Setup Procedure for MAX11410 Universal Input Design Board

Figure 1: AFE Board (Sensor Front End, Switch, Passives, ADC, Reference, Reference Power Supply, Isolated Supply, Data Isolator)



Figure 2: Communication Board: (MAXQ622: for USB to SPI communication from Laptop to ADC)



Jumper Settings: AFE Board

All the Jumper settings are pre-installed.

Name	Default Position
JP1	Install (1-2)
JP2	Install (1-2)
JP3	Install (1-2)
JP4	Do not Install (Don't Care)
JP5	Do not Install (Don't Care)
JP6	Install (2-3)
JP7	Install (1-2)
JP8	Connecter – 3 Terminal (+/-20V, TC, 2w, 3w)
JP9	(PT100/PT1000 connected), Cold Junction Terminal
JP100	Connector – 2 Terminal (+/-25mA)
JP12	Install (2-3)
JP13	Install (1-2)
J2	10-pin Connector (male)

Table 1

Jumper Settings: USB to SPI comm board

All the Jumper settings are pre-installed.

Name	Default Position
JP1	10-pin connector (female)
JP2	Install (2-3)
JP3	Micro USB Connector Input
JP4	10- pin JTAG connector
JP6	+5V Jack Input

Table 2

Procedure for Thermocouple measurement (TC and Cold Junction):

- 1. Connect AFE board and the Communication board using J1(Comm. Board) to J2(AFE board).
- 2. Verify all the Jumper connections are as the table 1 and 2.
- 3. Connect the USB to micro-USB cable (USB laptop side and micro-USB to J3 of comm. Board)
- 4. D51 LED will be RED when connected.
- 5. JP9 is already installed with PT-1000 RTD, with Leg 2, 3 connected.
- 6. Connect the Thermocouple (Yellow wire to Terminal 1 of JP8 Connector and Red wire to Terminal 2 of JP8 Connector).
- 7. Double click and open the "MAX11410EVKit.exe" file provided specifically for this board. Verify if the board is connected in the status log present in the low region of the EVKIT software.

24-Bit, 10-Channel ADC MAX11410 Eval ile Device Options Window	uation Kit (PLCDEMO) Help	
ADC Config Scope DMM H	istogram FFT Registers Universal Input Measurement	
Channel 0 🗸	Block Other Sequence	Channel 0
Sample Rate (SPS)	MAX11410 Current Source VBIAS Power	Data (V)
1 *	IDAC1 Matched VBIAS Mode Power State	0
Number of Samples	AINO + 10µA + Active + NOP +	Data (Hex)
256 *	IDAC0 Burnout VBIAS AIN Select Reset Registers	000000
Reference Voltage (V)	AINU + Disabled + 4 5 6 7	Status (Hex)
2.500000 ±	Channel MUX Input Path	000000
	AINP AIN0 + Buffers + Delta-Sigma Modulator Data Format Bipolar + Softontz Fire + Convert	New Conversion Read
	AINN 2's Complement + + + + +	New Calibration Ready
	AINU * Conversion Mode Single *	Svs Gain Overrange
		Data Underrange
	Reference	Data Overrange
	Select Reference Calibration Select CHX System Cal Self Offset/Gain A • Self Offset System Offset X • 0 * h 0 * h	Underrange Channels: none Overrange Channels:

Figure 3

8. Please click the "**Universal Input Measurement** " Tab for this demo as shown in the above figure 3. The screen will be as shown below figure 4.

DC Config Scope DMM Hist	ogram FFT Registers Universal Input Measurement	
put Configuration	Physical Measurement	
K-type Thermocouple (1)-(2)	Average	
3-Wire PT100 RTD (1)-(2,3) 2-Wire PT100 RTD (1-3) Cold Junction PT1000 RTD +/- 25mA Current Input (4)-(5) +/- 20V Voltage Input (1)-(2)	+XX.XXX Average	V
Restore to Initial Default		
	0	mV
	Cold Junction Temperature (Ambient) °C	Capture Read Automatical
	Calibration Values	
	Load File SELF_OFF SYS_OFF_A reserved	

- 9. 7 Radio Buttons are available for display. The test associated for each radio button is shown as the radio button label.
 - a. When radio button is clicked for a measurement, all the configurations are internally taken care of.
- 10. Loading Calibration File: Pre-calibrated information is available for BRD #1, BRD #2, BRD #3 as shown below in Figure 5 and Figure 6 respectively
 - a. Please click the "Load File" to load the calibration file. The calibration file is a .txt file and is labeled based on the board.
 - b. If you have BRD #1, use BRD1.MAX11410.txt and so on.

c. If the board is not labeled, please use BRD3.MAX11410.txt.

MA Current Input (4)-(5) V Voltage Input (1)-(2)								
re to Initial Default	0			mV				
3-Wire RTD COLD-JUNCTION	Cold Junction Temperature	• (Ambient) °C	25.00 ÷ Capture	Read Automatically				
~~ <u>0</u>	Calibration Values Load File SELF_OFF SELF_GAIN_1	SYS_OFF_A SYS_GAIN_A	reserved reserved					

Figure 5.



USB not found Calibration Values: Load File

- **11. Thermocouple Measurement:** For Thermocouple measurement, we would like to read the COLD Junction as well as the HOT Junction. Thermocouple reading is the HOT Junction. COLD Junction PT-1000 reading is Cold Junction.
 - a. Firstly, COLD Junction PT-100 reading radio button is selected as shown below in Figure 7

24-Bit, 10-Char File Device	nnel ADC M Options	MAX11410 Wind	Evaluation Kit ow Help	[PLCDEMO]						- 0
ADC Config	Scope	DMM	Histogram	FFT	Registers	Universal Input Measurem	ent			
Input Configu	uration			Physical M	leasurement					
K-type Th	nermocou	ple (1)-(2)		Cold	Junctio	n PT1000 RTD				
 3-Wire PT 2-Wire PT Cold June +/- 25mA 	F100 RTD F100 RTD ction PT10 Current In	(1)-(2,3) (1-3) 000 RTD	0	+	X.X	X				°C
+/- 20V V	oltage Inp	out (1)-(2)	<i>*</i>	Avera	age					
Restore to	o Initial D	efault		0						mV
C PT-1000	3-Wire R		00	Cold	Junctio	n Temperature (A	mbient) °C	25.00 ±	Capture	Read Automatica
/	۶ <u>/</u>		\odot	Calibration	n Values					
				Load Fi	le SELF	OFF	SYS_OFF_A	reserved		
					SELF_	GAIN_1	SYS_GAIN_A	reserved		

Figure 7

+X.XX		°C
Average		
0		mV
Cold Junction Temperature (Ambient) °C	25.00 ± Captu	re Read Automatically

- b. cold Junction measurement reads the reference temperature or the Room Temperature.
- c. Single Capture/ Read Automatically: As shown in Figure 8, the part can perform a single capture or continuous read as highlighted red box shows.
- d. Choose the single capture/ read automatically based on your convenience, and wait for the temperature to settle and display.
- e. Once this is done, you will notice that the display for Cold Junction Temperature (Ambient) will get updated.
- f. Now we have the reference/ ambient temperature.
- g. Now, select the TC K-Type Thermocouple radio button, and perform a capture/ continuous capture.

	ogram FFT Registers Universal Input Measurement	
put Configuration	Physical Measurement	
K-type Thermocouple (1)-(2)	K-type Thermocouple (1)-(2)	
3-Wire PT100 RTD (1)-(2,3) 2-Wire PT100 RTD (1-3) Cold Junction PT1000 RTD	+X.XX	°C
+/- 25mA Current Input (4)-(5)		
+/- 20V Voltage Input (1)-(2)	Average	
Restore to Initial Default	0	mV
K-Type 200° C tn 1250° C	Cold Junction Temperature (Ambient) °C	pture Read Automatical
-200 C 10 1250 C	Calibration Values	
	Load File SELF_OFF SYS_OFF_A reserved	

- h. You can see that the reference temperature measured in previous configuration (cold Junction) is updated here as shown in Figure 9.
- i. When Capturing the TC input, you will notice the that the large Box display will display the final Temperature (HOT Junction + Cold Junction) or the total temperature.
- 12. We have successfully taken and displayed a measurement.