

# PowerFlow-2-10G

## Industrial 10G Core Switch



- Flexible deployment scenarios using xSTP, ERPS and ultra-fast recovery with PF-ring and PF-chain
- L2 with security features
- Variety of input voltage and POE feeding options including POE+
- Ethernet switching
- Wide Operating Temperature

PowerFlow-2-10G are industrial grade Ethernet switches equipped with 4 10G SFP+ ports with two combinations of UNI ports. The first includes 20 GbE SFP ports plus 4 combo GbE ports, and the second supports 24 GbE copper ports with up to 400W PoE and 4 GbE SFP ports. The devices have fanless design with redundant, isolated power supplies and can be mounted in 19-inch EIA standard rack. PowerFlow-2-10G offers various L2 Ethernet functions (IGMP, VLAN, QoS, ACL, Security, IPv6 for management, bandwidth control, and port mirroring) and also supports PF-Ring redundancy protocol. The switches can also be centrally managed by RADview.

### MARKET SEGMENTS AND APPLICATIONS

PowerFlow-2-10G applications include power utilities, railways, traffic controllers, and safe city applications which require advanced Layer 2 functionality and which in many cases are PoE intensive or need to aggregate multiple 1GbB rings. PowerFlow-2-10G systems are fully compliant with the requirement of 50121-4 for railways. The switches provide a variety of redundant functions to increase the reliability and deployment flexibility of the communications system, including variety of Ethernet functions, such as xSTP, G.8032 and ultra-fast recovery using PS-ring and PF-chain unique features. Dual DC (dual AC or combination) power supplies address a wide range of installation scenarios.

### INTEROPERABILITY

PowerFlow-2-10G devices are compatible with PowerFlow-2 and SecFlow-2 (RSTP, ERPS).

### ETHERNET

PowerFlow-2-10G support IEEE802.1q, IEEE802.1d and relevant parts of IEEE802.3.

### RESILIENCY

#### Ethernet Ring Protection

PowerFlow-2-10G support STP, RSTP, MSTP, ITU-T G.8032v1, G.8032v2 Ethernet Ring Protection Switching (ERPS), and PF-Ring for redundant cabling.

PowerFlow-2-10G provide 14 ring instances, while each can support the PF-Ring, PF-Chain or Sub-Ring type for flexible networking applications.

PF-Ring can be established for Redundant Ethernet Ring, having recovery time<10ms with up to 250 units.

#### LAG

The full Gigabit capability supports Link Aggregation (Dynamic IEEE 802.3ad LACP) with up to 14 trunk group (maximum 8 ports per group) to increase bandwidth, thus providing high-performance quick transfer of large amounts of video, voice and data across a network.

### TIMING AND SYNCHRONIZATION

PowerFlow-2-10G support IEEE1588 PTPv2 for precise time synchronization to operate in Transparent Clock mode by each port.

### MONITORING AND DIAGNOSTICS

Diagnostic features include RMON (1, 2, 3, 9 group), RMON II, RFC1213 MIB II, IP Source Guard, and Port Mirroring.

### MANAGEMENT AND SECURITY

PowerFlow-2-10G can be managed via:

- CLI
- Web-based application
- SNMPv1, SNMPv2c, SNMPv3

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### Specifications

#### CAPACITY

##### Max. Frame Size

Jumbo frame 10K

##### MAC Address Table

32K

##### Memory Buffer

4MB for packet buffer

##### Multiple PF-Ring

Up to 250 devices

#### ETHERNET

##### VLAN

IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID

IEEE 802.1ad Q-in-Q

MAC-based VLAN, up to 256 entries

IP Subnet-based VLAN, up to 128 entries

Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries

VLAN Translation, up to 256 entries

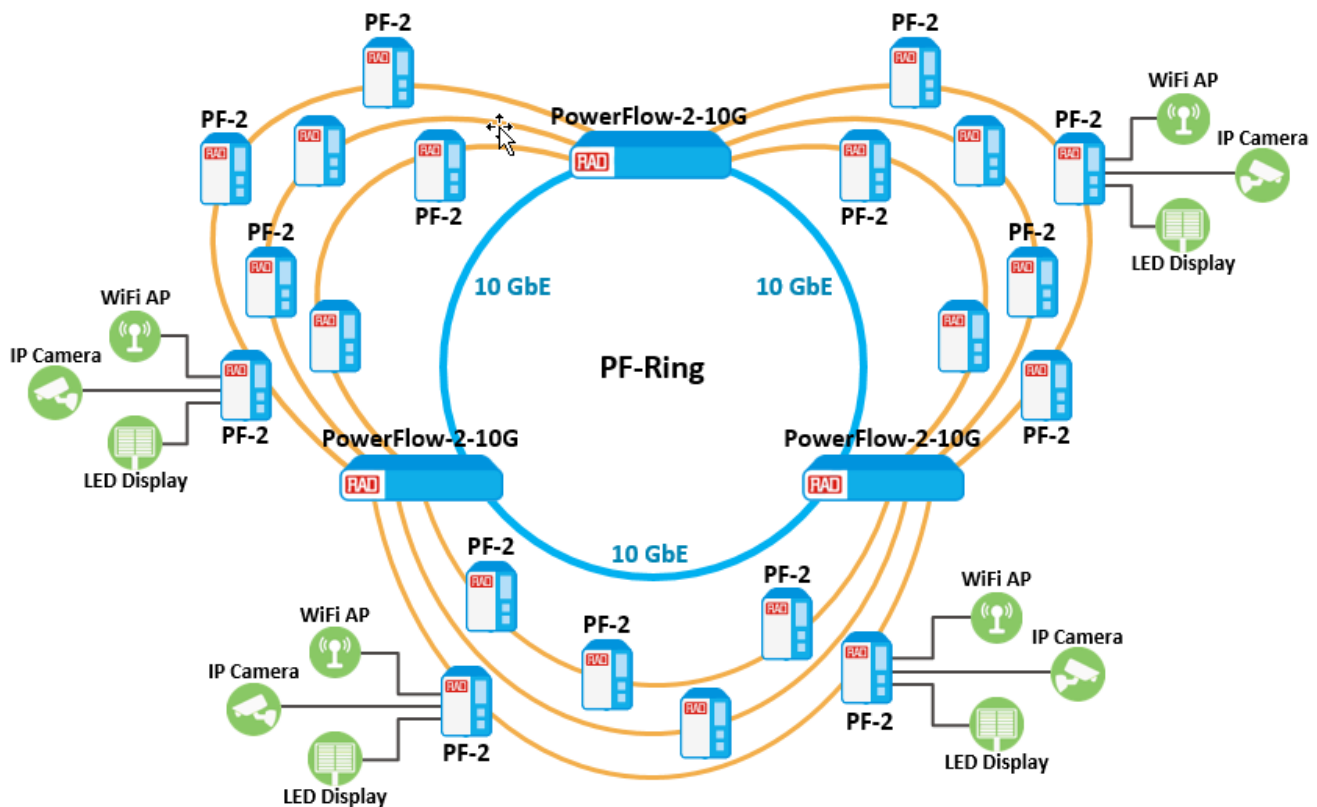


Figure 1. 10GbE Backbone Application

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## Industrial 10G Core Switch

### QUALITY OF SERVICE (QoS)

#### Traffic Classification QoS

IEEE802.1p based CoS

IP Precedence based CoS

IP DSCP based CoS

QCL (QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI

QCE (QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number

#### Bandwidth Control

##### Ingress

Port-based

##### Egress

- Port-based

- Per queue / per port shaper

DiffServ (RF 2474) Remarking

#### Storm Control

Unicast, Broadcast, Multicast

### MANAGEMENT

#### Control Port

RS-232 (RJ-45)

#### Management Port

SFP Model: dedicated MGMT port

UTP model: any of the UTP ports (1-24)

#### Management Options

- CLI
- Web
- SNMPv1, SNMPv2c, SNMPv3

Table 1. PowerFlow-2-10G Product Options, Feature Comparison

Specification	PF-2-10G/ETR/48R/ 4SFPP/4SFP/24PH	PF-2-10G/48R/ 4SFPP/4ETH/20SFP	PF-2-10G/ACR/ 4SFPP/4ETH/20SFP	PF-2-10G/ACDC/ 4SFPP/4ETH/20SFP
10/100/1000 Base-T(x) RJ-45 interfaces	24	-	-	-
GbE UTP/SFP Combo	-	4	4	4
FE/GbE SFP interfaces	4	20	20	20
1G/2.5G/10GBase-X SFP+ interfaces	4	4	4	4
PoE interfaces	24	-	-	-
Total	32	28	28	28
CLI	+	+	+	+
Web-based	+	+	+	+
Modbus/TCP	+	-	-	-
IPv6 Management	+	+	+	+
IEEE 802.1ag CFM	+	+	+	+
ITU-T Y.1731 performance monitoring (PM)	+	+	+	+
Advanced PoE Management	+	-	-	-

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## Industrial 10G Core Switch

### SECURITY

RADIUS

TACACS+

HTTPS, HTTP

SSL / SSH v2

#### IEEE 802.1X

- Port-based
- MAC-based

### ACL

- L2: MAC address SA/DA/VLAN
- L3: IP address SA/DA, Subnet
- L4: TCP/UDP

### TIMING

NTP, SNTP client

IEEE1588 PTP V2

Transparent Clock

### RESILIENCY

#### Ethernet Ring Protection Switching (ERPS)

Recovery time <50ms

Single Ring, Sub-Ring, and Multiple ring topology network

Up to 14 instances of PF-Ring, PF-Chain or Sub-Ring with up to 250 nodes in a ring

#### Link Aggregation

Static (Hash with SA, DA, IP, TCP/UDP port), up to 14 trunk groups

Dynamic (IEEE 802.3ad LACP), up to 14 trunk groups

Up to 8 ports per group

### DIAGNOSTICS

#### Alarm Relay

Relay outputs with current carrying capacity of 1 A @24VDC, 2-Pin removable terminal block

#### Syslog

Syslog server

Warning messages

#### IGMP/MLD Snooping

- IGMP Snooping v1, v2, v3
- MLD Snooping v1, v2
- Port Filtering Profile
- Throttling
- Fast Leave
- Maximum Multicast Group: up to 1022 entries
- Query/Static Router Port

#### Indicators

LED indicators for power and link activity

# PowerFlow-2-10G

## Industrial 10G Core Switch

Table 2. Power, Physical, and Environmental Specifications – PowerFlow-2-10G Product Options

Specifications	PF-2-10G/ETR/48R/ 4SFPP/4SFP/24PH	PF-2-10G/48R/ 4SFPP/4ETH/20SFP	PF-2-10G/ACR/ 4SFPP/4ETH/20SFP	PF-2-10G/ACDC/ 4SFPP/4ETH/20SFP
Compliance	Hi-pot protection	+	-	-
	4KV surge protection	+	-	-
Power Supply	Dual redundant 48 VDC	Dual redundant 48 VDC	Dual redundant wide range AC/HVDC (100 – 240V)	1x48 VDC and Wide range AC/HVDC (100– 240 V)
Power Consumption	30.4W	See Table 3	See Table 3	See Table 3
Power	PoE Power Budget	400W	-	-
	Total Power Consumption	430.4W	-	-
	Negative voltage power input support	+	+	+
Size	Height, cm (inch)	4.4 (1.73)	4.4 (1.73)	4.4 (1.73)
	Width, cm (inch)	44 (17.3)	44 (17.3)	44 (17.3)
	Depth, cm (inch)	31.5 (12.4)	31.5 (12.4)	31.5 (12.4)
	Weight, kg (lb)	4.46 (9.8)	4.2 (9.3)	4.76 (10.5)
Storage Temperature	-40 to +85°C (-40 to 185°F)			
Operating Temperature	-10 to +60°C (14 to 140°F)			
Humidity	5% to 95% (non-condensing)			

# PowerFlow-2-10G

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### Ordering

#### RECOMMENDED CONFIGURATIONS

##### PF-2-10G/ETR/48R/4SFPP/4SFP/24PH

Dual redundant 48 VDC power supply, four 1G/2.5G/10G SFP+ ports, four 100/1000Base-X SFP ports, 24 10/100/1000 Base-T(X) ports, PoE+ (400W)

##### PF-2-10G/48R/4SFPP/4ETH/20SFP

Dual redundant 48 VDC power supply, redundant 48VDC power supply, four 1G/2.5G/10G SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

##### PF-2-10G/ACR/4SFPP/4ETH/20SFP

Dual redundant wide-range AC/HVDC power supply, four 1G/2.5G/10G Base-X SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

##### PF-2-10G/ACDC/4SFPP/4ETH/20SFP

48 VDC and wide-range AC/HVDC power supplies, four 1G/2.5G/10G Base-X SFP+ ports, four 100/1000Base Combo (UTP/SFP) ports, 20 x 100/1000Base-X SFP ports

#### SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options

#### SUPPLIED ACCESSORIES

##### PF-CBL-RJ45-DB9

Console cable RJ-45 to DB9

##### PF-2-TB

Terminal block for power input connector as per specific device

##### PF-2-10G-RM-KIT

Rack-mount kit for mounting the unit into 19-inch rack

#### OPTIONAL ACCESSORIES

##### SFP Transceivers

##### SFP-2DH

Fast Ethernet/STM 1, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)

##### SFP-6DH

Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)

##### SFP-30H

Multirate 10/100/1000 copper SFP, industrially hardened, 100m (328 f)

##### External Power Supplies

##### SF-AC-48VDC-40W (to be used with non-POE options)

External DIN rail AC to 48 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 60°C (140°F) and above

##### SF-AC-48VDC-120W

External DIN rail AC to 48 VDC power supply, 120 W, -20 to 60°C (-4 to 140°F); 60 W at 65°C (149°F) and above

##### SF-24VDC-48VDC-240W

24 VDC to 48 VDC power supply, 240 W, -40 to 50°C (-40 to 122°F); 120 W at 65°C (149°F) and above

##### SF-AC-12VDC-40W

AC to 12 VDC power supply, 40 W, -20 to 60°C (-4 to 140°F); 20 W at 65°C (149°F) and above

Table 3. PF-2-10G/\*\*\*/4SFPP/4ETH/20SFP Power Consumption

Input Voltage	Consumption
110VAC/VDC	34.4W
220VAC/VDC	34.4W
48VDC	33.4W

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