

upcstudio

MASTER THE POWER  
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WAVE

# UPC STUDIO OPERATIONS MANUAL

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## 1.0 Introducing UPC Studio

UPC Studio provides a complete graphical interface for your UPC controller and power source. It includes safeguards to protect your load and guides you into entering values that are appropriate for your power source. UPC Studio can be used to directly control your UPC through the remote interface or "offline" using simulation files. In addition, you can monitor the status of your power source and view metered values like output voltage, load current, waveforms and harmonics.

UPC Studio is a sub-set of a number of Utilities included in the UPC Manager program. UPC Manager allows you to control your power source from your PC using an available serial port or GPIB interface. The following lists some of the features of UPC Manager:

- View and print UPC metered values including waveforms and harmonics (Firmware option).
- Export metered values to Microsoft™ Excel™ (\*.csv file).
- Monitor power source status.
- Create arbitrary waveforms.
- Connect to a virtual UPC using simulation files.
- Update UPC settings offline using simulation files.
- Capture and record commands and queries sent to your UPC.
- Create and execute output sequences based on time or cycle variations of voltage or frequency.
- Preview power source outputs during steady state or transient operation.
- Read all settings in your UPC controller and save them to a file on your PC (backup).
- Send settings from a file on your PC to your UPC controller (restore).
- Use your PC to view, edit and print UPC settings

Refer to your UPC Programmable Controller Operation Manual for additional information on UPC operation and the values of the various UPC settings.

## 2.0 System Requirements

UPC Studio/Manager requires:

- Windows 98/ME/2000/XP PC. UPC Studio requires Windows 2000/XP SP2.
- An available COM (serial) port or GPIB port (not required for simulation mode)
- Serial cable or GPIB interface cable (not required for simulation mode)
- NI-VISA software
- If you are using a GPIB interface, you also need NI-488.2 software.

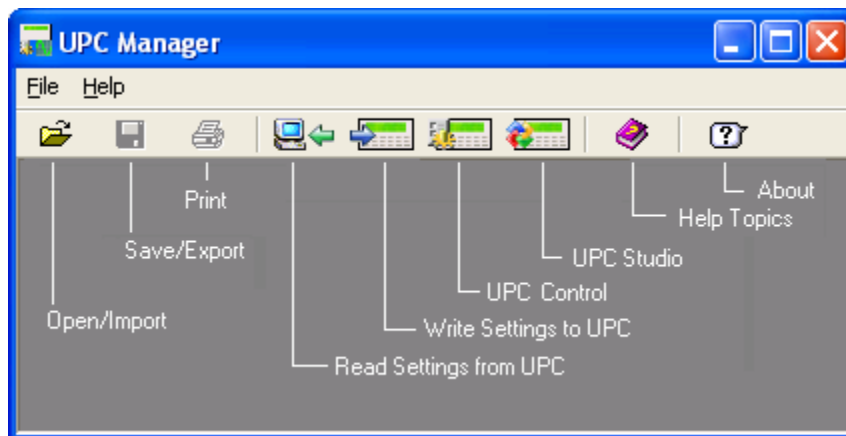
NI-VISA and NI-488.2 software are available for free download from the National Instruments web site at <http://www.ni.com/support/>.

## 3.0 Getting Started

To start UPC Manager, click **Start**, then click **Programs**, then choose **Pacific Power Source** then **UPC Manager**.

### 3.1 Main Window

UPC Manager is an MDI (Multiple Document Interface) application. As show below, the main window includes a toolbar. The toolbar allows you to perform the operations listed. The **Open/Import**, **Save/Export** and **Print** items are only enabled when a settings file or UPC window is open.

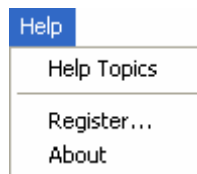


Click below for more information on a particular toolbar item:

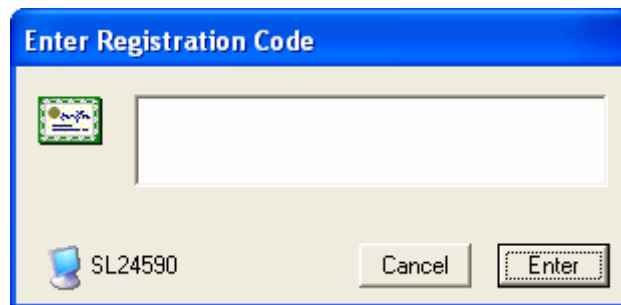
- **Introducing UPC Studio** - UPC Studio provides a complete graphical interface for your UPC controller and power source.
- **Introducing UPC Control** - The UPC Control window allows you to directly control your UPC through the remote interface.
- **Reading UPC Settings** - The Read UPC Settings window stores all the values in your UPC to a file on your PC.
- **Writing UPC Settings** - The Write UPC Settings window sends values from a settings file on your PC to your UPC.
- Save Settings to Text File
- Print
- Write Settings to UPC
- Registering
- About (System Resources )

## 3.2 Registering

Some UPC Studio/Manager features require a registration code. If a dialog appears that explains that feature is unavailable for your UPC, contact Pacific Power Source and provide your UPC serial number (also shown in the dialog box) to obtain the necessary registration code. To enter the registration code, choose Register from the Help menu.



Enter the registration code in the dialog box that appears. To minimize entry errors, you can copy (Ctrl+C) and paste (Ctrl+V) the code you received.





## 4.0 Introducing UPC Studio

UPC Studio provides a complete graphical interface for your UPC controller and power source. It includes safeguards to protect your load and guides you into entering values that are appropriate for your power source. UPC Studio can be used to directly control your UPC through the remote interface or "offline" using simulation files. In addition, you can monitor the status of your power source and view metered values like output voltage, load current, waveforms and harmonics.

UPC Studio features:

- Connect to your UPC using a Serial port or GPIB interface card.
- Easily change power source parameters like output voltage, frequency etc.
- View and print UPC metered values including waveforms and harmonics (Firmware option) Export metered values to Microsoft Excel (\*.csv file)
- Monitor power source status.
- Create arbitrary waveforms.
- Create and execute output sequences based on time or cycle variations of voltage or frequency.
- Connect to a virtual UPC using simulation files.
- Update UPC settings offline using simulation files.
- Capture and record commands and queries sent to your UPC.
- Preview power source outputs during steady state or transient operation.

Use the UPC Studio Connection Setup window to connect to your UPC.

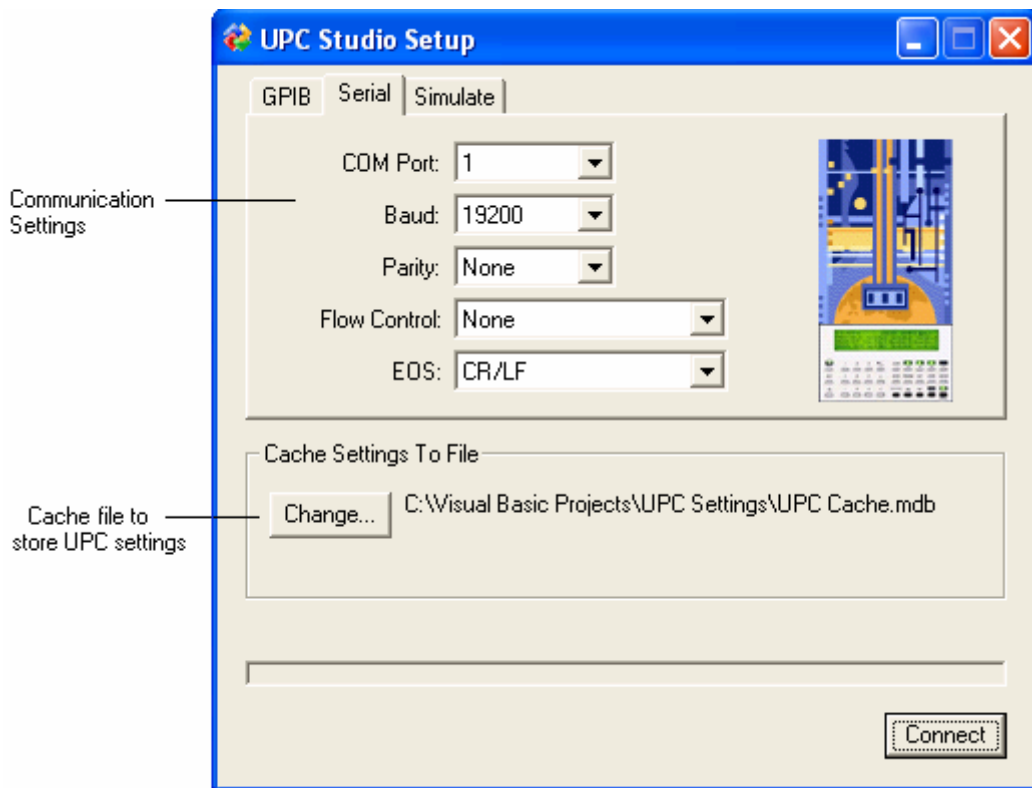
### 4.1 UPC Studio Connection Setup

Before UPC Studio can communicate with your UPC, you must specify the interface connection. The steps below describe how to connect to your UPC.

1. Press the **UPC Studio** icon in the toolbar
2. The **UPC Studio Setup** window appears as shown below. In this example, the **Serial** interface tab was selected. Click on the tab corresponding to the interface connection of your UPC then enter

the appropriate communication settings. You can view or change the remote interface settings currently programmed in your UPC by pressing **Fn 3, 3** on the UPC front panel.

3. Specify the cache file that will be created when controlling your UPC. The default cache file name automatically assigned for you should be fine for most applications.
4. After you specify the appropriate connection settings, press the **Connect** button.



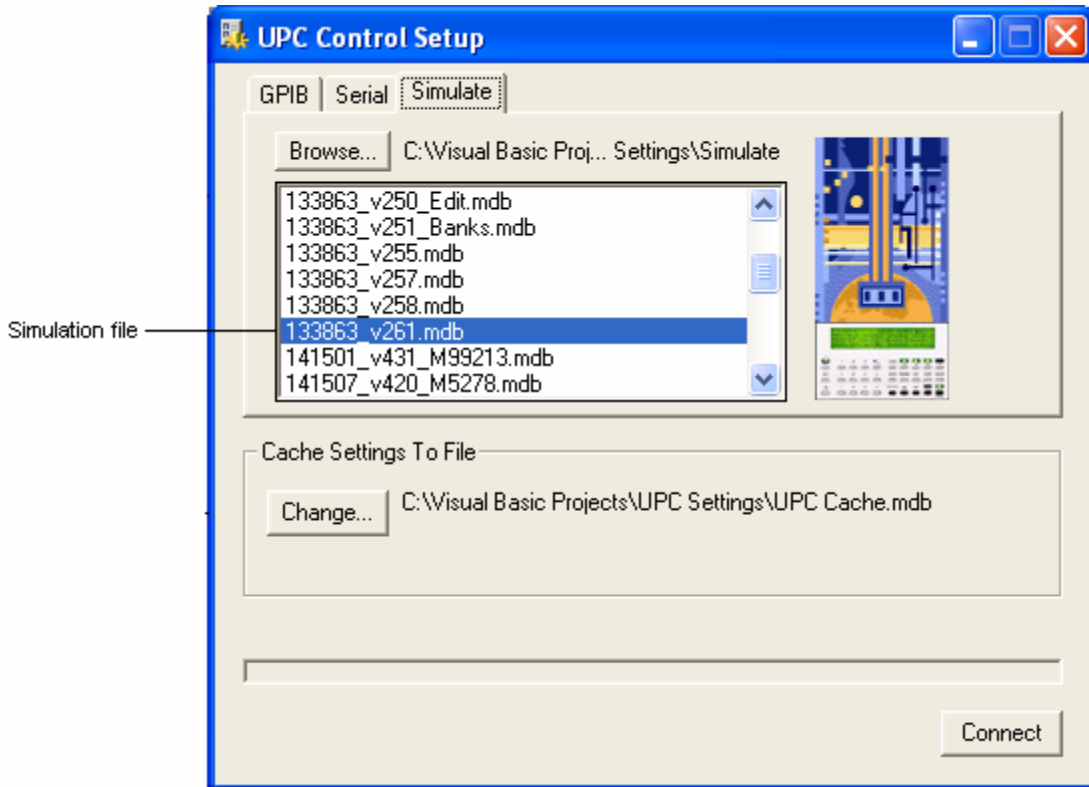
The progress of connecting is shown in the window. When the connection process completes, the main UPC Studio window appears. Also a UPC Meter window appears that allows you to view all UPC measured values.

### 4.1.1 Simulation Mode

In addition to being able to connect to your UPC using either a GPIB or Serial interface, you can connect to a virtual UPC using a simulation file.

Simulation files are nothing more than UPC Settings files and can be created using the Read UPC Settings icon in the toolbar. Simulation files should be stored in the "Simulate" folder located in the same directory as the UPC Manager application (typically C:\Program Files\UPC Manager\Simulate).

Simulation files are handy if you want to run your UPC "off-line". You can then upload your changes to your UPC using the Write UPC Settings icon in the toolbar. Shown below is an example of the UPC Studio Setup window with the **Simulate** tab selected.



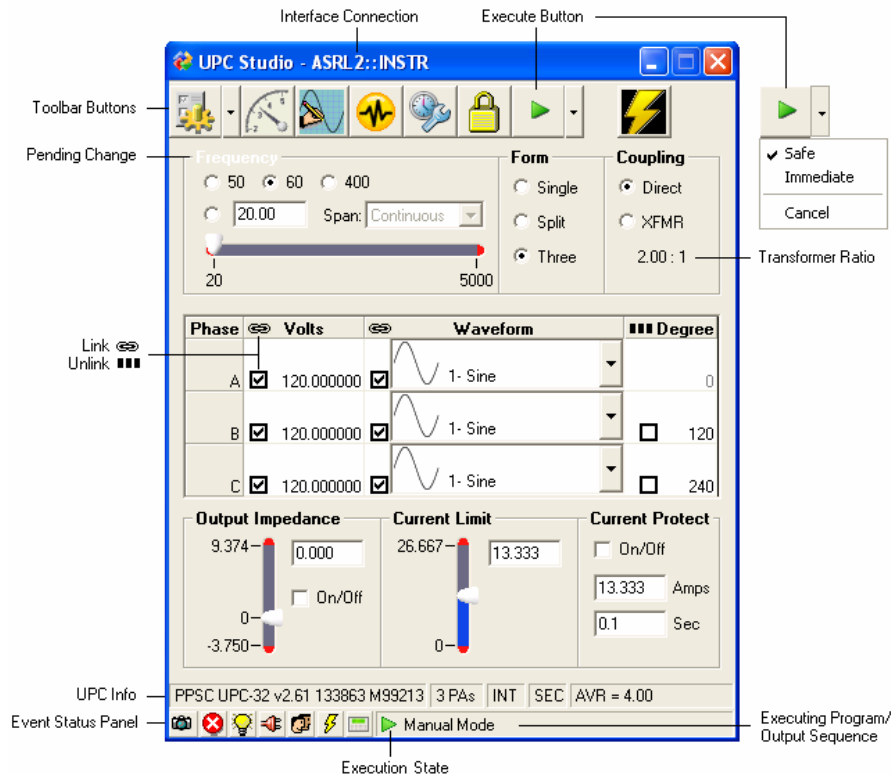
## 4.2 UPC Studio Window

After you connect to your UPC using the UPC Studio Setup window, the main UPC Studio window appears as shown below. The title bar of the window shows the interface connection used to connect to your UPC. A UPC Meter window is also associated with the main UPC Studio window.

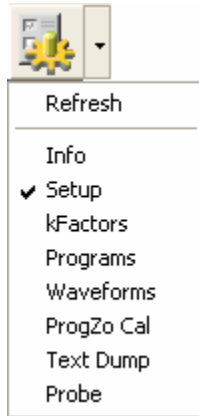
## 4.2.1 Operation

The UPC Studio window shows the output values presently executing in your UPC. Changes you make to the **CSC**, **Lock** and **Output Enable** buttons in the toolbar immediately take affect. For all other items, the change is "pending" until you press the **Execute** button. This provides a safeguard to protect the load and allows you to review all the changes before updating your UPC. Whenever a change is pending, the bold text associated with that item flashes white. You can discard pending changes by choosing "Cancel" from the execute button drop down menu. If you want changes to take effect immediately, choose "Immediate" from the Execute button drop down menu. Enter "DANGER" when you are prompted for a password.

Some items in the window shown below only apply to certain factory installed options and may not be available for your UPC. Right-clicking anywhere in the Frequency section or the Volts or Degree table cells opens the Adjust window.



## 4.2.2 Toolbar Buttons



The UPC Control (Ref. Para. 5.0) button includes a drop down menu that allows you to view the various panels in the UPC Control window. This menu is intended for troubleshooting purposes. Using the UPC Control window is not recommended because it bypasses the safeguards in UPC Studio. Choosing "Refresh" causes the values shown in UPC Studio to be re-read from your UPC. This normally isn't necessary unless you change values using the UPC front panel (not recommended when UPC Studio is connected to your UPC), causing UPC Studio to get out of sync.



This button activates the UPC Meter window (Ref. Para. 10.0).



This button opens the Waveform Editor (Ref. Para. 4.3).



This button opens the Output Sequence Browser (Ref. Para. 4.4).



Toggling this button turns CSC (Continuous Self Calibration) ON or OFF. When the button is depressed, CSC is ON.



This button set the UPC local lockout mode. When local lockout is active (Lock icon), the UPC front panel is disabled. When local mode is active (Key icon), you can access the UPC keyboard and view the LCD display. **Note:** You should not change items using the UPC front panel because it will cause UPC Studio to get out of sync.



When "Safe" mode is selected (default), pressing this button sends any pending changes you made in the UPC Studio window (or Adjust window ) to your UPC. Pending changes are indicated by flashing white text. You can discard pending changes by choosing "Cancel". If you want changes to take effect immediately, choose "Immediate" then enter "DANGER" when prompted for a password.

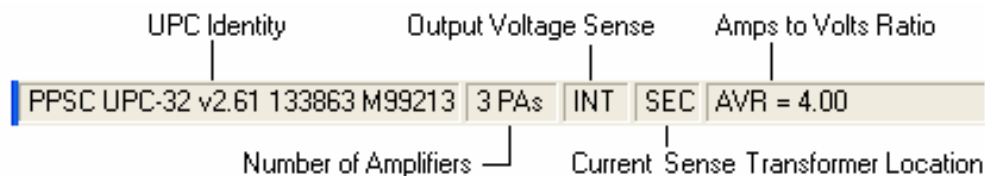


This button toggles the output contactor of your power source. A black background means the output is disabled (contactor open) and a red background means the output is enabled (contactor closed).

### 4.2.3 Link/Unlink

The **Link/Unlink** icon is available for columns in the table. This allows you to set the values for all phases independently or as a group. To change **Link/Unlink**, click in the column header. You can also selectively link items using the row checkboxes.

### 4.2.4 UPC Info



Most of the items in the **Info** panel relate to factory installed options. These items show the firmware and hardware configuration of your UPC and power source. **UPC Identity** is based on the "\*IDN?" query and shows the firmware options installed in your UPC. **Output Voltage Sense** can be either internal (INT) or external (EXT) and can be reconfigured using the UPC Control window Setup panel. The **Current Sense Transformer Location** can be either primary (PRI) or secondary (SEC) and the current sense transformer ratio is also shown.

### 4.2.5 Event Status Panel

Refer to the Event Status Panel section 4.8 for more information on these items.

## 4.3 Waveform Editor



The Waveform Editor is opened when you click the icon in the toolbar of the main UPC Studio window or Output Sequence window. The waveform editor allows you to view all waveforms stored in your UPC or in a particular output sequence. Waveforms stored in your UPC are the ones currently being used to generate the output voltages of your power source. Waveforms belonging to an output sequence are stored in the output sequence file. When that output sequence is executed, the necessary waveforms are downloaded into your UPC. The

title bar of the waveform editor window shows the location of the waveforms contained in the window. In the example below, these waveforms are the ones currently loaded into your UPC.

The waveform editor allows you to import, export, edit, print, or create arbitrary waveforms. UPC Waveforms are based on 1024 steps which represents 360 degrees (one complete cycle). The full scale amplitude range is +/-100%. Your UPC automatically scales these waveforms to achieve the Vrms value you enter in the main UPC Studio window or output sequence. Note that waveform 1 (Sine) is reserved meaning the contents cannot be changed but you can edit the **Title** and **Comments**.

The screenshot shows the 'UPC Waveforms - ASRL2::INSTR' window. It features a table of waveforms, a toolbar with buttons like Import, Export, Revert, Save, Draw, Pan, Zoom, Select, and Mirror. Below the toolbar is an 'Amplitude Table' and a graph titled 'Waveform #5 - Dropout' showing a sine wave with a vertical dropout at approximately 120 degrees.

**Waveforms Table**

Waveform	Title	CRC	Max Vrms	DC Offset %	Comments
1	Sine	-20844	150	0.0000	Factory Sine
2	Triangle	-21951	150	0.0000	Factory Triangle
3	Square	13059	150	0.0000	Factory Square
4	Pulse	2995	70.08	0.0177	Factory Pulse
5	Dropout	58	150	-3.9793	

**Amplitude Table**

Index	Degrees	Percent
425	149.062	51.4
426	149.414	50.87
427	149.766	50.33
428	150.117	49.79
429	150.469	49.3
430	150.820	48.77
431	151.172	48.23
432	151.523	47.69
433	151.875	47.16
434	152.227	46.57
435	152.578	46.03
436	152.930	45.49

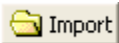
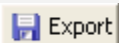
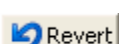
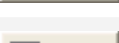
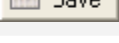
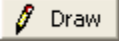

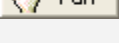

**Waveform #5 - Dropout**

The graph shows Amplitude % on the y-axis (ranging from -100 to 100) and Degrees on the x-axis (ranging from 0 to 360). A sine wave is plotted, with a vertical green bar indicating a dropout at approximately 120 degrees.

### 4.3.1 Waveforms Table

This table shows all waveforms stored in the UPC or output sequence file. You can click in the **Title** and **Comments** cells to enter your own text. The **CRC** column shows a unique number based on the actual waveform data. This allows the waveform editor to associate the waveform name and comments to a particular waveform stored in the **waveforms reference database**. This database file is stored in the same directory as the UPC Manager application and is automatically updated and maintained by UPC Studio. The **Max Vrms** column shows the maximum allowable output voltage that can be achieved for that waveform for your power source using the coupling and transformer ratio selected in the main UPC Studio window. The **DC Offset %** column shows the DC component of the waveform. You can set this value to 0 by using the **Zero DC Offset** function in the Waveform Graph Context menu.

### 4.3.2 Toolbar buttons

	Refer to the Importing, Exporting and Printing section below for more info.
	Refer to the Importing, Exporting and Printing section below for more info.
	This button is only enabled after you begin editing. Clicking this button will revert the waveform to the values last saved. This effectively undoes all your changes.
	This button is only enabled after you begin editing. Clicking this button will save the waveform to your UPC or output sequence.
	When this button is depressed, you can use the mouse to draw arbitrary values in the waveform graph.
	When this button is depressed, you can pan (reposition) the waveform when you click and drag the mouse in the graph. You can also use "Default" in the Waveform Graph Context menu to recenter the graph.
	When this button is depressed, the graph zooms-in (magnifies) when you click the mouse in the graph. If you press and hold the shift key, the graph zooms-out (reduces) when you click the mouse in the graph. You can also use "Default" in the Waveform Graph Context menu to reset the zoom to normal (100%).
	When this button is depressed, you can click and drag the mouse in the graph to make a selection. Some functions in the Waveform Graph Context Menu require that you first make a selection. The selection is also shown in the amplitude table.
	This button toggles the mirror state. When the mirror button is depressed, any changes you make to the waveform are automatically "mirrored" 180 degrees. This helps to maintain 0% DC offset or to create symmetrical waveforms.



### 4.3.3 Amplitude Table

The amplitude table shows the index, degrees and amplitude (in percent) for all 1024 waveform steps. You can click cells in the **Percent** column to change a value. Editing a cell in a selection range affects all selected rows. Right-clicking in the amplitude table displays a shortened version of the Waveform Graph Context Menu.

### 4.3.4 Selection

Clicking and dragging the mouse in the amplitude table selects a range of rows. You can also "shift-click" to create a selection range. The selection also appears in the waveform graph. Clicking in the header row of the amplitude table removes the selection. If the **Select** button is depressed in the Toolbar, you can also click and drag the mouse in the graph to select a portion of the waveform. The corresponding rows in the amplitude table are also selected.

### 4.3.5 Waveform Graph Context Menu

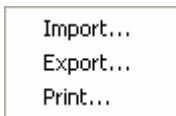
This menu appears when you *right-click* the mouse in the *graph*. A shortened version of this menu also appears when you right-click the amplitude table. Some items in this menu apply to the selection in the amplitude table or graph. Refer to the previous topic for information on making a selection.

Default	
Show Cursor	
Select All	Ctrl+A
Copy	Ctrl+C
Paste	Ctrl+V
Undo	Ctrl+Z
Scale...	
Set...	
Offset...	
Noise...	
Clipped Sine...	
Ring...	
Flip Vertical	
Flip Horizontal	
Zero DC Offset	
Draw	
Pan	
Zoom	
✓ Select	
Mirror	

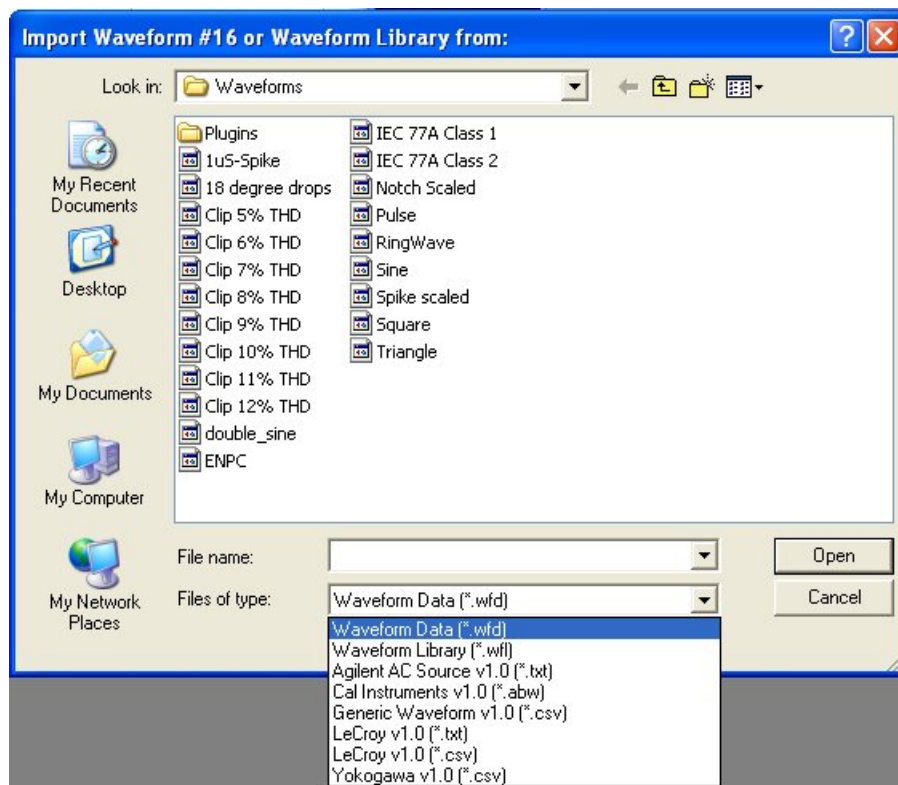
Item	Description
Default	Centers the graph view and sets the zoom level to normal (100%).
Show Cursor	Tracks the mouse movement in the graph with a vertical cursor. Cursor annotation text is also displayed showing the waveform index, degrees and amplitude.
Select all	Selects all 1024 steps (360 degrees) of the waveform.
Copy	Copies the selection to the clipboard.
Paste	Pastes the clipboard to the waveform at the start of the selection.
Undo	Undoes the last change. This menu item then changes to Redo, allowing you to restore the last change.
Scale	Multiplies the amplitude of the selection by the scale factor you enter.
Set	Sets the amplitude of the selection to the value you enter.
Offset	Shifts the amplitude of the selection by the value you enter.
Noise	Adds a random number (+/-) to the amplitude of the selection. The amplitude of the noise is based on the value you enter.
Clipped	Creates a clipped sine wave based on the THD (Total Harmonic Distortion) number you enter.
Ring	See the Ring Window for more information.
Flip Vertical	Multiplies the amplitude of the selection by -1 (inverts).
Flip Horizontal	Reverses the index (degrees) of the selection. This swaps the left to right orientation of the selection.
Zero DC Offset	Removes the DC component of the entire waveform.
Draw	Sets the mouse action in the graph to allow you to draw arbitrary values.
Pan	Sets the mouse action in the graph to allow you to move the waveform view horizontally or vertically.
Zoom	Sets the mouse action in the graph to zoom-in (magnify) the waveform. Holding the Shift key allows you to zoom-out (reduce) the waveform.
Select	Sets the mouse action in the graph to select a portion of the waveform. The selection also appears in the amplitude table.
Mirror	Toggles the Mirror state. When this item is checked, any changes you make to the waveform are automatically "mirrored" 180 degrees. This helps maintain 0% DC offset or to create symmetrical waveforms.

## 4.3.6 Importing, Exporting and Printing Waveforms

Right-clicking a row in the Waveforms Table displays the Waveform Table Context menu.



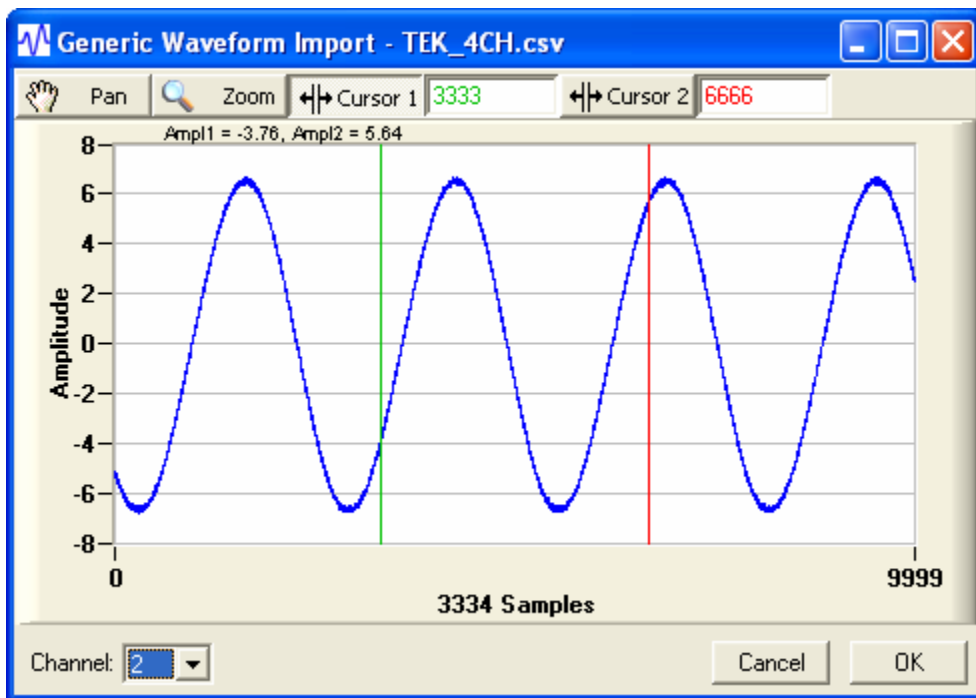
Selecting Import or Export displays a file dialog. Shown below is the Import file dialog.



The file type menu at the bottom allows you to import or export a single waveform (Waveform Data), all waveforms (Waveform Library) or custom waveform. Custom waveform file formats are supported using waveform plug-ins. These DLL files are stored in the Plug-ins folder (typically located at C:\Program Files\UPC Manager\Waveforms\Plug-ins). Contact Pacific

Power if you have a custom waveform file format you want to import or export using the Waveform Editor.

Importing waveforms from an Oscilloscope file will require you to select the portion of the captured data you wish to use for your waveform. If you have a multiple channel Oscilloscope you may have more than one column of data. The following screen is the 'Generic Waveform Import' selection wizard:



Using the Pan and Zoom functions you can locate the portion of the waveform you wish to import. Selecting "Cursor 1" will let you position the first cursor at the beginning of the waveform. Selecting "Cursor 2" will let you position the second cursor at the end of the waveform. Pressing OK will import the selected portion of the waveform.

### 4.3.7 Harmonic Table

Clicking the **Harm Tab** allows you to create waveforms based on harmonic amplitude and phase as shown below.

The screenshot shows the 'UPC Waveforms - ASRL2::INSTR' window. It contains a table of waveforms and a harmonics table for the selected waveform, 'Waveform #13 - Odd Distortion\*'. The harmonics table has columns for harmonic number, magnitude percentage, and phase. A graph to the right shows the amplitude percentage of the waveform over 360 degrees.

Waveform	Title	CRC	Max Vrms	DC Offset %	Comments
9	Untitled	25927	150	0.0000	
10	Untitled	4403	150	0.0000	
11	Untitled	28236	150	0.0000	
12	Clipped	22256	150.00	0.0000	
13	Odd Distortion	-26109	150	0.0000	

#	Mag %	Phase
1	100	0
2	0	0
3	20	0
4	0	0
5	5	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0

Amplitude % vs Degrees graph for Waveform #13 - Odd Distortion\*:

Degrees	Amplitude %
0	0
90	100
180	-100
270	0
360	0

The default harmonic content is a pure sine wave. You can click in the table cells to enter values for **Mag %** and **Phase**. Right-clicking the Harm table will display the Harmonics Context Menu.

- Load Harmonics...
- Save Harmonics...

---

- Sine
- Triangle
- Square

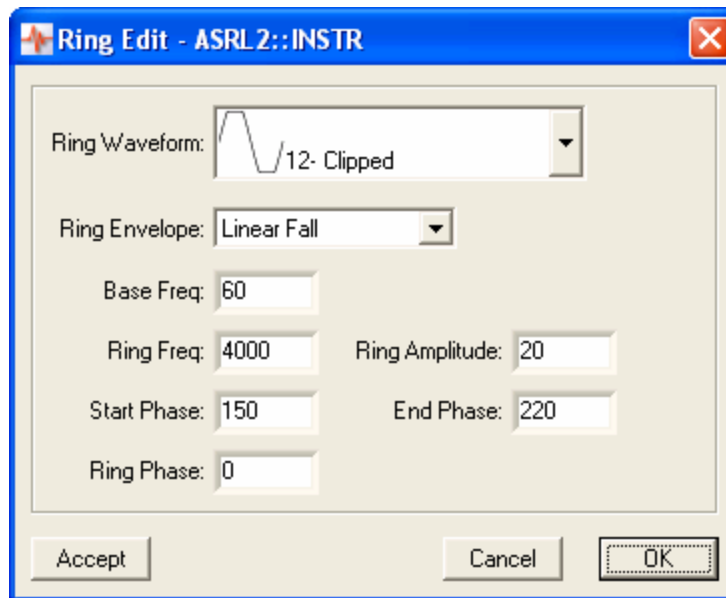
---

- ✓ 51 Harmonics
- 64 Harmonics
- 128 Harmonics
- 256 Harmonics
- 512 Harmonics

This menu allows you to load or save the harmonics table to a file. Selecting "Sine", "Triangle" or "Square" fills in the table with a harmonics series that creates that waveform. You can also specify the number of harmonics used to create the waveform.

### 4.3.8 Ring Edit Window

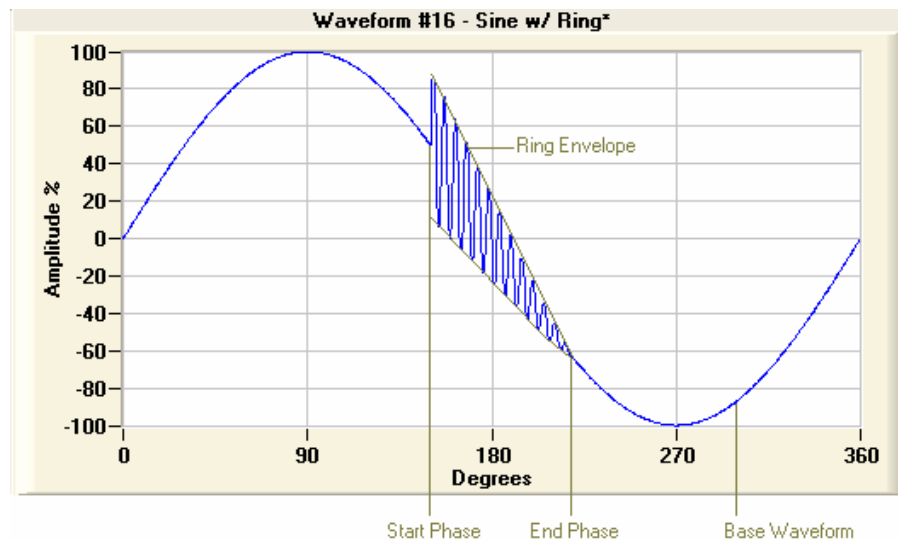
The Ring Edit window is accessed by selecting "Ring" in the Waveform Graph Context Menu in the Waveform Editor. The Ring Edit window allows you to superimpose a ring onto the waveform you are editing (base waveform) in the waveform editor. Changes in the Ring Edit window are immediately shown in the graph in the waveform editor.



Item	Description
Ring Waveform	This is the waveform used for the ring. The default waveform is a sine wave but you can use any waveform shown in the drop down list.
Ring Envelope	Defines the amplitude envelope of the ring.
Base Frequency	This is an arbitrary reference frequency representing the base waveform.
Ring Frequency	This is an arbitrary reference frequency of the ring and is relative to the base frequency.
Ring	This is the amplitude of the ring in percent.

Amplitude	
Start Phase	This is the phase angle (degrees) of the base waveform where the ring will start.
End Phase	This is the phase angle (degrees) of the base waveform where the ring will end.
Ring Phase	This is the starting phase angle (degrees) of the ring waveform.
Accept	Commits the ring to the base waveform and allows you to create another ring.
OK	Commits the ring to the base waveform and closes the window
Cancel	Undoes ring editing and closes the window.

The diagram below shows how the Ring Edit values relate to the base waveform.

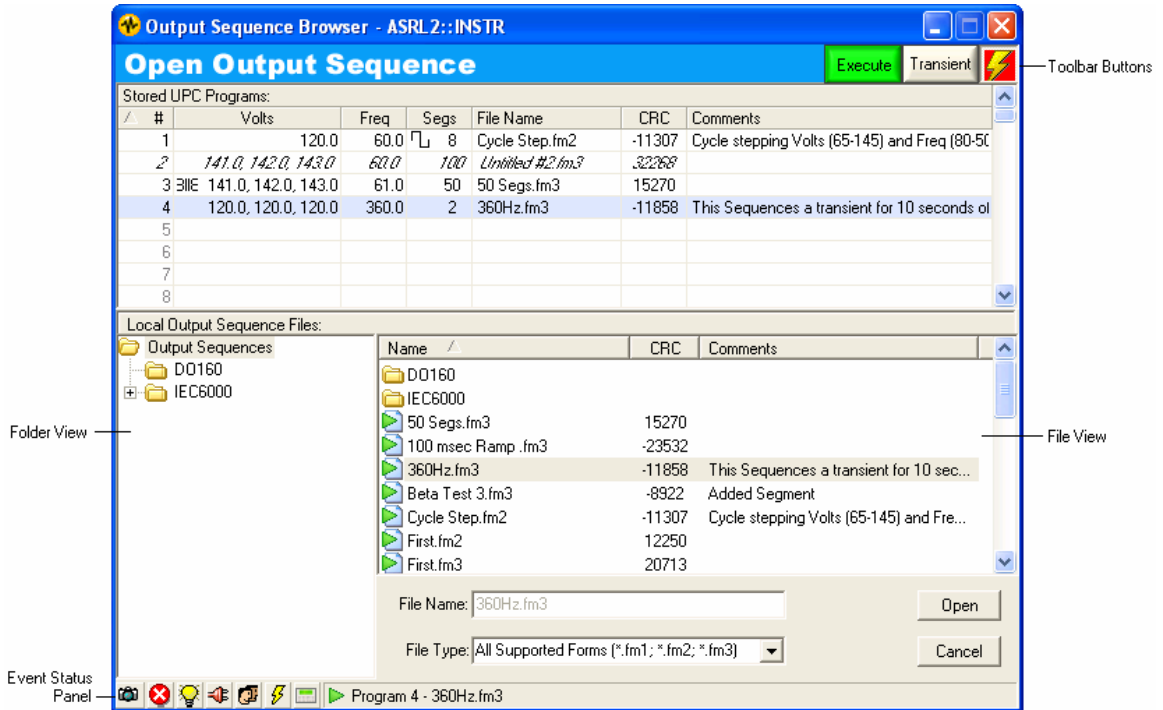


### 4.3.9 Event Status Panel

Refer to the **Event Status Panel** section 4.8 for more information on these items.

## 4.4 Output Sequence Browser

This window is accessed by pressing the Output Sequence Browser button in the main UPC Studio window.



The top panel shows the programs stored in your UPC. The bottom panels shows the output sequence files locally stored on your PC. The root folder for the output sequence files is located in the same directory as the UPC Manager application (typically C:\Program Files\Upc Manager\Output Sequences). Only output sequences stored at or below this directory level are available to the browser.

Output sequence files provide a graphical interface that allow you to view and edit UPC programs. When an output sequence is saved to your UPC, the file itself is not transferred. Instead, the file contents are translated into native UPC steady state and transient segment parameters. The Output Sequence Browser uses CRC information to keep track of which output sequence files are stored in your UPC. In the above example, the browser was able to associate Programs 1, 3 and 4 to the output sequence files



listed. But a local output sequence file could not be located for Program 2 (shown in italics). You can open an output sequence or stored UPC program by selecting it in either the **Stored UPC Programs** table or the **File View** and then click the **Open** button. Refer to the Output Sequence window section for more information. To copy an output sequence file to your UPC, simply click and drag the file to the desired program.

#### 4.4.1 Stored UPC Programs Table

This table shows all programs in your UPC. The table shows a brief summary of the program's voltage, frequency and transient. The transformer icon indicates the program uses transformer coupling and the cycle icon indicates the transient is cycle based. If the program does not contain a transient, the **Segs** entry for that program is blank. Italic text means a local output sequence file on your PC could not be found. When you open a program, the Output Sequence window is displayed using the appropriate output sequence file. If a file doesn't exist, a new one is created with the name "Untitled #n" where "n" is the program number. The Output Sequence window allows you to specify a different name (when saving) and enter any comments that will appear in the browser.

Right-clicking a row in the table allows you to access the functions in the context menu shown below.

New	Ctrl+N
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Refresh	F5

Using any of these menu items immediately affects the programs stored in your UPC. **Refresh** causes your UPC to be queried for stored programs and checks for any associated output sequence files.

#### 4.4.2 Toolbar Buttons

The toolbar buttons are available when you select a row that contains a program. These buttons are described below:



This button allows you to execute the steady state portion of the selected program. It turns green while the selected program is executing. Unpressing this button switches the UPC to Manual Mode.



This button allows you to execute the transient portion of the selected program. It turns yellow while the transient of the selected program is running. This button also shows if a Ramp is executing. Unpressing this button stops the transient or Ramp and resumes steady state operation. Refer to the Adjust window for more information about Ramps.

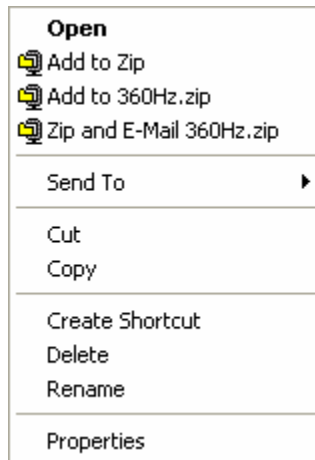


This button indicates the output contactor state of your power source. You can click this button to toggle output state. A black background means the output is disabled (contactor open) and a red background means the output is enabled (contactor closed).

**Note:** Pressing the **Execute** button also turns on the output contactor.

### 4.4.3 Folder and File Views

The Folder and File views provide a Windows Explorer type interface. You can create folders, rename files, or move files by clicking and dragging. Right-clicking in either section displays the context menu shown below.



The file extension used for output sequences is based on the output Form. The **File Type** drop down menu shows the output Forms supported by your power source. You can use this menu to filter out which files (Forms) are shown.

### 4.4.4 Event Status Panel

Refer to the **Event Status Panel** section 4.8 for more information on these items. Note that the executing program number and output sequence file name in the event status panel match the program selected in the Stored UPC Programs table.

## 4.5 Output Sequence Window

When you open an output sequence or UPC program from the Output Sequence Browser, the Output Sequence windows appears as shown below.

Out of Range Value Program Number File Name Column Link/Unlink

**Output Sequence - ASRL2::INSTR - Program #3 - 150v Stress Test**

Toolbar Buttons: Revert, Save As..., Waveforms, Details

Steady State: Form: 3, Freq: 15.000000, Coupling: DIRECT, Curr Limit: 50.000000 Amps, IProt: 50.000000 Amps, 0.1 Sec

Phase	Volts	Waveform	Degrees
A	120.000000	1- Sine	0
B	120.000000	1- Sine	120
C	120.000000	1- Sine	240

EXECUTE

Transient Segments:

Seg	Freq	Volts A	Volts B	Volts C	Waveform A	Waveform B	Waveform C	Duration
1	60.000000	30.000000 Vrms	120.000000 Vrms	120.000000 %	1	1	1	0.500000 Sec
2	60.000000	50.000000 Vrms	120.000000 Vrms	120.000000 Vrms	1	1	1	60.000000 Cyc
CR	60.000000	50.000000 Vrms	120.000000 Vrms	120.000000 Vrms	1	1	1	0.016667 Sec

TRANSIENT

Graph Checkboxes:  Frequency,  Volt A,  Volt B,  Volt C






Event Status Panel: Manual Mode, -16639, Comments: Rise to 150 Volts & Hold for 60 Cycles

Transient Graph: Seg 2: 0.5 - 1.5 Sec (1.0 Sec), Vrms, Frequency, 1.5167 Sec/Event, 1 Event

Labels: Output Enable, Execute Button and elapsed time indicator, Transient Button and elapsed time indicator, Number of Events, Cycle Based Transient Checkbox, Transient Event Progress

Labels: CRC, Comments, Total Transient Time

### 4.5.1 Toolbar Buttons

 Revert	This button is only available after you make a change in the window. Clicking this button undoes all your changes and restores the output sequence to its original state.
 Save As...	This allows you to save this output sequence to another file or UPC program. Refer to the Saving Output Sequences section for more information.
 Waveforms	This button opens the Waveform Editor for the waveforms contained in this output sequence.
 Details	This button allows you to view a simulation of the output sequence (See Section 9.0).
	This button toggles the output contactor of your power source. A black background means the output is disabled (contactor open) and a red background means the output is enabled (contactor closed). This button is automatically activated when you press the <b>Execute</b> or <b>Transient</b> button.

### 4.5.2 Execute Button and Elapsed Time Indicator

Your power source is updated with the steady state values when you press the Execute button. Pressing the Execute button also turns the Output Enable On. The Execute button also indicates when this program is Executing. The Elapsed time indicator shows how long the program has been running. Unpressing the Execute button switches the UPC to Manual Mode.



### 4.5.3 Transient Button and Elapsed Time Indicator

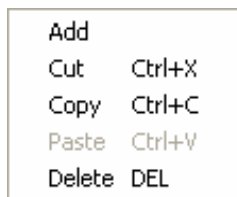
The Transient button executes the steady state values, turns the Output Enable On, then starts executing the transient event(s). The Transient

button also indicates when the transient is running. Unpressing the Transient button stops the transient and resumes steady state operation. The Elapsed time indicator and Transient Event Progress bars show how long the transient has been running. If a Ramp is programmed (see Adjust window), the Transient button will indicate when the Ramp is running.



#### 4.5.4 Transient Segments

The Transient Segment table defines a transient event. When the Transient button is pressed, the event defined by these segments is repeated by the number of events you specified by the **Number of Events** items. Right-clicking a row in the **Seg** column of this table displays the Segment Context menu shown below.



These menu items act on the location of the mouse when you right-clicked or the selected row(s). The table below describes these items.

Item	Description
Add	Adds a transient segment row immediately past the current selection.
Cut	Cuts the selected row(s) and copies them to the clipboard.
Copy	Copies the selected row(s) to the clipboard.
Paste	Pastes the clipboard immediately past the current selection.
Delete	Deletes the selection.

You can select one or more rows by clicking (or dragging) in the **Seg** column for that row. The selection is highlighted in yellow. The graph also shows the selection.

For a time based transient (**Cycle Based Transient Checkbox** is not checked), the frequency and voltage values entered in a row are the ending values. Your UPC smoothly transitions each segment to the ending values starting with the values of the previous segment (or steady state). You can specify the units of the Volts or Duration table cells. The Volts units can be toggled between Vrms and percent steady state by clicking the **Vrms** or **%** text. Percent steady state means the segment voltage for that phase is a percentage of the corresponding steady state voltage. For the Duration table cells, you can toggle the Duration units between seconds and cycles by clicking on the **Sec** or **Cyc** text.

For a cycle based transient (**Cycle Based Transient Checkbox** is checked), the segment values for frequency and voltage immediately take affect without any transition from the prior segment. Also, the duration table cells are always 1 cycle and cannot be edited.

#### 4.5.5 Cycle Reset

The Cycle Reset segment is automatically created for time based transients. Transient events always begin with the phase A zero crossing. The duration of the Cycle Reset segment is calculated from when the last user segment ends until the next phase A positive zero crossing. You cannot edit the values of the Cycle Reset segment but you can select it to view in the graph.

#### 4.5.6 Out of Range Values

Values with **red** text are out of range. This means the value is outside the allowable range for that item. This can occur, for example, if the output sequence (file) was created on a different power source (that supported that value) or the value exceeds the limits currently programmed in your UPC. Right-click the value to display the Adjust window. The Adjust window shows the valid range of values and allows you to view or change the limits.

## 4.5.7 Transient Graph

The Transient Graph shows a graphical representation of the transient segments. Clicking in the graph highlights that segment. The graph shows the values as they transition from one segment to the next starting with the steady state values. If you specified more than one transient event, only the first event is shown. The **Total Transient Time** calculation displayed at the bottom right of the graph includes all events. A vertical cursor shows the elapsed time, voltage and frequency. You can selectively show a particular plot by clicking the Graph Checkboxes. The **Details** button allows you to see an exact simulation of the output sequence.

When you right click in the transient graph, the graph context menu appears.



The items in this menu are described below.

Item	Description
Default	Sets the time axis to show the entire transient event. This undoes any Pan or Zoom.
Cursor	Displays a vertical cursor and annotation values that show the voltages and frequency at the cursor position.
Select	Clicking in the graph selects the associated segment.
Pan	Clicking and dragging the mouse in the graph shifts the graph left or right. This also allows you to view the steady state values before and after the transient event.
Zoom	Clicking the mouse in the graph zooms-in (expands) the graph time. Shift-clicking the mouse zooms-out (contracts) the graph time.



#### **4.5.8 Link/Unlink**

Clicking the Link/Unlink icon toggles the Link/Unlink state of that table column. When a column is linked, changing one item in that column sets all other items to the same value.

#### **4.5.9 Event Status Panel**

Refer to the **Event Status Panel** section 4.8 for more information on these items.

#### **4.5.10 CRC**

This is a unique number calculated from the values in the output sequence. The Output Sequence Browser uses this number to associate output sequence files to stored UPC programs. NOTE: The comments section of the Output Sequence is not used to generate the CRC number, but is displayed in the Open Output Sequence window.

#### **4.5.11 Comments**

Text entered here appears in the Output Sequence Browser window.

#### **4.5.12 Cycle Based Transient Checkbox**

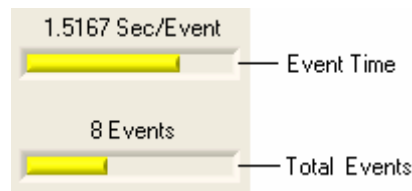
Your UPC supports two kinds of transients - time based and cycle based. Each segment of a time based transient can be any duration of time between 200usec and 300 seconds. The frequency and voltage smoothly change from one segment to the next. Cycle based transient segments are exactly one cycle in duration based on the segment frequency. The frequency and voltage of cycle based transients instantaneously changes from one segment to the next.

#### **4.5.13 Number of Events**

These items determine how many times the transient segments are repeated when you press the Transient button.

#### 4.5.14 Transient Event Progress

These bars show the progress of the transient based on the transient time of each event and the total number of events.



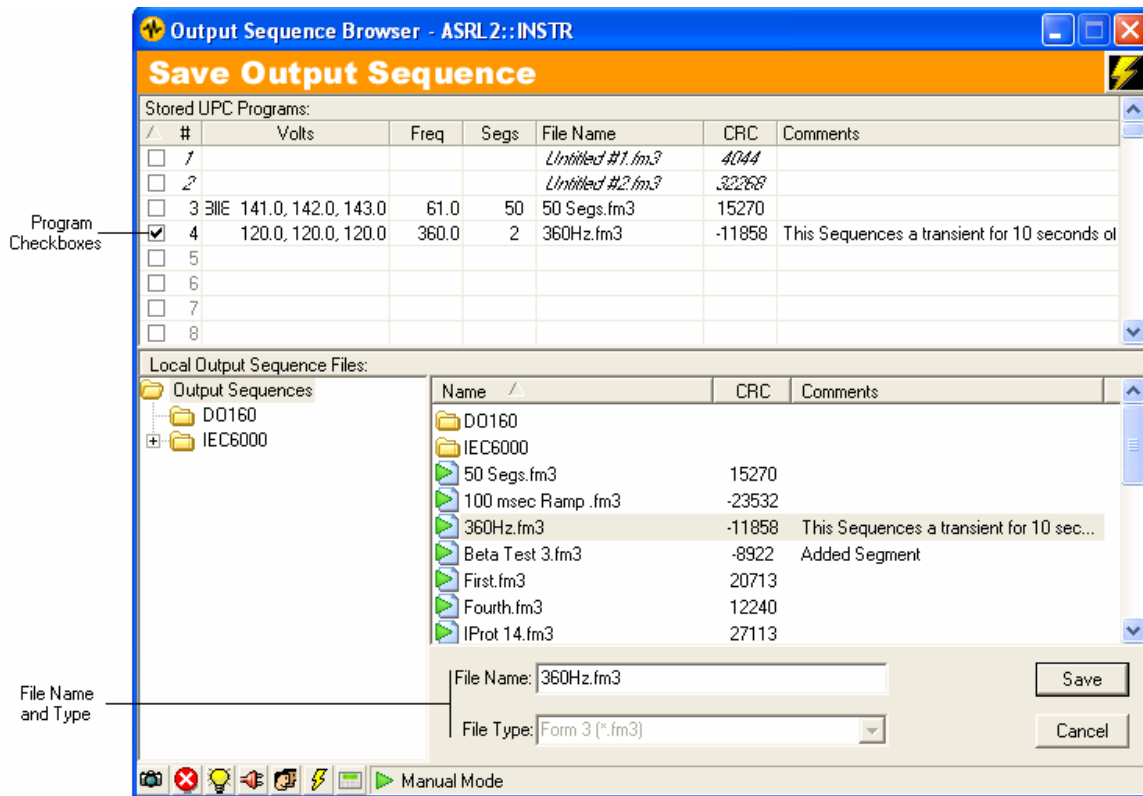
#### 4.6 Saving Output Sequences

Output sequences are stored in local files on your PC and optionally, in one or more stored UPC programs. You have several options when saving output sequences. The Output Sequence Window uses the existing file name and program number (shown in the title bar) when you press the **Save** button. If a program or file is not currently defined or you press the **Save As** button, the **Save Window** appears as shown below.

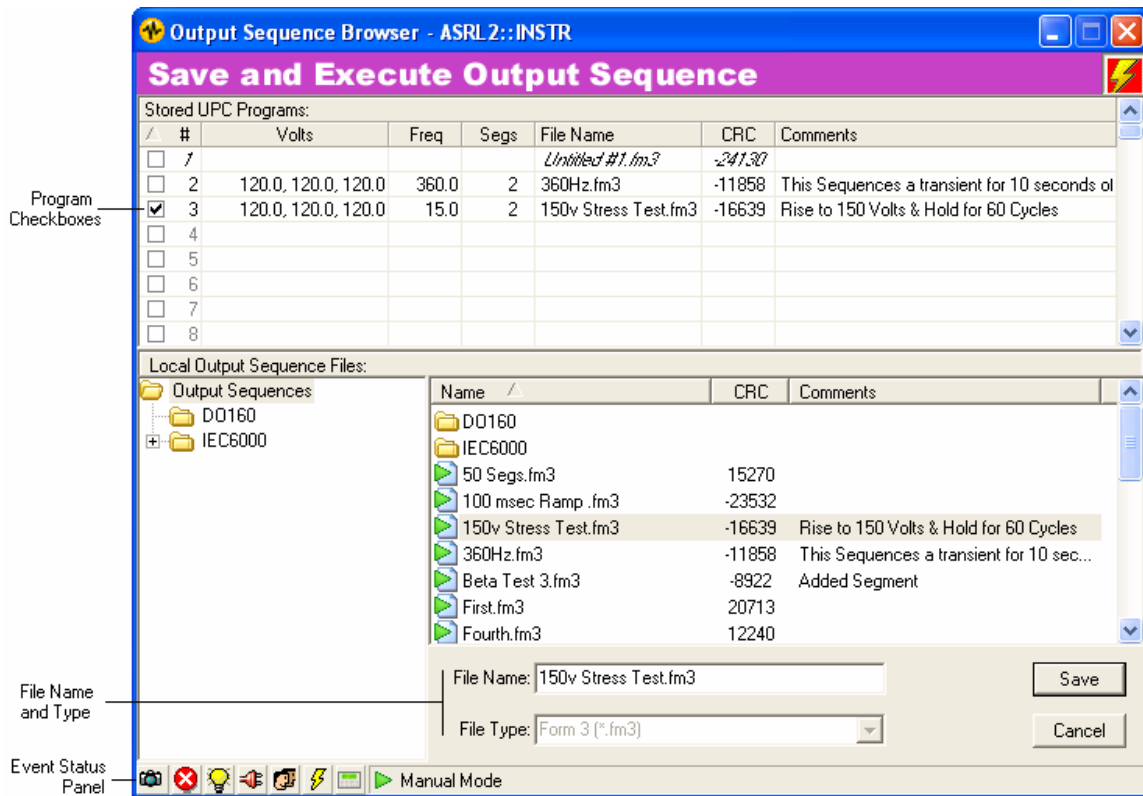
If you press the **Execute** or **Transient** button in the Output Sequence window and your changes are not currently saved to a UPC program and file, the **Execute and Save Window** appears as shown below.

These windows are actually the Output Sequence Browser reconfigured with a series of checkboxes in the **Stored UPC Programs** table. These checkboxes allow you to select the UPC program to store. In the file browser section, you can select an existing file to overwrite or enter a new file name. The **File Type** is automatically selected for you. It's based on the output Form specified in the Output Sequence window.

## 4.6.1 Save Window

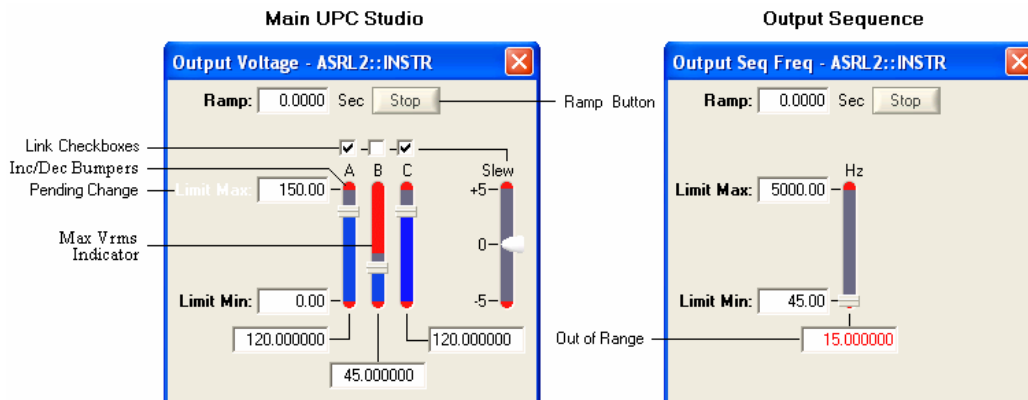


## 4.6.2 Save and Execute Window



## 4.7 Adjust Window

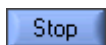
This window can be accessed from the main UPC Studio window or Output Sequence window. It appears when you right-click the **Frequency** or the **Volts** or **Degrees** table cells. The examples below show the Adjust window after right-clicking one of the **Volts** table cells in UPC Studio and the steady state **Frequency** in the Output Sequence window.



Use the sliders or the number boxes at the bottom to change values. Changing a value with the **Link** checkbox "checked" means all other "checked" phases will be affected.

### 4.7.1 Ramp

This number box allows you to control the transition time (in seconds) used when changing values. A ramp time of 0 means the output immediately changes to the new value. Programming a Ramp time provides a smooth transition to the new value. When the Ramp is executing, the button changes (shown below) indicating the Ramp is in progress and it also allows you cancel the Ramp.



**Note:** Voltage or Frequency changes can be ramped but not Phase (degrees) changes.

### 4.7.2 Pending Change

Whenever a Min or Max Limit change is pending, the bold text associated with that item flashes white. The way changes are handled in the Adjust window tracks the Execute mode presently configured in the main UPC Studio window. Refer to the Execute button section for more information.

**Note:** Pending changes only apply if the Adjust window was accessed from the main UPC Studio window.

### 4.7.3 Max Vrms Indicator

This applies only when using the Adjust window to change the voltage. The red indicator shows the maximum voltage allowed for that phase based on the Waveform, Form and Coupling presently indicated in the main UPC Studio window or Output Sequence window. Based on these values, there may be cases where your power source may not be capable of setting the output voltage for that phase to the **Limit Max** value. You can hover the mouse over the slider to see the max Vrms value allowed. Refer to the Waveform Editor for more information about **Vrms max**.

### 4.7.4 Out of Range

Values with **red** text are out of range. This means the value is outside the allowable range for that item. The Voltage range is determined by the Form, Coupling, Waveform (of that phase) and the Limit Min/Max value. The Frequency range is determined by the Limit Min/Max value. The Phase (degree) range is 0 to 359 degrees.

**Note:** You will not be able to Execute an output sequence that contains an out of range value.

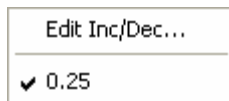
### 4.7.5 Slew

This is a "spring loaded" control that allows you to slew the values up or down. The further from the center (0), the greater the change and the scale is logarithmic. Only phases that are checked will be slewed. Slewing changes the values in real time when the Execute mode is "Immediate" so it behaves similar to the UPC front panel slew controls.

**Note:** The slew control is not available for Output Sequences.

#### 4.7.6 Inc/Dec Bumpers

Clicking at either end of the sliders changes the output by a fixed value. You can view or change this value by right-clicking on the sliders.

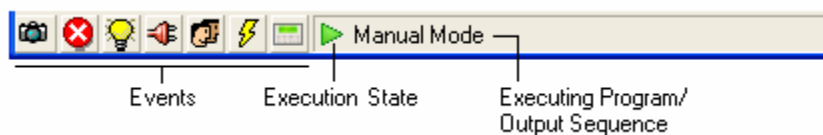


#### 4.7.7 Limit Min/Max

These items limit the allowable values you can enter for the voltage or frequency. Attempting to set your power source outside these limits will be prevented. The Info panel in the UPC Control window shows the maximum and minimum values (range) you can enter for the voltage or frequency limits.

#### 4.8 Event Status Panel

The Event Status Panel shown below appears at the bottom of most UPC Studio windows.



## 4.8.1 Events

Events are shown at the bottom left of the **Event Status Panel**. Except for the **Capture** icon, UPC Studio polls your UPC and automatically updates these icons. These icons indicate a particular event occurred and they remain latched until you clear them by clicking on that icon.



This icon means that Command/Query capture mode is on. Click this icon or press the **Probe** tab to view the commands and queries that have been sent to the UPC or to turn Capture mode off.



This icon means an error occurred. A message box also appears describing the error. This event is automatically cleared when you close the message box.



This icon means a power-on event has occurred with your UPC. You should normally disconnect (close) UPC Manager first before turning on/off you UPC. This event can alert you that one or more settings may have been changed and that you should refresh the affected views.



This icon means the power source has shut down due to an output overload condition.



This icon means the UPC was operating in the **Local** mode and someone pressed the Local/Remote key on the UPC front panel. This event can alert you that one or more settings may have been changed and that you should refresh the affected views.



This icon means the UPC output was turned off because the output current or voltage exceeded the programmed threshold.







This icon means the remote interface is unavailable because your UPC is not in the V/I Display mode. Press the "Clear" or "Display" buttons on your UPC keyboard to return to the V/I Display screen.



This icon means the remote interface is not responding. This can be because your UPC is turned off or the interface cable is disconnected.



## 4.8.2 Execution State

-  This icon means the steady state portion of the executing program listed is executing.
-  This icon means the transient portion of the executing program listed is executing.
-  This icon means a Ramp is currently executing. Ramps provide a smooth transition when changing an output parameter (like volts or frequency) or when executing a new program. You can view or program the Ramp time using the Adjust window .
-  This icon means no programs are executing. This is most likely caused by an illegal program parameter that would prevent it from being executed.

## 4.8.3 Executing Program

This is the program number (or Manual Mode) of the currently executing program. You can use the Output Sequence Browser to specify which program to execute. Manual Mode is automatically entered whenever an output parameter of the last executing program was changed. If the program is based on a output sequence, the output sequence file name is also shown.

## 5.0 Introducing UPC Control

The UPC Control window allows you to directly control your UPC through the remote interface. In addition, you can monitor the status of your power source and view metered values like output voltage, load current, waveforms and harmonics. UPC Studio also allows you to access all items in the UPC Control window.

**\*\*CAUTION\*\***

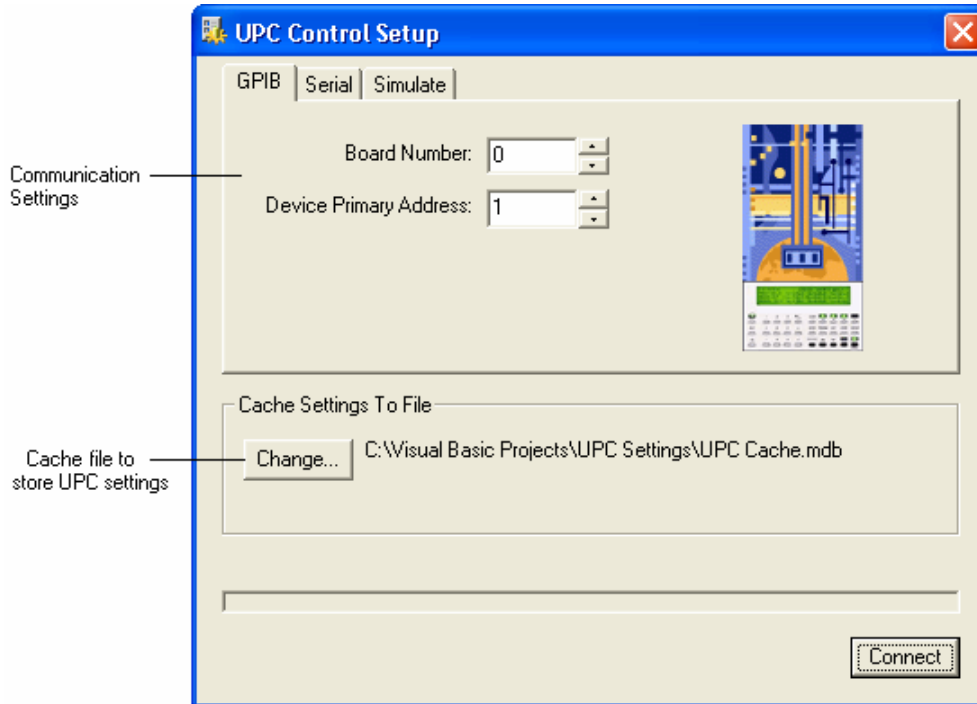
Because UPC Control allows you to make immediate changes to your power source, you should carefully consider the effects changing a particular setting (e.g. output voltage) may have. To minimize problems, you should instead use UPC Studio to control your UPC. UPC Studio provides many safeguards and guides you into entering values that are appropriate for your power source.

Use the UPC Control Connection Setup window to connect to your UPC.

### 5.1 UPC Control Connection Setup

Before UPC Control can communicate with your UPC, you must specify the interface connection. The steps below describe how to connect to your UPC.

1. Press the **UPC Control** icon in the toolbar
2. The **UPC Control Setup** window appears as shown below. In this example, the **GPIB** interface tab was selected. Click on the tab corresponding to the interface connection of your UPC then enter the appropriate communication settings. You can view or change the remote interface settings currently programmed in your UPC by pressing **Fn 3, 3** on the UPC front panel.
3. Specify the cache file that will be created when controlling your UPC. The default cache file name automatically assigned for you should be fine for most applications.
4. After you specify the appropriate connection settings, press the **Connect** button.

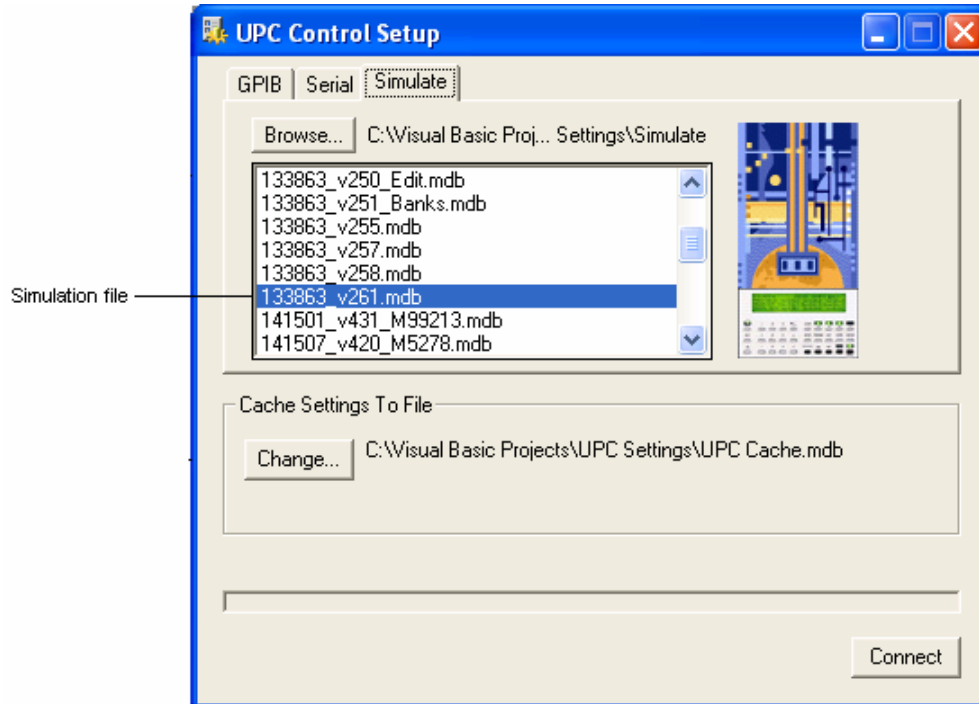


The progress of connecting is shown in the window. When the connection process completes, the UPC Control window appears. Also a UPC Meter window appears that allows you to view all UPC measured values.

## 5.2 Simulation Mode

In addition to being able to connect to your UPC using either a GPIB or Serial interface, you can connect to a virtual UPC using a simulation file. Simulation files are nothing more than UPC Settings files and can be created using the Read UPC Settings icon in the toolbar. Simulation files should be stored in the "Simulate" folder located in the same directory as the UPC Manager application (typically C:\Program Files\UPC Manager\Simulate).

Simulation files are handy if you want to run your UPC "off-line". You can then upload your changes to your UPC using the Write UPC Settings icon in the toolbar. Shown below is an example of the UPC Control Setup window with the Simulate tab selected.



## 5.3 UPC Control Window

After you connect to your UPC using the UPC Control Setup window, the title bar of the window shows the interface connection and the cache file name you specified. The UPC Control window is similar to the View/Edit UPC Settings window except changes you make immediately take affect. Another difference is there is now a Control and Event Panel at the bottom of the window. A series of **tabs** at the top of the window displays panels related to various UPC settings.

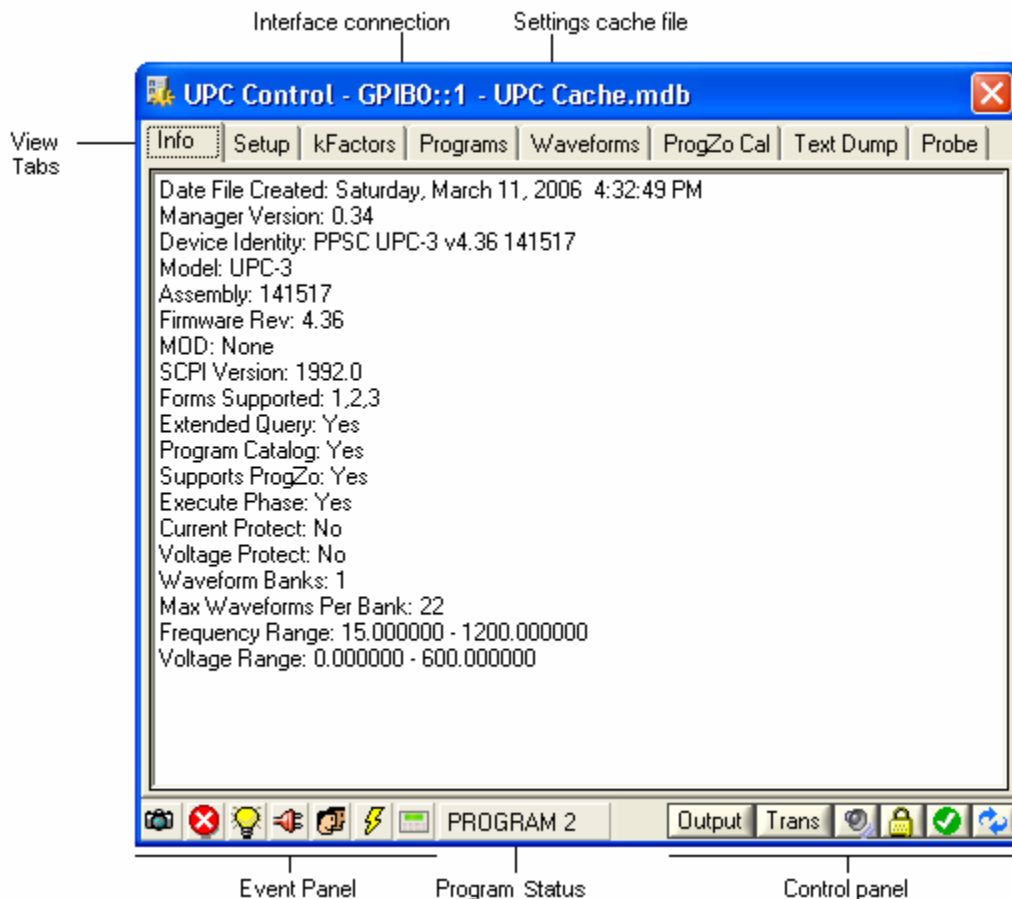
### 5.3.1 Operation

The **UPC Control** window automatically sends values as you update them, then immediately queries them to verify. Initially after connecting to your UPC, none of the programs, waveforms or setup values are read. When you first select a panel (or item), the UPC Control window notes that this view has not been queried, so it sends the necessary commands to your UPC to read the values. These values are then stored in the **cache file** specified in the Connection Setup window. The cache file minimizes the communication activity with your UPC, increasing the navigation

speed of the views. The **UPC Control** window uses the stored values in the cache file to display the items in the various panels. You can manually update the cache file by pressing the **Refresh** button located in the control panel at the bottom right of the window. This forces fresh values to be read from your UPC. This normally isn't necessary unless you change a value using the UPC front panel, causing UPC Control to get out of sync.

### 5.3.2 Info Panel

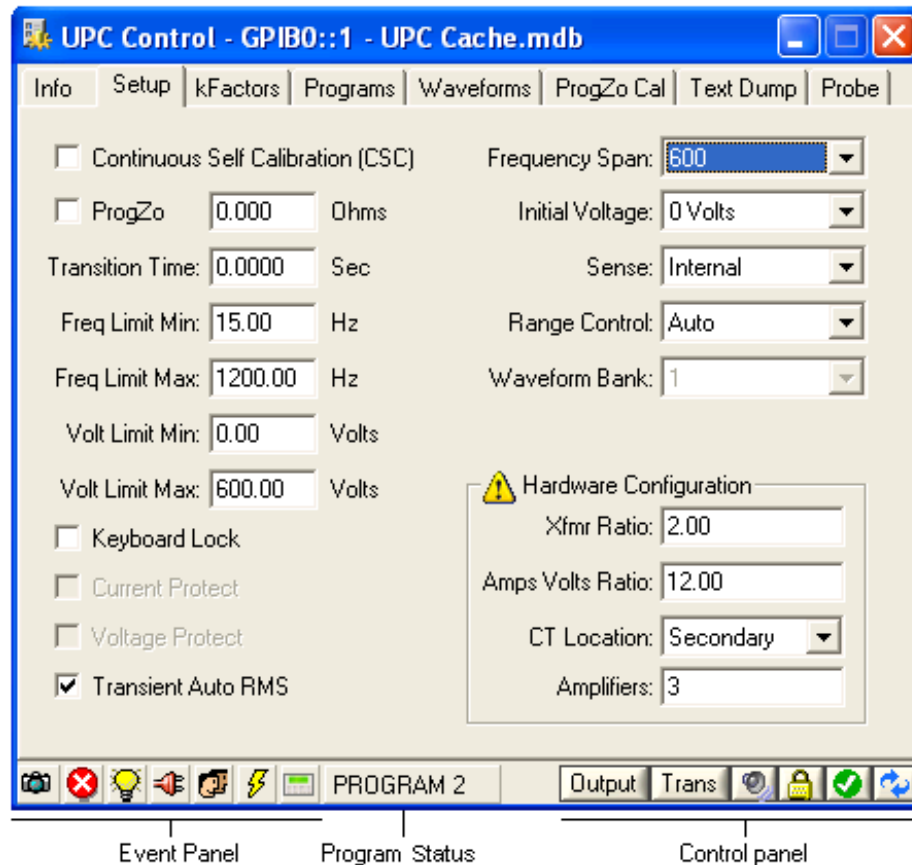
The **Info panel** is the initial tab selected after you connect to your UPC. The Info panel shows basic information and capabilities about your UPC. Some of the items like "ProgZo", "Execute Phase" and "Current Protect" are related to a particular firmware MOD or assembly. Firmware MODs are customer specific options that are installed at the factory. Some features are not supported by older firmware versions and are shown in **red**. Refer to the Firmware Versions section for information about features not supported by older firmware.



Refer to the Control and Event Panels section for more information on these items.

### 5.3.3 Setup Panel

The window below shows the UPC Control window with the Setup tab selected. If certain items are grayed, it means your UPC does not support that feature. Items shown in red indicate the firmware in your UPC does not support querying that value. Refer to the Firmware Versions section for information about the defaults UPC Manager substitutes for these values.



Refer to the Control and Event Panels section for more information on these items.

### 5.3.4 kFactors Panel

The window below shows the UPC Control window with the kFactors tab selected. kFactors are the calibration values stored in your UPC that affect voltage and current sensing accuracy used for metering. The items shown in this panel vary depending on the UPC model. In the example below, UPC-1/3 has separate kFactor columns for each Form. In order to enable entering kFactors for a particular Form, you must first change the Manual Mode program (in the Programs panel) to that Form.

**WARNING: Changing these values will affect the accuracy of your power source and may damage the load. Refer to the UPC User's Manual for information on calibrating your UPC.**

The screenshot shows the 'UPC Control - GPIB0::1 - UPC Cache.mdb' window. The 'kFactors' tab is active, displaying a table with the following data:

Name	Form 1	Form 2	Form 3
Vint A	1.059862	1.000000	1.001455
Vint B	NaN	NaN	1.002349
Vint C	NaN	NaN	1.001987
Vext A	1.052249	1.000000	1.003245
Vext B	NaN	NaN	1.008954
Vext C	NaN	NaN	0.998970
I A	0.997823	1.000000	1.006887
I B	NaN	NaN	1.005687
I C	NaN	NaN	1.003987
Vosc A	0.991023	1.000000	0.998000
Vosc B	NaN	NaN	0.956000
Vosc C	NaN	NaN	1.000321

The interface also includes a menu bar (Info, Setup, kFactors, Programs, Waveforms, ProgZo Cal, Text Dump, Probe), a toolbar with icons for Event Panel, Program Status, and Control panel, and a status bar showing 'PROGRAM 2' and 'Output Trans'.

Refer to the Control (6.1) and Event (6.2) Panels section for more information on these items.

### 5.3.5 Programs Panel

The Programs panel in the UPC Control window allows you to view or change any program stored in your UPC including the Manual Mode values. Select one of the programs in the list to view the steady state and transient values. If a particular program is not stored, the steady state and transient items do not appear when that program is selected. Stored programs are typically shown in black text and gray text means no program is stored at that location. With older versions the firmware, UPC Control cannot determine in advance which programs are stored until you select it. Clicking the **Execute** button executes the selected program.

You can right-click a program in the list to display the **Program Context Menu**. This menu allows you to create or delete a program, import or

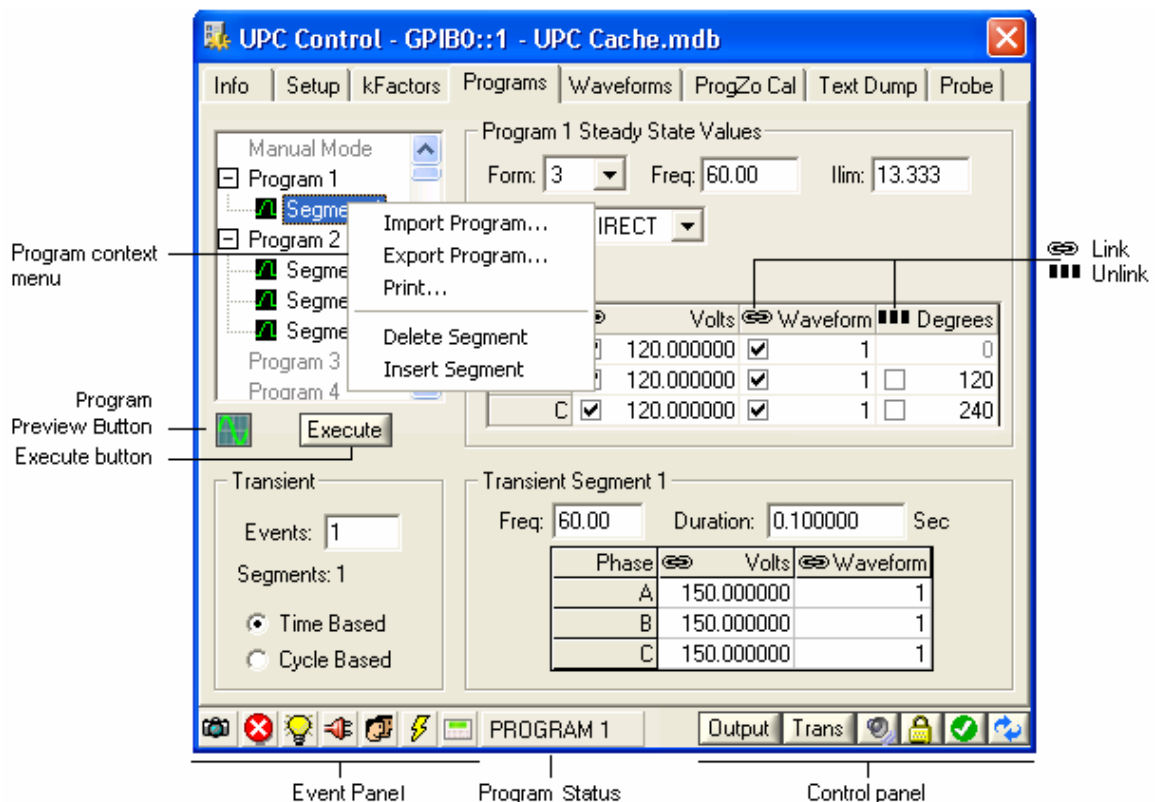


export a program from a file, print text values of the program to your printer or add a transient.

When you right-click a transient segment, the program context menu also allows you to delete the selected segment or add a new one. The transient button in the Control panel at the bottom right of the window will trigger the transient. Note that you must first execute a program before triggering its transient. Also, the Manual Mode program cannot contain a transient.

The **Link/Unlink** icon is available for certain columns in the tables. This allows you to set the values for all phases independently or as a group. To change **Link/Unlink**, click in the column header. You can also selectively link items using the row checkboxes.

The **Program Preview** button is described in the Program Preview section.



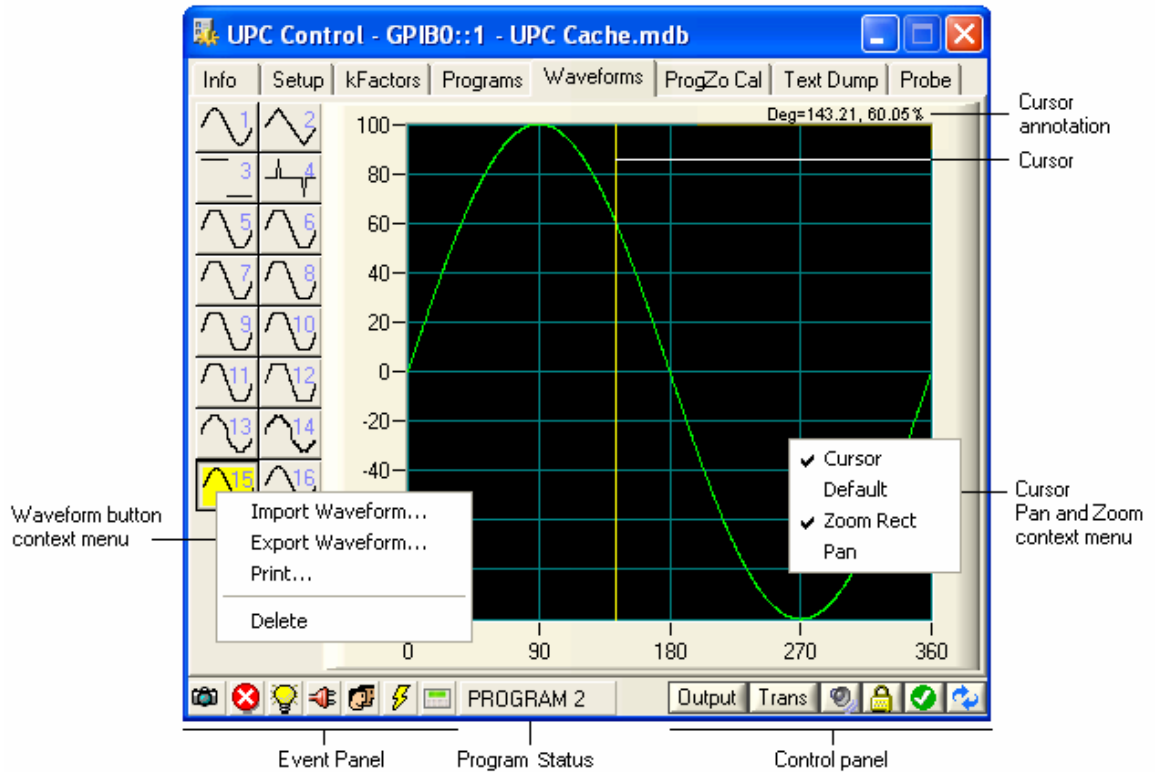
Refer to the Control (6.1) and Event (6.2) Panels section for more information on these items.

### 5.3.6 Waveforms Panel

This Waveforms panel in the UPC Control window allows you to view or change waveforms in your UPC. The thumbnail buttons on the left of the window select which waveform is displayed. If you right-click a button, a menu appears that allows you to import or export that waveform from a file or print the waveform. Note that the selected waveform is overwritten when you import a waveform. Also, waveform 1 (sine wave) is reserved so you cannot **Import** it.

If you right-click on the waveform graph, a menu appears that allows you to select the cursor and pan or zoom options. When **Cursor** is checked, a vertical line appears in the graph that tracks the mouse movement with annotation text showing the phase angle (degrees) and amplitude in percent.

The pan and zoom options control the mouse behavior when you click and drag the mouse over the waveform. The **Default** item restores the **Pan** and **Zoom** state to their normal values (100%, centered).



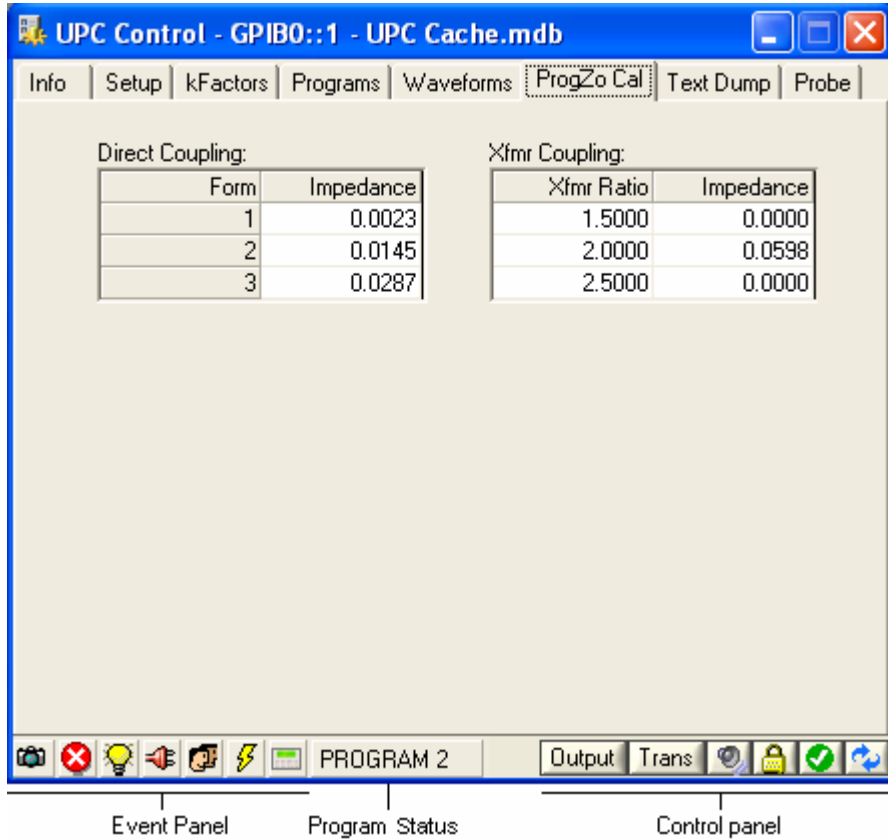
Refer to the Control (6.1) and Event (6.2) Panels section for more information on these items.

### 5.3.7 Prog-Zo Cal Panel

This panel is only available if your UPC is equipped with the programmable output impedance option. This option is installed at the factory. The window below shows the UPC Control window with the Prog-Zo Cal panel selected.

These calibration values "null" the output impedance of your power source to 0 ohms for various output Forms and coupling and affect the output voltage accuracy of your power source. They also allow you to compensate for the cable impedance used to connect the power source to the load. Items shown in red indicate the firmware in your UPC does not support querying that value. Refer to the Firmware Versions section for information about the defaults UPC Manager substitutes for these values.

**WARNING: Changing these values will affect the accuracy of your power source and may damage the load. Refer to the UPC User's Manual for information on calibrating your UPC.**

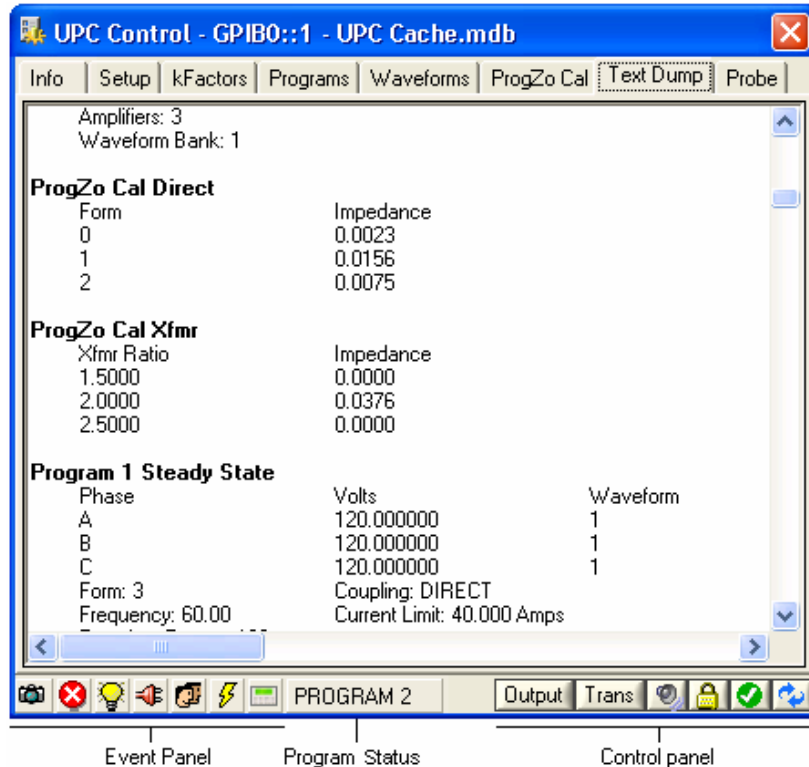


Refer to the Control (6.1) and Event (6.2) Panels section for more information on these items.

### 5.3.8 Text Dump Panel

The file format of the UPC Control cache file is Microsoft Access Database (\*.mdb). The Text Dump panel allow you to view the entire contents of the cache file in text format. Since you are viewing the contents of the cache file, only those items that have been refreshed will be shown.

The **Save** icon in the toolbar allows you to save the cache file to a text file (\*.rtf). You can then open it in a word processor. Use the **Print** icon in the toolbar to print the contents of the Text Dump panel.



Refer to the Control (6.1) and Event (6.2) Panels section for more information on these items.

### 5.3.9 Probe and Capture Panel

The **Probe** tab in the UPC Control window allows you to send commands and queries to your UPC. To probe your UPC:

1. Click on the **Probe** tab in the UPC Control window.
2. The **Probe panel** appears as shown below.
3. Select an existing command or query from the **Command/Query Strings** drop-down control. You can add a new item to the list by typing in the string and pressing <Enter>. To remove a string, select that item the press the <Delete> key. Refer to the UPC Operation Manual for a complete list of all commands and queries.
4. Once you have selected or entered the desired command or query string, press the **Command** or **Query** button. Make sure you press the correct button based on whether the string is a command or query otherwise you will get an error (most likely a timeout).

- The results of a query are saved in **Received String**. The elapsed time the command or query took is also shown.

## Command/Query Capture

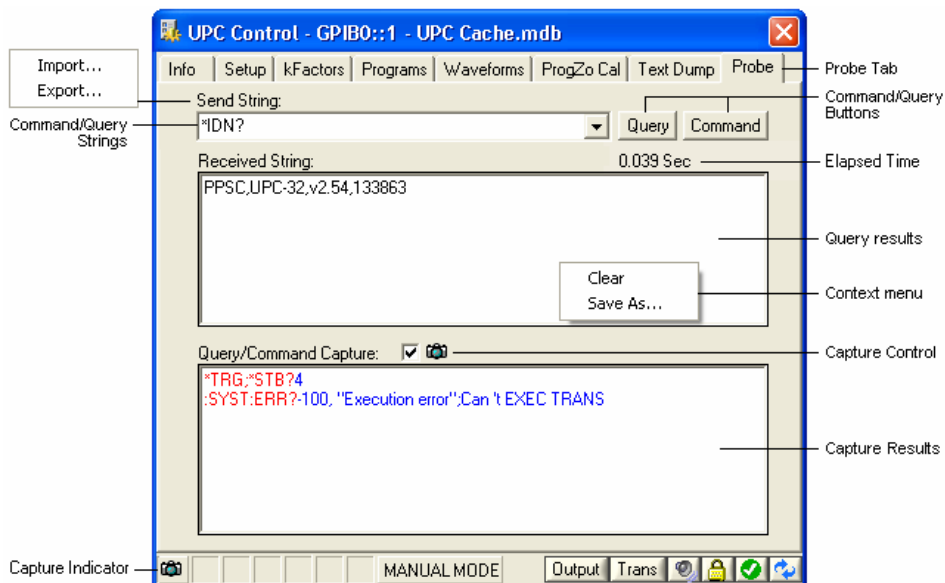
You can also use the Probe panel to capture commands and queries sent by UPC Manager as you activate the various controls and buttons in the other panels (like **Programs** or **Setup**). Simply click the **Capture Control** to activate capturing. A small capture icon appears in the lower left of the event panel. You can then select other panels to access controls and enter values. These commands and queries are saved in the Probe panel and are stored in the **Capture Results** section. The **Red** text is the command/query and the **Blue** text is the response.

## Results Context Menu

When you right-click on the Query or Capture Results, a menu appears allowing you to clear the results or save it to a text file.

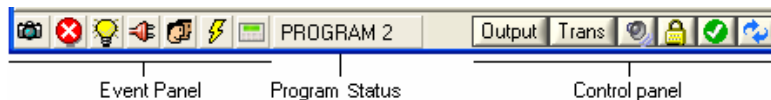
## Import/Export Context Menu

When you right-click on "Send String:", an Import/Export menu appears. Use this to load or store the command query strings to or from a file.













## 6.0 Control and Event Panels

The Control and Event panels are located at the bottom of the UPC Control window as shown below:



### 6.1 Control Panel

The **Control Panel** is at the bottom right of the UPC Control window. The purpose of each button is described below:

-  This shows that the output power is OFF. Pressing this button turns the output power ON.
-  This shows that the output power is ON. Pressing this button turns the output power OFF.
-  This shows that the steady state program values are executing. Pressing this button triggers the transient portion of the program currently executing. If the program does not contain a transient, pressing this button will cause an error.
-  This shows a transient is executing. Pressing this button stops the transient and resumes steady state operation.
-  This shows a Ramp is executing. Pressing this button stops the Ramp and resumes steady state operation.
-  Pressing this button beeps the built-in UPC speaker.
-  This shows that **Local Lockout** is in **Lockout** mode. This prevents you from using the UPC keyboard or viewing V/I meter data on the LCD. Pressing this button changes the state to **Local** mode as described below.
-  This shows that **Local Lockout** is in **Local** mode. This allows you to use the UPC keyboard and LCD. Note that if you change values using the UPC keyboard, you should refresh the view in the UPC Control window that contains that setting. Pressing this button changes the state to **Lockout** mode as described above.
-  Pressing this button queries your UPC and updates the event panel status and state of the buttons in the Control panel.
-  Pressing this button queries your UPC and refreshes the items in the current panel. If the current panel is **Programs** or **Waveforms**, then the selected program or waveform is queried and the view updated.

## 6.2 Event Panel

The **Event Panel** is at the bottom left of the UPC Control window. Except for the **Capture** icon, these icons are normally updated as you change settings or after you execute a program or you press the **Status** button in the Control panel. Later versions of UPC firmware poll the status of your UPC and automatically update these icons. These icons indicate a particular event occurred and they remain latched until you clear them by clicking on that icon.



This icon means that Command/Query capture mode is on. Click this icon or press the "Probe" tab to view the commands and queries that have been sent to the UPC or to turn Capture mode off.



This icon means an error occurred. A message box also appears describing the error. This event is automatically cleared when you close the message box.



This icon means a power-on event has occurred with your UPC. You should normally disconnect (close) UPC Manager first before turning on/off you UPC. This event can alert you that one or more settings may have been changed and that you should refresh the affected views.



This icon means the power source has shut down due to an output overload condition.



This icon means the UPC was operating in the **Local** mode and someone pressed the Local/Remote key on the UPC front panel. This event can alert you that one or more settings may have been changed and that you should refresh the affected views.



This icon means the UPC output was turned off because the output current or voltage exceeded the programmed threshold.



This icon means the remote interface is unavailable because your UPC is not in the V/I Display mode. Press the "Clear" or "Display" buttons on your UPC keyboard to return to the V/I Display screen.



This icon means the remote interface is not responding. This can be because your UPC is turned off or the interface cable is disconnected.

## 6.3 Program Status

The currently executing program is shown at the bottom of the window. This information is normally updated after you execute a program in the Programs panel.

**Note:** Program status is not supported by older versions of the firmware.



## 7.0 Printing


Once you connect to your UPC, you can press the **Print** icon in the toolbar to print the contents of the UPC Control window. The entire contents of the cache file will be printed including graphs for the waveforms. Since you are printing the contents of the cache file, only those items that have been refreshed will be printed. The Programs and Waveforms panels also allow you to print a selected program or waveform.

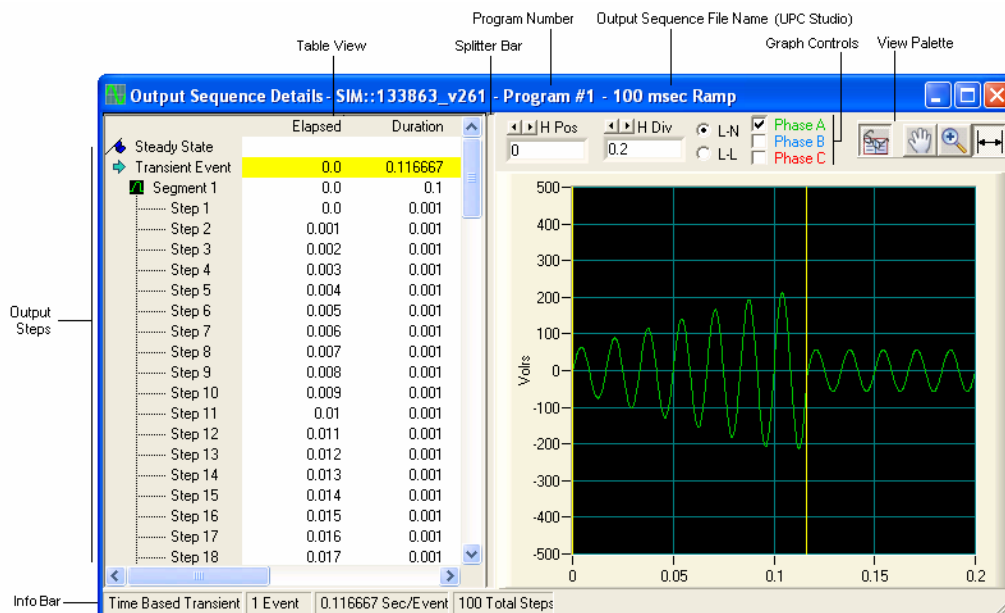
## 8.0 Saving

The file format of the UPC Control cache file is Microsoft Access Database (\*.mdb). The **Save** icon in the toolbar allows you to save the cache file to a text file (\*.rtf). You can then open it in a word processor. The Programs and Waveforms panels also allow you to save (export) a selected program or waveform.

## 9.0 Program Preview

The **Program Preview** window allows you to view a simulation of the actual waveforms generated by your UPC. To preview a program:

1. Open a settings file or connect to your UPC using UPC Control or UPC Studio .
2. Click on the Programs panel to view the available programs then select the program you want to view. For UPC Studio, open an output sequence or program in the Output Sequence Browser .
3. Press the **Program Preview** button . For UPC Studio, click the **Details** button in the Output Sequence window.
4. The **Program Preview** window will appear as shown below:



## 9.1 View Palette



This button turns the Table View On or Off



When this button is depressed, the graph pans horizontally when you click and drag the mouse in the graph view.



When this button is depressed, the graph zooms-in horizontally (magnifies) when you click in the graph view. If you press and hold the shift key, the graph zooms-out (reduces) when you click the mouse in the graph view.



When this button is depressed, the cursors are positioned to that step or segment. The corresponding row in the table view is also highlighted.

## 9.2 Splitter Bar

The Splitter Bar allows you to adjust the relative sizes of the table and graph views. To use the Splitter Bar, position the mouse anywhere on the bar and click and drag the bar to the desired position. The splitter bar is not available if the table view is turned off.

## 9.3 Table View

The table view is displayed when the Table View icon is pressed in the View Palette. The left half of the window shows a table containing the items related to that program. The table columns show the elapsed time (running time), the duration of that item, and the output waveform frequency and voltage.

### Steady State

The Steady State program values in the table are always shown in the first row of the table view. Steady state values always begin and end with the Phase A positive zero crossing. If the program does not contain a transient then the next row again shows the steady state values. This provides a cursor reference point in the graph at the Phase A zero crossing.

### Transient Event

If the program contains a transient, then the next row in the table summarizes a single transient event. Note that programs can contain an infinite number of transient events. Since multiple transient events are

simply repeats, only the first event is shown. The "Transient Pedestal" output signal from your UPC (J5-3) is active for the duration shown by the **Transient Event** row.

### Segments

Segments describe the program transient. The segments listed in the table are the same segments show in the Programs panel .

### Steps

In order to smoothly perform the desired voltage or frequency change specified in a segment, the UPC firmware breaks each segment into discrete steps. There can be up to 100 steps in a segment. The detailed voltage and frequency values the UPC firmware calculates for each step is shown in separate rows in the table.

## 9.4 Graph View and Controls

The right half of the window shows a graphical representation of the **Output Steps**. The graph is a simulation of the actual UPC waveforms created by the selected program.

### Graph Cursors

Each time you click on a row in the table view, the cursors are automatically positioned in the graph relating to the start and end time of that row. Similarly, when you click on an arbitrary place in the graph, the row relating to that item is automatically highlighted in the table view.

### Graph HPos and HDiv

These controls allow you to pan and zoom the time axis of the graph. The values are in seconds. The **HPos** (Horizontal Position) can be positive or negative. Negative time values always refer to the steady state portion of the program.

### L-N and L-L

These controls allow you to view the waveforms as Line-Neutral or Line-Line.

## Navigation

In addition to using the mouse, you can use the arrow keys to navigate through the table rows. The arrow keys also change the cursors in the graph and scroll the graph view as necessary.

## Phase Checkboxes

These checkboxes allow you to show or hide a particular phase.

## 9.5 Info Bar

The **Info Bar** shown at the bottom of the **Program Preview** window shows details related to the selection.

## 9.6 Printing and Exporting

You can print the graph or export the output steps to a file. Right click the mouse in the table or graph and a context menu appears.

## 9.7 Updating Values

Anytime you change values in the Programs panel or Output Sequence window, the **Program Preview** window is automatically updated.

## 10.0 UPC Meter V/I Display

The **UPC Meter** window is shown below. This window is automatically displayed after connecting to your UPC using either UPC Studio or UPC Control. The type of information displayed in the UPC Meter window depends on the Toolbar Display button selected. The date and time the last measurement was completed is shown in the title bar of the window.

### 10.1 V/I Display

The first time the UPC Meter window is opened, the default view is the V/I Display and metered values are automatically updated. Subsequently, you must click the **Refresh** button to update the values. The format of the V/I Display Table depends on the power source output Form currently executing.

Labels in the image:

- V/I Display Button
- V/I Display Menu
- Measurement date and time
- Refresh button
- Measurement Templates
- V/I Display Table

	Phase A	Phase B	Phase C
Vrms(L-L)	204.171	204.171	204.171
Irms	6.468	6.468	6.468
Ipeak	9.173	11.187	6.480
Icrest	1.416	1.727	1.002
KW	0.780	0.779	0.777
KVA	0.780	0.779	0.777
PF	1.000	1.000	1.000
Frequency	60.000	60.000	60.000

## 10.2 Refresh and Toolbar Display Buttons

The various buttons in the toolbar are described below:



This queries your UPC for the meter values specified by the selected toolbar button as described below. It then updates the values shown in the window.



This button selects the volt/amp metered values shown above. These values also include the output power, power factor and frequency.



This button selects the waveform metered values.



This button selects the voltage harmonics metered values. This button is only available if your UPC firmware contains the Harmonics Analysis and Synthesis option.



This button selects the amp harmonics metered values. This button is only available if your UPC firmware contains the Harmonics Analysis and Synthesis option.

## 10.3 V/I Display Menu and Measurement Templates

The V/I Display button must be pressed before you can access the V/I Display Menu. This menu allows you to start/stop data logging and select **measurement templates**. Measurement templates are files that define which measurements are made during data logging or when refreshing the V/I Display Table. These files are located in the Templates folder (typically C:\Program Files\UPC Manager\Meter Data\Templates). You can edit or create these files. Shown below is a sample template file opened in Microsoft Excel:



	A	B	C	D
1	# Pacific Power Source VI Meter Template			
2	# "1" = Measure	0 = Skip		
3				
4	Function	Phase A	Phase B	Phase C
5	Vrms (L - N)	1	1	1
6	Vrms (L - L)	0	0	0
7	Irms	1	1	1
8	Ipeak	0	0	0
9	Icrest	0	0	0
10	KW	0	0	0
11	KVA	0	0	0
12	PF	0	0	0
13	Frequency	0	0	0

Rows 4-13 correspond to the rows and columns in the V/I Display Table. Only cells with a "1" will be measured as shown below:

Function	Phase A	Phase B	Phase C
Vrms(L-N)	120.603	120.465	120.219
Vrms(L-L)			
Irms	6.484	6.482	6.472
Ipeak			
Icrest			
KW			
KVA			
PF			
Frequency			

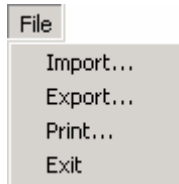
### Measurement Template Notes:

- Template file names must use a \*.csv extension. Only template files stored in the ...\\Meter Data\\Templates folder appear in the menu. The name shown is the file name without the extension. Files you copy or create automatically appear in the menu the next time you click it.

- The actual rows and columns displayed in the V/I Display Table depend on the output Form.
- The Phase B and C columns in the template file are ignored (not measured) for Form 1 and 2.
- For Form 1, the Vrms(L-L) row is not displayed. The Vrms(L-N) template file row controls the Form 1 V/I Display Table Vrms value.
- For Form 2, the Vrms(L-N) row is not displayed. The Vrms(L-L) template file row controls the Form 2 V/I Display Table Vrms value.
- The fewer the measured values, the faster the measurement speed (this mostly affects data logging).
- For the **Frequency** row, the Phase A template file cell controls all phases shown in the V/I Display Table.

## 10.4 File Menu

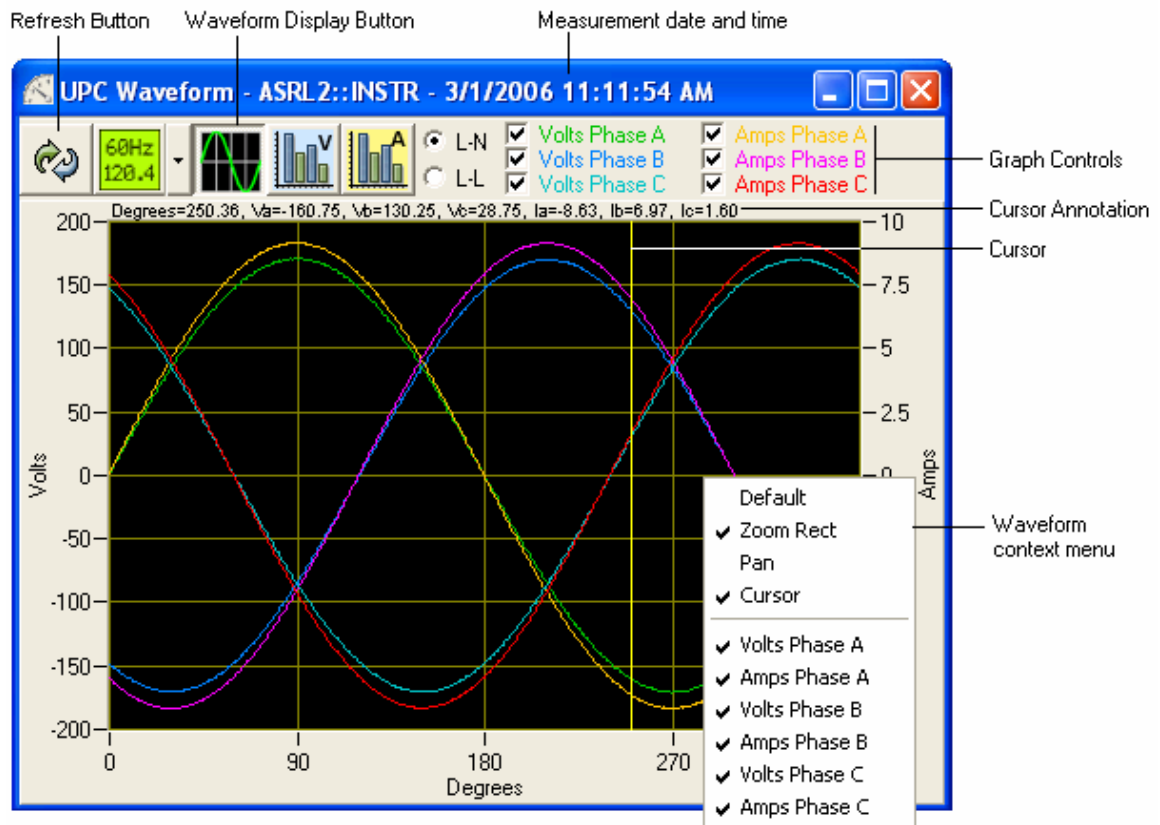
The **File** menu allows you to export, import or print measurements in the **UPC Meter** window.



**Export** allows you to save the measured values presently shown in the window. **Import** allows you to view a previously saved (exported) measurement. The data format of the file is \*.csv (Microsoft Excel). The date and time shown in the title bar of the window is the time the measurement was originally taken

## 11.0 UPC Meter Waveform Display

When you press the **Waveform** button in the UPC Meter toolbar, the window appears as shown below:

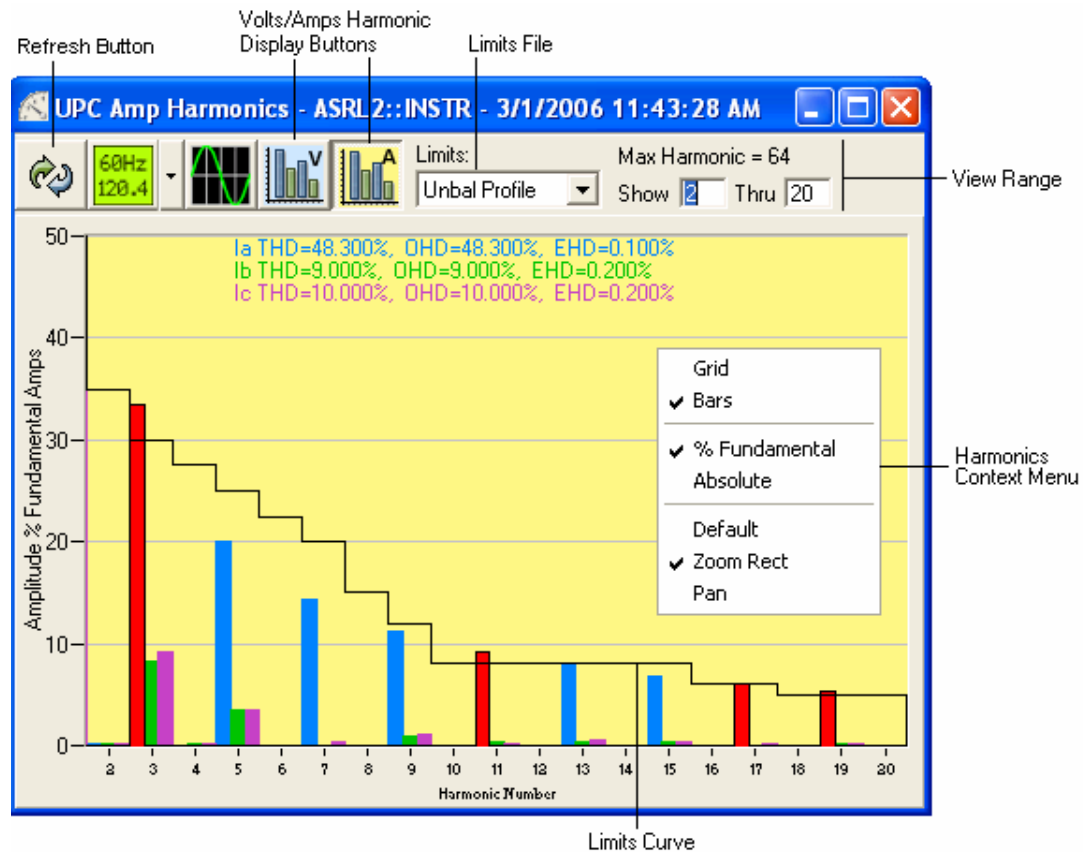


When you select the Waveform Display button for the first time, the display is automatically updated. Subsequently, you must click the Refresh button to update the waveforms. If you right-click on the waveform graph, a context menu appears that allows you to select the **Pan** or **Zoom** option. These options control the mouse behavior when you click and drag the mouse over the waveform. The **Default** item restores the **Pan** and **Zoom** state to the normal values (centered, 100%). The **Cursor** item displays a vertical line in the graph that tracks the mouse movement and text annotation appears above the graph showing the values at the cursor location. The remaining items in the menu control which waveform is visible.

## 12.0 UPC Meter Harmonics Display

The Harmonics display is only available if that firmware option was installed in your UPC at the factory. The Harmonics display is accessed by pressing either the **Volts Harmonic** or **Amps Harmonic** buttons in the UPC Meter toolbar. The default harmonics view is a bar chart as shown below.

### 12.1 Bar View



When you select the Volts or Amps Harmonic Display buttons for the first time, the display is automatically updated. Subsequently, you must click the **Refresh** button to update the measured values. You can specify the range of harmonics to be displayed and if the amplitude should be expressed as a percentage of the fundamental or as absolute values by using **Harmonics Context menu**. Different phases (Form 3) are shown

using different colors. If a particular bar is **red**, it means the amplitude of that harmonic and phase exceeds a predefined limit. For more information on limits and the Limits Curve, refer to the Limits File section below.

## 12.2 Grid View

The Grid view is accessed using the Harmonics Context menu and appears as shown below:

Harmonic	Ia Mag%Fund	Ia Phase	Ib Mag%Fund	Ib Phase	Ic Mag%Fund	Ic Phase	Amps Limit
THD	48.3		9.0		10.0		14
OHD	48.3		9.0		10.0		7.65
EHD	0.1		0.2		0.2		3.28
1	100.0	0.0000	100.0	0.0000	100.0	0.0000	
2	0.1	211.9	0.1	179.9	0.1	180.8	35
3	33.4	0.0	8.2	0.0	9.2	0.1	30
4	0.0	267.5	0.1	180.1	0.1	175.0	27.5
5	20.0	0.0	3.5	179.9	3.5	179.9	25
6	0.0	270.4	0.0	141.8	0.0	146.8	22.5
7	14.3	0.1	0.0	142.8	0.4	182.7	20
8	0.0	338.2	0.0	225.5	0.0	143.9	15
9	11.2	0.0	1.0	0.5	1.1	0.8	12
10	0.0		0.0	162.7	0.0	158.5	8
11	9.2		0.4	178.2	0.2	176.6	8
12	0.0		0.0	199.6	0.0	153.3	8
13	7.9		0.3	177.3	0.5	177.9	8
14	0.0		0.0	311.3	0.0	240.0	8
15	6.8	0.1	0.4	0.0	0.3	2.5	8

The harmonics grid view shows both the amplitude and phase angle for all phases in one table. It also shows the Total Harmonic Distortion (THD), Odd Harmonic Distortion (OHD) and Even Harmonic Distortion (EHD).

## 12.3 Limits File

The Limits File drop down menu allows you to specify a file containing limit values to check the measured values of THD, OHD, EHD and harmonic amplitude. The drop down menu also allows to select "None" so no limits checking are performed. When a limits file is specified, items with a **red** background in the Bar or Grid view mean the measured value exceeds (fails) the limit test. For the Grid view, items with a **green** background mean the measured value is equal to or less than (passes) the limit test. A white background in the Grid view means a limit value was not defined for that value so no limit testing was performed.

Limits files are stored in the Harmonics Limits folder located in the same directory as the UPC Manager application (typically C:\Program Files\Upc Manager\Harmonics Limits). Limits files are text files with a \*.csv extension and contain rows of comma separated values. Shown below is a sample limits file opened in Microsoft Excel:

	A	B	C	D	E
1	[Column Header	VOLTS % FUND	AMPS % FUND	VOLTS ABSOLUTE	AMPS ABSOLUTE]
2	Desc		Amps Limit		
3					
4	[% DISTORTION	VOLTS % FUND	AMPS % FUND	VOLTS ABSOLUTE	AMPS ABSOLUTE]
5	THD		14		
6	OHD		7.65		
7	EHD		3.28		
8					
9	[HARM #	VOLTS % FUND	AMPS % FUND	VOLTS ABSOLUTE	AMPS ABSOLUTE]
10	1				
11	2		35		
12	3		30		
13	4		27.5		
14	5		25		
15	6		22.5		
16	7		20		
17	8		15		
18	9		12		
19	10		8		
20	11		8		
21	12		8		
22	13		8		

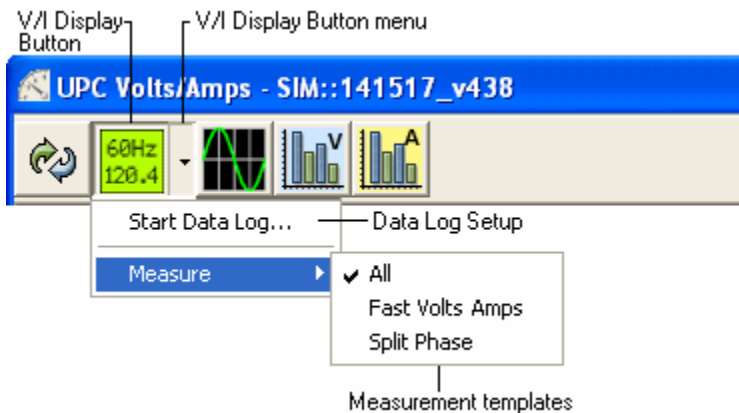
Columns B, C, D and E correspond to the 4 types of harmonics data that can be displayed in the Bar or Grid views. In the above bar and grid examples, "Amps % Fundamental" was selected by using the Toolbar buttons and Harmonics context menu. This corresponds to column "C" in the Excel file. This means these values will be used to check the measured values. The Grid view also shows these values in the far right column. The Bar view shows these values in the Limits Curve.

Only items in the Limits File that contain values are used to check the measured values. If the corresponding entry in the limits file is blank, then the measured value is not checked. In the above example, all the limits values for columns B, D and E are blank so none of the measured values for "Volts % Fundamental", "Volts Absolute" or "Amps Absolute" will be checked. Also, you don't have to specify every harmonic (row) in the limits file. The measured values for skipped rows are not checked. In the above Excel example, row 10 (Harmonics #1) could have been deleted since columns B, C, D and E were blank.

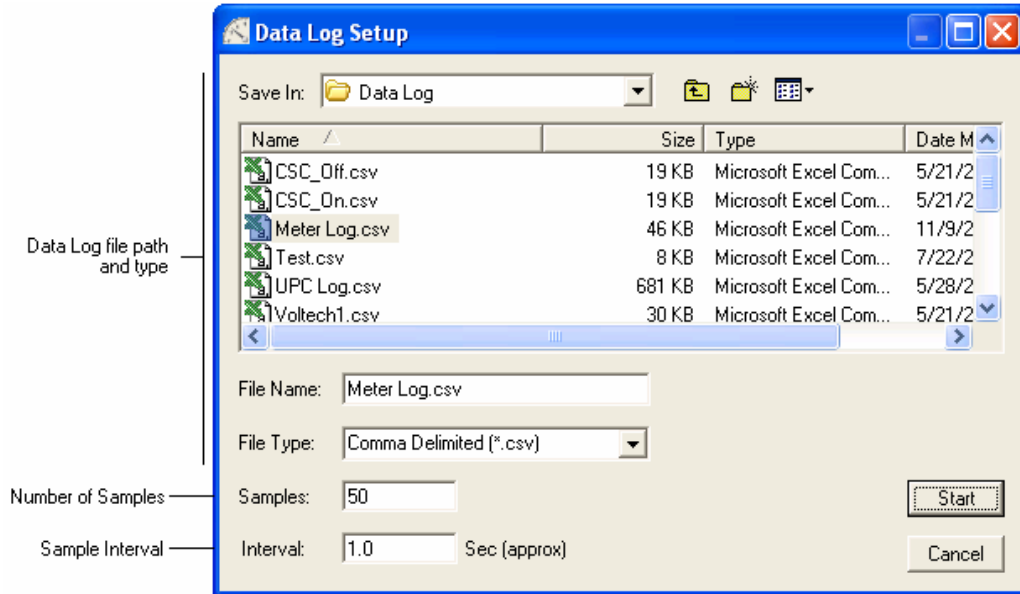
## 13.0 Data Log

The UPC Meter window allows you to log measurement results to a file. To start data logging:

- 1) Open the UPC Meter window and click on the V/I Display button menu as shown below. Note that the V/I Display button must be pressed before you can access the menu.

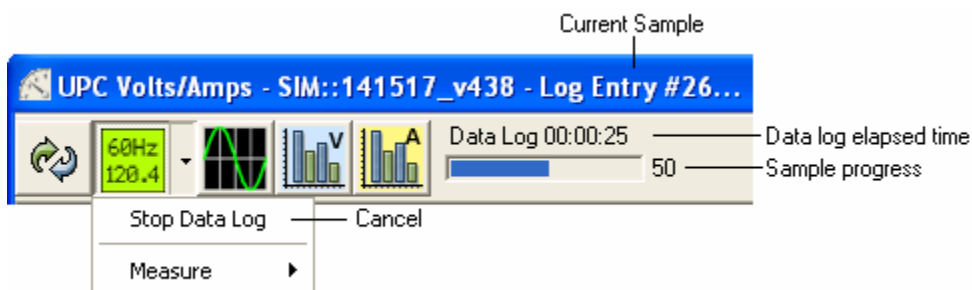


- 2) Specify the desired measurement template then select **Start Data Log...** Refer to the measurement templates section for more information.
- 3) The **Data Log Setup** window appears as shown below:



Specify the file name, number of samples and sample interval. For \*.csv files, keep in mind the maximum number of samples supported by Excel is 65532. A warning icon is displayed if the value you enter is greater. Sample intervals below 1 second default to "MIN". The minimum time is based on your UPC configuration, template file, and remote interface communication speed. After you enter the desired values, press **Start**.

- 4) During data logging, the V/I Meter window updates as each sample is taken. The display also shows the entry number, elapsed time and progress of the data log as shown below:



You can cancel data logging by choosing **Stop Data Log** from the V/I Display button menu.



**Notes:**

- The data log file includes a date time stamp and the precise elapsed time for each sample.
- The measurement template file determines which values are measured and stored in the data log file.
- The time accuracy of the data log interval is approximate and depends on the Windows operating system and other running applications.
- Data logging pauses when another UPC Manager window is activated and resumes when the UPC Meter window is reactivated.
- The maximum number of samples is 2,147,483,647 but may be less depending on available disk space. Each entry in the data log file takes around 200 bytes.

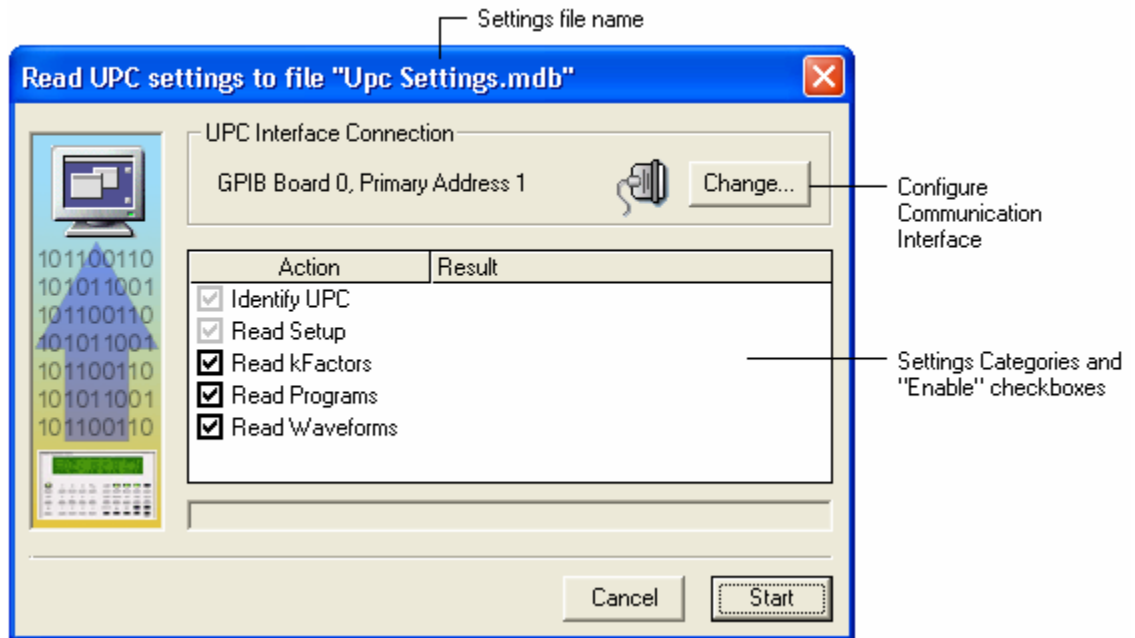
## 14.0 Reading UPC Settings

The Read UPC Settings window stores all the values in your UPC to a file on your PC. This is a convenient way to "back up" your UPC. The settings file you create can also be used to update other UPCs.

**Note:** If you intend to create settings files to be used with other UPCs, you should **uncheck** the "Read kFactors" check box. That way, these values will not be saved in the file so they can't then accidentally be sent when writing the file to another UPC.

To read settings from your UPC and save them to a file on your PC, perform the following steps:

1. Press the **Read Settings From UPC** icon in the toolbar
2. A dialog box will appear asking you for the name of the file you want to create. The default name is "UPC Settings" but it helps to enter a name that better describes your particular UPC. After you specify the name of the file, press **Save**.
3. The **Read UPC Settings** window appears as shown below. The name of the settings file you specified is shown in the title bar of the window.
4. Press the **Change** button. The UPC Interface Connection window will appear. Enter the interface (Serial or GPIB) and settings used by your UPC then press **OK**. You can view the communication settings of your UPC on the built-in LCD display by pressing Fn 3,3.
5. The **Read UPC Settings** window shows a list of items with checkboxes that show the various settings categories that will be read. You should normally check all items, but unchecking an item may assist troubleshooting a particular problem. Some items are checked and dimmed meaning that item is mandatory.
6. Press the **Start** button. The progress of reading UPC settings is shown in the window.
7. When all items have completed, you will be asked if you want to view the settings that were just created. You can choose **Yes** to view it now (read-only) or you can later use the **Open** icon in the toolbar to open the file in Edit mode so you can make changes.



## 15.0 Writing UPC Settings

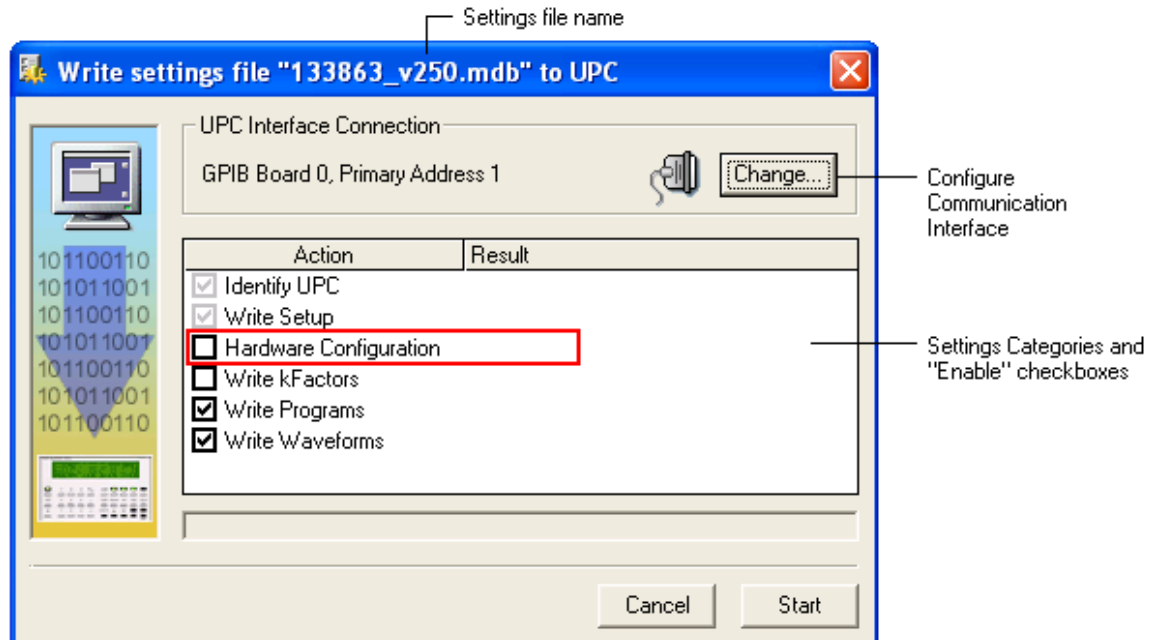
**Warning: This operation overwrites settings stored in your UPC.**

The Write UPC Settings window sends values from a settings file on your PC to your UPC. This is a convenient way to "restore" your UPC or update other UPCs.

**Note:** If the settings file you intend to write was created by a different UPC, you should **uncheck** the "Write kFactors" check box. Otherwise, the calibration of your UPC will be affected.

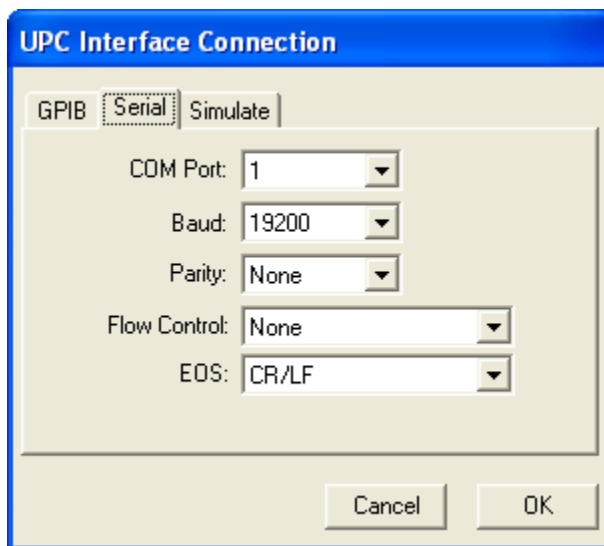
To write a settings file to your UPC, perform the following steps:

1. Press the **Write Settings To UPC** icon in the toolbar
2. A dialog box will appear asking you for the name of the file you want to write. Select the desired file then press **Open**.
3. The Write **UPC Settings window** appears as shown below. The name of the settings file you selected is shown in the title bar of the window.
4. Press the **Change** button. The UPC Interface Connection window will appear. Enter the interface (Serial or GPIB) and settings used by your UPC then press **OK**. You can view the communication settings of your UPC on the built-in LCD display by pressing Fn 3,3.
5. The **Write UPC Settings** window shows a list of items with checkboxes that show the various settings categories that will be written. You can optionally uncheck one or more items to skip writing those settings. If the kFactors category is checked, calibration values in your UPC will be updated. Make sure the kFactors in this settings file are correct for this UPC. Otherwise you will be forced to recalibrate your UPC. Refer to the UPC Programmable Controller Operation Manual for instructions on calibration. (**Note:** The Hardware Configuration row sends the Transformer Ratio, Amps Volts Ratio, Current Transformer Location (Primary/Secondary) and Number of Amplifiers. These values define the hardware configuration of your power source. Carefully check your power source documentation and hardware to verify that these values are correct.)
6. Press the **Start** button. The progress of writing UPC settings is shown in the window.



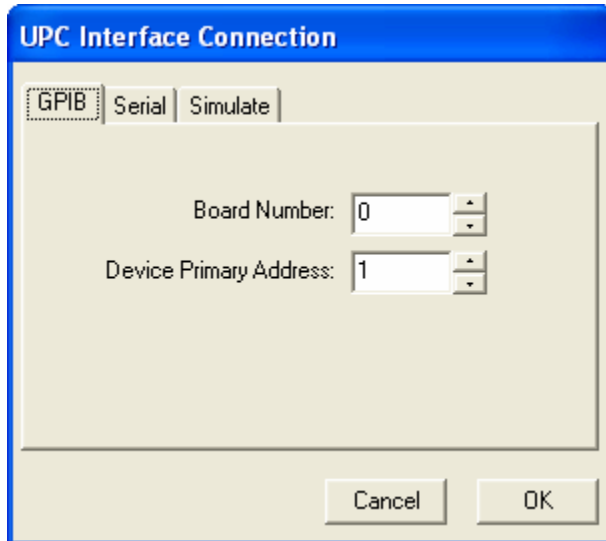
## 16.0 UPC Settings Interface Connection

You access the **UPC Interface Connection** window from either the **Write UPC Settings** or **Read UPC Settings** windows. If your UPC is connected to a serial port, press the **Serial** tab and the window appears as shown below:



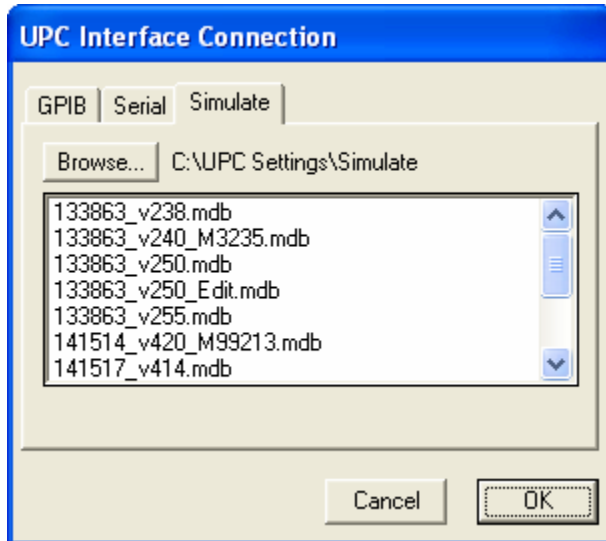
The Baud Rate, Parity and EOS should match the values in your UPC. Press Fn 3,3 on the UPC front panel to view these UPC communication settings. The **Flow Control** item shown above should be set to "None". Once you have entered the desired values, press **OK**. The tab (Serial or GPIB) you last selected prior to pressing OK is the interface that UPC Manager will use.

If your UPC is connected to a GPIB port, press the **GPIB** tab and the window appears as shown below:



The Board Number is assigned by your system to the GPIB card installed in your PC. The Device Primary Address is the GPIB address of your UPC. You can view the GPIB address by pressing Fn 3, 3 on the UPC front panel. Enter the desired values in the window above then press **OK**. The tab (Serial or GPIB) you last selected prior to pressing OK is the interface that UPC Manager will use.

You can also connect to a simulated UPC. The simulation mode allows you to operate a virtual UPC. The simulation mode is also a convenient way edit/view UPC settings offline. Press the **Simulate** tab and the window appears as shown below.



The list shows the available simulation files located in the folder path shown next to **Browse...** Simulation files are actually settings files that are created when using Read Settings From UPC.

You can verify the available system resources (serial ports and GPIB interfaces) installed on your PC by pressing the **About** icon in the toolbar.



## 17.0 Troubleshooting Guidelines

- Make sure the necessary software is installed on your PC
- Make sure your UPC is in the "V/I METER:" display mode. The "V/I METER:" display mode allows your UPC to communicate with your PC.
- Verify system resources .
- If you are having problems running the UPC Manager Installer, try updating your operating system with the latest service pack.
- When reading or writing settings, check that the communication settings match your UPC settings
- If UPC Manager preferences become corrupted, press and hold the <Shift> key when opening UPC Manager. UPC Manager preferences include window position and sizes, communication settings, file paths and saved commands in the Probe window .
- If the RAM in your UPC becomes corrupted, you may have difficulty writing a settings file. First reset the UPC RAM (FN 1,3) then try sending the settings file. **WARNING: FN 1,3 will delete all RAM settings including calibration values (kFactors). Do not use FN 1,3 unless you previously saved a settings file of this UPC or you are willing to re-enter all values and calibrate the unit.**

## 18.0 Firmware Versions

The View/Edit UPC Settings or UPC Control window shows the firmware version in the **Info** panel. UPC Studio also shows the firmware version in the status bar at the bottom of the window. You can also view the firmware version on the UPC built-in LCD display by pressing Fn 3,3. The paragraphs below show which items are unavailable with older versions of the UPC firmware. If you want your UPC to support these features, contact Pacific Power Source for information on upgrading your firmware.

### 18.1 UPC-12/32 Firmware

UPC-12/32 firmware prior to version 5.0 does not support the following operations through the remote interface:

- Determine if the firmware contains a MOD (customer specific option) and the MOD number.
- Query "Volt Limit Min/Max", "Range Control", "Amps Volt Ratio", "CT Location" or "Amplifiers". Also, if the firmware assembly supports ProgZo, you can't query the "ProgZo Cal Xfrm Ratio" values. When UPC Manager attempts to read these settings, it sets the values to the defaults shown in the table below.
- Query program catalog. The program catalog allows the remote interface to quickly determine which programs are stored.
- Query the currently executing program name.

UPC-12/32 Setting	Default Value
Volt Limit Min	0
Volt Limit Max	600
Range Control	0 - Auto
Amps Volt Ratio	4
CT Location	Secondary
Amplifiers	3
ProgZo Cal Xfmr Ratio 1	1.5
ProgZo Cal Xfmr Ratio 2	2
ProgZo Cal Xfmr Ratio 3	2.5

When reading settings from your UPC-12/32, it's important to note that the above default values will be substituted for the values presently stored in your UPC-12/32. When writing this settings file, the default values for "Volt Limit Min/Max", "Range Control" and "ProgZo Cal Xfrm Ratios" will be written to your UPC. "Amps Volts Ratio", "CT Location" and "Amplifiers" are not important because they are not written to the UPC-12/32 but are configured by DIP switches inside the UPC-12/32.

## 18.2 UPC-1/3 Firmware

UPC-1/3 firmware prior to version 5.0 does not support the following operations through the remote interface:

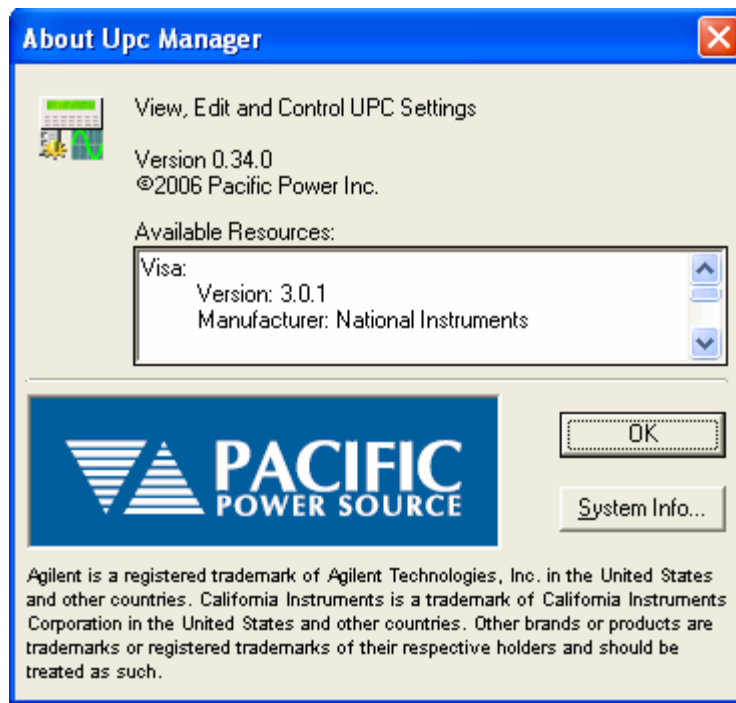
- Query program catalog. The program catalog allows the remote interface to quickly determine which programs are stored.
- Set the CT Location.
- Query "Range Control" and "CT Location".
- Query or set "Transient Auto RMS".
- Query the currently executing program name.

UPC-1/3 Setting	Default Value
Range Control	0 - Auto
Transient Auto RMS	On
CT Location	Secondary

When reading settings from your UPC-1/3, it's important to note that the above default values will be substituted for the values presently stored in your UPC-1/3. When writing this settings file, the default value for "Range Control" will be written to your UPC. As mentioned earlier, the value for "CT Location" is not sent to your UPC because this command is not supported by the older firmware.

## 19.0 System Resources

The **About** window allows you to view the system resources like the available serial or GPIB interfaces. To view the About window, press the **About** icon in the toolbar.



The **About** window shows a list of system resources that are described below:

Resource Name	Description
Visa	Required software driver
ASRLn::INSTR	Serial COM port n
GPIBn::INTFC	GPIB interface board number = n
GPIBn::INSTR GPIB	GPIB Instrument device primary address = n



If no interfaces are listed, make sure NI-VISA and NI-488.2 software are installed.

You can also use Measurement & Automation Explorer (MAX) available from National Instruments to view the installed hardware and software on your PC. The **Devices and Interfaces** section will show the installed interface hardware and instruments and the **Software** section will show drivers and versions.