Copenhagen Atomics

Hub10 Temperature Data Logger
OVERVIEW

Copenhagen Atomics Temperature data logger system allows you to connect several hundred k-type thermocouples on your computer using one or more USB hubs. The software will sample and upload sensor values 10 times every second (10 Hz) to the web graph, where data can be viewed and downloaded as csv files for further processing.

The web graph stores the data for 7 days by default. This storage is included in the account, when the user buys the hardware from Copenhagen Atomics. Web server distributes data via SignalR protocol, thus multiple computers can be connected to receive the data and set off alarms, control other components, etc. We are in the process of implementing IFTTT (if this then that) to the web chart, such that you can easily program your own actions / alarms when certain temperature, pressure, etc. thresholds are reached.

Both firmware and software are open source available from Github (MIT license).
https://github.com/copenhagenatomics/CA_DataUploader
By default, the data logger has a software package installed which allows the box directly to be connected to a computer USB port or another port, e.g., Raspberry Pi USB port, after opening the serial port with baud rate 115200 8N1. You can use putty or minicom for this type of communication.

By default, temperatures are given in centigrade with 0.25 degree accuracy. However, the C# software from Github include low pass filters, which can be used to produce a running average over many samples. The length of this filter can be adjusted in the settings. The data logger will stream the temperature values into the terminal as lines of text at a rate of 10 new lines per second.

When you buy the Hub10 product, it comes with 7 days of cloud data storage included in the price and two low cost stainless-steel thermocouples which allow you to measure temperatures up to 1200°C. Additional storage and technical support can be purchased from Copenhagen Atomics, if needed.
MOUNTING & PLUGS

The box can be DIN rail mounted or mounted through 2 screw holes in each end. The input terminals are k-type mini connectors, which are widely available.
You can connect more than 25 boxes to your USB hub and this will give you more than 250 thermocoupler ports, which can be scanned at 10 Hz.

Inside the Hub10 is an Arduino Nano, which the user can reprogram the firmware via the famous Arduino IDE.

If you are familiar with Arduino IDE, then you can write your own software and manage the inputs. With minor changes you can make the unit return Fahrenheit values.

There are software packages available for interfacing with many of these boxes here: https://github.com/copenhagenatomics/CA_DataUploader/tree/master/CA_DataUploaderLib

https://www.nuget.org/packages/CA_DataUploaderLib/

The above package is written in C# and works as a general framework for attaching a large number of sensors to the systems, which Copenhagen Atomics builds. It uses an IO.conf config file to setup all the sensors and actuators in a system.

This software package has been tested on Windows, Mac, Linux, Raspberry Pi. It works both on x86 and ARM CPUs and it is both .NET Core 3.0 and .Net Framework compatible and work with Mono too.

You can download a package with the executables here, thus you do not need to compile the software yourself.
https://github.com/copenhagenatomics/CA_DataUploader/releases

Please follow the guide on lower part of this page for installation and setup. https://github.com/copenhagenatomics/CA_DataUploader

It is possible to download another Arduino sketch to the device, which will allow you to communicate with it using the MODBUS protocol. Work is under way to make it compatible with OpenPLC.
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