

ADRF6755 SPI Interface User Guide for USB

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1 Introduction.

The ADRF6755 has both an SPI and an I²C interface. This document describes the user interface software that communicates to the I.C. via the SPI port. The software is written using LabVIEW 10.0.

The SPI interface is provided by an additional SDP-S board. This must be ordered with the ADRF6755 evaluation board. The system demonstration platform (SDP) is a hardware and software platform that provides a means to communicate from the PC to Analog Devices products and systems that require digital control and/or readback.

The SDP-S controller board connects to the PC via USB 2.0 and to the ADRF6755 evaluation board via a small footprint, 120-pin connector. The SDP-S (serial only interface) is a low cost, small form factor, SDP controller board.

There are three files to be installed in order to successfully run the ADRF6755 SPI software.

1. Firstly, install the SDP-S driver. To do this, run the file named 'SDPDrivers.exe' located on this CD in the folder 'CUSTOMER_SOFTWARE\ADRF6755 SPD Software\SPD Driver'.
2. Secondly, install the LabVIEW runtime engine. Run the file named 'setup.exe' located in the folder 'CUSTOMER_SOFTWARE\ADRF6755 SPD Software\Labview 2010 Installer\Volume'.
3. Thirdly, run the ADRF6755 specific software. This is called 'ADRF6755_USB.exe' and is located in the folder 'CUSTOMER_SOFTWARE\ADRF6755 SPD Software\ADRF6755 SPD Executable'.

2 ADRF6755 SPI Interface Description

The ADRF6755 SPI interface program will start running when the executable is loaded. The following front panel appears.

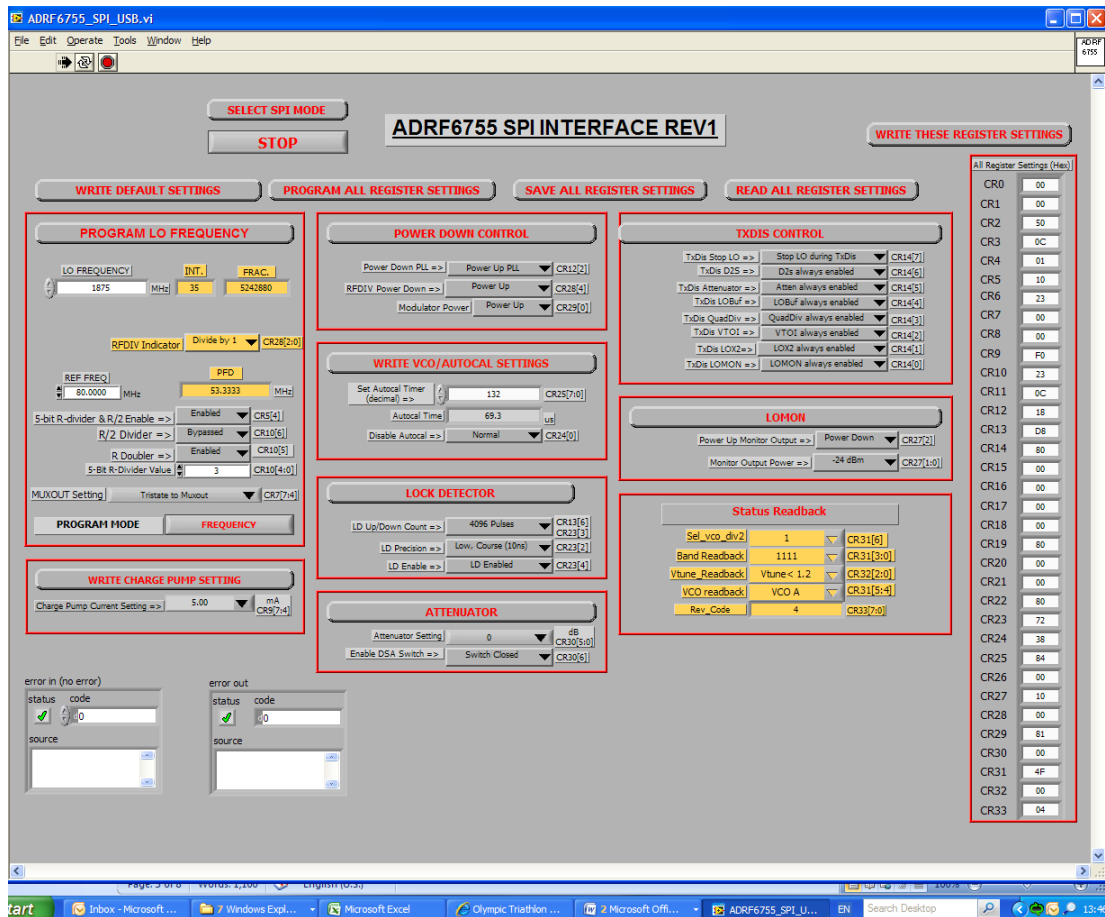


Figure 1: ADRF6755 SPI Interface Software Front Panel

This front-panel allows push-button control over all user registers.

2.1 Overview of Front Panel

To understand how to operate the software, it is best to section off the front panel. Refer to Figure 2.

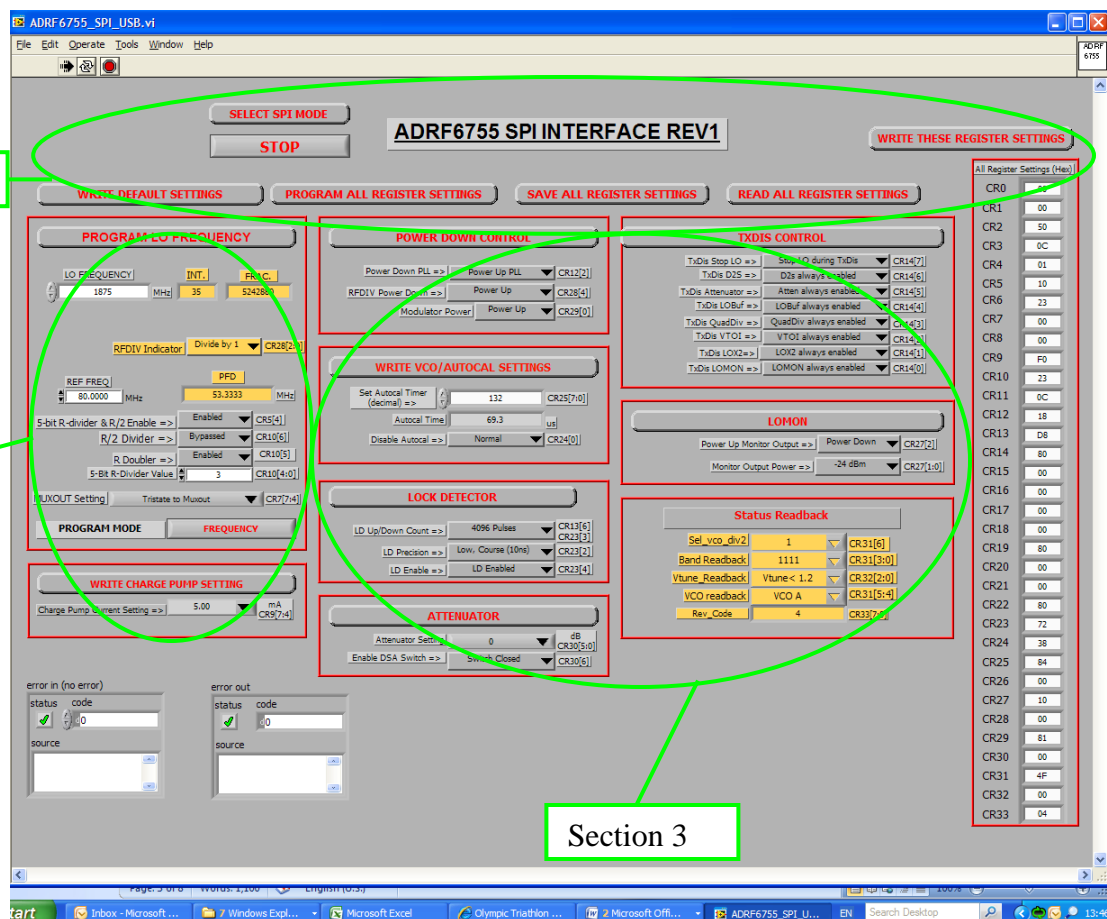


Figure 2: ADRF6755 SPI Interface Software Front Panel – Sectioned

Each of these sectioned pieces will now be explained.

2.2 Section 1: Full Register Set Control

Select SPI Mode:

Click on the push-button labelled 'SELECT SPI MODE' to send three clock edges to the CS pin of the ADRF6755, therefore selecting and locking in SPI mode. This should be executed before any SPI register writes.

Write Default Settings:

Click on the push-button labelled 'WRITE DEFAULT SETTINGS' to write the following settings to the ADRF6755.

CR0: 00h
CR1: 00h
CR2: C0h
CR3: 09h
CR4: 01h
CR5: 10h
CR6: 2Eh
CR7: 00h
CR8: 00h
CR9: F0h
CR10: 41h
CR11: 0Ch
CR12: 18h
CR13: D8h
CR14: 80h
CR15: 00h
CR16: 00h
CR17: 00h
CR18: 00h
CR19: 80h
CR20: 00h
CR21: 00h
CR22: 80h
CR23: 72h
CR24: 38h
CR25: 64h
CR26: 00h
CR27: 10h
CR28: 08h
CR29: 80h
CR30: 00h

Basically, this programs the PLL to lock to 1875MHz. The reference frequency is 80MHz and the reference R/2 divider is enabled to set the PFD frequency to 40MHz. A

charge pump current of 5.00mA is used to set the loop bandwidth to 100kHz with the loop filter components populated on the applications board. The modulator is also powered up.

Program All Register Settings:

Click on the push-button labelled 'PROGRAM ALL REGISTER SETTINGS' to write to all register settings controlled by the push-buttons in sections 2 and 3 with the values set by the menu controls.

Read All Register Settings:

Click on the push-button labelled 'READ ALL REGISTER SETTINGS' to read all register values to the register display table on the right-hand side of the front panel. All values are displayed in hex notation.

Save All Register Settings:

This enables the complete register set to be written to a text file.

Write These Register Settings:

This control allows all registers to be written with the contents displayed in the register display table. This function enables access to all registers even those not featured on the front panel.

Stop:

Click on the push-button labelled 'STOP' to stop the program from running. Clicking on the arrow in the top left-hand corner will start the program running again.

2.3 Section 2: LO Frequency Control

This section needs to be accessed in order to change the LO frequency from the one programmed by the default setting push-button.

With the 'PROGRAM MODE' push-button set to 'FREQUENCY', the user can alter the 'LO FREQUENCY' control and the 'INT.', 'FRAC.' and 'RFDIV Indicator' displays will follow accordingly.

With the 'PROGRAM MODE' push-button set to 'INT & FRAC', the user can alter the 'Enter INT.', 'Enter FRAC' and 'RFDIV Control' controls and the 'LO FREQUENCY' display will follow accordingly.

The reference frequency control can be set together with the reference doubler and reference dividers to set the PFD frequency.

Access can also be obtained to the Muxout test mode. The default mode is set to tristate.

The 'PROGRAM LO FREQUENCY' push-button needs to be clicked each time the user requires to write the settings in section 2 to the ADRF6755.

2.4 Section 3: Control Over Other Registers

Other registers on the ADRF6755 as mentioned in the datasheet are controlled by accessing section 3. In each case, the push-button needs to be clicked when the ADRF6755 is required to be written to. The push-button in each case controls only those settings within the zone set by the red outline boxes.

This section includes control over the following functions:

- Power up / down control over the PLL, RFDIV divider and modulator.
- The ability to set the autocalibration timer for VCO band select. The default setting is 70 μ s. Also, the user has the ability to disable the autocalibration function for switching frequency within a band.
- Enable / disable for the lock detector as well as the ability to program one of four settings controlling the declaration of lock. Note that this function has no impact on the PLL acquisition time to a frequency error of 100Hz.
- Control of the attenuator setting. The DSA switch function is not incorporated on this part and should be ignored.
- Control of which circuits to power down when TXDIS is asserted.
- LOMON power up / down control as well as the ability to set the power level to one of four different settings.
- Readback of the VCO and band that is currently used by the PLL.

The datasheet has more detail on all these settings.