Specification of the Integrated HD Vehicle Recognition Machine TD-GPA-XJ201 of Overseas Series

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Release History

Version number	Date	Change information
V1.0	5/24/2024	Initial version

Catalog

1. Introduction

1.1 Brief

With the adoption of the NPU processor, 5 megapixel starlight CMOS sensor, and the 8th generation of the Oeuvre vehicle recognition algorithm systems specially customized for the deep learning, the XJ201 Integrated HD Vehicle Recognition Machine is the multi -functional intelligent license plate recognition equipment by integrating the license plate recognition with the license plate anti-counterfeiting, unlicensed vehicle detection and cloud management. This equipment is featured with the following functions, such as the 4 megapixel ultra HD (UHD) imaging, various license plate/vehicle information recognition, monitoring recording, intelligent fill light, front-end storage, remote video browsing on the cloud, remote operation and maintenance, and offline Ad-Hoc networking.

1.2 Main features

1.2.1 Advantages of the license plate/vehicle recognition algorithm

With the adoption of the 8th generation of the Oeuvre vehicle recognition algorithm systems by the Integrated HD Vehicle Recognition Machine XJ201, we have successfully developed a license plate/vehicle recognition algorithm system based on the deep learning from massive data. The 8th generation of the vehicle recognition algorithm systems has great advantages over the similar products sold in the market in the stable recognition of the license plate at a large angle, unlicensed vehicle detection, license plate anti-counterfeiting, and long distance recognition.

Typical license plate recognition rate: Able to recognize license plates of Taiwan of China, Brazil, Singapore, Vietnam, Malaysia, Europe, Thailand, Hong Kong of China, Macau of China, Chile, Colombia, South Africa, Dubai, etc. In typical scenarios, the recognition rate of mainstream license plates is up to 97%.

Stable recognition at a large angle: The maximum levelness of the license plate and camera is 65 °, the maximum angle up and down is 60 °, the comprehensive capturing rate > 99%, and the comprehensive recognition rate > 97%, all of which contribute to its powerful environmental adaptability.

Unlicensed vehicle recognition: The unlicensed vehicle detection rate is over 99%.

License plate anti-counterfeiting: After the comprehensive vehicle and license plate features are considered in the algorithm, the effective anti-counterfeiting rate is over 99%.

Wide distance recognition: The effective recognition distance range is 2-12m.

1.2.2 Stable and reliable performance, and rich and diverse Interfaces

XJ201 is a 15-inch whole machine with the adoption of the IP65 protection design to ensure its stable and reliable long-term operation in typical scenarios.

XJ201 is equipped with up to 4 inputs, 2 outputs, and 2 RS485, and a zoom lens, and The interface surge protection level is 6 kV. It can satisfy the requirements of different equipment, such as daily connection of ground sensing coils, barriers, and LED displays in various scenarios.

1.2.3 4 Megapixel HD imaging effects

With the adoption of the industry-leading 4 megapixel starlight imaging solution, XJ201 can output photos with the resolution of up to 2560*1440. Under the environment with the same imaging effect, XJ201's resolution is over 80% higher than that of common 2 megapixel cameras. With the help of the intelligent deep learning ISP (Image Signal Processing) algorithm, XJ201 can not only satisfy the customers' requirements on the license plate full-scenario recognition, but also provide more vehicle details to help them improve the recognition rate of the algorithm.

1.2.4 All-round development transfer

SDK development suite: SDK development suites for Windows, Linux, and Android are available, and the development languages including VB, C#, Delphi, and C++ are available.

API protocol interface: The API interfaces based on TCP, HTTP, MQTT and other standard protocols are available to achieve the transfer between the camera and platform system.

1.3. Application scenarios

This product has more functions and interfaces than other products, so it can provide users with a variety of options to satisfy the different needs in various application scenarios. This product can be widely applied to the following scenarios, such as entrances and exits of the parking lot of various parking lots, communities and highways, new energy charging piles, garage ground locks, unattended vehicle washing shops, automobile 4S shops, unattended weighing and unattended duty, especially the business parking lots with the large traffic and high revenue.

1.4 Equipment form

The XJ201 appearance is shown in the figure below. It is equipped with 15-inch housing. Thus, it has sufficient internal space to accommodate various interfaces,

indicators, and buttons. Additionally, its housing can be easily opened, facilitating the installation, commissioning and maintenance, and further achieving function expansion.

Overall appearance diagram

2. Product specifications

2.1. Function specifications

List of specifications of the equipment function:

Category	Item	Description
	Comprehensive license plate recognition rate	97% or above
	Unlicensed vehicle detection rate	99% or above

Recognition algorithm	Anti-counterfeiting rate	99% or above
	Recognition angle	The maximum angle on the left and right is 65°; and the maximum angle up and down is 60°
	Stable recognition rate at a large angle	97% or above
	Recognition distance	2~12 m
	Vehicle speed	45km/h
	License plate recognition type	Able to recognize license plates of Taiwan of China, Brazil, Singapore, Vietnam, Malaysia, Europe, Thailand, Hong Kong of China, Macau of China, Chile, Colombia, South Africa, Dubai, etc.
	Vehicle structuring information	Able to recognize different vehicle features, such as the vehicle model, vehicle type, and vehicle color
	License plate recognition features	Number, color, type and width
	Whitelist of license plates	Adopt rules to accurately, intelligently and fuzzily match license plates in the whitelist
	Intelligent calibration	Able to calibrate the license plate number, license plate type and license plate color intelligently with the accurate or wildcard methods
Imaging	Basic configuration	Embedded intelligent ISP algorithm Able to intelligently optimize the dimming algorithm, and intelligently adapt to complex scenarios. Basic parameters (brightness/definition/gain/ exposure time) can be set independently.
Video	Video compression standard	H.264/MJPEG;
	Video resolution	352*288, 704*576, 1280*720, 1920*1080
	Compress the output bitrate	384Kbps ~ 4Mbps
	Frame rate	1 ~ 25 frames and the default value is 25.
Communication	Communication protocol	SDK, HTTP, MQTT, ONVIF, RTSP, TCP/IP, UDP, NTP , DHCP
	HTTP push	Able to upload recognition results, and re-upload them offline
Networking	Offline networking	Without any upper computers or servers, operation networking can be achieved among different cameras

	Offline billing	Able to set billing rules according to the vehicle type, duration, frequency, time period and time ladder.
	Blacklist and whitelist	Able to satisfy the requirements of vehicle
		Classification management with the strategy.
	Primary and secondary cameras	Multiple cameras can be added to the same entrance/exit, such as one primary and one secondary, which can be applicable to scenarios with the big angle or wide entrance/exit
	Screen display protocol	Able to be connected to mainstream brand LED screens, and output recognition\billing results
Management	Management protocol	PC/mobile terminal management, PC management tools, SDK development suites, and HTTP push
	Cloud management	Remotely manage a single camera, uniformly manage multiple cameras through the account, and support the cloud SDK development management platform

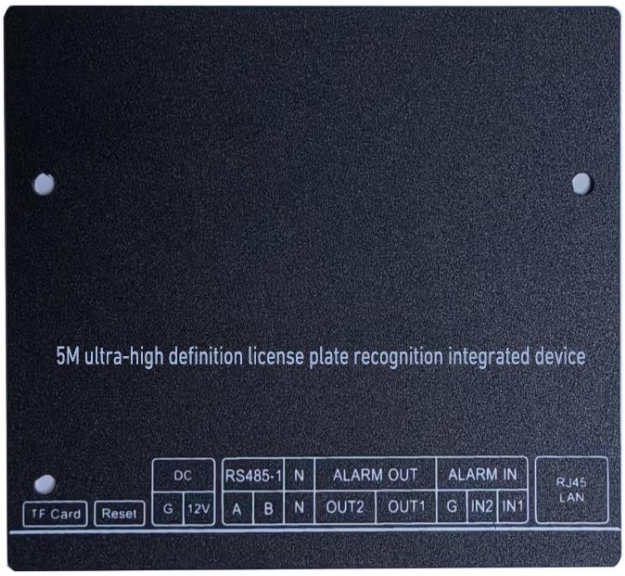
2.2 Hardware specifications

List of basic hardware specifications:

Category	Indicator	Specification
Imaging	Sensor	5 Megapixel starlight CMOS
	Resolution	2880*1620
	Low illumination	0.1 Lux color
	Electronic shutter	0-10 ms; the default is 5 ms.
	Standard lens	4mm zoom lens
	Interface	M12
Image Indicator	Image settings	Brightness, gain, and exposure time
	Noise reduction	2D/3D noise reduction is available
Interface Key	Network interface	1-way 10/100 Mbps adaptive RJ45 port
	I/O Output	2-way
	I/O Input	2-way
	RS485	1-way
	Reset key	1-way RESET key
	Power supply indicator	1-Way power supply indicator

Reliability indicator	Temperature	Operating temperature: -30～+75 ℃
	Static electricity	Contact 6 kV, air 8 kV
	Surge	Electric surge 2 kV Interface surge 6 kV
	EFT	Power supply EFT 2 kV, Data cable EFT 2 kV
	Power supply	12V DC
	Power consumption	Power consumption≤4 W
	Protection	IP65
Structure Parameter	Fill light	4 lights
	Overall dimensions	Whole machine: 443 mm*146 mm*105 mm

2.3. Schematic diagram of equipment interface



Note: The actual interface layout is designed according to the actual equipment

Function	Identifier	Description
Power supply	12V/GND	12 V input
Network port	ETHERNET	Support 10/100 Mbps Ethernet transmission
Output	OUT1/OUT2	Able to be applied to the lift rod of the barrier
Input	IN1+/IN2	Able to be connected to the induction coil to trigger external signals and capture photos
Serial port (RS485)	A/B/N/	Able to be connected to the upper computer to output the recognition results
USB interface	USB	Import the whitelist through the USB
Reset key	RESET	After you shortly press Reset for 2 sec, the equipment will be restored to its ex-factory IP, login account, and password. After you longly press Reset for 10 sec, the equipment will

		be completely restored to its ex-factory configuration
Operation indicator	STATUS	If it flashes, it means that the system runs normally. Always-on or always-off means that the system is starting or abnormal
Power supply indicator	POWER	Always-on means that the power supply runs normally

2.4. Interface description

2.4.1 Power supply interface

The interface marked as GND and 12 V in the rear of the equipment is the power supply interface. The detailed description is as follows:

Description on the power supply interface:

Signal name	Signal direction	Function description
12V	POWER	Wide-voltage DC input
GND	POWER	Power ground

The power input in the equipment is featured with the reverse polarity protection, over voltage protection, and surge protection.

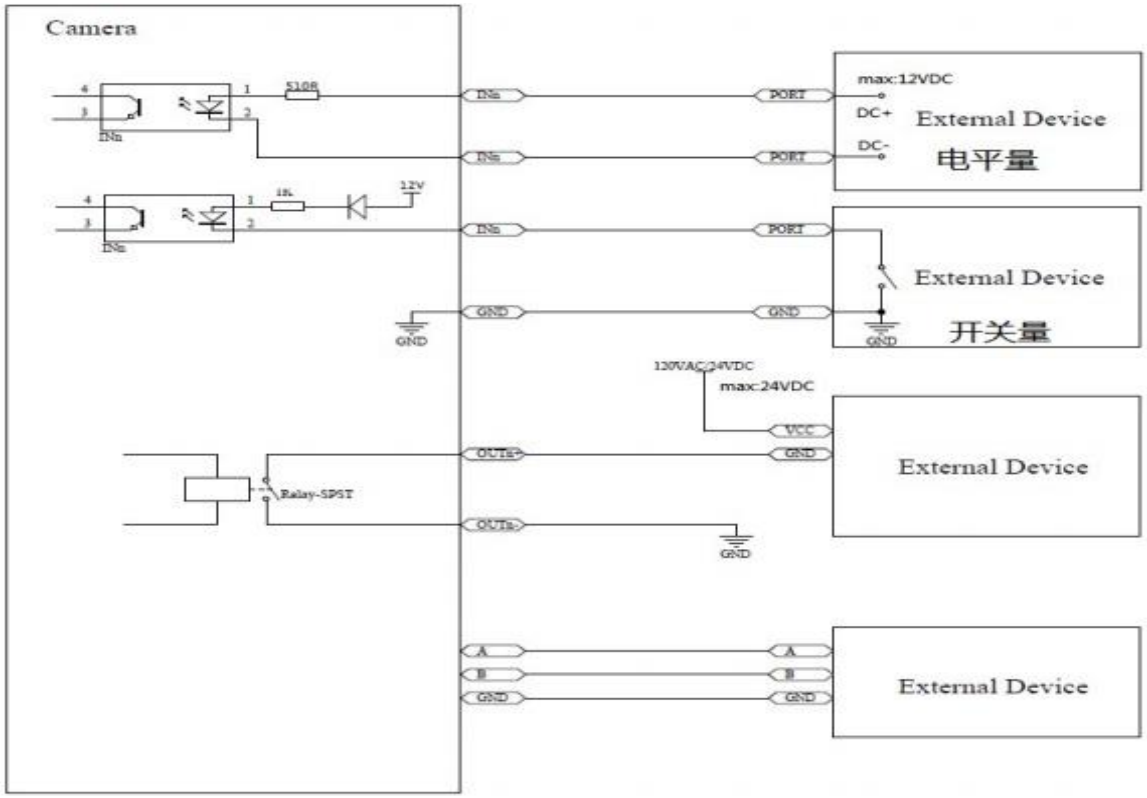
2.4.2 Integrated interface

The terminal in the rear of the equipment is the integrated interface, which is described in details as follows:

The RS485 interface is a non-isolated differential half-duplex interface with the maximum baud rate of 115,200.

The output is the output of the passive relay switch quantity with the contact voltage capacity of 24 VDC/120 VAC, and power capacity of 30W.

The default input is the input of the switch quantity.



2.4.3 Ethernet interface

The interface marked as ETHERNET in the rear slot of the equipment is the camera's Ethernet interface, which is used to transmit camera control commands, and capture image results and video streams. The default ex-factory IP of the camera is 192.168.0.10. Users can browse images and set camera parameters through a web browser.

2.4.4 Reset key

The key marked as RST in the rear slot of the equipment is the Reset key. Press and hold the Reset key with your hand, shortly press it for 2 sec, and then the equipment will be restored to the default IP address, user name and password. If you longly press it for over 10 sec, the equipment will be completely restored to the ex-factory settings.

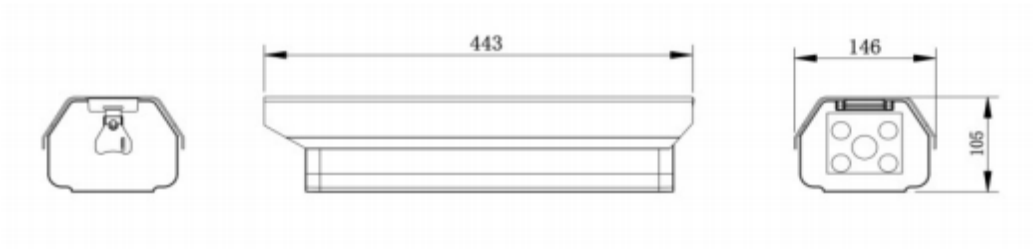
2.4.5 Panel indicator

The indicator marked as power in the rear slot of the equipment is the system (power supply) indicator, which will become red after power-on. The indicator marked as STATUS is the system operation indicator, and the red indicator flashes during the normal operation.

2.4.6 USB interface

The interface marked as U disk in the rear slot of the equipment is the USB interface, and the whitelist can be imported through inserting the USB.

2.5. Mechanical dimensions



Size photo