

The Programming Guide of the TPD430_Test Project (Demo_05)

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1. Introduction

This document describes step by step how to make the TPD430_Test Project. The TPD430_Test Project (Demo_05) is the sixth demo of the Getting Started Manual. Refer to 3.5 “Demo List” for more details.

Download the Getting Started Manual from:

ftp://ftp.icpdas.com/pub/cd/touchpad/document/english/getting_started/

2. Creating TPD430_Test (Demo_05)

2.1. Using the C Programming Language

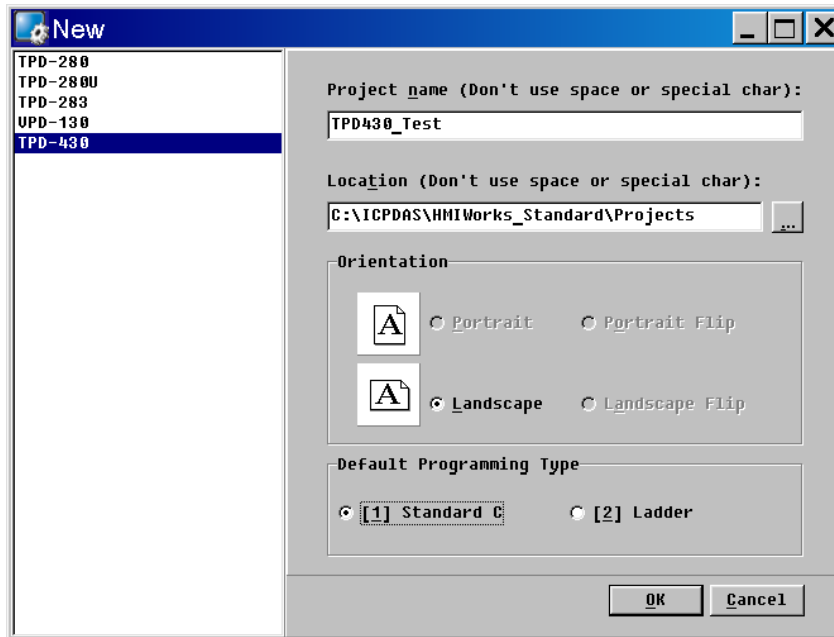
Step 1: Read the Getting Started Manual first.

1. We strongly suggest users to read the getting started manual first.
2. This demo is used to show the basic procedure when creating a project.
3. For details about HMIWorks, refer to the user manual:

ftp://ftp.icpdas.com/pub/cd/touchpad/document/english/user_manual/

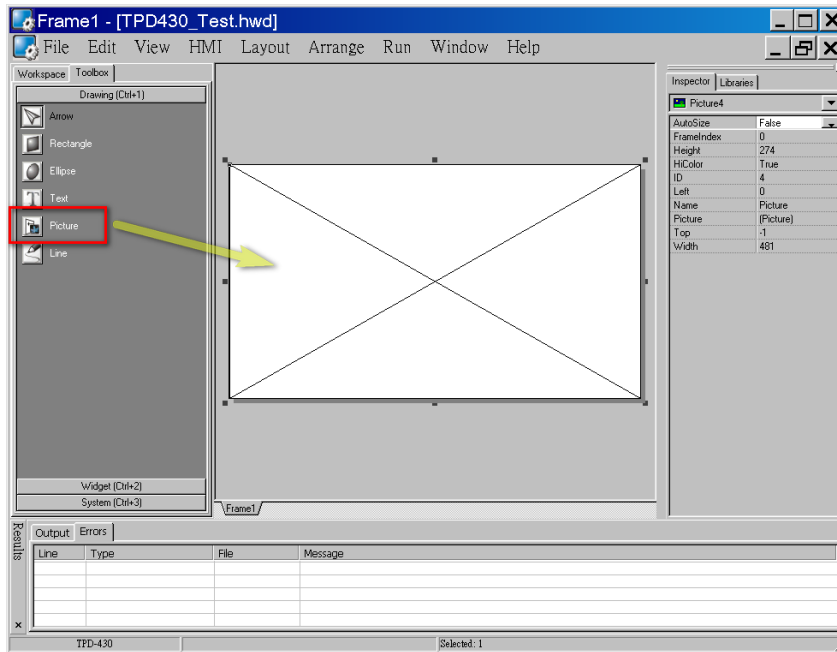
Step 2: Create a new project for the TPD-430 device

1. Open the HMIWorks software to create a new project for the TPD-430 device.
2. Enter the project name, select the options, etc. as shown in the picture below.



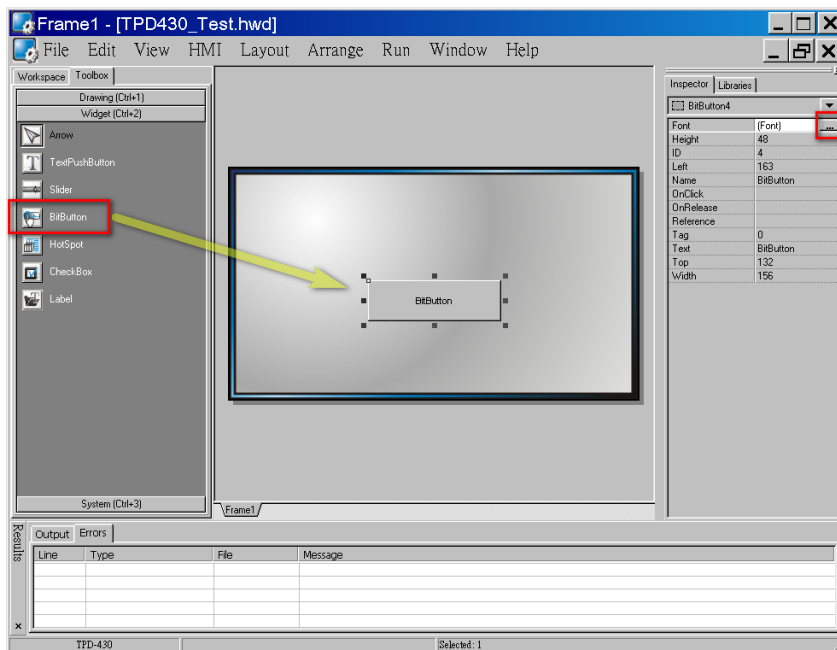
Step 3: Set up the background picture

1. Click the Picture component from the Toolbox tab and then drag a size to cover the whole frame.
2. Double click on the Picture component to select a background picture.



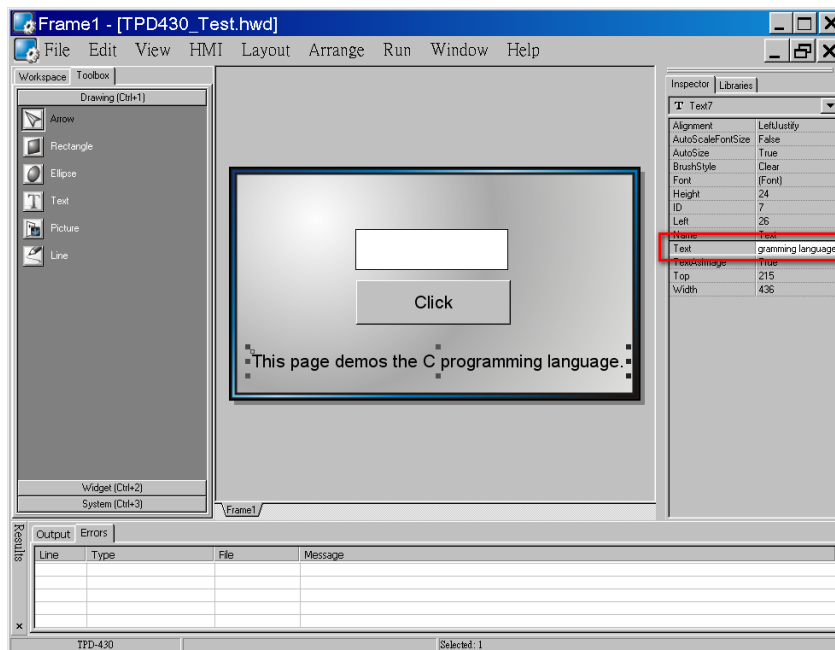
Step 4: Put a BitButton component on the frame

1. Click the BitButton component from the Toolbox tab and then drag a suitable size.
2. On the right side of the HMIWorks environment, modify appropriately the Font property of the BitButton in the Inspector. (Click the "..." Button)



Step 5: Similarly put a Label component and a Text component on the frame

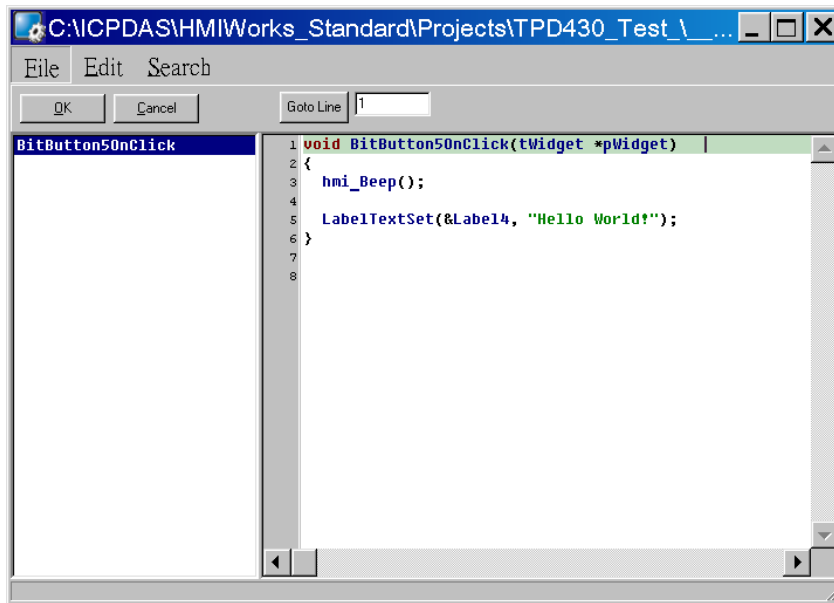
1. After putting both components on the position you want, change their properties (Font, etc.).
2. Here we set the Text property of the Text component the following string: “This page demos the C programming language” to tell users that this frame is of ProgramStyle “Standard”.



Step 6: Display “Hello World!” on the Label by BitButton’s On-Click event

1. Double click the BitButton on the frame to open the programming window. Write the code as shown in the picture below.
2. Note that the identifier “Label4” is composed of two part. One is the Name property of the Label and the other is the ID property of the Label. (Here the Name property simply is “Label”.)
3. For details about these functions, refer to the API Reference from:

ftp://ftp.icpdas.com/pub/cd/touchpad/document/english/api_reference/



Step 7: Build and download the program

1. Click the "Setup Device (TouchPAD)" option from the Run menu to select the com port.
2. Then press F9 on your keyboard or click the "Run (Build & Download)" option from the Run menu.
3. After downloading, click the BitButton and "Hello World!" is shown on the Label.

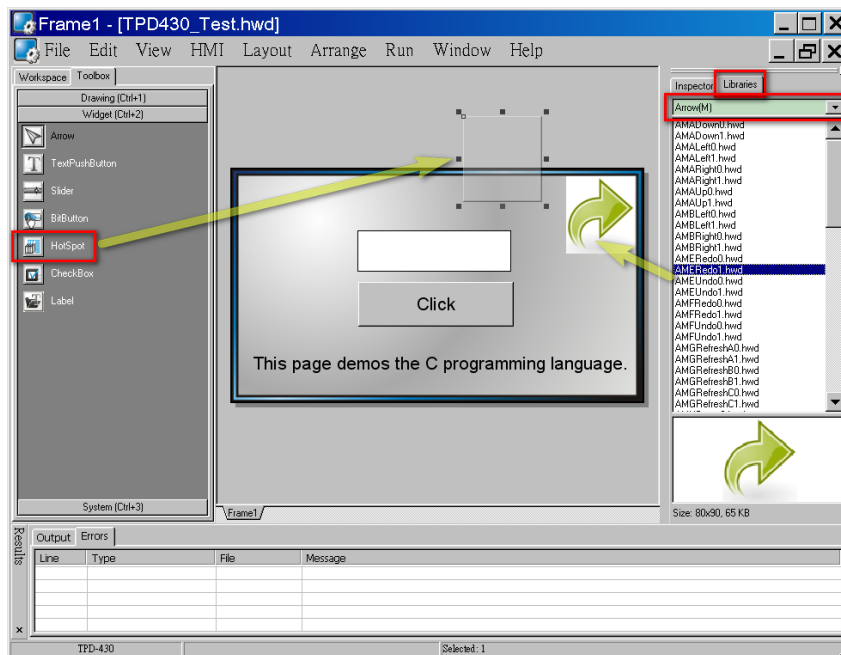
Now as you can see, development in HMIWorks is pretty easy. The followings are "Controlling I/O" and "Page Switching" for multipage designs.

2.2. Controlling I/O in the Ladder mode

Step 8: Put a Hotspot component on an arrow figure for page switching

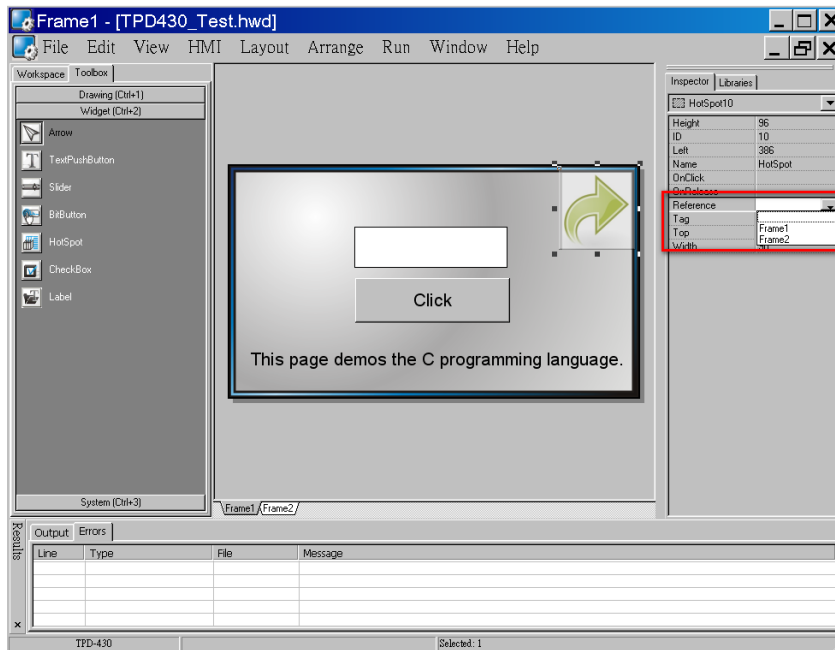
1. Click the Libraries tab and choose the "Arrow(M)" category from the dropdown menu and then drag an arrow picture from it.
2. Then put a HotSpot component from the Toolbox tab exactly on the arrow figure.
3. The HotSpot component is the translucent rectangle when developing in HMIWorks but invisible after downloading into the TPD-430 device. It is usually used to cover on a picture to make the picture be able to response

to the Click event (by the On-Click event handler of the Hotspot component).



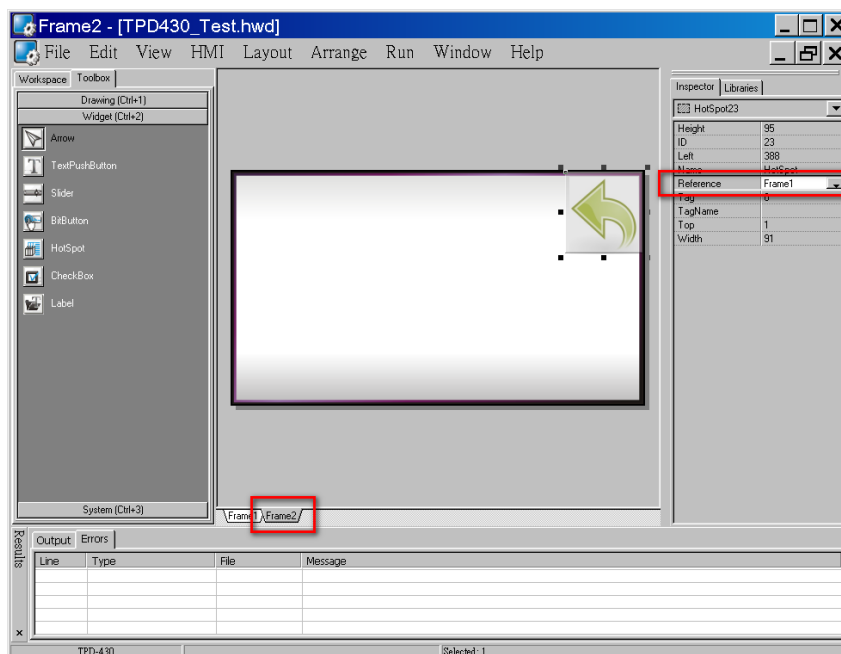
Step 9: Set the HotSpot's Reference to the newly-created frame

1. Click on the "New Frame" option from the Layout menu and select the "Programming Type" as "Ladder". We plan to control I/O on the next frame (page) and Ladder is required for this (it is easier in the Ladder mode).
2. Click on the HotSpot component and choose the "Frame2" for the property Reference. After downloading into the TPD-430 device, touching the arrow area will switch to the next page. (Note that enabling HotSpot's Reference property disables the Click event of it.)



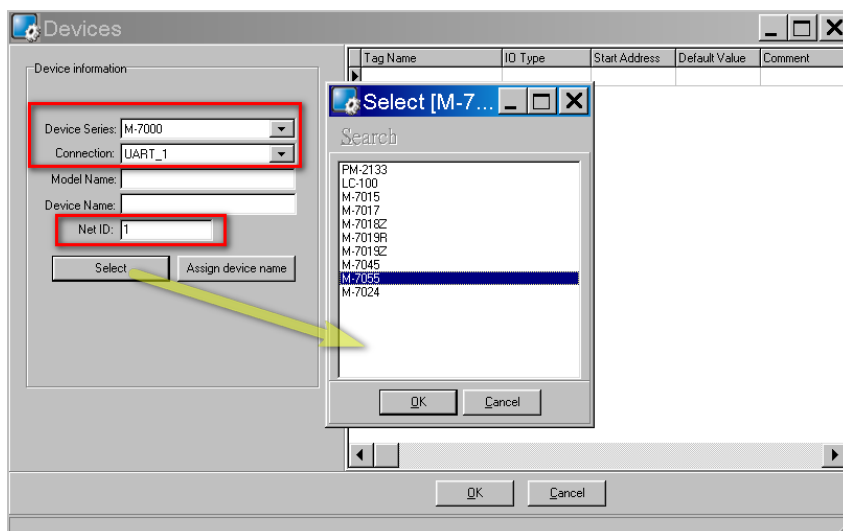
Step 10: Set the background picture and reference to the previous page

1. Similar to Step 3 for setting up a background picture for Frame2.
2. Similar to Step 8 to browsing an arrow picture from libraries.
3. Similar to Step 9 to set Reference of a HotSpot component to Frame1.



Step 11: Register M-7055 and M-7018Z in the Workspace

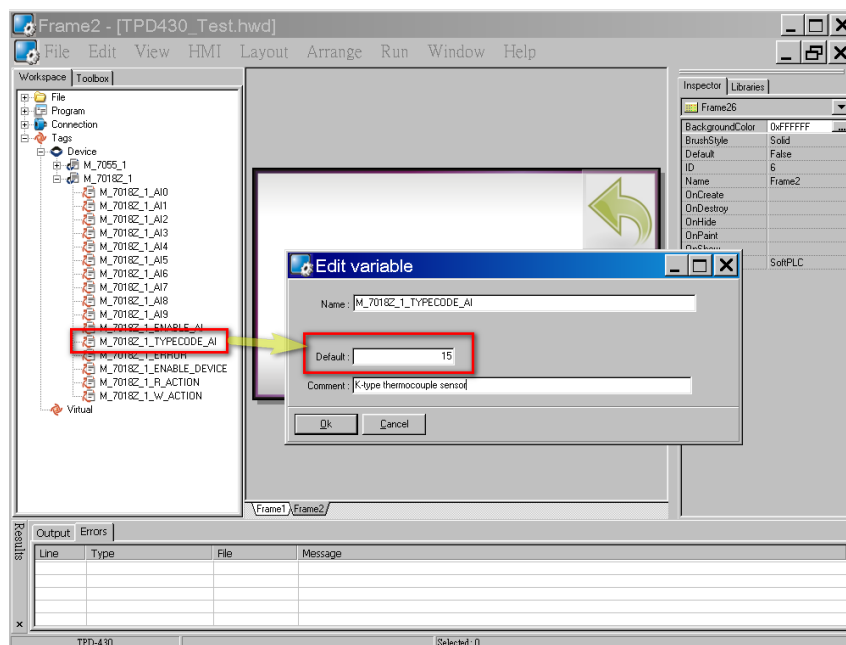
1. The M-7055 and M-7018Z are Modbus RTU Slave I/O modules. M-7055 is used as a digital I/O module and M-7018Z is for temperature measuring and analog input. Refer to the link below for details.
http://www.icpdas.com.tw/product/solutions/remote_io/rs-485/i-7000&m-7000/i-7000_m-7000_selection.html
2. Configure M-7055 and M-7018Z with DCON Utility first. Set the address of M-7055 to 1 and M-7018Z to 2. Be sure to set the Dataformat to “2’s complement” for M-7018Z. HMIWorks is designed with some convenient procedure for this format. And finally choose “T/C K-type” option for CH 0 in the “Channel Enable/Disable Setting”, we plan to use K-type thermocouple sensor in the channel 0 of the M-7018Z module. See Appendix B “Configuring the I/O Module” of the Getting Started Manual for details.
3. Press F3 on your keyboard or click the “Register Devices (I/O)” option from the HMI menu. As shown in the figure below, set
 - I. Device Series = M-7000
 - II. Connection is determined by a dialog. Set appropriately.
 - III. Press the Select button to choose the model (here M-7055)
 - IV. Be sure to set the Net ID the same as the address you just set with DCON Utility. (here we set Net ID to 1)
4. With similar procedure, press F3 to register M-7018Z. Here M-7018Z’s Net ID is 2.



Step 12: Verify the imported tags and set the type code of M-7018Z

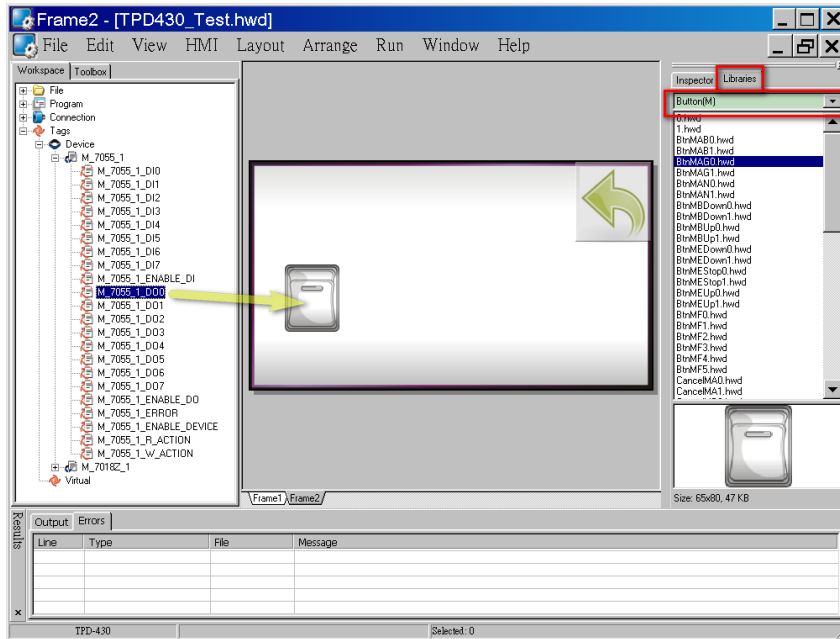
1. Click the Workspace tab and the two newly-registered devices can be seen.

2. Click the “Type Code” tag of the M-7018Z as shown below and set the “Default” value to 15 which means using K-type thermocouple sensors. (In this example, this tag has name “M_7018Z_1_TYPECODE_AI”.)
3. The range of the “Type Code” is described in the “TypeCode.txt” file in the following path: “C:\ICPDAS\HMIWorks_Standard\bin\Modules\M-7000”.



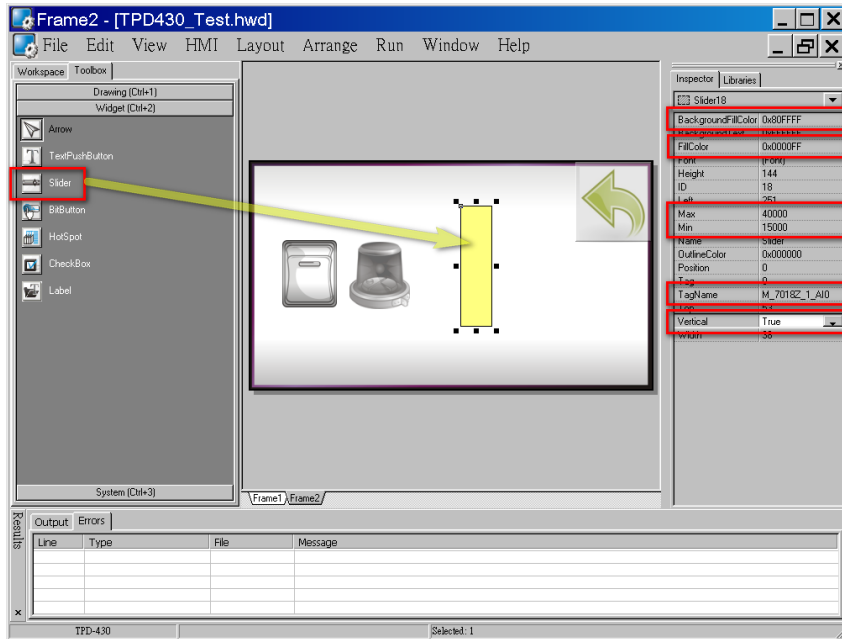
Step 13: Drag-and-drop the tags on the frame for DI or DO (M-7055)

1. Click the “Libraries” tab and choose the “Button(M)” option from the dropdown menu and then select a picture (.hwd) to represent the M-7055’s DO. When a picture is selected, users can see it in the preview box.
2. Click the tag of the M-7055 module’s channel 0 (M_7055_1_DO0) and drag-and-drop it on the frame. After downloading, touching the button will toggle the state of the channel 0 of the M-7055 module’s digital outputs.
3. Similarly, drag-and-drop the tag of the M-7055 module’s DI channel 0 with a picture from the “Light(M)” option from the dropdown menu.



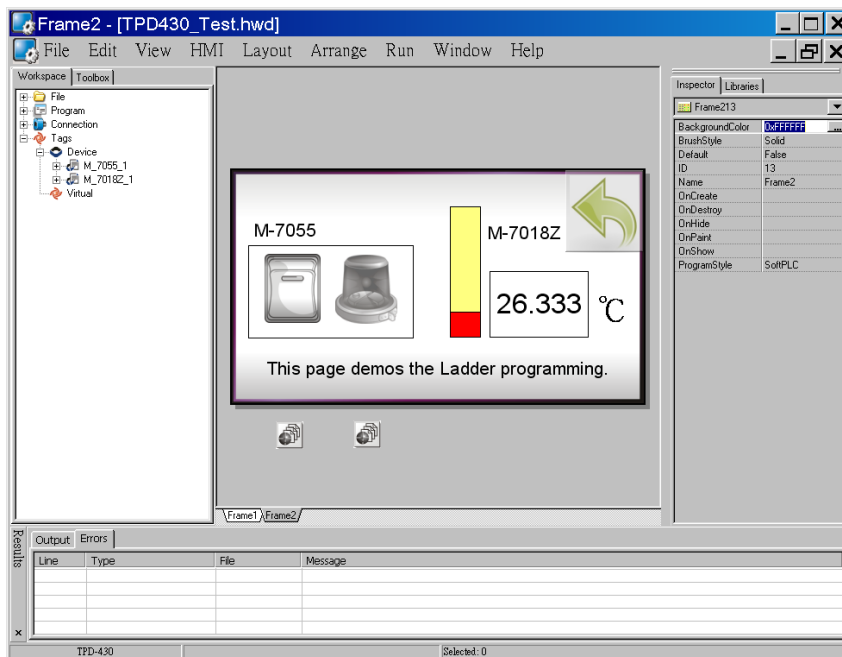
Step 14: Use a Slider and a Label to display the temperature. (M-7018Z)

1. Click the Slider component and drag a suitable-sized rectangle. Set the properties in the Inspector appropriately as suggested below:
 - I. BackgroundFillColor: some light color as a background
 - II. FillColor: red to represent the reading
 - III. Max: $40 (^{\circ}\text{C}) \times 1000 = 40000$ (we multiply the reading with 1000 for the decimal places)
 - IV. Min: $15 \times 1000 = 15000$
 - V. TagName: M_7018Z_1_AI0 (M-7018Z's AI channel 0)
 - VI. Vertical: true for FillColor increases/decreases its area up or down with the reading.
2. Click the Label component and drag a suitable-sized rectangle. Set the properties in the Inspector appropriately as suggested below:
 - I. DecimalDigits: it MUST set to 3 (because we multiply the reading with 3 tens)
 - II. Font: choose a suitable font
 - III. TagName: M_7018Z_1_AI0 (M-7018Z's AI channel 0)
 - IV. Text: arbitrarily choose 26.333 for default display



Step 15: Put some Text components, build and download the program

1. Similar to Step 5, put some Text components to describe the widgets.
2. Similar to Step 7, build and download the program.
3. After downloading the program, we now have a TPD-430 device which can control the remote DO of the M-7055 modules and acquire data from both M-7055 and M-7018Z modules.



3. Conclusion

Now the power of easy and seamless integration with remote I/O (esp. with ICP DAS) has been shown. We try to make developing projects for TouchPAD easy and quick but if you still have any questions or any advices, contact us: service@icpdas.com .

Thank you.