Abeeway Device Updater 2.4.0 Documentation

November 15th, 2021

Table of contents

1 Introduction

This Document is intended to help users updating the firmware of Abeeway trackers by using USB hub or the smart badge docking station.

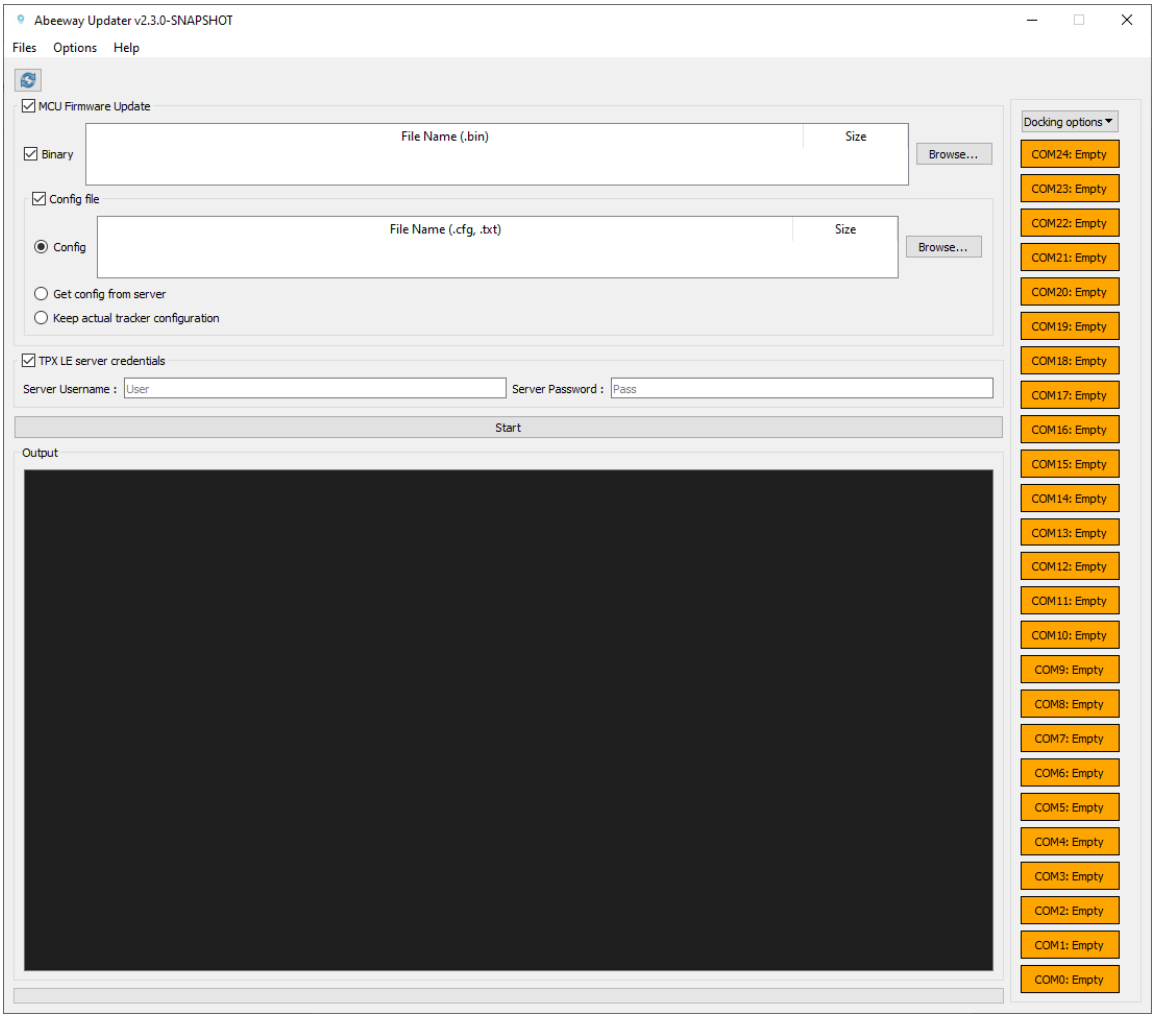
2 Setup

Note: We do not recommend using Windows to run Abeeway updater (especially with docking station or USB Hub connected to many trackers). Windows is OK for testing, but not recommended for upgrading large number of trackers in production environment. We recommend only specific version of Linux (as described in section 2.2.2) and for production environment we recommend using only the mini PC that is suggested in 2.2.1 as it has been extensively tested in our RnD environment.

2.1 Windows

The windows version is a standalone executable. You do not need anything else than launching the .exe file to run it. It will ask for Administrator rights at launch.

Windows version does not have access to BLE features.



2.2 Linux

2.2.1 Hardware Setup

We recommend using a mini-PC with Bluetooth 4.2 support.

Some can be found here.

You first need to plug in the sector adaptor then connect:

- USB Mouse
- USB Keyboard
- HDMI or VGA Screen (HDMI cable is in the box)

2.2.2 Install Linux on the mini-pc

The Abeeway Device Updater only works on Linux for now. Here are the instructions to install it:

- We recommend using Ubuntu 20.04, you can download it here. Be sure to download 20.04 and not 20.10 since 20.10 only have 9 months of support versus 5 years for 20.04.
- Once you have the .iso file. Use a software like RFUS on Windows to flash the Ubuntu ISO file in a USB flash drive.
- We must allocate space in the PC to install Linux. To do so, right click on the Windows icon and select "**Disk management**".
- Right click on the partition you want to reduce (It should be named **Windows**. If it is not, select the larger one) and select **Shrink**.
- You can allocate as much memory as you want but 20Gb is enough for it. Enter 20000 in the box and validate.
- After a little time, you should see a partition in black named "**Non allocated space**" which should weight 20Gb (maybe something like 19.8Gb).
- Keep the USB flash drive connected to the mini-pc and reboot it.
- While it is rebooting, enter the **BIOS** menu and select the UEFI USB device to boot.
- It should boot on the USB drive and you should see a black screen. You can hit enter or wait 5 seconds to enter Ubuntu.
- Once it is launched, just follow the instructions to install it.
- When the installation asks you the **Installation Type**, select **Install Ubuntu alongside Windows Boot Manager** and follow the instructions on the screen.

2.2.3 Software Installation

The Linux version is a standalone executable, but you can install it on your system to access it via your application menu. It will ask for Administrator rights at launch.

It comes with 4 files:

- Abeeway-Device-Updater: executable of the updater
- Abeeway-device-updater.desktop: file to generate an icon in the application menu. DO NOT TOUCH THIS ONE.
- Setup.sh: script to install the updater on the PC.
- README: file explaining how to install the updater.

If you want to use it without installation, just open a terminal, go where the file Abeeway-Device-Updater is located and run:

```
./Abeeway-Device-Updater
```

If you want to install it so you can find it under your applications menu, go where the file setup.sh is located and run :

```
./setup.sh
```

3 Prerequisites

3.1 Download the Firmware files

You need to download the following firmware files depending on your needs.

1. MCU Firmware binaries
2. BLE Firmware binaries
3. Firmware Configuration files

3.2 Connect the trackers

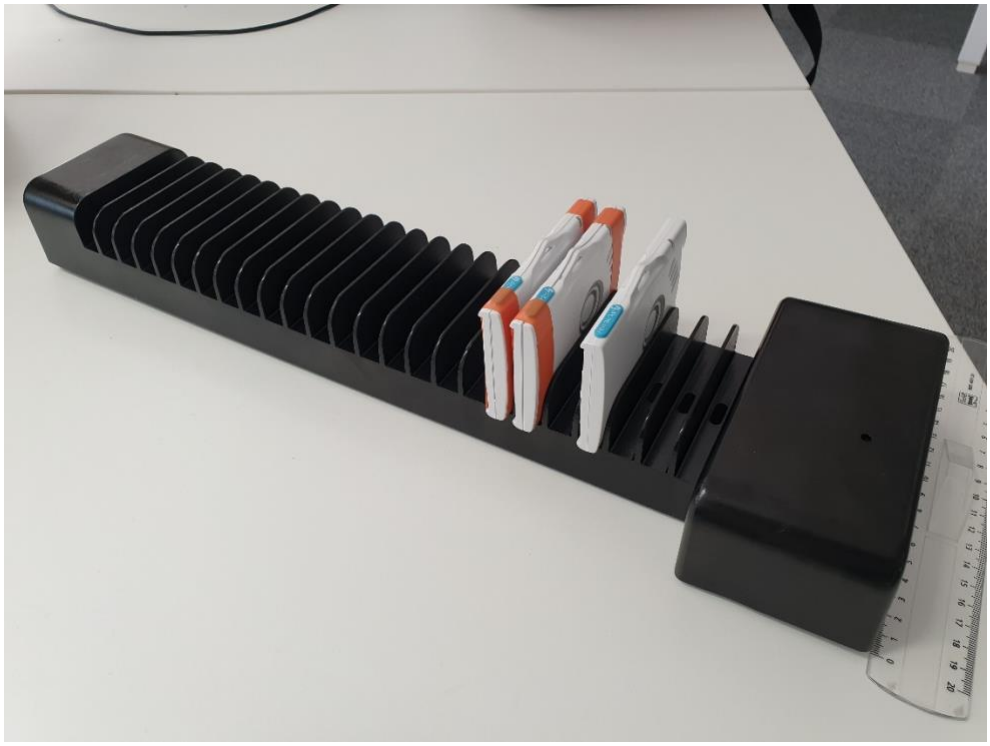
You can connect the trackers to the computer by either a POGO cable, with the Docking Station, or using a USB Hub.

Use the docking station :

1. Connect the power supply to the docking station first. WARNING: Be sure to plug it correctly, the flat side up (with the arrow). Otherwise, this can cause damages to the docking station and on connected trackers if any.

2. Connect the docking station to the computer using a mini-USB Type B cable.

3. Plug the devices in the docking station.

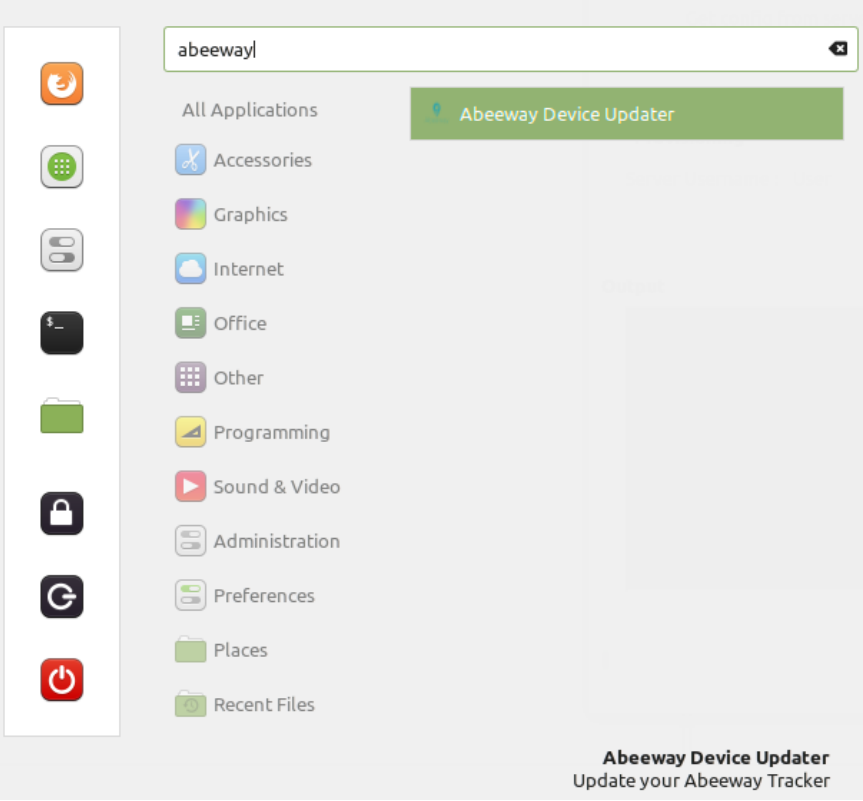


Warning: Be sure to respect the first step. It is very important to plug the docking station to the power supply before connecting it to the computer and to connect it the right way.

4 Usage

4.1Start

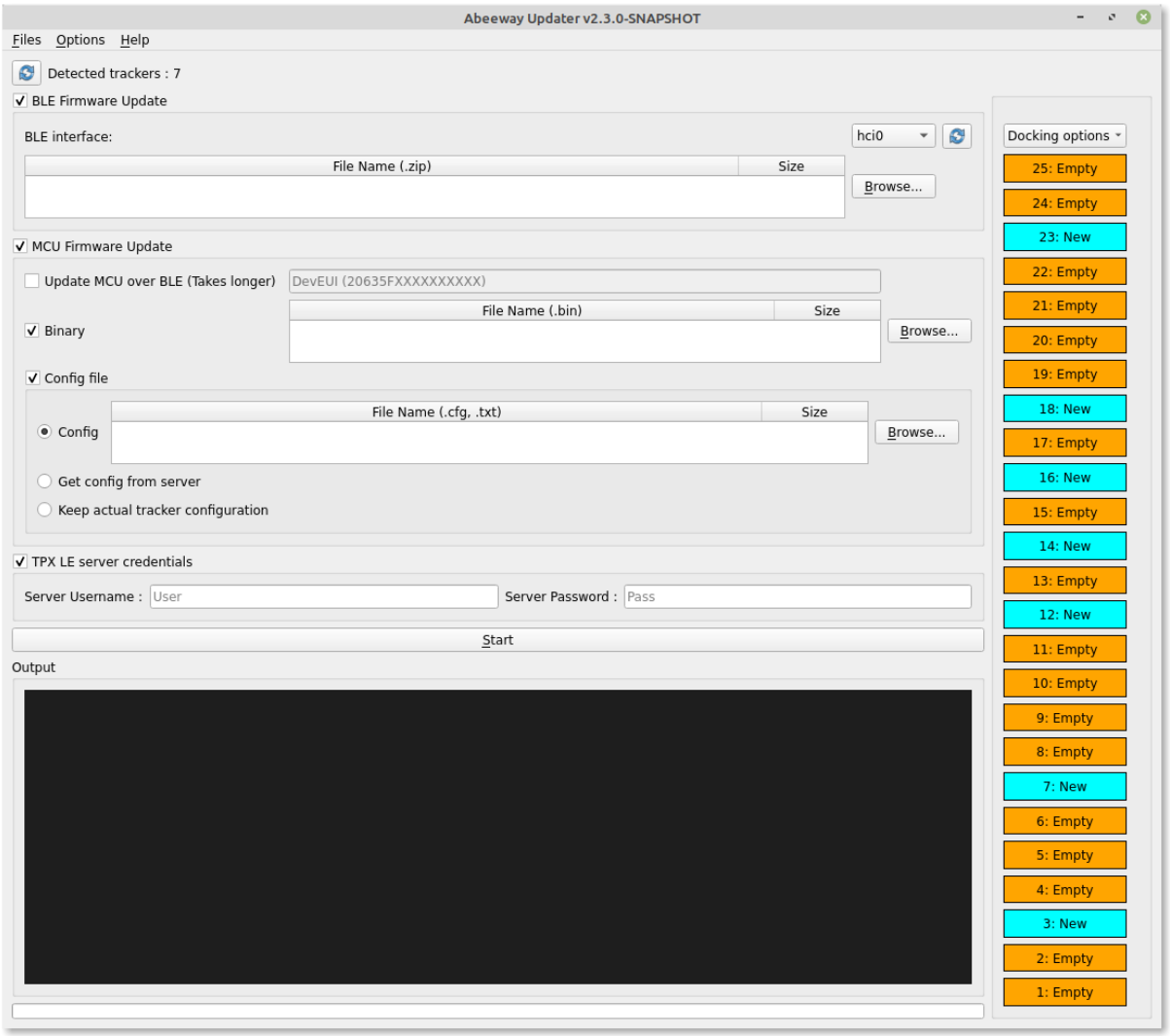
Launch the Abeeway Device Updater by opening the application menu or by pressing the Windows key on your keyboard and type “Abeeway Device Updater” then click on the icon or using directly the executable for Windows version.



Note : You can also launch it with the following command line so you can see errors in the terminal if any and report it to ***abeeway.support@actility.com****:*

/usr/bin/Abeeway-Device-Updater

Once launched, you will have a page like that:



4.2Menu

At the top of the UI, you have 3 menus: Files, Options and Help.

4.2.1 Files Menu

The files menu will allow you to see some files related to the updater such as the logs.

4.2.1.1 Logs

The submenu Logs Allow you to access the different logs of the updater. Log files are created every new day when launching the software. On **Linux**, they are located under /var/log/abeeway/ and are sorted by day in separates directories by their types.

On **Windows**, they are located under C:\\abeeway-updater.

There are 3 types of logs:

- Log: These are the main logs of the updater. It prints everything that is prompted during the software execution.
- DevEUI Logs: This log shows the results of the flashes. It shows the DevEUI, the state of the flash [PASSED/FAILED] and the files that were flashed to it.
- Errors Logs: Logs to retrieve errors if any so you can send it to Abeeway for investigation.

In this submenu, there is also a button “Logs Directory” that opens the directory where logs are stored so you do not have to search it on your computer.

4.2.2 Options Menu

The options menu will allow you to modify parameters used by the software.

4.2.2.1 Depth

The depth parameter is used if you see that the docking station visualization is wrong. You can change it to the other and see if it fixes the grid.

4.2.2.2 Schema Type

The schema type parameter is used to change the visualization type of the grid. There are 2 types of schemas:

- Location: This is the default parameter if you use a Docking Station. It shows the devices by their physical place on the Docking Station.
- Ports : This is the default parameter if you use a USB Hub. It shows the devices by the port they use.

Note: If you are using a USB Hub, the Location option will not be enabled.

4.2.2.3 Verifying devices after flash

If you want to check the device’s state (DevEUI, Firmware version, BLE version) after the flash, you can check this box.

It will take a little more time than just flashing so therefore it is disabled by default. You can also check theses information from the docking station panel of the software.

4.2.2.4 Bypass DevEUI check

By default, if the software cannot retrieve the DevEUI of a device for any reason, this device will not be updated.

By checking this option, the flash will still be processed even if the DevEUI cannot be retrieved. In this case, the identifier of the device in the logs will be its Hardware ID.

4.2.2.5 Bypass type check

By default, if the software cannot verify the type of the tracker with the Type Table CSV (see Files->Type Table) or if the type of the tracker is not contained in the name of the binary, the program will not flash it to ensure that no wrong firmware is flashed on a tracker.

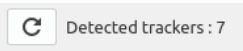
By checking this option, the flash will still be processed even if the type does if wrong or if it is not registered is the CSV file.

4.2.3 Help Menu

The help menu contains buttons to open this documentation and see information about the software.

4.3 Docking Panel

You can find on the right of the interface the physical representation of the docking station. The number of detected trackers is printed at the top left of the UI, there is also a button to refresh the UI in case of problems:



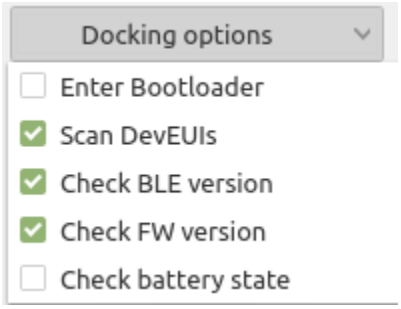
If you are using a USB hub or if the docking station is not correctly plugged, the grid will prompt the devices by the port they use.

Note : Some USB Hubs are known to be detected the same way as the docking station by the system. In these cases, the grid may be displayed with strange positions, but it will not affect the flashing, it is only visual. You can force to show them by port by checking "Ports" in the Options->Schema type menu.

The dropdown "Docking Options" stores checkboxes that you can use to retrieve information about the trackers or put every tracker on the docking in bootloader mode.

If the device is written "No port attached", you will not be able to retrieve information from it, but it is still seen by the PC and it will be flashed.

Note : If you have a device that is plugged in to the docking station, but you do not see it on the screen, try to remove it and plug it again. If this does not change things, you can try to press the button for about 2 seconds. If it is still not seen, please contact ***abeeway.support@actility.com***



4.3.1 Display DevEUI

By default, the grid will just display “New” at the position of the tracker on the docking station. You can check the following checkbox to allow the software to ask the devices their DevEUI:

After a little time, it will display the DevEUI instead of “New”.

4.3.2 Display BLE Version

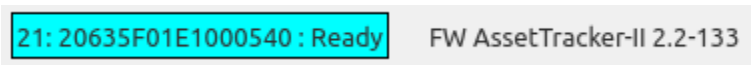
You can display the devices BLE version by checking the following box:

After a little time, the BLE version will be displayed next to the DevEUI box.

4.3.3 Check MCU/Application Firmware Version

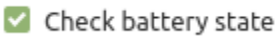
You can display the devices Firmware version by checking the following box:

After a little time, the Firmware version will be displayed next to the DevEUI box.

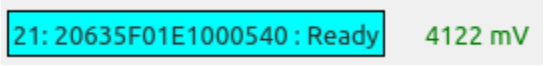


4.3.4 Check battery state (Only works with AssetTracker2.2 joining or MFG)

Checking this box allows you to retrieve the current voltage of the tracker:



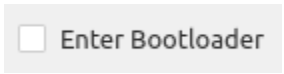
It will show it in millivolts. If the value is under 3600 mV (3.6 V), the value will be displayed in red. It means that the battery is low, and you should let it charge (for a rechargeable tracker).



You can of course check all these boxes at once, this will be shown like this:

4.3.5 Enter Bootloader

The following box will allow you to enter every device connected to the Docking station into Bootloader mode:



While it is checked, every new device plugged will automatically put in bootloader mode. It comes back to its normal state when you plug it off from the docking station.

Since you cannot retrieve the DevEUI of the tracker when it is on Bootloader mode, you need to enter your provisioning server credentials to get it.

*Note: If you do not mind of the DevEUI, you can check the box under **Options->Bypass DevEUI Check** as said before.*

*If you do so, be sure to also check the **Bypass Type Check** from the same menu. Otherwise, it will not be able to verify the if the firmware and the tracker type match and it will not flash it.*

4.4 MCU Firmware Update

4.4.1 MCU Firmware and Hardware Model Compatibility

It is important that the MCU Firmware Version and Hardware model no is compatible***. If the wrong firmware is flashed on the tracker, it might not boot anymore and not recoverable for another firmware upgrade***. The Hardware model number can be derived from DevEUI. The first few digits of DevEUI identify the hardware model number that you have received.

Note: If your tracker DEVEUI prefix is not part of the table below, then please contact local distributor or Abeeway support (abeeway.support@actility.com)

Hardware Model	DevEUI Prefix	MCU Firmware	BLE Firmware
Micro Tracker V2	20635F0106 20635F0107 20635F0108 20635F0109	1.9.x and below	2.0.x and below
Micro Tracker V3.0	20635F0171 20635F0172 20635F01C1 20635F01D1	2.x and above	3.2.x and above

Hardware Model	DevEUI Prefix	MCU Firmware	BLE Firmware
Micro Tracker V3.1	20635F0261 20635F0271 20635F0281 20635f0361	2.x and above	3.2.x and above
Smart Badge	20635F01E1 20635F01F1 20635F0201 20635F0211 20635F0231 20635F0241 20635F0251 20635F0291 20635F02A1 20635F02B1 20635F0291 20635F02C1 20635F02E1	2.x and above	3.2.x and above
Compact Tracker	20635F0161 20635F0181 20635F0191 20635F01A1 20635F01B1 20635F0181 20635F0311 20635F0321 20635F01A2 20635F0191	2.x and above	3.2.x and above

Hardware Model	DevEUI Prefix	MCU Firmware	BLE Firmware
Industrial Tracker V1	20635f00C5 20635f00C6 20635f00C8 20635f00C9 20635F0131 20635F0132 20635F0133	1.8.x and below	Not Applicable
Industrial Tracker V2	20635F0134 20635F0135 20635F02D1	2.x and above	3.2.x and above

The firmware files can be downloaded from here.

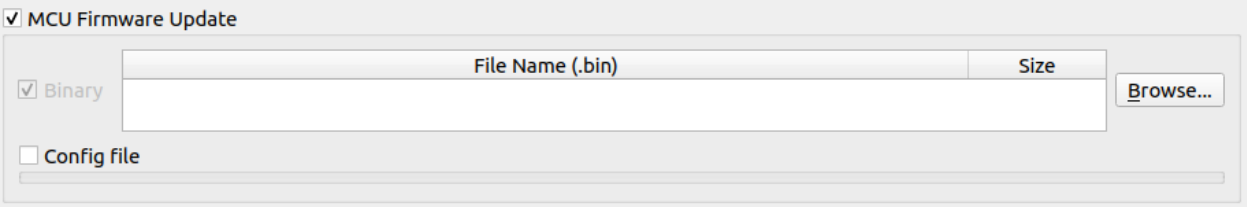
4.4.2 MCU & BLE Firmware Compatibility

It is important to ensure the BLE Firmware and MCU Firmware are compatible with each other to avoid any issues. The following table below describes the compatible MCU and BLE Firmware that we have validated. ***Please use only these combinations below to avoid any issues in the field.***

MCU Firmware	BLE Firmware	Compatible Tracker Models
1.9.x	2.0.0	Micro Tracker V2
2.0	3.1.0	Micro Tracker V3.x, Smart Badge, Compact Tracker, Industrial Tracker V2
2.1.x	3.2.2	Micro Tracker V3.x, Smart Badge, Compact Tracker, Industrial Tracker V2
2.2.x	3.3.3	Micro Tracker V3.x, Smart Badge, Compact Tracker, Industrial Tracker V2
2.3.x	3.3.3	Micro Tracker V3.x, Smart Badge, Compact Tracker, Industrial Tracker V2
2.4.x	3.3.4	Micro Tracker V3.x, Smart Badge, Compact Tracker, Industrial Tracker V2

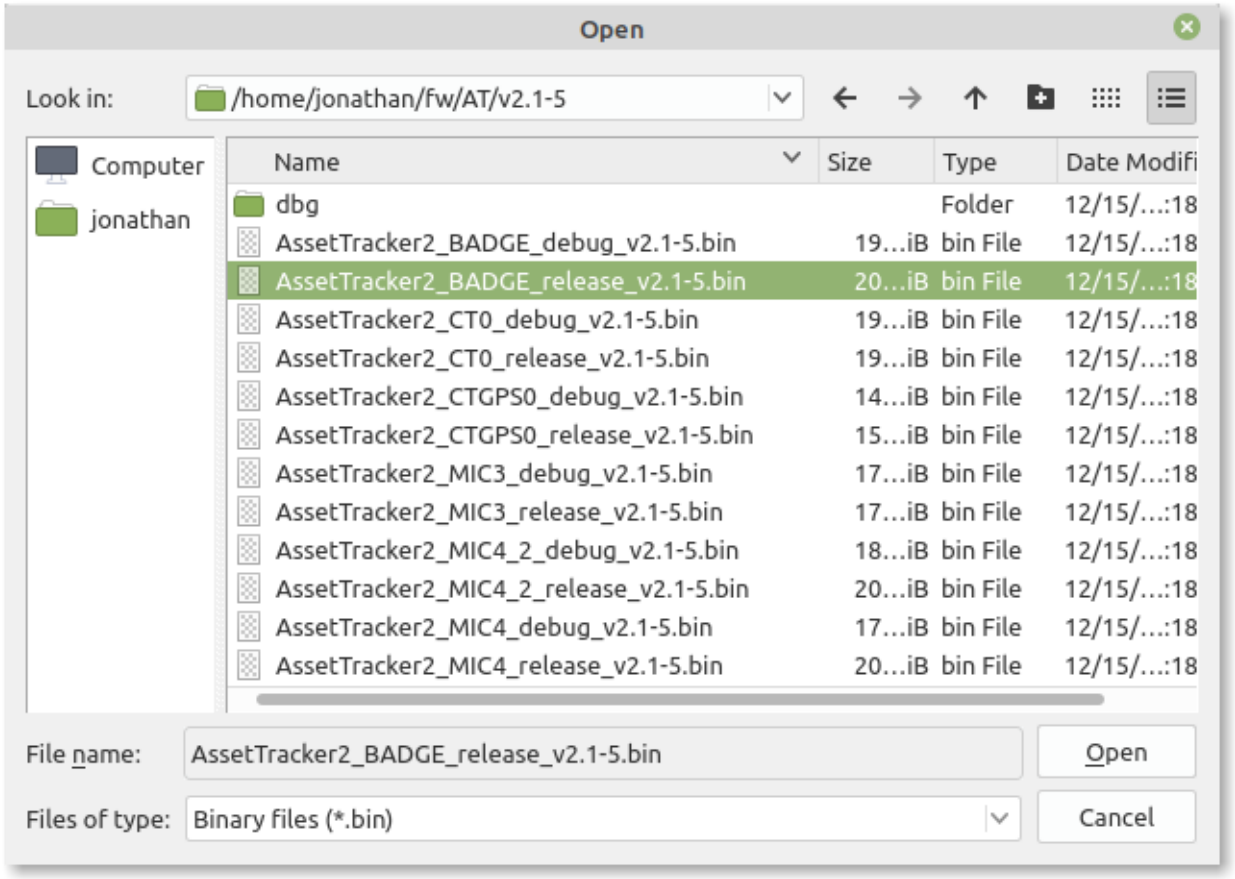
4.4.3 Activate MCU

If a MCU firmware update is intended, activate the MCU Firmware Update options menu. It is already activated by default.



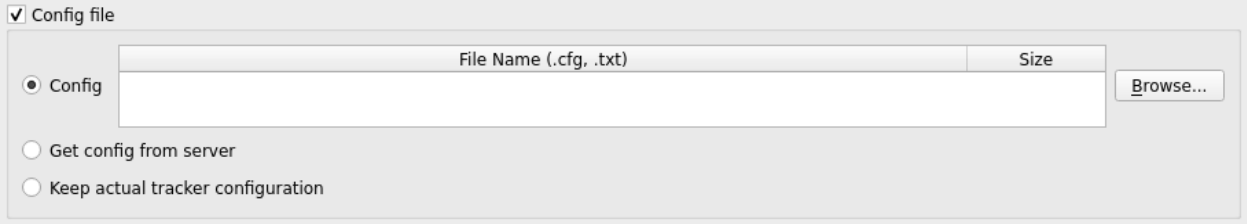
4.4.4 Select MCU firmware file

Click the "Browse…" button and select in your computer the MCU firmware binary file (.bin) to flash to the trackers.



4.4.5 Activate configuration file

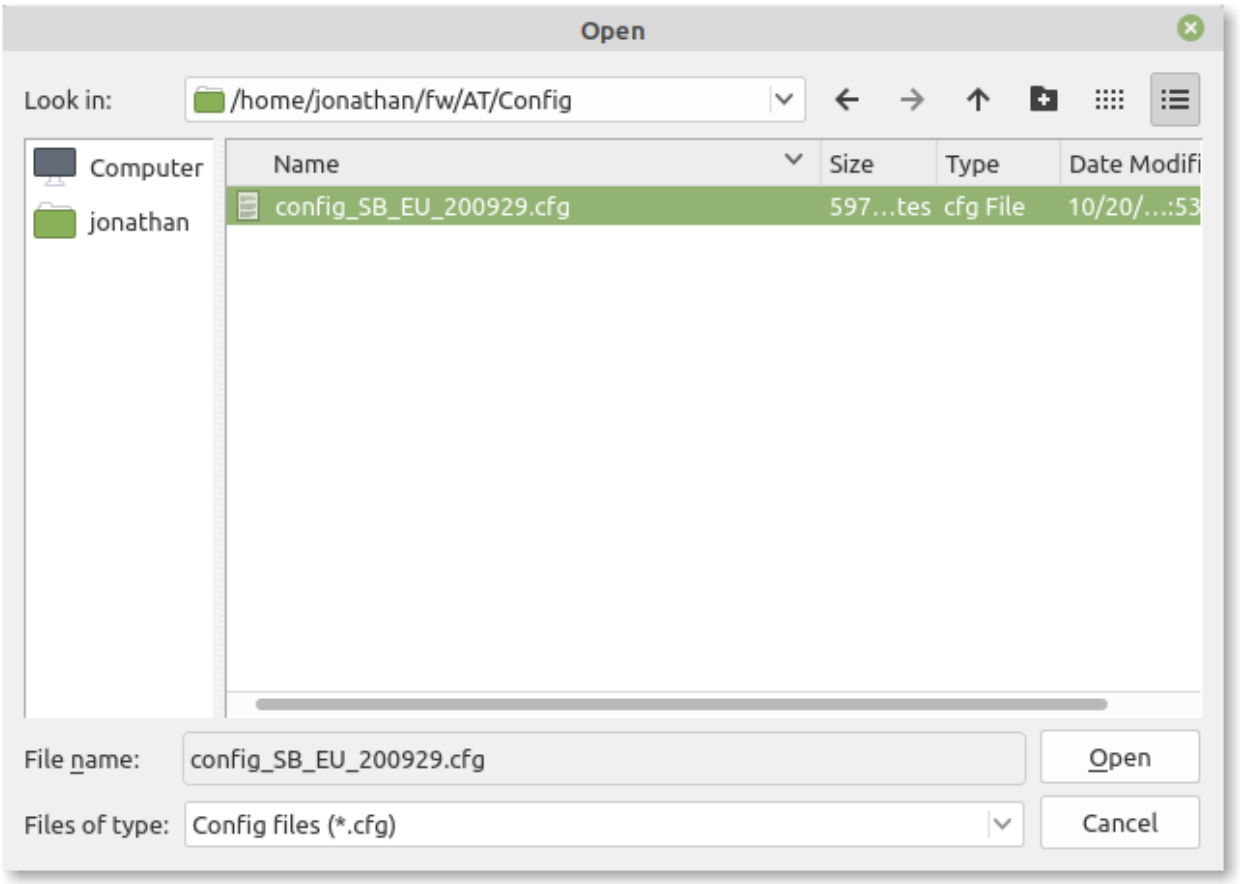
If a configuration file must be appended, activate "Config file" menu.



Note: If you do not check the "Binary" checkbox but select a configuration option, this will only update the configuration of the tracker without flashing it. It can be useful to easily change its parameters.

4.4.5.1 Select MCU configuration file

Click the "Browse…" button and select the MCU configuration file (.cfg or .txt) on your computer.



Note:

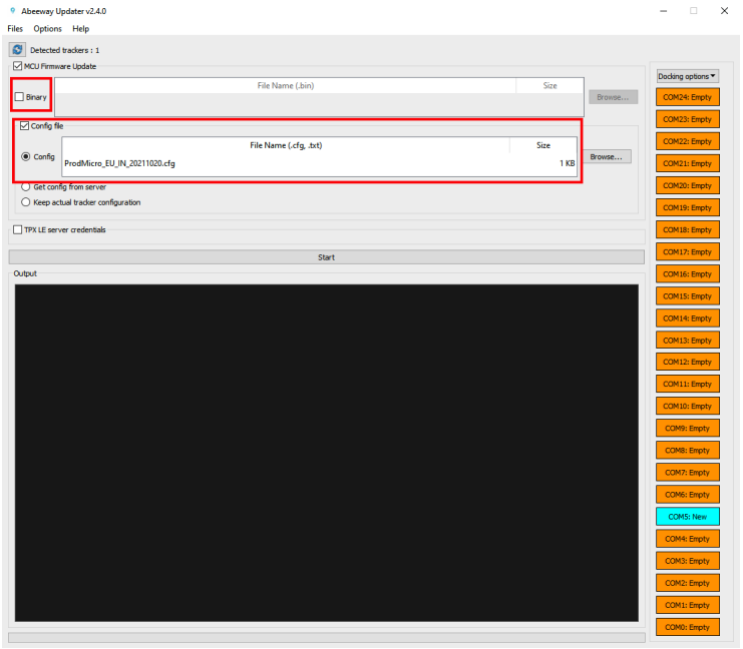
- Any error in configuration file in terms of invalid parameter/value or a firmware parameter that is not present in the Firmware Version you are flashing will result in

part of the config file being ignored by the MCU Firmware. Please ensure the firmware parameter names and their values are compatible from the Asset Tracker Firmware Reference Guide version that is matching the MCU Firmware version you are flashing. Very often, newer MCU Firmware versions have additional parameters that are non-existent in the old versions.

- Ensure to check the tracker configuration on CLI using serial tool like Tera term entering “config show” on serial console. For more information on CLI Usage, see [6].
- The config file should ONLY contain parameters that are different from factory default configuration. Please refer to chapter: factory default configuration in Abeeway trackers reference guide that corresponds to the MCU Firmware that is being flashed in the tracker
- The size of the config file should be limited 10 parameters due to limited flash area. If the appended MCU binary + config file exceeds flash area, the tracker might be permanently damaged.
- For updating the tracker configuration for more than 10 parameters, please see the next section

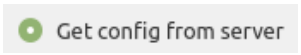
4.4.5.2 Updating ONLY the tracker configuration (without updating the MCU Firmware binary)

To update only the tracker’s configuration but not the MCU Firmware binary, you can uncheck the MCU firmware binary option and only select the config file. This step is very useful when updating the tracker configuration for large number of parameters without changing the firmware version/binary. ***We recommend that you do this step after the tracker has joined LoRaWAN network.***

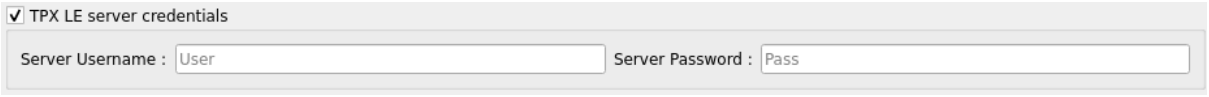


4.4.5.3 Get configuration file from TPX LE server

If you want to get the configuration file from the server, you must check the following box:

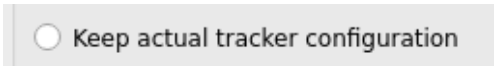


You will also need to log into the TPX LE server by providing your credentials at the bottom of the window.



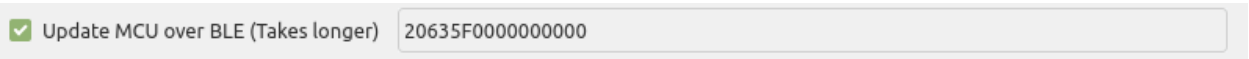
4.4.5.4 Keep actual tracker configuration

If you want to update the tracker and keep its actual configuration, check this box:



4.4.5.5 Update Over BLE

Note: This feature is only available under Linux



If you do not have access to the USB port of the device, you can update its firmware by checking this box. You will need to do 2 things:

- Write the DevEUI of the tracker in the textbox
- Enable the tracker to advertise over Bluetooth
    - If you have set bit 5 = true for ***config_flags*** firmware parameter in the firmware [1], the tracker will advertise itself for the duration defined by, ***ble_cnx_adv_duration (seconds)*** once restarted with long button press. **(Applicable only to smart Badge/Micro tracker).**
    - You can also send the downlink (***ff020b0064***) to the tracker on downlink port = 2. This downlink will trigger BLE advertisement for the duration of 100 seconds. If you wish to change the duration of BLE advertisement, please refer to ***section: Start and Stop BLE advertisement*** in Abeeway driver [1] [2]

Only use this option if really you do not have access to USB. It is way slower than casual firmware update (around 4-5 minutes over BLE against 10-15 seconds over USB). This option is only available in Linux

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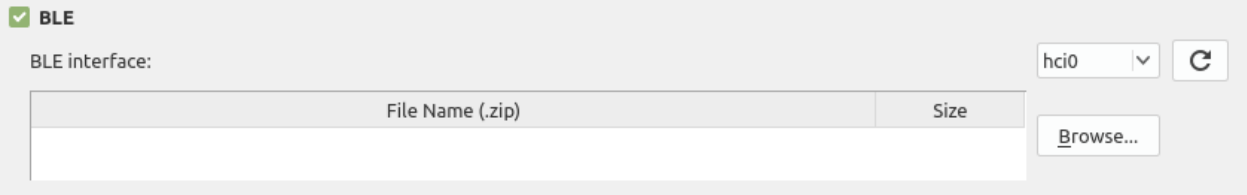
4.5 BLE Firmware Update

Note: This feature is only available under Linux

4.5.1 Activate BLE

If you need to update the BLE Firmware, just activate the BLE checkbox.



The dropdown at the top right shows you if your system has Bluetooth. If not, the dropdown will be like this and you will not be able to update BLE:

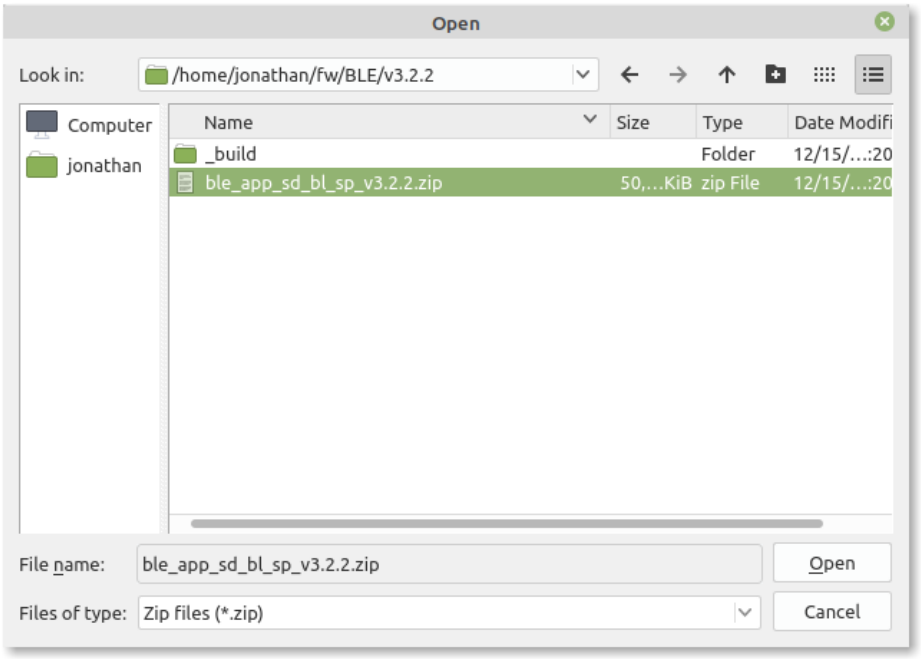
You could refresh this for example if you plugged a USB Bluetooth dongle after launch.

Note: The example USB Bluetooth dongle that works with the updater tool is available here

4.5.2 Select BLE Firmware File

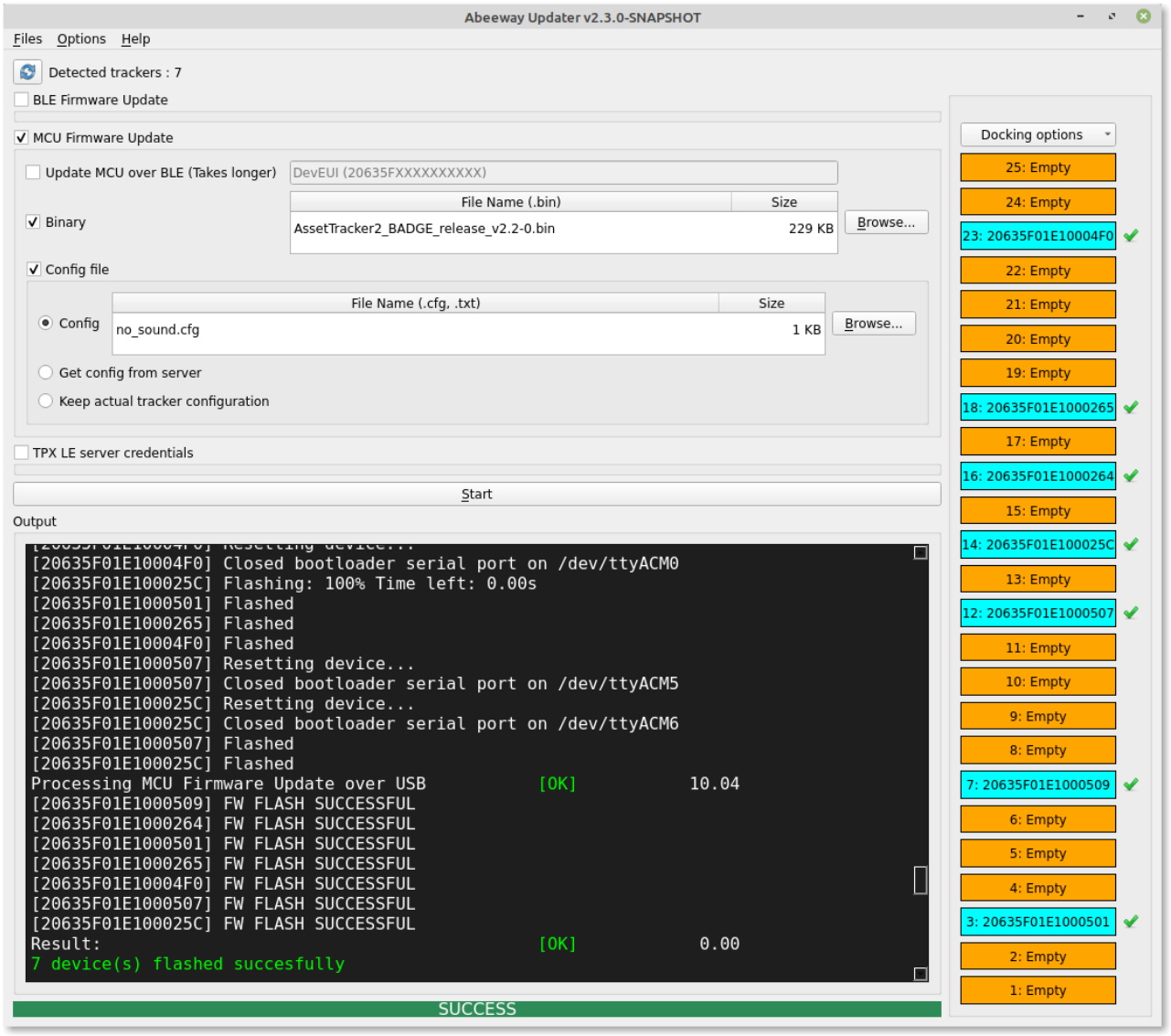
Note: Please refer to section 4.4.1 to ensure you select the right BLE Firmware file that is compatible with your tracker model and MCU Firmware version installed on the tracker

Click the “Browse…” button and select the BLE firmware file (.zip) on your computer.



4.6 Result

Once you have selected everything you want, click on the “Start” button. You will see the ongoing operations on the black box at the bottom. Once update procedure has been completed, you should see the status:



Note:

1. ***The tracker should not be disconnected from USB port or when the Firmware update tool is running to avoid damaging the tracker***
2. If the tracker is running AT 2.2 Firmware and above, then the tracker LED will flash with continuous RED LED indicating the tracker is in MCU Bootloader. (Applicable only to Micro Tracker V3.x and Smart Badge)
3. The Firmware update process will trigger a reset at the end, which will require the tracker to initiate JOIN on LoRaWAN network. Please ensure you are in the presence of LoRaWAN network during the firmware update process.
4. Starting from firmware version 2.2, there is user password to be able to use CLI over USB port. This password is set to default value of “123”. If this password is changed, then the script will prompt for this password during firmware update process. If you

have forgotten the password, then you can reset it to 123 by sending the following downlink ***0b01660000007b*** on LoRaWAN **fport=2** to the tracker [1].

4.7Verifying Firmware Update

Once firmware update is finished, you can check the result by reading BLE and MCU Firmware versions in any one of the following ways:

1. Using Abeeway updater as outlined in section Display BLE Version and Check MCU/Application Firmware Version.
2. The MCU and BLE firmware versions are also present in LoRaWAN heartbeat messages [1][2]
3. Please validate that the configuration is flashed correctly for at least few trackers as follows. It is very critical to do this step especially for large field deployments to avoid costly mistakes that can be time consuming:
    a. Exit Abeeway updater completely. Abeeway updater or any other serial terminal program cannot access the same USB port simultaneously.
    b. Install Tera term or a similar serial terminal program and open the USB port on which the tracker is connected
    c. Once the tracker is connected to Tera term, it will prompt you for login. The default password is ***123***
    d. Once the password is set, you can type “config show” which will result in all the firmware parameters.
    e. If there is error in step (d), it is because the tracker has not joined LoRaWAN network. In this case, you can type “system skip” followed by “config show”. Once verification is done, you can type “system reset” to resume normal operation of the tracker
    f. Please validate that the firmware configuration in step (d) or step (e) is matching the configuration file that was flashed. If there is mismatch, it means the configuration file is in error.
    g. In case of any issues in the above steps, please refer to [6] for CLI Usage application note and CLI Usage training slides.

4.8Example demo videos

The example demo videos for Abeeway updater can be viewed below:

a. https://youtu.be/WHN3aLIjKtY
b. https://youtu.be/xeWkKNEO74s

5 Troubleshooting the USB Port

It can happen that the USB port is not properly recognized or due to some problem during the firmware update, the tracker's firmware gets corrupted. If this happens, you can try either all or some of the following steps:

1. Ensure that you are using USB data cable for this operation
2. Unplug the tracker from the computer and try to plug it back again.

   If it works, you can see if Linux has successfully detected the tracker.

   sudo dmesg

   [2293.225552] usb 2-2.1: USB disconnect, device number 11

   [2300.242543] usb 2-2.1: new full-speed USB device number 12 using uhci_hcd

   [2300.568789] usb 2-2.1: New USB device found, idVendor=10c4, idProduct=8c0f, bcdDevice= 0.00

   [2300.568791] usb 2-2.1: New USB device strings: Mfr=1, Product=2, SerialNumber=3

   [2300.568792] usb 2-2.1: Product: Microtracker

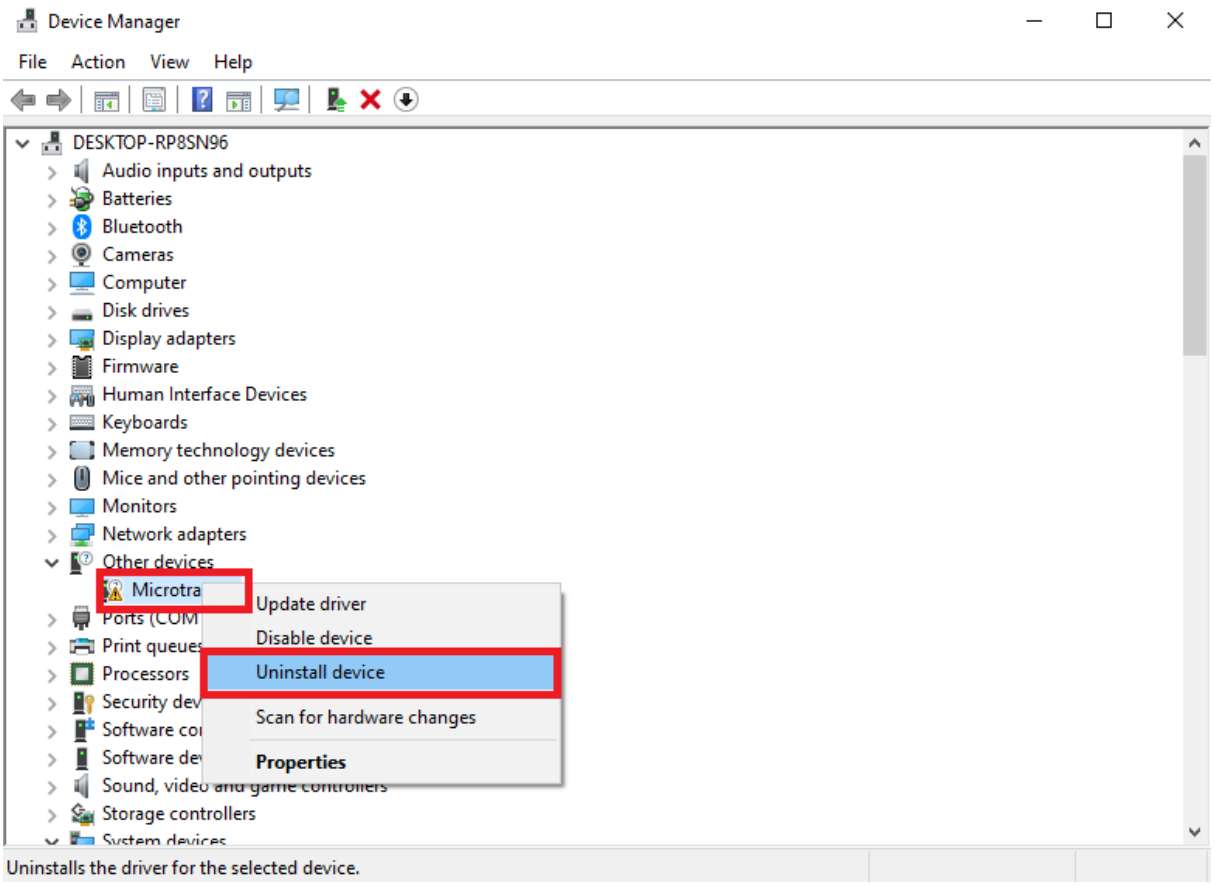
   [2300.568793] usb 2-2.1: Manufacturer: Abeeway

   [2300.568794] usb 2-2.1: SerialNumber: 24a83f015dad6ba4

   [2300.571627] cdc_acm 2-2.1:1.1: ttyACM0: USB ACM device

On windows, you can see the USB COM port on Windows device manager if the tracker is detected correctly.

3. There are scenarios that the USB driver of Windows can malfunction, and the COM port is not shown correctly in Windows Device Manager (even after repeatedly connecting/disconnecting the tracker). In that case, uninstall the Micro Tracker USB driver from device manager as shown below and unplug the tracker



4. Reset the tracker to enter MCU bootloader with the button sequence ***<4 short press, 1 long press, 2 short press, 1 long press>*** and then perform firmware upgrade while the tracker is in MCU bootloader mode. Resetting the tracker will trigger LoRaWAN join procedure, so please ensure the tracker is in LoRaWAN network coverage during firmware update.
5. If the MCU bootloader reset sequence is not working to enter bootloader mode, then hold the button for at least 30 seconds. If this works, you will see a new USB port in the operating system. Once that happens, you can launch Abeeway updater to carry out the MCU firmware update.
6. Reboot the computer.

Once the USB port is successfully detected, then carry out the firmware update using the steps shown earlier.

If this does not solve the issue, see Chapter 6 on how to report problems.

6 Reporting Problems

The problems with Abeeway updater must be reported to local distributor from where you purchased the trackers or Abeeway support if you purchased them from Actility/Abeeway. When reporting the problems, please ensure the following:

1. The issue is described clearly with all the steps you did to experience the issue.
2. Screenshot of the Abeeway updater
3. Logs of the terminal from where Abeeway updater script is launched.
4. Archive the logs directory, /var/log/abeeway/ and include it in the e-mail.

7 References

[1] Abeeway Asset Tracker Reference Guide

[2] Abeeway Driver

[3] Abeeway Updater Repository

[4] ThingPark Location online documentation portal

[5] Abeeway Firmware binaries and config files

[6] CLI Usage

8 License