UPC STUDIO TEST MANAGER
OPERATIONS MANUAL

PACIFIC
POWER SOURCE

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TEST MANAGER
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PPS PART No. 149060

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FIRST EDITION

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Contractor/manufacturer is Pacific Power Source, Inc., 17692 Fitch, Irvine, CA. 92614

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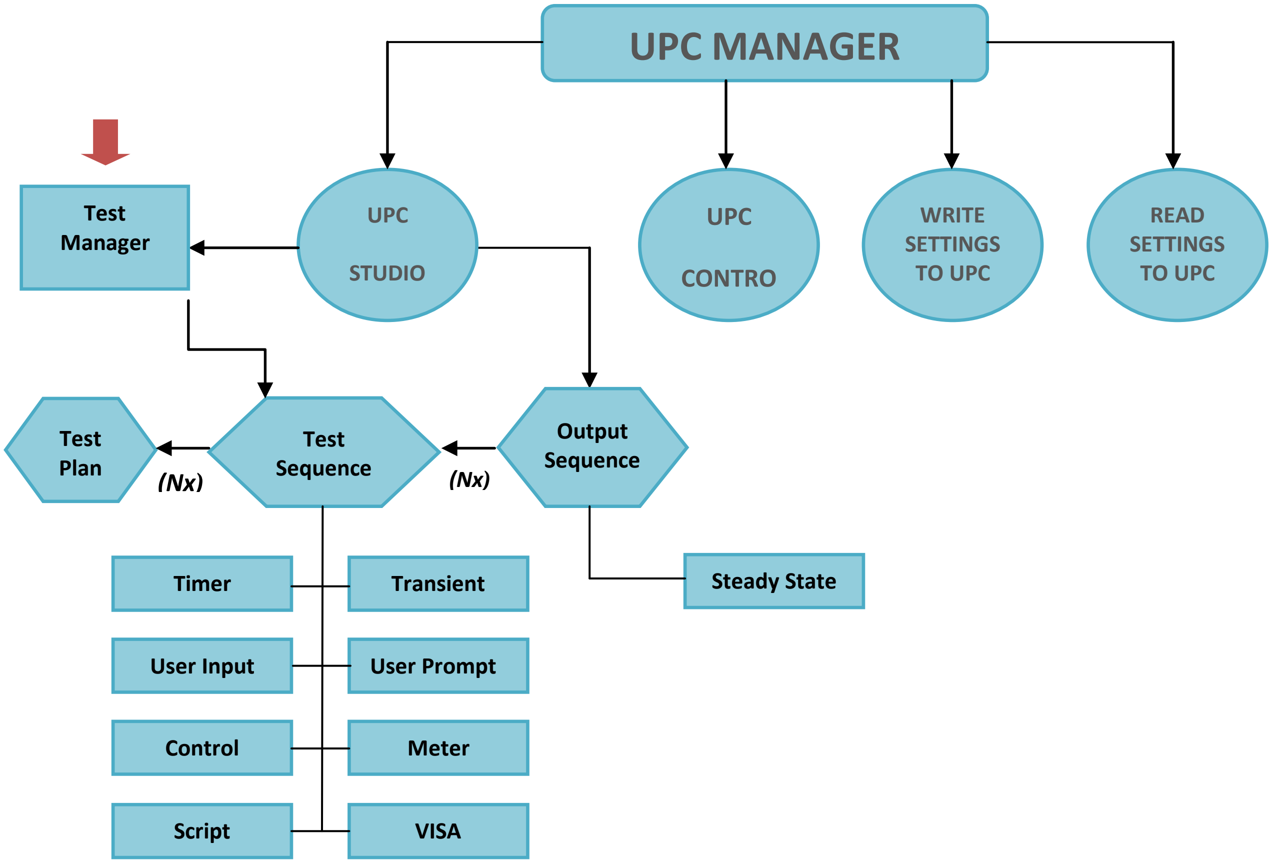
OVERVIEW

Test Manager is a unique UPC Studio feature that consolidates all UPC Manager features into a single comprehensive test executive. Test Manager allows test engineer to link together a series of Test Sequences and custom reports into a single Test Plan. Test Manager also allows test engineer to quickly create and run a Test Sequence using multiple Output Sequences and control steps such as Timers, User Prompt and Metering functions.

UPC STUDIO Test Manager Map



- **Test Plans:** A collection of Test Sequences.
- **Test Sequences:** A collection of Output Sequences and various control steps.
- **Output Sequences:** A collection of steady state outputs, waveforms and associated transients.

1. Overview (Cont.)

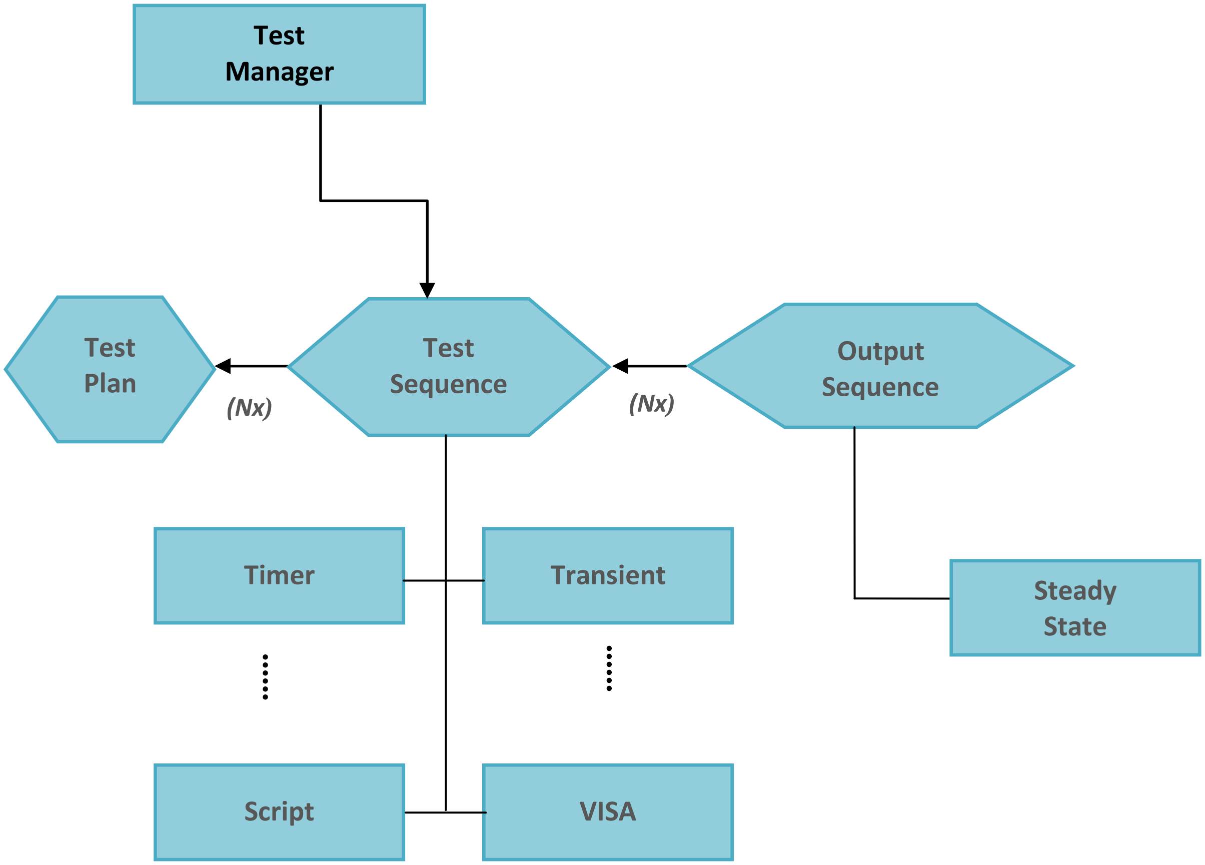
Test Manager features:

- Automate instrument compliance testing and certification. Obtain pre-configured test sequences from Pacific Power Source for a variety of standard and custom applications.
- Custom report generation, printing and print preview. Create report templates using MS Word with page header/footer, page paragraph and character formatting, graphics and form fields.
- Test reports fully document and record parameters and results for each test step. Built-in error handling helps isolate the root cause of failures
- Built-in editor allows test engineers to create and run their own custom test sequences and test plans.
- Within a Test Sequence, run an entire test or control test flow using Single Step, Run-To-Next, Run Selected, Stop or Resume. Disable individual steps for troubleshooting, reconfiguring, prototyping and debugging.
- No compiling needed. Run entire tests or individual steps immediately after making changes.
- Test sequences support 8 built-in test step types including Steady State Output, Transient Trigger, UPC Control, User Prompt, User Input, Timer, VISA (generic instrument control) and UPC Metering.
- Embed Scripts to create custom functions with full access to test manager objects.
- Complete UPC metering support including waveform capture and V/I/F/Power/Harmonics. Specify measurement functions and phases, value limits, out-of-limit behavior and data logging.
- Total, elapsed and remaining time indicators for the entire test and individual steps. Monitor the progress and results of each step while the test runs.

Pacific Power Source has developed several test sequences based on common industry test standards. These test sequences can help test engineers to simplify test procedures in their compliance testing practice, and are offered as cost options which can only be used with UPC Studio Test Manager. Please contact Pacific Power Source sales representative for more information either by phone:+1.949.251.1800 (worldwide), and 1.800.854.2433 (US only) or email:sales@pacificpower.com.

2

GETTING STARTED

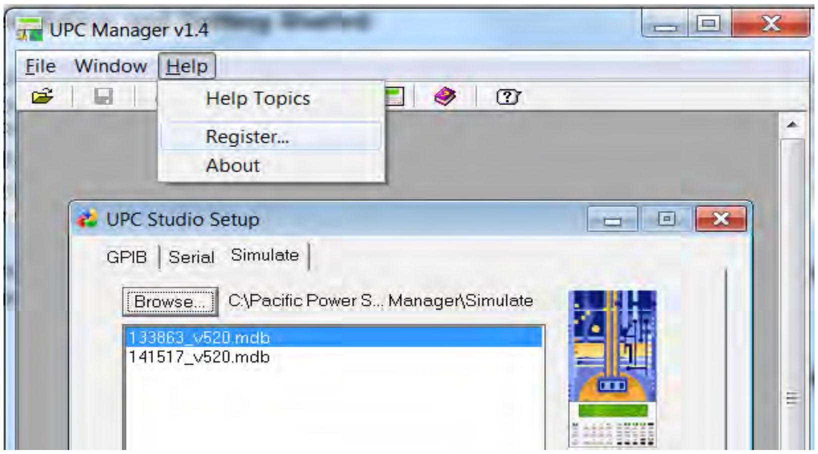


All UPC Manager features operate in “Simulate” mode. Test engineer may open, create and edit Test Plans and Test Sequences without restriction. However, to communicate with a Pacific Power Source product, a registration number, which is unique to the power source in user, must be obtained from Pacific Power Source. Test Manager is installed on the computer as part of UPC Studio during UPC Manager installation. Test engineer can experience the capabilities of UPC Studio Test Manager in “Simulate” mode. To activate UPC Studio Test Manager to communicate with power source unit, administrator is required to obtain a UPC Studio Test Manager registration code from Pacific Power Source for each serial number associated with the power source unit. The contact information is phone: +1.949.251.1800 or 1.800.854.2433 (US only); email:sales@pacificpower.com.

2. Getting Started (Cont.)

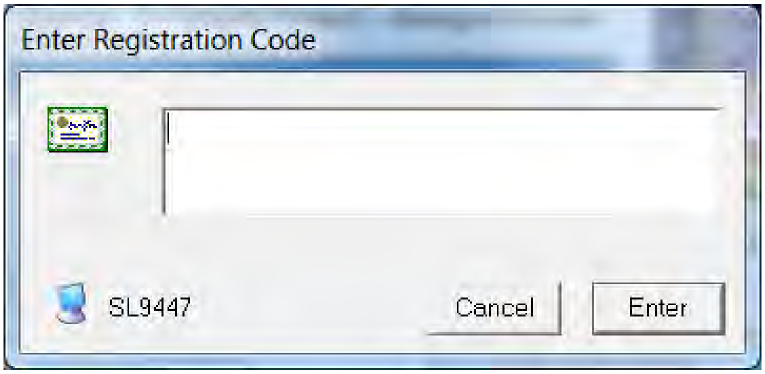
To register UPC Test Manager,

- Launch UPC Manager from the desktop quick launch icon UPC Manager or click **Start → Programs → Pacific Power Source → UPC Manager** from the desktop to open the *UPC Manager* window
- Click **Help →Registration** to open the *Enter Registration Code* window.
- Click **Help →Registration** to open the *Enter Registration Code* window



C:\Pacific Power S... Manager\Simulate

133863_v520.mdb
141517_v520.mdb

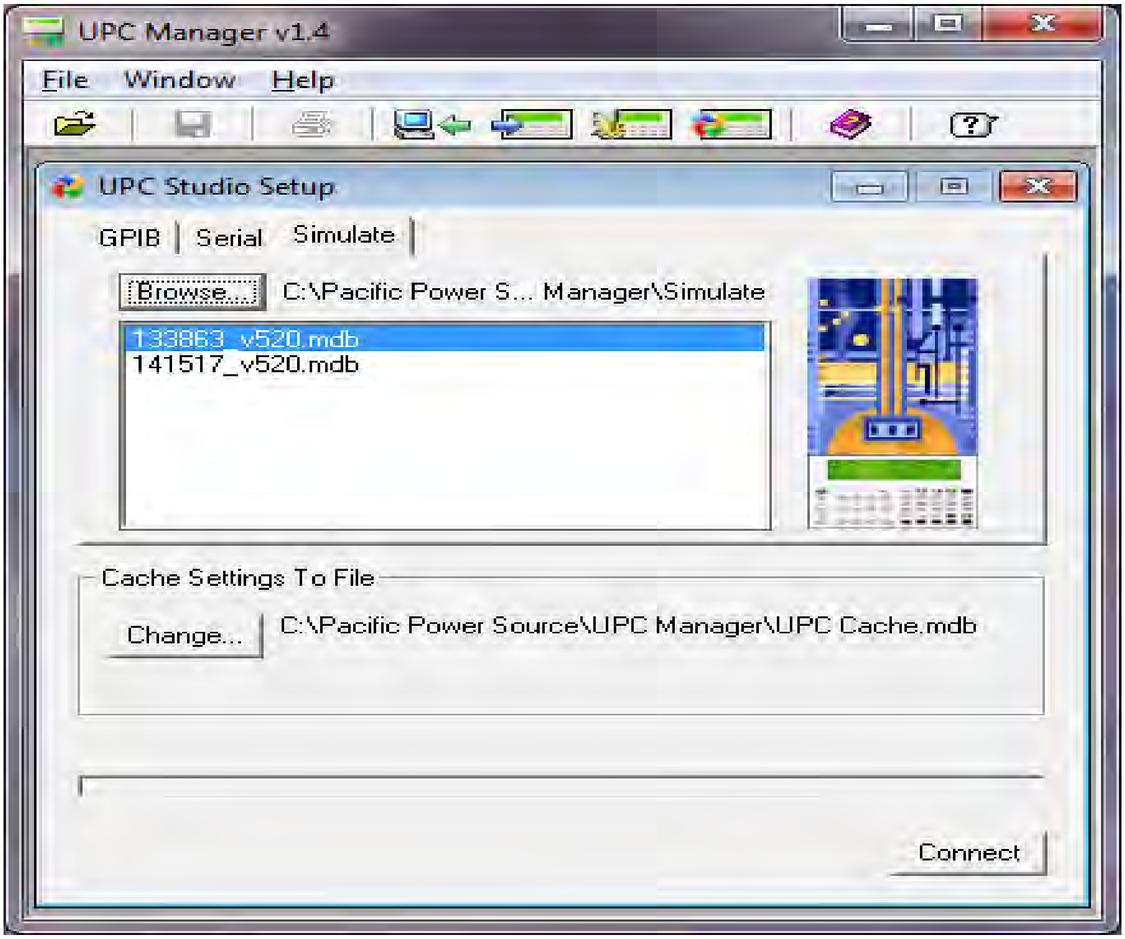


SL9447

2. Getting Started (Cont.)

To open UPC Test Manager:

- Click a tab to select *GPIB, Serial* or *Simulate* mode in the *UPC Studio Setup* window as shown below.



C:\Pacific Power S... Manager\Simulate

133863_v520.mdb
141517_v520.mdb

Cache Settings To File

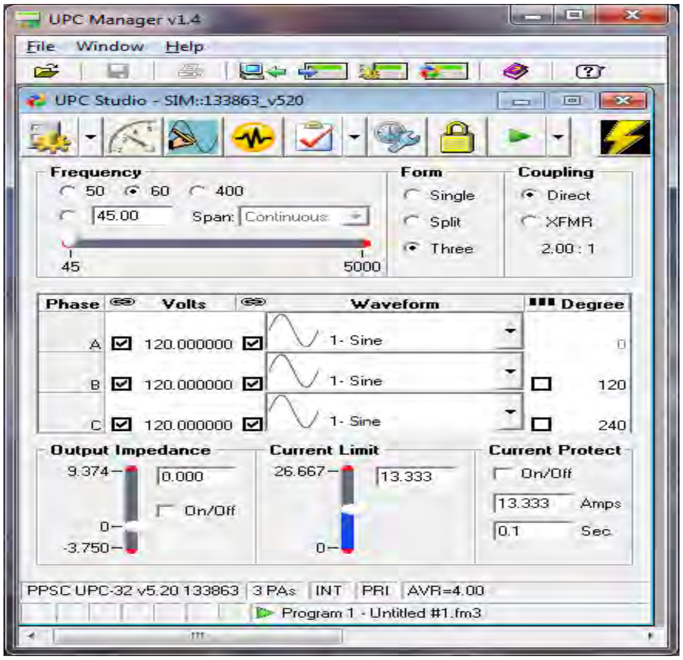
C:\Pacific Power Source\UPC Manager\UPC Cache.mdb

Note: *In "Simulate" mode, 133xxx emulates a UPC12 or UPC32 controller; 141xxx emulates a UPC1 or UPC3 controller.*

2. Getting Started (Cont.)

- Click **Connect** to open the *UPC studio* window as shown below.

UPC Studio window is displayed, showing the present operating condition.



Frequency ○ 50 ● 60 ○ 400
○ 45.00 Span: Continuous
45 5000

Form ○ Single ○ Split ● Three

Coupling ● Direct ○ XFMR 2.00 : 1

Phase	Volts	Waveform	Degree
A	☑ 120.000000 ☑	1- Sine	0
B	☑ 120.000000 ☑	1- Sine	□ 120
C	☑ 120.000000 ☑	1- Sine	□ 240

Output Impedance 9.374 0 -3.750 0.000 □ On/Off

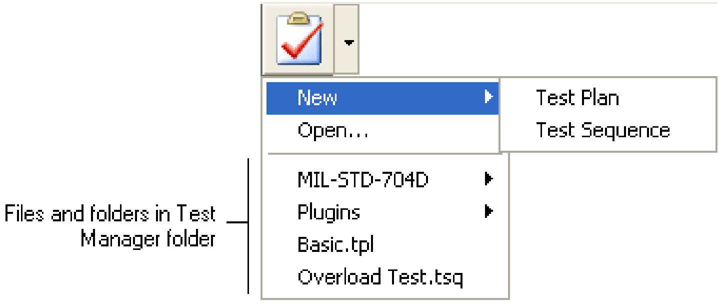
Current Limit 26.667 0 13.333

Current Protect □ On/Off 13.333 Amps 0.1 Sec

PPSC UPC-32 v5.20 133863 | 3 PAs | INT | PRI | AVR=4.00

Program 1 - Untitled #1.fm3

The **Test Manager** button in the main UPC Studio window allows user to open an existing test sequence or test plan. The drop down menu also lets user create a new test sequence or test plan file and contains a list of available files located in the test manager folder (typically "C:\Pacific Power Source\UPC Manager\Test Manager") on the PC. Selecting one of these items opens that file.

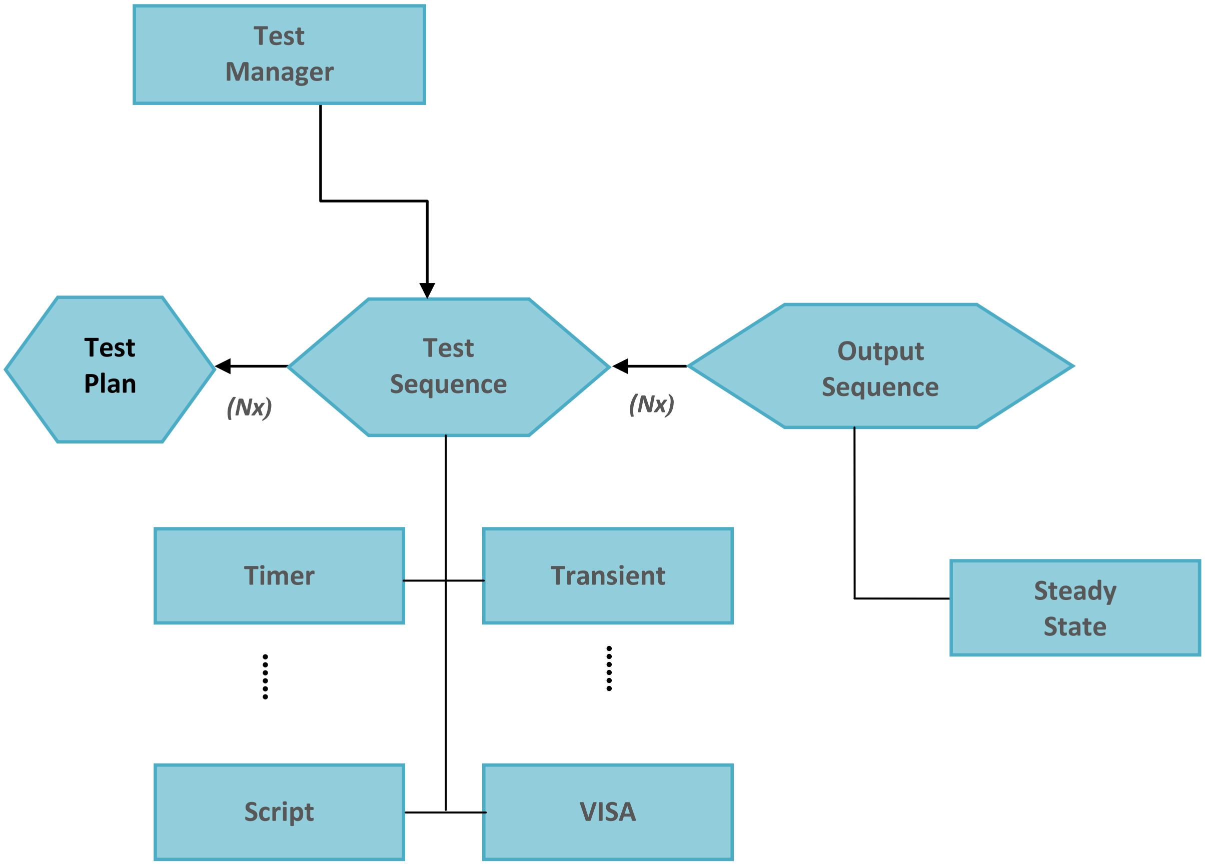


Files and folders in Test Manager folder

Note: *.tpl: Test Plan file type.*
.tsq: Test Sequence file type.

3

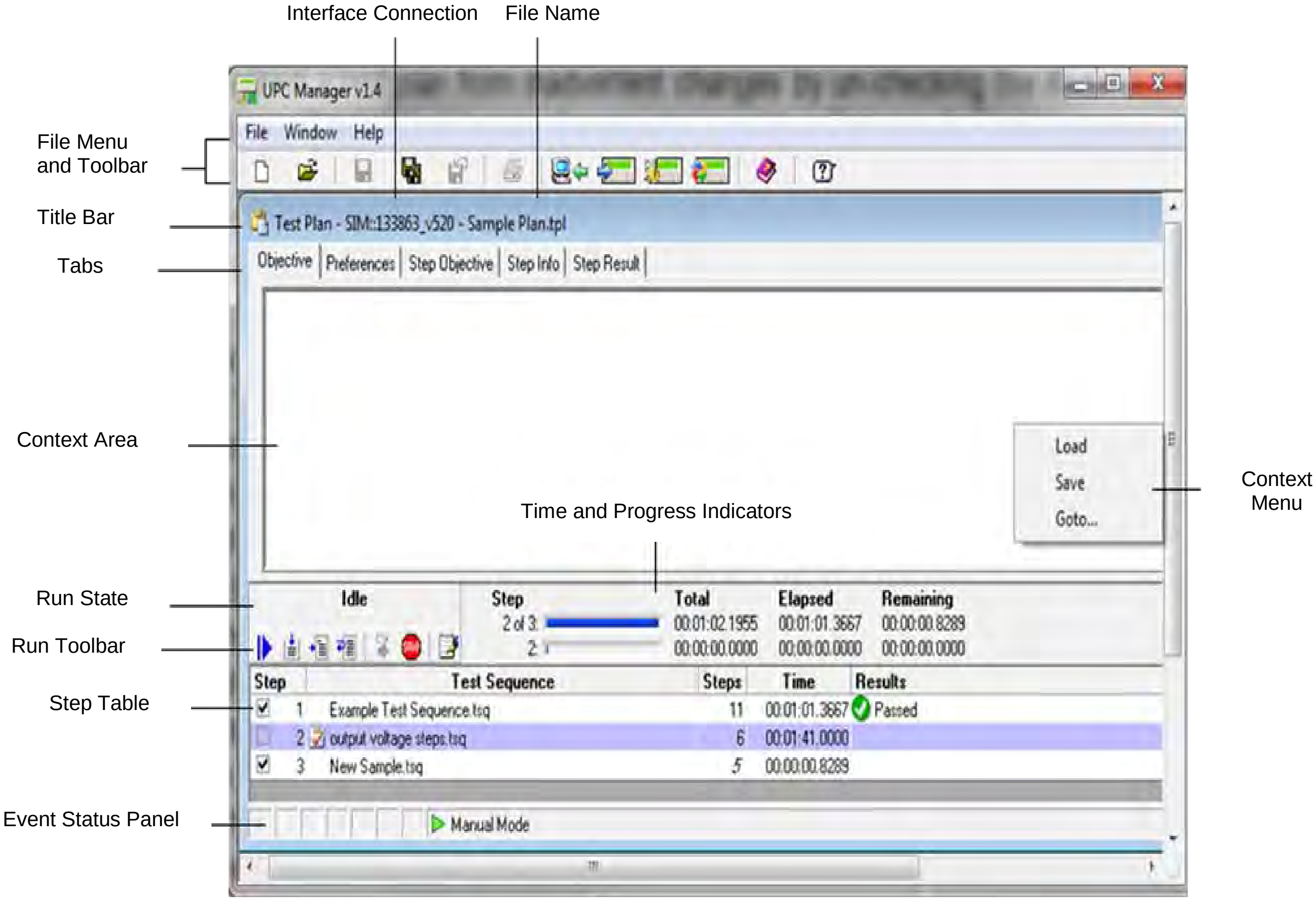
INTRODUCING TEST PLAN WINDOW



A Test Plan is a collection of test sequences. Test plans manage and simplify complex tasks by allowing test engineer to link together a series of test sequences into a single file. Test sequences consist of one or more test steps designed to run a test, automate a task, or control and monitor the power source or other instruments. The results of a test sequence and test plan are stored in a test report which is automatically generated in UPC Test Manager.

3 Test Plan Window (Cont.)

When test engineer open an existing test plan file or create a new one using the **Test Manager** button in the UPC Studio window, the Test Plan window appears as shown below.

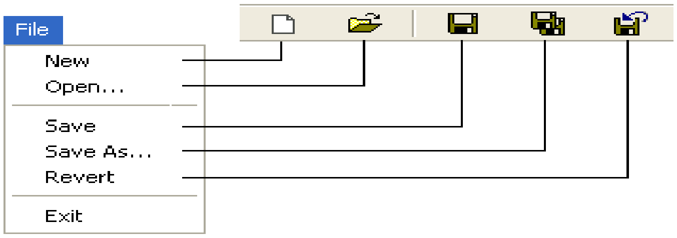


Idle	Step	Total	Elapsed	Remaining
	2 of 3	00:01:02.1955	00:01:01.3667	00:00:00.8289
	2	00:00:00.0000	00:00:00.0000	00:00:00.0000

Step		Test Sequence	Steps	Time	Results
☑	1	Example Test Sequence.tsq	11	00:01:01.3667	✓ Passed
□	2	output voltage steps.tsq	6	00:01:41.0000	
☑	3	New Sample.tsq	5	00:00:00.8289	

3.1 File Menu and Toolbar

The file menu and MDI (Multiple Document Interface) toolbar (shown below) allow test engineer to create a **New** test plan, **Open** an existing file, **Save** or **Save As...** (To a different file) or **Revert** the test plan to the last saved version. The Save and Revert items are only enabled if the test plan has been edited but not yet saved (the file name in the title bar shows an "*" at the end).



3.2 Title Bar

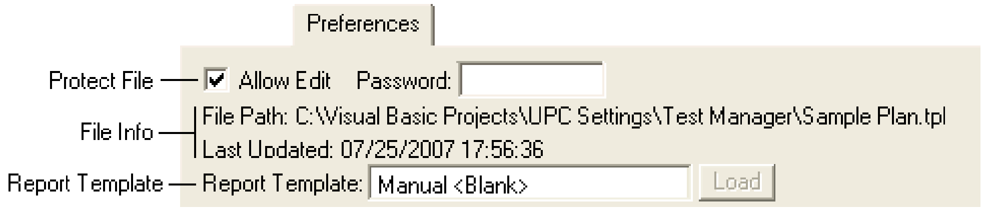
The title bar shows the interface used to connect to a UPC and the test plan file name. An "*" at the end means the file is currently being edited and the changes have not been saved.

3.3 Objective Tab, Context Area and Context Menu

Selecting one of the tabs updates the **Context Area** with that item. In the previous example, the **Objective** tab is selected. The objective is intended as a brief summary or description of the test plan and will be automatically included in the test report. Test engineer can type directly into the context area or copy and paste text or graphics from another application. Right-clicking the context area displays the **Context Menu**. Test engineer can **Load** or **Save** the objective from a Rich Text (*.rtf) or Plain Text (*.txt) file. **Go-to...** shows the current cursor location and allows test engineer to position the cursor to a particular line and column.

3.4 Preferences Tab

The **Preferences** tab shown below displays general settings and file information for the test plan.



☑ Allow Edit Password:

File Path: C:\Visual Basic Projects\UPC Settings\Test Manager\Sample Plan.tpl

Last Updated: 07/25/2007 17:56:36

Report Template: Manual <Blank>

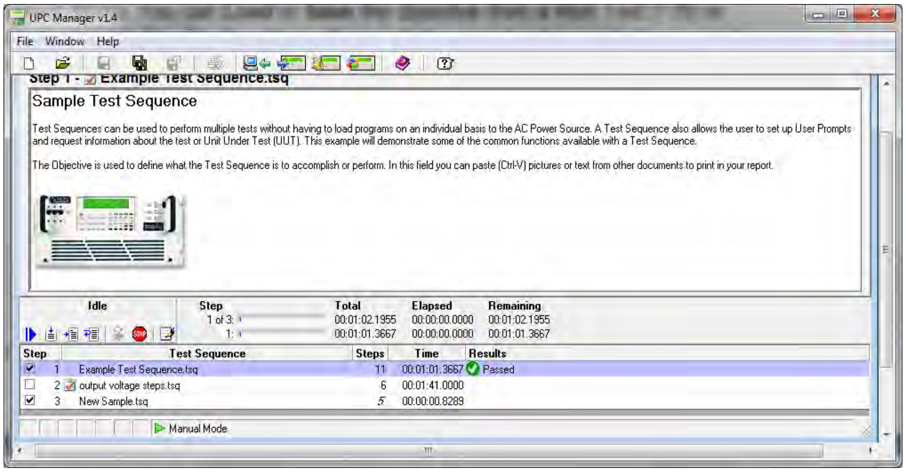
Test engineer can protect a test plan from inadvertent changes by un-checking the Allow Edit checkbox. For additional security, test engineer can assign a Password. Once a password is assigned, test engineer will be prompted to enter it in order to allow editing. The File Info section shows the full path of the test plan database file and the last time it was updated.

The Report Template shows which template is used by all test sequences in this test plan. This is useful if the test sequences update form fields in the report or test engineer want the test plan to always use a particular template. If this item is red, that template file is missing from the Templates folder (typically "C:\Pacific Power Source\UPC Manager\Test Reports\Templates"). Pressing the Load button initializes the report with that template (if it's not already loaded). Clicking in the report template text box displays a drop-down list of template files installed on the computer that test engineer can select. The "Manual" selection means the test sequences use whatever template file is currently loaded. An "*" means the test report has been updated and changes have not yet been saved.

Note: *The test plan report template overrides the report templates specified in the test sequences.*

3.5 Step Objective Tab

The step objective is intended as a brief summary or description of the selected test sequence included in the test plan. If the objective is defined during the test sequence creation, the step objective is automatically loaded in Step Objective window when the test sequence is added.



Step 1 - Example Test Sequence.tsq

Sample Test Sequence

Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence also allows the user to set up User Prompts and request information about the test or Unit Under Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

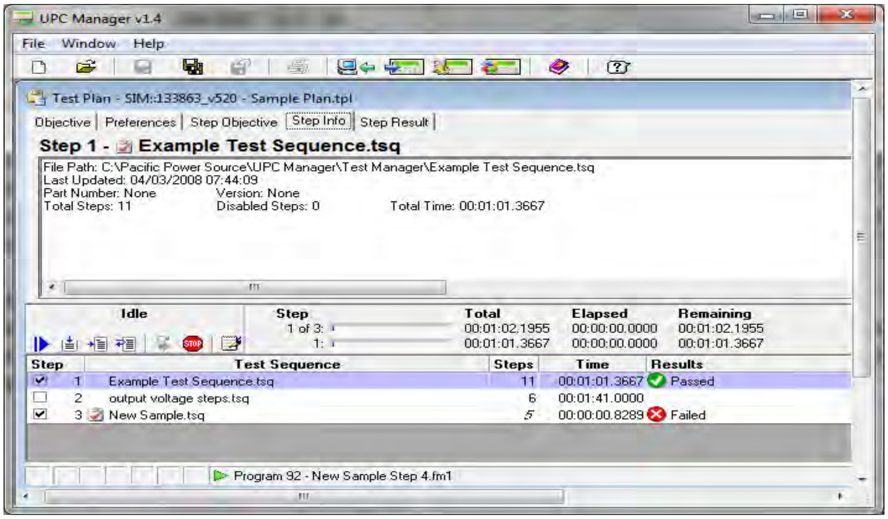
The Objective is used to define what the Test Sequence is to accomplish or perform. In this field you can paste (Ctrl-V) pictures or text from other documents to print in your report.

Idle	Step	Total	Elapsed	Remaining
	1 of 3:	00:01:02.1955	00:00:00.0000	00:01:02.1955
	1:	00:01:01.3667	00:00:00.0000	00:01:01.3667

Step		Test Sequence	Steps	Time	Results
☑	1	Example Test Sequence.tsq	11	00:01:01.3667	✓ Passed
□	2	output voltage steps.tsq	6	00:01:41.0000	
☑	3	New Sample.tsq	5	00:00:00.8289	

3.6 Step Info

The Step Info tab illustrated below shows the full path of the selected test sequence database file and the last time it was updated. Test plans only contain references to test sequence files, not the actual file contents. Test plans maintain "relative" path relationships with test sequence files. This allows the test plan and test sequence files to be moved to a different location or PC, as long as the files retain the same location relative to each other.



Step 1 - Example Test Sequence.tsq

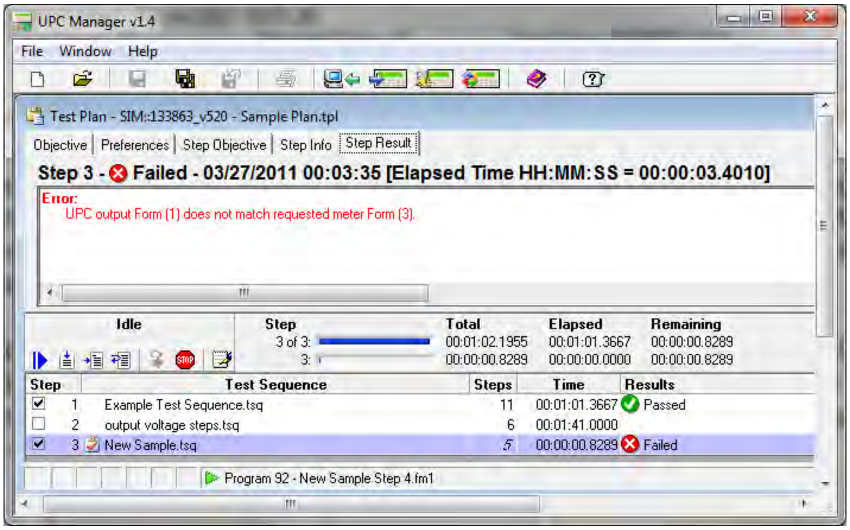
File Path: C:\Pacific Power Source\UPC Manager\Test Manager\Example Test Sequence.tsq
Last Updated: 04/03/2008 07:44:09
Part Number: None Version: None
Total Steps: 11 Disabled Steps: 0 Total Time: 00:01:01.3667

Idle	Step	Total	Elapsed	Remaining
	1 of 3:	00:01:02.1955	00:00:00.0000	00:01:02.1955
	1:	00:01:01.3667	00:00:00.0000	00:01:01.3667

Step		Test Sequence	Steps	Time	Results
☑	1	Example Test Sequence.tsq	11	00:01:01.3667	✓ Passed
□	2	output voltage steps.tsq	6	00:01:41.0000	
☑	3	New Sample.tsq	5	00:00:00.8289	✗ Failed

3.7 Step Result Tab

Step Result tab illustrated below relates to the selected step and it shows the result icon and title (Passed, Failed, Stopped, and Skipped), date/time the step completed and the elapsed time the step completed from the beginning of the test. If a step fails, the results also include the error description.



Step 3 - ✗ Failed - 03/27/2011 00:03:35 [Elapsed Time HH:MM:SS = 00:00:03.4010]

Error:
UPC output Form (1) does not match requested meter Form (3).

Idle	Step	Total	Elapsed	Remaining
	3 of 3:	00:01:02.1955	00:01:01.3667	00:00:00.8289
	3:	00:00:00.8289	00:00:00.0000	00:00:00.8289

Step		Test Sequence	Steps	Time	Results
☑	1	Example Test Sequence.tsq	11	00:01:01.3667	✓ Passed
□	2	output voltage steps.tsq	6	00:01:41.0000	
☑	3	New Sample.tsq	5	00:00:00.8289	✗ Failed

▶ Program 92 - New Sample Step 4.fm1

3.8 Run State

The Run State section above the Run Toolbar shows the current status of the test. The various run states are shown below.

Idle No test or steps have completed or are currently running.

Running Step n... Step "n" is currently running.

Stopped The test was stopped. The results column in the step table shows which step was stopped. A test is stopped by pressing the Stop button in the run toolbar or the Stop button in a User Prompt, User Input or Transient Prompt dialog box.

Failed The test failed. The results column in the step table shows which step failed. Click in the results column for that step to view additional information.

Done The test or selected step(s) have successfully completed.

3.9 Run Toolbar

The table below describes the buttons in the Run Toolbar. Some items (like **Run Step**) require one or more selected rows in the step table. Running a step runs the entire test sequence for that step. To run an individual step in a test sequence, open the test sequence file (double-click it in the test plan step table), then use the run toolbar in the test sequence window.

Start - Clears the test report then runs the entire test starting from step 1 (regardless of which step is currently selected).

Continue - Resumes the test starting with the currently selected row (step). The test continues to the last step.

Run Step- Runs the selected step(s) then pauses. Run Step is convenient for testing and troubleshooting.

Run To Next- Runs the selected step. When the step completes, the test pauses with the next row selected. Run To Next allows test engineer to "single step" through a test sequence.

Show Running Step- When a test is running, pressing this button selects and shows the currently running step, scrolling the step table if necessary.

Stop - Stops the test and disables the power source output.

Show Report - Shows the test report window

Running a test using **Start,** first initializes the test report, then appends the test data to the report after each step completes. This creates a clean test report each time the test is run. Running a test using the other controls does not first clear the test report, making it easier to troubleshoot (single step etc) a test.

3.10 Time and Progress Indicators

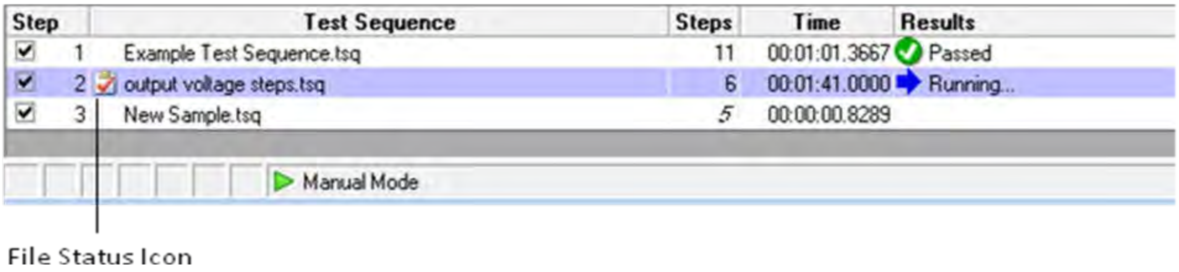
The upper time and progress indicator shows the values for the entire test (all enabled steps) and the lower one shows the values of the selected step(s). The total time values update as step rows are selected making it easy to see when that step begins relative to the start of the test, even if a test is not running. The total time values take into account if step rows are not enabled (step checkbox not checked). Time and progress indicators are updated as the test runs. Step times are estimates based on the test sequence and system performance. Time values are shown in HH:MM: SS.SSSS format. The actual elapsed time of each step is recorded in the test report.

3.11 Event Status Panel

Event Status Panel in the Test Plan window functions the same in the Test Sequence window. It consists of Execution State icon and Executing Program / Output Sequence description. Different colors of the Execution State icon indicates different types of state being currently executed such as steady state, transient state, ramp or no program. Executing Program is the program number (or Manual Mode) of the currently executing program. The program number range for execution is defined in the Preference tab when the test sequence is created. Manual Mode is automatically entered whenever an output parameter of the last executing program was changed. If the program is based on an output sequence, the output sequence file name is also shown.

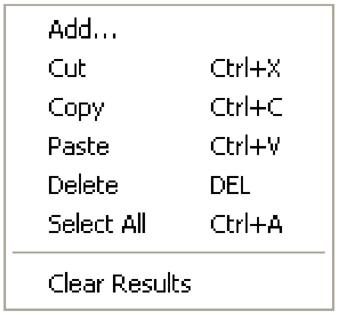
3.12 Test Plan Step Table

The step table shown below appears at the bottom of the Test Plan window. The steps in the table are links to test sequence files stored in the Test Manager folder (Typically "C:\Pacific Power Source\UPC Manager\Test Manager"). Double-clicking one of the test sequence files in the table opens the test sequence window, allowing test engineer to view or edit the values.



Step		Test Sequence	Steps	Time	Results
☑	1	Example Test Sequence.tsq	11	00:01:01.3667	✓ Passed
☑	2	output voltage steps.tsq	6	00:01:41.0000	➡ Running...
☑	3	New Sample.tsq	5	00:00:00.8289	

- Right-click anywhere in the step table to active step context menu shown below.



3.12 Test Plan Step Table (Cont.)

Add… Displays a file open dialog box. The test sequence file Test engineer select is added to the table.

Cut Copies the selected steps to the clipboard and then deletes them from the table.

Copy Copies the selected steps to the clipboard.

Paste Pastes the clipboard after the selected step.

Delete Deletes selected steps.

Select All Selects all steps.

Clear Results Clears the results column of the selected steps.

Note: *If no step is selected before user right-clicking the step table, Cut, Copy, Delete and Clear Results selection will be disabled.*

3.12.1 Step Table Columns

The columns in the step table are described below.

Step Enables checkbox and step number. Steps that aren't checked are skipped when the test sequence runs. Un-checking a step is a convenient way to temporarily disable a step while troubleshooting or reconfiguring a test.

Test Sequence Shows the File Status Icon and test sequence file name. Refer to the test sequence file status section below for more information.

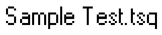
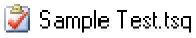
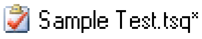
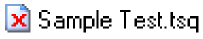
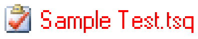
Steps Indicates total number of steps in the test sequence. Numbers in *italic* mean the test sequence contains one or more disabled steps.

Time Estimates to run the test sequence.

Results Shows the results state (Pass, Fail, Stopped, and Skipped) the last time this step was run. It also shows if a step is currently running. Clicking in the results column for a particular step automatically selects the Step Result tab in the test plan window, providing additional information.

3.12.2 Test Sequence File Status

The test sequence file status is shown in the **Test Sequence** column of the step table. The table below shows the status of various conditions.

 Sample Test.tsq	The test sequence file exists but is currently not loaded.
 Sample Test.tsq	The test sequence file is currently loaded. Test sequence files are automatically loaded when they are run or opened (double-click).
 Sample Test.tsq*	The test sequence file is loaded and currently being edited (*).
 Sample Test.tsq	The test sequence file is missing. Use the **Step Info** tab in the main test plan window to view the file path the test plan expects.
 Sample Test.tsq	The test sequence contains invalid values or values not supported by the power source in use. Double-click the file to view or edit the values (opens test sequence window). Note that the test plan only checks for invalid or unsupported values when the test sequence loads or runs.

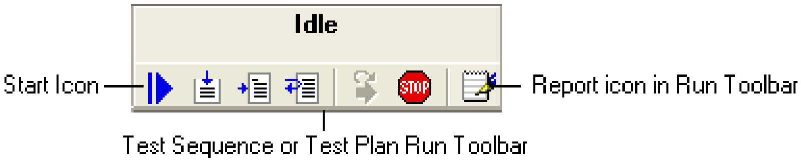
4

CREATING AND VIEWING TEST REPORT

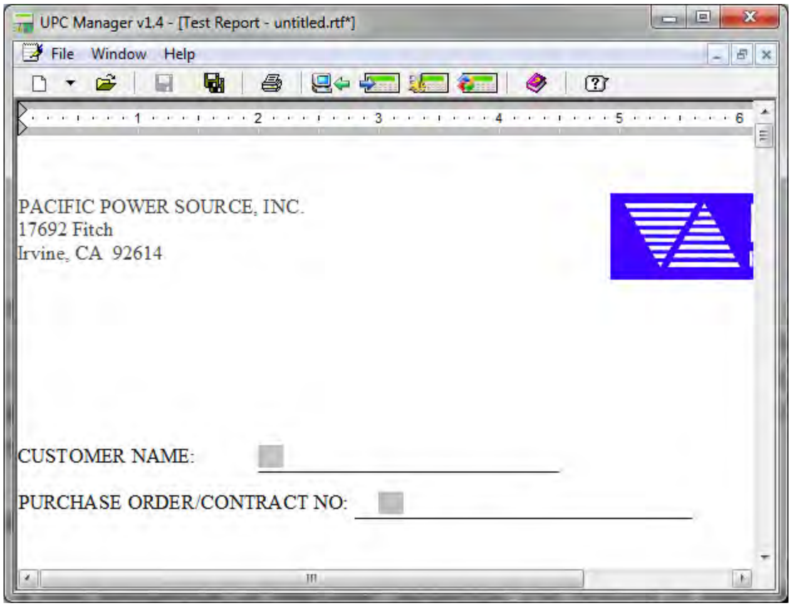
The Test Report window allows test engineer to view and print test reports created by a test sequence or test plan.

To access the test report window:

- Click the **Report icon** in the **Run Toolbar** in the Test Plan or Test Sequence window to open the Test Report printout window as shown below.


Idle
Start Icon
Report icon in Run Toolbar
Test Sequence or Test Plan Run Toolbar

A sample test report is shown below, initialized from a template file.



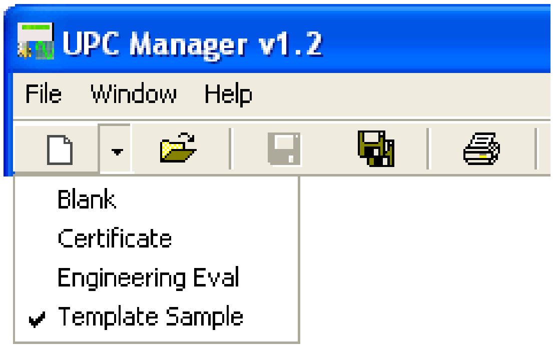
PACIFIC POWER SOURCE, INC.
17692 Fitch
Irvine, CA 92614

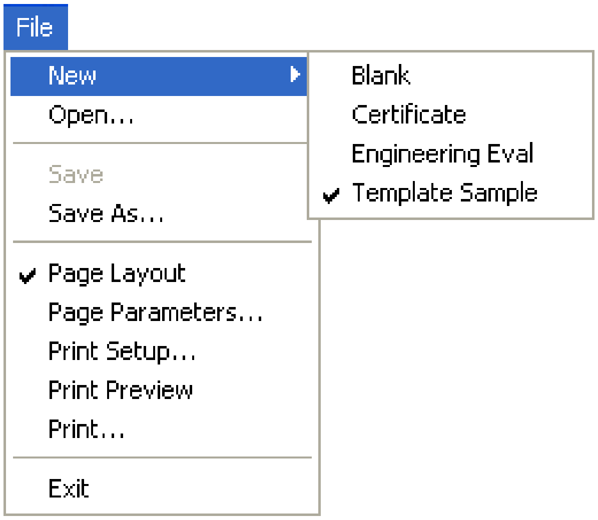
CUSTOMER NAME: ____________________

PURCHASE ORDER/CONTRACT NO: ____________________

4 Creating and Viewing Test Report (Cont.)

The top of the test report window includes a File menu and toolbar as illustrated below.





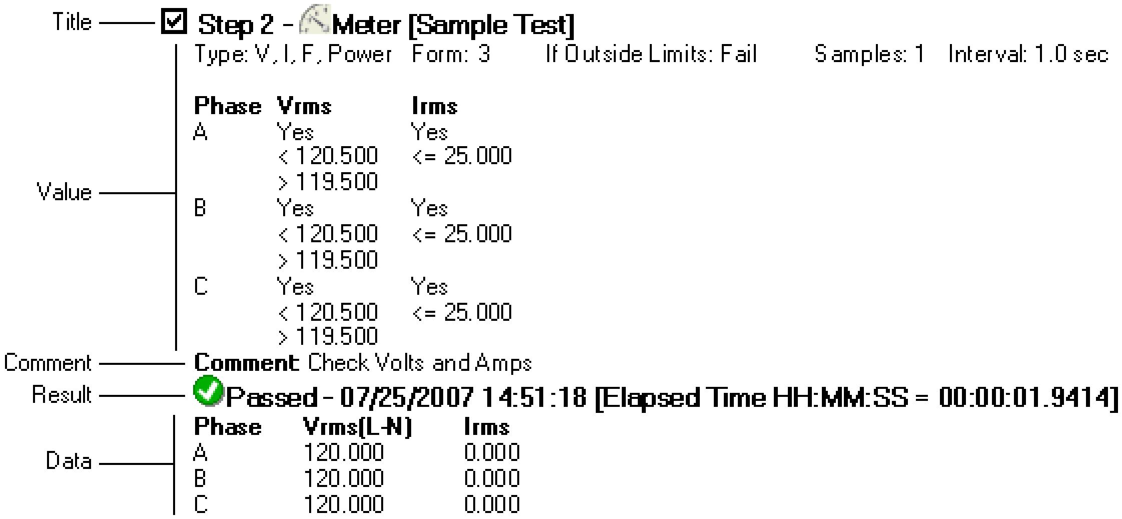
The New item allows test engineer select one of the template files stored in the Test Report template folder (typically "C:\Pacific Power Source\UPC Manager\Test Reports\Templates"). Selecting a new template file or pressing the New button creates a new test report based on the selected template file.

A template file is a .RTF file created in MS Word and is used as a test report template to store test result during a Test Plan or Test Sequence execution. Template files can be blank or contain introductory text, graphics, page header and footer (page numbering, date etc), page/paragraph/character formatting, form fields. Each form field should be given a unique field name. When a report template file is loaded in a Test Plan or Test Sequence, the form field names embedded in the template file will be available to *Report Field* in User Input step (See Chapter 6.4 User Input). Test engineer can select the form field names from the Report Field to store input information in a test report. Refer to Chapter 7 Exercise for examples on creating template files and working with template files in Test Sequence or Test Plan.

4.1 Test Results

Running a test sequence or test plan appends the results of each step at the end of test report. Running a test sequence from the beginning (using the **Start icon** in the **Run Toolbar**) initializes the test report from the selected template file then adds the test sequence Objective and Preferences. This creates a clean report each time the test sequence is run. Running a test sequence using the other controls does not clear the test report or add the Objective or Preferences, making it easier to troubleshoot (single step etc) a test.

After each step runs, the information about that step is appended to the test report as shown below. This information includes the **Title**, **Value**, **Comment**, **Result** and **Data** of each step.



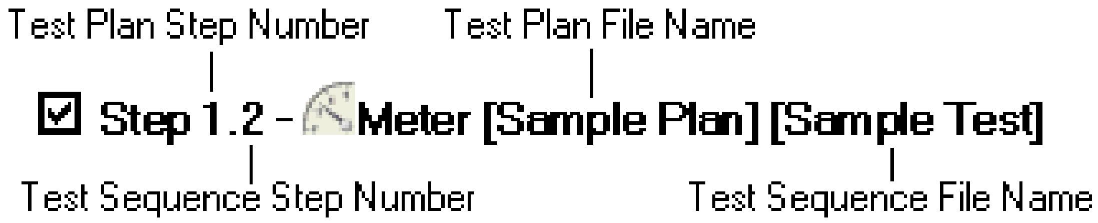
```
☑ Step 2 - Meter [Sample Test]
Type: V, I, F, Power   Form: 3    If Outside Limits: Fail    Samples: 1   Interval: 1.0 sec

Phase  Vrms       Irms
A      Yes        Yes
       < 120.500  <= 25.000
       > 119.500
B      Yes        Yes
       < 120.500  <= 25.000
       > 119.500
C      Yes        Yes
       < 120.500  <= 25.000
       > 119.500
Comment: Check Volts and Amps
✓Passed - 07/25/2007 14:51:18 [Elapsed Time HH:MM:SS = 00:00:01.9414]
Phase     Vrms(L-N)    Irms
A         120.000      0.000
B         120.000      0.000
C         120.000      0.000
```

Title: Includes the enable checkbox, step number, icon, type and test sequence file name.
Value and Comment: Are the test sequence information from the design window, Step Value/ Comment tab.
Result: Shows the result icon, title, date/time the step completed and the elapsed time the step completed from the beginning of the test.

> ***Note:*** *Not all steps produce data. The data also includes any errors that occurred running the step. Result and Data are also shown in the Step Result tab in the test sequence window.*

4.2 Test Plan Step Title

When a test sequence is part of a test plan, the step **Title** in the test report shows both the test plan and test sequence step numbers and file names.



☑ Step 1.2 - Meter [Sample Plan] [Sample Test]

4.3 Controlling Report Information

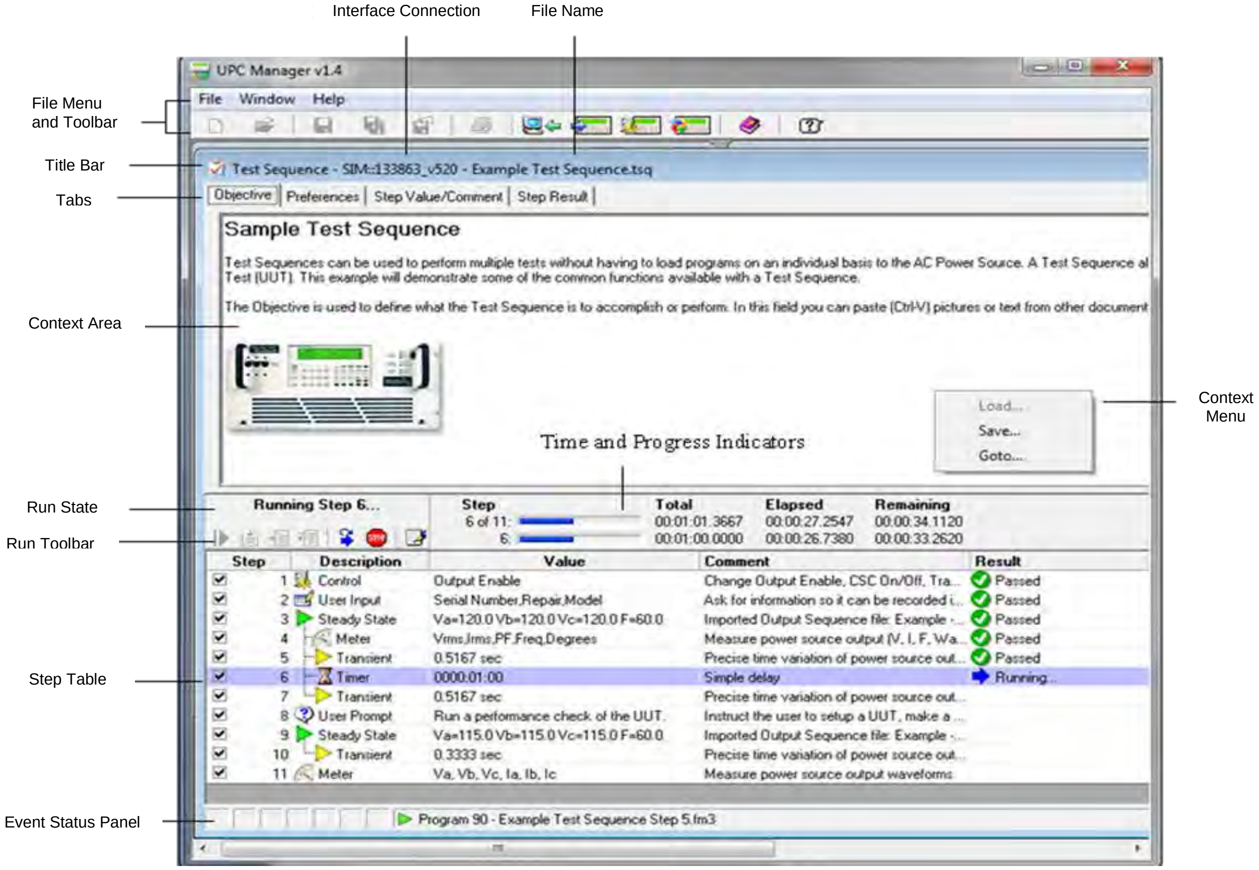
UPC Test Manager allows test engineer to create a script with the TM.StepReportFlags method (see Chapter 6.8 Script) to control the step items included in the test report for any step. These step items include but are not limited to: step comment, step summary and step title. The default setting for test report generation is to include all information (Title, Value, Comment, Result and Data)

5

INTRODUCING TEST SEQUENCE WINDOW

A Test Sequence is a collection of Output Sequences and various control steps. Test sequences consist of one or more test steps designed to run a test, automate a task, or control and monitor the power source or other instruments. The results of a test sequence are stored in a test report.

A test sequence file contains all the information necessary to run the test. This makes it easy to transfer the test sequence to another location or PC. When Test Engineer open an existing test sequence file or create a new one using the Test Manager Button in the UPC Studio window, the test sequence window appears as shown.



Test Sequence - SIM::133863_v520 - Example Test Sequence.tsq

Sample Test Sequence

Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence al Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

The Objective is used to define what the Test Sequence is to accomplish or perform. In this field you can paste (Ctrl-V) pictures or text from other document

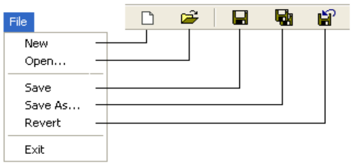
Running Step 6...	Step	Total	Elapsed	Remaining
	6 of 11:	00:01:01.3667	00:00:27.2547	00:00:34.1120
	6:	00:01:00.0000	00:00:26.7380	00:00:33.2620

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC On/Off, Tra...	✓ Passed
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	✓ Passed
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Imported Output Sequence file: Example -...	✓ Passed
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	✓ Passed
☑	5	Transient	0.5167 sec	Precise time variation of power source out...	✓ Passed
☑	6	Timer	0000:01:00	Simple delay	➡ Running...
☑	7	Transient	0.5167 sec	Precise time variation of power source out...	
☑	8	User Prompt	Run a performance check of the UUT.	Instruct the user to setup a UUT, make a ...	
☑	9	Steady State	Va=115.0 Vb=115.0 Vc=115.0 F=60.0	Imported Output Sequence file: Example -...	
☑	10	Transient	0.3333 sec	Precise time variation of power source out...	
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output waveforms	

Program 90 - Example Test Sequence Step 5.fm3

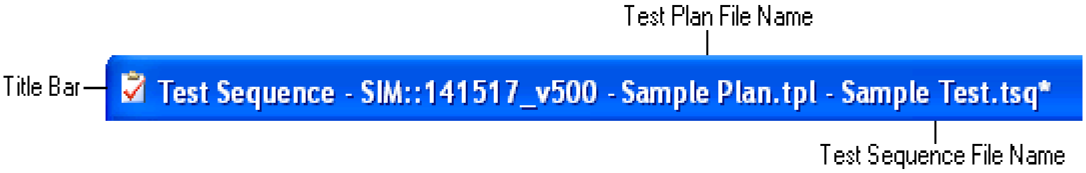
5.1 File Menu and Toolbar

The file menu and MDI toolbar allows user to create a **new** test sequence, **open** an existing file, **Save** or **Save as...** (to a different file) or **Revert** the test sequence to the last saved version. The Save and Revert items are only enabled if the test sequence has been edited but not yet saved (the file name in the title bar shows an "*" at the end).



5.2 Title Bar

The title bar shows the interface used to connect to the UPC and the test sequence file name. An "*" at the end means the file is currently being edited and the changes have not been saved. If the test sequence is part of a test plan, the test plan file name is shown first.

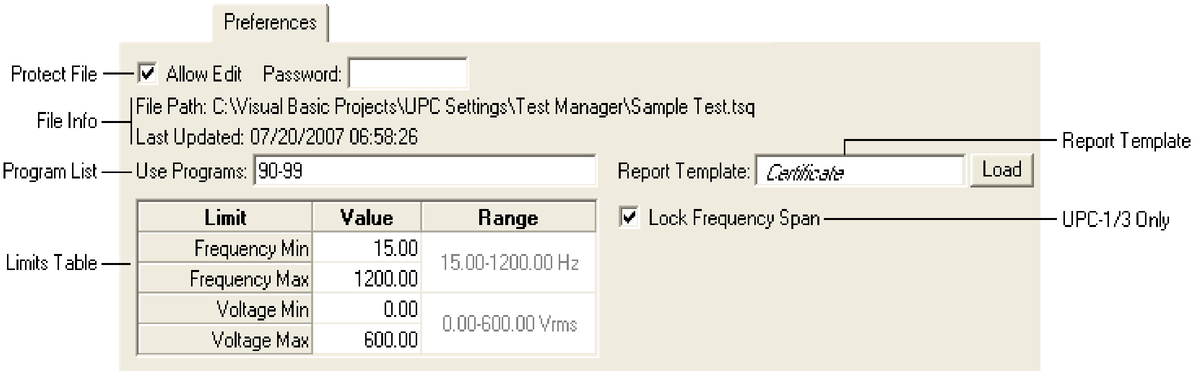

Test Sequence - SIM::141517_v500 - Sample Plan.tpl - Sample Test.tsq*

5.3 Objective Tab, Context Area and Context Menu

Selecting one of the tabs updates the **Context Area** with that item. In the above example, the **Objective** tab is selected. The objective is intended as a brief summary or description of the test sequence and is automatically included in the test report. A user can type directly into the context area or copy and paste text or graphics from another application. Right-clicking the context area displays the **Context Menu**. User can **Load** or **Save** the objective from a Rich Text (*.rtf) or Plain Text (*.txt) file. **Go-to...** shows the current cursor location and allows test engineer to position the cursor to a particular line and column.

5.4 Preferences Tab

The **Preferences** tab shown below displays general settings and file information for the test sequence.



☑ Allow Edit Password:

File Path: C:\Visual Basic Projects\UPC Settings\Test Manager\Sample Test.tsq
Last Updated: 07/20/2007 06:58:26

Use Programs: 90-99

Report Template: Certificate

☑ Lock Frequency Span

Limit	Value	Range
Frequency Min	15.00	15.00-1200.00 Hz
Frequency Max	1200.00	
Voltage Min	0.00	0.00-600.00 Vrms
Voltage Max	600.00	

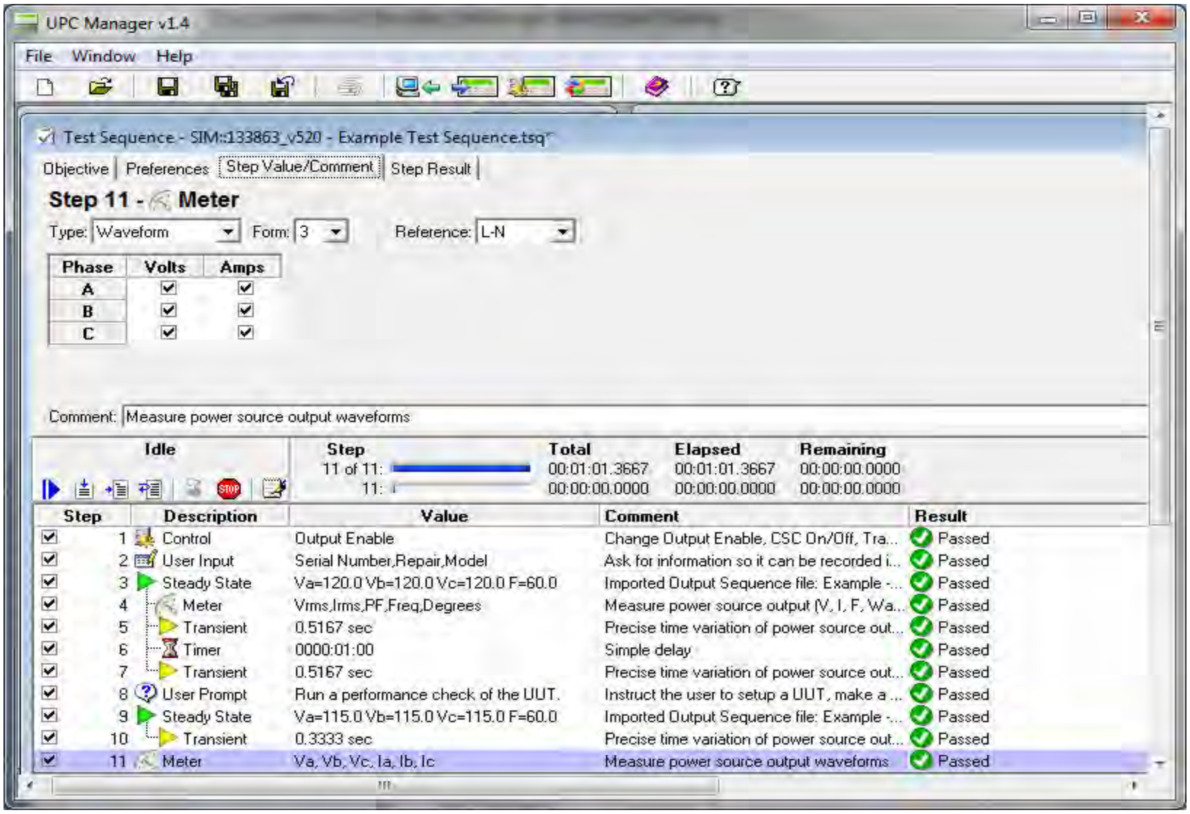
test engineer can protect a test sequence from inadvertent changes by un-checking the Allow Edit checkbox. For additional security, Test Engineer can assign a Password. Once a password is assigned, Test Engineer will be prompted to enter it in order to allow editing. The File Info section shows the full path of the test sequences database file and the last time it was updated. The program list defines which stored programs in Test Engineer UPC the test sequence can use. These programs will be overwritten as necessary when running the test sequence. The program list can be a range (90-99), comma separated values (90, 93, 97) or both (90-93, 99). The Limits Table lets Test Engineer to define the minimum and maximum frequency and voltage values allowable during the test. The test sequence will not run any program step (steady state or transient) that contain values outside these limits.

The Report Template shows which template is used with this test sequence. This is useful if the test sequence updates form fields in the report or Test Engineer want the test sequence to always use a particular template. If this item is red, that template file is missing from the Templates folder (typically "C:\Pacific Power Source\UPC Manager\Test Reports\Templates"). Pressing the Load button initializes the report with that template (if it's not already loaded). Clicking the report template text box displays a drop-down list of template files installed on Test Engineerr computer that Test Engineer can select. The "Manual" selection means the test sequence uses whatever template file is currently loaded. An "*" means the test report has been updated and changes have not yet been saved. Note: If the test sequence is opened from a test plan, the test plan report template is used.

If the Lock Frequency Span checkbox is checked, the highest frequency in the test sequence is used when setting the frequency span. This prevents the frequency span from changing and leaves the output enabled during the test. If this checkbox is not checked, the optimal (lowest) frequency span is selected for each step. This provides the maximum output waveform resolution and greatest metering accuracy but may cause the output to be temporarily disabled as the test runs. This checkbox is only available for UPC-1/3 based power sources

5.5 Step Value/Comment Tab

Step Value/Comment Tabs allows user to edit settings and comment for each selected step in the Step Table. The content in the tab varies depending on the type of test steps selected. The text Test Engineer enter in the **Comment** box automatically appears in the step table and test report.



Step 11 - Meter

Type: Waveform Form: 3 Reference: L-N

Phase	Volts	Amps
A	☑	☑
B	☑	☑
C	☑	☑

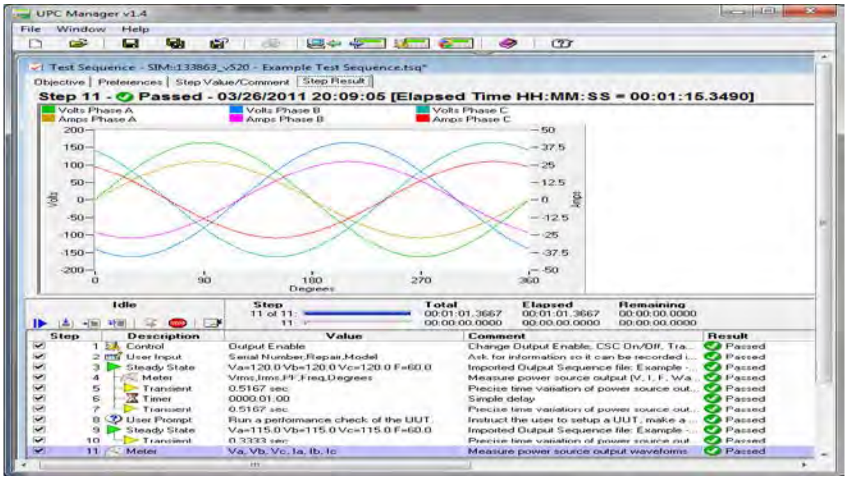
Comment: Measure power source output waveforms

Idle	Step	Total	Elapsed	Remaining
	11 of 11:	00:01:01.3667	00:01:01.3667	00:00:00.0000
	11:	00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC On/Off, Tra...	✓ Passed
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	✓ Passed
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Imported Output Sequence file: Example -...	✓ Passed
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	✓ Passed
☑	5	Transient	0.5167 sec	Precise time variation of power source out...	✓ Passed
☑	6	Timer	0000:01:00	Simple delay	✓ Passed
☑	7	Transient	0.5167 sec	Precise time variation of power source out...	✓ Passed
☑	8	User Prompt	Run a performance check of the UUT.	Instruct the user to setup a UUT, make a ...	✓ Passed
☑	9	Steady State	Va=115.0 Vb=115.0 Vc=115.0 F=60.0	Imported Output Sequence file: Example -...	✓ Passed
☑	10	Transient	0.3333 sec	Precise time variation of power source out...	✓ Passed
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output waveforms	✓ Passed

5.6 Step Result

Result Tabs records the test result for each select step and additional desired information. The results can be recorded in the forms of text, numbers or graphs defined by users.



Test Sequence - SIM::133863_v520 - Example Test Sequence.tsq*

Step 11 - ✓ Passed - 03/26/2011 20:09:05 [Elapsed Time HH:MM:SS = 00:01:15.3490]

Idle	Step	Total	Elapsed	Remaining
	11 of 11:	00:01:01.3667	00:01:01.3667	00:00:00.0000
	11	00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC On/Off, Tra...	✓ Passed
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	✓ Passed
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Imported Output Sequence file: Example -...	✓ Passed
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output [V, I, F, Wa...	✓ Passed
☑	5	Transient	0.5167 sec	Precise time variation of power source out...	✓ Passed
☑	6	Timer	0000.01.00	Simple delay	✓ Passed
☑	7	Transient	0.5167 sec	Precise time variation of power source out...	✓ Passed
☑	8	User Prompt	Run a performance check of the UUT.	Instruct the user to setup a UUT, make a ...	✓ Passed
☑	9	Steady State	Va=115.0 Vb=115.0 Vc=115.0 F=60.0	Imported Output Sequence file: Example -...	✓ Passed
☑	10	Transient	0.3333 sec	Precise time variation of power source out...	✓ Passed
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output waveforms	✓ Passed

5.7 Run State

The Run State section above the Run Toolbar shows the current status of the test. The various run states are shown below.

Idle No test or steps have completed or are currently running.

Running Step n... Step "n" is currently running.

Stopped The test was stopped. The results column in the step table shows which step was stopped. A test is stopped by pressing the Stop button in the run toolbar or the Stop button in a User Prompt, User Input or Transient Prompt dialog box.

Failed The test failed. The results column in the step table shows which step failed. Click in the results column for that step to view additional information.

Done The test or selected step(s) have successfully completed.

5.8 Run Toolbar

The table below describes the buttons in the Run Toolbar. Some items (like Run Step) require one or more selected rows in the step table.

Start - Clears the test report then runs the entire test starting from step 1(regardless of which step is currently selected).

Continue - Resumes the test starting with the currently selected row (step). The test continues to the last step.

Run Step- Runs the selected step(s) then pauses. Run Step is convenient for testing and troubleshooting.

Run To Next- Runs the selected step. When the step completes, the test pauses with the next row selected. Run To Next allows Test Engineer to "single step" through a test sequence.

Show Running Step- When a test is running, pressing this button selects and shows the currently running step, scrolling the step table if necessary.

Stop - Stops the test and disables the power source output.

Show Report - Shows the test report window

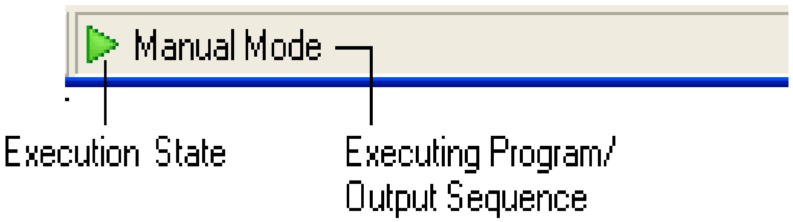
Running a test using Start first initializes the test report then appends the test data to the report after each step completes. This creates a clean test report each time the test is run. Running a test using the other controls does not first clear the test report, making it easier to troubleshoot (single step etc) a test.

5.9 Time and Progress Indicators

The upper time and progress indicator shows the values for the entire test (all enabled steps) and the lower one shows the values of the selected step(s). The total time values update as step rows are selected making it easy to see when that step begins relative to the start of the test, even if a test is not running. The total time values take into account if step rows are not enabled (step checkbox not checked). Time and progress indicators are updated as the test runs. Step times are estimates based on the type of step, programmed values and system performance. Time values are shown in HH:MM: SS.SSSS format. The actual elapsed time of each step is recorded in the test report.

5.10 Event Status Panel

Event Status Panel consists of Execution State icon and Executing Program / Output Sequence description.



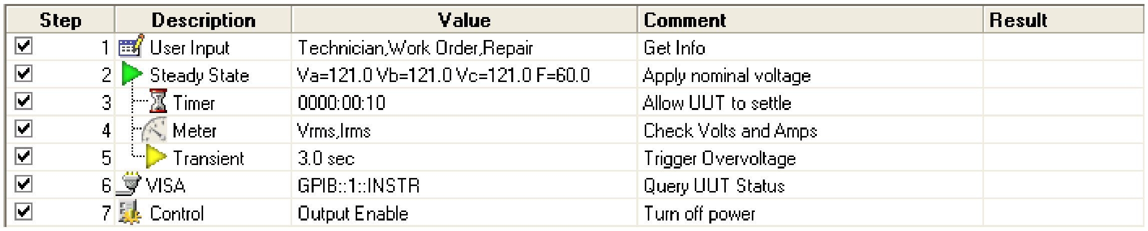
Different colors of the Execution State icon indicates different types of state being currently executed

▶	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. Test Engineer 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.

Executing program is the program number (or Manual Mode) of the currently executing program. In the Preference tab user can 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 an output sequence, the output sequence file name is also shown.

5.11 Step Table

The step table shown below appears at the bottom half of the Test Sequence window. The table consists of 5 columns- Step, Description, Value, Comment and Result which are described belwo. The type and order of steps in the table defines the operations performed by the test sequence.



Step	Description	Value	Comment	Result
☑ 1	User Input	Technician,Work Order,Repair	Get Info	
☑ 2	Steady State	Va=121.0 Vb=121.0 Vc=121.0 F=60.0	Apply nominal voltage	
☑ 3	Timer	0000:00:10	Allow UUT to settle	
☑ 4	Meter	Vrms,Irms	Check Volts and Amps	
☑ 5	Transient	3.0 sec	Trigger Overvoltage	
☑ 6	VISA	GPIB::1::INSTR	Query UUT Status	
☑ 7	Control	Output Enable	Turn off power	

Step Step enables checkbox and step number. Steps that aren't checked are skipped when the test sequence runs. Un-checking a step is a convenient way to temporarily disable a step while troubleshooting or reconfiguring a test.

Description Step icon and name. Note that Transient steps are linked to a particular Steady State step. The description column for all steps up to and including the transient step is automatically indented.

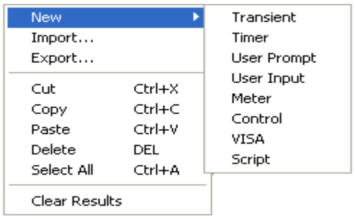
Value Shows a brief one-line summary of the values in the step. Clicking in the Value column for a particular step automatically selects the Step Value/Comment tab in the test sequence window, allowing Test Engineer to edit the value.

Comment Shows the step comment. Clicking in the comments column for a particular step automatically selects the Step Value/Comment tab in the test sequence window, allowing Test Engineer to edit the comment.

Result Shows the results state (Pass, Fail, Stopped, and Skipped) the last time this step was run. It also shows if a step is currently running. Clicking in the results column for a particular step automatically selects the Result tab in the test sequence window, providing additional information.

5.11 Step Table (Cont.)

- Right-click anywhere in the step table, and select **New**
  The step context menu appears as shown below.



New Adds a new step in the step table.

Import Loads a step from a file. User can load Output Sequence files (*.fm1, *.fm2, *.fm3) or test step files (*.tsp). Output sequence files contain Steady State and optional Transient values. If both are present, two steps are added after importing an output sequence.

Export Saves the selected step to a file. When used with Import..., this is convenient for transferring steps from one test sequence to another.

Cut Copies the selected steps to the clipboard and then deletes them from the table.

Copy Copies the selected steps to the clipboard.

Paste Pastes the clipboard after the selected step

Delete Deletes selected steps.

Select All Selects all steps.

Clear Results Clears the results column of the selected steps.

The menu items apply to the currently selected step(s). New steps are added or pasted after the selected step.

To add or create a step after a selected step:

- Right-click anywhere in the step table, and select **New**
- Select any desired step type from 8 step types such as **Transient, Timer**, or **Control**

Note: *If non existing step is selected from the table, a new step is added as the last step in the table.*

To insert a step before the first step in an existing step table:

- Right-click table header of a column in the step table, and select **New**
- Select any desired step type from 8 step types such as **Transient, Timer**, or **Control**

6

STEP TYPES

There are 8 step types user can choose from to create a test sequence. Users can setup parameters for each step type under the *Step Value Comment* tab.

6.1 Transient

The Transient step allows a test sequence to vary the power source output voltage, frequency and waveform at precisely defined intervals. Use New->Transient in the step table context menu to add a transient step to the step table. Transients are defined in output sequences. Refer to the Steady State step for instructions on importing output sequences into a test sequence.

Output sequences contain steady state and optional transient values. These appear as two separate rows in the Step Table linked together. Selecting the transient step shows the values in the Context Area. Red text indicates values outside the limits defined in the Preferences tab or values not supported by Test Engineerr power source. Click the Preferences tab to view and edit the limits. Note that the limits apply to all Steady State and Transient steps in the test sequence. Test Engineer can delete the transient step if Test Engineer only want the steady state values to be used in the test.

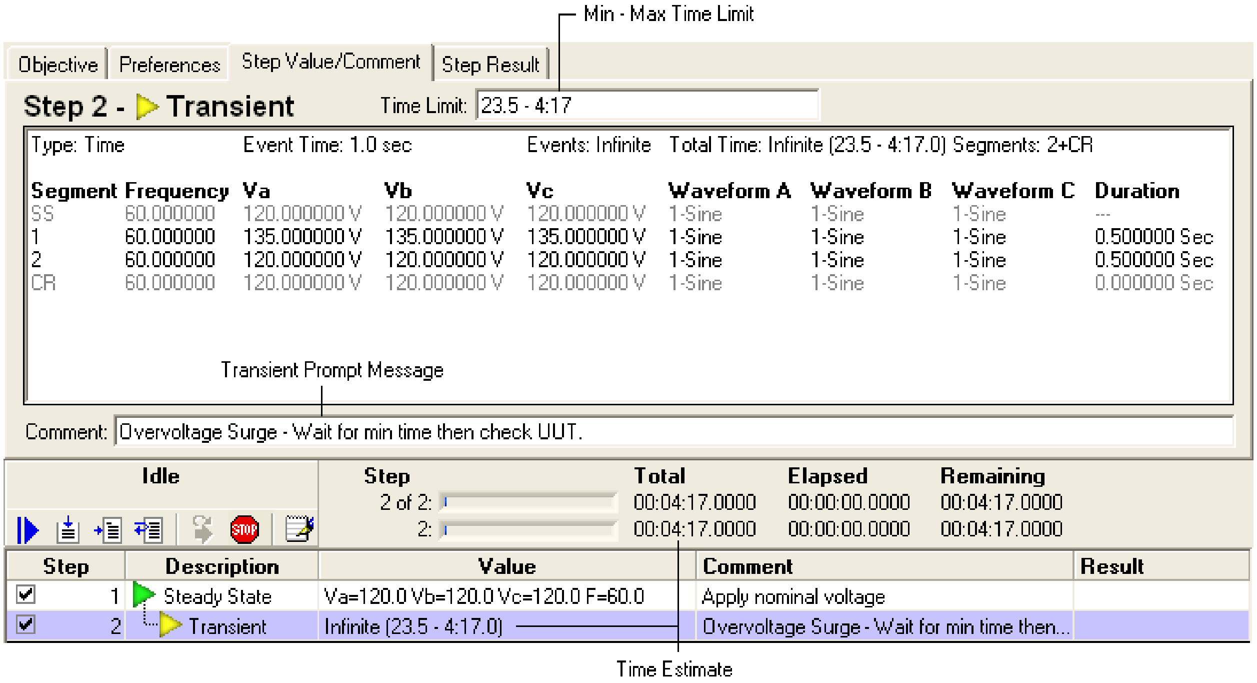
The test sequence will not run steps that contain invalid values. When running a transient step, the test sequence stores the output sequence in one of the programs Test Engineer specified in the program list in the Preferences tab. It then enables the output then triggers the transient. When the transient completes, the power source returns to the steady state values. Pressing the Stop Button disables the output, stops the transient then return the power source to the steady state values. Since running a transient step is simply triggering the transient portion of the output sequence, Test Engineer can add as many transient steps as Test Engineer want. Test Engineer can also add other step types (Meter, User Prompt, Timer, etc) between the steady state and transient steps.

6.1 Transient (Cont.)

To edit the transient values, double click the steady state or transient step in the step table. The output sequence window will appear allowing Test Engineer to make changes. Click the Save button in the output sequence window toolbar to save the changes to the test sequence. Test sequences store the actual contents of the output sequence Test Engineer imported. This means changes to the Steady State or Transient steps in the test sequence do not affect the original output sequence file.

The Context Menu allows Test Engineer to save the transient values to a Rich Text (*.rtf) or Plain Text (*.txt) file. The text Test Engineer enter in the Comment box automatically appears in the step table and test report.

The time estimate in the progress/time indicator and step table value column is based on the transient time.



Min - Max Time Limit

Step 2 - Transient   Time Limit: 23.5 - 4:17

Type: Time   Event Time: 1.0 sec   Events: Infinite   Total Time: Infinite (23.5 - 4:17.0) Segments: 2+CR

Segment	Frequency	Va	Vb	Vc	Waveform A	Waveform B	Waveform C	Duration
SS	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	---
1	60.000000	135.000000 V	135.000000 V	135.000000 V	1-Sine	1-Sine	1-Sine	0.500000 Sec
2	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	0.500000 Sec
CR	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	0.000000 Sec

Transient Prompt Message

Comment: Overvoltage Surge - Wait for min time then check UUT.

Idle	Step	Total	Elapsed	Remaining
	2 of 2:	00:04:17.0000	00:00:00.0000	00:04:17.0000
	2:	00:04:17.0000	00:00:00.0000	00:04:17.0000

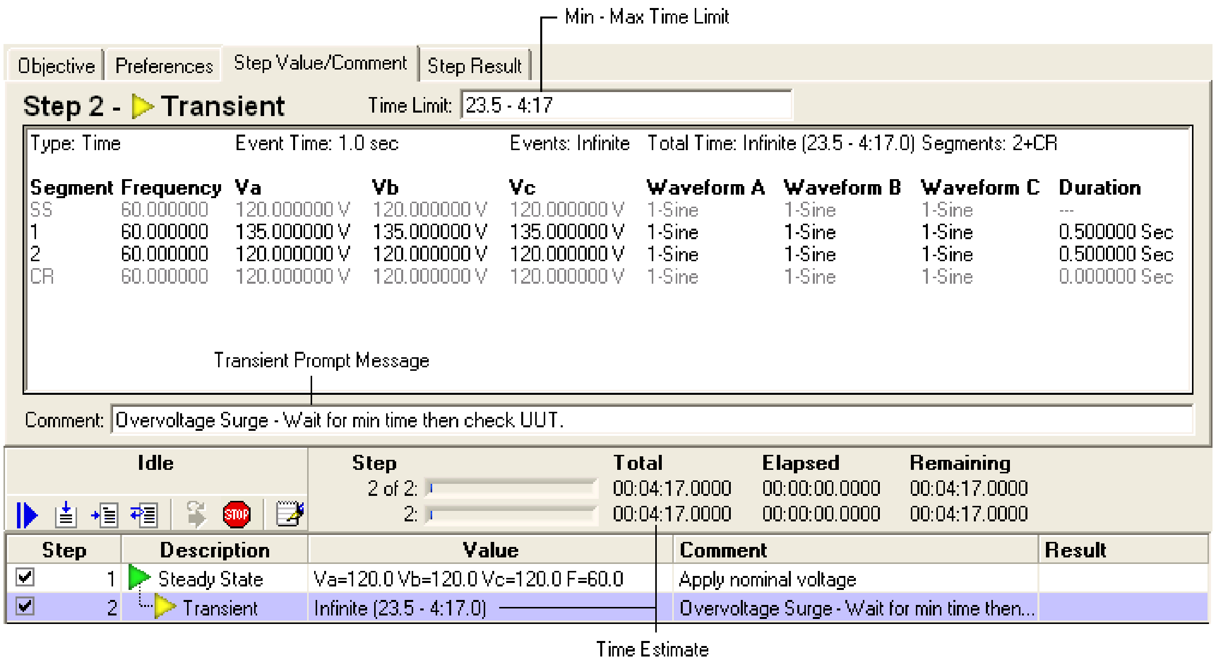
Step		Description	Value	Comment	Result
☑	1	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Apply nominal voltage	
☑	2	Transient	Infinite (23.5 - 4:17.0)	Overvoltage Surge - Wait for min time then...	

Time Estimate

6.1.1 Infinite Transient

The output sequence window allows Test Engineer to specify an infinite number of events for a transient. Since the total transient time is the event time multiplied by the number of events, this means the total transient time is infinite. Infinite transients are useful if Test Engineer need to precisely vary the power source output over an extended period of time. However, using an infinite transient in a test sequence would prevent the test from proceeding past the transient. The only way to cancel it is to press the stop button in the Run Toolbar.

The transient step allows Test Engineer to override an infinite transient by specifying an optional **Min Time** and **Max Time** Test Engineer want the transient to run. Shown below is an infinite transient step with a min and max time limit. The time values are in HH:MM: SS.SSSS format. The estimate shown in the progress/time indicator and step table value column is based on the max time.



Step 2 - Transient   Time Limit: 23.5 - 4:17

Type: Time   Event Time: 1.0 sec   Events: Infinite   Total Time: Infinite (23.5 - 4:17.0) Segments: 2+CR

Segment	Frequency	Va	Vb	Vc	Waveform A	Waveform B	Waveform C	Duration
SS	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	---
1	60.000000	135.000000 V	135.000000 V	135.000000 V	1-Sine	1-Sine	1-Sine	0.500000 Sec
2	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	0.500000 Sec
CR	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	0.000000 Sec

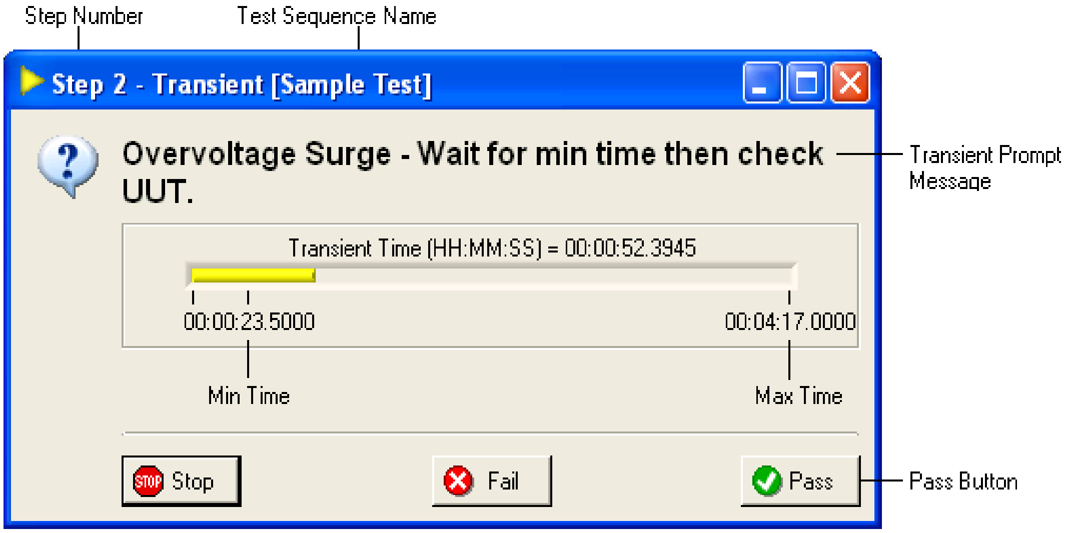
Comment: Overvoltage Surge - Wait for min time then check UUT.

Idle	Step	Total	Elapsed	Remaining
	2 of 2:	00:04:17.0000	00:00:00.0000	00:04:17.0000
	2:	00:04:17.0000	00:00:00.0000	00:04:17.0000

Step		Description	Value	Comment	Result
☑	1	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Apply nominal voltage	
☑	2	Transient	Infinite (23.5 - 4:17.0)	Overvoltage Surge - Wait for min time then...	

6.1.1 Infinite Transient (Cont.)

When an infinite transient is running, the Transient Prompt window appears as shown below.



Step 2 - Transient [Sample Test]

Overvoltage Surge - Wait for min time then check UUT.

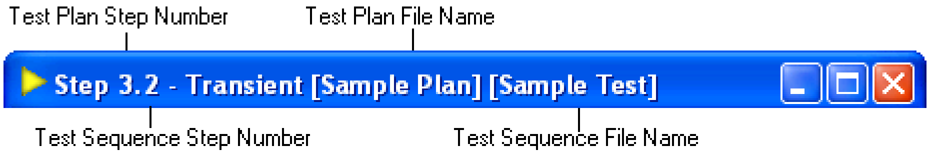
Transient Time (HH:MM:SS) = 00:00:52.3945

00:00:23.5000

00:04:17.0000

The window uses the comment text for the Transient Prompt Message and shows the transient progress. Stopping a transient before the min time is reached will stop the test. Test Engineer must press the Pass button before the max time is reached, otherwise the test will stop. If Test Engineer only enter a max time limit, the transient step will pass when Max Time is reached and the test will proceed to the next step.

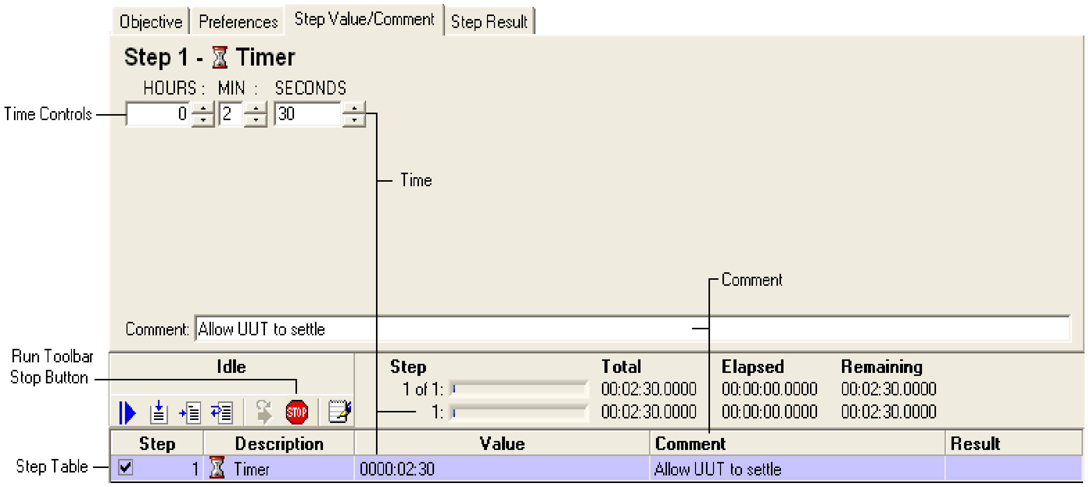
The title bar of the window shows the step number and test sequence file name. If the test sequence is part of a test plan, the test plan step number and file name are shown first.



Step 3.2 - Transient [Sample Plan] [Sample Test]

6.2 Timer

The Timer step inserts a delay in the test sequence. The Timer step design window is shown below.



Step 1 - Timer

HOURS : MIN : SECONDS

0 : 2 : 30

Comment: Allow UUT to settle

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:02:30.0000	00:00:00.0000	00:02:30.0000
	1:	00:02:30.0000	00:00:00.0000	00:02:30.0000

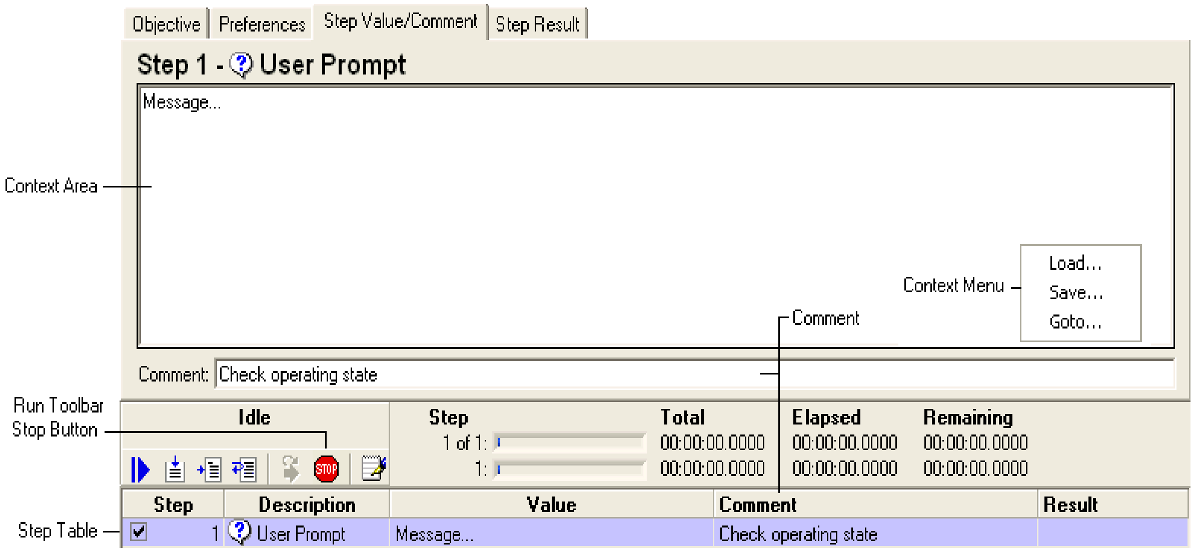
Step	Description	Value	Comment	Result
☑ 1	Timer	0000:02:30	Allow UUT to settle	

Use the Time Controls to enter the desired delay time. The SECONDS value can be entered in SS.SSSS format. The time value is also shown in the value column of the step table. When a test sequence runs a Timer step, the progress/time indicators update. Pressing the Stop Button in the Run Toolbar stops the test with "Stopped" results. When the Timer step is allowed to complete the test sequence proceeds with the next step.

The text Test Engineer enter in the Comment box automatically appears in the step table and test report.

6.3 User Prompt

The User Prompt step allows the test sequence to ask the user to perform some task such as verifying UUT operation or changing the test configuration. Shown below is the User Prompt design window.



Step 1 - User Prompt

Message...

Comment: Check operating state

```
Idle        Step          Total            Elapsed          Remaining
            1 of 1:       00:00:00.0000    00:00:00.0000    00:00:00.0000
                 1:       00:00:00.0000    00:00:00.0000    00:00:00.0000
```

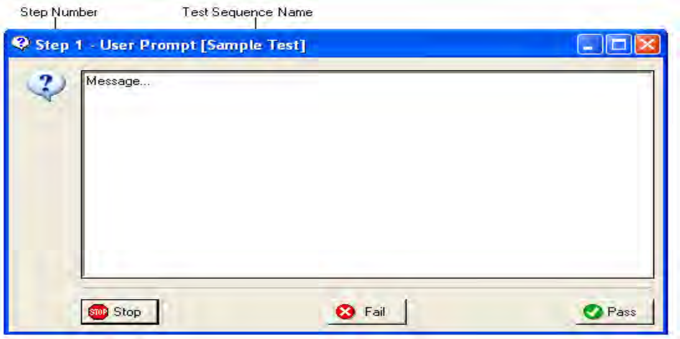
Step	Description	Value	Comment	Result
☑ 1	User Prompt	Message...	Check operating state	

The context area contains the message text displayed to the user when the step runs. Test Engineer can type directly into the context area or copy and paste text or graphics from another application. Right-clicking the context area displays the Context Menu. Test Engineer can Load or Save text from a Rich Text (*.rtf) or Plain Text (*.txt) file. Go-to... shows the current cursor location and allows Test Engineer to position the cursor to a particular line and column.

The text Test Engineer enter in the Comment box automatically appears in the step table and test report.

6.3.1 User Prompt Window

When the test sequence runs a user prompt step, the user prompt window appears as shown below.



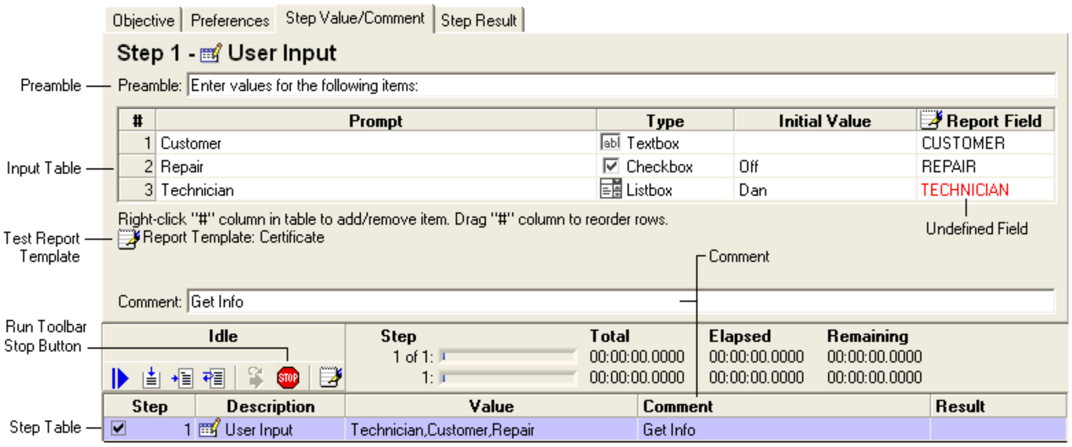
Step 1 - User Prompt [Sample Test]

Message...

Pressing the **Pass** button causes the test sequence to proceed with the next step. Pressing the **Fail** button stops the test with "Failed" results. Pressing the **Stop** button (similar to pressing the Stop button in the Run Toolbar) stops the test with "Stopped" results.

6.4 User Input

The User Input step allows the test sequence to ask the user to enter one or more values. Shown below is the User Input design window. The Preamble is the message displayed at the top of the User Input window to provide instructions to the user.



Step 1 - User Input

Preamble: Enter values for the following items:

#	Prompt	Type	Initial Value	Report Field
1	Customer	Textbox		CUSTOMER
2	Repair	Checkbox	Off	REPAIR
3	Technician	Listbox	Dan	TECHNICIAN

Right-click "#" column in table to add/remove item. Drag "#" column to reorder rows.

Report Template: Certificate

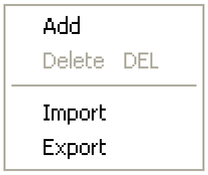
Comment: Get Info

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:00:00.0000	00:00:00.0000	00:00:00.0000
	1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

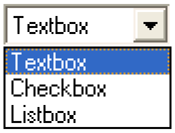
	Step	Description	Value	Comment	Result
☑	1	User Input	Technician,Customer,Repair	Get Info	

6.4.1 Input Table

The input table contains the items Test Engineer want the user to supply when the step runs. To add or delete items (rows), right-click in the step column (#) and the input table context menu appears as shown below. New rows are added after the row Test Engineer clicked the mouse. To add a row at the beginning, right-click the table header. To add a row at the end, right-click the last row. To rearrange rows, click the row in the step column (#) and drag it to the new position.



The **Prompt** column is the title or brief description of the input row. The **Type** column shows the input type. Clicking the type column for a particular row displays the Input Type menu.

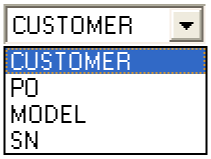


There are three different input types. TextBox is a simple text entry value. CheckBox is an On/Off value and ListBox is a menu that lets the user select from a list of choices. The Initial Value column lets Test Engineer specify the initial value (TextBox text, CheckBox state and ListBox selection) that is shown when the user input step runs. To create a list for a ListBox, enter the text for the first item then press the Enter key. Repeat these steps for each additional item, and then select the desired item Test Engineer want as the initial choice. To remove an item from the list, first select the item then press the Delete key. Test Engineer can also use the Delete key to remove the initial value for a TextBox item.

Report Field allows users to select the form field related to the template files to store the information input. When a test sequence runs, the test report file is updated with the results. Test reports are based on template files created by MS Word. The template file used by the test report window is shown in the design window (top of this page) below the input table next to the report icon. Clicking this icon activates the test report window. Refer to the Test Report topic for more information on creating and selecting test report templates.

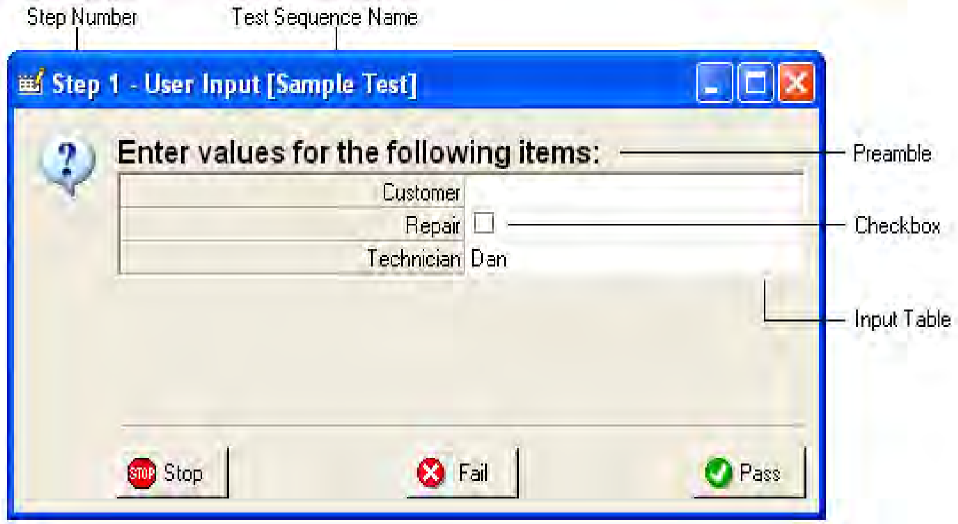
6.4.1 Input Table (Cont.)

If the template file contains form fields, clicking the **Report Field** column in the input table will display a menu that allows Test Engineer to select the form field to store the information input by the user. Items in red mean that field is **Undefined** in the selected template file. Either the wrong template file is selected or the file was changed and this field no longer exists. To remove a form field for a row, click the report column for that row then press the Delete key.



6.4.2 User Input Window

When the test sequence runs a user input step, the user input window appears as shown below.



Step 1 - User Input [Sample Test]

Enter values for the following items:

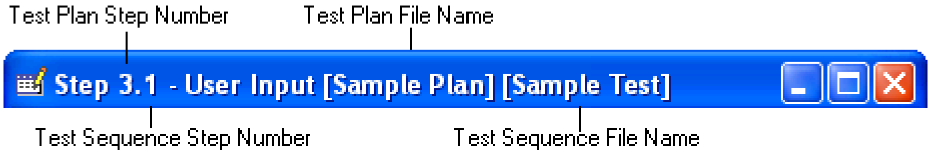
Customer	
Repair	□
Technician	Dan

The Preamble and Input Table show the values from the design window. The input table is automatically filled in with initial values (including items and selection for the ListBox) if specified. Clicking a Checkbox toggles the checkbox state. Note that the Report Field column is not shown. This is because the value input by the user is automatically stored in the report field (if any) specified in the design window.

6.4.2 User Input Window (Cont.)

After the user enters the values, pressing the Pass button causes the test sequence to proceed with the next step. Pressing the Fail button stops the test with "Failed" results. Pressing the Stop button (similar to pressing the Stop button in the Run Toolbar) stops the test with "Stopped" results. In all three cases, the values entered by the user are stored in the test report.The title bar of the

window shows the step number and test sequence file name. If the test sequence is part of a test plan, the test plan step number and file name are shown first.


Test Plan Step Number
Test Plan File Name
Step 3.1 - User Input [Sample Plan] [Sample Test]
Test Sequence Step Number
Test Sequence File Name

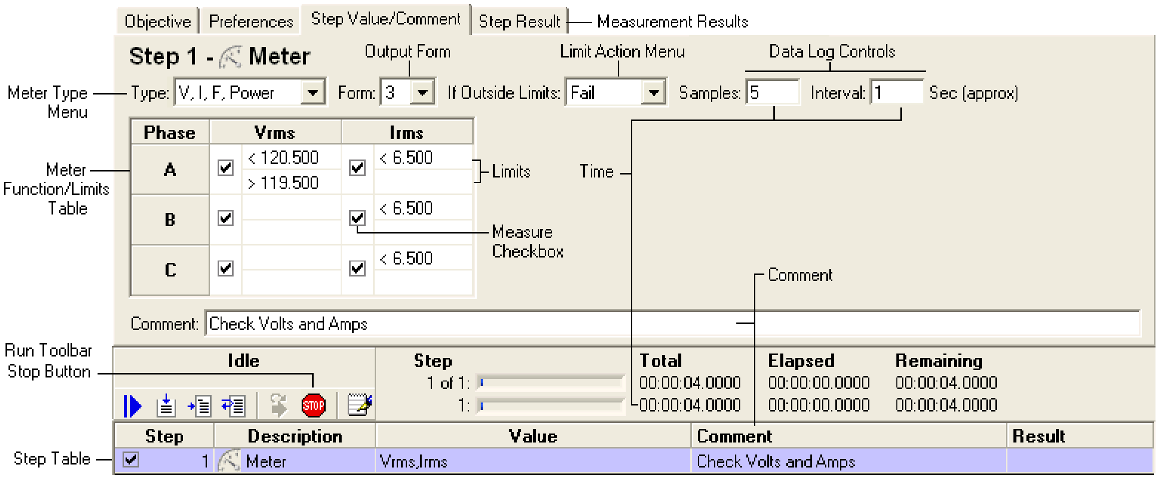
6.5   Meter

The Meter step allows the test sequence to measure voltage, current, power, frequency, harmonics and waveforms using the built-in metering functions in Test Engineerr UPC. These functions are normally performed manually using the UPC Meter Window. The meter step also supports limit checking, out-of-limit behavior and data logging.

When a test sequence runs a Meter step, the requested measurements are made, updating the progress/time indicators and step result with the measured values. If specified, limit checking is also performed on the measured values. If Test Engineer specify that the test should fail if a value is outside the limits, the test will stop with "Failed" results. Pressing the Stop Button in the Run Toolbar stops the test with "Stopped" results. When the Meter step is allowed to complete, the test sequence proceeds with the next step.

6.5 Meter (Cont.)

The Meter step setup window is shown below.



Step 1 - Meter

Type: V, I, F, Power Form: 3 If Outside Limits: Fail Samples: 5 Interval: 1 Sec (approx)

Phase		Vrms		Irms
A	☑	< 120.500 > 119.500	☑	< 6.500
B	☑		☑	< 6.500
C	☑		☑	< 6.500

Comment: Check Volts and Amps

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:00:04.0000	00:00:00.0000	00:00:04.0000
	1:	00:00:04.0000	00:00:00.0000	00:00:04.0000

	Step	Description	Value	Comment	Result
☑	1	Meter	Vrms,Irms	Check Volts and Amps	

Meter Type Menu selects which measurement category Test Engineer want to use. The choices are shown below.

Meter Type	Available Functions	Limit Checking	Data Log
V,I,F,Power	Vrms, Vrms(L-L), Irms, Ipeak, Icrest, KW, KVA, PF, Freq, Degrees	Yes	Yes
Volts Harm %	THD, OHD, EHD, Magnitude (1-51), Phase (1-51)	Yes	Yes
Amps Harm %	THD, OHD, EHD, Magnitude (1-51), Phase (1-51)	Yes	Yes
Volts Harm Abs	THD, OHD, EHD, Magnitude (1-51), Phase (1-51)	Yes	Yes
Amps Harm Abs	THD, OHD, EHD, Magnitude (1-51), Phase (1-51)	Yes	Yes
Waveform	Volts, Amps	No	No

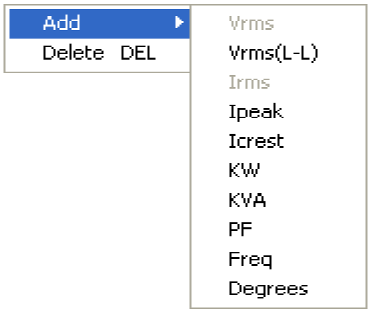
When using **“**Waveform” in the Meter Type menu, the actual voltage and current waveforms for each selected phase (1 cycle) are plotted in a graph and stored in the Step Result tab and test report.

6.5 Meter (Cont.)

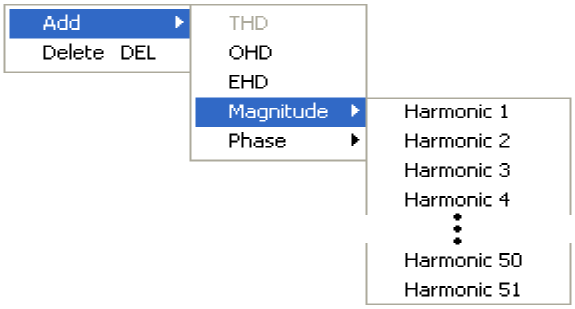
Output Form d specifies the data format of the metered data. An error occurs if the present UPC output form (set by a previous Steady State step) does not match this setting when the meter step is run.

Meter Function/Limits Table allows Test Engineer to specify which functions are measured and any limit checking Test Engineer want performed. To add a function to the table, right-click the header of the table and the Meter Function menu appears. Shown below are the V, I, F, Power and Harmonics meter function menus.

V, I, F, Power



Harmonics



Items already in the table are disabled (grayed). The new item is added after the column Test Engineer clicked the mouse. Test Engineer can rearrange columns by click the table header for that column and dragging it to the new location. To delete a column (function), click the mouse in the column header then press Delete. The order the columns appear in the table is also the order the measurement appears in the Step Result tab and test report.

For maximum performance, include only the meter functions and phases Test Engineer need. Un-checking the Measure Checkbox allows Test Engineer to skip that function/phase from being measured. When metering output form 2, the Vrms(L-L) function should be used instead of Vrms.. Each measured value can be checked against none, one or two limit values. This allows high/low range checking for each measured value. Limit entries can use any of the following relational operators followed by a number.

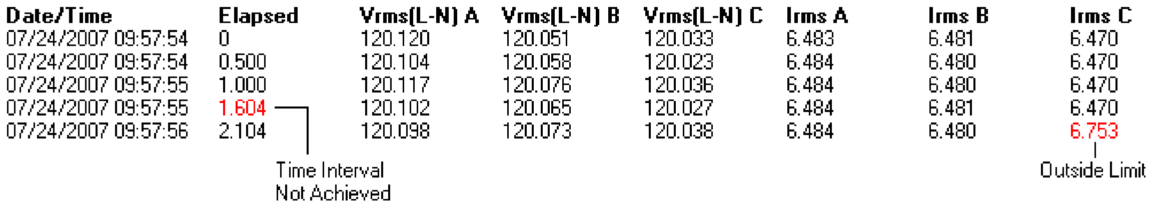
Operator	The measured value must be...
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to
=	Equal to
<>	Not equal to

6.5 Meter (Cont.)

Limit Action Menu controls what happens if a measured value is outside the limits. “Continue**”** means the meter step completes normally. “Fail ” means the meter step stops the test with "Failed" results. In either case, the out-of-limit measured value is highlighted in red in the **Step Result** tab and test report.

Data Log Controls specify the number of measurement **Samples** and time **Interval** between measurements. Data logging allows Test Engineer to monitor values over an extended period of time. When making multiple measurements, the total time the meter step takes is (Samples - 1) * Interval. The first measurement is taken immediately when the meter step starts running. The meter step completes immediately after the last measurement is made (no final delay). Specifying short time intervals between measurements may not be achievable with Test Engineerr power source or PC. The Step Result tab and test report shows the actual elapsed time of each measurement and is highlighted in red if it didn't achieve the interval Test Engineer specified. The progress/time indicators update as the step runs and the Step

Result tab lets Test Engineer view measurements as they are being made. Data log measurement samples are stored in separate rows as shown below.



Date/Time	Elapsed	Vrms(L-N) A	Vrms(L-N) B	Vrms(L-N) C	Irms A	Irms B	Irms C
07/24/2007 09:57:54	0	120.120	120.051	120.033	6.483	6.481	6.470
07/24/2007 09:57:54	0.500	120.104	120.058	120.023	6.484	6.480	6.470
07/24/2007 09:57:55	1.000	120.117	120.076	120.036	6.484	6.480	6.470
07/24/2007 09:57:55	1.604	120.102	120.065	120.027	6.484	6.481	6.470
07/24/2007 09:57:56	2.104	120.098	120.073	120.038	6.484	6.480	6.753

Time Interval
Not Achieved

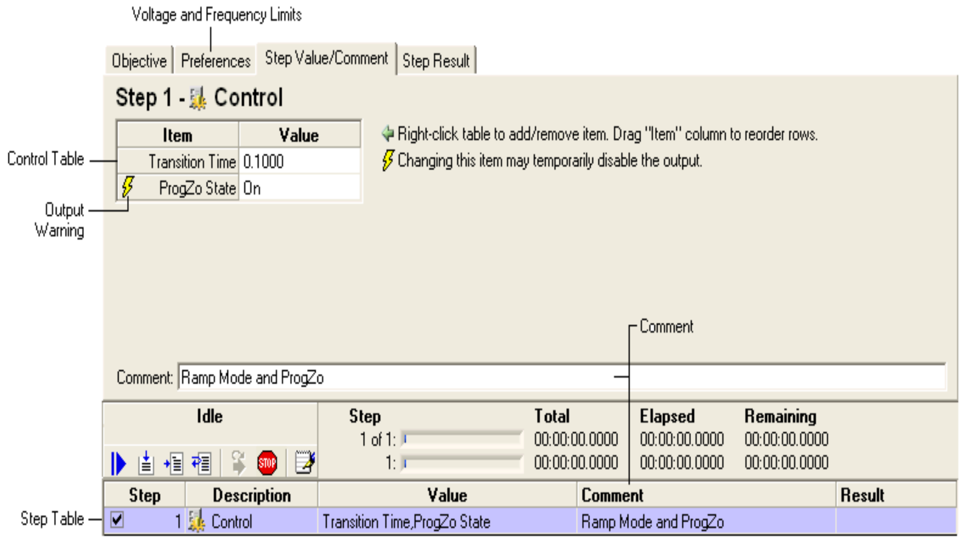
Outside Limit

Notes:

- *When requesting a single sample, each phase uses a separate row in the step result and test report, similar to the laTest Engineert of the Meter Function Table in the meter design window.*
- *Setting Local Keyboard Lock (local lockout) ON and CSC Off improves metering performance.*

6.6 Control Step

The Control step allows the test sequence to change UPC setup parameters like CSC, Output Enable, and Transition Time etc. These items are normally defined in the Setup panel in the *UPC Control* window in UPC Studio. User also is able to create and change Control Step setup in UPC Test Manager under *Step Value/ comment* tab as shown below



Step 1 - Control

Item	Value
Transition Time	0.1000
ProgZo State	On

Right-click table to add/remove item. Drag "Item" column to reorder rows.
Changing this item may temporarily disable the output.

Comment: Ramp Mode and ProgZo

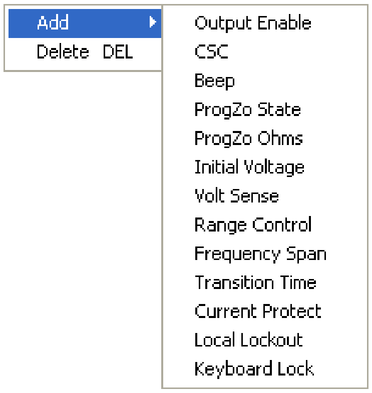
Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:00:00.0000	00:00:00.0000	00:00:00.0000
	1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

Step	Description	Value	Comment	Result
☑ 1	Control	Transition Time,ProgZo State	Ramp Mode and ProgZo	

The Control Table contains entries that change UPC setup values. To change an existing entry, click in the value column for that row.

To add a new item in the Control Table,

- Right-click anywhere in the table to activate the Control Menu as shown below.



6.6 Control Step (Cont.)

The items in the menu vary depending on the features supported by Test Engineerr power source. Items already in the table are disabled (grayed). Selecting one of these items adds it to the table. The new item is added after the row Test Engineer right-clicked the mouse. To add an item at the beginning, right-click the Item column in the table header. To add an item at the end, right-click the Item column of the last row. The order of the items in the table is not critical but Test Engineer can rearrange them by clicking the item column for a row and dragging it to the new location. To delete a row, click the item column for that row then press the Delete key.

The text Test Engineer enter in the Comment box automatically appears in the step table and test report.

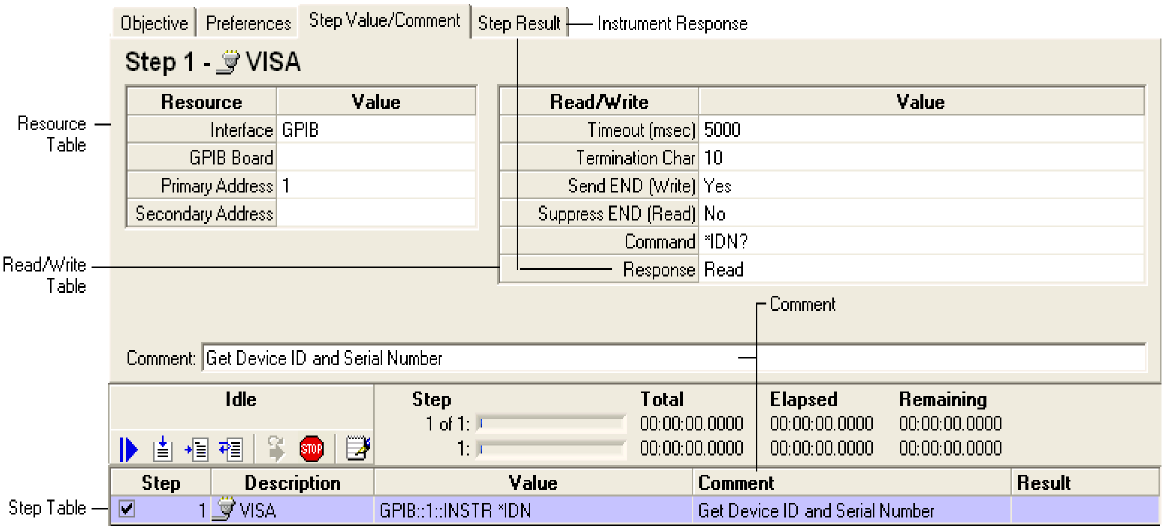
Notes:

- The Steady State and Transient test steps automatically enable the output and select the optimum frequency span so it's not necessary to add a control step to do this.
- Depending on Test Engineerr UPC model, changing some items may temporarily disable the output. These items are marked with the Output Warning icon .
- The Output Enable value may actually change first or last depending on whether it's being enable or disabled and the other items and values in the control table that Test Engineer specified.

- Avoid using multiple control steps back-to-back to only change one item. Changing all needed items in one step reduces output enable changes and speeds up the test.
- Only include items that need changing. Including unnecessary items slows down the test and may unintentionally change a value set by another step. To delete a row, click the item column for that row then press the Delete key.
- The voltage and frequency limit values can only be set in the test sequence Preferences tab.
- The control table does not allow changing the hardware configuration (Transformer Ratio, Amps Volts Ratio, CT Location, Amplifiers).
- The value of the Beep item controls the UPC beep duration

6.7 VISA

The VISA step allows the test sequence to perform generic instrument control and monitoring. It's primarily designed for use with instruments that support message based communication using the SCPI standard. The VISA step design window is shown below.



Step 1 - VISA

Resource	Value
Interface	GPIB
GPIB Board	
Primary Address	1
Secondary Address	

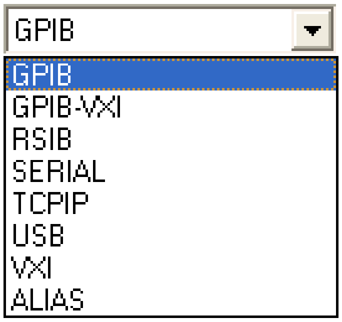
Read/Write	Value
Timeout (msec)	5000
Termination Char	10
Send END (Write)	Yes
Suppress END (Read)	No
Command	*IDN?
Response	Read

Comment: Get Device ID and Serial Number

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:00:00.0000	00:00:00.0000	00:00:00.0000
	1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	VISA	GPIB::1::INSTR *IDN	Get Device ID and Serial Number	

The Resource Table defines the interface settings used to connect to the instrument. The items shown in the resource table vary depending on the interface type Test Engineer select. Clicking the "Interface" value column displays the Interface Menu.



6.7 VISA (Cont.)

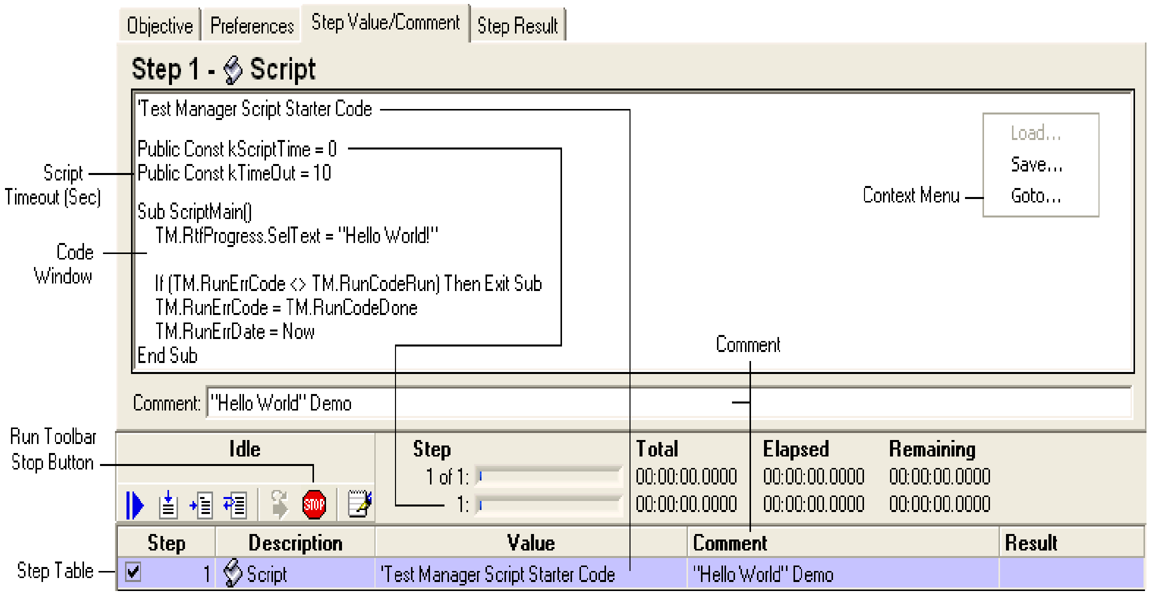
The Interface menu lets Test Engineer select from a list of hardware interfaces. Test Engineer can use Measurement & Automation Explorer (MAX) available from National Instruments to view, test and configure the installed hardware and software interfaces on Test Engineerr PC. Note that some items in the resource table are optional and can be left blank.

The Read/Write Table defines the communication settings to use with the instrument. The "Timeout (msec)"value is the maximum time the VISA step will wait for the instrument to complete the command or provide the response. The "Command" value is the command to send to the instrument. If the instrument command generates a response, choose "Read" for the response otherwise choose "None". The response is shown in the Step Result tab and included in the test report.

The text Test Engineer enter in the Comment box automatically appears in the step table and test report.

6.8 Script

The Script step allows the test sequence to perform custom operations using Microsoft Visual Basic Scripting. In addition to the full VBScript language support, the script has access to various test manager objects. Scripts are very fast and efficient and run without needing a compiler or other programming tools. The Script step design window is shown below.



```
'Test Manager Script Starter Code

Public Const kScriptTime = 0
Public Const kTimeOut = 10

Sub ScriptMain()
   TM.RtfProgress.SelText = "Hello World!"

   If (TM.RunErrCode <> TM.RunCodeRun) Then Exit Sub
   TM.RunErrCode = TM.RunCodeDone
   TM.RunErrDate = Now
End Sub
```

Comment: "Hello World" Demo

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	00:00:00.0000	00:00:00.0000	00:00:00.0000
	1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

Step	Description	Value	Comment	Result
☑ 1	Script	'Test Manager Script Starter Code	"Hello World" Demo	

The above example shows the default script created when Test Engineer add a new Script step to the step table. The script starter code simply puts "Hello World!" in the Step Result tab and test report. Test Engineer can enter or edit code directly in the Code Window and immediately run it using the Run Toolbar. Running a script step calls the Script Main subroutine.

The first line of the script (usually a comment) appears in the value column of the step table. Two optional constants at the top of the code window define time information (seconds) used by the test sequence prior to running the script. kScriptTime is the step time estimate used for the progress/time indicators and kTimeOut is the maximum time the script should be allowed exclusive control Test Engineerr PC before a message box is displayed asking if Test Engineer want to cancel the script

6.8.1 Test Manager Object Reference

This section defines the various methods and properties available to a script. Test manager objects begin with "TM".

Notes:

- The range for program numbers is 0-99, where 0 refers to the Manual Mode program.
- Script coding errors (syntax and run-time) are reported in the Step Result tab.
- Use Go-to ... in the Context Menu to view the current cursor location or locate a particular line and column.
- Scripts can use the Step object to read but not change the values and result of any step in the Step Table.
- When a script starts, the prior results are automatically cleared. Test Engineer can use form fields in the test report to simulate "global" variables or to pass values between script steps.
- To assist troubleshooting and debugging, use TM.RunMsgBox and TM.RunInputBox to show or enter variables.
- Do not use TM.RunVisa to change values of Test Engineerr power source. Instead, use the methods and properties provided by the Run and UPC objects.
- Creating and debugging scripts require prior programming experience with VBScript. Contact Pacific Power for assistance in developing custom scripts.
- The property Get and Let definitions listed below should be treated as variable assignments (e.g. result = TM.RunErrCode or TM.RunStepProgress = t) in Test Engineerr script code.

6.8.2 Run Object

Public Property Get TM.RunStep () As Integer

Returns the step number currently running (the script step).

Public Property Get TM.RunNextStep () As Integer

Returns the step number that will be run after the script step completes. The default value is 0 which means to run the next step.

Public Property Let TM.RunNextStep (ByVal step As Integer)

Sets the step number to be run after the script step completes. The default value is 0 which means to run the next step. Changing the next step is essentially the same as a "Go-to". Be careful when changing TM.RunNextStep because it makes the test difficult to analyze and can create endless loop situations.

Public Property Get TM.StepElapsedTime () As Double

Returns the elapsed time in seconds since the script step started.

Public Property Let TM.RunStepProgress (ByVal elapsed As Double)

Updates the progress and time indicators with "elapsed" time

Public Property Get TM.RunStepPercent () As Single

Returns the step percentage completed.

Public Property Let TM.RunStepPercent (ByVal percent As Single)

Updates the progress and time indicator with the "percent" complete. Only applies if kScriptTime = 0.

Public Sub TM.RunDoEvents ()

Gives the test manager time to update (not normally necessary).

6.8.2 Run Object (Cont.)

Public Function TM.RunUserPrompt (ByVal Caption as String, ByVal prompt As String) As Integer

Displays a User Prompt window. Refer to the TM.RunCodeXXX properties for the return values. "Caption" is the title bar of the window and "prompt" can be Rich or Plain Text.

Public Function TM.RunUserInput (ByVal Caption As String, ByVal parameter As String, result As Variant) As Integer

Displays a User Input window. Refer to the TM.RunCodeXXX properties for the return values. "Caption" is the title bar of the window and "parameter" is a formatted string that defines the input table rows and columns. "Result" is a string containing the values input by the user. Refer to the TM.ReportInputXXX properties for constants that define the various input types (Textbox, Checkbox, and Listbox). The easiest way to determine the “parameter” string format is to create a user input step and export it to a file then examine the files contents.

Public Function TM.RunControl (ByVal param As String) As String

Updates UPC setup values. The easiest way to determine the “param” string is to create a Control step and export it to a file then examine the file contents. The return value is the query response string.

Public Function TM.RunVisa (ByVal param As String) As String

Sends a command string to an instrument and return the response.The easiest way to determine the "param" string is to create a Visa step and export it to a file then examine the file contents. Test Engineer only need to include values that relate to the interface (resource) Test Engineer are using. If the "command" uses commas, Test Engineer must replace them with TM.VisaCommaChar. The comma will be restored when the VISA step runs.

Public Function TM.RunProgramDefine(ByVal progNum As Integer, ByVal field As String, ByVal data As String, Optional ByVal prefix As String) As Boolean Sends a program define string to the UPC. Test Engineer can send a single "field" with "data" or group multiple fields together. When updating multiple fields, the "field" contains comma delimited field and data pairs except skip the final comma and data value. Then set the "data" value to the data for the last field. Refer to the UPC

Operation Manual for the available program define fields and data values. Returns True if the program define was sent successfully.

6.8.2 Run Object (Cont.)

Public Function TM.RunProgram (ByVal progNum As Integer) As Boolean

Executes a program. Return False if the program is not stored.

Public Function TM.RunTransient () As Boolean

Triggers a transient. Returns True when the transient completes.

Public Sub TM.RunErrClear ()

Clears the test manager error state. This is normally used when the script uses "On Error Resume Next "and Test Engineer want to handle errors and continue.

Public Property Get TM.RunErrCode () As Integer

Returns the current error code. Refer to the TM.RunCodeXXX properties for the return values. This property allows Test Engineer to determine if the test manager has generated an error.

Public Property Let TM.RunErrCode (ByVal errCode As Integer)

Sets the error code. Refer to the TM.RunCodeXXX properties for the available values.

Public Property Get TM.RunErrDate () As Date

Returns the date and time the error reported by TM.RunErrCode occurred.

Public Property Let TM.RunErrDate (ByVal errDate As Date)

Sets the data and time the error occurred.

Public Property Get TM.RunErrDesc () As String

Returns a description of the error reported by TM.RunErrCode.

Public Property Let TM.RunErrDesc (ByVal errDesc As String)

Sets the description of the error.

6.8.3 Run Object (Cont.)

Public Property Get TM.RunCodeRun () As Integer

Returns the value for the "Running" state. This is the normal state of a step when it's running.

Public Property Get TM.RunCodeStop () As Integer

Returns the value for the "Stopped" state. This is the state when a step is stopped.

Public Property Get TM.RunCodeDone () As Integer

Returns the value for the "Done" state ("Passed"). This is the state when a step has completed normally.

Public Property Get TM.RunCodeFailed () As Integer

Returns the value for the "Failed" state. This is the state when a step has failed.

Public Property Get TM.RunCodeSkipped () As Integer

Returns the value for the "Skipped" state. This is the state when the test sequence attempts to run a step and the enable checkbox is not checked.

Public Function TM.RunMsgBox (ByVal prompt As String, Optional ByVal flags As Long = vbOKOnly, Optional ByVal title As String = "VBScript") as integer

Calls the standard Visual Basic MsgBox function modally in the test manager workspace.

Public Function TM.RunInputBox (ByVal prompt As String, Optional ByVal title As String = "VBScript") as integer

Calls the standard Visual Basic InputBox function modally in the test manager workspace.

6.8.3 Step Object

Public Property Get TM.StepEnabled (ByVal i As Integer) As Boolean

Returns the enable checkbox state of the requested step.

Public Property Get TM.StepType (ByVal i As Integer) As Integer

Returns the numeric index of the type of the requested step.

Public Property Get TM.StepDesc (ByVal i As Integer) As String

Returns the description of the requested step.

Public Property Get TM.StepComment (ByVal i As Integer) As String

Returns the comment of the requested step.

Public Property Get TM.StepSeconds (ByVal i As Integer) As Single

Returns the time estimate of the requested step.

Public Property Get TM.StepInvalid (ByVal i As Integer) As Boolean

Returns True if the requested step contains invalid values.

Public Property Get TM.StepSummary (ByVal i As Integer) As String

Returns the text summary for the values of the requested step.

Public Property Get TM.StepParameter (ByVal i As Integer) As String

Returns the parameter value of the requested step.

Public Property Get TM.StepCount () As Integer

Returns the total number of steps in the test sequence.

Public Property Get TM.StepResultCode (ByVal i As Integer) As Integer

Returns the result code of the requested step. Refer to the TM.RunCodeXXX properties for the available values.

6.8.3 Step Object (Cont.)

Public Property Get TM.StepResultDate (ByVal i As Integer) As Date

Returns the date and time the requested step completed.

Public Property Get TM.StepResultElapsed (ByVal i As Integer) As Single

Returns the elapsed time in seconds the requested step took to complete.

Public Property Get TM.StepResultTitle (ByVal i As Integer) As String

Returns the result title (Passed, Stopped, Failed, and Skipped) of the requested step.

Public Property Get TM.StepResultRtf (ByVal i As Integer) As String

Returns a Rich Text string of the result data for the requested step.

Public Property Get TM.StepResultSelected (ByVal i As Integer) As Boolean

Returns True if the Result tab for requested step is currently selected.

Public Property Get TM.StepReportFlags (ByVal i As Integer) As Integer

Returns the report flags of the requested step. Refer to the TM.ReportStepXXX properties for the available flags.

Public Property Let TM.StepReportFlags (ByVal i As Integer, ByVal report As Integer)

Sets the report flags of the requested step. Refer to the TM.ReportStepXXX properties for the available flags. To include multiple items, add them together (i. e. TM.ReportStepTitle + TM.ReportStepResultTitle + TM.ReportStepResultData)

6.8.4 Report Object

Public Sub TM.ReportGetInfo (path As Variant, fileDirty As Variant, template As Variant)

Sets "path" to the current report file path. Sets "fileDirty" to True if the file has been changed but not saved. Sets "template" to the current template name.

Public Function TM.ReportSave (ByVal path As String) As Boolean

Saves the test report to the file specified by "path". Returns True if the file was successfully saved.

Public Function TM.ReportGetTemplate (ByVal Index As Integer, name As Variant) As Boolean

Sets "name" to the template name of the specified index. This function allows Test Engineer to query the available templates. Start with an index of 0 and continue until the function returns False.

Public Function TM.ReportSetTemplate (ByVal name As String) As Boolean

Changes the report template to "name". This also clears the test report. Returns True if the template name exists and the report was initialized.

Public Function TM.ReportGetFieldInfo (ByVal Index As Integer, name As Variant, checkboxfield As Variant) As Boolean

Returns information about the form fields in the test report. Sets "name" to the field name. Sets "checkbox" to True if the field is a checkbox. This function allows Test Engineer to query the available form fields in the current test report. Start with an index of 0 and continue until the function returns False.

Public Function TM.ReportGetField (ByVal name As String, Val As Variant, ByVal checkbox field As Boolean) As Boolean

Sets "Val" to the value of the form field specified by "name". Sets "checkbox field" to True if the field is a checkbox. Returns False if the requested field name does not exist in the test report.

6.8.4 Report Object (Cont.)

Public Function TM.ReportSetField (ByVal name As String, ByVal val As String, ByVal checkboxfield As Boolean) As Boolean

Sets the form field specified by "name" to "val". Test Engineer must set "checkboxfield" to True if the field type is a checkbox. Returns False if the requested field name does not exist or the checkbox field value does not match the actual field type in the report.

Public Property Get TM.ReportStepTitle () As Integer

Returns a constant that controls if the step title is included in the test report. See StepReportFlags above.

Public Property Get TM.ReportStepSummary () As Integer

Returns a constant that controls if the step summary is included in the test report. See StepReportFlags above.

Public Property Get TM.ReportStepComment () As Integer

Returns a constant that controls if the step comment is included in the test report. See StepReportFlags above.

Public Property Get TM.ReportStepResultTitle () As Integer

Returns a constant that controls if the step result title is included in the test report. See StepReportFlags above.

Public Property Get TM.ReportStepResultData () As Integer

Returns a constant that controls if the step result data is included in the test report. See StepReportFlags above.

Public Property Get TM.ReportStepAll () As Integer

Returns a constant that controls if the all step items are included in the test report. See StepReportFlags above.

Public Property Get TM.ReportRtfClear () As String

Returns a string that can be used to reset formatting and clear text in a RichTextBox.

6.8.4 Report Object (Cont.)

Public Property Get TM.ReportGraphWidth () As Long

Returns the width in pixels of the waveform graph created by the Meter step.

Public Property Let TM.ReportGraphWidth (ByVal Width As Long)

Sets the width in pixels of the waveform graph created by the Meter step.

Public Property Get TM.ReportGraphHeight () As Long

Returns the height in pixels of the waveform graph created by the Meter step.

Public Property Let TM.ReportGraphHeight (ByVal Height As Long)

Sets the height in pixels of the waveform graph created by the Meter step.

Public Property Get TM.ReportInputTextbox () As Long

Returns a constant that defines the Textbox type used for the TM.RunUserInput function "parameter".

Public Property Get TM.ReportInputCheckbox () As Long

Returns a constant that defines the Checkbox type used for the TM.RunUserInput function "parameter".

Public Property Get TM.ReportInputListbox () As Long

Returns a constant that defines the Listbox type used for the TM.RunUserInput function "parameter".

6.8.5 UPC Object

Public Function TM.UpcGetProgramNameCRC (ByVal progNum As Integer, name As Variant, crc As Variant) As Boolean

Sets "name" to the output sequence file name and "crc" to the program CRC for the specified program. Returns False is no program is stored at "progNum".

Public Function TM.UpcGetExecutingProgram () As Integer

Returns the currently executing program number.0 is the Manual Mode program and -1 means no program is currently executing.

Public Property Get TM.UpcGetInfo () As String

Returns info about the UPC Test Engineer are currently connected (IDN, serial number, supported features etc).

Public Property Get TM.UpcGetSetup () As String

Returns the setup and configuration values of the UPC.

Public Property Get TM.UpcGetProgram (ByVal progNum As Integer) As String

Returns the program values (Steady State and Transient) of the requested program.

Public Property Get TM.UpcGetkFactors () As String

Returns the kFactors calibration data of the UPC.

Public Property Get TM.UpcGetProgZoCal () As String

Returns the ProgZo calibration data of the UPC.

Public Function TM.UpcGetWaveform(ByVal wf As Integer, title As Variant, source As Variant, dateTime As Variant, comments As Variant, crc As Variant,

maxVrms As Variant, rmsFactor As Variant, dcOffset As Variant, data As Variant) As Boolean

Returns waveform values of waveform "wf". "data" is set to an array of 1024 values ranging from -100 to +100 percent. The waveform values are shown in the Waveform Editor window.

6.8.5 UPC Object (Cont.)

Public Function TM.UpcSetWaveform(ByVal wf As Integer, title As Variant, source As Variant, dateTime As Variant, comments As Variant, data As Variant) As Boolean

Sets the values for waveform "wf". "data" is an array of 1024 values ranging from -100 to +100 percent. The waveform values are shown in the Waveform Editor window.

For maximum performance and to reduce memory usage, it's best to set "source" to TM.UpcWaveformNoDatabase to prevent the waveform from being added to the waveform reference database. It's also recommended Test Engineer restore any waveforms Test Engineer change back to a sine wave. To restore a waveform to a sine wave, use TM.UpcGetWaveform (1 ...) to read waveform 1 (it's always a sine wave) then use TM.UpcSetWaveform to reset it.

Note: TM.UpcSetWaveform disables the output.

Public Function TM.UpcGetEvents () As String

Returns a string of event tokens currently showing the Event Status Panel. The tokens (description) are "CAPTURE" (probe capture), "ERR" (Error), "PON" (power on), "SHUTDOWN" (power source shutdown), "URQ" (user request), "IPROT" (current protect), "VPROT" (voltage protect), "NR" (remote interface not responding) and "BSY" (remote interface busy).

Public Sub TM.UpcClearEvents ()

Resets all events in the Event Status Panel.

6.8.6 Rich Textbox Objects

Scripts have access to three rich textbox objects. These are standard Visual Basic RichTextBox controls. Refer to the Microsoft documentation for the available properties and methods. These controls allow Test Engineer to create and manipulate formatted text and graphics. Test Engineer can access these controls using TM.RtfProgress, TM.RtfResults and TM.RtfTemp. The contents of TM.RtfProgress are shown in the step result tab and test report when the script completes. Use RtfTemp for a scratch pad but keep in mind that the contents may be changed by other test manager objects. RtfResults allows Test Engineer to dynamically update the step result tab (like the Meter step does during data logging) while the script is running. Test Engineer should only update RtfResults if TM.StepResultSelected returns True for Test Engineerr script step. To initialize the contents of a rich textbox, use TM.RtfTemp.TextRTF = TM.ReportRtfClear.

6.9 Steady State

In additions to the step types listed in the Context Menu, user also can use Steady State step to import a existing output sequence files into the UPC Test Manager to set the power source output voltage, frequency, phase, and waveform, output form, coupling and current limit.

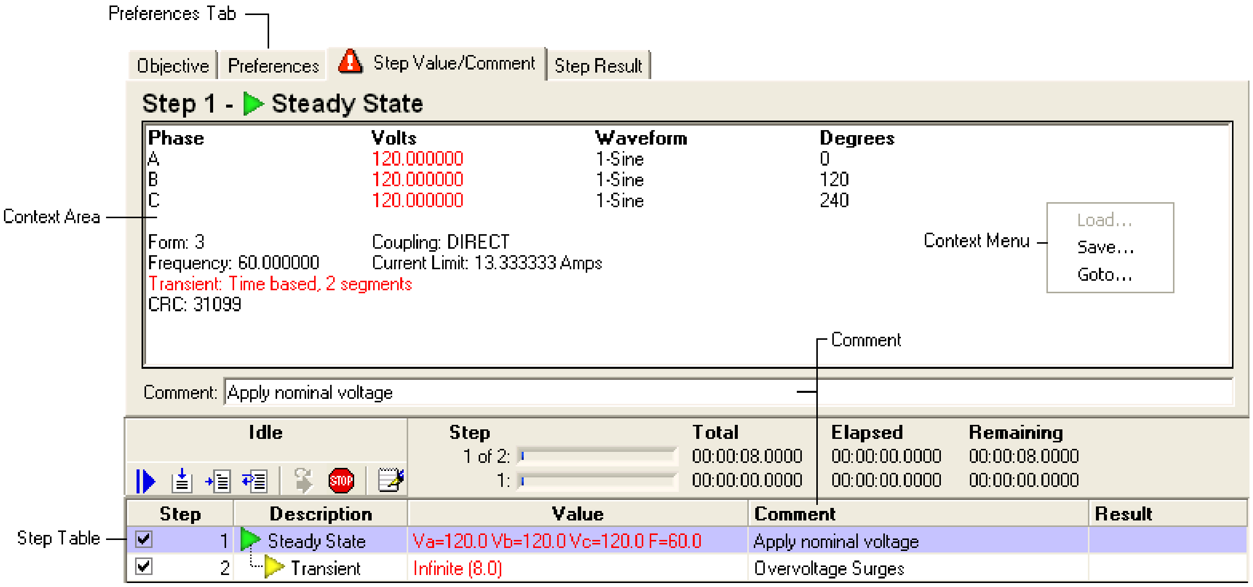
Use **Import...** in the step table context menu to import output sequence files into the step table. Output sequences contain steady state and optional transient values. These appear as two separate rows in the **Step Table** linked together. Clicking on the steady state step shows the values in the **Context Area**. Red text indicates values outside the limits defined in the Preferences tab or values not supported by Test Engineerr power source (i.e. Form or Coupling). Click the Preferences tab to view and edit the limits. Note that the limits apply to all Steady State and Transient steps in the test sequence. Test Engineer can delete the transient step if Test Engineer only want the steady state values to be used in the test.

The test sequence will not run steps that contain invalid values. When running a steady state step, the test sequence stores the output sequence in one of the programs Test Engineer specified in the program list in the Preferences tab. It then executes the steady values and enables the output.

6.9 Steady State (Cont.)

To edit the steady state values, double click the steady state step in the step table. The output sequence window will appear allowing Test Engineer to make changes. Click the Save button in the output sequence window toolbar to save the changes to the test sequence. Test sequences store the actual contents of the output sequence Test Engineer imported. This means changes to the Steady State or Transient steps in the test sequence do not affect the original output sequence file.

The **Context Menu** allows Test Engineer to save the steady state values to a Rich Text (*.rtf) or Plain Text (*.txt) file. The text Test Engineer enter in the **Comment** box automatically appears in the step table and test report.



Step 1 - Steady State

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

Form: 3 Coupling: DIRECT
Frequency: 60.000000 Current Limit: 13.333333 Amps
Transient: Time based, 2 segments
CRC: 31099

Comment: Apply nominal voltage

Idle	Step	Total	Elapsed	Remaining
	1 of 2:	00:00:08.0000	00:00:00.0000	00:00:08.0000
	1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Apply nominal voltage	
☑	2	Transient	Infinite (8.0)	Overvoltage Surges	

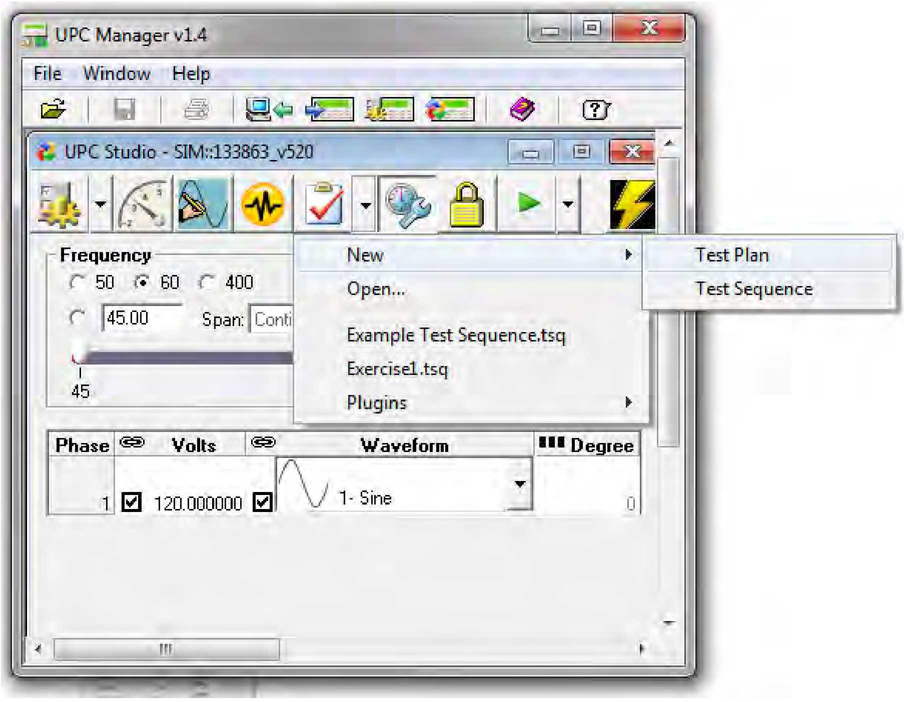
7

EXERCISE

7.1 Exercise 1: Creating a Test Plan

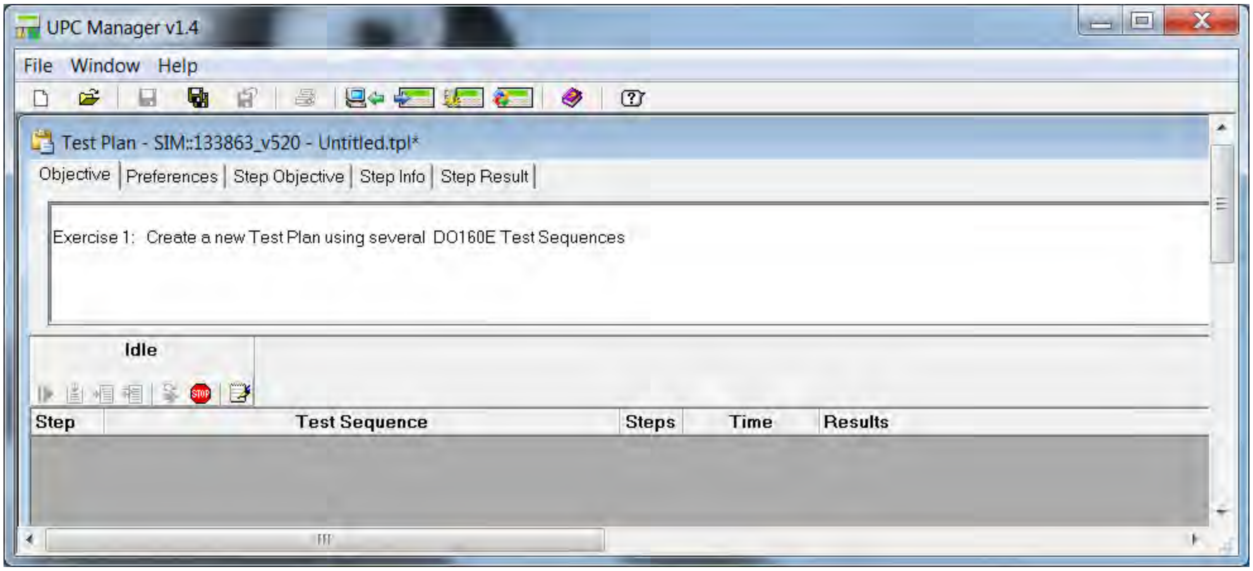
Assume Test Engineer have purchased DO160E Test Sequence option and installed with Test Engineerr UPC Studio Test Manager. Test Engineer can use Test Manager to quickly create a Test Plan which links together several existing DO160E Test Sequences in a single test. In this exercise we are going to create a Test Plan using multiple existing DO160E Test Sequences. In the UPC Studio Window,

1. Click arrow button next to **Test Manager** icon and select **New → Test Plan** as illustrated below to open a new Test Plan setup window.



7.1 Exercise 1: Creating a Test Plan (Cont.)

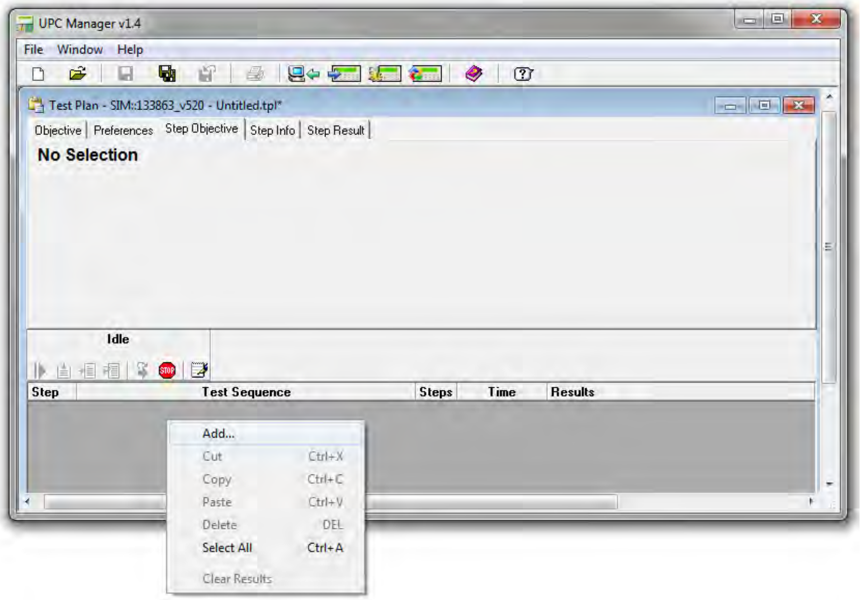
2. In **Objective** tab, enter the description as shown below.



UPC Manager v1.4
File Window Help
Test Plan - SIM::133863_v520 - Untitled.tpl*
Objective | Preferences | Step Objective | Step Info | Step Result
Idle
Step | Test Sequence | Steps | Time | Results

Exercise 1: Create a new Test Plan using several DO160E Test Sequences

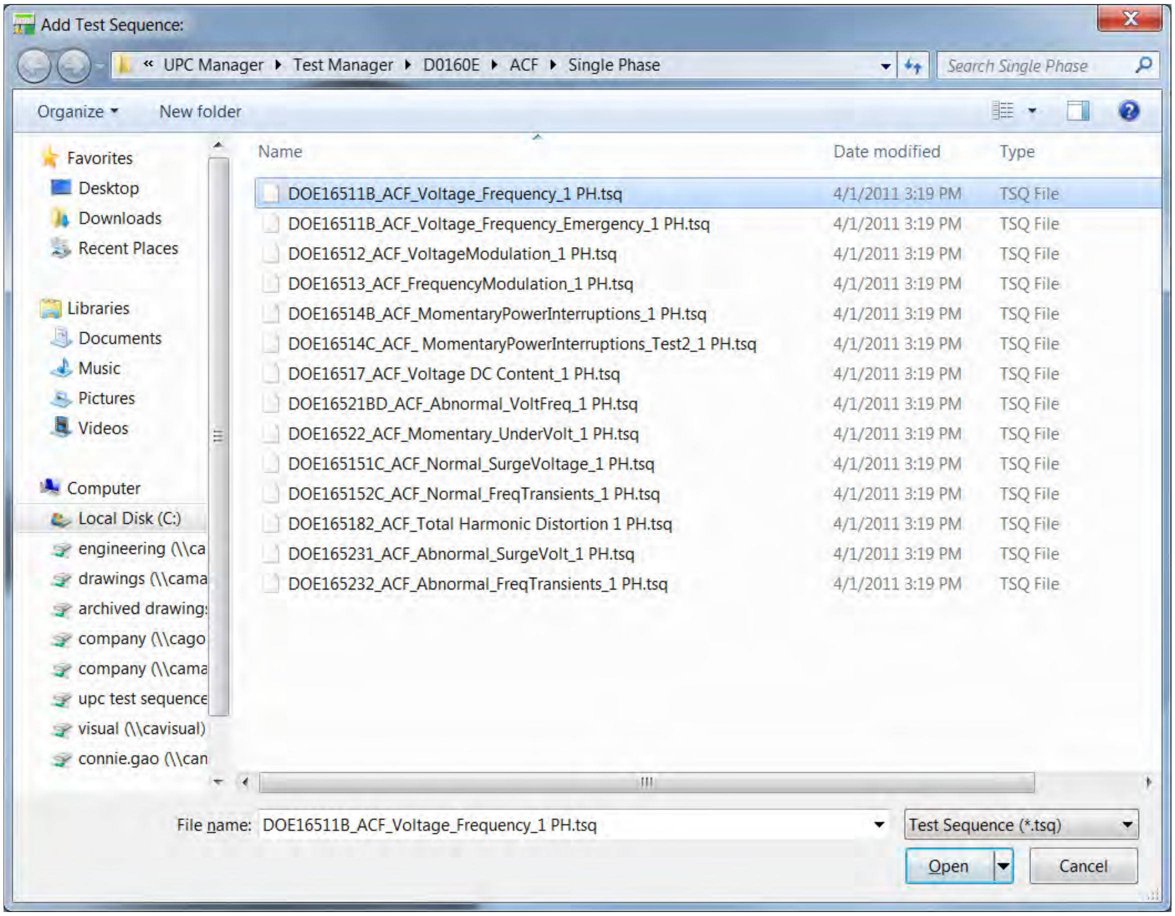
3. Right-click anywhere in the Step table and select Add from the popup menu as shown below



UPC Manager v1.4
File Window Help
Test Plan - SIM::133863_v520 - Untitled.tpl*
Objective | Preferences | Step Objective | Step Info | Step Result
No Selection
Idle
Step | Test Sequence | Steps | Time | Results
Add...
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Delete DEL
Select All Ctrl+A
Clear Results

7.1 Exercise 1: Creating a Test Plan (Cont.)

4. In the Add Test Sequence window, select *DOE16511B_ACF_Voltage_Frequency_1 PH.tsq* in the folder *C:\Pacific Power Source\UPC Manager\Test Manager\D0160E\ACF\Single Phase* as shown below. Click **Open** button.



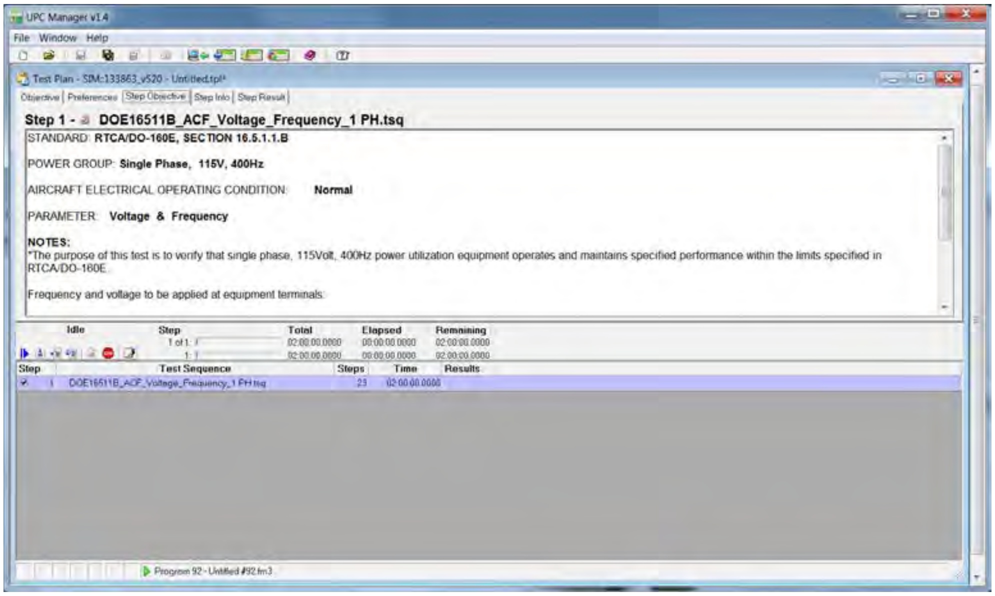
Name	Date modified	Type
DOE16511B_ACF_Voltage_Frequency_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16511B_ACF_Voltage_Frequency_Emergency_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16512_ACF_VoltageModulation_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16513_ACF_FrequencyModulation_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16514B_ACF_MomentaryPowerInterruptions_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16514C_ACF_ MomentaryPowerInterruptions_Test2_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16517_ACF_Voltage DC Content_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16521BD_ACF_Abnormal_VoltFreq_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE16522_ACF_Momentary_UnderVolt_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE165151C_ACF_Normal_SurgeVoltage_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE165152C_ACF_Normal_FreqTransients_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE165182_ACF_Total Harmonic Distortion 1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE165231_ACF_Abnormal_SurgeVolt_1 PH.tsq	4/1/2011 3:19 PM	TSQ File
DOE165232_ACF_Abnormal_FreqTransients_1 PH.tsq	4/1/2011 3:19 PM	TSQ File

File name: DOE16511B_ACF_Voltage_Frequency_1 PH.tsq

Test Sequence (*.tsq)

7.1 Exercise 1: Creating a Test Plan (Cont.)

The test sequence *DOE16511B_ACF_Voltage_Frequency_1 PH.tsq* now is added to the test plan. The objective of the selected test sequence is automatically loaded as shown In the Objective tab


UPC Manager v1.4
File Window Help
Test Plan - SIM::133863_v520 - Untitled.tpl*
Objective | Preferences | Step Objective | Step Info | Step Result
Program 92 - Untitled #92.fm3

Step 1 - DOE16511B_ACF_Voltage_Frequency_1 PH.tsq

STANDARD: **RTCA/DO-160E, SECTION 16.5.1.1.B**

POWER GROUP: **Single Phase, 115V, 400Hz**

AIRCRAFT ELECTRICAL OPERATING CONDITION: **Normal**

PARAMETER: **Voltage & Frequency**

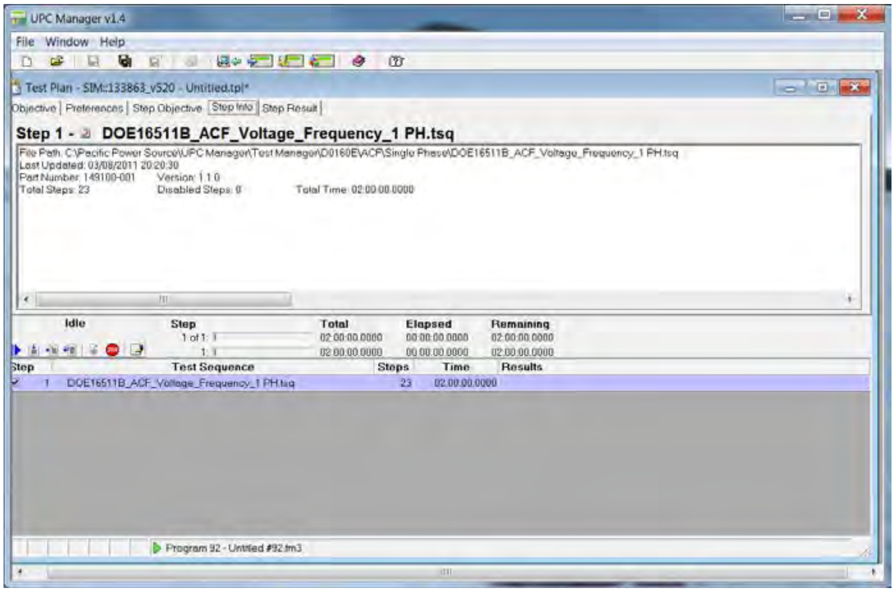
NOTES:
"The purpose of this test is to verify that single phase, 115Volt, 400Hz power utilization equipment operates and maintains specified performance within the limits specified in RTCA/DO-160E.

Frequency and voltage to be applied at equipment terminals.

Idle	Step	Total	Elapsed	Remaining
	1 of 1:	02:00:00.0000	00:00:00.0000	02:00:00.0000
	1:	02:00:00.0000	00:00:00.0000	02:00:00.0000

Step		Test Sequence	Steps	Time	Results
☑	1	DOE16511B_ACF_Voltage_Frequency_1 PH.tsq	23	02:00:00.0000	

In the Step Info tab, the test sequence properties such as file path, last updated time, number of steps in the test sequence and total run time are also recorded as shown below.


UPC Manager v1.4
File Window Help
Test Plan - SIM::133863_v520 - Untitled.tpl*
Objective | Preferences | Step Objective | Step Info | Step Result
Program 92 - Untitled #92.fm3

Step 1 - DOE16511B_ACF_Voltage_Frequency_1 PH.tsq

File Path: C:\Pacific Power Source\UPC Manager\Test Manager\D0160E\ACF\Single Phase\DOE16511B_ACF_Voltage_Frequency_1 PH.tsq
Last Updated: 03/08/2011 20:20:30
Part Number: 149100-001 Version: 1.1.0
Total Steps: 23 Disabled Steps: 0 Total Time: 02:00:00.0000

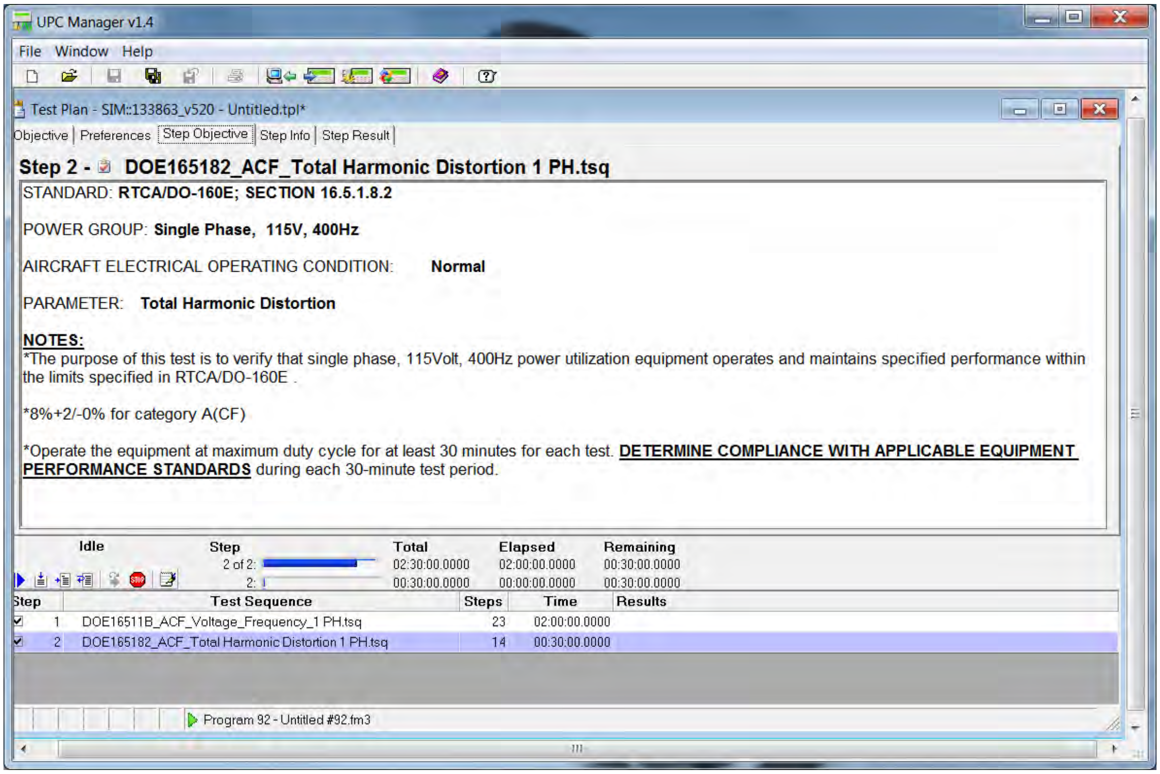
Idle	Step	Total	Elapsed	Remaining
	1 of 1:	02:00:00.0000	00:00:00.0000	02:00:00.0000
	1:	02:00:00.0000	00:00:00.0000	02:00:00.0000

Step		Test Sequence	Steps	Time	Results
☑	1	DOE16511B_ACF_Voltage_Frequency_1 PH.tsq	23	02:00:00.0000	

7.1 Exercise 1: Creating a Test Plan (Cont.)

5. Repeat steps 3 and 4 to add second test sequence *DOE165182_ACF_Total Harmonic Distortion 1 PH.tsq* to the test plan. The file path is *C:\Pacific Power Source\UPC Manager\Test Manager\D0160E\ACF\Single Phase\DOE165182_ACF_Total Harmonic Distortion 1 PH.tsq*

The test plan design window should look the same as illustrated below


UPC Manager v1.4
File Window Help
Test Plan - SIM::133863_v520 - Untitled.tpl*
Objective | Preferences | Step Objective | Step Info | Step Result
Program 92 - Untitled #92.fm3

Step 2 - DOE165182_ACF_Total Harmonic Distortion 1 PH.tsq

STANDARD: **RTCA/DO-160E; SECTION 16.5.1.8.2**

POWER GROUP: **Single Phase, 115V, 400Hz**

AIRCRAFT ELECTRICAL OPERATING CONDITION: **Normal**

PARAMETER: **Total Harmonic Distortion**

NOTES:
*The purpose of this test is to verify that single phase, 115Volt, 400Hz power utilization equipment operates and maintains specified performance within the limits specified in RTCA/DO-160E .

*8%+2/-0% for category A(CF)

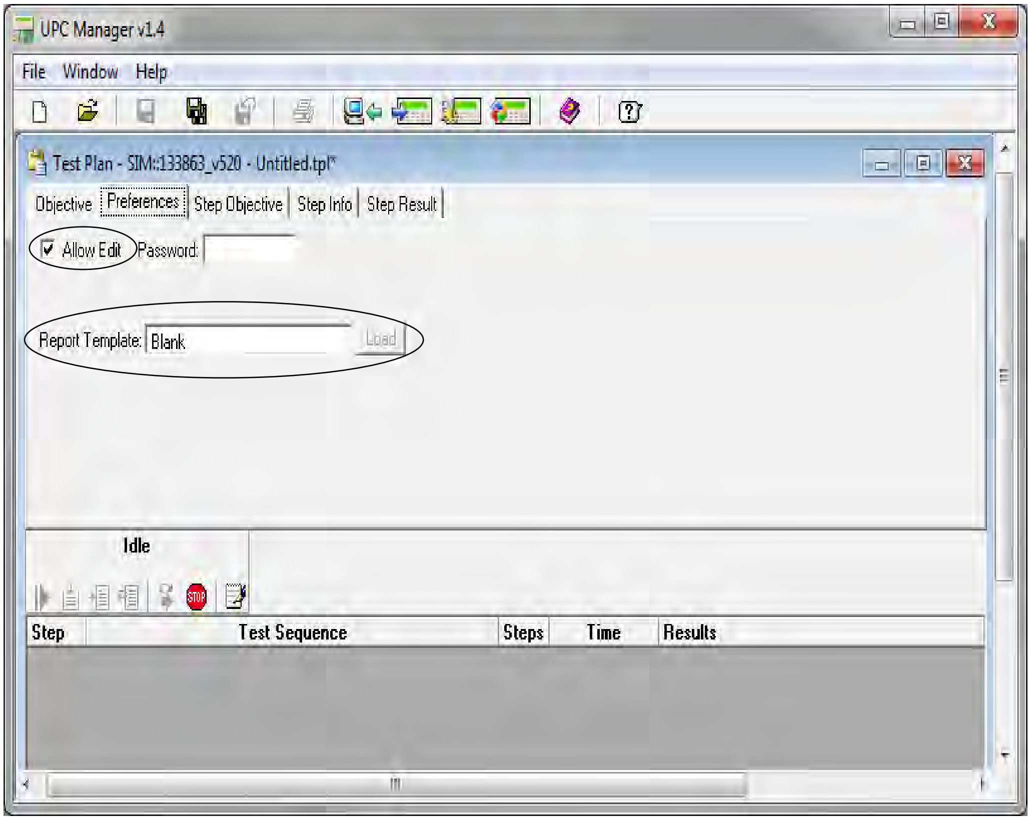
*Operate the equipment at maximum duty cycle for at least 30 minutes for each test. **DETERMINE COMPLIANCE WITH APPLICABLE EQUIPMENT PERFORMANCE STANDARDS** during each 30-minute test period.

Idle	Step	Total	Elapsed	Remaining
	2 of 2:	02:30:00.0000	02:00:00.0000	00:30:00.0000
	2:	00:30:00.0000	00:00:00.0000	00:30:00.0000

Step		Test Sequence	Steps	Time	Results
☑	1	DOE16511B_ACF_Voltage_Frequency_1 PH.tsq	23	02:00:00.0000	
☑	2	DOE165182_ACF_Total Harmonic Distortion 1 PH.tsq	14	00:30:00.0000	

7.1 Exercise 1: Creating a Test Plan (Cont.)

6. Set the **Preference** properties as shown below



☑ Allow Edit

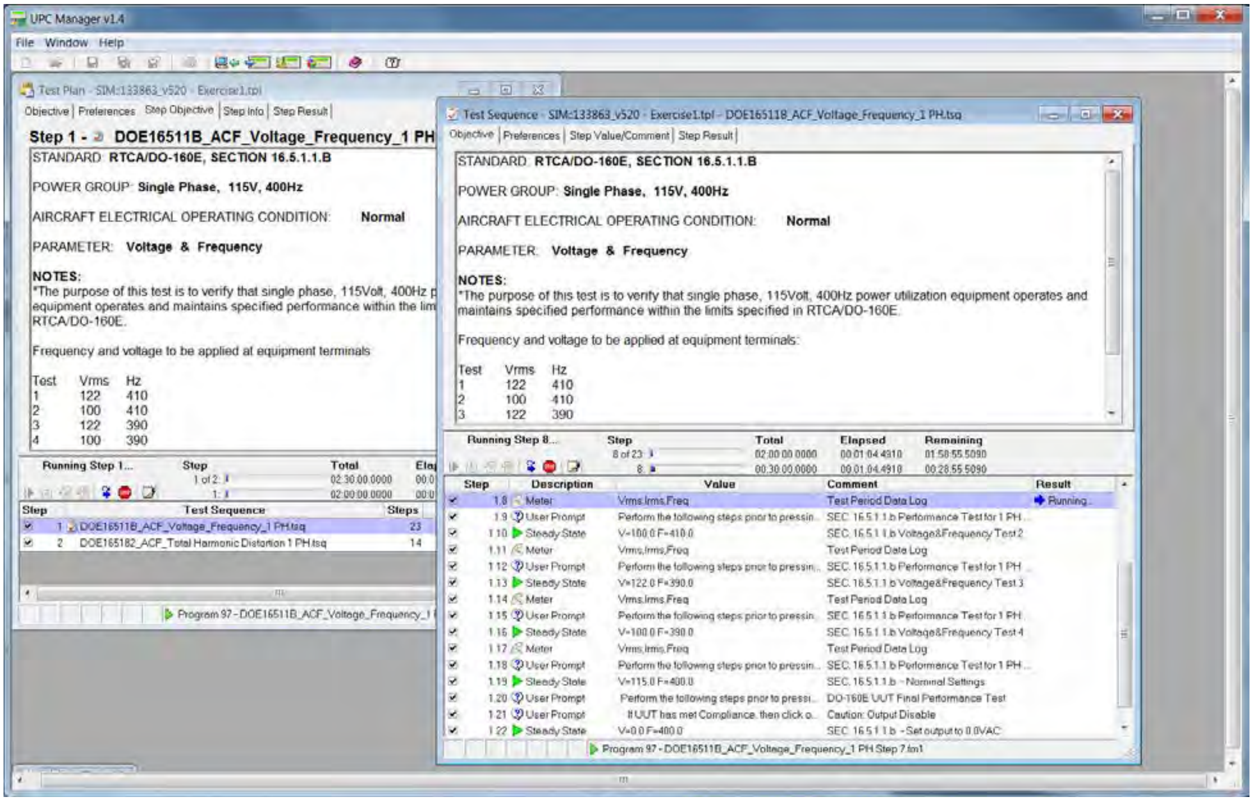
Password:

Report Template: Blank

7. Click **Save As** button from the menu toolbar and save the test plan as *Exercise1.tpl*
8. Click Start button from the run toolbar to run the test plan.

7.1 Exercise 1: Creating a Test Plan (Cont.)

9. Double click the step 1 to open the *DOE16511B_ACF_Voltage_Frequency_1 PH.tsq* test progression window as shown below.


UPC Manager v1.4
File Window Help
Test Plan - SIM:133863_v520 - Exercise1.tpl
Objective | Preferences | Step Objective | Step Info | Step Result
Test Sequence - SIM:133863_v520 - Exercise1.tpl - DOE165118_ACF_Voltage_Frequency_1 PH.tsq
Objective | Preferences | Step Value/Comment | Step Result

Step 1 - DOE16511B_ACF_Voltage_Frequency_1 PH

STANDARD: **RTCA/DO-160E, SECTION 16.5.1.1.B**

POWER GROUP: **Single Phase, 115V, 400Hz**

AIRCRAFT ELECTRICAL OPERATING CONDITION: **Normal**

PARAMETER: **Voltage & Frequency**

NOTES:
*The purpose of this test is to verify that single phase, 115Volt, 400Hz p
equipment operates and maintains specified performance within the lim
RTCA/DO-160E.

Frequency and voltage to be applied at equipment terminals

Test	Vrms	Hz
1	122	410
2	100	410
3	122	390
4	100	390

Running Step 1...	Step	Total	Elap
	1 of 2:	02:30:00.0000	00:0
	1:	02:00:00.0000	00:0

Step		Test Sequence	Steps
☑	1	DOE16511B_ACF_Voltage_Frequency_1 PH.tsq	23
☑	2	DOE165182_ACP_Total Harmonic Distortion 1 PH.tsq	14

Program 97 - DOE16511B_ACF_Voltage_Frequency_1

STANDARD: **RTCA/DO-160E, SECTION 16.5.1.1.B**

POWER GROUP: **Single Phase, 115V, 400Hz**

AIRCRAFT ELECTRICAL OPERATING CONDITION: **Normal**

PARAMETER: **Voltage & Frequency**

NOTES:
*The purpose of this test is to verify that single phase, 115Volt, 400Hz power utilization equipment operates and maintains specified performance within the limits specified in RTCA/DO-160E.

Frequency and voltage to be applied at equipment terminals:

Test	Vrms	Hz
1	122	410
2	100	410
3	122	390

Running Step 8...	Step	Total	Elapsed	Remaining
	8 of 23:	02:00:00.0000	00:01:04.4910	01:58:55.5090
	8:	00:30:00.0000	00:01:04.4910	00:28:55.5090

	Step	Description	Value	Comment	Result
☑	1.8	Meter	Vrms,Irms,Freq	Test Period Data Log	Running...
☑	1.9	User Prompt	Perform the following steps prior to pressin...	SEC. 16.5.1.1.b Performance Test for 1 PH ...	
☑	1.10	Steady State	V=100.0 F=410.0	SEC. 16.5.1.1.b Voltage&Frequency Test 2	
☑	1.11	Meter	Vrms,Irms,Freq	Test Period Data Log	
☑	1.12	User Prompt	Perform the following steps prior to pressin...	SEC. 16.5.1.1.b Performance Test for 1 PH ...	
☑	1.13	Steady State	V=122.0 F=390.0	SEC. 16.5.1.1.b Voltage&Frequency Test 3	
☑	1.14	Meter	Vrms,Irms,Freq	Test Period Data Log	
☑	1.15	User Prompt	Perform the following steps prior to pressin...	SEC. 16.5.1.1.b Performance Test for 1 PH ...	
☑	1.16	Steady State	V=100.0 F=390.0	SEC. 16.5.1.1.b Voltage&Frequency Test 4	
☑	1.17	Meter	Vrms,Irms,Freq	Test Period Data Log	
☑	1.18	User Prompt	Perform the following steps prior to pressin...	SEC. 16.5.1.1.b Performance Test for 1 PH ...	
☑	1.19	Steady State	V=115.0 F=400.0	SEC. 16.5.1.1.b - Nominal Settings	
☑	1.20	User Prompt	Perform the following steps prior to pressi...	DO-160E UUT Final Performance Test	
☑	1.21	User Prompt	If UUT has met Compliance, then click o...	Caution: Output Disable	
☑	1.22	Steady State	V=0.0 F=400.0	SEC. 16.5.1.1.b - Set output to 0.0VAC	

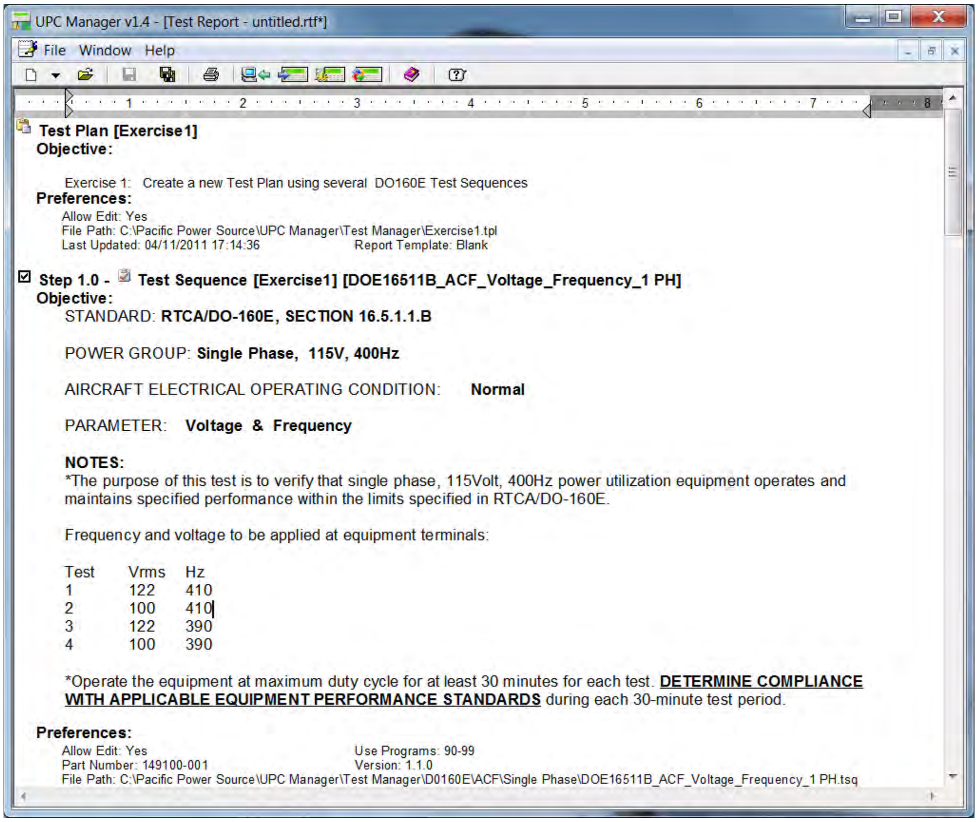
Program 97 - DOE16511B_ACF_Voltage_Frequency_1 PH Step 7.tm1

Notice in the Test Sequence window, unlike exercise one, each test sequence step is numbered as 1.1, 1.2,…..1.23. This is because those test sequence steps are also part of test plan being executed.

7.1 Exercise 1: Creating a Test Plan (Cont.)

To open the Test Report:

- Click **Show Report** button from the Run Toolbar to open the test report window as shown below.



Test Plan [Exercise1]
Objective:

Exercise 1: Create a new Test Plan using several DO160E Test Sequences

Preferences:

Allow Edit: Yes
File Path: C:\Pacific Power Source\UPC Manager\Test Manager\Exercise1.tpl
Last Updated: 04/11/2011 17:14:36 Report Template: Blank

☑ **Step 1.0 - Test Sequence [Exercise1] [DOE16511B_ACF_Voltage_Frequency_1 PH]**
Objective:

STANDARD: **RTCA/DO-160E, SECTION 16.5.1.1.B**

POWER GROUP: **Single Phase, 115V, 400Hz**

AIRCRAFT ELECTRICAL OPERATING CONDITION: **Normal**

PARAMETER: **Voltage & Frequency**

NOTES:
*The purpose of this test is to verify that single phase, 115Volt, 400Hz power utilization equipment operates and maintains specified performance within the limits specified in RTCA/DO-160E.

Frequency and voltage to be applied at equipment terminals:

Test	Vrms	Hz
1	122	410
2	100	410
3	122	390
4	100	390

*Operate the equipment at maximum duty cycle for at least 30 minutes for each test. **DETERMINE COMPLIANCE WITH APPLICABLE EQUIPMENT PERFORMANCE STANDARDS** during each 30-minute test period.

Preferences:

Allow Edit: Yes Use Programs: 90-99
Part Number: 149100-001 Version: 1.1.0
File Path: C:\Pacific Power Source\UPC Manager\Test Manager\D0160E\ACF\Single Phase\DOE16511B_ACF_Voltage_Frequency_1 PH.tsq

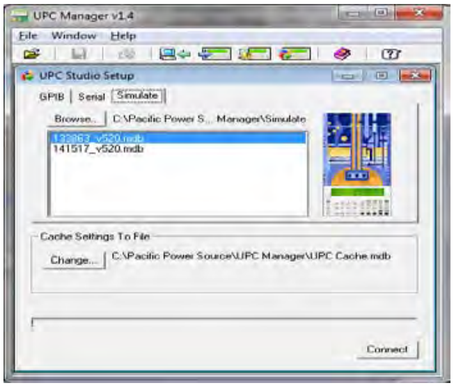
- Click Save As button in the test report window and save the report file as *Exercis1_TR.rft*

The test report of a Test Plan is saved in the following directory by default
C:\Pacific Power Source\UPC Manager\Test Reports\Templates
The directory can be change based on Test Engineerr preference.

7.2 Exercise 2: Loading a Test Sequence

To launch the Test Manager in a simulation mode with UPC-32/12 firmware 5.2.0 version,

- Click **Start** → **Programs** → **Pacific Power Source** → **UPC Manager** from the desktop to open the *UPC Manager* window
- Select **Simulate** tab, then click "*133863_v520.mdb*" option from the list as shown below and click **Connect** button.



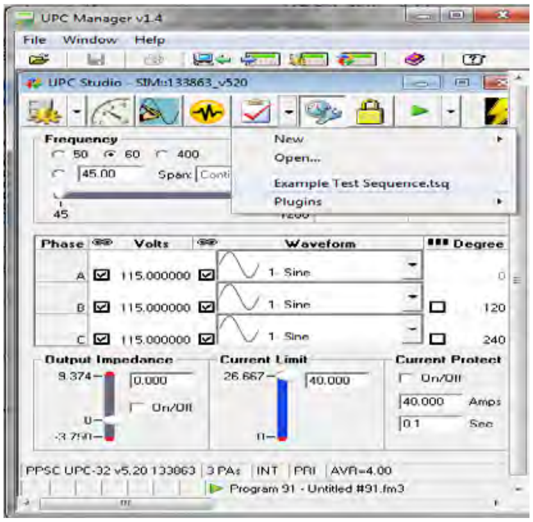
C:\Pacific Power S... Manager\Simulate

133863_v520.mdb
141517_v520.mdb

C:\Pacific Power Source\UPC Manager\UPC Cache.mdb

Note: The options appeared in the list are in the format of PPS UPC firmware part number _ revision # In this example 133863 is PPS part number of the firmware embedded in UPC-32/12 controller, and current revision is 5.2.0

- Click arrow button next to **Test Manager** icon and select the "Example Test Sequence.tsq" from the dropdown menu as illustrated below



Frequency: ○ 50 ● 60 ○ 400 ○ 45.00 Span: Conti

Phase		Volts		Waveform		Degree
A	☑	115.000000	☑	1 Sine		0
B	☑	115.000000	☑	1 Sine	□	120
C	☑	115.000000	☑	1 Sine	□	240

Output Impedance: 9.374 / 0 / -3.750; 0.000; □ On/Off

Current Limit: 26.667 / 0; 40.000

Current Protect: □ On/Off; 40.000 Amps; 0.1 Sec

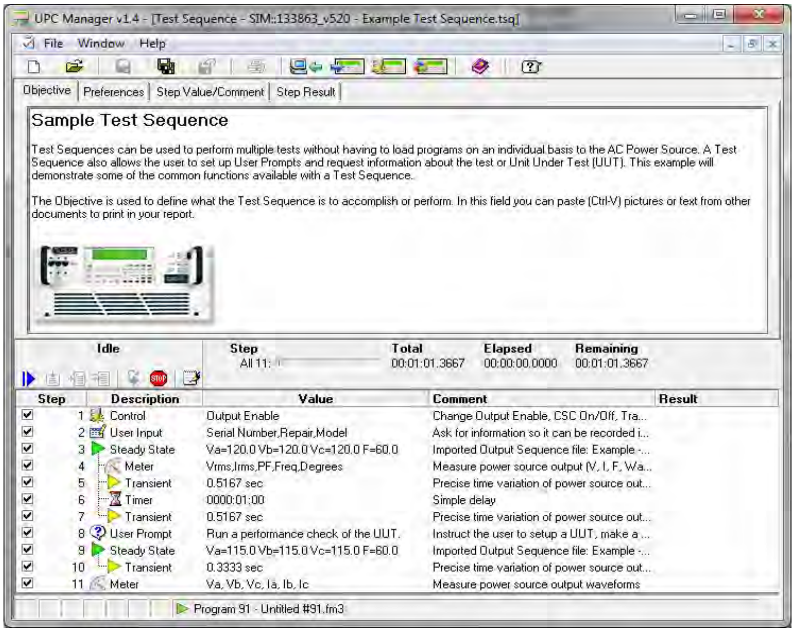
PPSC UPC-32 v5.20 133863 | 3 PAs | INT | PRI | AVR=4.00

Program 91 - Untitled #91.fm3

Now the Example Test Sequence.tsq is loaded into Test Manager window.

7.3 Exercise 3: Creating and Executing a Test Sequence

Exercise 3 is to create a new test sequence that is a duplication of *Example Test Sequence.tsq* in Exercise 2, as illustrated below, and then execute it.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Example Test Sequence.tsq]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result

Sample Test Sequence

Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence also allows the user to set up User Prompts and request information about the test or Unit Under Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

The Objective is used to define what the Test Sequence is to accomplish or perform. In this field you can paste (Ctrl-V) pictures or text from other documents to print in your report.

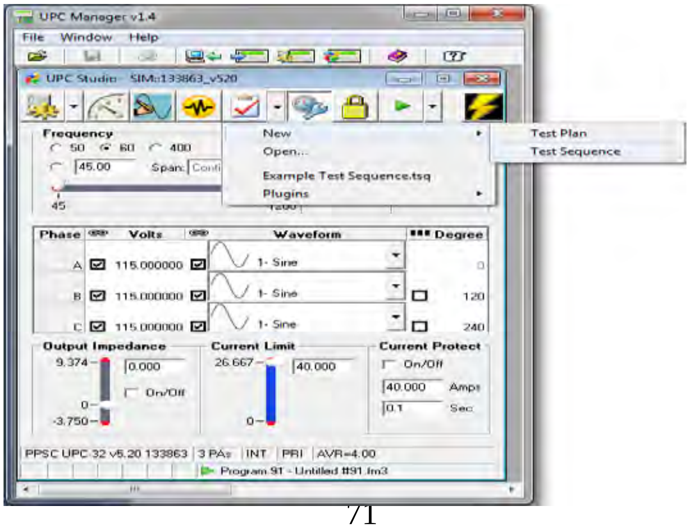
Idle	Step	Total	Elapsed	Remaining
	All 11:	00:01:01.3667	00:00:00.0000	00:01:01.3667

Step		Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC On/Off, Tra...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Imported Output Sequence file: Example -...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precise time variation of power source out...	
☑	6	Timer	0000:01:00	Simple delay	
☑	7	Transient	0.5167 sec	Precise time variation of power source out...	
☑	8	User Prompt	Run a performance check of the UUT.	Instruct the user to setup a UUT, make a ...	
☑	9	Steady State	Va=115.0 Vb=115.0 Vc=115.0 F=60.0	Imported Output Sequence file: Example -...	
☑	10	Transient	0.3333 sec	Precise time variation of power source out...	
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output waveforms	

Program 91 - Untitled #91.fm3

7.3.1 Creating a Test Sequence

1. Click arrow button next to **Test Manager** icon and select **New → Test Sequence** as illustrated below to open a new Test Sequence setup window.



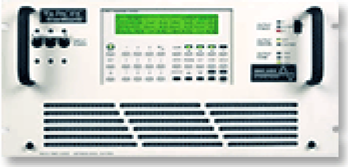
7.3.1 Creating a Test Sequence (Cont.)

2. Click **Objective** tab and copy (Ctrl+C) and paste (Ctrl+V) the following paragraph including the picture into the Context area to define the objective of the test sequence.

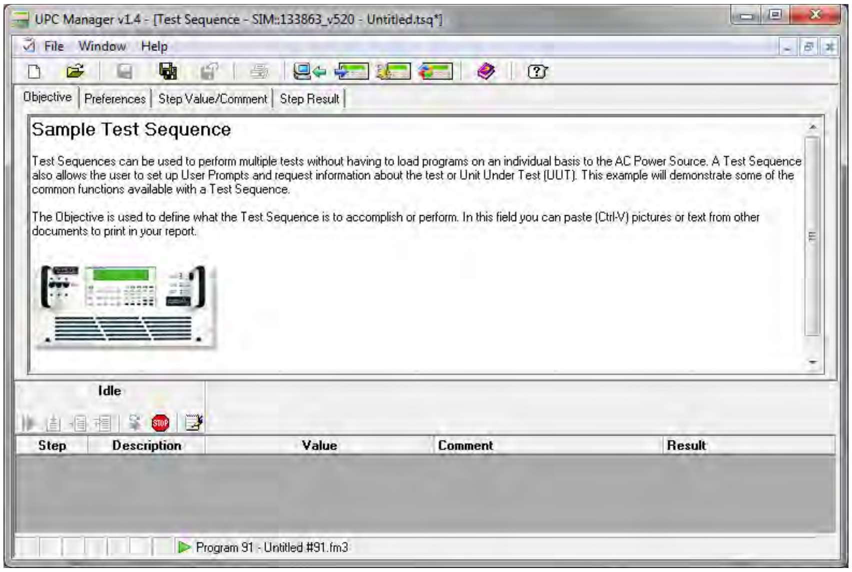
   Sample Test Sequence

   Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence also allows the user to set up User Prompts and request information about the test or Unit Under Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

   The Objective is used to define what the Test Sequence is to accomplish or perform. In this field Test Engineer can paste (Ctrl-V) pictures or text from other documents to print in Test Engineerr report.



Once the step 2 is completed, the window should look same as shown below.



Sample Test Sequence

Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence also allows the user to set up User Prompts and request information about the test or Unit Under Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

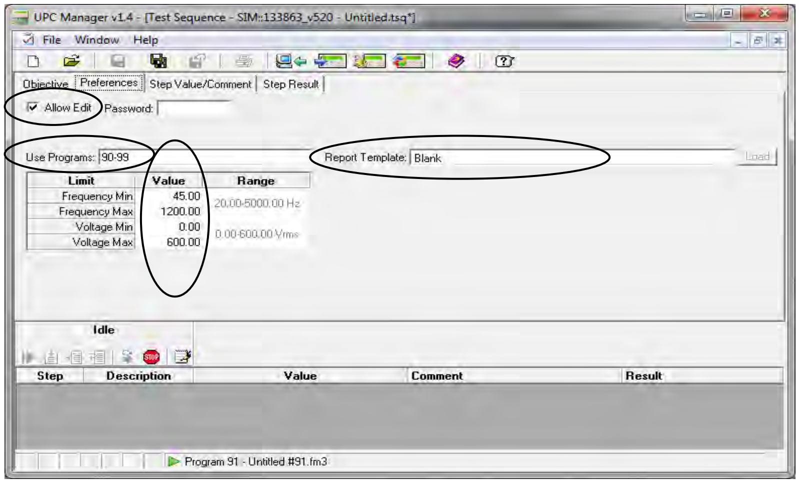
The Objective is used to define what the Test Sequence is to accomplish or perform. In this field you can paste (Ctrl-V) pictures or text from other documents to print in your report.

Idle

Program 91 - Untitled #91.fm3

7.3.1 Creating a Test Sequence (Cont.)

3. Click **Preference** tab, and change the settings to be the same as shown below.



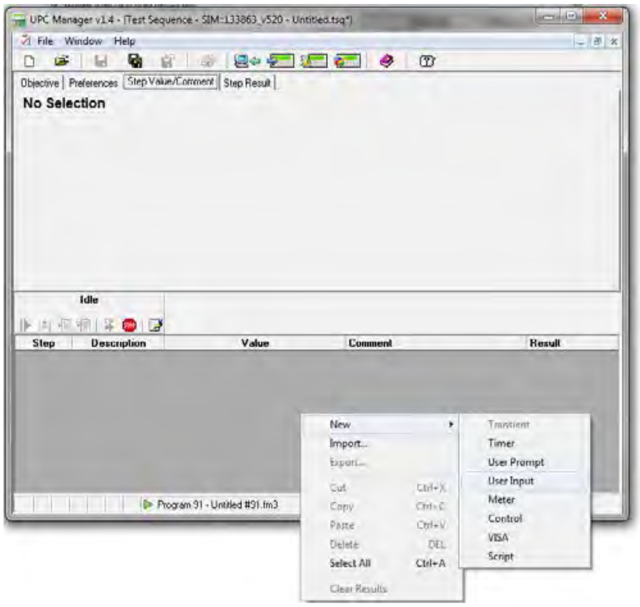
☑ Allow Edit Password:

Use Programs: 90-99

Report Template: Blank

Limit	Value	Range
Frequency Min	45.00	20.00-5000.00 Hz
Frequency Max	1200.00	
Voltage Min	0.00	0.00-600.00 Vrms
Voltage Max	600.00	

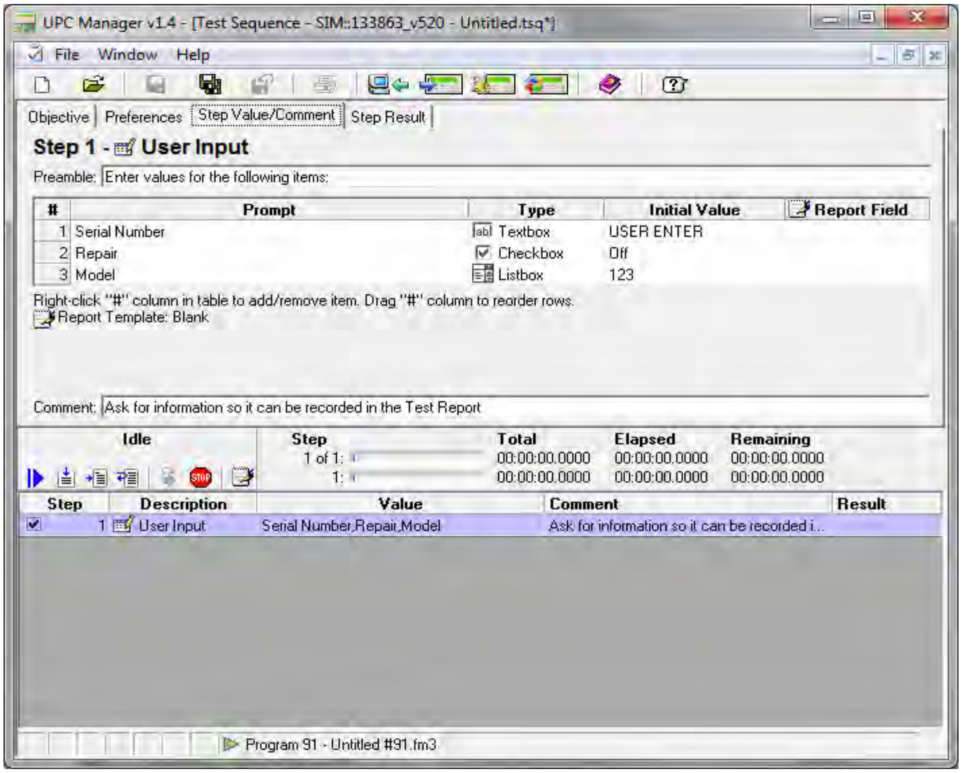
4. Click **Step Value/Comment** tab,
5. Right-click anywhere in the step table area to active context menu
6. Select **New → User Input** from context menu to add user input step as illustrated below.



7.3.1 Creating a Test Sequence (Cont.)

7. In the **Comment** field enter the text “Ask for information so it can be recorded in the Test Report.” and then press *Enter* key.

   The default setting for User Input step should be same as shown below. If not, modify the settings accordingly.



UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result

Step 1 - User Input

Preamble: Enter values for the following items:

#	Prompt	Type	Initial Value	Report Field
1	Serial Number	Textbox	USER ENTER	
2	Repair	Checkbox	Off	
3	Model	Listbox	123	

Right-click "#" column in table to add/remove item. Drag "#" column to reorder rows.
Report Template: Blank

Comment: Ask for information so it can be recorded in the Test Report

Idle	Step		Total	Elapsed	Remaining
	1 of 1:		00:00:00.0000	00:00:00.0000	00:00:00.0000
	1:		00:00:00.0000	00:00:00.0000	00:00:00.0000

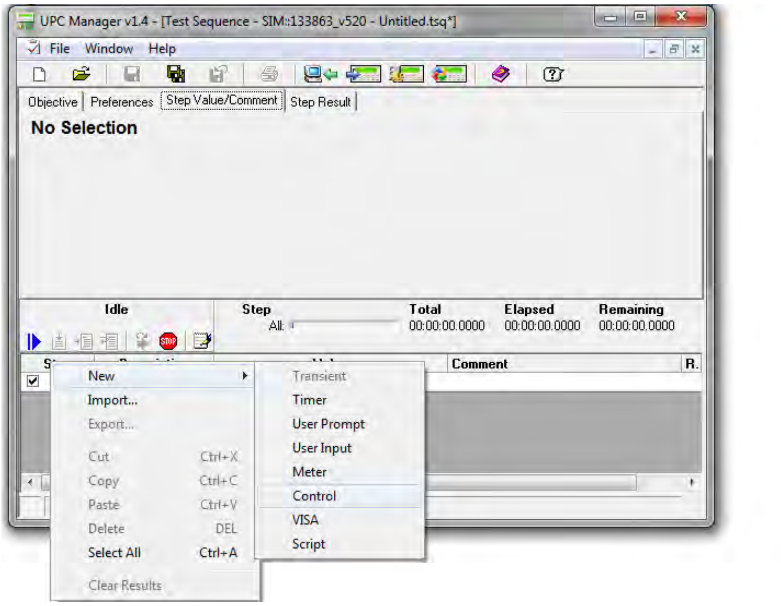
Step	Description	Value	Comment	Result
☑ 1	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	

Program 91 - Untitled #91.fm3

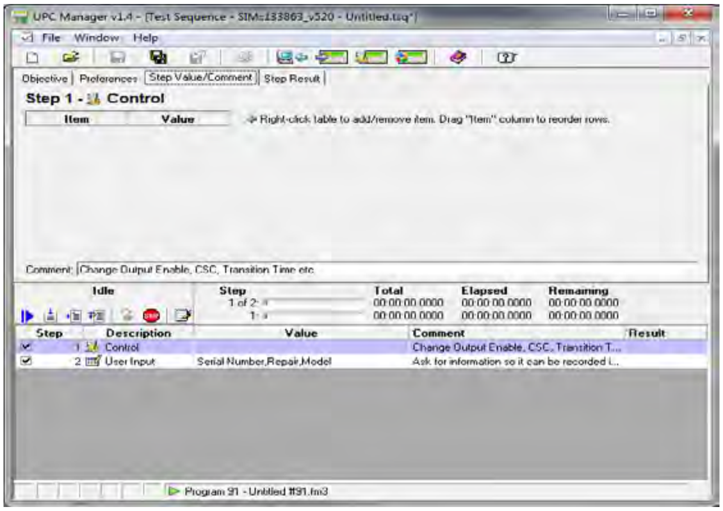
8. Move the mouse to the header “Step” in the step table area, and right-click to active the context menu.

7.3.1 Creating a Test Sequence (Cont.)

9. Select New → Control from the menu as shown below.



As illustrated below the Control step is added as step 1 right above User Input. User Input step now becomes step 2.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File Window Help
Objective | Preferences | Step Value/Comment | Step Result
Step 1 - Control
Item
Value
Right-click table to add/remove item. Drag "Item" column to reorder rows.
Idle
Program 91 - Untitled #91.fm3

Comment: Change Output Enable, CSC, Transition Time etc

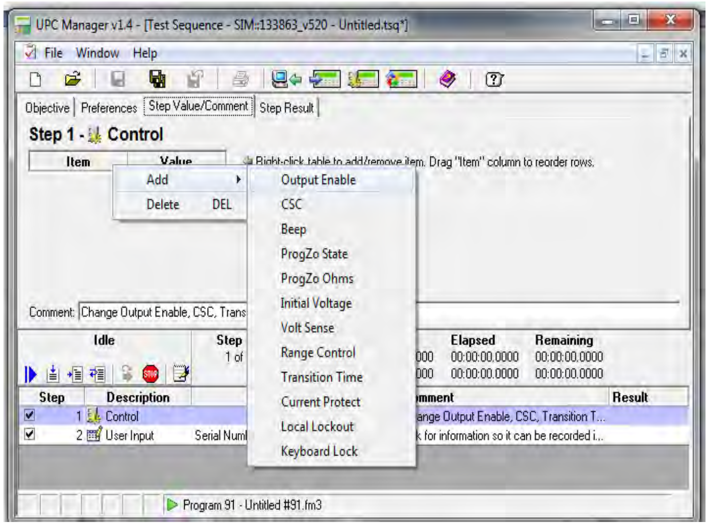
Step	Total	Elapsed	Remaining
1 of 2:	00:00:00.0000	00:00:00.0000	00:00:00.0000
1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Control		Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	

10. Right-click anywhere on the Control table in the context area

7.3.1 Creating a Test Sequence (Cont.)

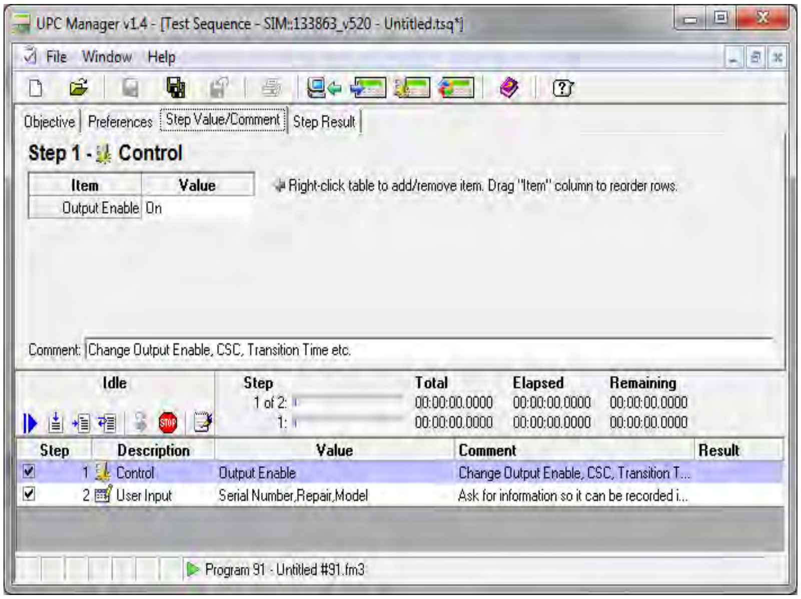
11. Select Add→ Output Enable from the menu to add Output Enable control as shown below.



Comment: Change Output Enable, CSC, Trans

Step	Description	Value	Comment	Result
☑ 1	Control		ange Output Enable, CSC, Transition T...	
☑ 2	User Input	Serial Numl	k for information so it can be recorded i...	

12. Set the Value of Output Enable to be “On” as shown below.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result
Step 1 - Control
Right-click table to add/remove item. Drag "Item" column to reorder rows.
Idle
Program 91 - Untitled #91.fm3

Item	Value
Output Enable	On

Comment: Change Output Enable, CSC, Transition Time etc.

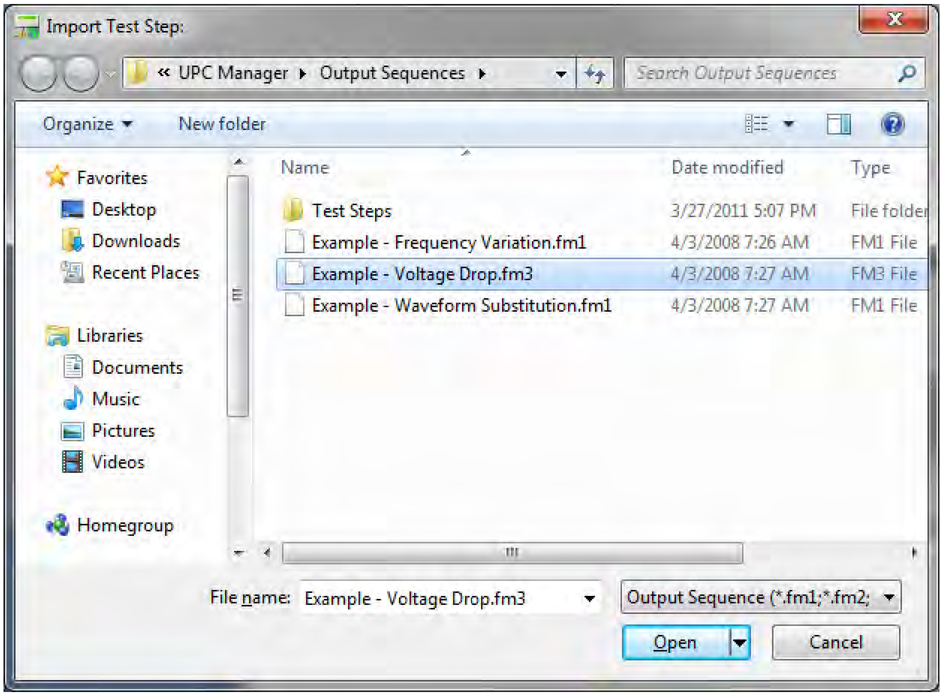
Step	Total	Elapsed	Remaining
1 of 2:	00:00:00.0000	00:00:00.0000	00:00:00.0000
1:	00:00:00.0000	00:00:00.0000	00:00:00.0000

Step	Description	Value	Comment	Result
☑ 1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑ 2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	

13. Click anywhere in Step table and select **Import** from the context menu

7.3.1 Creating a Test Sequence (Cont.)

14. In **Import Test Step window** choose the existing output sequence *Example - Voltage Drop.fm3* from the direction C:\Pacific Power Source\UPC Manager\Output Sequences folder as shown below, and click **Open** button to go back to Step Value/Comment tab in UPC Test Manager.



Name	Date modified	Type
Test Steps	3/27/2011 5:07 PM	File folder
Example - Frequency Variation.fm1	4/3/2008 7:26 AM	FM1 File
Example - Voltage Drop.fm3	4/3/2008 7:27 AM	FM3 File
Example - Waveform Substitution.fm1	4/3/2008 7:27 AM	FM1 File

File name: Example - Voltage Drop.fm3

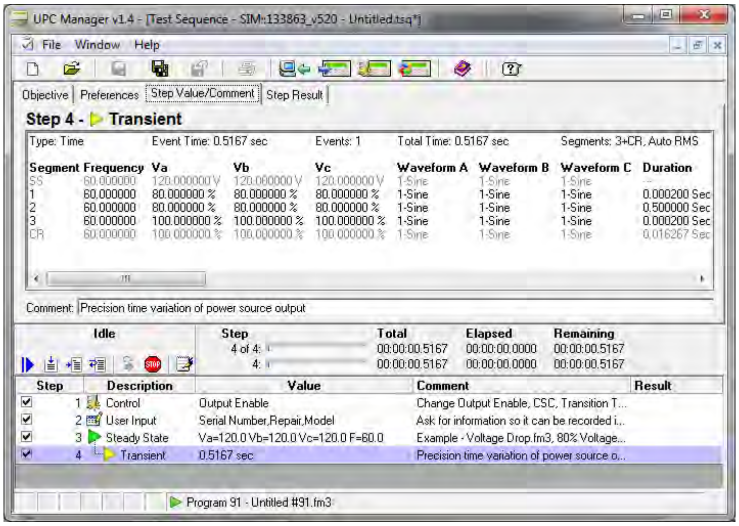
Output Sequence (*.fm1;*.fm2;

15. In the **Comment** field, modify the text to “Import Output Sequence file: Example - Voltage Drop.fm3, 80% Voltage Drop for 0.5 Seconds”

16. Select step4 Transient; In the **Comment** field, enter the text “ Precision time variation of power source output”, and press *Enter* key

7.3.1 Creating a Test Sequence (Cont.)

The new **Step Value/Comment** tab should look similar to the one shown below.



UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result

Step 4 - Transient

Type: Time   Event Time: 0.5167 sec   Events: 1   Total Time: 0.5167 sec   Segments: 3+CR, Auto RMS

Segment	Frequency	Va	Vb	Vc	Waveform A	Waveform B	Waveform C	Duration
SS	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	--
1	60.000000	80.000000 %	80.000000 %	80.000000 %	1-Sine	1-Sine	1-Sine	0.000200 Sec
2	60.000000	80.000000 %	80.000000 %	80.000000 %	1-Sine	1-Sine	1-Sine	0.500000 Sec
3	60.000000	100.000000 %	100.000000 %	100.000000 %	1-Sine	1-Sine	1-Sine	0.000200 Sec
CR	60.000000	100.000000 %	100.000000 %	100.000000 %	1-Sine	1-Sine	1-Sine	0.016267 Sec

Comment: Precision time variation of power source output

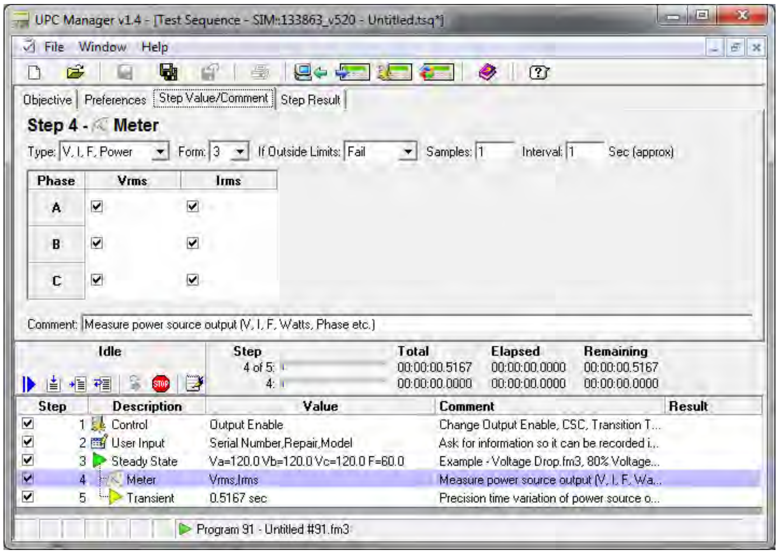
Idle	Step	Total	Elapsed	Remaining
	4 of 4:	00:00:00.5167	00:00:00.0000	00:00:00.5167
	4:	00:00:00.5167	00:00:00.0000	00:00:00.5167

Step		Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Transient	0.5167 sec	Precision time variation of power source o...	

Program 91 - Untitled #91.fm3

Note: Importing this output sequence not only adds step3, a steady state step, also adds step4, a transient step to the table. The output sequence Example - *Voltage Drop.fm3* was created using UPC studio. Please refer to the UPC Studio Operation manual on how to create output sequence.

17. Select step3 Steady State from the table.
18. Right-click and choose **New→ Meter** to insert a *Meter* step below *Steady State* step as shown below



Step 4 - Meter

Type: V, I, F, Power | Form: 3 | If Outside Limits: Fail | Samples: 1 | Interval: 1 Sec (approx)

Phase	Vrms	Irms
A	☑	☑
B	☑	☑
C	☑	☑

Comment: Measure power source output (V, I, F, Watts, Phase etc.)

Step		Total	Elapsed	Remaining
4 of 5:		00:00:00.5167	00:00:00.0000	00:00:00.5167
4:		00:00:00.0000	00:00:00.0000	00:00:00.0000

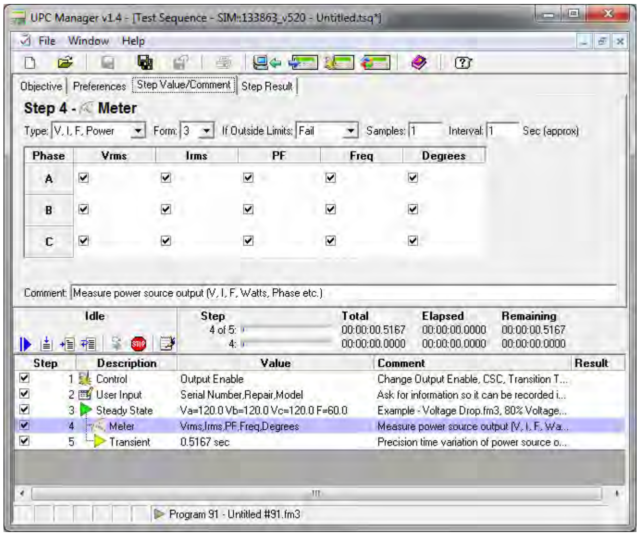
	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	

Program 91 - Untitled #91.fm3

7.3.1 Creating a Test Sequence (Cont.)

19. Right click header “Irms” in the Meter table, and select **Add→ PF** to add a Power Factor column after Irms column.
20. Right click header “PF” in the Meter table, and select **Add→ Degrees** to
add a
degrees column after PF column.
21. Right click header “PF” in the Meter table, and select **Add→ Freq** to insert a frequency column before Degrees column.

The new window should be same to the following illustration.



Step 4 - Meter

Type: V, I, F, Power | Form: 3 | If Outside Limits: Fail | Samples: 1 | Interval: 1 Sec (approx)

Phase	Vrms	Irms	PF	Freq	Degrees
A	☑	☑	☑	☑	☑
B	☑	☑	☑	☑	☑
C	☑	☑	☑	☑	☑

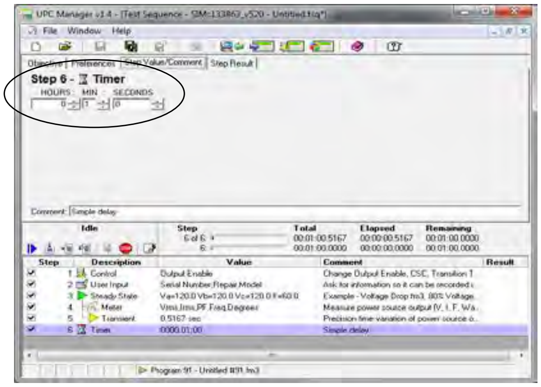
Comment: Measure power source output (V, I, F, Watts, Phase etc.)

Step		Total	Elapsed	Remaining
4 of 5:		00:00:00.5167	00:00:00.0000	00:00:00.5167
4:		00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	

Program 91 - Untitled #91.fm3

22. Select step5 Transient step, and right-click.
23. Choose **New→ Timer** to add step6, a Timer step.
24. Set Timer to be 0 hours, 1 minute, 0 second as shown below.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]

Step 6 - Timer

HOURS: 0 MIN: 1 SECONDS: 0

Comment: Simple delay

Idle	Step	Total	Elapsed	Remaining
	6 of 6:	00:01:00.5167	00:00:00.5167	00:01:00.0000
	6:	00:01:00.0000	00:00:00.0000	00:01:00.0000

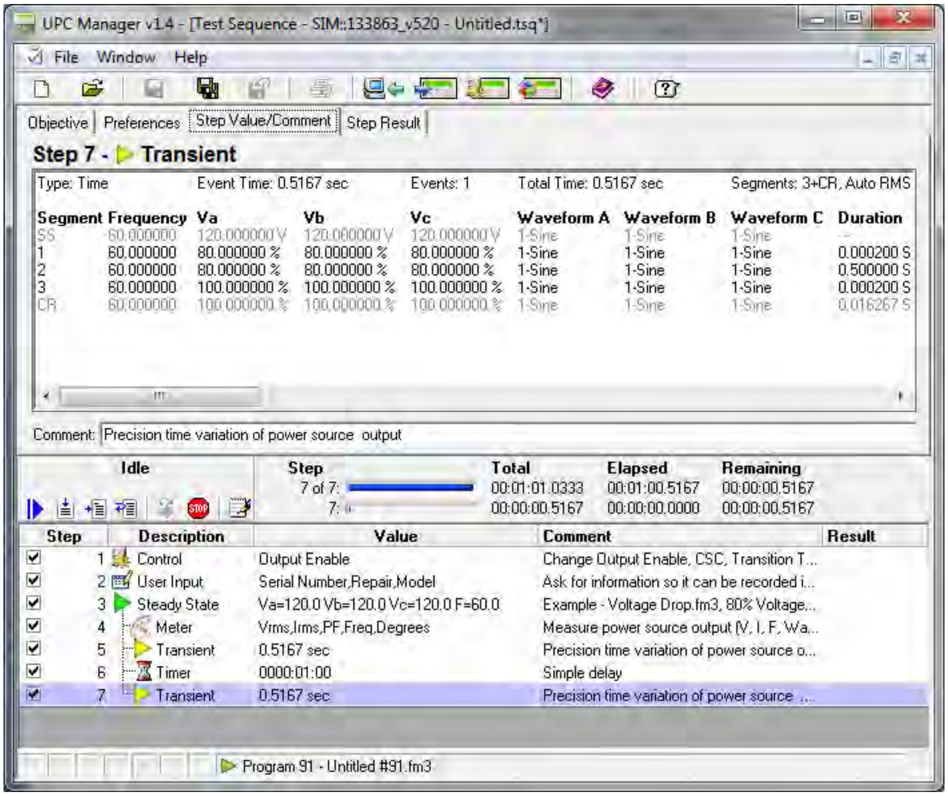
Step		Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	
☑	6	Timer	0000:01:00	Simple delay	

Program 91 - Untitled #91.fm3

7.3.1 Creating a Test Sequence (Cont.)

25. Select step6 Timer step, and right-click.
26. Choose **New→ Transient** to add step7, a Transient step.
27. In the **Comment** field, enter the text “Precision time variation of power source output”, and press *Enter* key.

The Step Value / Comment window is shown below.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]

Step 7 - Transient

Type: Time Event Time: 0.5167 sec Events: 1 Total Time: 0.5167 sec Segments: 3+CR, Auto RMS

Segment	Frequency	Va	Vb	Vc	Waveform A	Waveform B	Waveform C	Duration
SS	60.000000	120.000000 V	120.000000 V	120.000000 V	1-Sine	1-Sine	1-Sine	--
1	60.000000	80.000000 %	80.000000 %	80.000000 %	1-Sine	1-Sine	1-Sine	0.000200 S
2	60.000000	80.000000 %	80.000000 %	80.000000 %	1-Sine	1-Sine	1-Sine	0.500000 S
3	60.000000	100.000000 %	100.000000 %	100.000000 %	1-Sine	1-Sine	1-Sine	0.000200 S
CR	60.000000	100.000000 %	100.000000 %	100.000000 %	1-Sine	1-Sine	1-Sine	0.016267 S

Comment: Precision time variation of power source output

Idle	Step	Total	Elapsed	Remaining
	7 of 7:	00:01:01.0333	00:01:00.5167	00:00:00.5167
	7:	00:00:00.5167	00:00:00.0000	00:00:00.5167

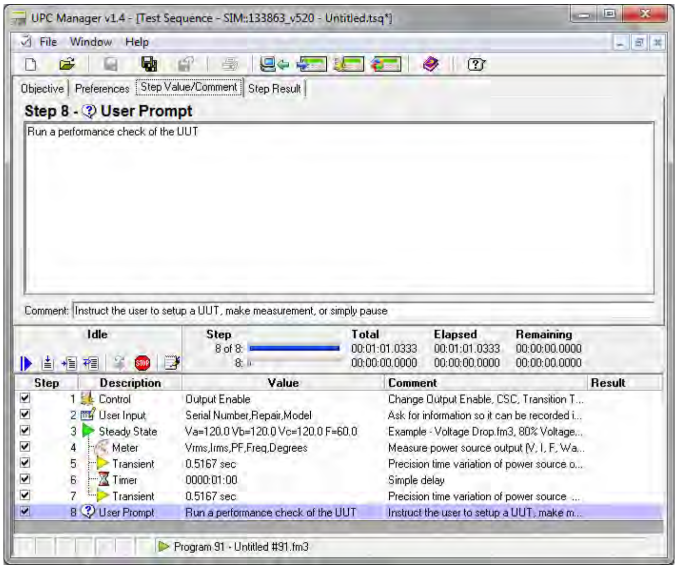
Step		Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	
☑	6	Timer	0000:01:00	Simple delay	
☑	7	Transient	0.5167 sec	Precision time variation of power source ...	

Program 91 - Untitled #91.fm3

28. Select step7 Timer step, and right-click.
29. Choose **New→ User Prompt** to add step8, a User Prompt step.
30. In the **User Prompt message** field, enter the text "Run a performance check of the UUT", and press *Enter* key.

7.3.1 Creating a Test Sequence (Cont.)

31. In the **Comment** field, enter the text "Instruct the user to setup a UUT, make measurement, or simply pause", and press *Enter* key.


UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result
STOP

Step 8 - User Prompt

Run a performance check of the UUT

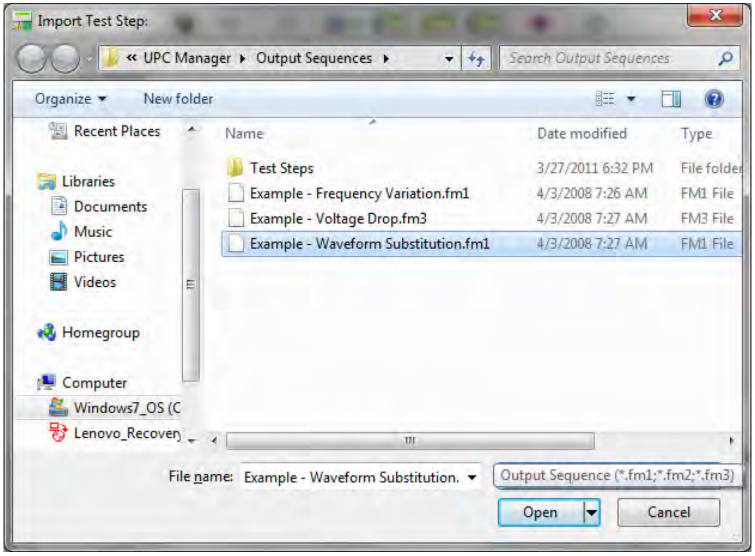
Comment: Instruct the user to setup a UUT, make measurement, or simply pause

Idle	Step		Total	Elapsed	Remaining
	8 of 8:		00:01:01.0333	00:01:01.0333	00:00:00.0000
	8:		00:00:00.0000	00:00:00.0000	00:00:00.0000

Step	Description	Value	Comment	Result
☑ 1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑ 2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑ 3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑ 4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑ 5	Transient	0.5167 sec	Precision time variation of power source o...	
☑ 6	Timer	0000:01:00	Simple delay	
☑ 7	Transient	0.5167 sec	Precision time variation of power source ...	
☑ 8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	

Program 91 - Untitled #91.fm3

32. Select step8 and right click. Select **Import** from the context menu
33. In **Import Test Step window** choose the existing output sequence *Example - Waveform Substitution.fm1* from the direction C:\Pacific Power Source\UPC Manager\Output Sequences folder as shown below, and click **Open** button to go back to **Step Value/Comment tab** in UPC Test Manager.



Name	Date modified	Type
Test Steps	3/27/2011 6:32 PM	File folder
Example - Frequency Variation.fm1	4/3/2008 7:26 AM	FM1 File
Example - Voltage Drop.fm3	4/3/2008 7:27 AM	FM3 File
Example - Waveform Substitution.fm1	4/3/2008 7:27 AM	FM1 File

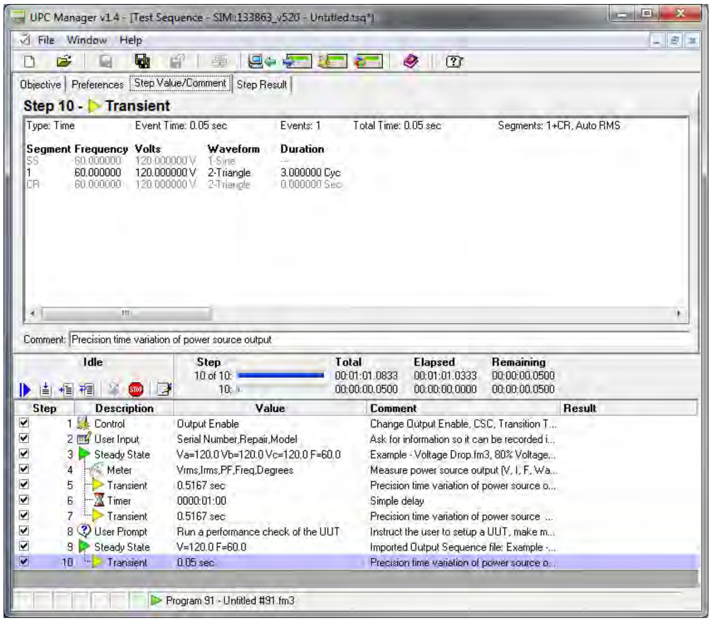
File name: Example - Waveform Substitution.

Output Sequence (*.fm1;*.fm2;*.fm3)

7.3.1 Creating a Test Sequence (Cont.)

34. Select step9; in the **Comment** field, enter the text “Imported Output Sequence file: Example - Waveform Substitution.fm1, Change the waveform for 3 Cycles”, and press *Enter* key.
35. Select step10; in the **Comment** field, enter the text “Precision time variation of power source output”, and press *Enter* key.

The window should be the same as shown below.


UPC Manager v1.4 - [Test Sequence - SIM:133863_v520 - Untitled.tsq*]
File
Window
Help
Objective
Preferences
Step Value/Comment
Step Result
Idle

Step 10 - Transient

Type: Time   Event Time: 0.05 sec   Events: 1   Total Time: 0.05 sec   Segments: 1+CR, Auto RMS

Segment	Frequency	Volts	Waveform	Duration
SS	60.000000	120.000000 V	1-Sine	---
1	60.000000	120.000000 V	2-Triangle	3.000000 Cyc
CR	60.000000	120.000000 V	2-Triangle	0.000000 Sec

Comment: Precision time variation of power source output

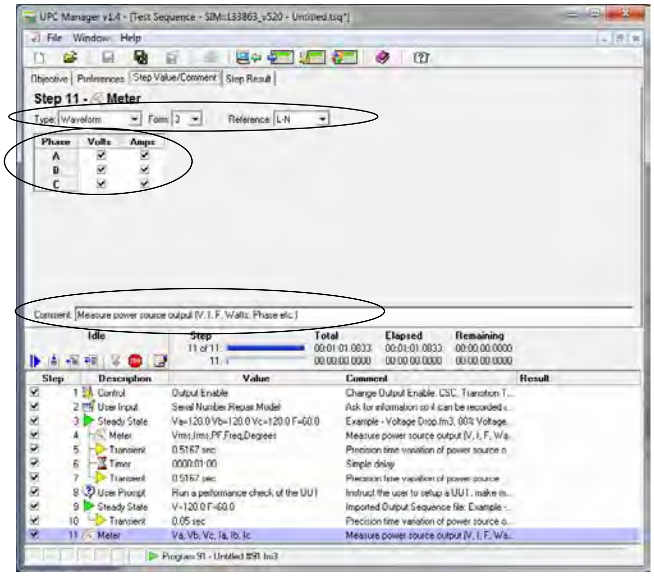
Step		Total	Elapsed	Remaining
10 of 10:		00:01:01.0833	00:01:01.0333	00:00:00.0500
10:		00:00:00.0500	00:00:00.0000	00:00:00.0500

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	
☑	6	Timer	0000:01:00	Simple delay	
☑	7	Transient	0.5167 sec	Precision time variation of power source ...	
☑	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	
☑	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example -...	
☑	10	Transient	0.05 sec	Precision time variation of power source o...	

Program 91 - Untitled #91.fm3

36. Select step10 Steady State from the table.
37. Right-click and choose **New→ Meter** to add step11 a *Meter* step

38. Set the Meter property window the same as shown below.



UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File Window Help
Objective | Preferences | Step Value/Comment | Step Result

Step 11 - Meter

Type: Waveform Form: 3 Reference: L-N

Phase	Volts	Amps
A	☑	☑
B	☑	☑
C	☑	☑

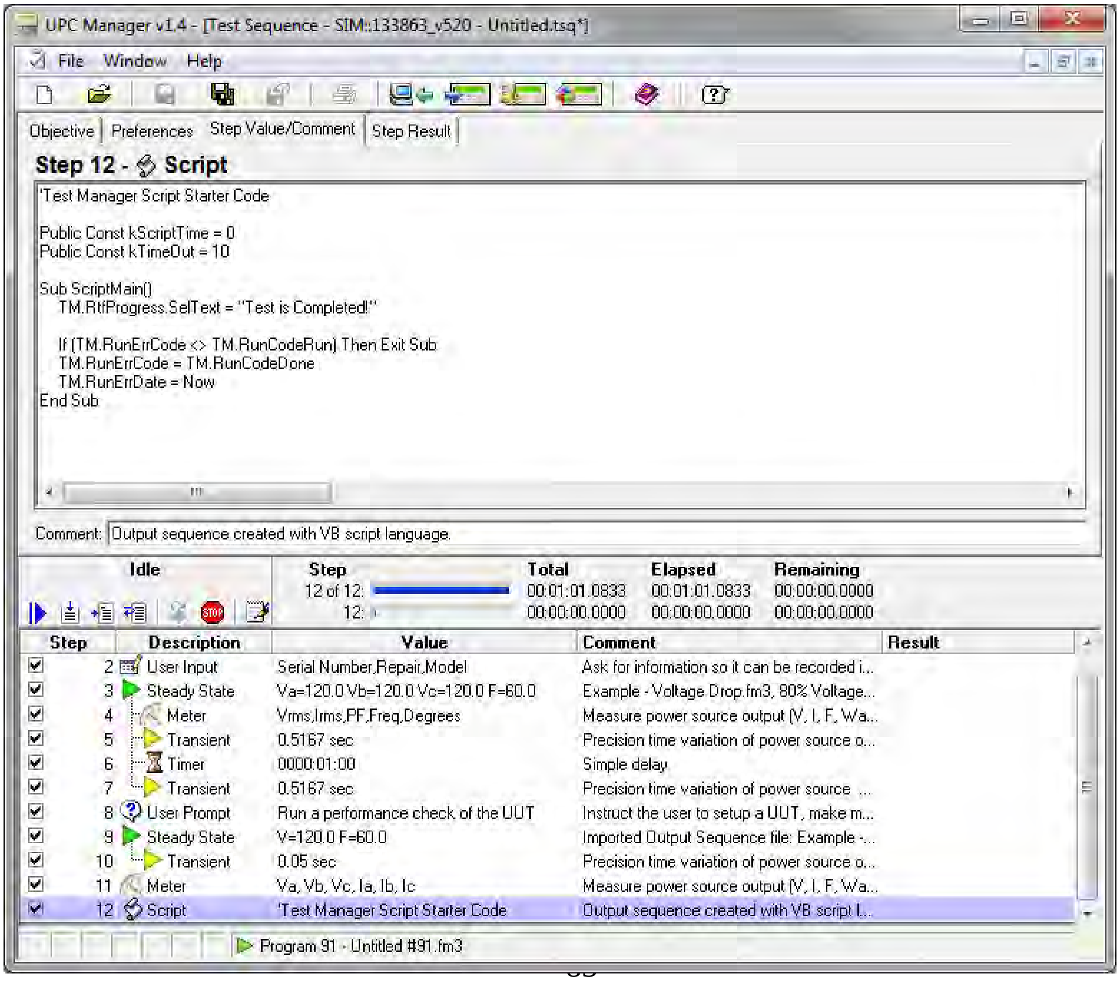
Comment: Measure power source output (V, I, F, Watts, Phase etc.)

Idle	Step		Total	Elapsed	Remaining
	11 of 11:		00:01:01.0833	00:01:01.0833	00:00:00.0000
	11:		00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	
☑	6	Timer	0000:01:00	Simple delay	
☑	7	Transient	0.5167 sec	Precision time variation of power source	
☑	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	
☑	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example -...	
☑	10	Transient	0.05 sec	Precision time variation of power source o...	
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output (V, I, F, Wa...	

7.3.1 Creating a Test Sequence (Cont.)

39. Select step11 Steady State from the table.
40. Right-click and choose **New→ Script** to add step12 a *Script* step
41. Type VB script in the script window as shown below.



UPC Manager v1.4 - [Test Sequence - SIM::133863_v520 - Untitled.tsq*]
File Window Help
Objective | Preferences | Step Value/Comment | Step Result

Step 12 - Script

```
'Test Manager Script Starter Code

Public Const kScriptTime = 0
Public Const kTimeOut = 10

Sub ScriptMain()
   TM.RtfProgress.SelText = "Test is Completed!"

   If (TM.RunErrCode <> TM.RunCodeRun) Then Exit Sub
   TM.RunErrCode = TM.RunCodeDone
   TM.RunErrDate = Now
End Sub
```

Comment: Output sequence created with VB script language.

Idle	Step		Total	Elapsed	Remaining
	12 of 12:		00:01:01.0833	00:01:01.0833	00:00:00.0000
	12:		00:00:00.0000	00:00:00.0000	00:00:00.0000

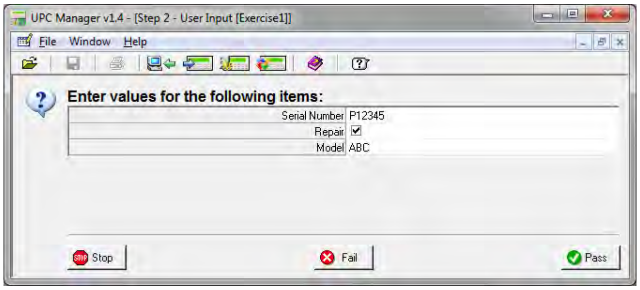
	Step	Description	Value	Comment	Result
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.fm3, 80% Voltage...	
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	
☑	6	Timer	0000:01:00	Simple delay	
☑	7	Transient	0.5167 sec	Precision time variation of power source ...	
☑	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	
☑	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example -...	
☑	10	Transient	0.05 sec	Precision time variation of power source o...	
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output (V, I, F, Wa...	
☑	12	Script	'Test Manager Script Starter Code	Output sequence created with VB script l...	

Now a test sequence which consists of 12 output sequences has been created.

42. Click **Save As** button from the file menu bar to save the new test sequence
43. Type a new name in the File name file: *Exercise3.tsq*

7.3.2 Executing a Test Sequence

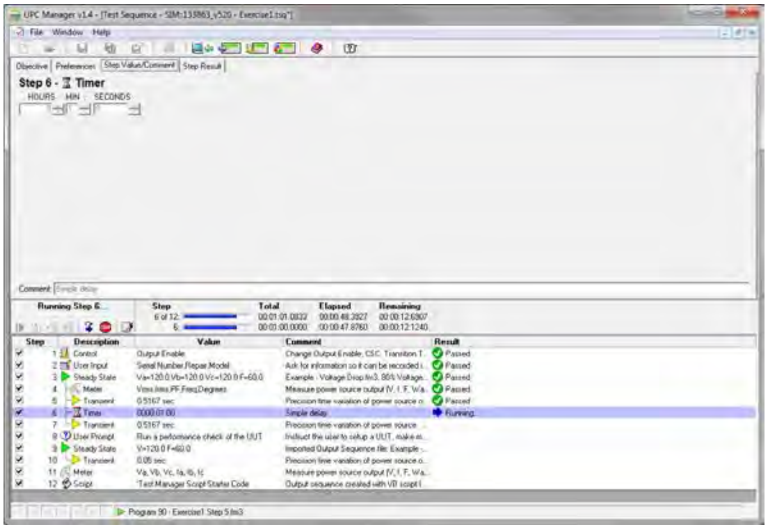
44. Select step 1, Control step from the Step table and click Start button .
45. Enter then information as shown below in the popup window and then click **Pass** button



Enter values for the following items:

Serial Number	P12345
Repair	☑
Model	ABC

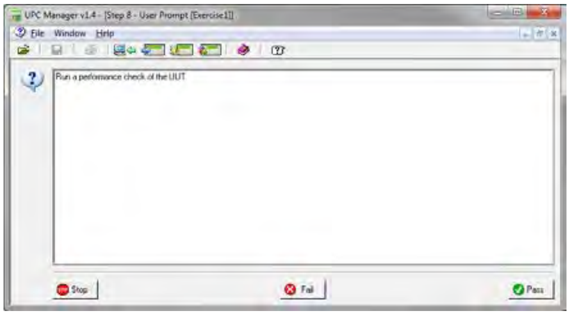
As the test sequence simulation progressing, the test result (pass/fail) for each step is recorded result column in the step table as shown below.



Step	Total	Elapsed	Remaining
6 of 12	00:01:01.0832	00:00:48.3927	00:00:12.6907
6	00:01:00.0000	00:00:47.8760	00:00:12.1240

	Step	Description	Value	Comment	Result
✓	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	Passed
✓	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	Passed
✓	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.lm3, 80% Voltage...	Passed
✓	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, W,a...	Passed
✓	5	Transient	0.5167 sec	Precision time variation of power source o...	Passed
✓	6	Timer	00:00:01:00	Simple delay	Running...
✓	7	Transient	0.5167 sec	Precision time variation of power source ...	
✓	8	User Prompt	Run a peformance check of the UUT	Instruct the user to setup a UUT, make m...	
✓	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example -...	
✓	10	Transient	0.05 sec	Precision time variation of power source o...	
✓	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output (V, I, F, W,a...	
✓	12	Script	'Test Manager Script Starter Code	Output sequence created with VB script (...	

When the step 8 User Prompt is in progress, the User Prompt window indicated below pops up.



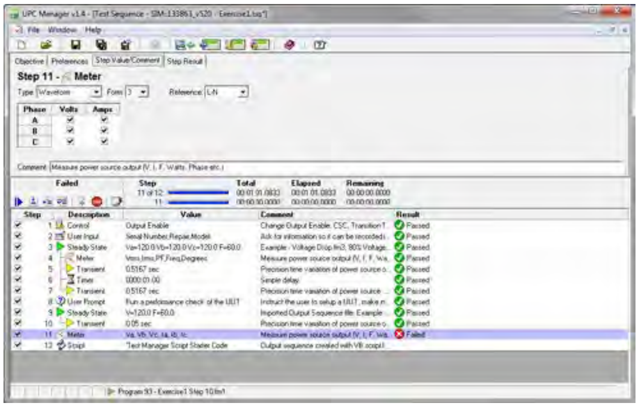
UPC Manager v1.4 - [Step 8 - User Prompt [Exercise1]]

Run a performance check of the UUT

7.3.3 Executing a Test Sequence (Cont.)

46. Click **Pass** button to continue.

    The simulation is interrupted because the step 11 Meter fails the test as indicated below.



UPC Manager v1.4 - [Test Sequence - SIM-133861_v520 - Exercise1.tsq*]

Step 11 - Meter

Type: Waveform Form: 3 Reference: L-N

Phase	Volts	Amps
A	☑	☑
B	☑	☑
C	☑	☑

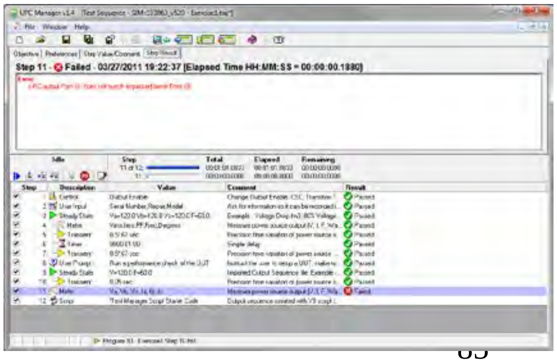
Comment: Measure power source output (V, I, F, Watts, Phase etc.)

```
     Failed          Step                 Total            Elapsed          Remaining
                     11 of 12             00:01:01.0833    00:01:01.0833    00:00:00.0000
                     11                   00:00:30.0000    00:00:00.0000    00:00:00.0000
```

Step		Description	Value	Comment	Result
☑	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	Passed
☑	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	Passed
☑	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop.lm3, 80% Voltage...	Passed
☑	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	Passed
☑	5	Transient	0.5167 sec	Precision time variation of power source o...	Passed
☑	6	Timer	0000:01.00	Simple delay	Passed
☑	7	Transient	0.5167 sec	Precision time variation of power source ...	Passed
☑	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	Passed
☑	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file. Example ...	Passed
☑	10	Transient	0.05 sec	Precision time variation of power source o...	Passed
☑	11	Meter	Va, Vb, Vc, Ia, Ib, Ic	Measure power source output (V, I, F, Wa...	Failed
☑	12	Script	'Test Manager Script Starter Code	Output sequence created with VB script ...	

Program 93 - Exercise1 Step 10.lm1

47. Select the step 11 and switch to **Step Result** tab to see error message as shown below.



UPC Manager v1.4 - [Test Sequence - SIM-133861_v520 - Exercise1.tsq*]

Step 11 - Failed - 03/27/2011 19:22:37 [Elapsed Time HH:MM:SS = 00:00:00.1880]

Error:
UPC output Form (1) does not match requested meter Form (3)

```
     Idle            Step                 Total            Elapsed          Remaining
                     11 of 12
                     11
```

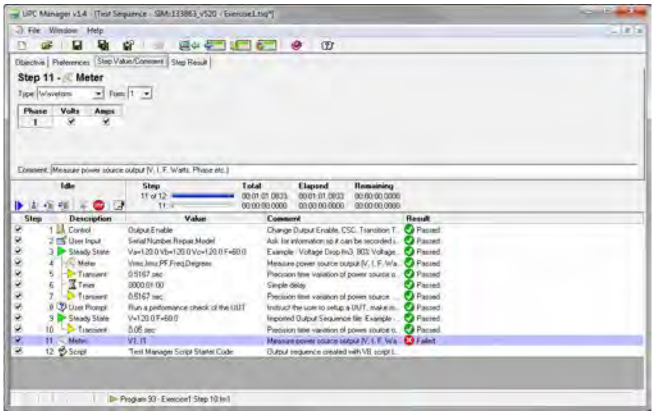
Program 93 - Exercise1 Step 10.lm1

The following error message appeared in the Step Result window.

Error:

UPC output Form (1) does not match requested meter Form (3).

48. Switch back to **Step Value/Comment** tab and change the Form settings from 3 to 1 as shown below to fix the error.


UPC Manager v1.4 - [Test Sequence - SIM=133863_v520 - Exercise1.tsq*]
File Window Help
Objective | Preferences | Step Value/Comment | Step Result

Step 11 - Meter

Type: Waveform Form: 1

Phase	Volts	Amps
1	✓	✓

Comment: Measure power source output (V, I, F, Watts, Phase etc.)

Idle	Step		Total	Elapsed	Remaining
	11 of 12		00:01:01.0833	00:01:01.0833	00:00:00.0000
	11		00:00:00.0000	00:00:00.0000	00:00:00.0000

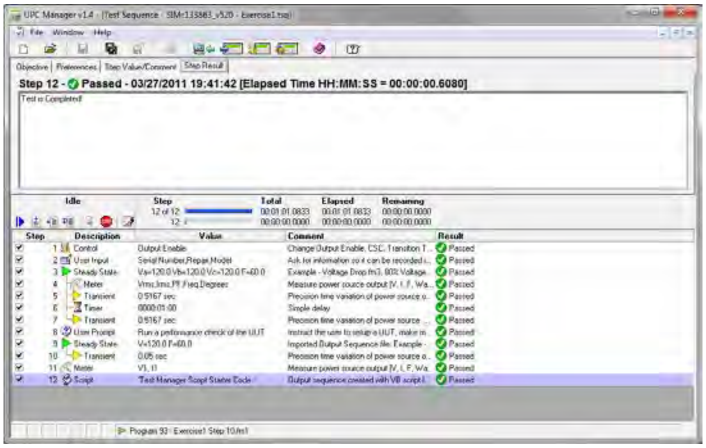
	Step	Description	Value	Comment	Result
✓	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	Passed
✓	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	Passed
✓	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop fm3, 80% Voltage...	Passed
✓	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	Passed
✓	5	Transient	0.5167 sec	Precision time variation of power source o...	Passed
✓	6	Timer	0000:01:00	Simple delay	Passed
✓	7	Transient	0.5167 sec	Precision time variation of power source ...	Passed
✓	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	Passed
✓	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example ...	Passed
✓	10	Transient	0.05 sec	Precision time variation of power source o...	Passed
✓	11	Meter	V1, I1	Measure power source output (V, I, F, Wa...	Failed
✓	12	Script	'Test Manager Script Starter Code	Output sequence created with VB script I...	

Program 93 - Exercise1 Step 10.fm1

7.3.3 Executing a Test Sequence (Cont.)

49. Click **Save** button from the menu bar to save the change
50. Select step 11 from the step table and click Continue button to continue the simulation.
51. Click the Step Result tab after the test sequence simulation is finished.

The "Test is Completed!" appears in the Result text field as illustrated below.


UPC Manager v1.4 - [Test Sequence - SIM=133863_v520 - Exercise1.tsq]
File Window Help
Objective | Preferences | Step Value/Comment | Step Result

Step 12 - Passed - 03/27/2011 19:41:42 [Elapsed Time HH:MM:SS = 00:00:00.6080]

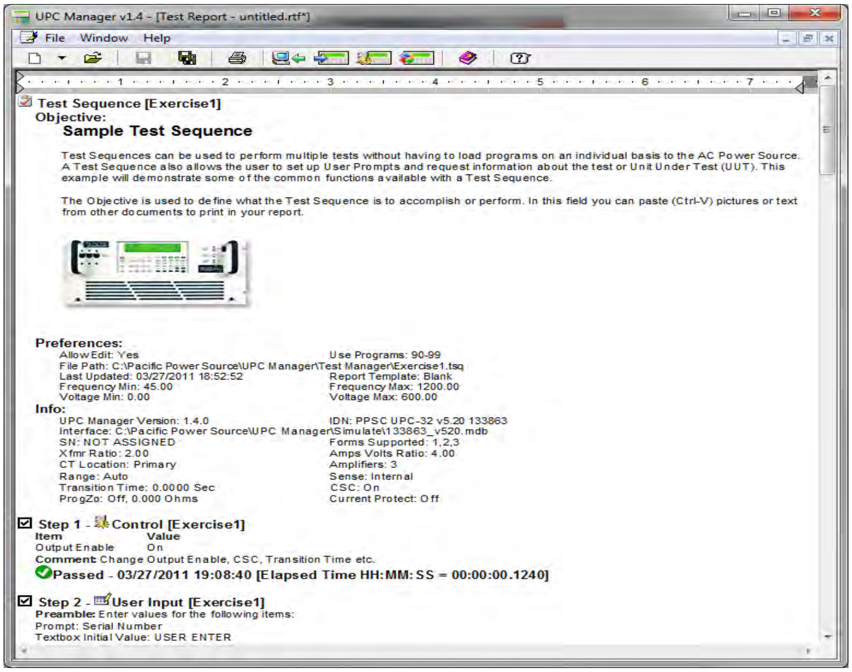
Test is Completed!

Idle	Step		Total	Elapsed	Remaining
	12 of 12		00:01:01.0833	00:01:01.0833	00:00:00.0000
	12		00:00:00.0000	00:00:00.0000	00:00:00.0000

	Step	Description	Value	Comment	Result
✓	1	Control	Output Enable	Change Output Enable, CSC, Transition T...	Passed
✓	2	User Input	Serial Number,Repair,Model	Ask for information so it can be recorded i...	Passed
✓	3	Steady State	Va=120.0 Vb=120.0 Vc=120.0 F=60.0	Example - Voltage Drop fm3, 80% Voltage...	Passed
✓	4	Meter	Vrms,Irms,PF,Freq,Degrees	Measure power source output (V, I, F, Wa...	Passed
✓	5	Transient	0.5167 sec	Precision time variation of power source o...	Passed
✓	6	Timer	0000:01:00	Simple delay	Passed
✓	7	Transient	0.5167 sec	Precision time variation of power source ...	Passed
✓	8	User Prompt	Run a performance check of the UUT	Instruct the user to setup a UUT, make m...	Passed
✓	9	Steady State	V=120.0 F=60.0	Imported Output Sequence file: Example -	Passed
✓	10	Transient	0.05 sec	Precision time variation of power source o...	Passed
✓	11	Meter	V1, I1	Measure power source output (V, I, F, Wa	Passed
✓	12	Script	'Test Manager Script Starter Code	Output sequence created with VB script I...	Passed

Program 93 - Exercise1 Step 10.fm1

52. Click **Show Report** button from the Run Toolbar to open the test report window as shown below.



UPC Manager v1.4 - [Test Report - untitled.rtf*]

Test Sequence [Exercise1]
Objective:
Sample Test Sequence

Test Sequences can be used to perform multiple tests without having to load programs on an individual basis to the AC Power Source. A Test Sequence also allows the user to set up User Prompts and request information about the test or Unit Under Test (UUT). This example will demonstrate some of the common functions available with a Test Sequence.

The Objective is used to define what the Test Sequence is to accomplish or perform. In this field you can paste (Ctrl-V) pictures or text from other documents to print in your report.

Preferences:
Allow Edit: Yes — Use Programs: 90-99
File Path: C:\Pacific Power Source\UPC Manager\Test Manager\Exercise1.tsq
Last Updated: 03/27/2011 18:52:52 — Report Template: Blank
Frequency Min: 45.00 — Frequency Max: 1200.00
Voltage Min: 0.00 — Voltage Max: 600.00

Info:
UPC Manager Version: 1.4.0 — IDN: PPSC UPC-32 v5.20 133863
Interface: C:\Pacific Power Source\UPC Manager\Simulate\133863_v520.mdb
SN: NOT ASSIGNED — Forms Supported: 1,2,3
Xfmr Ratio: 2.00 — Amps Volts Ratio: 4.00
CT Location: Primary — Amplifiers: 3
Range: Auto — Sense: Internal
Transition Time: 0.0000 Sec — CSC: On
ProgZo: Off, 0.000 Ohms — Current Protect: Off

☑ Step 1 - Control [Exercise1]

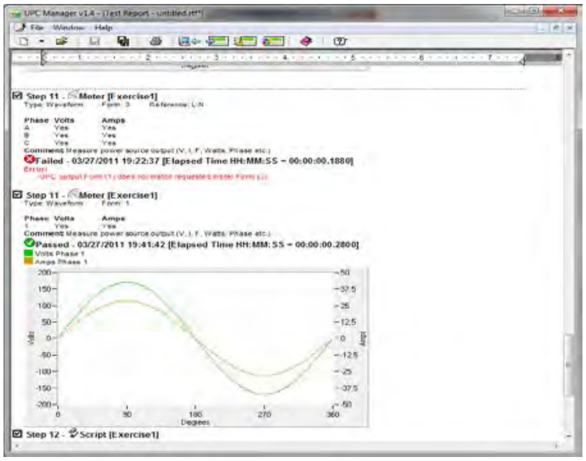
Item	Value
Output Enable	On

Comment: Change Output Enable, CSC, Transition Time etc.
✓Passed - 03/27/2011 19:08:40 [Elapsed Time HH:MM:SS = 00:00:00.1240]

☑ Step 2 - User Input [Exercise1]
Preamble: Enter values for the following items:
Prompt: Serial Number
Textbox Initial Value: USER ENTER

7.3.4 Executing a Test Sequence (Cont.)

Each test step and its test result including time, pass/fail, values and error message are recorded in details as shown below.



UPC Manager v1.4 - [Test Report - untitled.rtf*]

☑ Step 11 - Meter [Exercise1]
Type: Waveform — Form: 3 — Reference: L-N

Phase	Volts	Amps
A	Yes	Yes
B	Yes	Yes
C	Yes	Yes

Comment: Measure power source output (V, I, F, Watts, Phase etc.)
✗Failed - 03/27/2011 19:22:37 [Elapsed Time HH:MM:SS = 00:00:00.1880]
Error:
-UPC output Form (1) does not match requested meter Form (3)

☑ Step 11 - Meter [Exercise1]
Type: Waveform — Form: 1

Phase	Volts	Amps
1	Yes	Yes

Comment: Measure power source output (V, I, F, Watts, Phase etc.)
✓Passed - 03/27/2011 19:41:42 [Elapsed Time HH:MM:SS = 00:00:00.2800]

☑ Step 12 - Script [Exercise1]

53. Click **Save As** button in the test report window and save the report file as *Exercise3_TR.rft*

    By default the test report is saved in the following directory
    C:\Pacific Power Source\UPC Manager\Test Reports\Templates
    The directory can be change based on Users' preference.

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