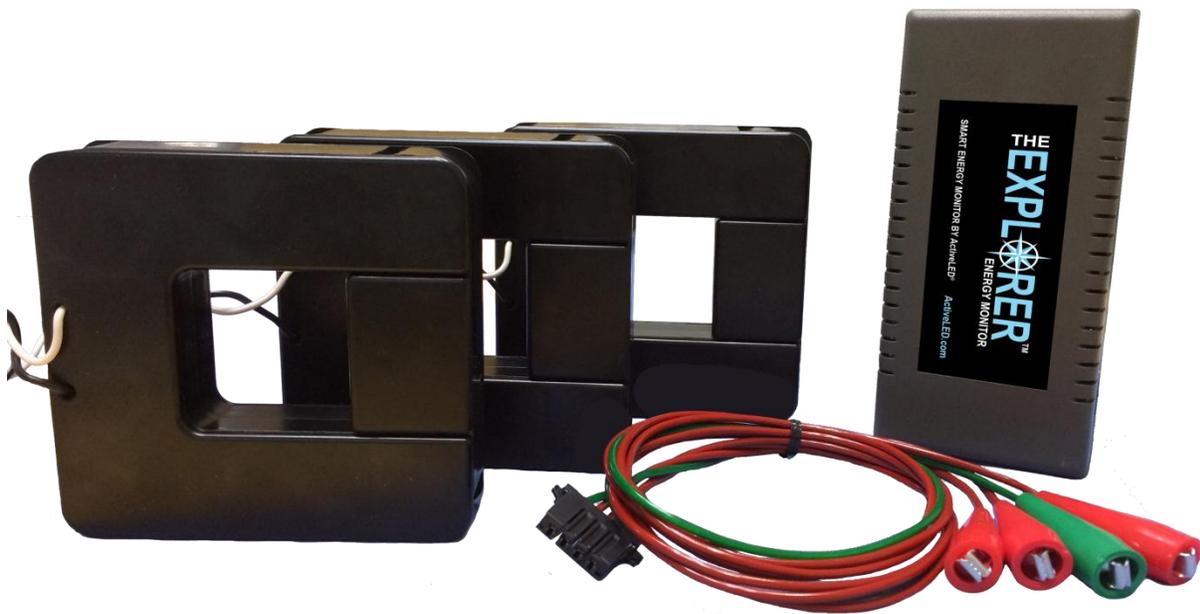




Explorer Energy Monitor Application Guide

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NOTE:

Because of the fast pace of software development it is possible that there will be minor differences between the manual and the actual release of the program.

Trademarks

All trademarks are hereby acknowledged.

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Introduction

The Explorer Energy Monitor Pro is a 3-phase current transformer data logger with an Ethernet, USB, or Wi-Fi interface. The Explorer Energy Monitor may be programmed to monitor various different aspects of electrical power.

The application has multiple modes of operation. It is first used to set up the Explorer Energy Monitor so that it may collect data. Later it is used to retrieve and analyze that data. It may also analyze data as it arrives in real time.

The part number for the Ethernet Professional version of the product is 00-11-0568-110-P
The part number for the Wireless Professional version of the product is 00-11-0568-110-PW
The part number for the Ethernet Home version of the product is 00-11-0568-110-U
The part number for the Wireless Professional version of the product is 00-11-0568-110-UW

Explorer Energy Monitor Hardware

The Explorer Energy Monitor is available with an Ethernet, USB storage, or Wi-Fi interface.

Ethernet Connected

The device is connected to a LAN and may be powered by 12 Volts DC. In this mode the unit may send emails or other alerts when programmed conditions are encountered or in response to a programmed schedule. Data may be transmitted on the LAN and also stored on an external flash drive. The User interface will be through a web browser.

USB Flash Drive Storage

Data may be transmitted to an external flash drive.

The Explorer Energy Monitor offers a USB port for connection of a Flash Drive. Data samples will be written to a compatible Flash Drive as they are obtained and may be viewed and analyzed later. The Flash Drive may be removed (when safe to do so) and plugged directly into a PC for data analysis using the Energy Analyzer application.

The Flash Drive must use the 'USB Mass Storage Class' with a sub-class of 'SCSI transparent' and the transport protocol 'Bulk-Only Transport'.

Examples of Flash Drives that use these standards are:

ActiveLED USB 2.0 1GB	Toshiba 2GB
Pretec I-Disk	Verbatim 8GB (formatted for 2GB)
SanDisk 1GB Cruzer Micro	

The Flash Drive must be formatted as FAT or FAT16.

The Explorer Energy Monitor expects a file named "DATALOG.BIN" in the root directory and the data area of that file to be contiguous. Once created, the same file will be re-used. Do not move or copy the file on the drive as this may result in fragmentation and the possible corruption of the disk storage structures.

The file size determines the maximum number of samples that may be stored within it. At the maximum file size of 512MB, approximately 16.7 million data sample records may be stored, 19.4 days when sampling at a 1/10 second frequency.

Explorer Energy Monitor Windows Application

The companion application provided is used to configure, program and monitor one or more devices.

Configure

The term “configure” means setting up the Explorer Energy Monitor’s name, TCP/IP, E-mail, and Time & Date parameters.

Program

This refers to instructing the Explorer Energy Monitor when to start sampling and how often.

Monitor

This function is used to:

- 1) Set the application to listen to the device
- 2) Set it to collect records and determine where the record file is kept
- 3) Whether to save records and/or logs.

Records are binary data.

Log Records are interpreted records that are readable text.

Connecting an Explorer Energy Monitor

Types of Service Supported

Supported electric services include 50 or 60-hertz, alternating current, single-phase or three-phase.

Nominal secondary voltages are listed below:

Type	Volt (nominal)	Conductors	Mode	Description
Single-phase	100 to 240-Volt	two-wire, grounded	00	Mainly Japan and US small user power
Single-phase	120/240-Volt	three-wire, grounded	00	Mainly US Household power
Three-phase	208Y/120-Volt	four-wire, grounded, wye	10	US 3 phase
Three-phase	385Y/220-Volt	four-wire, grounded, wye	10	Mainly Germany high power users, In Germany also used as Household Power.
Three-phase	420Y/230-Volt	four-wire, grounded, wye	10	Mainly UK, Canada, Australia high power users
Three-phase	480Y/277-Volt	four-wire, Delta	11	Mainly US
Three-phase	208 to 480-Volt	three wire, Delta	01	US, Europe, Japan high power user

Programming Location

For convenience, an Explorer Energy Monitor should be configured before locating it at the place where it will be coupled to the power lines. Although this is not mandatory, there may not be easy access to the network.

For the purpose of programming, connect the device to the network in any convenient location.

Connect the power supply into the wall socket and the Explorer Energy Monitor.

Once programmed and ready to install



- 1) Plug in the USB Flash Drive if being used.
- 2) If Ethernet is available, plug the Ethernet cable into the RJ45 jack.

To connect to the Explorer Energy Monitor using Wi-Fi (optional) the default network name is Energy Monitor.

IMPORTANT NOTE: The user should exercise caution in connecting the voltage and current inputs since the connection points may be live. It would be best to disconnect power when connecting but that may not be practical in all cases. Inspect the voltage and current sensing cables for damaged insulation and exposed conductors before each use and do not use if damage is found. Replacement voltage cables and current transformers may be purchased from ActiveLED and current transformers with damaged cables may be returned for repair.

- 3) There is only one way to connect the voltage and current sensing cables to the Explorer Energy Monitor:
 - ./ The current transformers clip around current-carrying conductors and connect to the Explorer Energy Monitor at the AØ, BØ, and CØ Current inputs.
 - ./ The red connectors are used to measure voltage.
 - ./ The green connects to the neutral (grounded) conductor.
 - ./ The red wires connect to each of the 3 voltage phases. The red wire adjacent to the green wire is for the CØ. The next red wire is the BØ. The last red wire is the AØ.

- 4) Connect the power supply into the wall socket and the Explorer Energy Monitor.

Configuring an Explorer Energy Monitor

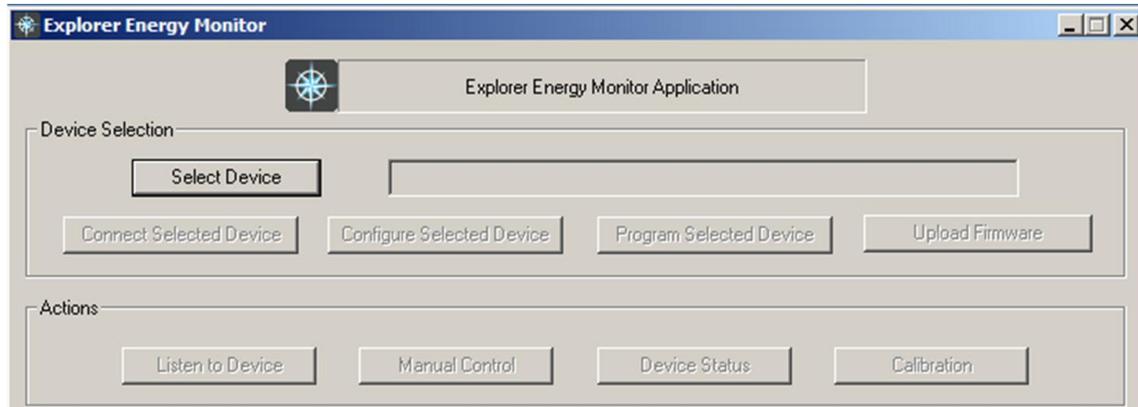
Network configuration of an Explorer Energy Monitor device may be done using the Energy Analyzer Application or a web browser. Basic setup includes setting the device IP address, specifying the e-mail server address and destination e-mail recipients for alert messages.

For configuration using a web browser, please go to page 26.

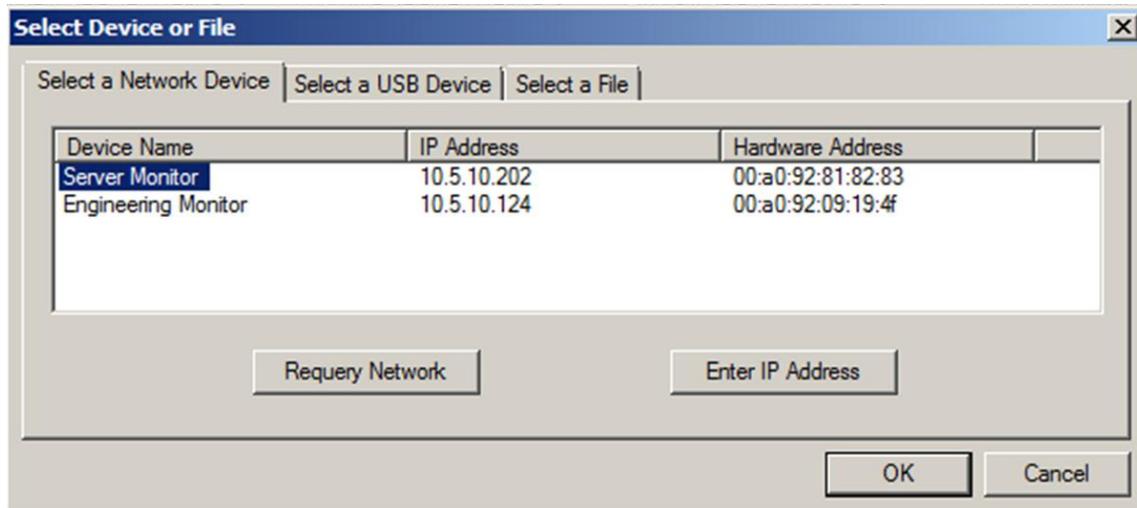
To use the application continue here.

Insert the provided flash drive with the **Energy Analyzer Application** and install on your computer. Follow the instructions on the install software.

Start the Energy Analyzer Application.



A device must first be selected. Click "Select Device".

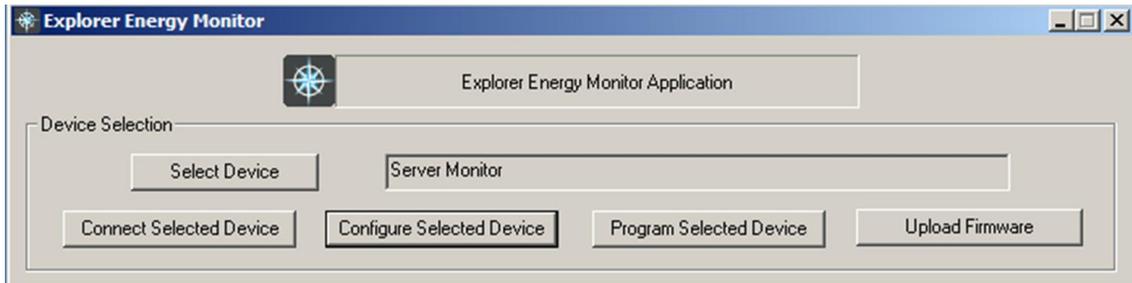


Any Explorer Energy Monitors on your network will show up in the panel as shown above. If it doesn't appear straight away, use the Requery Network button to try again to find the device. Click on the device that is to be configured to highlight it and then click the **OK** button.

If you have a USB version of the Explorer Energy Monitor, select that tab to see it. Use the Select a File for a previously saved file.

IMPORTANT NOTE:

All Explorer Energy Monitors are shipped with a factory default IP address of 192.168.229.240. To avoid TCP/IP conflicts, only one device that has not been configured should be connected to the network at a time.



Once selected, the device's name will appear in the main panel and the three options "Connect Selected Device", "Configure Selected Device", and "Program Selected Device" will become available.

The first step is to configure the Explorer Energy Monitor's name, TCP/IP, E-mail, and Time & Date parameters. Click on the **Configure Selected Device** button and the Configure Network Device panel will come up.



General

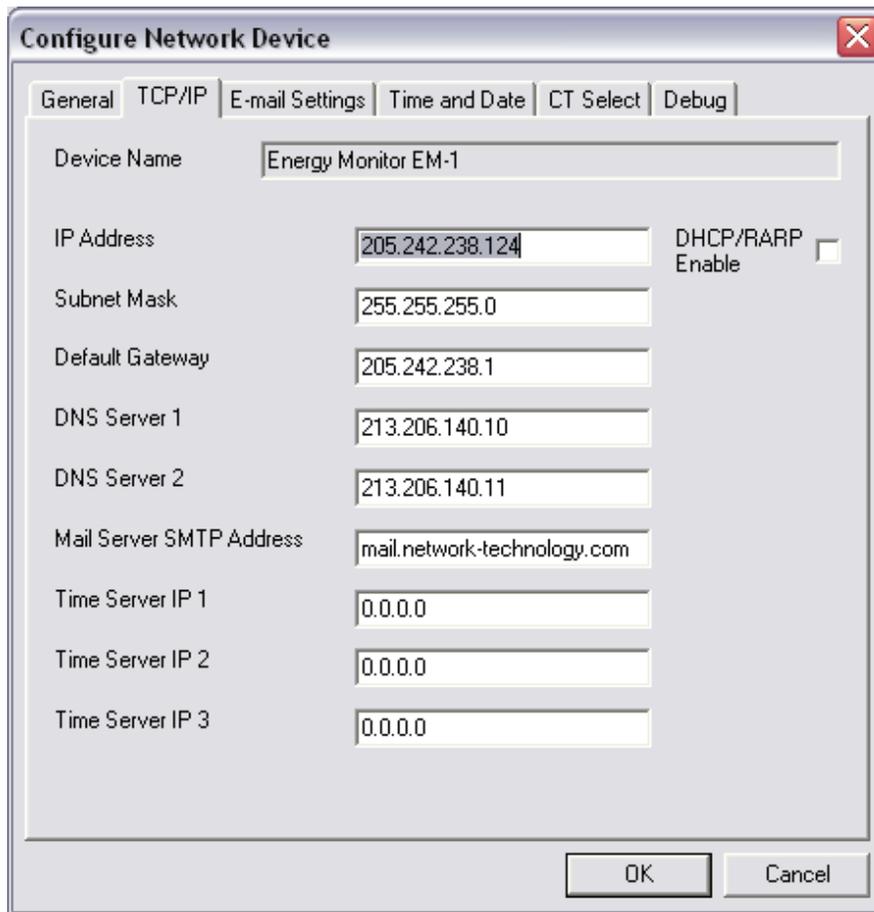
The General tab allows you to modify the device name and set or change a password.

It also shows the Hardware model and Firmware revision.



TCP/IP

This tab is used to assign the Explorer Energy Monitor with an appropriate IP address for your network. It also allows you to set the IP addresses that the Explorer Energy Monitor will contact for e-mail sending and accurate time keeping. When changing the IP address of the Explorer Energy Monitor, it is best to make just that change first, and then go back to "Select Device" to re-select the device using its new IP address, and then make the other changes.



- 1) Enter an unused IP Address from your network, or click on the DHCP/RARP Enable.

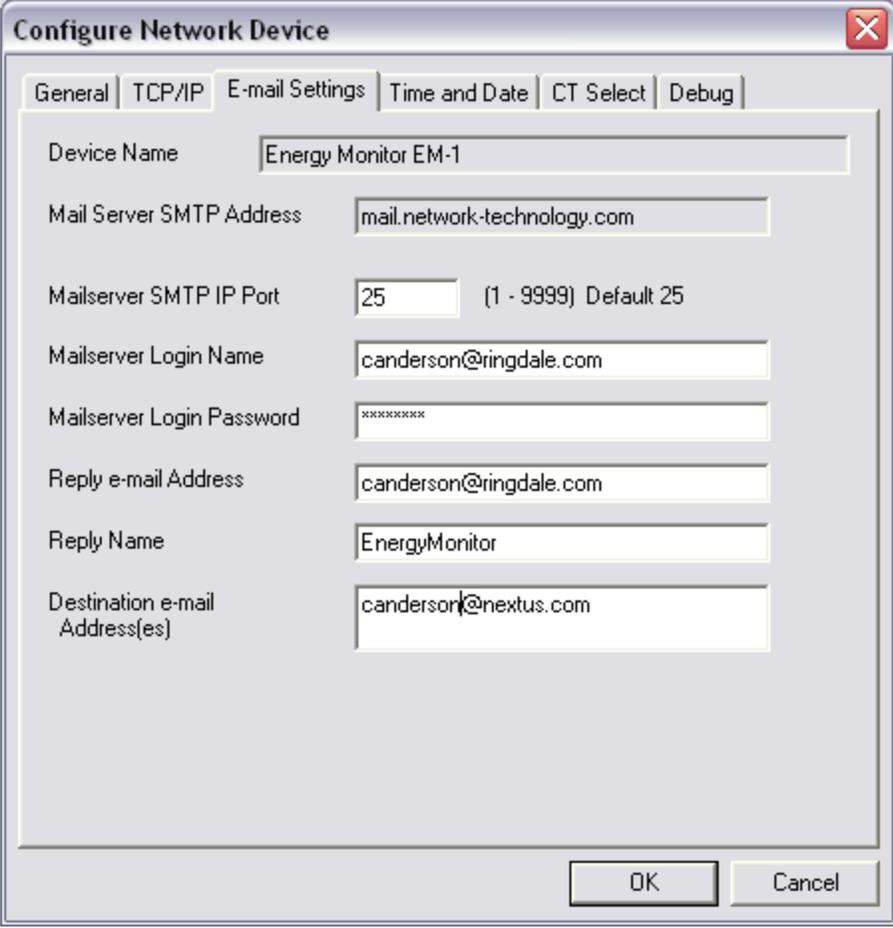
NOTE: If you change to an address that is NOT in the same network range that your PC is, you will still be able to see the Explorer Energy Monitor with the Explorer Energy Monitor utility, but you will not be able to change any parameters until you are on the same subnet.

- 2) If you are not using DHCP or RARP, enter the Subnet Mask.
- 3) If you are not using DHCP or RARP, set the Default Gateway.
- 4) DNS Servers, 1 and 2, are the Domain Name Servers provided by your ISP. It is used to convert the Mail Server SMTP Address's URL to an IP Address.
- 5) If you have a DNS server defined, the Mail Server SMTP Address can be entered either as a URL (for example smtp-server.austin.rr.com) or an IP Address. Using the URL is recommended if you may be changing your network, and you have your own mail server.
- 6) Time Server IP 1,2, & 3. You can either set the time manually on the Time and Date panel or configure up to three preferred timeservers. Without the correct time, the timestamp will be incorrect on all records, and if you email Alert conditions, your spam filter may trap the email. The 192.043.244.018 address is the timeserver at NCAR.

TIME SERVER NOTE: All timeservers send the time UTC. In order to set the time stamps correctly you must adjust your Time Zone Offset under the Time and Date tab. There is a list of public timeservers at this URL: <http://tf.nist.gov/service/time-servers.html>

E-mail Settings

The e-mail settings are used to send an Alert message if certain triggers are met.



The screenshot shows a dialog box titled "Configure Network Device" with a close button (X) in the top right corner. The "E-mail Settings" tab is selected. The fields are as follows:

Field	Value
Device Name	Energy Monitor EM-1
Mail Server SMTP Address	mail.network-technology.com
Mailserver SMTP IP Port	25 (1 - 9999) Default 25
Mailserver Login Name	canderson@ringdale.com
Mailserver Login Password	XXXXXXXXXX
Reply e-mail Address	canderson@ringdale.com
Reply Name	EnergyMonitor
Destination e-mail Address(es)	canderson@nextus.com

At the bottom right, there are "OK" and "Cancel" buttons.

- 1) Mail Server SMTP Address – Use the TCP/IP tab to change this.
- 2) Mail server SMTP IP Port – The default is 25. This is most common. Other common ports used are 26, and 2525.
- 3) Mail server Login Name – Often this is an email address. When a fax is received in the email box, it will come from this user. Max 58 characters.
- 4) Mail server Login Password – This is the password for the above email account. There is a maximum of 58 characters. NOTE: case-sensitive.
- 5) Reply e-mail Address – If the person who receives the fax does a reply, it will go to this address.
- 6) Reply Name – This is the name that shows in the email header when you receive a fax.
- 7) Destination e-mail Address(es) - This is where the email will be sent. This can be the same as item 2) or it may be an alias set up to forward to multiple users. Simply enter the addresses you wish to send to as one entry, each address separated by either a semi-colon (;) or a comma (.). There is a limitation of a maximum of 80 characters for all addresses. No spaces are allowed. Enter each address on a new line.

Time and Date

The screenshot shows a dialog box titled "Configure Network Device" with a close button (X) in the top right corner. The "Time and Date" tab is selected. The dialog contains the following fields and controls:

- Device Name: Energy Monitor EM-1
- Time Server IP 1: 0.0.0.0
- Time Server IP 2: 0.0.0.0
- Time Server IP 3: 0.0.0.0
- Time Zone Offset: -6:00 (dropdown menu)
- Daylight Savings Enable:
- Check Time From Device: (button)
- Set Device Time From PC Clock: (button)
- Current Time: Tue, 19 Aug 2008 10:12:21 -0500
- OK and Cancel buttons at the bottom right.

The Explorer Energy Monitor features a battery backed up clock. When first set up and periodically after, the clock may be (re) synchronized with a time server or the PC running the Explorer Energy Monitor application.

If at least one Time Server IP address has been specified, the Explorer Energy Monitor will automatically contact a Time Server to keep its clock accurate. Note that it will not adjust its clock while it is monitoring to avoid spoiling the record sequence.

The "Set Device Time From PC Clock" function allows you to synchronize the device time with the PC time. This option is only available if no Time Servers have been specified.

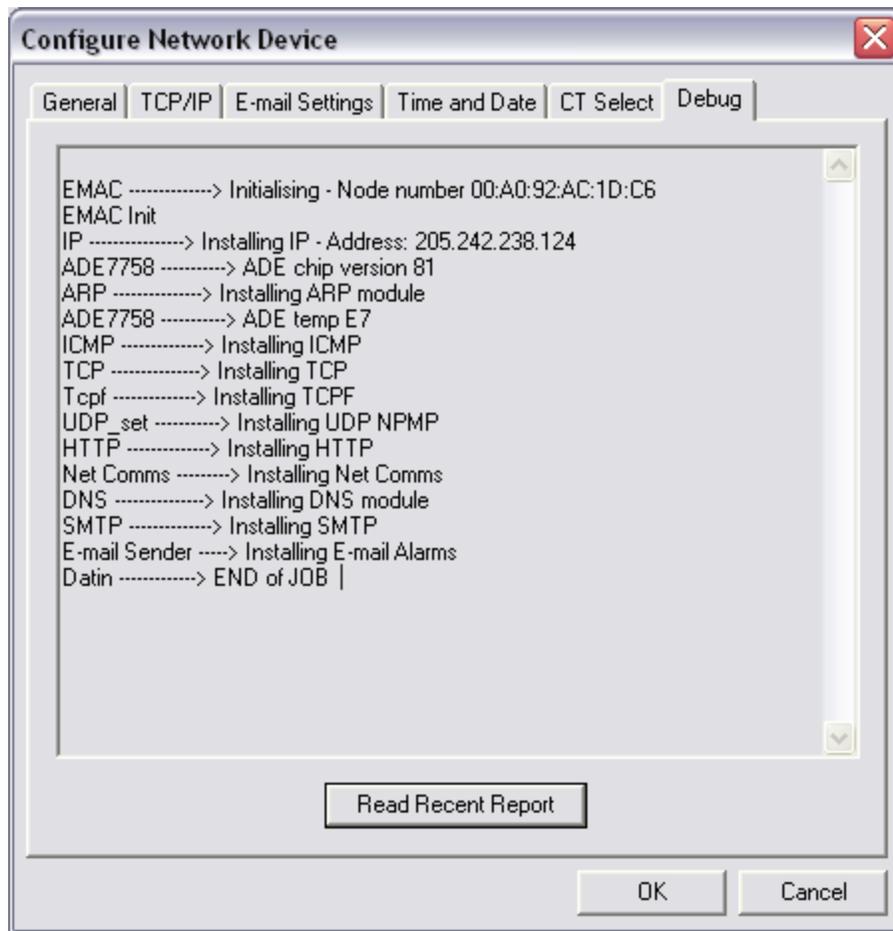
TIME SERVER NOTE: Some local timeservers and all Internet timeservers send the time in UTC. In order to set the time stamps correctly you may need to adjust your Time Zone Offset and select or de-select the Daylight Savings Enable option.

CT Select



Select the value of the current transformers that you are using.

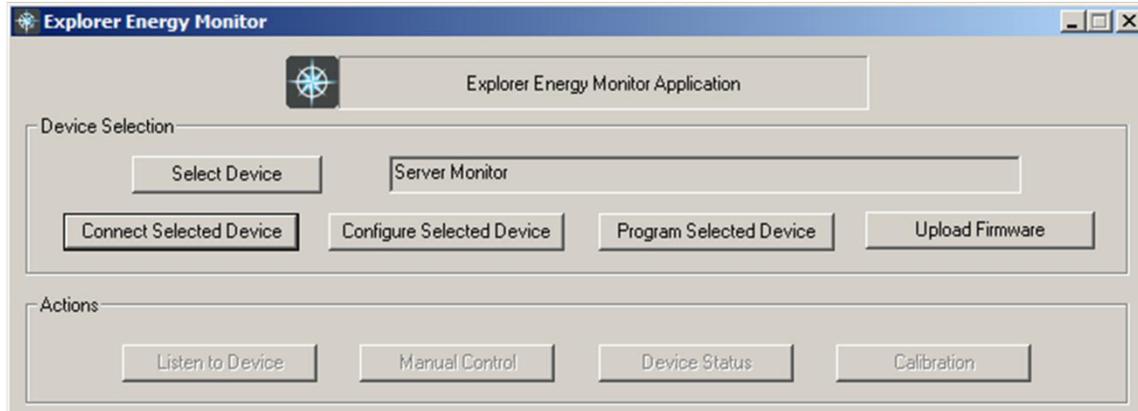
Debug



The Explorer Energy Monitor keeps a log of various messages. This panel is useful only if a problem should arise, at which time obtaining the recent messages may prove informative. Under normal circumstances there is no need to use this panel.

Controlling the Explorer Energy Monitor

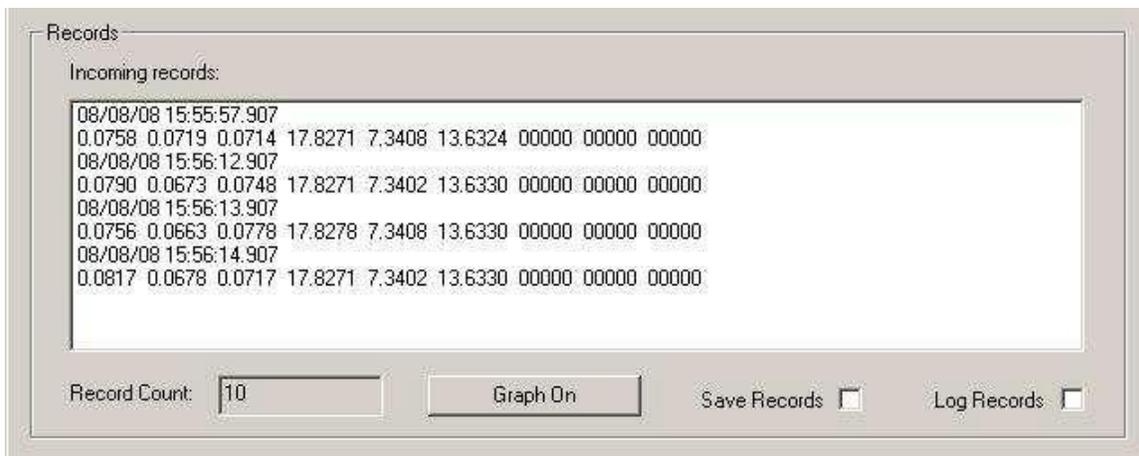
Select the device to monitor and connect to it using the **Connect Selected Device** button.



When successfully connected the Actions buttons will become available.

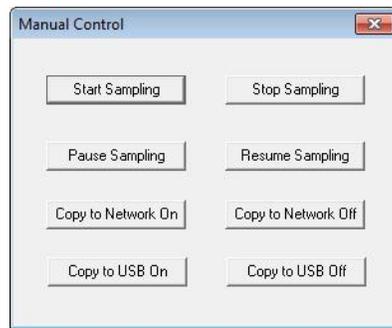
Listen to Device

This will tell the Explorer Energy Monitor to send a copy of each sample record to you. If the device is not actually running, then you will not receive any records. Sample records will still be recorded into a flash drive if fitted, regardless of this setting.



Manual Control

This window only stays up for 30 seconds. The eight buttons give you the choice of action you want the device to take.



Start and Stop Sampling are normally used to begin and end a sampling session if there is no automatic start and stop Time and / or Date defined.

When the Explorer Energy Monitor is running, the Stop Sampling button must be used before removing a flash drive to ensure that the sample record file is closed properly, and to ensure that the flash drive can safely be removed.

Pause and Resume are used where sampling is temporarily stopped.

IMPORTANT NOTE: The flash drive should not be removed while the device is running or paused. Removal of the flash drive without stopping the unit may result lost data of up to 16 of the last records sampled.

Device Status

This button will show you the status of the Explorer Energy Monitor but is currently not implemented.

Use the web interface to get status of the sampling and the levels of each channel.

Records Panel



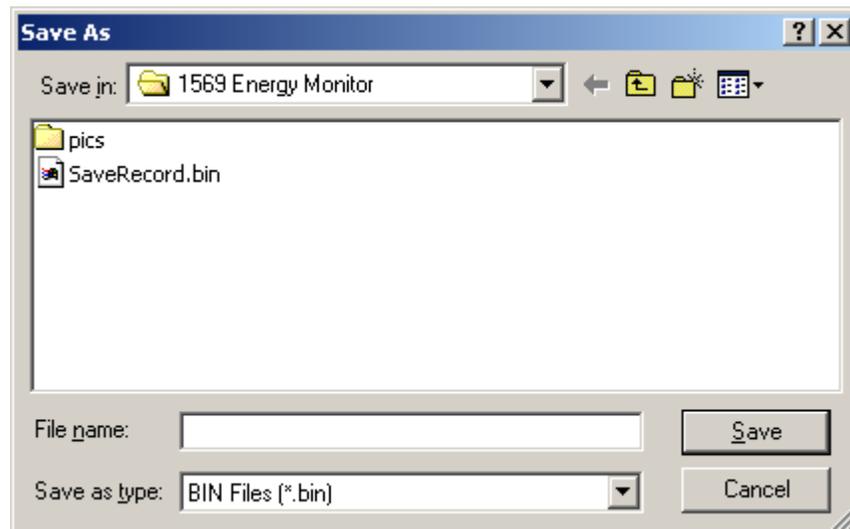
Incoming Records

The device must be in Listen mode by selecting the **Listen to Device** button. You must also set the device to sample records either manually or using the Program Start/Stop Times.

Save Records

Put a check in the Save Records box to bring up the location where the records binary file will be kept. If you select the same name as a previously saved bin file, it will be overwritten.

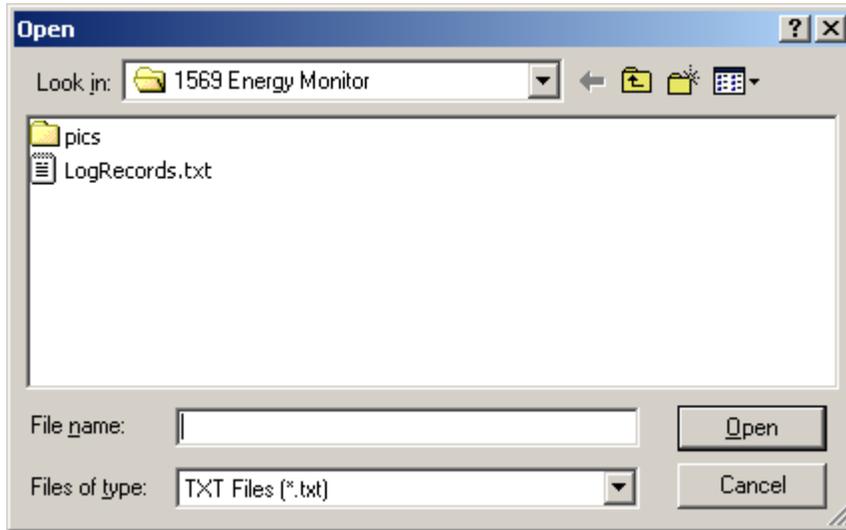
The device must be in Listen mode by selecting the **Listen to Device** button. You must also set the device to sample records either manually or using the Program Start/Stop Times.



Log Records

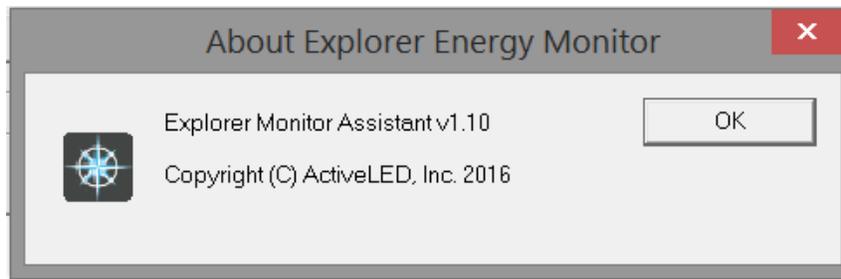
Put a check in the Log Records box to bring up the location where the records binary file will be kept. If you select the same name as a previously saved bin file, it will append to the previous data.

The device must be in Listen mode by selecting the **Listen to Device** button. You must also set the device to sample records either manually or using the Program Start/Stop Times.



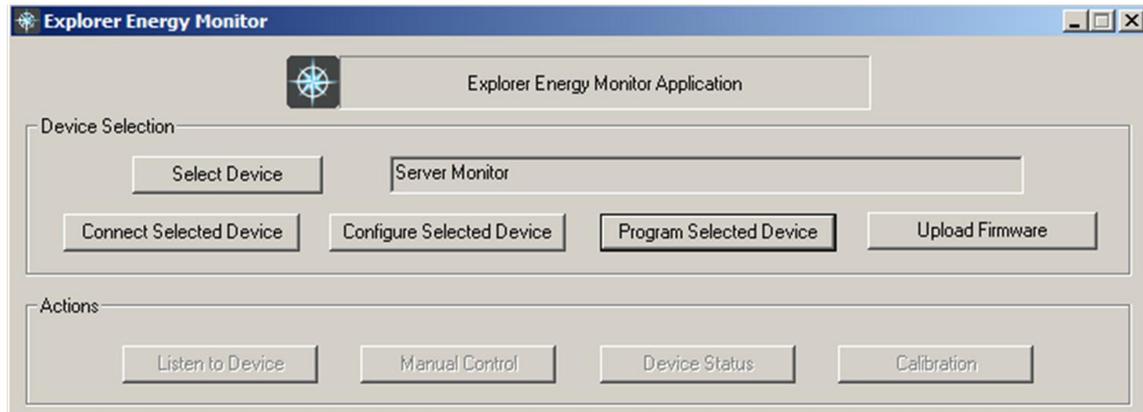
About

Click on the **About** button to find the version of the Explorer Energy Monitor software.



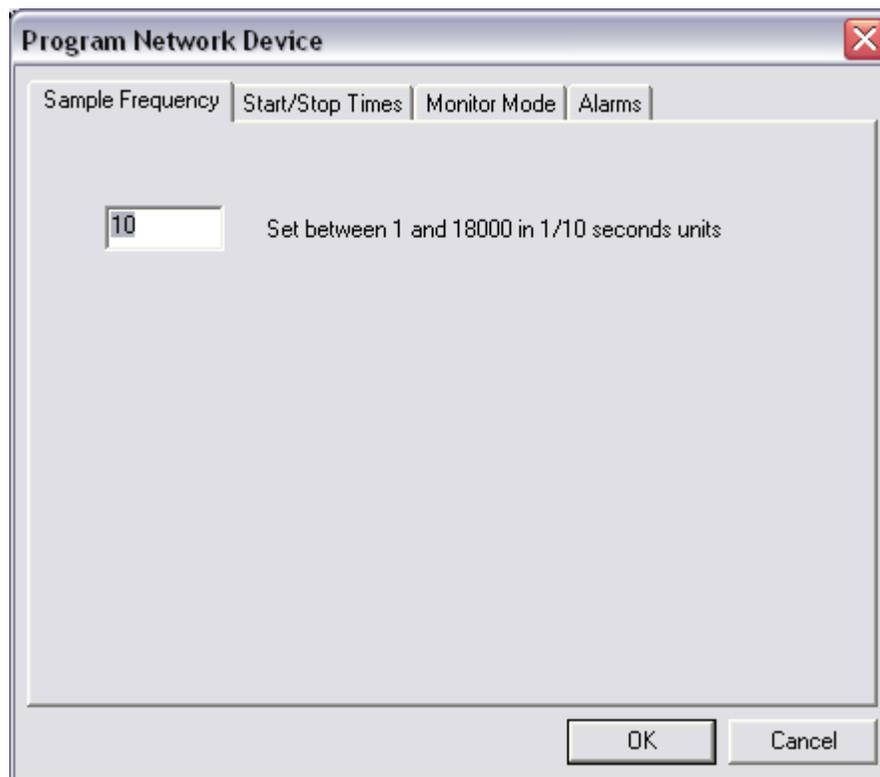
Programming an Explorer Energy Monitor

Sample records will be recorded into a flash drive (if one is plugged in) as soon as either the Manual Control / Start Sampling has been selected or it is between the Start Time and Stop Time.



Click on the **Program Selected Device** button to call up the Program Device panel.

Program Device



Sample Frequency

The sample frequency determines how often a sample is reported. At 18000, one sample is taken every 30 minutes. At 10, one sample is taken per second. At 1, ten samples are taken per second.

Start and Stop Times

The screenshot shows a dialog box titled "Program Network Device" with a close button in the top right corner. It has four tabs: "Sample Frequency", "Start/Stop Times", "Monitor Mode", and "Alarms". The "Start/Stop Times" tab is active. Inside this tab, there is a section titled "Start Sampling" which contains a checkbox labeled "Specify Start and Stop Times - leave unspecified if starting manually". This checkbox is currently unchecked. Below the checkbox are two rows of controls. The first row has a "Start Time" field with a dropdown menu showing "8:32:40 AM" and a "Specify Start Date" checkbox which is unchecked, with a date dropdown menu showing "8/14/2008". Below the date dropdown is the text "Unspecified is 'Any'". The second row has a "Stop Time" field with a dropdown menu showing "8:32:40 AM" and a "Specify Stop Date" checkbox which is unchecked, with a date dropdown menu showing "8/14/2008". Below the date dropdown is the text "Unspecified is 'Any'". At the bottom of the dialog box are two buttons: "OK" and "Cancel".

Each of the Start and Stop Times, Start Date and Stop Date may be given a value or left undefined. Leave all of these values undefined if you intend to start and stop the device manually.

Specifying Start and Stop times but leaving the Dates undefined will set a repetition pattern. It is possible to define the Start Time as 9:00 pm and the Stop Time as 6:00 am for monitoring through each night if the dates are left undefined, or for a particular night or nights if the dates are defined.

Specifying a Start Date without specifying a Start Time, and the same for the Stop values, will have no effect.

NOTE:

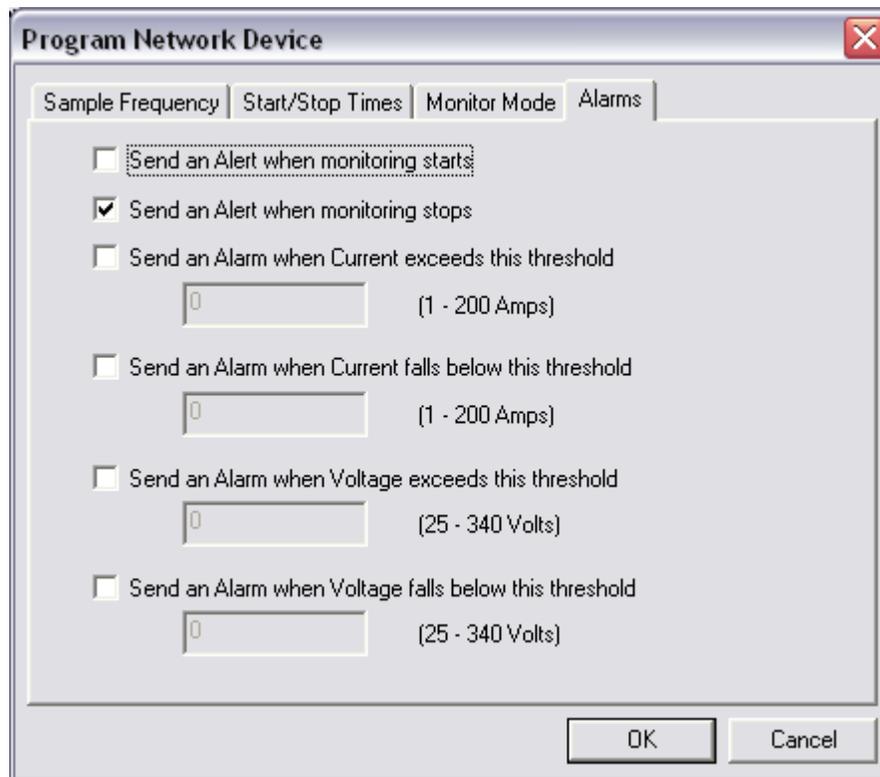
If Start and Stop times defined, you will not always be able to start and stop the device manually. For example, if the device is programmed to start at 4:00 pm and stop at 10:00 pm, the device will automatically restart if manually stopped between 4:00 pm and 10:00 pm. Similarly, manually starting the device after 10:00 pm will result in an automatic stop. As a rule, it is better to not define Start and Stop times if you wish to manually start and stop the unit, or to re-program with undefined times prior to manually starting or stopping.

Monitor Mode

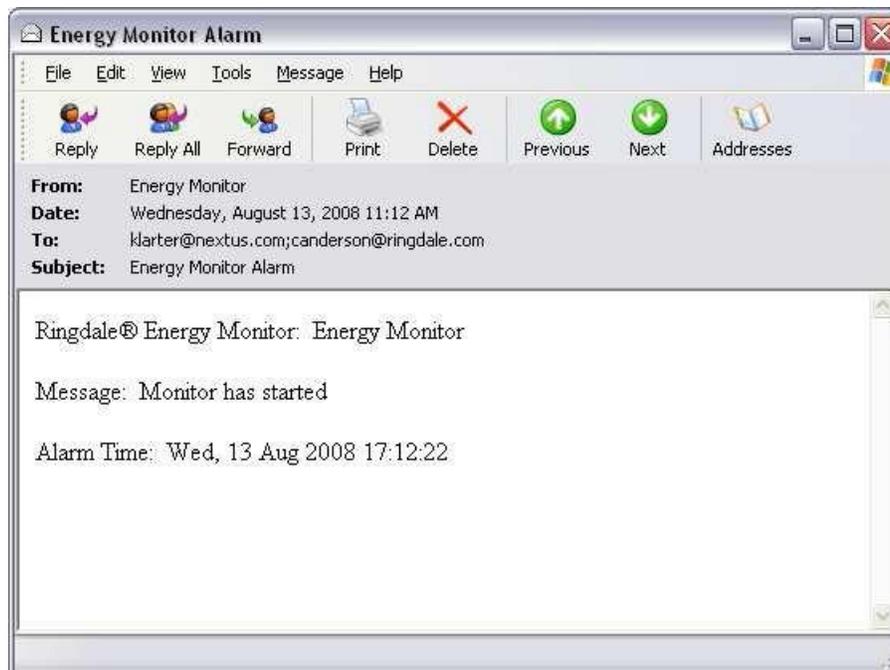


The initial option is RMS Voltage and Current with Accumulated Watt Hours. Other Monitor Mode options may be available by requesting through Technical Support. Email support@ActiveLED.com.

Alarms

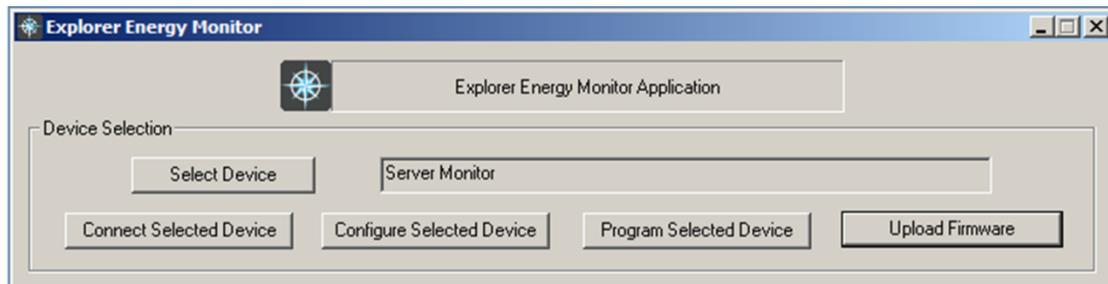


You can set an Alert to be sent to the Destination Email Address when monitoring starts and/or stops. Future revisions will current/voltage threshold triggers.

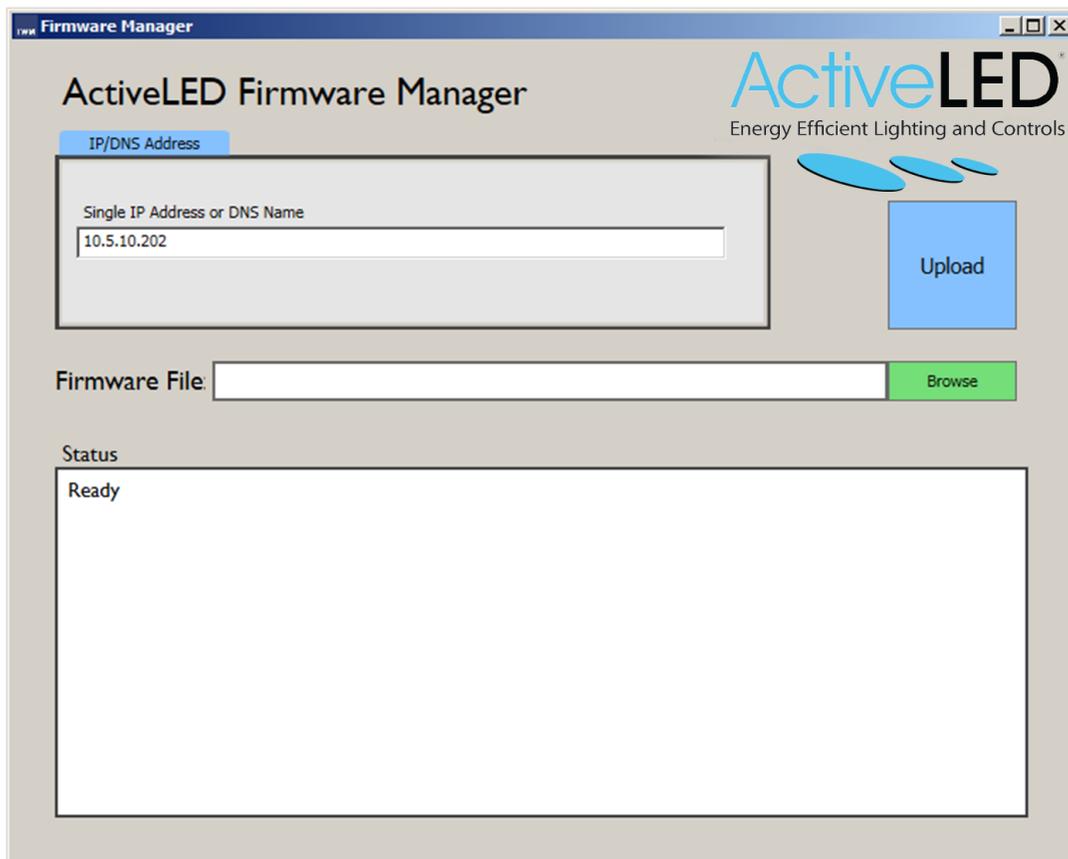


Uploading Firmware to the Explorer Energy Monitor

The ability to upload firmware is provided should an incident occur that Technical Support would request the firmware be uploaded as part of service or if an updated version is made available to download. For product stability and data protection reasons, it is not recommended to upload firmware without Technical Support instructing or approving it.



Pressing the **Upload Firmware** button will bring up the ActiveLED Firmware Manager application.



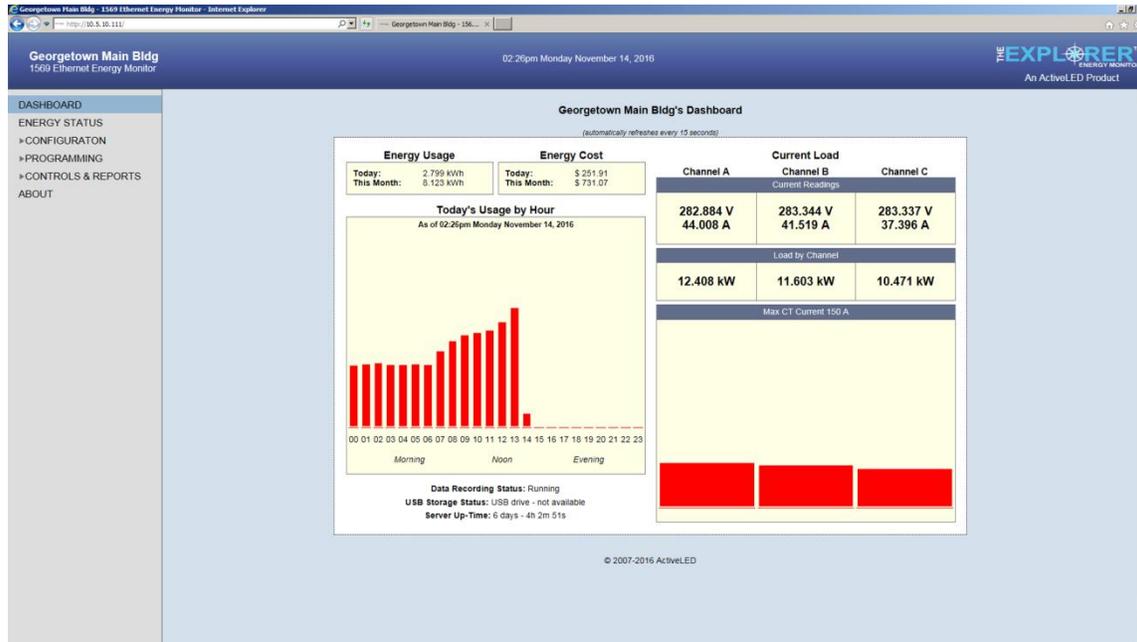
To upload firmware press the **Browse** button and select the Firmware (.dld) file. After the file is selected, upload the file by pressing the **Upload** button.

Setting up an Explorer Energy Monitor – Using a Web Browser

Upon opening the Home page of the device, you will see the Dashboard, which shows a general overview of the current energy usage, and the menu on the left. In our example here the device has an IP address of 10.5.10.111.

Note: You need to be on the same virtual network (subnet) as the device in order to be able to communicate with it.

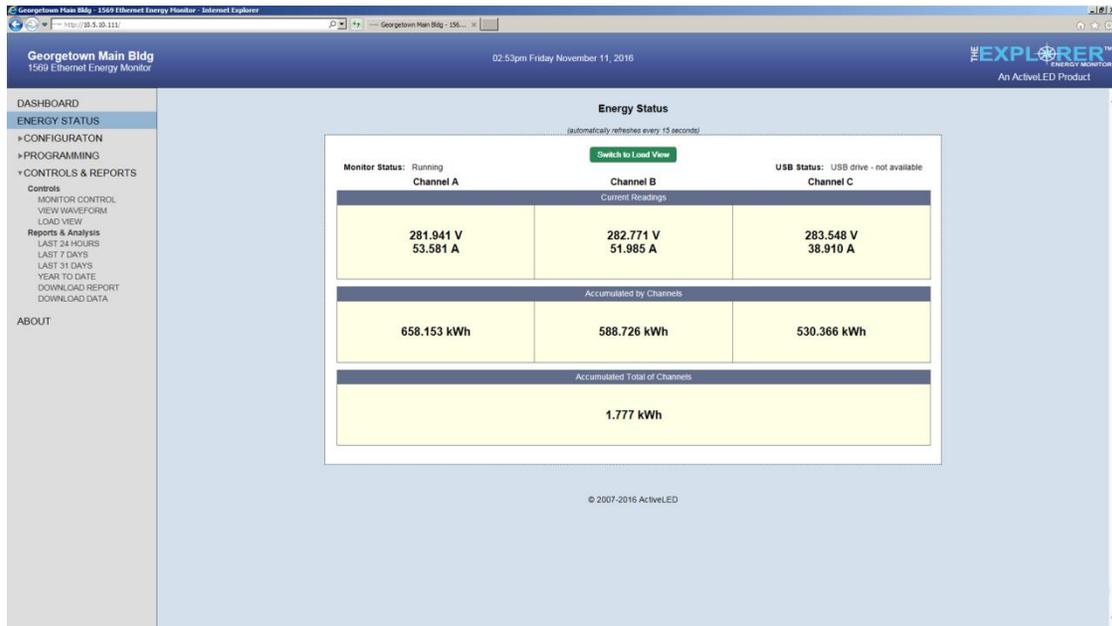
Dashboard



The upper panel shows the device description and the name currently assigned to the device – “Georgetown Main Bldg's Dashboard” in our example. The Dashboard also gives a quick view of energy usage in KWh and Cost as well as shows the days usage, broken down into 24 hours, and the Current Load.

Energy Status

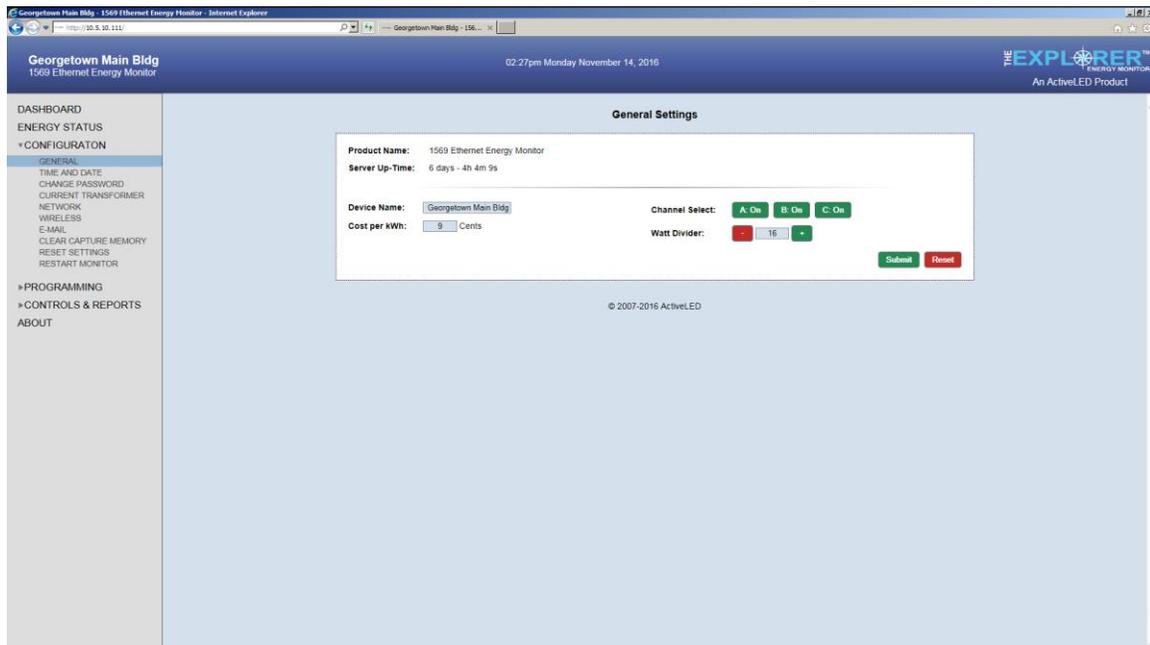
Energy Status will display the current readings and accumulated readings for each channel, Show if the Explorer Energy Monitor is running or not, and show the status of a USB drive.



Switch to Load View - Used to display Current and Load Readings for each channel.

Configuration

Under the Configuration menu, there are ten submenus: General, Time and Date, Change Password, Current Transformer, Network, Wireless, E-mail, Clear Capture Memory, Reset Settings, and Restart Monitor.



Configuration - General

The screenshot shows the 'General Settings' page for the Explorer Energy Monitor. The page is titled 'Georgetown Main Bldg - 1569 Ethernet Energy Monitor'. The settings are as follows:

- Product Name: 1569 Ethernet Energy Monitor
- Server Up-Time: 0 days - 0h 23m 26s
- Device Name: Energy Monitor
- Channel Select: A: On, B: On, C: On
- Cost per kWh: 9 Cents
- Watt Divider: 16

There are 'Submit' and 'Reset' buttons at the bottom right of the settings area. The footer indicates '© 2007-2016 ActiveLED'.

This section allows you configure a unique name for each Explorer Energy Monitor that you have, input a cost per kWh, select channels to monitor (green represents active monitoring, red represents not currently monitored), and adjust for any inaccuracies with the Watt Divider.

Configuration – Time and Date

The Time and Date option brings up the Clock Setting options and the current time. You can either select time servers, or set the time and date manually. If the time is not set correctly the timestamp will be incorrect and your spam filter may trap the email.

The screenshot shows the 'Date & Time Settings' page for the Explorer Energy Monitor. The page is titled 'Georgetown Main Bldg - 1569 Ethernet Energy Monitor'. The settings are as follows:

- Current Time: 02:28pm Monday November 14, 2016
- Enter Time Server Address(es) or...: Time Server 1 IP Address: 0.0.0.0, Time Server 2 IP Address: 0.0.0.0, Time Server 3 IP Address: 0.0.0.0
- Manually Enter Date and Time: Current Date: 14 November 2016, Current Time: 02:28 pm
- Time Zone Offset: UTC

There are 'Submit' and 'Reset' buttons at the bottom right of the settings area. The footer indicates '© 2007-2016 ActiveLED'.

Time Server IP 1, 2, & 3 – You can either set the time manually or use time servers. You can add up to three time servers.

TIME SERVER NOTE: There is a list of public time servers at this URL: <http://tf.nist.gov/service/time-servers.html>

Time Zone Offset – All time servers send the time UT. In order to set the time stamps correctly you must adjust your Time Zone Offset. This is the offset from UT. If you are in Greenwich, England, this number will be 0. If your time zone is east of Greenwich, England, the number is positive. If your time zone is west of GMT, the number is negative. For EST, use -5, CST -6, MST -7, PST -8, AKST -9, and HAST - 10.

Date & Time Settings

Current Time: 07:31pm Sunday January 1, 2016

Enter Time Server Address(es) or... Manually Enter Date and Time

Time Server 1 IP Address: Current Date: 01 January 2016

Time Server 2 IP Address: Current Time: 07:31 pm

Time Server 3 IP Address:

Time Zone Offset: UTC

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Configuration – Change Password

Change Password

Current Password:

New Password:

Confirm Password:

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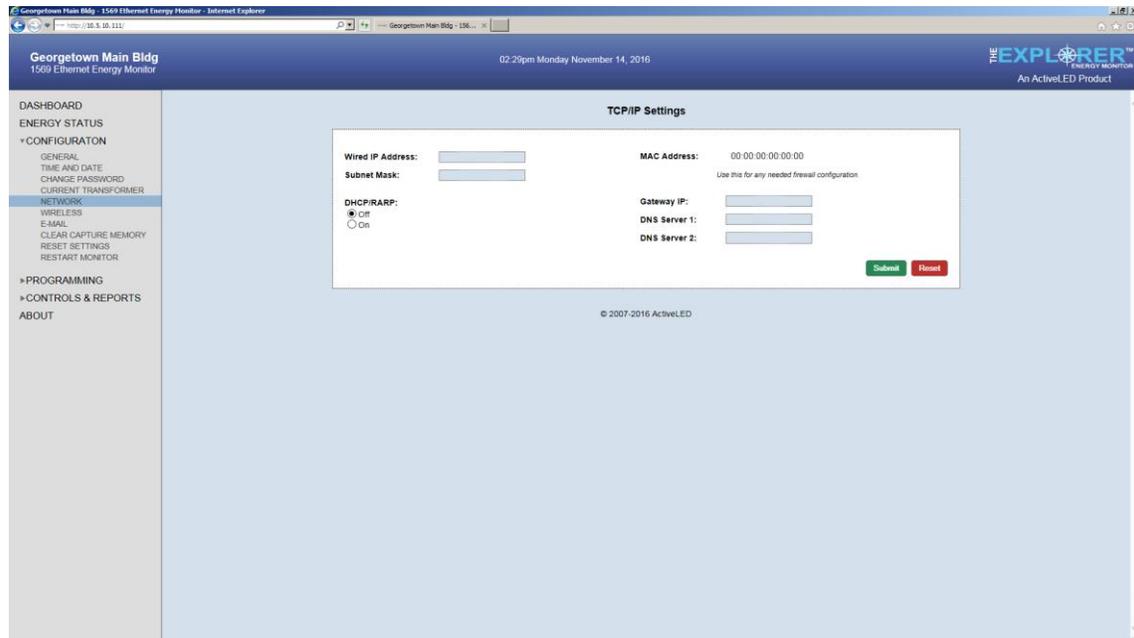
The Change Password submenu allows you to set a password or change a current password. The default password is "1234567890"

Configuration – Current Transformer

The screenshot shows a web browser window with the URL "Georgetown Main Bldg - 1569 Ethernet Energy Monitor - Internet Explorer". The page title is "Georgetown Main Bldg 1569 Ethernet Energy Monitor". The current time is "02:20pm Monday November 14, 2016". The page features a navigation menu on the left with options: DASHBOARD, ENERGY STATUS, CONFIGURATION (GENERAL, TIME AND DATE, CHANGE PASSWORD, CURRENT TRANSFORMER, NETWORK, WIRELESS, E-MAIL, CLEAR CAPTURE MEMORY, RESET SETTINGS, RESTART MONITOR), PROGRAMMING, CONTROLS & REPORTS, and ABOUT. The "CURRENT TRANSFORMER" option is selected. The main content area is titled "Current Transformer Selection" and contains an image of a current transformer and a text prompt: "For accurate reporting, please select your Current Transformer's current rating". Below the text is a dropdown menu showing "150 A". At the bottom of the form are "Submit" and "Reset" buttons. The footer of the page reads "© 2007-2016 ActiveLED".

The Current Transformer submenu allows for the Selection of the Current Transformer. Selections available from 10 - 1500 Amps.

Configuration – Network



IP Address – Enter an unused IP Address from your network, or click on the DHCP/RARP Enable.

NOTE: If you change to an address that is NOT in the same network range that your PC is, you will still be able to see the Explorer Energy Monitor with the Explorer Energy Monitor utility, but you will not be able to change any parameters until you are on the same subnet.

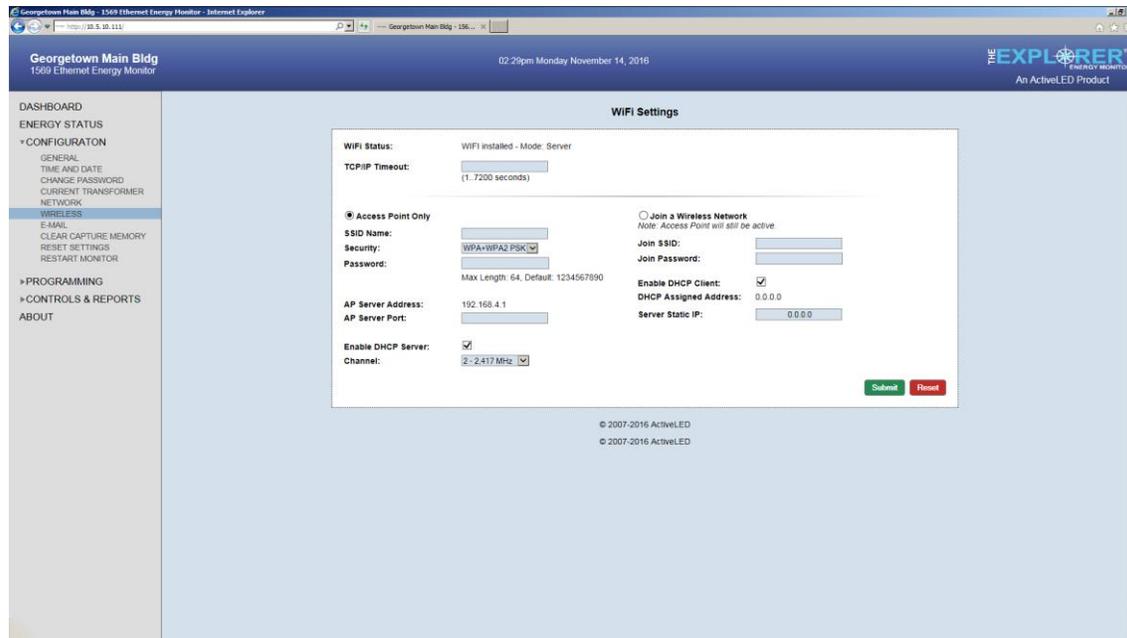
Subnet Mask – Enter the subnet mask.

DHCP can be used if you do not use static IP addresses

on the network. Gateway IP is the default gateway.

DNS Server 1,2 – DNS Servers can be used to resolve the Mail Server IP from the URL.

Configuration – Wireless



Wi-Fi Status - Displays if Wi-Fi is installed or not.

TCP/IP Timeout - Set how long to wait for connection before timing out, default is 7200.

Act as Access Point - This option is checked by default.

SSID Name - Set name for the network.

Security - Set level of security or encryption.

Password - Set a password, 64 character maximum, for the network, default password is "1234567890".

AP Server address - IP address of the network.

AP Server Port - 80 is default for HTTP.

Enable DHCP Server - Enable this option to have the Wi-Fi network assign IP addresses to connected devices.

Channel - Set a Wi-Fi broadcast channel.

Join a Wireless Network - Enable this option to have the Wi-Fi join an existing network.

Join SSID - Name of the network to join.

Join Password - Password for the existing network.

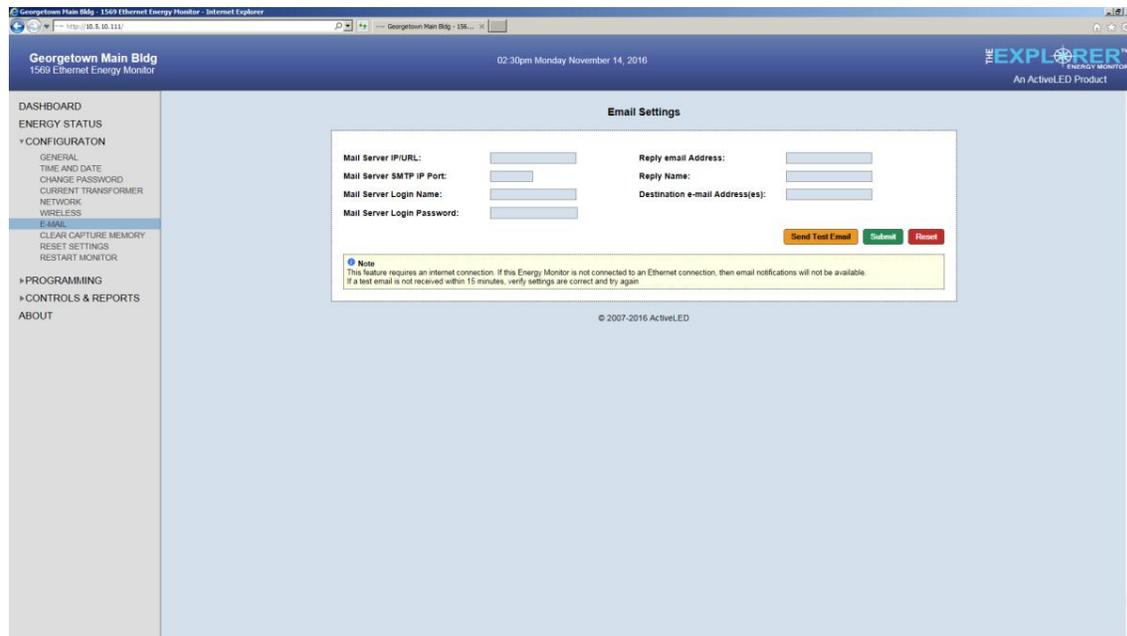
Available Networks - Displays available networks.

Enable DHCP Client - Enable this option to have the existing network assign an IP address.

DHCP Assigned Address - Displays the assigned IP address

Server Static IP - Manually assign an IP address.

Configuration – E-Mail Settings



Mail Server IP/URL - If you will be configuring the Explorer Energy Monitor to report threshold trigger events, you must enter an IP Address for the SMTP mail server.

Mail Server SMTP IP Port – The default is 25. This is most common. Other common ports used are 26, and 2525.

Mail Server Login Name – Often this is an email address. When a fax is received in the email box, it will come from this user. Max 58 characters.

Mail Server Login Password – This is the password for the above email account. There is a maximum of 58 characters. NOTE: case-sensitive.

Reply e-mail Address – If the person who receives the fax does a reply, it will go to this address.

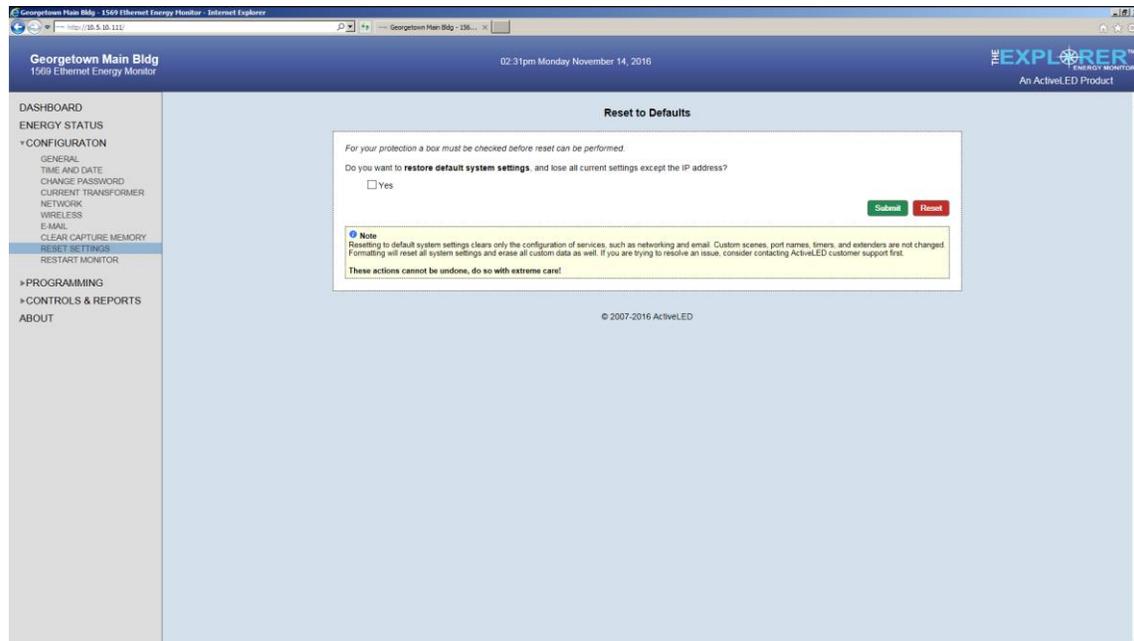
Reply Name – This is the name that shows in the email header when you receive a fax.

Destination e-mail Address(es) - This is where the email will be sent. This can be the same as the Mail Server Login Name or it may be an alias set up to forward to multiple users. Simply enter the addresses you wish to send to as one entry, each address separated by either a semi-colon (;) or a comma (,). There is a limitation of a maximum of 80 characters for all addresses. Max 80 characters. No spaces are allowed. Enter each address on a new line. input you cell phones SMS email address. to find out your SMS email address contact your carrier.

Configuration - Clear Capture Memory

Use this to erase all collected data. Once this is done, the data cannot be recovered.

Configuration – Reset Settings



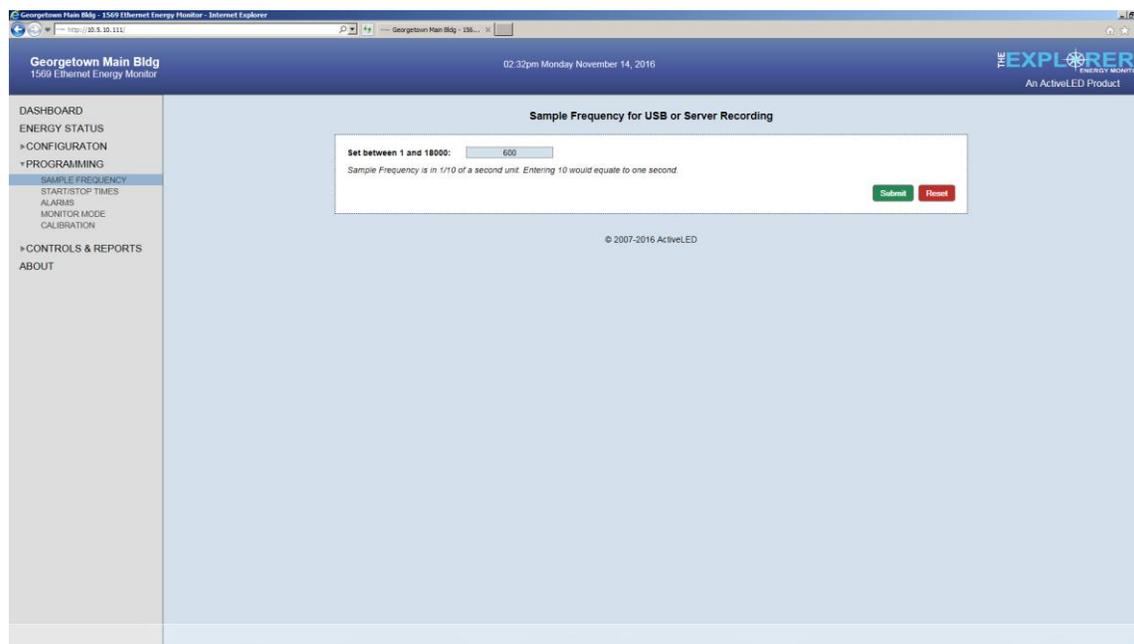
This will normally only be used under the direction of Technical Support. It will not change the IP Address of the Explorer Energy Monitor.

Configuration - Restart Monitor

Use this option to restart the device. This operation will save all collected data up to the point of the restart and will not collect data during re-boot.

Programming

The Programming option brings up the following Programming page.



Programming - Sample Frequency

The screenshot shows a web interface titled "Sample Frequency for USB or Server Recording". It features a text input field with the value "20" and a label "Set between 1 and 18000:". Below the input field, a note states: "Sample Frequency is in 1/10 of a second unit. Entering 10 would equate to one second." At the bottom right of the form are two buttons: "Submit" (green) and "Reset" (red). The footer of the page reads "© 2007-2016 ActiveLED".

The sample frequency determines how often a sample is reported. At 18000, one sample is taken every 30 minutes. At 10, one sample is taken per second. At 1, ten samples are taken per second. The default value is 20, the equivalent to a 2 second sample rate.

Programming - Start / Stop Times

The screenshot shows a web interface titled "Sampling Timer Setup for USB or Server Recording". It has a sidebar on the left with navigation links: DASHBOARD, ENERGY STATUS, CONFIGURATION, PROGRAMMING (selected), SAMPLE FREQUENCY, START/STOP TIMES (highlighted), ALARMS, MONITOR MODE, CALIBRATION, CONTROLS & REPORTS, and ABOUT. The main content area contains a form with two radio buttons: "No Remote Storage Recording Schedule" (selected) and "Specify Remote Storage Recording Start and Stop Times". Below these are three sections for "Start Time", "Specify Start Date", "Specify Stop Time", and "Specify Stop Date", each with a time picker and a date picker. The "Specify Start Date" and "Specify Stop Date" sections include explanatory text: "Unspecified Start Date will start recording the next day that the Start Time is reached" and "Unspecified Stop Date means the next day that the Stop Time is reached". At the bottom right are "Submit" (green) and "Reset" (red) buttons. The footer reads "© 2007-2016 ActiveLED".

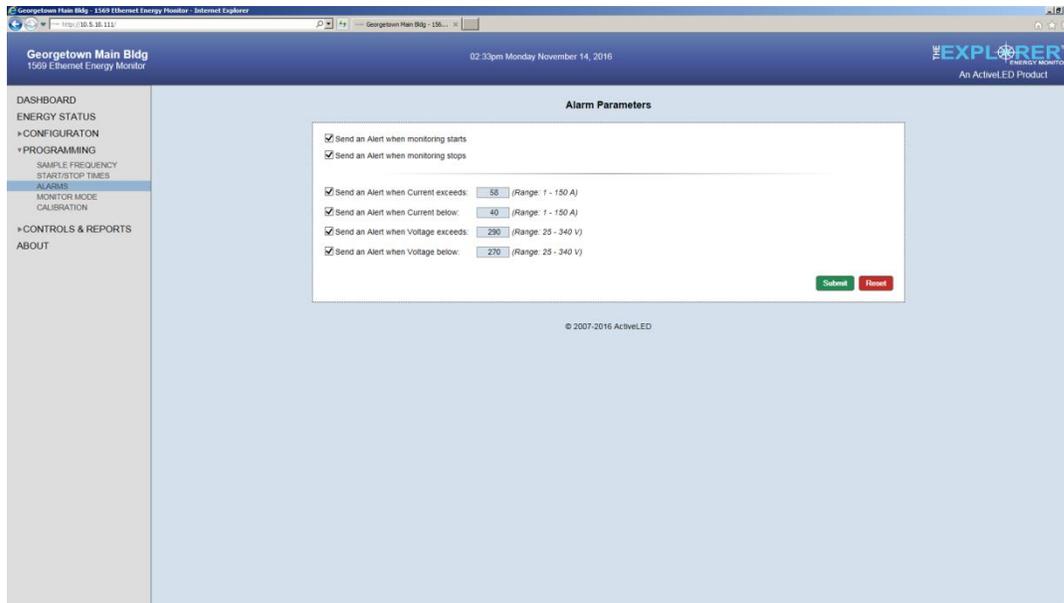
Each of the Start and Stop Times, Start Date and Stop Date may be given a value or left undefined. Leave all of these values undefined if you intend to start and stop the device manually.

Specifying Start and Stop times but leaving the Dates undefined will set a repetition pattern. It is possible to define the Start Time as 9:00 pm and the Stop Time as 6:00 am for monitoring through each night if the dates are left undefined, or for a particular night or nights if the dates are defined.

Specifying a Start Date without specifying a Start Time, and the same for the Stop values, will have no effect.

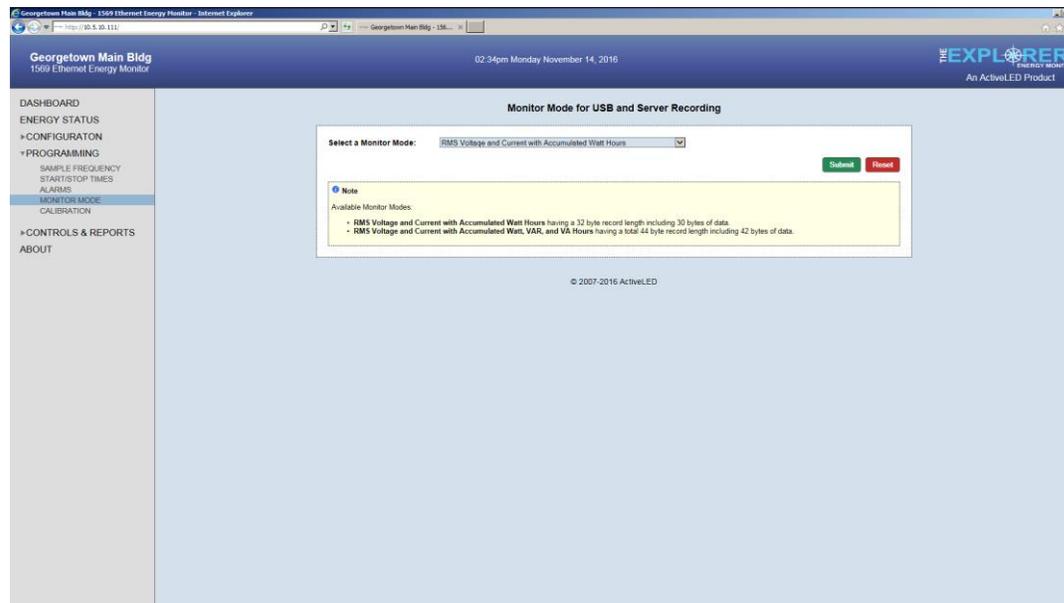
NOTE: If Start and Stop times defined, you will not always be able to start and stop the device manually. For example, if the device is programmed to start at 4:00 pm and stop at 10:00 pm, the device will automatically restart if manually stopped between 4:00 pm and 10:00 pm. Similarly, manually starting the device after 10:00 pm will result in an automatic stop. As a rule, it is better to not define Start and Stop times if you wish to manually start and stop the unit, or to re-program with undefined times prior to manually starting or stopping.

Programming - Alarms



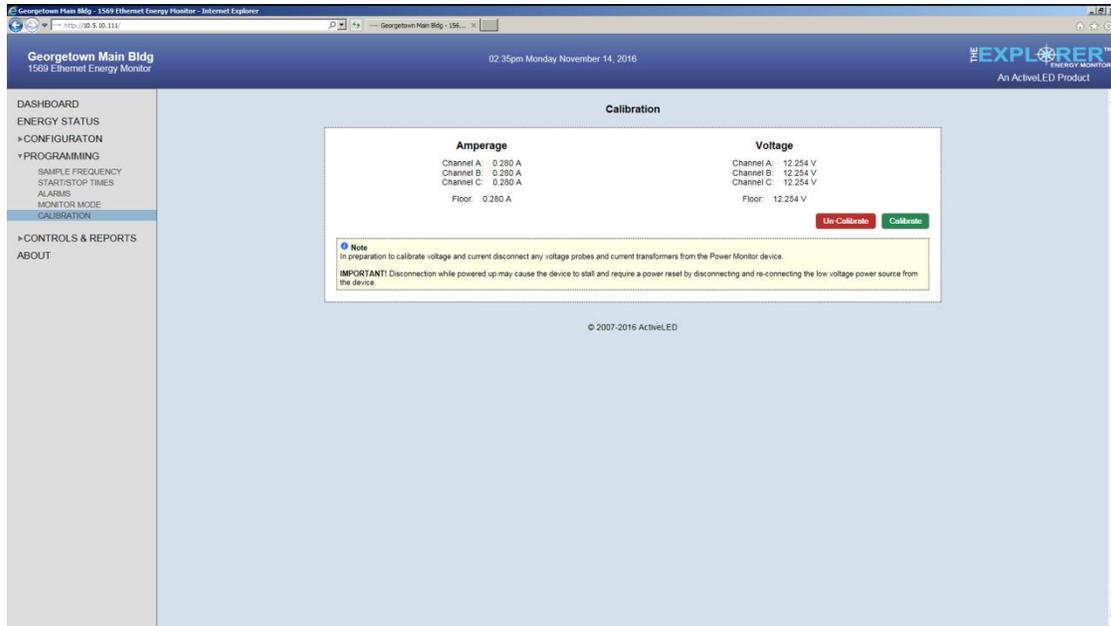
Set options to be notified by an Alarm. Alarm parameters include: Monitor start/stops, if Current exceeds or falls below a user specified range, and if Voltage exceeds or falls below set range. Notifications, or Alerts, will be sent to the specified email.

Programming - Monitor Mode



There are two fundamental monitor modes the first being the smallest record size recording only the basic information of voltage, current and watt hours occupying 32 bytes per record and thus allowing to store the maximum amount of records on the USB Flash drive. The extended mode records in addition reactive power and VA.

Programming - Calibration



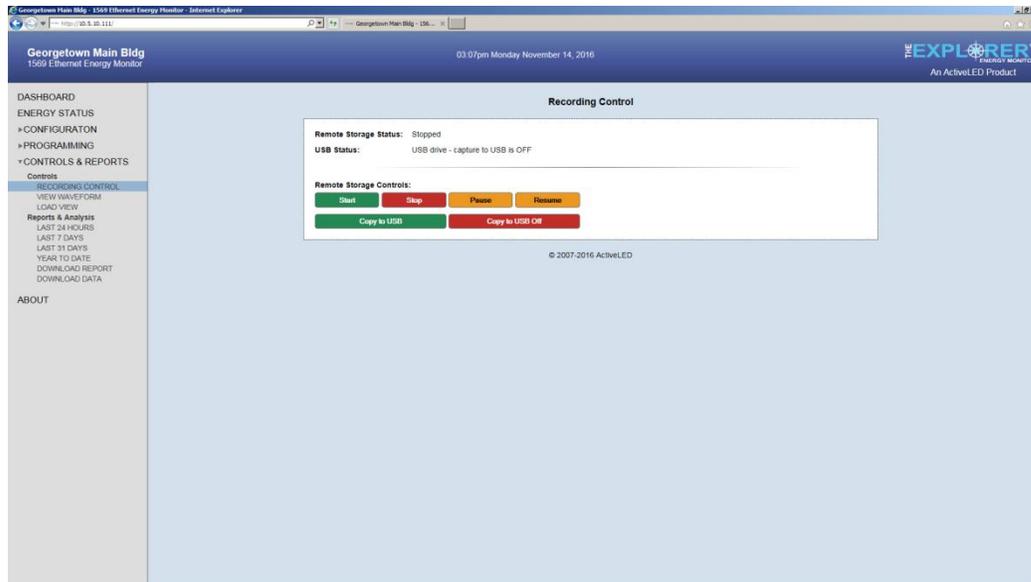
Calibration - Use Calibrate to calibrate the Explorer Energy Monitor to zero.

Note: It is important to make sure to disconnect any voltage probes and current transformers from the Explorer Energy Monitor device before calibration is performed. If inaccuracies occur in utility bill and the Explorer Energy Monitor reports after properly calibrating the Explorer Energy Monitor, then adjustments to the Watt Divider, located in General Settings submenu, may be needed.

Un-Calibrate - Use Un-Calibrate to reset the calibration back to default.

Controls & Reports

The Controls and Reports menu panel provides access to Monitor Control Functions, Waveform View and an option to download and view 24 hour, Last 7 days, Last 31 days and Year to Date reports. The Monitor Control option brings up the following Monitor Control page.



Controls & Reports - Recording Control



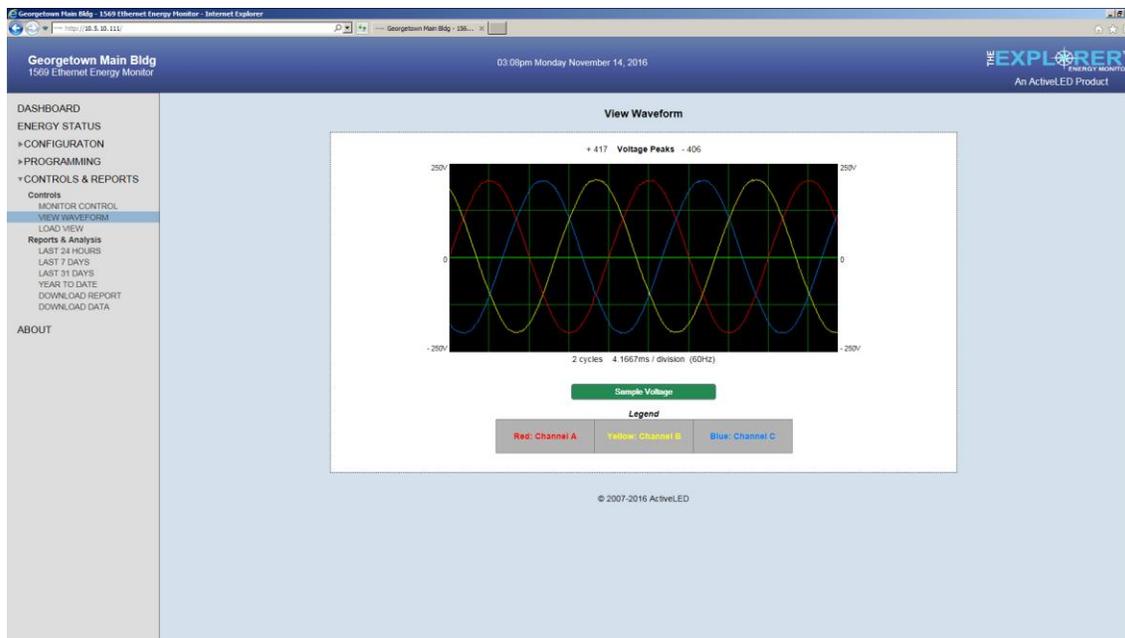
Start and Stop - Normally used to begin and end a sampling session recording to the USB.

Pause and Resume - used to temporarily stop or resume sampling to the USB.

Copy to USB - Used to capture data to a USB device or, to stop USB capture.

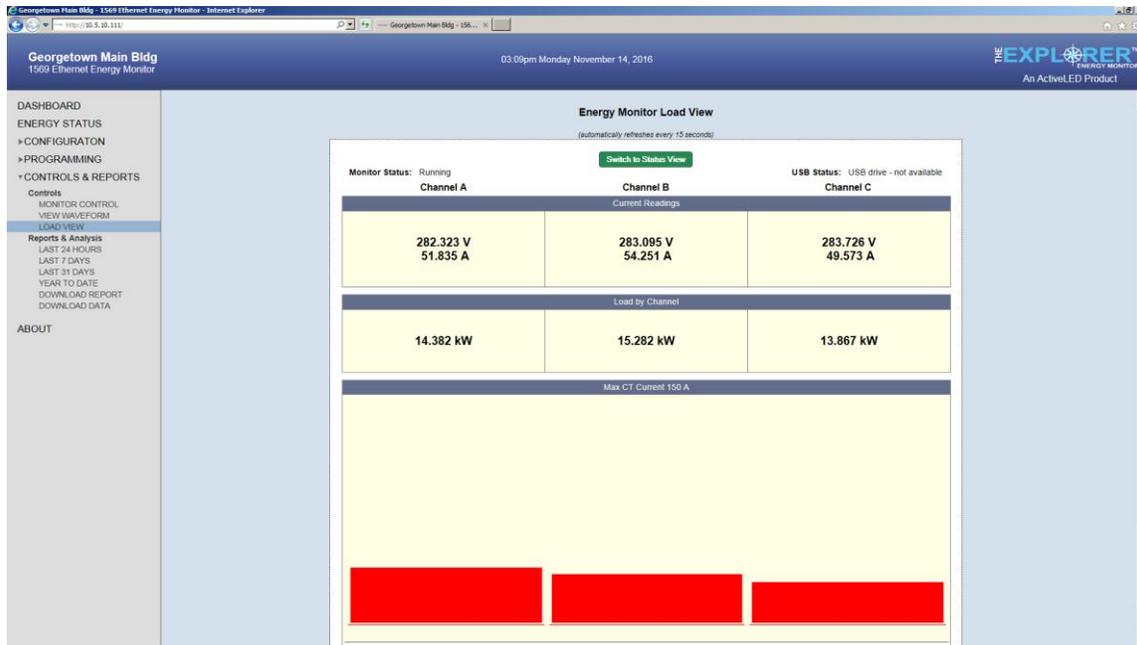
IMPORTANT NOTE: The flash drive should not be removed while the device is running or paused. Removal of the flash drive without stopping the unit may result in corrupted data.

Controls & Reports - View Waveform



Sample Voltage - Used to view the Voltage waveform for each channel

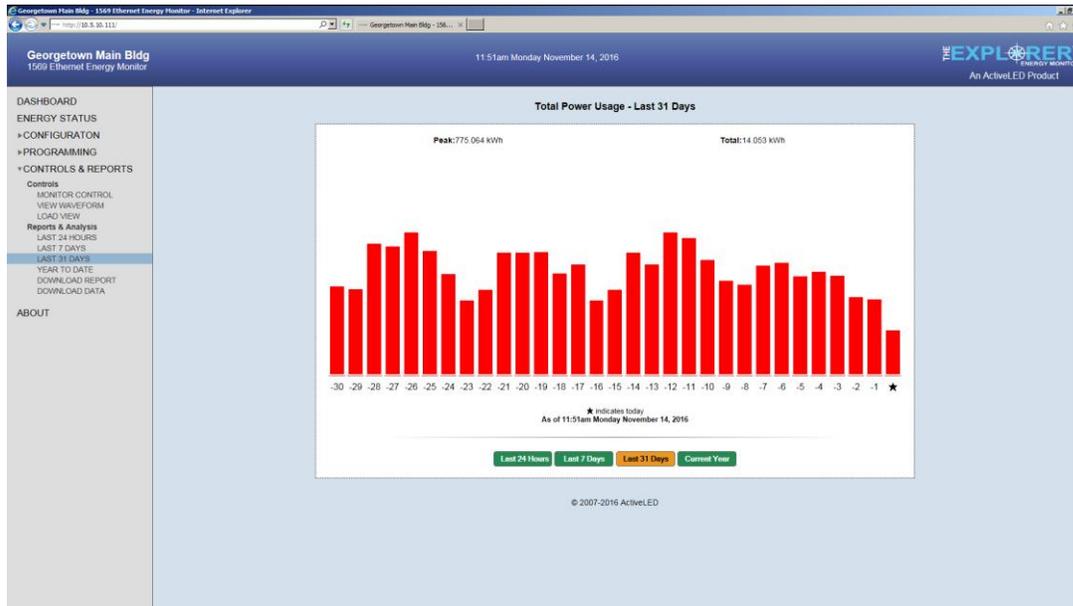
Controls & Reports - Load View



Load View displays the current energy usage, for separate channels, in voltage and amperage, and kW

Controls & Reports - Report & Analysis

Within the Reports & Analysis submenu of Controls & Reports, total power usage reports can be viewed as well as the option to download a detailed report. 24 hour, 7 days, 31 days, and year to date. (Last 31 Days shown)



Note: When viewing report as Last 31 Days, days are counted backwards from the current date which is symbolized as a star. In this example the star represents November 14th and -1 through -30 is a subtraction from that date.

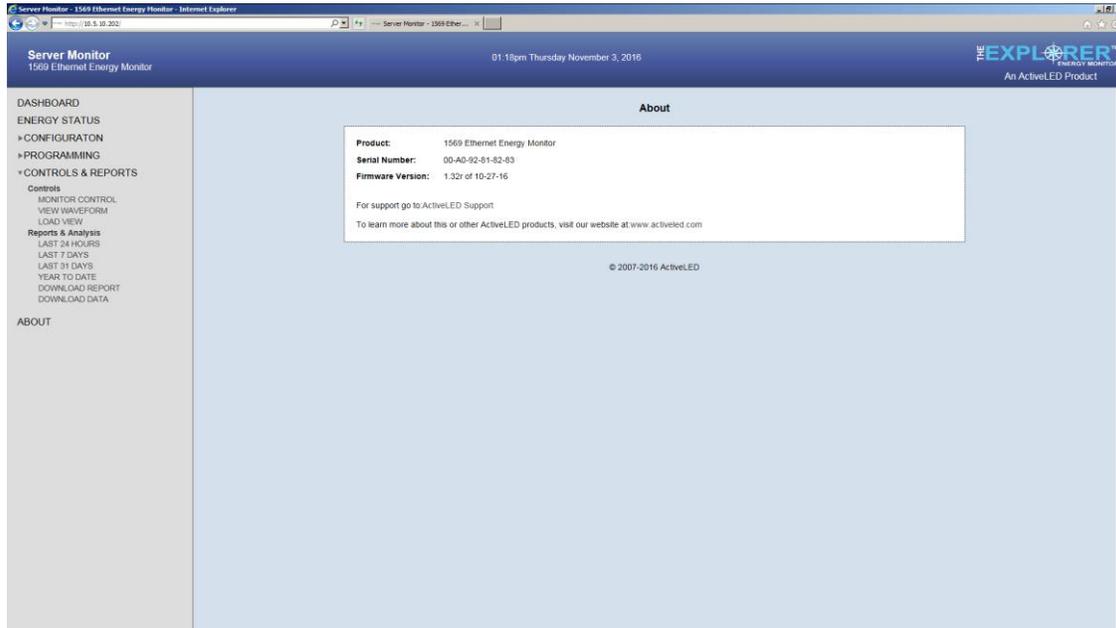
Downloading Report and Data

Download Report - Use this option to open or save a rich text file showing the Last 24 Hours and Last 7 Days energy report.

Download Data - Use this option to download an excel spreadsheet that shows the Year to Date energy usage displayed in Watt hours. (Available in Pro version only)

About

This page provides information about the unit.



The screenshot shows a web browser window displaying the 'Server Monitor' interface. The browser title is 'Server Monitor - 1569 Ethernet Energy Monitor - Internet Explorer'. The address bar shows 'http://192.168.1.100:8080'. The page header includes 'Server Monitor 1569 Ethernet Energy Monitor' on the left and '01:15pm Thursday November 3, 2016' and 'THE EXPLORER ENERGY MONITOR An ActiveLED Product' on the right. The left sidebar contains a navigation menu with categories: DASHBOARD, ENERGY STATUS, CONFIGURATION, PROGRAMMING, CONTROLS & REPORTS (with sub-items: Controls, MONITOR CONTROL, VIEW WAVEFORM, LOAD VIEW, Reports & Analysis, LAST 24 HOURS, LAST 7 DAYS, LAST 31 DAYS, YEAR TO DATE, DOWNLOAD REPORT, DOWNLOAD DATA), and ABOUT. The main content area is titled 'About' and contains a white box with the following information: Product: 1569 Ethernet Energy Monitor, Serial Number: 00-A0-92-61-62-83, and Firmware Version: 1.32r of 10-27-16. Below this box, it says 'For support go to ActiveLED Support' and 'To learn more about this or other ActiveLED products, visit our website at www.activeled.com'. At the bottom of the page, it says '© 2007-2016 ActiveLED'.

Collecting Monitor Records

Data Records may be obtained from one of three sources, 1) from a Network device, 2) from a USB device and 3) from a folder that includes the file from the USB flash drive that has been written by the device.

Records should be considered to come in a stream.

The Explorer Energy Monitor may be started and stopped manually using the Manual Control panel, or it can be programmed to start and/or stop automatically at certain times and dates.

You can take the compact flash; plug it into a PC with the Explorer Energy Monitor for analysis. This is the procedure:

- 1) Take the compact flash, plug it into a PC.
- 2) Open the Explorer Energy Monitor application. Click the **Select Device** button, then the Select A File tab
- 3) Click the **Browse** button and choose the datalog.bin
- 4) Click Connect Selected Device.
- 5) Put a check in Log Records. Provide a file name for the text file.
- 6) Click Listen to Device to see the data go by.

The text file is space delimited. When it is done you can import the file into Excel and generate a chart.

USB Flash Device

The only USB Flash devices supported are up to 2GB with FAT format 2048 bytes per sector.

The filename is DATALOG.BIN and is not case sensitive since version 1.10.

The file should be pre-formatted with all 0xFF for the length of the file. However the file gets overwritten on every power-up of the device.

Since version 1.12 the device will always append data to the end of previously recorded data. To erase the data use a PC to reformat and re-apply the preformatted datalog.bin file.

Output files

Sample log file:

Date	Time	IA	IB	IC	VA	VB	VC	WHA	WHB	WHC
08/03/07	12:39:11.499	0.2124	0.1941	0.1960	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:13.499	0.2017	0.2061	0.1985	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:15.499	0.2029	0.2174	0.1847	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:17.499	0.2048	0.2168	0.1973	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:19.499	0.2193	0.2010	0.1966	1.5321	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:21.499	0.2080	0.2092	0.2036	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:23.499	0.2004	0.2162	0.1985	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:25.499	0.2067	0.1998	0.1954	1.5327	12.6643	7.0982	00000	00000	00000
08/03/07	12:39:27.499	0.2055	0.2136	0.1992	1.5327	12.6650	7.0988	00000	00000	00000
08/03/07	12:39:29.499	0.1979	0.1960	0.1966	1.5327	12.6643	7.0988	00000	00000	00000
08/03/07	12:39:31.499	0.2080	0.1985	0.2036	1.5327	12.6643	7.0988	00000	00000	00000
08/03/07	12:39:33.499	0.2061	0.2143	0.2029	1.5321	12.6650	7.1789	00000	00000	00000
08/03/07	12:39:35.499	0.2080	0.2111	0.1865	1.5327	12.6643	7.0988	00000	00000	00000
08/03/07	12:39:37.499	0.2023	0.2067	0.1809	1.5327	12.6643	7.0988	00000	00000	00000
08/03/07	12:39:39.499	0.2092	0.1941	0.1985	1.5327	12.6650	7.1789	00000	00000	00000
08/03/07	12:39:41.499	0.2017	0.1947	0.1941	1.5327	12.6650	7.1789	00000	00000	00000
08/03/07	12:39:43.499	0.2029	0.1960	0.1985	1.5321	12.6650	7.1789	00000	00000	00000

IA-IC = Current readings for channel A-C.

VA-VB= Voltage readings for channel A-C.

WH=Watt/Hours for channel A-C.

Technical Specifications

Power Supply	External All Voltage
Power Input	12..48 Volt DC, 1A
Power Consumption	3 Watts typical
Operating Temperature	-40°C to +85°C

Records Definitions

This is the general record description. It is beneficial to programmers performing an analysis of the .bin record file.

```
struct  dataloggerRecord {
    BYTE      rectype;
    BYTE      length;      // length following
    USHORT    dateStamp;   // 16 bit date stamp

    ULONGtimeStamp;       // 32bit 1/32768sec count from midnight
    BYTE      data[length - 6];
};
```

5.3 powerRecord

```
//
// Record Type == 0
// RMS Power consumption monitor
//
struct  powerRecord {

    BYTE  rectype = 0;
    BYTE  length = 30;
    USHORT    dateStamp;
    ULONGtimeStamp;
    BYTE  phaseACurrent[3];    // 24bit Phase A current RMS
    BYTE  phaseBCurrent[3];    // 24bit Phase B current RMS
    BYTE  phaseCCurrent[3];    // 24bit Phase C current RMS
    BYTE  phaseAVoltage[3];    // 24bit Phase A voltage RMS
    BYTE  phaseBVoltage[3];    // 24bit Phase B voltage RMS
    BYTE  phaseCVoltage[3];    // 24bit Phase C voltage RMS
    BYTE  phaseAWattHr[2];     // 16bit Phase A Watt-Hour Accumulation
    BYTE  phaseBWattHr[2];     // 16bit Phase B Watt-Hour Accumulation
    BYTE  phaseCWattHr[2];     // 16bit Phase C Watt-Hour Accumulation
};
```

```
//
// Record Type == 1
// Alarm
//
to be specified
//
// Record Type == 2
// Waveform data
//
struct  waveRecord{
    BYTE      rectype = 2;
    BYTE      reserved;
    USHORT    dateStamp;
    ULONGtimeStamp;
    BYTE      waveData[16][3];    // 6x x 24bit values
};
```

wave Records will come in batches of 32 records

Notes

For non wave Record types:

dateStamp is bit packed yyyymmdd

timeStamp is 1/32768sec from midnight

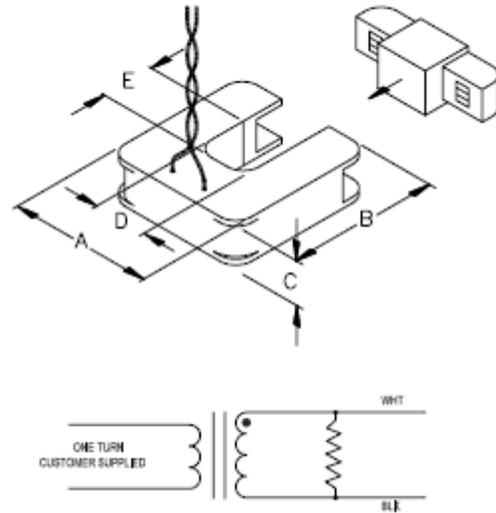
For waveRecord type:

To be specified

Current Transformers (CT)

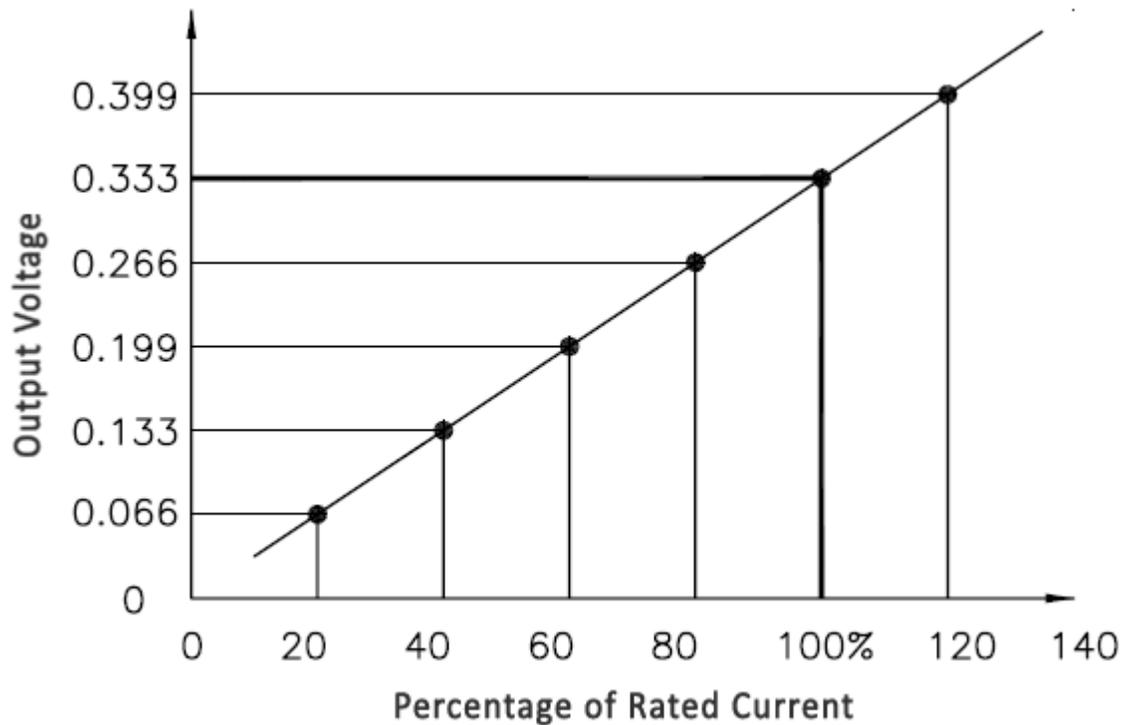
This is a specification for current transformers useable with the ActiveLED Explorer Energy Monitor. Current transformers can be purchased in a wide range of clamp sizes and rated current configurations from the [ActiveLED Online Store](#).

Note: Only use CTs with burden resistors for ActiveLED Explorer Energy Monitor Device.



Part No.	Rated Current (Amps)	Dimension (inches)				
		A	B	C	D	E
00-11-0750-0000*	0-200	2.00	2.10	0.61	0.75	0.75
00-11-0750-0005	5					
00-11-0750-0010	10					
00-11-0750-0015	15					
00-11-0750-0020	20					
00-11-0750-0025	25					
00-11-0750-0030	30					
00-11-0750-0050	50					
00-11-0750-0060	60					
00-11-0750-0070	70					
00-11-0750-0100	100					
00-11-0750-0150	150					
00-11-0750-0200	200					
*Products with -0000 have no burden resistor.						

The following table shows the output voltage versus the percentage of 'Rated Current' (see table below).



Glossary

- CT Current Transformer is the device used to determine the amount of current flow based on the electrical induction of the wire. For a list of purchasable 333mV [current transformers](#) see the ActiveLED website.
- IEC The International Electro technical Commission is the international standards and conformity assessment body for all fields of electro technology.
- NCAR National Center for Atmospheric Research
- NPMP Network Peripheral Management Protocol, a protocol developed by ActiveLED for communicating with ActiveLED devices.
- NTP Network Time Protocol - It uses ports 123 for TCP and UDP.
- RMS Root Mean Square - The RMS value is the effective value of a varying voltage or current.
- USB Universal Serial Bus A widely used hardware interface for attaching peripheral devices

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