KI-Tool and KI-Link Software

User's Manual

2110-921-01 Rev. A / July 2012

KI-Tool And KI-Link Software

User's Manual

Document number: 2110-921-01 Rev. A / July 2012

Table of Contents

Section 1

Introduction

In this section:

Welcome

Thank you for using a Keithley Instruments product. This manual provides information about the following start-up software and utilities included with your product:

- KI-Tool
- KI-Link

What is the KI-Tool?

The KI-Tool software does not require programming to provide charting and graphing capabilities, simplifying setup and basic measurement applications requiring graphical data representation. Scale, offset, and level can be adjusted to fine-tune images for visual evaluation of signal and noise elements over time. It also includes tabular data and Standard Commands for Programmable Instruments (SCPI) command prompt windows for maximum flexibility. Data sets can also be saved to disk files.

The KI-Tool software simulates the front-panel operation of a Keithley Instruments digital multimeter, including the following functions:

- DC voltage (DCV)
- AC voltage (ACV)
- DC current (DCI)
- AC current (ACI)
- 2-wire resistance (2Ω)
- 4-wire resistance (4Ω)
- Frequency (FREQ)
- Period
- Continuity (CONT)
- Diode (⊣▶⊢)
- Resistance temperature detectors (TEMP)
- Thermocouple {TCOUPL)
- Capacitance (⊣⊢)

The KI-Tool software allows you to quickly control the instrument over USB or GPIB (if equipped).

The KI-Tool software provides MIN, MAX, AVG, and count math functions.

What is the KI-Link?

KI-Link software provides Microsoft® Word and Excel® add-in tools for remotely storing and recalling the measured values from these applications.

System requirements

Operating system

The KI-Tool and KI-Link applications run on computers with the following versions of the Microsoft Windows® operating system:

- Microsoft Windows XP Home, Professional, or Tablet PC Edition with Service Pack 3 (32 bit) or Service Pack 2 (64 bit)
- Windows Server® 2003 (32 bit and 64 bit; Service Pack 2 required for 64 bit); Windows Server 2008 or 2008 R2 (32 bit and 64 bit)
- Windows Vista® Home Basic, Home Premium, Business, Ultimate, or Enterprise with Service Pack 2 (32 bit and 64 bit)
- Windows 7 Starter, Home Premium, Professional, Ultimate, or Enterprise (32 bit and 64 bit)

NI-VISA Runtime

NI-VISA™ is National Instruments (NI™) implementation of the VISA standard. There are two versions: a full version and a run-time version. The Keithley I/O Layer (KIOL) contains a licensed version of the NI-VISA Run-Time Engine that contains only the binary files (DLLs) that allow the NI-VISA drivers to operate.

If you already have NI software (such as LabVIEW™ or LabWindows™) installed, you have a valid license that can be used with Keithley drivers and application software.

If you do not have NI software installed, you must install the KIOL to install the the drivers.

Obtaining the software

The required software is provided on the CD-ROM that came with your instrument. This software is also available on the Keithley Instruments website (*http://www.keithley.com*).

Section 2

Installing the software

In this section:

Installing the software

To install NI-VISA:

Refer to the reference manual for information about installing NI-VISA. The reference manual is located on the CD-ROM that came with your instrument.

Information about installing NI-VISA is also available on the Keithley Instruments website (*http://www.keithley.com*).

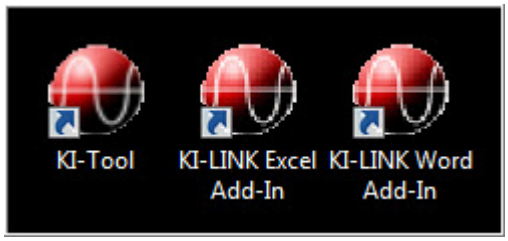
To install the KI-Tool and KI-Link software:

The installation software is located on the CD-ROM that came with your instrument.

1. Run the executable file to install the software.
2. Select your language.
3. When the Keithley Instruments Software Setup wizard displays, follow the instructions to install the software.

During the software installation, the Software Setup wizard places KI-Tool, Excel Add-In, and Word Add-in icons on the computer desktop and in the program/start menu. The following figure shows what the desktop icons look like:

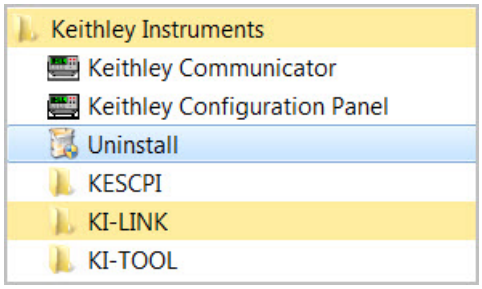
Figure 1: KI-Tool icons



To remove the software:

If it is ever necessary to remove the software, use the Uninstall selection in the Keithley Instruments folder under the program/start menu.

Figure 2: Uninstall



1. Click **Uninstall**.
2. When the Keithley Instruments Software Uninstall wizard displays, follow the instructions to uninstall the software.

Connecting instruments to a computer

NOTE

Make sure you install the NI-VISA Runtime (on page 1-3) before you connect instruments to a computer.

NOTE

Connect the instrument to the computer before starting the KI-Tool software.

Using USB

A USB cable is shipped with the instrument. If the original cable is not available, you will need a USB cable with a USB Type B connector on one end and a USB type A connector on the other end for each instrument you plan to connect to the computer at the same time using the USB interface.

1. Connect the Type A end of the cable to the host computer.
2. Connect the Type B end of the cable to the instrument.
3. Turn power to the instrument on.
4. When the host computer detects the new USB connection, the Found New Hardware Wizard will start.
5. On the "Can Windows connect to Windows Update to search for software?" dialog box, click **No**, and then click **Next**.
6. On the "USB Test and Measurement device" dialog box, click **Next**, and then click **Finish**.

Using GPIB

GPIB is an optional interface and may not be installed on the instrument. If the GPIB interface is available on your instrument, refer to the Reference manual that came with your instrument for information about using GPIB.

Section 3

KI-Tool

In this section:

Starting the KI-Tool Software

NOTE

Connect the instruments to the computer first, before starting the KI-Tool software. If you forget to connect the instruments first, you can click **Refresh** on the Settings menu to display the instruments. Refer to Refresh (on page 3-18) for details.

To start the KI-Tool software from the desktop:

Double-click the KI-Tool software icon, shown in the following figure. The KI-Tool software opens.

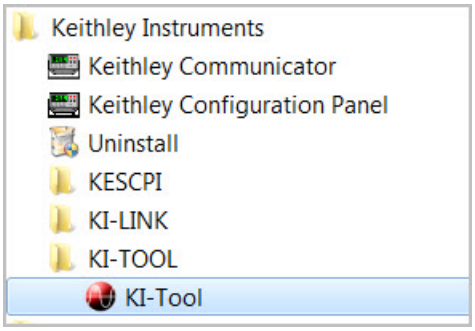
Figure 3: KI-Tool icon

If the KI-Tool software icon is not on your desktop, perform the procedure below to start the KI-Tool software from the Windows start menu.

To start the KI-Tool software from the start menu:

1. Click **Start**, **All programs**, and then click the **Keithley Instruments folder**. The folder opens, as shown in the following figure.

Figure 4: Start menu



2. Click the **KI-TOOL** folder.
3. Click **KI-Tool**. The KI-Tool software opens.

Changing the language

By default, the KI-Tool software displays menu items in English. You have the option to change the language to Chinese. If you select another language, the KI-Link software will display menus in the selected language. Refer to the Help (on page 3-26) topic for information about how to change the language.

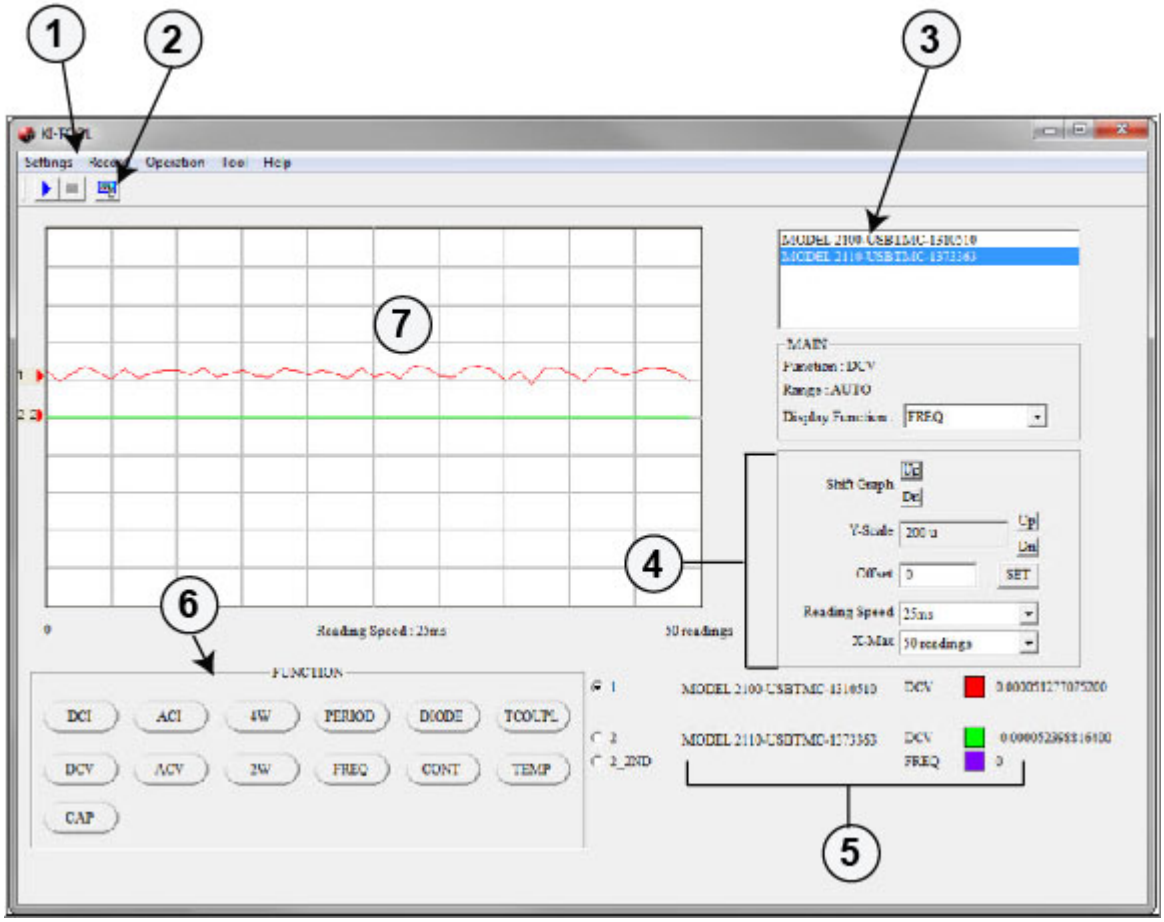
Workspace

The workspace is the environment that appears when you open the KI-Tool software. The workspace contains areas which provide:

- Access to tools to configure instruments connected to the computer.
- Access to tools and menu items to control the KI-Tool software's charting and graphing capabilities.

The following figure shows the KI-Tool software workspace. The workspace is divided into seven areas, described in the following topics.

Figure 5: KI-Tool Workspace



(1) Menu bar

The menu bar provides menus and buttons to configure and run the KI-Tool software. The menu bar is located at the top of the user interface. Refer to Menus (on page 3-6) for information about the menus on the menu bar.

(2) Toolbar

The toolbar contains tools to control the KI-Tool software operation and to set up functions.

 Click the start icon to start plotting data on the graph.

 Click the stop icon to stop plotting data on the graph.

 Click the settings icon to open the Device Settings (on page 3-7) menu.

(3) Instrument List

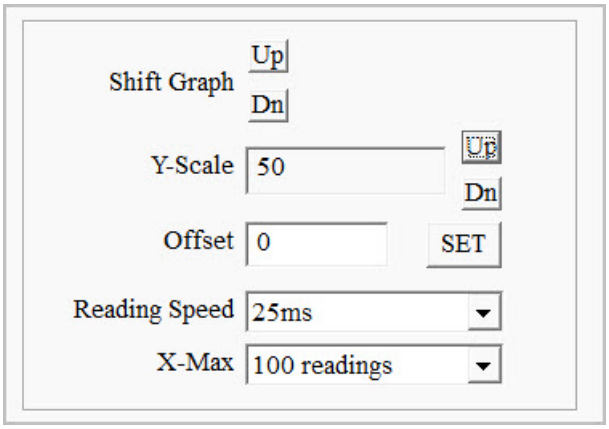
For each instrument connected to the computer, the Instrument List:

- Identifies the instrument by its model number and serial number
- Shows the present function and range selected
- Provides a drop-down menu to select a second measurement (2ND) function, if desired

(4) Graph Settings

The Graph Settings area provides controls to scale and control the graph. The following figure shows the Graph Settings area.

Figure 6: Graph Settings



Shift Graph

The Shift Graph control allows you to shift positions of the lines on the graph. This feature is useful when graphing dual measurements or graphing data from multiple instruments. Use the **Up** and **Dn** (down) buttons to position the lines on the graph display.

Each time you click a button, the graph shifts up or down by one division, changing the position of the zero-line.

Y-Scale

The Y-Scale control allows you to adjust the size of the vertical axis division. Use the **Up** and **Dn** (down) buttons to increase and decrease the span of the plots.

Offset

The Offset control allows you to apply an offset to each data point by adding or subtracting the value entered. Enter the offset value and click the **SET button**.

Reading Speed

The Reading Speed control allows you to set the amount of time in milliseconds (ms) that the instrument takes between readings. Select the Reading Speed from the drop-down menu.

X-Max

The X-Max control allows you to select the maximum number of readings that will display on the completed graph. When you select an X-Max value, the KI-Tool software will show all the readings until it reaches the X-Max number of readings. Then, it will show the last X-Max number of readings. For example, if the instrument takes 1000 readings and X-Max is set to 100, the KI-Tool software will only display 100 readings on the completed graph.

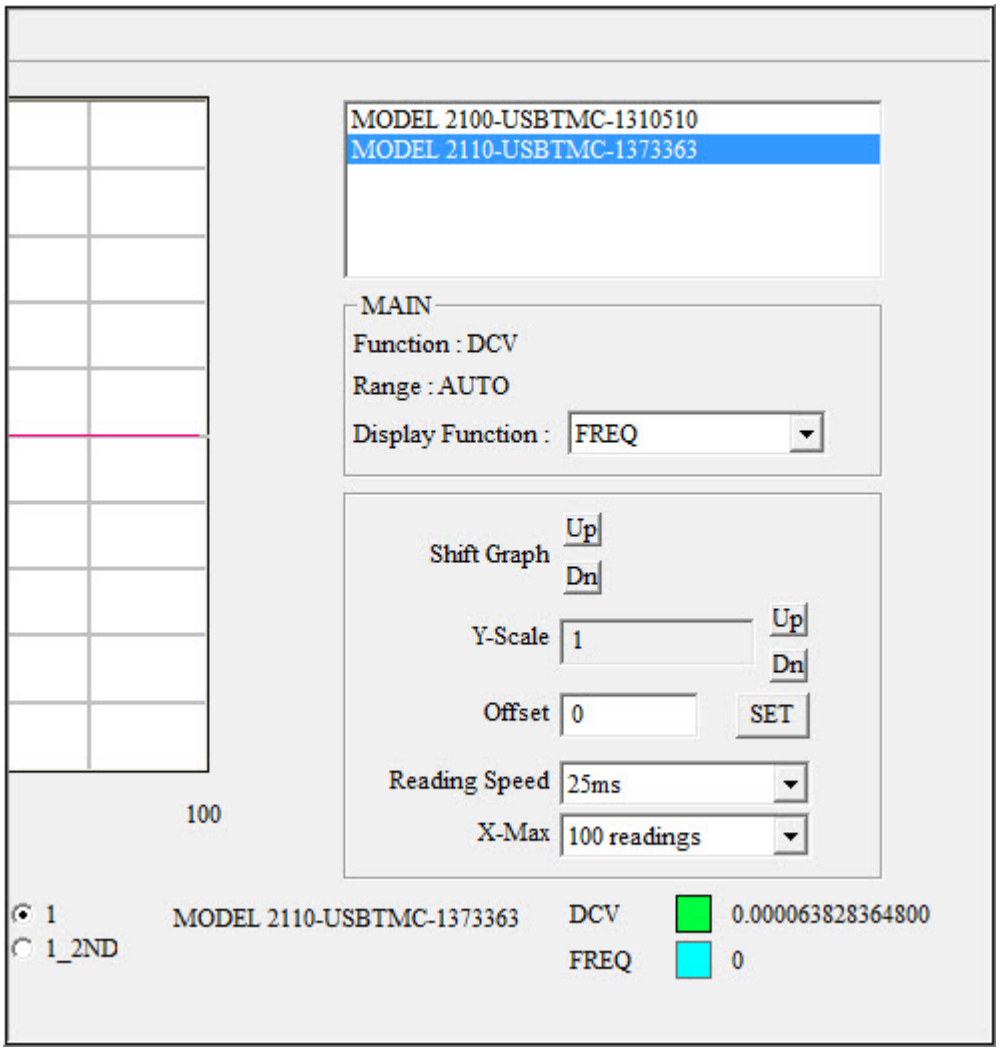
(5) Instrument Information

The Instrument Information display shows information about each instrument that is connected including:

- Model number and serial number
- Selected function
- Line color
- The reading that the instrument is presently taking. This display changes each time the instrument tales a reading. When the instrument is not taking readings, the display shows the last reading taken.

The Instrument Information display only shows information about one instrument at a time. Select the instrument to display from the Instrument List as shown in the following figure.

Figure 7: Select instrument from Instrument List to display readings



(6) Function Panel

Select the function you want the instrument to perform by clicking the desired function button. See the following table for a description of each function.

Button	Function
DCI	DC current measurement.
ACI	AC current measurement.
4W	4-wire (Ω 4) resistance measurement.
PERIOD	Period measurement.
DIODE	Diode (⊣▶⊢) test.
TCOUPL	Thermocouple temperature measurement.
DCV	DC voltage measurement.
ACV	AC voltage measurement.
2W	2-wire (Ω 2) resistance measurement.
FREQ	Frequency measurement.
CONT	Continuity test.
TEMP	RTD temperature measurement.
CAP	Capacitance (⊣⊢) measurement.

(7) Graph Display

The Graph Display area shows the readings from all connected instruments in a graphical format. Readings will not display until you select Start Readings (on page 3-24) from the Operation menu.

Menus

The menu bar provides the following menus:

- Settings (on page 3-6)
- Record (on page 3-18)
- Operation (on page 3-23)
- Tool (on page 3-24)
- Help (on page 3-26)

Settings

Use the Settings menu to configure device and reading settings.

The Settings menu has four selections:

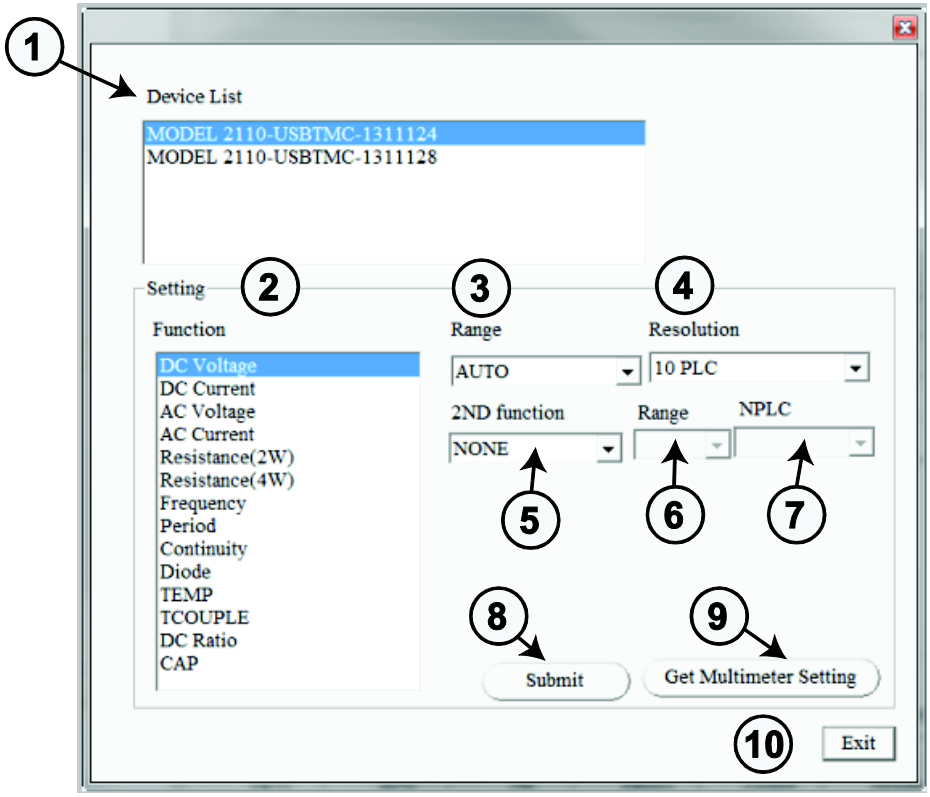
- Device Settings (on page 3-7)
- Reading Settings (on page 3-12)
- Refresh (on page 3-18)
- Exit (on page 3-18)

Device Settings

Use Device Settings to set up the selected instrument. Alternatively, you can copy the present local settings from the instrument. Depending on which model instrument you are setting up, the Device Settings window may have different settings.

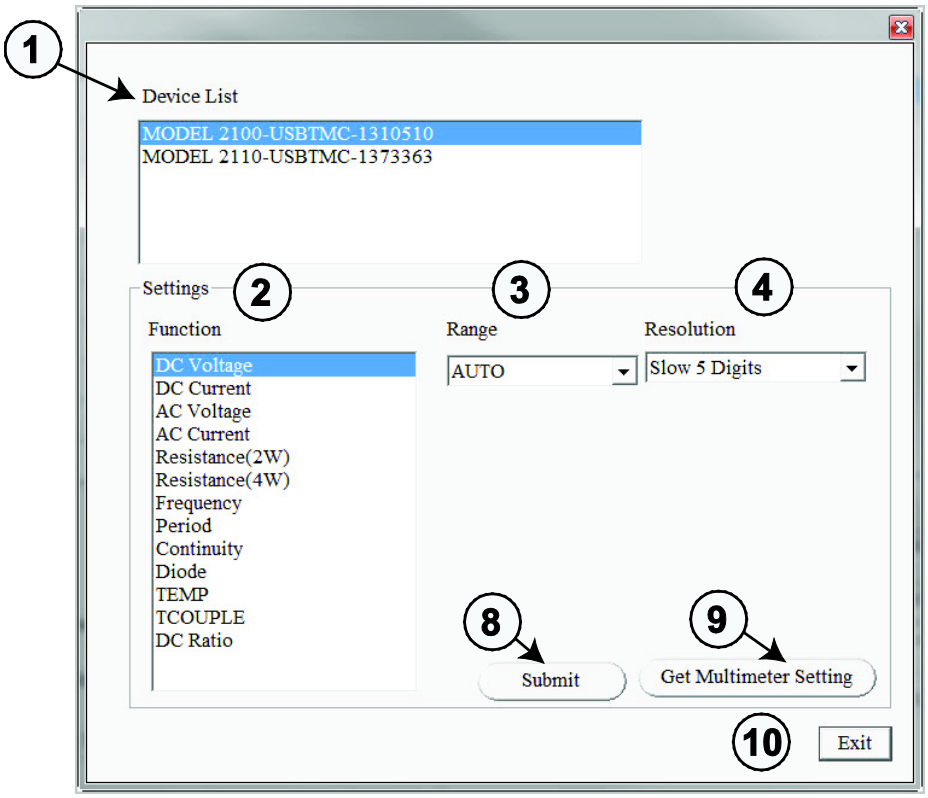
The following figure shows the Device Settings window for an instrument equipped with second measurement (2ND) function capabilities.

Figure 8: Device Settings window (instrument with 2ND function capabilities)



The following figure shows the Device Settings window for an instrument without 2ND function capabilities.

Figure 9: Device Settings window (instrument without 2ND function capabilities)



(1) Device List

Lists the instruments connected to the computer.

If you want to view or change an instrument's settings, click to highlight the instrument.

NOTE

If you want to use the configuration settings already set from the instrument's front panel, click **Get Multimeter Settings**.

(2) Function

Lists the functions available for the instrument.

To configure a function:

1. Click the function you want to configure. After you select a function to configure, the labels for the drop-down menus will change depending on which function you are configuring. See the following table for information about the labels associated with each function.
2. Configure additional settings as necessary:
   - (4) Resolution, Filter, Aperture, or Unit (on page 3-10)
   - (5) 2ND function (if equipped) (on page 3-11)
   - (6) Range (for 2ND function, if equipped) (on page 3-12)
   - (7) NPLC, Bandwidth, Aperture, Integration Time, and Type (on page 3-12)
3. Click **Submit** when you are finished with the configuration.

NOTE

You must click **Submit** for the settings to take effect.

See the figure in the Device Settings (on page 3-7) section for information about what the numeric designators in the following table indicate.

Function (2)	Label (3)	Choices	Label (4)	Choices
DC Voltage	Range	AUTO, 100m Vdc, 1 Vdc, 10 Vdc, 100 Vdc, 1000 Vdc	Resolution	0.001 PLC, 0.006 PLC, 0.02 PLC, 0.06 PLC, 0.2 PLC, 0.6 PLC, 1 PLC, 10 PLC, 100 PLC
DC Current	Range	AUTO, 10m Adc, 100 Adc, 1 Adc, 3 Adc, 10 Adc	Resolution	0.001 PLC, 0.006 PLC, 0.02 PLC, 0.06 PLC, 0.2 PLC, 0.6 PLC, 1 PLC, 10 PLC, 100 PLC
AC Voltage	Range	AUTO 100m Vdc, 1 Vdc, 10 Vdc, 100 Vdc, 750 Vdc	Filter	3 HZ, 20 HZ, 200 HZ
AC Current	Range	AUTO, 1 Adc, 3 Adc, 10 Adc	Filter	3 HZ, 20 HZ, 200 HZ
Resistance (2W)	Range	AUTO, 100 ohm, 1K ohm, 10K ohm, 100K ohm, ohm, 1M ohm, 10M ohm, 100M ohm,	Resolution	0.001 PLC, 0.006 PLC, 0.02 PLC, 0.06 PLC, 0.2 PLC, 0.6 PLC, 1 PLC, 10 PLC, 100 PLC
Resistance (4W)	Range	AUTO, 100 ohm, 1K ohm, 10K ohm, 100K ohm, ohm, 1M ohm, 10M ohm, 100M ohm,	Resolution	0.001 PLC, 0.006 PLC, 0.02 PLC, 0.06 PLC, 0.2 PLC, 0.6 PLC, 1 PLC, 10 PLC, 100 PLC
Frequency	Range	AUTO, 100m Vdc, 1 Vdc, 10 Vdc, 100 Vdc, 750 Vdc	Aperture	0.01 Sec, 0.1 Sec, 1 Sec
Period	Range	AUTO, 100m Vdc, 1 Vdc, 10 Vdc, 100 Vdc, 750 Vdc	Aperture	0.01 Sec, 0.1 Sec, 1 Sec
Continuity	N/A	N/A	N/A	N/A
Diode	N/A	N/A	N/A	N/A
TEMP	Sensor	PT100, D100, F100, PT385, PT3916, NTCT, SPRTD, USER	Unit	C, F, K
TCOUPLE	Sensor	K, J, R, S, T, E, N, C	Unit	C, F, K
DC Ratio	Range	AUTO, 100m Vdc, 1 Vdc, 10 Vdc, 100 Vdc, 1000 Vdc	Resolution	0.001 PLC, 0.006 PLC, 0.02 PLC, 0.06 PLC, 0.2 PLC, 0.6 PLC, 1 PLC, 10 PLC, 100 PLC
CAP	Range	AUTO, 1nf, 100nf, 100nf, 1 µF, 10 µF, 100 µF	N/A	N/A

(3) Range or Sensor

Lists the ranges available for the function you selected in the list of functions. If you selected TEMP or TCOUPLE, this list will list sensors.

To make a selection, open the drop-down menu and click the range or sensor. Or, click **AUTO** to use autorange.

(4) Resolution, Filter, Aperture, or Unit

Open the drop-down menu and click the appropriate choice for the function you selected.

(5) 2ND Function (if equipped)

The Model 2110 is equipped with a dual-measurement feature. It allows a user to configure the instrument to take two different measurements in a sequential order and to display the results simultaneously.

If you are using the KI-Tool software with an instrument that provides dual-measurement capability, the second measurement function (2ND) settings display in the Device Settings window. If you are using an instrument without this capability, no 2ND function settings are present.

See the following table for information about the 2ND functions available for each main measurement function.

The main measurement function you select determines which 2ND functions are available. In the following table, the symbol (•) indicates which 2ND functions are available for each main measurement function. Diode and continuity testing are not available as a 2ND functions.

	2ND function											
Main function	DCV	ACV	DCI	ACI	Ω2/Ω4	FREQ (VOLT)	FREQ (CURR)	PERIOD (VOLT)	PERIOD (CURR)	CAP	TEMP (RTD)	TCOUPL
DCV		•	•			•		•				•
ACV	•		•			•		•				•
DCI	•	•		•		•	•	•	•			•
ACI			•				•		•			•
Ω2/Ω4												•
FREQ (VOLT)	•	•	•					•				•
FREQ (CURR)			•	•					•			•
PERIOD (VOLT)	•	•	•			•						•
PERIOD (CURR)			•	•			•					•
CAP												•
TEMP (RTD)												•
TCOUPL	•	•	•	•	•	•	•	•	•	•	•	

Open the drop-down menu and click the appropriate choice for the 2ND function you selected.

NOTE

If you want to stop taking two different measurements, click **NONE** to remove the 2ND function.

(6) Range (for 2ND Function, if equipped)

Lists the ranges available for the 2ND function you selected in the list of 2ND functions. The 2ND function you select determines what ranges are available.

Open the drop-down menu and click the appropriate choice for the 2ND function you selected. Refer to (5) 2ND function (if equipped) (on page 3-11) for information about selecting a 2ND function.

NOTE

Click **AUTO** to select autorange.

(7) NPLC, Bandwidth, Aperture, Integration Time, and Type

Open the drop-down menu and click the selection you want.

(8) Submit

Click the **Submit** button when you are finished configuring the KI-Tool software to take readings. If you do not click **Submit**, the settings will not take effect.

(9) Get Multimeter Settings

Use the **Get Multimeter Settings** button to retrieve the present instrument configuration to the Device Settings window.

(10) Exit

Use the **Exit** button to close the Device Settings window.

Reading Settings

Use Reading Settings to configure the following KI-Tool software settings:

- Store the readings from multiple devices simultaneously.
- Display the readings in the color you select.
- Save the readings to a record.

Reading Mode

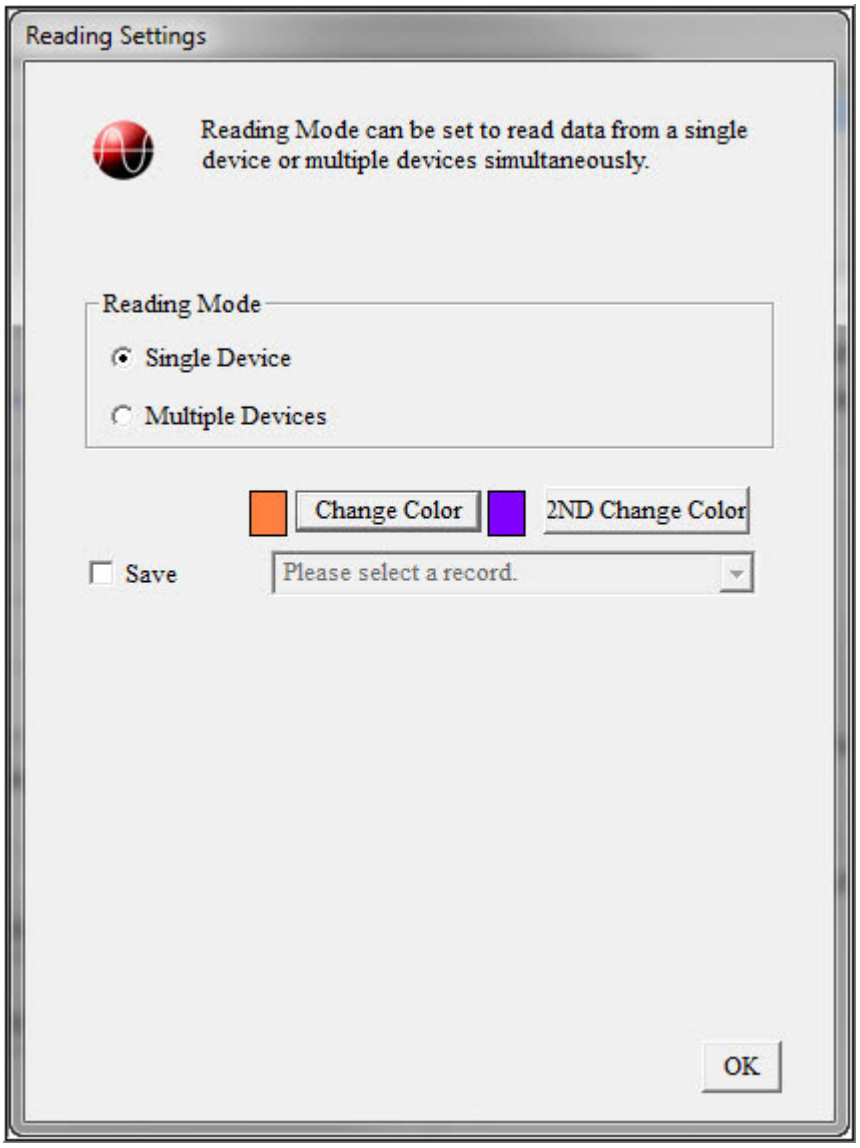
Select Single Device (on page 3-13) or Multiple Devices (on page 3-14).

Single Device

Click **Single Device** to configure the instrument to take readings on one device only. The KI-Tool software displays the following dialog box.

Click the **Change Color** and **2ND Change Color** buttons (if present) to change the color(s) of the graph display.

Figure 10: Reading Mode (single device)



Multiple Devices

The Multiple Device selection is only available when multiple instruments are connected to the computer. The maximum number of devices you can connect is four.

To configure more than one instrument:

1. Select **Multiple Devices**. The KI-Tool software displays the Reading Settings dialog box.
2. Click the **>>** and **<<** buttons to toggle between the settings for different instruments. See the following figures for the Reading Setting dialog boxes for a computer with two instruments.

Figure 11: Reading Settings for first instrument

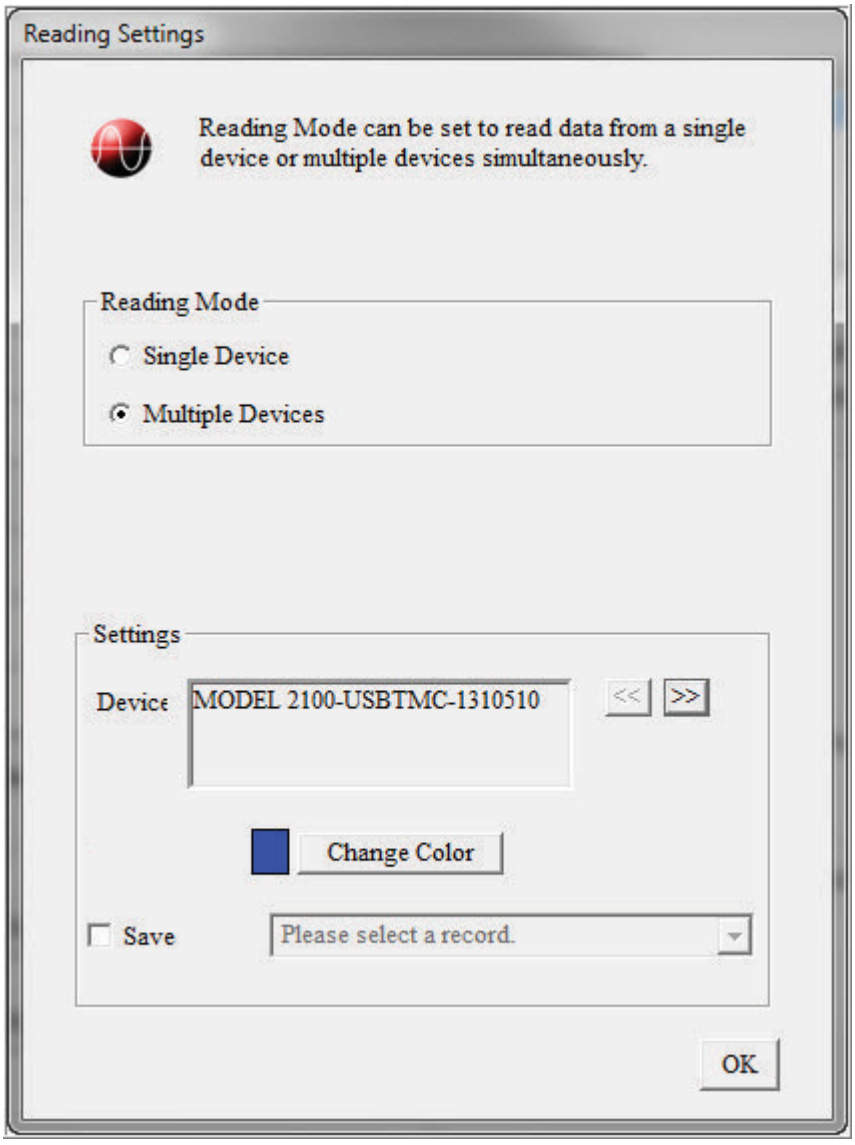
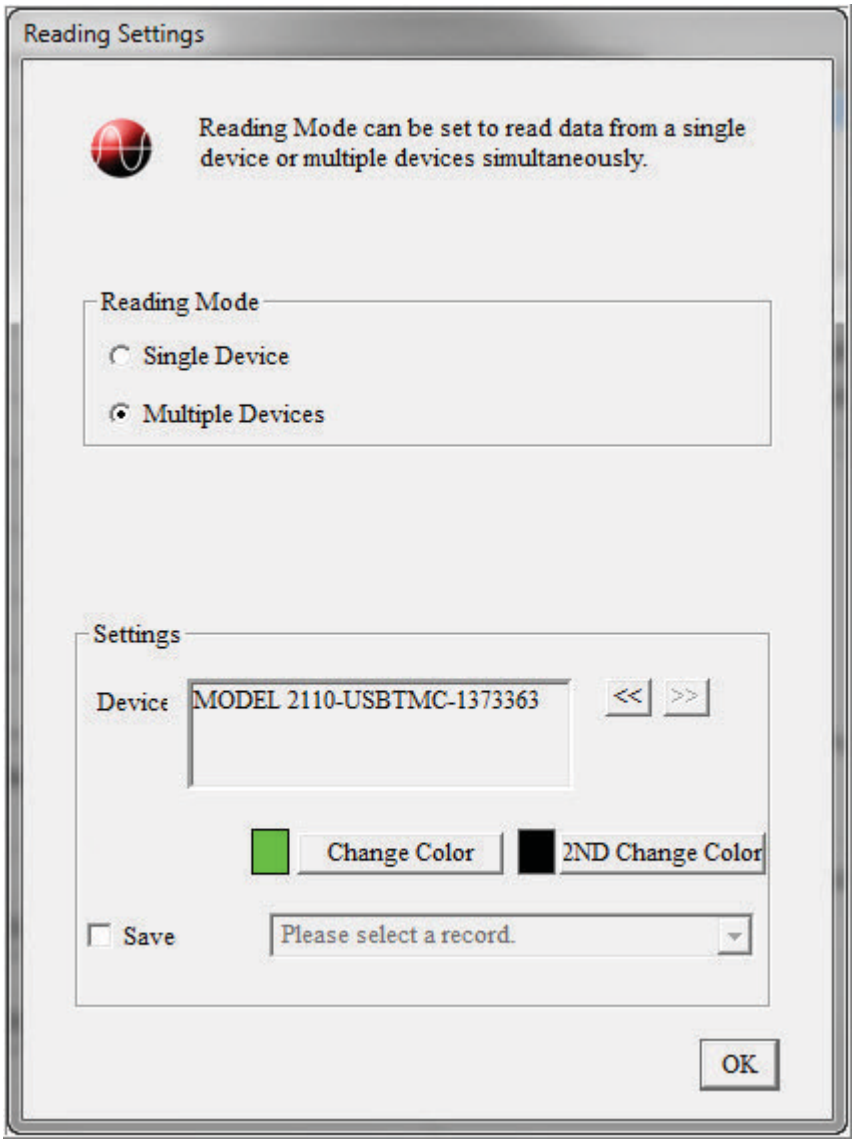


Figure 12: Reading Settings for second instrument



Change Color

Configure the KI-Tool software to display the graphs for each instrument in the color you choose.

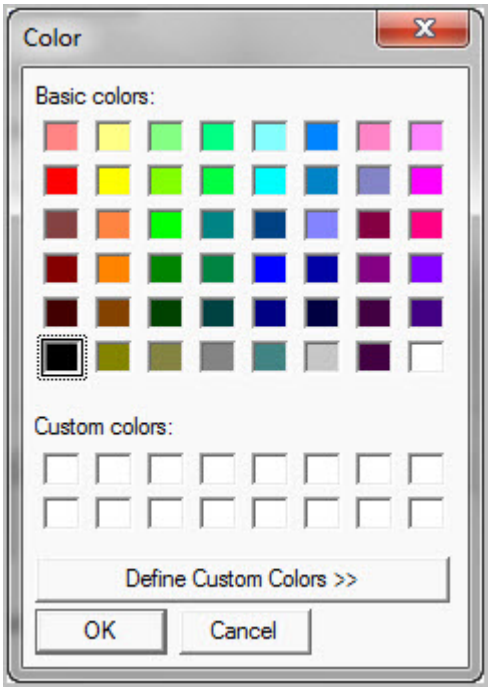
Not all instruments support Dual Measure. Refer to (5) 2ND function (if equipped) (on page 3-11) for details. You cannot select Dual Measure; the KI-Tool software enables Dual Measure when you select 2ND function. If Dual Measure is enabled, you will be able to select a color to graph the 2ND function.

To select a color:

1. Click **Change Color**, the KI-Tool software displays the color palette as shown in the following figure.
2. Select the color.
3. Click **OK**.

If a **2ND Change Color** button is on the Reading Settings dialog box, repeat steps 1 through 3 to change the 2ND color.

Figure 13: Color palette



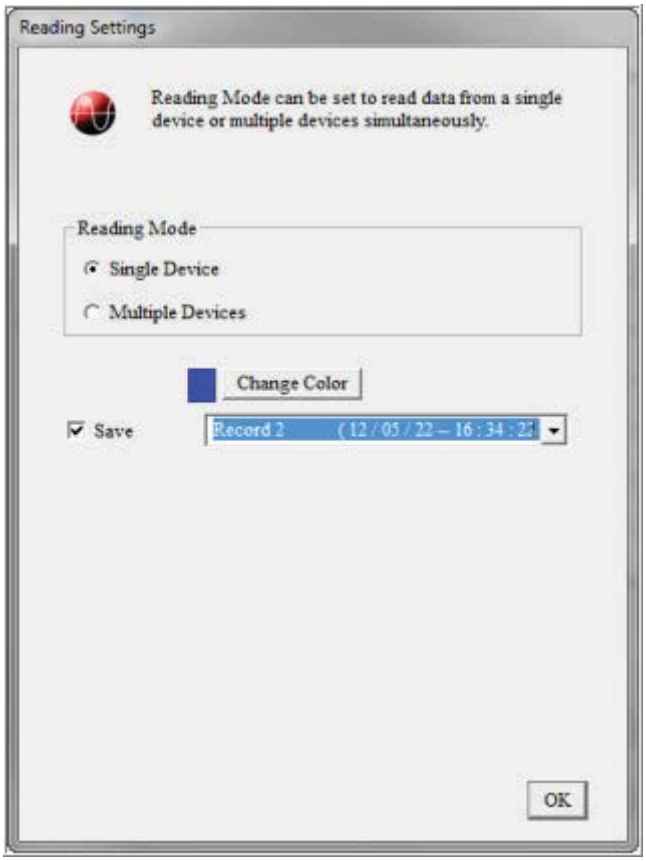
Save

Use Save to record readings. You can save up to 10 records.

To record readings:

1. Select the **Save** check box.
2. Select one of the numbered records for recording readings in the drop-down menus.
3. If you are recording from multiple instruments, refer to Multiple Devices (on page 3-14) for information about toggling between the different devices.

Figure 14: Select Save to record readings



The KI-Tool software date and time stamps previously recorded records in the following format:

```
yy / mm / dd -- hh : mm : 00
```

Where:

- yy = last two digits of the year
- mm = month
- dd = day of the month
- hh = hours in 24 hour format
- mm = minutes
- ss = seconds

Refresh

If you connect additional instruments to your computer after starting the KI-Tool software, click **Refresh** to add them to the instrument list.

Exit

Click the **Exit** button to close the KI-Tool software.

Record

Use the Record menu to view and chart previously saved records. Refer to Save (on page 3-17) for information about saving records.

The Record menu has two selections:

- View Record (on page 3-18)
- Chart Record (on page 3-20)

View Record

Use the View Record selection to view previously saved records.

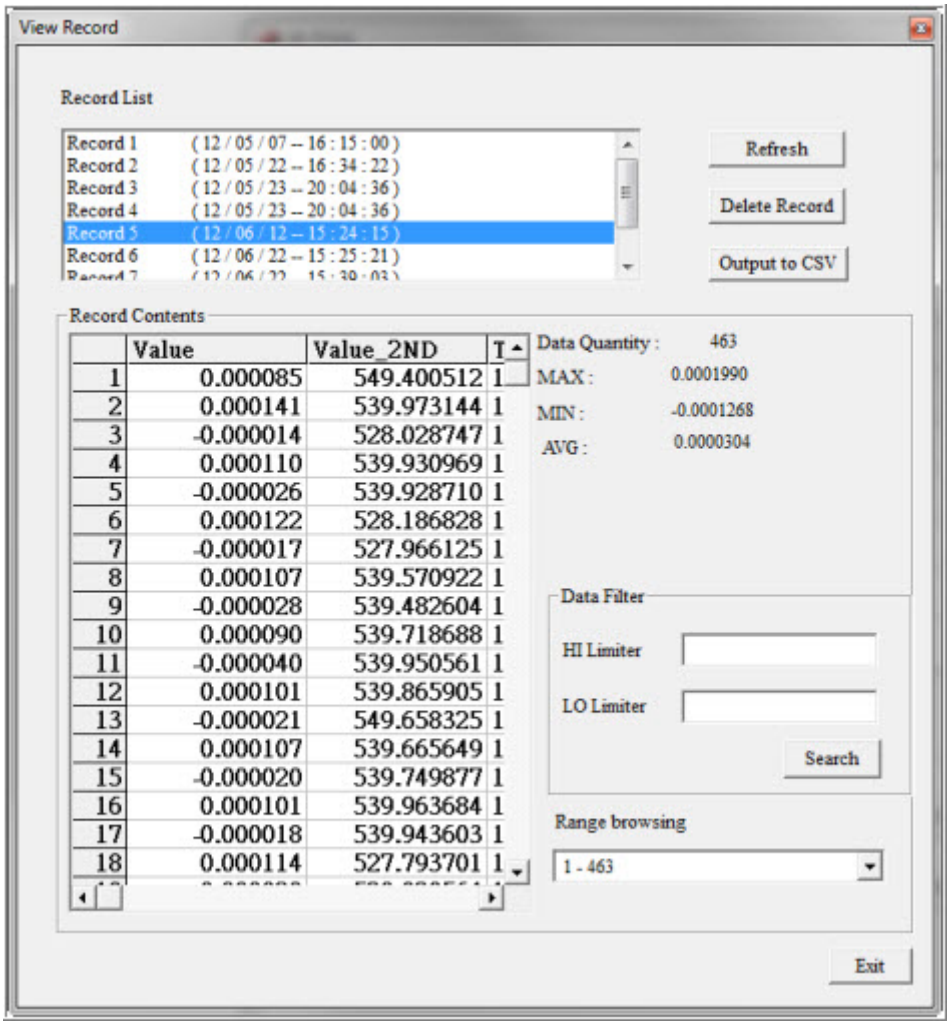
The KI-Tool software displays a maximum of 10 previously recorded readings on the Record List.

Click a record to select and display it.

Use the buttons in the View Record dialog box to perform the following operations on the records:

- **Refresh Record** - Update the display.
- **Delete** - Delete a saved record.
- **Output to CVS** - Export the saved record to CSV format. Microsoft Excel uses this format.

Figure 15: View Record



Record Display

The Record Display lists the following information for each reading in the record:

- Record number (in the first column)
- Value - the reading value
- Value_2ND - the reading value for the 2ND function. If the instrument is not configured for a 2ND function, the field will be blank. If the instrument does not support a 2ND function, the field will not be present.
- Time - the time the reading was taken in hours, minutes, and seconds. The time is displayed in 24-hour format.

Data Quantity

Displays the number of readings taken.

MAX MIN AVG

Displays the following information:

- MAX - the value of the maximum (highest) reading in the record.
- MIN - the value of the minimum (lowest) reading in the record.
- AVG - the average value of all readings in the record.

Data Filter

The Data Filter allows you to set upper and lower boundaries to sort the readings.

To use the data filter:

1. Enter the upper limit in the HI Limiter field.
2. Enter the lower limit in the LO Limiter field.
3. Click **Search** to start the filter.

Range Browsing

Use the Range Browsing menu to select a range of readings within the record to view.

Exit

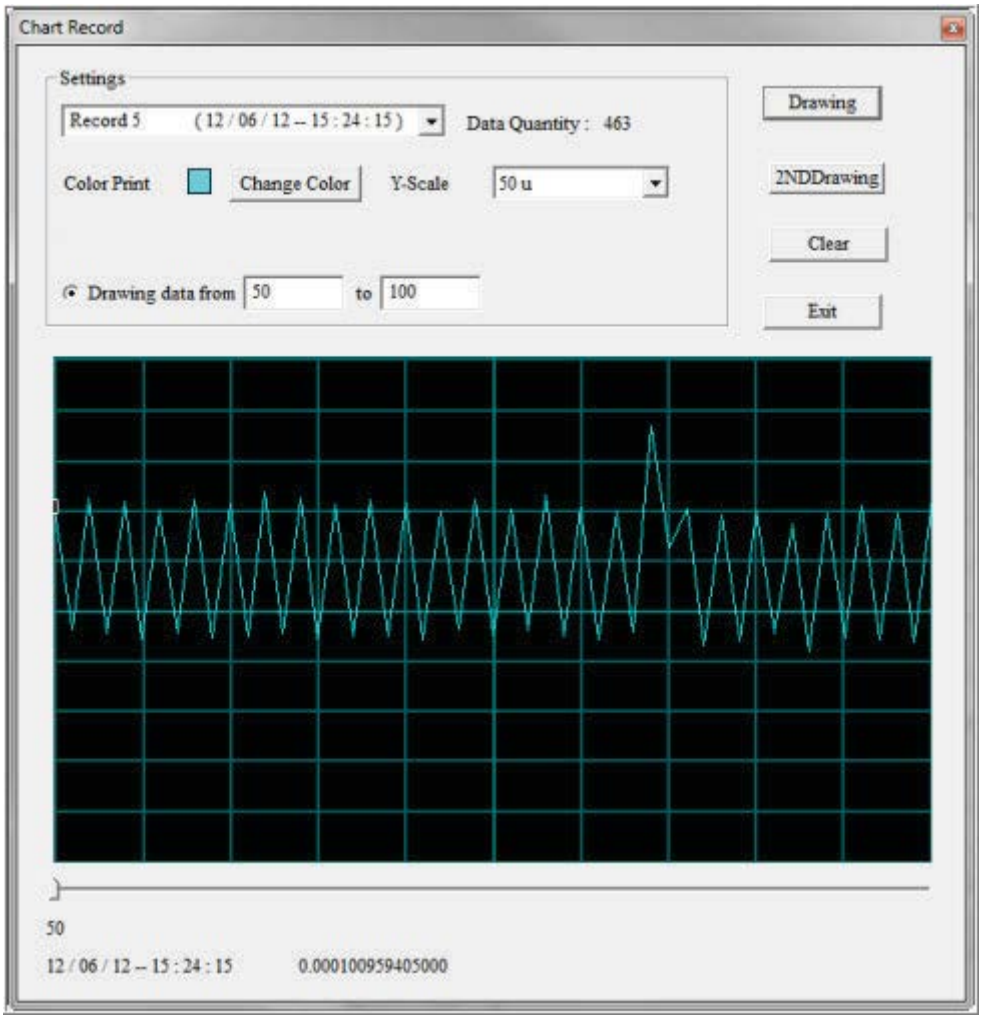
Click the **Exit** button to close the View Record window.

Chart Record

Use Chart Record to draw graphs of previously saved readings.

The following figure shows the Chart Record window. The window has seven areas described in the following topics:

Figure 16: Chart Record



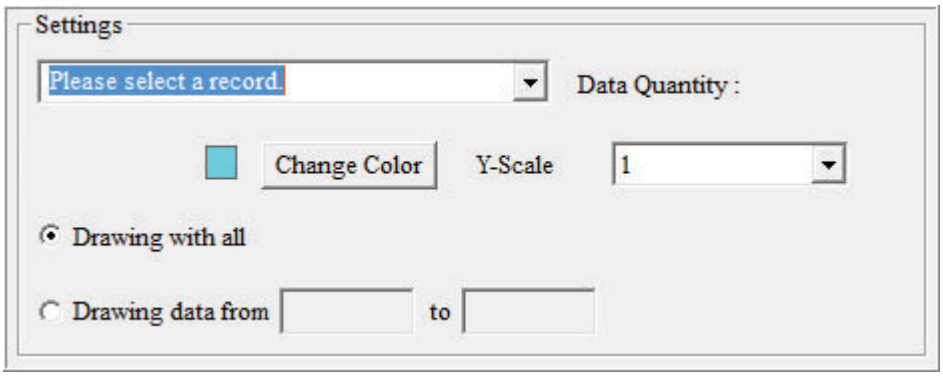
Settings

Use the Settings area of the Chart Records window to set up the following charting operations:

- Select a record to chart.
- Display the records in the color you select.
- Set the Y-scale for the chart.

The following figure shows the Settings area. Refer to the following topics for descriptions of the settings.

Figure 17: Settings



Select Record
Open the drop-down menu and select a previously saved record you want to chart.

Data Quantity
This field displays the number of readings in the selected record.

Change Color
Click the **Change Color** button to display the color palette.Select the color for the record display.

Y-Scale
Open the drop-down menu and select the appropriate Y-Scale (vertical) measurement unit for the chart.

Drawing with all
Select **Drawing with all** to use all readings in the record to draw the chart.

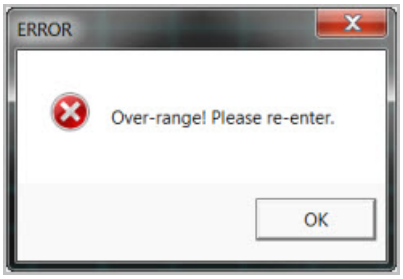
Drawing data from
Select **Drawing data from** to choose a section of readings in the record to graph.

1. Enter the reading number of the first entry for the graph.
2. Enter the reading number of the last entry for the graph.

For example, if the Data Quantity is 22, you can use this selection to start the chart at reading number 12 and end it at reading number 20.

If you enter a reading number that is greater than the total number of readings, the following error message displays.

Figure 18: KI-Tool Error



Graph

The KI-Tool software graphs the data and displays the chart.

Drawing

Use the **Drawing** button to instruct the KI-Tool software to create the chart based on the selections in the Settings.

2ND Drawing (if equipped)

If the record you are charting has a 2ND function measurement, use the **2ND Drawing** button to plot the 2ND function measurement readings.

Clear

Use the **Clear** button to reset the display to blank.

Exit

Use the **Exit** button to close the Chart Record window.

Data Selection Slider

Use the Data Selection Slider to step through data points.

Operation

The Operation menu instructs the instrument to start or stop taking measurement readings.

The Operation menu has three selections:

- Multiple Readings (on page 3-24)
- Start Readings (on page 3-24)
- Stop Readings (on page 3-24)

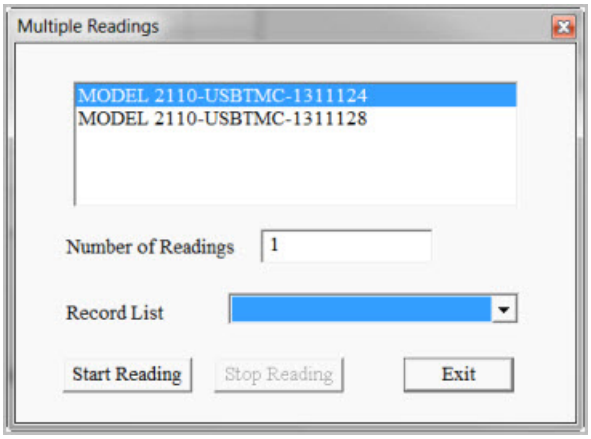
Multiple Readings

Multiple Readings keeps the chart from updating while the instrument is taking readings. The KI-Tool software stores the readings in a file and does not display dynamic curves.

Multiple Readings takes a specified number of measurements and puts them into the specified lists. When you select Multiple Readings, stop is enabled while data is being taken.

The following figure shows the Multiple Readings dialog box. The following topics describe the fields in the Multiple Readings dialog box.

Figure 19: Multiple readings



Instrument List

Use Instrument List to select the instrument to use to take the readings.

Number of Readings

Enter the number of readings you want the instrument to take. The minimum number of readings you can take is 1 and the maximum number is 50,000.

Record List

Open the drop-down menu to select the record that the instrument will use for storing readings.

Start Readings

Click the **Start Readings** button to start the measurements.

Stop Readings

Click the **Stop Readings** button to stop the measurements.

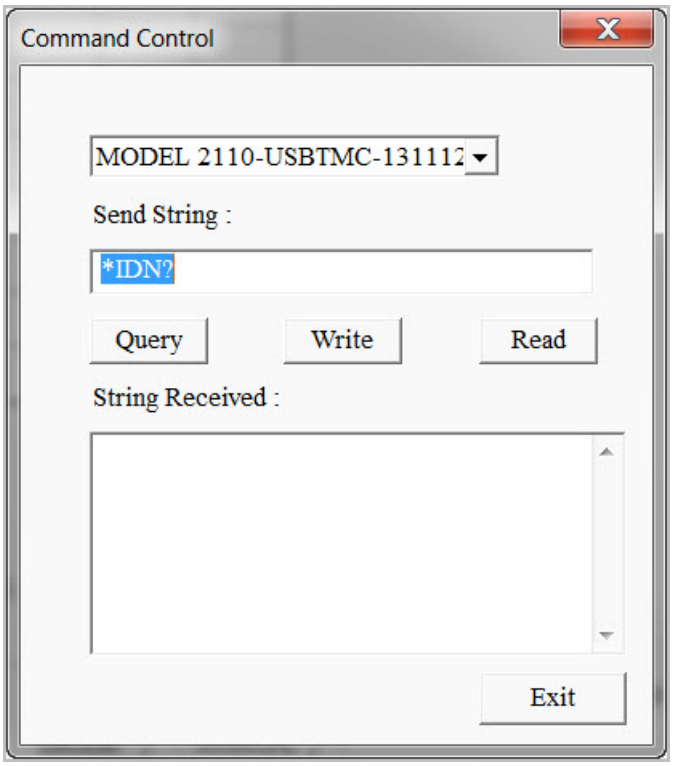
Tool

Use the Tool menu has a command control submenu that provides an interactive dialog box for sending SCPI commands to the instruments connected to your computer. Refer to your instrument's *Reference* manual for information about SCPI commands.

Command Control

The following figure shows the Command Control dialog box. The following topics describe the fields in the Command Control dialog box.

Figure 20: Command Control



Device List

The Device List drop-down menu lists the instruments connected to the computer. Open the drop-down menu and click the instrument you want to configure, operate, or command.

Send String

Enter the SCPI commands in the Send String dialog box.

Query

Use the **Query** button to send the command in the Send String field to the instrument. The KI-Tool software displays any information the instrument returns in the String Received display area.

The Query command performs both a write and a read operation.

Write

Use the **Write** button to send the command in the Send String field to the instrument.

Read

Click the **Read** button to retrieve data from the output buffer of the selected instrument.

String Received

The KI-Tool software displays any information the instrument returns in the String Received display area.

Exit

Click the **Exit** button to close the KI-Tool software.

Help

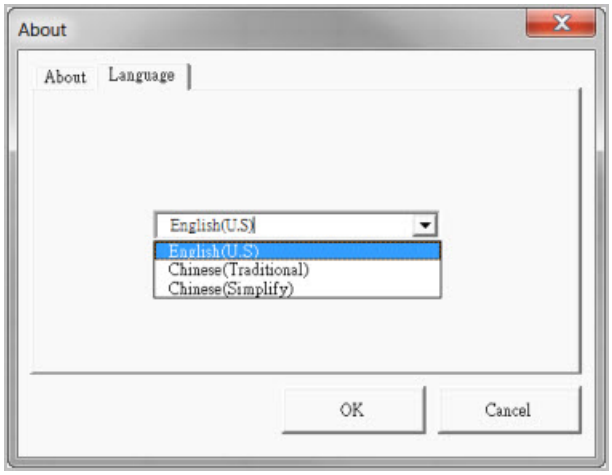
Use the **Help** menu to view the KI-Tool software version information, view this manual, and change the language.

Figure 21: About Multimeter Tool

To select the language:

1. Click the **Language** tab on the About dialog box. The KI-Link software displays the language list shown in the following figure.

Figure 22: KI-Tool language



2. Click the language you want.
3. Click **OK** to close the About dialog box.

Section 4

KI-Link

In this section:

Overview

Before you can start using the KI-Link software, you must install the software and connect instruments to your computer. Refer to the Getting started (see "Installing the software" on page 2-1) section for information about installing the software.

The KI-Link software works with:

- Microsoft Excel (on page 4-1)
- Microsoft Word (on page 4-14)

Both of these products must be installed on the same computer as the KI-Tool software.

Microsoft Excel

Starting the KI-Link software add-in for Microsoft Excel

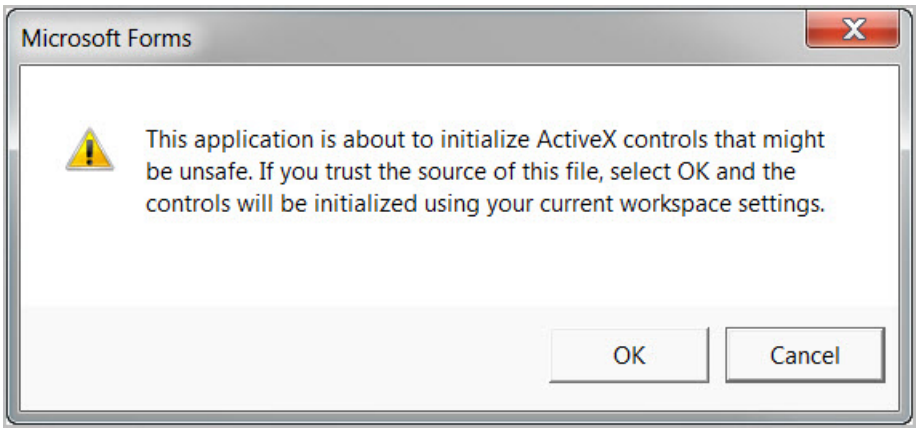
To start the software:

1. Double-click the KI-LINK Excel Add-In icon on the desktop.

Figure 23: KI-Link EXCEL Add-In icon

The following message may appear:

Figure 24: Message



2. Click **OK**. If you are using an earlier version of Microsoft Office than Office 2007, the KI-Link software toolbar displays.
3. If you are using Office 2007 or 2010, click the **Add-Ins** tab.

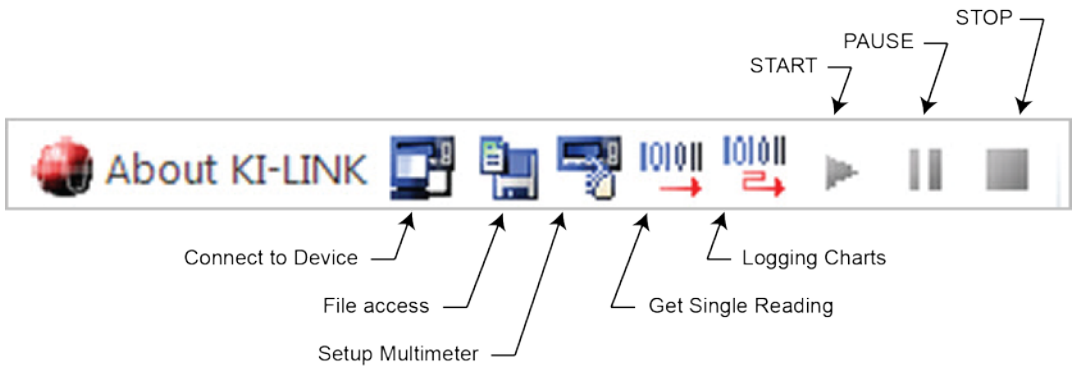
The following figure shows how the KI-Link software toolbar displays in Excel 2010.

Using the toolbar

The toolbar provides easy access to all of the KI-Link software features.

The following figure shows the KI-Link software toolbar. The following topics describe the icons on the toolbar.

Figure 25: Toolbar



About the KI-Link software

Use the **About** button on the toolbar to:

- View information about operating system compatibility.
- Select the language. The default language is English. If you select another language, the KI-Link software will display menus in the selected language.

To view information about operating system compatibility:

1. Click the **About KI-Link software** button. The KI-Link software displays the About dialog box shown in the following figure.

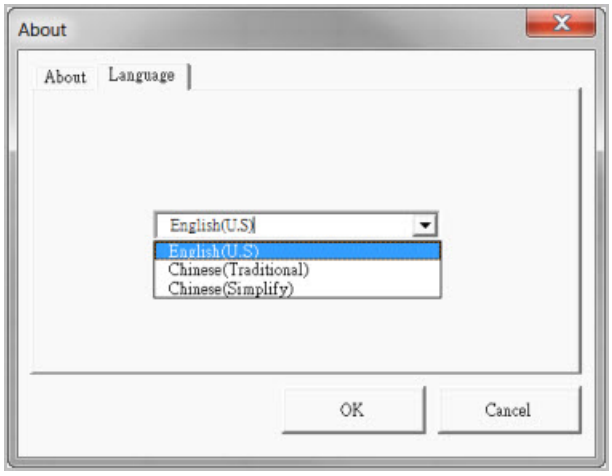
Figure 26: About dialog box

2. If you want to select a language, use the following procedure or click the **OK** button to close the dialog.

To select the language:

1. Click the **Language** tab on the About dialog box. The KI-Link software displays the language list shown in the following figure.

Figure 27: KI-Tool language



2. Click the language you want.
3. Click **OK** to close the About dialog box.

Connect to Device

The KI-Link software can only control one instrument at a time.

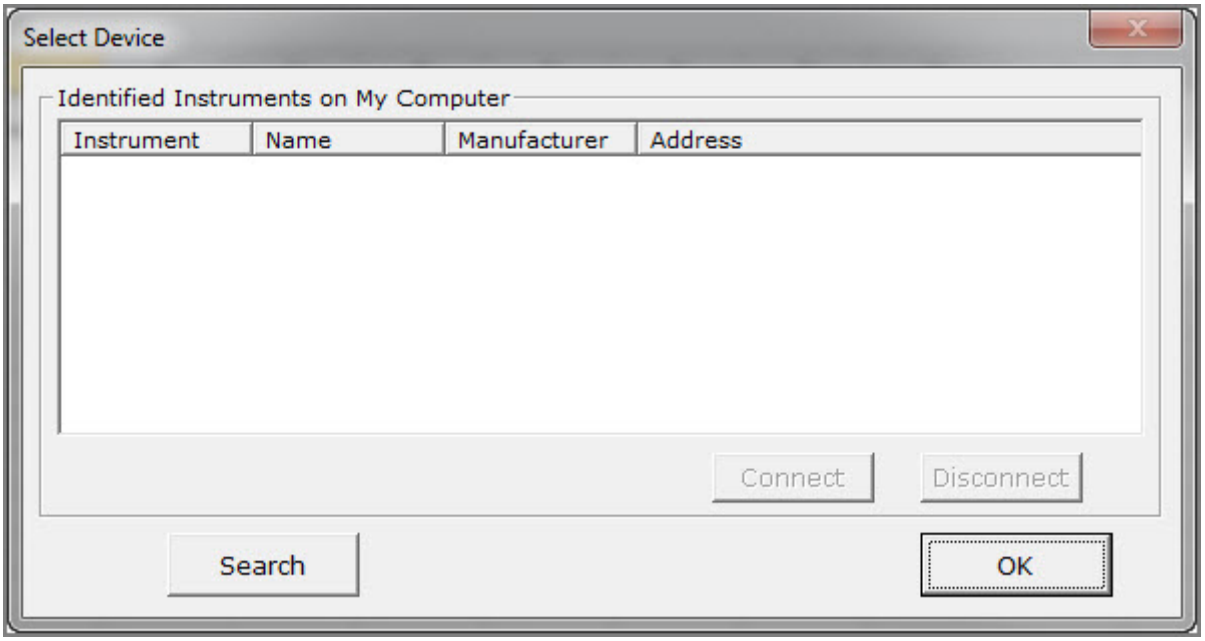
Use the Connect to Device dialog to:

- Connect instruments
- Disconnect instruments
- Search the device list for instruments that are connected

To connect an instrument:

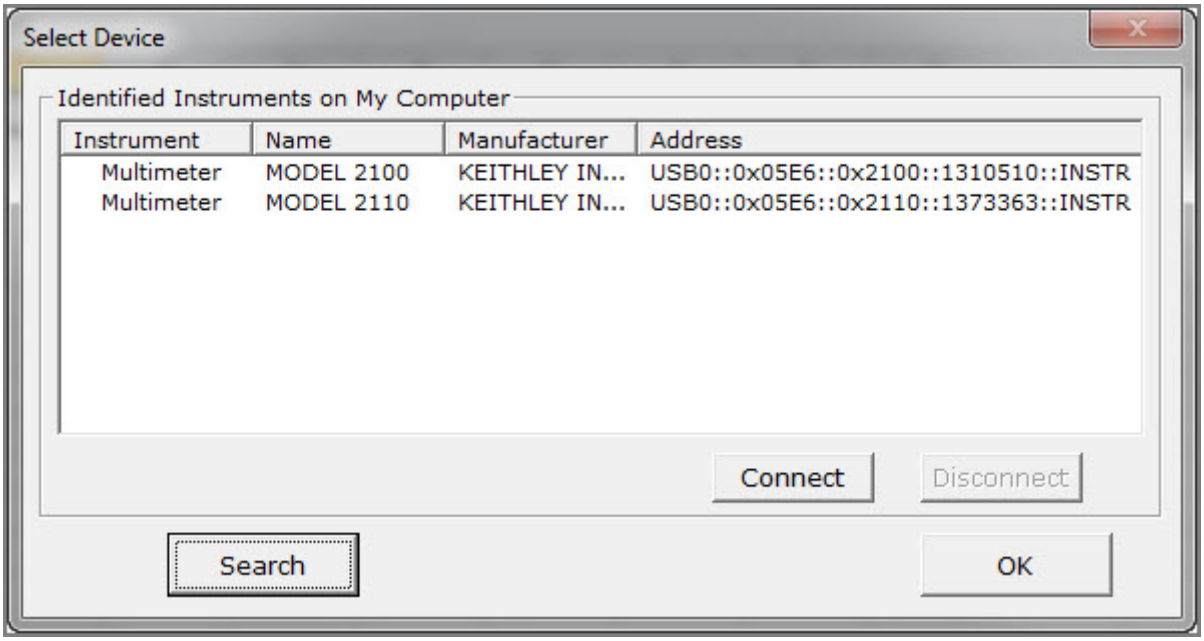
1. Click the Connect to Device  icon. The KI-Link software displays the Select Device dialog box, shown in the following figure.

Figure 28: Select Device dialog box



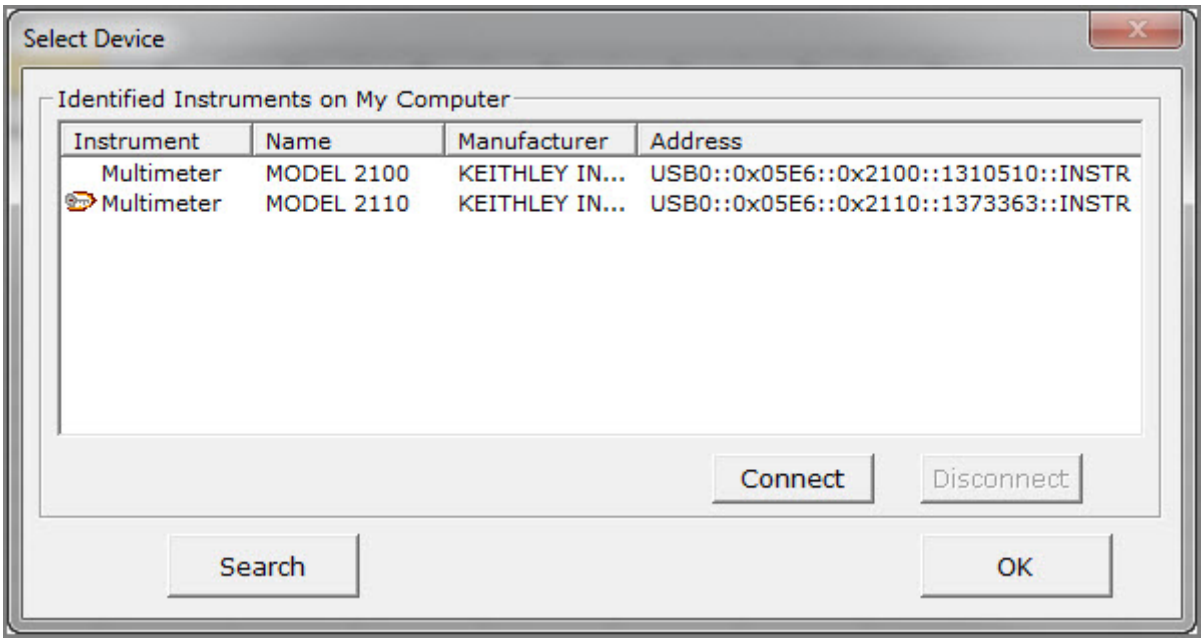
2. Click the **Search** button. The KI-Link software displays the Select Device dialog box showing the **Identified Instruments on My Computer** list, shown in the following figure.

Figure 29: Identified Instruments on My Computer list



3. Select the device you want to connect.
4. Click the **Connect** button. After your computer connects to the instrument, the KI-Link software displays the Key Lock icon in the Instrument field to indicate that the instrument is connected.

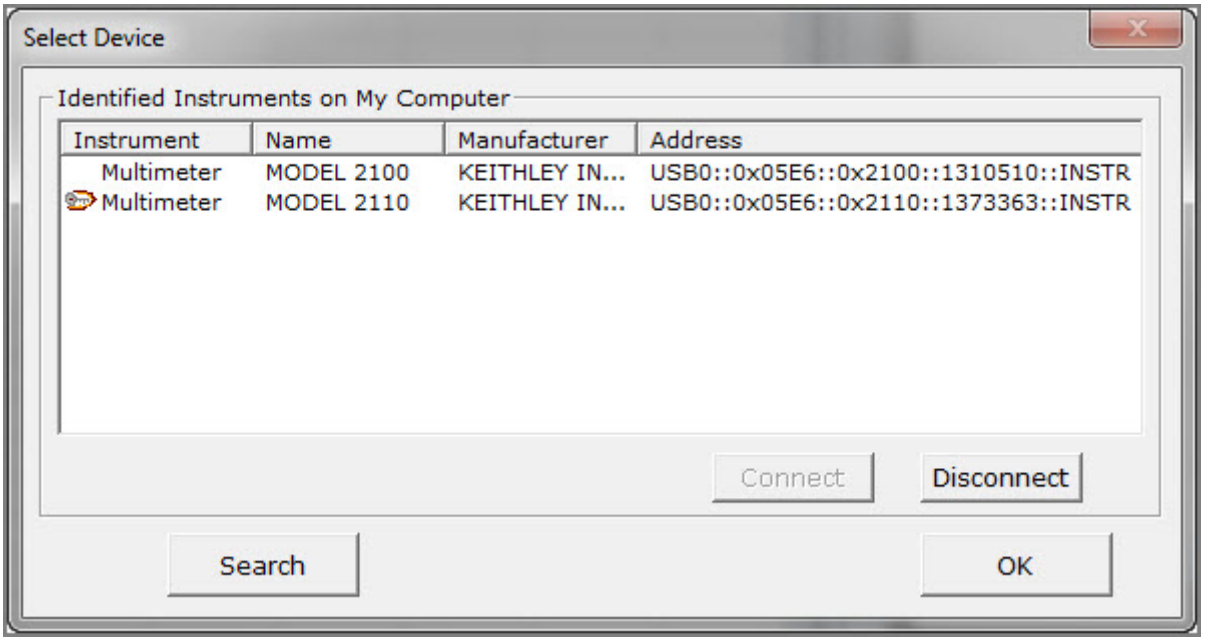
Figure 30: Key Lock icon indicates connected instrument



To disconnect an instrument:

1. If the **Select Device** dialog box is not open, click the Connect to Device  icon to open it.

Figure 31: Device Connect



2. Click the **Disconnect** button. After your computer disconnects from the instrument, the KI-Link software removes the Key Lock  icon from the selected instrument.
3. You can connect another instrument on the list, or click the **OK** button to exit the Select Device dialog box.

To search the device list for instruments that are connected:

Click the **Search** button. The Select Device dialog box displays all instruments connected to your computer.

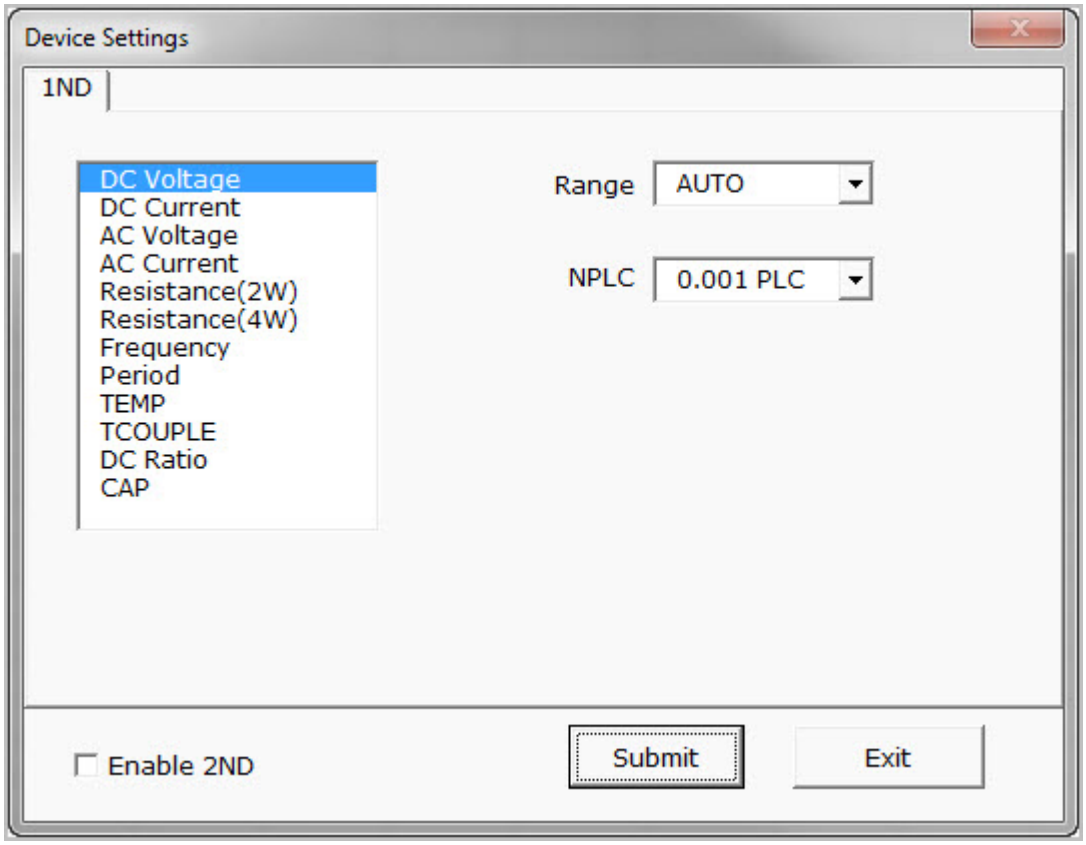
Setup Multimeter

Use the Setup Multimeter dialog box to configure the instrument.

To configure the instrument:

1. Click the Setup Multimeter  icon.
   The KI-Link software displays the Device Settings dialog box, shown in the following figure.

Figure 32: Device Settings dialog box



2. Select a function from the function list.
3. Use the default values for range and resolution or open the drop-down menus to display a list that shows appropriate values for the function.
4. Click the values you want to use.
5. If you are taking a second measurement with the instrument, check the **Enable 2ND** box.
6. Click the **Submit** button when you are finished selecting values.
7. Click **Exit** to close this dialog box.

File Access

Use the File Access dialog box to save instrument settings to a file and restore them for use.

To save settings to a file:

1. Click the File Access  icon.
   The KI-Tool displays the dialog box shown in the following figure.

Figure 33: Load Multimeter Setting from File / Save Multimeter Setting to File

2. Select **Save Multimeter Settings to File**.
3. Click **OK**. The Windows Save As dialog box opens.
4. Enter the name that you want to use as the file name.
5. Click **OK**.

To restore the settings:

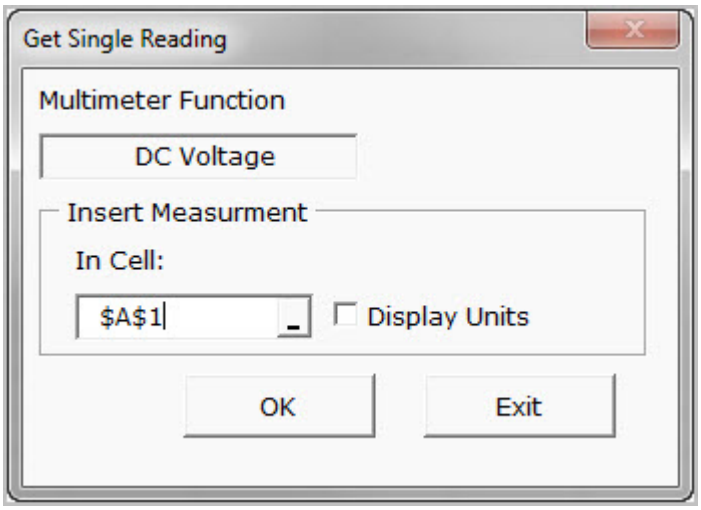
1. Select **Load Multimeter Settings from File**.
2. Click **OK**. The Windows Save As dialog box opens.
3. Click the saved file you want to restore.
4. Click **Save**.

Get Single Reading

Use Get Single Reading to obtain a single reading from the instrument and select the cell in which to save the reading.

Click the Get Single Reading  icon to display the Get Single Reading dialog box.

Figure 34: Get Single Reading



Logging Charts

Use Logging Charts to set up data logging and display it on a chart.

Click the Logging Charts  icon.

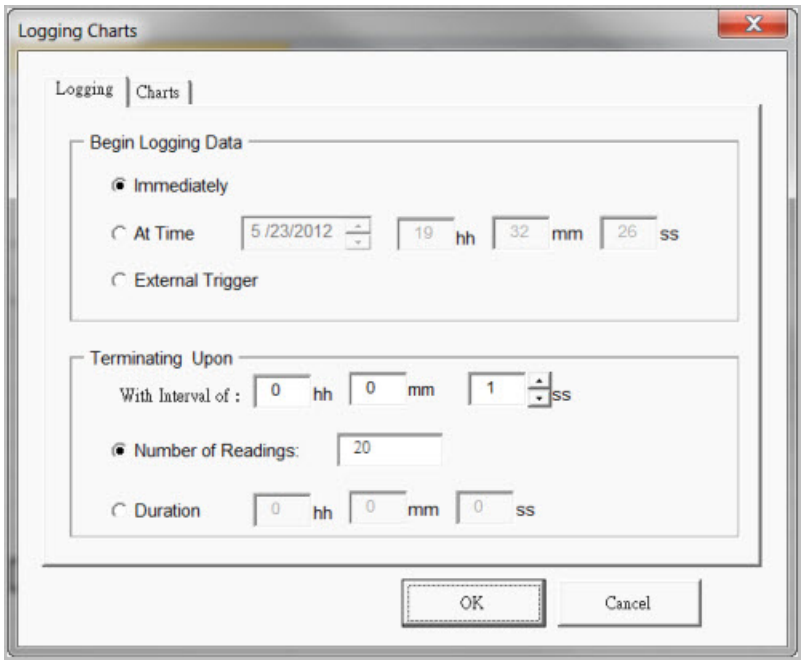
The KI-Link software displays the Logging Charts dialog box. This dialog box has two tabs:

- Logging
- Charts

Logging

The following figure shows the **Logging** tab. Refer to the following topics for information about the fields on the **Logging** tab.

Figure 35: Data logging



Begin Logging Data

Select one of the following options to instruct the instrument to take readings and log the data.

- **Immediately** - right now
- **At Time** - at a specific time in the future
- **External Trigger** - when someone presses the **LOCAL** key on the front panel

If you select **At Time**, enter the time as follows:

1. Select the date by positioning the cursor in the month, day, or year field and using the up and down arrows to increase or decrease digits. The date format is mm/dd/yyyy.

   Where: mm = 2-digit month, dd = day, and yyyy = 4-digit year
2. Enter the time in 24-hour format by positioning the cursor in the hours, minutes, or seconds field and entering the digits. The maximum time you can set is 23 hours, 59 minutes, and 59 seconds.

   Where: hh = hours, mm = minutes, ss = seconds.

With Interval Of

Enter the interval time in the following format: hh/mm/ss

Where: hh = hours, mm = minutes, ss = seconds

- The maximum interval time is 23 hours, 59 minutes, and 59 seconds.
- The minimum interval time can be set 0.5 seconds.

Terminating Upon

Select one of the following options to instruct the instrument to stop taking readings and logging the data.

- **Number of Readings** - 1 to approximately 65535 (Excel 2003 or later) or 1 to approximately 1048575 (Excel 2007 or later)
- **Duration** - when someone presses the **LOCAL** key on the front panel. The available duration time is within 1 second to 65535 seconds.

Chart

The following figure shows the **Chart** tab. Refer to the following topics for information about the fields on the **Chart** tab.

Figure 36: Charts

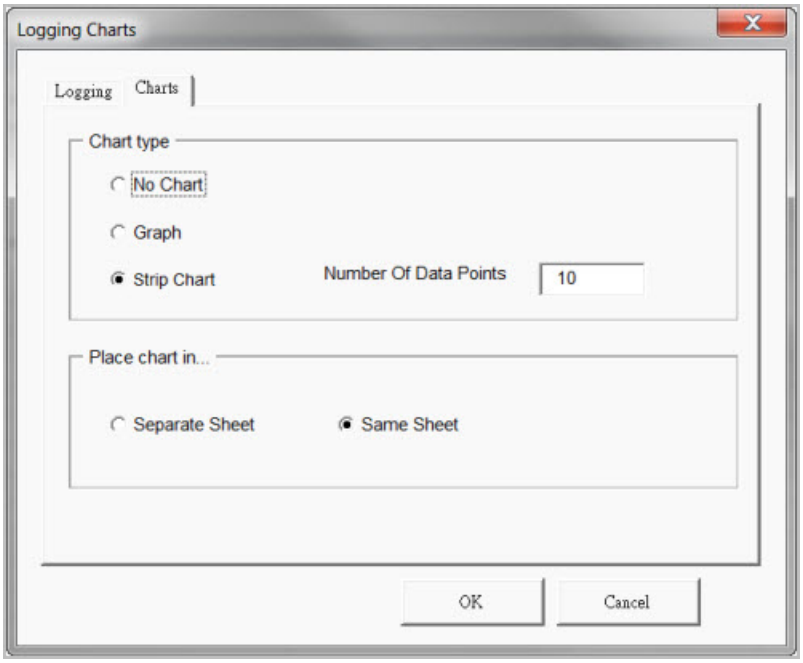


Chart Type

Select one of the following chart types:

- No Chart - Select **No Chart** to keep the data from appearing on the chart until you click the **OK** button.
- Graph
- Strip Chart

If you select **Strip Chart**, enter the number of data points.

Refer to the Examples (on page 4-12) topic for information about what the different types of charts look like.

Place Chart In

Select one of the following print/display options for the chart:

- Separate Sheet
- Same Sheet

Examples

This topic shows some examples of charts.

Figure 37: Strip chart example

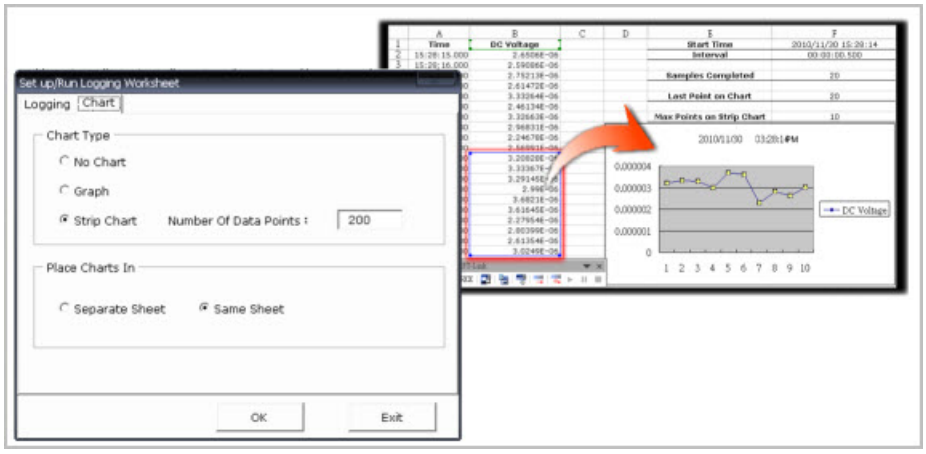
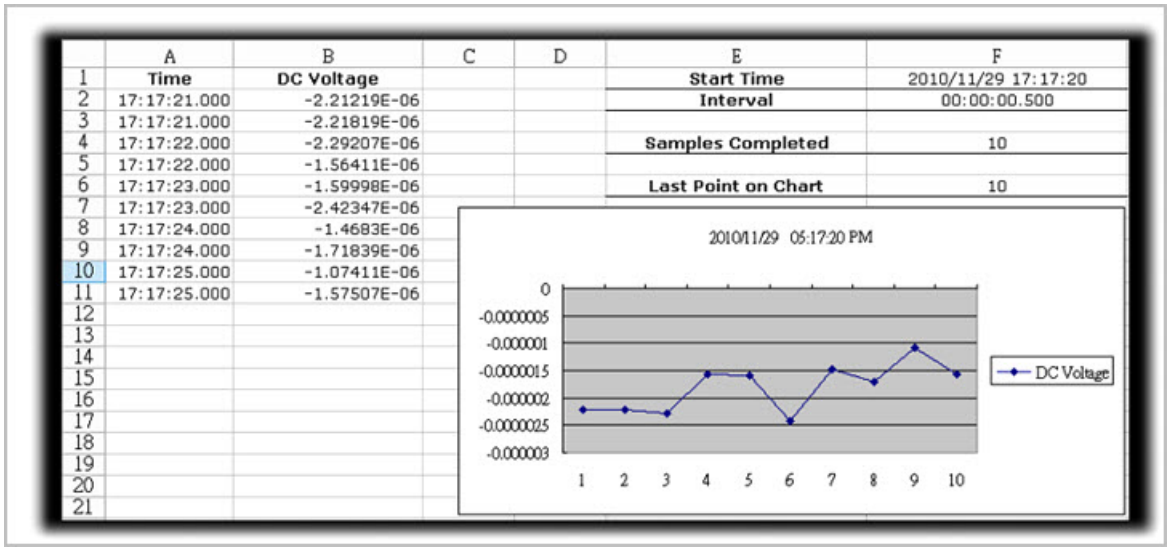
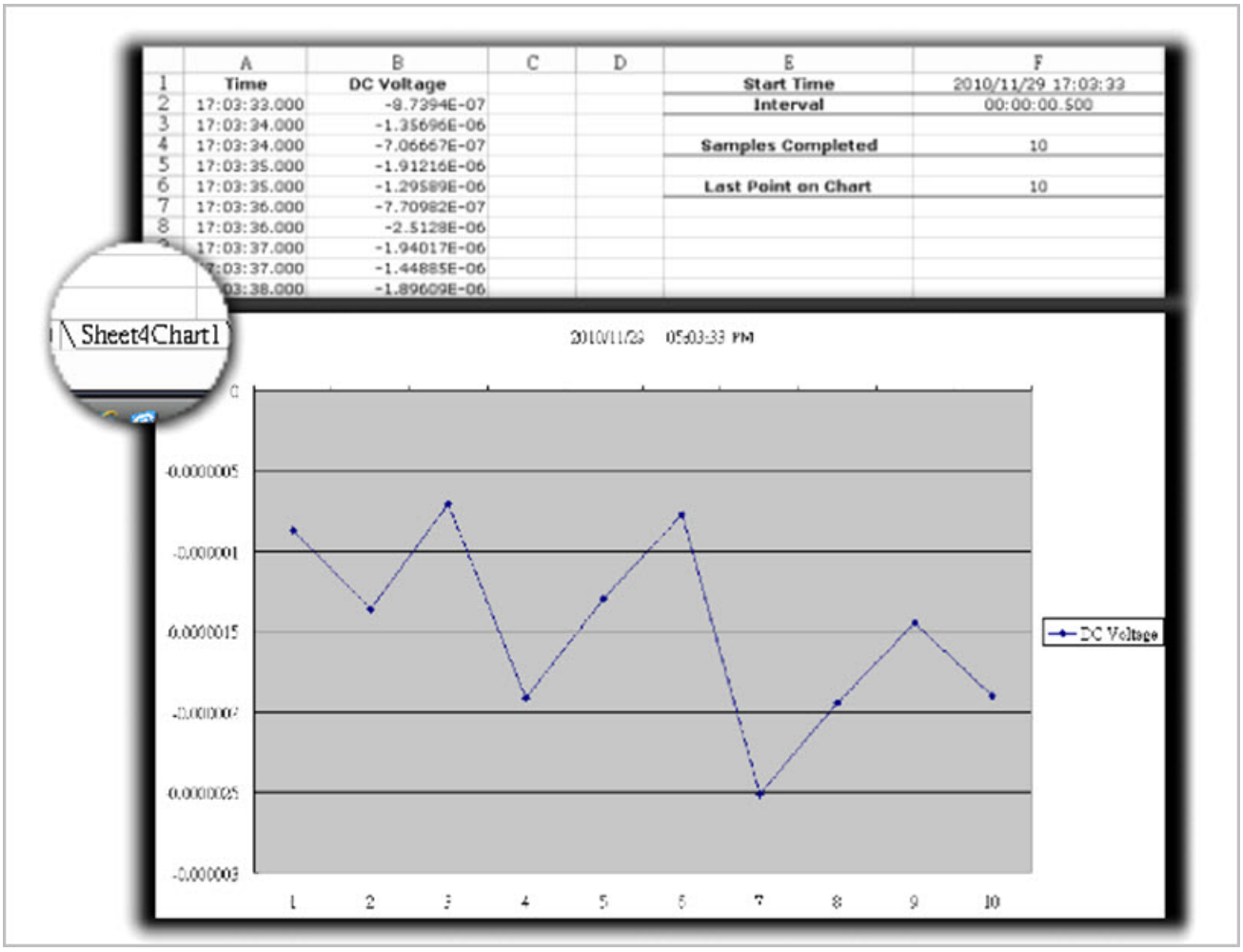


Figure 38: Measured data on the same sheet



	A	B	C	D	E	F
1	Time	DC Voltage			Start Time	2010/11/29 17:17:20
2	17:17:21.000	-2.21219E-06			Interval	00:00:00.500
3	17:17:21.000	-2.21819E-06				
4	17:17:22.000	-2.29207E-06			Samples Completed	10
5	17:17:22.000	-1.56411E-06				
6	17:17:23.000	-1.59998E-06			Last Point on Chart	10
7	17:17:23.000	-2.42347E-06				
8	17:17:24.000	-1.4683E-06				
9	17:17:24.000	-1.71839E-06				
10	17:17:25.000	-1.07411E-06				
11	17:17:25.000	-1.57507E-06				
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

Figure 39: Measured data on different sheets



START, PAUSE, and STOP

Use the START, PAUSE, and STOP icons to control data capture to the KI-Link software.

- Use to start.
- Use to pause.
- Use to stop.

Microsoft Word

Starting the KI-Link software add-in for Microsoft Word

To start the software:

1. Double-click the KI-LINK Word Add-In icon on the desktop. Word opens.

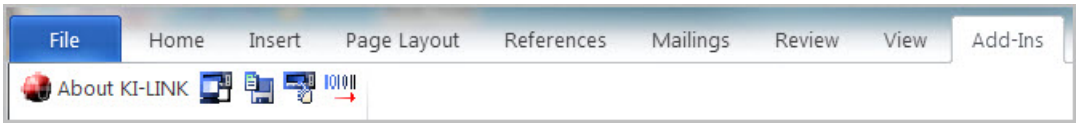
Figure 40: KI-LINK Word Add-In icon

2. The toolbar displays.

NOTE

If there is an Add-Ins tab, click it to display the toolbar.

Figure 41: Toolbar



Using the KI-Link software for Word

Refer to Using the toolbar (on page 4-2). The KI-Link software for Word toolbar operation is very similar to the KI-Link software for Excel operation.

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12/06