

PRODUCT INFORMATION BULLETIN

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OMNISCOPE PRODUCT INFORMATION

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This information is intended to announce the OmniScope program available from SilverLeaf Electronics.

PRODUCT INFORMATION

The function of the OmniScope program is to diagnose and manage various functions within the RV-C system. The program consists of a USB-to-RVC adapter and the OmniScope software.

SilverLeaf Electronics has offered this program at a cost of \$295.00. The program can be purchased by contacting the Newmar Parts Department. The Newmar part number is:

SRVC Tool SilverLeaf OmniScope.....Part # 019191.....Cost \$295.00

Please review the attached RV-C OmniScope Technician Manual for more information.



The OmniScope USB-to-RVC Adapter



Technician Manual



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Installation

File Installation

OmniScope does not require a special installation program. The files can merely be copied to a convenient directory.

If you are not familiar with copying and moving files in Windows, then follow these directions.

1. Click on My Computer on the Desktop.
2. Double-Click on the "Local Disk (C:)"
3. Select "File - New - New Folder", and create a new folder on your hard drive. Name it "OmniScope" or something similarly descriptive.

If you are installing from the CD, insert the CD and when Windows asks what to do with the CD, tell it to open the CD for browsing. This should open a second window listing the files on the CD. Use the mouse to "drag-and-drop" all the files over to the new folder you just made on your hard drive.

If you are installing from the internet, you can download the files directly to the directory you created. Most internet distributions are compressed. Double-click on the compressed (".ZIP") file to decompress the files into the new folder.

Finally, you can create a "shortcut" to start OmniScope by simply clicking on the OmniScope icon and dragging it to the task bar at the bottom of the screen, or to the desktop.

Driver Installation

Before you can use OmniScope you must first install the USB driver for the adapter. Plug the USB-to-RV-C adapter into the USB port of your laptop. Within a few seconds the computer should detect the adapter and start the "Add New Hardware" wizard. The wizard will prompt you for the location of the driver file. Click on the Browse button and point the wizard to the directory where you copied the OmniScope files, or if you are installing from the CD you can use the driver files on the CD.

Each SilverLeaf USB-to-RV-C adapter has a unique identifier, and if you change adapters Windows will ask to reinstall the driver. This is normal, and you will have to reinstall only once for each adapter that you have.

Updates

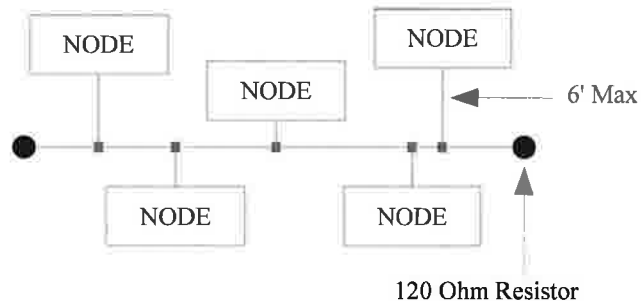
SilverLeaf deliberately designed OmniScope to make it as simple as possible to update the system and download new modules. To update any of the modules, scripts, or files, simply download or copy them into the directory you created. There are no other installation programs to run.

Introduction to RV-C

RV-C is a standard for RV appliances to talk to share information, provide diagnostic data, control and be controlled. It is a “peer” network, meaning every appliance, or “node”, is equal in the eyes of the network. A typical network will consist of at least one or two control panels, one multi-purpose controller, and any number of appliances such as inverters, generators, and slide rooms. All the data is shared digitally using a single pair of wires.

These two wires form a “bus”, connecting each node. The “trunk” of the bus may be quite long, but the “drops”, or the lines between the main trunk and each node, is limited to no more than six feet. At each end of the trunk is a 120 ohm resistor connecting the two data lines. These resistors absorb any “ringing” on the bus.

Each RV-C-equipped RV will include a nine-pin circular connector, located either under the dash or in the utility bay. This connector allows the service tool to tap into the network and become another node in the system. Once connected, the service tool can send commands and ask for data from every node in the system.



Nodes send commands and messages in small packets. Each packet can contain several pieces of data - for example, temperature, current, and voltage. Each packet is identified by a Parameter Group Number, or PGN, and you can determine the contents of the packet by looking up the PGN in the RV-C documentation. Some PGNs are unique to a certain type of product - e.g. Slide Rooms use a PGN called SLIDE_STATUS. Some PGNs are common to all products - e.g. the PRODUCT_ID PGN is universal to all RV-C devices. For the most part you don't need to know the details of the PGNs to troubleshoot a network. It's the software's job to parse these packets of data into meaningful values on your screen.

One of the most important PGNs, which is common to all RV-C nodes, is the DM1, or Diagnostic Message. This message is sent by all nodes to communicate general operating status and whether any problems have been detected.

Each node has a Source Address, which is used simply to make sure no two nodes talk at the exact same time. But a node may have more than one function - e.g. an inverter/charger is both an Inverter and a Charger. These multi-function nodes may display multiple DM1 messages. For example, the Charger may be Off, while the Inverter is On and displaying a Low DC Voltage warning. Each DM1 is distinguished by a DSA, or Default Source Address, which shows which function is being described in the message.

Starting OmniScope

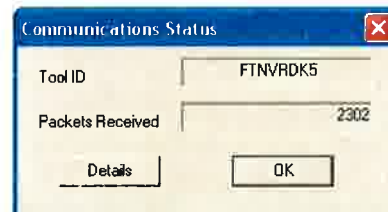
Before starting OmniScope, you must first plug in the USB-to-RV-C adapter into the USB port. When starting the program you may see "Tool Not Responding" message. This can be caused merely by unplugging the adapter unexpectedly, and is not necessarily a real problem as the program often can find the adapter on a second try. If it can't, the program will abort. Make sure the adapter is plugged in and try again.

Checking The Adapter

The adapter has four LEDs, two green, two red. When you first plug it in you should see just one green LED flashing. If not, then the unit is not receiving power - check the cable and the port for problems.

Once the OmniScope program has initialized the adapter the rapid flashing should stop. Instead the LEDs will start flashing with each data packet that it sends and receives on the data bus. If you have not yet plugged the adapter into the RV diagnostic port there should be an initial few flashes and not much else. When you plug it into the RV you should start seeing lots of activity.

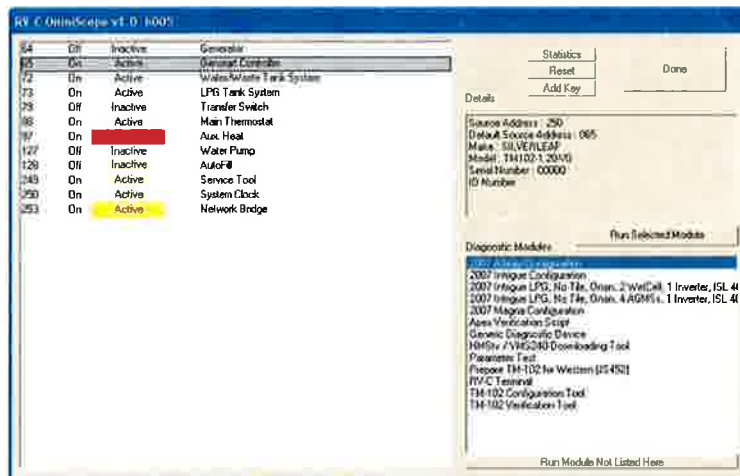
You can verify this by clicking the Statistics button in the OmniScope program. This should bring up a box showing two items. The Tool ID is an eight-digit serial number for the adapter. Packets Received is the number of packets seen so far on the network. This number should be constantly increasing. If not, first exit the program and start again just to be sure the problem wasn't the tool initialization. If it still doesn't work, you must start troubleshooting the physical wiring.



Running the OmniScope Program

OmniScope itself is a very simple program. It merely provides a general overview of the status of the nodes on the network, and it provides a way to run other programs called "modules". It's the modules that do most of the real work - OmniScope itself is simply a starting point.

The OmniScope screen shows three boxes. On the left is the "Device List" - a list of every "device" that has been detected. Keep in mind that one node may include several functions - each function will show up as a different device.



For each device OmniScope lists the DSA, or Default Source Address. This code merely identifies the function of the device - e.g. generator or inverter. Next it lists the general operating status, "On" or "Off", and "Active" or "Inactive". For example, the charger may be "On" but "Inactive" if no AC power is available for charging. The status may be highlighted in red or yellow

if some sort of problem is being reported by the device.

The Device List will always include at least one item: the Service Tool itself.

To the right of the Device List is a Details box. If you click on any device, the Details box will provide additional information on that item. It will show the actual Source Address of the device, and more importantly it will show whatever Product Identification information the device will provide. This may include manufacturer, model, and serial number.

In the lower right is the Module List. This box shows all the modules that are installed on the computer and that might apply to that particular device. For example, for a SilverLeaf HMStv control panel it will show such modules as the Generic Diagnostic Device, the HMStv Software Downloader, and the HMStv Configuration Tool. Clicking on an AEC Transfer Switch would bring up a different list of modules.

The Reset Button

Clicking this button will clear out the Device List and cause the program to start over again. This is occasionally useful when disconnecting and reconnecting nodes, and when switching RVs.

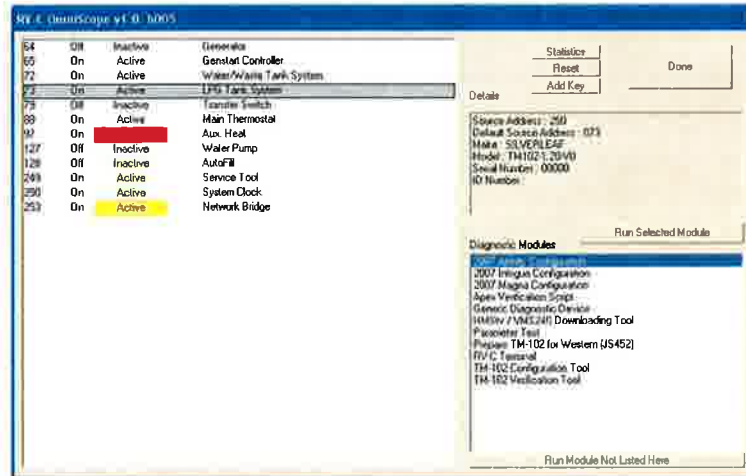
Quitting

To quit, click the "Done" button. However, the button will not be accessible if there are any modules still open. You must exit all other modules before OmniScope will let you shut it down.

Running Modules

When you select a device from the Device List, the Module List will show all the modules that are installed on the computer that are relevant to that device. Double-click on any module, or select a module and click on the "Run Selected Module" button.

Modules can be either scripts or full-fledged programs. A program can have almost any conceivable purpose, and each such program should have its own instructions. The only limitation placed on a program module is that the program must be shut down before you shut down OmniScope. You can run more than one program at a time, and simply Alt-Tab or click the task bar to switch between different program modules.



A script, however, is not an independent program but a feature of OmniScope. Only one script can be run at a time, and running a script does not open a new program. A script is a set of instructions to be processed by OmniScope, typically the instructions are RV-C commands to configure or test devices on the network.

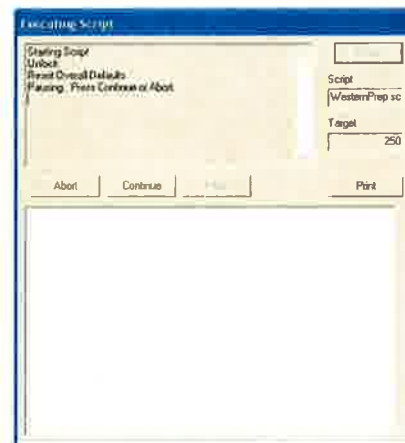
If the module you need is not listed in the Module List, make sure the desired target device is selected in the Device List. Then click on the "Run Module Not Listed Here". This will bring up a standard Windows File Selection dialog, and you can select the desired program (".exe") or script (".scp"). If you do not select a device before starting the program or script, the module may not run properly.

Running Scripts

Simple scripts often run automatically, with little or no intervention from the user. The script will start by opening the Script Execution window. The top left box in this window provides information on the status of the script execution. The script writer may include various messages to provide feedback for the user.

The script may include pauses, where the script will wait for you to click one of the buttons. The Abort button will end the script. The Continue button will cause the script to resume processing. While the script is running you can click Abort to stop the script mid-stream.

Some scripts may include commands that require a specific response from the target device. In this case you may see the Retry button activate, meaning that the device has not responded as expected and you have the option of

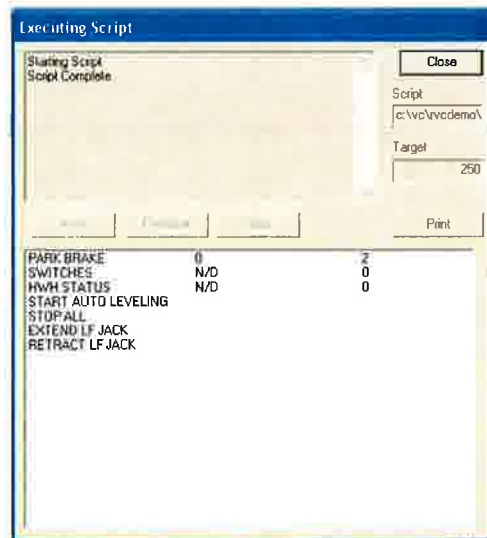


trying the command again. Clicking on Continue will cause the command to be skipped.

When the script is complete click on Close to close the window and return to the main OmniScope screen. Clicking on Print will print the contents of the status window to the default printer.

Some scripts require more intervention from the technician. Scripts can include menus. For example, a configuration script for a certain model of RV may require you to choose various options such as the model of generator or the floor plan of the RV.

Scripts can also feature displays of live network data. The box at the bottom of the Script Execution box is the "Monitor List". Scripts may put data items in that box, and the data items will continuously update with the latest values that appear on the network. Two numbers will appear next to the name of the data item. The number in the middle is the current value. This can be "N/D", or "No Data", meaning that the data item has not been detected on the network. It can also be "Err", meaning that the device sending the datum is registering some problem with the data item.



The number on the right is the number of times the datum has been seen on the network. Normally this should continuously count up. The speed depends on the type of data, and can vary from ten times per second to once every five seconds. In some cases the data is only provided on an "as needed" basis.

The Monitor List can also include lines with no numbers. These lines are actually "buttons" than can be double-clicked to trigger specific commands. The effect depends on the intentions of the script-writer. This technique is often used to provide a way to test various system functions, such as starting the generator or levelling the RV.

The details of writing scripts is beyond the scope of this manual.

Entering Keys

OmniScope has a simple licensing scheme built in. The system requires you to enter "keys" - 26 digit codes - into the program to give you access to OmniScope and various modules. If you don't have the proper keys registered in the system you will not be able to run certain modules or access all the features of OmniScope. You can add a key by clicking on the Add Key button.



The keys are all based on the serial number of the USB-to-RV-C adapter. If your shop is using multiple adapters, you can enter keys for all the different adapters on all the different computers so you don't have to worry about which computer is being used with which adapter. The keys are stored in a program called "key.dat", and that file can be copied among the computers in the shop. Thus you can install OmniScope and its modules on any number of computers, as long as you have at least one valid adapter and the proper code. The adapter number is shown on the Add Key Code or the Statistics boxes. In the illustration above the serial number is "FTNVRDK5". The number is always an eight-digit code.

Each adapter is provided with a code which will "unlock" OmniScope, all the scripts, and many of the modules. This code should be provided with the adapter. If this code is not available, contact SilverLeaf Electronics to receive a new code.

Various modules may require additional codes. These codes may expire after a limited period of time, depending on the policy of the company providing the module. (The main OmniScope code will never expire.) To obtain a code contact the issuing company and be ready with the serial number of the adapter.

To enter the code, carefully type the 26-digit code in the Add Key Code box and click "Add". Then click "Done", unless you have additional codes to enter. The keys take effect immediately.

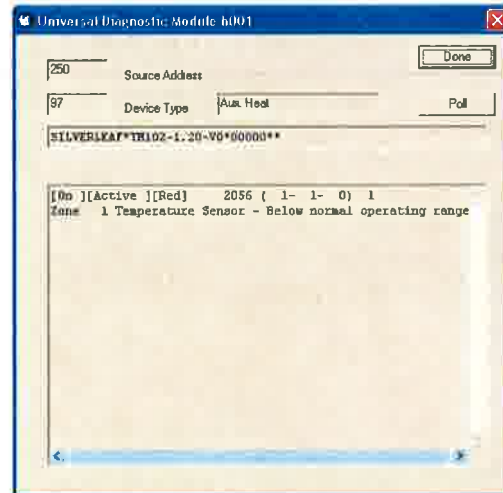
Universal Diagnostic Module

The Universal Diagnostic Module can be used to troubleshoot any RV-C device, regardless of the make or manufacturer. All devices that are fully RV-C compliant provide basic troubleshooting information that this module can display and interpret.

It is important to select the proper target device before starting this program. The module will provide information only for the selected device.

The module displays the Source Address for the target device, along with the Device Type (or DSA). The Device Type indicates generally what type of product the module is looking at. Note that sometimes a product may include several different devices. For example, a generator may include a "Generator" (DSA 64) and a "Genstart Controller" (DSA 65). One of these devices may be malfunctioning while the other is functioning fine. Or, one may have a problem linked to the other.

The module also displays the full Product Identification. This is a long string of letters and numbers separated by asterisks, and indicates the manufacturer, product model, and may include serial numbers as well. The details are up to each manufacturer.



The main window shows the diagnostic information, as provided by the device in the DM1 diagnostic message. The first three values, shown in brackets, shows the general status of the device. First, whether the device is On or Off. Second, whether it is Active or Inactive. Third, whether the device is in a "Yellow" or a "Red" fault condition.

The distinction between On/Off and Active/Inactive varies among devices, but most devices are either Off, On and Inactive, or On and Active. On and Active means it is fulfilling its designed purpose at this moment. On and Inactive means it is not producing anything at the moment, but it is prepared to do so at any appropriate moment - it is "standing by". And Off means it will not do anything without some intervention (usually, but not always, from the user). Note that an item that is Off likely still has power - otherwise it couldn't tell the network that it was off.

Generally "Yellow" faults are situations which can be remedied with only basic intervention, or have negligible effect on the operation of the device. A typical "Yellow" fault is low battery levels for an inverter. "Red" conditions are more serious, and generally require attention from a technician. These guidelines are subjective, of course, and manufacturers may interpret them differently.

The next item displayed is a number called the SPN, or "Suspect Parameter". This number has two different forms, and the module shows both forms. In the raw form the SPN is just a number - in the example above it is 2056. In the parsed form it is a series of three numbers - in the example those numbers are 1, 1, and 0.

The interpretation of these numbers depends on the product. Most manufacturers provide a table of the SPNs for their device, and that table will indicate the proper form for that device. The distinction relies on whether the device is designed to allow multiple "instances" on the network. The parsed form allows the table to show which specific device the fault applies to. The raw form is used for products that can't have more than one installation on the RV.

Regardless of the form, the purpose of the SPN is the same. It identifies what component of

the device is malfunctioning. For example, in a generator the SPN might refer to the oil pressure or tachometer. In a slide room the same SPN might refer to a proximity switch. Every different device has its own list of potential SPNs.

The last number (1, in our example), is the Failure Mode, or FMI. This number is universal among all devices, and identifies the general nature of how the SPN is bad. For example, an FMI of 1 means "Below Normal Operating Range", which would be a serious fault if the SPN is Oil Pressure.

Fortunately, the module automatically looks all this data up in its own tables, and provides the interpretation on the next line. This interpretation is general to all manufacturers, so it will not necessarily use the exact same terms as the manufacturer's documentation.

Normally the diagnostic information is sent automatically. If the device is not responding properly, clicking on the Poll button will request updated information from the device.

RV-C OmniTool

64	Off	Inactive	Generator
65	On	Inactive	Genstart Controller
68	On	Active	Control Panel
68	On	Active	Control Panel
69	On	Active	House Battery
72	On	Active	Water/Waste Tank System
73	On	Active	LPG Tank System
79	Off	Inactive	Transfer Switch
88	Off	Inactive	Main Thermostat
127	Off	Inactive	Water Pump
128	Off	Inactive	AutoFill
130	On	Active	Awning
249	On	Active	Service Tool
250	On	Active	
252	On	Active	

Statistics

Reset

Add Key

Details

Source Address : 250
Default Source Address : 128
Make : SILVERLEAF
Model : TM102-1.17-CC
Serial Number : 00000
ID Number :

Run Selected Module

SilverLeaf TM-102 Tool

Acknowledgement Received : PGN EFFA
Code 0 - ACK
Acknowledgement Received : PGN EFFA
Code 0 - ACK

Done

Diagnostic Device
JS240 Downloading Tool
TM102 for Western (JS452)

Tank Configuration

	Fresh	Black	Gray	LPG
Level	0 / 100	0 / 100	0 / 100	0 / 100
Gallons	0 Gal	0 Gal	0 Gal	0 Gal
Raw Counts	0	0	0	0
Tank Size	104	80	104	39
Empty	1.00	1.00	1.00	Set LPG Size
1/4	5.50	5.50	5.50	
3/4	14.50	14.50	14.50	
Full	19.00	19.00	19.00	
CPI	24			
	Set Size	Set Size	Set Size	Done
	Set Dry Point	Set Dry Point	Set Dry Point	
	Set Geometry	Set Geometry	Set Geometry	Refresh