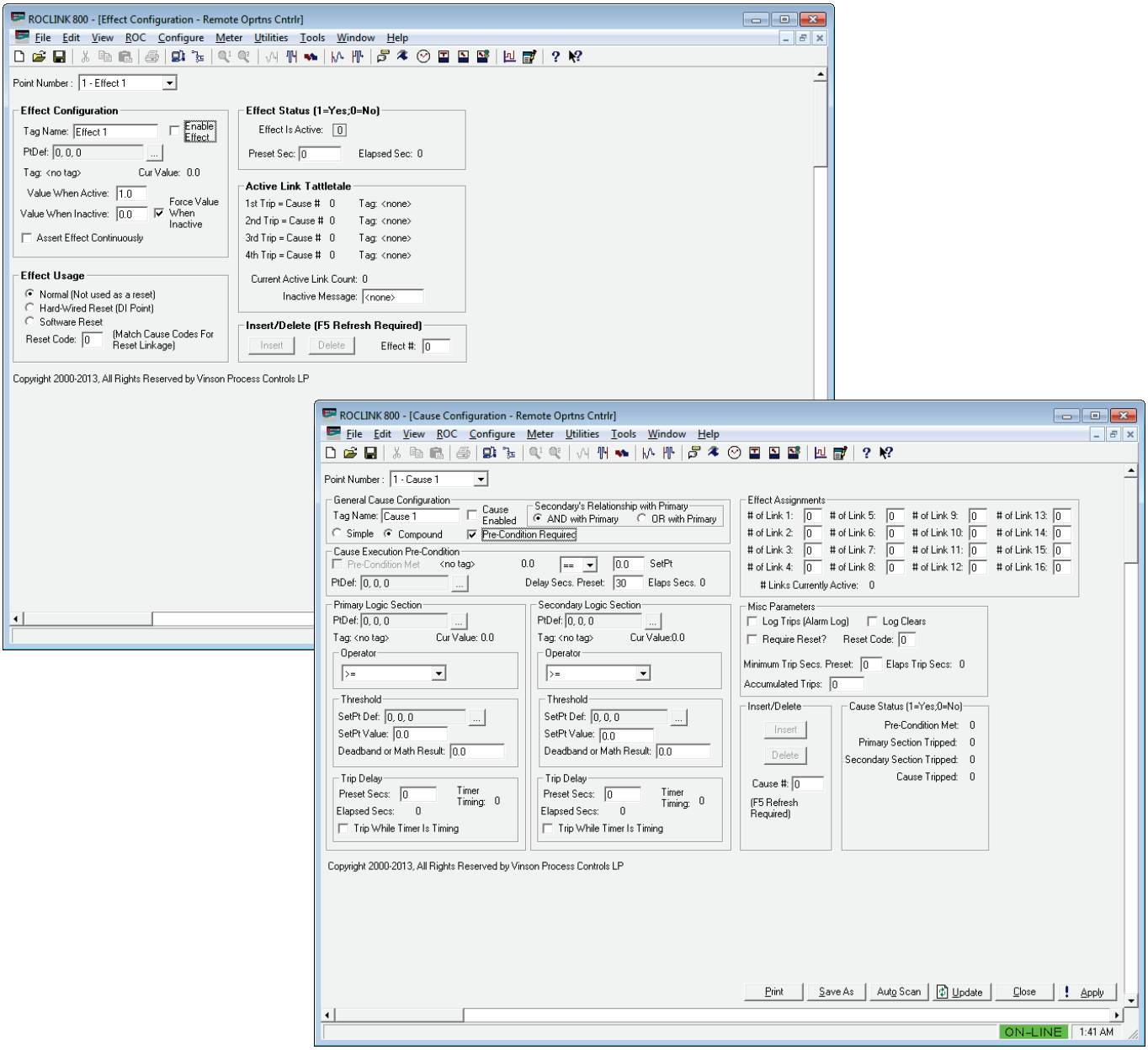
Part D301745X012
June 2016

Cause and Effect Manager Program User Manual (for ROC800-Series)



Remote Automation Solutions

EMERSON.

Revision Tracking Sheet

June 2016

This manual may be revised periodically to incorporate new or updated information. The revision date of each page appears at the bottom of the page opposite the page number. A change in revision date to any page also changes the date of the manual that appears on the front cover. Listed below is the revision date of each page (if applicable):

Page	Revision
All Pages	June-2016
Initial release	August-2014

Contents

[This page is intentionally left blank.]

Chapter 1 – Introduction

⚠ Caution **When implementing control using this product, observe best industry practices as suggested by applicable and appropriate environmental, health, and safety organizations. While this product can be used as A safety component in a system, it is NOT intended or designed to be the ONLY safety mechanism in that system.**

This chapter describes the structure of this manual and presents an overview and installation instructions of the Cause and Effect Manager Program for the ROC800-Series Remote Operations Controller.

1.1 Scope and Organization

This document serves as the user manual for the Cause and Effect Manager program, which is intended for use in a ROC800-Series (ROC800). This manual describes how to download, install, and configure the Cause and Effect Manager program (referred to as the "Cause and Effect program" or "the program" throughout the rest of this manual). You access and configure this program using ROCLINK™ 800 Configuration Software (version 2.10 or greater) loaded on a personal computer (PC) running Windows® 2000 (with Service Pack 2), Windows XP (with Service Pack 3), Windows Vista™ (32-bit), or Windows 7 (32-bit or 64-bit).

The sections in this manual provide information in a sequence appropriate for first-time users. Once you become familiar with the procedures and the software, the manual becomes a reference tool.

This manual has the following major sections:

- *Chapter 1 – Introduction*
- *Chapter 2 – Installation*
- *Chapter 3 – Configuration*
- *Chapter 4 – Reference*

This manual assumes that you are familiar with the ROC800 and its configuration. For more information, refer to the following manuals:

- *ROC800 Remote Operations Controller Instruction Manual* (Part D301217X012)
- *ROCLINK 800™ Configuration Software User Manual (for ROC800-Series)* (Part D301250X012)

1.2 Product Overview

The Cause & Effect Manager user program for the ROC800 supports up to 128 causes and 48 effects. The program is designed to allow you to configure the ROC800 to do logical operations without writing FSTs. A Cause typically monitors a selected point that would be logically evaluated

against a user defined set-point. Any tripped Cause linked to an Effect forces the action defined in that Effect. An example of this would be a gas application monitoring multiple gas quality limits defined as Causes (BTU, H_2S, Nitrogen, CO_2, etc) which are linked to a slam valve (which is the Effect).

The layout of the configuration screens is such that you can configure logic by inputting entries from a Cause and Effect matrix. In many cases, you can input the effects and causes line by line through the entire matrix.

Features

- Cause precondition evaluation must be satisfied before a trip is possible.
- Cause compound primary and secondary conditions that trips the cause based on "And / Or" evaluation.
- Cause operators that allow selectable evaluations or operations (logical, on-change, mathematical, watchdog and data movement).
- Cause condition and precondition timer delays.
- Cause condition deadbands.
- Caused definitions for up to 16 effect link assignments.
- Cause trips that clear automatically when the condition clears or trips that are reset controlled.
- Cause alarming to the ROC alarm log for trips and/or clears.
- Effect active/inactive values or states that are definable.
- Effect selectable option to assert those values continuously or not.
- Effect usage that defines its behavior as a normal effect or a reset point (i.e. reset push button).
- Effect delay timer.
- Effect last four tattletales that show the order of multiple causes tripped.

1.3 Program Requirements

The Cause and Effect program is compatible with version 3.50 (or greater) of the ROC800 firmware and with version 2.10 (or greater) of the ROCLINK 800 software.

Program specifics include:

Note:

- You must load one version of the program only depending on your available user program slot or location.
- The **CauseAndEffect_128x48_TLP7172.tar** and the **CauseAndEffect_128x48_TLP7475.tar** program files support 128 causes and 48 effects. The **CauseAndEffect_64x32_TLP7172.tar** and the **CauseAndEffect_64x32_TLP7475.tar** program files support 64 causes and 32 effects.

File Name	Target Unit/ Version	User Defined Point (UDP)	Flash Used (in bytes)	DRAM Used (in bytes)	ROCKLINK 800 Version	Display Number
CauseAndEffect_128x 48_TLP7172.tar	ROC800 3.50	71, 72	52,328	143,360	2.10	71, 72
CauseAndEffect_128x 48_TLP7475.tar	ROC800 3.50	74, 75	52,328	143,360	2.10	74, 75
CauseAndEffect_64x32 _TLP7172.tar	ROC800 3.50	71, 72	51,328	126,976	2.10	71, 72
CauseAndEffect_64x32 _TLP7475.tar	ROC800 3.50	74, 75	51,328	126,976	2.10	74, 75

Note: You must connect a PC to the ROC800's LOI port before starting the download.

For information on viewing the memory allocation of user programs, refer to the *ROCLINK 800 Configuration Software User Manual (for ROC800-Series)* (Part D301250X012).

1.3.1 License Key

License keys, when matched with valid license codes, grant access to applications such as Cause and Effect.

The term "license key" refers to the physical piece of hardware that can contain up to seven different licenses (refer to *Figure 1*). Each ROC800 can have none, one, or two license keys installed. If you remove a license key after enabling an application, the firmware disables the task from running. This prevents unauthorized execution of protected applications in a ROC800.

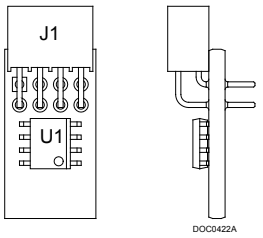


Figure 1. License Key

Note: The Cause and Effect program requires either **Cause and Effect** (for CauseAndEffect_128x48_TLP7172.tar and CauseAndEffect_128x48_TLP7475.tar program files) or **C&E64X32** (for CauseAndEffect_64x32_TLP7172.tar and CauseAndEffect_64x32_TLP7475.tar program files) license key depending on your requirements.

[This page is intentionally left blank.]

Chapter 2 – Installation

This section provides instructions for installing the Cause and Effect program into the ROC800. Read *Section 1.3* of this manual for program requirements.

2.1 Installing the License Key

If you order the Cause and Effect program for a new ROC800, your ROC800 is delivered with the license key installed. Go to *Section 2.2*.

If you order the program for an existing ROC800, you must install the license key yourself.

⚠ Caution

Failure to exercise proper electrostatic discharge precautions, such as wearing a grounded wrist strap may reset the processor or damage electronic components, resulting in interrupted operations.

When working on units located in a hazardous area (where explosive gases may be present), make sure the area is in a non-hazardous state before performing these procedures. Performing these procedures in a hazardous area could result in personal injury or property damage.

To install a license key:

1. Remove power from the ROC800.
2. Remove the wire channel cover
3. Unscrew the screws from the Central Processing Unit (CPU) faceplate.
4. Remove the CPU faceplate
5. Place the license key in the appropriate terminal slot (**P4** or **P6**) in the CPU

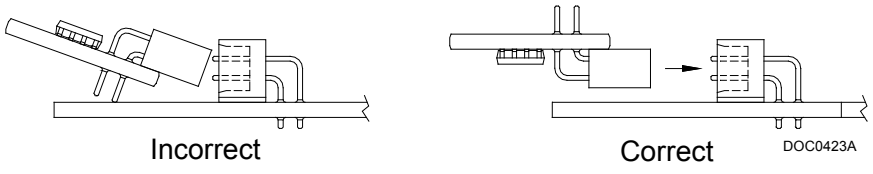


Figure 2. License Key Installation

6. Press the license key into the terminal unit it is firmly seated (Refer to *Figure 2*.
7. Replace the CPU faceplate.
8. Replace the screws on the CPU faceplate.
9. Replace the wire channel cover.
10. Restore Power to the ROC800.

2.1.1 Verifying the License Key Installation

After you install the license key, you can verify whether the ROC800 recognizes the key. From the ROCLINK 800 screen, From the ROCLINK 800 screen, select **Utilities** > **License Key Administrator**. The License Key Administrator screen displays:

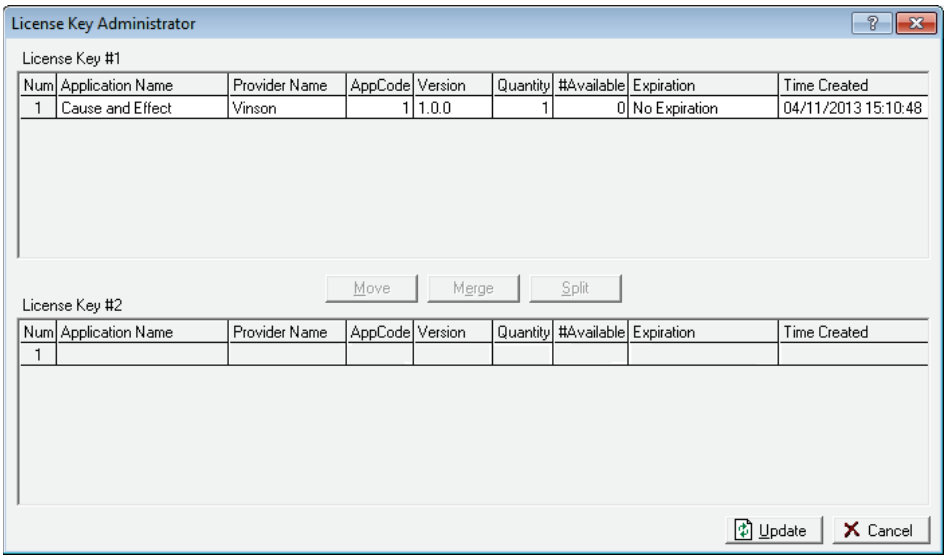


Figure 3. Transfer Licenses Between a Device and a Key (Cause and Effect)

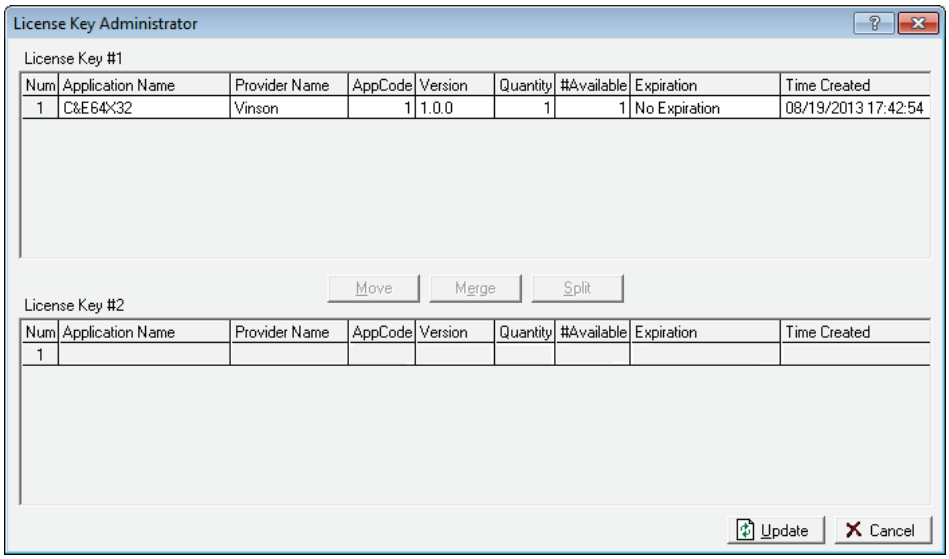


Figure 4. Transfer Licenses Between a Device and a Key (C&E64X32)

2.2 Downloading the Program

This section provides instructions for installing the program into the Flash memory on the ROC800.

To download the program using ROCLINK 800 software:

1. Connect the ROC800 to your computer using the LOI port.
2. Start and logon to ROCLINK 800.
3. Select **Utilities** > **User Program Administrator** from the ROCLINK menu bar. The User Program Administrator screen displays (see *Figure 3*):

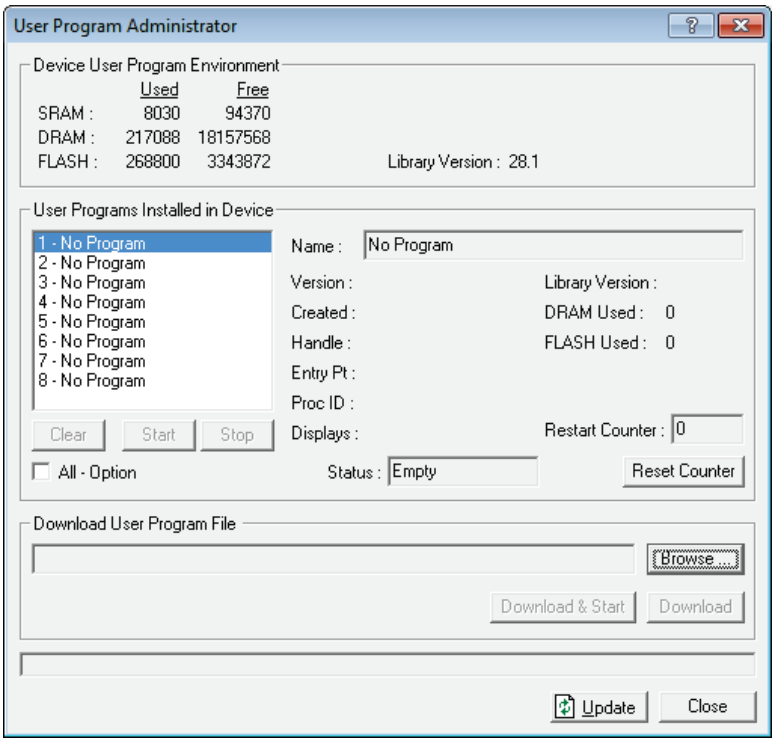


Figure 3. User Program Administrator

4. Click **Browse** in the Download User Program File frame. The Select User Program File screen displays (see *Figure 4*).
5. Select the path and user program file to download from the CD-ROM. (Program files are typically located in the Program Files folder on the CD-ROM). As *Figure 4* shows, the screen lists all valid user program files with the **.tar** extension:

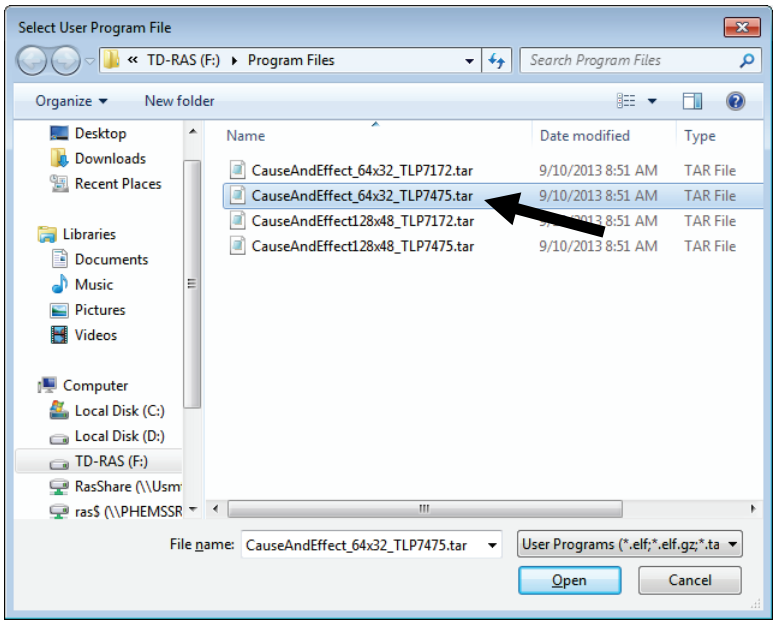


Figure 4. Select User Program File

6. Click **Open** to select the program file. The User Program Administrator screen displays:

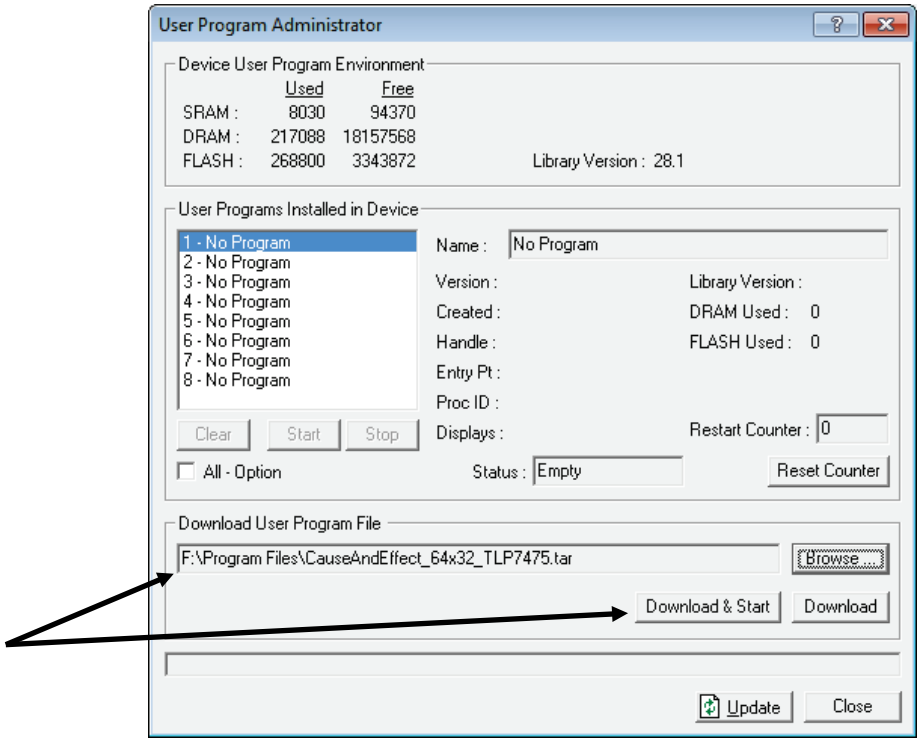


Figure 5. User Program Administrator

7. Click **Download & Start** to begin loading the selected programs. The following message displays:

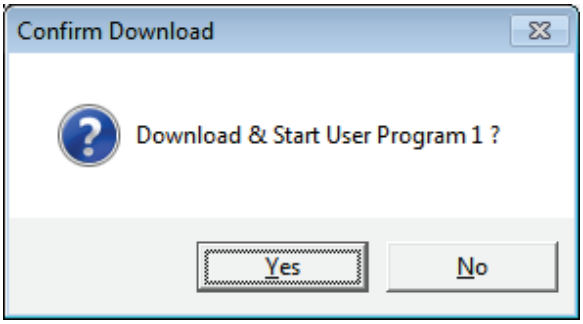


Figure 6. Confirm Download

Note: If the **User Display Conflict** screen (*Figure 7*) displays when you click the **Download & Start**, choose another empty slot or select another program that is compatible with your license but with different TLP. See *Section 1.3.*1 for more information.

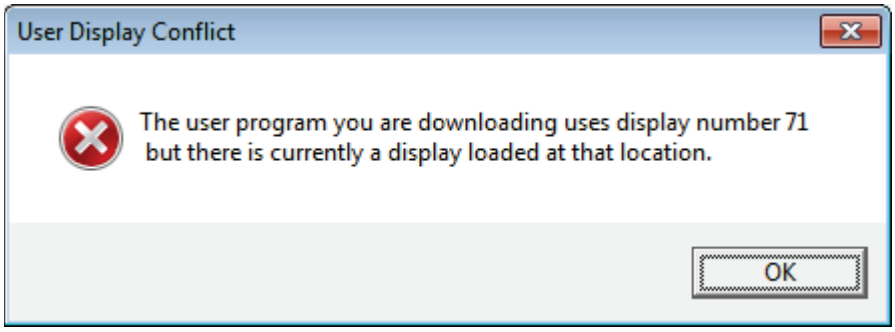


Figure 7. User Display Conflict

8. Click **Yes** to begin the download. When the download completes the following message displays:

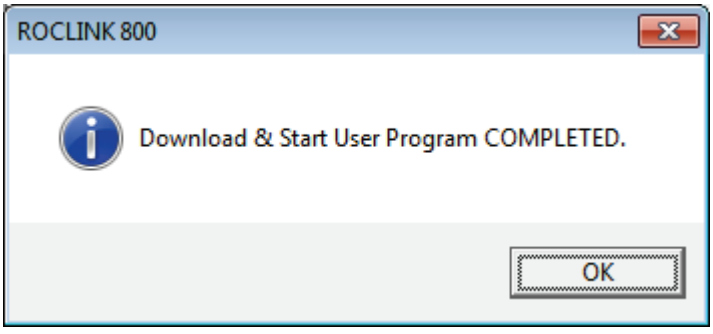


Figure 7. ROCLINK 800 Download Confirmation

9. Click **OK**. The User Program Administrator screen displays (see *Figure 8*). Note that:

- The User Programs Installed in Device frame identifies the installed program(s).
- The Status field indicates that the program is running.

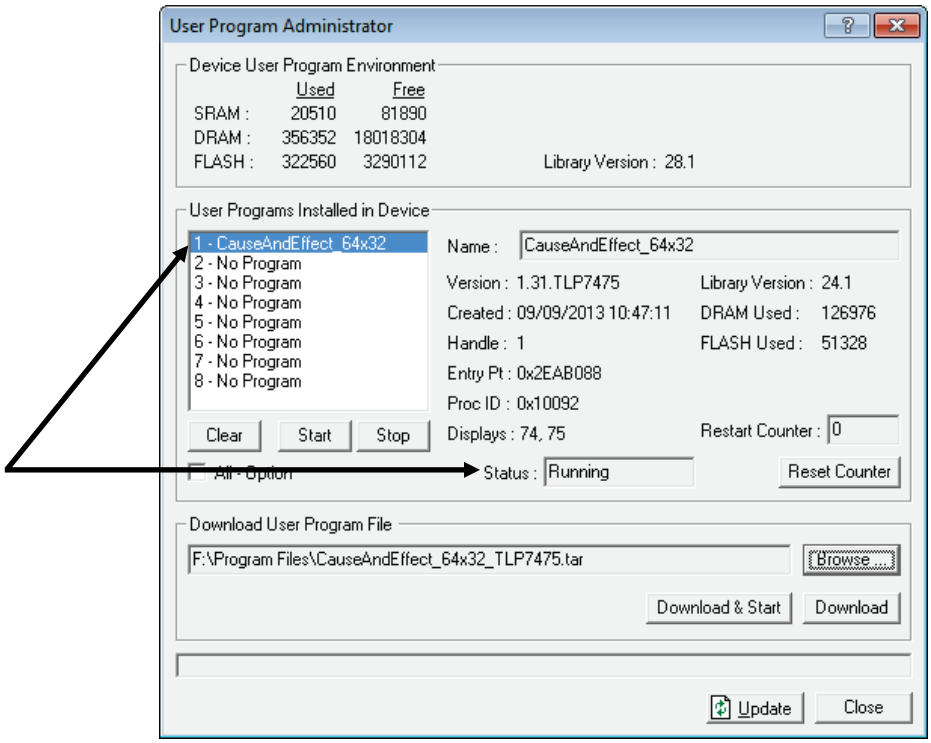


Figure 8. User Program Administrator

10. Click **Close**. The ROCLINK 800 screen displays and the download is complete. Proceed to *Chapter 3*, *Configuration*.

2.3 MPU Loading Threshold

To maximize the performance of your ROC800 device, always verify the performance of specific application combinations before using them in the field to ensure the MPU load typically remains **below** 85% with peak MPU loading levels **below** 95%.

To check the current MPU load at any time, select **ROC** > **Information** > **Other Information** and review the value in the MPU loading field.

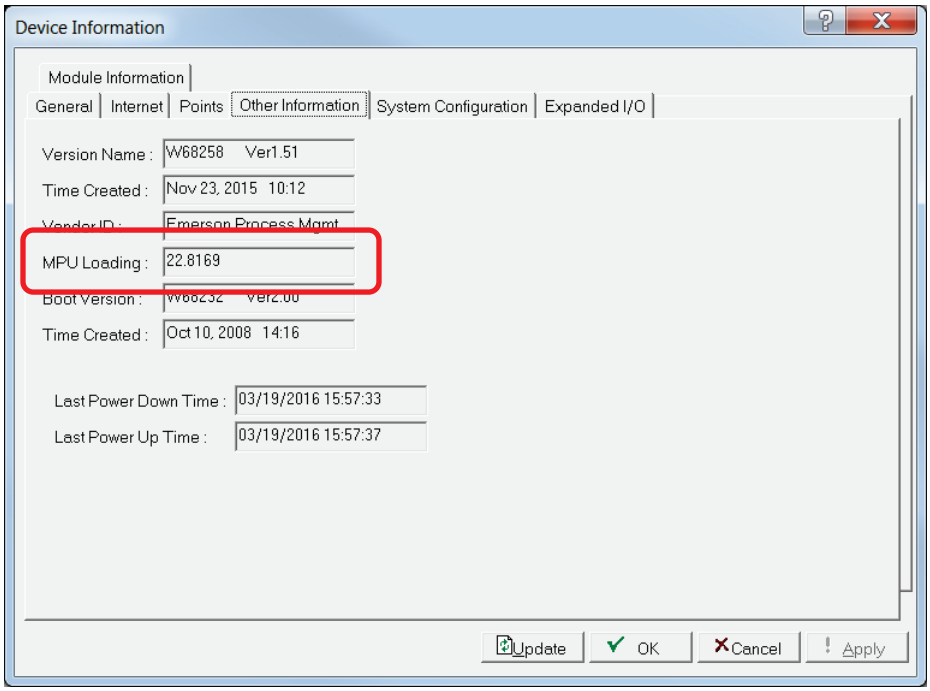


Figure 9. MPU Loading

[This page is intentionally left blank.]

Chapter 3 – Configuration

Before you begin configuring causes and effects, a little planning is helpful. You can have up to 48 effects triggered by up to 128 causes. It is best to plan your effects first, and then decide what triggers them. The intersecting point in the matrix shows which causes trip which effects. It may be useful to use another symbol to show which trips reset automatically when the condition clears, and which ones need a manual reset.

You may wish to use a chart shown in *Figure 10* as a handy way to organize your information. Notice the effects are across the top in columns, and the causes are listed down the left side of the table for easy reference:

Injection Well Skid 00-RSK-18 Cause & Effect Matrix	Output Description	Injection Meter Skid Shutdown	General Alarm Beacon	Annunciation in DCS	Annunciation in Local Display	Run 1 SD Valve Open Command	Run 2 SD Valve Open Command	Run 3 SD Valve Open Command	Run 4 SD Valve Open Command	Utility Gas SD Valve Open Cmd	Run 1 SD Valve Close Command	Run 2 SD Valve Close Command	Run 3 SD Valve Close Command	Run 4 SD Valve Close Command	Utility Gas SD Valve Close Cmd		
Input Description	**Tag**	USD-1901	UA-1901	–	–	ESDV-1901	ESDV-1902	ESDV-1903	ESDV-1904	ESDV-1905	ESDV-1901	ESDV-1902	ESDV-1903	ESDV-1904	ESDV-1905		
Remote Shutdown	EXS-1901	X	X		X	O	O	O	O	O	X	X	X	X	X		
Utility Gas ESD Valve Closed Limit Switch	EZSC-1905		X	X	X												
Local ESD Hand Station	EHS-1906	X	X	X	X	O	O	O	O	O	X	X	X	X	X		
Reset Hand Switch	EHS-1907	O	O	O	O						O	O	O	O	O		
Gas Level Hi-Hi Alarm	AAHH-1901	X	X	X	X						X	X	X	X	X		
Fire Level Hi-Hi Alarm	AAHH-1902	X	X	X	X						X	X	X	X	X		
Gas Level Hi Alarm	AAH-1901			X	X												
Gas Detector Fault	AAL-1901		X	X	X												
Fire Detector Fault	AAL-1902		X	X	X												
Gate Intrusion Limit Switch	ZSO-1901		X	X	X												
Panel Intrusion Limit Switch	ZSO-1902		X	X	X												
Power Supply Low Voltage Switch	ESL-1908			X	X												
Power Supply Low-Low Voltage Switch	ESLL-1909	X	X	X	X	O	O	O	O	O	X	X	X	X	X		
Run 1 Pressure Lo-Lo Alarm	PALL-1901A		X	X	X	R					X						
Run 2 Pressure Lo-Lo Alarm	PALL-1902A		X	X	X		R					X					
Run 3 Pressure Lo-Lo Alarm	PALL-1903A		X	X	X			R					X				
Run 4 Pressure Lo-Lo Alarm	PALL-1904A		X	X	X				R					X			
Run 1 Strainer Diff Press Hi-Hi Limit	PDHH-1901		X	X	X												
Run 2 Strainer Diff Press Hi-Hi Limit	PDHH-1902		X	X	X												
Run 3 Strainer Diff Press Hi-Hi Limit	PDHH-1903		X	X	X												
Run 4 Strainer Diff Press Hi-Hi Limit	PDHH-1904		X	X	X												
Run 1 Flow High Alarm	FAH-1901		X	X	X												
Run 2 Flow High Alarm	FAH-1902		X	X	X												
Run 3 Flow High Alarm	FAH-1903		X	X	X												
Run 4 Flow High Alarm	FAH-1904		X	X	X												

X = condition present to cause effect

O = condition resets effect, unless causes are still present

R = effect must be reset by clearing condition, namely, re-pressurizing the run for the PALL

Figure 10. Sample Matrix

To configure the program (after logging onto ROCLINK 800 and successfully installing the program), proceed through the program screens as shown in the following sections.

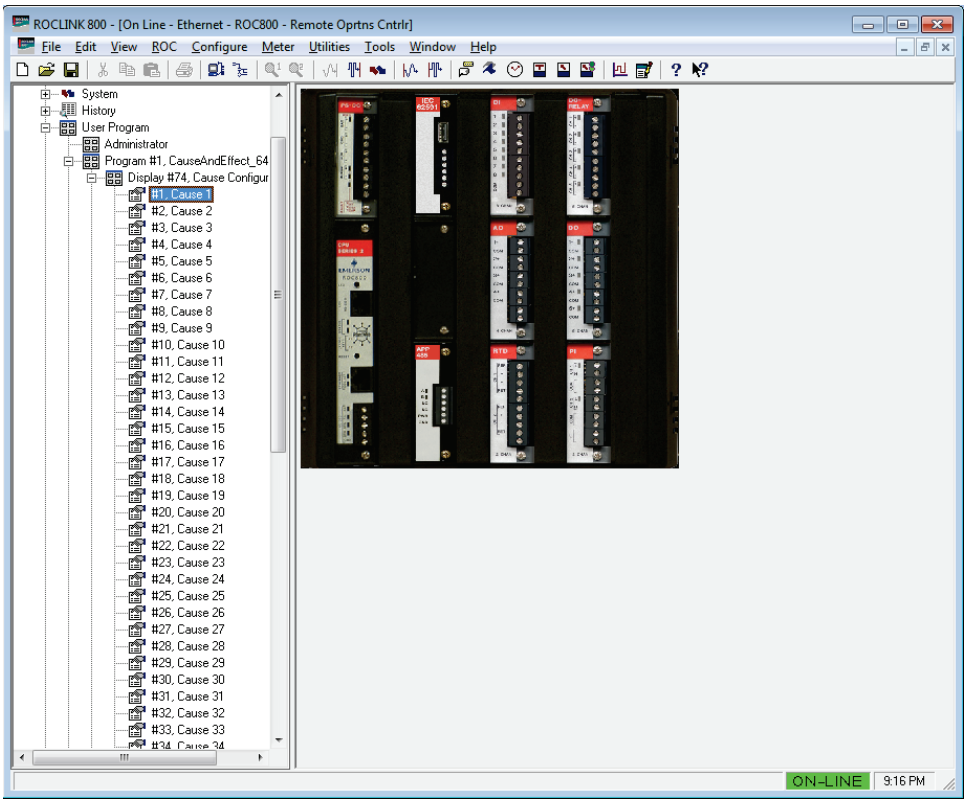


Figure 11. ROCLINK 800

3.1 Effect Configuration Screen

Each Effect represents a particular action that is taken when the Causes that are linked to it are tripped or cleared. The Value When Active is the value that is applied to the PtDef selected when the Effect Is Active. The Value When Inactive is the value that is applied to the PtDef selected when the Effect Is Not Active. Use the Assert Effect Continuously option to control writes to the effect point once or continuously. Writing one time to the output can be useful for operations such as setting a discrete output momentary parameter for a resettable output.

The screen is divided into five main sections – Effect Configuration, Effect Usage, Effect Status, Active Link Tattletale and Effect Edit:

To access this screen:

1. From the Directory Tree, select **User Program** > **Cause and Effect Mgr**.
2. Double-click **#75, Effect Configuration**.
3. Double-click **#1, Effect 1**. The Effect Configuration screen displays:

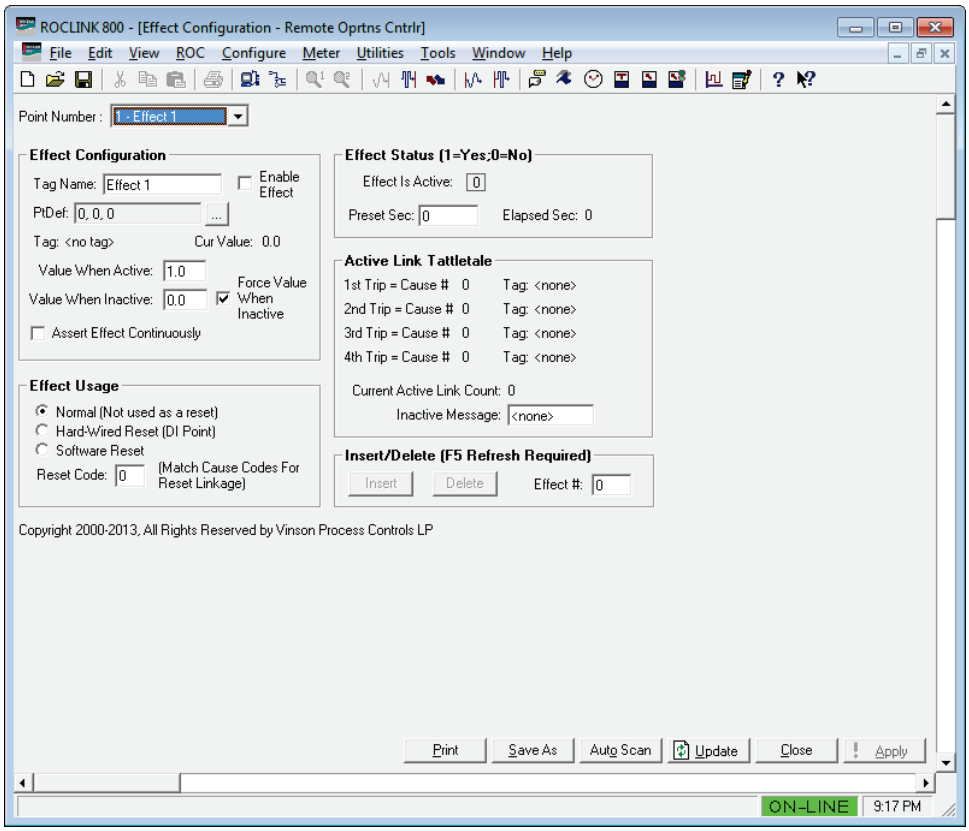


Figure 12. Effect Configuration Screen

4. Review and change as necessary the values in the following fields:

Field	Description
Point Number	Specifies the effect identification.
Effect Configuration Use this area to name your effect, define the point and define the active and inactive states that will be applied.	
Tag Name	Sets the 10-character name for the effect.
Enable Effect	If this box is checked, the effect will be processed. If unchecked, this effect will be ignored, even when a cause is linked to it.
PtDef	Sets the TLP to be controlled.
Tag	Displays the tag name of the TLP specified in the **PtDef** field.
Cur Value	Displays the current value of the TLP specified in the **PtDef** field.
Value When Active	Sets the value that is sent to the TLP defined in the **PtDef** field.
Value When Inactive	Sets the value that is sent to the TLP defined in the **Effect Def** field whenever the effect is un-actuated. If the field **Force Value When Inactive** is unchecked, the TLP defined in the **PtDef** field is not controlled by **Value When Inactive** when un-actuated.
Force Value When Inactive	Determines if the **Value When Inactive** value be written to the TLP defined at **PtDef** when the effect is un-actuated.
Assert Effect Continuously	When checked, the Active or Inactive values are written to the **PtDef** selection continuously. This may be desirable to assure that the output is re-asserted to the expected state. When unchecked, the program sets the state one time. This may be useful for a DO point in the momentary mode that must reset itself.
Effect Usage This frame allows effects to be defined as reset points. Reset points are monitored by causes that require a reset before clearing from a tripped condition.	
Normal (Not used as a reset)	Choose this button when the effect is handled as a normal effect (this is the default).
Hard-Wired (DI Point)	Choose this when you wish the effect to behave as a reset point such as the input for a reset push button.

Field	Description
Software Reset	Choose this when you wish the effect to behave as a reset point that can be reset through a variable. This variable can then be controlled through the LCD display or set by SCADA. The program will automatically reset the field back to the Inactive Value after it is set. The program now allows the selection of other data types besides UINT8.
Reset Code	Defines a code that if matched to a Cause Reset Code will reset those Causes when a Software or Hard-Wired reset point is detected. Multiple codes allow multiple independent resets possibilities. A reset point is normally a digital input point, such as a status point. For example, you may have the "Pt Def" configured to be a DI status and the "Actuated Value" would be the value of the digital input when the reset button is pushed. All causes that require resets (Require Reset = checked) would examine this reset effect and clear all tripped causes assuming their conditions are clear.
Effect Status This area shows the effect active status and configures the effect delay.	
Effect Active	Shows whether the effect has been tripped (actuated).
Preset Sec	Shows the preset in seconds that will delay the effect active action.
Elapsed Sec	Shows the timer in seconds showing the delay before the effect is active.
Active Link Tattletale This area is informational related to tattletale order and tags.	
1st Trip = Cause #	Shows the first cause that currently holds this effect active.
2nd Trip = Cause #	Shows the second cause that currently holds this effect active.
3rd Trip = Cause #	Shows the third cause that currently holds this effect active.
4th Trip = Cause #	Shows the fourth cause that currently holds this effect active.
Tag (1st – 4th Trip)	Shows the cause tag name.
Current Active Link Count	Shows the number of causes that currently activate this effect.
Inactive Message	Sets a 10 character tattletale tag message when the effect is inactive. This may be useful if the first Trip tattletale tag is displayed on the LCD and a meaningful inactive message is needed (i.e. "No Alarms").
Insert/Delete This area is used to insert or delete effects within the list.	

Field	Description
Insert	Inserts an effect before the **Effect #** indicated. This button is grayed out when waiting for the **Effect #** to be entered and applied and re-gray out after the action is taken. Multiple inserts are possible one at a time. The last effect will always roll off the end, so make sure there are unused spares at the end of the list.
Delete	Deletes the effect at the **Effect #** indicated. This button is grayed out when waiting for the **Effect #** to be entered and applied and re-gray out after the action is taken. Multiple deletes are possible one at a time.
Effect #	Indicates the effect to insert before or the effect to delete according to what action is taken. Enter the **Effect #** first and the **Apply** button next to un-gray the **Insert/Delete** buttons. The two step process is meant to prevent accidental inserts or deletes. It is not necessary to be in the screen showing that effect to operate on a particular **Effect #.**

5. Click **Apply** to save your changes.
6. Click **Close** to return to the ROCLINK 800 screen. Proceed to *Section 3.2* to configure the Cause Configuration screen.

3.2 Cause Configuration Screen

Causes are configured to do comparisons with a true/false result that controls effects, or configured to do math functions or timing. Other features include delay timing, dynamic enabling, and compound comparisons. You can connect individual causes to one or up to 16 effects. When the cause is true, the connected effects are actuated.

The Cause Configuration window is divided into eight main sections – Cause Configuration, Pre-Condition, Primary Logic Section, Secondary Logic Section, Effect Assignments, Misc Parameters, Insert/Delete and Cause Status.

To access this screen:

1. From the Directory Tree, select **User Program** > **Cause and Effect Mgr**.
2. Double-click **Display #74 Cause Configuration**.
3. Double-click **#1, Cause 1**. The Cause Configuration screen displays:

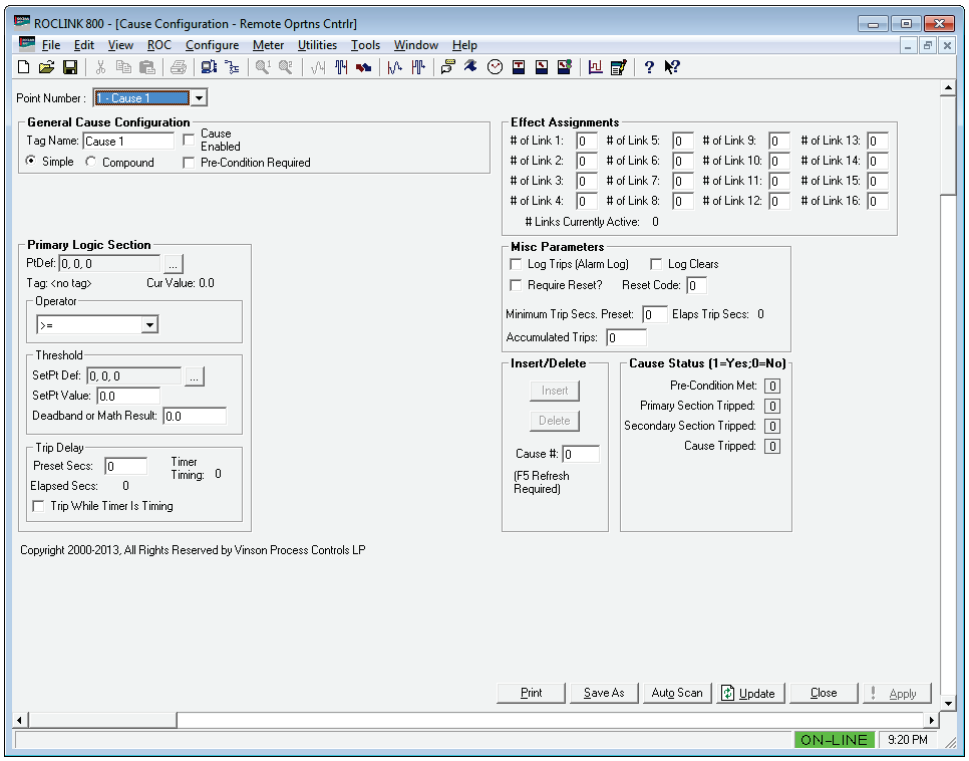


Figure 13. Cause Configuration Screen

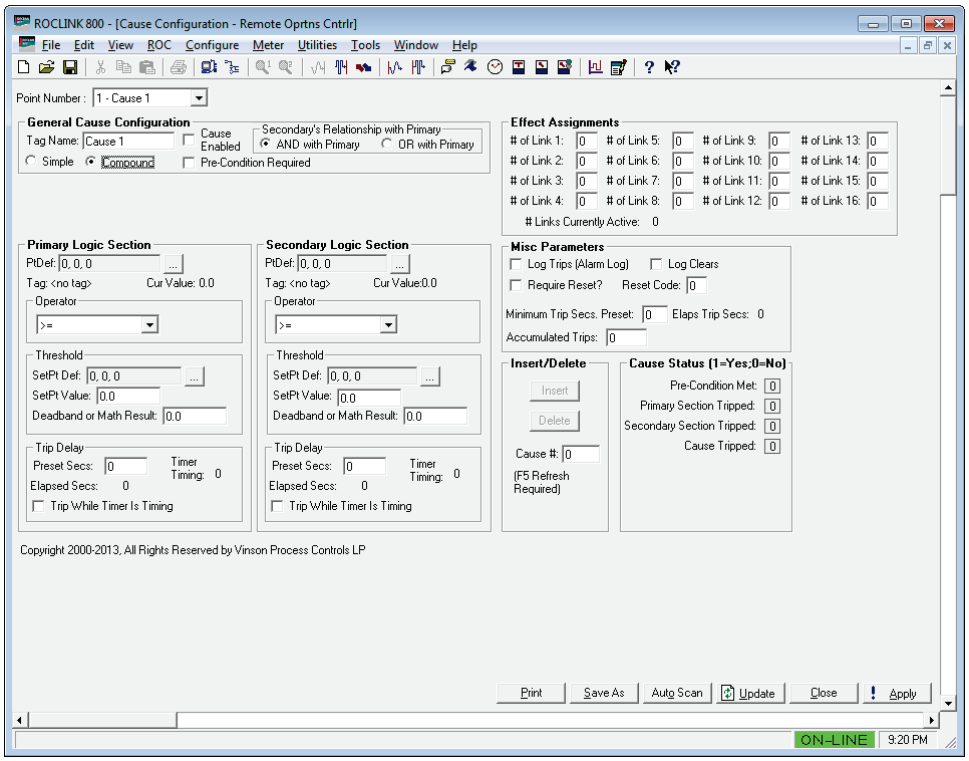


Figure 14. Cause Configuration Screen – Compound cause selected

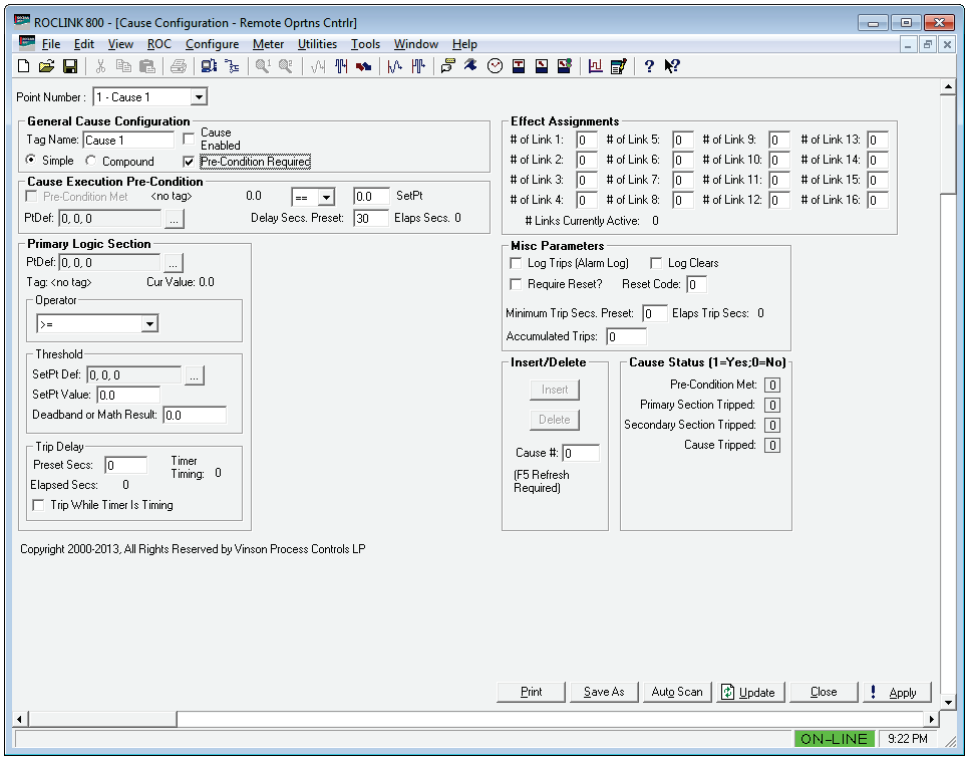


Figure 15. Cause Configuration Screen – Pre-Condition Required enabled

4. Review the values in the following fields:

Field	Description
Point Number	Specifies the cause identification.
General Cause Configuration Configures the Cause by assigning a name for the cause, defining the cause as simple or compound, and setting whether a pre-condition is required.	
Tag Name	Sets a 10-character identification name for the selected cause.
Cause Enabled	Enables the selected cause. Make sure that everything on the cause configuration screen is configured correctly before enabling the cause.
Simple	Sets one logic section for the selected cause.
Compound	Sets two logic sections (primary and secondary) for the selected cause.
Pre-Condition Required	Sets a pre-condition in order to activate the cause.
Secondary's Relationship with Primary	Sets the relationship between the primary and secondary logic sections. The two valid selections are **AND with Primary** and **OR with Primary**. This parameter shows **only** when **Compound** cause is selected.

Field	Description
Cause Execution Pre-Condition	
Defines the pre-condition of the selected cause. This frame shows **only** when the **Pre-Condition Required** option is activated or checked in the **General Cause Configuration** section.	
Pre-Condition Met	This **read-only** parameter shows if the pre-condition is met or not.
SetPt	Sets the point where the pre-condition test commences according to the selected operator. The operator selection is located on the left side of the StPt field. Click to select the operator. Valid operators are **==** (equal), **>=** (greater than or equal to), **!=** (not equal), and **<=** (less than or equal to).
Delay Secs Preset	Sets the time for the system to wait after the condition is met before activating the cause.
Elaps Sec	This **read-only** parameter shows the elapsed time in seconds.
Primary Logic Section	
Defines and Configures the Primary logic of the selected cause.	
PtDef	Sets the TLP that displays in Cur Value. This item can be any numerical point in the ROC including values from other Causes. Click to browse through the list of available parameters.
Tag	Displays the tag name of the TLP specified in the **PtDef** field.
Cur Value	Displays the current value of the TLP specified in the **PtDef** field.
Operator	Sets the **Cur Value** and **SetPt Value** comparison operator. Click to select the operator. Avaliable operators are as follows: >= True if greater than or equal to <= True if less than or equal to == True if equal to != True if not equal to One-Scan Rising Cur Value, 0 to 1 transition = true One-Scan Falling Cur Value, 1 to 0 transition = true Watchdog Timer Resets on changing value of Cur Value On-Change Detects a change in the value. Can monitor a DI accumulator to capture a brief pushbutton press. **Note:** The On-Change operator always needs a Required Reset configured to clear the Cause trip condition.

Field	Description	
	Copy Data	Copies from PtDef to SetPt Value. There are four different types of copies – by logicals, by parameters, logicals to parameters, parameters to logicals. The numeric value in the **DeadBand** field to tells the system what type of copy to make and how much data to copy.
		Number: XX — **Logicals** Source data located in a Logical order will be copied to the Target data location in a Logical order.
		Number: 1XX — **Parameters** Source data located in a Parameter order will be copied to the Target data location in a Parameter order.
		Number: 2XX — **Logicals to Parameters** Source data located in a Logical order will be copied to the Target data location in a Parameter order.
		Number: 3XX — **Parameters to Logicals** Source data located in a Parameter order will be copied to the Target data location in a Logical order.
		For example, 105 in the DeadBand field means copy parameters 0 through 4 to parameters 1 through 5 on another TLP.
	Add	Cur Value plus the SetPt Value
	Subtract	Cur Value minus the SetPt Value
	Multiply	Cur Value times the SetPt Value
	Divide	Cur Value divided by the SetPt Value
	Modulus	Integer remainder of Cur Value / SetPt Value.

Field	Description
SetPt Def	Sets the TLP of the set point value dynamic source. Click … to browse through the list of available parameters.
SetPt Value	Holds the value that is used for comparisons and math functions. This field is not used for the One-Scan or Watchdog Timer functions. If the **SetPt Def** field is configured (other than "Undefined"), this field gets its value from the TLP specified in **SetPt Def**.
Deadband or Math Result	This field serves three purposes. When using comparison operators (>=, <=, ==, !=), it specifies a dead band value that must be exceeded before an existing true comparison can go false. For math functions (Add, Subtract, Multiply, Divide), this field holds the result of the math operation. For the Copy Data function, this field defines the number of fields or parameters to copy. DeadBand is not used with One-Scan or Watchdog Timer functions.
Preset Secs	Sets the number of user-defined seconds for which the comparison must be true before the cause goes true. The exception is if Trip While Timer Is Timing is selected, the cause will be true during the timer period.
Elapsed Secs	Displays the delay count in seconds up to the user-defined preset. When the comparison becomes true, the count (seconds) increments until it reaches the "Preset Secs" and the cause becomes true. If at any time the comparison turns false, the count resets to zero and the cause becomes false. The exception is if Trip While Timer Is Timing is selected, the cause will be true during the timer period.
Timer Timing	Indicates that the timer has been activated.
Trip While Timer is Timing	When the cause condition is met, this selection when checked, trips the cause while the timer is timing. The cause clears when the timer expires. This setting is normally used without a Required Reset.
Secondary Logic Section	Defines and Configures the Secondary logic of the selected cause. This section shows **only** if Compound is selected in the **General Cause Configuration** frame. The Secondary Logic section has the same fields and logic as the Primary Logic section.
Effect Assignments Links the Cause to one or more Effects.	
# of Link (1-16)	Sets the first, second, third (and so on) effect to be activated. For instance, if you wanted effect number 4 to be the first to activate, then enter 4 in the **# of Link 1** field.
# Links Currently Active	Shows the number of effects that are currently tripped for the cause.

Field	Description
Misc Parameters	
Allows cause logging and enables cause resetting.	
Log Trips	Determines if an alarm generated by the cause will be written to the ROC's alarm log. If this field is checked, every time the cause is tripped an alarm will be logged. The log consists of the cause's 10-character tag and the value of **Cur Value** along with the date and time.
Require Reset?	Check this box if the logic requires that a reset button needs to be pushed before the cause is set back to false. This is normally used in scenarios when the cause goes true it actuates effects that cause a shutdown and it is desired that the shutdown be maintained until a manual reset.
Log Clears	Determines whether an entry will be written to the ROC's alarm log when this cause is cleared. If this field is checked, every time the cause is cleared an alarm will be logged. The log consists of the cause's 10-character tag and the value of **Cur Value** along with the date and time. **Note:** Log entries that begin with a "Z" as the first digit are cause entries. Alarms not generated by Cause & Effect are not prefixed with a Z.
Reset Code	Sets a numeric value that is associated with the Effect Reset Code, providing the reset through a button or software point. By using multiple codes, many independent resets are possible.
Minimum Trip Secs Preset	Holds the trip state for a minimum time so a short duration trip can be detected.
Elaps Trip Secs.	Shows the minimum trip timer.
Accumulated Trips	Shows the number of times the cause has been tripped.
Insert /Delete	
Edits the cause list to avoid manually retyping all the cause parameters when a shift is needed.	
Insert	Inserts a cause before the cause # indicated. This button is grayed out when waiting for the **Effect #** to be entered and applied and re-gray out after the action is taken. Multiple inserts are possible one at a time. The last cause always rolls off the end, so make sure there are unused spares at the end of the list.
Delete	Deletes the cause at the Cause # indicated. This button is grayed out when waiting for the **Effect #** to be entered and applied and re-gray out after the action is taken. Multiple deletes are possible one at a time.

Field	Description
Cause #	Sets the cause to insert before or the cause to delete according to what action is taken. Enter the Cause # first and the **Apply** button next to un-gray the Insert/Delete buttons. The two step process is meant to prevent accidental inserts or deletes. It is not necessary to be in the screen showing that cause to operate on a particular **Cause #**.
Cause Status Indicates the Status of the Cause. Red indicates tripped, and green indicates not tripped.	
Pre-Condition Met	Shows whether the Pre-Condition section has been tripped (1 for Yes, 0 for No).
Primary Section Tripped	Shows whether the Primary section has been tripped (1 for Yes, 0 for No).
Secondary Section Tripped	Shows whether the Primary section has been tripped (1 for Yes, 0 for No).
Cause Tripped	Shows whether the cause has been tripped (1 for Yes, 0 for No). If this is a compound cause and the relationship between primary and secondary was set to AND, the cause will only be tripped if both the Primary Section and Secondary Sections are tripped.

5. Click **Apply** to save any changes you have made to this screen.
6. Click **Close** to return to the ROCLINK 800 screen. Proceed to *Section 3.3* to save the configuration.

3.3 Saving the Configuration

Whenever you modify or change the configuration, it is a good practice to save the final configuration to memory. To save the configuration:

1. Select **ROC** > **Flags**. The Flags screen displays:

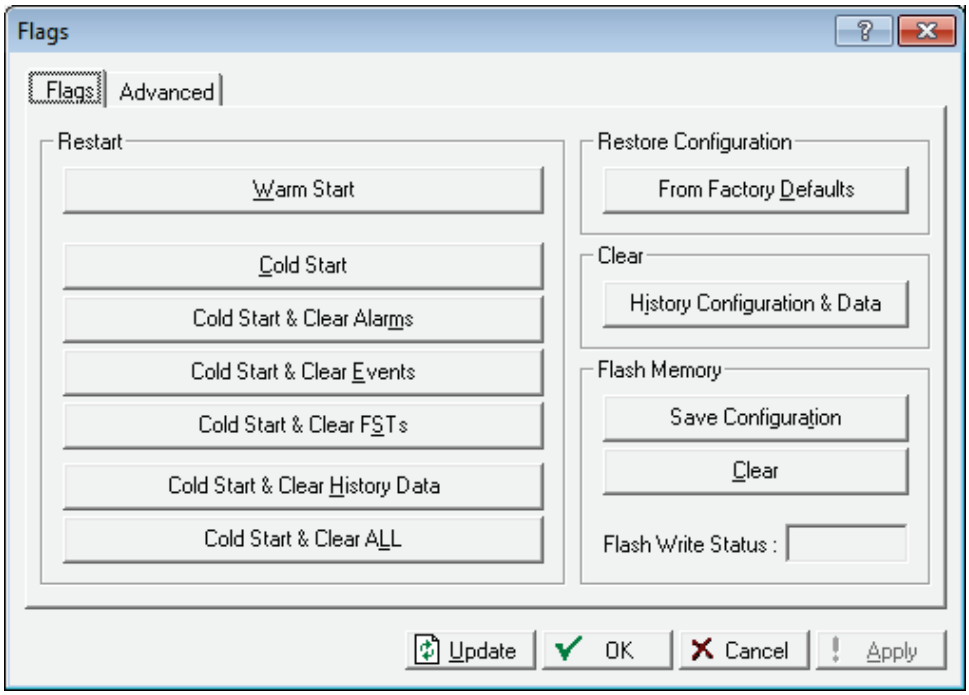


Figure 16. Flags screen

2. Click **Save Configuration**. A verification message displays:

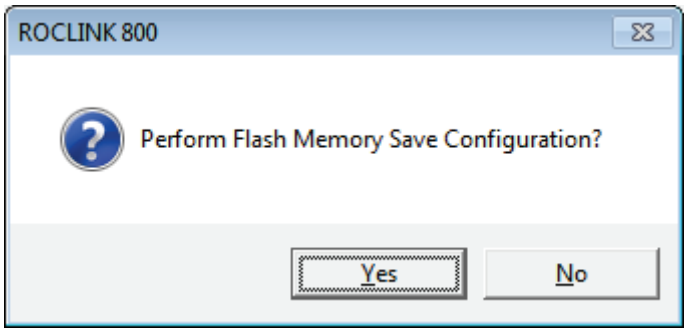


Figure 17. Perform screen

3. Click **Yes** to begin the save process. The Flash Write Status field on the Flags screen displays In Progress. When Save Configuration is complete, the Flash Write Status field on the Flags screen displays Completed.

4. Click **Update** on the Flags screen. This completes the process of saving your new configuration.

Note: For archive purposes, you should also save this configuration to your PC's hard drive or a removable media (such as a flash drive) using the **File** > S**ave Configuration** option on the ROCLINK 800 menu bar.

[This page is intentionally left blank.]

Chapter 4 – Reference Material

This section provides tables of information on the operation of the program and the user-defined point types used by the Cause and Effect program.

For Cause and Effect large versions (Cause and Effect regular license)

- Point Type 71/74 (Cause Configuration)
- Point Type 72/75 (Effect Configuration)

For Cause and Effect small versions (C&E64X32 license)

- Point Type 71/74 (Cause Configuration)
- Point Type 72/75 (Effect Configuration)

4.1 Point Type 71/74: Cause Configurations

Point type 71/74 contains the parameters for configuring the Cause. The program maintains either sixty-four or one-hundred-twenty-eight logical points for this point type.

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
0	Cause Tag	R/W	User	AC10	10	0x20 → 0x7E for each ASCII characters	Cause 1 to Cause 128	1.31	Indicates cause tag name.
1	Enable Cause	R/W	User	UINT8	1	0 → 1	0	1.31	Enables the Cause. 0 = Disable 1= Enable
2	Input1 Definition	R/W	User	TLP	3		0,0,0	1.31	Selects the primary logic current.
3	Input1 Tag	R/O	System	AC10	1	0x20 → 0x7E for each ASCII characters	1	1.31	Selects the gas meter to be used.
4	Cur Value 1	R/W	System	FLOAT	4	Any Floating Number	0	1.31	Shows the primary logic current value.
5	Function1 Type	R/W	User	UNIT8	1	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 18	1	1.31	Selects the primary logic operator. 1. >= 2. <= 3. == 4. != 5. Watch Dog Timer 7. One Scan Rising 8. One Scan Falling 10. Add 11. Subtract 12. Multiply 13. Divide 14. Modulus 18. Copy Data
6	SetPt1 Definition	R/W	User	TLP	3		0,0,0	1.31	Sets the primary logic setpoint selection
7	SetPt1 Value	R/W	User	FLOAT	4	Any Floating number	0	1.31	Sets primary logic setpoint value

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
8	Deadband or Result1	R/W	User	FLOAT	4	Any Floating number	0	1.31	Sets primary logic setpoint deadband or math result
9	Part2 Enable	R/W	User	UNIT8	1	0 → 1	0	1.31	Enables Secondary. 0 = Simple 1 = Compound
10	Input2 Definition	R/W	User	TLP	3		0,0,0	1.31	Selects secondary logic point.
11	Input2 Tag	R/O	System	UINT8	1	0x20 → 0x7E for each ASCII character		1.31	Sets secondary logic point tag ID.
12	Current Value2	R/O	System	FLOAT	4	Any Floating number	0	1.31	Sets secondary logic current value.
13	Function2 Type	R/W	User	UNIT8	1	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 18	1	1.31	Selects the primary logic operator. 1) >= 2) <= 3) == 4) != 5) Watch Dog Timer 7) One Scan Rising 8) One Scan Falling 10) Add 11) Subtract 12) Multiply 13) Divide 14) Modulus 18) Copy Data
14	SetPt2 Definition	R/W	User	TLP	3		0,0,0	1.31	Sets the primary logic setpoint.
15	SetPt2 Value	R/W	User	FLOAT	4	Any Floating number	0	1.31	Sets primary logic setpoint value.
16	Deadband or Result2	R/W	User	FLOAT	4	Any Floating number	0	1.31	Sets primary logic setpoint deadband or math result.
17	And/Or Mode	R/W	User	UINT8	1	15 → 16	15	1.31	Sets Secondary relationship with Primary. 15 = And with Primary 16 = Or with Primary

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
18	Cause Trip/Clear	R/O	System	UINT8	1	0 → 1	0	1.31	Shows Cause Tripped status. 0 = No 1 = Yes
19	Part1 Trip/Clear	R/O	System	UINT8	1	0 → 1	0	1.31	Shows Primary Section Tripped status. 0 = No 1 = Yes
20	Part2 Trip/Clear	R/O	System	UINT8	1	0 → 1	0	1.31	Shows Secondary Section Tripped status. 0 = No 1 = Yes
21	Use Digital Enabler	R/W	User	UINT8	1	0 → 1	0	1.31	Enables pre-condition required. 0 = Disable 1 = Enable
22	Digi Enab Definition	R/W	User	TLP	3		0,0,0	1.31	Sets the pre-condition point type.
23	Digi Enab Tag	R/O	System	AC10	10	0x20 → 0x7E for each ACII character		1.31	Sets the pre-condition point tag ID.
24	Digi Enab Process Value	R/O	System	FLOAT	4	Any Floating number	0.0	1.31	Sets the pre-condition point value.
25	Digi Enabler Type	R/W	User	UINT8	1	0 → 3	0	1.31	Sets the pre-condition operator. 0) == 1) != 2) >= 3) <=
26	Digi Enab StPt Value	R/W	User	FLOAT	4	Any Floating number	0.0	1.31	Sets pre-condition setpoint.
27	Digi Enab Result Status	R/O	System	UINT8	1	0 → 1	0	1.31	Shows if the pre-condition met. 0 = No 1 = Yes
28	Enab Delay Secs Preset	R/W	User	UINT16	2	0 → 65535	30	1.31	Sets the pre-condition timer in seconds.
29	Enab Delay Secs Elapsed	R/O	System	UINT16	2	0 → 65535	0	1.31	Shows the pre-condition timer in seconds.

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
30	Pri Trip Delay Secs Preset	R/W	User	UINT16	2	0 → 65535	0	1.31	Sets the Primary Logic Trip Preset in seconds.
31	Pri Trip Delay Secs Elapsed	R/O	System	UINT16	2	0 → 65535	0	1.31	Shows the Primary Logic Trip Elapsed in seconds.
32	Scan Interval	R/W	User	UINT8	1	0 → 5	3	1.31	Sets the scan interval. (Not Used) 0 = 100 ms 1 = 200 ms 2 = 500 ms 3 = 1 s 4 = 2 s 5 = 5 s
33	Log Alarms	R/W	User	UINT8	1	0 → 1	0	1.31	Activates the Alarm Log 1 = No 1 = Yes
34	Require Reset	R/W	User	UINT8	1	0 → 1	0	1.31	Sets if Trip requires reset 1 = No 1 = Yes
35	Effect1	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 1
36	Effect2	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 2
37	Effect3	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 3
38	Effect4	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 4
39	Effect5	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 5
40	Effect6	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 6
41	Effect7	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 7
42	Effect8	R/W	User	UINT8	1	1 → 8	0	1.31	Sets Effect assignment link 8
43	Links Energized	R/O	System	UINT8	1	1 → 8	0	1.31	Indicates if the Effects assignment links are currently active.
44	Min Trip Secs Preset	R/W	User	UINT16	2	0 → 65535	0	1.31	Sets the minimum trip in seconds preset.
45	Min Trip Secs Elapsed	R/O	System	UINT16	2	0 → 65535	0	1.31	Sets the minimum trip in seconds elapsed.

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
46	Log Clears	R/W	User	UINT8	1	0 → 1	0	1.31	Enables logs clears to alarm log. 0 = No 1 = Yes
47	Reset Code	R/W	User	UINT8	1	0 → 255	0	1.31	Sets reset code to match with effect reset code.
48	Sec Trip Delay Secs Preset	R/W	User	UINT16	2	0 → 65535	0	1.31	Sets the secondary trip preset in seconds
49	Sec Trip Delay Secs Elapsed	R/O	User	UINT16	2	0 → 65535	0	1.31	Sets the secondary trip elapsed in seconds
50	Pri Trip Delay Timer Timing	R/O	System	UINT8	1	0 → 1	0	1.31	Sets the primary logic trip timer timing. 0 = Timer expired 1 = Timing
51	Sec Trip Delay Timer Timing	R/O	System	UINT8	1	0 → 1	0	1.31	Sets the secondary logic trip timer timing. 0 = Timer expired 1 = Timing
52	Accumulated Trips	R/W	Both	UINT16	2	0 → 65535	0	1.31	Shows accumulated trips
53	Pri Trip When Timer Timing	R/W	User	UINT8	1	0 → 1	0	1.31	Sets the secondary trip when timing timer. 0 = Normal 1 = Trip when timer timing
54	Sec Trip When Timer Timing	R/W	User	UINT8	1	UINT8	0	1.31	Sets the primary trip when timing timer. 0 = Normal 1 = Trip when timer timing
55	Effect 9	R/W	User	UINT8		UINT8	0	1.31	Sets the Effect assignment link 9.
56	Effect 10	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 10.
57	Effect 11	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 11.
58	Effect 12	R/W	User	UINT8		UINT8	0	1.31	Sets the Effect assignment link 12.
59	Effect 13	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 13.
60	Effect 14	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 14.
61	Effect 15	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 15.
62	Effect 16	R/W	User	UINT8	1	UINT8	0	1.31	Sets the Effect assignment link 16.

Point Type 71/74: Cause Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
63	Watchdog Timer	R/O	System	UINT16	2	0 → 65535	0	13.2	Provides an incrementing counter, to validate the program's running status. Only updated for the first logical instance.

4.2 Point Type 72/75: Effect Configuration

Point type 72/75 contains the parameters for configuring the Effects. The program maintains either thirty-two or sixty-four logical points for this point type, depending on the version of the program installed.

Point Type 72/75: Effect Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
0	Effect Tag	R/W	User	AC10	10	0x20 → 0x7E for each ASCII character	Effect 1 to Effect 64	1.31	Sets the Effect tag name
1	Effect Enable	R/W	User	UINT8	1	0 → 1	0	1.31	Enables effect. 0 = Disabled 1 = Enabled
2	Effect Definition	R/W	User	TLP	3		0,0,0	1.31	Selects the Effect point type.
3	Definition Tag	R/O	System	AC10	10	0x20 → 0x7E for each ASCII character		1.31	Shoes the Point tag ID of the selected Effect.
4	Now Active	R/O	System	UINT8	1	0 → 1	0	1.31	Indicates the Effect status. 0= No 1 = Yes
5	Cur Val	R/O	System	FLOAT	4	Any Floating Number	0.0	1.31	Shows the Effect current value.
6	Value When Active	R/W	User	FLOAT	4	Any Floating Number	0.0	1.31	Sets Effects value when active.
7	Value When Not Active	R/W	User	FLOAT	4	Any Floating Number	0.0	1.31	Sets Effects value when not active.
8	Apply When Not Active	R/W	User	UINT8	1	0 → 1	1	1.31	Forces Values to apply when inactive. 0 = No 1 = Yes
9	Is Reset Pt?	R/W	User	UINT8	1	0 → 2	0	1.31	Sets the Reset type. 0 = Not a reset point 1 = Hard-wired reset 2 = Software reset

Point Type 72/75: Effect Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
10	1st Out Cause	R/O	System	UINT8	1	0 → 1	0	1.31	Indicates first cause number tattletale. 0 = none 1 = active
11	2nd Out Cause	R/O	System	UINT8	1	0 → 1	0	1.31	Indicates second cause number tattletale. 0 = none 1 = active
12	3rd Out Cause	R/O	System	UINT8	1	0 → 1	0	1.31	Indicates third cause number tattletale. 0 = none 1 = active
13	4th Out Cause	R/O	System	UINT8	1	0 → 1	0	1.31	Indicates fourth cause number tattletale. 0 = none 1 = active
14	1st Out Tag	R/O	System	AC10	10	0x20 → 0x7E for each ASCII character	<none>	1.31	Shows first Trip Cause Tag.
15	2nd Out Tag	R/O	System	AC10	10	0x20 → 0x7E for each ASCII character	<none>	1.31	Shows second Trip Cause Tag.
16	3rd Out Tag	R/O	System	AC10	10	0x20 → 0x7E for each ASCII character	<none>	1.31	Shows third Trip Cause Tag.
17	4th Out Tag	R/O	System	AC10	10	0x20 → 0x7E for each ASCII character	<none>	1.31	Shows fourth Trip Cause Tag.
18	Reset Code	R/W	User	UINT8	1	0 → 255	0	1.31	Matches reset code with cause reset code.
19	Active Link Count	R/O	System	UINT8	1	0 → 16	0	1.31	Shows current active link count.

Point Type 72/75: Effect Configuration

Parm #	Name	Access	System or User Update	Data Type	Length	Range	Default	Version	Description of functionality and meaning of values
20	Assert Effect Continuously	R/W	User	UINT8	1	0 → 1	0	1.31	Sets wether to assert effect once or continuously. 0 = Once 1 = Continuously
21	Active Effect Delay (Sec)	R/W	User	UINT16	2	0 → 65535	0	1.31	Sets active effect delay in seconds
22	Active Effect Timer (Sec)	R/O	System	UINT16	2	0 → 65535	0	1.31	Sets active effect timer in seconds
23	Tattletale Inactive Message	R/W	User	AC10	10	0x20 → 0x7E for each ASCII character	<none>	1.31	Sets Tattletale inactive message.
24	Insert/Delete Edit Command	R/W	Both	UINT8	1	0 → 4	0	1.31	Allows insert/delete edit command. 0 = No command 1 = Effect insert 2 = Effect delete 3 = Cause insert 4 = Cause delete
25	Insert/Delete Edit Item	R/W	Both	UINT8	1	0, 1 → 64 for Causes, 1 → 32 for Effects	0	1.31	Allows insert/delete edit item.

[This page is intentionally left blank.]

For customer service and technical support,
visit *www.EmersonProcess.com/Remote/Support*.

**Global Headquarters,
North America, and Latin America:**
Emerson Process Management
Remote Automation Solutions
6005 Rogerdale Road
Houston, TX 77072 U.S.A.
T +1 281 879 2699 | F +1 281 988 4445
www.EmersonProcess.com/Remote

Europe:
Emerson Process Management
Remote Automation Solutions
Unit 8, Waterfront Business Park
Dudley Road, Brierley Hill
Dudley UK DY5 1LX
T +44 1384 487200 | F +44 1384 487258

Middle East/Africa:
Emerson Process Management
Remote Automation Solutions
Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone – South 2
Dubai U.A.E.
T +971 4 8118100 | F +971 4 8865465

Asia-Pacific:
Emerson Process Management
Remote Automation Solutions
1 Pandan Crescent
Singapore 128461
T +65 6777 8211 | F +65 6777 0947