



JIDOSHA

OCR/LPR

JIDOSHALIGHT

LIBRARY FOR CHARACTER RECOGNITION WITH HIGH ASSERTIVENESS INDEX

| Product

Pumatronix Equipamentos Eletrônicos Ltda.

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Change History

Date	Revision	Updated content
12/19/2022	1.0	Review of the layout and general formatting of the document; Content referring to version 3.21.0 of the product
06/17/2024	1.0.1	Update for firmware versions 3.22.0 to 3.26.0
06/25/2024	1.0.2	Update for firmware version 3.27.0

Overview

The continuous increase in population in urban areas implies major challenges in the public management of cities. Intelligent services that use Information and Communication Technologies (ICTs) become increasingly relevant in helping to monitor, control and make efficient and quick decisions to solve the problems inherent in the large concentration of people, such as mobility and safety in traffic, energy efficiency, public security, supply control, among others.

The concept called Smart Cities is a global trend that classifies the strategic use of infrastructure and services from the application of IT solutions in urban planning and management, bringing results to the social and economic needs of a city. Therefore, the use of Information Technology allows cities to develop economically while increasing the quality of life of their inhabitants by generating efficiency in urban operations.

Examples of these technologies are Intelligent Transport Systems (ITS), in which Pumatronix products are used, such as the *JidoshaLight* software library, specialized in automatic license plate reading (LPR) in images. Responsible for the automatic delivery of vehicle license plate information, through image analysis methods and with a high recognition index, the *JidoshaLight* software library is ideal for application in electronic traffic inspection, presenting the expected performance in several types of vehicle flow control and management scenarios.

Handling Risks



Hardkey is the validation key of the *JidoshaLight* software library and for this reason must be kept connected while using the product.

Models

JidoshaLight software library supports PCs (x86/x86_64) with Windows™ or Linux operating system and ARM™ processors with Android™ or Linux system and is available in the specified formats:

- Windows x64 and x32 - using a .dll in the application;
- Linux x64 and x32 - using a .so in the application;
- Arm - packages according to the specified model;
- Android - in a format to be integrated into android applications.

In this document, the terms *JidoshaLight* and *Jidosha* (reads *jidousha*, car in Japanese) are used as synonyms to designate the product *JidoshaLight* software library.

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1. Knowing the Product

The SDK is *JidoshaLight's* software development kit composed of the specific license plate recognition libraries of each operating system, the respective pre-compiled APIs, wrappers and sample applications, the source code of these applications, a basic compilation script, the Integration Manual, and a license plate image for testing.

The SDK data package is delivered in *JidoshaLight_PC_WINDOWS_64_vX.X.X.7z* format, which contains the framework for development:

Folder	Content
<i>res</i>	folder containing the manuals and a photo to use as an example in the execution of the software
<i>lib</i>	folder containing the libraries (.so or .dll)
<i>includes</i>	folders with the headers to be included in C applications
<i>sample</i>	folder containing the sample codes for C *Note: In the sample/bin folder are mini programs to test the operation.
<i>wrappers</i>	folder containing bindings for other language types
<i>jidoshapc</i>	folder containing bindings to the old Jidosha interface

Supported APIs

Jidosha's primary Application Programming Interface (API) is the *JidoshaLight C/C++* API and can be found within the *include* and *lib* folders. Wrappers (bindings) for other languages are provided along with the SDK and are inside the *wrappers* folder:

- 1) JidoshaLight C/C++;
- 2) JidoshaLight Java (1.7+);
- 3) JidoshaLight Android;
- 4) JidoshaLight Python (2.7 and 3.x);
- 5) JidoshaLight C#.

For integration with other languages not yet supported, please contact Technical Support.

The SDK also provides a set of legacy APIs within the *legacy* folder. These APIs do not receive new functionality and exist only to ensure support for legacy applications developed from *Jidosha* (version 1.7.0 or lower). Internally this API uses the standard *JidoshaLight C/C++* API and therefore generates the same recognition results.

Attention to APIs that are NOT recommended for new designs:



1. **jidoshapc C/C+**
2. **jidoshapc Java (1.6+)**
3. **jidoshapc Python (2.7)**
4. **jidoshapc Delphi (Windows only)**
5. **jidoshapc C#**

2. Generated Information

The main functionality of the *JidoshaLight* library is to recognize license plates from images, in the various formats currently existing, according to the specific characteristics of each country of origin. The *JidoshaLight* library has the capability to recognize the following formats:

Country	Syntaxes	Support
Argentina (032)	LLLNNN (Car) LLNNLL (Mercosur Car)	Partial
Bolivia (068)	NNNNLL (Car and Motorcycle)	Initial
Brazil (076)	LLLNNNN (Car and Motorbike) LLLNLNN (Mercosur Car and Motorcycle)	Complete
Chile (152)	LLXXNN (Car) LLNNN (Motorcycle 1984) LLLNN (Motorcycle 2014)	Complete
Colombia (170)	LLLNNN (Car)	Partial
Ecuador (218)	LLLNNN (Car) LLLNNNN (Car)	Initial
France (250)	LL-NNN-LL (SIV Car)	Partial
Italy (380)	LL-NNN-LL (Car)	Partial
Mexico (484)	LL-NNNN-L (Car) LLL-NN-NN (Car) LLL-NNN-L (Car) LL-NN-NNN (Truck) NNN-LL-N (Truck) NNLLNL (Truck) NNNNNNL (Truck) LNNNNNL (Truck) XNN-LLL (CDMX Car) NN-NN-LL (CDMX Truck)	Complete
Netherlands (528)	NN-LL-LL (Car 1999) XX-XXX-X (Car 2008) N-LLL-NN (Car 2013)	Partial
Paraguay (600)	LLLNNN (Car) NNNLLL (Motorcycle) LLLNNNN (Mercosur Car) NNNLLL (Mercosur Motorcycle)	Complete
Peru (604)	LXXNNN (Car)	Partial
Uruguay (858)	LLLNNNN (Car) LNNNNNN (Punta Cana Car) LLLNNN (Salto Car)	Complete

Caption: L: Letter, N: Number, X: Alphanumeric



Support for reading black license plates of the Mercosul model is only enabled in mode `JIDOSHA_LIGHT_MODE_ULTRA_SLOW`.

3. Additional Documentation

Product	Link	Description
JidoshaLight	Integration Manual	Programming and integration manual containing the necessary information for the integration of the JidoshaLight library.

4. Licensing

The attached software and documentation are protected by copyright. By installing the software, you agree to the terms of the license agreement.

The *JidoshaLight Linux* software library was created to work in conjunction with the hardkey (security key) that came with the library. That is, for the correct functioning of the library, the referred hardkey must be connected to the USB of the environment in which the library will be used. There are two hardkey versions, one for demonstration and one for general use, and the demo version has an expiration date. When its expiration date expires, the library automatically returns empty plates. If your demo hardkey expires and you wish to purchase a license or extend the demo period, please contact Pumatronix. Please refer to the [conditions of use](#) for further information.

The *JidoshaLight Windows* library requires only the connection of the hardkey on a Windows-based PC, which runs the software and then installs a driver automatically on the first installation. Please refer to the [conditions of use](#) for further information. To test whether the installation occurred correctly, the example applications can be run, as detailed in the Integration Manual.

The *JidoshaLight Linux* software library with FPGA acceleration is licensed from a hardware-linked license file, without the need to use hardkey (security key). This library supports hardware acceleration based on Xilinx FPGAs from the **Zynq-7000** family. By default, it has support for the *XC7Z020-CLG400* device, and can be adapted for larger capacity devices. Please refer to the [conditions of use](#) for further information.

The *JidoshaLight Android™* library requires a valid license file for operation. The licensing is done by device and by time, requiring a new licensing if the equipment has its hardware characteristics changed or the term of the license has expired. Please refer to the [conditions of use](#) for further information.



Hardkey is the validation key of the *JidoshaLight* software library and for this reason must be kept connected while using the product.

5. Initial Setting

Installation Prerequisites

Minimum Recommended Hardware

The processing time of the JidoshaLight library is linked to the image size, amount of details in the scene, CPU and memory, in addition, with the use of SMID instructions (Single Instruction/Multiple Data) in processors, a processor that has AVX instructions.

For better library performance, in a scenario where images acquired at the time of activating a Loop are generated, with a resolution of 1632x1220 and that execute more than one exposure, it is recommended to follow the following minimum hardware values*:

Processor	Number of colors	Number of threads	AVX support	Memory	HD
i3-5015U	2	4	Sim	4Gb (no mínimo)	256Gb

* For other settings, such as number of colors and threads, contact Technical Support.

JidoshaLight Linux and Linux/FPGA Library

The minimum requirements for the operation of the *JidoshaLight Linux* and *JidoshaLight Linux/FPGA* software libraries refer to Linux versions that have the same or higher standard libraries as the versions listed below:

Platform	Libraries
PC_LINUX_64 PC_LINUX_32	GLIBC 2.7 GLIBCXX 3.4.11
ARM_A9 ARM_A9_HF ZYNQ7000	GLIBC 2.17 GLIBCXX 3.4.15

JidoshaLight Windows Library

The minimum requirements for the operation of the *JidoshaLight Windows* software library refer to the versions of the operating systems:

Platform	Versions
PC_WINDOWS_64 PC_WINDOWS_32	Windows 7 Windows 7

Android™ JidoshaLight Library

The *JidoshaLight* software library is designed to work in conjunction with the license file that must be generated after the application is installed by the user. The license file is generated per installation and is

linked to the device hardware, requiring a new license in case of reinstallation of the application or modification of the device hardware, including the SIM card of the device. Replacing the battery does not require a new license. For temporary licenses, released for a limited time, the date and time of the equipment must be synchronized with the cellular network.

The library supports multithreaded applications, with the **maximum number of threads** and the **minimum processing time** limited by the license purchased. For the use of the server API, the **maximum number of simultaneous connections** it accepts is also limited by the license.

JidoshaLight Android library features are accessed via the Java API. This version is compatible with ARM™ processors (armv7-a) with Android™ 4.4 or higher operating system for library use (shared libraries and basic Java classes) and Android™ 8 or higher for demo application installation.

6. Care and Maintenance

Some care is required to ensure the performance of the product and extend its service life.



Product Risks: The use of the product presents risks, which are presented in the [Handling Risks](#) section.

Software Upgrade

For the library update there is no break in the API in relation to version 3.25.0. The current version, 3.26.0, can be installed by extracting the headers (.h) and shared libraries (.so) from the SDK folder into the user application directory.

If you have any questions, please contact Technical Support at suporte@pumatronix.com.

7. General Conditions of the Warranty

Pumatronix guarantees the product against any defect in material or manufacturing process for a period of 1 year from the date of issuance of the invoice, provided that, at the discretion of its authorized technicians, a defect is found under normal conditions of use.

The replacement of defective parts and the performance of services resulting from this Warranty will only be carried out at the Authorized Technical Assistance of Pumatronix or a third party expressly indicated by it, where the product must be delivered for repair.

This Warranty will only be valid if the product is accompanied by a *Maintenance Form* duly completed and without erasures and accompanied by an Invoice.

Situations in which the Product Loses the Warranty

- 1) Use of software/hardware not compatible with the specifications in the Manual;
- 2) Connection of the product to the power grid outside the standards established in the product manual and installations that present excessive voltage variation;
- 3) Infiltration of liquids from the opening/closing of the product;

- 4) Damage caused by natural agents (electric discharge, flood, sea air, excessive exposure to climatic variations, among other factors) or excessive exposure to heat (beyond the limits established in the Manual);
- 5) Use of the product in environments subject to corrosive gases, with excessive humidity and/or dust;
- 6) Show signs of security seals tampering;
- 7) Show signs of opening and modification made by the Client in places of the product not authorized by Pumatronix;
- 8) Damage caused by accidents/falls/vandalism;
- 9) Display tampered and/or removed serial number;
- 10) Damage resulting from transport and packaging of the product by the Client in unsuited conditions;
- 11) Misuse and not in accordance with the Instruction Manual.

8. Privacy Policy

In compliance with the Brazilian General Data Protection Law (LGPD) - Law No. 13,709 dated August 14, 2018, this product has programmable functions for capturing and processing images that may infringe the LGPD when used to capture personal data together with other equipment.

Pumatronix is not responsible for the purposes, use and treatment of the captured images, and the control of information and ways of operating the product are the exclusive decision of the user or purchaser of the product.





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