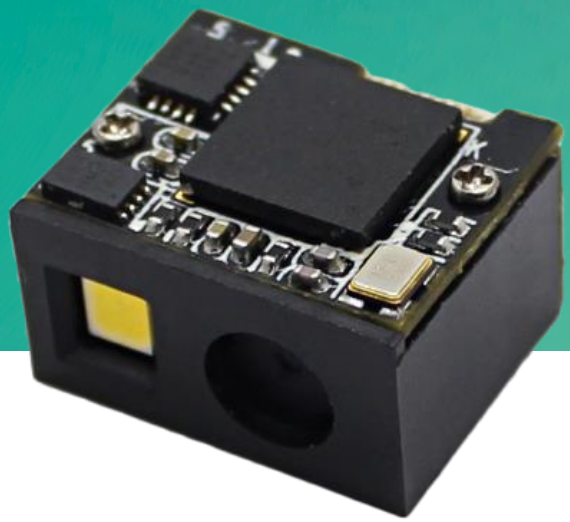
Newland

SCANNING MADE SIMPLE



EM3080-W

OEM scan engine

integration guide

Disclaimer

Please read through the manual carefully before using the product and operate it according to the manual. It is advised that you should keep this manual for future reference.

Do not disassemble the device or remove the seal label from the device, doing so will void the product warranty provided by Fujian Newland Auto-ID Tech. Co., Ltd.

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Revision History

Version	Description	Date
V1.0.0	Initial release.	July 3, 2018

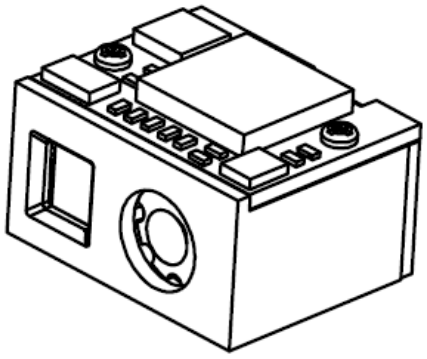
Table of Contents

Chapter 1 Introduction

Overview

Armed with the Newland patented NIIMG® image recognition system-on-chip, the EM3080-W OEM scan engines boast superb performance on reading printed barcodes as well as electronic barcodes, ultra-low power consumption, miniature size and easy-to-integrate design.

- ✧ Ultra-low power, ultra-compact scan engine that is optimized for quick and easy integration.
- ✧ Support all mainstream 1D and 2D barcodes.
- ✧ Convenient configuration through scanning barcodes.
- ✧ Outstanding near-field reading and wide viewing angle



Illumination

The EM3080-W has a white LED for supplementary lighting. The illumination can be programmed On or Off.

Chapter 2 Installation

General Requirements

ESD

ESD protection has been taken into account when designing the EM3080-W and the engine is shipped in ESD safe packaging. Always exercise care when handling the engine outside its package. Be sure grounding wrist straps and properly grounded work areas are used.

Dust and Dirt

The EM3080-W must be sufficiently enclosed to prevent dust particles from gathering on the imager, lens and circuit board. Dust and other external contaminants will eventually degrade the engine's performance.

Ambient Environment

The following environmental requirements should be met to ensure good performance of the EM3080-W:

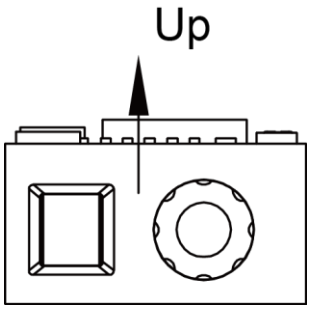
Operating Temperature	-20℃ to 60℃
Storage Temperature	-40℃ to 70℃
Humidity	5% ~ 95% (non-condensing)

Thermal Considerations

Electronic components in the EM3080-W will generate heat during the course of their operation. Operating the EM3080-W in continuous mode for an extended period may cause temperatures to rise on CIS and decoder chip. Overheating can degrade image quality and affect scanning performance. When the engine is used in high temperature environments, appropriate precautions should be taken in the integration design.

Installation Orientation

The figure below illustrates a front view of the EM3080-W after installation, with the engine's decoder board on the top, and illumination and lens on the front. The EM3080-W installed in this manner allows its lens to be seen from the outside.

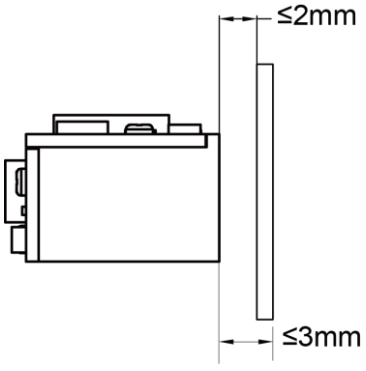


Optics

Window Placement

The window should be positioned properly to let the illumination beam pass through as much as possible and no reflections back into the engine (reflections can degrade the reading performance).

The window should be mounted close to the front of the engine (parallel). The maximum distance is measured from the front of the engine housing to the farthest surface of the window. In order to reach better reading performance, the distance from the front of the engine housing to the furthest surface of the window should not exceed 3mm and the distance from the front of the engine housing to the nearest surface of the window should not exceed 2mm.



If the window is required to be in a tilted position, the above distance requirements should be met and tilt angle should ensure no reflections back into the lens.

Window Material and Color

CIS's responsiveness (mainly to wavelengths of white light） should be taken into consideration when choosing window material and color, in order to achieve the possible highest spectral transmission, lowest haze level and homogeneous refractive index. It is suggested to use PMMA or optical glass with spectral transmittance over 90% and haze less than 1%. Whether to use an anti-reflection coating or not depends on the material and application needs.

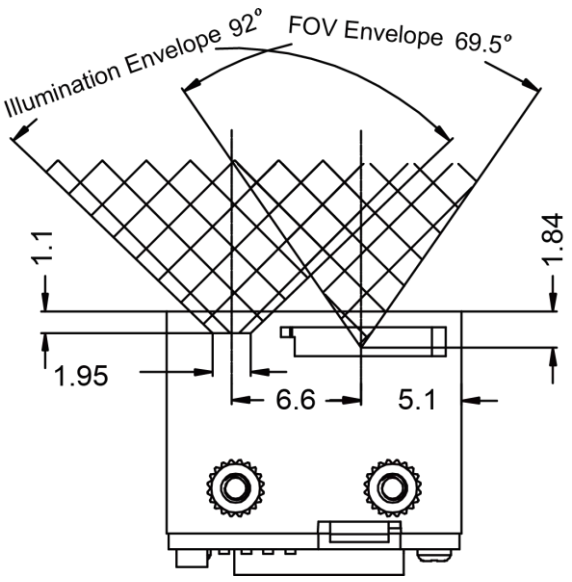
Scratch Resistance and Coating

Scratch on the window can greatly reduce engine performance. It is suggested to use abrasion resistant window material or coating.

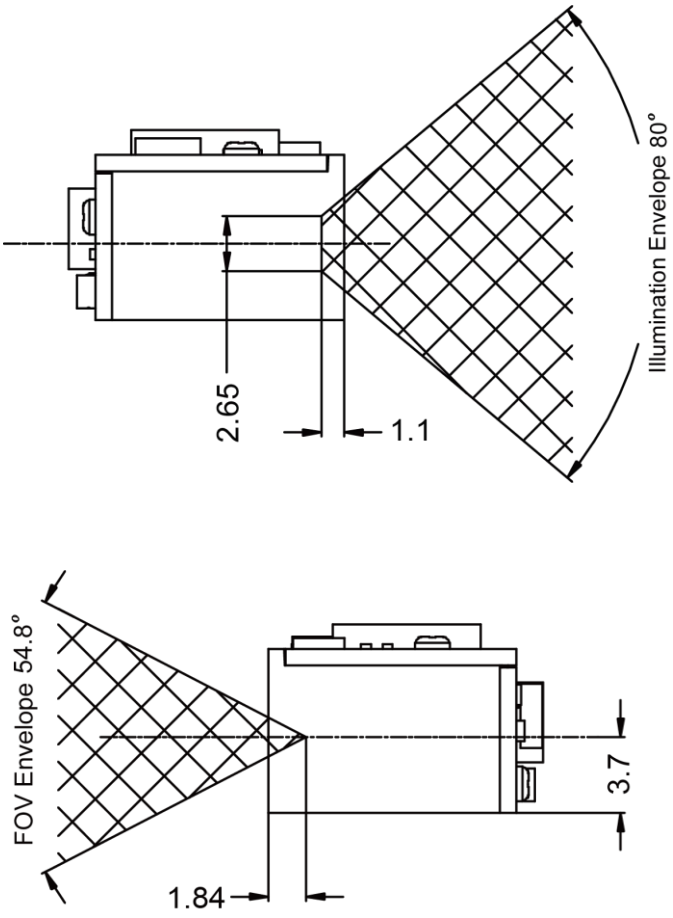
Window Size

The window must not block the field of view and should be sized to accommodate the illumination envelope shown below.

Horizontal:



Vertical:



Ambient Light

The EM3080-W shows better performance with ambient light and it is well able to handle the flicker in fluorescent lights using 50-60Hz AC power. However, high-frequency pulsed light can result in performance degradation.

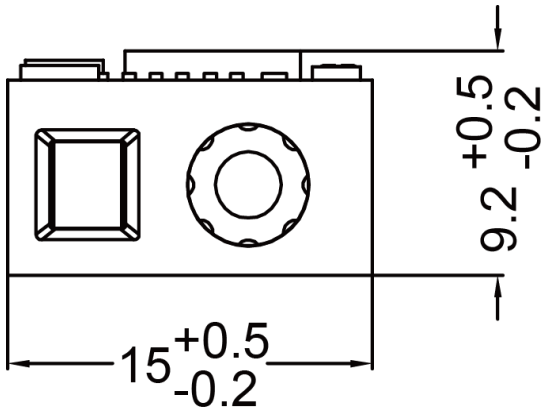
Eye Safety

The EM3080-W uses LED to create the illumination beam. The LED is bright, but testing has been done to demonstrate that the engine is safe for its intended application under normal usage conditions. However, the user should avoid looking into the beam.

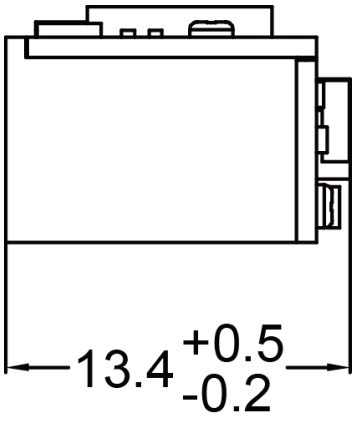
Mounting

The illustrations below show the mechanical mounting dimensions for the EM3080-W. The structural design should leave some space between components.

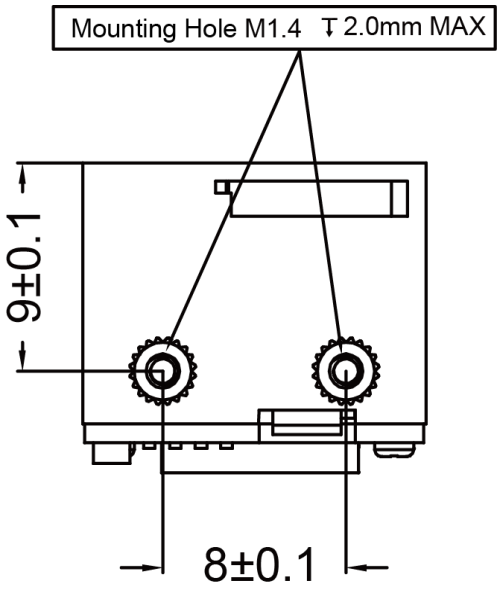
Front View (unit: mm)



Left View (unit: mm)



Bottom View (unit: mm)



Chapter 3 Electrical Specifications

Power Supply

Do not power up the EM3080-W until it is properly connected. Be sure the power is cut off before connecting a flexible cable to or disconnecting a flexible cable from the host interface connector. Hot-plugging could damage the engine.

Unstable power supply or sharp voltage drops or unreasonably short interval between power-ons may lead to unstable performance of the engine. Do not resupply the power immediately after cutting it off. It is advised that the minimum interval should exceed 500ms.

The EM3080-W itself does not provide a power switch. Users can switch the engine off by cutting off the power. Switching it on and off frequently will not shorten the service life of the EM3080-W.

The EM3080-W's start-up time is less than 200ms.

Ripple Noise

Image sensor and decoder chip are directly fed by the input power of EM3080-W. To ensure the image quality, a power supply with low ripple noise is needed.

Acceptable ripple range (peak-to-peak) : ≤50mV (≤30mV recommended).

DC Characteristics

Operating Voltage

Ta=23℃

Parameter	Description	Minimum	Typical	Maximum	Unit
V_{DD}	Voltage Drain Drain	3.0	3.3	3.6	V
V_{IH}	High Level Input Voltage	0.7*V_{DD}	-	-	V
V_{IL}	Low Level Input Voltage	-	-	0.2*V_{DD}	V
V_{OH}	High Level Output Voltage	0.9*V_{DD}	-	-	V
V_{OL}	Low Level Output Voltage	-	-	0.1*V_{DD}	V

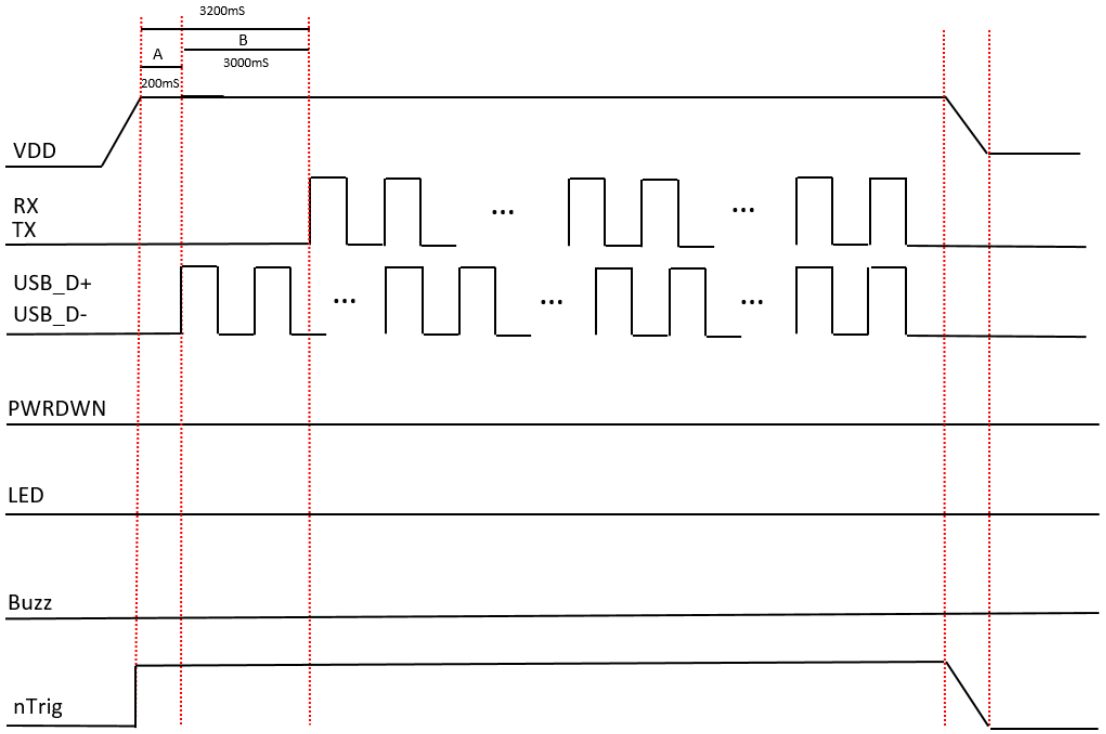
Operating Current

Ta=23℃，V_{DD}=3.3V

Operating Current	Sleep Current	Unit
55.1 (typical) 100.5 (max.)	3.5	mA

Timing Sequence

The following diagram indicates the typical timing for the Power-up sequence of the engine.



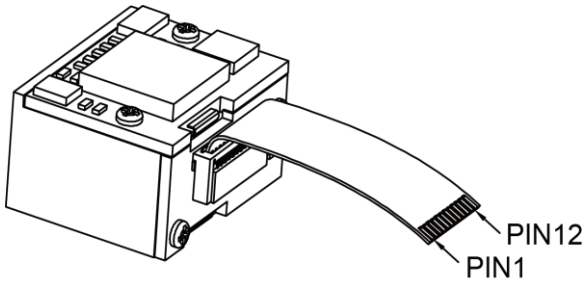
Notes:

1. In the diagram above, **A** shows the time it takes for the engine to power up.
2. Before powering on the engine, ensure that all the signals remain low to prevent current from flowing backwards to affect the performance of the engine.

Chapter 4 Interfaces

Host Interface Connector

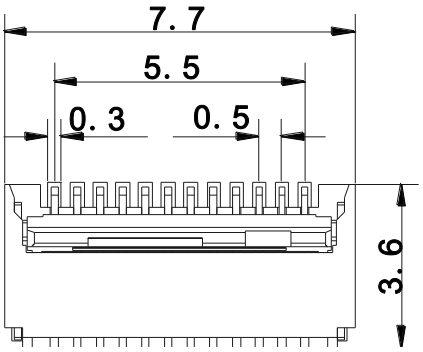
The following table lists the pin functions of the 12-pin host interface connector on the EM3080-W.



PIN#	Signal	I/O	Function
1	-	-	Not connected.
2	VDD	-	3.3V power supply.
3	GND	-	Power-supply ground.
4	RXD	I	TTL level 232 receive data.
5	TXD	O	TTL level 232 transmit data.
6	USB_D-	I/O	USB D- differential data signal
7	USB_D+	I/O	USB D+ differential data signal
8	-	-	Not connected.
9	BUZZ	O	Beeper output.
10	VIB	O	LED output: When using this signal, a driver circuit is needed to drive an external LED.
11	RESET	I	Reset signal input: Active low. Driving this pin low for 100us resets the engine.
12	TRIG	I	Trigger signal input: Driving this pin low for 10ms causes the engine to start a scan and decode session.

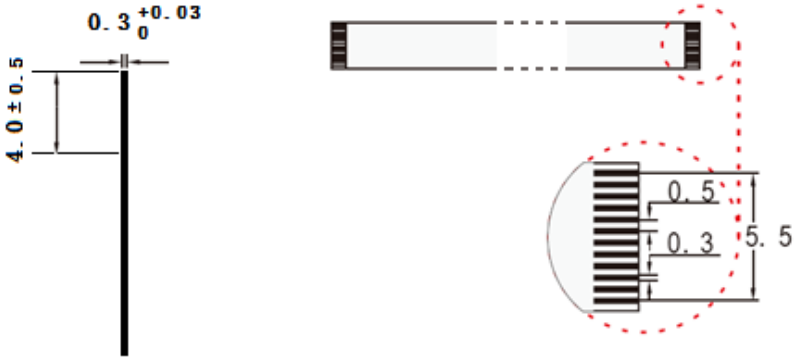
Dimensions of the Host Interface Connector (unit: mm)

The EM3080-W uses a 12-pin ZIF connector (bottom contact). This connector can be connected to a host device with an FFC cable.



FFC Cable (unit: mm)

A 12-pin FFC cable (contacts on the same side or on opposite sides) can be used to connect the EM3080-W to a host device. The cable design must be consistent with the specifications shown below. Use reinforcement material for the connectors on the cable and reduce cable impedance for reliable connection and stable performance.



Communication Interfaces

The EM3080-W can communicate with the host device via any of the following interfaces:

- ✧ TTL-232: This interface is applicable to most system architectures. For those requiring RS-232, a TTL-232 to RS-232 conversion circuit is needed. The EM3080-W's TTL-232 interface supports baud rates from 1200bps to 115200bps; it does not support hardware or software flow control. Its default settings are 9600bps, 8 data bits, no parity check and 1 stop bit.
- ✧ USB HID Keyboard: Based on USB connection, the engine's transmission is simulated as USB keyboard input. It works on a Plug and Play basis and no driver is required.
- ✧ USB COM Port Emulation: The USB port on the host device is emulated as a serial port with the same data transmission and configuration as a real serial port. A driver is required.
- ✧ USB DATAPIPE: This protocol is defined by Newland. A driver is required when using this protocol to communicate with the engine.
- ✧ HID-POS: HID-POS does not require a custom driver. However, an HID interface on Windows 98 does. All HID interfaces employ standard driver provided by the operating system. Use defaults when installing the driver.

Control Interfaces

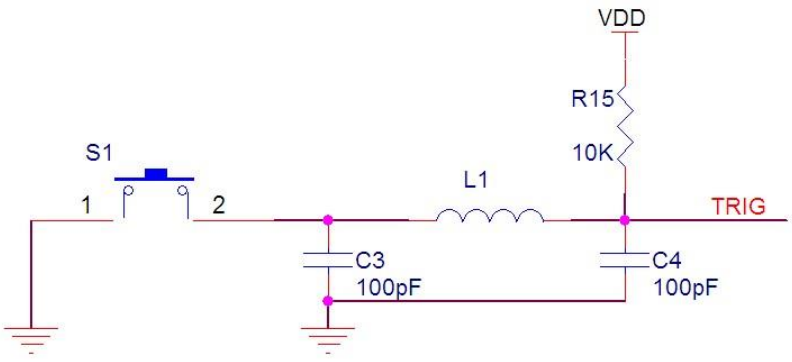
Trigger

Driving the TRIG pin (PIN 12) on the host interface connector low for over 10ms causes the EM3080-W to start a scan and decode session. If a barcode is decoded, the EM3080-W waits for the voltage at the TRIG pin to turn high (or the trigger to be released) after sending the data to the Host. If the trigger is released during a scan attempt, the EM3080-W immediately stops decoding.

Next decode session does not happen until the EM3080-W receives active trigger signal (driving the TRIG pin low) again.

As a decode session involves image capture, barcode decoding and other steps, it is suggested that the minimum interval between triggers should exceed 50ms.

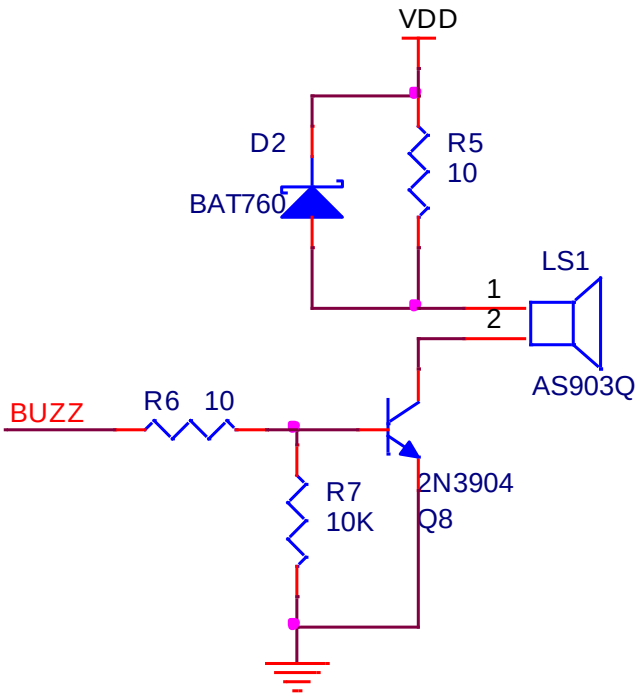
The following trigger circuit is provided for reference.



Beeper

The EM3080-W provides a pin (BUZZ, PIN 9) on the host interface connector that provides a PWM output to an external driver circuit for generating audible feedback to the user to indicate statuses like power up or good read. The PWM output is not strong enough to drive a beeper, thus a beeper driver circuit is needed.

The following beeper driver circuit is provided for reference.



Chapter 5 Development Tools

The EM3080-W's development tools include both software and hardware and can be utilized for engine performance evaluation, application development and engine configuration.

EVK

The EVK is provided to help users to test and evaluate the EM3080-W, which contains beeper & beeper driver circuit, LED & LED driver circuit, trigger & reset buttons, TTL-232 to RS-232 converter & TTL-232 to USB converter, RS-232 & USB interfaces, etc. The EM3080-W can be connected to the EVK via a 12-pin FFC cable type 1 (contacts on the same side). Either USB connection or RS-232 connection can be used when connecting the EVK to a host device.

QuickSet/uExpress

A bunch of software such as QuickSet and uExpress is provided to assist users in function settings for the EM3080-W under Windows.

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