

Semaphore Software LLC

Signal Scout

User's Manual

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1 Introduction

Signal Scout is a troubleshooting and training tool designed for use with wayside and crossing controllers. For wayside equipment, Signal Scout combines real-time and/or log-based information with signal program application logic to present information in a more accessible format. For crossing predictors, Signal Scout presents data in a visualized format and provides behavioral analysis to assist in troubleshooting and trend identification.

2 System Requirements

Signal Scout was designed for and has been tested to run on Windows 8, Windows 10, and Windows 11. Signal Scout needs about 150 MB of empty disk space. Signal Scout runs as a stand-alone executable file, so no installation is needed.

3 Platform Support

3.1 Wayside Equipment

Function Support	ElectroLogIXS Family	VHLC	VPI	iVPI	Microlok II
LiveView	✓	✓			✓
LogView	✓	✓	✓	✓	✓
Training	✓	✓	✓	✓	✓
Log Download	✓	✓			

3.2 Crossing Predictors

- ElectroLogIXS XP4
 - Crossing System Event Logs
 - Train Data Logs

4 Video Support

Videos that cover topics from this manual can be found on the Semaphore Software YouTube channel:

<https://www.youtube.com/@semaphoresoftware2012/videos>

5 Application Software Requirements

For Signal Scout to display ladder logic and I/O information for wayside certain site-specific application files are needed based on the equipment in use. These files are needed to create a sort of image of the application, and **after** this image has been created and added to a collection **the application program files are no longer needed**.

5.1 Required File Types by Platform

5.1.1 ElectroLogIXS and VHLC (ACE Compiled)

- .ler
- .rpt

5.1.2 VHLC (ALC Compiled)

- .all

5.1.3 Microlok II

- .mlr (can be reverse compiled from .mlp)

5.1.4 VPI and iVPI (VSP, not VSP2)

- .hdw
- .cfg AND/OR .cfn
- .nv AND/OR .vtl
- .css (optional)
- .lcs (optional)
- .log (optional)
- .lsv (optional)
- .nss (iVPI optional)

6 Initial Setup

6.1 Obtain and Unpack the Software

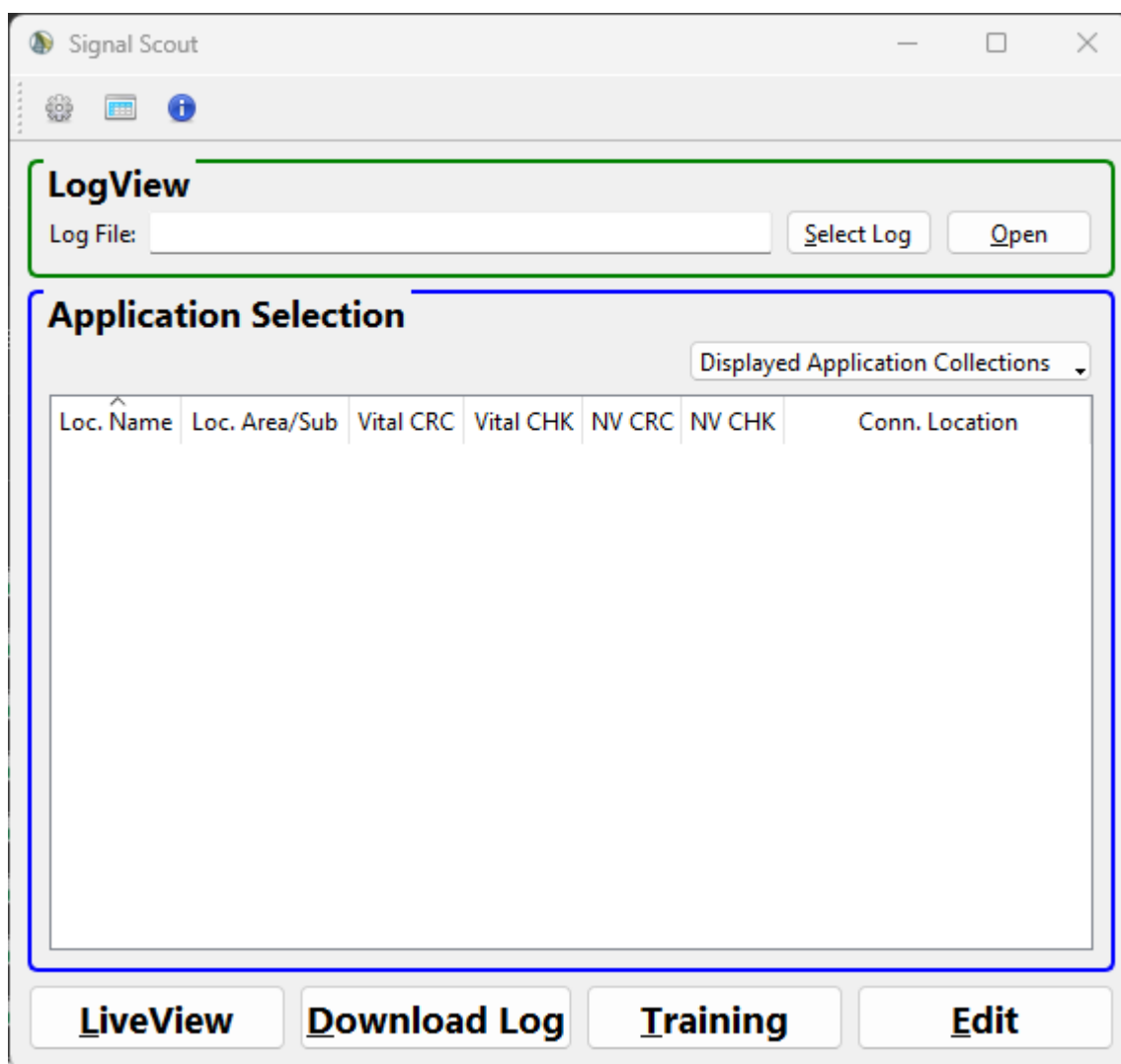
Signal Scout will be provided in a ZIP file containing a Revision History, End User License Agreement, this User's Manual, the Signal Scout executable, and other documents.

Unpack the contents of the ZIP file to an empty folder (recommended to be named Signal Scout).

Review the End User License Agreement, the entirety of the User's Manual, and other documentation before proceeding.

6.2 First Time Opening Signal Scout

Double-click the Signal Scout executable file. Below is a screenshot of the window that will be displayed when running Signal Scout for the first time.



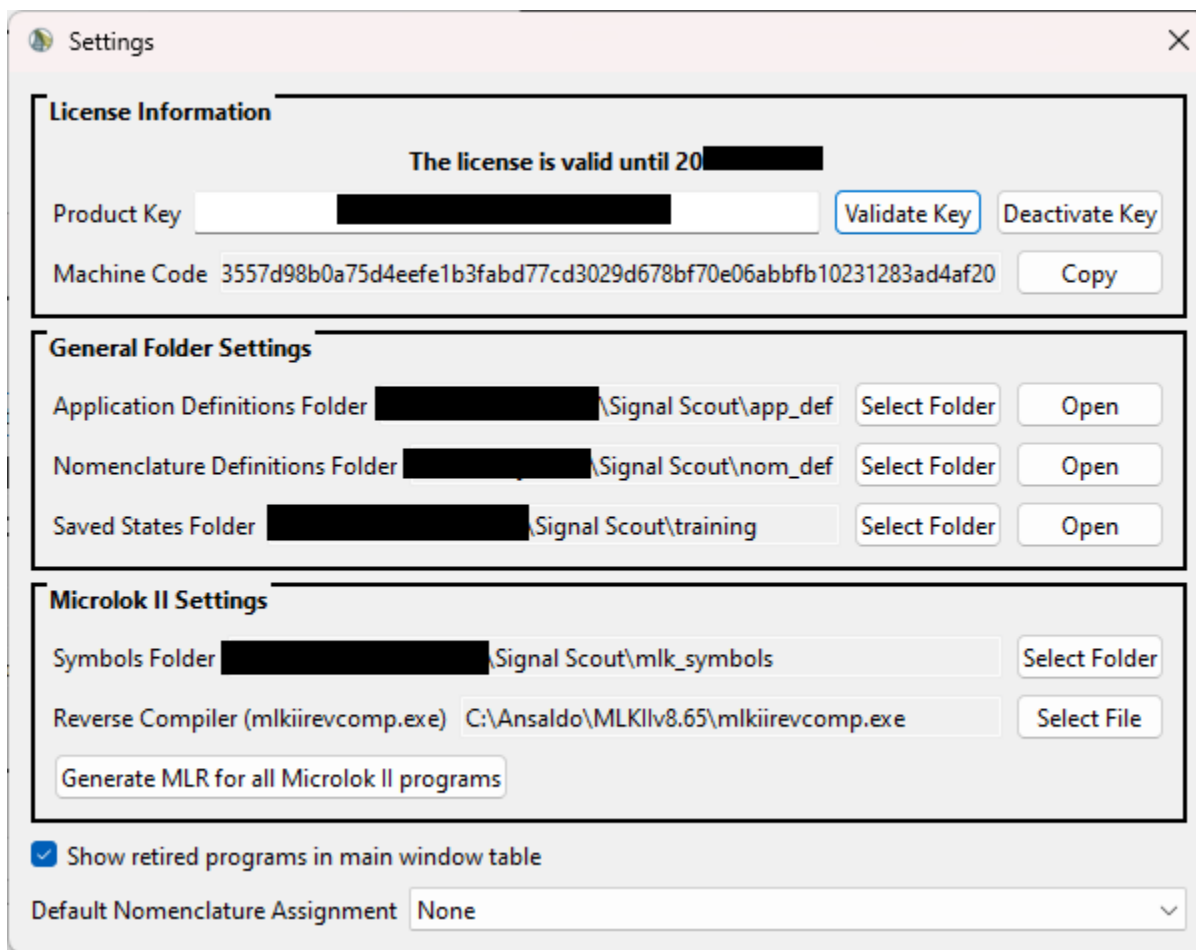
7 Settings Window

7.1 Accessing the Settings Window

The settings window can be accessed by clicking on the gear icon on the main window toolbar.



Clicking the settings icon will bring up the settings window shown below.



Settings

License Information

The license is valid until 20[redacted]

Product Key [redacted] **Validate Key** **Deactivate Key**

Machine Code 3557d98b0a75d4eefe1b3fabd77cd3029d678bf70e06abbfb10231283ad4af20 **Copy**

General Folder Settings

Application Definitions Folder [redacted]\Signal Scout\app_def **Select Folder** **Open**

Nomenclature Definitions Folder [redacted]\Signal Scout\nom_def **Select Folder** **Open**

Saved States Folder [redacted]\Signal Scout\training **Select Folder** **Open**

Microlok II Settings

Symbols Folder [redacted]\Signal Scout\mlk_symbols **Select Folder**

Reverse Compiler (mlkiirevcomp.exe) C:\Ansaldo\MLKIlv8.65\mlkiirevcomp.exe **Select File**

Generate MLR for all Microlok II programs

☒ Show retired programs in main window table

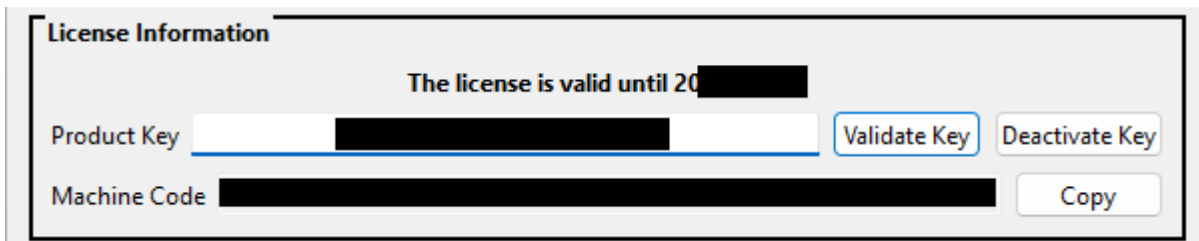
Default Nomenclature Assignment None

7.2 License Information

7.2.1 Activating and Deactivating a Key

Product keys are usually issued to a company, meaning the company will use the same product key on multiple computers. Signal Scout is sold on a license basis, and each key is associated with a computer. To activate Signal Scout on a computer, you must first enter a product key in the box shown and click the “Validate Key” button. A message will be provided above the product key indicating when the key expires or if there was an error. Signal Scout connects to the internet to validate the key. The user will need to provide internet connectivity (at least every six months) to validate the key.

If the user wishes to stop using a certain computer, the user should deactivate Signal Scout from that computer first by clicking the “Deactivate Key” button. This will remove the computer from the license pool and free the license for use on a different computer. If the user needs to remove a key from use on a computer that is inaccessible, this can be requested directly from Semaphore Software support.



7.2.2 Air Gapped Computers

It may be the policy of some organizations to keep their computers “air gapped” or disconnected from the internet to prevent exposure to unwanted risk. If the computer that Signal Scout will be used on is air gapped, the user may follow these instructions to provide a valid license to the computer.

1. From the settings window click the “Copy” button to the right of the “Machine Code” text.
2. Using a computer that is not air gapped, visit the following website:

<https://app.cryptolens.io/Form/A/O4uMXKEa/1511>

3. Paste the copied information into the “Machine code” entry box.
4. Enter the license key into the “License Key” entry box.
5. Click the “Activate” button. The user will be presented with a file to download.
6. Save the file to a USB device (or some other method that will allow for transfer to the air gapped machine)
7. Place the saved file on the air gapped machine in the same folder as “Signal Scout.exe” is located.
8. The file must be named “cert.skm” for the license to work properly.
9. Open Signal Scout and verify the license is valid through the correct date.

7.3 General Folder Settings

Signal Scout saves files that it creates, and accesses files created by others to implement all its functionality. By default, Signal Scout creates folders directly within the Signal Scout installation folder. The user can change these folder paths if desired in this section of the settings window. It may be useful to set up a networked folder with application definition or nomenclature definition files in it that can be

updated remotely. With Signal Scout pointing to these files the user can be sure to always get the most updated information for their use.

7.4 Microlok II settings

7.4.1 Setting the Symbols Folder path

For Signal Scout to provide a Live connection to a Microlok II unit there is an additional file Signal Scout needs for each application. This file is generated when accessing a Microlok II unit on a computer for the first time through the Microlok Development tool. By default, these files are stored in the C:\Ansaldo*version*\Symbols folder. Use the “Select Folder” button here to change the folder path based on the version installed or based on where these files have been placed.

Symbols Folder Path:	<input type="text" value="C:/Ansaldo/MLKCCv3.20B/Symbols"/>	<input type="button" value="Select Folder"/>
----------------------	---	--

7.4.2 Setting the Reverse Compiler path

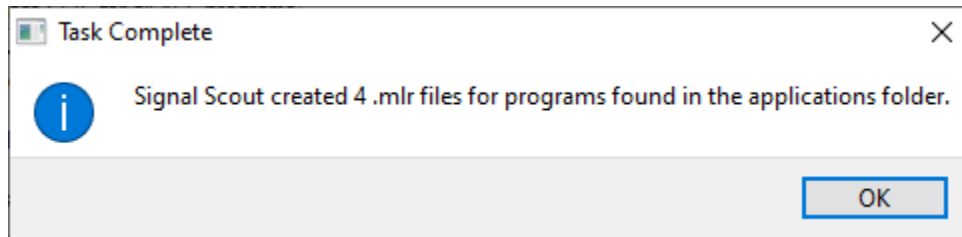
For Signal Scout to create .mlr files from .mlp files it must know where the reverse compiler to be used is installed. Use the “Select File” button here to identify the path of the Microlok II reverse compiler.

Reverse Compiler Path (mlkiirevcomp.exe):	<input type="text" value="C:/Ansaldo/MLKCCv3.20B/mlkiirevcomp.exe"/>	<input type="button" value="Select File"/>
---	--	--

7.4.3 Generating MLR files

Once the Reverse Compiler path is set, Signal Scout can help create .mlr files which are required to use Signal Scout with Microlok II programs. After clicking the “Generate MLR for Microlok II programs” button Signal Scout will allow the user to select a folder. Signal Scout will try to create .mlr files for all Microlok II .mlp files that it finds within the selected folder and any sub-folders.

Signal Scout will notify the user when the work is completed by displaying the following message.



Please allow Signal Scout to complete this work without interruption and avoid using the computer for other purposes during this time. Because Signal Scout is using another program it is better to leave the process uninterrupted.

7.5 Retired Programs

Application programs can be designated as “Retired”. Setting programs to “retired” is covered in the Edit Application section. By default, retired programs do not show up in the application table on the main window. To view these programs on that table, check the box to “Show retired programs in the main window table”.

☐ Show retired programs in main window table

7.6 Default Nomenclature

A default Nomenclature can be set for use with Signal Scout. This will prevent the user from having to set the nomenclature definition file for every application program. If the default is set but a program still has a nomenclature definition file selected, the default will be ignored.

Default Nomenclature Assignment

8 Application Programs and Collections

Signal Scout needs to know about the site-specific application programs for the wayside locations you plan to work with. This requires some setup by the user. Signal Scout makes use of certain files from the original site-specific application program (see Section 5 for file types needed) to make its own image of the application program. This process and the organization of your programs is handled within the “Application Data File Configuration” window.

8.1 Accessing the Application Data File Configuration Window

The Application Data File Configuration window can be accessed by clicking on the gear icon on the main window toolbar.



Clicking the icon will bring up the window shown below.

Application Data File Configuration

Applications for Import

Applications Search Folder: C:/Users/idele/My Drive/Application Programs/ByCustomer/RTD/NMRL Select Folder

Loc. Name	Loc. Area/Sub	Vital CRC	Vital CHK	NV CRC	NV CHK
FAIRFAX CONTROL POINT ...	NORTH METRO RAIL ...	73D6	5FC9	xxxx	xxxx
LAKE CONTROL POINT MAI...	NORTH METRO RAIL ...	1DF5	CCAD	xxxx	xxxx
LAKE CONTROL POINT MAI...	NORTH METRO RAIL ...	8C03	3B53	xxxx	xxxx
N 124TH CONTROL POINT ...	NORTH METRO RAIL ...	E491	0A9E	xxxx	xxxx
N STOCK CONTROL POINT ...	NORTH METRO RAIL ...	2200	4346	xxxx	xxxx
N STOCK CONTROL POINT ...	NORTH METRO RAIL ...	FE42	9953	xxxx	xxxx
NM0122RH - CP Platte ...	IXS - RTD - North Metr...	C621	222A	D605	3399
NM0131RH - CP Platte (AUX)	North Metro Rail Line	6B25	2DD7	1FAE	65C3
NM0170RH - CP Ringsby ...	North Metro Rail Line	3A11	11B6	480B	6AB6

Select All Add to Collection Clear Selections

Application Collections

Select Collection: EXPO Delete Collection

Loc. Name	Loc. Area/Sub	Vital CRC	Vital CHK	NV CRC	NV CHK	Compiled Rev.
ARLINGTON AVE CROSSIN...	EXPO	8091	AE7F	CC60	F3EC	2023.05.01
BUCKINGHAM ROAD ...	LA EXPO	DAF7	D0DA	B62E	DAE6	2023.05.01
CRENSHAW STATION S-40	EXPO	B227	A122	09D5	5D5D	2023.05.01
MP 123 S-006 Pico Station	E-Line	88E5	A52B	B5A9	D104	2023.05.01
S-004 San Pedro	LA EXPO	6FE2	22FC	1665	1DE5	2023.05.01
S-004 San Pedro Station	EXPO LINE	8127	B9BB	C95D	095E	2023.05.01
S-006 Pico Station	LA EXPO	87E0	C7DC	681C	65A0	2023.05.01
S-008 Case C	LA EXPO	5DAD	2CE1	A151	71A2	2023.05.01
S-010 23rd Street	LA EXPO	AAE1	75A4	B9C1	906F	2023.05.01

Remove Selected Clear Selections

8.2 Applications for Import Section

The blue bordered section of this window is where you will select programs that Signal Scout is able to identify to be added to your application collections.

By default, Signal Scout will not look anywhere for application programs. The user must inform Signal Scout about where these files are located. To select where Signal Scout will search for application programs, click the “Select Folder” button.



Clicking this button will display a folder selection window. Navigate to the parent folder that contains all the sub-folders of programs for Signal Scout to identify and click “Select Folder”. After this is completed the application programs table will populate with a listing of all application programs found within that folder and all sub-folders.

From here you can use the buttons at the bottom of the blue bordered section to do the following:

Select All	Will select all the application programs within the table.
Add to Collection	Will add all the selected application programs to the selected collection from the “Application Collections” in the green group box.
Clear Selections	Will deselect all the application programs within the table.

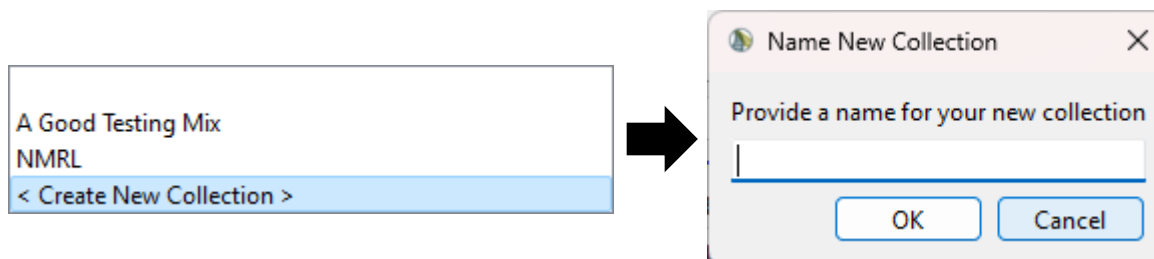
Left clicking on a program within the table will add the program to those selected if it was not already selected and will de-select a program if it was already selected.

8.3 Application Collections

The green bordered section of this window is where create “Application Collections”. An application collection is simply a grouping of programs that are grouped together to be displayed together later. There can be as few as one, or as many collections as the user would like. The groupings can be made however the user wants. Examples would be making a collection of all programs from a Subdivision, transit line, or of one equipment type.

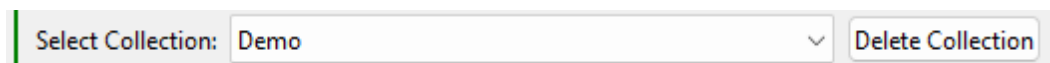
8.3.1 Creating a New Collection

To create a new collection, click on the down arrow from the “Select Collection” combo box and select the “< Create New Collection >” line. The user will be prompted to give the collection a name.



8.3.2 Adding Programs to a Collection

First ensure the collection you want the programs to be added to is selected in the “Select Collection” combo box. The “Demo” collection is shown selected below.



The image shows a user interface element consisting of a dropdown menu and a button. The dropdown menu is labeled 'Select Collection:' and has 'Demo' selected. To the right of the dropdown is a button labeled 'Delete Collection'.

Select the programs you wish to add from the upper table and then click the “Add to Collection” button. After some processing, the programs will be added to your collection.

8.3.3 Removing Programs from a Collection

First ensure the collection you want the programs to be removed from is selected in the “Select Collection” combo box. Select the programs you wish to remove from the lower table and then click the “Remove Selected” button. After some processing, the programs will be removed from the collection and the table updated.

8.3.4 Importing / Exporting Application Collections

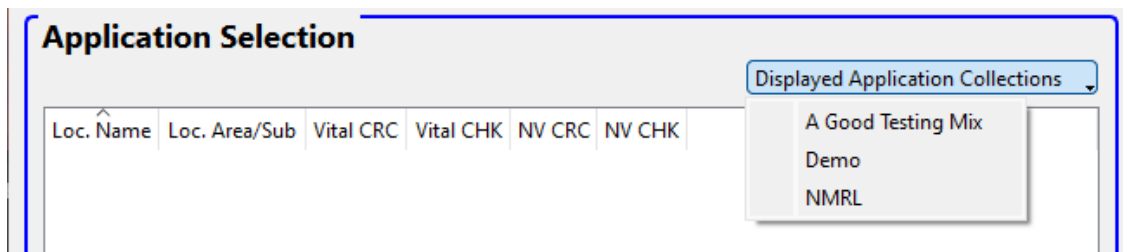
Application collections can very easily be shared with others. By default, Application Collections are stored in a subfolder of the folder where you have the Signal Scout executable placed named “app_def”. In Windows Explorer, navigate to the “app_def” folder and you will find files with the file extension “.adf” with the same name as is displayed for each collection within Signal Scout. These files can be transferred to other computers so that others may use the same application collections.

To import a collection to a new computer simply place any of the “.adf” files into the “app_def” folder on the new computer and restart Signal Scout. The added Application Collection(s) should be ready to use.

9 Main Window

9.1 Displaying Wayside Application Programs

To display wayside application programs for use, you must first create or import one or more Application Collections (see Section 8). With a valid Application Collection in place, from the main window select the “Displayed Application Collections” drop-down.



Select one or more of the available collections. All the programs from the selected collections will be available for use.

9.2 Opening a Log

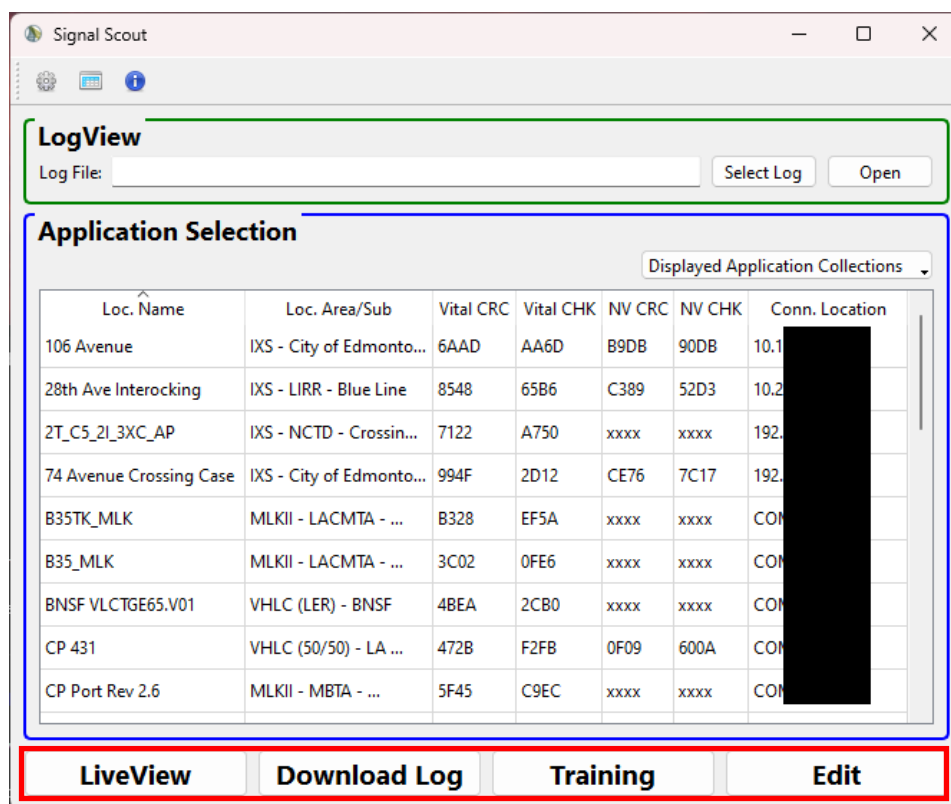
To open a log, click the “Select Log” button from within the LogView grouping. This will open a file selection window from which the log can be selected. The log must have a file extension of “.cap”, “.log”, or “.txt”. For crossing predictor logs, no other information is needed. For wayside logs, the program matching the log must be located within the selected applications folder.



Signal Scout identifies the log type automatically. Data logs are opened into a LogView window. Crossing predictor logs are opened into a Crossing Predictor Visualizer. If a LogView window is closed the same log can be re-opened by simply clicking the “Open” button.

9.3 Opening a LiveView

To connect to a wayside signal controller and access the LiveView functionality, the user must first select the wayside program they want to view by left-clicking the location in the application programs table from the main screen. Ensure the connection location is properly entered (whether that is the correct IP address or correct communications port setting) and modify through the edit window if needed. After selecting the program to use, click the “LiveView” button.



9.4 Downloading a Data Event Log

Signal Scout provides the ability to download a data event log from select connected equipment. If the user first selects a program and then clicks the “Download Log” button, the download selection dialog window that pops up will be populated with information from the selected program by default. The user can change this information. If no program is selected before clicking the “Download Log” button, there will not be any program information provided in the download selection dialog window by default.

9.5 Opening a Training Session

To access the Training functionality, the user must first select the program they want to work with by left-clicking the location in the application programs table from the main screen. After selecting the program to use, click the “Training” button.

9.6 Editing a Program’s Information

To edit information about an application program, the user must first select the program they want to view by left-clicking the location in the application programs table from the main screen. After selecting the program to use, click the “Edit” button. This will allow the user to change various aspects of the program. The allowable changes are covered in the “Edit Application Information Window” section.

10 Edit Application Information Window

The “Edit Application Information” window will look different depending on the type of application selected.

ElectroLogIXS Program (left) vs VHLC Program (right)

10.1 Non-editable fields

There are some non-editable fields in the application information window. These fields are provided for information to the user only. The non-editable fields are:

- Vital CRC
- Vital Checksum
- Non-vital CRC
- Non-vital Checksum
- Program folder

10.2 Editable fields

There are numerous fields that can be edited by the user. Some of these fields are purely to help the user understand the program, or sort items. Others affect aspects of the program that are used in other areas.

10.2.1 Location Name / Area

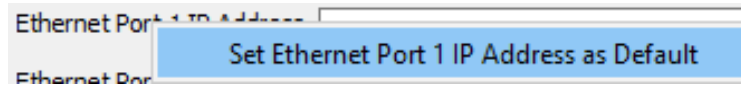
These two fields are purely aesthetic and can be changed to better understand the program or to help sort on the main window by location, milepost, subdivision, etc.

10.2.2 Connection port or address

These fields affect how Signal Scout tries to connect to a device. Ensure that the IP address or communications port (as applicable) is selected and saved before trying to connect to a device.

10.2.2.1 Right-clicking “Ethernet Port x IP Address”

Right clicking on the “Ethernet Port 1 / 2 IP Address” label will raise an action menu that allows the user to change the default IP address displayed in the main window.



10.2.3 Username and Password

These fields are set to the default value for the equipment type but give the user the option to modify if security settings on the signal control device have been modified. Checking the “Change for all” box next to these fields will change the value for all programs of the same equipment type in the application folder selected.

10.2.4 Nomenclature Definition File

Nomenclature Definition Files, if utilized, must be placed in a folder named “nom_def” located at the install directory of Signal Scout (or the folder that is selected in the settings window). The user will need to place any “.ndf” files into this folder for Signal Scout to use. Signal Scout will create a listing of the nomenclature definition files (ending in “.ndf”) within this folder and give the user the ability to select one of these files to associate with any given application program. Checking the “Change for all” box next to these fields will change the value for all programs in the application folder selected. Further information about nomenclature definitions is provided in the LadderView section and in a separate manual.

10.2.5 Program is Retired

Check this box to identify the selected program as retired. This will by default hide the program from the main screen applications table.

10.2.6 Buttons

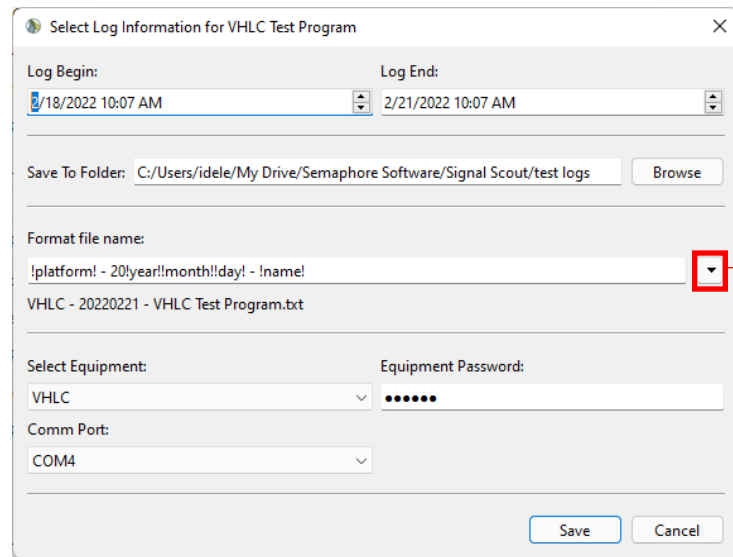
The “Save” button saves any changes made for the selected program.


The “Cancel” button discards any changes made for the selected program.

The “Restore Defaults” button will restore the values Signal Scout pulls for the application files and eliminate any user defined settings for the program. These changes will not apply unless saved.

11 Download Log Selection Window

The Download Log Selection Window allows the user to select various aspects of the log to be downloaded, where it will be saved, and how the file will be named.



- 
- Application program name
 - Application program area/subdivision
 - Equipment type
 - Full date/time (YYYY-mm-dd HHMM)
 - Two digit year
 - Numerical month
 - 3-character month
 - Numerical day
 - Hour (24-hour format)
 - Hour (12-hour format)
 - AM/PM
 - Minute

11.1 Equipment Selection

The field available for selection will change based on the type of equipment selected for the log download to be performed on.

11.2 Log Timeframe

The user can choose the timeframe from which the log will be captured. By default, the end time is chosen as the current time, and the begin time is selected as three (3) days prior to the current time.

11.3 Save to Folder

The user can choose what folder the log will be saved to by clicking the “Browse” button next to the save folder field. The default folder will be based on the last selected location.

11.4 File Name Formatting

Signal Scout gives the ability to the user to provide a default username for the log being captured based on commonly used characteristics. To utilize these characteristics, the user can click the down-arrow box next to the “Format file name” entry field. From this menu the user can select various attributes to be entered into the file name. These will be entered into the field to the left, and the expected output is represented below the entry field. As an example, if the text “!year!” is entered in the entry field, that text will be replaced with the current year in two-digit format upon saving the file. This allows for the user to be consistent with the naming of their log files without needing to make any changes.

12 LadderViews (General – Wayside)

The component parts of a LadderView window change based on whether it is a LiveView, LogView, or Training mode window. This section covers components that are common across all formats.

LiveView - SD 239.47 - CP Cardiff - IXS - NCTD - San Diego - 1.2.3.4

Equation Name Search:

2EBRGE

2EBRGLO

2ECSLOT

2EDKE

2EGHS

2EGK

2EGKR

2EGZ

2EGZR

2EGZSR

2EG_PB

2ELO

2ELR OUT

Moused-over Variable Info.

Variable Name	2EGZ
Additional Variable Info	Non-Vital 2E Signal Request.

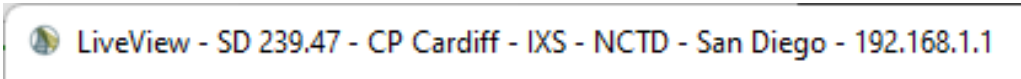
Retry Connection

```
graph LR; REMOTE1[REMOTE] --> 2EGHS[2EGHS]; 2EGHS --> START[START]; START --> 2EGZ[2EGZ]; 2EGZ --> REMOTE2[REMOTE]; 2EGZ --> 2EG_PB[2EG_PB]; 2EG_PB --> REMOTE1;
```












Connection failed due to connection timeout... Disconnected.

12.1 Title Bar

The LadderView type, location name information, location area information, and connection information (if applicable) are given in the title bar across the top of the window. Multiple LadderView windows can be opened at once, so the title bar orients the user as to which they are viewing at any given time.

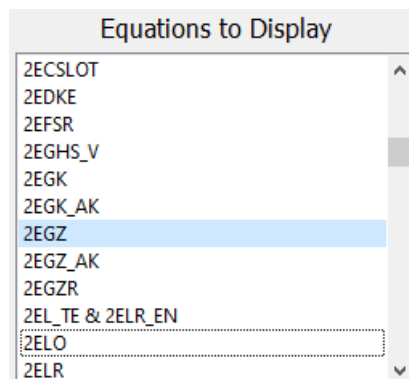


12.2 Toolbar and Buttons

	Inputs Window Opens an Input Modules window.
	Outputs Window Opens an Output Modules window.
	Timers Window Opens a Timers window.
	Clear Selections Removes all selections from the draw canvas.
	Reset Scaling Resets the display size scaling to default.
	Scaling Slider Allows for the user to change the size of drawn objects by moving the slider side-to-side.
	Begin / End Record Begins or ends a screen capture video recording.
	Key Window Opens a window that provides a Symbols and Colors Key. Provides a reference for the meanings of various symbols and colors.
	Download Log Opens a dialog that allows the user to conduct a log download directly from the connected equipment.
	Save State This allows the user to save the current program state. All bit states will be saved as they are known at that time, including timer values.
	Hide / Show Sidebar Hides the left column including the Equation Names List and the Mouse-over Variable Info box. Can be clicked again to un-hide that same information.

12.3 Equation Names List

All the equation names for the program are placed in a list on the left-hand side of the LadderView window. The equation names can be left-clicked within this list to toggle the display of the equation within the logic canvas.



12.4 Equation Name Search

The Equation Names List can be filtered by typing into the Equation Name Search field. Signal Scout will display only equation names that contain the string of characters provided in the Equation Name Search field.

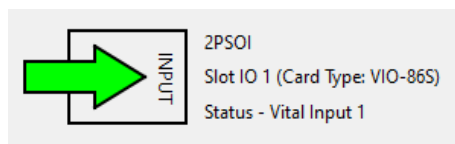
Equation Name Search:

12.5 Logic Canvas

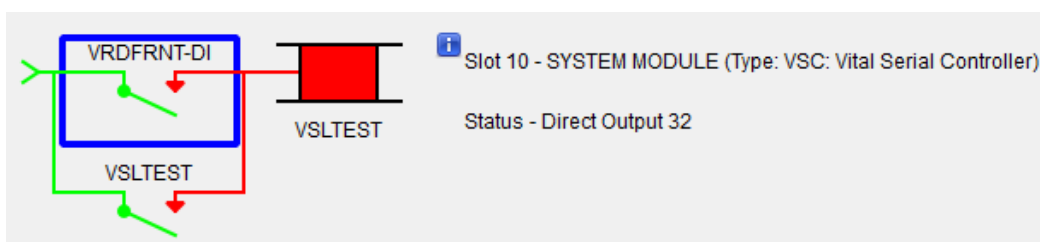
The Logic Canvas takes up most of the window and is where the logic equations are drawn. Meanings for the various symbols, colors, and other aspects of how the equations are drawn are detailed and available for reference in the Symbols and Colors Key.

12.5.1 Left-Click

Left clicking on a variable within the canvas window will toggle the display of that bit equation if possible. For example, if the “XR” equation is being displayed, and a symbol representing the “XR” equation is left-clicked, that equation will be closed from the canvas window. If the “XR” equation is being displayed and a symbol representing the “MDR” is left-clicked, the “MDR” equation will be displayed. Left clicking on a direct input will display a direct input symbol and provide additional information about the direct input.



Sometime there will be a blue information symbol that shows up as shown in the picture below. This symbol represents that there is additional information that can be viewed regarding this bit. Left clicking on the blue information icon will cycle through the various pieces of information that are available.



12.5.2 Right-Click

Right-clicking on a variable within the canvas window will bring up an Action menu that changes based on what is being selected. An example of the action menu is provided below.

- Show all instances
- Set variable True
- Set variable False
- Set variable Unknown

- Show all instances will display all equations in which the variable clicked on is used.


- Set variable True/False/Unknown will set the variable clicked to the selected state. To ensure that the user knows this information is not provided in a log, Signal Scout will surround the set variable with a blue box outline.

12.5.3 Mouse-Over


Mousing over variables will display additional information about the variable when possible. This information is displayed in the lower left-hand corner of the LadderView display window.

Moused-over Variable Info.	
Variable Name	DCPOK
Additional Variable Info	DC Power Off Indication
Time since last change	00:06:33
Time until next change	00:00:01

12.5.4 Screen Recording

Signal Scout allows the user to capture a recording of actions taken as a video for distribution or replay later. After clicking on the “Start Recording” button [] the user will be prompted to name the file. After the user selects a name for the file and a location to save it the recording will start.

The recording will capture the portion of the screen dedicated to the LadderView window at the time the recording starts. If the window is resized or moved the recording will continue to capture the previously established portion of the screen.

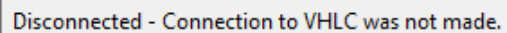
Recording will stop when the user clicks the “Stop Recording” button [] or 15 minutes has elapsed, whichever comes first. The user will be notified when the recording has been completed.

13 LiveView (Wayside)

To access LiveView, the user must set their computer up in such a way that they would otherwise be able to access information from the signal controller. For instance, if the user would normally need to change their ethernet IPv4 settings to access an ElectroLogIXS web interface, the user will still need to make those changes manually. Signal Scout does not change network settings on the user's computer.

13.1 Status Bar

The status of the LiveView connection with the signal controller is given in the status bar at the bottom of the LiveView window. This will include refresh frequency as well as information gather, connected, or disconnected status.



Disconnected - Connection to VHLC was not made.

13.2 Retry Connection

The retry connection button is in the upper right-hand corner of the LiveView window. If the connection is lost, the user can click this button to retry the connection instead of exiting out of the window and re-opening from the main screen.



 Retry Connection

14 LogView (Wayside)

Signal Scout will not modify an original log file in any way. Signal Scout only reads from log files; it does not issue any “write” commands.

Signal Scout will try to identify the state of unrecorded bits. If Signal Scout can confidently infer the state, it will display that state as well as a grey border for the bit to indicate to the user that the information is being inferred and is not actually present in the log.

14.1 Accepted Log Types

The log types listed below are data logs used with LogView. For crossing predictor log types, see the Crossing Predictor Visualizer section. Some platforms allow for the download of various logs and log types. ElectroLogIXS for instance provides Data logs, System logs, Configuration logs and more. Data logs are also provided in text format as well as GDA compatible format. Below is a list by platform of the log types that Signal Scout can use.

In all cases it is important to only include the logged information in the log file and not introduce extra information that may lead to Signal Scout being unable to properly parse the log.

An example of incorrect data being provided in the log would be if someone recorded an entire Putty or HyperTerminal session for their connection with a VHLC. There could be information in that text document that contains information that leads to the log not being interpreted correctly. When possible, use Signal Scout to download the log for you.

14.1.1 Log Types by Platform

- ElectroLogIXS
 - VPM-3 (using WebGUI)
 - Diagnostics -> System Logs -> Data Log
 - VPM-2 (using a serial connection with Putty/HyperTerminal)
 - Include data provided by both menu selections:
 - C = Checksum/CRC data
 - PD = Condensed data dump
- VHLC (using a serial connection with Putty/HyperTerminal)
 - Display Memory Log -> Display All/Range of Entries (Oldest First)
- Microlok II (using the Microlok development or maintenance system software)
 - User Data log
- (i)VPI
 - Data log

14.2 Current Log Time

The variable states are displayed for a given time in the log timeframe. The time for which the states are being displayed is given just above the logic canvas. If the log has been shifted by the user, the total amount of shift will be displayed next to the current log time. If the Time Zone is identified, it will be displayed. The Time Zone will not be changed based on any log shifting that may occur.

Current Log Time: 01/25/2020 15:49:44.0 (Log shifted forward by 3 hr. 2 min. 1 sec.) (Time Zone GMT-7)

14.3 Time Selection Scrollbar

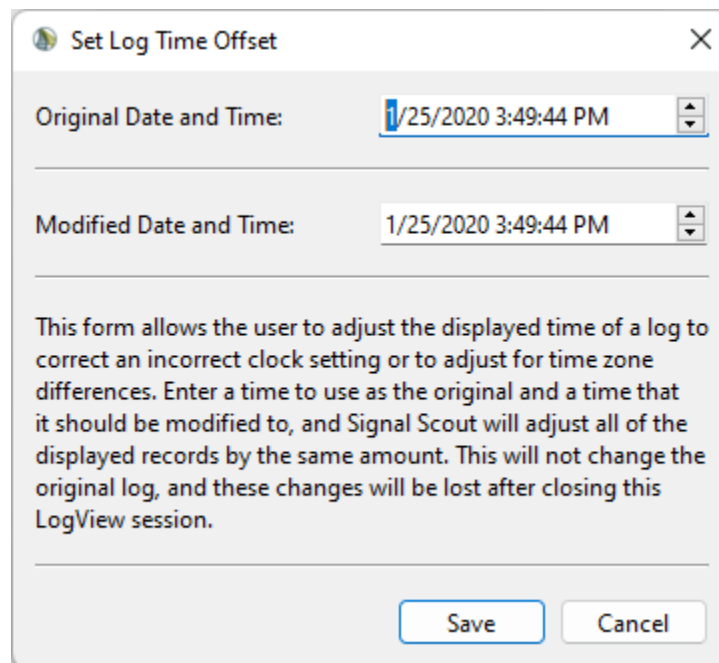
A scroll bar at the bottom of the window is added to LogView to allow the user to move forward and backward through the event log. Moving to the right moves the display forward in time and left moves backward in time. The scrollbar can be used through mouse clicks or by using the left and right arrow keys.

14.4 Shifting Log Time

The user may need to shift the log time for several reasons. This could be because the unit time was incorrectly set, or the user wants to adjust for time zone changes, or to match it up to another log. This change can be made by clicking the button to “Edit Log Time” from the button bar.



After clicking this button, the following dialog menu will be displayed. Clicking save will activate the resulting log shift. None of the changes will result in any modification to the original log file.



Set Log Time Offset

Original Date and Time: 1/25/2020 3:49:44 PM

Modified Date and Time: 1/25/2020 3:49:44 PM

This form allows the user to adjust the displayed time of a log to correct an incorrect clock setting or to adjust for time zone differences. Enter a time to use as the original and a time that it should be modified to, and Signal Scout will adjust all of the displayed records by the same amount. This will not change the original log, and these changes will be lost after closing this LogView session.

Save Cancel

14.5 Saving a Log State

The user is given the ability to save the state of a log by clicking the save disc icon (more on this in the “Training Mode” section). Saving the state will record all the known states and allow the user to load that state in “Training Mode” later. This allows the user to assume full control over the inputs from a pre-determined program state.

14.6 Selecting a Display Time Zone

The LogView toolbar includes a “Select Time Zone” button that allows the user to view log timestamps in any time zone. This is a display-only change and does not modify the log data. The current display time zone is shown in the header alongside the log time. Recent time zone selections are remembered for convenience.

14.7 Log Oddities

14.7.1 Quick Succession Events

Logs sometimes have events recorded at separate times that happened nearly simultaneously. This will often show up when a bit changes state and drives another bit to change state, but the second bit changing state will not be recorded until the following second. This can look strange when reviewing logs because the log is displayed second-by-second. This means a log may represent logic that shows a bit should be False, but the coloring of the bit itself will show it as True (or vice versa). This is correct behavior given the information but can throw the user off and is good to be aware of. The solution to this is usually to simply move one time-unit forward or backward in the log so that that everything is "caught up" to display in a manner that gives a clearer understanding.

14.7.2 Delayed Log Entry

Logs also sometimes record the same bit changing state twice within a given second. Signal Scout solves this problem for display by adding one-tenth of a second to any repeated bit-state change within the same timestamp. This allows Signal Scout to display both variable state changes to the user.

14.7.3 Time Change Overlaps

Sometimes the time needs to be changed on a recording device due to time float or events such as Daylight Savings Time. When these changes occur, it is possible to have the log record multiple instances of the same timeframe. For example, if we look at Daylight Savings Time in November clocks move from 2 AM back to 1 AM meaning that the 1 AM hour "happens twice" in the log. This can cause confusion with the sequencing of events since the log is displayed with the expectation that time is always sequential. Signal Scout takes care of this by eliminating all state changes within the "overlap window". Since displaying information would be more complicated than no information, Signal Scout errs on the side of not giving conflicting or confusing information. This condition does not happen often, and an orange border is utilized to inform the user if this condition exists.

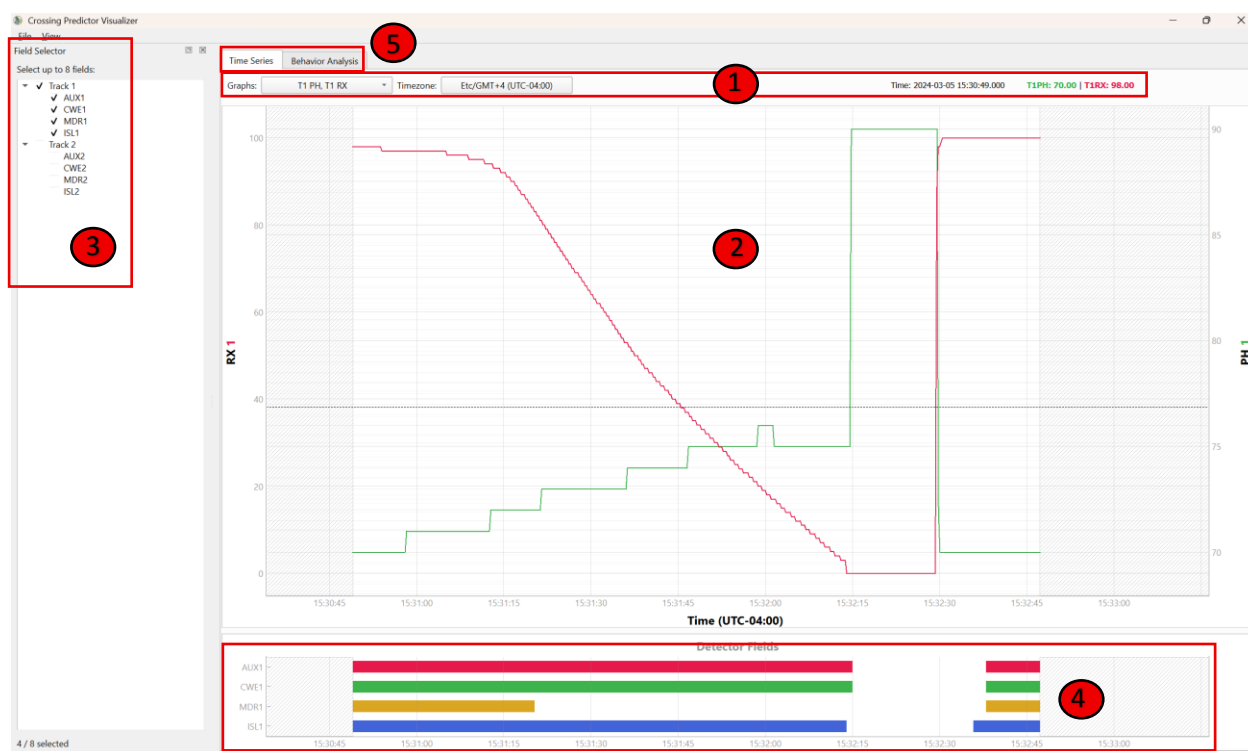
15 LogView (Crossing Predictor Visualizer)

The Crossing Predictor Visualizer is used to analyze crossing predictor log files. It is opened automatically when the user selects a crossing predictor log file through the “Select Log” button on the main window.

15.1 Window Layout

The Crossing Predictor Visualizer window is organized into the following areas:

1. Controls Toolbar — Contains the track and graph selector, time zone button, and cursor value readout.
2. Time Series Graph / Behavior Analysis — Displays track RX and PH values plotted over time or behavior analysis information, depending on which tab is selected.
3. Binary Bands Display — Shows detector field states as colored horizontal bands.
4. Field Selector (dockable side panel) — Tree of available binary fields organized by category.
5. Time Series / Behavior Analysis — Select between which information is displayed in the main body.



15.2 Selecting Tracks and Graphs

Use the track graph selector dropdown in the controls toolbar to choose which track RX and PH values to display. Multiple tracks can be displayed simultaneously. Each track and value type is drawn in a distinct color for identification.

15.3 Time Series Graph

The time series graph displays RX values on the left axis and PH values on the right axis. Use the mouse wheel or right-click hold and drag to zoom in and out. Left-click drag to pan across the time range. A

crosshair cursor tracks the mouse position, and the corresponding values are displayed in the controls toolbar above the graph.

Processor reset events are marked on the graph when they occur in the log. For constantly polled logs (such as the IXS Train Data log), periods of missing data are shown as breaks in the plotted lines.

15.4 Binary Bands Display

The binary bands display shows the on/off state of selected binary detector fields as colored horizontal bands. Up to eight fields can be displayed at the same time. Zooming and panning is synchronized with the time series graph above. For constantly polled logs (such as the IXS Train Data log), data gaps are shown as shaded regions within the bands.

15.5 Field Selector

The Field Selector is a dockable panel that lists all available binary fields organized by category: ISL (Island), MDR (Motion Detector Rail), AUX (Auxiliary), CWE (Crossing Warning Enable), and AP (Approach). The field selector is available through the View → Field Selector menu. Check or uncheck fields to control which ones appear in the binary bands display. When track associations are available and the user changes tracks, the fields associated with the selected track are automatically checked.

15.6 Track Associations

Signal Scout automatically analyzes the log data to determine which binary fields belong to which tracks. When successful, associated fields are auto-selected when switching between tracks. To view or manually edit associations, use File → Track Associations from the menu bar.

Important: If the log contains insufficient data or the automatic analysis is not successful, track associations will not be made. The user must manually assign track associations through the Track Associations dialog before behavior analysis will be available. Without track associations, the Behavior Analysis panel will display a message indicating that associations are required.

15.7 Behavior Analysis

The Behavior Analysis panel provides statistical analysis of crossing predictor activation patterns. This feature requires track associations (see Track Associations above). The panel includes the following views:

- Activation Charts — Shows the distribution of RX values at the time of each activation, broken down by track.
- Approach Timing — Shows the time between the motion detector activating and the island detector activating for each event.
- Statistics Panel — Per-track summary cards showing activation counts, average RX values, and anomaly indicators such as erratic RX behavior.

15.8 Changing the Time Zone

Click the time zone button in the controls toolbar to select a display time zone. The time axis and cursor values will reflect the selected time zone. The original log time zone is preserved.

16 Training Mode (Wayside)

Training mode offers the user the ability to control direct inputs to the system and view the resulting logical results. This mode acts as a rudimentary simulator of the program logic.

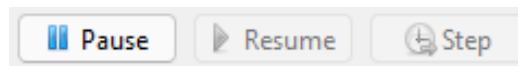
16.1 Program States

Training mode will always be in either one of two states: Running or Paused. While in the running mode, program logic will be evaluated, and timers will run with the passage of time. While paused, program logic will continue to be evaluated, but timers will not run and will remain fixed at their value from when the pause was enabled.

Running

16.2 Time Control

There are three buttons that allow the user to control the running or paused state and an additional option that allows the user to skip forward in time.



16.2.1 Pause Button

The Pause button is only enabled when training mode is in the running state. Clicking the Pause button will cause training mode to go into a paused state where timers will not run. This will also enable the “Resume” and “Step” buttons.

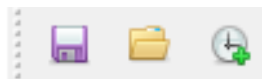
16.2.2 Resume Button




The Resume button is only enabled when training mode is in the paused state. Clicking the Resume button will cause training mode to go into a running state where timers will resume running. This will also enable the “Pause” button.

16.2.3 Step Button

The Step button is only enabled when training mode is in the paused state. Clicking the Step button will move any active timers forward one (1) second in time and re-evaluate the results. The Step button can be used to slowly move through states that are caused by the triggering of timer bits.

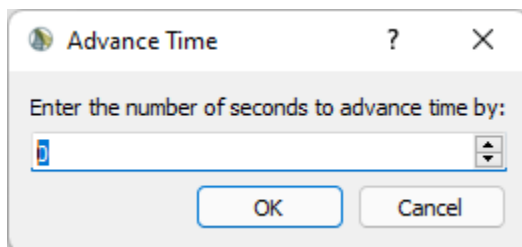
16.3 Training Toolbar



	This allows the user to save the current program state. All bit states will be saved as they are known at that time, including timer values.
	This allows the user to load a previously saved program state. Loading a saved state will revert bit states to the saved condition and continue running.
	This allows the user to advance time by a specified amount. This would be used to complete the expiration of a timer.

16.3.1 Advance Time

The user may choose to bypass longer duration of timers running by using the Advance Time function, which is available through Training toolbar. Time can be advanced whether in the Running or the Paused state. Please note that advancing a time will only affect timers that are currently running and will not affect any timers that may have been triggered during the advancement of time.



16.4 Loading Saved States

To assist with using Training Mode, Signal Scout gives the user the ability to save program states and then reload those states later. Program states can be saved in any mode (LiveView, LogView, or Training mode) but can only be loaded in Training mode. To load a previously saved state the user needs only click on the open folder icon and select a previously saved program state for the application program they are currently using in Training Mode. Signal Scout will set the input bits to the state they were in at the time the save file was created.

16.5 Timer Values

Timer values can be set from the Timers Window, which is accessed through the view toolbar.



The user is given the ability to change the value of timers that have been identified as adjustable in the program. Timers that have been set to a fixed value in the program cannot be changed by the user.

TIMERS						
Timer Name(s)	Slow Pick Min Value	Slow Pick Set Value	Slow Pick Max Value	Slow Drop Min Value	Slow Drop Set Value	Slow Drop Max Value
1.S	0.0	0.0	6553.0	0.0	0.0	6553.0
10.1ATPK	0.0	0.0	6553.0	0.0	1.0	6553.0
10.1NSP	0.0	0.0	6553.0	0.0	1.0	6553.0
10.1SSP	0.0	0.0	6553.0	0.0	1.0	6553.0
10.1TPK	0.0	0.0	6553.0	0.0	1.0	6553.0
10N.TRAP	0.0	2.0	6553.0	0.0	1.0	6553.0
10NA.TRAP	0.0	2.0	6553.0	0.0	1.0	6553.0
10NAFL_AUTO	0.0	0.0	6553.0	0.0	20.0	6553.0

17 Modules Windows

The modules windows show either direct inputs or direct outputs separated by module. This is useful to be able to see all input or output statuses in one location at any given time. Variables are enabled and disabled for modification based on the type of LadderView (Log, Live, or Training) and whether the bit state is known or unknown. Unknown variables are available for the user to define by right-clicking to directly select the desired state.

17.1 Always Show

Since the user may want to only focus on certain variables the ability is given to select certain variables to be always visible. By default, no variable is selected, and modules can be collapsed to show nothing. If a variable is checked for “Always Show” when the module is collapsed the variable(s) will still be shown.

17.2 Variable Search

The user can input text in the “Variable Name Search” text input to search for specific information. Any matching information will have the text changed to the color red. The * character can be used as a wildcard to represent one or more characters.

INPUTS

Variable Name Search:

Name	Description	Always Show
> IO Slot 1 (Type: VIO-86S: Vital In8/Out6)		
> Status		
● S1_VIO_HLTH	Module Health	<input type="checkbox"/>
> Vital Inputs		
● 2PSOI	Input 1	<input type="checkbox"/>
● 2PSOS	Input 2	<input type="checkbox"/>
● 2PSON	Input 3	<input type="checkbox"/>
● GFD	Input 8	<input type="checkbox"/>
> IO Slot 2 (Type: VIO-86S: Vital In8/Out6)		
> Status		
● S2_VIO_HLTH	Module Health	<input type="checkbox"/>
> Vital Inputs		
● A-GD	Input 1	<input type="checkbox"/>
● B-GD	Input 2	<input type="checkbox"/>
● A-GP	Input 3	<input type="checkbox"/>
● B-GP	Input 4	<input type="checkbox"/>
● DCPOKA	Input 5	<input type="checkbox"/>
● ACPOKA	Input 6	<input type="checkbox"/>
● INTRUSION	Input 7	<input type="checkbox"/>
● SMOKEA	Input 8	<input type="checkbox"/>
> IO Slot 4 (Type: IXC-20S: Integrated Crossing Control)		
> Status		
● S4_IXC_HLTH	Module Health	<input type="checkbox"/>
● ABPY2	Vital Input 2	<input type="checkbox"/>
● XRTEST	Vital Input 3	<input type="checkbox"/>
> Port 3 (Type: Network)		
> Remote 1		
● R11MS_68-2T	Input 1	<input type="checkbox"/>

OUTPUTS

Variable Name Search:

Name	Description	Always Show
> IO Slot 2 (Type: VIO-86S: Vital In8/Out6)		
> Vital Outputs		
● 2XR	Output 2	<input type="checkbox"/>
● XR	Output 3	<input type="checkbox"/>
● GPP	Output 4	<input type="checkbox"/>
● GDP	Output 5	<input type="checkbox"/>
● PTCHLTH	Output 6	<input type="checkbox"/>
> IO Slot 4 (Type: IXC-20S: Integrated Crossing Control)		
> Status		
● S4_IXC_BELL	Bell Control	<input type="checkbox"/>
● GC_A	Gate Control 1	<input type="checkbox"/>
● GC_B	Gate Control 2	<input type="checkbox"/>
● S4_IXC_FLASH	Lamp Flash Control	<input type="checkbox"/>
● S4_TST_GRANT	Xing Test Grant	<input type="checkbox"/>
> Port 3 (Type: Network)		
> Remote 1		
● R10MS_2NXENA	Output 1	<input type="checkbox"/>
● R10MS_2SXENA	Output 2	<input type="checkbox"/>
> Remote 2		
● R2OMN_2NXENA	Output 1	<input type="checkbox"/>
● R2OMN_2SXENA	Output 2	<input type="checkbox"/>
> Remote 3		
● R3OCS_2NXENA	Output 1	<input type="checkbox"/>
● R3OCS_2SXENA	Output 2	<input type="checkbox"/>
> Remote 4		
● R4OCN_2NXENA	Output 1	<input type="checkbox"/>
● R4OCN_2SXENA	Output 2	<input type="checkbox"/>
> System Slot 1 (Type: VPM: Vital Peripheral Master)		

18 Nomenclature Definition Files

Signal Scout gives the ability to the user to add nomenclature definition information. This means that if properly configured, when a user mouses-over a variable Signal Scout will provide additional information in the “Additional Information” section of a LadderView window.

Exactly how nomenclature definition files are created, their structure, and function, is beyond the scope of this document.

Appendix A: Symbols Key

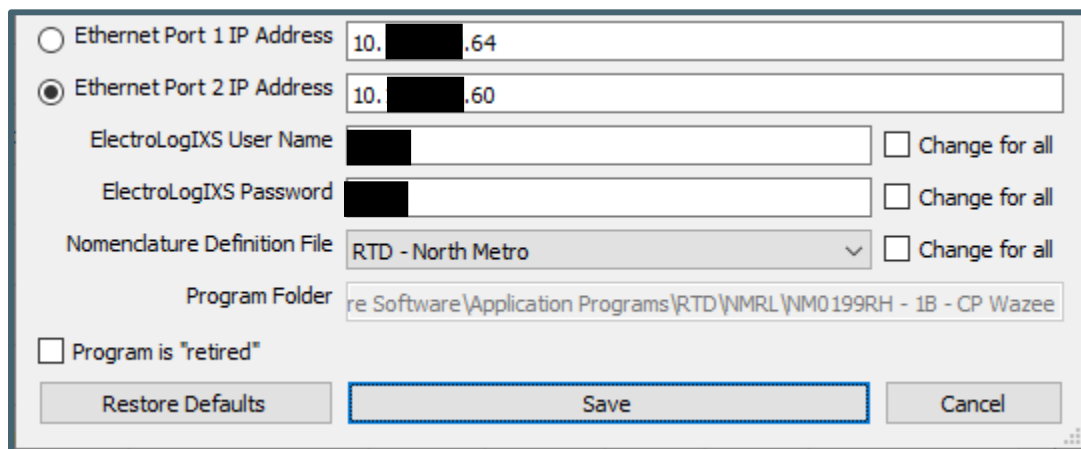
	Battery / Power source		Black = Power Unknown
	Relay bit		Green = Power Present
	Slow-pick relay bit		Red = Power Missing
	Slow-pick / Slow-release relay bit		Bit state just changed (yellow fill)
	Front contact		Blue Outline – User-set bit state
	Back contact		Grey Outline – Program inferred bit state
	State Unknown (no armature)		Orange Outline – Unknown due to log time change overlap
	Unrecorded bit (dashed line)		Green = Status TRUE Red = Status FALSE Partial = Status UNKNOWN
	Direct Input		Cycle additional information.
	Coded-output relay. When True output is cycling between on and off at given rate.		

Appendix B: ElectroLogIXS LiveView QuickStart Guide

1. Open Signal Scout and select the location by left clicking the program name from the main screen. (If the location does not show up, make sure the folder selected at the top of the main screen contains the desired program.) The program will be highlighted when selected.

4	NM0170RH - CP Ringsby (AUX)	North Metro Rail Line	3A11	11B6	480B	6AB6	10. [REDACTED] .50
5	NM0199RH - CP Wazee	North Metro Rail Line	F537	C3E6	A668	A505	10. [REDACTED] .60
6	NM0278RH - CP S Stock	North Metro Rail Line	06F9	A639	04C5	B8D5	10. [REDACTED] .70

2. Plug an ethernet cord into the computer and the device that will be used to connect to the ElectroLogIXS equipment (this could be a network switch or directly into one of the ethernet ports of the VPM).
3. Configure IPv4 settings as needed to access the ElectroLogIXS device. This differs based on each railroad's configuration and setup. If the ElectroLogIXS web GUI can be accessed through an internet browser, the setup should be correct to use Signal Scout.
4. Check to make sure that the IP address in the rightmost column is the correct IP address to access the ElectroLogIXS unit.
 - a. If it is incorrect, click the "Edit" button in the lower righthand corner of the screen. When the "Edit Application Information" window appears, change either the Ethernet Port 1 or Ethernet Port 2 address to the IP address required for this location. Make sure that the radio button to the left of the desired IP address is selected by left clicking it. Click Save.



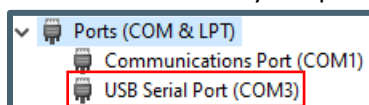
5. Click the "LiveView" button at the bottom of the screen. A LiveView window should now pop up and Signal Scout will begin gathering live status information.

Appendix C: VHLC LiveView QuickStart Guide

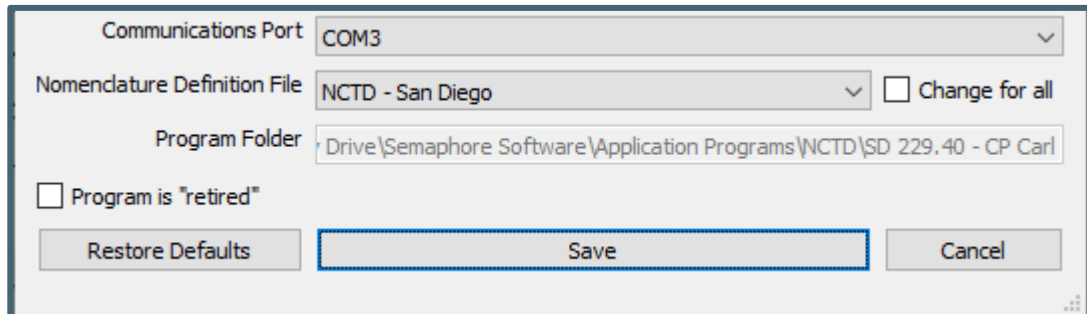
1. Open Signal Scout and select the location by left clicking the program name from the main screen. (If the location does not show up, make sure the folder selected at the top of the main screen contains the desired program.) The program will be highlighted when selected.

33	SD 228.40 - CP Longboard	San Diego	6CBA	AA71	8BA7	6612	COM3
34	SD 229.40 - CP Carl	San Diego	DD47	974B	C1A7	6361	COM3
35	SD 231.60 - CP Farr	San Diego	9043	42CD	B167	BD7B	COM3

2. Plug a NULL MODEM serial cable into the computer and the Serial Diagnostic Port on the VHLC ACP module.
3. Open Device Manager from the Windows Control Panel (type "Device Manager" into the Windows bar) and expand the "Ports" section. Identify the port assigned to the serial cable.



4. Check to make sure that the Communications Port in the rightmost column matches the port name identified in the previous step.
 - a. If it is incorrect, click the "Edit" button in the lower righthand corner of the screen. When the "Edit Application Information" window appears, click the dropdown menu next to the "Communications Port" label, and select the port name that matches the serial port identified in step 3 above. Click Save.



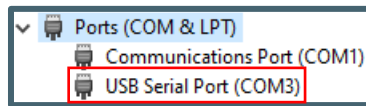
5. Click the "LiveView" button at the bottom of the screen. A LiveView window should now pop up and Signal Scout will begin gathering live status information.

Appendix D: Microlok II LiveView QuickStart Guide

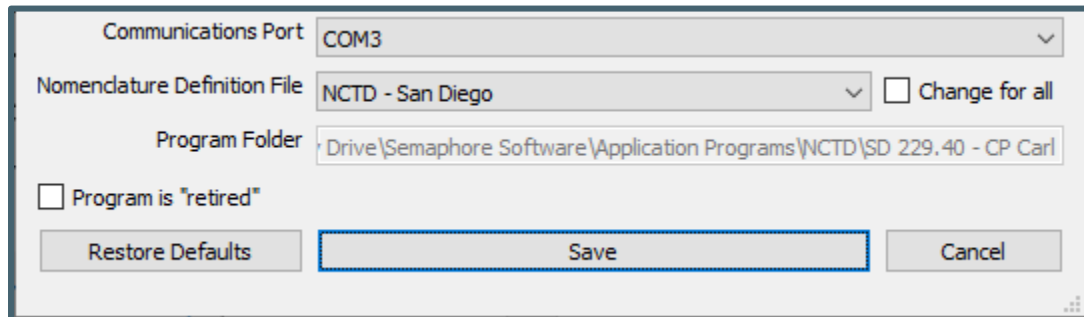
1. Open Signal Scout and select the location by left clicking the program name from the main screen. (If the location does not show up, make sure the folder selected at the top of the main screen contains the desired program.) The program will be highlighted when selected.

4	B01B_MLK	Green Line	2A60	88A2	xxxx	xxxx	COM3
5	B01C_MLK	Green Line	B858	D080	xxxx	xxxx	COM3
6	B01D_MLK	Green Line	D221	A18F	xxxx	xxxx	COM3

2. Plug a NULL MODEM serial cable into the computer and the Serial Diagnostic Port on the Microlok II CPU module.
3. Open Device Manager from the Windows Control Panel (type “Device Manager” into the Windows bar) and expand the “Ports” section. Identify the port assigned to the serial cable.



4. Check to make sure that the Communications Port in the rightmost column matches the port name identified in the previous step.
 - a. If it is incorrect, click the “Edit” button in the lower righthand corner of the screen. When the “Edit Application Information” window appears, click the dropdown menu next to the “Communications Port” label, and select the port name that matches the serial port identified in step 3 above. Click Save.



5. Click the “LiveView” button at the bottom of the screen. A LiveView window should now pop up and Signal Scout will begin gathering live status information.