A D Metro's Resistive Controller Board - User Guide

Version 1.0

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Introduction

The A D Metro analog resistive USB and RS-232 touch screen controller board represents a feature-rich, fully-integrated universal touch screen controller solution. The touch screen controller board automatically selects between USB and RS-232 communication protocols, can be USB powered, and supports 4-, 5-, and 8-wire analog resistive touch screens from A D Metro and a variety of other touch screen manufacturers. The A D Metro touch screen controller board dynamically adapts to a various touch screen electrical characteristics such as sensitivity, contact resistance, and capacitance to provide optimal performance with minimal design time.

Controller Calibration

To calibrate the A D Metro controller board with a touch panel, please use the following documents and resources by going to the Microchip website at http://www.microchip.com/wwwproducts/en/AR1100 and selecting the "Documentation" menu. Download the following resources:

- "AR1100 Calibration Utility" software installer,
- "AR1100 Calibration Templates for Development", and
- "AR1100 Calibration Utility User's Guide".

Install the AR1100 Calibration Utility (ACU) by double-clicking on the downloaded installation zip file and following the on-screen instructions. Two executables will be installed; ARCalibration and AR1100 Cal Config.

Note: *Both will have desktop and program menu shortcuts installed.*

Configuration Utility Wizard

To start "AR Configuration Utility" click the Windows icon from the desktop and the screen with AR Configuration Utility will appears. On the screen will be shown the "Configuration Wizard", "Manual Setup", and "Expert" options.

Choose "Configuration Wizard", then select "Next" and the menu below will appear:

- Select AR1100, because the AR1000 chip is not used in the controller, and Custom Setup is for another board. Click Next.
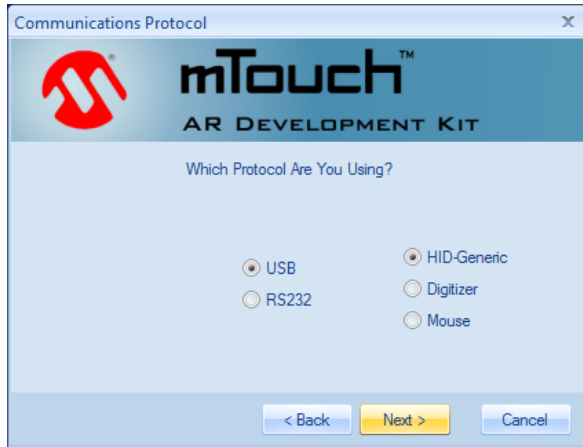
- Select USB. Make sure the controller is connected to the computer (the RS232 option will be explained later). Click Next.
- Select HID-Generic (Digitizer and Mouse are not part of the calibration process). Click Next.
- Verify that the jumper J5 for 5W is installed (see Fig. 5 on pg. 11) if 5 wire function is desired. For 4- or 8-wire function, remove the J5 jumper. Click Next.
- Make sure the touch panel is connected to the A D Metro controller. Click Next.

- The MTouch software searches for the controller, then the USB and AR1100 check boxes appear.
- Make sure the box "Skip calibrate" is unchecked. Click Next.
- Prepare calibration. Click Next. Click Next.

- Press touch screen to the proper point, repeat for 2, 3, and 4.
- Click Next and Finish.

Now the Scribble Demo, Equalizer Demo, and P.O.S Demo can be performed.

Calibration for 9 Points and 25 Points

There are three types of tablet screens: touch screens, active digitizers, and mouse. Touch screens respond to the touch of your finger or stylus and the cursor jumps to whatever point is touched on the display. Active digitizers sense the tip of the stylus as it approaches the screen surface and display a pen/mouse cursor. The mouse is much liked the touch screen, but the mouse is following the cursor the screen.

The advantage of the touch screen is that you can use your finger or any pen device for data input. The disadvantage is that there is no "cursor tracking" which can make it difficult to work with applications where precise cursor placement is needed. The advantage of the active digitizer is that it provides very precise cursor placement, but if the pen is lost, the screen cannot be used as the display will not respond to any other touch of any kind.

4-point calibration can be performed, but 9-point or 25-point calibration is recommended as they are more precise.

Enter the calibration desired in "Option" from the "Tools" menu. You should select 9-point or 25-point of the bottom of the tab "Calibration". Then the follow the cursor and press on the proper touch point.

Attach the templates for "AR1100 Calibration Templates for Development".
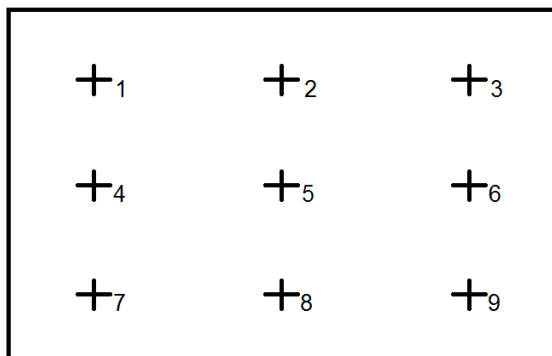

Figure 1: 9-Point template

Pinouts for Controller and Panel

A D Metro manufactures for 4-, 5- and 8-wire panels. There are two common pinout schemes for 5 wire touch screens. A D Metro manufactures screens with both of types of pinout schemes, depending on the design of the screen and the customer's requirements. The sensor drawings show the pinout scheme used; contact A D Metro for the appropriate pinout based on sensor's part number if the drawing is not available. The pinout of the controller and the two common 5 wire pinouts is shown in the table below (refer to Fig.5 for controller pin numbers):

Table 1: 5-wire panel pinout connection

Bottom row connector	9	7	5	3	1
5-wire panel	1	2	3	4	5
Function	Y+	X+	SX-	X-	Y-
Straight Cable	LL	UL	SENSE	LR	UR
Crossover Cable	LL	LR	SENSE	UR	UL

Most A D Metro 5 wire resistive touch screens match the pinout of the controller without need of a crossover cable (the Straight Cable configuration). If the sensor pinout does not match the Straight Cable configuration, a crossover cable will be needed to properly calibrate the screen (the Crossover Cable configuration). If a screen has a Crossover cable pinout, a crossover cable will be needed between the controller and touchscreen to rearrange the pins.
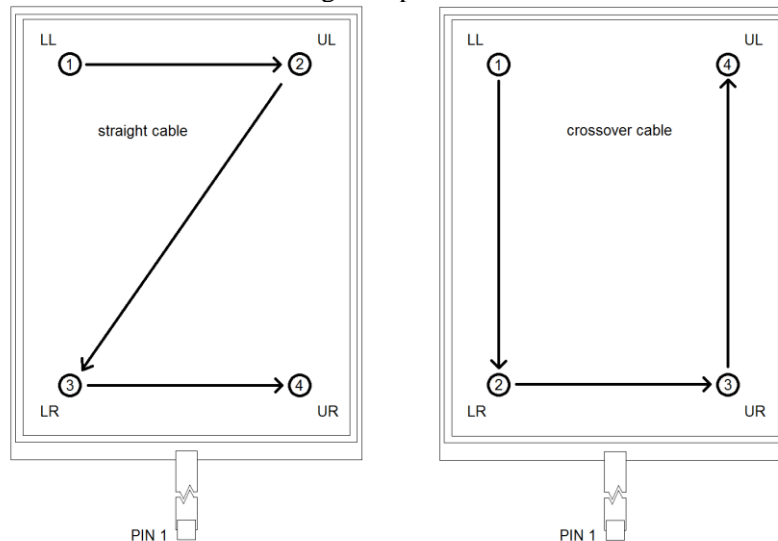
**Figure 2:** Common touch panel pin configurations

Similarly, 4- and 8-wire screens also must have crossover cables to rearrange the pins if the pinouts of the touchscreens do not match those expected by the controller. See the Tables below for standard 4- and 8-wire pinouts.

Table 2: 4-wire panel pinout connection

Top row connector	2	4	6	8
4-wire panel	1	2	3	4
Crossover cable	1	3	2	4
Function	Y+	X+	X-	Y-

Table 3: 8-wire panel pinout connection

On side connector	1	2	3	4	5	6	7	8
Crossover cable	1	2	6	5	4	3	7	8
Function	X+	SX+	Y+	(Y+)	X-	SX-	SY-	Y-
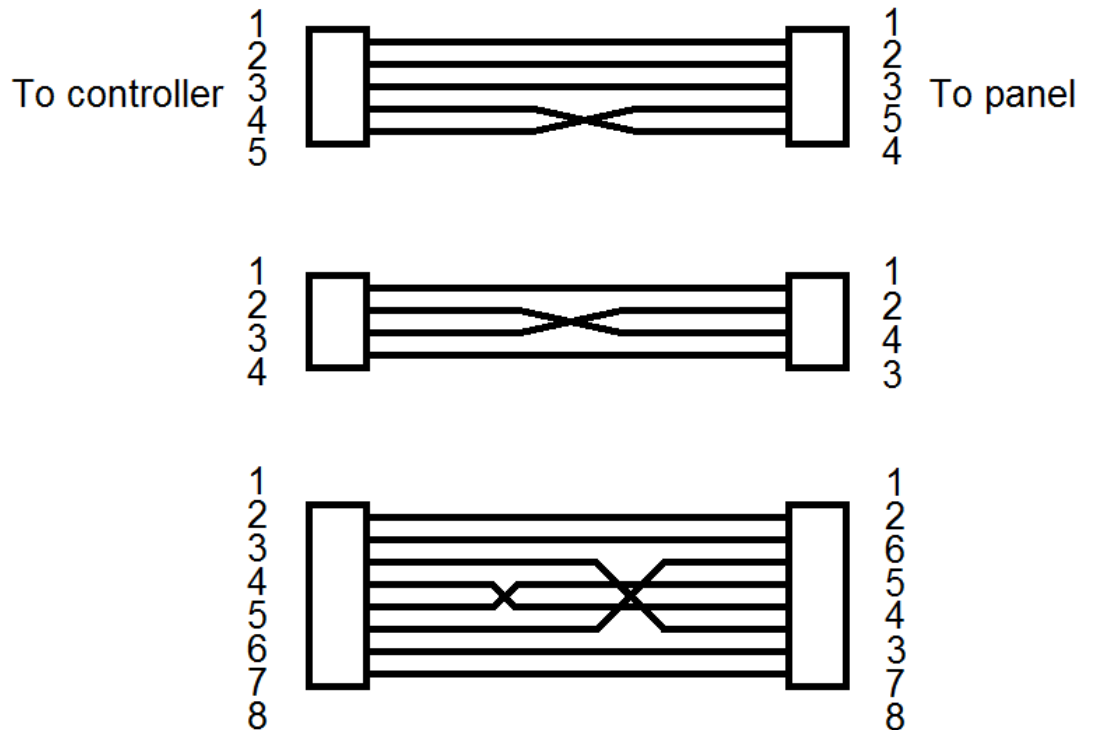
**Figure 3:** Crossover cables for 5-wire, 4-wire, and 8-wire

Configuration Utility for serial RS-232

The configuration procedure for RS-232 is the same as the USB.

For RS-232 operation:

- remove the USB cable, replacing with a RS-232 cable,
- change the jumper beside the connector (J3) from "USB" to "RS-232", and
- add an external power feed cable.

The RS-232 cable requires two wires for data transmission and one for GND. The external power supply requires two wires with the cable. The A D Metro will provide the cable with two wires for external power supply.
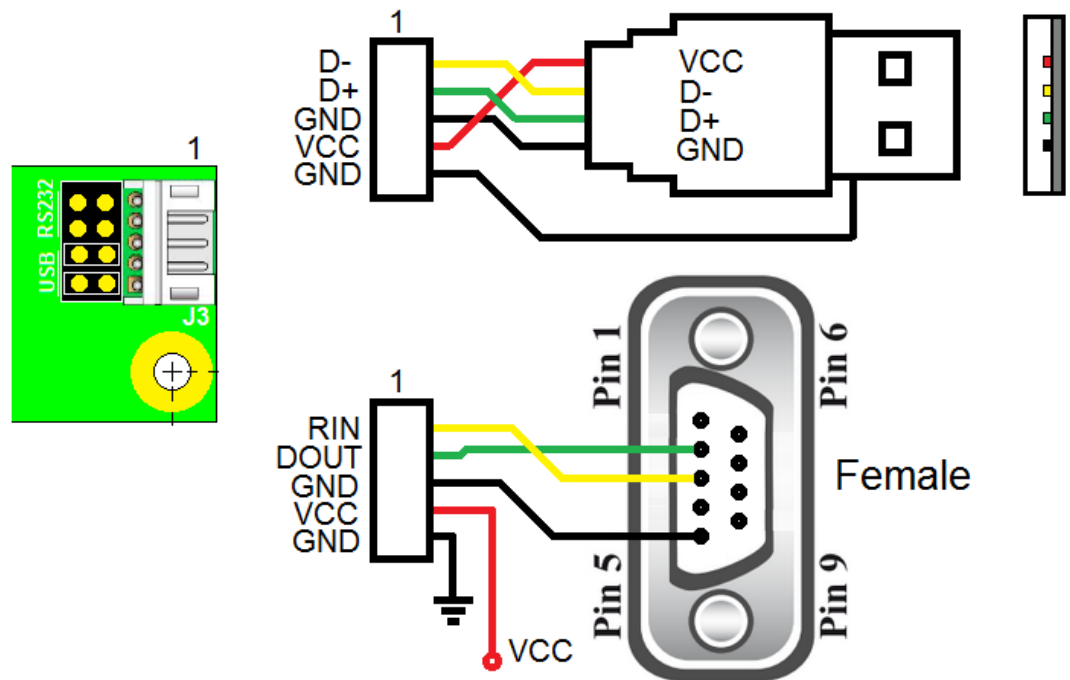
Figure 4: Configuration Utility for serial RS-232

The USB cable is standard for AD Metro and other manufactures.

Controller Board Layout
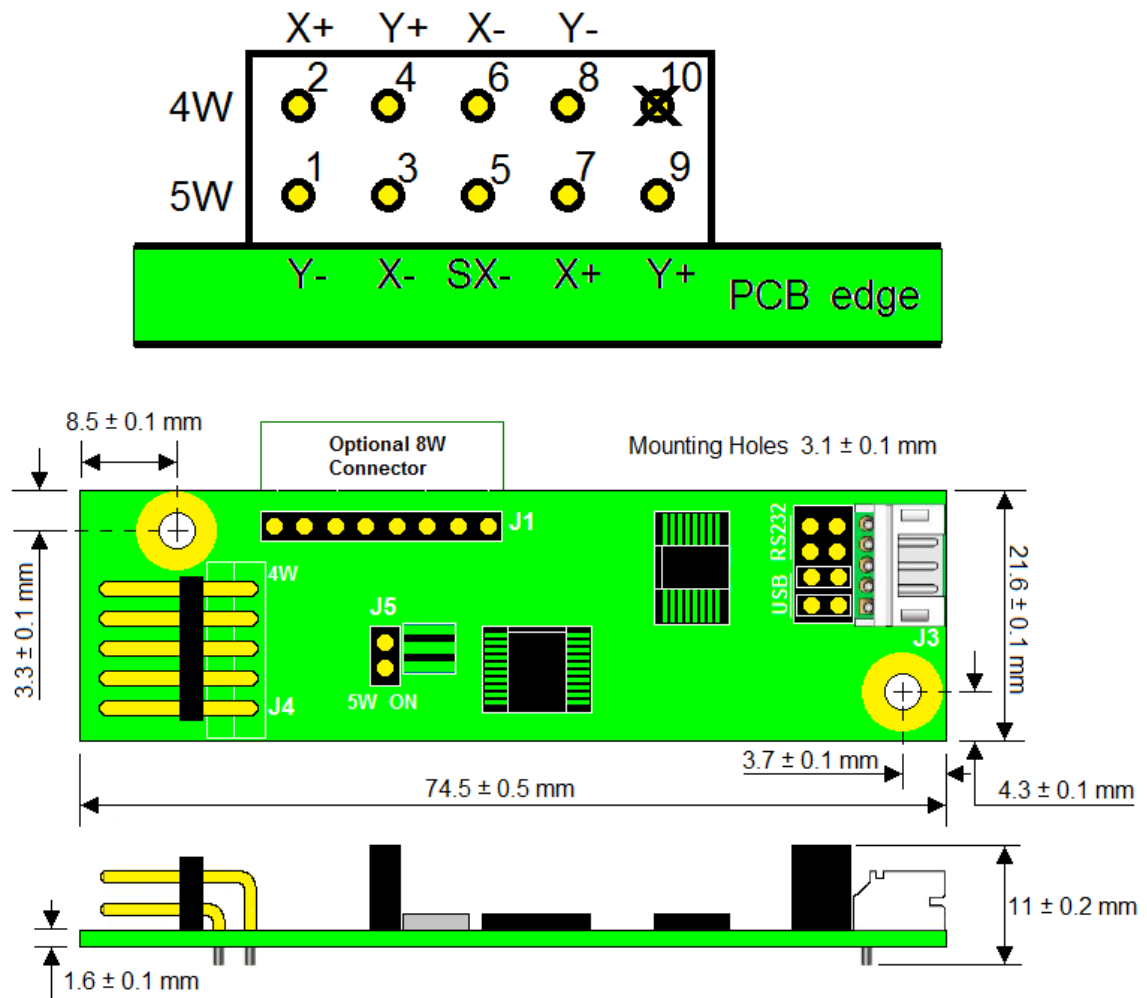
Figure 5: Controller Board Layout