uLog 3-Channel Analog Datalogger

The uLog is a tiny analog-voltage logger with a 3.3V TTL serial interface. It uses an Atmel ATtiny24 AVR to sample three analog voltage channels at 50 Hz with 10-bit resolution and stores the data on an AT45DB161D 16 Mbit flash IC, which allows for approximately two hours of logging when running the default firmware.

Overview

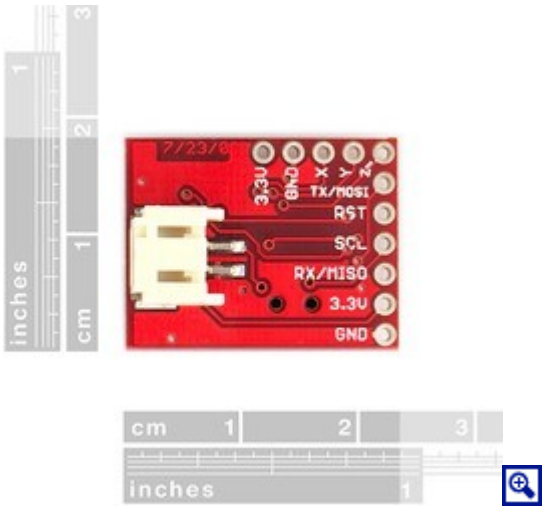
The uLog is a tiny analog-logging device with a 3.3V TTL serial interface. Central to the logger is an Atmel ATtiny24 mated with an AT45DB161D 16Mbit flash IC. Sampling at 50Hz, it can log 3 channels of 10-bit ADC for about 2 hours before the memory fills up.

The board operates at 3.3V using a low dropout (LDO) 3.3V regulator and does **not** have 5V-tolerant inputs, so it cannot be directly connected to 5V systems. The recommended supply voltage is 3.3 to 16 V. The power connector on the board is a 2-pin male JST connector that works with our 2-pin female JST cables. Note that the power connector is **not** compatible with the female connectors on our NiMH battery packs. The board's pins have a 0.1" pitch and work with 0.1" male headers and 0.1" female headers.

For a more advanced logger, see the Logomatic v2 serial SD datalogger.

Using the Datalogger

The uLog is very simple to use. At power up it determines if a UART line is attached. If there is, it transmits a **'?'** at a baud rate of 38,400 bps (using non-inverted, 3.3V TTL serial) and waits for user input. There are only two commands: **'r'** for read and **'e'** for erase. Erasing the flash sets all addresses to 0xFFFF, and reading dumps all the data up to the first 0xFFFF. If there is no UART line attached, the uLog starts sampling. You can connect this board to a computer using a USB-to-serial adapter or a 23201a serial adapter.



Features

- AT45DB161D provides 16 Mbits of flash
- 3 channels of analog voltage logging
- Access to ATtiny24 SPI pins for reprogramming the board and open-source firmware
- Easy-to-use TTL serial interface (38400 baud) for reading and erasing flash
- Integrated power switch
- Recommended supply voltage: 3.3 to 16 V
- Logic voltage: 3.3 V (from on-board 3.3V LDO regulator)
- Size: 0.9" x 0.7"
- Weight: 8.1 g

Modifying the Firmware

The uLog firmware is open source and can be downloaded from the resources tab. If you want to reprogram the ATtiny24 AVR microcontroller with custom firmware, you will need to use an avr programmer that can program at 3.3V. The necessary programming pins are all brought out, but they are not arranged in the standard 6-pin ISP header, so you will also need to make a custom programming connector. The firmware needed to write/read from the flash IC and read from the adc channels almost fills up the entire programming space, so there is there is very little room for additional data manipulation.

Note: The uLog is a 3.3V device. The voltage on the pins should not exceed Vdd+0.5V, so external components (such as voltage dividers) are required when interfacing with 5V systems.