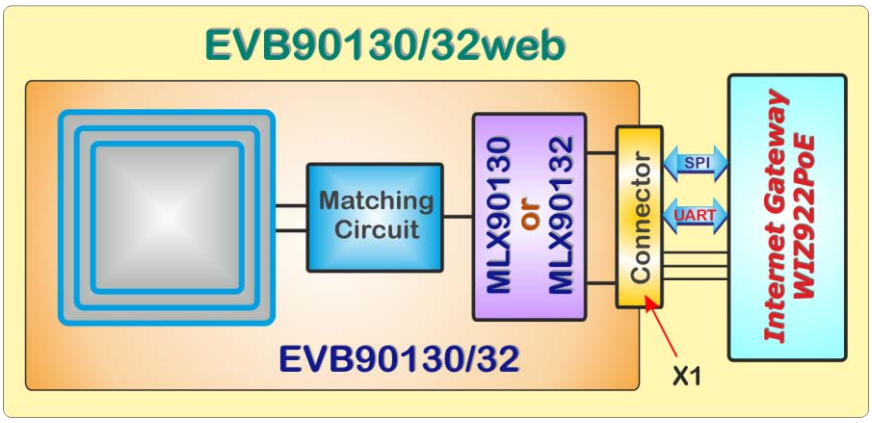
Table of Contents

1. General Description

The EVB90130/32web consists of two parts:

- The EVB90130/32
- The Internet-Gateway-Module WIZ922PoE



The RFID/NFC Reader Board is a universal HF frontend for mobile and stationary 13.56MHz reading devices. The MLX90130 or MLX90132 RFID-Transceiver IC from Melexis used here supports all commonly used standards like:

- ISO/IEC 18092 (NFC, MLX90132 only)
- ISO/IEC 14443A und B
- ISO/IEC 15693
- ISO/IEC 18000-3 mode 1

The MLX90130/32 is a 13.56MHz, fully integrated, multi-protocol RFID/NFC transceiver IC. It has been designed to handle sub-carrier frequencies from 106 to 848 kHz and baud rates up to 848kbit/s. The dual driver architecture of the MLX90132 requires minimal external support components.

The MLX90132 embeds tag emulation functionality for NFC support. Enhanced tag and field detection capabilities provide significant power consumption reduction in RFID reader configuration and in NFC mode.

The digital section of the MLX90130/32 handles the low protocol layers from API to physical layer using advanced bit and frame encoding/decoding functions. It contains a digital demodulator based on sub-carrier detection and a programmable bit/symbol encoder/decoder. It also encodes and decodes the start and stop bits, parity bits, extra guard time (EGT), start and end of frame (SOF/EOF) and CRC. Its 528 bytes buffer allows buffering of an entire RFID frame.
The EVB90130/32 allows an operation with the integrated PCB antenna and can be controlled by any Microcontroller via the standard SPI or UART interface. The EVB90130/32web consists in addition to the EVB90130/32 of a WIZnet WIZ922PoE module with an MCU and preprogrammed Web frontend for an easy plug-and-play start to help implement a RFID- or a fully functional NFC-reader. Free ANSI-C code is available for software support.

1.1 Connector X1 (SPI/ UART Communication)

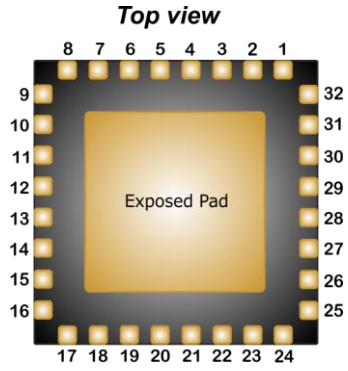
X1 connects to the WIZnet internet module WIZ922PoE. Here, the internal 3.3V regulator of the WIZ922 Module is used.

Pin	Name	Description	Mode
1	MOSI	SPI Data Input	SPI Mode
2	NSS	SPI Slave Select, low active	
3	MISO	SPI Data Output	
4	SCK	SPI Clock	
5	GND	Ground	Source
6	NC	NC	
7	VDD3V3	3.3V Regulator-output (WIZnet)	
8	VDD	Main power Supply voltage 5V (PoE out)	
9	UART_TX_IRQ_out	UART Transmit pin /Interrupt output	UART Mode
10	UART_RX_IRQ_in	UART Receive pin /Interrupt input	

2. MLX90130 / MLX90132 Pin Definitions & Descriptions

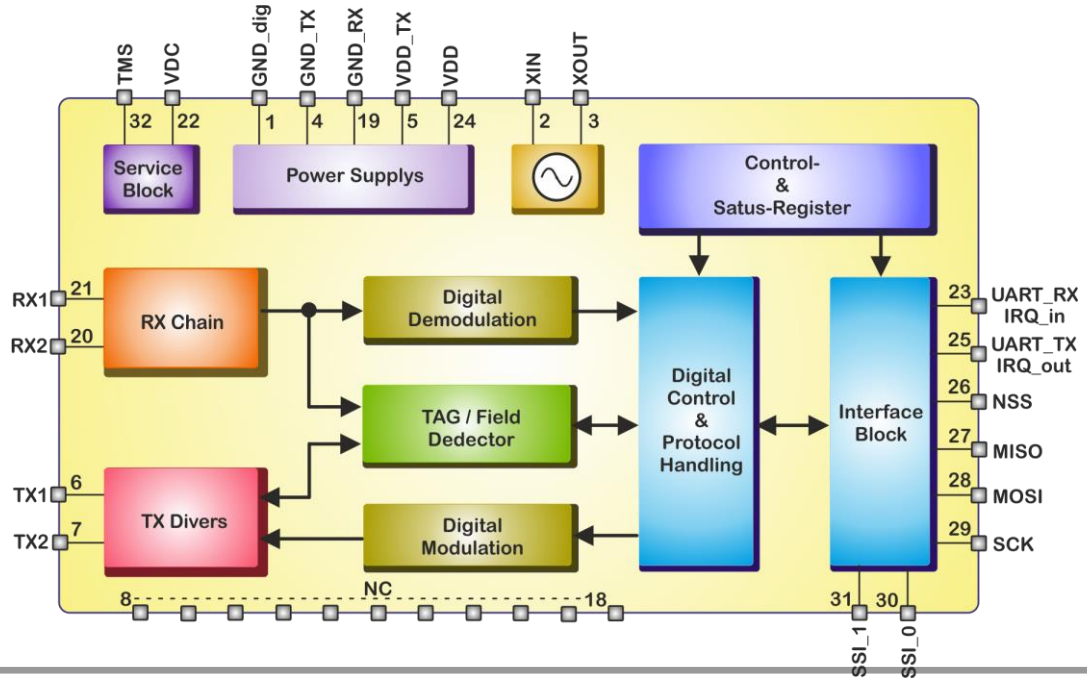
Pin	Pin Name	I/O Type	Description
1	GND_dig	Supply	Digital Ground
2	XIN	Analog	Crystal oscillator input
3	XOUT	Analog	Crystal oscillator output
4	GND_TX	Supply	Ground TX-Drivers
5	VDD_TX	Supply	Power supply TX-Drivers
6	TX1	Analog	Driver output_1
7	TX2	Analog	Driver output_2
8	NC		Not connected
9-16	NC		Not connected
17	NC		Not connected
18	NC		Not connected
19	GND_RX	Supply	Analog Ground
20	RX2	Analog	Receiver input_2
21	RX1	Analog	Receiver input_1
22	VDC	Analog	Melexis Reserved
23	UART_RX/IRQ_in	Digital I	UART Receive pin / Interrupt input
24	VDD	Supply	Main Power Supply
25	UART_TX/IRQ_out	Digital O	UART Transmit pin / Interrupt output
26	NSS	Digital I	SPI Slave Select
27	MISO	Digital O	SPI data output
28	MOSI	Digital I	SPI data input
29	SCK	Digital I	SPI clock
30	SS_0	Digital I	Select for Serial comm. interface
31	SS_1	Digital I	Must be set to GND
32	TMS *	Digital I	Must be set to VDD
EXP		Expos. Pad	Must be set to GND

*Versions MLX90130/132-AEA have an internal pull up and the TMS is NC.

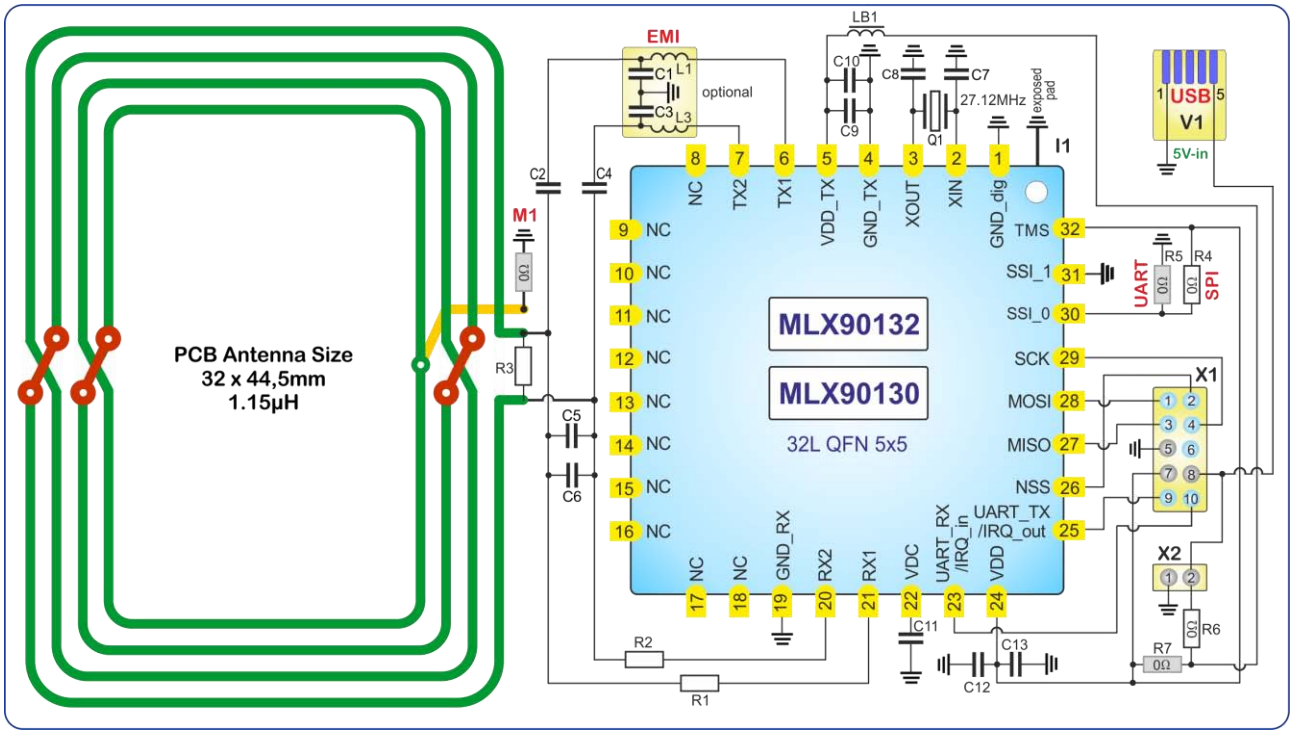


The device is packaged in a 32 pin lead free QFN package

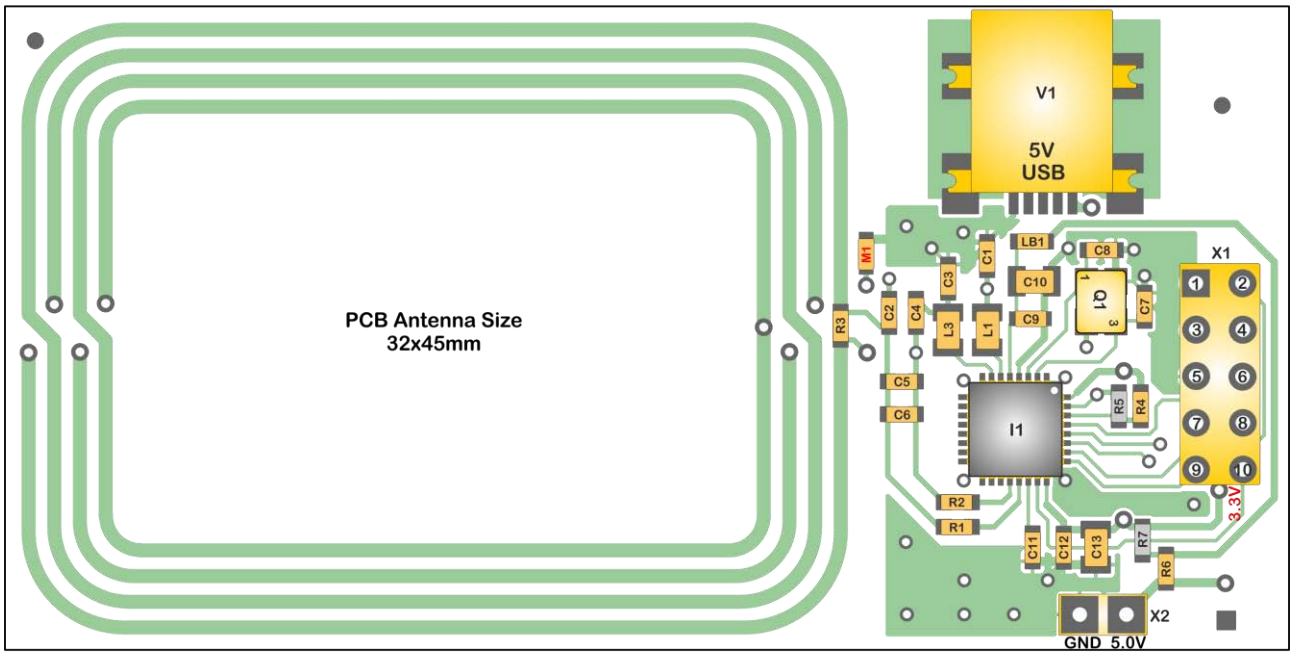
2.1 MLX90130 / MLX90132 simplified Block Diagram



3. RFID90130/32 Circuit Diagram with PCB Antenna



4. Component Arrangement RFID90130/32 Board with PCB Antenna



Board size is 35mm x 70mm

5. Board Component Values from RFID90130/32 Board

Part	Size	Value MLX90130/MLX90132	Tol.	Description
I1	32L QFN 5x5	MLX90130		13.56MHz RFID Transceiver, sales Dacom
C1	0603	220 pF [1)]	±5%	Antenna matching, filter capacitors (EM FilterI)
C2	0603	100 pF	±5%	Antenna matching, serial resonance capacitor
C3	0603	220 pF [1)]	±5%	Antenna matching, filter capacitors (EMI Filter)
C4	0603	100 pF	±5%	Antenna matching serial resonance capacitor
C5	0603	10 pF	±5%	Antenna matching, parallel resonance capacitor
C6	0603	47 pF	±5%	Antenna matching, parallel resonance capacitor
C7	0603	12 pF	±5%	27.12MHz crystal load capacitors
C8	0603	12 pF	±5%	27.12MHz crystal load capacitors
C9	0603	100 nF	±10%	Ceramic decoupling capacitor
C10	0805	4.7 µF	±20%	Ceramic decoupling capacitor GRM21-series
C11	0603	47 pF	±5%	Ceramic decoupling capacitor
C12	0603	100 nF	±10%	Ceramic decoupling capacitor
C13	0805	10 µF	±20%	Ceramic decoupling capacitor GRM21
R1	0603	560 Ω	±5%	Antenna matching network, feedback Rx resistors
R2	0603	560 Ω	±5%	Antenna matching network, feedback Rx resistors
R3	0603	2 kΩ [6)]	±5%	Antenna matching network, resonance damping resistor
R4	0603	0 Ω [3)]		The serial communication interface is programed on SPI
R5	0603	0 Ω [3)]		Optionally, serial communication interface is pro-gramed on UART
R6	0603	0 Ω [5)]		Power Supply for TX-Diver is 5V source
R7	0603	0 Ω [4)]		Optionally, Power Supply is 3.3V source for MLX90130/32
L1	0805	0,56 µH [2)]	±10%	Antenna matching, filter inductors (EMI Filter) LQM21N Murata
L3	0805	0,56 µH [2)]	±10%	Antenna matching, filter inductors (EMI Filter) LQM21N Murata
LB1	0603	BLM18AG601		EMI filter, impedance = 600Ω, current = 500mA
M1	0603	nc		Test point for antenna matching tuning
Q1	SMD 3.2x2.5 SMD 2.5x2.0	27.1200 MHz	±30ppm	Fundamental-mode crystal, Petermann Series SMD03025/4 or equivalent Part
X1		10-polig		Interface-Connector, 2.54mm, 2-reihig
X2		2-polig		Optionally VDD-Connector, 2.54mm, 1-reihig
V1	SMD	5-polig [7)]		Mini USB-B Connector: CONNFLY DS1104-BN0SR (musb-g5p to WIZnet), Molex 0548190572 (mx54819 to WIZnet) or equivalent Part

Note: 1) to 7), according to section 6.

6. Assembly Options

1) C1/C3 ⇒ Optionally EMI Filter 220-270pF
   Without EMI filters C1/C3 is = n. c.
2) L1/L3 ⇒ Optionally EMI Filter 0.22 µH -0,56µH LQM21N Series Murata
   Without EMI filters L1/L3 is = 0 Ohms
3) R4/R5 ⇒ Standard is R4 ⇒ SPI Mode
   Optionally ⇒ R5 UART Mode,

R4	R5	Description
0 Ω	off	SPI Mode
off	0 Ω	UART Mode

4) R7 ⇒ Optionally ⇒ MLX90130/32 and TX-Diver in 3,3V Mode
5) R6 ⇒ Standard is Power Supply for TX-Diver = 5V source
6) R3 ⇒ Optionally ⇒ Resonance Damping Resistor 2-10 kΩ
7) V1 ⇒ Standard is Mini USB Connector for Power Supply source

7. Power Supply Variants MLX90130/32 Optionally for 3.3V or 5V

The MLX90130/32 can be supplied by 3.3V or 5V. Here 3.3V is used provided by the WIZ922PoE-module, thus R7 (VDD) is not connected on the EVB and R6 (5V-in) is connected on the board.
Table 5 summarizes the different supply options. The first two are used with power of Ethernet, the other three use X2 or V1 as power supplies (as described in 5.3.1 and 5.3.2) Only the first of these options can be used in conjunction with the WIZ922.

Part		Source TX Driver		VDD	Connector					Can the WIZ922 be used? If yes is PoE used?
					X1			X2 / V1		
R6	R7	Voltage			5	7	8	1	2	
0 Ω	off	5V		3.3V	⏚	3.3V	4.3V PoE	⏚	—	WIZ922 Yes, PoE Yes
off	0 Ω		3.3V	3.3V	⏚	3.3V	4.3V PoE	⏚	—	WIZ922 Yes, PoE Yes
0 Ω	0ff	5V		3.3V	⏚	3.3V	5V	⏚	5V	WIZ922 Yes, PoE No
0 Ω	0 Ω		3.3V	3.3V	⏚	3.3V	3.3V	⏚	3.3V	WIZ922 No
0 Ω	0 Ω	5V		5V	⏚	5V	5V	⏚	5V	WIZ922 No

7.1 Connector V1 (Supply Voltage)

You only need to connect 5V supply to Pin 5 and to Pin1 GND.

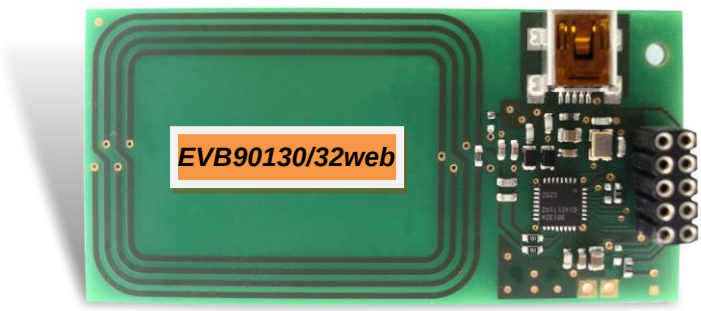
Pin	Name	Description / USB Connector
1	GND	Ground
5	VDD	Main power Supply 5V

7.2 Connector X2 (Optionally for Supply Voltage)

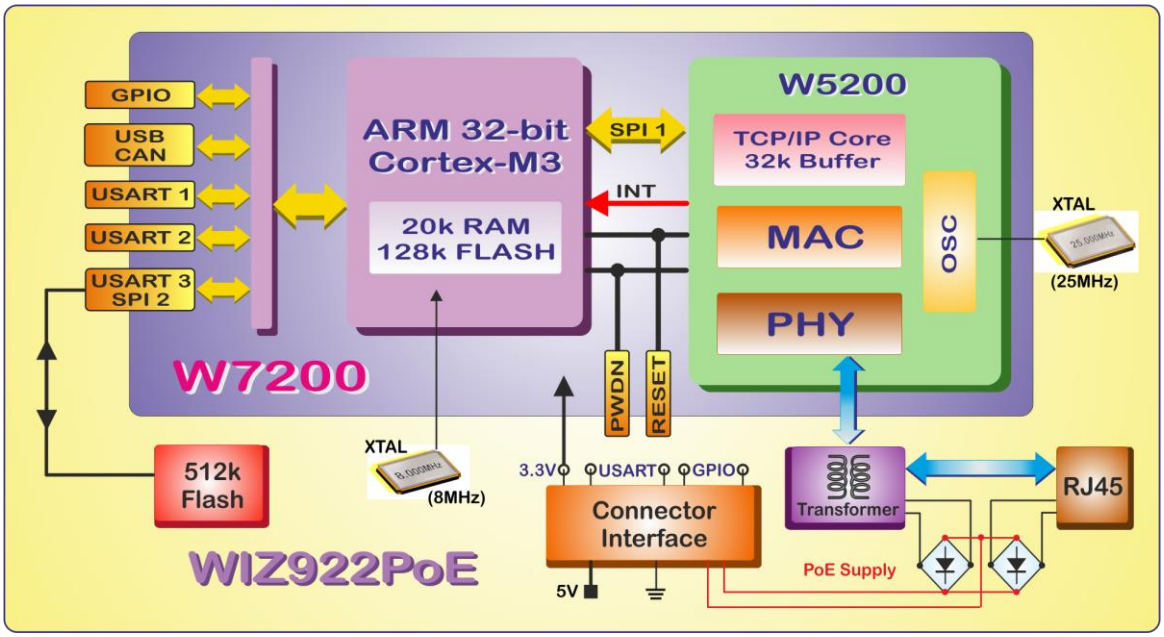
You only need to connect 5V or 3.3V supply to Pin 2 and to Pin1 GND.

Pin	Name	Description / USB Connector
1	GND	Ground
2	VDD	Main power Supply 5V or 3.3V

8. RFID Reader Board and Internet Gateway-Module



8.1 Block Diagram WIZ922PoE



8.2 Reference List RFID90130/32 Reader Board to Internet Gateway-Module WIZ922PoE

X1 Pin	Reader Bord RFID90130/32		Interface WIZ922PoE	
	Pin Name	Description	Pin Name	Description
1	MOSI	SPI data input	P15_SP12_MOSI	MOSI
2	NSS	SPI Slave Select, low active	PB11	SPI Slave Select
3	MISO	SPI Data Output	PB14_SP12_MISO	MISO
4	SCK	SPI Clock	PB13_SP12_SCK	SCK
5	GND	Ground	GND	GND
6	NC	NC	nRESET	Reset, low active
7	VDD3	3.3V Regulator-output	VDD3V3	3.3V-Regulator out
8	VDD	Main power Supply voltage 5V	VDD5V	5V-input or PoE-out
9	UART_TX_IRQ_out	UART Transmit pin /Interrupt output	PA10_ UART1_RXIN	UART Receive pin
10	UART_RX_IRQ_in	UART Receive pin /Interrupt input	PA9_ UART1_TXOUT	UART Transmit pin

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