Open Source Solar Tracker

In the frame of a four-week technology seminar in Tamera Greg Fung, Christian Oekermann and Daniel Müller started the development of a microcontroller-based solar tracker.

The interest in that topic in Tamera mainly was raised from the Tamera-FixFocus project, where an analog sensor and electronics were used to control the two axis of the solar concentrator. This setup was limited in functionality and a digital modular solution based on the popular Arduino platform seem to be a good way to go forward.

Beside industrial applications the interest for solar tracking controllers also expands to other application fields, mainly towards solar cooking. Several tracked solar cookers are currently in use in Tamera and potentially could be controlled by the very same system to improve the usability greatly.

# General features

* 12-24 V input voltage
* Arduino based
* Modular system - Control board, motor drivers, real-time clock easily exchangeable
* Controles two axes (configurable for mounts based on Horizontal or equatorial coordinate systems)
* Homing with limit switches
* Support of different motor types (e.g. DC motors, stepper motors)
* Two stage tracking:  
  Rough positioning by sun position algorithm when the sun doesn’t shine (open-loop control) and accurate tracking with photodiode sensor (closed-loop control) when the sun shines

# First application - Solar Tracker v0.1

The first implementation of the system is pretty much a copy of the analog tracking control system previously with the Tamera-FixFocus solar concentrator, but now comes with the capability of both closed-loop (sensor) tracking mode and open-loop tracking mode (using the sun position algorithm).

Download the files here

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