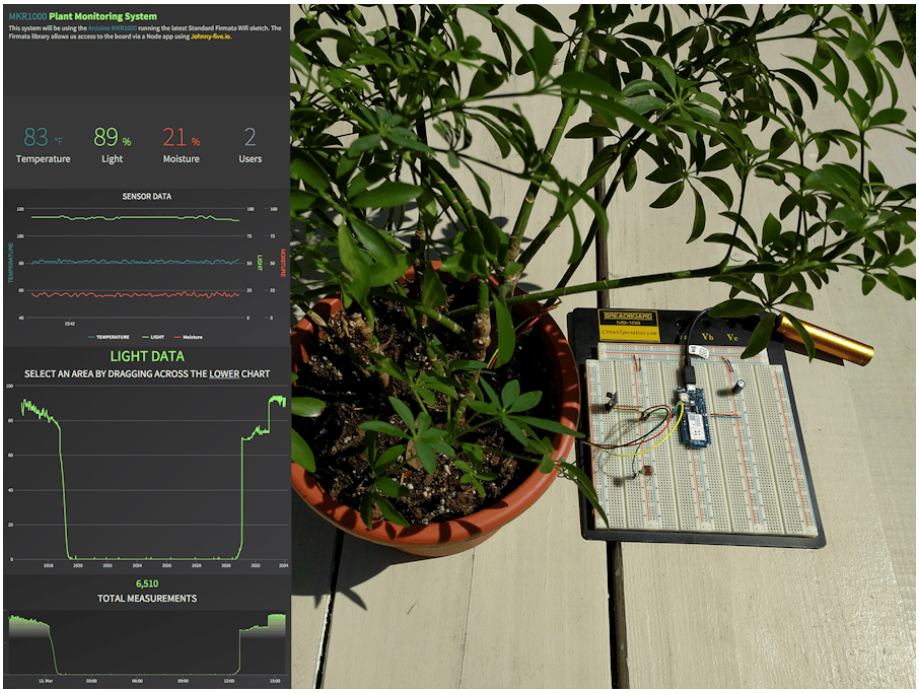
Pros and cons of building your own sensor and data logging system in hydroponics

If you've read my blog before, you know how important data logging is to having a successful hydroponic crop. Data allows you to monitor and tune the different variables in your grow, which allows you to give your plants the perfect environment through their entire growing cycle. However, deciding how to do this is not simple, you need to decide if you're going to go with a company that sells some pre-made data-logging solution or you need to build everything yourself. In this post, I'm going to talk about several pros and cons of building your own data logging system for your hydroponic crop.

Pros

You have control over everything. The most important pro when building your own data logging solution is that you have total and absolute control over all aspects of it. If you want to support some type of sensors or have your data stored a certain way, there is nothing preventing you from doing this except your own skills and imagination. If you want to support an obscure messaging protocol, wireless transmission system, etc, it is all up to you. You won't be limited by the management decisions of an external company and you will be able to build a system that perfectly caters to your needs.



A simple plant monitoring custom built system. Read more here.

You will be able to leverage low-cost hardware. When building your own system you will be able to get all the parts yourself. This means you will be able to substantially reduce costs. Of course, you're incurring the important cost of your time but the hardware itself will be low cost and once you implement the basic setup you will be able to connect new rooms and build new logging stations for a fraction of the cost of buying one commercially.

Take advantage of new hardware quickly. As new technologies for monitoring environmental variables are invented or the desire to control new variables comes into play, your ability to fully control your setup will allow you to take advantage of new hardware that comes into the scene while companies will usually be very slow to respond to such changes.

A much deeper understanding. When you build all the monitoring setup yourself, you will create a lot of understanding about how the sensors work, how each one of them is calibrated, how data is transmitted, stored, etc. If you build your own monitoring setup you will gain a much deeper understanding than somebody who just buys an off-the-shelf product.

No need for patchwork approaches. When you decide to get a commercial solution for data logging, one of the issues that comes along is that you will get the setup from a company that supports some types of sensors but you will often face challenges if you want a sensor outside this offering. This will usually mean buying a setup that includes that sensor from a completely different company, measuring some variables with one system and some others with another system.

Cons

No one to support it. The biggest drawback of building things yourself – or hiring someone to build a custom system for you – is that you will have no one to help you debug your system when things go wrong. You will also have limited ability to delegate this work, as your highly custom system will demand somebody with a high level of skill to become familiar with it and operate it with the same level of proficiency as you do. A custom solution means all of this responsibility will fall on the shoulders of those who developed the system.



A custom built data logging system to read EC/pH/ORP. Read more here.

Limited by your knowledge. Although it is true that you will get a pretty deep understanding of the things you decide to incorporate into your system, you will also be very limited in the design and implementation of your system because of your particular limitations as an individual. A big company that develops a data logging system will have dozens of people working on it, and all of their experience will go into the decisions that were made in the sensor and software implementations. This can mean better sensor choices are made, more robust communication protocols are used, etc.

Not built for sharing. Custom-built systems usually have the problem that they are built with poor documentation. Sharing is normally not the priority and people will prefer to build "fast and dirty" in order to get things done. This means that the code is usually poorly commented and of a lower quality than what you get from a product that comes from a business.

Although some people who build custom software that they intend to release as open-source implementations will often go to great lengths to provide great code quality this is rarely the case when the intention is not to make everything open source.

Big overhauls are a big problem. Since your custom building efforts will usually rely on one or two individuals, bad decisions that are made at the beginning of a project will carry a big toll during the entire life of the system. Poor decisions will be hard to overcome, as a lot of work will be needed to overhaul these “built from scratch” systemA big business with large teams will make fewer poor decision and those mistakes will be found out and fixed faster.

Messy hardware that often breaks easily. Due to the fact that people who build DIY implementations will go for rapid prototyping and functionality over robustness, sensor and data logging setups built in this manner will usually lack the roughness of commercial implementations. While a business dedicated to data logging wants to build systems with adequate sensor housing, and durability for transport, with customer satisfaction in mind, a person who builds this for him or herself might be ok with having a lot of exposed boards and cables. Overall DIY setups are therefore less robust, more likely to break, and more likely to suffer from electrical issues like poorly grounded circuitry.

Hopefully, the above pros and cons give you a useful idea of what you’re gaining and losing when you decide to build your own custom-built data logging system for hydroponics. While you will usually get much more flexible, lower cost, cohesive and personalized setups from custom building, this will usually come at the cost of higher support costs in time, lower reliability, lower build quality, and compromises in quality depending on where your strengths as a builder/coder are. For small setups, it is usually a no-brainer to go with a custom setup – because of how much you learn from doing this

and how much you can experiment – while for larger setups careful consideration of the above cons is important.