

Hexagon Application Kit

For XMC4000 Family

CPU_42A-V1

CPU Board XMC4200 Actuator

Board User's Manual

Revision 1.0, 2013-02-19

Microcontroller

Edition 2013-02-19

**Published by
Infineon Technologies AG
81726 Munich, Germany
© 2013 Infineon Technologies AG
All Rights Reserved.**

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

Revision History

Page or Item	Subjects (major changes since previous revision)
Revision 1.0, 2013-02-19	Initial release

Trademarks of Infineon Technologies AG

AURIX™, C166™, CanPAK™, CIPOS™, CIPURSE™, EconoPACK™, CoolMOS™, CoolSET™, CORECONTROL™, CROSSAVE™, DAVE™, EasyPIM™, EconoBRIDGE™, EconoDUAL™, EconoPIM™, EiceDRIVER™, eupec™, FCOS™, HITFET™, HybridPACK™, I²RF™, ISOFACE™, IsoPACK™, MIPAQ™, ModSTACK™, my-d™, NovalithIC™, OptiMOS™, ORIGA™, PRIMARION™, PrimePACK™, PrimeSTACK™, PRO-SIL™, PROFET™, RASIC™, ReverSave™, SatRIC™, SIEGET™, SINDRION™, SIPMOS™, SmartLEWIS™, SOLID FLASH™, TEMPFET™, thinQ!™, TRENCHSTOP™, TriCore™.

Other Trademarks

Advance Design System™ (ADS) of Agilent Technologies, AMBA™, ARM™, MULTI-ICE™, KEIL™, PRIMECELL™, REALVIEW™, THUMB™, µVision™ of ARM Limited, UK. AUTOSAR™ is licensed by AUTOSAR development partnership. Bluetooth™ of Bluetooth SIG Inc. CAT-iq™ of DECT Forum. COLOSSUS™, FirstGPS™ of Trimble Navigation Ltd. EMV™ of EMVCo, LLC (Visa Holdings Inc.). EPCOS™ of Epcos AG. FLEXGO™ of Microsoft Corporation. FlexRay™ is licensed by FlexRay Consortium. HYPERTERMINAL™ of Hilgraeve Incorporated. IEC™ of Commission Electrotechnique Internationale. IrDA™ of Infrared Data Association Corporation. ISO™ of INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. MATLAB™ of MathWorks, Inc. MAXIM™ of Maxim Integrated Products, Inc. MICROTEC™, NUCLEUS™ of Mentor Graphics Corporation. Mifare™ of NXP. MIPI™ of MIPI Alliance, Inc. MIPS™ of MIPS Technologies, Inc., USA. muRata™ of MURATA MANUFACTURING CO., MICROWAVE OFFICE™ (MWO) of Applied Wave Research Inc., OmniVision™ of OmniVision Technologies, Inc. Openwave™ Openwave Systems Inc. RED HAT™ Red Hat, Inc. RFMD™ RF Micro Devices, Inc. SIRIUS™ of Sirius Satellite Radio Inc. SOLARIS™ of Sun Microsystems, Inc. SPANSION™ of Spansion LLC Ltd. Symbian™ of Symbian Software Limited. TAIYO YUDEN™ of Taiyo Yuden Co. TEAKLITE™ of CEVA, Inc. TEKTRONIX™ of Tektronix Inc. TOKO™ of TOKO KABUSHIKI KAISHA TA. UNIX™ of X/Open Company Limited. VERILOG™, PALLADIUM™ of Cadence Design Systems, Inc. VLYNQ™ of Texas Instruments Incorporated. VXWORKS™, WIND RIVER™ of WIND RIVER SYSTEMS, INC. ZETEX™ of Diodes Zetex Limited.

Last Trademarks Update 2011-02-24

Table of Contents

Introduction	7
1 Overview	7
1.1 Key Features	7
1.2 Block Diagram	8
2 Hardware Description	9
2.1 Power Supply	9
2.2 Encoder Jumper	11
2.3 CAN	12
2.4 Reset	13
2.5 Clock Generation.....	14
2.6 Boot Option	14
2.7 Debug Interface.....	15
2.7.1 On-board Debugger	16
2.7.2 Cortex Debug Connector (10-pin)	17
2.7.3 Cortex Debug+ ETM Connector (20-pin)	18
2.8 USB	20
2.9 RTC	21
2.10 User LEDs and User Button.....	22
2.11 Potentiometer	22
2.12 Satellite Connector	23
2.12.1 ACT Satellite Connector.....	24
3 Production Data.....	24
3.1 Schematics.....	24
3.2 Component Placement.....	29
3.3 Bill of Material (BOM)	30

List of Figures

Figure 1	Block Diagram of the CPU Board CPU_42A-V1	8
Figure 2	CPU Board XMC4200 Actuator(CPU_42A-V1)	9
Figure 3	Powering Options	10
Figure 4	Block Diagram Of Power Supply	10
Figure 5	Encoder Jumper	11
Figure 6	CAN Interface	12
Figure 7	Reset	13
Figure 8	Reset LED and Reset Button	13
Figure 9	Clock Generation	14
Figure 10	Boot Options Switch	14
Figure 11	Installation of Serial Port Driver	16
Figure 12	On-board Debugger	16
Figure 13	Cortex Debug Connector (10-pin)	17
Figure 14	Cortex Debug Connector (10-pin) Layout	17
Figure 15	Cortex Debug+ETM Connector (20-pin)	18
Figure 16	Cortex Debug+ ETM Connector (20-pin) Layout	19
Figure 17	USB Connector	20
Figure 18	Battery Holder for Coin Cells	21
Figure 19	XMC4200 Power Domains and Real Time Clock	21
Figure 20	User LED and User Button	22
Figure 21	Satellite Connector	23
Figure 22	Satellite Connector Type ACT	24
Figure 23	Satellite Connector, USB, CAN	25
Figure 24	XMC4200	26
Figure 25	Power and Debug	27
Figure 26	On-board Debugger	28
Figure 27	Component Placement	29

List of Tables

Table 1	Power status LED's	10
Table 2	Power Measurement	11
Table 3	CAN Connector Pinout (X200)	12
Table 4	Boot Options Settings	14
Table 5	Cortex Debug Connector (10 Pin).....	17
Table 6	Cortex Debug+ ETM Connector (20 Pin)	18
Table 7	USB micro AB connector Pinout	20
Table 8	User LEDs	22
Table 9	User Buttons.....	22
Table 10	Potentiometer	22
Table 11	BOM of CPU_42A-V1-4 Board.....	30

Introduction

This document describes the features and hardware details of the CPU Board XMC4200 Actuator (CPU_42A-V1) designed to work with Infineon's XMC4200 Microcontroller. This board is part of Infineon's Hexagon Application Kits.

1 Overview

The CPU board CPU_42A-V1 houses the XMC4200 Microcontroller and the ACT satellite connector for application expansion. The board along with satellite cards (e.g. AUT_ISO-V1, MOT_GPDLV-V2 boards) demonstrates the capabilities of XMC4200. The main use case for this board is to demonstrate motor control and power conversion features of the XMC4200 device including tool chain. The focus is safe operation under evaluation conditions. The board is neither cost nor size optimized and does not serve as a reference design.

1.1 Key Features

The CPU_42A-V1 board is equipped with the following features

- XMC4200 (ARM® Cortex™-M4-based) Microcontroller, 256 kByte on-chip Flash, QFN-48
- Connection to satellite cards via the ACT satellite connector
- USB Device support via micro USB connector
- CAN Transceiver with CAN Connector (SUB-D, DE-9 male)
- Debug options
 - On-board Debugger via the Debug USB connector
 - Cortex Debug connector 10-pin (0.05")
 - Cortex Debug+ETM connector 20-pin (0.05")
- Reset push button
- Boot from Embedded Flash or CAN
- PowerScale Connector: Ready for power consumption analysis
- 6 LED's
 - 3 Power indicating LEDs
 - 1 User LED (P2.1)
 - 1 RESET LED
 - 1 Debug LED
- User button connected to P14.7
- Potentiometer, connected to analog input P14.4
- Power supply
 - Via Micro-USB connector
 - Via satellite connector pins (ACT satellite cards can supply power to CPU board)
 - Via Debug USB connector (Micro USB)
 - RTC backup battery

1.2 Block Diagram

Figure 1 shows the functional block diagram of the CPU_42A-V1 board. For more information about the power supply please refer to chapter 2.1.

The CPU board has got the following building blocks:

- Satellite Connector (ACT)
- CAN transceiver and CAN Connector
- Variable resistor (POTI) connected to GPIO P14.4
- USB Connector (Micro-USB)
- On-board Debugger via Debug USB connector (Micro-USB)
- 2 Cortex Debug Connectors
- User LED connected to GPIO P2.1
- User Button connected to P14.7

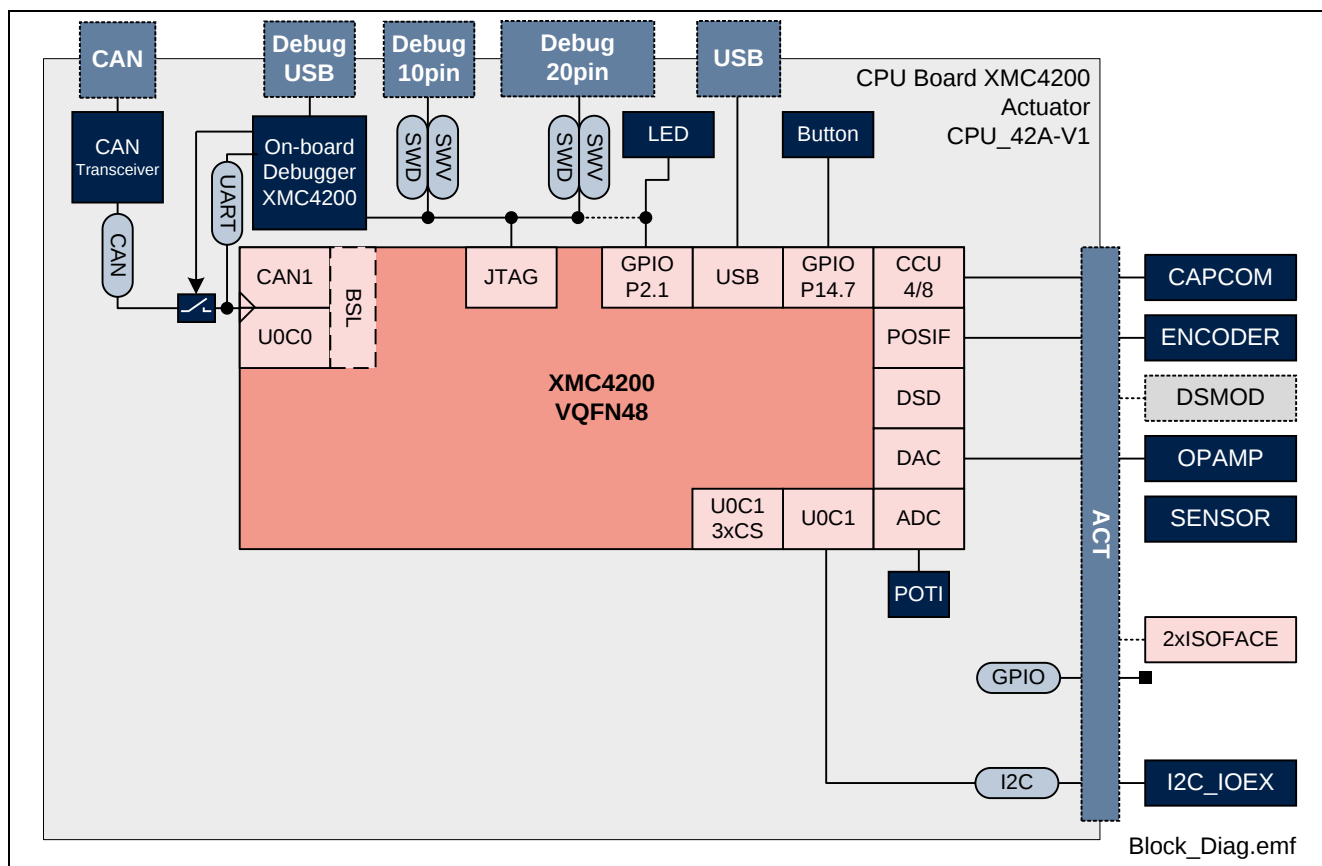


Figure 1 Block Diagram of the CPU Board CPU_42A-V1

2 Hardware Description

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

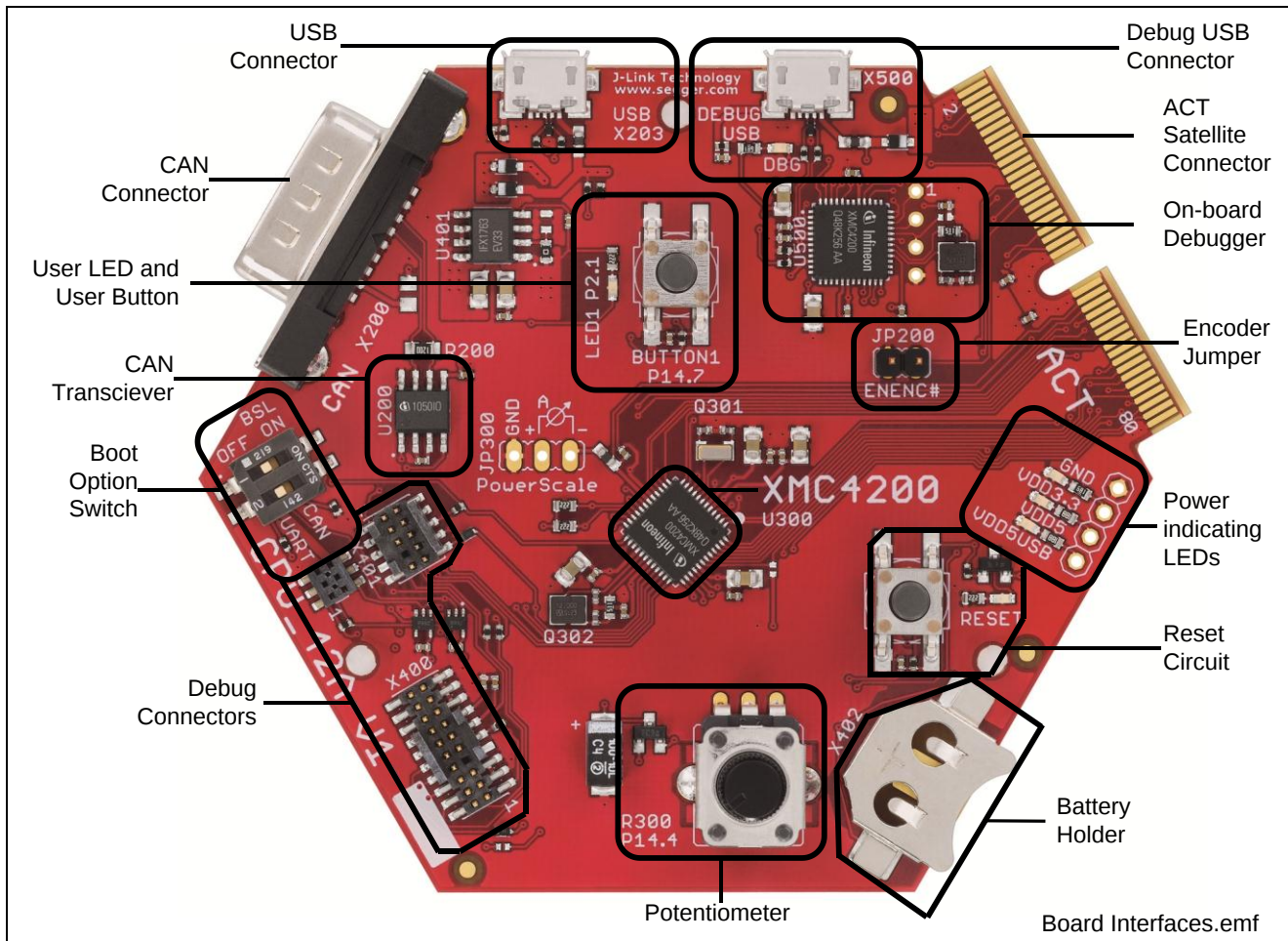


Figure 2 CPU Board XMC4200 Actuator(CPU_42A-V1)

2.1 Power Supply

The CPU_42A-V1 board can be powered via either of the USB plugs (5 V); however, there is a current limit that can be drawn from the host PC through USB. If the CPU_42A-V1 board is used to drive other satellite cards e.g. MOT_GPDV-V2 and the total system current required exceeds 500 mA, then the CPU_42A-V1 board needs to be powered by the satellite cards. These satellite cards support external power supply.

The typical current drawn by the CPU board without any satellite cards connected is about 170 mA (@5 V).

For powering the board through an USB interface, connect the USB cable provided with the kit to either of the Micro-USB connector on board as shown in Figure 3.

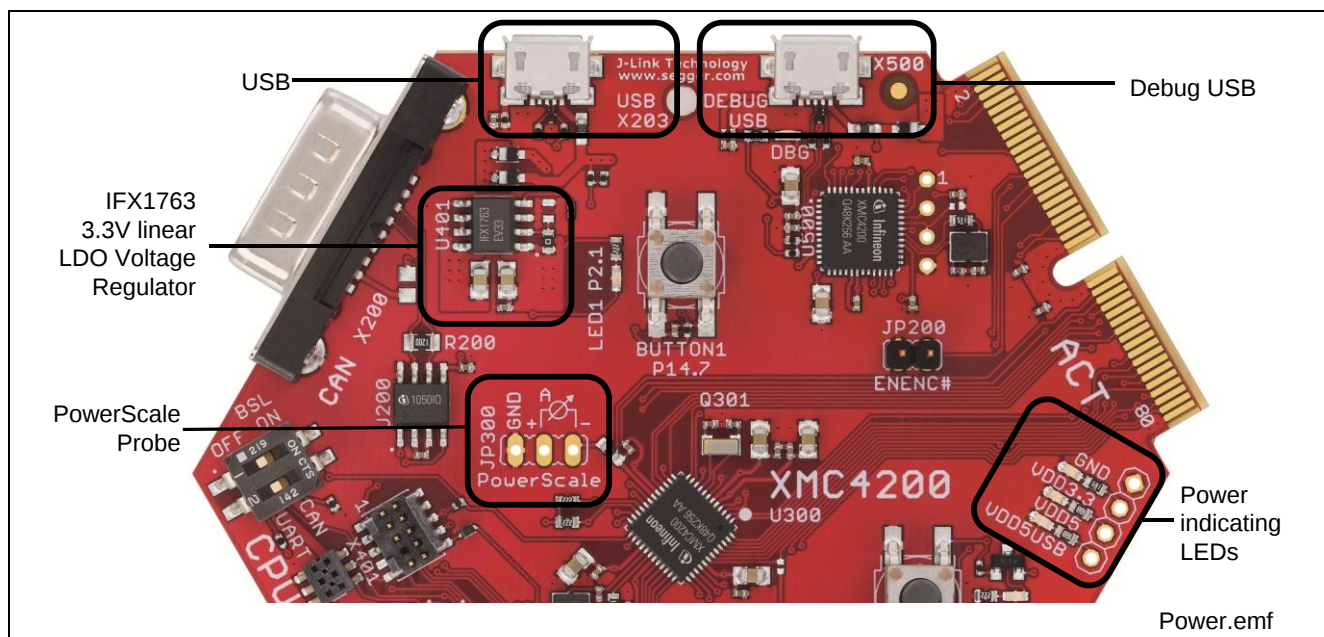


Figure 3 Powering Options

To indicate the power status of the CPU_42A-V1 board three power indication LED's are provided on board (see Figure 3). The LED will be "ON" when the corresponding power rail is powered.

Table 1 Power status LED's

LED Reference	Power Rail	Voltage	Note
V401	VDD5	5 V	Must always be "ON"
V402	VDD5USB	5 V	"ON" if powered by USB connector X203 "OFF" in all other supply cases
V403	VDD3.3	3.3 V	Must always be "ON"

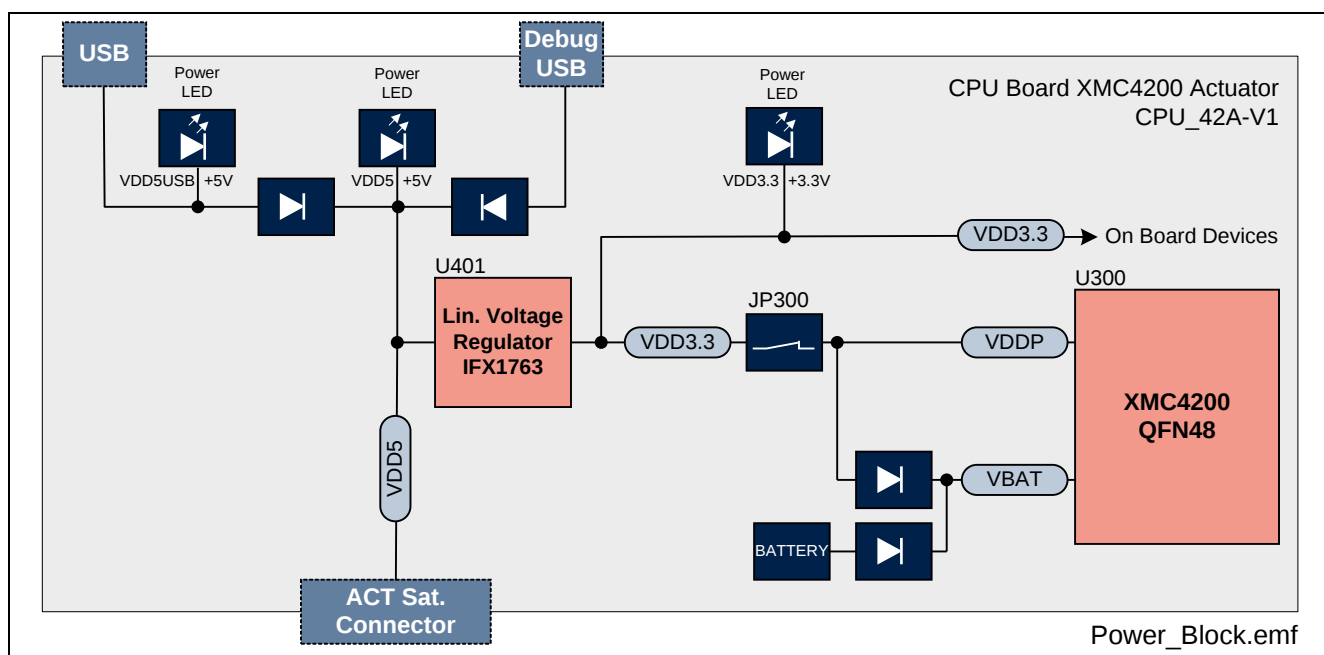


Figure 4 Block Diagram Of Power Supply

Hitex PowerScale probe is provided on the CPU_42A-V1 board to measure the power consumption of the XMC4200.

Table 2 Power Measurement

Jumper	Function	Description
JP300	PowerScale	A Hitex PowerScale probe can be connected for current sensing the VDD3.3 (CPU power source). Default: pos. 1-2 (closed) <i>Note: On the PCB there is a shorting trace between pin 1-2. This trace has to be cut first, before using PowerScale. Pin 3 is GND.</i>

2.2 Encoder Jumper

The jumper JP200 "ENENC#" on the CPU_42A-V1 board is used to enabled/disable an external unit connected to the ACT satellite connector, e.g. an encoder line receiver on the Motor Drive Card MOT_GPLV-V2.

The signal on the encoder jumper is not connected to the XMC4200. It's connected to pin 30 of the ACT satellite connector only. If the jumper JP200 is shorted, a ground level is driven at pin 30 of the ACT satellite connector. If the jumper is open the line is floating. In this case a pull-up resistor on the ACT satellite card must ensure a high level.

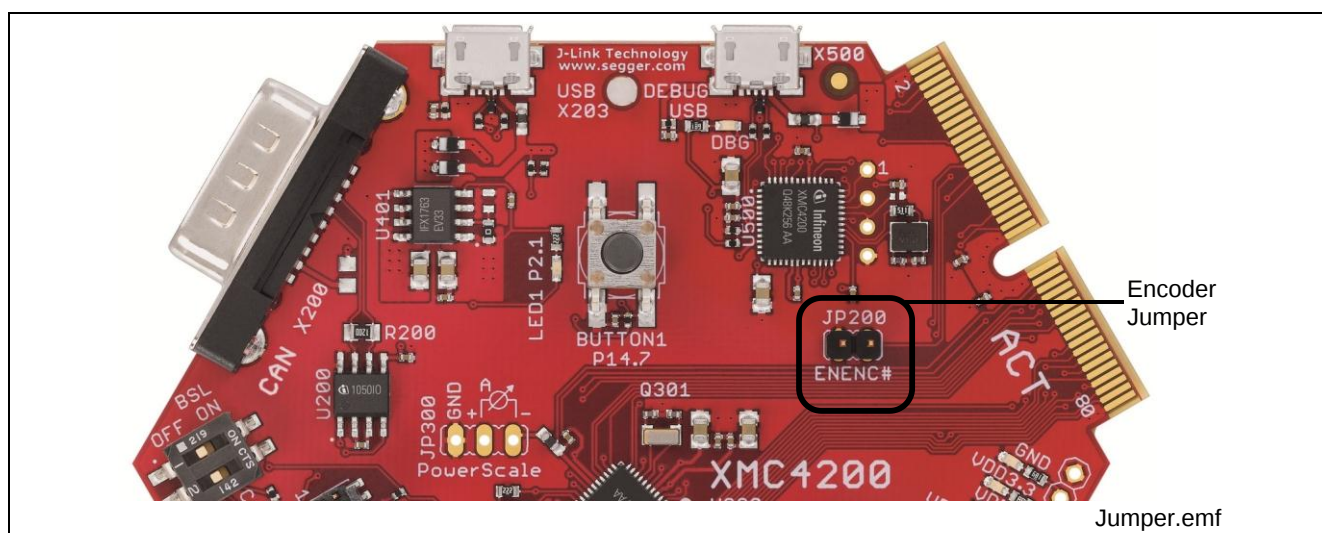


Figure 5 Encoder Jumper

2.3 CAN

The CPU_42A-V1 board provides a CAN interface via a Sub-D DE-9 connector (X200). Infineon's high speed CAN transceiver IFX1050GVIO for industrial application supports 3.3V I/O logic and is suitable for 12V and 24V bus systems with an excellent EMC performance. The CAN bus is terminated on-board with 120 Ohm.

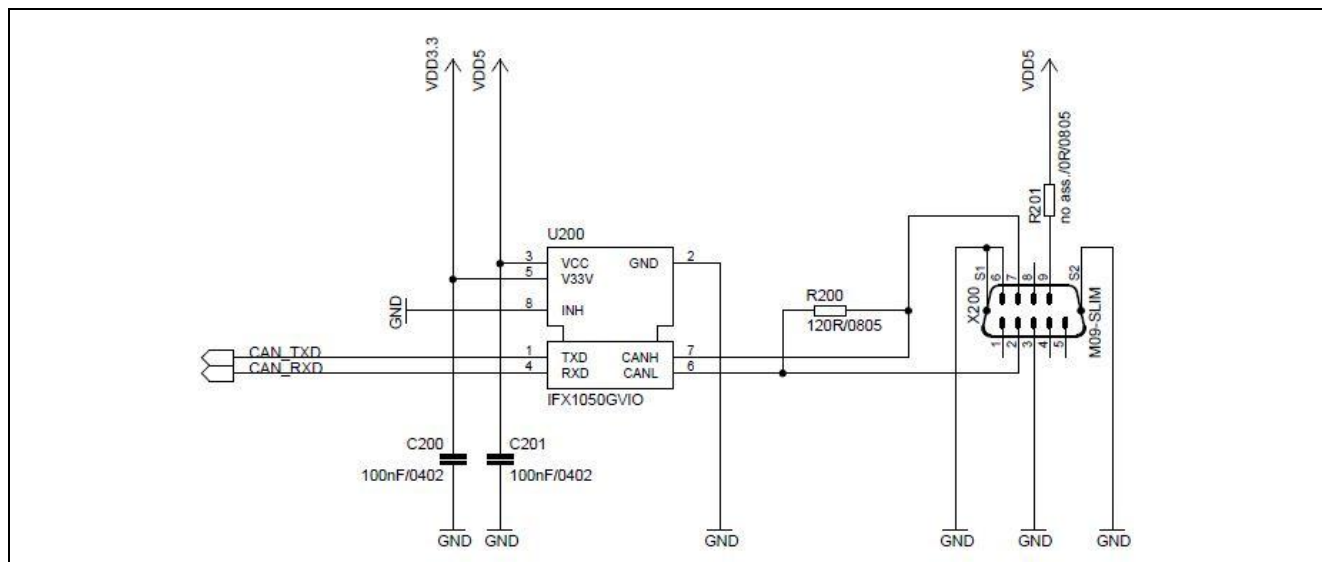


Figure 6 CAN Interface

Table 3 shows the signals available at the CAN connector X200.

Table 3 CAN Connector Pinout (X200)

Pin No.	Signal Name	Description
1	NC	No Connection
2	CANL	CAN Low
3	GND	Ground
4	NC	No Connection
5	NC	No Connection
6	GND	Ground
7	CANH	CAN High
8	NC	No Connection
9	VDD	5 Volt (not connected, use R201 to apply power to the connector)

The CAN signals CAN_TXD and CAN_RXD are routed to XMC4200 port pins P1.5 and P1.4 respectively via the switches U301 and U303. These switches will disconnect the CAN transceiver from the port pins P1.5 and P1.4 in case a UART function is required. On these pins of the XMC4200 the UART function is overlaid with the CAN function. The UART function can be used for external communication via a USB virtual COM port, which is supported by the on-board debugger.

2.4 Reset

A reset signal connected to the low-active PORST# pin of XMC4200 (U300) can be issued by

- an on-board Reset Button (SW400, RESET)
- an on-board debugger (U500)
- an external debugger connected to either of the Cortex Debug connector X400 or X401

The RESET signal is routed to all satellite connectors. The reset circuit includes a red LED (V407) to indicate the reset status: The Reset LED (V407) will be "ON" during active reset state and will be "OFF" if reset is not active.

Be aware that PORST# is a bidirectional reset pin of the XMC4000 family which can also be pulled low by the XMC4000 device itself.

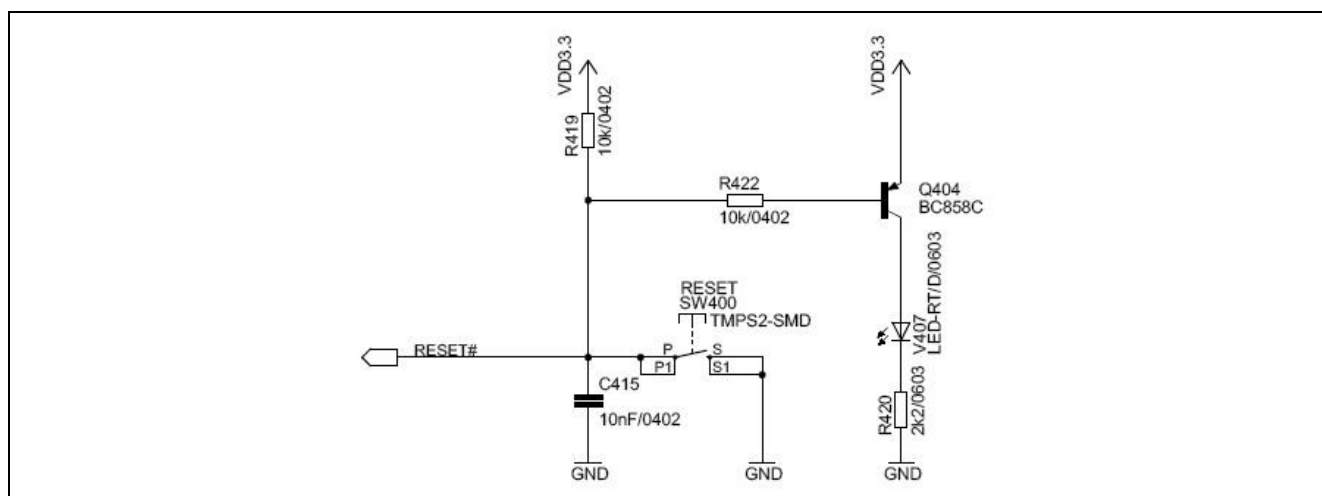


Figure 7 Reset

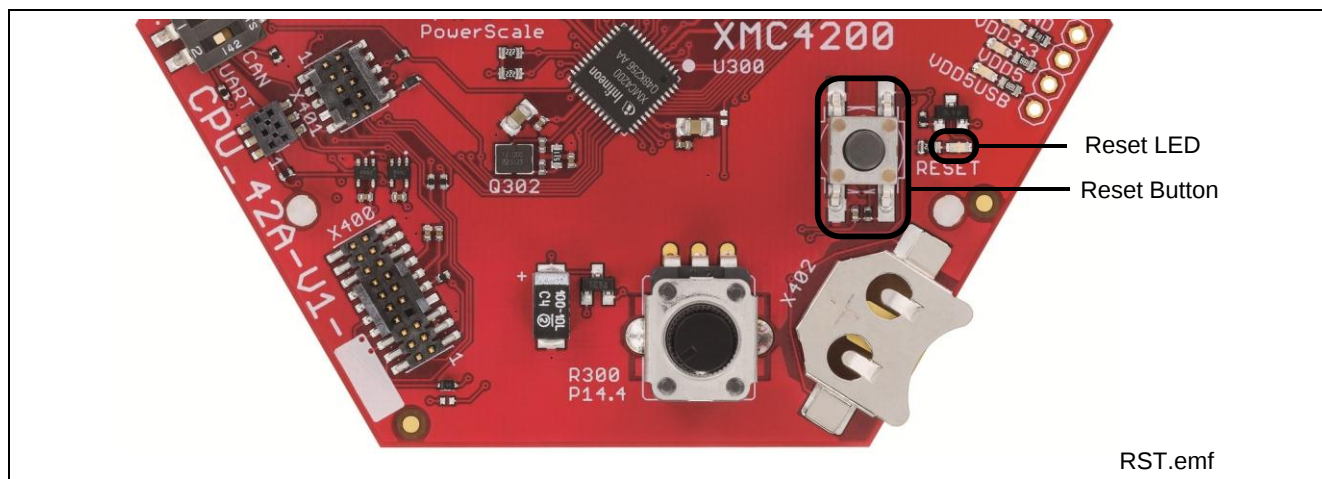


Figure 8 Reset LED and Reset Button

2.5 Clock Generation

An external 12 MHz crystal provides the clock signal to the XMC4200 microcontroller. The drive strength of the oscillator is set to maximum by software, in order to ensure a safe start-up of the oscillator even under worst case conditions. A serial 510 Ohm resistor will attenuate the oscillations during operations.

For the RTC clock a separate external 32.768 kHz crystal is used on board.

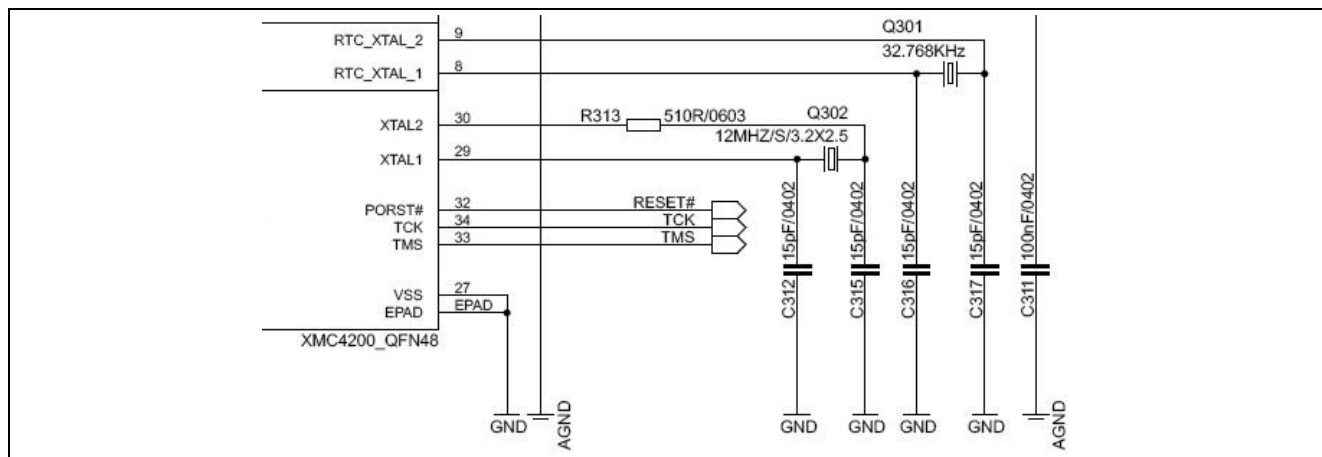


Figure 9 Clock Generation

2.6 Boot Option

During power-on-reset the XMC4200 latches the dip switch SW300 settings via the TCK and the TMS pin. Based on the values latched different boot options are possible.

Table 4 Boot Options Settings

BSL (TMS)	CAN/UART (TCK)	Boot Option
OFF (1)	UART (0)	Normal Mode (Boot from flash)
ON (0)	UART (0)	ASC BSL Enabled (Boot from UART)
OFF (1)	CAN (1)	BMI Customized Boot Enabled
ON (0)	CAN (1)	CAN BSL Enabled (Boot from CAN)

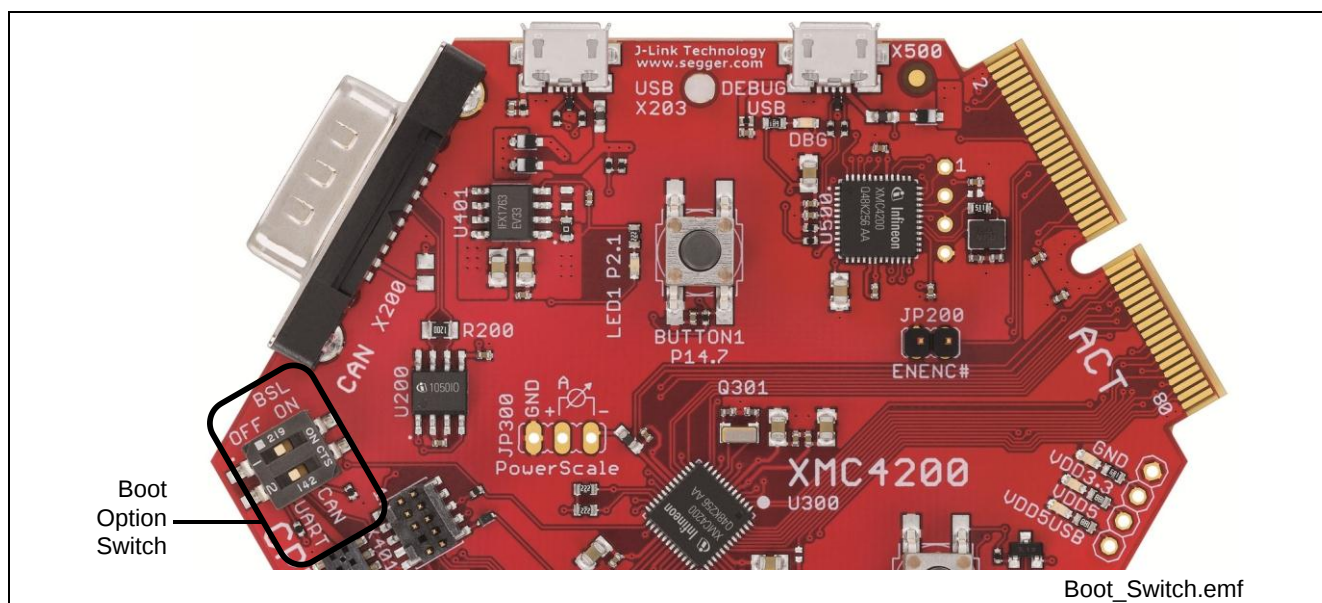


Figure 10 Boot Options Switch

2.7 Debug Interface

The CPU_42A-V1 board supports debugging via 3 different channels:

- On-board debugger
- Cortex Debug Connector (10-pin)
- Cortex Debug+ETM Connector (20-pin)

The Hexagon Application Boards are designed to use “Serial Wire Debug” as debug interface. JTAG debug is not supported by default because the GPIO P0.7, where the required TDI function is mapped to also, is used by various Actuator boards connected to the ACT satellite connector.

Note: It is strongly recommended not to use JTAG debug mode, especially if satellites boards are connected, which uses the GPIO P0.7. For the same reason also do not use the on-board debugger in JTAG debug mode.

If you want to use the JTAG debug mode through the cortex debug connectors (X400, X401) anyway, enable the JTAG interface of the XMC device by assembling the pull-up resistor R427 (4k7 Ohm) and the resistor R410 (0 - 33 Ohm).

2.7.1 On-board Debugger

The on-board debugger [1] supports

- Serial Wire Debug
- Serial Wire Viewer [2]
- Full Duplex UART communication via a USB Virtual COM

[1] Attention: Newer firmware versions of the on-board debugger require the latest J-Link driver (V4.62 or higher) and a Serial Port Driver (CDC driver) installed on your computer. Please check "Install J-Link Serial Port Driver" when installing the latest J-Link driver (see Figure 11)

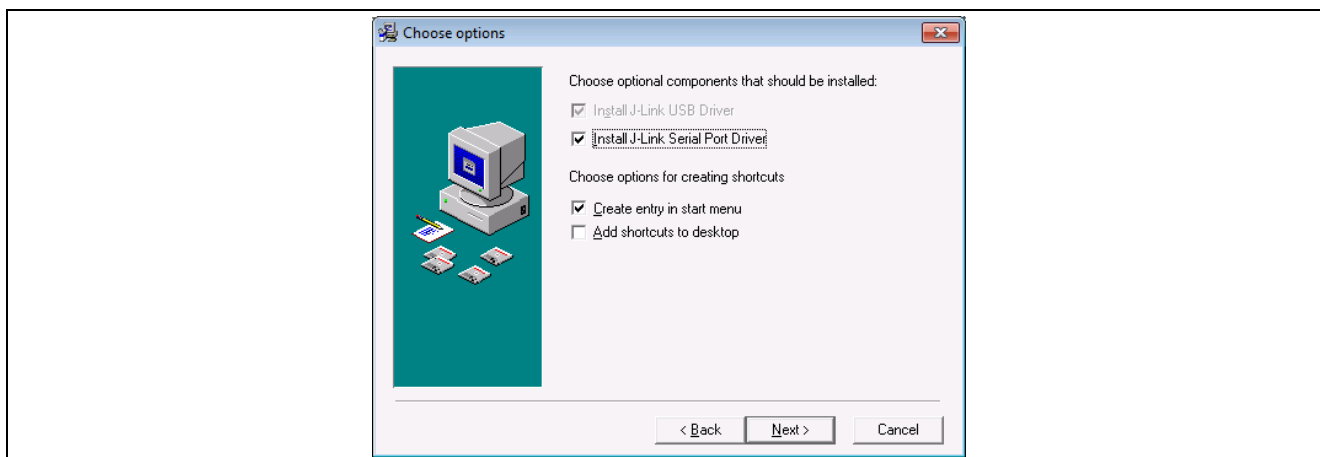


Figure 11 Installation of Serial Port Driver

[2] If Serial Wire Viewer is used, the User LED cannot freely be programmed and starts flickering, because the Serial Wire Viewer function is overlaid with the GPIO function connected to the User LED.

The on-board debugger can be accessed through the Debug USB connector shown in Figure 12. The Debug LED V502 shows the status during debugging.

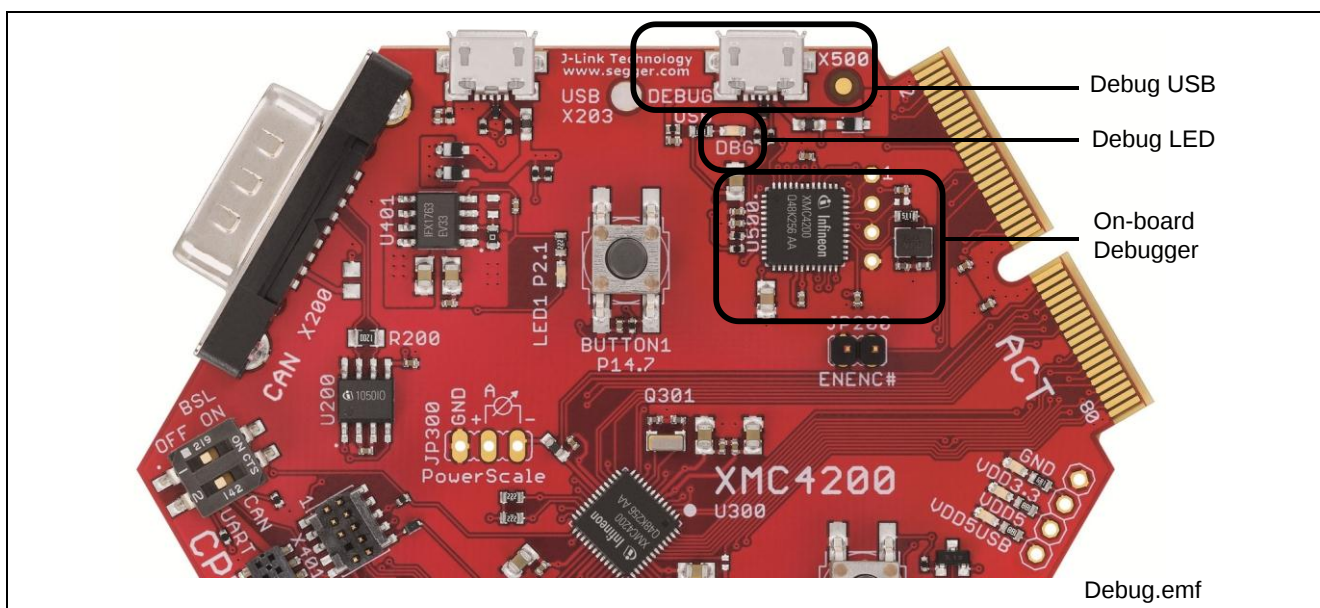


Figure 12 On-board Debugger

When using an external debugger connected to the 10pin/20pin Cortex Debug Connector, the on-board debugger is switched off.

When using the USB virtual COM port function of the on-board debugger the on-board CAN interface is disabled through the switches U301 and U303.

2.7.2 Cortex Debug Connector (10-pin)

The CPU_42A-V1 board supports Serial Wire Debug operation and Serial Wire Viewer operation (via the SWO signal when Serial Wire Debug mode is used) through the 10-pin Cortex Debug Connector.

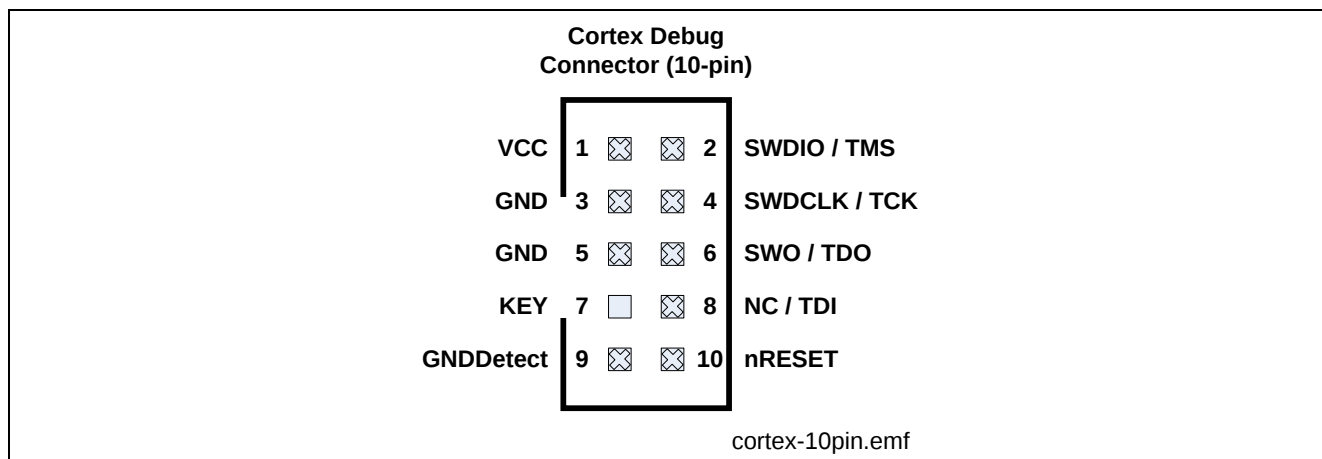


Figure 13 Cortex Debug Connector (10-pin)

Table 5 Cortex Debug Connector (10 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
1	VCC	+3.3 V	+3.3 V
2	SWDIO / TMS	Serial Wire Data I/O	Test Mode Select
3	GND	Ground	Ground
4	SWDCLK / TCK	Serial Wire Clock	Test Clock
5	GND	Ground	Ground
6	SWO / TDO	Trace Data OUT	Test Data OUT
7	KEY	KEY	KEY
8	NC / TDI	Not connected	Test Data IN
9	GNDDetect	Ground Detect	Ground Detect
10	nRESET	Reset (Active Low)	Reset (Active Low)

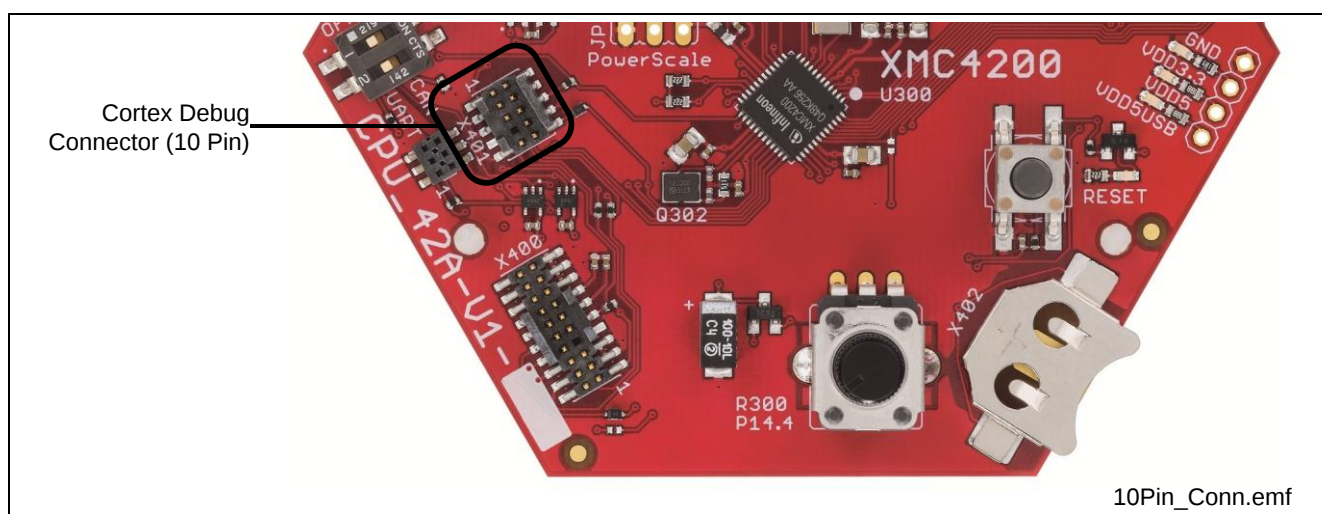


Figure 14 Cortex Debug Connector (10-pin) Layout

2.7.3 Cortex Debug+ ETM Connector (20-pin)

The CPU_42A-V1 board supports Serial Wire Debug operation, Serial Wire viewer operation (via SWO connection when Serial Wire Debug mode is used) through the 20-pin Cortex Debug+ ETM Connector. The board does not support the Instruction Trace operation.

JTAG Debug operation additionally would require the TDI (P0.7) signal. By default the TDI signal is disconnected from the Cortex Debug Connectors by a not assembled resistor R410, because the port pin P0.7 is used by the Actuator boards connected to the ACT satellite connector.

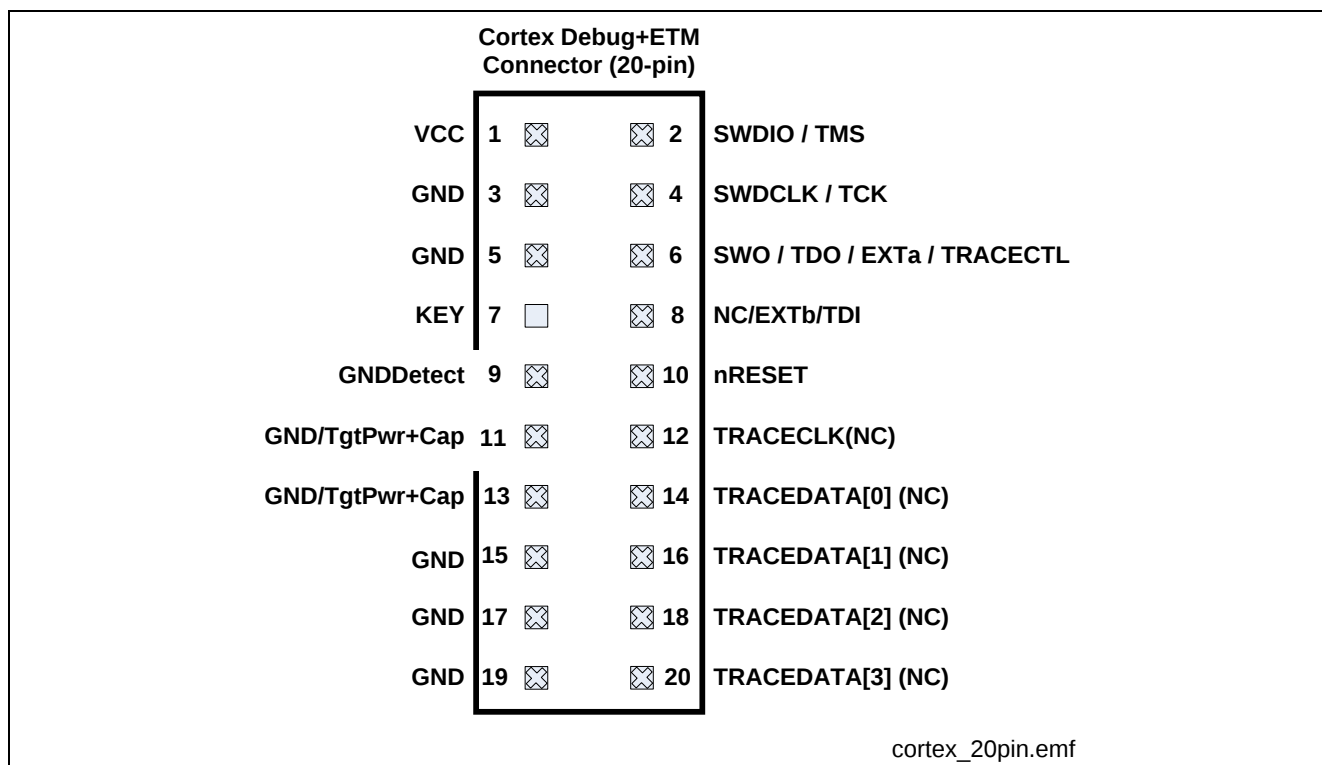


Figure 15 Cortex Debug+ETM Connector (20-pin)

Table 6 Cortex Debug+ ETM Connector (20 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
1	VCC	+3.3 V	+3.3 V
2	SWDIO / TMS	Serial Wire Data I/O	Test Mode Select
3	GND	Ground	Ground
4	SWDCLK / TCK	Serial Wire Clock	Test Clock
5	GND	Ground	Ground
6	SWO / TDO	Trace Data OUT	Test Data OUT
7	KEY	KEY	KEY
8	NC / TDI	Not connected	Test Data IN
9	GNDDetect	Ground Detect	Ground Detect
10	nRESET	Reset (Active Low)	Reset (Active Low)
11	GND/TgtPwr+Cap	Ground	Ground
12	TRACECLK	TRACECLK	TRACECLK
13	GND/TgtPwr+Cap	Ground	Ground
14	TRACEDATA[0]*	TRACEDATA[0]	TRACEDATA[0]
15	GND	Ground	Ground

Table 6 Cortex Debug+ ETM Connector (20 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
16	TRACEDATA[1]*	TRACEDATA[1]	TRACEDATA[1]
17	GND	Ground	Ground
18	TRACEDATA[2]*	TRACEDATA[2]	TRACEDATA[2]
19	GND	Ground	Ground
20	TRACEDATA[3]*	TRACEDATA[3]	TRACEDATA[3]

Note: * Not connected on board

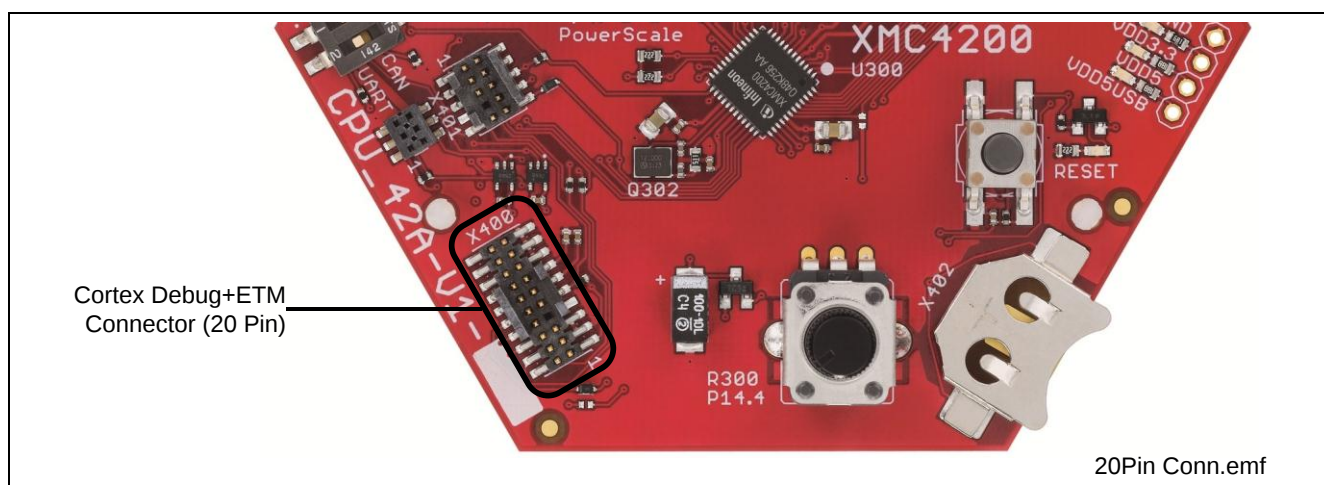


Figure 16 Cortex Debug+ ETM Connector (20-pin) Layout

2.8 USB

The XMC4200 supports USB interface in device mode. The power is expected through VBUS (pin 1) from an external host (e.g. PC). When the current consumption of the application running on the Hexagon Application system is higher than 500 mA, power from an external source through satellite cards shall be used.

Note: Some PCs, notebooks or hubs have a weak USB supply which is not sufficient for proper supply. In this case use an external 5 Volt power supply or a powered USB hub.

The VBUS function can be mapped to the HIB_IO_0 pin. A voltage divider (R205/R206) limits the voltage level at the HIB_IO_0 to maximum 3.3V.

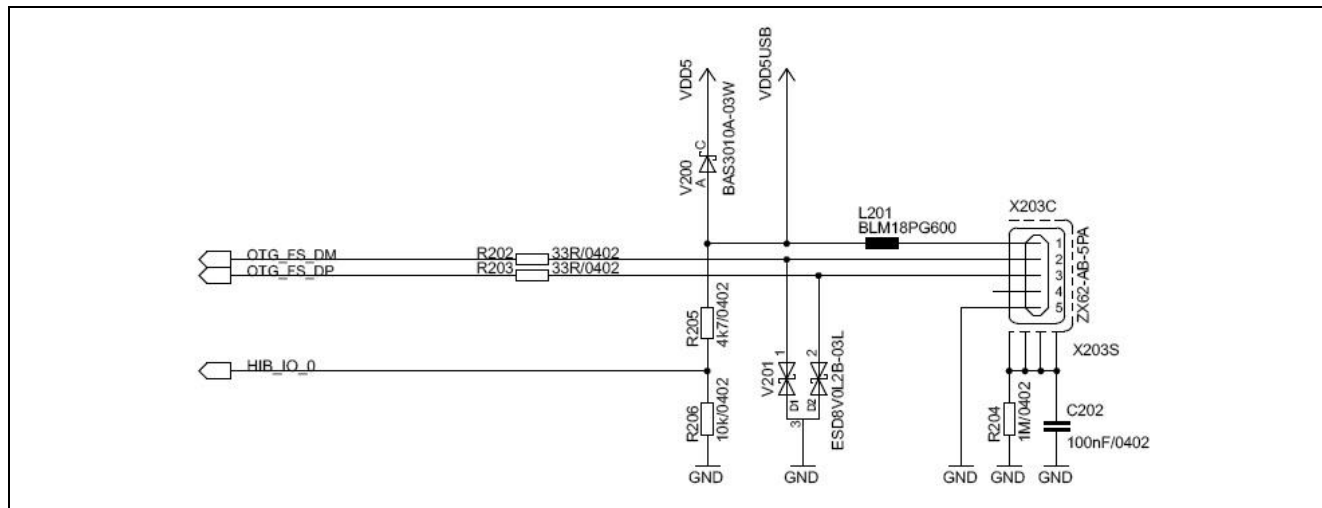


Figure 17 USB Connector

Table 7 USB micro AB connector Pinout

Pin No.	Pin Name	Pin Description
1	VBUS	5 V
2	D-	Data Minus
3	D+	Data Plus
4	ID	Identification
5	GND	Ground

2.9 RTC

The XMC4200 CPU has two power domains, the Core Domain and the Hibernate Domain.

The Core Domain (VDDP pins) is connected to the VDD3.3 rail. An on-board LDO voltage regulator generates VDD3.3 (3.3 V) out of VDD5 (5 V).

The Hibernate Domain is powered via the auxiliary supply pin VBAT, which is supplied by either a 3 V coin cell (size 1216, 1220 or 1225) plugged into the battery holder or 3.3 V (VDD3.3) generated by the on-board voltage regulator.

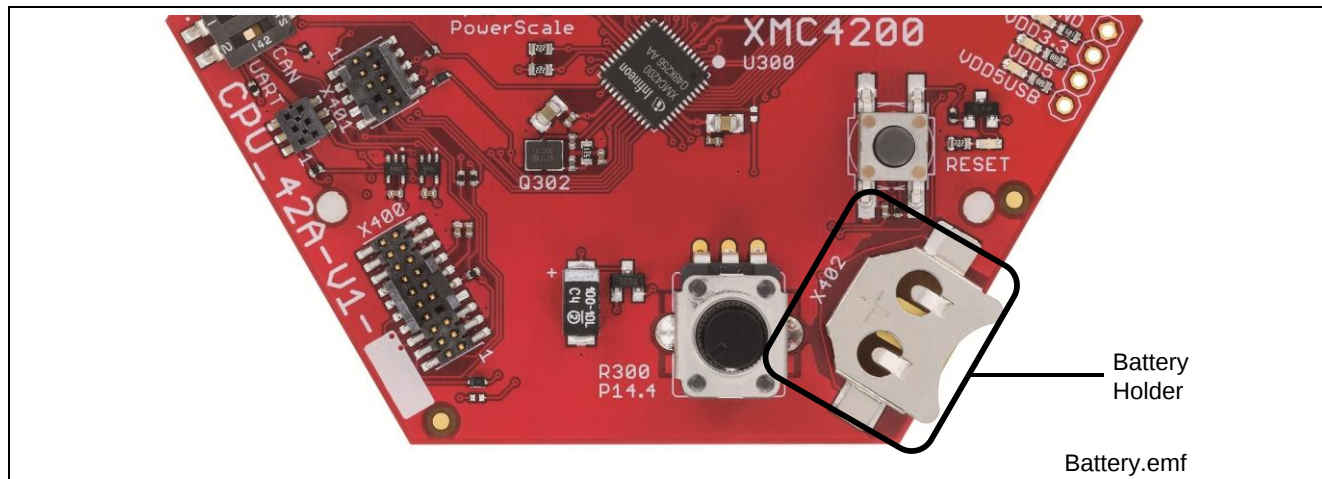


Figure 18 Battery Holder for Coin Cells

The Real Time Clock (RTC) is located in the hibernate domain. Even if the Core Domain is not powered the Hibernate Domain will operate if VBAT is supplied. The RTC keeps running as long as the Hibernate Domain is powered via the auxiliary supply VBAT.

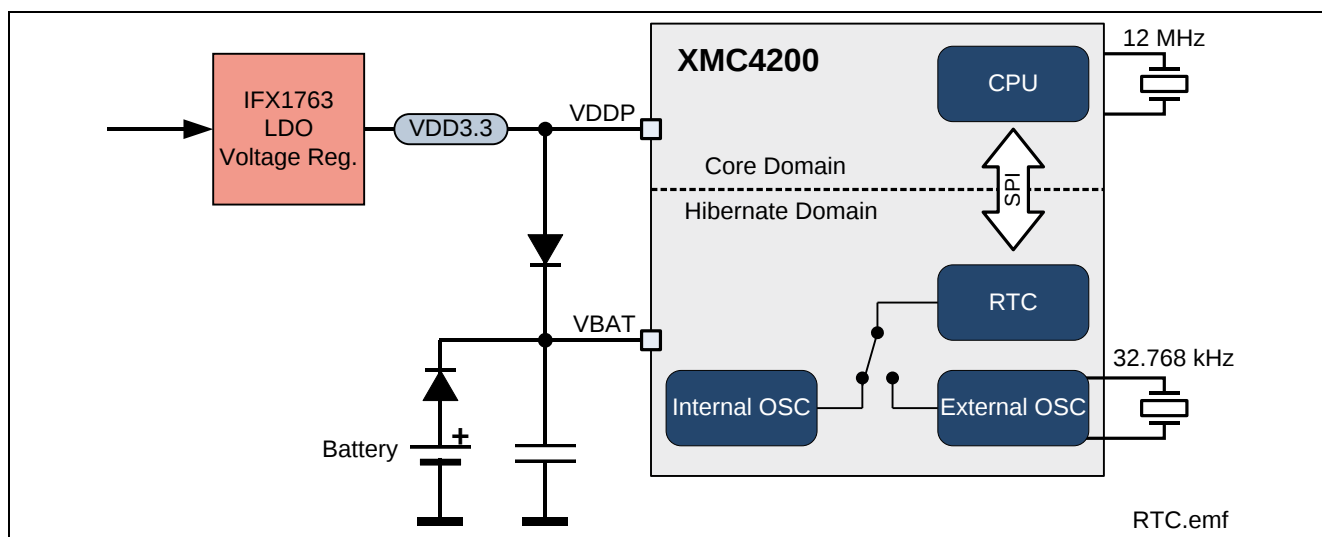


Figure 19 XMC4200 Power Domains and Real Time Clock

2.12 Satellite Connector

The CPU_42A-V1 board provides an ACT (Actuator) satellite connector for application extension by satellite cards.

Note: Satellite cards shall be connected to their matching satellite connectors only. (For e.g. ACT satellite cards shall be connected to ACT satellite connector only)

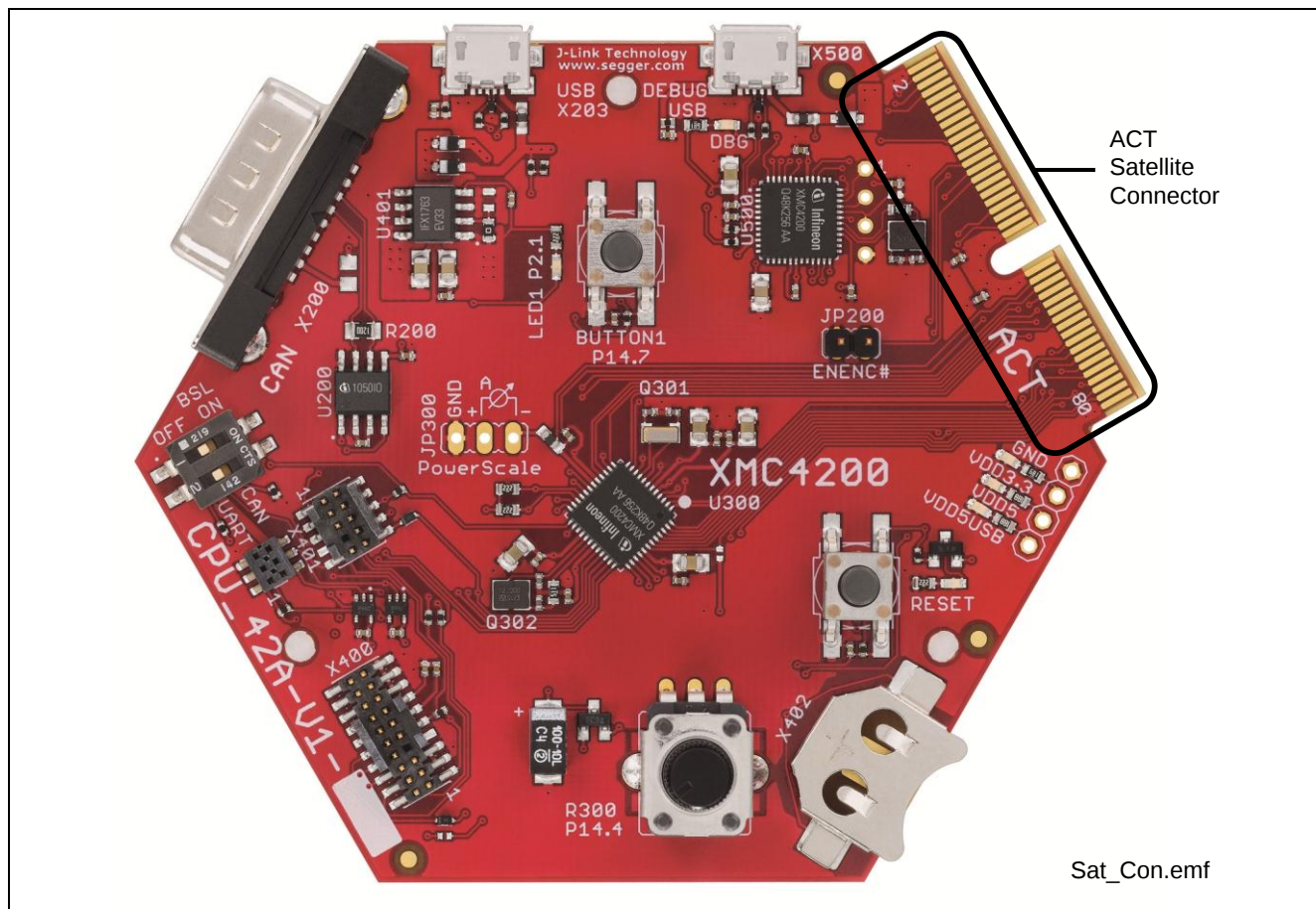


Figure 21 Satellite Connector

2.12.1 ACT Satellite Connector

The ACT satellite connector on the CPU 42A-V1 board allows interface expansion through ACT satellite cards.

CPU_42A-V1		Satellite Connector		CPU_42A-V1	
XMC Pin	XMC Function	Pin	Function	XMC Pin	XMC Function
VSS	GND	1	GND	VSS	GND
nc	nc	2	PIF1N0	nc	nc
nc	nc	3	PIF1N1	nc	nc
nc	nc	4	PIF1N2	nc	nc
nc	nc	5	PWMN	nc	nc
nc	nc	6	PWMP	nc	nc
nc	nc	7	DSDC1K0	nc	nc
nc	nc	8	DSDC1K1	nc	nc
nc	nc	9	RSVD	nc	nc
nc	nc	10	CC_IN3	nc	nc
nc	nc	11	CC_IN4	nc	nc
nc	nc	12	CC_IN5	nc	nc
nc	nc	13	TRAP_A	P0.7 (1.6)	CCU80.IN0A
nc	nc	14	TRAP_B	nc	nc
nc	nc	15	TRAP_X	nc	nc
nc	nc	16	SPI_CS40	nc	nc
nc	nc	17	SPI_CSA1	nc	nc
nc	nc	18	SPI_CSA2	nc	nc
P2.5	U0C1.DX0B/DOU70	19	I2C_SDA	nc	nc
nc	nc	20	ACT_GPI01	nc	nc
nc	nc	21	ACT_GPI00	nc	nc
nc	nc	22	VDD5	nc	nc
nc	nc	23	VDD5	nc	nc
nc	nc	24	VDD5	nc	nc
nc	nc	25	VDD5	nc	nc
nc	nc	26	VDD5	nc	nc
nc	nc	27	VDD5	nc	nc
nc	nc	28	VDD5	nc	nc
nc	nc	29	VDD5	nc	nc
nc	nc	30	VDD5	nc	nc
nc	nc	31	VDD5	nc	nc
nc	nc	32	VDD5	nc	nc
nc	nc	33	VDD5	nc	nc
nc	nc	34	VDD5	nc	nc
nc	nc	35	VDD5	nc	nc
nc	nc	36	VDD5	nc	nc
nc	nc	37	VDD5	nc	nc
nc	nc	38	VDD5	nc	nc
nc	nc	39	VDD5	nc	nc
nc	nc	40	VDD5	nc	nc
nc	nc	41	VDD5	nc	nc
nc	nc	42	VDD5	nc	nc
nc	nc	43	VDD5	nc	nc
nc	nc	44	VDD5	nc	nc
nc	nc	45	VDD5	nc	nc
nc	nc	46	VDD5	nc	nc
nc	nc	47	VDD5	nc	nc
nc	nc	48	VDD5	nc	nc
nc	nc	49	VDD5	nc	nc
nc	nc	50	VDD5	nc	nc
nc	nc	51	VDD5	nc	nc
nc	nc	52	VDD5	nc	nc
nc	nc	53	VDD5	nc	nc
nc	nc	54	VDD5	nc	nc
nc	nc	55	VDD5	nc	nc
nc	nc	56	VDD5	nc	nc
nc	nc	57	VDD5	nc	nc
nc	nc	58	VDD5	nc	nc
nc	nc	59	VDD5	nc	nc
nc	nc	60	VDD5	nc	nc
nc	nc	61	VDD5	nc	nc
nc	nc	62	VDD5	nc	nc
nc	nc	63	VDD5	nc	nc
nc	nc	64	VDD5	nc	nc
nc	nc	65	VDD5	nc	nc
nc	nc	66	VDD5	nc	nc
nc	nc	67	VDD5	nc	nc
nc	nc	68	VDD5	nc	nc
nc	nc	69	VDD5	nc	nc
nc	nc	70	VDD5	nc	nc
nc	nc	71	VDD5	nc	nc
nc	nc	72	VDD5	nc	nc
nc	nc	73	VDD5	nc	nc
nc	nc	74	VDD5	nc	nc
nc	nc	75	VDD5	nc	nc
nc	nc	76	VDD5	nc	nc
nc	nc	77	VDD5	nc	nc

Figure 22 Satellite Connector Type ACT

- (1) P0.7 can also be used for JTAG Debugging (TDI)
- (2) P0.8 is used as TRST in order to enable JTAG Debug
- (3) This pin is connected with the satellite connector via an analog switch
- (4) This ADC input does not support “Out of Range Detection”
- (5) This pin must be “enabled” by a solder jump.
- (6) Support High Resolution PWM

3 Production Data

3.1 Schematics

This chapter contains the schematics for the CPU board:

- Satellite Connector, USB, CAN
- XMC4200
- Power and Debug
- On-board Debugger

The board has been designed with Eagle. The full PCB design data of this board can also be downloaded from www.infineon.com/xmc-dev.

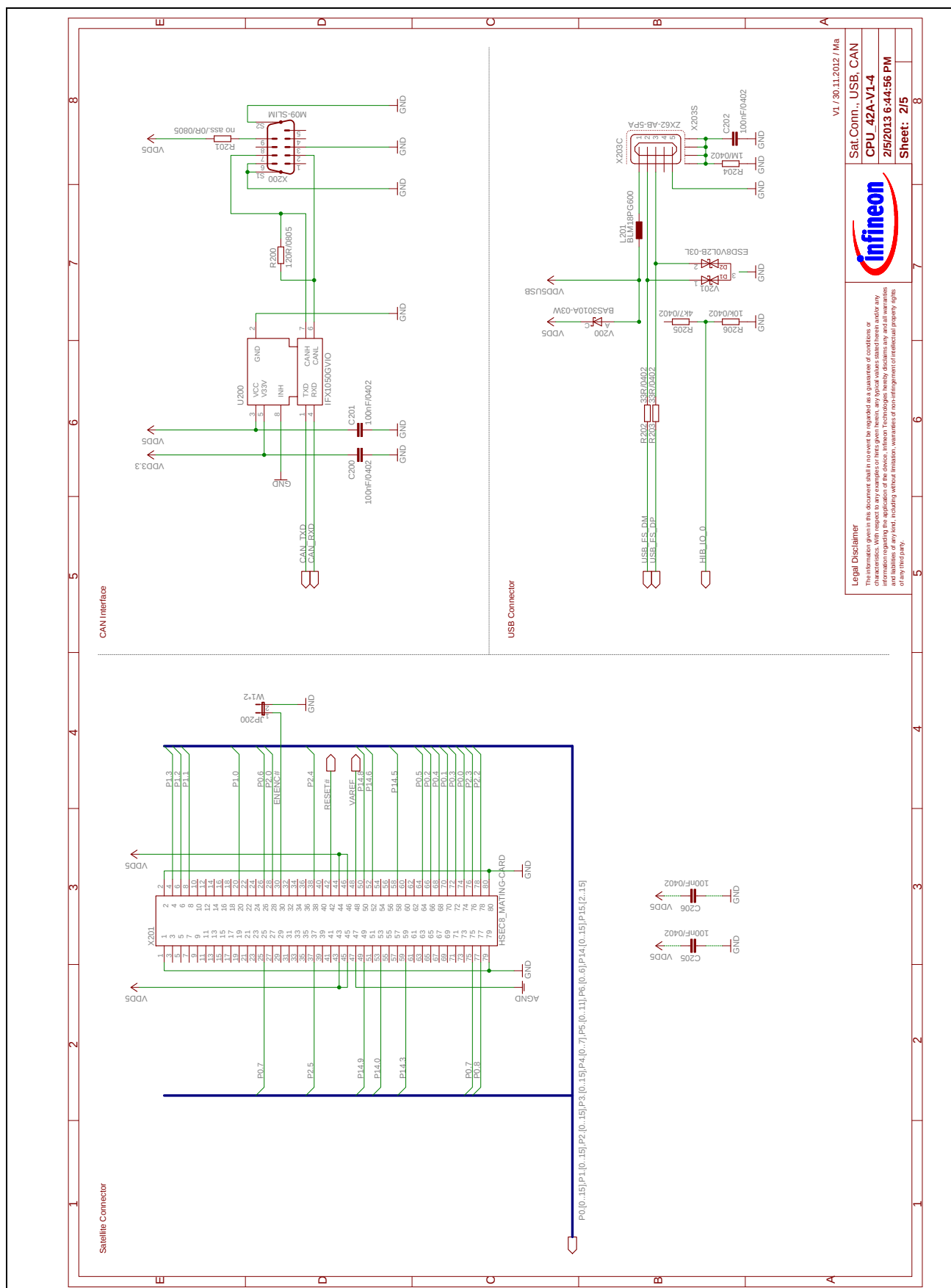


Figure 23 Satellite Connector, USB, CAN

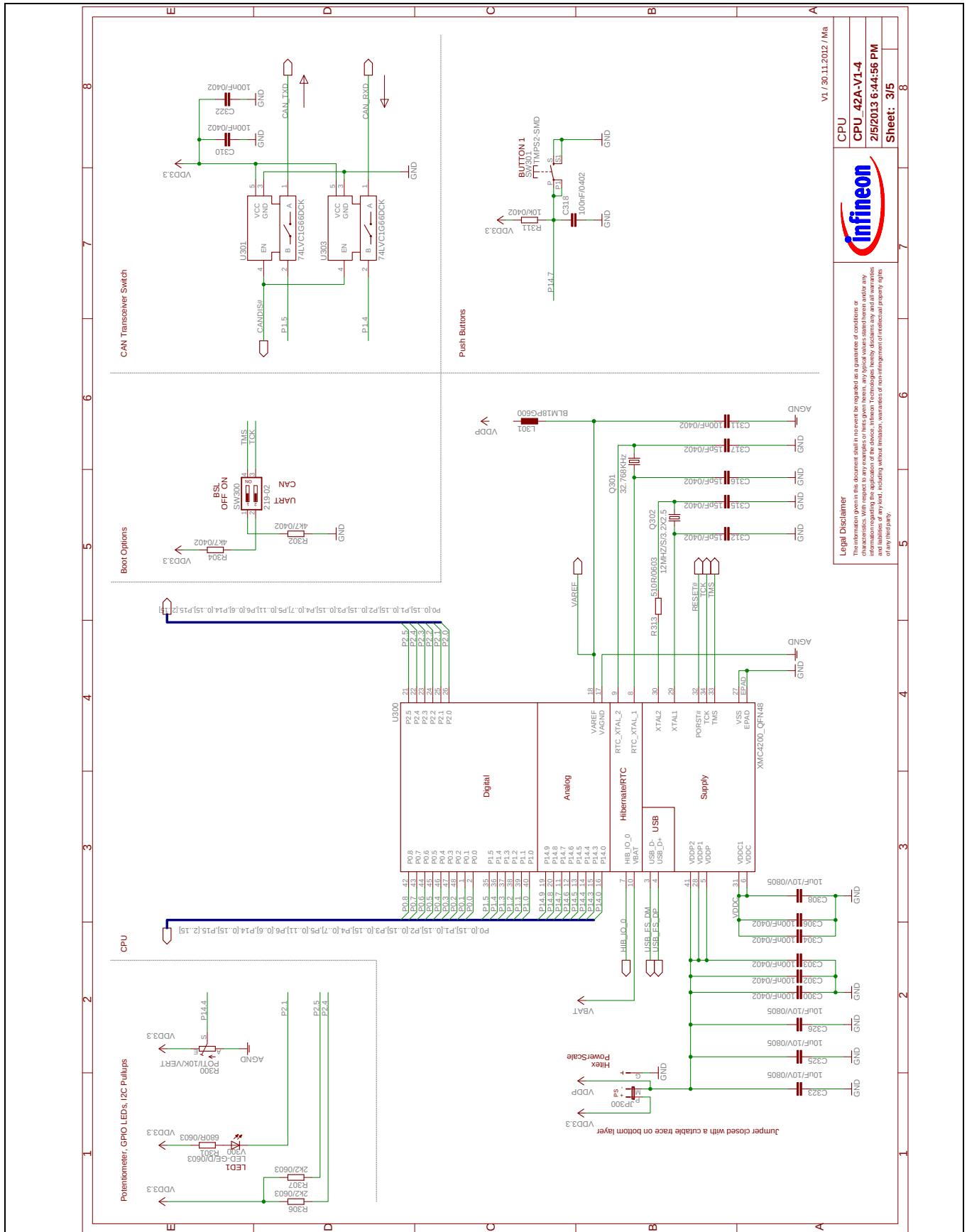


Figure 24 XMC4200

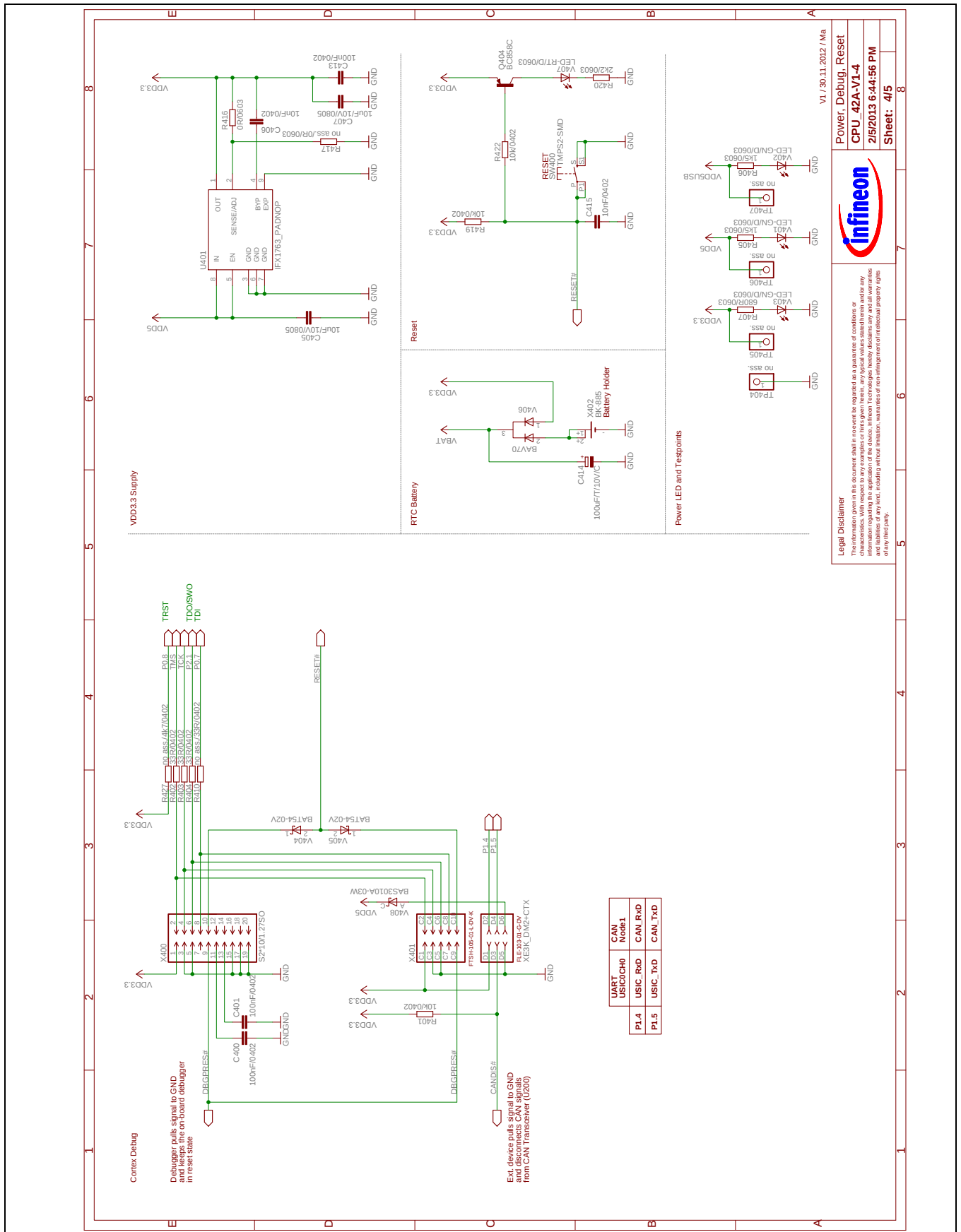


Figure 25 Power and Debug

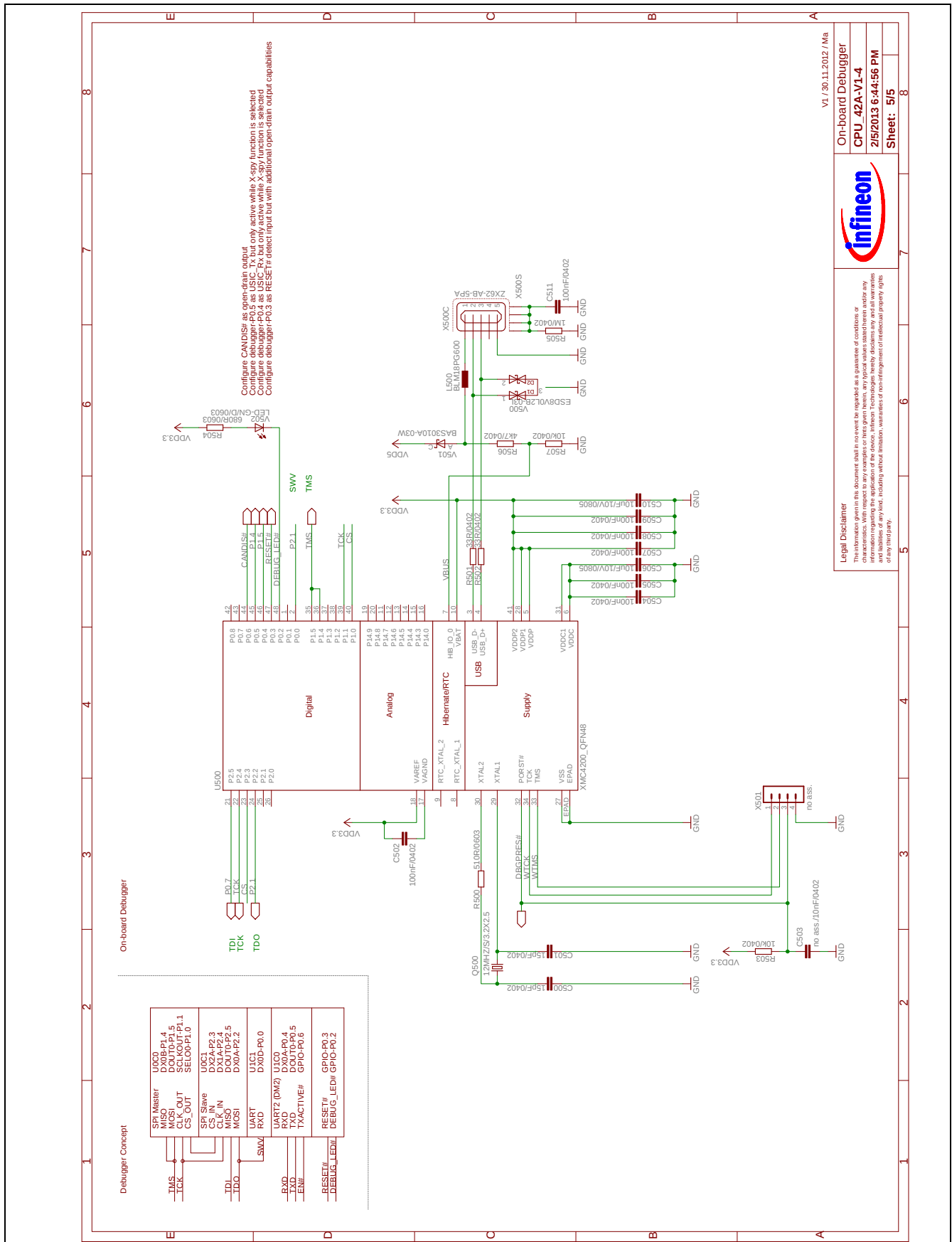


Figure 26 On-board Debugger

3.2 Component Placement

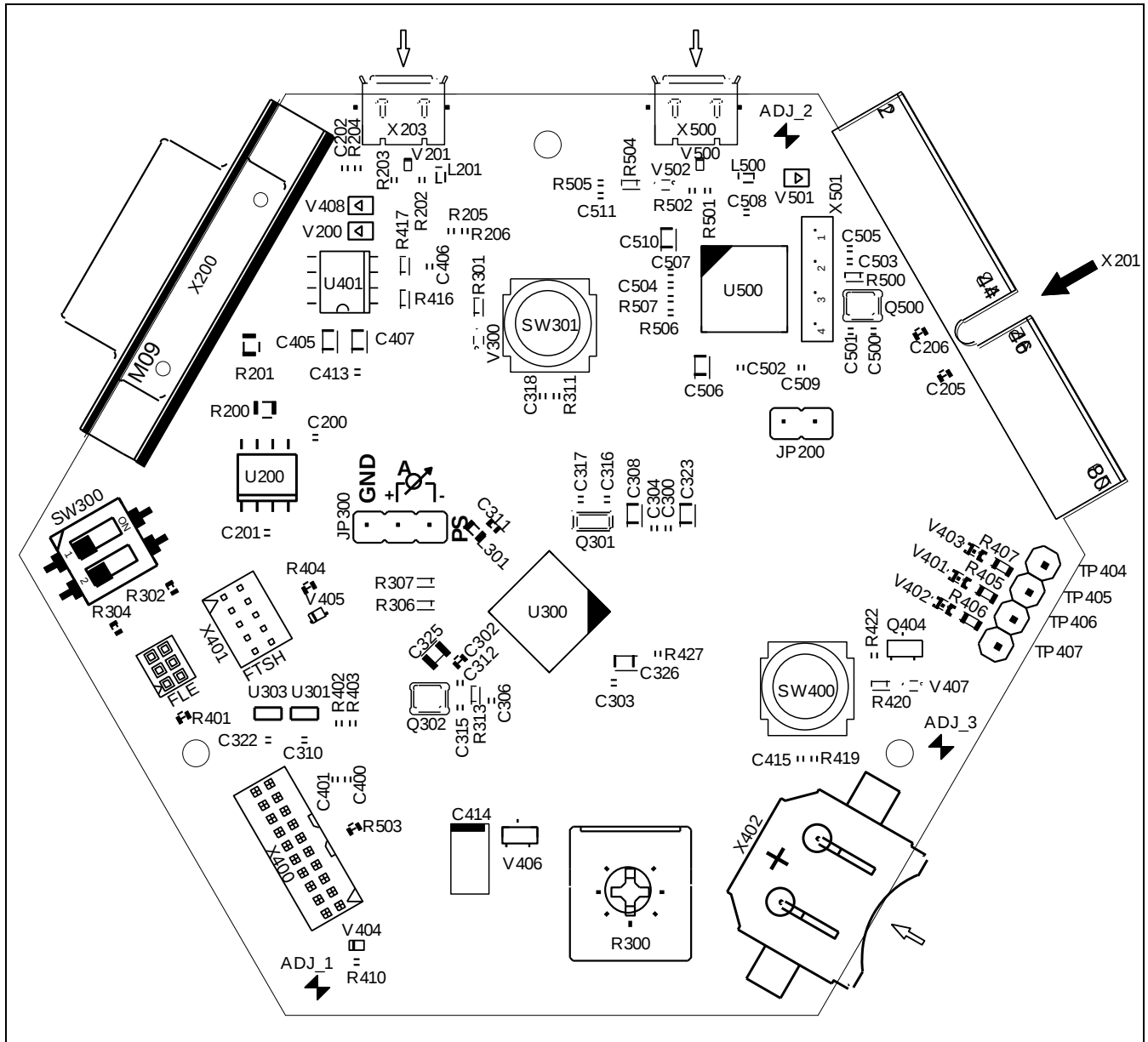


Figure 27 Component Placement

3.3 Bill of Material (BOM)

Table 11 BOM of CPU_42A-V1-4 Board

Qty	Value	Device	Reference
1	0R/0603	Resistor	R416
2	1M/0402	Resistor	R204, R505
2	1k5/0603	Resistor	R405, R406
3	2k2/0603	Resistor	R306, R307, R420
4	4k7/0402	Resistor	R205, R302, R304, R506
7	10k/0402	Resistor	R206, R311, R401, R419, R422, R503, R507
2	10nF/0402	Capacitor	C406, C415
8	10uF/10V/0805	Capacitor, ceramic	C308, C323, C325, C326, C405, C407, C506, C510
2	12MHZ/S/3.2X2.5	Crystal, NX3225GD, NDK	Q302, Q500
6	15pF/0402	Capacitor	C312, C315, C316, C317, C500, C501
1	32.768KHz	Crystal, NX3215SA, NDK	Q301
7	33R/0402	Resistor	R202, R203, R402, R403, R404, R501, R502
2	74LVC1G66DCK	IC, Single Analog Switch	U301, U303
24	100nF/0402	Capacitor	C200, C201, C202, C205, C206, C300, C302, C303, C304, C306, C310, C311, C318, C322, C400, C401, C413, C502, C504, C505, C507, C508, C509, C511
1	100uF/T/10V/C	Capacitor, bipolar	C414
1	120R/0805	Resistor	R200
1	219-02	Dual DIP-Switch, 0.1" SMD	SW300
2	510R/0603	Resistor	R313, R500
3	680R/0603	Resistor	R301, R407, R504
3	BAS3010A-03W	Diode, SOD323, Infineon	V200, V408, V501
2	BAT54-02V	Diode, SC79, Infineon	V404, V405
1	BAV70	Diode, SOT23-3, Infineon	V406
1	BC858C	Transistor, SOT23-3, Infineon	Q404
1	BK-885	Battery Holder, 12mm Coin Cell	X402
3	BLM18PG600	Ferrite Bead, 0603, Murata	L201, L301, L500
2	ESD8V0L2B-03L	Diode, TSLP-3-1, Infineon	V201, V500
1	HSEC8_MATING-CARD	Connector, Edgecard, Samtec	X201
1	IFX1050GVIO	IC, CAN Transceiver, Infineon	U200
1	IFX1763-3.3	Voltage Regulator, 3.3V LDO, Infineon	U401
1	LED-GE/D/0603	LED, yellow	V300
4	LED-GN/D/0603	LED, green	V401, V402, V403, V502
1	LED-RT/D/0603	LED, red	V407
1	DSUB9-male	Connector	X200
1	POTI/10K/VERT	Potentiometer, RK09K1130A8G, ALPS	R300
1	S2*10/1.27SO	Connector, FTSH-110-01-L-DV-K-P, Samtec	X400

Production Data

2	FSM2JSMA	Switch, tactile	SW301, SW400
1	W1*2	Pinheader, 2-pin, 0.1" TH	JP200
1	XE3K_DM2+CTX	Connector, FTSH-105-01-LM-DV-K, without pin 7, Samtec Connector, FLE-103-01-G-DV, Samtec	X401
2	XMC4200_QFN48	IC, XMC4200, QFN48, Infineon	U300, U500
2	ZX62-AB-5PA	Connector, Micro-USB, Hirose	X203, X500
1	no ass.	Pinheader, 4-pin, 0.1" TH	X501
4	no ass.	Pinheader, 1-pin, 0.1" TH	TP404, TP405, TP406, TP407
1	no ass./0R/0603	Resistor	R417
1	no ass./0R/0805	Resistor	R201
1	no ass./4k7/0402	Resistor	R427
1	no ass./10nF/0402	Resistor	C503
1	no ass./33R/0402	Resistor	R410
1	no ass.	Pinheader, 3-pin, 0.1" TH, Hitex PowerScale	JP300

www.infineon.com