TWN4

MultiTech Core

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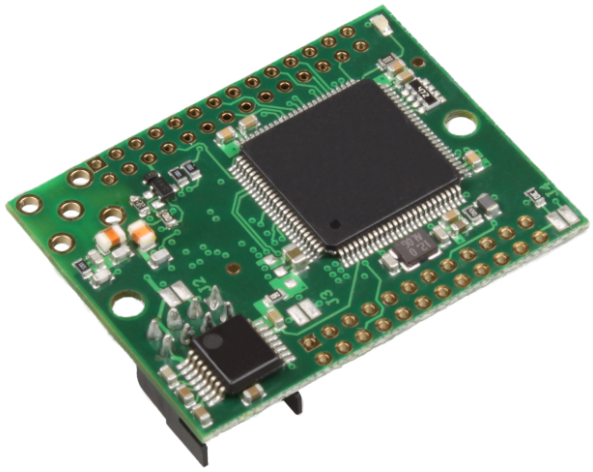
ELATEC GmbH

Contents

1 Introduction

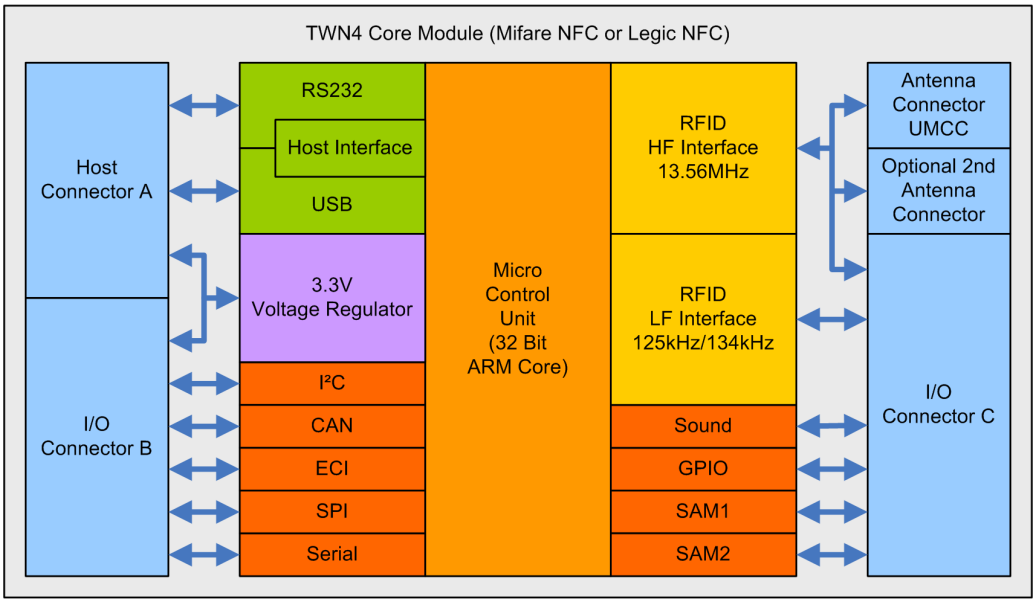
Here is a picture of the TWN4 Core Module MIFARE NFC:



There are three models of TWN4 Core Module available:

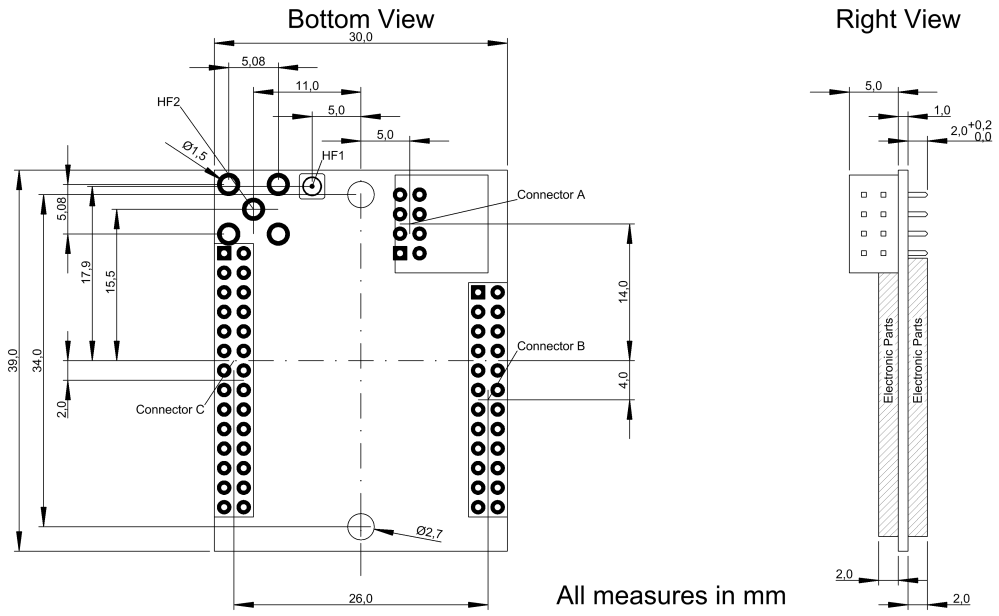
- TWN4 MultiTech Core (former TWN4 Core Module MIFARE NFC)
- TWN4 MultiTech Core LEGIC 42 (former TWN4 Core Module LEGIC NFC)
- TWN4 MultiTech Core LEGIC 45 (former TWN4 Core Module LEGIC NFC 4500)

TWN4 MultiTech Core contains voltage regulator, control unit, RFID front ends and communication interfaces.



2 Dimensions

The dimensions of TWN4 Core Module are as follows.:



3 Connectors

TWN4 MultiTech Core has several connectors on-board. There are three connectors (A, B and C) which connect either to a carrier board or to a host. Furthermore, there is a antenna connector and a optional position for placing a coaxial connector.

The connectors A, B and C have identical pitch. Following type of connector is recommended:

- Dual row header
- Pitch 2.0mm
- Pin shape square
- Pin width 0.5mm x 0.5mm
- Length of pins appropriate to custom requirements

3.1 Connector A

The connector A is intended for connecting a cable to the TWN4 core module, which allows communication with a host. Typically, such a cable is either type USB or RS232. Various appropriate USB and RS232 cables are available from stock.

There is a right-angle connector mounted on-board, which is type Hirose, DF11 series.

Pin	Pin Name	Function
A1	UGND	USB Ground
A2	USB_D+	USB Data +
A3	UVCC	USB VCC
A4	USB_D-	USB Data -
A5	V24_RXD	RS232 RXD (Input)
A6	GND	Ground
A7	V24_TXD	RS232 TXD (Output)
A8	MGND	Cable Sense

Note:

If pin A6 and A8 are connected to each other this has two effects:

1. The firmware of TWN4 changes host channel to RS232
2. The integrated circuit, which is interfacing to voltage levels of RS232 is powered up.

Following order codes for connector A and mating parts:

- Pin header on TWN4 Core Module: Hirose DF11-8DP-2DS(24)

- Mating part (crimping socket): Hirose DF11-8DS-2C
- Mating part (crimping contact): Hirose DF11-22SC (22 AWG)

3.2 Connector B

Pin	Pin Name	Function
B1	GND	Ground
B2	VIN	Unregulated input to on-board voltage regulator
B3	VREG	3.3V output from on-board voltage regulator
B4	VCC	3.3V power supply input
B5	RESET-	Low active TTL input with internal pull-up resistor for hard reset.
B6	PWRDWN-	Low active TTL input with internal pull-up resistor for turning off the voltage regulator.
B7	COM1_RX-	Low active TTL input with internal pull-up resistor of asynchronous RXD to COM1.
B8	COM1_TX-	Low active TTL output (push/pull) of asynchronous TXD from COM1.
B9	I2C_SDA	Data pin of I2C interface. No internal pull up.
B10	I2C_SCL	Clock pin of I2C interface. No internal pull up.
B11	CAN_RX	TTL RX pin of CAN interface. A external interface circuit is required.
B12	CAN_TX	TTL TX pin of CAN interface. A external interface circuit is required.
B13	ECI_MOSI	Pin MOSI of ECI
B14	ECI_MISO	Pin MISO of ECI.
B15	ECI_CLK	Pin CLK of ECI.
B16	ECI_ATTN-	Pin ATTN- of ECI.
B17	GND	Ground
B18	Res.	This pin is reserved for future purposes.
B19	SPI_MOSI	Pin MOSI of SPI interface
B20	SPI_MISO	Pin MISO of SPI interface
B21	SPI_SCK	Pin SCK of SPI interface
B22	SPI_SS-	Pin SS- of SPI interface
B23	Res.	This pin is reserved for future purposes.
B24	Res.	This pin is reserved for future purposes.

3.3 Connector C

Pin	Pin Name	Function
C1	GND	Ground
C2	ANT_HF	Together with pin C1, this pin builds a 50 ohm output for connecting external 13.56MHz antennas
C3	ANT_LF1	Output 1 for connecting external 125 kHz / 134.2 kHz antennas.
C4	ANT_LF2	Output 2 for connecting external 125 kHz / 134.2 kHz antennas.
C5	Res.	This pin is reserved for future purposes.
C6	SPK+	Digitally modulated output for a speaker. Second connection for the speaker is ground. The impedance of the speaker should be greater than 24 ohm.
C7	IO0	GPIO0, I/O pin for general purposes.
C8	IO1	GPIO1, I/O pin for general purposes.
C9	IO2	GPIO2, I/O pin for general purposes.
C10	IO3	GPIO3, I/O pin for general purposes.
C11	IO4	GPIO4, I/O pin for general purposes.
C12	IO5	GPIO5, I/O pin for general purposes.
C13	IO6	GPIO6, I/O pin for general purposes.
C14	IO7	GPIO7, I/O pin for general purposes.
C15	SAM1_CLK	Clock output for SAM1
C16	GND	Ground
C17	SAM1_IO	I/O line for SAM1
C18	SAM1_RST	Reset output for SAM1
C19	SAM2_CLK	Clock output for SAM2
C20	GND	Ground
C21	SAM2_IO	I/O line for SAM2
C22	SAM2_RST	Reset output for SAM2
continued on next page. . .		

Pin	Pin Name	Function
C23	COM2_RX-	Low active TTL input with internal pull-up resistor of asynchronous RXD to COM2.
C24	COM2_TX-	Low active TTL output (push/pull) of asynchronous TXD from COM2.
C25	Res.	This pin is reserved for future purposes.
C26	Res.	This pin is reserved for future purposes.
C27	Res.	This pin is reserved for future purposes.
C28	VCC	3.3V power supply input or output for supplying external components. Internally connected to B4.

Note:

- The nominal inductance for an external 125 kHz/134.2 kHz antenna is 490 µH. The series resistance of the antenna should be lower than 10 ohms.

3.4 Connector HF1

HF connector 1 is a UMCC series 50-ohms output, which is connected internally in parallel to pins C1 and C2.

3.5 Connector HF2

Position of HF2 offers the possibility to place another 50-ohm connector. It is connected internally in parallel to pins C1 and C2. There are several series of RF connectors, which can be used for position HF2, like SMA, SMB, SMC, MCX.

3.6 Jumpers

There are several jumpers on-board of the TWN4 Core Module. Depending on the requirements these jumpers can be soldered together.

Jumper	Function
J1	The function is identical to pins A6 and A8. If J1 is closed, the RS232 interface is turned on and the host channel is assumed to be RS232.
J2	Same function like J1 but other side of PCB.
J3	This jumper must be closed, if TWN4 Core Module is powered via connector A, e.g. from USB. It connects VCC from the Core Module to the on-board voltage regulator, which is supplied from connector A. If TWN4 Core Module is mounted on a carrier board, this connection can be avoided by connecting pins B3 and B4 at the carrier board, which results in exactly the same functionality.
J4	This jumper is for internal purposes only.

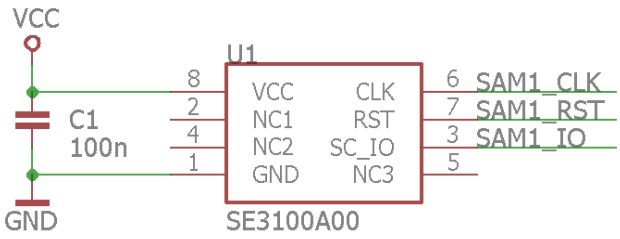
4 Using PI Option

To use the PI Option, e.g. to read the PAC bits from an iCLASS transponder, a SIO processor is needed. This can be either a SIO chip which is soldered directly on a PCB or a SAM card incorporating the SIO processor.

4.1 SIO Chip soldered on PCB

The SIO processor has to be added to the design of the mainboard. The chip can be connected either to SAM1 or SAM2 of the TWN4 Core Module.

Recommended schematic:

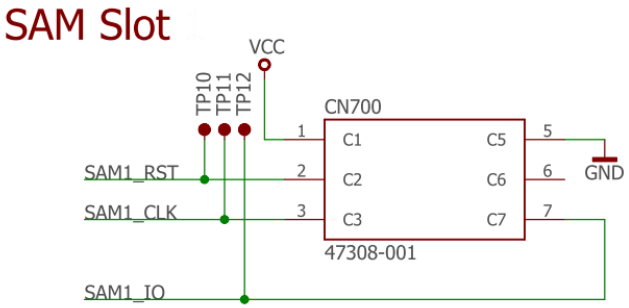


4.2 SAM Card Connection

A SAM socket has to be added to the design of the mainboard. The SAM socket can be connected either to SAM1 or SAM2 of the TWN4 Core Module.
Following SAM sockets are recommended:

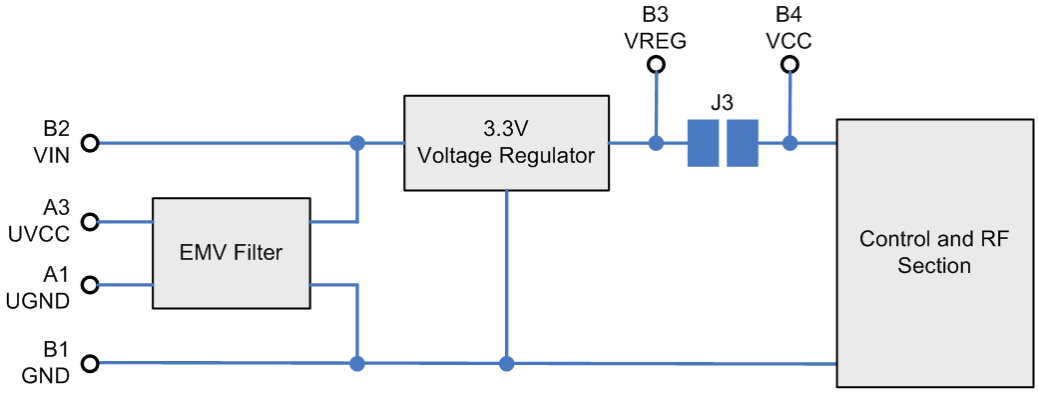
- Molex 47388-2001
- Molex 47308-0001

Recommended schematic:



5 Power Supply

The picture below is showing, how power is routed through TWN4 Core Module:



6 Power states and current consumption breakdown

The TWN4 Core Module supports 2 power states that can be used to reduce the current consumption of the reader when the application calls for it.

In Normal state the reader can accommodate a request to search for a high-/low-frequency tag or interact with peripherals on short notice; the current consumption in this state is the highest.

In Sleep state the reader is not capable of any of the above, but consumes considerably less current. The reader can be woken by communication on USB/COM ports or a predefined timeout and taken to Normal state.

In Stop state the reader consumes the least current and can be woken up via external/internal interrupt and taken to Normal state.

Table 6.1 shows the expected *typical* current draw in the 2 states described above, depending on the reader interface connected. It is assumed that a +5V DC Power Source is used. Results vary marginally when +3.3V source is used in the UART-TTL option. The UART-RS232 option was exercised using *MAX3221A* chip.

Module Version	MIFARE	LEGIC
Normal Idle	69,1	72,1
Sleep	8	20
Stop	0,5	13,5

Table 6.1: Typical Current Consumption in Base System States (mA)

Table 6.2 shows the extra current observed when the TWN4 Core Module is integrated into a reader (these results are to be taken as example only and are expected to change); these values are to be added to those in the "Normal Idle" base state.

Function	Current Consumption
SearchTag-HF	+130
SearchTag-LF	+25
RS232	+4
Speaker Constant Tone	+80

Table 6.2: Extra Current Consumption per Function added to "Normal Idle" base state (mA)

7 Disclaimer

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