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### **Features and Benefits**

- Output power up to 200miliwatts
- Complies with standard ISO15693 and ISO 14443 protocols
- Programmable encoder for custom protocol
- Short to medium reading range applications
- Matching network optimized for 50 ohm antenna impedance
- 10 pins connector for communication with a microcontroller
- Board voltage supplied by a jack connector from 6 to 9 Volts DC
- Internal power supply of the board between 3 Volts and 5 Volts DC

### **Ordering Information**

**Part No.**  
EVB90121

### **Applications Examples**

- Freight identification systems
- Smart labels and write systems
- Access control systems

### **Evaluation Board EVB90121**



### **General Description**

The EVB90121 is an assembled module that allows to evaluate the advantages of the MLX90121 13MHz transceiver IC and to facilitate the development of RFID applications.

The board voltage is supplied by a jack connector from 6 to 9 Volts DC. The internal power supply of the board can be chosen between 3 Volts and 5 Volts DC by putting the corresponding jumper up or down. A suppression choke reduces the supply noise.

The matching network can be adjusted through CV1 capacitor and thus can be optimized to transmit full electromagnetic power up to 200mWatt to a 50-ohm load antenna connected on a SMA connector.

All digital inputs/outputs from the MLX90121 are connected to a standard 10 pins connector. This allows easy connection to a microcontroller.

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### 1 Schematic

The schematic of the MLX90121 evaluation board is shown in figure 1.

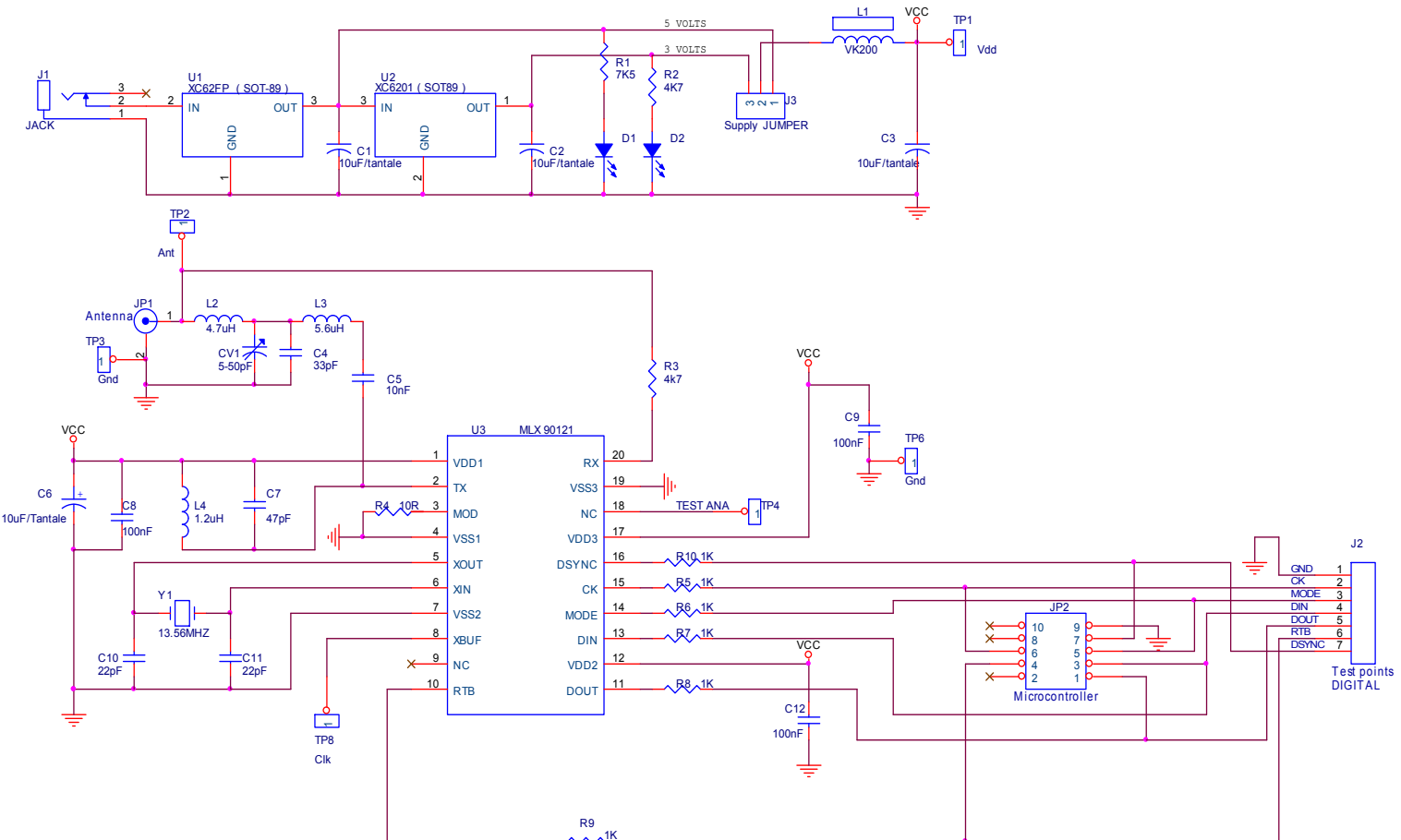


Figure 1: Schematic of the evaluation board EVB90121





### 3 Components

The table below gives an overview of all components that composed the evaluation board EVB90121.

| Reference       | Value           | Description   |
|-----------------|-----------------|---|
| R1              | 7,5 kΩ          |   |
| R2              | 4,7 kΩ          |   |
| R3              | 4,7 kΩ          |   |
| R4              | 10 Ω            |   |
| R5,R6,R7,R8,R9, | 1 kΩ            |   |
| CV1             | 5-50 pF         | Tuned capacitor used to adjust the matching network to 50-ohm |
| C1,C2,C3,C6     | 10uF            | Decoupling capacitors, Tantalum type                          |
| C4              | 33 pF           |   |
| C5              | 10 nF           |   |
| C7              | 47 pF           |   |
| C8,C9,C12       | 100 nF          |   |
| C10,C11         | 22 pF           |   |
| D1,D2           | -               | Red LEDs  |
| JP1             | SMA connector   | Connection to a 50 ohms antenna                               |
| JP2             | DIL10 connector | Connection to a microcontroller                               |
| J1              | Jack connector  | Power supply connection                                       |
| J2              | Debug connector |   |
| L1              | VK200           | Noise suppressor choke  |
| L2              | 4,7 μH          | Through hole RF chokes type B78108S from EPCOS                |
| L3              | 5,6 μH          | Through hole RF chokes type B78108S from EPCOS                |
| L4              | 1,2 μH          | Through hole RF chokes type B78108S from EPCOS                |
| U1              | XC62FP          | +5Volts regulator, package SOT23                              |
| U2              | XC6201          | +3Volts regulator, package SOT23                              |
| U3              | MLX90121        | MLX90121CA device, package SSO20                              |
| Y1              | Crystal         | Crystal oscillator  |

Table 1: Components

## 4 Guidelines

This chapter describes all connections and jumpers available on the EVB90121 circuit to be able to use it in the most efficient way.

### 4.1 Power supply

- The circuit can be supplied with a standard DC supply block (transformer or switch mode power supplies) connected to the jack connector **J1**. The input supply can be selected from 6 to **maximum 9 volts** DC to avoid permanent damage of the evaluation board.
- The internal power supply of the board can be selected between 3 Volts and 5 Volts DC by changing the position of the jumper **J3**.

### 4.2 Antenna connection

- The SMA screw connector **JP1** allows the connection of a 50-ohm antenna. The matching network is adjusted with **CV1** capacitor on a perfect 50-ohm load. This will give maximum power up to 250mWatt to the connected antenna.

### 4.3 Connection to a microcontroller

- All digital Inputs/Outputs of the MLX90121 device are available on the JP2 connector. This allows easy connection to a microcontroller. Following table is the description of JP2 connector.

| Pin number (connector JP2) | Name  | Description                                    |
|----------------------------|-------|--|
| 1                          | DOUT  | Data Output                                    |
| 2                          | -     | Not connected                                  |
| 3                          | DIN   | Data Input                                     |
| 4                          | RTB   | Reception or Transmission selection Input      |
| 5                          | MODE  | Configuration or Communication selection Input |
| 6                          | CK    | Serial Clock Input                             |
| 7                          | DSYNC | Synchronization Output                         |
| 8                          | -     | Not connected                                  |
| 9                          | GND   | Ground   |
| 10                         | -     | Not connected                                  |

Table 2: Connector JP2

### 4.4 Digital connector

- All digital Inputs/Outputs of MLX90121 device are also available on the connector **J2** and can be used to connect digital probes of an oscilloscope.

| Pin number | Name  | Description                                    |
|------------|-------|--|
| 1          | GND   | Ground   |
| 2          | CK    | Serial Clock Input                             |
| 3          | MODE  | Configuration or Communication selection Input |
| 4          | DIN   | Data Input                                     |
| 5          | DOUT  | Data Output                                    |
| 6          | RTB   | Reception or Transmission selection Input      |
| 7          | DSYNC | Synchronization Output                         |

Table 3: Connector J2

### 4.5 Analogue outputs

- Some analogue outputs are foreseen on the evaluation board as test pins referenced from **TP1** to **TP8**. These test pins can be used to measure analogue information. The following table describes all test pins available on the evaluation board.

| Test pins number | Name | Description                    |
|------------------|------|--------------------------------|
| TP1              | VDD  | Supply Voltage                 |
| TP2              | Ant  | Antenna                        |
| TP3,TP6          | GND  | Ground                         |
| TP8              | CLK  | Output XBUF of MLX90121 device |

Table 4: Test pins



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