

MDS MkV Light Sensor Protocol

General Information

MkV Light sensors measure light intensity in $\mu\text{m}/\text{m}^2\text{sec}$. Their measuring range is from 0-2000 $\mu\text{m}/\text{m}^2\text{sec}$ with a resolution of 0.5 $\mu\text{m}/\text{m}^2\text{sec}$. The sensors hold 2MB of data (around 530070 data recordings). There are two types of sensors, one set calibrated for water and another for air.

Field Deployment

All subtidal light sensors are attached to a rebar stake with two all stainless hose clamps. Air sensors are attached to a surface spar buoy with two stainless hose clamps. See Table 1 for each location. The light sensor should be wrapped with black electrical tape before deployment in such a way that all light intensity readings prior to field deployment are equal to 0. Once deployed, the electrical tape should be removed and time deployed should be noted in an event log.

Field Retrieval

Air light sensors should be wrapped with black electrical tape during retrieval in such a way that all light intensity readings after removal from the rebar stake are equal to 0. Water sensors should be collected in a water-filled black bag for the same effect without disturbing fouling communities. Once retrieved, retrieval time should be noted in an event log.

Fouling

Fouled sensors must be tested to quantify sampling error associated with each deployment. As sensors are brought back from the field, they should be placed with the sensor oriented up (using molding clay) in fiberglass tanks in the 3rd floor Seawater Workroom (SWWR). Two 500 watt lamps should be placed above the tanks with 5 window screens supported by wire mesh placed directly beneath the lamps. A fan must be turned on so that screens do not overheat and smoke. Fouled sensors should be left in tanks for 20 minutes. “Dirty” Start and end time should be recorded on the event log associated with that retrieval. After 20 minutes, sensors should be carefully cleared of all algae, dirt and other material that may affect light readings. Sensors should be placed back in the tanks for another 20 minutes. “Clean” start and end time should be recorded on the same event log. Tank number used for each sensor and number of window screens should also be recorded on the event log.

Data Download

- Remove battery case from sensor and connect to interface unit by aligning prongs on unit with holes in the sensor. Turn switch so that the red light is on.
- Open *MDS Mk5* software and choose *start data transfer* from the File Menu.
- You should see the Transfer Data Screen. Click on *wake up*. Click on *transfer header*.
- Click on *Save as*. Save the file in the following location:
X:\internal\research\Reef\Working\Data\NPPCampaign\Raw\Light\continuous light data
- Choose air or water and site. Then, choose the folder labeled *deploy_mm_dd_yy* (for deployment date). If there is no deployment folder, create one named above where mm= deployment month, dd= deployment date and yy= deployment year. All files should be named the following way:

Serial#_mm_dd_yy.raw

Serial#=6 digit serial # on instrument mm=two digit month of deployment
dd=two digit day of deployment yy=two digit year of deployment

The sas code for trimming values calls on files in this format and if they are saved in any other format they will not be imported.

- To export data click on *Transfer*.
- Once data is transferred, it must be converted into a CSV file. To do this, choose *open* from the file menu and choose the file you just saved.
- Once the file is opened, choose *save in csv* from the same menu. The program will ask you if you would like to divide the file. Choose *cancel*. The file will be saved in the same place as the raw file and will be named identically.

Sensor Programming

- Remove battery case from sensor and connect to interface unit. Make sure that switch is turned on.
- Open *MDS Mk5* software and choose *start data transfer* from the File Menu
- You should see the Transfer Data Screen. Click on *wake up*. Choose *Real Time Mode* and click on *Transfer Header* then on *Transfer*. This will show a real time graph of light. Use this to make sure the sensor is working properly.
- Close graph then hit *cancel*, confirm cancel and hit *previous screen*
- To program choose *wake up* then *setup*. Under *Calendar* type the current date and time in GMT and select *save setup*.
- To get the time as accurate as possible, set your computer to GMT and open the clock so you can watch the seconds. Hit the *save setup* button exactly when the hh:mm:ss you entered matches up with the computer's clock.
- Choose *read setup* to be sure it is correct. Every time you choose *read setup*, the new time it displays should match the computer's clock.
- Choose *memory clear* then type the word "clear" in the box that pops up, confirm clear.
- Under *Measuring*, choose the start time and date in GMT. For monthly deployments choose 1 minute intervals, for daily deployments choose 1 second intervals. Click on *save setup*.
- On the Transfer Data Screen change mode back to *memory*, click on *wake up* then *transfer header*. Look at start time and interval to be sure it is correct. Note end time will normally read 1 minute before programmed start time
- Click end and remove the sensor.
- The MKV light sensors use 6volt lithium batteries. For long deployments use a new battery which may last over a year. Used batteries with 4-5 volts can be used on monthly deployments. For shorter (daylong deployments) do not reuse a battery more than 2-3 times. Install battery positive side up.
- Before deploying clean threads and make sure that o-rings are cleaned and greased. Replace the battery case.
- Record deployment information in the following location for monthly deployments only: X:\internal\research\Reef\Working\Data\NPP Campaign\Raw\Light\continuous light data\Light Deployment Log.xls