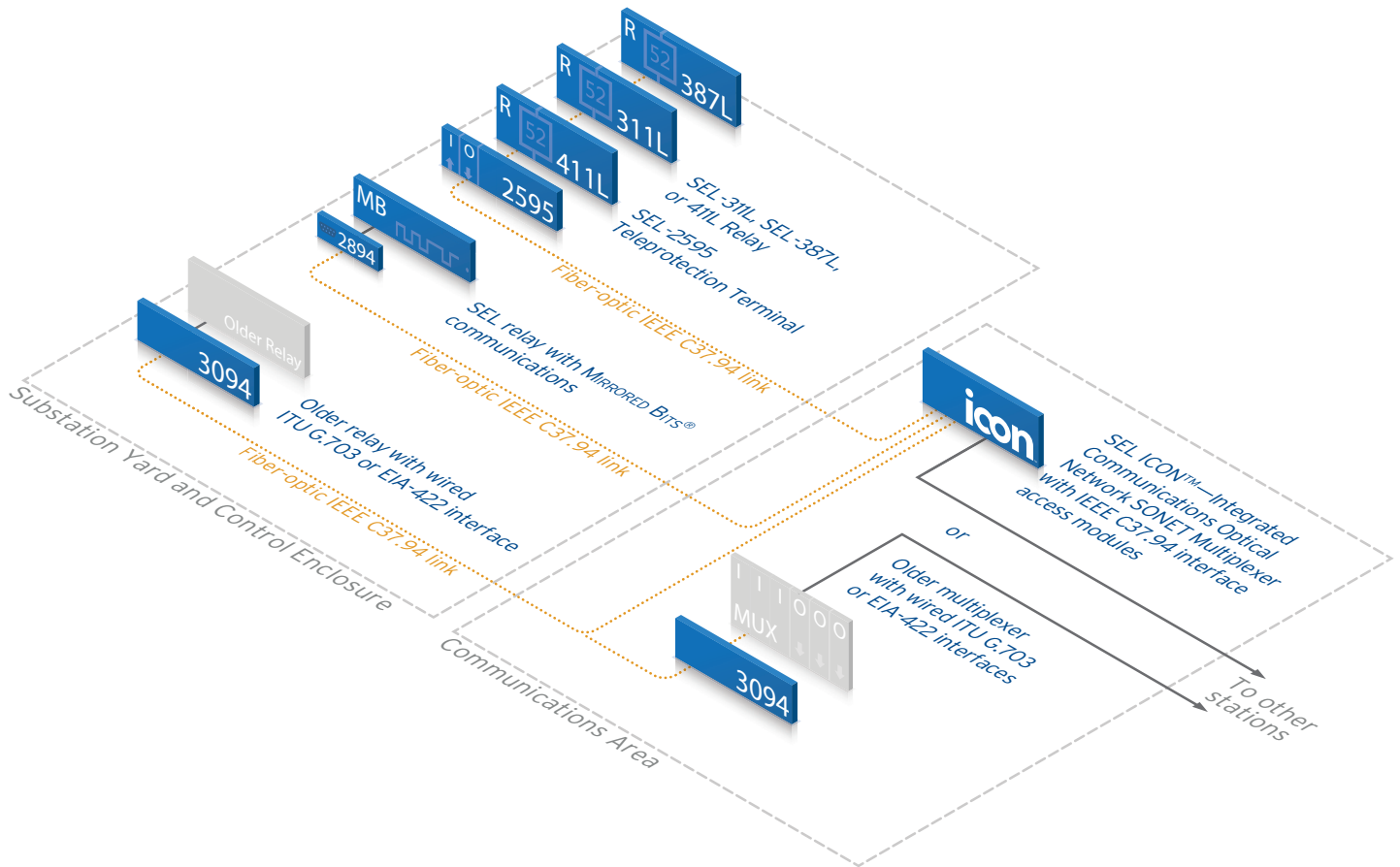


## Improve safety and protect equipment by upgrading to fiber-optic teleprotection links.



### What Is IEEE C37.94?

The IEEE C37.94 Standard for *N Times 64 Kilobit Per Second Optical Fiber Interfaces Between Teleprotection and Multiplexer Equipment* (2002) provides plug-and-play transparent communications between different manufacturers' teleprotection and multiplexer devices using

multimode optical fiber. The standard defines clock recovery, jitter tolerances, physical connection method, and the equipment failure actions for all communications link failures.

# Protect With Line Current Differential Relaying

## SEL-311L Line Current Differential Protection and Automation System



*Protect transmission with reliable communications links.*

- Use the SEL-311L, SEL-387L, or the SEL-411L with an IEEE C37.94 fiber-optic interface and fiber-optic cable to connect to an SEL ICON™ or SEL-3094 Interface Converter.
- Complete pilot protection for primary and backup three-pole tripping schemes on transmission and subtransmission lines.

## SEL-387L Line Current Differential Relay



*Provide three-pole current differential protection with zero settings.*

## SEL-411L Advanced Line Current Differential Protection, Automation, and Control System



*Provide complete protection and control of any transmission line.*

# Convert Electrical Interfaces to Optical IEEE C37.94 Interfaces

## SEL-3094 Interface Converter

- Convert older electrical teleprotection interfaces to the new optical standard.
- Convert IEEE C37.94 noncompliant multiplexers or relays that have metallic communications interfaces.
- Use a pair of interface converters to connect two EIA-422 relays back-to-back for testing without a multiplexer.

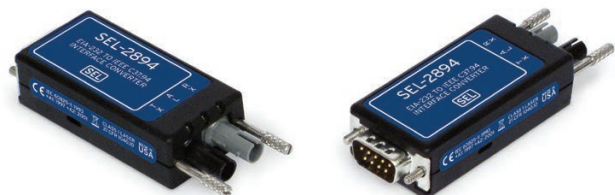


*Convert electrical ITU G.703, EIA-422, EIA-232, and EIA-485 links to optical IEEE C37.94 links.*

# Transfer MIRRORRED BITS® Communications Data for Teleprotection

## SEL-2894 Interface Converter

- Connect any EIA-232 device to an IEEE C37.94 fiber-optic network.
- Apply the SEL-2894 to relays or multiplexers without an IEEE C37.94 interface.



*Convert electrical EIA-232 to IEEE C37.94 optical links.*

## Transfer Contacts for Teleprotection

### SEL-2595 Teleprotection Terminal

- Clear faults with high-speed (5.5 ms) teleprotection.
- Annunciate the status of digital I/O.
- Reduce electrical wiring.



*Communicate digital inputs and outputs through an IEEE C37.94 optical link.*

## Switch Optical Links for Breaker Bypass and Communications Failover

### SEL-2126 Fiber-Optic Transfer Switch

- Preserve primary and backup protection communications during circuit breaker operations.
- Reroute multiple communications protocols with one transfer switch.
- Perform local or remote relay testing.



*Switch IEEE C37.94 optical links for circuit breaker bypass and communications failover.*

## Wide-Area Communication for Teleprotection

### SEL-ICON Integrated Communications Optical Network

- Provide IEEE C37.94 interface support via dedicated access modules.
- Combine SONET multiplexer and Ethernet switch capabilities in a single platform.
- Support other data formats, including EIA-232, EIA-422, EIA-485, EIA-530, and EIA-449.



*Employ the SEL ICON SONET multiplexer for interstation communication of IEEE C37.94 data.*

# SEL Family of IEEE C37.94 Compatible Products

## Product Comparison

	SEL-3094	SEL-2894	SEL-2595	SEL-311L	SEL-387L	SEL-411L	SEL-2126	SEL ICON
<b>Application</b>								
Convert Metallic Links to IEEE C37.94 Fiber-Optic Links	•	•						
Synchronous ITU G.703	•							
Synchronous EIA-422	•							
Synchronous EIA-485	•							
Asynchronous EIA-485	•							
Asynchronous EIA-232	•	•						
Transfer Eight Inputs and Eight Outputs Using IEEE C37.94 Fiber-Optic Links			•					
Line Current Differential Relaying Using IEEE C37.94 Fiber-Optic Links				•	•	•		
Switch Optical Links for Breaker Bypass or Communications Failover							•	
Optical Multiplexing for Intersubstation Communication								•
<b>Mounting</b>								
Surface	•							
Panel			•	•	•	•	•	•
Rack	•		•	•	•	•	•	•
On EIA-232 Connector		•						

## Accessories

SEL-C807 and SEL-C808 Multimode 62.5 µm Core Fiber-Optic Cables



SEL-C807



SEL-C808



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