ZEBEX
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User's Manual

2D Image Scan Engine

Revision History

Changes to the original manual are listed below:

Version	Date	Description of Version
1.0	2017/09/15	Initial release

Important Notice

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For CE-countries
This scanner is in conformity with CE standards.   Please note that an approved, CE-marked power supply unit should be used in order to maintain CE conformance.

Guidance for Printing
1. This manual is in A5 size. Please double check your printer setting before printing it out.
2. When printing barcodes for programming, the use of a high-resolution laser printer is strongly suggested for the best scan result.
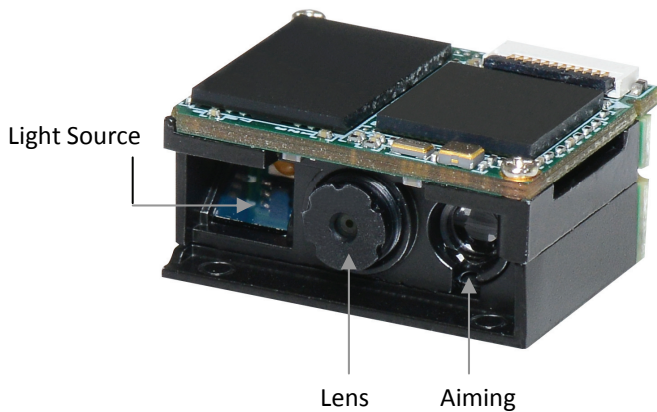
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Introduction

High scanning speed without compromising performance, the device is a powerful 2D image scan engine that easily decodes most 1D and 2D barcodes with intuitive aiming accuracy. It also supports standard serial, USB interface that can be easily integrated with most hardware platform. The compact dimension makes installation effortless even in the most space-constrained products, including mobile computers, kiosks, lottery machine and more. The device is the perfect solution for many industries.

• Ultra small size
• No separate decoder board required
• Flexible interface communications
• Outstanding 1D and 2D scanning performance
• Captures barcodes on mobile phone, tablet, or computer screens

Overview

Light Source

Lens   Aiming

Components

Description	Function
Light Source	Reinforced light brightness
Aiming	Produce easy to see scan line
Lens	Captures image for decoding

Scanner Operation

Precautions

To ensure the scanner reaches its best performance, the following points need to be noticed when mounting the scanner:

a.   Do not place the scanner under direct sunlight or any other bright light source illuminating.

b.   When placing the barcode label, one must be careful not to over tilt, skew and/or pitch the barcode.

c.   Do not place the device at specula reflection position. The LED light of the scanner reflects directly back on the scanner if it is placed at specula reflection position. As to the nature of CMOS sensor, it will not be able to read any barcodes.

d.   The barcode label must be placed within the effective depth of field (D.O.F.) since it is the effective reading distance for the barcode from the scanner. For the best placing position, please refer to the Decode Depth of Field drawing.

Maintaining the Scanner

Handling with care! The scan engines are electrostatic sensitive device; do not handle with bare hands.   Store the engines away from dust and humidity places.
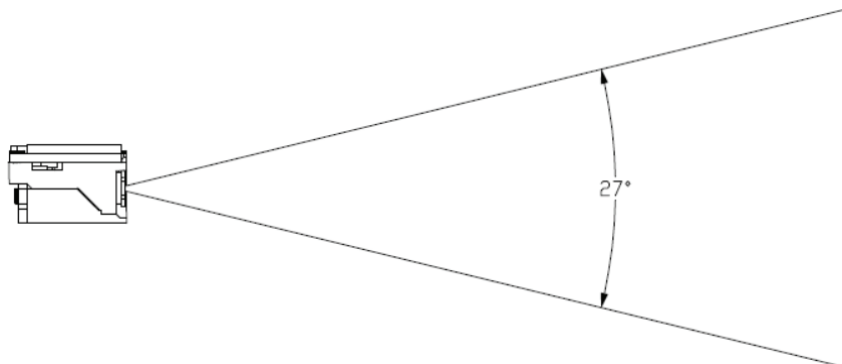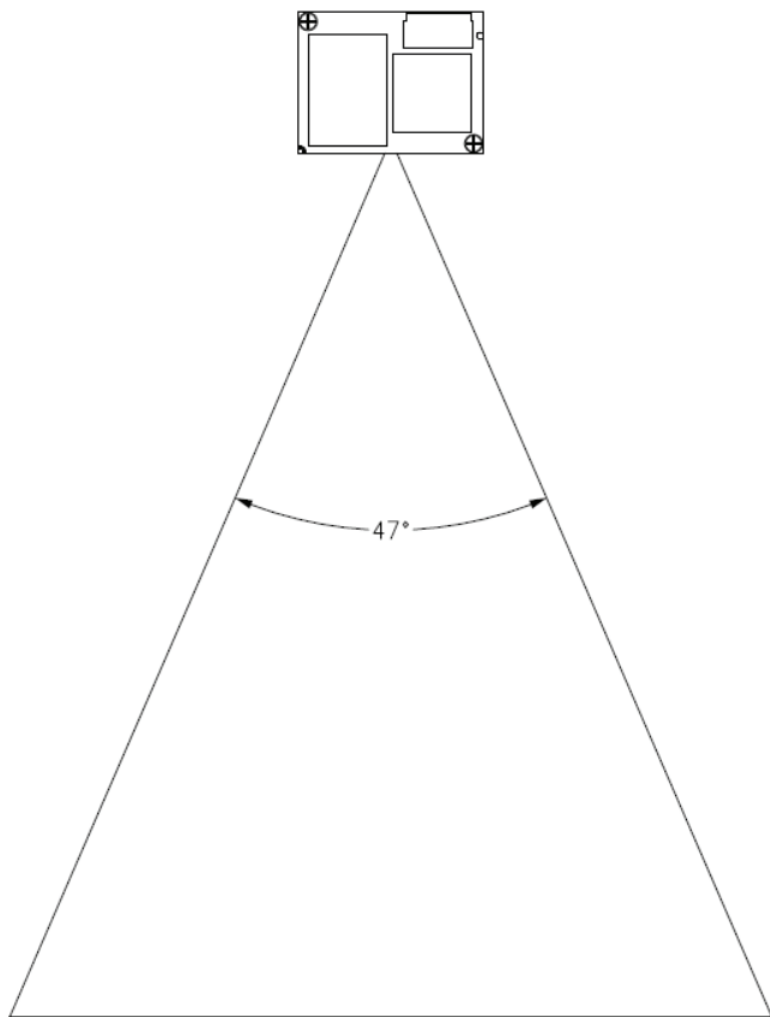

ESD

The scan engines are protected from ESD events that may occur in an ESD-controlled environment. Always exercise care when handling the module. Use grounding wrist straps and handle in a properly grounded work area.
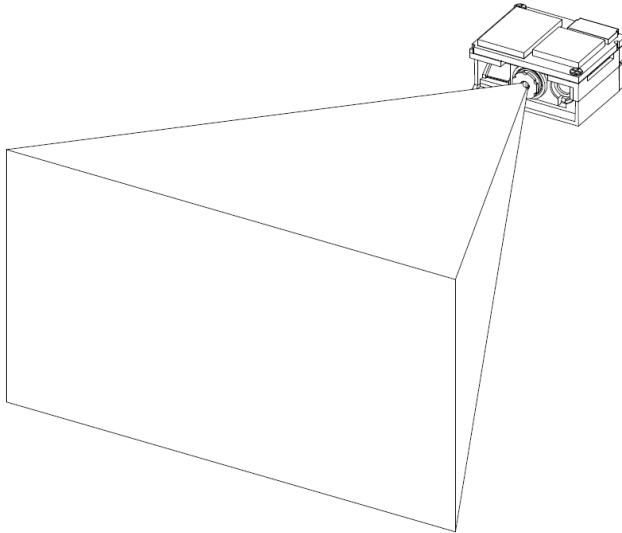
Scan Angles

See the following illustrations for the effective barcode reading angles.

27°

47°

Scan Zone

The effective reading distance for the scanner is illustrated as below.

Typical Depth of Field	Code 39 (5 mil): 70 - 110 mm±10mm
	UPC/EAN (13 mil): 60 - 260 mm±10mm
	PDF417 (6.7 mil): decodable
	Datamatrix (7.5 mil): decodable
	QR Code (10 mil): decodable

Different quality and density of a barcode could effect its decode depth of field. Usually when a barcode has poor printing quality or high density, the depth of field would be shorter. It is highly suggested **not** place the barcode label at the extremes of depth of field as it is often easy to move out from the reading range.
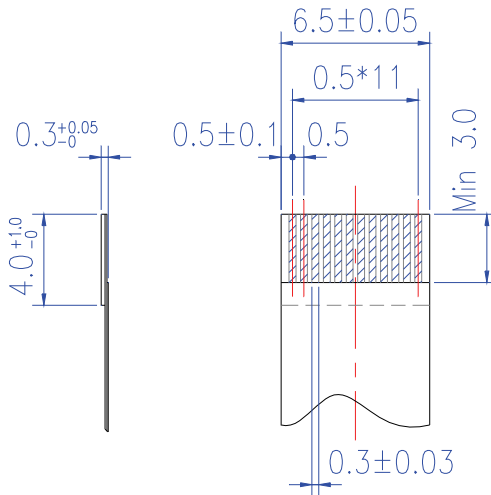
Installation

FFC Cable

A flex strip cable is needed to connect the scan engine to your host terminal, and different decode mode uses different FFC cable.
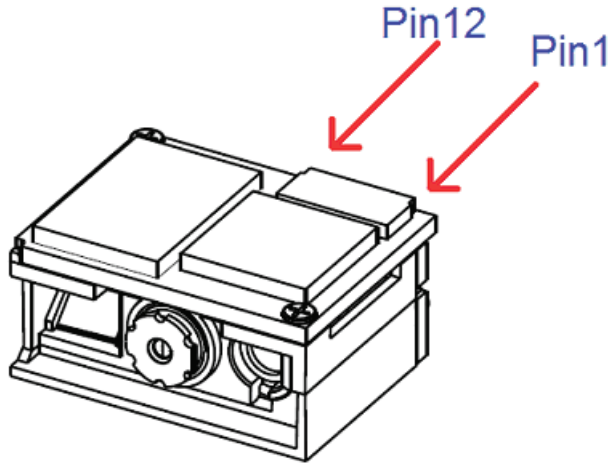Decoded mode scan engine: 12Pin ZIF Pin configured FFC cable

The following figure shows the FFC cable dimension and its pin-out configuration.

FFC Cable Dimension

USB Mode & RS232 Mode Pin Definition

RS232 Mode Pin Definition

PIN#	Signal Name	I/O	Function
1	Download	I	L=software download mode, H=No action
2	VDD	Power	5V or 3.3V power supply
3	GND	Power	Power supply ground
4	RXD	I	TTL level 232 receive data
5	TXD	O	TTL level 232 transmit data
6	CTS	I	TTL level 232 clear to send signal
7	RTS	O	TTL level 232 request to send
8	POWER_DOWN	O	L=normal state, H=engine is in power down state
9	BEEPER_OUT	O	Beeper output
10	DEC_LED	O	L=LED on, H=LED off
11	Wake_up	I	L=wake up device from power down state, H=no action
12	Trigger	I	L=start session, H=inactive

USB Mode Pin Definition

PIN#	Signal Name	I/O	Function
1	Download	I	L=software download mode, H=No action
2	VDD	Power	5V or 3.3V power supply
3	GND	Power	Power supply ground
4	USB_DN	I	USB_DN differential data signal
5	NC	-	Not connected
6	USB_DP	I	USB_DP differential data signal
7	NC	-	Not connected
8	POWER_DOWN	O	L=normal state, H=engine is in power down state
9	BEEPER_OUT	O	Beeper output
10	DEC_LED	O	L=LED on, H=LED off
11	Wake_up	I	L=wake up device from power down state, H=no action
12	Trigger	I	L=start session, H=inactive

Mounting

In this section, we will introduce how to mount the scan engine into your design.

At the back of scan engine, there are two screw holes reserved for mounting, the scan engine can be fixed in any position and any angle without any degradation in performance. And to ensure the scanner reaches its best performance, the following points need to be noticed when mounting the scanner:

To avoid direct sunlight or any other bright light source illuminating.

When placing the barcode label, one must be careful not to over tilt, skew and/or pitch the barcode.

To avoid putting the scanner in specula reflection position, the CMOS sensor will not sense the reading of any barcodes if the LED light reflects straight back.

The barcode must be placed within the effective depth of field (D.O.F.) area, the effective reading distance for the barcode from the scanner.   Its theory is like a camera, if the object is placed within the focal range, and the image appears clearly.   But if the object is outside the focal range, the image then is blurred.   And different quality and density of barcodes could affect its D.O.F.; usually a lower piece or high density of barcode, its depth of field is shorter.   It is suggested to avoid using depth of field extremes range, barcode is easily moved away from the reading range.
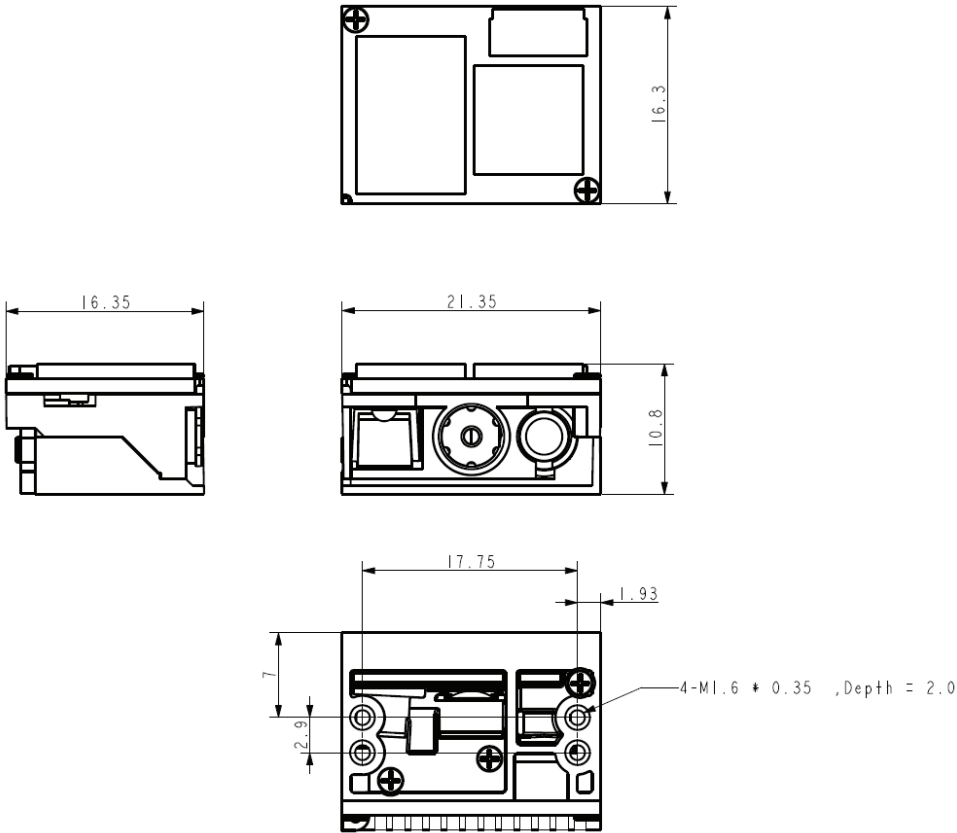
For best placing position, please refer to the Decode Depth of Field drawing.
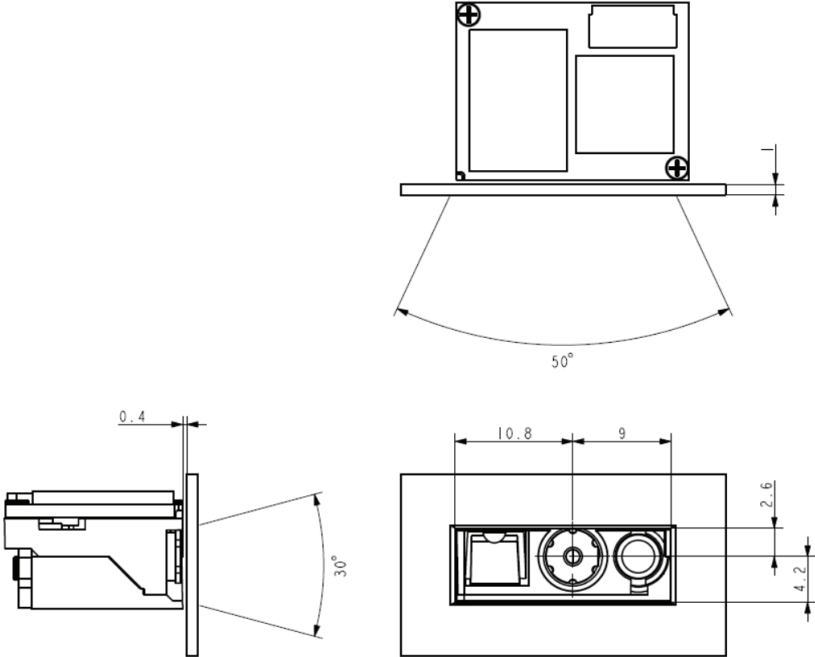
Thermal Considerations
Electronic components in the Z-5212 will generate heat during the course of their operation. Operating the Z-5212 in continuous mode for an extended period may cause temperatures to rise on APU and decoder chip. Overheating can degrade image quality and affect scanning performance. Given that, the following precautions should be taken into consideration when integrating the Z-5212.
1.   Reserve sufficient space for good air circulation in the design.
2.   Avoid wrapping the Z-5212 with thermal insulation materials such as rubber.
3.   Increase the thermal strategy to reduce the scanning engine continuous operating temperature.

Dimensions

Outline Drawing

50°

0.4

30°

10.8   9

2.6

4.2

Cover Glass Drawing

Technical Specification

Resolution	1296H x 732V pixels
Light Source	2* 617nm LED (Red)
Aiming Pattern	2* 617nm LED (Red)
Image Field of View (Scan Zone)	47°H x 27°V
Roll/ Pitch/ Yaw (Skew)	360°/ ± 65°/ ± 60°
Scan Rate	30 fps
Swipe Speed (Motion Tolerance)	-
Print Contrast Ratio (Minimum)	30%
Minimal Element Resolution	Code 39: 5 mil PDF417: 6.7 mil Datamatrix: 7.5 mil QR Code: 7.5 mil
Typical Depth of Field	Code 39 (5 mil): 70 - 110 mm±10mm
	UPC/EAN (13 mil): 60 - 260 mm±10mm
	PDF417 (6.7 mil): decodable
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