



USER GUIDE

Visual Factory Configurator



StatusWatch

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Visual Factory Configurator User Guide

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CHAPTER ONE

GLOSSARY OF TERMS

Introduction

The terms as defined below will be used throughout this document. Although these terms may have different meanings in another context, in this document they are assumed to have the meaning defined here.

Action

Work to be performed after a Trigger has been raised and at least one of its associated sets of conditions have been met. An Action could be changing the state of a light or sending data to a server.

Behavior

A set of Modbus Variables, Events, Triggers and Actions that can be used by multiple StatusLights.

Configuration

This term is used generally to reference a collection of devices along with their settings.

Configuration File (Config File)

See Configuration.

Event Trigger

Event Triggers contain data that can be compared to or stored in a variable. They are sent from one StatusLight to another or from Responder devices to StatusLights

Gateway

A StatusLight wireless gateway device used to connect a wireless StatusLight network to an Ethernet network.

Group

Each device in a configuration may be assigned to a single group. Groups do not affect the performance of a device or have any bearing in its behavior. They are only meant to aid in organizing devices within the VFC application itself to make locating a particular device easier.

HID

A human interface device is something that allows a user to input data to a computer. For a StatusLight this will be a USB connected device such as a barcode scanner or keyboard.

Modbus

An openly published communications protocol which is widely used in industry for communicating with industrial electronic devices.

Network Service

A network based data collection service with an API known to the StatusLight. This can be used to configure data to be pushed to the service as part of an Action. StatusWatch would be an example of a Network Service.

Responder

A Windows application that reads communications from the StatusLights and can respond. They generate events that StatusLights can read in turn. They are used to request parts or assistance from mobile units in a simple form.

StatusLight

An andon stack light with buttons that can communicate with a number of other devices on the factory floor and also report information it receives to supervising computers wirelessly or over ethernet.

Trigger

An event which causes an Action to be taken. This event could take on different forms such as a button press or the scanning of a barcode.

Variables

Variables are the data that is loaded into the Modbus, saved in memory, and sent to other devices or software such as StatusWatch.

Visual Indicator (Light Result)

A type of Action in which the visual state of the light stack changes but there is no change in the current state of the associated station. Intended as a signal to those within visual range of the StatusLight when such a signal is necessary but there is no desire to indicate a state change to any software that might be monitoring the station.

CHAPTER TWO

GETTING STARTED

Introduction

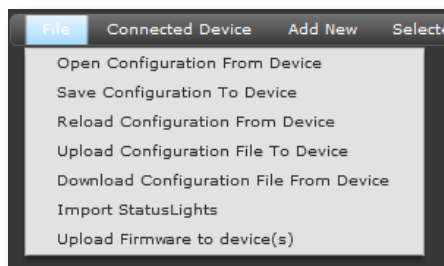
This chapter provides information on accessing the Visual Factory Configurator (VFC) and some of the basic commands provided within the VFC menus. The following chapters will go into more detail about each command.

Launch the Visual Factory Configurator (VFC) by opening a web browser and entering the IP address of a StatusLight you have network connectivity to.

The first screen you will see contains the VFC logo, login information, and a menu bar which provides access to various tasks. Following is a description of each menu item.

File Menu

The File Menu provides high level actions such as opening and saving configuration data to the StatusLight as well as the ability to import new StatusLights to the existing network.



Open Configuration from Device – *This command opens the Configuration File of the connected device for viewing and editing.*

Save Configuration To Device – *This command saves any changes made to the connected device's configuration file. You may also upload the file to any other applicable devices provided they are connected to the network.*

Reload Configuration From Device – *This command reloads the connected device's configuration file. You will be prompted that any unsaved changes will be lost before continuing.*

Upload Configuration File To Device – *This command will allow the user to upload a new configuration file to the device. This is useful if you have several lights you need to update at the same time, but not all of them are connected to the network. The connected device name must match a device name in the new configuration file.*

Download Configuration File From Device – *This command allows you to save the configuration file of the connected device to your computer. This may be done to create a backup copy before changing the current configuration file or uploading a new configuration file..*

Note...

All StatusLights have the IP of their front Ethernet port set to 192.168.0.2 when shipped from the factory. It is strongly recommended that you do not change this as it would be difficult to access VFC if the IP address information was lost.

VFC requires the Adobe Flash Player 9.0 or newer browser plug-in.

Connected Device

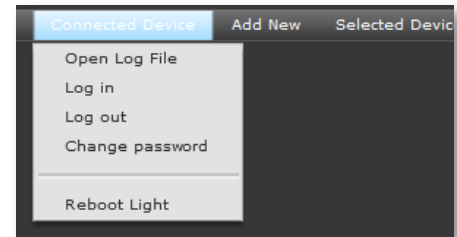
These actions will be performed on the device that you are connected to. That is to say, if you entered IP 10.1.3.50 to launch VFC, these actions would be executed on that device only until they are uploaded to the other connected devices.

Open Log File – This command opens the log file of the connected device. The Log File can be used to view progress of different processes or diagnose errors.

Log In/Log Out – This command logs the user in or out of the connected device in order to make and save changes to the connected device.

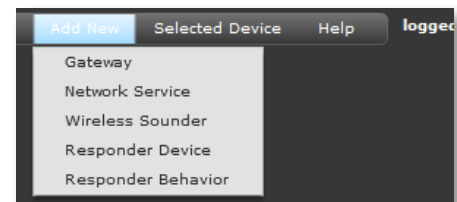
Change Password – This command changes the password of the connected device.

Reboot Light – This command will reboot the connected StatusLight.



Add New

This menu item allows you to add one or more of the device types listed to the current configuration.



Selected Device

The actions listed in this menu item will be performed on the device that is selected in the Device Summary Table (only visible after selecting [File > Open Configuration From Device]).

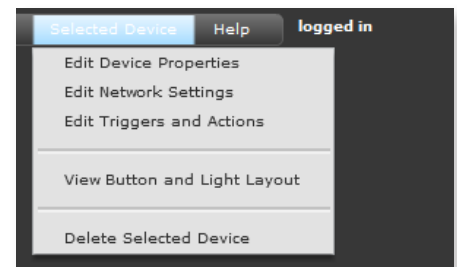
Edit Device Properties – This command will open the device settings pages for the selected device.

Edit Network Settings – This command will open the network settings page for the selected device.

Edit Triggers and Actions – This command will open the Triggers & Actions page for the selected device.

View Button and Light Layout – This command will open a window showing the front cover and light stack of the connected StatusLight. It illustrates the colors and pattern of the buttons and lights. Click this window to close it and return to the main screen.

Delete Selected Device – This command removes the selected device from the configuration file of the connected device.



CHAPTER THREE

OPENING A CONFIGURATION

Introduction

All StatusLights are typically pre-loaded with a default configuration. This configuration may be changed to suit your needs once it is accessed through the VFC. This chapter describes how to access these configuration settings as well as what information is displayed and its function.

You can open the current configuration in the device by selecting [File > Open Configuration From Device] from the main menu. This will open a table below the menu bar that contains a summary of all devices in the current configuration as seen below.

The table data is sortable by clicking on the column headers. Columns can be rearranged by dragging the column header to the desired order. The information below gives an explanation of the column functions.

File Connected Device Add New Selected Device Help logged out						
Device Name	Device Type	Comment	Wireless	Wireless Name	Group	Connected
TestLights	StatusLightBehavior		✓			
SL1	StatusLight	F0224, Cell C, Bay 7 - VTC	✓		Machinery Factor	✓
SL2	StatusLight	Demo Unit	✓		Machinery Factor	
SL3	StatusLight	F2815, 4a1107,Bay 8 - Lathe	✓		Machinery Factor	
SL2-051100722	StatusLight	F2870, 4a1107,Bay 8 - Lathe	✓		Machinery Factor	
SL2-051100723	StatusLight	F1858, 4a1107,Bay 8 - OD Grinder	✓		Machinery Factor	
SWSL01	Wireless Gateway	Bay 4/5 - NW corner of GL offices			Machinery Factor	
TestCrS	ResponderBehavior					
Truck1	ResponderDevice				Machinery Factor	
Truck2	ResponderDevice				Machinery Factor	

Device Name

By default this is the serial number of the device. it can be changed but it is recommended that it be left as-is for easy identification of devices. If you would like to assign a more meaningful name see the Comment column.

Device Type

Current device types include StatusLight, Wireless Gateway, Network Service and Responder Device. More device types may be supported in future versions of VFC.

Comment

This is the user assigned comment for the device. This field is commonly used to assign a meaningful name to the device such as "Assembler 5A".

Wireless

A check in this column indicates that this device has wireless capabilities enabled.

Wireless Name

If a device has wireless capabilities it is possible to assign a separate name here. This will only show up in the wireless gateway that the device is associated with. It is recommended to leave this name the same as Device Name.

Note...

Sorting the "Connected" column is a quick way to find the currently connected device when the summary table contains a large number of devices.

Group

This is the user defined group for the device. See Group in the Glossary of Terms (Chapter Two).

Connected

A check in this column indicates the device that you are currently connected to.

CHAPTER FOUR

DEVICE SETTINGS

Introduction

This chapter provides information on how to change specific settings for a connected device. Device information, including name and group, as well as Network settings can be accessed and edited through the device settings pages.

To edit the settings of a particular device, either double-click on the device in the summary table, or select the device and choose [Selected Device > Edit Device Properties] from the menu bar. The screen will be replaced with the first in a series of settings screens.

At the top of this new section is the name of the device you are configuring with a button to the right named “Discard Changes”. This button will close the device configuration screen without saving any changes and return you to the summary table. If you have made any changes, the “Accept Changes” button will appear allowing you to save any changes that you’ve made to the settings before returning to the summary table.

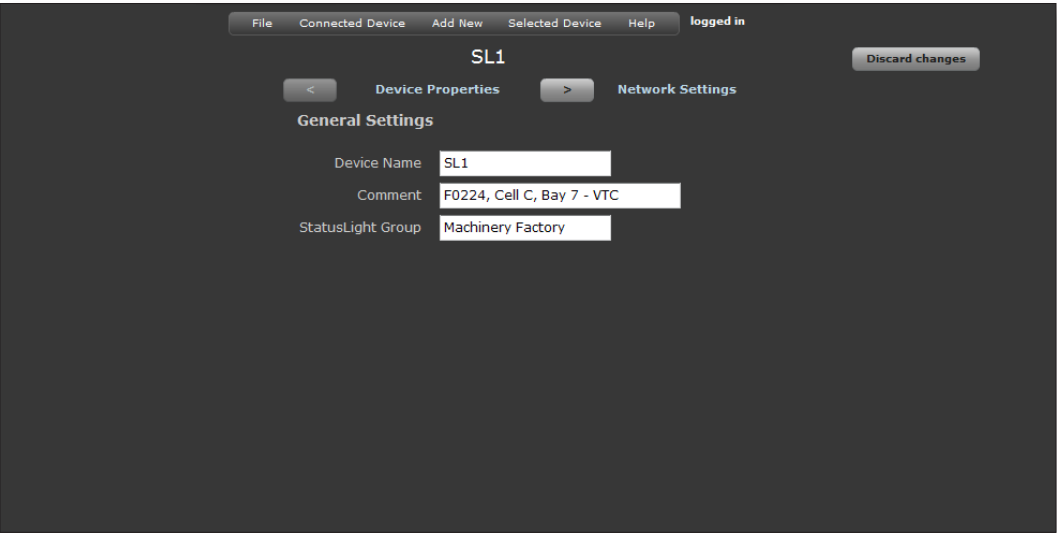
Below the device name is the name of the settings screen that is currently displayed. In the figure below, it is “Network Settings”. The buttons to either side of this text are for navigating through the settings screens. The text to the outside of the navigation buttons tells which settings screen you will see if you click that button. For example, in the figure below, clicking on the right navigation button will take you to “Network Settings” while the left navigation button is disabled because “Device Properties” is the first settings screen.

The screenshot displays the SL1 device settings interface. At the top, a menu bar includes 'File', 'Connected Device', 'Add New', 'Selected Device', and 'Help', followed by a 'logged in' status. Below the menu, the device name 'SL1' is shown next to a 'Discard changes' button. Navigation buttons for '< Device Properties' and '> Network Settings' are present. The 'General Settings' section contains three input fields: 'Device Name' with the value 'SL1', 'Comment' with the value 'F0224, Cell C, Bay 7 - VTC', and 'StatusLight Group' with the value 'Machinery Factory'.

Device Settings

This screen provides a means for changing properties specific to an individual device. Device Name, Comment, and StatusLight Group can be modified as required.

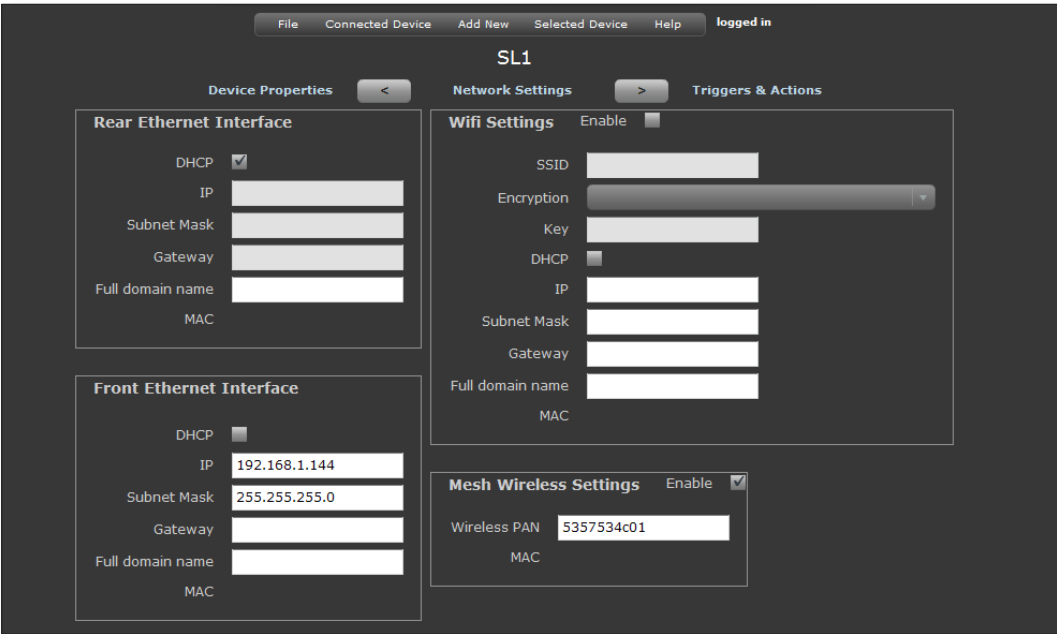
Note...
We recommend that the Device Name not be changed. For a more meaningful name, use the Comment field.



Network Settings

This screen provides a means for changing network related settings such as IP, Subnet Mask, Gateway and Dominion Name for both StatusLight Ethernet ports. DHCP and optional Mesh Wireless (ZigBee 2.4GHz) and WiFi (802.11) can be enabled or disabled by checking/unchecking the appropriate boxes. Specific Wireless settings may also be modified using this settings screen.

Note...
MAC addresses are shown for informational purposes only and cannot be changed.

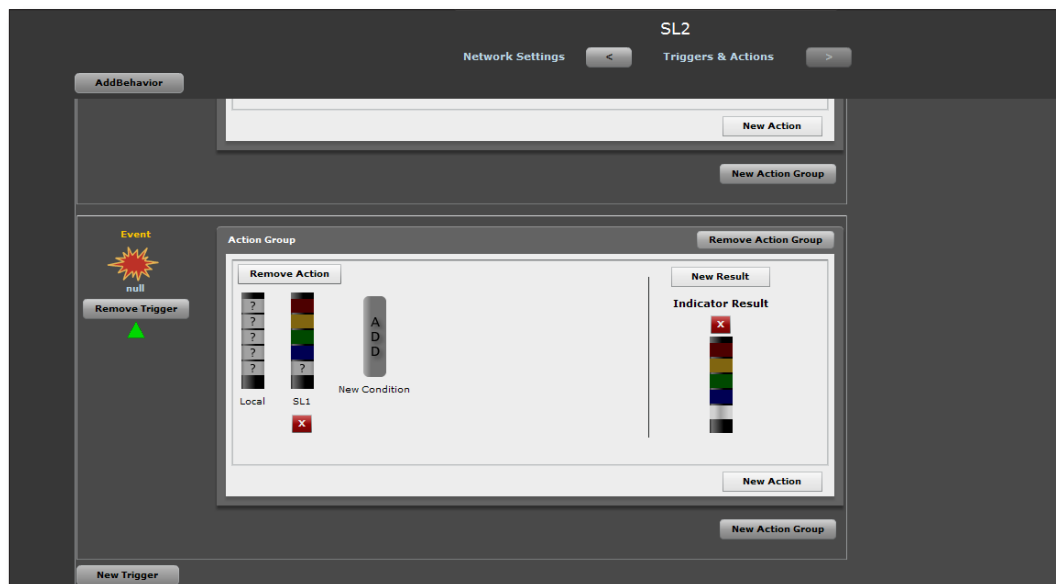


CHAPTER FIVE TRIGGERS & ACTIONS OVERVIEW

Introduction

The Triggers & Actions screen is where most of the behavior of a StatusLight is defined. The purpose of the Triggers and Actions page is to change what the StatusLights do. The lights can be programed to respond to a set of triggers also they can be programed to only respond if certain conditions are met. The changes on the Triggers and Actions screen are saved to the configuration file which is system wide and contains the rules for all the StatusLights and affiliated devices.

A typical example of the Triggers & Actions screen is shown below. It is accessed by double-clicking on the device in the Device Summary Table or selecting the device and choosing [Selected Device > Edit Device Properties] from the menu bar.

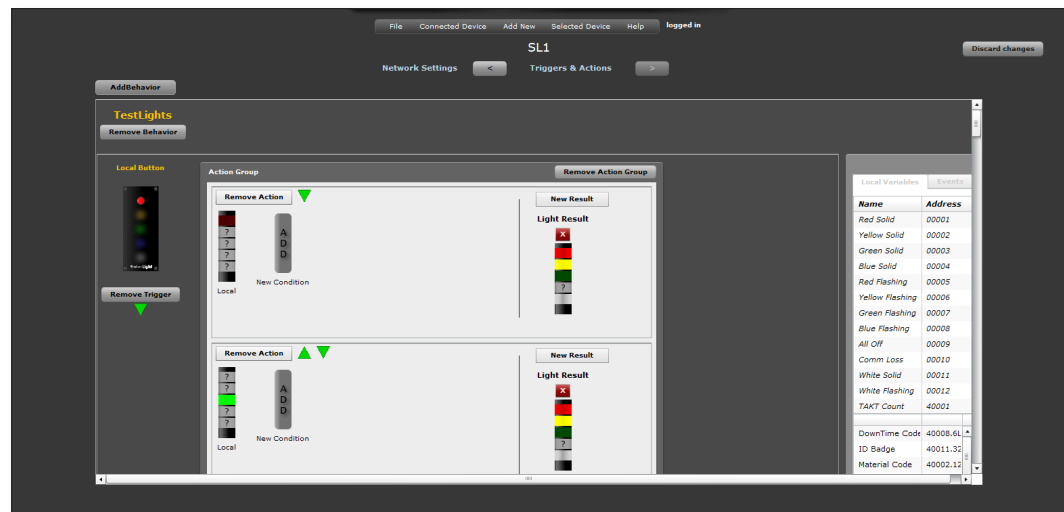


Most StatusLights shipped will have a default configuration which will include a generic Behavior and set of Triggers and Actions. The settings screen for Triggers & Actions displays a button for adding a behavior and a vertical group of boxes in the middle. Each box represents a trigger and its associated action groups.

Each Behavior will have a Trigger. Each Trigger will have at least one Action Group which will in turn contain at least one Action. Action Groups are distinguished by being contained in a panel labeled “Action Group”. Each horizontal row within an Action Group represents one Action. Actions are simply a row of Conditions which must be met in order for the Result at the far right of the row to be executed.

Green Arrows

The components on the triggers and actions screen including: behaviors, triggers, action groups, and actions all can be rearranged using green arrows. Clicking a green arrow will move the relevant component up or down one on the screen this is for convenience and aesthetics so the user can change the order in which behaviors, triggers, and actions are displayed. Clicking the arrows will move the component up or down one by switching places with its immediate neighbors.



Add & Remove Buttons

- | | | |
|-----------------|---------------------|------------------|
| 1. New Behavior | 3. New Action Group | 5. New Condition |
| 2. New Trigger | 4. New Action | 6. New Result |

Several Add, Remove, and Delete buttons are placed throughout the Triggers & Actions screen. The figure above gives the location and description of each button.

Behaviors

The Behaviors exist separately from the StatusLight, but each StatusLight needs to reference a Behavior if it is going to respond to button pushes or other outside influences. The Behavior will tell its referencing StatusLight how to behave and which variables and events are available. The Add Behavior button references another behavior to the selected StatusLight, and opens it on the Triggers & Actions screen so the user can begin editing it. Also, you may create a Behavior from scratch by clicking “New Behavior” instead of “Existing Behavior.”

Adding New Behaviors

When a New Behavior is added, a popup allows you to name and comment the Behavior first, then it is displayed on the screen. When an existing Behavior is added, the relevant Triggers and Actions are immediately added at the bottom of the page under any other StatusLight Behaviors referenced.

Note...

You must name the New Behavior before you will be allowed to save changes to the configuration file.

Triggers

A trigger group will show the type of trigger in the upper left corner. Below the trigger type and image, there is a button named “Remove Trigger” which is used to remove the trigger and all of its action groups. Here is a list of various trigger types :

Local Button Triggers – fired when a button on the connected StatusLight is pressed. These are identified by the color of the button which fires the trigger.

Remote Button Triggers – fired when a button of another StatusLight connected on the same network is pressed. These are identified by the name of the StatusLight and the color of the button.

Local Event Trigger – when the specified local event occurs, something triggered the event result

Remote Event Trigger – the specified event occurs on a device connected to the StatusLight network

Continuous Event Trigger – A continuous trigger fires approximately one hundred (100) times per second without the need for any stimulus to initiate it

HID Input Trigger – fired when input from a Human Interface Device (HID) source is detected.

Timer Trigger – a local timer has timed out

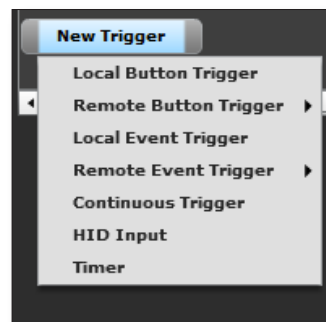
Adding New Triggers

To add a New Trigger, click the button labeled “New Trigger” at the end of the Action Group section. If there is no Action Group section, it will be at the bottom of the Behavior section. Once the “New Trigger” button is clicked, you will see a drop-down menu. Clicking on a desired trigger type will add a new trigger to the bottom of the existing list.

For Remote Button Triggers, the menu will expand to show all of the StatusLights contained in the current configuration which have buttons. These StatusLights will be divided into groups if group names have been assigned.

For Remote Event Triggers, the menu will expand to show all of the compatible devices (such as StatusLights and CRS Responder Devices). These devices will be divided into groups if group names have been assigned.

When adding a Button Trigger, either Local or Remote, you will be presented with an image of a StatusLight faceplate with buttons as they are configured for that device. Clicking on a button will cause the new trigger to be associated with that button. The “Cancel” button will abort the addition of the new trigger.



Note...

You may have to scroll down to the end of the Action Groups to see the “New Trigger” button.



Action Group

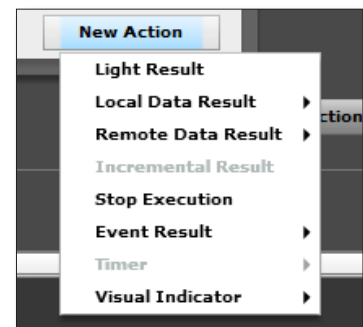
New Action Group has no menu. It simply adds an empty action group below the current action group. An empty Action Group box is automatically added for each Trigger created.

Adding New Action Groups

Every new trigger is created with one empty action group in it. All actions must be contained within an action group. When a trigger fires, each of the action groups within the trigger are evaluated from top to bottom. Within an action group, each action is evaluated unless a “Stop Execution” result is reached in which case evaluation within that action group is terminated and the next action group is evaluated. “Stop Execution” results are explained later. You can add a new action group with the “New Action Group” button at the bottom of the trigger container.

Action

The new action always contains one result and a blank local condition. Each action is named for the result type it adds. The Result functions are listed and described under the Results Section later in this chapter.



Adding New Actions

Clicking the “New Action” button at the bottom of an action group will open a menu allowing you to choose the type of action you want to add. The new action is added to the bottom of the action group.

Conditions

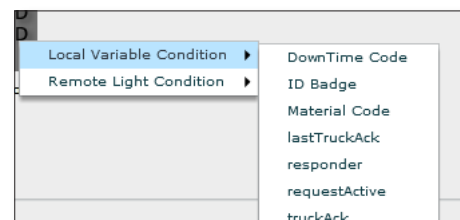
Local StatusLight Condition - default condition can be set to null, checks if the local StatusLight’s stack light matches the condition

Local Variable Condition - checks if a local Modbus variables value matches the condition

Remote StatusLight Condition - checks through the network if the specified StatusLight’s stack light matches the condition.

Adding New Conditions

To add a new condition to an existing action, click the “New Condition” button within the action. A drop-down menu will appear that allows you to choose the type of condition you want to evaluate. The condition is added to the screen to the right of the original condition(s).



Results

The new result is added to the left of any existing result the action box expands as necessary.

Light Result – Sets the state of the light stack on the current StatusLight. Each light cell can be set to Off, On, or Flashing.

Local Data Result – changes the value of a Modbus variable on the local StatusLight

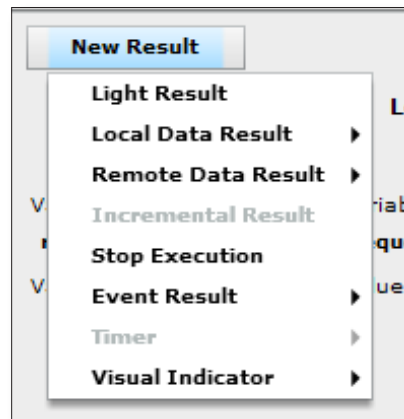
Incremental Result – increments the value of a local Modbus Integer variable by one.

Stop Execution – stop any currently running results

Event Result – send a local event out that usually triggers some action in another device.

Timer Result – start, stop, or restart a local timer

Visual Indicator – turns the lights on and off in some pre-programmed pattern.



Adding New Results

To add a New Result to an existing Action, click the “New Result” button for the desired action group. A drop-down menu will appear that allows you to choose the type of result you want. The result is added to the screen to the right of the original result(s).

Event Triggers

Event Triggers contain data that can then be compared or stored in a variable. Events are sent from one StatusLight to another, or from Responder devices to StatusLights. They can have multiple parameters and are clearly defined. The only difference from an Event Trigger and a Remote Event Trigger is that a Remote Event is caused by an event from another device instead of an event in the same device.

When making a new Action Trigger simply click on the result you are interested in. You may also remotely trigger from a StatusLight Behavior, then if any lights referencing that Behavior create that event, the Trigger will respond not just to one light in particular.

HID Triggers

Human Interface Devices(HIDs) trigger the StatusLight from input by an external device often using the USB terminal such as a keyboard or a scanner. The trigger carries information, such as a string or number, from the external device. Each HID Trigger Action has a HID Condition. The data received is compared with the HID Condition string. Knowledge of how the external device reports information will be necessary to enter a Condition that will match what the device outputs. For example, if the device is a scanner, it may add characters such as a “new line character” after each scan. This extra information will be read by the StatusLight and may cause a data error if it is not acknowledged and filtered out of the data string sent by the scanner. You may also use extra data such as this to act as markers for separating data.

The HID Condition input panel has three buttons to add the following: the new line ascii character, a single unknown character place-holding symbol, or a multiple unknown characters place-holding symbol. Part of the condition string can be typed into the input panel and another part can be added using the buttons. The single character placeholder and the multiple character placeholders in the comparison string captures data that can be entered into a variable or an event result.

One use for an HID trigger is a barcode scanner scanning a part number that is then stored into a variable.

CHAPTER SIX

TRIGGER & ACTION RELATIONSHIPS

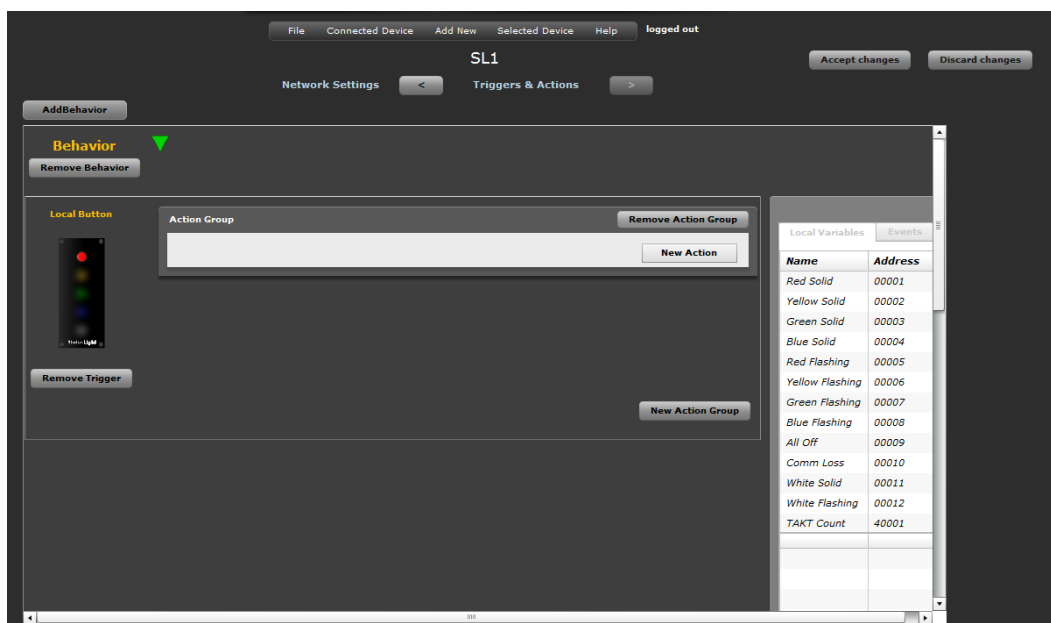
Introduction

Now that you have an understanding of the layout and functions of the Triggers & Setup page, let's create some simple behaviors to illustrate the relationships between these components. In this chapter you will set up a simple Button Trigger and a HID trigger.

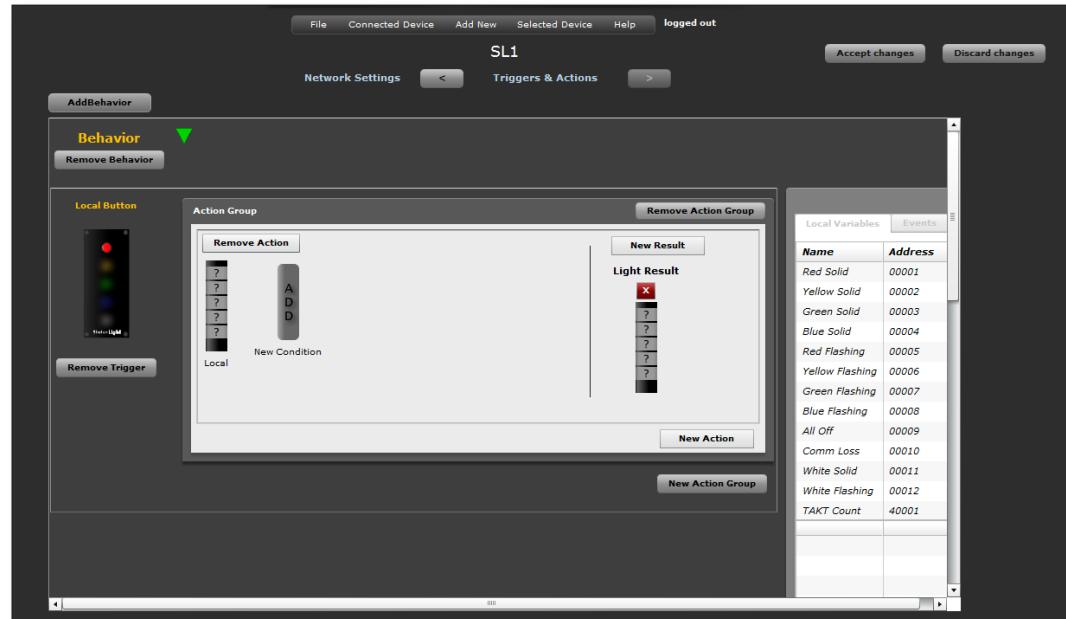
Setting Up Button Triggers

As defined in Glossary of Terms, a Trigger is an event which causes a set of conditions to be evaluated. Any Behavior that a StatusLight performs is initiated by a Trigger. Every time a Trigger is fired, one or more sets of Conditions are evaluated. If a set of Conditions evaluates "True", then one or more actions take place as a Result.

Create and name a New Behavior. A blank Behavior box will appear at the bottom of the Behaviors. In order for the StatusLight to notice a button press, we'll first add a new Local Button Trigger and select the Red Button as the source. This will give us a screen similar to the one below.



The next thing to do is click the New Action button and choose “Light Result.” This will add a new row to the Action Group with a single Condition, the local StatusLight, and a Result which is also the local StatusLight. This is seen in the next screen.



The Condition labeled “Local” represents the light stack of the StatusLight currently being configured. Click on the top “?” in the light stack and you will see that it turns to a dark red color indicating that the red light is off. Possible states are off, on, flashing, and “?”. “?” means that particular light isn’t evaluated as part of the condition.

On the light stack under the “Light Result” label, click the top light cell until it is flashing red. Click the remaining light cells in the stack so that they represent the “Off” state for each light. The action box will now resemble the next figure. This Trigger/Action is now complete.

Saving this configuration to a StatusLight will cause the device to watch for the red button to be pressed. Once it detects a red button press, it will check to see if the red light is currently off (Local Condition). It will disregard the current state of the other local lights because the condition has them set to “?”. Of this condition is True (the red light is off) then it will execute the result which is to set the red light to flashing and turn the remaining lights off according to the settings under “Light Result” in our action.

If we had more than one condition in this action, all of the conditions would have to be met in order for the result to be executed. If we wanted more than one result to be executed for the same set of conditions we would create a new result with the desired result type.

Setting Up HID Triggers

HID triggers are unique in that there is potentially data to capture from the event which fires the trigger. In this example, we want to use a barcode scanner to scan a part number, and we want the StatusLight to react by changing the state of its lights and setting a Modbus variable to the value of the part number scanned. In this example, the event which fires the trigger (the scan of the barcode) contains data (the part number) that you want to capture and use (to set the value of a variable).

For this example, you need to set up a Modbus variable named “partNumber.” Follow instructions in the Modbus Settings chapter to set up a User Defined string variable.

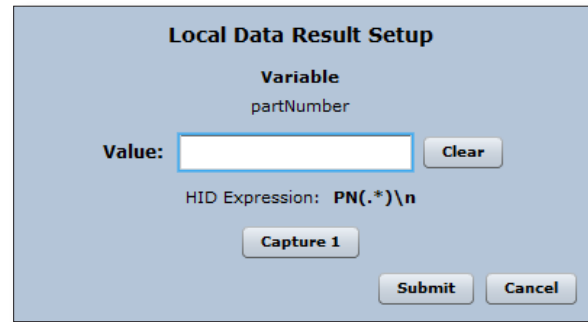
Using the same behavior configuration as the previous section, click the “New Trigger” button at the bottom of the Action Groups. Select “HID Input” as the Trigger type from the pop-out menu. VFC adds a new Trigger section and a blank Action Group section for this new Trigger. Click the New Action button and select Local Data Result. Another pop-out menu will appear and select “partNumber.”

When adding a new action to an HID trigger, you are presented with a window. This is where you will tell the StatusLight what type of data to look for from the HID device. In order to filter out data that this action isn’t interested in, we use a Regular Expression.

If we have a convention of always naming part number with the prefix “PN” and follow that by a variable number of alphanumeric characters then we all we have to do is tell the StatusLight that whenever it sees this pattern from an HID, it must be a part number. To do that, we would put PN in the expression field then click the “Multiple Characters” button. Most barcode scanners will terminate each scan with what is called a New Line Character so we’ll click the “New Line” button to indicate that the StatusLight should look for that as the final character in an scan. The expression should not look like this :

To continue this example, we’ll assume that the action result type chosen was “Local Data Result.” After clicking the Submit button, you’ll be presented with another window asking what value should be assigned to the chosen local variable when data matching our “expression” is detected from an HID source.

The figure here shows that we chose the Modbus variable named “partNumber” and has a value field where we can insert the value we want to assign to this variable. Below the value field is the expression that we assigned in the previous step. The button labeled “Capture 1” is used to insert a placeholder in the value field. This placeholder represents whatever data is captured between the parenthesis in our expression.

A screenshot of a dialog box titled "Local Data Result Setup". It has a light blue background. At the top, it says "Variable" and "partNumber". Below that, there is a "Value:" label followed by a text input field. To the right of the input field is a "Clear" button. Below the input field, it says "HID Expression: PN(.*)\n". Below the expression is a "Capture 1" button. At the bottom right, there are "Submit" and "Cancel" buttons.

Remember that we used the “multiple characters” placeholder in our expression to capture whatever data comes after the “PN” and before the new line character. If we want to assign only that data to our variable all we need to do is click the “Capture 1” button. Had we used multiple placeholders in our expression there would be a button for each. We could also type values directly into the value field before or after the captured values.

If the result type chosen doesn’t need to do anything directly with the data captured, such as a light result, this second window will not be displayed.

Clicking Submit will save your changes and complete the creation of the action. The expression we entered will appear in the list of conditions for the action. This means that you can add other conditions just as with any other type of trigger. Perhaps you only want the action to happen when the HID scan matches your expression and the blue light is on. You can add such a condition if you’d like.

CHAPTER SEVEN VARIABLES & EVENTS SETTINGS

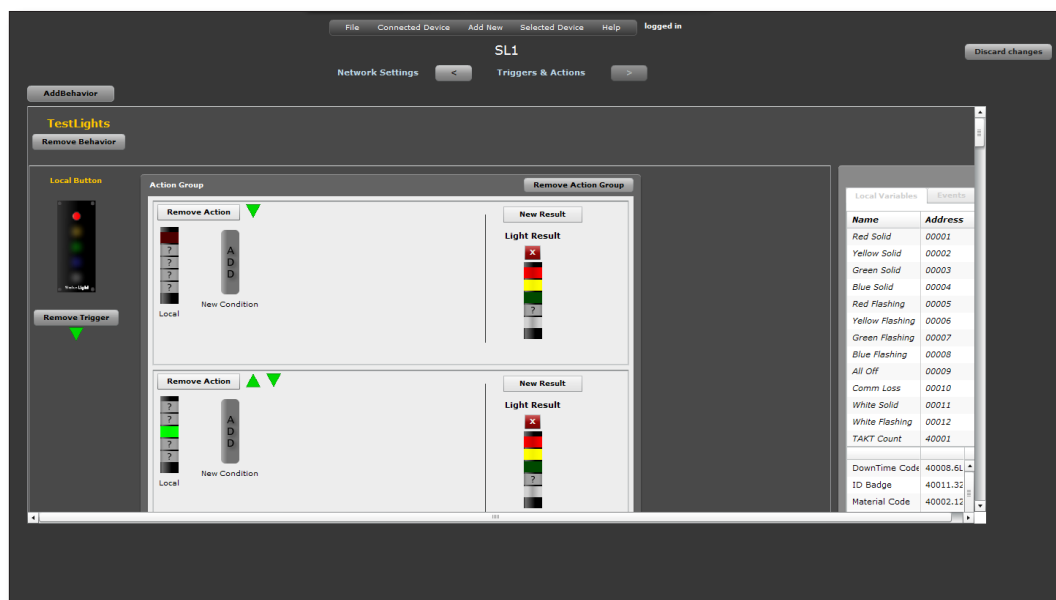
Introduction

This chapter describes the uses of Variables and Events and how to set them up. See the chapter “Trigger & Action Relationships” for an example of how to set up a Trigger using Variables and Events saved to a StatusLight.

Each Behavior has a Variables and Events panel. These settings are to the right of the Behaviors on the Triggers & Actions screen.

The top section of the Local Variables tab is a list of pre-configured Modbus variables that cannot be altered or removed from the device. The section below is for adding and deleting user defined Modbus variables. These User-Defined Variables can be Added or Deleted using the buttons located at the bottom of the panel. Variables are the data that is loaded into the Modbus, saved in memory, and sent to other devices or StatusWatch.

The top section of the Events tab is a list of Events. The Events panel contains User-Defined Events and can be added or deleted using the buttons at the bottom of the panel. These Events sent to all interested devices on the network when they occur and are useful for signaling or carrying data. Event data is not saved in memory.



Note...

No two variables can use the same address which means that the addresses assigned to the pre-configured variables are unavailable for user defined variables.

User Defined Modbus Variables

Click the add button to add a new user defined Modbus variable. Assign a name to the variable using only alphanumeric values. The address format will depend on the data type of the variable. The types of data that a StatusLight can make available over Modbus and examples of their addresses are shown below.

String – *this can best be described as text. it could be a single word or multiple words but usually only contains letters and numbers.*

Example : PN2380P20

Address : 40050.32L

Integer – *This is a whole number value.*

Example : 38

Address : 40020

Bit – *This is used to represent either on/off or true/false and is expressed as a 1 or 0 where 1=true and 0=false.*

Address : 00020

Modbus addresses as used here are five (5) digits long. String and Integer variables must have an address between 40000 and 49999. Bits should be addressed between 00020 and 09999. String variables are special in that their address is followed by a decimal point and a number which represents the maximum possible length of the String. The final character should be "L".

A valid String address would be 40030.32L where the starting address is 40030 and the maximum length of string that can be stored in that variable is 32 characters.

It is important to not that a String will use up address space beyond the address assigned to it depending upon the maximum length defined. For example, a String addressed as 40020.32L will occupy the addresses 40020 to 40052 (40020 + 32). This means that the address space used by the string is unavailable for use by other variables so the next valid address in this example would be 40053. Although it is perfectly valid to define two String variables as 40020.32L and 40021.16L, doing so would result in erroneous data being reported for either or both variables.

All Modbus variables can be used during the evaluation phase of an Action. Some may also be used as the target of an Action.

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