

DNP Points List and Implementation

Table of Contents

Section	Page	Section	Page
Introduction	1	Control Points	11
Status Points	2	Group 0 Objects	14
Analog Input Points	8	DNP Implementation	14
Analog Output Points	10		

Introduction

This instruction sheet provides DNP points and DNP implementation information for an S&C IntelliRupter PulseCloser applied in an S&C IntelliTeam® SG Automatic Restoration System.

This instruction sheet is used with **IRInstaller-3.3.x** and **HMI Screens 3.3.x**. The “x” can indicate any number from 0 to 255. Other related software component version information is found on the *Setup > General > Revisions* screen. **IRInstaller-3.3.x.exe** is the name of the installer file on the IntelliRupter CD and available at the S&C Automation Customer Support Portal.

The DNP master station should define IntelliRupter with the following status, analog input, analog output, and control points:

Point	Count
Status	121
Analog Input	59
Analog Output	5
Control	42

The available DNP Points are listed in tables on pages 2 through 13, in the same order they are presented for selection on the *Setup-Communication-Point Mapping* screens. You can assign IntelliRupter status, data, and control points to any SCADA DNP Point index. Point descriptions begin with a code number that is used to find the detailed definition in this instruction sheet. Refer to the Communication Setup section of S&C Instruction Sheet 766-530, “S&C IntelliRupter® PulseCloser: Setup Instructions.” The code number for each point description is listed in 766-560 (this publication), and is not the SCADA Point index.

For a specific SCADA system, typically all IntelliRupter PulseClosers operate with the same DNP Point index configuration.

Unless otherwise noted, each point is “on” if the condition is logically true or active.

The Source Address in IntelliLink is now 65432 instead of 1.



Status Points

These IntelliRupter features have multiple Status Points:

Open or Close: 1–8

Closing Profile: 15, 16, 21

PulseFinding: 91–93

Lockout: 88–90

Hot Line Tag: 17, 22–24

IntelliTeam Operation: 56–74

Overcurrent Trip: 34–39

Sensitive Earth Fault: 75–78

Site Acceptance Test: 101–104

General Profile: 11–14

Loop Restoration: 79–82

Netlist Information: 105–109

STATUS POINTS	
Code #	Name—Definition
1	Pole 1 Open —On when Pole 1 interrupter contact is open. Otherwise off.
2	Pole 1 Closed —On when Pole 1 interrupter contact is closed. Otherwise off.
3	Pole 2 Open —On when Pole 2 interrupter contact is open. Otherwise off.
4	Pole 2 Closed —On when Pole 2 interrupter contact is closed. Otherwise off.
5	Pole 3 Open —On when Pole 3 interrupter contact is open. Otherwise off.
6	Pole 3 Closed —On when Pole 3 interrupter contact is closed. Otherwise off.
7	IntelliRupter Open—All Poles —On when Pole 1, Pole 2, and Pole 3 interrupter contacts are open. Otherwise off.
8	IntelliRupter Closed—All Poles —On when Pole 1, Pole 2, and Pole 3 interrupter contacts are closed. Otherwise off.
9	Manual Lever Locked Open —On when interrupter open/close/ready lever is in the open position. Off when lever is moved back to ready or closed position.
10	Manual Disconnect Open —On when disconnect on Disconnect Style models is open. Otherwise off.
11	General Profile 1 Active —On when General Profile 1 is in effect. Otherwise off.
12	General Profile 2 Active —On when General Profile 2 is in effect. Otherwise off.
13	General Profile 3 Active —On when General Profile 3 is in effect. Otherwise off.
14	General Profile 4 Active —On when General Profile 4 is in effect. Otherwise off.
15	Closing Profile 1 Active —On when Closing Profile 1 is in effect. Otherwise off.
16	Closing Profile 2 Active —On when Closing Profile 2 is in effect. Otherwise off.
17	Hot Line Tag Profile Active —On when Hot Line Tag Profile is in effect. Otherwise off.
18	Ground Trip Blocked —On when Ground Trip feature is blocked. Off when Ground Trip feature is enabled.
19	Circuit Testing Blocked —On when Circuit Testing feature is blocked. Off when Circuit Testing feature is enabled.
20	Test on Backfeed Blocked —On when Test on Backfeed feature is blocked. Off when Test on Backfeed feature is enabled.
21	2nd Closing Profile —On when Second Closing Profile is selected. Otherwise off.
22	Hot Line Tag Active SCADA —On when Hot Line Tag, activated by SCADA command, is in effect. Off when Hot Line Tag is removed.
23	Hot Line Tag Active IntelliLink —On when Hot Line Tag, activated by IntelliLink command, is in effect. Off when Hot Line Tag is removed.
24	Hot Line Tag Active Manual —On when Hot Line Tag, activated by manual lever, is in effect. Off when Hot Line Tag is removed.
25	Remote Operation On —On when Remote Operation is on. Off when Remote Operation is off, so only local control is allowed.
26	Battery System Low —On when routine battery test indicates low battery voltage. Otherwise off. The battery voltage set points can be accessed on the <i>IntelliLink Diagnostic-Control Power</i> screen.

STATUS POINTS—Continued	
Code #	Name—Definition
27	Battery System Bad —On when routine battery system test indicates inadequate battery capacity; however, IntelliRupter will operate normally when power is available from the Integrated Power Module(s). Otherwise off. The battery voltage set points can be accessed on the <i>IntelliLink Diagnostics—Control Power</i> screen.
28	Battery Charger Problem —On when routine battery system test turns charger off due to overvoltage. Off when next routine test does not detect overvoltage.
29	AC Control Power Present —On when there is output from the Integrated Power Module(s). Otherwise off.
30	IntelliRupter Shut Down Due to Control Power Loss —On just prior to the IntelliRupter shutting down due to loss of line power and no battery power. Otherwise off.
31	Trip on Loss of Control Energy —On when IntelliRupter trips due to loss of control energy and there is no ac power. Off when IntelliRupter closes or command to close IntelliRupter is given.
32	Source Loading Data Is Active —On when real-time feeder loading logic is in effect. Does not indicate whether IntelliRupter is using actual real-time feeder loading data received from the DNP master, or the Default Source Segment Loading setting. Off when Maximum Source Capacity and Default Source Segment Loading are set to disabled.
33	Real-Time Load Data May Be Old or Abnormal —On when the DNP analog output value received is less than the real-time three-phase load sensed by IntelliRupter. Also on when the real-time feeder loading data is not updated within the configured time interval. Off when new data is received, and the analog value is equal to or greater than the local measured load.
34	Overcurrent Timing —On when any overcurrent element is timing. Otherwise off.
35	Overcurrent Current Trip, Pole 1 —On if this pole was >20% trip and a phase-overcurrent element has tripped. On if the phase-overcurrent element for this pole was timing prior to a ground-overcurrent or negative sequence element trip or no phase-overcurrent elements were timing prior to trip. Off when the IntelliRupter closes or command to close IntelliRupter is given.
36	Overcurrent Current Trip, Pole 2 —On if this pole was >20% trip and a phase-overcurrent element has tripped. On if the phase-overcurrent element for this pole was timing prior to a ground-overcurrent or negative sequence element trip or no phase-overcurrent elements were timing prior to trip. Off when the IntelliRupter closes or command to close IntelliRupter is given.
37	Overcurrent Current Trip, Pole 3 —On if this pole was >20% trip and a phase-overcurrent element has tripped. On if the phase-overcurrent element for this pole was timing prior to a ground-overcurrent or negative sequence element trip or no phase-overcurrent elements were timing prior to trip. Off when the IntelliRupter closes or command to close IntelliRupter is given.
38	Overcurrent Trip, Any Pole —On when any overcurrent element on Pole 1, Pole 2, or Pole 3 has tripped. Off when IntelliRupter closes or command to close IntelliRupter is given.
39	Tripped to Lockout —On when IntelliRupter has locked-out as the result of an event; IntelliTeam may begin the reconfiguration process. Off when command to close IntelliRupter is given.
40	Voltage Timing —On when any voltage element is timing. Otherwise off.
41	Voltage Trip —On when a voltage element has tripped. Off when command to close IntelliRupter is given.
42	Frequency Timing —On when any frequency element is timing. Otherwise off.
43	Frequency Trip —On when any frequency element has tripped. Off when command to close IntelliRupter is given.
44	Sectionalizing Timing —On when any sectionalizing element is timing. Otherwise off.
45	Sectionalizing Trip —On when any sectionalizing element has tripped. Off when command to close IntelliRupter is given.

Status Points

STATUS POINTS—Continued	
Code #	Name—Definition
46	IntelliRupter Alarm —On when any alarm is active. Turned off automatically when problem that caused alarm is resolved.
47	IntelliRupter Warning —On when any warning is active. Turned off automatically when problem that caused warning is resolved.
48	IntelliRupter Error —On when any error is active. Turned off by user action to clear error.
49	Good Source Voltage—Terminal X —On when the X-side terminal voltages equal or exceed the Source Voltage Indication setting for the active profile. Otherwise off.
50	Good Source Voltage—Terminal Y —On when the Y-side terminal voltages equal or exceed the Source Voltage Indication setting for the active profile. Otherwise off.
51	WiFi Is Connected —On when a WiFi connection to IntelliRupter has been established. Otherwise off.
52	WiFi Intrusion Alarm —On when WiFi module reports replay attack or authentication failure. Turned off by user. See SCADA Control Point Index #21 Clear WiFi Intrusion Alarm .
53	Testing —On when IntelliRupter is engaged in circuit testing. Off when IntelliRupter closes or command to close IntelliRupter is given.
54	Close Blocked by Synch. Check —On when closing operation is blocked by Synch. Check feature (i.e., different voltage magnitude, phase angle, or frequency on each side of IntelliRupter). Off when command to close IntelliRupter is given.
55	Pulseclosing, Fault Detected —On when fault is detected during a pulseclosing operation. Off when IntelliRupter closes or command to close IntelliRupter is given.
56	IntelliTeam Prohibit Restoration Timer Exceeded —On when the Prohibit Restoration Timer expires for any team in which this IntelliRupter is a member. Countdown starts when a transfer process begins at the team, usually when a sectionalizing event occurs. Timers in adjacent teams may start simultaneously. Each team will decrement its timer independently, so the teams can potentially enter the Prohibit Restoration state asynchronously. Off when local manual operations have been cleared, all local trouble indications are cleared, and Prohibit Restoration is not active locally.
57	IntelliTeam Prohibit Restoration Enabled —On when IntelliRupter receives a local command or a remote command from the SCADA master to prohibit load restoration. No switch on any team in which this IntelliRupter is a member is allowed to automatically close, preventing automatic load restoration. Off when Prohibit Restoration feature is latched off with a command from the SCADA master.
58	Setup Data Revision —On when the configuration data for an enabled IntelliTeam team has been modified. Off when all changes have been successfully applied.
59	IntelliTeam Automatic Transfer In Progress —On when any team in which this IntelliRupter is a member is actively performing an automatic transfer operation. Turned off by IntelliTeam.
60	IntelliTeam Return To Normal In Progress —On when any team in which this IntelliRupter is a member is returning the circuit to its normal configuration. Turned off by IntelliTeam.
61	IntelliTeam Fault Pole 1 —On when the phase overcurrent element on Pole 1, or any of the negative sequence, ground, or sensitive earth overcurrent elements exceed 50% of the trip time setting. Turned off by IntelliTeam.
62	IntelliTeam Fault Pole 2 —On when the phase overcurrent element on Pole 2, or any of the negative sequence, ground, or sensitive earth overcurrent elements exceed 50% of the trip time setting. Turned off by IntelliTeam.
63	IntelliTeam Fault Pole 3 —On when the phase overcurrent element on Pole 3, or any of the negative sequence, ground, or sensitive earth overcurrent elements exceed 50% of the trip time setting. Turned off by IntelliTeam.

STATUS POINTS—Continued	
Code #	Name—Definition
64	IntelliTeam Team Member Not Transfer Ready —On when an IntelliRupter operation is not consistent with the expected team operation. A variety of manual operations will take the IntelliRupter out of “Ready.” Off when local manual operations have been cleared, and all local trouble indications have been cleared.
65	Not All IntelliTeam Teams Transfer Ready —On if any team in which this IntelliRupter is a member is not fully operational. This may be due to conditions of individual team members; team-wide conditions such as the isolation of a fault, or configuration or coordination problems, or Automatic Restoration is set to prohibited on the <i>IntelliTeam II/SG Operation</i> screen. Off when all conditions that caused this status point to be set initially have been cleared. Unless otherwise prohibited, team member IntelliRupters will revert to standalone basic protection when Not Transfer Ready is active, whether due to local conditions or conditions at adjacent team members.
66	IntelliTeam Team 1 Transfer Ready —On when Team 1 is in the Ready to Transfer state. Off when any member of Team 1 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 1 contains a fault.
67	IntelliTeam Team 2 Transfer Ready —On when Team 2 is in the Ready to Transfer state. Off when any member of Team 2 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 2 contains a fault.
68	IntelliTeam Team 3 Transfer Ready —On when Team 3 is in the Ready to Transfer state. Off when any member of Team 3 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 3 contains a fault.
69	IntelliTeam Team 4 Transfer Ready —On when Team 4 is in the Ready to Transfer state. Off when any member of Team 4 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 4 contains a fault.
70	IntelliTeam Team 5 Transfer Ready —On when Team 5 is in the Ready to Transfer state. Off when any member of Team 5 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 5 contains a fault.
71	IntelliTeam Team 6 Transfer Ready —On when Team 6 is in the Ready to Transfer state. Off when any member of Team 6 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 6 contains a fault.
72	IntelliTeam Team 7 Transfer Ready —On when Team 7 is in the Ready to Transfer state. Off when any member of Team 7 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 7 contains a fault.
73	IntelliTeam Team 8 Transfer Ready —On when Team 8 is in the Ready to Transfer state. Off when any member of Team 8 is set to Manual Operation, or has any trouble indication active, or has Prohibit Restoration active, or if the line section represented by Team 8 contains a fault.
74	IntelliTeam Manual Operation Team Condition —On when any member of a team registers a manual switch operation (Open or Close) that makes that team not Ready to Transfer. Some manual operations will not cause this condition, most notably closing a source switch on a previously faulted team to allow Return To Normal to proceed, when Return To Normal is enabled. Turned off by using the Clear Manual Operation <i>Execute</i> button on the <i>IntelliTeam II/SG Operation > Team Summary</i> screen. Also turned off by issuing SCADA Control Point Index #23 IntelliTeam Clear Manual Operation .
75	Sensitive Earth Trip Blocked —On when Sensitive Earth Trip feature is blocked. Off when Sensitive Earth Trip feature is enabled.
76	Overcurrent Timing—Sensitive Earth Fault —On when sensitive earth element is timing. Otherwise off.
77	Overcurrent Trip—Sensitive Earth Fault —On when sensitive earth element has tripped. Off when IntelliRupter closes or command to close IntelliRupter is given.

Status Points

STATUS POINTS—Continued	
Code #	Name—Definition
78	Tripped to Lockout—Sensitive Earth Fault —On when IntelliRupter has locked-out as the result of a sensitive earth trip element; IntelliTeam may begin the reconfiguration process. Off when command to close IntelliRupter is given.
79	Loop Restoration Enabled —On when Loop Restoration is Enabled. Otherwise off.
80	Loop Restoration Ready —On when Loop Restoration is Ready. Otherwise off.
81	Loop Restoration Timing —On when the Loop Restoration timer is running. Otherwise off.
82	Loop Restoration Reconfigured —On when Loop Restoration functionality has caused a normally-open device to close, a normally-open device to lockout after testing, a normally-closed device to open and lockout, or a normally-closed device has tripped, then closed, and is now serving load in the opposite direction. Otherwise off. This point is reset when the IntelliRupter is manually opened or closed.
83	Current Flowing In Direction 1 —On when current flows in Direction 1, as configured for this IntelliRupter on the Setup-General screen. Otherwise off.
84	Current Flowing In Direction 2 —On when current flows in Direction 2, as configured for this IntelliRupter on the Setup-General screen. Otherwise off.
85	Close Blocked Due to Pulseclosing Not Available —On when closing operation is blocked due to pulseclosing not being available and the user setting for <i>Conventional Close if Pulseclosing Not Available</i> set to No . Note that the switch can still be closed by issuing a command that does not use pulseclosing. Off when a successful close is performed.
86	Current Restraint-Phase —On when Phase-Current Restraint is in effect for single-phase tripping. Otherwise off.
87	Current Restraint-Ground —On when Ground-Current Restraint is in effect for single-phase tripping. Otherwise off.
88	Lockout-Pole 1 —On when Pole 1 is locked-out. Otherwise off.
89	Lockout-Pole 2 —On when Pole 2 is locked-out. Otherwise off.
90	Lockout-Pole 3 —On when Pole 3 is locked-out. Otherwise off.
91	Pulse Detected Fault-Pole 1 —On when a fault has been detected during a test sequence or close attempt by pulseclosing on Pole 1. This point is cleared by the next successful close operation on Pole 1.
92	Pulse Detected Fault-Pole 2 —On when a fault has been detected during a test sequence or close attempt by pulseclosing on Pole 2. This point is cleared by the next successful close operation on Pole 2.
93	Pulse Detected Fault-Pole 3 —On when a fault has been detected during a test sequence or close attempt by pulseclosing on Pole 3. This point is cleared by the next successful close operation on Pole 3.
94	Single-Phase Operation Blocked —On when Single-Phase Operation is blocked. Otherwise off.
95	Ground Trip Block Lever Applied —On when Ground Trip Block Lever is applied. Otherwise off.
96	Battery Disconnected —On when battery is disconnected, or no battery is installed.
97	Battery Test In Progress —On when a battery test is being performed. Otherwise, off.
98	GPS Not Active Time Source —On when GPS is not the active time source. Otherwise, off.
99	Communication Test —Toggles state each time a Test Communication command (Control Point 41) is received by Communication Test. The initial state on power up is Off.
100	WiFi Disabled by SCADA —On when a Disable WiFi command has been received from Control Point 42. Off when an Enable WiFi command has been received from Control Point 43. Control Point 45 toggles WiFi communication on and off; On when WiFi is disabled, and Off when WiFi is enabled.
101	Site Acceptance Test: Script Active —On when an SAT Script has been received and a Start Test command has been issued from the SAT Manager.
102	Site Acceptance Test: Switch Closed —On when the SAT process sees the switch status as Closed.

STATUS POINTS—Continued	
Code #	Name—Definition
103	Site Acceptance Test: Switch Open —On when the SAT process sees the switch status as Open.
104	Site Acceptance Test: Test Prohibited —On when all SAT activity has been prohibited locally by the IntelliLink screenset. All requests issued from the SAT Manager are ignored.
105	Netlist Missing Runners —On when the received Runner Count doesn't match the expected Runner Count. Rapid Self Healing is disabled as long as this is the case.
106	Netlist Settings Propagation —On when the local control is receiving Netlist records from either a download or through propagation. If this is a Netlist download the status point remains on until all expected runners arrive with the new Netlist.
107	Netlist Settings Accepted —On when a new Netlist has been successfully validated. Off when a Netlist is being downloaded or propagated. Off if the user has changed any team settings so they are different from the screenset.
108	Netlist Propagation Enabled —On when Netlist propagation has been enabled by the IntelliLink screenset or through SCADA.
109	Netlist Inactive —On when Netlist is not in use. This implies that IntelliTeam SG is not used—and either IntelliTeam II Mode is active, or no version of IntelliTeam has been installed. Off when Netlist is active.
110	IntelliTeam Overload Alarm —On when Post Restoration Load Management is operational, and the substation feeder is supplying sections that it does not normally supply, and an overload condition has been present when sampled for 10 consecutive times ten seconds apart. The alarm is cleared the first time an overload condition is not present when sampled, or when the feeder is no longer supplying the extra sections.
111	Close Blocked Due to Insufficient Energy —On when a close operation was blocked due to insufficient storage capacitor energy.
112	Communication Enhanced Coordination Ready —On when a Closed IntelliRupter is active on a General Profile configured for CEC in at least one direction, and all sourceside IntelliRupters are Closed and active on the same General Profile as this IntelliRupter. Otherwise off.
113	Communication Enhanced Coordination Shift for X Terminal —On when the IntelliRupter has shifted to the slower curve for the X terminal. Otherwise off.
114	Communication Enhanced Coordination Shift for Y Terminal —On when the IntelliRupter has shifted to the slower curve for the Y terminal. Otherwise off.
115	Ground Overcurrent Trip —On when Ground Overcurrent element has tripped. Off when IntelliRupter closes or command to close IntelliRupter is given.
116	Negative Sequence Overcurrent Trip —On when Negative Sequence Overcurrent element has tripped. Off when IntelliRupter closes or command to close IntelliRupter is given.
117	Definite Time Overcurrent Trip —On when any Definite Time Overcurrent element has tripped. Off when IntelliRupter closes or command to close IntelliRupter is given.
118	IT Out of Normal Switch State —On when the switch state is not in the normal open or close switch state for IntelliTeam. Off when the switch state is the normal open or close switch state for IntelliTeam.
119	Overcurrent fault detected —On if the fault detection circuitry has detected a line fault condition which has not been reset by the SCADA operator. Line fault conditions clear automatically when 3-phase line voltage has been sensed, the switch is closed, and 45 minutes have elapsed, or the Clear Fault Flags button is clicked on the Operation—Profiles/Commands page. If the conditions above are met and you send the Clear Latched Overcurrent Status command (control point 46) via SCADA, the fault condition also clears.
120	PLI Open —PLI = Phase Loss Isolation. On when the switch has been opened by the Phase Loss Isolation logic. Otherwise Off.
121	LoopRest CIs Blk'd, UnderFreq —On when a Loop Restoration close attempt is blocked due to under-frequency detection. Off when the IntelliRupter closes, or command to close IntelliRupter is given, or Loop Restoration is re-enabled by manual lever operation, or by WiFi or SCADA commands.

Analog Input Points

ANALOG INPUT POINTS	
Code #	Name—Definition
1	Voltage, Pole 1X —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 1, Terminal X. Each count equals one Vac RMS.
2	Voltage, Pole 2X —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 2, Terminal X. Each count equals one Vac RMS.
3	Voltage, Pole 3X —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 3, Terminal X. Each count equals one Vac RMS.
4	Voltage, Pole 1Y —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 1, Terminal Y. Each count equals one Vac RMS.
5	Voltage, Pole 2Y —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 2, Terminal Y. Each count equals one Vac RMS.
6	Voltage, Pole 3Y —Primary phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole 3, Terminal Y. Each count equals one Vac RMS.
7	90% Voltage Reference Standard —A constant, required by protocol implementation to conform to the RTU standard.
8	0% Voltage Reference Standard —A constant, with a value of zero, required by protocol implementation to conform to the RTU standard.
9	Battery Voltage —Nominally 12 Vdc. If ac power is available, value is updated only during battery testing. If ac power is not available, value is continuously updated. One count equals 0.0293 Vdc.
10	Current, Pole 1 —Single-phase true RMS current measured on Pole 1. Each count equals one ampere.
11	Current, Pole 2 —Single-phase true RMS current measured on Pole 2. Each count equals one ampere.
12	Current, Pole 3 —Single-phase true RMS current measured on Pole 3. Each count equals one ampere.
13	Residual Current —Vector sum of the fundamental power frequency currents on Pole 1, Pole 2, and Pole 3. Each count equals one ampere.
14	Fault Current, Pole 1 at Time of Trip —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.
15	Fault Current, Pole 2 at Time of Trip —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.
16	Fault Current, Pole 3 at Time of Trip —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.
17	kW, Pole 1 —Single-phase kW on Pole 1, calculated using instantaneous voltage and current. Each count equals one kW.
18	kW, Pole 2 —Single-phase kW on Pole 2, calculated using instantaneous voltage and current. Each count equals one kW.
19	kW, Pole 3 —Single-phase kW on Pole 3, calculated using instantaneous voltage and current. Each count equals one kW.
20	Total kW —Sum of kW Pole 1, kW Pole 2, and kW Pole 3. Each count equals one kW.
21	kVAR, Pole 1 —Single-phase kVAR on Pole 1, calculated using apparent power, true power, and phase angle. Each count equals one kVAR.

ANALOG INPUT POINTS—Continued	
Code #	Name—Definition
22	kVAR, Pole 2 —Single-phase kVAR on Pole 2, calculated using apparent power, true power, and phase angle. Each count equals one kVAR.
23	kVAR, Pole 3 —Single-phase kVAR on Pole 3, calculated using apparent power, true power, and phase angle. Each count equals one kVAR.
24	Total kVAR —Sum of kVAR Pole 1, kVAR Pole 2, and kVAR Pole 3. Each count equals one kVAR.
25	Power Factor, Pole 1 —Single-phase power factor measured on Pole 1, reported as the cosine of the phase angle. Leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF).
26	Power Factor, Pole 2 —Single-phase power factor measured on Pole 2, reported as the cosine of the phase angle. Leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF).
27	Power Factor, Pole 3 —Single-phase power factor measured on Pole 3, reported as the cosine of the phase angle. Leading power factor is represented by a negative number. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF).
28	Power Factor Angle of Pole 1 —Angle whose cosine is the power factor. Each count equals one-eighth of a degree.
29	Power Factor Angle of Pole 2 —Angle whose cosine is the power factor. Each count equals one-eighth of a degree.
30	Power Factor Angle of Pole 3 —Angle whose cosine is the power factor. Each count equals one-eighth of a degree.
31	Total Harmonic Distortion—Pole 1, X Side Voltage —Each count equals 0.1%.
32	Total Harmonic Distortion—Pole 2, X Side Voltage —Each count equals 0.1%.
33	Total Harmonic Distortion—Pole 3, X Side Voltage —Each count equals 0.1%.
34	Total Harmonic Distortion—Pole 1, Y Side Voltage —Each count equals 0.1%.
35	Total Harmonic Distortion—Pole 2, Y Side Voltage —Each count equals 0.1%.
36	Total Harmonic Distortion—Pole 3, Y Side Voltage —Each count equals 0.1%.
37	Total Harmonic Distortion—Pole 1, Current —Each count equals 0.1%.
38	Total Harmonic Distortion—Pole 2, Current —Each count equals 0.1%.
39	Total Harmonic Distortion—Pole 3, Current —Each count equals 0.1%.
40	Line Frequency —Each count equals 0.01 Hz.
41	Temperature —The most recent temperature reading. Each count equals one °F.
42	Number of Pole 1 Opening Operations —Number of interrupter operations on Pole 1, incremented on each open operation. Overflows back to zero at 65,535.
43	Number of Pole 2 Opening Operations —Number of interrupter operations on Pole 2, incremented on each open operation. Overflows back to zero at 65,535.
44	Number of Pole 3 Opening Operations —Number of interrupter operations on Pole 3, incremented on each open operation. Overflows back to zero at 65,535.
45	Number of Pole 1 Closing Operations —Number of interrupter operations on Pole 1, incremented on each close operation. Overflows back to zero at 65,535.
46	Number of Pole 2 Closing Operations —Number of interrupter operations on Pole 2, incremented on each close operation. Overflows back to zero at 65,535.

Analog Input Points / Analog Output Points

ANALOG INPUT POINTS—Continued	
Code #	Name—Definition
47	Number of Pole 3 Closing Operations —Number of interrupter operations on Pole 3, incremented on each close operation. Overflows back to zero at 65,535.
48	Number of Pole 1 Pulse Operations —Number of interrupter operations on Pole 1, incremented on each pulseclose operation. Overflows back to zero at 65,535.
49	Number of Pole 2 Pulse Operations —Number of interrupter operations on Pole 2, incremented on each pulseclose operation. Overflows back to zero at 65,535.
50	Number of Pole 3 Pulse Operations —Number of interrupter operations on Pole 3, incremented on each pulseclose operation. Overflows back to zero at 65,535.
51	Phase Angle, X Side Voltage to Y Side Voltage, Pole 1 —Phase angle in degrees between X Side and Y Side Voltage signals. Positive value indicates that X side is leading. Each count equals one-eighth degree.
52	Phase Angle, X Side Voltage to Y Side Voltage, Pole 2 —Phase angle in degrees between X Side and Y Side Voltage signals. Positive value indicates that X side is leading. Each count equals one-eighth degree.
53	Phase Angle, X Side Voltage to Y Side Voltage, Pole 3 —Phase angle in degrees between X Side and Y Side Voltage signals. Positive value indicates that X side is leading. Each count equals one-eighth degree.
54	Analog Communication Test —Displays the value sent to Analog Output Point 5. The initial state at powerup is zero.
55	Total kVA —Sum of kVA Pole 1, kVA Pole 2, and kVA Pole 3. Each count equals one kVA.
56	Total Power Factor —Sum of kW Pole 1, kW Pole 2, and kW Pole 3 divided by the sum of VA Pole 1, VA Pole 2, and VA Pole 3. Each count equals 0.001 with a 1000 offset (0 = -1.0 PF, 1000 = 0.0 PF, 2000 = 1.0 PF).
57	Latched Overcurrent, Pole 1 —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, including a Sectionalizing trip, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.
58	Latched Overcurrent, Pole 2 —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, including a Sectionalizing trip, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.
59	Latched Overcurrent, Pole 3 —Current at time of trip for the last overcurrent or tandem protective element that tripped and opened this pole, including a Sectionalizing trip, regardless of which phase caused the trip. Cleared when this pole is commanded to close. Each count equals one ampere.

ANALOG OUTPUT POINTS	
Code #	Name—Definition
1	Application Layer Confirmation Retry Time —Time (100 to 65535 mSec.) that IntelliRupter will wait for an application layer confirmation to an event response message before resending the request for confirmation.
2	Application Layer Confirmation Retry Count —Number of times (0 to 10) IntelliRupter will send an event response message if a confirmation is not received.
3	Control Point Select Time —During a select-before-operate procedure, the time (10 to 1000 tenths of a second) allowed to elapse between receiving the select function for a point and receiving the operate function for it. If an operate function is not received within this period, the point is de-selected; another select function is required before the point will operate.
4	Real-Time Feeder Loading —Total averaged three-phase feeder loading (in amperes), measured at the source breaker. This value is used in determining if the load can be transferred to another source. Each count equals one ampere.
5	Analog Communication Test —Accepts a value that reports back through Analog Input Point 54.

The **Object Type** must be configured on the *Communication—Point Mapping—Controls—DNP Control Point Mapping* screen for each control point when it is mapped. Only the configured Object Type will be accepted and acted on for that control point. Some control points will not work with all Object Types. The available Object Types are listed for each control point.

For information about Restarting an IntelliRupter (**Control Restart**) see *Note: 4* in the *DNP Implementation* section of this document.

Control Points related to **Open** or **Close** commands: 1, 2, 24, and 27–35.

Control Points related to **General Profile** selection: 3–6, and 17.

Control Points related to **IntelliTeam SG**: 22, 23, and 36.

Control Points related to **WiFi** operation: 20, 21, 42, and 43.

CONTROL POINTS	
Code #	Name—Definition
1	Open IntelliRupter—SCADA —The open command opens all closed poles, and may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command.
2	Close IntelliRupter—SCADA —The close command closes all open poles, and may be issued using a Breaker Close, Pulse-On, or Latch-On DNP command.
3	General Profile 1—SCADA —Enables General Profile 1. Command may be issued using a Pulse-On or Latch-On DNP command.
4	General Profile 2—SCADA —Enables General Profile 2. Command may be issued using a Pulse-On or Latch-On DNP command.
5	General Profile 3—SCADA —Enables General Profile 3. Command may be issued using a Pulse-On or Latch-On DNP command.
6	General Profile 4—SCADA —Enables General Profile 4. Command may be issued using a Pulse-On or Latch-On DNP command.
7	Enable/Disable Hot Line Tag—SCADA —Enables or disables the Hot Line Tag profile. Enable command may be issued using a Latch-On or Pulse-On DNP command. Disable command may be issued using the Latch-Off or Pulse-Off DNP command.
8	Reserved.
9	Start Battery Test—SCADA —Begins battery test cycle. Command may be issued using a Pulse-On or Latch-On DNP command. If ac power is available, the battery charger is disconnected for several minutes during the test. If ac power is not available, a brief impedance test is used to evaluate battery condition.
10	Clear Errors—SCADA —Command may be issued using a Pulse-On or Latch-On DNP command to clear all error flags. Alarms and warnings are not affected.
11	Enable/Block Ground Trip —Enables or blocks Ground Trip. Enable command may be issued using the Latch-On or Pulse-On DNP command. Block command may be issued using the Latch-Off or Pulse-Off DNP command.
12	Enable/Block Sensitive Earth Trip —Enables or blocks Sensitive Earth Trip. Enable command may be issued using the Latch-On or Pulse-On DNP command. Block command may be issued using the Latch-Off or Pulse-Off DNP command.
13	Enable/Block Circuit Testing —Enables or blocks Circuit Testing. Enable command may be issued using the Latch-On or Pulse-On DNP command. Block command may be issued using the Latch-Off or Pulse-Off DNP command.
14	Reserved.

Control Points

CONTROL POINTS—Continued	
Code #	Name—Definition
15	Enable/Block Test on Backfeed —Enables or blocks Testing on Backfeed. Enable command may be issued using the Latch-On or Pulse-On DNP command. Block command may be issued using the Latch-Off or Pulse-Off DNP command.
16	Reserved.
17	Turn On/Off Second Closing Profile —Enables the Second Closing profile. On command may be issued using the Latch-On or Pulse-On DNP command. Off command may be issued using the Latch-Off or Pulse-Off DNP command.
18	Reserved.
19	Execute Waveform Capture —Command may be issued using the Latch-On or Pulse-On DNP command. This command initiates a user-directed waveform capture, the same function as shown on the <i>IntelliLink Log Management</i> screen.
20	WiFi Test —Activates WiFi beacon transmitter for troubleshooting purposes. Command may be issued using Pulse-On, or Latch-On DNP command.
21	Clear WiFi Intrusion Alarm —Command may be issued using Pulse-On, or Latch-On DNP command.
22	IntelliTeam Prohibit Restoration—SCADA —Prevents IntelliRupter, and other devices in any team in which this IntelliRupter is a member, from automatically closing to restore load. Prohibit Restoration command may be issued using the Pulse-On, or Latch-On DNP command. Prohibit Restoration may be disabled by issuing a Pulse-Off, or Latch-Off DNP command.
23	IntelliTeam Clear Manual Operation—SCADA —A Pulse-On, or Latch-On DNP command is used to clear a manual operation. Allows IntelliTeam to return to the ready state, provided IntelliRupter contacts are in their IntelliTeam normal open or closed position.
24	Open/Close IntelliRupter—SCADA —The open command may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP Command. The Close command may be issued using a Breaker Close, Pulse-Off, or Latch-Off DNP Command. When the Open/Closed state of the poles is mismatched, if the command includes either an Open or Close command with it, then all poles will Open or Close accordingly. If SCADA sends this command without specifying Open or Close, then IntelliRupter will ignore the command.
25	Enable/Disable Loop Restoration—SCADA —Enables or disables Loop Restoration. Enable command may be issued using the Latch-On or Pulse-On DNP command. Disable command may be issued using the Pulse-Off, or Latch-Off DNP Command.
26	Enable/Block Single Phase Operation—SCADA —If enabled, allows single-phase user commands and automatic operation according to the active General Profile configuration. If blocked, all automatic operations or IntelliLink user commands will be executed three-phase, and single-phase SCADA commands will be rejected. Enable command may be issued using the Latch-On or Pulse-On DNP command. Block command may be issued using the Latch-Off or Pulse-Off DNP command.
27	Open Pole 1—SCADA —This command opens only Pole 1, and may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command.
28	Open Pole 2—SCADA —This command opens only Pole 2, and may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command.
29	Open Pole 3—SCADA —This command opens only Pole 3, and may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command.
30	Close Pole 1—SCADA —This command closes only Pole 1, and may be issued using a Breaker Close, Pulse-On, or Latch-On DNP command.
31	Close Pole 2—SCADA —This command closes only Pole 2, and may be issued using a Breaker Close, Pulse-On, or Latch-On DNP command.

CONTROL POINTS—Continued	
Code #	Name—Definition
32	Close Pole 3—SCADA —This command closes only Pole 3, and may be issued using a Breaker Close, Pulse-On, or Latch-On DNP command.
33	Open/Close Pole 1—SCADA —This single command Opens or Closes only Pole 1. Open may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command. Close may be issued using a Breaker Close, Pulse-Off, or Latch-Off Command.
34	Open/Close Pole 2—SCADA —This single command Opens or Closes only Pole 2. Open may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command. Close may be issued using a Breaker Close, Pulse-Off, or Latch-Off Command.
35	Open/Close Pole 3—SCADA —This single command Opens or Closes only Pole 3. Open may be issued using a Breaker Trip, Pulse-On, or Latch-On DNP command. Close may be issued using a Breaker Close, Pulse-Off, or Latch-Off Command.
36	Enable/Disable Netlist Propagation—SCADA —If enabled, allows new netlist requests and netlist transmissions. If disabled, multiple downloads of a netlist can be sent to a local control. The enable command may be issued as Pulse On, Latch On, or Breaker Close. The disable command may be issued as Pulse Off, Latch Off, or Breaker Trip.
37	PulseClose Test —This command initiates a three-phase pulseclose test, and may be issued using Breaker Close, Pulse-On, or Latch-On. When a pulseclose test is executed, a pulseclose operation followed by a close operation that executes without point on wave control.
38	PulseClose Test Pole 1 —This command initiates a single-phase pulseclose test on pole 1 only, and may be issued using Breaker Close, Pulse-On, or Latch-On. When a pulseclose test is executed, a pulseclose operation followed by a close operation that executes without point on wave control.
39	PulseClose Test Pole 2 —This command initiates a single-phase pulseclose test on pole 2 only, and may be issued using Breaker Close, Pulse-On, or Latch-On. When a pulseclose test is executed, a pulseclose operation followed by a close operation that executes without point on wave control.
40	PulseClose Test Pole 3 —This command initiates a single-phase pulseclose test on pole 3 only, and may be issued using Breaker Close, Pulse-On, or Latch-On. When a pulseclose test is executed, a pulseclose operation followed by a close operation that executes without point on wave control.
41	Communication Test —This command changes the state of the Communication Test point (Status Point 99) each time a Communication Test message is received. Command may be issued using Pulse-On or Latch-On.
42	WiFi Disable —This command disables local WiFi communication. Command may be issued as Pulse-On or Latch-On.
43	WiFi Enable —This command enables local WiFi communication. Command may be issued as Pulse-On or Latch-On.
44	Clear Overcurrent Trip —This command clears Overcurrent Trip status points 35, 36, and 37 if they are set when this command is received. Command may be issued as Pulse-On or Latch-On.
45	WiFi Enable/Disable —Toggles the state of local WiFi communication. Command may be issued as Pulse-On or Latch-On.
46	Clear Latched Overcurrent Status —This command clears Latch Overcurrent status points 119 if it is set when this command is received. Command may be issued as Pulse-On Latch-On.

Group 0 Objects

GROUP 0 OBJECTS		
Variation	Variation Name	Name—Definition
242	Device manufacturer's software version	The S&C implementation will return a string containing the MCU Application, MCU EOS, DSP Application, and DSP EOS version numbers. The following is an example of the string that will be returned: "003.003.004.003 060.001.021.043 003.003.003.000 050.008.000.014," representing MCU Application 3.3.4.3, MCU EOS 60.1.21.43, DSP Application 3.3.3.0, and DSP EOS 50.8.0.14.
248	Device serial number	The S&C implementation will return a string containing the IntelliRupter PulseCloser and Protection and Control Module serial numbers. The following is an example of the string that will be returned: "08-0001769 4540-0000-000051," representing IntelliRupter PulseCloser and Protection and Control Module Serial Numbers.

DNP Implementation

This implementation of DNP and this section of documentation conform to the document DNP V3.00 Subset Definitions, Version 2.00, available from the DNP Users Group.

Device Profile Description

This following describes the compatibility of S&C's implementation of DNP with other devices.

DNP 3 DEVICE PROFILE DOCUMENT	
Vendor Name: S&C Electric Company	
Device Name: IntelliRupter® PulseCloser	
Highest DNP Level Supported: For Requests - Level 2 For Responses - Level 2	Device Function: ___ Master X Slave
Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table): 8-Bit Unsigned Integers _____ _____ _____ _____	
Maximum Data Link Frame Size (bytes) Transmitted - 292 Received - 292	Max Application Fragment Size (bytes) Transmitted - 2048 Received - 2048
Maximum Data link Re-tries: X None ___ Fixed at _____ ___ Configurable, range 1 to 25	Maximum Application Layer Re-tries: ___ None ___ Fixed at _____ X Configurable, range 0 to 10
Requires Data Link Layer Confirmation: X Never ___ Always ___ Sometimes If 'Sometimes', when? ___ Configurable If 'Configurable', how?	

Requires Application Layer Confirmation:

- Never
- Always (not recommended)
- When reporting Event Data (Slave devices only)
- When sending multi-fragment responses (Slave devices only)
- Sometimes If 'Sometimes', when?
- Configurable If 'Configurable', how?

Timeouts while waiting for:

Data Link Confirm	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	Fixed	<input type="checkbox"/>	Variable	<input type="checkbox"/>	Config
Complete Appl. Fragment	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>	Fixed	<input type="checkbox"/>	Variable	<input type="checkbox"/>	Config
Application Confirm	<input type="checkbox"/>	None	<input type="checkbox"/>	Fixed	<input type="checkbox"/>	Variable	<input checked="" type="checkbox"/>	Config
Complete Appl. Response	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	Fixed	<input type="checkbox"/>	Variable	<input type="checkbox"/>	Config
Others	_____							

Attach explanation if 'Variable' or 'Configurable' was checked
(see Note 1 below for explanation)

Sends/Executes Control Operations:

WRITE Binary Outputs	<input checked="" type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
SELECT/OPERATE	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
DIRECT OPERATE	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
DIRECT OPERATE - NO ACK	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Count > 1	<input checked="" type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Pulse On	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Pulse Off	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Latch On	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Latch Off	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Trip/Close	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Queue	<input checked="" type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
Clear Queue	<input checked="" type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config
WRITE Analog Outputs	<input type="checkbox"/>	Never	<input type="checkbox"/>	Always	<input checked="" type="checkbox"/>	Sometimes	<input type="checkbox"/>	Config

Attach explanation if 'Sometimes' or 'Configurable' was checked
(see Note 2 below for explanation)

Maximum Select/Execute Delay Time:

- Not Applicable
- Fixed at _____ seconds
- Configurable, range 1 to 100 seconds

DNP Implementation

FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:	
<p>Master Expects Binary Input Change Events:</p> <p><input type="checkbox"/> Either time-tagged or non-time-tagged for a single event</p> <p><input type="checkbox"/> Both time-tagged and non-time-tagged for a single event</p> <p><input type="checkbox"/> Configurable (attach explanation)</p>	
FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY:	
<p>TimeSynch Information</p> <p>a.) TimeSynch Period</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Fixed at _____ seconds</p> <p><input checked="" type="checkbox"/> Configurable, range 60 to 3600 seconds, then to 60 hours in 1 hour increments</p> <p>b.) Maximum time base drift over a 10 minute interval: _____21_ms (21 ms for real-time clock, < 1 ms for GPS)</p> <p>c.) Maximum Internal Time Reference Error when set via DNP: _____1_ms</p> <p>d.) Maximum Delay Measurement error: _____2_ms</p> <p>e.) Maximum Response time: _____2_ms</p>	
<p>Reports Binary Input Change Events when no specific variation requested:</p> <p><input type="checkbox"/> Never</p> <p><input checked="" type="checkbox"/> Only time-tagged</p> <p><input type="checkbox"/> Only non-time-tagged</p> <p><input type="checkbox"/> Configurable to send both</p>	<p>Reports time-tagged Binary Input Change Events when no specific variation requested:</p> <p><input type="checkbox"/> Never</p> <p><input checked="" type="checkbox"/> Binary Input Change with Time</p> <p><input type="checkbox"/> Bin In Change Relative Time</p> <p><input type="checkbox"/> Configurable (explain)</p>
<p>Sends Unsolicited Responses:</p> <p><input type="checkbox"/> Never</p> <p><input checked="" type="checkbox"/> Configurable (explain)</p> <p><input type="checkbox"/> Only certain objects</p> <p><input type="checkbox"/> Sometimes (explain)</p> <p><input type="checkbox"/> ENABLE/DISABLE UNSOLICITED Function codes supported (see Note 3 below)</p>	<p>Sends Static Data in Unsolicited Responses:</p> <p><input checked="" type="checkbox"/> Never</p> <p><input type="checkbox"/> When Device Restarts</p> <p><input type="checkbox"/> When Status Flags Change</p> <p>No other options are permitted.</p> <p>(see Note 3 below)</p>
<p>Supports Collision Avoidance:</p> <p><input checked="" type="checkbox"/> Never</p> <p><input type="checkbox"/> Always</p> <p><input type="checkbox"/> Configurable (attach explanation)</p>	<p>Collision Avoidance Detection Method:</p> <p><input checked="" type="checkbox"/> Not Applicable</p> <p><input type="checkbox"/> Link Activity</p> <p><input type="checkbox"/> DCD - With aid of external device</p> <p><input type="checkbox"/> DCD - Without aid of external device</p>

<p>Default Counter Object/Variation:</p> <p><input checked="" type="checkbox"/> No Counters Reported</p> <p><input type="checkbox"/> Configurable (explain)</p> <p><input type="checkbox"/> Default Object - 20</p> <p>Default Variation - 5</p> <p><input type="checkbox"/> Point-by-point list attached</p>	<p>Counters Roll Over at:</p> <p><input checked="" type="checkbox"/> No Counters Reported</p> <p><input type="checkbox"/> Configurable (explain)</p> <p><input type="checkbox"/> 16 Bits</p> <p><input type="checkbox"/> 32 Bits</p> <p><input type="checkbox"/> Other Value _____</p> <p><input type="checkbox"/> Point-by-point list attached</p>
<p>Analog Deadbands:</p> <p><input type="checkbox"/> Fixed</p> <p>Configurable:</p> <p><input checked="" type="checkbox"/> Per Point</p> <p><input type="checkbox"/> Per Analog Type</p> <p><input type="checkbox"/> Global</p>	<p>Configurable Analog Deadbands:</p> <p><input type="checkbox"/> Not Applicable</p> <p><input checked="" type="checkbox"/> Configuration Software</p> <p><input type="checkbox"/> Using Object 34 from the master station</p> <p><input type="checkbox"/> Both configuration software and Object 34</p>
<p>Are the updated deadband values preserved through a device reset:</p> <p><input checked="" type="checkbox"/> YES</p> <p><input type="checkbox"/> NO</p>	
<p>The maximum number of objects supported in a single control request for objects 12 and 41.</p> <p>Number of objects allowed for object 12: 1</p> <p>Number of objects allowed for object 41: 1</p>	
<p>Ability for REMOTE/LOCAL control mode:</p> <p><input type="checkbox"/> Not Applicable</p> <p><input type="checkbox"/> Per point</p> <p><input type="checkbox"/> Per object</p> <p><input checked="" type="checkbox"/> Global</p>	<p>Is the Event Buffer size configurable:</p> <p><input checked="" type="checkbox"/> NO fixed size: __64__ each for binary and analog</p> <p><input type="checkbox"/> YES range: _____</p> <p>Configurable Per Class buffer:</p> <p><input checked="" type="checkbox"/> NO</p> <p><input type="checkbox"/> YES</p>
<p>Are the updated ENABLE/DISABLE unsolicited settings saved through a device reset:</p> <p><input type="checkbox"/> YES</p> <p><input checked="" type="checkbox"/> NO</p>	<p>Self Address Support using address 0xFFFC:</p> <p><input checked="" type="checkbox"/> YES (only allowed if configurable)</p> <p><input type="checkbox"/> NO</p>
<p>Source Address Filtering:</p> <p><input checked="" type="checkbox"/> Not Supported</p> <p><input type="checkbox"/> Configurable (attach explanation)</p>	
<p>Sends Multi-Fragment Responses (Slave Only): <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	

NOTE 1: Timeouts While Waiting for Confirmations

When an application layer response confirmation is requested, the Interface Module waits before sending another response/confirmation attempt (if the retry number has not been reached), or stopping the confirmation process.

You can set the *Time Delay Between Retries* with the Setup software or via SCADA. (See the Setup chapter for more details.)

NOTE 2: Control Operations Executed

For all Binary Output Relay operations and Analog Output operations, the allowed control functions are:

- Select/Operate
- Direct Operate
- Direct Operate No Ack

The master station can choose which of these three functions to use at any given time.

The Switch Control ignores the On Time and Off Time values and the Queue and Clear flags in the Control Code.

For more details, see the *Control Relay Output Block* section of the document object library in the *DNP V3.00 Basic 4 Document Set*, available from the DNP Users Group.

NOTE 3: Unsolicited Responses

The Switch Control returns unsolicited responses to the configured master station address when a change occurs in any mapped status point that is configured for event reporting, when the configured deadband is exceeded in any mapped analog input point that is configured for event reporting, or when the configured deadband is exceeded for any mapped counter point that is configured for event reporting.

You can control the delivery of unsolicited response messages by adjusting the *Unsolicited Transmit Delay Event Count* and the *Unsolicited Transmit Delay Time* in the Setup software.

You can enable and disable unsolicited responses from the Setup software or via SCADA (function code 20 to enable, function code 21 to disable).

NOTE 4: Cold Restart

To command an IntelliRupter Cold Restart send DNP Function Code 13 (0x0D). A Cold Restart is similar to what IntelliRupter does when powering up after a long-term power loss. When IntelliRupter receives Function Code 13, it immediately responds with a Delay Time DNP3 object, g52v1, and then initiates the restart. The delay time sent (10 seconds) is the time required for the restart, when IntelliRupter will be unable to respond to DNP requests.

For more details see page 55, of the *DNP3 Specifications, Part I, Application Layer*, dated March 15, 2009 or later.

Implementation Table

This section describes which objects and requests this implementation accepts and which responses are returned. Object, Variation, and Qualifier Codes in the request must exactly match what is expected. All application layer responses use the standard response function code 129. Unsolicited responses, if configured, will always use function code 130. Included in the table is the default variation returned if no specific variation is requested. This also applies to Class data and unsolicited reports where applicable.

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
1	0	Binary Input - All Variations	1	06	01
1	1	Binary Input	1	06	
1	2	Binary Input with Status	1	06	
2	0	Binary Input Change - All Variations	1	06,07,08	02
2	1	Binary Input Change without Time	1	06,07,08	
2	2	Binary Input Change with Time	1	06,07,08	
2	3	Binary Input Change with Relative Time (object parsed but no data to return)	1	06,07,08	
10	0	Binary Output - All Variations	1	06	02
10	1	Binary Output (object parsed but WRITE not used)			
10	2	Binary Output Status (only the on-line bit is used)	1	06	
12	0	Control Block - All Variations			
12	1	Control Relay Output Block	3,4,5,6	17,28	echo of request
12	2	Pattern Control Block			
12	3	Pattern Mask			

DNP Implementation

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
20	0	Binary Counter - All Variations			
20	1	32-Bit Binary Counter			
20	2	16-Bit Binary Counter			
20	3	32-Bit Delta Counter			
20	4	16-Bit Delta Counter			
20	5	32-Bit Binary Counter without Flag			
20	6	16-Bit Binary Counter without Flag			
20	7	32-Bit Delta Counter without Flag			
20	8	16-Bit Delta Counter without Flag			
21	0	Frozen Counter - All Variations			
21	1	32-Bit Frozen Counter			
21	2	16-Bit Frozen Counter			
21	3	32-Bit Frozen Delta Counter			
21	4	16-Bit Frozen Delta Counter			
21	5	32-Bit Frozen Counter with Time of Freeze			
21	6	16-Bit Frozen Counter with Time of Freeze			
21	7	32-Bit Frozen Delta Counter with Time of Freeze			
21	8	16-Bit Frozen Delta Counter with Time of Freeze			
21	9	32-Bit Frozen Counter without Flag			
21	10	16-Bit Frozen Counter without Flag			
21	11	32-Bit Frozen Delta Counter without Flag			
21	12	16-Bit Frozen Delta Counter without Flag			

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
22	0	Counter Change Event - All Variations			
22	1	32-Bit Counter Change Event without Time			
22	2	16-Bit Counter Change Event without Time			
22	3	32-Bit Delta Counter Change Event w/o Time			
22	4	16-Bit Delta Counter Change Event w/o Time			
22	5	32-Bit Counter Change Event with Time			
22	6	16-Bit Counter Change Event with Time			
22	7	32-Bit Delta Counter Change Event w/ Time			
22	8	16-Bit Delta Counter Change Event w/ Time			
23	0	Frozen Counter Event - All Variations			
23	1	32-Bit Frozen Counter Event without Time			
23	2	16-Bit Frozen Counter Event without Time			
23	3	32-Bit Frozen Delta Counter Event w/o Time			
23	4	16-Bit Frozen Delta Counter Event w/o Time			
23	5	32-Bit Frozen Counter Event with Time			
23	6	16-Bit Frozen Counter Event with Time			
23	7	32-Bit Frozen Delta Counter Event w/ Time			
23	8	16-Bit Frozen Delta Counter Event w/ Time			
30	0	Analog Input - All Variations	1	06	04
30	1	32-Bit Analog Input	1	06	
30	2	16-Bit Analog Input	1	06	
30	3	32-Bit Analog Input without Flag	1	06	

DNP Implementation

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
30	4	16-Bit Analog Input without Flag	1	06	
31	0	Frozen Analog Input - All Variations			
31	1	32-Bit Frozen Analog Input			
31	2	16-Bit Frozen Analog Input			
31	3	32-Bit Frozen Analog Input with Time of Freeze			
31	4	16-Bit Frozen Analog Input with Time of Freeze			
31	5	32-Bit Frozen Analog Input without Flag			
31	6	16-Bit Frozen Analog Input without Flag			
32	0	Analog Change Event - All Variations	1	06,07,08	02
32	1	32-Bit Analog Change Event without Time	1	06,07,08	
32	2	16-Bit Analog Change Event without Time	1	06,07,08	
32	3	32-Bit Analog Change Event with Time	1	06,07,08	
32	4	16-Bit Analog Change Event with Time	1	06,07,08	
33	0	Frozen Analog Event - All Variations			
33	1	32-Bit Frozen Analog Event without Time			
33	2	16-Bit Frozen Analog Event without Time			
33	3	32-Bit Frozen Analog Event with Time			
33	4	16-Bit Frozen Analog Event with Time			
40	0	Analog Output Status - All Variations	1	06	02
40	1	32-Bit Analog Output Status	1	06	
40	2	16-Bit Analog Output Status	1	06	

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
41	0	Analog Output Block - All Variations			
41	1	32-Bit Analog Output Block	3,4,5,6	17,28	echo of request
41	2	16-Bit Analog Output Block	3,4,5,6	17,28	echo of request
50	0	Time and Date - All Variations			
50	1	Time and Date	2	07 where quantity=1	
50	2	Time and Date with Interval			
51	0	Time and Date CTO - All Variations			
51	1	Time and Date CTO			
51	2	Unsynchronized Time and Date CTO			
52	0	Time Delay - All Variations			
52	1	Time Delay Coarse (response for a restart request)	13		
52	2	Time Delay Fine (response for a delay measure request)	23		
60	1	Class 0 Data	1	06	
60	2	Class 1 Data	1	06,07,08	
60	3	Class 2 Data	1	06,07,08	
60	4	Class 3 Data	1	06,07,08	
80	1	Internal Indications	2	00 index=7	
81	1	Storage Object			
82	1	Device Profile			
83	1	Private Registration Object			
83	2	Private Registration Object Descriptor			

DNP Implementation

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
90	1	Application Identifier			
100	1	Short Floating Point			
100	2	Long Floating Point			
100	3	Extended Floating Point			
101	1	Small Packed Binary-Coded Decimal			
101	2	Medium Packed Binary-Coded Decimal			
101	3	Large Packed Binary-Coded Decimal			
102	0	8-Bit Unsigned Integer			
102	1	8-Bit Unsigned Integer	1,2	03,04,05	
No Object			13		
No Object			23		