SecFlow®-1

Ruggedized SCADA-Aware Router Gateway

- Compact ruggedized SCADA-aware router gateway for serial and Ethernet devices, supporting IEC-101, IEC-104, Modbus, and DNP3 protocols
- Resilient Ethernet or LTE cellular network uplink for maximum service continuation
- Integrated SCADA-aware firewall and L2/L3 VPN with IPsec for secure connection over public networks
- IEC61850 certified
- Built to withstand harsh utility environment

SecFlow-1 is an Ethernet router gateway, a member of RAD's SecFlow suite of ruggedized Ethernet family.

With a unique built-in packet processing SCADA-aware engine, it fits the mission-critical industrial applications. It is most suitable for infrastructure topologies, used by utility companies with remotely distributed sites, connected to the SCADA control center. SecFlow-1 is installed at remote locations, forwarding Ethernet or serial traffic over fiber optic or cellular links.

SecFlow-1 supports one FE UTP port and one GbE SFP port, two serial RS-232 ports and a cellular modem with two SIM cards for maximum link resiliency.

The gateway is designed for installation under harsh environmental conditions. It features DIN-rail mount, IP30 protection level, wide operating temperature range (-40°C/-40°F to +70°C/158F°) without fans, EMI immunity (IEC61850-3, IEEE1613 and EN50121-4).

MULTI-SERVICE GATEWAY

SecFlow-1 utilizes Ethernet ports for new IEC 61850 compliance IEDs for automation and teleprotection applications in substations.

Additionally, SecFlow-1 is equipped with the serial interfaces for connectivity of legacy RTUs with new IP-based IEDs. SecFlow-1 gateway converts legacy IEC-101 protocol to IP-based IEC-104, enabling seamless communication from the IP SCADA to both the old and new RTUs. This provides a single box solution for multi-service applications and smooth migration to all-IP networks.

MARKET SEGMENTS AND APPLICATIONS

SecFlow-1 addresses the following markets:

- Utility installations (electricity, water, gas, and oil)
- Intelligent transportation (highway, railway)
- Manufacturing facilities (chemical, food industry)
- Military and defense applications (HLS, safe city).

SCADA-AWARE FIREWALL

SecFlow-1 supports an integrated firewall per port, providing a network-based distributed security designed especially for the SCADA applications.

The device monitors SCADA commands (IEC 104, Modbus TCP, and DNP3 DCP), using deep packet inspection, to validate if they fit the intended application purpose.

Additionally, the device features a VPN gateway with two operation modes:

- Inter-site connectivity, using IPSec tunnels
- Remote user access, using SSH.

Inter-site VPN based on GRE tunnels over an IPSec encrypted link ensures L2/L3 transparent connection of the Ethernet networks sites.

For remote access, the router uses an SSH-encrypted tunnel, with user authentication and specific access authorization.

INTEROPERABILITY

SecFlow-1 is compatible with SecFlow-2 and SecFlow-4.

MANAGEMENT

The device can be managed via RADview, RAD's carrier-class NMS for Windows and Unix, and SecFlow Network Manager that provides end-to-end management for SecFlow devices.

SecFlow-1 also supports a variety of access protocols, including CLI, Telnet, Web, SNMPv3 and TFTP.
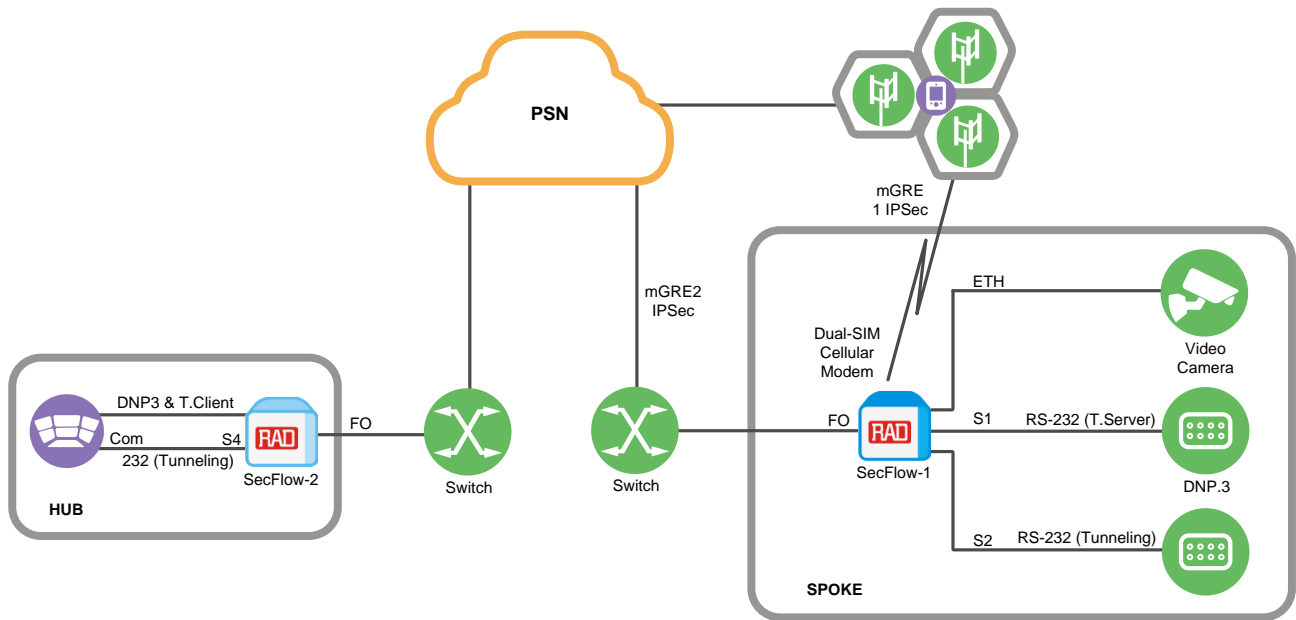
Application

Figure 1. Remote Site Access over the Fiber Link with Cellular Network Redundancy

Specifications

ETHERNET

1 x 10/100BaseT RJ-45 port

1 x 100/1000BaseSX SFP port

Max Frame Size
9 kB

SERIAL INTERFACE

Up to 2 × RS-232 port, with control lines

1 x RS-485 port (2/4-wire)

Serial transparent tunneling byte mode

Protocol gateway – serial to Ethernet
(IEC-60870-5-101, IEC-60870-5-104)

Terminal server frame and byte mode

DISCRETE LINES

2 x Input lines

2 x Output lines

CELLULAR MODEM

Dual SIM cellular modem for GPRS/UMTS or
HSPA/EVDO/LTE networks (2G and 3G)

NETWORKING

SCADA gateway for IEC101/104,
ModBus RTU/TCP and DNP3

Terminal server frame and byte modes

Serial transparent tunneling byte mode

L3 mGRE DM-VPN

L3 IPSec VPN

L2 VPN GRE

Discrete IO control

QUALITY OF SERVICE (QoS)

Prioritization, shaping, scheduling,
bandwidth limiting, multiple priority
queues

ROUTER

Static routing

OSPFv2

RIPv2

IPv4

NAT

SWITCH

Auto Crossing

Autonegotiation IEEE 802.3ab

VLAN tagging

MANAGEMENT

Control Port
RS-232, RJ-45

Management Options
Command-line interface with password
protected access, authorization levels
Telnet/SSH, SNMPv1, SNMPv2, SNMPv3,
RADview, iSIM, SFTP
Syslog

Date/Time Synchronization
Local time setting, NTP

SECURITY

Access lists L3-L4

SFTP client

Firewall
Distributed DPI SCADA firewall

IEC 101, IEC 104, ModBus (RTU, TCP),
DNP3 firewalls

Learning and simulation modes

DNP3 firewall

IPsec
X.509 certificate

Dynamic Key Exchange

AES

3DES

Authentication
Local

RESILIENCE

Conditioned/scheduled system reboot

OSPF v2

RIP

Protection between the cellular ISP (SIM
cards backup)

DIAGNOSTICS

Statistic counters per port

LEDs

RMON

DDM

TIMING

Local time setting

GENERAL

Physical
Height: 106 mm (4.17 in)
Width: 44.7 mm (1.76 in)
Depth: 120 mm (4.72 in)
Weight: 1.4 kg (3.1 lb)
DIN rail mounting, optional wall mount

Power
9 to 60 VDC

Power Consumption
8W

Environment
Temperature:
     Operating: -40 to +70°C (-40 to 158°F)

     Storage: -40 to +85°C (-40 to 185°F)

Operation humidity: up to 95%

Rugged enclosure – fanless, IP 30-rated

Substation automation per IEC 61850-3/
IEEE1613 EMI

Vibration and shock resistance per
EN50121-4

SecFlow-1

Ruggedized SCADA-Aware Router Gateway

Ordering

RECOMMENDED CONFIGURATIONS

Refer to *Table 1* for the SecFlow-1 recommended configuration

SUPPLIED ACCESSORIES

CBL-SF-RJ45-CONSOLE
Console port cable

OPTIONAL ACCESSORIES

CBL-RJ45/DB9/NULL
Serial port cable

SF-2/RM1
Kit for mounting up to two SecFlow-1 units into a 19-inch rack

Table 1. SecFlow-1 Recommended Configurations

Product	Description
SF1/48VDC/1UTP/2RS232	48 VDC (36-60 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces
SF1/48VDC/1UTP1GBE/2RS232	48 VDC (36-60 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces
SF1/48VDC/1UTP1GBE/2RS232/CEL	48 VDC (36-60 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, cellular interface
SF1/12VDC/1UTP1GBE/2RS232/CEL	12 VDC (9-18 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, cellular interface
SF1/12VDC/1UTP1GBE/2RS232	12 VDC (9-18 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces
SF1/12VDC/1UTP/2RS232/CEL	12 VDC (9-18 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, cellular interface
SF1/12VDC/1UTP/2RS232	12 VDC (9-18 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces
SF1/48VDC/1UTP/2RS232/LTENA	48 VDC (36-60 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, LTE cellular modem with North American bands
SF1/48VDC/1UTP1GBE/2RS232/LTENA	48 VDC (36-60 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, LTE cellular modem with North American bands
SF1/48VDC/1UTP/2RS232/LTEEU	48 VDC (36-60 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, LTE cellular modem with European bands
SF1/48VDC/1UTP1GBE/2RS232/LTEEU	48 VDC (36-60 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, LTE cellular modem with European bands
SF1/24VDC/1UTP/2RS232/LTENA	24 VDC (18-32 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, LTE cellular modem with North American bands
SF1/24VDC/1UTP1GBE/2RS232/LTENA	Ruggedized SCADA-aware gateway, 24 VDC (18-32 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, LTE cellular modem with North American bands
SF1/24VDC/1UTP/2RS232/LTEEU	24 VDC (18-32 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, LTE cellular modem with European bands
SF1/24VDC/1UTP1GBE/2RS232/LTEEU	24 VDC (18-32 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, LTE cellular modem with European bands
SF1/24VDC/1UTP/2RS232	24 VDC (18-32 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces
SF1/24VDC/1UTP1GBE/2RS232	24 VDC (18-32 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces
SF1/24VDC/1UTP1GBE/2RS232/CEL	24 VDC (18-32 VDC), 10/100BaseT Ethernet port and Gigabit Ethernet SFP port, 2 RS-232 serial interfaces, cellular interface
SF1/24VDC/1UTP/2RS232/CEL	24 VDC (18-32 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, cellular interface
SF1/48VDC/1UTP/2RS232/CEL	Ruggedized SCADA-aware gateway, 48 VDC (36-60 VDC), 10/100BaseT Ethernet port, 2 RS-232 serial interfaces, cellular interface

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