EN50155 Cyber-Hardened Managed PoE Switch

ITR-AG804TM-8PHE24i & ITR-AG804TM-8PHE-WVi

- **12x GbE M12 with 8x PoE 60W, 24/48VDC**
- **12x GbE M12 with 8x PoE 60W, 24/48/72/96/110VDC**

- *L3 IPV4/IPV6 Static Routing, RIP v1/v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing*
- *Compliant with the IEC 62443-4-2* Industrial Cybersecurity Standards*
- *EN50155, EN50121-4, EN45545-2, EN61000-6-2, EN61000-6-4, CE and FCC Certified*
- *24/48/72/96/110VDC Redundant Dual Power Input*
- *Supports Power Isolation*
- *Regulated PoE Output Voltage*
- *Auto Checking and Auto Reset when PoE PD Fail*
- *Build-in 2 Bypass GbE UTP Port*

EN50121-4 | EN61000-6-2 EN61000-6-4 | EN45545-2 | EN50155 | PoE Regulated | µ-Ring | Power Isolation | Cyber Security IEC 62443-4-2

The EN50155 certified and cyber-hardened managed PoE switches, ITR-AG804TM-8PHE24i and ITR-AG804TM-8PHE-WVi, deliver reliable, high-speed connectivity for rolling stock environments. They feature 12 Gigabit M12 X-code Ethernet ports that ensure secure and stable connections even under vibration and shock conditions. With Layer 3 routing capabilities, including IPv4/IPv6 static routing, RIP v1/v2, and OSPF v2/v3 dynamic routing, the switches enable flexible network segmentation and optimized data traffic management.

Compliant with the IEC 62443-4-2 cybersecurity standard, the ITR-AG804TM series ensures the security and stability of onboard and train-to-ground communications. This compliance strengthens protection against cyber threats and enhances the overall resilience of intelligent railway systems. In addition, the switches support ring redundancy to ensure reliable network failover and prevent system downtime caused by single-point failures.

The series also supports advanced PoE management functions, including auto power detection, intelligent power reset, and scheduling, improving energy efficiency and device uptime. With isolated 24/48 VDC or 24/48/72/96/110 VDC power inputs, the design supports voltage boosting to ensure stable PoE operation across diverse vehicle power systems. Certified to EN 50155 standards for temperature, voltage fluctuation, surge, ESD, vibration, and shock, the ITR-AG804TM series delivers long-term reliability in mission-critical rail and vehicle applications.

Features

- M12 connector against vibration and shock
- 24/48/72/96/110VDC redundant dual input power, and built-in power booster design up to 50VDC for PoE output
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters
- Cable diagnostics, identifies opens/shorts distance
- Provides up to 5 instances that each supports µ-Ring, µ-Chain or Sub-Ring type for flexible uses.
  (Please see CTC Union's µ-Ring white paper for more details)
- Supports TTDP for train application
- Supports EMS Management

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1D	STP (Spanning Tree Protocol)
	IEEE 802.1W	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1S	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)

Standard	ITU-T G.8031 / Y.1342	APS (Automatic Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ac	Max frame size extended to 1522Bytes
	IEEE 802.3ad	Link aggregation for parallel links with LACP (Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet ehancements)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
VLAN ID	4094 IEEE802.1Q VLAN ID	
Switch Architecture	Back-plane (Switching Fabric): 24Gbps (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
PoE RJ-45 Pin Assignment	8x M12 (8-Pin X-code Female) ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode.	
Network Connector	12x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP	
	UTP port provides Auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function	
	Build-in 2x bypass GbE UTP ports	
Console	RS-232 (5-pin A-Code M12 male)	
USB	5-Pin M12 male	
Network Cable	UTP/STP Cat. 5e cable or above	
	EIA/TIA-568 100-ohm (100meter)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	System: Power 1 (Green), Power 2 (Green)	
	UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber)	
	PoE: ON (Green)	
Jumbo Frame	10KB	
MAC Address Table	16K	
Memory Buffer	12Mb for packet buffer	
Device Memory	4G Bytes eMMC, 2G Bytes RAM	
PoE Standard	IEEE802.3af, IEEE802.3at	
PoE Power Output	Maximum PoE output power budget 96W at 70°C, 60W at 75°C (Max 30W/port) Regulated PoE output voltage at 50VDC	
Power Supply	Provides 1x M12 (5-Pin, male) for redundant dual DC 24/48V (20~57VDC) or DC 24/48/72/96/110V (16~130VDC) input power	
	Built-in very high efficiency booster(94~97%) to rise up 50VDC for PoE output	
	Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100 meter	

Power Consumption

Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
24 VDC	80W	13W	60W	95.6%
48 VDC	81W	14W	60W	95.9%
110VDC	82W	15W	60W	N/A

Warning Message	System Syslog, SMTP/ e-mail event message
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless, IP40 grade housing for against water, dust, and oil
Dimensions	116.5 x 184.6 x 118mm (D x W x H)
Weight	TBD
Installation Mounting	Wall mounting or DIN Rail mounting (Optional)
MTBF	TBD (MIL-HDBK-217)

Certification	
Industrial Cybersecurity	IEC 62443-4-1, IEC 62443-4-2*
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN45545-2
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
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

*Future release

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN ID
	IEEE 802.1q VLAN, up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN, up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	Private VLAN for port isolation
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
	Voice VLAN
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 6 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 6 trunk group
Spanning Tree	IEEE802.1D STP, IEEE802.1W RSTP, IEEE802.1S MSTP
MRP (IEC 62439-2)	Supported
Multiple μ-Ring	Up to 5 instances that each supports u-Ring, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings.
	Recovery time <20ms
	The maximum number of device is allowed 250 nodes in a Ring.
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported

QoS Features	
Class of Service	IEEE802.1p 8 active priorities queues per port
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, Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number

Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
	Per queue / Port shaper
DiffServ (RF 2474) Remarking	
Storm Control	For Unicast, Broadcast and Multicast
IP Multicasting Features	
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
Security Features	
IEEE 802.1X	Port-Based, MAC-Based
ACL	Number of rules : up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS	Authentication & Accounting
TACACS+	Authentication, Authorization, Accounting
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local Authentication
	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access Filtering	Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web UI	Supported
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	SFTP, TFTP, FTP, HTTPS, HTTP
	Redundant firmware in case of upgrade failure
FTP client	Supports for upload/download configuration
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82, Snooping
RARP	Supported
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
	Syslog server (RFC3164) (Supports 4 Server)
Warning Message	System syslog, e-mail
DNS	Client, Proxy
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTPS, HTTP over IPv6	Supported

SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP
Others Features	
Green Ethernet	Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link
Cable Diagnostic	Measuring UTP cable OK or broken point distance
Advanced PoE Management	PoE PD Failure Auto Checking, and Auto reset when PD fail
	PoE Scheduling (On/Off schedule weekly)
	PoE Configuration
	PoE Enable/Disable
	Power limit by classification
	Power limit by management
	Total PoE Power budge (maximum 96W at 70°C, 60W at 75°C) limitation

Ordering Information

Model Name	Managed	Total Port	UTP M12	PoE	PoE Total Power Budget	Power Input	Certification				Operating Temperature
			10/100/1000 Base-T	IEEE 802.3at		Redundant	EN50155 EN50121-4	EN45545-2	EN61000-6-2 EN61000-6-4	CE FCC	
ITR-AG804TM-8PHE24i	V	12	12 (X-Code)	8	60W	24/48VDC	V	V	V	V	-40~75°C
ITR-AG804TM-8PHE-WVi	V	12	12 (X-Code)	8	60W	24~110VDC	V	V	V	V	-40~75°C

Optional Accessories

■ Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12XM8-RJ45

M12 X-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter

For GbE UTP (X-code model)

P/N: CAB-M12KF5-OPEN

M12 K-code Female (5-Pin) to open wire , AWG 16 , IP67, 1 meter

For Power

P/N: M12X-M8

M12 X-code Male (8-Pin) connector, IP67

For GbE UTP (X-code model)