

SolarVu Installation Guide for Advanced Energy AE35TX-AE100TX Inverters

Site Preparation

SolarVu® is an energy portal that enables remote monitoring of renewable energy generation sites over the web. It requires the installation of a K135 gateway which continuously transfers data from the inverter(s). This guide explains how to connect the K135 gateway to AE35TX - AE100TX inverters.

Each inverter must have a RS485 communication card installed which is normally a standard feature. To access SolarVu from a browser, the inverters are connected to the internet through a Cachelan Kyoto K135 gateway. The K135 connects to multiple inverters using twisted pair wire, typically cat5e, daisy chained to multiple inverters. An RJ45 ethernet jack, connected to the LAN network and 120VAC outlet for the gateway power dongle are required. The LAN must have high speed internet service to an ISP to provide a gateway to the internet as shown in figure 1.

K135 Installation

Mount the SolarVu enclosure with conduit to the inverter for the RS485 serial cable, ethernet cat5e cable and 120VAC control power. Normally this enclosure will be in the same electrical room as the inverter, however, the RS485 serial cable can run long distances, over 1000 feet, if necessary.

Power Supply: Temporarily unplug the K135 power dongle. Wire 120VAC control power from a suitable 15A circuit to the the internal receptacle and replace the cover securing the dongle with the reusable cable tie supplied.

RS485 Serial: Consult the AE installation manual and fig 3 for location, wiring and slave address setting of the RS485 serial communications. Route twisted pair cable through the inverter cable entry holes away from power conductors to the terminals marked +, -, REF as shown in fig 2. Connect the other end of the twisted pair cable in the SolarVu enclosure to the K135 gateway terminals as shown in fig 2. Shielded twisted pair wire is preferred for noise immunity but standard Cat5e, 8 wire, UTP, #24 cable may also work. If more than one inverter is to be monitored, daisy chain from the first inverter to the second etc. Do not connect in star configuration.

Fig 1 Internet Connection

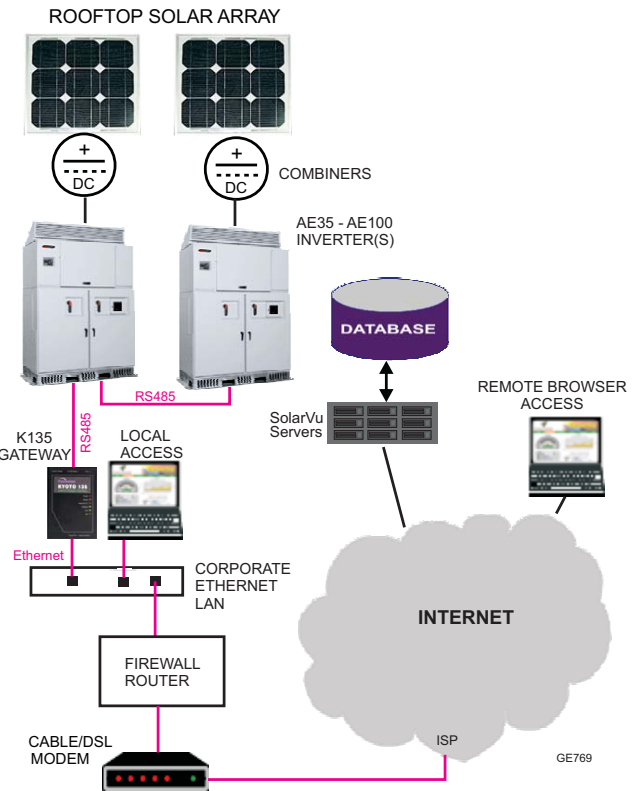
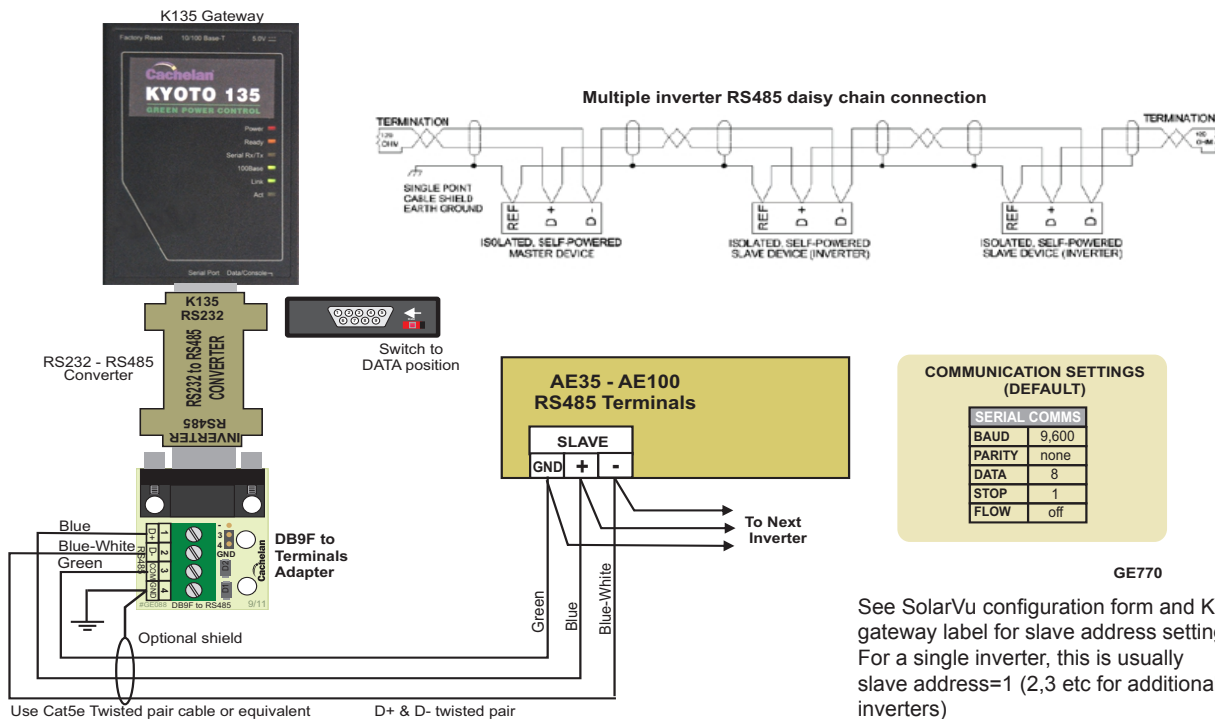


Fig 2 K135-AE inverter connections

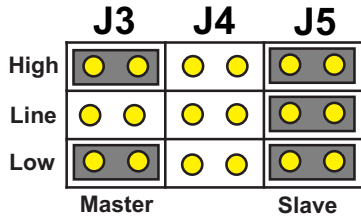


See SolarVu configuration form and K135 gateway label for slave address settings. For a single inverter, this is usually slave address=1 (2,3 etc for additional inverters)

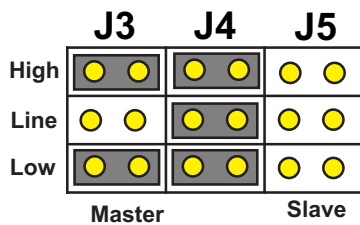
Fig 3 RS485 Connection for AE35 and AE50 Inverters

AE35 & AE50 RS485 Comms Board

**JUMPER SETTINGS
STANDARD SINGLE INVERTER**
Jumpers for single or end inverter
Terminator Resistor + Biasing



**JUMPER SETTINGS
OPTIONAL MULTI INVERTER**
Jumpers for middle inverter
No Terminator Resistor, No Biasing



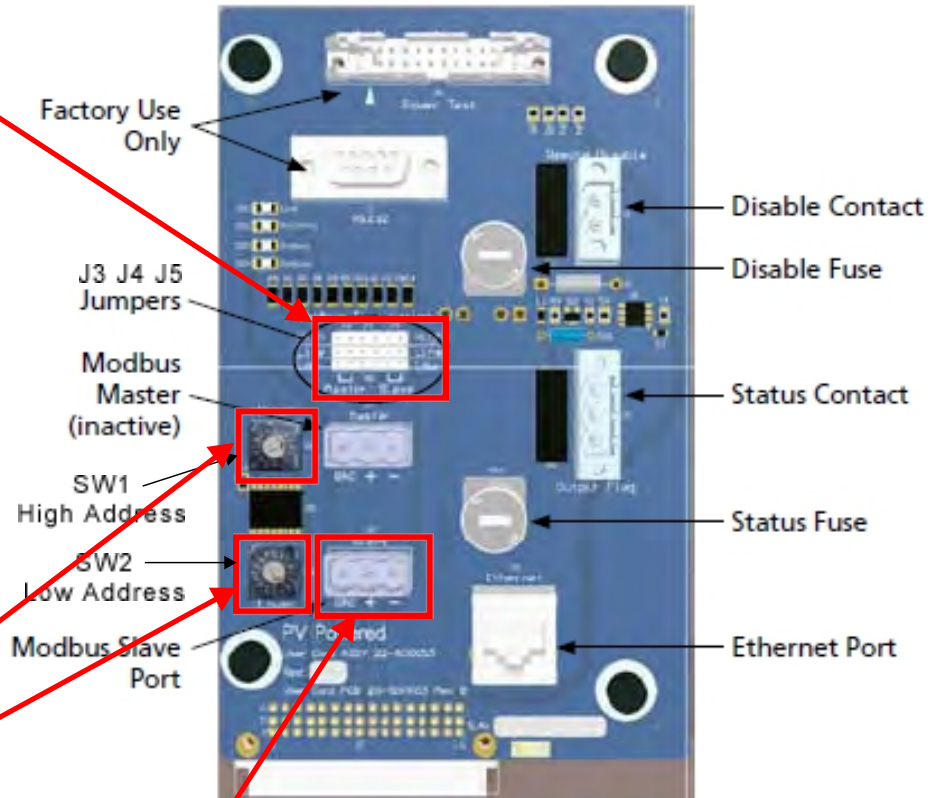
Default Address=1
SW1=0, SW2=1

| Address | Switch | |
|---------|---------|-----|
| | Decimal | Hex |
| | 1 | 2 |
| 1 | 0 | 1 |
| 2 | 0 | 2 |
| 3 | 0 | 3 |
| 4 | 0 | 4 |
| 5 | 0 | 5 |
| 6 | 0 | 6 |
| 7 | 0 | 7 |

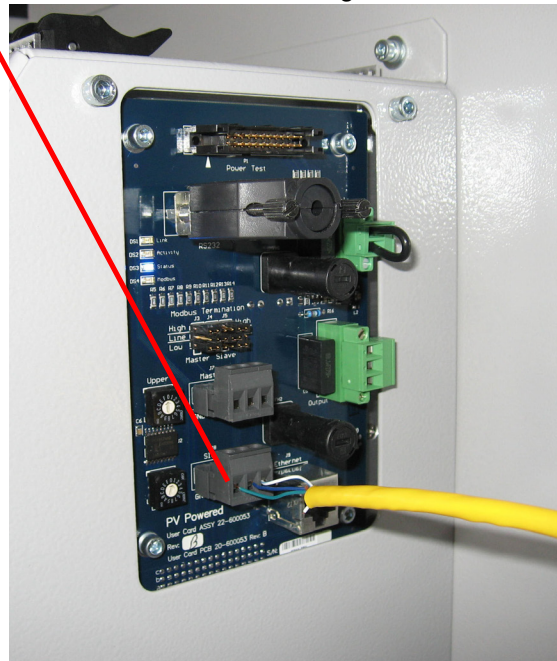
COMMUNICATION SETTINGS (DEFAULT)

| SERIAL COMMS | |
|--------------|-------|
| BAUD | 9,600 |
| PARITY | none |
| DATA | 8 |
| STOP | 1 |
| FLOW | off |

DATA MANAGEMENT MODULE



RS485 Connection using cat5e Cable



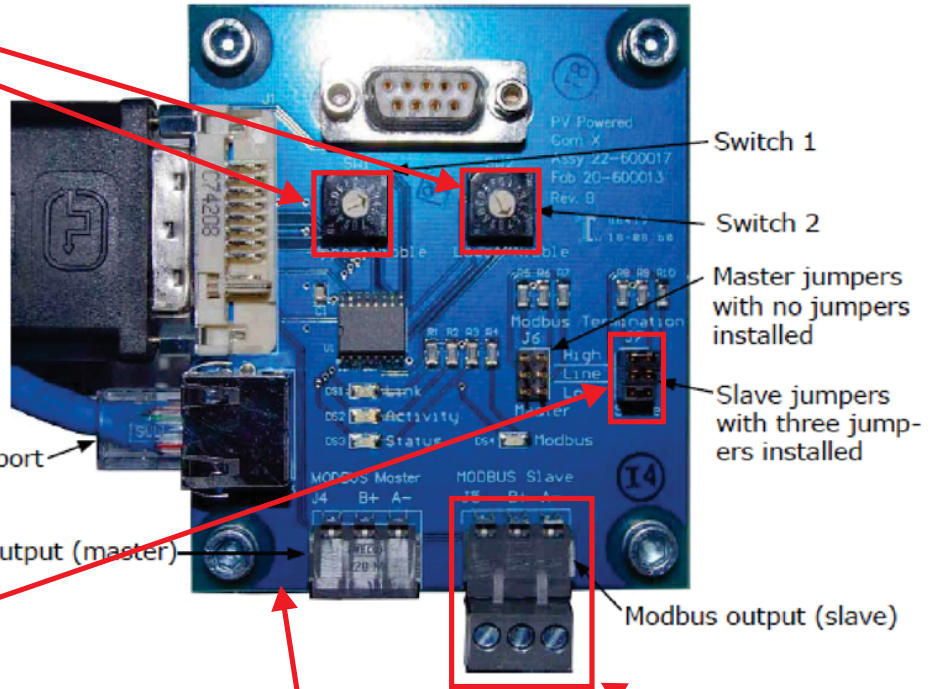
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Fig 3b RS485 Connection for AE75 and AE100 Inverters

Default Address=1
SW1=0, SW2=1

| Address | Switch | |
|---------|---------|-----|
| | Decimal | Hex |
| | 1 | 2 |
| 1 | 0 | 1 |
| 2 | 0 | 2 |
| 3 | 0 | 3 |
| 4 | 0 | 4 |
| 5 | 0 | 5 |
| 6 | 0 | 6 |
| 7 | 0 | 7 |

AE75 & AE100
RS485 comms board



**JUMPER SETTINGS
STANDARD SINGLE INVERTER**
Jumpers for single or end inverter
Terminator Resistor + Biasing

| | J3 | J4 | J5 |
|------|--------|-----|-------|
| High | ● ● | ● ● | ● ● |
| Line | ● ● | ● ● | ● ● |
| Low | ● ● | ● ● | ● ● |
| | Master | | Slave |

**JUMPER SETTINGS
OPTIONAL MULTI INVERTER**
Jumpers for middle inverter
No Terminator Resistor, No Biasing

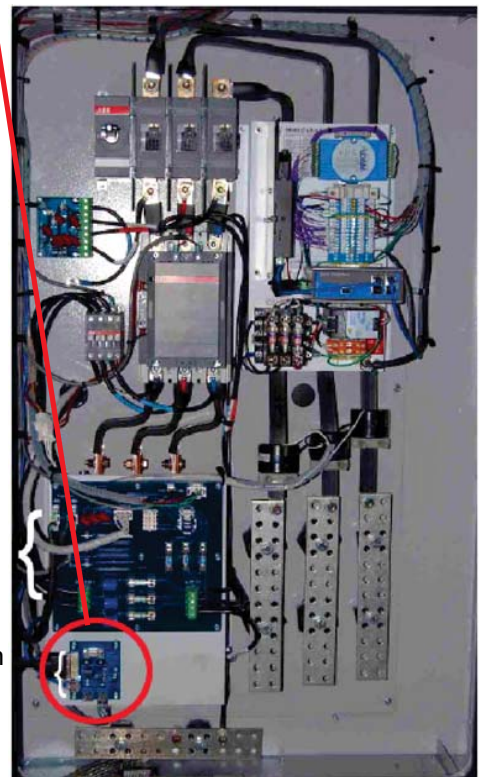
| | J3 | J4 | J5 |
|------|--------|-----|-------|
| High | ● ● | ● ● | ● ● |
| Line | ● ● | ● ● | ● ● |
| Low | ● ● | ● ● | ● ● |
| | Master | | Slave |

**COMMUNICATION SETTINGS
(DEFAULT)**

| SERIAL COMMS | |
|--------------|-------|
| BAUD | 9,600 |
| PARITY | none |
| DATA | 8 |
| STOP | 1 |
| FLOW | off |

RS485 Connection using cat5e Cable

Comms board location in main cabinet of AE75 & AE100

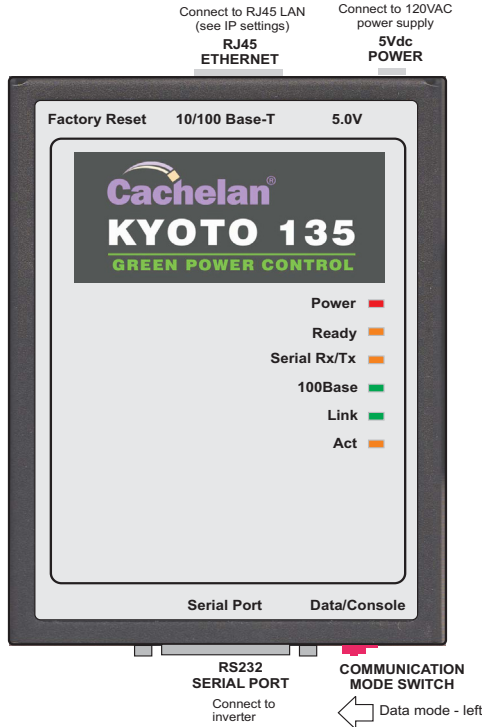


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Network Setup

On power up, the K135 looks for a DHCP server to provide it a dynamic IP address. If a PC connected to the network can automatically connect to the internet through a browser then the network is already configured to accept the K135. Otherwise consult the IT systems administrator for assistance. If a dedicated IP address, subnet mask and DNS server address are required, this needs to be entered into the K135 before shipment. Once the K135 receives its IP address it acts as a client. It will automatically try to connect to the SolarVu™ server and begin transferring data from the inverter to the server.

K135 indicators and connections



Testing

Ensure the inverters and K135 are powered on, the ethernet cable is plugged into a network jack and the RS485 cable is connected between the K135 and the inverter. The Power and Ready lights should be on if the power supply is plugged in. The Link light on indicates the ethernet connection is working. 100Base will only be on for high speed connections; for 10Base it is off. The Act light will periodically flash showing network activity. The Serial Rx/Tx flashes when the inverter is polled by the K135 but most of the time the light is off.

Internet Connection

Power on the K135 and allow at least 2 minutes for communication to be established. From any internet connected computer, open the browser and type in the site address assigned for your account. This will be found on the account label shipped with the K135 and on the front panel of the K135 after the URL.

Once the website is reached, the opening screen is the SITE view. Click ANALYZER > INVERTER STATUS. If there is a connection from the site, the Last Communication light will be green. The K135 gateway does not need to be connected to the inverter for this light to be green. If this indicator is red, it indicates no internet connection has been established. Check internet connections at the site by trying to browse the internet at the site with a PC connected to the network.

If the K135 gateway is successfully collecting data from the inverter, the Last Data Updated indicator will be green and inverter data will appear. If this indicator is red but the Last Communication indicator is green, check the serial connection to the inverter and that it is operating. When both lights are green the gages on the SITE screen will display live data and graphs will begin recording site energy output.

K135 Status Indicator Interpretation

| INDICATOR STATUS | | | |
|------------------|----------|--|--|
| LED | NORMAL | STATUS | |
| POWER | ON | OFF- no power | ON-power OK |
| READY | ON | OFF | No DHCP or static IP address. Check IP settings, ethernet connection |
| SERIAL | FLASHING | OFF | Check RS232 to inverter connection. Inverter may be off. |
| 100Base | ON | ON- 100Base, OFF- 10Base or no ethernet connection | |
| Link | ON | OFF | No ethernet connection |
| Activity | FLASHING | FLASH - data traffic activity | |

| TROUBLESHOOTING CHECKLIST | |
|---------------------------|---|
| IP | Obtain IP by DHCP or set static IP. Network configured to recognize K135 |
| Serial | RS232 serial cable connected between inverter and K135 |
| Inverter | Inverter is powered on |
| Internet | Internet connection from ISP to LAN is operating normally |
| K135 | K135 in data mode (red switch set to left viewed from top) |
| Support | Technical support: contactus@cachelan.com |

K135 front panel label with web address and login

K135 GATEWAY

URL: mysite.solarvu.net
 USER: myusername
 PASSWORD: mypassword
 IP: DHCP
 MAC: 00-01-95-06-E8-33
 ID: SS100 070300075 v1.4.1
 TYPE: Xantrex GT

Check ANALYSER > INVERTER STATUS for communication. Screen shots may vary by inverter type

LIVE - for valid data, green status light and time received

Video Tour

For an overview of available features, visit www.solarvu.net and play the What is SolarVu video. Each screen has a HELP button that explains how all the features work. An online help guide is available for printing under **SETUP > DOWNLOADS > PRINTED HELP**.

Visit www.solarvu.net for a features video



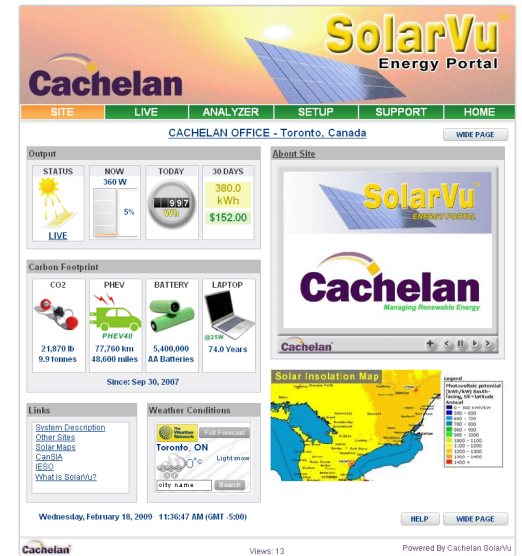
Help guide



Site Screen

For a summary of information about the site, click the **SITE** menu button. On the upper left, the current charging status of the solar panels, total power being generated now and in the last 30 days is displayed. Underneath, the carbon footprint of energy equivalents is displayed since startup. Links to other websites can be left as defaults or changed in **SETUP** to personal preferences. The local weather is preset. Email contactus@cachelan.com to have it changed. For viewing on a widescreen TV suitable for display in a public place, click the **WIDE PAGE** button. On the right is a slideshow for public viewing. Content can be personalized using uploaded graphics in **SETUP**.

Site Summary Screen



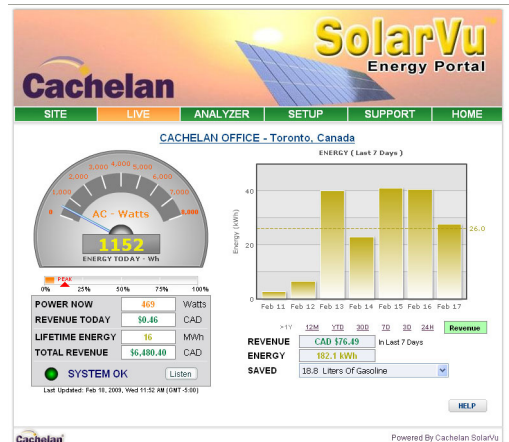
Select wide screen view for public display on an HDTV



LIVE view shows current conditions

Live Data

Click the **LIVE** menu button to display current power being generated in the array. Actual power and energy generated today are shown on the meter dial. For a normally operating system, the status indicator should be green with the last update time less than 15 minutes ago. Lifetime energy and revenue are shown digitally. For correct revenue display, the sell price per kWh must be entered in **SETUP**. If connection to the site is lost, or if an alarm is detected, the status indicator will be red. Click the Listen button with sound on for more information.

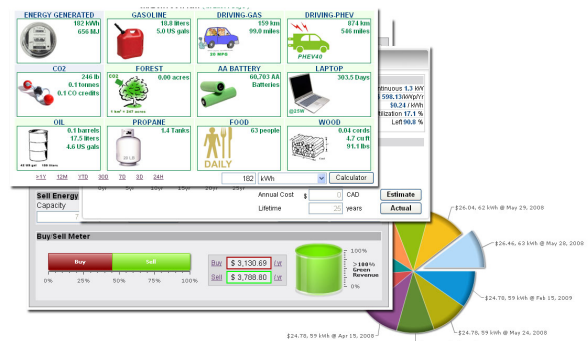


Trends are shown for the lifetime of the system using the graphs on the right. Select either an Energy or Revenue view using the button. Click the desired time period under the graph. Scroll over a data point with the mouse for more detailed information about that day. The carbon footprint pulldown gives energy equivalents for the solar power generated for the selected time period.

Analyzer - Performance

Click the **ANALYZER** menu button and select a category in the pulldown menu and a time period under the graph. The carbon footprint will compute the energy equivalents to the solar energy generated over the selected time period. This helps visitors get a practical feel for the benefits available. To find the carbon equivalent for an arbitrary value, override the actual solar amount by entering a kWh value and selecting a category, then click the Calculator button. Other views including buy/sell energy use, performance and payback can be selected with in the pulldown menu. The screen will return to the last value selected on return.

ANALYSER - select performance views from pulldown



Analyzer - Troubleshooting

When problems occur with the system or to check inverter operation, click ANALYZER > INVERTER STATUS. Each inverter connected to the system with a K135 gateway will have its own display panel showing actual values sent. Remotely located technical personnel can assist in interpreting what the values are conveying. If no communication has been received from the device for more than 2 hours a No Data Available message will be shown.

For detailed analysis, it may be helpful to download all readings for the time period of interest into a spreadsheet for further analysis using SETUP > DOWNLOAD.

Download printable HELP guide or actual readings for any time period

Setup

For entering settings to configure your site, click the SETUP menu button. Enter your unique username and password from the account label. The setup screen appears showing communication status and current preference settings. Check the last communication time ❶. It should show a time within the last 15 minutes if communication between the site and SolarVu™ server is working normally.

For the payback and revenue calculators to work properly, correct parameters for energy sell rate, capacity, average insolation etc should be entered. Account > Equipment Setup is for factory use. All changes take immediate effect. The Site Setup tab is used to customize the banner, links, slideshow and system description. Click the Help ❷ button for each section for a description of the effect for each entry. For further analysis, individual energy readings for any time period can be downloaded into a spreadsheet from the DOWNLOAD section.

Enter the email address ❸ for each individual that wants a regular status report sent to them and select the frequency. This report will include energy and revenues for different time periods and indicate if there are any alarms. In the Password tab, include an email address to receive the Setup login password if this is forgotten.

Support

See the What is SolarVu? video at www.solarvu.net for a feature overview. Each screen has a HELP button with details for the items on that view. A printable HELP guide can be downloaded in SETUP > DOWNLOAD.

For additional technical support, send an email to contactus@cachelan.com or dial our support line in Toronto, Canada at 905.470.8400

Click ANALYZER > INVERTER STATUS for troubleshooting

| Xantrex GT (North Array) | | | | | | |
|--------------------------|------------|-----------|-----------|-------------|---|----------|
| DC INPUT | POWER | 903.0 W | Volts | 294.1 V | Amps | 3.07 A |
| AC OUTPUT | POWER | 793.0 W | Volts | 212.4 V | Amps | 3.90 A |
| PERFORMANCE | Efficiency | 87.8 % | Frequency | 60.0 Hz | Heat Sink | 37 C |
| TODAY | Energy | 7.132 kWh | Max Power | 3.35 kW | Online | 08h 20m |
| LIFETIME | Energy | 8.151 kWh | Revenue | \$ 3,423.42 | Run Time | 607 Days |
| Listen | | | | | Last Data Updated: Feb 26, 2009, Thu 3:42 PM (GMT -5:00) | |
| Listen | | | | | Last Communication: Feb 26, 2009, Thu 3:42 PM (GMT -5:00) | |

| Xantrex GT (South Array) | | | | | | |
|--------------------------|------------|-----------|-----------|-------------|---|----------|
| DC INPUT | POWER | 727.0 W | Volts | 300.4 V | Amps | 2.42 A |
| AC OUTPUT | POWER | 640.0 W | Volts | 211.8 V | Amps | 3.13 A |
| PERFORMANCE | Efficiency | 88.0 % | Frequency | 60.0 Hz | Heat Sink | 36 C |
| TODAY | Energy | 5.609 kWh | Max Power | 2.36 kW | Online | 08h 18m |
| LIFETIME | Energy | 8.175 kWh | Revenue | \$ 3,433.50 | Run Time | 607 Days |
| Listen | | | | | Last Data Updated: Feb 26, 2009, Thu 3:42 PM (GMT -5:00) | |
| Listen | | | | | Last Communication: Feb 26, 2009, Thu 3:42 PM (GMT -5:00) | |

See K135 label for SETUP login

| K135 GATEWAY |
|---|
| URL: mysite.solarvu.net |
| USER: myusername |
| PASSWORD: mypassword |
| IP: DHCP |
| MAC: 00-01-95-06-E8-33 |
| ID: SS100 070300075 v1.4.1 |
| TYPE: Outback Mate |
| DATE: Feb 2009 |
| SUPPORT: cachelan.com |

Configure site settings in SETUP

Cachelan Technical Support

contactus@cachelan.com

905.470.8400 x228