

1 Attiny Solar Energy Harvest Tests

I have the following:

- Solar panels
- Attiny 10

To this list, I will add a supercap, and an energy harvesting IC. The goal being to load the super cap during the day, and to run 24/7. I will need an exceptionally low power micro. The super cap will need to be about 3.3V or 5V.

1.1 Micro Considerations

The Arduino Atmega328P is not an option. I'm looking to have a current draw of only 1mA max, (ideally 500uA) when active. Moteino is also not an option for this. Those are made for batteries. I want to be battery free. A super cap, however can be used to store energy. I'll get to that shortly.

For micros, I have some Attiny10 on hand, and these have a reasonably low power pull in active mode. Let's build those up first. What will the micro do? No idea. I haven't a clue.

1.1.1 Micro Notes

Must run at 1.8V / 1MHz per front page of data sheet, for 200uA draw in active mode.

1.2 Energy Storage

I don't want a battery. Let's go with a super cap. The solar panels will only be active some of the time, so I will want to harvest

energy with some kind of IC into the cap when the sun is out.¹

1.3 Make parts, not scrap

I will want to make sure that all parts I build are perf board parts, not breadboard scrap (to be torn down and rebuilt again). This is an Attiny, so no need to test much, yet.

1.4 Programming

To program the Attiny10, I'll use the Arduino adapter from the Junk + Arduino blog. I built it up², and was able to Read the memory. In order to upload to the board, you will need a compiler setup. You can possibly do it in AVRGCC, but instead I opted for either Arduino IDE (via Attiny10Core which didn't work), and then went to Mplab. In order for mplab 5.25 to work, it will need XC8 compiler, and there is a pack that can be downloaded through the IDE to get Attiny10 support.

It appears the AVR Dragon (which I have) can not be used. However, other programmers can be used. Pickit 4, Mkavrii, stk600, I think.

¹Reference: www.analog.com/media/en/technical-documentation/technical-articles/solarenergyharvesting.pdf is a start. I'll need to do more research.

²Had slight error where the Arduino + board wouldn't read - pins too short on headers, then the arduino wouldn't boot - due to bad connection on perf board shield. Thankfully, the USB port didn't try to run. Protection circuitry cut in on the laptop.