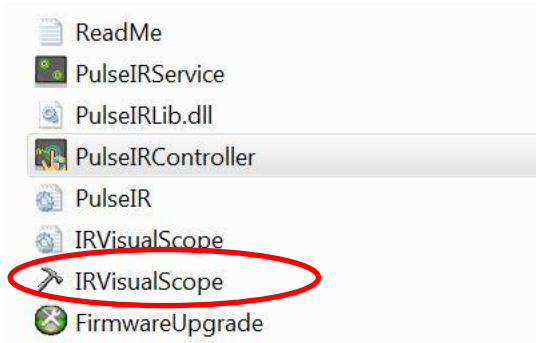


PulseIR System Testing Procedure

This document outlines the system testing procedure for PulseIR touch screen during the PCB assembly and troubleshooting process. Before proceeding, be sure that you have installed PulseIR Controller Application and IRVisualScope tool. (These are bundled in Windows PulseIR Utilities download file.)

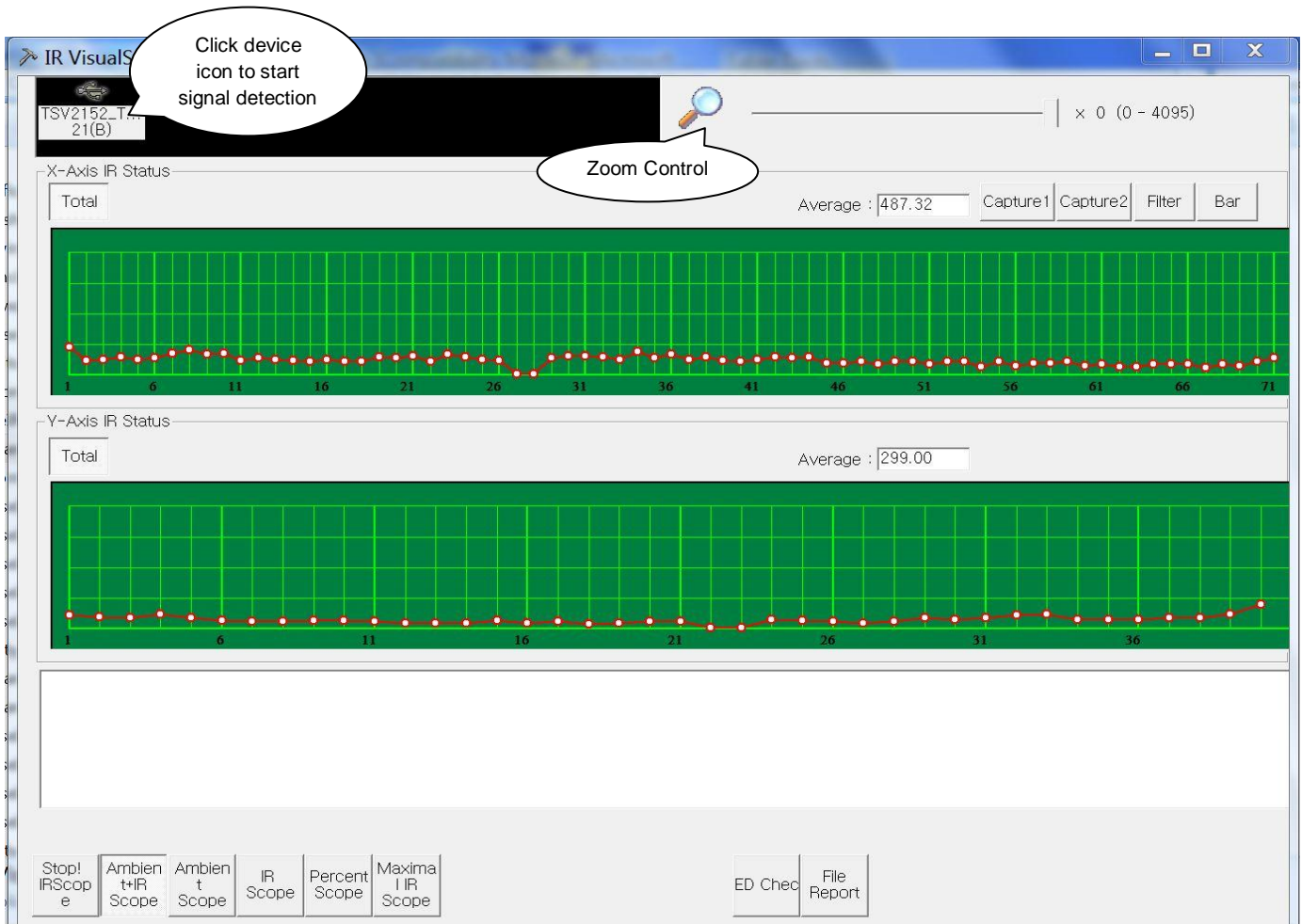
Step 1: Launch PulseIR Diagnostic Tool.

Start to click "IRVisualScope.exe" application in PulseIR Controller utility.



You should see the PulseIR touch screen device on the top left window of the screen.

Button	Function
Device Icon	click to divert touch screen data from window cursor to the graph <i>touch screen does not operate while in this mode.</i>
Zoom (magnifying glass)	Scale up or down the graphs.
X-Axis Status	Select specific LED banks on top and bottom PCB's.
Y-Axis Status	Select specific LED banks on left and right (vertical) PCB's.
Stop!	Stop graphing and reset the touch screen to window control.
Ambient + IR	Measures IR sensor + Ambient readings.
Ambient	Measures ambient(extraneous) IR readings only.
IR Scope	Graphs compensated IR reading (i.e., IR sensor - ambient IR)
Percent Scope	Touch Detection Reading
Maximal IR Scope	Measures the signal strength of IR transmitter sensor
Capture1,2	Captures the IR graph and compares the current IR graph to the captured graph
LED Chk	In Maximal IR Scope mode, finds out the dead IR LEDs
File Report	In Maximal IR Scope mode, creates an Excel sheet to show the signal strength of each IR LED sensor

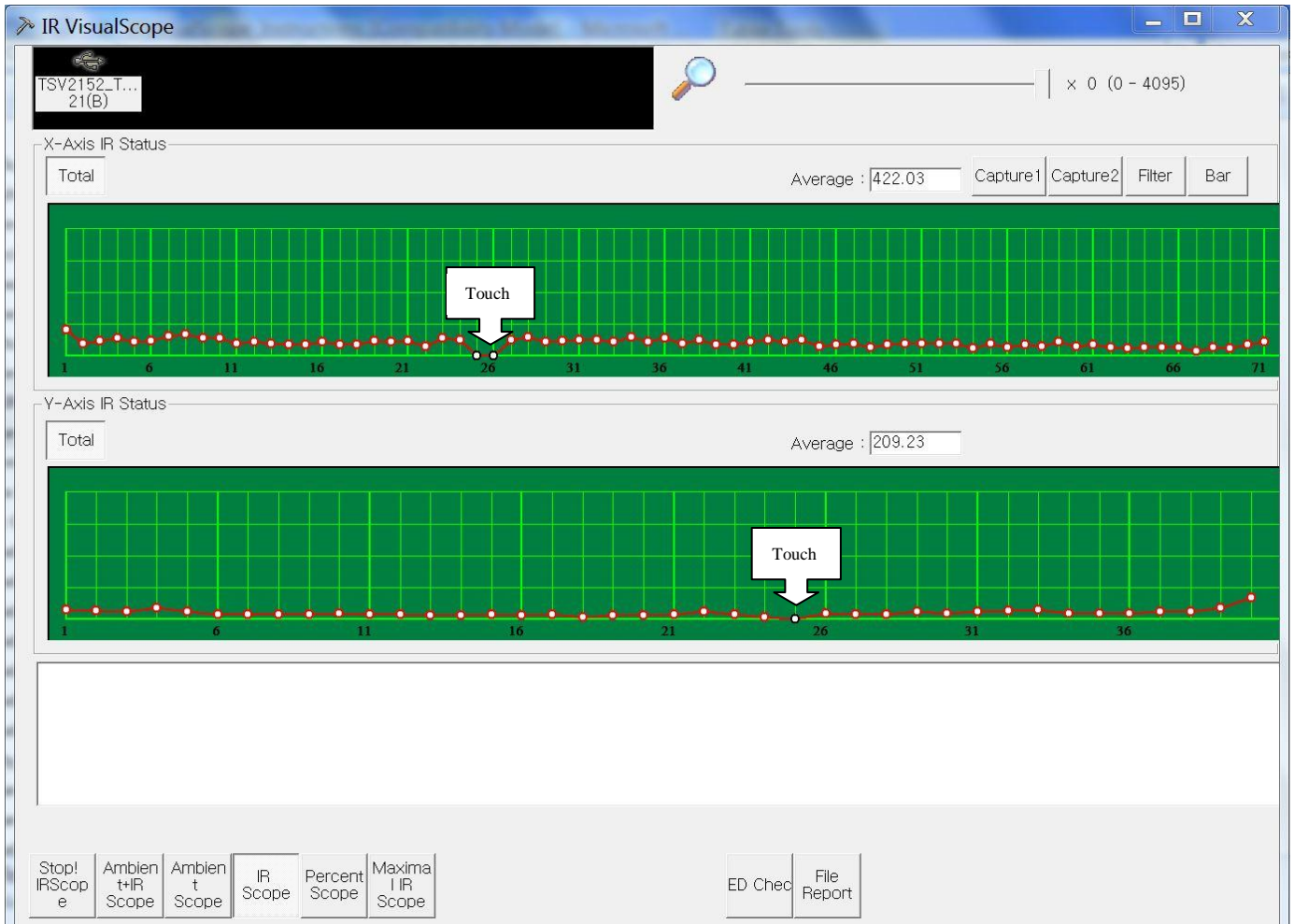


Step 2: Quick Check for IR LED status

1. Select the device as shown in figure below. (Measurement will start.)
2. Adjust the Zoom slide bar as necessary.
3. Check Ambient+IR, Ambient readings for raw signal detection and Maximal IR for IR LED transmitter signal.

Step 3: Detailed Check

Click on **IR Scope** button to view IR LED-readings compensated for ambient light. Look for dead spots and any occurrences of false detection.



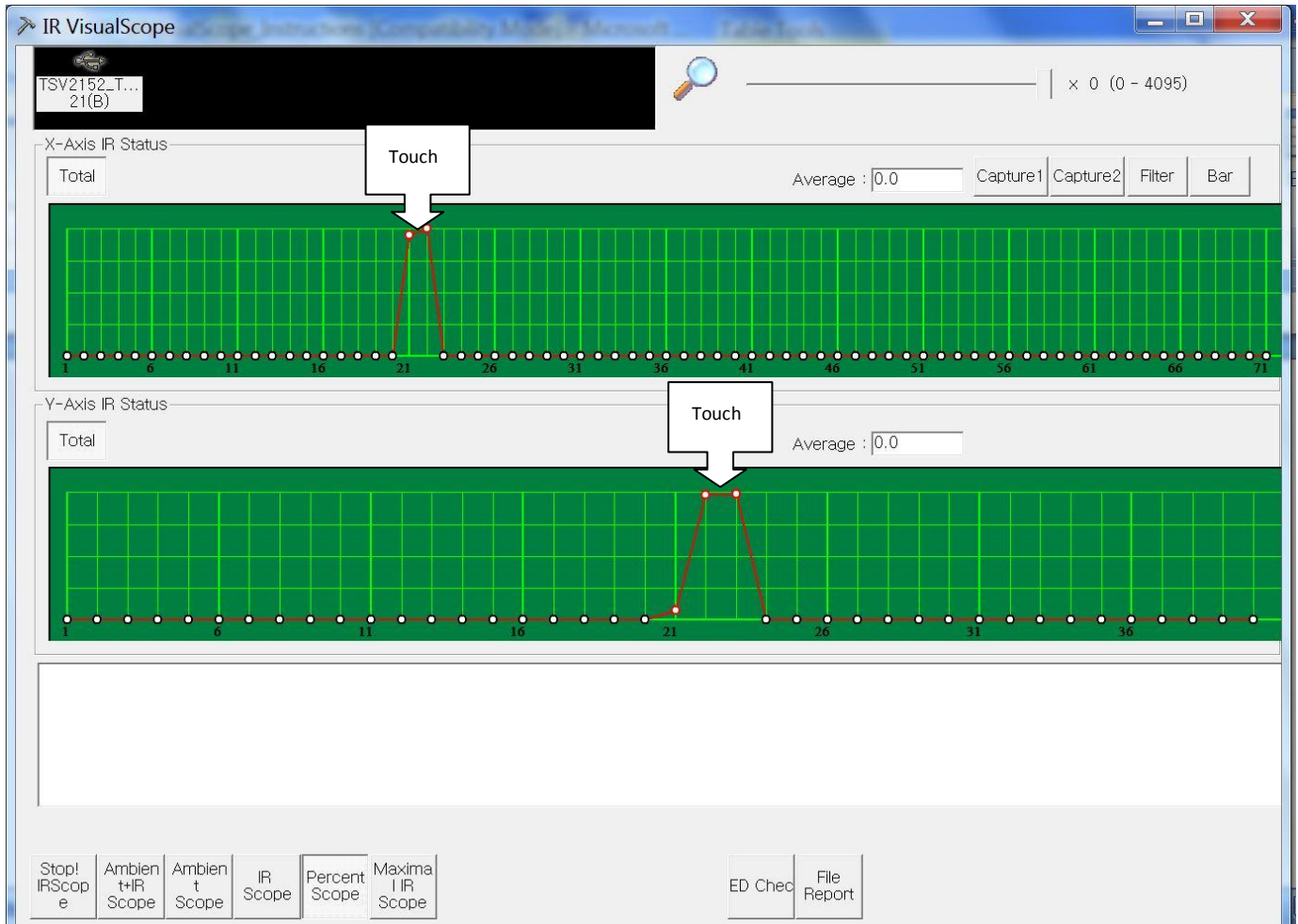
Troubleshoot

Here are some abnormal behaviors due to defects that we have encountered in the past.

Abnormal Condition	Possible Cause(s)
No Reading – all value = 0	(1) Defective Connector (2) Faulty contact with connector (3) Error in PCB Assembly (e.g., X, Y boards out of sequence; edges out of order; wrong edge_A connector direction)
Reading only on partial section	(1) Error in PCB Assembly (e.g., X, Y boards out of sequence; edges out of order; wrong edge_A connector direction) (2) Mismatched controller (e.g., wrong screen size) (3) Faulty connection between PCB units (solder defect, shorts, etc.)
Readings differ by sections	Mis-matched <i>Gain Option</i> between PCB modules
Abnormal level of noise across the graph	Defective connector (improper shielding of connector)
Detection at wrong location in single-touch mode	Shorted contacts at connector between boards
Mouse control stops working following USB connection	Defective PCB board

Step 4: Check Single Touch Detection

Select **Percent Scope** button and check for touch detection. Figure below illustrates the normal detection pattern across adjacent IR LED's.



On-board Diagnostics LED

The control Board has a built-in diagnostics LED.

Following the USB cable connection, the diagnostics LED will blink in following order as the system initializes:

1. rapid blinking in red
2. rapid blinking in yellow
3. slow blinking in yellow: (ready for touch detection)

If the system does not follow this pattern during the initialization, check the USB cable and connection.

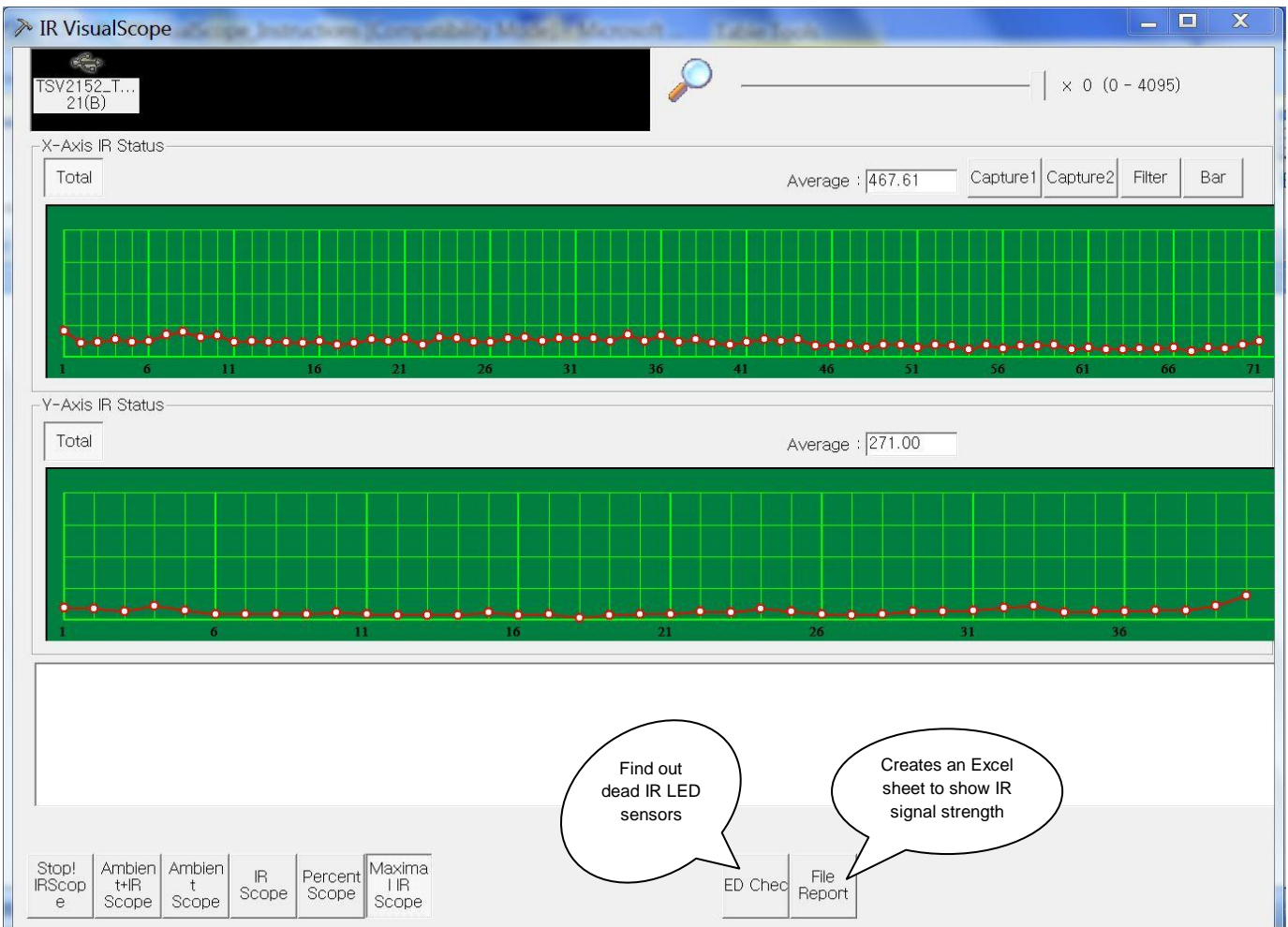
While there is no touch event, the LED will continue to blink slowly in yellow. Upon touch detection, the LED will change to continuous red.

Failure to follow this pattern can indicate controller malfunction or assembly error.

Step 5 : Check Maximal IR Scope

Select **Maximal IR Scope** button and check for the signal strength of IR LED transmitter sensor. Figure below illustrates the Maximal IR Scope for IR LED transmitter sensors.

If an IR LED doesn't blink in black, it indicates that the IR LED transmitter sensor doesn't work.



In Maximal IR Scope mode, click "LED chk" button to find out dead IR LED sensors and click "File Report" button to create an excel sheet to show the signal strength of IR LED sensors.