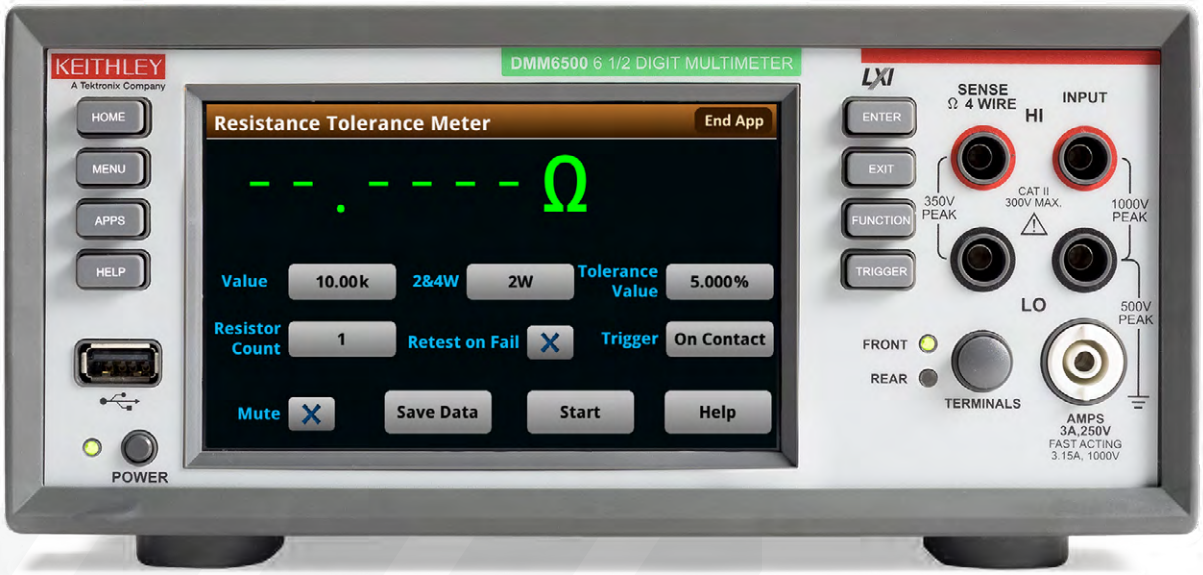
Tektronix®

Using your DMM as a Resistor Tolerance Meter with TSP™ Technology

APPLICATION NOTE



KEITHLEY
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Introduction

The practical limitations of cost-effective device manufacture require that resistors be assigned a tolerance range by their manufacturers. As such, digital multimeters are often used to confirm whether a given resistor falls within its specified tolerance range. When testing many resistors, it is helpful to use a device which can automatically check if a resistor is within its tolerance specifications and record this data. This can be done through custom code development, but code creation is an expensive and time consuming investment. Keithley's DMM6500, DMM7510 and DAQ6510 leverage Test Script Processor (TSP) technology to eliminate the need to run code from a PC with the Resistance Tolerance TSP App. This app leverages the large touchscreen panel to simplify the setup process and present clear results to the user. In this application note, we will discuss how to install and use the Resistance Tolerance TSP App.

Setting Up the Resistance Tolerance TSP App

The Resistance Tolerance App can be downloaded from the supported instrument product pages on tek.com. Download the .tspa file into the root directory of your USB drive. Insert the USB drive into the front panel and select the "APPS" button to go to the Apps Manager page. Select the "USB" tab in the Apps Manager and you should now see the app, which can be run directly from the USB or saved to the instrument's internal memory. Touch the app and touch "Run" to start it.

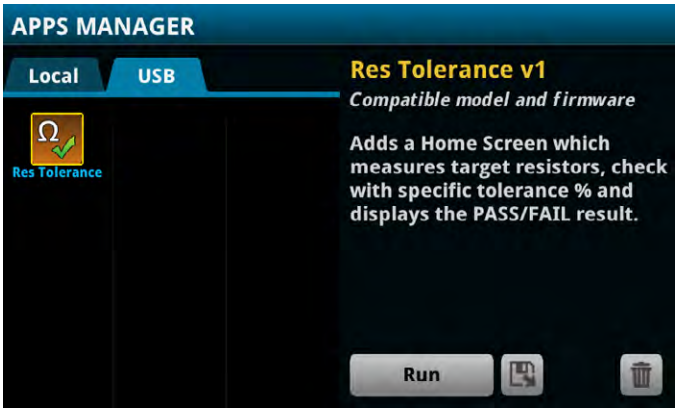

Figure 1: Resistor Tolerance TSP App in the App Manager.

Once the app opens, the user will be presented with the main app screen as shown in **Figure 2**.

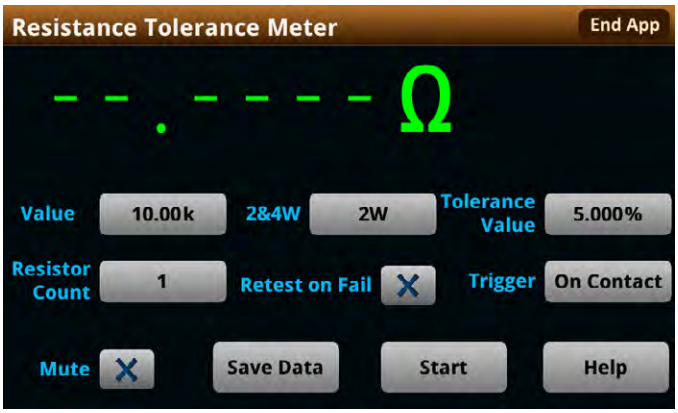

Figure 2. Resistance Tolerance Meter Home Screen.

The **Value** field lets the user set the expected or rated resistance value of the resistor.

Figure 3. Field for Entering Resistance Target Value.

The **2&4W** field lets the user set whether to use two or four-wire sensing for measurements. Four-wire sense will help negate lead resistance in measurements and is more accurate, especially for measuring low-resistance devices.

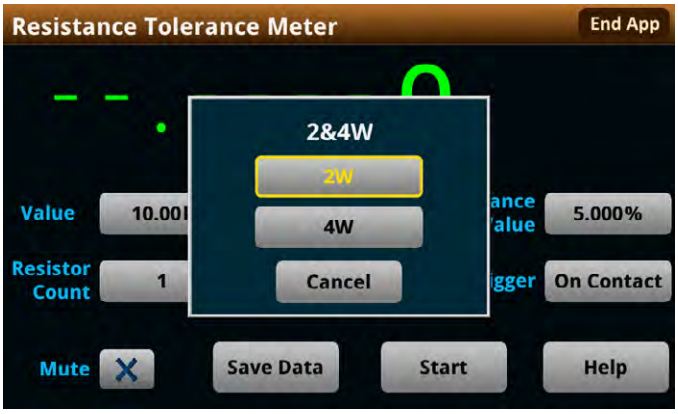

Figure 4. Two and Four-Wire Measurement Selection.

The **Tolerance Value** field lets the user set the tolerance for the resistor in percentage.

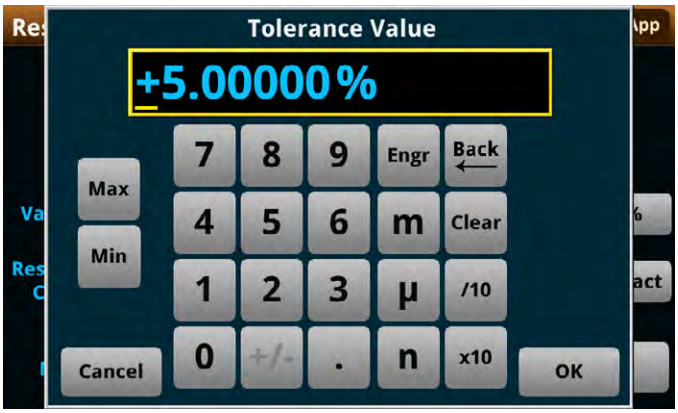

Figure 5. Field for Entering Resistance Tolerance Value.

The **Resistor Count** field sets the number of resistors to be measured before ending the test. This corresponds to the number of readings in the table.

Figure 6. Field for Entering Resistor Count.

Enabling the **Retest on Fail** check box will prompt the user to retest the resistor if the test fails. This may be desirable if the user believes that the test failed due to a poor connection rather than the device being out of specification.

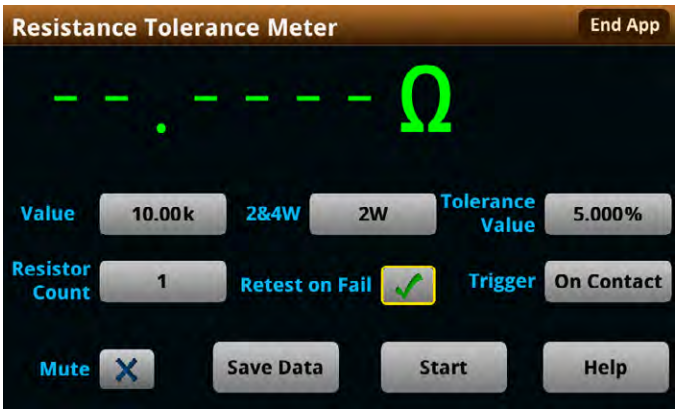

Figure 7. Retest on Fail Enabled.

Figure 8. Retest on Fail Prompt Issued when Measurement Fails.

The **Trigger** field allows the user to specify what kind of trigger initiates a measurement. There are three options:

- **On Contact:** The app takes a measurement when the test leads contact a device whose resistance is not measured as an overflow.
- **Foot Pedal:** The app takes a measurement when a foot pedal connected to the External Trigger In on the back of the device is depressed. See the section below on "Connecting a Foot Pedal".
- **TRIGGER button:** The app takes a measurement when the **TRIGGER** button on the front panel is pressed.

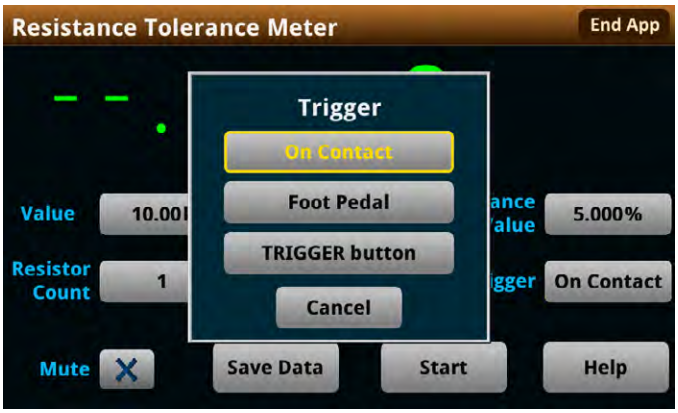

Figure 9. Trigger Selection Menu.

The **Mute** checkbox sets whether the instrument audibly beeps on measurement or not.

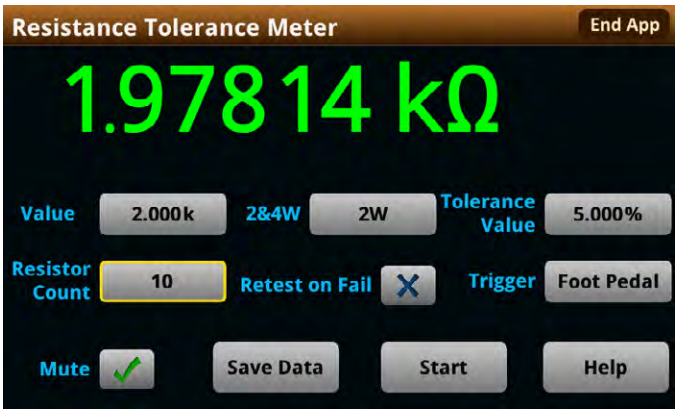

Figure 10. Mute Option Enabled.

The **Start** button begins the test and sets the instrument to wait for a trigger. The **Help** button provides basic information about the operation of the app.

The **Save Data** button prompts the user to enter a filename and saves the data from the last run as a CSV file on a USB drive. A USB drive must be inserted into the front panel of the instrument.

Figure 11. File Name Input Prompt when User Saves Data.

Connecting a Foot Pedal

The Resistance Tolerance TSP app provides users with the ability to connect a generic momentary switch or foot pedal in order to trigger measurements. This mode was designed for use with a momentary switch of the kind used for musical keyboards. Switches which are normally open or normally closed both work. The details of the connection depend on the measurement device used.

For the DAQ6510/DMM6500: The coaxial External Trigger IN on the back of these devices is normally pulled up, and therefore can be connected directly to a switch. A convenient way to connect a foot pedal is to use a pedal with a quarter inch jack connector (such as is used for electric pianos) and a ¼ inch jack to coaxial adapter.

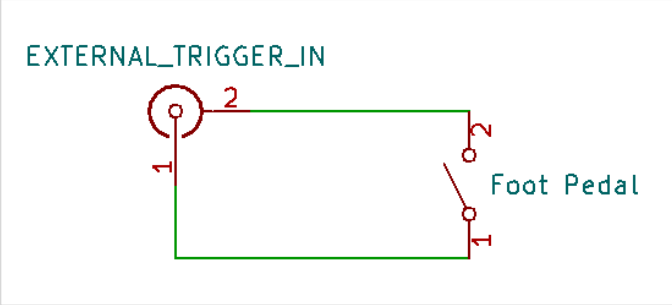

Figure 12. Foot Pedal Connection for DAQ6510/DMM6500.

For the DMM7510: The DMM7510's External I/O is connected via an 8-pin DIN connector (Trigger Link) on the back of the device. The details of this connection can be found in the reference manual DMM7510-901-01 Rev. C, section 7-15. One way to connect a switch is to connect the EXT TRIG OUT (pin 1) and EXT TRIG IN (pin 2) to one side of the switch and connect the other side of the switch to Signal ground (pin 7 or 8). EXT TRIG OUT is configured as a pull-up.

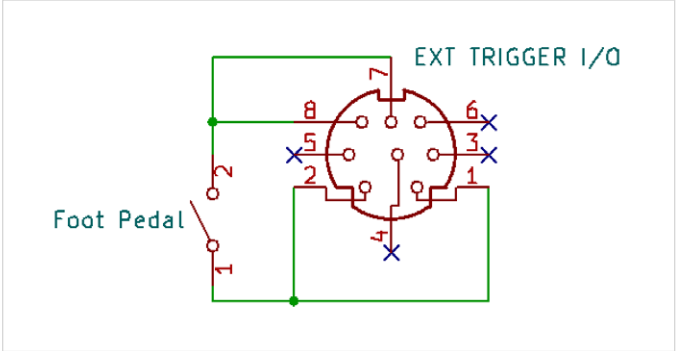

Figure 13. Foot Pedal Connection for DMM7510.

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