commands can be transmitted from the host computer.

8.2.1. Settings

Reading the menu barcodes in section 10.1 can set the USB interface default.

The interface is full-speed USB (12 Mbps).

Device Class: High power bus-powered function. This interface does not require an AC adaptor. It connects to a high-power bus (500 mA max.) USB terminal.

Japanese Kanji data or images cannot be transmitted via the USB-HID interface.

Note: You must install the USB-VCP driver on the host.

8.2.2. Interface Circuit

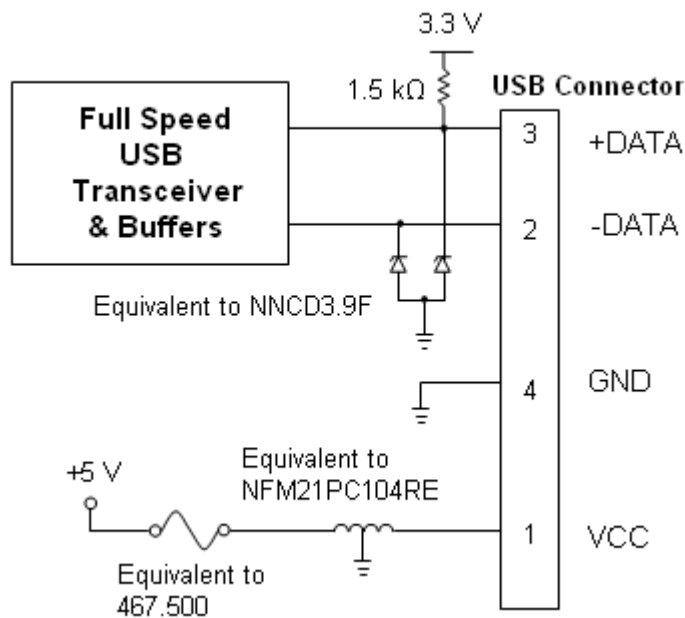


Figure 17: Interface circuit

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

8.3. DOS/V Wedge Interface Specification

Reading the menu barcodes in section 10.1 can set the DOS/V Wedge interface default.

For either interface (USB or HID/Wedge)—Set the language for the scanner and PC keyboard to the same language before use; otherwise, the output may not be correct.

9. Cable and Connector

9.1. RS-232C Cable

(Standard specification)

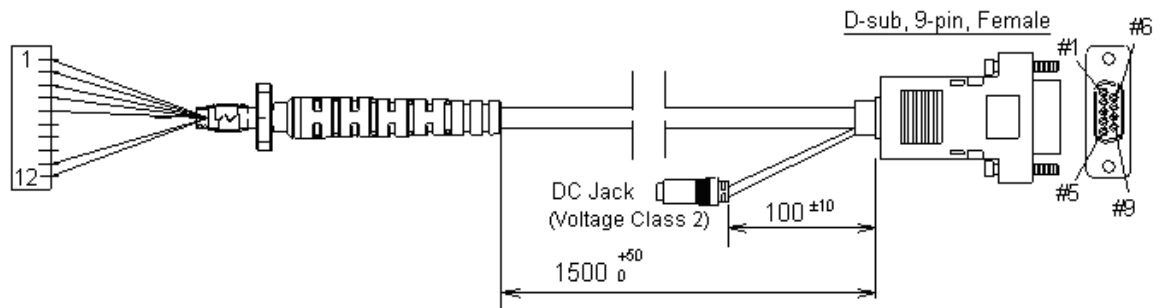


Figure 18: RS-232C cable

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

9.2. USB Cable

(Standard specification)

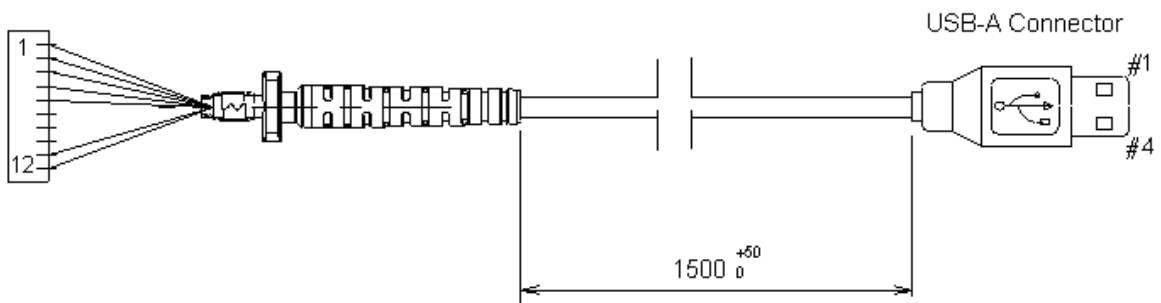


Figure 19: USB cable

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

9.2.1. Connector

a) USB "A" connector

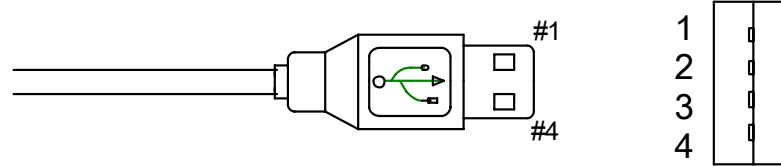


Figure 20: USB "A" connector

9.2.2. Pin Assignment

Pin	Signal
1	VCC
2	-DATA
3	+DATA
4	GND

9.3. Wedge Cable

(Standard specification)

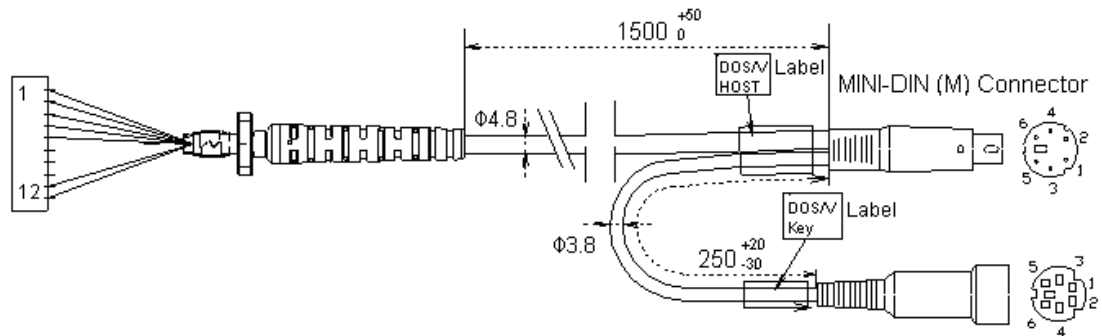


Figure 21: Wedge cable

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

9.3.1. Connectors

a) DOS/V Host Connector

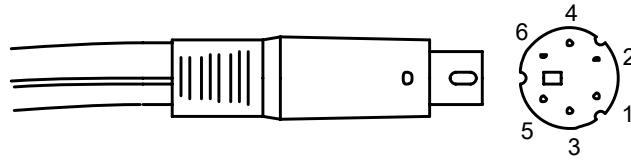


Figure 22: DOS/V host connector

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

b) DOS/V Keyboard Connector

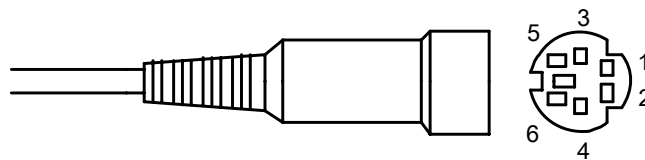


Figure 23: DOS/V keyboard connector

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

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

9.4. Connector Specification (Scanner Side)

CN1 (12-pin)

Pin No	RS-232C	USB	Wedge
1	GND	GND	GND
2	RXD	—	—
3	TXD	—	—
4	CTS	—	—
5	RTS	—	—
6	NC	—	—
7	NC	- DATA	KEY_CLK
8	NC	+ DATA	KEY_DATA
9	NC	—	CPU_CLK
10	NC	—	CPU_DATA
11	VCC	VCC	VCC
12	FG (shield)	FG (shield)	FG (shield)

10. Default Settings

10.1. Set Default Interface

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

RS-232C

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

10.2. 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 Matrix 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	
MSI/Plessey	■	X	■CD1	■CD1	—	CR	
PDF417	X	X	—	—	—	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.”

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

Item		Default Setting
Setting the number of characters		Fixed length OFF all codes
Read mode		Single read
Multiple read reset time		500 ms
Add-on wait mode		500 ms
Multiple column read		Disable
Redundancy	Default option ([X0] setting)	Read 1 times, redundancy = 0
	Other options ([X1 .. X3] setting) ([BS .. BW] setting)	Read n times, redundancy = n+1 for the following symbologies and lengths: • Code 11 with length <= 5 • Code 39 with length <= 5 • IATA, Industrial 2of5, Interleaved 2of5 with length <= 8 • Matrix 2of5 (& Chinese Post), Scode 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. Serial Number

The serial number shown below is affixed to the scanner.

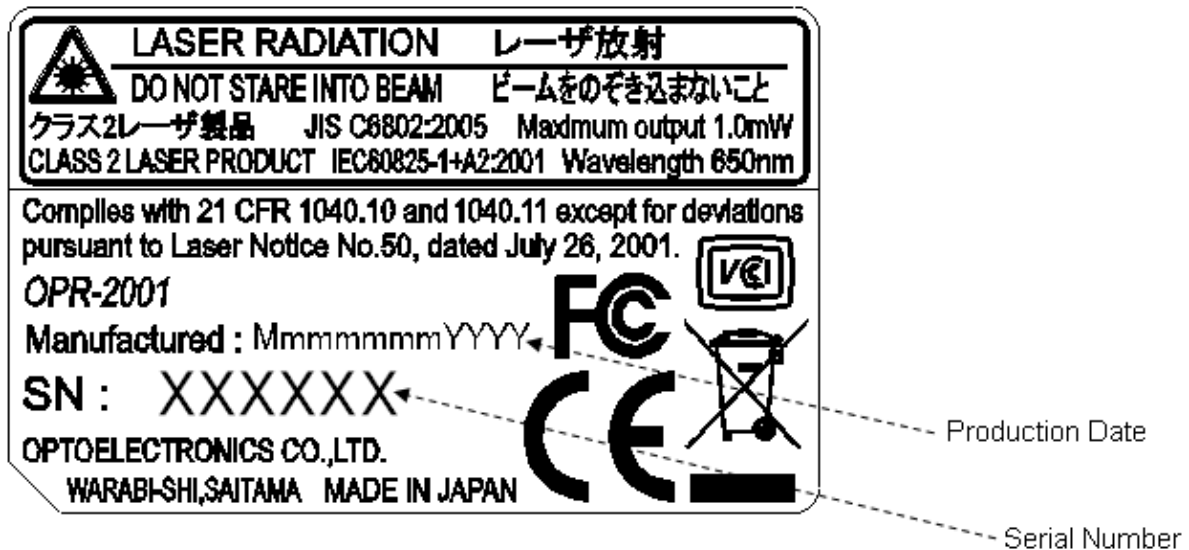


Figure 24: Serial number diagram

12. Packaging Specifications

12.1. Individual Packaging Specification

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

Size of the package (after assembly: 245 (W) x 110 (D) x 40 (H) mm

12.2. Collective Packaging

Put 50 individually packaged OPR 2001 scanners in a collective packaging box.

Dimensions: 650 mm (W) x 550 mm (D) x 250 mm (H)

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.

13. Durability

13.1. Electrical Noise

No malfunction occurred when sinusoidal electrical noise (10 Hz–100 kHz, < 0.1 Vp-p) was added to the power supply line.

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:	90 mm
Angle:	$\alpha = 0^\circ \beta = 15^\circ \gamma = 0^\circ$
Curvature:	$R = \infty$
Power Supply Voltage:	5.0 V

13.2. Static Electricity

Air discharge:	± 10 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

13.3. Shock

13.3.1. 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 on each of 5 sides.

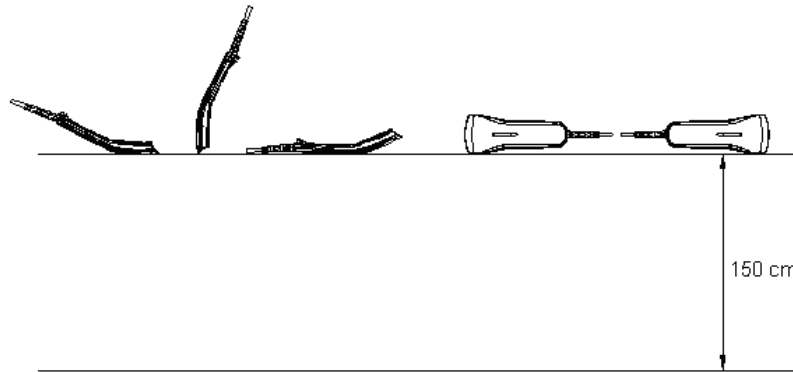


Figure 25: Drop test

13.3.2. Drop Test (with individual packaging)

No malfunction occurred after the following drop test.

Drop Test: Drop the scanner from a height of 150 cm onto a concrete floor on each of one corner, three edges, and six sides (10 drop tests in total)..

13.4. Vibration Strength

No malfunction occurred after the following vibration test.

Vibration test: Increase the frequency of the vibration from 12 Hz to 100 Hz with accelerated velocity 19.6 m/s^2 (2 G) for 60 minutes in non-operating state. Repeat this routine in each X, Y, Z direction once for 60 minutes each.

13.5. 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.

13.5.1. Cable Strength

No malfunction occurred after the following pulling test.

Pulling test: Fix the scanner and pull the cable with the force of 2.5 kg (24.5N) for 1 second. Repeat 20 times.

13.5.2. Cable Tail Bending Test

No malfunction occurred after the following bending test.

Bending test: Fix the scanner and attach a weight of 500 grams (4.9N); swing the cable back and forth at an angle of 90°. Repeat it 1,000,000 times.

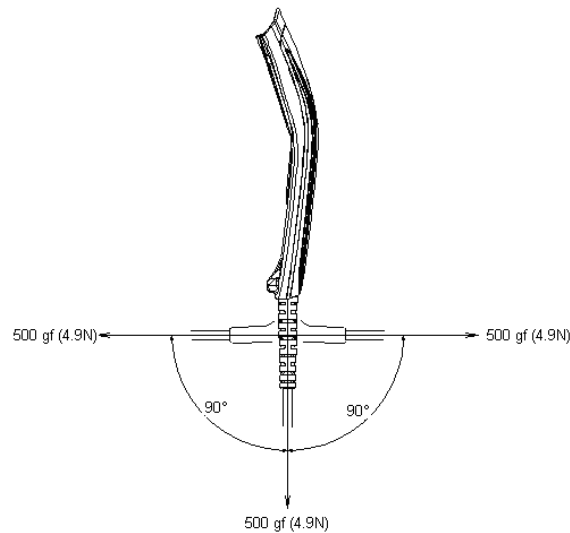


Figure 26: Cable tail bending test

14. Reliability

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

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

15. Trigger and Read Options

15.1. Trigger Modes

Disabled: When this option is selected, the reader will stay on all the time.

Enabled: After receiving a trigger signal, the barcode reader will turn on and the read cycle starts. The reader will stay on for a time as set in 'Read time options'. The trigger signal can be initiated in the following ways:

Manual mode: When the trigger key is pressed, the read cycle starts. In manual mode, you can also use single-line aiming mode when there are multiple printed codes, but you want to scan only one. Use single-line mode to tell the scanner to read only codes aimed at with a single line. The single line is activated by the manual trigger key.

Auto trigger mode: The read cycle automatically starts when a trigger signal is received via sensor detection.

Serial mode: The read cycle starts at the time set in 'Read time options' after a serial command (<ESC>Z<CR>) is received.

15.2. Read Modes

Single read mode: When a symbol has been decoded, the reader will be turned off. The reader must be triggered again to read another symbol. This option and 'Disable trigger' cannot be programmed at the same time.

Multiple read mode: When a symbol has been decoded, the reader will stay on for a time (set by 'Read time options') or indefinitely, if the trigger switch has been disabled. The same symbol can only be decoded again after the symbol has not been detected for a set number of scans (multiple read reset time).

Continuous read mode: The reader will produce as much data as it can decode even if it is reading the same symbol. This mode is mainly used for demonstration and diagnosis.

15.3. Auto Trigger Options

15.3.1. Auto Trigger Sensor

The product has an optional auto trigger setting, which starts barcode reading automatically by using sensor detection. The scanner starts barcode reading after detecting reflection from the surface when the auto trigger is used.

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

Conditions

Moving Speed:	100 $\pm$ 10 mm/s (the moving direction is not specified)
Angle:	Skew angle, excluding Pitch Angle and Dead Zone, specified in section 7.3 Pitch, Skew and Tilt.
Environmental Temperature and Humidity:	Room temperature and humidity
Environmental Illuminance:	500 to 900 lx
Conditions for the auto trigger:	- Barcode sheet: OPTOELECTRONICS Test Sheet (white) Background: OPTOELECTRONICS Test Sheet (black) - Barcode sheet: OPTOELECTRONICS Test Sheet (black) Background: OPTOELECTRONICS Test Sheet (white)

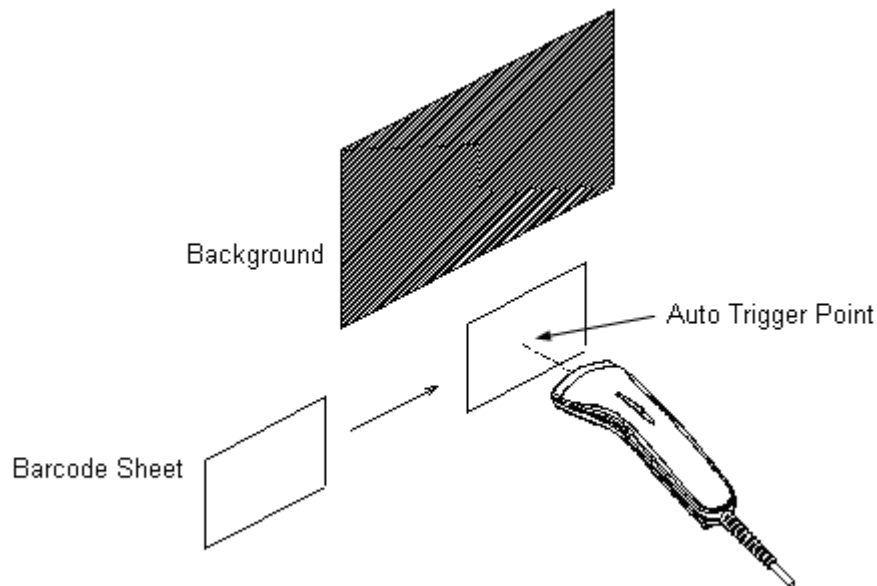


Figure 27: Auto trigger operation

Auto trigger can be enabled in 2 ways:

- Stand detection mode: This option enables auto trigger automatically in case the scanner is inserted into the stand.
- Normal auto trigger mode.

*Descriptions in () show menu IDs.

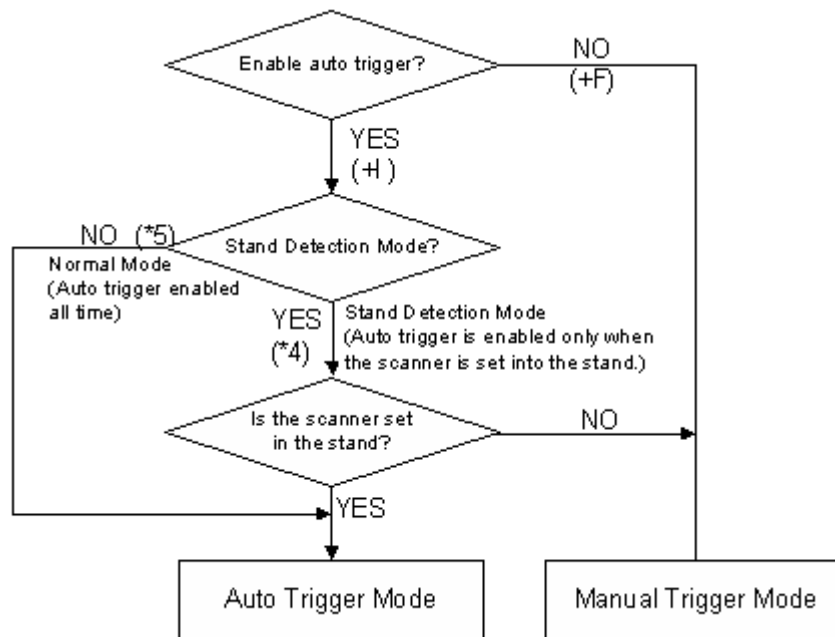


Figure 28: Trigger options

16. Trigger and Read Settings

16.1.1. Enable/Disable Settings

Use the following settings to enable or disable the auto trigger. (Auto trigger is disabled by default).

To enable auto trigger, scan “ZZ”, “+I” and “ZZ” in that order.

To disable auto trigger, scan “ZZ”, “+F” and “ZZ” in that order.

Functions	Menu labels	Menu codes
SET	 z z	ZZ
Enable auto trigger	 + I	+I
Disable auto trigger	 + F	+F
END	 z z	ZZ

Note: Please configure the following **after** enabling the auto trigger.

16.2. Auto Trigger Stand Detection Settings

16.2.1. Stand Only

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

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

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

16.2.2. Always

Enable auto trigger all the time.

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

16.2.3. Manually

Only trigger manually (default).

Functions	Menu labels	Menu codes
SET	 z z	ZZ
Disable auto trigger	 + F	+F
Disable auto trigger stand detection	 * 4	*5
END	 z z	ZZ

A magnetic switch and a magnet are 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.

Opticon shall not be held responsible for any damages caused by using an AC adapter not provided by Opticon.

19. Mechanical Drawing

Dimensions: 151.0 mm x 56.0 mm x 30.5 mm (except protruding parts)

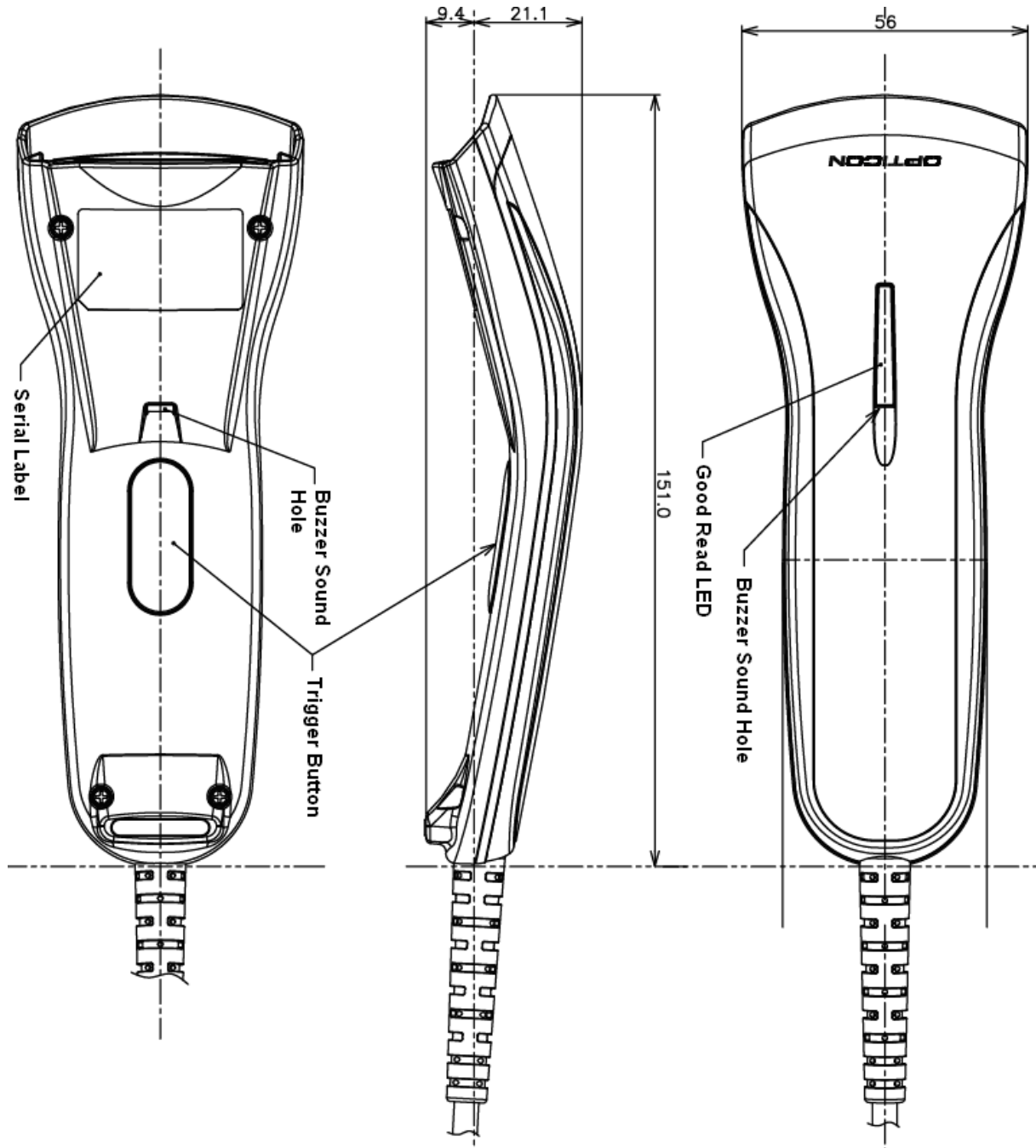


Figure 29: Mechanical drawing