

Powerlyzer

Power Quality Monitor

**Companion Software
Users Guide**

June 27, 2007

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Table of Contents

Chapter 1	Powerlyzer Overview	5
Chapter 2	Installing the Powerlyzer Companion Software	6
Chapter 3	Powerlyzer Connections	13
Chapter 4	Configuring the Powerlyzer Companion S/W.....	16
Chapter 5	Examining the PCS Windows and Menus	22
Chapter 6	Harmonics Window & Data.....	42
Chapter 7	Historical Window (Powerchart) & Data.....	45
Chapter 8	Download Files Management	60
Chapter 9	Using the Terminal TL Program.....	65
Chapter 10	Powerlyzer Calibration.....	70
Chapter 11	Practical Exercises	74
	Practical Exercise 1 – Configuring For Field Recording	74
	Practical Exercise 2 – Initiating Recording in the Field.....	77
	Practical Exercise 3 – Terminating Field Recording	79
	Practical Exercise 4 – Download & Analyze Data	80
	About Valquest Systems, Inc.	86



Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

Before Applying Power

Verify that the product shows no signs of physical damage that may impair proper operation.

Verify that the Cables & Accessories (Voltage probes/Current Transformers) to be used are in good working condition and that they do not impose any safety hazard such as exposure to electrical shock.

Warnings



When OPERATING or CONNECTING the Powerlyzer to a VOLTAGE/CURRENT Source:

- Always Wear Protective Goggles or Safety Glasses
- Always wear Industrial Grade Electrically Insulated Gloves
- NEVER CONNECT the Powerlyzer to Service with a Maximum Nominal Voltage of 480 Volts Phase-to-Phase
- NEVER CONNECT any Current Clamps/Probes/other accessories to the Current Inputs that will produce more than 1000 milliAmps RMS (1 Amp RMS Max)
- NEVER CONNECT Voltmeter Probes or Test Leads to the Powerlyzer Current Inputs
- NEVER CONNECT the Neutral (White) voltage lead to an UNGROUNDED Phase unless the service is an UNGROUNDED 3-WIRE DELTA



Chapter 1 Powerlyzer Overview

The Powerlyzer is a Recording Test Meter based upon the architecture of the Motorola 68HCxx micro-controller. It is used to measure and compute various AC signal characteristics and/or derivative AC signal components. Signal characteristics such as Voltage Blink, Voltage/Current Level, Power Usage, Harmonic Analysis are just a few of the measurements within its capabilities. The Powerlyzer is a small, rugged and lightweight instrument; making transportability easy for use in temporary installations where short term or periodic monitoring is necessary. The primary intended use for the Powerlyzer is within the residential and industrial voltage range of 120 VAC to 480 VAC. Front Panel operational controls and accessible connector interfaces make the Powerlyzer simple to setup and operate.

The Powerlyzer is compatible with a wide selection of Voltage and Current Clamps allowing it to function in a diverse set of operating environments. These capabilities along with its feature rich and friendly operating environment make the Powerlyzer a versatile and economical instrument used to measure, record and analyze various power systems and their associated characteristics.

With an optional personal computer or laptop having a Microsoft™ Windows 2000, XP, or later based operating system and the Powerlyzer companion software, users can exchange data between the computer and the Powerlyzers internal memory for configuration, setup or data recording and analysis. The companion software is written using Microsoft Visual Basic™ and features the same look and feel of other windows based visual menu driven environments. The companion software also provides the user with the ability to visually examine the signal characteristics using tables, charts and graphs presenting the information needed to understand and make recommendations for corrective action and improved system performance.

Powerlyzer Variants



The Powerlyzer is supplied to clients in 2 unique configurations based upon the type of Current Transformer (CT) input. One configuration supports CT's which provide a current output (mA/A), the other supports CT's which provide a voltage output (mV/A). To Verify the particular input type, refer to the unit labels and/or refer to the Version number within the Powerlyzer.

CT Current Output Mode – Version 3.3.2

CT Voltage Output Mode – Version 3.3.1 or 3.3.3



Chapter 2 Installing the Powerlyzer Companion Software

Installing the Powerlyzer Companion Software

The Powerlyzer Companion Software (PCS) application offers users a windows-based graphical environment in which to communicate with the Powerlyzer. Additionally, an array of tools from Tables, Charts and Graphs are incorporated in which to analyze and evaluate the measurements and recorded data. The setup program installs the Powerlyzer Companion Software (PCS) on PC's running Microsoft Windows 2000™, and Microsoft Windows XP™.

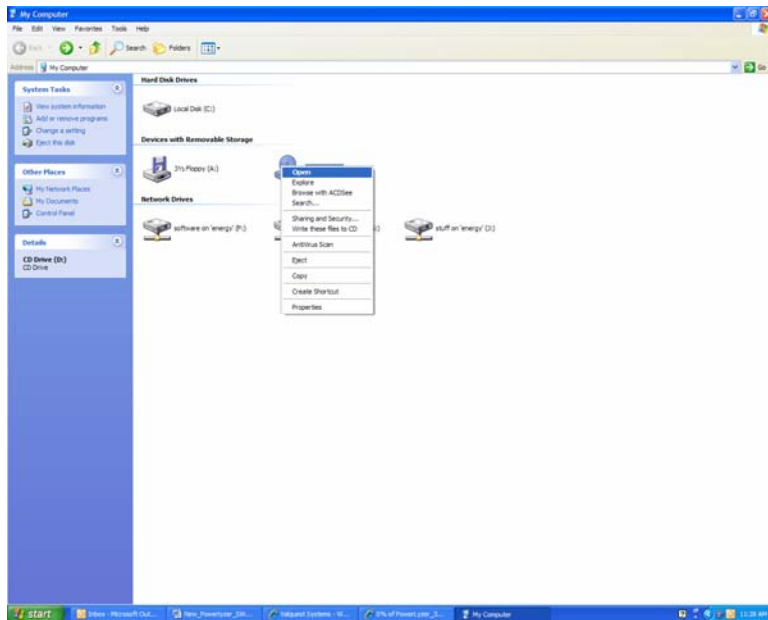
The PCS application is available on cd-rom or at the company website (www.valquest.net) making it easy to get the latest software release.

Installing from the CD

If you received the PCS application on a cd-rom, place the application cd into an available drive on your system. If Auto run is enabled, the software application will automatically begin and you may proceed to the section “*Powerlyzer Software Setup*”.

If the cd does not Auto run, then perform the following:

Open you're “**My Computer**” window and within the area labeled “**Devices with Removable Storage**” or similar, locate the cd-rom drive that you used when inserting your application cd into your system. **Right click** on this drive and select **Open**.



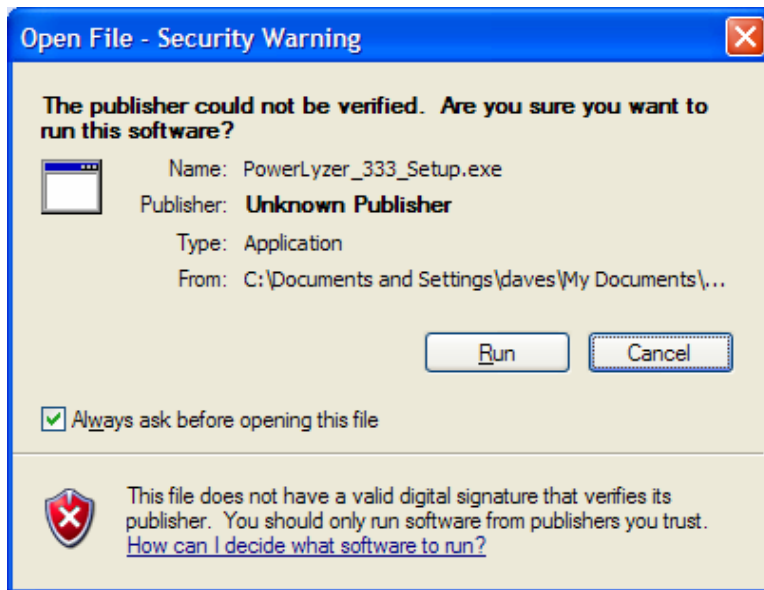


When the folder opens, select the application (Powerlyzer_xxx_Setup.exe, where xxx is the current version number) by **double clicking** to begin program execution.



PowerLyzer_333_Setup.exe

Based upon your current windows setting you may see the following window; if so, click the **Run** button to proceed with the installation.



To continue with program installation, skip to the section labeled *Powerlyzer Software Setup*.



Installing from the Website

Using your browser enter: www.valquest.net

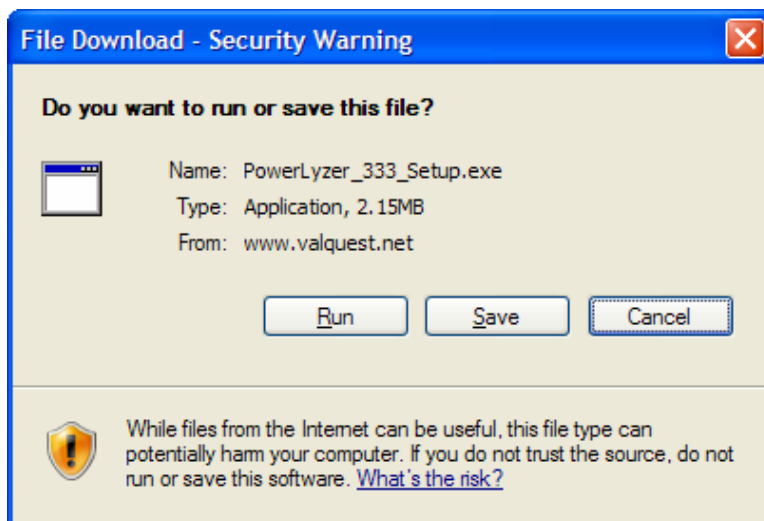
Scroll down the page to locate the Powerlyzer as shown below:

[PowerLyzer](#)

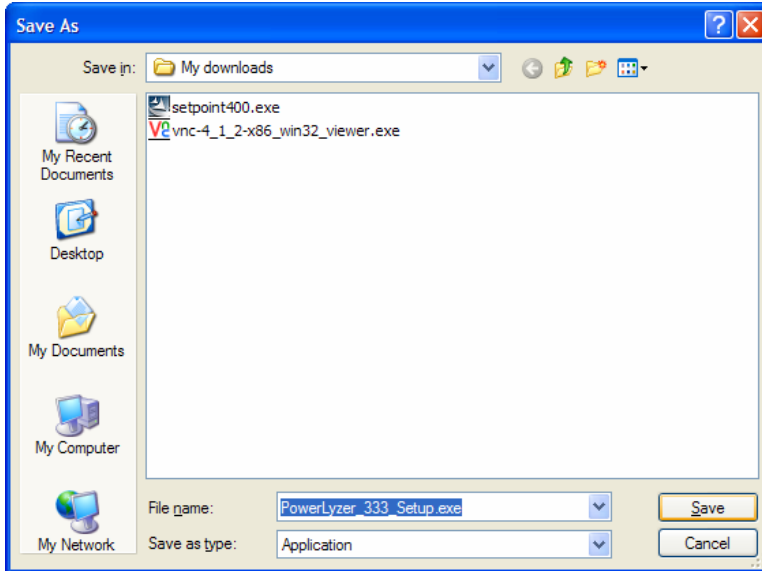
[Latest Software 3.33](#)



Click on the “Latest Software x.xx” where x.xx is the current version number and the following window or similar will appear:

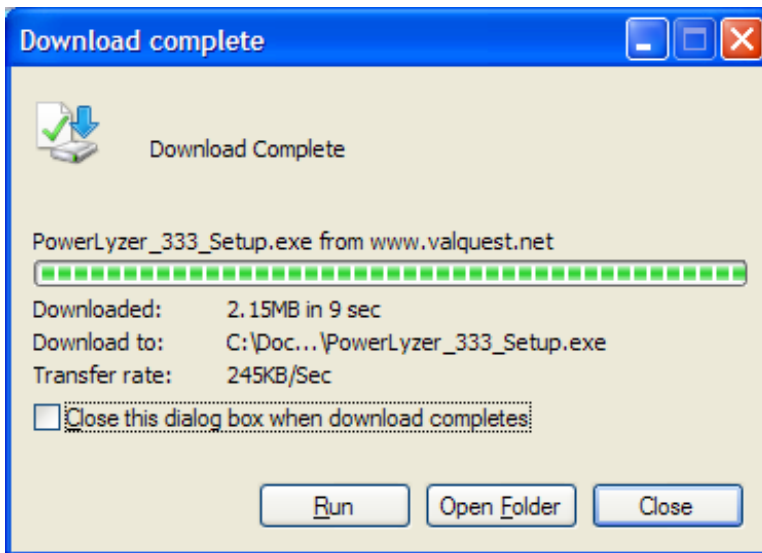


Click **save** option and the following window or similar will appear:

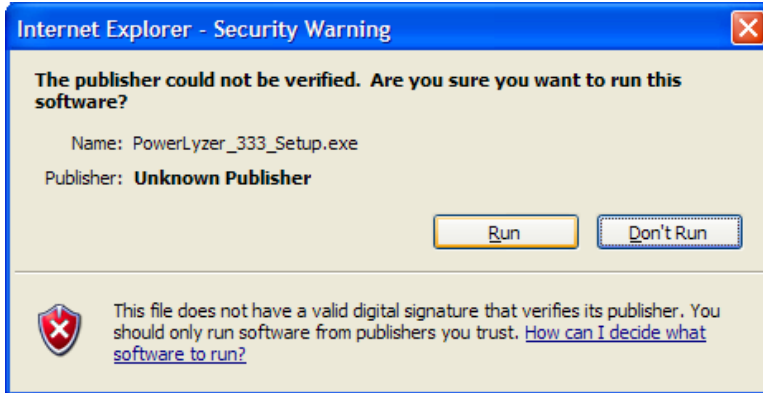


You may accept the defaults or specify your own location and filename; however for the purposes of this manual, the default values will be used.

Click the **Save** button to save the application using the default directory and application name. After clicking the Save button, the download status window will appear and at the completion of the download process, the following window will appear:



Click the **Run** button to run the setup application, the following window will appear:

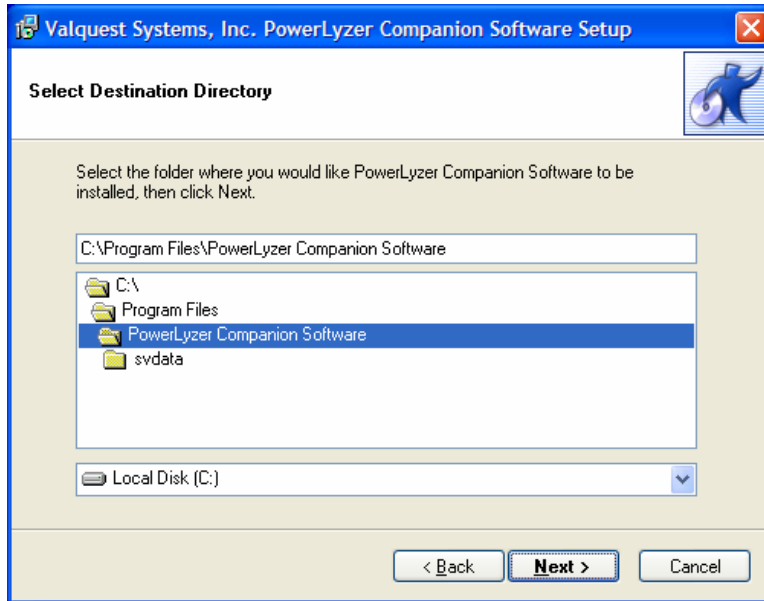


Click the **Run** button to run the setup application, precede to the Powerlyzer Software Setup section below for the remaining installation instructions.

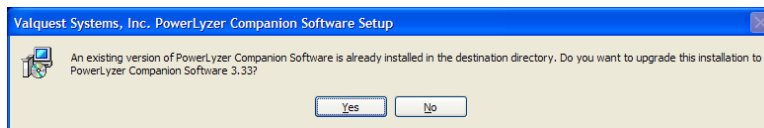
Powerlyzer Software Setup



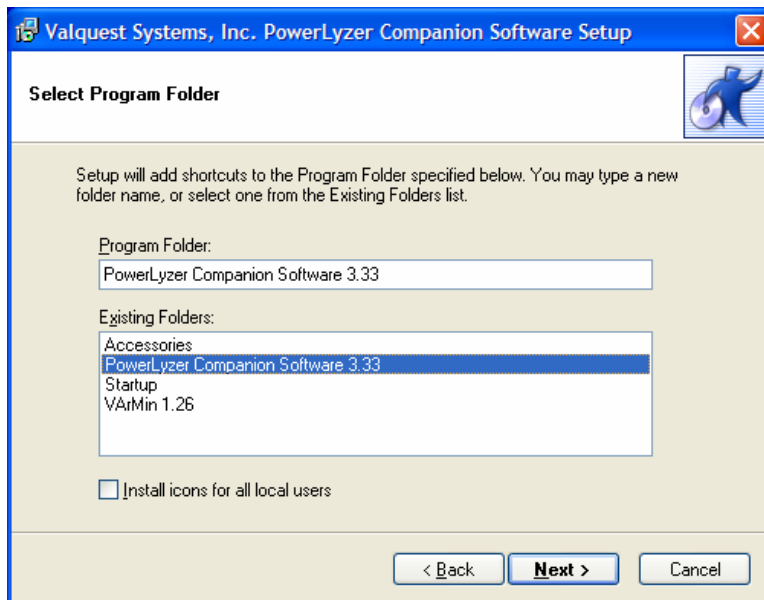
Click the **Next** button to run the setup application, the following window or similar will appear:



Click the **Next** button to continue, the installation software will check for a previous installation in the current directory and if a previous installation exists the following window will appear:

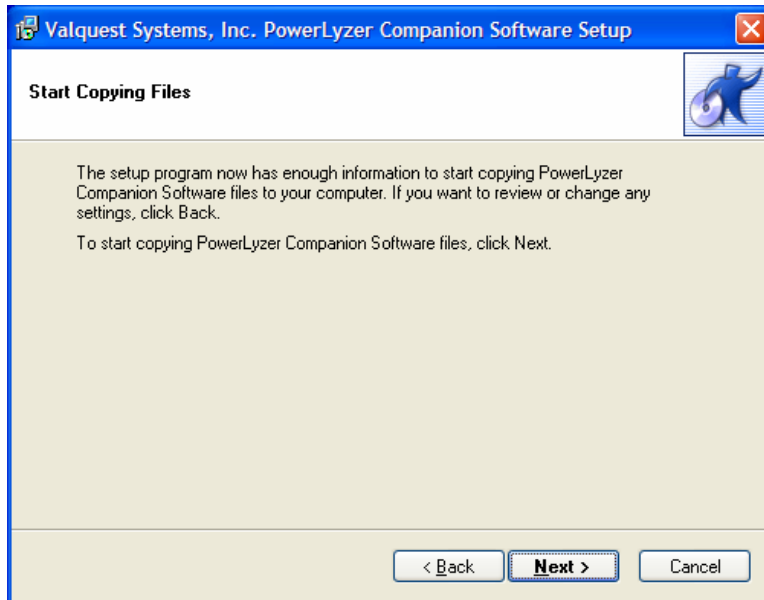


If you select **No** this window will close. Selecting **Yes** will be allowed prompted with the following or very similar:

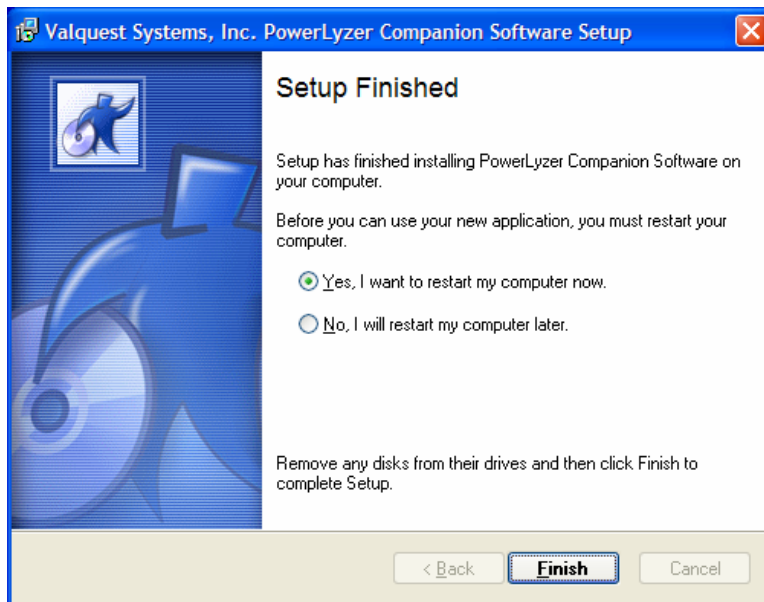




This setup window will determine the application folder and executable placement. Accept the defaults or change the Program Folder and Existing folders based upon your specific requirements and press **Next** to continue. The following window will appear:



File setup, extraction and installation will now begin. A progress window will be displayed and when completed, the following window will be displayed:



Press **Finish** to complete the setup application and the computer will reboot completing the installation process.



Chapter 3 Powerlyzer Connections

The Powerlyzer software communicates between your PC/Laptop and your Powerlyzer using either of 2 methods; traditional RS-232 Serial Cable connections or a USB to RS-232 cable adapter.

Traditional RS-232 (Serial Port) Setup

This connection method is the traditional RS-232 Serial Port adapter/cable connected between the Powerlyzer front panel connector and an available COM port of the PC. This is generally a Male DB9 connector labeled as Com1 or Com2. The serial cable needs to be a 9 Pin Male to 9 Pin Female connector cable style. Connect the Female end to the selected COM port on the pc/laptop. Connect the Male end to the front of the Powerlyzer.

NOTE
 To:
 Operator
 From:
 Valquest

The **required serial cable** is a *straight thru conductor* or *pin-to-pin connection* style serial cable.

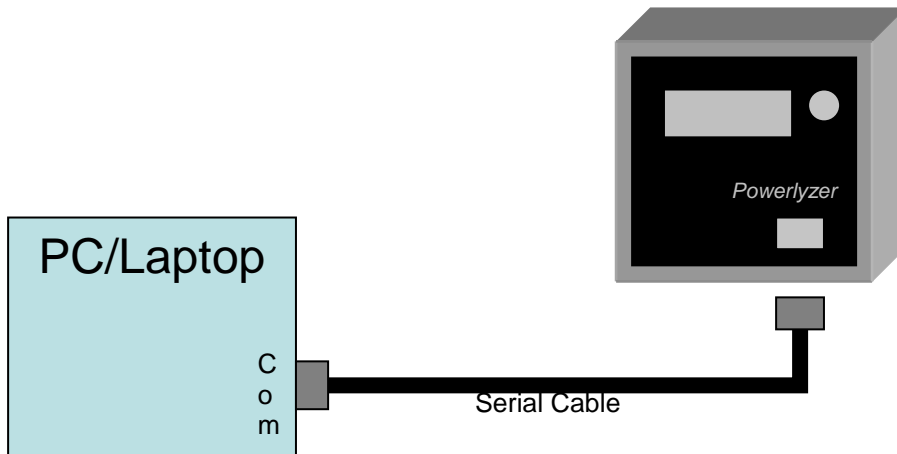


Figure #1 Traditional Serial Port Connections



USB to Serial Port Setup

This method requires connecting the PC/Laptop to the Powerlyzer using a USB 1.1/USB 2.0 Port to Serial adapter used in conjunction with an RS-232 Cable. This method is becoming increasingly more common with PC/Laptop Manufacturers discontinuing the use of the traditional Com-ports. Connect the USB connector on the adapter cable to an available USB port on the PC/Laptop. Connect the Female connector on the serial cable to the USB adapter 9 pin male connector. Connect the 9 pin Male connector of the serial cable to the Powerlyzer front panel 9 pin Female connector.

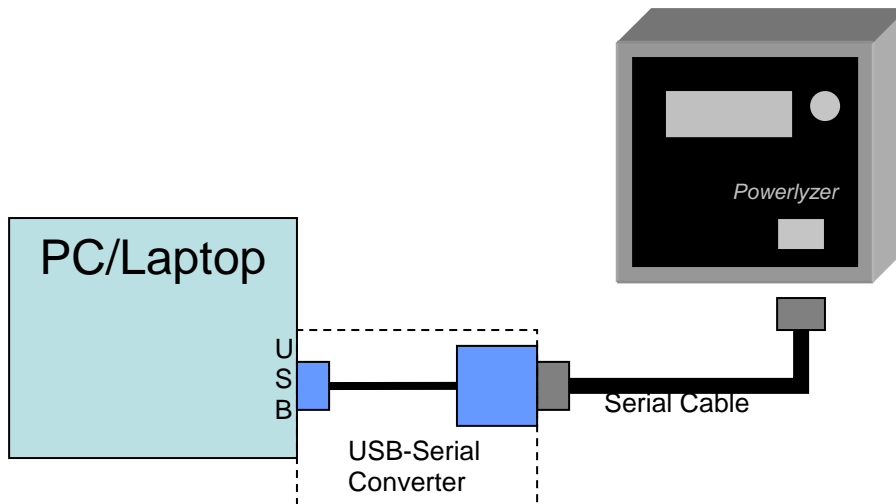


Figure #2 USB to Serial Port Connections



You will need to install the USB-Serial Converter software and/or Drivers according to the manufacturer's installation procedures *prior* to connecting and executing the PCS application.

The **required serial cable** is a *straight thru conductor* or *pin-to-pin connection* style serial cable.

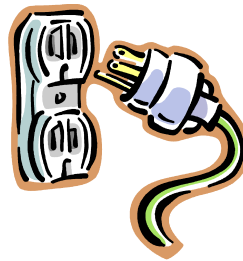


AC Power Cable

Using the *supplied* AC power cable assembly, connect the circular connector end of the cable to the Voltage input connector located on the bottom panel of the Powerlyzer. Plug the AC power cable into a standard Facilities 125V/15A/60Hz service outlet. The Powerlyzer LCD display should momentarily indicate the Company Name and Current Firmware Revision followed by the voltage display.



Connect the AC Line Cord to the Powerlyzer



Connect the Power Cord to the proper receptacle



Check that the display is ON and information is present

Figure #3 AC Power Connections & Initial Display



If you have successfully completed the software and cable installation as described in the above Chapters, you are now ready to begin communicating with your Powerlyzer using the Powerlyzer Companion Software (PCS) application.

If you have been unsuccessful, determine the cause and resolve the issue prior to continuing.

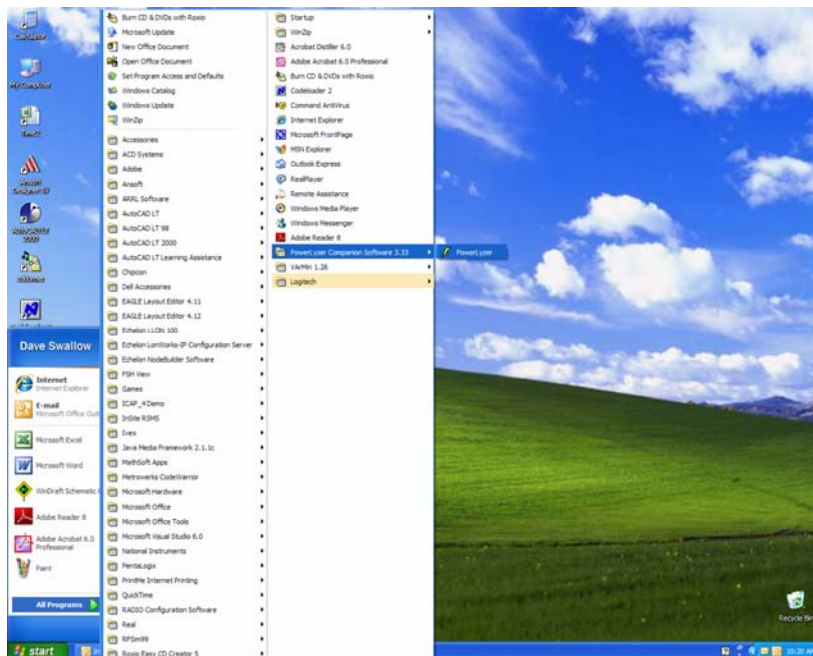


Chapter 4 Configuring the Powerlyzer Companion S/W

This chapter is designed to assist the User in understanding several key points regarding the design and use of the PCS application. The focus will be to present an overview to the User of the PCS Menu system, setup the 1st Run-time application parameters and provide a look at what is contained within each Menu item and its function.

Starting the Application

On the task bar, click **Start** to open up the Applications/Program list. Within the Applications/Programs list, click on the **Powerlyzer Companion Software x.xx** application. Refer to the following screen image as an example:

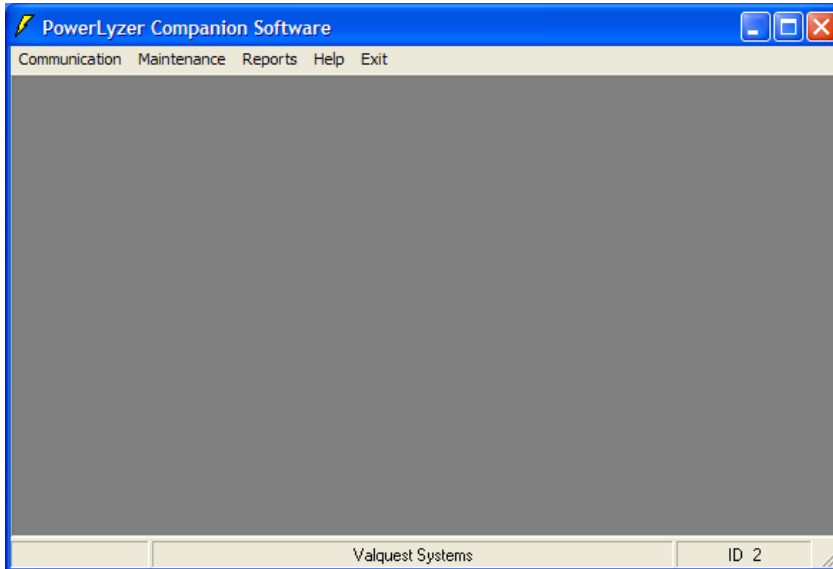


Click or select **Powerlyzer** and program execution will be initiated.

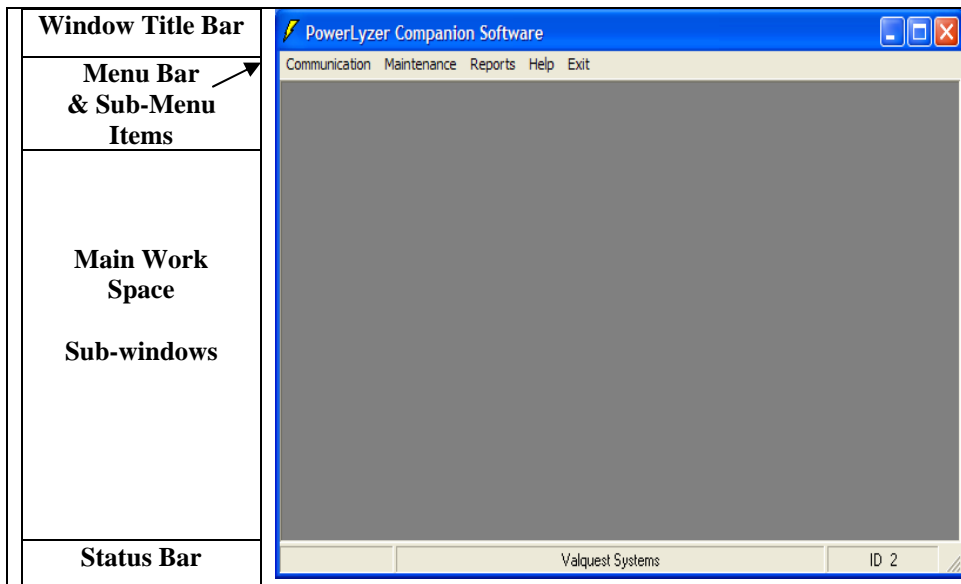


PCS Application Main Menu Window

The following illustration is the main menu window for the PCS application software. The graphical environment has been designed using a standard Microsoft application *look and feel* just as many applications written for the windows platform contain, making learning and navigation of the software quick and easy.



The following is an overview of the PCS Main Window and intended to make it easy for the user to understand how the PCS graphical environment and user information is contained.





Window Title Bar

The Window Title Bar provides the user with the name of the application and is used to allow the operator to minimize, maximize or terminate the application. These are standard windows features and function in the same manner as most windows applications.

Menu Bar & Sub- Menu Items

The Menu Bar and Sub-Menu Items provides the user with the mechanism of selecting and choosing the particular routines, functions and processes that are contained within the application. These are standard windows features and function in the same manner as most windows applications.

Main Work Space & Sub-Windows

The Main Work Space is where most of the activity and windows will be displayed during program execution. This provides the user with the workspace for other menus and popup displays which occur during the execution of functions and processes that are contained within the application.

Status Bar

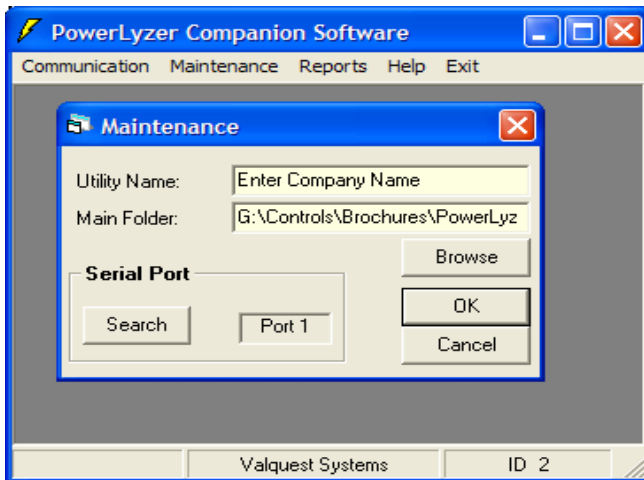
The Status Bar provides the user with specific information about the Powelyzer, communications and/or other information that may be relevant to a particular operation or process. There are several text fields that comprise the Status Bar and the information contained in a particular field may change based upon current operating conditions, processes and functions. In the example above, the status bar is displaying the Company Name and the Powerlyzer Device ID. Note that the Powerlyzer that is currently being used has a Device ID of 2 as noted in the right hand status field.



Running the PCS Application for the 1st Time



*The first time the PCS application is executed the **Maintenance Globals** window will be displayed. Once this information has been entered, this window will no longer be present during application startup.*



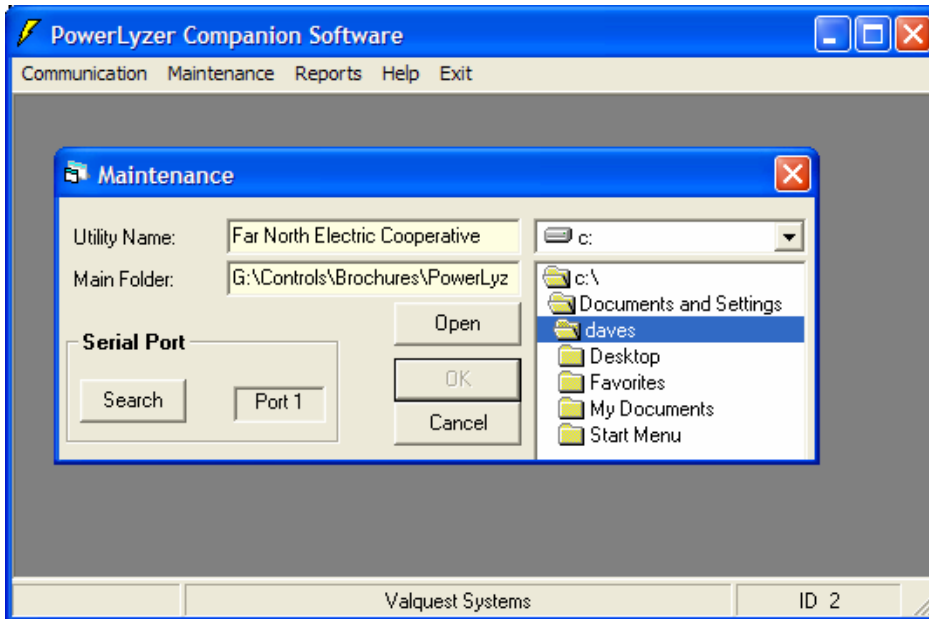
The **Maintenance Globals** form allows the User to enter the parameters necessary for the Powerlyzer software to execute functions and read/write data correctly to the configured Powerlyzer unit. These parameters are as follows:

Utility Name

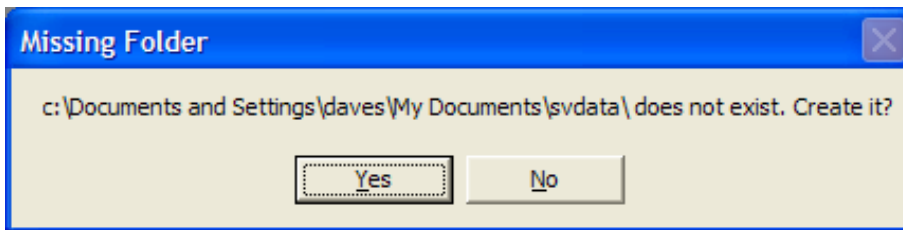
The Utility Name **text** box allows the user a method to enter a descriptive name to identify or associate the Powerlyzer with an organization. (*Example: Far North Electric Cooperative*)

Main Folder

The Main Folder **text** box contains the default path is set during installation, however it may be modified by the user based upon actual requirements and personal configuration preferences. To modify the setting, click the **Browse** button to open the File subsystem tool and browse to the appropriate directory path. When the correct path is selected, click the **Open** Button to save the path setting.



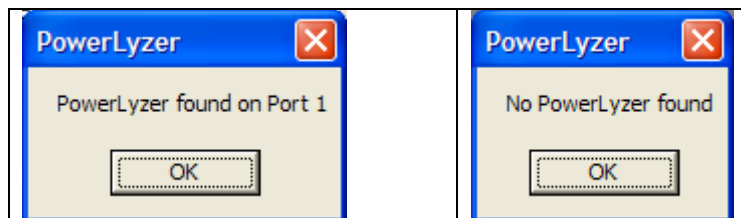
If the path is does not exist, you will be prompted with the following window:



To create the new path, enter the appropriate answer before proceeding. *Answering Yes will create the new path, answering NO will allow you to select another path.*

Serial Port

The Serial Port controls consist of a **Search** command button and a **text** box. When the **Search** Button is clicked, the software will interrogate the serial ports looking for a Powerlyzer. When the interrogation is complete, a popup window will appear stating either of two conditions: Powerlyzer was found on Port x, where x is the Port currently connected to the Powerlyzer, or that NO Powerlyzer was found.





In the later case, it will be necessary to check cable setup before continuing. Click the **OK** button on the Powerlyzer window to continue.

When the connection has been established, the Serial Port connection will be displayed in the Serial Port text box on the Maintenance Window.

After completing the setup information in the Maintenance window, click the OK button. The Maintenance window will close.

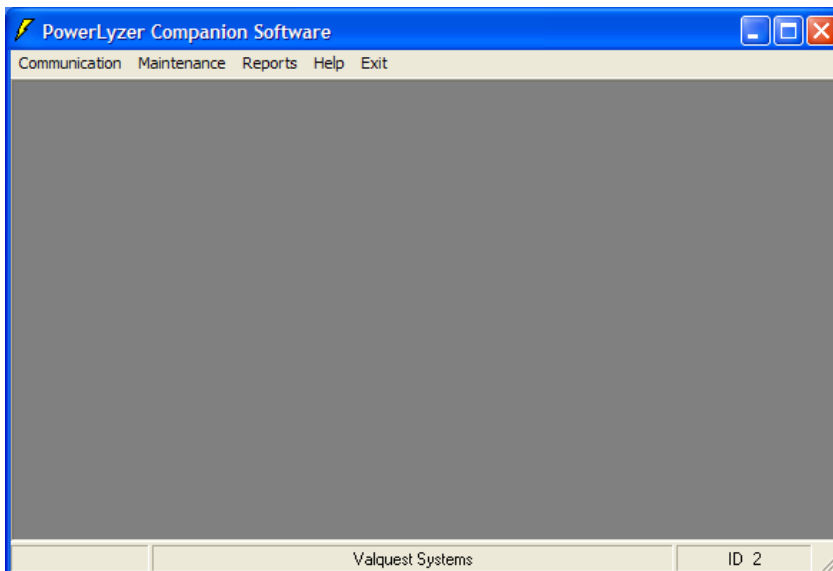


Chapter 5 Examining the PCS Windows and Menus

The following paragraphs will provide the User with an overview of the Window and Menu System and various sub-windows and sub-menus along with a brief explanation of the specific functions.

PCS Application Main Menu Window

Let us begin with a closer look at the Main Menu Window. In Chapter 4 the user learned about the various parts of the PCS window and where the specific processes, functions and status information were located. We will now examine the Menu Selections and explain in general terms what each menu item represents.



PCS Application Sub-Menu Windows

In the subsequent paragraphs, each of the Sub-menu list of items will be listed in the order that they appear in each sub-menu along with their associated window.

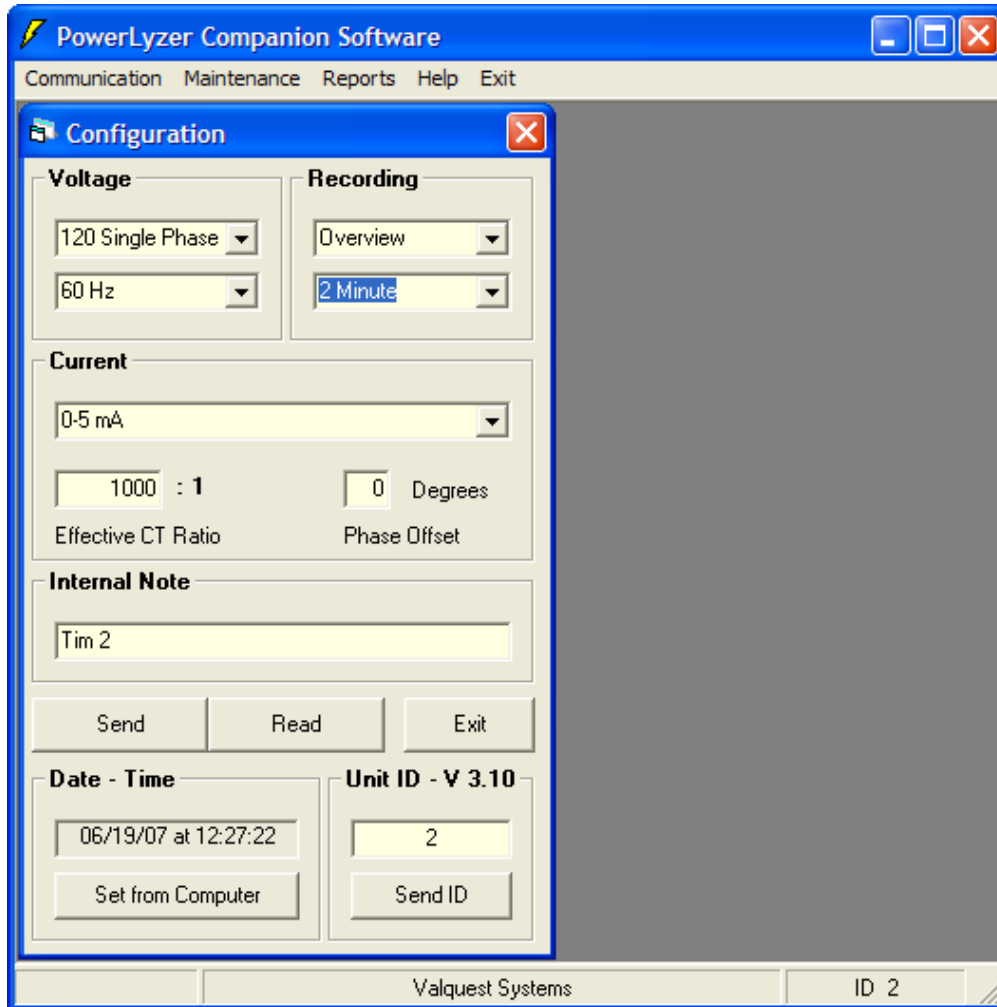
Communication

The **Communications** menu selection contains 5 sub-menu user selectable commands. The options are as follows (*in sub-menu order*):



Configuration (Configuration Window)

This menu selection creates a window in which the user can configure the **Main Electrical** parameters as well as other critical parameters the Powerlyzer needs to function properly. This is used primarily to setup the device prior to installation in the field. The following illustration represents the Configuration Window:



Configuration Window (Control Definitions)



*When a Unit is connected, the information **FROM** the unit will be displayed in the window by default. The User must change these settings according to his/her requirements prior to starting a planned recording session.*

*If the default settings are correct, the user **DOES NOT NEED** to change/alter those settings, only those that are not*



correct for the planned recording session..

*When the settings have been changed by the user to the proper setting, the user **MUST** click the **SEND** button for the data to be sent to the Powerlyzer and stored in the Powerlyzer internal memory.*

Voltage Parameters

The voltage parameters (Voltage & Frequency) are selected from two pull down boxes which define the type of service to be monitored.

The user must select the **correct Voltage** configuration from the drop down list:

- 120 Single Phase
- 120/240 3 Wire
- 120 / 208 Y *(208 Volts 3 Phase – three 120 volt legs)*
- 139 / 240 Y *(240 Volts 3 Phase – three 139 volt legs)*
- 240 3 Wire Delta *(240 Volts – 3 Phase Corner Ground Delta)*
- 240 4 Wire Delta *(240 Volts 3 Phase – two 120 volt legs and a 208 volt wild leg)*
- 277 / 480 Y *(480 Volts 3 Phase – three 277 volt legs)*
- 480 3 Wire Delta *(480 Volts – 3 Phase Corner Ground Delta)*

The user must select the **correct Line Frequency** configuration from the drop down list:

- 60 Hz *(Most Commonly Used in USA)*
- 50 Hz

Recording Parameters

The recording parameters (Type & Interval) are selected from two pull down boxes which define the type of recorded information and the measurement interval of the data to be monitored.

The user must select the **correct Recording Type** from the drop down list:

- Overview *18 byte records (3 voltages, 3 currents, 3 phase angles)*
- Metered *10 byte records (3 voltages, Total kW, Total kVA_r)*
- Voltage *2, 4, or 6 byte records depending Electrical Configuration*



The user must select the **correct Recording Interval** from the drop down list:

- 1 Minute
- 2 Minute
- 5 Minute
- 15 Minute

This following table shows the number of **recording days** available for any Recording Type and Interval.

Type	15 Min	5 Min	2 Min	1 Min
Overview	73	24	9	4
Metered	132	40	17	8
Voltage 3 Phase	220	72	29	14
Voltage Split Phase	256	104	44	22
Voltage Single Phase	256	220	88	44

Current Parameters

The current parameters (Range, Effective CT Ratio and Phase Offset) are selected from a single pull down box which defines the Range and 2 text box controls for direct numeric entry for the type of signal to be monitored.



NOTE
 To: Operator
 From: Valquest

*The Current Range must be set properly to function properly on the signal to be monitored. The Range **must** be set such that the **secondary current of the CTs does not exceed the range.** Using a lower range will improve measurement resolution, however, if the range is too low, the current waveform will be clipped.*

Example: You are directly monitoring a system that is running about 160 amps. If you are using 1000:1 current clamps you would most likely use the 0-250 mA setting since the current into the Powerlyzer will be about 160 mA.

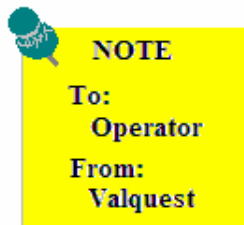


*If you don't know the current, set the **Input Current Range** to **0-1000 mA**. Once the current value is known, the go back and set the **Input Current Range** to a more practical value.*

The user must select the **correct Current Range** from the drop down list shown below.

- 0-5 mA
- 0-10 mA
- 0-25 mA
- 0-50 mA
- 0-100 mA
- 0-250 mA
- 0-500 mA
- 0-1000 mA

The user must select the **correct Effective CT Ratio** by directly entering in a numeric value.



NOTE

To:
Operator
From:
Valquest

*The **CT Current Ratio** is normally the **CT Ratio** of the amp probe being used. This **CT Ratio** value is typically a value expressed in terms of ? Thousands:1, (ie. 1000:1, 2000:1, 5000:1, etc.). However, when monitoring the secondary of a large CT, this number is the arithmetic product of the CT ratio and the current ratio of the amp probe.*

Example: If you have a 1000:1 amp probe and are

*monitoring the secondary of an 800:5 CT, the **Effective Current Ratio** would be $1000 \times 160 = 160,000$. You would most likely use 0-5 mA or 0-10mA **Input Current Range**.*

The user must select the **correct Phase Offset** by directly entering in a numeric value.

This value by default is typically set to 0. However, there could be cases in which some phase shift exists and the user desires to compensate for this offset. This allows entry of



an artificial phase offset from the current to the voltage. If this entry is made the user should select a number between **0 and 359** degrees.

Internal Note

A note of up to 48 *alpha-numeric* characters can be stored in the unit. The note is completely up to the discretion of the user and may be changed/deleted/alterd by retyping it. *Any note contained in memory will be erased when the memory is cleared.*

Date – Time

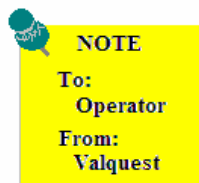
The date and time fields are used to keep accurate time records during recording sessions. The default values displayed are read from the unit (if presently connected). If the Date or Time is incorrect the user may click the **Set from Computer** button to set the unit's clock.



*The time is displayed in Military time 24 hour format.
(Example: 3:06 pm is displayed as 15:06:00)*

Unit ID –xxx

The Unit ID is used to provide a specific identifier to each Powerlyzer. This is beneficial when more than one Powerlyzer is being used in a system. This is a numeric field and values from **0-999999** may be used.

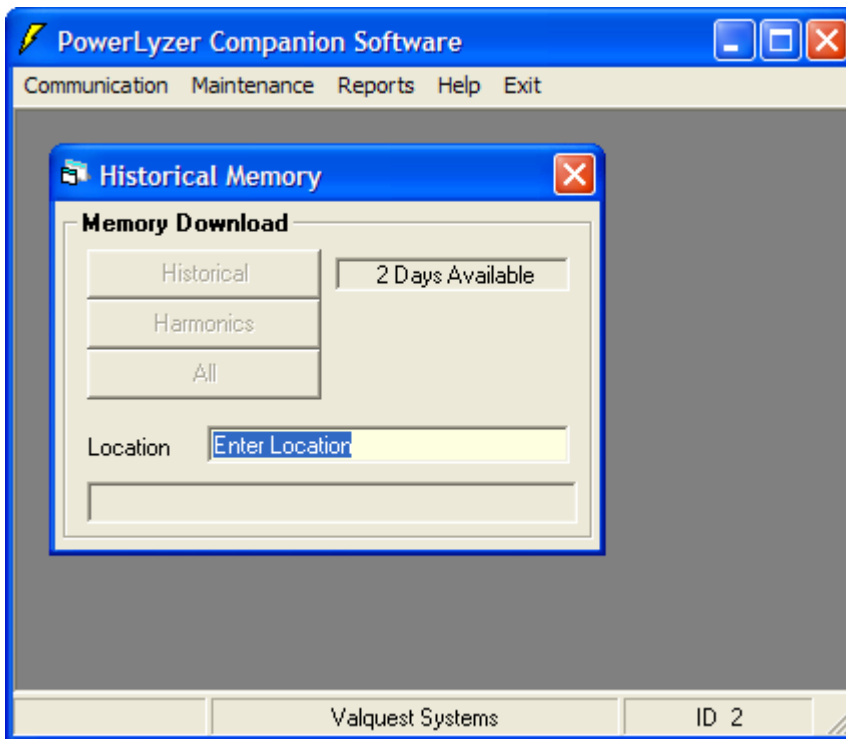


The default factory setting for this value is the Serial Number as shown on the label.



Download (Historical Memory Window)

This menu selection creates a window titled, “Memory Download” which the user can download the data stored within the memory of the Powerlyzer to a connected pc/laptop. This information is the result of previously captured Data Recording sessions. The following illustration represents the Memory Download Window:



Historical



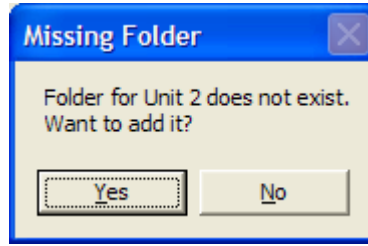
NOTE
To:
Operator
From:
Valquest

The Location field MUST be completed prior to downloading Historical data. The command buttons will be disabled until a value has been entered in this field.

The **Historical** command button is used to begin the download process of any trend data currently stored in the Powerlyzer to the pc/laptop. The download process creates a file for each downloaded day in the folder for the particular Unit ID. If the PowerLyzer software determines that a folder does not exist for the unit being downloaded, a message will appear advising the user and asking whether one should be created. *The download cannot proceed without the existence of the unit folder.*

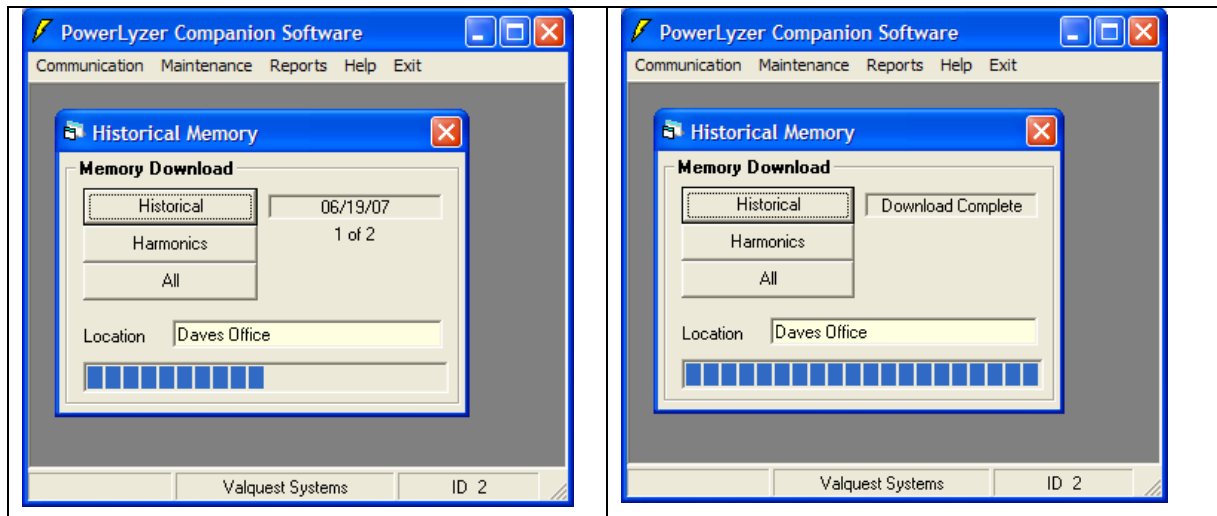


The Folder does not exist, Therefore click on YES to continue and a folder will be created.



As the data is downloaded, the textbox (immediately to the right of the Historical command button) is used to indicate the files and data being transferred to the pc/laptop.

Example Windows: Text Box Status during Historical download



Each download also causes the creation of a *Download File*. This file will have as its filename, the "Location and Download date.dnl".

(Example filename: Daves Office 06-20-2007.dnl)

The *.dnl file generated is used by the Report application to facilitate viewing the information by recording session.

This file contains the following information:

- Download Place (Text)
- Download Date/Time (Numeric)
- Unit ID (Numeric)
- Filenames of all the one day historical ("H") files (Hyymmdd.dat)
- Filename of the Min/Max file (Myymmdd.dat)
- Filename of the Interruption file (Iyymmdd.dat)



Harmonics

NOTE
To: Operator
From: Valquest

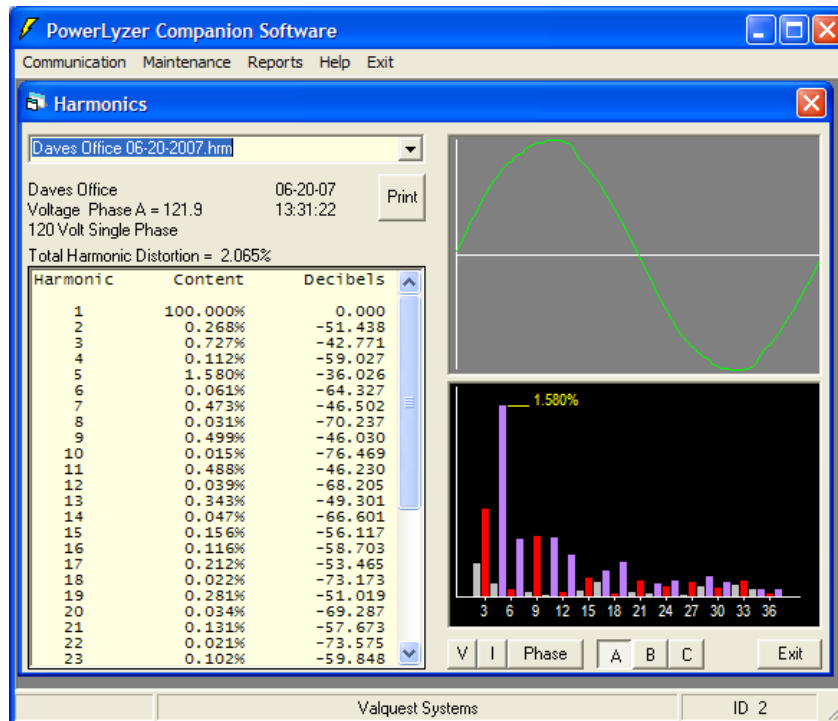
*This function **requires** the user to have a pc/laptop present at the test site as the **Harmonic data is captured and downloaded in real-time** from the Powerlyzer to the pc/laptop. **The Powerlyzer DOES NOT store the harmonic data.***

The **Harmonics** command button is used to begin the process of capturing Harmonic data in real-time within the Powerlyzer and download this data into the pc/laptop. *This data is not historical in nature.* The harmonic data is captured for the **MOST RECENT WAVEFORM ONLY** or *the single cycle* prior to the download.

NOTE
To: Operator
From: Valquest

*The **Location** field **MUST** be completed prior to downloading Harmonic data. The command buttons will be disabled until a value has been entered in this field.*

The following window represents the Harmonics window after the download has been completed:





Each Harmonics download also causes the creation of a *Download File*. This file will have as its filename, the “*Location and Download date.hrm*”.

(Example filename: Daves Office 06-20-2007.hrm)

The *.hrm file generated is used by the Report application to facilitate viewing the information by recording session.

This file contains the following information:

- Download Place *(Text)*
- Download Configuration *(Numeric)*
- Download Date *(Numeric)*
- Download Time *(Numeric)*
- Data *(6 Bytes)*

More Specific instructions on understanding the Harmonics window and associated user controls and data items will be given in **Chapter ?**.

All

The **All** command button allows the user to retrieve both the Historical trend data and Harmonic data in one process. The Historical trend data will be downloaded as explained above, followed by the Harmonics data. *(Review the paragraphs above for operational details)*

Location

The Location text box allows the user to enter a unique phrase or description of the place in which the trend recording session has taken place. *(Example: Browns Service Station)*



*This field **MUST** be completed prior to downloading recorded data. The command buttons will be disabled until a value has been entered in this field.*

Status Bar (unlabeled)

Located at the bottom of the window is a status bar that is used to notify the operator of the current download status and visually indicate the progress as the bar travels from left to right.

Text Box (unlabeled)



Valquest Systems Inc.

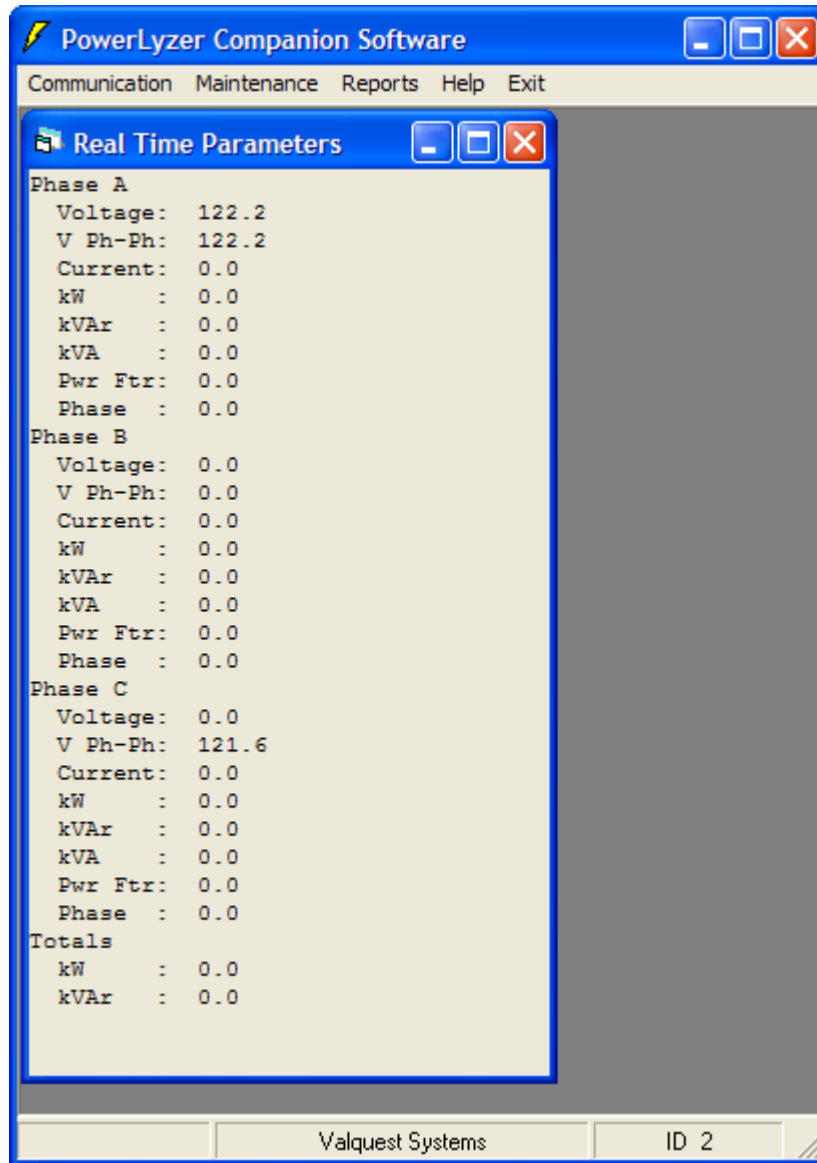
Powerlyzer Companion S/W Users Guide

The window contains a text box located in the top right area of the window. This is used to provide the user with a descriptive quantity about the amount of data that has been stored and is ready to download as well as the status of the progress during the download process. (*Example: 2 Days Available or 8 Days Available, the Recording Date or Download Complete*)



Realtime Viewer (Real Time Parameters Window)

This menu selection creates a window titled, “Real Time Parameters” which provides the user a way in to view the electrical parameters in real-time conditions as the data is periodically taken from the Powerlyzer and displayed on the PC/Laptop display. The following illustration represents the Realtime Window:



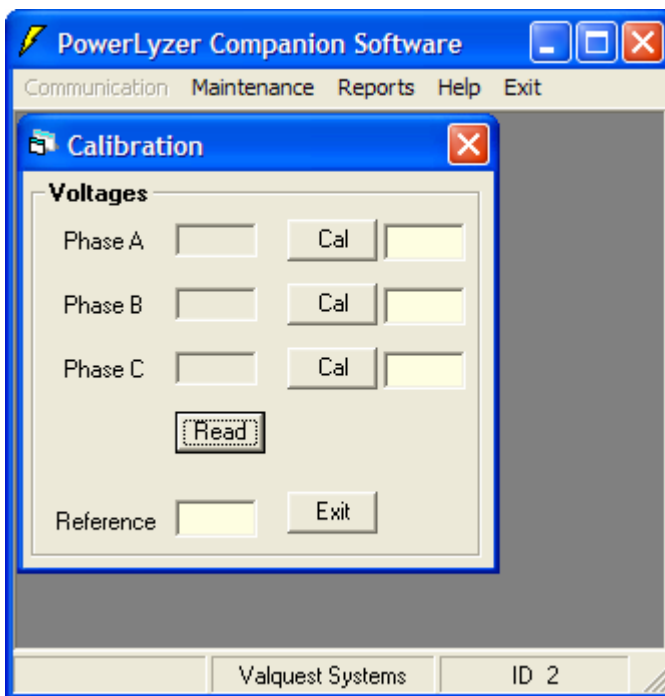
The electrical real-time parameters which are captured are displayed in the above window. The parameter values being updated are entirely dependent upon the configuration setting. *The values are updated approximately every 3 seconds.*



No other communications functions are available while viewing real-time parameters. Close the window in order to perform other communication functions.

Calibration (Calibration Window)

This menu selection allows the user to calibrate the 3 voltage inputs. The following illustration represents the Calibration Window:



The Calibration window provides a set of controls (text boxes and buttons) which are necessary to perform a voltage calibration on the Powerlyzer. More Specific instructions on calibration will be given in **Chapter 9**. At this point, our discussion will be limited to an understanding of the window controls.

The Phase A, B, C **text** boxes are used to report the input voltage as seen on each phase from the Powerlyzer.

Each Phase also contains a **Cal** Button along with a **text** box for the user to enter in a calibration offset value as part of the calibration process. This value is a *numeric* value.

The **Read** command button is used to update the Phase A, B, C text box values as they are read from the Powerlyzer.



The **Reference** text box allows the user entry of a reference voltage as measured with a calibrated True RMS voltmeter.

The **Exit** command button allows the user a method to terminate the calibration process and close the calibration window.



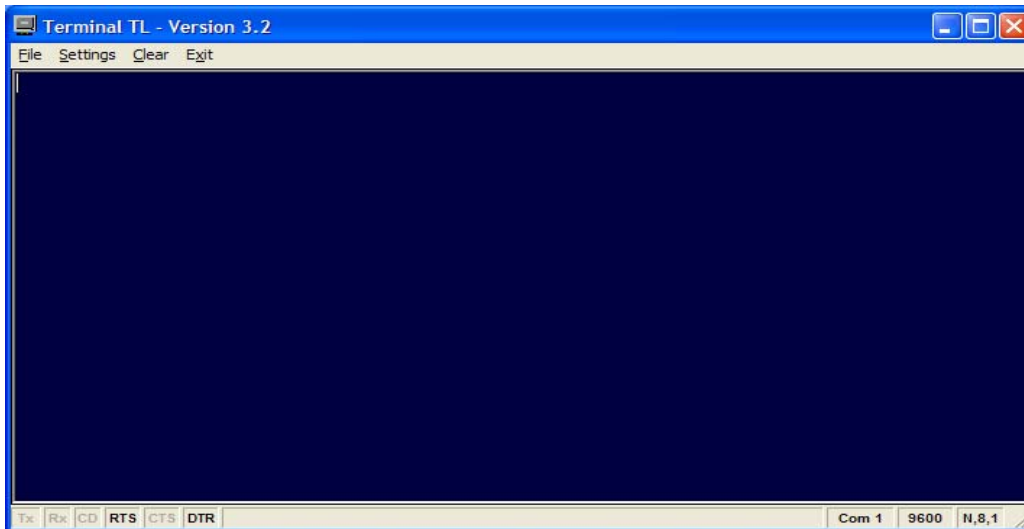
NOTE

To:
Operator
From:
Valquest

No other communications functions are available while calibrating the Powerlyzer. Complete the calibration process and close the window in order to perform other communication functions.

Direct Communications (Terminal TL Window)

This menu selection calls a Terminal application program that works much the same way that Microsoft HyperTerminal works. It allows the user to communicate directly with any Powerlyzer currently attached to the PC/Laptop. This application uses a native set of terminal commands. The following illustration represents the Communication Terminal Window:



More Specific instructions on the use of the Terminal TL window and application will be given in **Chapter 8**.

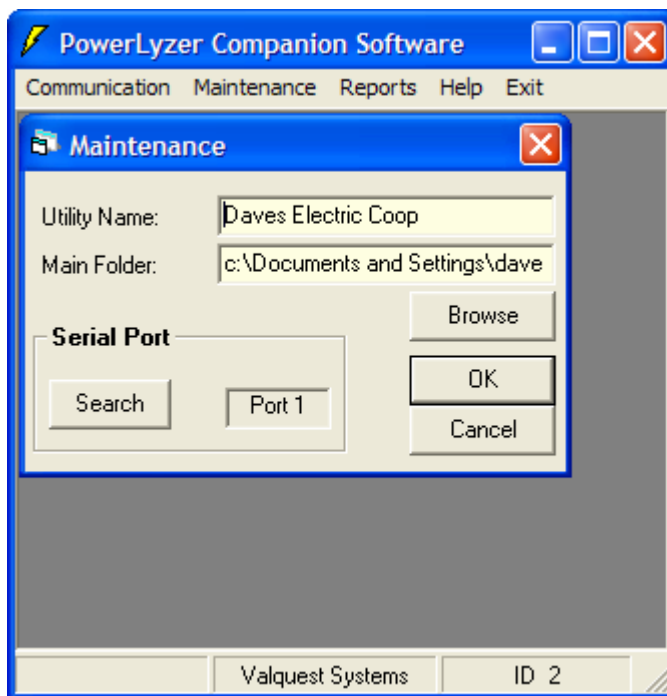


Maintenance

The **Maintenance** menu selection contains 2 sub-menu user selectable commands.

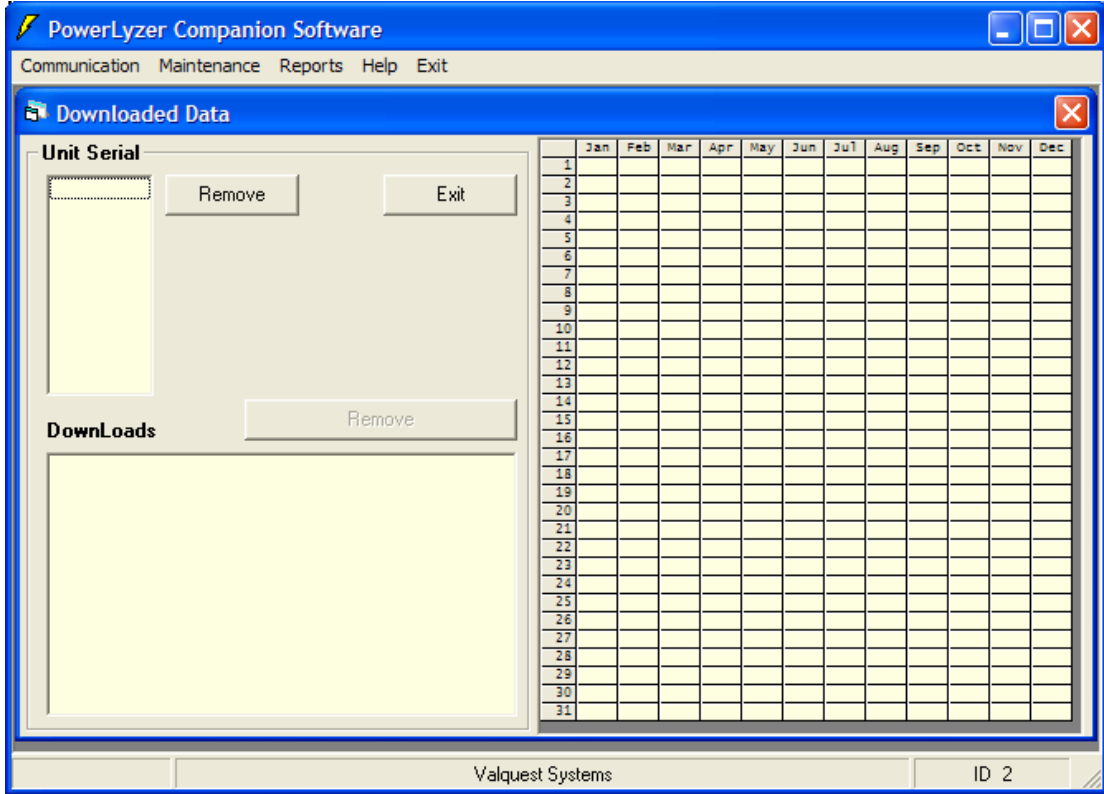
Globals (Maintenance Window)

The Globals menu selection will open a window titled, “Maintenance” which will be automatically presented the 1st time the application is executed, thereafter it may be accessed via the menu selection process. For specific details relating to this window refer to the previous section titled, “Running the PCS Application for the 1st time”.



Data Files (Downloaded Data Window)

The Data Files selection will open a Window titled “Downloaded Data”. This window is used to provide the user with a method to view and maintain historical data files. This is a powerful tool which makes it easy for the user to review, maintain and delete historical files using parameters such as the Unit Serial Number or Date.



Unit Serial

The **Unit Serial** list box shows all unit serial numbers for which the computer has folders. Clicking any of the serial numbers listed, will cause the **Downloads** list to show all Download files (*.dnl) which have that particular unit serial number in their third line (see the section on Historical Memory Download). Also the Calendar display will show all existing data file dates as yellow.

Clicking any of the Download Files will cause the Calendar display to show all data file dates for that particular Download File as red.

Clicking the **Remove** button associated with the **Downloads** list will delete the selected Download File. It will also delete any of the Historical Data files associated with the selected Download File.

Clicking the **Remove** button associated with the **Unit Serial** list will delete the selected unit folder. It will also delete all Historical Data files in the folder.

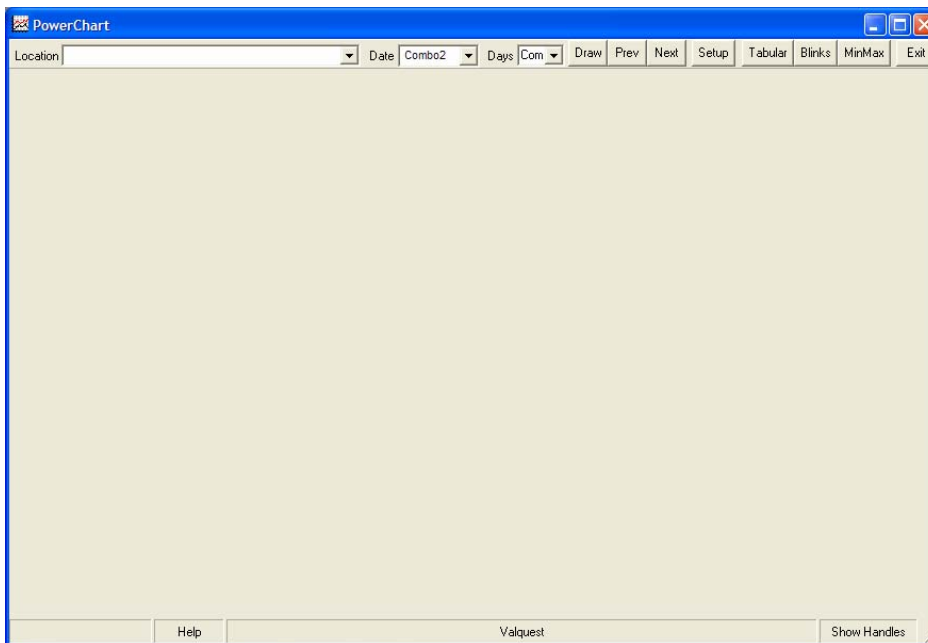


Reports

The **Reports** menu selection contains 2 sub-menu user selectable commands.

Historical (PowerChart Window)

The Historical selection will open a Window titled “PowerChart”. This window is used to display historical trend data in graphical form. Using graphs, strip charts, adjustable “handle controls” and other user friendly features the user can easily “zoom in” on signal characteristics that require closer examination.

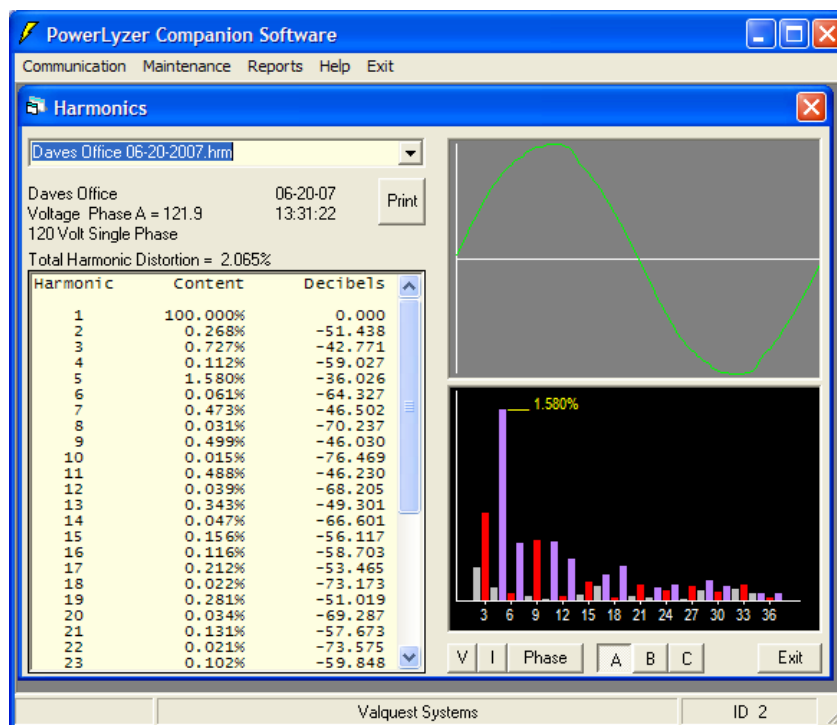




Harmonics (Harmonics Window)

The **Harmonics** report selection will open a Window titled “Harmonics”. This window is the same window that was used earlier to “Download” the Harmonics data from the Powerlyzer. Within the Reports section, the user can select various “historical” files containing the Harmonic data for review and analysis.

The following window represents the Harmonics window after the download has been completed:



Specific instructions on understanding the Harmonics window and associated user controls and data items will be given in **Chapter 6**.

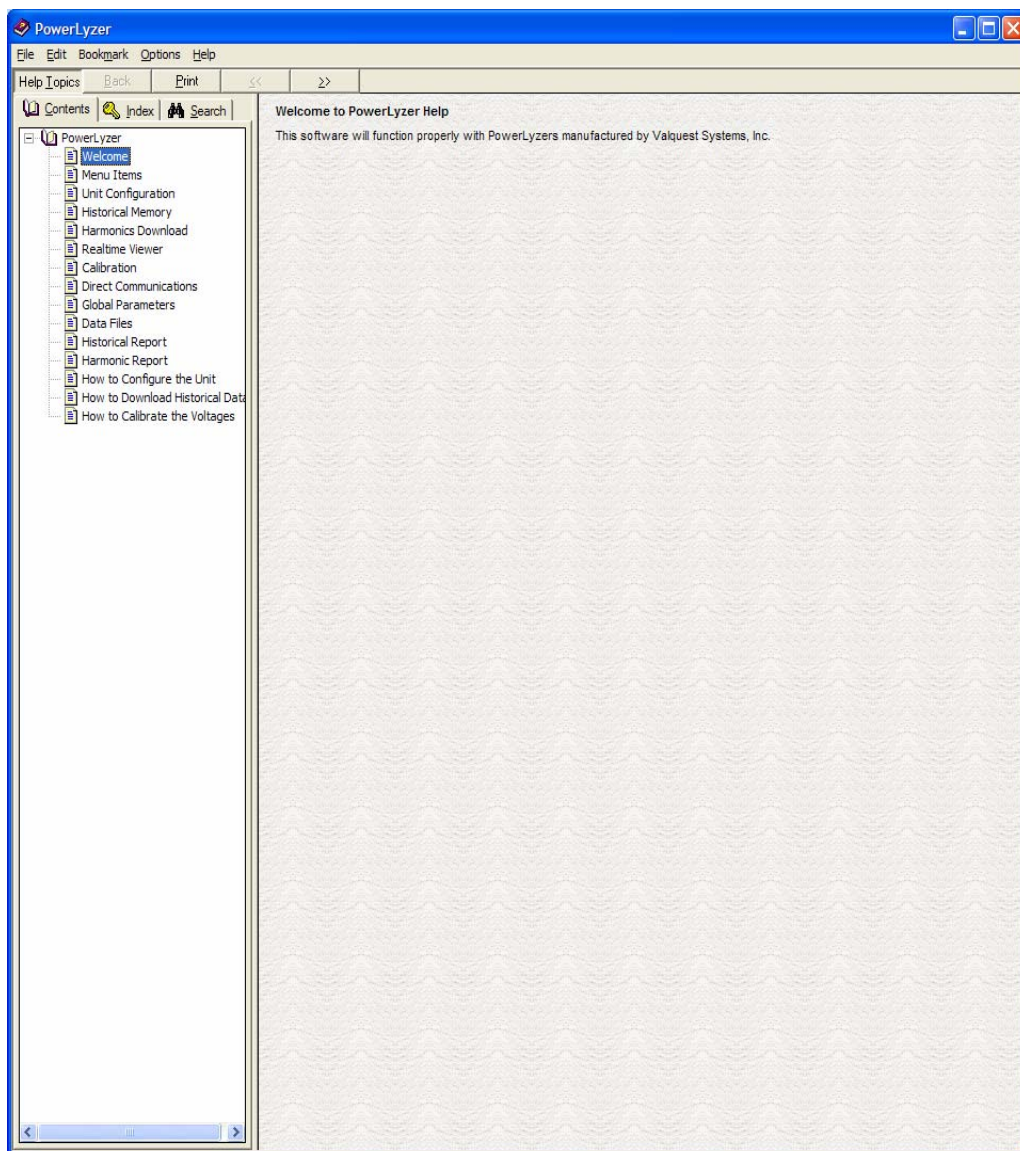


Help

The **Help** menu selection contains 2 sub-menu user selectable commands with standard features found on most windows applications.

Powerlyzer (Powerlyzer Window)

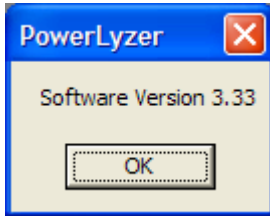
This command provides specific information relating to the PCS application. This structure uses the standard Microsoft Help structure and provides a quick and easy resource for the user to obtain specific assistance. The following illustration represents the Powerlyzer Help Window:





About (Powerlyzer Pop-up)

This provides the user with the specific PCS application software version number. The following illustration represents the About Window:



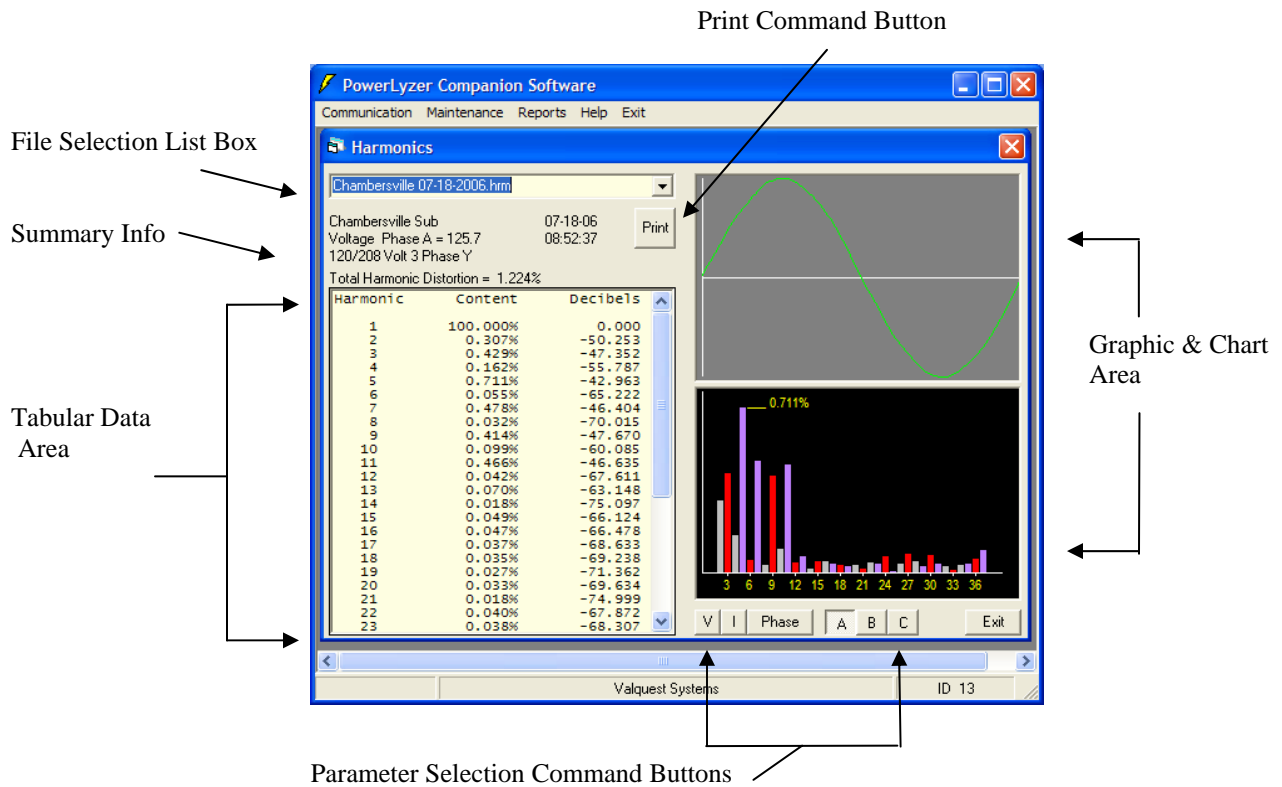
Exit

The **Exit** menu selection contains no additional sub-menu and is used to provide the User with a normal manner in which to correctly exit or terminate the PCS application. Clicking this option will close all application files and open application windows and return the user back to the windows desktop.



Chapter 6 Harmonics Window & Data

The Harmonics Report window provides a user friendly method of quickly displaying previously saved harmonic data and analyzing the various signal characteristics. The Harmonics Report window is comprised of zones or areas which provide the user with a simple means of observing and interpreting the harmonic data. Below is a description of the window and the various areas that contain information followed by a functional description of the areas.



File Selection List Box

The File Selection List Box allows the user to quickly and easily locate and select a Harmonics (*.hrm) file for viewing and analysis. This control operates as a drop down list box and expands as the number of harmonic files expands within the directory. When the user has located and selected the file under review, a single click will open the file information and display the information as shown.

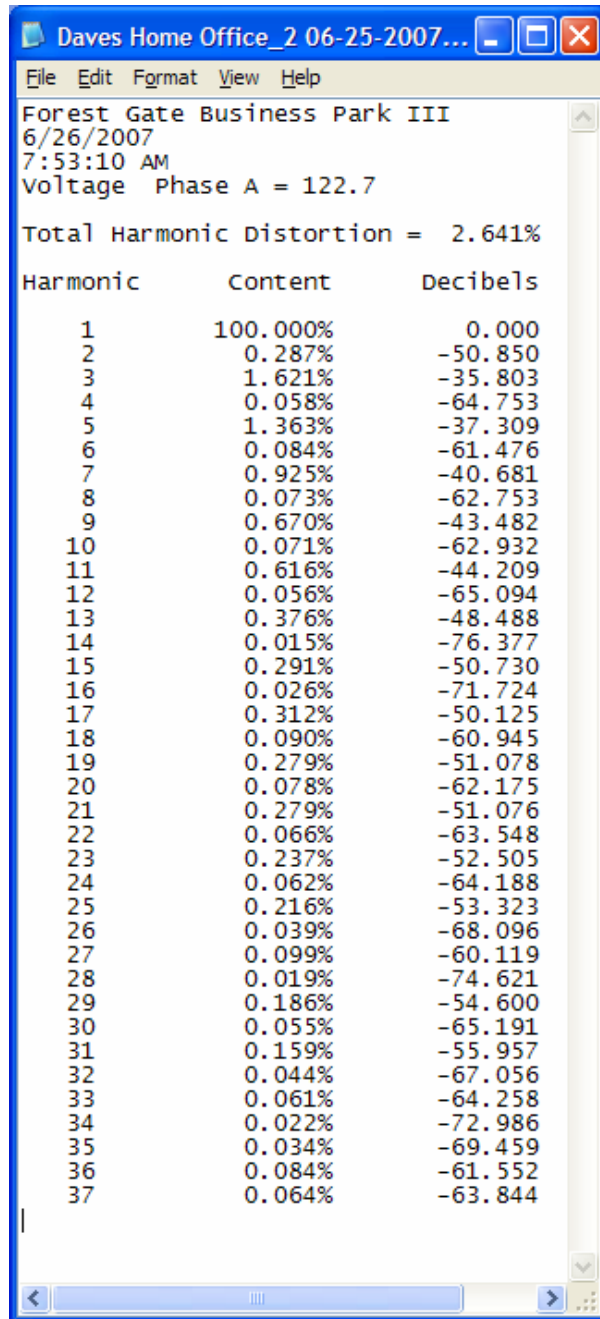
Summary Info



The Summary information area provides the user with a quick view of the Location, the voltage configuration, date & time as well as the selected parameter.

Print Command Button

The Print command button provide the user with a method to extract the tabular data (*selected by the parameter selection command buttons*) and place this into data into the Notepad application for further editing and/or printing at the discretion of the user. The example below shows the data after Phase A data after extraction into the Notepad application.





Tabular Data Area

The Tabular data area provides a means for the user to view the details and characteristics associated with the Harmonic signal content. *(The data displayed is dependent on the parameter selection command buttons.)*

Graphic & Chart Area

The Graphic & Chart area is used to present a visual image of the data measured by the Powerlyzer. The Graphic area is used to display a reproduction of the sine wave based upon the measured data for 1 cycle.

The Chart area is used to present a bar graph representing the level of the harmonics *(as expressed in a percentage of the primary signal level)*. The bars vary in color to make it easy to differentiate the various types of harmonics from (primary, odd and even harmonics). *(The data displayed is dependent on the parameter selection command buttons.)*

Parameter Selection Command Buttons

The parameter selection command buttons provide the user with a simple and easy method to select individual parameters for review and analysis. These parameters are as follows:

Parameter Selection Button Label	Description
V	Selects the Voltage Information for the selected Phase (A, B, C)
I	Selects the Current Information for the selected Phase (A, B, C, N)
Phase	Selects the Composite Information for all of the phase information. The Voltage, Current, kVA,kw and kVAr information is available.
A	Selects the Phase A signal Information
B	Selects the Phase B signal Information
C	Selects the Phase C signal Information

Exit

The Exit command provides a means for the user to close the Harmonic window and return to the main Menu Bar.



Chapter 7 Historical Window (Powerchart) & Data

The Historical Report (PowerChart) window provides a user friendly method of quickly displaying previously saved historical trend data and presents this data to the user in “Strip Chart” format. This visual format makes analysis quick and easy because everything shown is based on the time domain. PowerChart also allows the user to create tabular reports and build Microsoft Excel™ spreadsheets.

The Historical Report (PowerChart) window is comprised of zones or areas which provide the user with a simple means of selecting, observing and interpreting the historical trend data.

As many as six (6) parameters can be displayed simultaneously. Each parameter has its own strip with its name (Voltage A, 3 Phase kW, Current C, etc.) shown on the left just above each one. These are selected from the **Setup Page**.

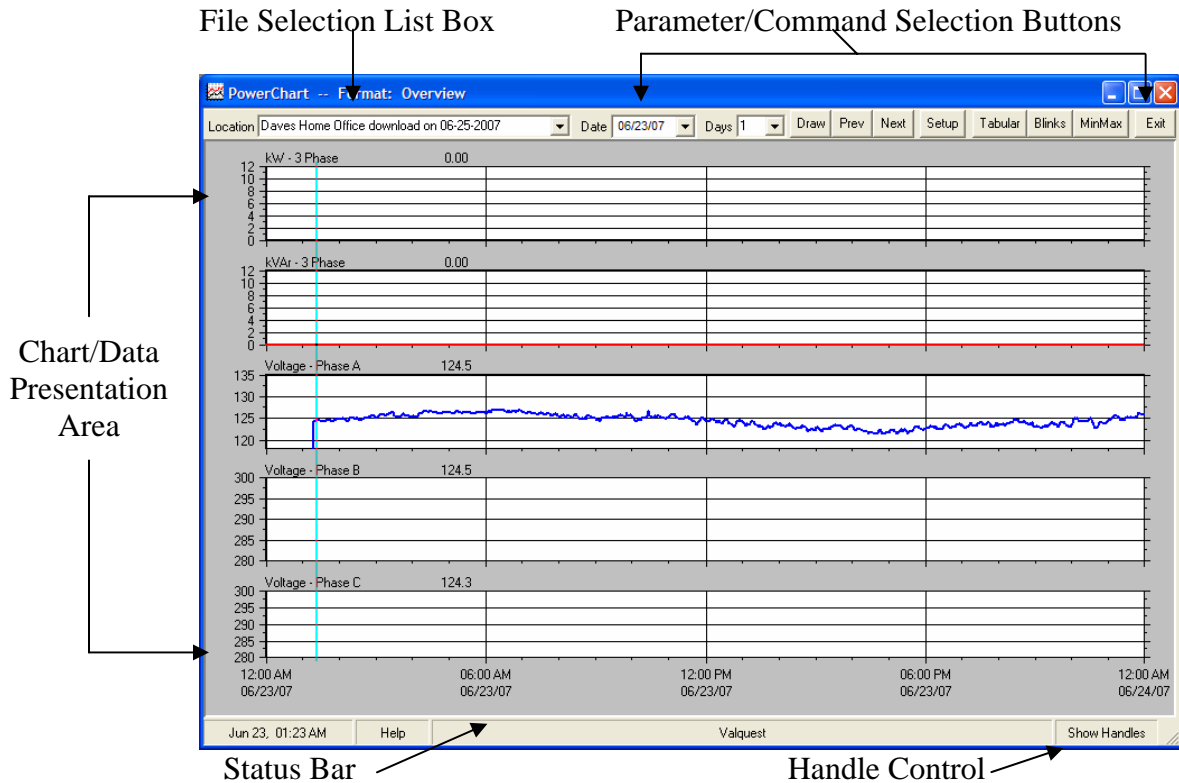


NOTE

To:
Operator
From:
Valquest

Each time you start PowerChart, it will remember how you had it configured and will re-configure itself the same way until you enter the Setup window and re-configure the settings.

Below is a description of the window and the various areas that contain information followed by a functional description of the areas.



File Selection List Box (Location)

The File Selection List Box (Location) allows the user to quickly and easily locate and select a Historical (*.dnl) file for viewing and analysis. This control operates as a drop down list box and expands as the number of historical files expands within the directory. When the user has located and selected the file under review, a single click will open the file information and display the information based upon the settings in the setup menu.

Chart/Data Presentation Area

The Graphic & Chart area is used to present a visual image of the data measured by the Powerlyzer. The Graphic area is used to display a reproduction of the sine wave based upon the measured data for 1 cycle.

The Chart area is used to present a bar graph representing the level of the harmonics (*as expressed in a percentage of the primary signal level*). The bars vary in color to make it easy to differentiate the various types of harmonics from (primary, odd and even harmonics). (***The data displayed is dependent on the parameter selection command buttons.***)



Parameter/Command Selection Command Buttons

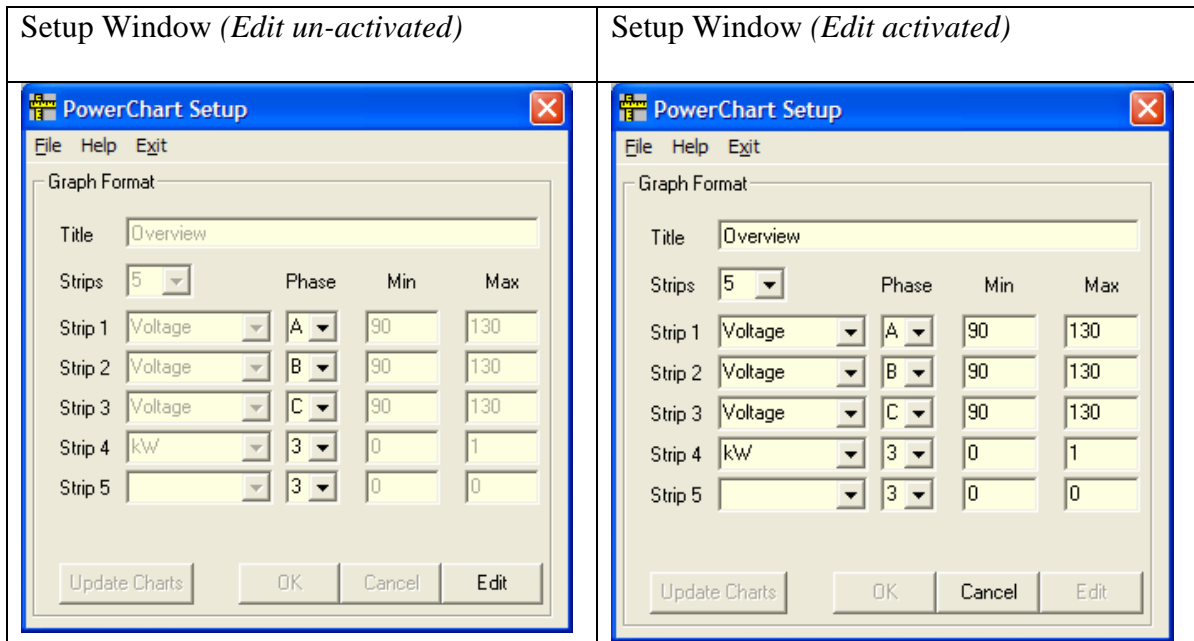
The parameter selection command buttons provide the user with a simple and easy method to select individual parameters for review and analysis. These parameters are as follows:

Parameter Selection Button Label	Description
Date	When a download file has been selected the Date Box is filled in with only those dates which are associated with the selected download file.
Days	This box contains the number of days of data that are present within the selected file.
Draw	This command causes the charts to be re-drawn.
Prev	Selects the previous day of data (if present) and causes a re-draw operation.
Next	Selects the next day of data (if present) and causes a re-draw operation.
Setup	This command presents a setup window to the user in which specific parameters and chart settings may be configured. <i>(Refer to the Detailed Setup information below)</i>
Tabular	This command translates the information presented on the strip chart into tabular form and displays the data into a Notepad (*.txt) file. Each parameter defined by the setup command is shown in a column . At the end of each column of data, the Consumption, Averages and Min/Max values will be presented. <i>(Refer to the Tabular Window information below)</i>
Blinks	This command presents the Interrupt data into a Tabular Interruption Report based upon the location (file) selected. The data is presented in a Notepad (*.txt) file. <i>(Refer to the Blinks Window information below)</i>
MinMax	This command presents the Minimum and Maximum data values into a Tabular Min-Max Report based upon the location (file) selected. The data is presented in a Notepad (*.txt) file. <i>(Refer to the Min-Max Window information below)</i>
Exit	Closes the Powerchart window



PowerChart Setup Command Window

The PowerChart Setup window is a powerful tool used to configure the PowerChart Graphics window. The user has the ability to set the strip charts to a default setting in a variety of configurations based upon what is most frequently used, but also has the flexibility to change these settings as conditions and data warrant. Once these configurations are established the user may save these to specific files so that they can be easily recalled depending on specific user requirements without having to re-generate each setup prior to displaying the actual trend data. Below is a sample screen of the Setup window. (*Notice that most of the functions are not available until the edit command button has been activated.*)



File Menu Commands

The **File** menu selection contains 6 sub-menu user selectable commands. The options are as follows (*in sub-menu order*):

Open

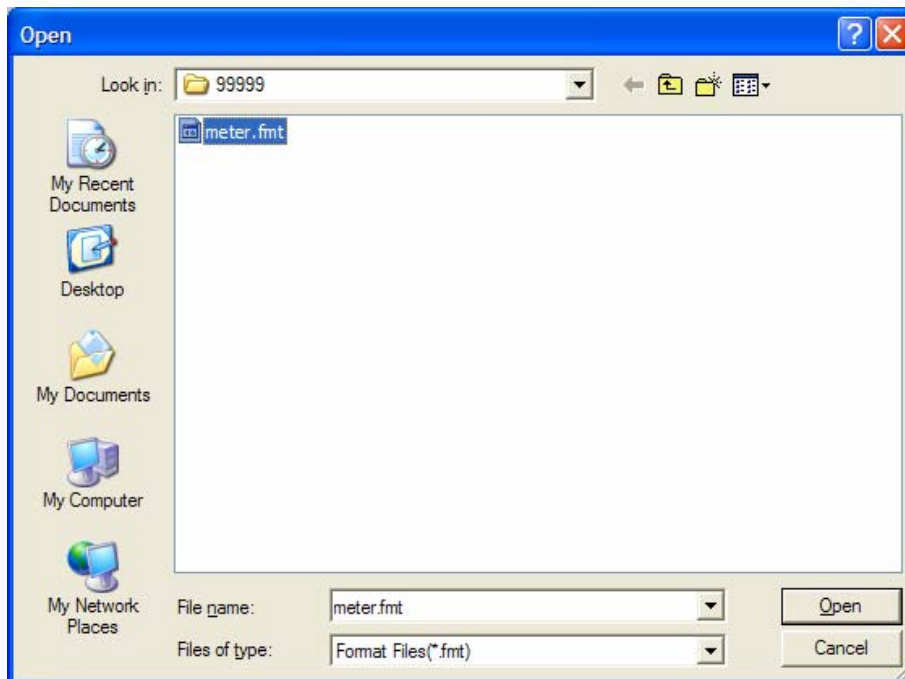
This menu selection allows the user to open a previously saved (*.fmt) format file. (*User doesn't have to re-configure setup each time when using this powerful feature*)

NOTE
To:
Operator
From:
Valquest

It is recommended that you provide a standard directory path and use descriptive file names when using this feature to facilitate easy file recall.



In the following example, the format file selected is located in the ...\\99999 folder and the previously saved format file is named meter.fmt



Save

This menu selection will save any changes of the user's current setup configuration into the same *filename.fmt* file that is presently open and being used for recalling at a later time period. ***(This will overwrite the setup that existed prior to the changes)***

Save As

This menu selection will save the users current setup configuration into the *filename.fmt* file. This file can then be opened and used at a later time period without re-creating the setup configuration.

Print Setup

This command provides the user with the Microsoft Windows™ Print Setup window. This allows the user make printer selections, configuration settings, etc., prior to beginning the actual print function.



Print

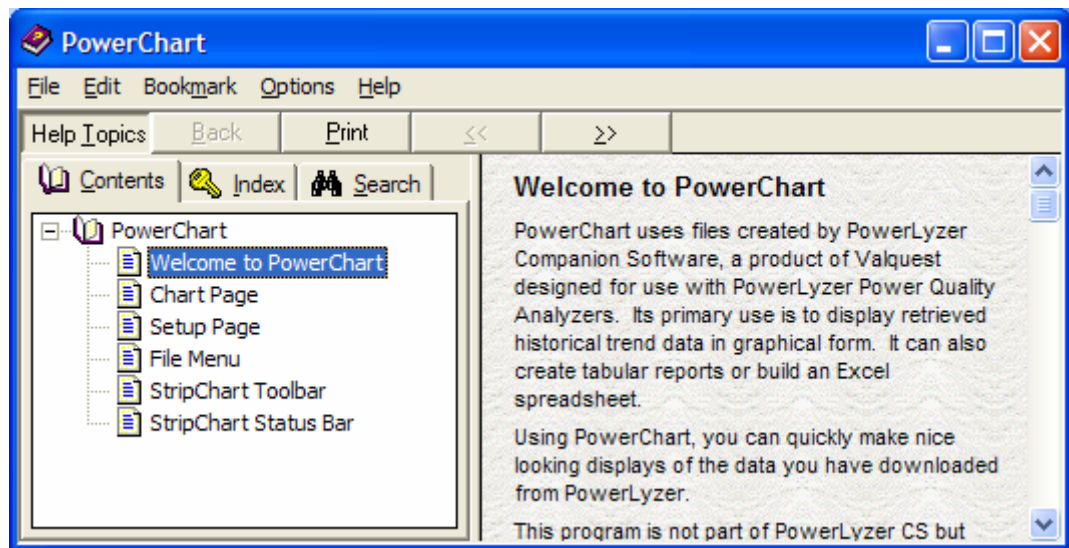
This command sends the chart page to the default printer and initiates the standard print function based upon the Print Setup configuration. The chart will print in color if sent to color printer.

Build Excel

The Build Excel command allows the user to create a Microsoft Excel™ spreadsheet from the data displayed on the chart page. When selected, the user will be presented with the File dialog box prompting for a filename. Specify the appropriate path and filename and save the data.

PowerChart Help Menu Command

The Help field allows the user to quickly access the informative help window. Structured much like other windows applications, the help tool is user friendly and a powerful method of obtaining assistance relating to the PowerChart window and application.



Exit

The Exit command provides a means for the user to close the Historical (PowerChart) window and return to the main Menu Bar.



Graph Format Commands

The Graph Format commands consist of a set of pull-down list box's as well as command buttons which allow user control over specifying the individual settings.

Title

This menu selection allows the user to specify a chart configuration name.

Strips

This menu selection allows the user to select a number of strip charts to place in the window for a specific setup. This will also determine how many parameter boxes that must be configured for the setup. (*Valid options are 1-6*)

Strip 1-5 Parameter Selection

This menu selection allows the user to specify what electrical parameter they wish to have displayed on a particular chart. (*Valid options are Voltage, Voltage Ph-Ph, Current, kW, kVAR, kVA, Power Factor, Phase Angle+ and PhaseAngle -*)

Phase Parameters

This menu selection allows the user to specify any of the following Phase parameters to be displayed on the chart. (*Valid options are A, B, C, 3 Phase Composite*)

Min& Max Parameters

This menu selection allows the user to specify the Minimum range and the Maximum range for each of the specified parameters. Enter a valid number based upon the type of parameter to be displayed. (Ex. Voltage may be Min 120, Max 130, or kW may be Min 10000, Max 30000)

Update Charts

This menu selection is used to “apply” the changes to the currently open chart. After making the desired changes, the user will click this command and those changes will be

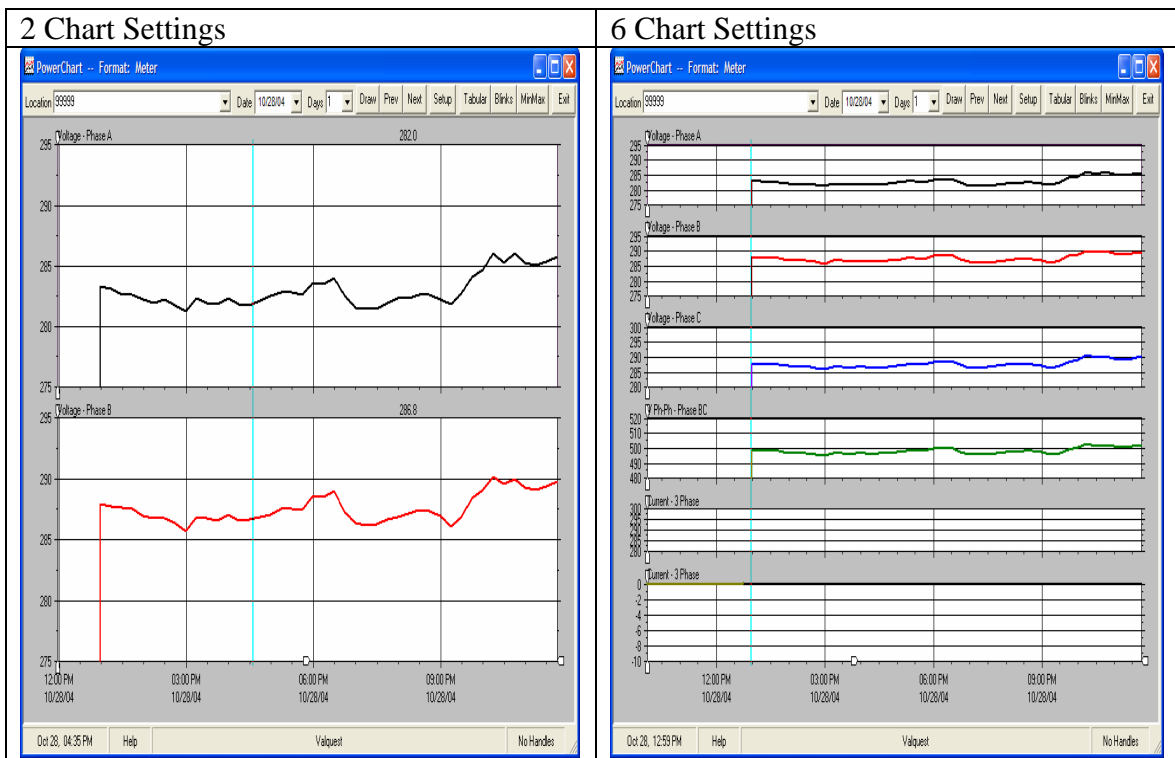


reflected in the displayed chart. If the changes are not satisfactory re-edit the incorrect parameters.

Edit

This menu selection requires that the user enable the other Graph Format Commands for editing to avoid inadvertently changing a setup condition.

Sample PowerChart Graphs





Tabular Trend Report Window

The following Tabular Tend Report window screen captures are examples of the Trend Report. The first window shows the pre-ambule information prior to the actual trend data, the second window shows the Summary information following the trend data. This information can be saved for import into excel, reports or other applications.

99999.txt - Notepad

File Edit Format View Help

Mid-west Electric Coop
Tabular Trend Report

Download Date: 12-10-2004|
Location: Smoothies
Configuration: 277 / 480 Y
From: 10/28/04
Through: 10/28/04

Date	Time	voltage A	voltage B	voltage C	kw 3Ph	3Ph
10/28/04	00:00	0.0	0.0	0.0	0.0	0.0
10/28/04	00:15	0.0	0.0	0.0	0.0	0.0
10/28/04	00:30	0.0	0.0	0.0	0.0	0.0
10/28/04	00:45	0.0	0.0	0.0	0.0	0.0
10/28/04	01:00	0.0	0.0	0.0	0.0	0.0
10/28/04	01:15	0.0	0.0	0.0	0.0	0.0
10/28/04	01:30	0.0	0.0	0.0	0.0	0.0
10/28/04	01:45	0.0	0.0	0.0	0.0	0.0
10/28/04	02:00	0.0	0.0	0.0	0.0	0.0
10/28/04	02:15	0.0	0.0	0.0	0.0	0.0

99999.txt - Notepad

File Edit Format View Help

10/28/04	22:45	286.1	290.0	290.2	0.6	0.0
10/28/04	23:00	285.3	289.3	289.5	0.6	0.0
10/28/04	23:15	285.1	289.1	289.4	0.6	0.0
10/28/04	23:30	285.4	289.4	289.7	0.6	0.0
10/28/04	23:45	285.8	289.8	290.2	0.6	0.0
Consumption					60.7	
Maximum		286.1	290.2	290.6	10.1	0.0
Minimum		281.3	285.7	286.0	0.6	0.0

Blinks Report Window

The following Blinks Report window screen capture is an example of the Blinks Report. This information can be saved for import into excel, reports or other applications.



I041210.txt - Notepad

File Edit Format View Help

Mid-west Electric Coop
Power Interruption Report

Download Date: 12-10-2004|
Location: Smoothies
Configuration: 277 / 480 Y

Beginning Date	Time	Minimum Voltage			Average Voltage			Duration	
		A	B	C	A	B	C	Cycles	Seconds
11-18-04	22:24:32	12.4	1011.	1016.	95.0	1011.	1016.	7.0	0.117
11-18-04	22:24:35	28.9	1016.	1016.	210.6	1016.	1016.	7.5	0.125
11-19-04	12:31:38	0.0	0.0	0.0	16.5	33.0	28.9	23.0	0.383

Min-Max Report Window

The following Min-Max Report window screen capture is an example of the Min-Max Report. This information can be saved for import into excel, reports or other applications.

M070625.txt - Notepad

File Edit Format View Help

Mid-west Electric Coop
Minimum-Maximum Report

Download Date: 06-25-2007
Location: Daves Home office_2
Configuration: 120 / 208 Y

	Minimums			Maximums		
	A	B	C	A	B	C
1 Minute	121.4	121.4	121.2	127.8	127.8	127.6
Date	06/23/07	06/23/07	06/23/07	06/25/07	06/25/07	06/25/07
Time	16:43:36	16:53:36	16:53:36	01:16:05	01:16:05	01:15:05
	AB BC CA			AB BC CA		
	0.0	0.0	0.0	0.0	0.0	0.0
Date	06/21/07	05/25/06	06/21/07	06/20/07	05/17/06	06/20/07
Time	09:48:26	09:40:34	09:48:26	19:32:39	03:42:37	19:32:39
	A B C			A B C		
4 Second	121.2	121.2	121.0	128.1	128.0	127.8
Date	06/23/07	06/23/07	06/23/07	06/25/07	06/25/07	06/25/07
Time	16:36:40	16:52:56	16:52:56	01:15:57	01:15:57	01:14:33
	AB BC CA			AB BC CA		
	0.0	0.0	0.0	0.0	0.0	0.0
Date	06/21/07	05/25/06	06/21/07	06/21/07	05/17/06	06/21/07
Time	17:37:58	09:40:26	17:37:58	17:37:46	03:37:13	17:37:46



Status Bar Features

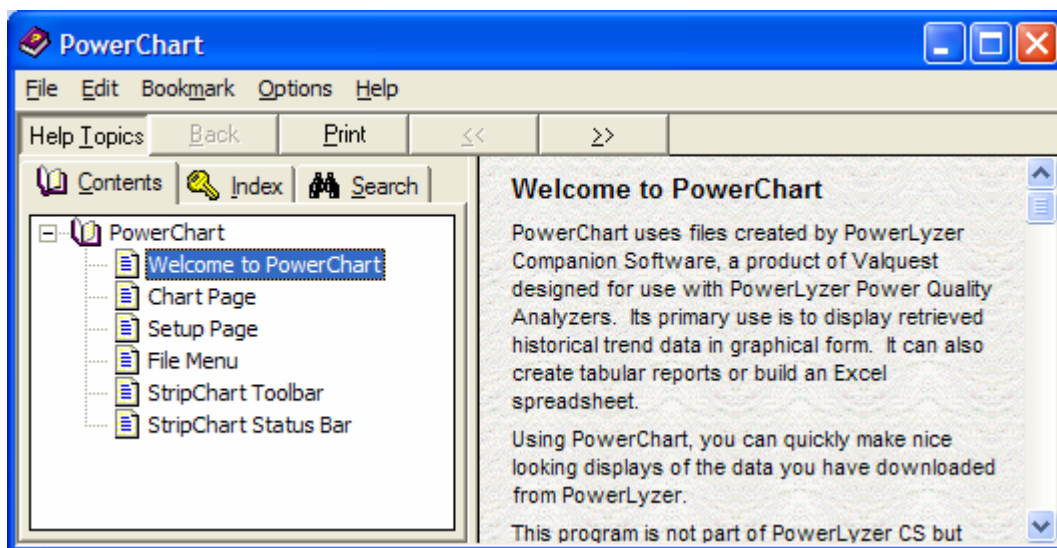
The Status bar contains a couple of user friendly tools that make the chart window and data analysis quick and convenient. Refer to the PowerChart layout illustration above.

Date-Time

The Date-Time field shows the user the actual date and time of the measurement at any given position along the time axis of the chart. *(This is present only when the Vertical Cursor has been activated on the graphic window)*

Help

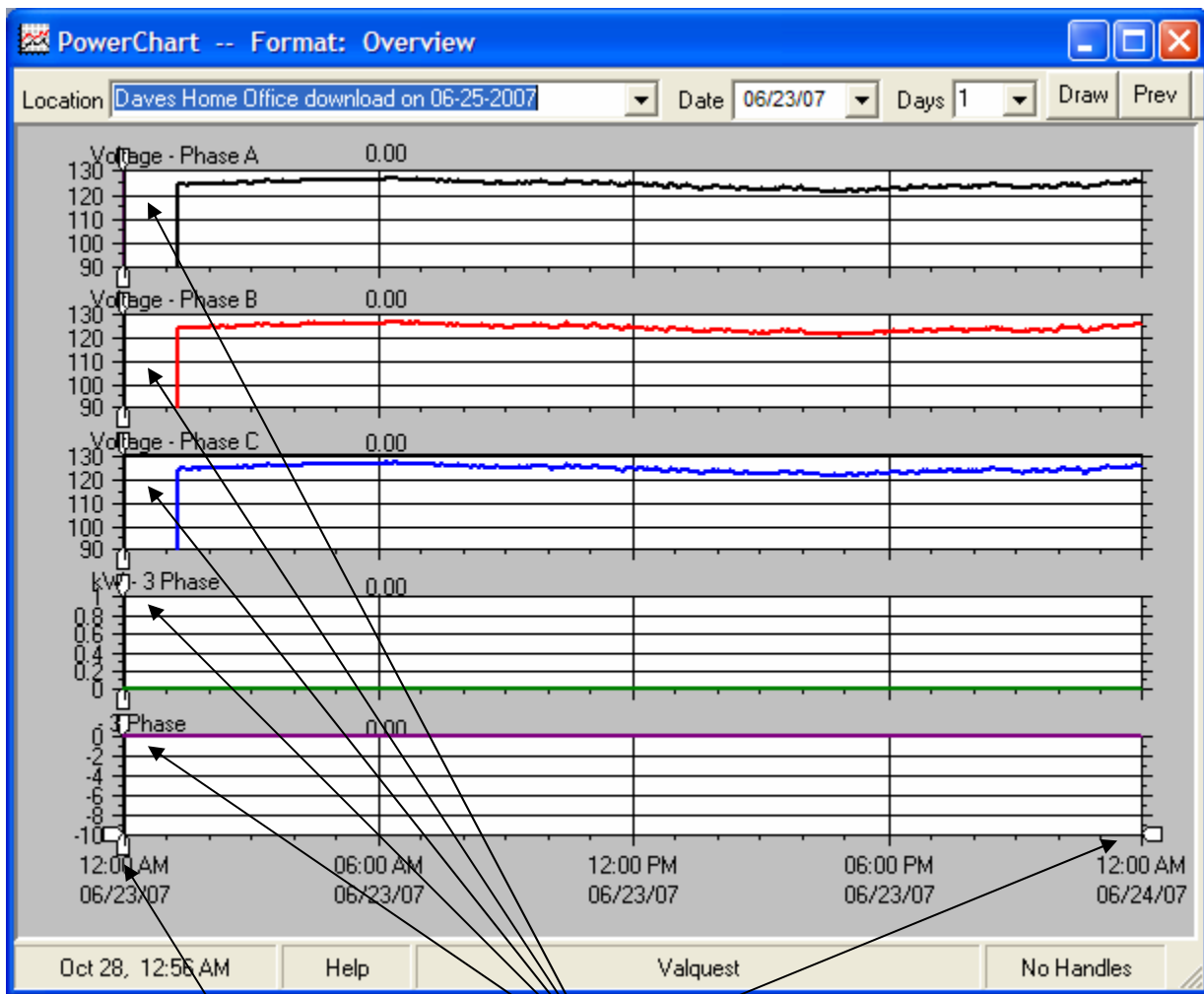
The Help field allows the user to quickly access the informative help window. Structured much like other windows applications, the help tool is user friendly and a powerful method of obtaining assistance relating to the PowerChart window and application.





Handles

The Handles field allows the operator to activate/de-activate the strip chart handles. This tool is very useful in allowing the user to expand/shrink the data on the strip chart. When activated each chart has a specific set of Vertical Handles located along the left side of the chart. The bottom chart also contains a Horizontal Handle set which allows the user to control the time period for all of the currently displayed charts. The following screen illustration shows the handles along the vertical graph axis and the horizontal graph axis.



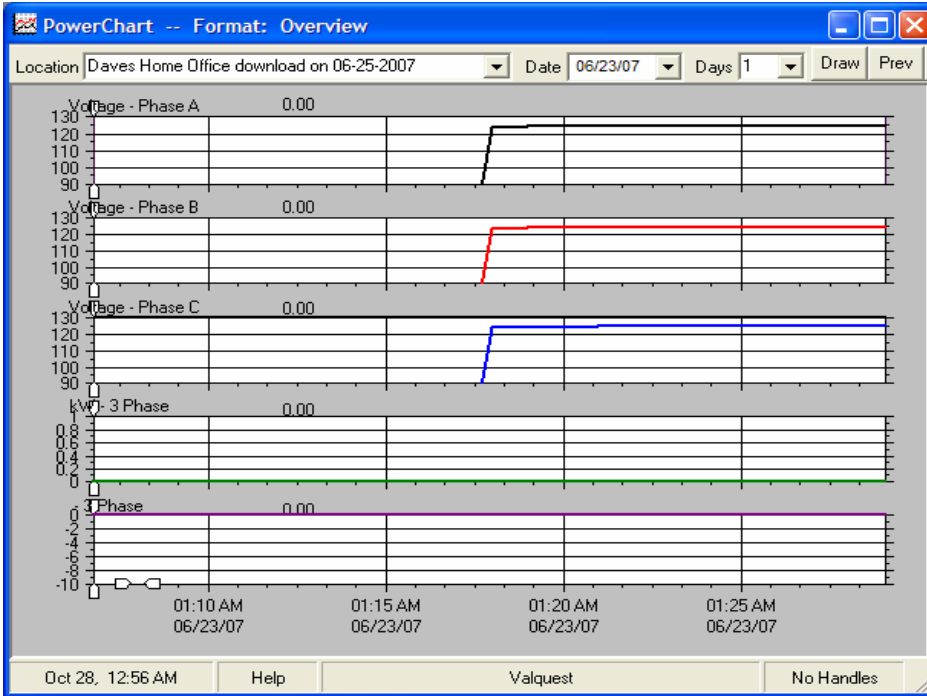
Horizontal Handle

Vertical Handles



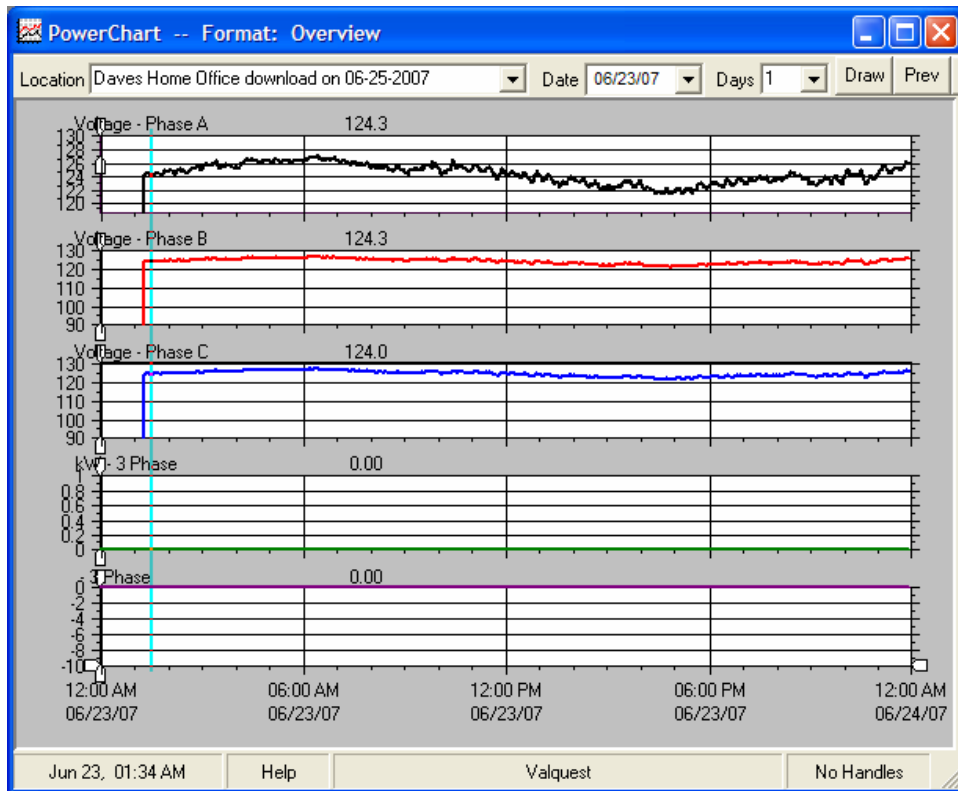
Horizontal Handles

With the handles activated, the user can see how the chart can be expanded to focus on a specific area. The following window will demonstrate a detailed look at the beginning of the measurement cycle. Note the location of the **horizontal** handles.



Vertical Handles

With the handles activated, the user can see how each strip chart can be expanded to focus on a specific area. The following window demonstrates the use of vertical handles on the top strip chart (Voltage - Phase A). Note the location of the vertical handles and the scale setting as compared to the other 2 voltage strip charts.



Mouse Control Chart Features

Some very powerful and important user features are the mouse control chart features. These features allow the user a great amount of control in data analysis simply by moving the mouse over the data contained in the strip chart.

When you move the mouse around the screen, you will notice that a pointing hand will appear when it is on one of the strips. You can see what the numeric values of the strips are by left clicking when the hand points to the desired horizontal location.

Each time you click, a vertical line will be shown which spans all the strips with values just above each strip. Down in the lower left hand corner, the **Strip Chart Status Bar** will show the date and time at the vertical line. You can make the vertical line go away by right clicking on a strip.

If you move the mouse in between the strips you will notice that it will become a sizing symbol. This allows you to change the size of the strips so that you can see the information better.

As many as six (6) parameters can be displayed simultaneously. Each parameter has its own strip with its name (Voltage A, 3 Phase kW, Current C, etc.) shown on the left just above each one. These are selected from the **Setup Page**. Each time you start PowerChart, it will remember how you had it configured and will re-configure itself the same way.



Exit

The Exit command provides a means for the user to close the Historical (PowerChart) window and return to the main Menu Bar.



Chapter 8 Download Files Management

The Download Files Management table provides the user with an outstanding method of quickly and easily displaying file data for various Powerlyzer units and data file downloads of historical trend and harmonic data (when downloaded).

Each time a download is performed the files are saved based upon the Unit ID (most commonly the Powerlyzer Serial Number) at the time of the download. The Downloaded Data window provides the user with 3 specific regions which quickly show the user information regarding the downloaded files and unit data by folder & date.

The Downloaded Files window is comprised of zones or areas which provide the user with a simple means of selecting, observing and interpreting the file data.

Unit/Serial Number List

Historical & Harmonic Files List

Date Specific Information

Downloaded Data Commands

The Downloaded Data commands consist of a set of two sets of list box's as well as two Remove command buttons which allow user control over specific file and/or folder functions and an Exit command button.



Unit Serial List Box

This Unit Serial list box is populated based upon the (Unit ID number, normally set to the serial number) as files for that Unit ID are downloaded and saved on the pc/laptop system storage drive.

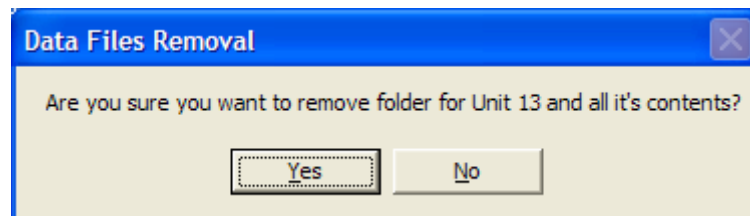
Download List Box

This menu selection allows the user to select a number of strip charts to place in the window for a specific setup. This will also determine how many parameter boxes that must be configured for the setup. (*Valid options are 1-6*)

Remove Command Button (Near Unit ID)

This command button will allow the user to specify what folders they wish to have deleted. Using this function will **Erase** all data files associated with this Unit Id number.

Example: If Unit ID 13 above were selected and then the Remove command button were selected, a popup window as follows:

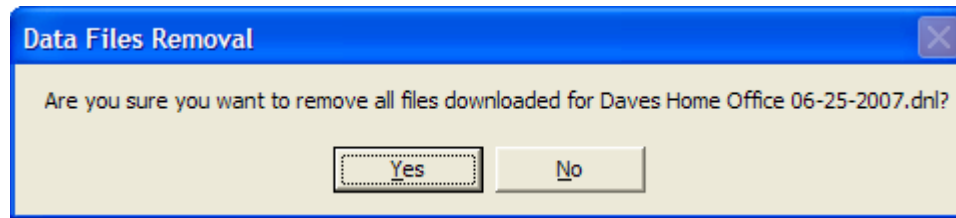


Selecting **Yes** will erase and remove the folder and all included files

Remove Command Button (Near Downloads)

This command button will allow the user to specify what individual *.dnl files they wish to have deleted and removed from the Unit ID Folder. Using this function will **Erase** the selected *.dnl data files associated with this Unit Id number.

Example: With Unit ID 13 selected in the above window there are 3 .dnl files associated with that Unit 13 ID. If the user selects, "*Daves Home Office 06-25-2007.dnl*" and then click on the Remove command button near the Downloads area, the data associated with the selected *.dnl file will be erased but not the other *.dnl files. The following popup will appear stating the results of continuing:



Selecting *Yes* will erase and remove the folder and all included files

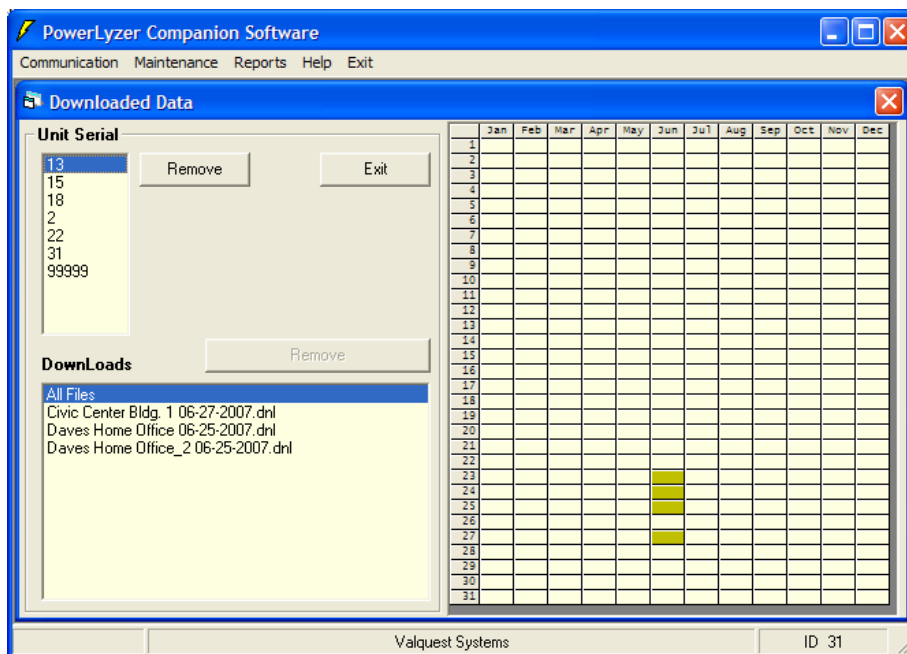
Exit

The Exit command provides a means for the user to close the Downloaded Data window and return to the main Menu Bar.

Understanding the Calendar Table

The Calendar Table provides the user with a very quick and powerful method of visually examining the file and folder information. The following illustrations provide a understanding of this tool.

Refer to the following screen capture:

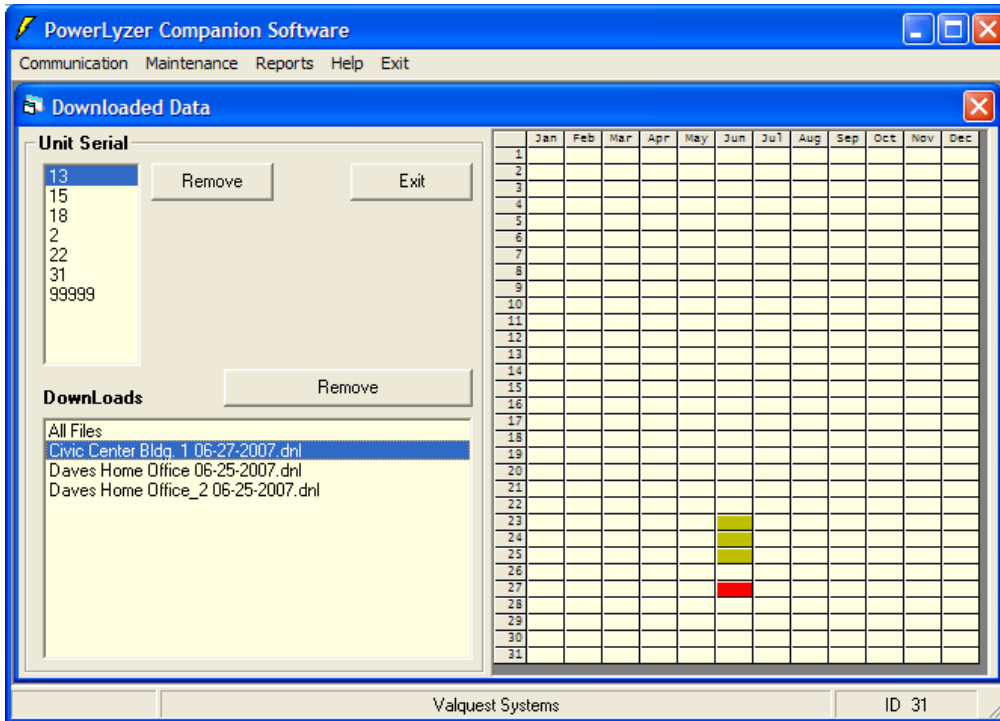




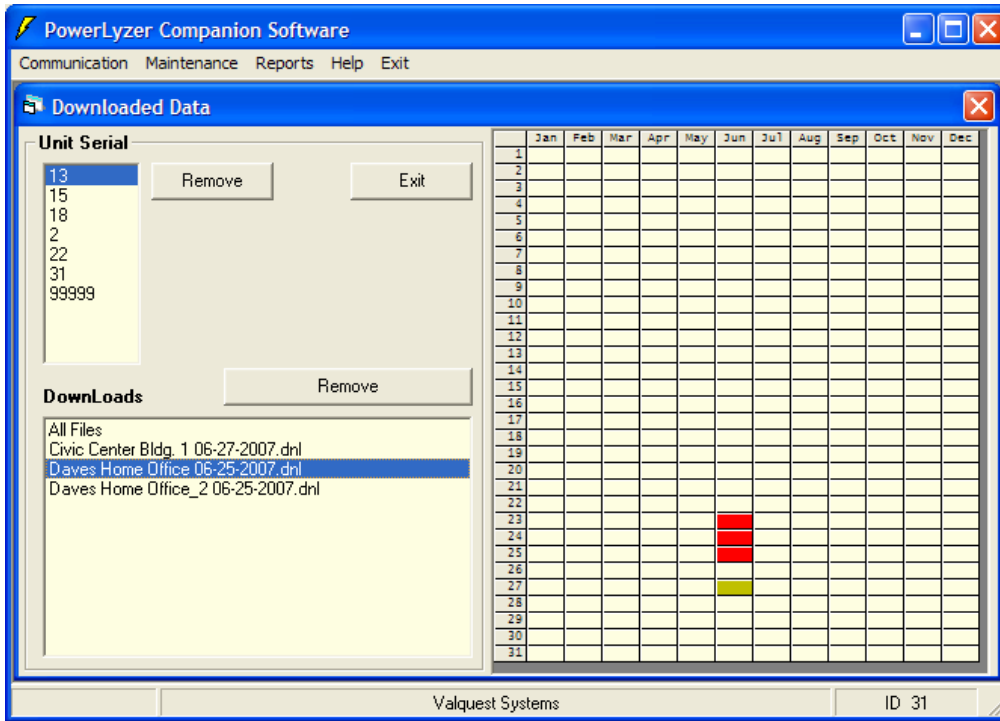
Observe the Unit Serial number 13 is highlighted or selected. When a particular Unit ID is highlighted, all of the files associated with that unique folder are displayed in the Downloads section.

Observe that in the Downloads list box, all files are selected. In this example, there are 3 unique download files. Examining the Calendar table, we can clearly see that there are 4 days of historical data present within these 3 *.dnl files, (June 23,24,25,27). All are highlighted in light green.

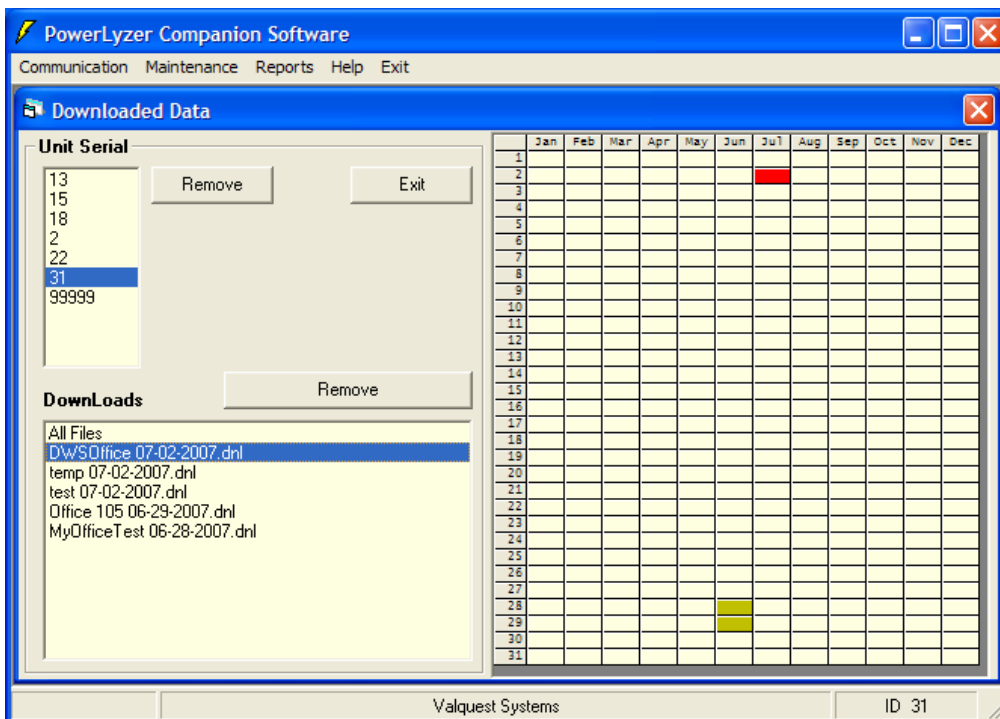
If we select the “Civic Center Bldg. 1 06-27-2007.dnl file we can observe that the June 27th cell turns “Red” in color. This indicates that the “Civic Center” file contains data from this day only. Refer to the following screen:



If we select the “Daves Home Office 06-27-2007.dnl file we can observe that the June 23, 24, 25 cells turns “Red” in color. This indicates that the “Daves Home” file contains data from each of these 3 days. Refer to the following screen:



In the next example we can see that Unit Serial 31 contains test data in 5 different download files containing test data from 3 days, June 28, 29 and July 2. Notice that with “DWSOffice” Selected there is only data which was taken on July 2.





Chapter 9 Using the Terminal TL Program

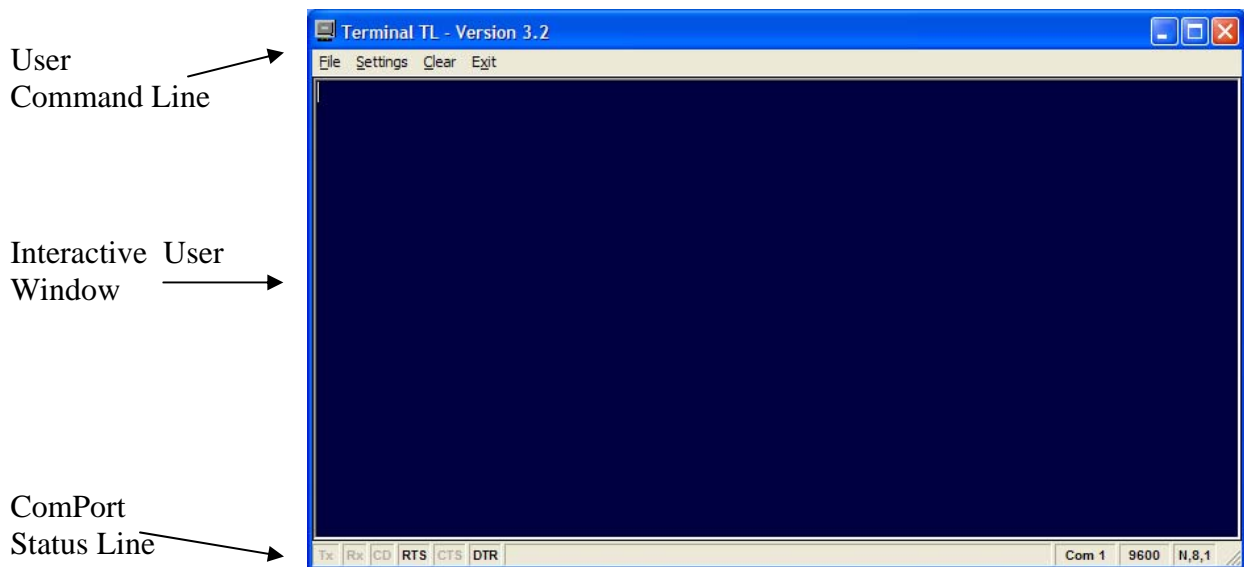
The following Chapter provides the User with the information necessary to perform specific communication functions between a pc/laptop and the Powerlyzer.



*This tool is not used for normal activity but may be helpful in evaluating and/or configuring the unit in special situations. **This activity should only be performed by qualified service technicians or personnel who have been trained or directed to perform this operation.***

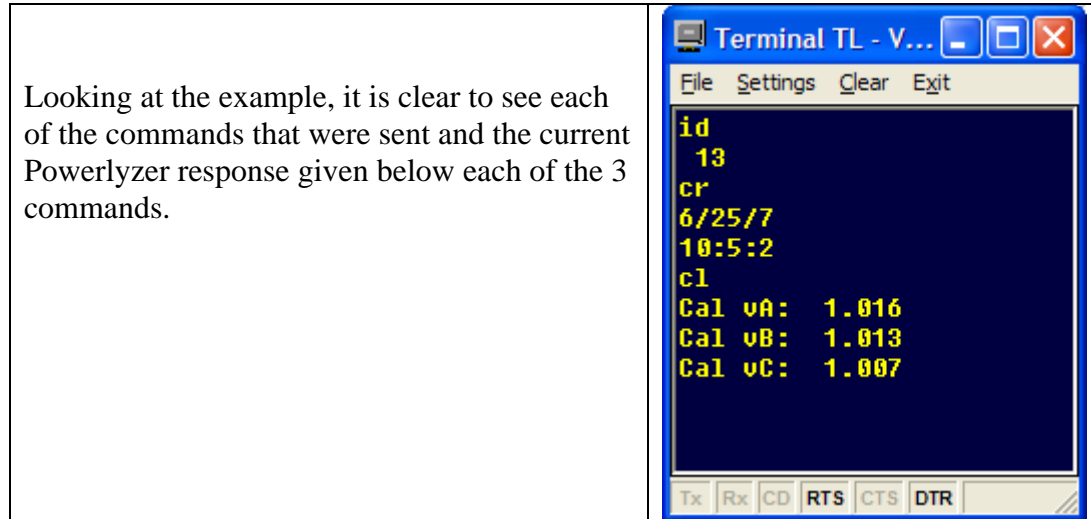
No other communications functions are available while viewing real-time parameters. Close the window in order to perform other communication functions.

The Terminal TL window consisted of 3 primary areas as shown below:





The following screen image is an example of how the user may send and receive commands within the interactive screen window. In this example, the user sends the ID, CR and CL commands to retrieve the unit id #, date and time as well as retrieving the calibration values:



Command Line Commands

File Commands

Receive File

This receive file command allows the user to create a file that acts as a data logger. This file uses the standard windows file manager routine to open and create a path and filename. Upon File Creation, all commands sent and received from the Powerlyzer will be recorded in this file as an ascii text file. *(It is recommended that this file be named *.txt for easy application viewing using a standard text editor such as: word, wordpad or notepad).*

The following display windows illustrate this operation. The left window is the screen image within the Terminal TL program. The right window is the screen image of the same parameters as they were captured into the file, "temp.txt".



NOTE
To: Operator
From: Valquest

After collecting the data within the “receive file” command or data log file, it is important to end and close the file by using the “File>>End Reciet” command.

```

Terminal TL - Versio...
File Settings Clear Exit
cp
Electrical Measurements
Phase A
Voltage: 125.4
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Phase B
Voltage: 125.3
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Phase C
Voltage: 125.1
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Totals
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0

id
13
cr
6/25/7
8:41:21
Tx Rx CD RTS CTS DTR

```

```

temp.txt - Notepad
File Edit Format View Help
cp
Electrical Measurements
Phase A
Voltage: 125.4
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Phase B
Voltage: 125.3
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Phase C
Voltage: 125.1
V Ph-Ph: 0.0
Current: 0.0
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0
Totals
kW : 0.0
kVAr : 0.0
kVA : 0.0
Pwr Ftr: 0.0
Phase : 0.0

id 13
cr 6/25/7
8:41:21

```



Transmit File



This operation is reserved for factory and authorized personnel use only!!!

Transmit Last File

This command is used to re-transmit the last Transmit file. This option provides the user with a short-cut to re-send the last transmission since you don't have to re-specify the file to send.



This operation is reserved for factory and authorized personnel use only!!!

Exit

This command will terminate and close the Terminal-TL application.

Settings Commands

The settings command are used to configure the individual serial port parameters such as baud rate, parity, port #, line break, duplex and a few other special parameters. These are



very typical commands and there functionality is the same as found in similar applications.

Clear Command

This command is used to clear the interactive window area.

Exit Command

This command will terminate and close the Terminal-TL application.

Terminal Commands

The following table provides the available communications Terminal Commands and their associated Description:

Terminal Command	Description
cp	Retrieves all monitored electrical values
hm	Retrieves waveform data
hl	Retrieves a list of stored trend dates
hi xx	Retrieves trend data for day xx
ld	Shows the maximum number of recording days
cr	Shows current date and time
dt y,m,d,h,m,s	Sets the date and time
bk	Retrieves all recorded blinks
cl	Shows calibration values
cl p xxxx	Sets calibration value for phase p to x.xxx
rp t,dd	Sets recording parameters to Type Index = t and Period = dd
cc i,r,ooo	Sets current parameters to range index = I, ratio = r and offset = ooo
vc c,f	Sets voltage parameters to configuration index = c and freq index = f
rc	Shows all various parameters
mm	Retrieves Min/Max data
id	Shows unit ID
id xxxxx	Sets unit ID to xxxxx
nt	Retrieves note
nt <Message>	Sets note to <Message>



Chapter 10 Powerlyzer Calibration

The following paragraphs provide the User with the information necessary to perform the calibration process on the Powerlyzer.

Tools & Equipment

The calibration process will require the following equipment:

- A pc/laptop with the Powerlyzer connected
- The Powerlyzer Companion Software application
- Calibrated True RMS Voltmeter with test leads
- Multi-functional AC Input Cable (3 Phase Leads)

Setup

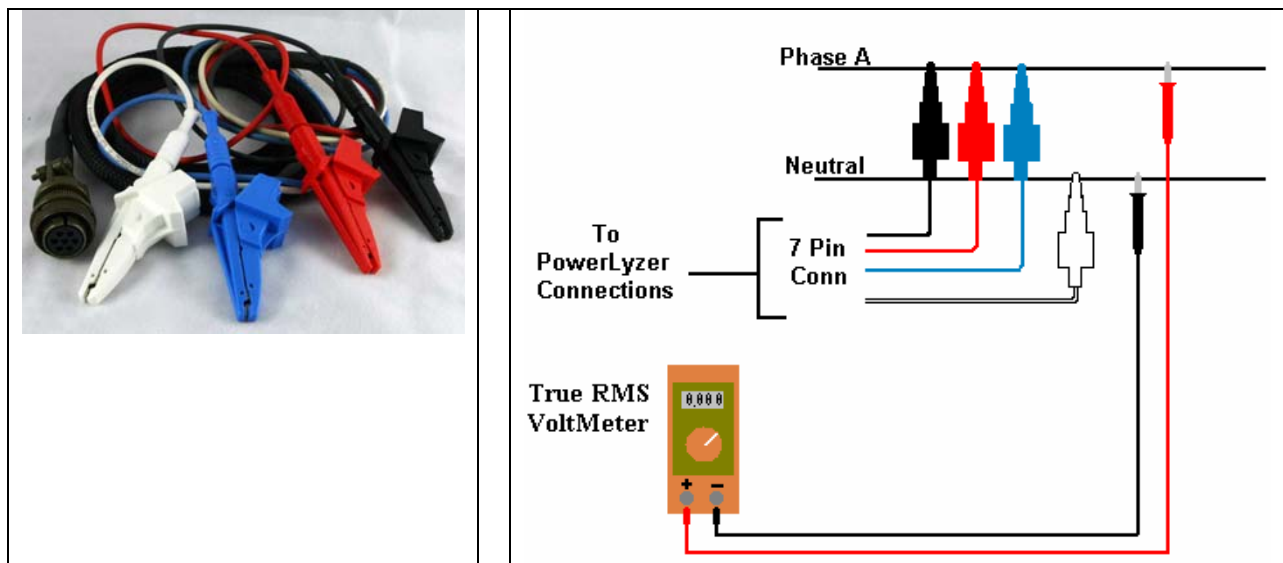
Connect the Powerlyzer and pc/laptop as shown in either of the configurations as shown above in Chapter 3.

Connect the Multi-functional AC Input Cable to the Powerlyzer via the 7 Pin Mating connectors.

Connect the AC Input Cable Neutral alligator clip lead to the Neutral signal of a voltage source and the alligator clips on **all (3) phases** to a very stable 120V/60Hz Phase or Line signal.

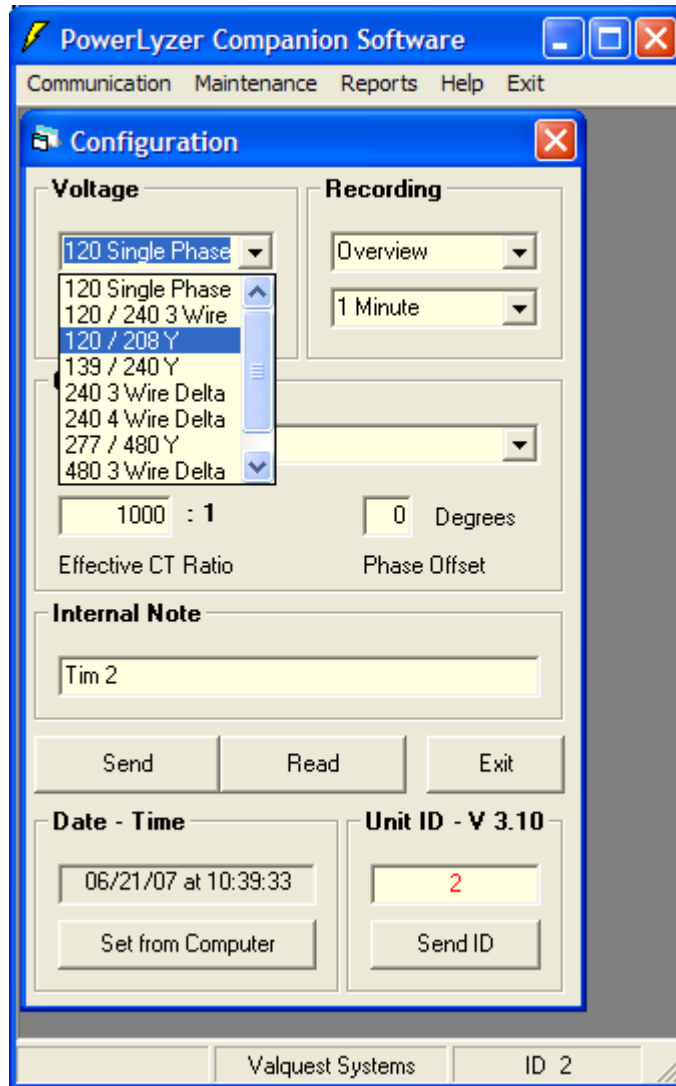
Connect the positive test lead of a TRUE RMS Voltmeter across the Phase or Line signal and the Negative test lead to the Neutral signal of a voltage source.

The following pictures illustrate the setup:





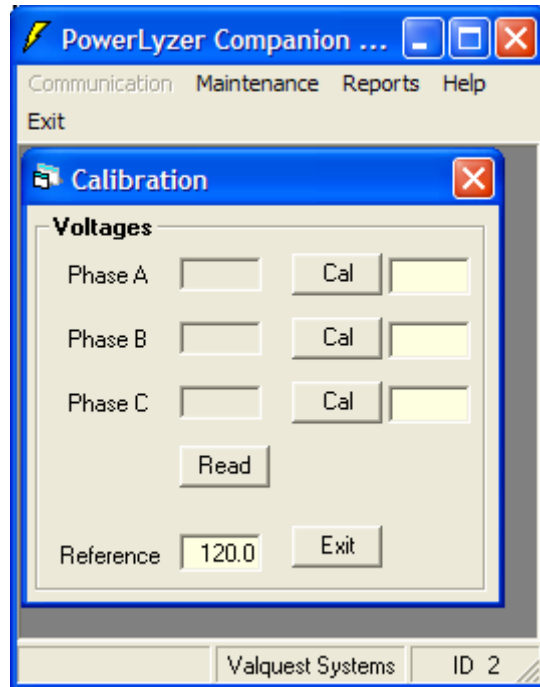
When connected to the voltage source, the Powerlyzer display will contain voltage information. Using the PCS, select the **“Communications”** menu and then select the **“Configuration”** window. In the Voltage section of the Configuration window, use the drop down box and select the **“120/208 Y”** configuration option as shown below:



After selecting the 120/208 Y option, click the **“Send”** command button to update the Powerlyzer.

Select the **“Communications”** menu selection and select the **“Calibration”** menu command.

In the textbox labeled Reference, enter the reading from the **TRUE RMS VOLTMETER**. The example shown below shows a 120.0 volt reading being entered:



Verifying that the Phase A voltage reading is stable and the Reference value entered are equal, click the **“Read”** button above the Reference textbox. This forces the Powerlyzer to take measurements on each phase and display the results for each phase in the appropriate text box.

Click the Phase A **“Cal”** command button and wait for the Phase A offset correction value to update. *(This value will typically be around 1.000 +/- 0.020, depending upon line stability)*

Again enter a Reference Value as read from the True RMS Voltmeter.

Verifying that the Phase B voltage reading is stable and the Reference value entered are equal, click the **“Read”** button above the Reference textbox. This forces the Powerlyzer to take measurements on each phase and display the results for each phase in the appropriate text box.

Click the Phase B **“Cal”** command button and wait for the Phase B offset correction value to update. *(This value will typically be around 1.000 +/- 0.020, depending upon line stability)*

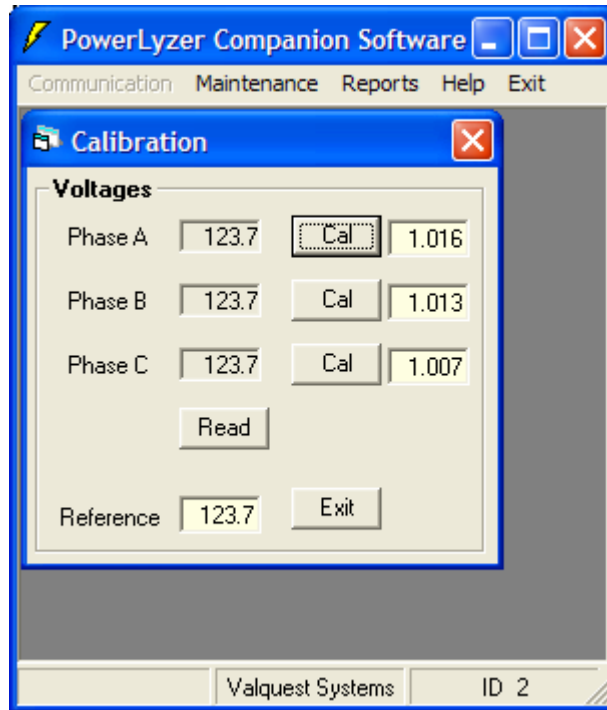
Again enter a Reference Value as read from the True RMS Voltmeter.

Verifying that the Phase C voltage reading is stable and the Reference value entered are equal, click the **“Read”** button above the Reference textbox. This forces the Powerlyzer to take measurements on each phase and display the results for each phase in the appropriate text box.



Click the Phase C “**Cal**” command button and wait for the Phase C offset correction value to update. (This value will typically be around 1.000 +/- 0.020, depending upon line stability)

Verify that all 3 of the Phase voltages were read correctly and closely match the Reference values as shown in the window illustration below:



If so, click the “**Exit**” button to exit calibration. If the Phase voltage readings were incorrect or reading to high/low compared to the True RMS voltmeter, repeat the procedure from the beginning until successfully completing the calibration process.



Chapter 11 Practical Exercises

The following exercises have been designed to provide the user with training material using real life scenarios and applications. *It is assumed that the user has read and studied the User Manual as well as the Software Companion Users Guide (Chapters 1-10) before beginning these exercises and the user is familiar with the hardware and software setup as described within these documents.*

Practical Exercise 1 – Configuring For Field Recording

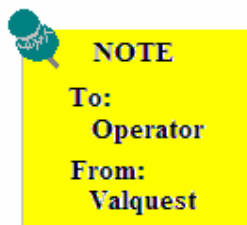
Hardware Setup

Connect the Powerlyzer to the pc/laptop using a serial or usb/serial connection.

Connect the Powerlyzer to standard 120v/1p/60Hz power using the single phase power cord.

Verify that the LCD display contains unit information and/or voltage information.

When the Powerlyzer LCD display is showing voltages, rotate the knob to the right to show the record mode. This should be set to **Record Mode Off**. If **Record Mode On** is displayed, press the Enter button to obtain a **Record Mode Off** setting.



This exercise assumes that any data that is contained within the Powerlyzer is not needed or has previously been downloaded.

Software Setup

Start & run the Powerlyzer software application on the pc/laptop.

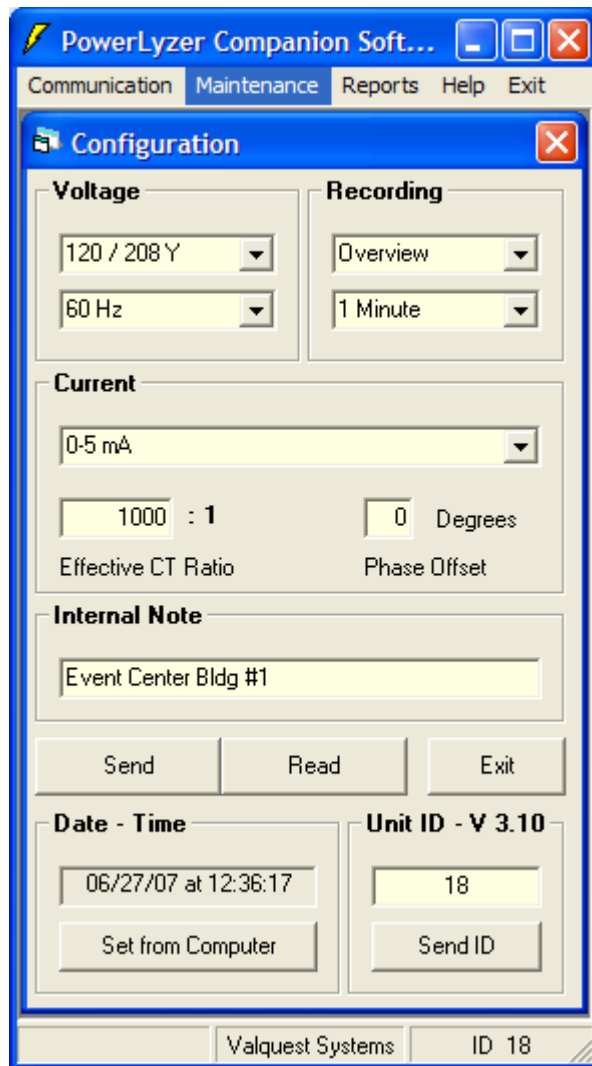
From the Communications command, select the Configuration option to open the Configuration settings. Set the configuration settings appropriately for the type of service to be monitored. *(This should be known ahead of time and the appropriate parameters determined before proceeding)*



Example Requirements:

Location (Note)	Event Center Bldg #1
Service Type:	120/208v 3 phase
Current:	Not Monitored
Measurement Interval:	1 min
Recording Mode:	Voltage

Set the Configuration Parameters as follows:



After each of the specified parameters has been set, press the Send command button to update the Powerlyzer with this configuration. The unit is now configured and ready to take to the field.

Close the Powerlyzer application.



Disconnect the Powerlyzer Line cord from the unit and connect the 3 phase multi-conductor voltage cable assembly.

Disconnect the serial cable from the unit.

Take the Powerlyzer and the 3 phase multi-conductor voltage cable assembly to the jobsite.

You are ready to proceed with Field Installation and initiating the field recording session



Practical Exercise 2 – Initiating Recording in the Field

Pre-requisite actions: Practical Exercise 1 must have been properly completed prior to performing this exercise.

After arriving at the jobsite (Civic Center Bldg 1), perform your safety evaluation and inspection of the area in which you will be installing and locating the Powerlyzer.



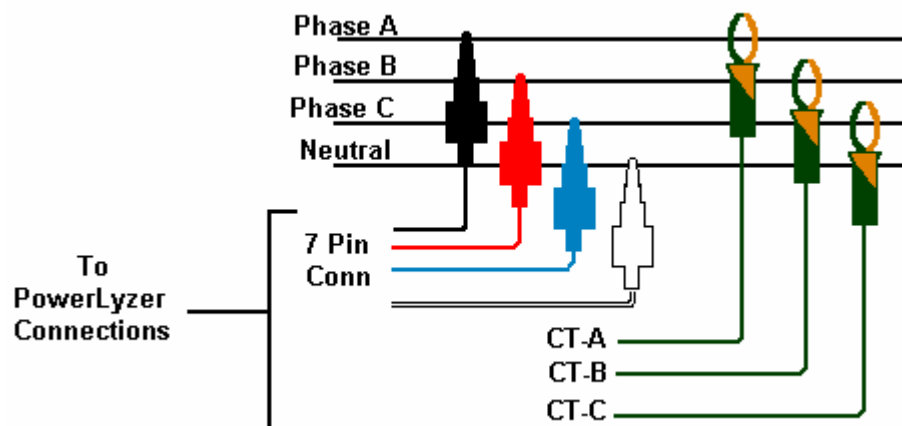
If you have not read the Warnings and safety information found on Page 4 please do so before continuing!!!

When using the multi-phase power cable, use Standard Connection chart for each voltage lead to in order make quick and easy identification of each conductor phase. This will ensure proper connections to your power service.

Standard Connection Chart

Black Conductor	Phase A
Red Conductor	Phase B
Blue Conductor	Phase C
White Conductor	Neutral

Connect the Powerlyzer to the supply as shown (*ignore the CT clamps as we are not monitoring current in the example*)

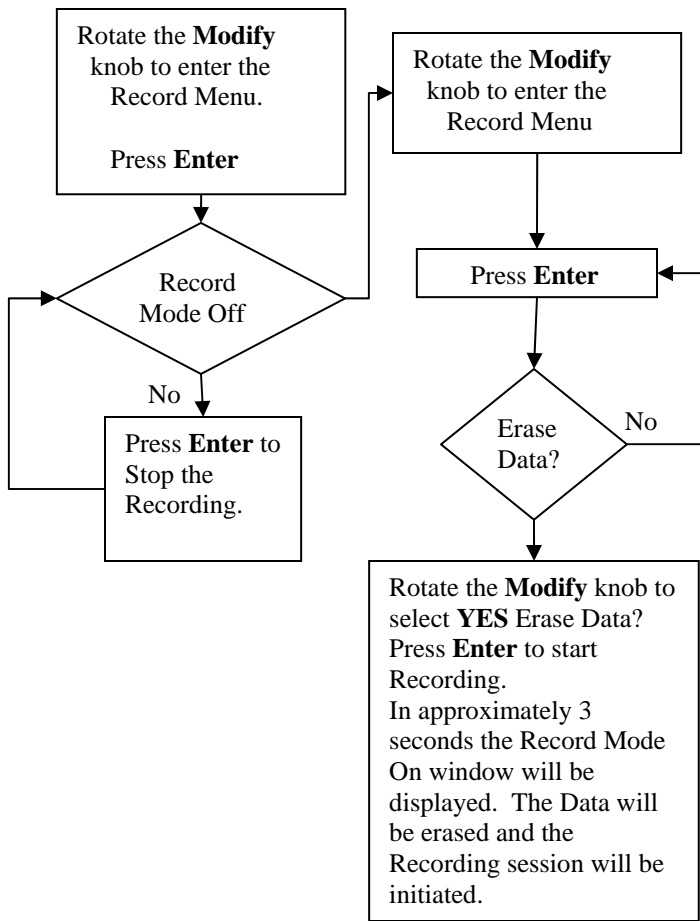




After connecting the Powerlyzer to the service, the unit should be displaying voltage information in the LCD screen. The voltage for phase A, B, and C should be displayed as shown:



Rotate the “**Modify**” knob clockwise to obtain the Record Mode Status screen. It should be displaying **Record Mode OFF**, if the screen shows **Record Mode ON**, then press the “**Enter**” button to stop recording mode. Use the flowchart and illustrations below to obtain the proper setup.



The unit is now recording the voltage information at an interval of 1 minute.

Rotate the “**Enter**” knob counter-clockwise to return to the voltage screen.

The Powerlyzer will operate unattended and take the required measurements for up to 4 days. (Refer to the Recording Interval chart in Chapter 5)



Practical Exercise 3 – Terminating Field Recording

Pre-requisite actions: Practical Exercise 1 & 2 must have been properly completed prior to performing this exercise.

After arriving at the jobsite (Civic Center Bldg 1), perform your safety evaluation and inspection of the area where the Powerlyzer was located.



If you have not read the Warnings and safety information found on Page 4 please do so before continuing!!!

Visually examine the display and verify that the voltages are present in the LCD display. If not, depress the “**Enter**” button until the voltages are displayed.

Rotate the “**Modify**” knob clockwise to show the Record Mode. It should be displaying Record Mode ON (and this will be assumed for this exercise), if it is showing Record Mode OFF then it was not properly placed into Record Mode or it was inadvertently turned off. (The Data will be non-existent or questionable depending on the circumstances.)

Depress the “**Enter**” button to STOP the Record Mode. It should now show “**Record Mode OFF**”.

Disconnect each of the voltage clamps from the service being tested.

Transport the Powerlyzer back to the office for data analysis.



Practical Exercise 4 – Download & Analyze Data

Pre-requisite actions: Practical Exercise 1, 2 & 3 must have been properly completed prior to performing this exercise.

This exercise will provide the user with information relating to file downloading and analyzing the data using the PowerChart graphical environment.

It is assumed the Powerlyzer has been returned from the field and now ready to have the stored information downloaded and analyzed.

Hardware Setup

Connect the Powerlyzer to the pc/laptop using a serial or usb/serial connection.

Connect the Powerlyzer to standard 120v/1p/60Hz power using the single phase power cord.

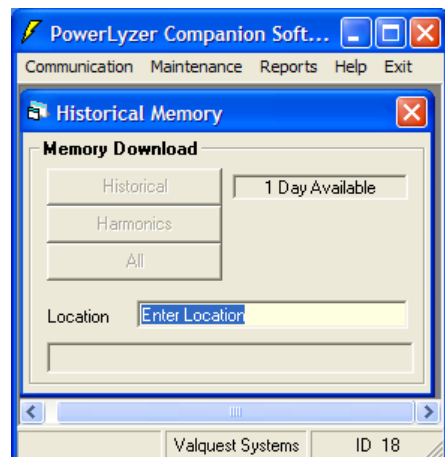
Verify that the LCD display contains unit information and/or voltage information.

When the Powerlyzer LCD display is showing voltages, rotate the knob to the right to show the record mode. This should be set to **Record Mode Off**. If **Record Mode On** is displayed, press the Enter button to obtain a **Record Mode Off** setting.

Software Setup & Data Download

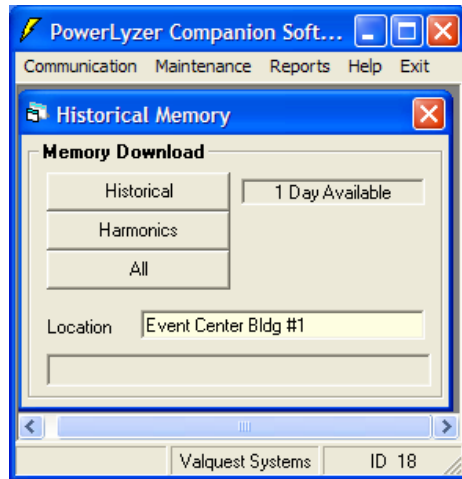
Start & run the Powerlyzer software application on the pc/laptop.

Under the Communication Window select the “**Download**” command to open the Historical memory window. Refer to the following illustration:

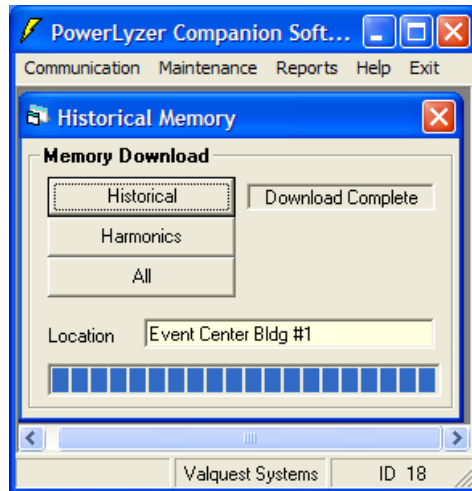




Enter “Event Center Bldg #1” for the location. (This will allow the additional commands to be used.)



Click the “**Historical**” command button. This will begin the download process. When the download is complete, the window will appear as shown below. Close the Historical Memory window by clicking on the window close (x) command button.

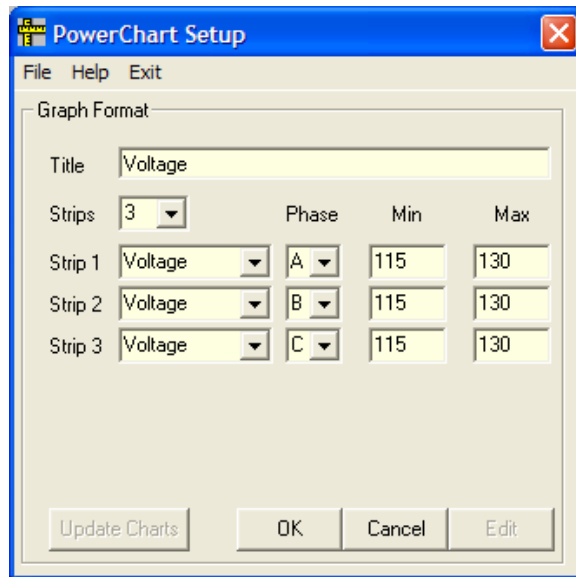


Data Analysis

On the Main command line click on “**Reports**” menu selection and select the “**Historical**” menu selection to open up the PowerChart window.

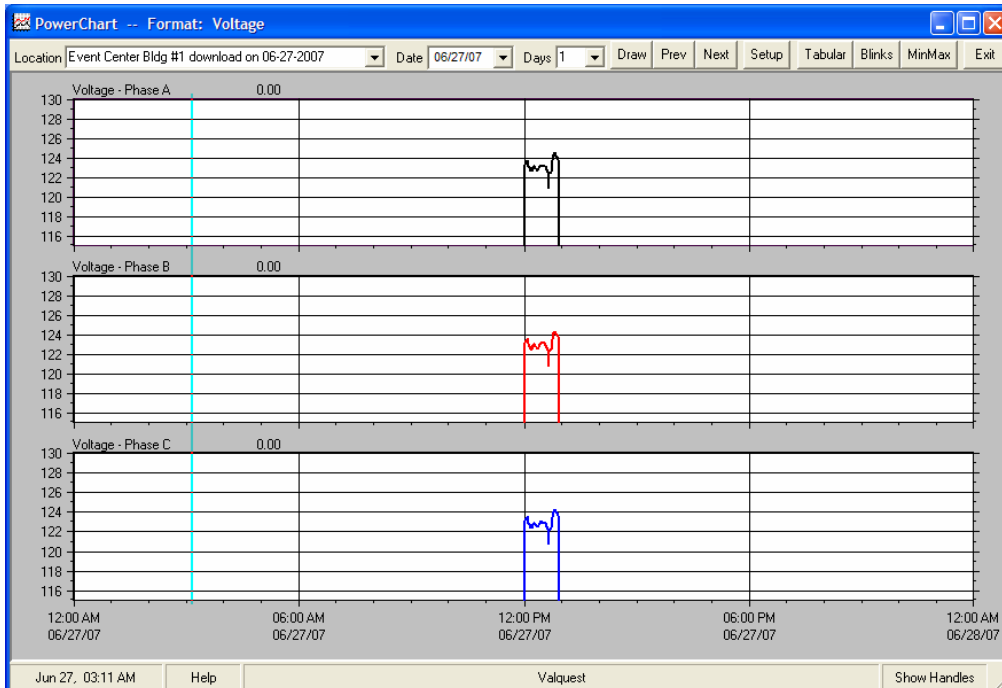
In the Location textbox, select the “Event Center Bldg #1 download on mm-dd-yyyyy”

Select the “**Setup**” command button to open the PowerChart Setup window, click the “**Edit**” command button and set the parameters as follows:



Click the “**OK**” button and then click the “**Update**” Charts button. Exit the PowerChart Setup.

A similar window will be displayed. Data-time information and voltage levels will vary based upon actual test scenario used.





Select the “**Tabular**” command button to see detailed trend data. The following screen shots are different sections of the tabular report and displayed to condense the main information. The window shows the preamble information.

Event Center Bldg #1 download on 06-27-2007.txt - Note...

File Edit Format View Help

Daves Electric Coop
 Tabular Trend Report

Download Date: 06-27-2007
 Location: Event Center Bldg #1
 Configuration: 120 / 208 Y
 From: 06/27/07
 Through: 06/27/07

Date	Time	voltage A	voltage B	voltage C
06/27/07	00:00	0.0	0.0	0.0
06/27/07	00:01	0.0	0.0	0.0
06/27/07	00:02	0.0	0.0	0.0
06/27/07	00:03	0.0	0.0	0.0

The window below shows the actual voltage area of captured data:

Event Center Bldg #1 download on 06-27-2007.txt - Notepad

File Edit Format View Help

06/27/07	12:19	123.2	123.0	122.9
06/27/07	12:20	122.9	122.8	122.7
06/27/07	12:21	122.9	122.8	122.6
06/27/07	12:22	122.7	122.6	122.5
06/27/07	12:23	122.8	122.7	122.6
06/27/07	12:24	122.8	122.6	122.5
06/27/07	12:25	122.9	122.7	122.6
06/27/07	12:26	123.1	123.0	122.8
06/27/07	12:27	123.1	123.0	122.9
06/27/07	12:28	123.3	123.2	123.1
06/27/07	12:29	123.3	123.2	123.1
06/27/07	12:30	123.2	123.1	123.0
06/27/07	12:31	123.2	123.1	122.9
06/27/07	12:32	123.2	123.1	123.0
06/27/07	12:33	123.2	123.1	122.9

The window below shows the end of the data file information and provides the Consumption information:



Date	Time	Value 1	Value 2	Value 3
06/27/07	23:56	0.0	0.0	0.0
06/27/07	23:57	0.0	0.0	0.0
06/27/07	23:58	0.0	0.0	0.0
06/27/07	23:59	0.0	0.0	0.0
Consumption				
Maximum		124.5	124.3	124.2
Minimum		120.9	120.8	120.7

Close the Tabular (Notepad) window.

Clicking on the “**Blinks**” command button we will see the following information based upon the data. (This data was taken during a different time period than the other reports, it is shown here as an example of the Blinks report.)

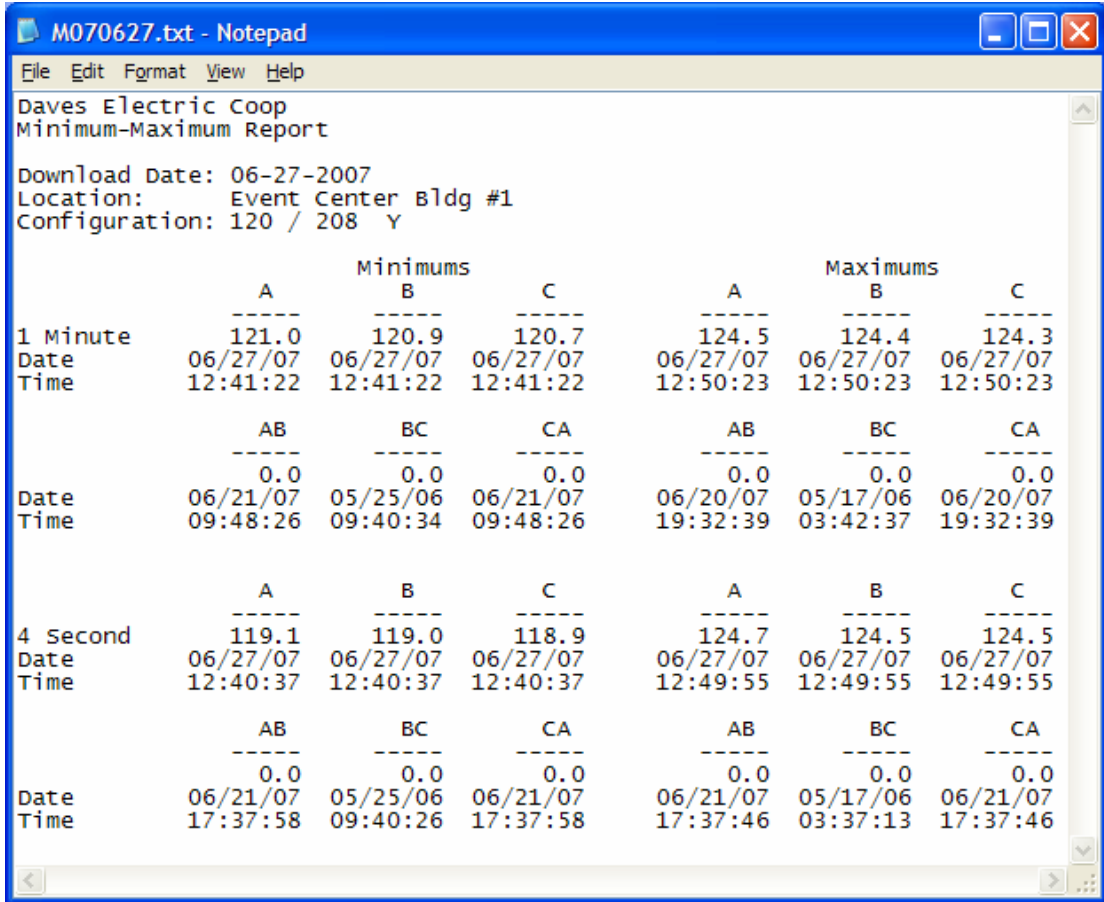
Daves Electric Coop
Power Interruption Report

Download Date: 06-28-2007
Location: Bldg 105
Configuration: 120 / 208 Y

Beginning Date	Time	Minimum voltage			Average voltage			Duration	
		A	B	C	A	B	C	Cycles	Seconds
06-27-07	18:49:40	69.8	69.8	71.6	73.3	73.3	75.1	39.0	0.650
06-27-07	18:49:42	73.3	73.3	73.3	75.1	75.1	75.1	41.5	0.692
06-27-07	18:49:47	69.8	71.6	71.6	73.3	73.3	73.3	40.0	0.667
06-27-07	18:49:58	71.6	71.6	71.6	73.3	73.3	73.3	36.5	0.608
06-27-07	18:50:06	71.6	71.6	71.6	73.3	73.3	73.3	38.5	0.642

Close the Blinks (Notepad) window.

Clicking on the “**Min-Max**” command button we will see the following information based upon the data.

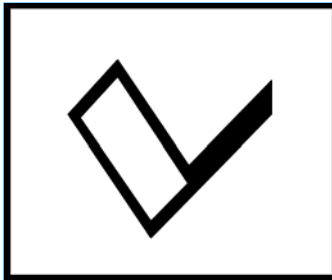


Close the Min-Max window.

Close any open Powerlyzer Companion Software windows that may have been left open and exit the application. Remove the cables from the Powerlyzer and store the cables and Powerlyzer in a safe place until next use.



About Valquest Systems, Inc.



Valquest Systems What Sets Us Apart

We *Stand* for building strong Client relationships and providing exceptional service and products.

Our *Vision* is to be a leading provider of monitoring and control equipment to small electric utilities on a national basis.

Our *Purpose* is to improve the efficiency of electricity transmission and distribution in America.

Our *Commitment* is to create optimal long-term approaches for our Clients needs.

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