

Streamlining Automation: Associated Power Technologies' Graphic User Interface

Introduction

Incorporating an automated AC power source into a production line or laboratory can be challenging for any user. How can the power source be integrated into the existing infrastructure? How can the user remotely communicate with the source? How can the user pull data from the power source to analyze trends?

Associated Power Technologies has answered these questions by releasing a free graphic user interface (GUI). The APT GUI is designed to communicate directly with the APT 6000, 7000, 300XAC and 400XAC series power sources. With this GUI, the user can communicate directly with the APT power source via RS-232, USB, GPIB or Ethernet interfaces. This intuitive interface streamlines setup by allowing the user to set system settings, test parameters and extract test data from the power source in real time. This paper will explain the APT GUI's functions and capabilities as well as outline the advantages of remotely controlling an APT source.

Control Panel

The Control Panel tab is the portal by which the user interacts with the APT source. The Control Panel consists of 5 sections:

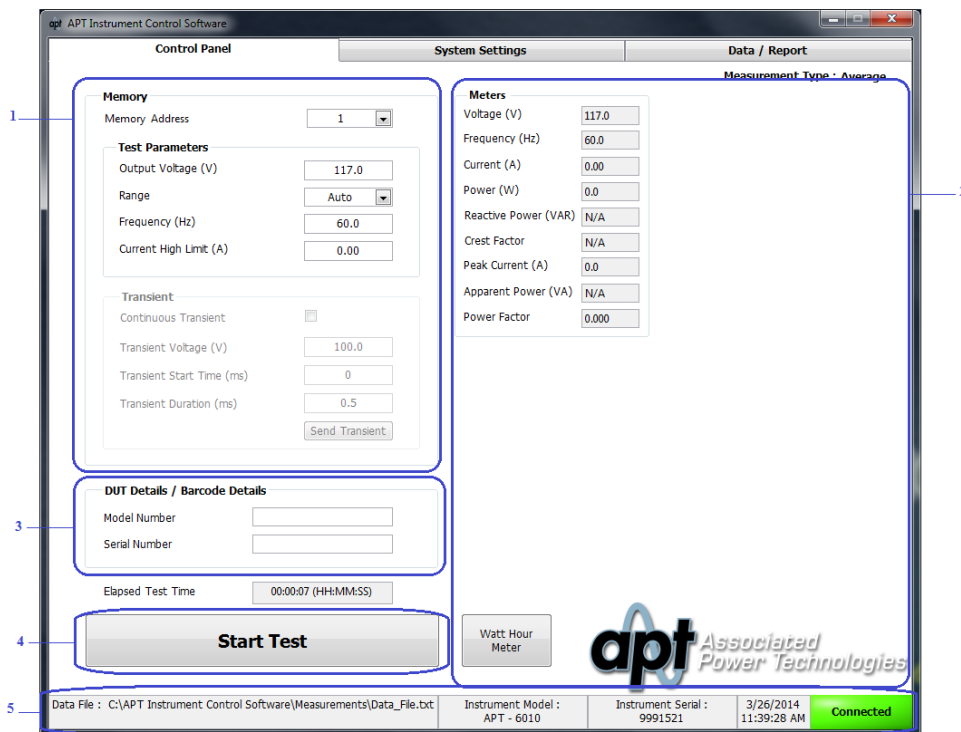


Figure 1: Control Panel Tab

| Reference # | Section | Description |
|-------------|-------------------------|--|
| 1 | Memory Information | The four main parameters in each memory of the APT source: output voltage, voltage range (auto/high range), frequency and current high limit. User can also edit voltage transients on the output to mimic brown out and black out conditions (NOTE : the Transient parameter must first be enabled in the System Settings). |
| 2 | Meters | Parameters monitored real time by the source during testing |
| 3 | DUT and Barcode Details | Model and serial number of the device under test (DUT). Allows user to enter/scan barcode information |
| 4 | Start/Stop Button | Start/Reset the output on the APT source |
| 5 | Status Bar | Real time information on the APT unit, data path, model number, serial number, time stamp and connectivity status |

Table 1: Control Panel References

Once the power source output is active, the APT GUI queries the source for real time metrics. These values are displayed in the “Meters” section of the Control Panel (reference #2 above). The “Meters” section allows the user to view all parameter values:

| Parameter** | Units | Description |
|----------------|-----------------|--------------------|
| Voltage | V | Output voltage |
| Frequency | Hz | Output frequency |
| Current | A | DUT current draw |
| Power | W | DUT real power |
| Reactive Power | VA _r | DUT reactive power |
| Crest Factor | N/A | DUT crest factor |
| Peak Current | A | DUT peak current |
| Apparent Power | VA | DUT total power |
| Power Factor | N/A | DUT power factor |

Table 2: Real-time Meters

** The APT 300XAC and 400XAC series have the capability to monitor parameters for each phase A, B, C as well as total values.

The APT GUI also includes a Watt Hour meter (activated from by pressing the applicable button in the Control Panel tab) to help further define DUT characteristics:

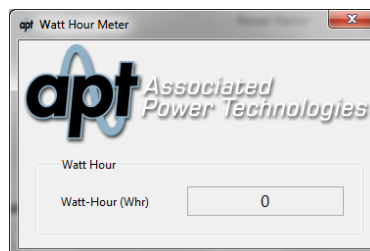


Figure 2: Watt Hour Meter

With the DUT/barcoding detail, the user can barcode scan or enter DUT model and serial numbers. These numbers are then recorded by the APT GUI. This allows users to track a DUT’s model and serial number with the corresponding data (see “Data Recording” section for details):

| | A | B | C | D | E | F | G | H | I | J |
|---|-----------------|-------------|--------------|---------------|-------------|--------------|--------------------------|-----------|-------------------|----------------------|
| 1 | Date Time Stamp | Result | Line Model # | Line Serial # | DUT Model # | DUT Serial # | Measurement Interval (s) | Test Type | Total Voltage (V) | Total Frequency (Hz) |
| 2 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117.2 | 60 |
| 3 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117.1 | 60 |
| 4 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117.1 | 60 |
| 5 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117 | 60 |
| 6 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117 | 60 |
| 7 | 3/25/2014 12:16 | In Progress | 6010 | 9991521 | T522-25 | NP353253215 | 1 | AC | 117 | 60 |

Figure 3: Example Data Report

System Settings

The System Settings are the global settings on the APT power source. From this tab, the user can edit all system parameters:



Figure 4: System Settings Tab

| Parameter | Range | Description |
|------------------------|--|---|
| Contrast | 1-9 | LCD contrast |
| Alarm Volume | 0-9 (0 = OFF) | Test failure alarm volume |
| Voltage High Limit | 5.0-300.0V | Limits max voltage user can program in Control Panel |
| Voltage Low Limit | 5.0-300.0V | Limits min voltage user can program in Control Panel |
| Frequency High Limit | 40.0-500.0Hz | Limits max frequency user can program in Control Panel |
| Frequency Low Limit | 40.0-500.0Hz | Limits min frequency user can program in Control Panel |
| Start Angle | 0-359° | Output waveform starting angle |
| End Angle | 0-359° | Output waveform ending angle |
| Results Displayed | Last/Pass-Fail/All | The displayed results at the end of a test |
| Transient | ON/OFF | Enables/disables transient parameters in Control Panel |
| Over Current Fold Back | ON/OFF | Enables/disables current fold back mode |
| Lock | ON/OFF | Locks out instrument front panel keys |
| Memory Lock | ON/OFF | Locks out access to other memory locations |
| Operation Mode | AC/DC/1 ϕ 2W/1 ϕ 3W, 3 ϕ 4W | Sets output mode (NOTE: multi-phase modes only available on 300XAC and 400XAC series) |

Table 3: AC Power Source System Settings

The APT GUI also includes system setting recall and save functions. These functions are helpful when programming multiple APT instruments of the same model number. The user can set system parameters on one source, save these settings and recall them when using other power sources. This enables the user to “copy/paste” system settings to multiple APT power sources, eliminating tedious manual programming and reducing the potential for human error. The power source can be set to factory defaults by hitting the “Restore Defaults” button.

If the power source loses communication during operation, the APT GUI will warn the user. The “Scan Instrument” button can be used for connection troubleshooting. By hitting this button, the GUI will automatically scan all available communication ports to find an APT power source:

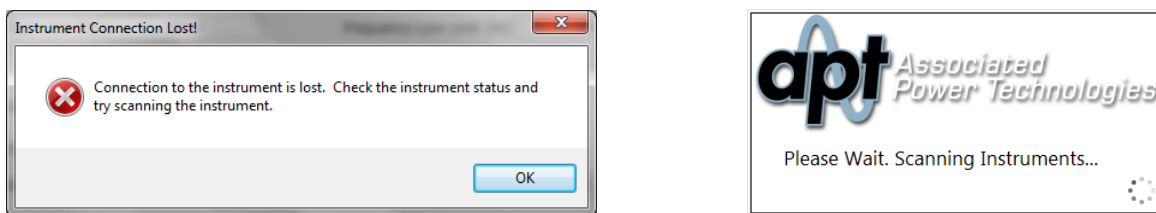


Figure 5: Instrument Connection Status and Scanning Instruments Pop Ups

The capability to remotely set all test and system parameters makes the APT GUI a versatile tool for remotely controlling an APT power source. However, one of the most advantageous aspects of the GUI is the ability to save and track testing data.

Data Recording

The APT GUI allows the user to record and track test data in standard .TXT file format.

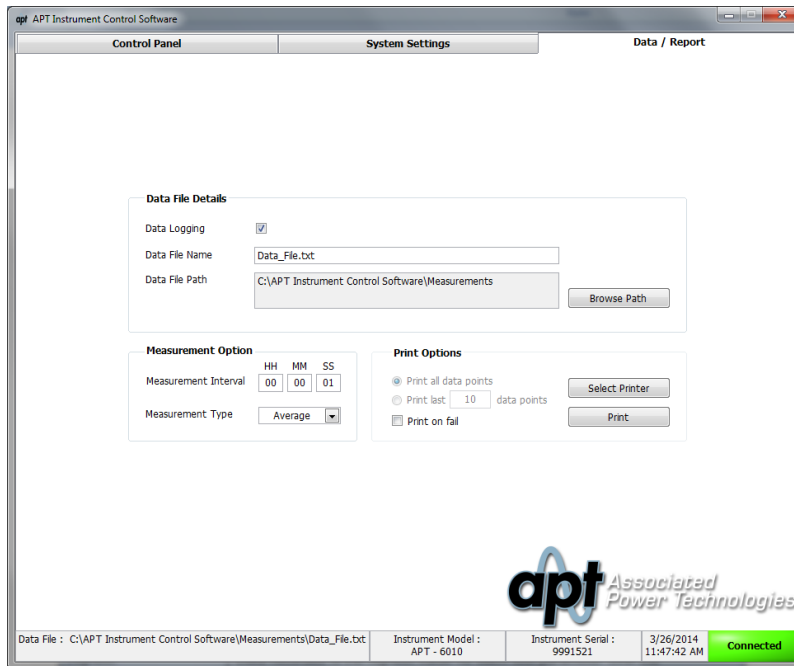
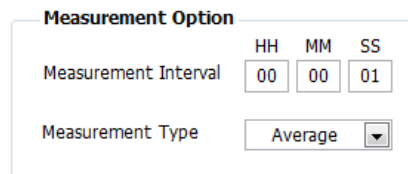


Figure 6: Data/Report Tab

The data file can be saved directly to an individual PC or to a network location. One of the most versatile tools in the Data/Report tab is the “Measurement Option” feature:



The two parameters in this field are the measurement interval and measurement type. The measurement interval dictates how often a set of data will be recorded by the APT GUI. The measurement type determines what set of data will be recorded. There are four different measurement types:

| Measurement Type | Description |
|------------------|--|
| Average | Data recorded is the calculated average value for each test parameter over the measurement interval period |
| Highest | Data recorded is the highest value for each test parameter over the measurement interval period |
| Last | Data recorded is the reading taken from the last 100msec sample in the measurement interval period |
| Interval | Data recorded at each measurement interval. This mode allows for printing of the last X data points (where X is the number of data points specified by the user) |

Table 4: Measurement Types

For example, if the user sets the measurement interval to 10 seconds and the measurement type to “Highest”, the APT GUI will record the highest values during the test every 10 seconds.

Additionally, the GUI offers printing capabilities.

Print Options

Print all data points

Print last data points

Print on fail

Select Printer

Print

Once a printer is selected, the user can choose to print on failures only, print all data points or print only a certain number of data points (“Interval” must be selected as the measurement type to print last X number of data points). Data recording and printing allows for customization of test data. As a result, users don’t have to write a program to query the instrument for specific test data.

Conclusion

The APT GUI provides a simple method to remotely communicate with an APT power source. The GUI’s capabilities range from troubleshooting bus connections to collecting data for research and analysis. Users with multiple APT power sources can save both system settings and test parameters to all APT instruments. The DUT model and serial number can be barcode scanned, saved and associated with test data. The APT GUI’s offers a level of flexibility to streamline the setup and installation process.

The APT GUI is free software that can be downloaded directly from the APT website:

<http://www.aspowertechnologies.com/products/software/default.aspx>

For more information on the APT GUI or APT power sources, visit the website:

<http://www.aspowertechnologies.com/Default.aspx>

1142 S. Diamond Bar Blvd # 106, Diamond Bar, CA 91765 | Toll Free: +1-877-322-7693 | Phone: +1-909-860-1646
Fax: +1-909-992-3307 | Email: info@aspowertechnologies.com | Web: www.aspowertechnologies.com