分類/Classification	☐ tDS ☐ tGW ☐ PETL/tET/tPET ☐ DS/PDS/PPDS ☐ tM-752N ☐ I/O Card ☐ VXC Card ☐ VxComm ☑ Other (TouchPAD)				
作者/Author	Jim	日期/Date	2024-05-17	編號/NO.	FAQ047

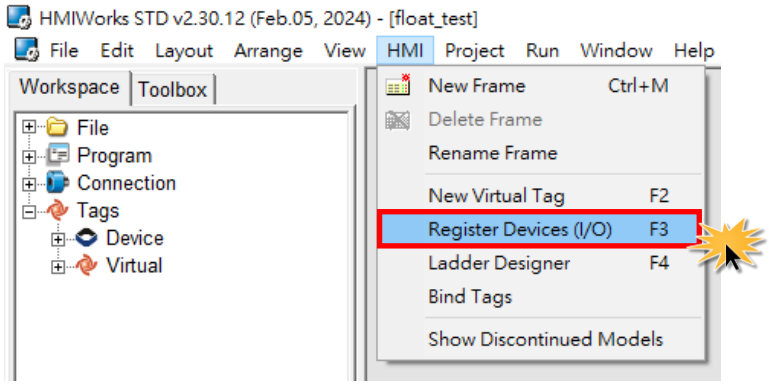
Q: How to use TouchPAD as a Modbus Master to read voltage and display it as a decimal?

HMIWorks offers two methods for program development: Standard C and Ladder Designer. The method for displaying decimal values on TouchPAD is similar whether it is used as a Modbus TCP Master or a Modbus RTU Master. Therefore, the following sections provide examples of using TouchPAD as a Modbus RTU Master to read voltage with decimals, developed using both Standard C and Ladder Designer.

1. Ladder Designer

The numbers used in the Ladder Designer are all integers. The decimals are not accepted in the Ladder Designer. You need to use the property of Label, DecimalDigits, to determine how many decimal places are displayed for the associated label value.

Step 1: Click the “Register Devices (I/O) (F3)” from the “HMI” menu to open the “Device” window.



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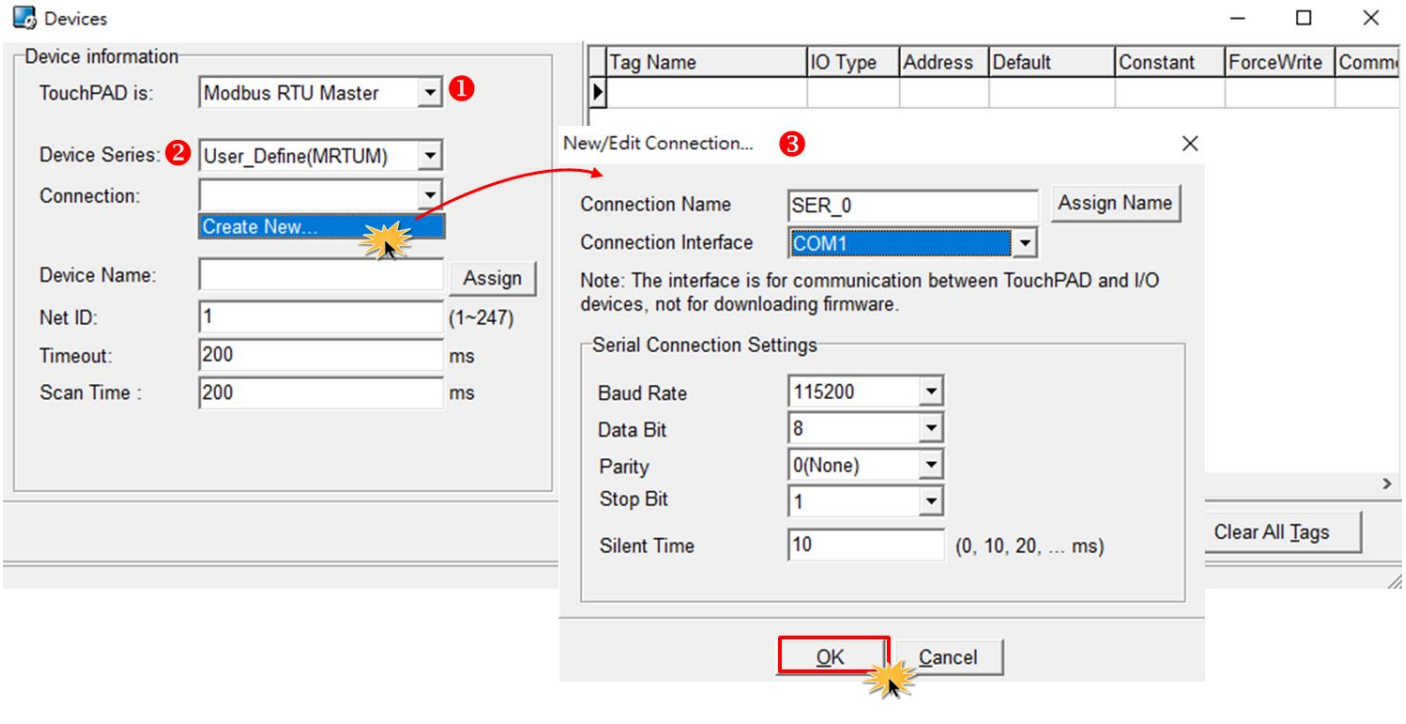
Step 2: In the **"Device"** window, configure the device information.

Here, the remote Modbus RTU I/O modules of third parties are used as an example.

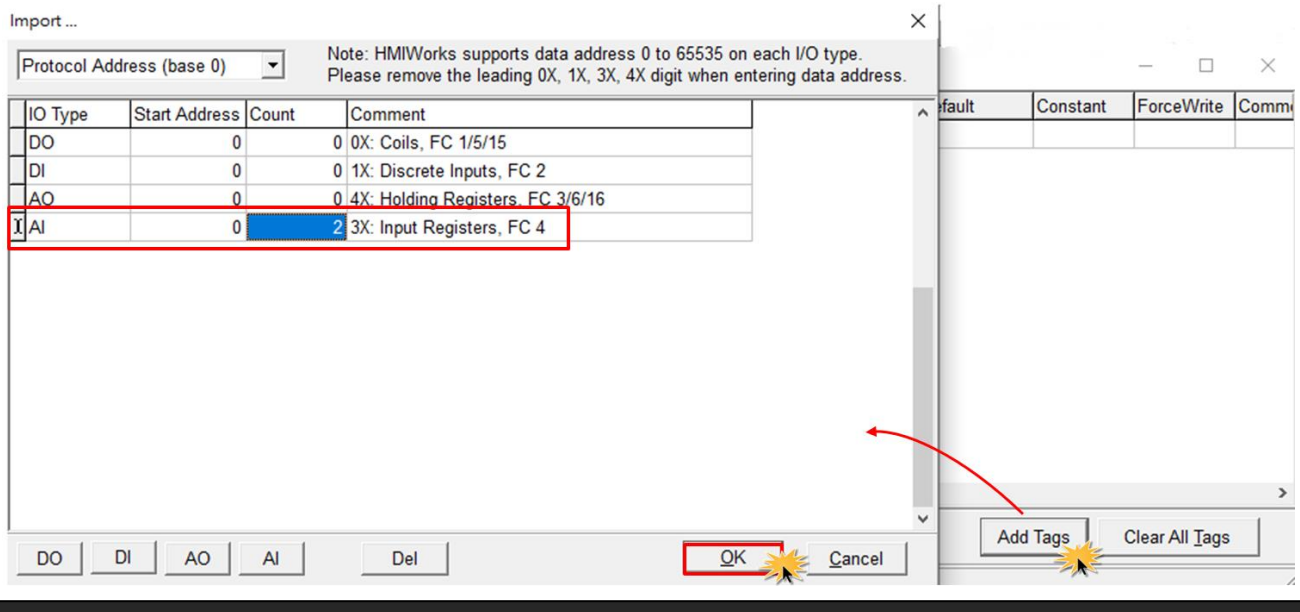
❶ From the **"TouchPAD is"** dropdown menu, select **"Modbus RTU Master".**

❷ From the **"Device Series"** dropdown menu, select **"User_Define(MRTUM)"**.

❸ From the **"Connection"** dropdown menu, select **"Create New…"** to open **"New/Edit Connection…"** window. Configure the connection for your Modbus RTU device, and click the **"OK"** button to complete the connection setup.



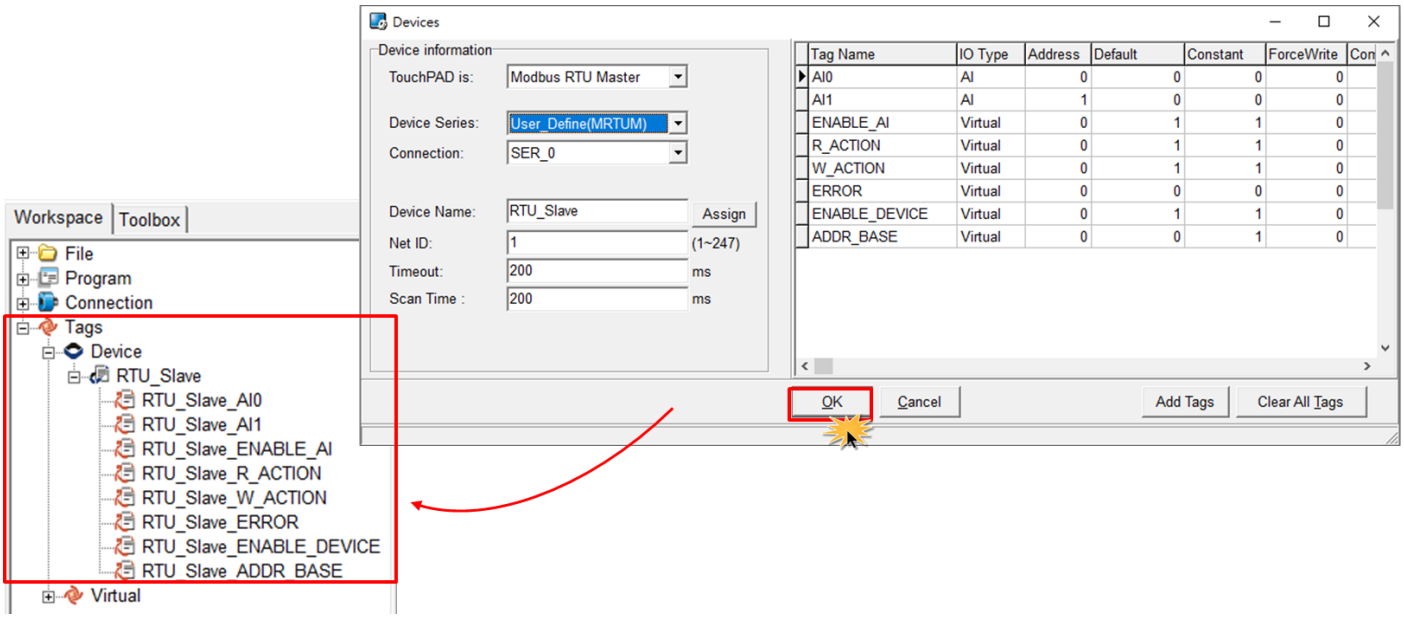
Step 3: In the **"Device"** window, click **"Add Tags",** fill in the relevant device information, and then click **"OK"** to import the tags.



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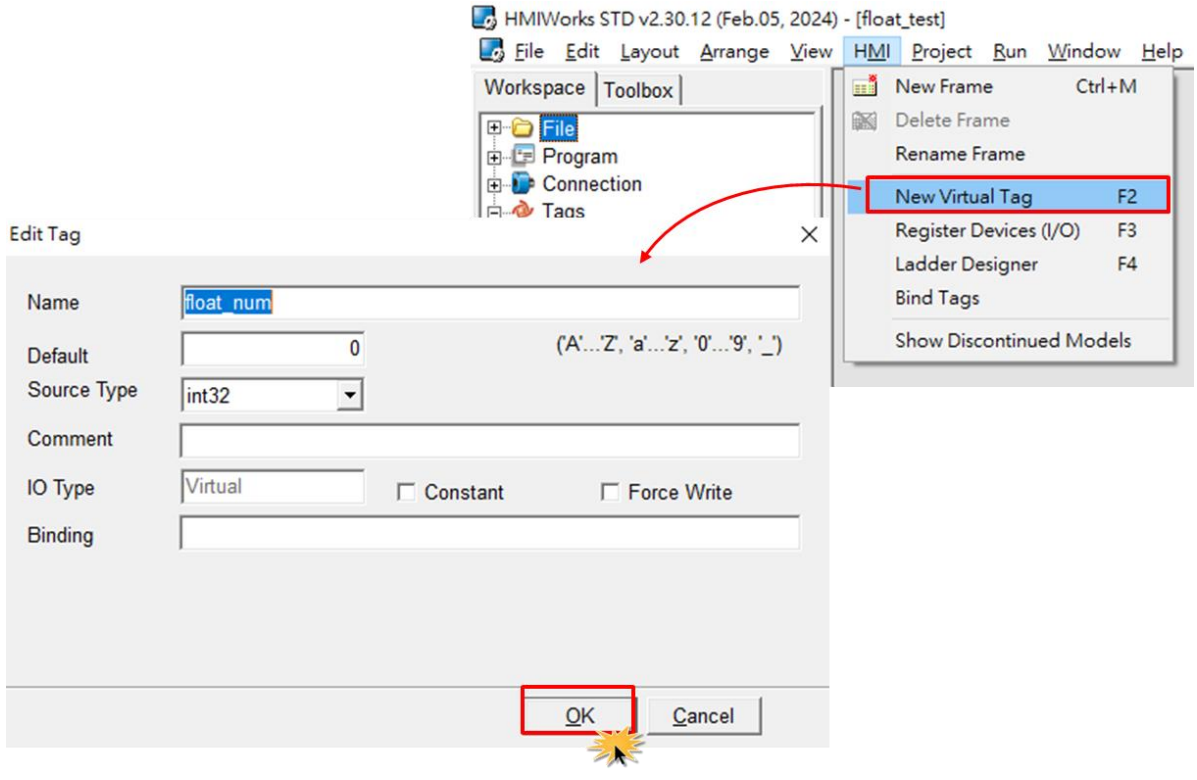
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Step 4: Confirm the device information and then press “OK” to import the device tags.



Step 5: Click the “**New Virtual Tag (F2)**” from the “**HMI**” menu to open “**Edit Tag**” window.

Step 6: In the **“Name”** field, enter the tag name (e.g., float_num), then press the **“OK”** button.



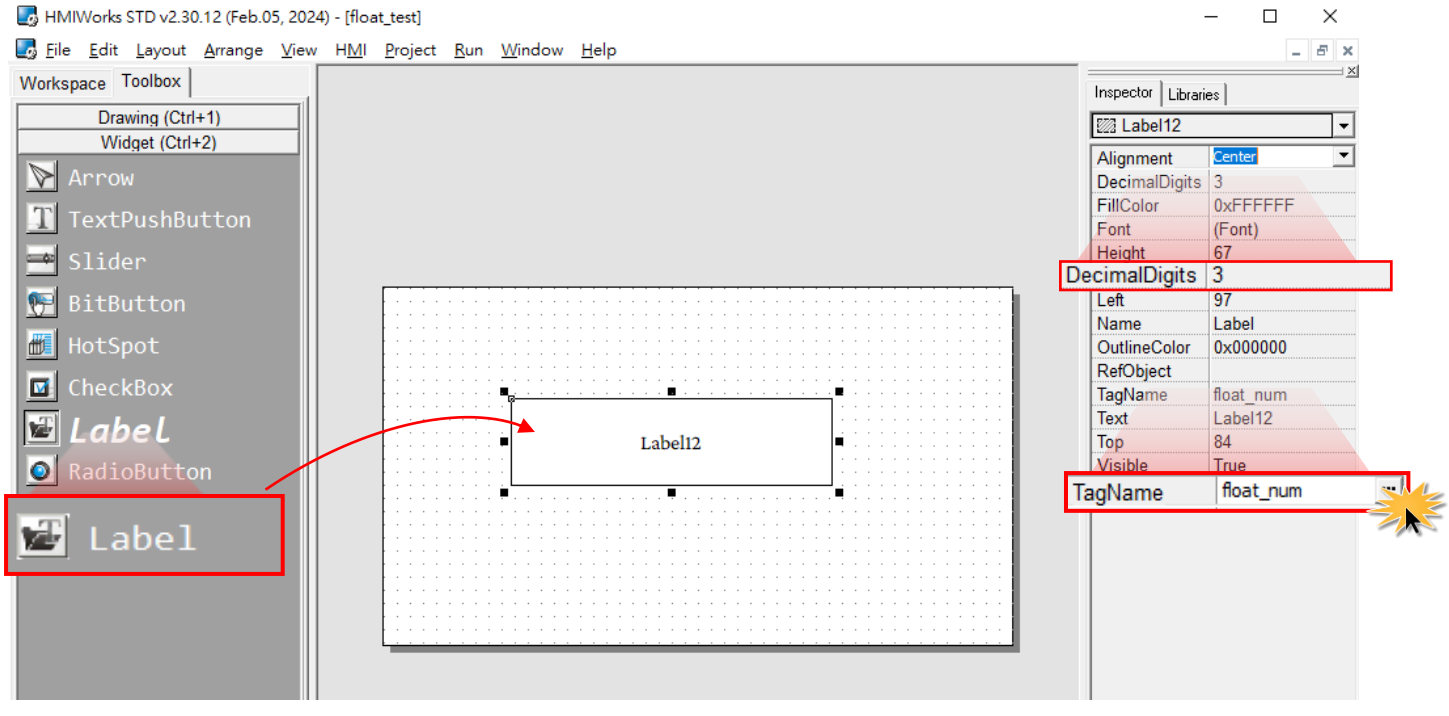
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Step 7: In the **"Toolbox"** section, click on the **"Label"** item and drag out a suitably sized box in the control screen design area.

Step 8: In the "**Inspector**", click on "**DecimalDigits**" to set the number of decimal places to be displayed in the text display box.

Step 9: In the "**Inspector**", click on "[...]" in "**TagName**" to select the name of the associated tag.

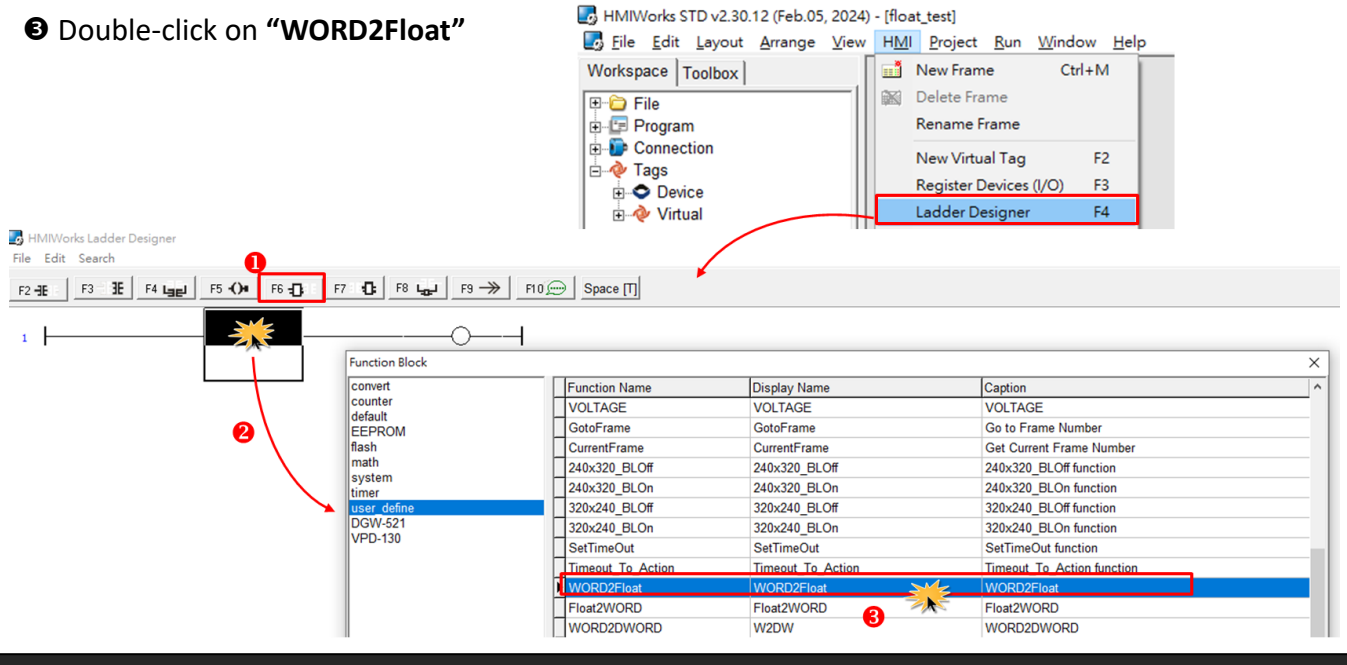


Step 10: Click the "Ladder Designer (F4)" from the "HMI" menu.

❶ Click F6 button to add a function block.

❷ Double-click on this function block to open the "Function Block" configuration window.

❸ Double-click on **"WORD2Float"**



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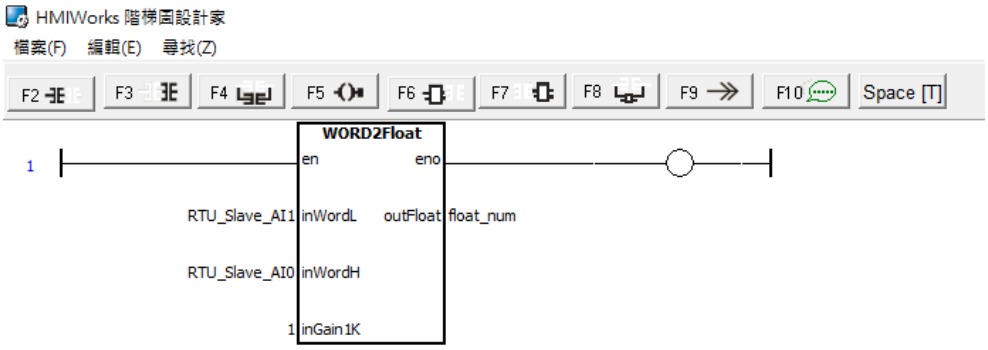
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Step 11: Obtain the enlarged integer through the "**WORD2Float"** function block.

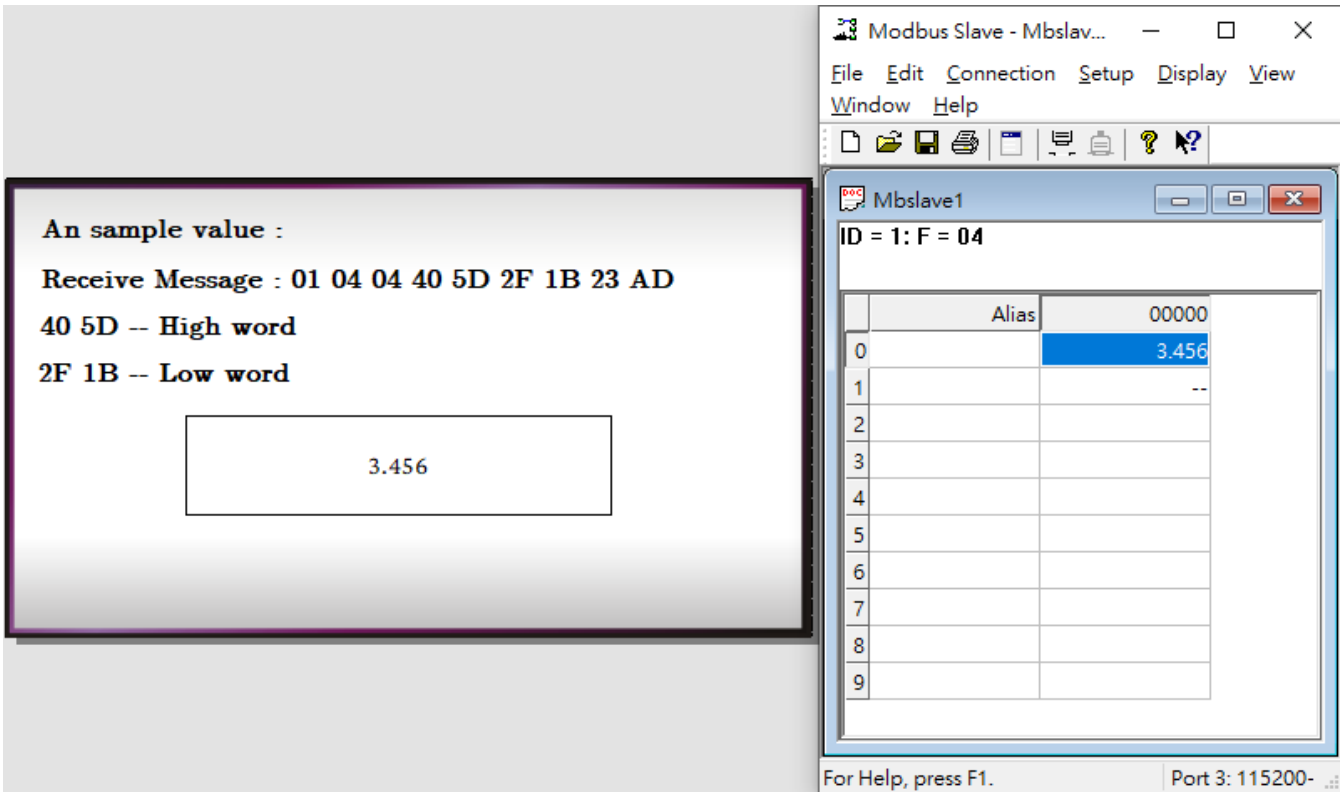
❶ Enter the High word (AI0) / Low word (AI1) into inWordH / inWordL.

❷ When inGain1K is set to 1 (not 0), it will amplify the value by 1000 times, which is equivalent to shifting the decimal point three places to the right.

❸ Finally, store the integer in the "float_num" tag, and set the DecimalDigits property of the label to 3 to display three decimal places.



Step 12: After compiling the project and downloading it to the TouchPAD, you will be able to read the values and successfully display decimals.



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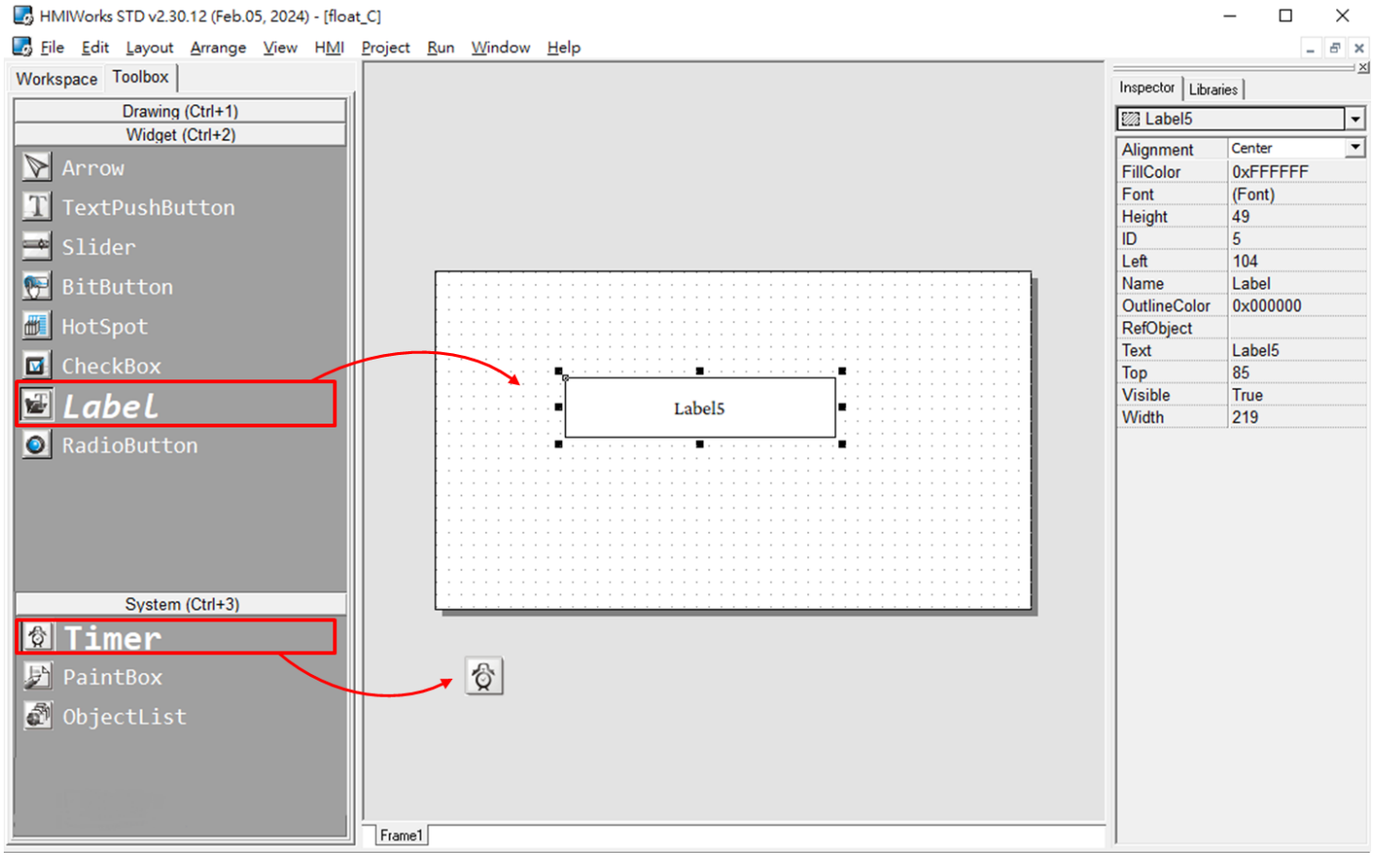
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2. Standard C

In **"**Standard C**",** we use the function "**FloatToStr"** to convert a floating-point number to a string.

Step 1: In the **"Toolbox"** section, click on the **"Label"** item and drag out a suitably sized box in the control screen design area.

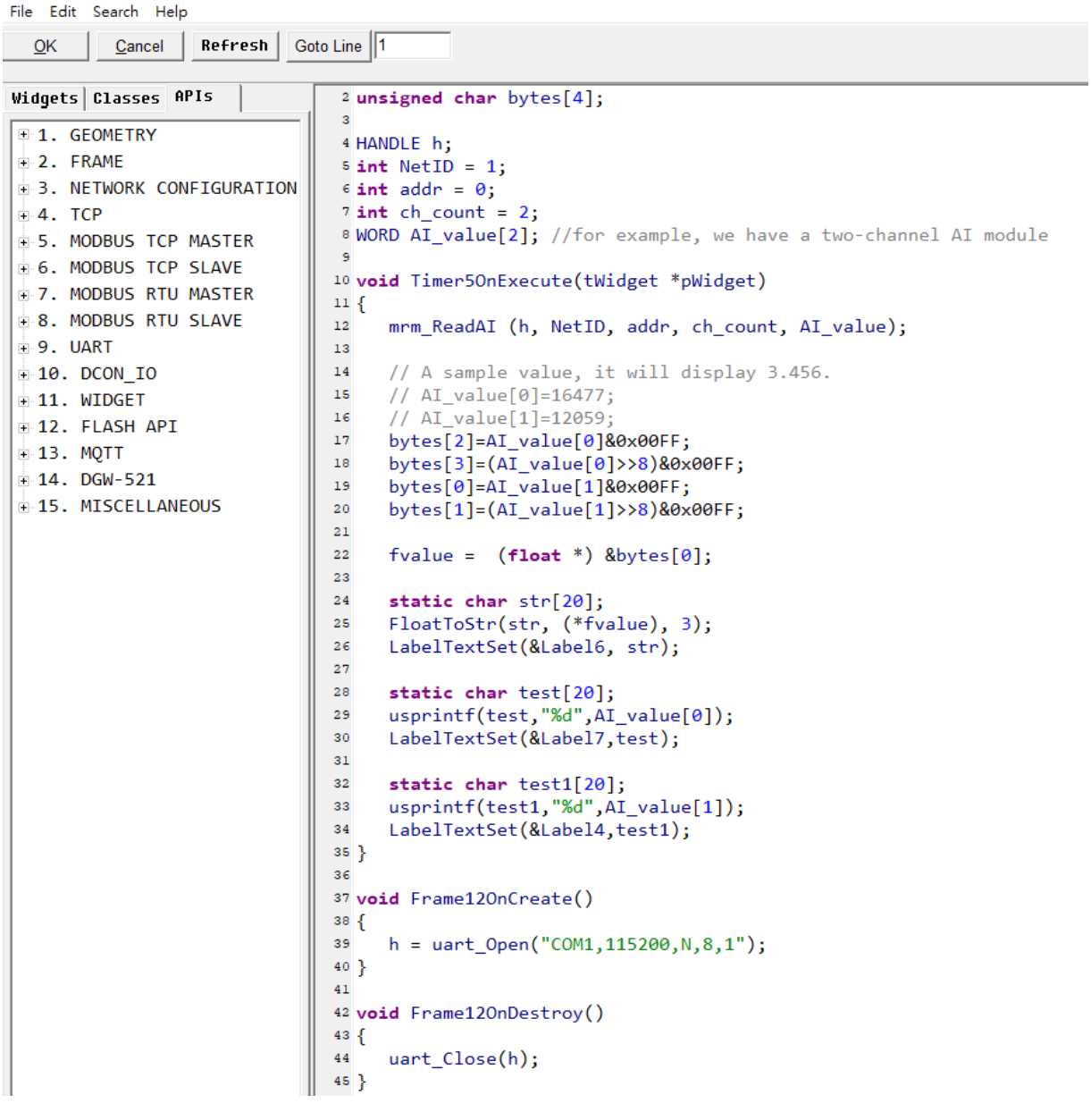
Step 2: In the "**Toolbox**" section, click on the "**Timer**" item, and then click once on any location in the control screen design area.



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Step 3: Use the function "FloatToStr" to convert a floating-point number to a string, as shown in the following example.




```
unsigned char bytes[4];

HANDLE h;
int NetID = 1;
int addr = 0;
int ch_count = 2;
WORD AI_value[2]; //for example, we have a two-channel AI module

void Timer5OnExecute(tWidget *pWidget)
{
   mrm_ReadAI (h, NetID, addr, ch_count, AI_value);

   // A sample value, it will display 3.456.
   // AI_value[0]=16477;
   // AI_value[1]=12059;
   bytes[2]=AI_value[0]&0x00FF;
   bytes[3]=(AI_value[0]>>8)&0x00FF;
   bytes[0]=AI_value[1]&0x00FF;
   bytes[1]=(AI_value[1]>>8)&0x00FF;

   fvalue =  (float *) &bytes[0];

   static char str[20];
   FloatToStr(str, (*fvalue), 3);
   LabelTextSet(&Label6, str);

   static char test[20];
   usprintf(test,"%d",AI_value[0]);
   LabelTextSet(&Label7,test);

   static char test1[20];
   usprintf(test1,"%d",AI_value[1]);
   LabelTextSet(&Label4,test1);
}

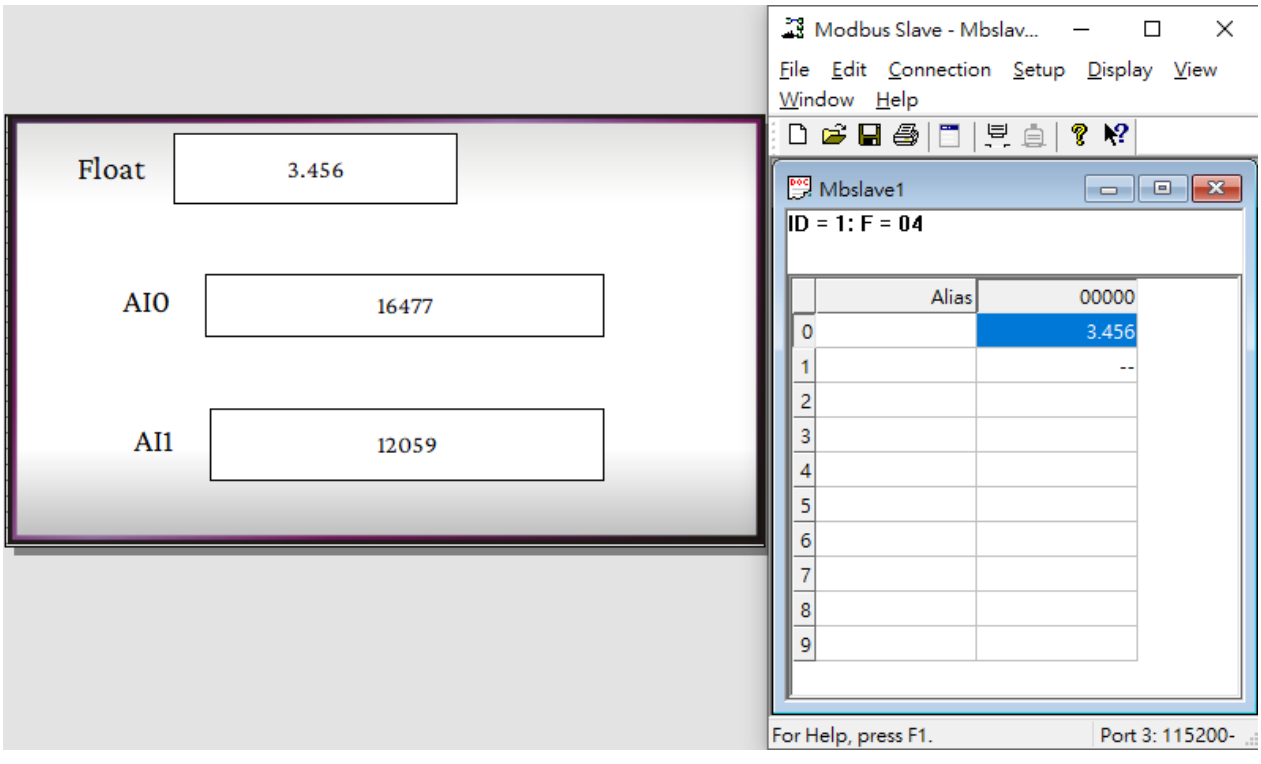
void Frame12OnCreate()
{
   h = uart_Open("COM1,115200,N,8,1");
}

void Frame12OnDestroy()
{
   uart_Close(h);
}
```

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Step 4: After compiling the project and downloading it to the TouchPAD, you will be able to read the values and successfully display decimals.



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