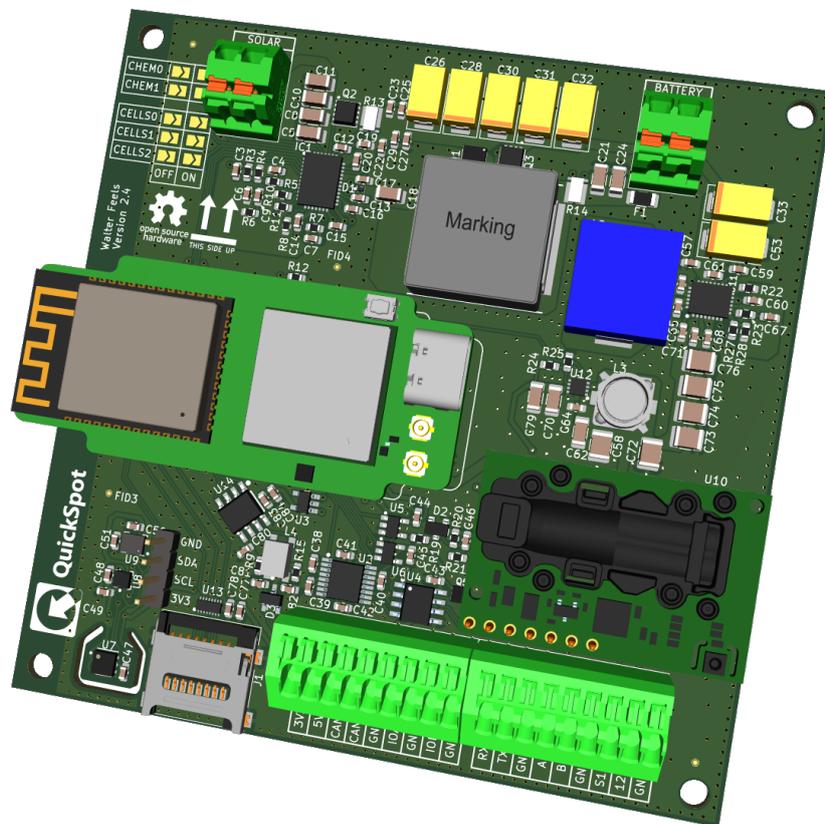




QuickSpot®

## Walter Feels - Gateway carrier board for the Walter module

Datasheet



## 1 General information

Walter Feels is a carrier board for the Walter module. It contains an MPPT battery charger, battery management with coulomb counter, various sensors such as temperature, humidity, barometric pressure and a 6DoF IMU. The board also has fieldbus interfaces such as RS232, RS485, SDI-12, CAN-bus and two GPIO pins directly connected to the ESP32-S3 inside Walter. Finally there are a 3.3V, 5V and 12V output, an SD-card slot and a connector for the Sensirion SCD30 absolute CO2 sensor.

The carrier board is open source and designed in KiCAD with two use-cases in mind:

1. *Use it as a gateway*: in this setup you can use the Walter Feels board as a base module for your industrial gateway without any modification. It has everything you need and is ready for deployment without any hardware design work to be done.
2. *Use it as a reference design*: if the Walter Feels board has too many features you can optimize your product cost by remove whatever you don't need. The permissive open source license allows you to adapt the board to your needs.

## 2 Features

Walter Feels is a carrier board for the Walter module. The board is designed to be multifunctional gateway and sensor platform. The device is open source and can therefore be used as an example gateway implementation on which you can base your own designs. The most notable features are:

- Wide input range (2.5 - 26 V) MPPT power input.
- Single- to multi-cell and multi-chemistry (LiFePo, Li-Ion, Lead) battery charger. The board operates on voltages as low as 2.5V
- I<sup>2</sup>C battery and power management (Analog Devices LTC4015)
- MicroSD card slot
- Sensors: temperature, humidity, barometric pressure, and 6 DoF IMU
- Sensor connectors: Sensirion SCD30 absolute CO2 sensor (not included)
- Multiple interfaces, including RS232, RS485, SDI-12, and CAN bus
- 3.3V, 5V, and 12 V output
- Two GPIO pins directly from the Walter board
- I2C connector for other external sensors
- Compatible with Takachi PFF13-4-13W housing for indoor applications

## 3 Electrical characteristics

For the most reliable use and stability of the module we advice to use the typical ratings. We do not guarantee the correct functioning of the device outside the minimum and maximum range of the module.

Parameter	Units	Minimum rating	Typical rating	Maximum rating
Battery voltage	V	2.5	–	26
Solar voltage	V	3.1	–	26
Power consumption @3.2V	A	–	–	0.3

## 4 Connections

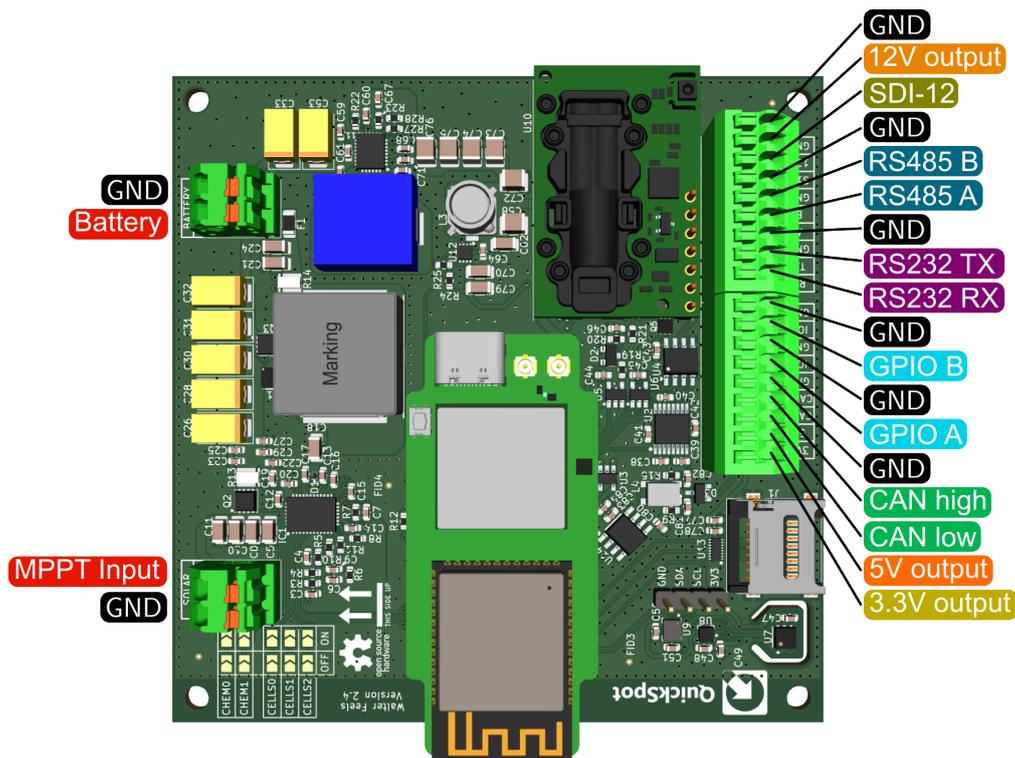


Figure 1: Walter Feels power and fieldbus connections

## 5 Application information

### 5.1 MPPT power input

MPPT stands for Maximum Power Point Tracking, it is a technique used with variable power sources to maximize energy extraction as conditions vary. This input is ideally suited to connect a renewable energy source such as a solar panel or wind generator. The input accepts any voltage between 2.5V and 26V.

**Solar panel voltages are specified under load. When there is almost no load the output voltage can get much higher which could damage the Walter Feels board. You must make sure that the Voc or open-circuit voltage rating of the panel doesn't exceed 26V.**

### 5.2 Battery configuration

Walter Feels' power management IC is the Analog Devices LTC4015 which supports the following battery chemistry and cell combinations:

1. Li-Ion/Polymer: up to 9 cells
2. LiFePO4: up to 9 cells
3. Lead-Acid (Liquid, Gel, AGM): 3, 6 or 12 cells

The LTC4015 must be configured for the correct battery chemistry and cell count before the charger will engage. To do this you need to close the correct solder jumpers. The following table shows the configuration required to configure the cell count of the connected battery:

Cell count	CELLS0	CELLS1	CELLS2
1	H	L	L
2	L	H	L
3	H	H	L
4	Z	L	L
5	L	Z	L
6	Z	H	L
7	H	Z	L
8	Z	Z	L
9	L	L	H
12	H	H	H

Table 1: Cell count configuration map for Walter Feels

Table 2 gives an overview of the possible chemistries and how to configure them. If you choose the *programmable* option you must make sure to adopt your firmware to correctly configure charging parameters in the LTC4015.

Chemistry	CHEM0	CHEM1
Li-Ion programmable	L	L
Li-Ion 4.2V/cell fixed	H	H
Li-Ion 4.1V/cell fixed	Z	L
Li-Ion 4.0V/cell fixed	L	Z
LiFePO4 programmable	H	L
LiFePO4 fixed fast charge	Z	H
LiFePO4 fixed standard charge	H	Z
Lead-Acid fixed	Z	Z
Lead-Acid programmable	L	H

Table 2: Chemistry mapping table

The meaning of 'H', 'L' and 'Z' in table 1 and 2 is:

- H: close the ON jumper, leave OFF jumper open.
- L: close the OFF jumper, leave ON jumper open.
- Z: leave ON and OFF jumper open.

## 6 Software

All software for Walter Feels is open source and can be found on Github via the following links:

- <https://github.com/QuickSpot/walter-arduino/tree/main/examples>
- <https://github.com/QuickSpot/walter-esp-idf/tree/main/examples/walter-modem>

## 7 Operating conditions

The module can operate in a wide range of temperatures and conditions. The following are guidelines in which the module is guaranteed to work correctly.

Parameter	Units	Minimum rating	Typical rating	Maxium rating
Working temperature	°C	-40		85
Storage temperature	°C	-40		100
Humidity	%RH	10		90
Storage humidity	%RH	5		90

Please note that no condensation may occur on the PCB and components.

## 8 Orderable part numbers

Part number	Description	HS	JPHTS	ECCN
P000000105	Walter Feels without CO2 sensor	851779	851779000	EAR99

## 9 Legal information

This board is manufactured by DPTechnics bv. We are not responsible for any product this module is part of. This datasheet is made with great care for detail but it can be possible the datasheet will be updated with more accurate data in te future. Users of DPTechnics bv products can contact us by letter, telephone or email.

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