4WD-Panda Manual

Introduction to chassis functions

This chassis is a fully enclosed four-wheel drive chassis. The main components of the chassis include the battery, motor (with suspension structure), encoder, IMU, 4-way ultrasonic sensors, and motor control board. The main functions include following the command speed, providing feedback on the movement speed, reporting IMU data, detecting battery current and voltage, reporting ultrasonic data, and indicating the chassis working status through RGB lights and buzzers. This chassis has a maximum load capacity of 20kg and can be used as a mobile expansion platform with certain industrial and commercial application potential. For example, it can be equipped with a robotic arm and combined into a mobile robotic arm.

Definition of chassis indicator lights and buzzer status

The green indicator light flashes at a frequency of 2Hz (slow flashing)	Chassis function is normal, no connection is established with the host computer (no data protocol data sending and receiving)
The green indicator light flashes at a frequency of 0.5Hz (fast flashing)	Chassis function is normal, and the connection with the host computer has been established (data

	receiving and sending within the data protocol)
The buzzer keeps sounding for 2 seconds	The chassis is connected to the upper computer
The buzzer beeps at 2HZ for 3 seconds	The chassis is disconnected from the upper computer
The yellow indicator blinks at 2Hz, and the buzzer buzzes at 1Hz	Battery low voltage alarm (below 12.8V)
The red indicator blinks at 0.5Hz, and the buzzer buzzes at 1Hz	Battery low voltage alarm (below 12.8V)

Under normal circumstances, when the user turns on the power after receiving the chassis, the green indicator light should light up, and then the green indicator light should flash at a frequency of 0.5Hz (slow flashing). After opening the upper computer application, the buzzer will continue to sound for 3 seconds, and the green indicator light will flash at a frequency of 2Hz (fast flashing) from 0.5Hz. After closing the upper computer application, the buzzer will sound at a frequency of 2Hz for 3 seconds, and at the same time, the green indicator light will change from fast flashing to slow flashing.

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Panel interface definition

As shown in the figure below, the panel ports from left to right are three color indicators, two external power supply ports (need to be customized, the output voltage can be customized), power display, 16.8V charging port and the main switch. In addition, the coordinate system of the vehicle follows the ROS REP-105 rule, and the power display panel is in the backward direction.

Chassis charging instructions

The chassis has a built-in 16.8V power lithium battery. There are the following points to note about the use and charging of lithium batteries:

1. Please use the charger delivered with the robot to charge the robot, plug the charger into the socket, the indicator light on the charger is green, and when the charger is connected to the charging interface of the robot, the indicator light of the charging interface is red; When full, the light is green.

2. When charging the chassis with the charger provided with the chassis, the indicator light on the charger is red; When full, the indicator is yellow green, when no load, the indicator is yellow green.

3. Do not charge the chassis without being guarded, and do not place the chassis near flammable materials when charging to avoid accidents.

4. When the chassis has a low voltage alarm (below 12.8V), it should be stopped immediately to avoid over discharge of the lithium battery affecting the battery performance or even damaging the battery.

5. If you do not use the chassis for a long time, please charge or discharge the lithium battery to 15.2V ~ 15.6V. If the chassis is stored for a long time, check the battery power regularly to ensure that the battery voltage is always maintained at 15.2V ~ 15.6V.

Install the remote control handle signal receiver

Take out the plug of the receiver from the carriage, and then take out the signal receiver and 3M double-sided tape from the accessory package. Stick the receiver in an appropriate position and plug it in.

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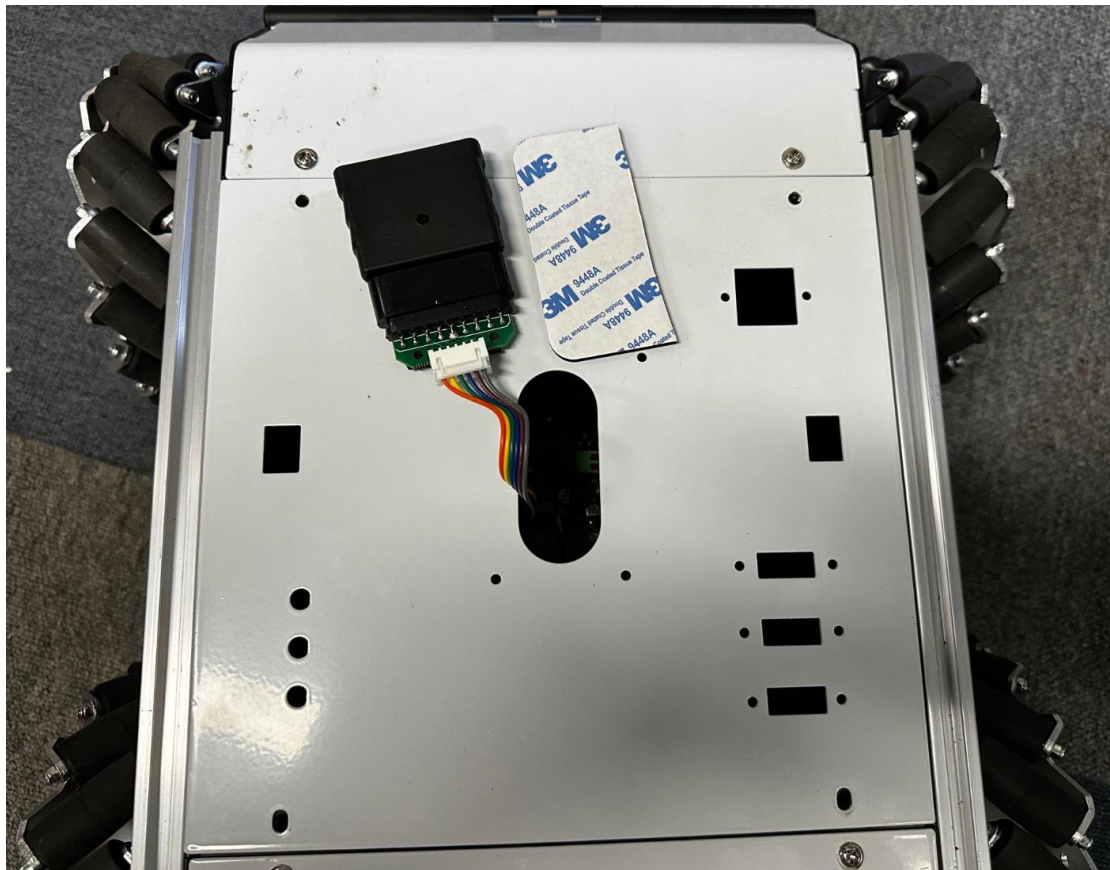
Display screen installation

As shown in the following figure. Take out two 1515 corner codes and four sets of M4 screws T-type nuts; Install two sets of screws and nuts for each corner code, ensuring that the nuts only need to be rotated 1-2 turns; Place the T-nut on the installed profile and tighten the screws, paying attention that the end face of the profile needs to exceed the black frame (red line in the bottom right figure), which will facilitate the loading and unloading of the upper cover plate.
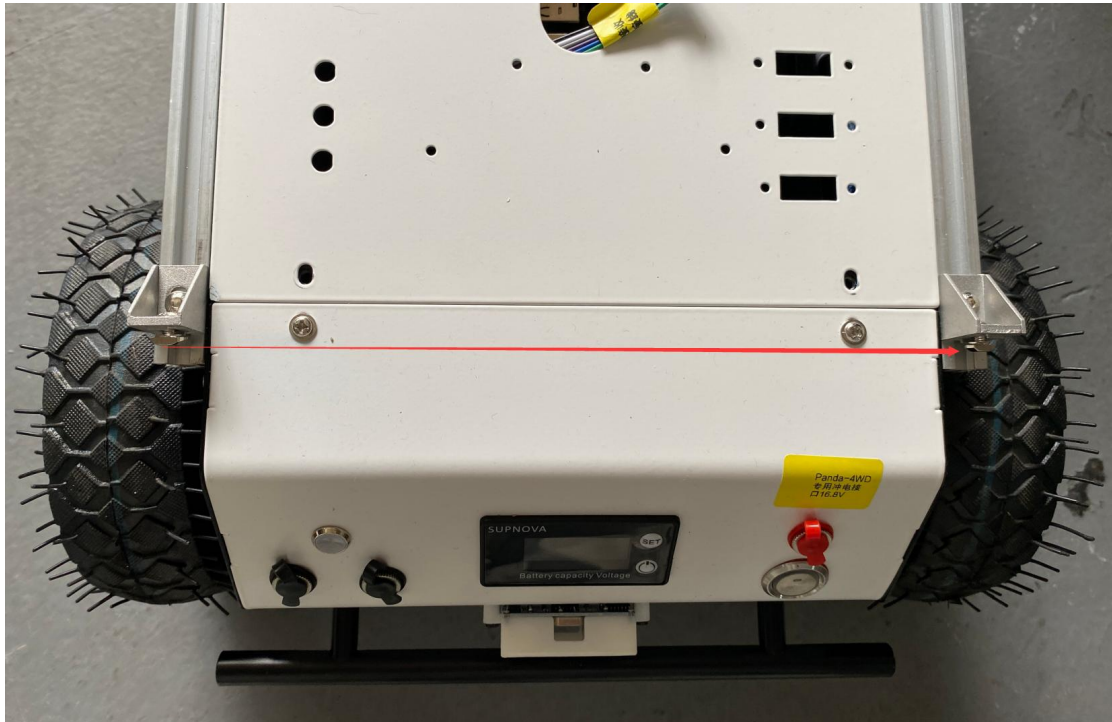
Take out the profile with a length of 244mm, align the groove with the end face of the above corner code, and tighten the screw T-shaped nut on the end face; The effect is shown in the following figure.

Take out the installation bracket, damping hinge, M3 * 6 screw, M3 anti loosening nut, and cross screwdriver provided with the display screen, and install them according to the left image. Note that the hinge part (protruding part) should be on the same side as the nut.
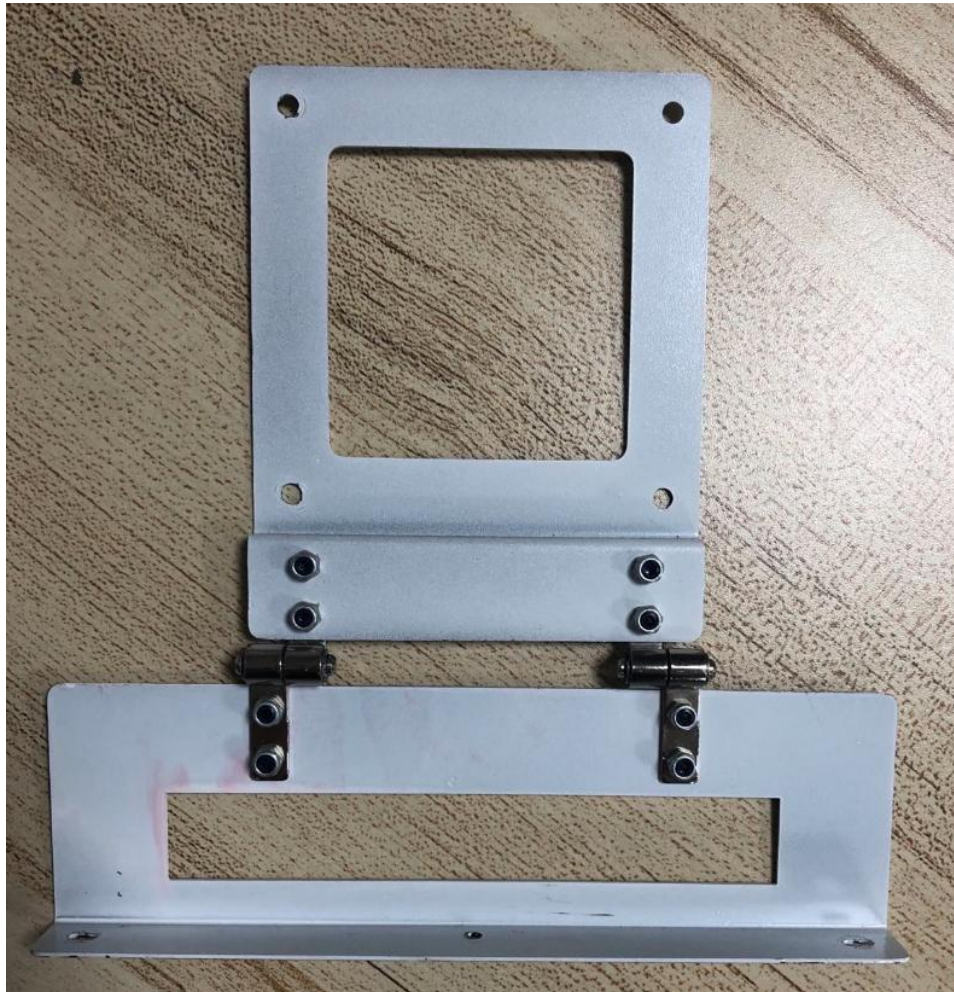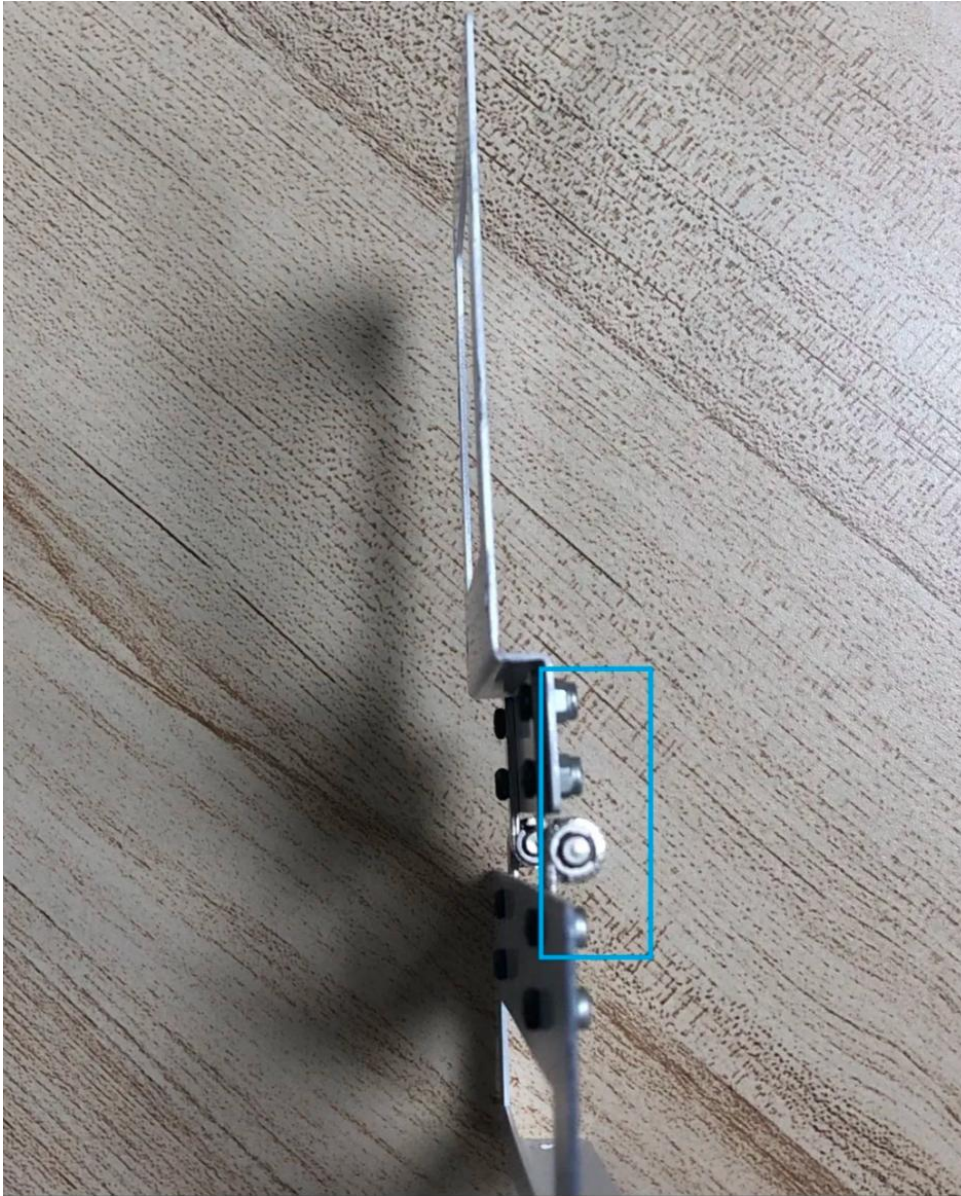
Remove the M4 * 5 screws that come with the display screen, install the mounting bracket and display screen together as shown in the bottom left image, and make sure that the button is above; Then install it on the profile, take out two sets of M4 screws and T-shaped nuts, and the installation holes are shown in the following figure on the right.
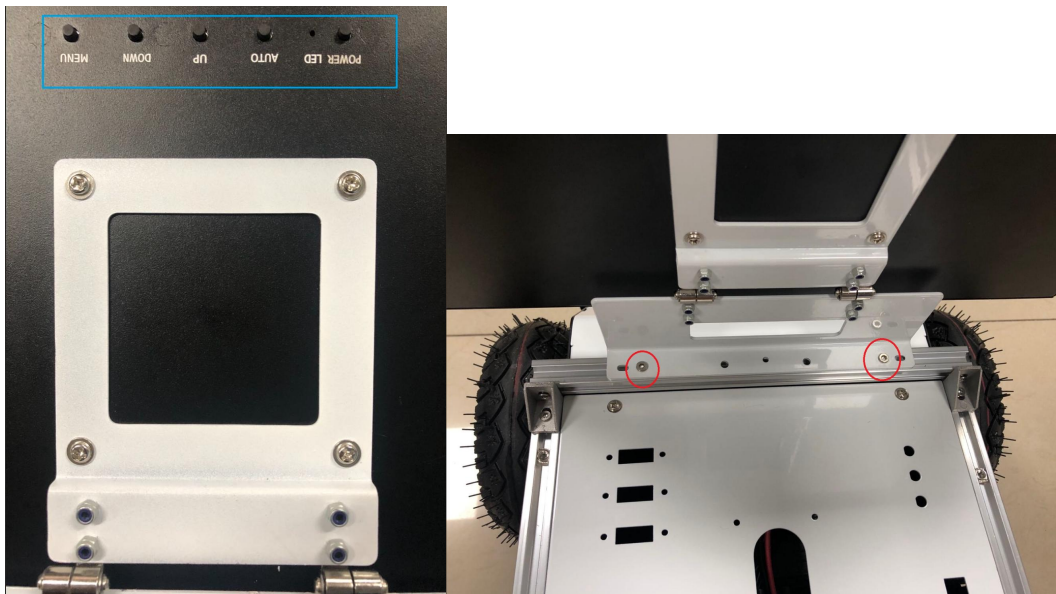
The installed rendering is shown in the bottom left image; The display screen needs to be plugged in with an HDMI cable and a USB power cable.

Expansion layer

Expansion layer - column installation

Take out two profiles with a length of 350mm, two profiles with a length of 218mm, six 1515 corner codes, and M4 screws T-nuts, and install

them according to the following diagram. Repeat the above action and assemble another set of such frameworks.


Install the two sets of frames installed above onto the vehicle in sequence. The first group is installed on the side near the front panel, paying attention to the fact that the end faces of the two profiles in the red circle are in the same plane (as shown in the lower left figure); Next, install the second set of frames. As the position of the second set is not yet determined, do not tighten the screws for now.

**Expansion layer - installation of radar and depth camera**

Remove the camera, camera mounting bracket, and two M2 screws, and install them as shown in the following two pictures.
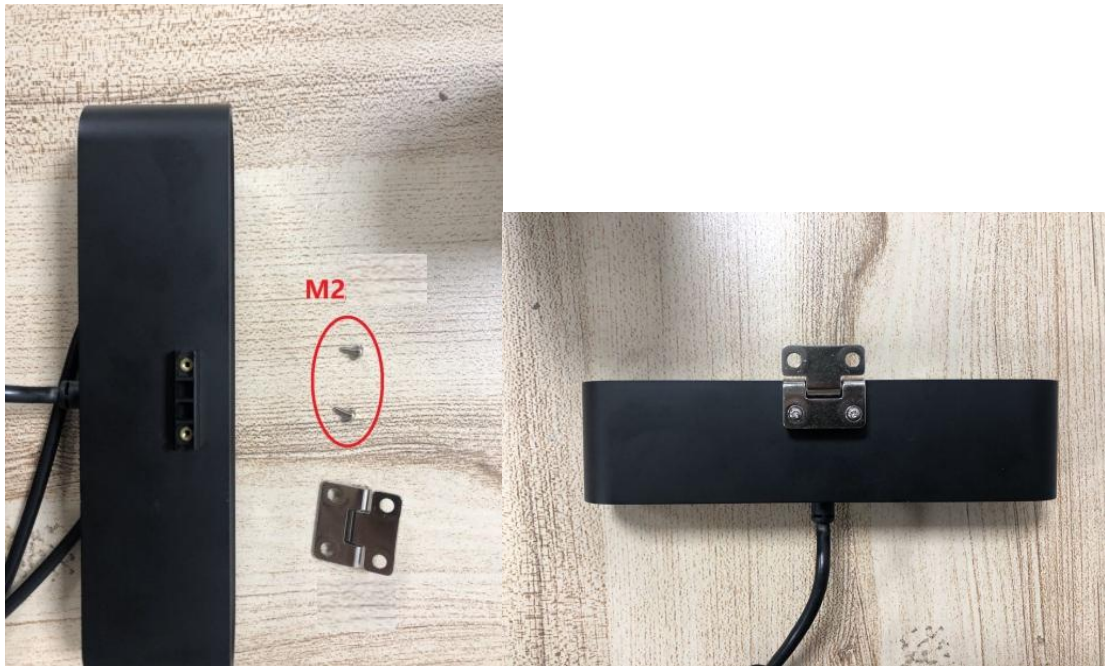
Take out two sets of M3 bolts and nuts, and install them on the mounting base as shown in the following two pictures.


Take out the expansion board, nvillidar radar (equipped with m3 * 6 screws), and astra camera (equipped with m3 bolts). The coordinate system and installation holes of the board are shown in the left figure below; The installed rendering is shown in the bottom right image, with the camera and radar pointing in the same direction as the board.
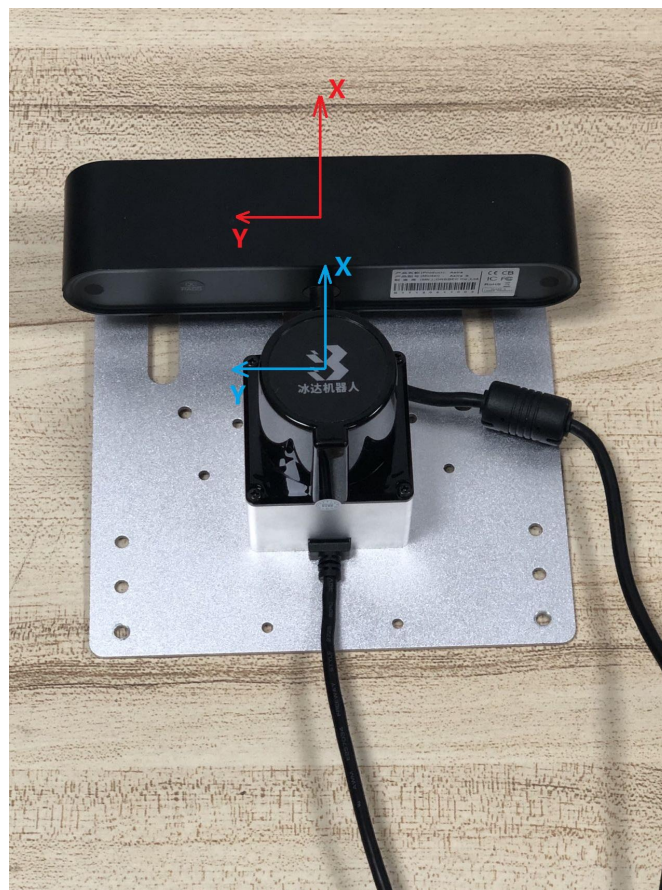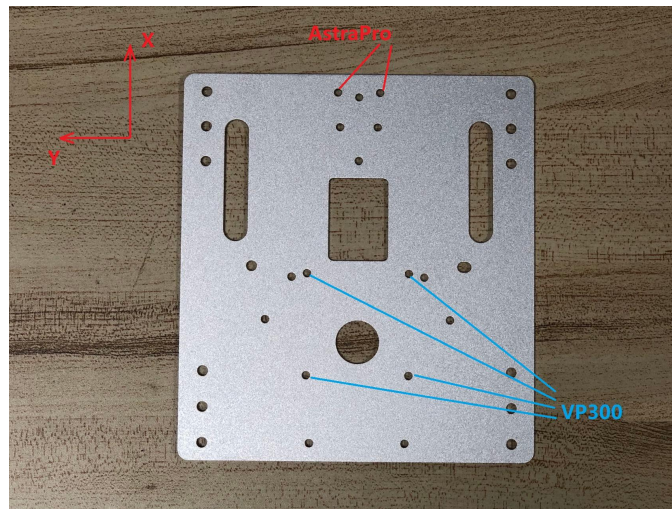
Install the expansion board onto the pillar

Take out 4 M4T nuts and place them on the profile, as shown in the lower left image. Move the expansion board in sequence to align with the installation holes (as shown in the bottom right figure) and T-nuts,

and tighten the screws (do not tighten). After all four installation holes are tightened, move the expansion board to the center position and tighten all screws.
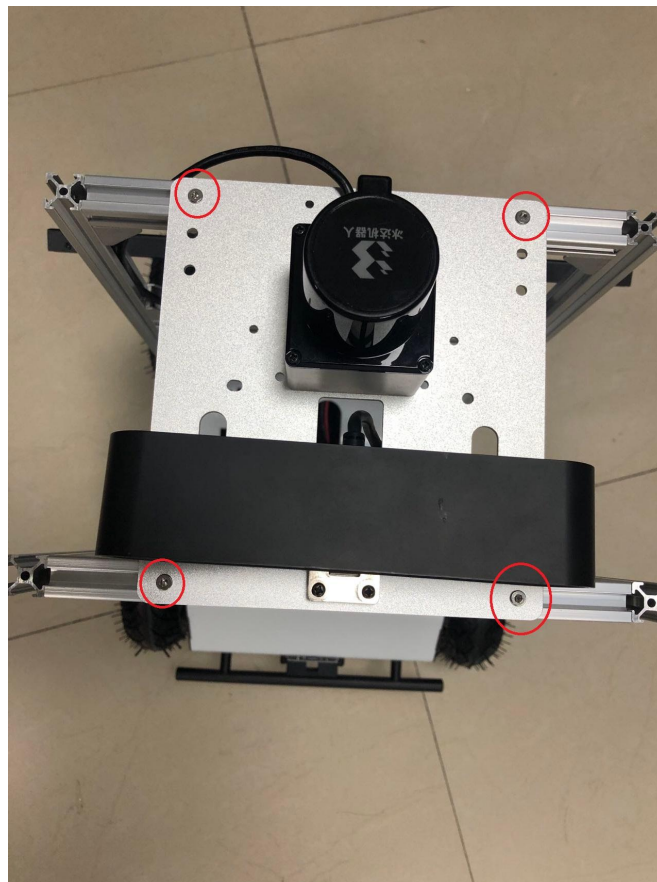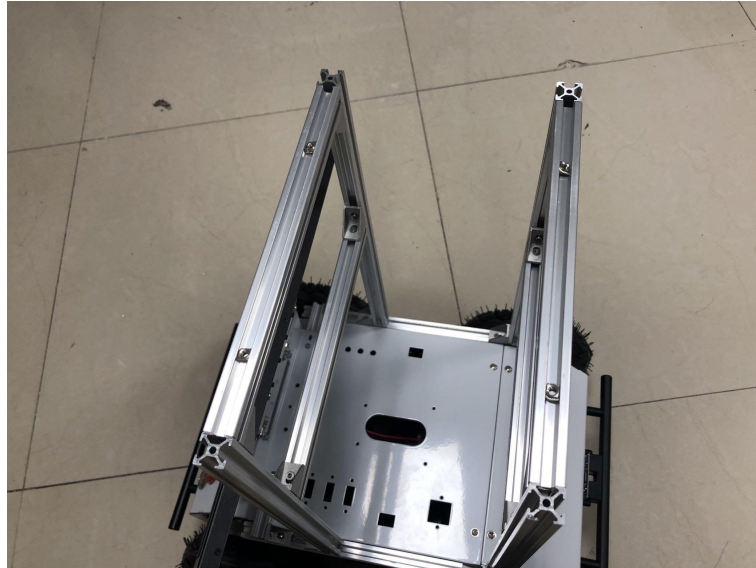
The effect diagram of the entire expansion structure is as follows：

Please note that the power supply capacity of the chassis USB and motherboard is limited, and cannot support the simultaneous operation of depth cameras, LiDARs, external screens, and other devices. We use a separate USB power cord for the screen and recommend not connecting too many USB devices.

Installing a USB color camera

Due to the lack of UVC protocol in the color lens of ASTRAS depth cameras, our image acquisition and processing operations cannot be processed. Therefore, for customers who purchase depth cameras, we

provide a set of USB-UVC protocol color cameras for color image acquisition.

Remove the camera and two sets of M4 bolts - trapezoidal nuts - from the USB camera accessory package, and install them as shown in the following two pictures.
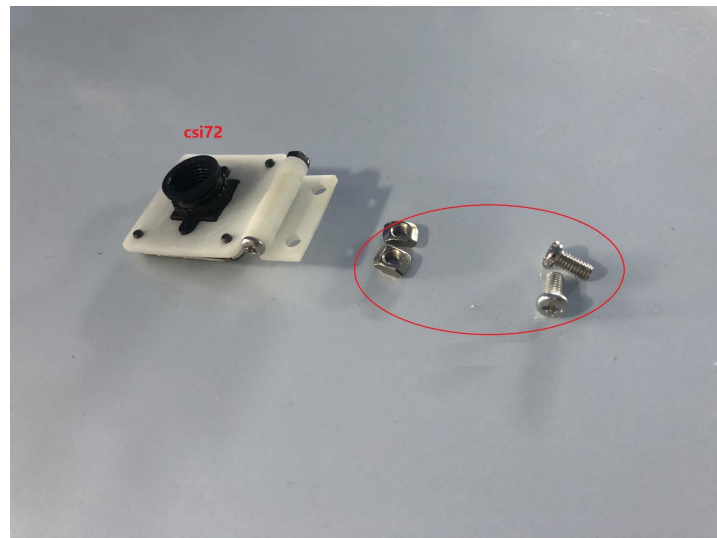
Place the nut in the groove of the profile, then tighten the screw as shown in the following figure.