Power On
Racing Electronics

TS124G

Telemetry Manual with Cosworth System

TS124G

PRODUCT DESCRIPTION

TS124G is a 4G device used to send telemetry data in real time. It allows data transmission to one or more connected PCs and, if covered by 3G/4G Network, the transmission occurs in any place. Regarding data receiving, only an Internet connection is necessary.

Thanks to this kind of data transmission, transmitters and other additional systems are no longer necessary.

Furthermore, the system is compatible with all Bosch, MOTEC and Cosworth devices and it is possible to connect it to any different logger if provided with RS232 data transmission.

TABLE OF CONTENTS

1 Hardware Required

CAR:

- TS124G Modem

- Sim Card with enabled internet connection

- Car wiring harness

- Antenna

PIT:

- Internet connection

Cosworth System

Cosworth system is based on PI Toolset software which can be downloaded at:

https://www.cosworth.com/products/toolset/?cat=software

and for data view using PI Toolbox available at:

https://www.cosworth.com/products/toolbox/?cat=software

2 How to Start

Initial system configuration:

1) Buy a qualified Internet traffic Sim card (see Sim Card) and insert it in a mobile phone in order to verify its mode of operation and remove the PIN Code request (verify this by switching off and on the mobile phone);

2) In PI Toolset Configuration enable the transmission data in telemetry (see PI Toolset Configuration);

3) Install these two software:

-PowerOnBridge Cosworth (download it here t1.powerontelemetry.it);

-PI Toolset available on www.cosworth.com website and at addresses of the previous page;

4) Start PowerOnBridge and configure it (See PowerOnBridge Configuration);

5) Once the Sim Card is inserted and the telemetry turned on, connect to the module wireless network and carry on with the APN configuration depending on the telephone operator (see Configure Car);

6) If all has been configured correctly, the green led turns on (it indicates that the module is connected to Internet) and the orange-one (it indicates that the module is receiving data from the logger);

7) Launch PI Toolset and start the configuration (see PI Toolset configuration for Telemetry Reception).

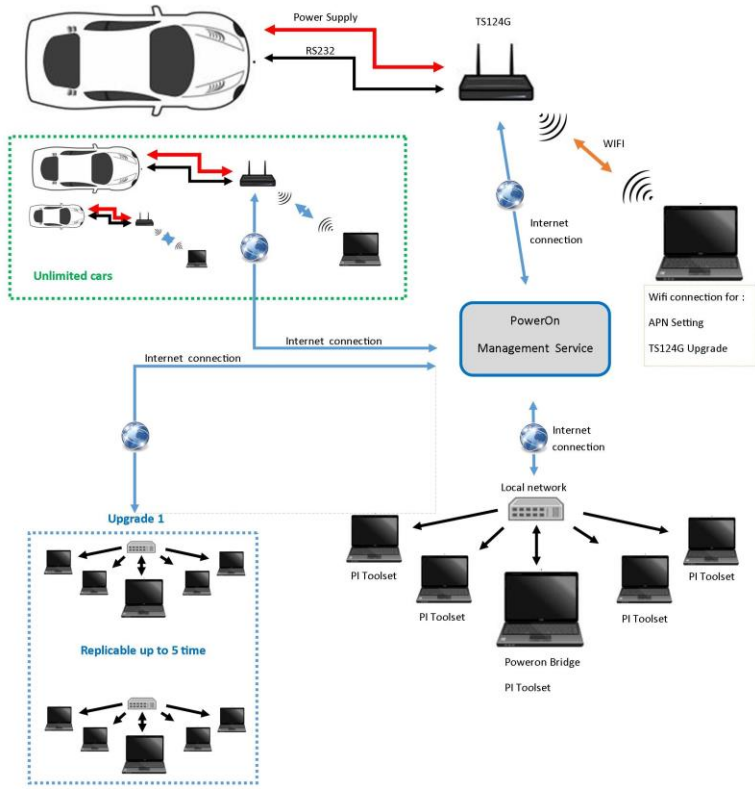
3 Pin Out

Connector	AS008-35PN
Pin	
1	+12V
2	GND
3	RS232 RX (telemetry side)
4	RS232 TX (telemetry side)
5	GND
6	nc

Name	Main
Connector	SMA receptacle

Name	Div
Connector	SMA receptacle

4 System Layout



5 Sim Card

Sim of any provider, unless it has an enabled internet connection, can be used.

Roaming internet, if enabled by the internet navigation contract, can be used.

Be sure of disabling the pin code of the sim card.

It is necessary to use a MINI-SIM or smaller sizes with an adapter.

6 Antennas

The telemetry modules TS124G have two antenna connectors, **Main** and **Diversity** (Div).

An antenna must always be connected to **Main** connector to make the module work.

The connection of a second antenna to the **Div** connector is optional; connecting the second antenna, the reception gets improved since its signal is linked to the other reducing interferences.

7 Led Status

LED PWR (red)

If this led is on, the telemetry module is powered

LED WAN (green)

It is permanent when it is trying to connect to a network.

It flashes when it is accurately connected to a network.

!!CAUTION!!: if the green led flashes it does not mean that it is ready to broadcast data to the server, but it means that it was able to connect to the right operator network. This led represents a help to understand if the right APN was inserted in the modem configuration (see chapter APN). Even if the Sim card has no credit, this led flashes in any case because it is connected to the network.

LED DAT (yellow)

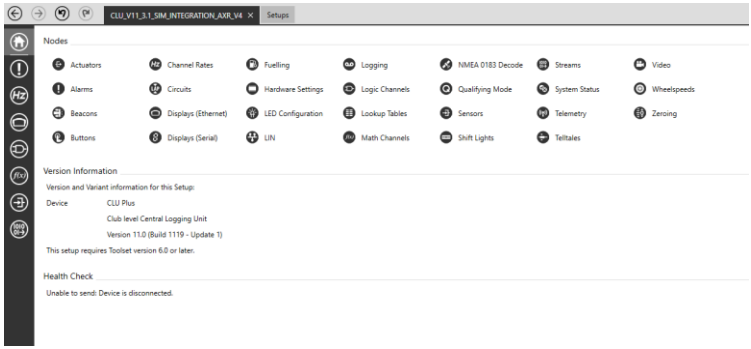
The led flashes with a frequency in the amount of the received data quantity

LED SYS (blue)

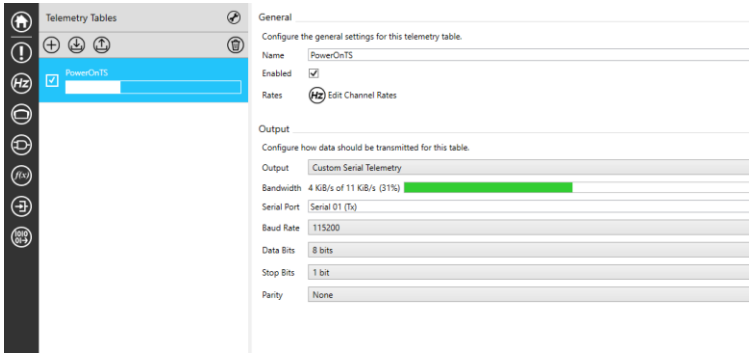
It turns on during the system initialization

8 PI Toolset Configuration

Open *Setups* page from the project tree, then double click on the current project.



Click on *Telemetry* icon, choose “+” button from the left-sided menu.



Here enter the parameters as follows:

-*Name*: PowerOnTS

-Select *enabled*

-*Output*: Custom serial telemetry

-*Serial Port*: Serial 01 (Tx) (select it by clicking on "**···**"icon on the right). If the Engine control unit setup implies the use of another port for telemetry data transmission, please choose the right port named as (Tx). Probably some port are named as (Rx), this means that they are input (GPS input for example) and that they cannot be used for telemetry transmission. Connect TS124G telemetry to the selected serial port.

-*Baud Rate*: 115200

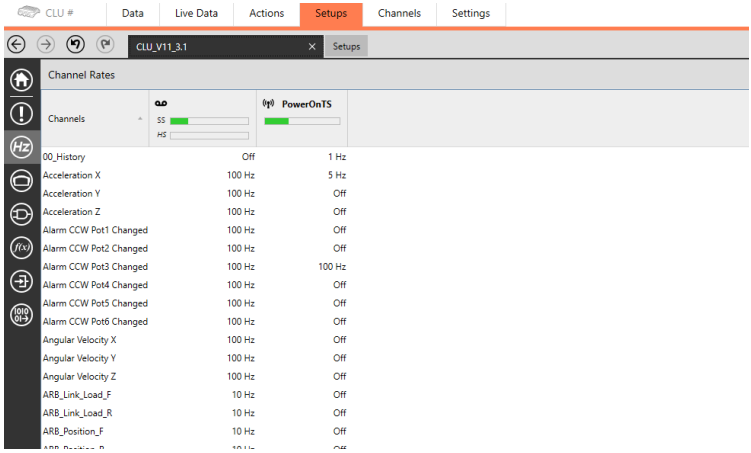
-*Data Bits*: 8

-*Stop Bits*: 1

-*Parity*: none

Once all parameters have been entered, click on *Save* button below on the right.

Click on *Hz* icon in the menu on the left and set the desired frequency of the channels used in telemetry.



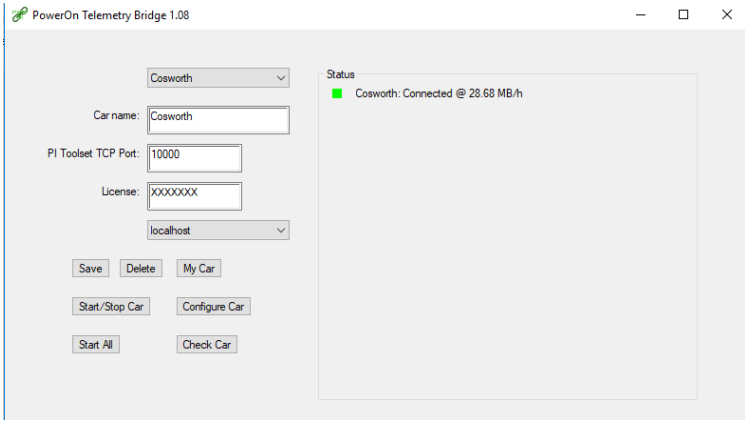
Save and send the configuration to the ECU.

9 PowerOnBridge Configuration

Download the latest version of Power On Bridge Cosworth and install it following the wizard.

9.1 New Car

Create a new car with connected license and set up the transmission port with PI Toolset:



-Car name

-PI Toolset TCP port: The inserted port, which can have any value from 10000 to 19999, must have different values from car to another.

This port must be the same of the set-up PI Toolset-one for the corresponding car (from 10000 to 19999), see Chapter 10 PI Toolset Configuration for telemetry reception.

-*License*: The license code allows the connection to the Server. This license is supplied from PowerOn.

-*Peripheral device*: (selection menu below the license field). Set the peripheral to which send received data, generally is *localhost.* If the network configuration includes several pc and network transmission toward another pc is required, select the correct interface. Caution! This option could involve advanced network knowledge or administration privilege and firewall setting modification.

After having set up all parameters for the connection, the configuration can be saved and then displayed in the drop-down menu.

By opening the drop-down menu it is possible to add other cars and delete them with *Delete* button.

Press *Start/Stop Car* to open and close the communication with the Server, by closing the program all communications with Server get closed.

With *Start All* button it is possible to start at the same time all saved cars.

All saved cars are displayed on the right box, with their connection status (on their side).

Inside the status box it is possible to have small diagnostics with 3 colours markers:

- Red the program is disconnected from the server.
- Orange the program is connected to the server but it doesn't receive any data in telemetry.
- Green the program is connected to the server and it receives data in telemetry. When there is a connection with the server the writing speed: XX,XX MB/h appears at the bottom and this allows to understand the traffic size which is used for the selected car.
- Blue it stands for a waiting status which happens when another pc is using the same license code. As soon as the first user gets disconnected, the second one gets connected automatically (*Checking connection…*).

For a complete list of errors see PowerOnBridge Error List.

By clicking the button "minimize", the program will shift to the hidden taskbar.

Caution: be sure that only one PowerOnBridge is open.

9.2 Car Configure

After having set up the program and having configured own vehicle, turn the device on and connect to its Wi-Fi network (TS124G_XX).

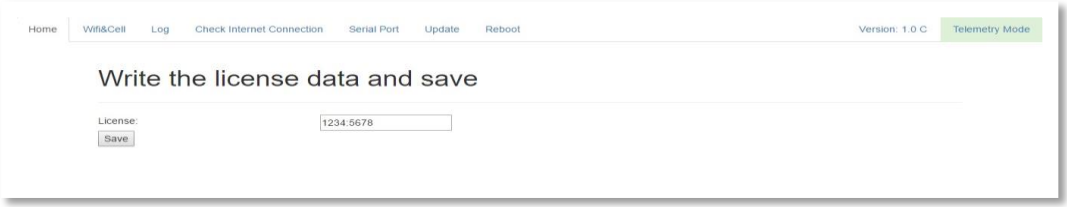
The default password for the device connection is the same of the Wi-Fi name (capital letters included)

By clicking the button *Configure Car* it is possible to enter to the configuration page.

If by clicking the button the web page does not open, you can enter your browser and type *10.10.0.25* in the address bar.

Once connected to the device, the following pages can be found:

- *HOME:*



Insert the license key in this screen (default inserted).

- *WIFI&CELL*

Mode: Here the telemetry module function mode can be chosen:

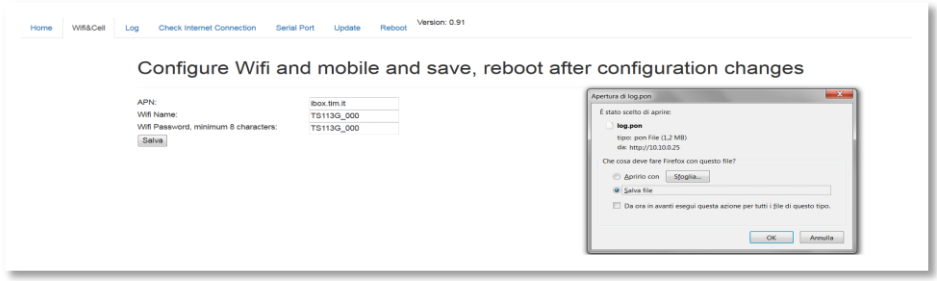
- Router Mode: Choosing this mode the module works as a Wi-Fi internet hotspot.
- Telemetry Mode: In this mode the module sends vehicle data to the server

APN: insert here the APN. It is necessary to connect the device to the network through the own providers (here must me used the same APN which would be used inserting the sim in a tablet).

To know the correct APN, it should be asked when buying the sim card. Or this can be found searching for it in the network. More APN will be found for each provider and if it is not clear which APN is the correct one, we advise to contact the provider. Once the correct APN has been inserted, on the telemetry module a green flashing led will turn on. Furthermore, on this page it is possible to set a new Wi-fi network name and a new password.

Press Save button and reboot the modem in the reserved page.

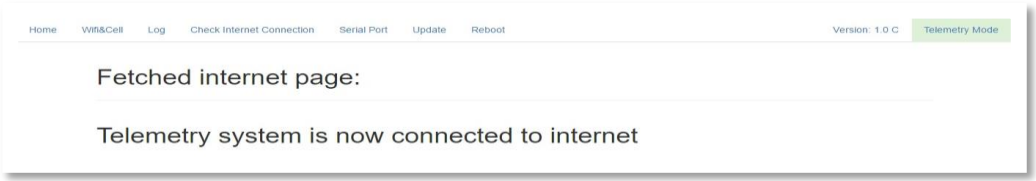
- *LOG:*



It is possible to download the device log file, which is the telemetry module file archive, by clicking on Log page.

If need be, the file can be sent to Power On to be analysed.

- CHECK INTERNET CONNECTION:

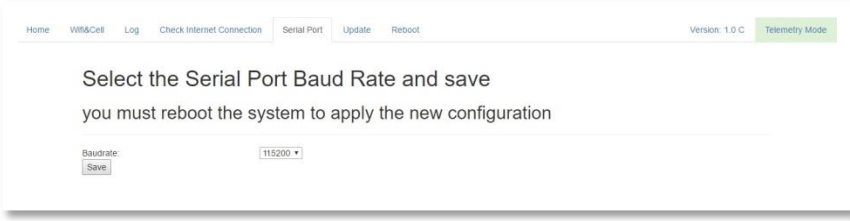


By clicking on ‘’Check Internet Connection’’, this screen will be displayed. In this page it is possible to verify if the device, after having set up the correct APN, is connected to the network.

- *UPDATE:*

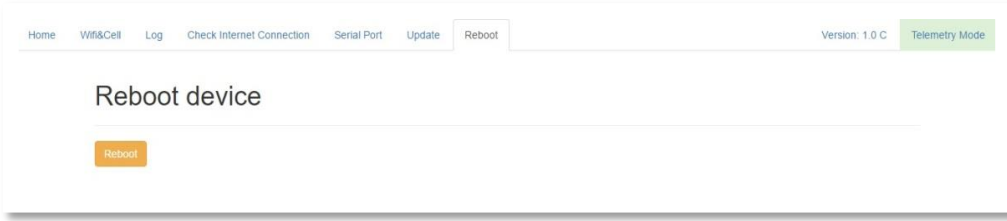
In this screen it is possible to update automatically the device with the last updated version (see Module Update).

- *SERIAL PORT:*



In this screen it is possible to select the communication speed of the RS-232 serial port. The speed shall correspond to the one set in PI Toolset (see Chapter 8 PI Toolset configuration). Generally, the speed is the maximum one, 115200.

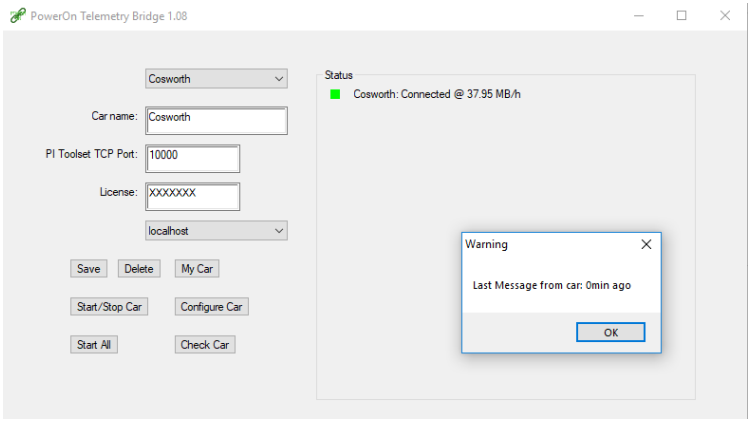
- *REBOOT:*



Here the module reboot can be started. The reboot is necessary in order to save modifications applied in the previous screens.

9.3 Car Check

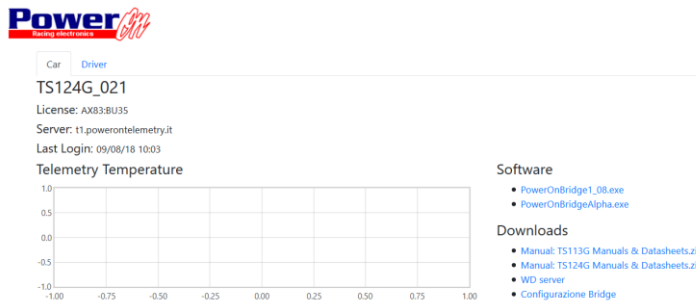
Once the communication with the Server has started, the last received message from the car can be displayed by clicking on *Check Car*.



Once pressed, the message ‘*”Last Message from car: Xmin ago”* appears.

9.4 My Car

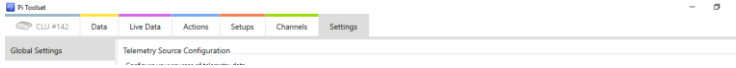
In PowerOnBridge program, a new Internet page will be open by clicking on ‘’MyCar’’. Useful details and download will be found in this internet page, if the license code is the correct one.



In My Car a temperature diagram of TS124G modem installed in the car can be displayed.

10 PI Toolset Configuration for Telemetry reception

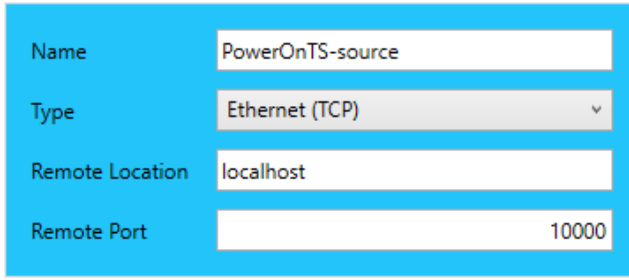
Enter *Settings* in PI Toolset.



Choose *Telemetry* from the menu in the left, then click on *add telemetry source*

10.1 6.0 Version and following

In PI Toolset 6.0 version and following use the configuration below:



Telemetry Server Configuration

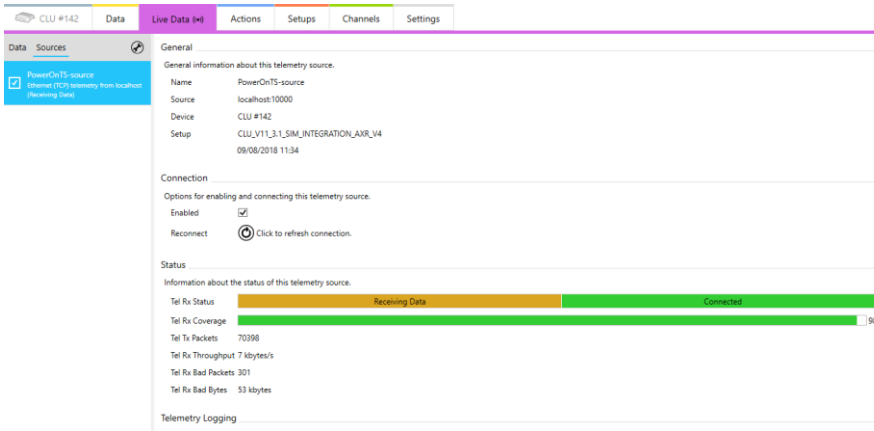
-*Name*: PowerOnTS-source
-*Type*. Ethernet (TCP)
-*Remote location*: localhost (if different, enter the IP address of the selected network card in PowerOnBridge settings).
-*Remote port*: enter the set port in “PI Toolset TCP port” in Power On Bridge program.

10.2 Previous versions to 6.0

In PI Toolset versions previous to 6.0 one, use the following configuration:

-*Name*: PowerOnTS-source
-*Type*. Custom Ethernet
-*Remote location*: localhost (if different, enter the IP address of the selected network card in PowerOnBridge settings)
-*Remote port*: enter the set port in “PI Toolset TCP port” in Power On Bridge program.

10.3 Live Data



The screen shall be as follows

-*Tel Rx Status*: the bar shall be green on the right, that means that PI Toolset is connected to PowerOnBridge, while it shall be yellow on the left.
-*Tel Rx Coverage*: the bar shall be mainly green (it stands for the received data quantity compared to the quantity that the software expects to receive). If the bar is not green, check if the pc used for the RCU programming is the one used, otherwise configuration files from the pc used for the programming shall be get back.
-*Tel Rx Packet6.s*: stands for the received data quantity
-*Tel Rx Throughput*: stands for received data speed
-*Tel Rx Bad Packets*: rejected packets because of communication errors
-*Tel Rx Bad Bytes:* rejected bytes because of communication errors

If the bar is light green or orange, *connecting* or *no stream found* appear in the right side, check if PowerOnBridge receives data from the vehicle.

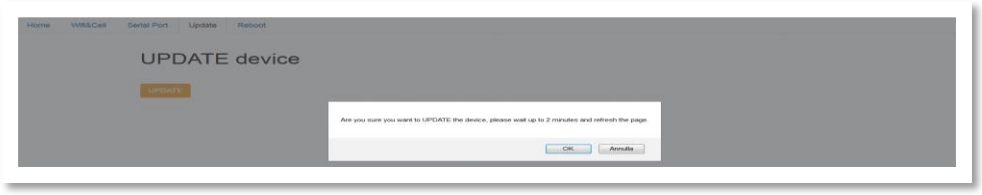
12 Module Update

In the device configuration page, the TS124G can be upgraded automatically by clicking on Configure Car button in PowerOnBridge.

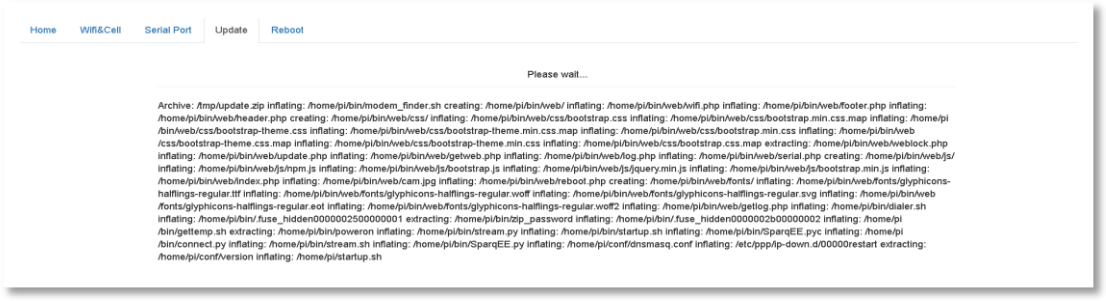
Be sure that the module is correctly connected to Internet.

- Connect to the Wi-fi module network and enter the configuration page.

-Enter the *Update* page. Click on UPDATE button and then press OK.



If the update run out successfully, some signs corresponding to the downloaded packets during the update will be displayed.



Wait a minute and then refresh the page.

13 Utility

- Before insert in the Sim card inside the modem, be sure that the pin code has already be disabled.

- If the Internet connection in the box is not permanent, PowerOnBridge program could lose the connection to the server. Click on Start/Stop Car button to restart the connection to the server.

-Be sure of a permanent Internet connection in the box.

It happens very often that using the free racetrack Wi-Fi during the first trial competition days, the system works correctly but later, during the race competition, the system could have a precarious connection. This happens because more people will be connecting to the same wi-fi network.

Recommended is a second Sim card which can be insert in a smartphone, tablet or modem in order to create a hotspot network which can guarantee a more permanent internet connection.

If in PI Toolbox the communication with the car has stopped and it won't be activated, click on Start/Stop Car button

14 Optional Upgrade

Upgrade1

An optional upgrade can be bought if telemetry on more than one not connected pc is required.

Thanks to this upgrade, the configuration and visualization telemetry software can be used on three different pcs at the same time.

Two new license codes to be used in different places will be given.

15 PowerOnBridge Error List

15.1 Section “Status” Errors

Error Message	Description	Possible Solution
Checking connection...	Server connection in progress	/
Could not get license information	Error during the connection to the license server	Check internet connection
Car already connected	Car is already connected to and running in the same PowerOn Bridge	Remove one of the two identical cars
Error checking license	License error	Check if the added license is the right one
Server was Disconnected	PowerOn Bridge was disconnected from the server because of user's request or because of an error	Check the internet connection
Server Disconnected	PowerOn Bridge is not connected to the server	Switch on the chosen vehicles
Waiting for server become ready	Waiting for streaming server availability, the wait continues until other bridge take up the connection	Check if the same car is running on another PowerOn Bridge (check also if another PowerOn Bridge is on)

Server Unreachable	The streaming server is unreachable, there is no connection	Check the internet connection and firewall settings regarding the tcp traffic from port 10000 to 50000 reception
Authentication	Authentication on the streaming server	/
ERROR in UDP Socket Creation	Error in the UDP socket creation for the local wd server	Check if other programs are broadcasting on the same PowerOn Bridge port and check if the right value was added (between 1000 and 65000)
Connected @	PowerOn Bridge is connected to the server and receives data at the specified speed	/
no data from car	PowerOn Bridge is connected to the server but the telemetry is not sending any data	Check the license and the right APN in the telemetry
Authentication Error, check username and password	Error during the license authentication on the server streaming	Check if the computer firewall interrupts the connection

15.2 “Check Car” Screen Errors

Error Message	Description	Possible Solution
Could not get information	Error during the license server connection	Check internet connection
Last Message from car…	Last telemetry connection to the PowerOn bridge is shown	/
Error communicating with server, check connection and license information	Error during the license authentication (not valid or license server error)	Check if the added license is the right one
Error communicating with server, check connection	No connection to the license server	Check internet connection

15.3 “Popup” Errors

Error Message	Description	Possible Solution
Couldn't open config file	Configuration file not existing or missing reading authorisation	Check that the "client.conf" file is in the PowerOn Bridge installation folder (Default "C:\Program Files (x86)\ PowerOnBridge") and check the reading/writing authorisation existence in the folder
Configuration Saved	The selected car configuration was saved accurately	/
Error retrieving car details or license information's	"My Car" page cannot be opened on the license server	Check the internet connection and check that the license is the right one.

NOTE

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