6801 Automatic Switch Control
For Outdoor Pole-Mounted Gear

Automatic Control

The 6801 Automatic Switch Control combines sophisticated automatic control schemes with remote terminal unit functionality, data logging, and advanced communication capabilities in one integrated package.

The 6801 switch control manages distribution switches and can automatically sectionalize a feeder based on such factors as overcurrent, loss of voltage, and phase unbalance.

A control can be ordered with, or upgraded to, the IntelliTeam® SG Automatic Restoration System, which enables multiple switch controls to work together as teams. These teams use peer-to-peer communication, and they quickly transfer load and minimize the number of customers affected by a fault or outage. Teams use true distributed intelligence; no central processing or SCADA supervision is required. IntelliTeam SG system software works with both line switches and reclosers, and each team may include different switch types and controls.

Remote Operation

SpeedNet™ Radios or fiber-optic transceivers are required for IntelliTeam SG system operation, and a wide variety of communication devices are available for use with a SCADA system.

Switching Device Compatibility

The 6801 switch control supports the following switching devices:

- Scada-Mate® Switches
- Scada-Mate® SD Switches
- Scada-Mate CX™ Switches
- Others (contact S&C)

Signal Processing and Overcurrent Fault Detection

Operating voltage and current readings are true RMS measurements that have an accuracy of 0.5% over the entire temperature range. Phase angle accuracy is ±1°.

The 6801 switch control is specifically configured for fault detection. Fault magnitude, duration, and inrush restraint setpoints can be set for each application.

Automatic Sectionalizing

The 6801 switch control has automatic sectionalizing capabilities that improve circuit reliability when coordinated with a source-side reclosing device. The 6801 control can help reduce loss of service and pinpoint faulted line sections.

With IntelliTeam SG system-equipped controls, further fault isolation and automatic circuit reconfiguration provide full restoration of unaffected customer loads if circuit capacity is sufficient to allow it.

Loss of Phase

The 6801 switch control protects three-phase loads from single-phasing by automatically opening the switch if phases become unbalanced. The control can be programmed to automatically reclose when stable three-phase voltage returns.

Shots-To-Lockout

The selectable **Shots-to-Lockout** feature prevents the source-side protective device from reclosing into a fault multiple times.

Software and Control Architecture

All S&C automation products run under the supervision of a mature, reliable, state-of-the-art operating system, and they can be easily upgraded. Setpoint values can be configured with user-friendly IntelliLink® Setup Software, which runs on your PC. The faceplate port—either serial or USB—provides easy local access to the control. Setpoints can also be configured remotely with optional IntelliLink Setup Software.

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Data Logging

A 6801 switch control has extensive data-logging capabilities. Voltage, current, kvars, kilowatt power level, and phase angles are included in the daily maximum and minimum and time-averaged records. Overcurrent, loss-of-voltage, fault-magnitude and duration data, and equipment diagnostics are also recorded. A crystal-controlled, temperature-compensated, real-time clock provides time-stamping of the data. The optional GPS feature provides time-stamp accuracy to 1 ms.

Data gathered at a switch location are invaluable for analyzing circuit problems, troubleshooting system operation, and planning future expansion. Access to this information helps optimize the performance of your installation.

IntelliTeam SG data-logging is especially useful for determining the exact sequence of events during a team reconfiguration and for comparing this information with substation data. IntelliTeam SG system software uses GPS time-stamping for accurate data comparison with other controls.

Field-Proven Design

The 6801 switch control provides the security of S&C's field-proven computer technology and electronics manufactured in an ISO 9001-certified facility. Thousands of S&C controls are in use by hundreds of utilities, and the IntelliTeam application is the most successful restoration system on the market.

Flexible Communications

The 6801 switch control has four communication ports: two Ethernet and two serial SCADA ports for remote operation, and a USB or serial faceplate connector for local monitoring and configuration. A 6801 control can service SCADA requests even when a computer is connected locally.

Backlit display provides clear, understandable information

Serial and USB configuration ports
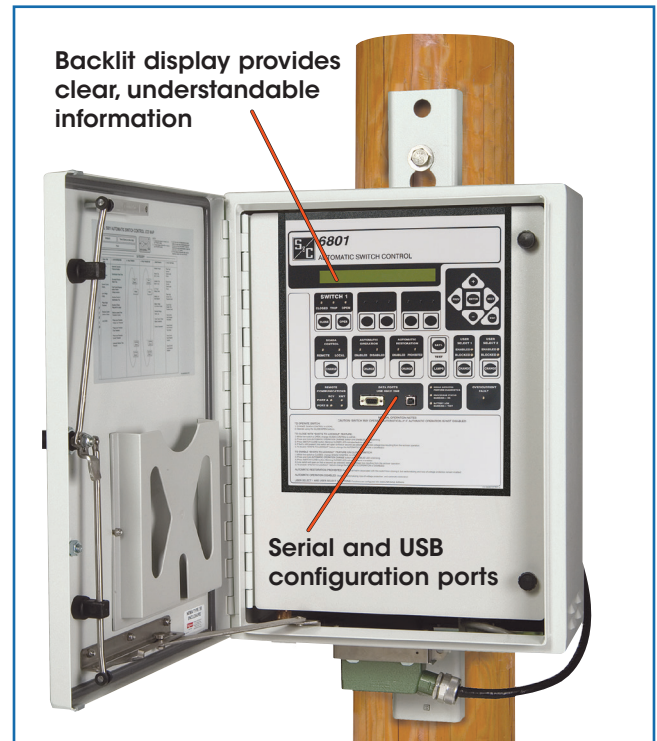
The 6801 switch control supports a variety of communication gateway hardware options and software protocols. Hardware options include:

- SpeedNet™ Radios
- MDS radios
- Modems (Scan Data Bell 202 or Hayes-compatible)
- Cellular transceivers
- Fiber-optic transceivers
- Others (contact S&C)

Radios and modems may be factory-mounted inside the switch control to save on installation costs, and both serial and Ethernet interfaces are provided.

DNP 3.0 is the standard protocol for the 6801 switch control.

Software upgrades can be done in the field using IntelliLink Setup Software, S&C's Windows®-based program used for local connection to a control.

Power Supply/Battery System

The 6801 switch control uses a single power supply, eliminating the inherent problems of multiple power supplies and batteries. This highly efficient supply delivers 12 Vdc to the entire system, and it provides 24-Vdc temperature-compensated float charging to maximize battery life.

The switch control automatically checks battery condition on a periodic basis and under varying load. Detailed information about battery and power-supply status is available at the faceplate LCD and all communication ports.

The 6801 control for use with S&C switching devices can accept control power from a 120-Vac or 240-Vac source, or it can be powered by the S&C sensor outputs. If both sources are available, the control automatically uses line power and switches to sensor power if line power is lost.

When the 6801 switch control has the "-E33" option, sensor power can be obtained from either side of the switch. The control will take power from one or both sides, depending on the available sensor power.

Note: Radio power is restricted when using sensor power and three voltage sensors on 12.47-kV and lower system voltage. Contact your nearest S&C Sales Office for specific radio limitations.

What is IntelliLink Setup Software?

IntelliLink Setup Software is S&C's Windows-based program for interfacing locally with S&C's family of controls. Users can view real-time data, manage setpoints, gather troubleshooting information, and download historical data for reports—all from screens that are easy to use and understand.

Options

IntelliTeam SG Automatic Restoration System

The 6801 switch control is fully compatible with the IntelliTeam SG Automatic Restoration System. Users can take full advantage of S&C's field-proven IntelliTeam SG system. Its **Rapid Self-Healing** feature accomplishes restoration in seconds. The IntelliTeam SG system includes a setup tool, IntelliTeam® Designer, which greatly simplifies configuration and deployment. The IntelliTeam SG system uses all available alternate sources to restore unfaulted line segments without overloading any part of the system. The system minimizes the number of customers experiencing an extended power interruption, tremendously improving your system.
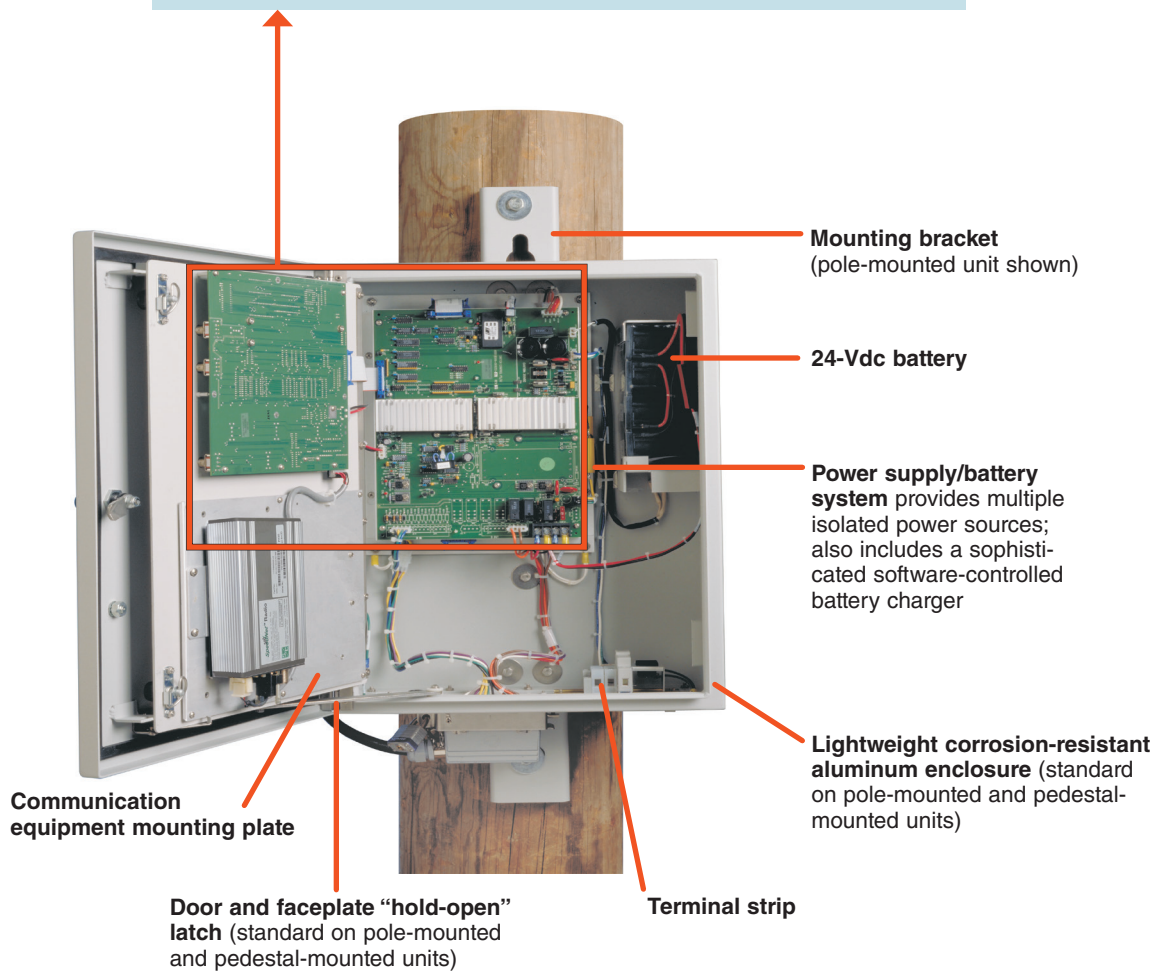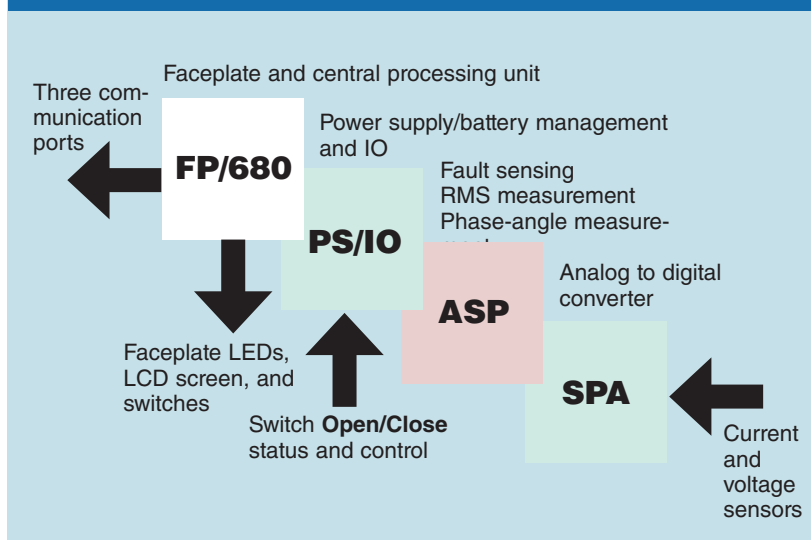
R3 Communication Module Firmware Version 3.0.00512

Firmware version 3.0.00512 offers a fully redesigned web-user interface for an enhanced user experience and provides additional cybersecurity protection for the 6801 switch control.

Firmware version 3.0.00512 incorporates the latest industry standards in cybersecurity defenses for improved security across a range of advanced security controls, including data encryption, code-signing with a secure boot, customizable user-access controls, a customizable firewall, and security event logging and monitoring.

The Ethernet/IP wiring of the R3 Communication Module is required to use all the security features available in firmware version 3.0.00512. The result is increased speed and security of communications between the 6801 control, the R3 Communication Module, and SCADA or IntelliLink Setup Software.

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INTERNAL ELECTRONICS

Faceplate and central processing unit

Three com-
munication
ports

FP/680

Power supply/battery management
and IO

PS/IO

Fault sensing
RMS measurement
Phase-angle measure-

ASP

Analog to digital
converter

SPA

Faceplate LEDs,
LCD screen, and
switches

Switch **Open/Close**
status and control

Current
and
voltage
sensors

Mounting bracket
(pole-mounted unit shown)

24-Vdc battery

**Power supply/battery
system** provides multiple
isolated power sources;
also includes a sophisti-
cated software-controlled
battery charger

**Lightweight corrosion-resistant
aluminum enclosure** (standard
on pole-mounted and pedestal-
mounted units)

**Communication
equipment mounting plate**

**Door and faceplate "hold-open"
latch** (standard on pole-mounted
and pedestal-mounted units)

Terminal strip

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Specifications

Electrical Operating Characteristics
- Nominal operating voltage: 120 Vac or 240 Vac
- Operating voltage range: 100 to 135 Vac or 200 to 270 Vac
- Power dissipation: 10 to 120 Watts, depending on the installed options

Electrical Isolation/Protection
- Insulation withstand: 2.5 kV RMS
- Surge withstand: ANSI C37.90.1
- Power line surge: ANSI C62.41
- ESD withstand: IEC 1000-4-2
- Electromagnetic emissions (conducted and radiated): FCC Part 15, Class B
- Electromagnetic compatibility: EN 61000-4-3

Fuses
- Ac fuses: FNM-10, GMD-2A
- Battery fuse: ATC-10

Environmental Operating Characteristics
- Temperature: -40°F (-40°C) to +158°F (+70°C)
- Humidity: 0 to 95% (non-condensing)

Sensor Inputs
- True RMS voltage and current measurement
- Voltage accuracy: ±0.5% full scale over the entire temperature range; resolution: 0.1 Vac
- Current sensor input range: 0 to 800 A RMS
- Current accuracy: ±0.5% full scale over the entire temperature range; resolution: 1 A RMS
- Phase angle range: 0 to 360°
- Phase angle accuracy: ±1° at 5% of full-scale current; resolution: $\frac{1}{8}$°

Enclosure   Overhead
- Mounting   Pole-mount bracket
- Material   Corrosion-resistant aluminum
- Dimensions   24 in. (610 mm) × 18 in. (457 mm) × 9.5 in. (241 mm)
- Typical weight●   58 lbs. (26 kg.)

Overcurrent Fault Detection
- Overcurrent fault detection range: 0 to 4000 A RMS■
- Overcurrent fault detection method: Peak detection with sample and hold circuitry
- Overcurrent fault detection accuracy: ±0.5% full scale; resolution: 1 A RMS

Battery
- Sealed lead-acid
- Expected battery carryover: 16 hours▲

Memory
- Non-volatile, Flash RAM
- Does not require firmware change to upgrade software

Calendar
- GPS time source
- Perpetual calendar—automatically adjusted for leap year
- User-enabled automatic holidays and daylight saving time changeover

Communication Ports
- Three RS232 connectors, 1,200 to 57,600 baud
- One Ethernet port
- One USB port

Communication Hardware and Protocols◆
- SpeedNet Radios, a FreeWave radio, MDS radios, modems, cellular transceivers, and fiber-optic transceivers
- DNP 3.0 standard

Quality
- Electronics manufactured in an ISO 9001-certified facility

● Typical weight includes battery.

■ Consult S&C for other ranges.

▲ Varies with battery type, age, ambient temperature, communication option installed, and number of switch operations.

◆ Consult S&C for current list of communication hardware and protocols supported.

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Excellence Through Innovation