µModules

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Introduction

µModules is a supplemental concept to H-Storm. These modules are simple and easy to use peripherals, that are connected together using the TWI interconnect standard. The signaling over this interface is compatible with the H-Storm PnP bus so any µModule can be used with any H-Storm CPU card. These modules perform simple interface functions that does not require high volume of data-transfer. The modules usually contain some kind of micro-controller (current ones are based on the 8-bit AVR processor family from Atmel) and perform some kind of data-collection or local control function. On the top of being compatible with the H-Storm PnP bus specification these modules can be easily interfaced to any device with a TWI interface, such as the OOPic and many others. One of the modules contain an RS-232 - TWI interface which allows these modules to be easily connected to a standard PC or any module with an RS-232 interface. The phisical connection between the modules uses standard telephone sockets and wires. These wires can be easily assembled at home, provide rugged connection and allows fast assembly. Each module contain two connectors and can be easily dasy-chained in any order.

The documentation of the communication with the modules, including enumeration is detailed in the [µModule User's Manual (PDF)](#).

Features

- 3.3V operation (5V operation is optional using an external power source)
- Modules are connected with standard telephone wires
- Modules can be power from external sources, or through the connecting wire
- A single module can provide power to many other modules through the wiring
- TWI communication interface that's compatible with the H-Storm PnP standard
- Up to 10-20 devices allowed on a single chain depeding on wire length
- PnP protocol for full discoverability and jumperless operation

Application: robotics

The main theme I had in mind for these modules is hobby-robotic applications. The intent was to provide a highly flexible framework to build complex robotic control systems as simple as possible. The idea was that these small modules can be distributed over the robot and placed close to the sensor or actuator that the work with. The modules themselves than can be connected with a single wiring, creating a network of sensors and control points. The central brain of the robot than can discover this network and identify each of the modules connected to it and orchestrate the actions of the various components.

Currently available modules

The following µModules are currently available:

- µM-H-Bridge - a 20A H-bridge driver with various speed feed-back options for closed-loop speed-control
- µM-Servo-32 - a 32 channel R/C servo control module
- µM-Servo Brain - a replacement R/C servo electronics module with similar features as the µM-H-Bridge

Planned modules

Many additional modules can be designed. Here are a couple of ideas. Sooner or later some or all of them will be implemented:

- A temperature sensor module with local and remote sensor connections
- An axelero-meter module
- An electronic compass
- A multi-channel solenoid/relay driver module
- A keypad and LCD display interface module