SolarVu™ Installation Guide
for Schneider Conext CL60 Inverter

Introduction

SolarVu® is an energy portal that remote monitoring of provides solar PV renewable energy generation sites over the web. It requires the installation of an M504 gateway (datalogger) which continuously transfers data from the inverter(s) to the SolarVu servers. This guide explains how to connect the M504 gateway to the Schneider Conext CL60 inverter(s) using ModBus RTU RS485 serial communications which is a standard feature of this inverter. The M504 gateway connects to one or more inverters usingtwisted pair wire, typically cat5e, daisy chained for multiple inverters. A persistent internet connection is required either by connection to an RJ45 ethernet jack connected to the building LAN or by installing the optional 3G cellular modem in the SolarVu enclosure. A source of 120VAC must be available to power the SolarVu equipment. The LAN must have high speed internet service to an ISP to provide a connection to the internet as shown in figure 1.

SolarVu Installation

Before starting, review the drawings and instructions in the document pouch on the SolarVu enclosure door. The multiport M504-485 comms board should be connected correctly according to the SLD (single line drawing) provided. Use the SLD for the specific terminal connections that apply for the project with this guide for general instructions. Mount the SolarVu enclosure with conduit to the inverter for the RS485 serial cable, ethernet cat5e cable to the building LAN (unless 3G cellular is installed) and 120VAC control power as shown in fig 2. Normally the SolarVu enclosure will be mounted in the same electrical room as the inverter. However, the RS485 serial cable can run long distances, over 1000 feet, if necessary.

Power Supply: Wire 120VAC control power from a suitable 15A circuit to the circuit breaker, N and G terminals.

RS485 Serial: Refer to page 2 of this installation guide for inverter communication to connect the serial wires to the inverter. Route the twisted pair cable away from power conductors into the first inverter terminal blocks as shown in fig 3. Connect the other end of the twisted pair cable in the SolarVu enclosure to the M504-485 comm board terminals. Shielded twisted pair wire such as Belden 3106A 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. Do not use the RJ45 ports for RS485 serial communication.

Ethernet: The LAN must have high speed internet service to an ISP to provide access to the internet. The SolarVu gateway RJ45 ethernet jack plugs into an RJ45 LAN jack connected to the building router using a standard Cat5e patch cable. Alternatively, SolarVu can be ordered with a 3G cellular modem for wireless internet connection. A source of 120VAC for control power needs to be connected to the SolarVu enclosure.

Inverter Configuration: After wiring all inverters, each inverter is required to be configured to have a unique address for communication. Refer to page 3 for detailed inverter address assignment.
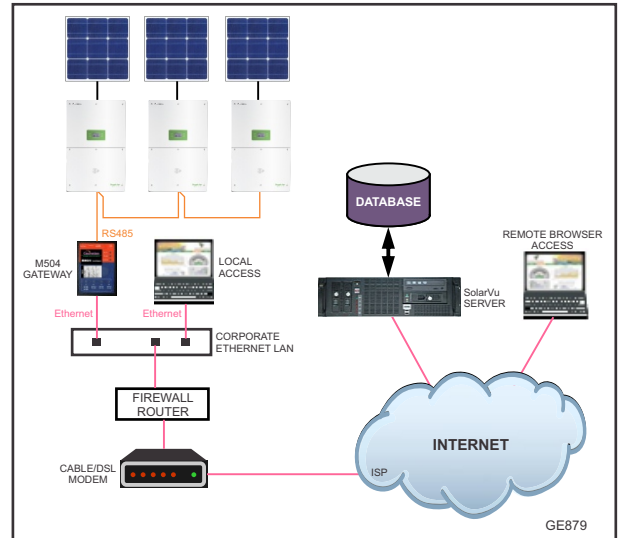

Fig 1 Network Connections

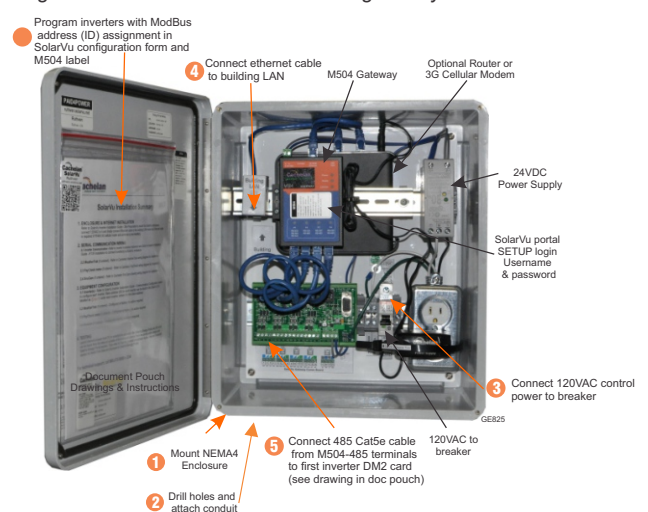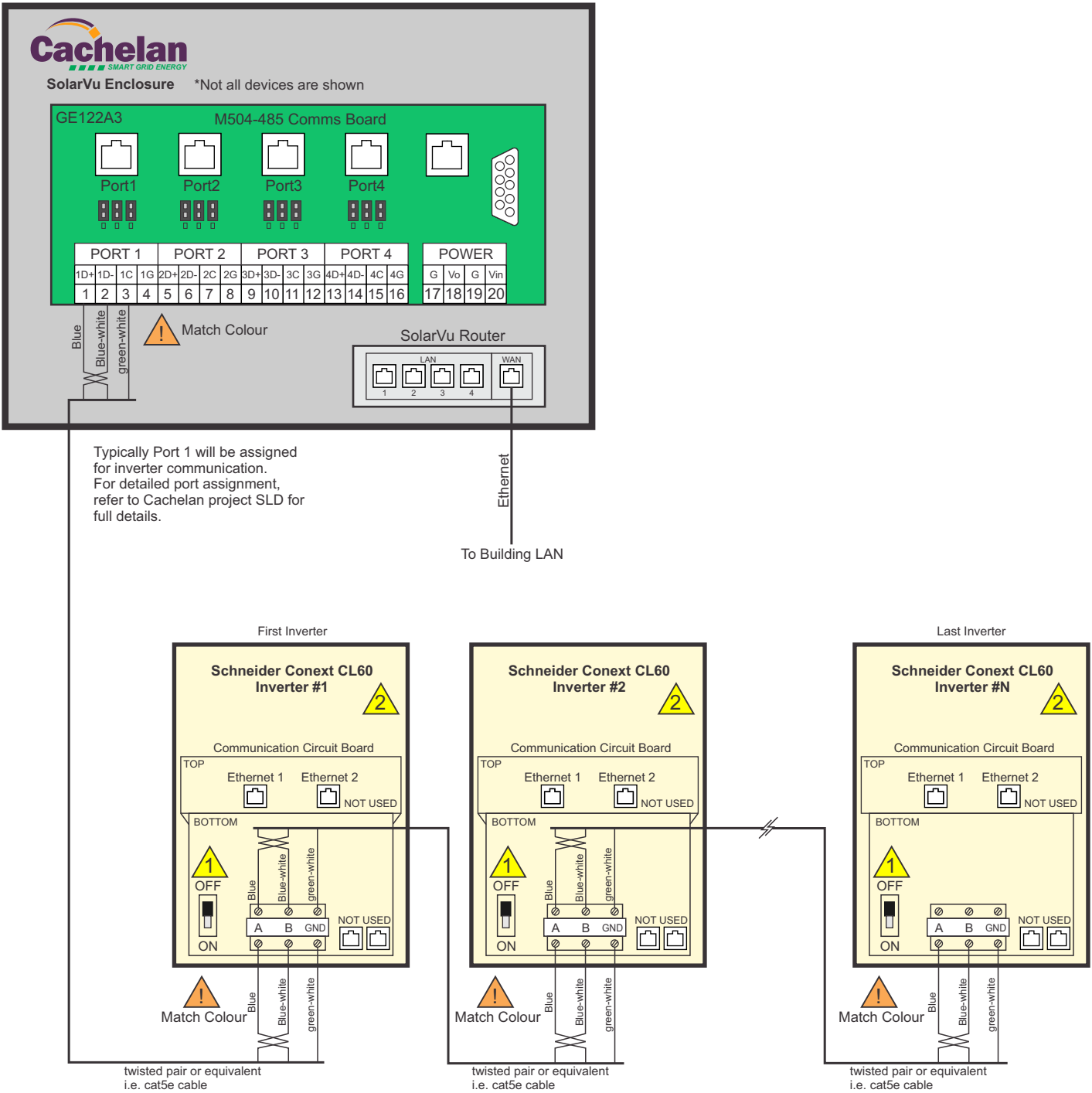*Fig 2 SolarVu enclosure - for M504 gateway*

Fig 3 SolarVu Inverter Communication Wiring

SolarVu M504 to Schneider Conext CL60 Inverters

1. Keep the 120ohm termination resistor at OFF position for all inverters

2. Refer to page 3 for detailed inverter communication configuration and address assigment

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Fig 4 SolarVu Inverter Communication Setting

The CL-60 inverter has two selection buttons for looking up information and configuring the settings. The two buttons have multiple functions. See the following description for details.

| Button	Operation	Operation Detail	Description
∨ ESC	Quick Press	Press less than 2 seconds	Move downwards or scroll among set values
	Long Press	Press more than 2 seconds	Return to the previous menu or cancel the command
> OK	Quick Press	Press less than 2 seconds	Move left or right, or turn pages
	Long Press	Press more than 2 seconds	Enter into the sub-menu or confirm the command

NOTE:
- After one minute of no button activity, the LCD backlight turns off
- After two minute of no button activity, the interface system returns to the default screen (the Main Screen)
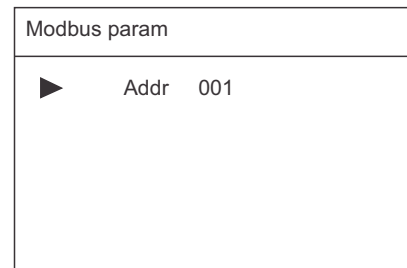
Inverter Communication Setup

Fig 4 shows the button functions and detailed descriptions. The following setups are required to be performed on each inverter to make all inverters communicate to SolarVu gateway:

1. From the main screen, quick press the OK button to go to the menu page.
2. In the menu page, quick press the ESC button three times to move to *Set-param*, long press OK.
3. The system will ask for password. The default password is *111111*. Quick press ESC to change the number and quick press OK to move to the next digit. When set, long press OK to enter.
4. In *Set-param* page, quick press ESC three times to move to *Com-param*, long press OK to enter.

5. In *Com-param*, make sure the cursor is at *Modbus param*, long press OK to enter.

```
Com-param
─────────────────────────
►       Com-param

        Uart param
```
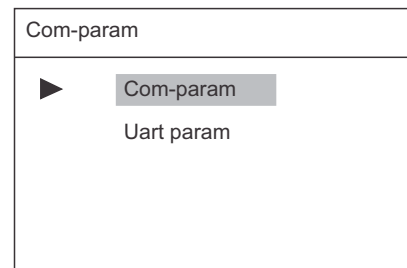
6. Quick press ESC to set the address based on the Cachelan project SLD. Typically inverter #1 should have address 1, inverter #2 should have address 2 and etc. Refer to Cachelan project SLD for detailed address assignment. When address is set to the desired one, long press OK to confirm.

```
Modbus param
─────────────────────────
►       Addr    001
```

7. Return to the *Com-param* page, move cursor to *Uart param* and enter. Make sure the *Baud* is set at 9600, *Parity* is NO and *Stop bit* is 1 and return all the way to the menu page. The communication setup for this inverter is done. Repeat from step 1-7 for the rest of the inverters.

```
Uart param
─────────────────────────
►       Baud      [ 9600 ]

        Parity    [ NO ]

        Stop bit  [ 1 ]
```
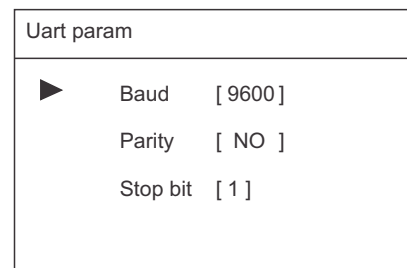
Testing the System

At this point the installation should be complete ready for testing. It is helpful to have access to a PC that is connected to the internet for viewing SolarVu screens. Using the URL supplied for the system. The gateway is preconfigured to automatically send inverter data to the SolarVu servers. To do this it must first establish an internet connection. Then it will collect data from the inverters and periodically transmit it.

Verifying correct operation is described in the sections that follow. Indicator lights and actual values accessible from the SolarVu Analyzer > Inverter Status screen Fig 6 are useful for determining the status of the system.

To access the inverter status screen, enter the SolarVu URL in your browser Click ANALYZER

Inverter Status

| SITE | LIVE | **ANALYZER** | SETUP | SUPPORT | HOME |

Inverter Status ▼   HELP 📄 🎥

Time of last update received from the M504 gateway ➡ Monday, February 8, 2016 11:51:04 AM (GMT -5:00)

Schneider CL#1 (Slave ID : 1)   [Data Log] [Manual] [Installation]

DC Input	Power 1	**8,100 W**	Voltage 1	**589 V**	Current 1	**12.8 A**
	Power 2	**8,500 W**	Voltage 2	**589 V**	Current 2	**13.7 A**
AC Output	Voltage A L-N	**285 V**	Voltage B L-N	**285 V**	Voltage C L-N	**286 V**
	Voltage A-B	**493 V**	Voltage B-C	**495 V**	Voltage C-A	**493 V**
	Current A	**16.8 A**	Current B	**16.9 A**	Current C	**17.0 A**
	Apparent	**14.4 VA**	Reactive	**500 Var**	Frequency	**60.0 Hz**
Energy	Lifetime	**50,500 kWh**	Today	**72.4 kWh**	Yesterday	**132 kWh**
Inverter	Model	**PVSCL25NA201**	S/N	**ZX1512002645**	Software Version	**02.06**
	Temperature	**49 °C**	Operating	**6,504 Hrs**	Modbus ID	**1**

Power Now
14.4 kW

Lifetime Energy
50,500 kWh

| **Status** | **Online and power production** | |
| **Fault** | 🟢 **None** | [Error Log] [Codes] |

Alarms and status reported by inverter

[Update]

[Listen] 🟢 Last Data Updated: **Apr 10, 2017, Mon 1:16 PM (GMT -5:00)**

[Listen] 🟢 Last Communication: **Apr 10, 2017, Mon 1:27 PM (GMT -5:00)**

Light is green if M504 gateway is reading valid data from the inverter over RS485. M504 must be connected to the internet.

Light goes green if M504 is connected to the internet

Time of last communication. M504 sends an update every 10 minutes

Network Setup

On power up, the gateway 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 gateway. If a dedicated IP address was programmed instead, subnet mask and DNS server address are required. This needs to be entered into the gateway before shipment. Network configuration is shown on the gateway label and the Configuration Settings page in the doc pouch. Once the gateway 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.

Fig 7 M504 Gateway Indicators

Blue data LED flashes when transmitting and receiving data from the inverter

504-485 Comm Board

JUMPER SETTINGS
Terminator Resistor + Biasing

B+ Bias high = ON
B- Bias low = ON

T 120R termination = ON

B+   B-   T

ON

OFF

Inverter is normally connected to PORT1.
See SLD drawing in doc pouch for details

PORT1   PORT2   PORT3   PORT4
485 serial communication ports
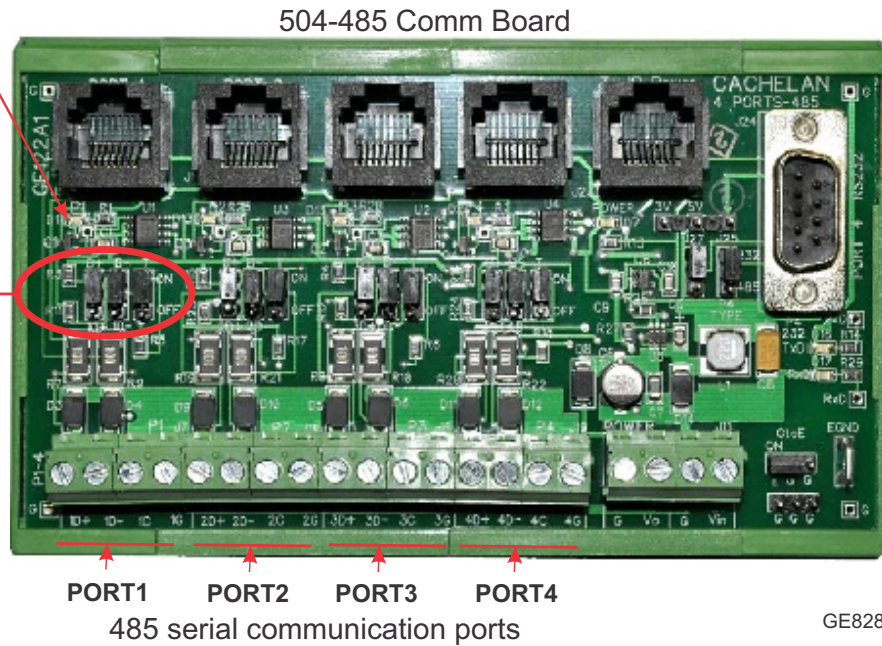
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INDICATOR STATUS		
LED	**NORMAL**	**STATUS**
Power	●	OFF-no power ON-power OK
Ready	●	ON M504 booted up and running
Link/Act	●	OFF-no ethernet connection FLASH- data traffic activity
P1	●	Serial Port 1 usually inverter Transmit=orange, Receive=green, flashing
P2	●	Serial Port 2 usually option Transmit=orange, Receive=green, flashing
P3	●	Serial Port 3 usually option Transmit=orange, Receive=green, flashing
P4	●	Serial Port 4 usually option Transmit=orange, Receive=green, flashing

TROUBLESHOOTING CHECKLIST	
IP Address	Obtain IP by DHCP or set static IP Network must be configured to same settings
Serial	Check inverter connected to correct port. Polarity of serial twisted pair wires. Serial ID entered correctly in each inverter
Inverter	Powered on. Serial ID has been set to match SLD drawing. Serial wiring correct.
Internet	Internet connection for ISP to LAN working
Support	For Cachelan technical support 905.470.8400 x224 contactus@cachelan.com

GE829

Help guide

PLAY VIDEO

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 .

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.
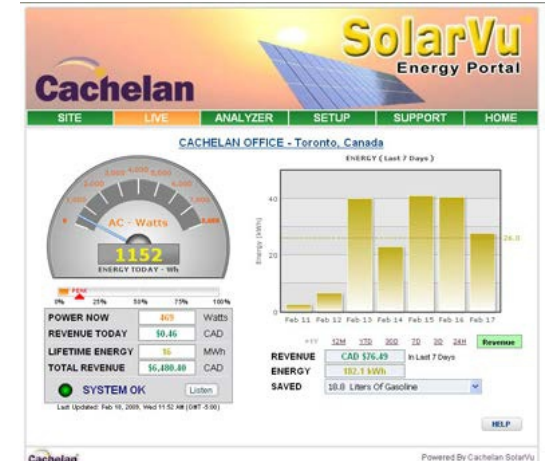
Site Summary Screen

Select wide screen view for public display on an HDTV
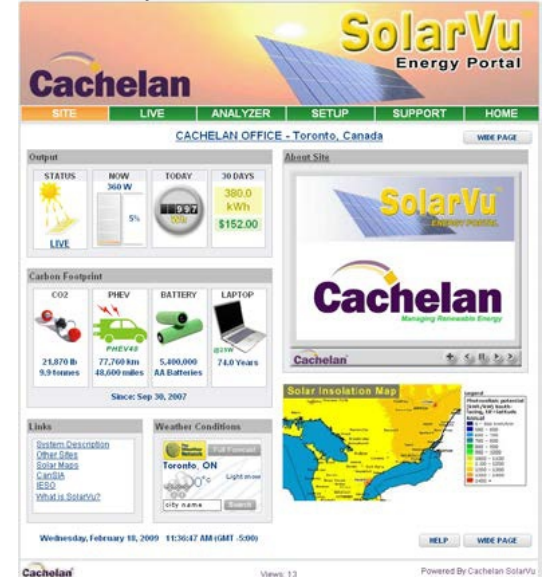
*LIVE view shows current conditions*

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
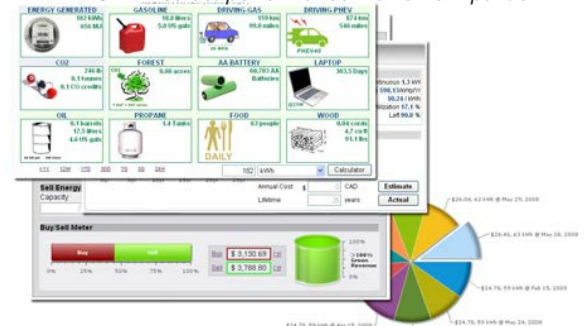
Analyzer - Troubleshooting

When problems occur with the system or to check inverter operation, click ANALYZER > INVERTER STATUS. Each inverter connected to the system with a 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.

Click ANALYZER > INVERTER STATUS for troubleshooting

*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.

See gateway 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:
DATE: Feb 2009
SUPPORT: cachelan.com

Configure site settings in SETUP

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
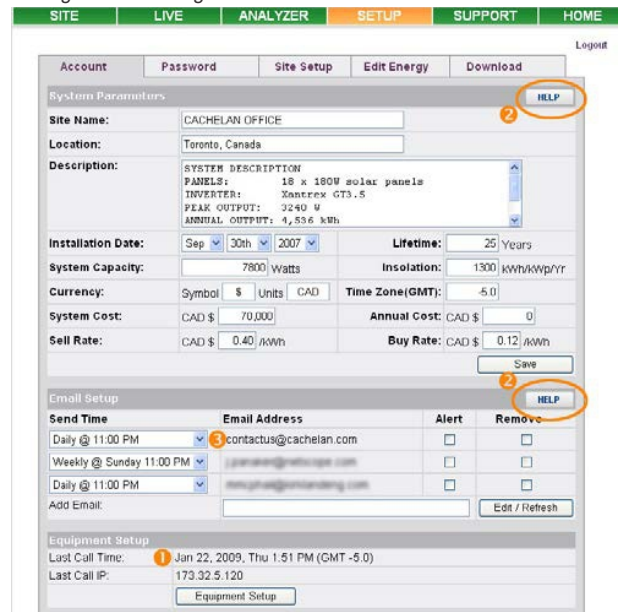
Cachelan Technical Support
contactus@cachelan.com
905.470.8400 x224