JetNet 6710G-M12 HVDC

Industrial 8 PoE + 2G Managed M12 High Power IEEE802.3at PoE Switch, on-board HVDC power input

Exclusive M12
High Power PoE

korenix

CE FC RoHS

8PoE+2G	30W PoE	120W	MSR < 5ms
4+1G Rings	MSTP	LLDP & Korenix NMS	DC 110V
IEC 61373	EN 50121-4	-40~70°C	

- 8 10/100 Base TX PoE ports and 2 Gigabit uplink ports
- Solid M12 D-coded Ethernet connectors to protect from vibration applications such as PoE in Tram, Rail or Highway
- M12 Power Connector for stable power supply under vibrating environment
- 8 PoE ports support both 15.4W IEEE 802.3af & 30W high power IEEE 802.3at with 120W total power budget by LLDP PoE classification
- Built-in Isolated DC-DC Power module for vehicle use
- DC 110V (77VDC~137VDC) power input
- All ports support Korenix patented RSR with 5ms recovery time, and MSR for up to 4 x 100M Rings plus 1 Gigabit Ring
- IEEE 802.1AB LLDP and optional Korenix NMS software for auto-topology and group management
- Tag-VLAN for multiple VLAN traffic isolation and QinQ for private VLAN
- LACP port trunk for bandwidth aggregation in video surveillance
- Auto thermal detection and power budget control
- Redundant DC Power Inputs and Relay Output
- AC 1.5KV Hi-Pot Isolation Protection for ports and power
- EN 50121-4 EMC verification for railway on-board surveillance
- -40~70°C wide operating temperature

Overview

JetNet 6710G-M12 HVDC is a Gigabit Managed Industrial Power over Ethernet Switch equipped with an isolated 110VDC power module and designed exclusively to fit in highly critical PoE applications on-board railways. By software configuration or by LLDP auto detection, the eight 10/100 TX PoE injector ports can deliver 15.4W by IEEE 802.3af or 30W by the latest High Power PoE IEEE 802.3at standard.

The total power budget is up to 120W per unit to fulfill local increasing PoE demands. The two Gigabit Ethernet ports provide high speed uplink to connect with higher level backbone switches with Korenix MSR™ network redundancy technology. Korenix RSR™ can recover the network failure in less than 5 ms. To work under vibration and shock environments, the industrial M12 connectors provide exceptional solid Ethernet and PoE connections.

## Driving the High Power PoE Market - Security, WiMAX

Since the ratification of the Power over Ethernet standard in 2003, the Power over Ethernet technology becomes a trend; more devices adopt PD technology to obtain power through Ethernet cable eliminating the need of running separate power wirings to a remote device. However, the frequently used IEEE 802.3af PoE standard with 15.4W power budgets cannot satisfy the power needs of high end demanding applications, such as WiMAX, IP DOM Cameras, which require greater than the 15.4W power.

The JetNet 6710G-M12 HVDC is equipped with the new PSE solution, compliant with both IEEE 802.3af 15.4W and IEEE 802.3at 30W high power PoE standards. It supports 8 PoE ports in End-span wiring architecture with up to 30W high powering capability per port and
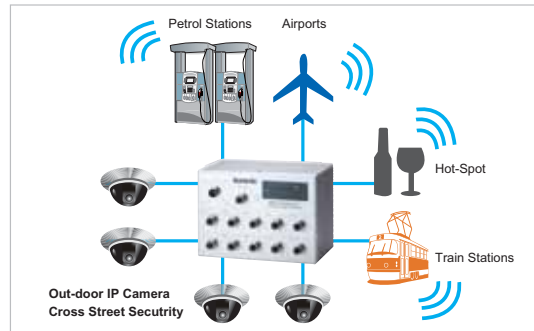
120W per unit at 60°C operating. temperature, to drive the motors of outdoor PTZ IP cameras with direction control for cross–street monitoring, or WiMAX systems for internet access in train stations, airports or Hot-spots.

Efficient Powering Mechanism- IEEE 802.3at LLDP Power over Ethernet
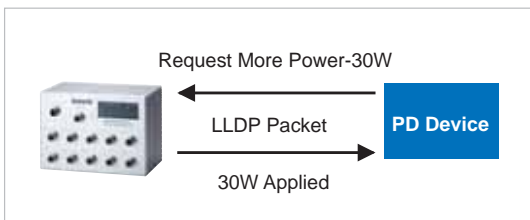
Some of legacy PD devices feature user defined manual mode and forced powering mode to support non-standard PD devices without PoE signature resistor for applying in WiMax systems.

For the new PoE+ (IEEE 802.3at) standard, in addition to the manual and forced powering modes, JetNet 6710G-M12 HVDC implements the Link Layer Discovery Protocol (LLDP) into the system for efficient power budget negotiation between PD devices. The LLDP packet provides smart power budget control behavior to fulfill the needs of higher-end setups requiring exact high power delivery.

Power Budget Limitation with Priority Control

To power the High power PoE IEEE 802.3at, PSE device need to deliver 48V or higher voltage. However, in some environments it becomes hard to obtain enough power budget when the PSE is working with heavy loading in its high power mode. To solve this issue, the JetNet 6710G-M12 HVDC provides budget and priority control to ensure that thetotal power consumption will not exceed the power limit installed by user. It also provides budget control function to limit the output power in case if the PD device is not claimed right consumption numbers. This feature allows user to protect high priority PD devices from shut down caused by overloading of the power supply.

Solid M12 Connectors Against Vibration and Shock

In most occasions, PD devices installed in industrial environments are being subjected to vibration, shock, dust and other environmental threats. Korenix has designed JetNet 6710G-M12 HVDC with 8 M12 D-coded connectors and 1 M12 A-coded power connector allowing the switche to be used for upgrading industrial applications while delivering power along with data to PD devices in industrial machinery, factory automation, railways, marine applications etc.

Comprehensive Redundant Solutions – Multiple Super Ring (MSR^{TM})

The JetNet 6710G-M12 HVDC supports new generation ring technology - MSR^{TM} (Multiple Super Ring), which includes various new technologies for different network redundancy applications and structures. The JetNet 6710G-M12 HVDC allows aggregating up to 5 Rapid Super Rings, including 4 Fast Ethernet plus 1 Gigabit Ethernet Rings. With the MSR^{TM} technology, a node can be configured to multiple rings with the failover time in as little as 5ms and zero-second of restoration time. In addition, users can extend the ring topology by adding hundreds of JetNet series to meet the large-scale network needs without compromising the network speed.
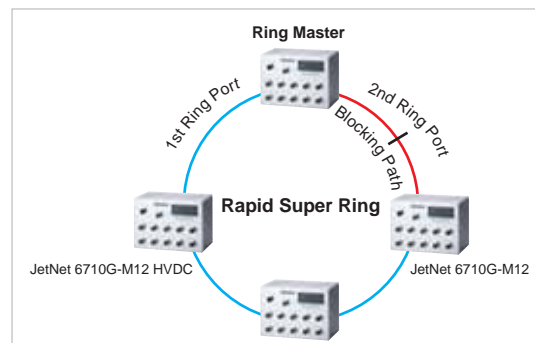
The MSR^{TM} also allows the JetNet series to easily connect with core management switches via standard Rapid Spanning Tree Protocol or through multiple paths or nodes to increase the reliability by RDH^{TM} (Rapid Dual Homing) technology. By integrating MSR^{TM} and Link Aggregation Control Protocol (LACP) the JetNet series can enhance the link availability and increase the overall link capacity. Two or more Fast Ethernet connections are combined in order to increase the bandwidth and to create a resilient and redundant link.

Multiple Super Ring

Rapid Super Ring RSR^{TM}	Rapid Dual Homing^{TM}	MultiRing^{TM}	TrunkRing^{TM}
■ Ring Master auto-select ■ Seamless restoration ■ Ring Status indication ■ Failed ring port together with Ring Master ■ Up to 5ms Recovery Time ■ Backward compatible with legacy Super Ring	■ Multiple Uplink Paths ■ One to One upper, Many to One upper, one to many upper switches ■ Seamless restoration ■ Korenix Patent protected	■ Couple 2 ring with shared unit ■ Maximum up to 5 rings 4 100Mbps Ring 1Gigabit Ring ■ Korenix Patent protected	■ Integrate Port Trunk/ LACP with MSR, RSR ■ Load balancing of ring Ports ■ Backup with each other ■ Korenix Patent protected

Rapid Super Ring (RSR^{TM}) Technology

Rapid Super Ring is the 2nd generation of Korenix Ring Redundancy technology. The recovery time is greatly improved from 30ms to few ms for both copper and fiber ring. The Ring master can be auto-selected by RSR engine. The 1st ring port of the R.M. is the primary path while the 2nd ring port of the R.M. is the block path. Once the primary path fails, the 2nd path will be recovered within few ms. Besides, the restoration time is also shortened to zero in the R.M. auto-selection mode.

Ring Master

1st Ring Port
2nd Ring Port
Blocking Path

Rapid Super Ring

JetNet 6710G-M12 HVDC   JetNet 6710G-M12
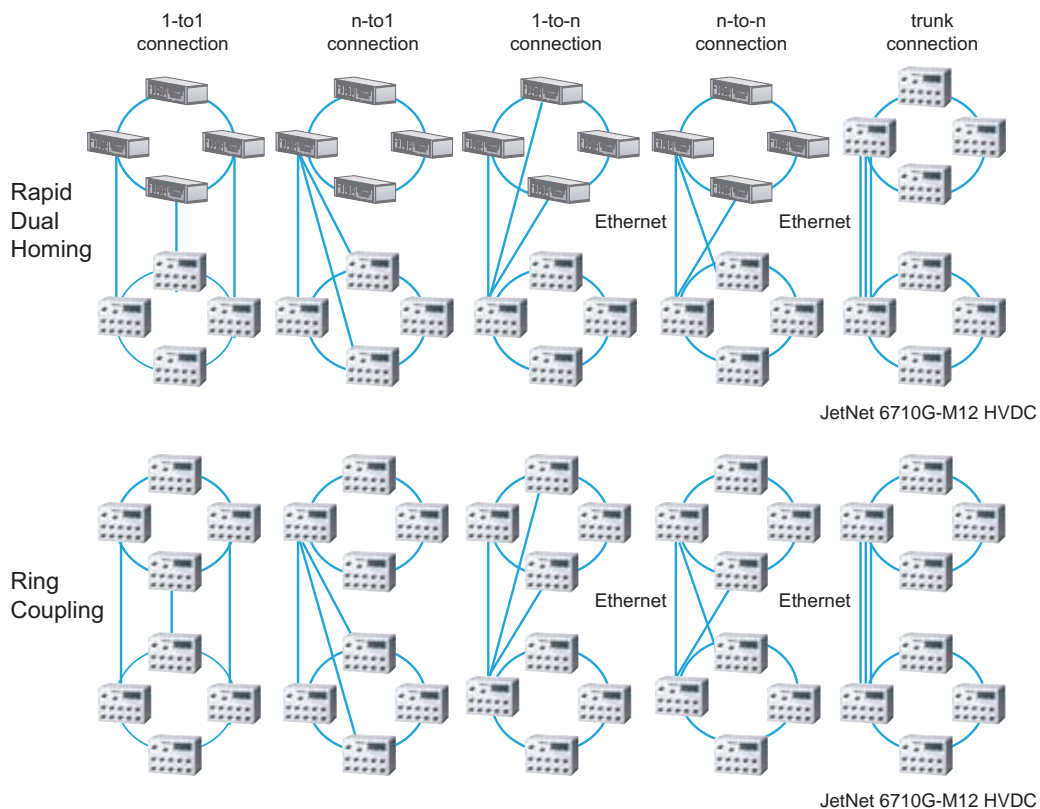
Seamless Ring Port Restoration[TM]

Seamless restoration is a new Korenix patented technology which can restore a failed ring without causing any loop problem, topology change and packet loss. With a 0 second restoration time, this mechanism eliminates any unstable status and guarantees the applications running non-stop.

Rapid Dual Homing (RDH[TM]) Technology

Rapid Dual Homing is also an important feature of Korenix new generation Ring technology. It supports ring coupling with other vendors devices. Moreover, providing easy configuration and multiple redundancies, the failover time is much faster and the restoration time is zero ms. Uplinks can be auto detected and gathered into groups. In each group uplinks are sorted into primary, secondary and standbys based on their link speed. The uplink with the highest speed is more likely to be active path for data transmission. Link aggregation is also integrated into RDH[TM]. An uplink connection can be a single link or several links aggregated as a trunk, which provides better redundancy and link capacity.

1-to1 connection	n-to1 connection	1-to-n connection	n-to-n connection	trunk connection

Rapid Dual Homing

Ethernet   Ethernet

JetNet 6710G-M12 HVDC

Ring Coupling

Ethernet   Ethernet

JetNet 6710G-M12 HVDC

TrunkRing^TM

TrunkRing is a new feature in MSR which merges the two technologies of RSR and link aggregation. It takes advantages of aggregation to enhance the link redundancy, while increasing the link speed. The ring will open only if all the aggregated links are broken. Link aggregation can be achieved by either static trunk or LACP. Not all the link sections in a TrunkRing need to be the same. Ring links can be either symmetric or asymmetric. Some are a single path, and the others are aggregated by links where the number of links in a trunk group can be different. Users can enhance the link redundancy at different locations in accordance to the need. The link with less speed is more likely to be used as the backup path for restoring the network to full play capacity.
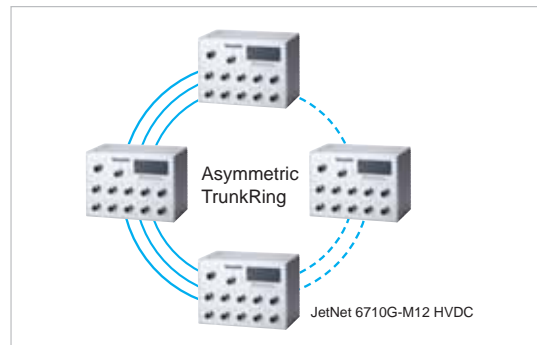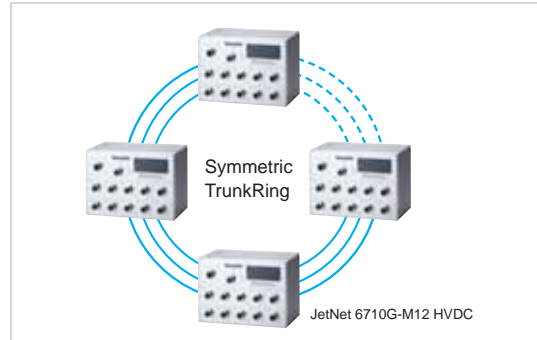
Symmetric
TrunkRing

JetNet 6710G-M12 HVDC

Asymmetric
TrunkRing

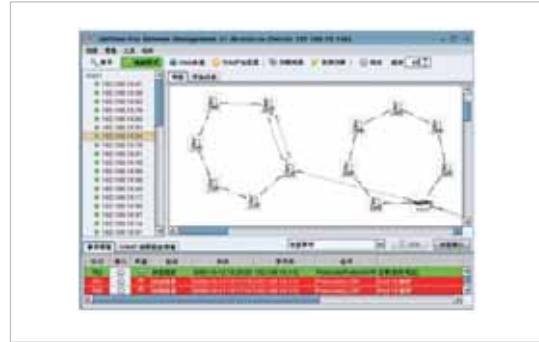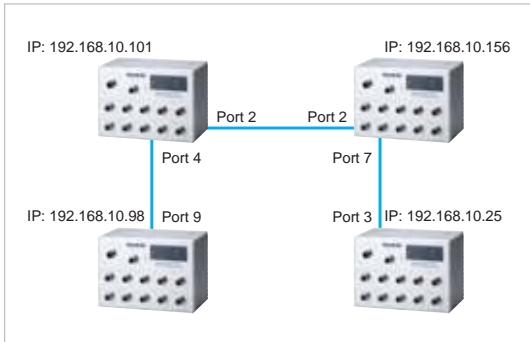JetNet 6710G-M12 HVDC

Link Aggregation Control Protocol

Link Aggregation Control Protocol allows users grouping multiple Ethernet ports in parallel to increase the link bandwidth. The aggregated ports can be viewed as one physical port, so that the bandwidth is higher than just one single Ethernet port. The member ports of the same trunk group can balance the loading and backup with each other. The LACP feature is usually used when higher bandwidth is needed for the backbone network. This is a cost-effective way for transfering much more data.

Port Aggregation (Trunk)

Auto Topology Discovery & Efficient Management through LLDP and Korenix NMS

JetNet 6710G-M12 HVDC supports topology discovery or LLDP (IEEE 802.1AB Link Layer Discovery Protocol) function that can help users to discover multi-vendor's network devices on the same segment by an NMS system, which support LLDP function. With LLDP function, NMS can easily maintain the topology map, display port ID, port description, system description, VLAN ID, etc.. Once a link failure happens, the topology changed events are updated to the NMS to help users easily maintain the network system. Besides the SNMP and LLDP protocols,

JetNet 6710G series efficiently works with the Korenix patented Korenix NMS, which in addition to the auto-topology discovery, also delivers MSR^{TM} group management, group IP assignment, firmware upgrade, configuration file backup/ restore ,SNMP MIB Browser / compile, etc. Furthermore, users can export the topology map to diverse formats, such as JPG, BMP, PNG and PDF, for easily managing and trouble-shooting the network. The user-friendly software allows administrators to discover devices automatically and efficiently manage the performance of the industrial network.


Outstanding Management and Enhanced Security

The JetNet 6710G-M12 HVDC provides various network control and security features to ensure the reliable and secure network connection. To optimize the industrial network environment, JetNet 6710G-M12 HVDC supports advanced network features, such as Tag VLAN, Private VLAN, QinQ, IGMP Snooping, Quality of Service (QoS), Link Aggregation Control Protocol (LACP),

Rate Control, etc. To avoid hacker's attacks and ensure the secure data transmission, JetNet 6710G series features DHCP client, DHCP server with IP and MAC binding, 802.1X Access Control, SSH for Telnet security, IP Access table, port security and many other security features.

Dimensions (Unit = mm)
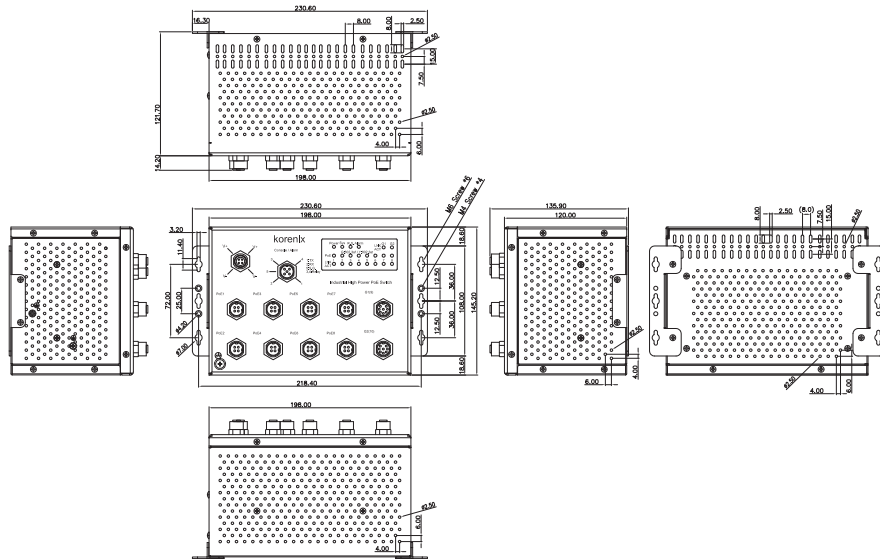
Specification

Technology

Standard:

IEEE 802.3 10 Base-T Ethernet

IEEE 802.3u 100 Base-TX Fast Ethernet

IEEE 802.3ab 1000 Base-T

IEEE 802.3x Flow Control and Back-pressure

IEEE 802.3af Power over Ethernet

IEEE 802.3at High Power over Ethernet

IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

IEEE 802.1p Class of Service (CoS)

IEEE 802.1Q VLAN and GVRP

IEEE 802.1 QinQ

IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)

IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

IEEE802.3ad Link Aggregation Protocol (LACP)

IEEE802.1x Port Based Network Access Protocol

System Performance

Switch Technology: Store and Forward Technology with 32Gbps Switch Fabric

System Throughput: 8.3 Mpps@64 Bytes

CPU performance: 32 bits ARM-9E running at 180 Mhz and performance up to 200MIPS; Embedded hardware based watch-dog timer.

System Memory: 8M bytes flash ROM, 64M bytes SDRAM.

Transfer packet size: 64 bytes to 1522 bytes (includes double VLAN tag)

MAC Address: 8K MAC address table.

Packet Buffer: 1M bits shared memory for packet buffer.

Transfer performance: 14,880pps for Ethernet and 148,800 pps for Fast Ethernet, 1488,100 pps for Gigabit Ethernet

Environment Monitoring: Embedded board-level thermal detector for system temperature monitoring

Relay Alarm: Dry Relay output with 1A /30V DC

System Management

Configuration and monitoring interface: Telnet, local RS-232 console, Web- browser interface, SNMP, Trap and SMTP interface.

Cisco-Like CLI, TFTP/Web Update for firmware and configuration backup and restore, DHCP Client, warm reboot, reset to default, Admin password, Port Speed/ Duplex Control, status, statistic, MAC address table display, static MAC, Aging time, SNMP v1, v2c, v3, Traps and RMON groups 1,2,3,9.

Telnet & Local Console: Supports command line interface with Cisco like commands and maximum 4 sessions; the telnet interface also supports SSH.

SNMP: v1, v2c, V3 with SNMP trap function, trap station up to 4 and can be manually configured the trap server IP address.

SNMP MIB: MIBII, Bridge MIB, Ethernet-like MIB, VLAN MIB, IGMP MIB, Korenix Private MIB.

Korenix Utility: Supports Korenix View and Korenix NMS with IEEE 802.1AB Link Layer Discovery Protocol for device finding and link topology discovery

Network Time Protocol: Supports NTP protocol with daylight saving function and localize time sync function.

Management IP Security: IP address security to prevent unauthorized access

E-mail Warning: 4 receipt E-mail accounts with mail server authentication

System Log: Supports both of Local or remote Server with authentication

JETPoE

Network Performance

Port Configuration: Port link Speed, Link mode, current status and enable/disable.

Port Trunk: IEEE 802.3ad LACP with timer and static port trunk; trunk member up to 8 ports and maximum 5 trunk groups include Gigabit Ethernet port.

VLAN: IEEE 802.1Q VLAN with GVRP. 256 VLAN Entries, VLAN ID from 1 to 4094

Supports Trunk, Hybrid and Link access modes.

Private VLAN: Direct client ports in isolated/community VLAN to promiscuous port in primary VLAN

IEEE 802.1 QinQ: Double VLAN Tag in an Ethernet frame

Class of Service: IEEE 802.1p class of service; per port 4 priority queues.

Traffic Prioritize: Supports 4 physical queues, weighted fair queuing (WRR) and Strict Priority scheme, which follows 802.1p CoS tag and IPv4 ToS/ Diffserv information to prioritize the traffic of your industrial network.

IGMP Snooping: IGMP Snooping v1/v2c /v3 for multicast filtering and IGMP Query mode; also support unknown multicasting process forwarding policies- drop, flooding and forward to router port.

Rate Control: Ingress/Egress filtering for Broadcast, Multicast, Unknown DA or All packets.

Port Mirroring: Online traffic monitoring on multiple selected ports

Port Security: Port security to assign authorized MAC to specific port

DHCP: DHCP Client, DHCP Server with IP & MAC Address binding, DHCP Relay Agent function and DHCP Server with static port based single IP assigned function

IEEE 802.1x: Port based network access control and user authentication by radius account, password and key for the radius server authentication

Power over Ethernet: IEEE 802.3af / IEEE 802.3at; End-span wiring architecture

PoE Operating Mode: Auto mode:Auto detects and powering by IEEE 802.3af behaviors and IEEE 802.3at 1-Event plus LLDP protocol for high power.
Forced mode: User configured power consumption without detection, classification

PoE forwarding conductor: M12 D-code: V+ (3,4), V- (1,2)

Power forwarding ability: IEEE 802.3af: 15.4W
IEEE 802.3at: 30W

Power Budget Control: Port Based budget control with priority control, system will auto calculate total power and shut down low priority port when drawing current is over the power supply

Network Redundancy

Multiple Super Ring (MSR)^{TM}: New generation Korenix Ring Redundancy Technology, Includes Rapid Super Ring, Rapid Dual Homing, TrunkRing^{TM}, MultiRing ^{TM} and backward compatible with legacy Super Ring^{TM}.

Rapid Dual Homing (RDH)^{TM}: Multiple uplink paths to one or multiple upper switch

TrunkRing^{TM}: Integrate port aggregation function in ring path to get higher throughput ring architecture

MultiRing^{TM}: Support up to 4 100M rings and 1 Gigabit ring in single switch

Rapid Spanning Tree: IEEE802.1D-2004 Rapid Spanning Tree Protocol. Compatible with Legacy Spanning Tree and IEEE 802.1w

Multiple Spanning Tree: IEEE802.1s MSTP, each MSTP instance can include one or more VLANs.
Supports multiple RSTP deployed in a VLAN or multiple VLANs

Interface

Enclosure Port:

10/100 TX port: 8 x M12-D-Code 4-pin Female

Gigabit port: 2 x M12-A-Code 8-pin Female

Console port & Alarm Relay Output:
M12 A-code Male for RS-232 and relay alarm output.

Power port: M12, A-coded, male type, 4-pin connector

Cables:
100 Base-TX: 4-pair UTP/STP Cat.5e/Cat.6, EIA/TIA-568B 100-ohm (100m)
1000 Base-T: 4-pair UTP/STP Cat.5e/Cat.6, EIA/TIA-568B 100-ohm (100m)

RS-232 & Alarm Output: RS232: M12 A-code female 5-pin connector, TxD (Pin 1), RxD(Pin 2), Signal Ground (Pin 5)
Alarm Output :M12 A-code female 5-pin connector 3, 4

LED Indicators:
100Mbps RJ-45: Link (Green on) / Activity (Green Blinking)
Gigabit Copper: Link (Green on) / Activity (Green Blinking)
PoE port:
IEEE 802.3af (Green on: Power forwarding;
Blinking: PoE Detection)
IEEE 802.3at (Blue on: Power forwarding;
Blinking: PoE Detection)
Power: System Power ready (Green on)
Sys: System Ready (Green On)
Alm: Alarm Relay Active (Green On)
Ring Status: Green on (Ring normal) / Blinking (Ring with wrong port), Amber on (Ring abnormal) / Blinking (device's ring port failed)

Power Requirements

System Power:
Input Vltage:Typical DC 110V (Un), Variation Vlots from 77Vdc(0.7Un)~137.5Vdc (1.25Un)
Power Consumption: 14W@DC 48V without PD loading

Mechanical

Installation: Wall Mount

Case: Steel metal case

Dimension (mm):
198 (W) x 145.2 (H) x 120 (D) w/o mounting kit
230.6 (W) x 145.2 (H) x 120 (D) w/mounting kit

Weight: 3.14Kg

Environmental

Operating Temperature: -40 ~ 60°C: PoE 120W, -40~70°C: PoE 100W

Operating Humidity: 0% ~ 95%, non-condensing

Storage Temperature: -40 ~ 85°C

Hi-Pot: AC 1.5KV for all ports and power

Regulatory Approvals
EMI : FCC Part 15B Class A, Compliance with Heavy Industrial
IEC/EN61000-6-4, CISPR 16-1-2/16-2-1/16-2-3, CISPR 22
EMS: Compliance with Heavy Industrial IEC/EN61000-6-2, EN61000-4-2,EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-9

Railway EMC: Compliance with EN50121-4 and EN50121-1
Vibration & Shock: Compliance with IEC 61373 for Railway and Rolling stock.
Warranty: Global 5 years

Ordering Information

JetNet 6710G-M12 HVDC Industrial 8PoE + 2G Managed M12 High Power IEEE802.3at PoE Switch, on-board HVDC power input
Includes:

- JetNet 6710G-M12 HVDC
- M-12 D-code to RJ-45 Ethernet Cable x1
- M-12 A-code 5-pin to DB-9 console cable x1
- Cap of M12 connector (tighten on the switch) x 11
- Wall Mounting kits with screw x 1 set
- Quick Installation Guide x1

Optional Accessories

Connector package:
- M12 D-code 4-pole Field Assemble Connecter x 8
- M12 A-code 8-pole Field Assemble Connector x2
- Field Assemble power connector (metal) x1