# Car monitor

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# Hardware

## Heat sensors

Wemos D1 Mini

MLX90614 heat sensor

BL-5C battery (http://www.cpkb.org/wiki/Nokia\_BL-5C\_battery\_pinout)

## Display device

Android device (code made for 10.1”)

## Wiring

#### Heat sensor:

|  |  |  |
| --- | --- | --- |
| D1 Mini | MLX90614 heat sensor | BL-5C |
| 3.3V | VIN | + |
| GND | GND | - |
| D1 | SCL |  |
| D2 | SDA |  |
| D0 wired to RST  (to enable deep sleep) |  |  |

#### Voltage sensor:

|  |  |  |
| --- | --- | --- |
| D1 Mini |  | 12V battery |
| 3.3V |  | + |
| GND |  | - |
| D1 |  |  |
| D2 |  |  |
| D0 wired to RST  (to enable deep sleep) |  |  |

# Functional Description

## Communication

### Principle

Host (Android tablet) and client (Arduino) communicates via UDP on wifi.

Both need to connect on Wifi hotspot.

Order of appearance is insignificant.

#### Basic initial handshake and sensor reading commands

|  |  |
| --- | --- |
| Client | Host |
| send CMD\_ASK\_HOST\_TO\_JOIN\_NETWORK |  |
|  | Register client.  Respond CMD\_OK\_TO\_JOIN\_NETWORK |
| Wait for next command from host (or timeout) |  |
|  | Send CMD\_READ\_SENSOR\_DATA to initiate sensor reading |
| Reply with sensor reading in CMD\_SENSOR\_DATA\_REPLY |  |

#### Reconnection if client has lost power or connection

|  |  |
| --- | --- |
| Client | Host |
| send CMD\_ASK\_HOST\_TO\_JOIN\_NETWORK |  |
|  | (client already registered)  Respond CMD\_OK\_TO\_JOIN\_NETWORK |

#### Reconnection if host has lost power or connection

|  |  |
| --- | --- |
| Client | Host |
| Repeat until reply from host:  send CMD\_ASK\_HOST\_TO\_JOIN\_NETWORK  wait a few seconds  go to deep sleep (if not reply received) |  |
|  | Register client.  Respond CMD\_OK\_TO\_JOIN\_NETWORK |

#### Power saving when not in use: Set client in sleep mode

|  |  |
| --- | --- |
| Client | Host |
|  | Send CMD\_READ\_SENSOR\_DATA to initiate sensor reading  (always read sensor before going to deep sleep) |
| Reply with sensor reading in CMD\_SENSOR\_DATA\_REPLY |  |
|  | Send CMD\_GOTO\_DEEP\_SLEEP (specifies deep sleep period) |
| Go to deep sleep  When power up, it’s same sequence as a power down (i.e. a reconnection sequence) |  |

All commands are in JSON format

CMD\_ASK\_HOST\_TO\_JOIN\_NETWORK = 1;

CMD\_OK\_TO\_JOIN\_NETWORK = 2;

CMD\_READ\_SENSOR\_DATA = 3;

CMD\_SENSOR\_DATA\_REPLY = 4;

CMD\_GOTO\_DEEP\_SLEEP = 5;

UDP\_PORT = 1026;

## Deep sleep

Deep sleep occurs in the following situations:

* On reception of CMD\_GOTO\_DEEP\_SLEEP from host
* If wifi connection cannot be established
* If host connection cannot be established

The duration of the deep sleep period is set through CMD\_GOTO\_DEEP\_SLEEP. The default value (until this command is received for the first time) is deepSleepPeriod seconds (=30).

# UI