

October 2019

UART Evaluation Board

User manual

Date: 14.10.2019	SF-103 Rev. 4
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ul. Jasnogórska 44
31-358 Kraków
Poland

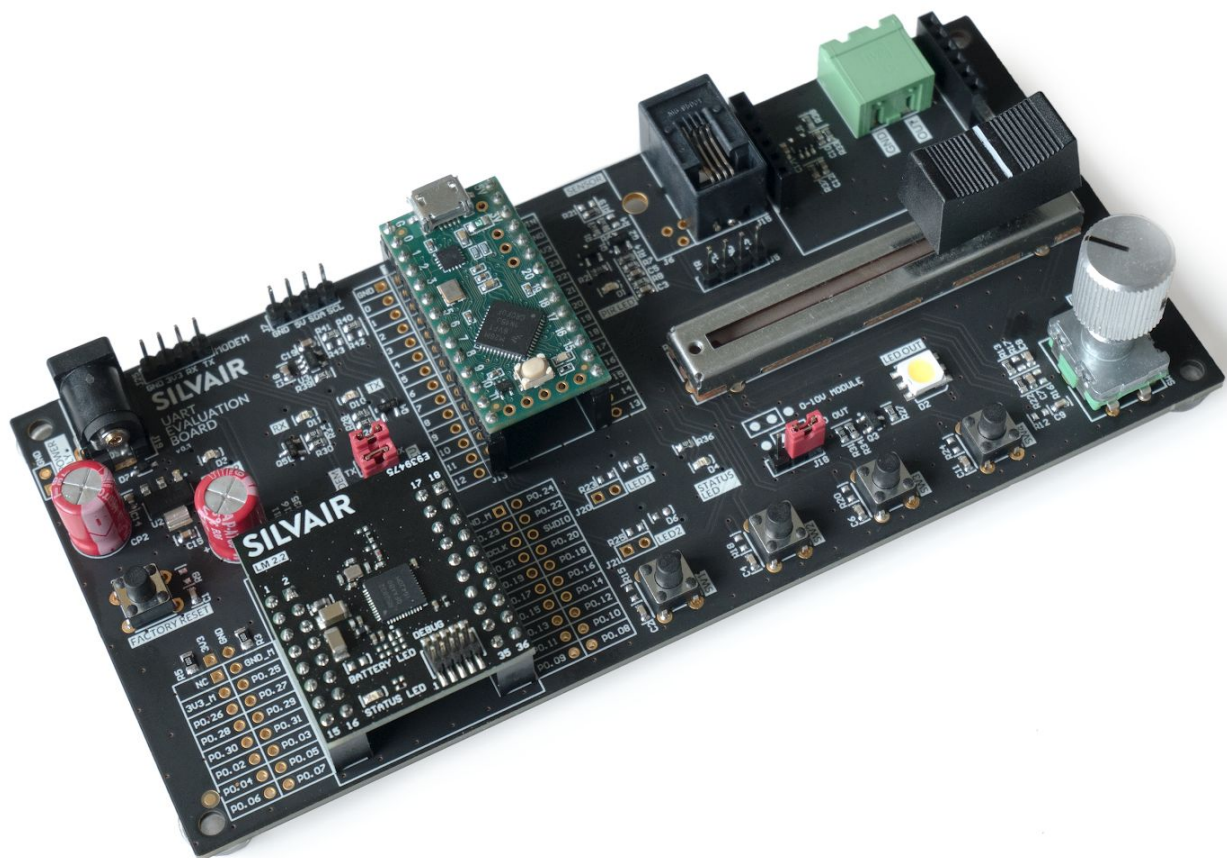
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1. Introduction

The Silvair UART Evaluation Board is an evaluation platform for testing and evaluation of Firmware developed on customer's microcontroller unit in cooperation with Silvair UART Modem to deliver communication with Bluetooth Mesh network. It gives possibility to test:

- 0-10V Analog output
- PWM output
- Analog sensor input
- LED Outputs
- Button, slider/potentiometer and rotary encoder input
- UART, I2C interface



1.1 Kit contents

The Silvair UART Evaluation Board kit comes with the following:

- UART Evaluation Board
- Light Module 2.2
- Teensy LC Module
- USB Power Supply Cable

1.2 Features

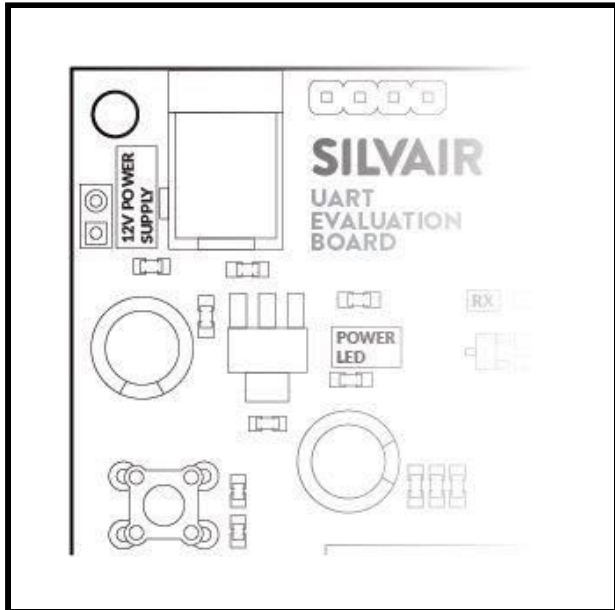
You can power up the following features on a Silvair UART Evaluation Board:

- Server
 - On-board LED output
 - 0-10V or 1-10V output (depending on hardware configuration)
 - PWM output
 - Sensor input
 - Information about PIR and ALS status on an LCD 16x2 Alphanumeric Display
- Client
 - Lightness control via slider potentiometer
 - Delta control via rotary encoder
 - ON/OFF and scene control via tact switches

2. Hardware description

2.1 Power supply

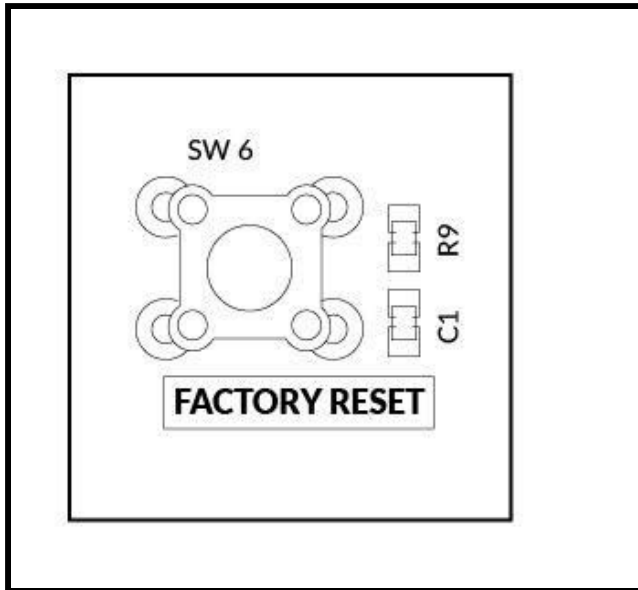
UART Evaluation Board is powered by two options: micro USB connector on Teensy LC Module or via DC connector 2,5mm/5,5mm J19 with 12V. They can be used simultaneously. If micro USB is the only power source, the minimum output current should be 60mA. Shining POWER LED indicates a properly supplied board.



NOTE:For 0-10V or 1-10V output, please provide 12V on J19 connector.

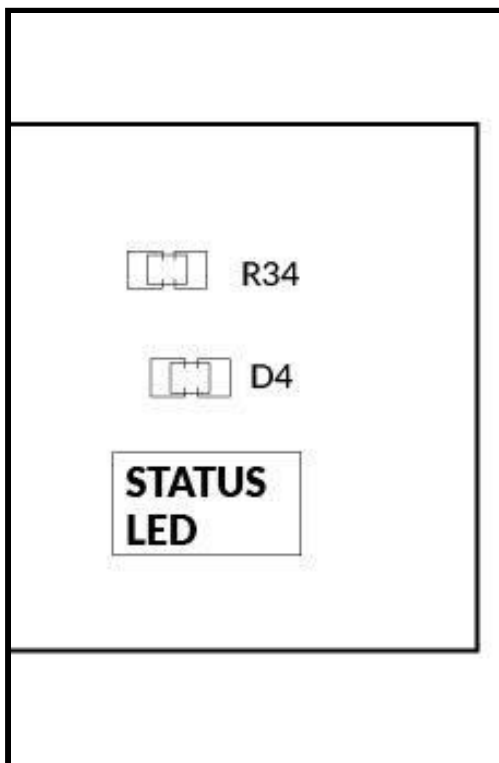
2.2 Light Module Factory Reset

A Factory Reset restores the device to default settings and removes it from a Bluetooth Mesh network. Depending on the configuration, settings can be restored to default values by pressing and holding the Factory Reset button for 5s.



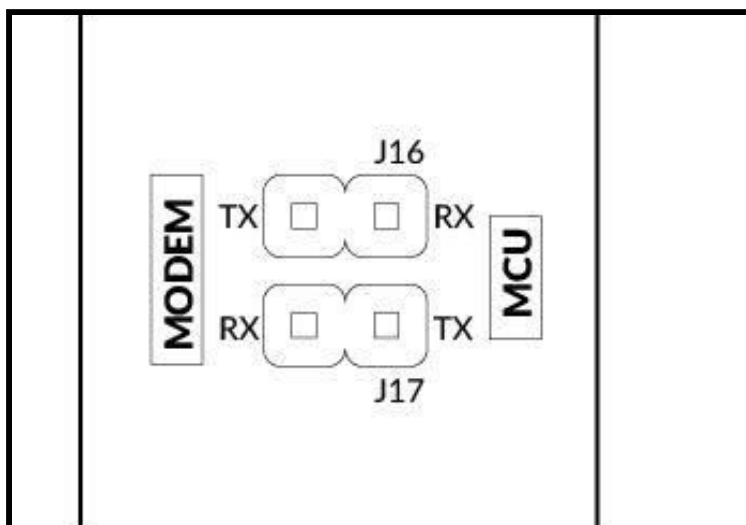
2.3 Teensy LC Module status LED

D4 Status LED duplicates LED indicator which is on Teensy LC module board on pin 13.

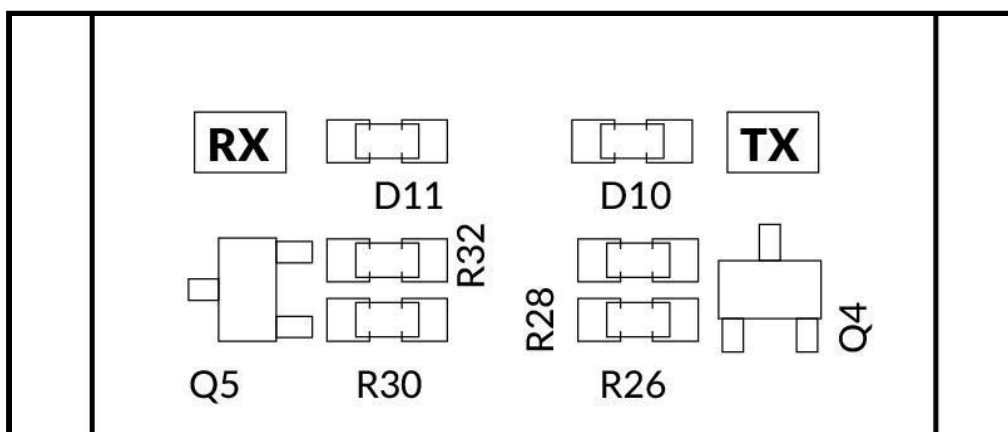


2.4 UART bus configuration

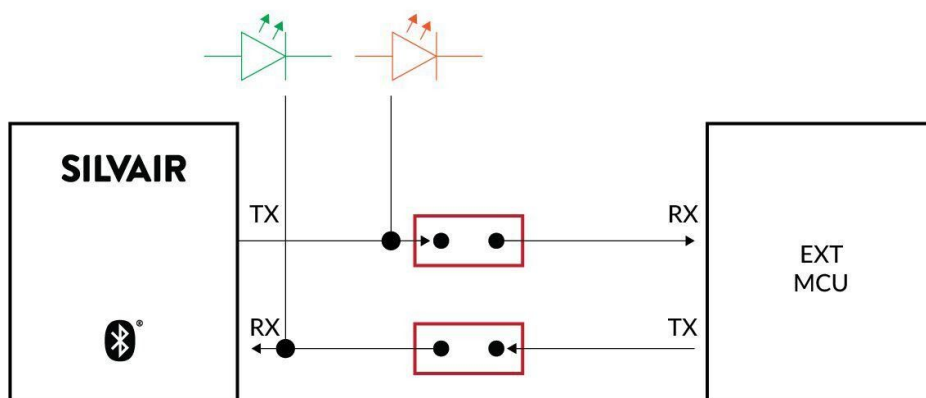
On UART Evaluation Board there are two 2x1 headers. Jumpers need to be placed on the board as indicated below for a proper communication.



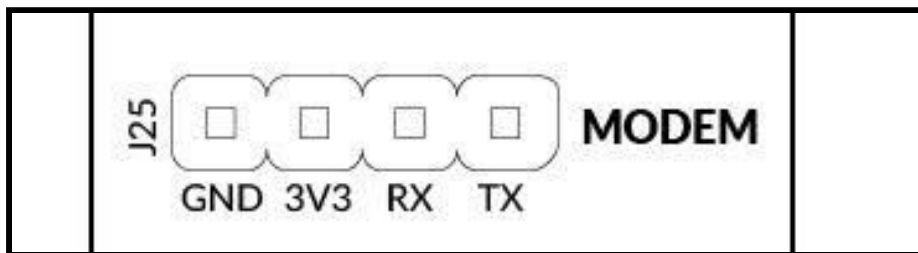
Additionally, there are two LEDs on the Modem side which are connected to RX (green LED) and TX (amber LED).



The diagram below shows how to connect the MODEM and external MCU.



RX/TX signals are also connected to the J25 connector for debugging purposes.

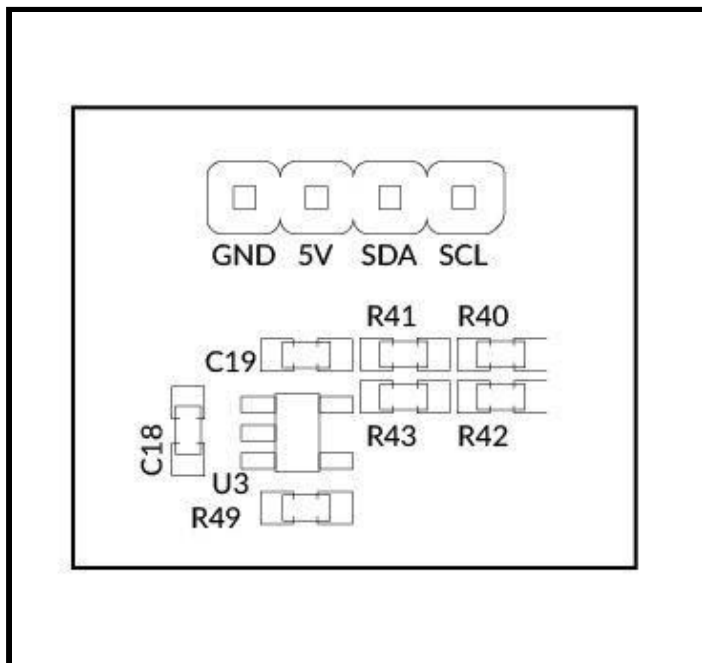


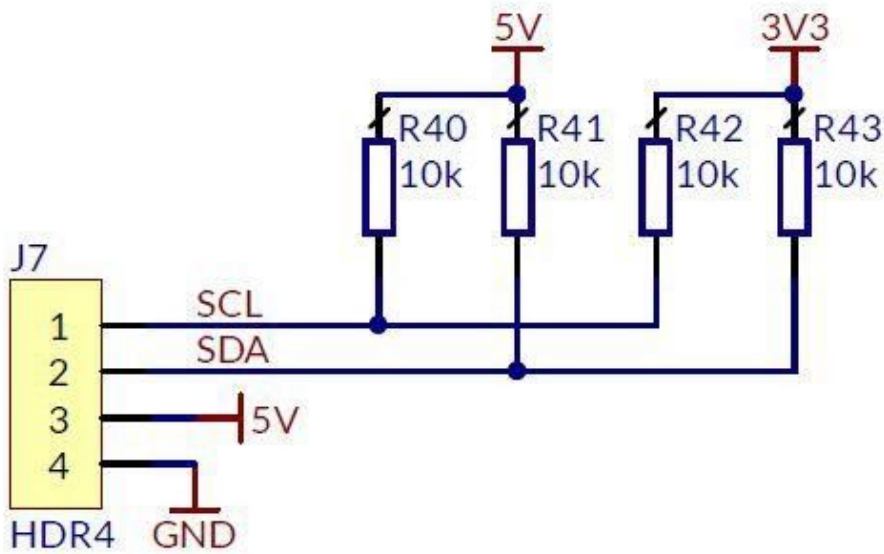
2.5 I2C connector (CLIENT mode only)

On UART Evaluation Board I2C connector is placed, which by default provides 5V logic signal from Teensy LC module pins:

- SDA - pin 18
- SCL - pin 19

For a 3.3 V logic signal, the R40 and R41 resistors must be removed and 10k Ω resistors R42, R43 must be placed.



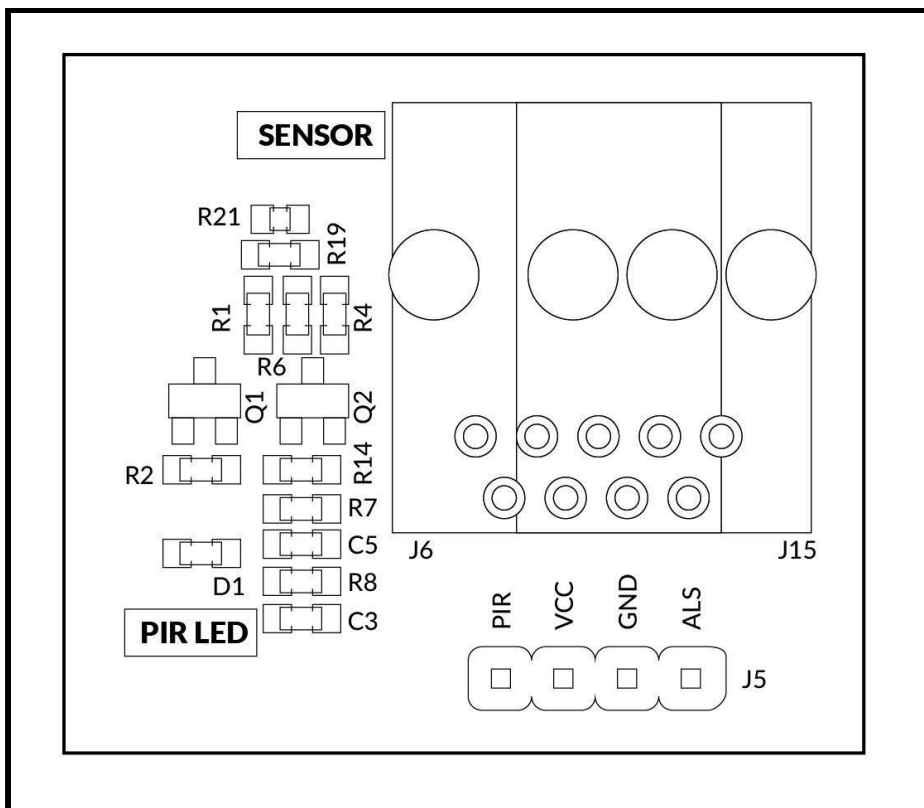


2.6 Sensor connector (SERVER mode only)

PIR and ALS sensors can be connected to UART Evaluation Board with a RJ9 connector shown on the below board as (J15). Another way to connect signals from sensor is to match them to J5 header connector.

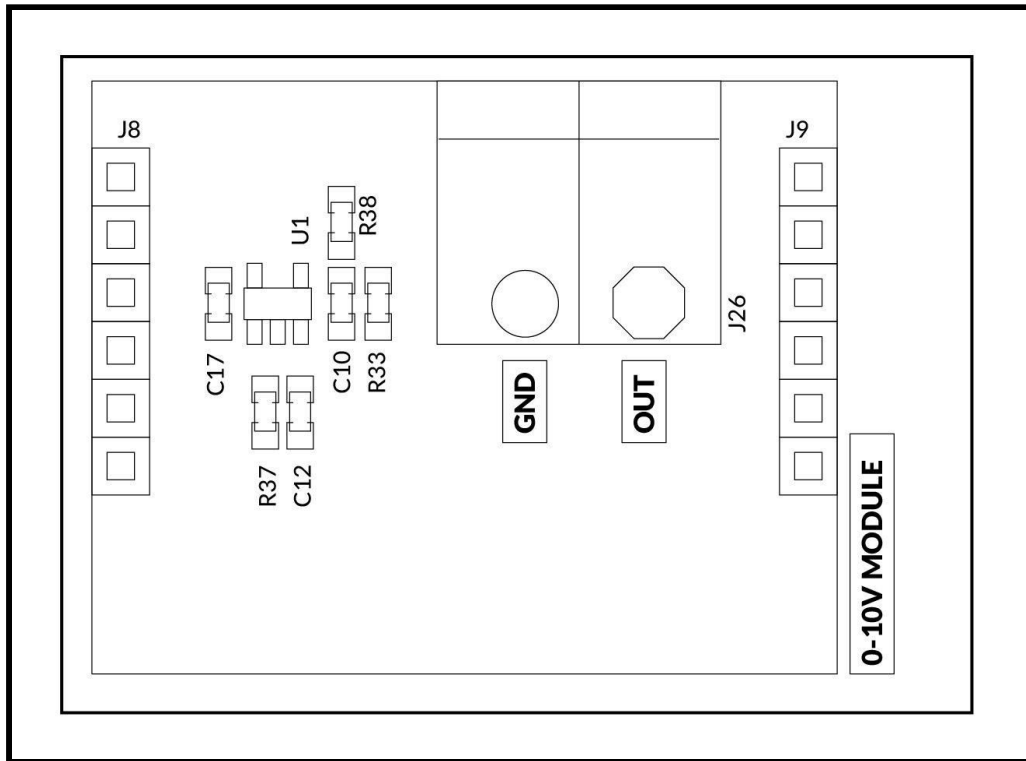
There is a PIR LED for occupancy indication. By default, PIR LED is set to positive logic. For a negative one, Q2, R6, R14 need to be disassembled and 4k7Ω resistor mounted to R4.

By default, board provides 3V3 power supply for a sensor. For 5V, remove R19 and assembly 0Ω to R21.

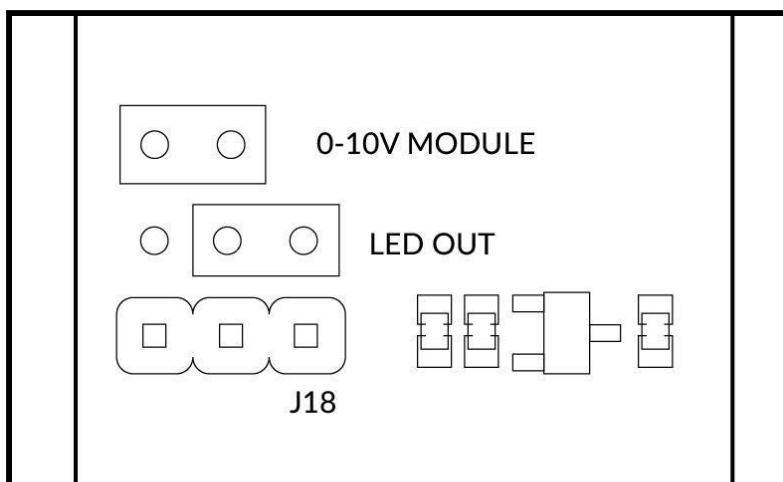


2.7 0-10V Module connector (SERVER mode only)

On board there are also connectors for 0-10V Module (which may also cut off the mains power supply). If you want to use only 0-10V functionality, you can use the signal only from J26 without 0-10V Module board.

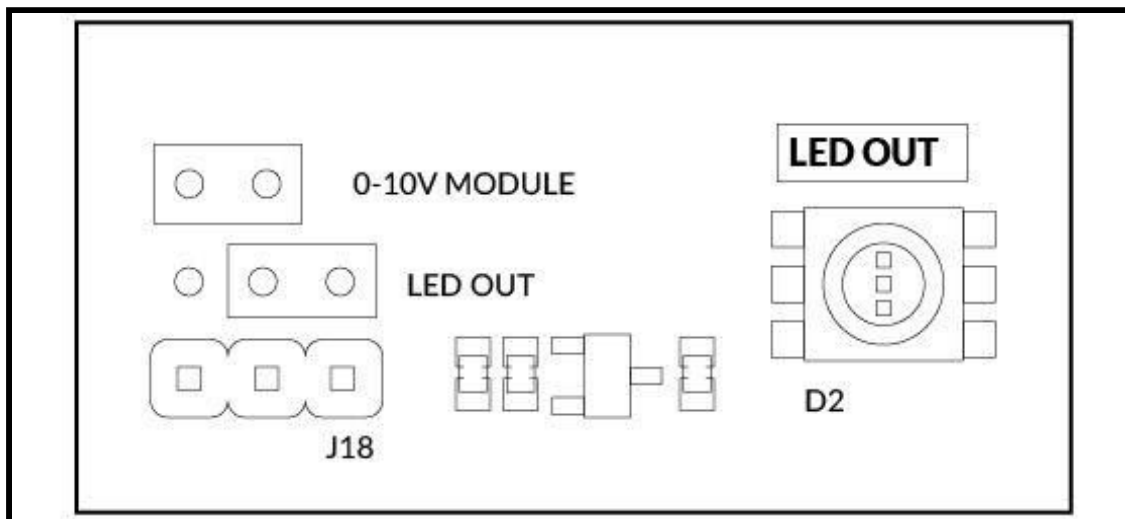


To use 0-10V from 0-10V Module or J26 connector, place a jumper as shown on the board.



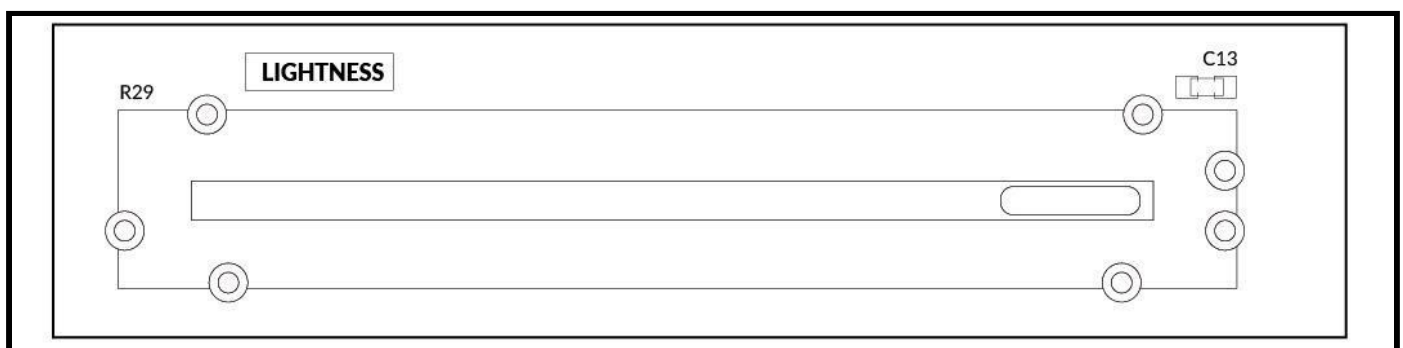
2.8 LED OUT (SERVER mode only)

To simulate external lamp behaviour, D2 LED OUT can be used. A jumper must be placed on the LED OUT position.



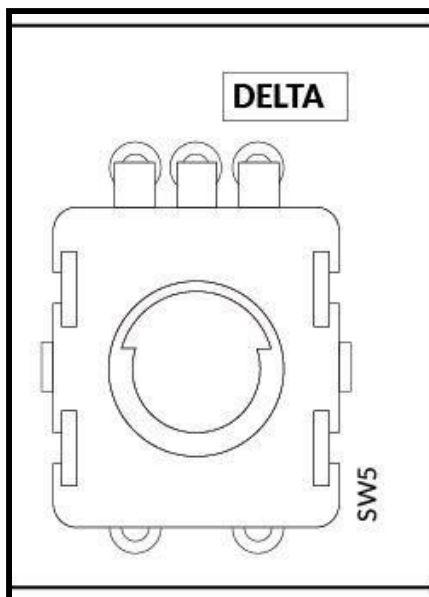
2.9 Lightness switch (CLIENT mode only)

To change the color temperature message (CCT mesh model), you can use a slide potentiometer R29. This command sets the absolute value for lightness to change.



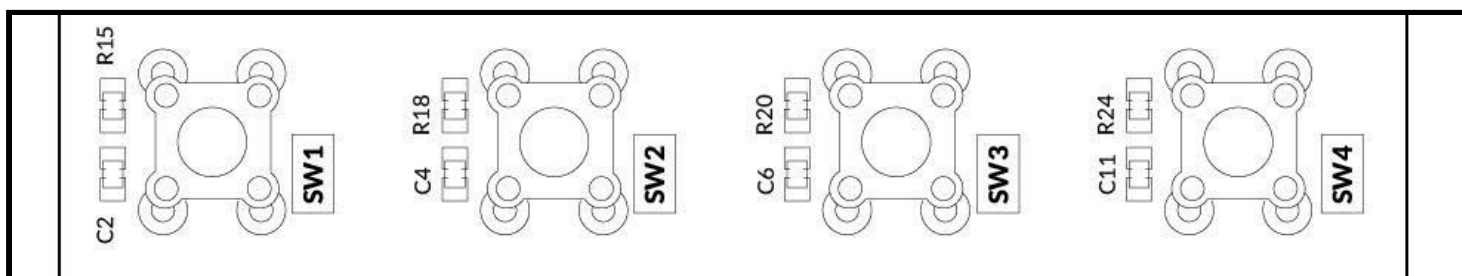
2.10 Delta switch (CLIENT mode only)

For sending delta message, you can use an encoder switch SW5. By default, it is set to 10%.



2.11 Tact switches (CLIENT mode only)

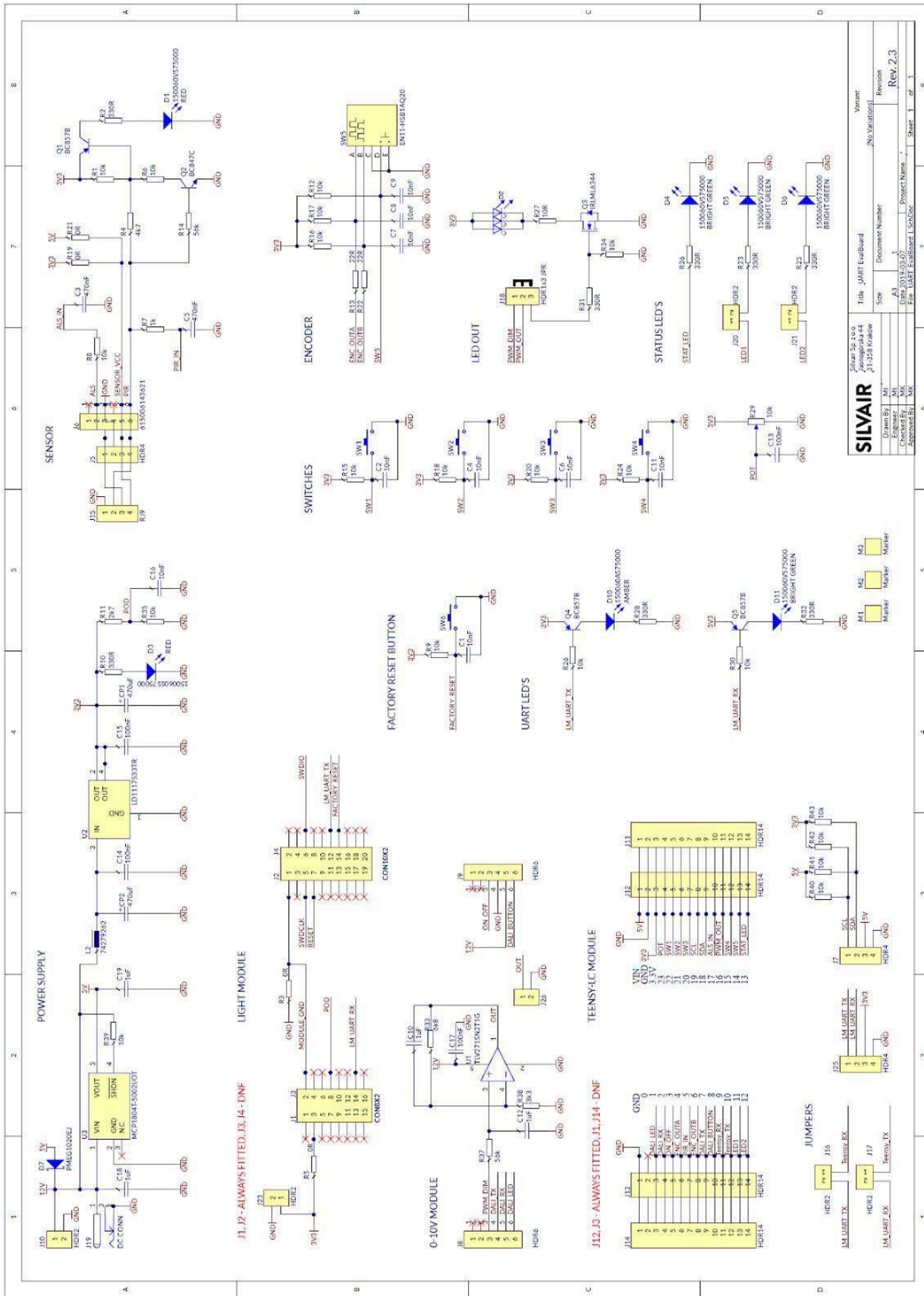
Tact switches SW1, SW2 are used to send ON/OFF messages, SW3, SW4 are used to recall preset scenes in zones. For example these messages may allow the user to turn off all the lights, enable automation or recall a specific scene.



2.12 External MCU Socket

UART Evaluation board is designed for use with Arduino compatible “Teensy LC” which is based on MKL26Z64VFT4 (ARM Cortex-M0+ processor at 48 MHz, 62K Flash, 8K RAM, 12 bit analog input & output, hardware Serial, SPI & I2C, USB, and a total of 27 I/O pins). More details can be found at <https://www.pjrc.com/teensy/teensyLC.html>

2.13 Schematic



SILVAIR		Title	UART EvalBoard	Version	Rev. 2.3
Drawn By	M1	Size	Document Number	Revision	
Checked By	M1	Date	2018.03.07	Project Name	
Approved By	M1	File	UART EvalBoard_Lschlor	Sheet	1 of 1

3. Support

If you have any questions, or need clarification please contact us at support@silvair.com.

4. Document revisions

Rev	Date	Editor	Changes
3	28.02.2019	IK	Changed outdated content.
2	22.11.2018	IK	Updated reference design. 3
1	21.03.2019	MI	Initial release.