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Data Sheet

General Availability

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 or without PoE (up to 400W) 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 supports IEEE802.1q, IEEE802.1d and relevant parts of IEEE802.3.

RESILIENCY

Ethernet Ring Protection

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

PowerFlow-2-10G provides 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.

RAD

Your Network's Edge®

PowerFlow-2-10G

Industrial 10G Core Switch

TIMING AND SYNCHRONIZATION

PowerFlow-2-10G supports 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

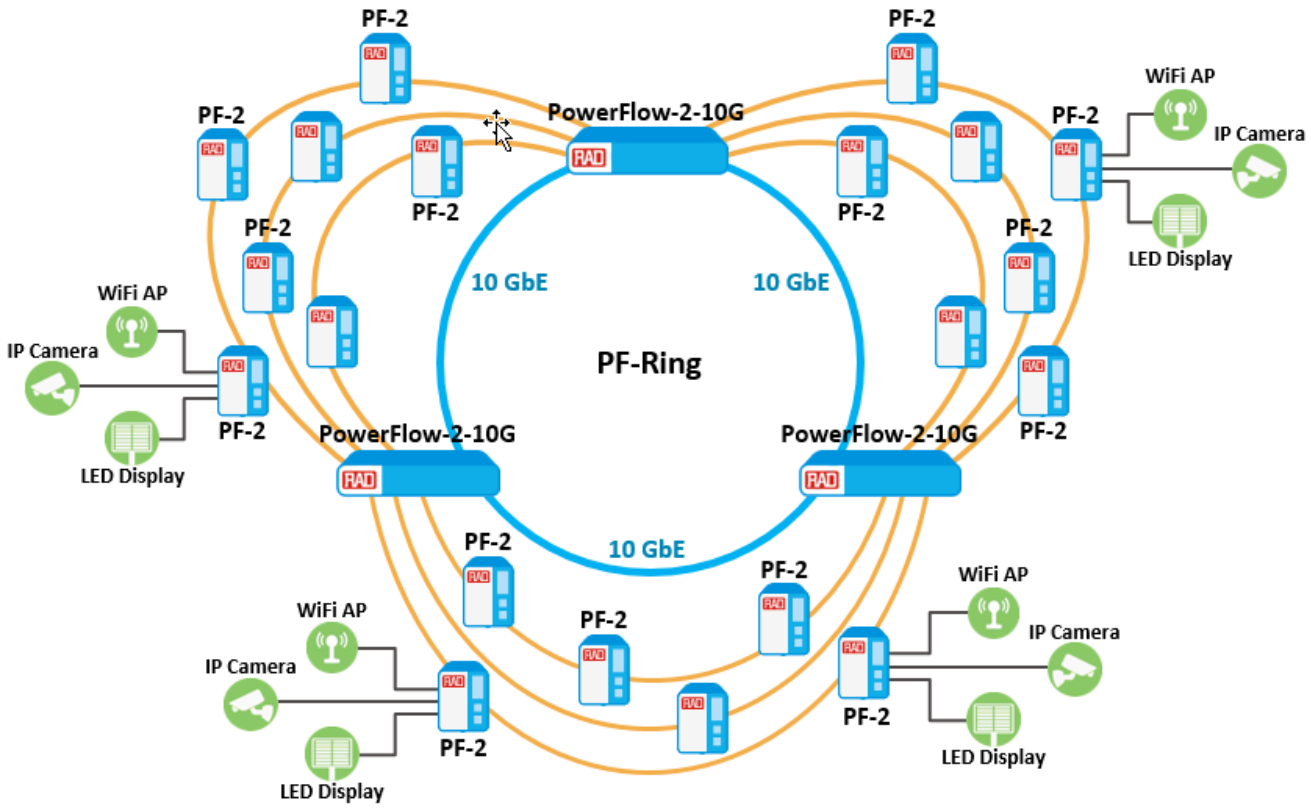

Figure 1. 10GbE Backbone Application

PowerFlow-2-10G

Industrial 10G Core Switch

Specifications

CAPACITY

Switching Capacity	Up to 136 Gbps
Forwarding Rate	Up to 107.136Mpps
Max. Frame Size	Jumbo Frame: 10K
MAC Address Table	32K
Memory Buffer	4MB for packet buffer

ETHERNET INTERFACES

Ports	See Table 1
Power over Ethernet (PoE)	PoE+ (30W per port): 802.3at
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
	MVR (Multiple VLAN Registration)
	GVRP (GARP VLAN Registration Protocol)

MANAGEMENT

Control Port	RS-232 interface, RJ-45 connector
Management Port	SFP Model: dedicated MGMT port UTP model: any of the UTP ports (1-24)
Options	CLI with password-protected access
	Web-based
	SNMPv3

TIMING

Clients	NTP client
	SNTP client
IEEE1588 PTP V2	Transparent Clock

SECURITY

ACL	L2: MAC address SA/DA/VLAN
	L3: IP address SA/DA, Subnet
	L4: TCP/UDP
TACACS+	
RADIUS	
HTTPS, HTTP	
SSL/SSH v2	
IEEE 802.1X	Port-based
	MAC-based

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
IGMP/MLD	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

PowerFlow-2-10G

Industrial 10G Core Switch

Data Sheet

RESILIENCY

ERPS v2	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 16 trunk groups
	Dynamic (IEEE 802.3ad LACP), up to 16 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
Indicators	LED indicators for power and link activity
Syslog	Syslog server
	Warning messages

GENERAL

Environment

Housing	Rugged Metal
	IP30 Protection
	Fanless
For the rest, see Table 2	

Physical

See Table 2

Power

See Tables 2,3

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

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

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

	Specifications	PF-2-10G/ETR/48R /SFPP/4SFP/24PH PF-2-10G/ACR/ 4SFPP/4SFP/24PH	PF-2-10G/ETR/48R/ 4SFPP/4SFP/24U	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	Power Supply	ETR/48R option: Dual redundant 48 VDC ACR option: Dual redundant 110/220 VAC (85VAC~264VAC)	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	33W	See Table	See Table	See Table
	PoE Power Budget	ETR/48R option: 400W ACR option: 150W	-	-	-	-
	Total Power Consumption	33W without PoE load ETR/48R option: 430W ACR option: 209W with 150W PoE load	33W	-	-	-
	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)	4.4 (1.73)
	Width, cm (inch)	44 (17.3)	44 (17.3)	44 (17.3)	44 (17.3)	44 (17.3)
	Depth, cm (inch)	ETR/48R option: 31.5 (12.4) ACR option: 33.0 (13.0)	31.5 (12.4)	31.5 (12.4)	31.5 (12.4)	31.5 (12.4)
	Weight, kg (lb)	ETR/48R option: 4.46 (9.8) ACR option: 5.2 (11.5)	4.26 (9.4)	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)				
Humidity		5% to 95% (non-condensing)				
*POE type devices do not support negative DC voltage (-48V) redundancy.						

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

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

PowerFlow-2-10G

Industrial 10G Core Switch

Data Sheet

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/ACR/4SFPP/4SFP/24PH
Dual redundant 110/220VAC (85VAC~264VAC) power supply, four 1G/2.5G/10G SFP+ ports, four 100/1000Base-X SFP ports, 24 10/100/1000 Base-T(X) ports, PoE+ (maximum 150W)

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

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

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

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

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