3 Megapixel Integrated HD Infrared Bayonet Machine
Specification

Item No.: RPL-G43

Release History

Version number	Date	Change information
V1.0	5/24/2022	Initial version

Catalogue

1. Introduction

1.1 Brief

With the adoption of the low-power high-performance AI processor and 3 megapixel starlight CMOS sensor, RPL-G43-series Integrated HD Infrared Bayonet Machine integrates the license plate detection with the license plate recognition, position and management. This series is featured with the following functions, such as the 3 megapixel ultra HD (UHD) imaging, various license plate/vehicle information recognition, monitoring recording, infrared fill light, front-end storage, remote operation and maintenance on the cloud, cloud-based operation and maintenance management, and greatly reduce the after-sales maintenance cost.

1.2 Main features

1.2.1 Advantages of the license plate/vehicle recognition algorithm

With the adoption of the 8th generation of the Realpark vehicle recognition algorithm systems by the Integrated HD Vehicle Recognition Machine RPL-G43, 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, vehicle structuring (the model, type and color), 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%.

1.2.2 Stable and reliable performance, and rich and diverse interfaces

RPL-G43 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.

RPL-G43 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.

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1.2.3 3 Megapixel HD imaging effects

With the adoption of the industry-leading 3 megapixel starlight imaging solution, RPL-G43 can output photos with the resolution of up to 2304*1296. Under the environment with the same imaging effect, RPL-G43's resolution is over 60% higher than that of common 2 megapixel cameras. With the help of the intelligent deep learning ISP (Image Signal Processing) algorithm, RPL-G43 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 Equipment form

The equipment appearance of RPL-G43 is shown in the figure below. It is equipped with a 15-inch white housing. It has sufficient internal space to accommodate various interfaces, indicators, and buttons, enabling the housing to be opened easily, facilitating the installation, commissioning and maintenance, and further achieving function expansion.

Overall appearance diagram

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2. Product specifications

2.1. Function specifications

List of specifications of the equipment function:

Category	Item	Description
Recognition Algorithm	Comprehensive license plate recognition rate	97% or above
	Unlicensed vehicle detection rate	99% or above
	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	18~35 m
	Vehicle speed	130km/h
	Lane management	Single-lane
	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) x 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.
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.

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2.2 Hardware specifications

List of basic hardware specifications:

Category	Indicator	Specification
Imaging	Sensor	3 megapixel starlight CMOS sensor
	Resolution	2304*1296
	Low illumination	0.1 Lux color
	Electronic shutter	0-10 ms, the default is 5 ms
	Standard lens	5-50 mm zoom lens
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	4-way (the default switch quantity to switch different level signals)
	RS485	2-way
	TF card	1-way TF card slot with the maximum 64G volume available
	USB	Reserve the seat at the 4pin_1.25 spacing
	Reset key	1-way RESET key
	System indicator	1-way GPIO status indicator
	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≤5W
	Protection	IP65
Structure Parameter	Fill light	Built-in infrared LED fill light with adjustable brightness
	Overall dimensions	Whole machine: 443mm*146mm*105mm

2.3. Schematic diagram of equipment interfaces
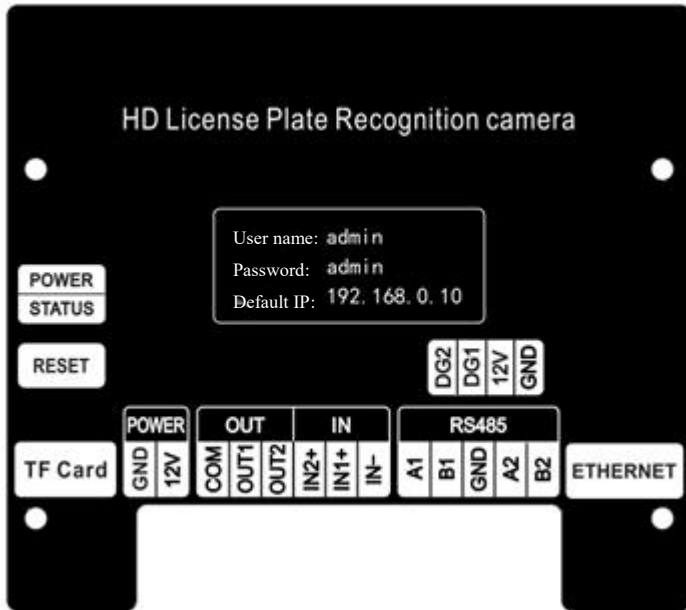
Note: The actual interface layout is designed according to the actual equipment

Function	Identifier	Description
Power supply	12V/GND	12 V input (this machine provides the integrated lightning arrester-power supply module)
Network port	ETHERNET	Support 10/100 Mbps Ethernet transmission
Output	OUT1/OUT2/COM	Relay output
Input	IN1+/IN2+/IN-	Optical coupling input signal
Serial port (RS485)	A1/B1/GND/A2/B	Able to be connected to the upper computer to output the recognition results
Ground-sensing input	DG2/DG1/12V/GND	Input signal
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.

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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, overvoltage 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 30 W.

The default input is the input of the switch quantity.
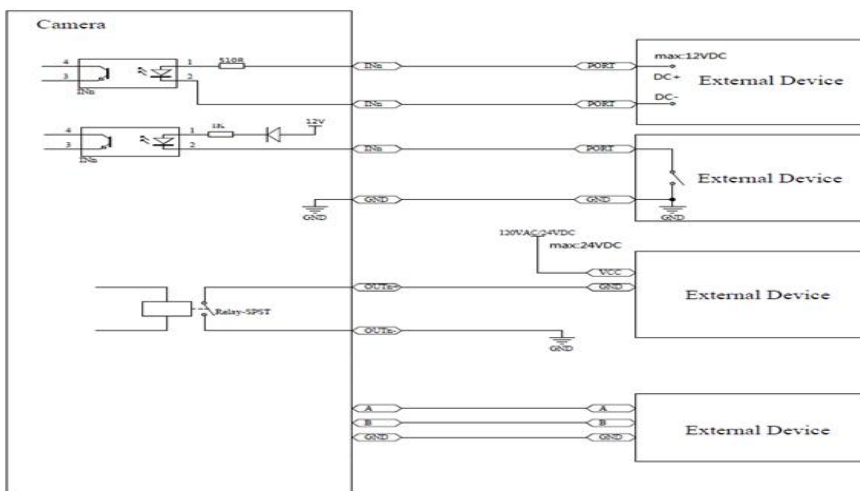
2.4.3 Ethernet interface

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 TF card interface

The interface marked as TF CARD in the rear slot of the equipment is the Micro SD card interface, which supports the SDHC standard TF card. The card capacity that can be expanded is up to 64GB.

2.5. Mechanical dimensions

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