Never stop thinking

XE166 Family

AP90005

UConnect XE162N Hardware Description

Application Note

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Microcontrollers

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Device1
Revision History: V1.0 2010-01

Previous Version(s):

Page	Subjects (major changes since last revision)
–	This is the first release …

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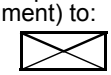

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1 Introduction - XE166 family

XE166 family - More performance, more Flash, better peripherals

With more than 15 successful years in the microcontroller market place, C166 has set the standard for 16-bit architectures with the highest aggregate volume share of all available 16-bit devices.

With its fast interrupt response and context switching, the C166 family is ideally suited for automotive, industrial, mass storage and wired as well as wireless communications applications.

Compared with the XC166, XE166 delivers more performance, more Flash memory, more RAM, strongly enhanced peripherals and a complete DSP library.

MCU and DSP in a core

Infineon Technologies´ Real Time Signal Controller combines the traditional strengths of a Microcontroller Unit (MCU) to control peripherals with the computing power of Digital Signal Processors (DSP). All in one enhanced XE166 core. Together, the Microcontroller's real-time capability and ease of use and the DSP's mathematical performance and data throughput form a powerful singe-chip solution ideal for many embedded applications.

For detailed technical information about the different derivatives please refer to the XE166 family web pages on the Infineon Internet.

2 Features of the XE162N UConnect

2.1 Summary of Features

–
– Infineon's XE162N Controller in TQFP64 Package
– High Speed CAN Transceivers
– 2 Low Power USB/Debug Status LEDs
– 2 Low Power GPIO LEDs
– On board USB to JTAG / UART interface
– Powered via USB

Connectors

The XE162N UConnect offers the following connectors:

– USB connector for ASC/JTAG Interface
– 16-pin header for JTAG interface (OCDS)

Components

– Two status LED´s for USB Power / Debug RUN state
– 1 CAN-Transceiver TLE 6251
– FT2232 Dual USB to UART/JTAG interface
– 2 general purpose LEDs

2.2 Block Diagram

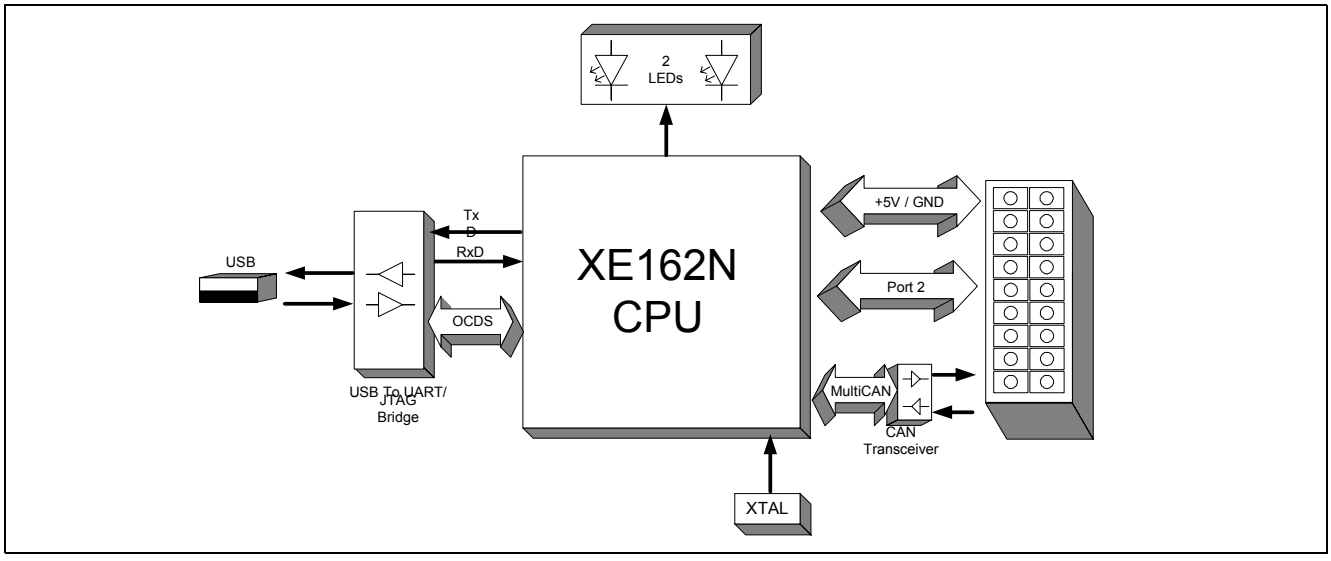


Figure 1 Block diagram of XE162N UConnect layout overview

2.3 Layout Overview

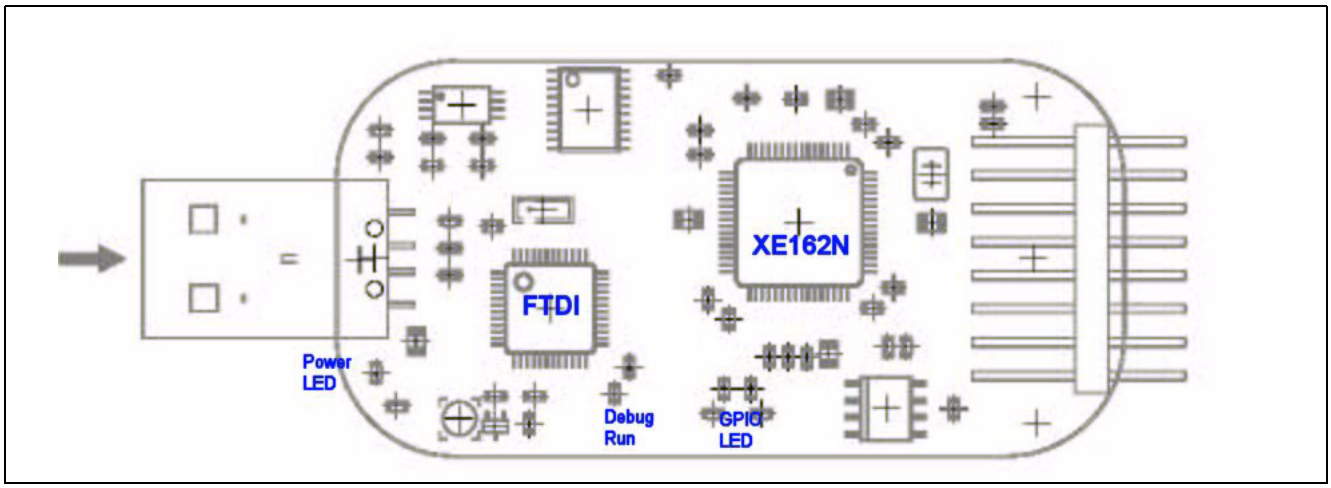


Figure 2 Top View

2.4 UConnect Power Supply concept

The UConnect Power Supply concept enables the user to work with the Stick without an external Power Supply.

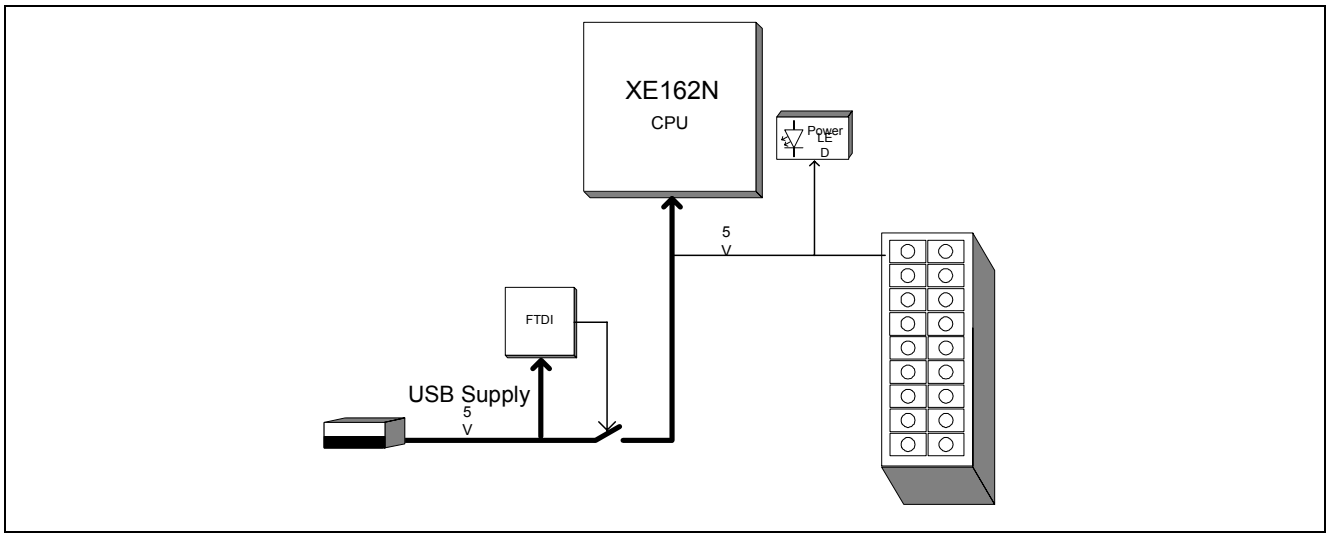


Figure 3 UConnect Power Supply concept

The Power Supply for the XE162N will be controlled by the PWREN Signal of the FTDI chip. Only if the device is installed by the operating system on the PC, the XE162N will be supplied by the 5V from the USB Bus.

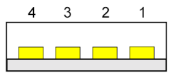
The USB specification provides a 5 V supply on a single wire from which connected USB devices may draw power. The specification provides for no more than 5.25 V and no less than 4.35 V between the +ve and -ve bus power lines.

Initially, a device is only allowed to draw 100 mA. It may request more current from the upstream device in units of 100 mA up to a maximum of 500 mA. In practice, most ports will deliver the full 500 mA or more before shutting down power, even if the device hasn't requested it or even identified itself. If a (compliant) device requires more power than is available, then it cannot operate until the user changes the network (either by rearranging USB connections or by adding external power) to supply the required power.

Note: In case the USB Host PC goes into Suspend Mode, the UConnect will be switched off.

2.5 Headers and Connectors

2.5.1 USB Connector



Standard A

Table 1 USB Signals

Pin	Name	Description
1	VCC	+ 5V
2	D -	Data -
3	D +	Data +
4	GND	Ground

2.5.2 LEDs

Table 2 LEDs description

LED number	Color	XE162N Pin	Description
LED1	blue	Port 10.3	GPIO LED
LED2	blue	Port 10.4	GPIO LED
LED3	green	-	Board Voltage 5 Volt
LED4	red	-	Debug Run Mode

2.5.3 CAN Node 0 Connection

XE162N CAN Node 0 connection

Signal	XE162N Pin	Description
CAN1_TXD	Port 2.2	CAN Node 0 transmit signal for CAN tranceiver
CAN1_RXD	Port 2.7	CAN Node 0 receive signal for CAN tranceiver

Note: A terminal resistor of 120 Ohm is soldert on the UConnect Board.

2.5.4 16 Pin Header

On-board header X400

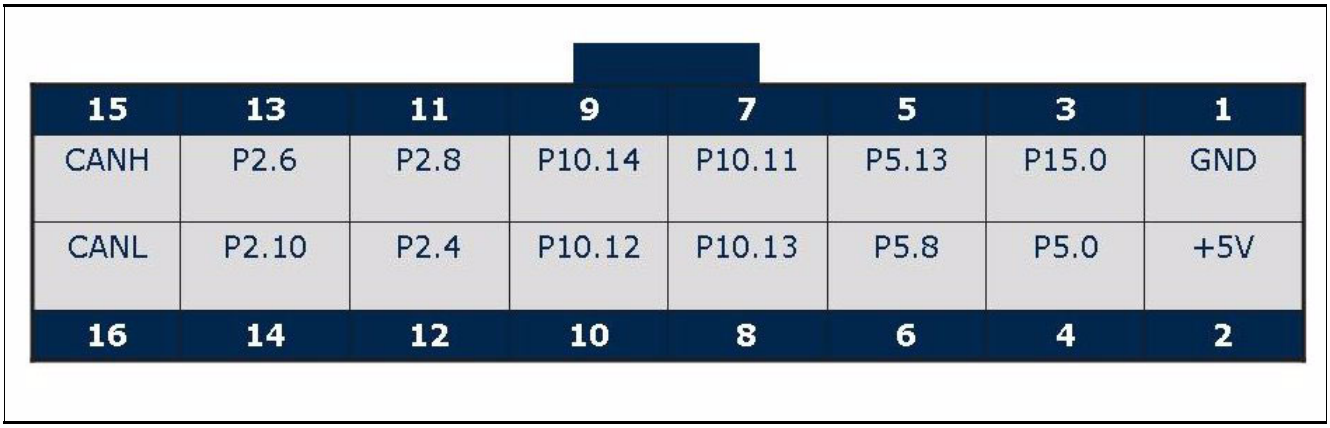


Table 3 X400 Header Pin/Signal description

Pin number				
1	Ground			
2	+5V			
3	P15.0	ADC1_CH0		
4	P5.0	ADC0_CH0		
5	P5.13	ADC0_CH13		
6	P5.8	ADC0_CH8	ADC1_CH8	T12HRC / T13HRC CCU6x
7	P10.11	U1C0_SCLKOUT	U1C0_DX1D	
8	P10.13	U1C0_DOUT	U1C0_SELO3	U1C0_DX0D
9	P10.14	U1C0_SELO1	U0C1_DOUT	U0C1_DX0C
10	P10.12	U1C0_DOUT	U1C0_DX0C	U1C0_DX1E
11	P2.8	U0C1_SCLKOUT	EXTCLK	CC2_CC21
12	P2.4	U0C1_DOUT	CC2_CC17	U0C0_DX0F
13	P2.6	U0C0_SELO0	U0C1_SELO1	CC2_CC19
14	P2.10	U0C1_DOUT	U0C0_SELO3	CC2_CC23
15	CANH Signal from CAN transceiver			
16	CANL Signal from CAN transceiver			

Note: For a complete Pin description, please refer to the User Manual!

2.6 64- Pinout

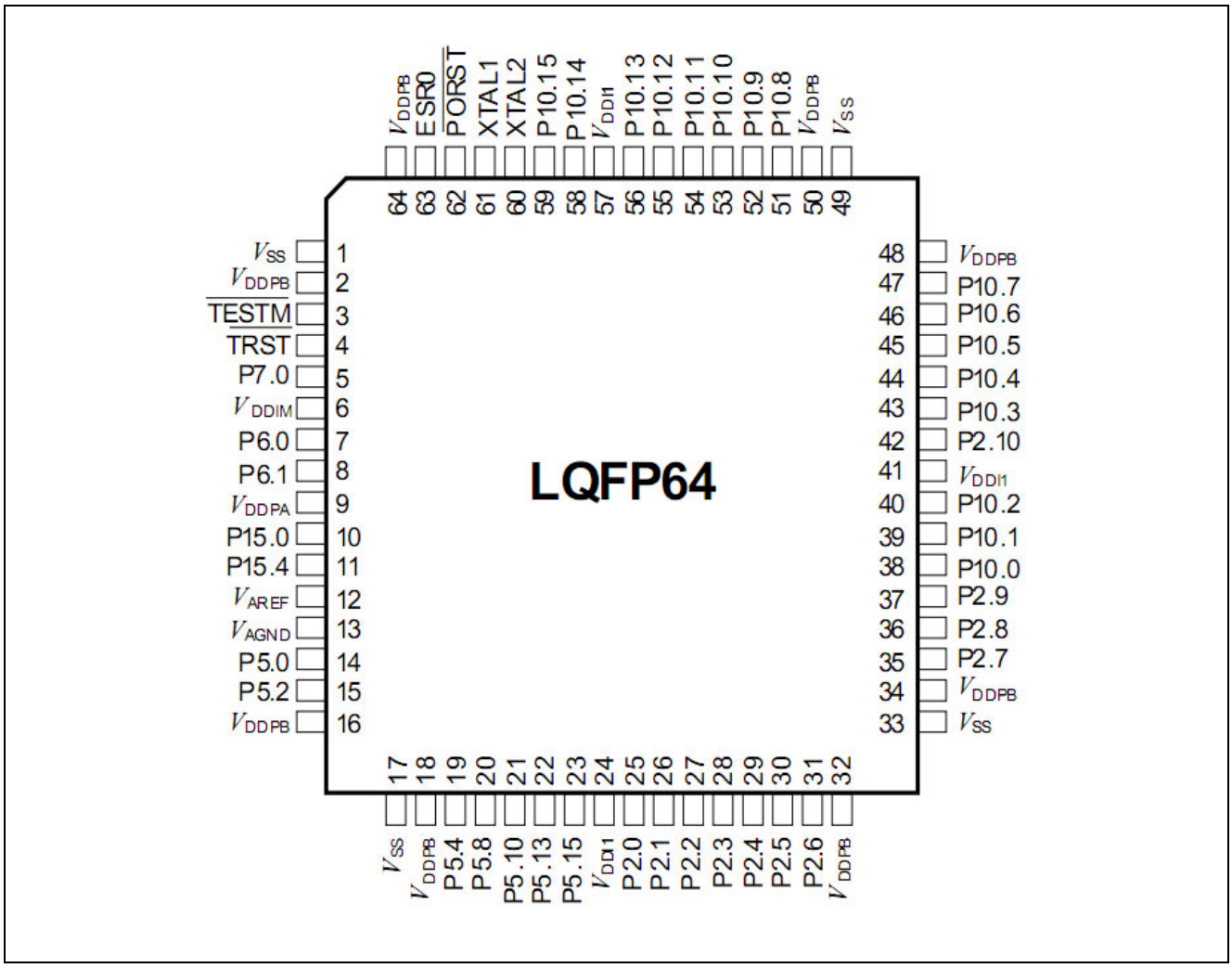


Figure 4 Pinout of the XE162N device

3 Quick Start Up

For a successful start up of the UConnect the following Steps should be done:
Start the autorun.exe on the UConnect CD and follow the Getting Started.

Figure 5 UConnect CD

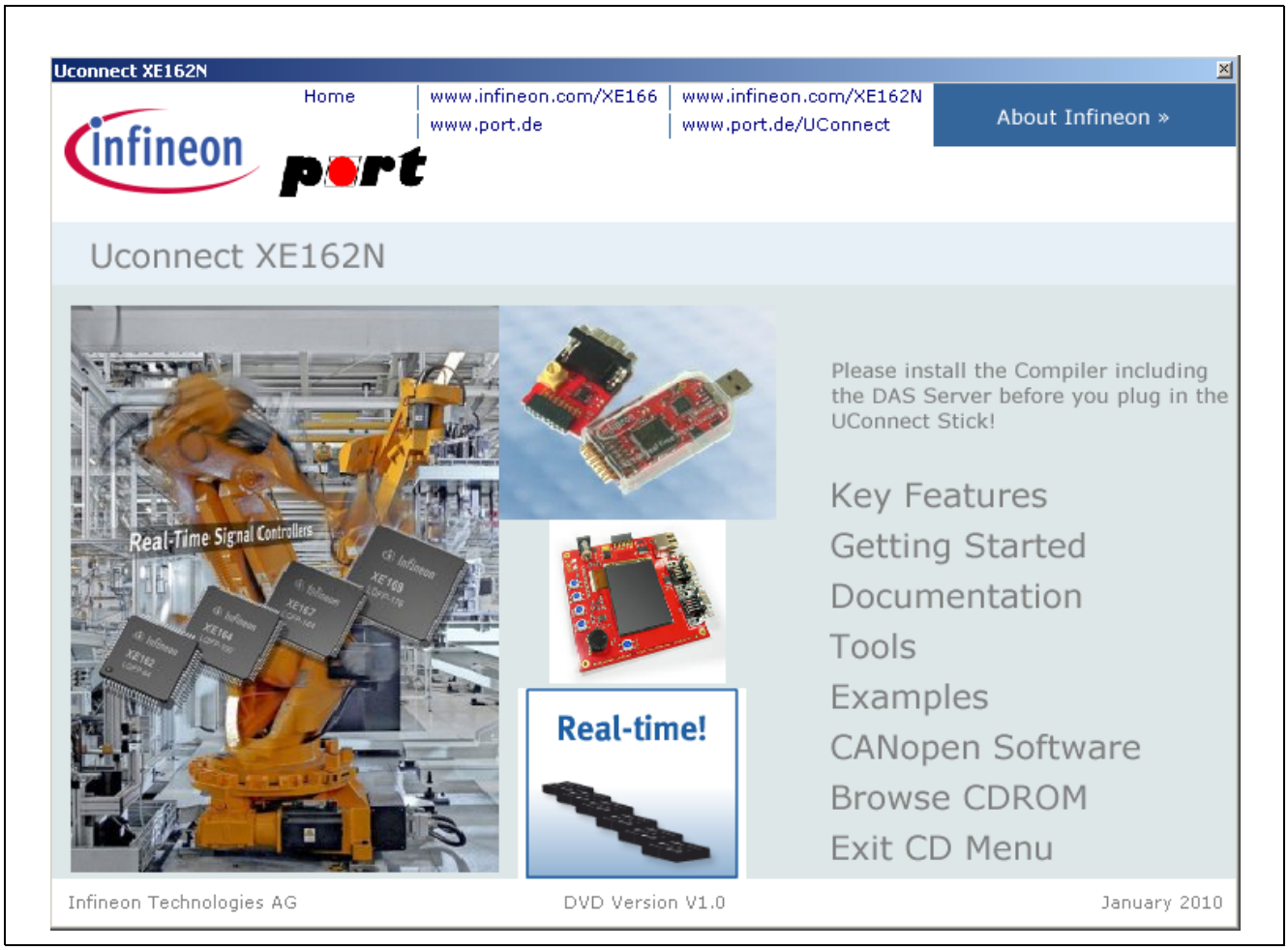


Figure 6 CD start page

3.1 USB OCDS debugging interfaces

The UConnect XE162N includes an On-Chip Debug Support (OCDS) system, which provides convenient debugging, controlled directly by an external device via debug interface pins.

To verify the connection between the UConnect and the DAS Software running on the PC, the following check should be done.

Open Start - Program - DAS the “DAS Server Control Panel” click in “Installed Servers” and start the “JTAG over USB Chip” or “UDAS” Server by clicking on the Start Button on the right hand side.

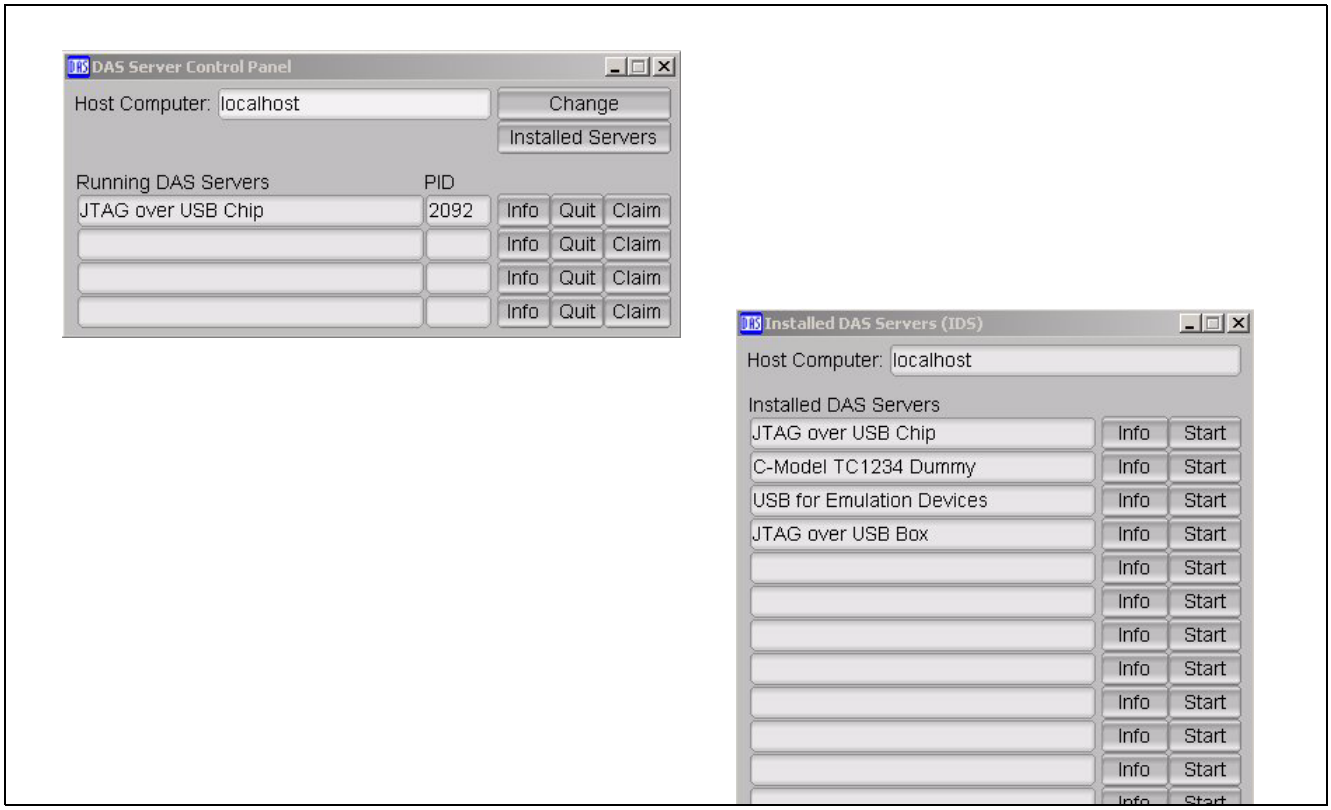


Figure 7 DAS Server Control Panel

After starting the DAS Server, open the “DAS Device Scanner” under Start - Program - DAS.

The “XE166/XC2000-Family” in the Device list shows that the connection is established between Host Computer and the Easy Kit.

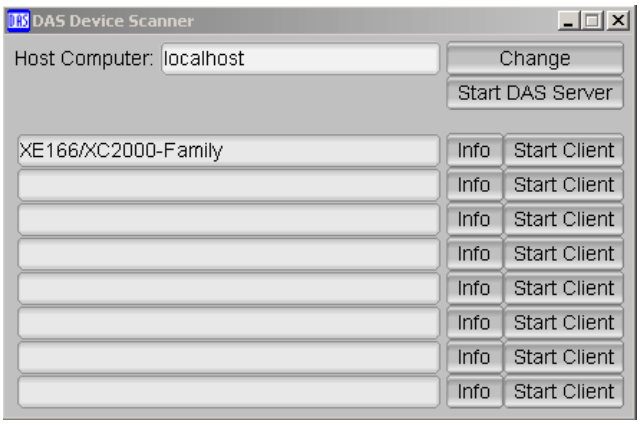
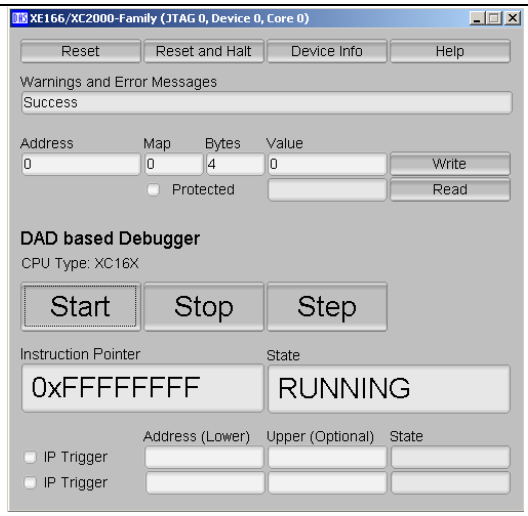


Figure 8 DAS Device Scanner

3.2 Using the DAS Client to control the XE162N

To use the DAS Client use the Button on the right side in the DAS Device scanner shown in **Figure 8** . The client like shown in **Figure** should start and the red Debug Run LED sould be switched on.



DAS client

With the help of the following Buttons you can controll the XE162N of the UConnect:

- The Start Button is starting the user program
- The Stop Button stops the user program during runntime, the red Debug run LED should switch off in hold state
- With the Step Button you can Step inside the user program
- The Reset Button can be used for Reset the XE162N and continue program execution from the begin of the user program
- The Reset and Halt Button can be used for Reset the XE162N and stop executing the user program with the fist instruction in the internal Flash
- With the Address field, Write and Read Button you can read and write internal RAM areas and register. The internal Flash can not be written, it require a programming algorithm which is not included in that tool.

3.3 Virtual COM Port

The DAS Software package provides the driver for the virtual COM port of the second USB channel of the FTDI chip. This serial channel is connected to the Pins P2.3 and P10.6 of the XE162N.

Virtual serial port is a trade term used by certain vendors of COM port redirector software that emulates a serial port (RS-232, RS-422, and RS-485). Virtual serial ports are created by special software which enables extra serial ports in the operating system without using additional hardware (such as expansion cards, etc.). The number of virtual serial ports that can be created in a system is limited only by its performance capacity. It may require a substantial amount of resources to emulate say 255 serial ports on a slow computer.

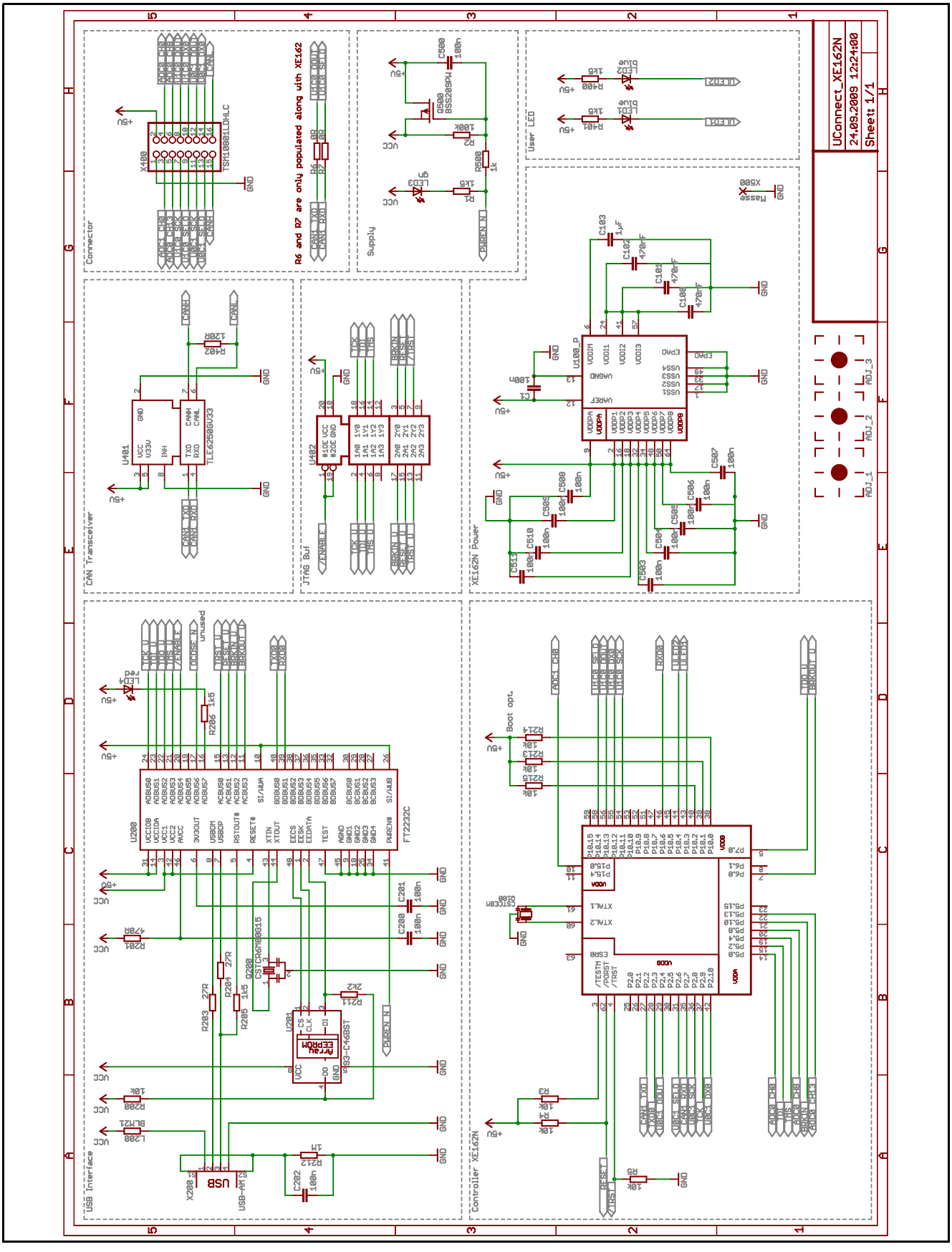
A virtual serial port emulates all serial port functionality, including Baud rate, Data bits, Parity bits, Stop bits, etc.

To work with the Serial Port of the UConnect XE162N the Hyper Terminal of your Windows Software or a free Program like MTTY can be used. A version of the MTTY can be found on the UConnect CD under Tools.

```
*************************************************************
*     Copyright (C) Infineon Technologies (2009)            *
*                                                           *
*               All rights reserved.                        *
*                                                           *
*                                                           *
*        Welcome to UConnect XE162N Demo program!           *
*                                                           *
*                                                           *
*Description: The demo uses the LED on Port 10.4            *
*             and show a blinking LED.                      *
*             A Hello World is printed to the serial        *
*             connectiom and show you the running           *
*             Time of the UConnect.                         *
*                                                           *
*                                                           *
*Baudrate: 19200Baud                                        *
*                                                           *
*                                                           *
*Chip: XE162N                                               *
*Code: Sep 24 2009                                          *
*************************************************************
UConnect is running since  0. 1.12 (hh.mm.ss)
```

Figure 9 HyperTerminal with Hello World program

4 Schematic


UConnect_XE162N
24.09.2009 12:24:00
Sheet: 1/1
Connector
Supply
User LED
CAN Transceiver
JTAG Buf
XE162N Power
USB Interface
Controller XE162N

5 UConnect extension

5.1 CAN ADC GPIO extension Board

The UConnect extension Board is targeted to show the CANopen Software stack which can be find on the UConnect CD. It consists of a CAN tranceiver for CAN node 0of the XE162N, two additional LEDs, a header for the CAN node 1 Bus and a Poti use as feedback signal.

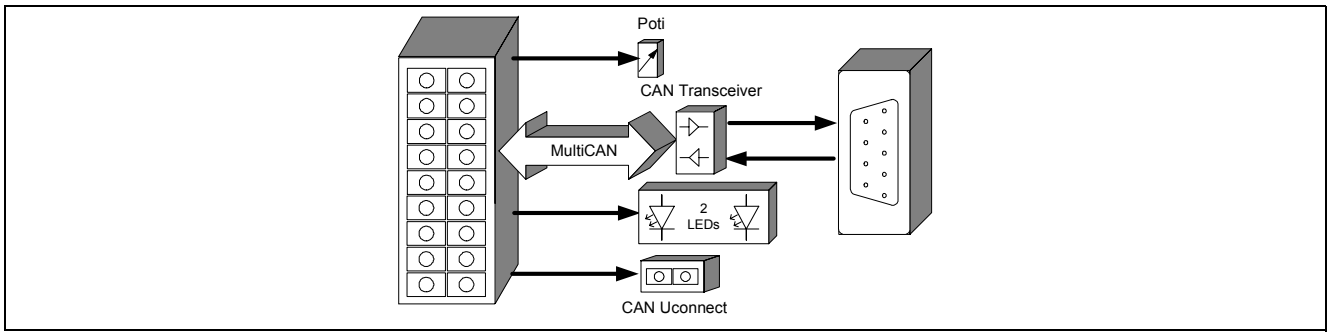


Figure 10 Block Diagramm of the UConnect extension Board

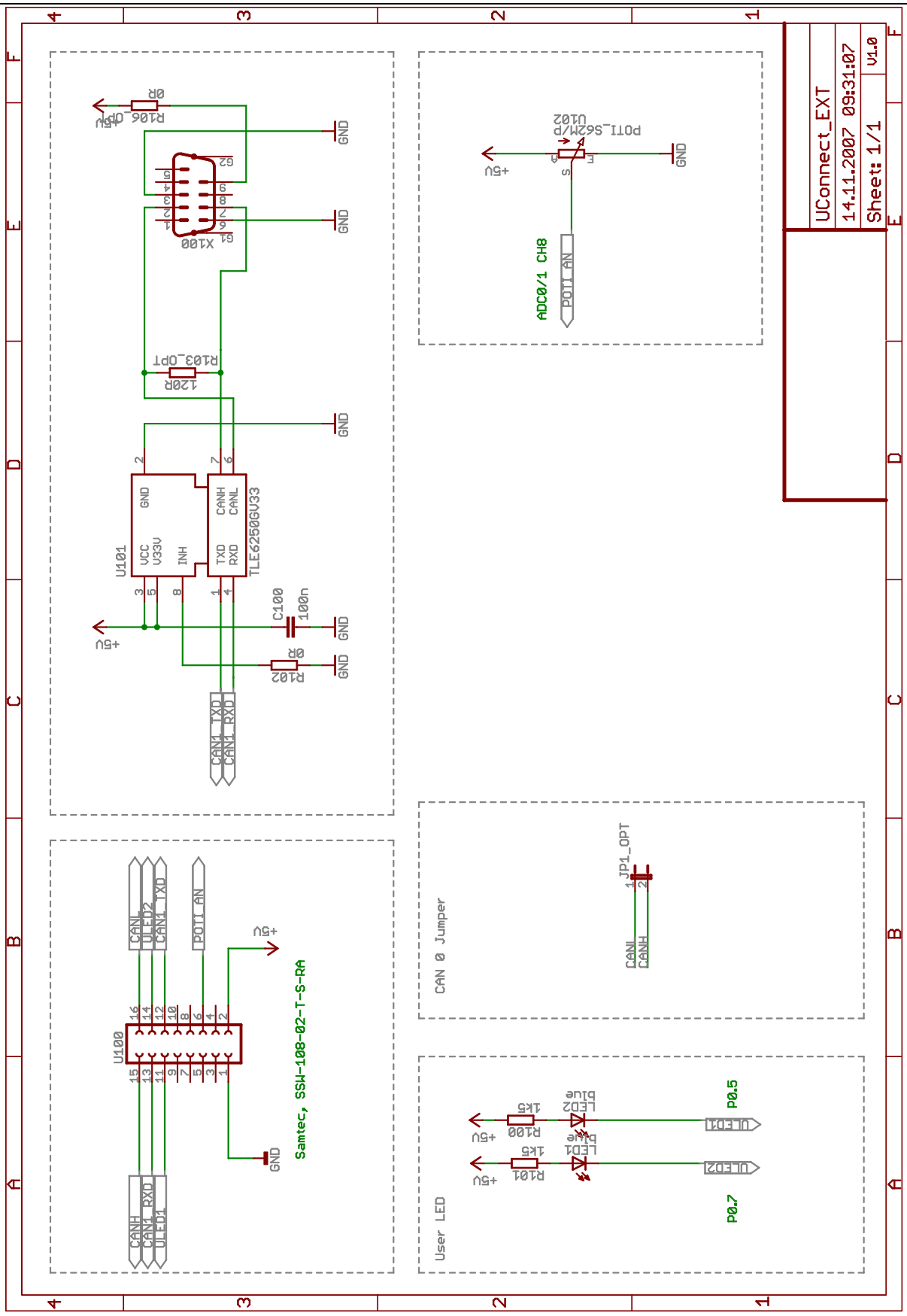
5.2 Header Connection and XE162N Pins on UConnect

In **Table 4** the used Pins from the XE162N are shown.

Table 4 Header connection of the extension Board (U100)

Pin	XE162N Pin	Description
1	GND	Power Supply for extension Board
2	+5V	Power Supply for extension Board
6	ADC0_CH8	Poti analog Signal
11	Port 2.8	User LED 1 (ULED1)
12	Port 2.6	CAN Node 1 transmit (CAN1_TXD)
13	Port 2.4	CAN Node 1 receive (CAN1_RXD)
14	Port 2.10	User LED 2 (ULED2)
15	-	UConnect CAN Node 0 HIGH (see **Table**)
16	-	UConnect CAN Node 0 LOW (see **Table**)

5.3 Extension Board Schematic



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