Installation

Table of Contents

Qualified Persons

⚠ WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating the 6800 Series Automatic Switch Controls. Become familiar with the Safety Information and Safety Precautions on pages 4 and 5. The latest version of this publication is available online in PDF format at **sandc.com/en/contact-us/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the 6800 Series Automatic Switch Controls. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

⚠ WARNING

The equipment in this publication is only intended for a specific application. The application must be within the ratings furnished for the equipment. Ratings for the 6800 Series Automatic Switch Controls are listed in the ratings table in Specification Bulletin 1045-31.

Special Warranty Provisions

The standard warranty contained in the seller's standard conditions of sale, as set forth in Price Sheet 150, applies to the 6801 Automatic Switch Control, except that the first paragraph of said warranty is replaced by the following:

(1) General: The seller warrants to the immediate purchaser or end user for a period of 10 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within 10 years after the date of shipment the seller agrees, upon prompt notification thereof and confirmation that the equipment has been

stored, installed, operated, inspected, and maintained in accordance with recommendations of the seller and standard industry practice, to correct the nonconformity either by repairing any damaged or defective parts of the equipment or (at the seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

Replacement parts provided by seller or repairs performed by seller under the warranty for the original equipment will be covered by the above special warranty provision for its duration. Replacement parts purchased separately will be covered by the above special warranty provision.

Warranty Qualifications

Warranty of the 6801 Automatic Switch Control is contingent upon the installation, configuration, and use of the control or software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not of S&C manufacture, such as batteries, communication devices, and remote terminal units. However, S&C will assign to the immediate purchaser or end user all manufacturers' warranties that apply to such major components.

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels attached to the 6800 Series Automatic Switch Controls. Become familiar with these types of messages and the importance of these various signal words:

⚠ DANGER

"DANGER" identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

"WARNING" identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

"NOTICE" identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If any portion of this instruction sheet is unclear and assistance is needed, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com**, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing or operating the 6800 Series Automatic Switch Controls.

Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ DANGER

The 6800 Series Automatic Switch Control line voltage input range is 93 to 276 Vac. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to the 6800 Series Automatic Switch Control must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

Applicable Software

This instruction sheet is used with software versions SG6801Installer-7.6.x, SG6801E33Installer-7.6.x, SG6801UInstaller-7.6.x, SG6802OverheadSTInstaller-7.6.x, SG6802VistaInstaller-7.6.x, SG6802-3PMInstaller-7.6.x and SG6802-3UInstaller-7.6.x. The "x" can indicate any number from 0 to 255.

The revision number and other related software-component version information is found on the *Setup>General>Revisions* screen. For questions regarding the applicability of information in this chapter to future software releases, contact S&C Electric Company.

NOTICE

For users upgrading from versions 3.4.x and earlier who have the **Features Enabled** mode set to the **Sectionalizing Only or Sectionalizing and Phase Loss Protection** settings, the settings-conversion process involves setting the **3-Phase Voltage Loss** sectionalizing mode to "No" in version 3.6.x. To make the control functionally equivalent to version 3.4.x and earlier versions with the **Features Enabled** mode set to the **Sectionalizing Only or Sectionalizing and Phase Loss Protection** settings, set **3-Phase Voltage Loss** sectionalizing mode to the **IT-SG Only** setting.

Starting IntelliLink Software

The following steps explain how to start IntelliLink Setup Software when working with the setpoints or stored data in a switch control. To edit a snapshot (virtual memory file) or simply view the software without data, see the "Using Snapshots" section in Instruction Sheet 1045-540, "S&C 6800 Series Automatic Switch Controls: *Operation*."

NOTICE

When using an ungrounded (two-wire) extension cord to power either the computer or the switch control while they are connected, the serial port on the computer may be damaged. Always use a grounded (three-wire) extension cord or battery power.

STEP 1. Connect the computer to the switch control. Use the Local Communication Access port on the switch control faceplate and a USB A to B cable or a serial cable.

STEP 2. Double click on the **IntelliLink** icon in the S&C Electric folder, and the S&C Electric IntelliShell—Select Connection Mode dialog box opens.

STEP 3. Click on the **Local Connection (Serial or Wi-Fi)** button, and the S&C Electric IntelliShell—Product Selection dialog box opens.

STEP 4. Click on the **Series 6800 IntelliTeam II/SG** tab.

STEP 5. Click on the **Serial** button at the bottom of the dialog box and the S&C Electric IntelliShell—Local Communication Setup dialog box opens.

STEP 6. Click on the **IntelliLink** button in the upper right corner. The S&C IntelliLink software program will start and the S&C IntelliLink—Registered Log In dialog box opens.

STEP 7. Enter the username and password, and the IntelliLink Setup Software will open the *Operation* screen. See Figure 3 on page 18. Contact S&C Electric Company when the default username and password is needed.

NOTICE

With firmware later than version 7.3.100, the default passwords for all user accounts, including the Admin user, must be changed before the IntelliLink software can connect to and configure a control. See the "Security Settings—Password Management" section on page 111 for more information.

Navigating IntelliLink Software Screens

View the Operation screen

The *Operation* screen shows the present status of various switch-control settings, and any existing fault and error conditions. See Figure 1.

To display the Operation screen

Click on **Operation** entry on the left-hand navigation tree.

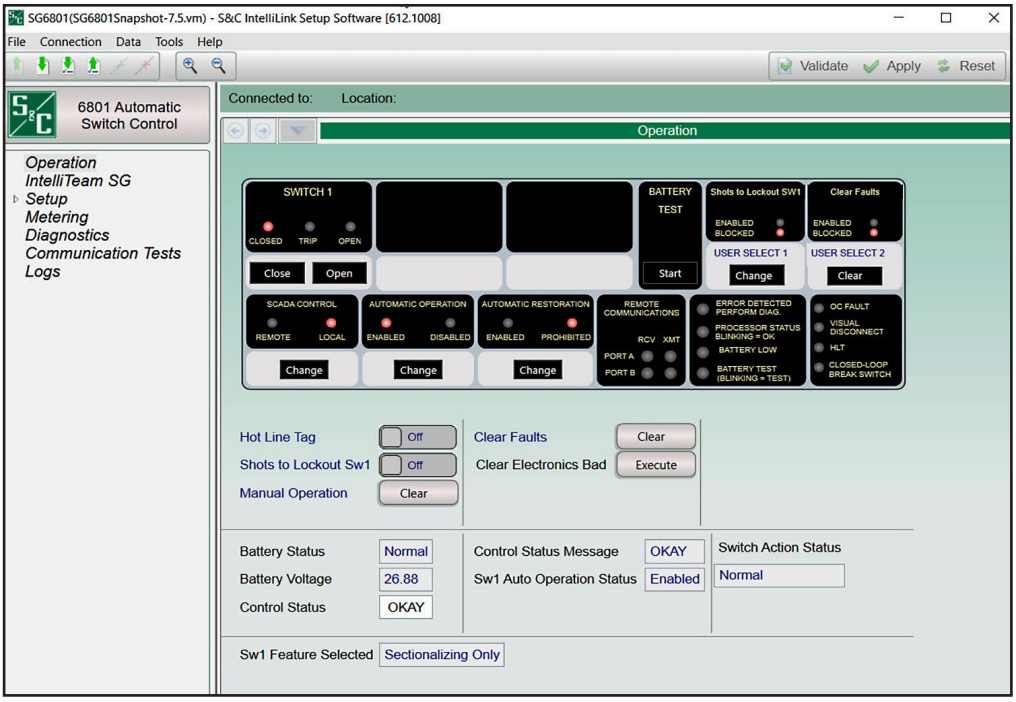


Figure 1. The *Operation* screen for a 6801 Automatic Switch Control.

The *Operation* screen presents 6800 Series control status information and can issue operation commands. User-assigned location-identification information (Connected to: and Location:) is shown at the top of every screen. See Figure 1.

Switch Position Indication and Open/Close Command Buttons

The switch position is indicated for each operated switch, and switches can be manually operated from this screen using IntelliLink software connected through the serial and USB connections on the faceplate or through a Wi-Fi connection.

To block manual operation from remote locations over the serial or Ethernet connections under the faceplate, the **IntelliLink Remote Commands** setting must be disabled on the *Setup>Security* screen.

The switch position is indicated by switch contact information for each line switch:

Closed—The switch position contacts indicate a **Closed** switch position.

Trip—This indicates the switch was opened automatically, and it goes off when the switch is in the **Closed** position.

Open—The switch position contacts indicate an **Open** switch position.

Battery Test

The **Start** button manually starts the battery test.

User Select Commands

These buttons change the status for the two **User Select** commands configured on the *Setup>General>User Commands* screen.

SCADA Control

When set to the **Remote** state, SCADA commands are permitted. When set to the **Local** state, SCADA commands are blocked. The **SCADA Control** mode can be set to the **Local** state from the front panel, a local connection (serial or Wi-Fi), and with a remote IntelliLink software command.

Note: When the **SCADA Control** mode is set to "Local" by a remote IntelliLink software command, the **Remote Operation** state can only be enabled by a local connection (serial or Wi-Fi) at the 6800 control site.

Automatic Operation

This setting enables or disables **Automatic Operation** mode.

Automatic Restoration

This setting enables or prohibits **Automatic Restoration** mode.

Remote Communications

These indicators only show communication activity on serial ports 1 and 2. Activity on the Ethernet ports is not displayed.

Error Detected Perform Diagnostics

This indicates an active error condition.

Processor Status Blinking = OK

This displays the processor heartbeat, and blinking indicates proper operation.

Battery Low

This indicates a marginal battery condition that may not permit line-switch operation.

Battery Test

This indicator blinks to show the battery test is in progress.

OC (Overcurrent) Fault

This indicates fault current has been registered on any phase.

Vista® Underground Distribution Switchgear, with an overcurrent relay and the **Fault Interrupter Option** setpoint set to "Present" on the *Setup>General>Sensor Cfg* screen, will cause the **OC Fault** indicator to blink when fault current is sensed.

Visible Disconnect *(for SG680, SG6801E33, and SG6802DO only)*

This indicates an open visible disconnect when one is installed.

External Local/Remote Switch *(for SG6802Vista only)*

This indicates the external LOCAL/REMOTE switch on the switch operator is in the **Local** mode, and the switch operator will not respond to **Open** or **Close** commands from the 6802 Automatic Switch Control. The **Error Detected** virtual LED on the *Operation* screen will also be in the **On** state. This condition is indicated on the *Logs>Status Point Log* screen as "SW1 Disabled/Local Mode" or "SW2 Disabled/Local Mode." This condition is recorded in the historical log using the same text and reports in the SWX category.

When the LED is off, it indicates the external switch operator is in the **Remote** mode, and the switch operator will respond to **Open** and **Close** commands from the 6802 switch control.

The external **Local/Remote** switch setting is not the same as the **Local/Remote** state that manages operation of the 6802 Switch Control.

Low Gas *(for SG6802Vista only)*

This indicates SF_6 gas pressure is low for the Vista Underground Distribution Switchgear.

HLT (Hot Line Tag) *(Only applicable to SG6801 and SG6801E33 software)*

Indicates an active **Hot Line Tag** status.

Closed-Loop Break Switch *(Only for SG6801 software)*

When "On," this indicates **IntelliTeam** logic has set this control as the designated load-center switch and enabled the **Shots to Lockout** mode for one shot. The **Shots to Lockout** indicator will be "On." This switch will break the loop if an event occurs.

This is only displayed on the IntelliLink software *Operation* screen; there is no CLOSED-LOOP BREAK SWITCH LED on the faceplate. The faceplate displays the active **Shots to Lockout** mode by blinking the SWITCH CLOSED LED, and on the LCD screen under the "Maintenance" section as "Shots-to-Lockout: ON."

Hot Line Tag *(Only applicable to SG6801 and SG6801E33 software)*

The **Hot Line Tag** mode can be applied by selecting "On." The **Hot Line Tag** mode can be set by this button, by an IntelliLink software screen command, by a remote IntelliLink software command, and by a SCADA command. The **Hot Line Tag** mode can only be cleared by the same method used to set it.

Shots to Lockout Switch 1/2

This enables the **Shots to Lockout** mode, which is the configured number of three-phase voltage losses that must be detected during the configured **Shots to Lockout Time Threshold** setting before the control can trip open the switch.

Manual Operation

The **Clear** button clears a manual operation to return the IntelliTeam system to the **Ready** state.

Clear Faults

The **Clear** button clears all fault indicators.

Clear Electronics Bad

The **Execute** button clears all bad electronics indicators.

Battery Status

This shows the overall status of the battery system:

Normal—Enough charge is present to operate the line switch.

Low—The battery is in a marginal condition, and line switch operation may or may not be possible.

Bad—The battery charge is too low to operate the line switch.

Low Impedance—Battery resistance is below 15 milliohms for 24- or 36-Vdc systems.

Battery Voltage

This shows the battery voltage under normal operating load with the charger disconnected. If ac power is present, the switch control updates this voltage only during a battery test. If ac power is not present, this is the real-time measurement of battery voltage.

Control Status

This can indicate:

OKAY—The control is functioning normally.

Alarm—The control is functioning normally but maintenance is required (for example, battery replacement).

Warning—The control can function in a limited capacity (for example, battery low).

Error—The control cannot function properly and may not be able to open or close.

Maintenance Mode—The control cannot function properly, and an application program needs to be loaded.

Control Status Message

This can indicate:

OKAY—The control is operating correctly.

Settings Mismatch—The **Validate/Apply** command failed.

Problem Present—An error has been detected that is not a **Warning** or **Alarm** condition.

Switch 1/2 Auto Operation Status

SCADA commands can enable/disable the **Automatic Operation** mode for each switch. This indicates a **Disabled** state for both switches when the **Automatic Operation** mode has been disabled on the *Operation* screen or the faceplate. When the **Automatic Operation** mode has been enabled on the *Operation* screen or the faceplate, this indicates the state of the **Automatic Operation** mode configured for each switch by SCADA. This will have the same indication for both switches if a SCADA command has not been received.

Switch 1/2 Feature Selected

The **Automatic Operation** setting is configured on the *Setup>General>Automatic Op.* screen. This indicates the setting configured for each switch. Possibilities are:

Sectionalizing Only

- **Three-Phase Voltage Loss**
- **Phase-Loss Protection**
- **Phase-Loss Protection with Automatic Reclose**

Switch 1/2 Identification (only for Dual Overhead Switch Control)

These are read-only fields configured on the *Setup>General>SG6800* screen.

Pad-Mount Configuration

This shows the settings for pad-mount configuration only; set on the *Setup>General>Sensor Config* screen.

Switch Action Status

This field indicates the status of SW1/SW2 if an active user-defined input has resulted in the switch action being blocked. The following statuses will be displayed in this field:

- **Sw1 Close Op Blocked**
- **Sw1 Open Op Blocked**
- **Sw2 Close Op Blocked**
- **Sw2 Open Op Blocked**

If there is no action, this field will display the status as “Normal.” Statuses only go active when the **User-Defined Input** feature is also set to block operation (block close or block both open and close) and they go active. The statuses clear when the **User-Defined Input** status points go inactive.

Active User-Defined Inputs

The three wired inputs at connector J20 on the PS/IO board are configured on the *Setup>Point Mapping>Status>User Defined Inputs* screen. This field displays the configured **User Defined Input Label** setpoint when that user-defined digital input is active.

Navigating IntelliLink Software Workspace

The IntelliLink software user interface includes many standard features found in Windows-based products as well as some custom features designed to make navigating through the 6800 Series control settings easier. See Figure 2.

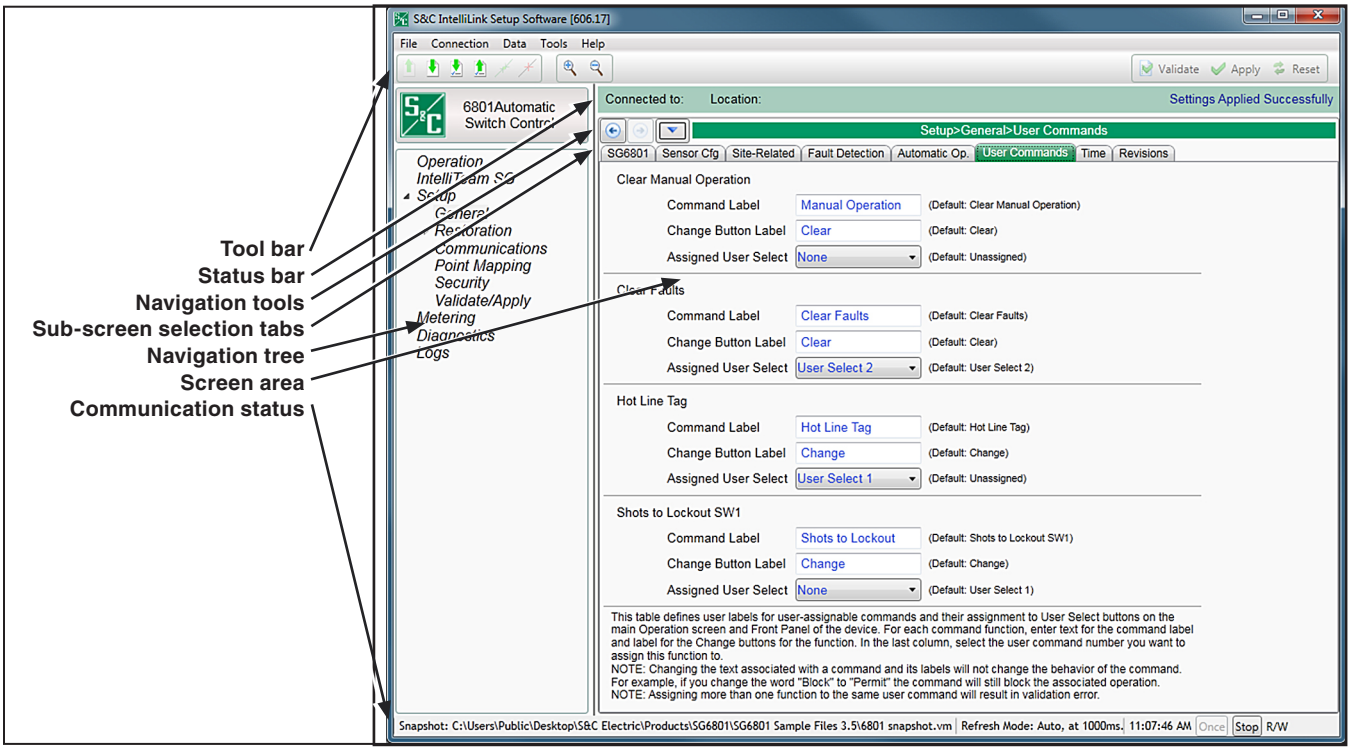
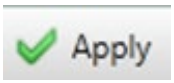


Figure 2. IntelliLink software navigation features.

Tool Bar

 **Open Snapshot**	Same as the *Main Menu>File>Open Snapshot* screen—clicking on this icon opens a file browser to allow the selection of a snapshot file.
 **Save Data Snapshot**	Same as the *Main Menu>File>Save Data Snapshot* screen—clicking on this icon allows saving a snapshot of the control data. It provides a picture of the controls memory content is a programing format.
 **Save Setpoints**	Same as the *Main Menu>File>Save Setpoints* screen—clicking on this icon opens the Save Setpoints dialog box.
 **Load Setpoints●**	Same as the *Main Menu>File>Load Setpoints* screen—clicking on this icon opens the Load Setpoints dialog box.
 **Zoom In**	Clicking on this icon increases the size of objects and text in the screen area.
 **Zoom Out**	Clicking on this icon decreases the size of objects and text in the screen area.
 **Validate**	Same as the **Validate** button on the S*etup> Validate/Apply* screen. See Figure 52 on page 1204. Checks the pending changes but does not apply them.
 **Apply**	Same as the **Apply** button on the S*etup>Validate/Apply* screen. See Figure 52 on page 1204. Checks the pending changes and applies them if no errors are found.
 **Reset**	Same as the **Reset Buffer** button on the *Setup> Validate/Apply* screen. See Figure 52 on page 1204. Removes pending changes and returns to settings in the memory.

● When setpoints from an earlier or a newer compatible version of IntelliLink software are loaded and the setpoints do not exist in this version, an error will occur because the software does not understand any setpoints not presently supported by the software. The unknown objects also will not be converted.

Status Bar

Connected to:	**Connected to:**	This field shows the user-defined device name. The device name is entered on the *Setup>General>Site-Related* screen.
Location:	**Location:**	This field shows the user-defined device location. The device location is entered on the *Setup>General>Site-Related* screen.
Completed Successfully	**Validate Status**	This field shows the status of the **Validate** and **Apply** functions.

Navigation Tools

	**Navigation History**	Clicking on this icon opens a list of the last 10 screens visited. Selecting a screen from the list will automatically transition from the present screen to the selected screen.
	**Navigate Back**	Clicking on this icon selects the next screen down in the history list.
	Navigate Forward	Clicking on this icon selects the next screen up in the history list.
Setup>	**Breadcrumb Field**	Contains the path of the present screen.

Navigation Tree

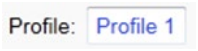
	Expand Arrow	Indicates the item to the right is collapsed with additional items underneath (Clicking on this icon expands the list to show the hidden sub-items.)
	**Collapse Arrow**	Indicates the item to the right is expanded, showing additional items underneath (Clicking on this icon collapses the list to hide the displayed sub-items.)

Sub-screen Selection Tabs

	**Active Tab**	Green indicates an active screen tab.
	**Inactive Tab**	Grey indicates an inactive tab. Clicking on an inactive tab changes from the active screen to the screen associated with the tab.

Screen Area and Data Entry

The screen area contains various data objects used for configuring the control as well as some features for displaying and accessing the data objects. The basic data objects contain text boxes for direct text entry and list boxes for data selection.

	**Editable Text Boxes**	Text boxes with white background and light blue text indicate editable content. The cursor will change when hovering over and editable field.
	**Non editable Text Boxes**	Text boxes with a grey background and dark blue text indicate dynamic text that is populated by the control. This text cannot be changed.
	**List Boxes**	List boxes as indicated by the down arrow supply a list of choices when selected. The present selection will either be shown on the list box or in an adjacent text box.
	**Check Boxes**	Check boxes will be provided for enable/disable decisions. Data fields for disabled items will be automatically hidden or grey-shaded. Data fields for disabled items cannot be changed.
	**Text Expanders**	Expanders are provided to help manage the view. When the data below the expander is visible, the expander icon arrow points up. Clicking on this icon collapses or hides the data from view. When the data are hidden, the expander arrow points down. Clicking on this icon displays the hidden data.

Communication Status

The communication status bar at the bottom of the IntelliLink software screen displays the connection addresses, the **Refresh** mode, and the last refresh. The time changing after "Refresh:" indicates the control is communicating. The refresh defaults to the **Auto** setting, but it can be stopped by clicking on the **Stop** button and manually refreshed by clicking on the **Once** button that comes into context when the refresh is stopped.

Setup
General Screen

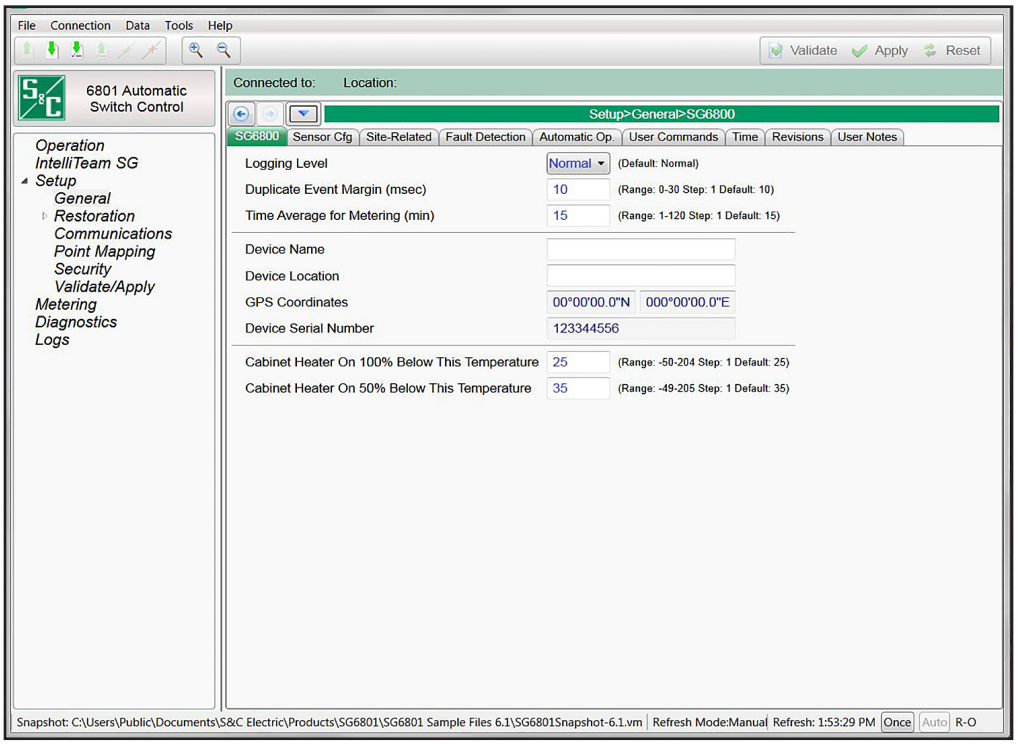


Figure 3. The *Setup>General>SG6800* screen.

Logging Level

This setting configures the data log message types displayed on the *Logs/Historic Events* screen. Possible settings are **Normal**, **Extended**, and **All**. See Figure 3.

Duplicate Event Margin (milliseconds)

The storage of identical events within a short time period can flood the internal memory and does not yield useful diagnostic information. For events to be considered duplicates, every element of their event records must match.

This setpoint selects the data stored in the internal memory and displayed on the *Logs>Historic Log* screen. It determines the time between logging of duplicate events. It has no effect on an alternating sequence of events. For example, the setpoint can be set to 10 ms.

For a sequence of events ABABAB (where A and B are different), assume the next event occurs 1 ms after the previous one. Even though identical events occur within 2 ms, well within the value of the setpoint, all events will be logged. (Minimum value: 0; maximum value: 30; increment: 1; default: 10)

Time Average for Metering

This is the sampling period, in minutes, used in generating data for the flash memory Metering profiles. A smaller interval results in more log entries. (Minimum value: 1; maximum value: 120; increment: 1; default: 15)

Device Name

Enter a name for the control location, up to 12 characters. This name is displayed at the top of every screen as “Connected to:”.

Device Location

Enter a location for the control, up to 64 characters. This location is displayed at the top of every screen as “Location:”.

GPS Coordinates

The location data provided by the integrated Global Positioning System is automatically displayed.

Device Serial Number

The serial number is automatically read from the control.

Cabinet Heater On 100% Below This Temperature

If there is a heater in the switch control enclosure and the control is powered by an external ac source, the heater stays on continuously while the interior enclosure temperature is below this value. This setpoint is usually set at the factory-default value. (Minimum value: -50; maximum value: 204; Increment: 1 degree Fahrenheit; Default: 25)

The cabinet temperature is evaluated once every 10 minutes. The temperature at the thermistor location (on the Power Supply/Control I/O module) is typically 10-15 degrees Fahrenheit above the ambient air temperature.

Cabinet Heater On 50% Below This Temperature

If there is a heater in the switch control enclosure, and the control is powered by an external ac source, the heater stays on 50% of the time whenever the interior cabinet temperature is below this value but above the **Cabinet Heater on 100% Below This Temperature** value. This setpoint is usually set at the factory-default value. (Minimum value: -49; maximum value: 205; Increment: 1 degree Fahrenheit; Default: 35)

Switch 1/2 Identification *(only for the Dual-Overhead Switch Control)*

Enter a custom identifier for each switch. This will display on the *Operation* screen.

Switch 1/2 Serial Number *(only for the Dual-Overhead Switch Control)*

Enter the serial number for each switch.

Sensor Configuration

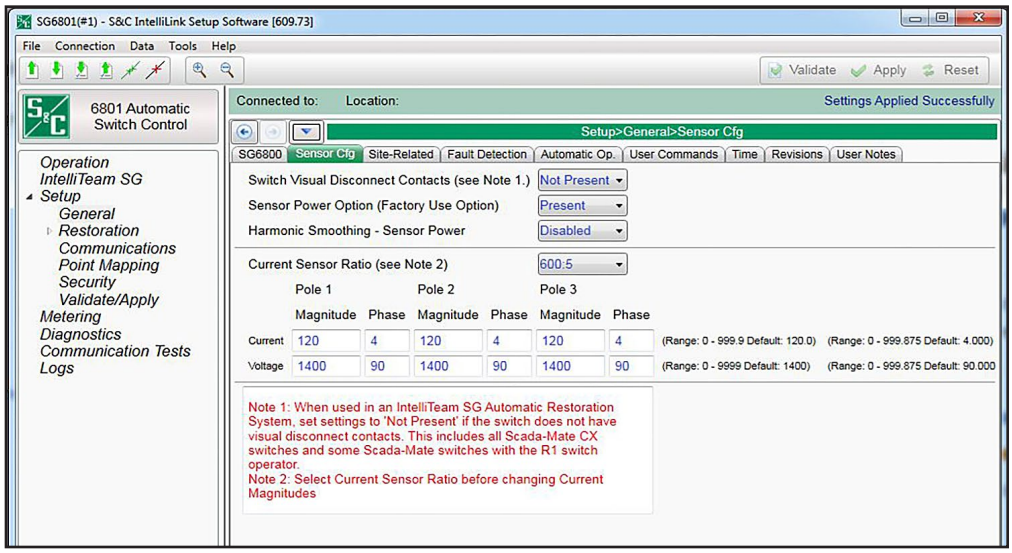


Figure 4. The *Setup>General>Sensor Configuration* screen (6801 switch control shown).

This screen allows entering calibration data for Scada-Mate® Switching Systems; PME or PMH pad-mounted gear, or Vista® Underground Distribution switchgear sensors. See Figure 4. The switch control uses this data to calibrate sensor input to the voltage and current amplitude accuracy specified for S&C sensors.

Current (Magnitude/Phase) & Voltage (Magnitude/Phase) on Poles 1, 2, and 3

S&C sensors are factory-calibrated. The sensor ratios are stamped on each sensor and are provided in the information sheet shipped with the switch. The number of sensors must be selected before entering calibration factors.

Ratios must be entered on this screen to obtain accurate voltage and current measurements. Each field already has the approximate default value to reduce the number of keystrokes needed to enter data. The switch control ignores values for any pole not specified in the **Voltage Sensors Present** setting on the *Setup>General>Site-Related* screen. Store the calibration data sheet in the control-door pocket for future reference.

NOTICE

Ratios must be entered for phase B when phases A, B, and C are measured. The phase B ratios are used to adjust all voltage scales for 15-, 25-, or 35-kV systems.

This screen may also include the following fields:

Switch Visible Disconnect Contacts (only applicable to SG6801, SG6801E33, and SG6802DO software)

All Scada-Mate Switches equipped with R2 switch operators have visible-disconnect contacts. Visible-disconnect contacts are optional with the R1 switch operator.

When the switch has visible-disconnect contacts, select the **Present** option for this setpoint. When the visible-disconnect contacts are open, the ERROR DETECTED indicator on the faceplate is on, and the *Logs>Historic Log* screen indicates a **Not Ready** condition and a **Disconnect Active** condition.

These conditions clear when the switch visible disconnect is manually closed. Scada-Mate CX™ Switching Systems do not have visible-disconnect contacts. When the switch does not have visible disconnect contacts, select the **Not Present** option (default) for this setpoint.

Note: When used in an IntelliTeam SG Automatic Restoration System, select the **Not Present** setpoint when the switch does not have visible disconnect contacts. This includes all Scada-Mate CX switches and some Scada-Mate Switches with the R1 switch operator.

Sensor Power Option

When a switch control has the sensor-power option, this setpoint is factory set to the **Present** state. A 6800 Series control with the sensor-power option has a cable connected from J8 on the PS/IO (Power Supply/Input Output) board to J6 on the SPA (Sensor Power Analog) board. When installing a replacement SPA board that does not have the sensor-power option, changing this setpoint to the **Not Present** state is required.

Harmonic Smoothing for Sensor-Powered Controls (not applicable to Vista switchgear or Universal software)

Customers have reported excessive fluctuation of voltage and phase-angle values when the sensor **Control Power** feature is installed on a feeder with harmonic content in excess of the IEEE 519 guidelines. The Harmonic Smoothing—Sensor Power algorithm mitigates fluctuations for display and DNP-reporting purposes.

To enable the Harmonic Smoothing algorithm, select “Enabled.” The factory default is the **Disabled** state.

The algorithm can take up to 20 minutes to stabilize the voltage and phase-angle values, depending on the harmonic content and magnitude of the power-line harmonics. Excessive voltage and phase-angle fluctuations are not an issue for customers using the 120-Vac control-power option.

Pad-mount Configuration (only applicable to SG68023PM software)

These settings allow the user to define the type and configuration of the pad-mounted gear with which the control will be used. The specific type of switchgear is entered (PME-5, PME-9, PME-11, PMH-9/11, PMH-11, Live Front, Dead Front), the number of motor operators (up to three), the number of ways with voltage sensors (up to two), and the number of ways with current sensors (up to three).

NOTICE

When changes are made to the **Pad-mount Configuration** settings and the **Apply** button is clicked on, all current and voltage settings for Poles 1, 2, and 3 switch back to the default values. Reconfigure these settings after applying changes to the **Pad-mount Configuration** settings.

Switch (Operator) Type *(only applicable to SG6801U and SG68023U software)*

This setting allows the user to select the type of third-party switch with which the control will be used. See S&C Specification Bulletins 1045-31 and 1045-33 for details about the switch, sensor, and software options defined in the control catalog number that relate to this setpoint.

Sensor Type *(only applicable to SG6801U and SG68023U software)*

This setting allows the user to select the type of third-party sensors with which the control will be used. See S&C Specification Bulletins 1045-31 and 1045-33 for details about the switch, sensor, and software options defined in the control catalog number that relate to this setpoint.

Voltage Sensors Present *(only applicable to SG68023U software)*

This setting allows the user to select the voltage-sensor configuration in which the control will be used. See S&C Specification Bulletins 1045-31 and 1045-33 for details about the switch, sensor, and software options defined in the control catalog number that relate to this setpoint.

Switches In Use *(only applicable to Vista switches)*

When "2" is selected, the 6802 control functions as a two-switch device. When "1" is selected, only Switch 1 is recognized by the control. When only Switch 1 is recognized, a **Fault** condition for Switch 2 is ignored, Switch 2 **Voltage** and **Current** analog input points are ignored/inactive, and Switch 2 **Open**, **Closed**, and **Grounded** status points are ignored/inactive.

Low Pressure Indication Option *(only applicable to Vista switches)*

When the Vista Underground Distribution Switchgear includes a low-pressure indication, select the **Present** state. When the sensor indicates low pressure, the ERROR DETECTED indicator on the faceplate turns on and the *Logs>Historic Log* screen indicates a **Switch Not Xfer Ready and a Low-Pressure** condition.

Fault-Interrupter Option *(only applicable to Vista switches)*

When the Vista Underground Distribution Switchgear includes fault-interrupting positions, select "Present." When a fault interrupter trips open, the OVERCURRENT FAULT indicator flashes, the LCD displays a message, and the switch control makes entries on the *Diagnostics>Fault Info* and *Logs>Status Point Log* screens. The condition clears when the fault interrupter is closed.

Current Sensor Ratio

Scada-Mate Switching Systems have several current ratings. For Scada-Mate Switches rated for 600 amps, or 900 amps continuous current, select a **Current Sensor Ratio** setting of 600:5. For Scada-Mate Switches with a continuous rating of 1200 amps, select a **Current Sensor Ratio** setting of 1200:5. The default setting is 600:5.

Note: After entering the **Current Sensor Ratio** setpoint, click on the **Apply** button before entering the new **Current Magnitude** setpoints. If the new **Current Sensor Ratio** setpoint is not applied before entering new **Current Magnitude** setpoints, when clicking on the **Apply** button, the default **Current Magnitude** setpoints for the selected **Current Sensor Ratio** setpoint will replace the **Current Magnitude** setpoints entered.

Changing the ratio from 600:5 to 1200:5 or back will change values of the following settings, so be sure to review each setting after changing the **Current Sensor Ratio** value:

- *Setup>General>Sensor Cfg* screen: The **Current Magnitude Poles 1, 2, and 3** setting changes to **240** if the ratio changes from 600:5 to 1200:5, or the setting will change to **120** if the ratio changes from 1200:5 to 600:5.
- *Setup>General>Sensor Cfg* screen: The Dual Overhead software has two **Current Magnitudes for Poles 1, 2, and 3** settings.
- *Setup>General>Fault Detection* screen: The **Phase Fault Detection Current Level** setting changes to **1600** if the ratio changes from 600:5 to 1200:5, or the setting will change to **800** if the ratio changes from 1200:5 to 600:5.
- *Setup>General>Fault Detection* screen: The **Ground Fault Detection Current Level** setting changes to **200** if the ratio changes from 600:5 to 1200:5, or the setting will change to **100** if the ratio changes from 1200:5 to 600:5.
- *Setup>General>Fault Detection* screen: The Dual Overhead software has **Phase Fault Detection** and **Ground Fault Detection** levels for both Switch 1 and Switch 2.

When using a 1200-ampere device with the IntelliTeam SG Automatic Restoration system, be sure to configure the appropriate **Maximum Capacity** settings for the system. The default setting is **600 amperes**.

When using a 1200-ampere device with the IntelliTeam SG Automatic Restoration system and the **Phase Loss Isolation** feature, be sure to configure the appropriate **Phase Loss Protection Current Threshold** setting for the system. The default setting is **600 amperes**.

Selecting a sensor ratio changes the defaults shown on the *Setup>General>Sensor Conf* screen and on the *Setup>General>Fault Detection* screen. The default information changes immediately when a **Current Sensor Ratio** setting is selected. After entering the **Current and Voltage Magnitude** settings and the **Current and Voltage Phase** data for all poles, click on the **Apply** button to activate the settings.

Site-Related Configuration

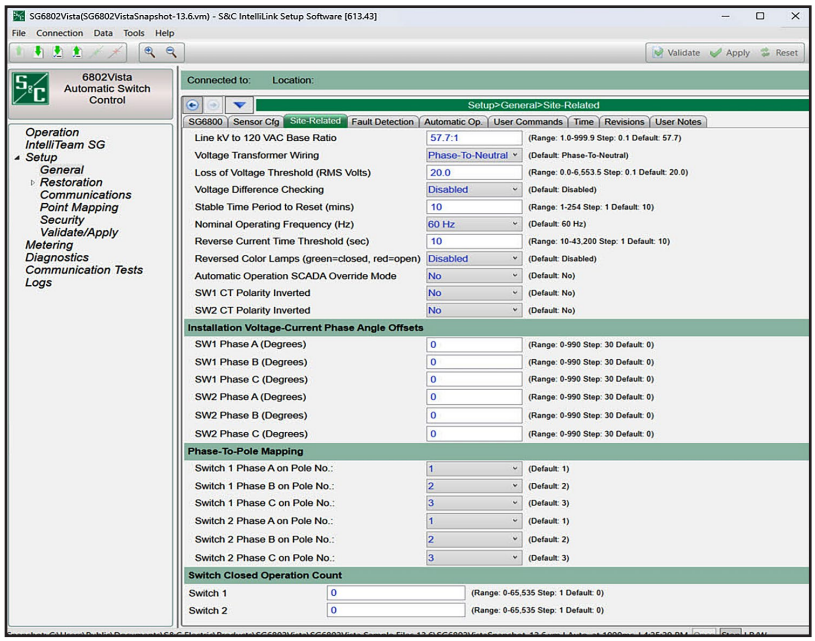


Figure 5. The *Setup>General>Site-Related* screen.

Line kV to 120 Vac Base Ratio

This is the voltage step-down ratio of all customer-load transformers on the feeder. See Figure 5. The switch control records, displays, and manipulates voltages normalized on a 120-Volt or 240-Volt base. This setting is the conversion ratio from line voltage to base voltage. (Range: 1.0-999.9; Step: 0.1; Default: 100.0)

Enter the ratio for transformers wired the same way (phase to phase or phase to neutral) as the value entered for the Voltage Transformer Wiring parameter in the following examples:

Example #1—For a four-wire, wye, multi-grounded, 24.9-kV, phase-to-phase primary distribution system with phase-to-neutral-connected customer single-phase transformers rated 14,400/120 Volts, enter a ratio of 120:1 and select the **Phase-To-Neutral** setting for the **Voltage Transformer Wiring** parameter.

Example #2—For a three-wire, wye, 12-kV, phase-to-phase primary distribution system with phase-to-phase connected customer transformers rated 12,000/120 Volts, enter a ratio of 100:1, and select the **Phase-To-Phase** setting for the **Voltage Transformer Wiring** parameter.

Voltage Transformer Wiring

This configures the switch control for customer-voltage reporting. The control uses this information when calculating kvars. For delta voltage reporting, select the **Phase-To-Phase** setting for this parameter. For wye voltage reporting, select the **Phase-To-Neutral** setting for this parameter. (Default: Phase-To-Neutral)

Loss of Voltage Threshold (RMS Volts)

When the voltage level drops below this value (on a 120-Volt base), the switch control assumes power is no longer being supplied to the monitored phase. Normally leave this at the factory default value 20.0 Volts.

Loss of voltage is detected by the switch control's true RMS transducer circuits, and voltage-loss detection qualification time can approach 600 ms. When the first voltage loss will be less than 600 ms, configure the **First-Reclose Qualification Time** setting on the *Setup>General>Automatic Operation* screen.

For more information about voltage-loss detection qualification time characteristics, see the "Loss of Voltage Threshold" section in S&C Instruction Sheet 1045-530, "S&C 6800 Series Automatic Switch Controls with IntelliTeam® SG Automatic Restoration system: *Setup*." (Range: 0.0-6,553.5; Step: 0.1; Default: 20.0)

When loss of voltage is detected, the **Voltage Loss** status indication will be active, and the **Phase Loss of Voltage** status indication will be active for any phase below this threshold. See Figure 6.

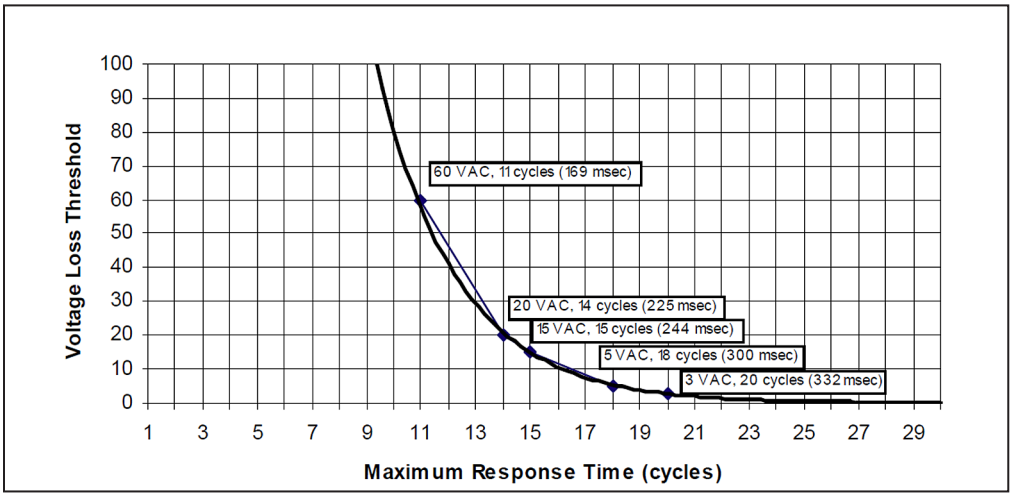


Figure 6. The Voltage Loss Threshold and Maximum Response Time curve.

NOTICE

Times listed in the Figure 6 curve do not include the output relay or switch operation times. For proper coordination with a fast-reclosing source-side protective device, make sure the reclosing interval time for the device is long enough for the switch control to detect the outage and for the sectionalizing switch to open fully.

Backfeed from customer loads also affects the speed of voltage-loss detection. Enter a threshold value high enough to detect the loss of voltage before service is resumed and low enough to ensure loss of voltage is not falsely detected because of system overload or persistent backfeed.

Voltage Sensors Present

Configure this setpoint for the number of sensors on the line switch. For S&C PME/PMH pad-mounted switches, the IntelliLink Setup Software automatically sets the correct value based on the **Padmount Configuration** status selected on the *Setup>General>Sensor Configuration* screen. Correct values are also set by IntelliLink software for Vista Underground Distribution Switchgear. (Default: Phase A, B and C)

Voltage Difference Checking (Vista switchgear only)

If Switch 1 and 2 are closed and their voltages disagree by greater than 10 Volts, at least one voltage sensor is generating bad voltage. When set to the **Enabled** mode, the control will disable automatic operation while this condition is latched. The state is latched on the first occurrence of mismatched voltages.

The control will indicate maintenance action is required with the ERROR DETECTED PERFORM DIAGNOSTICS indicator on the front panel. The *Logs-Status Point Log* screen indicates the **Voltage Imbalance** status point is active and the **Maintenance Required** status point is active when this feature is enabled and the condition is true. (Default: Disabled)

To clear the **Maintenance Required** state, click on the **Clear Errors** button on the *Diagnostics>Errors* screen or send a SCADA command to the **Clear Errors** control point.

Stable Time Period to Reset (mins) (Vista only)

When voltages for Switch 1 and 2 disagree, according to the description for the previous field, the control will latch a **Voltage-Mismatch** state. This state will reset when the control senses no mismatch voltage during this time period. (Range: 1 to 254 minutes or Never; Step: 1; Default: 10)

Nominal Operating Frequency

Set this to the nominal operating frequency in Hertz for the distribution system. (Default: 60 Hz)

Reverse Current Time Threshold (seconds)

This is the minimum qualification time a change in current direction must persist after detection before it is displayed or reported. The default is 10 seconds.

This setting was not previously configurable. Set this value to “Disabled” to stop reporting the change of current direction, and any present indication of a reverse current condition will be cleared. (Range: 10-43,200; Step: 1; Default: 10)

Reversed Color Lamps

This setting configures the color of the **Open** and **Closed** indicators on the *Operation* screen. When the **Reversed Color Lamps** setting is enabled, the **Open** indicator is red and the **Closed** indicator is green. When the **Reversed Color Lamps** setting is disabled, the **Open** indicator is green and the **Closed** indicator is red. (Default: Disabled)

Detect Faulty Voltage Sensor *(for SG6801 and SG6802DO only)*

For a closed switch only, when enabled, this setting validates a detected **Loss of Voltage** condition by checking for loss of current. If the **Loss of Voltage** condition is met and current is not present, the **Loss of Voltage** condition is deemed valid (the sensor is good). The SG6801E33 software confirms a **Loss of Voltage** condition with a cross-comparison of its voltage sensors. (Default: No)

If RMS voltage on a single phase falls below the **Faulty Voltage Sensor Detection Voltage Threshold** setting for a period of one second and at least 3 amps phase current is present for that phase, automatic operation will be blocked. To ensure the **Detect Faulty Voltage Sensor** feature operates properly when the **Phase Loss Protection** feature is in the **Enabled** state on the *Setup>General>Automatic Op.* screen and is set to the **Yes** or **IT-SG Only** mode, the **Phase Loss Protection Time Threshold** setpoint must be greater than one second.

Note: When considering the **Faulty Voltage Sensor Detection Voltage Threshold** setting, voltage sag levels and feedback paths from downstream transformers must be considered.

Setting Example: System studies indicate voltage sags will be >70% retained voltage (70% of a 120-Volt base nominal).

- The **Phase Loss Protection** setpoint is 95 V (79%).
- The **Phase Loss Protection Time Threshold** setpoint is a minimum of 2 seconds.
- The **Faulty Voltage Sensor Detection Voltage Threshold** setpoint is 84 V (70%).

Bench Testing Considerations: The **6800 Series Control** logic waits 4 seconds after a power-up or restart for voltage and current measurements to stabilize before running any of the internal logic. When bench testing any of the 6800 Series control functions, put a 4 to 5 second precondition into the test profile.

Faulty Voltage Sensor Detection Voltage Threshold (VAC) *(for SG6801 and SG6802DO only)*

This setting is used as the detection threshold for the **Detect Faulty Voltage Sensor** logic. When the RMS voltage on a single phase falls below the **Faulty Voltage Sensor Detection Voltage Threshold** setting, the **Faulty Voltage Sensor** logic is triggered.

The **Faulty Voltage Sensor Detection Voltage Threshold** setpoint can only be configured when the **Detect Faulty Voltage Sensor** setpoint is in "Yes." The **Faulty Voltage Sensor Detection Voltage Threshold** setting must be configured higher than the presently configured values for the **Loss of Voltage Threshold** and the **Phase Loss Protection Voltage Loss Threshold** setpoints (if configured).

A validation rule ensures the **Faulty Voltage Sensor Detection Voltage Threshold** setting is greater than or equal to the presently configured values for the **Loss of Voltage Threshold** and the **Phase Loss Protection Voltage Loss Threshold** setpoints. This ensures the **Faulty Voltage Sensor Detection** logic is executed to inhibit automatic operation before the switch times and trips. (Range: 1.0-300.0; Step 0.1; Default: 80.0)

Normal Current Direction *(Not available in software version 7.5 and later)*

Select from the drop-down list: Sensor to Non-sensor Side (default) or Non-sensor to Sensor Side. This setting is used by the IntelliTeam system application to accurately determine team loading in circuits with bi-directional power flow due to distributed generation penetration.

By selecting **Sensor to Non-sensor Side** setting the **IntelliTeam** logic assumes normal direction current flows from the sensor side to the non-sensor side of the switch. These assumptions are reversed when **Non-sensor to Sensor Side** setting is selected. Normal direction means current is flowing from the normal utility source (not distributed generation) to the load.

Normal Current Direction *(For the 6801 E33 Control only)*
(Not available in software version 7.5 and later)

Select from the drop-down list: **Jaw-side to Hinge-side** (default) or **Hinge-side to Jaw-side**. This setting is used by the IntelliTeam system application to accurately determine team loading in circuits with bi-directional power flow due to Distributed Generation penetration.

By selecting **Jaw-side to Hinge-side** setting the IntelliTeam logic assumes normal direction current flows from the jaw-side to the hinge-side of the switch. These assumptions are reversed when **Hinge-side to Jaw-side** setting is selected.

NOTICE

If the **Current Direction** setpoint is incorrect, the IntelliTeam system application will not be able to accurately determine the direction of current flow and may lead to a misoperation in the field.

Automatic Operation SCADA Override Mode *(for SG6801, SG6801E33, SG6802PM, and SG6802Vista)*

When set to "No:"

- When the **Automatic Operation** mode is disabled by the front panel, only the front panel or locally connected IntelliLink software can enable it. When enabled again, any method can disable it.
- When the **Automatic Operation** mode is disabled by IntelliLink software, only the front panel, locally connected IntelliLink software, or remotely connected IntelliLink software can enable it. When enabled again, any method can disable it.
- When the **Automatic Operation** mode is disabled by a SCADA command, only the front panel, locally connected IntelliLink software, or a SCADA command can enable it. When enabled again, any method can disable it.

When set to "Yes," a SCADA command always has complete control over the enabling and disabling of the **Automatic Operation** mode:

- When the **Automatic Operation** mode is disabled by the front panel, only the front panel, locally connected IntelliLink software, or a SCADA command can enable it. When enabled again, any method can disable it.
- When the **Automatic Operation** mode is disabled by IntelliLink software, only the front panel, locally connected IntelliLink software, or a SCADA command can enable it. When enabled again, any method can disable it.
- When the **Automatic Operation** mode is disabled by a SCADA command, only the front panel, locally connected IntelliLink software, or a SCADA command can enable it. When enabled again, any method can disable it.

The configured option for this setpoint is remembered after a firmware upgrade or power cycle.

For two-switch controls, SCADA can set this option individually or globally. The faceplate and IntelliLink software screenset do not allow configuring this setpoint for individual switches; only global configuration can be set.

SWx CT Polarity Inverted (only for 68023 and Vista software)

When the **Yes** option is selected for the **SWx CT Polarity Inverted** setpoint for either SW1 or SW2, the normal current flow is from the non-sensor side to the sensor side of the switch on which this is enabled. When set to "No" (the default), the normal current flow is from the sensor side to the non-sensor side of the switch. These settings allow the IntelliTeam system to detect the direction of current flow, which is necessary to calculate correct team loading.

Installation Voltage-Current Phase Angle Offsets

The setpoints (one for each voltage-current phase) allow installation-dependent phase-angle corrections. The angle offsets are used to determine the Normal Current and Reverse Current flow direction.

These corrections and the Current Sensor Ratio configuration on the *Setup>General>-Sensor Configuration* screen are used to calculate power factor and kvars. In the normal feeder configuration, this setpoint is used to adjust the reported current direction at each switch to the **Normal** state. The team members closest to the substations must have their sensors facing the substation. (Range: 0-990; Step: 30; Default: 0)

The phase-angle detection and display require a minimum current of 0.75% of full scale (6 amperes at 800 amperes full scale). Current magnitude is detected and displayed below this level. The settings must be applied for the effect of changing an offset value to be displayed on real-time data.

Phase-To-Pole Mapping

These setpoints allow installation-dependent pole-phase assignment. Based on the pole-phase assigned for these setpoints, the **DNP Analog Input** values will report the data for Phase A, B, C per the pole the phases are assigned to.

Switch Closed Operation Count

This is the number of times a switch is closed. The **Switch Closed Operation Count** value is maintained through power cycles, application restarts and selected firmware updates. The **Switch Closed Operation Count** value can be updated by entering a valid value in the **Count** field and confirming the update in the pop-up dialog window.

Note: Do not check the checkbox on the *Load Setpoints* screen if the user does not want the control's **Switch Closed Operation Counts** value overwritten from the settings file information.

Note: Do not check the checkbox on the *Save Setpoints* screen if the user does not want the **Switch Closed Operation Counts** value saved in the settings files.

Note: Before uploading new setpoint files, note the **Switch Closed Operation Count** value on the *Setup>General>Site-Related* screen for all applicable switches in use. These must be entered manually after uploading setpoints because they are not maintained through the setpoint upload. Then, go to the *Setup>General>Site-Related* screen and enter the count for applicable switches.

Fault Detection Configuration

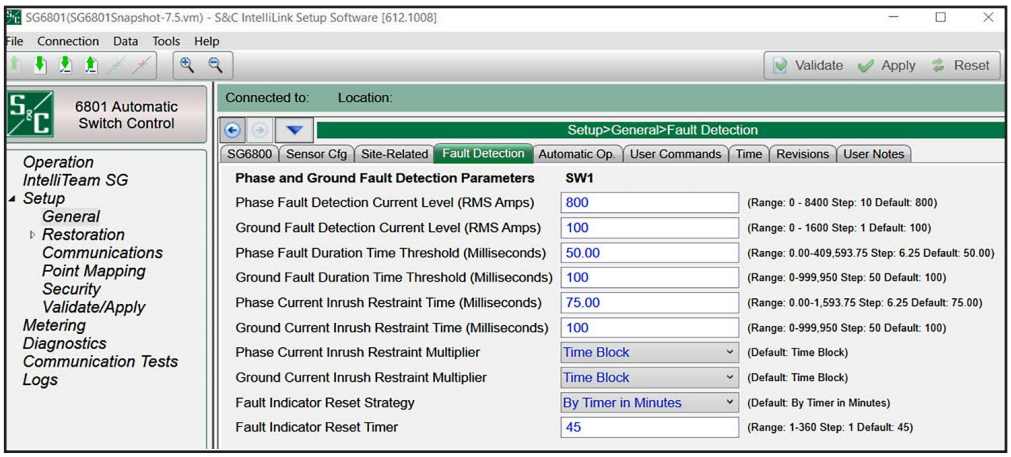


Figure 7. The *Setup>General>Fault Detection* screen.

This screen allows entering setpoint values the switch control will use to detect phase and ground faults. See Figure 7.

⚠ WARNING

6800 Series Automatic Switch Controls can be applied with many different switch types. Because of this, wide setting ranges are provided to accommodate different switch specifications. It is important to set values appropriate for the equipment with which the control is installed.

Inappropriate settings will result in equipment damage and possibly personal injury.

Refer to the equipment documentation or nameplate, and set the current threshold at or below the maximum interrupting rating of the device.

This screen includes the following fields:

Phase and Ground Overcurrent Detection Parameters

Phase fault current is measured by a high-speed detecting circuit that has a full scale of approximately 4200 amps RMS and samples every 6.25 ms. Phase faults greater than full scale are recorded as full scale.

The **Phase Fault Detection Current Level** and **Phase Fault Duration Time Threshold** setpoints control the phase fault detection characteristics. Currents on all three phases are monitored and compared with these setpoints.

The **Phase Fault Duration Time Threshold** timer starts when an overcurrent condition is registered. The switch control records a phase overcurrent fault when the overcurrent condition is present for the duration of the timer. If the current drops below the **Phase Fault Detection Current Level** setpoint before the timer expires, the switch control will ignore the overcurrent condition and reset the timer.

Ground fault current is measured separately by a true-RMS detecting circuit as the vector sum of the three individually sensed phase currents. The detecting circuit has a full scale of approximately 800 amps and is slower and more accurate than the phase-detecting circuit.

The analog signal is continuously integrated over several cycles and sampled every 50 ms. Because the circuit continuously integrates the current signal, faults of a shorter duration than the sampling rate will be detected.

The net response of this circuit is similar to the Time-Current Characteristic (TCC) curves of a protective relay. See Figure 8. The curves show that, with a **Ground Fault Detection Current Level** setting of 150 amps, the switch control would detect a 500-amp fault in 1.42 ms.

With a **Ground Fault Detection Current Level** setting of 231 amps, the switch control would detect an 800-amp fault in 42 ms. The **Ground Fault Detection Current Level** and **Ground Fault Duration Time Threshold** setpoints control the ground fault detection characteristics. In the normal feeder configuration, this setpoint is used to adjust the reported current direction at each switch to the **Normal** state.

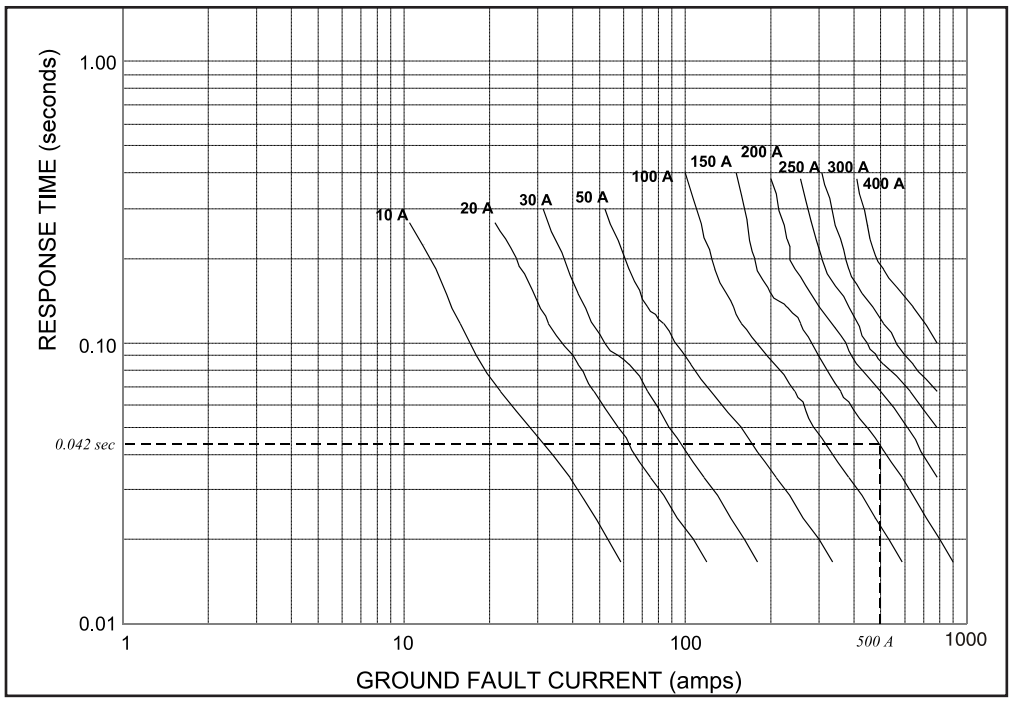


Figure 8. The TCC curve for ground fault detection.

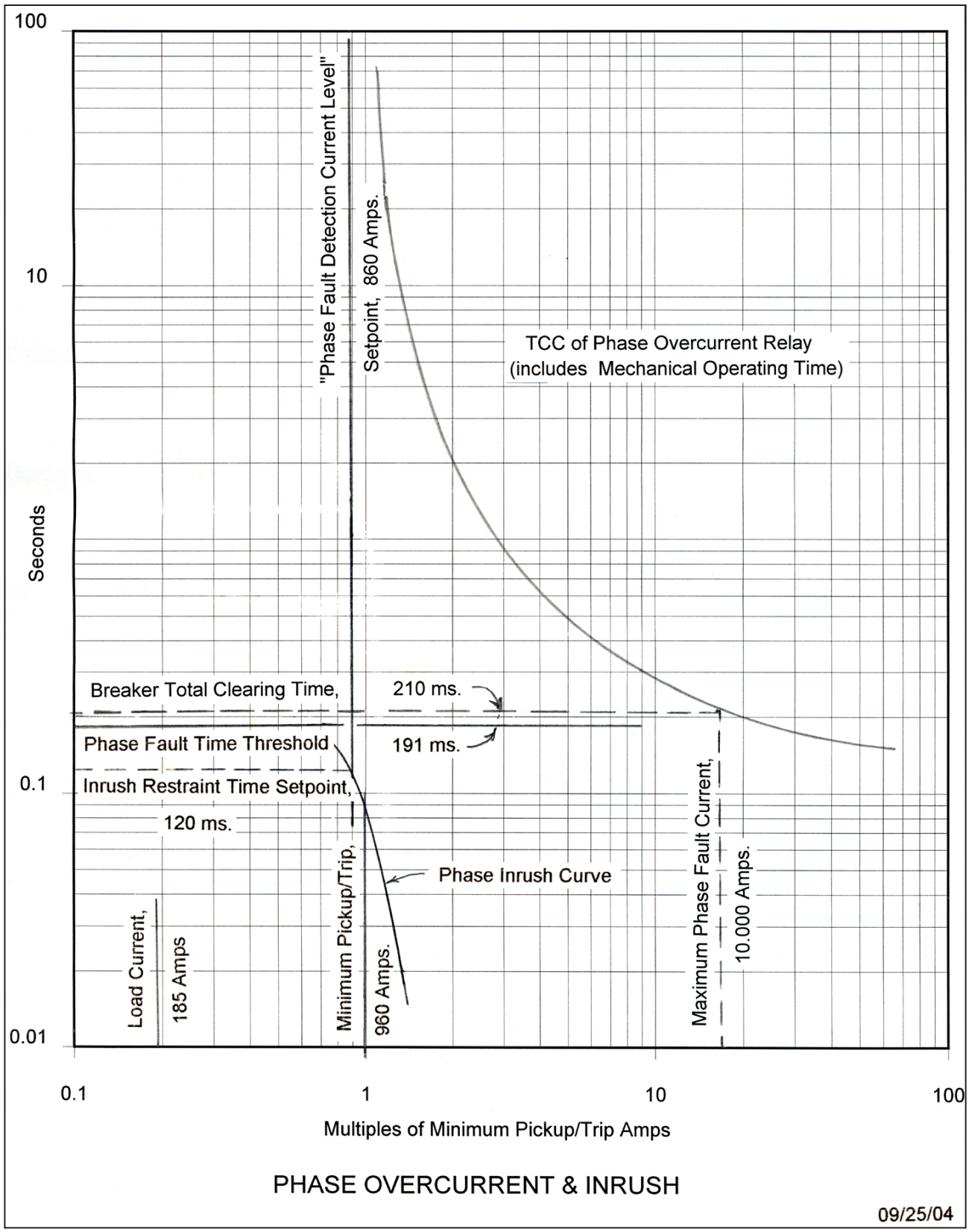


Figure 9. An example coordination sheet for phase overcurrent and inrush.

Phase Overcurrent Detection Setup Procedure

To determine the proper setting, examine the source-side protective device phase TCC curves for a range of fault duty, up to the maximum available phase fault current at the sectionalizing switch. In general, set the **Phase Fault Detection Current Level** setpoint slightly lower than the source-side protective device's minimum pickup/trip and the **Phase Fault Duration Time Threshold** setting slightly faster than the fastest time the source-side protective device will trip. See Figure 9 on page 32 for an example.

Phase Fault Detection Current Level (RMS Amps)

Set the **Phase Fault Detection Current Level** to a value equal to 90% of the minimum pickup/trip of the source-side protective device. The setpoint may be increased to 95% or higher in situations where an available inrush restraint multiplier is too small to mask expected inrush currents but the next higher multiplier is too large and may mask fault currents. (Range: 0-65,530; Step: 10; Default: 800 when current sensor ratio is 600:5; otherwise, Default: 1600)

Phase Fault Duration Time Threshold (Milliseconds)

Set the **Phase Fault Duration Time Threshold** to a value equal to or less than the breaker total clearing time minus the **Time Block** inrush restraint value, if any, and minus 19 ms (where 19 ms is the approximate time required for the control to confirm a fault). The inrush restraint time can be ignored in situations where numerical multipliers are used (the **Time Block** value is not used), and the elevated overcurrent level (the numerical multiplier times the **Phase Fault Detection Current Level** setting) is less than the expected minimum phase fault current levels.

In situations where the elevated overcurrent level exceeds the estimated Minimum Phase Fault Current levels, select the lowest inrush multiplier that will protect against inrush. Minimum Phase Fault Current levels may be estimated as 60% of end-of-line maximum fault current levels where the end-of-line is defined as the worst case end-of-line after load has been transferred to the alternate feed. (Range: 12.50-2,725.00; Step: 6.25; Default: 50)

Ground Overcurrent Detection Setup Procedure

To determine the proper setting, look at the source-side protective device's ground TCC curves for a range of fault duty, up to the maximum available ground fault current at the sectionalizing switch. The switch control must be able to detect the fault before the source-side protective device trips. See Figure 10 on page 35.

Ground Fault Detection Current Level (RMS Amps)

This configures the RMS level of neutral or ground current required to indicate the presence of a possible ground overcurrent (fault) condition. (Range: 0-65.535; Step: 1; Default: 100 when current sensor ratio is 600:5; otherwise, Default: 200)

Set the **Ground Fault Detection Current Level** value equal to ground minimum pickup/trip current of the source-side protective device.

Find the switch control time-current curve for that minimum ground-trip current. See Figure 10 on page 35.

Compare the time-current curves to the time-current curve for the protective device. The curve for the protective device should include the mechanical operating time. The switch control response time should be set less than 75% of the source-side protective device's total clearing time for fault current values up to the maximum line-to-ground fault current at the control.

To compare times, select several fault current values between the configured **Ground Fault Detection Current Level** setpoint and maximum available faults at the control. For each fault-current value selected, determine the response and clearing times from the time-current curves. In each case, the control response time should be less than 75% of that of the source-side protective device clearing time.

If necessary, reduce the **Ground Fault Detection Current Level** value until the switch control's response time is short enough. When the **Ground Fault Detection Current Level** setting is not found on an existing curve, estimate the points and plot them on the coordination sheet with the source-side protective device TCC curve.

Where more accuracy is needed, interpolate the points between the nearest pair of curves. For example, to interpolate a 231-amp point, the detection times are needed for the 200- and 250-amp curves at the specific fault-current level. The 231-amp point is the 200 detection time plus the difference between the 200- and 250-amp detection times multiplied by (231-200)/(250-200).

For locations where the load current exceeds the configured **Ground Fault Detection Current Level** setpoint and the circuitry is four-wire grounded wye, source-side line-to-ground faults on a four-wire grounded wye distribution system can reduce load current on faulted phase(s) and result in an imbalance up to the magnitude of the phase load current.

The switch control records a ground fault when the unbalanced current exceeds the configured **Ground Fault Detection Current Level** setpoint for a period equal to the configured **Ground Fault Duration Time Threshold** setpoint. When the event is followed by a loss of voltage, the control will count. During stand-alone sectionalizing, the control may go to a full count and trip.

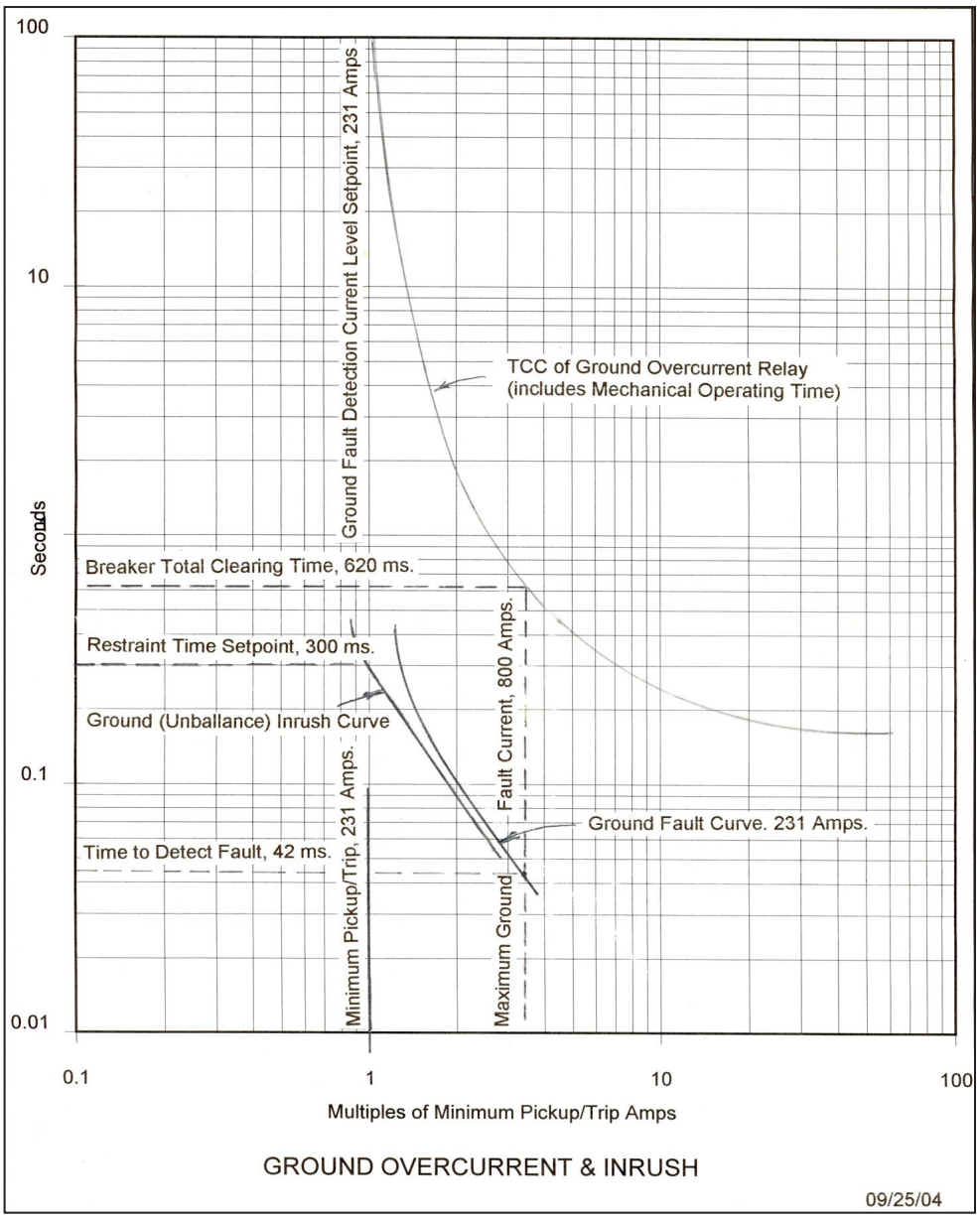


Figure 10. The coordination sheet for ground overcurrent and inrush.

For IntelliTeam systems, registering a false fault may prematurely shut down both the reconfiguration and the service-restoration processes, and customers will experience an unnecessary outage. Prevent this by setting the **Ground Fault Detection Current Level** setpoint to a value greater than the load current.

A disadvantage to this is that the switch control will ignore any low-level ground faults below the setpoint. However, in most cases the fault-current levels will be high enough to be detected by the high-speed phase-fault detection system. This is true for underground lines where the faults are usually low impedance, high current, and persistent. (Range: 0-65,535; Step: 1; Default: 100)

Ground Fault Duration Time Threshold (Milliseconds)

This setpoint configures the time a detected ground-overcurrent condition must be continuously present before the switch control will register a ground-overcurrent fault. Set this to a value less than the source-side protective device total clearing time minus the Time Block inrush restraint (if any) minus the time required to detect a ground fault.

The resolution of this value is 50 milliseconds (3 cycles), so this value should be rounded down to the nearest multiple of 50 milliseconds. Values of 0 or 50 milliseconds for this setpoint will yield the same effective time threshold of 50 milliseconds.

When using an **Inrush Restraint Numerical Multiplier** setpoint (of 2x, 4x, etc.) and the elevated **Ground Fault Detection Current Level** value exceeds the maximum-available ground short-circuit current level, adjust the **Ground Fault Duration Time Threshold** and **Ground Fault Current Inrush Restraint Time** setpoints to ensure the switch control has enough time after the restraint time to detect a ground fault.

The sum of both timers plus the ground-fault detection time must be less than the breaker total clear time. If the multiplier elevates the fault-current detection to greater than the maximum fault current available at the switch location, this has the same effect as setting a time block. (Range: 50-999,950; Step: 50; Default: 100)

Inrush and Load Pickup Restraint

Inrush and load pickup currents occur when voltage is restored to a distribution circuit with connected load.

Magnetizing inrush—The magnetizing-inrush current has a short duration, and its magnitude depends primarily on connected transformer capacity, residual magnetism in the transformers, and system impedance. Generally accepted inrush for a single distribution transformer is up to 25x full-load kVA for 0.01 second.

Hot load pickup—The hot-load pickup current occurs when the source breaker trips and recloses. Its magnitude depends on the magnetizing inrush and the type of connected load. For example, a momentary power interruption may cause motor controllers to disconnect their motors, while resistive loads may remain online. See Figure 11 on page 37.

Cold load pickup—The cold-load pickup current occurs from connected load after an extended outage. The magnitude depends on the magnetizing inrush and the type and amount of connected load and the duration of the outage.

For example, thermostatically controlled loads (such as refrigeration, air conditioning, and heating) will increase due to a loss of diversity. Generally accepted inrush for cold-load pickup is 6x full load for 1 second, 3x full load for 10 seconds, and 2x full load for 100 to 300 seconds.

The 6800 Series switch control invokes inrush restraint whenever three-phase voltage is lost and one or more phases return. The current inrush restraint time is the amount of time, in milliseconds, that must elapse after restoration of voltage before the switch control will respond normally to an overcurrent fault condition. The **Phase or Ground Current Inrush Restraint Multiplier** setting determines the switch control response during this time period.

When using a fast reclose on the source-side breaker, it must remain open long enough for the control to detect the outage or inrush restraint will not be applied. The time required for the control to detect a loss of voltage is variable depending on the selection of the **Loss of Voltage Threshold** setpoint. For example, the control can detect a loss of voltage in approximately 11 cycles with a threshold of 60 Volts or 14 cycles with a threshold of 20 Volts.

The software has two types of inrush/load pickup restraint: time block and a numerical multiplier. When the **Inrush Restraint Multiplier** setpoint is set to the **Time Block** setting, the switch control ignores all overcurrent conditions during the restraint time. When it is a numerical Multiplier Value (2x, 4x, 8x, or 16x), the corresponding **Phase or Ground Fault Detection Current Level** setting is temporarily raised by the multiplier value.

Setup Procedures

Evaluate the magnitude and type of load beyond the switch control, and estimate the magnitude and duration of the inrush/load pickup current. See Figure 11.

Phase Current Inrush Restraint Time (Milliseconds)

Set this setpoint to a value long enough to allow the inrush/load pickup current to drop below the **Phase Fault Detection Current Level** setpoint before the timer expires. (Range: 0.00-1,593.75; Step: 6.25; Default: 75.00)

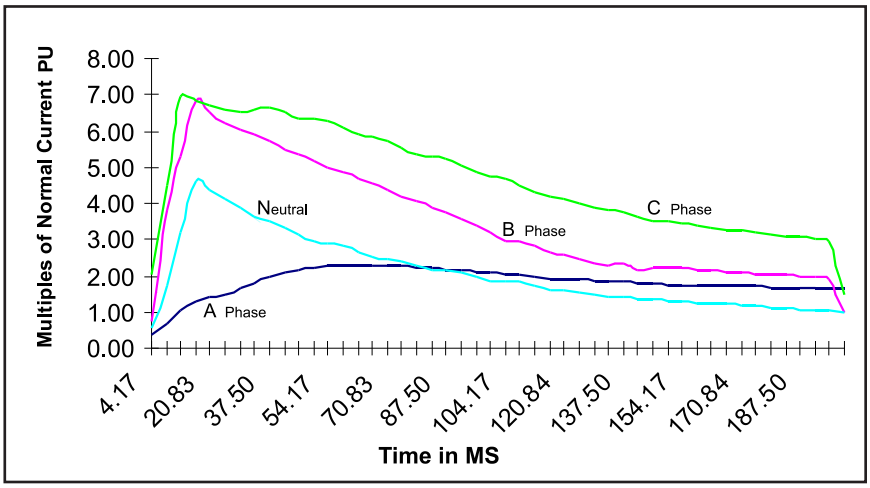


Figure 11. Example of hot load pickup inrush current for a commercial area.

Phase Current Inrush Restraint Multiplier

Select either the **Time Block** or a **Multiplier Value** setting. Either setting is used only for the duration of the **Phase Current Inrush Restraint Timer** setpoint. **Time Block** is the default setting.

Time Block—Phase overcurrents are not qualified until the restraint timer expires. If an overcurrent condition is present at the end of the time block, the switch control starts the **Phase Fault Duration Time Threshold** timer. Adjust the **Phase Fault Duration Time Threshold** and **Phase Current Inrush Restraint Time** setpoints to ensure the switch control has enough time after the time block to detect a phase fault before the feeder breaker operates again.

Multiplier Value—The **Phase Fault Detection Current Level** setting is temporarily raised by the selected multiplier value: 2x, 4x, 8x, or 16x. If the switch control detects current magnitudes greater than the elevated level, it starts the **Phase Fault Duration Time Threshold** timer. The switch control records a fault when the current remains above fault levels and the timer expires.

Where possible, set the multiplier to raise the **Phase Fault Detection Current Level** setting above the expected inrush/load pickup levels but below end-of-line minimum phase-fault current levels. The end-of-line minimum phase-fault levels may be estimated as 60% of end-of-line maximum fault current levels where the end-of-line levels are defined as the worst case end-of-line level after load has been transferred to the alternate feed. When the inrush multiplier raises the elevated fault detection current level to a value that exceeds actual fault current, the result is the same as selecting the **Time Block** setting.

Check that there is enough time after the phase-inrush restraint timer expires to detect a fault. Consider fault-current values up to the **Phase Fault Detection Current Level** setting.

For example, when the **Phase Fault Detection Current Level** setting is 860 and the **Phase Current Inrush Restraint Multiplier** setting is set to 4x, during the Phase Current Inrush Restraint Time period, the switch control ignores all phase-fault conditions of less than 3440 RMS amps. The switch control responds to all faults of at least 860 amps when the inrush restraint time expires.

Note: Actual fault duration may be longer than the duration reported in the historic log. When the **Phase Current Inrush Restraint Multiplier** or the **Ground Current Inrush Restraint Multiplier** feature is set to the **Time Block** mode:

- The control does not count the portion of the fault occurring in the Time Block period.
- The **Fault Duration Time Threshold** timer begins counting when the Time Block ends.
- Actual fault duration may be longer than the duration reported in the historic log.
- Faults that do not qualify are disregarded.

Ground Current Inrush Restraint Time (Milliseconds)

Estimate the maximum imbalance inrush/load pickup current and its duration at the switch. Set this setpoint to a value long enough to allow the inrush/load pickup current to drop below the **Ground Fault Detection Current Level** setpoint before the timer expires. (Range: 0-999,950; Step: 50; Default: 100)

Ground Current Inrush Restraint Multiplier

Select either the **Time Block or Multiplier Value** setting. Either setting is used only for the duration of the Ground Current Inrush Restraint Timer period. **Time Block** is the default setting.

Time Block—Ground (unbalanced) currents are not qualified until the restraint timer expires. Adjust the **Ground Fault Duration Time Threshold** and **Ground Current Inrush Restraint Time** setpoints to ensure the switch control has enough time after the time block to detect a ground fault before the feeder breaker operates again.

Multiplier Value—The Ground Fault Detection Current level is temporarily raised by the selected multiplier value: 2x, 4x, 8x, or 16x. If the switch control detects currents whose magnitudes are greater than the elevated level, it starts the **Ground Fault Duration Time Threshold** timer. The switch control records a fault when current remains above fault level and the timer expires.

Set the multiplier to raise the ground-fault current-detection level above the expected inrush/load pickup levels. Don't set the multiplier higher than necessary or it may mask a low-level ground fault. When the inrush multiplier raises the elevated fault-detection current level to a value that exceeds full scale, the result is the same as a **Time Block** setting. Full scale for ground faults is 800 amps.

Note: Actual fault duration may be longer than the duration reported in the historic log. When the **Phase Current Inrush Restraint Multiplier** or the **Ground Current Inrush Restraint Multiplier** feature is set to the **Time Block** mode:

- The control does not count the portion of the fault occurring in the Time Block period.
- The **Fault Duration Time** threshold begins counting when the Time Block period ends.
- Actual fault duration may be longer than the duration reported in the historic log.
- Faults that do not qualify are disregarded.

Suggested Information for Each Switch Location:

Select the phase and ground TCC curves for the source-side protective device:

- Phase and ground source-side protective device minimum pickup/trip (amps)
- Source-side protective device mechanical operation time
- Maximum available phase and ground fault current at each sectionalizing switch from each source
- Peak normal load current at each sectionalizing switch
- End-of-line phase and ground fault current, for each source

Fault Indicator Reset Strategy

Reset By Timer in Seconds

Reset By Timer in Minutes *(default strategy)*

Reset By Timer in Hours

When one of the three timer strategies is selected, the OVERCURRENT FAULT indicator will be automatically reset when all of the conditions required for the **Reset When Fault Clears** strategy are met and after a configured time period expires. The **Fault Indicator Reset** timer starts when all three conditions are met. The timer strategy selected determines the unit of time, and the **Fault Indicator Reset Timer** setting specifies the numerical time.

Note: The switch control will wait until the switch is closed before starting the **Fault Indicator Reset** timer if the switch is not closed when the **Sectionalizer Reset** timer expires.

Reset When Voltage Returns

The OVERCURRENT FAULT indicator will be automatically reset when all of the conditions required for the **Reset When Fault Clears** strategy are met and the control has detected the return of normal three-phase voltage.

Reset Manually

When this strategy is selected, automatic reset of the OVERCURRENT FAULT indicator is disabled and it must be reset manually. The reset can be selected by a SCADA command, an IntelliLink software command, by issuing a **Clear Fault** command through the LCD faceplate menu, or by using a USER ASSIGNED button mapped to the **Clear Faults** command.

Reset When Fault Clears

With this strategy selected and the OVERCURRENT FAULT indicator active, it will reset automatically when all of these conditions are met:

- The overcurrent condition is not present.
- The configured **Sectionalizer Reset and Extended Voltage Loss Time** expires. This timer is set on the *Setup>General>Automatic Operation* screen with a 45 second default. The **Sectionalizer Reset Timer** setting is reset (cleared) if it expires without a new fault or three-phase loss of voltage event occurring. This timer will be reset to zero and must expire again before any **Fault Indicator Reset Strategy** setting is activated when a sectionalizing event occurs and the switch trips open.
- The switch is closed, The control will wait until the switch is closed to reset the OVERCURRENT FAULT indicator if the switch is not closed when the **Sectionalizer Reset Timer** setting expires.

Fault Indicator Reset Timer

This is the numerical value in seconds, minutes, or hours used when the timer strategy for automatically clearing an overcurrent fault is selected. (Range: 1-360; Step: 1; Default: 45)

Automatic Operation Configuration

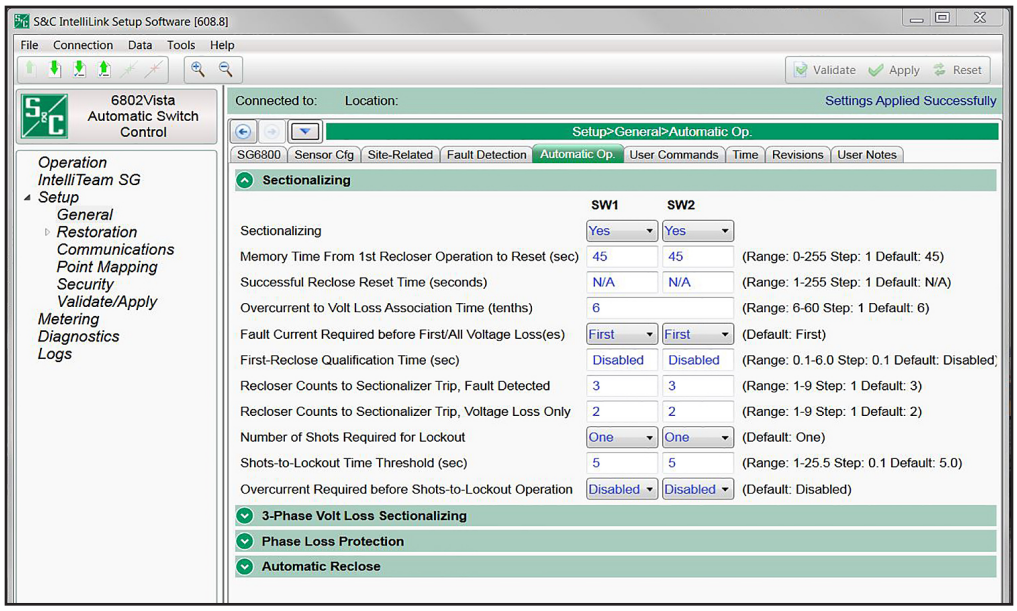


Figure 12. The *Setup>General>Automatic Operation>Sectionalizing* screen; 6801/2/3 Automatic Switch Control is shown.

The screen shown in Figure 12 allows enabling and disabling various automatic switch control operations and enter setpoints for these operations. For the 6802/3 Automatic Switch Control, configure most setpoints as separate values for Switch 1 and Switch 2.

Features Enabled [Switches 1 and 2, if applicable]

The switch control can carry out the following automatic operations:

- **None** (all automatic operation features are disabled)
- **Sectionalizing Only**
- **Phase Loss Protection Only**
- **Sectionalizing + Phase Loss Protection**

Sectionalizing—Team members monitor conditions associated with breaker and recloser operations, and they sectionalize the line based on overcurrent and/or loss of voltage.

Phase Loss Protection—Team members open their switch based on loss of voltage on one or two individual phases.

Note: If one of the automatic operation options is selected (on either switch if applicable), use the faceplate AUTOMATIC OPERATION ENABLE/DISABLE switch or a SCADA command to disable automatic operation. If "None" is selected (on both switches if applicable), the control software puts the team member in the **Automatic Operation Disable** mode and ignores all commands from the faceplate AUTOMATIC OPERATION ENABLE/DISABLE switch. Also, **Automatic Operation** mode cannot be enabled with a SCADA command.

Note: Total loss of power to the switch control (complete battery discharge and no ac power) cancels all automatic operations in progress.

Note: For a 6802 control with Vista switchgear software, when the **Switches in Use** feature is set to "One," the **Sectionalization Switch 2** mode is automatically set to "No" on the *Setup>General>Automatic Operation>Sectionalizing* screen and the control disables the **Automatic Operation Switch 2** mode, which will result in Switch 2 not sectionalizing if there is an event. To re-enable Switch 2 (if needed), change the **Switches in Use** setting to "Two" and then change the **Automatic Operation** setting on the IntelliLink software *Operation* screen from "Enabled" to "Disabled" and then back to "Enabled."

Sectionalizing

Sectionalizing

When the **Sectionalizing** mode is set to "Yes" and the team members recognize a three-phase voltage outage, they start the **Sectionalizer Reset and Extended Voltage Loss Timer** function and begin to count source-side protective operations. If three-phase voltage returns with no faults detected, the **Sectionalizer Reset and Extended Voltage Loss Timer** function resets and the **Successful Reclose Reset Timer** function starts.

If the source-side protection continues to operate, when the operation count equals the **Recloser Counts to Sectionalizer Trip** setpoint, the control will open the line switch. If the **Sectionalizer Reset and Extended Voltage Loss Timer** function expires before the **Recloser Counts to Sectionalizer Trip** value is reached, the switch control resets the timer and the counter to zero.

If three-phase voltage remains out for the duration of the **Sectionalizer Reset and Extended Voltage Loss Timer** operation, an extended voltage-loss condition exists and the switch control opens the line switch when the **3-Phase Volt Loss Sectionalizing** feature is set to the **Yes** or **ITSG Only** mode, and the IntelliTeam system is in the **Ready** state.

Sectionalizer Reset and Extended Voltage Loss Time (seconds)

The **Sectionalizer Reset** timer is started for any of these conditions when:

- An overcurrent event persists long enough to qualify as a fault.
- The first breaker operation after an overcurrent fault registers as a **Three-Phase Loss of Voltage** condition the control counts it as the first breaker/recloser operation of the sectionalizing sequence.
- A **Three-Phase Loss of Voltage** condition occurs.
- A sectionalizing event occurs and the switch trips open. (The control logs an extended voltage loss, in addition to the sectionalizing event, if three-phase voltage has not been restored before this timer expires.)

When this timer is not running and the control interprets a three-phase voltage loss as a breaker operation, it will increment the count of breaker operations to one and start the timer. When the control has counted the number of breaker/recloser operations equal to the number required to sectionalize, and this count is reached before the timer expires, the control will trip open the switch.

When all three phases are continuously below the **Loss of Voltage Threshold** setting (configured on the *Setup>General>Site-Related* screen) for the duration of this timer, the control will trip open the switch if so configured.

Set the **Sectionalizer Reset and Extended Voltage Loss Time** setting to 5 seconds longer than the maximum lockout time for the normal source-side protective device. This will ensure the loss of voltage is not a temporary condition and the normal source-side protective device has reached the lockout state. (Range: 0-255; Step: 1; Default: 45)

Successful Reclose Reset Time (seconds)

When three-phase voltage is continuously present without an overcurrent event for this amount of time (in seconds), the switch control considers the source-side protective device to have had a successful reclose. When this timer expires, the control resets the sectionalizing timers and counters to zero.

Configure this setpoint if the **Successful Reclose Reset Time** setting has been implemented in the source-side protective device. Set the value to the same value as the source-side protective device.

When the source-side protective device does not use this reset scheme, set the value to "N/A;" the switch control will use the **Sectionalizer Reset and Extended Voltage Loss Time** setting to reset the count. (Range: 1-255; Step: 1; Default: N/A)

Overcurrent to Volt Loss Association Time (tenths)

This setpoint defines the time interval between the end of a detected overcurrent event and the start of a detected three-phase voltage loss for the purpose of associating the two events to count breaker operations. Under normal circuit conditions, leave this set to the factory default of six-tenths. When the line voltage will be supported for an abnormal period of time following the breaker operation, adjust this setpoint to account for it. (Range: 6-60; Step: 1; Default: 6)

Fault Current Required before First/All Voltage Loss(es)

For the switch control to trip open the switch because of an overcurrent event, it must detect and count fault-current and voltage-loss events. If this setpoint is set to "All," the switch control only increments counts if it detects fault current before every voltage loss.

Any voltage loss without an associated fault current disarms the sectionalizer. If set to "First," the switch control must detect fault current only before the first voltage loss. After that, the recloser operation count increments with each voltage loss.

When the count is reset, the next voltage loss must be preceded by fault current for the switch control to start counting again. The current transformers (CTs) are load-metering CTs (not fault current CTs); and they may not register subsequent faults correctly after the first fault. (Default: First)

First-Reclose Qualification Time (seconds)

In some recloser configurations that implement an initial instantaneous reclose strategy, the three-phase voltage loss cannot be reliably detected or is missed by the sectionalizing logic that counts recloser operations. The **First-Reclose Qualification Time** feature

requires a detected three-phase loss of voltage to persist longer than the configured time for it to register as the first sectionalizing count. This allows controls to ignore an initial instantaneous reclose should it be detected.

After the first qualified sectionalizing count in a series has been recorded, subsequent voltage losses are not qualified by this time before being counted for purposes of sectionalizer operation. All detected voltage losses are entered in the events log, whether qualified for sectionalizing count or not, and a voltage loss disqualified by this criterion is logged as an instantaneous reclose and is not counted for purposes of sectionalization. (Range: 0.1-6.0 seconds; Step: 0.1; Default: Disabled) See the "(Enhanced) First-Reclose Qualification Time" section.

Note: This time represents an additional qualification period after the detection of the voltage loss during which the control determines whether to count it for sectionalizing purposes. It is distinct from the **Loss of Voltage Threshold Maximum Response** Time function, which varies based on the **Loss of Voltage Threshold** setting configured on the *Setup>General>Site Related* screen. The detection threshold applies to all voltage losses. The **First-Reclose Qualification Time** feature allows the control to disqualify any potentially detected voltage loss, such as those caused by initial instantaneous reclose operations, and disregard them only for purposes of sectionalizing. It is applied to detected voltage losses only until the first qualified recloser operation in a series has been recorded.

When this feature is used, the memory time from the first recloser operation to reset will be counted from the first qualified breaker operation count in the series recorded by the control, and not from the disqualified instantaneous **First-Reclose** operation, if it is detected.

Note: When the **First-Reclose Qualification Time** setting is enabled and the breaker uses an instantaneous first reclose, the configured number of breaker shots-to-lockout events must be increased by one because the switch control will ignore the first instantaneous breaker operation should it be detected and disqualified.

NOTICE

This increase also applies to the **Shots-to-Lockout** feature, which will also ignore the first instantaneous breaker operation when the **First-Reclose Qualification Time** setting is in effect.

The time selected for the next breaker operation after the instant reclose must be longer than the time chosen for the **First Reclose Qualification Time** setting by 250 ms to allow the subsequent operation to qualify as the first recloser operation count. Therefore, for reliable operation, the **First Reclose Qualification Time** setting MUST be set to a value that is at least 250 ms shorter than the next breaker operation.

(Enhanced) First-Reclose Qualification Time *(Only for SG6801 Software)*
(Range 0.1 seconds to 60.0 seconds; Step: 0.1; Default: Disabled)

When a **Reclose Counts to Sectionalizer Trip** operation occurs, the **Fault Detected Counts** value is set to "1," and the **3-Phase Voltage Loss Sectionalizing** mode is set to "No," the **First-Reclose Qualification Time** setting can be used to time coordinate multi-pole sectionalizers with an IntelliRupter® PulseCloser® Fault Interrupter.

Examples:

FRQT = First-Reclose Qualification Time; S1 = Source 1; IR1 = IntelliRupter fault interrupter 1,

SM1 = Scada-Mate switch 1; SM2 = Scada-Mate switch 2; NC = Normally Closed; Lx = Line segment x where x = 1, 2, or 3.

Settings:
SM1 FRQT = 9 seconds

SM2 FRQT = 3 seconds

Both SM have Recloser Counts to Sectionalizer Trip, Fault Detected = 1.

Both SM have 3-Phase Voltage Loss Sectionalizing set to the No setting.

IR1 Test open intervals = 1 second for Test 1, 5 seconds for Test 2, 10 seconds for Test 3, and 30 seconds for Test 4.

Fault in L3

S1(B)------IR1 (NC)-----(L1)-----SM1 (NC)-----(L2)-----SM2 (NC)--X---(L3)-----

t = 0 all devices see the fault, IR1 trips and interrupts the fault.

t = 1 second IR1 pulse tests; fault still present, so IR1 remains open.

t = 3 seconds later, SM2 opens.

t = 5 seconds IR1 pulse tests; detects no fault, and closes and holds.

Fault in L2

S1(B)------IR1 (NC)-----(L1)-----SM1 (NC)-----(L2)---X--SM2 (NC)-----(L3)-----

t = 0 IR1 and SM1 see the fault, IR1 trips and interrupts the fault.

t = 1 second IR1 pulse tests, fault still present so IR 1 remains open.

t = 5 seconds IR1 pulse tests, fault still present so IR1 remains open.

t = 9 seconds SM1 opens.

t = 10 seconds IR1 Pulse tests, no fault and closes and holds.

Recloser Counts to Sectionalizer Trip, Fault Detected

This is the number of three-phase voltage losses associated with fault current that will cause the control to open the line switch. The switch control trips open the line switch when all of the following are true:

- The switch control detects a number of three-phase voltage losses equal to the **Recloser Counts to Sectionalizer Trip, Fault Detected** setpoint
- **Sectionalizing** mode is enabled
- An overcurrent fault preceded the number of voltage losses set by the **Fault Current Required before First/All Voltage Loss(es)** setpoint

For example, if the applicable value is “3,” the switch control trips open the line switch on the third qualifying voltage outage. (Range: 1-9; Step: 1; Default 3)

Recloser Counts to Sectionalizer Trip, Voltage Loss Only

When **Sectionalizing** mode is enabled, the **3-Phase Volt Loss Sectionalizing** feature is set to **Yes** or **ITSG Only** mode, the IntelliTeam system is in the **Ready** state, and the switch control detects this number of three-phase voltage losses with or without fault current, the control opens the line switch. For example, if this value is set to "3," the switch control trips open the line switch on the third qualifying voltage outage. (Range: 1-9, Step: 1, Default: 2)

Number of Shots Required for Lockout

Should a source-side breaker or switch inadvertently close into a fault, this is the number of three-phase voltage losses the switch control must detect during the **Shots-To-Lockout Time Threshold** condition before it trips open the switch. The switch control can lock out after either one voltage loss or two voltage losses. Normally set this value to "1" unless the breaker coordinating with uses an instantaneous reclose feature. (Default: One)

Shots-To-Lockout Time Threshold (seconds)

This is the number of seconds the **Shots-to-Lockout** timer runs. If the applicable number of three-phase voltage losses (see the **Number of Shots Required for Lockout** setpoint) occurs during this time period, the switch control trips open the switch. To enable the **Shots-to-Lockout** feature, set this time to a value greater than zero. (Range: 1-25.5; Step: 0.1; Default: 5.0)

During circuit reconfiguration, the **Shots-to-Lockout** timer is always used if enabled. When the IntelliTeam system closes a switch to restore load, it will wait the Shots-to-Lockout Time Threshold period before progressing to the next switch. This delay helps to verify that each switch will remain closed as circuit reconfiguration continues.

Overcurrent Required before Shots-To-Lockout Operation

Enable this setpoint for the **Shots-to-Lockout** feature to reopen the switch only if the three-phase voltage loss was preceded by an overcurrent event. The **Shots-to-Lockout** feature was designed to look only at voltage loss to detect a breaker trip. This guards against a misoperation caused by an incorrect fault detection or inrush restraint setting. Enabling this setpoint is recommended when the system circuit breakers trip on inrush current. (Default: Disabled)

If the **Number of Shots Required for Lockout** setpoint is two, the relationship between the detection of overcurrent and voltage losses follows the **Fault Current Required before First/All Voltage Loss(es)** setpoint.

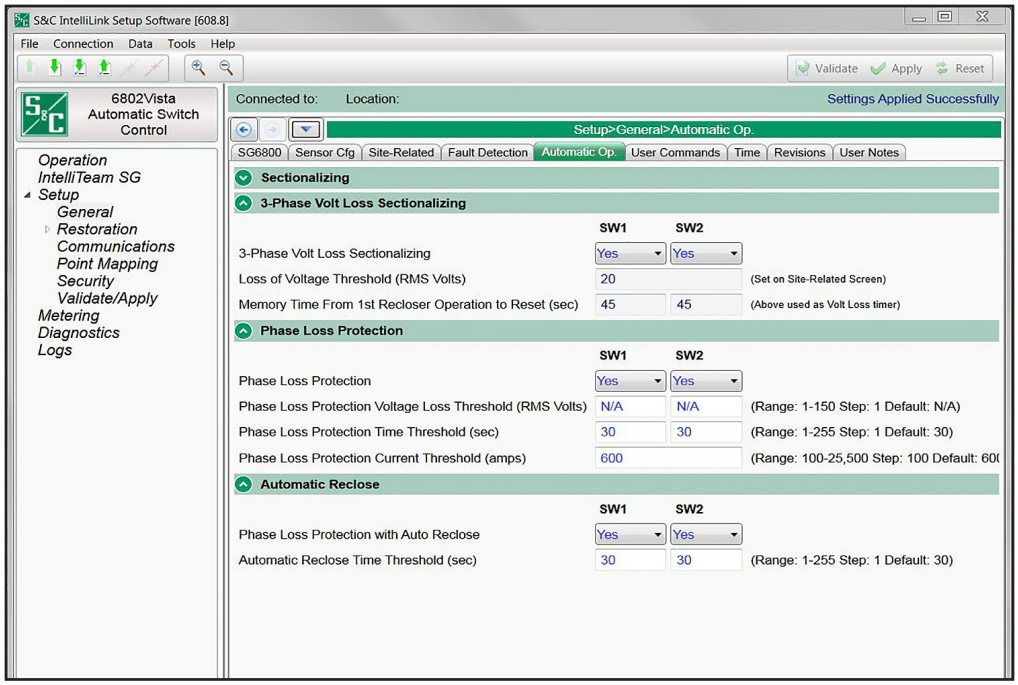


Figure 13. The *Setup>General>Automatic Operation* screen, with Three-Phase Volt Loss Sectionalizing, Phase Loss Protection, and Automatic Reclose expanded.

3-Phase Volt Loss Sectionalizing

This feature is only applicable when the **Sectionalizing** mode is set to "Yes." See Figure 13. When the **3-Phase Volt Loss Sectionalizing** feature is set to "No," the switch control will not open the switch for an extended voltage loss.

Select "Yes" to enable sectionalizing an extended three-phase voltage loss. Select the **ITSG Only** option to enable sectionalizing from and extend three-phase voltage loss when IntelliTeam SG is in the **Ready** state.

When set to "ITSG Only," the switch control will not open because of an extended three-phase voltage loss if the IntelliTeam SG system is not in the **Ready** state or for the duration of the **Sectionalizer Reset and Extended Voltage Loss Time** condition.

If a switch has already operated, when the **Voltage Loss** timer expires, it will not try to operate the switch if the extended voltage loss flag in the sectionalizing logic is still set. The log message "Reclose sequence ended (time limit)" will be entered, indicating the **Voltage Loss** timer has expired. If the extended voltage loss flag is still set, the message "Sectionalizing Disabled for Voltage Loss Only" will be entered directly afterward.

Note: This setting must be set to "Yes" or "ITSG Only" when using the IntelliTeam SG Automatic Restoration System.

Loss of Voltage Threshold (RMS Volts)

This setpoint is configured on the *Setup>General>Site-Related* screen.

Sectionalizer Reset and Extended Voltage Loss Time (sec)

This setpoint is configured in the "Sectionalizing" section on this screen and is used as the **Loss of Voltage** timer.

Phase Loss Protection Section

Phase Loss Protection

When the **Phase Loss Protection** feature is enabled and the switch control detects a loss of voltage on one or two phases, it starts the **Phase Loss Protection Time Threshold** timer. If the voltage loss persists and true RMS current remains below the setpoint until the timer expires, the control trips open the line switch. If voltage returns on one phase but is then lost on another phase, the switch control restarts the timer.

In a wye system, when a phase loses voltage, the voltage reading is "0" (zero) for that phase, so a phase imbalance can be detected easily.

In a delta system, the loss of one phase results in sensor readings with magnitudes slightly more than half of the normal phase-to-phase voltage. Simultaneous loss of two phases is not detectable as a **Phase Imbalance** condition.

When the **Phase Loss Protection** feature trips the switch open and the phase imbalance has corrected for the **Auto-Reclose Time Threshold** condition, the switch will reclose.

Note: The **Phase Loss Protection with Auto Reclose** function must be set to "No" when the **Phase Loss Protection** function is set to "Yes" or "ITSG Only" and the **Phase Loss Protection** function is used with the IntelliTeam system.

Phase Loss Protection Voltage Loss Threshold (RMS Volts)

When voltage on one or two phases drops below this value, the switch control starts the **Phase Loss Protection Time Threshold** timer. If the voltage stays continuously below this voltage until the timer expires, the control opens the line switch.

When this setpoint is set to "N/A," the switch control uses the **Loss of Voltage Threshold** setpoint (on the *Setup>General>Site-Related* screen) for both three-phase voltage loss and for phase-loss protection. A higher value for his setpoint lets the switch control detect phase-loss conditions where there are delta-connected transformers and they still provide accurate sensing of true three-phase outages. A threshold of approximately 75% of the normal phase voltage 90 Volts on a 120-Volt base) is recommended. (Range: 1-150; Step: 1; Default: N/A)

When this setpoint is set to other than "N/A," it is also used as the **Return of Voltage** threshold setpoint.

Phase Loss Protection Time Threshold (seconds)

This is the number of seconds the switch control waits after it detects a loss of phase voltage before it trips open the switch. When the timer expires if the voltage on one or two phases has remained below the **Phase Loss Protection Voltage Loss Threshold** setting, and the current has remained continuously below the **Phase Loss Protection Current Threshold** setting, the control trips open the line switch. (Range: 1-255; Step: 1; Default: 30)

At a minimum, this time should exceed the reaction time of any single-phase source-side protective device.

Phase Loss Protection Current Threshold (amps)

When minimizing **Loss of Phase** conditions, the control must switch the remaining live phases. To make sure these live phases have current flows that are safe for the switch, set this setpoint to the load-break rating of the line switch.
(Range: 100-25,500; Step: 100; Default: 600)

Automatic Reclose

Phase Loss Protection with Auto Reclose

When the **Automatic Reclose** feature is enabled, this is the number of seconds the switch control waits (after three-phase voltage is sensed) before it recloses the switch.

Note: This feature is not applicable to the IntelliTeam system and should be disabled when the IntelliTeam system is enabled.

Automatic Reclose Time Threshold (sec)

When **Automatic Reclose** mode is enabled, this is the number of seconds the switch control waits (after three-phase voltage is sensed) before it recloses the switch.
(Range: 1-255; Step: 1; Default: 30)

Note: This must be set to “No” when using the IntelliTeam system.

User Commands Configuration

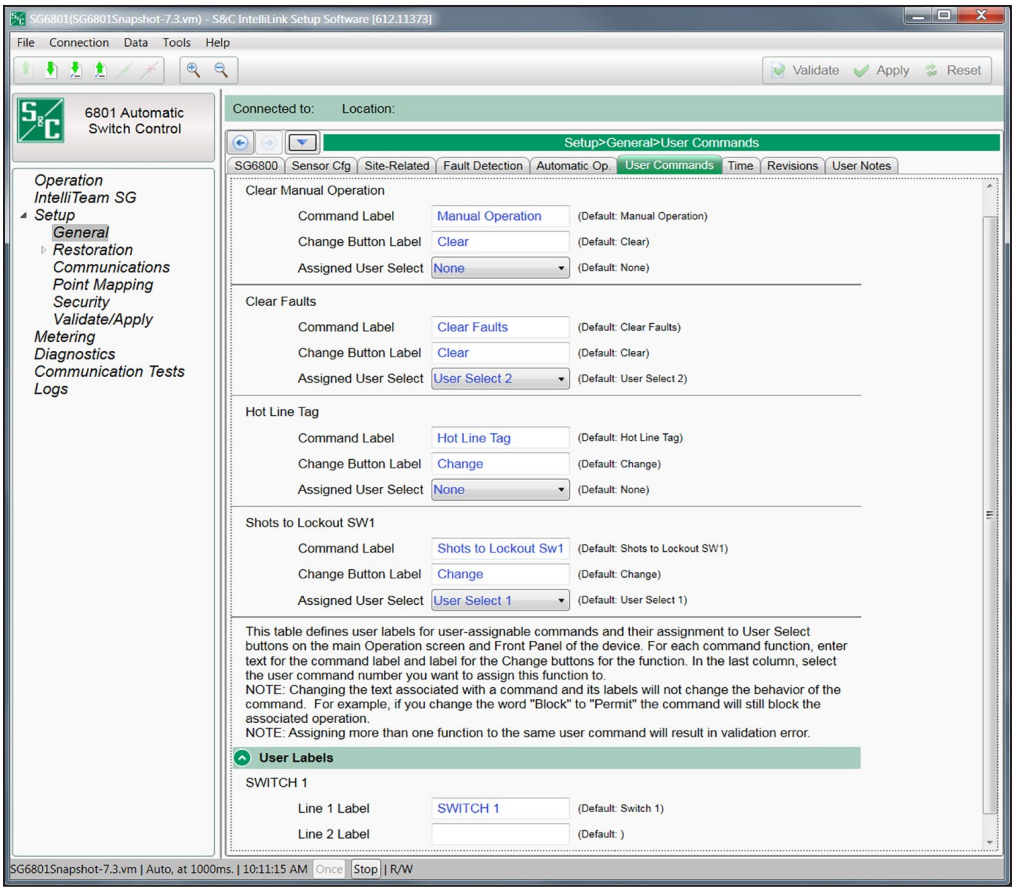


Figure 14. The *Setup>General>User Commands* screen.

This screen defines the user labels for user-assignable commands and their assignment to the two **User Select** buttons on the *Operation* screen. See Figure 14. Enter text for the command label of each command function.

In the last column, select the user command number this function should be assigned to. The **Hot Line Tag** function is only available on 6801 switch controls.

Note: Changing the text associated with a command and its labels will not change the behavior of the command. For example, if changing the word “Block” to “Permit,” the command will still block the associated operation.

Note: Assigning more than one function to the same User Select number will result in a validation error.

Clear Manual Operation

If manual operation has been affected by a local lever, Wi-Fi, or SCADA command, the team(s) will not be in the **Ready** state. Manual operation(s) can be cleared with a **User Select** button assigned to this function.

Clear Faults

When the switch control detects an overcurrent condition, the OC FAULT indicator on the front panel will be illuminated to indicate the detected overcurrent. The indicated overcurrent can be cleared with a **User Select** button assigned to this function.

User Labels Section

Line 1 Label

This is the first text line for the user to add descriptive information about the switch location. (Default: Switch 1)

Line 2 Label

This is the second text line for the user to add descriptive information about the switch location.

Hot Line Tag

An active **Hot Line Tag** (HLT) mode inhibits closing by: a front panel switch command, a SCADA command, a remote IntelliLink Setup Software command, or automatically by the IntelliTeam SG Automatic Restoration System.

The **Hot Line Tag** mode does not prohibit a Scada-Mate Switching System hotstick operation to close the switch.

An active **HLT** mode on an open IntelliTeam SG system switch takes it, and the teams it is a member of, out of the **Ready** state. When the **HLT** mode is cleared, the switch and the teams will be restored to the **Ready** state if the switch is in the **Normally Open** mode. If the switch is in the **Normally Closed** state, and then opened to set a **HLT** mode, then the **HLT** mode must be cleared, the switch closed and the manual operation cleared before the team(s) will go back to the **Ready** mode.

Setting a Hot Line Tag

The **Hot Line Tag** mode can only be set on a 6801 switch control with an open Scada-Mate Switch. A closed switch must be opened before the **HLT** mode can be applied. The **Hot Line Tag** mode can be set with:

- A configurable button on the faceplate
- Faceplate navigation to the LCD DISPLAY: “8. User Select Menu” and activating the **HLT** mode
- A SCADA command by DNP Control point 8 or 9

Note: The **HLT** mode can only be cleared by the command type used to set it.

Reporting a Hot Line Tag Configuration

On the *Logs>Historic Log* screen, the event is either "Hot Line Tag Active" or "Hot Line Tag OFF." If the **HLT** mode was set from the faceplate, another event is reported, "Hot Line Tag Set Local" and Data 2 = "FP." If the **HLT** mode was not set from the faceplate, another event is reported, "Hot Line Tag Set Remote," and Data 2 is "ILink," when set by IntelliLink software, or Data 2 is "SCADA" when set by a SCADA command.

When the **HLT** mode is active; the LCD only displays "Hot Line Tag Active." However, the front panel arrow buttons still navigate the LCD menu, so the **HLT** mode can be turned off with a command on the LCD display.

When the **HLT** mode is active, the ERROR LED is on. When the **HLT** mode is cleared and no other error conditions are active, the ERROR LED will be off.

Shots to Lockout

The **Shots-to-Lockout** feature allows a field technician or SCADA operator to test a potentially faulted line by reducing counts-to-trip to either 1 or 2 for a specified time period.

When the circuit is de-energized by a source-side protective device (recloser, breaker, etc.) and the switch control sees the transition from voltage resent to loss of voltage, the switch control opens the switch immediately. This allows the faulted line segment to be isolated and prevents the source-side device from reclosing into a fault multiple times.

NOTICE

If the source-side device opens and recloses very quickly, sensors on the load side of the switch may not have enough time to sense both the voltage increase (when the switch closes) and the voltage loss (when the source-side device opens) before the source-side device recloses. Under these conditions, the switch control cannot carry out a **Shots-to-Lockout** function, except during a transfer event. Always position the switch so the sensors are on the source side for best results.

NOTICE

It is important to properly coordinate the end of the **Shots-to-Lockout** timer with the source breaker operation. Operation of the breaker at the same time the switch opens could result in a switch malfunction.

To enable the **Shots to Lockout** mode on an open switch from the front panel, the SCADA Control function indication must be in **Local** mode. If the **SCADA Control** function indication is in **Remote** mode, press the CHANGE button to toggle the SCADA CONTROL to the **Local** mode.

When the SCADA CONTROL indicates **Local** mode, press the USER SELECT button assigned to **Shots-to-Lockout** mode for the desired switch. Press the USER SELECT button to toggle from **Blocked** mode to the **Enabled** mode. The feature is enabled indefinitely (latched) until the switch is closed or the assigned User Select CHANGE button is pressed again.

If the **Enabled** indication is present when the switch is closed, the CLOSED indicator for the switch starts blinking. The CLOSED indicator will blink for the duration of the **Shots-to-Lockout Time** threshold if the switch closes and holds.

Enable the **Shots-to-Lockout** mode when the switch is closed. This feature is useful for extending **Shots-to-Lockout** functionality to a load-side manual switch. The feature is enabled until the **Shots-to-Lockout Time** threshold expires.

To enable the **Shots to Lockout** mode on a closed switch from the front panel, the SCADA CONTROL the indicator must show **Local** mode. When the **SCADA Control** function indication is in **Remote** mode, press the CHANGE button to toggle the **SCADA Control** function to **Local** mode.

When the **SCADA Control** function shows **Local** mode, press the USER SELECT button assigned to the **Shots-to-Lockout** mode for the desired switch. Press the USER SELECT button to toggle from **Blocked** mode to the **Enabled** mode, and the CLOSED indicator for the switch starts blinking. The CLOSED indicator will blink for the duration of the **Shots-to-Lockout Time** threshold if the switch closes and holds.

When a **User Commands** button is configured for the **Shots-to-Lockout for Switch 2** feature, and the user subsequently configures the **Switches in Use** setting to "One" on the IntelliLink Setup Software *Setup>General> Sensor Cfg* screen, (for Vista Underground Distribution Switchgear) the **Shots to Lockout SW2 User Command** button will then be greyed out for Switch 2 in the **User Commands** tab on the *General* screen. Because the button is greyed out, the user cannot change that button to a different **User Command** function.

Follow these steps to re-configure the **Shots to Lockout SW2 User Command** button:

STEP 1. Configure the **Switches in Use** setting on the *Setup>General>Sensor Cfg* screen to "Two."

STEP 2. Set the **Assigned User Select** setting on the *Setup>General>User Commands* screen to the appropriate **User Select** button.

Time Configuration

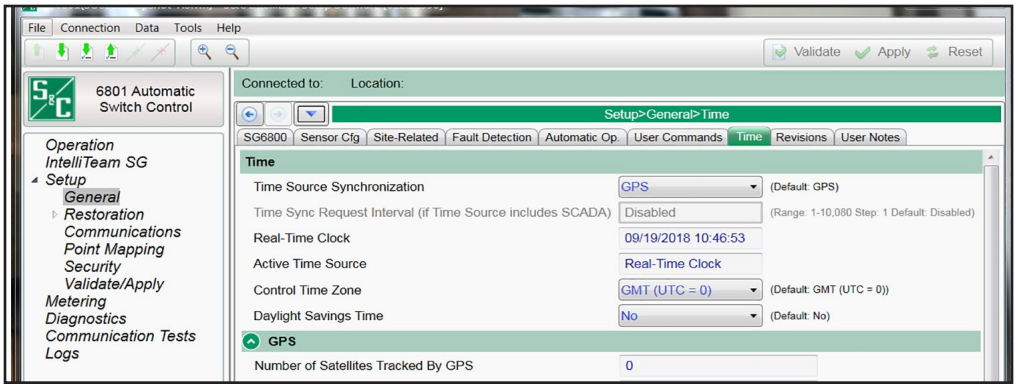


Figure 15. The *Setup>General>Time* screen.

The clock synchronization source and daylight savings time are configured on the screen shown in Figure 15.

Time Source Synchronization

Select from the drop-down list: **GPS** (default), **SCADA**, **GPS and SCADA**, or **User Set**. SCADA can only function for Master 1.

When **SCADA** mode is selected, the real-time clock will be synchronized to the time and date specified in the SCADA master's time synchronization request. Configuration of the **Time Sync Request Interval** setting is required.

When **GPS and SCADA** mode is selected, the GPS signal will be used when available. If the GPS signal is not available, the real-time clock will be synchronized to the time and date specified in the SCADA master's time synchronization request; otherwise, the master's time synchronization request is ignored. Configuration of the **Time Sync Request Interval** setting is required.

When **User Set** mode is selected, the real-time clock will synchronize once to the time indicated on a user-furnished computer or the time entered by the user. Go to the **Tools** menu, select the "Device Maintenance" entry from the drop-down list, and click on either the **Set Control Time** button to enter the user-set time or on the **Synchronize with PC** button.

Time Sync Request Interval (if Time Source=SCADA or Time Source=GPS and SCADA)

When this interval (in minutes) expires, the control will assert IIN1.4 (Need Time) on every response until the master successfully writes absolute time and date using Object 50 variation 1. (Minimum: 1; Maximum: 10080; Step: 1; Default: Disabled)

Real-Time Clock

This is the date and 24-hour time display.

Active Time Source

This display indicates the time source as the real-time clock or as the GPS source.

Control Time Zone

Select from the drop-down list. GMT (UTC = 0) is the default.

All time-stamped files and the internal time are Universal Time, Coordinated (UTC), also known as Greenwich Mean Time (GMT). Local time also can be displayed by using the **Control Time Zone** and **Daylight Savings Time** settings.

Daylight Savings Time

Select from the drop-down list: **No** (default) or **Yes** mode.

Note: Select the **Start Day**, **End Day**, and **Offset** settings for the **Daylight Savings Time** feature.

GPS

Number of Satellites Tracked by GPS (2nd digit)

This is the number of satellites used in the calculation of the position and time displays. Triangulation of three satellites at a minimum is required to determine position, but three satellites in a straight line cannot determine position. Only one satellite is required to determine time.

GPS Fix Quality

This statement indicates the GPS fix quality:

- Invalid
- GPS fix (SPS)
- DGPS fix
- PPS fix
- Real time kinematic
- Float RTK
- Estimated (dead reckoning)
- Manual input mode
- Simulation mode

Horizontal Dilution of Precision of GPS Fix

This statement indicates the relative estimate of GPS horizontal position fix accuracy:

<1 = Ideal—This is the highest confidence level.

1-2 = Excellent—The position measurements are accurate for most applications.

2-5 = Good—This is the minimum information appropriate for making business decisions.

5-10 = Moderate—This information could be used for calculation, but a more open sky view is recommended.

10-20 = Fair—This indicates a low confidence level, producing a very rough estimate of the present location.

>20 = Poor—This information can be inaccurate by as much as 300 meters with a 6-meter accurate device.

Signal Stability Countdown

This counter starts when a signal returns after it had been lost. It counts down from 300 seconds, and when the timer reaches “0” (the signal has persisted for 300 seconds), the signal is considered stable.

GPS Status

This statement indicates the status of time, position, and reception conditions:

- **Time and Position OK**
- **Time and Pos OK, Pending Stability**
- **Time and Pos OK, No Pulse Signal**
- **Time and Position Invalid**
- **Data Invalid: Serial-Line Anomaly**
- **Data Invalid: Serial-Line Error**
- **Data Invalid: Serial-Line Silence**
- **Disabled By User**
- **Not Initialized**

GPS Signal Available

A **Yes** display indicates the GPS signal is adequate to permit GPS time synchronization.

Satellite Signal Noise Ratio

This displays the satellites in view by ID number and the signal-to-noise ratio in dB for each satellite. The number of satellites in the list can be higher than the number shown in the **Number of Satellites Tracked by GPS** field. 30 dB+ is a good signal, 20 dB to 30 dB is an acceptable signal, 10 dB to 20 dB is a poor signal, and less than 10 dB is unreliable.

Firmware Revisions

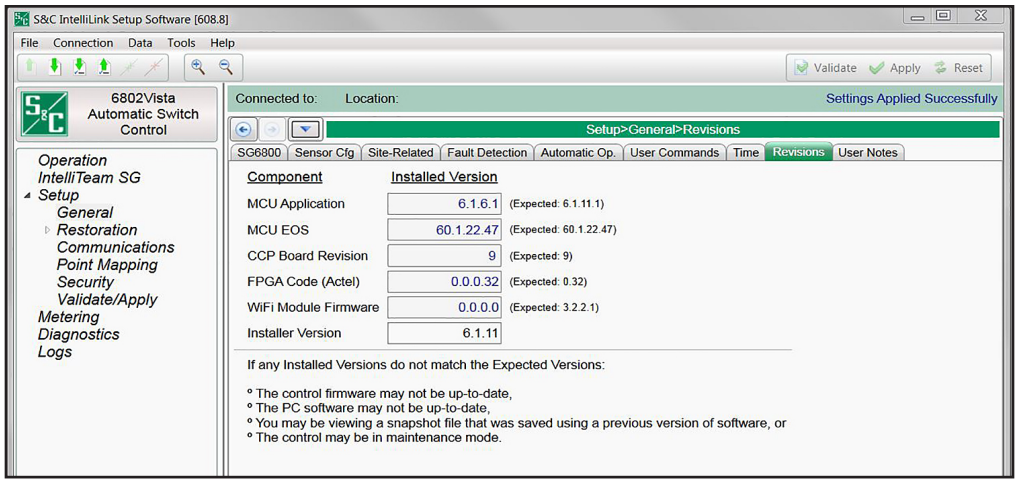


Figure 16. The *Setup>General>Revisions* screen.

Data for the installed version updates whenever a new software revision is installed. The expected value is stored in the IntelliLink software, and the installed version is loaded from the connected control. See Figure 16.

The latest 6800 Series Automatic Switch Control software revisions are available at the S&C Automation Customer Support Portal, which requires an assigned user name and password. Go to this link: **sandc.com/en/support/sc-customer-portal/**.

Portal access can be registered at this link.

User Notes

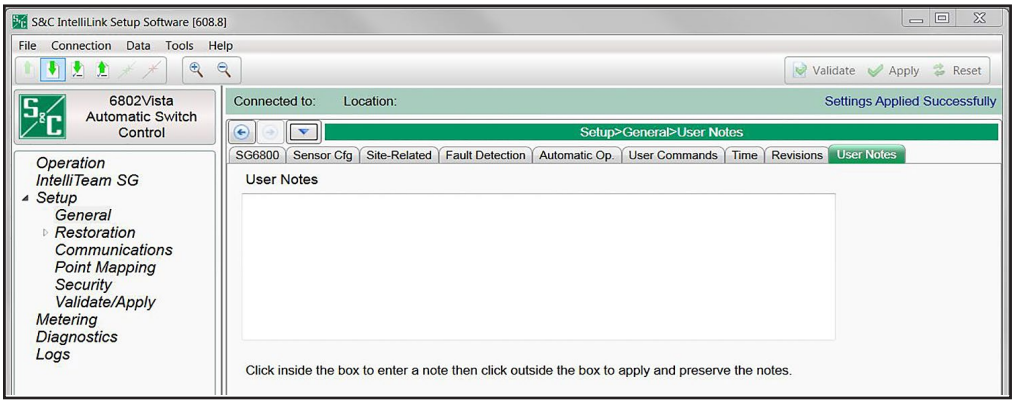


Figure 17. The *Setup>General>User Notes* screen.

Any character used in a standard text file can be entered. Field capacity is 1000 characters. See Figure 17.

Team RTU Addresses

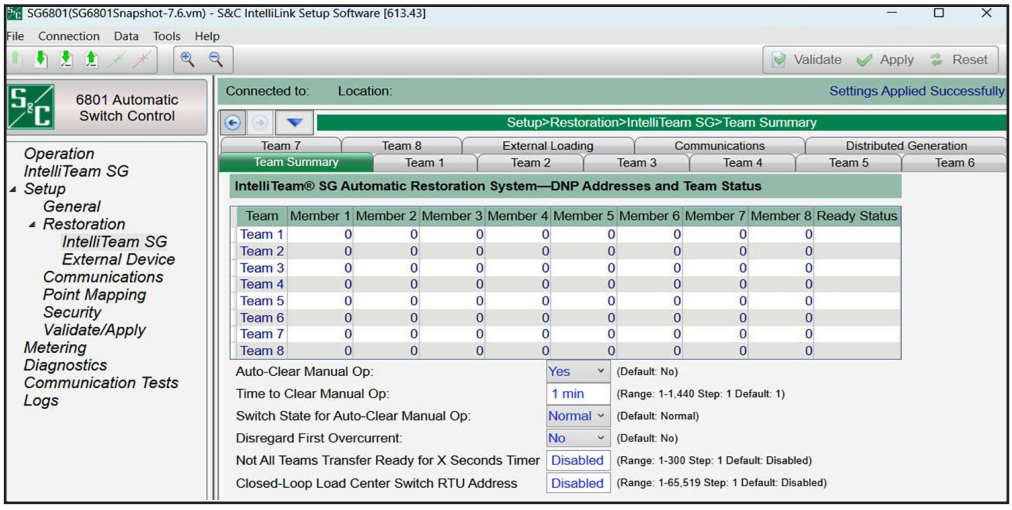


Figure 18. The *Setup>Restoration>IntelliTeam SG>Team Summary* screen.

The screen shown in Figure 18 shows the DNP/RTU address of the teams in which this control is a member and shows **Ready** status for each team.

DNP Addresses and Team Status

Team Selection

The tabs for Team 1 through Team 8 can be used to navigate to screens where general team parameters and information for individual team members are entered for IntelliTeam II Compatibility Mode configuration. For the IntelliTeam SG system, the parameters in these screens are automatically entered by the Netlist the IntelliTeam® Designer software generated.

Auto-Clear Manual Operation

Select "Yes" to automatically clear the **Manual Operation** condition when all other **Ready** conditions are met for this team member. When "No" is selected, **Manual Operation** conditions must be cleared by an IntelliLink software or SCADA command before teams will return to the **Ready** state. The **No** setting is the default.

Switch State for Auto-Clear Manual Op

Select the switch state the switch shall be in to automatically clear a **Manual Operation** condition when the **Auto-Clear Manual Operation** setting is enabled and the **Time to Clear Manual Operation** setting has been met. The three options are:

Normal—Auto-clear manual operations only on devices that are in their normal switch state.

Abnormal—Auto-clear manual operations only on devices that are in their abnormal switch state.

Both—Auto-clear manual operations on devices that are in their normal or abnormal switch state.

⚠ WARNING

Selecting the "Abnormal" or "Both" setting will clear manual operation on a switch when it is in an **Abnormal** state. To ensure any associated team is not reenergized during maintenance activities, disable the **Auto Clear Manual Operation** function on the device and/or put the device in a **Prohibit Restoration** state. **Unexpected reenergization of the team during maintenance or repair activities may cause personal injury.**

Time to Clear Manual Operation

When the **Auto Clear Manual Operation** setting is set to "Yes," enter the time delay before the IntelliTeam SG system will clear the **Manual Operation** condition. (Range: 1-1440 minutes; Step: 1 minute; Default: 1 minute)

Disregard First Overcurrent

When "Yes" is selected, the IntelliTeam application disregards the fault flag generated after the first overcurrent event is detected on the circuit and does not count it as a fault. Instead, it waits until after the first **Reclose/PulseClosing Technology** sequence to allow the distributed generation (DG) to be taken offline before counting the fault event. This will produce more accurate fault location information and lead to better load restoration decisions when there is distributed generation feeding fault current into the circuit.

Note: Enabling this setting has no effect on the sectionalizing logic of the device (i.e. the **Recloser Counts to Sectionalizer Trip** setting is not impacted). This setting only impacts how the **IntelliTeam** logic determines fault location.

When "No" is selected, the IntelliTeam application functions normally. The application will qualify a fault condition and determine fault location based on the external device DNP status point information.

Not All Teams Transfer Ready for X Seconds Timer

This is the amount of time the device can be in the **Out of Ready** state before the **Not all Teams Transfer Ready for X Sec** status point becomes active. The timer resets and the status point becomes inactive when a new coach arrives and the team goes back into the **Ready** state. (Range: 0-300 seconds; Step: 1; Default: Disabled)

Closed-Loop Load Center Switch RTU Address

(only for 6801 Scada-Mate software)

This setpoint is used on a closed-loop circuit to configure the load center switch and to enable the **Set Load Center Switch** logic. All controls on the main line of the closed-loop circuit must be configured with the same RTU address for this to function properly.

When the **Closed-Loop Load Center Switch RTU Address** setting is set to "0," the **Set Load Center Switch** logic is disabled and will not attempt to reconfigure a load center switch. As a result, if there is already a load center switch configured, making this setting "0" on all controls in the closed loop will prevent the IntelliTeam system from running the **Set Load Center Switch** logic but will retain the existing load center switch.

When a non-zero value is entered, the non-zero value must be set to the RTU address of a control on the main line of the closed-loop circuit that will be selected as the load center to break the loop in all controls. (Range: 1-65519; Step: 1; Default: 0 (Disabled)

Source Transfers with Bus Sensing (only for 68023PM software)

A source-transfer switch with voltage sensing on the bus cannot sense voltage present when the primary source is lost. The IntelliTeam SG Automatic Restoration System normally does not close the alternate switch when voltage is not sensed. With the **Source Transfers with Bus Sensing** mode set to "Yes," the IntelliTeam SG system is permitted to switch without sensing voltage present and can close the alternate switch.

When using the **Source Transfers with Bus Sensing** mode, set the **Return to Normal** mode on the *Setup>Restoration>IntelliTeam SG>TeamX>Team Member Settings* screen to "None."

If voltage is not present when the alternate switch is closed, and the **Team Member Re-Qualify Time** setting on the *Setup>Restoration>IntelliTeam SG>Communications* screen is set to "Disabled," the IntelliTeam SG system opens the alternate switch. If a time value is configured for the **Team Member Re-Qualify Time** feature, the IntelliTeam SG system will perform one retry when the timer expires.

Team Setup

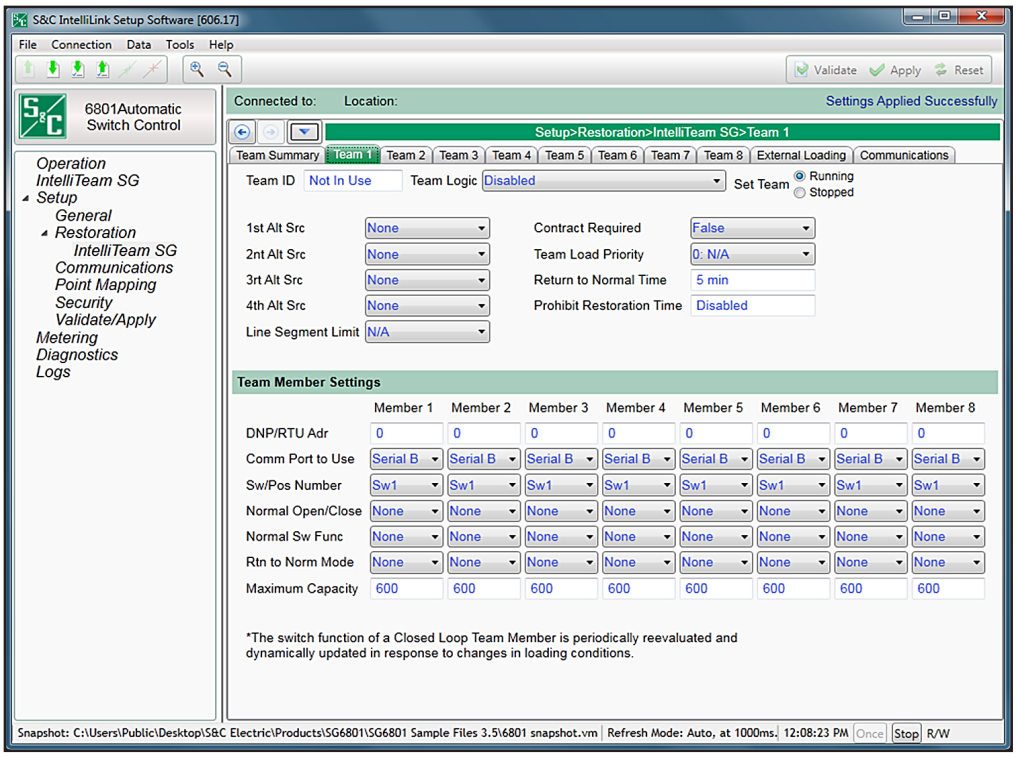


Figure 19. The *Setup>Restoration>IntelliTeam SG>Team 1 to Team 8* screen.

The *Setup>Restoration>IntelliTeam SG>Team X* screens allows setting the IntelliTeam II Automatic Restoration System parameters for each team in which this control is a member. See Figure 19.

Only use these screens when configuring this control to operate in the **IntelliTeam II Compatibility Mode** setting. If this control is configured to operate in an IntelliTeam SG system, use IntelliTeam Designer software. See S&C Instruction Sheet 1044-570, "S&C IntelliTeam® Designer: *User's Guide*."

The **Set Team** setpoint is used with both IntelliTeam II and IntelliTeam SG restoration systems when it is necessary to restart the **IntelliTeam** logic for troubleshooting purposes.

Note: For any one team, the values must be identical in all team members except for the **Comm Port to Use** setting.

Each team screen includes the following fields:

Team ID

Enter the name of this team, 16 characters maximum. This name will help identify the team to the SCADA operator. It appears on all reports generated from the team members. When saving a team configuration, this name is saved along with the other information. It also appears on the front panel display, if applicable.

Team Logic

This setpoint enables or disables the IntelliTeam II system or sets various IntelliTeam SG system feature options for this team.

Set Team

This setpoint changes the operation status of the team defined on this screen. When team logic detects any parameter changes on this screen, the setpoint automatically changes to the **Stopped** status.

Note: When this value is set to "Stopped" and then back to "Running," IntelliLink software uses the setpoint values on this screen as the presently valid team parameters. Until all team members have identical values on this screen, the team will not be in the **Ready** state.

Alternate Source Sequence

Prioritize the way team members restore a line segment. If the team cannot use the source device (see Normal Sw Func) to restore the line segment, the team will try the members listed here, in the order configured.

The alternate source sequence is optional and does not need to be configured for automatic load restoration to occur. If this information is not entered or if the selected team members cannot be used to restore the line segment, the team will try to restore the line segment with the tie device(es). If this is not successful, the team will try to restore the line segment using the load/tie device(es).

General Team Parameters

These setpoints apply to the entire team.

Line Segment Limit

Configure this to the maximum number of line segments the team can pick up. For example, the **Add 1** setting inhibits additional line segments from being restored through a member after the team restores one line segment. To allow the team to pick up as many line segments as capacity allows, set this value to "N/A."

Contracts will be used if the **Line Segment Limit** threshold is set. Configuring this setpoint to a value other than "N/A" automatically changes the **Contract Required** setpoint to "Yes."

Contract Required

If there is concern a line segment may overload, set this value to "Yes." As team members encounter such line segments in a restoration path, they will communicate with all the other line segments in the direction of the alternate source to ensure the alternate source will not be overloaded.

Team Load Priority

This is user configurable, and the default is "NoXfer." The choices are:

Priority1_NoXfer—Load shedding or transferring is not allowed.

Priority2_CloseXfer—<Future> Load shedding is not allowed. Load transfer is allowed through closed transition only.

Priority3_OpenXfer—Load shedding is not allowed. Load transfer allowed through an open transition only.

Priority4_XferShed—Load shedding is allowed. Only shed after transfers to other circuits have been considered. Priority 4 is the highest priority of this category.

Priority5_XferShed—Load shedding is allowed. Only shed after transfers to other circuits have been considered.

Priority6_XferShed—Load shedding is allowed. Only shed after transfers to other circuits have been considered.

Priority7_XferShed—Load shedding is allowed. Only shed after transfers to other circuits have been considered. Priority 7 is the lowest priority of this category and will be transferred or shed before Priority 6, 5, 4, etc.

Priority8_Shed—Load shedding is allowed. Shed these loads before considering load transfers to other circuits. Priority 8 is the highest priority of this category.

Priority9-19_Shed—Load shedding is allowed. Shed these loads before considering load transfers to other circuits.

Priority20-25_Shed and Do Not Restore Load—Priority 25 is the lowest priority of this category and will be shed before any others.

Any load configured with a priority of 20-25 will be shed and will not be restored until the circuit returns to normal. These will only be used when there is a self-tie in the circuit and will only be used on loads that are in the self-tie area. See Figure 20 on page 63.

Note: Using a load priority of 20-25 in a non-self-tie circuit will result in those teams not getting restored. To correct a misconfiguration, the load priorities must be configured with a different load priority (1-19) and the circuit must be re-pushed to the devices.

Note: If loads that were shed using PRLM are brought back online manually and the circuit has not been returned to normal, then the loads may be restored in subsequent events and will not be shed again. This is a known limitation of the PRLM logic. To shed these loads again, they must be shed manually.

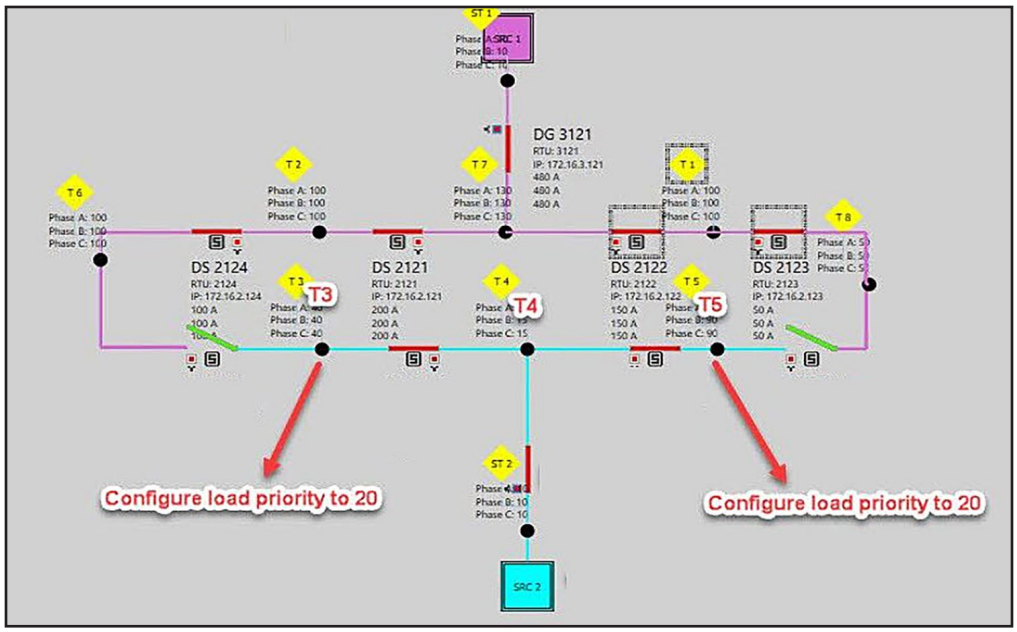


Figure 20. Self-tie example diagram.

Return to Normal Time

This setting is the amount of time, in minutes, power must be restored to the faulted line segment before the **Return to Normal** process will start. (Range: 1 to 254 minutes; Default: 5)

Prohibit Restoration Time

Set this value for the amount of time (in minutes) the team is allowed to restore service after an event begins. If the team cannot restore service within this period, it will enter the **Prohibit Restoration** state, preventing any further restoration activity.

It will remain in this state until cleared through the appropriate SCADA command or clicking on the **IntelliTeam SG Restoration Enabled** button on the *IntelliTeam SG>Team Summary* screen. For 6800 Series controls and 6801M Switch Operators, the **Automatic Restoration Enabled** command on the faceplate or *Operation* screen can also be used.

Note: The **Prohibit Restoration** state must be cleared from a device being removed from an IntelliTeam system before pushing a new Netlist to avoid issues.

Team Member Settings

These setpoints apply to individual team members in this team.

DNP/RTU Address

Enter the DNP/RTU address for each team member. One of these addresses must be the DNP/RTU address entered on the *Setup>Communications>DNP* screen.

Comm Port to Use

This column shows the port through which this team member is found for the purpose of peer-to-peer communications, either serial or Ethernet. If a single radio is used for peer-to-peer communications, set this parameter to the port to which the radio is connected. Because the radio communication port may be different for each team member, this is the only parameter on this screen that can be different for each member of the same team.

When selecting the **Discover** option, the control will scan all ports, and the port that receives a response from a destination peer will be selected for subsequent communications.

Note: This parameter is not saved in a team setpoint profile and must be modified separately if the default value (Port B) is not correct.

Sw/Pos Number

Position number associated with the team member; for example, set Sw1 for a single overhead switch.

Normal Open/Close

This is the **Normal Open** or **Normal Closed** state of each device when the circuit is configured normally. The team uses this information during transfer operations.

Normal Sw Func

The IntelliTeam SG system dynamically assigns the switch functions for a team operating in the **Closed Loop Operation** mode. This is a team that has only two substation sources capable of supplying fault current.

If the listed control is part of a Closed Loop team, the field will have an asterisk "*" in the upper right corner. The IntelliTeam Designer software assigns a switch function at the time of configuration, but the IntelliTeam SG system may override that assignment. The assigned switch function is displayed when the screen updates. See Table 1 on page 65.

Table 1. Normal Switch Function of Each Team Member

Normally closed IntelliRupter® fault interrupters, 6800 Series controls, switches, breakers, and reclosers	
Function	**Characteristics**
Source/Sub	Assigned to the source device when it is the first team out of the substation or it is an IntelliNode Interface Module on a substation breaker
Source	Assigned to the normally closed device that provides power to the line segment when the team is in its normal configuration
Source Load/Tie	(6801SM software only) Assigned to all switches in a closed-loop system because they are all tied to the sources on the closed loop
Load/Tie	A team may have from zero to seven closed switches through which loads on other line segments receive power. This value is assigned when the switch could be involved in restoring power to the line segment because line segments on the other side of the switch have alternate sources.
Load	A team may have from zero to seven closed switches through which loads on other line segments receive power. This value is assigned when the switch could not be involved in restoring power to the line segment because line segments on the other side of the switch have no alternate sources.
Normally open IntelliRupter fault interrupters, 6800 Series controls, switches, breakers, and reclosers	
Function	**Characteristics**
Tie/Sub	This is assigned when the tie switch is the first team member after the substation source. A tie/sub switch or recloser should have its voltage sensors facing the alternate source.
Tie	This is assigned to open switches in the team that restores power to the line segment directly from an alternate source when closed. A team may have from zero to seven open switches.
Note: Every closed switch or recloser should have its sensors facing the normal source of the team. A tie/sub switch or recloser should have its voltage sensors facing the alternate source.	
IntelliNode Interface Modules directly associated with distributed generation sources	
Function	**Characteristics**
Info Only	This value is assigned when the IntelliNode Interface Module is directly associated to a distributed generation device to gather distributed generation real-time contribution data and status from the device and to send a **Transfer Trip** command to the distributed generation when necessary. An Info Only team member takes part in all normal team activity but cannot initiate a team transfer event, nor can it be selected as a switch to open or close during normal restoration and reconfiguration. If **DG Reconnect** mode is enabled, and after the **DG Reconnect Delay Timer Time** setpoint expires, this IntelliNode module will also issue a **Close** command to the associated device to bring the distributed generation back online.

Rtn to Norm Mode

Team members can return the circuit to its normal configuration automatically when stable three-phase voltage has been restored to a faulted line segment or on command.

For teams with one or more tie switches, select the **Open** transition setting. The tie device(es) open before other team members return the circuit to its normal configuration. When selecting the **Closed** transition setting, team members will close the normal source switches and then open the tie device(es). The **Return to Normal** process starts at the line segments closest to the normal source and works outward.

Maximum Capacity

Maximum load (in amperes) this team member can carry because of limitations, such as conductor size and device rating, when carrying current in any direction.

External Loading

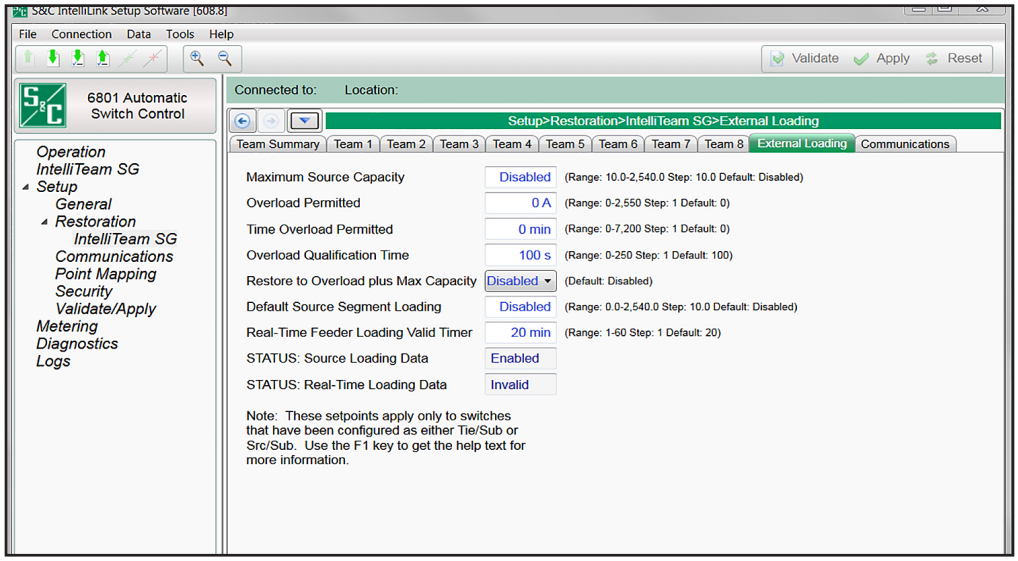


Figure 21. The *Setup>Restoration>IntelliTeam SG>External Loading* screen.

The screen in Figure 21 is used with feeder loading monitored at the substation breaker to calculate the real-time excess capacity available when a transfer occurs. Both **Maximum Source Capacity** and **Default Source Segment Loading** settings must only be set for SRC/sub or tie/sub.

Maximum Source Capacity

This is the maximum feeder capacity (in amperes) as viewed from the substation end of the feeder. This value represents the maximum three-phase average load the feeder can carry at any time. (Range: 10-2,540 amps; Step: 10; Default: Disabled)

Overload Permitted

This value is added to the **Maximum Source Capacity** threshold and becomes the new maximum load threshold that when exceeded requires immediate load shedding using the **Post Restoration Load Management** feature. This setting is only applicable when the IntelliTeam **Post Restoration Load Management** (PRLM) options are enabled. Overloads above this level trigger a load-shedding event with no intentional delay to get the load under the **Overload Permitted** threshold, and the **Time Overload Permitted** timer will continue to count if it has not expired at this point.

The load will be shed based on the **Team Load Priority** setting configured for the affected team. Otherwise, when load is above the **Maximum Source Capacity** value but lower than the **Overload Permitted** threshold, it will be allowed to remain until the **Time Overload Permitted** timer expires, which triggers an immediate load-shedding event to get the load below the **Maximum Source Capacity** value. At this point, the PRLM will identify the lowest priority team and shed its load.

If shedding that team's load does not eliminate the overload condition, the PRLM will find the next lowest priority team and shed its load. It will continue that process until the load falls below the **Maximum Source Capacity** value, removing the overload condition. No other overload conditions will be allowed until the system returns to its **Normal** state. (Range: 0-2,550 amps; Step: 1; Default: 0)

This setting is configured in the IntelliTeam Designer software and cannot be changed on this screen. See S&C Instruction Sheet 1044-570, "S&C IntelliTeam® Designer: *User's Guide.*"

For example: If the **Maximum Source Capacity** value is set to 150 amps and the **Overload Permitted** value is set to 150 amps, the PRLM will allow up to 300 amps of load on that source before shedding load.

Time Overload Permitted

This is the total time that the overload can be above the **Maximum Source Capacity** setting before load shedding is triggered. This setting is only applicable when the IntelliTeam system **Post Restoration Load Management** options are enabled. This setting is used along with the **Overload Permitted** setting to allow temporary overloads on a specific source. (Range: 0-7,200 minutes; Step: 1; Default: 0) This setting is configured in the IntelliTeam Designer software and cannot be changed on this screen. See S&C Instruction Sheet 1044-570, "S&C IntelliTeam® Designer: *User's Guide.*"

Overload Qualification Time

This is the time the measured load must be above the **Maximum Source Capacity** setting to qualify as an overload condition. When an overload is qualified, the **Time Overload Permitted** timer begins timing. This setting is only applicable when the IntelliTeam system **Post Restoration Load Management** options are enabled. (Range: 0-250 seconds; Step: 1; Default: 100)

For example: The **Maximum Source Capacity** setting = 400 amps, the **Overload Permitted** setting = 100 amps, the **Time Overload Permitted** setting = 5 minutes, and the **Overload Qualification Time** setting = 50 seconds. If the load goes above 400 amps for 50 seconds, the **Time Overload Permitted** timer begins timing. If the load stays between 400 and 500 amps for 5 minutes, a load-shedding event is initiated based on the configured load priorities, and load will be shed to below the **Maximum Source Capacity** value.

Restore to Overload plus Max Capacity

When enabled, this setting allows the IntelliTeam system to restore load up to the **Maximum Source Capacity + Overload Permitted** values during an IntelliTeam system restoration event. This setting is only applicable when the IntelliTeam system **Post Restoration Load Management** options are enabled. (Default: Disabled) This setting is configured in the IntelliTeam Designer software and cannot be changed on this screen. See S&C Instruction Sheet 1044-570, "S&C IntelliTeam® Designer: *User's Guide*."

For example: The **Maximum Source Capacity** setting = 400 amps, the **Overload Permitted** setting = 100 amps, and the **Restore to Overload plus Max Capacity** setting = Enabled. When there is a restoration event, the IntelliTeam system will restore up to 500 amps of load (the **Max Source Capacity + Overload Permitted** settings) for the configured source.

Default Source Segment Loading

This is the estimated peak three-phase average load (in amperes) of the source-side segment between the substation-feeder breaker and first IntelliRupter fault interrupter, 6800 Automatic Switch Control, switch, or recloser. This value is used to estimate the maximum load in the event that real-time feeder loading data are not available or valid. (Range: 0-2,540 amps; Step: 10.0; Default: Disabled)

Real-Time Feeder Loading Valid Timer

When real-time feeder loading data are received through SCADA, this configurable timer starts counting. If the loading data are not updated within the configured interval (in minutes), loading calculations will default to using the **Default Source Segment Loading** value. (Range: 1-60; Step: 1; Default: 20)

STATUS: Source Loading Data

If either the **Maximum Source Capacity** or the **Default Source Segment Loading** setpoint is not configured, the real-time loading feature is not active. This field will show "Disabled," even if the team member receives feeder-loading data. In this case, the present calculations using the **Maximum Source Capacity** value are used. Both setpoints must be configured for this field to show "Enabled."

STATUS: Real-Time Loading Data

This field will show "Invalid" if:

1. Either the **Maximum Source Capacity** or the **Default Source Segment Loading** setting is configured as "Disabled."
2. The received real-time feeder loading data:
    - Is zero
    - Is less than the 3-phase Average Load of the IntelliRupter fault interrupter, 6800 series switch control, switch, or recloser team member
    - Is equal or greater than the **Maximum Source Capacity** setpoint
    - Has not been updated within the **Real-Time Feeder Loading Valid Timer** setting

When this field shows "Invalid," the **Default Source Segment Loading** value will be used instead if it is configured.

Note: Real-time feeder loading data are only available at a sub switch.

Team Communication Parameters

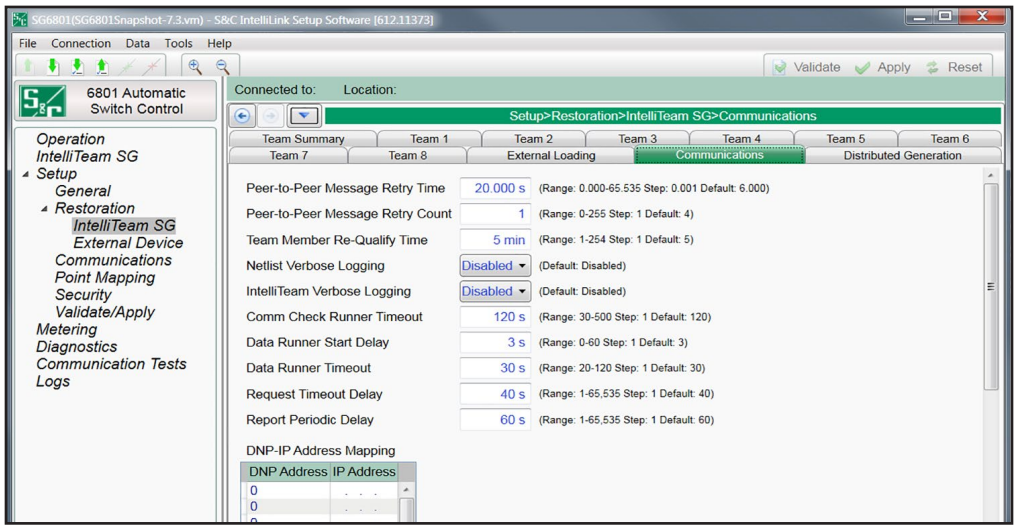


Figure 22. The *Setup>Restoration>IntelliTeam SG>Communications* screen.

Peer-to-Peer Message Retry Time (sec)

The control waits this amount of time (in seconds) to receive a response from another team member. If it does not receive the response within this time period, it resends the message to that team member. It continues sending the message until it receives a response or reaches the **Peer-to-Peer Message Retry Count** value. (Range: 0.000-65.535; Step: 0.001; Default: 6.000) See Figure 22.

Peer-to-Peer Message Retry Count

This is the number of times the control resends a message to a team member that does not respond within the Peer-to-Peer Message Retry Time period. (Range: 0-255; Step: 1; Default: 4)

Note: Decreasing the **Peer-to-Peer Message Retry Time** value or increasing the **Peer-to-Peer Message Retry Count** setting may have a negative effect on some communications systems because of increased traffic. Be sure to take this into account when changing these setpoints.

Team Member Re-Qualify Time (minutes)

This is the time a team member will remain disqualified as a potential alternate source after that team member attempted but was unable to restore full service. This inability to restore full service is likely the result of a second contingency event, such as a loss of phase between the alternate source and the team member attempting to restore service. In this case, the team member would close, find that three-phase voltage is not present, and reopen. (Range: 1-254 minutes; Step: 1; Default: 5)

Netlist Verbose Logging

When enabled, all Netlist-related event messages will be logged. The default is the **Disabled** setting because Netlist logging quickly fills log memory and should only be used for troubleshooting a specific situation.

IntelliTeam Verbose Logging

When enabled, all IntelliTeam restoration system event messages (excluding Netlist-related events) will be logged. The default is the **Disabled** setting because IntelliTeam system logging quickly fills log memory and should only be used for troubleshooting a specific situation.

Comm Check Runner Timeout

When this timer expires before the Communications Check Runner cycle is complete, the Netlist push is incomplete. (Range: 30-500 seconds; Step: 1; Default: 120)

Data Runner Start Delay

This sets the interval between the completion of one Data Runner cycle (to collect and distribute real-time data) and the start of the next Data Runner cycle. (Range: 0-60; Step: 1; Default: 3)

Data Runner Timeout

When this timer expires before the Data Runner cycle is complete, a new Data Runner cycle is started. (Range: 20-120 seconds; Step: 1; Default: 30)

Request Timeout Delay

This sets the time interval between firmware upload completion and the subsequent request for a new Netlist. This delay also applies when a new control is deployed, it will wait this time interval before requesting a new Netlist. (Range: 1-65,535 seconds; Step: 1; Default: 40)

Report Periodic Delay

This sets the time interval between each Netlist transmission. (Range: 1-65,535 seconds; Step: 1; Default: 60)

DNP-IP Address Mapping

Map IP addresses to DNP/RTU addresses for team members that are accessible only over an Ethernet port. An entry must be included in this table for any team member where Ethernet is the configured **Comm Port to Use** setting. The **DNP Address** value is the DNP/RTU address for the IP-based team members. The **IP Address** value is the IP address associated with the destination team members.

Distributed Generation

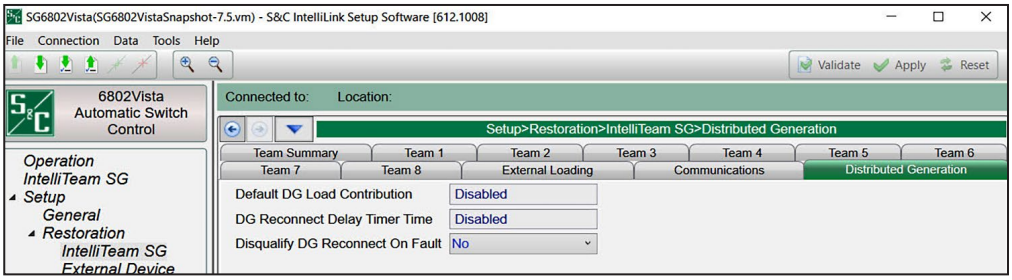


Figure 23. The *Setup>Restoration>IntelliTeam SG>Distributed Generation* screen.

These settings are used for IntelliTeam systems with distributed generation resources (e.g. solar, wind, etc.) on the circuit. See Figure 23.

Default DG Load Contribution

This setting should only be used when no real-time loading data are available from a distributed generation (DG) device. (Range: 0–1000 A; Default: 0, meaning this is disabled and not used by the IntelliTeam system.)

When set to a non-zero value, the IntelliTeam system uses this as the amount of current flowing from the (DG) device into the distribution grid. When set to "0" (the default) and the DG device is teamed with an IntelliNode/Info-Only module, the IntelliTeam system uses loading polled by the IntelliNode/Info-Only module from the DG device as the current it's contributing to the distribution grid.

However, if a normal IntelliTeam system device is teamed with the DG device, it will assume there are zero amps flowing into the distribution grid from the DG device when this value is set to zero. The IntelliTeam system will then calculate the DG load contribution by using the direction and magnitude of current flow into or out of the IntelliTeam device.

Note: If this value is set to a non-zero value and the DG device is teamed with a normal IntelliTeam system device (i.e., not an IntelliNode/Info-Only module), the IntelliTeam system uses this value as the DG load contribution if the device teamed with the DG device measures less current than configured for the **DG Load Contribution** value.

For example, if the device measures 20 amps but the **DG Load Contribution** setting is 80 amps, the IntelliTeam system will use 80 amps as the DG load contribution. Otherwise, if the device measures more current than configured for the **DG Load Contribution** setting, the IntelliTeam system will use the measured current from the device as the DG load contribution.

Note: The configured **DG Load Contribution** value will only appear on the device teamed with the distributed generation device in the *Setup>Restoration>IntelliTeam SG>Distributed Generation* screen. All other devices on the circuit will display "Disabled."

DG Reconnect Delay Timer Time

If set to 0, then the **DG Reconnect** feature is disabled on all devices receiving a Transfer Trip message. Upon return of the normal source, users must manually close the device that opened due to the **Transfer Trip** command to bring the distributed generation back online. Setting this to a non-zero value enables the **DG Reconnect** feature.

After the normal source returns (either during restoration or the **Return to Normal** process) to the device that opened due to the **Transfer Trip** command, then the IntelliTeam logic will count down the timer. After the timer expires, the IntelliTeam system logic removes the **Transfer Trip Prohibit Restoration** (TTPR) mode on the device and will then close the device to bring the distributed generation device back online. (Range: 0-900 seconds; Default = 0 seconds, meaning the **Reconnect DG on Return to Normal** mode is disabled.)

Note: The configured value will only appear on the device teamed with the distributed generation. All other devices on the circuit will display "Disabled."

Note: If for any reason the **DG Reconnect Delay Timer Time** timer is aborted, the timer will not restart automatically and the distributed generation device must be manually put online.

Note: When an IntelliNode/Info-Only module is not directly associated with the distributed generation device, it is up to the distributed generation device's own protection/control device (e.g. breaker, inverter, etc.) to reconnect the distributed generation device because the IntelliTeam system has no control over the device or the reconnection process. However, it should be put online when good voltage, current, and frequency are seen by the distributed generation protection/control device. When the IntelliTeam system control is an IntelliNode/Info-Only module directly associated with the distributed generation device, if it was sent the initial **Transfer Trip** command it will control the reconnection process and issue a **Close** command to the distributed generation device's protection/control device when the **DG Reconnect Delay Timer Time** timer expires.

Disqualify DG Reconnect On Fault

If set to "Yes," and the **DG Reconnect Delay** timer time is set to a non-zero value, the **DG Reconnect** feature will be disqualified if a fault was detected by the device that received the **Transfer Trip** command, but that device is not providing fault direction. If the **DG Reconnect** feature is disqualified, when the normal source returns, users must manually close the device that opened because of the **Transfer Trip** command to bring the distributed generation back online.

If set to "No," and the **DG Reconnect Delay** timer is set to a non-zero value, the **DG Reconnect** feature will automatically close the device that opened because of the **Transfer Trip** command, bringing the distributed generation back online, even when that device detected a fault but does not provide fault direction.

Restoration—External Device

Remote Prohibit Restoration List Table (when using firmware version 7.3)

The screen shown in Figure 24 contains setpoints specifically related to sending the **Prohibit Restoration** SCADA command to remote devices. The non-zero RTU address in this list must be configured to receive a **Latch On**, **Direct Operate** SCADA control point when any of the following events are active in the control: **Hot Line Tag** mode is active, a **Frequency Trip** state occurs, the IntelliTeam SG system determines a **Manual Operation** event has occurred or a SCADA **Prohibit Restoration** command was received from a configured master address and the **Enable Remote Transmit from SCADA P. R.** setpoint is enabled.

Prohibit Restoration is also sent when **Prohibit Restoration** mode is active in the local control, set from the front panel or with an IntelliLink screen command and the **Enable Remote Transmit from Local P. R.** setpoint is enabled.

Note: The **Prohibit Restoration** mode is applied to the device if a **Frequency Trip** event is active. Therefore, the **Prohibit Restoration** mode must be removed from the device to put it and the teams associated to it back into the **Ready** state.

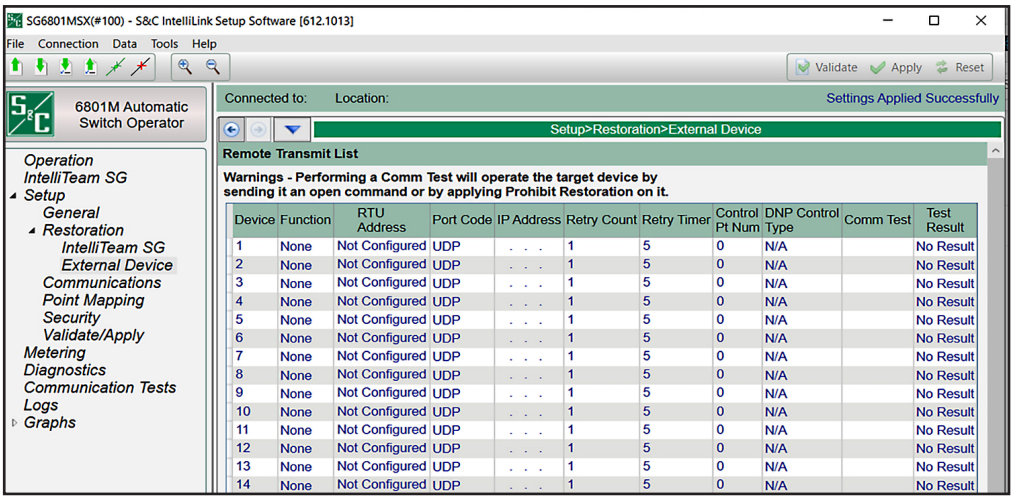


Figure 24. The *Setup>Restoration>External Device* screen

Device

This is the Device ID for the remote device. This field is not configurable.

RTU Address

Enter the address of the remote device. (Range: 1-65519; Step: 1; Default: Not Configured)

Port Code

Select the port to use for transmitting to the remote device. (Default: UDP)

IP Address

When the port code is set to "UDP," enter the IP address of the remote device here.

Retry Count

Enter the number of retries to perform on any timeout event. (Range: 0-255; Step: 1; Default: 1)

Retry Timer

Enter the amount of time in seconds to wait before a retry is attempted. (Range: 0-255; Step: 1; Default: 5)

Control Point Number

Enter the DNP control point number that activates the **Prohibit Restoration** mode in the remote device. (Range: 0-255; Step: 1; Default: 0)

Commission Test

Selecting the **Execute** option from the drop-down menu sends a **Prohibit Restoration** command to the target device(s) to perform the operation in the exact same manner that will occur when the command is sent during normal operation.

NOTICE

Performing a commission test will apply the **Prohibit Restoration** state to the target device. The **Prohibit Restoration** state must be removed to put the device in the **Ready** state.

Test Result

This indicates "Pass," "Pending," "Bad Response," or "No Result" for the sent **Prohibit Restoration** command. "Pass" means that the local device received an acknowledgment from the remote device before the **Retry** timer expired. "Pending" means that the local device sent out the test command but is still awaiting a response. "Bad Response" means that either the remote device rejected the command or the **Retry** timer expired before the local device received an acknowledgment. "No Result" means that no tests have been performed yet.

Note: If DNP association of the peer device cannot be completed due to an incorrect RTU address, IP address, or Port Code, the **Test Result** field may show a **Pending** status indefinitely until the test is rerun again and the association can be made.

Enable Remote Transmit from Local P.R.

Enabling this option sends a **Prohibit Restoration** command to all devices in the list when the **Prohibit Restoration** state is activated locally via the front panel or IntelliLink screen.

Enable Remote Transmit from SCADA P.R.

Enabling this option will send a **Prohibit Restoration** command to all devices in the list if any the following events are active: **Hot Line Tag** mode, **Frequency Trip** state, **Manual Operation** state, or **Prohibit Restoration** state is activated from a SCADA command from a configured master station address.

Remotely Clear Prohibit Restoration

Clicking on this button sends a **Clear Prohibit Restoration** command to the local device and all devices in the list and will clear the local **Prohibit Restoration** state. If an event is still active (**Hot Line Tag** mode, **Frequency Trip** state, **Manual Operation** state) the **Clear Prohibit Restoration** command will not be sent.

Remote Transfer Trip List Table (when using firmware version 7.3.x)

Transfer Trip commands are sent from the device to distributed generation (DG) resources within the distribution system immediately upon detection of a circuit anomaly so the DG does not interfere with IntelliTeam system restoration activities. This action is both for safety reasons and for the protection of load. See Figure 25 on page 77.

If the local device trips open due to a Protection or Automatic Sectionalizing event, and the **Transfer Trip** feature is enabled, Then, it sends **Transfer Trip** (TT) commands to all devices, whether S&C controls or third party controls, listed on its Remote Transfer Trip List. The TT messages are sent, no matter what state the DG/DER is in at the time, to ensure it is disconnected from the system. When the trip is due to a Protection event the TT messages will initiate following the initial trip. **Lockout** state is not necessary.

Device

This is the Device ID for the remote device. This field is not configurable.

RTU Address

Enter the address of the remote device. (Range: 0-65519; Step: 1; Default: Not Configured)

Port Code

Select the port to use for transmitting to the remote device. (Default: UDP)

IP Address

When the port code is set to “UDP,” enter the IP address of the remote device here.

Retry Count

Enter the number of retries to perform on any timeout event. (Range: 0-255; Step: 1; Default: 1)

Retry Timer

Enter the amount of time in seconds to wait before a retry is attempted. (Range: 0-255; Step: 1; Default: 5)

Control Point Number

Enter the DNP control point number that activates the **Transfer Trip** mode in the remote device. (Range: 0-255; Step: 1; Default: 0)

Protocol

When the remote device is an S&C device select the peer-to-peer (P2P) protocol. The P2P protocol allows the remote S&C device to report the actual opening of the remote device to the sending device, to allow the IntelliTeam system to proceed with transfer events. When the remote device is not an S&C device, select DNP3 for the protocol.

DNP Control Type

Enter the appropriate control type for the configured **Control PT Number** setpoint: **Pulse On**, **Latch On** or **Breaker Close**. When received, the remote control will issue an **Open** command to the distributed generation switch.

Commission Test

Selecting "Execute" from the drop-down menu sends a **Transfer Trip** command to the target device(s) in the exact same manner that will occur when the command is sent during normal operation.

NOTICE

Performing a commission test will operate the target device by sending it an **Open** command. A **Close** command must be sent to the device and any alarms cleared to put the device in the **Ready** state.

Test Result

This indicates **Pass**, **Pending**, **Bad Response**, or **No Result** for the sent **Prohibit Restoration** command. "Pass" means that the local device received an acknowledgment from the remote device before the **Retry** timer expired. "Pending" means that the local device sent out the test command but is still awaiting a response. "Bad Response" means that either the remote device rejected the command or the **Retry** timer expired before the local device received an acknowledgment. "No Result" means no tests have been performed yet.

Remote Transfer Trip

Selecting the **Enabled** state allows commands from this device to be sent to all non-zero RTU addresses listed on the Remote Transfer Trip List. Selecting the **Disabled** state blocks the commands. When there are no distributed generation resources listed on the Remote Transfer Trip List, set this to the **Disabled** state.

Control Relay Pulse On Time

This sets the control relay output block on time for the distributed generation devices that receive DNP3 transfer trip control requests. Each count is 1 ms. (Range: 0-4,294,967,295; Step: 1; Default:1)

Control Relay Pulse Off Time

This sets the control relay output block off time for the distributed generation devices that receive DNP3 transfer trip control requests. Each count is 1 ms. (Range: 0-4,294,967,295; Step: 1; Default: 0)

Remote Transmit List Table

With firmware versions 7.5.x and later, the **Remote Prohibit Restoration List** and **Remote Transfer Trip List** functions have been combined into a single table called, "Remote Transmit List." This table is on the *Setup>Restoration>External Device* screen and includes the same functionality for sending a **Remote Prohibit Restoration** or **Remote Transfer Trip** command to remote devices as was available in the 7.3.x firmware release. See Figure 25

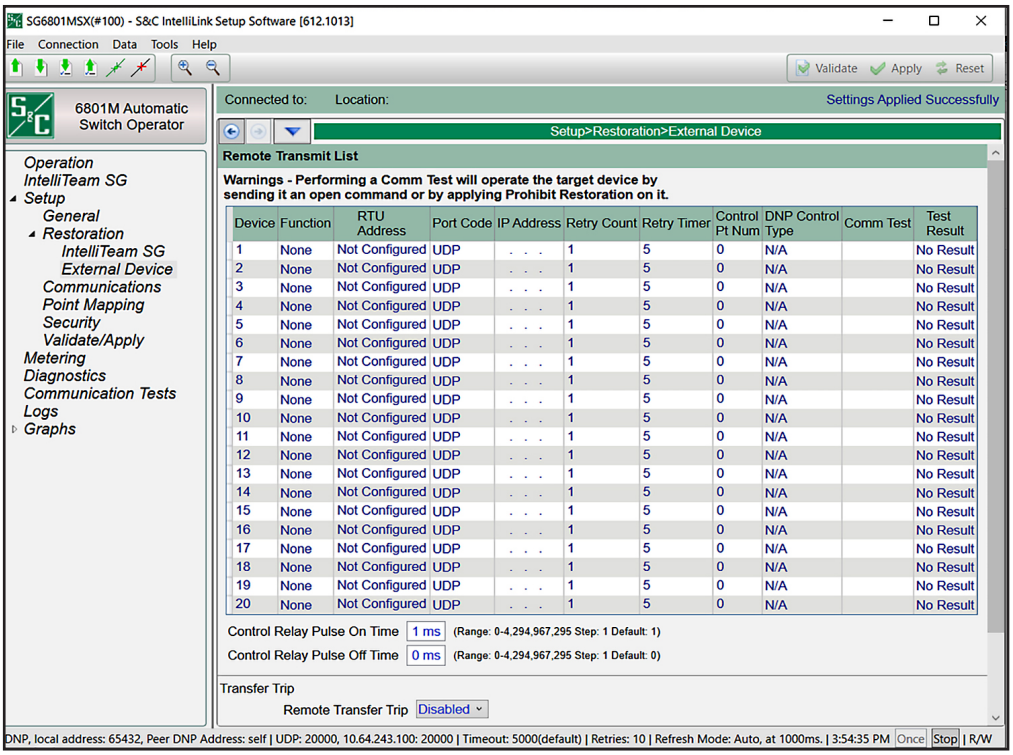


Figure 25. The *Setup>Restoration>External Device* screen Remote Transmit List.

DEVICE

This is the Device ID of the remote device and is not configurable.

Function

Select "Xfer Trip" to send a **Transfer Trip** command to a remote device. Select "Proh. Rest." to send a **Prohibit Restoration** command to a remote device. Default is "None," which means no function is selected for the device.

When “Proh. Rest.” is selected as the function, the device will send the **Prohibit Restoration** SCADA command to remote devices. The non-zero RTU address in this list must be configured to receive a **Latch On**, **Direct Operate** SCADA control point when any of the following events are active in the control: **Hot Line Tag** mode is active, a Frequency **Trip** state occurs, the IntelliTeam SG system determines a Manual Operation event has occurred or a SCADA **Prohibit Restoration** command was received from a configured master address and the **Enable Remote Transmit from SCADA P. R.** setpoint is enabled. Prohibit Restoration is also sent when **Prohibit Restoration** mode is active in the local control, set from the front panel or with an IntelliLink screen command and the **Enable Remote Transmit from Local P. R.** setpoint is enabled.

When “Xfer Trip” is selected as the function, **Transfer Trip** commands are sent from the device to distributed generation (DG) resources within the distribution system immediately upon detection of a circuit anomaly so the DG does not interfere with IntelliTeam restoration activities. This action is both for safety reasons and for the protection of load.

If the local device trips open because of a Protection or Automatic Sectionalizing event, and the **Transfer Trip** mode is enabled, it sends **Transfer Trip** (TT) commands to all devices, whether S&C controls or third-party controls, listed on its Remote Transmit List that have “Xfer Trip” configured for their function.

The **TT** commands are sent, no matter what state the DG/DER is in at the time, to ensure it is disconnected from the system. When the trip is because of a Protection event, the **TT** commands will initiate following the initial trip. The **Lockout** state is not necessary.

RTU Address

Enter the DNP RTU address of the remote device. (Range: 0-65519; Step: 1; Default: Not Configured)

Port Code

Select the port to use for transmitting to the remote device. (Default: UDP)

IP Address

When the **Port Code** setting is “UDP,” enter the IP address of the remote device here.

Retry Count

Enter the number of retries to perform on any timeout event. (Range: 0-255; Step: 1; Default: 1)

Retry Timer

Enter the amount of time in seconds to wait before a retry is attempted. (Range: 0-255; Step: 1; Default: 5)

Control Point Number

Enter the DNP control point number that activates the **Prohibit Restoration** mode in the remote device. (Range: 0-255; Step: 1; Default: 0)

DNP Control Type

Enter the appropriate **DNP Control Type** value for the configured **Control Point Number** setpoint: **Pulse On**, **Latch On** or **Breaker Close**. When received, the remote control will issue an **Open** command to the distributed generation switch.

Commission Test

Selecting the **Execute** command from the drop-down menu sends a **Prohibit Restoration** command to the target device(s) to perform the operation in the exact same manner the command is sent during a normal operation.

NOTICE

A **Commission Test** command will apply the **Prohibit Restoration** state to the target device. The **Prohibit Restoration** state must be removed to put the device in the **Ready** state.

Test Result

This indicates "Pass," "Pending," "Bad Response," or "No Result" for the sent **Commission Test** command. "Pass" means the local device received an acknowledgment from the remote device before the **Retry** timer expired. "Pending" means that the local device sent the **Commission Test** command but is still waiting for a response. "Bad Response" means either the remote device rejected the message or the **Retry** timer expired before the local device received an acknowledgment. "No Result" means no tests have been performed yet.

Note: If DNP association of the peer device cannot be completed because of an incorrect RTU address, IP address, or Port Code, the **Test Result** field may show a "Pending" status indefinitely until the test is rerun again and the association can be made.

Enable Remote Transmit from Local P.R.

Enabling this option sends a **Prohibit Restoration** command to all devices in the list when the **Prohibit Restoration** state is activated locally via the front panel or IntelliLink software screen.

Enable Remote Transmit from SCADA P.R.

Enabling this option will send a **Prohibit Restoration** command to all devices in the list if any the following events are active: **Hot Line Tag** mode, **Frequency Trip** state, **Manual Operation** state, or **Prohibit Restoration** state is activated from a SCADA command from a configured master station address.

Clear Prohibit Restoration on Hot Line Tag Removal

When both the **Clear P.R. on Hot-Line-Tag Removal** and the **Enable Remote Transmit from SCADA PR** settings are enabled, the **Prohibit Restoration** state will be cleared on a device when the **Hot Line Tag** state is removed from the device, provided a **Frequency Trip** state is not active. At that point, the device will also send a **Clear PR** SCADA command to all devices listed in its Remote Transmit List table that have the **Prohibit Restoration** function configured.

A device receiving this **Clear PR** command will then clear its **Prohibit Restoration** states, other than those PR states that were caused by a Transfer Trip event or a PRLM Do-Not-Restore Load Shed event.

Note: Receiving a propagated **Prohibit Restoration Clear** command will clear the **Prohibit Restoration** state even if any of the local critical conditions are still present, including **Hot Line Tag**, **Frequency Trip**, and **Manual Operation**. If these critical conditions are present, they will remain active on the local device, and the local device and its associated team members will remain in the **Out of Ready** state until the critical conditions are cleared themselves.

Note: The **Clear P.R. on Hot-Line-Tag Removal** setting is hidden until the **Enable Remote Transmit from SCADA PR** setting is set to "Enabled."

Remotely Clear Prohibit Restoration

Clicking on this button sends a **Clear Prohibit Restoration** command to the local device and all devices in the list and will clear the local **Prohibit Restoration** state. If an event is still active (**Hot Line Tag** mode, **Frequency Trip** state, **Manual Operation** state), the **Clear Prohibit Restoration** command will not be sent.

Communications Setup

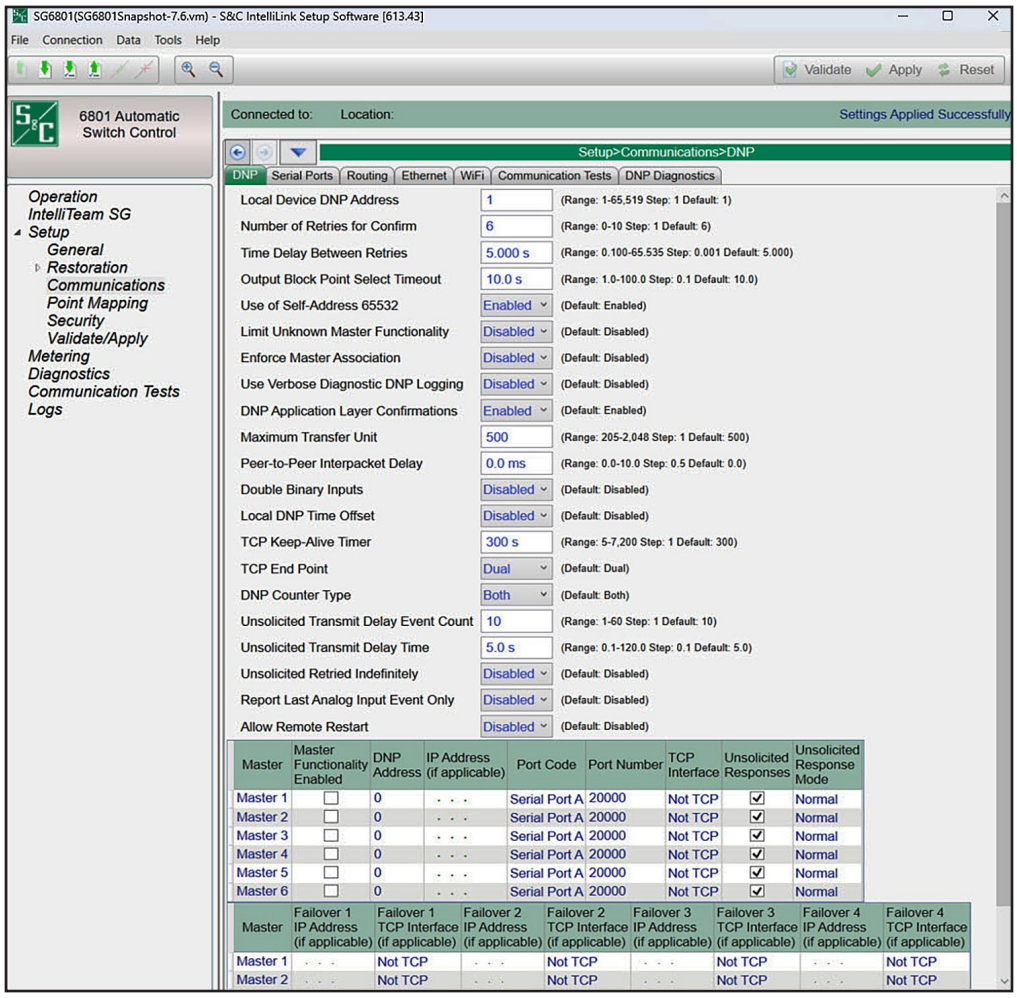


Figure 26. The *Setup>Communications>DNP* screen.

DNP communication settings for the IntelliTeam SG Automatic Restoration System, SCADA, and IntelliLink Setup Software are configured on the screen shown in Figure 26.

Local Device DNP Address

Enter the network address for this control. It must be the same as the DNP/RTU address on the *Setup>Restoration>IntelliTeam SG>Team Summary* screen. Be sure to enter an address even if this control will not be accessed via SCADA or a remote IntelliLink software connection. The DNP address must be greater than 0; 1 is the default, and the maximum value is 65519.

NOTICE

Changing the DNP address or other communication parameter can prevent the control from communicating with other team members in an IntelliTeam SG system and via SCADA or a remote IntelliLink software connection. If communication is lost with a control, go to the site, connect through IntelliLink software, and reset the communication parameter that had been changed.

NOTICE

If relocating a configured control to a new site, be sure to enter its new DNP address. If the new address is not entered, the control may respond to commands intended for a different location.

Number of Retries for Confirm

This is the number of times the control will resend unsolicited event data to the master station if a confirmation message is not received within the **Time Delay Between Retries** setting. The control will save the event data after this number of retries until it receives a confirmation.

If there is no confirmation after the number of retries is exceeded and a new event occurs, the control will resend the saved event data along with any new event data. Setting this parameter at "0" will prevent retries. This setting applies to all masters. (Range: 0-10; Step: 1; Default: 6)

Time Delay Between Retries

This is the time delay between retries for initial unsolicited null and data-filled unsolicited responses. The initial unsolicited null is transmitted indefinitely until the master confirms it. Data-filled unsolicited responses are transmitted until the number of retries specified in the **Number of Retries for Confirm** setting has been reached. Transmission retries stop when an application confirmation is received from the master during this period.

For master event requests, this is the application confirmation timeout period. When the control receives a confirmation after this timer has expired, the confirmation will be ignored and the events will remain in the event buffers. This setting applies to all masters. (Range 0.100-65.535 seconds; Step: 0.001; Default: 5.000)

NOTICE

When the master will set or read an Application Layer Confirmation Retry Time longer than 32.767 seconds: to set it, use Group 41 variation 1 (32-bit); to read it use Group 40 variation 1 (32-bit with flag). Otherwise, a SCADA poll may report a negative value because the default configuration is 16-bit. Review the DNP Points List and Implementation instruction sheets for more information.

Output Block Point Select Timeout

This is the timeout duration of the **Select** function on control points. See the appropriate S&C Instruction Sheet 766-560, 1043-561, 1045M-560A, 1045M-560B, 1045-560, 1045-560B, 1045-560C, 1045-560D, 1045-560E, or 1045-560F: "*DNP Points List and Implementation.*"

If the timeout duration between **Select** and **Operate** functions during a **Select-Before-Operate** sequence exceeds this timeout value, the control will disable the point and return a timeout status code in the subsequent **Operate** request. This setting applies to all masters. (Range: 1.0-100.0; Step: 0.1; Default: 10.0)

Use of Self-Address 65532

NOTICE

Disabling the **Use of Self-Address** setting can prevent the control from communicating with IntelliLink software. If communication with the control is lost, the user must know the **Local Device DNP Address** setting, connect through a remote IntelliLink software connection, and re-enable the **Use of Self-Address** setting to connect locally. Wi-Fi will not work if the **Use of Self-Address** setting is disabled. If the user does not know the local DNP address and the **Use of Self-Address** setting is disabled, the control will require reprogramming at the factory to re-establish access to the control.

This setting is present to comply with the DNP standard. Care must be used when deciding to change the default. Options are "Disabled,"which blocks the use of DNP Address 65532, and "Enabled," which allows the use of DNP Address 65532. The setting is enabled by default.

Limit Unknown Master Functionality

NOTICE

Enabling this feature prevents unknown master stations from making any configuration changes. When the **Limit Unknown Master Functionality** setting is enabled, at least one master other than the SCADA master must be enabled. When this feature is enabled, the only way to connect with the control (to make any changes or disable this feature) is with IntelliLink software and a computer set to the configured DNP address of the enabled master that is not the SCADA master. The control must be returned to the factory to be reset to the factory default when the DNP address of the master is unknown.

The default is "Disabled" to allow master station addresses to be entered into the configuration. After those addresses have been entered, this parameter may be enabled and a configured master station address used to complete the configuration process.

When enabled, a master/peer station that is not included in the configuration of this control is prevented from writing to or controlling it. Master/peer stations configured in this control include any of the six Master Station DNP addresses and team members configured on the *Setup>Restoration>IntelliTeam SG>Team Summary* screen. The default is "Disabled."

Enforce Master Association

The primary identification for a master station is its DNP address. When a master sends DNP requests to a control and this setting is enabled, the master's port code (i.e. TCP, UDP,

or serial), IP address (when the port code is TCP or UDP), and DNP address must match the data configured for that master station in the control.

DNP requests are ignored when this setting is enabled and the IP address and port code do not match the configured data. When this setting is disabled, the IP address and port code are ignored, and only the DNP address is checked and validated with the control configuration.

Note that configuring the **Failover IP Address** setting is optional; when the **Enforce Master Association** feature is enabled, the master station IP address must match either the configured **IP Address** or the **Failover IP Address** setting. For this feature to work, the **Limit Unknown Master Functionality** feature must be enabled. The allowable port values are 20,000 - 20,999 and 49,152 - 65,535.

Use Verbose Diagnostic DNP Logging

When the **Enabled** setting is selected (for diagnosing a communication issue), a message is logged for every source and destination frame. Enabling this function for an extended period will cause Historic logs to fill quickly and reduce the number of saved historical events. The **Disabled** setting is the default.

DNP Application Layer Confirmations

When the **Enabled** setting is selected, an application layer confirmation will be requested with every solicited response that includes event data. Event buffers will not be cleared until an application layer confirmation is received from the master station. When disabled, the event buffers are cleared when events are reported. The **Enabled** setting is the default. This setting applies to all masters.

Maximum Transfer Unit (all product software except ST6801MSS)

This setting allows the IntelliTeam SG system to make the most efficient use of communication system bandwidth. For SpeedNet™ Radios, set it to 500. For an Ethernet connection, set it to 1500.

For other communication devices, set it to the maximum packet size of the device. The maximum transfer unit is only used for IntelliTeam SG system communications and can be set to the default setting for any control not using the IntelliTeam SG system. (Range: 205-2,048; Step: 1; Default: 500)

Note: When pushing Netlists using IntelliTeam Designer, an MTU of 500 or higher is required.

Peer-to-Peer Interpacket Delay

Set this to zero, unless the IntelliTeam SG system is enabled. Interpacket delay improves communication reliability between team members by adjusting the delay between successive frames of a multi-frame P2P fragment. The **Maximum Transmission Unit** setting defined for that control determines frame size. When data traffic is heavy, a peer's receive buffer may overflow and messages could be lost. This problem is usually noticed in a direct P2P/UDP system.

The **Interpacket Delay** setting increases the time a peer will have to process received data. It is advisable to increase the receive buffers instead of increasing the **Interpacket**

Delay setting, which will create artificial delays in the communication system. (Range: 0.0-10.0; Step: 0.5; Default: 0.0)

Double Binary Inputs (only for SG6801, SG68023PM, and SG6802Vista software)

The **Disabled** setting is the default. When enabled:

- Double-Bit Binary status points for any operating switches will be available in Intelli-Link software and via a SCADA master for polling and unsolicited DNP events.
- The Logs>Double Status Point Log and Setup>Point Mapping>Double-Bit Status screens are available; otherwise, these screens are hidden.
- The outstation will respond to a SCADA master's DNP read command for Double-Bit Binary inputs and Double-Bit Binary Input Events, return those items in Class 0, 1, 2, 3 polls, and also generate DNP unsolicited events for the Double-Bit Binary Inputs (if unsolicited events are enabled).

When disabled, the outstation will not respond to a read command for those items, will not include them in a Class 0, 1, 2, 3 poll, and will not generate any unsolicited events. See Table 2.

Table 2. Open and Closed Contact Indications

Open Contact	Close Contact	Meaning
On	Off	Switch open
Off	Off	Switch is traveling (error if on longer than 30 seconds)
Off	On	Switch closed
On	On	Error (at least one position sensor is stuck)

Local DNP Time Offset

When the **Disabled** setting is selected, UTC time is applied to the DNP timestamps. When a local time offset ranging from +14 hr. to -14 hr. in 15-minute increments has been selected, the offset is applied to the UTC time to allow the DNP time stamp to be adjusted to local time. (Default: Disabled)

TCP Keep-Alive Timer

This timer specifies the time between keep-alive messages as defined in the DNP specification. See the appropriate S&C Instruction Sheet 766-560, 1043-561, 1045M-560A, 1045M-560B, 1045-560, 1045-560B, 1045-560C, 1045-560D, 1045-560E, and 1045-560F: "*DNP Points List and Implementation*." This setting applies to all masters. (Range: 5-65,535; Step: 1; Default: 300)

TCP End Point

A listening end point can be configured to report unsolicited events, but it cannot initiate a connection. It must wait for the master to connect and then report unsolicited events. A dual end point can initiate a connection if there is no active connection already present.

DNP Counter Type

This selects the counter that will be reported in static data for a Class 0 Poll requested by the master station. Selections are “Frozen,” “Running,” and “Both Counters;” the default is “Both Counters.”

Unsolicited Transmit Delay Event Count

This is the number of new events that will cause an unsolicited message to be transmitted, provided the **Unsolicited Transmit Delay Time** setting has not been reached. Setting this parameter to 1 results in an unsolicited message generated for every new event. This setting applies to all masters. (Range: 1-60; Step: 1; Default: 10)

Unsolicited Transmit Delay Time

This is the maximum time (in seconds) that may elapse after a new event before an unsolicited message is sent. During this delay, other new events may be added to the message. If the number of events reaches the **Unsolicited Transmit Delay Event Count** setting before the delay time elapses, the unsolicited message will be sent immediately. This setting applies to all masters. (Range: 0.1-120.0; Step: 0.1; Default: 5.0)

Unsolicited Retried Indefinitely

Enabling this setting allows unsolicited message retries to be performed until a confirmation is received, and the **Number of Retries for Confirm** setting will be ignored. Disabled is recommended for normal operation. This setting applies to all masters.

Report Last Analog Input Event Only

When the **Report Last Analog Input Event Only** setting is set to “Enabled,” only the latest DNP analog input events will be reported for a DNP analog input point (both solicited and unsolicited messages); otherwise, all analog input point changes will be reported when this setting is in “Disabled,” which is the default.

Allow Remote Restart

When the **Allow Remote Restart** setting is set to “Enabled,” the control performs a restart on receipt of a request to perform a cold restart or a warm restart from a master station.

Master Stations 1 through 6

Master Station Functionality

When the box is checked to enable master functionality, several features are provided to the master:

- Event data are saved until the master confirms receipt of the data (or just polls the data if the **DNP Application Layer Confirmations** setting is disabled). Each of the masters has its own event data, so if one of the masters has retrieved and confirmed receipt of the data, the other masters can still retrieve the data they have not yet received. (Unknown/unregistered masters may still receive event data through polling, but they will only receive the data that have not yet been confirmed/received by Master 1.)
- The **Unsolicited Reporting by Exception** feature for event data is available.
- The **Limit Unknown Master Functionality** setting (if enabled) does not apply to these masters.

No master can have the same DNP address as the local device. All masters must have unique DNP addresses. To properly clear event buffers, the port code must match the connection type and the proper IP address must be associated with the DNP address.

DNP Address

This is the DNP address to which the control sends all unsolicited responses. This is also used to verify whether a master is one of the registered masters. (Range: 0-65,519; Step: 1; Default: 0)

IP Address (if applicable)

This is the IP address to which the control sends all unsolicited responses (if enabled). It is also used to verify whether a master is one of the registered masters (both DNP and IP addresses must match).

An IP address of 0.0.0.0 is represented as blank on the IntelliLink software screen. When using serial communications, specify the DNP master address and the serial port to be used. All other IP related parameters are ignored.

Note: The listening port for incoming TCP connections and UDP packets is hard coded at 20,000.

Entering an IP Address

Follow these steps to enter an IP address:

STEP 1. Click on and highlight the character in the first cell.

STEP 2. Type one to three characters as needed.

STEP 3. Hit the space bar to advance to the next field. Advancing in this fashion automatically highlights the characters in the next field.

STEP 4. Repeat typing, followed by the space bar until entry is complete.

To revert to the IP address value presently configured in the control memory, press the <Esc> key or click the **Reset** button in the tool bar.

Port Code

This is the port through which unsolicited report-by-exception DNP frames to the master station are sent. Port A (serial) is the default. Select TCP if the SCADA master is configured for a TCP/IP connection, and select UDP if the SCADA master is configured for UDP/IP.

The port code also is used to check that an incoming message is from a registered master. In addition to the DNP address and IP address (if TCP or UDP is used), the port code must also match.

Port Number

This setting is ignored unless the **TCP** or **UDP** option has been selected for the master station port code. This port is the outgoing port for unsolicited TCP or UDP messages that occur when there isn't an active session with the master. (Range: 1,024-65,535; Step: 1; Default: 20,000)

Note: The **UDP** option uses the fixed port 20,000 as the source port for all UDP messages.

Note: When the **Enforce Master Association** and **Limit Unknown Master** options are enabled, the valid UDP port number must be in the following range: 20,000-20,999; 49,152-65,535.

TCP Interface

When configuring the IP address (if applicable), set this to the Ethernet port associated with that IP address. This setting is ignored unless the **TCP** option has been selected for the master station port. Select the **Add-On or Native** setting. The **Not TCP** option is a placeholder and is not applicable.

Unsolicited Responses

When enabled (the default), the control sends a message to the master station when new event data are available based on the **Unsolicited Transmit Delay Event Count** setting and the **Unsolicited Transmit Delay Time** setting. A master station DNP address and master station port code or master station IP address must be entered. Enabling this feature may add significant traffic to the communication network.

Unsolicited Response Mode

Select "Normal" (default) or "5800 V2 Mode" setting. The **Normal** mode requires that the master station acknowledge an initial empty (null) unsolicited message at control restart. The SCADA master must send a command to enable unsolicited reporting. If acknowledgment of the initial empty unsolicited message is not received, the control continues to resend these messages at the configured retry interval until an acknowledgment is received.

The **5800 V2 Mode** setting is a non-standard mode that bypasses the initial empty unsolicited messages and the requirement for the master station to enable unsolicited reporting with a SCADA command. It simply starts sending unsolicited responses as events occur, provided that the **Unsolicited Responses** parameter is enabled.

The **5800 V2 Mode** setting may require restarting the control unless the control is presently sending unsolicited responses in the **Normal** mode or a remote command to enable unsolicited responses can be sent to the control. To restart the control after all configuration changes have been successfully applied:

STEP 1. Select the **Tools>Device Maintenance…** option on the menu bar.

STEP 2. Select the **Reset Control** option.

STEP 3. Click on the Yes button in the dialog box.

STEP 4. Log in when the IntelliLink software dialog box opens.

IP Address FAILOVER (if applicable)

Each of the six master stations can have up to four Failover IP addresses registered. The local control sends unsolicited messages (if enabled) to any registered master it has received a message from (provided that master has sent an **Enable Unsolicited Messages** command, if the **Unsolicited Response Mode** is set to the **Normal** state).

The local control will respond to either the Primary master or the Failover master, whichever sent the last message. The IP address in use will be highlighted. If there is no **Failover** setting configured for this master, leave this entry blank or enter 0.0.0.0.

Failover TCP Interface (if applicable)

Each of the six master stations can have up to four Failover TCP interfaces configured.

Serial Ports

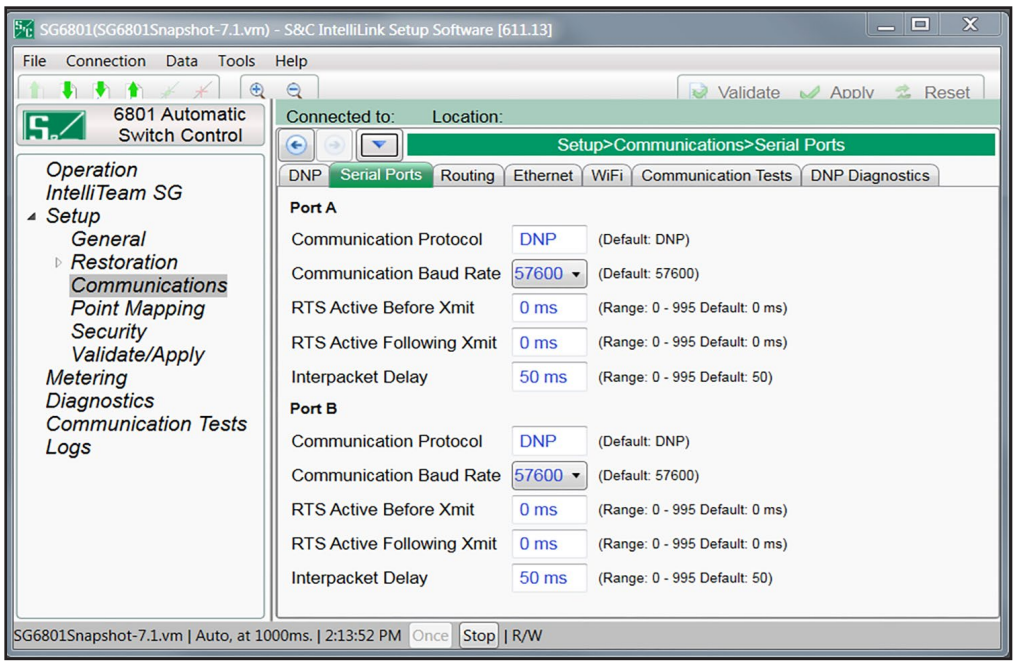


Figure 27. The *Setup>Communications>Serial Port* screen.

This screen contains communication settings related to the IntelliTeam SG Automatic Restoration System, SCADA, and IntelliLink Setup Software. See Figure 27. S&C automation products have different serial-ports configurations. 6800 Series Controls have configurable serial ports A and B.

Port A

Communication Protocol

The **DNP** setting is permanently configured because S&C controls only use the Distributed Network Protocol. (Default: DNP)

Communication Baud Rate

This is the baud rate from the S&C control to the radio, and it must be identical to the baud rate of the radio. (1 200, 2 400, 4 800, 9 600, 19 200, 38 400, 57 600 (default), 115 200, and 230 400 baud)

RTS Active Before/Following Xmit

This is the time in milliseconds the request to send (RTS) is active for this port before and after a transmission takes place. The default value is usually suitable. (Range: 0-995; Step: 5; Default: 0)

Interpacket Delay

This is the time in milliseconds between individual message frames of a data stream. Set this parameter appropriately for the radio. (Range: 0-995; Step: 5; Default: 50)

Port B

Communication Protocol

The **DNP** setting is permanently configured because S&C controls only use the Distributed Network Protocol. (Default: DNP)

Communication Baud Rate

This is the baud rate from the S&C control to the radio, and it must be identical to the baud rate of the radio. (1 200, 2 400, 4 800, 9 600, 19 200, 38 400, 57 600 (default), 115 200, and 230 400 baud)

RTS Active Before/Following Xmit

This is the time in milliseconds the request to send (RTS) is active for this port before and after a transmission takes place. The default value is usually suitable. (Range: 0-995; Step: 5; Default: 0)

Interpacket Delay

This is the time in milliseconds between individual message frames of a data stream. Set this parameter appropriately for the radio. (Range: 0-995; Step: 5; Default: 50)

Routing

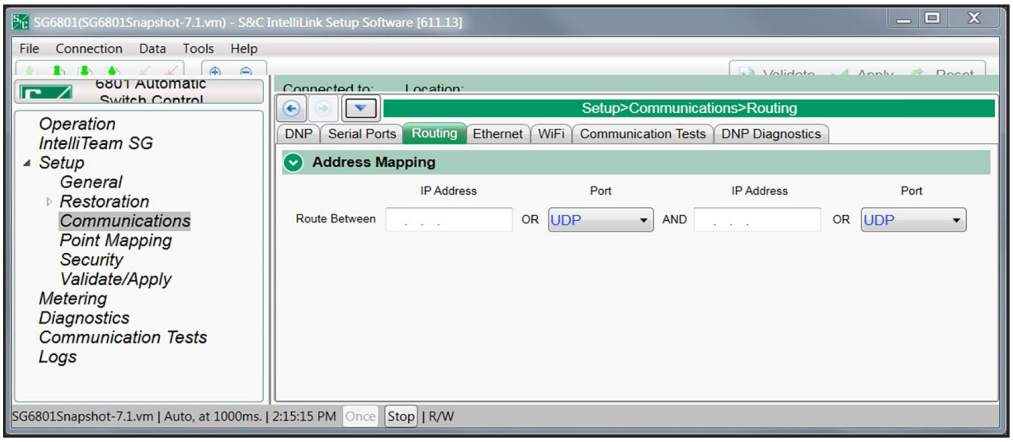


Figure 28. The *Setup>Communications>Routing* screen.

The *Routing* screen can display routing information for up to 32 destination devices. See Figure 28. If a message frame is received with a destination address other than the local address, this information is used to redirect the message out an adjacent port. The frame will be dropped if the destination address is not included in the routing table and a default pass-through route has not been configured.

Address Mapping Section

RTU Address

When an incoming message frame is received that is not destined for the local device, these addresses are searched to find an active route.

IP Address

This parameter should be configured if the destination device is on an IP network. The received frame will be transmitted out the local UDP port.

Port

This parameter should be configured if the destination device may be found through a serial communications port. The received frame will be transmitted out the local serial port.

Local Device DNP Address

This setting contains entries that define default routing for messages that are addressed to devices that were not found in the configured routing table and are not the local device. This default routing performs a simple pass-through functionality between the two interface points. If unknown traffic should not be routed through this device, leave these entries unconfigured.

IP Addresses

This parameter should be configured if the intended destination device may be found on the IP network. This will cause the received frame to be transmitted out the local UDP port.

Port

This parameter should be configured if the intended destination device may be found through a serial communications port. This will cause the received frame to be transmitted out the configured local serial port.

Ethernet Settings

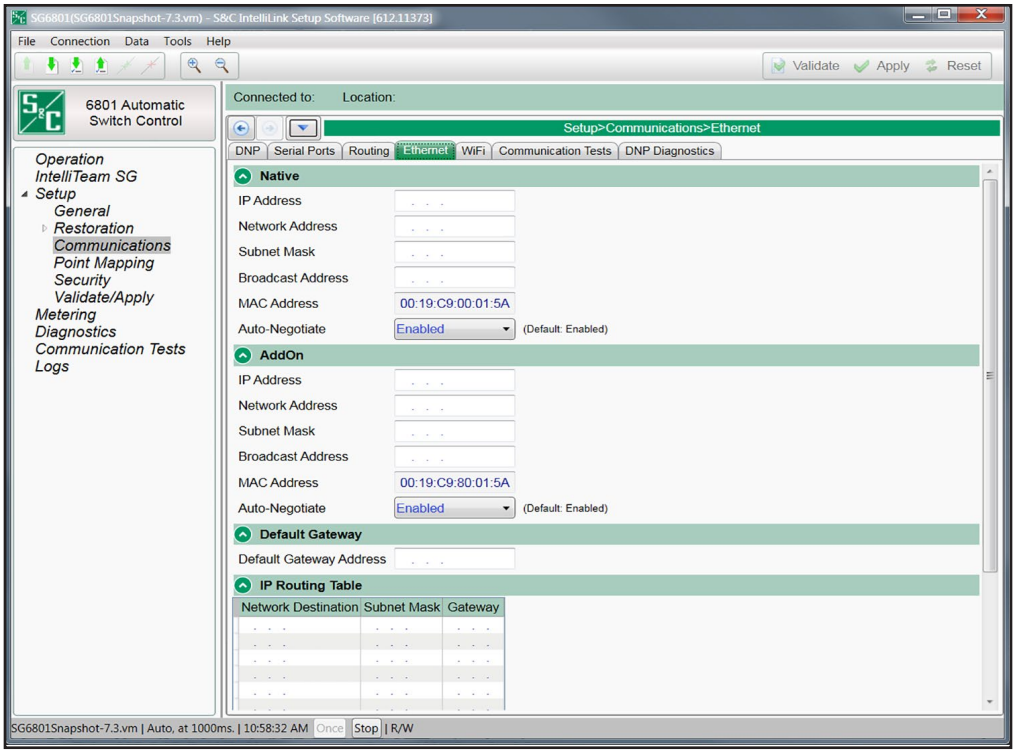


Figure 29. The *Setup>Communications>Ethernet* screen.

IntelliRupter fault interrupters have only an AddOn port. Other controls have both Native and AddOn ports.

IP Address

This is the IP address of the control. See Figure 29.

Network Address

This is the IP address of the network. The IP address entered must be an address within the network. The relationship between the IP Address entry and the Network Address entry is defined by the Subnet Mask entry.

Subnet Mask

This is a 32-bit mask that divides an IP address into subnets and specifies the available hosts. Two bits are always automatically assigned. For example, in 255.255.255.0, "0" is the assigned network address; and in 255.255.255.255, "255" is the assigned broadcast address. The "0" and "255" are always assigned and cannot be used.

Broadcast Address

This is the address used to distribute a signal across a network. It is commonly used to declare that a new device has been connected and to provide information about the device to existing devices on the network. The broadcast address commonly ends with "255."

MAC Address

This is the MAC address assigned to the control's Ethernet port.

Auto-Negotiate

Enable the **Auto-Negotiation** setting for the Ethernet port. When disabled, the **Duplex Mode** setting and **Data Rate** setting must be configured.

NOTICE

The Native Port of units shipped before April 17, 2014, do not support the **Auto-Negotiate** function. The recommended solution is to connect the communication device to the Add-on-Port. If it is necessary to use both ports, turn off the **Auto-Negotiate** mode and explicitly set the port speed to 100 MBS. Looking at the bottom of the front panel with the faceplate at the top, the left port is Native and the right port is Add-on.

Duplex Mode

The **Full Duplex** setting permits simultaneous communication in both directions. The **Half Duplex** (default) setting permits communication in one direction at a time.

Data Rate

This can be set to 10 Mbit or 100 Mbit. (Default: 10 Mbit)

Default Gateway Address

A gateway is a node (a router) on a computer network that serves as an access point to another network. A default gateway is the node on the computer network that is chosen when the IP address does not belong to any other entities in the routing table.

The default gateway address is the Ethernet IP address of the radio in the control.

Note: Both ports must have different IP addresses and different network addresses. Otherwise, routing issues will occur.

IP Routing Table

This table is used to route data to specific network destinations. All controls (except IntelliRupter fault interrupters) have two Ethernet ports: native and addon. If both ports are configured with different network addresses and/or subnet masks, then filling out this table may be required to send data to a specific network over a specific port. If the IP packet destination resides in one of the Defined Routes networks, the packet is forwarded to the defined gateway. Otherwise, the packet is forwarded to the control's default gateway. The defined gateway(s) shall always reside on one of the Ethernet ports.

The table can accommodate 16 entries for 16 possible rules. Variables are entered in IPv4 dot-decimal notation (xxx.xxx.xxx.xxx) and the priority of network destination is from first to last. When the source IP matches a rule, the corresponding destination is automatically selected and further routing is abandoned. The IP Routing Table has higher priority than the regular port routing (based on Ethernet settings). When the IP Routing Table is parsed and no rule is found to match, the regular routing function will be used.

Network Destination

This is typically the IP address of the client machine that wants to connect to a specific interface address.

Subnet Mask

This is typically 255.255.255.255 which means only one specific address is directed to the specified interface. However, by carefully selecting the netmask values and defining the priority rules, it is possible to create a range of addresses directed to specific interfaces.

Gateway

This is typically the IP address of the Ethernet port (native or addon) on the control.

Wi-Fi Settings

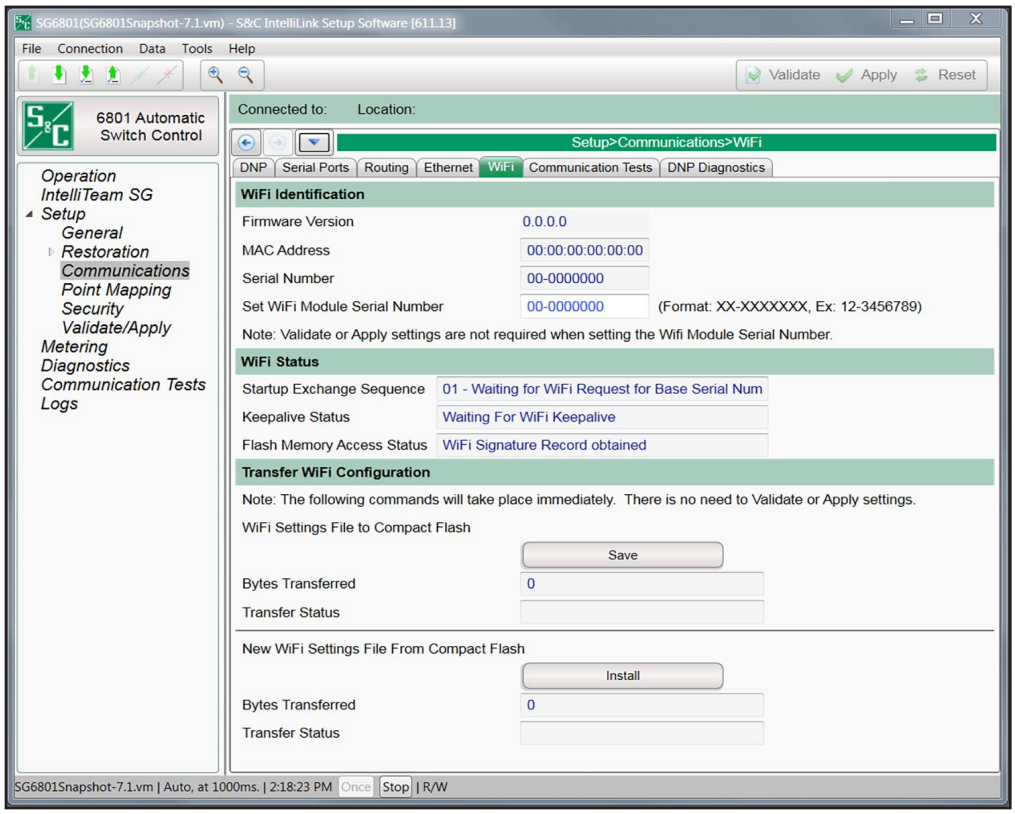


Figure 30. The *Setup>Communications>Wi-Fi* screen.

The Wi-Fi module is a separate computer that sends Wi-Fi communication information to the MCU computer in the control over a serial port. The Wi-Fi module must have the control serial number registered to initiate Wi-Fi communication with a PC at the site.

When the Wi-Fi module cannot obtain a serial number from the control, it uses the universal serial number: 00-0000000. See Figure 30.

Wi-Fi Identification

NOTICE

The *Setup>Communications>Wi-Fi* screen is only applicable to Wi-Fi modules manufactured on or before December 2019. Boards manufactured after that month do not connect to this screen. For 6800 Series controls, look for the part number on the Wi-Fi module. If the module part number is 005-004701-01, it was manufactured after December 2019.

Firmware Version

This is the firmware revision assigned by the manufacturer for the Wi-Fi transceiver.

MAC Address

This is the MAC address of the control.

Serial Number

This is the control serial number obtained by the Wi-Fi module.

Set Wi-Fi Module Serial Number

This allows manual entry of a serial number. (Format: XX-XXXXXXX; Example: 12-3456789)

Wi-Fi Status Section

Startup Exchange Sequence

During the Wi-Fi module power-up sequence, it queries the control for specific information, such as the serial number and time of day. The query status is displayed here and can finish at either "04 - Link to Wi-Fi Active" or "08 - Link to Wi-Fi Active."

Keepalive Status

The Wi-Fi module exchanges a message with the control every 5 seconds. When the control responds, the Wi-Fi module maintains communication and reports "Keepalive Active."

Flash Memory Access Status

"Wi-Fi Signature Record obtained" indicates that the Wi-Fi module obtained the required configuration information from flash memory, such as the security passwords.

Transfer Wi-Fi Configuration Section

Click on the **Save** button to transfer the current Wi-Fi configuration to the compact flash memory. The **Bytes Transferred** field indicates the file size transferred, and the **Transfer Status** field indicates completion by changing from the **Ready** to **Done** state.

Click on the **Install** button to upload a new Wi-Fi settings file from the compact flash memory. The **Bytes Transferred** field indicates the file size transferred, and the **Transfer Status** field indicates completion by changing from the **Ready** to **Done** state.

NOTICE

The **Wi-Fi Status** and **Transfer Wi-Fi** configuration fields became no longer valid for Wi-Fi options shipping on or after January 1, 2021.

Communication Tests

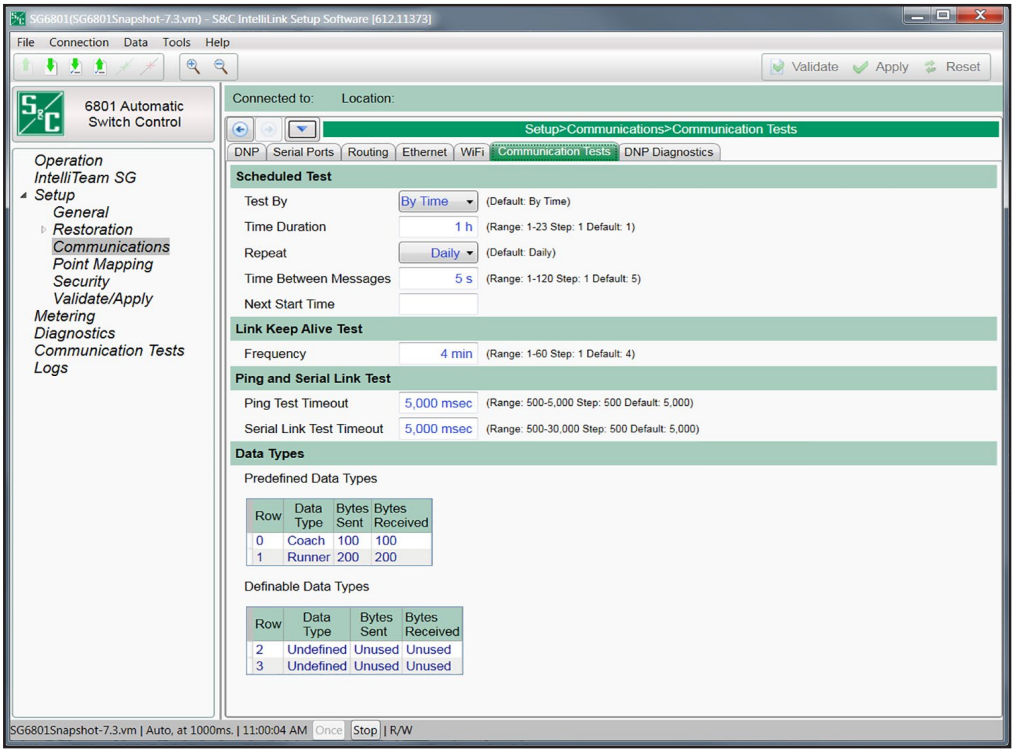


Figure 31. The *Setup>Communications>Communication Tests* screen.

Scheduled Test

Diagnostic tests determine nodes are responding to communication and how quickly they respond. Statistics are recorded, such as response time, failure, and retry. Tests are scheduled periodically and typically run for one hour.

Any network node can send tests to other network nodes. One or more test message types (data types, such as a coach or runner) can be configured but do not contain real data. See Figure 31.

NOTICE

Running scheduled tests across a slower speed communication network may cause poor performance. S&C recommends keeping all settings at their default or lower values when running these tests on slower communication networks.

Note: The tested nodes are determined automatically based on the nodes entered on IntelliTeam system configuration screens.

Test By

The test duration mode can be selected: By Time—the amount of time it will run, or By Message—the total number of messages it will send. (Default: By Time)

Time Duration

When the **Test By Time** option is selected, the **Time Duration** field sets the number of hours the test will be run. (Range: 1-23; Step: 1; Default: 1)

Message Duration

When the **Test by Message** option is selected, the **Message Duration** field will set the number of messages that will be sent. (Range: 100-1,000; Step: 100; Default: 100)

Repeat

This is the retest schedule interval: None, Daily, Weekly, or Monthly. (Default: Daily)

Time Between Messages

This is the number of seconds between each message transmission. The first test message is sent to each node sequentially. Then the second test message is sent to each node sequentially, etc. (Range: 1-120; Step: 1; Default: 5)

Next Start Time

This field is blank until the first start time is entered. After the next test, the field updates automatically to show the next time a test will start. The **Next Start Time** function is determined by the previous start time (entered manually or updated automatically from the last test) and the configured repeat interval.

Note: Users are not allowed to set a date or time in the past.

Link Keep Alive Test Section

When a TCP or UDP connection remains idle, it may shut down. A **Link Keep Alive** command is not a test, but to keep all links active it periodically sends a single message to every node. If more than one message is configured for the scheduled test, the **Link Keep Alive** command only sends the first configured message. It also records statistics for the message transmissions.

Frequency

This sets how often a **Link Keep Alive** command is run. (Range: 1-60 minutes; Step: 1 minute; Default: 4 minutes)

Ping and Serial Link Test Section

A ping test is a manually sent Ethernet ping to a specific IP address. A serial link test is a manually sent ping over a serial port to a specific DNP address.

Ping Test Timeout

If a ping test return takes longer than this configured value, the Ping Test event will timeout and stop waiting for a response. Set this value in milliseconds. (Range: 500-5,000; Step: 500; Default: 5,000)

Serial Link Test Timeout

If a serial link test return takes longer than this configured value, the Serial Link Test event will timeout and stop waiting for a response. Set this value in milliseconds. (Range: 500-30,000; Step: 500; Default: 5,000)

Data Types Section

This section configures each message sent in a scheduled test. The **Predefined Data Types** messages sent are not actual coach or runner messages, but they're configured to represent the approximate size of an actual average coach or runner message. The definable data types allow users to define their own messages by setting the byte size of the sent and received messages.

Predefined Data Types

The Connection ID in Row 0 is always configured "Coach" and Row 1 is always configured "Runner." The **Bytes Sent** and **Bytes Received** fields are not configurable.

Data Types

The Connection IDs in Row 2 and 3 are always configured "Undefined" whereas the **Bytes Sent** and **Bytes Received** fields are user defined. If one "Unused" entry is changed, a numerical entry must also be entered for the other field in that row.

Row

This identifies the row: 0 is the first message type sent, 1 is the second message type sent, etc.

Data Type

This is the name of the configured test message, such as coach or runner. The message sent is not an actual coach or runner message, but it should be configured to represent the approximate size of the average coach or runner message by setting the appropriate number of sent and received bytes.

Bytes Sent

This field configures the length of the message being sent for this type. (Range: 1-2048 and Unused; Step: 1, Default: Unused)

Bytes Received

This field configures the length of the response message automatically generated when the remote node receives the sent message. (Range: 1-2048 and Unused; Step: 1; Default: Unused)

DNP Diagnostics

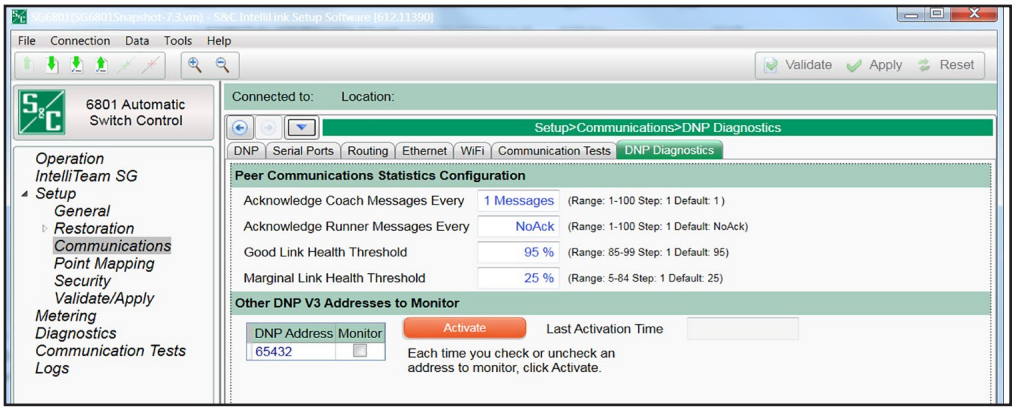


Figure 32. The *Setup>Communications>DNP Diagnostics* screen.

Peer Communications Statistics Configuration

Acknowledge Coach Messages Every "N" Messages

This configures the number of messages required before an acknowledgment is sent, where "N" is the number of messages. When "10" is entered, every 10th coach message will be acknowledged. (Range: 1-100; Step: 1; Default: 1) See Figure 32.

Acknowledge Runner Messages Every "N" Messages

This configures the number of messages required before an acknowledgment is sent, where "N" is the number of messages. When "10" is entered, every 10th runner message will be acknowledged. (Range: 1-100 or NoAck; Step: 1; Default: NoAck)

Good Link Health Threshold

This configures the percentage of successful message transmissions that will define good link health. (Range: 85-99; Step: 1; Default: 95)

Marginal Link Health Threshold

This configures the percentage of successful message transmissions that will define marginal link health. (Range: 5-84; Step: 1; Default: 25)

Other DNP V3 Addresses to Monitor

Selected DNP Addresses

These DNP addresses can be monitored, check the box to select an address to monitor. (Default: Unchecked)

Activate button

Every time a DNP address is checked or unchecked for monitoring, click on the **Activate** button.

Last Activate Time

This timestamp indicates the last time the **Activate** button was clicked.

DNP Status Point Mapping

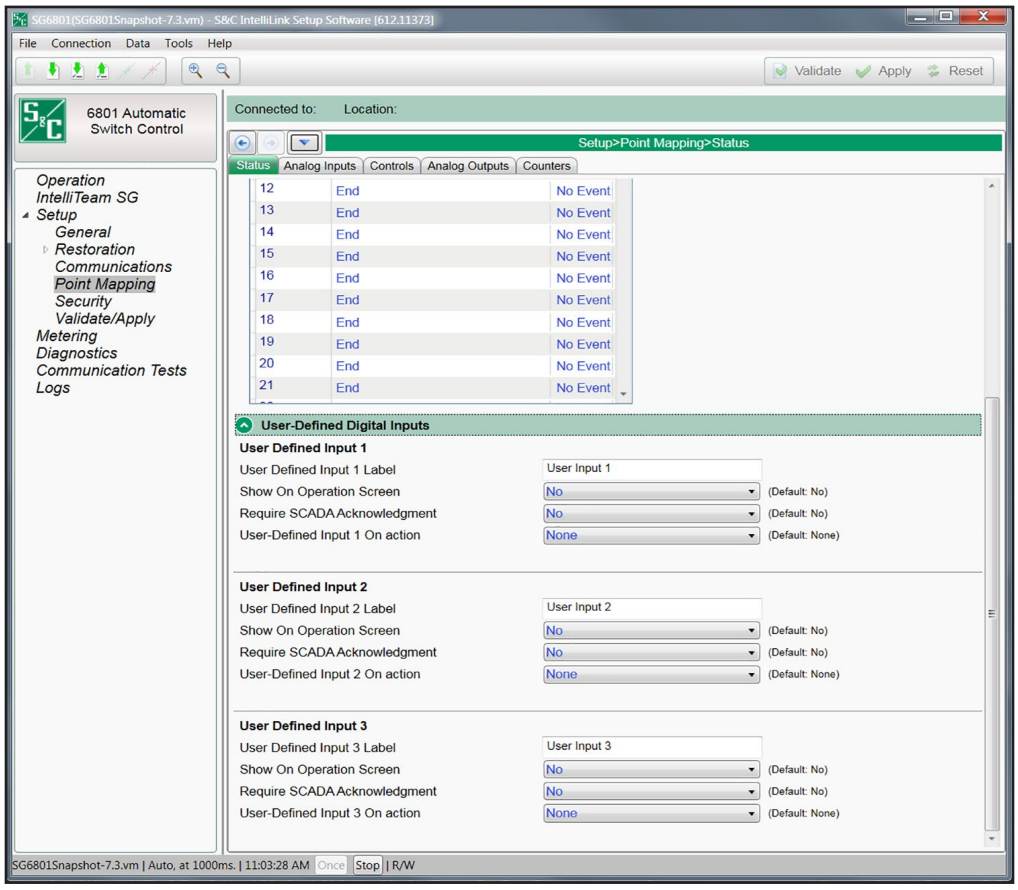


Figure 33. The *Setup>Point Mapping>Status* screen, SG6802-3U software shown.

The screen shown in Figure 33 contains configuration parameters for DNP status points. Map these points to make them available in the SCADA system.

Status Point

This is the point number the SCADA system will see in response to a static or event data request or an unsolicited event response.

Code-Description

These are the point codes representing specific status points that may be assigned to individual SCADA point numbers. Setting a code-description point code to the **End** setting defines the end of the configured points list and the maximum number of status points that can be returned.

Status points received from the external device may be mapped to individual SCADA points. Enter the external device status point number (the range is 0 to 255) in this column. See the external device manufacturer's documentation for definitions of its status points.

Class

This is the DNP event class in which this point can be placed. Specify **Class 1**, **Class 2**, **Class 3**, or choose the **No Event** option if event data reporting is turned off for this point.

User-Defined Digital Inputs Section

The digital input contacts use connector J20 on the PS/IO board. See Figure 34 on "Figure 34. Digital inputs connect at J20 on the PS/IO board." on page 103 for the contact description.

Note: The **User-Defined Digital Inputs** feature is only available for PS/IO boards with a J20 connector, shipped after the end of 2013.

User-Defined Input n Label

This user-configured label has a 30-character limit and can be displayed on the *Operation* screen.

Show on Operation Screen

These points can be displayed on the *Operation* screen because they can be configured to block an operation. (Default: No)

Require SCADA Acknowledgment

When set to "Yes," an acknowledgment is required for receiving a NP control point, an LCD command to clear the user input, or a screenset **Clear Input** command. Because these inputs will typically represent some form of alarm condition, when an acknowledgment is required, it will only clear the alarm if the user-defined input has become inactive. (Default: No)

User-Defined Input n Status

This shows the active or inactive status of the user-defined input.

Clear Input n Button

When the **Require SCADA Acknowledgment** setpoint is set to "Yes," the active state of the user-defined input will persist after the physical input has become inactive until receipt of this button command or the corresponding control point.

User-Defined Input n On action

These functions are activated by a user-defined input change of state from inactive to active and are not locked to the active state. For a command such as the **Prohibit Restoration** command, the DNP control point or a front panel command can execute an **Enable Restoration** command to cancel the **Prohibit Restoration** command.

A subsequent user-defined input change of state from inactive to active would then re-execute the **Prohibit Restoration** command. (Range: Disable Automatic Operation, Prohibit Restoration, Block Close Operations, Block Open and Close Operations, and None; Default: None)

When User Input n Is On, Block Operation of

This setpoint selects the switch the user-defined input will block. (Range: Switch 1, Switch 2, Switch 3, and All; Default: Switch n)

Front Panel LCD Screen

The "Real-Time Data" section of the LCD screen shows the state of the User-defined Inputs: "User Inputs: 1 2 3" on line one and "State: 0 1 1" on line two. See Figure 34.

When the **Require SCADA Acknowledgment** setpoint is set to "Yes," the "User Command" section of the LCD screen includes an option to clear each of the configured user-defined inputs. (Press the ENTER button to run command: **Clear User Input n**)

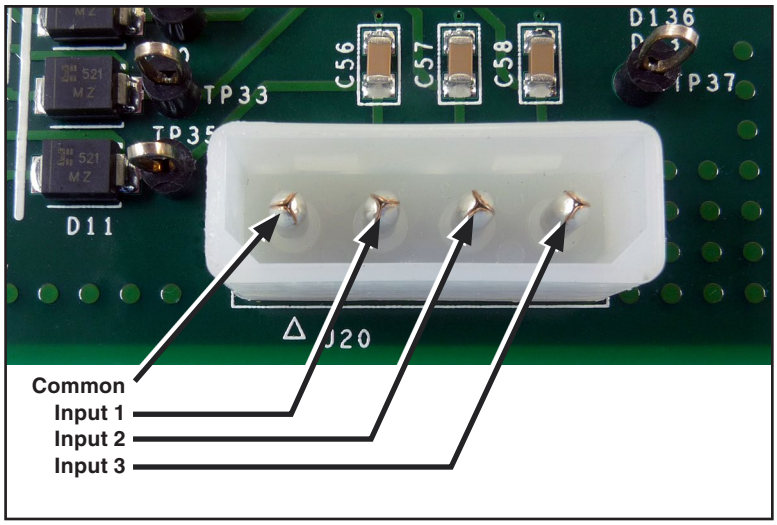


Figure 34. Digital inputs connect at J20 on the PS/IO board.

DNP Double-Bit Status Point Mapping

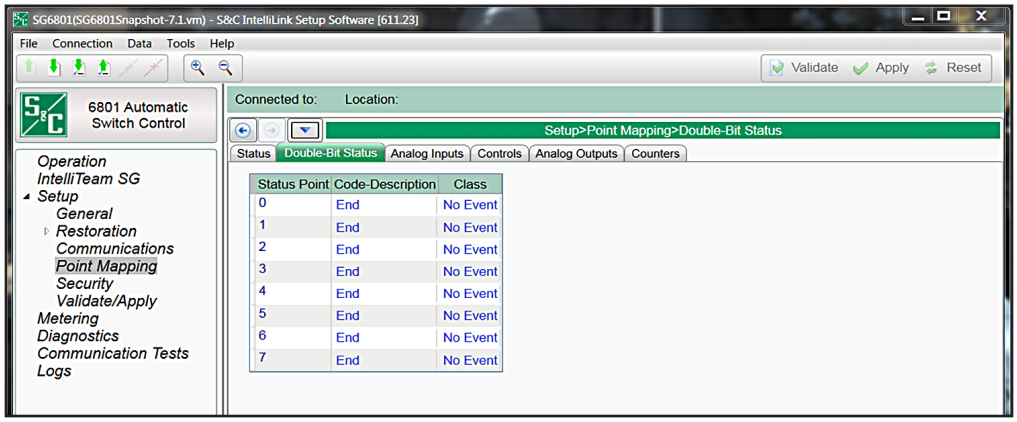


Figure 35. The *Setup>Point Mapping>Double-Bit Status* screen.

The screen shown in Figure 35 is visible when the **Double Binary Inputs** mode is set to "Enabled" on the *Setup>Communications>DNP* screen. It has configuration parameters for DNP Double-Bit status points. Map these points to make them available in the SCADA system.

Status Point

This is the **Double-Bit** status point number the SCADA system will see in response to a static or event data request, or an unsolicited event response.

Code-Description

These are the point codes representing specific status points that may be assigned to individual SCADA point numbers. Setting a **Code Description** point code to the **End** setting defines the end of the configured points list and the maximum number of status points that can be returned. All internal **Double-Bit** status points that can be mapped to individual SCADA points are available in a pull-down list in the column next to the SCADA point number the master station should receive it as.

Class

This is the DNP event class in which this point can be placed. Specify **Class 1**, **Class 2**, **Class 3**, or choose the **No Event** option if event data reporting is turned off for this point.

DNP Analog Input Point Mapping

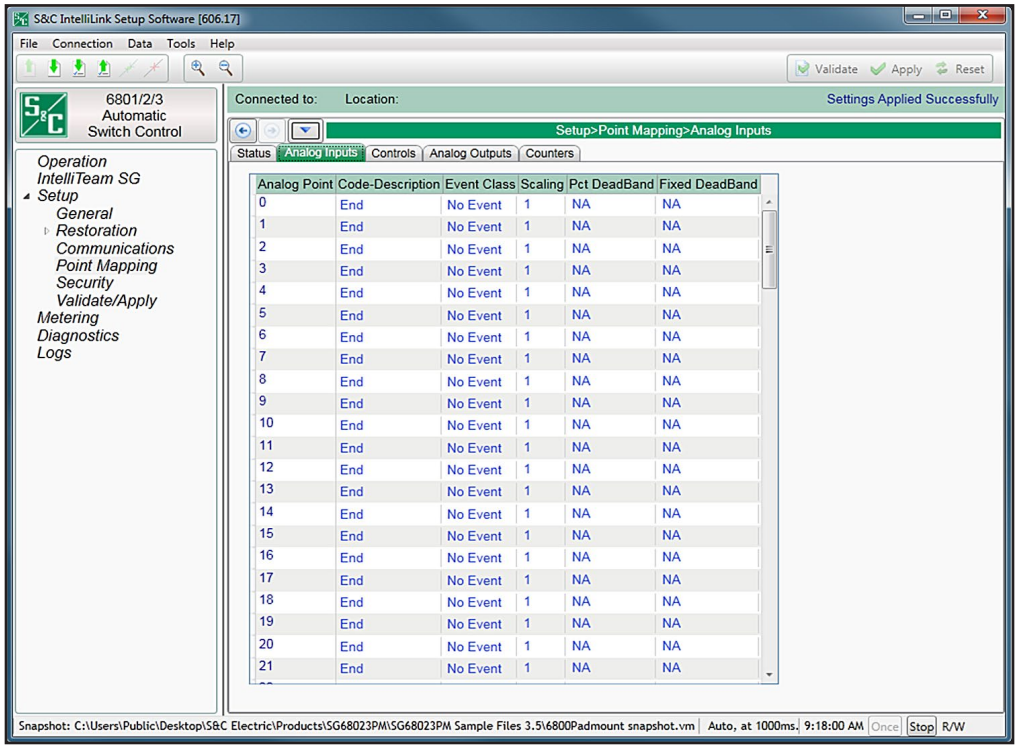


Figure 36. The *Setup>Point Mapping>Analog Inputs* screen.

The screen shown in Figure 36 contains configuration parameters for Analog Input points. Map these points to make them available in the SCADA system.

Analog Point

This is the point number seen by the SCADA system in response to a static request, event data request, or an unsolicited event response.

Code-Description

These are the point codes that represent specific analog inputs that may be assigned to individual SCADA point numbers. Setting a **Code Description** point code to "End" defines the end of the configured points list and the maximum number of analog inputs that can be returned.

Analog Input points received from the external device may be mapped to individual SCADA points. Enter the external device Analog point number (the range is 0 to 255) in this column. See the external device documentation for definitions of its Analog points.

Event Class

This is the DNP event class assigned to this point. Specify **Class 1**, **Class 2**, **Class 3**, or choose the **No Event** option to turn off event data reporting for this point.

Scaling

This is the scaling factor for the analog input data to match the analog input requirements of the SCADA system.

Pct DeadBand

This is the deadband range expressed as a percentage of the previously reported analog input data. If the analog input data associated with this point exceed the range in either a positive or negative direction, the information will be included in the next event report. Specify "N/A" to turn off deadband reporting as a percentage of the previously reported analog input data.

Fixed DeadBand

This is the deadband range expressed as a fixed value relative to the previously reported analog input data. If the analog input data associated with this point exceed the range in either a positive or negative direction, the information will be included in the next event report. Specify "N/A" to turn off deadband reporting as a fixed value relative to the previously reported analog input data.

DNP Control Point Mapping

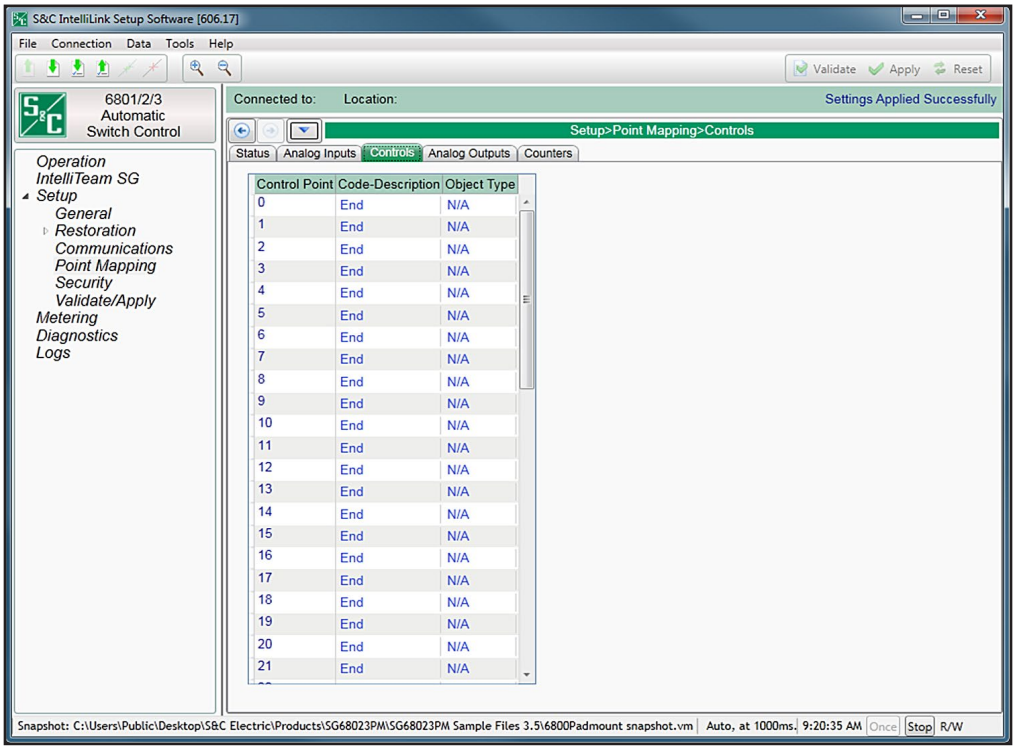


Figure 37. The *Setup>Point Mapping>Control Points* screen.

The screen shown in Figure 37 on page 106 contains configuration parameters for Control point mapping. Map these points to make them available in the SCADA system.

Control Point

This is the point number the SCADA system will use when operating the Control point.

Code-Description

These are the point codes representing specific Control points that may be assigned to individual SCADA point numbers. Setting a **Code Description** point code to "End" defines the end of the configured points list and the maximum number of Control points that can be returned.

Object Type

This specifies the type of control code the SCADA master will use in the control relay output block request. Specify "Breaker" for a **Trip/Close** operation, "Latch" for a **Latched On/Off** operation, "Pulse" for a momentary control output, or "N/A" if the control point will not be used.

The object type must be valid for the selected object. For more information see the appropriate S&C Instruction Sheet 1045-560, 1045-560B, 1045-560C, 1045-560D, 1045-560E or 1045-560F: "6800 Series Automatic Switch Controls: *DNP Points List and Implementation.*"

The control operation will be rejected if the object type received is Pulse and the mapped object type is either Breaker or Latch, or if the mapped object type is Pulse and the received object type is either Breaker or Latch.

Every control point configured for Breaker accepts **Latch** operations and every control point configured for Latch accepts **Breaker** operations.

Function Codes

Control requests may be issued using **Select/Operate** sequence or **Direct Operate** and **Direct Operate No Ack** function codes.

DNP Analog Output Point Mapping

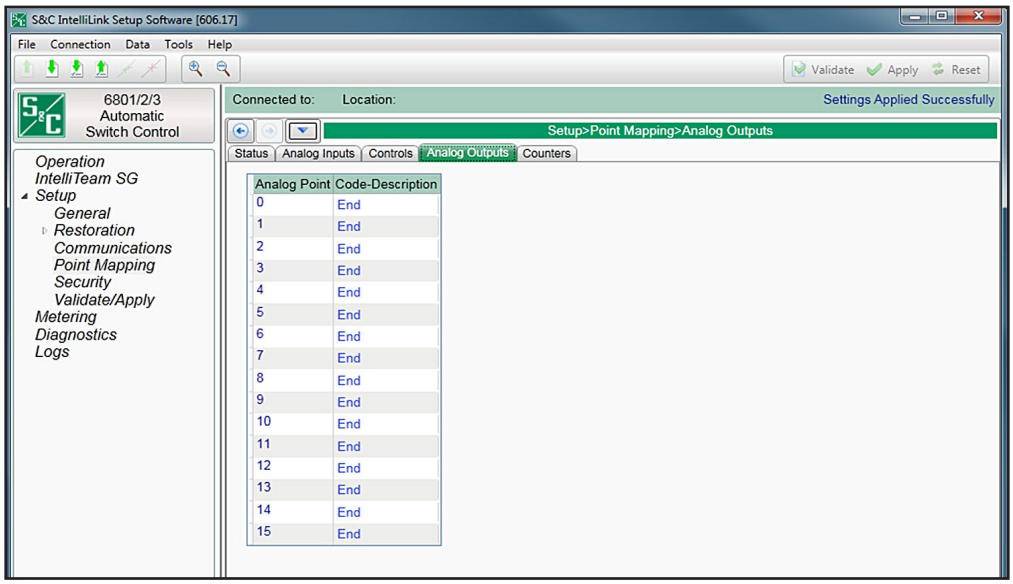


Figure 38. The *Setup>Point Mapping>Analog Output Points* screen.

The screen shown in Figure 38 contains configuration parameters for Analog Output points. Map these points to make them available in the SCADA system.

Analog Point

This is the point number the SCADA system will use when operating analog output.

Code Description

These are the point codes representing specific analog outputs that may be assigned to individual SCADA point numbers. Setting a **Code Description** point code to "End" defines the end of the configured points list and the maximum number of analog outputs that can be returned.

DNP Counter Point Mapping

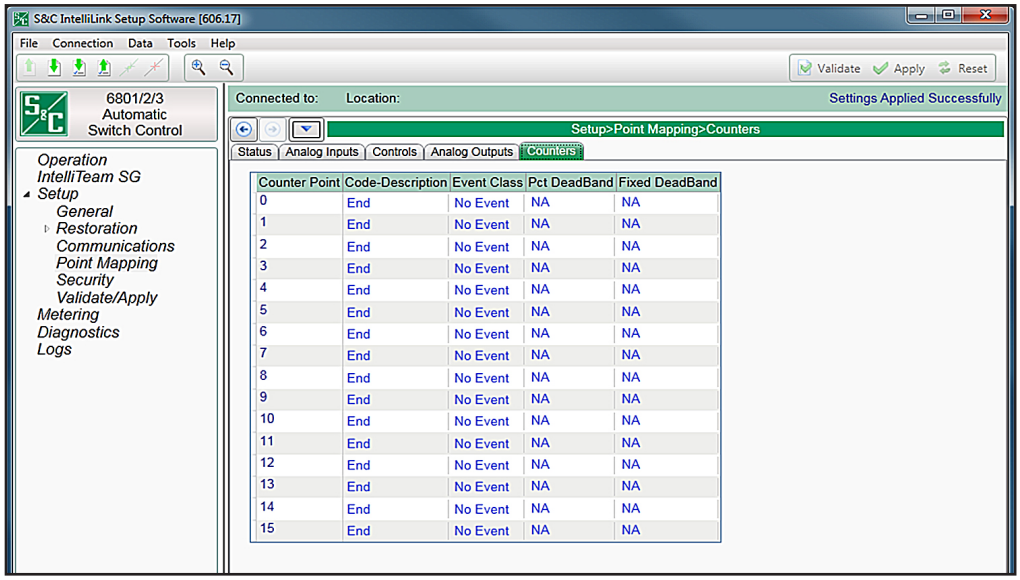


Figure 39. The *Setup>Point Mapping>Counter Point Mapping* screen.

The screen shown in Figure 39 contains configuration parameters for Counter points. Map these points to make them available in the SCADA system.

Counter Point

This is the point number the SCADA system will use in response to a static or event data request or an unsolicited event response.

Code-Description

This is the point codes representing specific Counter points that may be assigned to individual SCADA point numbers. Setting a **Code Description** point code to "End" defines the end of the configured points list and the maximum number of Counter points that can be returned. All Counter points that can be mapped to individual SCADA points are also displayed on the *Logs/Special Events* screen.

Evt Class

This is the DNP event class in which this point can be placed. Specify **Class 1**, **Class 2**, **Class 3**, or choose "No Event" to turn off event data reporting for this point.

Pct DeadBand

This is the deadband range expressed as a percentage of the previously reported counter point data. If the counter point data associated with this point exceed the range in either a positive or negative direction, the information will be included in the next event report. Choose "N/A" to turn off deadband reporting as a percentage of the previously reported counter point data.

Fixed Deadband

This is the deadband range expressed as a fixed value relative to the previously reported counter point data. If the counter point data associated with this point exceed the range in either a positive or negative direction, the information will be included in the next event report. Choose the **N/A** option to turn off deadband reporting as a fixed value relative to the previously reported counter point data.

Password Management

Admin User Default Password Change

With software versions later than 7.3.100, a user is required to change the default user passwords in the IntelliLink Setup Software before it will allow the user to access the control and read or modify settings on the control using IntelliLink Setup Software. This is required for all user accounts, including the Admin user, whose password must be changed first before any user can access a control. See Figure 40.

Figure 40. The Password Change Required dialog box notifying the user the password must be changed from the default.

Non-Admin User Default Password Change

When users attempt to log in with one of the non-Admin accounts before the default password is changed, they will be notified via the message shown in Figure 41 that the Admin user must change the default user account password before being allowed to connect to a control.

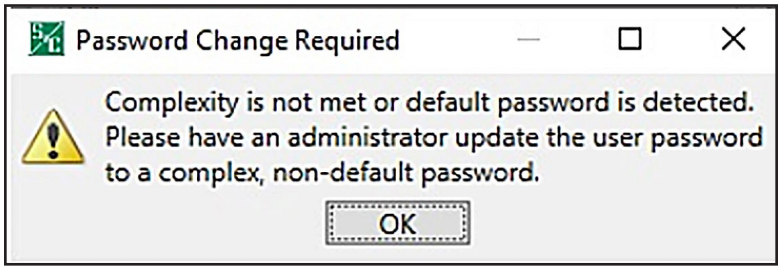


Figure 41. The Password Change Required dialog box notifying the user the complexity requirements have not been met.

Password Complexity Rules

When changing a user password using IntelliLink Setup Software, complexity rules are enforced for the new password. See Table 4.

Table 4. Password Complexity Rules

Rule	Description
Password Length	Must be between 8-12 characters long
Alpha Characters	Must have at least one uppercase and one lower-case character
Special Characters	May contain special characters with the exception of the “Space,” “Tab,” and “&,” characters, which are not allowed
Numbers	May contain numbers

When the password entered does not meet the complexity requirements, the error message shown in Figure 42 will open and the Admin user will be required to enter a password that meets the complexity requirements before being allowed to proceed.

Change Admin User Password

With software later than version 7.3.100, the Admin user account default password must be changed before IntelliLink Setup Software can connect to a control.

Follow these steps to change the Admin user password:

STEP 1. After IntelliLink Setup Software is launched and the default Admin password is used to connect to a control, the prompt shown in Figure 42 opens to instruct the user to change the Admin user account password.

Figure 42. The Password Change Required dialog box.

STEP 2. Enter a new non-default password that meets the complexity requirements into the **Enter Password** and **Confirm Password** fields. Then, click on the **OK** button. See Figure 43.

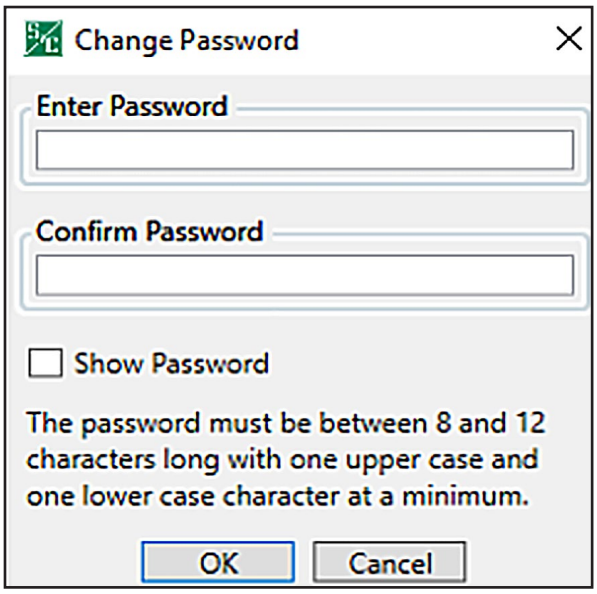


Figure 43. The Change Password dialog box.

STEP 3. When the password is changed successfully, a success message opens. See Figure 44. Click on the **OK** button to finish the **Change Password** process. If the password was not changed successfully, go to Step 4 on page 114.

Figure 44. The Password Change Required success message.

STEP 4. When the password was not successfully changed, the Password Change Required dialog box opens. See Figure 45. Click on the **Yes** button to change the password again and go back to Step 2 on page 113.

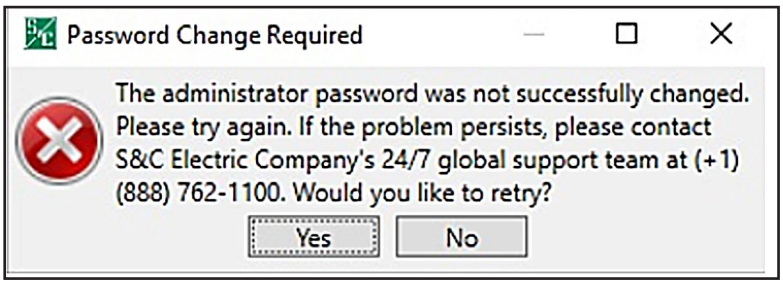


Figure 45. The Password Change Required dialog box.

Change Non-Admin User Password

With software later than version 7.3.100, the non-Admin user accounts (i.e. Engineer1/2, Technician1/2/3, Operator, and Viewer) must have the passwords changed by an Admin user before a control can be connected using IntelliLink Setup Software.

Note: The Admin user password must have been changed to a non-default password before a non-Admin user can access a control. If this has not been done, go to the "Admin User Default Password Change" section on page 111 for instructions on changing the Admin password before proceeding with the next instructions.

Follow these steps to change a non-Admin user password:

STEP 1. Launch the IntelliLink Setup Software and log in using the Admin account and the non-default Admin password.

STEP 2. Go to the *Setup>Security* screen in IntelliLink Setup Software. See Figure 46.

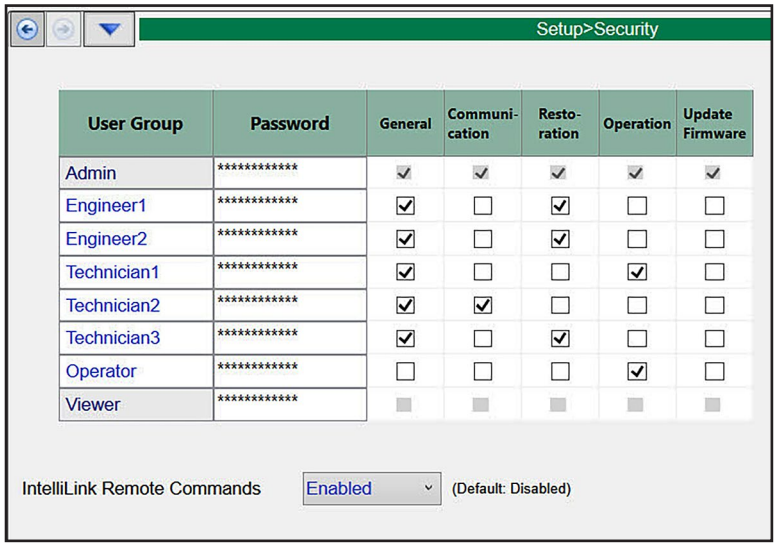


Figure 46. The *Setup>Security* screen.

STEP 3. Click on the **Password** field for a given user and enter a new non-default password that meets the complexity requirements into the **Enter Password** and **Confirm Password** fields. Then, click on the **OK** button. See Figure 47.

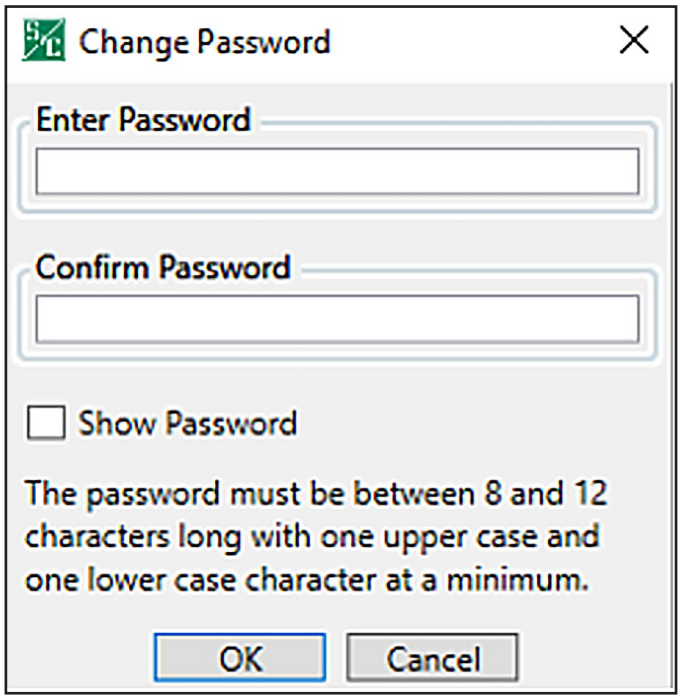


Figure 47. The Change Password dialog box.

STEP 4. When the password has been entered, click on the **Validate** button in the top right corner of the *IntelliLink* screen. See Figure 48.

Figure 48. The Validate button.

STEP 5. If the password change validates successfully, click on the **Apply** button to finish the **Password Change** process and configure the new password on the control. See Figure 50. Go to Step 6 if the password change was not validated successfully.

STEP 6. If the password was not successfully validated, the Validation Error dialog box will open. See Figure 49. Click on the **OK** button to attempt to change the password again. Go to Step 3 on page 116.

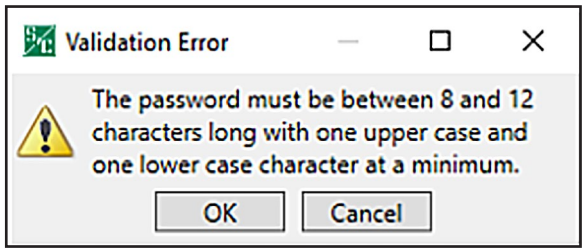


Figure 49. The Validation Error dialog box.

Security Screen

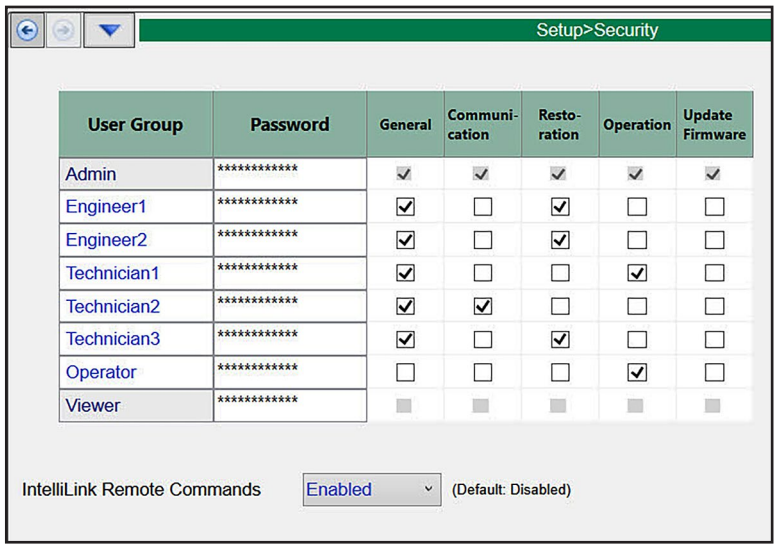


Figure 50. The *Setup>Security* screen.

Only a user logged in as Admin (administrator) can make changes to this screen. See Figure 50. The User Group name can be changed for all groups except Admin and Viewer. All passwords can be changed, and all default passwords must be changed by the Admin at initial login.

The following security controls are available for selection by the Admin for the various User Groups:

- **General**–When checked, it allows the User Group to configure all configurable settings found on the *Setup>General* screen.
- **Protection**–When checked, it allows the User Group to configure all configurable settings found on the *Setup>Protection* screen.
- **Communication**–When checked, it allows the User Group to configure all configurable settings found on the *Setup>Communication* screen.
- **Restoration**–When checked, it allows the User Group to configure all configurable settings found on the *Setup>Restoration* screen.
- **Operation**–When checked, it allows the User Group to configure all configurable settings found on the *Operation* screen.
- **Firmware**–When checked, it allows the User Group to perform a firmware upgrade on the control using the **Tools>Firmware Update** option on the **Tools** menu.

Note: When the **Update Firmware** option is checked, the Admin must check all other security settings groups to allow the non-Admin user group access to all settings groups. If the Admin disables access to any settings group after the **Update Firmware** option is enabled, settings validation will not pass.

Changes will not take effect until the **Apply** command is selected on the *Setup>Validate/Apply* screen.

IntelliLink Remote Commands

When set to **Enabled** mode, IntelliLink Setup Software can be used to access the device operation commands from a remote location through the serial or Ethernet connections under the faceplate. The **Disabled** setting is the default.

For all device types, these commands are not available when this setting is set to **Disabled** mode:

- **IntelliTeam SG Restoration—**on the *IntelliTeam SG>Team Summary* screen
- **Clear Manual Operation—**on the *IntelliTeam SG>Team Summary screen*

For 6800 Series Automatic Switch Controls, these commands are not available when this setting is set to **Disabled** mode:

- **Switch Open—**on the *Operation* screen
- **Switch Close—**on the *Operation* screen
- **Hot Line Tag—**on the *Operation* screen
- **Shots to Lockout—**on the *Operation* screen
- **Clear Manual Operation—**on the *Operation* screen
- **Clear Faults—**on the *Operation* screen
- **Clear Electronics Bad—**on the *Operation* screen
- **Battery Test—**on the *Diagnostics>Tests* screen

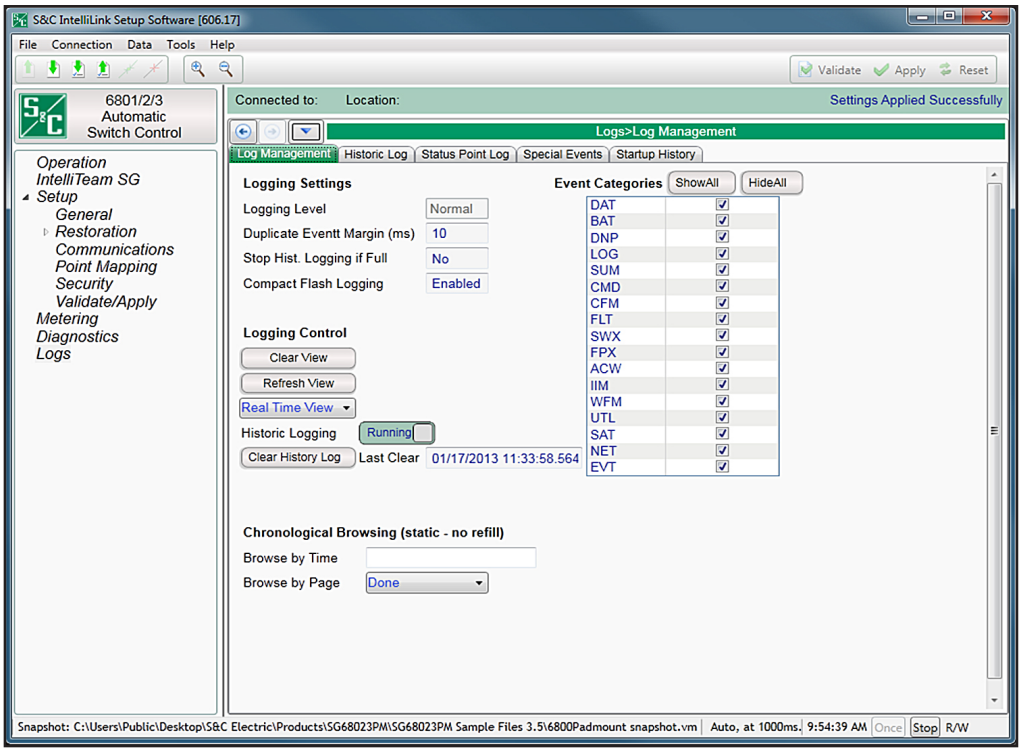


Figure 51. The *Setup>Logs>Log Management* screen.

The screen shown in Figure 51 configures the filter settings for viewing log screens. The Admin login is required to execute any of the log-control functions.

Logging Settings

Logging Level

The logging level selected determines the type of data-log messages captured in the base memory module (for an IntelliRupter fault interrupter) and is displayed on the *Logs>Historic Log* screen. Every data-log message is assigned a specific log level:

Normal—User information

Extended—User information and internal status

All—User information, internal status, and internal trace/debugging information

Duplicate Event Margin (milliseconds)

Storing identical events in a short time period can flood internal memory and does not provide useful diagnostic information. By configuring the time between duplicate event log entries, this setpoint determines which data will be stored in the internal memory and be displayed on the *Logs>Historic Log* screen. It has no effect on an alternating sequence of events.

Two events are considered duplicates when every element of their event records match. For example, when the **Duplicate Event Margin** setting is 10 ms. and the sequence of events ABABAB (where A and B are different) has every event occur 1 ms after the previous one. The identical events occur within 2 ms, well within the value of the setpoint, but all events will be logged because events are alternating. (Range = 0-30; Increment = 1.)

Stop Historic Logging if Full

When enabled, this setting stops logging events when the Historic log is full and subsequent events are discarded without overwriting contents of the log. Flash memory logging, the Status Point log, and Special Events Counter logging are not affected by this set point. Do not set this setting to "Yes" unless troubleshooting. When troubleshooting is completed or new event data are desired, set this setting to "No" to ensure continued event logging.

Compact Flash Logging

When enabled, every historic event generated is written to flash memory. **Logging Level** and **Duplicate Event Margin** setpoints do not prevent an event from being written to flash memory. Flash memory logging preserves as much data as possible. Flash memory data can be retrieved with IntelliLink software.

Open the **Tools** option on the menu bar and click on the **Compact Flash Access** option. Select and save any files needed. S&C strongly recommends enabling the **Compact Flash Logging** setting to simplify diagnostic and troubleshooting work.

Event Categories

Select the categories that will be displayed on the *Logs>Historic Log* screen. To display only the most important operation information, select the "EVT" category and click the **Refresh View** button. Utility operation data will be displayed and log information for software troubleshooting and debugging will be omitted.

Logging Control

Complete data are stored in the Historic Event Log in flash memory. Flash memory files can be downloaded by opening the **File** option on the menu bar and clicking on the **Flash Memory Files** option.

The complete Historic Event Log (up to a million events) cannot be viewed through IntelliLink software, but a small subset of the Historic Event Log (160 events) is displayed on the *Logs>Historic Log* screen. Event filters can be applied to the *Logs>Historic Log* screen, but these filters do not affect entry of events in the Historic Event Log.

Clear View

This button clears all data on the *Logs>Historic Log* screen. In **Real-Time View** mode, the next qualifying event will be placed at the top of the *Logs>Historic Log* screen. In **Static View** mode, the *Logs>Historic Log* screen will remain empty until it is completely refilled.

Refresh View

This button clears the present contents of the *Logs>Historic Log* screen and loads up 160 events from the Historic Event Log in ascending chronological order. Only events satisfying the checked **Event Categories** options are displayed on the *Logs>Historic Log* screen.

Real Time View or Static View

Use this drop-down menu to select the view mode. **Real Time View** mode loads the latest data on the screen, and **Static View** mode freezes data on the *Logs>Historic Log* screen.

Historic Logging

Running—Starts the Historic log but does not affect flash memory logging, Status Point log entries, or Special Events logging

Stopped—Stops the Historic log but does not affect flash memory logging, Status Point log entries, or Special Events logging (Subsequent events will not be put into the Historic log, preventing newer events from overwriting older events. Be sure to return the **Historic Logging** mode to the **Running** setting so future events will be logged.)

Clear History Log

This button clears all data in the Historic log. It does not affect flash memory logging, Status Point log entries, or Special Events logging. The date and time of the last **Clear History Log** command are displayed. Clearing the Historic log permanently deletes all event data. To preserve event data, generate an HTML report of logged data before clearing the log.

Chronological Browsing (static – no refill)

Chronological browsing is only available in the **Static View** mode. It is not available in the **Real Time View** mode. Because the size of the *Logs>Historic Log* screen is only a fraction of that of the Historic Event Log, the Historic Event Log must be navigated chronologically, either by **Browse By Time** mode or **Browse By Page** mode.

Browse By Time

This loads up to 160 events that occurred at or after the specific time entered. Only events that satisfy the Event Categories criterion are placed in the *Logs>Historic Log* screen. If all events in the Historic Event Log occurred before the specified time, the oldest-available events are placed in the *Logs>Historic Log* screen. The *Logs>Historic Log* screen is refilled as soon as the specific time is entered; the specified time is cleared when the refill is complete.

Browse By Page

Historic log pages can be browsed four ways:

Oldest 8 Pages—Loads up to 160 of the oldest-qualifying events from the Historic Event Log

Newest 8 Pages—Loads up to 160 of the newest-qualifying events from the Historic Event Log

Previous 8 Pages—Loads up to 160 previous events relative to the events in the *Logs>Historic Log* screen

Next 8 Pages—Loads up to 160 next events relative to the events in the *Logs>Historic Log* screen

When the selection is entered, the *Logs>Historic Log* screen is refilled immediately. Because the Historic Event Log is circular, selecting the **Previous 8 Pages** option may cause the newest events to be displayed (if the *Logs>Historic Log* screen presently holds the oldest). Similarly, selecting the **Next 8 Pages** option may cause the oldest events to be displayed (if the *Logs>Historic Log* screen presently holds the newest).

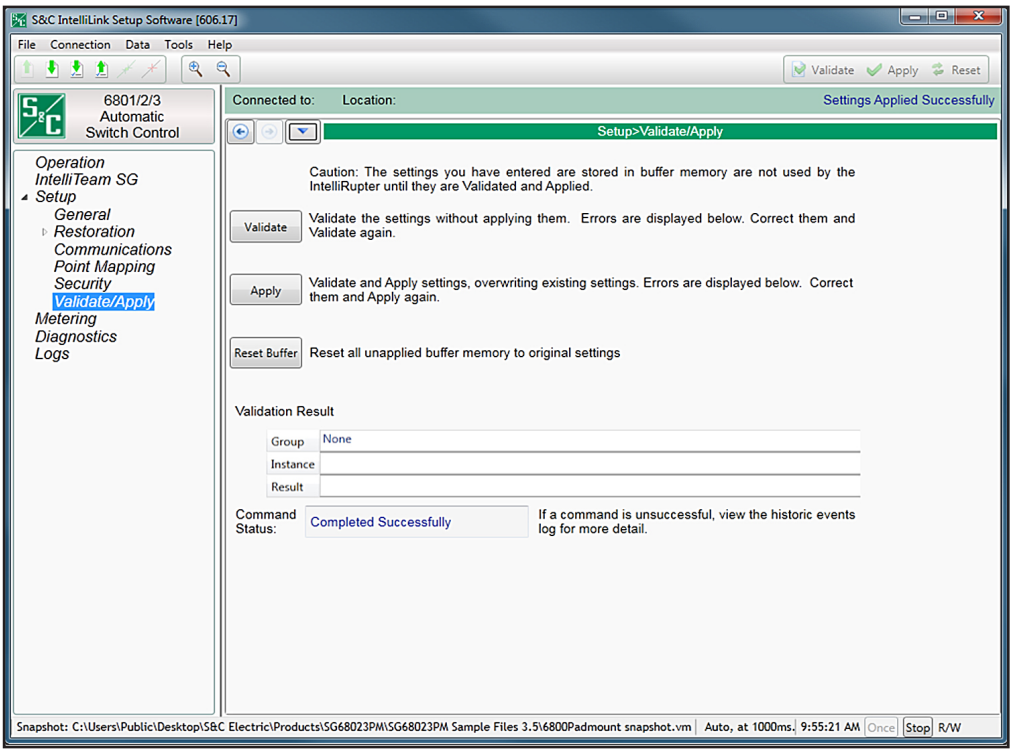


Figure 52. The *Setup>Validate/Apply* screen.

Settings are stored in the buffer memory of the control and are not active until they have been applied. The screen shown in Figure 52 provides commands for managing settings between the buffer memory and the active settings area of the control.

Validate

The **Validate** button evaluates settings in the buffer memory without applying them. When changes are pending, click on the **Validate** button to initiate a logical check of the pending changes for errors. If the validation procedure detects an error or inconsistency, it will be displayed in the Validation Result box.

Apply

The **Apply** button evaluates settings in the buffer memory and applies them. When changes are pending, click on the **Apply** button to initiate a logical check of the pending changes for errors and commit the changes to control memory if no errors are detected. A successful check will be indicated in the Validation Result box.

Reset Buffer

The **Reset Buffer** button resets settings in the buffer memory to the presently active values. It will not undo an **Apply** command. When changes are pending, click on the **Reset** button to remove pending changes and return to the setting presently located in the control memory. The **Validate**, **Apply**, and **Reset** icons will fade to indicate no changes are pending.

Validation Results

If a **Validation** or **Apply** command is unsuccessful, the **Validation Result** field will provide information related to the violated validation rules.

Command Status

Shows the result of the last **Validation** or **Apply** request.

Factory Reset Using IntelliShell

NOTICE

Factory Reset functionality requires the default setpoints/setting file be installed on the system for the firmware version the control is running at the time the factory reset is used. Therefore, to proceed with the factory reset, making sure the default setpoint/settings file is properly installed. If the default setpoints/settings file is not installed, the factory reset procedure will not be executed.

STEP 1. Click on the **IntelliShell** button and click on the **Local Connection (Serial/ Wi-Fi)** button. See Figure 53.

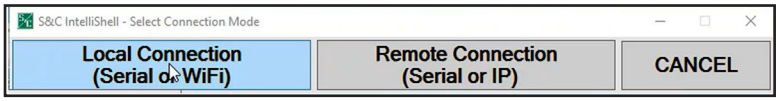


Figure 53. The IntelliShell Local Connection button.

STEP 2. Select the product on which to perform the factory reset and click on the **Serial** button. See Figure 54.

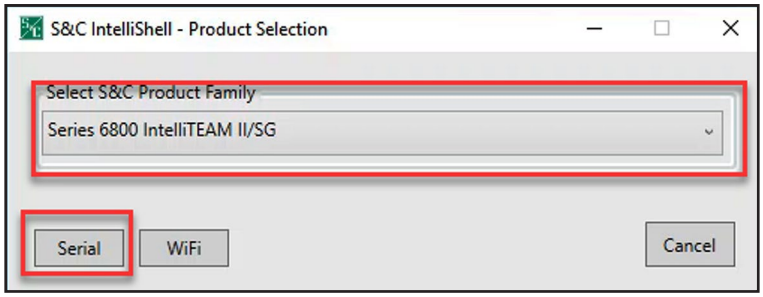


Figure 54. The Product Selection and Serial connection option.

STEP 3. Click on the **Factory Reset** option to launch the **Factory Reset** procedure. See Figure 55.

After clicking on the **Factory Reset** option, IntelliLink will launch and the use must login using the admin account.

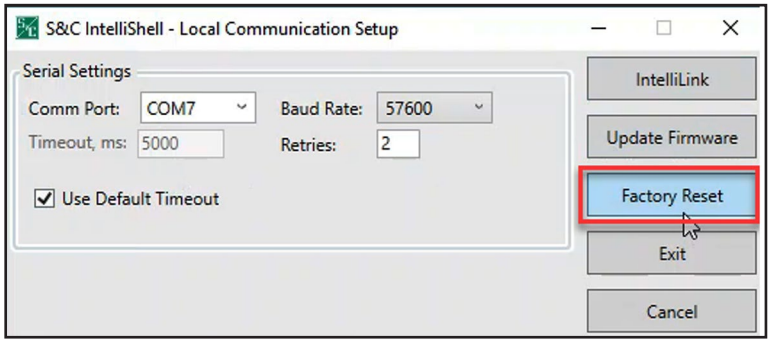


Figure 55. The Factory Reset button.

STEP 4. When prompted, enter “admin” for the username and enter the Admin password in the **Password** field. See Figure 56.

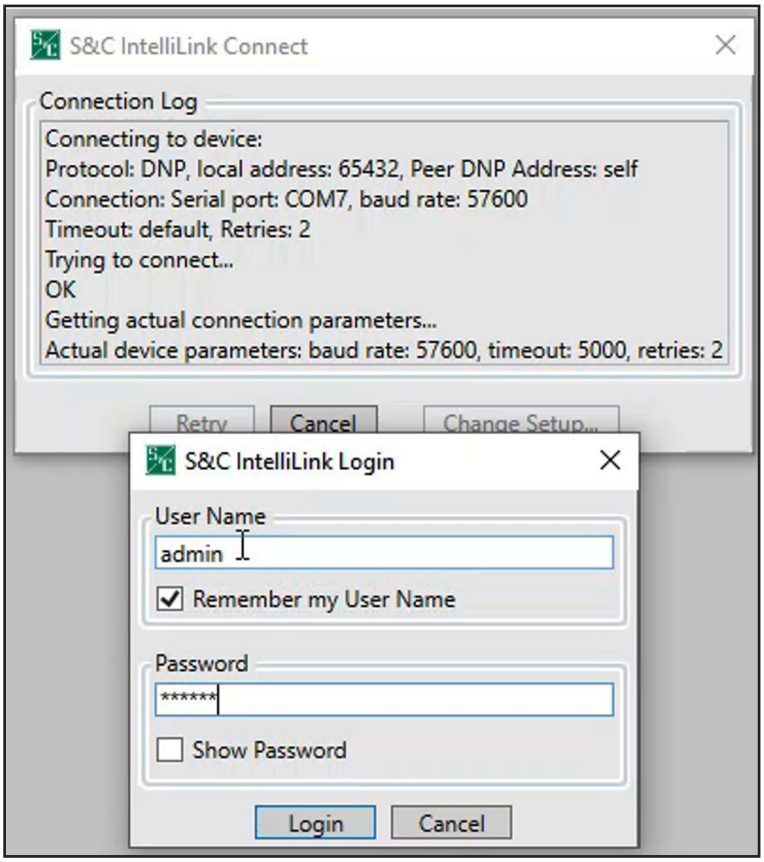


Figure 56. The IntelliLink Login dialog box.

STEP 5. Click on the **Proceed to Factory Reset** button when prompted. See Figure 57.

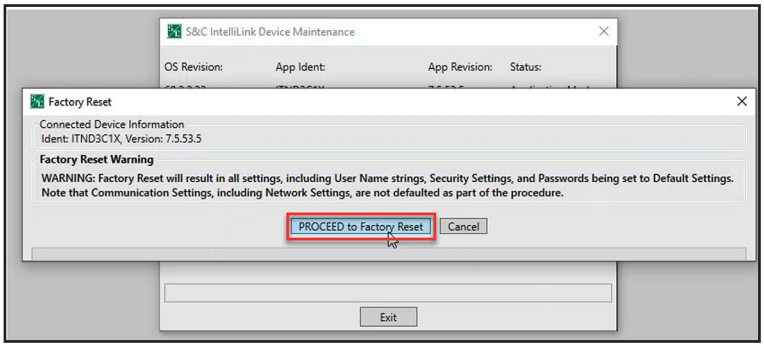


Figure 57. The Proceed to Factory Reset button.

NOTICE

Performing a **Factory Reset** procedure on software versions 7.5 and earlier results in usernames, passwords, and other security settings being reset to default-setting values. The communication settings are not set to default values as part of this procedure to allow the IntelliLink software to reconnect to the control when the factory reset is completed.

Performing a **Factory Reset** procedure on software versions 7.6 and later results in all settings (including usernames, passwords, security, and network settings) being reset to default-setting values. Because the network settings are reset to factory defaults, default network settings must be used to reconnect to the control when the factory reset is completed.

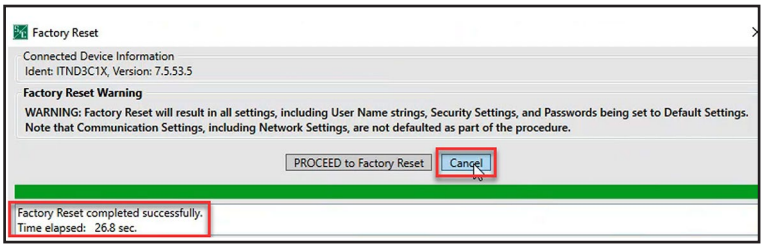


Figure 58. The Factory Reset completed successfully message.

STEP 6. When the **Factory Reset** procedure is completed, click on the **Cancel** button to complete the procedure. See Figure 58.

NOTICE

When the factory reset is completed, the Admin password will revert to the default password. At the initial login, the Admin user will be required to change the password to a non-default password that meets the complexity requirements.

Factory Reset Using IntelliLink Setup Software

STEP 1. Log in to the IntelliLink software using the Admin username and password.

STEP 2. Click on the **Tools>Device Maintenance** menu item. See Figure 59.

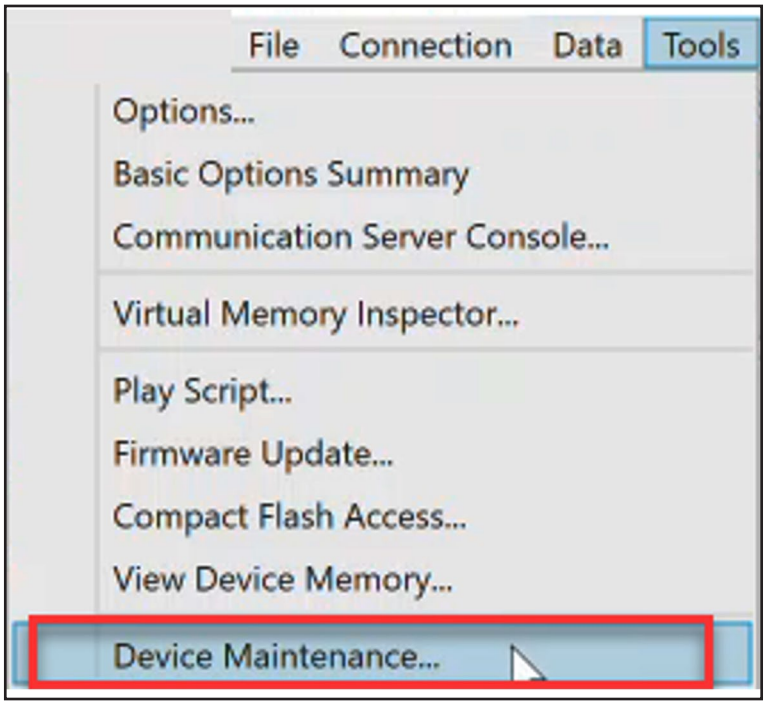


Figure 59. The Tools>Device Maintenance menu.

STEP 3. When the Device Maintenance dialog box opens, click on the **Factory Reset** button to launch the **Factory Reset** procedure. See Figure 60.

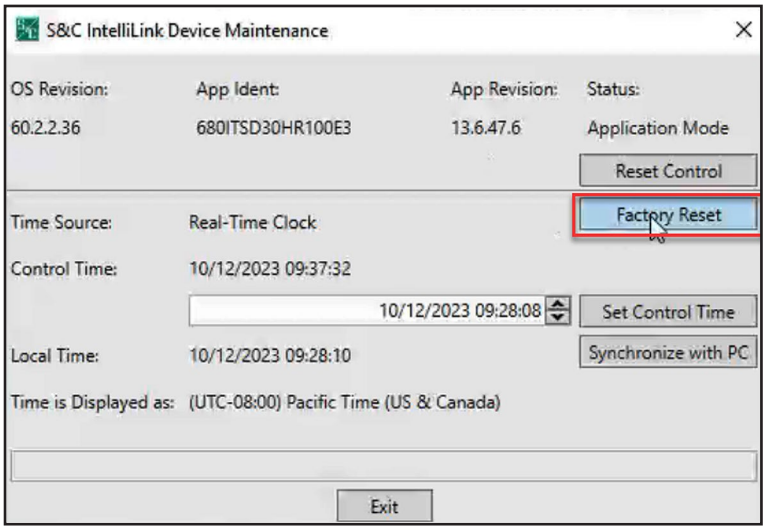


Figure 60. The Factory Reset button.

STEP 4. Click on the **Proceed to Factory Reset** button when prompted. See Figure 61.

NOTICE

Performing a **Factory Reset** procedure on software versions 7.5 and earlier results in usernames, passwords, and other security settings being reset to default-setting values. The communication settings are not set to default values as part of this procedure to allow the IntelliLink software to reconnect to the control when the factory reset is completed.

Performing a **Factory Reset** procedure on software versions 7.6 and later results in all settings (including usernames, passwords, security, and network settings) being reset to default-setting values. Because the network settings are reset to factory defaults, default network settings must be used to reconnect to the control when the factory reset is completed.

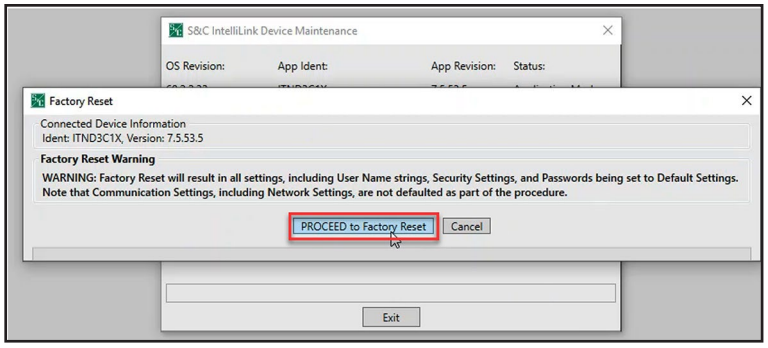


Figure 61. The Proceed to Factory Reset button.

STEP 5. When the Factory Reset procedure is completed, click on the **Cancel** button to complete the procedure. See Figure 62.

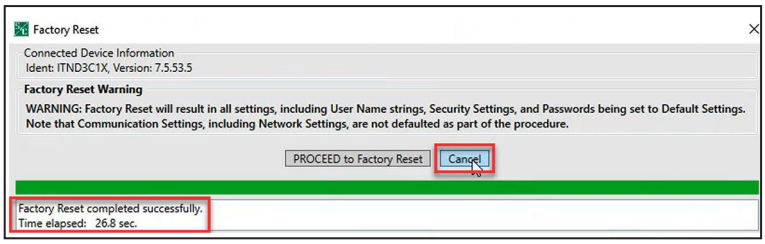


Figure 62. The Factory Reset completed successfully message.

NOTICE

When the **Factory Reset** procedure is completed, the Admin password will revert to the default password. At the initial login, the Admin user will be required to change the password to a non-default password that meets the complexity requirements.