KIT_XMC14_2Go user guide

About this document

Scope and purpose

This document describes the features and hardware details of the KIT_XMC14_2GO equipped with the ARM® Cortex™-M0 based XMC1400 microcontroller from Infineon Technologies AG.

Intended audience

This document is intended for users who use the KIT_XMC14_2GO.

Table of contents

1 Overview

The KIT_XMC14_2GO is designed to evaluate the capabilities of the XMC1400 microcontroller with the free of charge tool chain ModusToolbox™ and Arduino IDE.

This board is not cost optimized and does not serve as a reference design.

1.1 Key features

Table 1 summarizes the features of the KIT_XMC14_2GO.

Table 1 Features of the KIT_XMC14_2GO

Topic	Features
Processor	XMC1400 Family Microcontroller XMC1404-Q040X0200 (ARM® Cortex™-M0 based) in a 5 x 5 mm VQFN-40 package
Flash	200 KB
RAM	16 KB
Clock generation	Internal oscillator
Frequencies	Core frequency 48 MHz and 96 MHz peripherals clock
Dimensions	14 x 51.7 mm
Power supply	from USB 5V or up to 12V external power on Vin
Connectors	Two pin headers with 8 and 9 pins (pin pitch: 2.54 mm ≙ 100 mil / between rows: 10.16 mm ≙ 400 mil) Pin header fits to breadboard Additional 4 pins for CAN-H /CAN-L and 12V/GND connections
Debugger	Onboard J-Link debugger supports: Serial wire debug (SWD, ARM® standard) Single pin debug (SPD) UART-to-USB bridge (virtual COM)
Peripherals	Mapped to the connectors: 4 serial channels (USIC, configurable to SPI, UART, I2C, I2S) 12 channel 12-bit ADC, 2 x parallel sampling 8x 96MHz 16-bit timer External interrupts (via ERU) Others: Real time clock Random number generator One high speed CAN transceiver
Others	2 User LEDs @ P0.6 and P0.7

1.2 Block diagram

The block diagram in Figure 1 shows the main components of the Kit KIT_XMC14_2GO including the power supply concept. There are the following main building blocks:

- XMC1400 microcontroller in a 5 x 5 mm VQFN-40 package
- Onboard USB debugger realized with a XMC4200 microcontroller for serial wire debug (SWD) and UART to USB Bridge
- Two pin header with 8 and 9 pins
- Can transceiver with CAN-L and CAN-H on a pin header
- Power supply with voltage regulator for 5V and 3.3V
- 2 user LEDs

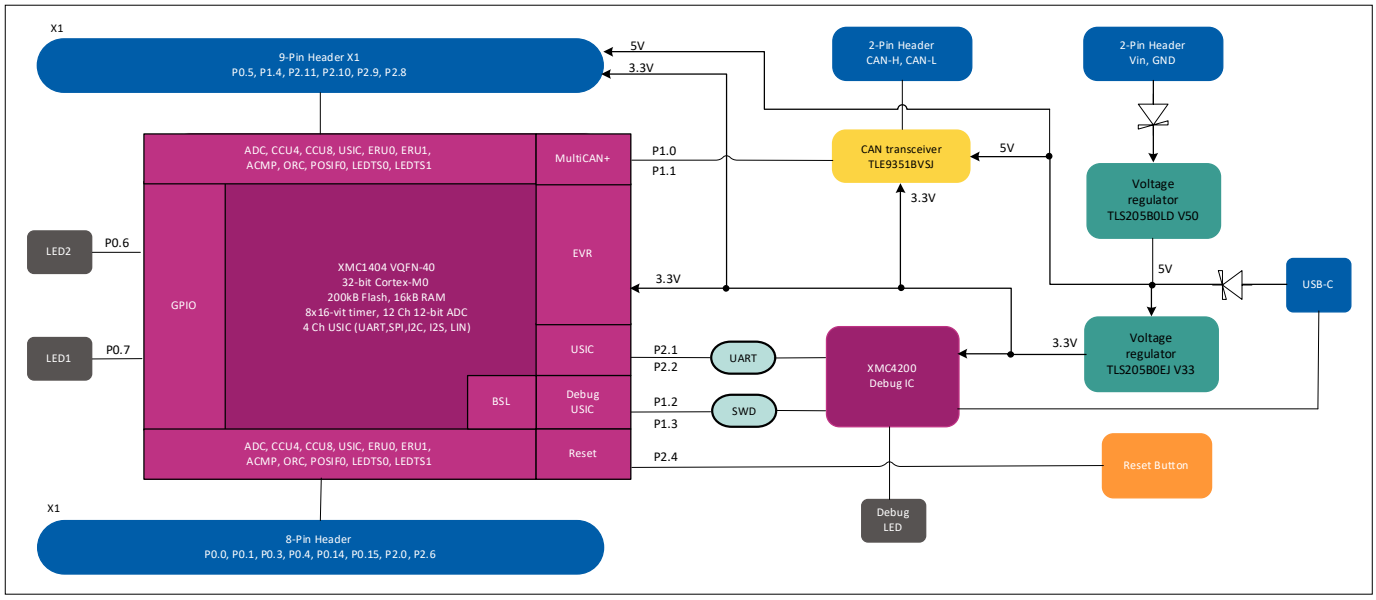

Figure 1 Block Diagram KIT_XMC14_2GO

2 Hardware description

The following sections give a detailed description of the board hardware and how it can be used. Figure 2 shows the components of the KIT_XMC14_2GO.

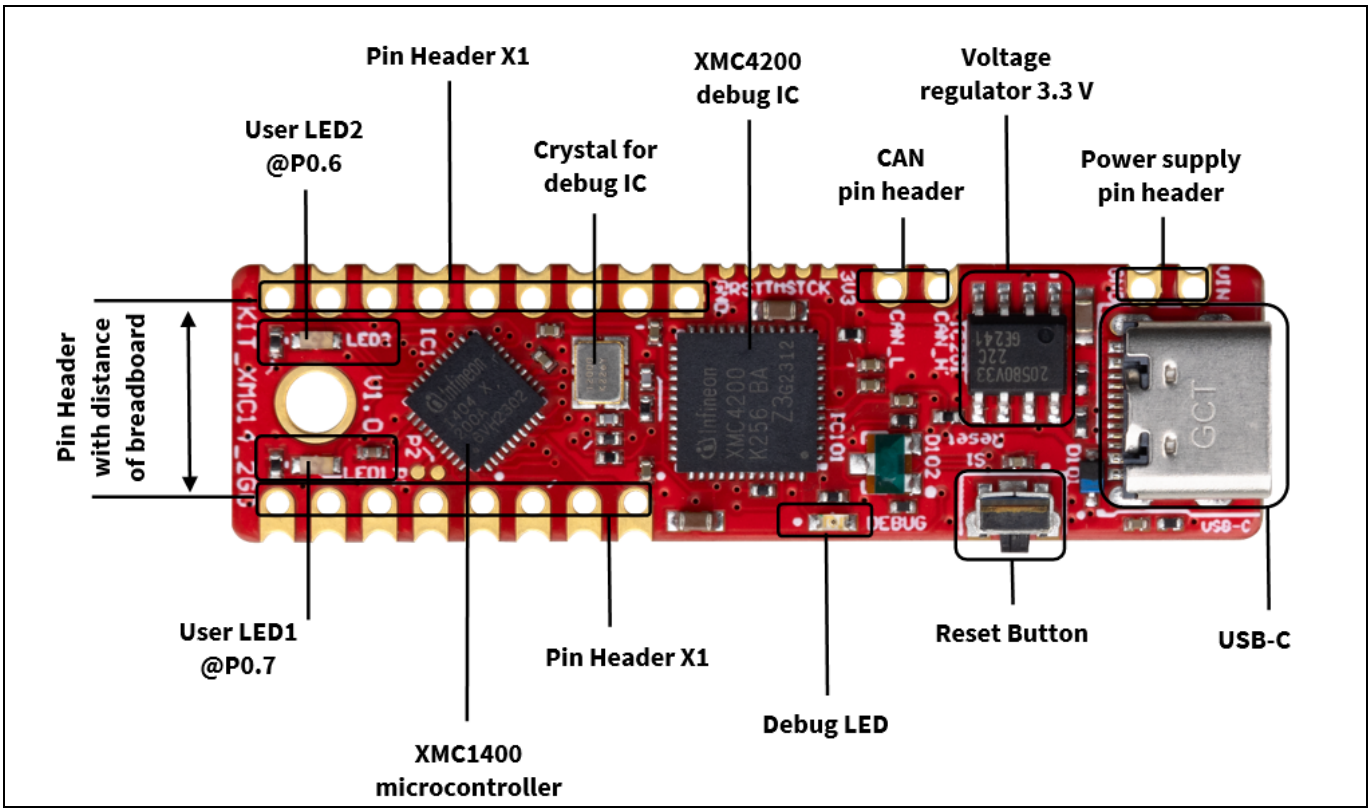

Figure 2 Top view of KIT_XMC14_2GO

The KIT_XMC14_2GO has also some components on the back of the platine which are shone in Figure 3.

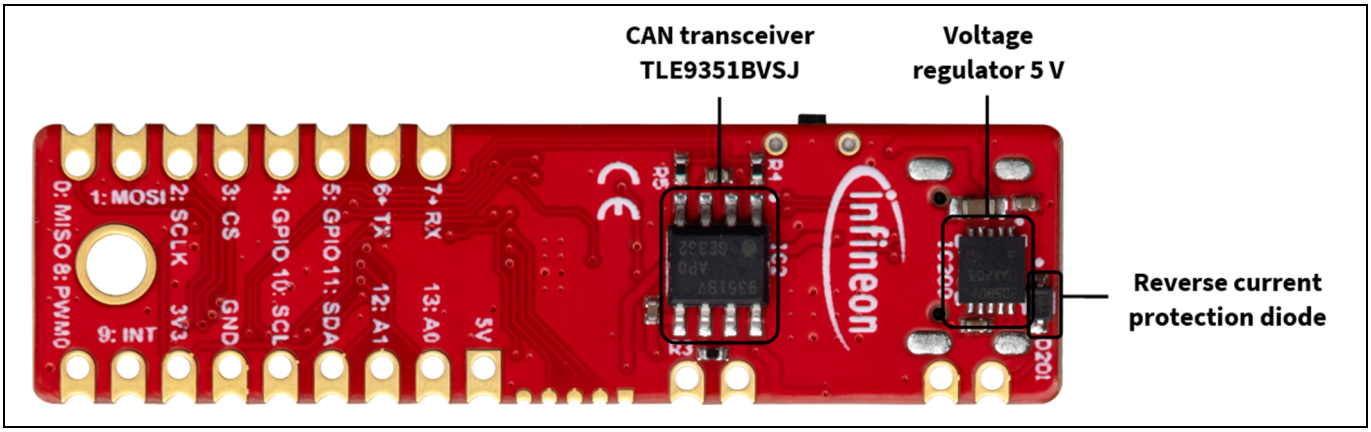

Figure 3 Back view of KIT_XMC14_2GO

2.1 Power supply

The KIT_XMC14_2GO can be powered by the USB-C connection with 5V. With the preprogrammed application and the onboard debugger in operation the KIT_XMC14_2GO typically draws about 85 mA. An onboard reverse current protection diode D101 will ensure safe operation and protects the USB port of the Laptop/PC in case power is provided through the pin header X1.

The board also has an additional option for external power supply via the Vin and GND pins. These are stabilized to 5V via an additional LDO TLS205B0LD V50 and the reverse polarity diode D201. A voltage supply of up to 20V is possible at this input.

The TLS205B0EJ V33 linear voltage regulator is responsible for generating the 3.3V power supply input for the XMC1400. The current capability of the VDD pin of the Kit is 500 mA. The same 3.3V power supply is provided for the XMC4200 debuging chip and th CAN transceiver.

2.2 Pin header connector

The pin header X1 can be used to extend the evaluation board or to perform measurements on the XMC1400. The pin labels are also printed onto the bottom side of the PCB.

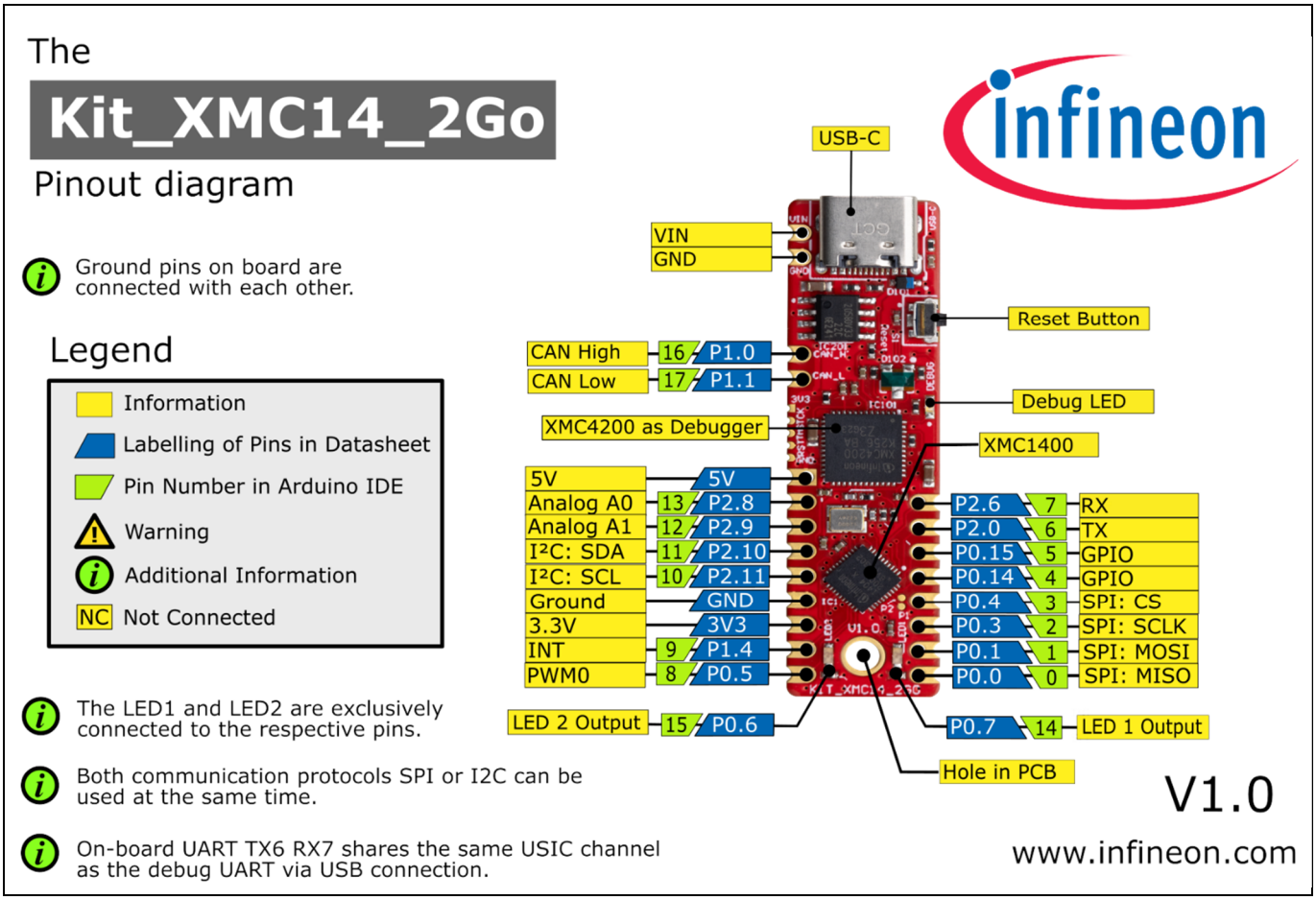

Figure 4 Pinout of the KIT_XMC14_2GO

In addition to the X1 pin header, the KIT_XMC14_2GO is equipped with four additional pins. These include Vin and GND, which can be supplied with an even higher external voltage. There is also a pin for CAN Low and CAN High, which are also shown in the pinout diagram in Figure 4.

2.3 User LEDs

The port pins P0.6 and P0.7 of the XMC1400 on the KIT_XMC14_2GO are connected to LEDs exclusively.

Table 2 List of material

LED	Port pin
LED1	P0.7
LED2	P0.6

2.4 Reset

The KIT_XMC14_2GO is equipped with a reset button. The Button S1 sets pin P2.4 on the XMC1400 to GND and generates a software reset.

2.5 Debugging and UART communication

The onboard debugger supports 2-pin serial wire debug (SWD), single pin debug (SPD) and UART communication. Both require the installation of Segger's J-Link Driver. The latest Segger J-Link Driver can be downloaded at https://www.segger.com/jlink-software.html.

During installation of the J-Link driver, you will be asked for the installation of optional components. For support of the UART communication, take care to install the CDC USB driver (Composite device class). Therefore, select the option "Install USB Driver for J-Link-OB with CDC" as shown in Figure 5.

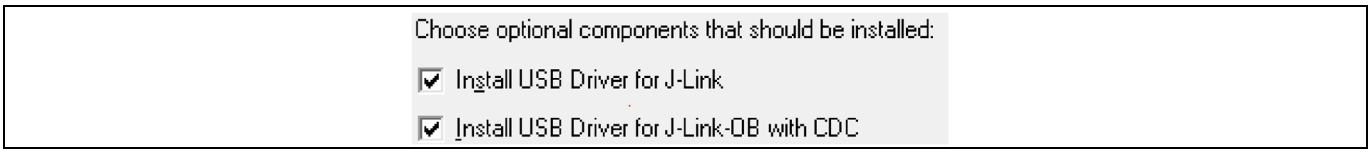

Figure 5 Recommended installation options for the J-Link driver

Table 3 shows the pin assignment of the XMC1400 used for debugging and UART communication.

Table 3 XMC1400 pins used for debugging and UART communication

Pin function	Input / output	Port pin
Data pin for debugging via SWD/SPD	I/O	P1.3
Clock pin for debugging via SWD	O	P1.2
Transmit pin for UART communication	O	P2.1
Receive pin for UART communication	I	P2.2

2.6 CAN Bus

The KIT_XMC14_2GO is provided with a CAN bus system. It uses CAN node 0 on RXD pin P1.1 and TXD pin P1.0 of the XMC1400. The High-Speed CAN Transeiver is TLE9351VSJ from Infineon which is used in CAN system for automotive applications as well as for industrial applications. CAN-H and CAN-L are accessible through a pin header on the Board.

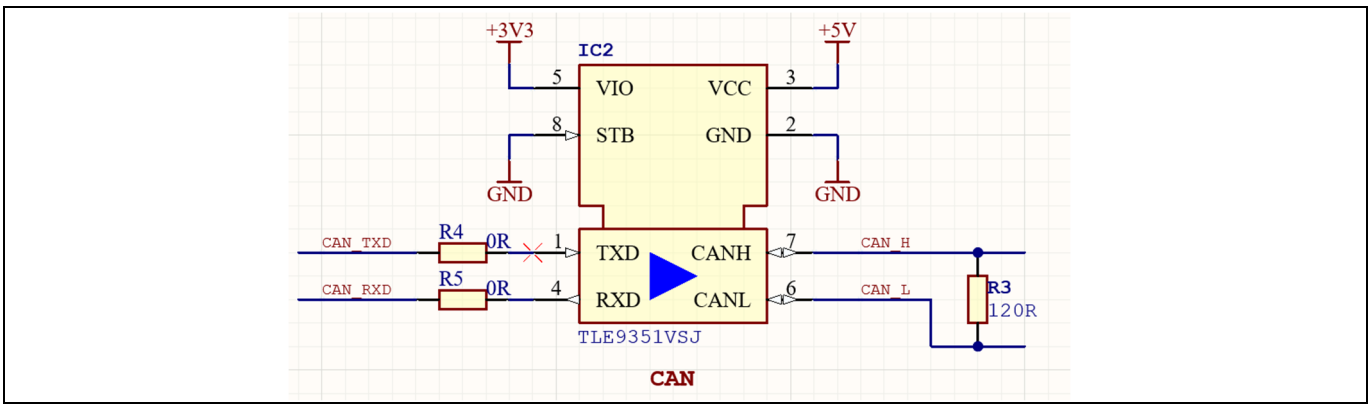

Figure 6 CAN transceiver circuitry

In a CAN bus network, the termination resistor R3 is required at either end of the bus to ensure proper signal transmission. The termination resistor helps to match the impedance of the transmission line, preventing signal reflections and ensuring reliable communication. However, when connecting more than two bus participants, such as in a multi-drop network, the termination resistor should be removed from the middle nodes. This is because having termination resistors at multiple points in the network can create signal reflections and degrade the communication quality. Therefore, for nodes in the middle of the bus, the termination resistor R3 should be desoldered to avoid signal integrity issues.

3 Production Data

3.1 Schematics

The schematic of the KIT_XMC14_2GO can be found in Figure 7.

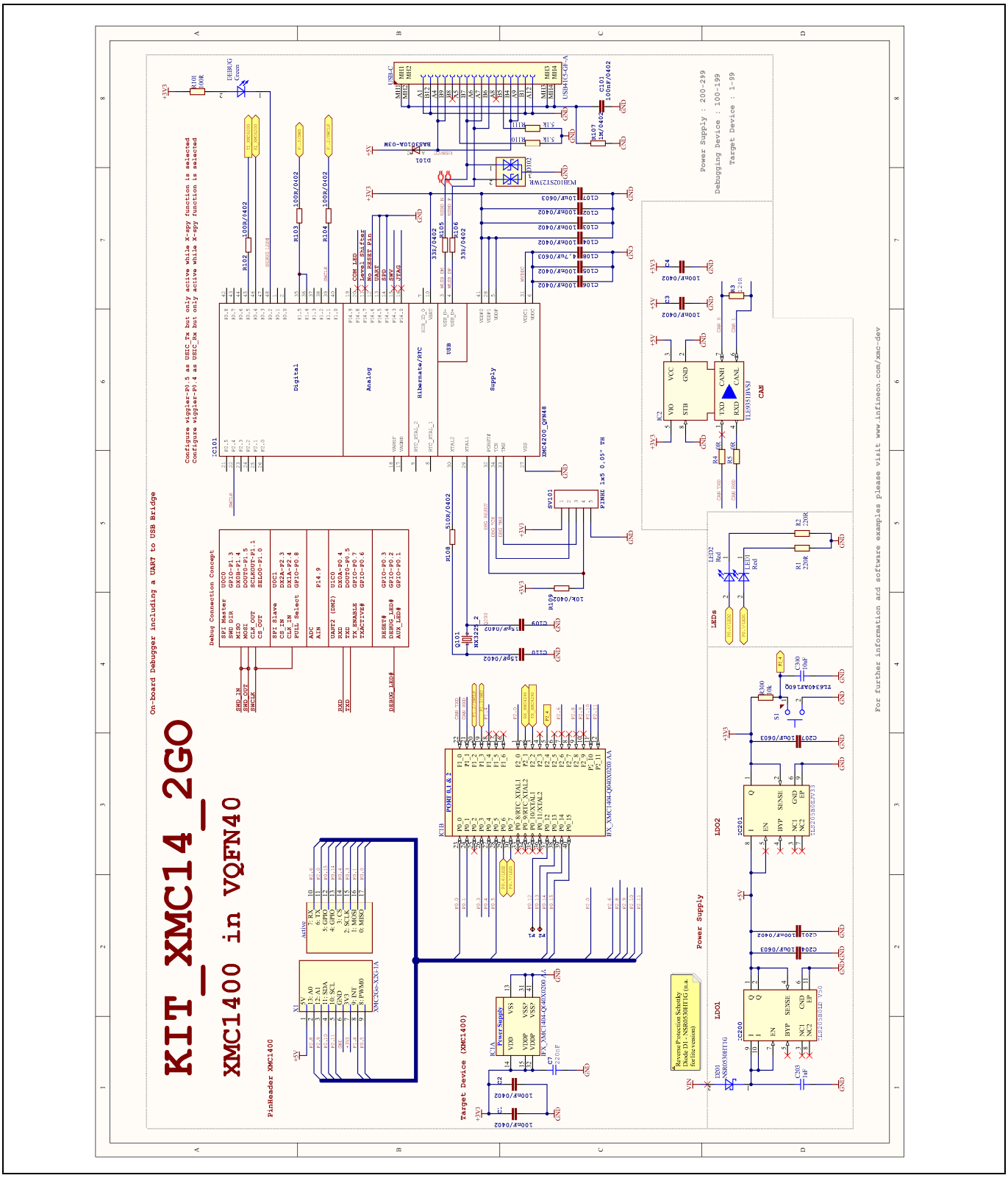

Figure 7 Schematic of the KIT_XMC14_2GO

3.2 Components placement and geometry

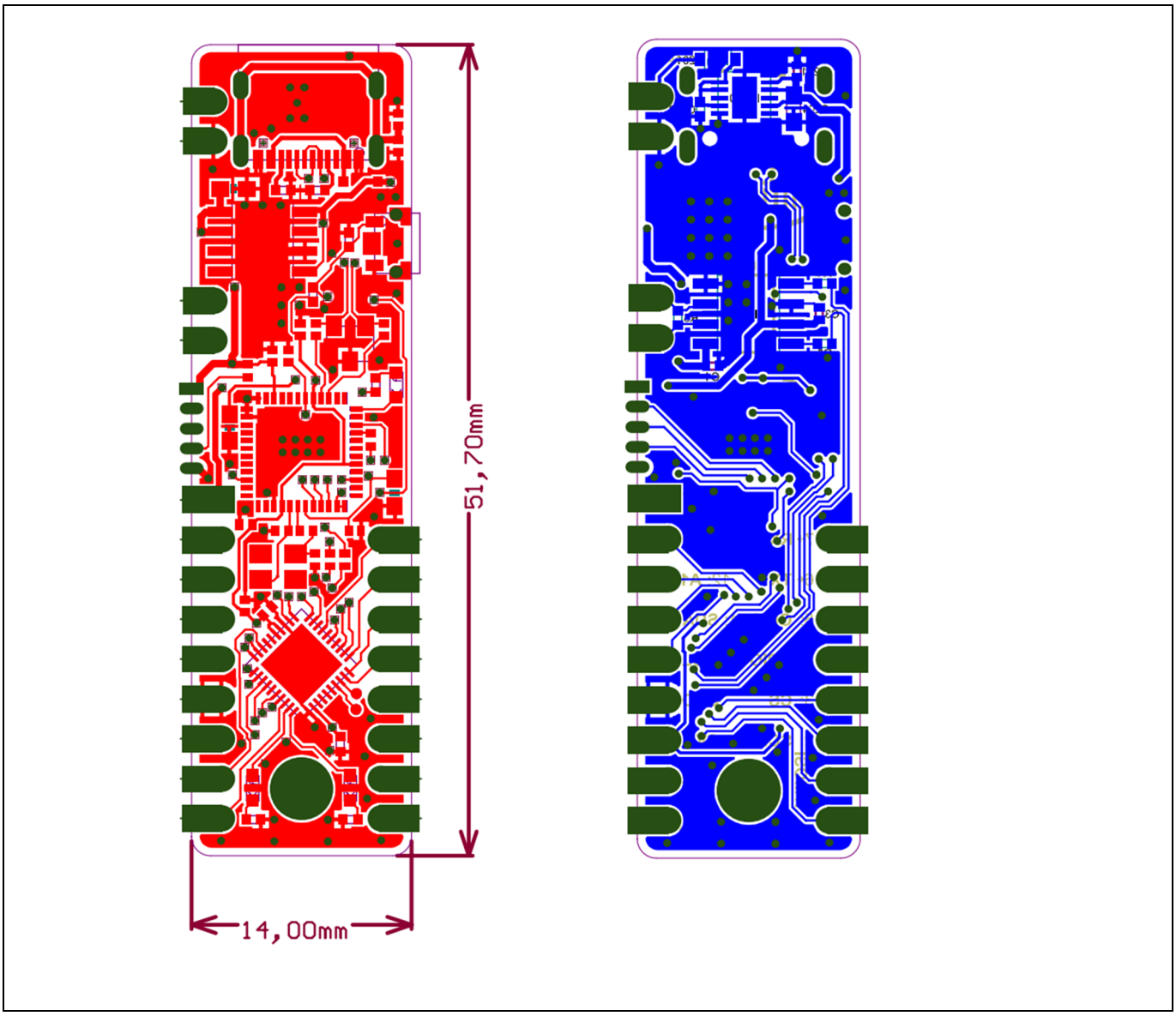

Figure 8 Layout and geometry

3.3 List of material

The list of material is valid for the KIT_XMC14_2GO version 1.

Table 4 List of material

No.	Qty	Value	Device	Reference designator
1	11	100nF 50V 0402 10% X5R CER	Capacitor	C1, C2, C3, C4, C101, C102, C103, C104, C105, C106, C201
2	1	220nF 16V 0402 10% X7R CER	Capacitor	C7
3	1	10nF 16V 0402 10% X7R CER	Capacitor	C300
4	3	10uF 35V 0603 X5R CER	Capacitor	C107, C204, C207
5	1	4.7uF 35V 0603 X5R CER	Capacitor	C108

6	2	15pF 50V 0402 10% COG CER	Capacitor	C109, C110
7	1	1uF 16V 0402 10% X6S CER	Capacitor	C203
8	1	BAS3010A-03W	Diode, Infineon	D101
9	1	PGB102ST23WR	Diode	D102
10	1	NSR0530HT1G	Diode	D201
11	1	XMC1404-Q040X0200	Microcontroller, XMC1404, Cortex M0, Infineon	IC1
12	1	TLE9351BVSJ	CAN transceiver, Infineon	IC2
13	1	XMC4200_QFN48	Microcontroller, XMC4200, Cortex M4F, Infineon	IC101
14	1	TLS205B0LD V50	Linear Voltage Regulator, Vout = 5V, Infineon	IC200
15	1	TLS205B0EJV33	Linear Voltage Regulator, Vout = 3.3V, Infineon	IC201
16	2	SMD WL-SMCD 0603 Red	LED red	LED1, LED2
17	1	WL SMCW SMT Mono Color Chip LED	LED green	DEBUG
18	1	12MHZ Crystals AEC-Q200 12000kHz 8pF 3.2x2.5mm	Crystal	Q101
19	2	220R 63mW 0402 1%	Resistor	R1, R2
20	1	120R 63mW 0402 1%	Resistor	R3
21	2	0R 63mW 0402 1%	Resistor	R4, R5
22	4	100R 63mW 0402 1%	Resistor	R101, R102, R103, R104
23	2	33R 100mW 0402 1%	Resistor	R105, R106
24	1	1M 100mW 0402 1%	Resistor	R107
25	1	510R 100mW 0402 1%	Resistor	R108
26	1	10k 63mW 0402 1%	Resistor	R109
27	2	5.1k 100mW 0402 5%	Resistor	R110, R111
28	1	10k 63mW 0402 1%	Resistor	R300
29	1	TL6340AF160Q	Tactile Switch	S1
30	1	PINHD 8x1 0,1" TH	Pin Header, 8-pin, 0.1” TH	X1
31	1	PINHD 9x1 0,1" TH	Pin Header, 8-pin, 0.1” TH	X1
32	1	USB4105-GF-A	USB2.0 TYP C	USB-C

Revision history

Document version	Date of release	Description of changes
	**	Initial release

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