

KIT XMC1400 AR

XMC1000 family

About this document

Scope and purpose

This document serves as a guide for using the KIT XMC1400 AR kit from the XMC1000 family. The kit utilizes Infineon's industry leading Arm® Cortex®-M0 microcontroller in combination with Arduino form factor. The focus is to evaluate the capabilities of the XMC1400 microcontroller's multiple applications solutions.

Intended audience

This document is intended for anyone who would like to evaluate the capabilities of XMC1400 using the Arduino compatible shields.

Reference Board/Kit

Product(s) embedded on a PCB, with focus on specific applications and defined use cases that can include Software. PCB and auxiliary circuits are optimized for the requirements of the target application.

Note: Boards do not necessarily meet safety, EMI, quality standards (for example UL, CE) requirements

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Introduction

1 Introduction

This document describes the features and hardware details of the XMC1400 CPU Card for Arduino. This board is mounted with Arm® Cortex®-M0 based XMC1400 microcontroller from Infineon Technologies AG and part of Infineon's XMC1000 offering of kits.

1.1 Overview

The XMC1400 CPU Card for Arduino has two rows of pin headers, which are fully compatible with the Arduino shield. Hence, the user can buy various Arduino shield boards off-the-shelf to test the capabilities of the XMC1400 microcontroller.

1.1.1 Key features

The XMC1400 CPU Card for Arduino is equipped with the following features:

- XMC1400 (Arm® Cortex®-M0 based) microcontroller, TSSOP38
- Headers compatible with Arduino shield
- Detachable SEGGER J-Link debugger and UART virtual COM port, with micro USB connector
- Power supply concept compatible with Arduino Uno
- Three user LEDs and separate LEDs each, for COM port and debug
- XTAL (20 MHz) and RTC_XTAL (32768 Hz)

Figure 1 shows the block diagram of the XMC1400 CPU Card for Arduino.

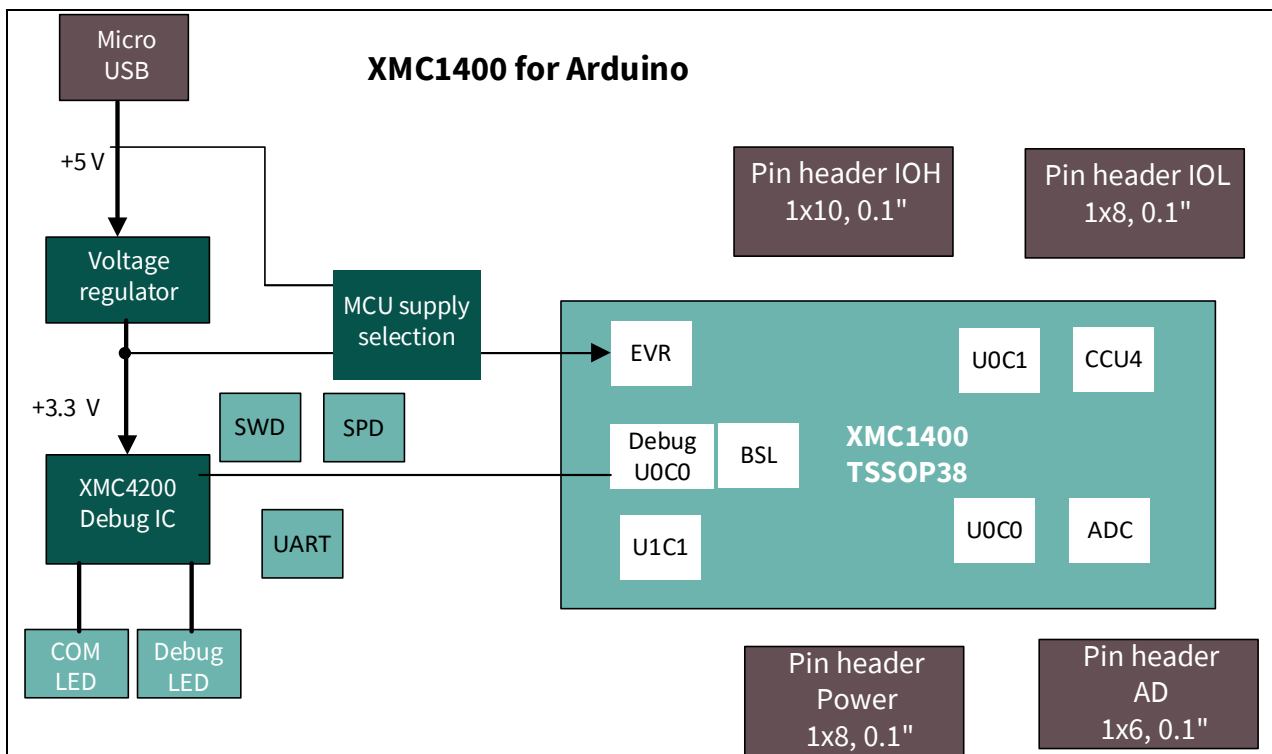


Figure 1 Block diagram of XMC1400 CPU Card for Arduino

2 Hardware description

The following sections give a detailed description of the hardware and how it can be used.

This kit has three User LEDs, connected to Port P0.5, P1.5, and P0.3 that is marked as DEBUG. When the board is connected using a Micro USB, the LEDs marked as “Power on LED” glow.

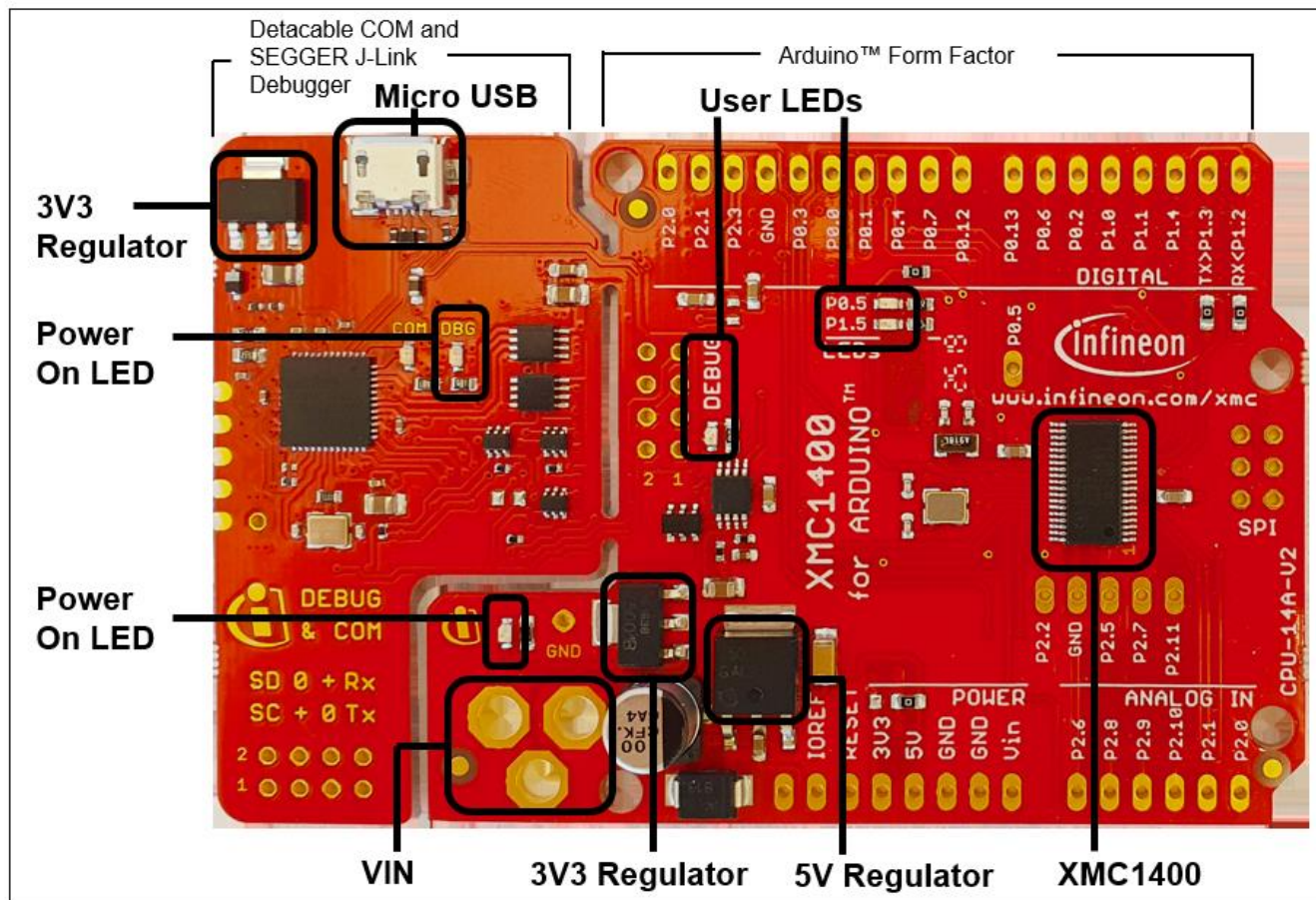


Figure 2 XMC1400 CPU Card for Arduino

2.1 XMC1400 connector for Arduino

2.1.1 Digital I/O connector

The XMC1400 CPU Card for Arduino has a 10-pin connector mounting holes and an 8-pin connector mounting holes at IOH and IOL respectively. Sixteen of those pins are digital input or output pins. The pinouts are listed in [Table 1](#) and [Table 2](#).

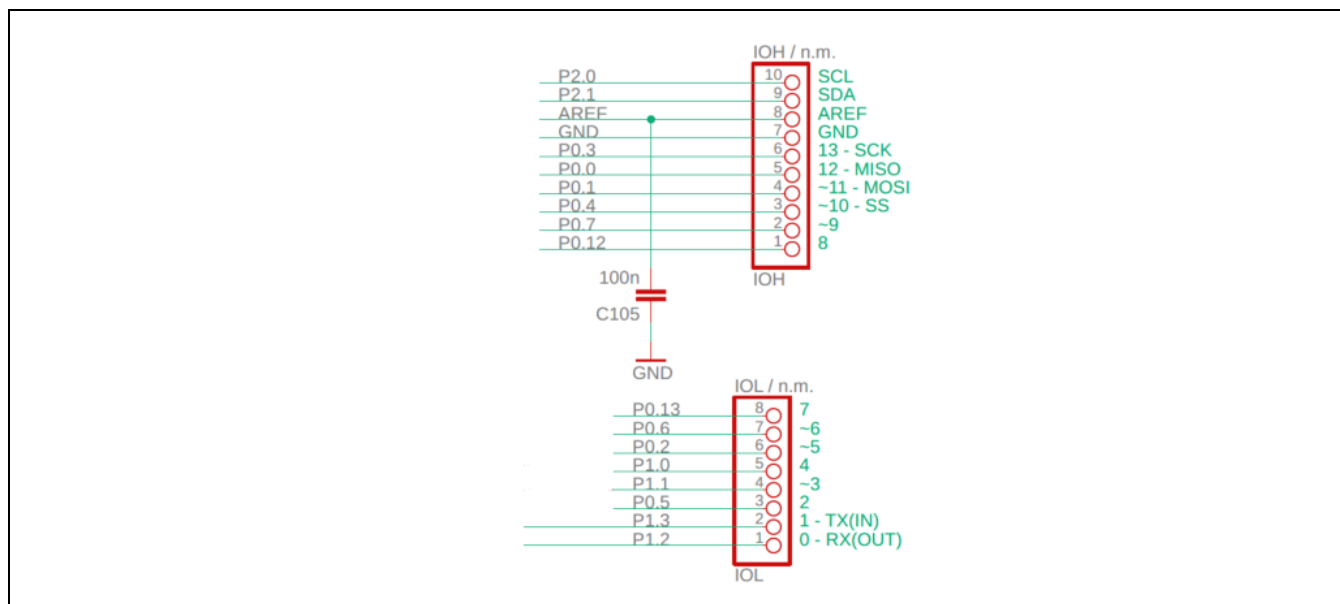


Figure 3 Digital I/O IOHIOL connectors

Table 1 Digital I/O of IOH connector

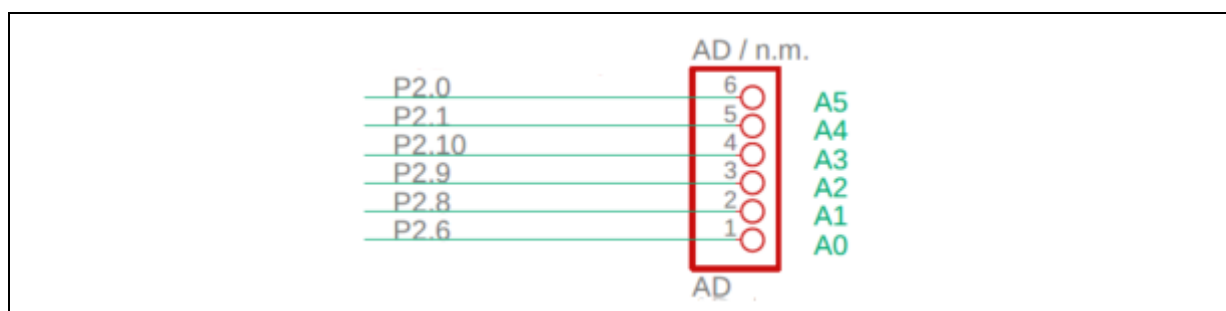
Pin No.	Arduino signal name	XMC1400 signal name	Description
10	SCL	P2.0	I ² C clock
9	SDA	P2.1	I ² C data / address
8	AREF	P2.3	Analog reference voltage
7	GND	GND	Ground
6	13 - SCK	P0.3	SPI-SCK / LED output
5	12 - MISO	P0.0	SPI-MISO
4	~11 - MOSI	P0.1	SPI-MOSI / PWM output
3	~10 - SS	P0.4	SPI-SS / PWM output
2	~9	P0.7	PWM output
1	8	P0.12	GPIO

Table 2 Digital I/O of IOL connector

Pin No.	Arduino signal	XMC1400 signal	Description
8	7	P0.13	GPIO
7	~6	P0.6	PWM output
6	5	P0.2	GPIO
5	~4	P1.0	GPIO/PWM
4	~3	P1.1	External interrupt / PWM output
3	2	P0.5	GPIO/LED2
2	1 - TX	P1.3	UART Transmit
1	0 - RX	P1.2	UART Receive

2.1.2 Analog input

The XMC1400 CPU Card for Arduino has six analog inputs at connector AD.

**Figure 4** Analog input AD connector**Table 3** Pinout of the AD connector

Pin No.	Arduino signal	XMC1400 signal	Description
1	A0	P2.6	ADC input
2	A1	P2.8	ADC input
3	A2	P2.9	ADC input
4	A3	P2.10	ADC input
5	A4	P2.1	ADC input
6	A5	P2.0	ADC input

2.1.3 Power connector, POWER

The XMC1400 CPU Card for Arduino can be powered from the micro USB connector or with an external power supply via the DC power jack. However, the DC power jack is not mounted.

The XMC1400 device can operate with a power supply of 1.8 V till 5.5 Vdc. On this board, 5 Vdc is used to power the XMC1400 device. However, if you want to power the XMC1400 device with 3.3 Vdc, then remove R102 and solder a 0-Ω resistor R101.

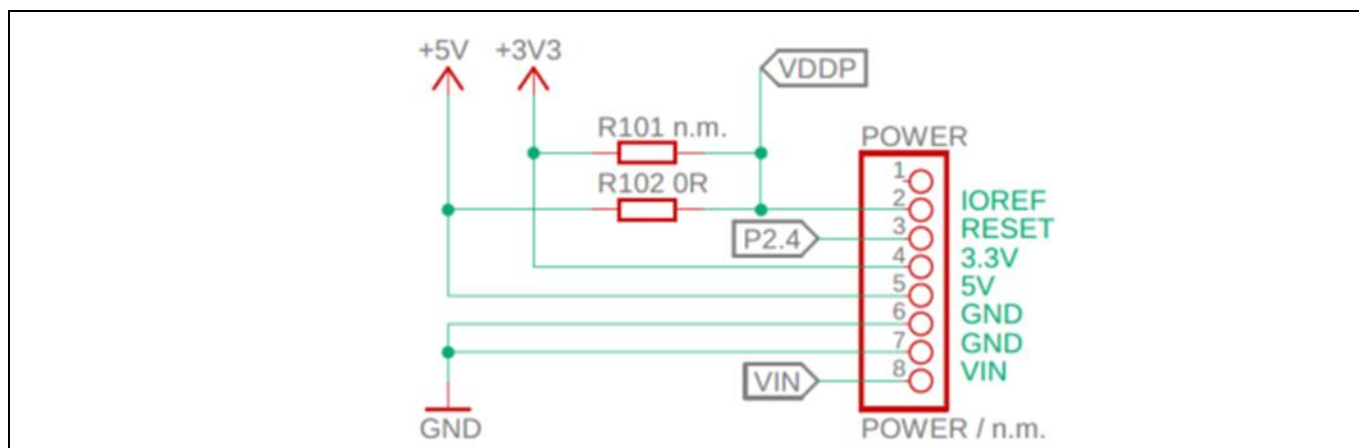


Figure 5 Power connector

Table 4 Pinout of the power connector

Pin No.	Arduino signal	XMC1400 signal	Description
1	-	-	-
2	IOREF	VDDP	VDDP connect to 5 V via R102
3	RESET	P2.4	RESET signal
4	3.3 V	+3V3	3.3 V is generated by a 3.3-V regulator IC101 from +5 V
5	5 V	+5 V	+5 V is generated by the 5-V regulator IC102 from VIN input. If VIN is not powered, +5 V is supplied by the micro-USB connector.
6	GND	GND	Ground
7	GND	GND	Ground
8	VIN	VIN	DC jack (not mounted), 7-12 V

2.1.4 In-circuit serial programming (ICSP) header

The SPI connector (not mounted) is used to program the XMC1400 microcontroller via the SPI interface.

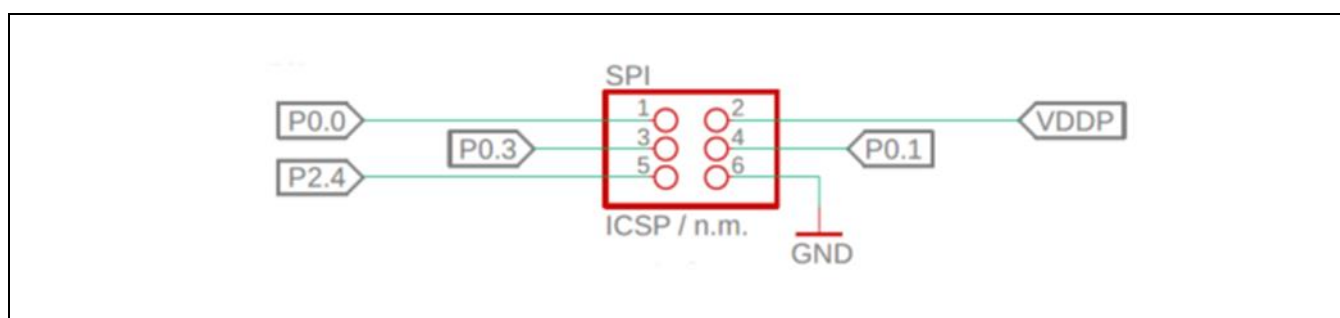


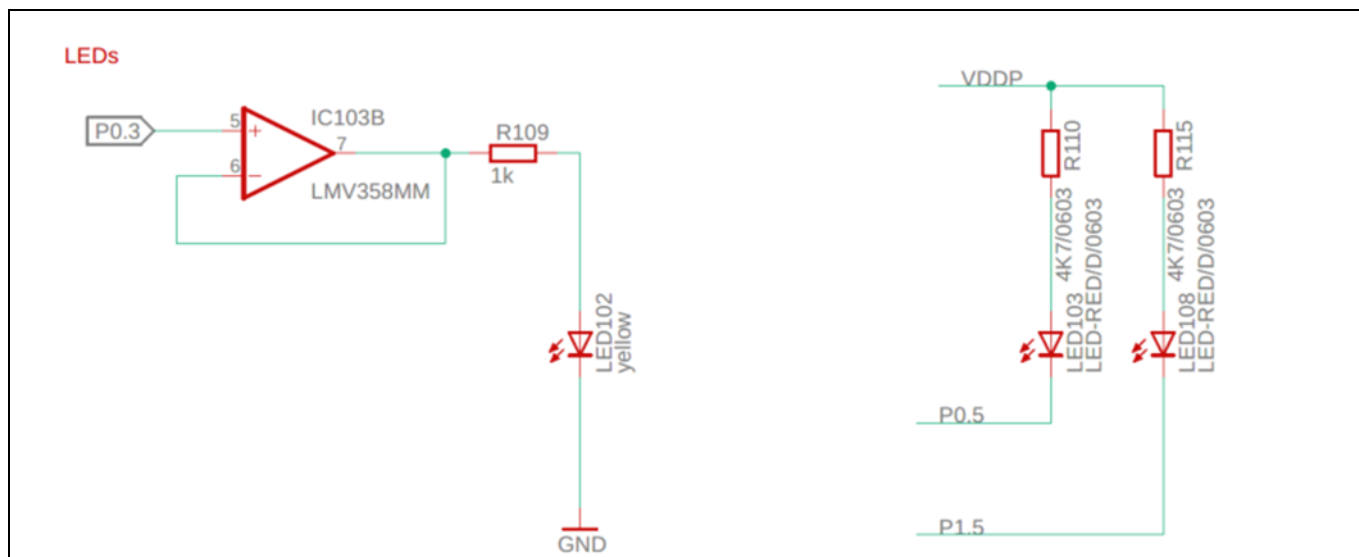
Figure 6 ICSP connector

Table 5 Signals of ICSP connector

Pin No.	Arduino signal	XMC1400 signal	Description
1	MISO	P0.0	Data transmit
2	+5 V	VDDP	5V DC
3	SCK	P0.3	Clock input
4	MOSI	P0.1	Data received
5	CS	P2.4	Chip select
6	GND	GND	ground

2.2 LEDs

The Arduino pinout signal '13-SCK' is connected to the yellow LED102 via a buffer. LED102 is labelled as DEBUG on the board and co-exists with SPI-CLK on P0.3. Furthermore, two surface-mount LEDs are available for user signaling. [Table 6](#) shows the LED's driving signals.

**Figure 7** LEDs circuit**Table 6** LEDs signal description

LED designation	Signal name	Description
LED102	P0.3	Output 'High' to switch on LED
LED103	P0.5	Output 'Low' to switch on LED
LED108	P1.5	Output 'Low' to switch on LED

2.3 Other connectors

The XMC1400 microcontroller has more pins than is required for the Arduino board's pinouts. These extra pins are grouped into connector AD_AUX (not mounted) and AUX (not mounted).

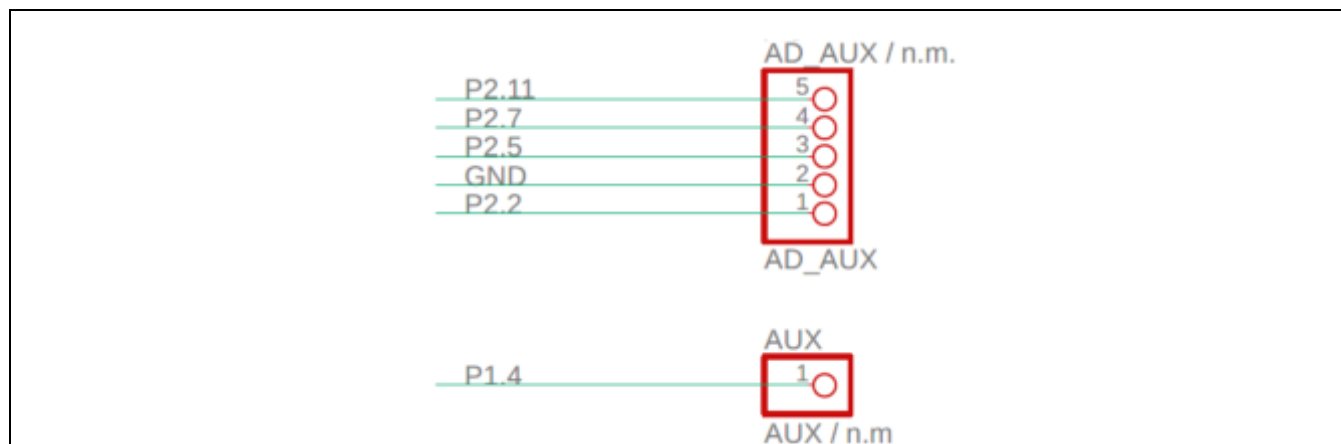


Figure 8 AD_AUX and AUX connector

Table 7 Signals of connector AD_AUX

Pin No.	Signal name	Description
1	P2.2	ADC input
2	GND	Ground
3	P2.5	ADC input
4	P2.7	ADC input
5	P2.11	ADC input

Table 8 Signals of connector AUX

Pin No.	Signal name	Description
1	P1.4	Interrupt /GPIO

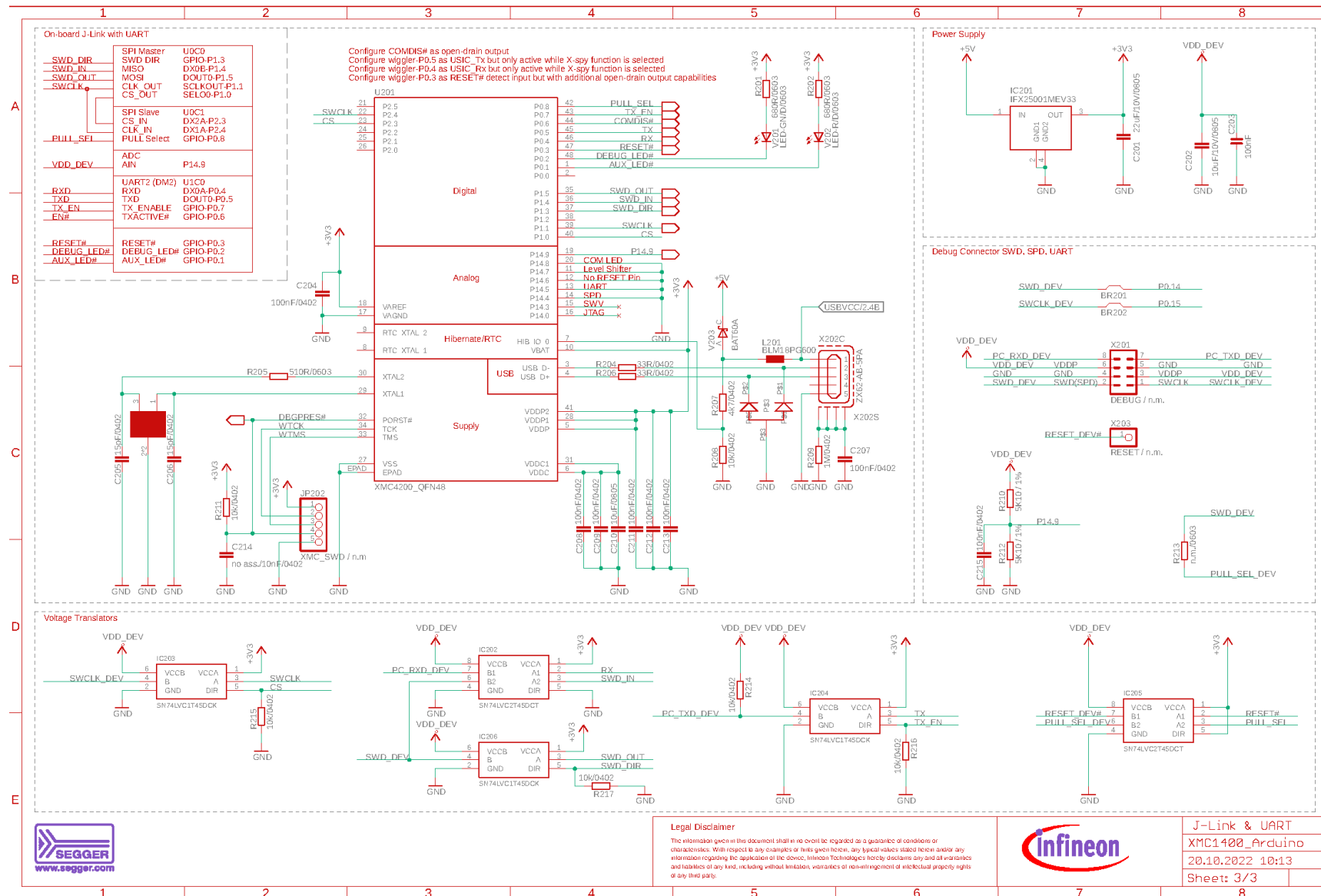
3 Production data

3.1 Schematics

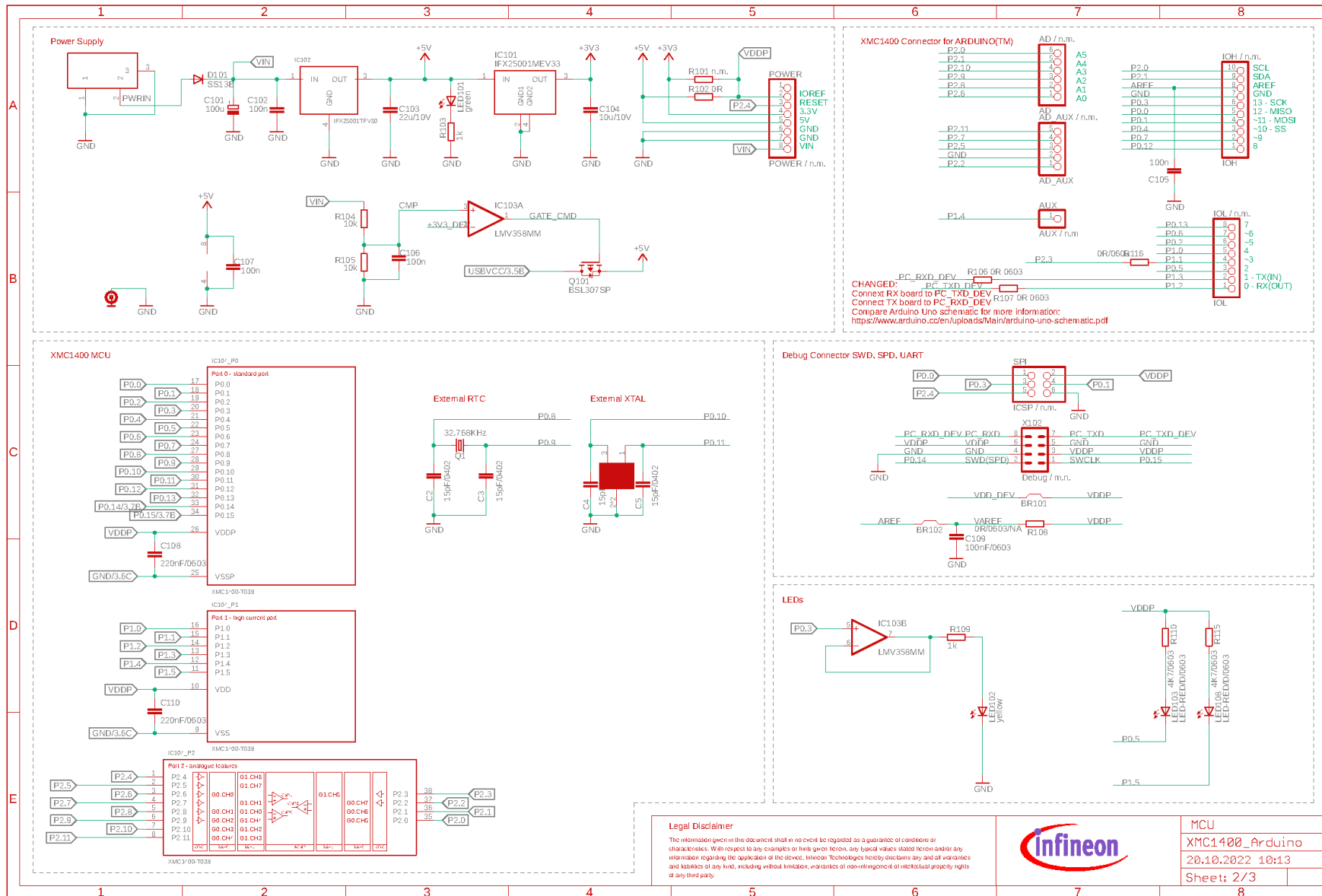
This section contains the schematics for the XMC1400 CPU Card for Arduino:

- Schematic 1: On-board debugger, power
- Schematic 2: CPU, Arduino pin header, LEDs, power supply

Production data



Production data



3.2 Layout and geometry

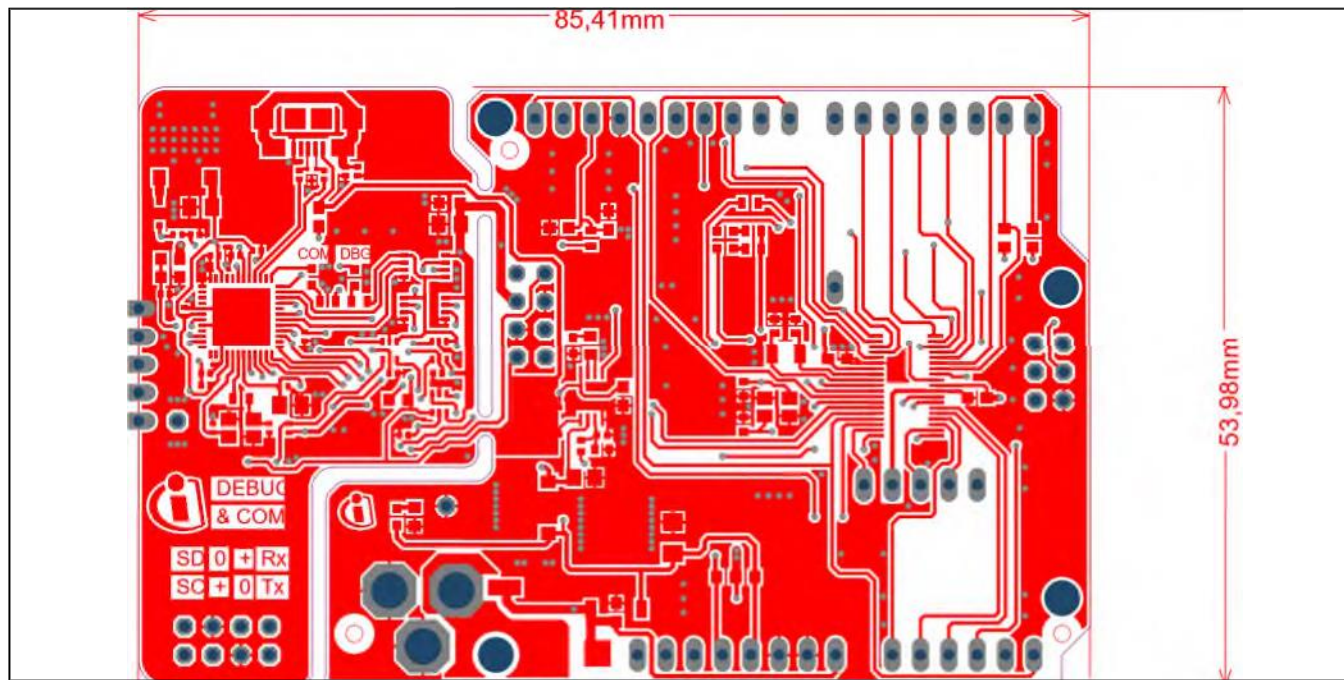


Figure 9 XMC1400 CPU Card for Arduino layout and geometry

3.3 Bill of materials

Table 9 XMC1400 CPU Card for Arduino

No	Qty	Value	Device	Reference designator
1	1	AD / n.m.	PINHD-1X6	AD
2	3	FIDUCIAL	FIDUCIAL	ADJ_301, ADJ_302, ADJ_303
3	1	AD_AUX / n.m.*	PINHD-1X5	AD_AUX
4	1	AUX / n.m.*	PINHD-1X1LONG	AUX
5	4	BRIDGE10X10	BRIDGE10X10	BR101, BR102, BR201, BR202
6	4	15pF/0402	RCL_C-EUC0402	C2, C3, C4, C5
7	1	100u	CPOL-EUD	C101
8	3	100 n	C-EUC0603	C102, C105, C107
9	1	22 u/10 V	C-EUC1206	C103
1	1	10 u/10 V	C-EUC0805	C104
1	1	100 n	C-EUC0402	C106
1	2	220 nF/0603	RCL_C-EUC0603	C108, C110
1	1	100 nF/0603	RCL_C-EUC0603	C109
1	1	22 uF/10 V/0805	C-EUC0805K	C201
1	1	10 uF/10 V/0805	C-EUC0805K	C202
1	1	100 nF	CNP-0603	C203
1	8	100 nF/0402	C-EUC0402	C204, C207, C208, C209, C211, C212, C213,
1	2	15 pF/0402	C-EUC0402	C205, C206

Production data

No.	Qty	Value	Device	Reference designator
19	1	10 uF/0805	C-EUC0805K	C210
20	1	no ass./10nF/0402	C-EUC0402	C214
21	1	SS13B	DIODE-SMB	D101
22	2	IFX25001MEV33	IFX25001MEV33	IC101, IC201
23	1	IFX25001TFV50	IFX25001TFV50	IC102
24	1	LMV358MM	LMV358MM	IC103
25	1	XMC1400-T038	XMC1400-T038	IC104
26	2	SN74LVC2T45DCT	SN74LVC2T45DCT	IC202, IC205
27	3	SN74LVC1T45DCK	SN74LVC1T45DCK	IC203, IC204, IC206
28	1	IOH / n.m.*	PINHD-1X10	IOH
29	1	IOL / n.m.*	PINHD-1X8	IOL
30	1	XMC_SWD / n.m.*	PINHD-1X5	JP202
31	1	BLM18PG600	L_EU_L0603	L201
32	1	green	LEDCHIPLED_0603	LED101
33	1	yellow	LEDCHIPLED_0603	LED102
34	2	LED-RED/D/0603	LED_LEDCHIP-LED0603	LED103, LED108
35	1	INFINEONS5	INFINEONS5	LOGO301
36	1	GND-PAD	GND-PAD	P101
37	1	INFINEONI3	INFINEONI3	PAGE101
38	1	INFINEONI5	INFINEONI5	PAGE201
39	1	POWER / n.m.*	PINHD-1X8	POWER
40	1	32.768KHz	MARS_FC135-32.768KHZ	Q1
41	1	BSL307SP	BSL307SP	Q101
42	1	CRYTAL_32X25_4PAD	CRYTAL_32X25_4PAD	Q102
43	1	CRYTAL_32X25_4PAD	CRYTAL_32X25_4PAD	Q201
44	1	n.m.	R-EU_R0603	R101
45	3	0R	R-EU_R0603	R102, R106, R107
46	2	1k	R-EU_R0603	R103, R109
47	2	10k	R-EU_R0402	R104, R105
48	1	0R/0603/NA	DSR_R-EU_R0603	R108
49	2	4K7/0603	DSR_R-EU_R0603	R110, R115
50	1	0R/0603	DSR_R-EU_R0603	R116
51	2	680R/0603	R-EU_R0603	R201, R202
52	2	33R/0402	R-EU_R0402	R204, R206
53	1	510R/0603	R-EU_R0603	R205
54	1	4k7/0402	R-EU_R0402	R207
55	6	10k/0402	R-EU_R0402	R208, R211, R214, R215, R216, R217
56	1	1M/0402	R-EU_R06030402	R209
57	2	5K10 / 1%	R-EU_R0603	R210, R212
58	1	n.m./0603	R-EU_R0603	R213
59	1	SEGGER.L_STOP	SEGGER.L_STOP	SEGGER201
60	1	ICSP / n.m.*	PINHD-2X3	SPI
61	1	XMC4200_QFN48	XMC4200_QFN48	U201
62	1	LED-GN/D/0603	LEDCHIPLED_0603	V201

[No.]	Qty	Value	Device	Reference Designator
62	1	LED-R/D/0603	LEDCHIPLED_0603	V202
63	1	BAT60A	BAT60	V203
64	1	ESD_2CH_TSFP-3-1	ESD_2CH_TSFP-3-1	V204
65	1	DC21MMX / n.m.*	DC21MMX	X101
66	1	Debug / n.m.*	MA04-2	X102
67	1	DEBUG / n.m.*	MA04-2	X201
68	1	ZX62-AB-5PA	ZX62-AB-5PA_MICRO-	X202
69	1	RESET / n.m.*	PINHD-1X1	X203

* n.m. (Not mounted)

Revision history

Major changes since the last revision

Document revision	Date	Description of changes
**	2023-09-12	New kit guide.

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