

preliminary PowerFlow-2-10G

Industrial 10G Core Switch



- Flexible deployment scenarios using xSTP, ERPS and ultra-fast recovery with PF-ring and PF-chain
- L2 and security features
- Variety of input voltage and POE feeding options including POE+
- Certified for EN 50212-4
- Ethernet switching

PowerFlow-2-10G are industrial grade Ethernet switches equipped with 4 10G SFP+ ports with two combinations of UNI ports. The first includes 20 gigabit SFP ports plus 4 combo gigabit ports, and the second supports 4GbE and 24 copper ports with up to 400W PoE. The devices have fanless design with redundant, isolated power supplies (2 DC for all options, 2 AC and AC + DC for the UNI SFP only version) 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 that can establish 14 independent rings and sub-rings for flexible applications, especially when employed in backbone infrastructure. The switches can also be managed centrally and conveniently by an Element Management System and mass configured 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 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. (Refer to *Installation and Operation manual* for more details).

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, SSL/SSHv2, SNMP v1/v2c/v3, Telnet server for management.



PowerFlow-2-10G

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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

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 Options

- CLI
- Web
- SNMPv1, SNMPv2c, SNMPv3

SECURITY

RADIUS

TACACS+

HTTPS, HTTP

SSL / SSH v2

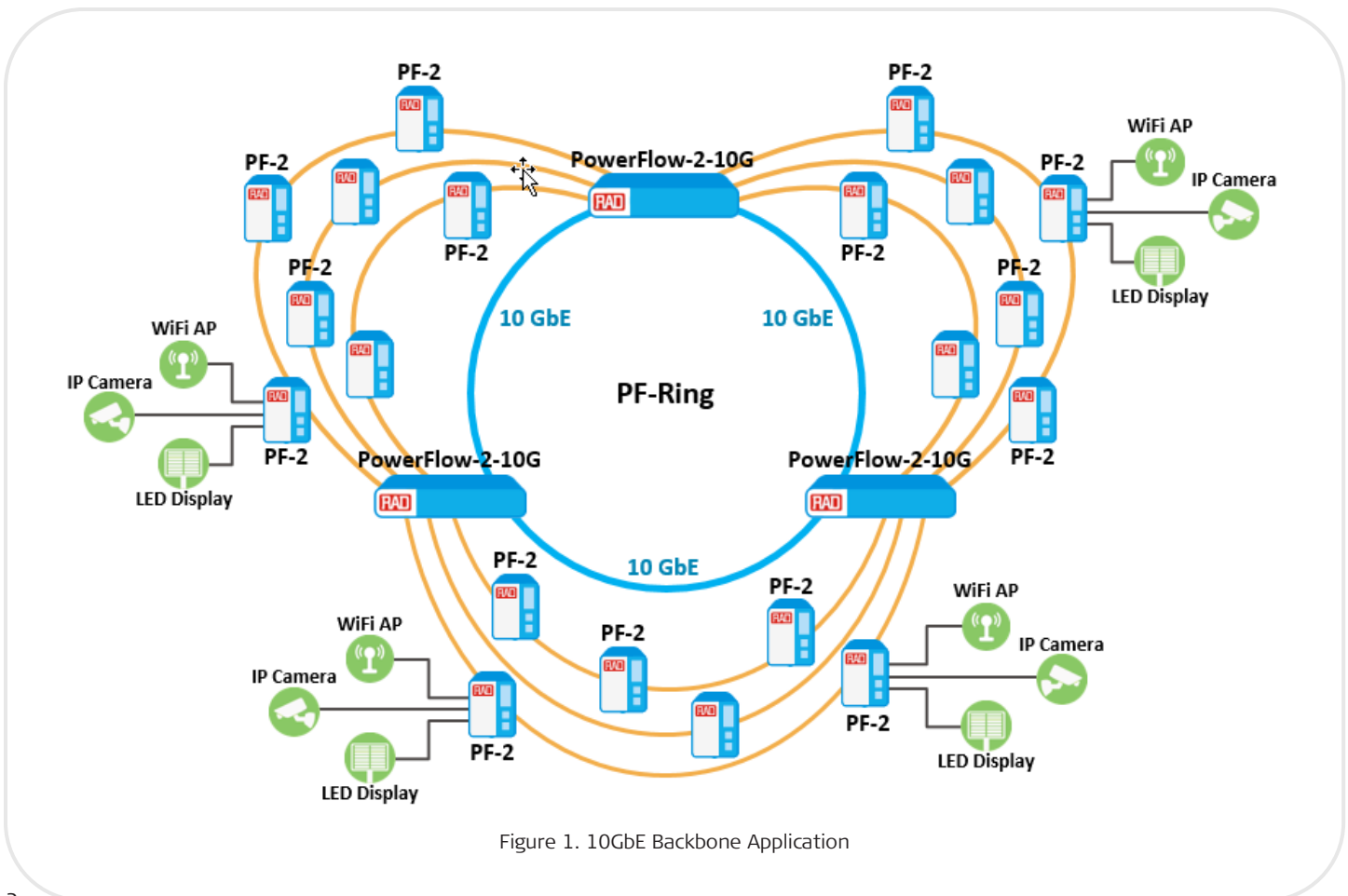


Figure 1. 10GbE Backbone Application

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

GENERAL

Compliance

EMC: CE

EMI (Electromagnetic Interference): FCC Part 15 Subpart B Class A, CE

Railway Traffic: EN50121-4

Immunity for Heavy Industrial Environment: EN61000-6-2

Emission for Heavy Industrial Environment: EN61000-6-4

EMS (Electromagnetic Susceptibility) Protection Level:

EN61000-4-2 (ESD) Level 3, Criteria B

EN61000-4-3 (RS) Level 3, Criteria A

EN61000-4-4 (Burst) Level 3, Criteria A

EN61000-4-5(Surge) Level 3, Criteria B

EN61000-4-6 (CS) Level 3, Criteria A

EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A

Safety: UL60950-1 (pending approval)

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Indicators

LED indicators

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

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
Interfaces	10/100/1000 Base-T(x) RJ45 interfaces	24	-	-
	UTP/SFP Combo	-	4	4
	FE/GbE SFP interfaces	4	20	20
	1G/2.5G/10GBase-X SFP+ interfaces	4	4	4
	PoE interfaces	24	-	-
	Total	32	28	28
Management	CLI	+	+	+
	Web-based	+	+	+
	Modbus/TCP	+	-	-
	IPv6 Management	+	+	+
	Advanced PoE Management	+	-	-

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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		48 VDC	48 VDC Redundant 48VDC	110/220 VAC Redundant AC	48VDC or 110/220VAC or 110/220 VDC
Power Consumption		30.4W	See <i>Table 3</i>	See <i>Table 3</i>	See <i>Table 3</i>
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)	4.4 (1.73)
	Width / cm(inch)	44 (17.3)	44 (17.3)	44 (17.3)	44 (17.3)
	Depth / cm(inch)	31.5 (12.4)	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)	4.51 (9.9)
Storage Temperature		-40 to +85°C (-40 to 185°F)			
Operating Temperature		-40 to +60°C (-40 to 140°F)		-10 to +60°C (14 to 140°F)	
Humidity		5% to 95% (non-condensing)			

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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Ordering

RECOMMENDED CONFIGURATIONS

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

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

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 AC/DC 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

48VDC and high voltage AC/DC 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

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

OPTIONAL ACCESSORIES

PF-CBL-RJ45-DB9

Console cable RJ-45 to DB9 for all devices

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)

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