

MT82W

(2D Wide Angle Scan Engine)

Integration Guide



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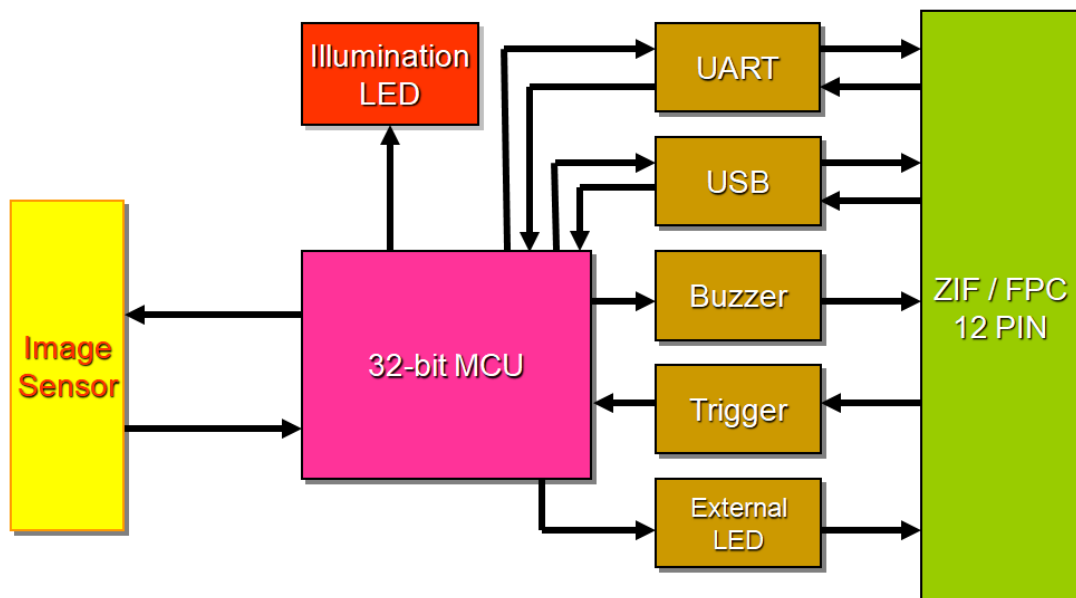
1. INTRODUCTION

The MT82W 2D Wide Angle Scan Engine uses the world's leading intelligent image recognition technology to combine advanced image recognition algorithms with advanced chip design and manufacturing technology, which greatly simplifies the design difficulty of one-dimensional barcode reading products and establishes one-dimensional images. An excellent benchmark for high performance, high reliability and low power consumption.

The MT82W 2D Scan Engine consists of 2 illumination LEDs, 1 aimer LED and a high-quality image sensor with a microprocessor that contains powerful firmware to control all aspects of operations and enable communication with the host system over the standard set of communication interfaces.

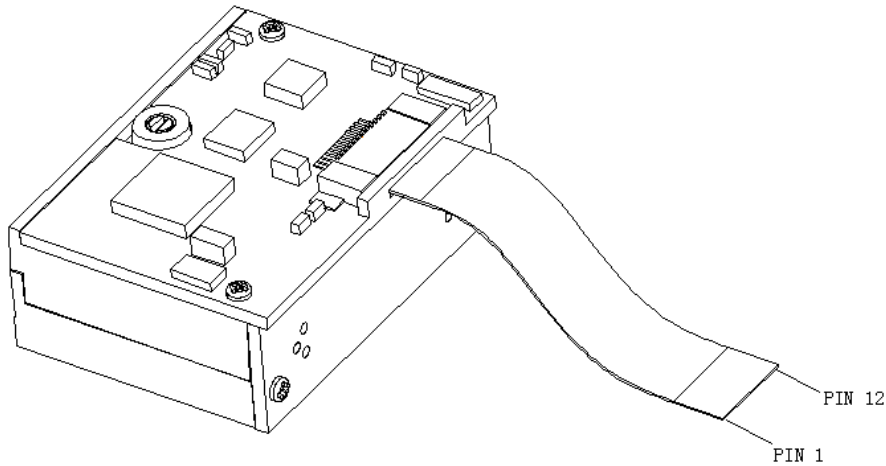
Two interfaces, UART & USB, are available. UART interface communicates with the host system over TTL-level RS232 communication; USB interface emulates a USB HID Keyboard or Virtual COM port device and communicates with the host system over USB.

1-1. Block Diagram

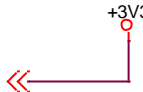



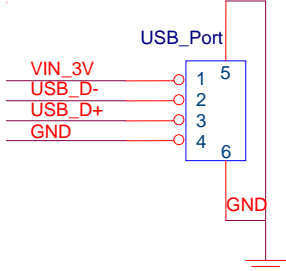
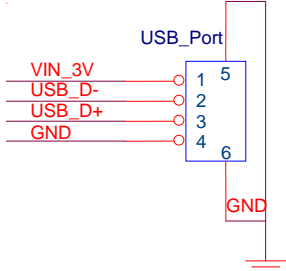
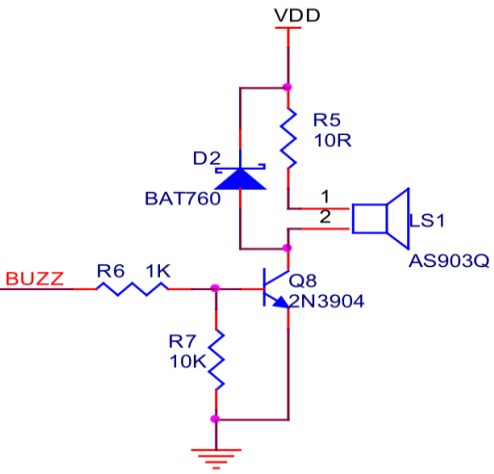
1-2. Electric Interface

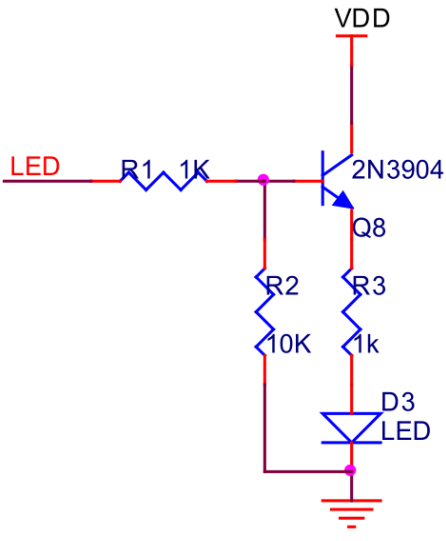
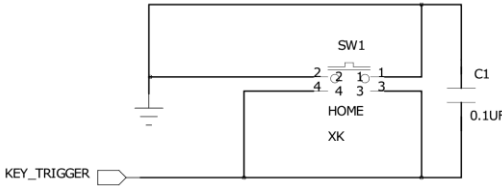
1-2-1. Pin Assignment



Contact points of connector are facing upwards

Pin#	Definition	I/O	Description	Schematic Example																								
1	NC	-----	Reserved	Leave it unconnected.																								
2	VCC	-----	Supply voltage input. Must always be connected to 3.3V power supply.																									
3	GND	-----	Power and signal ground.																									
4	RX	Input	UART TTL data input.	<div style="text-align: center;"> <p>RS232 IC</p> <table border="0"> <tr> <td>TXD</td> <td>11</td> <td>T11</td> <td>R10</td> <td>14</td> <td>RS232-TXD</td> </tr> <tr> <td>RTS</td> <td>10</td> <td>T21</td> <td>R20</td> <td>7</td> <td>RS232-RTS</td> </tr> <tr> <td>RXD</td> <td>12</td> <td>T10</td> <td>R11</td> <td>13</td> <td>RS232-RXD</td> </tr> <tr> <td>CTS</td> <td>9</td> <td>T20</td> <td>R21</td> <td>8</td> <td>RS232-CTS</td> </tr> </table> </div> <p>Sipex® Vendor P/N: SP232ACT</p>	TXD	11	T11	R10	14	RS232-TXD	RTS	10	T21	R20	7	RS232-RTS	RXD	12	T10	R11	13	RS232-RXD	CTS	9	T20	R21	8	RS232-CTS
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5	TX	Output	UART TTL data output.	<p style="text-align: center;">RS232 IC</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: none;">TXD</td> <td style="border: none;">11</td> <td style="border: none;">T11</td> <td style="border: none;">R10</td> <td style="border: none;">14</td> <td style="border: none;">RS232-TXD</td> </tr> <tr> <td style="border: none;">RTS</td> <td style="border: none;">10</td> <td style="border: none;">T21</td> <td style="border: none;">R20</td> <td style="border: none;">7</td> <td style="border: none;">RS232-RTS</td> </tr> <tr> <td style="border: none;">RXD</td> <td style="border: none;">12</td> <td style="border: none;">T10</td> <td style="border: none;">R11</td> <td style="border: none;">13</td> <td style="border: none;">RS232-RXD</td> </tr> <tr> <td style="border: none;">CTS</td> <td style="border: none;">9</td> <td style="border: none;">T20</td> <td style="border: none;">R21</td> <td style="border: none;">8</td> <td style="border: none;">RS232-CTS</td> </tr> </table> <p style="text-align: center;">Sipex® Vendor P/N: SP232ACT</p>	TXD	11	T11	R10	14	RS232-TXD	RTS	10	T21	R20	7	RS232-RTS	RXD	12	T10	R11	13	RS232-RXD	CTS	9	T20	R21	8	RS232-CTS
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6	DN	Bidirectional	USB Differential Signal Transmission (USB D-)																									
7	DP	Bidirectional	USB Differential Signal Transmission (USB D+)																									
8	NC	-----	Reserved	Leave it unconnected.																								
9	BUZZ	Output	When scanning is successful (Good Read), it outputs a PWM signal. The signal output can drive the buzzer to sound a sound through an external matching circuit. The Buzz pin has limited load capacity and cannot directly drive the buzzer to sound.																									

10	LED	Output	<p>When scanning is successful (Good Read), it outputs a high-level pulse with a duration of approx 300ms. The LED signal output pin has a limited load capacity and cannot directly drive the LED. A matching LED driver circuit is required.</p>	
11	NC	-----	Reserved	Leave it unconnected.
12	nTRIG	Input	<p>High: Stop Scanning Low: Start Scanning</p>	

1-2-2. Electric Characteristics

Operating Voltage

Ta=25°C

Symbol	Ratings	Min	Standard	Max	Unit
V _{DD}	Interface supply voltage	3.2	3.3	3.5	V
V _{IH}	Input high level	V _{DD} × 0.7	---	---	V
V _{IL}	Input low level	---	---	V _{DD} × 0.2	V
V _{OH}	Output high level	V _{DD} × 0.9	---	---	V
V _{OL}	Output low level	---	---	V _{DD} × 0.1	V

***Note:**

Exposure to maximum rating conditions for extended periods may affect device reliability.

Operating Current

Ta=25°C, V_{DD}=3.3V

Operating Current	Standby Current	Unit
245mA	30mA	mA

1-3. Power Requirement

Power input must be allowed after the MT82W is connected. If the MT82W (with hot plug) is plugged or unplugged while the cable is live, the electronic components of the MT82W may be damaged. Make sure that the power is turned off while the cable is being inserted.

Poor power connections, or short-closed power-off operations, or excessive voltage-dropping pulses may cause the MT82W to be in a stable, normal state of operation and maintain a stable power input.

The MT82W does not actively control the power supply itself. In the application, the power can be cut off to stop the operation to achieve the lowest consumption.

MT82W is less than 4s from power on to completion. After turning off the power, it is recommended to allow the power input to be turned on again after more than 500ms.

1-4. Ripple Noise

Since the power input of the MT82W is directly supplied to the image sensor and the decoder chip, a low ripple noise power input is required to ensure stable operation. It is recommended to control the ripple noise to within 50mV (peak-to-peak), at least not to exceed 100mV.(peak-to-peak).

2. SPECIFICATIONS

2-1. Technical Specifications

Optic & Performance	
Light Source	White LED
Aiming	Visible red LED
Sensor	640 x 480 pixels
Resolution	3.9mil/ 0.0975mm (1D) 5mil/ 0.125mm (2D)
Field of View	Horizontal 74° Vertical 58°
Scan Angle	Pitch Angle $\pm 70^\circ$ Skew Angle $\pm 70^\circ$ Roll Angle 360°
Print Contrast Ratio	20%
Width of Field	87mm (13Mil Code39)
Typical Depth Of Field (Environment: 800 lux)	5 Mil Code39: 28 ~ 68mm
	13 Mil UPC/EAN: 26 ~ 100mm
	15 Mil Code128: 27 ~ 109mm
	15 Mil QR Code: 19 ~ 93mm
	6.67 Mil PDF417: 25 ~ 70mm
	10 Mil Data Matrix: 23 ~ 77mm
Physical Characteristics	
Dimension	W22 x L14.6 x H11.7 mm
Weight	3.3g
Color	Black
Material	Plastic
Connector	12pin ZIF (pitch=0.5mm)
Cable	12pin flex cable (pitch=0.5mm)
Electrical	
Operation Voltage	3.3VDC $\pm 5\%$
Working Current	175mA (Typ.) 220mA (Max)
Standby Current	140mA (Typ.)
Sleep Current	20mA (Typ.)

Connectivity	
Interface	UART (TTL-level RS232)
	USB (HID Keyboard)
	USB (Virtual COM)
User Environment	
Operating Temperature	-10°C ~ 40°C
Storage Temperature	-10°C ~ 60°C
Humidity	5% ~ 95%RH (Non-condensing)
Ambient Light	50,000 Lux (Sunlight)
1D Symbologies	UPC-A / UPC-E EAN-8 / JAN-8 EAN-13 / JAN-13 Code128 / GS1-128 / ISBT 128 Code39 / Code32 Code93 Code11 Codabar Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 Standard 2 of 5 MSI Plessey Plessey GS1 Databar GS1 Databar Limited GS1 Databar Expanded
	QR Code Micro QR Code PDF417 MicroPDF417 Data Matrix Aztec Han Xin
2D Symbologies	
Regulatory	
ESD	Functional after 4KV contact, 8KV air discharge <i>(It requires housing that is designed for ESD protection and stray from electric fields.)</i>

Environmental	RoHS 2.0
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2-2. Interface

2-2-1. UART Interface

Below are default communication protocols:

Baud rate: 9600

Data Bits: 8

Parity: None

Stop Bit: 1

Handshaking: None

Flow Control Timeout: None

ACK/NAK: OFF

BCC: OFF

Interface Configuration Barcode:



UART

2-2-2. USB HID Interface

Interface Configuration Barcode:



USB HID (Default)

2-2-3. USB VCP Interface

Interface Configuration Barcode:



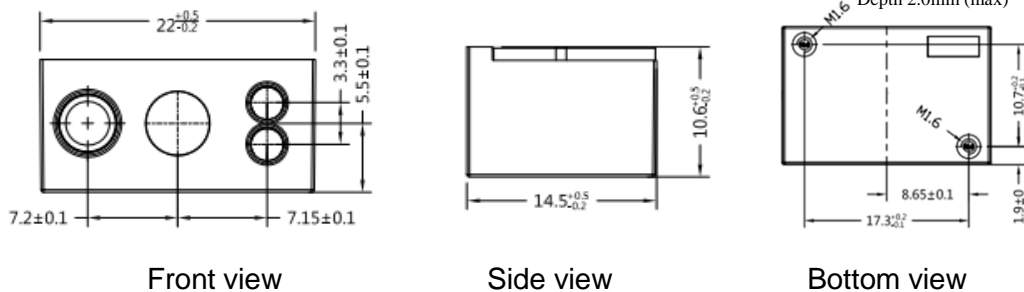
USB VCP

2-3. Operation Method

1. At power-up, the MT82W sends the Power-Up signals over Buzzer and LED pins as an indication that the MT82W enters **Standby Mode** and is ready for operation.
2. Once the MT82W triggered by either hardware or software method, MT82W will emit a beam of light which is aligned with the sensor's field of view.
3. The area image sensor captures the image of barcode and produces an analog waveform, which is sampled and analyzed by the decoder firmware running on the MT82W.
4. Upon a successful barcode decoded, the MT82W turns off the illumination LEDs, sending the Good Read signals over Buzzer and LED pins and transmitting the decoded data to the host.

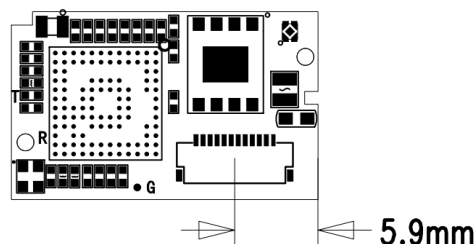
2-4. Mechanical Dimension

(Unit = mm)



2-5. Connector Specification

The figure below is a schematic of the MT82W connector. It uses a ZIF 12 PIN lower contact socket and is connected to the peripheral (host) with a flexible cable. The lower icon shows the size of the socket (unit: mm).



3. INSTALLATION

The scan engine is designed specifically for integration into customer's housing for OEM applications. However, the scan engine's performance will be adversely affected or permanently damaged when mounted into an unsuitable enclosure.

Warning: The limited warranty is void if the following recommendations are not adhered to when mounting the scan engine.

3-1. Electrostatic Discharge Cautions

All scan engines are shipped in ESD protective packaging due to the sensitive nature of the exposed electrical components.

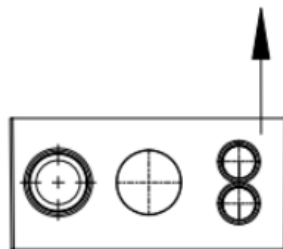
1. ALWAYS use grounding wrist straps and a grounded work area when unpacking and handling the scan engine.
2. Mount the scan engine in a housing that is designed for ESD protection and stray electric fields.

3-2. Installation Recommendations

When securing the scan engine by utilizing the machine screws:

1. Leave sufficient space to accommodate the maximum size of the scan engine.
2. Do not exceed 1kg-cm (0.86 lb-in) of torque when securing the scan engine to the host.
3. Use safe ESD practices when handling and mounting the scan engine.
4. Do not enclose the scan engine with thermal insulation material. Failure of heat dissipation may deteriorate the scan engine's performance.

3-3. Installation Orientation



When the MT82W is properly placed or installed, its front view looks like the

picture below. In the middle is the lens, the two sides are aimed, the upper is the decoding circuit board, and the screw mounting holes are below. At this time, the relative orientation of the image captured by the MT82W correctly corresponds to its orientation.

3-4. Window Materials

Following are descriptions of three popular window materials:

1. Poly-methyl Methacrylic (PMMA)
2. Allyl Diglycol Carbonate (ADC)
3. Chemically tempered float glass

Cell Cast Acrylic (ASTM: PMMA)

Cell cast Acrylic, or Poly-methyl Methacrylic is fabricated by casting acrylic between two precision sheet of glass. This material has very good optical quality, but is relatively soft and susceptible to attack by chemicals, mechanical stress and UV light. It is strongly recommended to have acrylic hard-coated with Polysiloxane to provide abrasion resistance and protection from environmental factors. Acrylic can be laser-cut into odd shapes and ultrasonically welded.

Cell Cast ADC, Allyl Diglycol Carbonate (ASTM: ADC)

Also known as CR-39™, ADC, a thermal setting plastic widely used for plastic eyeglasses, has excellent chemical and environmental resistance. It also has an inherently moderate surface hardness and therefore does not require hard-coating. This material cannot be ultrasonically welded.

Chemically Tempered Float Glass

Glass is a hard material which provides excellent scratch and abrasion resistance. However, un-annealed glass is brittle. Increased flexibility strength with minimal optical distortion requires chemical tempering. Glass cannot be ultrasonically welded and is difficult to cut into odd shapes.

Property	Description
Spectral Transmission	85% minimum from 635 to 690 nanometers
Thickness	< 1 mm
Coating	Both sides to be anti-reflection coated to provide 1% maximum reflectivity from 635 to 690 nanometers at

	<p>nominal window tilt angle. An anti-reflection coating can reduce the light that is reflected back to the host case. Coatings will comply with the hardness adherence requirements of MIL-M-13508.</p>
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3-5. Window Placement

The window placement distance is obtained by measuring the distance between the MT82W front plane and the farthest plane of the window. In order to ensure good reading performance, the vertical distance between the far end face of the window and the front end face of the MT82W is no more than 3mm, and the vertical distance between the near end face of the window and the front end face of the MT82W is not more than 2mm.

If the window needs to be tilted, the distance requirement is the same as the parallel installation. The tilt angle should ensure that there are no various beams that can be reflected into the lens to ensure read performance.

3-6. Window Care

In the aspect of window, the performance of MT82W will be reduced due to any kind of scratch. Thus, reducing the damage of window, there are few things have to be noticed.

1. Avoid touching the window as much as possible.
2. When cleaning the window surface, please use non-abrasive cleaning cloth, and then gently wipe the host window with the cloth that is already sprayed with glass cleaner.

3-7. Ambient Light

The MT82W can achieve better performance in the presence of ambient light, and can be well adapted to the fluorescent flicker of 50~60Hz common lighting AC, but in high frequency pulse flash environment, performance may be reduced due to interference.

3-8. Safe Use

The MT82W uses light-emitting diodes (LEDs) to form the aiming indication pattern. The wavelength range of the light wave generated by the LED under normal use is

safe, but it should still avoid direct-viewing the LED or directing the beam to the human eye during use to avoid causing discomfort.

4. REGULATIONS

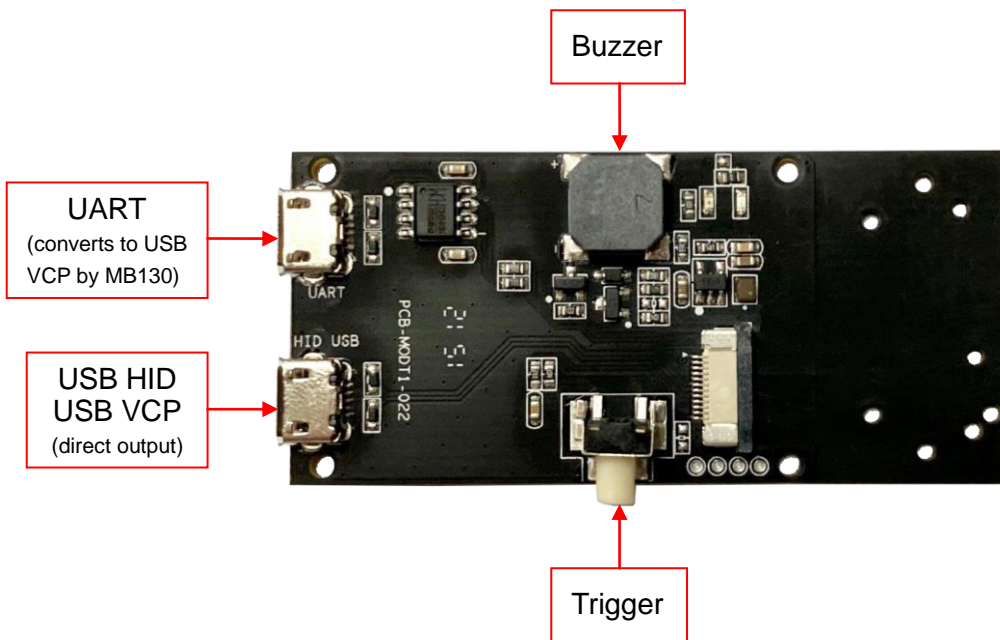
The MT82W scan engine conforms to the following regulations:

1. Electromagnetic Compliance – TBA
2. Electromagnetic Interference – TBA
3. Photobiological Safety – TBA
4. Environmental Regulations – RoHS 2.0

5. DEVELOPMENT KIT

MB130 Demo Kit (P/N: [11D0-A020000](#)) includes an MB130 Multi I/O Board (P/N: [9014-3100000](#)) and a micro USB cable. MB130 Multi I/O Board serves as an interface board for MT82W and accelerates the testing and integration with the host system. Please contact your sales representative for ordering information.

MB130 Multi I/O Board (P/N: [9014-3100000](#))



6. PACKAGING

1. **Tray** (size: 24.7 x 13.7 x 2.7cm): Each tray contains 8pcs of [MT82W](#).



2. **Box** (size: 25 x 14 x 3.3cm): Each Box contains 1pc of tray, or 8pcs of [MT82W](#).



3. **Carton** (size: 30 x 27 x 28cm): Each Carton contains 16pcs of boxes, or 128pcs of [MT82W](#).



7. VERSION HISTORY

Rev.	Date	Description	Issued	Checked
1.0	2023.05.17	Initial Release	Shaw	Ming
1.1	2023.07.25	Updated Specifications	Shaw	Ming
1.2	2023.12.12	Updated D.O.F, Working/Storage Temp., Ambient Light	Shaw	Ming

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