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Adding Radio Pilot Channels and Backing Up SCADA Communications

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INTRODUCTION

There is a need for power systems to provide redundant or backup communications for supervisory control and data acquisition (SCADA) data. Because of the high cost of adding fiber, many have investigated alternative methods for providing this capability at a lower cost. Newer regulations now mandate backup communications for critical infrastructure. The communications backup can be of the same type but must not use the same path in order to provide true backup communications. This application note explains how to use the SEL-3530 Real-Time Automation Controller (RTAC) and SEL-3031 Serial Radio Transceiver to provide faster pilot protection and a backup SCADA communications link.

PROBLEM

Many existing serial communications networks that use DNP3 to communicate with a SCADA master have no backup communications. There is a need to provide backup communications on existing networks without trenching for a separate communications path.

SEL SOLUTION

Use two SEL-3031 Radios to create a high-speed pilot protection scheme to back up the primary step distance protection. With this radio link, you can use two of the three channels for backup communications between two substations using the RTAC. If the primary serial SCADA link fails between the substation and master, the RTAC automatically routes the traffic through the radio channel and provides a secondary path for SCADA communications.

This solution not only provides faster tripping times for transmission systems but also provides a backup communications path for SCADA. It is easy to configure this system without modifying settings in the SCADA master.

Setting the RTAC

In the example shown in Figure 1, the primary serial SCADA communication is a multidrop connection to the RTACs in Substation 1 and Substation 2. As a result, both RTACs monitor all SCADA communications for all devices. Configure custom user logic and access point routing in the RTACs to automatically provide a redundant path through the SEL-3031. If the Substation 1 RTAC detects a primary SCADA communications failure, it notifies the Substation 2 RTAC through the SEL-3031. Using access point routing, the Substation 2 RTAC redirects all Substation 1 communication through the SEL-3031. When the primary communications problem is resolved, the Substation 1 RTAC notifies the Substation 2 RTAC, and normal communication resumes.

Setting the SEL-3031

The SEL-3031 provides three serial links over one radio channel. Port 1 and Port 2 provide separate communications links between the RTACs. If primary communication to Substation 1 fails, the Substation 2 RTAC automatically reroutes the information through the SEL-3031 to the Substation 1 RTAC. The SEL-3031 needs to have Port 1 and Port 2 set to "Standard" for the protocol.

The third port on the radio is used for MIRRORED BITS® communications for a pilot protection scheme between two transmission relays. Port 3 of the radio must be set to MB8 protocol, and the transmission relay must also be set to MB8 protocol.

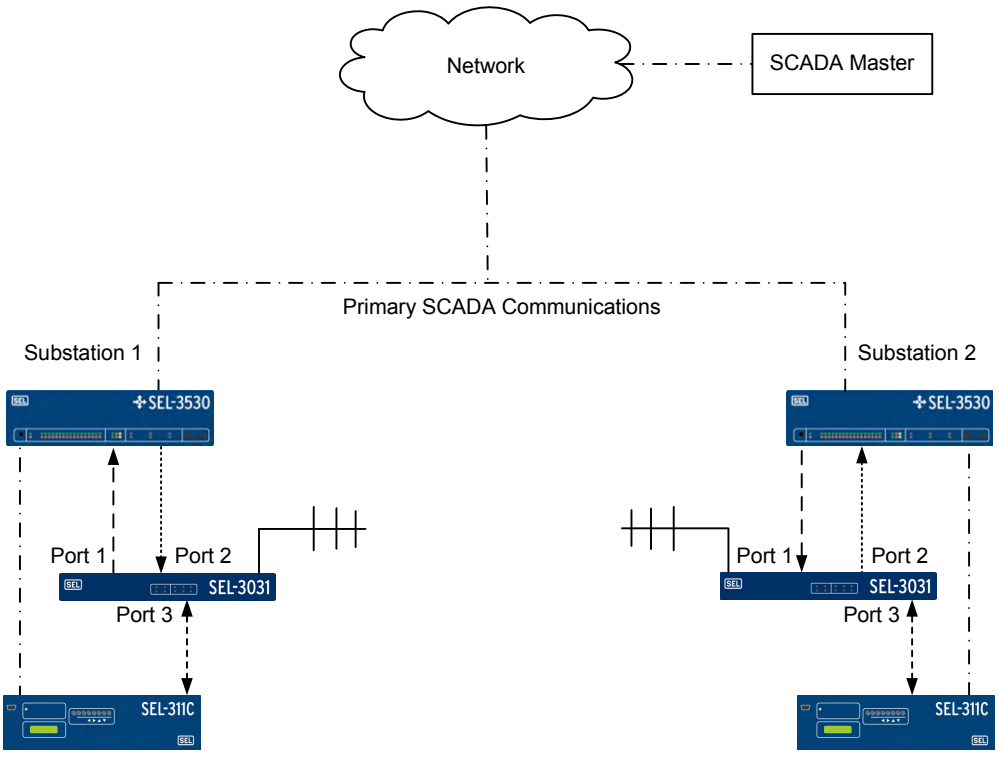

Figure 1 Backup SCADA Communications

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