



# 2MP STAR LEVEL LICENSE PLATE RECOGNITION INTEGRATED MACHINE

PRODUCT SPECIFICATIONS

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**Release History**

<b>VERSION</b>	<b>DATE</b>	<b>INFO</b>
V1.00	2019.8.15.	Initial version

## 1 Introduction

### 1.1 Brief

The continuous increase of urban traffic flow puts forward higher requirements for urban traffic management. In order to ensure the safety and convenience of people's travel, the urban traffic system urgently needs to provide structured and accurate data collection support for people's travel trend prediction, intelligent parking, traffic situation awareness and other intelligent traffic services through the large-scale deployment of intelligent data terminals.

The intelligent traffic camera obtains the edge computing ability through the deployment of advanced algorithms such as intelligent ISP, vehicle and personnel attribute detection, and faces the analysis conclusion and simple and efficient target characteristics of the structured transmission algorithm of the central cloud big data system, so as to assist the cloud big data system to carry out the intelligent traffic business such as road super, intelligent parking and intelligent travel more efficiently and accurately through the system linkage 。 intelligent camera of technology covers all kinds of scene platforms combined with intelligent transportation, which can realize intelligent perception, real-time recognition of vehicle license plate, vehicle logo, body color, vehicle type and other vehicle identity information, and provide accurate and effective data guarantee for urban traffic integrated management.

This license plate recognition integrated machine is an intelligent imaging device specially designed for high-end parking lot license plate recognition, etc. auxiliary license plate recognition camera, highway toll station, urban road bayonet and other scenes. In order to meet the needs of "unattended" and "senseless payment" in the scene, This provides 2MP star level ultra-high definition imaging, over 2100 vehicle types recognition, monitoring video, intelligent light compensation, front-end storage and other features, and also supports the triggering of unlicensed vehicles, license plate anti-counterfeiting, 4G non wiring networking, cloud remote operation and maintenance, offline self-networking, cloud voice intercom and other features to ensure unattended The business operates continuously for 7 \* 24 hours, and greatly reduces the after-sales maintenance cost.

## 1.2 Features

- **2 million starlight imaging effect, dual core processor CNN acceleration**

This, equipped with the industry's advanced 2 million imaging solutions, provides video and picture output with a maximum resolution of 2MP, supports star level imaging effect, and has good adaptability to night, smooth, backlight and other light scenes. With the unique VZ intelligent ISP (image signal processing) algorithm, it can not only meet the all-weather recognition needs of license plate recognition, but also provide more clear details of the car head and logo, which is conducive to better recognition of the algorithm!

This adopts the industry's new generation of 900MHz dual core high-speed processor, built-in CNN hardware acceleration engine, strong underlying hardware to ensure the efficient operation of the device, but also provides a strong support for subsequent function expansion.

- **VIR4.0 algorithm supports comprehensive and accurate vehicle information identification**

This is equipped with the vir4.0 algorithm based on deep learning technology, which integrates nearly ten years of service experience in the field of intelligent transportation, adopts the industry's advanced deep learning technology, and cooperates with hundreds of millions of on-site sample materials to successfully create a strong algorithm framework in the field of license plate / vehicle recognition. Through the deep optimization of This hardware, many rigid needs in the scene can be effectively solved.

All day license plate recognition rate is 99.8%: it supports the recognition of ordinary blue license plate, new energy license plate, single and double yellow license plate (including mud head vehicle), single and double military / police license plate, Embassy and consulate, Hong Kong and Macao in and out of the mainland license plate, emergency license plate and other license plate numbers, colors, types, etc. the recognition rate of all day license plate is up to 99.8%, and the recognition rate of mainstream license plate in typical scenes is higher than 99.9%.

11 types of vehicle identification, more than 2100 types of vehicle identification: it can identify vehicle structural information such as vehicle logo (brand), vehicle color, etc. at the same time, thanks to the latest vir4.0 algorithm, ANPR can identify 11 types of cars, SUVs, vans, etc. it also supports more than 2100 types of vehicle identification, which perfectly meets the scene demand of completing corresponding management / charging according to vehicle type and vehicle type.

100ms fast opening experience: the vir4.0 algorithm uses a hardware acceleration engine with stronger computing power and faster operation to carry out recognition operation. From recognition to opening, it will be reduced to 100ms, which will greatly improve the parking experience of parking lot users.

Parallel recognition of multiple vehicles and effective filtering of fake license plates: the powerful dual core acceleration engine will support parallel recognition of multiple vehicles, which can perfectly adapt to the scene of multiple lane entrances and exits. At the same time, the latest anti-counterfeiting algorithm will integrate the characteristics of vehicles and license plates, which can effectively avoid the problem of "false recognition" of the number, character and graphic content information on non-license plates; and take photos and print cars for lawbreakers through mobile phones Card and other ways, using other people's license plates to achieve the behavior of carrying the pole to evade fees for filtering and deterrence.

- **Cloud management platform, cross regional centralized operation and maintenance**

Cloud management platform is a comprehensive cloud business management platform for big data operation, remote centralized management and other needs. It aims to open the communication link between the local camera and the remote service system (or client). Break through the regional limitation of traditional network, realize remote access to camera, centralized operation and maintenance, and realize Internet based isolated scene. In order to realize the trend application of unattended and shared parking space, a simple and reliable data transmission solution is provided.

- **Designed for unattended, easy to install and maintain**

Remote voice intercom: the camera has built-in audio input / output interface, which can realize one button voice intercom / help function only with external amplifier and pickup equipment. It is easy to deal with all kinds of abnormal situations without the presence of technicians.

Build "unattended" parking lot, it is no longer necessary to purchase expensive independent intercom equipment, nor to invest in the docking of developers alone. The intercom business and license plate recognition business are seamlessly linked to meet the requirements of "15 seconds" to solve the customer's fault, and truly realize efficient operation.

4G \ 5g cabling free Networking: for unattended scenarios, whether the network transmission is stable and reliable often determines the final operation efficiency and user experience. Through the camera's built-in all Netcom 4G Internet access module, the business can be carried out anytime and anywhere without restrictions. For the scenarios with high stability requirements, wired + 4G dual link redundant networking can also be used to ensure real-time online services.

This innovation is equipped with 4G module specially designed for license plate recognition integrated machine by technology. Select the international first-line Qualcomm all Netcom chip, and redesign the all-in-one chip structure according to the structural characteristics of the integrated machine shield, so as to avoid the risk of unreliability between various connectors and make it easier to install and replace the SIM card. At the same time, the 4G module is far away from the camera motherboard, effectively avoiding the interference between the camera and 4G RF, and further improving the stability of 4G transmission. And can be smoothly upgraded to 5g solution in the future.

Easy configuration of mobile phone: just connect the mobile phone to the camera (WIFI network card can be selected for the model with USB interface), you can easily complete the basic debugging work such as drawing coil, changing IP, watching video, etc.

Video to control playback: using MJPEG format to transmit video stream, compatible with 90% of the mainstream browsers. No need to install additional video controls, you can easily manage the camera, greatly reducing the amount of after-sales maintenance.

- **Rich hardware interface with stable and reliable performance**

All These products are designed with high IP protection level to ensure long-term stable and reliable operation in typical scenarios.

The ANPR machine supports the maximum 4-way alarm input, 2-way alarm output, 1-way RS485, audio input and output, fill in light control, USB and other rich interfaces, which can meet the requirements of many equipment in the scene, such as connecting channel gate, ground induction coil, LED display screen, upper computer, voice intercom terminal, etc.;

It supports TF card data storage, which can store license plate recognition content, incoming video and other data.

The network disconnection data is not lost, and the system log is stored in real time;

- **All round development and docking support, easy for secondary development of users**

SDK: provide SDK for windows and Linux environment, support VB, C, Delphi, C + + and other development languages;

API protocol interface: support API interface based on TCP, HTTP and other standard protocols to meet the docking between camera and platform system;

Opendevsdk: for the secondary development needs of professional customers, it specially provides the underlying open platform (opendevsdk) and This with dual core acceleration processor, which will provide greater flexibility and higher scalability for the secondary development of customers, and facilitate users to develop functions according to business needs.



### **1.3 Applications**

This product has excellent front-end intelligent processing ability, and is widely used in auxiliary license plate recognition camera, highway toll station, high-end parking lot license plate recognition, urban road bayonet and other scenes requiring vehicle recognition. In collaboration with the back-end / cloud business platform, it can provide customers with solutions such as vehicle non parking charge, vehicle access management, parking time charge, parking space reservation, big data collection, VIP member management, etc.

## 2 Specification

### 2.1 Functions

#### 2-1function

category	Subject	Explain
recognition algorithm	Capture rate	≥99.9%
	Recognition rate	95%-99.9% (depending on countries and environment)
	Adapt to vehicle speed	0-50 km / h
	License plate recognition type	Ordinary blue license, single and double yellow license, new energy, single and double police car, new armed police, single and double military license, new embassy, coach car, license plate for Hong Kong and Macao to enter and leave the mainland, emergency license plate, civil aviation, special license plate, etc.
	License plate recognition features	Number, color, type, width
	License plate anti-counterfeiting	Support abnormal license plate (mobile phone photo, print) alarm
	Unlicensed car trigger	Support video trigger of unlicensed car
	Vehicle logo recognition	Support mainstream logo recognition
	Vehicle identification	Support mainstream vehicle identification (more than 2100 models)
	Body color recognition	Support mainstream body color recognition
	White list of license plate	Support accurate and intelligent fuzzy matching of white list license plate rules
	Intelligent calibration	Support accurate or wildcard way to intelligently calibrate license plate number, license plate type and color
imaging	Basic configuration	Embedded VZ intelligent ISP algorithm, intelligent optimized dimming, intelligent adaptation to complex scenes Basic parameters (brightness / contrast / saturation / sharpness / image flip / exposure time) can be set separately
Video and audio	Video compression standard	H.264/H.265/MJPEG;
	Video resolution	640*360、704*576、1280*720、1920*1080
	Compression output rate	512Kbps~5000Kbps
	Frame rate	1-25 frames, default 25 frames (1920 * 1080)
	Audio coding	G.711/AAC ;
	Voice intercom	Support cloud / local two-way voice intercom
communication	Communication protocol	SDK、ONVIF、HTTP、RTSP、TCP/IP、UDP、RS485、IO、NTP
	FTP upload picture	Support, upload the captured pictures to the server through FTP

	VPN virtual private network	Support the establishment of virtual private network through Open VPN
	HTTP push	Support, upload identification results and offline retransmission
	Dynamic domain name	Support the docking of 3322 dynamic domain name service
	UPNP port mapping	Support, automatic mapping of HTTP / RSTP communication ports
	4G extension	Support the expansion of 4G module (optional) and redundant link backup
	WIFI extension	Extending WIFI RF card through USB
networking	Offline networking	No upper computer or server is needed, and the operation networking between cameras is realized automatically
	Offline charges	Charging rules can be set by model, time length, times, time period, ladder, etc
	Parking lot management	Support the establishment of multiple parking lots and scene management of multiple cameras
	Black-and-white list	Cooperate with the strategy to meet the vehicle level management
	Phase auxiliary camera	No more than 4 auxiliary cameras can be added at the same entrance / exit
	Screen display protocol	Support the connection of LED screen display of mainstream brands, output identification / billing results
Administration	Audio output	Support external speaker broadcast recognition / billing results
	Management agreement	PC \ mobile management, PC management tools, SDK development kit, opendevsdk, HTTP push
	Cloud management	Remote management of single camera, centralized management of multiple cameras through account, support for cloud SDK development and management platform
*Indicates that later version update support is available		

## 2.2 Hardware Info

### 2-2 hardware info

category	Index item	Detailed parameters
imaging	sensor	200W 1/2.8CMOS
	Resolution	1920(H) x 1080(V)
	power	
	Low illumination	0.01LUX(white light)
	Electronic shutter	0-1ms or customized
	Standard lens	6mm fixed focus lens
	Matching lens	2.8-12mm、 6-22mm、 5-50mm electric focusing lens
	port	CSM14
Image index	Image settings	Brightness, contrast, saturation, image flip, exposure time, etc

	noise reduction	Support 2D / 3D noise reduction
	Wide dynamic	support
Interface key	network interface	1 path 10 / 100Mbps adaptive RJ45 port
	IO output	2 paths
	IO input	4 path (only switch value is supported)
	RS485	1 path
	RS232	—
	AUDIO	1 input + 1 output (active speaker only)
	USB	1 USB Type-A port (not available when 4G version is selected)
	TF slot	1 of TF card slot, with a maximum capacity of 128G
	reset	1 reset button
	Power lamp	1 (green)
reliability index	temperature	-20°C~70°C
	Static electricity	Contact 6kV, air 8Kv ;
	surge	10 / 70 common mode 4KV, differential mode 2KV
	Anti vibration	National standard
	power supply	220V AC (main board 12V DC)
	consumption	Mainboard power consumption≤5W
	protection	IP66
Structural parameters	supplementary LED	Standard LED lamp board (4 LED lamp beads with adjustable brightness, power consumption ≤ 6W)
	Size	Gun machine: 135mm (L) × 78mm (W) × 55mm (H) 15-inch shield: 452mm (L) × 130mm (W) × 104mm (H)

### 2.3 Device interface



Camera interface diagram

function	remark	explain
power	DV12V ; GND	Support 9-15v DC, standard 12V / 2A
network interface	RJ45/LAN	Support 10 / 100Mbps Ethernet transmission
Serial port (RS485)	A1/B1	Connect the upper computer and output the recognition results
( AUDIO )	AIN/AOUT/GND	Audio in / out
IO(ALARM OUT)	OUT1/OUT2	used for gate lifting and other operations
IO(ALARM IN)	IN1/2/3/4 /GND	Can connect Grounded induction coil for external signal trigger snapshot
LED interface	LED+/LED-	It can be used for power supply and control of fill light
USB port	USB	USB2.0 port
SD card slot	TF-CARD	SD card, maximum 128G
reset	RESET	Press and hold for 5-10 seconds, and the equipment will be completely restored to the factory configuration
Indicator light	SYS ( green )	Flashing means the system is working properly Normally on or off means starting or abnormal

## 2.4 Interfaces

### 2.4.1 Power interface

It is the power input interface that wins the bid of the rear section or tail line of the equipment. The details are as follows:

#### 2-3 Power interface description

Signal name	Signal direction	Function description
12V	POWER	12VDC $\pm$ 20% DC input
GND	POWER	Power ground

The internal power input of the equipment has reverse polarity protection, overvoltage protection and surge protection.

### 2.4.2 Integrated interface

The rear terminal or tail line of the equipment is the integrated interface, and the detailed description is as follows:

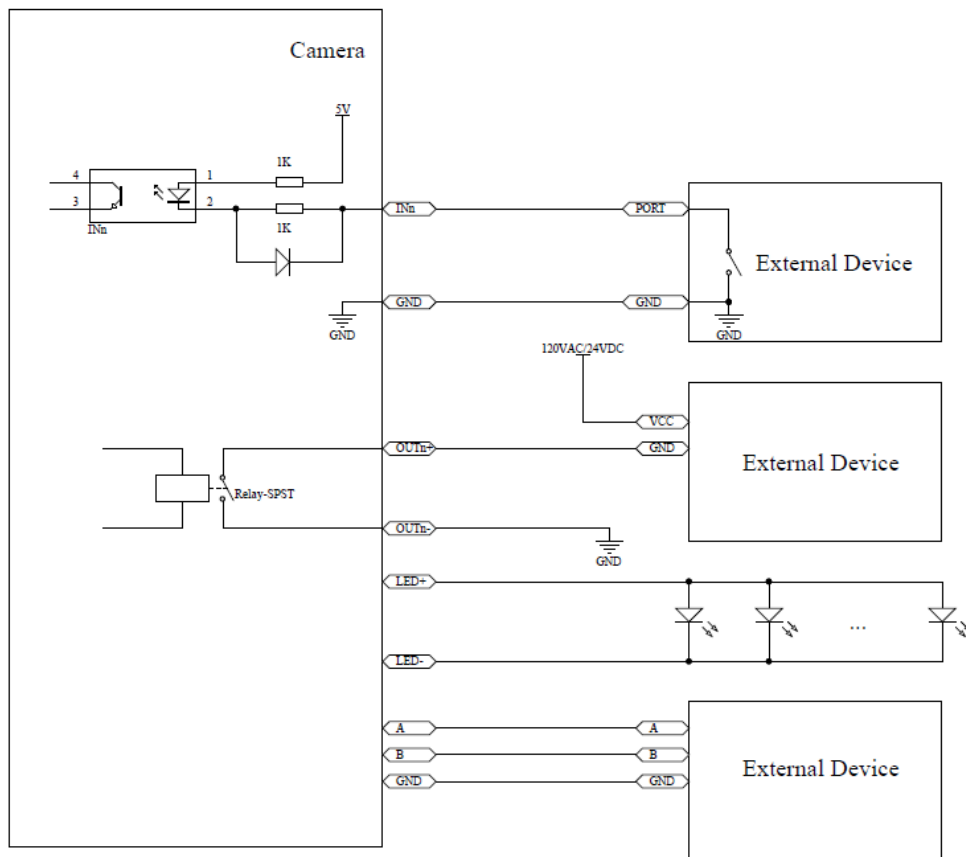
The RS485 interface is a non-isolated differential half duplex interface, with the maximum baud rate of 115200, and the internal termination resistance of 120 ohms. For long wire transmission, it is recommended to add 120-ohm terminal resistance at the other end of the bus.

Led external LED light interface is used for external light supplement led, constant current source output, 4 gears, respectively 12.5ma, 25mA, 125mA, 225ma, corresponding to the setting of light supplement distance of 2m, 4m, 6m, 8m in the camera.

The alarm output is the switch value output of the passive relay, and the contact voltage capacity is 220VDC, 250VAC; the contact current capacity is 1A; the power capacity is 30W.

The alarm input is switching value input, which is triggered by short circuit to ground.

The following is the common wiring diagram of signals in the integrated interface.



**2-2 Common interface wiring diagram**

### 2.4.3 Ethernet interface

RJ45 / LAN in the rear slot of the device is the Ethernet interface of the camera, which is used to transmit camera control commands, captured image results and video streams. The default factory IP address of the camera is 192.168.1.100. Users can browse images and configure camera parameters through web browser.

### 2.4.4 SD card interface

TF in the slot at the back of the device is the micro SD card interface, which supports the standard TF card of SDHC. Up to 128gbyte card capacity.

### 2.4.5 Reset button

The reset button is indicated in the slot at the back of the device. Use the pointed tool to press and hold the reset button. After the LED indicator on the panel flashes twice, release the button. After the device is restarted, it can be restored to the default IP address, user name and password.

#### **2.4.6 Panel indicator**

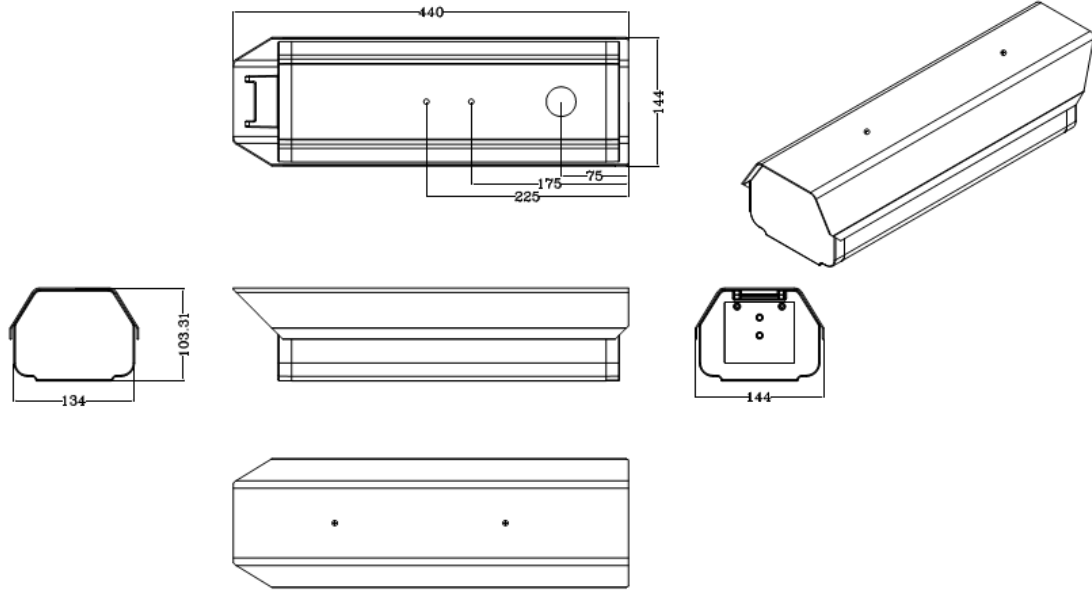
The system (power supply) indicator is indicated as POW in the rear slot of the device. It will be green after power on, and the green light will flash when the system is in normal operation.

#### **2.4.7 Audio interface**

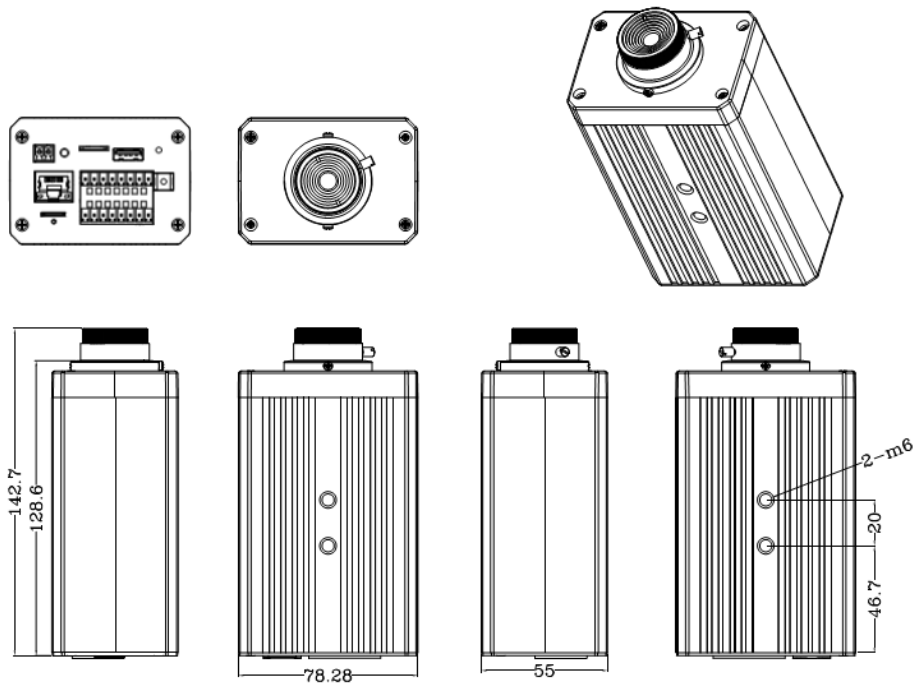
In the slot at the back of the device, the audio input interface is indicated as AIN, which is compatible with LINE and Mic. The slot at the back of the device indicates that AOUT is the audio output interface, which only supports active speakers.



## 2.5 Dimensions



15-inch size



ANPR machine appearance

**3 Appendix****3-1 Common order model list**

Order type	Product No	Specifications	Enclosure accessories	Parking
<b>ANPR Camera</b>		1 / 2.8 "2 million star light level sensor, 6mm fixed focus lens (CS interface), built-in fill light, support 12VDC power supply	15-inch White shield, 25mm single hole (standard single anti water head + 330mm bellows), three in one instruction	10 sets / carton