OM2385SF001QSG

OM2385/SF001 development kit

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1 OM2385/SF001 development kit

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Figure 1. OM2385/SF001

2 Getting started

The OM2385/SF001 development kit is an evaluation platform that supports applications using NXP's OL2385 system–on–chip (SoC) SIGFOX solution.

2.1 Kit contents/packing list

The **OM2385/SF001 development kit** contents includes:

- Assembled and tested OM2385/SF001 shield board mounted to a FRDM-KL43Z board pre-loaded with compatible microcode
- PCB antenna, ISM, 868/915 MHZ, 100MM Molex 105262-001
- Standard A (male) to Mini B (male) USB cable
- A Quick Start Guide

3   Configuring the hardware

To configure the OM2385/SF001, the user must:

1. Download drivers for the FRDM-KL43Z (first time only).
2. Connect the hardware for use with the SIGFOX network.

3.1   Downloading and installing the driver for the FRDM-KL43Z

This procedure involves downloading the FRDM-KL43Z driver from the P & E Microcomputer Systems website and installing it on the host PC.

1. Go to the P & E Microcomputer Systems OpenSDA page at http://www.pemicro.com/ opensda and, in the **Windows USB Drivers** box, click to download the **PEDrivers_install.exe** file to a location on the host PC.
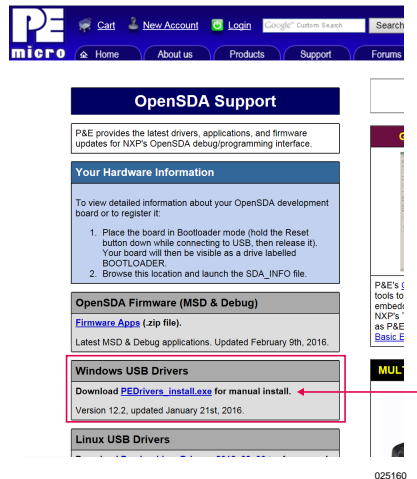
2. When the download completes, click on the **PEDrivers_install.exe** file and follow the instructions to install the driver.
3. Connect a USB cable between the host PC and the FRDM-KL43Z USB port labeled **SDA** (J13).
4. Open Windows Explorer on the host PC. An icon labeled **FRDM-KL43Z** appears as a removable drive on the PC.

The FRDM-KL43Z is now ready for use with the OM2385/SF001 development kit.

3.2   Connecting the hardware for use with the SIGFOX network

To connect the hardware to send messages across the SIGFOX network, do the following:

1. Check to assure that the OM2385 shield board is firmly attached to the FRDM-KL43Z. When connecting the boards, the three switches on the shield board should be on the same side as the USB ports on the FRDM-KL43Z board.
2. Attach the PCB antenna (included with the kit) by snapping the uFL connector on the antenna to the uFL connector on the shield board.
3. Connect the Standard A end of the supplied USB cable to a Windows host PC. Connect the Mini B to the FRDM-KL43Z USB port labeled **SDA** (J13).
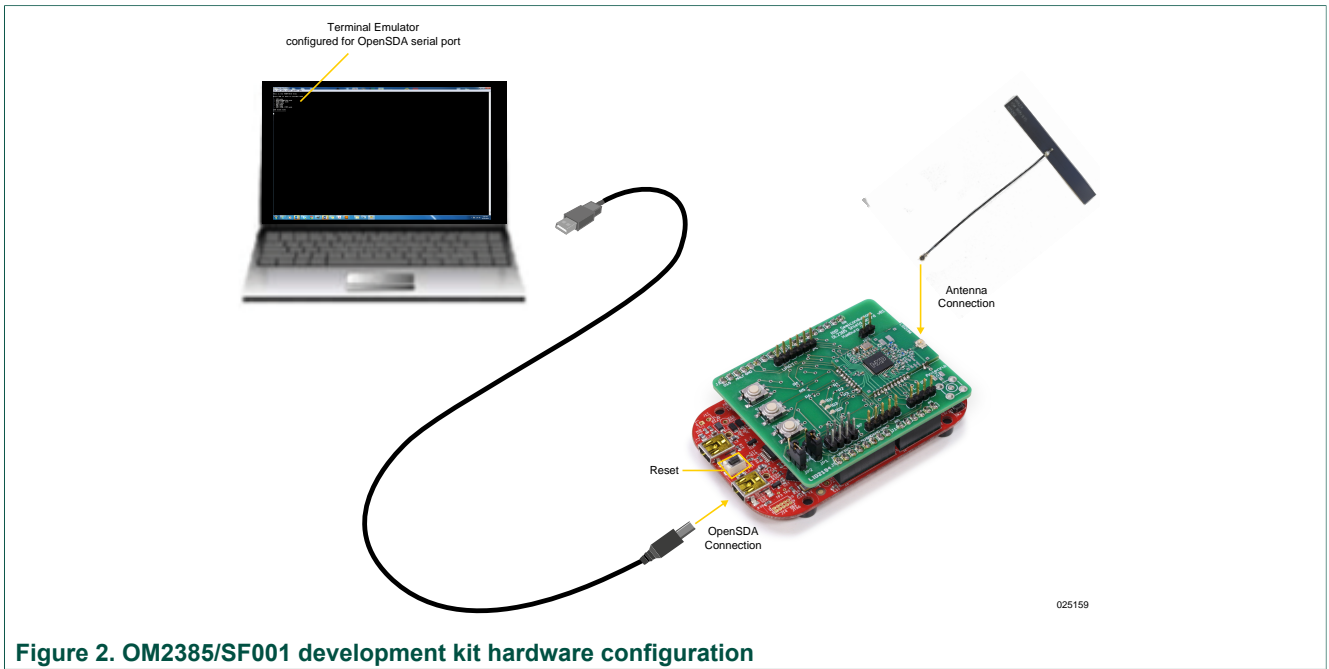
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Figure 2. OM2385/SF001 development kit hardware configuration

The OM2385/SF001 is now ready to be configured for use with the SIGFOX network.

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4   Setting up the software

Prior to using the OM2385/SF001, the designer must:

- Configure the terminal emulator.
- Get the Device ID and the Portable Access Code (PAC) for the modem.
- Activate a SIGFOX account and register the device
- Verify that the board is successfully sending and receiving messages on the SIGFOX network

The following sections describe the process for each of the above steps.
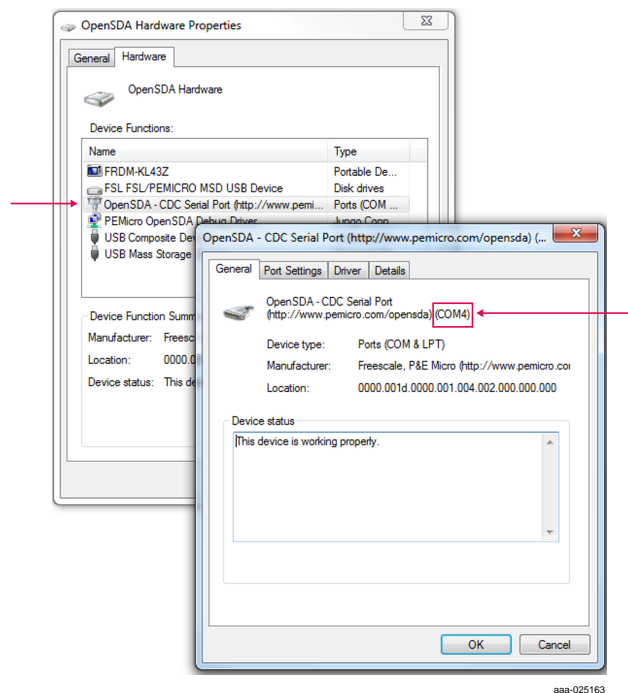
4.1   Configuring the terminal emulator

Prior to communicating with the SIGFOX network, the terminal emulator must be properly configured for serial communication. The process is as follows:

4.1.1   Getting the COM port number for the FRDM-KL43Z

Windows automatically assigns a COM port number to the FRDM-KL43Z OpenSDA port (**SDA**). This COM port number is required when connecting a terminal. To retrieve this number, do the following:

1. Assure that the USB cable is connected to the host PC through the **SDA** port on the FRDM-KL43Z.
2. From the Windows Control Panel under **Hardware and Sound** -> **Devices and Printers**, open the **Device Manager**.
3. In the Device Manager, click on **Ports (COM & LPT)**. Under **OpenSDA – CDC Serial Port**, note the COM port number.

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4.1.2 Setting up the serial port

The terminal emulator must be configured to support serial port communication. The procedure differs depending on the type of terminal emulator in use. However, all terminal emulators must be configured with the following settings.

- The terminal must be set up to use the COM port assigned to the OpenSDA port on the FRDM-KL43Z. (See Section 4.1.1 "Getting the COM port number for the FRDM-KL43Z".)
- The COM port must be configured with the following parameters:
  - 9600 baud rate
  - 8-bit word length
  - No parity bit
  - One stop bit

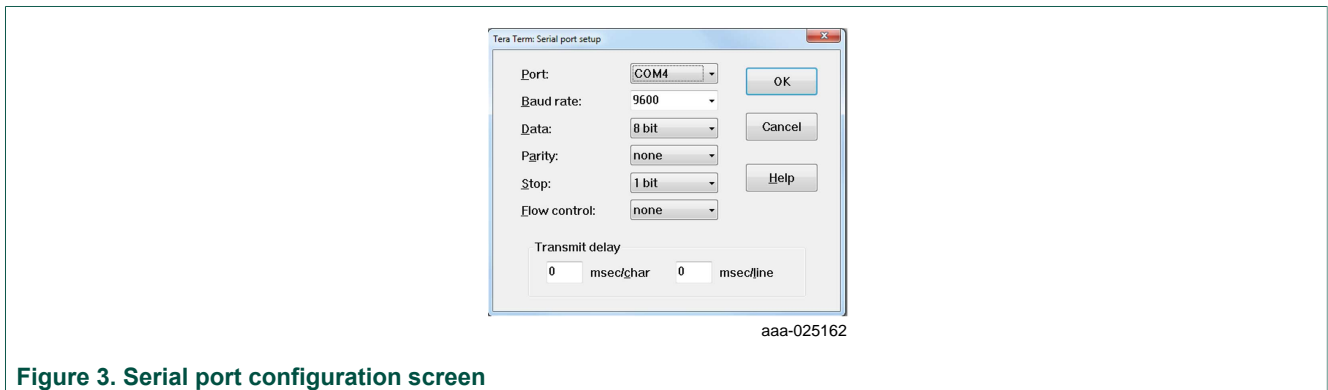Figure 3 shows the setup when the Tera Term emulator is used.

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Figure 3. Serial port configuration screen

4.2 Getting the Device ID and PAC

To get the 8-digit hexadecimal Device ID and 16-digit hexadecimal Portable Access Code (PAC), proceed as follows:

1. Detach the OM2385 shield board from the FRDM-KL43Z board. Locate the sticker on the back surface of the shield board and make a note of the 8-digit hexadecimal Device ID and the 16-digit hexadecimal Portable Access Code (PAC) (shown below).

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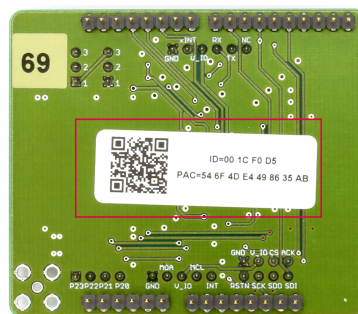
2. Re-attach the OM2385/SF001 board to the FRDM-KL43Z. Then connect the USB cable from the **SDA** port on the FRDM-KL43Z to the host PC.

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3. Activate the terminal emulator and press **Enter** to display a numbered menu of commands. If the list of commands does not appear, the FRDM-KL43Z microcode may need to be reloaded (see Section 5 "Appendix A—Downloading microcode to the FRDM-KL43Z")

4. From the command list, select command **0** and press **Enter**.

5. The Device ID and PAC displays as shown above. The the Device ID and PAC number should be identical to the number on the board label.

4.3 Activating a SIGFOX account

To activate a SIGFOX account, do the following:

1. Go to backend.sigfox.com/activate. On the **Choose your kit provider** page, select **NXP** as the kit provider.

2. On the upper right side of the page, select **Account details**. When the **Device Kit Activation** page displays, enter the appropriate account information. Then click **SUBSCRIBE**.

3. When the **Pick Your Country** page displays, select the appropriate country and Secondary Network Operator (SNO).

4. In the page that displays, enter the Device ID and the PAC. Then click **NEXT**.

4.4 Verifying that the board is sending and receiving messages

To verify that the board is sending and receiving messages on the SIGFOX network, do the following:

1. Connect the **SDA** port on the FRDM-KL43Z to a USB port on the PC.

2. Activate the terminal emulator and press the reset button (**RST**) on the FRDM-KL43Z to see the following menu:

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3. In the **List of commands**, select the appropriate region (**1**, **2**, **3** or **4**), then press **Enter**. This configures the device according to the selected regional standards. (This selection will have to be made every time the board is re-connected through the **SDA** port.)

4. To start the application, select the command **5** and press **Enter**.

5. Login to the SIGFOX account created in Section 4.3 "Activating a SIGFOX account".

6. Pick up the OM2385/SF001 board and do one of the following:
    • Using a twisting motion, vigorously shake the board back and forth a few times.
    • Press either the SW1 or the SW2 button on the board
    Both methods generate a message to the SIGFOX network.

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7. Return to the SIGFOX page and click on **Device's ID**. Then click **Messages**. A screen displays showing each message transmitted. The first byte of the message determines data type as follows:

Table 1. SIGFOX message - first byte format

Value (HEX)	Description	Unit of measurement
01	Temperature	Degrees Centigrade
02	Illuminance	Lumens (lx)
03	Acceleration	Thousandths of a gravitational field strength units (mg)

Figure 4 shows a typical SIGFOX message screen.
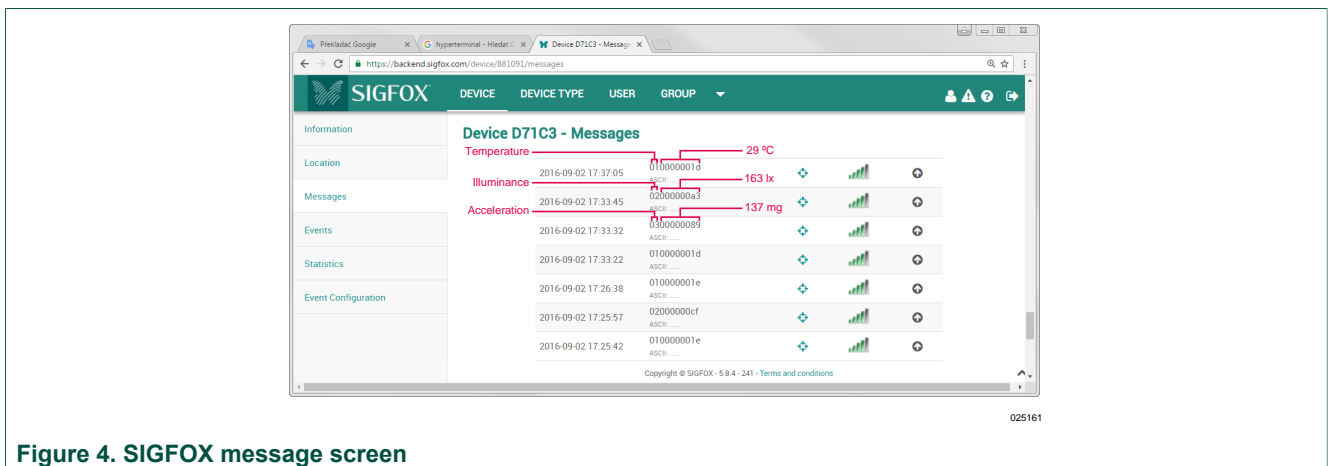

Figure 4. SIGFOX message screen

5   Appendix A—Downloading microcode to the FRDM-KL43Z

The OM2385/SF001 development kit comes with microcode already loaded on the FRDM-KL43Z. This appendix is intended for use only if the factory installed microcode is no longer functional and a fresh copy needs to be flashed to the board.

The procedure involves downloading the appropriate driver from the P & E Microcomputer Systems website and installing it on the FRDM-KL43Z board.

1. Go to the P & E Microcomputer Systems OpenSDA page at http://www.pemicro.com/opensda and in the **OpenSDA Firmware (MSD & Debug)** box, click to download the **Firmware Apps** zip file.
2. When the download completes, unzip the file contents to a folder on the host PC.
3. Connect the Standard A plug of the USB cable to the host PC.
4. On the FRDM-KL43Z, press and hold down the **Reset** button. With the button held down, attach the mini-B plug of the USB cable to the FRDM_KL43Z USB port labeled **SDA** (J13). Then release the **Reset** button. A blinking LED indicates the board is in Bootloader mode.
5. Open Windows Explorer on the host PC. An icon labeled **BOOTLOADER** appears as a removable drive on the PC.
6. From the files extracted from the PEMicro zip file, locate the driver file named **MSD-DEBUG-FRDM-KL43Z48M_Pemicro_v118.SDA**. Drag and drop this file onto the **BOOTLOADER** icon.
7. Unplug the USB mini-B plug then re-insert the plug back into the SDA port. A blinking LED on the board indicates that the FRDM-KL43Z is in bootload mode.

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8. Go to the OM2385/SF001 Tool Summary page at www.nxp.com/OM2385SF001 and open the Jump Start page. From the list of items, select and download the microcode file **FRDM_KL43_OL2385_DemoConsole.srec**.

9. Drag and drop the microcode file **FRDM_KL43_OL2385_DemoConsole.srec** onto the **FRDM-KL43Z** icon on the host PC.

10. Unplug the USB mini-B plug from the SDA port. The microcode is now installed and launches automatically each time the board is turned on.

6   References

The following URLs reference related NXP products and application solutions:

NXP.com support pages	Description	URL
OM2385/SF001	Tool summary page	http://www.nxp.com/OM2385
KTOM2385SF001UG	OM2385/SF001 hardware user guide	http://www.nxp.com/files/analog/doc/user_guide/KTOM2385SF001UG.pdf
OL2385SWUG	SIGFOX software driver user guide	http://www.nxp.com/files/analog/doc/user_guide/OL2385SWUG.pdf

7   Revision history

Revision	Date	Description of changes
1.0	10/2016	Initial release

8   Contact information

Visit http://www.nxp.com/support for a list of phone numbers within your region.

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