



Advanced transportation system technologies are being widely deployed by many transit systems worldwide in order to improve efficiency, reduce operating costs, upgrade service quality and security for transit passengers. To assure high quality of transmitted data and system interoperability, reliable and real-time Ethernet network infrastructures must be deployed.

Market Concerns

- Lack of 48VDC power source on-board of transit systems for standard IP camera powering
Result: involves additional power adapters adding extra expenses and decreasing efficiency
- Uniquely harsh environments on and off-board transit systems
Result: extreme temperature & humidity ranges, vibration & shock requiring mechanical robustness
- Certification approvals for various public transportation systems
Result: high-end hardware and software requirements

Korenix Certified Solutions for Transportation

Korenix offers complete computing and networking solutions built on innovative technologies and designed to upgrade transit system's infrastructure operation and maintenance to deliver improved passenger security, enhanced traffic safety, and higher operational efficiency, meanwhile easing the process and reducing cost of equipment and management integration.

Advantages

Korenix solutions excel by their unique design and groundbreaking technologies targeting transit systems:

- **Innovative Powering Mechanisms**
 - ***Vehicle PoE Capability** to simplify standard IP powering from 12 or 24VDC source
 - ***High Power PoE** to power up high-end PoE devices
- **Higher Bandwidth** to satisfy multimedia services designed for passenger comfort and security
- **2/3/4 Gigabit Capacity** to fit flexible high-speed backbone or switch-to-switch applications
- **Mobile Extension** to create seamless, wireless ground-to-transport connectivity
- **Embedded Computing** to ensure reliable recording and customized remote computing
- **Intelligent Industrial-grade Design** to endure harsh on-board and trackside environments
 - ***EN 50121-4 Railway EMC** Compliant Design
 - ***Solid RJ45/M12 Connectors** against Vibration and Shock
 - ***Isolated Booster** for surge and lightning resistance

Conformity Verifications

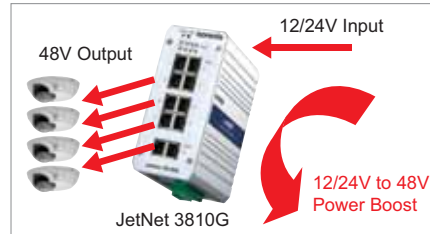
- **e-Mark** for On Board Vehicle
- **EN 50121-4** for Railway Trackside
- **IEC 61373** for Vibration / Shock in Railways
- **NEMA-TS1/TS2** for Intelligent Transportation System



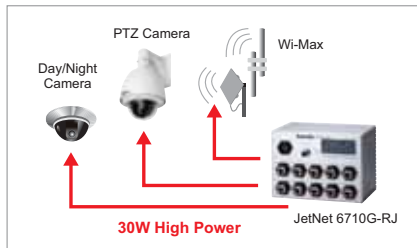
Korenix Innovative Technologies for Transit Systems

Pioneer 12~24V Vehicle PoE Capability

Korenix designs PoE switches and computing platforms with its patented 12~24V to 48V vehicle PoE Boost technology. This allows devices to be used in vehicles which do not have the 48V standard power input on board. Thus, it decreases cost and time for installing additional intermediate power adapter, making deployment of standard IEEE 802.3af PoE IP cameras feasible on bus, police cars, subway/ railway carriages, etc..



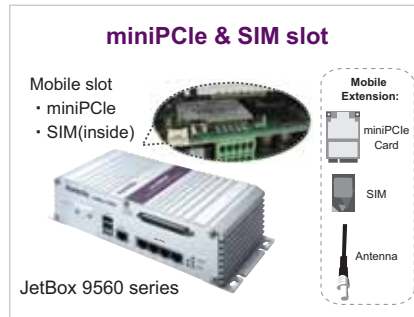
Global Exclusive 30W High Power PoE Compliant to IEEE 802.3at



Korenix offers world's 1st PoE switches with High Power PoE IEEE 802.3at capability for delivering up to 30 watts power per port and over 500W (JetNet 5728G-24P) per unit by software configuration or by LLDP PoE detection and power budget negotiation. This feature is best for transportation surveillance with high power consuming PTZ cameras, and for wireless delivery with Wi-Max APs.

Mobile Expansion and Wireless Transmission

To make IP surveillance or peripheral supervision simple in public transportations, trucks or railways, Korenix designs its JetBox 9560 series booster PoE computers with mobile expansion slots aiming to extend network communication via GSM / GPRS / 3G / 3.5G / HSPA, and thus enhance the mobility of the devices in PoE applications. Therefore, in transit system where wired transmission is not an option, the extension capability of JetBox allows sending wireless data to control center via mobile network card slots.



Ruggedized design

Solid RJ45/M12 Connectors against Vibration and Shock

Korenix designs switches with solid M12 D-coded and rugged RJ45 connectors, so that they can resist vibration / shock to reliably transmit data.

Wide Operating Temperature Range

To operate reliably on-board and off-board of transit systems, Korenix provides solutions with -25~70°C standard and up to -40~80°C wide operating temperature ranges.

Redundant Power Supply

Korenix offers solutions with dual power inputs, which can be connected to separate power sources or to a UPS as extended power source, as a result ensuring power reliability in transit applications.

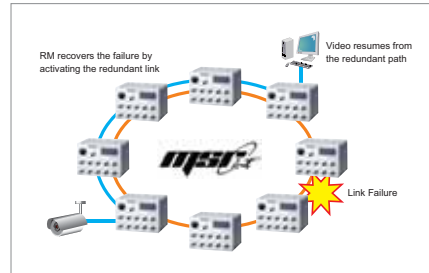
Isolated Booster for Safe Power Delivery

DC Booster of Korenix managed PoE switches is designed with Hi-pot isolation to protect the device from lightning and surge allowing switches efficiently power outdoor PDs under severe conditions.

Managing Transportation Networks Intelligently using Korenix

Multiple Super Ring (MSR) Network Redundancy Capability

To build a reliable network with non-stop data transmission inside transit systems and to backbone networks, in addition to MSTP/RSTP redundancy protocols, Korenix provides its own patented MSR ring redundancy technology with seamless restoration (0ms) and 5ms recovery time. The MSR enables switches to form multiple rings together with Gigabit or Fast Ethernet connection. As a result, it becomes possible to transfer data reliably without loss or collision.



MultiRing



To provide redundancy in complex networks, Korenix managed switches support MultiRing™ which allows aggregating multiple Gigabit & Fast Ethernet Fiber or Copper Rapid Super Rings within a single switch. Thus, with just one device, network bandwidth can be increased and system expanded through a variety of formed rings.

Advanced Layer 2 Network Management Functions

Korenix designs networking solutions with advanced network management and security functions to ensure the highest network performance inside transit systems with high quality and secure data transmission.

Some of the key features include:

IGMP Snooping: optimizes multicast video transmission, enhances bandwidth utilization and data quality

VLAN: isolates data traffic for a clear transmission and secures streams from malicious action

Private VLAN: enhances network security, simplifies network VLAN assignment, resolves VLAN shortage

QoS: prioritizes packets ensuring real-time video while preventing loss of images

DHCP option 82: assigns IP address with different policies

SNMP v1/v2c/v3: enables remote management of different levels of network

JetView Pro Industrial Intelligent Network Management System

Korenix i²NMS is specifically designed for industrial environments and provides a comprehensive platform for monitoring, configuring, and maintaining mission-critical IP-based communication networks.

Key distinguishing features are:

- Automated network discovery & topology visualization
- Manage up to 1024 network nodes
- Open support for 3rd party network devices
- Device and MSR group management
- Server-Client Operation for reliable, scalable and real-time network management
- Event, Status and Performance Management
- Centralized management to reduce traffic



High Power & Booster PoE for Transit Surveillance and High-End PoE

Managed / Unmanaged Transit Surveillance PoE Switches

- IEEE 802.3af PoE ports (max. 15.4W per port) to power IP Cameras
- Built-in Isolated 12~24V to 48V PoE Booster for vehicle PoE deployment
- Dual Gigabit ports for larger uplink bandwidth
- Extended Giga / 100Mbps fiber transmission by SFP transceivers
- Korenix MSR ring (5ms recovery time) & MSTP/RSTP for network redundancy
- Advanced management: LLDP, JetView Pro i²NMS, VLAN, IGMP Snooping
- Solid M12 / Rugged RJ45 connectors for anti-vibration/shock
- -40~60°C wide operating temperature, Isolated Booster PoE



Quick selection guide

	JetNet 6810G-RJ/M12	JetNet 3810Gf/3810f	JetNet 3810G	JetNet 3806G	JetNet 3705-24V
802.3af PoE (15.4W) ports	8 (RJ45/M12)	8	8	4	4
Uplink ports	2 GbE	2GbE / 100FX SFP	2GbE	2GbE	1100TX
Power Boost	Isolated 24 to 57V DC	12~24V to 48VDC	12~24V to 48VDC	12~24V to 48VDC	12~24V to 48VDC
Total Power Budget	120W	65W	65W	65W	67W@DC24V 62.4W@DC48V
Full Management/Security	•	QoS	QoS	QoS	QoS
Installation	Wall Mount	Din-Rail	Din-Rail	Din-Rail	Din-Rail
Environment	-40~60°C	-25~60°C	-25~60°C	-25~60°C	-25~60°C
Verification of Conformity	EN 50121-4/IEC 61373	e-Mark	e-Mark	e-Mark	

Industrial Managed PoE / 802.3at High Power PoE Switch



Quick selection guide

	JetNet 5728G series	JetNet 6710G-RJ/M12	JetNet 5710G	JetNet 4706/4706f
802.3at PoE (30W) ports	24 / 16 / 8	8 (RJ45/M12)	8	4/4
Uplink ports	4 GbE Combo	2GbE	2GbE	2 100TX / 100FX
Total Power Budget	540 / 340 / 160W @DC 240 / 240 / 75W @AC	200W	200W	80W
Full Management/Security	•	•	•	•
Installation	1U Rack	Wall Mount	Wall Mount	Din-Rail or Wall Mount
Environment	-25~65°C	-40~60°C	-40~70°C	-40~60°C
Verification		EN 50121-4/IEC 61373	EN 61000-6-2/-6-4	



Industrial PoE / Gigabit PoE Switch

Quick selection guide

	JetNet 3710G	JetNet 3706-RJ	JetNet 3705/3705f
802.3af PoE (15.4W) ports	8	4	4
Uplink ports	2 GbE	2 100TX	1 100TX / 100FX
Total Power Budget	65W	55W	60W
Installation	Din-Rail	Din-Rail or Wall Mount	Din-Rail or Wall Mount
Environment	-25~70°C	-40~70°C	-20~70°C / -10~70°C

Enriched Interface for Extended & High-Speed Data Transmission

Rackmount Managed Switches for Control Room

- Dynamic Layer 3 routing for Enhanced Network Group Management
- Up to 24 Gigabit Ports for High Speed Data Transmission
- Virtual Router Redundancy Protocol (JetNet 6524G / 5828G)
- Up to 8 unit stackable design (JetNet 6524G)
- 3 Exchangeable copper / fiber modular slots (JetNet 5628G / 5828G)
- Fiber / Gigabit SFP ports for extended data connection
- Korenix patented MSR (5ms recovery time) and MSTP/RSTP redundancy for reliable connection
- Advanced management: LLDP and JetView Pro i²NMS, Tag VLAN, IGMP Snooping, DHCP option 82



Quick selection guide

	JetNet 6524G/6524G-DC	JetNet 5828G series	JetNet 5628G series	JetNet 5428G/5428G-2G-2FX
10/100TX ports		Max 24	Max 24	24
10/100/1000TX ports	24	4	4	4 (JetNet 5428G); 2 (JetNet 5428G-2G-2FX)
Fiber ports	4G Combo	Max 22 (18+4G)	Max 22 (18+4G)	4G combo(JetNet 5428G), 2G combo + 2 100/Giga SFP (JetNet 5428G-2G-2FX)
Advanced L2+ Management	•	•	•	•
Layer 3 IP Routing	•	•		
Environment	-10~55°C (JetNet 6524G), -40~65°C Fanless (JetNet 6524G-DC)	-40~85°C, Fanless	-40~85°C, Fanless	-25~70°C, Fanless
Verification of Conformity		EN 50121-4, NEMA TS 1/NEMA TS 2		

Industrial Managed Din-Rail Switch for Field Site Connection

Quick selection guide



	JetNet 6059G	JetNet 5018G/5012G/5010G	JetNet 4518-w/4510	JetNet 4508 V2/4508f V2
10/100TX ports		16 / 8 / 7	18 / 10	8 / 6
10/100/1000TX ports	4 + 5 (Combo)	2 / 2 / 3 (Combo)		
Fiber ports	5 (Giga & 100FX SFP)	2 / 4 (Giga SFP) 3 (Giga & 100FX SFP)	2 / 3 (100FX SFP)	2 (100FX) (JetNet 4508f V2)
Full Management & Security	•	•	•	•
Environment	-25~70°C -40~75°C (-w)	-25~70°C -40~75°C (-w) -40~70°C (JetNet 5010G-w)	-40~75°C (JetNet 4518-w) -25~70°C (JetNet 4510) -40~70°C (JetNet 4510-w)	-20~70°C / -10~70°C -40~75°C (-w)
Verification of Conformity				EN50121-4/IEC61373

Industrial Din-Rail Entry-level Switch for Simple Data Streaming

Quick selection guide



	JetNet 3018G/3010G	JetNet 3008G/3005G	JetNet 3008/3008f	JetNet 2005/2005f
10/100TX ports	16 / 7		8 / 6	5 / 4
10/100/1000TX ports	2 (Combo) / 3	8 / 5 Giga		
Fiber ports	2 / 3 (Giga SFP)		2 (100FX) (JetNet 3008f)	1 (100FX) (JetNet 2005f)
Environment	-25~70°C / -20~70°C -40~70°C (JetNet 3010G-w)	-10~70°C	-34~70°C / 25~70°C	-25~75°C / -10~60°C -40~75°C (-w)

PoE Routing Platforms for Remote Computing & Mobile Expansion

Embedded Booster PoE Router Computers for in-Vehicle Surveillance

- VPN, DMVPN for enhanced secure networking
- Dynamic Layer3 Routing: OSPF, RIP, DVMRP, IPv6
- Multiple Interface: WAN, LAN, DIO, USB, Serial
- 12~24V to 48V DC Power booster for vehicle surveillance
- Gigabit for High-speed uplink bandwidth
- Full management with QoS, VLAN, PoE Scheduling
- miniPCIe & SIM slot for mobile expansion (GSM/GPRS/3G/HSUPA)
- Embedded Linux UI—Webmin
- Linux SDK for programming
- Auto-run SD card for customized configuration



Quick selection guide

	JetBox 9560	JetBox 9562	JetBox 9563G
Network (Switch + Router)	PoE x 4, WAN x 1	PoE x 4, WAN x 1	PoE x 4, GbE x 4, WAN x 1
PoE Booster	12~24V to 48V DC	12~24V to 48V DC	12~24V to 48V DC
Interface	USB x 3, DIO x 8	USB x 3, DIO x 8, RS 232/422/485 x 4	USB x 3, DIO x 8
CF / SD card slot	-	-	-
miniPCIe & SIM slot	-	-	-
Embedded Linux	Korenix JetOS95	Korenix JetOS95	Korenix JetOS95
Add-on SW	Webmin & JamVM	Modbus Gateway, Webmin & JamVM	Webmin & JamVM
Environment	-25~70°C	-25~70°C	-25~70°C

(PoE) Communication Computers for Data Gateway

- Static Routing: NAT, DMZ (JetBox 9300/9310)
- Embedded Linux ready for easy maintenance
- Linux SDK for programming
- Multiple Interface: WAN, LAN, DIO, USB, Serial
- 48V PoE for IP video surveillance (JetBox 9310)
- SD card slot for customized configuration
- -40~80°C wide operating temperature models



Quick selection guide

	JetBox 9310/9310-w	JetBox 9300/9300-w	JetBox 5300-w
Network (Switch + Router)	PoE x 4, WAN x 1	LAN x 4, WAN x 1	Ethernet Link x 2, LAN
Interface: Serial	RS 232/422/485 x 2, RS 232 x 2	RS 232/422/485 x 2, RS 232 x 2	RS 232/422/485 x 2, RS 232 x 2
Interface	USB x 2, DI x 4, DO x 4	USB x 2, DI x 4, DO x 4	USB x 2, DI x 4, DO x 4
CF / SD card slot	SD card slot	SD card slot	SD card slot
Add-on SW	Modbus Gateway	Modbus Gateway	Modbus Gateway
Embedded Linux	Korenix JetOS93 with Korenix WebUI & CLI		Korenix JetOS93 Lite
Environment	-25~70°C / -40~80°C	-25~70°C / -40~80°C	-40~80°C
Verification of Conformity	IEC 61373	IEC 61373	

Add-on Switch Cards / Computers for Infotainment

JetCard 5010G-P

- 8 LAN ports for high network connectivity
- 2 Gigabit SFP for long distance networking
- 9K Jumbo Frame for large packets
- 5 MultiRings for network redundancy
- Advanced management: SNMP, IGMP, QoS
- LLDP & JetView Pro efficient network management

JetCard 5400-w

- Intel IXP435 processor for enhanced routing
- VPN for long-distance and secure networking
- Pre-installed embedded Linux for computing

JetCard 2215

- 12~24V Booster PoE for Vehicle Surveillance
- PoE for IP camera connectivity



Quick selection guide

	JetCard 5010G-P Embedded Single Board Switch	JetCard 5400-w PCI-104 Single Board Computer	JetCard 2215 Standalone UPCI PoE Switch Card
Ports	10/100Mbps Ethernet x 82 Gigabit SFP	10/100Mbps Ethernet x 5 USB2.0 x 1 / Console x 1	10/100Mbps Ethernet x 5 (4ports with PoE, 15.4W)
Fiber ports			12~24V to 48V DC
Management & Security			QoS
Routing		Layer 3 routing, VPN, IPv6 Managed Switch	
Computing / OS		Linux Kernel	Vista/NT/2000/2003/XP
Environment	-25~70°C	-40~80°C	-25~70°C

Outdoor Wireless APs for Wireless Data Transmission

- IEEE 802.11a 5GHz + 802.11b/g 2.4GHz for long distance wireless transmission (JetWave 2600 series)
- IEEE 802.11n with 150Mbps data rate for high performance wireless transmission (JetWave 2450)
- 5KM ~ 40KM wireless coverage
- Link Aggregation for higher bandwidth & long distance transmission
- Embedded Directional Antenna and N-type External Antenna Slot
- Wireless QoS (WMM) for video precedence transmission
- Operating Mode: Base Station, CPE, Relay, P2P, P2MP for flexible installation
- Advanced Security: WEP, WPA, WPA2 and Mac Address Filter



Quick selection guide

	JetWave 2610	JetWave 2620	JetWave 2640	JetWave 2450
Standard	802.11a	Dual 802.11a	802.11a+b/g	802.11n(b/g/compliant)
Max. Transm. Distance	40KM	40KM	40KM	5KM
Power input	802.3af (48VDC)	802.3af (48VDC)	802.3af (48VDC)	12V PoE
Antenna	1Embedded	1Embedded, 1 external	1Embedded, 1 external	1Embedded / external
Operating Mode	Base Station, CPE, P2P, P2MP	Base Station, CPE, Relay, P2P, P2MP	Base Station, CPE, P2P, P2MP	Base Station, CPE, P2P, P2MP
Management & Security				
Other	STP, QoS	STP, QoS	STP, QoS	STP, QoS, DHCP Server, Router mode
Environment	-30~70°C	-30~70°C	-30~70°C	-20~70°C

Ethernet IO Modules for Remote Digital Control in Transit System

- Analog Input/Output, Digital Input/Output, temperature measurement channels for easy & multiple field device connections
- Active alarm for High/Low Voltage/Current/Temperature through SNMP trap
- Intelligent Condition&Go logic rules for smart IO configuration
- Flexible peer-to-peer I/O through one-to-one, one-to-many, many-to-one, and many-to-many communication for efficient IO extension
- Supports OPC Server Driver
- Flexible Remote Management via Windows Utility, OPC Server, Modbus/TCP protocol, SNMP and Web display
- Built-in watchdog timer and real-time clock
- Robust Aluminum case with IP31 protection, -25~70°C op. temp.



Quick selection guide

	Jet/O 6510	Jet/O 6511	Jet/O 6512	Jet/O 6520	Jet/O 6550
Analog Input Input Range	8 Channels, Res. 16bits Analog: $\pm 10V, \pm 5V, \pm 1V, \pm 500mV, \pm 150mV, \pm 20mA$	8 Channels, Res. 16bits Thermocouple; $\pm 2.5V, \pm 1V, \pm 500mV, \pm 100mV, \pm 50mV, \pm 15mV, \pm 20mA$	4 Channels, Res. 16bits RTD: PT100, NI 120		
Analog Output Output Range				4 Channels, Res. 12bits Voltage Source: 0-10V, Current: $\pm 10V, 0-20mA$	
Digital Input Digital Output					14 Channels, DI/Event Counter 8 Channels, DO/Pulse Output

Gigabit / FE Media Converters for Longer Distance Data Conversion

- Converts Fast Ethernet/Gigabit Copper to Fast Ethernet/Gigabit Fiber
- Flexible SFP Fiber transceivers for long distance transmission
- 2KM by Multi-mode and 30KM by Single-Mode
- Auto Link Loss Forwarding (LLF) for fault detection
- Fault Alert for port and power
- IEEE 802.1p QoS for data precedence transmission
- Redundant DC 12~48V power inputs
- Aluminum case with IP 30 / IP31 grade protection



Quick selection guide

	JetCon 3401G	JetCon 2301	JetCon 2302	JetCon 1301	JetCon 1302
Copper Ports: 10/100Base-TX	1 GbE	1	2	1	2
Fiber Ports: 10/100Base-FX	Gigabit SFP	1	2	1	1
Operating Mode	DC 24V x 2 (12~48)	DC 24V (10~60V)	DC 24V (10~60V)	DC24V (18~32V) (JetCon 1301 / 1302) DC48V (36~60V) (JetCon 1301-48V)	
Operation Modes	Switch Mode	Switch, Pure Converter, Converter w/ Auto Change, Modify Cut-through	Switch, 2-Channel Pure Converter	Switch, Pure Converter	Switch Mode
Management & Security
Environment	-25~70°C	-25~70°C -40~75°C(-w)	-25~70°C -40~75°C(-w)	-10~70°C -40~80°C(-w)	-10~70°C -40~70°C(-w)

Applications

Bus Surveillance

Enhance Bus Passengers' Safety through Real-Time Video Traffic Transmission



To help reduce crime and vandalism, many public transportation companies deploy IP video surveillance systems.

Korenix JetNet 3810G has been recently used by a bus company in Perth for its 24V PoE and dual gigabit uplink connectivity providing reliable video surveillance and becoming the ideal cost-effective solution for this application.



Why JetNet 3810G

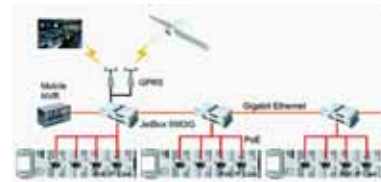
- Patented Booster: 12~24VDC power input, IEEE 802.3af PoE out for Bus Surveillance
- 8-port PoE for reducing wiring costs
- 2 Giga ports for megapixel video transmission
- Aluminum housing for anti-vibration/shock

Railway Carriage Monitoring

Ensure Non-Stop Monitoring of Large-Scale Networks via High-Bandwidth Uplink Connectivity



The rapid expansion of the railway networks and the latest technological developments conduct the transportation companies to build intelligent network systems for carriage monitoring. The JetBox 9563G integrates all-in-one functions in a single box to power 48V cameras inside carriages, provide high bandwidth uplink connectivity and wireless transmission while reducing the system maintenance time & costs.



Why JetBox 9563G

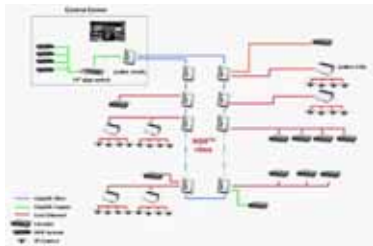
- 12~24V Booster PoE with 15.4W per port for Powering IP cameras in vehicles
- 4-port PoE reduces wiring costs
- 4 Gigabit uplinks for megapixel video transmission
- Linux SDK for programmable customized applications

Applications

Airport Auto Transit System High Performance and Non-Stop Video Surveillance of Automated Transit Systems



Unpolluted green environment is every society's main concern. The new ULTRA transit systems are a great response to this issue while providing fast, efficient services to the passengers. Equipped with rugged IP31 enclosure and outstanding management functions, Korenix solutions are best choice to provide real-time, high-quality surveillance under severe environmental conditions.



Why JetNet 5010G

- 3 Giga SFP combo ports to extend fiber ring
- MSR & MultiRing, up to 12 x 100M and 2
- Giga Rings for high-performance connectivity
- LLDP & JetView Pro for auto device discovery

Why JetNet 4706

- Up to 25W High Power PoE for high-end demanding IP cameras
- IP31 grade enclosure w/ -40~60°C op. temp. for severe environmental applications

Railway Carriage Monitoring Real-time and High Quality Traffic Monitoring of Vehicle Flow and Speed Limit on Toll Station



With increasing complexity of traffic flow in highways, the role of reliable, congestion-free road traffic management becomes more crucial. By applying Korenix switches with MSR redundant ring technology, non-stop and high speed transmission is ensured where any link failure is recovered within 5ms. This enables continuous surveillance network in large scale extended applications!



Why JetNet 5428G

- 14 MultiRings with 24+4G ports maximize network scale, ensure reliable data transmission
- 4 giga combo ports trunk 8G uplink bandwidth

Why JetNet 5018G

- 2Giga SFP combo ports extend fiber ring
- LLDP & JetView Pro for auto topology visualization and efficient network management
- IP 31 enclosure, -25~70°C wide op. temp. for severe environment applications