# AstroEQ configuration and first usage (Windows)

This guide will show you how to configure and test my DIY AstroEQ based controller on Windows. My controller version is basically a DIY PCB made to support the Arduino board were the official Tom Carpenter's AstroEQ firmware resides. The support board here considered is my proto-shield version but the same steps here documented ar also valid for my home-etched board. Let's start with the installation of AstroEQ firmware on the Arduino Mega2560 board.

Software pre-requisites:
1. ASCOM Platform
2. EQMOD/EQASCOM
3. Arduino IDE

1. Download the **AstroEQ source files** from Tom's GitHub site here. Go to AstroEQ-Firmware folder and download the source files. You need the Arduino IDE to upload the source code to the Mega board (download from here the latest version). Download also the AstroEQ Config Utility from the same GitHub repository (I use the version 7.5 that you can find here, using the Zip version). Note that the Config Utility requires Java Runtime JRE 1.6.0 or newer.

2. Download the appropriate **PinMappings.h** file from my site (bottom of the page), wheter you are using the proto-shield or home-etched PCB version. Make a copy of the original PinMappings.h and rename the one downloaded from my site to PinMappings.h.

3. Now **connect** your Arduino Mega to the PC (the Arduino board alone, without the support proto-shield/PCB) via USB.

4. Double click on **AstroEQ.ino** to open up the Arduino IDE (assuming you have already installed), choose the appropriate board and serial port under 'Tools' and upload the software to the Mega. Now your Arduino board is ready to be configured.
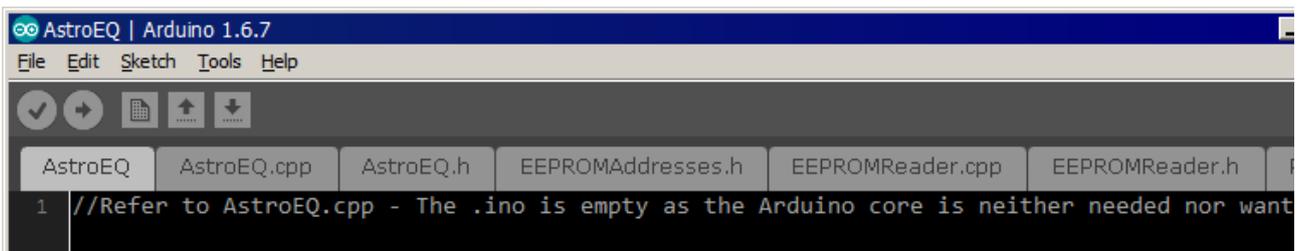

5. Run the AstroEQ Config Utility (versions **7.5** or **8.0** only). Select the port to which your Mega is connected to (COM Port field) and click on '**Configure**'. After reading the EEPROM, AstroEQ Utility will prompt you with a message like 'EEPROM Blank or Corrupt' or 'Loaded configuration'. The first case happen when the Mega has not yet been written by AstroEQ utility (new board). The second when the board has been configured by the Utility in previous sessions.

Click on '**Next**'

6. The setup of your board will take place mainly here. Click on 'Load' button to load an already existing configuration from the AstroEQ sample database only to check the type of data you have to enter in the setup entry fields. Fill in the **white fields** with your specific hardware characteristics. 'Moto Microstep Level' depends onthe type of 'Motor Driver IC Type' you choose. 'Goto Rate' is the slew speed you would like to set for fast movements like goto and manual operations. Here below an example of my test setup.
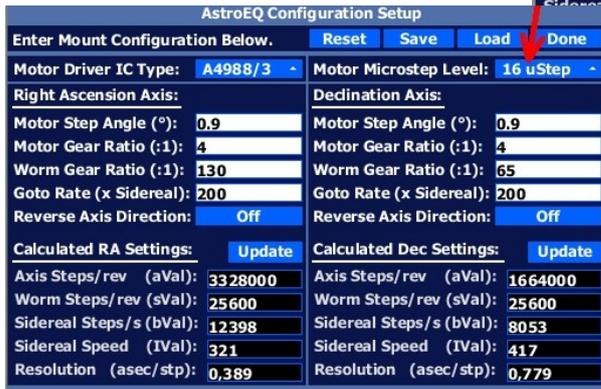
Once completed the data entry, click on the '**Update**' button for both RA and Dec settings columns and, if no errors occurs about possible incompatibilities in hardware settings, the Utility will calculate and prepare its own parameters to be stored in memory.

7. Click on 'Done' button and the Utility will write your configuration setup to the Mega's EEPROM.

8. The Utility will load automatically the EQMOD Mount testing interface but it is not yet time to do. We have to mount our DIY support PCB on top of the Mega …
   At this time, check the status of your Mega board. There ought to be its three LEDs (pin 13's LED togheter with TX and RX LEDs) blinking simultaneously, which means that the Mega is correctly connected and in communication with EQMOD's interface.
   Click on 'Done' to skip and exit this testing step and then on the following '**Finished**' button. The AstroEQ firmware update and configuration setup is hopefully completed successfully. Close the Utility application.

9. **Disconnect** the Mega from the PC and mount your support PCB (or proto-shield), equipped with the HC-06 module, on the Mega.

10. Connect the stepper motors to the support board and turn it on. The HC-06 module's LED is now blinking and waiting for connection (see my page for configuring this bluetooth device if you need help). Check on Windows's Device Manager for the port number opened by the HC-06 for communications.

11. Run the **EQMOD/EQASCOM Toolbox** application and choose '**Driver Setup**'. This will open the EQASCOM Setup window.
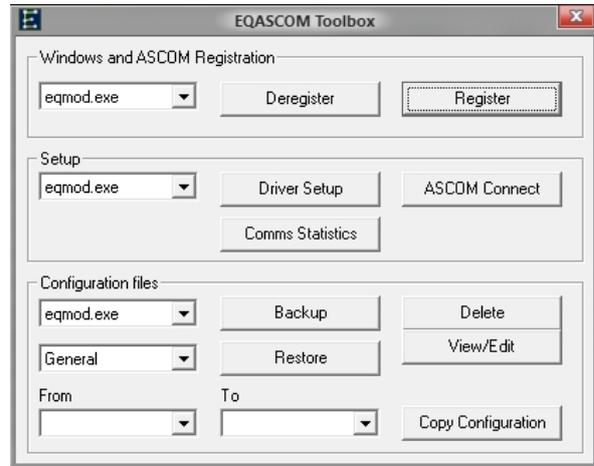
Check for the 'Slew Preset Rates' you want/prefer then set di EQMOD port details to reflect your environment (mainly the COM port number).
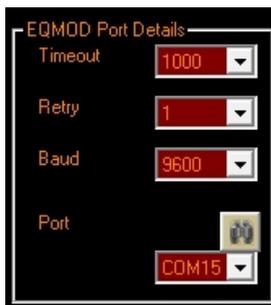
Click on 'Ok'.

12. Choose '**ASCOM Connect**' from the EQASCOM Toolbox. The 'EQMOD HEQ5/6' interface shoould open up, the HC-06's LED will stop blinking and the PCB's Stat LED should start blinking.
Set the Slew rate to 4 (in my case 200x) and try to activate the motors by clicking in the N, S, E and W buttons. The button with the star will start the sidereal tracking while the Stop button will stop it (of course ...).
The Stat LED of the PCB will remain steadly on (stopped blinking).
Hopefully, if all is going well, the AstroEQ board is now correctly configured and tested.
Click on '**ASCOM disconnect**'.

13. ASCOM interface to Sky maps softwares. Here is an example on using Cartes du Ciel (CdC). Under 'Telescope' menu select 'Control panel'>Select and choose 'EQMOD ASCOM HEQ5/6'. Click 'Ok' and then 'Connect'.
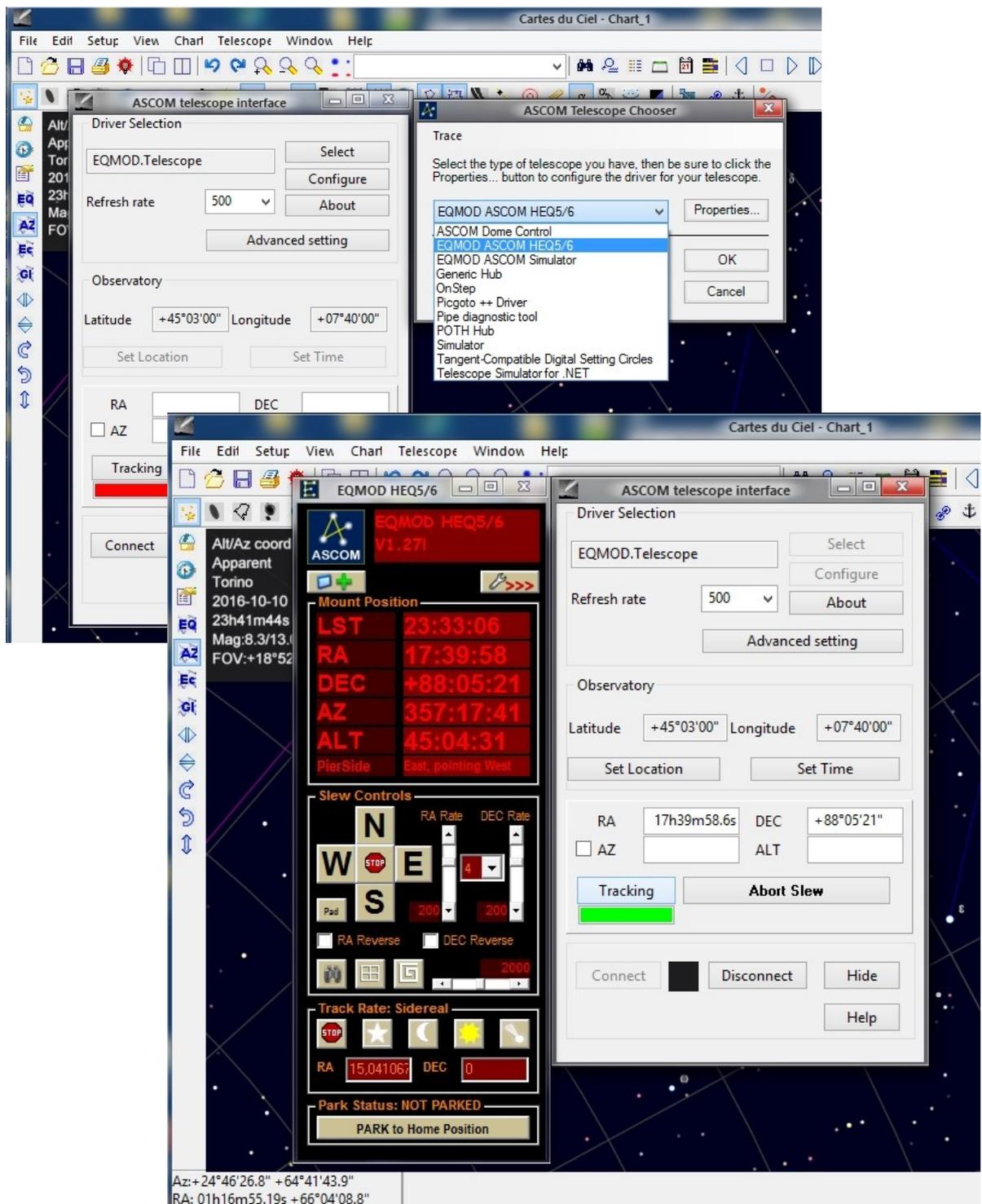
14. Note that you can use the controller via **USB cable** instead of the HC-06 Bluetooth. If this is the case, unplug the HC-06 module before connecting the Mega board to the PC via USB, power the support PCB as done before (DO NOT use the Arduino's External Power Jack!).