AerobTec Altis

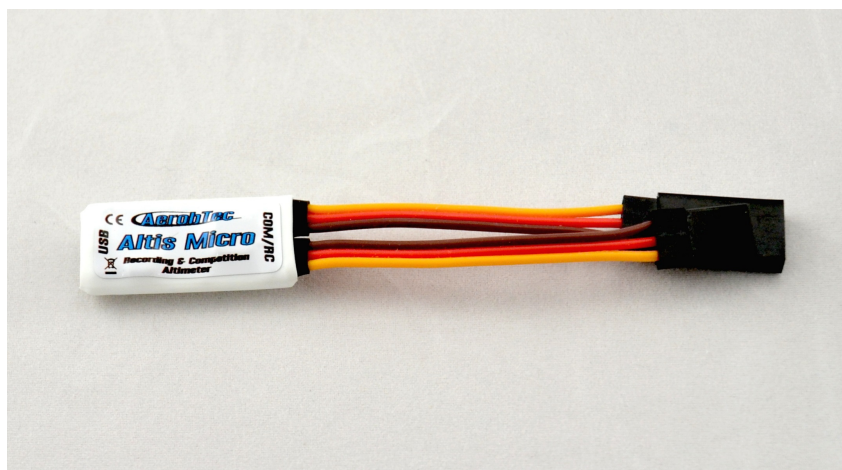# *Micro*

Recording / Competition Altimeter with Telemetry

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1. Specifications

- ✦ Memory: 3.9MB (more than 15 hour record with 0.1s sample rate, logging altitude, voltage, temperature, throttle in)

- ✦ Sample time: 0.1 – 25.5s (user selectable in 0.1s steps)

- ✦ Dimensions: 30 x 14 x 7mm
  Cable length approx. 7cm

- ✦ Weight: 4.7g with JR cable

- ✦ Power supply range: 4 – 8.4V

- ✦ Logging:
  - ○ altitude
  - ○ voltage
  - ○ temperature
  - ○ throttle input and output

- ✦ Conforms to all existing competition rules (FAI F5J, ALES, etc.) - for some competitions AerobTec Device Terminal is required as a display element

- ✦ Records multiple motor runs per flight

- ✦ LED for indication of state

- ✦ Telemetry support for
  - ○ Jeti Duplex EX®, Multiplex® MSB, Graupner® Hott
  - ○ Futaba® SBUS2, FrSky® S.Port with Telemetry Converter FF
  - ○ Spektrum DMSS, Hitec HTS-SS with Telemetry Converter HS

- ✦ Upgradeable firmware

- ✦ AerobTec Altis Flight manager software for Windows

2. Introduction

The AerobTec Altis Micro is a barometric altimeter designed especially to record the altitude of R/C aircraft during flight with additional competition features with telemetry support. The unit has very small dimensions and a low weight.

The Altis Micro senses barometric pressure variations caused by altitude changes of the aircraft. The altitude is then calculated from pressure data and stored in the internal memory of the device.

The included system allows you to connect to a personal computer with a Windows (XP or higher) operating system via USB. The supplied program will not only read the information from the device and save it to the computer in various formats but it can also display the information in an advanced graph and process the flight information in many other ways.

This altimeter has functions based on FAI F5J and Altitude limiting competitions (ALES) rules so it can be used for these competitions.

The device and the software also provide some other complementary functions such as temperature, throttle or voltage measurement and recording.

3. How it works

The Altis Micro uses a modern, fast, digital pressure sensor which allows it to sense very low pressure differences. This gives the unit an altitude resolution smaller than 0.5m with sample rates as low as 0.1s. Since atmospheric pressure changes over time, these changes will affect your measurements. For this reason, long term measurements may not be precise enough. However, the altitude for short term flights, which are common in R/C aircraft, can be recorded very precisely. The measured altitude is stored in the high capacity internal memory which allows approx. 15 hours of recording with the fastest sampling rate (0.1s).

After the Altis Micro is connected to a power supply, it will initialize in the first 3s. During initialization, the reference altitude and a zero throttle level are measured. **Note: It is necessary to keep the throttle on your R/C transmitter turned off during this phase. It is recommended to set the initial altitude before each flight by disconnecting and re-connecting the power supply.**

4. Hardware description

Connectors of your Altis Micro

Your Altis Micro has 4 connectors. They are shown in Fig 1.

RC IN   – input signal from the R/C receiver. Power to Altis Micro is provided from the receiver via this connector

RC OUT   – output signal to ESC (Electronic Speed Control)

USB   – Connects the Altis Micro to a computer via USB

COM   – Molex connector for connection with telemetry equipped receivers as well as future additional features
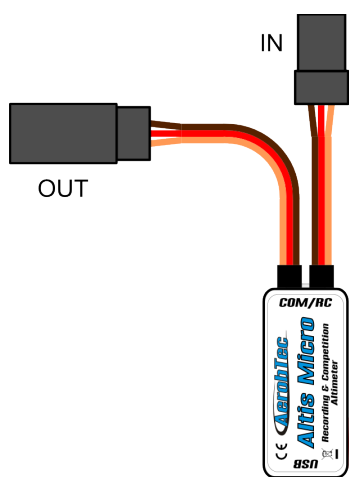

Fig 1: Connectors of your Altis Micro

Wire color	Signal
brown	Ground
red	Positive power supply
orange	R/C signal

Table 1: Colors of the connector wires

Mounting in the aircraft

Since Altis Micro uses atmospheric pressure for its measurement, it has to have open access to the outside atmosphere. It must not be completely sealed inside the fuselage or other box. As most standard R/C aircraft are not fully sealed, it is usually not necessary to do any special modifications for installation. The Altis Micro can simply be put in a free space inside the fuselage.

If the unit is mounted outside the aircraft, the location must be carefully considered. The unit must be mounted away from the airflow caused by the propeller.

Avoid mounting your Altis Micro on parts of the plane that might become hot during operation.

Connection for data logging only

If the Altis Micro device is used purely as a logging device, connect the device to any free receiver channel as shown in *Fig 2.* The signal polarity must be observed as shown in Table 1.

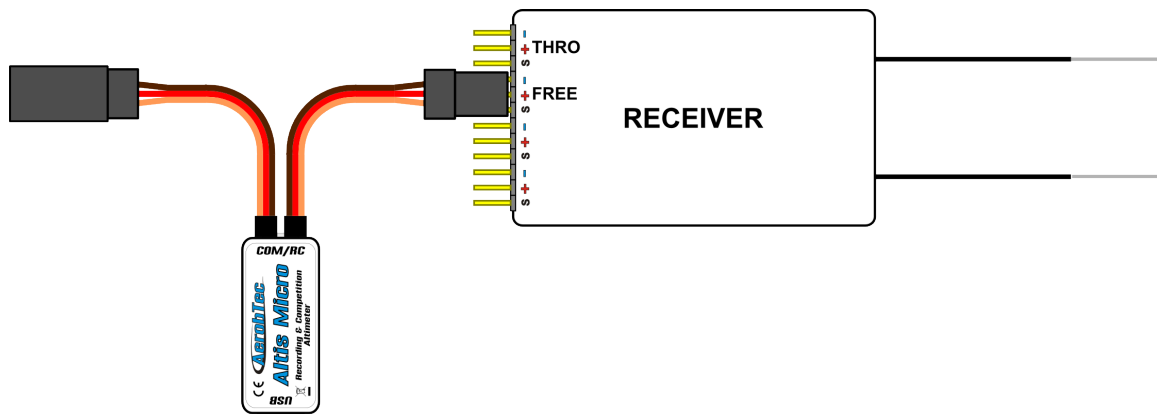*Fig 2: Connection scheme for data logging only (FREE – free receiver channel)*

Competition connection with internal BEC

For competition use (like F5J FAI, ALES, etc.) the JR input cable has to be connected to the R/C receiver, and the JR ESC cable has to be connected to the output connector on the main measuring unit board. See Fig 3. The signal polarity must be observed as shown in Table 1.
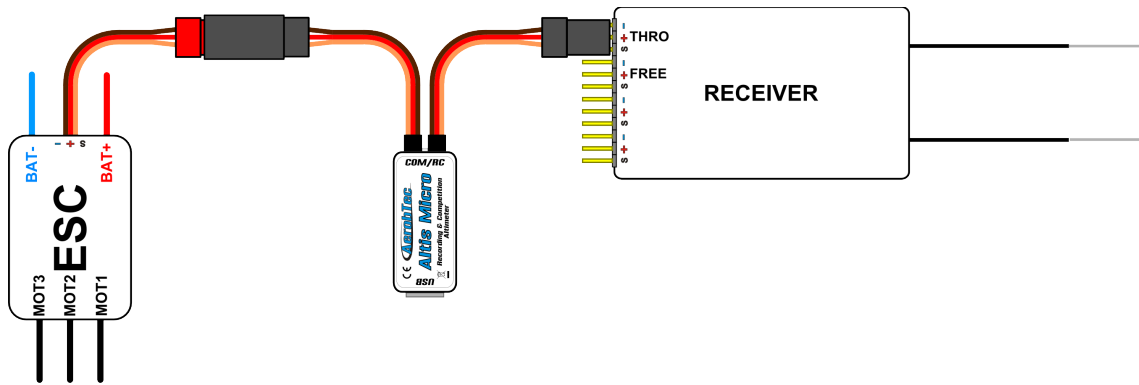
Fig 3: Connection scheme for competition use (ESC - electronic speed controller, THRO - throttle receiver channel)

Connection with external BEC

If you use a separate power source for your receiver or a battery eliminator circuit (BEC), you should make sure to separate your power supply from your ESC and the Altis Micro. This is done by disconnecting the red wire from the ESC connector. This is not usually necessary for "Opto" ESCs. The disconnected red wire must be insulated to ensure that it does not cause any short circuit or other problems. See Fig 4.
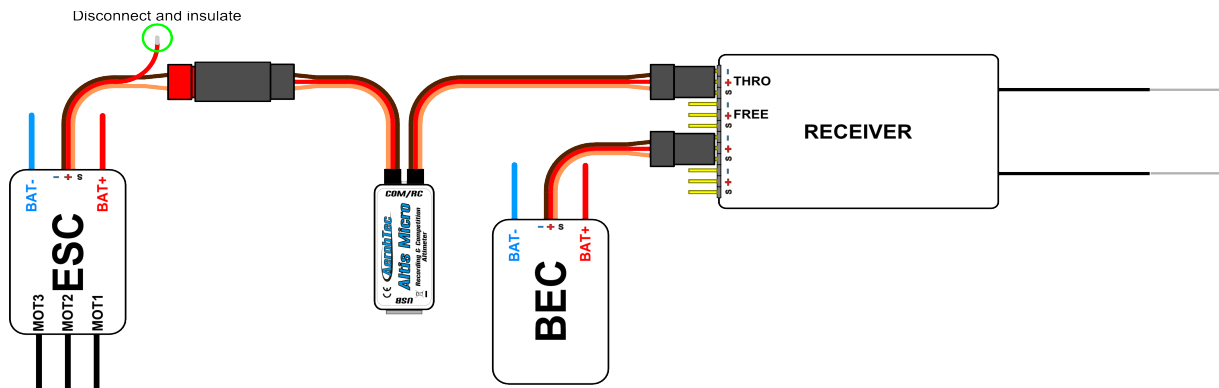
Fig 4: Connection of Altis Micro with BEC

Connection for telemetry

Some radio systems provide telemetry functions. These functions allow wireless transmission of certain data from the aircraft during the flight and display it on your Tx or monitor screen. The Altis Micro has COM connector reserved for this purpose. Use a Molex/JR telemetry cable (sold separately) to connect your Altis Micro to the telemetry input of your receiver. The schematic in Fig 5. shows the direct connection of Jeti model Ex, Multiplex MSB and Graupner Hott. Some other brands are supported using Telemetry Converter FF or Telemetry Converter HS.

Fig 5: Telemetry connection

USB connection

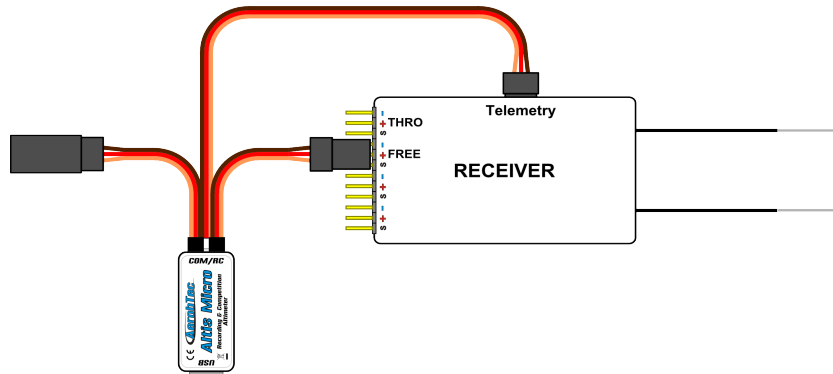When you wish to download your logged data to a computer or change the settings of your Altis Micro, connect the Altis Micro using a standard micro USB cable (sold separately) to a computer with Windows XP (or newer) operating system. See Fig 6. When you connect your Altis Micro for the first time, the computer should install the drivers automatically. You need to have the Altis Flight Manager program installed in your computer to display any stored data and make changes to your settings.
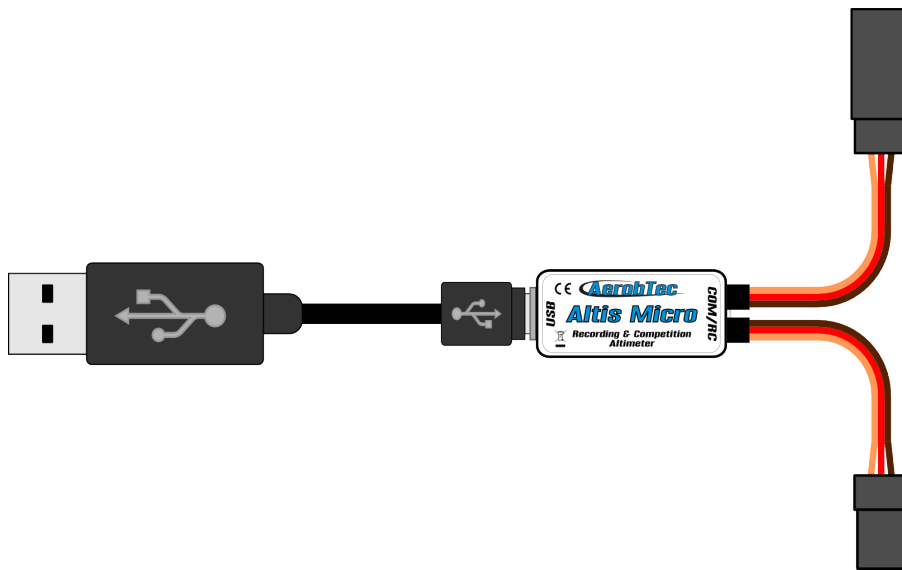

Fig 6: USB cable connection

5. Altis Micro LED indication of state

A Light emitting diode (LED) is used to indicate state of your Altis Micro.

The following states are available:

DO NOT DISCONNECT

…................................

LED is flashing very quickly. In this state Altis Micro writes some critical data to its internal memory.

Disconnection of the device might cause data corruption.

USB mode

– – – – – – – – – – – – – – – – – – – –

LED flashes once per second. It indicates the state when Altis v4 is connected to the computer.

F5J / Max height mode

When there is no other mode active, Led indicates either maximum height or F5J start height. This is determined by LED Display option.

The chosen height is indicated in the following form. Each digit is indicated by a corresponding number of short flashes. Zero is represented by a long flash. Digits are separated by a short pause, while the altitude is repeated permanently and separated by a long pause.

See the following examples:

– –   – – – –   – – – – – –   – –   – – – –   – – – – – –   246m

–   ——   – – – – – – –   –   ——   – – – – – – –   107m

Firmware upgrade

The progress of firmware upgrade is indicated, too.

There is a constant period of flashing, but the length of the impuls is increasing. So in the beginning only a very short flash appears. In the end of the, the flash is long while the pause is very short.

.   -   –   ——   ——   ————   ————

Backup frimware

– —— – —— – ——

If the firmware upgrade is not finished correctly, a backup firmware is activated.

6. Work with Altis Micro in the Altis Flight Manager

The AerobTec Flight Manager (AFM) is a PC application for Windows which allows you to communicate with Altis Micro and other devices made by AerobTec and to display and process the flight data recorded by them.

Altis Flight Manager can be downloaded from http://www.aerobtec.com/support/download/

Note: There is a separate manual for AFM. However, the following pages describe how to set up your Altis Micro according to your needs.

In order to connect to the device click **Tools -> Device** or Device icon on the toolbar. A window will appear. See Fig 7. Choose Altis Micro. AFM then automatically connects to your Altis Micro. If there is more than one Altis Micro connected to your computer, you will be asked to choose which one you wish to connect. When connected, Altis Micro screen window will be displayed.

Fig 7: Device choosing window

Altis Micro window

There are two parts of the window. The upper part shows general information about the device – its firmware version, serial number and used memory.

The bottom part of the window is used for settings.

Downloading data

In order to access the logged data from your Altis Micro, use the **Download data** button. Once the data is downloaded, you can close the Device window and work with the data.

Settings

There are many possible configurations for the Altis Micro. You can set your Altis Micro according to your needs. This is done by using the settings tabs in the bottom part of the window.

There are several tabs:

Logging Settings (Fig 8) – Here you can set how you wish to store the flight parameters to your device memory. The basic parameter, Sample time, determines how frequently the parameters will be logged.

You can set which parameters you wish to log. You can log altitude, temperature of the device (note: the device is usually several degrees warmer than its environment), input throttle PWM (signal from the R/C system), output throttle (signal to ESC) and the voltage on board (the voltage Altis Micro is powered from).

Note that the more parameters you log or the lower the sample time is, the more memory it consumes. However, there is memory enough to log about 15 hours of data when logging almost all available

![AerobTec logo]

parameters with a Sample time of 0,1s. With different settings you can log up to several days of data.

You can choose also a trigger type – this determines when your device starts logging. There are the following options:

- Always on – Data logging begins once the device is initialized

- RC trigger – When Altis Micro is connected to a receiver channel controlled by a switch on your R/C transmitter. You will activate the logging manually by turning this channel on. Note that this option is not available for some of the competition settings.

- Altitude trigger – The device starts logging when the plane reaches a certain altitude. It is possible to set your desired altitude.

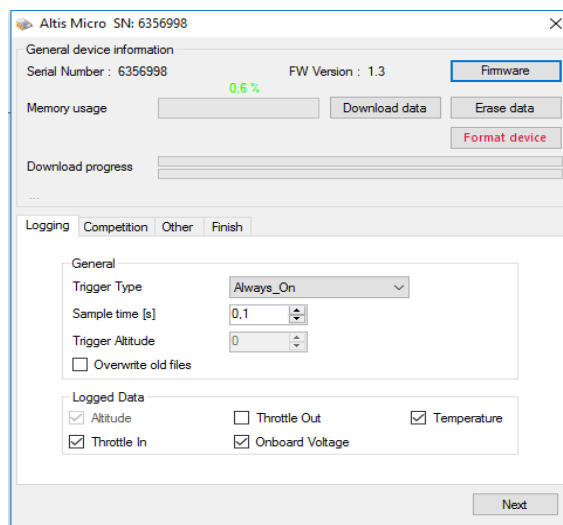**Overwrite old files** lets the device to erase old files in case the memory is full.

Fig 8: Logging settings

Competition settings (Fig 9) – There are several pre-programmed standard competitions. You can simply choose the one you want from the Competition Type list. This choice sets the proper values of all necessary parameters.

Of course, you can customize the parameters according to your needs. For example, you can set a motor switch at certain altitude or at certain time.

Meaning of General competition settings parameters:

Altitude switch – 10s measuring window starts when plane reaches preset altitude

Time switch – 10s measuring window starts when preset timer is timed out

Altitude start – competition starts when altitude is higher or equal to 5meters

Throttle start – competition starts when throttle output is higher than 1200us

Throttle switch – competition stops when throttle output goes under the 1180us

F5J FAI / F5J Height measurement – will measure start altitude as defined by F5J FAI rules

F3K mode – measure highest reached altitude on every throw, trigger altitude defining new throw is equal or higher to 5 meters

There are also several preset competition formats (F5J, ALES150, ALES200) from wich can user select.

At the bottom of the Competition Settings tab there are Safety and Training settings. **Allow Emergency Motor On** has the following function:

In some competitions it is not allowed to switch the motor on again during the flight. However, you may want to have the ability to switch the motor on again in an emergency situation. The user can choose to enable this or not. If enabled, when the motor is switched on for an emergency the Altis Micro restarts the recorded F5J height and it is recorded so it can be shown on the flight graph.

Sometimes during training it is not practical to reset your Altis Micro to start a new flight each time you land and launch again. In this case there is the option: **Allow Competition Restart.** It makes the device behave as if it has just been initialized (only for the competition settings) when your plane's altitude drops below 8m.

If user uses Altitude Switch there is possible to activate **Antizoom algorithm**. Its purpose is to take into account the ascending of the model, so the model will fly only to the specified switching altitude after the motor is turned off while ascending.

The antizoom gain specifies the influence of the vario for the calculation of the moment of motor off. The higher the number (maximal value is 2.55), the more vario is taken into account. If antizoom gain is 0, the model behaves as with deactivated antizoom algorithm.

Note: there are several types of firmware. Some firmware types will not allow certain setting changes. Refer to the Firmware types chapter for more information.
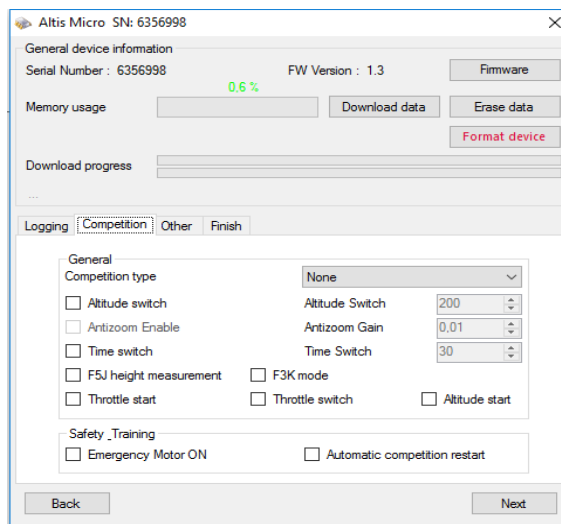

Fig 9: Competition Settings

Other settings (Fig 10) – You can assign a function for the selected port and change LED Display settings.

You can choose from

None - inactive

JETI Model Duplex EX

Multiplex MSB

Live Output – for online output of measured data

Graupner HOTT – behaves as Electric Air Module

Device Terminal – for to display results and change settings

Futaba SBUS2 with Telemetry Converter FF

FrSky Sart Port with Telemetry Converter FF

Spektrum DMSS with Telemetry Converter HS

Hitec HTS-SS with Telemetry Converter HS

Example of use: if user owns RC transmitter with telemetry link Multiplex M-LINK and he wants to use Altis Micro as a telemetry sensor, he has to select from combo-box „COM Usage" choice „Multiplex_MSB".
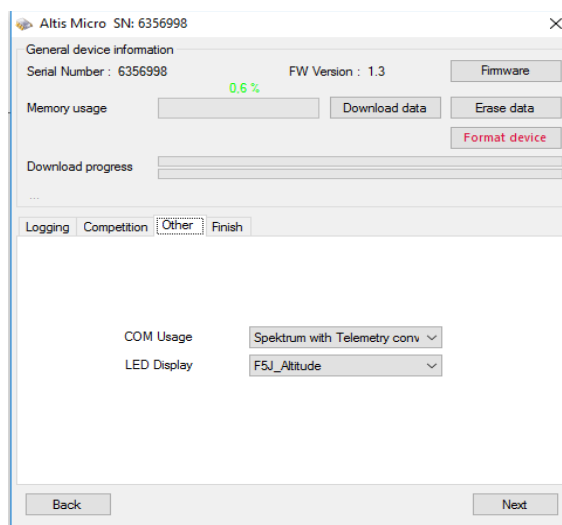

Fig 10: COM and LED Display settings

Firmware upgrade

When your computer is connected to the Internet and AFM is connected to an Altis Micro, AFM compares the firmware version of your Altis Micro with the newest currently available firmware and offers to update the latest firmware for your Altis Micro if necessary. To upgrade the firmware follow steps below :

1. Click **Firmware** button

2. Choose the firmware from the list.

3. You can choose a different firmware from a file stored in your computer.

4. After the firmware is selected click the button **Upgrade** and follow the instructions on the screen. They will guide you through the upgrade.
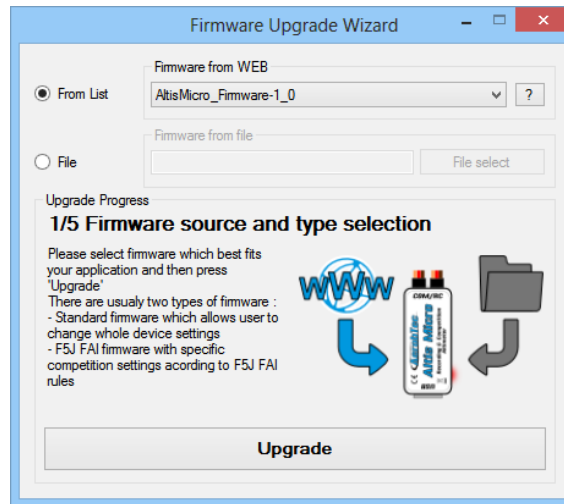
Fig 11: Firmware upgrade window

Firmware types

Note: there are two firmware types. One of them is marked, "F5J". This firmware complies exactly with FAI F5J competition rules and no other options are allowed.

The Firmware marked, "Standard" allows more setting changes, including settings for F5J competitions. It is recommended to use this firmware type during training and ordinary flights. However, this firmware type is not allowed for use in certain competitions. It should be specified by the organizer of the competition, which firmware is allowed.

Backup firmware

If the firmware updates fails or if the process is interrupted, the device tries to update the firmware again until it is successful. Once finished, your Altis Micro appears in the computer as a USB removable device again.

If this does not happen or if the first start of the new firmware is not performed from USB, a safety function is activated and backup firmware is written to your Altis Micro.

Backup firmware is indicated by the LED as a combination of short and long flashes (. - . - . - . - . -).

In this case, follow the firmware update instructions to update a new, valid firmware.

7. Connection with AerobTec Device Terminal

AerobTec Device Terminal is a device allowing you to display the data from your Altis Micro in the airfield and to change its settings.

In order to use it, set **ADT** in **COM usage** settings. In case of F5J firmware or during the initialization, F5J results are shown regardless of the settings.

Connect your Altis Micro Com port with Com port of the Device Terminal and the menu of Altis Micro will appear automatically.
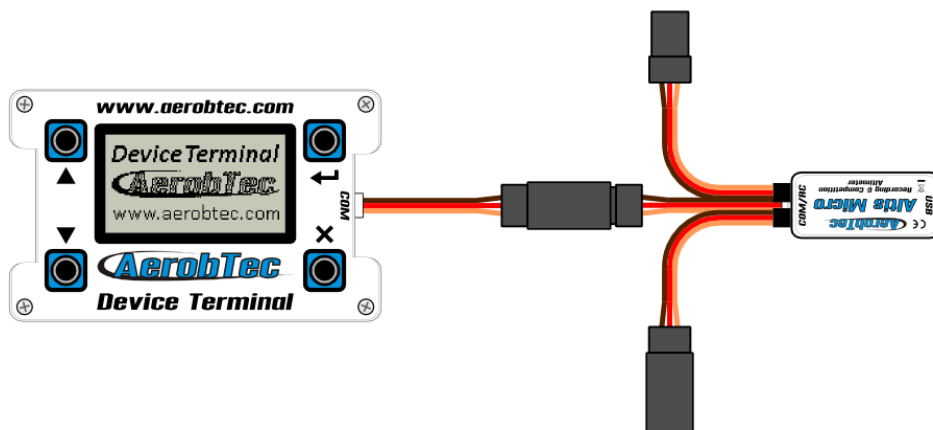
Fig. 1: Connection with Altis Micro

There are these options:

Live Output   It displays the basic measured parameters in real time. The parameters are: Relative altitude, F5J Altitude, Ambient pressure, Temperature of the device, Throttle input, Input voltage, Free memory

Device Info   Info about the device such as its name, serial number, firmware version and manufacturer

Logging   Group of Logging settings such as trigger type, sample time and logged parameters

Competition   Group of Competition parameters such as altitude/time switch, anti zoom, emergency motor on, competition restart and F5J height measurement

LED   Chooses if the LED displays the F5J or maximum height

COM   Function of the COM port. Note that you might disable the communication with AerobTec Device Terminal and would need to change the settings back via computer or activat communication during the initialization.

There are other functions available in AerobTec Device Terminal. Refer to its separate manual for more information.

8. Warning

It is not recommended to supply your whole aircraft via the Altis Micro device, however it is possible. The best choice is to use an external BEC circuit or separate power supply.

Do not mount the Altis Micro device on aircraft components which might be hot in operation (ESC, batteries)!

Do not touch the Altis Micro device to a metal surface, as this might lead to shorting of the power supply and RC system may fail.

Do not put the Altis Micro in water, fuel or other liquids!

Before flying with the Altis Micro always perform a range check!

Do not disconnect the Altis Micro when the the led indicates "Do not disconnect" state by very fast flashing

in form of (…............).

It is not recommended to write any of your own files or directories to the Altis Micro when it shows as a removable drive in your computer. This might lead to corruption or loss of any data on the device.

Do not diconnect the Altis v4+ from your PC without using *Safley Remove Hardware and Eject Media* action. This might lead to corruption or loss of any data on device.

9. Frequently asked questions and troubleshooting

1. I was updating my Altis Micro and it does not function anymore. It was OK before.

   Probably the process of firmware upgrade was not done in the right way. Connect your Altis Micro to the computer and wait. The new firmware should be upgrading. It is indicated by flashing with increasing pulse length. Within 30 – 150 seconds it should appear on the PC as a disk drive. In some cases backup firmware can be activated. The backup firmware is indicated by combination of short and long flashes (. - . - . - . - . -). In this case run the firmware upgrade again. If the firmware upgrade was finished successfully, your Altis Micro should run in a USB mode indicated by long flashes (- - - -)

   Please follow the instruction on the screen during update.

2. I see the height on the graph increasing to several meters during a test on the ground. Is my Altis Micro broken?

   No. The barometric pressure depends on the weather. Sometimes it can change variations of several meters in the measured height.

   Other cause can be a heated Altis Micro. Do not put Altis Micro near hot objects in your fuselage.

3. My Altis Micro measures F5J height even if do not start the motor. After power on, the F5J height is discarded.

   This might be caused by too high zero throttle level. In such case Altis Micro considers the signal to correspond to switched on motor.. Please check the zero throttle level in your radio system. It must be set bellow 1200µs.

4. When I fly with Altis Micro and stop the motor, it is not stopped and propeller continues spinning slowly. When I fly without Altis Micro, the motor break runs correctly.

   Try to set fixed endpoints on your ESC.

5. In case AFM can not read the flights from the device or Altis micro does not behave according to the settings, the file system might be corrupted. The reason might be disconnection in a wrong time or not ejecting in Windows.

   In order to fix this error, format the file system by clicking the Format device button in Device Window and restarting the device. Or this can be achieved also by renaming Altis micro disk from AE_DISK to AE_DISK1 in *My Computer* folder and restarting the device.

6. I want to allow Emergency Motor On, but (occasionally) it does not work, though all the settings are correct.

   The motor off throttle in value might not be present during all the initialization time. In such case default value 1000µs is used. The problem appears if your motor off value is above 1000µs, so the motor off is not detected and motor is considered active. Extend end the low end point bellow 1000µs. Motor off will be detected correctly also when the motor off value during initialization is not correct.

10. Correct disposal of this product

This product should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources. Household Users should contact either the retailer where they purchased this product, or their local government of fice, for details of where and how they can take this item for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract.

This product should not be mixed with other commercial wastes for disposal.

11. Product Registration

If you did not purchase the product directly from AerobTec please mail following information to sales@aerobtec.com. By registering your products you will be informed about updates and notifications.

Name :

Address* :

Country :

Phone* :

Email :

Product :

Serial number of product :

Date Purchased :

Where did you purchased your product? :

* this information is not obligatory

An alternative option is to register at http://www.aerobtec.com/support/products-registration

12. Notes

⚞ This manual is based on firmware version 1.3 and Altis Flight manager version 4.1.1.

⚞ Note – Altis Micro was partially developed using Atollic TrueSTUDIO®

13. Revision History

Rev. 1.0. (June 2014)

- Initial release

Rev. 1.1. (June 2016)

- Documented features added in firmware 1.3

- Added new telemetry support

- Added some new explanations