

Aubo Guides and Training material

Lead Robotics

May 2022 v0.1.0

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1 This document

This document is a manual for setting up the Aubo for the WheelRestore System.

The required steps to setup a robot for wheelrestore are sections 2.1 to 2.3.

1. Set static IP using system settings
2. Update Aubo software via USB
3. Installing Aubo Programs Using Backup File

The rest of the document is either optional or alternative ways of doing these 3 things.

You will need a USB with the update software. The USB should also have a backup of the demo-machine, you will use to install the robotprograms, setup modbus etc.

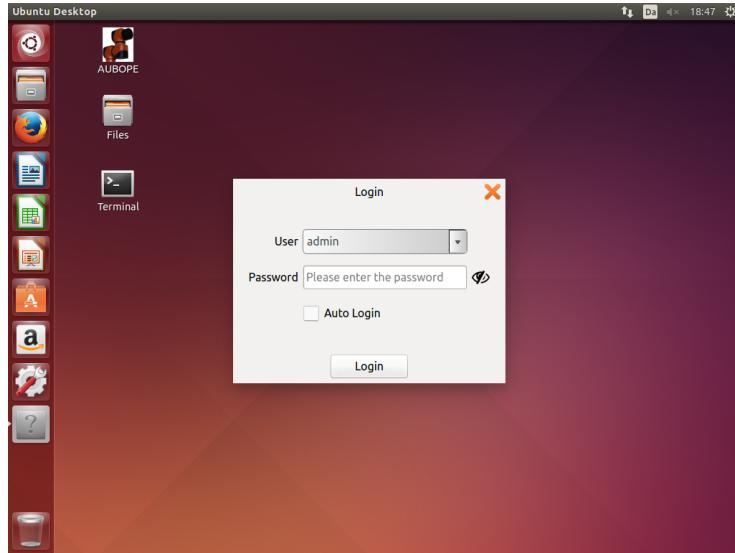
2 Guide

2.1 Set static IP using system settings

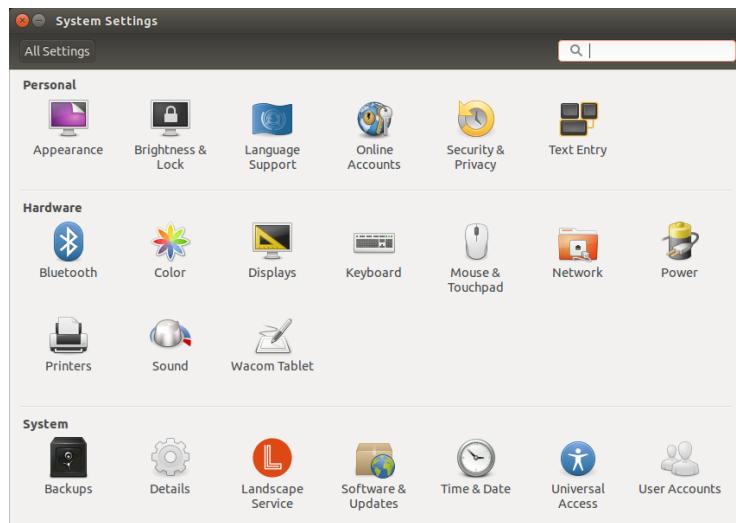
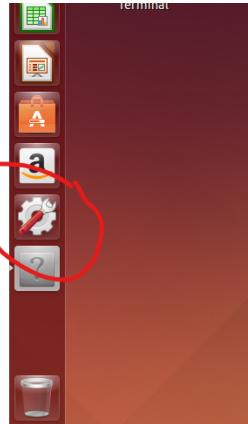
1. Connect the three cables to the controlbox. Connect the other ends to the manipulator arm, 230VAC power and the teachpendant screen respectively.
2. Turn the box on. On the compact box the switch is located right above the power cord plugin. On the large box the breaker is round and jutting out of the front of the box. After turning the switch you should hear the fans start in the box.



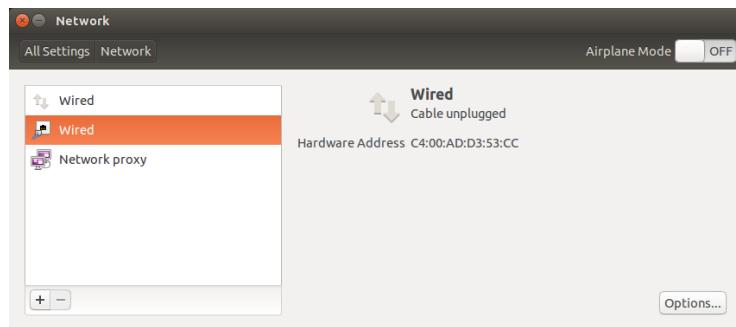
3. Wait for the *Standby* light to turn on with a solid orange light.
4. If the Emergency stop light is lit up in red make sure to clear the emergency stop button.
5. Now get the teachpendant and press and hold the power button in the top-left corner for at least 1s. The button should light up blue.
6. Wait for the teachpendant to start.
7. A guarantee disclaimer might appear, click agree to continue.
8. You should now see a login screen and a desktop.



9. Close the login screen for now, we will get to the robot program later.
10. You should now only see the desktop with 3 shortcuts - *AUBOPE*, *Files* and *Terminal*. *AUBOPE* is the robot software. This will re-open the login screen and get us into the robot programming. *Files* opens the filesystem. *Terminal* opens a bash terminal.
11. Open a terminal, by double tapping the icon. (or plug in a mouse and doubleclick on it)
12. We now need to type a terminal command beware if you haven't changed the keyboard layout the & sign will be on the key press *Shift + 7* as on a US keyboard not on a keypress of *Shift + 6* as with a Danish keyboard. Enter command: *unity&* . This command will start the unity desktop environment and give you a toolbar on the left side of the screen.
13. Open system settings either on the toolbar to the left or with the dropdown menu in the top right corner of the screen. The icon is a gear and a wrench.

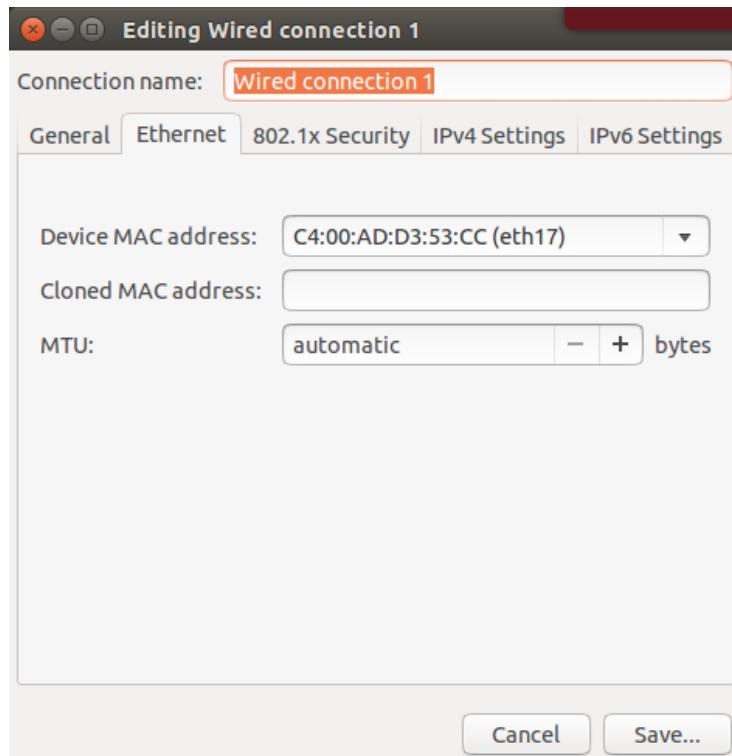


14. Doubleclick on network

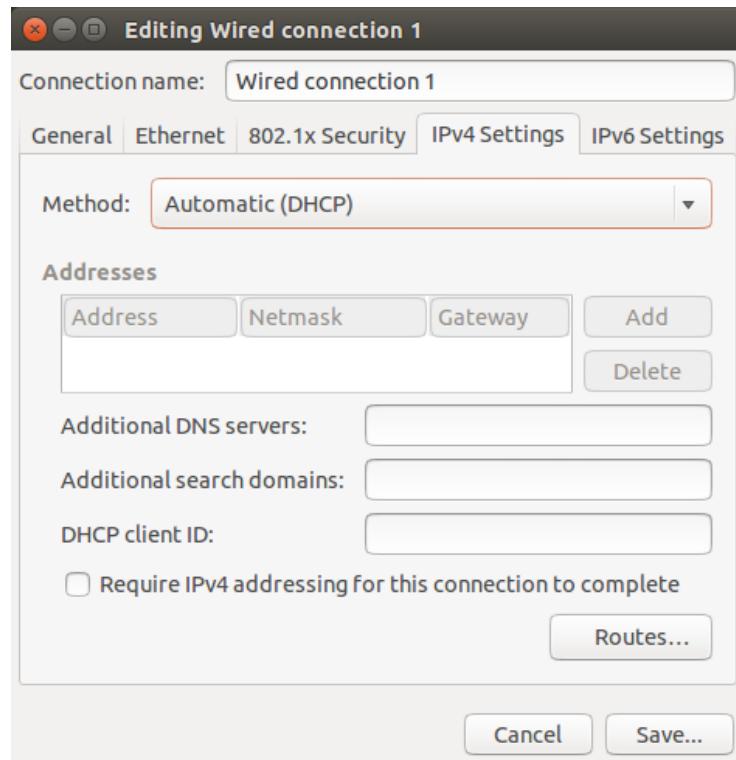


15. Select wired. The icon with the ethernet port not the arrows.

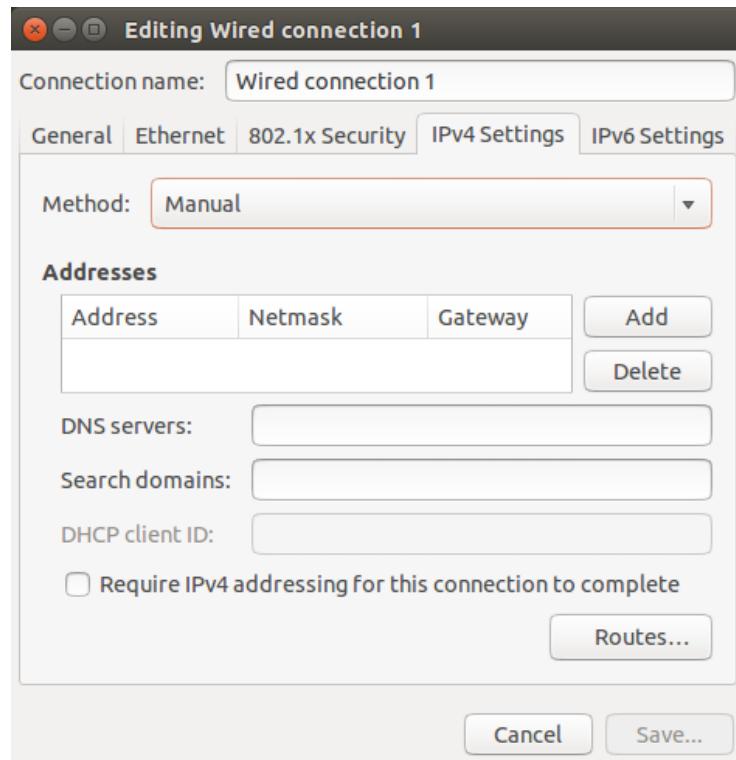
16. click options



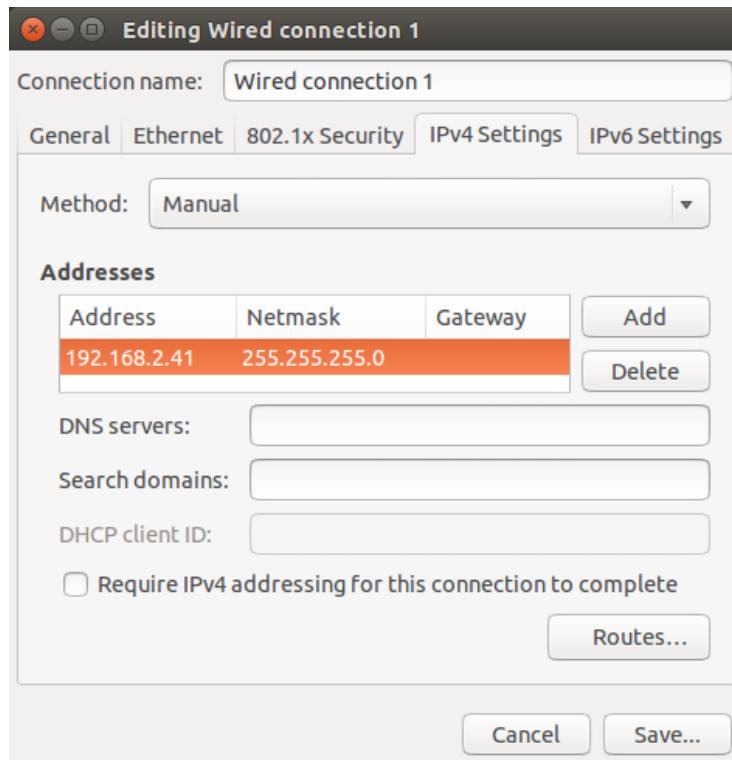
17. Select the IPv4 settings tab



18. In the Method dropdown bar select '*manual*'



19. Click add and type in your desired IP, mask and gateway.

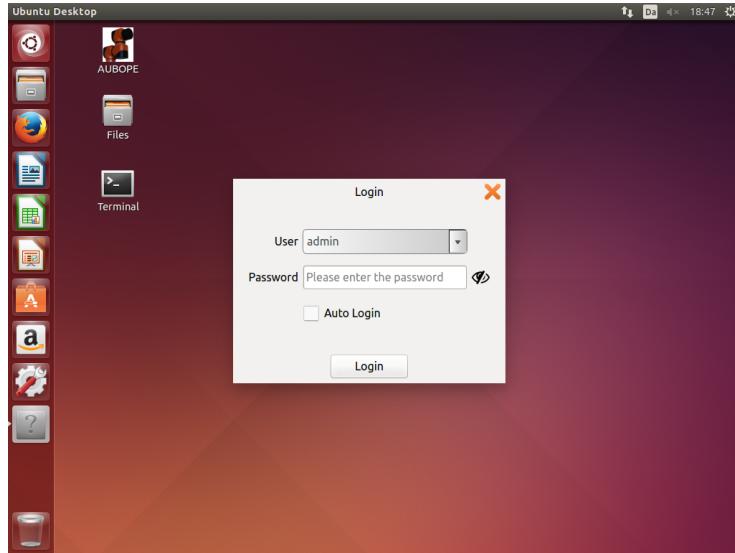


20. Click save.
21. Close the settings window and the terminal window. *x* is in the top left corner of the windows.

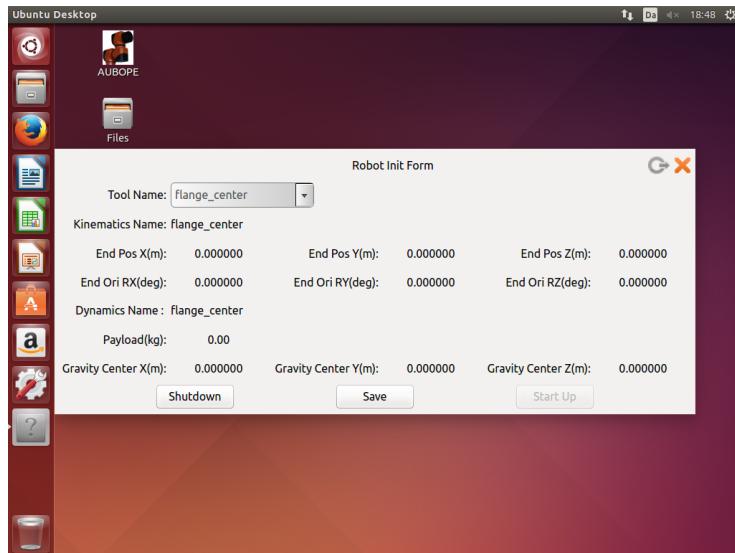
The robot should now have a static IP. You can test it by connecting a computer and pinging the robot on its new address.

2.2 Update Aubo software Via USB

1. Acquire USB with update software. the software is a compressed file ending in .aubo.
2. Plugin the usb.
3. Open AuboPE by double-clicking the shortcut on the desktop or by restarting the robot. The login screen should appear.

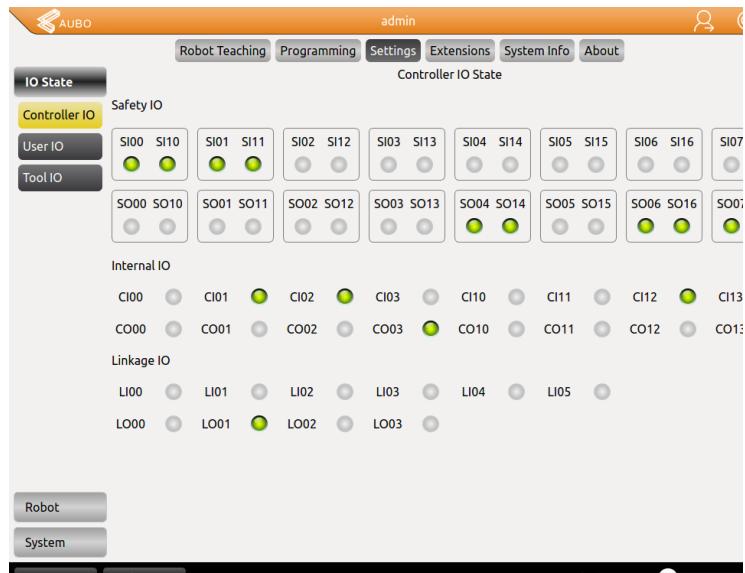


4. Type the password, default is '1' and press login. The *RobotInitForm* screen should appear

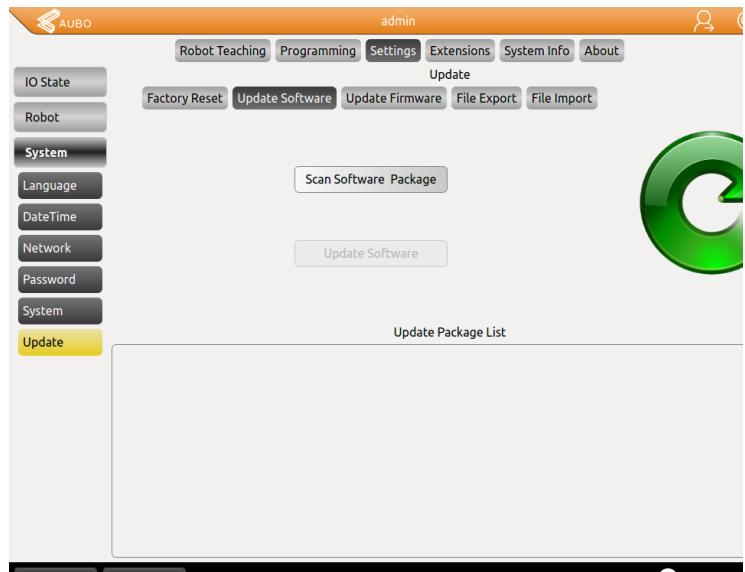


5. Press save and then startup to proceed. If this is the first time the robot has been started after being mounted it will say that the mounting pose has been changed. Click *ok* and then click *yes* to confirm that the mounting pose has changed. The robot will now initialize. You should hear the brakes click. The teachpendant should then show the robot user interface.

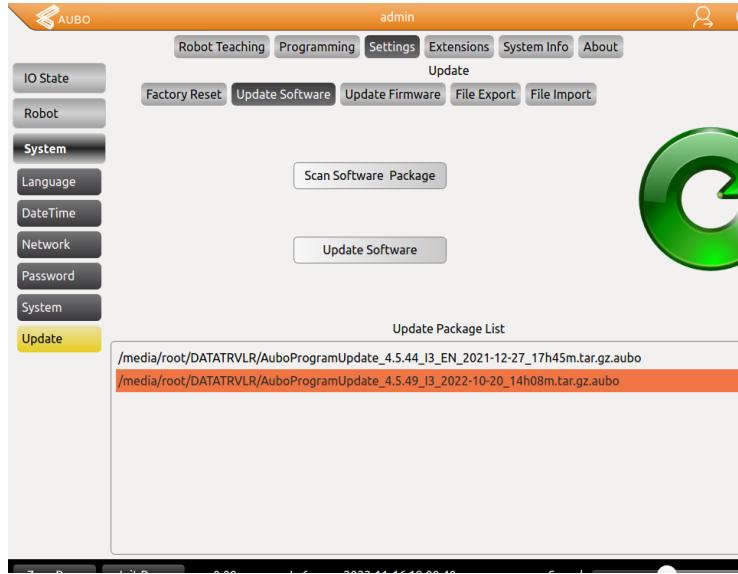
6. Click on the settings tab at the top.



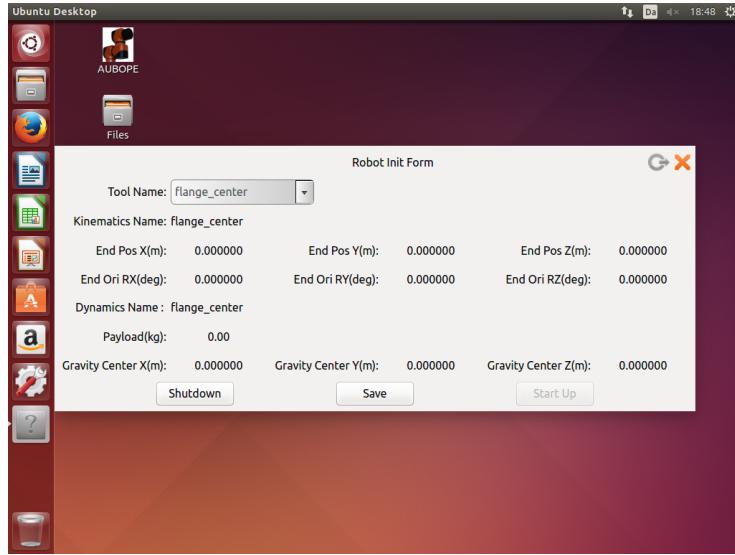
7. Navigate through the *System* tab into the *Update* tab on the bottom left.



8. Click on the '*ScanSoftwarePackage*' button in the center of the screen.
The path to the update file on your USB should appear in the *UpdatePackageList*.



9. Select your desired update file and press '*UpdateSoftware*'
10. A confirmation window will appear. Press '*yes*' you do want to update.
11. Wait for the update to finish. This will take about 30 seconds.
12. The program will tell you to restart. Click '*ok*', and then '*yes*' to shutdown.
13. Start the robot again with the power button on the teachpendant. The login screen should appear.
14. Type the password, default is '1' and press login. The *RobotInitForm* screen should appear

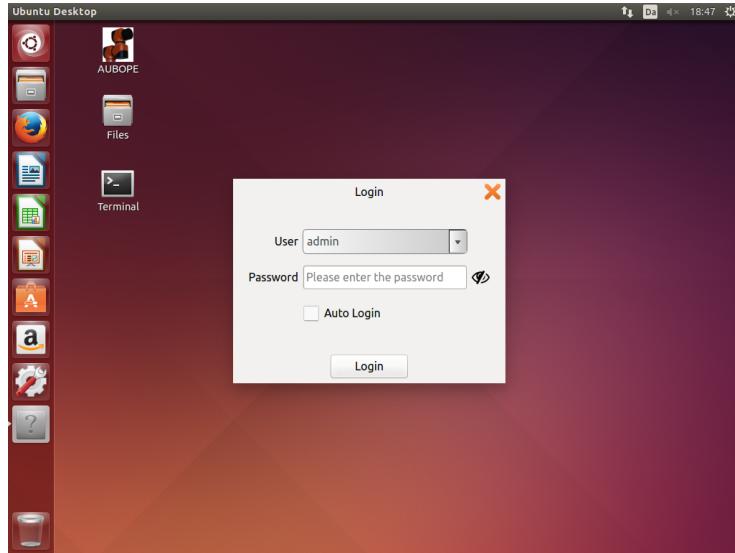


15. Press save and then startup to proceed.
16. Go to the about tab and in the top right
17. Check that the Teachpendant Version has been updated. An updated robot should say: Teachpendant Version: V4.5.49

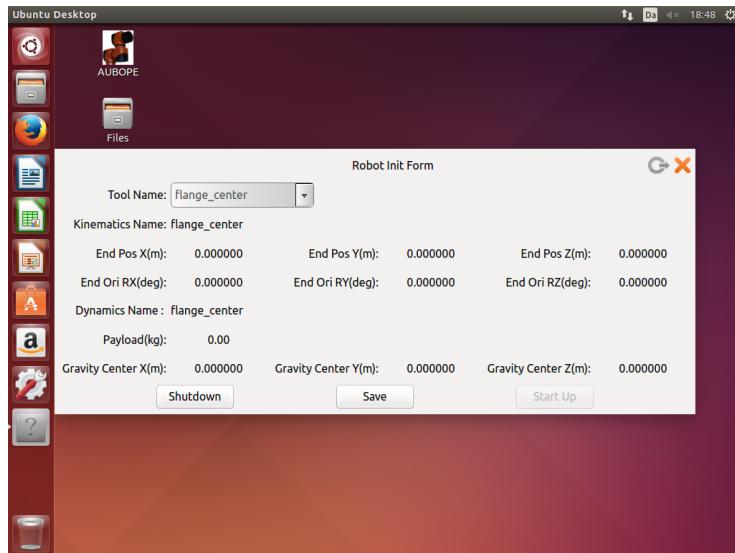
2.3 Installing Aubo Programs Using Backup File

With backups you can transfer all programs, variables and settings onto a new system.

1. Acquire USB with backupfile and plug it into the robot.
2. Open AuboPE by double-clicking the shortcut on the desktop or by restarting the robot. The login screen should appear.

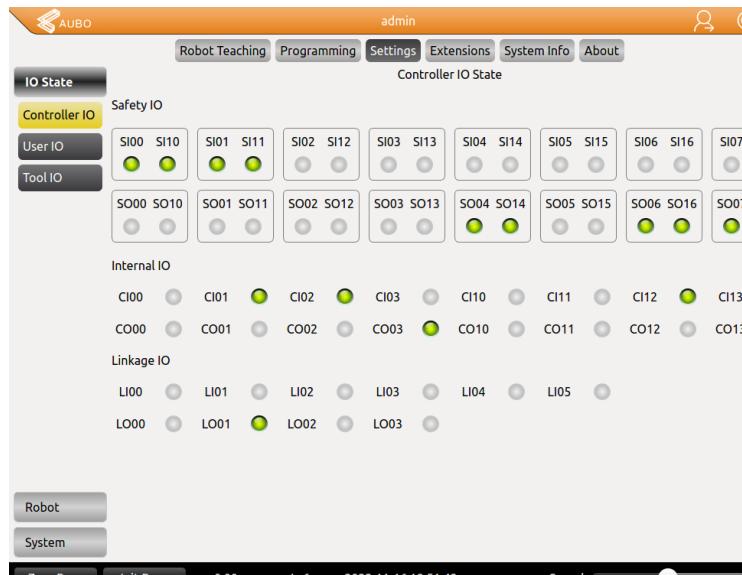


3. Type the password, default is '1' and press login. The *RobotInitForm* screen should appear

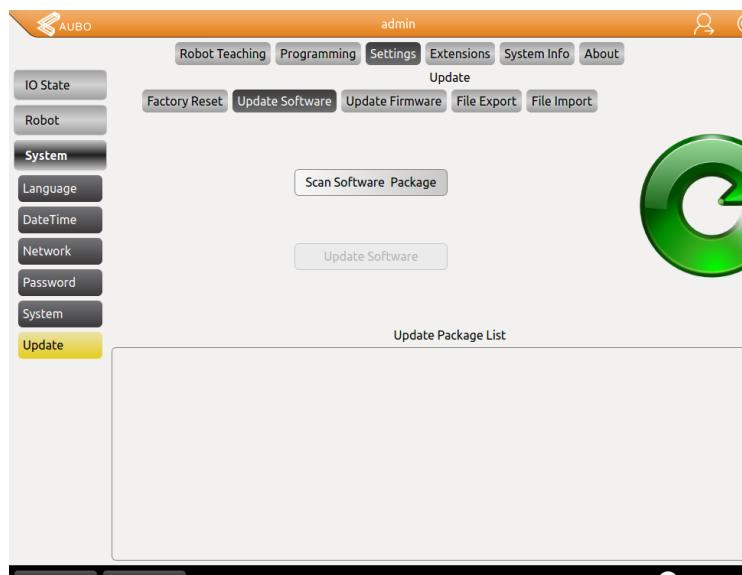


4. Press save and then startup to proceed. If this is the first time the robot has been started after being mounted it will say that the mounting pose has been changed. Click *ok* and then click *yes* to confirm that the mounting pose has changed. The robot will now initialize. You should hear the brakes click. The teachpendant should then show the robot user interface.

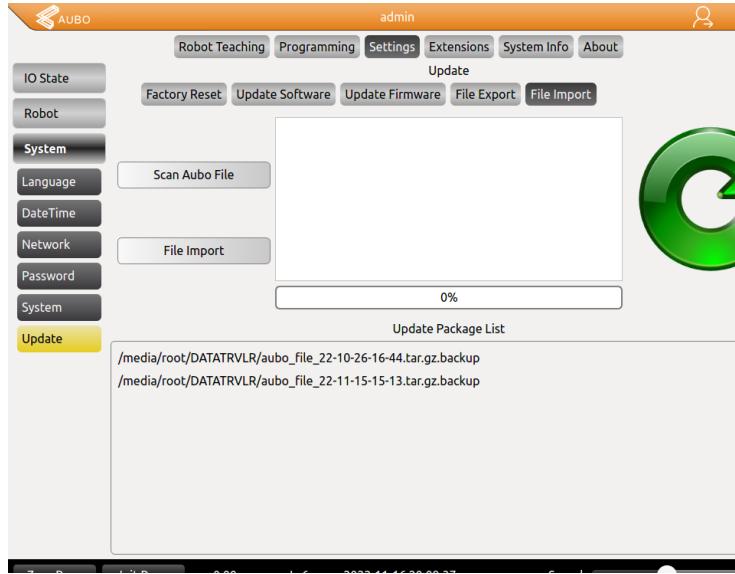
5. Click on the settings tab at the top.



6. Navigate through the *System* tab into the *Update* tab on the bottom left.



7. Select the '*FileImport*' tab.

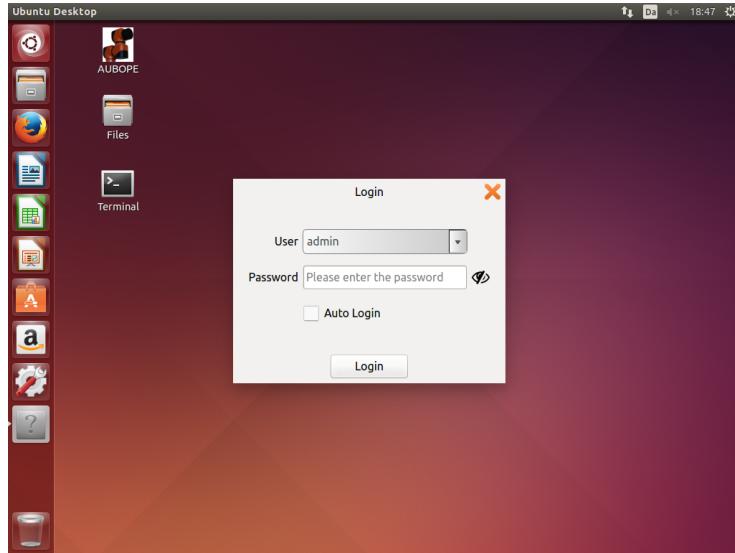


8. Click *ScanAuboFile*. The path to any backup files on your USB should appear in the *UpdatePackageList*
9. Select the desired backup and press '*FileImport*'
10. Wait a moment for the backup to install.
11. Restart the robot. Shutdown the robot by holding down the button on the teachpendant. Wait for the standby light to turn orange. Then press the teachpendant button again to start back up.

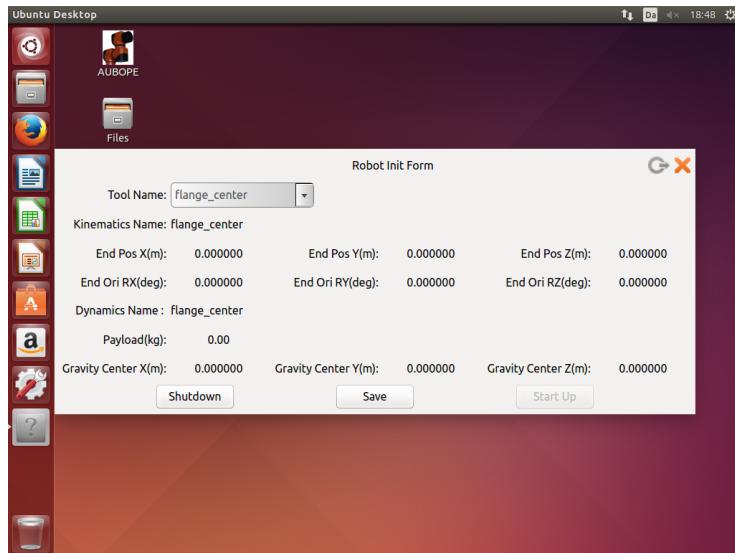
2.4 Tool pickup calibration

Because of imprecision in robot calibration, materials for the box or box assembly. The robot might not perform pickup of tools as smoothly as desired without a calibration of the pickup points. This section describes how to change those pickup points. The pickup point is defined as the moment we grab on to a tool. ie the moment we activate/deactivate the air in quickchange or 3D printed hand.

1. Open AuboPE by double-clicking the shortcut on the desktop or by restarting the robot using the teachpendant power button. The login screen should appear.



2. Type the password, default is '1' and press login. The *RobotInitForm* screen should appear



3. Press save and then startup to proceed.
4. Select the programming tab in the top.
5. Navigate through the *Config* tab into the *VarConfig* tab on the left.

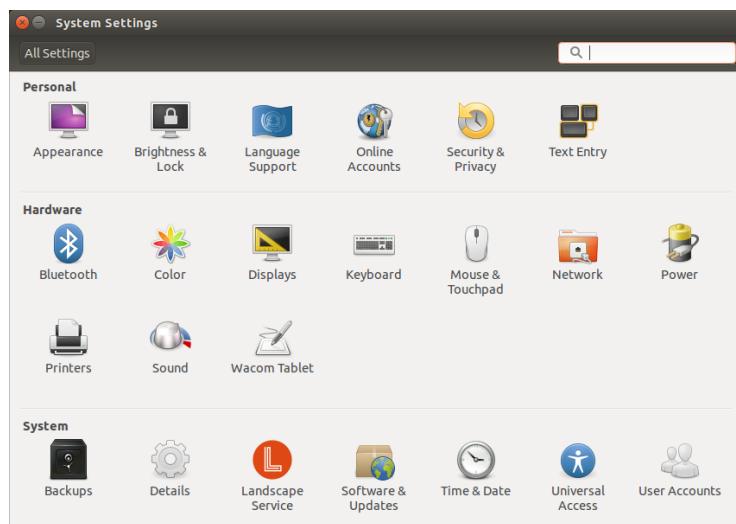
6. The variables on the right are the pickup poses of the robot named for the tool they pickup. The exception is connectionLost which is used for something else.
7. Go through each tool variable and perform the procedure.
8. Select the variable on the right.
9. While being carefull not to hit anything navigate to the current pickup position by holding the move here button in the button right. If you are about to collide with something let go of the move here button and use the black force control button on the right side of the teachpendant to pull the robot around the obstacle by hand.
10. When you get close to the pickup point you might have to stop using moveHere as the old pickup position could be wrong. Use the forcecontrol button and pull the robot into a better pickup position. Make sure you have a right angle with the tool holder and is centered on the tool holder.
11. When you are at the right position press the setPoint button.
12. Activate stepMode and move with the arrows to finetune your position.
13. Press confirm in the bottom right.
14. Now press modify to save the changes. Your pickup point should now be modified.
15. To test pickup positions go to programming tab in the top.
16. Navigate through *Project* tab on the left into *Load* tab.
17. On the right is a list of programs. The tooltests will be named as < *toolname* > *Test* fx UVLightTest.
18. select program click load
19. Make sure to move the robot free of any obstacles into the middle of the box. Also adjust the Move Limit down to reduce the speed the robot moves at, before you press start to run the test.
20. If your calibration was good the tool should now be picked up and sat back down without issue.

2.5 Changing Keyboard Layout

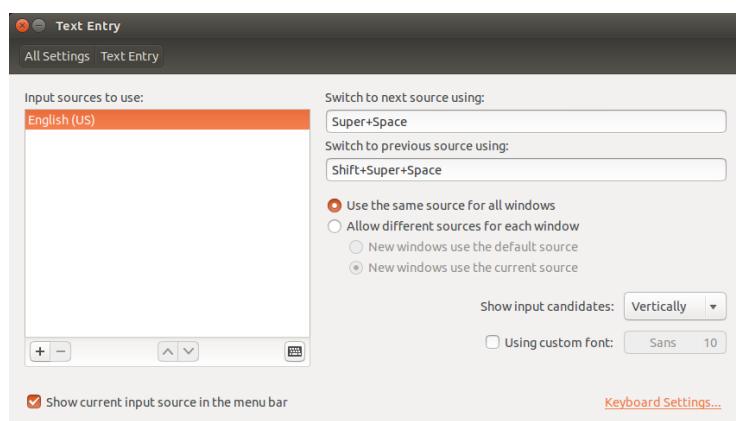
The keyboard layout will normally be set to English(US). This might be fine but be aware, if you are using a different keyboard, that some keys might be placed differently. If you want to change the layout continue in this section.

1. start the robot and navigate to the desktop. If you are in the robot software there is a logout button in the top-right.

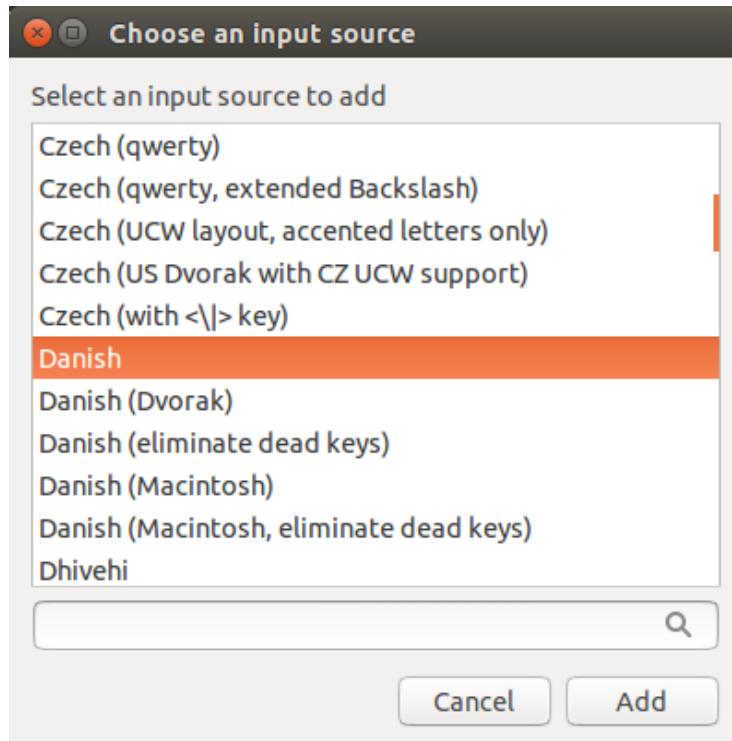
2. Open a terminal, by double tapping the icon on the desktop. (or plug in a mouse and doubleclick on it)
3. Enter command: *unity&*, beware if you haven't changed the keyboard layout the & sign will be on the key press *Shift + 7* as on a US keyboard not on a keypress of *Shift + 6* as with a Danish keyboard. This command will start the unity desktop environment and give you a toolbar on the left side of the screen.
4. Open system settings either on the toolbar to the left or with the dropdown menu in the topright corner of the screen. The icon is a gear and a wrench.



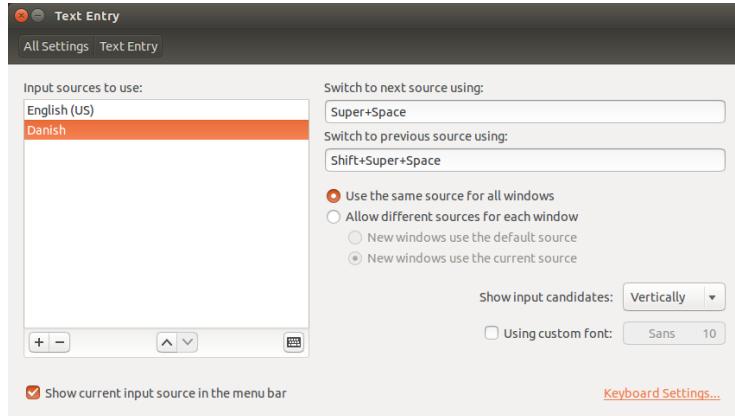
5. In system settings open 'Text Entry'



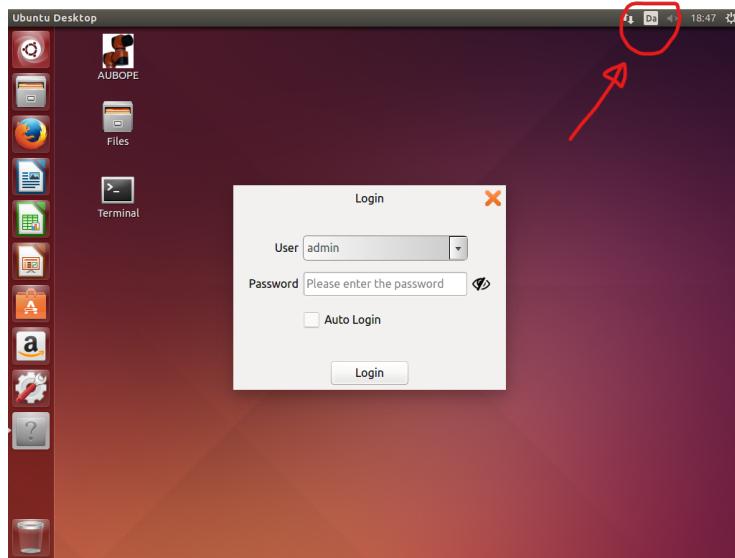
6. Under the list of input sources on the left press the ‘+’ button to add an input source.
7. Find your desired layout in the list (fx. Danish).



8. Select your layout and press add.
9. The name of your layout should now appear in the list of input sources marked with orange.



10. Close the Text Entry box.
11. Go to the top right corner of the screen and click where it says 'En' for English. This will open a dropdown menu where you can now select your newly added keyboard layout.



12. You should now have a different keyboard configuration. Test it by opening a terminal and typing some symbols.

2.6 Setting up remote Access with VNC and ssh

Remote access means as long as you can get access to the local network you can open up the robot screen on your pc and send updates, and logs back and forth.

2.6.1 SSH

To send files the SCP command is used. To be allowed access a tiny bit of setup is required. mainly you need to set a password. Open a terminal and type the command: `passwd` Then type the desired password twice. Note what password you gave the machine.

2.6.2 VNC

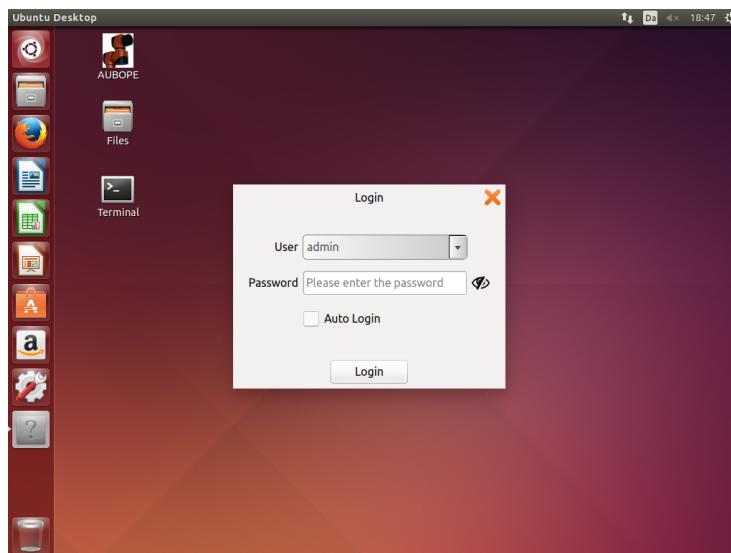
VNC is what lets us access the screen. For this you are going to need access to the internet for the robot. It only does cable connection so get an ethernet cable and plug in your internet. Then follow instructions here.

2.7 Change IP using interfaces file

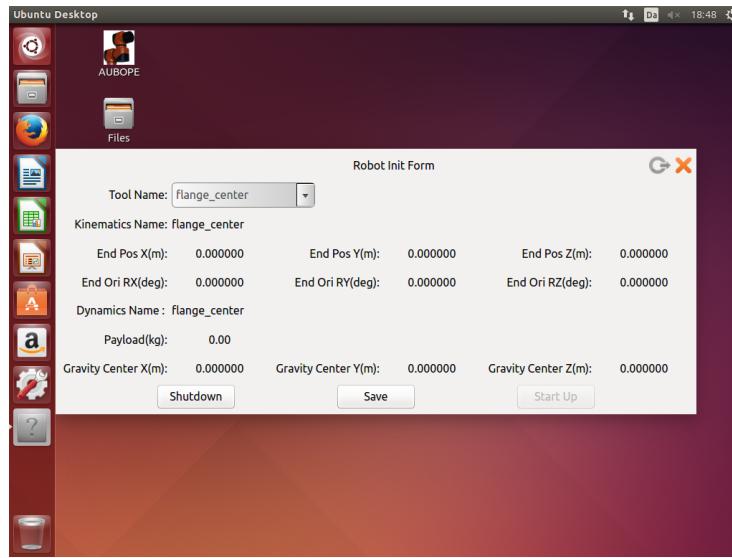
Open a terminal and type the command `ifconfig`. This will list your connection. Find the name of your ethernet connection fx. '`eth3`' and write out the ethernet specifications. An example could be. `#eth3 auto eth3 iface eth3 inet static address 192.168.137.2 #static Ip of robot gateway 192.168.137.1 netmask 255.255.255.0 #eth3 config finished` navigate to `/etc/network/interfaces`, and open it with a text editor. add your specification at the bottom of the file. Now either restart the network config, or the entire system.

2.8 Creating a Backup

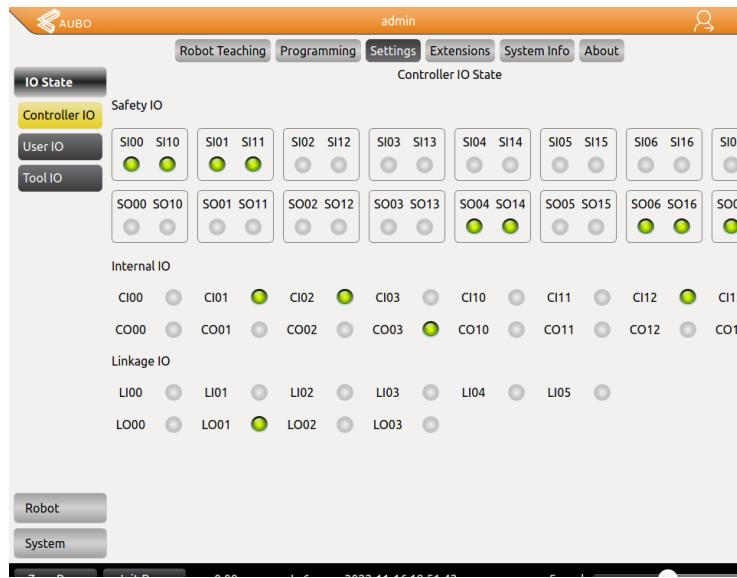
1. plugin a usb.
2. Open AutoPE by double-clicking the shortcut on the desktop or by restarting the robot. The login screen should appear.



3. Type the password, default is '1' and press login. The *RobotInitForm* screen should appear



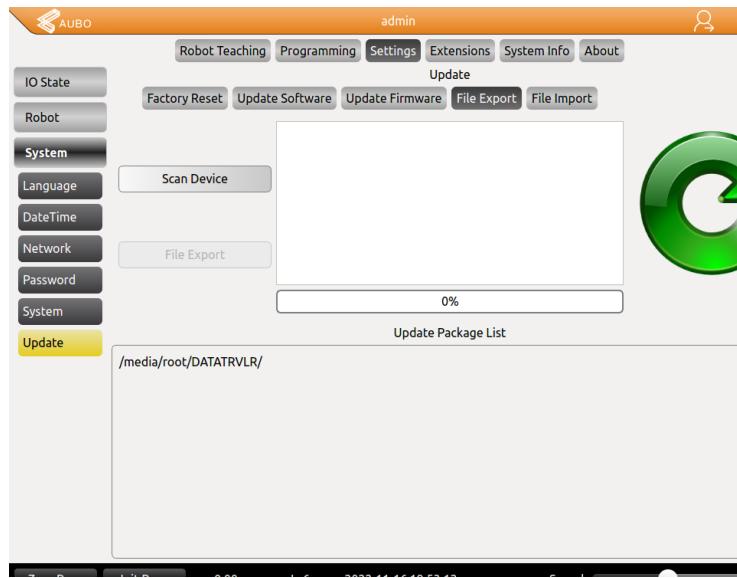
4. Press save and then startup to proceed. If this is the first time the robot has been started after being mounted it will say that the mounting pose has been changed. Click *ok* and then click *yes* to confirm that the mounting pose has changed. The robot will now initialize. You should hear the brakes click. The teachpendant should then show the robot user interface.
5. Click on the settings tab at the top.



6. Navigate through the *System* tab into the *Update* tab on the bottom left.



7. select the '*FileExport*' tab.



8. click '*ScanDevice*'. The path to your usb should appear in the *UpdatePackageList*.
9. Select your USB and then press '*FileExport*'

2.9 Update manually

Check out the guides here. For more info.