SN8200 SNIC EVK+ User Guide

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Release Record

Version Number	Release Date	Comments
Version 1.0	1/31/2012	• Initial release.
Version 1.1	3/7/2012	• Flow Control configuration update
Version 1.2	3/23/2012	• Scan, get WiFi status and RSSI update
Version 1.3	5/4/2012	• Soft AP and NVM related changes
Version 1.4	8/8/2012	• Misc control and sensor read changes • GPIO configuration • Firmware configuration update
Version 1.5	9/21/2012	• Default domain for soft AP changes to sn8200.com • USB driver installation procedure change
Version 1.6	10/17/2012	• UART and SPI configuration tab
Version 1.7	12/14/2012	• Transferred SNICMonitor usage to protocol specific documents [2] and [3].
Version 1.8	1/31/2013	• Combined SNIC_UART and SNIC_EWW
Version 1.9	4/9/2013	• Added SNIC_SPI
Version 2.0	5/17/2013	• Changed references from SNIC SN8200 to SNIC SN82XX

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1. <u>Introduction</u>

SN8200 is a complete low power embedded wireless solution to address the connectivity demand in home appliances and other applications. It integrates an ARM Cortex M3 micro-controller, WiFi BB/MAC/RF IC, RF front end, flash memory, clock, and on-board antenna into a small form factor module. The SN8200 Simple Network Interface Controller (SNIC) is a complete platform for easy network connectivity. This document provides an overview of the SNIC EVK+ installation and setup. For detailed information on the EZ Web Wizzard, UART serial interface and SPI serial interface applications, see [3][2][4].

1.1 Acronyms

Acronym	Meaning
API	Application Programming Interface
EVB	Evaluation Board
EVK	Evaluation Kit
FW	Firmware
GPIO	General Purpose Input/Output
PC	Personal Computer
SNIC	Simple Network Interface Card
SPI	Serial Peripheral Interface
SW	Software
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

1.2 References

[1] SyChip, "SN82XX EVB schematics".
[2] SyChip, "SN82XX SNIC UART Serial Interface User Manual".
[3] SyChip, "SN82XX SNIC EZ Web Wizzard User Manual".
[4] SyChip, "SN82XX SNIC SPI Serial Interface User Manual"..
[5] Winbond, "W25Q80BL Serial Flash Memory With Dual and Quad SPI"
[6] Sensirion, "Datasheet SHT21 Humidity and Temperature Sensor"

2. <u>Setting up the SN8200 EVK+ for Windows</u>

The latest SN8200 Simple Network Interface Controller Development Kit (SN8200 EVK+) can be used to access the wireless networking capabilities of the SN8200 SNIC embedded WiFi network controller. It consists of an SN82XX evaluation board (EVB) [1], a mini-USB cable, and an installation package including the Windows drivers, SN82XX SNICMonitor, sample application, open source info and this user guide. The SN8200 EVK+ is a complete platform for easy network connectivity, supporting software development prior to the availability of the target hardware. The SNICMonitor further permits product configuration, feature visualization and validation.

To use the EVK, the following steps must be performed:

- Download and extract the SN8200 EVK+ installation package on a computer with Windows XP or Win7

- Connect the SN82XX EVB to that computer with the mini USB cable

- Install the drivers for the SN8200 EVK+

- Install the SN82XX SNICMonitor

- Start the SN82XX SNICMonitor.

- Configure and download the desired FW if necessary. In particular, the country code must be set to match that of the location where the product is used. See the instructions for the EZ Web Wizzard ([3]) and serial interface over UART ([2]) and SPI ([4]). The EVK+ is preinstalled with a sample EZ Web Wizzard FW for US, so application such as serial interface over SPI needs to use a different FW image ([4]).

Each of these steps is discussed in detail in the following subsections.

2.1 SN82XX EVB

The SN82XX EVB provides the hardware platform for the SNIC application development. Some major components of the EVB are shown in Figure 1.
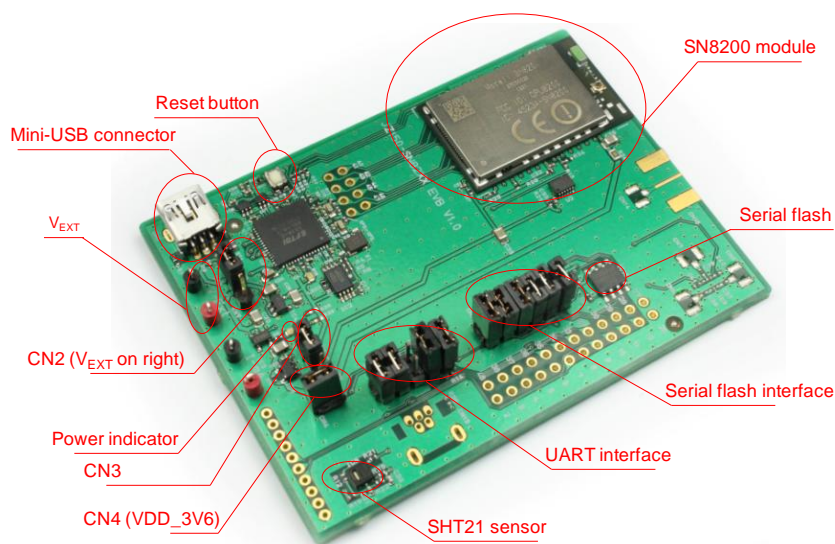

Figure 1 SN82XX EVB

- SN8200 module consisting of an ARM Cortex-M3 processor with integrated memory and an 802.11 b/g/n WiFi SoC.

- Mini-USB connector supporting USB-JTAG and USB-serial interfaces

- Jumper CN2 to select power supply source between V_{USB} and V_{EXT}.

- Jumper CN3 to select power supply source for VDD (3.3V or 3.6V)

- Jumper CN4 to select power supply source for VDD_WIFI (onboard regulator or external supply)

- Connectors for extern 5V power supply (V_{EXT})

- Power indicator LED for availability of onboard 3.6V regulated output

- Reset button

- Pads for headers to access the I/O pins of the SN8200 module.

- Serial flash (8M bits) and interface connectors

- SHT21 temperature and relative humidity sensor

- UART interface connectors

2.1.1 Programming and debug interface

The SN82XX EVB provides a mechanism for programming and debugging applications on the SN8200 module through the USB-JTAG interface. The instructions for installing the driver for the USB-JTAG interface are described in Section 2.3.

2.1.2 UART interface

The EVB also provides a serial interface to the SN8200 module through the USB-UART interface. The instructions for installing the driver for that interface are described in Section 2.3. The jumpers for connectors CN8-CN11 may be removed to disconnect the USB-UART interface; the corresponding signals from the module may then be directly connected to the customer platform for product development and testing. The ordering of the jumpers in the illustration below listed from left to right is CN9, 8, 12, 11 and 10. The upper row of the pins is connected to the USB-UART port, and the lower row is connected to SN8200. Jumper on CN12 should be removed.

UART interface
(CN9, 8, 12, 11, 10)
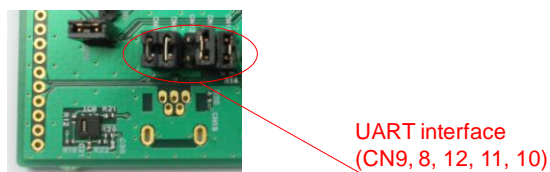
Connector	SN8200 pins	SN8200 Signal	Remark
CN8	35	RTS/	Jumper on to use USB-UART interface
CN9	34	CTS/	Jumper on to use USB-UART interface
CN10	32	TXD	Jumper on to use USB-UART interface
CN11	33	RXD	Jumper on to use USB-UART interface

Table 1 UART interface jumpers

2.1.3 Serial flash

The EVB has an 8MBits Winbond W25Q80BL ([5]) serial flash that may be used for over-the-air FW upgrade by the WICED SDK (see http://www.broadcom.com/support/wiced/sdk.php to obtain the SDK). The jumpers on connectors CN16-CN21 may be removed to disconnect the serial flash from the module so that those pins may be connected to the customer platform for other purposes. The ordering of the jumpers in the illustration below listed from left to right is CN20, 16, 17, 18, 19 and 21. The upper row of the pins is connected to the serial flash, and the lower row is connected to SN8200.


Serial flash

Serial flash interface
(CN20, 16, 17, 18, 19, 21)
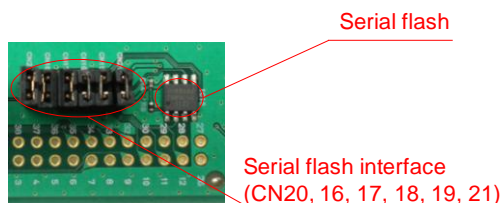
Connector	SN8200 pins	Flash Signal	Remark
CN16	6	WP/	Jumper on to use serial flash
CN17	10	CS/	Jumper on to use serial flash
CN18	11	CLK	Jumper on to use serial flash
CN19	12	DI	Jumper on to use serial flash
CN20	46	DO	Jumper on to use serial flash
CN21	-	Power	Jumper on to use serial flash

Table 2 Serial flash interface jumpers

2.1.4 EVB supply jumper setting

The EVB power can be provided either by the USB host or an external 5V supply. The supply source is configured by jumper CN2, as shown below and described in Table 3. By default, the USB is selected as the power source for the EVB.

Mini-USB connector

V_{EXT}

CN2 (V_{EXT} on bottom)
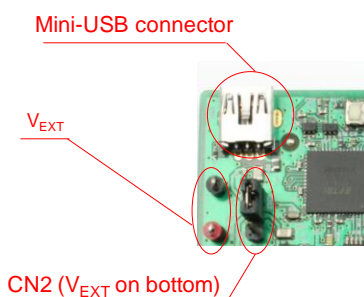
Power source	CN2 position	Remark
USB	Top	Jumper closest to mini-USB connector
External 5V DC	Bottom	Jumper away from USB connector

Table 3 EVB power supply jumper setting

2.1.5 SN8200 supply jumper setting

The SN8200 VDD can be provided by the EVB and is selectable between 3.3V and 3.6V. That permits the EVB to support platforms with different VDD voltages. The supply source is configured by jumper CN3, as shown below and described in Table 4. The power indicator LED shows the availability of onboard 3V6 regulated output, which also indicates power to SN8200 if the jumpers CN3 and CN4 both select the onboard 3.6V LDO.
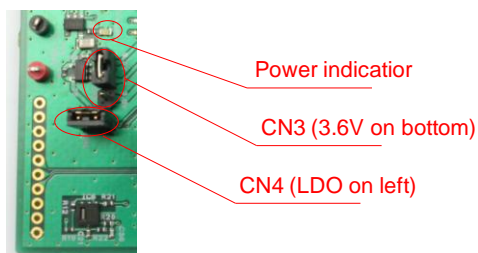
VDD source	CN3 position	Remark
3.3V	Top	Jumper closest to power indicator
3.6V	Bottom	Jumper away from power indicator

Table 4 VDD supply jumper setting

The WiFi power supply can be supplied either by the onboard regulator (jumper on CN4), or may be connected to the customer platform or external power supply by removing the jumper and applying the power to the pin on CN4 that is closest to CN3.

VDD_WIFI source	Remark
3.6V onboard LDO	Jumper on CN4
External supply	Jumper off CN4. Power connected to rightmost pin (closest to CN3) on CN4

Table 5 VDD_WIFI supply configuration

2.1.6 SHT21 sensor

The SHT21 ([6]) is a digital sensor that can be used to measure temperature and relative humidity. It is connected to the module's I2C interface (SN8200 pins 43-44). The sensor may be disconnected from the SN8200 module by removing capacitor C36 and the following 0Ω resistors: R19, R20 and R21 as highlighted below.
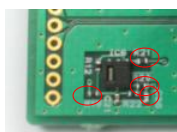

Figure 2 SHT21 sensor interface

2.2 SN8200 SNIC installation package

The SN8200 EVK+ installation package must first be installed in a PC running Windows XP or Win7. The package includes the Windows drivers, SN82XX SNICMonitor, open source info and this user guide. In the ensuing discussion, it is assumed that the package has been extracted to the SNIC root directory *<Install Folder>*, e.g., *C:\SNIC.* After accepting the click-through SLA, the following contents are installed in the *<Install Folder>* folder of the PC. Note that any existing file in the *<Install Folder>* and subfolders is kept if it has a different filename; otherwise, it is overwritten by that from the installation package. Delete any existing *<Install Folder>* prior to executing the install package for a clean installation.
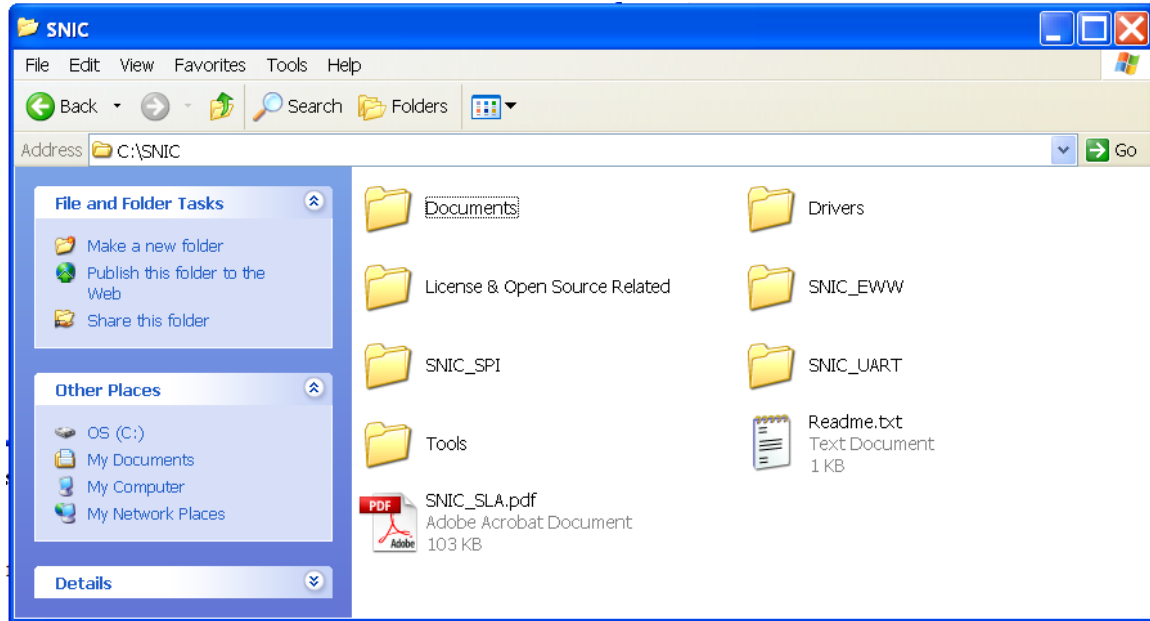
Figure 3 Installed SN8200 SNIC contents

- *Documents*

  Contains this user guide, simple web services (SWS) URIs and SN82XX EVB schematics.

- *Drivers*

  Contains the FTDI drivers for the PC to support the USB-JTAG and USB-UART devices on the EVB. The steps to install those drivers are detailed in Sections 2.3 and 2.4.

- *License & Open Source Related*

  Contains reference to the licenses and open source code.

- *Tools*

  Contains the SN82XX SNICMonitor and the OpenOCD driver for the USB-JTAG interface.

- *SNIC_EWW*

  Contains software that enables host-less applications using EZ Web Wizzard. SNIC_EWW is used mainly in applications for which SN8200 is controlled by web interface without any additional MCU. It may also be used in cases where SN8200 is simultaneously controlled by a host MCU via UART or SPI if the same interface pins are not used by both SNIC_EWW and SNIC_UART/SNIC_SPI.

- *SNIC_SPI*

  Contains software that enables MCU-based host applications to control SN8200 via SPI interface.

- *SNIC_UART*

    Contains software that enables MCU-based host applications to control SN8200 via UART interface.

2.3 Installing the USB drivers for the SN82XX EVB

This section can be skipped if the USB drivers have been installed before and are working normally. The SN82XX EVB connects to the PC through USB. The USB interface provides +5V power as well as individual JTAG and UART interfaces to the ARM processor in the SN8200 module.

Figure 4 SN8200 EVK+ Configuration

A USB driver for the SN82XX EVB is provided with the EVK. There are two USB devices on the SN82XX EVB, a USB-JTAG device (device A) and a USB-UART device (device B). Drivers must be installed for both devices. A serial port driver must also be installed. The purpose of the serial driver is to make the USB-Serial interface appear to Windows as a COM port. The driver installers are located in the directory *<Install Folder>\Drivers.*

Follow the instruction below to install the drivers for the SN82XX EVB. The steps and screen shots below are made from Windows XP (with Service Pack 3) or Win 7 computer that did not have any of the drivers installed. The steps are different if any of the drivers is already installed. If any uncertified driver warning window appears during installation, click to continue the installation process.

1. Connect the SN82XX EVB to a USB port on the PC. For XP, the Found New Hardware Wizard window should open if the drivers are not already installed. **Click "Cancel" for all such windows**. Otherwise the installation may fail. For Win 7, a message "Device driver software was not successfully installed" should appear. Ignore this message.

Figure 5 XP Found New Hardware warning

2. Go to directory *<Install Folder>\Drivers* and double click the corresponding installer to install drivers. For Windows XP, use SN8200_Install_XP.exe. For Windows 7, use SN8200_Install_Win7.exe.
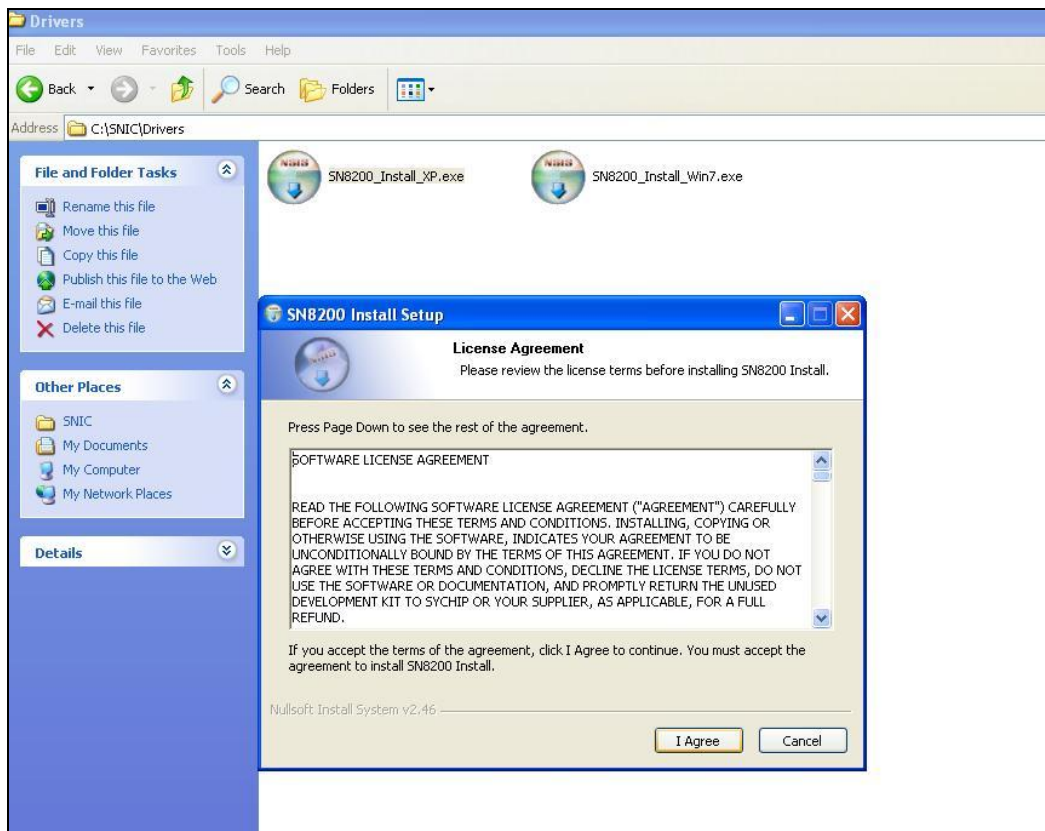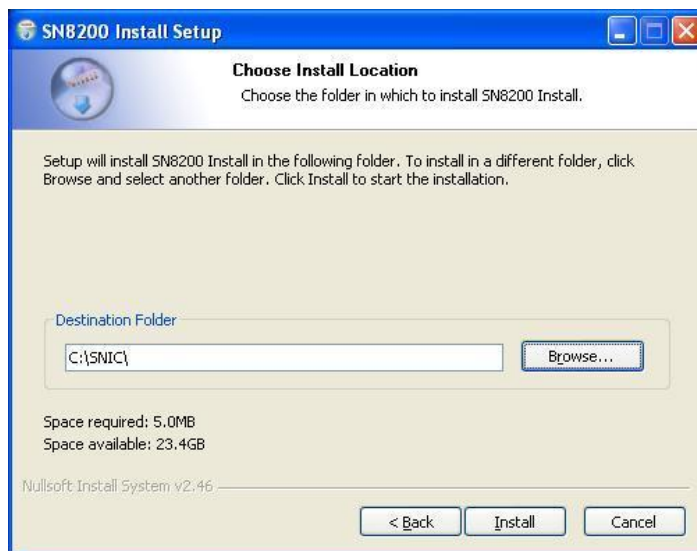

Figure 6 Driver installers

3. Click on "I Agree" to accept the license agreement. On the next screen, click "Next", and choose the install location to be the same as *<Install Folder>* (e.g., C:\SNIC):

4. Click "Install", and click "Next" on the next screen. If warning message about un-authenticated driver appears, click "Continue anyway" on XP, or click "Install this driver software anyway" on Win 7. Examples are shown in the following figures.

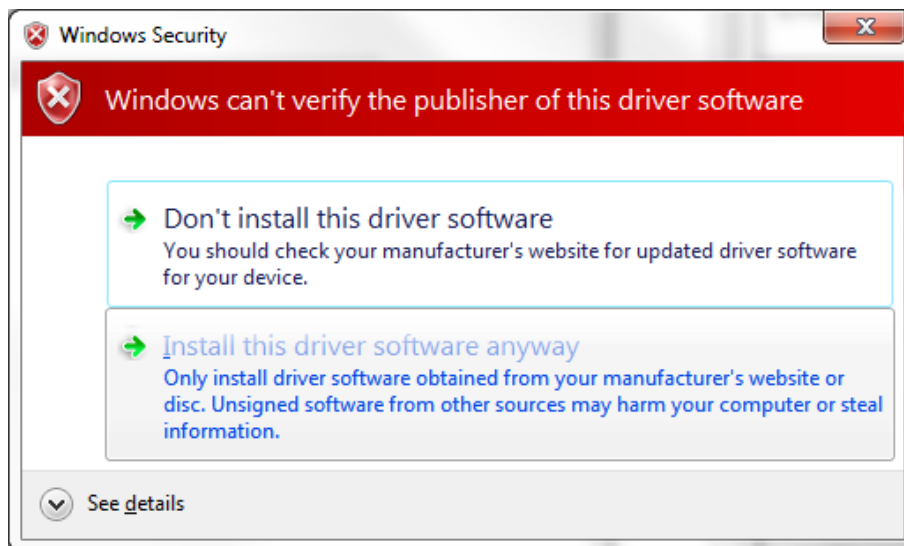**Figure 7 Warning message for Win XP**

Figure 8 Warning message for Win 7

5. The above screen may appear multiple (up to 3) times. Continue the installation until the
    following window shows up:

Figure 9 Completion of driver installation

6. Click "Finish" to complete the installation. The installed drivers will be located in the directory
    <Install Folder>\Drivers\SN8200EVAL1, e.g., *C:\SNIC\Drivers\SN8200EVAL.* See the next
    section to verify all drivers needed are properly installed.

2.4 Verifying USB Driver Installations

Verify that installation of the drivers was successful by checking the Device Manager window. Follow the
steps below to open the Device Manager window:

1. For XP, select **Windows Start Button->Control Panel->System->Hardware->Device Manager**.
    For Win 7, select **Windows Start Button->Control Panel->Hardware and sound->Device Manager**.
2. The A device (SN8200EVAL1 A) should be under *<computer-name>\SN8200 USB-JTAG Device* as shown in the screen capture below.

3. The B device (SN8200 USB Serial Port) should be under *<computer-name>\Ports (COM & LPT)* as shown in the screen capture below.

4. Take note of the USB serial COM port number for later use. Your SN82XX EVB USB serial COM port will most likely be assigned to a different port number than shown in the screen capture.
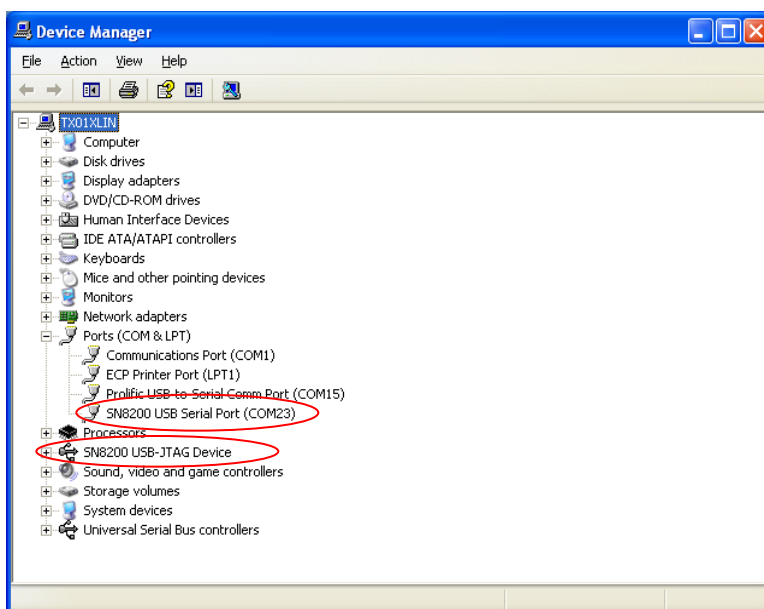

Figure 10 Device Manager screen showing installed SN8200 serial and JTAG drivers

2.5 Uninstalling the USB drivers

If for any reason, it is desired to uninstall the USB drivers, go to **Control Panel->Add Remove Programs** (for XP) or **Control Panel->Uninstall a program** (for Win 7) to remove the three drivers installed.
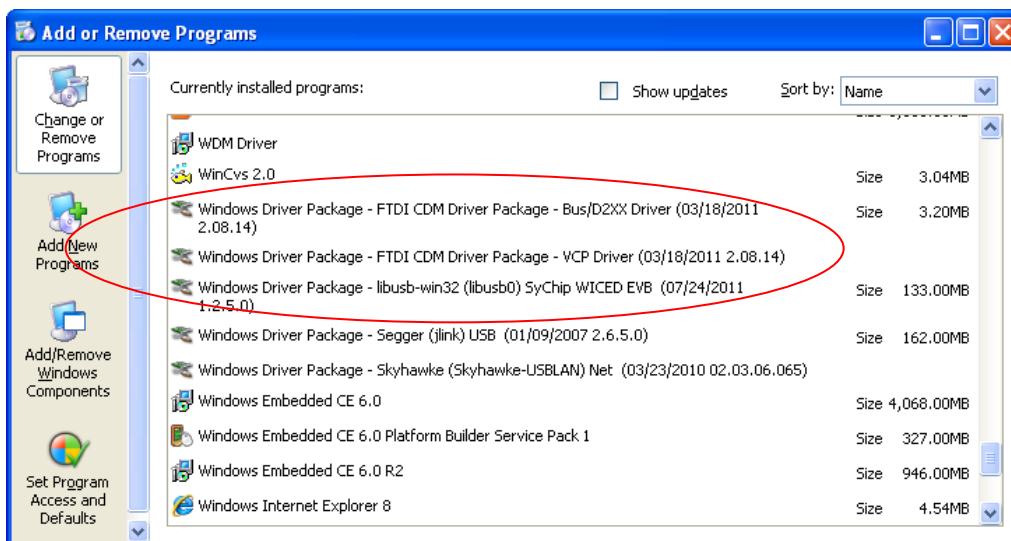
Figure 11 Uninstalling USB drivers

2.6 Installing the SN82XX SNICMonitor

Execute *<Install Folder>\Tools\SNICMonitor\setup.exe* to install.   It will copy the necessary files to *C:\Program Files\Murata\SNICMonitor* folder. A SNICMonitor shortcut similar to the one shown below should also be placed on the desktop.

Figure 12 SN82XX SNICMonitor icon

NOTE: To install an updated version, first go to PC's **Control Panel->Add Remove Programs** to remove the existing SNICMonitor, and then run *setup.exe* again.

The usage of SNICMonitor is application specific. It is detailed in *SN82XX SNIC UART Serial Interface User Manual [2]*, *SN82XX SNIC SPI Serial Interface User Manual [4]* and *SN82XX SNIC EZ Web Wizzard User Manual* [3].

3. <u>Third party licensing information</u>

The demo application uses the following open source and vendor-specific libraries:

- FTDI (libftdi/libusb) open source driver

- FreeRTOS open source RTOS

- LwIP open source network stack

- ARM GNU open source gcc toolchain

- STM32F1x library

- Cortex-M3 CMSIS

- Broadcom WICED SDK

- jQuery

The means for obtaining the licenses and sources for those components is located in *<Install Folder>\License & Open Source Related*.

(END)