PCS Hardware Manual

Release 2.1

Embention

2025-02-11

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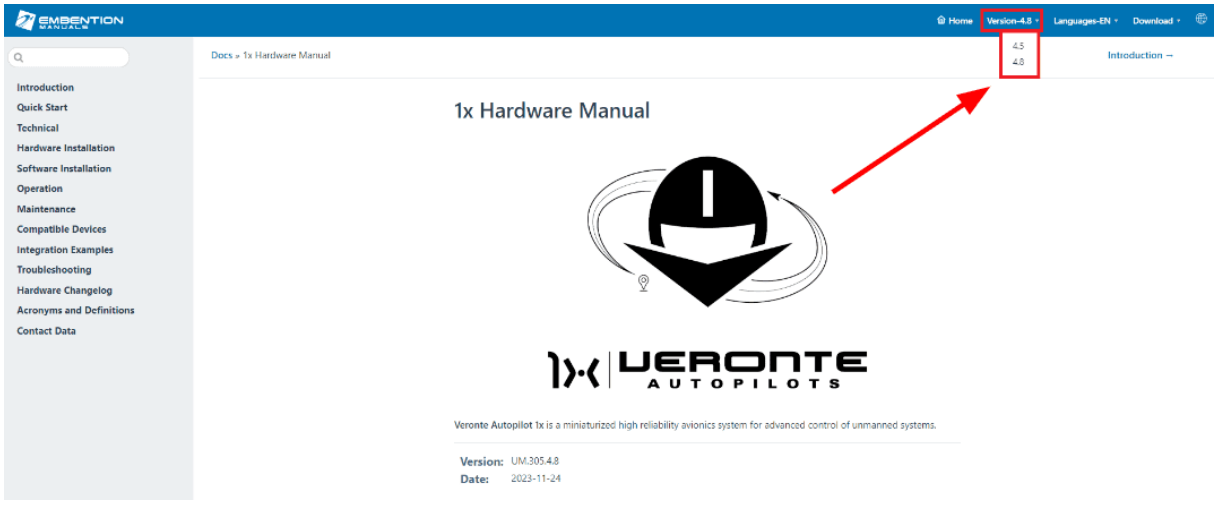
PCS | VERONTE CONTROL STATIONS

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

Fig. 1: **Veronte PCS**

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 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 Autopilot 1x** includes all sensors needed for professional drone operations, enabling RTK, differential barometer, operations from moving vehicles, relative missions…

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

Fig. 2: **Rugged plastic case**

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:

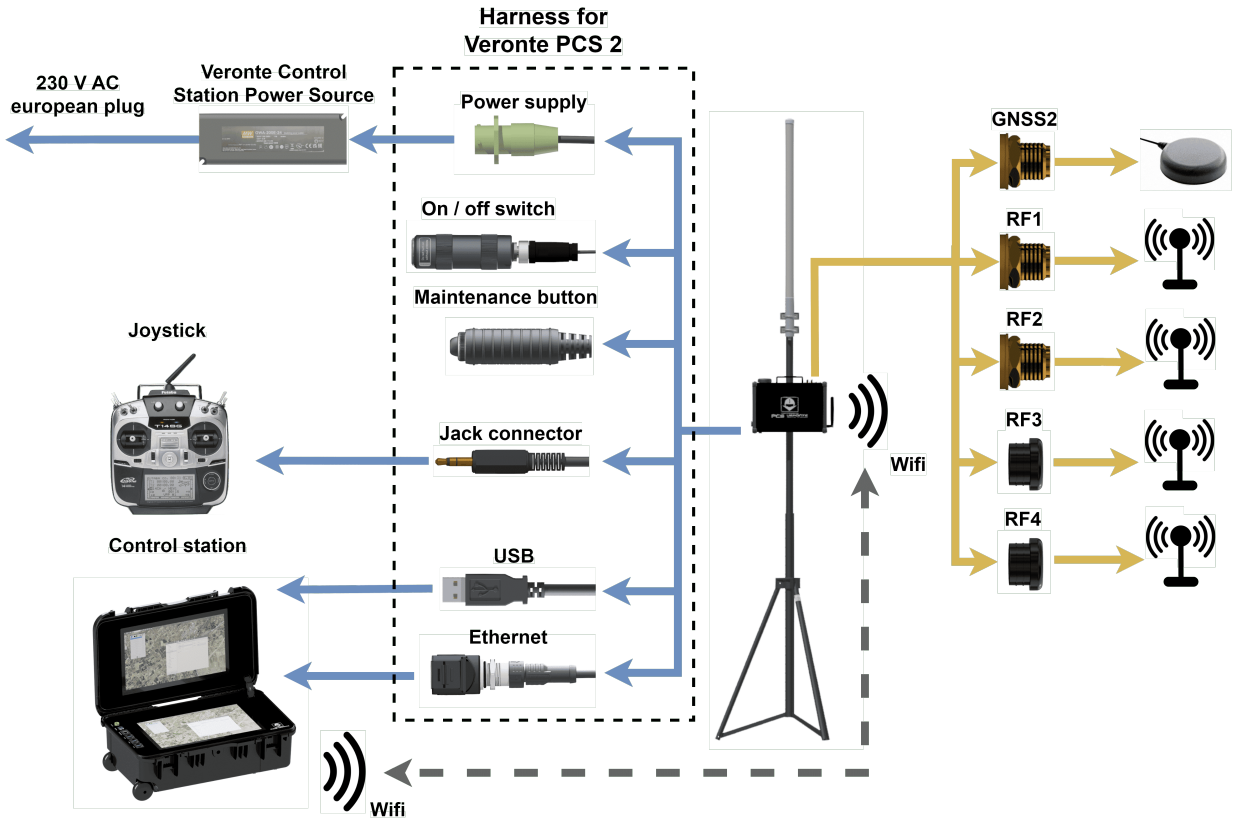
- Mapping and photogrammetry.
- Surveillance.
- Environmental control and research.
- Firefighting.

CHAPTER

TWO

QUICK START

2.1 Basic Connection Diagram



SMA Connections table					
Radio modem	**RF1**	**RF2**	**RF3**	**RF4**	**GNSS2**
No modem	Internal Digi radio of **Autopilot 1x**	NC	NC	NC	Second antenna for GNSS
DTC		Channel A of modem output (amplified)	Channel B of modem output (not amplified)	NC	
Silvus		Channel A1 of modem output	Channel A1 of modem output	Channel A2 of modem output	
Microhard		Modem output (amplified)	NC	NC	
SDL04		Modem output (not amplified)	NC	NC	
SDL09 or SDL24		Modem output (amplified if amplifier module is used)	NC	NC	

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 with a different power supply. It will damage the system.

2.3 Warnings

- Each pin of the **expansion bay connector** (the connector with 16 pins) has a current limit of **4 A**; except for pin 8 which has **2 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.
- **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 Autopilot 1x** 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.
- **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.

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

2.3.1 Antennas

- Users **must not power on a PCS** without **a suitable antenna** or **50 Ω load** connected to the RF port.

Danger: This may damage the PCS unit.

- Guarantee that no obstacles will interrupt LOS communications.
- Keep the **PCS** in a position where the GPS antenna is facing to the open sky for better satellite view.

- Operators should not stand or walk in front of any high gain antenna such as dish antennas, nor should they allow anyone else to do so.
- Operators should not operate an RF transmitter or power amplifier with any of its cover removed, nor should they allow anyone else to do so.
- At 2.4 GHz, operators should keep the minimum distances of the following table:

Antenna			Minimum safe distance (m) for transmitter powers				
Type	**Gain (dBi)**	**Gain Ratio**	**1 W**	**2 W**	**4 W**	**10 W**	**30 W**
Omni	3	2	0.4	0.6	0.8	1.3	2.2
Sector	20	100	2.9	4	5.6	9	15.5
Parabolic dish	35	3162	16	22.5	32	50	87

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 Part list

The system consists of a multiple components listed below.

- **Veronte PCS** Control Station Unit.
- Pole and wall mounting accessories.
- Foldable mast.
- Connection harness.
- Veronte Control station power source (euro plug). This power supply is worldwide compatible if the power cable is changed.
- 5 m ethernet extension cable.
- 5 m USB A extension cable.
- 5 m joystick extension cable.
- Rugged transport case.
- Omnidirectional antenna - 2.4G Hz and 3.2d Bi.
- Datalink (not always, depending on variant).
- Amplifier (not always, depending on variant).
- Cable power extension connector - 5m - Amphenol 6P.

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

3.3 Electrical Specifications

PCS DC input	14 to 24 VDC
PCS power	30 W to 80 W (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	RS-232, CAN and Ethernet. Each pin has a current limit of 4 A; except for pin 8 which has 2 A
External I/O	1x USB, 2x CAN ports, Ethernet, 16x PWM, PPM, 4x ADCs and 1x I2C
Expansion bay power outputs	3.3 V / 5 A, 5 V / 5 A, 12 V / 5 A and 24 V / 5 A

3.4 Mechanical Specifications

PCS Weight	5.7 kg max
PCS + Pole Weight	10.2 kg max
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

3.5 Dimensions

Below you can find a measurements drawing for the PCS.

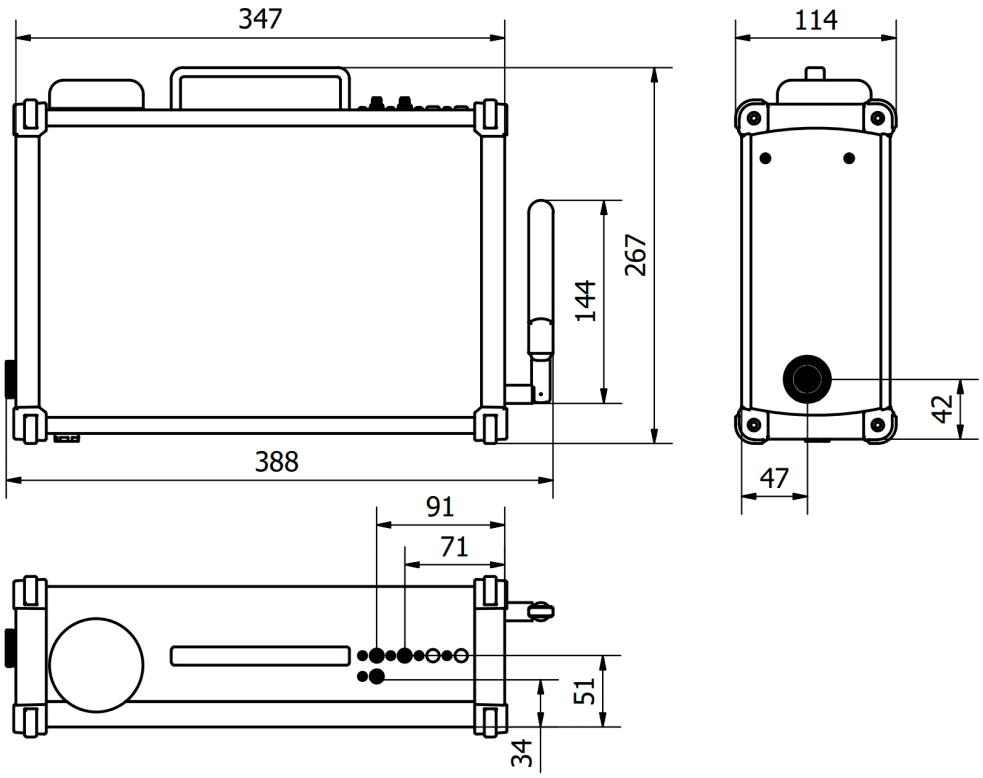


Fig. 1: **Product Components - Interface dimensions**

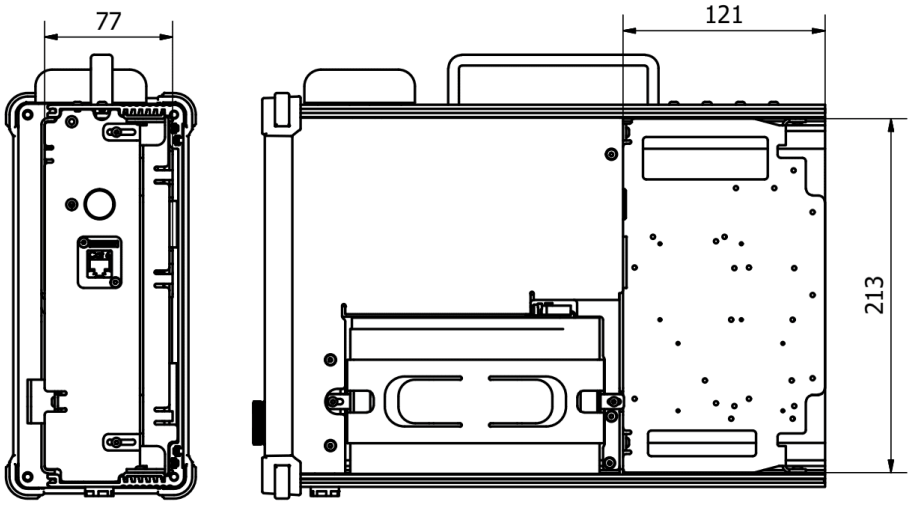


Fig. 2: **Product Components - Bay dimensions**

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.

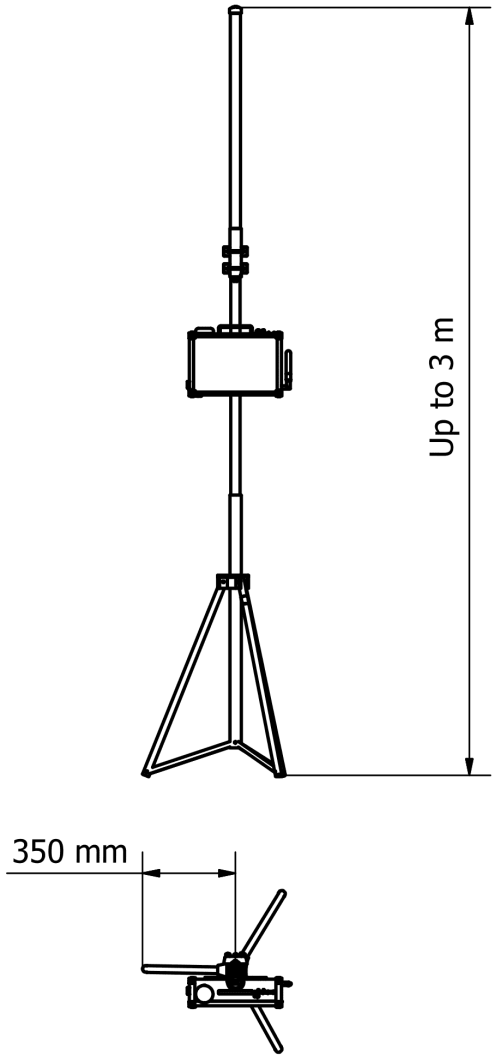


Fig. 3: **System Dimensions**

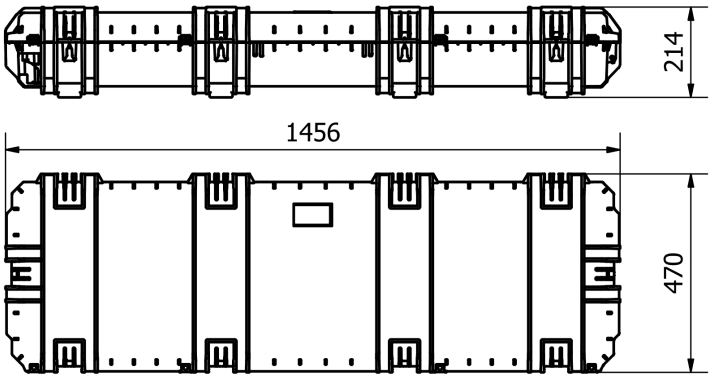
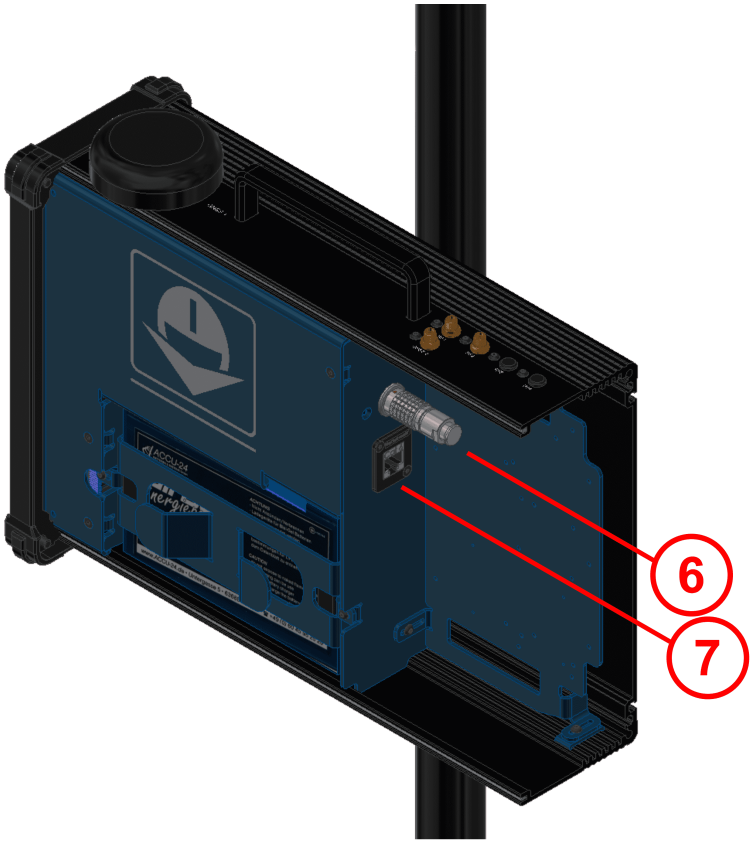


Fig. 4: **Case Dimensions**

3.6 Interfaces

ID	Items
1	Integrated GNSS antenna
2	SMA connectors, see *SMA Connections table* to know what they are connected to
3	Wifi antenna connector (SMA female RP)

4	PCS Harness connector
5	Automatic pressure purge



6	Connector for Expansion Bay
7	Ethernet connector

3.6.1 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
Hold button	Maintenance mode button
Power source	24 VDC input

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

3.6.2 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**.

3.6.3 Mating connectors to PCS harness

The Embention reference for the PCS Harness is **P007696 B000885**.

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

3.7 Antenna Integration

The system uses different kinds of antenna to operate, they must be installed on the airframe. Here you can find some advice for obtaining the best performance and for avoiding antenna interferences.

- **Recommended specifications for GNSS antennas**

Specifications	Range
Antenna frequency L1	1561.098 MHz to 1602 MHz
Antenna frequency L2	1207.14 MHz to 1246 MHz
Amplifier gain	17 dB to 35 dB
Out-of-band rejection	40 dB **Note:** Higher values are preferable. 30dB is considered the minimum acceptable value.
Polarization	RHCP (Right-Hand Circular Polarization)
Minimum supply voltage	2.7 V to 3.3 V
Maximum supply current	50 mA

3.8 Datalink Kits

Embention offers different Datalink kits to add a radio modem to the **PCS**. They are available with different device configurations in order to fit all operational requirements from each application. Each Datalink Kit variant is described below. To know how to install and configure each radio, read *Datalink Kit Installation and Configuration* section of this manual.

Veronte Control Stations: PCS Datalink	Part number	Radio modem	Frequency	Amplifier	RF Power	Video	Antenna datasheets
Kit A (SDL24 2.4GHz - 1W - TM/TC) 1.0	P008019	Veronte SDL24	2.4 GHz	No	1 W	No	HG2415U-PRO
Kit B (SDL09 900MHz - 1W - TM/TC) 1.0	P008021	Veronte SDL09	900 MHz	No	1 W	No	FG9023
Kit C (SDL04 400MHz - 1W - TM/TC) 1.0	P008023	Veronte SDL04	400 MHz	No	2 W	No	BC70-1G
Kit D (DT 2.4GHz - 5W - Video & TM/TC) 1.0	P008015	DTCRA	2.4 GHz	Yes	5 W	Yes	HG2407UP-NF HG2415U-PRO
Kit F (SV 2.4GHz - 4W - Video + TM/TC) 1.0	P008017	Silvus	2.4 GHz	No	4 W	Yes	FG24008
Kit G (SV 2.4Ghz (4W) & 5.8GHz (2W) - Video + TM/TC) 1.0	P008018	Silvus	2.4/5.8 GHz	No	4/2 W	Yes	HGV-2458-05U
Kit H (MH 2.4GHz - 5W - Video & TM/TC) 1.0	P008020	MH2RA	2.4 GHz	Yes	5 W	Yes	HG2415U-PRO
Kit I (MH 900MHz - 10W - Video & TM/TC) 1.0	P008022	MH9RA	900 MHz	Yes	10 W	Yes	HG906U-PRO
Kit J (SDL24 2.4GHz - 10W - TM/TC) 1.0	P009402	Veronte SDL24	2.4 GHz	Yes	10 W	No	HG2415U-PRO
Kit K (SDL09 900MHz - 10W - TM/TC) 1.0	P009403	Veronte SDL09	900 MHz	Yes	10 W	No	FG9023

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:

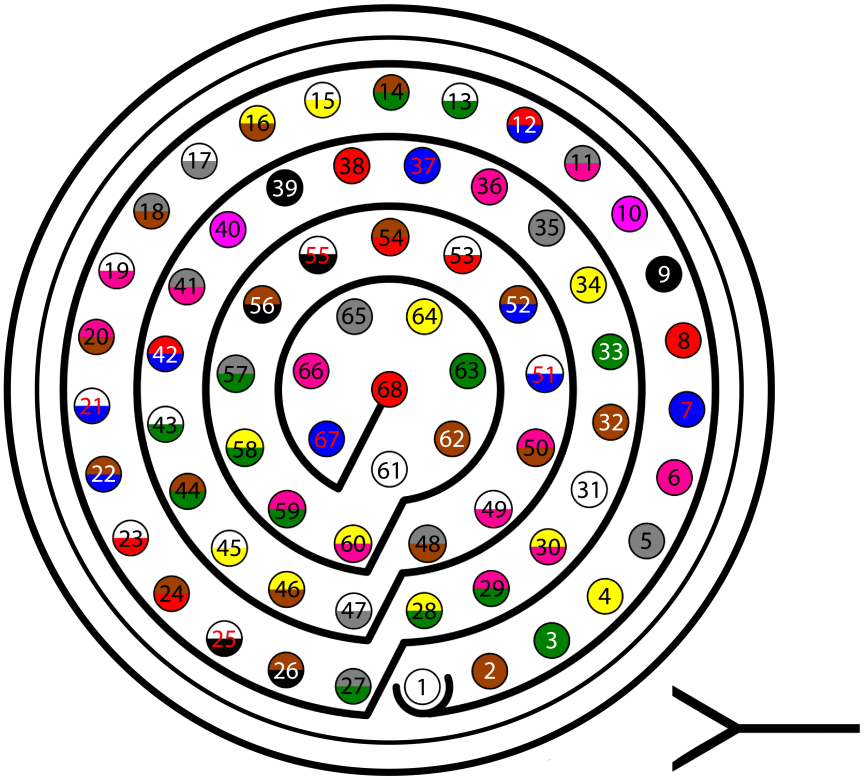


Fig. 1: **PCS Harness connector**

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

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
3	I/O3	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
4	I/O4	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
5	I/O5	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
6	I/O6	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
7	I/O7	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
8	I/O8	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
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
11	I/10	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
12	I/11	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
13	I/12	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
14	I/13	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
15	I/14	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
16	I/15	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
17	I/16	I/O	PWM / Digital I/O signal (0-3.3V). Protected against ESD and short circuit. Maximum
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
20	RS 232 RX	Input	RS 232 Input (-25V to 25V Max, -0.6V Low and 2.4V High Threshold). Protected aga
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 agai
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 resettabl
35	GND	GROUND	Ground for 5V power supply
36	5V	POWER	5V – 100mA power supply. Protected against ESD short circuit with 100mA resettable
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

Table 1 – continued from previous page

Pin	Signal	Type	Comments
50(*)	OUT_RS485_P	Output	**Warning:** RS-485 bus is used by default by the autopilot for ethernet communications (and consequently wifi). Do not connect these pins unless it is asked to support@embention.com.
51(*)	OUT_RS485_N	Output	
52(*)	IN_RS485_N	Input	
53(*)	IN_RS485_P	Input	
54(*)	RS-485_GND	GND	
55(*)	No connect	/	/
56(*)			
57	EQEP_S	I/O	DIGITAL output / DIGITAL input / Encoder strobe input (0-3.3V). Protected against E
58	EQEP_I	I/O	DIGITAL output / DIGITAL input / Encoder index input A (0-3.3V). Protected against
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(*)			
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.
- CANA and CANB buses do not have termination resistor, user should add them based on its own wiring design.

Connector colour code:

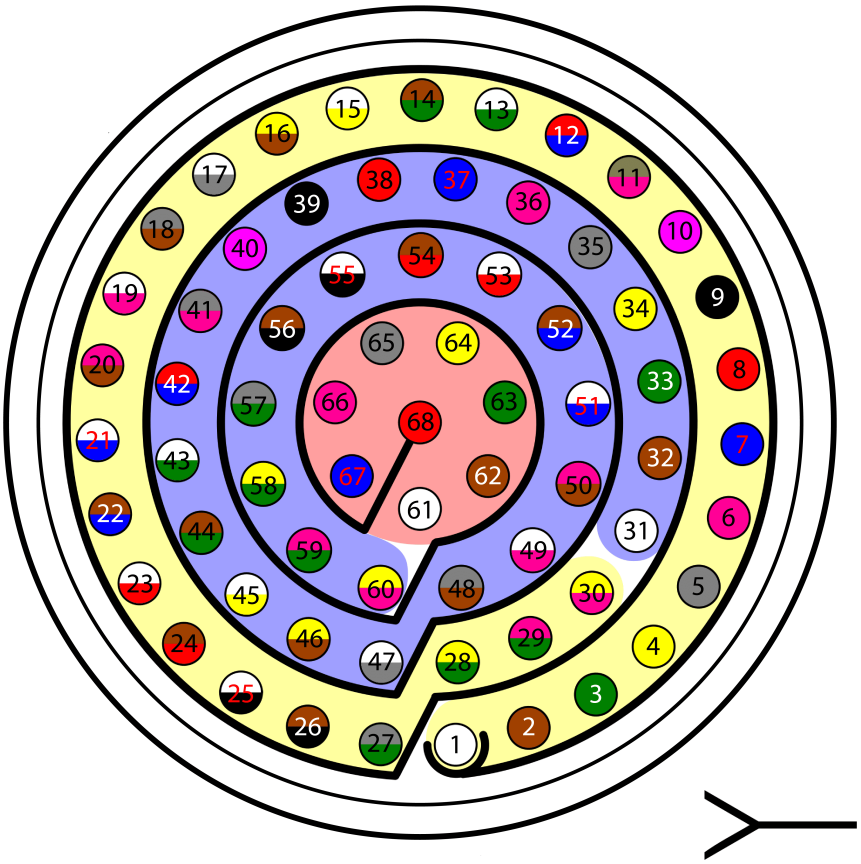


Fig. 2: **Connector HEW.LM.368.XLNP**

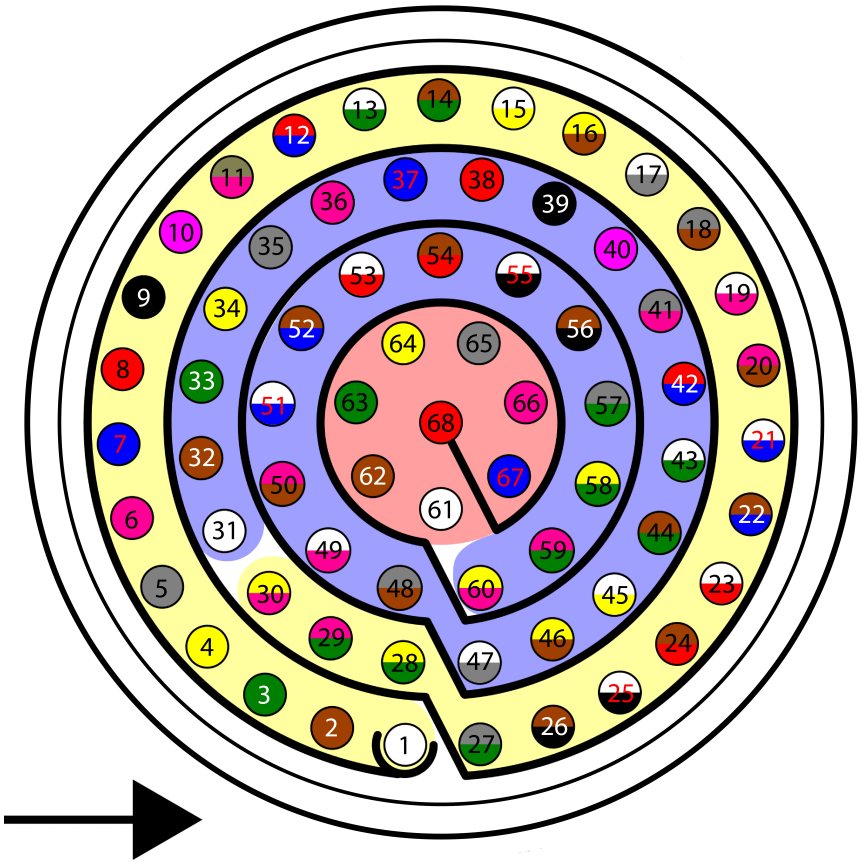


Fig. 3: **Harness plug**

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

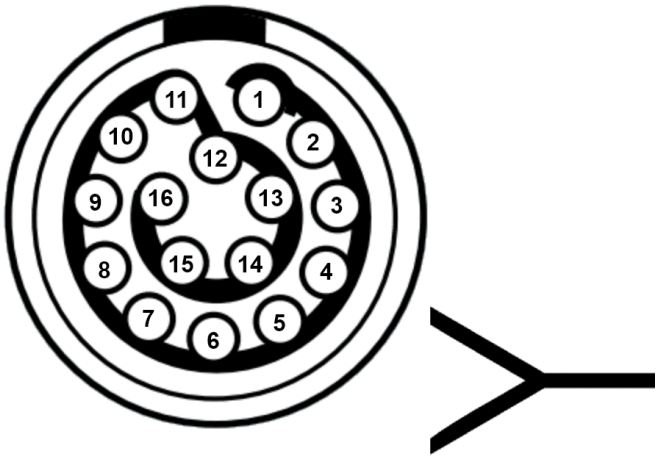


Fig. 4: **Expansion Bay Connector**

PCS Unit - Output pins

Warning: Pin 8 has a different maximum current.

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: 2 A.
9	No connect	/	/
10			
11			
12	PPM	Input	Pin for PPM signal.
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 pinout.

4.2 Mechanical installation

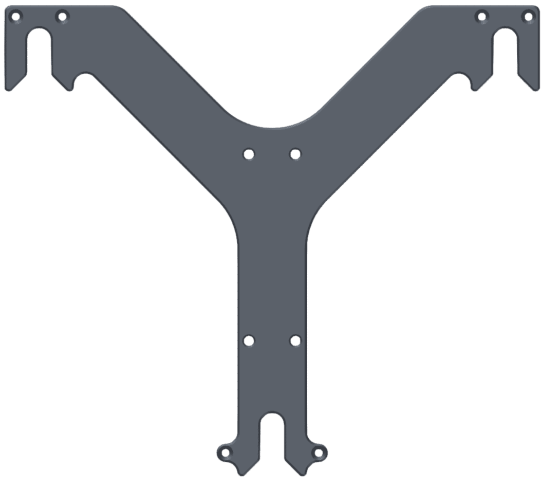
Warning: Do not forget to connect RF antenna before powering up!!!!

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:

Wall Mount:



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 wall mount to the PCS Control Station with M3 allen screw driver.

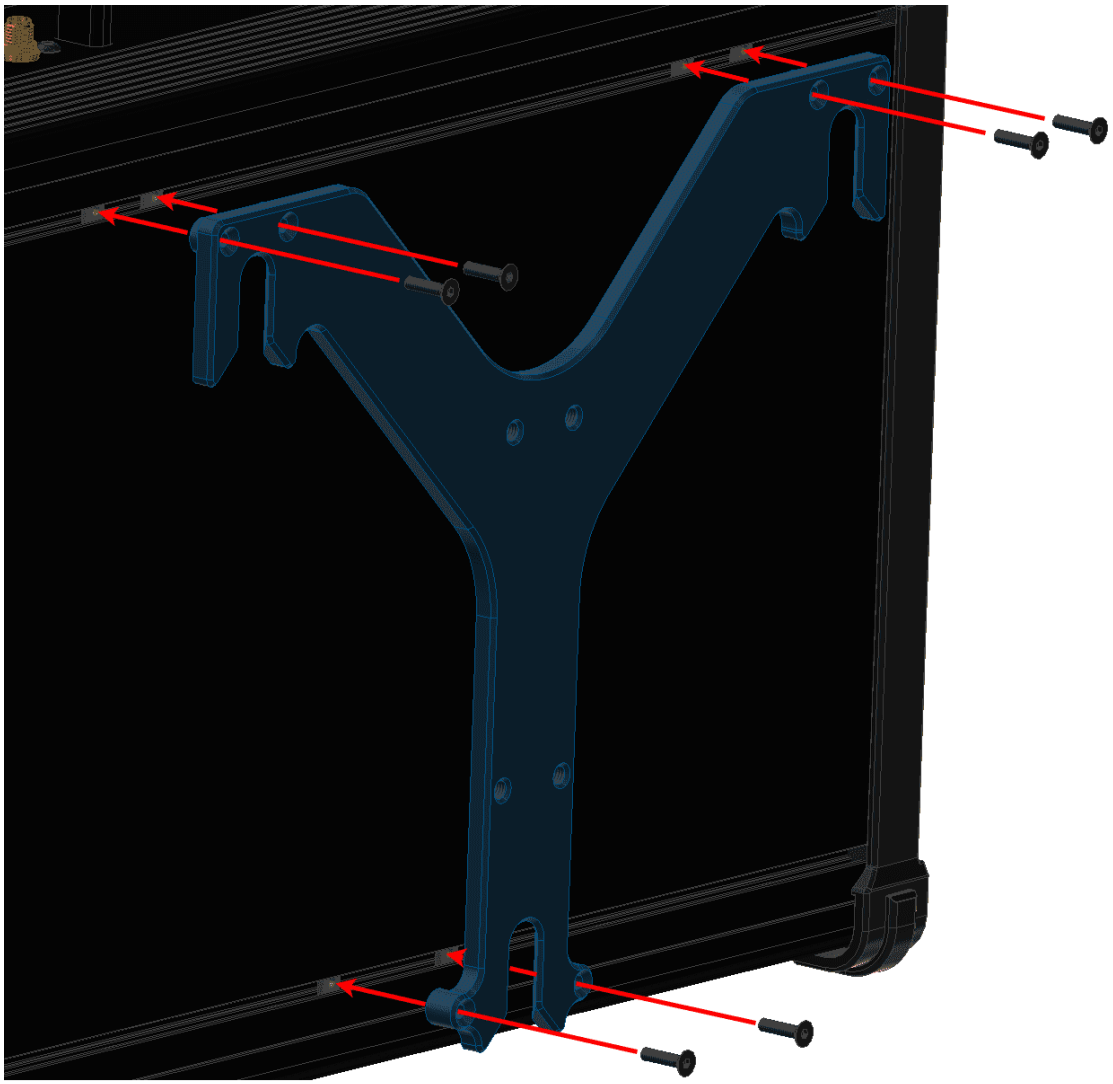


Fig. 5: **Pole mount installation - Step 1**

2. Screw the pole mount against the wall mount with M5 allen screw driver.

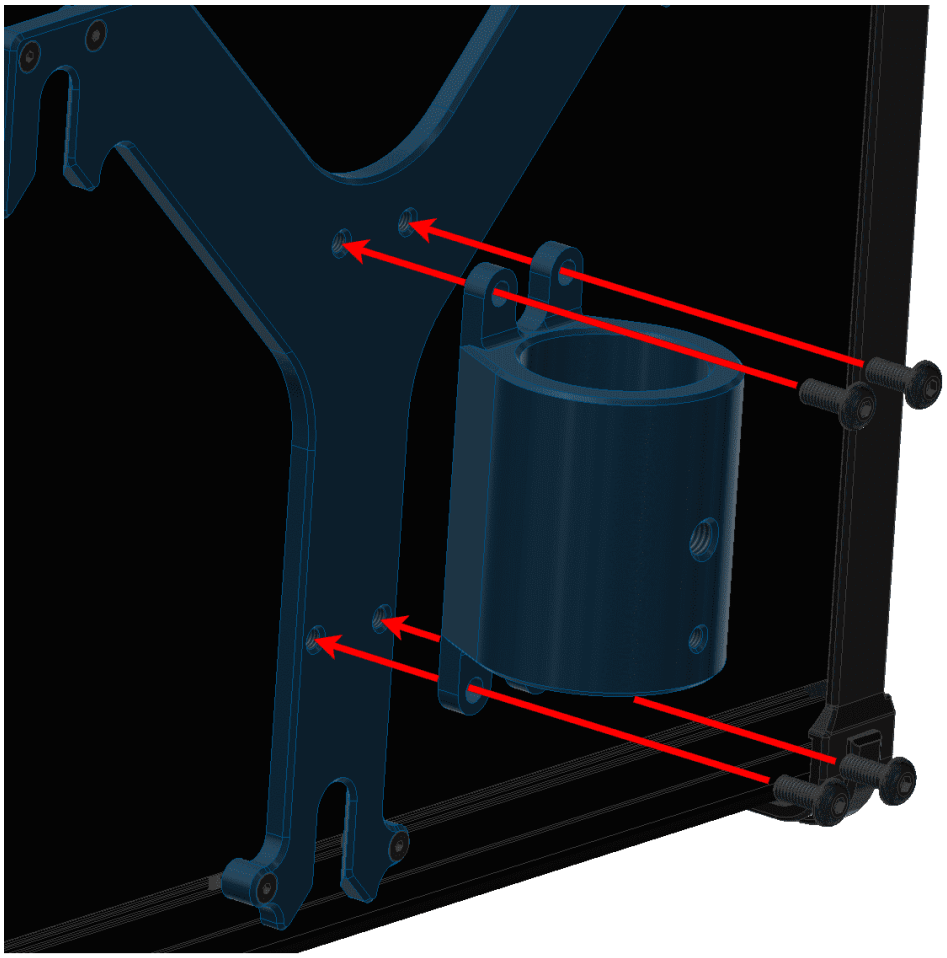


Fig. 6: **Pole mount installation - Step 2**

3. Introduce the pole through the pole mount.

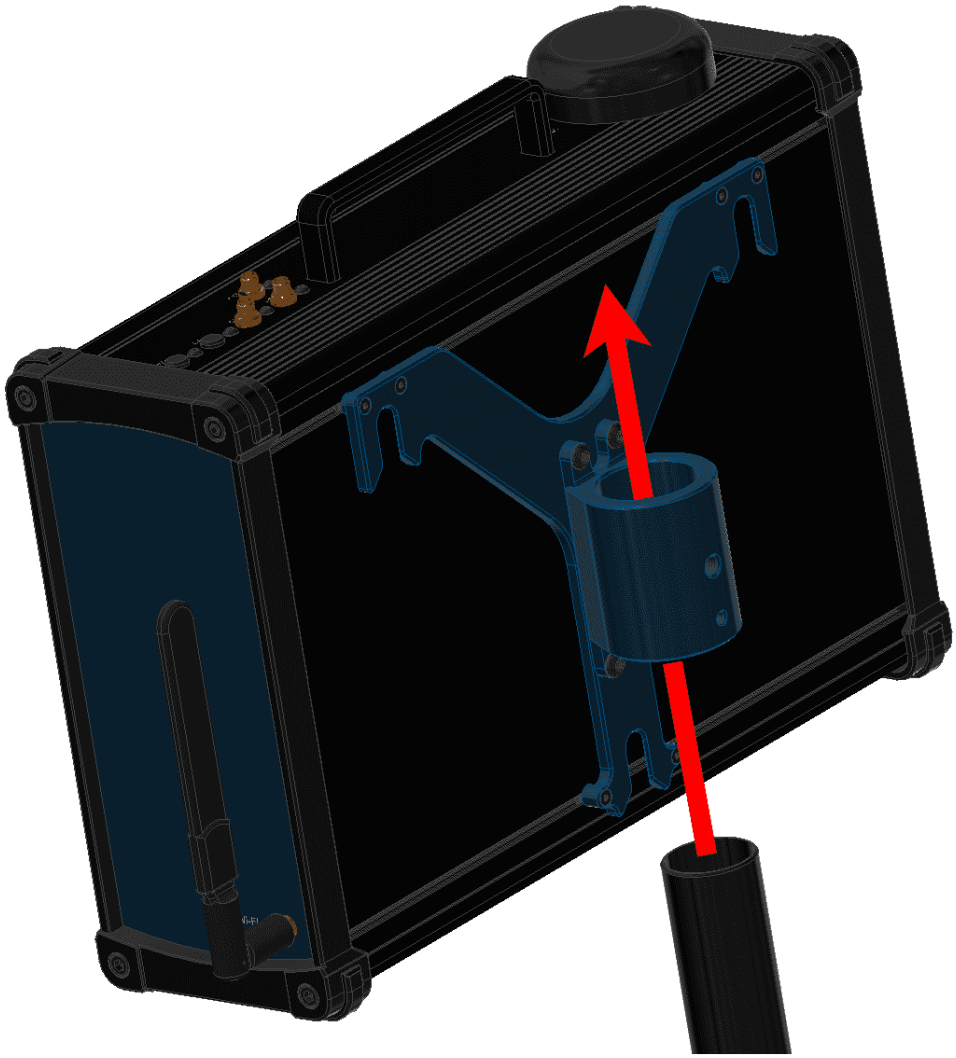


Fig. 7: **Pole mount installation - Step 3**

4. Attach the ball chain to the pole mount with an M5 allen screw.

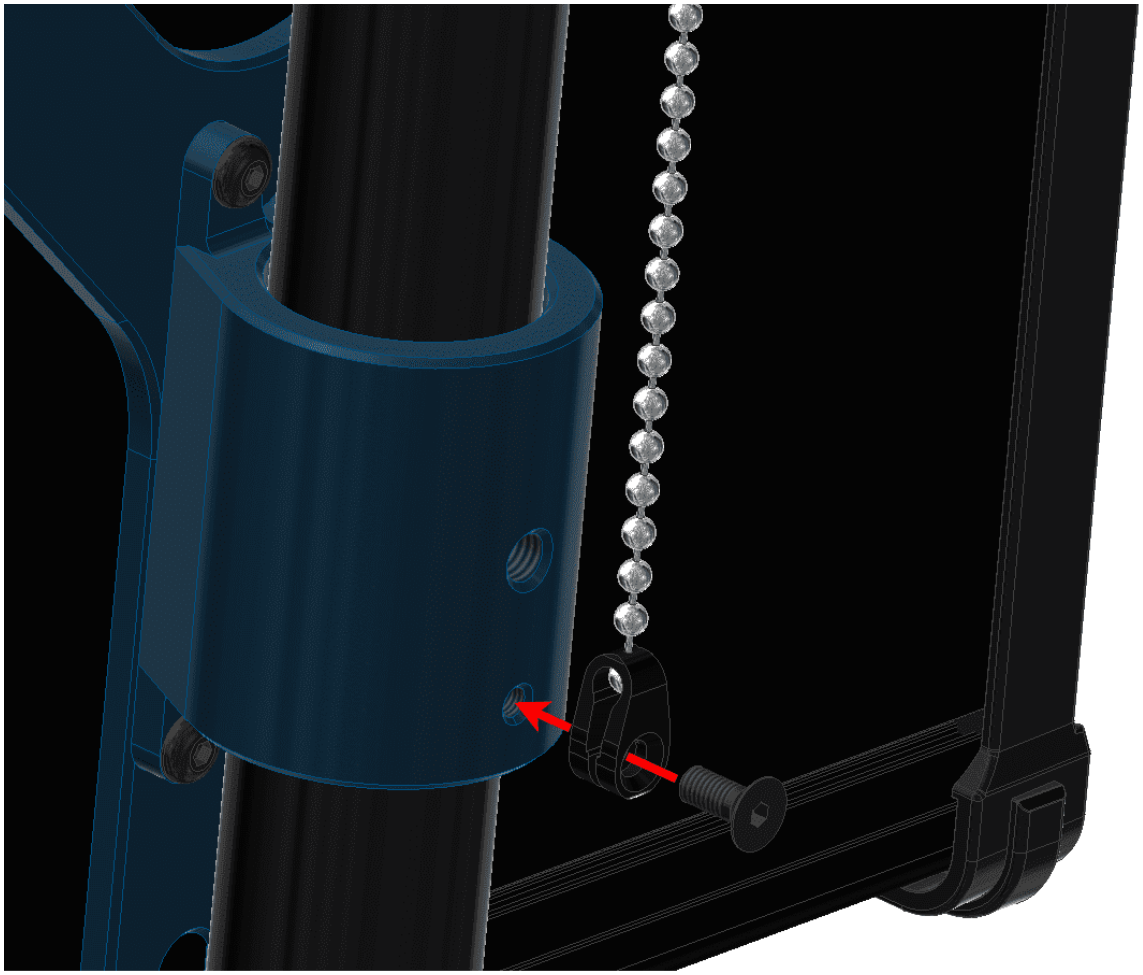


Fig. 8: **Pole mount installation - Step 4**

5. Screw the wing knob against the pole mount to fix the pole.

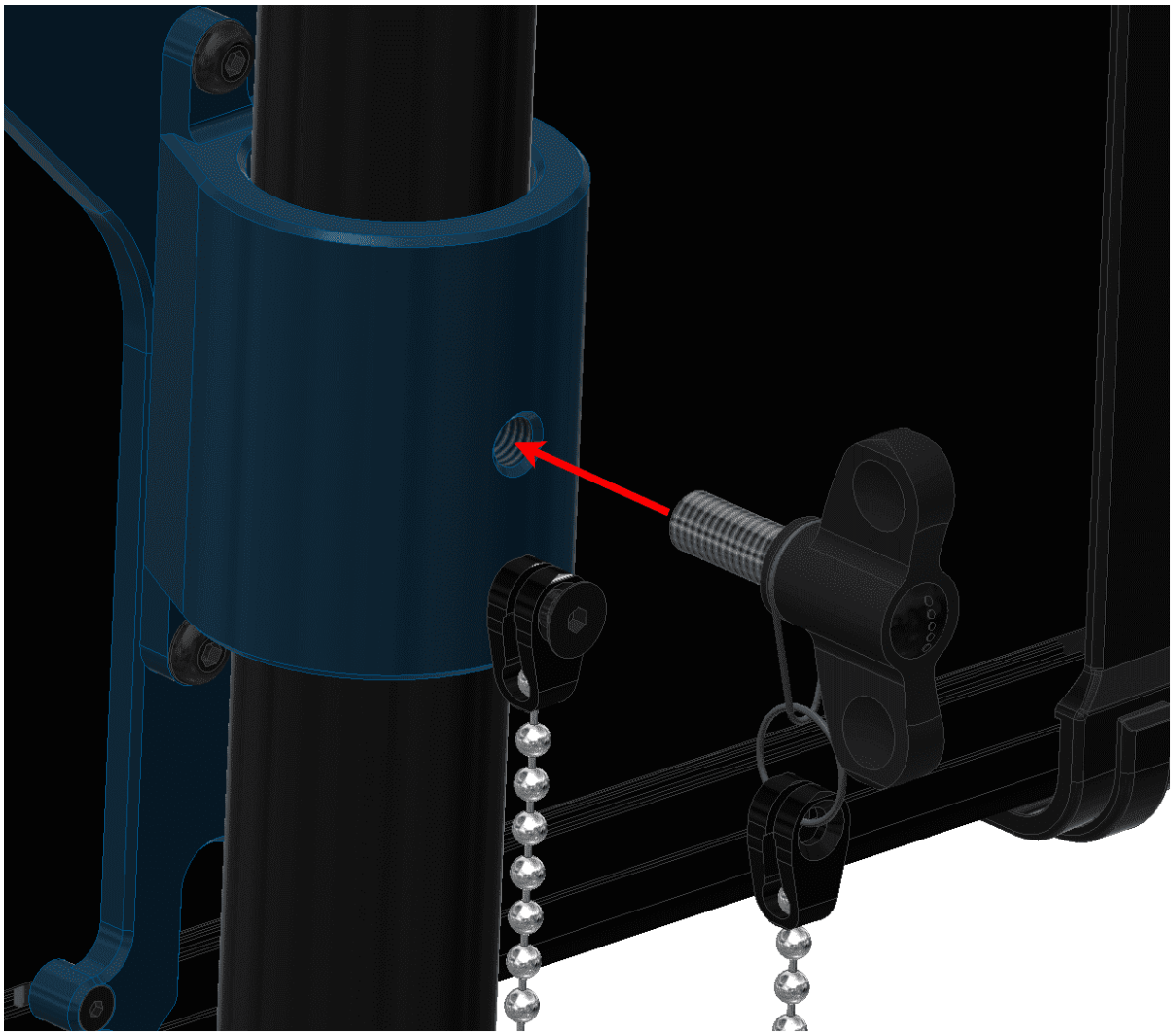


Fig. 9: **Pole mount installation - Step 5**

4.3 Expansion bay access

This section explains how to access to the bay and adjust its position inside the **PCS**.

1. Remove the four M5 allen screws and the lateral plate of the wifi antenna side.

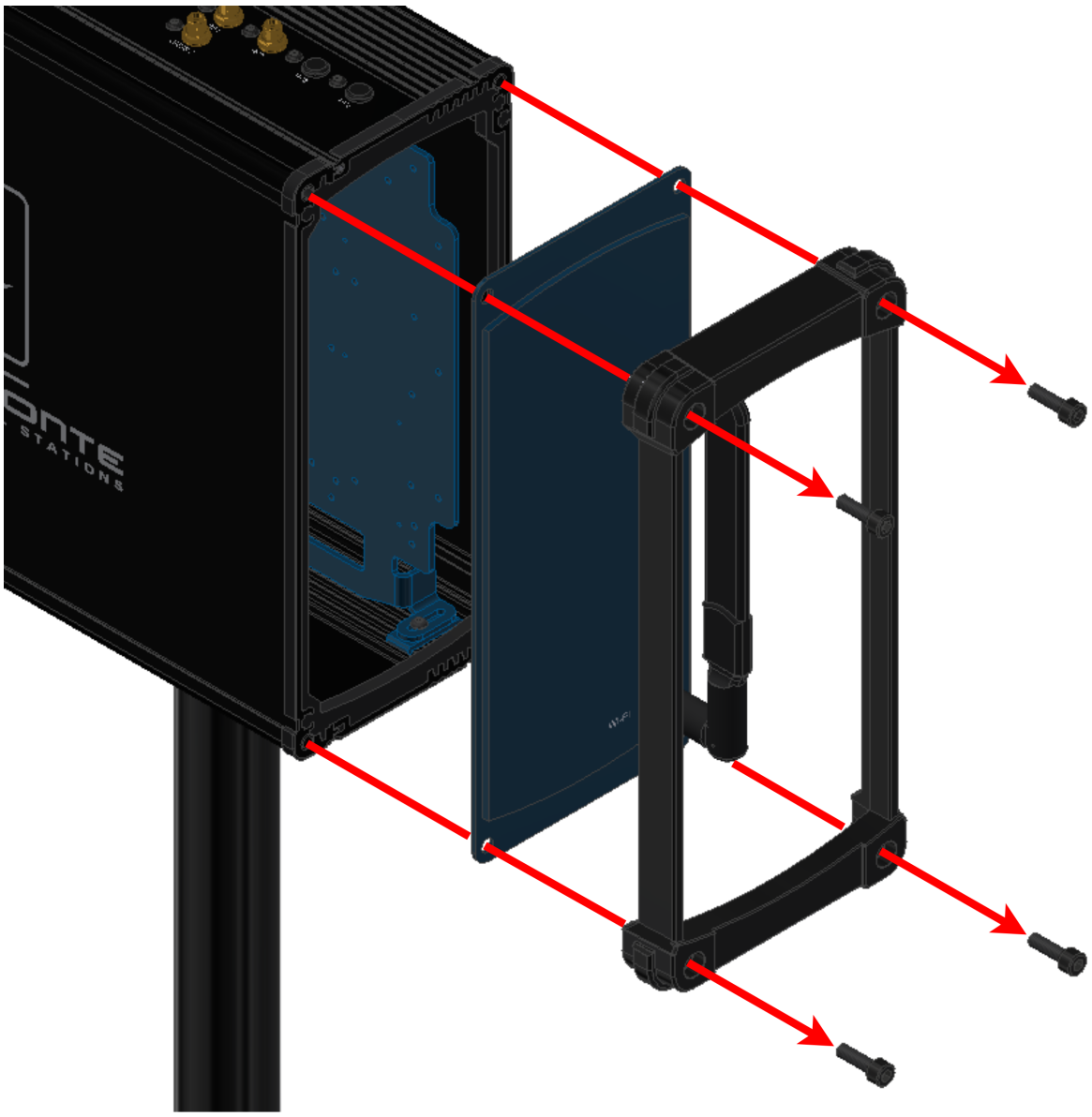


Fig. 10: **Expansion bay access - Step 1**

2. Slide the frontal plate with Veronte logo.

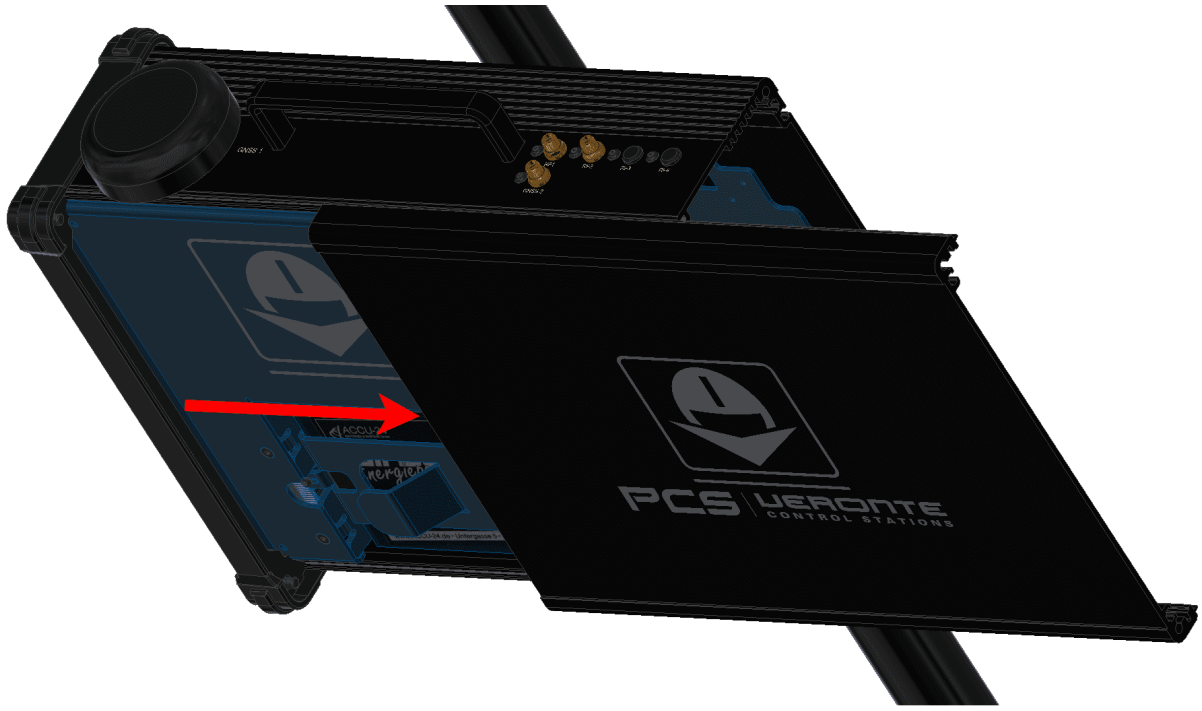


Fig. 11: **Expansion bay access - Step 2**

At this point, the expansion bay is accesible.

Fig. 12: **Expansion bay access - Step 2**

3. Unscrew slightly the four M3 allen screws to slide up or down the expansion bay.

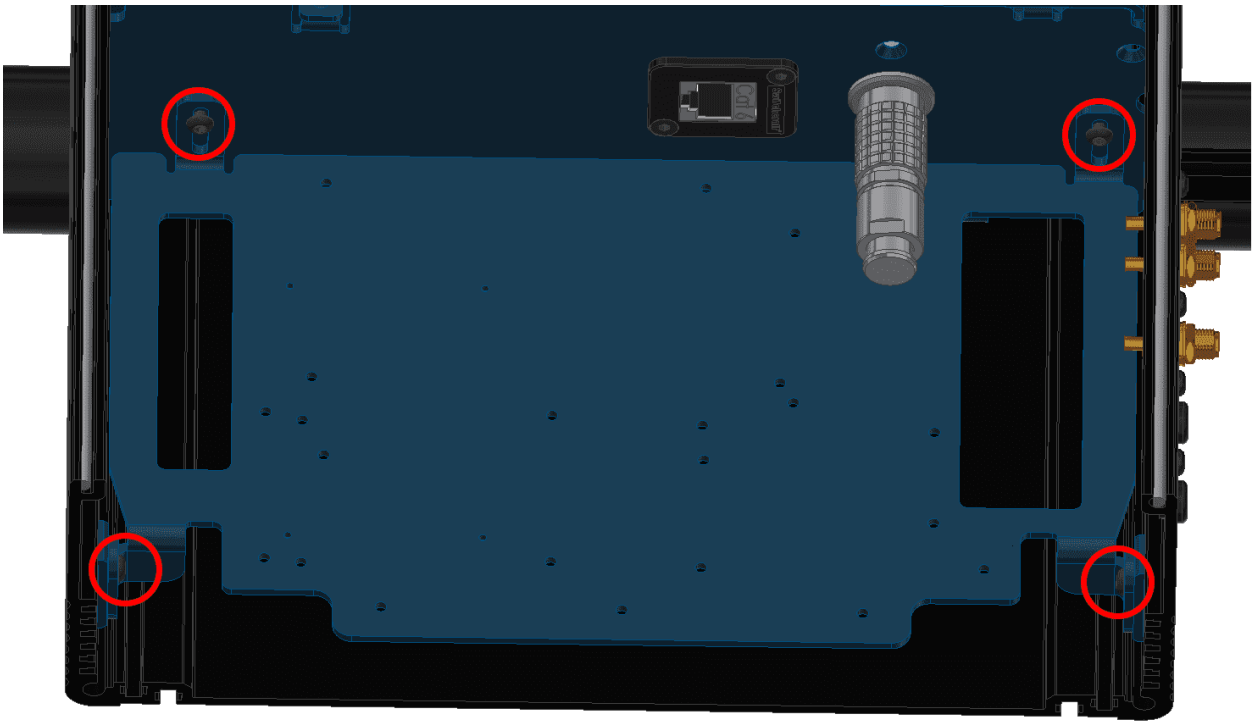


Fig. 13: **Expansion bay access - Step 3**

4. Unscrew them completely to take out the bay plate.

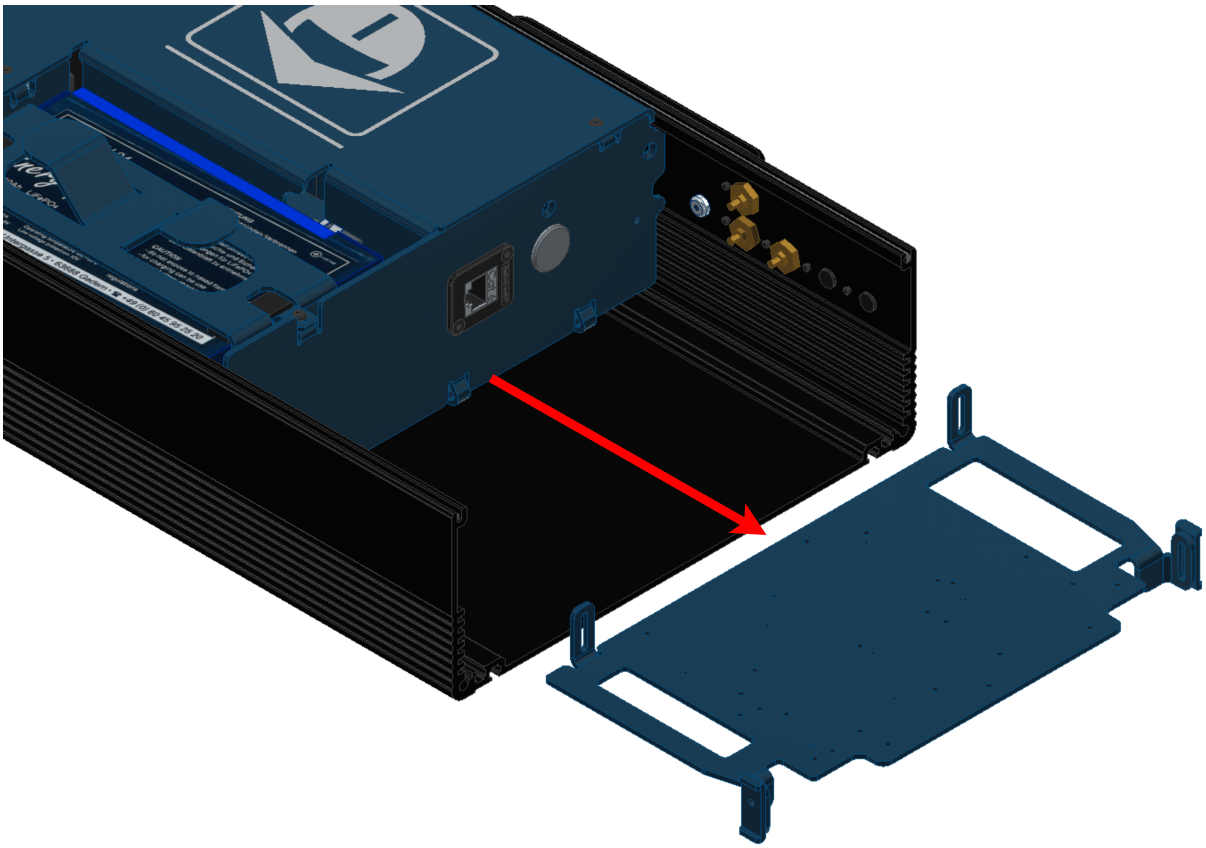


Fig. 14: **Expansion bay access - Step 4**

CHAPTER

FIVE

SOFTWARE INSTALLATION

5.1 Connection

Veronte PCS is a pre-configured device. It is built with an **Autopilot 1x** (hardware version 4.8) inside to manage communications, so configuration is done through the **1x**. Nonetheless, *MicroHard* and *DTC* radios are configured directly with a computer via ethernet.

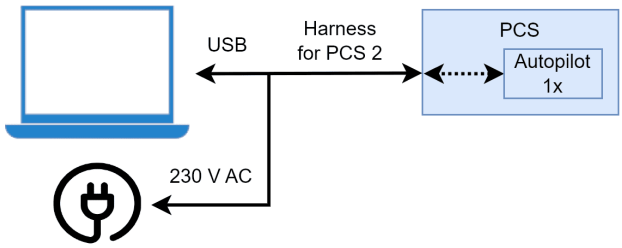


Fig. 1: **USB connection**

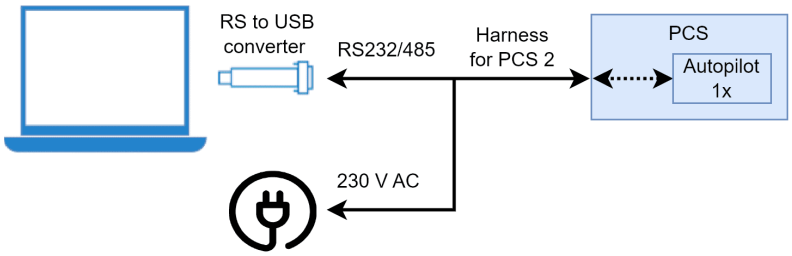


Fig. 2: **Serial connection**

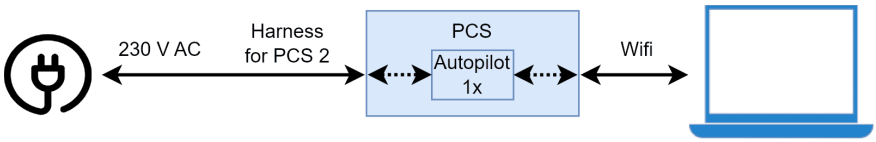


Fig. 3: **Wifi connection**

To install the required software and configure **Veronte Autopilot 1x**, read the 1x Software Manual.

5.2 Joystick Configuration

Joystick connection is preconfigured on the main external connector (Pin 57 EQEP_S) with **1x PDI Builder** . Wireless joystick connection is also possible with the installation of a joystick receiver on the Expansion Bay.

For more information, visit Stick section of **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 PWM - Connections section of **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 “EmbentionPCS21”. 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.

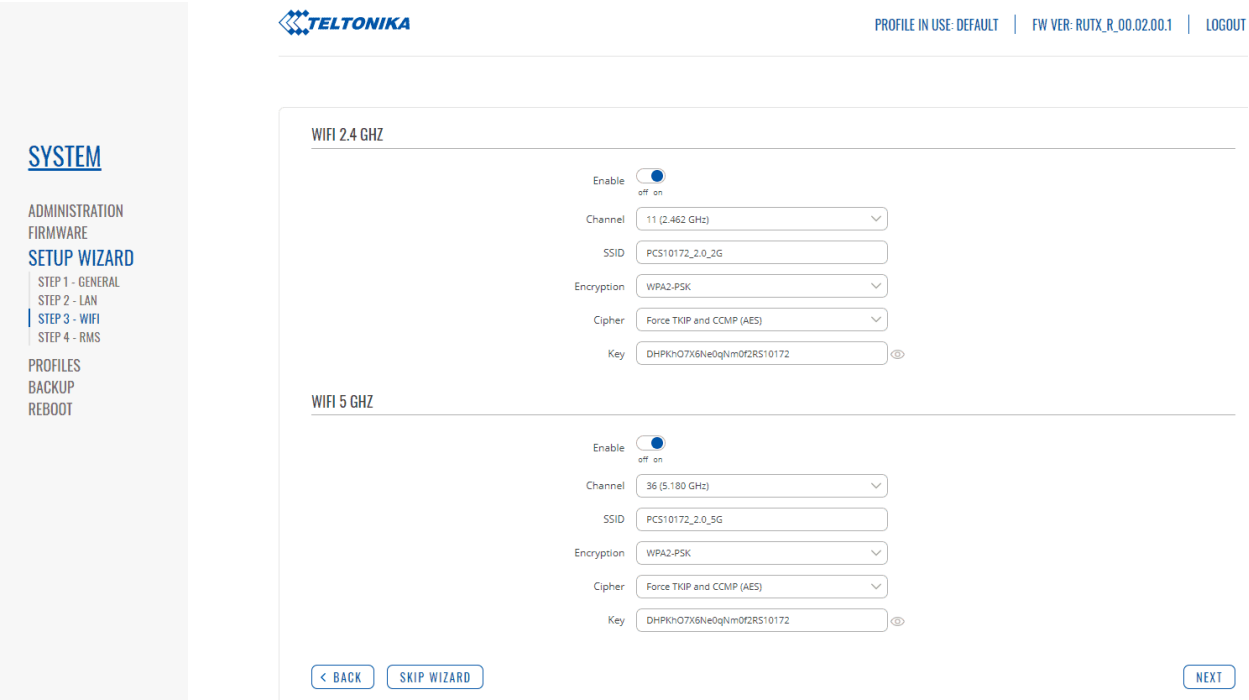


Fig. 4: **Wi-Fi menu**

Important: The wifi SSID is: “PCS” + <PCS serial number> + “_2.1_” + <”2G” for 2.4GHz frequency and 5G for “5GHz” frequency>. Example: PCS10172_2.1_2G.

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

Important: The IP port can be configured by following the Teltonika router manual, where the username and password to access the advanced configuration menu are specified in **step 3**.

Warning: Be careful when changing the login credentials on the router, because if they are lost, the router can only be accessed again by resetting it to the default configuration. If this happens, users should contact support team by creating a Ticket in their **Joint Collaboration Framework**.

5.5 Tilt activation distance

In case of using a Veronte T28, the threshold range (named as Tilt activation distance) can be changed with Veronte Ops, in the variable `Tilt Activation distance`.

To know how to change any variable in Veronte Ops, read Inputs - Workspace section of **Veronte Ops** user manual.

Note: When the aircraft passes the long range threshold, **PCS** enables the tilt movement, the second directional antenna and disables the omnidirectional antenna.

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

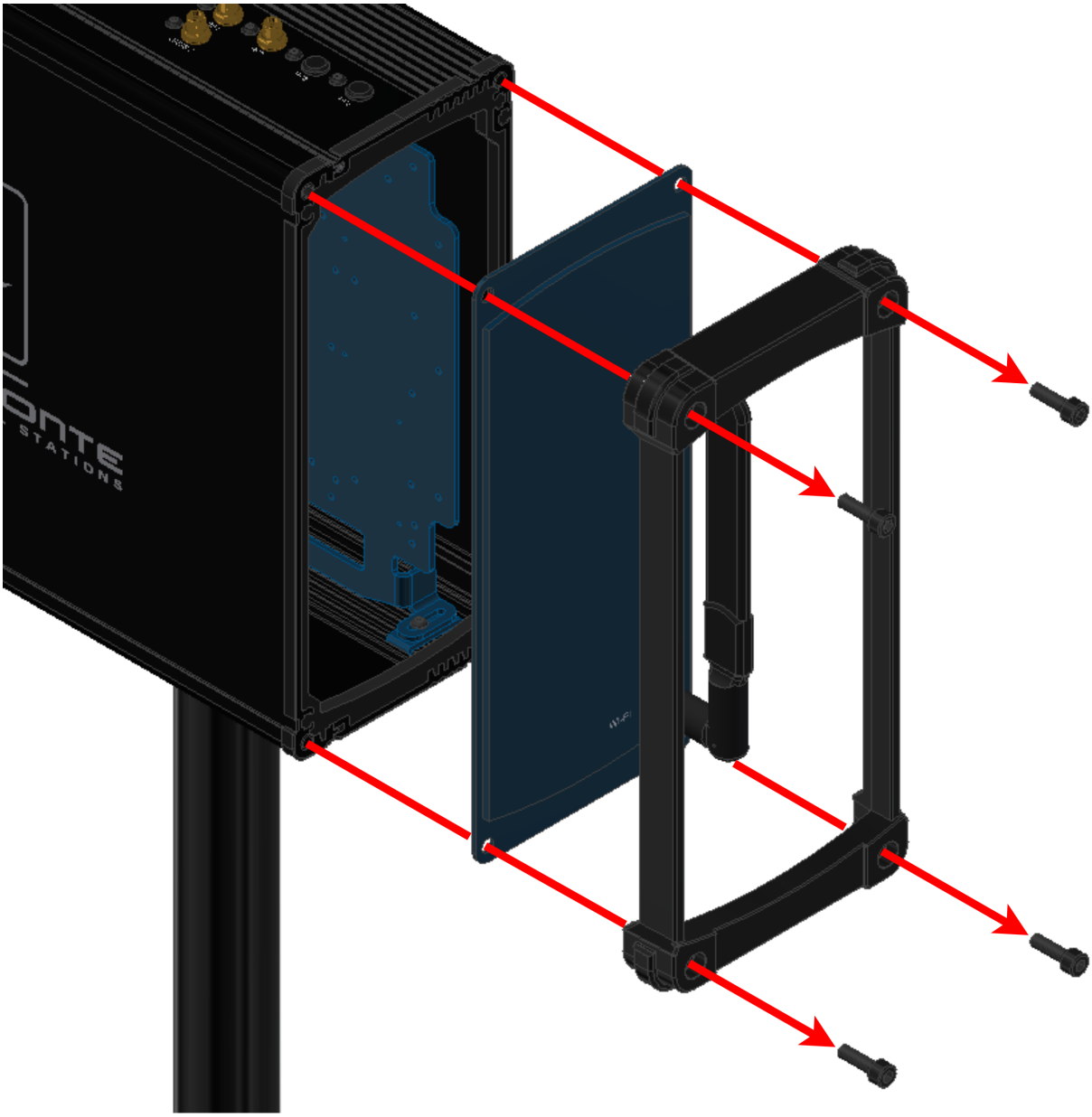
1. Switch off the system by pressing the button for 2 seconds (until the blue light turns off).
2. Check all connectors, in case of abnormality or damage, please contact us for replacement: support@embention.com.
3. Attach all protection cups to all connectors in order to protect from dust.
4. Store 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

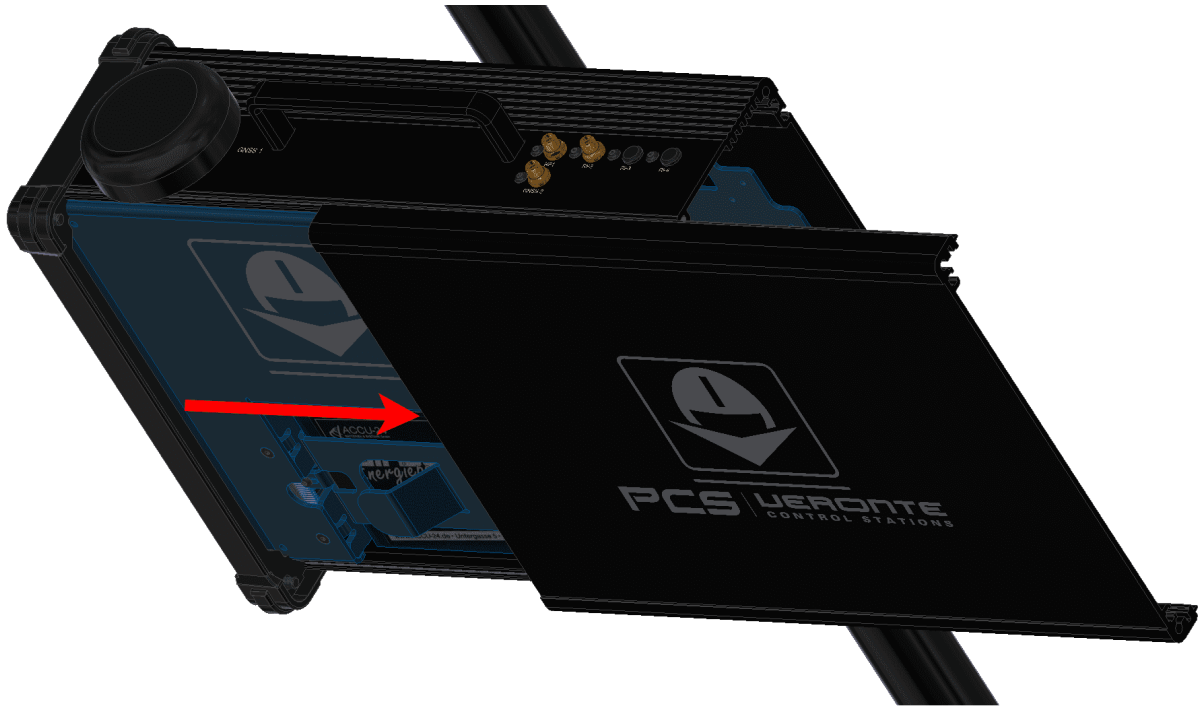
Battery

To extract the battery please follow the next steps:

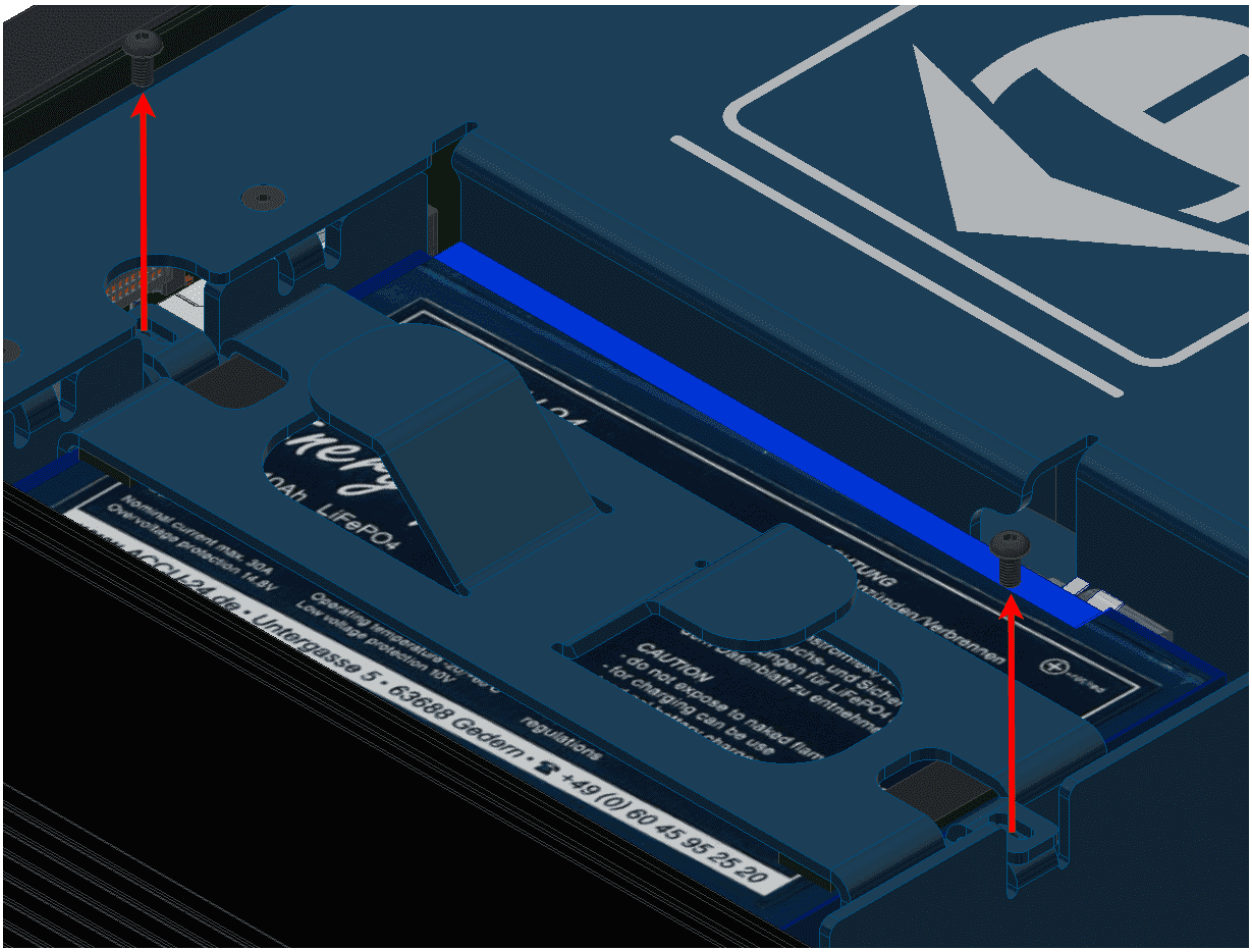
1. Remove the four M5 allen screws and the lateral plate of the wifi antenna side.



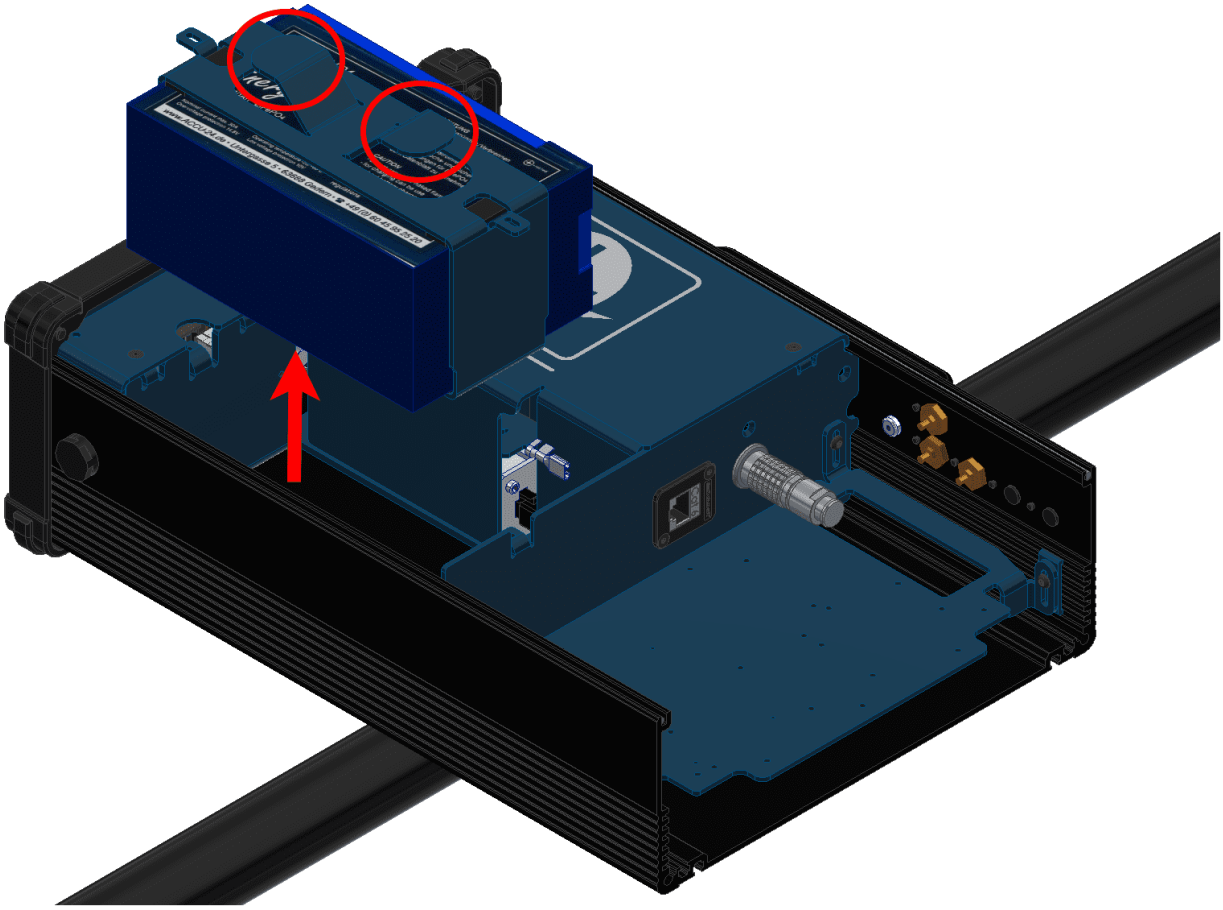
2. Slide the frontal plate with Veronte logo.



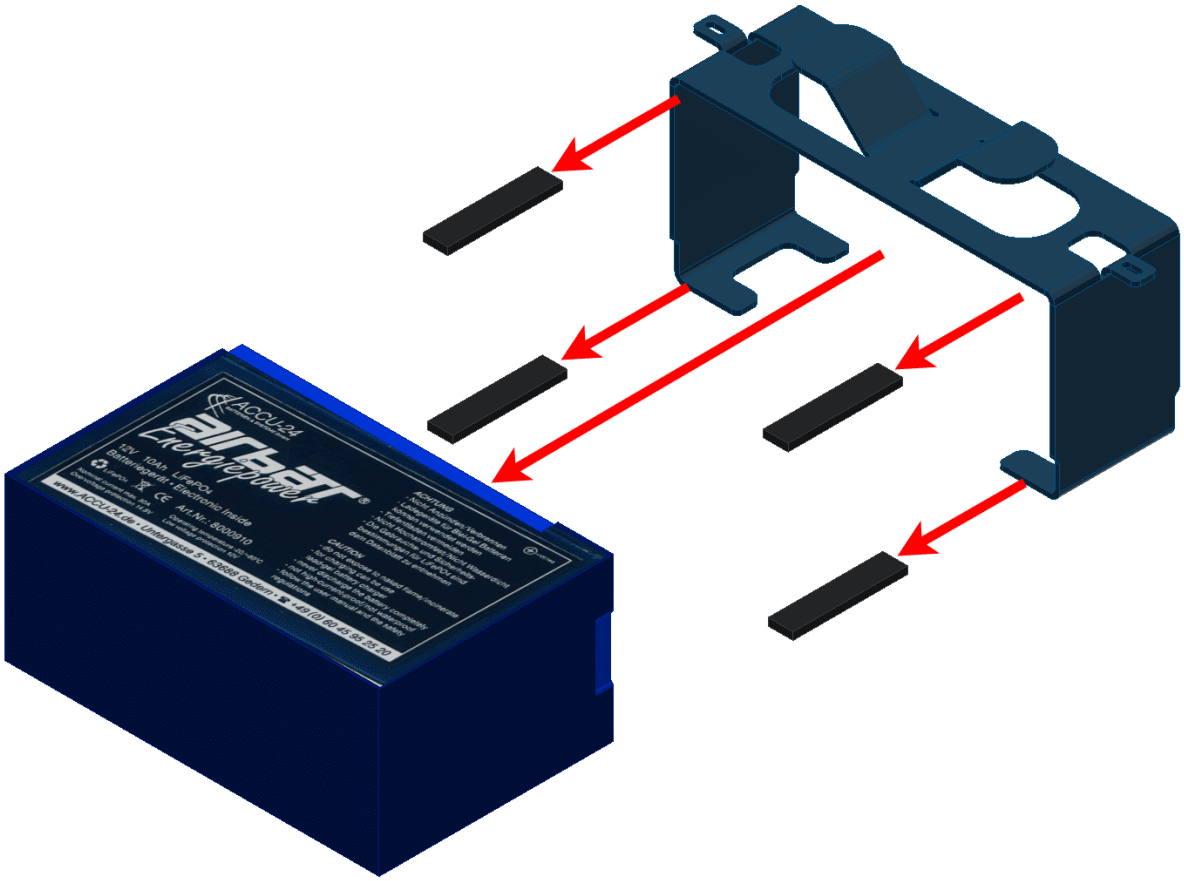
3. Unscrew bot M3 allen screws of the battery.



4. Take out the battery pulling from both marked handles



5. Remove the battery. Moving the battery will take out the four battery supports, since they are not fixed. Use them again with the new battery.



6. Now the new battery can be placed and connected. Please take care with the polarity. The possitive cable is marked with red.
7. To close the device do the same steps in the reverse way. Use **Loctite 243** to fix all screws and apply a 1 Nm of torque.

CHAPTER

SEVEN

INTEGRATION EXAMPLES

7.1 Internal Radio Configuration

To configure the internal radio of the autopilot, read Digi Internal Radio - Integration examples section of **1x PDI Builder** user manual.

7.2 Adjustable Antenna Mount

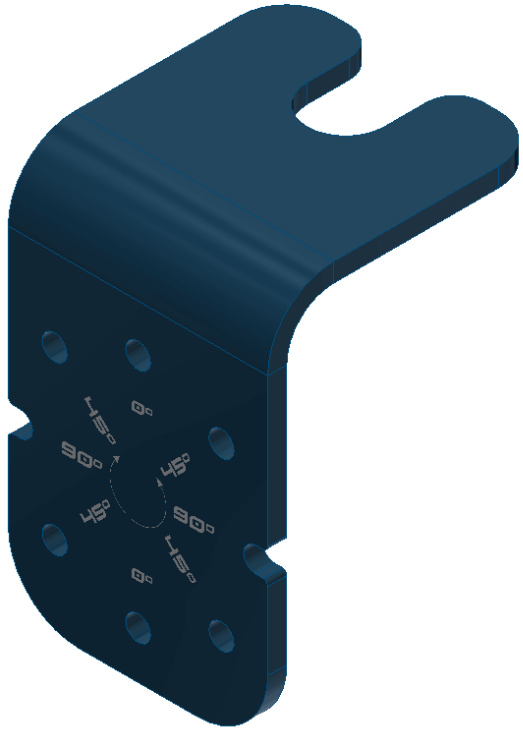


Fig. 1: **Adjustable antenna mount**

The **adjustable antenna mount** allows to set up certain antennas at 0, 45 or 90º, depending on the polarization desired.

Fig. 2: **PCS antennas at 0, 45 and 90º**

To attach the an antenna to the holder with the **adjustable mount** read the following steps:

1. Slide the antenna through the slot.

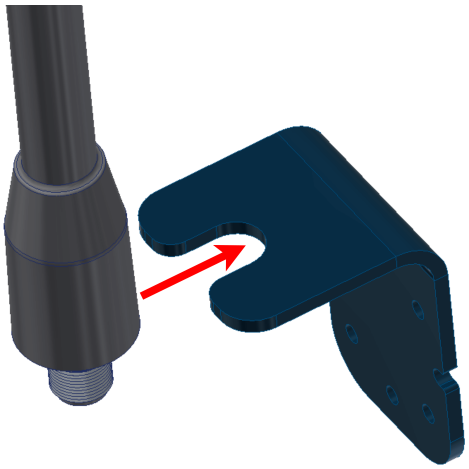


Fig. 3: **Adjustable mount - Step 1**

2. Screw the connector and the nut to fix the antenna.

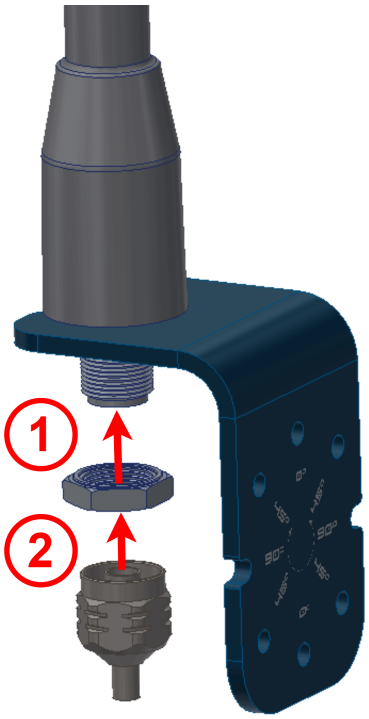


Fig. 4: **Adjustable mount - Step 2**

3. Attach the **adjustable antenna mount** with both knobs. Use the holes which correspond to the desired position.

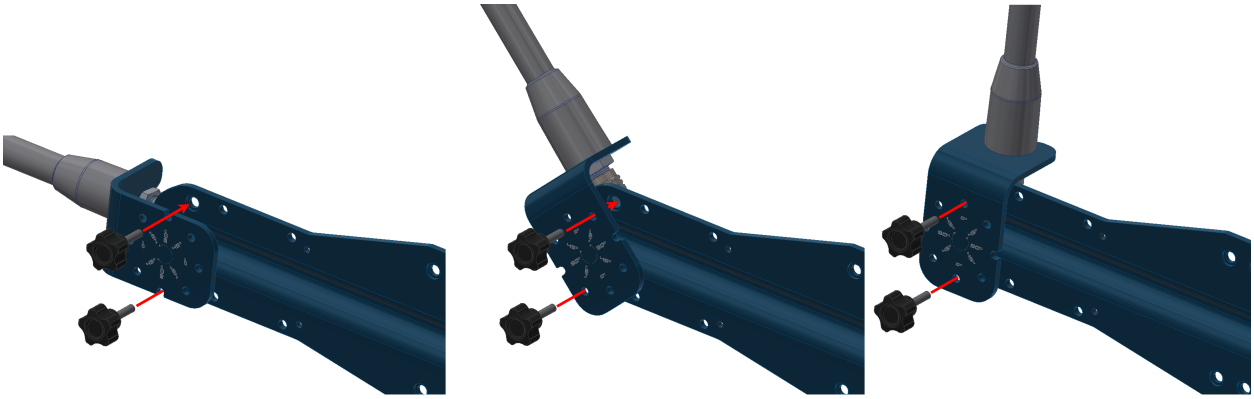


Fig. 5: **Adjustable mount - Step 3**

7.3 Datalink Kit Installation and Configuration

To install a radio module in the **PCS**, follow the installation instructions according to the modem of the datalink kit. Click on your corresponding modem:

- *Datalink Kit A/B/C - Veronte SDL modem*
- *Datalink Kit D - DTC modem*
- *Datalink Kit F/G - Silvus modem*

- *Datalink Kit H/I - MicroHard modem*
- *Datalink Kit J/K - Amplified Veronte SDL modem*

7.3.1 Datalink Kit A/B/C - Veronte SDL Modem

1. First of all, to access the expansion bay, read *Expansion bay access* section of this manual. It will not be necessary to take out the bay plate.
2. Screw the modem to the plate with four mushroom bolts M3 x 4.

Fig. 6: **Hardware SDL installation - Step 2**

3. Wire the modem to the **bay connector** and **RF2**.

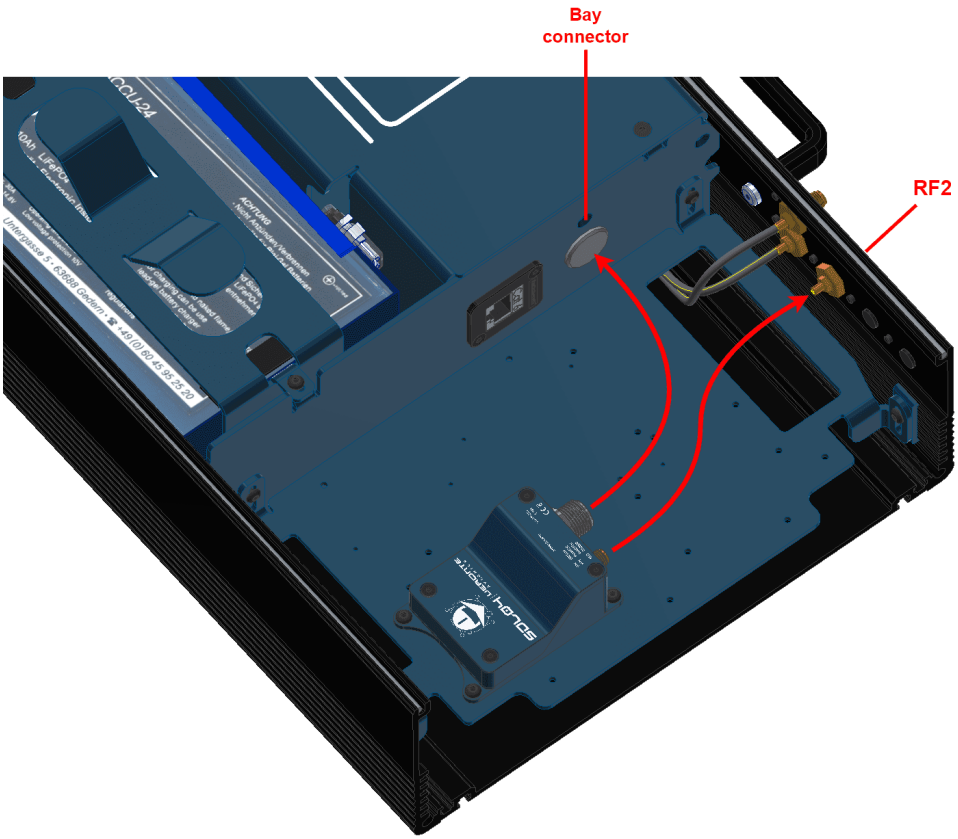


Fig. 7: **Hardware SDL installation - Step 3**

4. Mount the **PCS** to the pole according to *Pole mount installation* section of this manual (do not close the expansion bay yet).
5. Attach the omnidirectional antenna to the pole mount.

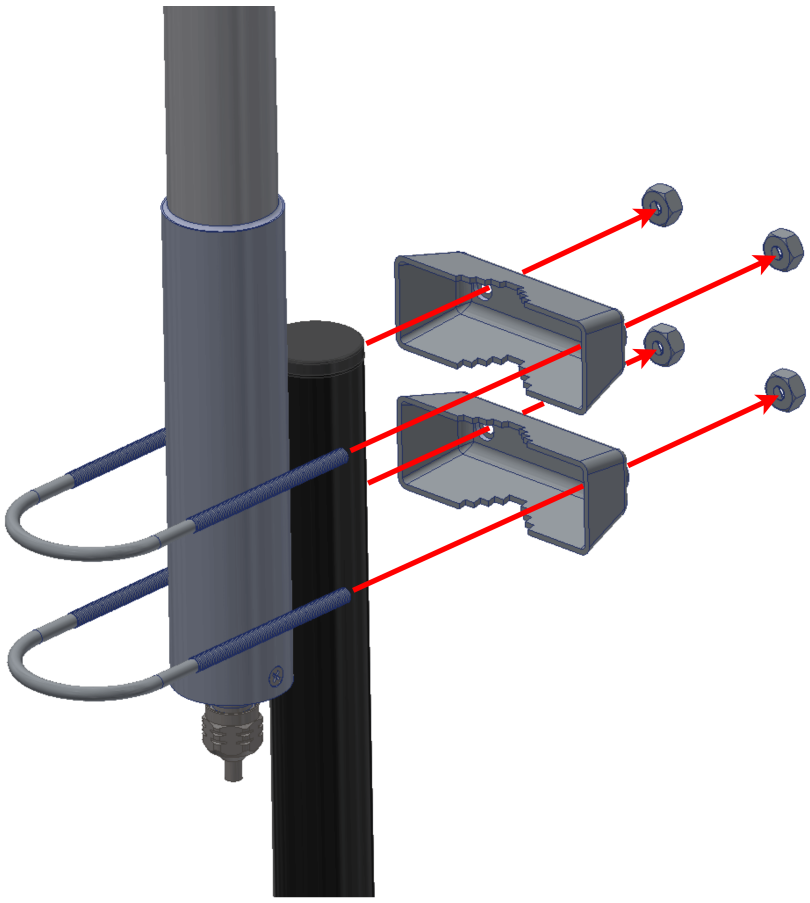


Fig. 8: **Hardware SDL installation - Step 5**

6. Wire the antennas to the **PCS**.

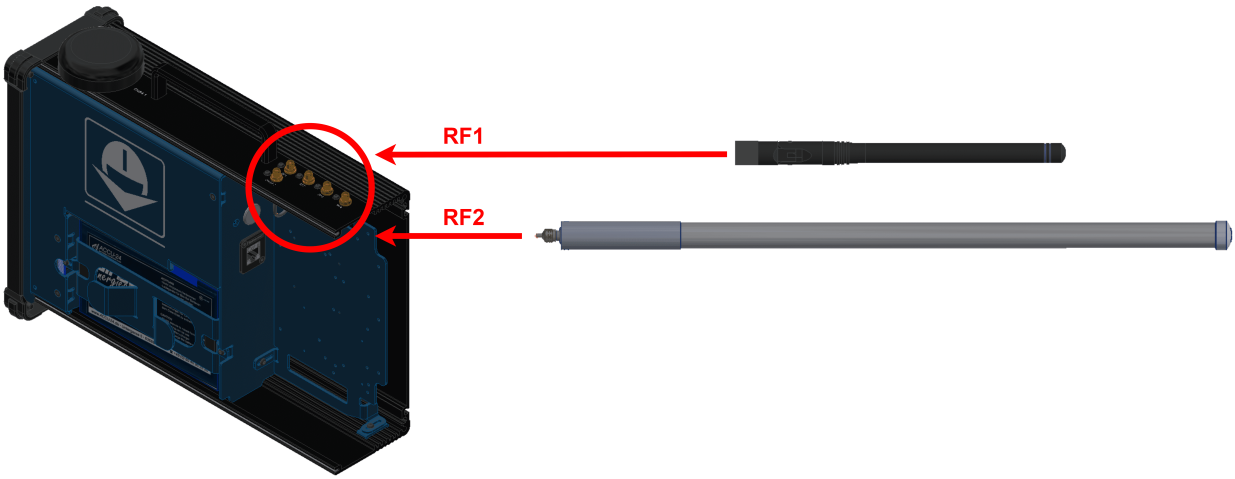


Fig. 9: **Hardware SDL installation - Step 6**
(Diagram not scaled)

7. Configure the **Veronte Autopilot 1x** as explained in External radios - Integration examples section of **1x PDI**

Builder user manual.

8. Configure the **Veronte Autopilot 1x** to communicate with **SDL** through a tunnel, to do it read Tunnel - Input/Output section of **1x PDI Builder** user manual.
9. Once the tunnel communication is established through **Autopilot 1x**, the modem can be configured with AT commands.

   9.1. To understand the basics, first of all, read How to configure SDL - Software Installation section of **SDL User Manual**.

   9.2. After that, read Veronte Autopilot 1x and Veronte BCS - Integration Examples section of **SDL User Manual**, to configure the **SDL** according to the autopilot used.
10. Once the **SDL** and the **Autopilot 1x** have been configured, close the **PCS**.

7.3.2 Datalink Kit D - DTC Modem

1. First of all, to access the expansion bay, read *Expansion bay access* section of this manual.
2. Screw the following components to the bay plate, placing both thermal pads:
   - Use two mushroom bolts M3 x 20 for the radio modem.
   - Four mushroom bolts M3 x 5 for the amplifier.

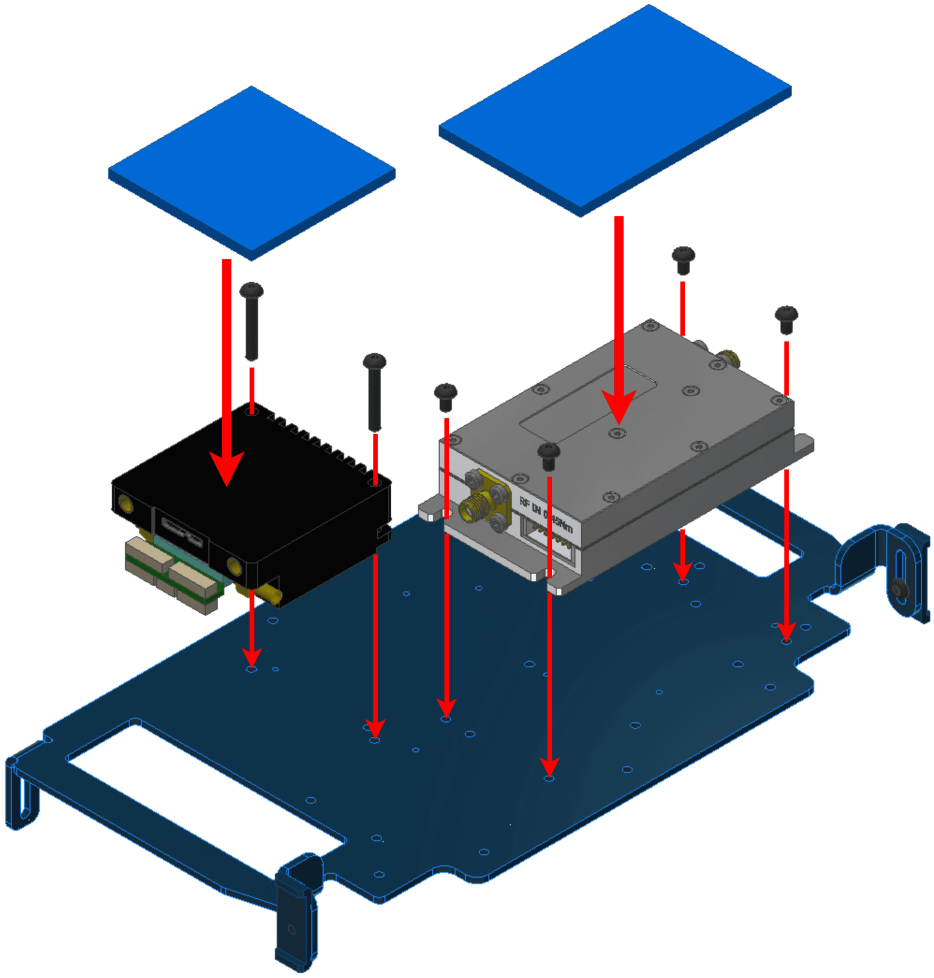


Fig. 10: **Hardware DTC installation - Step 2**

3. On the oppposite side of the plate, screw the ethernet connector with two mushroom bolts M3 x 8 and both spacers.

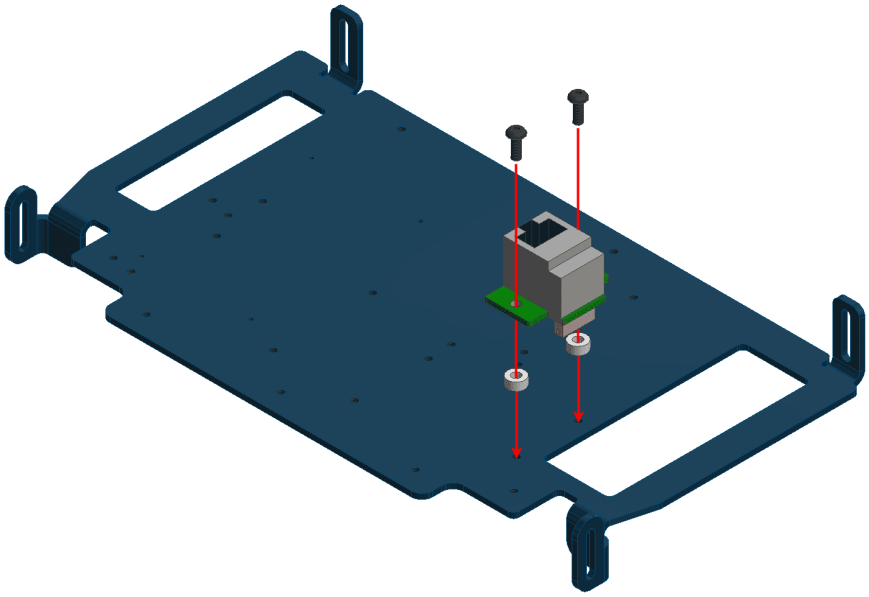


Fig. 11: **Hardware DTC installation - Step 3**

4. Connect the bay harness to the expansion bay connector. Harness, modem and amplifier are already wired, then it is only required to plug the harness to the bay connector.

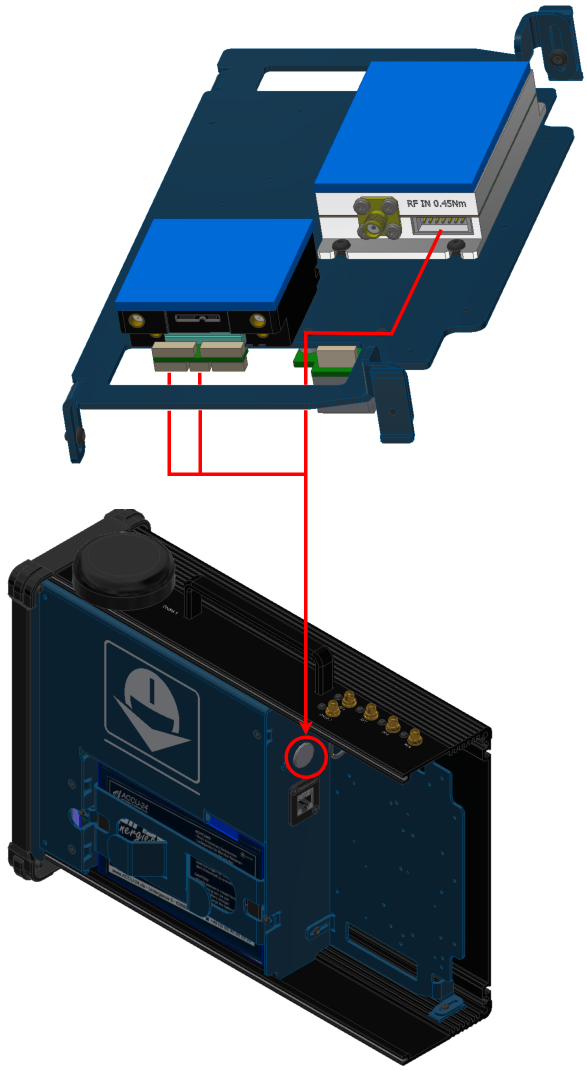


Fig. 12: **Hardware DTC installation - Step 4**
(Diagram not scaled)

5. Connect the amplifier and the radio modem.

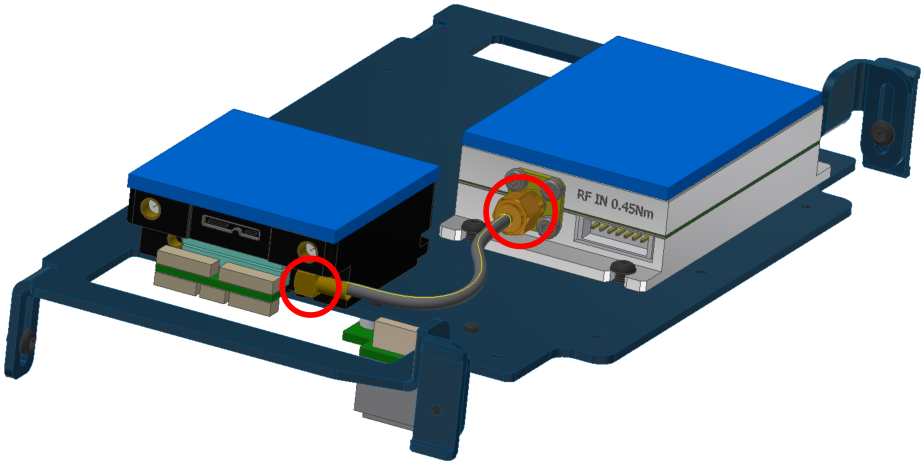


Fig. 13: **Hardware DTC installation - Step 5**

6. Connect the amplifier to **RF2** passing the cable through the plate hole.

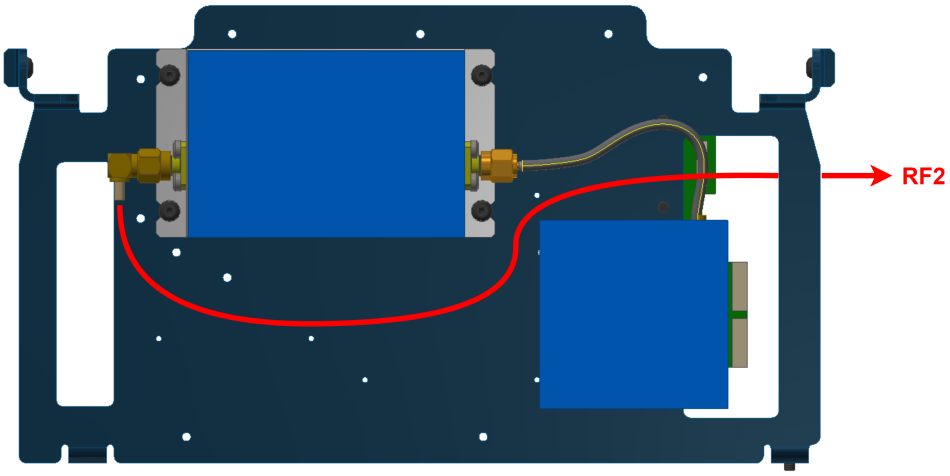


Fig. 14: **Hardware DTC installation - Step 6**

7. Connect the modem to **RF3**, passing the cable through the plate hole.

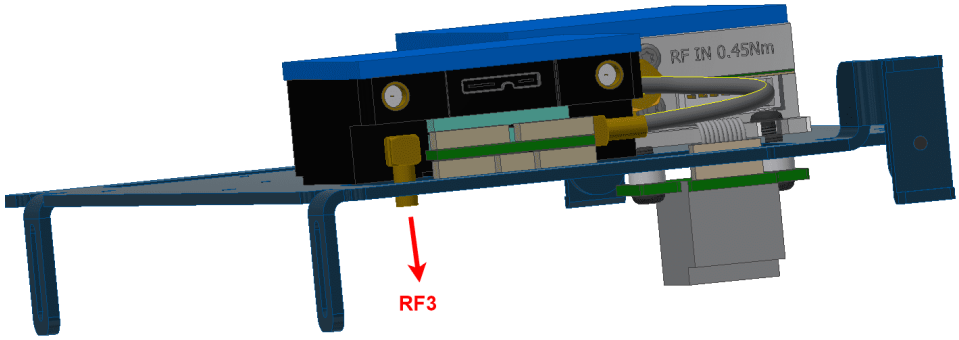


Fig. 15: **Hardware DTC installation - Step 7**

8. Place again the bay plate into the **PCS**, it should result as the following image:

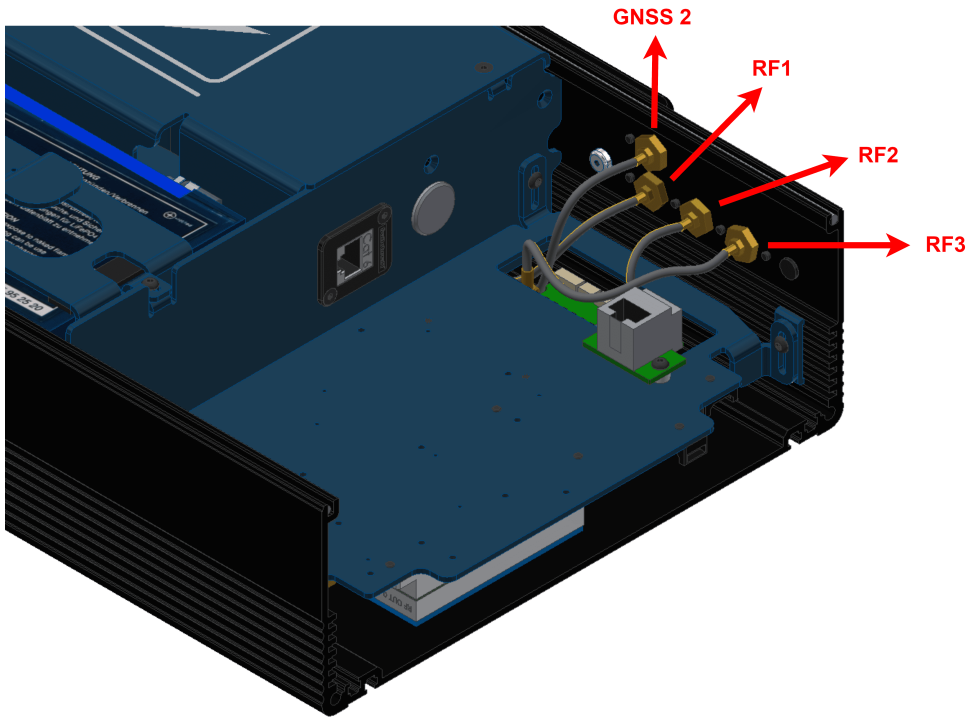


Fig. 16: **Hardware DTC installation - Step 8**

9. Attach the **PCS** to the pole according to *Pole mount installation* section of this manual (do not close the expansion bay yet).
10. Fix both antennas to the holder with the knobs.

Important: If the user desires **to tilt an antenna**, **ignore this step** and read the *Adjustable Antenna Mount* section of this manual.

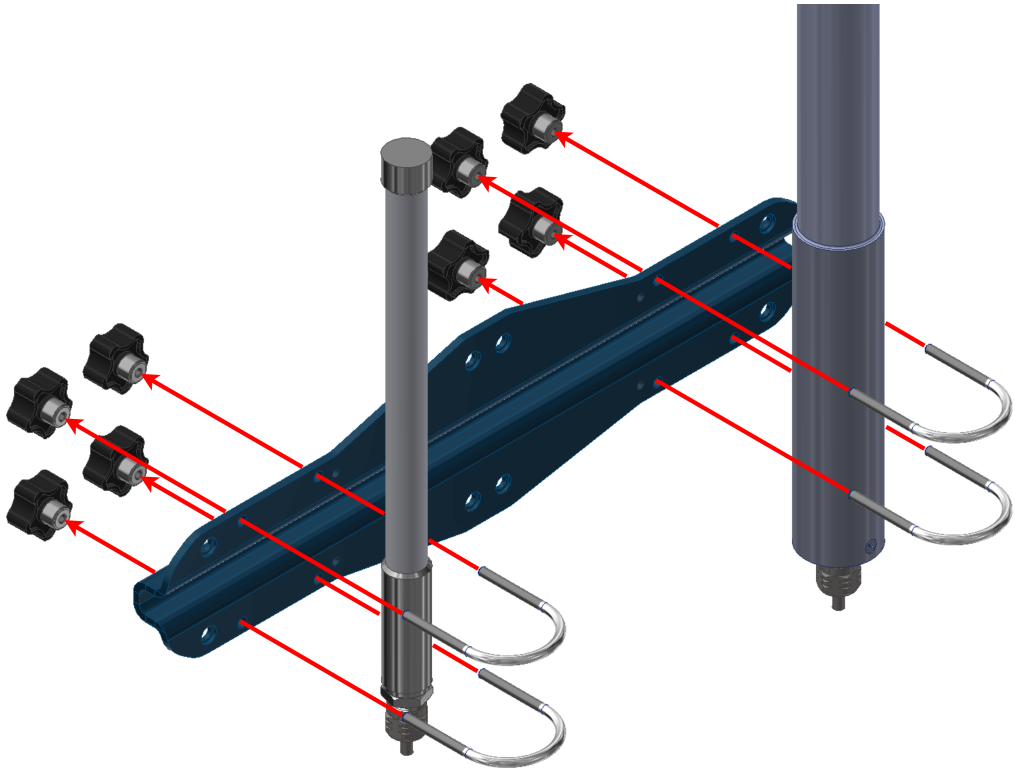


Fig. 17: **Hardware DTC installation - Step 10**

11. Join the holder to the pole with the wall bracket.

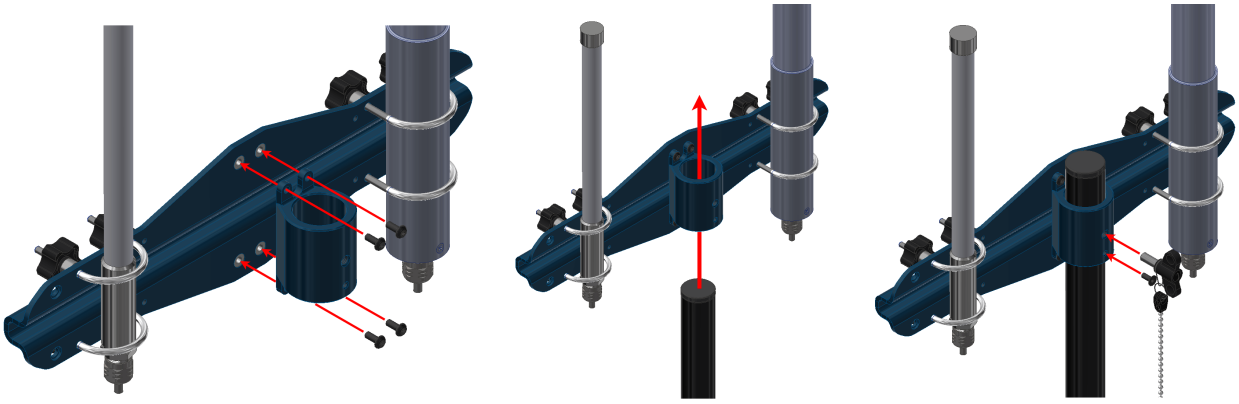


Fig. 18: **Hardware DTC installation - Step 11**

12. Wire the antennas.

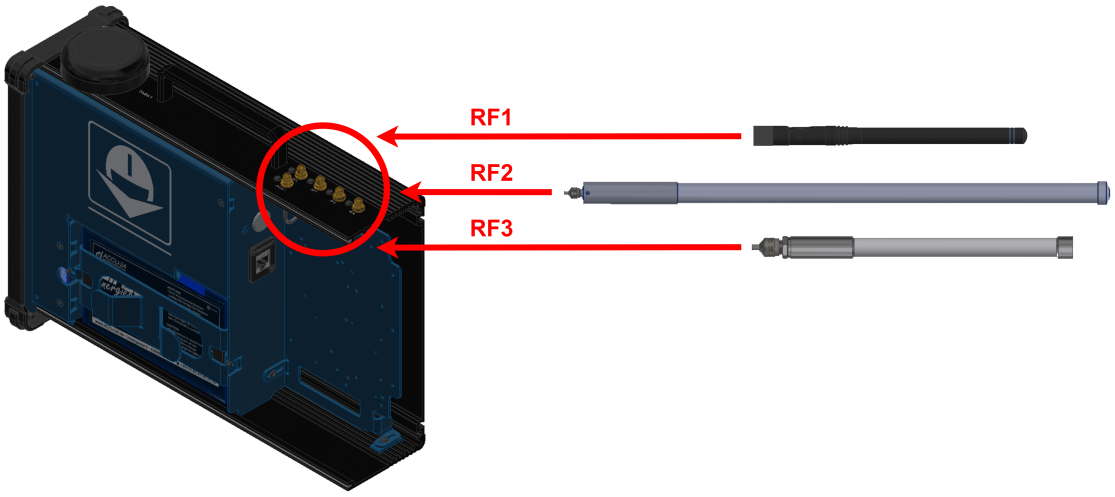


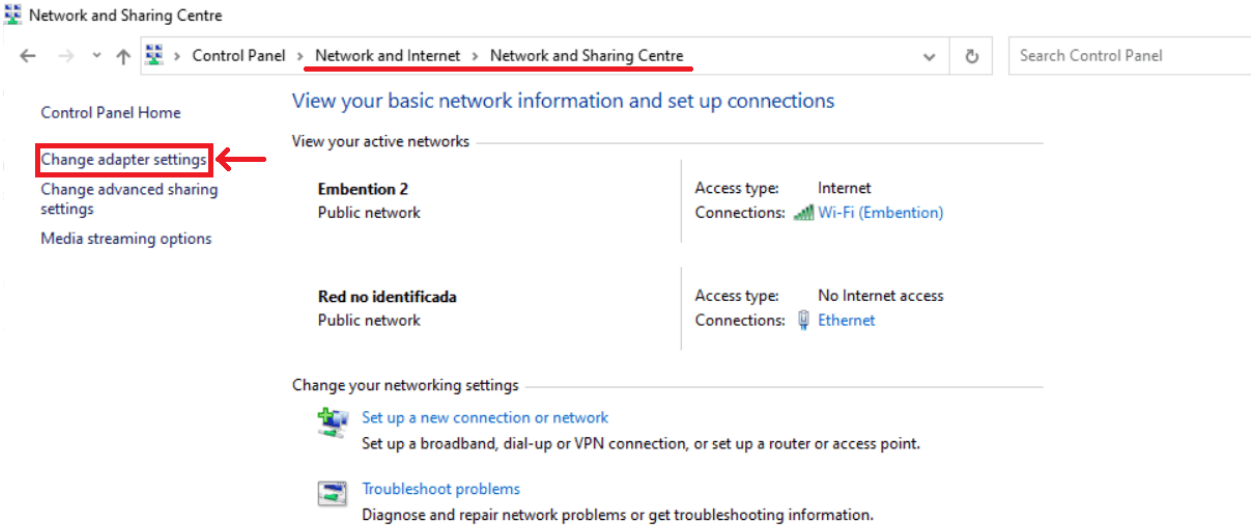
Fig. 19: **Hardware DTC installation - Step 12**
(Diagram not scaled)

13. Connect the computer to the ethernet cable.

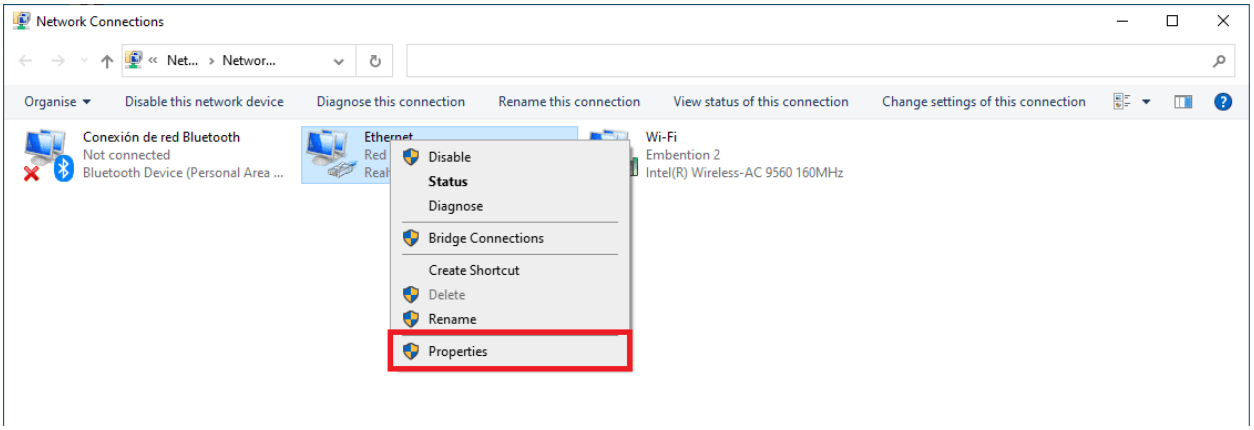
Fig. 20: **Hardware DTC installation - Step 13**

14. Make sure computer is set to static IP address on same subnet as radio. The following substeps clarify how to set the IP adress:

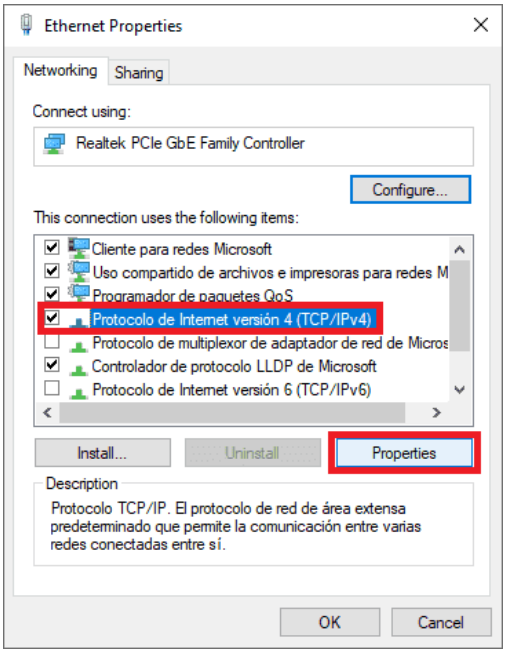
    14.1. Open **Network and sharing centre** and click **Change adapter settings**.



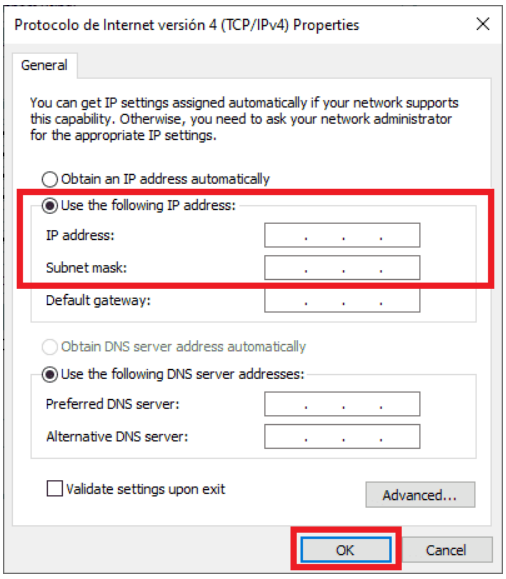
14.2. Select **Local Area Connection**, right click, and select **Properties**.



14.3. Select **IPv4** and click **Properties**.



14.4. Set IP address to 192.168.8.3. Set the Subnet mask to 255.255.255.0 and click **OK**.



15. Open a browser and introduce the radio address on the search bar 192.168.8.95. To know more details about the configuration, read DTC radio configuration - Integration examples section of **1x Hardware Manual**.
16. Configure the **Veronte Autopilot 1x** according to External radios - Integration examples section of **1x PDI Builder** user manual.
17. Calibrate the modem to the desired power.
18. Once the modem and the **Autopilot 1x** have been configured, close the **PCS**

7.3.3 Datalink Kit F/G - Silvus Modem

7.3.3.1 Hardware Installation

1. First of all, to access the expansion bay, read *Expansion bay access* section of this manual.
2. Screw the switch against the plate with the switch support and two mushoom bolts M3 x 5.

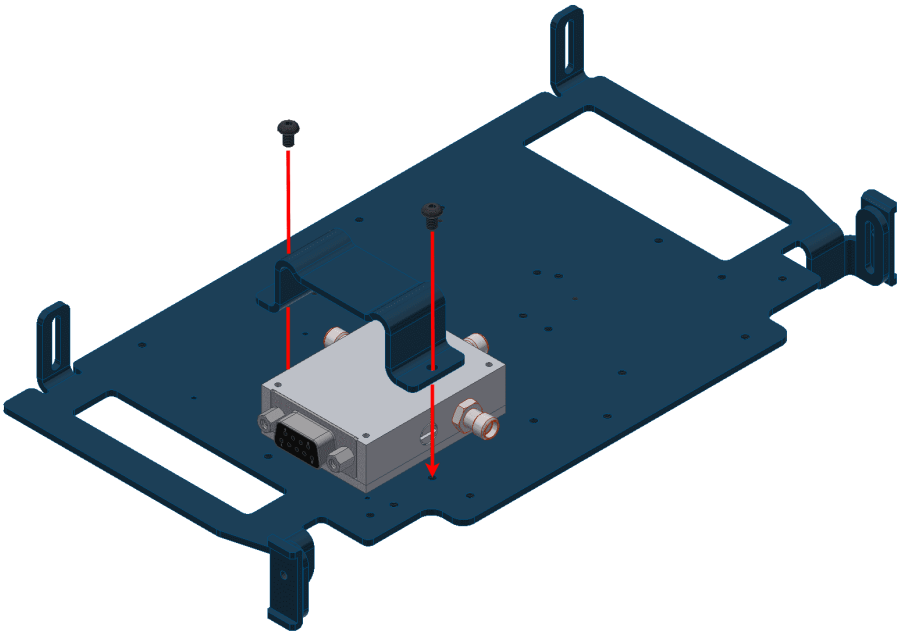


Fig. 21: **Hardware Silvus installation - Step 2**

3. Attach the switch connector.

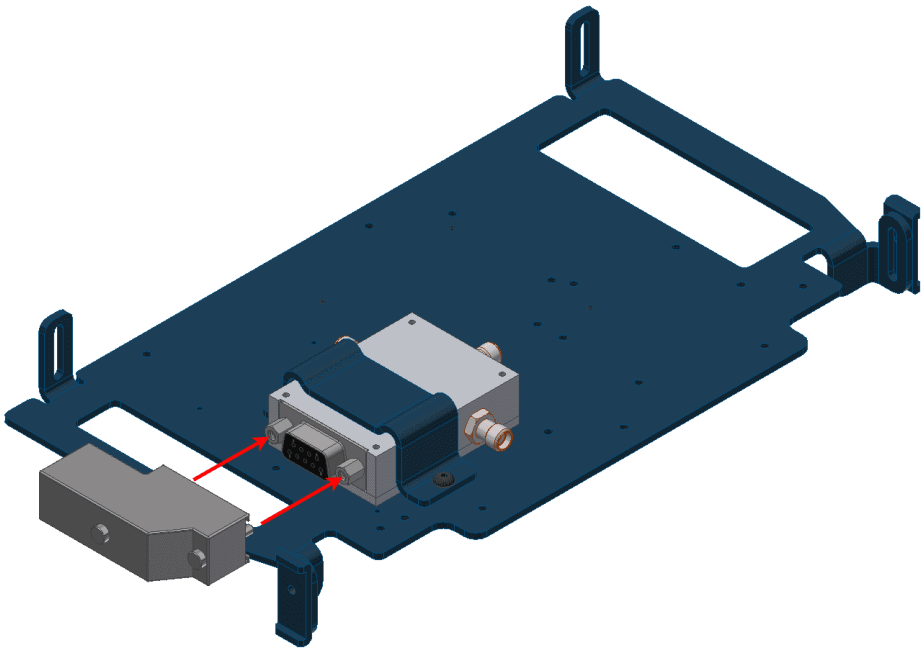


Fig. 22: **Hardware Silvus installation - Step 3**

4. Screw the modem on the opposite side of the plate with four screws M2 x 20. Place two thermal pads on the top and the bottom.

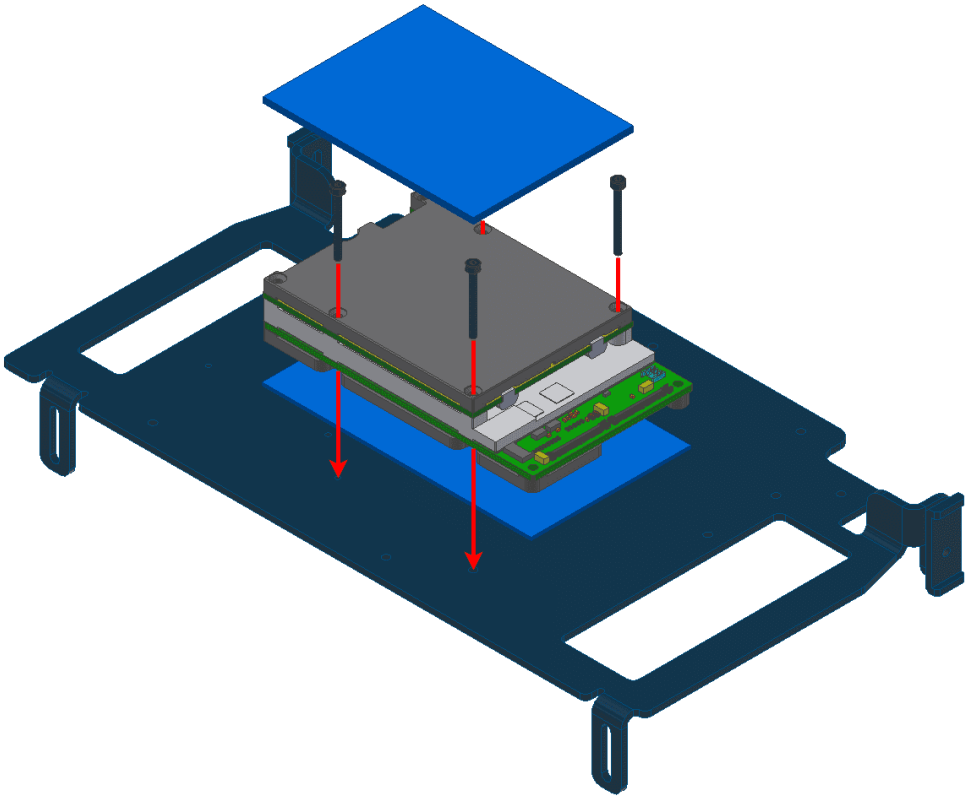


Fig. 23: **Hardware Silvus installation - Step 4**

5. Connect the modem to the switch as indicated in the following figure:

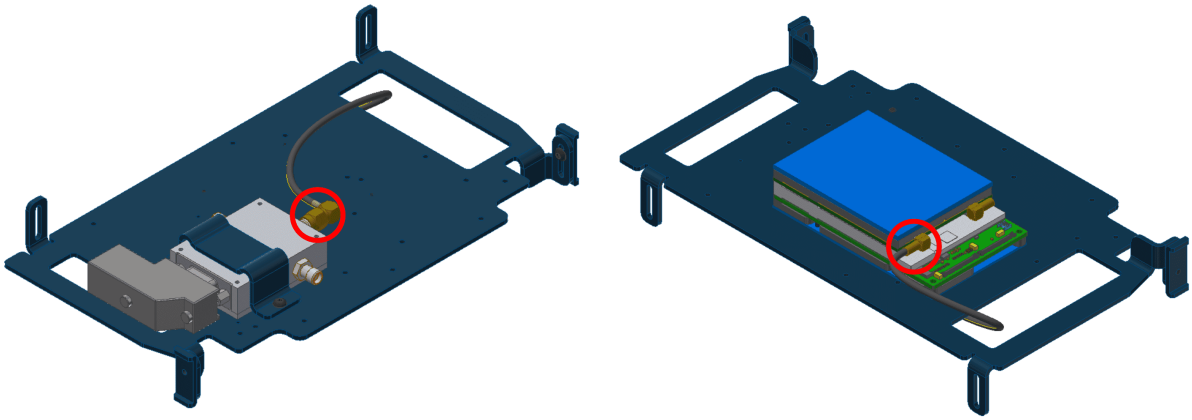


Fig. 24: **Hardware Silvus installation - Step 5**

6. Place the plate in the PCS and connect the indicated modem connector to the **RF2**.

Fig. 25: **Hardware Silvus installation - Step 6**

7. Connect the switch to **bay connector**, **RF3** and **RF4**.

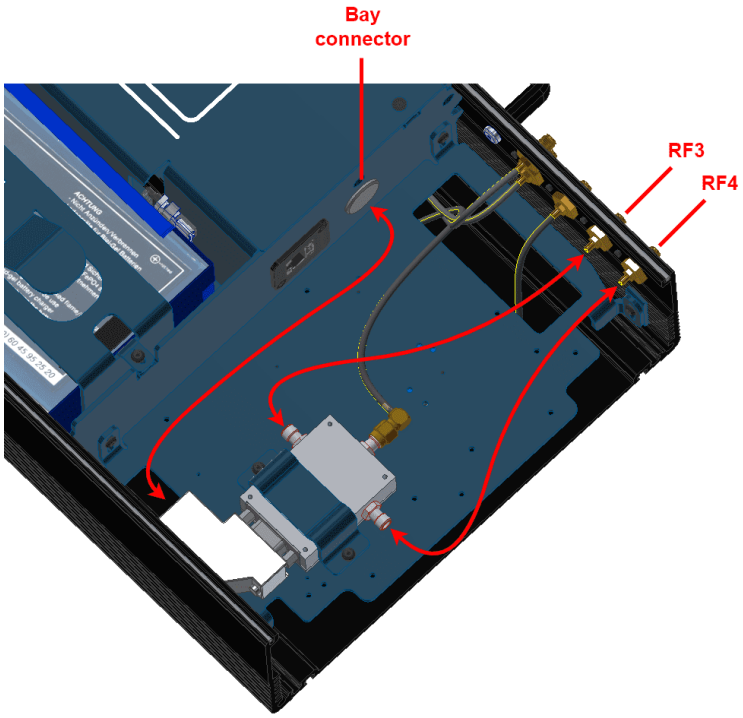


Fig. 26: **Hardware Silvus installation - Step 7**

8. Attach the **PCS** to the pole according to *Pole mount installation* section of this manual (do not close the expansion bay yet).
9. Fix both antennas to the holder with the knobs.

Important: If the user desires **to tilt an antenna**, **ignore this step** and read the *Adjustable Antenna Mount* section of this manual.

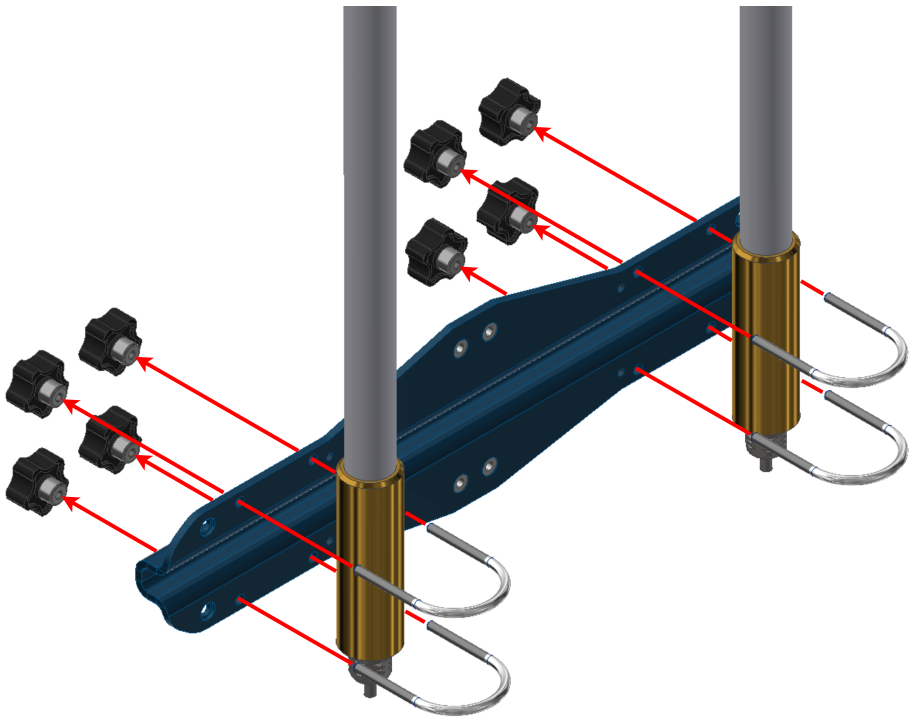


Fig. 27: **Hardware Silvus installation - Step 9**

10. Join the holder to the pole with the wall bracket.

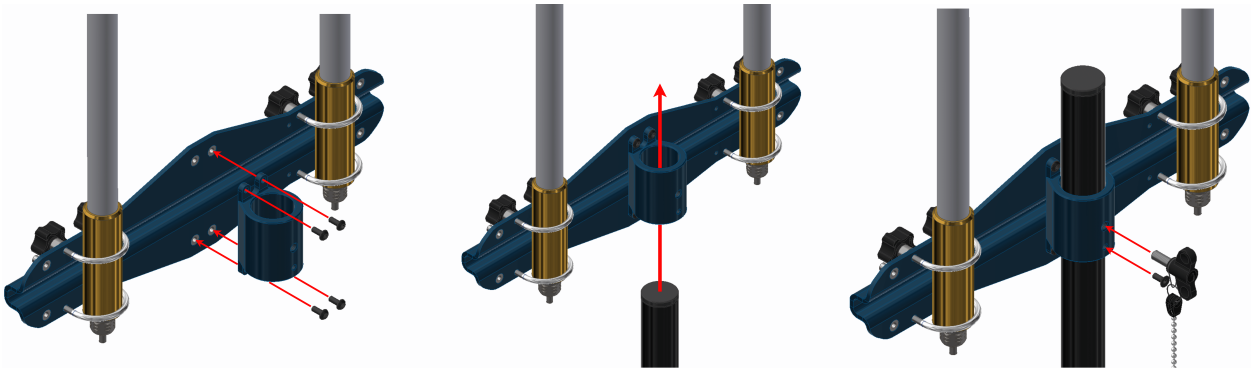


Fig. 28: **Hardware Silvus installation - Step 10**

11. Wire the antennas. In case of using a **Veronte T28** with the **PCS**, the wiring is different.

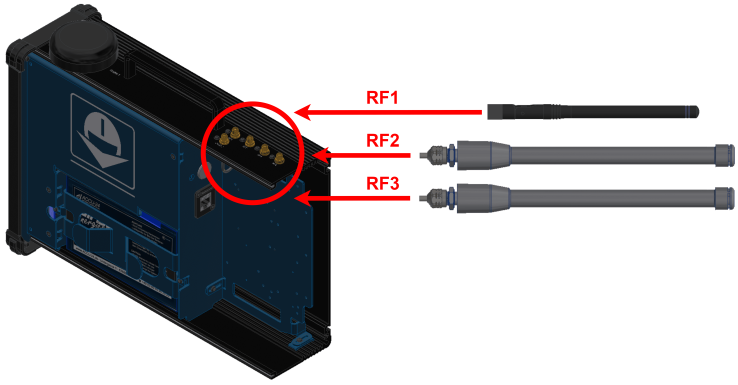


Fig. 29: **Wiring with only PCS**
(Diagram not scaled)

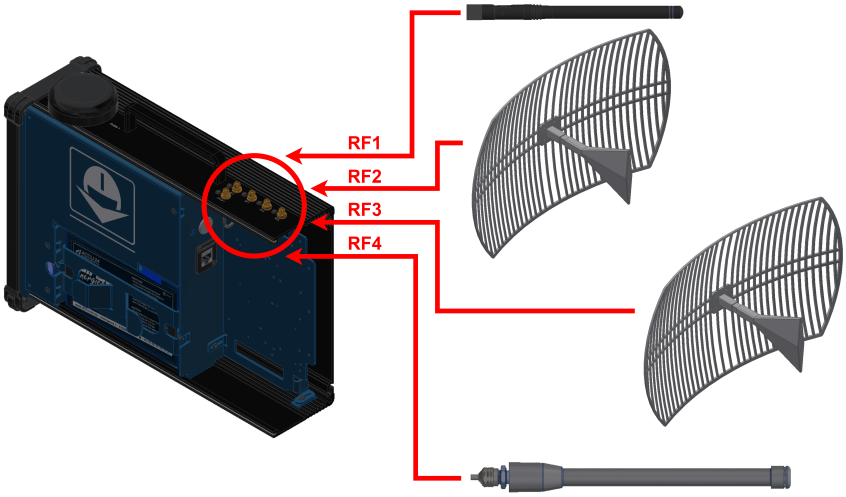


Fig. 30: **Wiring with PCS and T28**
(Diagram not scaled)

Tip: Do not close the **PCS** until all configurations are finished.

7.3.3.2 Silvus radio configuration

To know how to do a basic configuration of the Silvus radio, visit Silvus radio configuration - Integration examples section of **1x Hardware Manual**.

However, an additional configuration is required when working with a PCS instead of the GND unit of Veronte Autopilot 1x.

- Networking. LAN Settings

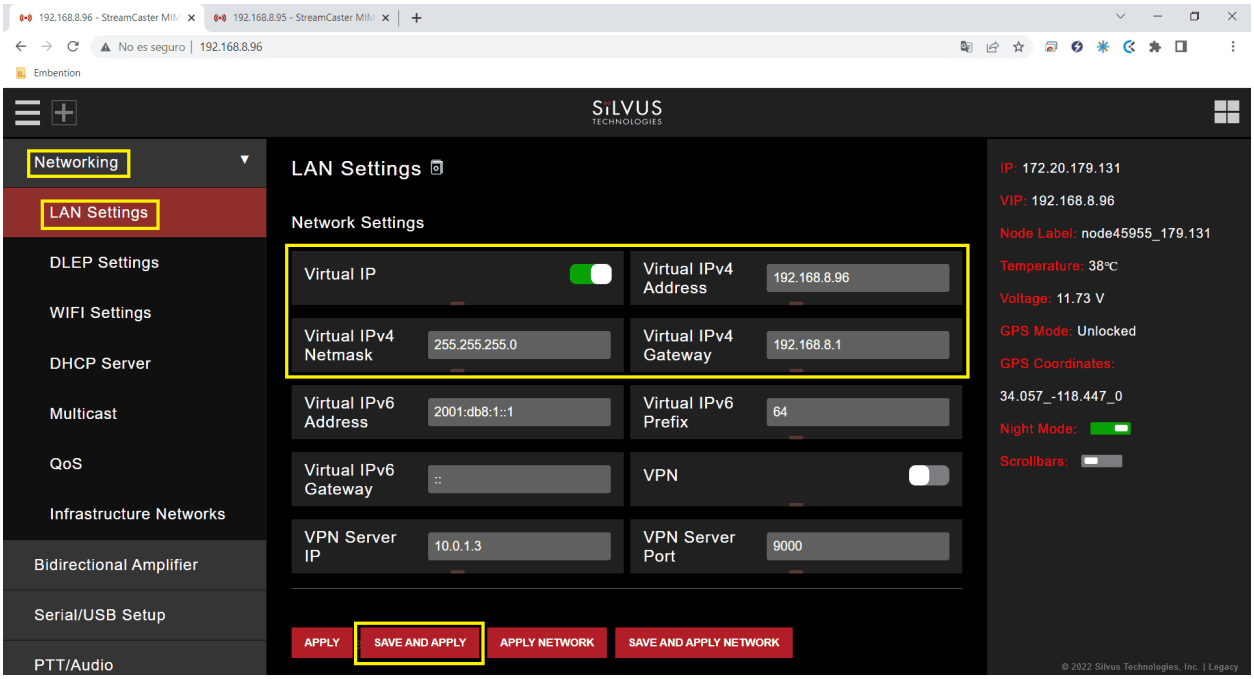


Fig. 31: **LAN Settings panel air unit**

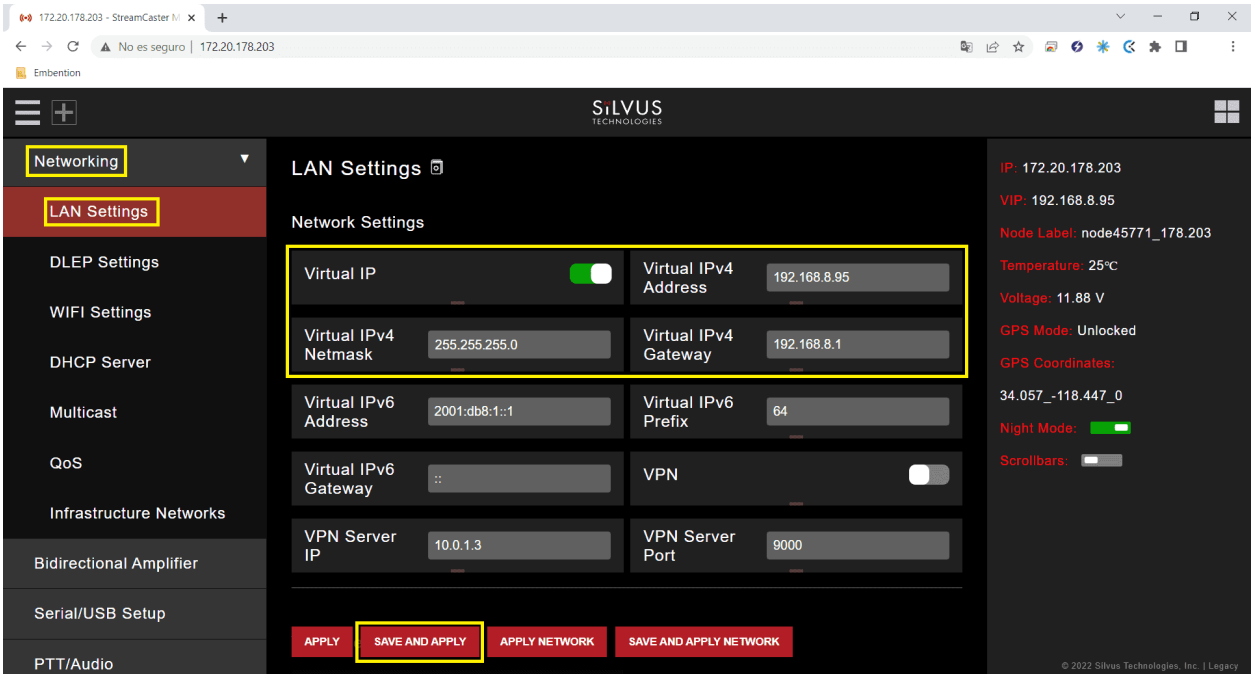


Fig. 32: **LAN Settings panel PCS**

- **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.

7.3.3.3 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.

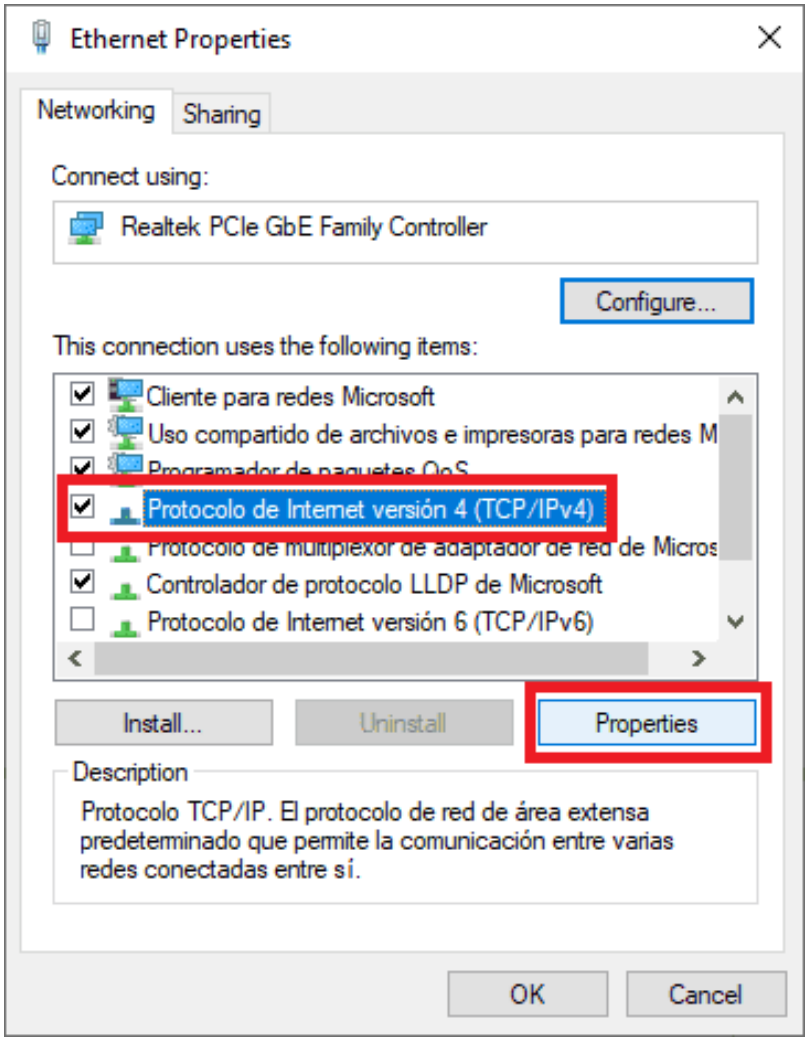


Fig. 33: **Ethernet settings 1**

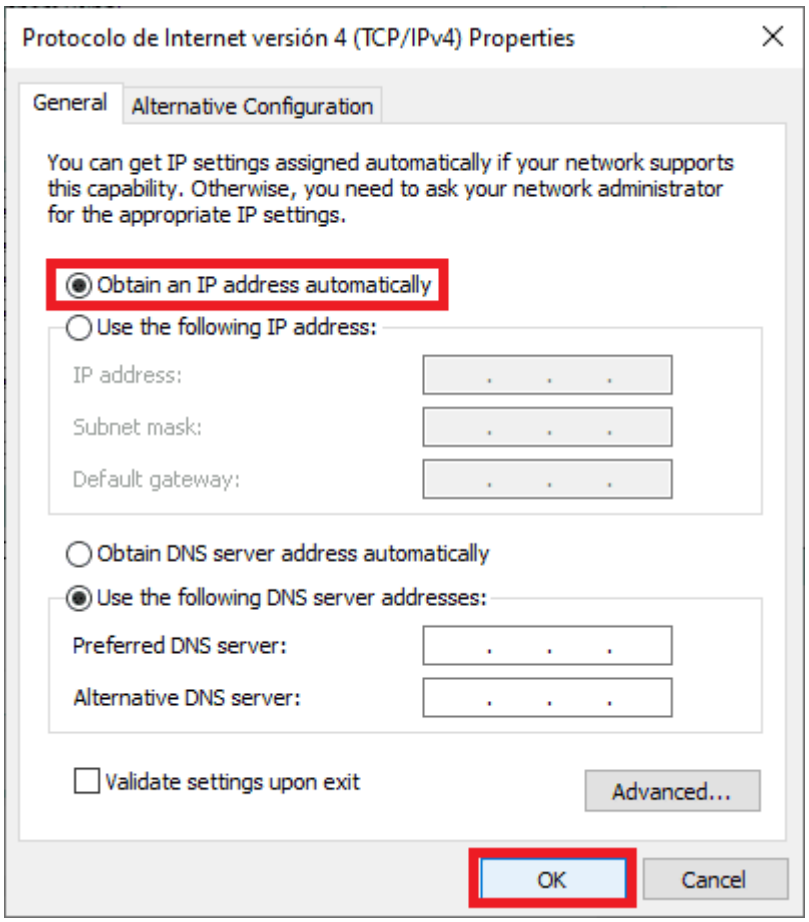


Fig. 34: **Ethernet settings 2**

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

7.3.3.4 Silvus radio configuration in autopilot

To configure an **Autopilot 1x** for a Silvus radio, visit External radios - Integration examples section of **1x PDI Builder** user manual.

7.3.4 Datalink Kit H/I - MicroHard Modem

1. First of all, to access the expansion bay, read *Expansion bay access* section of this manual.
2. Screw the brackets against the plate with two M3 x 4 mushroom bolts, so that they grip the base of the radio module.

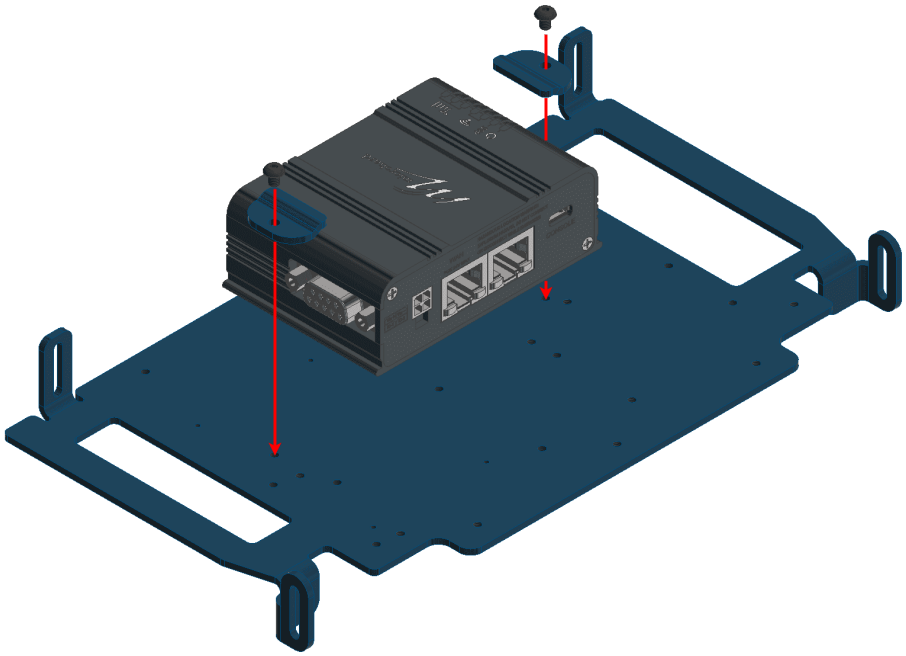


Fig. 35: **MicroHard installation - Step 2**

3. Join the casing.

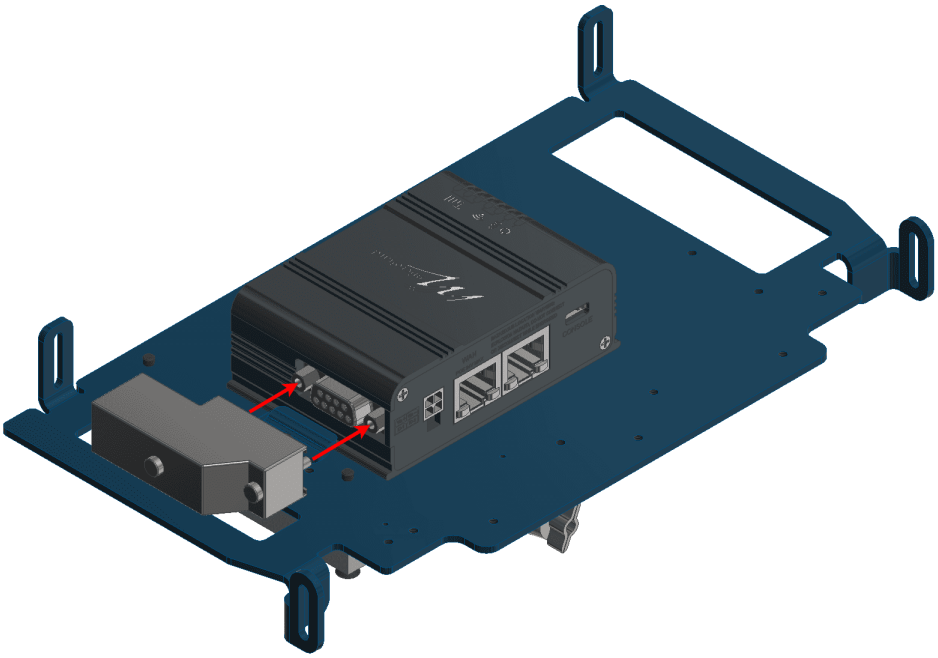


Fig. 36: **MicroHard installation - Step 3**

4. On the opposite side of the bay; screw the amplifier with three countersunk screws M3 x 30 and apply the thermal pad.

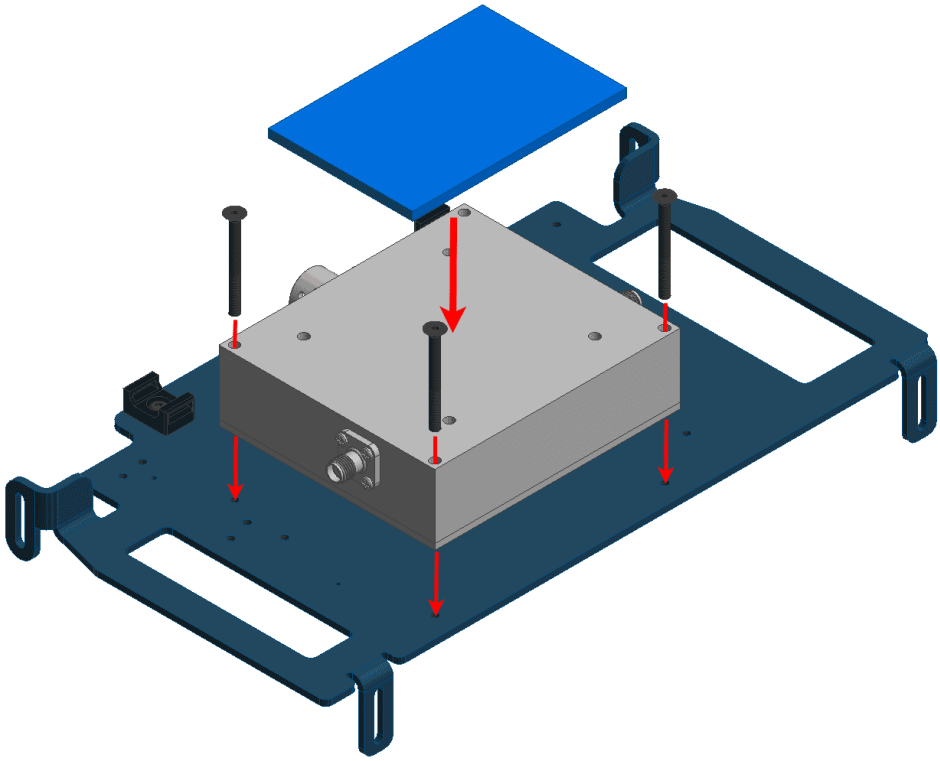


Fig. 37: **MicroHard installation - Step 4**

5. Connect the modem and the amplifier as indicated by the following figure. Notice that the cable is passed through the plate hole.

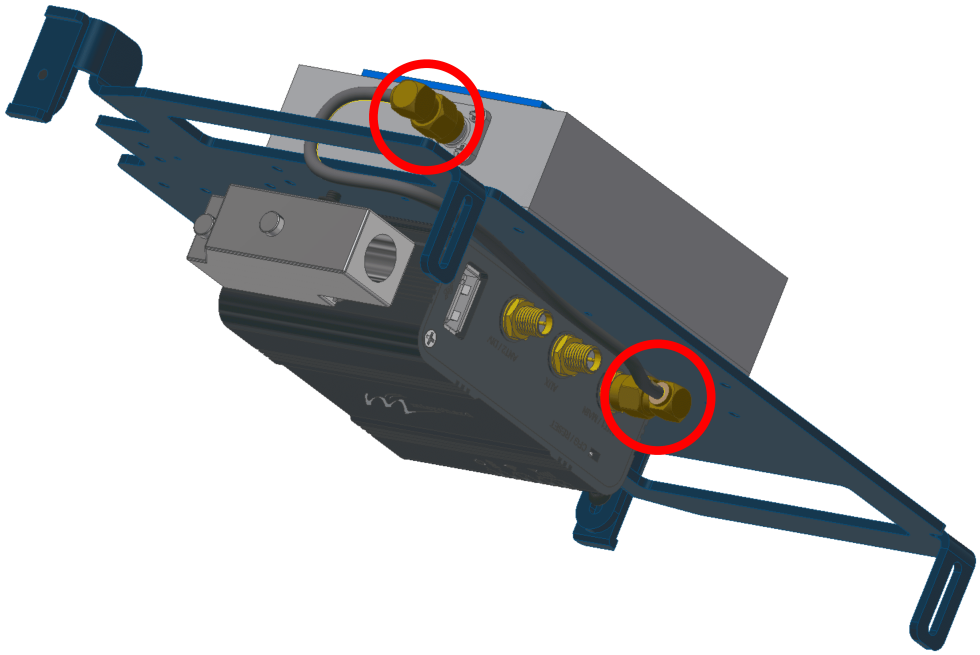


Fig. 38: **MicroHard installation - Step 5**

6. Connect the amplifier to the **RF2** port. Again, the cable must be passed through the indicated hole.

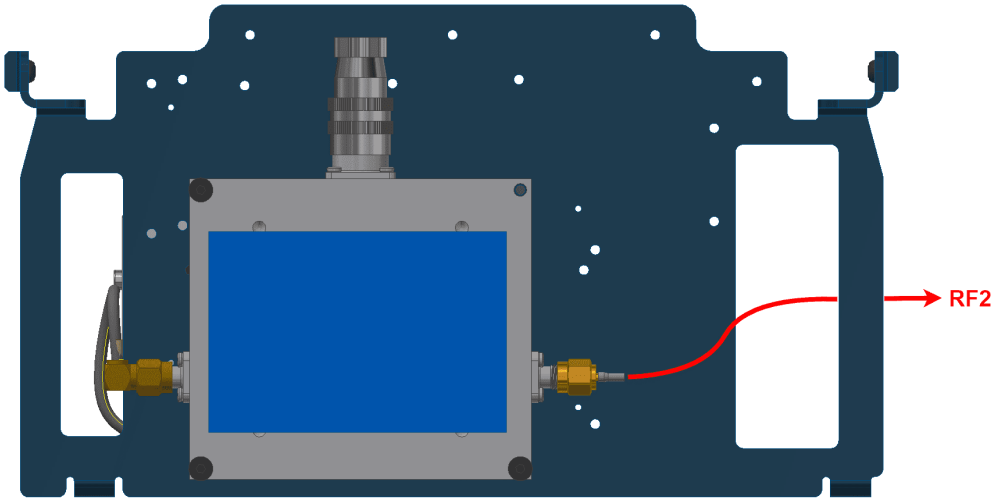


Fig. 39: **MicroHard installation - Step 6**

7. Place and screw the bay plate as the following image:

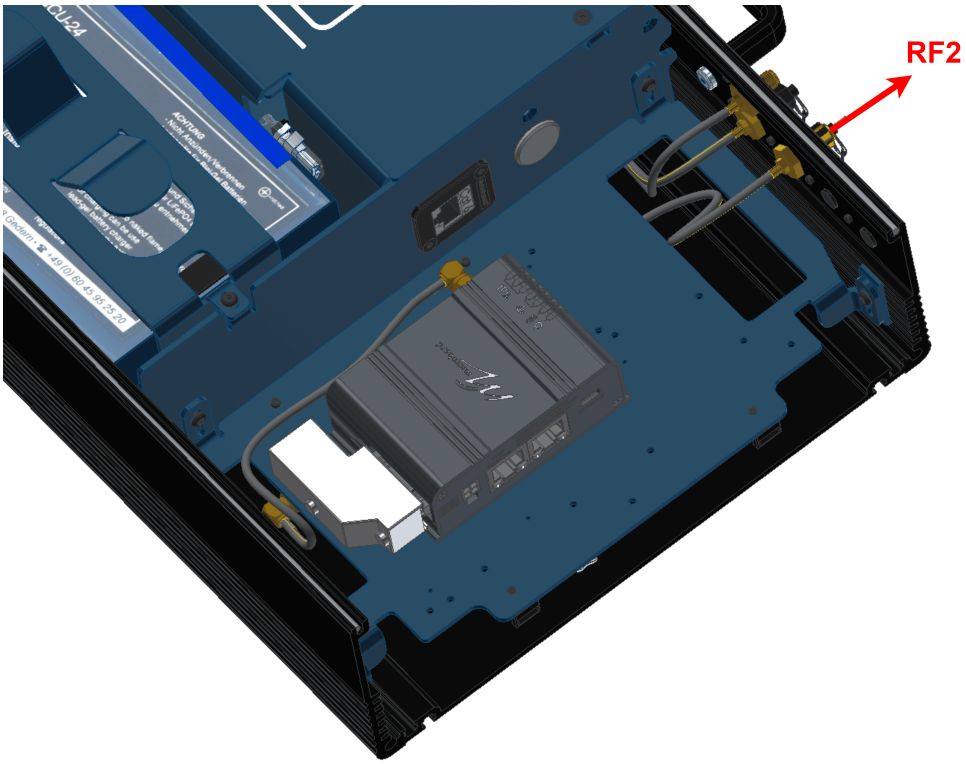


Fig. 40: **MicroHard installation - Step 7**

8. Connect the modem to the expansion connector.

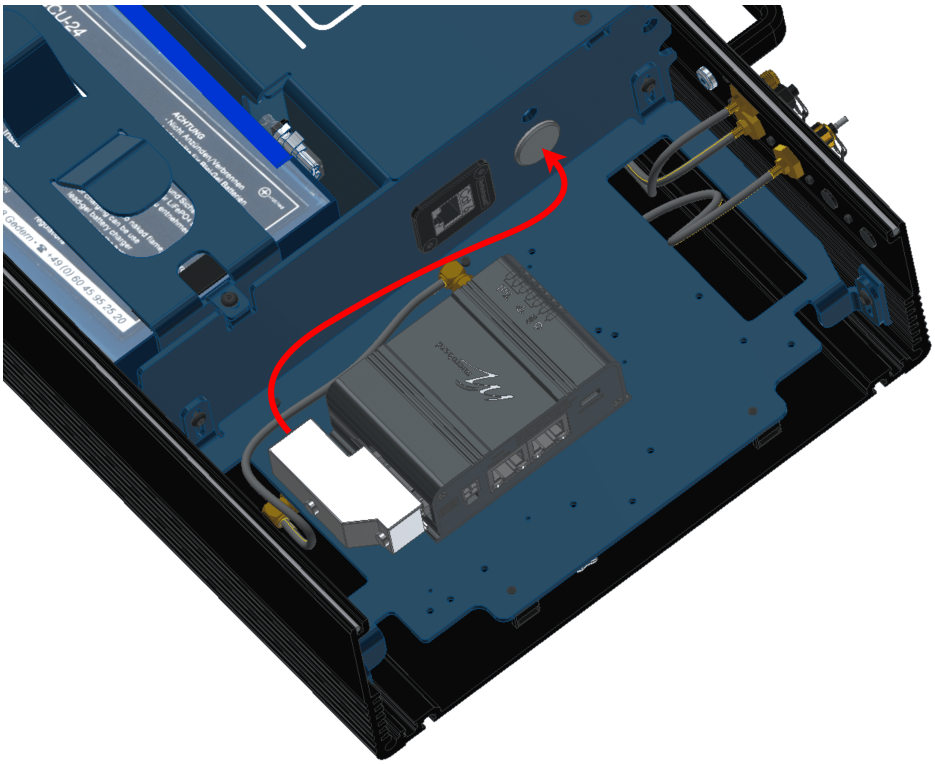


Fig. 41: **MicroHard installation - Step 8**

9. Mount the **PCS** to the pole according to *Pole mount installation* section of this manual (do not close the expansion bay yet).
10. Attach the omnidirectional antenna to the pole mount.

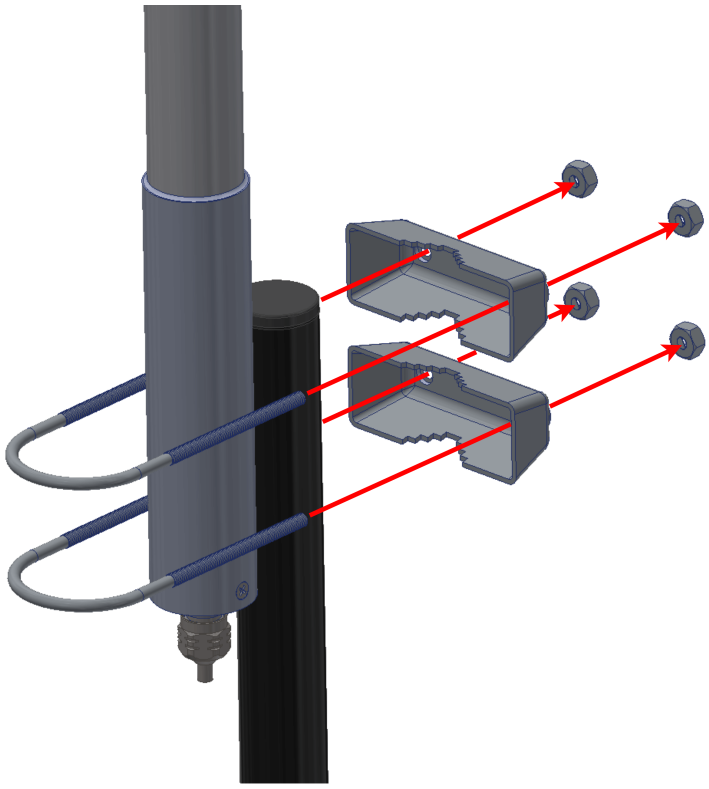


Fig. 42: **MicroHard installation - Step 10**

11. Connect both antennas.

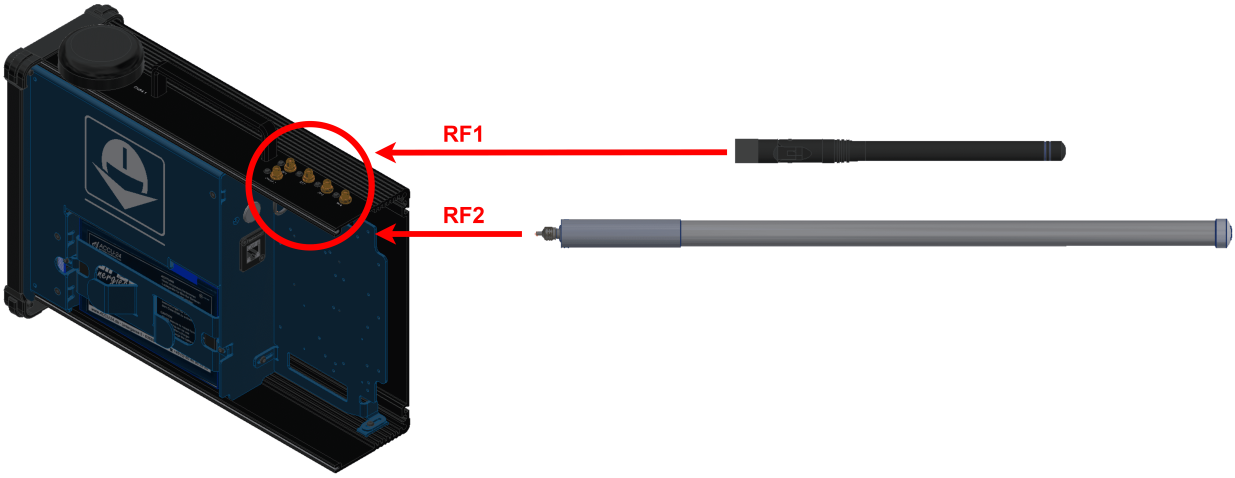


Fig. 43: **MicroHard installation - Step 11**
(Diagram not scaled)

12. Configure the **Veronte Autopilot 1x** as explained in External radios - Integration examples section of the **1x PDI Builder** user manual.
13. Connect the computer to the right ethernet port of the modem.

Warning: Do not connect the computer to the left port, since it is POE.

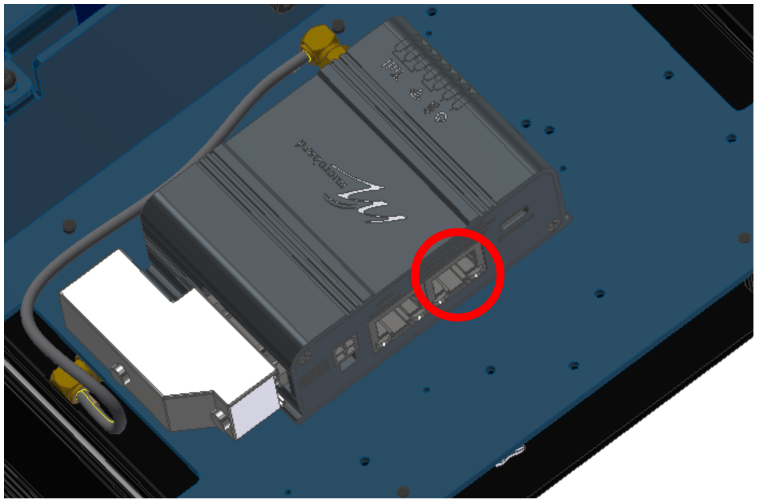


Fig. 44: **MicroHard installation - Step 13**

14. To configure the modem, open a browser and introduce the following address on the search bar: 192.168.8.4.
15. Calibrate the modem to the desired power.
16. Once the modem and the autopilot have been configured, close the **PCS**.

7.3.5 Datalink Kit J/K - Amplified Veronte SDL Modem

1. First of all, to access the expansion bay, read *Expansion bay access* section of this manual.
2. Screw the modem to the plate with four mushroom bolts M3 x 4.

Fig. 45: **Hardware amplified SDL installation - Step 2**

3. On the opposite side of the bay; screw the amplifier with three countersunk screws M3 x 30 and apply the thermal pad.

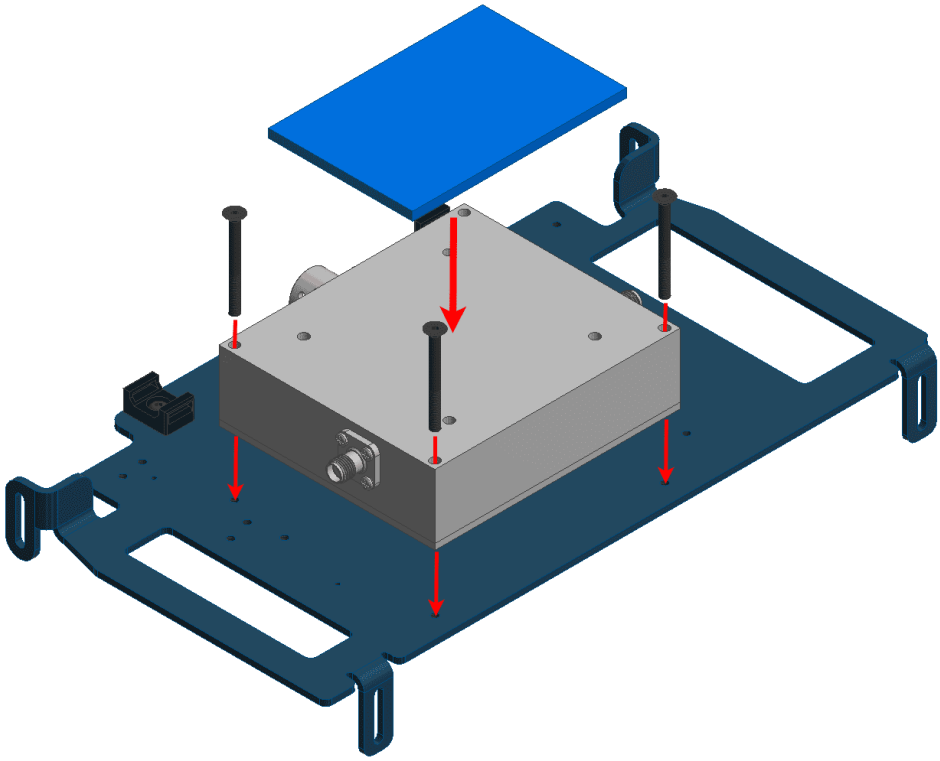


Fig. 46: **Hardware amplified SDL installation - Step 3**

4. Connect the modem and the amplifier as indicated by the following figure. Notice that the cable is passed through the plate hole.

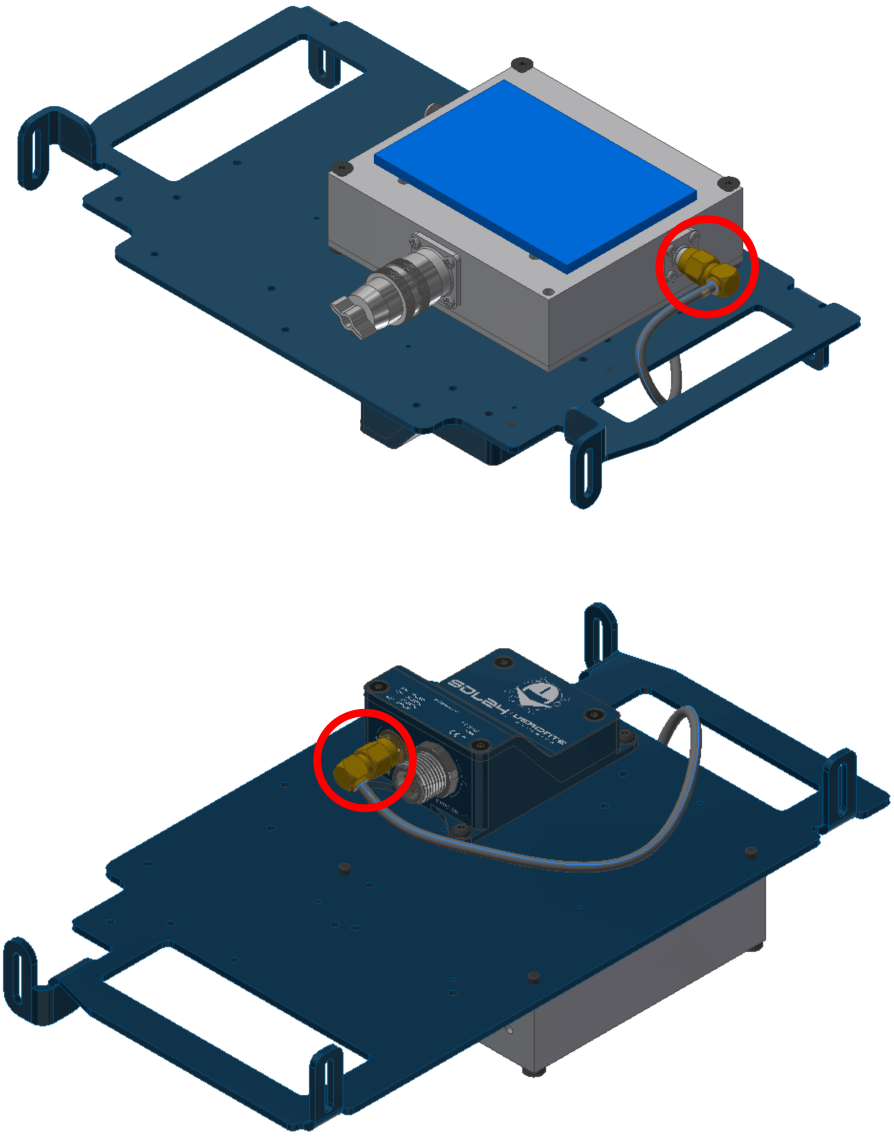


Fig. 47: **Hardware amplified SDL installation - Step 4**

5. Connect the amplifier to the **RF2** port. Again, the cable must be passed through the indicated hole.

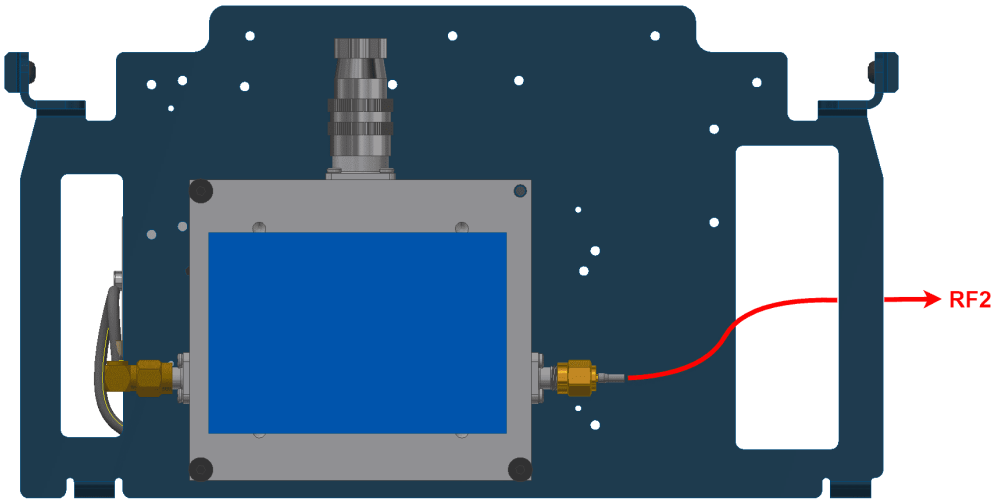


Fig. 48: **Hardware amplified SDL installation - Step 5**

6. Place and screw the bay plate as the following image:

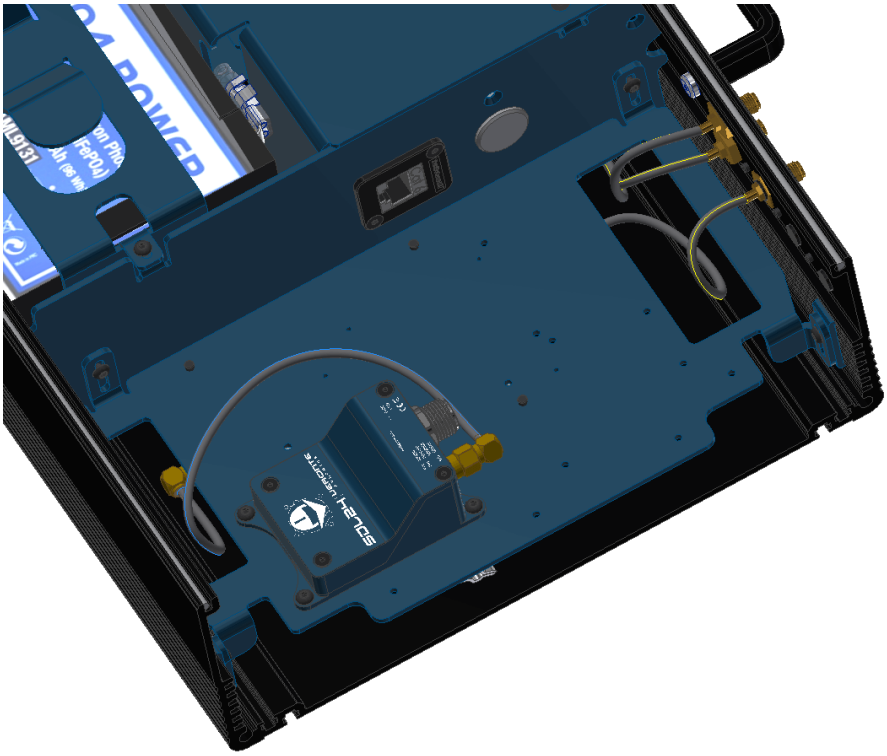


Fig. 49: **Hardware amplified SDL installation - Step 6**

7. Connect the modem to the expansion connector.

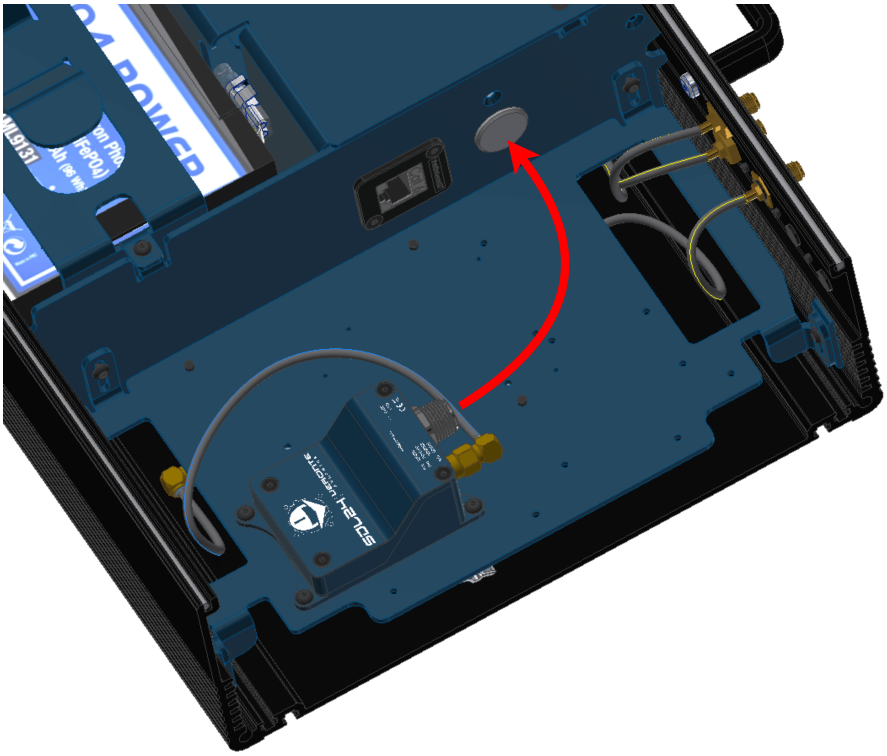


Fig. 50: **Hardware amplified SDL installation - Step 7**

8. Mount the **PCS** to the pole according to *Pole mount installation* section of this manual (do not close the expansion bay yet).
9. Attach the omnidirectional antenna to the pole mount.

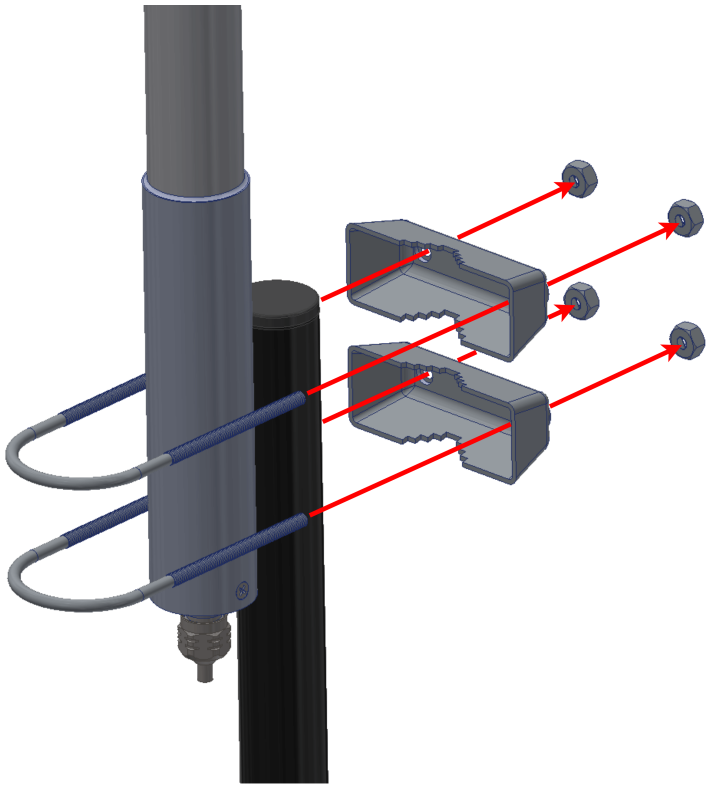


Fig. 51: **Hardware amplified SDL installation - Step 9**

10. Connect both antennas.

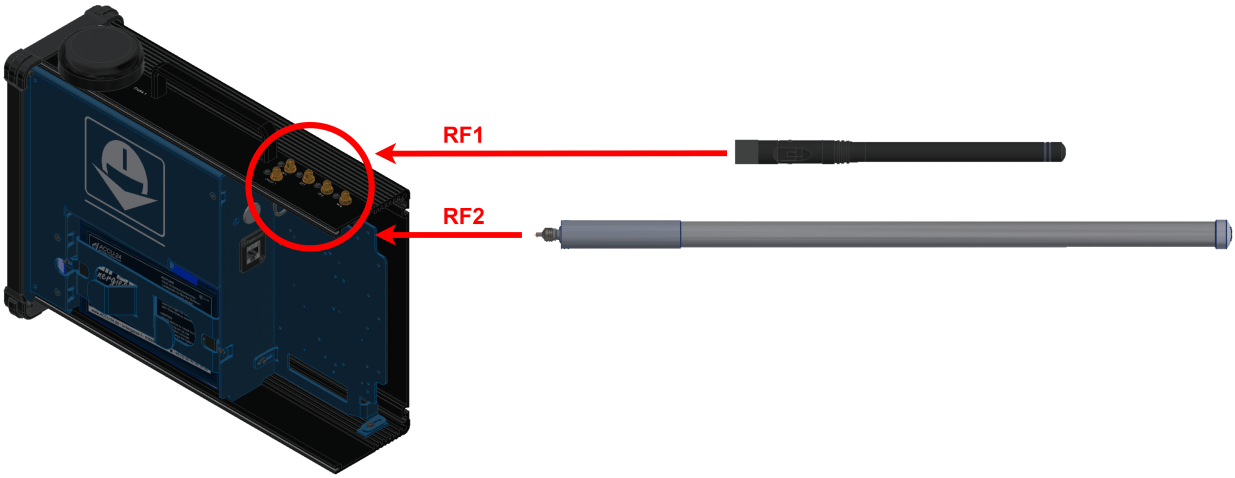


Fig. 52: **Hardware amplified SDL installation - Step 10**
(Diagram not scaled)

11. Configure the **Veronte Autopilot 1x** as explained in External radios - Integration examples section of **1x PDI Builder** user manual.
12. Configure the **Veronte Autopilot 1x** to communicate with **SDL** through a tunnel, to do it read Tunnel - Input/Output section of **1x PDI Builder** user manual.

13. Once the tunnel communication is established through **Autopilot 1x**, the modem can be configured with AT commands.

    13.1. First of all, to understand the basics, read How to configure SDL - Software Installation section of **SDL User Manual**.

    13.2. After that, read Veronte Autopilot 1x and Veronte BCS - Integration Examples section of **SDL User Manual**, to configure the **SDL**.

14. Once the **SDL** and the **Autopilot 1x** have been configured, close the **PCS**.

CHAPTER

EIGHT

TROUBLESHOOTING

8.1 Maintenance mode

Veronte Autopilot 1x can enter in maintenance mode to solve issues of configuration. To know more about this mode, read Maintenance mode - Troubleshooting section of **1x Hardware Manual**.

PCS harness includes a maintenance button to force the maintenance mode, which connects both I2C pins. To use the maintenance button read the following steps:

1. Turn off the **PCS**.
2. Press and hold the maintenance button.
3. Turn on the **PCS** (do not release the maintenance button yet).
4. Release the button.

8.2 Connection not established

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).

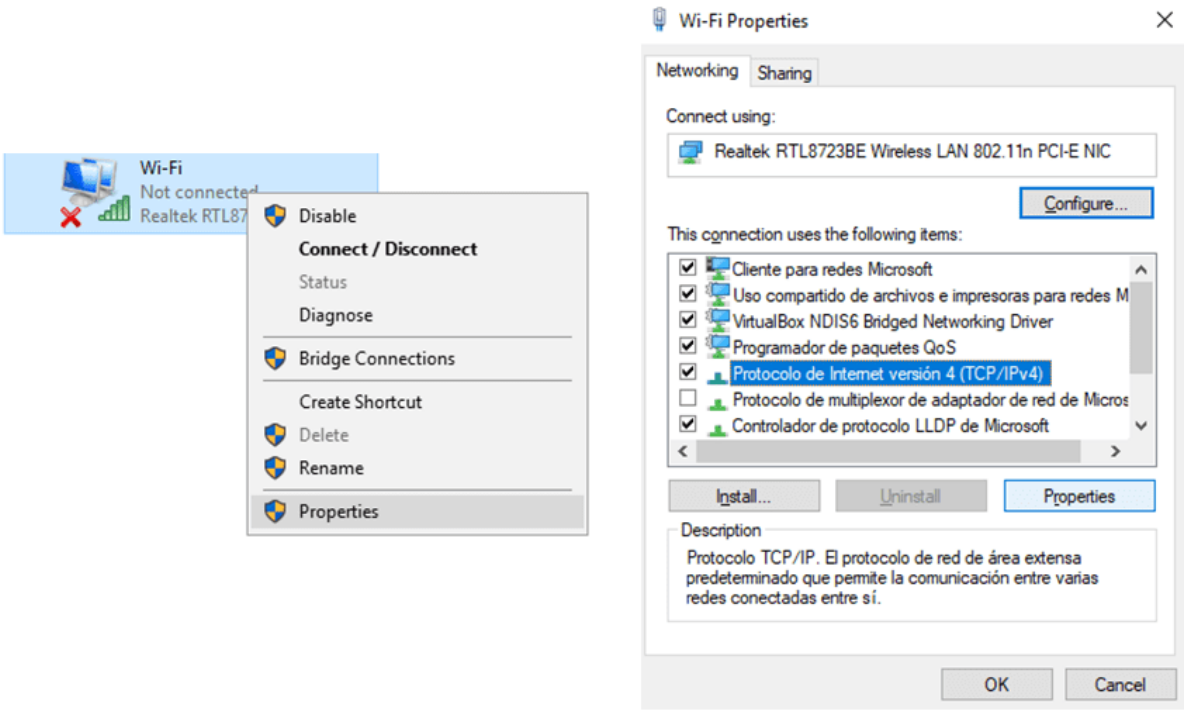


Fig. 1: **How to operate - Wi-Fi/Ethernet Settings**

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

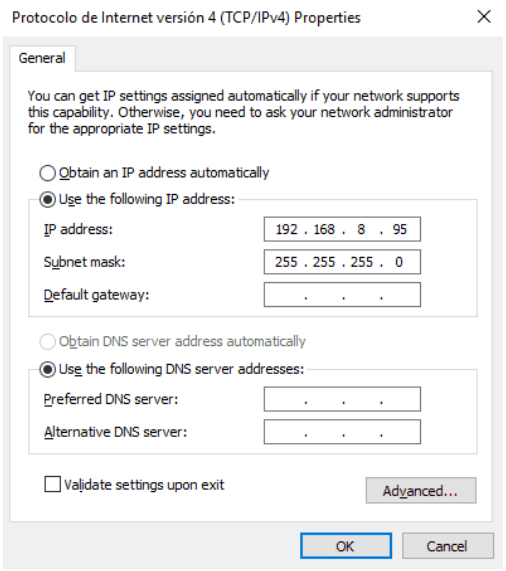


Fig. 2: **Static IP Configuration example**

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
NC	No Connect
PCS	Pole Control Station
POE	Power Over Ethernet
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
SDL	Standard Data Link
TC	TeleCommunications
TM	Telemetry
VCC	Voltage 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).