



Bareboat Necessities (BBN) Boat Monitoring

mgrouch

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<https://bareboat-necessities.github.io>

https://github.com/bareboat-necessities/lysmarine_gen

https://github.com/bareboat-necessities/lysmarine_gen/issues

<https://bareboat-necessities.wixsite.com/my-bareboat>

<https://github.com/bareboat-necessities/bbn-m5stack-tough>

<https://github.com/bareboat-necessities/bbn-nmea200-m5atom>

PDF version:

<https://bareboat-necessities.github.io/my-bareboat/bbn-boat-monitoring.pdf>

Chapter 1. What is BBN Boat Monitoring

BBN Boat Monitoring is a low-power solution to send alarms on various conditions from an unattended boat.

In the center is esp32 with Ethernet module connected wired to a boat router. Alarms are sent via WhatsApp messenger.

Modular design of software and hardware so users can pick and choose needed modules.

Chapter 2. Connectivity

1. MDNS discovery of other services gpsd, SignalK, pypilot, etc
2. DHCP client
3. NTP client
4. Web server for configuration
5. Uptime reporting (sleeping periods to save power)
6. Ethernet to router
7. WhatsApp message
8. Command line WhatsApp messenger for Linux
9. Internet connection speed reporting

Chapter 3. Hardware

esp32 on m5atom-lite or m5atom-lite-S3 from M5Stack. With M5Stack Ethernet AtomPoW (with w5500 chip).

Sensors (pick and choose)

- Accelerometer

M5Stack 3-Axis Digital Accelerometer Unit (ADXL345)

- IMU

M5Stack 6-DoF IMU Pro Mini Unit (BMI270, BMM150, BMP280)

or M5Stack 6-Axis IMU Unit(MPU6886)

- Env sensors (temperature, barometer, humidity)

M5Stack ENV IV Unit with Temperature Humidity Air Pressure Sensor (SHT40+BMP280)

or M5Stack ENV III Unit with Temperature Humidity Air Pressure Sensor (SHT30+QMP6988)

- Gas Sensors (CO, heavy gases, hydrogen, smoke detector)

- GPS

M5Stack Mini GPS/BDS Unit (AT6558)

- NMEA 0183 interface

M5Stack Isolated RS485 Unit

- NMEA 2000 interface

M5Stack IsolatedCANBus Unit (CA-IS3050G)

- Lightning sensor

Sparkfun LIGHTNING DETECTOR - AS3935

- Voltage sensor

M5Stack Voltmeter Unit (ADS1115)

- Current (amp) meter for bilge pump usage

- Temperature (1w) sensors

- Motion detection sensors

- Water salinity sensor
- Proximity sensors
- Snow / ice sensor
- Water level sensor
- Digby LoRa locator
- RTC clock

Chapter 4. Alarms (planned)

1. Heavy gases in bilge
2. High salinity of water in bilge
3. Hydrogen gas alarm
4. Fire alarm. Smoke detector
5. Carbon monoxide alarm
6. Hatch open
7. High heel or pitch (from IMU)
8. High wind alarm
9. Lightning storm detected
10. Forgot nav lights 'on'
11. Motion detected (Intrusion)
12. High humidity
13. Possible fog conditions
14. Snow or ice conditions
15. Barometer keeps falling
16. Temp alarm (ex: fridge warm)
17. Dingy too far
18. GPX fix lost
19. High current at anchor (by speed through water)
20. Low water under keel alarm
21. Accelerometer alarm for high waves
22. Anchor alarm (plus command line utility to activate and deactivate)
23. Grounding alarm from accelerometer
24. Hard impact on hull (via accelerometer)
25. Heartbeat (ImAlive) WhatsApp message
26. Low battery voltage
27. Battery overcharging
28. High battery temperature
29. Shore power loss
30. Bilge pump high utilization