User Manual

ROOT Logger Version May 2022 (ahp1)

Caution:

Always use a 12 V battery. Depending on the type of the 12 V battery, it must be removed for transport; gel/liquid can leak if stored incorrectly.
The AGM battery currently installed should be leak-proof.

Before data collection:
Charge the battery (ON/OFF switch to OFF.)
Delete old files on the SD card.

Data Collection:

1. Insert the SD card.

2. Connect the sensors:
   Load Cell to LOAD socket (6),
   Draw-wire sensor to CABLE socket (5)

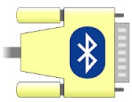
3. Set the ON/OFF switch (4) to ON.
   (When switching on and off, a new .csv is generated in each case).

4. Note the exact time of the measurement.

5. BT-MON/LOG switch (1)
   - When the green LED (3) flashes, the measured values are written directly to the SD.
   - - When the blue LED flashes (2), the measurement values can be read out via Bluetooth module (HC-05-ii) or displayed on the laptop via USB cable using the USB socket (7).
   - If no LED flashes. See if the SD has been inserted correctly.

     ATTENTION: **The data is not written to the SD card. When the blue LED flashes.**

Apps (only Android devices for now (not iPhone compatible))



App for Android:
Serial Bluetooth by Kai Morich

App for Windows
Serial port monitor (free version)– not yet tested

Read out the data

Time elapsed since start [ms]	Unix Time Stamp	Cable [cm]	Load [N]	Battery voltage [V]
29239	1652178932	25	-167.545	12.38
29249	1652178932	25	-170.112	12.38
…	…	…	…	…

Unix time stamp to date/time

The time stamp is stored via the internal battery of the SD Shield.

In Excel:

- =(((A1/60)/60)/24)+DATE(1970;1;1)
- Format to: hh:mm:ss TT.MM.JJ (or whatever you prefer)

In Python:

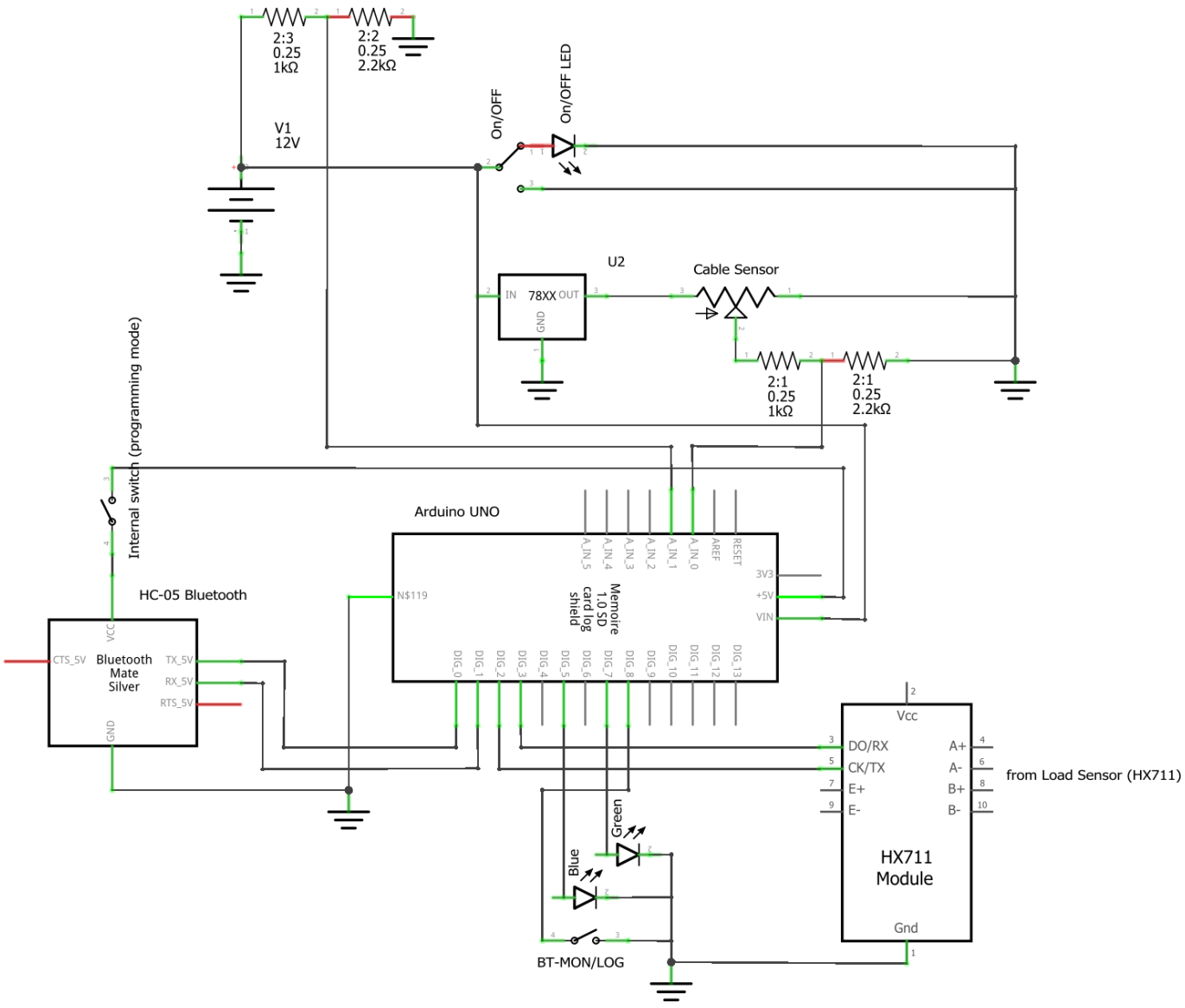
```
import datetime
dt = datetime.datetime.fromtimestamp(1652178932)

# Don’t forget to set the time zone.
```

Technical data

At 12.2 volts, an average of 140 mA (1.16 mA idle),
i.e., a fully charged battery with, for example, 6 Ah, lasts theoretically for approx. 40 hours (6 Ah/0.14A = 42.9 h).

Note that the lead-acid battery (AGM) is fully charged at a terminal voltage of 12.8 V (100 %) and discharged at a terminal voltage of approx. 11.8 V (0 %).

Schematic diagram



Calibration:

LEANE – DBBE 200 kg: factor **10050** – calibrated with a 20 kg and 40 kg load – **May 2022**
ME-Systeme - 5000 kg_ (factor **660** – measured with a 40 kg and 80 kg load – **May 2022**

Pin assignment

LoadCell Leane DBBE (small – 200 kg) to HX711	
blue (Pin 1)	E+
black (Pin 2)	E-
White (Pin 3)	A-
Red (Pin 4)	A+

LoadCell Leane DBBE (large – 2000 kg) to HX711	
blue (Pin 1)	E+
black (Pin 2)	E-
White (Pin 3)	A-
Red (Pin 4)	A+

For more information check: https://learn.sparkfun.com/tutorials/load-cell-amplifier-hx711-breakout-hookup-guide/all)

Parts List

No°	Article	Description	Seller
1	Basetech Outdoor IP67	Case 460 x 360 x 175 mm	conrad.ch
2	Neutrik NC5FD-LX-B	5-Pol socket	conrad.ch
3	Neutrik NC5MX	5- Pol plug	conrad.ch
1	Neutrik NAUSB-W-B	USB plug	conrad.ch
1	Neutrik SCDP-0CON	Seal for sockets	conrad.ch
1	TC-R13-208B-02 12 V/DC 20 A	Switch (green LED)	conrad.ch
1	TC-R13-208A-02 250 V/AC 10 A	Switch (no LED)	conrad.ch
1	Arduino Uno	Microcontroller	conrad.ch
1	TC-9927152	HC-05 Bluetooth module (Android only)	conrad.ch
1	Joy-it SEN-HX711-20	HX 711 - Amplifier board for the load cell	conrad.ch
1	Adafruit Assembled Data Logging shield	SD Shield Logger for Arduino Uno	conrad.ch
1	SD Card	32 GB	conrad.ch
1	Motobatterie YTX7A-BS Okay	Battery 12 V / 6Ah	Landi.ch
1	Kemo Spannungswandler (3 - 15 V/DC 1.5 A)	Voltage transformer/stabilizer	conrad.ch
1	110x80x70mm IP67	Transparent plastic housing Arduino	bastelgarage.ch