Unipi 1.1 Lite

Technical Documentation

unipi

Content

1 Product introduction

Unipi 1.1 Lite is an expansion module for Raspberry Pi, with which it forms a simple programmable control unit, which can be used for simple projects like smart home management, measuring and regulation and develop innovations in IoT world. The device is equipped with 6 digital inputs (7-24VDC), 6 relay outputs (250V AC/5A or 24V DC/5A) and integrated 1-Wire channel.

Digital inputs and relay outputs are equipped with signal LEDs. Power for digital inputs is supplied by 12V DC internal power supply limited to 100mA and featuring a short-circuit protection. It is also possible to use digital inputs with an external power supply (see below).
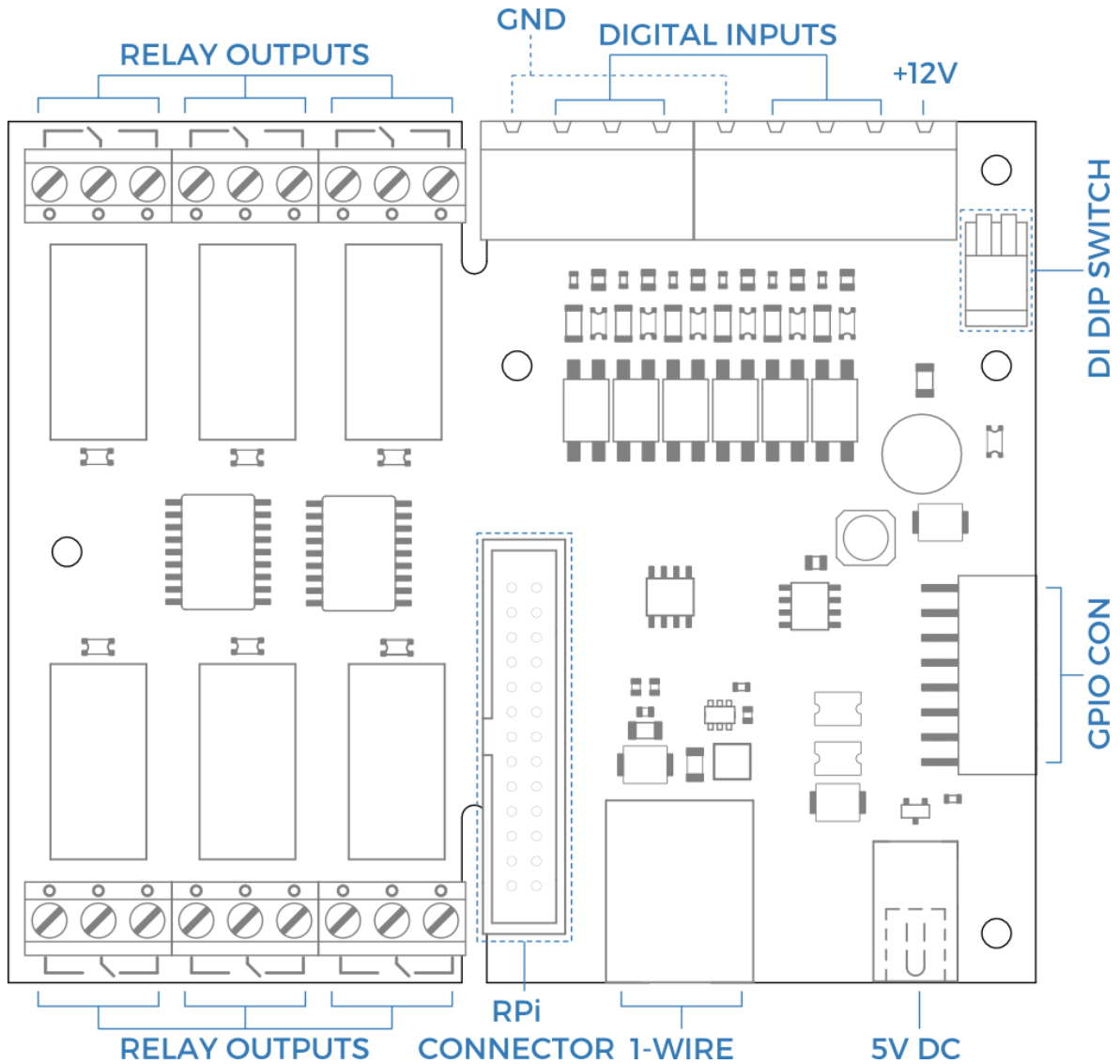
The device also provides easy access to the GPIO, I^{2}C, UART, 5V, 3V3 GND pins via onboard side connector labelled `GPIO CON`.

Unipi 1.1 Lite is compatible with many software products. It is recommended to use one of our supported platforms like Evok opensource API or advanced platform Mervis. Visit our web pages www.Unipi.technology for more information.

Unipi 1.1 Lite is compatible with the following Raspberry Pi models:

- **Raspberry Pi model B+**
- **Raspberry Pi 2 Model B**
- **Raspberry Pi 3 Model B**
- **Raspberry Pi 3 Model B+**
- **Raspberry Pi 4 Model B** (all RAM variants)

2 Product description

- **Relay outputs**: 6 × changeover relay 250VAC@10A or 30VDC@5A – for use with controlled devices (e.g. door locks, lights)
- **Digital inputs**: 6 × galvanically isolated (2 × 3) digital input (7-24V DC) for reading signals from external devices (e.g. magnetic contacts, motion sensors)
- **1-Wire channel**: Integrated channel for 1-Wire bus available via RJ45 port for connecting 1-Wire devices (e.g. digital thermometers)
- **Power supply 5V DC**: 2.1 mm for power supply connection
- **RPi connector**: 26-pin connector for Raspberry Pi connection
- **+12V**: Integrated power supply 12V@100mA – for use with digital inputs only
- **DIP switch**: For selection between an internal or external power supply for digital inputs

3   GPIO pins use

Tab. 1 – Raspberry Pi P1 header map

Unipi	RPi BCM	Function
DI01	GPIO04	Digital input
DI02	GPIO17	Digital input
DI03	GPIO27	Digital input
DI04	GPIO23	Digital input
DI05	GPIO22	Digital input
DI06	GPIO24	Digital input

Tab.2 – MCP23008 pin map

Relay	MCP23008
6	GP2
5	GP3
4	GP4
3	GP5
2	GP6
1	GP7

4   GPIO connector

1	3	5	7	9	11	13	15
2	4	6	8	10	12	14	16

The unused GIPOs or RPi are wired out via the side connector labelled `GPIO CON`. You can see pins description on next picture and table.

GPIO	Description
1	GND
2	GND
3	GND
4	GND
5	+5V
6	+3V3
7	TX
8	RX
9	SCL
10	SDA
11	GPIO10
12	GPIO18
13	GPIO11
14	GPIO09
15	GPIO07
16	GPI08

Tab. 3 – GPIO CON pin map

5   Power requirements

Unipi 1.1 Lite power supply connector is standard with 2.1 inner and 5.5 mm outer diameter with +5V connected on the centre.

A 5VDC/2A power supply is recommended. Unipi 1.1 Lite can supply power for Raspberry Pi up to 2A, the power supply is realized by flat connecting cable and not use MicroUSB connector on RPi.

Caution
Supplying power for Unipi 1.1 Lite from Raspberry Pi is not recommended, as it could cause damage to Raspberry Pi or Unipi 1.1 Lite.

---

6   Mount Raspberry Pi to Unipi 1.1 Lite

To mount Raspberry Pi to Unipi 1.1 Lite do the following:

1. Screw the spacers to the holes in the circuit board, dedicated for Raspberry Pi.
2. Use the attached flat cable to interconnect RPi and Unipi 1.1 Lite.
3. Screw the Raspberry Pi to the spacers
4. Connect the power supply to the Unipi 1.1 Lite device

7   Connecting and installation

8   Relay outputs

Maximal load of relay outputs is 250 VAC/5A or 24V DC/5A. For switching more current it is necessary to use external relay or contactor.
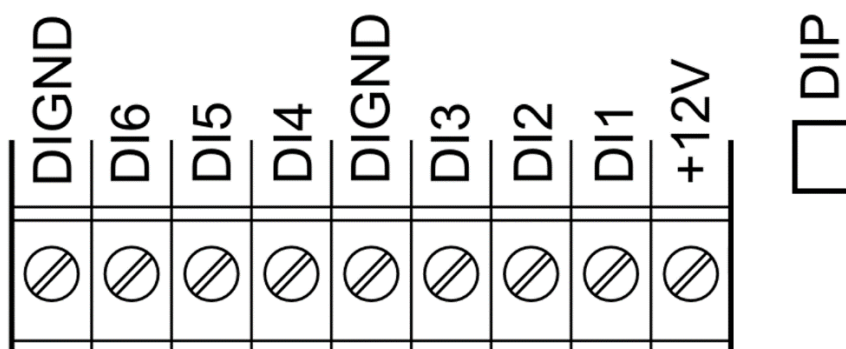
Relays are controlled by MCP23008 (I2C 0x20 address), more information about connection relays with MCP chip GPIO is in Table 2. Each relay has an indicator LED.

On each relay are three contacts labelled C (common), NO (normally opened) an NC (normally closed). In OFF state, C and NC are connected (the NO is not connected), when switch relay to ON state C and NO will be connected (NO will be disconnected).

9   Digital inputs

Signal for digital inputs must be in the range of 5 to 24V DC. Each input provides an LED indicating the state of the input. The device is equipped 6 digital inputs which are divided into two galvanically isolated groups – A and B. Group A contains inputs 1-3, group B contains inputs 4-6.

As Unipi 1.1 Lite features hardware pullup resistors, you do not need to enable software pullups as with the Unipi 1.1.

.

Digital inputs description

9.1.1   Selecting power supply of digital inputs

Signal to digital inputs can be supplied using an internal 12V power supply or using external 7-24V DC power supply. The onboard DIP switch is used to select between these two supplies.be done by internal power supply +12V or external power supply. Each group has one connector for connecting the negative pole of the external power supply (Is not used when using the internal 12).

```
DIGND
ON OFF
INT EXT
```

The dip switch has two positions – each position allows selecting power supply mode for one of the DI groups and is marked by the corresponding label. By default, both positions are set to **OFF** state. By switching it to **ON** state internal power supply is selected.

10 EEPROM

Unipi 1.1 Lite device has integrated EEPROM memory (24C02) for storage important information of size 2 kb organized to one block 256*8-bit.

Address space 0xe0 – 0xff is reserved. Other address space is left for user use.
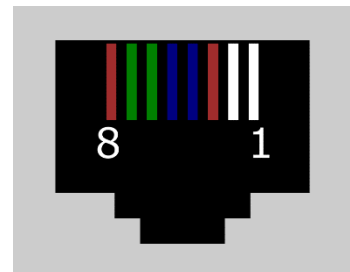
Tab. 4 – memory organization

Starting address	Number of bytes	Example	Definition
0xe0	2	fa-55	Unipi identification
0xe2	2	1.1	Unipi version

11 1-Wire channel

The device has one integrated channel for the 1-Wire bus (DS2482-100, address: 0x18). The bus is wired out via RJ45 connector. The description of pins is described in the following table. The data line has overvoltage protection and the power of the line is protected with TVS protection and current is limited to 50 mA.

Tab. 5 – RJ45 pins function

RJ45 pin	Function
1	-
2	-
3	GND
4	$5V_{cc}$
5	$5V_{cc}$
7	DATA
8	GND

12 Technical specification

13 Connected I^{2}C integrated circuits

All of the connected I^{2}C chips are connected to the main bus.

Chip type	Address	Use
MCP23008	0x20	Relay outputs
DS2482-100	0x18	1-Wire master
24C02ASN	0x50-0x57	EEPROM

14 Relay outputs

- Version Unipi 1.1 Lite: 6 × SPDT Omron G5Q-14-EU: 250V AC/10A or 30V DC/5A

15 Digital inputs

- 6 × 7-24V DC, galvanically isolated into two groups of three DIs

16 Power supply

- Unipi 1.1 Lite power supply connector is standard with 2.1 inner and 5.5 mm outer diameter
- Power supply 5V with 2A

Power cord requirements

- Minimal 18. AWG, ross-section 0.75 mm^2

Note
Unipi 1.1 devices can supply RPi with up to 2A current.

17 Dimensions

- Width: 105 mm
- Height: 88 mm
- Depth: 20 mm (40mm with mounted RPi, cable and spacers)
- Weight: 0.21kg

18 Conclusion

Latest edit: 01.02.2021

More information: www.Unipi.technology