nRF24L01+ Evaluation and Configuration User Guide

INSTALLATION

IMPORTANT! You must have administrator privileges to install this software and you must install the software before connecting the hardware to your computer. Your computer must run Windows XP and have two available USB ports.

Double click setup.exe found in the "nRF24L01+EC" directory on your CD-ROM to start the installation of nRF24L01+EC. Follow the instructions on the screen. At the end of the installation the USB driver will be installed. Once the installation is complete you can connect the evaluation boards to your computer.

USAGE

There is one tab for each evaluation board and the number after "USB" on the tab refers to the number selected on the "SW1" rotary switch on the evaluation board. This must be different on all boards connected to the same PC.

After installation and connection of the evaluation kits and starting up nRF24L01+EC the screen looks like the following figure:
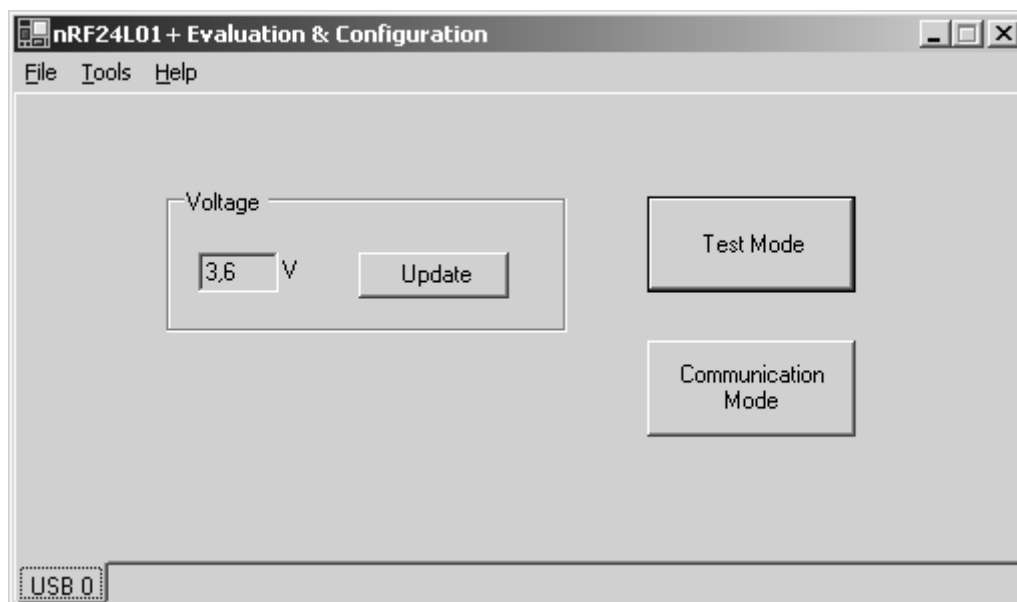

Figure 1: nRF24L01+ Main Window

The voltage shown is the voltage on the evaluation board. Hit the "Update" button to check the voltage when you adjust the voltage by rotating the pot meter on the board.

Firmware Upgrade Description

On the tools menu you can upgrade the firmware when new firmware is available.

Figure 2: Firmware upgrade window.

By default the program looks for the firmware files in the installation folder but you can specify another location if needed. Please make sure the evaluation board is firmly connected to the USB cable before hitting the "Upgrade" button. If your evaluation board has an old version of the firmware the firmware upgrade dialog box is shown automatically.

TEST MODE

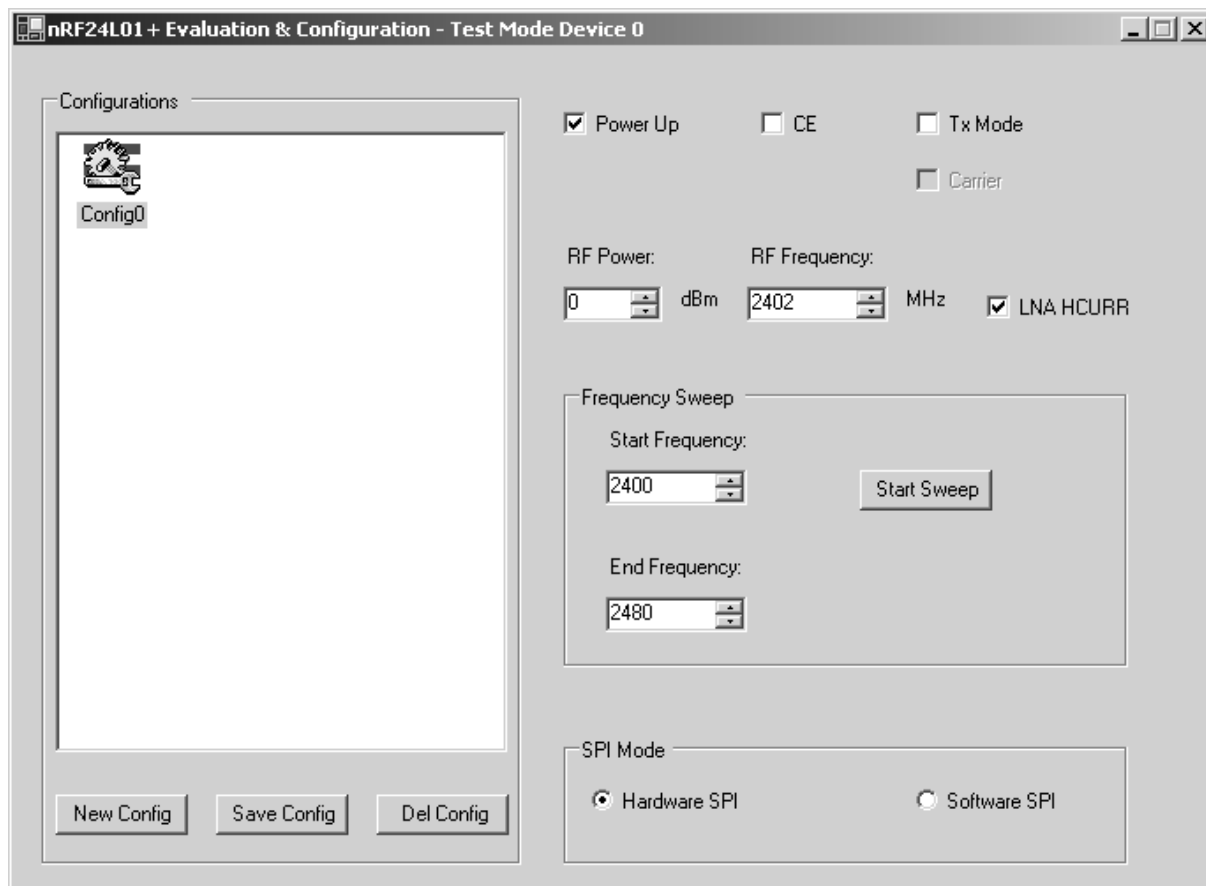Click the "Test Mode" button in the main window to enter test mode:

Figure 3: nRF24L01+EC Test Mode Window

Here you can control the device and do basic RF tests. The SPI Mode selects whether the microcontroller should use hardware SPI or software SPI when communicating with the nRF24L01+ device.

Test Mode Window Description:

Power Up: Toggles the Power Up bit in CONFIG register.
CE: Toggle CE pin high/ low.
TX Mode: nRF24L01+ device switches between RX and TX mode.
Carrier: When in "Tx Mode", nRF24L01+ device is set up with a constant carrier[1].
RF Power: Select one of the four output power levels available for nRF24L01+.
RF Frequency: Set RF channel for nRF24L01+.
LNA HCURR: Toggles the "LNA_HCURR" bit in RF_SETUP register.

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[1] Refer to the document "nRF24L01+ Test Setup" for a description of the carrier function.

Frequency Sweep frame:

Start Frequency: Select the lower frequency for "Frequency sweep mode".
Stop Frequency: Select the higher frequency for "Frequency sweep mode".
Start Sweep: Start continuous frequency sweep of nRF24L01+ device, in the range of "Start Frequency" to "Stop Frequency".

Hardware SPI: Configure CPU to use built-in hardware SPI protocol.
Software SPI: Configure CPU to use software driven SPI protocol.

Configurations frame:

Here you can save the current configuration and read a configuration by double-clicking the icon. You can also change the name of the configuration by clicking on the label and delete a configuration by clicking on the icon and hit the "DEL" button.

COMMUNICATION MODE

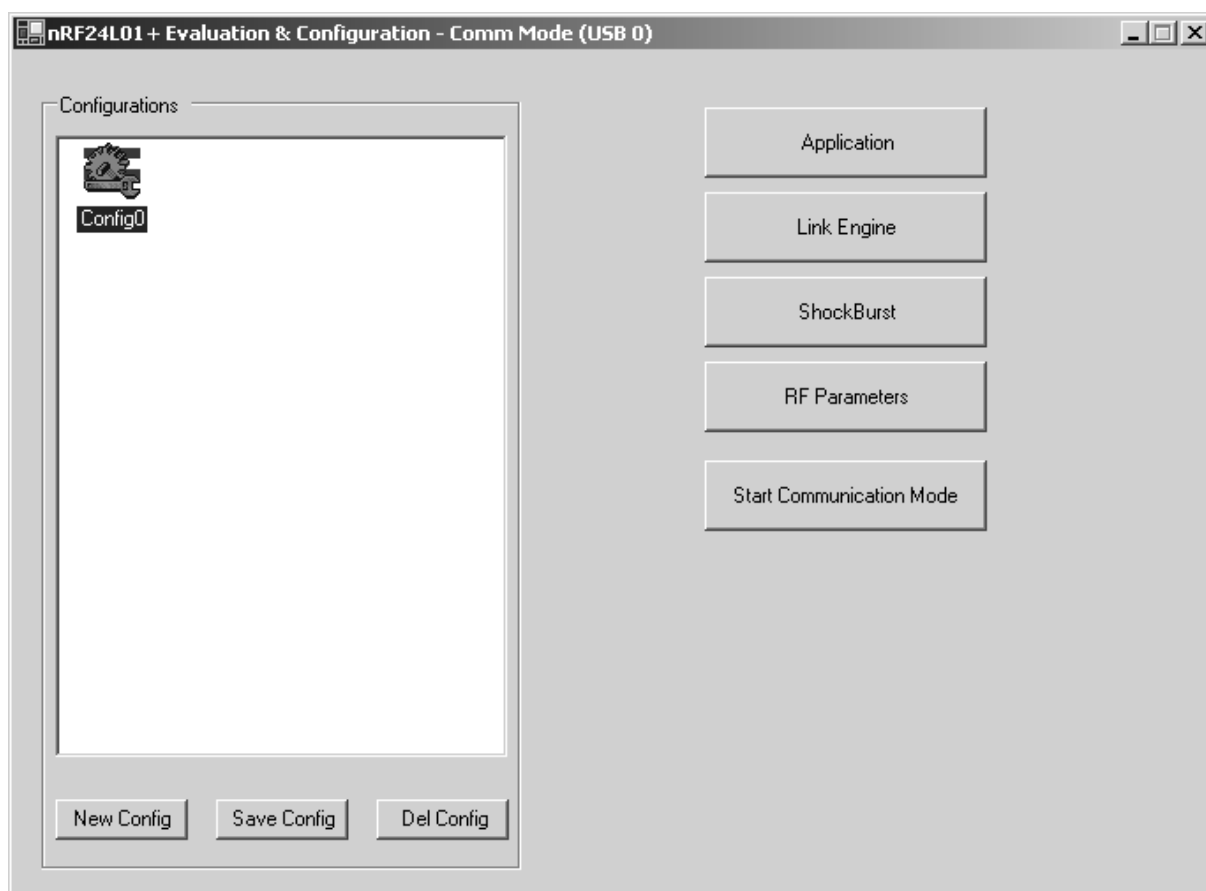When you click on the "Communication Mode" button in the main window the following screen pops up

Figure 4: Communication Mode Window.

In this window you configure the firmware for RF-communication. Please see the document "nRF24L01+ Test Setup" for a thorough description of the setup procedure. In the events window you will get a message each time the link is established or link is lost, when the device connected is an RX-device and the "Ignore Events" box is not checked. To save the events to a file, right click in the events window and select "Save Events…" in the displayed pop-up menu.

Buttons functionality:

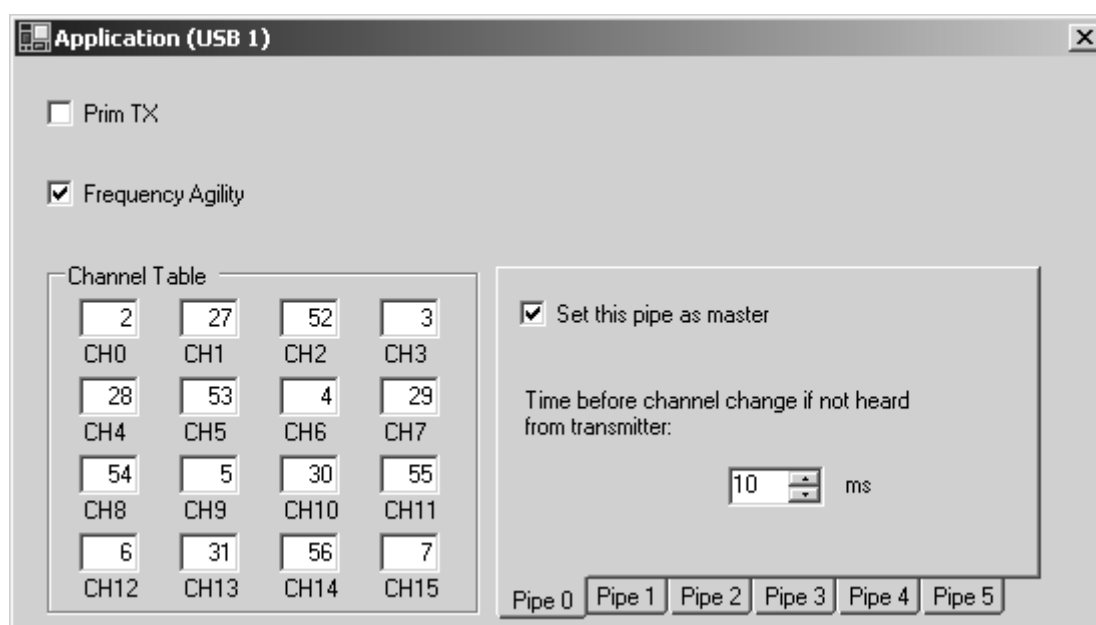**Application Button:**

Enter Application setup window.

Figure 5: Application Window when the device is a primary RX-device.

The channel table is used for frequency hopping when frequency agility is enabled. When the current device is a primary RX device you can select one of the pipes as a master. Only the pipes enabled in the Link form is shown here.

When "Prim TX" is checked you can select either that packets are sent at regular intervals or when Button 1 on the evaluation board is pressed.

Figure 6: Application Window when the device is a primary TX-device.

Link Engine Button:

Enter the Link Engine setup window.

Figure 7: Link Engine Window.

The "Enable auto acknowledgement" is checked and disabled when "Frequency Agility" is checked in the Application form.

ShockBurst Button:

In the ShockBurst form you can select the transmit address, payload and payload length when in primary TX mode. The CRC Length can also be selected in this page. If frequency agility is selected or auto acknowledgement is selected CRC checking can't be turned off.
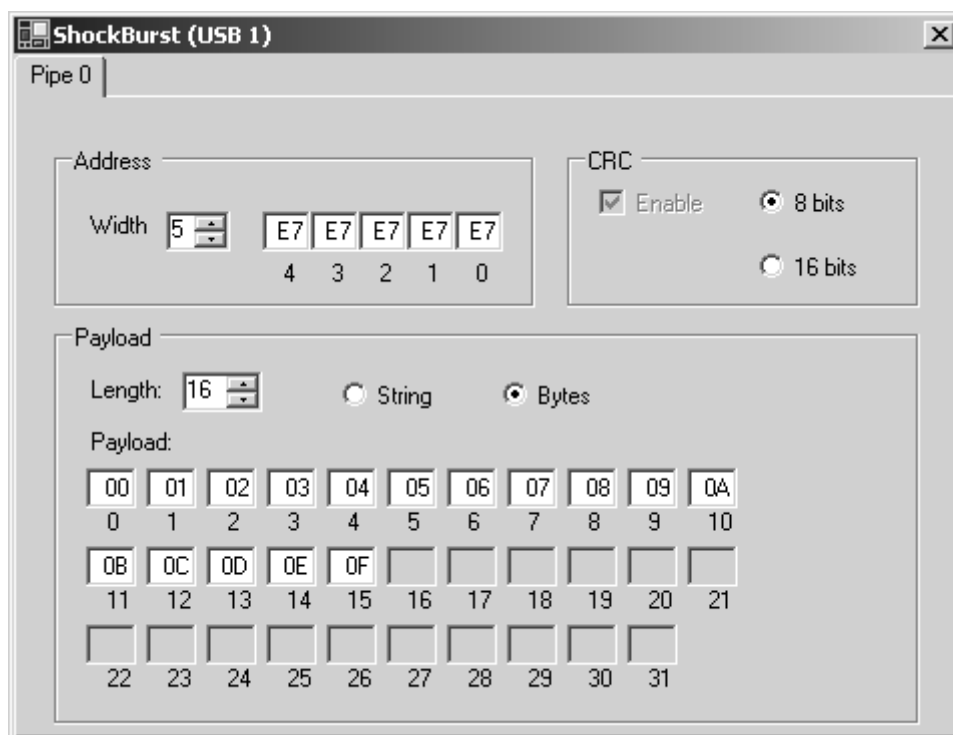
Figure 8: ShockBurst Window when the device is a primary TX-device.

When the device is in primary RX mode you can in addition set the address for pipes1-5 following the rules in the data sheet. The CRC and address widths are common for all pipes and the selections must be done under the Pipe0 tab. When the device is a TX-device you can select the payload to be sent as ASCII-bytes or as a text string. When the device is a primary RX-device, you can only set the length of the payload in the Payload area of this window as shown in Figure 9.
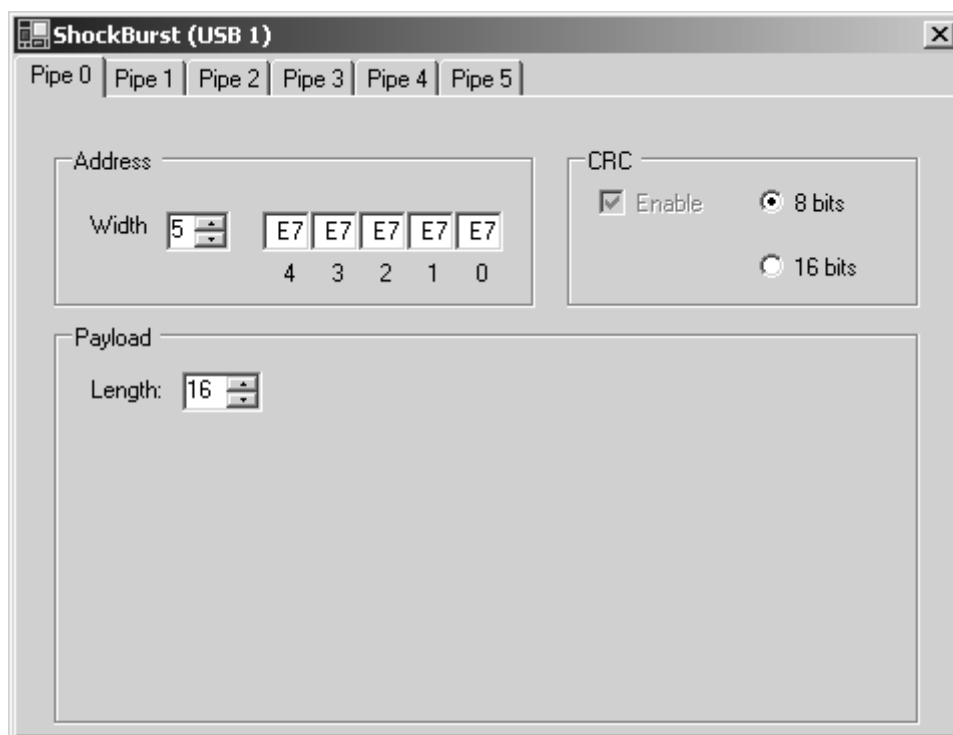
Figure 9: ShockBurst Window when the device is a primary RX-device.

RF Parameters Button:

Under RF Parameters you can select the RF power, if LNA HCURR should be used and if the microcontroller on the nRF24L01+ EVSYSTEM should use hardware SPI or software SPI while communicating with the nRF24L01+ device.
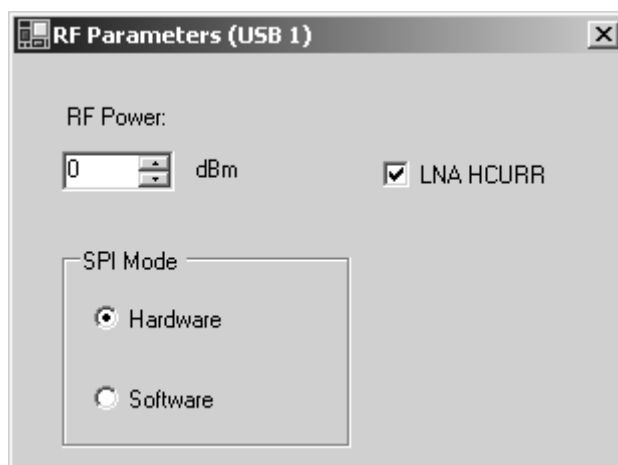

Figure 10: RF Parameters Window when frequency agility is turned on.
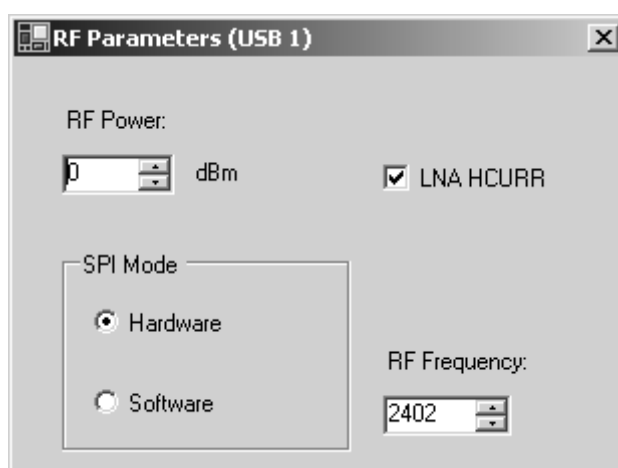
Figure 11: RF Parameters Window when frequency agility is turned on.

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Main Office:
Vestre Rosten 81, N-7075 Tiller, Norway
Phone: +47 72 89 89 00, Fax: +47 72 89 89 89

Visit the Nordic Semiconductor ASA website at http://www.nordicsemi.no