

**200 VISION-ZENITH INTELLIGENT ANPR
CAR LICENSE PLATE RECOGNITION
SYSTEM SPEPCIFICATION**

RX-IV Product Specification



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Forms Manual

FORM 2-1 FUNCTION SPECIFICATION FORMS 错误!未定义书签。

FORM 2-2 BASIC HARDWARE SPECIFICATION FORMS 错误!未定义书签。

FORM 2-3 POWER SOURCE CONNECTION DESCRIPTION 错误!未定义书签。

FORM 3-1 COMMON USED PURCHASE MODEL TABLE 错误!未定义书签。

Release History

Version	Date	Changed Information
V1.00	15 th August 2019	Initial Version

1 Introduction

1.1 Brief

The continuous incremental on urban vehicle traffic has put forward higher requirements for urban traffic management. In order to ensure the safety and convenience on travelling, the urban transportation department urgently needs large-scale deployment of intelligent data terminals on travelling trend prediction, artificial intelligent parking, traffic status awareness and such to support structured and accurate data collection.

Vision-Zenith Intelligent traffic cameras acquire advanced algorithms such as ISP, vehicle and human attribute detection, deployment of advanced algorithms to gain edge computing capabilities, facing centralized cloud data base system structured transmission algorithm analysis conclusion and simplified high efficiency target, assist cloud based big data system to conduct road supervision more efficiently and accurately through system linkage, intelligent transportation services such as smart parking and smart travel. Vision-Zenith smart camera also covers various scene platforms superimposed with intelligent transportation linkage, able to achieve intelligent perception, real-time identification of vehicle license plate, vehicle brands, vehicle color, vehicle type and other identity information, provide accurate and effective data guarantee for comprehensive urban traffic management.

RX-IV series license plate recognition integrated machine is a smart device designed for prestige parking lot license plate recognition, ETC auxiliary license plate recognition camera, highway toll station and urban road bayonet. In order to meet the requirement on “unmanned” and “senseless payment” scene, the RX-IV series provides 2MP starlight ultra-high-definition image, over 2100 types of vehicle identification, surveillance video, intelligent light supplement and front-end storage. It also support features such as unlicensed car trigger, anti-counterfeit license plate, 4G cableless networking, remote operation and maintenance on the cloud, offline adhoc networking, and cloud voice intercom. Guarantee 24/7 unmanned business operation, drastically reduce after-sales maintenance costs.

1.2 Features

- **2 Million star-level image effects, dual-core processor CNN acceleration**

The RX-IV series is equipped with an industry-leading 2 million image solution that provides video and picture output with a maximum 2M resolution, supports star-level imaging effects, and has good adaptability to night light, forward light, back light and other light scenes.

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

The RX-IV series is equipped with Zhenshi Technology's VIR4.0 algorithm based on deep learning technology. With hundreds of millions of on-site sample materials, we have successfully created a strong algorithm framework in the license plate recognition industry. Through deep optimization of the RX-IV series hardware, it can effectively solve many rigid needs in the scene.

All-weather license plate recognition rate of 99.8%: Supports recognition of ordinary blue cards, new energy license plates, single-double-layer yellow cards (including dump trucks), single-double-tier military car plate, police car plate, embassies and consulate, Hong Kong and Macau vehicles that enter and exit mainland China and emergency license plates, all sort of license plate number, color, type and etc, The all-weather license late recognition rate is as high as 99.8%, and in typical scenes the mainstream license plate recognition rate is higher than 99.9%. 11 types of vehicle identification, over 2100 types of vehicle identification: It can identify vehicle structure information such as logo (brand), vehicle color and etc. Riding on the facility of VIR4.0, RX-IV can identify 11 types of cars, SUVs, trucks and etc. At the same time support more than 2100 car models, tapping on the car models and type perfectly meet the sites management requirement on maintenance and collection.

100ms extremely fast boom gate access: The VIR4.0 algorithm uses a more powerful and fast speed engine to accelerate the performance on recognition rate. From recognition to barrier opening, it will be reduced to 100ms that improve greatly on parkers experience.

Multi-vehicle parallel recognition, effective filtering on duplicate car plates: The powerful dual-core acceleration engine supports multi-vehicle parallel recognition that can perfectly adapt to multi-lane entrance and exit scenarios. At the same time, the latest anti-counterfeiting algorithm will integrate the characteristics of vehicles and license plates to avoid misidentification on car plate number, alphabet and images. It also filter and deter criminals that duplicate car plates to evade the fee.

- **Zhenzhi cloud management platform, centralized operation and maintenance across regions.**

The Zhenzhi Cloud management platform is a comprehensive business management platform on the cloud that is specifically designed for the needs of big data operations and remote

centralized management. It target to open the communication link between the local camera and the remote business system (or client). It breaks through the geographical limitations of traditional networks, enable remote access to cameras, centralized operation and maintenance and digitalize isolated scenarios. To fulfill unmanned and shared parking spaces trend, provide simple and reliable data transmission solutions.

- **Designed for unmanned, easy installation and maintenance.**

Remote voice intercom: The camera has a built-in audio input/output interface, and only needs to be connected to an external amplifier and pickup device to reach one touch voice intercom/help function. It ease to handle various abnormal situations without technicians presence.

Build unmanned parking lot without purchase on expensive stand-alone intercom equipment and eliminates the need to invest in developers docking. The intercom service and the license plate recognition service are seamlessly linked to meet the requirements of resolve issues within 15 seconds and achieve highly efficient operation.

4G/5G cableless networking: The stability and reliable on unmanned scenarios determine the operational efficiency and user experience. Through the camera's built-in full Netcom 4G internet access module, you can carry out business at any time and place without restrictions. For scenarios with high stability requirements, wired + 4G dual-link redundancy networking can also be used to ensure that services are online in real time.

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

All products of the RX-IV series are designed with high IP protection to ensure long-term stability and reliable operation. The RX-IV machine supports upto 4 alarm inputs, 2 alarm outputs, 1 RS485, audio input and output, fill light control, USB and other rich interfaces, that meet requirement on the road barrier, ground sense coil, LED display, PC, voice intercom terminal and many other equipment requirements. Support TF card data storage, to store license plate identification content, incoming care video and other data, with system logs storage in real time to avoid data lost.

- **Comprehensive development and docking support, to easy secondary development for users**

SDK development kit: Provide SDK development kits for Windows and Linux, supporting VB, C#, Delphi, C++ and other development languages.

API protocol interface: Support API interfaces based on TCP, HTTP and other standard protocols to meet the connection between the camera and the platform.

Open Dev SDK: Specially provides the underlying open platform (OpenDevSDK) for secondary development needs for professional customers. And the RX-IV series equipped with dual-core acceleration processors which will provide customers with greater flexibility and higher scalability for the secondary development. It is convenient for users to develop functions according to business needs.

1.3 Applications

The product has excellent front-end intelligent processing capabilities and is widely used in ETC-assisted license plate recognition cameras, highway toll stations, high-end parking lot license plate recognition, urban road bayonet and other scenarios that require vehicle identification. Collaboration with back-end/cloud business platforms can provide customers with solutions such as non-parking charges, vehicle access management, parking timing charges, parking space reservation, big data collection, VIP membership management and other solutions.

2 Specs

2.1 Functions

Form 2-1 Function specification forms

category	Items	Description
Recognition algorithm	Capture rate	≥99.9%
	Recognize rate	Typical scene + typical license plate
	Suitable car speed	0-50 Km/hour
	license plate recognition type	Ordinary blue card, single double-deck yellow card, new energy, single double-deck police car, new armed police, single double-deck military license, new embassy, coach car, Hong Kong and Macau access to mainland license plates, emergency licensee plates, civil aviation, special license plates
	license plate recognition feature	Number, color, type, width
	Duplicate license plate	Support abnormal license plate (mobile phone photo, print) alarm
	Unlicensed car trigger	Support unlicensed car video trigger
	Vehicle logo	Support mainstream car logo recognition

	recognition	
	Vehicle type recognition	Support mainstream car identification (over 2100 models)
	Vehicle color recognition	Support mainstream body color recognition
	License plate white list	Support precise and intelligent fuzzy matching of white list license plate rules
	Smart calibration	Support accurate or wildcard character calibration for intelligent license plate number and license plate type and color
image	Basic configuration	Built-in VZ intelligent ISP algorithm, intelligent optimized dimming, intelligent adaptation for complex scenes. Basic parameters (brightness/contrast/saturation/sharpness/image flip/exposure time) can be set individually
Video & audio	Video compression standard	H.264/H.265/MJPEG;
	Video resolution	640*360、704*576、1280*720、1920*1080
	Compressed output bit rate	512Kbps~5000Kbps
	Frame rate	1~25 frame,default 25 frame (1920*1080)
	Audio coding	G.711/AAC;
	Voice	Support cloud/local two-way voice intercom

	intercom	
communication	protocol	SDK、ONVIF、HTTP、RTSP、TCP/IP、UDP、RS485、IO、NTP
	FTP upload image	Support, upload captured pictures to server via FTP
	virtual private network	Support the establishment of virtual private networks through OpenVPN
	HTTP push	Support uploading recognition results, offline retransmission
	Dynamic domain name	Support docking 3322 dynamic domain name service
	UNPN port mapping	Support, automatic mapping HTTP/RSTP communication port
	4G extension	Support expansion of full netcom 4G module (optional), support link redundant backup
	WIFI extension	Extend WIFI radio frequency card via USB
networking	Off-line network	No host computer or server is needed, automatic operation networking between cameras
	Off-line charges	Supports setting charging rules by model, duration, frequency, time frame, steps and etc
	Parking management	Support the establishment of multiple parking lots and scene management of multiple cameras
	Black & white list	Coordinate strategies to meet vehicle hierarchical management

	Complementary camera	≤4 auxiliary cameras can be added to the same entrance/exit
	On-screen display protocol	Supports docking with mainstream brands' LED screens, outputting identification/billing results
	Audio output	Support external speaker broadcast identification/billing
management	Management agreement	PC/mobile management, PC management tools, SDK development kit, OpenDevSDK, HTTP push
	Cloud management	Remotely manage a single camera, centrally manage multiple cameras through an account, support cloud SDK, development management platform
<ul style="list-style-type: none"> Indicates that it can be supported through version updates in the future 		

2.2 Hardware Info

2.2. Basic hardware specifications

type	item	specification
Image	sensor	200W 1/2.8 inch star level CMOS
	resolution	1920(H) x 1080(V)
	low light	0.01LUX (filler light)
	Electronic shutter	0-1ms or custom
	Standard lens	6mm fixed focus lens
	Optional lens	2.8-12mm、 6-22mm、 5-50mm motorized focus lens
	interface	CS\M14 interface

Image indicators	Image setting	Brightness, contrast, saturation, image flip, exposure time, etc
	noise reduction	support 2D/3D noise reduction
	Wide dynamic	support
Interface buttons	Network interface	1 10/100MbpsRJ45 1 10/100mps adaptive RJ45 port
	IO output	2 ways
	IO input	4 ways (only support on off switch)
	RS485	1 way
	RS232	---
	AUDIO	1 input + 1 output (supports active speakers only)
	USB	1USB type-A interface (not available when optional 4G version)
	TF card slot	1TF card slot, maximum support 128G capacity
	reset key	1 reset button
power light	1 way power light (green)	
Reliability index	temperature	operating temperature: -20°C~70°C
	static electricity	contact 6KV,air 8KV;
	surge	10/70 common mode 4KV, differential mode 2KV
	anti-vibration	national standard
	electrical supply	220V AC (motherboard 12V DC)
	power consumption	motherboard power consumption $\leq 5W$
	protection	IP66

Structure parameter	补光灯 fill light	standard LED light board (4 adjustable LED lamp beads, power consumption $\leq 6W$)
	outer measurement	gun machine: 135mm (L) *78mm(W)*55mm(H) 15inch guard: 452mm(L)*130mm(W)*104mm(H)

2.3 Device Interface



RX-IV Device Interface Photo

function	logo	description
power source	DV12V; GND	support 9-15V DC, standard 12V/2A
network interface	RJ45/LAN	support 10/100Mbps ethernet transmission
RS485	A1/B1	Connect to upper computer and output recognition result
AUDIO	AIN\AOUT\GND	Audio input/output
IO(ALARM OUT)	OUT1/OUT2	Can be used for barricade lifting
IO(ALARM IN)	IN1/2/3/4 /GND	Groundable induction coil for triggering capture by external signal
Fill light interface	LED+ /LED-	Can be used for power supply and control of fill light
USB interface	USB	USB2.0 interface
SD card drive	TF-CARD	SD card storage up to 128G
reset key	RESET	Press and hold for 5-10 seconds, the device completely restores the factory configuration
display light	SYS (green)	Blinking means the system is working properly. Light on or light off means in starting or abnormal status

2.4 Interfaces

2.4.1 Power Interface

The DC input on the back or tail of the device is the power input interface. The details are as follows:

Form 2-3 Power Interface Description

Signal Code	Signal Direction	Functions
12V	POWER	12VDC \pm 20% DC input
GND	POWER	power ground

The device's internal power input has reverse polarity protection, overvoltage protection and surge protection.

2.4.2 Integrated Interface

The terminal or tail cable at the rear of the device is the integrated interface as below:

The RS485 interface is a non-isolated differential half-duplex interface. The maximum supported baud rate is 115200, and the 120ohm termination resistor is included. When transmitting over long lines it is recommended to add a 120ohm termination resistor at the other end of the bus.

LED external LED light interface is used for external fill light LED, constant current source output, 4 gears, respectively 12.5mA, 25mA, 125mA, 225mA, corresponding to 2m, 4m, 6m, 8m fill light distance settings in the camera.

The alarm output is a passive relay switch output. The contact voltage capacity is: 220VDC, 250VAC, the contact current capacity is 1A, the power capacity is 30W.

The alarm input is a digital input, which is triggered by a short to ground.

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

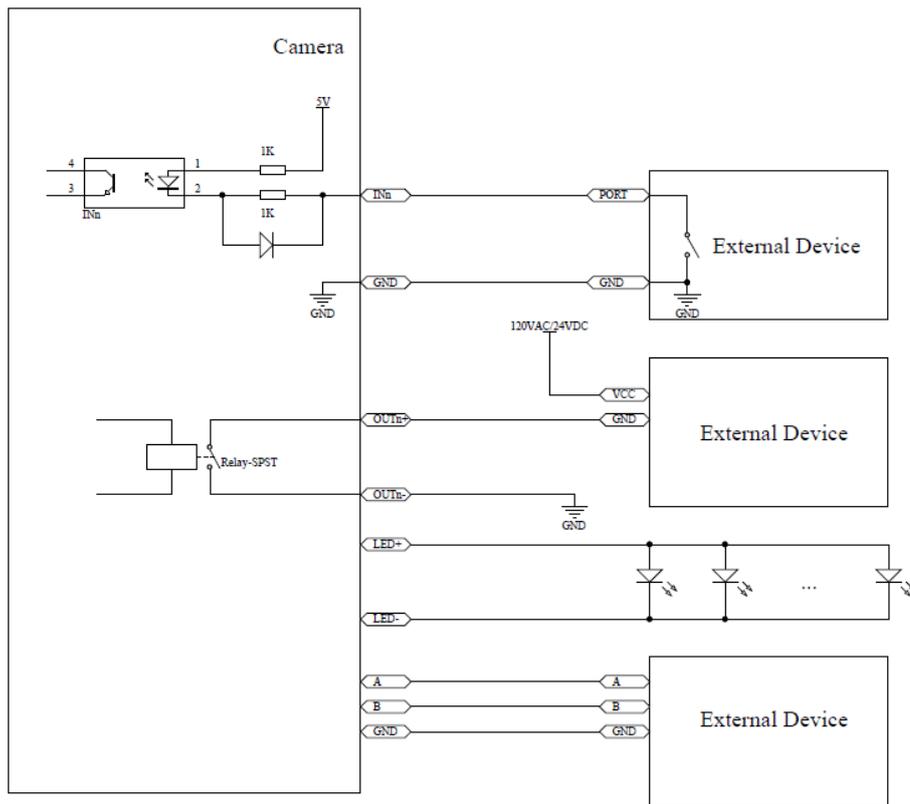


Chart 2-2 Common Interface Wiring Diagram

2.4.3 Ethernet Interface

The rear slot of the device is labeled RJ45/LAN as the camera Ethernet interface, that is used to transmit camera commands, capture images and video streams. The camera's default factory IP address is 192.168.1.100. Users can browse images and configure camera parameters through a web browser.

2.4.4 SD Card Interface

The micro SD card interface marked TF in the back slot of the device supports the SDHC standard TF card. Maximum capacity expandable to support up to 128 GByte.

2.4.5 Reset Button

The reset button is marked as RESET in the rear slot of the device. Use a pointed tool to press and hold the reset button. After the LED indicator on the panel flashes twice, release the button to restore to the default IP address, username and password.

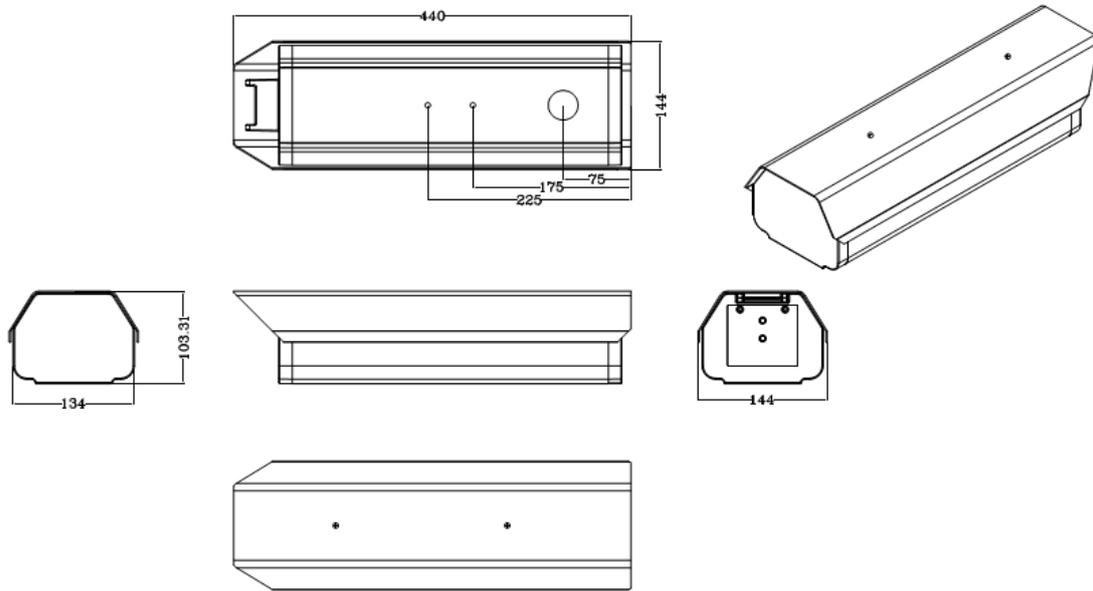
2.4.6 Panel Indicator

The POW in the rear slot of the device is the system (power) indicator. Green light is on after power on and the green light flashes when the system is operating under normal stage.

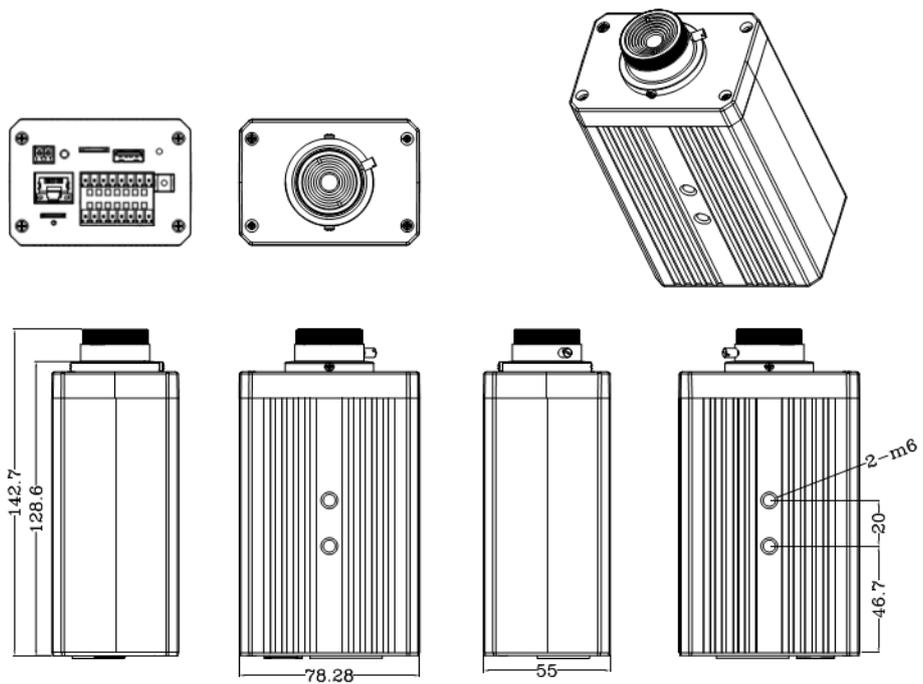
2.4.7 Audio Port

AIN in the rear slot of the device is the audio input interface, compatible with LINE and MIC. The AOUT in the rear slot of the device is an audio output interface, which only supports active speakers.

2.5 Dimensions



15 inch shield appearance dimensions



RX-IV Rifle bolt appearance size reference drawing

3 Appendix

Form 3-1 Commonly Ordered Models List

Model	Product Code	Description	Camera cover accessories	box
RX-IV series	VTC720A-A00D	½.8 inch 2 million starlight sensor, 6mm focus lens (CS interface), built-in fill light, support 12VDC power supply	15 inch white shield, 25mm single hole (standard waterproof single headed, 330mm bellows) 3-in-1 manual	10 unit/pack
RX-IV-IV series	VTC721A-A00A	½.8 inch 2 million starlight sensor, 6mm focus lens (CS interface), built-in fill light, support 12VDC power supply	15 inch white shield, 25mm single hole (standard waterproof single headed, 330mm bellows) 3-in-1 manual	10 unit/pack
RX-IV-IV series	VTC802A-A00A	1 ½.8 inch 2 million starlight sensor, 6mm focus lens (CS interface), built-in fill light, support 12VDC power supply	15 inch white shield, 25mm single hole (standard waterproof single headed, 330mm bellows) 3-in-1 manual	10 unit/pack

4 Company Info



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