

SCADAview® CSX

User's Manual

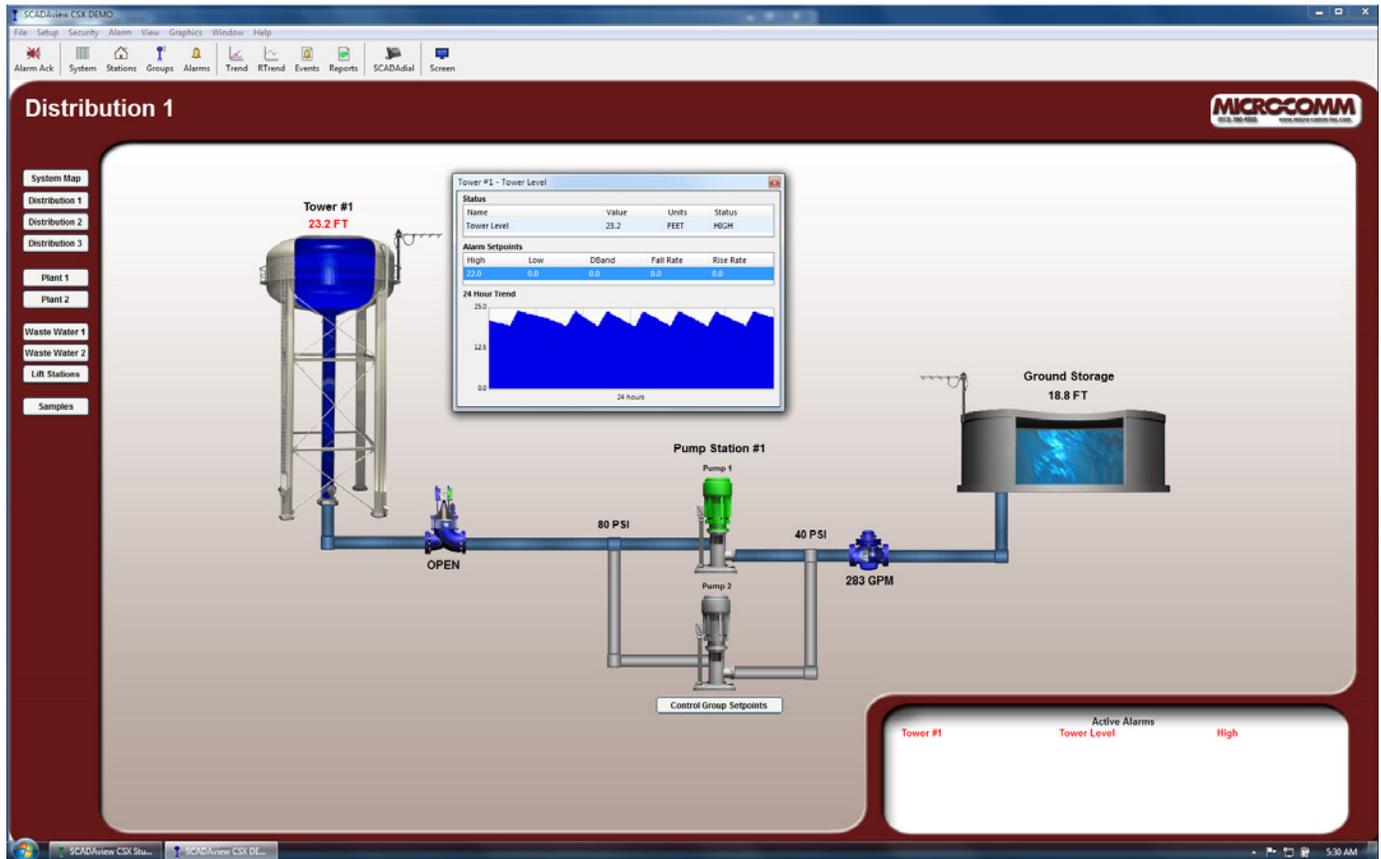
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Main Graphics Viewer

The main SCADAview CSX display window normally provides a graphical overview of the system (depending on how it was set up). An example is shown below:



The toolbar at the top allows access to various standard (text based) displays and reports as well as navigation to other graphics screens. The statusbar at the bottom shows who is currently logged in, how many alarms are still active and whether or not the connection is good to the server. The example above also shows a toolbar button for the optional “SCADA Dial” add-on along with the status message showing that it is currently disabled.

Other graphic viewer windows may be open at the same time and placed on other monitors if desired. Open a new graphic viewer by selecting “New Window” or “New Floating Window” from the Graphics menu. These additional windows will re-open automatically when the program is launched and will remember their placement (as all other standard windows do). If windows can no longer be seen due to changing the placement or removing monitors, select “Gather Windows” from the Window menu and they will all be pulled back to the primary display.

The operation of the custom graphical windows will be different depending on the system. The remainder of this manual describes the operation of the standard display screens, since their operation is somewhat generic no matter how the system was set up graphically.

Another option available is to disable the graphics in the main viewer. Graphics would only then be available when showing the separate graphics window by selecting “New Window” or “New Floating Window” from the Graphics menu.

System Display

System Display #1 - Entire System														
Station Name	AI1	AI2	AI3	Flow Rate	Flow Total	24hr Total	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
Tower #1	LVL	21.3 FEET												
Pump Station #1	DP	80.0 PSI	SP	40.0 PSI	FR	283.0 GPM	FT	10,234,000 GAL	FT	24,000 GAL	PIR			
Ground Storage	LVL	20.7 FEET		0.0										
Raw Water Pumps	LVL	0.0 FEET	FR	0.0 GPM										
Lift Station #1	LVL	0.0 FEET												
High Service Pumps	DP	72.0 PSI	LVL	54.0 INCH	V8S	76.8 %					P8R			
Rapid Mixer's	M1S	0.0 %	M2S	0.0 %	CL2	0.675 mg/L								
Flocculator #3-#6	F3S	0.0 %	F4S	0.0 %	F5S	0.0 %								
Flocculator #7-#10	F7S	0.0 %	F8S	0.0 %	F9S	0.0 %								
Influent Chlorine	CL2	0.63 mg/L	CF1	0.0 %	CF2	0.0 %	FR1	0.0 ppd	FT1	0 lbs	FT1	0 lbs		
Feeder #6 - #10	PH	7.3 PH	STR	0.0 VAL	LVL	0.0 FT								
Plant Influent Valve	POS	74.3 %	TUR	0.27 NTU	TMP	68.3 degF	FR	320.0 GPM	FT	0 GAL	FT	0 GAL	PIR	
Plant Influent Contr	PRC	0.0	PCV	0.0										
Backwash Pumps	DP	0.0 PSI	P5S	0.0 %	P6S	0.0 %	FR	0.0 GPM	FT	0 GAL	FT	0 GAL		
Clearwell & Ammonia	LVL	14.3 FT	GAS	0.0 ppm			FR	0.0 ppd	FT	0 lbs	FT	0 lbs		
High Service Control	CMD	0.0 %			DMD	0.0 KW/hr	PWR	0.0 KW/HR	PWR	0 KW	PWR	0 KW		
Finished Water	CL2	0.0 mg/L	CL2	3.55 mg/L	TUR	0.03 NTU	FR	4,274.0 GPM	FT	0 GAL	FT	0 GAL		
Tower #1 - Tower Level = 21.3 FEET														

The System Display windows provide an overview of the entire system (or part of a system) in the form of a spreadsheet. Columns in this spreadsheet will display the station name, levels and status inputs along with the appropriate alarm/status background color.

Station Name

All station names currently selected for display will appear in the first column and will have a gray background color. The background color will be different whenever the user has added a station note with a special color. The text color will change to Red if the station is in Loss-Of-Signal.

Analog Input Columns

Analog Input levels will be displayed in the next 8 columns if they are selected for display. Column labels will be AI1-AI8 by default. The background color will change based on the alarm status for that input.

Flow Rate/Total Columns

The next 3 columns are used for Flow Rate, 24 Hour Flow Total and Flow Total. The background color for these will change based on the flow rate/total alarm status.

Discrete Input Columns

All discrete inputs selected for display will be shown next in the spreadsheet. Column labels for the first six inputs will default to DI1-DI6 and the expansion module inputs will default to EI1-EI32.

Controlled outputs such as pumps will be set up as "Call/Run/Fail" so that a label will be changed based on the pump's status (i.e. P1R for pump #1 Run, P1C for pump #1 Call, and P1F for pump #1 Fail).

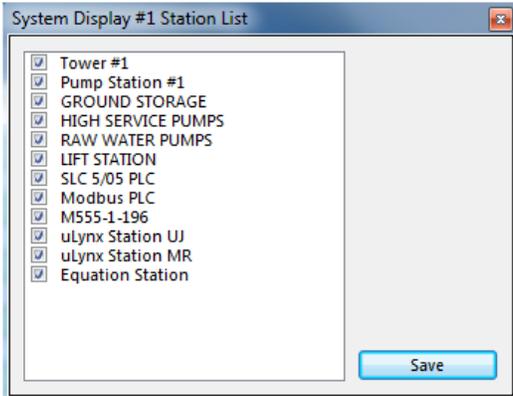
Status inputs will show their label whenever they are on along with the status color as the background.

System Display Station List

By clicking the right mouse button on the system display, the following options can be selected depending of the option clicked on:

Right-Click and select “Station List...”

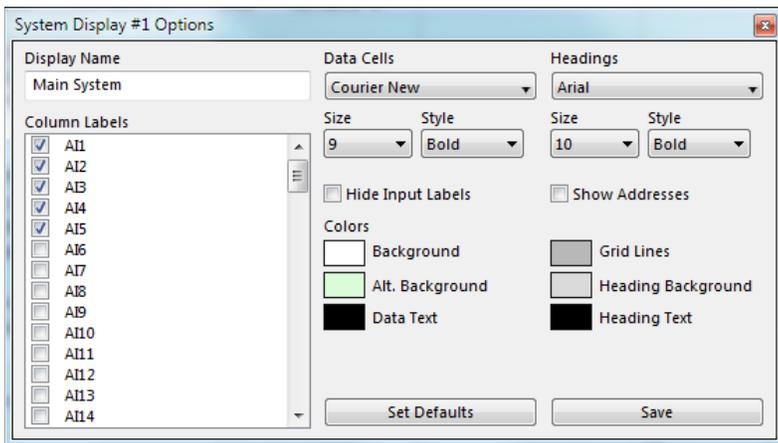
A selection window showing all the stations in the system will be displayed. Click on the checkbox next to the station name to show or hide a particular station. Close the setup screen when finished.



System Display Options

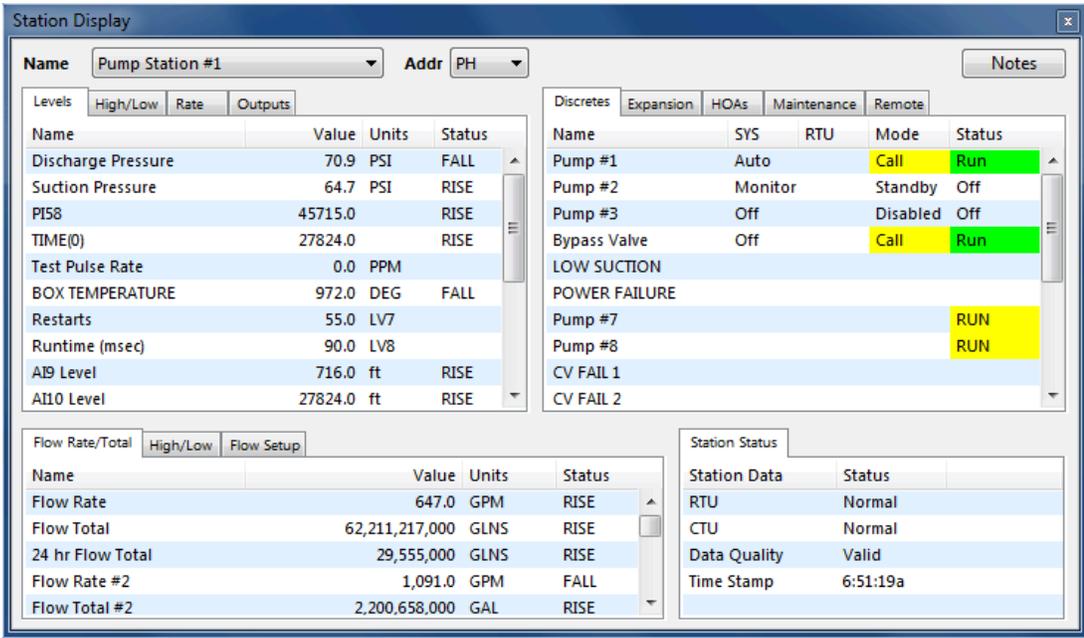
Right-Click and select “Display Options...”

A selection window showing the display labels and checkbox for each data column is shown. Changes can be made to the system display name, column labels, text styles and highlight color. Click on the checkbox to show or hide a particular column of data. Columns can also be re-ordered by clicking on Move Up or Move Down. Click Save to save all the changes.



Color options like the “Alt. Background” will bring up a screen that allows the alternating row color to be changed. Click on color desired and click OK to save the change.

Station Display & Control



The Station Display allows an operator to view all information and make changes to control parameters on a remote station.

Note – Making changes to setpoints is accomplished by selecting the proper tab, clicking once or twice in a text box, typing the new value and pressing “Enter” or clicking out of the text box.

Name

The name given to the remote station being displayed. Changing this selector or the ID selector will change the current station being viewed.

Addr

The 2-character address of the station being displayed (HH through WW).

Notes

Clicking on this button will bring up a text editor for typing notes related to the station. A status color can also be chosen in the editor that will be the background color for the station name on the System Display.

Information is presented in (4) separate tab panels that will show different items based on each tab selector. The following is a list of what each panel will do:

Upper left panel - Levels

This panel shows information related to analog input/output levels and settings. The name of each input used will appear on the left. The other columns will change based on the option being viewed:

Levels

Value The most recent level reading for the input
 Units The unit of measure i.e. PSI, FEET etc.
 Status The most recent status change or alarm (RISE, FALL, HIGH, LOW, RATE)

High/Low

High User setpoint for the high level alarm
 Low User setpoint for the low level alarm
 DBand Deadband for both the high and low level setting (level will have to fall/rise by this much before an alarm will clear)

Rate

Rise Rising rate-of-change alarm setpoint
 Fall Falling rate-of-change alarm setpoint

Note: The rate alarm setpoints are entered in units per 2 minute change interval. Alarm will generated if the level changes by more than this amount in 2 minutes.

Station Display

Name Pump Station #1 Addr PH Notes

Levels High/Low Rate Outputs

Name	High	Low	DBand
Discharge Pressure	250	0	4
Suction Pressure	0	0	0
PI58	0	0	0
TIME(0)	0	0	0
Test Pulse Rate	0	0	0
BOX TEMPERATURE	0	0	0
Restarts	0	0	0
Runtime (msec)	0	0	0
AI9 Level	0	0	0
AI10 Level	0	0	0

Discretets Expansion HOAs Maintenance Remote

Name	SYS	RTU	Mode	Status
Pump #1	Auto		Call	Run
Pump #2	Monitor		Standby	Off
Pump #3	Off		Disabled	Off
Bypass Valve	Off		Call	Off
LOW SUCTION				
POWER FAILURE				
Pump #7				OFF
Pump #8				RUN
CV FAIL 1				
CV FAIL 2				

Flow Rate/Total High/Low Flow Setup

Name	Value	Units	Status
Flow Rate	648.0	GPM	
Flow Total	62,211,419,000	GLNS	RISE
24 hr Flow Total	29,757,000	GLNS	RISE
Flow Rate #2	1,095.0	GPM	FALL
Flow Total #2	2,200,665,000	GAL	RISE

Station Status

Station Data	Status
RTU	Normal
CTU	Normal
Data Quality	Valid
Time Stamp	6:54:08a

Outputs

Value User setpoint for an output value sent to the remote - target setpoints, speed etc.
 Units The unit of measure i.e. PSI, GPM etc.

Station Display

Name Pump Station #1 Addr PH Notes

Levels High/Low Rate Outputs

Name	Value	Units
TEST AO1	0.0	RPM
TEST AO2	0.0	
TEST AO3	0.0	
TEST AO4	0.0	
AO5 Setpoint	0.0	%
AO6 Setpoint	0.0	%
AO7 Setpoint	0.0	%
AO8 Setpoint	0.0	%

Discretets Expansion HOAs Maintenance Remote

Name	SYS	RTU	Mode	Status
Pump #1	Auto	Auto	Call	Run
Pump #2	Auto	Auto	Standby	Off
Bypass Valve			Standby	Off
LOW SUCTION				
POWER FAILURE				ALARM

Flow Rate/Total High/Low

Name	Value	Units	Status
Flow Rate	283.0	GPM	
Flow Total	10,234,000	GAL	
24 hr Flow Total	24,000	GAL	

Station Status

Station Data	Status
RTU	Normal
CTU	Normal
Data Quality	Valid
Time Stamp	2:02:28p
Date	5/21/2012

Upper right panel - Discretes

This panel shows information related to discrete inputs at the remote station. These inputs are used as status/alarm inputs i.e. Pump Run, pressure alarms etc. In addition to viewing the status of the inputs, controlled discrete outputs may be changed between Hand, Off, and Auto.

Discrete Inputs

SYS

System HOA status. This is the final decision combination of all other HOAs in the system. It will show either HAND, OFF or AUTO for each controlled device.

RTU

Remote monitored HOA status when used. The remote station would be wired with an HOA whose status will be reported back to the CTU using the Expansion Inputs.

Mode

The current mode of a controlled output (pump). Four modes are possible:

- Standby the controlled device is off, in auto and available for use
- Disabled the controlled device is currently disabled or the HOA is off
- Fail device has failed to run
- Call device is being called on by the CTU

Status

The current status of the input. Pumps will always show either OFF or RUN in this column. Other discrete inputs will display a user-defined label when an input in on.

The screenshot shows the 'Station Display' window for 'Pump Station #1'. It features several data tables and a control panel for 'Pump #2'.

Name	Value	Units	Status
Discharge Pressure	40.8	PSI	
Suction Pressure	24.8	PSI	
Discharge If Greater than 50	40.8	PSI	
TIME(0)	52,042.0		
Test Pulse Rate	17.0	PPM	
PLC Temperature	1,051.736	DegF	
Restarts	357.0	LV7	
Runtime (msec)	90.0	LV8	

Name	Value	Units
Flow Rate	248.0	G
Flow Total	1,092,511,000	G
24 hr Flow Total	1,188,000	G
Flow Rate #2	2,098.0	G
Flow Total #2	7,181,751,000	G
24 hr Flow Total #2	1,934,000	G

Pump Station #1 - Control Panel

Pump #2

Control Status: **CALL** (Yellow), **RUN** (Green)

Event Log | Exp. Status

Last Run: Tuesday, September 22, 2015, 6:47:41 AM

SYS HOA	Mode	Status	Hours	Cycles
AUTO	CALL	RUN	4,142.2	5,368

Buttons: Off, Hand, Auto, RESET, Control Group Setpoints

Hand/Off/Auto Controls - Pump Control Panel

Double-clicking in the the Position or discrettes status column will bring up an individual pump's control panel / HOA (Note: The pump control panels can be globally enabled or disabled in application preferences). Pump control panels show the control status, event log and expanded output status (when available) for the controlled device.

Hand/Off/Auto Controls - Read All Option

If no pumps are selected, all HOA's can be read and displayed with dropdown selectors:

HOA Selectors

User selection for the mode of each controlled device:

HAND - turns the device ON

OFF - turns the device OFF

AUTO - lets the system control the device based on stop/start setpoints

Note: Other selection options may be available (i.e. OPEN/CLOSE, ON/OFF etc.)

Station Display

Name Pump Station #1 Addr PH Notes

Levels				Discretes		Expansion		HOAs		Maintenance		Remote	
Name	Value	Units	Status	Name	Status								
Discharge Pressure	80.0	PSI		PUMP 1 HAND									
Suction Pressure	40.0	PSI		PUMP 1 AUTO	P1A								
				PUMP 2 HAND									
				PUMP 2 AUTO	P2A								
				PUMP 3 HAND									
				PUMP 3 AUTO									
Temperature	75.0	DEG		DOOR OPEN									
				OPER PRESENT									

Flow Rate/Total				Station Status	
Name	Value	Units	Status	Station Data	Status
Flow Rate	283.0	GPM		RTU	Normal
Flow Total	10,234,000	GAL		CTU	Normal
24 hr Flow Total	24,000	GAL		Data Quality	Valid
				Time Stamp	6:37:32a

Expansion Inputs

Expansion inputs are additional discrete inputs usually located on an external input module at the RTU. The name and the input status are displayed for each device. On/Off labels are displayed for the status if they have been entered, otherwise the input label is displayed whenever the input is on.

Station Display

Name Pump Station #1 Addr PH Notes

Levels				Discretes		Expansion		HOAs		Maintenance		Remote	
Name	Value	Units	Status	Name	Hours	Alarm	Cycles	Alarm	Date				
Discharge Pressure	70.0	PSI	RISE	Pump #1	25.6	500.0	18	0	3/31/2013				
Suction Pressure	50.0	PSI	RISE	Pump #2	30.1	500.0	20	0	3/31/2013				
				High Discharge	0.0	0.0	0	0					
				Bypass Valve	0.0	0.0	0	0					
				Low Suction	0.0	0.0	0	0					
Temperature	75.0	DEG	RISE	Power Fail	0.0	0.0	0	0					
				Entry Alarm	0.0	0.0	0	0					
				Station Flood	0.0	0.0	0	0					

Flow Rate/Total				Station Status	
Name	Value	Units	Status	Station Data	Status
Flow Rate	0.0	GPM		RTU	Normal
Flow Total	10,234,000	GAL	RISE	CTU	Normal
24 hr Flow Total	24,000	GAL	RISE	Data Quality	Valid
				Time Stamp	5:59:09a
				Date	3/18/2013

Pump Maintenance

The current number of runtime hours and pump cycles can be entered here for each discrete input along with alarm setpoints. The runtime will automatically increment in tenths of hours whenever the discrete input is "ON" and the cycle count will increment whenever the discrete input goes from off to on. When the runtime or cycles reaches the setpoint, a "Runtime Alarm" or "Cycle Counter Alarm" is generated. A "Next Service Date" alarm can also be selected for each controlled device by double-clicking in the Date column.

Remote Station Commands

Poll Now

Clicking this button will cause the CTU to skip all the remaining stations in its polling list and start over with the selected station.

Accumulators

Click this button to display a window that allows reading and writing of remote accumulator variables. These may be used for pump runtimes, flow totals etc.

Real-Time Clock

If the remote station is RTU32 or later, this will allow the station's clock to be read back and then set to match the PC's clock.

Totalizer

If the station is RTU32 or later and the flow total value is being computed out at the remote, this will allow the flow total value to be changed. Note: The totalizer is usually displayed in 1000 gallon increments.

The screenshot shows the 'Station Display' window for 'Pump Station #1'. It features several data tables and control buttons. The 'Levels' table shows Discharge Pressure (70.0 PSI) and Suction Pressure (50.0 PSI). The 'Flow Rate/Total' table shows Flow Rate (0.0 GPM) and Flow Total (10,234,000 GAL). The 'Station Status' table shows RTU (Normal), CTU (Normal), Data Quality (Valid), Time Stamp (6:03:04a), and Date (3/18/2013). Control buttons include 'Poll Now', 'Real-Time Clock', 'Accumulators', and 'Totalizer'.

Name	Value	Units	Status
Discharge Pressure	70.0	PSI	
Suction Pressure	50.0	PSI	
Temperature	75.0	DEG	

Name	Value	Units	Status
Flow Rate	0.0	GPM	
Flow Total	10,234,000	GAL	
24 hr Flow Total	24,000	GAL	

Station Data	Status
RTU	Normal
CTU	Normal
Data Quality	Valid
Time Stamp	6:03:04a
Date	3/18/2013

Station Status

The Lower-Right panel will show all other status information related to the station.

RTU

The current status of the remote (Normal, Override or LOS)

Override means that a CTU has placed the remote in Override mode.

LOS means that the station has stopped responding. This also is displayed in the Data Status.

CTU

The current status of the central (Normal, Monitor or Override)

Monitor means that this CTU does not control the remote.

Override means this CTU has taken over control of the remote from the other CTU.

Data Quality

The status of all the displayed data from the remote.

Valid means that the data is less than 1 polling cycle old.

Old means the data is more than 1 polling cycle old.

LOS means the station has not responded for a programmed number of cycles.

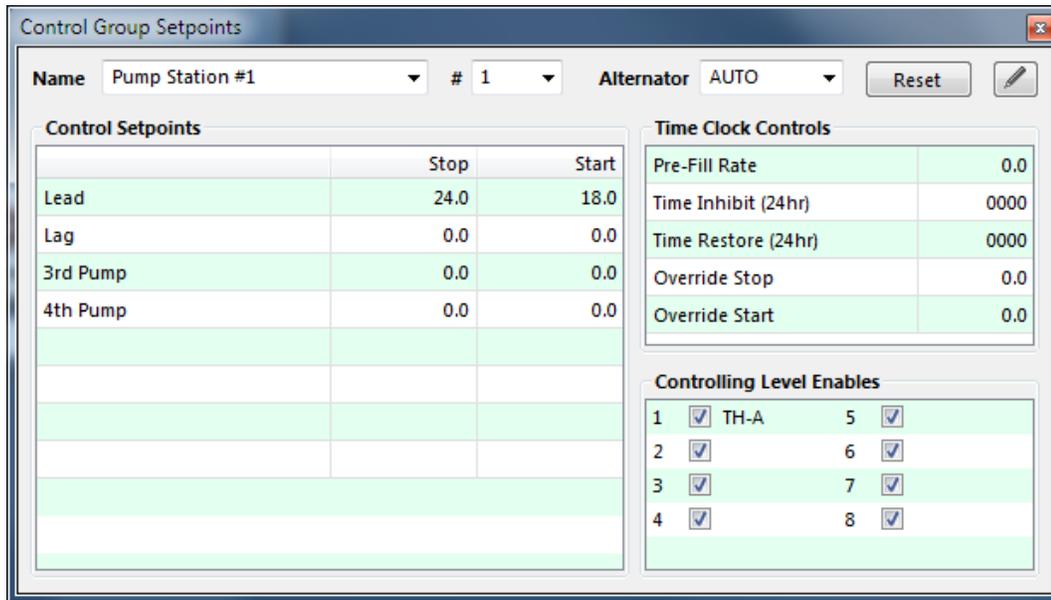
Time Stamp

The central's time when the remote data was last received.

Date

The computer's date when the remote data was last updated.

Control Group Setpoints



The Control Group Setpoints window allows an operator to change the starting and stopping levels for any control group in the system. A “Control Group” is a collection of controlling levels (usually an analog input from a remote station such as a tank level) and controlled devices (usually pumps or valves at another station).

Note: Making changes to setpoints is accomplished by clicking in the text box, typing the new value and pressing Enter. Changing other parameters such as the Controlling Level Enables is done by just clicking the box to select the new mode. Pressing Enter is not required in this case. If the control group is located at the remote then buttons for Read / Send will appear above the setpoints that allow the operator to change the setpoints at the remote.

Name and

The name of the control group is shown and selected here. The control group can also be selected by #.

Control Setpoints

Normal control groups have up to eight sets of stop/start setpoints on this screen; the eight are shown down the left-hand side of the window. The stop/start setpoints are values entered by the operator to determine at what value the corresponding controlled device will either stop or start.

Alternator

Use the mouse to select the alternator sequence for the control group. The alternator determines the mode of operation for the controlled devices. The choices are:

- Forward Device one is always first
- Reverse Last device is always first
- Auto Alternation sequence beginning with the first device and continuing through all available devices
- All Same as Auto.

Reset

If a device fails, the system automatically chooses the next device available (in auto mode) to control. The system will not try the failed device again until the operator resets the failed device(s) by clicking on this button.

Time Clock Controls

Pre-Fill

Enter the pre-fill rate (feet per hour) at which the tank fills when the pump is running. It will be used to determine when the controlled device will come on prior to the time that inhibit is activated. This will allow the system to top-off the tank using the lead control level setpoint prior to inhibiting the control group. The pre-fill value is used whenever Time Inhibit/Restore operation is also enabled.

Time Inhibit

Enter a time in 24-hour time (i.e. 1:00 PM would be entered as 1300) and press Enter. The inhibit time is the time of day that the control group is inhibited from controlling any devices.

Time Restore

Enter a time in 24-hour time and press Enter to continue. The restore time is the time of day that the control group is put back in control again.

Override

Enter the stop and start values for which you want control to be re-instated during the Time Inhibit because of a very low level. The override stop setpoint determines when it will inhibit control again. Note: By default during override the control group will function normally and run as many pumps as it is set up to use. This is a change from how older Micro-Comm centrals worked which only allowed 1 pump to run.

Controlling Level Enables

Use the mouse to toggle each of the eight controlling level ON or OFF. Each control group has corresponding controlling levels. These values determine when the device they control should turn on or off. All levels that are currently being used for control should be set to ON. The pumps or other controlled devices will run until the setpoints for ALL the levels selected are reached.

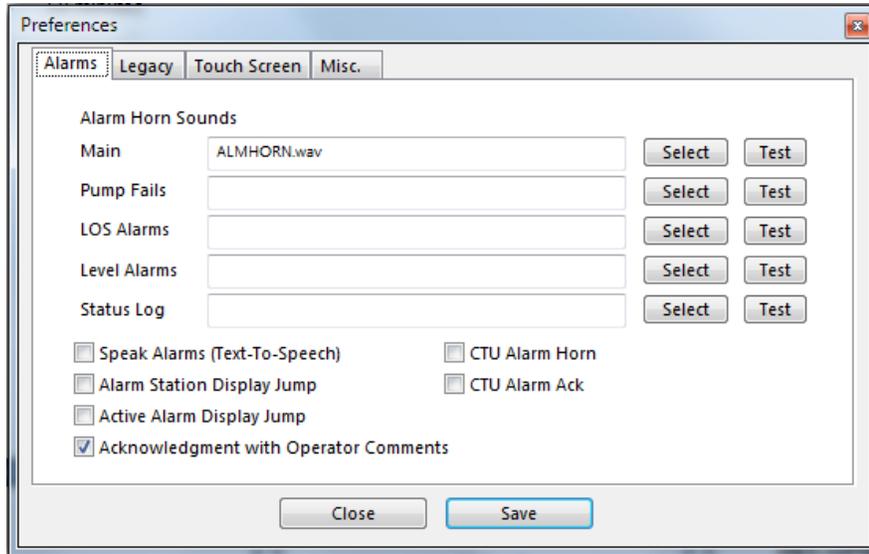
The scaling factor for the control group setpoints will also be determined based on which controlling level is selected.

Alarms

Acknowledging Alarms

To acknowledge alarms, press the F4 key or select the “Acknowledge All Alarms” option from the “Alarm” menu. The time, date, alarm description and current user name will be added to the event log.

Alarm Options



The Alarm Options are selected from then “Preferences...” item under the setup menu. These options allow an administrator to change the behavior of the alarm system.

Alarm Horn Sounds

The sounds selected will be played every 6.5 seconds whenever an alarm occurs and has not been acknowledged. Alarm sounds for Pump Fails, LOS Alarms and Level Alarms can be different from the main alarm sound. If these special alarm sound files are not selected, the main sound will be used instead. Select the .WAV sound files using the Select... button and then click on the “Test” button to try the sound.

Status Log Sound

The sound selected will be played once whenever a status event occurs.

Speak Alarms

All currently active alarms will be read (over and over) using the operating system’s text-to-speech engine.

Alarm Station Display Jump

When this option is turned on, the Station Display window will be opened to the alarming station when a new alarm occurs.

Active Alarm Display Jump

This will open the active alarms window whenever a new alarm occurs.

Acknowledgment with Operator Comments

This will allow the operator to type in some comments whenever an alarm is acknowledged. The comments will be logged to the alarm event log.

CTU Alarm Horn

When this option is turned on, the SV-PLC Server application will be told to turn ON the CTU alarm horn output bit whenever an alarm occurs. It will be turned back off when the operator hits Alarm Acknowledge.

CTU Alarm Ack

If this option is on, the CTU alarm horn will be silenced (an alarm ack bit will to momentarily turned on) whenever the operator hits Alarm Acknowledge.

Active Alarms Window

Station Name	Input Name	Status	Time Occurred
Tower #1	Tower Level	High	03-18-2013 07:00:06am
Pump Station #1	Discharge Pressure	High	03-18-2013 06:59:38am
Pump Station #1	Suction Pressure	Low	03-18-2013 06:59:55am

Selecting “Active Alarms” from the “View” menu shows the Active Alarms list. This window will show all the current alarms. Alarms that have not been acknowledged will be shown in red. Alarms that have cleared but still have not been acknowledged will be light brown. The list can be re-sized and scrolled through with the mouse.

Double clicking on an alarm line will bring up the Station Display for that alarm.

Right-clicking will allow acknowledgement of individual alarms as well as selecting stations/inputs whose alarms are to be disabled:

Input	Name	Label	Disabled
LOS	Loss Of Signal		<input type="checkbox"/>
AI1	Discharge Pressure	DP	<input type="checkbox"/>
AI2	Suction Pressure	SP	<input type="checkbox"/>
AI3	Water Temperature	WT	<input checked="" type="checkbox"/>
AI4	Pump 1 Speed	P1S	<input checked="" type="checkbox"/>
AI5	Pump 2 Speed	P2S	<input checked="" type="checkbox"/>
AI6	Pump 3 Speed	P3S	<input checked="" type="checkbox"/>
AI7	Net Demand	ND	<input type="checkbox"/>
FR1	Flow Rate	FR	<input type="checkbox"/>

Weekly reminder for all disabled alarms

Enable All Alarms Close Save

Note: When alarms have been disabled a special message will appear at the bottom of the Active Alarms window along with a button to show the disabled alarms. The main graphic viewer window will also include a warning icon after the active alarms in its status bar. A weekly reminder can be turned on to show the disabled alarms list every Monday morning.

Station Name	Input Name	Status	Time Occurred
Note: Some Station Alarms Have Been Disabled...			

Show

User Name: None User Level: None Active Alarms: 0 Connection: OK SCADAial: Disabled

Event Logs

Date/Time	Station Name	Input Name	Message	User
01-11-2016 06:43:20a	New Station #45		LOS	Rich
01-07-2016 07:18:37a	Endress+Hauser Test via PLC	RTU Temperature	Low Acknowledged	Rich
01-07-2016 07:15:11a	Endress+Hauser Test via PLC	RTU Temperature	Low (-78.302 DGF)	Rich
01-07-2016 07:14:50a	Endress+Hauser Test via PLC	RTU Temperature	Low Cleared (-78.302 DGF)	Rich
01-07-2016 07:14:45a	Endress+Hauser Test via PLC	RTU Temperature	Low Acknowledged	Rich
01-07-2016 07:10:35a	S4000		LOS Acknowledged	Rich
01-07-2016 07:10:24a	Endress+Hauser Test via PLC	RTU Temperature	Low (-78.302 DGF)	Rich
01-07-2016 03:39:50a	S4000		LOS Cleared	Rich
01-07-2016 03:37:14a	S4000		LOS	Rich
01-07-2016 03:32:20a	S4000		LOS Cleared	Rich
01-07-2016 03:27:28a	S4000		LOS	Rich
01-07-2016 03:23:11a	S4000		LOS Cleared	Rich
01-06-2016 02:58:33p	S4000		LOS	Rich
01-06-2016 02:54:24p	S4000		LOS Cleared	Rich
01-06-2016 12:47:18p	S4000		LOS	Rich
01-06-2016 12:41:18p	S4000		LOS Cleared	Rich
01-06-2016 11:47:15a	S4000		LOS	Rich

Event Count: 115

Selecting "Event Logs" from the "View" menu shows the Event Logs window. The Alarm log is stored in a monthly file. By default, ALL stations from the current year, month and day are selected. These options can then be changed to show any desired period of time.

The "Filter" option will find and display only the lines containing the given text.

This report also shows the number of events for the given time period and can be printed or saved as comma delimited file.

The types of event logs are as follows:

Alarm - logs when alarms occur, clear and when they are acknowledged by an operator.

Setpoint - changes made by operators to any system setpoints such as HOAs, Control Group setpoints etc.

System - keeps track of startups, setup change re-loads and shutdowns etc.

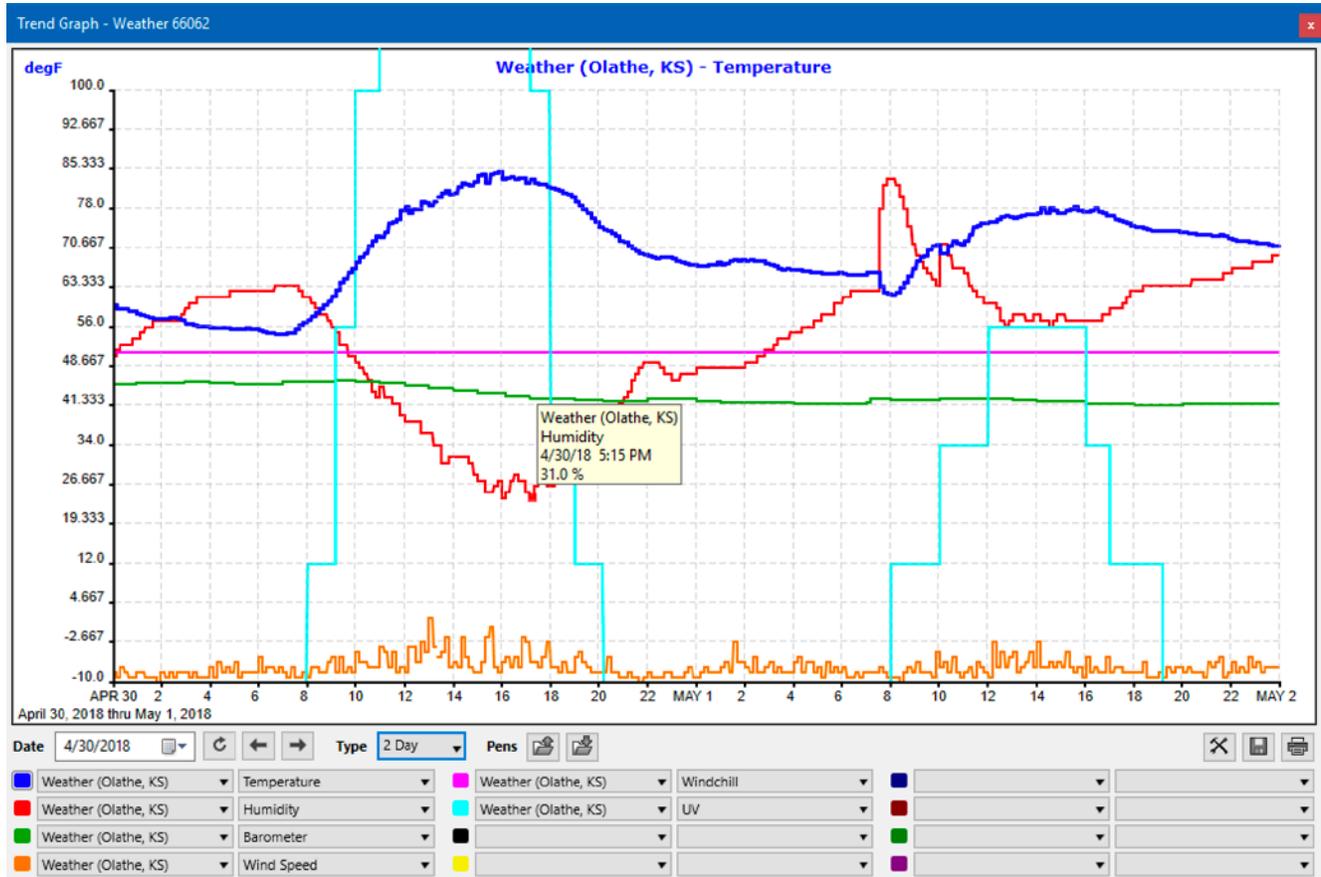
Security - log of all user security system logins/logouts.

Dialer - SCADAdial events (if this option is installed).

Reports

The following describes how to use the built-in reporting options found in SCADAview CSX. These can be selected from either the toolbar or from the “View” menu.

Trend Graph



This is a chart that will show up to 12 separate levels for a selected period of time. The user options include:

Date

Starting month, day and year for the graph. Clicking the calendar icon will bring up a calendar selector.

Left/Right Arrow Icons

Moves date backward or forward by one day.

Type

This sets the horizontal scale for the graph. Four selections are currently available – 1 Day, 2 Day, 7 Day, 14 Day and 30 Day.

Pens

Open and save buttons allowing the pen setup to be loaded / saved.

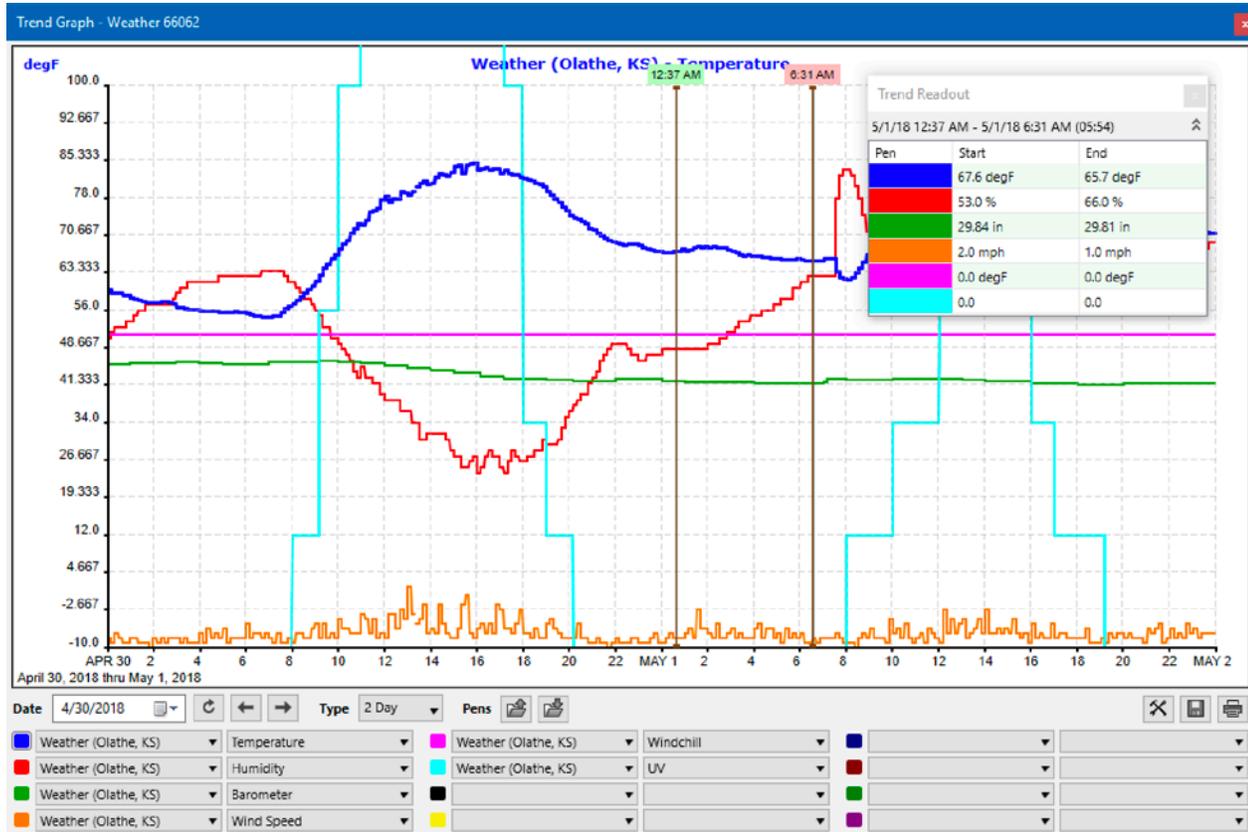
Station Names

Selected station for a particular pen color.

Input Names

Selected analog (level) or discrete input to be graphed for the corresponding pen.

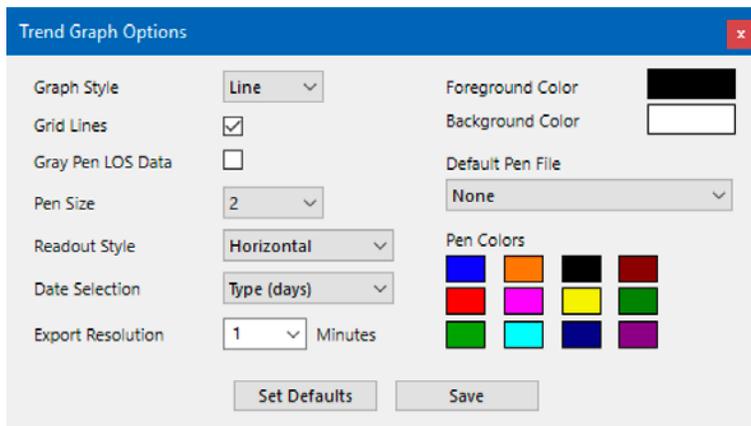
Double-Clicking on the graph or Right-Clicking and selecting from the pop-up menu will allow the Data Readout to be shown or hidden. The Data Readout will display the exact analog level for each readout line along with statistics for the range between the two lines. To change the selected times, click and drag the readout lines.



Right-Clicking on the graph will also show a menu with various options including:

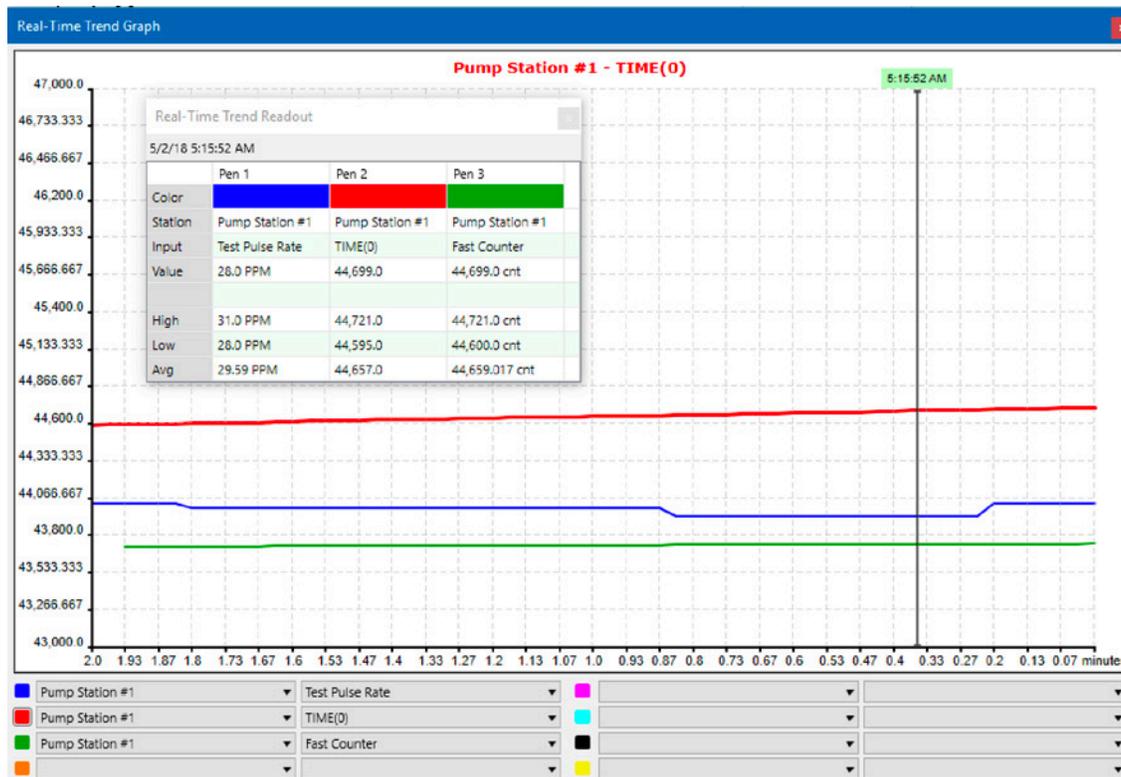
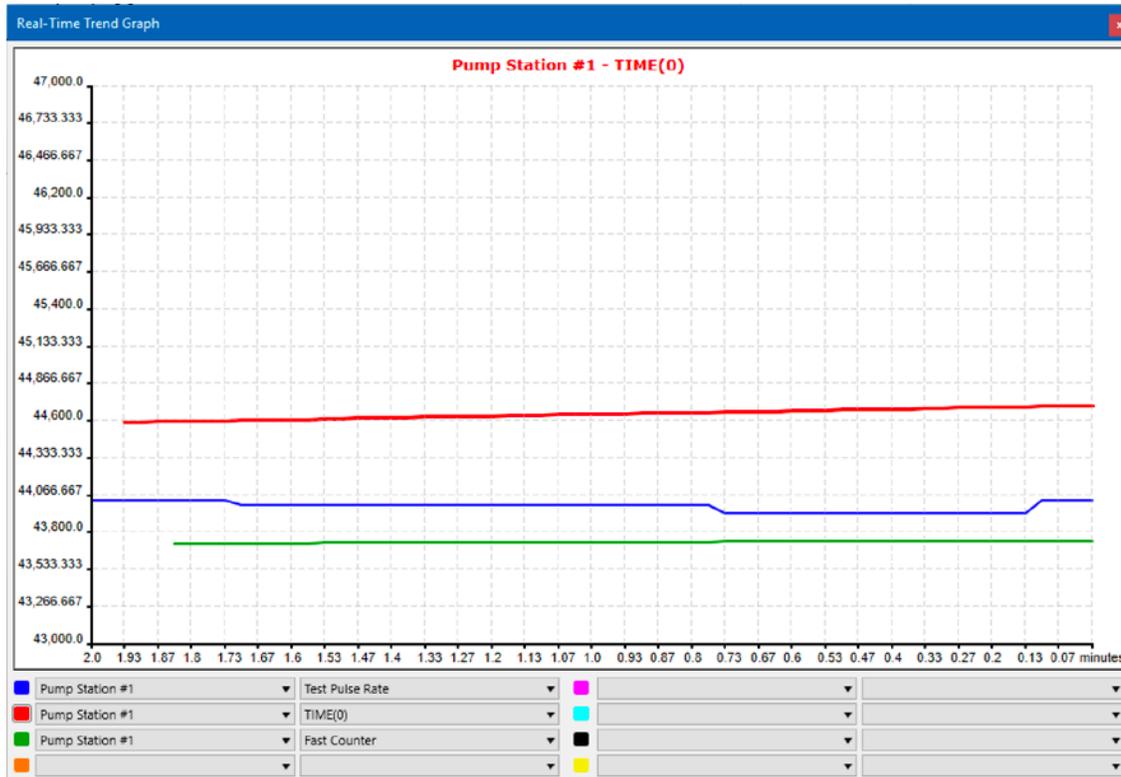
- Load Pens Opens a .pen file containing the pen selection.
- Save Pens Saves a .pen file with the current pen selection.
- Clear Pens Clears all the current pen selections.
- Hide/Show Grid This will turn off or on the light gray grid lines.
- Show/Hide Readout Data readout window will be shown or hidden.
- Area/Line Graph Selects the graph style - area graphs will fill with the pen color to each axis.
- Background Color Selects a different background color for the graph (normally white)
- Pen Size Data pen width can be selected from 1-4 pixels.
- Export Data... This option will save a Microsoft Excel (.XLSX) or comma delimited file (.CSV)
- Print... Allows the graph to be printed.

Various options can also be set by selecting the menu item or clicking on the "Graph Options" button.



Real-Time Trend Graph

Similar to the Trend Graph, the Real-Time trend is a chart that will show up to 12 separate levels for a past number of minutes and is updated every couple of seconds. This allows for much greater detail when viewing a rapidly changing value.



Pump Runtime Report

Reports

Daily Pump Reports | Analog Report | **Pump Runtime Report** | Custom Daily Reports | Custom Timed Reports

Station Name: Pump Station #1 | Start Date: 1/ 1/2010 | End Date: 1/31/2010 | Start HR: 12 am | End HR: 12 am

SCADAview CSX Demo System
Pump Station #1 - Pump Runtime Report for January 1, 2010 12:00am to January 31, 2010 11:59pm

#	Discrete Input Label	Hours	Cycles	#	Discrete Input Label	Hours	Cycles
1	Pump #1	85.1	104	9		0.0	0
2	Pump #2	78.4	108	10		0.0	0
3	High Discharge	0.0	0	11		0.0	0
4	Bypass Valve	0.0	0	12		0.0	0
5	Low Suction	0.9	5	13		0.0	0
6	Power Fail	0.0	0	14		0.0	0
7	Entry Alarm	0.0	0	15		0.0	0
8	Station Flood	0.0	0	16		0.0	0

Flow Summary

#	Flow Total Input Label	Total Flow	Flow Rate High	Flow Rate Low	Flow Rate NZAvg
1	Flow Total	7,436,000 GAL	1,310.0 GPM	0.0 GPM	733.26 GPM

Expansion Inputs

#	Expansion Input Label	Hours	Cycles	#	Expansion Input Label	Hours	Cycles
1	PUMP 1 HAND	0.0	0	17		0.0	0
2	PUMP 1 AUTO	0.0	0	18		0.0	0
3	PUMP 2 HAND	0.0	0	19		0.0	0
4	PUMP 2 AUTO	0.0	0	20		0.0	0
5	PUMP 3 HAND	0.0	0	21		0.0	0
6	PUMP 3 AUTO	0.0	0	22		0.0	0
7	DOOR OPEN	0.0	0	23		0.0	0
8	OPER PRESENT	0.0	0	24		0.0	0
9		0.0	0	25		0.0	0
10		0.0	0	26		0.0	0
11		0.0	0	27		0.0	0

This report will compute and display runtimes for discrete inputs DI1-DI16 and expansion inputs EI1-EI32. In addition to pump runtimes, it will also show the minimum, maximum and average flow rate and the total flow for a selected period of time. The user simply selects the station name, start date, end date, start hour and end hour. All runtimes are shown in hours and tenths of hours. This report is based on the 1-minute historical files.

Analog Report

Reports

Daily Pump Reports | **Analog Report** | Pump Runtime Report | Custom Daily Reports | Custom Timed Reports

Station Name: Pump Station #1 | Start Date: 1/ 1/2010 | End Date: 1/31/2010 | Start HR: 12 am | End HR: 12 am

SCADAview CSX Demo System
Pump Station #1 - Analog Report for January 1, 2010 12:00am to January 31, 2010 11:59pm

#	Analog Input Label	Units	High	Low	Average	NZAvg	Difference
1	Discharge Pressure	PSI	125.0	0.0	81.149	82.196	125.0
2	Suction Pressure	PSI	63.0	30.0	49.496	49.496	33.0
3			0.0	0.0	0.0	0.0	0.0
4			0.0	0.0	0.0	0.0	0.0
5			0.0	0.0	0.0	0.0	0.0
6	Temperature	DEG	-78.5	-78.5	-78.5	0.0	0.0
7		LV7	0.0	0.0	0.0	0.0	0.0
8		LV8	0.0	0.0	0.0	0.0	0.0

Report Generated: Monday, March 18, 2013 6:14:58 AM

This report will compute and display the minimum, maximum, average, non-zero average and difference all analog inputs in a station for a selected period of time. The user selects the station name, start date, end date, starting and ending hour. This report is based on the 1-minute historical files.

Daily Pump Reports

Reports

Daily Pump Reports | Analog Report | Pump Runtime Report | Custom Daily Reports | Custom Timed Reports

Station Name: Pump Station #1 | Start Date: 1/ 1/2010 | End Date: 1/31/2010

SCADAview CSX Demo System
Pump Station #1 - Daily Pump Report for January 1, 2010 to January 31, 2010

Date	Runtime (hours)								Flow Total	Flow Rate High	Flow Rate Low	Flow Rate NZAvg
	#1	#2	#3	#4	#5	#6	#7	#8	GAL	GPM	GPM	GPM
01-01-2010	4.00	4.90	0.00	0.00	0.00	0.00	0.00	0.00	201,000	440.0	0.0	353.05
01-02-2010	4.40	4.10	0.00	0.00	0.00	0.00	0.00	0.00	198,000	440.0	0.0	351.52
01-03-2010	5.00	4.70	0.00	0.00	0.00	0.00	0.00	0.00	212,000	440.0	0.0	324.53
01-04-2010	3.90	6.00	0.00	0.00	0.00	0.00	0.00	0.00	206,000	440.0	0.0	313.89
01-05-2010	6.10	3.20	0.00	0.00	0.00	0.00	0.00	0.00	210,000	440.0	0.0	343.76
01-06-2010	6.10	5.70	0.00	0.00	0.00	0.00	0.00	0.00	263,000	440.0	0.0	343.31
01-07-2010	5.40	3.60	0.00	0.00	0.00	0.00	0.00	0.00	194,000	440.0	0.0	343.58
01-08-2010	4.10	5.00	0.00	0.00	0.00	0.00	0.00	0.00	201,000	440.0	0.0	336.4
01-09-2010	6.30	4.40	0.00	0.00	0.00	0.00	0.00	0.00	248,000	440.0	0.0	304.38
01-10-2010	2.90	6.00	0.00	0.00	0.00	0.00	0.00	0.00	204,000	440.0	0.0	330.0
01-11-2010	2.80	6.00	0.00	0.00	0.00	0.00	0.00	0.00	203,000	440.0	0.0	369.89
01-12-2010	6.90	4.50	0.00	0.00	0.00	0.00	0.00	0.00	259,000	440.0	0.0	359.5
01-13-2010	5.90	3.00	0.00	0.00	0.00	0.00	0.00	0.00	179,000	440.0	0.0	290.8
01-14-2010	4.20	5.40	0.00	0.00	0.00	0.00	0.00	0.00	219,000	440.0	0.0	367.68
01-15-2010	4.00	6.80	0.00	0.00	0.00	0.00	0.00	0.00	231,000	440.0	0.0	358.04
01-16-2010	5.80	3.20	0.00	0.00	0.00	0.00	0.00	0.00	213,000	440.0	0.0	363.54
01-17-2010	5.80	4.80	0.00	0.00	0.00	0.00	0.00	0.00	236,000	440.0	0.0	364.11
01-18-2010	3.80	5.50	0.00	0.00	0.00	0.00	0.00	0.00	210,000	440.0	0.0	344.27
01-19-2010	4.90	3.40	0.00	0.00	0.00	0.00	0.00	0.00	186,000	440.0	0.0	374.35
01-20-2010	7.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	239,000	440.0	0.0	352.63
01-21-2010	5.70	2.80	0.00	0.00	0.00	0.00	0.00	0.00	188,000	440.0	0.0	364.42
01-22-2010	6.90	3.90	0.00	0.00	0.00	0.00	0.00	0.00	244,000	440.0	0.0	350.88
01-23-2010	6.10	2.50	0.00	0.00	0.00	0.00	0.00	0.00	202,000	440.0	0.0	351.37
01-24-2010	5.40	6.20	0.00	0.00	0.00	0.00	0.00	0.00	255,000	440.0	0.0	360.67
01-25-2010	4.70	3.20	0.00	0.00	0.00	0.00	0.00	0.00	178,000	440.0	0.0	350.82

This report uses a file that is updated every midnight and stores daily totals for Pump Runtimes, minimum Flow Rate, maximum Flow Rate, non-zero average Flow Rate and Flow Total. The report window will display the lines from this file based on the time period selected along with grand total numbers for each item at the bottom.

Custom Daily Reports

Reports

Daily Pump Reports | Analog Report | Pump Runtime Report | Custom Daily Reports | Custom Timed Reports

Report Name: Custom Daily Report | Start Date: 1/ 1/2010 | End Date: 1/31/2010

Custom Daily Report for January 1, 2010 to January 31, 2010

Date	Pump Station #1	Pump Station #1	Pump Station #1	High Service Pumps	
	Pump #1 Run	Pump #2 Run	24hr Flow Total	Pump 1 Run	Pump 2 Run
Hours	Hours	Gallons	Hours	Hours	Hours
01-01-2010	24.00	18.00	450	24.00	23.50
01-02-2010	24.00	18.00	300	24.00	23.50
01-03-2010	24.00	16.40	300	13.10	21.00
01-04-2010	6.40	23.10	300	11.00	23.50
01-05-2010	24.00	18.00	300	13.10	23.50
01-06-2010	24.00	16.40	300	13.10	23.50
01-07-2010	6.40	23.10	300	12.00	15.00
01-08-2010	24.00	18.00	300	13.10	23.50
01-09-2010	24.00	16.40	300	13.10	23.50
01-10-2010	6.40	23.10	300	13.10	23.50
01-11-2010	24.00	18.00	300	17.00	20.00
01-12-2010	24.00	16.40	300	13.10	23.50
01-13-2010	6.40	23.10	300	13.10	23.50
01-14-2010	6.40	23.10	300	13.10	16.00
01-15-2010	6.40	23.10	300	14.00	23.50
01-16-2010	6.40	23.10	300	13.10	23.50
01-17-2010	24.00	18.00	300	13.10	23.50
01-18-2010	24.00	16.40	300	13.10	19.00
01-19-2010	6.40	23.10	300	13.10	23.50
01-20-2010	24.00	18.00	300	13.10	23.50
01-21-2010	24.00	16.40	300	13.10	23.50
01-22-2010	6.40	23.10	300	10.00	23.50
01-23-2010	24.00	18.00	300	13.10	23.50
01-24-2010	24.00	16.40	300	13.10	23.50
01-25-2010	6.40	23.10	300	14.00	18.00
01-26-2010	24.00	18.00	300	13.10	23.50

This report uses a file that is updated every midnight and stores custom daily numbers for Pump Runtimes, minimum Flow Rate, maximum Flow Rate, non-zero average Flow Rate and Flow Total etc. The report window will display the lines from this file based on the time period selected along with grand total numbers for each item at the bottom.

Custom Timed Reports

Reports

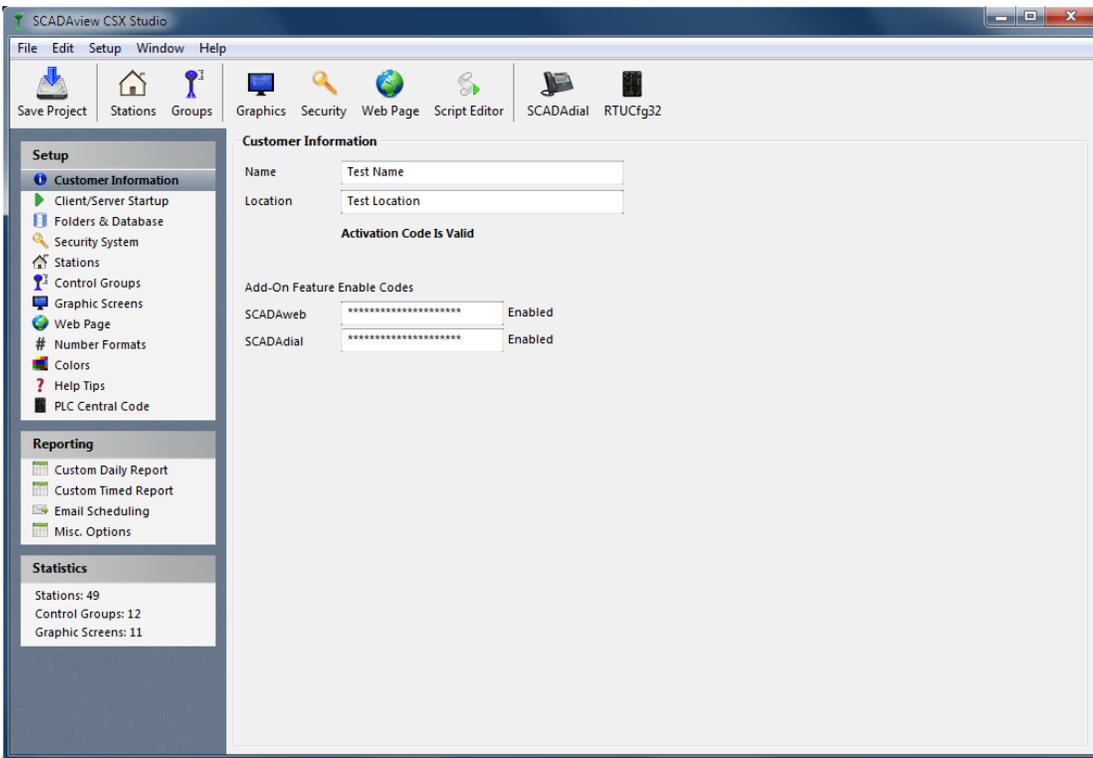
Report Name:
 Start Date:
 End Date:

Micro-Comm Demo System
 Custom Timed Report for November 1, 2014 to November 1, 2014

	Tower #1	Pump Station #1	Pump Station #1	Pump Station #1	Pump Station #1	Pump Station #1	Prev Total PSI	Total Pressure
	Tower Level	Discharge Pressure	Suction Pressure	Flow Rate	Flow Rate #2	Flow Rate #3		
Date	ft	PSI	PSI	GPM	GPM	GPM	PSI	PSI
11-01-2014 00:00:00	70.6	45.3	29.3	293.0	2,098.0	2,252.0	65.6	74.6
11-01-2014 00:15:00	79.6	49.8	33.8	338.0	2,098.0	2,256.0	74.6	83.6
11-01-2014 00:30:00	88.6	54.3	38.3	383.0	2,088.0	2,238.0	83.6	92.6
11-01-2014 00:45:00	82.4	51.2	35.2	352.0	2,099.0	2,249.0	92.6	86.4
11-01-2014 01:00:00	73.4	46.7	30.7	307.0	2,096.0	2,250.0	86.4	77.4
11-01-2014 01:15:00	64.4	42.2	26.2	262.0	2,094.0	2,249.0	77.4	68.4
11-01-2014 01:30:00	64.3	42.1	26.1	261.0	2,094.0	2,244.0	68.4	68.2
11-01-2014 01:45:00	73.2	46.6	30.6	306.0	2,095.0	2,245.0	68.2	77.2
11-01-2014 02:00:00	82.2	51.1	35.1	351.0	2,106.0	2,255.0	77.2	86.2
11-01-2014 02:15:00	88.7	54.3	38.3	383.0	2,096.0	2,251.0	86.2	92.6
11-01-2014 02:30:00	79.8	49.8	33.8	338.0	2,093.0	2,248.0	92.6	83.6
11-01-2014 02:45:00	70.8	45.3	29.3	293.0	2,096.0	2,252.0	83.6	74.6
11-01-2014 03:00:00	61.8	40.8	24.8	248.0	2,101.0	2,251.0	74.6	65.6
11-01-2014 03:15:00	67.0	43.5	27.5	275.0	2,095.0	2,249.0	65.6	71.0
11-01-2014 03:30:00	76.0	48.0	32.0	320.0	2,087.0	2,242.0	71.0	80.0
11-01-2014 03:45:00	85.0	52.5	36.5	365.0	2,095.0	2,240.0	80.0	89.0
11-01-2014 04:00:00	86.0	52.9	36.9	369.0	2,096.0	2,241.0	89.0	89.8
11-01-2014 04:15:00	77.0	48.4	32.4	324.0	2,105.0	2,254.0	89.8	80.8
11-01-2014 04:30:00	68.0	44.0	28.0	280.0	2,092.0	2,241.0	80.8	72.0
11-01-2014 04:45:00	60.7	40.4	24.4	244.0	2,100.0	2,249.0	72.0	64.8
11-01-2014 05:00:00	69.7	44.9	28.9	289.0	2,103.0	2,253.0	64.8	73.8
11-01-2014 05:15:00	78.7	49.4	33.4	334.0	2,100.0	2,250.0	73.8	82.8
11-01-2014 05:30:00	87.7	53.9	37.9	379.0	2,098.0	2,247.0	82.8	91.8
11-01-2014 05:45:00	83.3	51.6	35.6	356.0	2,098.0	2,253.0	91.8	87.2
11-01-2014 06:00:00	74.3	47.1	31.1	311.0	2,091.0	2,246.0	87.2	78.2
11-01-2014 06:15:00	65.3	42.6	26.6	266.0	2,092.0	2,242.0	78.2	69.2
11-01-2014 06:30:00	63.5	41.8	25.8	258.0	2,098.0	2,243.0	69.2	67.6
11-01-2014 06:45:00	72.5	46.3	30.3	303.0	2,098.0	2,242.0	67.6	76.6
11-01-2014 07:00:00	81.5	50.8	34.8	348.0	2,094.0	2,246.0	76.6	85.6
11-01-2014 07:15:00	89.5	54.7	38.7	387.0	2,089.0	2,241.0	85.6	93.4

This report uses a file that is updated on a user-selected time interval (1 minute, 15 minute etc.) and saves snapshot values for any station's data. The report window will display the lines from this file based on the period selected. High, low and average values will be computed and shown at the bottom of the report.

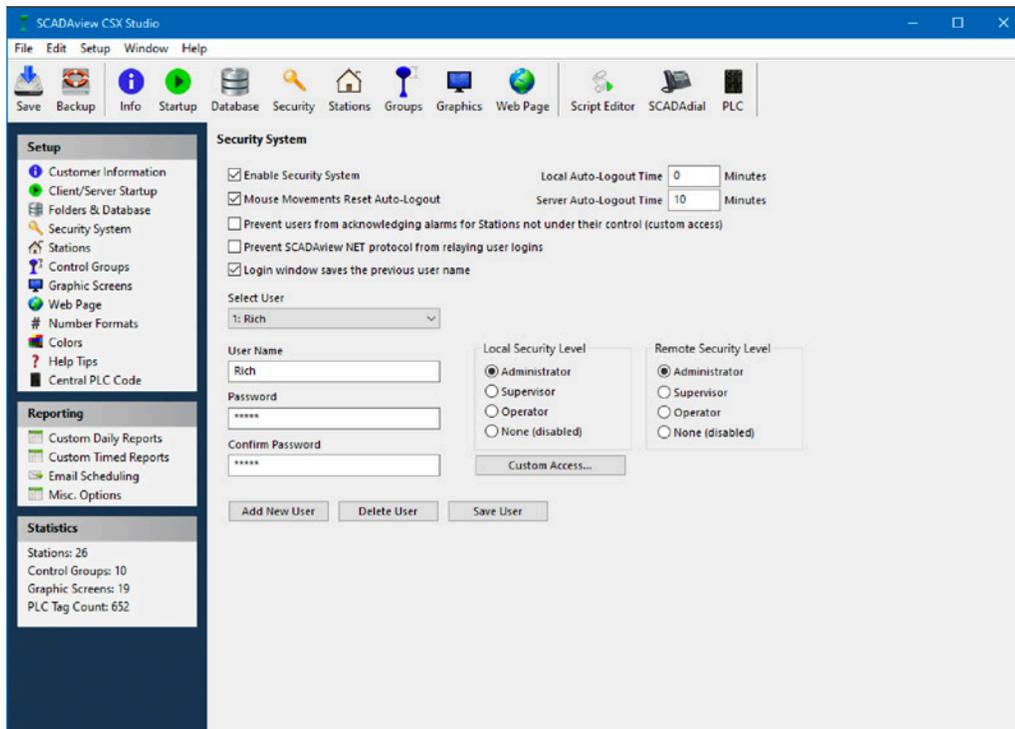
SCADAview CSX Studio



Customer Information

Use this setup screen in SCADAview CSX Studio to put in the customer's name and location. These are used when activating the program over the internet and are also used on the Web page and in some reports. The Add-On features such as the web page are also enabled using this screen - paste in the codes and click the "Save Project" toolbar button.

Security System



Select User

Use this pull-down list to select the user to edit.

Add New User

Click this button to add a new user to the end of the database.

Delete User

Deletes the currently selected user. Note: The user will not be deleted until the Save button is clicked.

Save User

This will save only changes made to the security system. You should click this when you are finished making changes.

Global Security System Options

Enable Security System

When this option is checked, all security features will be enabled for SCADAview CSX. Also, the next time the SCADAview CSX Studio is run it will require an administrator's user name and password. Be careful not to lock yourself out!

Local Auto-Logout Time

If a number other than zero is entered, SCADAview CSX will log off the current user after the given number of minutes has elapsed. This helps keep the system secure even if a user forgets to log out.

Server Auto-Logout Time

SCADAview CSX acting as the server will log out any remote logins after this amount of time. If set to 0 it will never log remote users out.

Mouse Movements Reset Auto-Logout

If selected, any time the user moves the mouse the local auto-logout timer will be re-started.

Login window saves previous user name

Normally the user will have to re-enter their name every time even if they were the last one logged in. Checking this will have the latest user's name already entered on the login screen.

User Options

User Name

The name a user must type when logging into SCADAview CSX.

Password

The password a user must type when logging into SCADAview CSX.

Confirm

When changing or setting a password, it must be entered again here to confirm the change.

User's Security Level

Administrator

The user can do anything including changing setup options. (SCADAview CSX Studio requires at least one administrator)

Supervisor

Supervisors can change setpoints, HOA controls etc. Basically they can do everything other than program setup.

Operator

Operators can view the display screens, run reports etc. and can make changes to the Hand/Off/Auto controls. They can't change setpoints or program setup options.

None

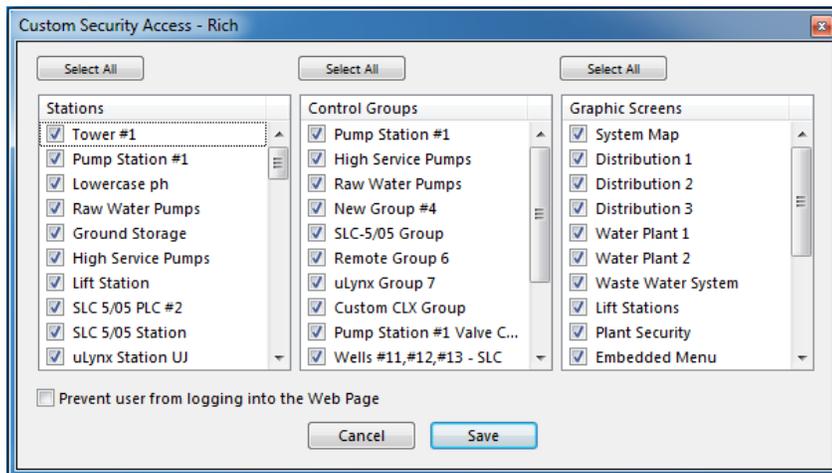
The user can log in but can't make any setpoint or HOA changes.

Note: When logged off, users can only view displays, view setpoints and HOAs and run reports.

Local vs. Remote Security Level

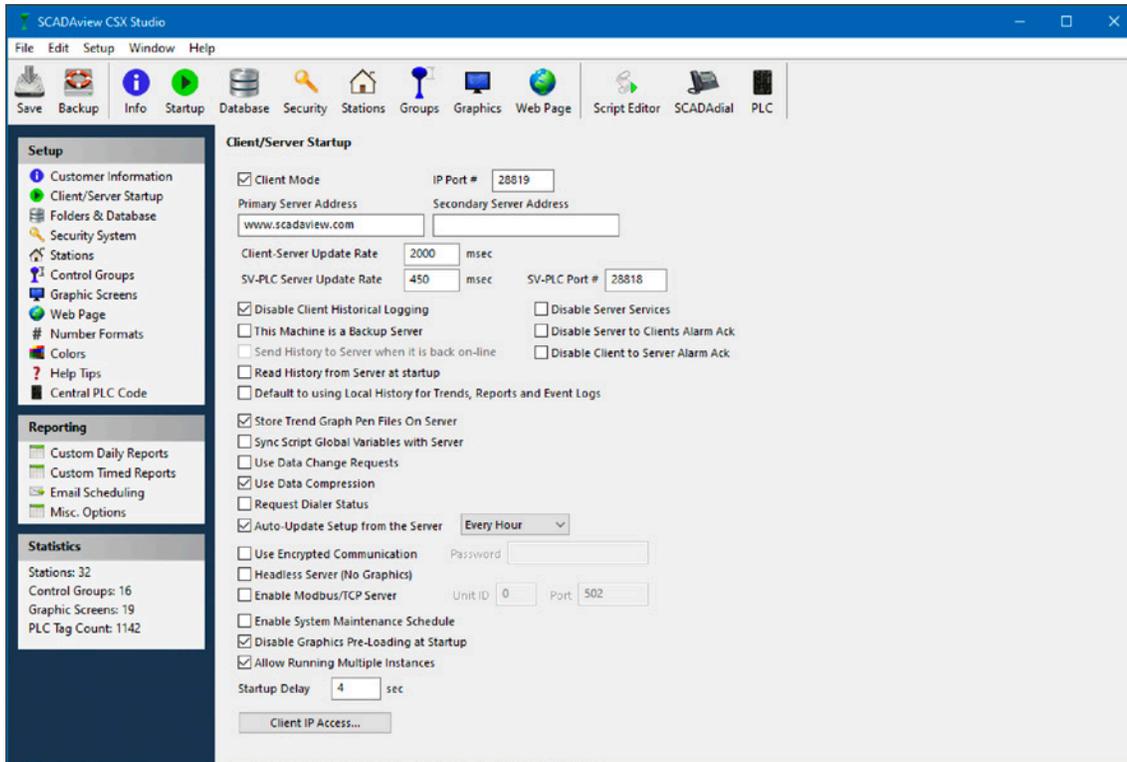
The local security level will be used whenever a user logs in on at the SCADAview CSX machine. The remote security level gets used when logging in over the web page or remotely using TCP/IP client/server or SCADAview NET data connections.

Custom Access...



The custom access option can be used block the user from making control changes on any station, group or graphic screen. It can also be used to keep the user from logging in on the web page.

Client/Server Startup Options



Client Mode

Makes SCADAview connect to a remote machine (SCADAview CSX Server) at startup and act as a client.

Data Update Rate (msec)

This is how often a SCADAview CSX client will request information from the server. This should be set higher when using a slow network radio connection or the Internet.

Primary Server IP Address

The IP address or hostname of the SCADAview CSX Server machine.

Secondary Server IP Address

The IP address or hostname of another SCADAview CSX Server that will be used if the primary fails.

IP Port

The IP port number to be used for client-server communication as well as SCADAview NET protocol connections.

Disable Client Historical Logging

Clients will not save any history files when this is checked.

Disable Server Services

If checked, no incoming client connections are allowed (used when running multiple clients on one machine).

Disable Client-Server Alarm Ack

Clients will not pass the alarm acknowledgements to the server when this is checked. The server machine will need to be acknowledged locally.

This Machine is a Backup Server

When checked, this machine will become a backup server if necessary. The SV-PLC data server will be launched in order to become a SCADAview CSX Server in case the primary and secondary servers fail. The primary server will then be tested periodically and this machine will become a client again when the primary server is back on-line.

Auto-Update Setup File from the Server

Whenever a change is made to the setup on the server, this option trigger the client to re-download all the current setup.

Default to using Local History for Trends, Reports and Event Logs

Forces a SCADAview CSX Client machine to use local data instead of requesting data from the server.

Store Trend Graph Pen Files On Server

If checked the save and open dialog boxes will be replaced with a selector that will save or load pen files on the server. Pen files are also saved locally.

Sync Script Global Variables with Server

When checked, CSX Script variables will be passed from server to client and sent back to the server when changed on a client. Normally this is not done and all variables will be local to the SCADAview CSX.

Use Data Change Requests

When checked, CSX clients will use special data requests for only the station or group data that has changed since the last request. This can be useful when the TCP connection is slow and the data is not really changing very rapidly on the server - which is typical for radio telemetry systems.

Use Data Compression

When checked, CSX clients will use data requests that will result in compressed data replies. This can be useful when the client-server connection is slow.

Request Dialer Status

When checked, CSX clients will get status messages and failure conditions from SCADAview CSX running on the server.

Use Encrypted Communication

Client/Server communication and SCADAview NET protocol connections can use encryption. If used, the same password must be entered at each client and server.

Headless Server Mode - Graphics Disabled

Checking this will make a dedicated server use the least amount of system resources by disabling all local graphics rendering.

Enable Modbus/TCP Server

This makes SCADAview act as a Modbus/TCP server with each station's data (normal station data order) located at 4x100, 4x200 etc. for each station in the list. You must also enter the correct Modbus/TCP Unit ID (default is normally 0).

Enable System Maintenance Schedule

If checked the server will be re-started every 5 days in order to clear memory and perform other maintenance tasks. This will occur at 2:08 AM on the 1st, 6th, etc. day of the month.

Disable Graphics Pre-Loading at Startup

If checked the graphics screens will be loaded as needed instead of all during startup. This speeds up initial startup and reduces memory usage.

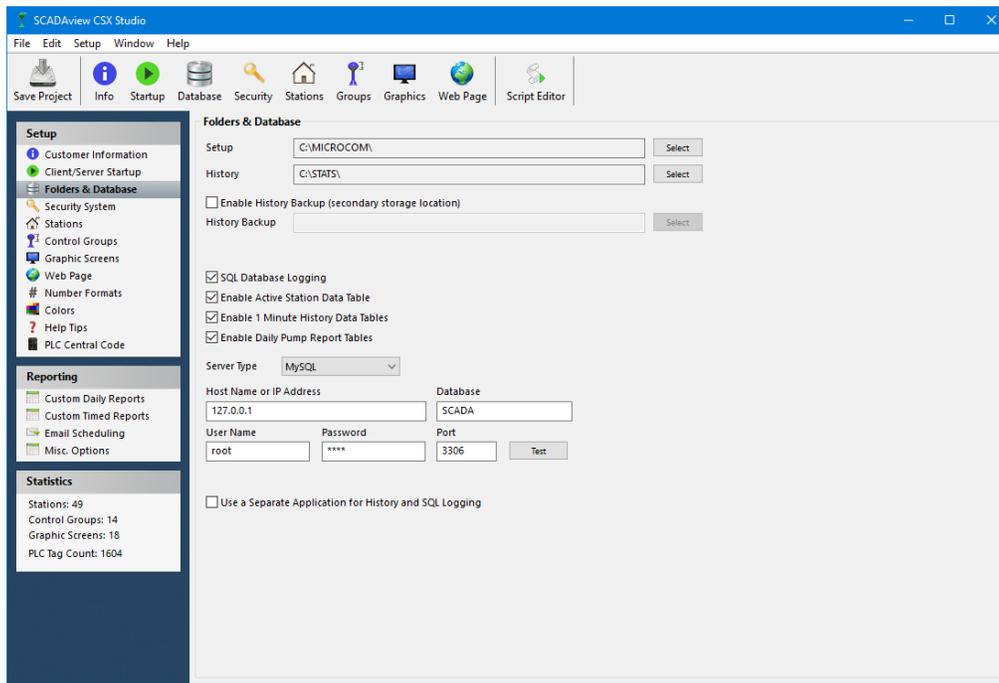
Allow Running Multiple Instances

Normally SCADAview CSX is only allowed to run once (globally - one user only) . This option can be used if more than one instance is required for some reason (multiple clients on one machine using terminal services).

Startup Delay

A number of seconds after the initial loading of setup that SCADAview CSX will wait before starting to update data, draw graphics etc. This has been necessary in the past on slower machines to allow all services to be ready.

Folders & Database



Setup and History Folders

This shows the current paths to where all the project files and history is stored on the computer. Click the “Select” buttons to change the locations.

Enable History Backup (secondary storage location)

This shows the path to where all history will be logged in addition to the primary location. This could be a network location or external drive.

SQL Database Logging

If an SQL database server is available, click this checkbox to enable historical information logging to various tables in the database.

Enable Active Station Data Table

If this is checked an extra table is created and updated every minute with all current station data. The SCADAreport add-on may need this for snapshot data.

Enable 1 Minute History Data Tables

If this is checked all 1 minute history will also be logged to the SQL server. Separate tables for each station will be created. The SCADAreport add-on may also need this data to generate reports.

Enable Daily Pump Report Tables

If this is checked all station daily pump reports will be logged to the SQL server. Separate tables for each station will be created.

Server Type

The type of SQL server being used. Currently the choices are MySQL, MS SQL, PostgreSQL, Oracle and ODBC.

Host Name or IP Address

This could be “localhost” if the SQL server is running on the local machine or may be a remote IP address.

Database Name

This will need to be a valid database name that already exists on the server.

User Name and Password

A valid login will be necessary to the SQL server. This will need to be set ahead of time.

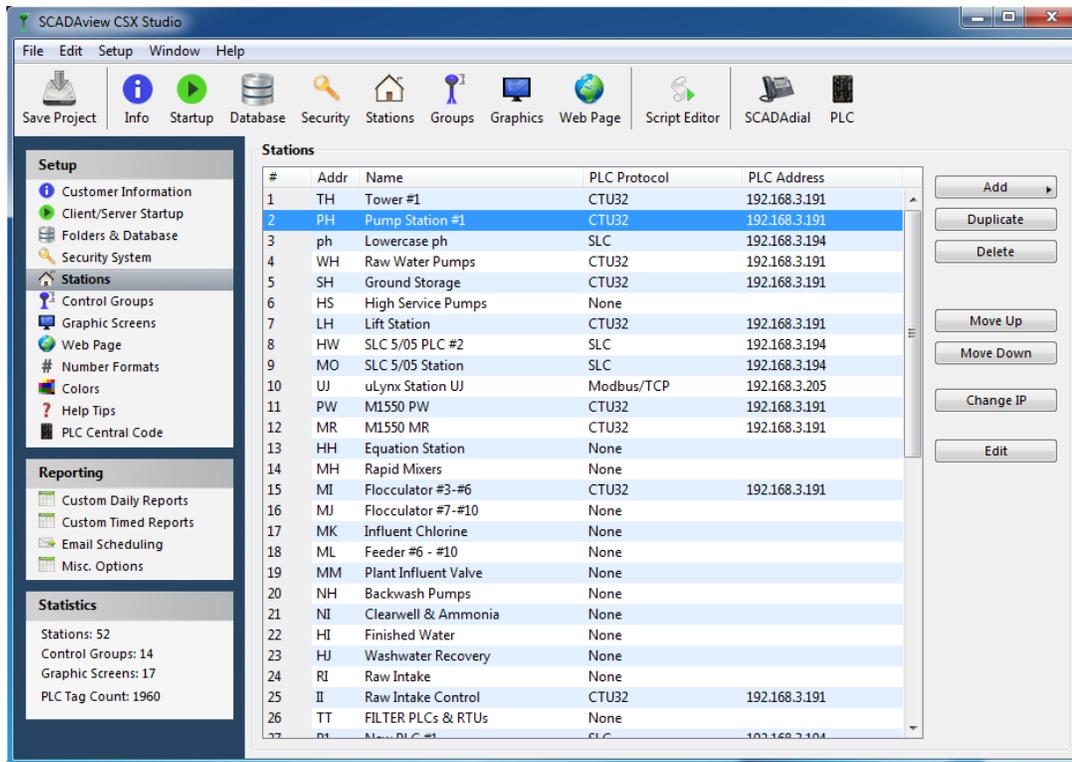
Port

This will selected automatically based on the server but can also be changed to special ports if necessary.

Use a Separate Application for History and SQL Logging

If checked, HistoryLog CSX starts up and will do all the history and SQL database logging.

Station Setup



Database Controls

Stations

Use this list to select the station to edit - double click or select and click the edit button. This list will show the name, address, PLC protocol and IP address / COM settings for each station.

Add

Click this button to add a new station to the end of the database.

Duplicate

Adds a new station with it's setup the same as the selected station.

Delete

Deletes the selected station or stations.

Move Up/Down

Changes the order in which the stations appear in SCADAview CSX menu lists and system displays.

Change IP

Will allow changes to multiple selected station's IP address and protocol selection.

Save Project

Use this toolbar button to save any changes made.

General

Station - Pump Station #1

General | PLC | AI | DI | HOA | EI | Flow | AO | Setpoints | Accumulators | Maintenance | Code

Address: PH Name: Pump Station #1

Data Source: SV-PLC Server

Expanded Data

Enable Output Status History Logging

Remote Flow Rate and Total Enable Radio Diagnostics Polling (only used with script)

Remote PC HOAs (polled on-demand)

Send Analog High/Low Setpoints to the PLC

Data Expression: [Empty text box]

Data Change Script: None [Edit Script]

2: Pump Station #1 (PH) Close Save

Address

The two letter code (HH-WW) assigned by Micro-Comm for the station when setting up a new system.

Name

Enter a name for this station. This name will be displayed on all screens and reports dealing with this station.

Data Source

The data for the station will be acquired from the selected source which can be either “SV-PLC Server” or “None / Data Entry”. SV-PLC communicates with various PLC types. The “None / Data Entry” selection can be used for special purposes such as data consolation or manually entered lab data that needs to be logged (analog input values can be entered).

Expanded Data

This is used for stations located in the PLC that have been set up to support expanded data. Additional analog inputs, outputs and flow information can then be gathered for this station.

Enable Output Status History Logging

This is used for logging extra status information for controlled outputs at the station (pump calls, pump fails, disables etc) so that these status conditions can be selected for trending.

Remote Flow Rate and Total

When using distributed control the station’s flow information will be polled for and the flow total will be remotely changeable.

Remote PC HOAs (polled on-demand)

When this is checked and used with CTU32 protocol RTUs, the Hand/Off/Auto control will be out at the remote and are accessed on-demand (read/send buttons added to the HOA screens).

Send Analog High/Low Setpoints to the PLC

Normally the high/low setpoints are stored on the computer only. When checked, these can also be send to the PLC so that it can use them to generate it’s own alarms. High/Low setpoint pairs starting at the “Reference” entered. The base reference will depend on the PLC protocol used (CTU32 would be just the uloc such as 1000, SLC protocol may be something like N20:0).

Enable Radio Diagnostics Polling

This allows CSX script to access the latest radio diagnostic counters for use in graphical diagnostic screens or alarm generation.

Data Expression

Expressions may be used that will take station data values and place results in other station data locations. See “Data Expressions” section later in this manual for more information.

Data Change Script

If selected, the CSX script will be run any time data changes for this station. Use the “Edit Script” button to make changes to this script or create a new one.

Analog Inputs

Name	Units	Range	Preset	Label	Trend Min	Trend Max
AI1 Discharge Pressure	PSI	1	0	DP	0	300
AI2 Suction Pressure	PSI	1	0	SP	0	300
AI3 Water Temperature	dgF	0.5	0	WT	0	500
AI4 Pump 1 Speed	%	1	0	P1S	0	100
AI5 Pump 2 Speed	%	1	0	P2S	0	100
AI6 Pump 3 Speed	%	1	0	P3S	0	100
AI7 Net Demand	GPM	10	0	ND	0	1000
AI8		1	0		0	100

Name

This is the label used on all reports and displays to name each analog input. This is also the message printed when the analog is in an alarm state.

Units

Enter the unit of measure for this analog (FEET, PSI, GPM etc.)

Range

For analog inputs, the range is the multiplier that is used on the raw value from the PLC.

Example: If the PLC analog value of 0-4095 is to be displayed as 240 ft, the range would be 0.0586 (4095 x Range = Full Scale of Measured/Displayed Value).

Preset

This pre-sets or offsets the starting raw value for an analog input. This allow scales that don't begin at zero.

Displayed values are computed: (raw + preset) x range

Label

Enter an abbreviation for this analog (LVL, DP, SP etc.)

Trend Min/Max

Trend graphs will use this for the Y-Axis scale (which can also be changed on the graph).

Flow

The screenshot shows a software window titled "Station - Pump Station #1" with a red close button in the top right corner. Below the title bar is a tabbed interface with tabs for "General", "PLC", "AI", "DI", "HOA", "EI", "Flow", "AO", "Setpoints", "Accumulators", "Maintenance", and "Code". The "Flow" tab is selected. The main area contains a table titled "Flow Rates and Flow Totals".

	Name	Units	Range	Preset	Label	Trend Min	Trend Max
FR1	Flow Rate	GPM	1	0	FR	0	1400
FT1	Flow Total	GAL	1000		FT		

At the bottom of the window, there is a dropdown menu showing "2: Pump Station #1 (PH)", and two buttons labeled "Close" and "Save".

Flow Rate and Flow Total

Name

This is the label used on all reports and displays to label the flow rate or total input.

Units

Enter the unit of measure for this rate or total (GPM, GALLONS)

Range

For flow rate enter the raw value multiplier (raw x range = full scale flow rate).

For flow total enter the increment value for the totalizer. (Usually either 100 or 1000 gallon increments).

Preset

This pre-sets or offsets the starting raw value for an analog input. This allow scales that don't begin at zero.

Displayed values are computed: (raw + preset) x range

Label

Enter an abbreviation for this rate or total (FR, FT)

Trend Min/Max

Trend graphs will use this for the flow rate Y-Axis scale (which can also be changed on the graph).

Discrete Inputs

Station - Pump Station #1

General PLC AI DI HOA EI Flow AO Setpoints Accumulators Maintenance Code

Discrete Inputs

Name	On Msg	Off Msg	Mode	Label	CG
D11 Pump #1	RUN	OFF	CRFHOA	P1X	1
D12 Pump #2	RUN	OFF	CRFHOA	P2X	1
D13 High Discharge			A1	HDP	
D14 Bypass Valve			CRF	V1X	
D15 Low Suction	Alarm		A1	LSP	
D16 Power Fail	Alarm		A1	PF	
D17 Entry Alarm			A1	EA	
D18 Station Flood			A1	SF	
D19					
D110					
D111					
D112					
D113					
D114					
D115					
D116					

2: Pump Station #1 (PH) Close Save

Name

The name for the discrete input. This name is displayed on the station display and will also be used for graphics tagging.

On Msg

Enter the label to be shown when the device is on or alarming.

Off Msg

Enter the label to be shown when the device is off.

Mode

Use the item list to select the available operating modes for the discrete input in question. Valid operating modes are:

A1 - Alarm when input is on, A0 - Alarm when input is off

S1 - Status when input is on, S0 - Status when input is off

CRF - Call/Run/Fail

CRFHOA - Call/Run/Fail/Hand/Off/Auto (remote HOA monitoring using expansion inputs)

Label

This is the label shown on the System Display screen for this discrete input or controlled device and is also used for graphics tagging. For controlled devices enter an abbreviation ending in X.

Example: P1X - the last character will change to display the current status of the device (R=Run, C=Call, F=Fail, O=Off).

CG

The control group # associated with the pump input. This is mainly for linking control groups with the Pump Control Panel window.

Expansion Inputs

Station - Pump Station #1

General PLC AI DI HOA EI Flow AO Setpoints Accumulators Maintenance Code

Expansion Inputs

Name	On Msg	Off Msg	Mode	Label	Name	On Msg	Off Msg	Mode	Label
EI1 PUMP 1 HAND			S1 P1H		EI17				
EI2 PUMP 1 AUTO			S1 P1A		EI18				
EI3 PUMP 2 HAND			S1 P2H		EI19				
EI4 PUMP 2 AUTO			S1 P2A		EI20				
EI5 PUMP 3 HAND			S1 P3H		EI21				
EI6 PUMP 3 AUTO			S1 P3A		EI22				
EI7 DOOR OPEN			S1 DO		EI23				
EI8 OPER PRESENT			S1 OP		EI24				
EI9					EI25				
EI10					EI26				
EI11					EI27				
EI12					EI28 Entry Alarm			A1	EA
EI13					EI29				
EI14					EI30				
EI15					EI31				
EI16					EI32				

2: Pump Station #1 (PH) Close Save

Name

The name of the expansion discrete input. This name is displayed on the station display and will also be used for graphics tagging.

On Msg

Enter the label to be shown when the device is on or alarming.

Off Msg

Enter the label to be shown when the device is off.

Mode

Use the item list to select the available operating modes for the expansion input. Valid operating modes are:

A1 - Alarm when input is on, A0 - Alarm when input is off

S1 - Status when input is on, S0 - Status when input is off

P1 - Pump status RUN or OFF (adds an R or O to the label)

Label

This is the label shown on the System Display screen for this input and is also used for graphics tagging.

Remote Setpoints

Station - Pump Station #1

General PLC AI DI HOA EI Flow AO Setpoints Accumulators Maintenance Code

Remote Stop Labels				Remote Start Labels					
	Stop Label	Units	Range	Preset		Start Label	Units	Range	Preset
1	Lead Backup Stop	FT	0	0	1	Lead Backup Start	0	1	0
2	Lag Backup Stop	FT	0	0	2	Lag Backup Start	0	1	0
3			0	0	3			0	0
4			0	0	4		0	0	0
5			0	0	5		0	0	0
6			0	0	6			0	0
7			0	0	7		0	0	0
8			0	0	8		0	0	0
9			0	0	9			0	0
10			0	0	10		0	0	0
11			0	0	11		0	0	0
12			0	0	12			0	0

2: Pump Station #1 (PH) [Close] [Save]

Remote setpoints are read and sent to remote stations on-demand. They could be used at the remote to control outputs when in backup control or for any other purpose. These setpoints represent the variables STOP1, START1 through STOP12, START12 in a Micro-Comm RTU.

Stop Label

Label used to describe the stop setpoint. i.e. "Pump 1 Stop"

Start Label

Label used to describe the start setpoint. i.e. "Pump 1 Start"

Units

Enter the unit of measure for this setpoint (FEET, PSI, GPM etc.)

Range

The range is the multiplier that is used on the raw value from the PLC.

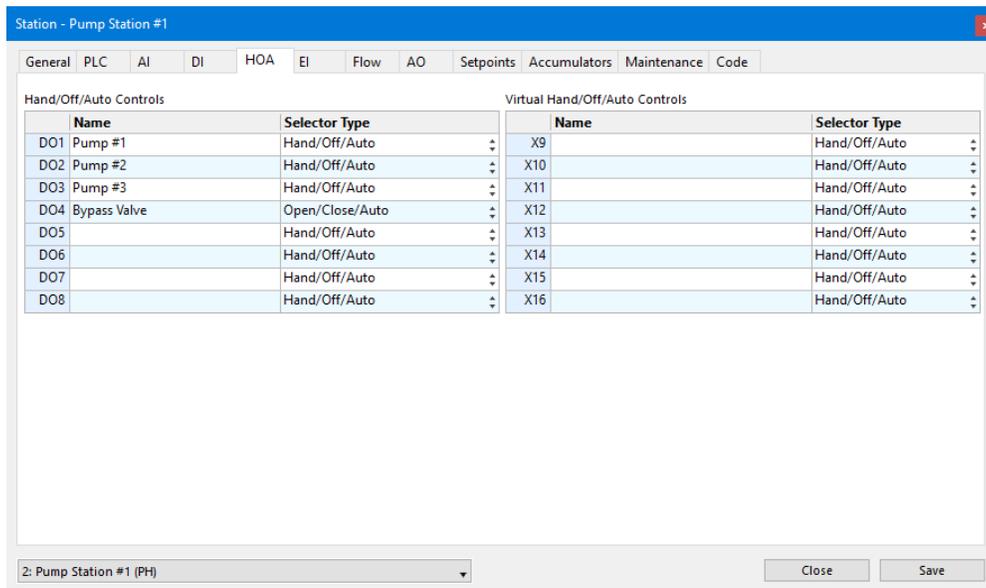
Example: If the PLC analog value of 0-4095 is to be displayed as 240 ft, the range would be 0.0586 (4095 x Range = Full Scale of Measured/Displayed Value).

Preset

This pre-sets or offsets the starting raw value. This allow scales that don't begin at zero.

Displayed values are computed as follows: (raw + preset) x range

HOAs



These HOA labels are used whenever an output needs to be labeled differently from the corresponding input. If labels are left blank, the discrete input labels will be used instead.

The HOAs have a “Selector Type” for what options will be displayed in a drop-down list or on a graphical HOA. Standard selectors include Hand/Off/Auto, Start/Stop, On/Off, Open/Close/Auto, Open/Close. Custom selector types may be created by manually entering up to 4 selection labels separated by the “/” character. For example: Manual/Off/Auto/Monitor. The first selection will write a value of 1 to the PLC, the second a value of 0, the third a value of 2 and if a fourth selection is used it will write value of 3.

The default is to use the normal 2 bits for an HOA. PLCs can use other options if values or bit references are placed at the end of each label immediately following an equals sign.

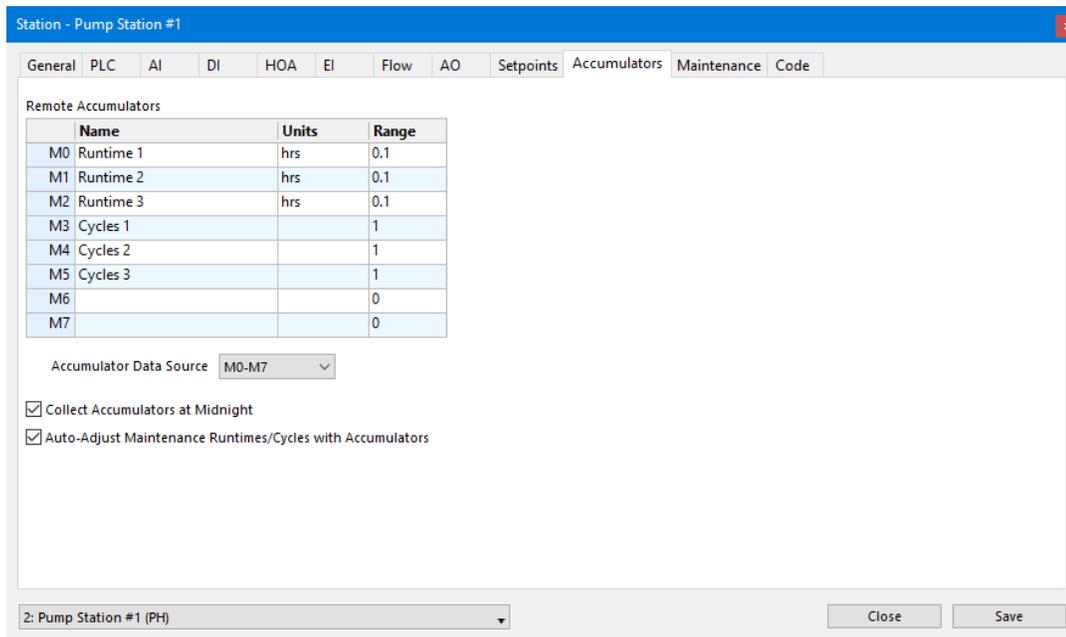
For example: “Manual=10/Off=11/Auto=12” would set a PLC location to 10,11 or 12 depending on the selection.

“Manual=b1/Off=b2/Auto=b3” would set bit 1,2 or 3 in a PLC location depending on the selection (and clear just the other 2 bits).

Virtual HOAs

Like the Remote Setpoints described before, these “virtual” HOAs are read and sent to the remote RTU. The variables X9 thru X16 are used to represent 8 different HOA settings (Hand=1, Auto=2, Off=0). Both the Central PC HOAs and the Remote Virtual HOAs have a selection for what options are displayed in the drop-down list (HAND/OFF/AUTO, START/STOP, ON/OFF etc.).

Accumulators



Micro-Comm remote RTU variables X17-X24, M0-M7, M8-M15 or M16-M23 can be labeled, scaled and treated as accumulators (runtimes, cycle counters, flow totals etc). These variables are then read and sent on demand from SCADAview CSX just like the Remote Setpoints or Remote HOAs.

A special option is also available to automatically read and save these accumulators at midnight (for use with the “Accumulator Report”).

Another option allows the accumulators to automatically adjust the maintenance runtimes. After they are read at midnight, any of the accumulators that have “runtime” in their name will set the corresponding maintenance runtime equal to the remote value.

Control Group Setup

The screenshot shows a software window titled "Group - Pump Station #1". It contains several tabs: "General", "PLC", "Normal Group", "Custom Group Screen", and "Disable Help". The "General" tab is selected. Inside the "General" tab, there are two input fields: "Group #" with the value "1" and "Name" with the value "Pump Station #1". Below these is a "Data Source" dropdown menu currently set to "SV-PLC Server". There are two checkboxes: "Remote Group" and "Use Custom Group Screen", both of which are unchecked. At the bottom of the window, there is a status bar showing "1: Pump Station #1 (1)" and two buttons: "Close" and "Save".

Group

The control group number (1-99) for the currently displayed group. This number is assigned by Micro-Comm when a system is created and will usually range from 1 to the number of groups in the system.

Name

A label that describes the control group. This is normally the name of a pump station or controlled device.

Data Source

The SV-PLC server application will normally be used to acquire data for the control group. Currently the choices are "None / Data Entry" or "SV-PLC Server".

Remote Group

Checked if the control group is located at the remote (distributed control).

Use Custom Group Screen

When checked, the appearance of the control group screen will reflect what is selected under the Custom Group Screen tab - each setpoint line can be labeled and scaled differently with this option. Otherwise the group screen will be set up using the Normal Groups tab.

Normal Group Screen Setup

Group - Pump Station #1

General | PLC | Normal Group | Custom Group Screen | Disable Help

Controlling Levels Controlling Level Labels Setpoint Labels

Station	Analog	Label	Label
1 TH - Tower #1	All - Tower Level	1 North Tower	1 Lead Pump
2		2	2 Lag Pump
3		3	3
4		4	4
5		5	5
6		6	6
7		7	7
8		8	8

Use analogs selected above to scale each line differently
 (Normally all setpoints will be scaled based on the first level that is enabled. Note that if the option to scale each line differently is selected then the Time Inhibit/Restore/Prefill setpoints will not be scaled.)

Stop/Start Column Labels Override Stop/Start Labels

Stop Start Stop Start

1: Pump Station #1 (1) Close Save

Controlling Levels

Station

The address and name of the station that controls the outputs for this control group. This information will tell SCADAview CSX what scaling factor to use when displaying the setpoints for the group. The scaling factor that will be used will also be based on which of the Controlling Levels (1-8) is selected on the Control Group Setpoints window.

Analog

The analog input and name used for control of this group. This information will along with the Controlling Station will tell SCADAview CSX what scaling factor to use when displaying the setpoints for this control group (unless the option below is checked).

Use analogs selected above to scale each stop/start line differently

This option makes it possible for each line on the control group stop/start screen to have a different scaling factor. Each line will be scaled using the selected station/analog.

Controlling Level Labels

Control groups can have up to 8 different controlling sites depending on how the system is set up. A label can be used to describe each controlling site. (TANK1, TH-A etc.)

Setpoint Labels

A label describing each controlled device in the group.
 Example: Lead Pump, Lag Pump etc.

Stop/Start Labels

Special labels for display above the stop/start setpoints in SCADAview CSX. If something other than "Stop" and "Start" are desired (such as "Cutoff" and "Restore") enter the labels here.

Override Stop/Start Labels

Same as above but these labels are displayed above the override setpoints.

Custom Group Screen Setup

Group - Pump Station #1

General | PLC | Normal Group | Custom Group Screen | Disable Help

Custom Stops

Stop Label	Units	Range	Preset
1		0	0
2		0	0
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0
9		0	0

Custom Starts

Start Label	Units	Range	Preset
1		0	0
2		0	0
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0
9		0	0

Show Fail Reset Button Show Alternator Custom Alternator

Setpoints Title:

Alternator Selections: Alternator Label:

1: Pump Station #1 (1) Close Save

Custom Group Screens allow much more flexibility in how they are displayed in SCADAview CSX. The options are as follows:

Stop Label / Start Label

Custom labels for each stop or start setpoint (stops are on the left side of the control group screen and starts are on the right).

Units

The units label is displayed to the right of each setpoint entry edit field.

Range/Preset

The multipliers and offsets used to scale each setpoint. (scaled=(raw+preset)*range)

Show Fail Reset Button

If checked, the group's "Fail Reset" button is shown on the custom group screen.

Show Alternator

If checked, the "Forward, Reverse, Auto" selector is shown on the custom group screen.

Setpoints Title

This label is shown above all the setpoints - this can be left blank.

Alternator Selections

Custom text for auto, forward and reverse can be used. Separate each one with a slash "/".

Alternator Label

Custom text shown above the alternator drop-down menu.

Notes:

Custom Group Screens can also use drop-down lists for setpoints instead of text boxes (for special mode selection). To specify the list, enclose it in braces and put it at the end of the setpoint label - formatted like {label1=value1;label2=value2;label3=value3 etc.} Example: Control Mode {Manual=1;Auto=2;Off=3}

The Custom Group setpoint labels can also be used to specify a minimum and maximum value allowed. To use this option, enclose a range in square brackets at the end of the setpoint label (Note: this will not be displayed on the control group screen). Example: Target Pressure [0-200]

These options can also be easily set up using a special window by right-clicking on the stop/start label and selecting "Edit Special Options..."

All Stations

- View
- System Display
- Station Display
- Graphic Screens
- Trend Graph
- Trend w/Penfiles
- Reports
- Control
- High/Low Setpoints
- Hand/Off/Auto
- Control Groups
- Alarms
- Active Alarms
- Event Log
- Acknowledge
- Security
- Not Logged in
- User
- Pass
- Login Logout

Station Display - High Service Pumps (HS)

High Service Pumps - (HS)

Levels	Value	Units	Status	Discretes	SYS HOA	RTU HOA	Mode	Status
Discharge Pressure	72.0	PSI		Pump #8	OFF		STBY	RUN
Surge Tank Level	54.0	INCH		Pump #9	OFF		STBY	OFF
Pump #8 Speed	76.8	%		Pump #10	OFF		STBY	OFF
Pump #9 Speed	0.0	%		Pump #11	OFF		STBY	OFF
Pump #10 Speed	0.0	%		Pump8 Hi/Lo PS				NORMAL
Pump #11 Speed	0.0	%		Pump9 Hi/Lo PS				NORMAL
Highmore BU Level	22.1	FT		Pump10 Hi/Lo PS				NORMAL
Highmore Control Level	0.0	FT		Pump11 Hi/Lo PS				NORMAL

Flow Rates and Totals	Value	Units	Status

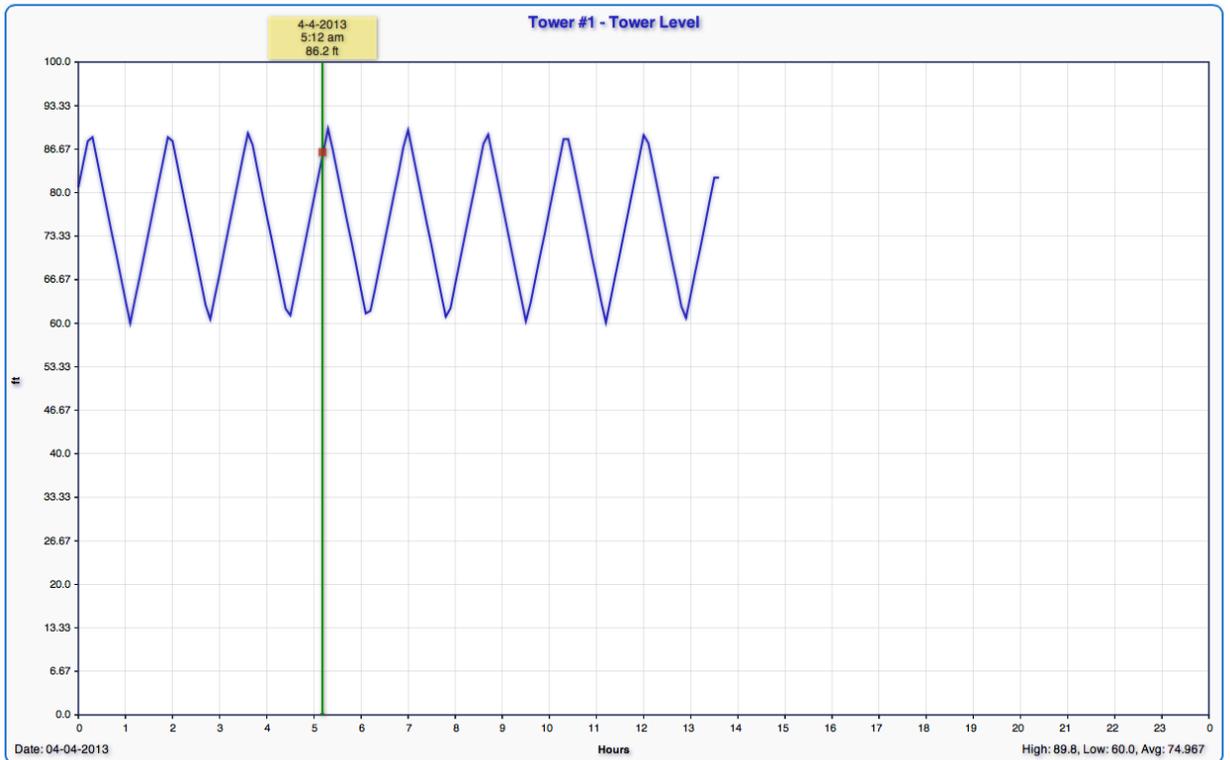
Discretes 9-16	Status	Expansion 1-8	Status	Expansion 9-16	Status	Expansion 17-24	Status	Expansion 25-32	Status	Station Status
VFD #8 FAULT	NORMAL	Pump #8 HAND		PLC Panel Power		Surge HIGH LVL				Data Valid
VFD #9 FAULT	NORMAL	Pump #8 AUTO		S3000 LOS		Surge LOW LEVEL				Time 11:01:11a
VFD #10 FAULT	NORMAL	Pump #9 HAND		Discharg Analog		Surge LOW AIR				Date 4-4-13
VFD #11 FAULT	NORMAL	Pump #9 AUTO		Surge Analog		Surge LOW OIL				
Pump #8 Cycle	ENABLE	Pump #10 HAND		Pump #8 Analog						
Pump #9 Cycle	ENABLE	Pump #10 AUTO		Pump #9 Analog						
Pump #10 Cycle	ENABLE	Pump #11 HAND		Pump #10 Analog						
Pump #11 Cycle	ENABLE	Pump #11 AUTO		Pump #11 Analog						

All Stations

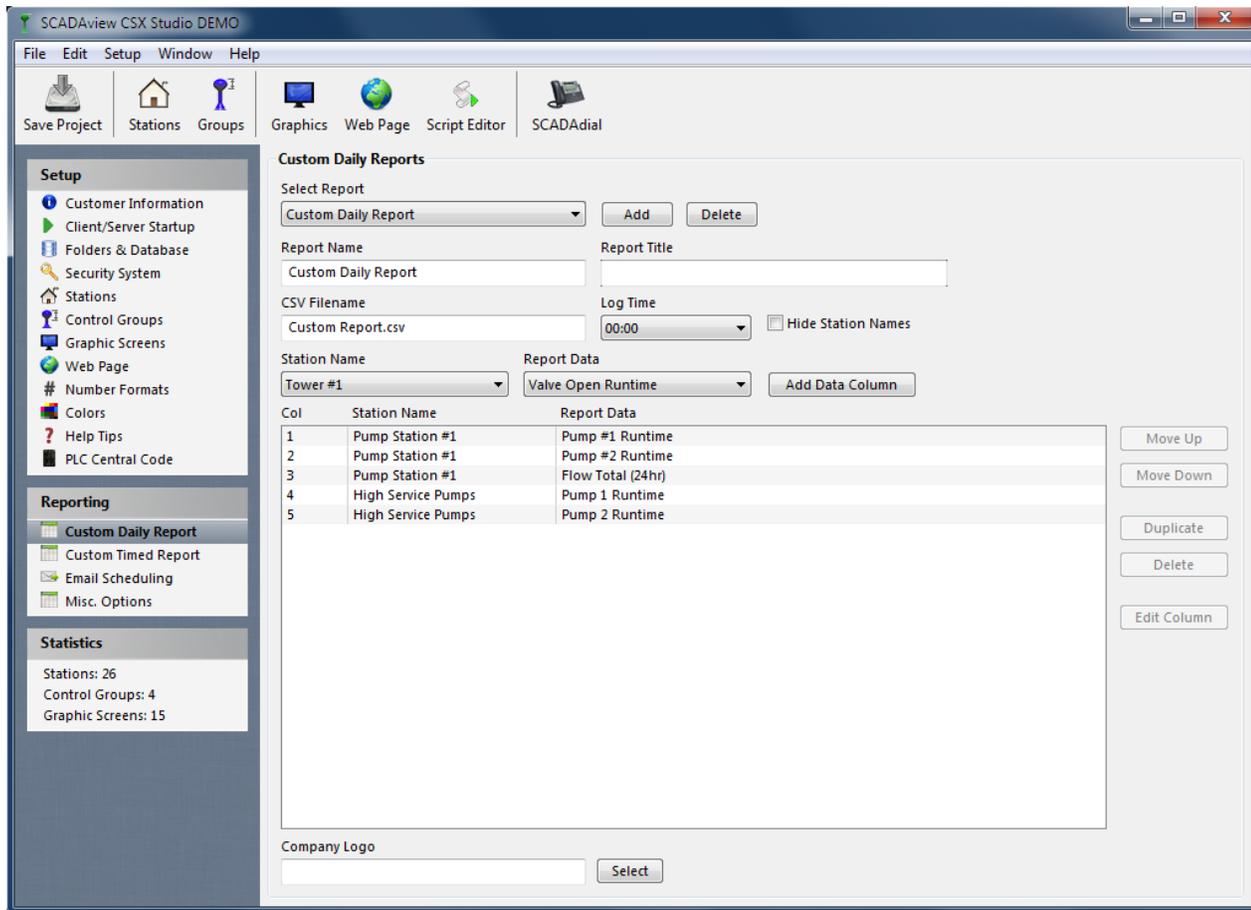
- View
- System Display
- Station Display
- Graphic Screens
- Trend Graph
- Trend w/Penfiles
- Reports
- Control
- High/Low Setpoints
- Hand/Off/Auto
- Control Groups
- Alarms
- Active Alarms
- Event Log
- Acknowledge
- Security
- Not Logged in
- User
- Pass
- Login Logout

Trend Graph - Tower #1 (TH)

Station Name: Tower #1 - (TH) Input Name: Tower Level Month: April Day: 4 Year: 2013 Type: 1 Day



Custom Daily Reports

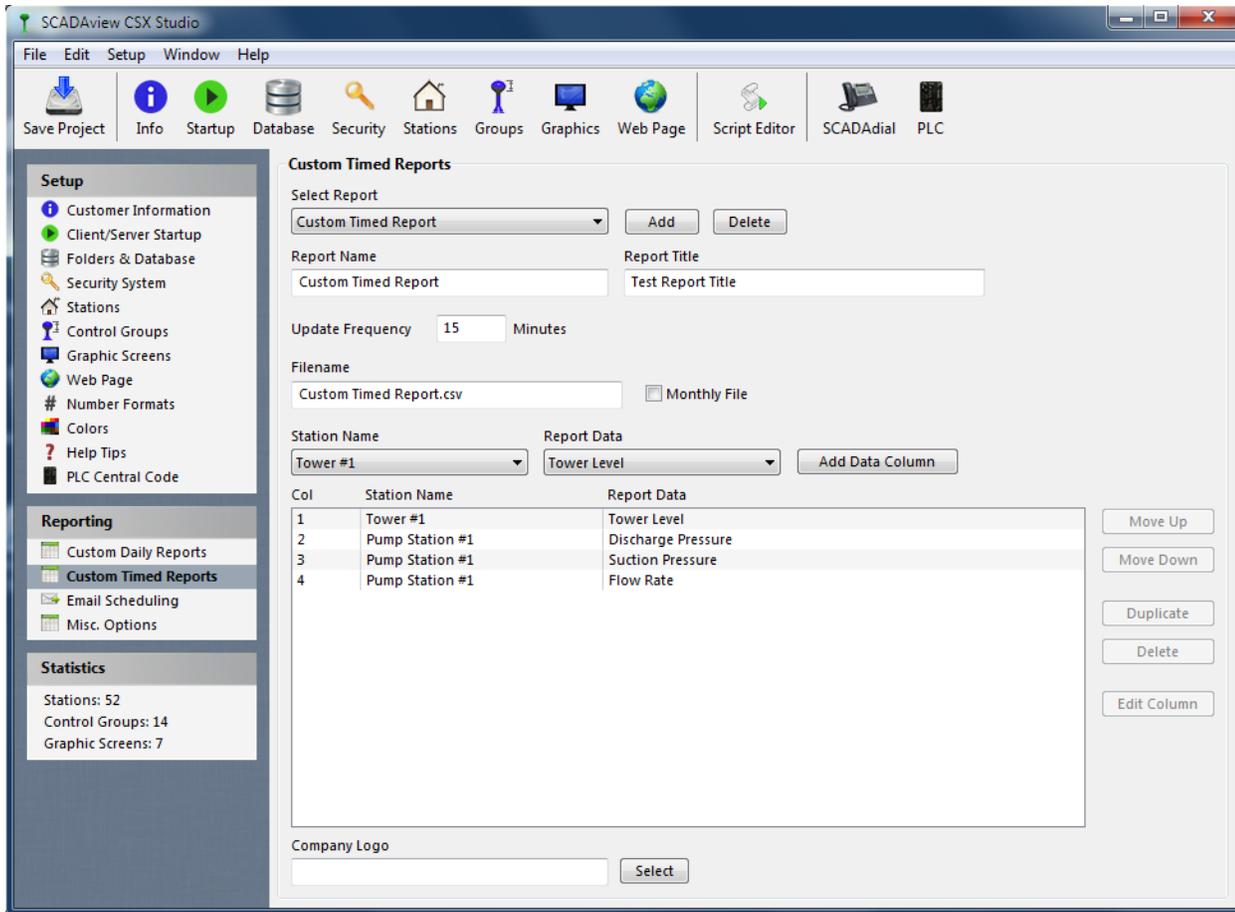


This reporting option is defined by selecting “Custom Daily Report” from the Setup menu in SCADAview CSX Studio.

Up to 50 user-defined Daily Reports can be updated every midnight (or at a custom Log Time) with 24-hour summary data columns. The stations and data points can be selected for up to 250 columns to be written to a comma-separated file (Microsoft Excel compatible). The first column in the report will always be the date in the format MM/DD/YYYY.

SQL database servers can also be updated with this data if so desired. Use “Folders & Database” to set up the connection. Supported servers include ODBC, Microsoft SQL, PostgreSQL and MySQL.

Custom Timed Reports

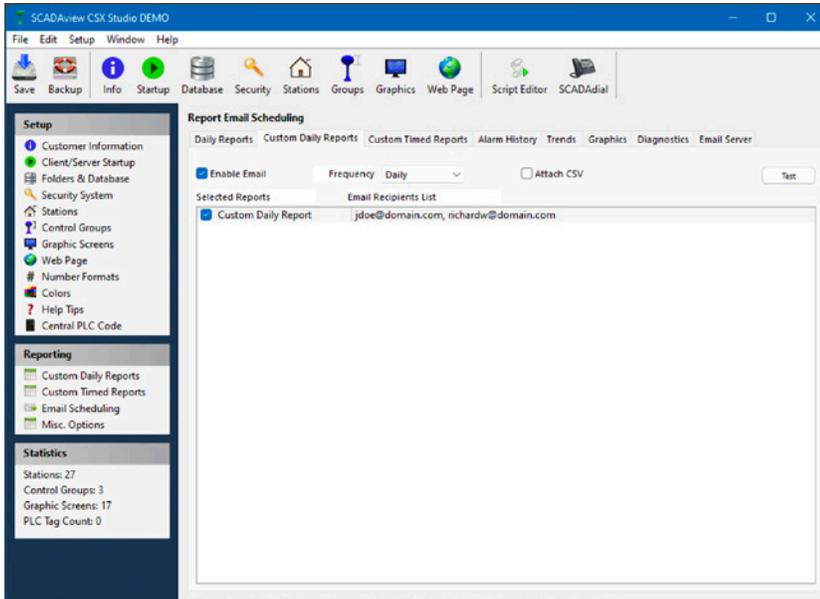


Up to 50 user-defined Timed Reports can be updated at any given rate with live station data. The stations and data points can be selected for up to 250 columns to be written to a comma-separated file (Microsoft Excel compatible). If “Monthly File” is checked, a new file will be started each month and the filename will end with MM-YYYY (month-year).

This reporting option is defined by selecting “Custom Timed Reports” from the Setup menu in SCADAview CSX Studio.

SQL database servers can also be updated with this data if so desired. Use “Folders & Database” to set up the connection.

Report Email Scheduling

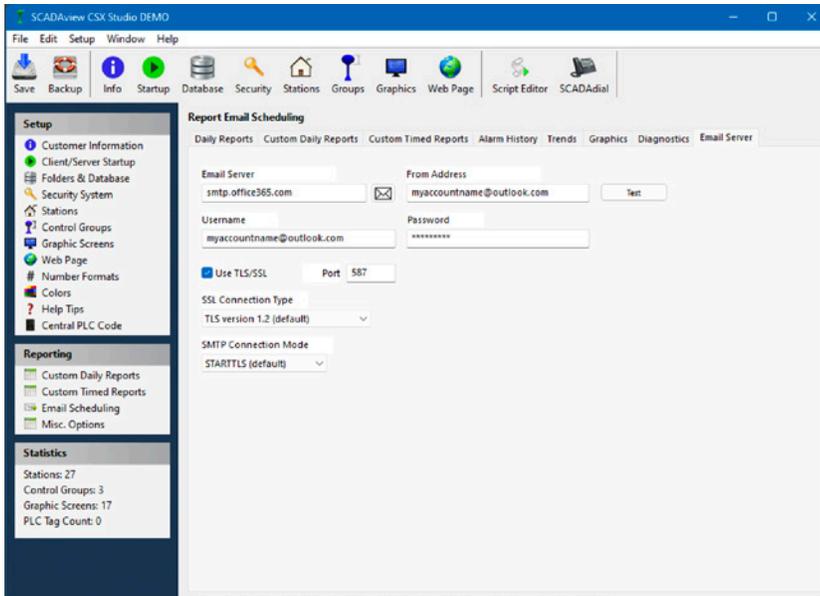


Daily, Custom Daily, Custom Timed, Alarm History, Graphic Screen, Trends and Radio Diagnostic can optionally be emailed to operators on a daily, weekly or monthly basis. Simply select “Enable Email” for the report type in question, select the reports and type in the email addresses separated by commas or semi colons as shown in the example above. Email addresses can also be specified with the recipients name like “John Doe <jdoe@domain.com>”.

The Daily email will be sent just after midnight each day. Weekly email will be sent out on Monday morning and Monthly will be sent on the 1st of each month with the previous month’s report.

Note: If an email address of “LocalPrinter” is used instead of an email address, the default local printer will be used.

In order to email the reports, SCADAview CSX needs to also have your email server settings. You may need to contact your network system administrator to get this info. SCADAview CSX will also use these settings whenever it needs to email anything else (CSX Script may be used to send email).




```

`DI5` bit(1) DEFAULT b'0',
`DI6` bit(1) DEFAULT b'0',
`DI7` bit(1) DEFAULT b'0',
`DI8` bit(1) DEFAULT b'0',
`DI9` bit(1) DEFAULT b'0',
`DI10` bit(1) DEFAULT b'0',
`DI11` bit(1) DEFAULT b'0',
`DI12` bit(1) DEFAULT b'0',
`DI13` bit(1) DEFAULT b'0',
`DI14` bit(1) DEFAULT b'0',
`DI15` bit(1) DEFAULT b'0',
`DI16` bit(1) DEFAULT b'0',
`EI1` bit(1) DEFAULT b'0',
`EI2` bit(1) DEFAULT b'0',
`EI3` bit(1) DEFAULT b'0',
`EI4` bit(1) DEFAULT b'0',
`EI5` bit(1) DEFAULT b'0',
`EI6` bit(1) DEFAULT b'0',
`EI7` bit(1) DEFAULT b'0',
`EI8` bit(1) DEFAULT b'0',
`EI9` bit(1) DEFAULT b'0',
`EI10` bit(1) DEFAULT b'0',
`EI11` bit(1) DEFAULT b'0',
`EI12` bit(1) DEFAULT b'0',
`EI13` bit(1) DEFAULT b'0',
`EI14` bit(1) DEFAULT b'0',
`EI15` bit(1) DEFAULT b'0',
`EI16` bit(1) DEFAULT b'0',
`EI17` bit(1) DEFAULT b'0',
`EI18` bit(1) DEFAULT b'0',
`EI19` bit(1) DEFAULT b'0',
`EI20` bit(1) DEFAULT b'0',
`EI21` bit(1) DEFAULT b'0',
`EI22` bit(1) DEFAULT b'0',
`EI23` bit(1) DEFAULT b'0',
`EI24` bit(1) DEFAULT b'0',
`EI25` bit(1) DEFAULT b'0',
`EI26` bit(1) DEFAULT b'0',
`EI27` bit(1) DEFAULT b'0',
`EI28` bit(1) DEFAULT b'0',
`EI29` bit(1) DEFAULT b'0',
`EI30` bit(1) DEFAULT b'0',
`EI31` bit(1) DEFAULT b'0',
`EI32` bit(1) DEFAULT b'0',
PRIMARY KEY (`ID`),
KEY `idx_SV1MHistoryTH_DT` (`DT`)
) ENGINE=InnoDB AUTO_INCREMENT=240776 DEFAULT CHARSET=utf8;

```

Station Address "PH" Daily Pump Report:

```

CREATE TABLE IF NOT EXISTS `SVDailyPumpReportPH` (
  `ID` int(11) NOT NULL AUTO_INCREMENT,
  `DT` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
  `PUMP1` double DEFAULT NULL,
  `PUMP2` double DEFAULT NULL,
  `PUMP3` double DEFAULT NULL,
  `PUMP4` double DEFAULT NULL,
  `PUMP5` double DEFAULT NULL,
  `PUMP6` double DEFAULT NULL,
  `PUMP7` double DEFAULT NULL,
  `PUMP8` double DEFAULT NULL,
  `FT24` double DEFAULT NULL,
  `FRMIN` double DEFAULT NULL,
  `FRMAX` double DEFAULT NULL,
  `FRAVG` double DEFAULT NULL,
  PRIMARY KEY (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=19 ;

```

```

--
-- Dumping data for table `SVDailyPumpReportPH`
--

```

```

INSERT INTO `SVDailyPumpReportPH` (`ID`, `DT`, `PUMP1`, `PUMP2`, `PUMP3`, `PUMP4`, `PUMP5`, `PUMP6`, `PUMP7`, `PUMP8`, `FT24`, `FRMIN`, `FRMAX`, `FRAVG`) VALUES
(1, '2012-07-02 04:59:59', 6.3, 7.3, 0, 12.05, 0, 0, 12.03, 11.95, 4444000, 239, 390, 315.5833),
(2, '2012-07-03 04:59:59', 5.97, 7.82, 0, 12.03, 0, 0, 11.9, 11.98, 4426000, 239, 390, 313.4917),
(3, '2012-07-04 04:59:59', 6.65, 7.42, 0, 11.98, 0, 0, 11.98, 12, 4435000, 239, 390, 314.4507),
(4, '2012-07-05 04:59:59', 7.18, 6.4, 0, 12, 0, 0, 12.02, 11.98, 4443000, 239, 390, 315.5326),
(5, '2012-07-06 04:59:59', 7.7, 6.12, 0, 12, 0, 0, 11.95, 12.08, 4425000, 239, 389, 313.4278),
(6, '2012-07-07 04:59:59', 7.5, 6.55, 0, 11.97, 0, 0, 12, 12, 4436000, 239, 390, 314.5549),
(7, '2012-07-08 04:59:59', 6.47, 7.05, 0, 11.98, 0, 0, 12.12, 11.95, 4444000, 239, 390, 315.4972),
(8, '2012-07-09 04:59:59', 6.2, 7.62, 0, 12.05, 0, 0, 12, 11.9, 4424000, 239, 390, 313.4035),
(9, '2012-07-10 04:59:59', 6.52, 7.53, 0, 11.95, 0, 0, 12.02, 12, 4437000, 239, 390, 314.6729),
(10, '2012-07-11 04:59:59', 7.03, 6.55, 0, 12.02, 0, 0, 11.95, 12.08, 4443000, 239, 390, 315.4167);

```

Sample Custom Daily Report #5 (includes 3 discrete input runtimes, flow rate low,high,avg and flow total)

```
CREATE TABLE IF NOT EXISTS `SVCustomDailyReport5` (
  `ID` int(11) NOT NULL AUTO_INCREMENT,
  `DT` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
  `PH_DI1_Runtime` double DEFAULT NULL,
  `PH_DI2_Runtime` double DEFAULT NULL,
  `PH_DI3_Runtime` double DEFAULT NULL,
  `PH_Flow_Rate_Low` double DEFAULT NULL,
  `PH_Flow_Rate_High` double DEFAULT NULL,
  `PH_Flow_Rate_NZAvg` double DEFAULT NULL,
  `PH_Flow_Total` double DEFAULT NULL,
  PRIMARY KEY (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=66 ;
```

```
--
-- Dumping data for table `SVCustomDailyReport5`
--
```

```
INSERT INTO `SVCustomDailyReport5` (`ID`, `DT`, `PH_DI1_Runtime`, `PH_DI2_Runtime`, `PH_DI3_Runtime`, `PH_Flow_Rate_Low`, `PH_Flow_Rate_High`, `PH_Flow_Rate_NZAvg`, `PH_Flow_Total`) VALUES
(1, '2012-07-10 04:59:59', 6.52, 7.53, 0, 239, 390, 314.6729, 4437000),
(2, '2012-07-11 04:59:59', 7.03, 6.55, 0, 239, 390, 315.4167, 4443000),
(3, '2012-07-12 04:59:59', 7.5, 6.32, 0, 239, 390, 313.3521, 4424000),
(4, '2012-07-13 04:59:59', 7.57, 6.48, 0, 239, 390, 314.7507, 4437000),
(5, '2012-07-14 04:59:59', 6.65, 6.87, 0, 239, 390, 315.3315, 4443000),
(6, '2012-07-15 04:59:59', 6.42, 7.43, 0, 239, 390, 313.3444, 4423000),
(7, '2012-07-16 04:59:59', 6.48, 7.57, 0, 239, 390, 314.8632, 4439000),
(8, '2012-07-17 04:59:59', 6.73, 6.75, 0, 239, 390, 315.2986, 4442000),
(9, '2012-07-18 04:59:59', 7.32, 6.55, 0, 239, 390, 313.3222, 4423000),
(10, '2012-07-19 04:59:59', 7.5, 6.55, 0, 239, 390, 314.941, 4439000);
```

Active Station Data

```
CREATE TABLE `SVActiveStationData` (
  `ID` int(11) NOT NULL AUTO_INCREMENT,
  `DT` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
  `SADDR` char(4) DEFAULT NULL,
  `NAME` varchar(255) DEFAULT NULL,
  `LOS` smallint(1) DEFAULT NULL,
  `PLCLOS` smallint(1) DEFAULT NULL,
  `NETLOS` smallint(1) DEFAULT NULL,
  `TimeStamp` varchar(10) DEFAULT NULL,
  `AI1` double DEFAULT NULL,
  `AI2` double DEFAULT NULL,
  `AI3` double DEFAULT NULL,
  `AI4` double DEFAULT NULL,
  `AI5` double DEFAULT NULL,
  `AI6` double DEFAULT NULL,
  `AI7` double DEFAULT NULL,
  `AI8` double DEFAULT NULL,
  `AI9` double DEFAULT NULL,
  `AI10` double DEFAULT NULL,
  `AI11` double DEFAULT NULL,
  `AI12` double DEFAULT NULL,
  `AI13` double DEFAULT NULL,
  `AI14` double DEFAULT NULL,
  `AI15` double DEFAULT NULL,
  `AI16` double DEFAULT NULL,
  `Flow_Rate` double DEFAULT NULL,
  `Flow_Total` double DEFAULT NULL,
  `Flow_Rate_2` double DEFAULT NULL,
  `Flow_Total_2` double DEFAULT NULL,
  `Flow_Rate_3` double DEFAULT NULL,
  `Flow_Total_3` double DEFAULT NULL,
  `Flow_Rate_4` double DEFAULT NULL,
  `Flow_Total_4` double DEFAULT NULL,
  `Flow_Rate_5` double DEFAULT NULL,
  `Flow_Total_5` double DEFAULT NULL,
  `Flow_Rate_6` double DEFAULT NULL,
  `Flow_Total_6` double DEFAULT NULL,
  `Flow_Rate_7` double DEFAULT NULL,
  `Flow_Total_7` double DEFAULT NULL,
  `Flow_Rate_8` double DEFAULT NULL,
  `Flow_Total_8` double DEFAULT NULL,
  `DI1` smallint(1) DEFAULT NULL,
  `DI2` smallint(1) DEFAULT NULL,
  `DI3` smallint(1) DEFAULT NULL,
  `DI4` smallint(1) DEFAULT NULL,
  `DI5` smallint(1) DEFAULT NULL,
  `DI6` smallint(1) DEFAULT NULL,
  `DI7` smallint(1) DEFAULT NULL,
  `DI8` smallint(1) DEFAULT NULL,
  `DI9` smallint(1) DEFAULT NULL,
  `DI10` smallint(1) DEFAULT NULL,
  `DI11` smallint(1) DEFAULT NULL,
  `DI12` smallint(1) DEFAULT NULL,
  `DI13` smallint(1) DEFAULT NULL,
  `DI14` smallint(1) DEFAULT NULL,
  `DI15` smallint(1) DEFAULT NULL,
  `DI16` smallint(1) DEFAULT NULL,
  `EI1` smallint(1) DEFAULT NULL,
  `EI2` smallint(1) DEFAULT NULL,
```


Exporting Historical Data

History File Export

Station Name
Pump Station #1

Flow Rate
Flow Total
Flow Rate #2
Flow Total #2
Flow Rate #3
Flow Total #3
Flow Rate #4

Selected Columns for Export

Station	Input
Tower #1	Tower Level
Pump Station #1	Suction Pressure
Pump Station #1	Flow Rate
Pump Station #1	Flow Total

Start Date: 4/ 1/2018 End Date: 4/30/2018 Export Resolution: 15 Minutes

Close Export

Station data for a given period of time can be exported to a Microsoft Excel spreadsheet or a comma-separated file. Select the “Export History” from the Files menu in SCADAview CSX or in SCADAview CSX Studio. Then select the station and data point from the list on the left and click the arrow to add it to the exported columns.

Station Name

The name of the station with the data to be exported.

Selected Columns for Export

The desired historical data point list in the column order they will be exported. Select a row and click the x icon to remove it from the export list.

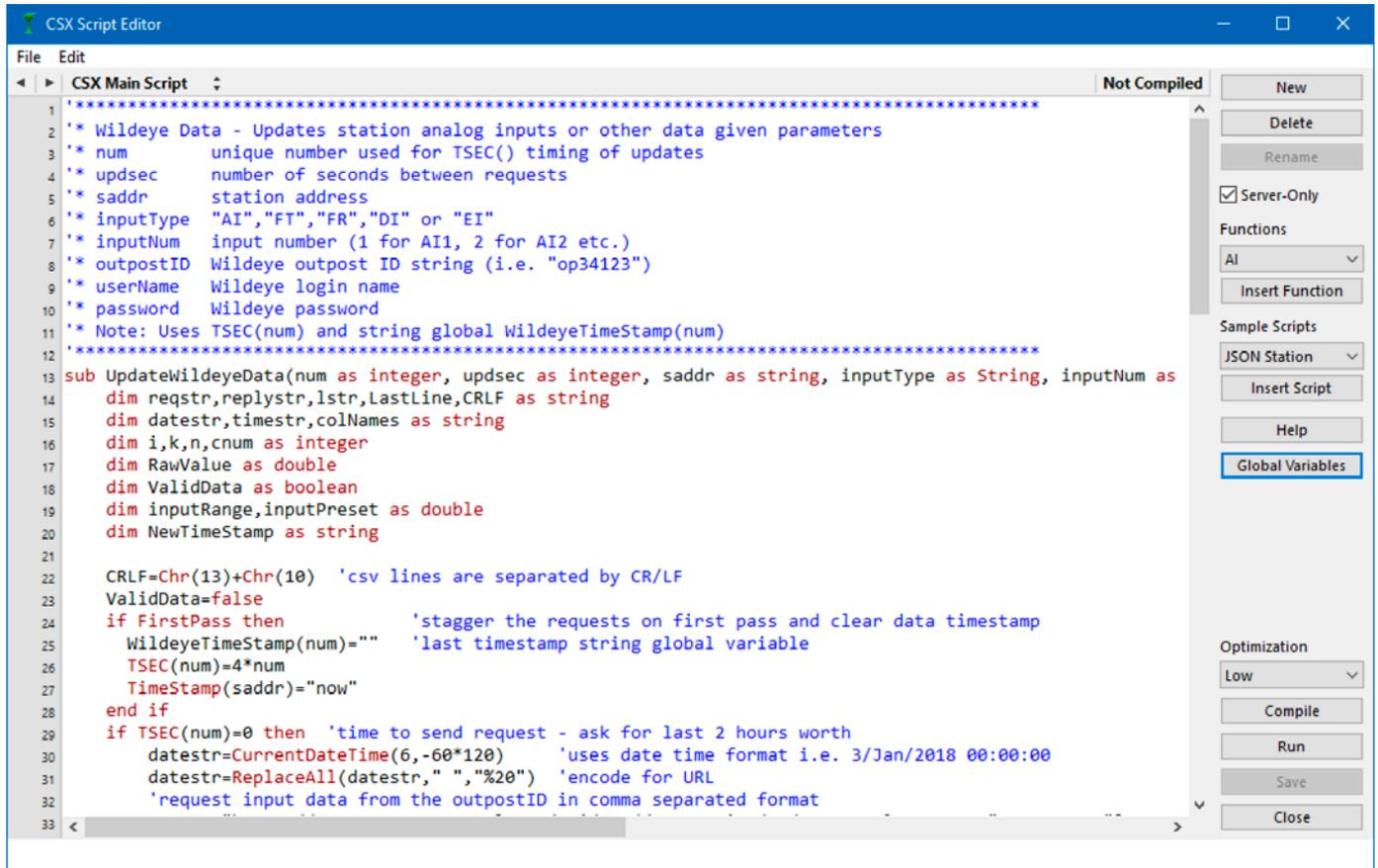
Starting / End Date

Starting and ending Month, Day and Year for the exported data.

Resolution

Time step for the exported data (1 minute is the default resolution).

Script Language



SCADAview CSX uses a scripting language that is a lot like Microsoft's Visual Basic or similar variants. Scripts can be run as graphics click actions, whenever a station's data changes or continuously in a main script (every second).

Scripts can optionally be set to only run on a SCADAview CSX server. This may be necessary when a script is doing server related tasks such as custom data logging or email messaging.

Variables and Constants

All numeric and alphanumeric operators are supported:

+, -, *, /, %, Mod, <, =, >, <=, >=, <>.

Logical operators: And, Not, Or.

Several forms of comments are supported: ', //, and REM.

Data Types

CSX Script supports the following data types: Integer, Single, Double, Boolean, String

Arrays can use any of these types.

Control Structures

All the control structures specified in this Language Reference are supported. This includes:

Function...

Sub...

For... Next

Do... Loop

If... Then... Else... Elseif... End If

Select Case... End Select

While...Wend

Return statement

Standard (BASIC Language) Functions

Function Definition	Description
Abs(Double) As Double	Returns the absolute value of the number specified.
Acos(Double) As Double	Returns the arccosine of the value specified. The arccosine is the angle whose cosine is value. The returned angle is given in radians.
Asc(String) As Integer	Returns as an Integer, the ASCII value for the first character of a String.
Asin(Double) As Double	Returns the arcsine of the value specified.
Atan(Double) As Double	Returns the arctangent of the value specified. The arctangent is the angle whose tangent is value.
Atan2(Double, Double) As Double	Returns the arctangent of the point whose coordinates are x and y. The arctangent is the angle from the x-axis to a line drawn through the origin (0,0) and a point with coordinates x, y.
ByRef keyword	Used to pass a parameter by reference.
ByVal keyword	Used to pass a parameter by value.
CDBl(String) As Double	Returns the numeric equivalent of the passed string.
Ceil(Double) As Double	Returns the value specified rounded up to the nearest integer.
Chr(Double) As String	Returns the character whose ASCII value is passed.
CMY	Returns a Color based on the CMY (cyan, magenta, yellow) color model.
Color	A Color is an intrinsic data type that consists of three bytes that define the color.
Const name = value	Declares a value as a local constant.
Cos(Double) As Double	Returns the cosine of the given angle.
CountFields(String, String) As Integer	Returns the number of values (fields) in the string passed that are separated by the separator string passed.
Dim	Creates a local variable or array with the name and size (in the case of an array) and data type specified.
Do...Loop	Repeatedly executes a series of statements while a specified condition is True.
Exit	Causes control to exit a loop and jump to another line of code without the loop conditions being satisfied.
Exp(Double) As Double	eturns "e to the power of the value specified.
False	Used to set Boolean variables or properties. False is the result of a comparison of two objects that are not equal.
Floor(Double) As Double	Returns the value specified rounded down to the nearest Integer.
For...Next	Executes a series of statements a specified number of times.
Format(Double, String) As String	Returns as a string a formatted version of the number passed based on the parameters specified. The Format function is similar to the way spreadsheet applications format numbers.
Function ... End Function	Declares the name, parameters, returned value, and code that form the body of a function (method that returns a value).
GOTO keyword	Jumps to a statement label.
Hex(Integer) As String	Returns as a String the hexadecimal version of the number passed.
HSV	Returns a Color object based on the HSV (hue, saturation, value) color model.

If...Then...Else	Conditionally executes a group of statements, depending on the value of a boolean expression.
InStr(Integer, String, String) As Integer	Returns the position of the first occurrence of a string inside another string. The first character is numbered 1.
IsA operator	Used to determine the class of a particular object reference.
Left(String, Integer) As String	Returns the first n characters in a source string.
Len(String) As Integer	Returns the number of characters in the specified string.
Log(Double) As Double	Returns the natural logarithm of the value specified.
Lowercase(String) As String	Converts the given string to all lowercase characters.
LTrim(String) As String	Returns the string passed with leading (left side) whitespaces removed.
Max(Double, Double) As Double	Returns the largest value passed to it.
Microseconds As Double	Returns the number of microseconds (1,000,000th of a second) that have passed since the user's computer was started.
Mid(String, Integer, Integer) As String	Returns a portion of a string. The first character is numbered 1.
Min(Double, Double) As Double	Returns the smallest of the numbers passed.
Nil	Used to determine if an object is nil (no value).
NthField(String, String, Integer) As String	Returns a field from a row of data. The first field is numbered 1.
Oct(Integer) As String	Returns as a string, the octal version of the number passed.
Pow(Double, Double) As Double	Returns the value specified raised to the power specified.
Redim	Resizes the passed array. Arrays are zero-based.
Rem	Used to add comments to your code. (can also use // or ')
Replace(String, String, String) As String	Replaces the first occurrence of a string with another string.
ReplaceAll(String, String, String) As String	Replaces all occurrences of a string with another string.
RGB	Returns a Color based on the RGB (red, green, blue) color model.
Right(String, Integer) As String	Returns the last n characters from the string specified.
Rnd As Double	Returns a randomly generated number in the range 0 to 1.
Round(Double) As Double	Returns the passed value rounded to the nearest Integer.
RTrim(String) As String	Returns the string data type passed with trailing (right side) whitespaces removed.
Select Case	Executes one of several groups of statements, depending on the value of an expression.
Sin(Double) As Double	Returns the sine of the value specified.
Sqrt(Double) As Double	Returns the square root of the value specified.
Str(Double) As String	Returns the string form of the value passed.
StrComp(String, String, mode as Integer) As Integer	Makes a binary (mode=0, case-sensitive) or text (mode=1, lexicographic) comparison of the two strings passed and returns the result.
Sub ... End Sub	Declares the name, parameters, and code that form the body of a subroutine (method).
Tan(Double) As Double	Returns the tangent of the angle specified.

Ticks as Integer	Returns the number of ticks (60th of a second) that have passed since the user's computer was started.
Titlecase(String) As String	Returns the string passed to it with all alphabetic characters in Titlecase.
Trim(String) As String	Returns the string passed with leading and trailing whitespaces removed.
True	used to set a Boolean object to the value of "True or test whether an existing Boolean expression is equal to True.
Ubound(array) As Integer	Returns the index of the last element in an array. Arrays are zero-based. Element zero may or may not be used.
Uppercase(String) As String	Converts the given string to all uppercase characters.
Val(String) As Double	Returns the numeric form of a string.
While...Wend	Repeatedly executes a series of statements while a specified condition is True.

SCADAview CSX Station and Group Data Functions

Function Definition	Description
AI(saddr as string, ai as integer) as double	Station analog input value given the address and input number.
AO(saddr as string, ao as integer) as double	Station analog output value given the address and output number.
CGAENABLE(cg as integer, ae as integer) as integer	Control group analog enable value (1 or 0) given the group number and enable number.
CGALT(cg as integer) as integer	Control group alternator value given the group number. (1=forward, 2=reverse, 3=auto)
CGLASTREAD(cg as integer) as string	Returns the Date and Time string for when a remote control group was last read. (i.e. 1/7/15 10:27 AM)
CGPREFILL(cg as integer) as double	Control group prefill value given the group number.
CGRESET(cg as integer) as integer	Control group reset value given the group number.
CGSTART(cg as integer, start as integer) as double	Control group start value given the group number and start number.
CGSTOP(cg as integer, stop as integer) as double	Control group stop value given the group number and start number.
CGTIHR(cg as integer) as integer	Control group time inhibit hours value given the group number.
CGTIMN(cg as integer) as integer	Control group time inhibit minutes value given the group number.
CGTRHR(cg as integer) as integer	Control group time restore hours value given the group number.
CGTRMN(cg as integer) as integer	Control group time restore minutes value given the group number.
ControlGroupAddress(cgname as string) as string	Returns the control group address given the control group name.
ControlGroupAddress(cgindex as integer) as string	Returns the control group address given the number (list index).
ControlGroupCount as integer	Returns the total number of control groups.
ControlGroupName(cgaddr as string) as string	Returns the control group name given the address.
ControlGroupName(cgindex as integer) as string	Returns the control group name given the number (list index).

DBAND(saddr as string, ai as integer) as double	Station analog input high-low deadband value given the address and input number.
DI(saddr as string, di as integer) as integer	Station discrete input value (1 or 0) given the address and input number.
DICycles(saddr as string, di as integer) as integer	Maintenance system cycle count for the given station and input.
DICyclesAlarm(saddr as string, di as integer) as integer	Maintenance system cycle alarm bit (1 or 0) for the given station and input.
DICyclesSetpoint(saddr as string, di as integer) as integer	Maintenance system cycle alarm setpoint for the given station and input.
DILastRun(saddr as string, di as integer, fmt as integer) as string	Maintenance system Last Run date / time string in either SQLDateTime format (YYYY-MM-DD HH:MM:SS) with 0 for fmt, or other formats: 1=ShortDate+ShortTime, 2=LongDate+LongTime, 3=ShortDate, 4=LongDate, 5=ShortTime, 6=LongTime
DIRuntime(saddr as string, di as integer) as double	Maintenance system runtime in hours for the given station and input.
DIRuntimeAlarm(saddr as string, di as integer) as integer	Maintenance system runtime alarm bit (1 or 0) for the given station and input.
DIRuntimeSetpoint(saddr as string, di as integer) as double	Maintenance system runtime alarm setpoint in hours for the given station and input.
DOCALL(saddr as string, do as integer) as integer	Station discrete output call bit (1 or 0) given the address and input number.
DODSBL(saddr as string, do as integer) as integer	Station discrete output disabled bit (1 or 0) given the address and input number.
DOFAIL(saddr as string, do as integer) as integer	Station discrete output failed bit (1 or 0) given the address and input number.
DORUN(saddr as string, do as integer) as integer	Station discrete output run bit (1 or 0) given the address and input number.
DOGD(saddr as string, do as integer) as integer	Station discrete output group disable bit (1 or 0) given the address and input number.
DOAD(saddr as string, do as integer) as integer	Station discrete output analog disable bit (1 or 0) given the address and input number.
DOPD(saddr as string, do as integer) as integer	Station discrete output pump disable bit (1 or 0) given the address and input number.
DOTD(saddr as string, do as integer) as integer	Station discrete output timeclock disable bit (1 or 0) given the address and input number.
EI(saddr as string, ei as integer) as integer	Station expansion discrete input value (1 or 0) given the address and input number.
FALLING(saddr as string, ai as integer) as integer	Station analog input falling (1 or 0) given the address and input number.
FR(saddr as string, fr as integer) as double	Station flow rate value given the address and input number.
FRDBAND(saddr as string, fr as integer) as double	Station flow rate high-low deadband value given the address and input number.
FRFALLING(saddr as string, fr as integer) as integer	Station flow rate falling bit (1 or 0) given the address and input number.
FRHIGH(saddr as string, fr as integer) as double	Station flow rate high setpoint given the address and input number.

FRHIGHALARM(saddr as string, fr as integer) as integer	Station flow rate high alarm bit given the address and input number.
FRLow(saddr as string, fr as integer) as double	Station flow rate low setpoint given the address and input number.
FRLowALARM(saddr as string, fr as integer) as integer	Station flow rate low alarm bit given the address and input number.
FRRISING(saddr as string, fr as integer) as integer	Station flow rate rising bit (1 or 0) given the address and input number.
FT(saddr as string, ft as integer) as double	Station flow total value given the address and input number.
FT24(saddr as string, ft as integer) as double	Station 24hr flow total value given the address and input number.
FT24FALLING(saddr as string, ft as integer) as integer	Station 24hr flow total falling bit given the address and input number.
FT24HIGH(saddr as string, ft as integer) as double	Station 24hr flow total high setpoint given the address and input number.
FT24HIGHALARM(saddr as string, ft as integer) as integer	Station 24hr flow total high alarm bit given the address and input number.
FT24LOW(saddr as string, ft as integer) as double	Station 24hr flow total low setpoint given the address and input number.
FT24LOWALARM(saddr as string, ft as integer) as integer	Station 24hr flow total low alarm bit given the address and input number.
FT24RISING(saddr as string, ft as integer) as integer	Station 24hr flow total rising bit given the address and input number.
FTFALLING(saddr as string, ft as integer) as integer	Station flow total falling bit given the address and input number.
FTRISING(saddr as string, ft as integer) as integer	Station flow total rising bit given the address and input number.
HIGH(saddr as string, ai as integer) as double	Station analog input high setpoint given the address and input number.
HIGHALARM(saddr as string, ai as integer) as integer	Station analog input high alarm bit given the address and input number.
HIHI(saddr as string, ai as integer) as double	Station analog input high-high setpoint given the address and input number.
HIHIALARM(saddr as string, ai as integer) as integer	Station analog input high-high alarm bit given the address and input number.
LABELS(saddr as string, itype as string, inum as integer, lname as string) as string	Station labels and other information given the input type, number and label name. (Inputs types are AI, DI, EI, FR, FT, AO and HOA. The label names correspond to the labels at the top of each station setup panel. For instance, the analog inputs would be: Name, Range, Preset etc.)
LOLO(saddr as string, ai as integer) as double	Station analog input low-low setpoint given the address and input number.
LOLOALARM(saddr as string, ai as integer) as integer	Station analog input low-low alarm bit given the address and input number.
LOS(saddr as string, ai as integer) as integer	Station Loss Of Signal bit (1=LOS) given the address and input number.
LOW(saddr as string, ai as integer) as double	Station analog input low alarm setpoint given the address and input number.

LOWALARM(saddr as string, ai as integer) as integer	Station analog input low alarm bit given the address and input number.
NDS(saddr as string) as integer	Returns a 1 whenever the station data is less than 6 seconds old.
NETLOS(saddr as string) as integer	Returns a 1 whenever the given station is in network Loss Of Signal (when using SCADAview Net Protocol).
PCHOA(saddr as string, pump as integer) as integer	Station PC HOA position given the address and pump number. (0=OFF, 1=HAND, 2=AUTO)
PCHOALASTREAD(cg as integer) as string	Returns the Date and Time string for when a remote PC HOA was last read. (i.e. 1/7/15 10:27 AM)
PLCLOS(saddr as string) as integer	Returns a 1 whenever the given station is in PLC Loss Of Signal (SCADAview CSX has stopped communicating with the PLC).
RATE(saddr as string, ai as integer) as double	Station analog input falling rate alarm setpoint given the address and input number.
RATEALARM(saddr as string, ai as integer) as integer	Station analog input falling rate alarm bit given the address and input number.
RISERATE(saddr as string, ai as integer) as double	Station analog input rising rate alarm setpoint given the address and input number.
RISERATEALARM(saddr as string, ai as integer) as integer	Station analog input rising rate alarm bit given the address and input number.
RISING(saddr as string, ai as integer) as integer	Station analog input rising (1 or 0) given the address and input number.
StationAddress(sname as string) as string	Returns a station address given the station name.
StationAddress(snum as integer) as string	Returns a station address given the station number (list index).
StationCount as integer	Returns the total number of stations.
StationData(saddr as string, doff as integer) as double	Returns a value from station data structure given it's address and data offset location.
StationName(saddr as string) as string	Returns a station name given the address.
StationName(snum as integer) as string	Returns a station name he station number (list index).
StationNotes(saddr as string) as string	Returns a station notes given it's address.
StationNotesColorStr(saddr as string) as string	Returns a station notes color (6 char hex string) given it's address.
SYSHOA(saddr as string, do as integer) as integer	Station System HOA position given the address and pump number. (0=OFF, 1=HAND, 2=AUTO)
TimeStamp(saddr as string) as string	Station Data Time Stamp (12-hour clock formatted string)
TimeStampDate(saddr as string) as string	Station Data Time Stamp Date (short format date string)
TimeStampDataAge(saddr) as integer	Returns the data age (in seconds since last update) for the given station address
TimeStampHours(saddr as string) as integer	Returns the Time Stamp Hours given the station address
TimeStampMinutes(saddr as string) as integer	Returns the Time Stamp Minutes given the station address
TimeStampSeconds(saddr as string) as integer	Returns the Time Stamp Seconds given the station address

VDS(saddr as string) as integer	Station Valid Data Signal bit (1=Valid) given the address and input number.
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SCADAview CSX Miscellaneous Functions

Function Definition	Description
AlarmAck	Tells SCADAview CSX to acknowledge all alarms.
AlarmCount as integer	Returns the number of active alarms.
AlarmDisable(saddr as string, itype as string, inum as integer) as boolean	Returns whether or not a particular station alarm has been disabled given the input type and number. (inputs types are AI, DI, EI, FR, FT, LOS)
AlarmDisableHours(saddr as string, itype as string, inum as integer) as double	Returns how many more hours a station alarm will be disabled given the input type and number. (inputs types are AI, DI, EI, FR, FT, LOS)
AlarmHorn as boolean	Returns true if there are any unacknowledged alarms (alarm horn is on).
AppRunning as boolean	Returns False when SCADAview CSX is being shut down. Use this to to cancel long loops or continuously running scripts.
Beep	Plays the default beep sound.
BitSet(wval as double, bnum as integer, bval as integer)	Sets a bit in the given word to a given value and returns the result.
BitTest(wval as double, bnum as integer) as integer	Tests a bit number in the given word and returns the result.
BoolToInt(bval as boolean) as integer	Returns an integer "0" or "1" based on whether the given boolean value is "false" or "true".
CSV2HTML(csvstr as string, title as string, hcsvstr as string) as string	Returns an HTML string with a table given a comma-separated fields / carriage return separated lines string. The HTML will have a title and column labels when these parameters are included. The column heading hcsvstr parameter needs to be a comma-separated string.
CSXBackupServer as boolean	Returns True if SCADAview CSX is set to run or is currently running as a backup server.
CSXClientMode as boolean	Returns True if SCADAview CSX is currently running as a client.
CSXServerMode as boolean	Returns True if SCADAview CSX is currently running as a server.
CSXMemoryUsed as double	Returns the amount of RAM memory (MB) used by the applicaion. Note: This value may differ from the total shown in the task manager.
CurrentDate(fmt as integer, dayoffset as integer) as string	Returns today's date string given the desired format: 1=ShortDate, 2=LongDate, 3=SQLDate format (YYYY-MM-DD), 4=MM/DD/YYYY, 5=MMDDYYYY, 6=dd/MMM/yyyy. Given no fmt parameter it will return the ShortDate (i.e. mm/dd/yy). It can also be given an optional day offset (i.e. CurrentDate(5,-1).
CurrentDateTime(fmt as integer, secoffset as integer) as string	Returns today's date string given the desired format: 1=ShortDate ShortTime, 2=LongDate LongTime, 3=SQLDateTime (YYYY-MM-DD HH:MM:SS), 4=MM/DD/YYYY HH:MM:SS, 5=MMDDYYYY HH:MM:SS, 6=dd/MMM/yyyy HH:MM:SS. Given no fmt parameter it will return the ShortDate ShortTime. It can also be given an optional time offset in seconds (i.e. CurrentDateTime(5,-360).
CurrentTime(fmt as integer, secoffset as integer) as string	Returns the current time string given the desired format: 1=ShortTime, 2=LongTime, 3=SQL-Time (HH:MM:SS). Given no fmt parameter it will return the ShortTime. It can also be given an optional time offset in seconds (i.e. CurrentTime(5,-60).
CurrentTimeZoneOffset as string	Returns the current GMT time zone offset string with the format: -HH:MM (or +HH:MM)
DateTimeValue(dtstr as string, param as integer) as integer	Parses the given date/time string and returns the date or time value given the desired param (1=DayOfWeek, 2=Month, 3=Day, 4=Year, 5=Hour, 6=Minute, 7=Second). Example: DateTimeValue("2012-02-01T13:45:00",4) would return a value of 2012.
FirstPass as boolean	True when SCADAview CSX first runs the script.

GlobalAlarm(anum as integer) as boolean	Returns the current state of a global alarm given the alarm number (1=CTU Comm Fail, 6=TCP/IP Server Fail, 7=SCADAadial Application Fail, 8=Modbus Comm Fail, 9=SV-PLC Server Fail, 10=PLC Major Error Halt, 11=PLC Math Error, 12=PLC Battery Low, 13=PLC Not Running, 14=SCADAadial Modem Failure, 15=TCP/IP Secondary Server Fail, 16=Phone Line Failure, 17=Server Modem Failure, 18=Server Phone Line Failure)
GotoNextScreen	Changes main graphics window to the next screen
GotoPrevScreen	Changes main graphics window to the previous screen
GotoScreenName(scrname as string)	Changes main graphics window to the given screen name
GotoScreenNum(scrnum as integer)	Changes main graphics window to the given screen number
GTagProperty(scrname as string, objname as string, propname as string) as string	Returns or sets a property value for any graphics screen tag. The tag object must be named and the property name will match what appears in the graphics editor property window.
GTagRedrawAll	This will force a redraw of all the graphic screen tags. This may be useful after property values are changed.
GTagScreenCount as integer	Returns to total number of graphics screens.
GTagScreenName(scrnum as integer) as string	Returns the graphics screen name given the screen number (1-ScreenCount).
GTagScreenType(scrnum as integer) as integer	Returns the graphics screen type (0=normal, 1=popup, 2=clone) given the screen number.
GTagScreenTagCount(scrnum as integer) as integer	Returns the total number of tags for a given graphics screen number.
HTTPNetRequestPage(sck as integer, url as string [, method as string])	Opens an HTTP 1.1 protocol connection to the given url and requests the web page. The socket number must be in the range of 0-255. The optional method parameter can be "GET", "POST", "OPTIONS", "HEAD", "PUT" etc. Both standard HTTP and secure HTTPS connections are supported. Example: HTTPNetRequestPage(1,"https://www.scadaview.com/")
HTTPNetPageReceived(sck as integer) as string	Returns the latest web page (string data) received after using the HTTPNetRequestPage function.
HTTPRequestPage(sck as integer, url as string [, method as string])	Opens an HTTP protocol connection to the given url and requests the web page. The socket number must be in the range of 0-255. The optional method parameter can be "GET", "POST", "OPTIONS", "HEAD", "PUT" etc. as per RFC 2616 describing the HTTP 1.1 protocol. If omitted, the "GET" method will be used: Example: HTTPRequestPage(1,"http://www.micro-comm-inc.com/index.html")
HTTPPageReceived(sck as integer) as string	Returns the latest web page (string data) received after using the HTTPRequestPage function.
HTTPSRequestPage(sck as integer, url as string [, method as string [, conntype as integer]])	Opens an HTTP secure socket (TLSv1) protocol connection to the given url and requests the web page. The socket number must be in the range of 0-255. The optional method parameter can be "GET", "POST", "OPTIONS", "HEAD", "PUT" etc. as per RFC 2616 describing the HTTP 1.1 protocol. If omitted, the "GET" method will be used. The optional conntype parameter set the connection type for the SSL socket. It can be 3=TLSv1, 4=TLSv1.1 or 5=TLSv1.2 (default uses auto-negotiate)
HTTPSPageReceived(sck as integer) as string	Returns the latest secure socket web page (string data) received after using the HTTPSRequestPage function.
IntToBool(ival as integer) as boolean	Returns a boolean "false" or "true" based on whether the given integer value is "0" or "non-zero".
JSONValue(jsonStr as string, itemName as string) as string	Parses the given JSON string, looks up the given named key and returns the corresponding string value. Note: Array items will be returned as a single comma-separated string and sub-objects will be returned as a JSON string. Example: If the string str1 is equal to the JSON formatted { "Name": "John Doe", "Age": 32 } then JSONValue(str1, "Name") would return "John Doe" and JSONValue(str1, "Age") would return "32".
JSONStationUpdate(saddr as string, jsonStr as string)	Parses the given JSON string reply (from a SCADAvie CSX station request i.e. http://www.scadaview.com:5880/JSON/Station.php?addr=HH) and updates the given address with all the data.

KeyPressed as string	Returns the last key pressed in SCADAview CSX (function keys will be returned as F1,F2 etc.)
LaunchFile(filepath as string)	Runs the given program file, opens the given folder name or launches the given file with it's default application.
LaunchReports	Runs the Reports CSX application.
LaunchTrend(penfilename as string)	Runs the Trend CSX application which will then load the given pen file.
LaunchSTrend	Runs the Single-Pen Trend CSX application.
LogMessage(Inum as integer, msg as string)	Logs a custom message to the given SCADAview CSX log number (1=alarm, 2=status, 3=set-points, 4=security, 5=scadadial, 6=system)
MonthNumDays(year, month) as integer	Returns the total number of days in month given the year and month.
MouseX as integer	Current X location of the mouse cursor (in pixels) relative to the upper left corner of the primary screen.
MouseY as integer	Current Y location of the mouse cursor (in pixels) relative to the upper left corner of the primary screen.
MyLANIP as string	Returns the current LAN IP address of this machine.
MyWANIP as string	Returns the current WAN IP address of this machine.
OpenNewWindow(scrname as string)	Opens a new graphics window given the name.
OpenNewFloatingWindow(scrname as string)	Opens a new floating graphics window (always in front of main graphics window) given the name.
OSFreeDiskSpace(pathnum)	Returns the amount of free space in Gigabytes for an optional path number (0=setup folder, 1=primary history, 2=secondary history) as reported by the operating system. The default path is the primary history folder.
OSFreeMemory	Returns the available RAM memory in Megabytes. This value will mean different things depending on the operating system.
OSR(bval as boolean, osrnum as integer) as boolean	One-shot rising function. This function will return True only once whenever the boolean bval parameter goes from false to true
OSR(ival as integer, osrnum as integer) as boolean	One-shot rising function. This function will return True only once whenever the ival parameter goes from 0 to non-zero
OSRTime(hour as integer, minute as integer) as boolean	One-shot time function. This function will return True only once whenever the current time reaches the given hour and minute (0-23,0-59)
PLCDiagValue(plcnum as integer, param as integer) as double	Returns a PLC diagnostic value given the plc # and the requested parameter (1=Update Rate (msec), 2=Total Messages, 3=Poll Time (sec), 4=Reads, 5=Read OKs, 6=Writes, 7=Write OKs, 8=Connection Fails, 9=Timeouts, 10=Status Errors, 11=Percent Done, 12=TxBytes, 13=RxBytes, 14=CRC Errors)
PLCName(plcnum as integer)	Returns the name of the PLC (or ip address if not named) for the requested plc # (numbers starting with 1 - as listed in the SV-PLC diagnostics screen)
PLCSendTime	Sends the computer time and date to all PLCs that have this option enabled using the SV-PLC server.
PLCSetConnection(cnum as integer)	This command tells the SV-PLC server which connection to use (1=primary, 2=secondary) when a PLC has both IP addresses specified (i.e. 192.168.3.118 192.168.3.114). Normally the secondary IP will get used only when the primary fails. The command PLCSetConnection(2) will tell SV-PLC to use the secondary IP address.
PlayAlarmSound(num as integer)	Plays the given alarm horn sound number (1=Main, 2=Pump Fail, 3=LOS, 4=Levels, 5=Status)
PlaySoundFile(fname as string)	Plays the given sound file name. The sound file needs to be in the "AlarmSounds" folder located in SCADAview CSX programs folder.

Print(msg as string)	Prints a line of text to the script console - normally used for debugging purposes.
PrintScreen	Prints the current main graphics viewer window.
RadioDiagReportHTML as string	Returns an HTML source string containing a report for all the CTU32 stations that were selected to collect radio diagnostics.
RadioDiagValue(saddr as string, param as integer) as double	Returns a CTU32 radio diagnostic value given the station address and the requested parameter (1=port, 2=type, 3=timeout, 4=antenna, 5=MR, 6=MW, 7=Done, 8=Fails, 9=Percent Done)
RunScript(fname as string [, sparams as string])	Runs another script given the script filename and an optional parameters string.
SaveScreen(scname as string, pzoom as single, fname as string)	Saves a snapshot of the given graphics screen (jpeg file) to the Script Output folder. Use the pzoom parameter to zoom the picture from 1 to 100%.
SCADAdialEnable as boolean	Returns the dialer enable status from SCADAdial CSX. Can be used to change the dialer enable status (tells SCADAdial CSX to enable or disable i.e SCADAdialEnable=true)
SCADAdialStatus as string	Returns the latest status message string from SCADAdial CSX (if installed and enabled). This message could be one of the following: Disabled, Modem Failed, Phone Line Fail, Recording..., Dialing, Dialing username, Line Busy, No Dialtone, Modem Reset, Modem Fail, Emailing All, OK
Scale(dval as double, minraw as double, maxraw as double, minscl as double, maxscl as double) as double	Scale the given dval variable given the min/max parameters.
ScreenNum	Returns the current screen number for the main graphics window.
ScriptParams	Parameters string which can be passed in from the Run Script graphics action or the RunScript function.
SecurityLogin	Show the security login window.
SecurityLogout	Logs the current user out.
SecurityLogoutTime as Integer	Returns the number of minutes remaining before the local user will be logged out (when using the auto-logout time option).
SecurityRUserLevel as integer	Returns the remote level of the current user (0=none ,9=Operator ,99=Supervisor, 999=Admin)
SecurityUserLevel as integer	Returns the local level of the current user (0=none, 9=Operator ,99=Supervisor ,999=Admin)
SecurityUserName as string	Returns the name of the current user
SecurityUserNum as integer	Returns the index number of the current user
SendEmail(emailaddr as string, subject as string, msg as string)	Sends an email message given the email address, subject and text. The server used must be set up with SCADAvieW CSX Studio Reports Email Scheduling options. The message should be plain text.
SendEmailFile(emailaddr as string, subject as string, msg as string, fname as string)	Sends an email message given the email address, subject, message and file name for attachment. The server used must be set up with SCADAvieW CSX Studio Reports Email Scheduling options. The text message is encoded as plain text and the attached file must be found in the Script Output folder.
SendEmailHTML(emailaddr as string, subject as string, html as string)	Sends an email message given the email address, subject and html source text. The server used must be set up with SCADAvieW CSX Studio Reports Email Scheduling options. The text message can be plain text or HTML source - css styles will be fixed for proper display in email client applications.
SerialOpen(ssetup as string) as boolean	Opens a serial port given the setup string (formatted like PLC serial connections: "COM1,9600,N,8,1")
SerialClose	Closes the serial port (if open).
SerialRead as String	Reads all incoming data from the serial port.
SerialWrite(senddata as string)	Sends the given data string out the serial port.

SetupFileDownload(sfild as string, allfiles as boolean)	Downloads the requested setup file or all setup files from the SCADAview CSX server. Example: SetupFileDownload("CSX Stations.svxml",false)
SetupFileUpload(sfild as string, allfiles as boolean)	Uploads the requested setup file or all setup files to the SCADAview CSX server. Example: SetupFileUpload("CSX Stations.svxml",false)
SetXXBIT(bnum as integer, bval as integer)	Sets or clears a bit in the CTU32 XXbyte (utility byte) given a bit number and value. This shows up at PMEM(110) in a Micro-Comm PLC.
ShellExec(cmdstr as string)	Executes the given command-line text (DOS or Unix shell commands). The results will be saved in ShellExecResult.
ShellExecResult as string	The will contain the string result from the ShellExec command as described above when a shell command has completed. It will be cleared automatically whenever a new ShellExec command is executed.
ShowControlGroup(cg as integer, more as boolean, x as integer, y as integer)	Opens a single control group window given the group number and x,y location. Use special x,y coordinates of 0,0 to center this window in the main window. If the "more" parameter is true then access to the time clock controls and level enables will be available.
ShowControlGroups(cg as integer)	Opens the main control groups window given the group number.
ShowCustomReport(repnum as integer)	Opens the custom daily report window given the report number to show.
ShowDailyPumpReport(saddr as string)	Opens the daily pump report window given the station address to show.
ShowHighLows(saddr as string, x as integer, y as integer)	Opens the High-Low Alarms setpoint entry window given the station address and x,y location. Use special x,y coordinates of 0,0 to center this window in the main window.
ShowHOA(saddr as string, hoa as integer, x as integer, y as integer)	Opens the Single HOA Graphic window given the station address and hoa number and x,y location. Use special x,y coordinates of 0,0 to center this window in the main window.
ShowHOAs(saddr as string, x as integer, y as integer)	Opens the All HOAs window given the station address and hoa number and x,y location. Use special x,y coordinates of 0,0 to center this window in the main window.
ShowAlertBox(title as string, msg as string, flash as boolean, x as integer, y as integer)	Opens a new Alert Box window with a given title and user message with a red background color that can optionally flash. Use x,y coordinates of 0,0 to center the alert box window in the main window.
ShowMsgBox(title as string, msg as string, x as integer, y as integer)	Opens a new generic Message Box popup window with a given title and user message. Use special x,y coordinates of 0,0 to center the message box window in the main window.
ShowPCP(saddr as string, do as integer, x as integer, y as integer)	Opens the Pump Control Panel HOA window given the station address and hoa number. Use x,y coordinates of 0,0 to center the Pump Control Panel window in the main window.
ShowPopupTemplate(scrname as string, replacelist as string, title as string, x as integer, y as integer [, sclperc as double])	Opens a popup window given the name, replacement list and title. Use x,y coordinates of 0,0 to center this window in the main window or use the saved position. The popup window can optionally be scaled to a given percentage using the sclperc parameter.
ShowPopupWindow(scrname as string, x as integer, y as integer [, sclperc as double])	Opens a popup window given the name. Use x,y coordinates of 0,0 to center this window in the main window or use the saved position. The popup window can optionally be scaled to a given percentage using the sclperc parameter.
ShowRemoteSetpoints(saddr as string, x as integer, y as integer)	Opens the Remote Setpoints window given the station address. Use special x,y coordinates of 0,0 to center this window in the main window.
ShowStation(saddr as string)	Opens the Station Display window to the given station address.
ShowStationNotes(saddr as string, x as integer, y as integer)	Opens the Station Notes window given then station address. Use special x,y coordinates of 0,0 to center this window in the main window.
ShowSystemDisplay(display as integer)	Open the system display given the number (1-3)
ShowTextEditor(text as string [, x as integer, y as integer])	Opens a text editor window with the given text string. Use optional x,y coordinates for upper left corner of the window.
ShowTimedReport	Opens the custom timed report window.

ShowTrend(pens as string [, year as integer, month as integer, day as integer, ndays as integer, shour as double, ehour as double])	Show the built-in trend window and load the given pen file. The "pens" parameter can also be a comma-separated string formatted: StationName, PenName, yMin, yMax (for each pen) Other optional parameters include the starting date, number of days and x-axis start and end hours.
ShowRTrend(penfile as string)	Show the built-in real-time trend window and load the optional pen file.
ShowSTrend	Show the built-in single-pen trend window.
ShowHTML(fname as string)	Show the built-in HTML Viewer and open the given file name.
ShowURL(urlstring as string)	Show the built-in HTML Viewer and move the given URL. (i.e. http://www.micro-comm-inc.com/)
ShowWindow(windowname as string)	Shows a SCADAview CSX window given the name (i.e. ShowWindow("Active Alarms").
Sleep(msec as integer)	Pauses processing the script for a given number of milliseconds. Use this in long loops or continuously running scripts to give up processor time to other threads.
SpeakText(msg as string)	Uses Mac OS X or Windows built-in speech engine to speak the given text message.
SlideshowStart	Starts slideshow mode on the main graphics window
SlideshowEnd	Ends slideshow mode on the main graphics window
SlideshowSpeed(nsecs as double)	Sets the slideshow speed (delay between screens) to the given number of seconds
SNMPGetRequest(id as integer, ipaddr as string, community as string, oid as String)	Sends a get request using Simple Network Management Protocol (SNMP). Given parameters are request id (1-255), ip address, community name and the OID value being requested. Example: SNMPGetRequest(1,"192.168.1.1","public","1.3.6.1.2.1.1.1.0") 'requests the router description
SNMPSetRequest(id as integer, ipaddr as string, community as string, oid as String, dtype as string, dvalue as string)	Sends a set request using SNMP. Given parameters are request id (1-255), ip address, community name, OID, data type (String,Integer,TimeTicks,IP Address) and data value as a string. Example: SNMPSetRequest(1,"192.168.1.1","public","1.3.6.1.2.1.1.1.0","String","Router1") 'try to set the router description
SNMPDataReceived(id as integer) as String	Returns the result of a GetRequest given the request id (1-255)
SOAPInitialize(sck as integer, wsdlURL as String, actionURL as string, methodURL as string)	Sets up a SOAP connection given a socket connection # and string parameters for the WSDL document (Web Services Description Language), the action and the method URLs.
SOAPParameterBoolean(sck as integer, paramName as String, paramValue as boolean)	Set the given parameter name to a given boolean value.
SOAPParameterInteger(sck as integer, paramName as String, paramValue as integer)	Set the given parameter name to a given integer value.
SOAPParameterDouble(sck as integer, paramName as String, paramValue as double)	Set the given parameter name to a given floating point value.
SOAPParameterString(sck as integer, paramName as String, paramValue as string)	Set the given parameter name to a given string value.
SOAPRequest(sck as integer, operation-Name as string)	Sends the SOAP request given an operation name string.
SOAPResult(sck as integer, paramName as string) as string	Returns the SOAP result message given a result parameter name. Values are always returned as a string.
SOAPErrorMessage(sck as integer) as string	Returns the SOAP error message if an error occurred during the request.
SQLConnected as boolean	Returns true if the SQL server is still connected.

SQLDate(yyyy as integer, mm as integer, dd as integer) as string	Formats the given date in SQL date format, YYYY-MM-DD
SQLDateTime(yyyy as integer, mm as integer, dd as integer, hr as integer, mn as integer, sc as integer) as string	Formats the given date and time in SQL date-time format, YYYY-MM-DD HH:MM:SS
SQLErrorMessage as string	Returns the latest (if any) SQL server error message.
SQLExecute(sql as string)	Executes a given SQL database string (uses the global SQL database server setup even if not enabled).
SQLSelect(sql as string) as string	Executes a given SQL select string and returns the result as a comma-separated list with CR line endings
StartCSXSetup(spath as string)	Changes the setup folder to the given path and restarts SCADAview CSX. Example: StartCSXSetup("C:\MICROCOM2\")
TCPConnect(sck as integer, ipaddr as string, ippport as integer)	Opens a TCP/IP Socket connection to the given ip address or hostname and ip port number. The socket number must be in the range of 0-255.
TCPConnectTest(sck as integer, ipaddr as string, ippport as integer, testperiod as integer, timeout as integer) as integer	Tries to open a TCP/IP Socket connection to the given ip host and port and returns 1 if the latest test was successful. Testing is done every testperiod and will fail if no connection is established within the timeout. The testperiod and timeout parameters are in seconds.
TCPDisconnect(sck as integer)	Closes the specified TCP/IP Socket connection (if connected).
TCPIsConnected(sck as integer) as boolean	Returns whether or not the socket connection has been successful. It may take a while for connections to be established, so this function should be used to test a connection before sending data.
TCPRead(sck as integer) as String	Reads all incoming data from a socket connection (if connected).
TCPWrite(sck as integer, senddata as string)	Sends the given data string out the socket connection (if connected).
Time(param as integer) as integer	Returns the current date or time value given the param (1=DayOfWeek, 2=Month, 3=Day, 4=Year, 5=Hour, 6=Minute, 7=Second)
TMIN(index as integer) as integer	Timer variables in minutes which count down to zero. Index can be 0-100.
TSEC(index as integer) as integer	Timer variables in seconds which count down to zero. Index can be 0-100.
URLRequestPage(sck as integer, url as string [, method as string])	Used to send and receive data using the HTTP 1.1+ protocol. The sck number must be in the range of 0-255. The optional method parameter can be "GET", "POST", "OPTIONS", "HEAD", "PUT" etc. If omitted, the "GET" method will be used: Example: URLRequestPage(1, "https://api.ipify.org/?format=json")
URLPageReceived(sck as integer) as string	Returns or sets the latest web page string data received after using the URLRequestPage function.

SCADAview CSX File Functions

Note: All file functions work with files stored in the «ScriptOutput» folder found inside the history folder.

Variable	Description
FileAppend(fname as string, writestr as string)	Adds the given string to a file given the filename (files are always in the "Script Output" folder inside the History folder)
FileAppendCSV(fname as string, str1 as double, str2 as double, str3 as double, etc.)	Adds the given string values to comma-separated line in the given filename
FileAppendCSV(fname as string, val1 as double, val2 as double, val3 as double, etc.)	Adds the given double values to comma-separated line in the given filename

FileCopy(fname1 as string, fname2 as string)	Copies one file to another given the two named files.
FileDelete(fname as string)	Deletes a file given the filename.
FileExists(fname as string) as boolean	Returns True if the given file exists.
FileRead(fname as string) as string	Returns the entire file contents as a string.
FileWrite(fname as string, writestr as string)	Writes the entire string to the given file.

SCADAview CSX History and Reporting Functions

Note: Local history files are required by the following functions. Do not disable local history logging if using Client/Server.

Function	Description
HistoryData(saddr as string, itype as string, inum as integer, year as integer, month as integer, day as integer, hour as integer, minute as integer) as double	Returns a snapshot value from the historical database given the station address, input type and number and date parameters. The input types are: AI, DI, EI, FR or FT.
HistoryWrite(saddr as string, itype as string, inum as integer, year as integer, month as integer, day as integer, hour as integer, minute as integer, datavalue as double [, Overwrite as boolean])	Saves the given data value to the historical database given the station address, input type and number and date parameters. The input types are: AI, DI, EI, FR or FT. Example: HistoryWrite("TH","AI",1,2020,1,12,0,1,123.4,False)
DailyReportData(saddr as string, colnum as integer, year as integer, month as integer, day as integer) as double	Returns a column value from the daily pump reports given the station address, column number and date parameters. The column numbers are: 1-8=runtime hours, 9=Flow Total, 10=Flow Rate Max, 11=Flow Rate Min, 12=Flow Rate NZAvg.
CustomReportData(repnum as integer, colnum as integer, year as integer, month as integer, day as integer) as double	Returns a column value from the custom daily reports given the report number, column number and date parameters.
CustomReportSumData(repnum as integer, colnum as integer, rownum as integer, year as integer, month as integer, sday as integer, eday as integer) as double	Returns a summary row value from the custom daily reports given the report number, column number, row number (1=high, 2=low, 3=average, 4=total) and date parameters including start and end day.
PumpRuntimeData(saddr as string, dtype as string, syear as integer, smonth as integer, sday as integer, shour as integer, eyear as integer, emonth as integer, eday as integer, ehour as integer) as double	Returns a pump runtime report value given the station address, data type, and the starting and ending date parameters. The data types are: 1-16=DI1-DI16 runtimes, 17-48=EI1-EI32 runtimes, 49-80=Flows 1-8 (in the order: total, avg flow rate, max flow rate, min flow rate), 81-96=DI1-DI16 cycles, 97-128=EI1-EI32 cycles. Example: Y(0)=PumpRuntimeData("PH",2,2012,11,1,0,2012,11,1,24) ' pump #2 runtime for the day of 11/1/2012.
AnalogReportData(saddr as string, dtype as string, syear as integer, smonth as integer, sday as integer, shour as integer, eyear as integer, emonth as integer, eday as integer, ehour as integer) as double	Returns an analog report value given the station address, data type, and the starting and ending date parameters. The data types are: 1-64=AI1-AI16 values (in the order: max, min, average, nzaverage). Example: Y(0)=AnalogReportData("PH",7,2012,11,1,0,2012,11,1,24) ' AI2 average for the full day of 11/1/2012.
DailyReportCSV(saddr as string, syear as integer, smonth as integer, sday as integer, eyear as integer, emonth as integer, eday as integer) as string	Returns a comma-separated string daily pump report given the station address and the starting and ending date parameters.

DailyReportHTML(saddr as string, syear as integer, smonth as integer, sday as integer, eyear as integer, emonth as integer, eday as integer) as string	Returns an HTML string daily pump report given the station address and the starting and ending date parameters.
CustomReportCSV(repnum as integer, syear as integer, smonth as integer, sday as integer, eyear as integer, emonth as integer, eday as integer) as string	Returns a comma-separated string custom daily report given the report number and the starting and ending date parameters.
CustomReportHTML(repnum as integer, syear as integer, smonth as integer, sday as integer, eyear as integer, emonth as integer, eday as integer) as string	Returns an HTML string custom daily report given the report number and the starting and ending date parameters.
TimedReportCSV(repnum as integer, syear as integer, smonth as integer, sday as integer, shour as integer, eyear as integer, emonth as integer, eday as integer, ehour as integer) as string	Returns a comma-separated string custom timed report given the report number and the starting and ending date parameters.
TimedReportHTML(repnum as integer, syear as integer, smonth as integer, sday as integer, shour as integer, eyear as integer, emonth as integer, eday as integer, ehour as integer) as string	Returns an HTML string custom timed report given the report number and the starting and ending date parameters.
EventLogCSV(LogName as string, sname as string, sYear as Integer, eYear as Integer, sMonth as Integer, eMonth as Integer, sDay as Integer, eDay as Integer, sHour as integer, eHour as integer, reverse as integer, searchstr as String) as string	Returns a comma-separated string of event log lines given the log name (Alarm,Status,Security,Setpoint, ALL) and given the starting and ending date parameters, reverse order flag and search filter string.
ReportWriteCSV(repname as string, headcsv as string, datacsv as string)	This function is used to create special custom timed reports that are available within SCADAview CSX. It appends the given comma-separated line of text as well as the current date and time to the given report name. The headcsv will be written to the first line if the file does not yet exist. Reports are stored in the history folder's "ScriptReports" folder. Example: ReportWriteCSV("Test Report","Tank LevellFEET,Discharge PressureIpsi,Suction PressureIpsi",format(AI("TH",1),##0.0)+", "+format(AI("TH",1),##0.0)+", "+format(AI("PH",2),##0.0))

SCADAview CSX Global Array Variables

Note: Values will be retained in memory after a script is run but will not be saved whenever SCADAview CSX shuts down.

Use file functions to load/save any variables that need to survive startup/shutdown.

These variables can also be synchronized with the CSX server when running on a client. This option is selected in the Client/Server Startup page in CSX Studio.

Variable	Description
B(index as integer) as boolean	Global boolean variable array B(0) through B(500)
M(uloc as integer) as integer	User memory variables (integers) stored in user memory tags on Micro-Comm CTU32 protocol PLCs. The uloc range is 0-999. Note: When no CTU32 PLC is available these will only be stored in memory.
S(index as integer) as string	Global string variable array S(0) through S(500)
X(index as integer) as integer	Global integer variable array X(0) through X(500)
Y(index as integer) as double	Global double variable array Y(0) through Y(500)

User Defined Global Variables

Variables may also be defined using the “Global Variables” button on the script editor. These can be saved/loaded automatically by using the “Ret” checkbox. Global variables can then be used for graphics tagging or in any CSX script. They can also be logged for trending by checking the “Log” checkbox. These variables can also be obtained from PLCs via SV-PLC server. The Connections and References are the same as those used in station or group PLC references. The PLC Scaling format can be a simple multiplier, Range, Preset or MinRAW,MaxRAW,MinSCL,MaxSCL.

Name	Descript...	Type	Ret	Log	Value	Units	TrMin	TrMax	Connection	Reference	Scaling
End_Hour		Double	<input type="checkbox"/>	<input type="checkbox"/>	0						
LorensArray(1000)		Double Array	<input checked="" type="checkbox"/>	<input type="checkbox"/>	...						
PLCFloat		Double	<input type="checkbox"/>	<input type="checkbox"/>	0				ComactLogix198	dtF(SVPLCFloat):0	
PLCIntArray(45)		Double Array	<input type="checkbox"/>	<input type="checkbox"/>	...				ComactLogix198	dtN(Test8000):0	0.1
PLCInteger		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.198;1	dtN(SVPLCint):0	0.1
PLCInteger_M1650_M70		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.208	N20:70	
PLCModbus_M1650_M0		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.208/0	4x3000	
QBassett_Flow		Double	<input type="checkbox"/>	<input type="checkbox"/>	0						
ReportDay		Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0						
ReportMonth		Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0						
ReportYear		Integer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0						
SNMP_Counter		Double	<input type="checkbox"/>	<input type="checkbox"/>	0						
SNMP_RouterName		String	<input type="checkbox"/>	<input type="checkbox"/>							
SQLUpdateTime		String	<input type="checkbox"/>	<input type="checkbox"/>							
Start_Hour		Double	<input type="checkbox"/>	<input type="checkbox"/>	0						
S_LAST_HOUR		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0						
Tank_Levels(10)		Double Array	<input type="checkbox"/>	<input type="checkbox"/>	...						
TestBoolean1		Boolean	<input type="checkbox"/>	<input type="checkbox"/>	False						
TestDouble1		Double	<input type="checkbox"/>	<input type="checkbox"/>	0	feet	0	2000			
TestDoubleArray(10)		Double Array	<input checked="" type="checkbox"/>	<input type="checkbox"/>	...						
TestInteger1		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0	psi	0	2000			
TestInteger2		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0	psi	0	100			
TestInteger3		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0	psi	0	100			
TestString1		String	<input type="checkbox"/>	<input type="checkbox"/>							
TestStringArray(100)		String Array	<input type="checkbox"/>	<input type="checkbox"/>	...						
TimedRepLastMin		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0						
Visibility		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0						
WeatherDescription		String	<input type="checkbox"/>	<input type="checkbox"/>							
WildeyeTimeStamp(256)		String Array	<input type="checkbox"/>	<input type="checkbox"/>	...						
M1650-M1000		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.208	M1000	0.1
PLCBoolean		Boolean	<input type="checkbox"/>	<input type="checkbox"/>	False				192.168.2.198;1	dtB(AutoTest):0	
PLCFloatArray1(10)		Double Array	<input type="checkbox"/>	<input type="checkbox"/>	...				192.168.2.198;1	dtF(FLOATTEST)	
PLCFloatArray2(10)		Double Array	<input type="checkbox"/>	<input type="checkbox"/>	...				192.168.2.198;1	dtF(FLOATTEST):10	
PLCDoubleInteger		Double	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.198;1	dtD(DINTTEST):0	
PLCInteger2		Double	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.198;1	dtN(INTTEST):0	
SB800EX-M80		Integer	<input type="checkbox"/>	<input type="checkbox"/>	0				192.168.2.206	M80	

PLC Data References

SV-PLC Server: PLC Connections - Ethernet or Serial

Accessed using the "PLC" tab in station or group setup, the connection can be either an ethernet IP address, hostname or a serial port setting string.

PLC Connection Examples:

192.168.3.194 - simple IP address

192.168.3.194;1 - a semi-colon at the end can specify an optional connection # (multiple connections to a a single PLC address)

192.168.10.117,8 - use a comma at the end to specify the slot # for a ControlLogix processor card (default is zero)

192.168.3.195,255 - use slot # 255 for a Micro850 processor or others that need a direct path

192.168.3.194\DHPx - use \DHPx at the end for a DH+ Gateway where x is the DH+ node ID (in decimal)

192.168.3.194:4002 - specifies the port number instead of using the default port for the protocol

COM1,9600,N,8,1 - serial port, baud rate, parity, databits, stopbits

192.168.3.118|192.168.3.114 - use the pipe symbol "|" followed by a secondary IP address to use if the primary fails

SV-PLC Server: Referencing PLC Data

DF1 References (DF1, SLC or CLX Protocols)

SLC style DF1 locations are referenced by File Type, File # : Offset and optional / Bit #.

Integer, Bit, Timer, Counter and Float file types are supported.

Timers and counters with field references are supported for certain locations.

(analog inputs, analog outputs or control group stop/starts)

Input and Output module files are supported as well as the status file.

DF1 Examples:

N7:0	Integer File 7, Offset 0
N7:0/1	Integer File 7, Offset 0, Bit 1
B3:0/15	Bit File 3, Offset 0, Bit 15
F8:20	Floating Point File 8, Offset 20
T4:0.ACC	Timer File 4, Offset 0, Accumulator Value
T4:0/13	Timer File 4, Offset 0, Bit 13 (timer done bit)
C5:0.PRE	Counter File 5, Offset 0, Preset Value
S2:4	Status File 2, Offset 4
I:1.0/2	Input Card Slot 1, Word 0, Bit 2
I:2.1	Input Card Slot 2, Word 1
O:2.0/0	Output Card Slot 2, Word 0, Bit 0
O:3.1	Output Card Slot 3, Word 1

CIP Data Table References (CLX Protocol)

Arrays are referenced by the data type followed by the array name or UDT enclosed in parentheses.

The array element number follows a ":" and the optional bit reference follows a "/".

Integer, Double-Integer, Float, Small-Integer and Boolean types are supported (dtN,dtD,dtF,dtS and dtB).

CLX Examples:

```
dtN(TestIntData):0
dtN(TestIntData):0/3
dtD(TestDIntData):10
dtF(TestFloatData):20
dtB(TestBoolData):0
dtB(TestBoolArray):2
dtD(TestUDTName.PropertyName):0
dtS(TestUDTName.PropertyArray):8
dtD(TestUDTArray[1].PropertyName):0
dtD(Program:MainProgram.TestDIntData):0
```

CIP Generic References (CLX Protocol)

These are referenced by data type followed by comma separated class,instance,attribute enclosed in parentheses.

Supported data types (gdN,gdD,gdF,gdS and gdB).

Note: All data types are referenced using the 16bit starting word# instead of the actual element number.

Examples:

```
gdF(4,100,3):6
gdF(4,100,3):12
gdN(4,100,3):0
SCADAview CSX
```

Modbus References

Modbus data locations are referenced using the register type follow by “x” and then followed by the offset and optional / bit number.

Supported types:

Holding Registers (4x), Input Registers (3x), Coils (0x) and Discrete Inputs (1x).

Floats are also supported and can be derived from either 4x or 3x registers.

(2 words in either MSW,LSW or LSW,MSW order)

Fx = float from 4x holding registers MSW,LSW

Rx = float from 4x holding registers LSW,MSW

Qx = float from 3x input registers MSW,LSW

Zx = float from 3x input registers LSW,MSW

Modbus Examples:

4x100

3x1

4x100/1

1x1

Fx100

Rx100

GE ENET References

GE ENET protocol - Service Request Transport Protocol (GE-SRTP)

Currently SV-PLC supports only the %R,%I,%M and %AI registers.

References are followed by the offset and optional / bit number.

Supported types:

%R = Integers 16bit

%I = Input registers (bits)

%M = Internal coils (bits)

%AI = Analog Inputs 16bit

Floats are also supported using %RF (2 words in LSW,MSW order from %R registers).

GE ENET Examples:

%R2

%R2/3

%AI1

%I1

%M2

%RF4

Signed Integer PLC References

Normally all 16bit registers from a PLC are assumed to be an unsigned integer.

By using a Preset = -32768, SCADAview CSX will treat it like a signed integer.

Floating Point PLC References

Floating point values from a PLC used for analogs are normally un-scaled to a 16bit integer for use in SCADAview CSX. This means that the displayed range of values will depend on the range and preset values used. (divide by the Range, subtract the Preset -> 16bit integer)
(Larger values are possible in a Flow Totals since they are un-scaled to a 32bit integer)

If, however, a Range of 1 and a Preset of 0 is used for a floating point reference, the value will be passed “as is” to SCADAview CSX without being un-scaled first.

In this case when the floating point reference needs to be scaled, a PLC expression should be used.

Custom Control Group setpoints using floating point registers can use the “range” for scaling.

Examples:

Range = 1 and Preset = 0, values can be any floating point number

Range = 0.1 and Preset = -32768, values can be -3276.8 to 3276.7

Range = 0.1 and Preset = 0, values possible are 0 to 6553.5

Range = 0.01 and Preset = 0, values possible are 0 to 655.35

PLC Expressions

Expressions using PLC references can also be used for station data (not for group data). PLC data references inside the expressions are enclosed in square brackets [].

Note: Expressions for analogs will result in a scaled value that is then converted back to raw values for SCADview CSX. This means you will need to scale the PLC raw values within the expression.

Expression Operators and Functions

Name	Description
+	Addition
-	Subtraction
*	Multiply
/	Divide
%	Remainder
^	Bitwise XOR
&	Bitwise AND
	Bitwise OR
<	Less Than
>	Greater Than
<=	Less Than or Equal To
>=	Greater Than or Equal To
==	Equal To
≠	Not Equal To
!	Not
()	Left and right parentheses (for functions or to force order of operation)
IF(x, y, z)	If x is > 0 then returns y else returns z
TIME(x)	returns a time or date value depending on the x parameter - 1: day of week (1=SUN), 2:Month 1-12, 3:Day 1-31 4:Year, 5:Hours 0-23, 6:Min 0-59, 7:Sec 0-59
SIN(x)	Sine (angles are in degrees)
COS(x)	Cosine
TAN(x)	Tangent
ASIN(x)	Arcsine
ACOS(x)	Arccosine
ATAN(x)	Arctangent
LOG(x)	Natural logarithm

INT(x)	Integer portion (rounds down to nearest)
POW(x,y)	Raise to power (x raised to y power)
SQR(x)	Square-root
SGN(x)	Sign (-1 when x<0, 1 when x>0, 0 when x=0)
FTC(#,value,secs)	Fail to change will return a 1 whenever the given value has not changed in the given number of secs. The # can be 1-64.
SCL(x,minraw,maxraw,minscl,maxscl)	If x is equal to v1 it will return y1, if x equals v2 it returns y2 and so on. If no value is found it returns 0.
SELECT(x, v1, y1, v2, y2 [, v-n, y-n])	Returns an integer value with the bits set as given in the parameters. Bit order b0,b1,b2,b3,b4 up to 16 total bits.
BMSK(b0,b1,b2...)	Returns an integer value with the bits set as given in the parameters. Bit order b0,b1,b2,b3,b4 up to 16 total bits.
BTST(x,n)	Tests bit #n in expression x and returns either a 1 or 0.

DF1 Examples:

[N7:0]*0.1+[N7:1]*0.1
 (([N7:0]+[N7:1]+[N7:2])/30
 [B3:0/0]I[B3:0/1]
 [B3:0/0]&[B3:0/1]
 SIN([F8:0])
 COS([F8:1])
 FTC(1,[N7:0],10)
 IF([N7:10]>0,[N7:10],0)
 SCL([N7:10],0,16384,0,1000)

CIP Data Table Expressions:

[dtN(TestIntData):0/3]I[dtN(TestIntData):0/4]
 [dtN(TestIntData):1]+[dtN(TestIntData):2]

Modbus Examples:

[4x104]+[4x105]-100
 [1x1]I[1x2]

Station and Control Group Data Expressions

Station and group data can also be referenced and used for station data - these expressions can also be used with CTU32 protocol.

Station Data References:

Always begin with the station address HH-WW (shown as “xx” in examples below) followed by an underscore “_”. Analog Inputs/Outputs and Discrete Inputs/Outputs are always followed by the input # (shown always as a “1” below).

Variable Name	Description
xx_LOS	Station Loss Of Signal (1=LOS)
xx_DI1	Discrete Input Value (1=ON)
xx_EI1	Expansion Input Value (1=ON)
xx_AI1	Analog Input Value
xx_AO1	Analog Output Value
xx_DO1	Discrete Pump Call Status (1=CALL)

xx_DO1_CALL	(same as above)
xx_DO1_RUN	Pump Run
xx_DO1_FAIL	Pump Fail
xx_DO1_DSBL	Pump Disabled Status
xx_DO1_SHAND	Pump System HOA HAND (1=HAND)
xx_DO1_SAUTO	Pump System HOA AUTO (1=AUTO)
xx_FR1	Flow Rate Value
xx_FT1	Flow Total Value

Examples:

[PH_AI1]

[TH_AI2]

[PI_DO1_CALL]

[PI_DO1_FAIL]

[PH_AI1]+[PH_AI2]

([PH_AI1]+[PH_AI2]+[PH_AI3])/3

[TH_DI1]|[TH_DI2]

[TH_DI1]&[TH_DI2]

Group Data References:

Always begin with “G” followed by a group number 1-255 (shown as “n” below) and then followed by an underscore “_”. Stop/starts and analog disables are followed by the setpoint number (shown always as a “1” below).

Variable Name	Description
Gn_STOP1	Stop Setpoint (STOP9=Override Stop)
Gn_START1	Start Setpoint (START9=Override Start)
Gn_RESET	Group Reset Status (1=resetting)
Gn_ALTFWD	Alternator Forward Bit
Gn_ALTREV	Alternator Reverse Bit (both bits are set for AUTO)
Gn_PREFILL	Prefill Rate
Gn_TIHR	Time Inhibit Hours
Gn_TIMN	Time Inhibit Minutes
Gn_TRHR	Time Restore Hours
Gn_TRMN	Time Restore Minutes
Gn_ADISABLE1	Analog Disables 1-8 (1=disabled)

Examples:

[G1_STOP1]

[G2_PREFILL]

[G1_ADISABLE2]

Data Expressions

Station Data Expressions are evaluated whenever a station's data changes and are used for custom calculations, moving data or other special purposes.

Expressions can also be used in graphic screen tags. Graphic Tags will normally get data directly from stations or groups. They can also get data from a special tag station source "FN Built-In Function". The Tag Data source can then be either EXA or EXD for analog or discrete expressions. Expressions can use station data variables, script global variables, control group data, operators and/or functions to return a value. Numbers used in all expressions are internally stored as double precision floating-point.

Graphic tags can also use script global array variables - B(),M(),X(),Y() as well as any user defined global variables.

In addition to the analog and discrete expressions, the following special "Static Text" messages are available:

TIME\$ - will display a short format time string (HR:MN AP).

DATE\$ - will display a short format date string (MM-DD-YYYY).

xxNAME\$ - display station name where xx is the station address.

GxxxNAME\$ - display group name where xxx is the group address.

LABELS\$(saddr,itype,inum,ltype) - used to display any station label (see the CSX Script LABELS function).

SCREENNAME\$ - used to display the graphic screen name.

Note: These special strings are entered in the graphic tag "Static Text" property.

Examples:

PHNAME\$ - to display the station name for address PH

LABELS\$(PH,DI,1,NAME) to show the input name for station PH, discrete input 1

LABELS\$(PH,AI,1,UNITS) to show the units label for station PH, analog input 1

Operators and Functions

Name	Description
+	Addition
-	Subtraction
*	Multiply
/	Divide
%	Remainder
^	Bitwise XOR
&	Bitwise AND
	Bitwise OR
<	Less Than
>	Greater Than
<=	Less Than or Equal To
>=	Greater Than or Equal To
==	Equal To
≠	Not Equal To
!	Not
()	Left and right parentheses (for functions or to force order of operation)
FULEV()	Security User Level (9=oper,99=super,999=admin)

FUNUM()	Security User Number (0=no one logged in)
FBMSK(b0,b1,b2...)	Returns an integer value with bits set as given in the parameters. Bit order b0,b1,b2,b3,b4 up to 16 total bits
FBTST(x,n)	Tests bit #n in expression x
FABS(x)	Absolute Value
FTIME(x)	computer time or date value depending on the x parameter - 1: day of week (1=SUN), 2:Month 1-12, 3:Day 1-31 4:Year 0-99, 5:Hours 0-23, 6:Min 0-59, 7:Sec 0-59
FSIN(x)	Sine (angles are in degrees)
FCOS(x)	Cosine
FTAN(x)	Tangent
FASIN(x)	Arcsine
FACOS(x)	Arccosine
FATAN(x)	Arctangent
FLOG(x)	Natural logarithm
FINT(x)	Integer portion (rounds down to nearest)
FPOW(x,y)	Raise to power (x raised to y power)
FSCL()	Scale - parameters are (x, minraw, maxraw, minscl, maxscl)
FSQR(x)	Square-root
FSGN(x)	Sign (-1 when x<0, 1 when x>0, 0 when x=0)
FIF(x, y, z)	If x is non-zero (true) then it will return y else it returns z
FSELECT(x, v1, y1, v2, y2 [, v-n, y-n])	If x is equal to v1 it will return y1, if x equals v2 it returns y2 and so on. If no value is found it returns 0.
FHASLABEL(saddr,ltype,lnum,Ltype[,label])	Discrete function that returns a 1 if a station's label (given the input type, input number and label type) is not blank or optionally if it matches a given label. Example: FHASLABEL(PH,DI,1,Name) Note: Inputs types are AI, DI, EI, FR, FT, AO and HOA. The Ltype corresponds to the name of the label column at the top of the station setup panel. For instance, the analog inputs would have Name, Range, Preset etc.

Examples

PHFR+PIFR+PJFR
(adds together 3 station's flow rates)

THAI1-TIAI1
(compute the difference between 2 tank levels)

(THAI1+THAI2)/2
(averages the first 2 analog inputs at TH)

G010SP3>120
(discrete expression for group #10 = 1 if stop setpoint is above 120)

FIF(THAI1>100,1,0)
(discrete expression returns a 1 if station TH analog input is greater than 100)

