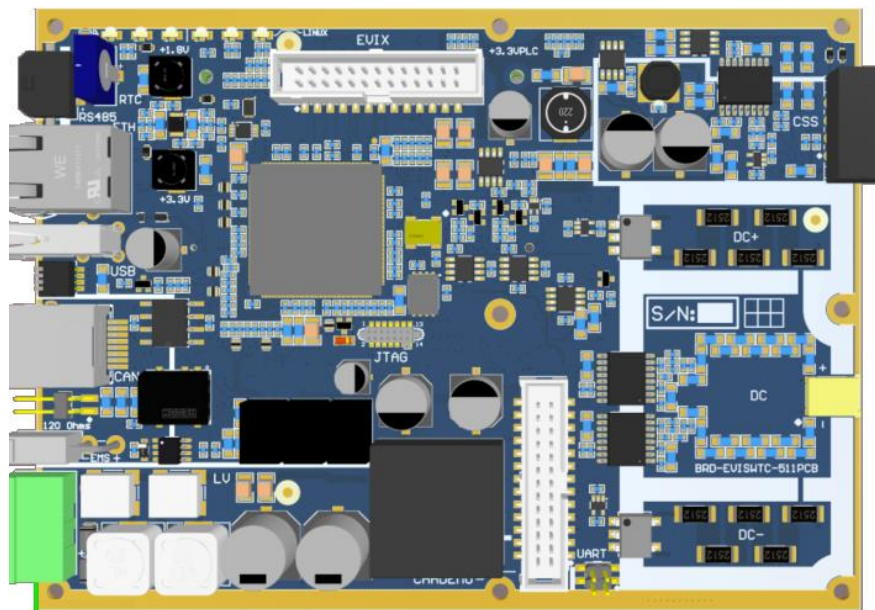


# EVI Getting Started



The given values are susceptible to change without prior notice.

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## 1 Introduction

Purpose of this document is to quickly get you started with the EVI v3 product, after reading this document, you will be able to:

- Power ON the EVI
- Connect to the SWUpdate interface and perform an update
- Connect to the EVI Command Line Interface (CLI)
- Connect to the EVI Graphical User Interface (GUI)
- Do basic configuration

A simple use case is provided here:

- A single EVI
- No additional CAN devices connected with EVI
- Network communication between a computer and the EVI using RJ45 cable direct access

Please note that it is recommended to read the **EVI-Cx-Ax datasheet (revXX)** first.

## 2 Precautions

### 2.1 ESD

ESD (Electrostatic Discharge) precautions are essential to prevent damaging the EVI. Here's a brief summary of ESD precautions:

1. **Grounding:** Always ground yourself by touching a grounded metal object before handling the EVI. Use an ESD wrist strap to maintain a common ground.
2. **Antistatic Mats and Surfaces:** Work on antistatic mats or surfaces to dissipate static charges. These materials help prevent the buildup of static electricity.
3. **ESD-Safe Clothing:** Wear ESD-safe clothing, including smocks and shoes, to minimize the generation and retention of static charges.
4. **ESD-Safe Tools and Equipment:** Use tools and equipment designed to be ESD-safe, including grounded soldering irons and ESD-safe workbenches.
5. **Humidity Control:** Maintain appropriate humidity levels (typically 40-60%) in the workspace, as higher humidity helps dissipate static charges.
6. **ESD-Safe Packaging:** Store and transport the EVI in ESD-safe packaging to prevent static buildup or discharge.
7. **ESD-Safe Workstations:** Set up ESD-safe workstations with proper grounding to ensure a controlled environment for handling electronic components.

By following these precautions, you can significantly reduce the risk of ESD-related damage to the EVI.

## 3 Wiring

### 3.1 LV - Low voltage connector

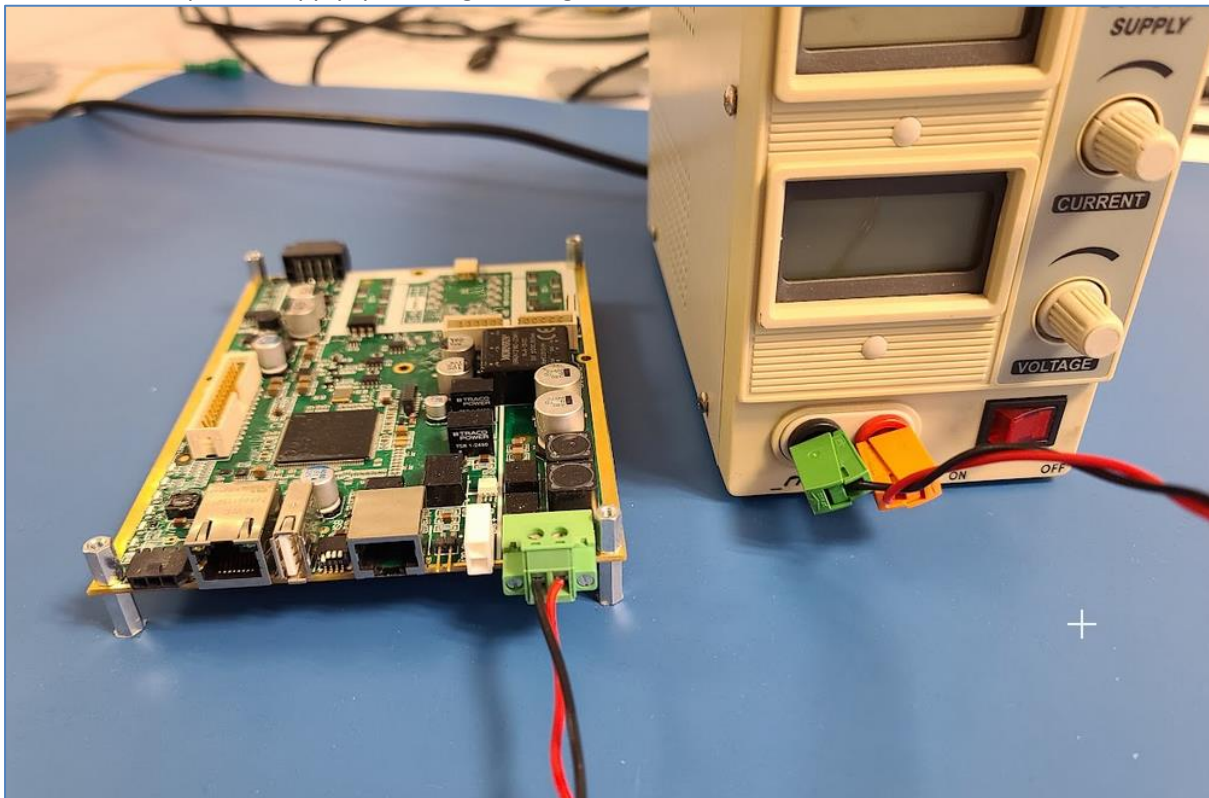
LV connector is used to supply power to EVI board.

Connector Reference (converter side): Phoenix Contact MSTBA 2,5/ 2-G-5,08 1757242.

Recommended mating connector (wire harness side):

- FKC 2,5/ 2-ST-5,08 1873058 (Push-in spring connection)
- MSTBP 2,5/ 2-ST-5,08 – 1769010 (Screw connection)

Make sure not to swap LV+ with LV- as it would damage the board. In the image below, LV+ is represented by the red wire, and LV- is represented by the black wire. The power cable should be connected to a power supply, providing a voltage between 11V and 29V:



**Figure 1: EVI LV wiring**

### 3.2 CAN jumper

The 120-ohm resistor in a CAN bus acts as a termination resistor to prevent signal reflections and maintain signal integrity. It is crucial for minimizing impedance mismatches and ensuring reliable communication. Using the jumper, as shown in the picture below, does provide the 120-ohm resistor, which is required in this example to adapt the bus with termination resistor:

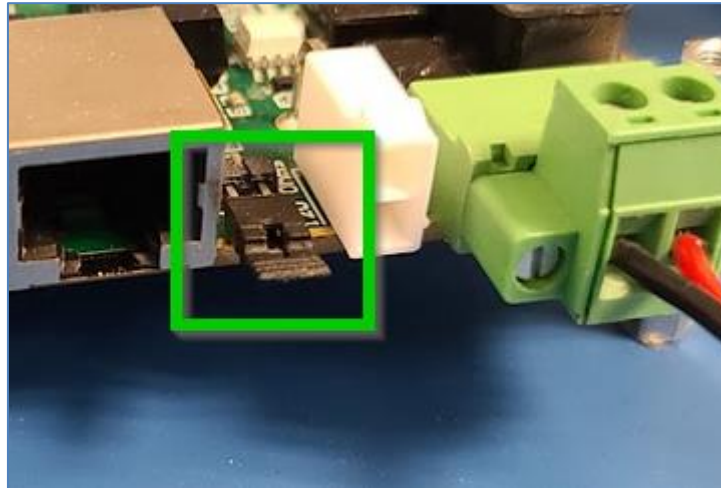


Figure 2: EVI CAN jumper

### 3.3 DIP switch configuration

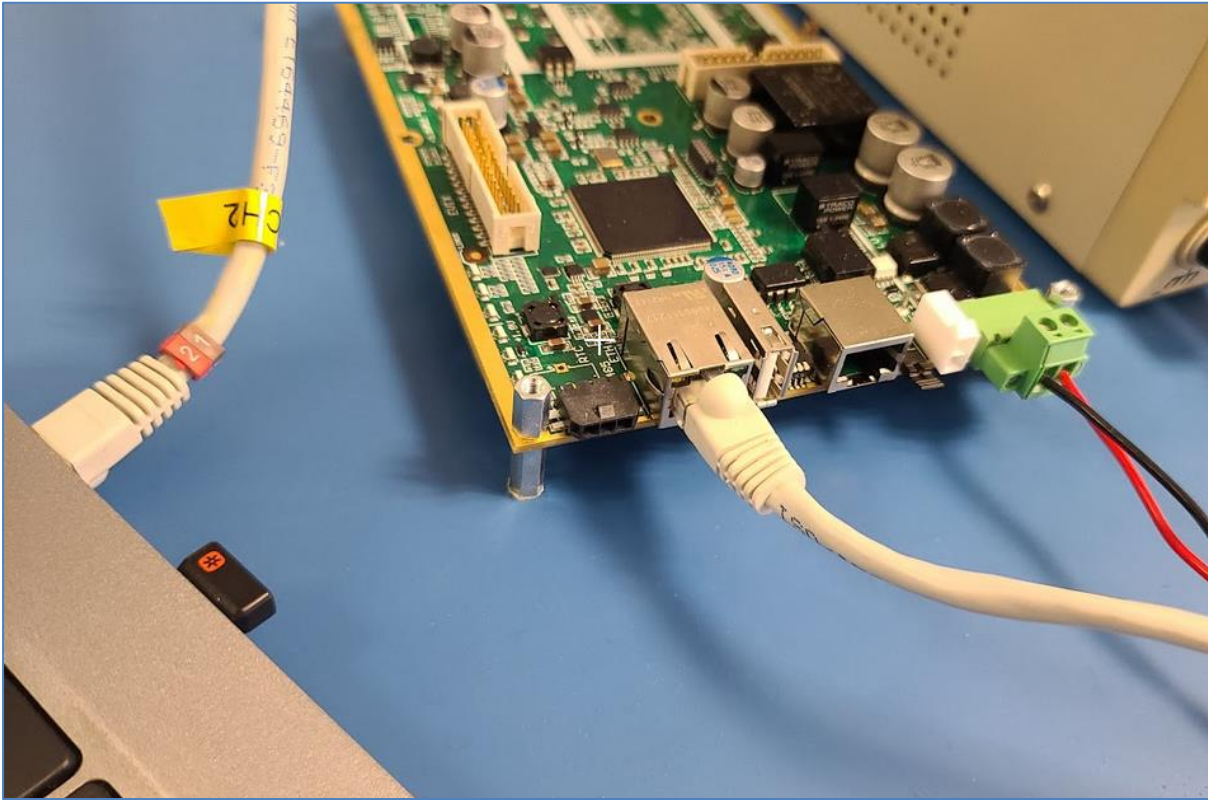
Several EVI can be used, in this example, only one is used, therefore the A index must be selected via the DIP switch, accordingly to the image below:



Figure 3: EVI DIP switch setting

### 3.4 Ethernet/RJ45

Connect a RJ45 cable between the computer and the EVI:



**Figure 4: EVI RJ45/Ethernet wiring**

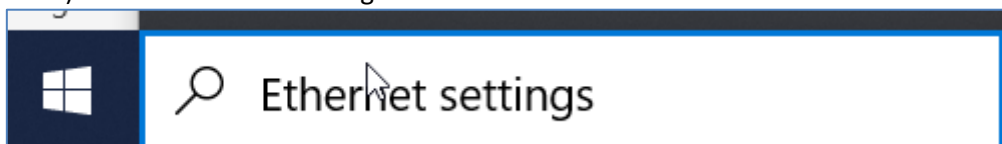
Set a valid static IP address on your computer, the following example is for Windows 10:

- 1) Press Windows “Start” button on bottom left corner of your screen:



**Figure 5: Windows 10 Start menu**

- 2) Enter “Ethernet settings” in the search bar:



**Figure 6: Windows 10 search bar**

- 3) Click on “Ethernet settings” menu:

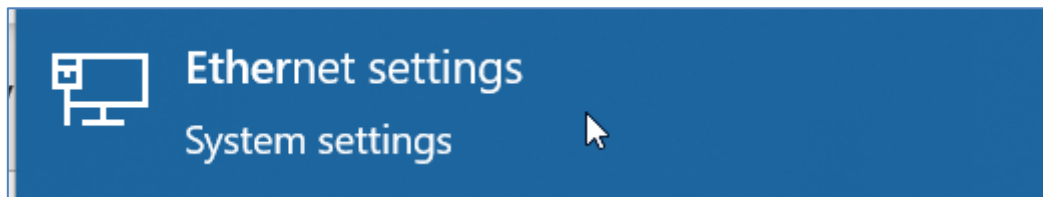


Figure 7: Windows 10 Ethernet settings

- 4) Click on the Ethernet menu, this interface must be associated with the one where the RJ45 is plugged:

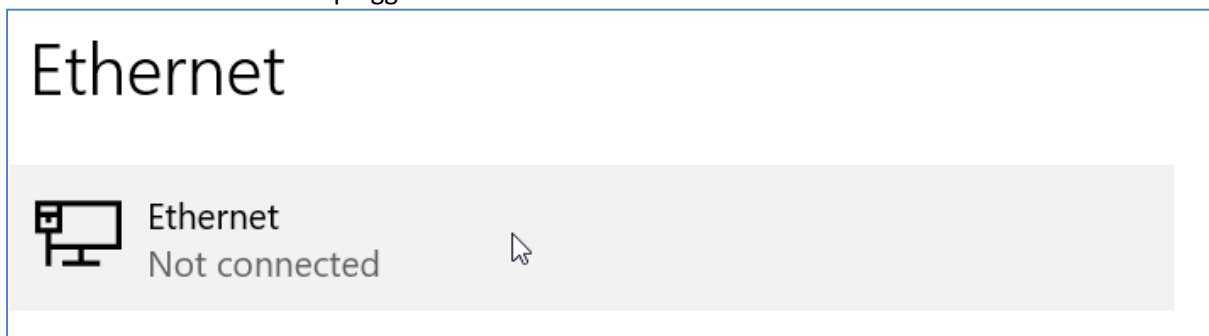


Figure 8: Ethernet interface selection for configuration

- 5) Edit the "IP settings" with the following values:

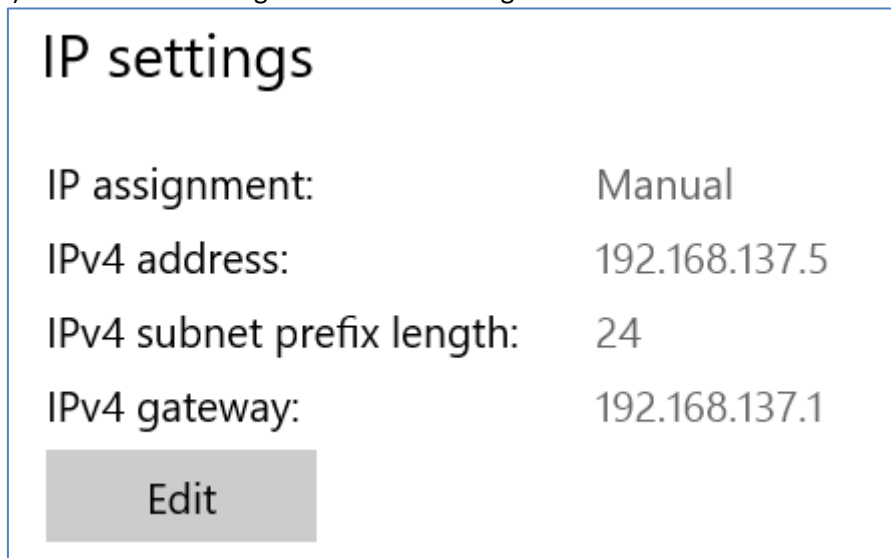


Figure 9: Interface IP configuration

## 4 Power ON

Power ON the EVI using DC power supply, set the current limit to 1A, and use a voltage between 12V and 24V. Here the voltage is set to “14,64V”:

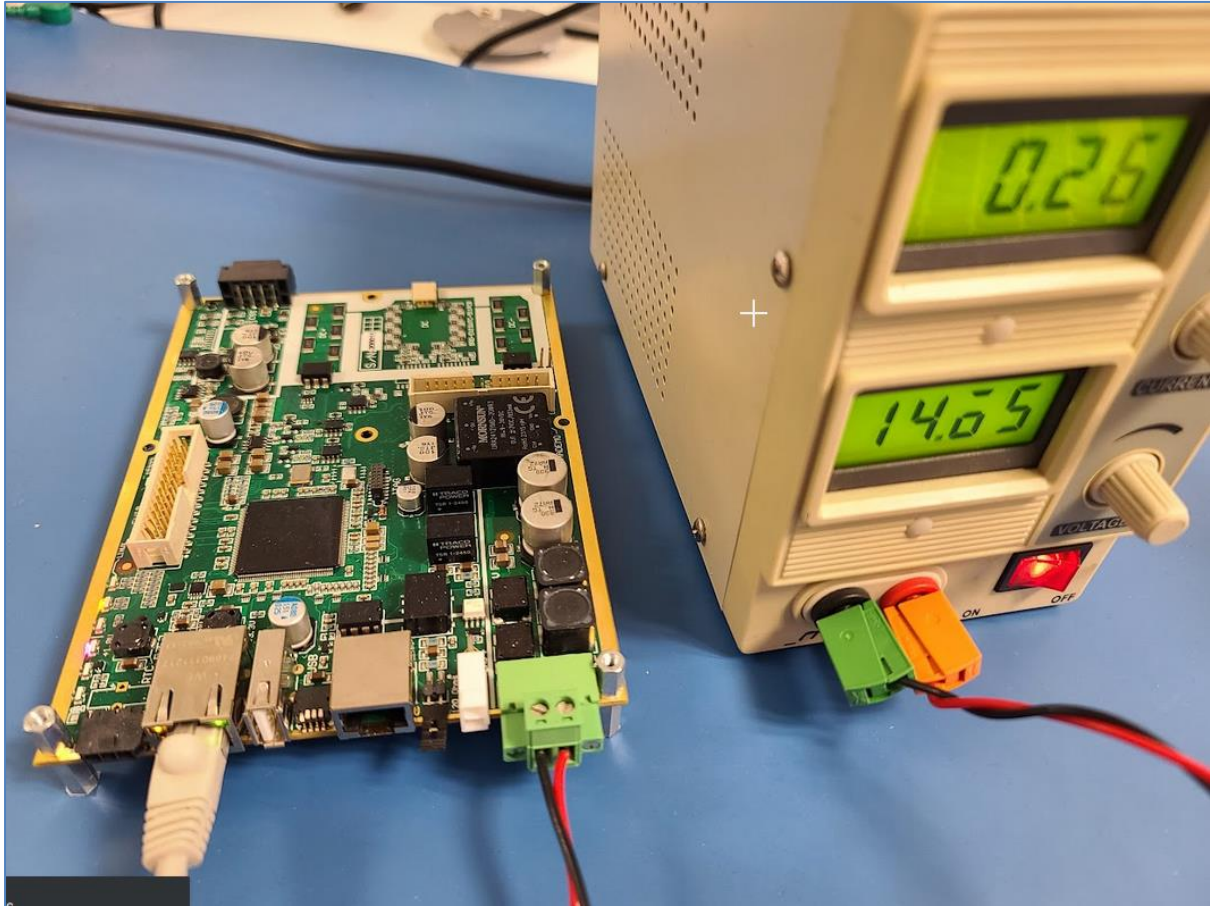


Figure 10: Powering up EVI



## 5 Connect to the EVI Command Line Interface (CLI)

### 5.1 SSH client installation

A SSH client must be used to access the EVI CLI, the MobaXterm application is used here as an example:

Open MobaXterm, then press the "Session" button:

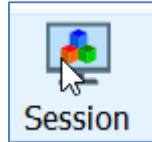


Figure 11: MobaXterm Session

Select SSH:



Figure 12: SSH protocol

Use the following settings:

 A screenshot of the "Basic SSH settings" dialog box. It contains a "Remote host" field with the value "192.168.137.100", a checked "Specify username" checkbox with a dropdown menu showing "evis", and a "Port" field with the value "22".

Figure 13: SSH session parameters

If the following message appears, press "Accept":

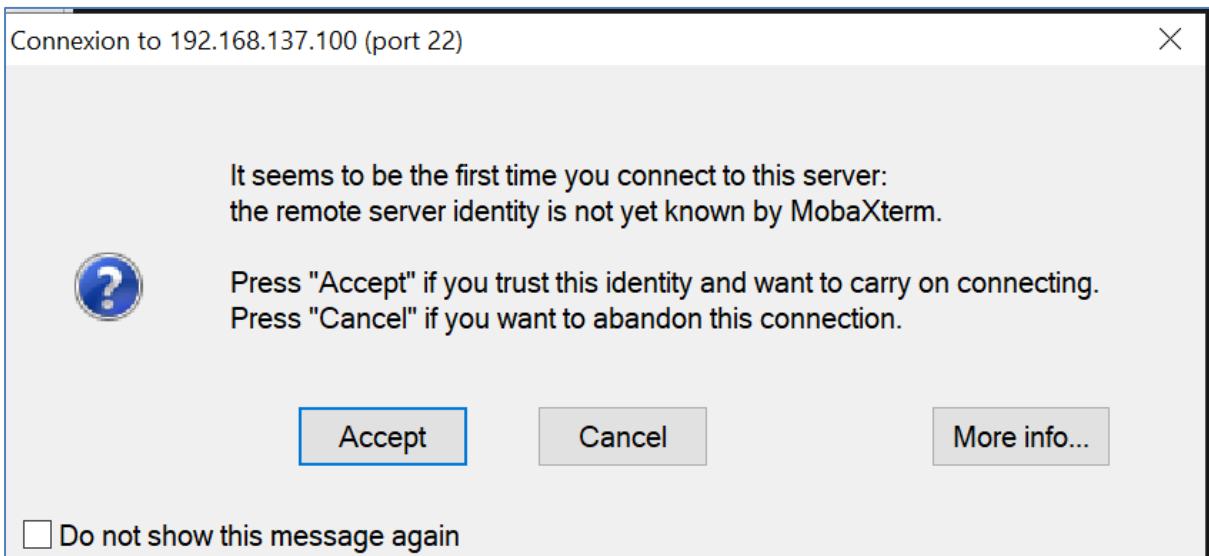


Figure 14: SSH known hosts

Then you must provide the password.

## 5.2 EVI CLI utilities

### 5.2.1 WDM

WDM stands for “Watt Device Manager”, it is Command Line Interface utility for interacting with Watt&Well devices via CANopen. It has many features such as :

- Scanning the CAN bus for available devices
- Reprogramming devices
- Calibrating and exporting device calibrations
- Dumping relevant EVIS (SECC) information (device logs, charging session logs, etc...)
- Log dumping of devices
- Controlling states of devices (reboot, stop, etc)
- Value monitoring via SDO (CANopen)
- Virtual scope dumping of devices (Fast, internal values measured by devices)
- Monitoring node (Watt Monitoring Node): This node can be used to detect emergency frames sent by devices and proceed to save all relevant information on the device (Device information and Virtual scope).

Here is a typical “wdm scan” output, for a single EVI without any connected Power Unit:

```

Linux dhsom 5.10.74-gf7d410bb9fef-dirty #10 SMP Tue Apr 18 10:20:37 CEST 2023 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov 27 21:33:07 2023 from 192.168.137.5
evis@dhsom:~$ wdm scan
No configuration toml was loaded for wdm
DEBUG:watt_node_v2.node.lu:Loaded common lookups
INFO:root:WDM log will be saved at : /var/local/evis/watt-device-manager/.debug/wdm-log-2023-11-27-17h-36m-42s.log
INFO:root:Enabling raw can logging at can-raw-2023-11-27-17h-36m-42s.log
INFO:can.interfaces.socketcan.socketcan:Created a socket
INFO:watt_node_v2.network:Connected to 'socketcan channel 'can0''
INFO:root:Disabling node monitoring
Scanning |#####-| 99.2% Complete
INFO:evis_utils.pm:loaded EVIS_OFFSET : 0
DEBUG:watt_node_v2.node.base:Reading software information of 16
DEBUG:watt_node_v2.node.base:Reading software information of 17
DEBUG:watt_node_v2.node.base:Reading software information of 2
DEBUG:evis_utils.pm:reading pm version at /home/evis/evis-ccs-pm
INFO:watt_node_v2.network:18 should'nt be a real node, still trying to read
INFO:watt_node_v2.network:21 should'nt be a real node, still trying to read
DEBUG:watt_node_v2.node.base:Reading software information of 21
DEBUG:watt_node_v2.node.base:Reading software information of 18
Detected a total of 2 valid node(s)
+-----+-----+-----+-----+-----+-----+-----+
| Node ID | Device name | Hardware revision | Serial number | Software version | Software Build Nb | NMT state |
+-----+-----+-----+-----+-----+-----+-----+
| 0x10(16) | Watt & Well | EVIS ChipSet | EVIS_5X1 | 1741 | 5.1.0r | 19639 | OPERATIONAL |
| 0x11(17) | PM CCS EVIS A | - | 0 | 0 | 1.3.13 | 0 | OPERATIONAL |
+-----+-----+-----+-----+-----+-----+-----+
INFO:root:Re-enabling node monitoring
evis@dhsom:~$

```

Figure 15 : WDM scan result

Notice that two devices are detected:

- Watt & Well | EVIS ChipSet: It is the EVI microcontroller responsible for PU management and IO interactions with the vehicle. Its internal state machine is representative for the Charging Process state. Here the serial number is “1741”, this must match the serial number on the EVI sticker. The chipset firmware version here is “5.1.0r”.
- PM CCS EVIS A: (Plug Module CCS) It is responsible of the communication with the EV and the CAN communication with the ChipSet. It exists in two flavors, either CHAdEMO or Combo. In this example, the “Combo” version is running, PM CCS has version 1.3.13 in this example.

## 5.2.2 PM logs

The “sudo journalctl -u evis-ccs-pm -f” command will display the “PM CCS” log messages, this typically displays information about the ongoing charging process:

```

MobaXterm Personal Edition v23.2
(SSH client, X server and network tools)

SSH session to evis@192.168.137.100
  Direct SSH      : ✓
  SSH compression : ✓
  SSH-browser     : ✓
  X11-forwarding  : ✗ (disabled or not supported by server)
  For more info, ctrl+click on help or visit our website.

Linux dhsom 5.10.74-gf7d410bb9fef-dirty #10 SMP Tue Apr 18 10:20:37 CEST 2023 armv7l
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov 27 17:43:04 2023 from 192.168.137.1
evis@dhsom:~$ sudo journalctl -u evis-ccs-pm -f
-- Logs begin at Thu 2019-02-14 10:11:59 UTC. --
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.348 | EvisCsm:463:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.348 | EvisCsm:600:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.349 | EvisCsm:620:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.366 | IChargeBroker:102:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.367 | IChargeBroker:102:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.408 | Processor:48:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.409 | Processor:49:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.424 | EvisCsm:550:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [D][27T17:30:51.840 | EvisCsm:475:3056533520]
Nov 27 17:30:51 dhsom evis-ccs-pm[1081]: [E][27T17:30:51.840 | EvisCsm:489:3056533520]
< Rx CS State: "CP17_EmergencyStop"
>> Tx EVIS CS State: Fault "CP17Error"
> Tx PM State: "S11_Fault"(11)
Dyn charge limits: 500V, [0,125]A, [0,0]W
Dyn charge limits: 0V, [0,0]A, [0,0]W
# "tcpdump" started
#####
< Rx CS State: "CP17_EmergencyStop", ChargeLoopSubStatus: 171 "Unknown CP8 ChargeLoopSubStatus 171", E
< Rx CS heartbeat State: 5
< Rx CS heartbeat timeout: false

```

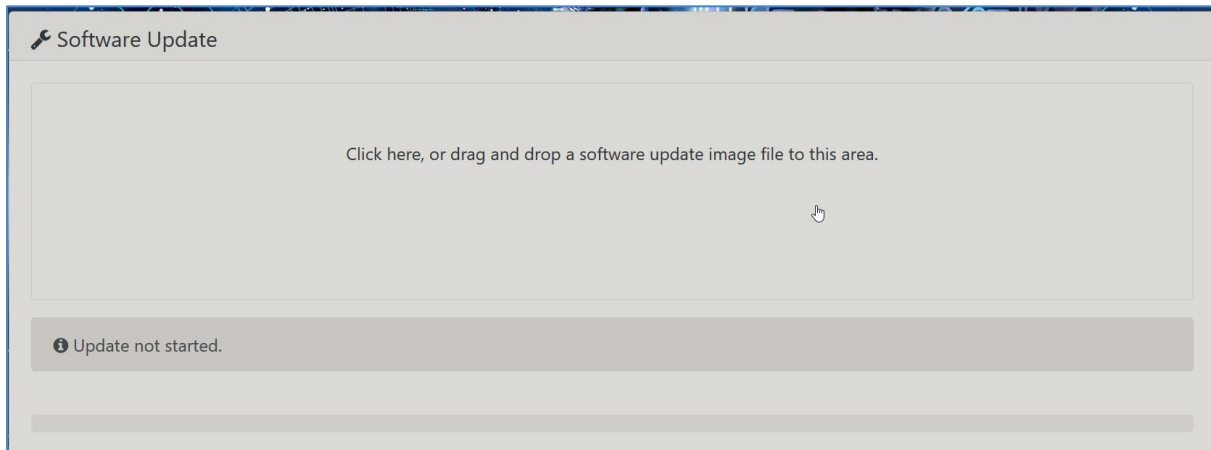
Figure 16 : sudo journalctl -u evis-ccs-pm -f output

## 6 Connect to the EVI SWUpdate interface

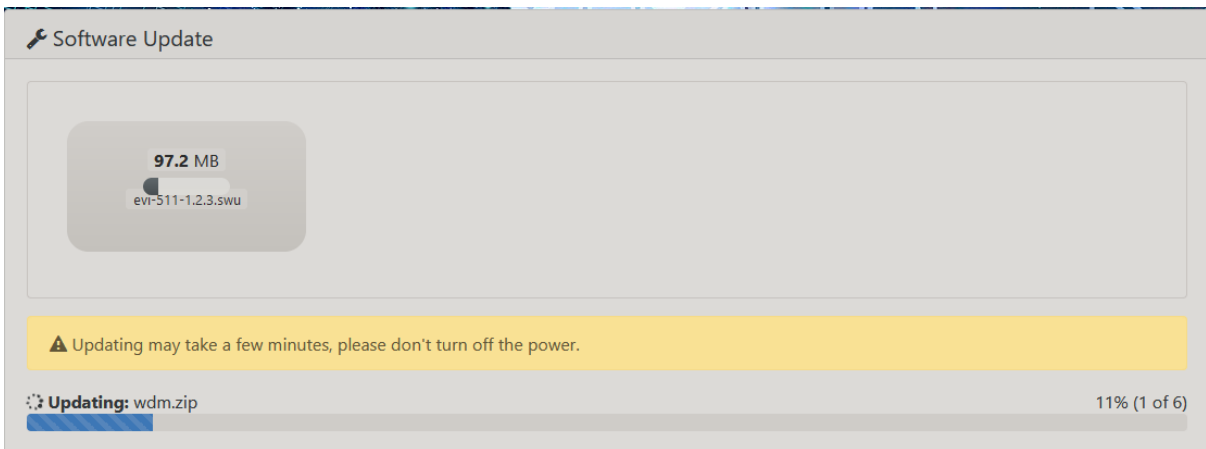
Using a web browser, enter the following URI:

<http://192.168.137.100:8080/>

Then drag and drop the “.swu” file:



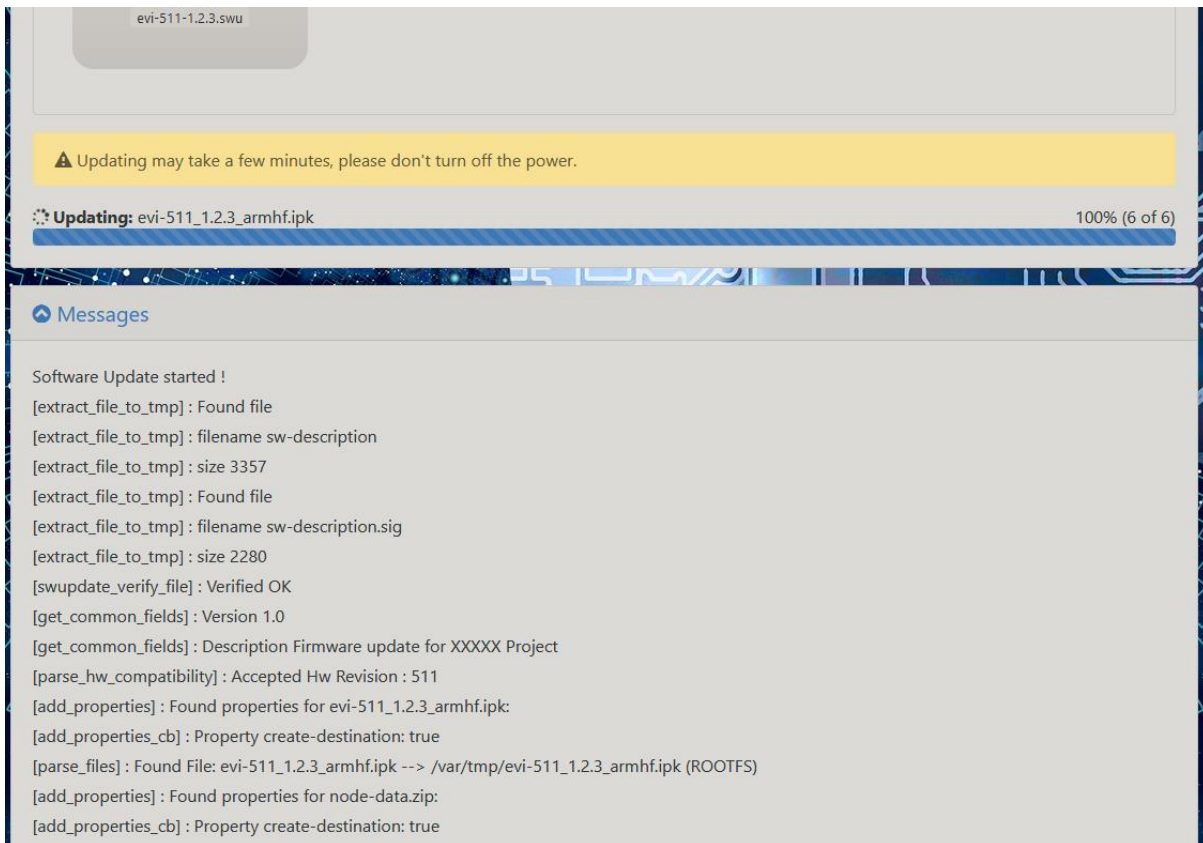
**Figure 17: SWUpdate drag and drop field**



**Figure 18 : Ongoing software update**

**This is extremely important to wait until the end of the update before powering off the EVI, this takes several minutes.**

You can extend the “Messages” tab to have SWUpdate log messages:



**Figure 19 : SWUpdate log messages**

At the end of the update, the EVI reboots and the SWUpdate interface is cleared up from every logs.

## 7 Connect to the EVI Graphical User Interface (GUI)

### 7.1 Connect to interface

Note: EVI GUI is available from EVI distro v1.2.2 and beyond, if an older distro version is installed, a software update is required before accessing the GUI.

Assuming a proper EVI distro version is installed, using a web browser, enter the following URI:  
<http://192.168.137.100:8333/>

Then enter the credentials provided by Watt&Well:



Figure 20: EVI GUI credentials menu

Press "SIGN IN"

### 7.2 Provide license key

License key must be provided for core EVI services to be operating, to provide license key, do the following steps.

Press "Settings" button:



Figure 21: EVI GUI "Settings" button

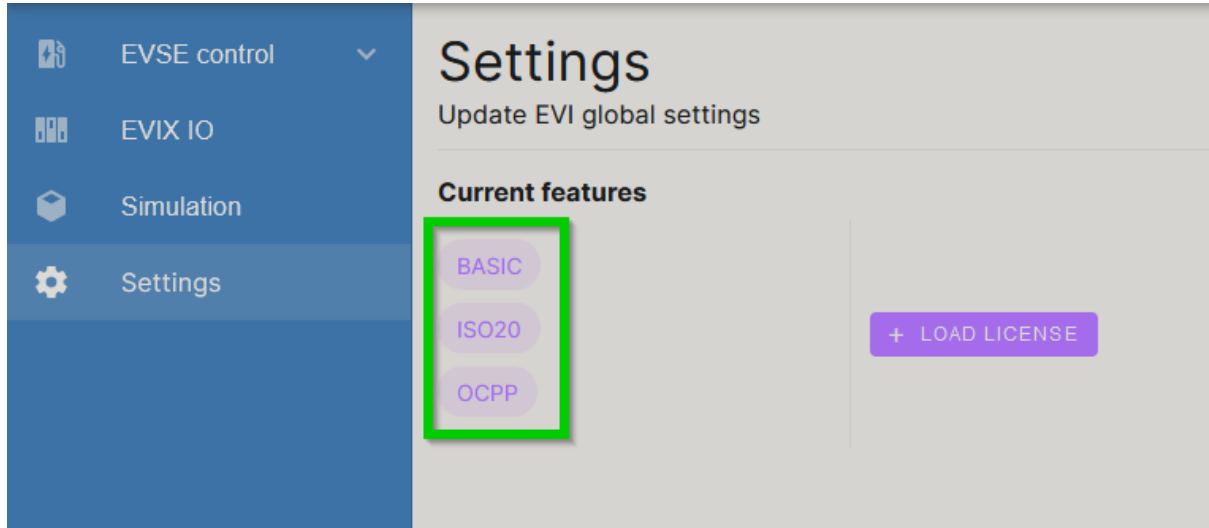
Press "LOAD LICENSE" button:



Figure 22: EVI GUI "LOAD LICENSE" button

Then drag and drop the “.lic” file, then press “UPLOAD”.

This must display the available features, in this example, “BASIC”, “ISO20” and “OCPP” features are provided:



**Figure 23: EVI available features**