Nivis Radio Modem Calibration Procedure

Version 1.0

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Revision History

Date	Revision	Description	Author
12/3/2004	1.0	Calibration Procedure	Robert Assimiti

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1. Scope

The scope of this document is to describe the tune-up procedure undergone by each Nivis Radio Modem

2. Calibration Equipment

2.1. NivisLink Software (Calibration GUI)

The NivisLink software is a LabView application that permits automatization of calibration and testing procedure of the Nivis radio modem.

2.1.1. Serial Port Setup

- Initialize the NivisLink application
- Select the “Serial” tab
- Ensure that the settings in the “Port Configuration” section are as follows

  Com Port: correct COM port
  Baud Rate: 9600
  Data bits: 8
  Buffer size: 0
  Stop bits: 1 bit
  Parity: no parity

A screenshot of the “Serial” tab is presented in Figure 1.

2.2. Calibration and Test Equipment

The following test equipment is necessary to support calibration procedures of the Nivis Radio Modem. Configuration details for each test are described under individual test headings.

- Computer
  - NivisLink Calibration software
  - GPIB card
- Frequency Counter (1GHz)
- Serial Cable
- GPIB Cable

- Power Supply/Battery

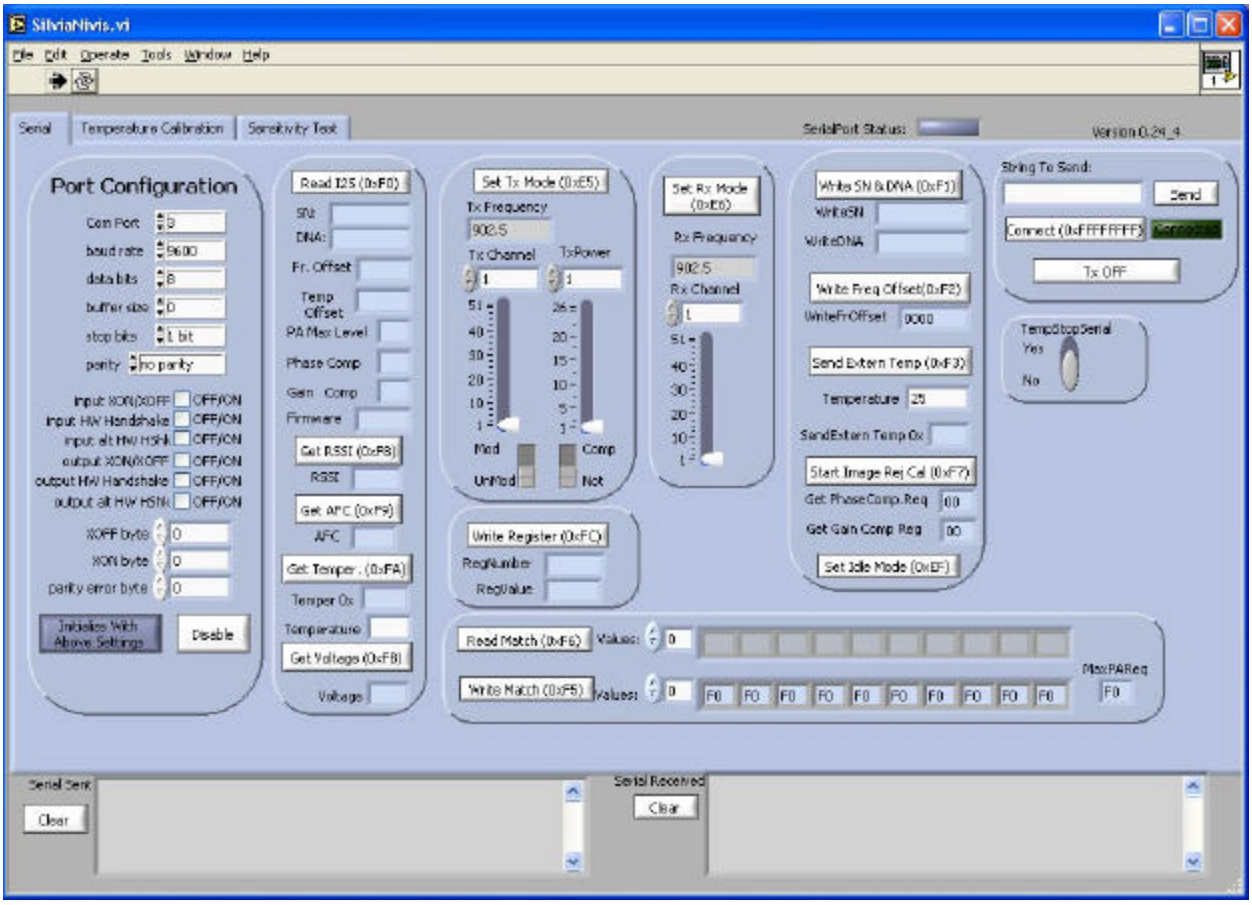
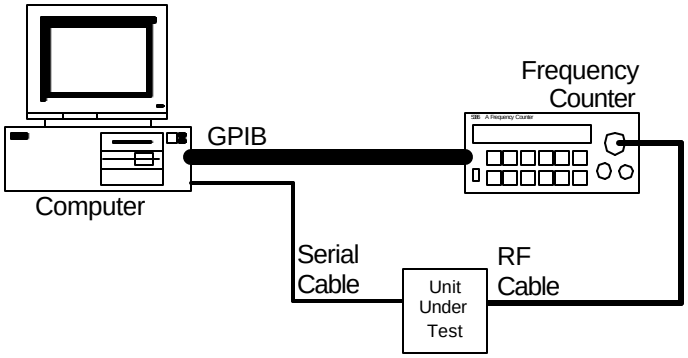


Figure 1: Screenshot of Serial Tab of the NivisLink Application

3. Automatic Frequency Control Calibration

After the manufacturing process the frequency of the RF transceiver must be correlated to an accurate reference frequency. This was traditionally accomplished manually with a trimmer capacitor.
The NivisLink application permits automatic frequency control calibration excluding the necessity of a costly manual operation.

3.1. Setup Diagram



3.1.1. Connect the computer's serial port to the Radio modem development board serial port through a serial cable.
3.1.2. Attach the RF output to the frequency counter input.
3.1.3. Make sure the appropriate channel is being used on the counter. The channel should work up to 1 GHz. Also ensure that the input to the frequency counter is protected to its maximum input power.
3.1.4. Power up the mother board/modem.

3.2. Procedure

Connect to the radio modem through the serial port by pressing the "CONNECT (0xFFFFFFFF) button located in the "String to Send" section of the "SERIAL" tab page (NivisLink GUI).
Once the "CONNECTED" button is highlighted, switch over to the tab entitled "Temperature Calibration". The "Temperature Calibration" tab is depicted in Figure 2. Press the "Frequency Offset" button. This will set the radio modem in transmission at a low output power at a frequency of 915 MHz. The counter will display the frequency of the signal and than send the value to the NivisLink application via the GPIB. The frequency received will be displayed in the "UnComp CalFreq". The offset between the frequency received and 915 Mhz will be displayed in the "UnComp Freq Error" tab and will be sent to the modem. The modem will adjust it's transmit frequency according to the offset received and will re-transmit. This string of events is re-iterated until the frequency is within ± 500 Hz of 915 Mhz. Once a final frequency offset value is reached, the value is written in the modem's calibration EEPROM.

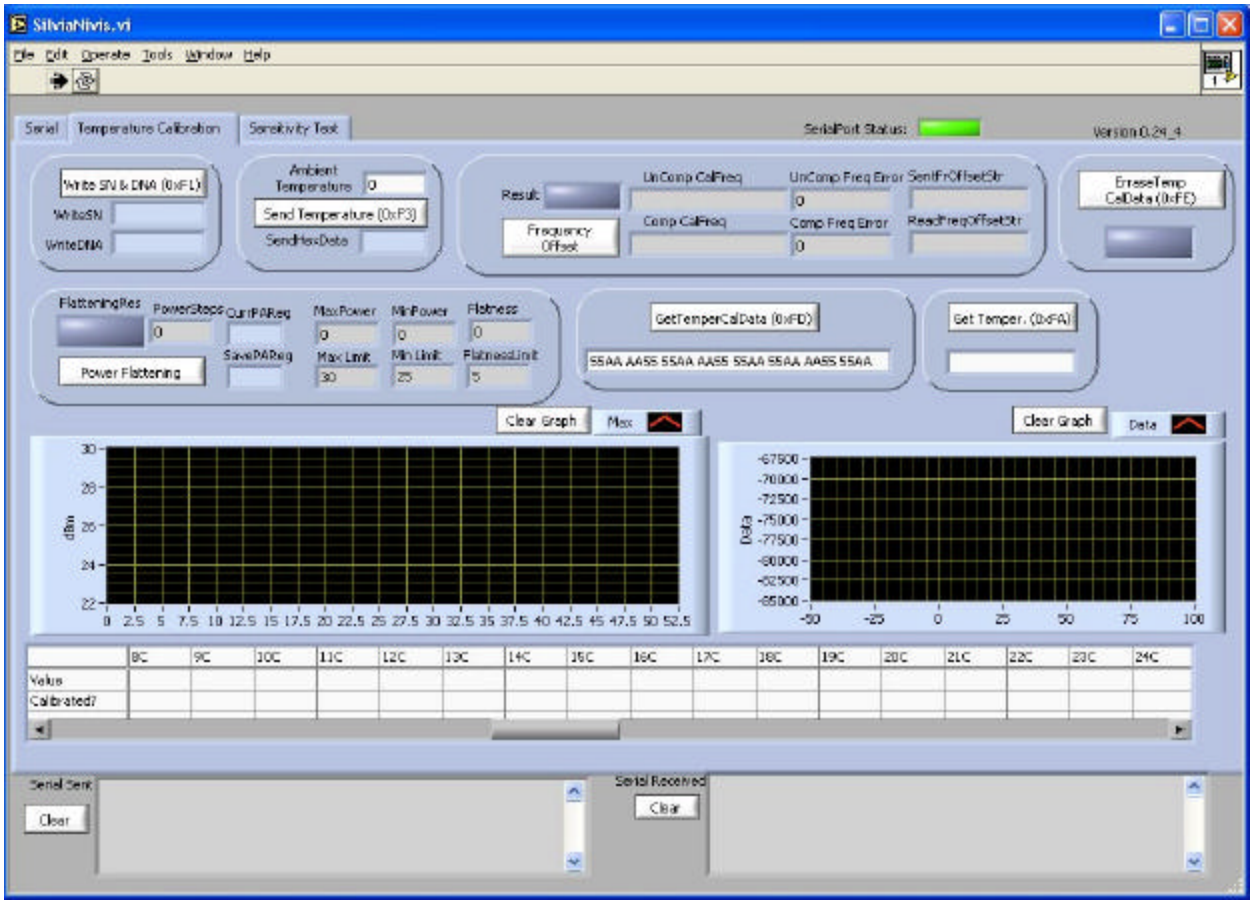


Figure 2: Screenshot of Temperature Calibraion Tab of the NivisLink Application

4. Assignment of ID and Temperature Compensation

4.1 Assignment of ID

Enter the desired serial number in the tab labeled “Write SN” and than press the “Write SN & DNA (0xF1)” button.
The serial number will be stored in the calibration EEPROM of the modem, and will become the permanent ID of the modem.

4.2 Temperature Compensation

Using an accurate temperature sensor measure the ambient temperature of the modem. Enter the temperature value in the tab labeled “Ambient Temperature” and than use the “Send Temperature” button.
The modem processor will write the value in the calibration EEPROM. This will serve as a temperature reference for the processor’s internal temperature sensor.