

WiMOD - iM282A

Application Note AN024 / Version 1.0

Firmware Update for iM282A

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Aim of this Document

Aim of this document is to give a short description on how to update the firmware of the module iM282A.

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1 Overview

Purpose of this application note is to describe how to update the firmware of the module.

2 Hardware Information

2.1 Schematic of the iM282A

The following figure shows the logical routing of the iM282A. It shows the pinout (left side) and all necessary information regarding software development.

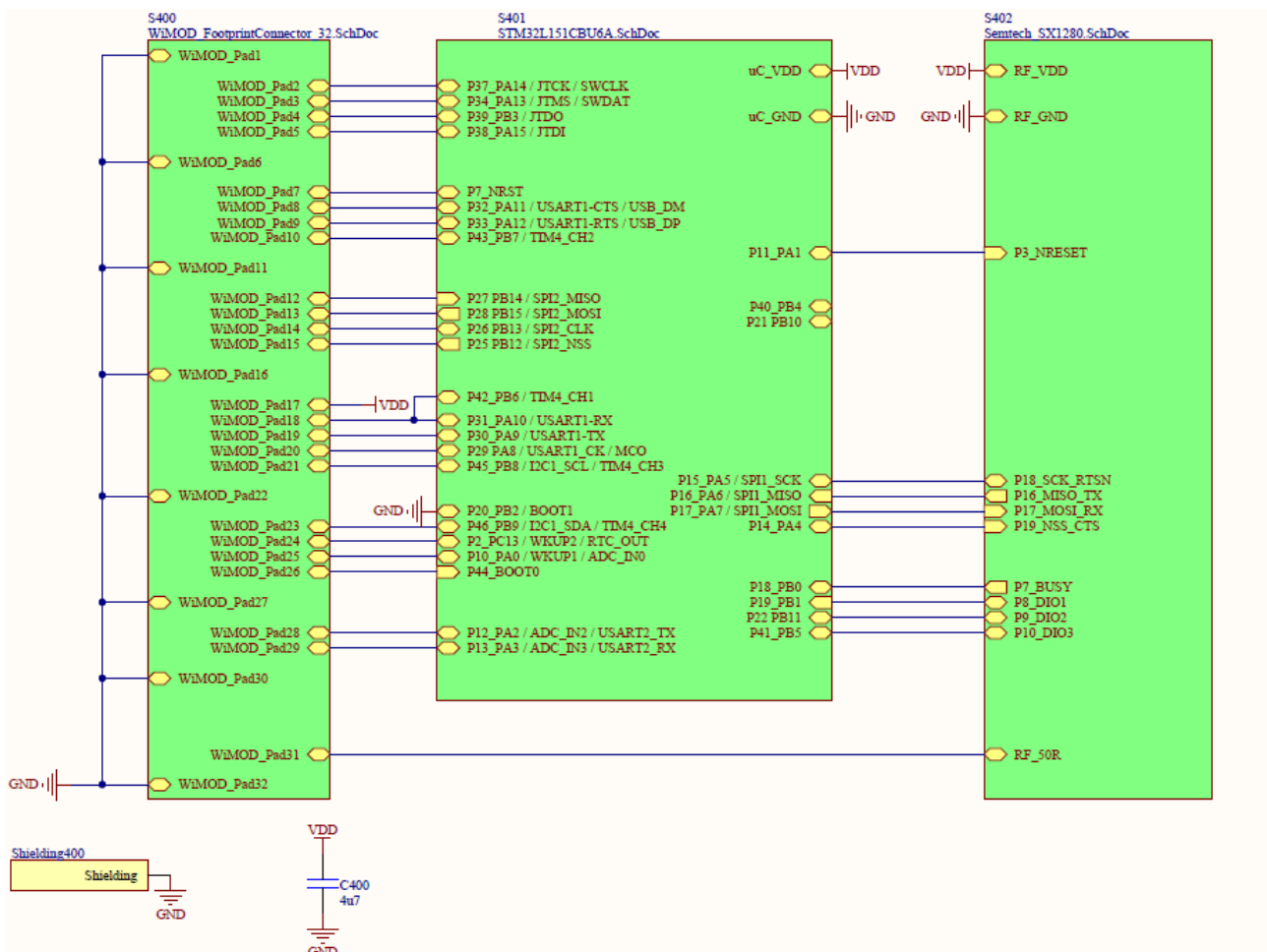


Figure 2-1: Logical routing of the iM282A

Main components of the iM282A are the STMicroelectronics microcontroller STM32L151Cx device generation "A" and the Semtech SX1280 transceiver. The microcontroller can be reprogrammed by using the integrated programming and debug interface described in chapter 2.3. The radio module is equipped with two external crystals. A 16MHz crystal is

connected to μC pins 5 and 6 (OSC_IN / OSC_OUT) and a 32.768 kHz crystal is connected to μC pins 3 and 4 (OSC32_IN / OSC32_OUT).

2.2 WiMOD Demo Board

The WiMOD iM282A provides several functional units like buttons, LEDs, a potentiometer, a buzzer and a temperature sensor. The module can easily be accessed via the on board UART to USB converter.

To develop software for the iM282A it is helpful to use the ST-Link/v2 debugger. The connection is described in chapter 2.3 of this document. Figure 2-2 gives an overview of the WiMOD Demo Board and its peripherals.

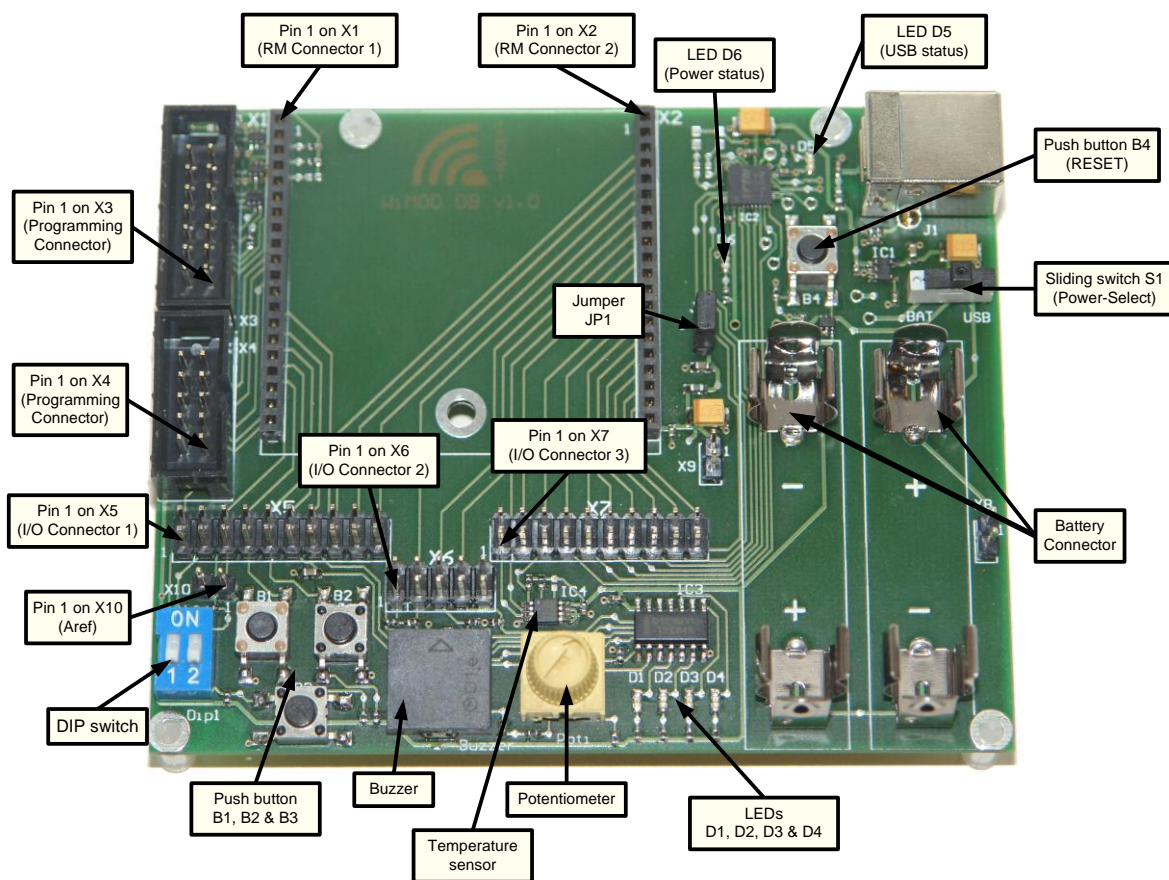


Figure 2-2: WiMOD Demo Board

When using the Demo Board with the iM282A, the module has to be soldered on its specific adapter board AB_01 and plugged into X1 and X2. Now all necessary module pins are available on X4 (programming interface), X5, X6, and X7 of the Demo Board.

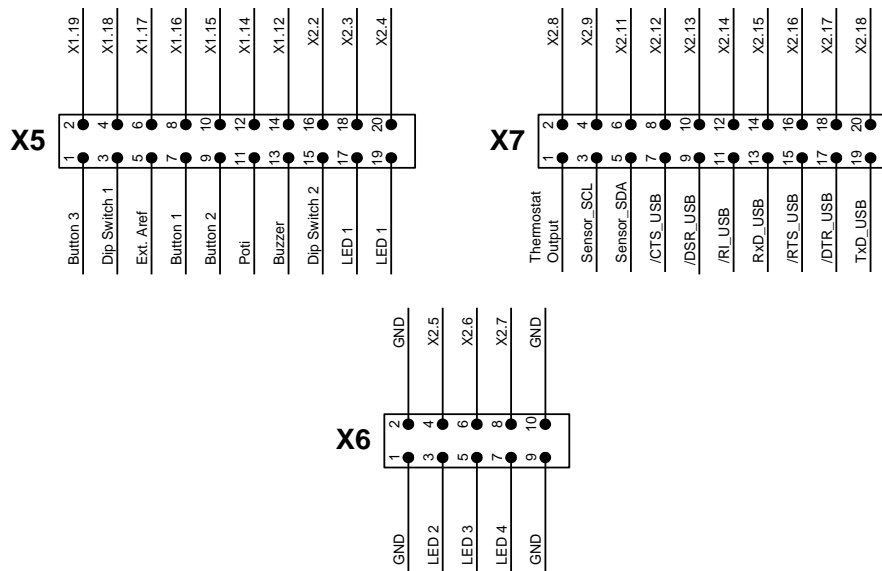


Figure 2-3: Graphical Pinout of the I/O connectors

Pin-Nr.	Connected to	Pin-Nr.	Connected to iM282A Pad Nr.
X5.1	Button 3	X5.2	14
X5.3	DIP Switch 1	X5.4	15
X5.5	Ext. ARef	X5.6	10
X5.7	Button 1	X5.8	13
X5.9	Button 2	X5.10	12
X5.11	Potentiometer	X5.12	9
X5.13	Buzzer	X5.14	8
X5.15	DIP Switch 2	X5.16	29
X5.17	LED 1	X5.18	29
X5.19	LED 1	X5.20	26
X6.1	GND	X6.2	GND
X6.3	LED 2	X6.4	25
X6.5	LED 3	X6.6	24
X6.7	LED 4	X6.8	20
X6.9	GND	X6.10	GND
X7.1	Thermostat Output	X7.2	28
X7.3	Temperature sensor (Sensor_SCL)	X7.4	21
X7.5	Temperature sensor (Sensor_SDA)	X7.6	23
X7.7	/CTS of the USB Controller	X7.8	-
X7.9	/DSR of the USB-Controller	X7.10	-
X7.11	/RI of the USB-Controller	X7.12	-
X7.13	RxD of the USB-Controller	X7.14	19
X7.15	/RTS of the USB-Controller	X7.16	-
X7.17	/DTR of the USB-Controller	X7.18	-
X7.19	TxD of the USB-Controller	X7.20	18

Table 2-1: Wiring of X5, X6 and X7 to the radio module

For more information please refer to the WiMOD Demo Board User Guide.

2.3 Programming Interface

The STM32L151Cx-A offers of a SWD test interface (SWCLK, SWDIO) which can be used for programming the On-chip flash and for accessing the On-chip Debug system¹. Table 2-2 lists the necessary pads of the iM282A which have to be connected to the programming device. (SWD line names are in bold.)

iM880B Pin #	Demo Board Pin row X4	Description
Pad 5	X4.1	JTDI (optional)
-	X4.2	GND
Pad 4	X4.3	JTDO / SWO (optional)
-	X4.4	VCC – Reference voltage for the programming device; must not be used to supply the demo board and the radio module
Pad 2	X4.5	JTCK / SWCLK
Pad 7	X4.6	/RESET (necessary for using the On-chip debug system)
-	X4.7	
-	X4.8	
Pad 3	X4.9	JTMS / SWDIO
-	X4.10	GND

Table 2-2: Programming and debug interface of the iM282A

With the WiMOD Starter Kit, a generic programming connector (JTAG/SWD) is reachable on pin row X4 of the WiMOD Demo Board. The development tool/programming device ST-Link/v2 STMicroelectronics must be connected to X4 using the wiring according to Figure 2-4:

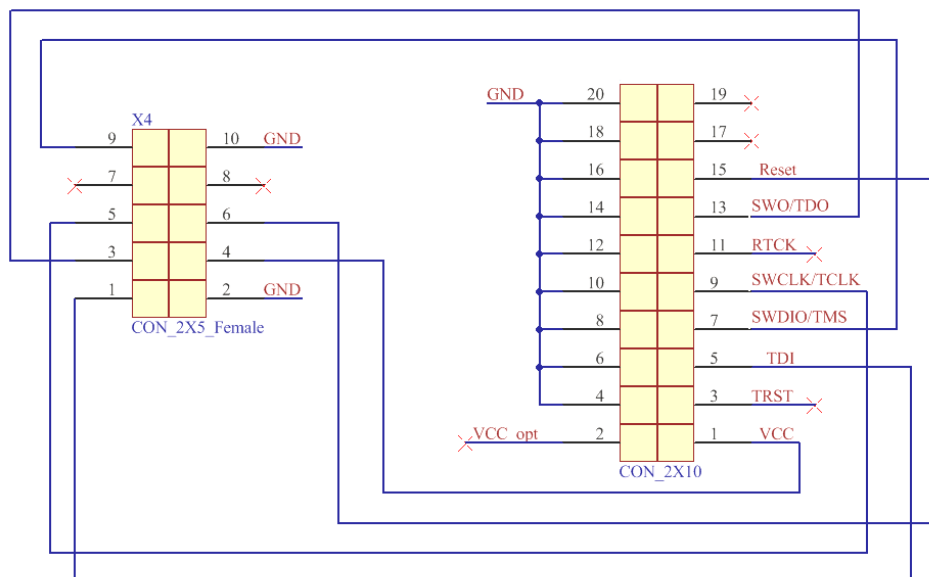


Figure 2-4: Pinout of X4 on the WiMOD Demo Board

¹ Note: The JTAG-Interface of the MCU is currently not available due to a silicon limitation; see: http://www.st.com/resource/en/errata_sheet/dm00097022.pdf (ES0224, V7.0, chapter 2.1.2)

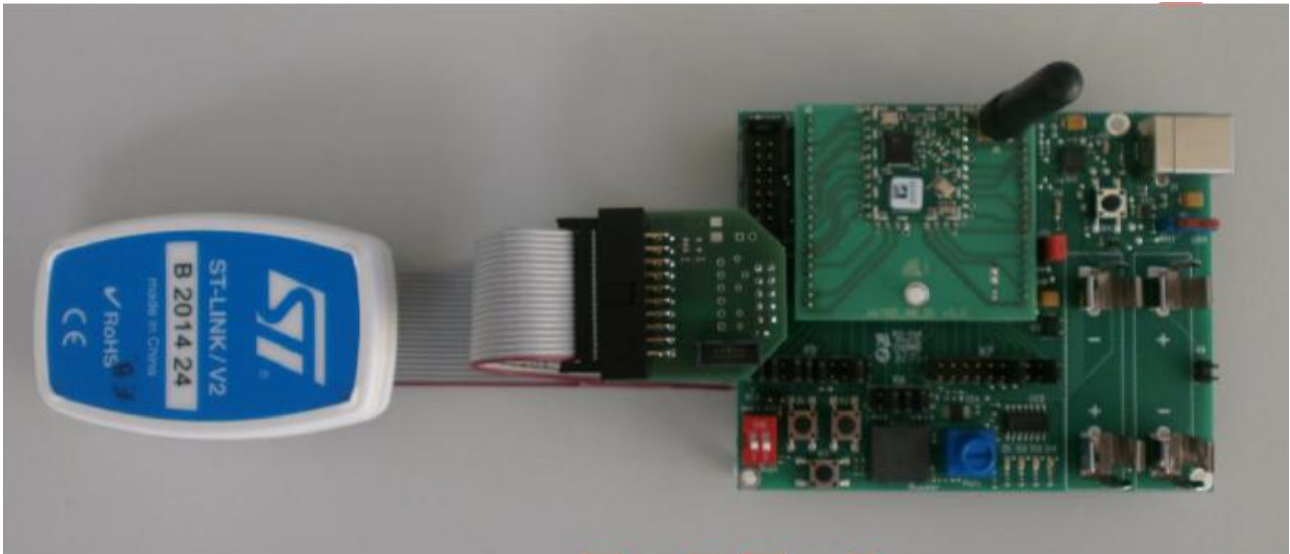


Figure 2-5: ST Link, Programming Adapter and SK-iM282A Demo Board.

3 Developing Software for the iM282A

3.1 Useful Tools

This chapter shows a non complete list of tools available for programming / debugging the module. There are more tools on the market which work as well, but have not been tested by IMST.

3.1.1 IAR Embedded Workbench

IAR Embedded Workbench for ARM is an integrated development environment (IDE) with high optimizing C/C++ Compiler for ARM microcontrollers.

Link: <http://www.iar.com/en/Products/IAR-Embedded-Workbench/ARM/>, IAR Systems

3.1.2 ST-Link/v2

The ST-LINK/V2 is a low-cost in-circuit debugger and programmer for the STM8 and STM32 microcontroller families. It can be used together *ST-Link Utility* to flash the modules microcontroller. It is also possible to be used with *IAR Embedded Workbench for ARM* for debugging.

Link: <http://www.st.com/stlinkv2>, STMicroelectronics

3.1.3 J-Link Debug Probe

Furthermore many of the J-Link Debug Probes made by Segger can be used to program and debug the iM282A. Link: <http://www.segger.com/jlink-debug-probes.html>, SEGGER Microcontroller GmbH & Co.KG

4 Firmware Update by Bootloader

The iM282A comes with an integrated bootloader to flash the device without using a programming adapter. With this bootloader HEX-Files can be loaded into the radio modules microcontroller via the UART interface. We recommend arranging an external access to the UART lines in your product design.

The bootloader uses the UART pins RxD and TxD and the bootloader pin (module pad 26) of the radio module to enter the bootloading mode.

4.1 Studio Support

Bootloading functionality is included within the LR_Studio under the "File" Menu. Please follow the instructions given by the tool.

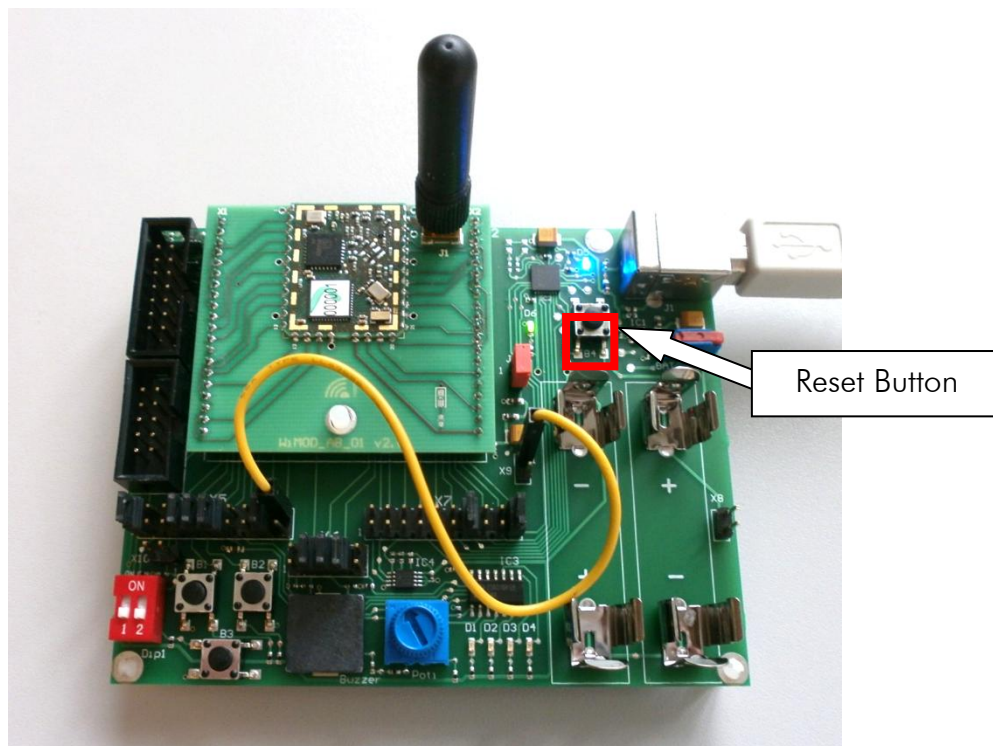


Figure 4-1: Establishing Bootloader Mode

On WiMOD Demo Board the iM282A bootloader pin2 is routed to connector X5.20. Connect X5.20 with X9.1 (Vcc) and press the reset button (B4) to power cycle the radio module.

² If using iM282A without WiMOD Demo Board, connect module pad 26 with Vcc to enter bootloader mode.

5 Appendix

5.1 List of Abbreviations

JTAG Joint Test Action Group
UART Universal Asynchronous Receiver Transmitter
USB Universal Serial Bus
VCP Virtual Com Port

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6 Important Notice

6.1 Disclaimer

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