

## 1. General information

**readyVoucher rPi** is a complete Internet access vending system used to generate and print vouchers for hotspot access using **Mikrotik** routers.

Voucher design can be fully customized according to your needs. You can view the default design at the right of this text.

**readyVoucher rPi** can be used in two different operation modes: *Vending mode* or *Terminal mode*. Using the *Vending mode* users can purchase Internet access using coins (coin acceptor is required). *Terminal mode* is used to easily create vouchers using the Raspberry Pi as a voucher creation terminal (operated without coins).

The system in Vending mode is designed to accept coins for Internet access payment. A color LCD is provided to ease system usage. This LCD shows available Internet access kinds with their price, available credit, and created access data, so the printer is needed only if you want to print a voucher for the customer.

**readyVoucher** also includes a set of features for remote maintenance and monitoring purposes. A web engine is provided to change system configuration, generate vouchers (locally or in the user LCD), modify available credit, view created voucher history and more. You can access this engine pointing to the IP address of your Raspberry with your preferred browser. By default, login username is pi and password is raspberry.

The system can send automatic emails in case of paper alarm or automatic sales reports (daily, weekly or monthly) in Excel format.



**INTERNET access card** **WiFi**

USER  
userent2u

PASSWORD  
ns6ds

PROFILE PRICE  
1 hour access 1.50 EUR

By using this voucher you agree to the Terms and Conditions shown at the login page. Printed 04/05/2017 12:07:04



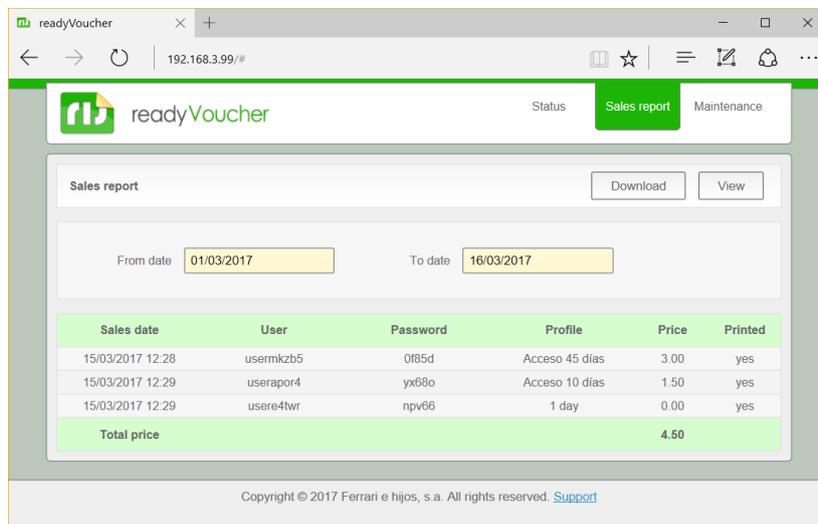
**INTERNET access card** **WiFi**

USER PROFILE  
user860r0 5 hours access

PASSWORD PRICE  
k6a03 2.50 €

By using this voucher you agree to the Terms and Conditions shown at the login page.

14/03/2017 17:16:58



readyVoucher Status **Sales report** Maintenance

Sales report [Download] [View]

From date: 01/03/2017 To date: 16/03/2017

Sales date	User	Password	Profile	Price	Printed
15/03/2017 12:28	usermikzb5	0f85d	Acceso 45 días	3.00	yes
15/03/2017 12:29	userapor4	yx68o	Acceso 10 días	1.50	yes
15/03/2017 12:29	usere4twr	npv66	1 day	0.00	yes
<b>Total price</b>				<b>4.50</b>	

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## 2. End-user system usage

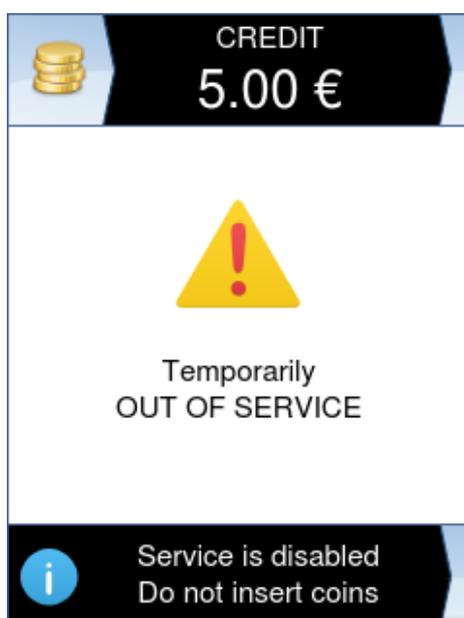
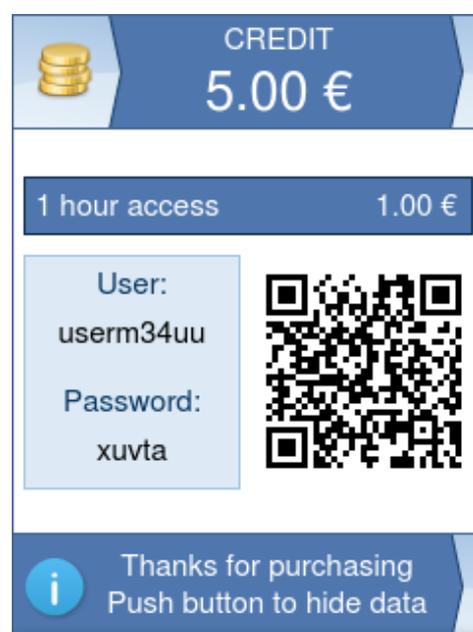
### 2.1 Vending mode

This mode is selected when a GPIO is assigned to the coin signal from the coin acceptor.

When using this mode, user can view in the LCD the available access with prices. User can then insert coins to complete the desired access payment.

When available credit matches an access price, the purchase button will light to indicate that user can push the button to create the access, but user can continue to insert credit to purchase a higher price access.

Once button is pressed, the highest matching access will be created and printed (if printer enabled). The LCD will show purchased access data with a QR code to easily access the hotspot with a smartphone.



## 2.2 Terminal mode

This mode is selected when a GPIO is not assigned to the coin signal from the coin acceptor.

Using this mode, user can select the desired profile by touching it directly in the LCD. When there are a large number of profiles, profiles are divided into pages. User can select the visible page by touching the upper arrow buttons.

When access is selected a “Create access” button will be shown. User can touch this button or the external button (optional) to create and print the access. The LCD will show purchased access data with a QR code to easily access the hotspot with a smartphone.

The interface displays a list of access profiles under the heading 'readyVoucher'. Each profile includes an icon of a printer with a plus sign, the duration of access, and the price in Euros. The '1 week access' profile is highlighted in the right screenshot, and a 'Create access' button is visible at the bottom of the interface.

Access Profile	Price (€)
1 hour access	1.00 €
2 hours access	1.50 €
5 hours access	2.50 €
1 day access	5.00 €
1 week access	10.00 €
2 weeks access	20.00 €
1 month access	30.00 €
2 months access	40.00 €
3 months access	50.00 €
4 months access	60.00 €

### 3. System components

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The readyVoucher vending system needs the following components:

- **Mikrotik router.**
- **Raspberry Pi card.**
- **Raspberry Pi LCD.** You can select between two LCD types, according to your requirements regarding price and size. **readyVoucher** can work using a 3.2" SPI touchscreen (Waveshare) or the official 7" Raspberry Pi touch screen:

*Waveshare 3.2" SPI LCD 320x240* (<http://www.waveshare.com/product/mini-pc/raspberry-pi/displays/3.2inch-rpi-lcd-b.htm>). If preferred, there are a number of low cost clones for this LCD. You can find some in Aliexpress for about 10.00 EUR. In order to identify these clones, you must view "3.2inch Plug-and-Play LCD for Raspberry Pi v3.1" at the back side of the LCD PCB. Also it must include three push buttons marked as K1, K2 and K3. We selected this LCD because it has the optimal size and resolution to be controlled by SPI with a reasonable speed. Other SPI based LCDs (3.5 and above) have more resolution, but screen refresh is very slow and gives a bad user experience.



*Official 7" Raspberry Pi Touch Screen.* This LCD offers a very high refresh rate (DSI interface) and a good viewing quality. You can purchase this LCD for about 60.00 EUR. This LCD is recommended when using readyVoucher in *Terminal mode*.



- **Coin acceptor** CH-92X (CH-923, CH-924, CH-925, CH-926, depending on the number of different coins accepted). This coin acceptor is required when using Vending mode. You can purchase these acceptors through Aliexpress for 10.00 - 30.00 EUR. When configuring CH-92X please ensure that switches are set to NC and Fast output.



- **TTL Printer** (optional). You have two options for this printer:  
*Printer with case* (sparkfun COM-10438, adafruit ID: 597). Paper size is 58 mm.



*Printer without case* (Xiamen Cashino Electronic Technology Co., Ltd. Model KP-628C – <http://www.csntek.com>). This is an OEM printer with **cutter**. Paper size is 58 mm. You can purchase this printer in Aliexpress for about 40.00 EUR. This printer uses an external paper roll to increase paper capacity, and includes a **cutter** to ease voucher delivery.



- **Light button.**

## 4. Hardware installation

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When using *Terminal mode*, only the GPIO connection to the printer serial interface is needed (when printer is required).

For *Vending mode*, you must design a simple PCB to connect components to the Raspberry Pi GPIO. Please note that Raspberry and TTL printer power is 5 VDC, and the coin acceptor power is 12 VDC. The best solution is to include a 12 VDC to 5 VDC (2A) in the PCB, so the system can power from a single 12 VDC power supply.

**readyVoucher** system uses the following I/O signals:

- Coin signal from the CH-92X. This signal is 5 VDC, but Raspberry GPIO is 3V3, so you need a signal conversion or the Raspberry will be damaged! Voltage divider resistors can be used for this. You can route this signal to any GPIO. This GPIO is configurable in readyVoucher.
- Acceptor power (output). This signal drives the coin acceptor power and is optional. You can use this signal to drive power to the acceptor, so it will not accept coins when readyVoucher is out of service.
- Button input. You can route this signal to any GPIO. This GPIO is configurable in readyVoucher. Pressed button must drive a low state on the GPIO (0V).
- Button light (output). You can route this signal to any GPIO. This GPIO is configurable in readyVoucher. You cannot drive this signal directly from the Raspberry GPIO. You can use a transistor to drive a 12 VDC light for the button. A high state (3V3) in this GPIO must switch on the light.
- TTL printer signals (TX, RX) must be routed directly to the Raspberry UART pins in the GPIO header. Printer signals are 3V3 (all printers), so no signal conversion is required.

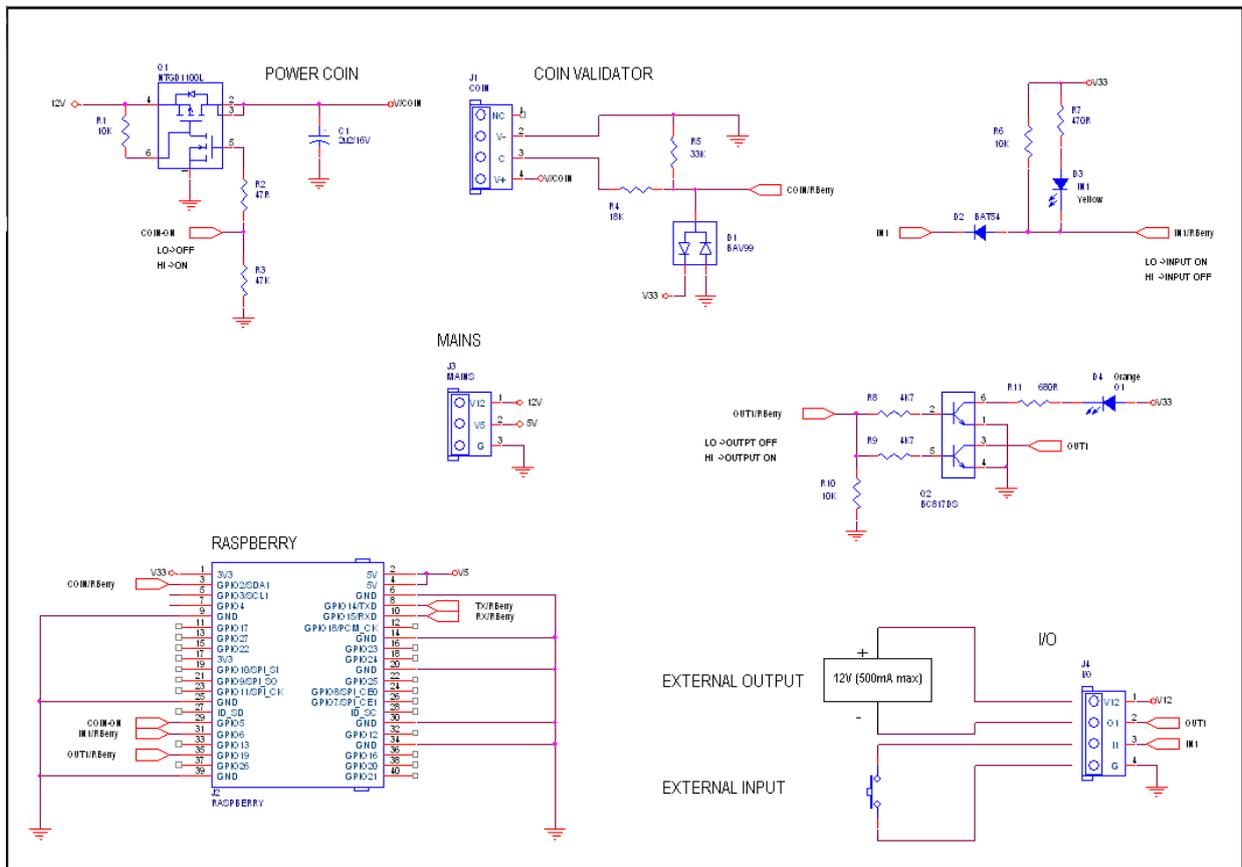
These signals are not required when using *Terminal mode*. The printer is optional in *Terminal mode* and *Vending mode*.

Please note that the 3.2" LCD includes a connector to match the Raspberry GPIO header, so you must use a connector with long pins to connect between the Raspberry and the LCD board.

You can view below a simple schematic of a basic PCB that can be used for this. In this case, a dual 5 VDC / 12 VDC supply is required to power the system. You can design your own 12 VDC to 5 VDC converter to use a single 12 VDC to power the entire system. Also, you can include a rechargeable battery to allow safe system shutdown in case of power failure.

This sample board uses three connectors: J3 (Input power to the system), J1 (Coin acceptor) and J4 (Button input and Button light).

About printer power, please consider that during printer and cutting periods, a high current is demanded. Consider using a 3A 5VDC power supply or an independent 1A 9 VDC power supply (best option).



We are designing a complete PCB to provide a ready to use system. This board will include a rechargeable backup battery to allow safe system shutdown, and it is designed to use a single 12 VDC power supply. It will be available soon. Please stay tuned.

## 5. Software installation

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readyVoucher requires last Raspbian Jessie (Lite version is recommended). You can find information about Raspbian setup in the [raspberrypi.org](http://raspberrypi.org) web site.

We tested readyVoucher on this Raspbian Jessie Lite:

[http://downloads.raspberrypi.org/raspbian\\_lite/images/raspbian\\_lite-2017-04-10/](http://downloads.raspberrypi.org/raspbian_lite/images/raspbian_lite-2017-04-10/)

We recommend to use this distribution. Please note that this Raspbian is not compatible with Raspberry Pi 3B+. Please contact us if you need to use readyVoucher on rPi 3B+.

Please note that on latest Raspbian distributions SSH is disabled by default. You must create a file with name `ssh` in the boot partition of the SD. This partition should be accessible from any machine with an SD card reader, on Windows, Mac or Linux.

Once you have the Raspbian up and running, you need to follow these steps:

### 5.1. Free UART from console and boot logging

Since we need this port for the TTL printer, you must free this port.

Open a terminal and edit file `/boot/cmdline.txt`.

```
sudo nano /boot/cmdline.txt
```

Remove **console=serial0,115200** parameter and press Ctrl+X to save changes.

Now you have to disable terminal spawn in the serial port.

On Raspberry Pi 1 or Pi 2:

```
sudo systemctl disable serial-getty@ttyAMA0.service
```

On Raspberry Pi 3:

```
sudo systemctl disable serial-getty@ttyS0.service
```

On Raspberry Pi 3 machines, the GPIO serial port is disabled by default. You must enable it by appending `enable_uart=1` option in `/boot/config.txt` file.

## 5.2a. Install Waveshare LCD drivers (only when using the 3.2" LCD)

In order to install drivers for the Waveshare LCD or clones, follow these steps:

Download, expand and install driver pack. Please note that driver used here is the last available at this time. You can check if there is any other by visiting Waveshare web site ([www.waveshare.com](http://www.waveshare.com)).

```
cd
wget http://waveshare.com/w/upload/7/74/LCD-show-170309.tar.gz
tar xvf LCD-show-*.tar.gz
cd LCD-show
chmod +x LCD32-show
./LCD32-show 90
```

Some driver versions installs X11, other does not. X11 is not required. An error message can appear indicating that no X11 is available. Simply ignore it.

The Raspberry will reboot and LCD boot messages must appear meaning that LCD is working.

Now we need to configure Raspbian to not use the LCD as the primary screen, so login again to the Raspberry and follow these commands:

```
sudo nano /boot/cmdline.txt
```

Remove **console=ttyAMA0,115200**, because it was appended again by the LCD install. Remove **fbcon=map:10** and **fbcon=fontXXXX** parameters. Press Ctrl+X to save.

## 5.2b. Configure the Official 7" LCD (only when using the Official 7" LCD)

The Official 7" LCD works out of the box in Raspbian. Configuration is only needed to rotate the image 90 degrees and to create a quiet system boot.

Open a terminal and edit file */boot/cmdline.txt*.

```
sudo nano /boot/cmdline.txt
```

Add **fbcon=map:1** at the end of the line. Press Ctrl+X to save. This ensures that boot messages will not be displayed in the LCD.

Edit file */boot/config.txt*.

```
sudo nano /boot/config.txt
```

Add at the end of the file the following lines:

```
disable_splash=1
display_rotate=1
```

Press Ctrl+X to save. This disables the rainbow splash screen and rotates the LCD image 90 degrees.

### 5.3a. Install readyVoucher (when using the 3.2" LCD)

To install readyVoucher follow these steps:

```
cd
wget http://www.ferrariehijos.com/readyvouchersetup
chmod +x readyvouchersetup
sudo ./readyvouchersetup
```

### 5.3b. Install readyVoucher (when using the Official 7" LCD)

To install readyVoucher follow these steps:

```
cd
wget http://www.ferrariehijos.com/readyvouchersetup-big
chmod +x readyvouchersetup-big
sudo ./readyvouchersetup-big
```

### 5.4. Start and stop readyVoucher

readyVoucher is installed as a daemon, and started automatically after install. You can stop or start readyVoucher by issuing:

```
sudo service readyvoucherd start
```

or

```
sudo service readyvoucherd stop
```

## 5.5. Configure readyVoucher parameters

readyVoucher includes some files to configure the engine. These files are stored in the executable directory */opt/readyVoucher*.

**readyVoucher.ini** - Contains configuration parameters

**HpProfiles.ini** - Contains definition of hotspot profiles.

**Vouchers.ini** - Contains definitions of voucher designs. By default, this file contains a ready to use voucher template. A file called **Vouchers-small.ini** contains a smaller voucher template. If you want to use this design, simply rename **Vouchers-small.ini** to **Vouchers.ini**. See **Section 1** images to view these voucher designs. Please remember to modify this file to include your printer in the **Target** parameter (see instructions in this section).

The engine logs messages to readyVoucher.log file, located at the executable directory.

### readyVoucher.ini file

This file is provided for configuring all router parameters. A sample readyVoucher.ini is distributed with this file. This sample contains all parameters set to default values.

Parameters under **[Settings]** and **[Routers]** sections define MikroTik connection settings and user generation behavior. Parameters are self explaining, and are directly related to configuration parameters of the readyVoucher Windows version. You can get general information on <http://www.ferrariehijos.com/readyVoucher/help.shtml>

From version 1.3, **UseCurrency** value can specify additional formats for currency strings. This value can reference only the currency string: EUR, for example. In this case price is printed before currency (10.00 EUR). Additional formats are specified using the % character. In this case, position of the % character will be replaced with the price value. For example:

**UseCurrency=\$ %d2** prints **\$ 1,999.00**

**UseCurrency=Lit %c2** prints **Lit 1.999,00**

**UseCurrency=Rp %c0** prints **Rp 1.999**

Parameters under **[Vending]** section define terminal settings:

- **CreditPerPulse** designates the desired credit to add when a pulse is received from the CH-92X acceptor, and must match the configuration of the CH-92X.
- **TerminalEnabled** (true/false) is used to enable or disable terminal for users.
- **DisableOnPaperError** (true/false). When this parameter is set to true the terminal will go into disabled mode when no paper is present at the printer.
- **MachineName** is the desired name for this terminal, and will be used when sending notification emails.
- **QRtext** is the text used when generating the QR code shown at the terminal when user purchases an access. This must be the link to the hotspot login page, so user can login automatically scanning the code using a smartphone.
- **SalesReportPeriod** sets the requested interval for automatic email sales reports. A value of 1 sets daily reports, 2 sets weekly reports, 3 sets monthly reports and a value of 0 disables report sending.
- **SmtpServer**, **SmtpPort**, **SmtpUser**, **SmtpPassword**, **SmtpUseSsl** are used to configure your SMTP server (mail server). When using SSL, you must set **SmtpUseSsl** to true and set a **SmtpPort** of 465 (usually). When not using SSL, set **SmtpUseSsl** to false and set a **SmtpPort** of 25 (usually).

- **NotifyEmail** is the target email for notifications. You can set several addresses by separating them with a comma (,). Leave this field blank if you do not need printer notifications.
- **WwwUsername** and **WwwPassword** are the authentication parameters for the Web engine. By default, username is pi and password is raspberry.
- **UseTerminalPassword** (only numeric password is supported) is the terminal password. When this parameter is set and in terminal mode, this password is required to create vouchers.

Parameters under **[Io]** section are used to configure GPIOs for the terminal, and designates the GPIO number for each function. Setting a value of -1 will disable the GPIO.

- **CoinGpio** is the input from CH-92X acceptor coin output. Set to -1 for *Terminal mode* selection. When using a GPIO, *Vending mode* is selected.
- **ButtonGpio** is the input from the user button.
- **PowerGpio** is an input used to power off readyVoucher. When this signal goes to low (0V) readyVoucher will go into poweroff state.
- **LightGpio** is the output for the light of the user button.
- **AcceptorGpio** is the output that drives the coin acceptor power.

Parameters under **[Strings]** section are used to translate terminal strings to your own language. Simply replace them with your preferred message. You must consider the small space available on the LCD to contain your messages, and you must respect the \n character meaning line breaks.

### HpProfiles.ini file

This file contains profile definitions for hotspot list users (not user-manager users). Profile name is given between [ ] signs. You can use as much profiles as you need. A sample HpProfiles.ini is distributed with this file. This sample contains all parameters set to default values. Parameters are self explaining, and are directly related to configuration parameters of the readyVoucher Windows version.

You can get general information on <http://www.ferrariehijos.com/readyVoucher/help.shtml>  
Validity and LimitUptime are given in Mikrotik time format (2w 1d 2h, for example).

### Vouchers.ini file

This file contains voucher designs used to print users. Design name is given between [ ] signs. Only the first design will be used in this system.  
After the **[Design name]**, you can add your required drawing items.

Also, you can put other voucher configurations like voucher width and height. All data is given in pixel units. Each drawing item is included line by line.

You can use these definitions for each voucher:

### **Target=Param1, Param2, Param3, Param4, Param5**

Param2, Param3, Param4 and Param5 are optional.

If Param1 is **ESCPOS**, voucher will be printed using the ESCPOS TTL printer (Adafruit, sparkfun). In this case Param2 is the serial port (/dev/serial0 by default), Param3 is the baudrate (19200 by default), Param4 are the initialization ESC/POS commands in XXXXXX... hex format (1B40 by default), and Param5 are the ESC/POS command after printing the voucher in XXXX... format (0A0A) by default. Please verify the configured baudrate in your printer.

If Param1 is **KP628C**, voucher will be printed using the KP-628C TTL printer. In this case Param2 is the serial port (/dev/serial0 by default), Param3 is the baudrate (115200 by default), Param4 are the initialization ESC/POS commands in XXXXXX... hex format (1B40 by default), and Param5 are the ESC/POS command after printing the voucher in XXXX... format (0A0A0A1B6D) by default. Please verify the configured baudrate when ordering the printer (115.200 is recommended).

If Param1 is **NULL**, voucher will not be printed. You can use this option if your system does not include a printer, and voucher is only shown in the LCD.

If Param1 is not one of the above options, this designates a bitmap file to output the voucher (file.bmp, for example).

### **Width=n**

This field designates your required voucher width in pixels.

### **Height=n**

This field designates your required voucher height in pixels.

### **MarginX=n**

This margin is applied to every drawing item in the X direction.

### **MarginY=n**

This margin is applied to every drawing item in the Y direction.

### **Aliasing=n**

Designates if fonts are smoothed (n=1) or not (n=0)

### **Line=X, Y, Width, Height, LineColor, LineWidth**

This draws a line. LineColor is designated as #RRGGBB in hex format. #000000 is black, #FFFFFF is white.

### **Box=X, Y, Width, Height, LineColor, LineWidth**

This draws a box. LineColor is designated as #RRGGBB in hex format. #000000 is black, #FFFFFF is white.

### **Image=ImageFile, X, Y, Width, Height**

This draws and scales a image ImageFile.

### **Barcode=Text, X, Y, Width, Height, Kind, Color, BackColor, Rotation**

Draws a barcode including Text. If you need to include a comma (,) in the text field, you can use the special scape sentence (\,) since the comma is used as a field separator.

Kind is one of Code128, QR, EAN8, EAN13, Code39, Interleaved2of5, UPC-A, UPC-E, Codabar, Postnet, PDF417, MicroQR.

Color and BackColor are designated as #RRGGBB in hex format. #000000 is black, #FFFFFF is white.

Rotation designates the rotation angle (0, 90, 180, 270).

### **Text=Text, X, Y, Align, Font, Size, FontType, Color, Rotation**

This draws a text using the font specified. If you need to include a comma (,) in the text field, you can use the special scape sentence (\,) since the comma is used as a field separator.

Align must be left, right, center.

To know available fonts in your system you can view at the readyVoucher.log file after a readyVoucherInit() function call.

FontType can be bold, italic, bold&italic.

Color is designated as #RRGGBB in hex format. #000000 is black, #FFFFFF is white.

Rotation designates the rotation angle (0, 90, 180, 270).

## **6. Licensing**

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License is based on Raspberry Pi hardware. You need a software license for each running Raspberry Pi. If you need to license your Raspberry Pi please send your system key shown in file readyVoucher.log after a readyVoucher run.

In order to register, you have to copy the provided license key in file readyVoucher.ini

**License = XXXXXXXXX**

You can find licensing information at

<http://www.ferrariehijos.com/readyVoucher/readyVoucherrPi.shtml>

## **7. Support**

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For support contact [info@ferrariehijos.com](mailto:info@ferrariehijos.com)

We are proud to offer the best customer support. Your questions are welcome.