16 CJC and Display Lab

Intro to Custom Display Configuration

16.1 Foreword

In some applications you may wish to change the function of one or more keys and/or cause different information to appear on the display. This lab uses a cold junction compensated temperature input and display to explore some basic elements of custom display building.

16.2 Objectives

In this lab, we will configure a compensated temperature input and create a display that toggles between compensated temperature and CJC temperature when the Scroll key is pressed.

16.3 Instructions

A - PLACE AND CONFIGURE THE TEMPERATURE MEASUREMENT

Step	Procedure	Comments
1.	Add a Loop Compound to the strategy, double-click on the block, and give it the name TEMP	
2.	Close the block	
3.	Right-click on the new TEMP compound and select Open Compound	You are now "inside" the compound, and the compound connection dialog box is visible.
4.	Select AIN from the library window and place the block on the screen.	This is a built-in analog input.
5.	Double-click on the AIN block.	
6.	Give the block the name **TT-100**	
7.	Use the pull-down menus to change the Input Type to **Thermocouple with CJC**	
8.	Change the Linearization Type to **Thermocouple Type K**	
9.	In the Initial Results field, enter **10**	Since we do not have an actual thermocouple connected, we will simulate a 10mV input.
10.	Change the Mode to **Manual**	This is to allow the block to operate with the

simulated input value.

11. Close the block with the OK button.

B- CONFIGURE SIGNAL CONDITIONING

Step	Procedure	Comments
1.	From the Library window, select a TI block and place it on the screen near your AIN block.	This block converts the mV to the selected engineering units (Celsius, Fahrenheit, Rankine or Kelvin)
2.	Double-click on the TI block	
3.	Enter the block name **TI-100**	We will accept the default configuration for the block
4.	Close the block	

C - PLACE THE DISPLAY BLOCK

Step	Procedure	Comments
12.	In the Library window, click on **DISP** , drag the box onto the screen and fix it in place	This is the Display block
13.	Double-click on the Display block	
14.	Change the <u>block</u> name to **TempDisp**	This is NOT the tag name that appears on the display during operation; it is the block reference name.
15.	Type in the name **TI-100** in the Display Tag field.	This is the tag name we will use to reference the display in the Display Interface Block, and on the front of the instrument.
16.	Under Initial display data, type **DISPTAG** in the Line 1 field.	This will cause the Display Tag (as entered in the Display Tag field) to appear on Line 1 of the display.
17.	Type **"TI"** in the Line 5 field. *DO NOT close the block.*	<u>DOUBLE QUOTES ARE</u> **REQUIRED.** The text TI will appear on line 5 of the display after the download. The quotes indicate text rather than an input name.
18.	Type **TI** in the Line 6 field.	DO NOT use quotes! This will be an input name, and the value will be displayed in Line 6.

D - CONFIGURE THE BLOCK INPUTS

Step	Procedure	Comments
5.	Click on the **Inputs** tab at the top of the dialog box	The Inputs window appears
6.	At the bottom of the screen, select the **Add** button	The input editing menu appears
7.	Change the name of Input 1 to **TI**	This will be the temperature value.
8.	In the Line Format field, type **TempL**	We have not yet set up the display formats; we will do this in the next part of the lab.
9.	Close the menu	The new input appears on the Inputs window
10.	Click on the **Add** button again	
11.	Give Input 2 the name **CJC** and type in **CJCL** for the format name	This will be the value being used for compensation.
12.	Close the menu	
13.	Add Input 3 and give it the name **SCRLCNT**	This counts the number of times the Scroll Key is pressed
14.	Use the pulldown menu to change the data type to **Count**	
15.	Close the menu	You should now have three inputs (TI, CJ and SCRLCNT) listed in the Inputs window.

C- EDIT THE DISPLAY FORMATS

Step	Procedure	Comment
1.	Click on the **Formats** tab at the top of the dialog box	The display formats window appears
2.	At the bottom of the screen, select the **Add** button	The Format editing menu appears
3.	Select the field showing **FMT1** and type in **TempL**	This was the format name we used when configuring the display block inputs
4.	Use the pull-down menu to change the format to **Float2**	This will display the input as a floating point variable with two places to the right of the decimal point
5.	Change the Low and High limits to **-200** and **1200** respectively	This is the range for a Type K thermocouple
6.	Change the Entry Method to **None**	This is for display only, no operator entry
7.	In the Engineering Units field, type **oC**	Use a lower-case o, not a zero

8.	Close the menu	
9.	Add a second format and give it the name **CJCL**	This is the name that was designated in the Inputs menu

10.	Make the following changes to this format:
	  Format **Float2**
	  Low Limit **-10**
	  High Limit **60**
	  Eng Units **oC** (lower case o)
	  Entry Method **None**	

11.	Close the menu	You should now have two formats listed in the Format window.

D - CONFIGURE THE DISPLAY SCRIPTS

Step	**Procedure**	**Comment**
1.	Click on the **Scripts** tab at the top of the dialog box	The display formats window appears
2.	Following the formats shown below EXACTLY, type in the display script shown below.	

```
DEFAULTS:
{
 SCROLL_PRESSED:
 {
   IF SCRLCNT >= 1 THEN
   SCRLCNT = 0;
   ELSE SCRLCNT = SCRLCNT + 1;
   CASE SCRLCNT OF
   {
    0:
      #LINE5 = "TI";
      #LINE6.SRC = TI;
     BREAK;
    1:
     #LINE5 = "CJC";
     #LINE6.SRC = CJC;
     BREAK;
   }
  }
}
```

This script counts the number of times the scroll key is pressed (starting with the first press being "0", increments the count accordingly, then determines what appears on Lines 5 and 6 for each count.

The hashmark indicates an assignment statement, that is, a value, input or text is assigned to that resource (in this case Lines 5 and 6). There are predetermined assignment statements; these are listed in the MOD 30ML Display Guide.

Text to appear on the display is enclosed in double quotation marks.

3.	When you have finished typing the script, click on the Checkmark icon at the top of the window.	This will verify your script immediately, checking for syntax errors.

4.	Once the script is verified without error, close the Display Block using the OK button.	

E – CONNECT THE BLOCKS

Step	Procedure	Comments
1.	Click on the Connections icon	You may use either right-angle or multi-segment
2.	Using the mouse to select the blocks and entries, make the following connections: TT-100.MODOUT to TI-100.MODIN TT-100.CJC to TempDisp.CJC TI-100.R to TempDisp.TI	

F - ADD THE DISPLAY TO THE DISPLAY LIST

Step	Procedure	Comments
1	Close the compound.	You should see the Environment Blocks (DIF, ST, SE, IF) in your workspace.
2	Double-click on the **DIF** block	
3	Click on the "NEW" icon above the Display List	
4	At the bottom of your display list add: **TI-100**	This is the Display Name, NOT the name of the display block!
6	Select OK to close the block.	

Save, compile and download the database.

When you select the tag TI-100, the scroll key will toggle between the measured temperature and the cold junction temperature (which should be room temperature in degrees Celsius).