PCS

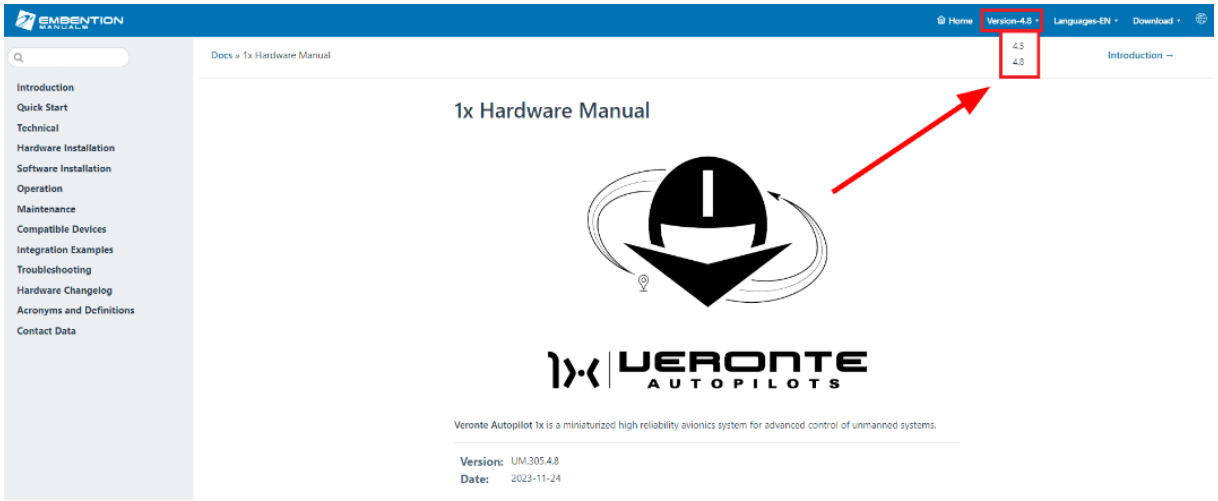
Release 2.0

Embention

2023-12-07

CONTENTS

Warning: Select your version before reading any user manual. The following image shows where to select a version from any Embention user manual.



CHAPTER

ONE

INTRODUCTION

Veronte PCS is a rugged control station hardware designed for outdoors use. The aluminium enclosure with IP54 protection allows the operation of the system in all weather conditions by protecting the electronics from rain and harsh environments.

The whole system is delivered in a wheeled rugged case for easy transportation and storage. The foldable mast included can be extended up to 3 m, rising the radio modules and antennas for maximizing the datalink LOS. Furthermore, the embedded **Veronte BCS** includes all sensors needed for professional drone operations, enabling RTK, differential barometer, operations from moving vehicles, relative missions…

Veronte PCS combines perfectly with **Veronte MCS** control stations. This setup allows installing the **Veronte PCS** init (installing datalink and sensors) on open fields, maximizing the performance of GNSS receivers and datalinks, while operator can operate from a safe location.

Veronte PCS is ready to be used with a ground configuration, all sensors and devices integrated and the required wires to connect it to any other Veronte device (like **T28 Tracker** or **MCS**)

The main applications for **Veronte PCS** are:

- Mapping and photogrammetry.
- Surveillance.
- Environmental control and research.
- Firefighting.

CHAPTER

TWO

QUICK START

2.1 Basic Connection Diagram

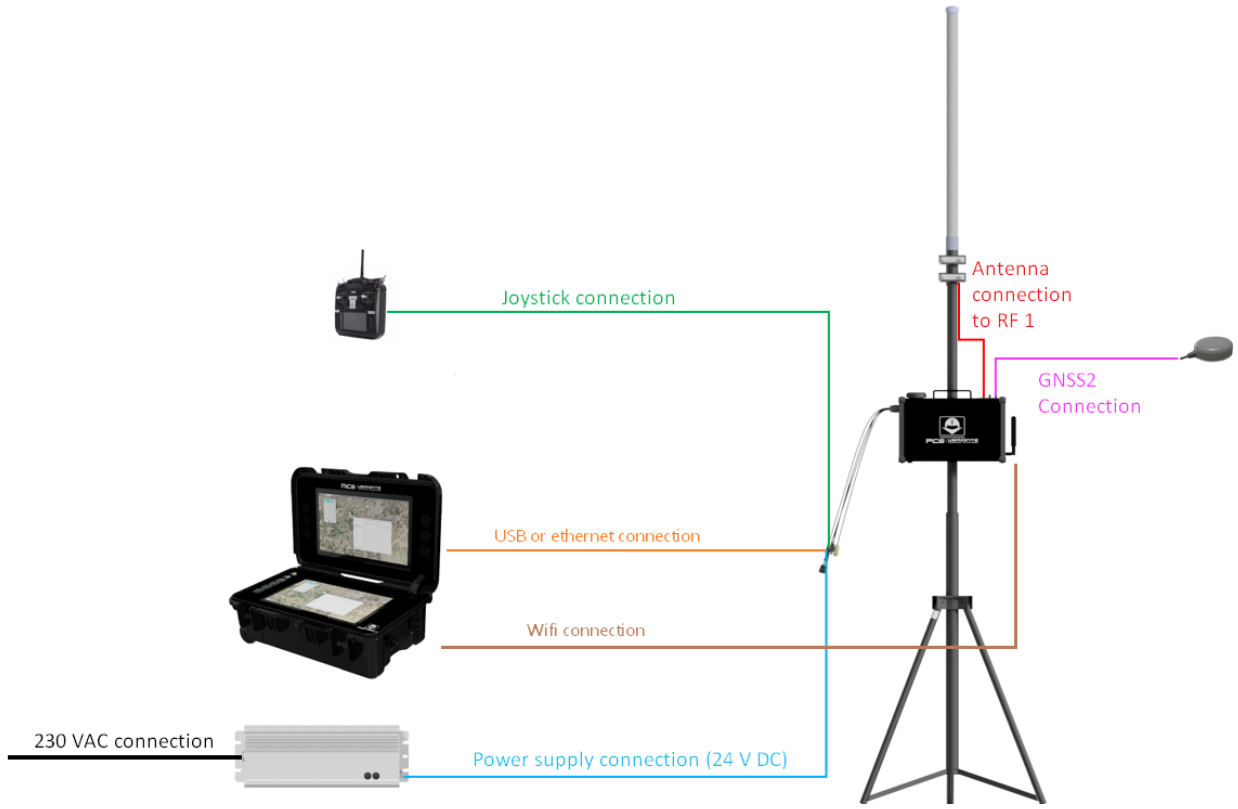


Fig. 1: **Basic Connection Diagram**

2.2 First Steps

2.2.1 ON/OFF

To switch on and off the **PCS**, it is necessary to attach the **PCS Harness** and connect an antenna.

By pressing the button for 2 seconds, the light will turn on and shine blue.

To turn the device off, the push button shall be pressed for 2 seconds (until the blue light turns off). The push button delay is implemented to avoid unwished disconnections.

Once the **PCS** is on, the connector can be detached and the system will continue working.

Warning: The connector only can be deatached in case of operating with battery and wireless. In this case the **PCS** will continue working, hence it will consume battery and the user has to remember to turn off the **PCS** after using it (plugging in the harness again).

Important: In order to not stress the battery unnecessarily, do not forget to turn off the system after using it.

2.2.2 Battery Charge

Veronte PCS can be connected and disconnected from the power supply during the operation without turning off the system. In case of external power supply disconnection, the smart battery managment system will switch automatically from external power supply to the internal battery.

In order to have a redundant power supply during operation and ensure the robustness of the system, it is recommended to use always the external power supply so the internal battery will be used as back-up.

PCS is provided with an internal intelligent battery charger which improves the charging process and optimizes it. In order to charge the battery, follow the next steps:

1. Ensure the power source is properly connected.
2. The Battery status shall be checked in the provided software.

Note: There is no need on turning on the system for charging the **PCS**. As soon as the power supply is connected, the battery starts charging.

Warning: Do **NOT** charge from a different power supply. It will damage the system.

2.3 Warnings

- Do not power on the **PCS** without connecting the antenna.
- Each pin of the expansion bay connector (the connector with 16 pins) has a current limit of 4 A. Higher intensities may damage internal components.
- Do not start a mission without a charged battery.
- Make sure the distance between ground end and air end is over 5 m.
- Guarantee that no obstacles will interrupt LOS communications.
- Port RS-232 has possible connections in both external harnesses (pin 19 is transmitter and pin 20 is receiver) and Expansion Bay (pin 14 is transmitter and pin 16 is receiver). CAUTION: only one of both can be used. They drive to the same input channel, but this configuration is thought to ease the connection of any device from the Expansion Bay if needed.

- Port RS-485 is used by default by the **Veronte BCS** for Ethernet connection. Please contact us before using it for other purposes.
- Only one DHCP device connection can be done simultaneously. If more than one is meant to be connected, then it is needed to configure a Static IP.
- **Veronte PCS** is IP54 protected while closed. However, it loses its water resistance meanwhile the outer cover is open.
- Do not break warranty seals. Please contact us before doing it.
- Keep the **PCS** in a position where the GPS antenna is facing to the open sky for better satellite view.
- Do not cover the pressure purge in order to ensure the correct flow of the system
- Avoid shocks during transportation or operation, some of the components could suffer damage.

Warning: For safer operations, it is recomended to operate the Veronte PCS connected to an external power source, using the internal battery as back-up.

Warning: Do not forget to connect RF antenna before powering up!!!!

CHAPTER

THREE

TECHNICAL

3.1 Main Features

- Ready for operation
- Compatible with Veronte MCS or third party computers
- RTK & differential barometer base
- Wifi, Ethernet and USB communications
- Expansion bay (free space for customer electronics installations)
- Easy maintenance
- 2 hours of battery life
- Battery over discharge protection

3.2 Variants

This system is available with different device configurations in order to fit all operational requirements from each application.

Variants with main specifications are described below.

Radio module	Frequency	Amplifier	RF Power	Frequency hopping	Video	Antenna type
Without radio module	No Radio	No	No Radio	No Radio	No Radio	No antenna
DTC 2.4GHz - 5W - Video & TM/TC	2.4GHz	Yes	5W	Yes	Yes	15dBi
MH 2.4GHz - 10W - TM/TC	2.4GHz	Yes	10W	Yes	No	15dBi
MH 2.4GHz - 10W - Video & TM/TC	2.4GHz	Yes	10W	Yes	Yes	15dBi
MH 2.4GHz MIC - 0.1W - TM/TC	2.4GHz	No	100mW	Yes	No	15dBi
MH 900MHz - 10W - TM/TC	900MHz	Yes	10W	Yes	No	6dBi
MH 900MHz - 10W - Video & TM/TC	900MHz	Yes	10W	Yes	Yes	6dBi
MH 400MHz & 900MHz - 1W - TM/TC	400MHz	No	1W	Yes	No	2.15dBi

3.3 Part list

The system consist of a multiple components listed below.

Quantity	Items
1	**Veronte PCS** Control Station Unit
1	Pole and wall mounting accessories
1	Foldable mast
1	Connection harness
1	Veronte Control station Power source (euro plug)
1	5m ethernet extension cable
1	5m USB A extension cable
1	5m joystick extension cable
1	Expansion Bay Male Connector FGG.2B.316.CLAD72Z
1	Rugged transport case
1	High Gain Antenna
1	RF Cable - N Male to SMA - LMR-195 - 410mm
1	Datalink (not always, depending on variant)
1	Amplifier (not always, depending on variant)

The **Veronte PCS** Control Station Unit is built with a **Veronte Autopilot 1x** inside to manage communications.

3.4 Electrical Specifications

PCS DC input	14 to 24 VDC
PCS power	30W to 80W (depending on version)
Power supply AC input	180-264 VAC 50-60 Hz
Battery type	LiFePO4
Battery capacity	10 Ah
Battery operation time	2 hours typically (depending on version)
Wifi	2.4GHz and 5GHz configurable Wifi output
RF1 and RF2 Frequencies	400MHz, 900MHz or 2.4GHz (depending on version)
RF1 and RF2 Impedance	50 Ohm
GNSS 1	Integrated GNSS antenna. 40dB Gain, covering GPS/QZSS L1, GLONASS G1, Galileo E1, BeiDou B1, as well as SBAS
GNSS 2	SMA female connector for secondary GNSS antenna
Expansion bay I/O	RS232, CAN and Ethernet. Each pin has a current limit of 4 A
External I/O	1x USB, 2x CAN ports, Ethernet, 16x PWM, PPM, 4x ADCs and 1x I2C
Expansion bay power outputs	3.3V/5A, 5V/5A, 12V/5A and 24V/5A

3.5 Mechanical Specifications

PCS Weight	5.9 kg max (depending on version)
PCS + Pole Weight	20.4 kg max (depending on version)
Operating temperature	-20 to 60 °C
Environmental proteciton	IP54
Transport case	Rugged plastic case, quad track wheels, pressure purge valve, side handles and carry handle

3.6 Dimensions

Below you can find a measurements drawing for the PCS.

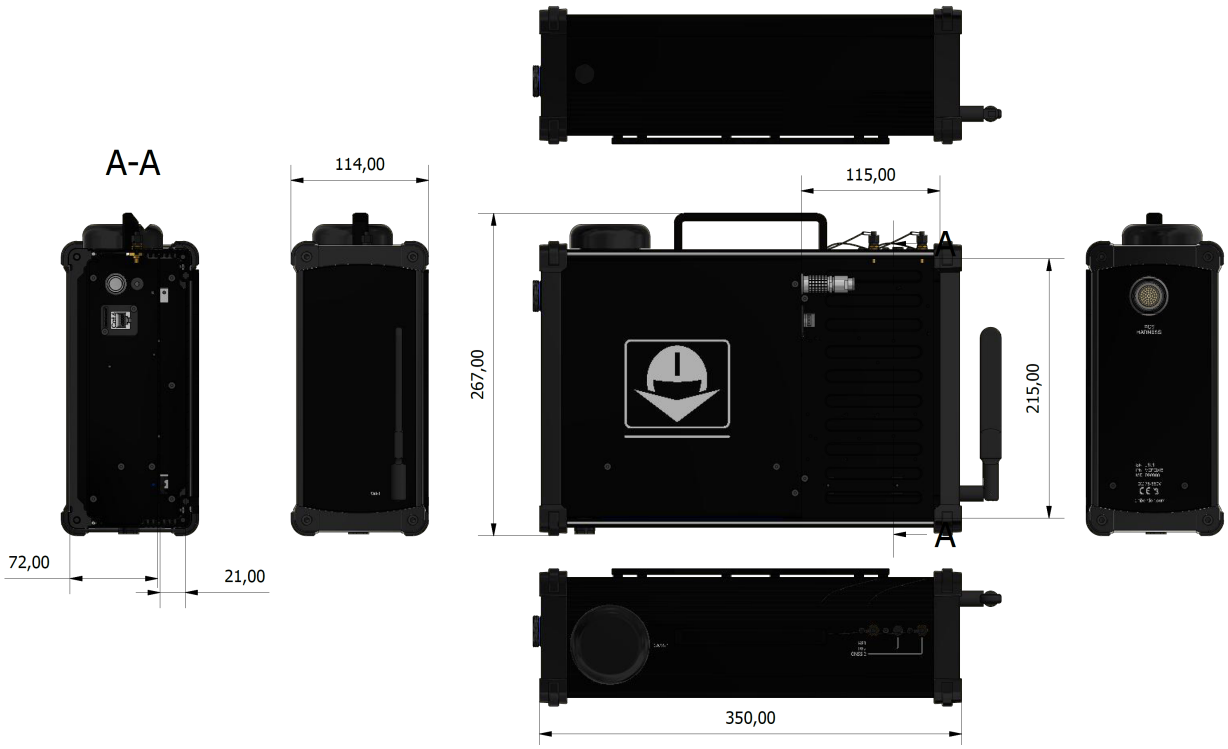


Fig. 1: **Product Components - Interface dimensions**

Veronte PCS is supplied together with a telescopic foldable mast that can be extended up to 3 m. The maximum and the minimum dimensions of the system are shown below.

Fig. 2: **System Dimensions**

The whole system is delivered with a rugged plastic storage case for easy transportation.

Fig. 3: **Rugged plastic case**

3.7 Interfaces

Fig. 4: **PCS Interfaces - Parts identification**

Fig. 5: **PCS Interfaces - Parts identification**

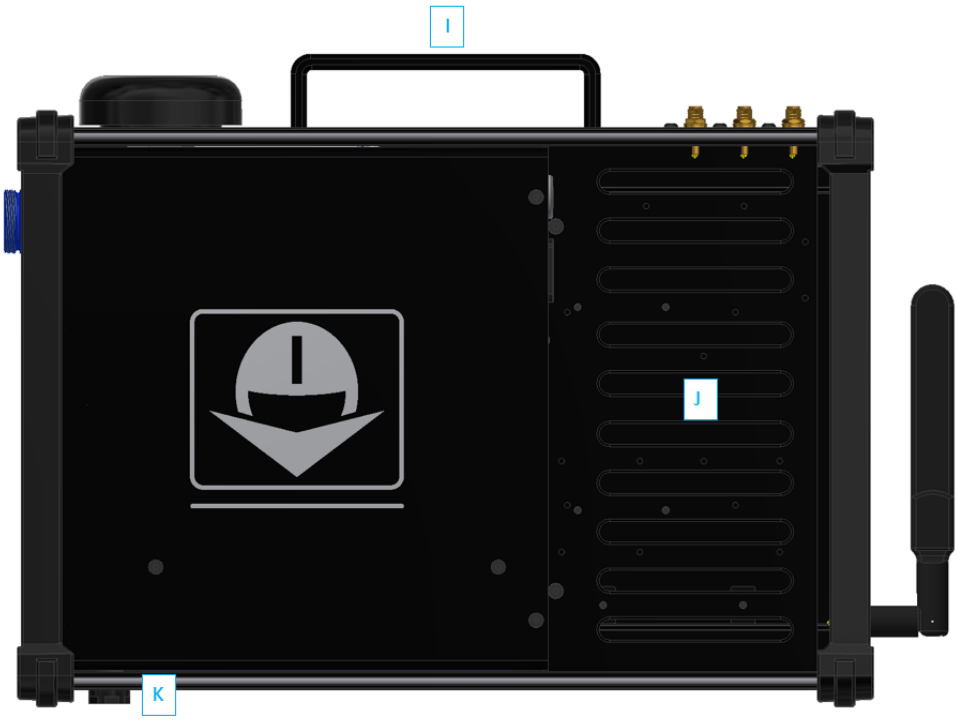


Fig. 6: **PCS Interfaces - Parts identification**

ID	Items
A	PCS Harness connector
B	Integrated GNSS antenna
C	RF 1 antenna (SMA female)
D	RF 2 antenna (SMA female)
E	GNSS 2 antenna (SMA female)
F	Connector for Expansion Bay
G	Ethernet connector
H	Wifi antenna connector (SMA female RP)
I	Hand carrier
J	Expansion Bay
K	Automatic pressure purge

3.7.1 PCS Harness

The PCS Harness is a cable provided with the system which has many connectors to control the PCS ground station.

Next table describes the equipped connectors and its functionality.

Connector	Description
FGW.LM.368.XLCT	Main connector to PCS ground station
Ethernet	Ready to connect an Ethernet cable to a Laptop or Veronte MCS
USB Type A	Ready to connect to a Laptop or Veronte MCS
Joystick	PPM input for Joystick
Push button	ON/OFF button
Power source	24 VDC input

Warning: Do **NOT** connect the CS harness provided for other Veronte units. **ONLY** use PCS own Matting connector.

3.7.2 Ethernet Internal Device Connection

PCS bay has an Ethernet connection fully isolated from the external connector. It is normally used for interconnection with video RF links. It can be used for any other device to integrate into the **PCS**.

3.7.3 Matting connectors to PCS harness

Connector	Standard
Ethernet	Regular ethernet connector
USB	USB female type A
Joystick	HI-J35S-Screw-F
Power source	PT06A-10-6S(005)

CHAPTER

FOUR

HARDWARE INSTALLATION

4.1 Pinout

4.1.1 Main Connector

The 68 pin main connector has the distribution of input/output channels as follows:

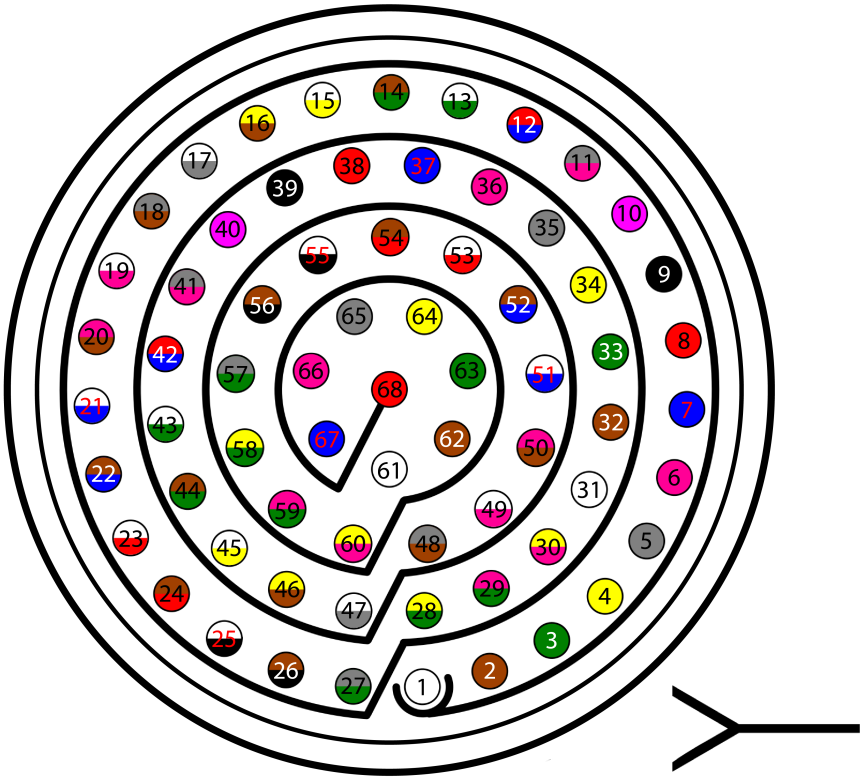


Fig. 1: **PCS Harness connector**

PCS Unit - Input pins

Pin	Signal	Type	Comments
1	I/O1	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c

Table 1 – continued from previous page

Pin	Signal	Type	Comments
2	I/O2	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
3	I/O3	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
4	I/O4	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
5	I/O5	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
6	I/O6	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
7	I/O7	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
8	I/O8	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
9	GND	GROUND	Ground signal for actuators 1-8
10	I/O9	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
11	I/10	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
12	I/11	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
13	I/12	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
14	I/13	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
15	I/14	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
16	I/15	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
17	I/16	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum c
18	GND	GROUND	Ground signal for actuators 9-16
19	RS 232 TX	Output	RS 232 Output (-13.2V to 13.2V Max, -5.4V to 5.4V Typical). Protected against ESD an
20	RS 232 RX	Input	RS 232 Input (-25V to 25V Max, -0.6V Low and 2.4V High Threshold). Protected again
21	Tx+ (*)	Output	Ethernet transmitter positive
22	Analog 4	Input Analog	Input 0-3.3V. Protected against ESD and short circuit
23	No connect(*)	Input Analog	Input 0-3.3V. Protected against ESD and short circuit
24	Tx- (*)	Output	Ethernet transmitter negative
25	CanA P	I/O	CANbus interface, up to 1Mbps (2.3V Typical, 1.2V-2.3V Differential). Protected agains
26	CanA N	I/O	Twisted pair with a 120 ohms Zo recommended (2.3V Typical, 1.2V-2.3V Differential).
27	24V (*)	Output	Power supply. Common with pin 44
28	CANB_P	I/O	CANbus interface. It supports data rates up to 1 Mbps. Protected against ESD
29	CANB_N	I/O	Twisted pair with a 120 ohms Zo recommended. Protected against ESD
30	Rx+ (*)	Input	Ethernet receiver positive
31	I2C_CLK	Output	Clk line for I2C bus (0.3V to 3.3V). Protected against ESD and short circuit
32	I2C_DATA	I/O	Data line for I2C bus (0.3V to 3.3V). Protected against ESD and short circuit
33	GND	GROUND	Ground for 3.3V power supply
34	3.3V	POWER	3.3V - 100mA power supply. Protected against ESD short circuit with 100mA resettable
35	GND	GROUND	Ground for 5V power supply
36	5V	POWER	5V – 100mA power supply. Protected against ESD short circuit with 100mA resettable f
37	GND	GROUND	Ground for analog signals
38	ANALOG_1	Input	Analog input 0-3.3V. Protected against ESD and short circuit
39	ANALOG_2	Input	Analog input 0-3.3V. Protected against ESD and short circuit
40	ANALOG_3	Input	Analog input 0-3.3V. Protected against ESD and short circuit
41	RX- (*)	I/O	Ethernet receiver negative
42	FTS1_OUT	Output	Deadman signal from comicro. Protected against ESD and short circuit
43	FTS2_OUT	Output	!SystemOK Bit. Protected against ESD and short circuit
44	24V (*)	Output	Power supply. Common with pin 27
45	UARTA_TX	Output	Microcontroller UART
46	UARTA_RX	Input	Microcontroller UART
47	GND	GROUND	Ground signal comicro power supply
48	VCC (*)	POWER	Power supply (14 to 24V). Protected against reverse polarity
49	GND (*)	GND	Ground
50	OUT_RS485_P	Output	Non-inverted output from RS485 bus (-7V to 12V Max, -2.3V to 2.3V Typical). Protecte

Table 1 – continued from previous page

Pin	Signal	Type	Comments
51	OUT_RS485_N	Output	Inverted output from RS485 bus (-7V to 12V Max, -2.3V to 2.3V Typical). Protected aga
52	IN_RS845_N	Input	Inverted input from RS485 bus (-7V to 12V Max, -2.3V to 2.3V Typical). Protected agai
53	IN_RS845_P	Input	Non-inverted output from RS485 bus (-7V to 12V Max, -2.3V to 2.3V Typical). Protecte
54	RS-485_GND	GND	Ground for RS-485 bus
55	No connect(*)	/	/
56	No connect(*)	/	/
57	EQEP_S	I/O	DIGITAL output / DIGITAL input / Encoder strobe input (0-3.3V). Protected against ES
58	EQEP_I	I/O	DIGITAL output / DIGITAL input / Encoder index input A (0-3.3V). Protected against E
59	GND	GROUND	Ground for encoders
60	V_USB_DP	I/O	Veronte USB data line. Protected against ESD
61	V_USB_DN	I/O	Veronte USB data line. Protected against ESD
62	USB_GND (GND)	GROUND	USB ground
63	No connect(*)	/	/
64	No connect(*)	/	/
65	GND	GROUND	Veronte ground input
66	GND	GROUND	Veronte ground input
67	VCC	POWER	Power supply (14V to 24V). Protected against reverse polarity
68	VCC	POWER	

Note: The functions marked with **(*)** differ from Veronte Autopilot 1x Pinout

Warning:

- All GND pins are common.
- Pins 27, 67 and 68 are common. Connect them to the same power supply voltage.
- RS-485 bus is used by default by the Veronte BCS for Ethernet communications.
- CANA and CANB buses do not have termination resistor, user should add them based on its own wiring design.

Connector colour code:

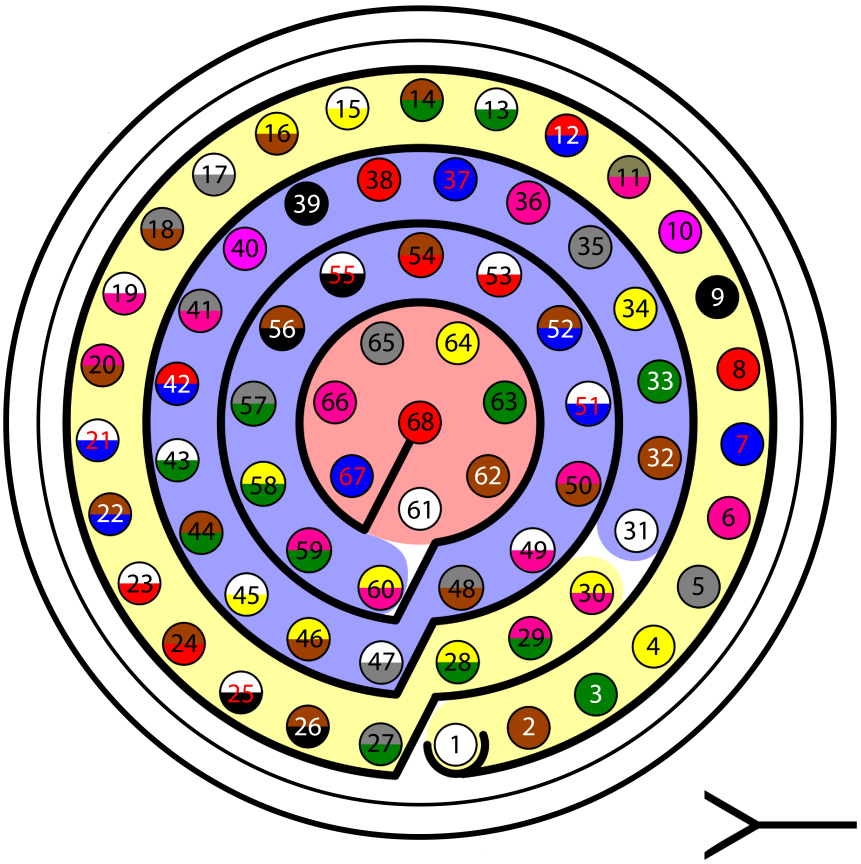


Fig. 2: **Connector HEW.LM.368.XLNP**

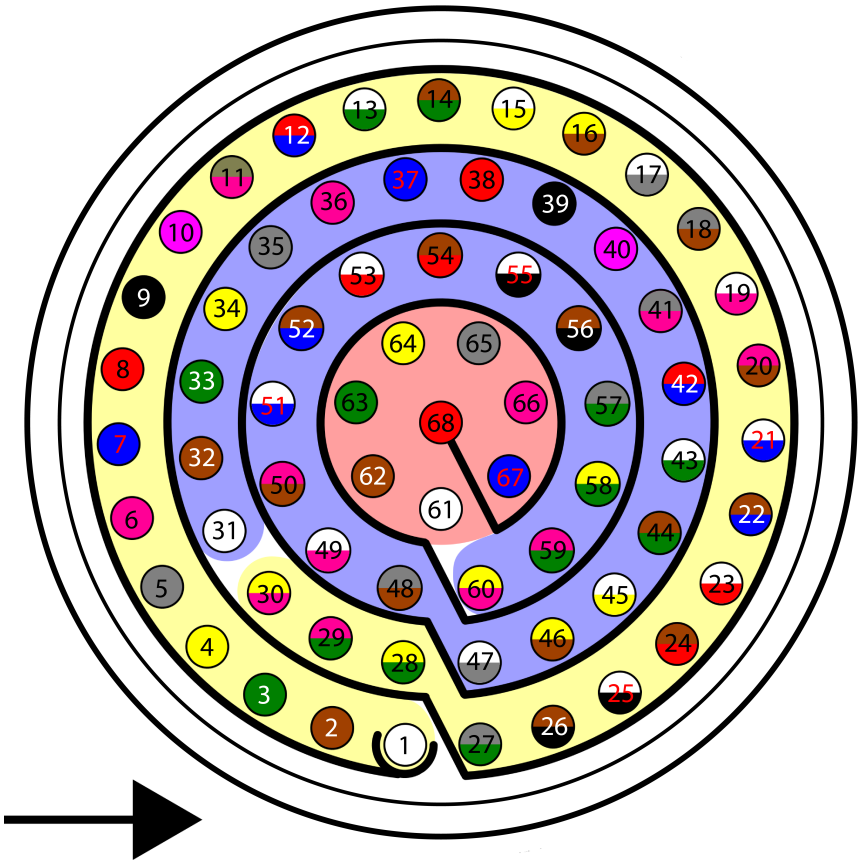


Fig. 3: **Harness plug**

Warning: Check the pin number before connecting. The colour code is repeated 3 times due to the amount of pins. First section (yellow) corresponds to pins 1-30, the second section (blue) to pins 31-60 and the third one (red) to pins 61-68. Pin number increases following the black line of the pictures above: counterclockwise for the connector and clockwise for the plug.

PIN	Color code	PIN	Color code
1	White	35	Gray
2	Brown	36	Pink
3	Green	37	Blue
4	Yellow	38	Red
5	Gray	39	Black
6	Pink	40	Violet
7	Blue	41	Gray – Pink
8	Red	42	Red – Blue
9	Black	43	White – Green
10	Violet	44	Brown – Green
11	Gray – Pink	45	White – Yellow
12	Red – Blue	46	Yellow – Brown
13	White – Green	47	White – Gray

continues on next page

Table 2 – continued from previous page

PIN	Color code	PIN	Color code
14	Brown – Green	48	Gray – Brown
15	White – Yellow	49	White – Pink
16	Yellow – Brown	50	Pink – Brown
17	White – Gray	51	White – Blue
18	Gray – Brown	52	Brown – Blue
19	White – Pink	53	White – Red
20	Pink – Brown	54	Brown – Red
21	White – Blue	55	White – Black
22	Brown – Blue	56	Brown – Black
23	White – Red	57	Gray – Green
24	Brown – Red	58	Yellow – Green
25	White – Black	59	Pink – Green
26	Brown – Black	60	Yellow – Pink
27	Grey – Green	61	White
28	Yellow – Green	62	Brown
29	Pink – Green	63	Green
30	Yellow – Pink	64	Yellow
31	White	65	Grey
32	Brown	66	Pink
33	Green	67	Blue
34	Yellow	68	Red

4.1.2 Expansion Bay Connector

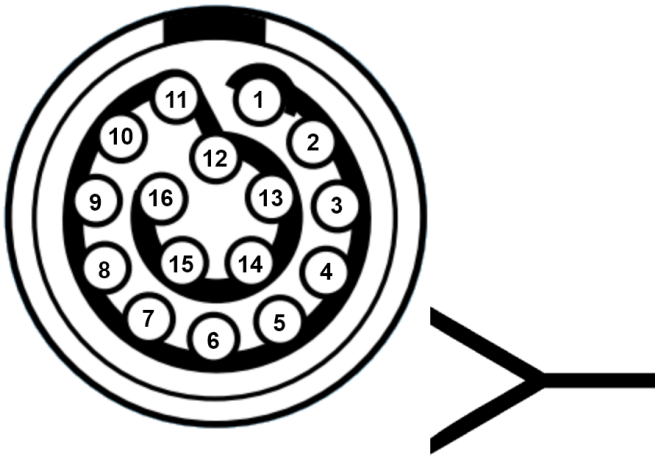


Fig. 4: **Expansion Bay Connector**

PCS Unit - Output pins

Pin	Signal	Type	Comments
1	3.3 V	Output	Output power supply. Maximum current: 4 A.
2	GND	GROUND	Ground. Maximum current: 4 A.
3	5 V	Output	Output power supply. Maximum current: 4 A.
4	GND	GROUND	Ground. Maximum current: 4 A.
5	12 V	Output	Output power supply. Maximum current: 4 A.
6	GND	GROUND	Ground. Maximum current: 4 A.
7	24 V	Output	Output power supply. Maximum current: 4 A.
8	GND	GROUND	Ground. Maximum current: 4 A.
9	No connect	/	/
10			
11			
12			
13	CanA P	I/O	CANbus interface, up to 1Mbps (2.3V Typical, 1.2V-2.3V Differential).
14	RS 232 TX	Output	RS 232 Output (-13.2V to 13.2V Max, -5.4V to 5.4V Typical).
15	CanA N	I/O	Twisted pair with a 120 ohms Zo recommended (2.3V Typical, 1.2V-2.3V Differential).
16	RS 232 RX	Input	RS 232 Input (-25V to 25V Max, -0.6V Low and 2.4V High Threshold).

Warning: RS-232 pins are common with the external pinnout.

4.2 Mechanical installation

There are 2 separate accessories for the Veronte PCS in order to mount the unit on a mast, on the Veronte Tracker or a wall.

The accessories are :

Pole Mount.

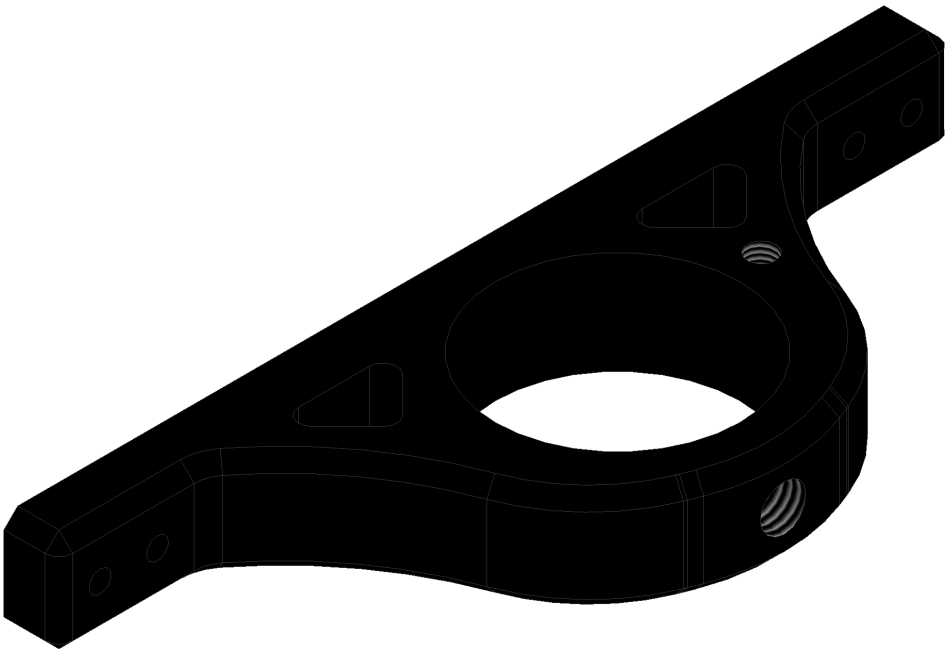


Fig. 5: **Pole mount**

Wall Mount

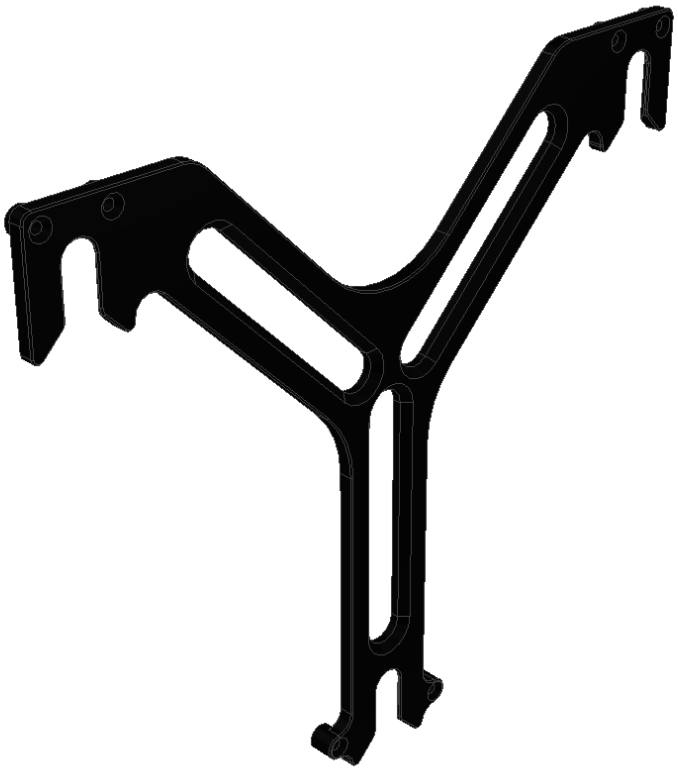


Fig. 6: **Wall mount**

The installation of the wall mount is described in the Veronte Tracker Manual.

Pole mount installation

The pole mount is composed by two aluminun brackets to assemble the PCS to the foldable mast.

To assemble the system follow the next steps:

1. Attach the two brackets to the PCS Control Station with 2mm allen screw driver.

Fig. 7: **Bracket Fixation**

2. Introduce the PCS Control Station into the mast and attach it with the two wing bolts.

Fig. 8: **PCS to pole fixation**

3. Attach the antenna to the mast with 13mm open wrench.

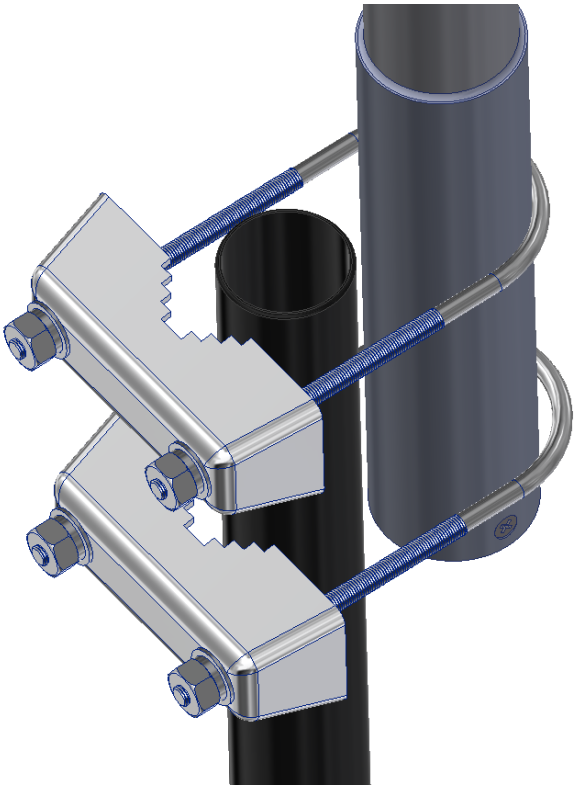


Fig. 9: **Antenna Fixation**

4. Connect the Antenna to the PCS Control Station (N-Male to SMA cable).

CHAPTER

FIVE

SOFTWARE INSTALLATION

Veronte PCS is a pre-configured device. It is built with a **Veronte Autopilot 1x** (hardware version 4.5) inside to manage communications, so configuration is done through the autopilot. Nonetheless, *external radios* (MH and DTC) are configured directly with a computer via ethernet.

Depending on the `software version`, the applications employed to configure the inner autopilot (and consequently the **PCS**) are different:

- `6.4 or lower`: **Veronte Pipe** to do everything.
- `6.8 or higher`: **Veronte Link** to connect the autopilot to the PC and **1x PDI Builder** to configure the autopilot.

Nonetheless, to configure the **PCS** it is required to establish connection with a computer according to the following section.

5.1 Computer to Autopilot Connection

5.1.1 Software version 6.4 or lower

Via USB

1. Connect the PCS to the computer via USB.
2. Open Pipe and go to Preferences ⇒ Connections ⇒ Serial COM ⇒ Add ⇒ Serial COM which matches the Veronte.

Via Wifi or Ethernet

> **Warning:** If the radio frequency in use is 2.4GHz, it is recommended to use the 5 GHz signal for PCS communication, disabling 2.4GHz if interferences are noticed.

1. First of all, a connection between the computer and the Veronte PCS is needed. To do that, the two available options are Wi-Fi or Ethernet. If connecting through Ethernet, step 2 does not apply.
2. If connecting through wifi, search for the PCS according to the indicated network name from the identification badge (name will be like PCSXXXXX-XXG) and connect to that network (use the password provided in the badge as well).
3. Password can be changed in accordance to 6. *Anex A. Advanced Wifi Configuration*.

Once the connection is done, enter in Pipe, **Preferences** ⇒ **Connections** and configure Port information (set it to 3000) and check Enable TCP box. Find the configuration in the following picture.

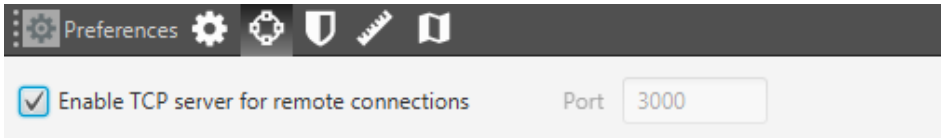


Fig. 1: **How to operate - TCP and port information**

4. Set an Ethernet connection. Fill with the following information:
   - IP: 239.0.0.1.
   - Port: 12345
   - Network interface: select your ethernet board.

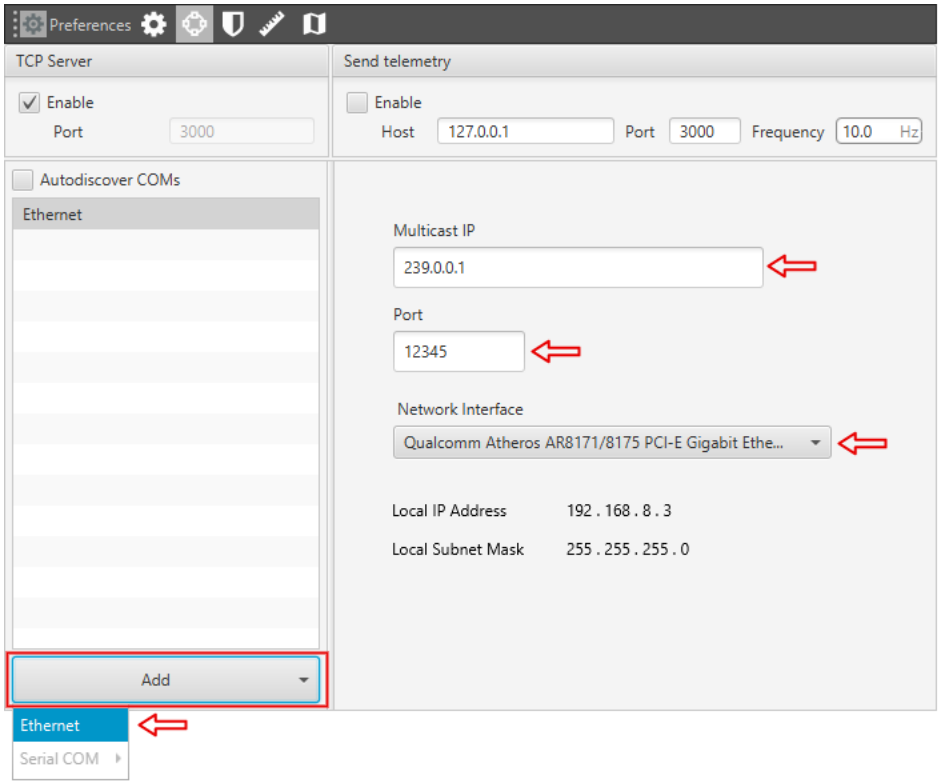


Fig. 2: **How to operate - Ethernet Setup**

The autopilot shall appear connected. If not, refer to the *Troubleshooting section*.

5.1.2 Software version 6.8 or higher

Connect the **PCS** to the computer via USB, wifi or ethernet and follow the instructions on the Operation section of the **Veronte Link** user manual.

5.2 Joystick Configuration

Joystick connection is preconfigured on the main external connector (Pin 57 EQEP_S). Wireless joystick connection is also possible with the installation of a joystick receiver on the Expansion Bay.

- `Software version 6.4 or lower`

Read the Transmitter section of the **Veronte Autopilot** manual.

- `Software version 6.8 or higher`

Read the Stick section of the **1x PDI Builder** user manual.

5.3 PWM Configuration

PWMs 1 and 2 are pre-configured for a tracker antenna. This does not disable them for different applications (with a proper configuration). To configure PWM signals for different applications, visit the following links:

- `Software version 6.4 or lower`

Read the GPIO/PWM section of the **Veronte Autopilot** manual.

- `Software version 6.8 or higher`

Read the PWM section of the **1x PDI Builder** user manual.

5.4 Advanced Wi-Fi Configuration

1. Connect the computer to the ethernet cable.
2. Open a browser and introduce the following address on the search bar: 192.168.8.1.
3. The user name is "admin" and the password is "EmbentionPCS20". For being able to Access this menu, the unit has to be linked.
4. Go to "SETUP WIZARD -> STEP 3 - WIFI". Here it is possible to configure the wifi password and activate/deactivate antennas.

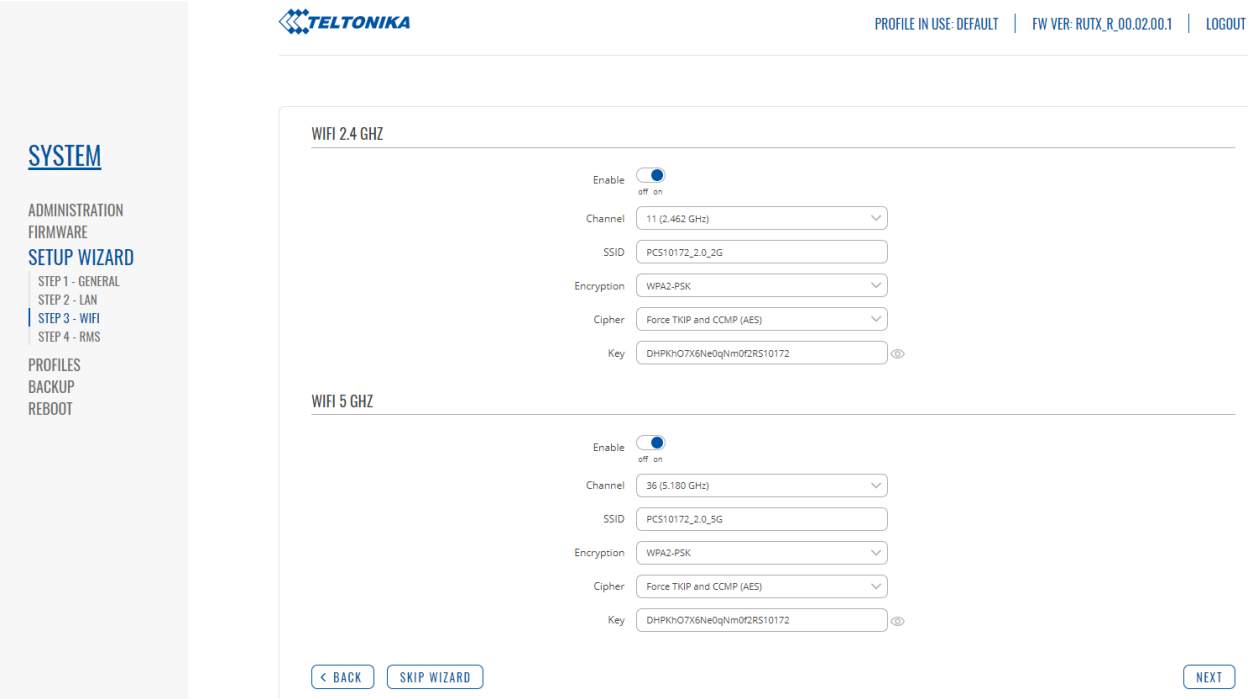


Fig. 3: **Wi-Fi menu**

Important: The wifi SSID is: “PCS” + <PCS serial number> + “_2.0_” + <”2G” for 2.4GHz frequency and 5G for “5GHz” frequency>. Example: PCS10172_2.0_2G.

Important: The wifi password is: “DHPKhO7X6Ne0qNm0f2RS” + <PCS serial number>. Example: DHPKhO7X6Ne0qNm0f2RS10172. User can change it if wished.

CHAPTER

SIX

MAINTENANCE

After installation, maintenance must be performed according to the present manual.

To facilitate this work whereby are described the procedures and methods. The maintenance manual of the **PCS** Control Station is divided in two parts: preventive and corrective maintenance.

6.1 Preventive Maintenance

Preventive maintenance is required to ensure the optimal working state for the platform.

Post-flight

1. Switch off the system by pressing the button for 2 seconds (until the blue light turns off).
2. Check all connectors, in case of abnormality or damage, please contact us for replacement: support@embention.com.
3. Attach all protection cups to all connectors in order to keep them free of dust.
4. Store the system in the supplied rugged case.
5. It is a good praxis to clean all connectors with a good contact cleaner after working in adverse conditions.

6.2 Corrective Maintenance

Battery

If battery needs to be replaced you can ask us (support@embention.com) for a replacement or buy directly to the supplier (AIRBATT Energiepower, internal number 8000910).

Battery replacement will void warranty, please contact Embention first.

To extract the battery please follow next steps:

1. Remove the 4 screws and open the device

Fig. 1: **Remove screws and cups**

2. Unscrew the 4 screws with a 2mm allen crew driver and remove the protective plate.

Fig. 2: **Remove screws and protective plate**

3. Unscrew the 2 screws with a 2mm allen screw driver and remove the battery holder bar.

Fig. 3: **Remove screws and battery holder bar**

4. Now the battery can be replaced. Please take care with the polarity. The possitive cable is red marked.
5. To close the device make the same steps in a reverse way. Use **Loctite 243** to fix all screws and apply 1 Nm torque.

CHAPTER

SEVEN

INTEGRATION EXAMPLES

7.1 External Radios Included with PCS

Each **PCS** variant includes an external radio; then **PCS** requires to configure the *autopilot* and the *radio itself*.

7.1.1 Radio Configuration

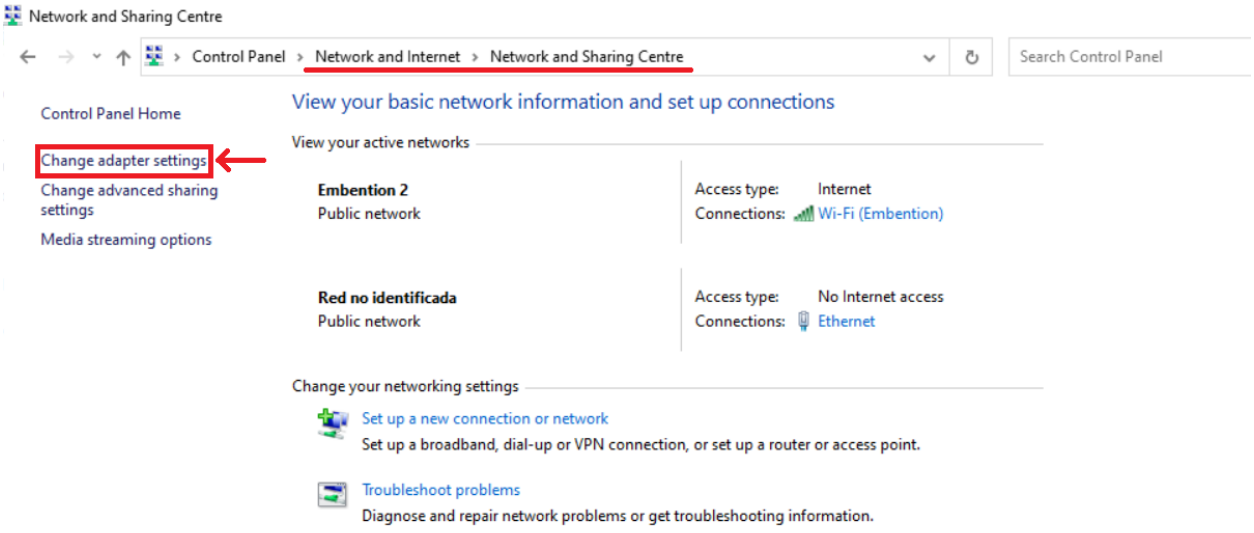
MH radio

1. Connect the computer to the ethernet cable.
2. Open a browser and introduce the following address on the search bar: 192.168.8.4.

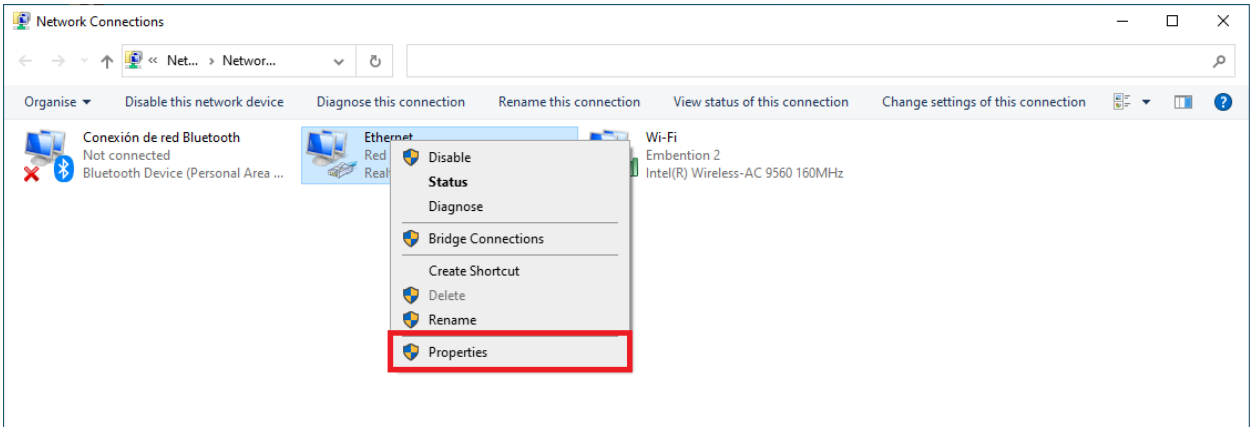
DTC radio

1. Connect the computer to the ethernet cable.
2. Make sure computer is set to static IP address on same subnet as radio. The following substeps clarify how to set the IP adress:

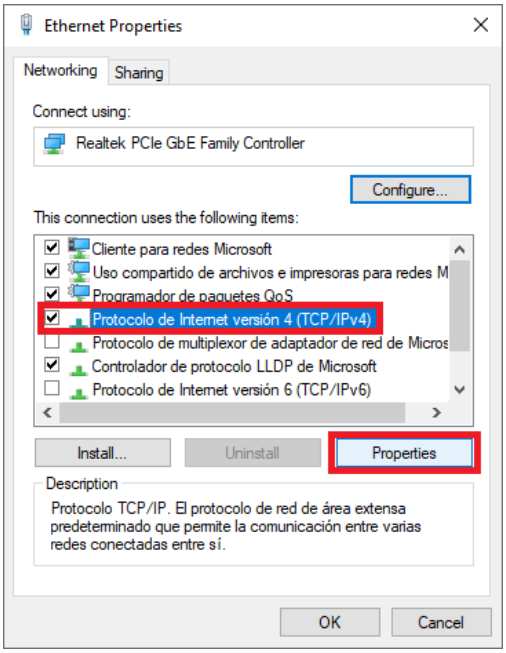
   2.1. Open **Network and sharing centre** and click **Change adapter settings**.



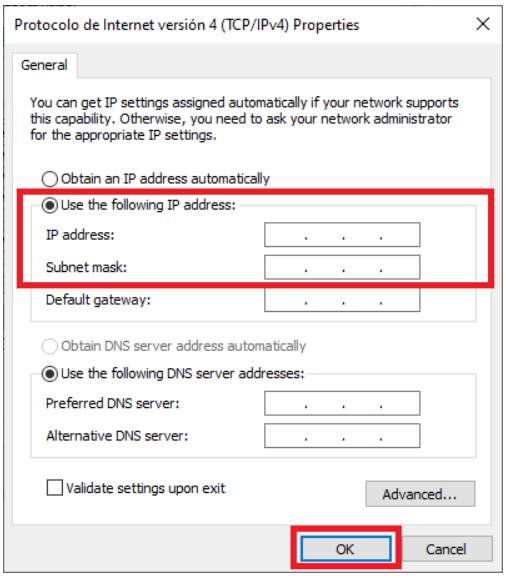
   2.2 Select **Local Area Connection**, right click, and select **Properties**.



2.3 Select **IPv4** and click **Properties**.



2.4 Set IP address to 192.168.8.XX; where XX is lower than 266, different of 95, 96 and every devices in the same subnet. Set the Subnet mask to 255.255.0.0 and Click **OK**.



3. Open a browser and introduce the radio address on the search bar 192.168.8.95.

7.1.2 Autopilot Configuration

- `Software version 6.4 or lower`

Read the Veronte LOS section of the **Veronte Autopilot** user manual.

- `Software version 6.8 or higher`

Read the External radios section of the **1x PDI Builder** user manual.

7.2 Internal Radio Configuration

This section is written for PCS that use the internal radio of the autopilot.

- `Software version 6.4 or lower`

Read the Radio Pairing section of the **Veronte Autopilot** manual.

- `Software version 6.8 or higher`

Read the Digi Internal Radio section of the **1x PDI Builder manual** manual.

7.3 Silvus radio (StreamCaster 4200E model)

7.3.1 System Layout

The following image shows the standard connection between Silvus radios and the PCS for operation:

Fig. 1: **Silvus and PCS connection**

7.3.2 Hardware Installation

A wiring configuration of the PRI cable connected to the PRI port of the radio is required in order to connect it to the connector of the Expansion bay and the ethernet connector of the PCS.

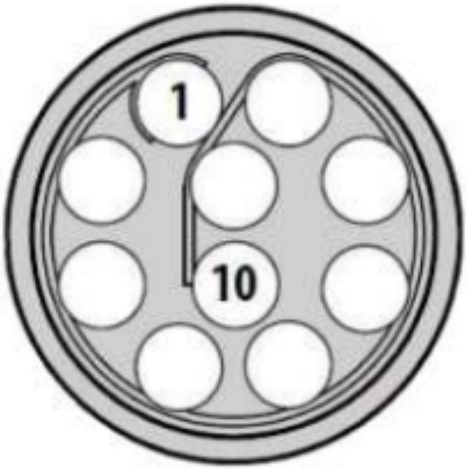


Fig. 2: **PRI port connector (mounted in radio)**

For the Expansion bay connector, the pinout is shown below:

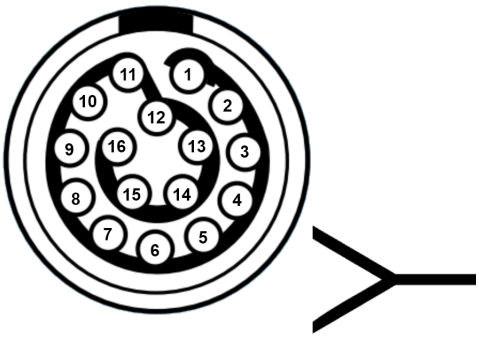


Fig. 3: **Expansion Bay Connector**

- RS-232 and power supply

PRI port connector - Silvus radio		Expansion bay connector - PCS	
PIN Nº	Signal	PIN Nº	Signal
2	GND IN	6	GND
3	VCC IN	5	12V (Output)
7	RS232_RXD	14	RS232-TX
8	RS232_TXD	16	RS232-RX
9	GND	2	GND

Warning: RS-232 pins are common with the external pinnout of the PCS.

- Ethernet

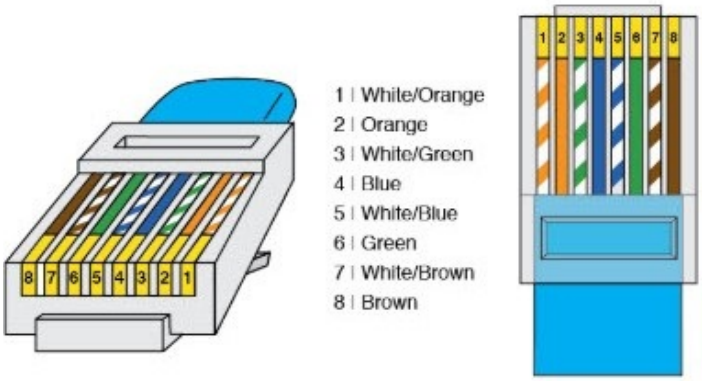


Fig. 4: **RJ45 pinout T-568B**

PRI port connector - Silvus radio		RJ45 Connector (T-568B)		
PIN Nº	Signal	PIN Nº	Signal	Color
4	ETH0_MX2N (RX-)	6	RX-	Green
5	ETH0_MX2P (RX+)	3	RX+	Green-White
6	ETH0_MX1P (TX+)	1	TX+	Orange-White
10	ETH0_MX1N (TX-)	2	TX-	Orange

7.3.3 Silvus radio configuration

To know how to do a basic configuration of the Silvus radio click on:

- `Hardware version 4.5 or lower:` Silvus Radio Configuration section of the **Veronte Autopilot** user manual.
- `Hardware version 4.8:` Silvus Radio Configuration section of the **1x Hardware Manual**.

However, an additional configuration is required when working with a PCS instead of the GND unit of 1xVeronte autopilot.

- Networking. LAN Settings

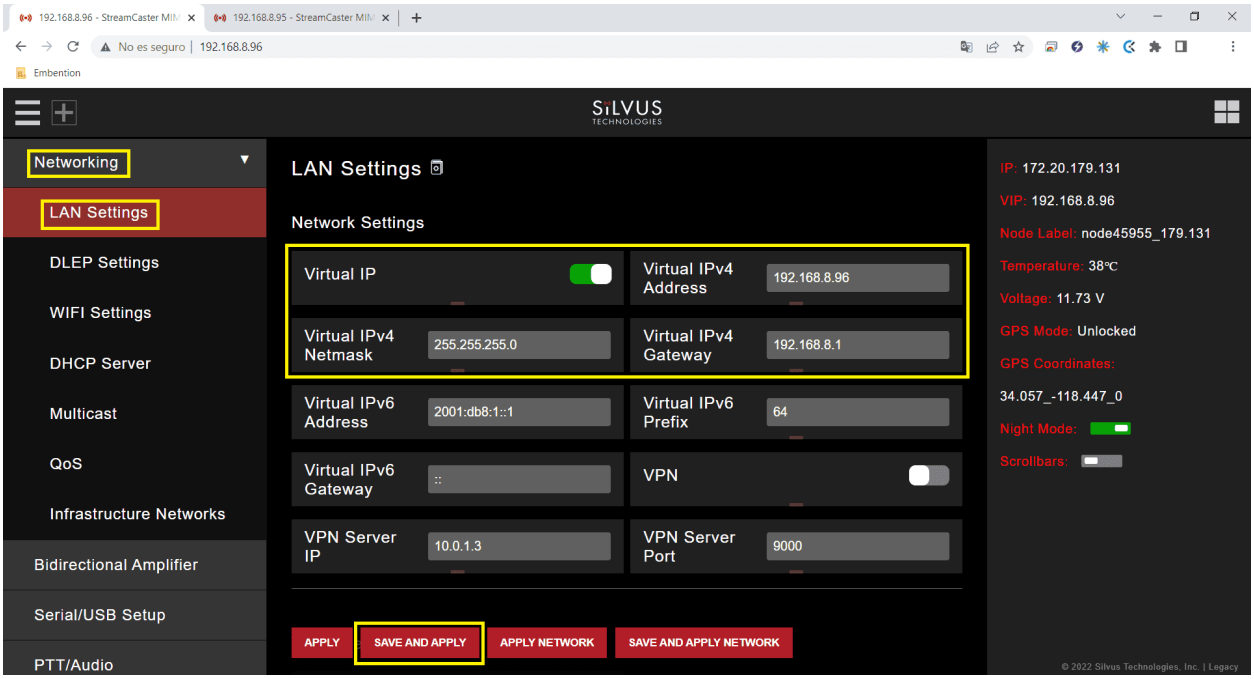


Fig. 5: **LAN Settings panel air unit**

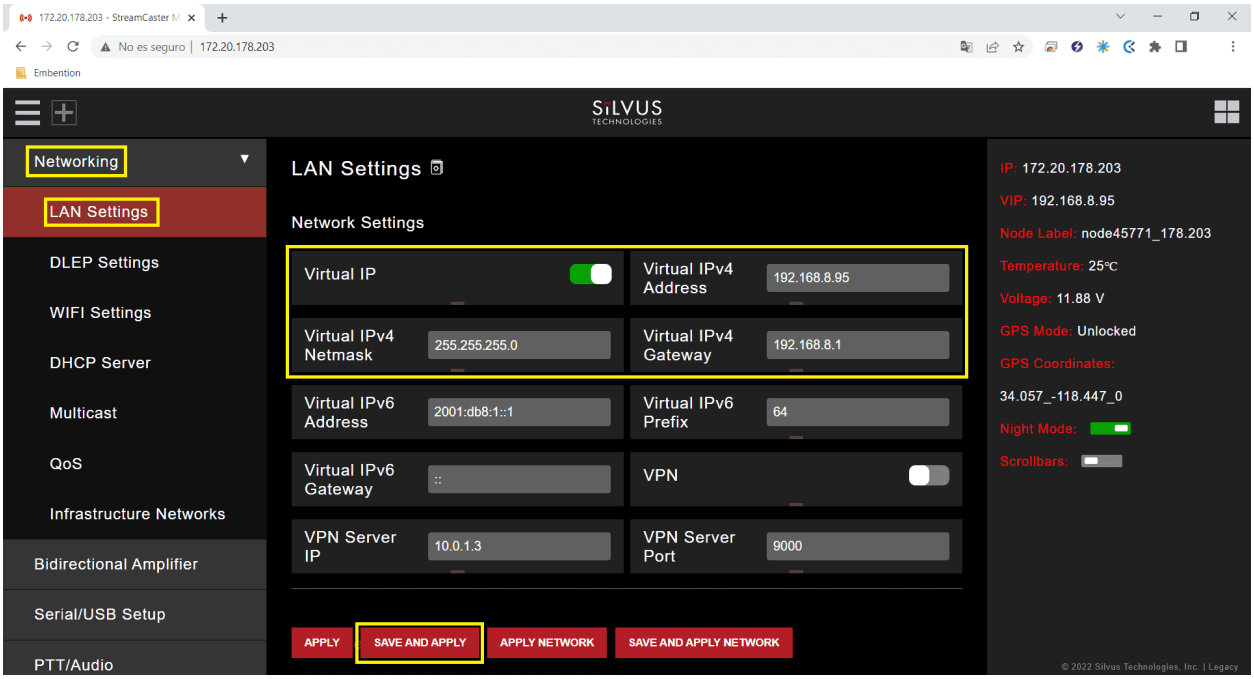


Fig. 6: **LAN Settings panel PCS**

- **Virtual IP**: Enable or Disable the Secondary IP address for the radio. **Enable**
- **Virtual IPv4 Address**: Set the secondary IP address for the radio. The user can set any IP address, we have chosen 192.168.96 for the radio connected to the air unit and 192.168.95 for the radio linked to the PCS.
- **Virtual IPv4 Netmask**: Netmask for the Secondary IP address, e.g. 255.255.255.0.
- **Virtual IPv4 Gateway**: Gateway for local network to allow radio to connect to the internet. **192.168.8.1** is set because it is the IP address of the PCS router.

7.3.4 Silvus radio configuracion on PC

To be able to access the StreamScape GUI of the radios once connected to the PCS, check that the **Network & Internet settings** of the PC are as shown in the following screenshots.

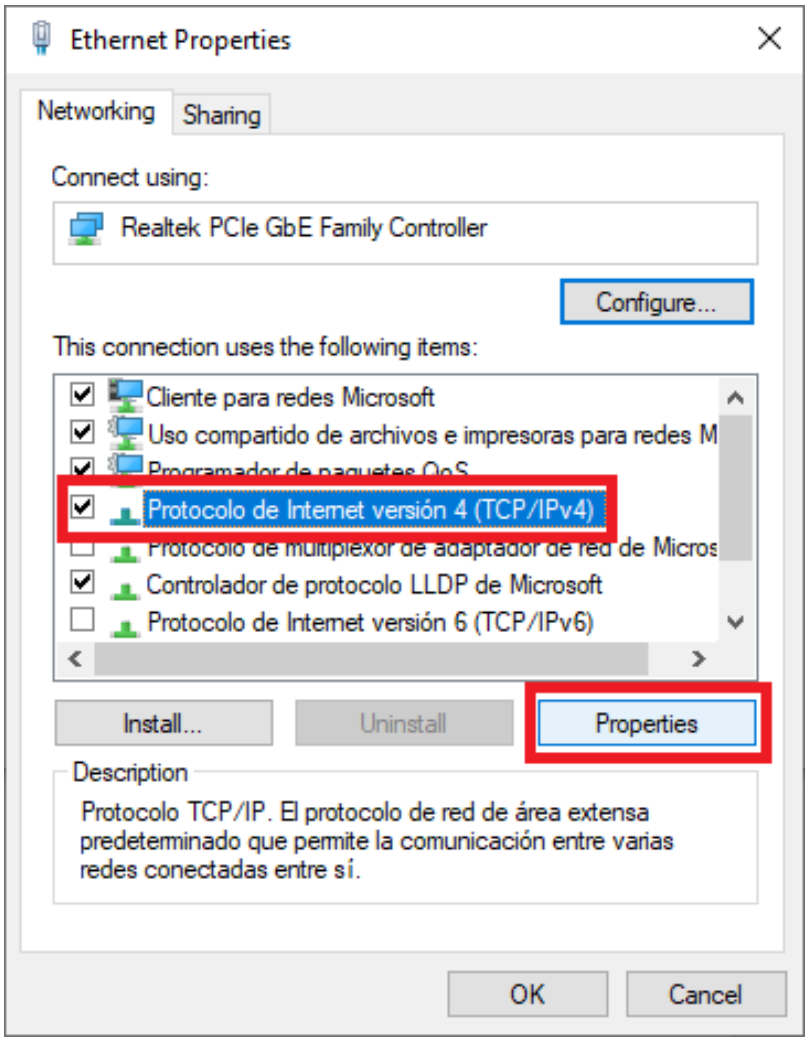


Fig. 7: **Ethernet settings 1**

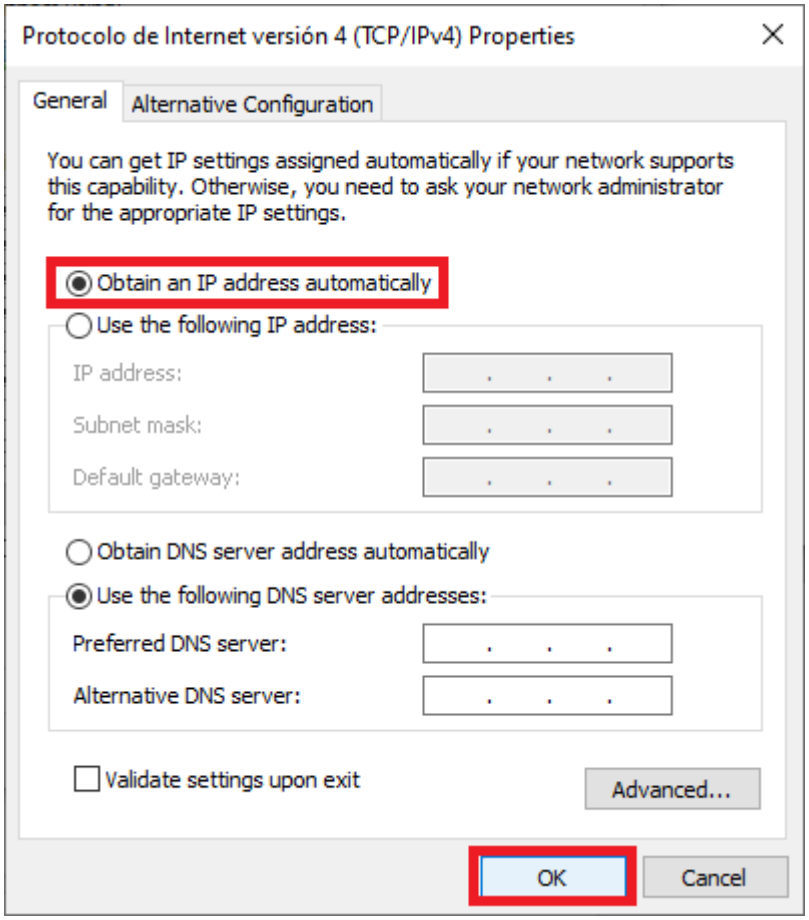


Fig. 8: **Ethernet settings 2**

Note: This configuration is the same whether the PCS is connected via wifi or ethernet.

7.3.5 Silvus radio configuration in autopilot

- `Software version 6.4 or lower`

Read the Silvus Radio Configuration in Veronte Pipe section of **Veronte Autopilot** user manual.

- `Software version 6.8 or higher`

Read the External Radios section of the **1x PDI Builder** user manual.

CHAPTER

EIGHT

TROUBLESHOOTING

Wifi or ethernet not connecting. If the connection is not detected, follow the next instructions:

1. Open cmd and text *ipconfig*. Check that IPv4 Address is 192.168.8.95 for DTC or 192.168.8.4 for MH. Now there exists 2 options: if the IP is ok, ensure to make a total charge of the battery. If the IP is not the same:

- The IP can be reserved for another device which has been connected recently. Wait for 2 minutes to free the IP (disconnect any other device from the PCS that could be interfering).
- If there has not been any other device connected recently, the problem might be related to the adapter, which means a static IP has to be configured. To do that, go to Change Wi-Fi/Ethernet Settings – Change Adapter options and go to Properties in the desired network (in the following picture it is done for Wi-Fi network).

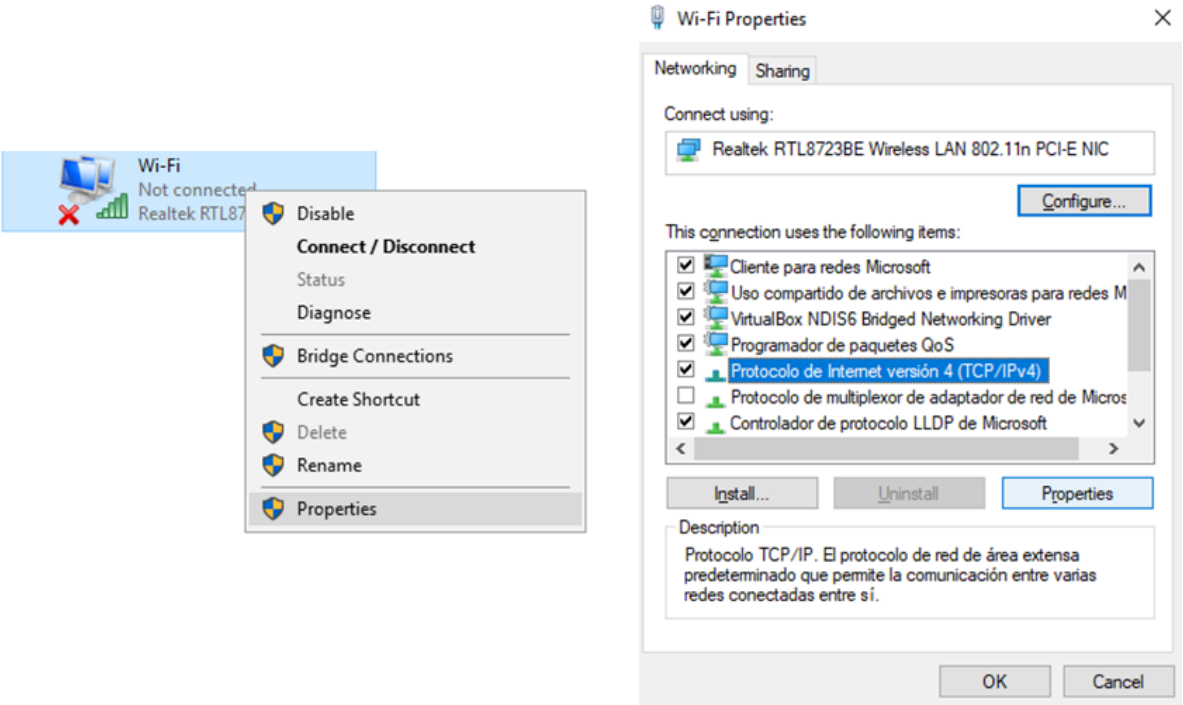


Fig. 1: **How to operate - Wi-Fi/Ethernet Settings**

- Once in Properties, check Protocol IPv4 and again Properties. There, configure the Static IP.

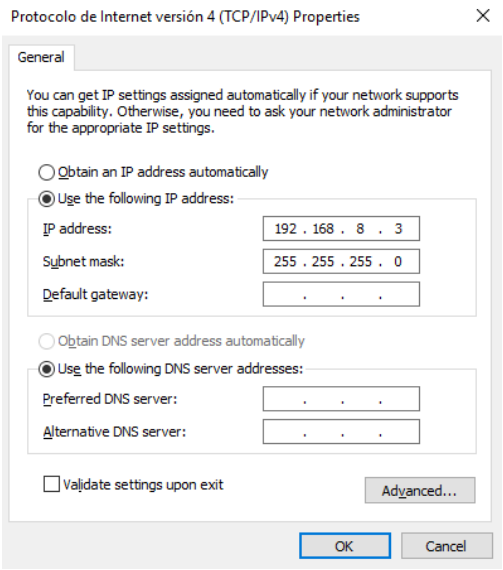


Fig. 2: **Static IP Configuration example**

2. If after all these steps it cannot be configured, send an email to support@embention.com.

CHAPTER

NINE

ACRONYMS AND DEFINITIONS

AC	Alternate Current
ARB	ARBiter signal
CAN	Controller Area Network
DHCP	Dynamic Host Configuration Protocol
DTC	DomoTaCtical company
EQEP	Enhanced Quadrature Encoder Pulse sensor
FTS	Fly Termination System signal
GND	Electrical Ground
GNSS	Global Navigation Satellite System
I2C	Inter-Integrated Circuit bus
LOS	Line of Sight
MCS	Multimedia Control Station
MH	MicroHard company
PCS	Pole Control Staton
PWM	Pulse Width Modulation signal
RF	Radio Frequency
RS-232	Recommended Standard 232
RS-485	Recommended Standard 485
RTK	Real Time Kinematic
SBUS	Serial BUS
TC	Telecommunications
TM	Telemetry
VCC	Votage Continuous Current
Veronte BCS	Veronte Basic Control Station

CHAPTER

TEN

CONTACT DATA

You can contact Embention if you need further help and support.

Embention contact data is as follows:

Email: support@embention.com

Telephone: (+34) 965 421 115

Address: Polígono Industrial Las Atalayas, C/ Chelín, Nº 16, CP 03114, Alicante (España).