





IVI™ Soft Front Panels Help

January 2007 Edition, Part Number 370698C-01

This help file explains features in the IVI Soft Front Panels and provides troubleshooting tips and key device shortcuts.

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window.

[Conventions](#)—formatting and typographical conventions in this help file

[Important Information](#)

[Technical Support and Professional Services](#)

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Conventions

This help file uses the following conventions:

< > Angle brackets that contain numbers separated by an ellipsis represent a range of values associated with a bit or signal name—for example, DBIO<3..0>.

» The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

bold Bold text denotes items that you must select or click on in the software, such as menu items and dialog box options. Bold text also denotes parameter names, emphasis, or an introduction to a key concept.

dark red Text in this color denotes a caution.

green Underlined text in this color denotes a link to a help topic, help file, or Web address.

italic Italic text denotes variables or cross references. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

IVI Soft Front Panels Help Overview

The following three types of help are available in IVI Soft Front Panels:

- Tip strips help appears when your cursor pauses over a user interface control or item. You can turn this feature on or off by selecting **Help»Show Tip Strips Help**.
- Pop-up context help appears in the Pop-up Help window when your cursor pauses over a user interface control or item. Information in the window describes the function or action associated with the underlying control. You can turn this feature on or off by selecting **Help»Show Context Help**.
- Online help for IVI Soft Front Panels appears when you select **Help»Online Reference**.

Printing

By default, you can print the front panels for IVI Soft Front Panels-Scope. If your printer supports postscript or color printing, you can modify lines in IVI Soft Front Panels—Scope.ini file to enable postscript or color printing when you print the IVI Soft Front Panels front panel. The IVI Soft Front Panels—Scope.ini file exists in your IVI Soft Front Panels directory. After you change information in the IVI Soft Front Panels—Scope.ini file, you must restart IVI Soft Front Panels for the changes to take effect.

You can edit the IVI Soft Front Panels-Scope.ini file with any word processing or text editing software, such as Notepad. For example, to enable postscript printing in the IVI Soft Front Panels-Scope, you can open IVI Soft Front Panels-Scope.ini in Notepad and change the postscript printing setting to True, as follows:

```
postScriptPrinting=True
```

If you enable postscript printing and your printer does not support postscript printing, your printer prints a single line of postscript code.

By default, color and grayscale printing are disabled. To enable color or grayscale printing, change the color/grayscale printing setting in the IVI Soft Front Panels-Scope.ini file, as follows:

```
colorPrinting=True
```

If you disable grayscale printing, you conserve toner.



Note To affect the printing options described above, you must modify the lines exactly as shown.



Caution Do not modify any other lines in the IVI Soft Front Panels-Scope.ini files. Doing so will cause IVI Soft Front Panels-Scope to operate incorrectly.

Saving and Restoring Settings

IVI Soft Front Panels saves the front panel and instrument settings of all instruments in files that you can restore at any time. You can also create settings files so that you can restore settings that you need repeatedly.

Saving Settings Automatically

IVI Soft Front Panels saves the settings for your front panel and instrumentation every time you exit from an instrument. IVI Soft Front Panels automatically names this settings file `last.xxx`, where `xxx` is the abbreviation of the instrument. For example, when you exit IVI Soft Front Panels—Scope, the last settings are saved in the `last.sco` file. It maintains the `last.sco` in the IVI Soft Front Panels folder.

Saving Settings Manually

You can save settings at any time by completing the following steps:

1. Select **Edit»Save Settings...**
2. Name your settings file.
3. Click **OK**.

Restoring Settings

You can restore the settings from a previously saved settings file by completing the following:

1. Select **Edit»Load Settings....**
2. Find the settings file you want and click **OK**. The saved instrument settings are applied.



Note When you restore settings for IVI Soft Front Panels—DC Power Supply, click **OK**, then click **Apply**. The settings are not applied to the instrument until you click **Apply**. See [Apply](#) for more information about applying settings to an instrument.

Similarly, when you restore settings for IVI Soft Front Panels—FG, click **OK**, then click **On**. The settings are not all applied to the instrument until you click **On**. See [On](#) for more information about enabling waveform generation.

Restoring Default Settings

You can restore default settings for any IVI Soft Front Panels instrument by selecting **Edit»Reset Settings**. IVI Soft Front Panels applies the settings from the default .xxx file for that instrument, where the xxx is the abbreviation of the instrument.

IVI Soft Front Panels—DMM Overview

Combined with an IviDMM classcompliant instrument, IVI Soft Front Panels—DMM transforms your PC into a fully featured digital multimeter with features rivaling desktop models. IVI Soft Front Panels—DMM display controls and operation faithfully emulate benchtop digital multimeters so that you can take maximum advantage of your previous instrument experience, with minimal training time, to use PCbased instruments.

Related Topic

[Working with IVI Soft Front Panels—DMM](#)

IVI Soft Front Panels—DMM Features

Combined with an IviDMM class-compliant instrument, IVI Soft Front Panels—DMM transforms your PC into a fully featured digital multimeter with features rivaling desktop models. IVI Soft Front Panels—DMM display controls and operation faithfully emulate benchtop digital multimeters so that you can take maximum advantage of your previous instrument experience, with minimal training time, to use PC-based instruments.

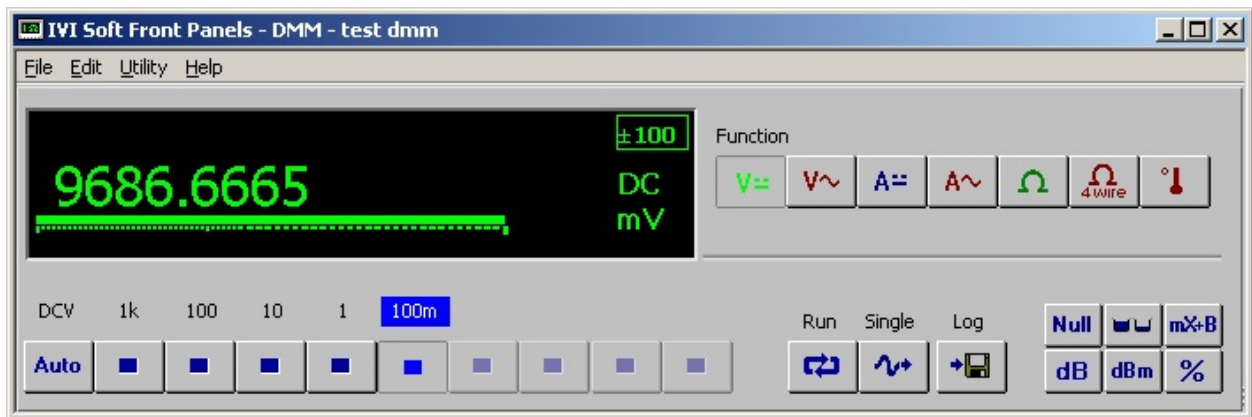
IVI Soft Front Panels—DMM includes the following features:

- Seven measurement modes: Volts DC, Volts AC, DC Current, AC Current, 2–Wire Resistance, 4–Wire Resistance, and Temperature.
- Relative measurement capability.
- Ability to log data to an ASCII file.
- Up to ten measurement ranges, including Auto Range.
- Fast real-time display.
- Ability to save and recall instrument settings.

Tour of Front Panel and Menus

The following figure is the front panel of IVI Soft Front Panels—DMM. You can scroll over regions of the figure and click areas of interest for more in-depth information.

Menus	Display	Buttons and Controls	
File	Measurement Display	Range Selector	Math Buttons
Edit		Mode Selector	Log
Utility		Run	Resolution
Help		Single	



File

Exit Closes IVI Soft Front Panels—DMM.

Edit

General Settings	Opens the DMM Settings dialog box. Refer to IVI Soft Front Panels—DMM Settings for details.
Temperature Settings	Opens the DMM Temperature Settings dialog box. Refer to DMM Temperature Settings for details.
Load Settings	Restores the configuration saved in a settings file.
Save Settings	Saves the current configuration to a settings file.
Reset Settings	Resets IVI Soft Front Panels—DMM to its factory default settings.

Refer to [Saving and Restoring Settings](#) for more information about options in the **Edit** menu.

Utility

- Self-Test** Performs self-test on the instrument. This operation may take several minutes.
- Reset** Resets the instrument.
- Error Query** Queries the errors occurred.

Help

You can choose the following items in the **Help** menu.

- | | |
|---------------------------------------|--|
| Show Context Help | Context Help appears in the Popup Help window when your mouse pointer pauses over a user interface control or item. Information in the Popup window describes the function or action associated with the underlying control. |
| Show Tip Strips Help | Tip Strips Help appears when your mouse pointer pauses over a user interface control or item. Information in the tip strips window briefly describes the function or action associated with the underlying control. |
| Online Reference | Shows the online help. |
| About IVI Soft Front PanelsDMM | Displays the About dialog box. |

Measurement Display

Displays measurements. The bar graph appears below the digital display. The Range Selector controls what percentage of the full scale graph appears in the display. When you select AutoRange, the bar graph shows a percentage of the next-highest power of 10.

Range Selector

The range selector determines the range of measurements IVI Soft Front Panels—DMM makes. This range differs for each measurement mode.

+OVER or **OVER** appears in the measurement display, if the measurement exceeds the range.

AutoRange mode selects the range that best matches the input signal.

Mode Selector

IVI Soft Front Panels—DMM has 7 measurement modes:

Volts DC	Measures DC component of a voltage signal.
Volts AC	Measures AC component of a voltage signal.
Current DC	Measures DC component of a current source.
Current AC	Measures AC component of a current source.
Ohms	Measures resistance.
4-Wire Ohms	Measures resistance using the 4-wire method.
Temperature	Measures temperature.

Select **Edit»Temperature Settings** to configure the temperature settings.

Run

Starts and stops continuous DMM measurements.

Single

Performs a single measurement.

Math Buttons

Null Starts relative mode. IVI Soft Front Panels—DMM makes all subsequent measurements relative to the measurement it makes when you click Null.

Max/Min Displays the maximum and minimum values that occur after you click Max/Min button.

dB Compresses a large range of measurements into a much smaller scope by expressing DC or AC voltage in decibels. The relationship between dB and voltage is defined by the following equation:

$$\text{dB} = 20 \log \frac{V_{in}}{V_{ref}}$$

where: V_{in} is the DC or AC signal. V_{ref} is the specified voltage reference level. This value is specified in the "dB, %Ref" field in the [DMM Settings—Math](#) dialog box.

dBm Shows decibels above or below a 1mW reference. With a user-defined reference impedance, IVI Soft Front Panels - DMM reads 0 dBm when the voltage needed to dissipate 1mW through the reference impedance is applied. The reference impedance (dBm Z_{ref}) is entered under the Math tab of the settings window. The relationship between dBm, a reference impedance, and the voltage is defined by the following equation:

$$\text{dBm} = 10 \log \frac{(V_{in}^2 / Z_{ref})}{1\text{mW}}$$

where: V_{in} is the DC or AC input signal. Z_{ref} is the specified reference impedance. This value is specified in the "dBm Z_{ref} " field in the [DMM Settings—Math](#) dialog box.

mX+B Enables the mX+B calculation on all readings. The Mx+B operation allows you to manipulate normal display readings

(X) mathematically according to the following equation:

$$Y = MX + B$$

where: X is the normal display reading. M and B are user-defined constants for multiplier and offset. Y is the displayed result. These values are specified in the "Mx+B Scaling" field in the [DMM Settings—Math](#) dialog box.

% Selects the percentage calculation. IVI Soft Front Panels-DMM expresses the displayed reading as a percent deviation from the reference value entered in the DMM-Math Settings dialog box. The percentage calculation is performed as follows:

$$\text{Percent} = \frac{\text{Input} - \text{Ref}}{\text{Ref}} \times 100\%$$

where: Input is the normal display reading. Ref is the user entered constant. Percent is the displayed result. Ref value is specified in the "dB, %Ref" field in the [DMM Settings—Math](#) dialog box.

Log

Enables data logging. To configure the datalog file and log interval, select **Edit»General Settings**. Refer to [Logging Measurements to Disk](#) for more details.

Resolution

A ring control in the DMM front panel display where you set measurement resolution in absolute units.

Working with IVI Soft Front Panels—DMM

Click on the following topics for information about configuring IVI Soft Front Panels—DMM software and using IVI Soft Front Panels—DMM to make a measurement and log measurements data to disk.

[Configuring General Settings](#)

[DMM Settings—Math](#)

[DMM Settings—Datalogging](#)

[DMM—Temperature Settings](#)

[Measuring Voltage](#)

[Measuring Current](#)

[Measuring Resistance](#)

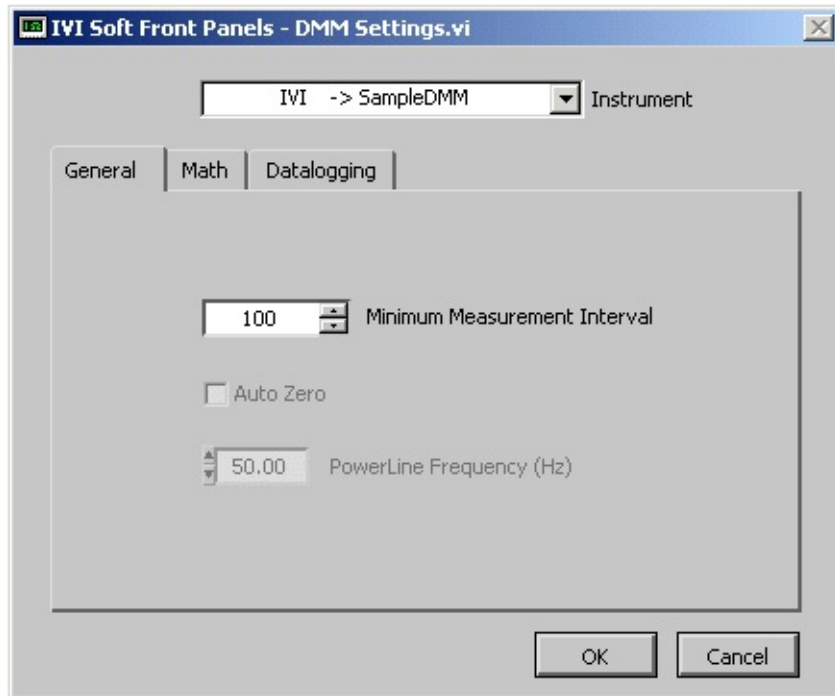
[Measuring Temperature](#)

[Logging Measurements to Disk](#)

[Making Relative Measurements](#)

DMM Settings—General

Click the other tabs in this figure for more information.



To configure IVI Soft Front Panels—DMM, select **Edit»General Settings**.

Instrument Selects the IVI instrument that you use with IVI Soft Front Panels—DMM. Only logical names that you have configured successfully in MAX appear in this list.

Minimum Measurement Interval Select a minimum interval between measurements. Use this control to introduce a time delay between measurements.

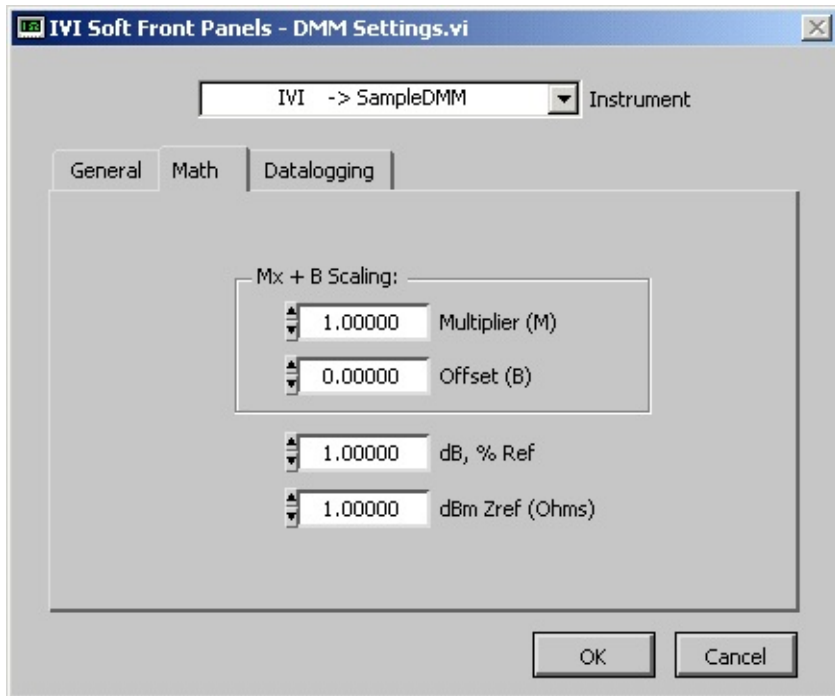
Auto Zero Enables/disables Auto Zero for the instrument. When the auto-zero mode is enabled, the DMM internally disconnects the input signal and takes a Zero Reading. The DMM then subtracts the Zero Reading from the measurement. Auto Zero prevents offset voltages present in the instrument's input circuitry from affecting measurement accuracy. This control is dimmed if the instrument does not support this feature.

Power Line Frequency Sets the power line frequency for the area where you are making your measurements. IVI Soft Front Panels—DMM uses this selection to best reduce measurement

inaccuracies due to line noise and interference from sources such as nearby AC-powered equipment and overhead lighting. The Auto Zero control is dimmed if the instrument does not support this feature.

DMM Settings—Math

Click the other tabs in this figure for more information.



To configure IVI Soft Front Panels—DMM, select **Edit»General Settings**.

To activate these calculations, click the Math buttons on the [front panel](#).

MX + B Manipulates normal display readings (X) mathematically according to the calculation $Y = MX + B$.

X is the normal display reading. Multiplier (M) is the constant you define for multiplier, B is the constant you define for offset, and Y is the result that displays.

dB, %Ref The reference value used for decibels (dB) and percent calculations.

dBm Zref The reference value used for dBm calculations.

When you click the dBm calculation button in the front panel, IVI Soft Front Panels—DMM calculates power in dBm using the input voltage reading and the Zref value you specify. The relationship between dBm, a reference impedance, and the voltage is defined by the following equation:

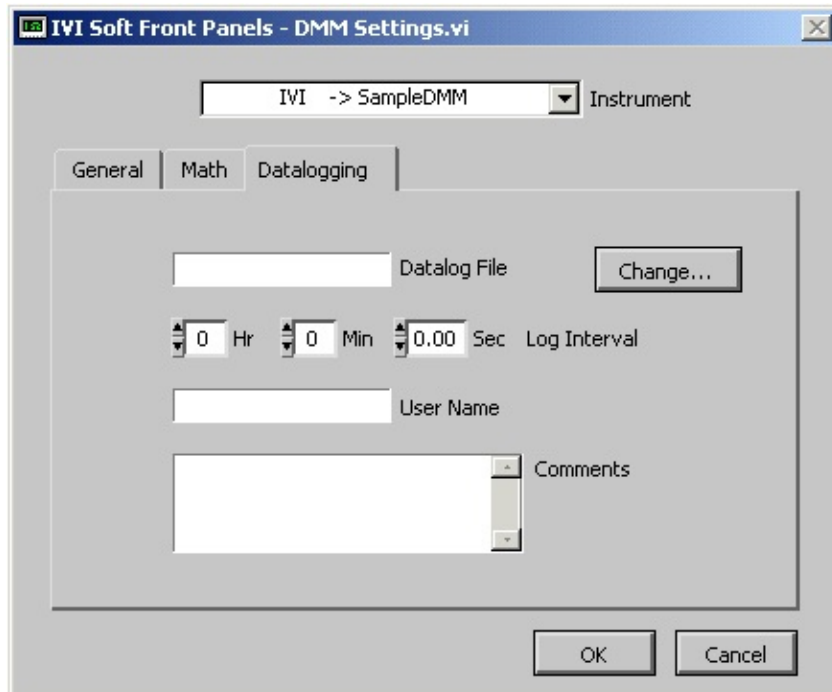
$$\text{dBm} = 10 \log \frac{(\text{Vin}^2 / \text{Zref})}{\text{-----}}$$

1mW

V_{in} is the DC or AC dBm input signal, and Z_{ref} is the specified reference impedance.

DMM Settings—Datalogging

Click the other tabs in this figure for more information.




To configure IVI Soft Front Panels—DMM, select **Edit»General Settings**.

To enable data logging, you must click **Log** in the [front panel](#).

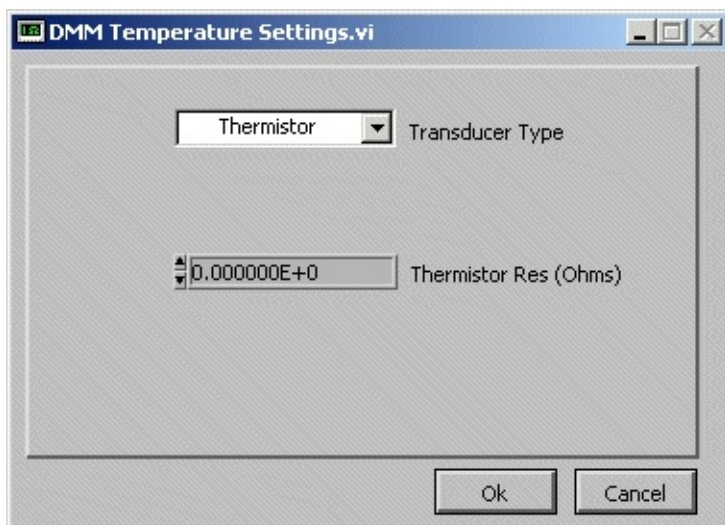
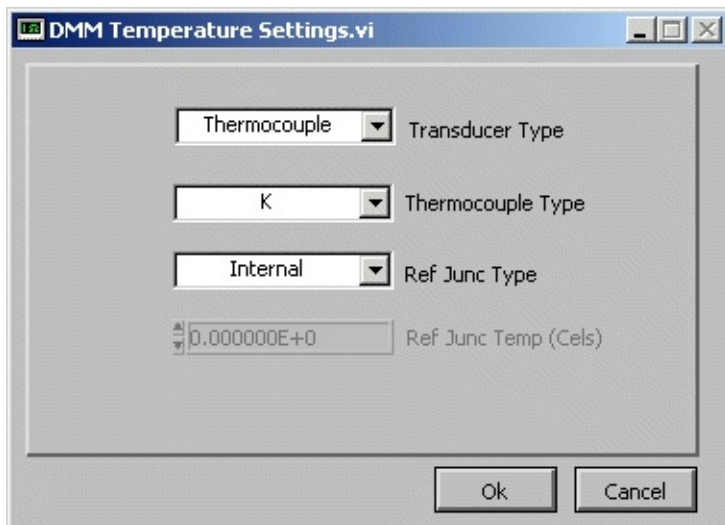
- Datalog File** Displays the current filename. To change the current datalog file, click **Change**.
- Log Interval** Specifies the time interval between log entries.
- User Name** Sets the user name to write to the log file for identification.
- Comments** Sets the comments to write to the log file.

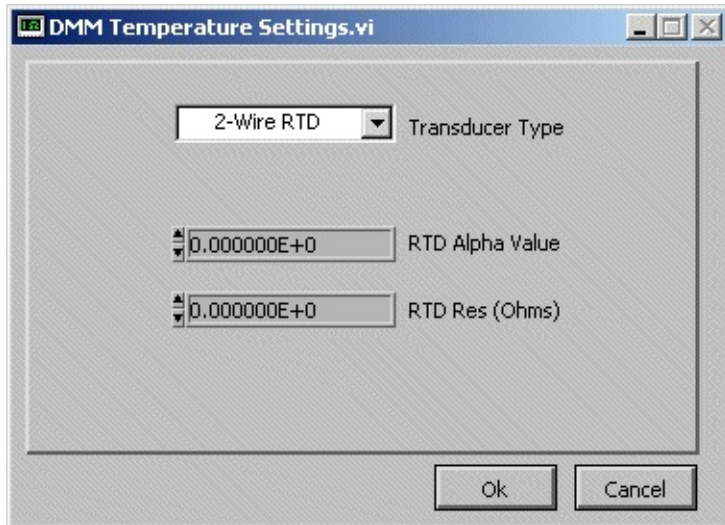
DMM Temperature Settings

To configure IVI Soft Front Panels—DMM temperature settings, select **Edit»Temperature Settings**.

 **Note** The Temperature Settings menu is enabled only when the temperature measurement is supported by the instrument.

The Temperature Setting dialog box displays differently depending on which Transducer Type control is selected. The following figures show all the Temperature Setting dialog boxes for the Transducer Type Thermocouple, Thermistor, 2Wire/4Wire RTD, respectively.





- Transducer Type** Specifies the type of temperature sensor.
- Thermocouple Type** Specifies the type of cold-junction sensor, if you are measuring from a thermocouple.
- Ref Junc Type** Specifies the type of reference junction used in the reference junction compensation of a thermocouple measurement.
- Ref Junc Temp** Specifies the external junction temperature in Celsius, if you are using the fixed reference junction.
- Thermistor Res** Specifies the resistance of the thermistor in Ohms, if you are measuring temperature from a resistance.
- RTD Alpha Value** Specifies the alpha parameter for a resistance temperature device (RTD), if you are measuring temperature from an RTD.
- RTD Res** Specifies the R parameter (resistance) for an RTD, if you are measuring temperature from a resistance.

Making a Measurement with IVI Soft Front Panels—DMM

Complete the following steps to make a measurement with IVI Soft Front Panels—DMM:

1. Connect a signal to the specified channel input of your IviDMM instrument.
2. On the [front panel](#), click **Single**. IVI Soft Front Panels—DMM displays a single measurement in the measurement display. If the signal seems incorrect, make sure the instrument is connected properly.
3. Click **Run**. IVI Soft Front Panels—DMM continuously acquires and displays measurements in the measurement display.
4. If the display shows **+OVER** or **OVER**, make sure the input signal has not exceeded the range selected on the [front panel](#).
5. Click **Run** again to stop acquisition.

Signal Options:

[Voltage](#)

[Current](#)

[Resistance](#)

[Temperature](#)

Measuring Voltage

IVI Soft Front Panels—DMM measures AC and DC voltage with your IviDMM instrument. Complete the following steps to measure voltage:

1. Connect a signal to the specified channel of your IviDMM instrument.
2. Click **Volts AC** or **Volts DC** in the [front panel](#).
3. Click **Run**. IVI Soft Front Panels—DMM continuously acquires and displays voltage measurements in the Measurement display. Or click **Single**, IVI Soft Front Panels—DMM acquires and displays a voltage measurement in the Measurement display.
4. If the display shows **+OVER** or **OVER**, make sure the input signal has not exceeded the range selected on the [front panel](#).

Other Signal Options:

[Current](#)

[Resistance](#)

[Temperature](#)

Measuring Current

IVI Soft Front Panels—DMM measures AC and DC current with your IviDMM instrument. Complete the following steps to measure current:

1. Connect a signal to the specified channel of your IviDMM instrument.
2. Click **Current AC** or **Current DC** on the [front panel](#).
3. Click **Run**. IVI Soft Front Panels—DMM continuously acquires and displays current measurements in the Measurement display. Or click **Single**, IVI Soft Front Panels—DMM acquires and displays a current measurement in the Measurement display.
4. If the display shows **+OVER** or **OVER**, make sure the input signal has not exceeded the range selected on the [front panel](#).

Other Signal Options:

[Voltage](#)

[Resistance](#)

[Temperature](#)

Measuring Resistance

IVI Soft Front Panels—DMM measures resistance with your IviDMM instrument. Complete the following steps to measure resistance:

1. Connect a signal to the specified channel of your IviDMM instrument.
2. Click **2Wire Ohms** or **4Wire Ohms** on the [front panel](#).
3. Click **Run**. IVI Soft Front Panels—DMM continuously acquires and displays resistance measurements in the Measurement display. Or click **Single**, IVI Soft Front Panels—DMM acquires and displays a resistance measurement in the Measurement display.
4. If the display shows **+OVER** or **OVER**, make sure the input signal has not exceeded the range selected on the [front panel](#).

Other Signal Options:

[Voltage](#)

[Current](#)

[Temperature](#)

Measuring Temperature

IVI Soft Front Panels—DMM requires a thermocouple, or a thermistor, or a 2Wire RTD, or a 4Wire RTD sensor to make precision temperature measurements.

Complete the following steps to measure temperature:

1. Connect a precision temperature sensor to the specified channel input of your IviDMM instrument.
2. Select **Edit»Temperature Settings...** Refer to the topic [DMM—Temperature Settings](#) for more information about configuring temperature.
3. Select the temperature sensor type from the list in the Transducer Type field.
4. If you are using a thermocouple, select the thermocouple type in the Thermocouple Type field. Next, select the type of reference junction from the drop-down menu in the Ref Junc Type field. If the reference junction type selected is Fixed, specify the external reference junction temperature in the Ref Junc Temp field.
5. If you are using a thermistor, specify the resistance of the thermistor in the Thermistor Res field.
6. If you are using an RTD sensor, specify the alpha parameter for a resistance temperature device in the RTD Alpha Value field and the R parameter (resistance) for a resistance temperature device in the RTD Res field.
7. Click **OK**.
8. Click **Temperature** in the [front panel](#).
9. Click **Run**. IVI Soft Front Panels—DMM continuously acquires and displays temperature measurements in the Measurement display. Or click **Single**. IVI Soft Front Panels—DMM acquires and displays a temperature measurement in the Measurement display.
10. If the display shows **+OVER** or **-OVER**, make sure the input signal has not exceeded the range selected on the [front panel](#).

Other Signal Options:

[Voltage](#)

Current

Resistance

Logging Measurements to Disk

Complete the following steps to log IVI Soft Front Panels—DMM measurements to an ASCII text file:

1. Select **Edit»General Settings**. Click the **Logging tab**. For more information, refer to [DMM Settings—Datalogging](#).
2. Click **Change** to browse the files.
3. Select a file that you want to log data to. Click **OK**.
4. Specify the hours, minutes, and seconds to use for the Log Interval. This rate does not have to match the DMM update rate.
5. Click **OK**.
6. Click **Run** on the front panel of IVI Soft Front Panels—DMM to start data acquisition.
7. Click **Log** on the front panel of IVI Soft Front Panels—DMM to start data logging.



Note When the Run button is enabled, data is logged to an ASCII text file only.

Making Relative Measurements

With IVI Soft Front Panels—DMM, you can make measurements relative to a reference measurement. Complete the following steps to make such measurements:

1. Set up IVI Soft Front Panels—DMM to acquire a signal. Refer to [Making a Measurement with IVI Soft Front Panels—DMM](#) for details.
2. Click **Null** on the [front panel](#).

IVI Soft Front Panels—DMM then makes all measurements relative to the measurement made at the moment you clicked **Null**. Click **Null** again to disable relative measurements.

IVI Soft Front Panels—FG Overview

Combined with an IviFGen classcompliant instrument, IVI Soft Front Panels—FG transforms your PC into a fully featured function generator with features that rival desktop models. IVI Soft Front Panels—FG display controls and operation faithfully emulate benchtop function generators so you can take maximum advantage of your previous instrument experience, with minimal training time, to use PCbased instruments.

Related Topic

[Working with IVI Soft Front Panels—FG](#)

IVI Soft Front Panels—FG Features

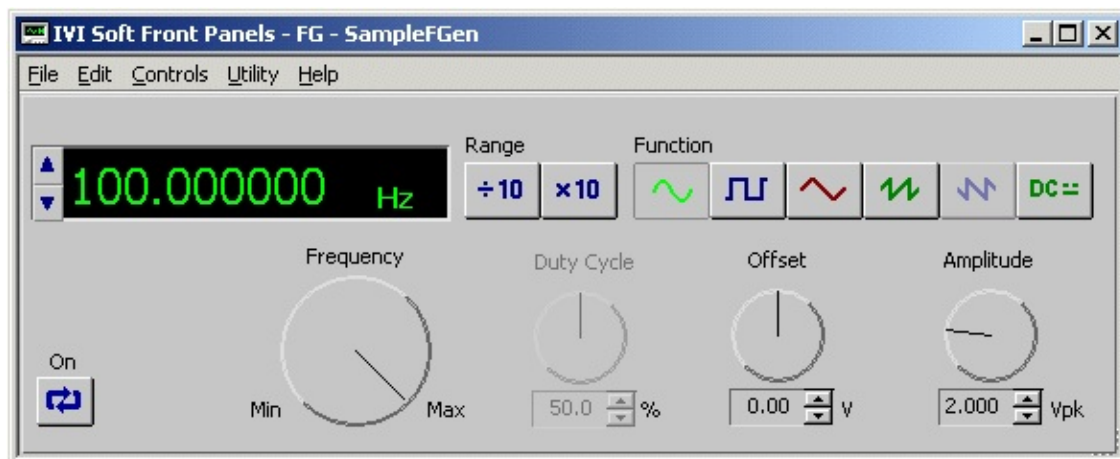
Combined with an IviFGen class-compliant instrument, IVI Soft Front Panels—FG transforms your PC into a fully featured function generator with features that rival desktop models. IVI Soft Front Panels—FG display controls and operation faithfully emulate benchtop function generators so you can take maximum advantage of your previous instrument experience, with minimal training time, to use PC-based instruments.

With IVI Soft Front Panels—FG, you can generate six standard waveforms: sine, square, triangle, ramp up, ramp down, and DC. As with all IVI Soft Front Panels Instruments, you can load and save instrument settings.

Tour of Function Generator Front Panel and Menus

The following figure shows the front panel of IVI Soft Front Panels—FG. You can scroll over regions of the figure and click areas of interest for more in-depth information.

Menus	Display	Buttons	Controls
File	Display Window	Range Selector	Frequency Knob
Edit		Function Selector	Waveform Modifier Controls
Controls		On	
Utility			
Help			



File

Exit Closes IVI Soft Front Panels—FG.

Edit

General Settings	Opens the FG Settings dialog box. Refer to IVI Soft Front Panels—FG Settings for details.
Load Settings	Restores the configuration saved in a settings file.
Save Settings	Saves the current configuration to a settings file.
Reset Settings	Resets IVI Soft Front Panels—FG to its factory default settings.

Refer to [Saving and Restoring IVI Soft Front Panels Settings](#) for more information about options in the **Edit** menu.

Controls

Frequency Increases/decreases frequency.

Amplitude Increases/decreases amplitude.

Offset Increases/decreases offset.

Utility

Self-Test	Performs self-test on the instrument. This operation may take several minutes.
Reset	Resets the instrument.
Error Query	Queries the errors occurred.

Help

You can choose the following items in the **Help** menu.

Show Context Help Context Help appears in the Popup Help window when your mouse pointer pauses over a user interface control or item. Information in the Popup window describes the function or action associated with the underlying control.

Show Tip Strips Help Tip Strips Help appears when your mouse pointer pauses over a user interface control or item. Information in the tip strips window briefly describes the function or action associated with the underlying control.

Online Reference Shows the online help.

About IVI Soft Front Panels—FG Displays the About dialog box.

Display Window

Shows the waveform frequency. The range and frequency settings determine this value.

To adjust the frequency, you can click the display and type in a frequency value directly. You also can adjust the frequency with the Frequency knob or the up/down arrows to the left of the display. Also, you can enter a frequency value directly when you double-click the display.

Range Selector

Selects the frequency range of IVI Soft Front Panels—FG. The following formulas specify the range of frequencies covered by each range:

Minimum Frequency = $0.1 \times \text{Range Setting}$

Maximum Frequency = $1.0 \times \text{Range Setting}$

Function Selector

Selects the waveform that IVI Soft Front Panels—FG generates. In order from left to right, the waveform buttons are as follows:

Sine Wave	Selects the sine wave function.
Square Wave	Selects the square wave function.
Triangle Wave	Selects the triangle wave function.
Ramp Up Exponential	Selects the ramp up exponential function.
Ramp Down Exponential	Selects the ramp down exponential function.
DC	Selects a DC waveform.

On

Click **On** to start the waveform generation. If you click **On** during waveform generation, IVI Soft Front Panels—FG stops generating the waveform. Also, enabling **On** allows IVI Soft Front Panels—FG to apply the Amplitude, DC Offset, Duty Cycle, Ref Clock Source, Output Impedance settings to the instrument.

Frequency Knob

Controls the frequency of the waveform, within the range you select with the range selector. Use the Fine knob to further fine-tune the frequency.

Waveform Modifier Controls

Provides additional control over the generated waveform.

Duty Cycle Adjusts the duty cycle of the square wave. Duty cycle is the upward cycle time expressed as a percentage of the entire cycle.



Note This control is enabled only when the square waveform function is selected by the [Function Selector](#) in the [Front Panel](#).

Offset Adjusts the DC offset of the waveform.

Offset is expressed as a voltage added to the output waveform of the current waveform amplitude.



Note This control might exceed the output limits of your device, in which case IVI Soft Front Panels—FG clips the output signal. When this occurs, a CLIP indicator appears.

Amplitude Adjusts the peak amplitude of the signal.



Note This control might exceed the output limits of your device, in which case IVI Soft Front Panels—FG clips the output signal. When this occurs, a CLIP indicator appears.

Working with IVI Soft Front Panels—FG

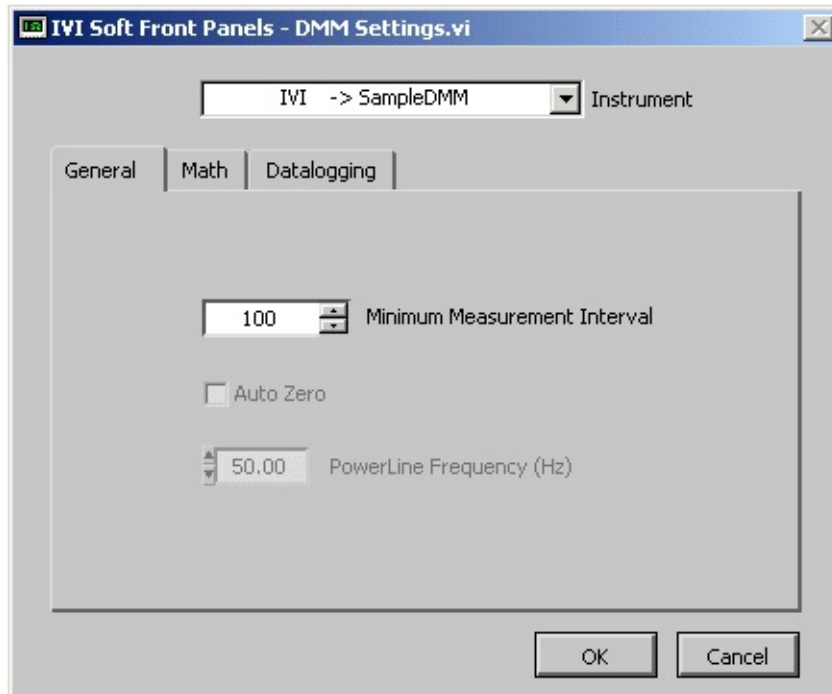
This topic introduces how to configure IVI Soft Front Panels—FG software and use IVI Soft Front Panels—FG to generate a waveform.

[Configuring IVI Soft Front Panels—FG](#)

[Generating a Waveform with IVI Soft Front Panel—FG](#)

Configuring IVI Soft Front Panels—FG

To configure IVI Soft Front Panels—FG, select **Edit»General Settings**.



Instrument Selects the instrument to use. Only logical names which you successfully configured in the MAX appear in this list.

Channel Selects the output channel used by IVI Soft Front Panels—FG.

Reference Clock Specifies the source of the reference clock.

Output Impedance Specifies the output impedance.

Generating a Waveform with IVI Soft Front Panels—FG

Complete the following steps to generate a waveform with IVI Soft Front Panels—FG:

1. Connect a device or oscilloscope to the output channel of your IviFGen Instrument. Refer to the user manual of your instrument for details.
2. Configure [FG Settings](#).
3. Click **On** on the [front panel](#). IVI Soft Front Panels—FG continuously generates an analog waveform at the output.
4. Click **On** again to stop waveform generation.

IVI Soft Front Panels—DC Power Supply Overview

Combined with an IviDCPwr classcompliant instrument, IVI Soft Front Panels—DC Power Supply transforms your PC into a fully featured DC power supply with features rivaling desktop models. IVI Soft Front Panels—DC Power Supply display controls and operation faithfully emulate DC power supply so that you can take maximum advantage of your previous instrument experience, with minimal training time, to use PCbased instruments.

Related Topic

[Working with IVI Soft Front Panels—DC Power Supply](#)

IVI Soft Front Panels—DC Power Supply Features

You use IVI Soft Front Panels—DC Power Supply to control any DC Power Supply with an IviDCPwrcompliant-specific driver. Features include the following items:

- DC power signal generation.
- Real-time voltage and current measurement display.
- Voltage and current limit controls.
- Over-voltage and over-current indicators.

Tour of Front Panel and Menus

The following figure shows the front panel of IVI Soft Front Panels—DC Power Supply. You can scroll over regions of the figure and click areas of interest for more in-depth information.

Menu Buttons

[File](#) [Apply](#)

[Edit](#) [Output On/Off](#)

[Utility](#)

[Help](#)

Controls/Indicators

[Measurement Display](#)

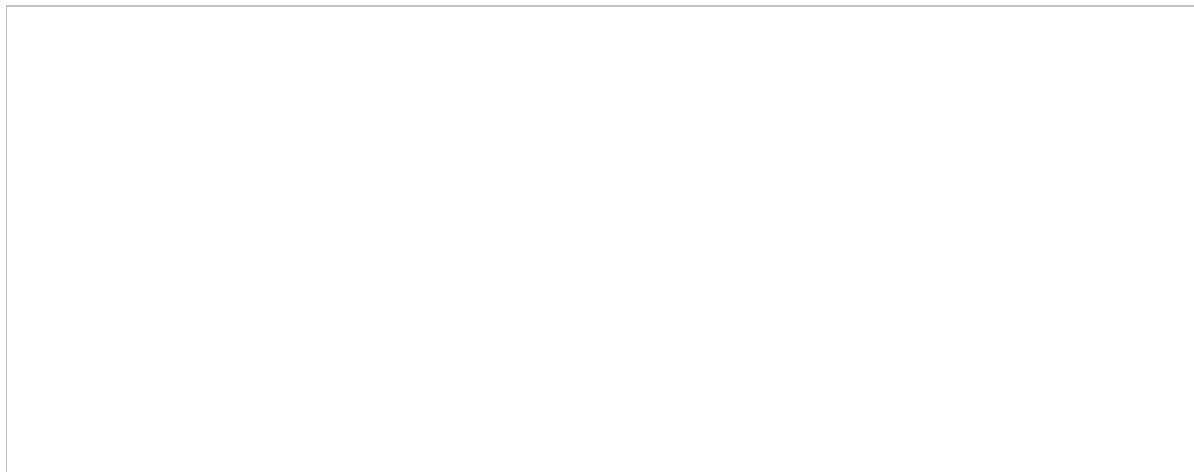
[Voltage Level](#)

[Voltage Limit](#)

[Current Limit](#)

[OVP Enabled](#)

[Over Current Behavior](#)



File

Exit Closes IVI Soft Front Panels—DC Power Supply.

Edit

- General Settings** Allows you to configure the IVI instrument and channel.
- Load Settings** Restores IVI Soft Front Panels—DC Power Supply to the configuration that you saved in a settings file.
- Save Settings** Saves the current IVI Soft Front Panels—DC Power Supply configuration in a settings file.
- Reset Settings** Restores IVI Soft Front Panels—DC Power Supply to its default settings.

Refer to [Saving and Restoring IVI Soft Front Panels Settings](#) for more information about options in the **Edit** menu.

Utility

- Self-Test** Performs self-test on the instrument. This operation may take several minutes.
- Reset** Resets the instrument.
- Error Query** Queries the errors occurred.

Help

You can choose the following items in the **Help** menu.

- | | |
|--|--|
| Show Tip Strips Help | Tip Strips Help appears when your mouse pointer pauses over a user interface control or item. Information in the tip strips window briefly describes the function or action associated with the underlying control. |
| Show Context Help | Context Help appears in the Pop-up Help window when your mouse pointer pauses over a user interface control or item. Information in the Pop-up window describes the function or action associated with the underlying control. |
| Online Reference | Shows the online help. |
| About IVI Soft Front Panels—DC Power Supply | Displays the About dialog box. |

Apply

Applies changes to the instrument that you made with the front panel controls.

Output On/Off

Enables/Disables signal generation of the DC Power Supply.

Measurement Display

Shows real-time voltage and current measurements, if your instrument supports these outputs. If not, the display shows your current settings.

"OVP" indicates that the over-voltage protection circuitry has tripped.

"OCP" indicates that the over-current protection circuitry has tripped.

"CV" indicates that the power supply's output signal reaches the voltage level before it reaches the current limit, "CC" indicates that the power supply's output signal reaches the current limit before it reaches the voltage level, "Unregulated" indicates that the power supply's output signal reaches neither the voltage level nor the current limit.

Voltage (V)

Specifies the DC level of the generated signal. The units are volts.

Voltage Limit (V)

Specifies the peak instantaneous voltage that the power supply allows.
The units are volts.

Current Limit (A)

Specifies the peak instantaneous current that the power supply allows.
The units are amperes.

OVP Enabled

Specifies whether the power supply provides over-voltage protection. When you select this control, the power supply disconnects the output if the output voltage exceeds the voltage you specify with the Voltage Limit control. When you deselect this control, the power supply limits the output voltage to the voltage that you specify with the Voltage Limit control.

Over Current Behavior

Selects the behavior of the DC power supply when an over current condition is reached.

The options are the following:

Regulate Lower the voltage so that the current limit is not exceeded.

Trip Disconnect the output of the DC power supply.

Working with IVI Soft Front Panels—DC Power Supply

Click the following links to find out how to configure IVI Soft Front Panels—DC Power Supply software, use IVI Soft Front Panels—DC Power Supply to generate a DC power signal and configure limits and OverVoltage/Current Protection.

[Configuring IVI Soft Front Panels—DC Power Supply](#)

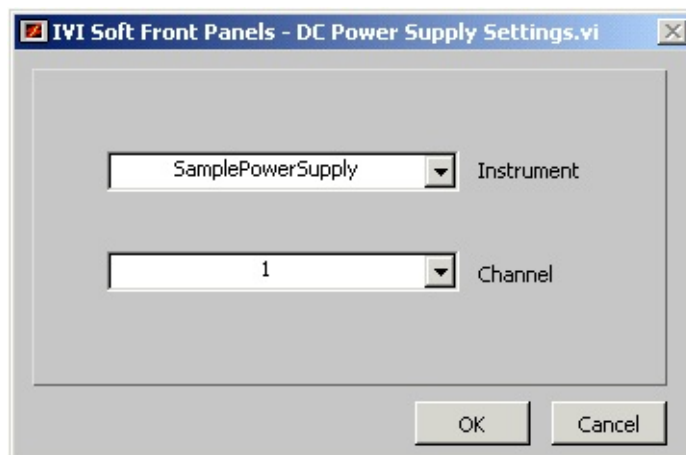
[Generate a DC Power Signal](#)

[Configuring Limits and OverVoltage/Current Protection](#)

Configuring IVI Soft Front Panels—DC Power Supply

When you launch IVI Soft Front Panels—DC Power Supply, the panel always launches in a Power off state. Other settings automatically assume the settings of your previous IVI Soft Front Panels—DC Power Supply session. You must configure IVI Soft Front Panels—DC Power Supply before you use it. Complete the following steps to configure IVI Soft Front Panels—DC Power Supply:

1. Connect a load to one of the output channels of your power supply.
2. Configure IVI Soft Front Panels—DC Power Supply.
 - a. Select **Edit»General Settings**
 - b. Select the IVI logical name of the instrument that you want to use. If you have not already configured a logical name, you need to do so first in MAX. Refer to [Measurement & Automation Explorer Help for MAX](#).
 - c. Select the channel you want to use.



- d. Click **OK** to use these settings.
3. Configure voltage level, voltage limit, current limit, OVP enabled, and over current behavior controls on the [front panel](#).
4. Click **Apply** to apply controls' settings to the instrument.

Generating a DC Power Signal

To generate a DC Power signal, complete the following steps in the Power Supply [front panel](#):

1. Enter a voltage in the **Voltage** control.
2. Click **Apply** to commit to the change. If a red error button appears in the display window, clicking the error button displays the error cause. Adjust the voltage level if necessary.
3. Click **Output** to enable the power supply.

Configuring Limits and OverVoltage/Current Protection

To configure Limits and OverVoltage/Current Protection, complete the following steps in the Power Supply [front panel](#):

1. Enter a voltage limit in the **Voltage Limit** control.
2. Enter a current limit in the **Current Limit** control.
3. Check the **OVP Enabled** control if you want to enable Over-Voltage protection.
4. Select a OverCurrent behavior with the **Over Current Behavior** control.
5. Click **Apply** to commit to the changes. If a red error button appears in the display window, clicking the error button displays the error cause.
6. Click **Output** to enable the power supply.

IVI Soft Front Panels—Scope Overview

Combined with an IviScope classcompliant instrument, IVI Soft Front Panels—Scope transforms your PC into a fully featured oscilloscope with features rivaling desktop models. IVI Soft Front Panels—Scope display controls and operation faithfully emulate benchtop oscilloscope so that you can take maximum advantage of your previous instrument experience, with minimal training time, to use PC-based instruments.

Related Topic

[Working with IVI Soft Front Panels—Scope](#)

IVI Soft Front Panels—Scope Features

Combined with an IviScope class-compliant instrument, IVI Soft Front Panels—Scope transforms your PC into a fully featured oscilloscope with features rivaling desktop models. The display controls and operation faithfully emulate benchtop oscilloscopes so you can take maximum advantage of your previous instrument experience, with minimal training, to use PCbased instruments.

Display Features

- Useradjustable trigger cursor
- Zoom
- Two cursors for precise measurements
- XY plot mode


Other Features

- Auto Setup
- 19 waveform measurement functions
- Save waveforms on disk for transfer to other applications
- Annotate saved waveforms
- Recall and display saved waveforms
- Save and recall instrument settings on disk
- Hard copy output of screen

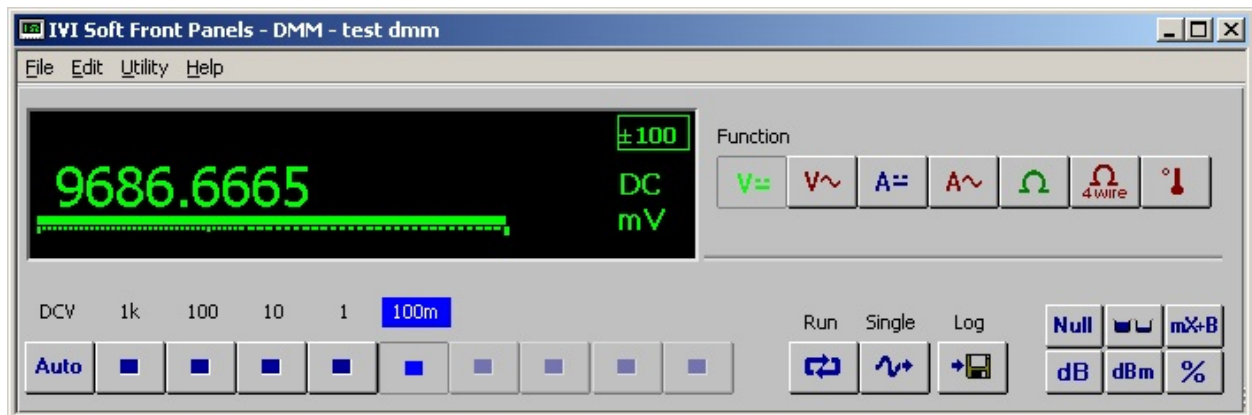
Tour of Front Panel and Menus

The following figure is the front panel of IVI Soft Front Panels—Scope. You can scroll over regions of the figure and click areas of interest for more in-depth information.

Menus	Displays	Controls		
File	Status	Vertical Position Sliders	Channel Selector	Channel Settings
Edit	Graphics Display	Main Control Bar	Timebase Control	Trigger Settings
Controls	Measurement	Maximize/Minimize	Cursor Settings	Zoom Controls
Measure				
Utility				
Help				

 **Note** Each time you launch IVI Soft Front Panels—Scope, the window returns to its previous position and size.

Printing the Front Panel Display



File

- Load Waveforms** Loads a waveform from an ASCII text file to one of the reference channels. Refer to [Viewing Saved Waveforms](#) and [Comparing Saved and New Waveforms](#) for more information.
- Save Waveforms** Saves one or more waveforms to disk as an ASCII text file. Refer to [Saving Waveforms to Disk](#) for more information.
- Printer Setup** Configures printer properties.
- Print Panel Display** [Prints](#) the IVI Soft Front Panels—Scope graphics display.
- Exit** Closes IVI Soft Front Panels—Scope.

Edit

General Settings	Selects the Scope Settings dialog box. See Scope Settings for more details.
Channel Settings	Selects the Scope Channel Settings dialog box. See Scope Channel Settings for more details.
Copy Channel to Ref 1, Copy Channel to Ref 2	Copies the waveform from the currently selected channel and stores it in either the Ref 1 or Ref 2 buffer.
Load Settings	Restores IVI Soft Front Panels—Scope to a configuration that you saved in a settings file.
Save Settings	Saves the current IVI Soft Front Panels—Scope configuration in a settings file.
Reset Settings	Restores IVI Soft Front Panels—Scope to its default settings.

Refer to [Saving and Restoring Settings](#) for more information about options in the **Edit** menu.

Controls

Timebase	Adjusts the time base control.
Volts per Division	Selects the vertical sensitivity. The units are in volts/division.
Vertical Position	Adjusts the vertical position of the trace.
Trigger	Adjusts the trigger control.
Zoom	Adjusts the current zoom magnification level.

Measure

Use this menu to measure waveforms. For more information, refer to [Using the Measurement Display](#).

Utility

- Self-Test** Performs self-test on the instrument. This operation may take several minutes.
- Reset** Resets the instrument.
- Error Query** Queries the errors occurred.

Help

You can choose the following items in the **Help** menu.

Show Context Help Context Help appears in the Popup Help window when your mouse pointer pauses over a user interface control or item. Information in the Popup window describes the function or action associated with the underlying control.

Show Tip Strips Help Tip Strips Help appears when your mouse pointer pauses over a user interface control or item. Information in the tip strips window briefly describes the function or action associated with the underlying control.

Online Reference Shows the online help.

About IVI Soft Front Panels—Scope Displays the About dialog box.

Status Display

Shows vital information about the current state of IVI Soft Front Panels—Scope. The top two lines indicate the vertical sensitivity and offset for the first four selected channels. The third line gives the current [state of the instrument](#) (running or stopped), the [Timebase](#), the current [Sample Rate](#), the [Trigger Level](#), and the [Waveform Size](#).

State of the Instrument

Indicates that the instrument currently is acquiring data (running) or idle (stopped).

Sample Rate

The rate in samples per second at which IVI Soft Front Panels—Scope acquires data. IVI Soft Front Panels—Scope calculates this value based on the sample rate of your instrument, the buffer size, and the timebase setting.

Timebase Control

Changes the timebase setting. The timebase setting determines the x-axis time scale in units of seconds/division in the [status display](#). A shorter time period appears in the [graphics display](#) as you turn the knob clockwise.

Trigger Level

The voltage threshold that IVI Soft Front Panels—Scope uses in conjunction with the slope setting to indicate when to acquire data.

Waveform Size

The number of samples in the acquired waveform.

Graphics Display

Displays waveforms and controls cursors for making individual cursor measurements. You can move cursors horizontally by clicking them and dragging them along the time axis. You can move the trigger cursor horizontally and vertically to choose the trigger position.

You can alter the vertical position of a waveform by clicking and dragging the [vertical position slider](#) that corresponds in color to the waveform that you want to alter.

To control the appearance of the graphics display, use the [Display tab](#) of the IVI Soft Front Panels—Scope Settings dialog box.

Measurement Display

Displays both waveform and cursor measurements.

Related Topic

[Using the Measurement Display](#)

Vertical Position Sliders

Colored arrows to the right of the graphics display adjust the voltage offset of each channel. The second line of the [status display](#) shows the vertical offset for each channel.

Main Control Bar

The Main Control bar contains the Run, Single, Auto Setup, Mode, and Select controls.

Run Starts or stops continuous data acquisition.

Single Acquires a single sweep acquisition.

Auto Setup Configures the scope for the best timebase, volts per division, and trigger setting for each channel selected with the channel selector.

Mode Toggles the scope between V–T (volts versus time) mode and X–Y mode.

Select Choose which objects you select on the graph. Then the measurements that display below the graph are derived only from the region or point(s) that you have selected.

- **Cursor Mode**—Allows you to move cursors, including the trigger cursor.
- **Plot Mode**—Allows you to select a section of a waveform. IVI Soft Front Panels—Scope uses this section for measurement calculations and saves this portion to disk, if you choose "Save selection only" when you save a waveform.

When you choose Plot mode of the Select control, a portion of the graph turns green. To increase or decrease the width of this selection area, click and drag one of the edges of the green band.

Maximize/Minimize Graphics Display

Toggles the mode of display to Maximize or Minimize. A maximized display fills the entire IVI Soft Front Panels—Scope window.

Channel Selector

Acquired Channels Selects analog input channels on your instrument.

Ref 1, Ref 2 Displays the contents of the reference channels. Refer to [Viewing Saved Waveforms](#) or [Comparing Saved and New Waveforms](#) for more details.

Derived Channels Displays the results of the waveform math calculation. Refer to [Using the Waveform Math Channels](#) for more details.

Cursor Settings

Controls two cursors, C1 and C2 that appear on the dialog box. You can change the cursor type in the [Display tab](#) of the IVI Soft Front Panels-Scope Settings dialog box.

C1,C2 Selects the plot associated with each cursor.

Sel Selects the active cursor with C1, or C2, or trigger cursor. You can move the active cursor with the arrow buttons below this control.

Arrows Move the active cursor to the left or right for C1 or C2 and left/right/up/down for trigger cursor, one point at a time, for precise cursor positioning. For more information about cursors, refer to [Using Cursors to Make Waveform Measurements](#).

Channel Settings

Controls each of the IVI Soft Front Panels—Scope channels. You can set vertical position and volts per division. The following list describes each component:

Top Arrows Scrolls through all channels selected in the channel selector and selects the active channel.

Volts/div Selects the vertical sensitivity. The units are in volts/division.

V Position Adjusts the vertical position of the trace.

Coupling Sets the input coupling to AC or DC.

Trigger Settings

Controls the trigger conditions under which IVI Soft Front Panels—Scope acquires a signal. To set the trigger holdoff value, refer to the [Acquire](#) tab in the IVI Soft Front Panels Scope general settings dialog box.

Src Selects the analog or digital channel that you want to use as a trigger source.



Note Only those trigger sources that the current instrument supports appear in this control.

- **Immed**—The oscilloscope does not wait for a trigger of any kind.
- **Ext**—The oscilloscope waits for a trigger on an external trigger input.
- **Ch x**—The oscilloscope waits for a trigger on the acquisition channel x.
- **AC**—The oscilloscope waits for a trigger on the AC line.
- **GET**—The oscilloscope waits until it receives a GPIB Group Execute Trigger (GET).
- **TTLx** —The oscilloscope waits until it receives a trigger on the PXI TTLx line (for PXI instruments) or the VXI TTLx line (for VXI instruments).
- **ECLx**—The oscilloscope waits for a trigger on the ECL line x.
- **Star**—The oscilloscope waits for a trigger on the PXI star bus.
- **RTSIx**—The oscilloscope waits for a trigger on the RTSI line x.

Slope Selects the slope (rising or falling) required to meet the trigger condition.

Set 50% Sets the vertical trigger position to halfway between the min and max values of the trigger channel's input signal. For instance, if a 5V amplitude sine wave with 1V offset (max value is 6V, min value is -4V) is connected to the trigger channel, the Set 50% button sets the vertical trigger position to 1V $((6 - 4) / 2)$.



Note On External (Ext) channels, clicking this button sets

the trigger level to 0 V.

Zoom Controls

Controls the current zoom magnification.

Scroll Bar Scrolls along the X- or time axis. To use the scroll bar to increase the zoom factor, click the zoom hotspot on the edge of the scroll bar, which turns red when active, and drag it left or right or slide the scroll bar to the far left or far right.

Zoom Increases the zoom factor by two.

Full Scale Autoscales the x-axis to display the entire waveform.

You can use these controls in conjunction with the [Timebase control](#) to display waveforms in more detail.

Working with IVI Soft Front Panels—Scope

This topic introduces how to configure IVI Soft Front Panels—Scope software, acquire data using IVI Soft Front Panels—Scope and save waveform.

Configuring [Scope Settings—Acquire](#)

Configuring [Scope Channel Settings—Acquire](#)

[Configuring Reference Channels—Color](#)

[Acquiring Data](#)

[Printing the Front Panel Display](#)

[Saving Waveforms to Disk](#)

[Viewing Saved Waveforms](#)

[Comparing Saved and New Waveforms](#)

[Using Waveform Math Channels](#)

[Using Cursors to Make Waveform Measurements](#)

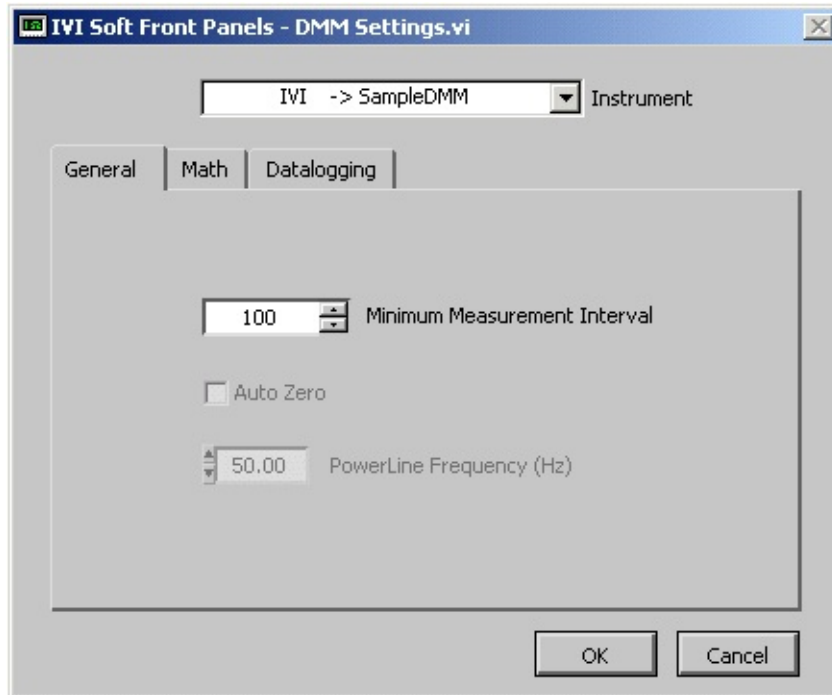
[Using the Measurement Display](#)

Configuring General Settings

Expand this book to view topics related to configuring general settings.

Scope Settings - Acquire

Click other tabs in this figure for more information about those settings.



To configure IVI Soft Front Panels—Scope General Settings, select **Edit»General Settings**.

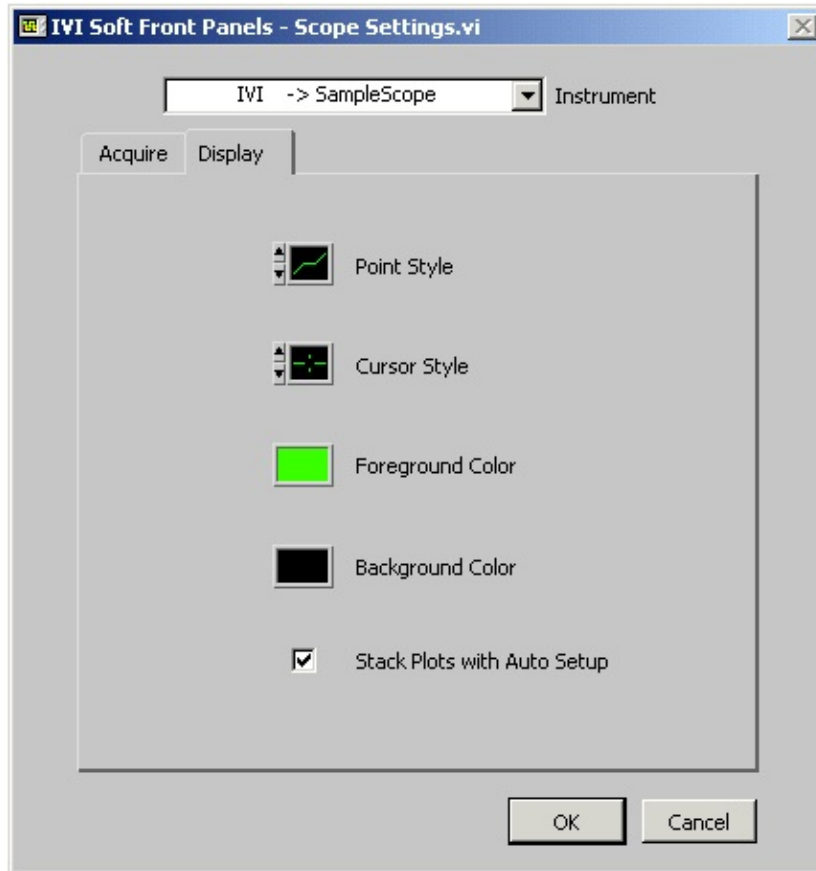
Instrument Selects an IVI instrument to use with IVI Soft Front PanelsScope. Only logical names that you have configured successfully in the MAX appear in this list.

Acquisition Type Specifies how the oscilloscope acquires data and fills waveform record.

Trigger Holdoff Specifies the length of time the oscilloscope waits after it detects a trigger before the enabling the trigger subsystem to detect another trigger.

Scope Settings—Display

Click the other tabs in this figure for information about those settings.



To configure IVI Soft Front Panels—Scope graphics display, select **Edit»General Settings**.

- | | |
|------------------------------|--|
| Point Style | Sets the point style for the waveforms displayed on the front panel . |
| Cursor Style | Sets the type of cursor that appears in the front panel display. |
| Foreground Color | Sets the color of the text and grid lines of the graphics display and status display. |
| Background Color | Sets the background color of the graphics display. |
| Stack Plots with Auto | Stacks plots vertically when you select Auto Setup , so that no overlap occurs. This feature takes effect only |

Setup

when the instrument does not support Auto Setup feature and IVI Soft Front Panels—Scope performs the Auto Setup by the software.

Configuring Channel Scope Settings

Expand this book to view topics related to configuring channel scope settings.

Scope Channel Settings—Acquire

Click the other tabs in this figure for information about those settings.

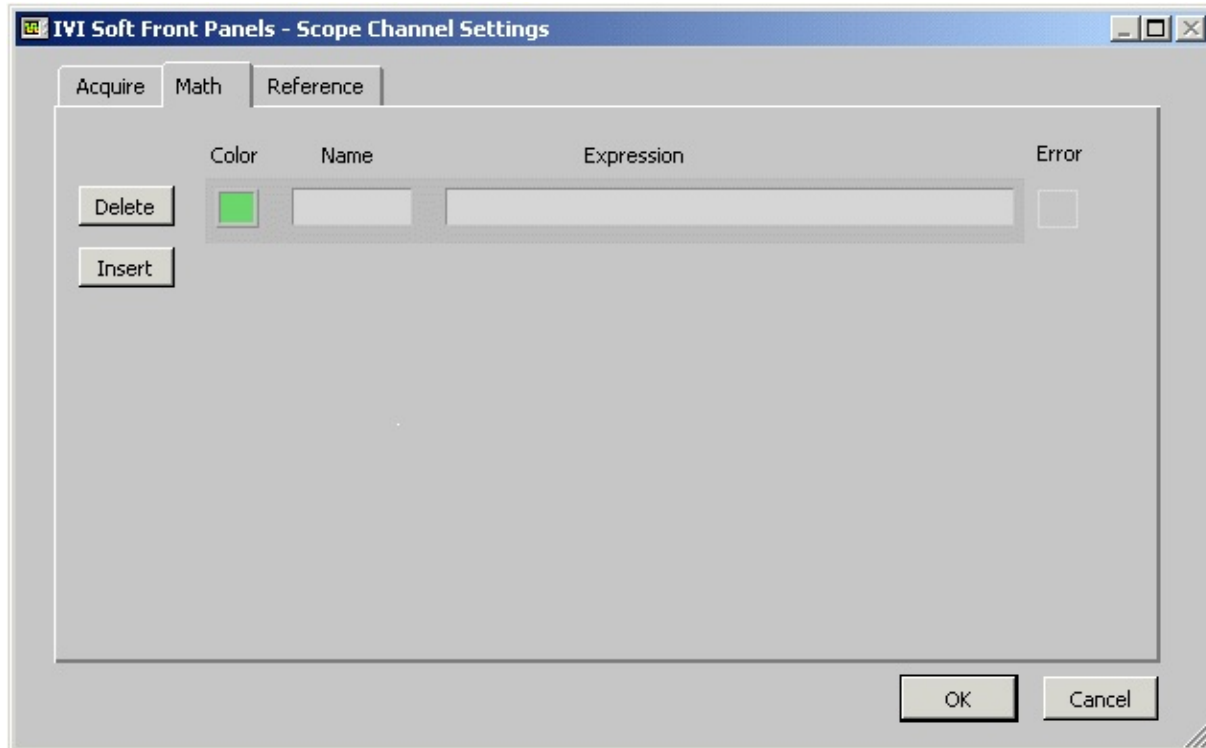


To configure IVI Soft Front Panels—Scope Channel Acquire Settings, select **Edit»Channel Settings**.

Channel Name	Displays the name for the corresponding oscilloscope channel.
Color	Selects the color of the plot and status information on the front panel.
Input Impedance	Specifies the oscilloscope channel's input impedance in Ohms.
Probe Attenuation	Specifies an initial scale value which applies to the signal. For example, if you use a 10X probe on channel one, set the attenuation value to ten. Each channel can have a different attenuation factor.

Scope Channel Settings—Math

Click the other tabs in this figure for information about those settings.



To configure IVI Soft Front Panel—Scope Math Channel, select **Edit»Channel Settings**.

In this screen, you can configure one or more math channels. Each math channel is defined by a mathematical expression in terms of channel names.

Examples

Ch 1² + Ch 2 + 5

(Ch 1 + log(Math 1)) / 2 + pi

Available operators and functions are:

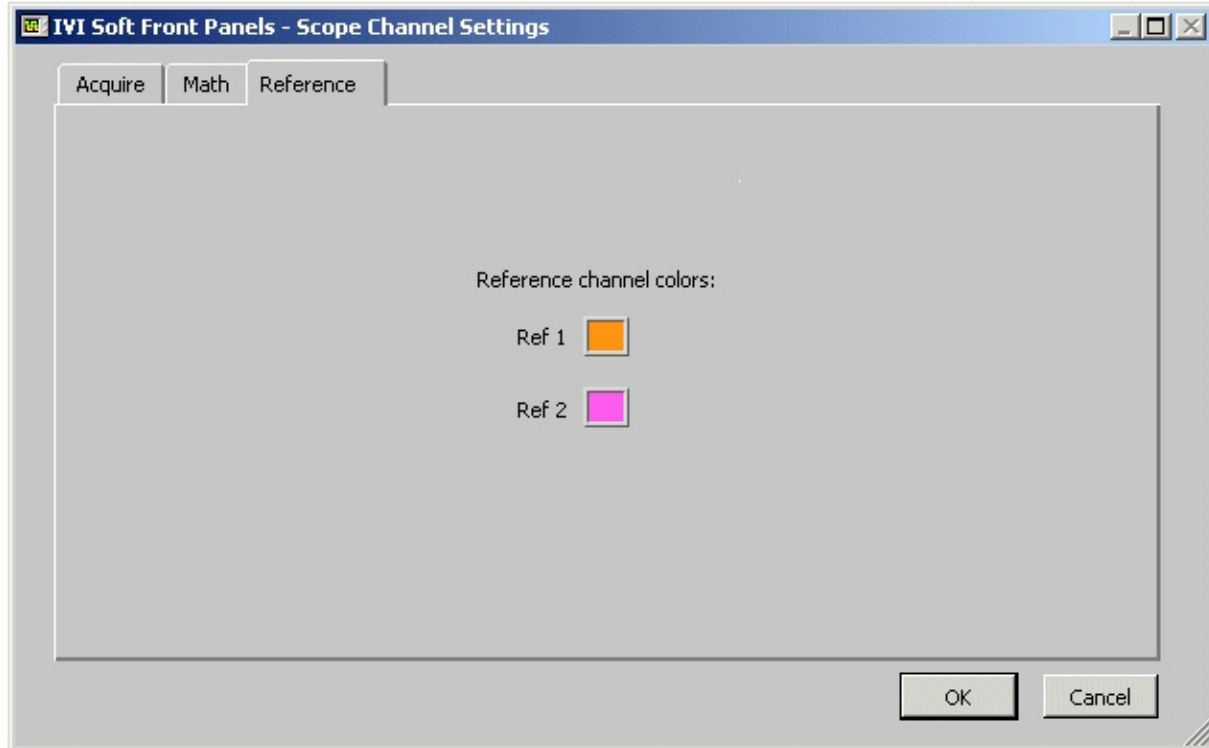
abs(x)	Absolute Value	Returns the absolute value of x.
acos(x)	Inverse Cosine	Computes the inverse cosine of x in radians.
acosh(x)	Inverse Hyperbolic Cosine	Computes the inverse hyperbolic cosine of x in radians.
asin(x)	Inverse Sine	Computes the inverse sine of x in radians.
asinh(x)	Inverse Hyperbolic Sine	Computes the inverse hyperbolic sine of x in radians.
atan(x)	Inverse Tangent	Computes the inverse tangent of x in radians.
atanh(x)	Inverse Hyperbolic Tangent	Computes the inverse hyperbolic tangent of x in radians.
ceil(x)	Round to +Infinity	Rounds x to the next higher integer (smallest int ³ x).
cos(x)	Cosine	Computes the cosine of x in radians.
cosh(x)	Hyperbolic Cosine	Computes the hyperbolic cosine of x in radians.
cot(x)	Cotangent	Computes the cotangent of x in radians (1/tan(x)).
csc(x)	Cosecant	Computes the cosecant of x in radians (1/sin(x)).
exp(x)	Exponential	Computes the value of e raised to the x power.
expm1(x)	Exponential	Computes the value of e raised to the x

	(Arg) - 1	power minus one ($e^x - 1$).
floor(x)	Round to - Infinity	Truncates x to the next lower integer.
getexp(x)	Mantissa & Exponent	Returns the exponent of x .
getmanint(x)	Mantissa & Exponent	Returns the mantissa of x .
intrz(x)	Round Toward 0	Rounds x to the nearest integer between x and zero.
ln(x)	Natural Logarithm	Computes the natural logarithm of x (to the base e).
lnp1(x)	Natural Logarithm (Arg +1)	Computes the natural logarithm of $(x + 1)$.
log(x)	Logarithm Base 10	Computes the logarithm of x (to the base of 10).
log2(x)	Logarithm Base 2	Computes the logarithm of x (to the base 2).
rand()	Random Number	Produces a floating-point number between 0 and 1 exclusively.
rem(x,y)	Remainder	Same as mod except quotient is rounded to the nearest integer.
sec(x)	Secant	Computes the secant of x radians ($1/\cos(x)$).
sign(x)	Sign	Returns 1 if x is greater than 0, returns 0 if x is equal to 0, and returns -1 if x is less than 0.
sin(x)	Sine	Computes the sine of x radians.
sinc(x)	Sinc	Computes the sine of x divided by x radians ($\sin(x)/x$).
sinh(x)	Hyperbolic Sine	Computes the hyperbolic sine of x in radians.
sqrt(x)	Square Root	Computes the square root of x .
tan(x)	Tangent	Computes the tangent of x in radians.

$\tanh(x)$	Hyperbolic Tangent	Computes the hyperbolic tangent of x in radians.
x^y	xy	Computes the value of x raised to the y power.
π	π	returns $\pi = 3.14159263538929$

Configuring Reference Channels—Color

Click the other tabs in this figure for information about those settings.



To configure the IVI Soft Front Panels—Scope Reference Channel Settings, select **Edit»Channel Settings**. Select the color for Ref 1 and Ref 2 channels. Click **OK**.

Acquiring Data

Complete the following steps to acquire data with IVI Soft Front Panels—Scope:

1. Connect the signal to one of the channels of your instrument. Refer to your instrument user manual for more information.
2. Configure [Scope General Settings](#) and [Scope Channel Settings](#).
3. Click the appropriate channel buttons (**Ch 1**, **Ch 2**, and so on) in the channel selector of the [front panel](#).
4. Click **Auto Setup**.
5. Adjust the Timebase knob, if necessary.
6. To change the trigger channel, select a new channel with the Trigger source selector and click **Auto Setup** again.

Printing the Front Panel Display

IVI Soft Front Panels—Scope can print to any standard printer connected to your computer either directly or over a network. Select **File»Print Display** to print out the IVI Soft Front Panels—Scope front panel.

Saving Waveforms to Disk



Complete the following steps to save to disk any waveforms currently in memory:

1. Select **File»Save Waveform** to open the dialog box shown above.
2. By default, all waveforms of the enabled channel are selected. Deselect the waveforms you do not want to save. Name and comment the waveforms. Click **OK**.
3. Enter the name of the file to store the waveforms. Click **OK**.

IVI Soft Front Panels—Scope stores the waveforms to disk as an ASCII text file.

Related Topics

[Viewing Saved Waveforms](#)

[Comparing Saved and New Waveforms](#)

Viewing Saved Waveforms



To use a saved waveform, you must load it into one of two memory locations or reference buffers by completing the following steps:

1. Select **File»Load Waveform**.
2. Select the text file in which the waveforms are stored.
3. Click **OK**. The dialog box shown above opens.
4. Select the column of the waveform to load.
5. Choose the reference channel for the waveform.
6. Click **OK**.
7. Click **Ref 1** and/or **Ref 2** in the channel selector of the [front panel](#) to display the waveforms.

Waveforms in the Ref 1 and Ref 2 channels are known as reference waveforms. The current reference waveforms remain in memory until you replace them with other saved waveforms or until you exit from IVI Soft Front Panels—Scope.

Related Topics

[Saving Waveforms to Disk](#)

[Comparing Saved and New Waveforms](#)

Comparing Saved and New Waveforms

Complete the following steps to compare one or two reference waveforms with newly acquired waveforms:

1. Load one or two waveforms from an ASCII text file. Refer to [Viewing Saved Waveforms](#) for more information. You also can copy a waveform from one of the existing channels. To select the waveform to copy, select the channel using the arrow buttons in the channel settings group of the [front panel](#) or the vertical position slider for that channel. Next, select **Edit»Copy Channel to Ref 1** or **Edit»Copy Channel to Ref 2** to copy the active waveform to the reference channel.
2. Click **Ref 1** or **Ref 2** in the channel selector to display the reference waveforms.
3. Adjust the vertical position sliders or other controls in the channel settings group and notice the effects on the reference waveforms.
4. Adjust the Timebase knob and the x-axis position slide control to view parts of the waveform.

Using Waveform Math Channels

To perform mathematical operations on incoming signals, use the math channel and complete the following steps:

1. Select **Edit»Channel Settings**.
2. Click the **Math** tab.
3. Enter a mathematical expression in terms of channel names. For more information, refer to [Scope Channel Settings—Math](#).
4. Click the math channel in the channel selector group of the [front panel](#) to display the result.

Using Cursors to Make Waveform Measurements

Complete the following steps to make precise measurements using the two cursors on the IVI Soft Front Panels—Scope display:

1. Set up IVI Soft Front Panels—Scope to display one or more waveforms. Refer to [Acquiring Data](#) for more information.
2. Turn on the cursor display by clicking the cursor button in the cursor settings group of the [front panel](#).
3. In the same group, set cursor 1 (C1) and cursor 2 (C2) to channels that have displayed waveforms.
4. Move the cursors to the right of the display by clicking on them and dragging them. You can also use the arrow keys below the Cursors control to move the cursor along one point at a time.

Related Topic

[Using the Measurement Display](#)

Using the Measurement Display

IVI Soft Front Panels—Scope has sophisticated waveform measurement capability in the measurement display of the [front panel](#). Complete the following steps to control the measurements that appear in the measurement display:

1. Select **Measure»Channel»Measurement**.
2. Enable the channel by selecting it in the channel selector.



Note To ensure accurate waveform measurements, use the following guidelines:

- The waveform must lie completely within the top and bottom confines of the display. Adjust the Volts/Division and/or Vertical Offset controls appropriately.
- If you are measuring frequency or period, at least four complete periods of the waveform must appear in the graphics display. Adjust the Timebase control appropriately.
- Remember that IVI Soft Front Panels—Scope detects when a measurement is being clipped or when there is not enough data being acquired to make valid frequency or period measurements. In these cases, +Over, -Over, or ? appears in the display in place of the usual numeric information.

Measurements

Mean	Average value of the signal.
RMS	Root Mean Square (RMS) or AC component of the signal.
Max	Maximum sampled voltage value.
Min	Minimum sampled voltage value.
Pk-Pk	Maximum voltage swing (Max – Min).
High	The value that best represents the active or high position of the signal.
Low	The value that best represents the inactive or low position in the signal.
Amplitude	Signal amplitude (High – Low).
Overshoot	The amount by which the maximum value exceeds the High value (Max – High).
Undershoot	The amount by which the minimum value is lower than the Low value (Low – Min).
Frequency	The frequency of the signal in Hz. To give an accurate frequency measurement, the display must show at least four complete cycles.
Period	The period of the signal in seconds. To give an accurate period measurement, the display must show at least four complete cycles.
Rise Time	The time required to rise from 10 percent amplitude to 90 percent amplitude.
Fall Time	The time required to fall from 90 percent amplitude to 10 percent amplitude.
Positive Width	The average period of time between the rising edge and the next falling edge, measured at 50 percent signal amplitude.
Negative Width	The average period of time between the falling edge and the next rising edge, measured at 50 percent signal amplitude.
Positive	The percentage of time that the signal is in a high signal

Duty Cycle state. $(\text{Positive Width} \times 100 \%) / \text{Period}$.

Negative Duty Cycle The percentage of time that the signal is in a low signal state. $(\text{Negative Width} \times 100 \%) / \text{Period}$.

Slew Rate The rate at which the signal changes in volts/seconds between the 90 percent and 10 percent levels. $(90\% \text{ amplitude} - 10\% \text{ amplitude}) / \text{Rise Time}$.

Related Topic

[Using Cursors to Make Waveform Measurements](#)

IVI Soft Front Panels—Switch Overview

Combined with an IviSwch classcompliant instrument, IVI Soft Front Panels—Switch transforms your PC into a fully featured switch with features rivaling desktop models. IVI Soft Front Panels—Switch display controls and operation faithfully emulate benchtop switch so that you can take maximum advantage of your previous instrument experience, with minimal training time, to use PCbased instruments.

Related Topic

[Working with IVI Soft Front Panels—Switch](#)

IVI Soft Front Panels—Switch Features

You use IVI Soft Front Panels—Switch to make and break connections on any Switch with an IviSwthcompliant specific driver. IVI Soft Front Panels—Switch includes the following features:

- Connects/disconnects channels on any switch
- Displays maximum voltage, current, and power limits for a particular channel

Tour of Front Panel and Menus

The following figure shows the front panel of IVI Soft Front Panels—Switch. You can scroll over regions of the figure and click areas of interest for more in-depth information.

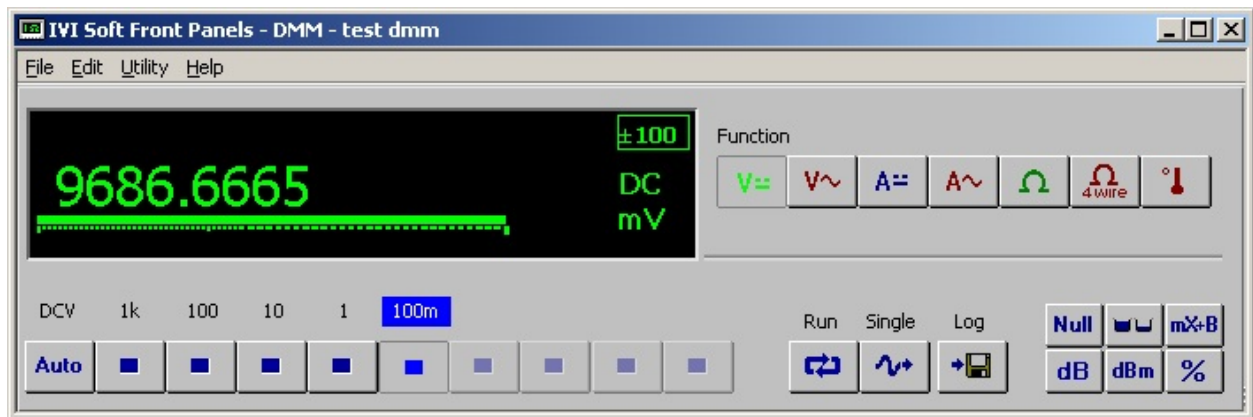
Menus Controls/Indicators

[File](#) [Instrument Selector](#) [Channel Selection Group](#)

[Edit](#) [Connection List](#) [Status Display](#)

[Utility](#)

[Help](#)



File

Exit Closes IVI Soft Front Panels—Switch.

Edit

Load Settings Restores IVI Soft Front Panels—Switch to the configuration you have saved in a settings file.

Save Settings Saves the current IVI Soft Front Panels—Switch configuration in a settings file.

Reset Settings Restores IVI Soft Front Panels—Switch to its default settings.

Refer to [Saving and Restoring Settings](#) for more information about options in the **Edit** menu.

Utility

Self-Test	Performs self-test on the instrument. This operation may take several minutes.
Reset	Resets the instrument.
Error Query	Queries the errors occurred.

Help

You can choose the following items in the **Help** menu.

- Show Tip Strips Help** Tip Strips Help appears when your mouse pointer pauses over a user interface control or item. Information in the tip strips window briefly describes the function or action associated with the underlying control.
- Show Context Help** Context Help appears in the Pop-up Help window when your mouse pointer pauses over a user interface control or item. Information in the Pop-up window describes the function or action associated with the underlying control.
- Online Reference** Shows the online help.
- About IVI Soft Front Panels—Switch** Displays the About dialog box.

Instrument Selector

Allows you to select the IVI instrument you want to use. Use MAX to configure the logical name to the IviSwtch class. Refer to **National Instruments IVI Driver Help»Configuring Your System** for more information about configuring a logical name.

Connection List

Shows all existing connections. To disconnect an existing connection, click the connection in the connection list and click the **Disconnect** button. To disconnect all existing connection, click the **Disconnect ALL** button.

Channel Selection Group

Allows you to choose two channels to connect. To connect two channels, select two valid channels and click **Connect**.

Status Display

Displays the following information:

- Connection path of the selected connection
- Channel information such as maximum current, voltage and power capacity
- Information on why two channels cannot be connected
- Any error information

Working with IVI Soft Front Panels—Switch

This topic introduces how to make connections with IVI Soft Front Panels—Switch software.

[Making Connections](#)

Making Connections

Complete the following steps to make signal connections:

1. Connect signals to two or more channels on your switch instrument.
2. Select an IVI instrument to use with IVI Soft Front Panels—Switch. Only logical names that you have configured successfully in MAX appear in the IVI Instrument list. Refer to:
3. Select two channels that you want to connect in the Channel Selection Group.
4. Click **Connect** to connect the two channels.
5. Click the connection in the Connection List to view information about the connection.

To view information about a particular connection, click the connection in the Connection List. IVI Soft Front Panels—Switch displays information such as the connection path and the maximum allowable voltage, current, and power levels for each channel.

To disconnect a signal connection, click the connection in the Connection List and then click **Disconnect**.

To exit IVI Soft Front Panels—Switch, select **Exit** from the **File** menu.

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