JAL: SI4432 Register Viewer
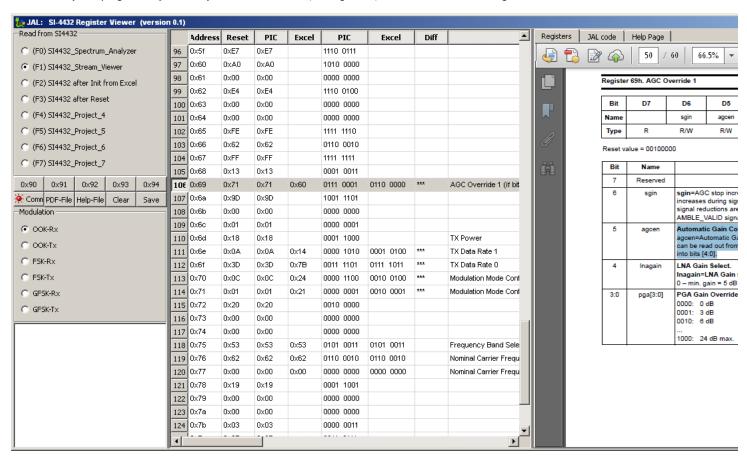
last updated: 26-okt-2014, Stef Mientki

Introduction

Creating the correct register settings for the SI4432 is often a terrible job. The formula in the manual are sometimes not correct, i.e. they differ from the formula used in the Excel sheet. Implementing the (correct) formula in JAL isn't an easy job either, using floats isn't still bug free, using integers (dword) often results in silent overflows. For these reasons I needed a tool that could do the following:

- Compare the current SI4432 register settings with the Excel sheet
- Compare the current SI4432 register settings with the default setting
- Generate a JAL procedure that sets the SI4432 registers correctly
- Handling different Excel sheets for different projects

Unfortunately this program only runs fully under MS-Windows (XP or greater). Instead of Excel also Kingsoft Office Suite can be used.

General use

- Select the special Project F3, so the default reset values from the SI4432
- Select the Project, reads the registers from the SI4432, but above all specifies which Excel file will be used
- Select the Modulation mode, opens Excel File
- Edit the Excel File
- Select the Modulation mode again, will copy register settings to the table, generates the JAL code
- Load the JAL code into the PIC
- Test the register settings by selecting the Project
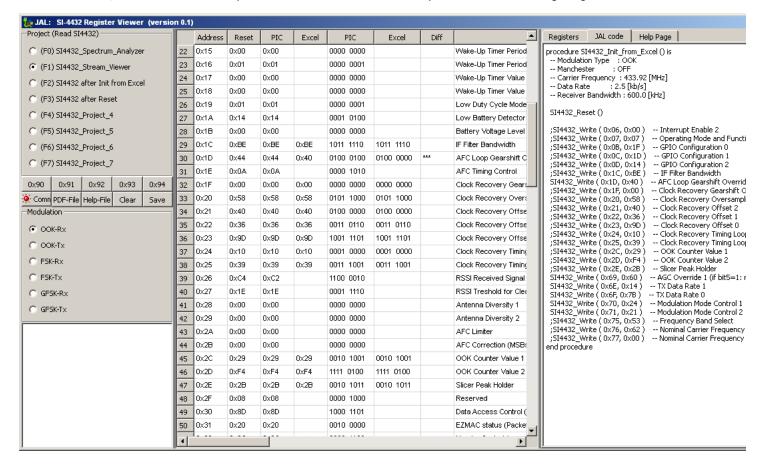
Reading the registers

By (re-)selecting a Project, the Comm port is connected (green light), the registers are read fom the SI4432 and put into the table, after which the Comm-port is disconnected (red light), allowing for modifying the loaded JAL file in the PIC. Pressing the already selected radiobutton will reread all the registers.

There's a special Project "(F3) SI4432 after Reset" which will read the registers of the SI4432 after a (software) reset. which should be equaul to the default values after a Power-UP. The values read in this mode are placed in the second column of the table, called "Reset".

Reading from the Excel file

Clicking on a radiobutton from Modulation of transmission reads the values calculated by the Excel sheet. If an Excel sheet with the name of the selected program ("Read from SI4432") exists, the Excel file with that name will be opened, otherwise a general Excel file will be opened. So if "(F1) SI4432_Stream_Viewer" was selected and in the program directory exists a file "SI4432_Stream_Viewer.xlsx", this file will be opened. In this way you can have a separate Excel file for each project.

Selected the modulation mode also generates the JAL code. All relevant registers are put into the JAL file. If the desired value is equal to the default reset value, it's commented out. The parameters chosen in the Excel file are put as comment in the beginning of the JAL code.

Save button

Pressing the save button, saves the tabel in a csv-file and the JAL code in a JAL file.

Comm button

Comm port is connected to this program
Comm port is disconnected and thus can be sued by the PIC-programmer.

PDF-File / Help-File

PDF-File button shows PDF-File about the registers of the SI4432.
Help-file button shows this document on the right side of the program.

General purpose buttons

There are 5 general purpose buttons, which sends commands with codes 0x90 .. 0x94 to the PIC.

| 0x90 | 0x91 | 0x92 | 0x93 | 0x94 |

History

october 2014: **Version 0.1**, initial release

ToDo / Future ideas

- load the table from a csv file
-

Background Information

Register 0x69
because bit 5 (0x60) is set, bits [4:0] reads back the LNA gain (which will differ from reading to reading)

106	0x69	0x71	0x60	0111 0001	0110 0000	***	AGC Override 1 (if bit5=1: reads LNA Gain)
106	0x69	0x75	0x60	0111 0101	0110 0000	***	AGC Override 1 (if bit5=1: reads LNA Gain)

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Si4430/31/32-B1

6.7. Preamble Length

The preamble detection threshold determines the number of valid preamble bits the radio must receive to qualify a valid preamble. The preamble threshold should be adjusted depending on the nature of the application. The required preamble length threshold will depend on when receive mode is entered in relation to the start of the transmitted packet and the length of the transmit preamble. With a shorter than recommended preamble detection threshold the probability of false detection is directly related to how long the receiver operates on noise before the transmit preamble is received. False detection on noise may cause the actual packet to be missed. The preamble detection threshold is programmed in register 35h. For most applications with a preamble length longer than 32 bits the default value of 20 is recommended for the preamble detection threshold. A shorter Preamble Detection Threshold may be chosen if occasional false detections may be tolerated. When antenna diversity is enabled a 20-bit preamble detection threshold is recommended. When the receiver is synchronously enabled just before the start of the packet, a shorter preamble detection threshold may be used. Table 14 demonstrates the recommended preamble detection threshold and preamble length for various modes.

It is possible to use Si4432/31/30 in a raw mode without the requirement for a 010101... preamble. Contact customer support for further details.

```
504  -- *****************************************************
505  -- writes all registers of the SI4432 to the serial port
506  -- (in chunks of 16 bytes)
507  -- *****************************************************
508  procedure SI4432_Dump_Registers is
509    for 128 using i loop
510      if ( i % 16 ) == 0 then
511        delay_100ms ( 1 )
512      end if
513      serial_hw_write ( SI4432_Read ( i ) )
514    end loop
515    delay_100ms ( 1 )
516
517    -- send my ID again
518    serial_hw_write ( 0xAA )
519    serial_hw_write ( 0xBB )
520    serial_hw_write ( 0xCC )
521    delay_100ms ( 1 )
522  end procedure
523  -- *****************************************************
```

```
AA BB CC
08 06 21 20 12 00 00 07 00 7F 06 1F 1D 14 00 00
00 00 20 00 03 00 01 00 00 01 14 00 31 00 0A 00
C8 00 A3 D7 10 A6 3F 1E 00 00 00 00 29 F4 29 08
00 20 00 80 00 00 2D D4 00 00 00 00 00 00 00 00
00 00 00 FF 00 00 00 00 00 00 00 FF 08 08 08 10
00 00 DF 52 20 64 00 01 87 00 09 94 0E E7 83 E7
A0 00 E4 00 00 FE 62 FF 13 75 9D 00 01 18 0A 3D
00 01 20 00 00 53 62 00 19 00 00 03 37 04 37 AA
AA BB CC
```