PG&E Points List for Universal Controls

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PG&E Points List for 6802/3 Universal Controls

This instruction sheet provides PG&E points and PG&E implementation information for S&C 6802/3 Universal Automatic Switch Controls applied in an S&C IntelliTeam® SG Automatic Restoration System.

This Points List section is used with **SG68023UInstaller-7.3.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.

The PG&E master station should define 6802/3 Controls with the following **Status**, **Analog Input**, **Supervisory Control**, **Pulse Accumulator,** and **Pulse Accumulator Buffer** points:

Point	Count
Status	101
13-Bit Analog Input	54
Supervisory Control	27
16-Bit Pulse Accumulator	16
16-Bit Pulse Accumulator Buffer	16

The available PG&E points are listed in Tables 1 through 5 on pages 3 through 15 in the same order they are presented for selection on the *Setup>Communication>Point Mapping* screens. 6802/3 **Status**, **Analog Input**, and **Control** points can be assigned to any SCADA PG&E point index. Point descriptions begin with a code number used to find the detailed definition in this instruction sheet. Refer to the Communication Setup section of S&C Instruction Sheet 1045-530, "S&C 6800 Series Automatic Switch Control: *Setup*." The code number for each point description is listed in Instruction Sheet 1045-560F (this publication) and is not the SCADA PG&E point index.

For a specific SCADA system, typically all 6802/3 Switch Controls operate with the same PG&E point index configuration.

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

NOTICE
The source address in IntelliLink® Setup Software is now 65432 instead of 1.

Both a Basic Scan request (for all data types) and a Scan Inclusive request (that covers sequence numbers 0 to 0xFF) can generate a large response. When the control is configured in such a way that the total response length exceeds 255 bytes (246 data + 7 header + 2 CRC), the control will not respond or will partially respond to the request.

Status points are sent in groups of 2 bytes for every 16 status points. Analog points will add 2 bytes each. 2-bit status-with-change points are sent in groups of 2 bytes for every 8 status points. Status Point Counters are sent in groups of 16 bytes for every 16 status points. Pulse Accumulators will add 2 bytes each, and pulse accumulator buffers will add 2 bytes each for every pulse accumulator.

As an example, the response length for a configuration that includes all 92 status points, all 50 analog points, and all 15 counters is 301 bytes. The control will partially respond to a Basic Scan or Scan Inclusive request for this configuration. Conversely, a configuration with 92 status points, 50 analog points, and 3 counters will be 253 bytes and is fully responded to.

Basic Scan Request

A Basic Scan request with command 0xD7 is equivalent to a Scan Inclusive request with start sequence of 0x00 and end sequence 0xFF. Two Basic Scan requests, each returning less than 246 bytes, are required. One possibility could be a Basic Scan request for simple status, status counter and 2-bit status points and a second Basic Scan request for 13-bit analog, 16-bit pulse accumulator and 16-bit pulse accumulator buffer points.

Scan Inclusive Request

To retrieve all data, a Scan Inclusive request with start sequence 0x00 to end sequence 0xFF has to be broken into two requests. The first Scan Inclusive request will have a start sequence number 0x00 to end sequence number 0x7F. The second could either be a Basic Analog Scan or Scan Inclusive request specifying a start sequence of 0x80 to end sequence of 0xFF.

The 6802/3 and 6803 Automatic Switch Control features have multiple status points:

Open or Close: 1-5   **IntelliTeam System Operation**: 44-60, 75-77

Netlist Information: 71-74

Table 1. 6802/3U Status Points

Code #	Name—Definition
1	**Switch 1 Open**—On when contact status is **Open**. Otherwise, off.
2	**Switch 2 Open**—On when contact status is **Open**. Otherwise, off.
4	**Switch 1 Closed**—On when contact status is **Closed**. Otherwise, off.
5	**Switch 2 Closed**—On when contact status is **Closed**. Otherwise, off.
7	**Switch 1 Disabled**—On when switch operation is in the **Disabled** state, which reports when **Battery Bad** (Status Point 17) is on. Otherwise, off.
8	**Switch 2 Disabled**—As noted in Status Point 7, for Switch 2.
9	**Automatic Operation Enabled**—On when the **Automatic Operation** mode is enabled using either the faceplate switch or a SCADA command. Otherwise, off.
10	**Automatic Operation enabled for Switch 1**—On when the **Automatic Operation** mode is enabled using either the faceplate switch or a SCADA command. Otherwise, off. This point is only applicable when Status Point 9 is enabled.
11	**Automatic Operation enabled for Switch 2**—On when the **Automatic Operation** mode is enabled using either the faceplate switch or a SCADA command. Otherwise, off. This point is only applicable when Status Point 9 is enabled.
12	**SCADA Control Enabled**—On when the SCADA CONTROL faceplate switch is set to the **Remote** position. Otherwise, off.
13	**Overcurrent Fault Detected, Switch 1**—On when the fault-detection circuitry registers an **Overcurrent Fault** condition. Off when cleared by the **Fault Indicator Reset Strategy** setting configured on the *Setup> General>Fault Detection* screen. Also off when manually cleared with the **Clear Faults** command in the LCD menu, the **Clear Faults** button on the *Setup>Site Related* screen, the faceplate/screenset pre-assigned USER COMMAND button, or the **Clear any Outstanding Overcurrent Fault Conditions Present** control point. The **Overcurrent Fault** condition also clears when the switch control is reinitialized using IntelliLink Setup Software or a SCADA reset command.
14	**Overcurrent Fault Detected, Switch 2**—As noted in Status Point 13, for Switch 2. Otherwise, off.
15	**Sectionalizer Tripped, Switch 1**—On when any **Automatic Control** function opens the switch. The point is cleared when the switch is closed for any reason. It is also cleared on reinitialization of the switch control using the setup software or when the SCADA CONTROL switch state is changed. Otherwise, off.
16	**Sectionalizer Tripped, Switch 2**—As noted in Status Point 15, for Switch 2. Otherwise, off.
17	**Battery Bad**—On when battery replacement is required unless the switch control is operating or has recently been operating on battery power. Otherwise, off.
18	**Maintenance Required**—On when some form of maintenance (other than battery replacement) is required. It is set when the battery charger stops functioning because of overvoltage or when the switch open/close contacts are not mutually exclusive. This is a summary point. An inspection of other status points can determine the exact cause. Otherwise, off.
19	**Open/Close Indication is Inconsistent, Switch 1**—On when both contacts are closed or open. Otherwise, off.
20	**Open/Close Indication is Inconsistent, Switch 2**—On when both contacts are closed or open. Otherwise, off.

TABLE CONTINUED ▶

Table 1. 6802/3U Status Points—Continued

Code #	Name—Definition
21	**Control Power On—**On when ac power is available to the control. Otherwise, off.
22	**Failure Override Set—**On when a SCADA operator executes the **Failure Override Latch-On** command to let the switch be operated even if the battery is bad. The point remains on until the override is disabled using the **Failure Override Latch-Off** command. Also, the point will go off and the **Failure Override** command will become disabled after a 15-minute timeout if it was not already turned off by the **Latch-Off** command. Otherwise, off.
23	**Battery System Low—**On when battery voltage is low but the switch will operate. Otherwise, off.
24	**Battery Charger Failed—**On when the charging voltage applied to the battery system is too high and the charger is turned off. Otherwise, off.
25	**Battery Test in Progress—**On when the switch control is automatically testing the batteries at periodic intervals. Battery voltage fluctuates during the test. Otherwise, off.
26	**Cabinet Door Open—**On when the enclosure door is open. When the door is closed, this point is off and all power to the faceplate LEDs is turned off. Otherwise, off.
27	**Temperature Sensor Bad—**On when the temperature sensor is reading out of range. Temperature-related correction factors will not be accurate when the sensor is incorrect. Otherwise, off.
28	**Phase A Overcurrent Fault, Switch 1—**On when the fault-detection circuitry registers an **Overcurrent Fault** condition. Off when cleared by the **Fault Indicator Reset Strategy** setting configured on the *Setup>General>Fault Detection* screen. Also off when manually cleared with the **Clear Faults** command in the LCD menu, the **Clear Faults** button on the *Setup>Site Related* screen, the faceplate/screenset pre-assigned USER COMMAND button, or the **Clear any Outstanding Overcurrent Fault Conditions Present** control point. The **Overcurrent Fault** condition also clears when the switch control is reinitialized using IntelliLink Setup Software or a SCADA reset command.
29	**Phase A Overcurrent Fault, Switch 2—**As noted in Status Point 28, for Phase B, Switch 2. Otherwise, off.
30	**Phase B Overcurrent Fault, Switch 1—**As noted in Status Point 28, for Phase B, Switch 1. Otherwise, off.
31	**Phase B Overcurrent Fault, Switch 2—**As noted in Status Point 28, for Phase B, Switch 2. Otherwise, off.
32	**Phase C Overcurrent Fault, Switch 1—**As noted in Status Point 28, for Phase C, Switch 1. Otherwise, off.
33	**Phase C Overcurrent Fault, Switch 2—**As noted in Status Point 28, for Phase C, Switch 2. Otherwise, off.
34	**Overcurrent Ground Fault, Switch 1—**As noted in Status Point 28, for ground, Switch 1. Otherwise, off.
35	**Overcurrent Ground Fault, Switch 2—**As noted in Status Point 28, for ground, Switch 2. Otherwise, off.
36	**Loss of Voltage on Any Configured Voltage Channel, Switch 1—**On when the voltage sensor on a configured voltage channel shows a **Loss of Voltage** status. For example, pad-mounted gear may be configures with three voltage sensors or six voltage sensors. Otherwise, off.
37	**Loss of Voltage on Any Configured Voltage Channel, Switch 2—**On when the voltage sensor on a configured voltage channel shows a **Loss of Voltage** status. For example, pad-mounted gear may be configures with three voltage sensors or six voltage sensors. Otherwise, off.
38	**Phase A Reverse Current, Switch 1—**On when the current on Phase A is flowing in the direction opposite to the **Normal Direction** setting configured in the switch control. The switch control identifies a **Reverse Current** condition when the voltage-current phase angle deviates more than 90 degrees from the value set during installation for the **Unity Power Factor** setpoint. Otherwise, off.
39	**Phase B Reverse Current, Switch 1—**As noted in Status Point 38, for Phase B, Switch 1. Otherwise, off.
40	**Phase C Reverse Current, Switch 1—**As noted in Status Point 38, for Phase C, Switch 1. Otherwise, off.

Table 1. 6802/3U Status Points—Continued

Code #	Name—Definition
41	**Phase A Reverse Current, Switch 2**—On when the current on Phase A is flowing in the direction opposite to the **Normal Direction** setting configured in the switch control. The switch control identifies a **Reverse Current** condition when the voltage-current phase angle deviates more than 90 degrees from the value set during installation for the **Unity Power Factor** setpoint. Otherwise, off.
42	**Phase B Reverse Current, Switch 2**—As noted in Status Point 41, for Phase B, Switch 2. Otherwise, off.
43	**Phase C Reverse Current, Switch 2**—As noted in Status Point 41, for Phase C, Switch 2. Otherwise, off.
44	**Switch Control Not Transfer Ready**—Active only for the reporting switch control. On when a switch operation is not consistent with the expected team operation (i.e. incomplete or manual switch operation). This point is also on if any of these status points are on: **Switch Disabled** (Status Points 7 and 8), **Automatic Operation Disabled** (status point 9), or **Switch Position Inconsistent** (Status Points 19 and 20). This point is used in conjunction with **Not All Teams Transfer Ready** (Status Point 45) to identify the specific team member where a problem exists. Otherwise, off.
45	**Not All Teams Transfer Ready**—On when any teams in which this switch control participates are **Not Transfer Ready** (Status Point 44). This may be because of an individual team member condition, team-wide conditions such as isolating a fault, team configuration or coordination problems, **Restoration Prohibited** (Status Point 49), or the **Team Logic** setting is set to the **Disabled** state on the *Team>Setup* screen. If Status Point 44 is on in one team member, Status Point 45 is also on in the other team members. Otherwise, off. **Note:** Unless otherwise prohibited, team member controls revert to standalone sectionalizing logic when the **Not Transfer Ready** state (this status point) is active in all teams in which that control participates, whether because of local conditions or conditions at adjacent team members.
46	**Automatic Transfer Operation in Progress**—On when any team defined in the control is actively performing an **Automatic Transfer** operation. Otherwise, off.
47	**Automatic Return to Normal Operation in Progress**—On when any team defined in the control is actively performing a **Return-to-Normal** operation. Otherwise, off.
48	**Setup Data Revision**—On when the configuration entries for any enabled team defined in the control are modified. It remains on until the **Team Setup** parameter on the *Setup>Team* screen has been changed from **Stopped** mode back to **Running** mode for any team where the configuration entries have been changed. Otherwise, off.
49	**Restoration Prohibited by SCADA**—On when the **Prohibit Load Restoration Latch On** command (control point 13) is received, the **IntelliTeam SG Restoration** mode is disabled using the *IntelliTeam SG>Team Summary* screen, or the **Automatic Operation** mode is set to the **Prohibited** state on the front panel. When this point is on, no switch in any team in which this switch control participates will be allowed to automatically close, preventing automatic load restoration. This point is off when the **Prohibit Load Restoration Latch Off** command (control point 13) is received, the **IntelliTeam SG Restoration** mode is enabled using the *IntelliTeam SG>Team Summary* screen, or the **Automatic Operation** mode is enabled using the front panel. Otherwise, off.
50	**Restoration Prohibited by Team Timer**—On when the **Team Transfer Process** timer expires in this control, resulting in the **Prohibit Restoration** mode being enabled for at least one of the teams in which this control participates. Only the team for which this timer has expired is prohibited from further automatic load restoration. This point is cleared when **Prohibit Load Restoration Latch Off** (control point 12) is received or the **IntelliTeam SG Restoration** feature is enabled using the *IntelliTeam SG>Team Summary* screen. Otherwise, off.
51	**Source Loading Data is Active**—On when the real-time feeder loading logic is active and in use. This point does not indicate whether the control is using actual real-time feeder-loading data received from a DNP master or the **Default Source Segment Loading** setting. Otherwise, off.
52	**Real-Time Load Data May be Old or Abnormal**—On when the received DNP analog output value is less than the real-time three-phase load as sensed by the switch. It is also set if the real-time feeder-loading data have not updated within the configured time interval. Off when new data are received and the analog value is equal to or greater than the local measured load. Otherwise, off.

Table 1. 6802/3U Status Points—Continued

Code #	Name—Definition
53	**Team 1 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
54	**Team 2 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
55	**Team 3 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
56	**Team 4 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
57	**Team 5 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
58	**Team 6 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
59	**Team 7 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
60	**Team 8 in Ready—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
61	**Loss of Voltage on Any Phase, Switch I—**On when voltage is off on any phase. Otherwise, off.
62	**Overcurrent Fault on Any Phase, Switch I—**On when fault current is sensed on any phase. Otherwise, off.
63	**Switch 1 Tripped to Lockout—**On when Switch 1 is in the **Locked Out** state as the result of an event. The IntelliTeam system may begin the reconfiguration process. Off when the **Close Switch 1** command is given. Otherwise, off.
64	**Manual Operation Detected for Switch 1—**On when the IntelliTeam system senses that the switch has been operated manually. Otherwise, off.
65	**IntelliTeam Interface Module, IIM Switch1 Switch Status Open—**Indicates the IntelliTeam system has properly received the switch status. This point should always agree with status point 1, **Switch 1 Open**.
66	**Loss of Voltage on Any Phase, Switch 2—**On when voltage is off on any phase. Otherwise, off.
67	**Overcurrent Fault on Any Phase, Switch 2—**On when fault current is sensed on any phase. Otherwise, off.
68	**Switch 2 Tripped to Lockout—**On when Switch 2 is in the **Locked Out** state as the result of an event. The IntelliTeam system may begin the reconfiguration process. Off when the **Close Switch 2** command is given. Otherwise, off.
69	**Manual Operation Detected for Switch 2—**On when the IntelliTeam system senses that the switch has been operated manually. Otherwise, off.
70	**IntelliTeam Interface Module, IIM Switch 2 Switch Status Open—**Indicates the IntelliTeam system has properly received the switch status. This point should always agree with **Switch 2 Open**. (Status Point 2).
71	**Netlist Missing Runners—**On when the received runner count doesn't match the expected runner count. The **Rapid Self Healing** feature is disabled as long as this is the case. Otherwise, off.
72	**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. Otherwise, off.
73	**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. Otherwise, off.

Table 1. 6802/3U Status Points—Continued

Code #	Name—Definition
74	**Netlist Propagation Enabled—**On when the IntelliLink software screenset or SCADA enables Netlist propagation. Otherwise, off. (From Revision 7.1.x, the **Netlist Propagation** mode is always in the **Enabled** state; therefore, this status point is always on.)
75	**IntelliTeam II Mode Active—**On when IntelliTeam II software is in use. Otherwise, off.
76	**IT Out of Normal S1 State—**On when the switch is not in the **Normally Open** or **Normally Closed** state for the IntelliTeam system. Off when the switch is in the **Normally Open** or **Normally Closed** state for the IntelliTeam system. Otherwise, off.
77	**IT Out of Normal S2 State—**On when the switch is not in the **Normally Open** or **Normally Closed** state for the IntelliTeam system. Off when the switch is in the **Normally Open** or **Normally Closed** state for the IntelliTeam system. Otherwise, off.
78	**Switch 1 PLI Open—**On when the switch has been opened by the **Phase Loss Isolation** (PLI) logic. Otherwise, off.
79	**AC Power Not Present—**On when ac power is not available to the control. Otherwise, off.
80	**Battery Disconnected—**On when battery is disconnected. Otherwise, off.
81	**Site Acceptance Test in Progress—**On when SAT Script has been received and the SAT Manager issues a **Start Test** command. Otherwise, off.
82	**Site Acceptance Test: Switch 1 Closed—**On when the SAT process sees a **Closed** state for Switch 1. Otherwise, off.
83	**Site Acceptance Test: Switch 1 Open—**On when the SAT process sees an **Open** state for Switch 1. Otherwise, off.
84	**Site Acceptance Test: Test Prohibited Locally—**On when the IntelliLink screenset locally prohibits all SAT activity. All requests issued from the SAT Manager are ignored. Otherwise, off.
85	**Site Acceptance Test: Switch 2 Closed—**On when the SAT process sees a **Closed** state for Switch 2. Otherwise, off.
86	**Site Acceptance Test: Switch 2 Open—**On when the SAT process sees an **Open** state for Switch 2. Otherwise, off.
87	**Site Acceptance Test: Ignore Open Disconnect—**On when the SAT Manager issues an **Ignore Open Disconnect** command. Otherwise, off.
88	**Wi-Fi Is Connected—**On when a Wi-Fi connection to the control is established. Otherwise, off.
89	**Wi-Fi Intrusion Alarm—**On when the Wi-Fi module reports a replay attack or improper authentication. Turned off by the user with **Clear Wi-Fi Intrusion Alarm** (Control Point 20).
90	**Wi-Fi Disabled by SCADA—**On when **Disable Wi-Fi** (Control Point 17) is received. Off when **Enable Wi-Fi** (Control Point 18) is received. **Enable/Disable Wi-Fi** (Control Point 15) toggles Wi-Fi communication on and off; on when Wi-Fi is disabled and off when Wi-Fi is enabled. Otherwise, off.
91	**Switch 2 PLI Open—**On when the switch has been opened by the **Phase Loss Isolation** (PLI) logic. Otherwise, off.
92	**Alarm—**On when any alarm is active. Otherwise, off.
93	**Warning—**On when any warning is active. Otherwise, off.
94	**Error—**On when any error is active. Turned off by a user action to clear the error.
95	**Switch 1 Phase A Loss of Voltage—**On when Phase A voltage falls below the configured **Loss of Voltage Threshold** setting. Otherwise, off.
96	**Switch 1 Phase B Loss of Voltage—**Same as noted in Status Point 95 for Phase B.
97	**Switch 1 Phase C Loss of Voltage—**Same as noted in Status Point 95 for Phase C.
98	**Switch 2 Phase A Loss of Voltage—**Same as noted in Status Point 95 for Phase A.

Table 1. 6802/3U Status Points—Continued

Code #	Name—Definition
99	**Switch 2 Phase B Loss of Voltage—**Same as noted in Status Point 95 for Phase B.
100	**Switch 2 Phase C Loss of Voltage—**Same as noted in Status Point 95 for Phase C.
101	**Comm System has Poor Quality—**On when the **Bad Health** alarm is active on the *Link Keep Alive Tests* screen and/or the *Diagnostic Communications Tests* screen. Otherwise, off.

Table 2. 6802/3U Analog Input Points

Code #	Name—Definition
1	**90% Voltage Reference Standard—**This is a constant representing 90% of the full-scale value.
2	**0% Voltage Reference Standard—**This is a constant representing the zero value.
3	**Neutral Current of Switch 1—**Taken as the vector sum of the phase currents on Phases A, B, and C. Current is measured using true RMS techniques. Each count equals one ampere.
4	**Current, Phase A Switch 1—**Single-phase true RMS current measured on Phase A. Each count equals one ampere.
5	**Current, Phase B Switch 1—**Single-phase true RMS current measured on Phase B. Each count equals one ampere.
6	**Current, Phase C Switch 1—**Single-phase true RMS current measured on Phase C. Each count equals one ampere.
7	**Neutral Current of Switch 2—**Taken as the vector sum of the phase currents on Phases A, B, and C. Current is measured using true RMS techniques. Each count equals one ampere.
8	**Current, Phase A Switch 2—**Single-phase true RMS current measured on Phase A. Each count equals one ampere.
9	**Current, Phase B Switch 2—**Single-phase true RMS current measured on Phase B. Each count equals one ampere.
10	**Current, Phase C Switch 2—**Single-phase true RMS current measured on Phase C. Each count equals one ampere.
15	**Voltage, Phase A Switch 1—**Single-phase voltage measured on Phase A of Switch 1. Voltage is measured using true RMS techniques and scaled to yield a nominal value of 120 Vac. Configuration of the switch control at installation provides the scaling factors such as voltage transformer turn ratio, etc. In cases where loads are connected in a delta (phase-to-phase) configuration, the switch control sensor conditioning module is jumpered to yield phase-to-phase voltage readings. Voltage is reported in units of one sensor count equals 0.1 Vac RMS.
16	**Voltage, Phase B Switch 1—**Phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole B, Switch 1. Each count equals 0.1 Vac RMS.
17	**Voltage, Phase C Switch 1—**Phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole C, Switch 1. Each count equals 0.1 Vac RMS.
18	**Voltage, Phase A Switch 2—**Phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole A, Switch 2. Each count equals 0.1 Vac RMS.
19	**Voltage, Phase B Switch 2—**Phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole B, Switch 2. Each count equals 0.1 Vac RMS.
20	**Voltage, Phase C Switch 2—**Phase-to-ground or phase-to-phase voltage (depending on setup) measured on Pole C, Switch 3. Each count equals 0.1 Vac RMS.
21	**Phase Angle, on Phase A Switch 1—**Each count equals 0.125 degree.
22	**Phase Angle, on Phase B Switch 1—**Each count equals 0.125 degree.
23	**Phase Angle, on Phase C Switch 1—**Each count equals 0.125 degree.
24	**Phase Angle, on Phase A Switch 2—**Each count equals 0.125 degree.
25	**Phase Angle, on Phase B Switch 2—**Each count equals 0.125 degree.

Table 2. 6802/3U Analog Input Points—Continued

Code #	Name—Definition
26	**Phase Angle, on Phase C Switch 2**—Each count equals 0.125 degree.
27	**Single-Phase kvars, Phase A Switch 1**—Kvars (volt-amperes, reactive) are calculated from single-phase true RMS voltage and current sensor values and the respective voltage-current phase angle. Each count equals one kvar.
28	**Single-Phase kvars, Phase B Switch 1**—As noted in Analog Input Point 27.
29	**Single-Phase kvars, Phase C Switch 1**—As noted in Analog Input Point 27.
30	**Single-Phase kVARs, Phase A Switch 2**—As noted in Analog Input Point 27.
31	**Single-Phase kVARs, Phase B Switch 2**—As noted in Analog Input Point 27.
32	**Single-Phase kVARs, Phase C Switch 2**—As noted in Analog Input Point 27.
33	**Cabinet Temperature**—In units of degrees Fahrenheit.
34	**Battery Voltage**—Nominally 24 Vdc. If ac power is on, this value is updated only during battery testing. If ac power is off, this value is continuously updated. One count equals 0.035 Vdc.
35	**Single-Phase kW, Phase A Switch 1**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
36	**Single-Phase kW, Phase B Switch 1**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
37	**Single-Phase kW, Phase C Switch 1**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
38	**Single-Phase kVA Phase A Switch 1**—Each count equals one kVA.
39	**Single-Phase kVA Phase B Switch 1**—Each count equals one kVA.
40	**Single-Phase kVA Phase C Switch 1**—Each count equals one kVA.
41	**Single-Phase kW, Phase A Switch 2**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
42	**Single-Phase kW, Phase B Switch 2**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
43	**Single-Phase kW, Phase C Switch 2**—Calculated using instantaneous voltage and current, and the respective voltage-current phase angle. Each count equals one kW.
44	**Single-Phase kVA Phase A Switch 2**—Each count equals one kVA.
45	**Single-Phase kVA Phase B Switch 2**—Each count equals one kVA.
46	**Single-Phase kVA Phase C Switch 2**—Each count equals one kVA.
47	**Total kvars Switch 1**—Sum of kvar Phase A, kvar Phase B, and kvar Phase C. Each count equals one kvar.
48	**Total kvars Switch 2**—Sum of kvar Phase A, kvar Phase B, and kvar Phase C. Each count equals one kvar.
49	**Total kW Switch 1**—Sum of kW Phase A, kW Phase B, and kW Phase C. Each count equals one kW.

Table 2. 6802/3U Analog Input Points—Continued

Code #	Name—Definition
50	**Total kW Switch 2—**Sum of kW Phase A, kW Phase B, and kW Phase C. Each count equals one kW.
51	**Total kVA Switch 1—**Sum of kVA Phase A, kVA Phase B, and kVA Phase C. Each count equals one kVA.
52	**Total kVA Switch 2—**Sum of kVA Phase A, kVA Phase B, and kVA Phase C. Each count equals one kVA.
53	**Average Three-Phase Current Switch 1—**Average of Phase A Current, Phase B Current, and Phase C Current. Each count equals one ampere.
54	**Average Three-Phase Current Switch 2—**Average of Phase A Current, Phase B Current, and Phase C Current. Each count equals one ampere.

The object type must be configured on the *Setup>Point Mapping>Controls* 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.

Control Points related to **Open** or **Close** commands: 1–5.

Control Points related to IntelliTeam SG system: 11–13

Table 3. 6802/3U Supervisory Control Points

Code #	Name—Definition
1	**Open or Close Switch 1—SCADA—**Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point, followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to open the switch. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point, followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to close the switch.
2	**Open or Close Switch 2—SCADA—**Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point, followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to open the switch. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point, followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to close the switch.
4	**Issue the Shots-to-Lockout command to Switch 1—**Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to issue the command.
5	**Issue the Shots-to-Lockout command to Switch 2—**Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to issue the command. **Note:** (Codes 1–5): These commands are ignored and return an error if a **Bad Battery** condition is active and the **Failure Override** command has not been issued, or the external LOCAL/REMOTE switch in the motor operator cabinet associated with the intended position is set to the **Local** position. These commands are ignored if the LOCAL/REMOTE switch is not in the **Remote** position.
6	**Clear any outstanding Overcurrent Fault conditions present—**Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear an **Overcurrent Fault** condition. The fault condition otherwise remains active until cleared by the **Fault Indicator Reset Strategy** setting selected on the *Setup>General>Fault Detection* screen.
7	**Enable/Disable Failure Override status—**Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Failure Override** status. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Failure Override** status. This allows **Open** and **Close** commands to be processed even if the **Switch Not Ready** condition is active.
8	**Enable/Disable Automatic Operation—**Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Automatic Operation** feature— or issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Automatic Operation** feature. In **Automatic** mode, the switch control automatically opens the switch if a preconfigured recloser sequence is recognized after a detected fault. **Note:** The **Automatic Operation** state is not disabled when the faceplate REMOTE/LOCAL switch is set to **Local** operation.

Table 3. 6802/3U Supervisory Control Points—Continued

Code #	Name—Definition
9	**Enable/Disable Automatic Operation, Switch 1**—Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Automatic Operation** feature. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Automatic Operation** feature.
10	**Enable/Disable Automatic Operation, Switch 2**—Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Automatic Operation** feature. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Automatic Operation** feature.
11	**IntelliTeam Clear Manual Operation Status—SCADA**—Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear a **Manual Operation Status** condition. This allows the IntelliTeam system to return to the **Ready** state, provided the switches are in the **Normally Open** or **Normally Closed** state for the IntelliTeam SG system.
13	**IntelliTeam Prohibit Restoration**—Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Prohibit Automatic Restoration** function. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Prohibit Automatic Restoration** function. When latched, this command will prevent the local switch and any switches in any team in which this switch control participates from automatically closing to restore load under any circumstances.
14	**Netlist Propagation Enable/Disable**—Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable the **Netlist Propagation** feature. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable the **Netlist Propagation** feature. When enabled, new Netlist requests and Netlist transmissions are allowed. When disabled, multiple downloads of a Netlist can be sent to a local control. (From Revision 7.1.x, the **Netlist Propagation** mode is always in the **Enabled** state; therefore, this control point does not operate.)
15	**Wi-Fi Enable/Disable**— Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable local Wi-Fi communication. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable local Wi-Fi communication.
16	**Start Battery Test—SCADA**—Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to start the battery test. 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 the battery condition.
17	**Wi-Fi Disable**—Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to disable local Wi-Fi communication.

TABLE CONTINUED ▶

Table 3. 6802/3U Supervisory Control Points—Continued

Code #	Name—Definition
18	**Wi-Fi Enable**—Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to enable local Wi-Fi communication.
19	**Wi-Fi Test**—Activates Wi-Fi beacon transmitter for troubleshooting purposes. Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** command (Function 10, Command 22) to test Wi-Fi. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** command (Function 10, Command 22) to test Wi-Fi.
20	**Clear Wi-Fi Intrusion Alarm**—Issue a **Control-Select-Open** command (Function 10, Command 10) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear an active **Wi-Fi Intrusion** alarm. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear an active **Wi-Fi Intrusion** alarm.
21	**Clear Errors**—Clears all error flags. Alarms and warnings are not affected. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear all **Error** conditions.
22	**Clear Warnings**—Clears all warning flags. Errors and alarms are not affected. The **Active Warnings** function will reassert in approximately one second. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear all **Warning** conditions.
23	**Clear Alarms**—Clears all alarm flags. Errors and warnings are not affected. The **Active Alarms** function will reassert in approximately one second. Issue a **Control-Select-Close** command (Function 10, Command 11) on the control point followed by a **Control-Operate** operation (Function 10, Command 20) or a **Pulse Select Point** operation (Function 10, Command 22) to clear all **Alarm** conditions.
24	**Clear OC Faults Switch 1**—Clears the **Overcurrent Fault** status for Switch 1.
25	**Clear OC Faults Switch 2**—Clears the **Overcurrent Fault** status for Switch 2.
26	**Manual Operation Status Switch 1**—Clears the **Manual Operation** status for Switch 1.
27	**Manual Operation Status Switch 2**—Clears the **Manual Operation** status for Switch 2.

These are 16-bit counters and will overflow back to zero at 65,536.

Table 4. 6802/3U 16-Bit Pulse Accumulator Points

Code #	Name—Definition
1	**Operation Count Switch 1—**This is the number of switch operations. The counter is incremented on each **Close** operation.
2	**Operation Count Switch 2—**This is the number of switch operations. The counter is incremented on each **Close** operation.
4	**New Coach Generated on Team—**This is the number of coach generations on the team. The counter is incremented on each coach generation.
5	**Team Communication Problem—**This is the number of communication problems. The counter is incremented on each communication problem.
6	**Unexpected State Change—**This is the number of unexpected state changes. The counter is incremented on each unexpected state change.
7	**Rebuilding Coach—**This is the number of **Coach Rebuild** operations. The counter is incremented on each coach rebuild operation.
8	**Error Putting Coach on the Task List—**This is the number of errors entering the coach on the task list. The counter is incremented on each error.
9	**Error Putting Event on the Task List—**This is the number of errors entering an event on the task list. The counter is incremented on each error.
10	**Error Putting Member on the Task List—**This is the number of errors entering a member on the task list. The counter is incremented on each error.
11	**Error Putting Communication Entry on Task List—**This is the number of errors entering a communication entry on the task list. The counter is incremented on each error.
12	**Resynchronize Sequence Number—**This is the number of sequence number resynchronizations. The counter is incremented on each **Resynchronization** operation.
13	**Flash Memory Issue—**This is the number of flash memory issues. The counter is incremented on each flash memory issue.
14	**Logging Overflow—**This is the number of log overflows. The counter is incremented on each log overflow.
15	**Disk Problem—**This is the number of disk problems. The counter is incremented on each disk problem.
16	**Wi-Fi Intrusion Attempt—**This is the number of Wi-Fi intrusion attempts. The counter is incremented on each Wi-Fi intrusion attempt.

Note: The *Logs>Special Events* screen displays the **SW1 Not Open** and the **SW2 Not Open** counters. The displayed values are 32-bit, which corresponds to the 32-bit DNP counter point variation. The PG&E Accumulators are 16-bit, and when the PG&E Accumulator exceeds 0xFFFF, the accumulator rolls over (modulo 65536). The counters shown on the *Logs>Special Events* screen keep incrementing monotonically until their value exceeds 0xFFF FFF (modulo 4,294,967.296) and the counter rolls over. Therefore, the counter values shown on the *Logs>Special Events* screen may be different from the accumulator value reported through SCADA. The PG&E command to reset these counters will bring both the 32-bit and 16-bit counters back into synchronization when issued. The PG&E command is: Function 20, Command 11, Sequence Number (the sequence number is changed by the configured accumulator point order).

When issuing a PG&E **Freeze** command to an accumulator, the accumulator value at that time overwrites the value stored in the pulse accumulator buffer, which cannot be reset.

These are 16-bit counters and will overflow back to zero at 65,536. There is one accumulator buffer corresponding to each accumulator.

Table 5. 6802/3U 16-Bit Pulse Accumulator Buffer Points

Code #	Name—Definition
1	**Operation Count Switch 1**—This is the number of switch operations. The counter is incremented on each **Close** operation.
2	**Operation Count Switch 2**—This is the number of switch operations. The counter is incremented on each **Close** operation.
4	**New Coach Generated on Team**—This is the number of coach generations on the Team. The counter is incremented on each coach generation.
5	**Team Communication Problem**—This is the number of communication problems. The counter is incremented on each communication problem.
6	**Unexpected State Change**—This is the number of unexpected state changes. The counter is incremented on each unexpected state change.
7	**Rebuilding Coach**—This is the number of **Coach Rebuild** operations. The counter is incremented on each coach rebuild operation.
8	**Error Putting Coach on the Task List**—This is the number of errors entering a coach on the task list. The counter is incremented on each error.
9	**Error Putting Event on the Task List**—This is the number of errors entering an event on the task list. The counter is incremented on each error.
10	**Error Putting Member on the Task List**—This is the number of errors entering a member on the task list. The counter is incremented on each error.
11	**Error Putting Communication Entry on Task List**—This is the number of errors entering a communication entry on the task list. The counter is incremented on each error.
12	**Resynchronize Sequence Number**—This is the number of sequence number resynchronizations. The counter is incremented on each **Resynchronization** operation.
13	**Flash Memory Issue**—This is the number of flash memory issues. The counter is incremented on each flash memory issue.
14	**Logging Overflow**—This is the number of log overflows. The counter is incremented on each log overflow.
15	**Disk Problem**—This is the number of disk problems. The counter is incremented on each disk problem.
16	**Wi-Fi Intrusion Attempt**—This is the number of Wi-Fi intrusion attempts. The counter is incremented on each Wi-Fi intrusion attempt.

Supported Functions

Basic Scan, Function Code $00

This scan is for all data types supported in the control. The packed-analog form of encoding analog data is not supported.

Scan Inclusive, Function Code $01

The packed-analog form of encoding analog data is not supported.

Supervisory Control, Function Code $10

The **Direct Digital Control**, **Direct Open**, **Direct Close**, and **High Resolution Proportional Control** commands are not supported. The **Pulse Selected Point** command is supported, but the pulse time is ignored because the switch requirements dictate all pulse times.

Internal Control Function Commands, Function Code $20

These commands are implemented:

Command Code $00, **Initialize RTU Configuration** (Standard Mode)

Command Code $10, **Accumulator Freeze**

Command Code $11, **Accumulator Reset**

Command Code $20, **Initialize Specified Status Counter**

Command Code $21, **Initialize All Status Counters**

Access to Data Logging Results Via PG&E Protocol

Function Code $28, Command Code $30, the **Read RTU Memory** command only supports read for Ordinal 0 (Error Code File).

Analogs

Analog Input points are 13-bit analogs.

Extended Error Code File Definitions

The codes assigned for inclusion in the error code file have been extended in this protocol implementation to provide additional detail on communications failures. The definitions of the additional codes are shown in Table 6 on page 18.

PG&E Protocol Implementation

Table 6. Error Code File—Additional Communications Failures

Code (HEX)	Interpretation
F0	**CRC error on incoming packet**—Suspect bad reception if intermittent; otherwise, check master station software.
F1	**Bad interrupt (internal software error)**—Notify S&C Electric Company.
F2	**Packet timeout during receipt**—Intercharacter delay greater than 40 milliseconds, suspect bad reception if intermittent otherwise master station has excessive intercharacter delay.
F3	REMOTE/LOCAL switch in LOCAL position on the switch control faceplate.
F4	**Length of incoming packet inconsistent with packet type**—Suspect bad reception if intermittent otherwise check master station software.
F5	**Illegal incoming packet length**—Check master station software.
F6	**Control operating mode inconsistent with command**—Not in software manual mode when software manual operation requested. Use **Manual** command, and then retry request.
F7	**Incoming packet has not enough data in data field**—Suspect bad reception if intermittent otherwise check master station software.
F8	Ordinal read/write not supported
F9	**Memory pointer bad, no data to transfer**—Check master station software.
FA	**Character received with bad framing, parity, break rcvd, etc.**—Probable bad reception or modem failure.
FB	Invalid sequence numbers
FC	Invalid scan table number
FD	Automatic operation in manual mode
FE	Write memory locked
FF	Invalid RTU address

Functions Not Supported

This implementation no longer supports these previous 5800 Series PG&E functions:

- **Scan-By-Table**, Function Code $0A
- As with the **Basic Scan** function, packed-analog encoding is not supported.
- **Write to RTU Memory**, Function Code $20, Command Code $30
- **Execute Write Memory**, Function Code $20, Command Code $31
- **Read RTU Memory**, Function Code $28, Command Code $30, except for Ordinal 0 (Error Code File)