

APPLICATION NOTE 6555

## HOW TO INTERFACE THE MAX11301WING PIXI 20-PORT, MIXED-SIGNAL I/O WITH THE MAX32630FTHR

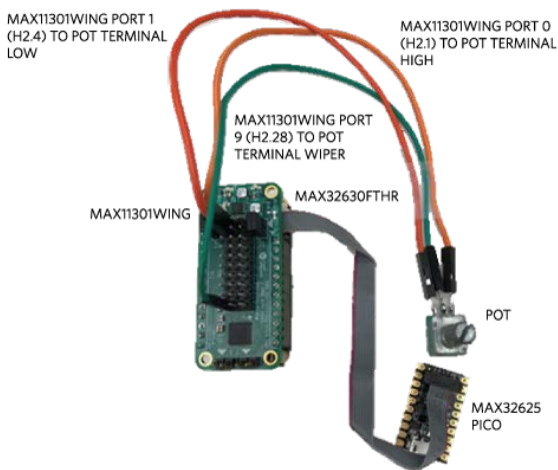
*Abstract: This quick start guide explains how to interface the MAX11301WING with the MAX32630FTHR. A demo program is used to show a working program using the two devices.*

### Introduction

The **MAX11301WING** is a rapid development prototyping board designed for quick integration with other Maxim Feather and Wing evaluation boards. The **MAX11301** PIXI™ is a highly configurable mixed signal IC that provides versatility to any application. This quick start guide explains how to configure the MAX11301 PIXI programmable IC to read a potentiometer's wiper position using two digital-to-analog converters (DACs) and one analog-to-digital converter (ADC). The internal DACs are configured for  $\pm 5V$  output range, and connecting a potentiometer between the two DAC outputs with the center wiper connected to an internal ADC allows sensing over the entire voltage range. When paired with a **MAX32630FTHR** microcontroller platform, the MAX11301WING ADC conversions can be read and converted into a voltage value. If connected to a PC, the unprocessed and converted data can be printed to a serial terminal.

Follow the below steps to set up the MAX11301WING with the MAX32630FTHR+MAX32620PICO platform using the **MAX11301WING\_Demo** program software.

**Figure 1** shows the hardware schematic for the MAX11301WING demo program.



*Figure 1. Hardware schematic of the MAX11301WING demo.*

### Required Equipment

- Computer with two USB ports
- MAX32630FTHR microcontroller
- Any Mbed® programmer, **MAX32625PICO** recommended
- MAX11301WING PIXI 20-port I/O
- 10k $\frac{1}{2}$  potentiometer
- Three cables that can connect the MAX11301WING to a potentiometer
- One fine-pitch, 10-pin ribbon cable, included with the MAX32630FTHR
- Two USB cables to connect the MAX32625PICO and MAX32630FTHR to a computer

### Hardware Assembly

1. Connect the MAX32625PICO to the MAX32630FTHR using the 10-pin ribbon cable used for programming and communication. The 10-pin header on the MAX32630FTHR and MAX32625PICO boards have a mating groove and can only connect in the proper orientation.
2. Ensure jumpers J1 and J2 are installed on the MAX11301WING to connect the -7.5V rail to AVSSIO and the +7.5V rail to AVDDIO of the PIXI.
3. Stack the MAX11301WING on top of the MAX32630FTHR. The MAX11301WING form factor has 16 pins on one side of the board and 12 pins on the other. Make sure the 16-pin header (H1) and 12-pin header (H3) align on each board when stacking. **Figure 2** shows the MAX11301WING stacking on the MAX32630FTHR.

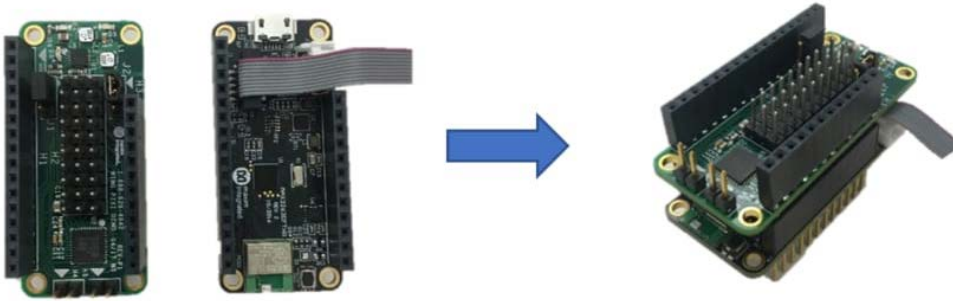


Figure 2. Displays stacking the MAX11301WING on top of the MAX32630FTHR.

4. Connect the potentiometer between PORT0 and PORT1 of the MAX11301WING, located on header H2, pins 1 and 4. **Figure 3** displays the H2 header pinout and highlights the desired ports with a red box.

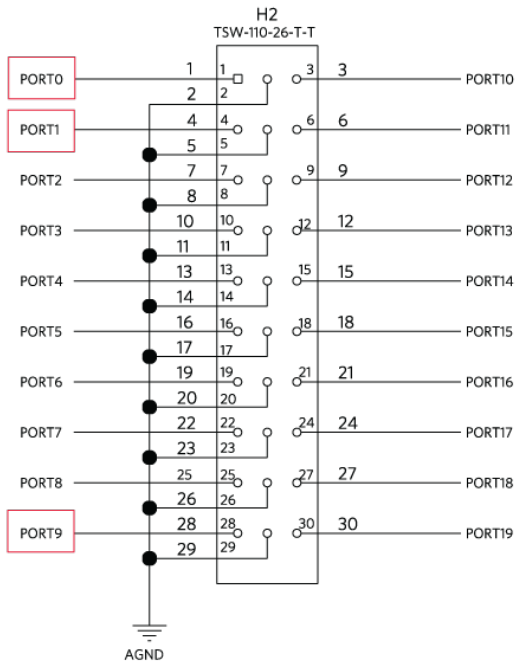


Figure 3. Header H2 pinout with the desired ports highlights with red boxes.

5. Connect the potentiometer wiper to PORT9 of the MAX11301WING, located on header H2, pin 28. Reference Figure 3 for a pinout of the H2 header with PORT9 highlighted with a red box.
6. Connect the MAX32625PICO and MAX32630FTHR to a PC using the USB cables. The green and blue LEDs on the MAX11301WING should turn on, indicating that the board has power.

#### Software Configuration

1. Go to [os.mbed.com](https://os.mbed.com) and log in. If you do not have an account, create one.
2. After signing in, navigate to the MAX32630FTHR Mbed landing page by clicking the following link: [os.mbed.com/platforms/MAX32630FTHR](https://os.mbed.com/platforms/MAX32630FTHR). On the right-hand side, click the Add to your Mbed compiler button to add the MAX32630FTHR as a target microcontroller board to your compiler. **Figure 4** highlights the **Add to your Mbed compiler** button with a red box on the MAX32630FTHR landing page.

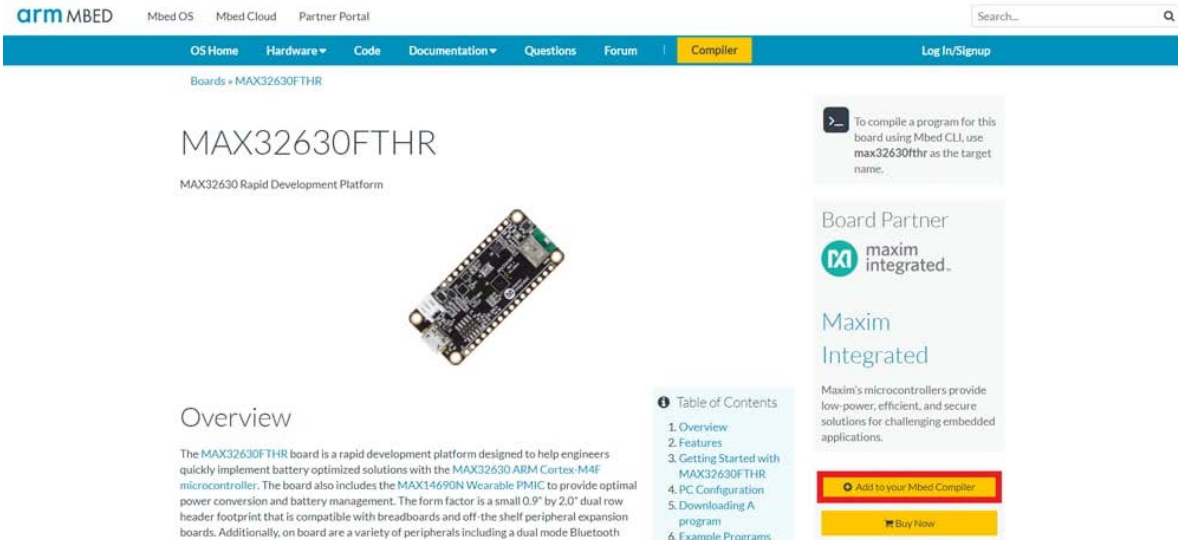
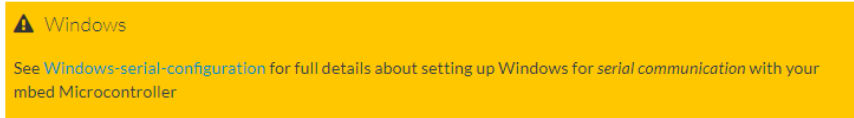


Figure 4. Highlights the Add to your Mbed Compiler button in a red box on the MAX32630FTHR Mbed landing page.

3. Install the Windows<sup>®</sup> OS driver for Mbed microcontrollers by scrolling down the MAX32630FTHR Mbed landing page to reach the **PC Configuration** section; follow the installation instructions. **Figure 5** displays the **PC Configuration** section.

## PC Configuration

Your mbed Microcontroller can appear on your computer as a serial port. On Mac and Linux, this will happen by default. For Windows, you need to install a driver:



From a host PC to communicate with mbed you will need a **terminal application**. This allows the mbed Microcontroller to print to your PC screen, and for you to send characters back to your mbed.

- **Terminals** - Using Terminal applications to communicate between the Host PC and the mbed Microcontroller

Some terminal programs (e.g. TeraTerm) list the available serial ports by name. However, if you do need to know the identity of the serial port so that you can attach a terminal or an application to it:

Figure 5. Displays PC Configuration section of the MAX32630FTHR Mbed landing page.

4. Import the **MAX11301WING\_Demo** program at **Maxim-Integrated/MAX11301WING\_Demo** into the compiler's program work space by clicking the **Import to Compiler** button on the right-hand side. **Figure 6** highlights the import button on the MAX11301WING\_Demo repository page with a red box. This automatically opens the Mbed compiler in a new window. When this window opens, select **Import** to import the program.

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## Maxim Integrated / MAX11301WING\_Demo

Demo code for the MAX11301WING. Programs a +5V on Port 0, -5V on Port 1 and a single-ended ADC on Port 9.

**Dependencies:** MAX113XX\_Pixi max32630fthr

Fork of MAX11301\_Demo by John Greene

Home History Graph API Documentation Wiki Pull Requests

You can edit this area!  
[Edit repository homepage](#)

Files at revision 6:fe500943de11 Download repository: zip gz

Name	Size	Actions
<a href="#">[up]</a>		
<a href="#">MAX11301Hex.h</a>	79069	<a href="#">Revisions</a> <a href="#">Annotate</a>

Repository toolbox:

- Import into Compiler** (highlighted with a red box)
- Export to desktop IDE
- Build repository
- Send Pull Request from here
- Make featured
- Following
- Embed url: <<program /teams/Maxim-Int
- Clone repository to desktop: hg clone https://johnGreeneM

Figure 6. Highlights the **Import into Compiler** button with a red box on the MAX11301WING\_Demo repository.

- In the compiler window, select the MAX11301WING\_Demo program in your program work space. In the upper right corner, the target microcontroller is displayed. Confirm the MAX32630FTHR is the target microcontroller. **Figure 7** highlights the location of the target microcontroller on the compiler webpage with a red box. If the MAX32630FTHR is not selected, click this area to select a target microcontroller. Once clicked, the selection window appears; select MAX32630FTHR.

Mbed /MAX11301WING\_Demo

New Import Save Save All Compile Commit Revision Help

Program Workspace: My Programs > MAX11301WING\_Demo

Program: /MAX11301WING\_Demo

Name	Size	Type	Modified
MAX113XX_Pixi		Published Library	3 days, 3 hours ago
max32630fthr		Published Library	3 days, 3 hours ago
main.cpp	2.7 kB	C/C++ Source File	3 days, 3 hours ago
MAX11301Hex.h	77.2 kB	C/C++ Header File	3 days, 3 hours ago
mbed-os		Library	3 days, 3 hours ago

Program Details:

- Summary
- Build
- Name: MAX11301WING\_Demo
- Created: 3 days, 3 hours ago
- Last Modified: 3 days, 3 hours ago
- Last Built: Never
- URL: Maxim-Integrated/MAX1130
- Revision: 6:fe50094
- Status: synced

Update Commit Revisions Export Publish Homepage

Figure 7. Highlights the target microcontroller selection area of the Mbed compiler window.

- With the MAX11301WING\_Demo program selected in the program work space, click the **Compile** button in the command banner at the top of the screen. **Figure 8** highlights the **Compile** button. This initiates the download of the program's binary file.

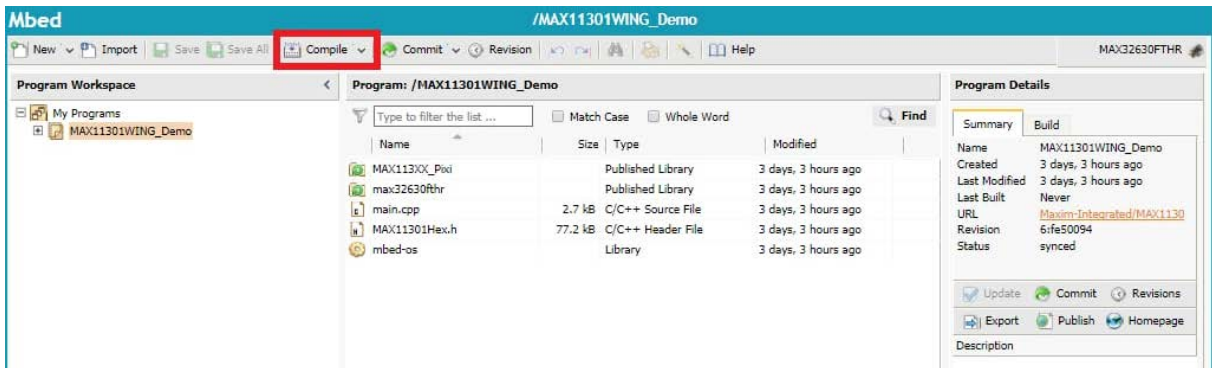


Figure 8. Highlights the Compile command button in the Mbed compiler with a red box.

- The MAX32625PICO board appears as a USB drive with the name **DAPLINK** in your native file navigation program. Figure 9 highlights the DAPLINK drive with a red box. Program the MAX32630FTHR by dragging the binary file onto the DAPLINK drive. Red LEDs flash on the MAX32625PICO until programming is complete. This typically takes a few seconds.

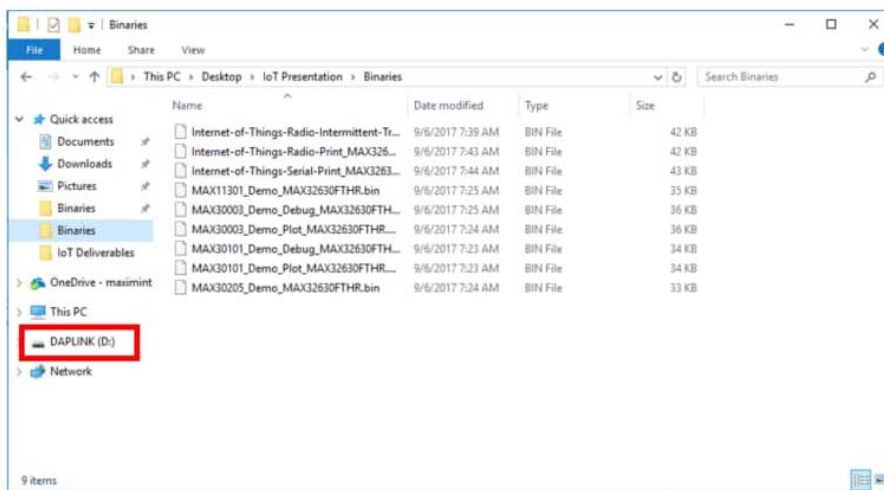


Figure 9. Drag the binary file onto the DAPLINK drive to program the microcontroller.

- Install the serial terminal program Tera Term by visiting this link and following the installation instructions: <https://osdn.net/projects/ttssh2/releases/>.
- Open Tera Term and select the **Serial** radio button and the Mbed device from the pull-down menu, as shown in Figure 9. The Mbed device could be on a different COM port than what is shown in Figure 10. Click **OK**.

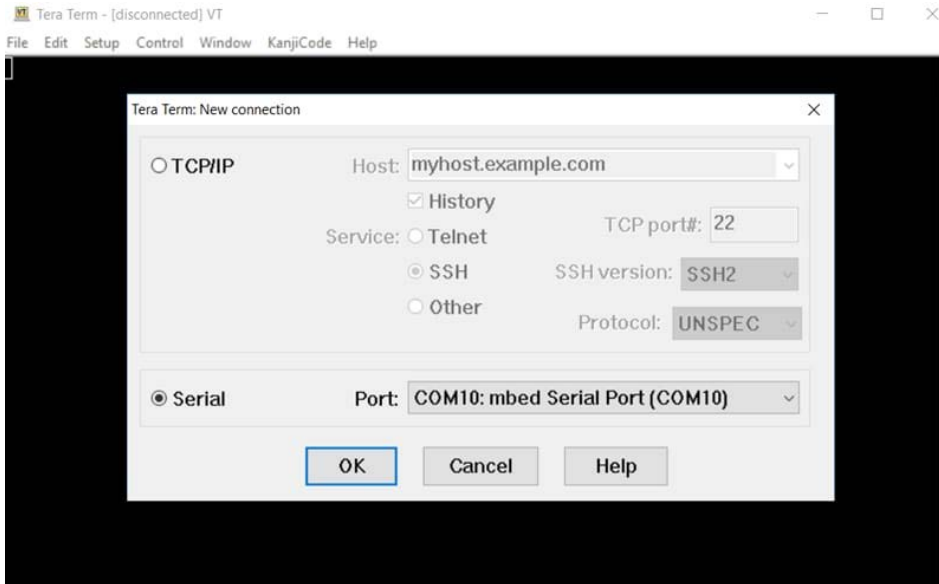


Figure 10. Tera Term opening window. Select the Serial radio button and the mbed Serial Port from the drop-down menu.

- Set the baud rate to 115200bps by navigating to Setup/Serial Port. This opens a new configuration window. Select 115200 in the Baud rate pull-down menu, as shown in Figure 11.

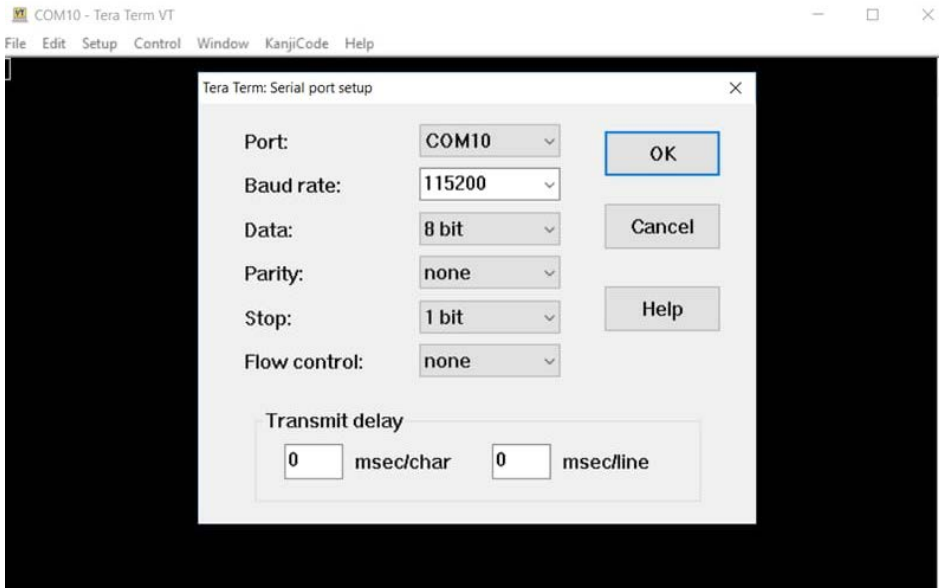


Figure 11. Displays 115200bps baud rate selected in Tera Term.

- Press the reset (SW1) button on the MAX32630FTHR, as displayed in Figure 12.

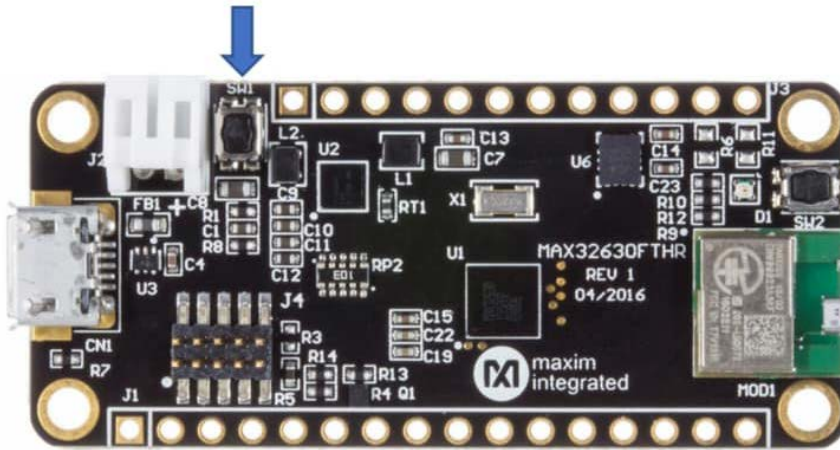


Figure 12. The reset button is SW1 on the MAX32630FTHR.

12. Data should begin streaming to the serial terminal, as shown in Figure 13.

```
//Serial Output//
-----
ADC Read is : 3747,      Voltage is 4.150 V
ADC Read is : 3643,      Voltage is 3.896 V
ADC Read is : 3556,      Voltage is 3.684 V
ADC Read is : 3437,      Voltage is 3.393 V
ADC Read is : 3339,      Voltage is 3.154 V
ADC Read is : 3210,      Voltage is 2.839 V
ADC Read is : 3113,      Voltage is 2.602 V
ADC Read is : 2998,      Voltage is 2.321 V
ADC Read is : 2912,      Voltage is 2.111 V
ADC Read is : 2811,      Voltage is 1.864 V
```

Figure 13. Serial output of the MAX11301WING\_Demo program.

This completes the integration and set up of the MAX11301WING with the MAX32630FTHR. Please continue to use this quick start as an example for making your own applications using the MAX11301 PIXI. Maxim has several Wing evaluation boards to enable rapid development of entire systems. Check out Maxim's Feather and Wing solutions for your next project!

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PIXI is a trademark of Maxim Integrated Products, Inc.

Windows is a registered trademark and registered service mark of Microsoft Corporation.

Related Parts		
<a href="#">MAX11301</a>	PIXI, 20-Port Programmable Mixed-Signal I/O with 12-Bit ADC, 12-Bit DAC, Analog Switches, and GPIO	<a href="#">Free Samples</a>
<a href="#">MAX11301WING</a>	Evaluation Kit for the <a href="#">MAX11301</a> PIXI Mixed-Signal IO	
<a href="#">MAX32625</a>	Ultra-Low Power, High-Performance ARM Cortex-M4 with FPU-Based Microcontroller for Wearables	<a href="#">Free Samples</a>
<a href="#">MAX32625PICO</a>	Evaluation Kit for the <a href="#">MAX32625/MAX14750</a>	
<a href="#">MAX32630</a>	Ultra-Low Power, High-Performance Cortex-M4F Microcontroller for Wearables	<a href="#">Free Samples</a>
<a href="#">MAX32630FTHR</a>	MAX32630FTHR Application Platform	

#### More Information

For Technical Support: <https://www.maximintegrated.com/en/support>

For Samples: <https://www.maximintegrated.com/en/samples>

Other Questions and Comments: <https://www.maximintegrated.com/en/contact>

Application Note 6555: <https://www.maximintegrated.com/en/an6555>

APPLICATION NOTE 6555, AN6555, AN 6555, APP6555, Appnote6555, Appnote 6555

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