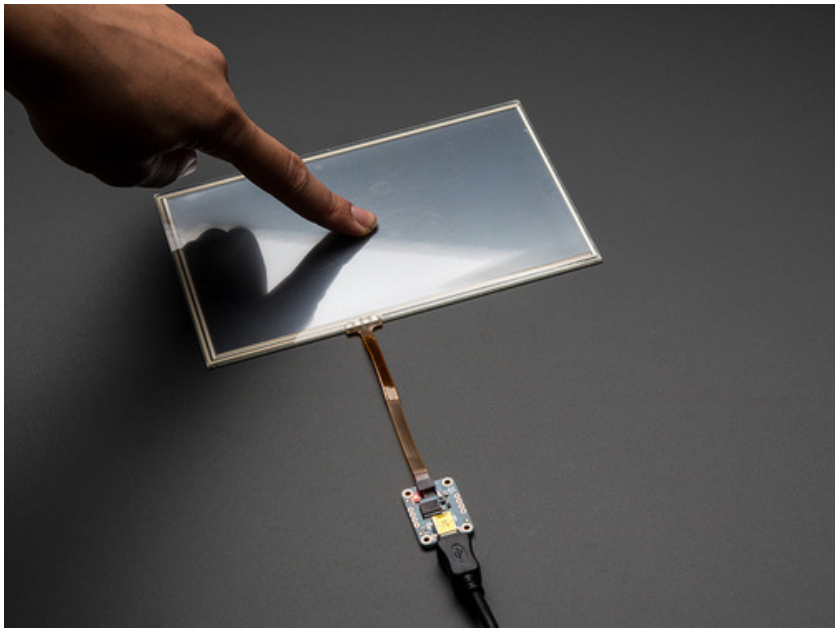
adafruit learning system

AR1100 Resistive Touch Screen Controller Guide

Created by lady ada



Last updated on 2015-06-30 01:40:06 PM EDT

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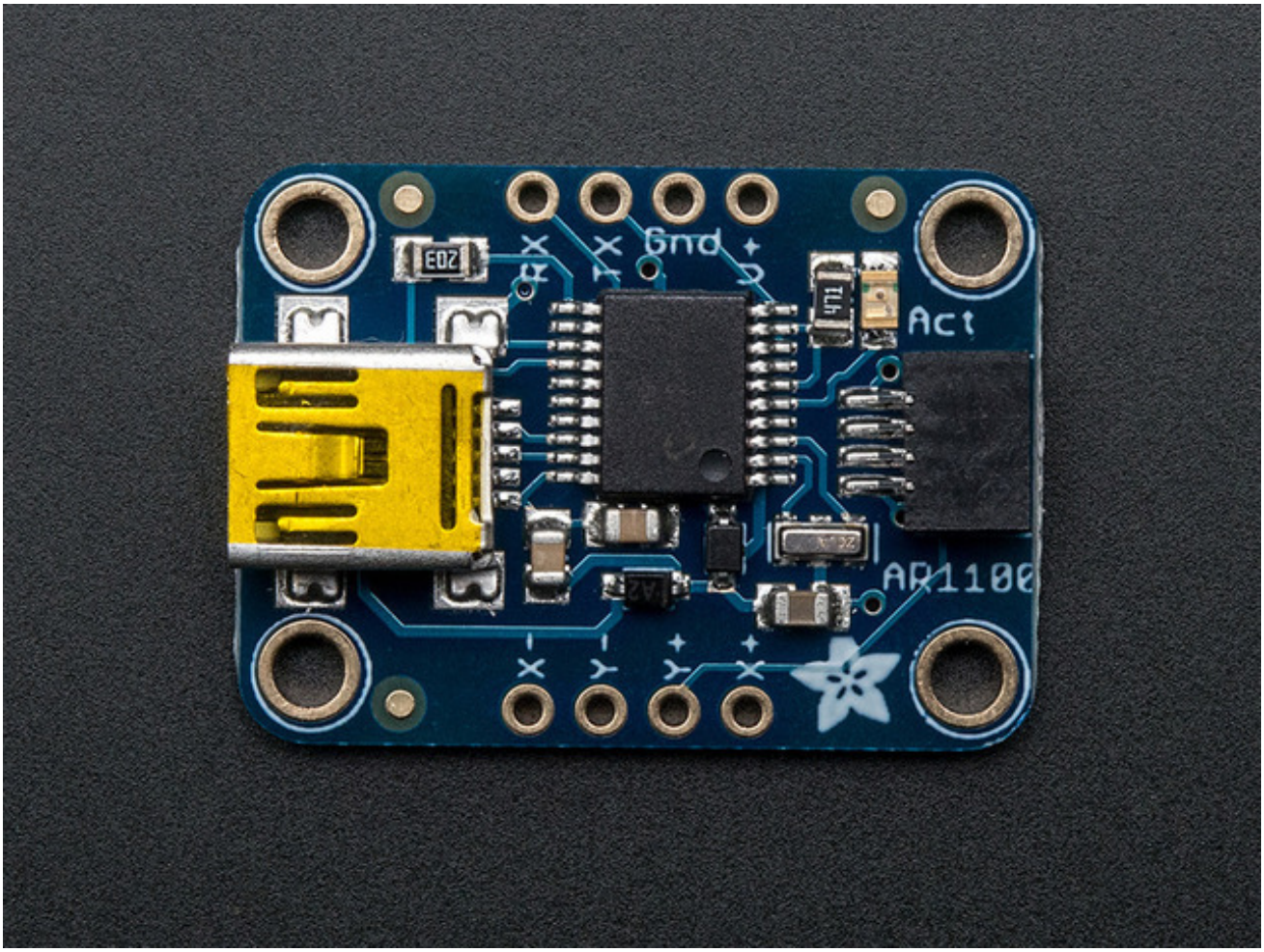
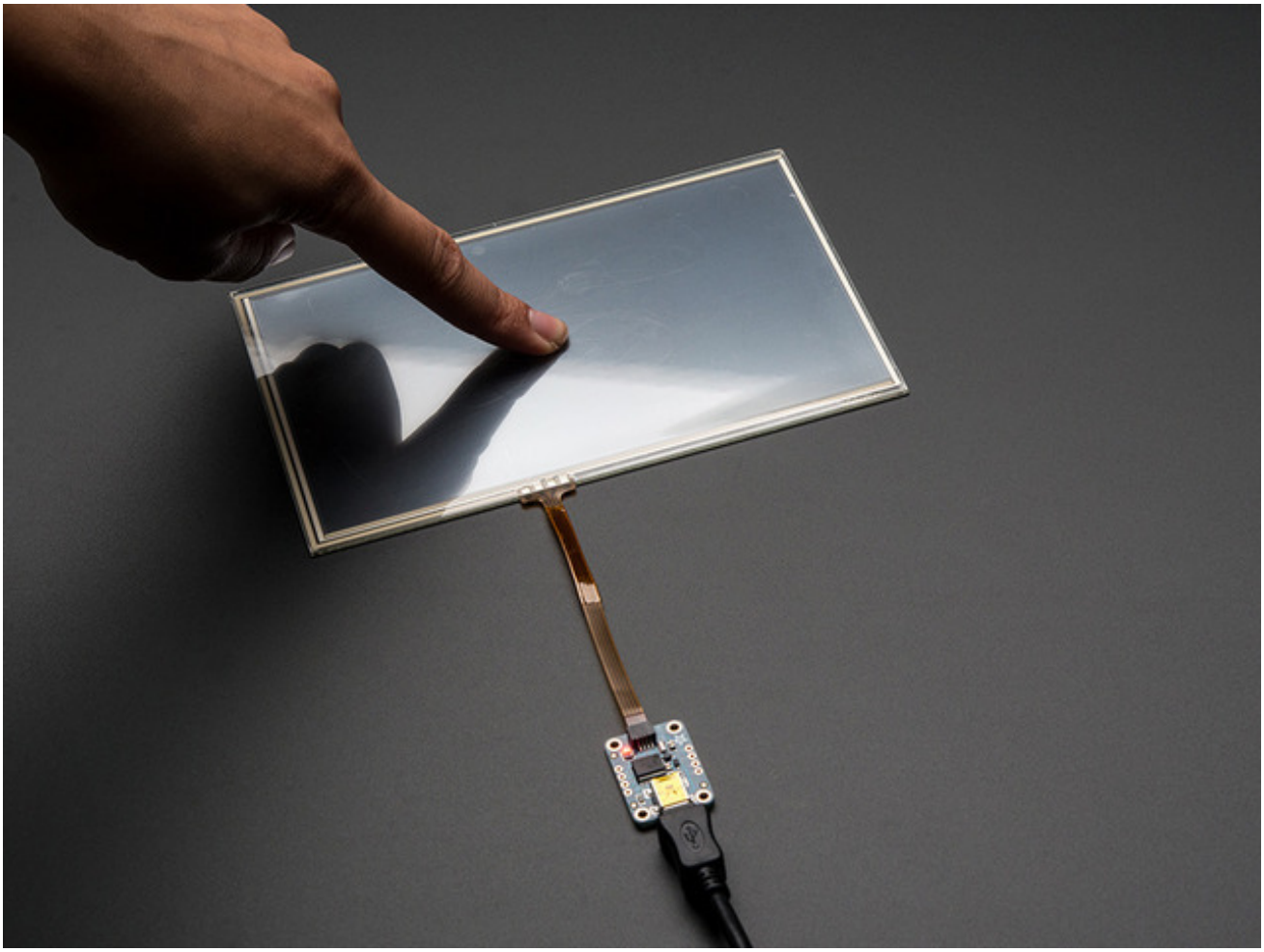
Overview

Getting touchy performance with your screen's touch screen? Resistive touch screens are incredibly popular as overlays to TFT and LCD displays. If you want to connect one to a computer you need something to handle the analog to digital conversion. Most converters we've found are not very easy to use, and are 'fixed' - making them difficult to calibrate.

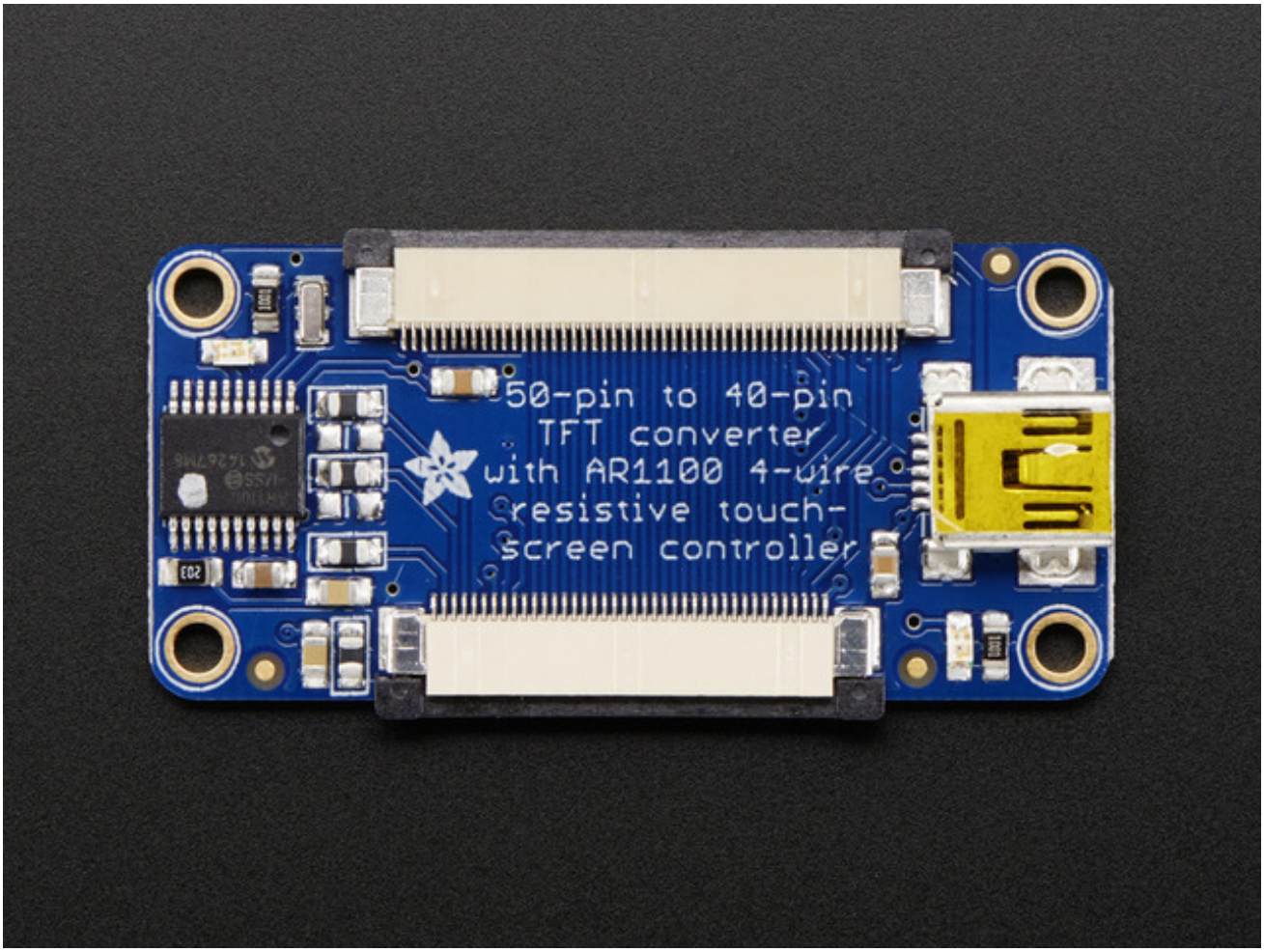
The AR1100 is a nice chip that solves this problem by acting as a touch->USB converter and also comes with calibration software. The calibration software is Windows only, but once you've calibrated you can use the screen on any OS. The AR1100 shows up as a regular Mouse or Digitizer HID device so no drivers are required and it works on any operating system that supports a USB mouse (that is, every single one we've ever seen) There is also a red LED that lights up to indicate when a touch has been detected.



We have a breakout that features the AR1100, which has both USB and UART interfaces available. 99% of the time, you'll want to use the USB interface but there is some functionality for getting TTL UART data out (see the datasheet for details)



For the screens that have 1mm pitch FPC cables, you can plug the cable right into the connector. The majority of medium/large touchscreens have that kind of connector. If you have another kind of touch screen, the four X/Y contacts are available on 0.1" pitch breakouts so you can hand-solder or wire them. We set this breakout up for 4-wire sensing only



We also use this same chip in our TFT Touch screen designs, so that the screen can act like a display+mouse for any kind of computer.

You can pretty much just plug and play to get started, for more details including calibration software, check out the AR1100 page (http://adafru.it/e6g). If you're using the breakout, plug any 1mm-pitch 4-wire resistive touchscreen to the on-board FPC connector. Otherwise, it should already be wired up internally.

When you plug into a computer's USB port you should see a new device and touching the screen will cause the mouse cursor to move around.

Calibrating the AR1100

If you bought a display that has the AR1100 built into it, we already did a calibration procedure for you here in the factory, so you should be able to use it out of the box.

However, you may want to recalibrate it, say you don't think it's set up well for you, or you want to change modes. Or you're using the breakout board and want to change resolutions or layouts.

To calibrate the AR1100 chip, you must use a Windows computer. We know, that sucks, but that's the only software Microchip wrote! The good news is you only have to calibrate once, and then the calibration is stored permanently in the chip, so you do not have to re-calibrate every time you turn it on.,

Download and Install AR1100 Configuration Software

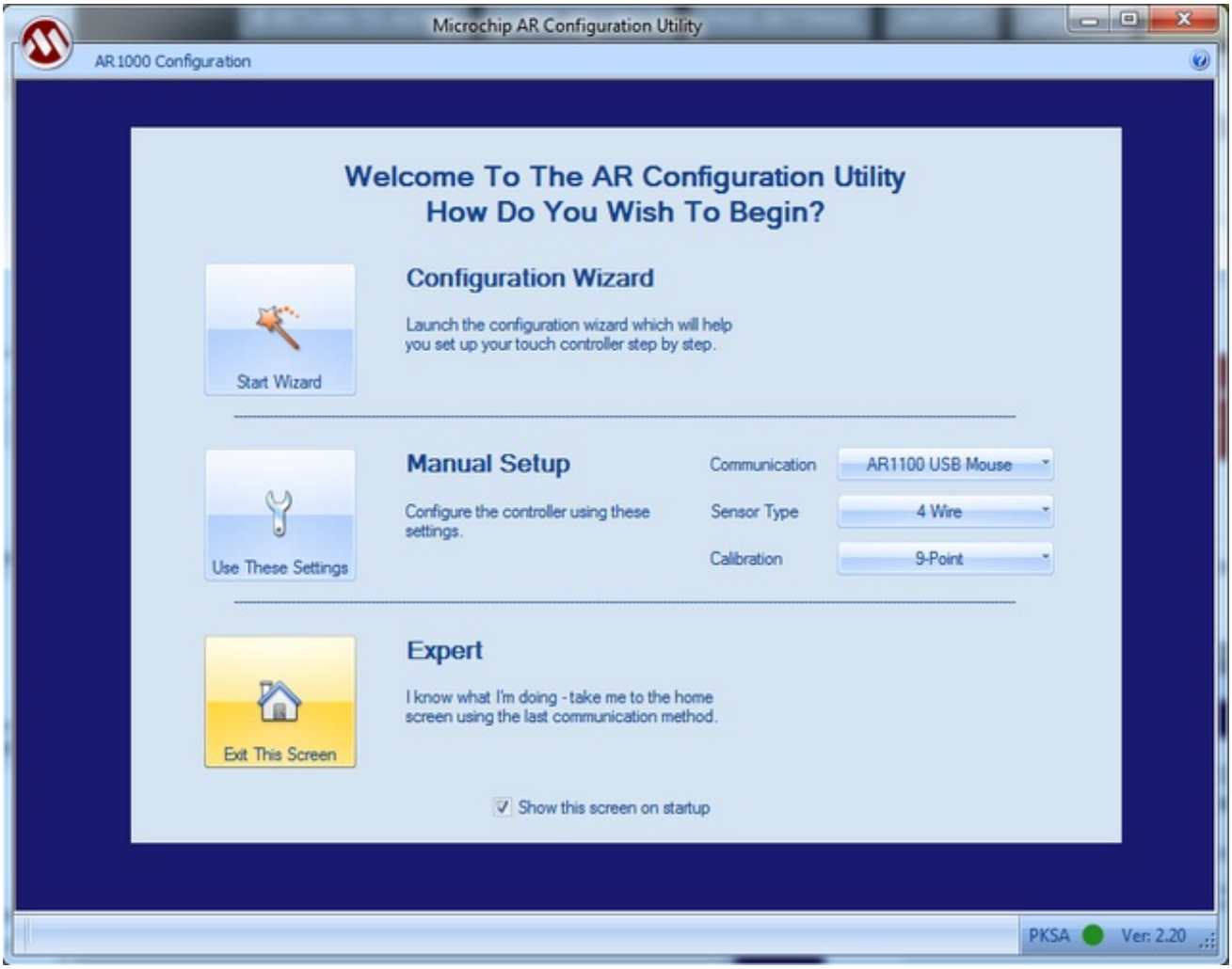
Start by downloading the AR1100 Calibration/Config software here (http://adafru.it/e6h)

and install like any other software. Now start up the AR1100 Calibration Utility software

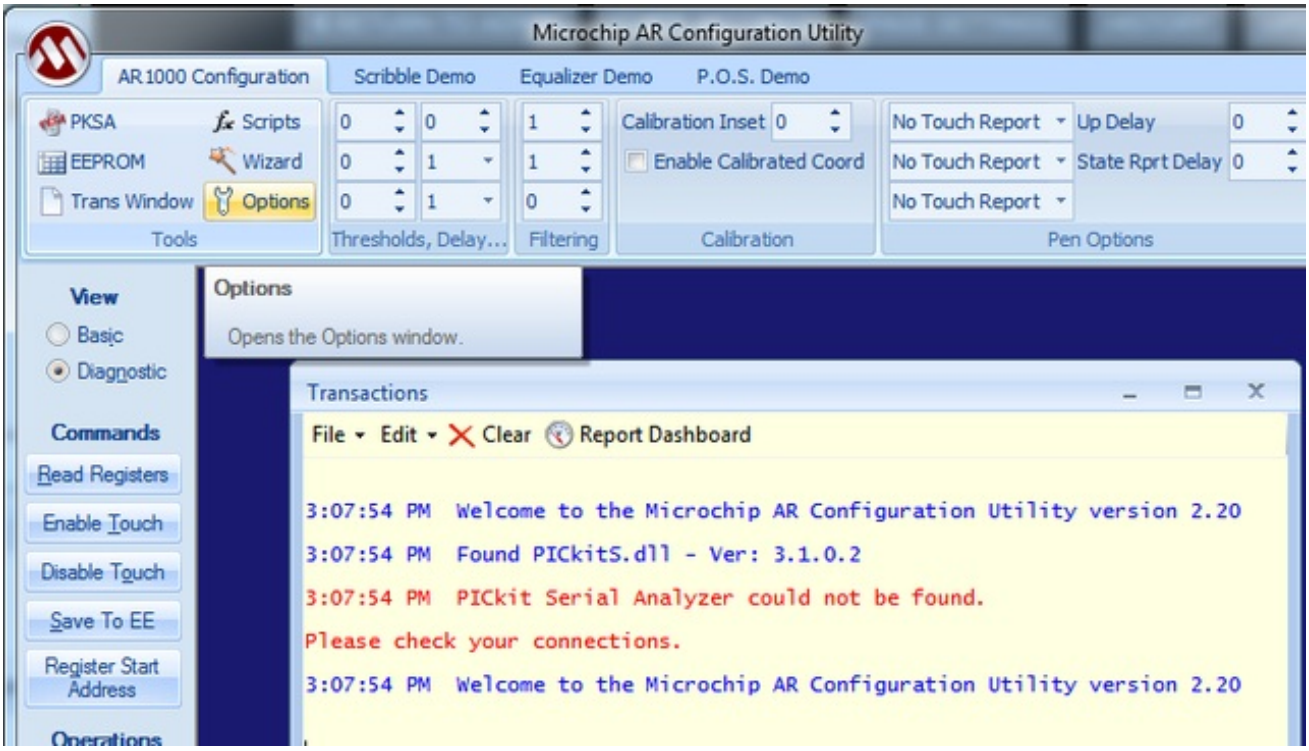
If and only if you are using the display as a SECONDARY monitor (not your main monitor) perform the steps below

Secondary Monitor calibration

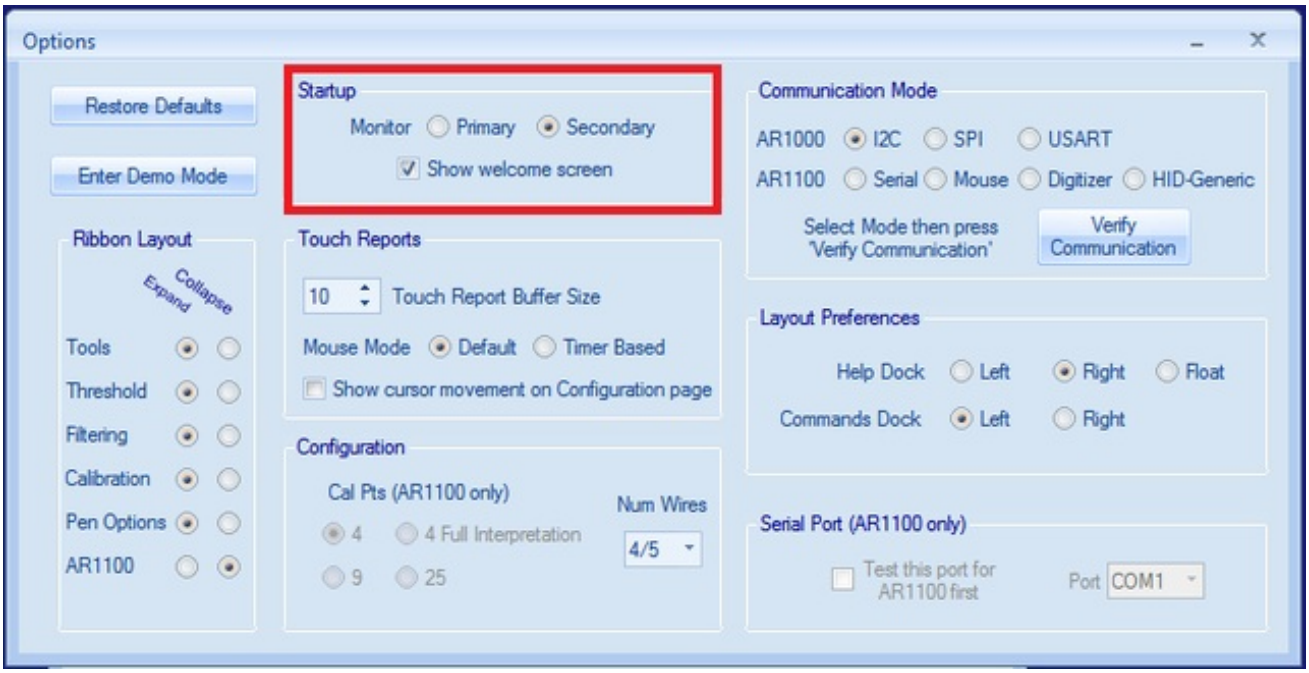
If you have two monitors (one main one and a second with touch) you'll need to tell the software to use the secondary monitor! To do this start up and select Exit Screen to get out of the config screen



Click **Options**



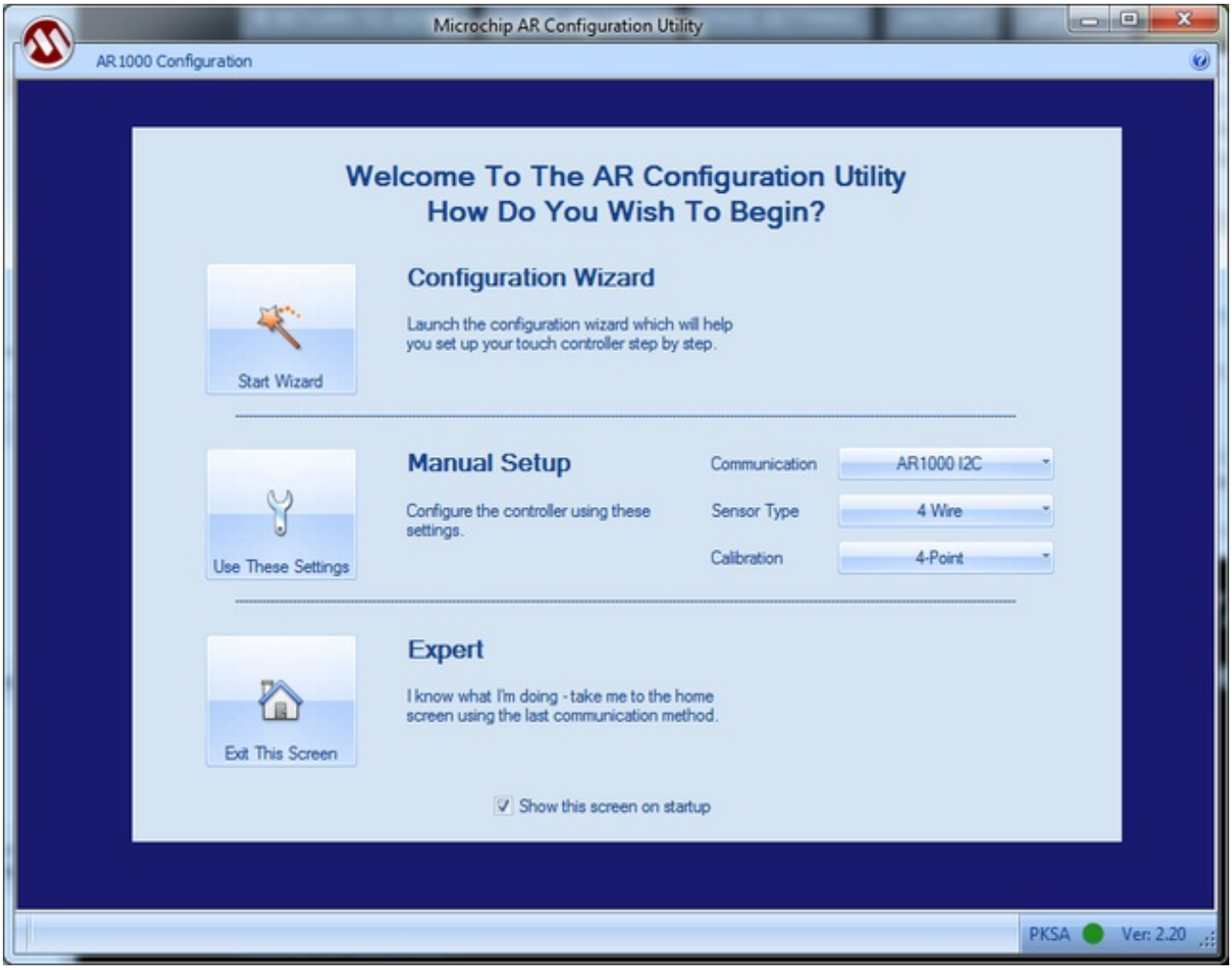
Then in the options window, select the secondary type of monitor



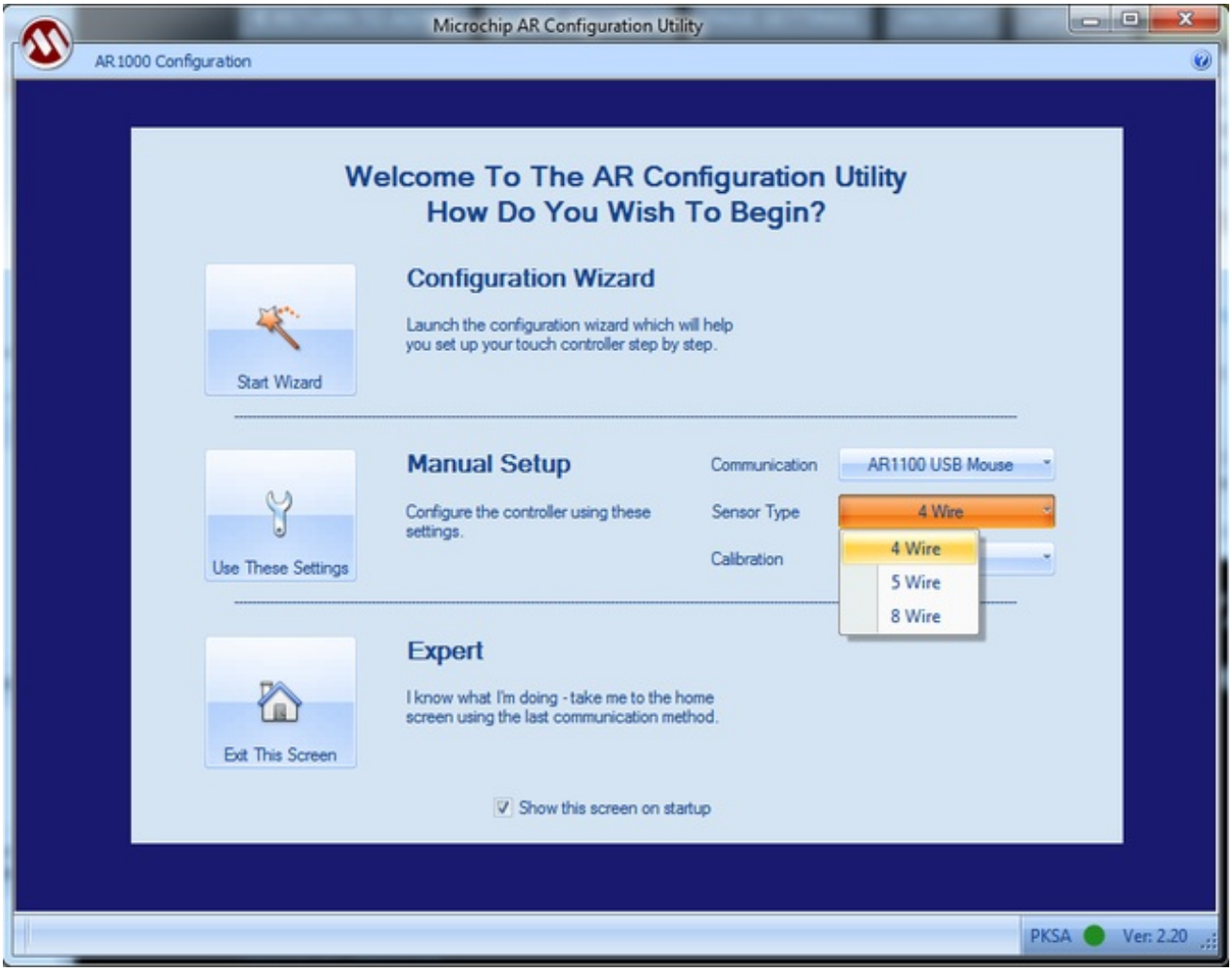
Then quit and restart the software, next time you run it - the program will be in the secondary monitor

Manual Setup

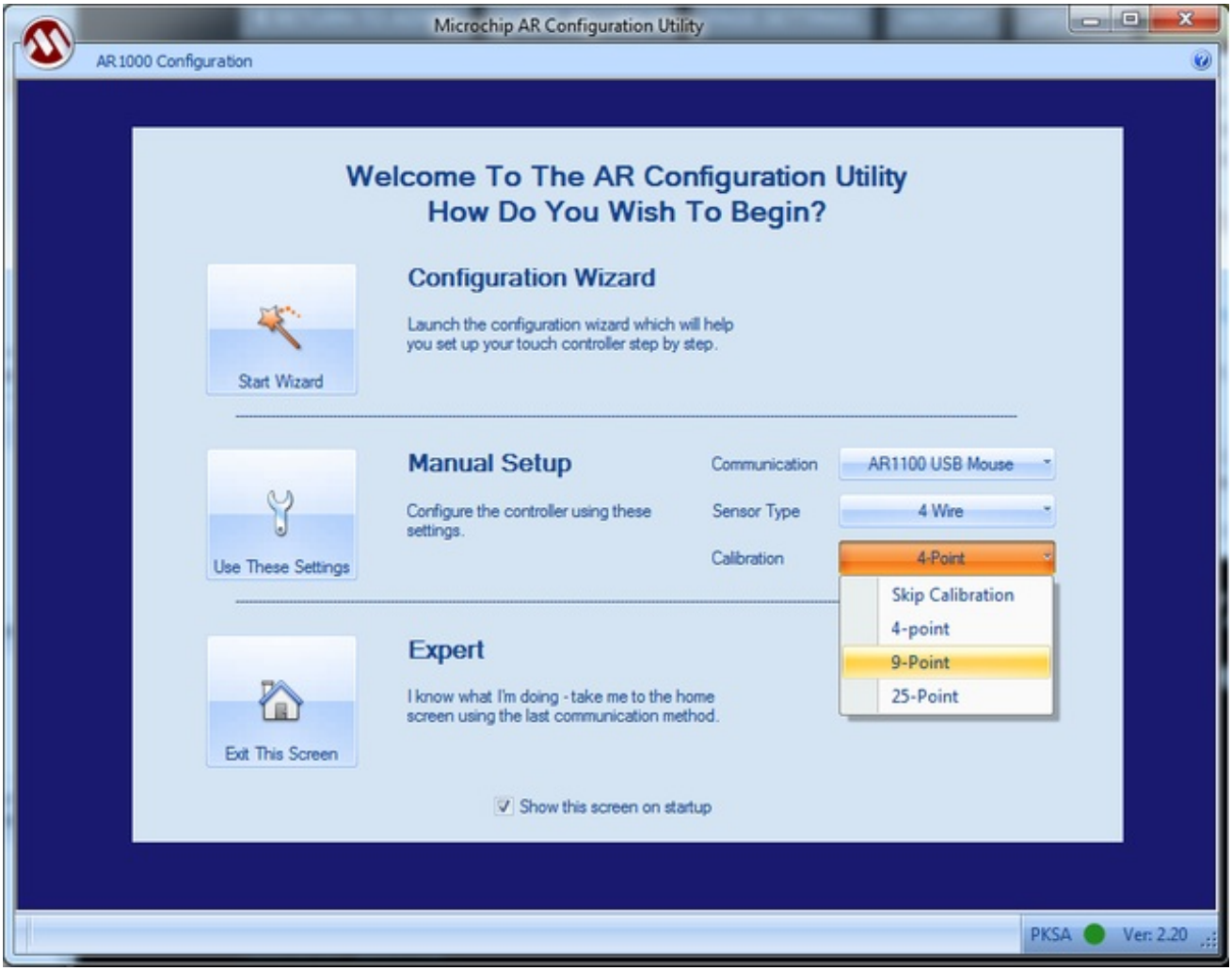
Select **USB Mouse** as the type of AR1100 interface you want (this is the most universal!)



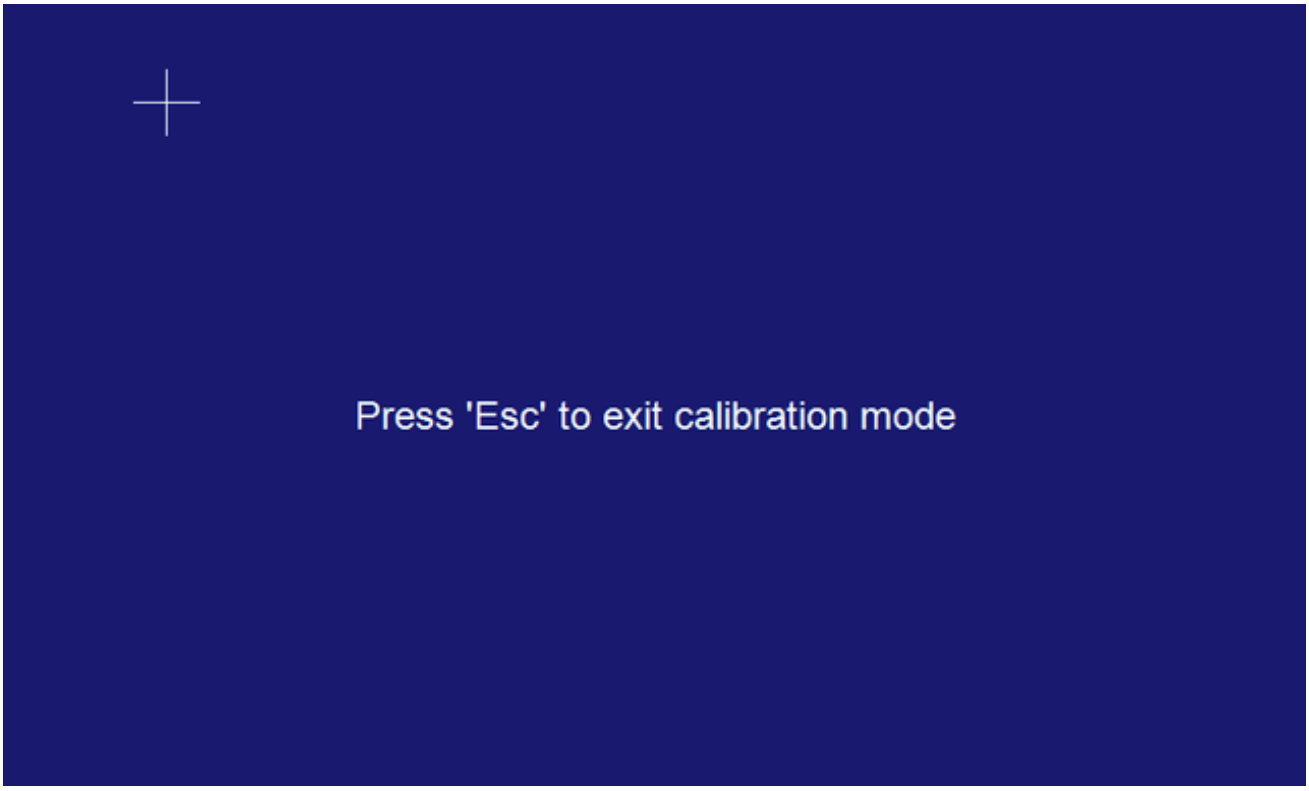
And 4-wire for the type of resistive screen



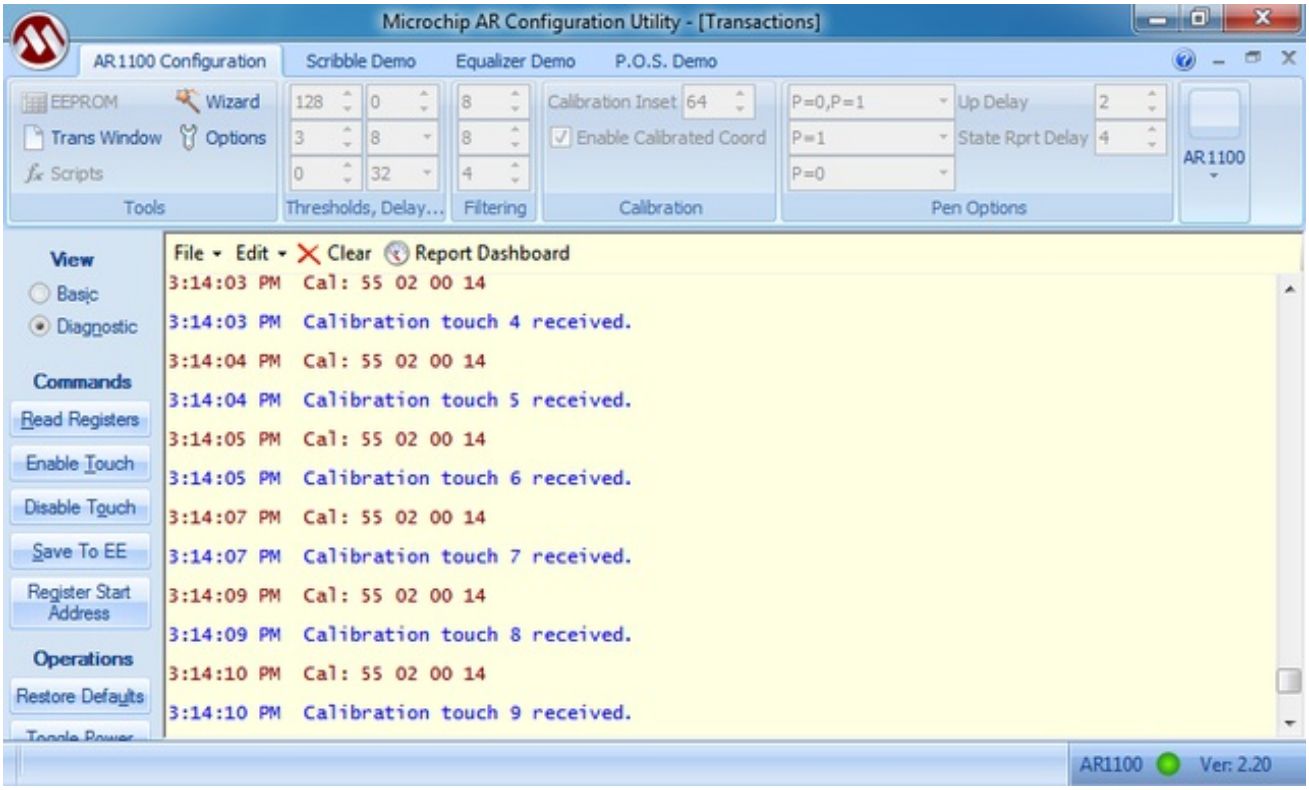
And 9-point Calibration as the type of calibration (or skip calibration if you don't want to re-calibrate)



You'll get some driver unloading and reloading and then the calibration screen will pop up. Use a stylus to hit each point. There are 9 points, so if you dont end up poking the screen 9 times, something went wrong, rerun the software to restart calibration



When done, you'll pop back to the 'control panel'. That's it! You can test out your calibration with the **Scribble Demo** if you are using the monitor as a main screen. If its a secondary monitor, it wont work right because the mouse shows up on the first screen.



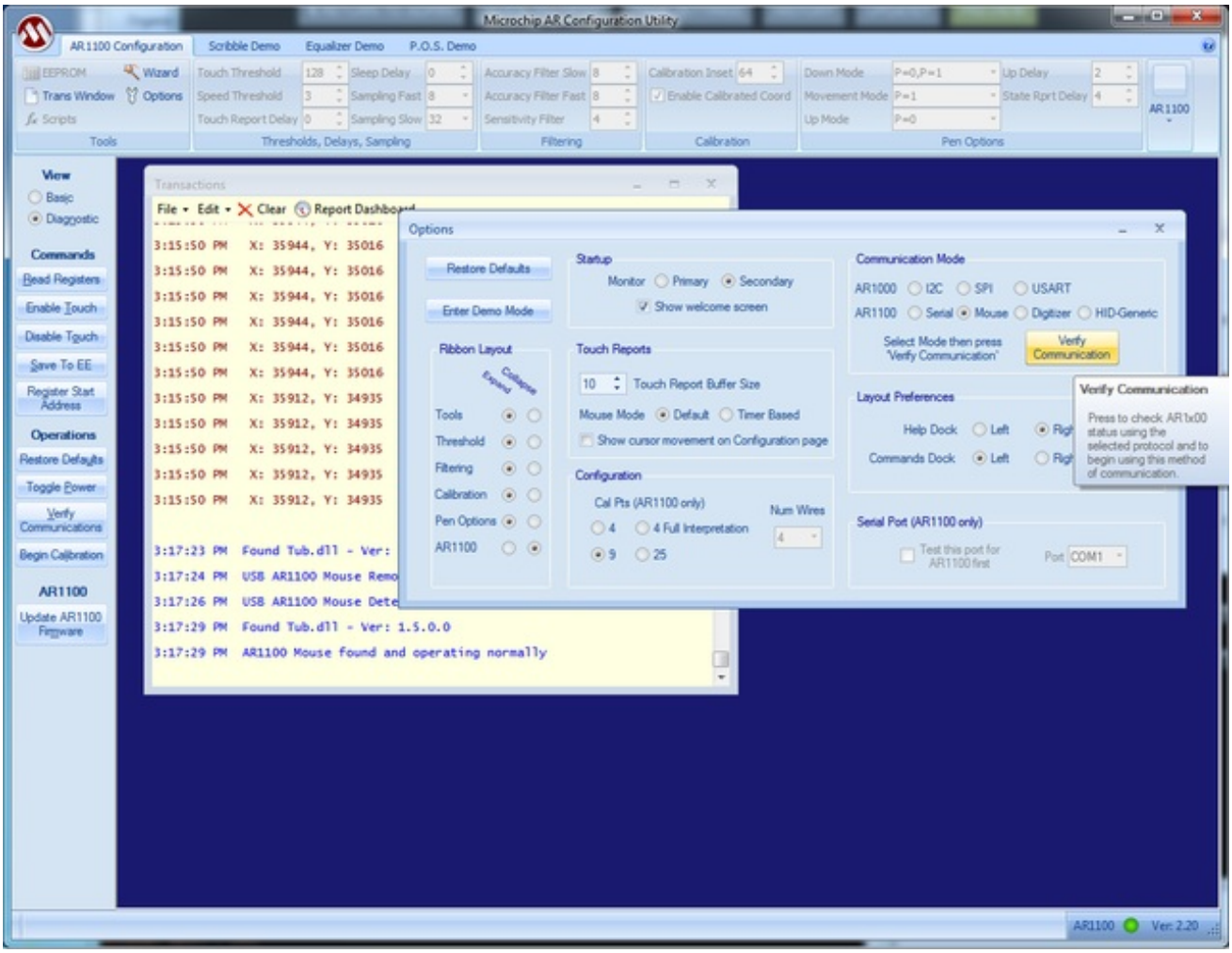
Advanced Configuration

There's a lot of settings you can adjust if you like to the AR1100. For more details, check the datasheet but here's the stuff we find handy:

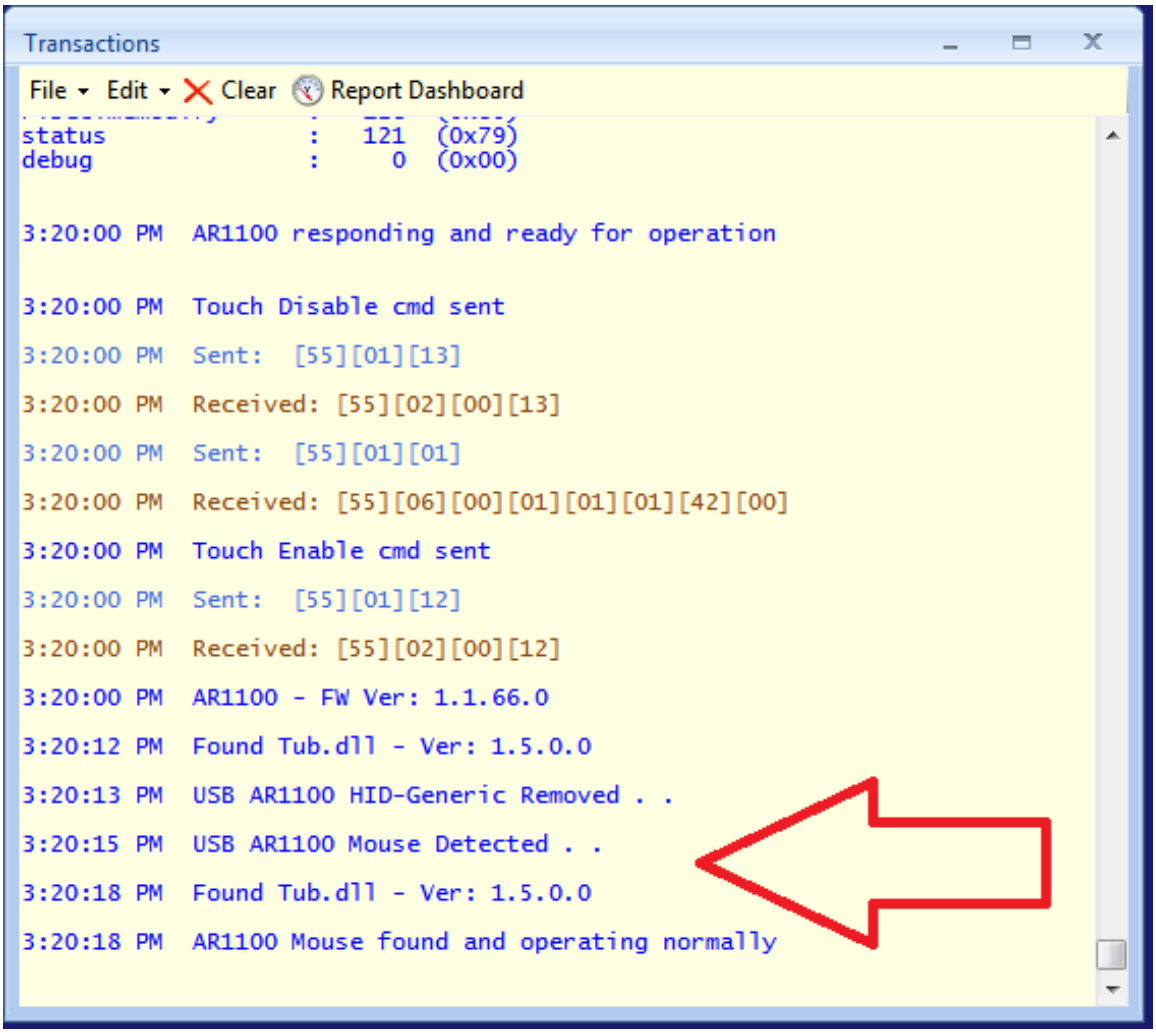
> Note that if you're using a small screen, you may want to drag the window over to the main monitor with not calibrating since the software has a lot of buttons on the sides!

Verifying Communication

This is kind of the fix-all button if you ever find you got the AR1100 in a weird mode. The chip can act like a mouse, digitizer or raw 'USB HID generic'. For many of the settings adjustments you'll need to switch to HID generic since that's how the software sends commands.



Yeah it would be handy if it did this for you but just bear with us and switch modes as necessary. When you're done, dont forget to set the mode back to Mouse (or digitizer if you wish) and Verify to set that mode



Adjusting Filters and Threshholds

Depending on your setup and screen, you may find that the touch is too sensitive, not sensitive enough, a little noisy, a little slow, etc. You can tweak just about all of the settings in the top panel. Note that you must be in HID generic mode to do this! Then set back to mouse when done

Microchip AR Configuration Utility
AR1100 Configuration
Scribble Demo
Equalizer Demo
P.O.S. Demo
Diagnostics
EEPROM
Trans Window
Scripts
Wizard
Options
Tools
Sleep Delay
Sampling Fast
Sampling Slow
Thresholds, Delays, Sampling
Accuracy Filter Slow
Accuracy Filter Fast
Sensitivity Filter
Filtering
Calibration Inset
Enable Calibrated Coord
Calibration
Up Delay
State Rprt Delay
Pen Options
AR1100
View
Basic
Diagnostic
Commands
Read Registers
Enable Touch
Disable Tguch
Save To EE
Register Start Address
Transactions
File
Options
Restore Defaults
Enter Demo Mode
Startup
Monitor
Primary
Secondary
Show welcome screen
Communication Mode
AR1000
I2C
SPI
USART
AR1100
Serial
Mouse
Digitizer
HID-Generic
Select Mode then press 'Verify Communication'
Verify Communication
Ribbon Layout
Collapse
Expand
Tools
Touch Reports
Touch Report Buffer Size
Mouse Mode
Default
Timer Based
Layout Preferences

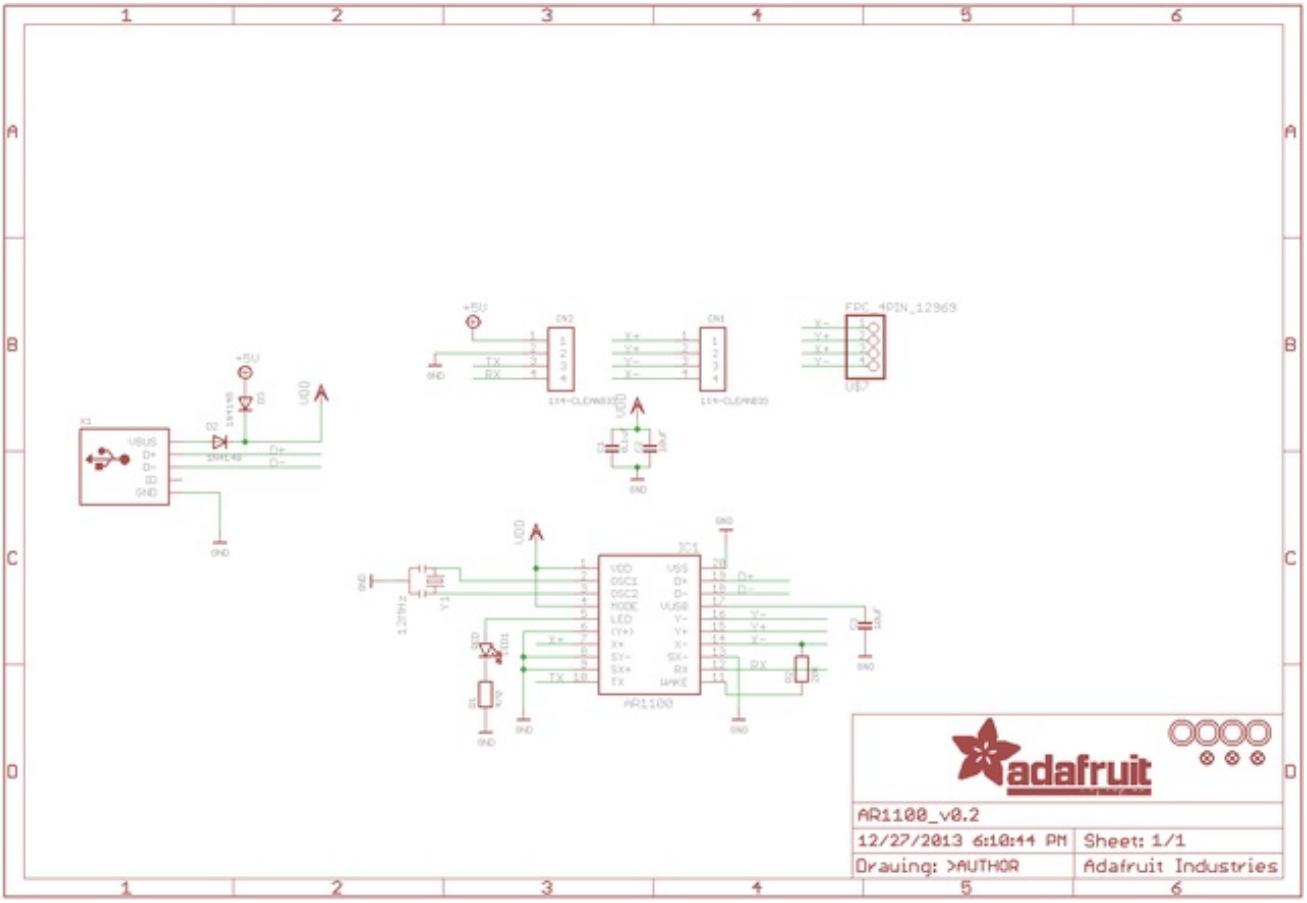
Downloads

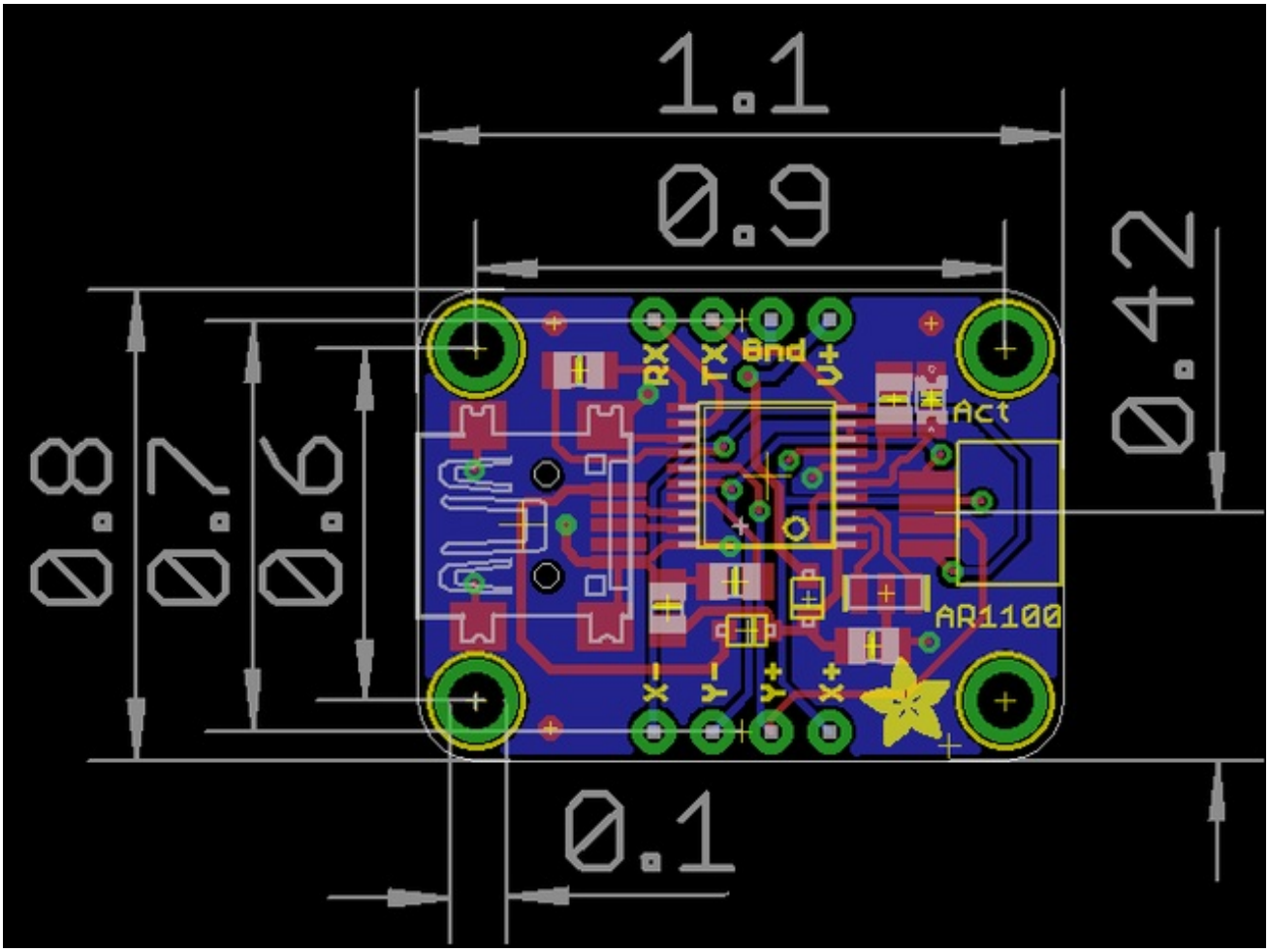
Software

- If Microchip doesn't have the download configuration software available for some reason, we have a mirror here (http://adafru.it/e6i)

Schematic

Here's the schematic for the breakout board, we use nearly identical setup for each use of the AR1100




1.1
0.9
0.42
0.8
0.7
0.6
0.1
RX
TX
Gnd
V+
Act
AR1100
X-
Y-
Y+
X+

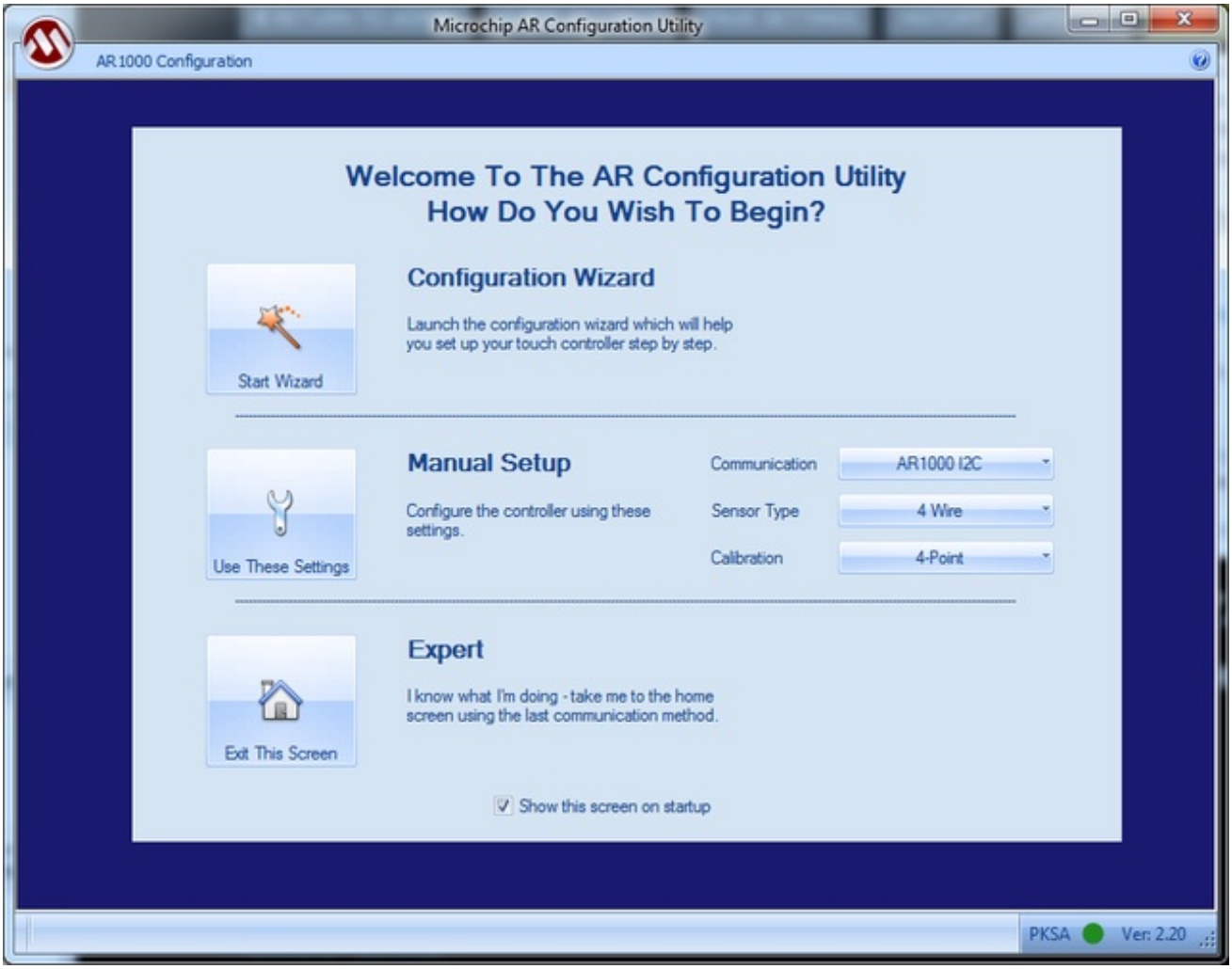
HELP!

My touch screen isn't showing up as a mouse / isn't responding!

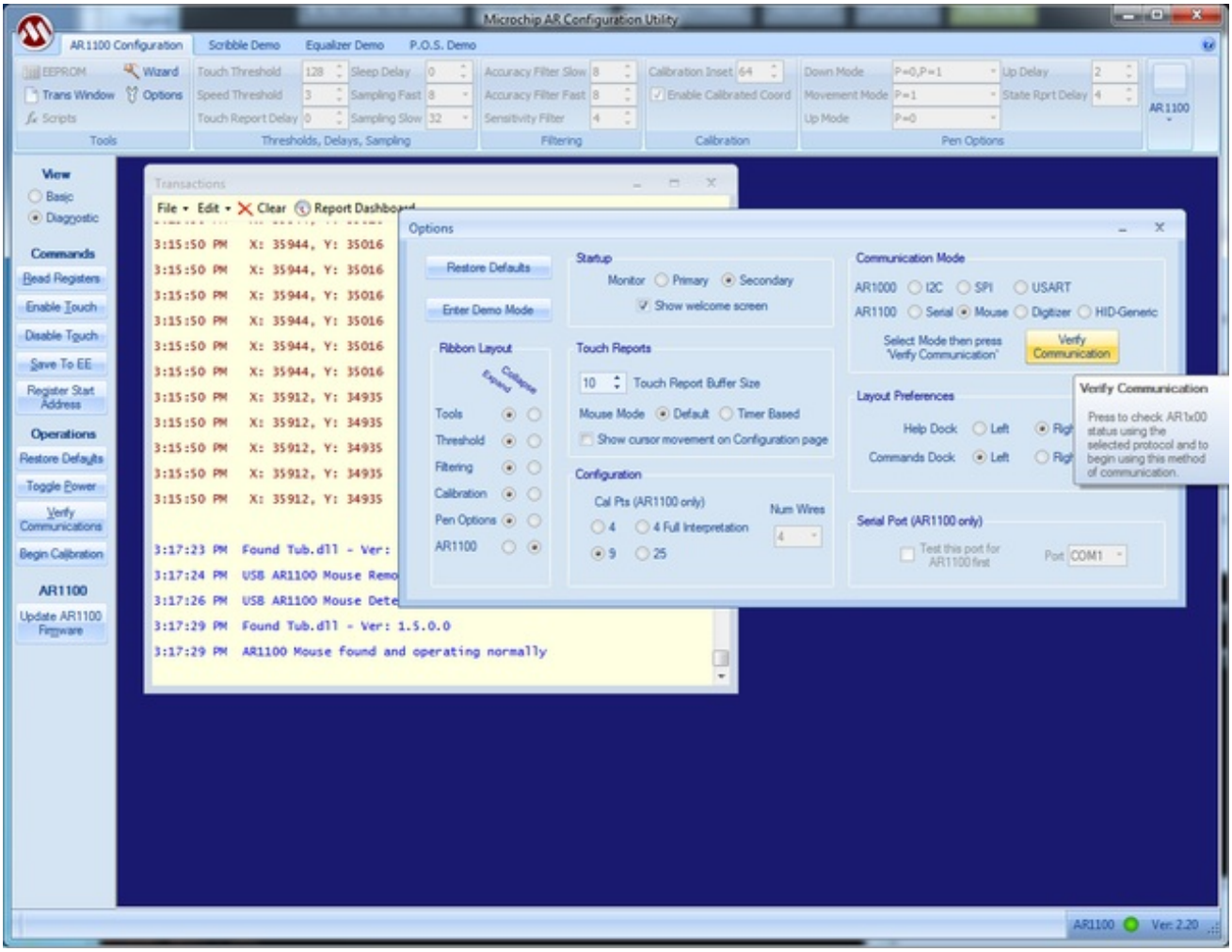
If your AR1100 touch screen isn't working first up

- Make sure you see the red LED blink faster when you touch the screen. If not, check that you have a good USB cable and power

If you get a reaction from the Red LED but its not moving the mouse cursor, its likely your AR1100 is in non-mouse mode. The AR1100 can get set into 'Digitizer' or 'raw HID' mode, its easy to fix, run the AR1100 software and don't calibrate just go into **Expert** mode if mode (or if you want to, go ahead and calibrate, doesn't matter)



Then select the **Options** button and when the window comes up, click on the **AR1100 Mouse** radio button and click **Verify Communications** - this will force the AR1100 into mouse



I'd like to use this touchscreen with Kodi but its not calibrated right
Check out this fine tutorial for more details on how to use the AR1100 with XBMC Kodi

http://arendwierks.blogspot.nl/p/touchscreen-fix-raspberry-pi-xbmc-kodi.html