DESIGN: Minimal Logger Station

Great Lakes Data Watershed (gldw.org)

Instrument Toolkit Program

Revised: July 17, 2019

# Minimal Logger Station

One specific goal for the Instrument Tookit Program is to allow the development of low cost monitoring stations with a target minimum cost of about $300.00 including the minimal sensors, weatherproof enclosure, solar charging and wifi based radio.

Due the high cost of individual commercial electrodes ($100 - $1500) it is necessary to look at lower-priced alternatives that still meet the basic requirements.

### Stream monitoring minimal sensor configuration:

* Ambient barometric pressure, humidity and temperature.
* Stream depth
* Stream temperature
* Water conductivity

### Stream monitory optional sensors

* pH
* Dissolved O2
* Rain gauge.
* Ambient light sensor

### Other Requirements

* Weatherproof housing.

### Maintenance Requirements

* The station should be configured to be easily serviceable.
* Maintenance should generally be required no more than once a month.

# Parts List for Minimal Mayfly Data Logger – Low Priced Sensors

The following is an initial list of parts for building the minimal station.

|  |  |  |
| --- | --- | --- |
| Part | Part Details | Estimated Cost |
| Mayfly Data Logger |  | $60.00 |
| Weather proof case |  | $20.00 |
| Clock Battery | CR1220 | $1.00 |
|  |  |  |
| Wifi Transceiver XBee S6B | XB2B-WFST-001 | $29.00 |
| Wifi Antenna 6dBi+ | ?? | $15.00 |
| WiFi extension cable w/ bulkhead connector | ?? | $4.00 |
| Solar Array | ?? | $20.00 |
| Rechargeable Battery | Lithium Ion  2500 ah | $15.00 |
| Solar Panel | ?? | $20.00 |
| JST PH 2-Pin Cable female connector |  | $0.75 |
| Pressure Temperature Humidity Sensor | Adafruit BME280 | $20.00 |
| Internal small parts and cabling |  | $20.00 |
| External cabling |  | $20.00 |
| Misc Hardware |  | $20.00 |
| Weather temperature sensor | DS18B20  3 meter cable | $3.00 |
| 4-20ma 24V Depth Sensor |  | $50.00 |
| 5V to 24V DC to DC converter |  | $3.00 |
| Conductivity Sensor | ?? | $30.00 |
| **TOTAL** |  | **$344.00** |

# Parts List for Minimal Mayfly Data Logger – Commercial Sensor

The following is an initial list of parts for building the minimal station using a commercially available multiparameter sensor.

|  |  |  |
| --- | --- | --- |
| Part | Part Details | Estimated Cost |
| Mayfly Data Logger |  | $60.00 |
| Weather proof case |  | $20.00 |
| Clock Battery |  | $1.00 |
|  |  |  |
| Wifi Transceiver XBee S6B | XB2B-WFST-001 | $29.00 |
| Wifi Antenna 6dBi+ | ?? | $15.00 |
| WiFi extension cable w/ bulkhead connector | ?? | $4.00 |
| Solar Array | ?? | $20.00 |
| Rechargeable Battery | Lithium Ion  2500 ah | $15.00 |
| Solar Panel | ?? | $20.00 |
| Pressure Temperature Humidity Sensor | Adafruit BME280 | $20.00 |
| Internal small parts and cabling |  | $20.00 |
| External cabling |  | $10.00 |
| Misc Hardware |  | $20.00 |
| Commercial pressure, temperature and conductivity Sensor | Meter environmental  Hydros 21 | $491.00 |
| **TOTAL** |  | **$739.00** |