



ITP-1204GTM-12PH

12x 10/100Base-TX + 4x 10/100/1000Base-T with
12x PoE⁺ Managed Ethernet Switch

ITP-2204GTM-16PH

22x 10/100Base-TX + 4x 10/100/1000Base-T with
16x PoE⁺ Managed Ethernet Switch



These models of industrial grade M12 managed PoE switches that provide total 16/26 ports Ethernet connectivity, come with 12/22 ports 10/100Base-TX and 4 ports 10/100/1000Base-T(X). These PoE switches with up to 12/16 IEEE 802.3at compliant PoE plus ports are classified as power source equipment (PSE) and provide up to 30 watts of power per port, maximum power budget up to 120W, and can be used to power IEEE 802.3af/at compliant powered devices (PDs), such as surveillance cameras, wireless access points, and IP phones.

The PoE switches use M12/M23 connectors to ensure tight and robust connections that guarantee the reliable connections against environmental disturbances, such as strongly vibration and shock. These switches provide wide power input range of 24/48/72/96/110VDC (operating range 20 to 137.5VDC) making this product series suitable for rolling stock and track side installations. Especially, the ITP series switches defined by the EN 50155 standard covering power input voltage and insulation, surge, EFT, ESD, operating temperature as well, thus making the M12 switches suitable for industrial applications, not only for rolling stock, vehicle but also for oil, gas, mining and heavy industry applications.

These switches provide a variety of advanced Ethernet functionalities including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and μ-Ring, μ-Chain (recovery time <10ms @250 devices) for networking redundancy, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic, Green Ethernet, and can work with CTC Union's platform SmartView™ to provide convenient, real-time and centralized device management.

Features

- 12x 10/100Base-TX + 4x 10/100/1000Base-T with 12x PoE⁺ (ITP-1204GTM-12PH)
- 22x 10/100Base-TX + 4x 10/100/1000Base-T with 16x PoE⁺ (ITP-2204GTM-16PH)
- M12 and M23 connector against vibration and shock, M12 X-code for Gigabit port
- IP64 grade housing protection
- 24/48/72/96/110VDC (20~137.5VDC) redundant dual wide input power
- Supports negative voltage power input (for example in telecom system)
- Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meters
- Provides 12/16-port IEEE 802.3af / 802.3at PoE output (30W per Port)
- Maximum PoE output power budget 120W
- Advanced PoE Management, management, PoE PD failure, auto checking and auto reset, PoE configuration for power planning, weekly scheduling
- EN60950-1, CE, FCC, Rail Traffic EN50155, EN45545-2, EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for PoE and UTP ports
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- Cable diagnostics, identifies opens/shorts from 7 to 100 meters
- Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Protection Ring (EPR) for redundant cabling
- 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)
- μ-Ring for Redundant Cabling, recovery time<10ms in 250 maximum devices
- Build-in 2 bypass GbE UTP ports to avoid one or more nodes power fail in a ring or bus structure to collapse the network (-BP bypass model)
- DHCP Server/ Client/ Relay/ Relay option 82/ Snooping
- Supports TTDP for train application
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- Supports IEEE 1588 PTP V2 for precise time synchronization to operate in Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave mode by each port
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for Management (Please see Catalog chapter 1- Software Management for more details)
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supports SmartView for Centralized Management*

*Please see Chapter 1- **Software Management** for more details

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 802.1d	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)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE802.3ac	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 enhancements)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
VLAN ID	4094	IEEE802.1Q VLAN VID
	10.4 Gbps (ITP-1204GTM-12PH)	
	12.4Gbps (ITP-2204GTM-16PH)	
(Full wire-speed)		
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
PoE Port	12x M12 (4-Pin D-code Female) PoE ports (ITP-1204GTM-12PH)	
	16x M12 (4-Pin D-code Female) PoE ports (ITP-2204GTM-16PH)	
	Maximum PoE output power budget 120W (30W/per port), Regulated PoE output voltage at 50VDC	
	IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode	
Network Connector	12x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-1204GTM-12PH)	
	22x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 4x M12 (8-Pin, Female, X-Code) 10/100/1000Base-T UTP (ITP-2204GTM-16PH)	
	UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function Build-in 2x bypass GbE UTP ports (For -BP model optional)	
Console	RS-232 (5-pin A-Code M12 male)	
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Amber)	
	UTP port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	

Software Specifications

Topology		
VLAN	IEEE 802.1q VLAN,up to 4094	IEEE802.1Q VLAN VID
	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(Ethernet, SNAP, LLC), up to 128 entries	
	VLAN Translation, up to 256 entries	
	GVRP (GARP VLAN Registration Protocol)	
	MVR (Multicast VLAN Registration)	
	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group	
Link Aggregation (Port Trunk)	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group	

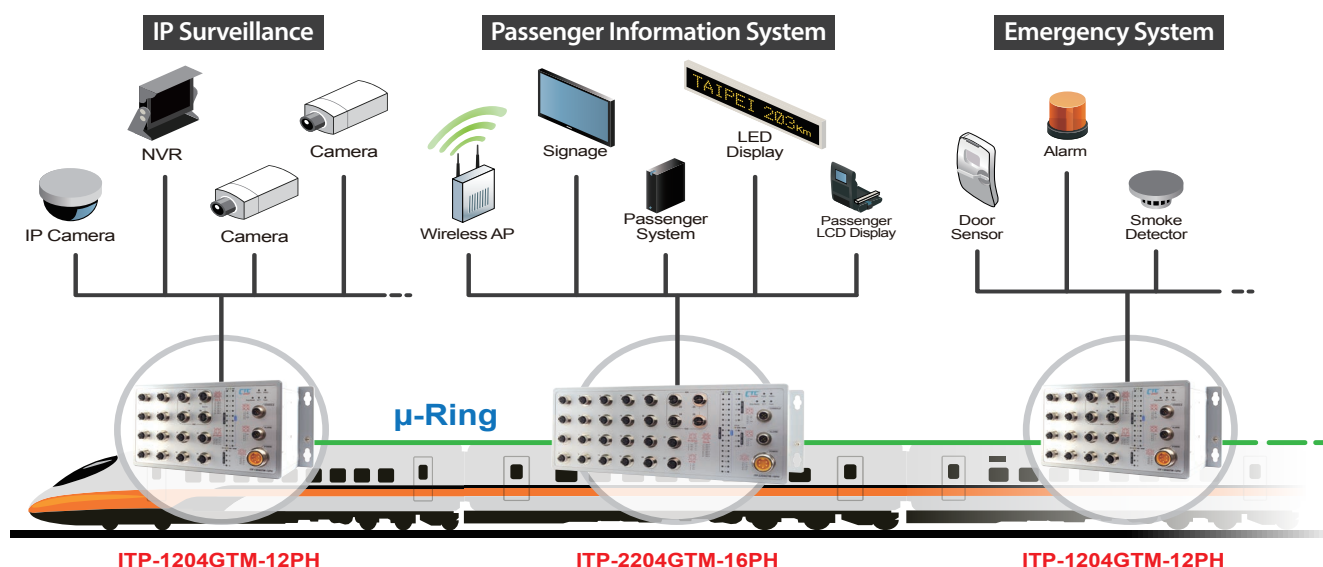
LED	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green)
Jumbo Frame	9.6KB
MAC Address Table	8K
Memory Buffer	512K Bytes for packet buffer
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48/72/96/110VDC (20~137.5VDC) wide input power Supports negative voltage power input (for example in telecom system) Regulated PoE output voltage (50VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter
Power Consumption	TBD
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC
Operating Temperature	-40 ~ 75°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, Fanless, IP64 grade housing protection
Dimensions	113 x 260 x 132 (D x W x H) (ITP-1204GTM-12PH) 113 x 360 x 132 (D x W x H) (ITP-2204GTM-16PH)
Weight	TBD
Installation Mounting	Wall mounting
MTBF	TBD (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50155, EN50121-4
Fire protection of railway vehicles	EN 45545-2
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
Safety	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
	EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for PoE and UTP port
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP
Multiple μ-Ring	up to 5 instances that each supports μ-Ring, μ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250. (Please see CTC μ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <10ms Single Ring, Sub-Ring, Multiple ring topology network

QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port
Traffic Classification	IEEE802.1p based CoS
Classification QoS	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 for Ingress	Rate in steps : 1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
Bandwidth Control for Egress	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
IP Multicasting Feature	
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile, Throttling
IGMP / MLD Snooping	Fast Leave
IGMP / MLD Snooping	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 & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name	Local Authentication
Password	
Authentication	Remote Authentication (via RADIUS / TACACS+)
Management Interface Access	Web, Telnet / SSH, CLI, RS-232 console
Filtering	
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
	Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB II	RFC 1213
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
TTDP	Supported (Train Topology Discovery Protocol)
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
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
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 SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
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 120W) limitation Power feeding priority

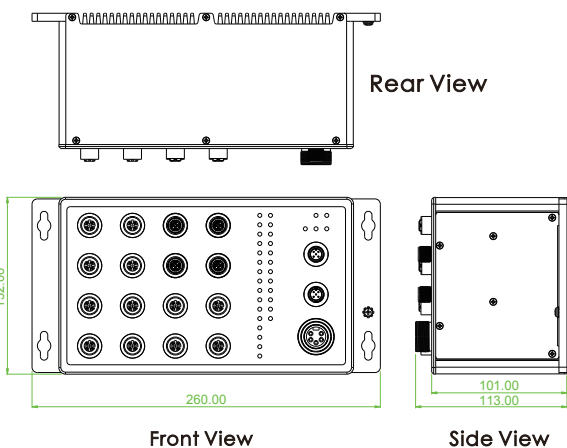
Application

Figure : ITP Series in Onboard Train Application

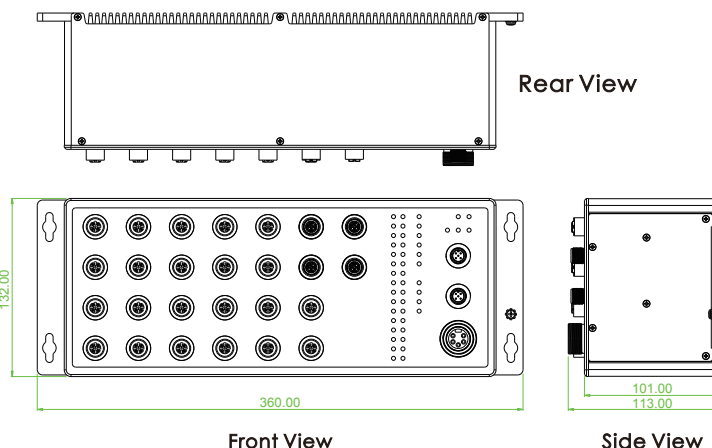


Dimensions

▶ ITP-1204GTM-12PH



▶ ITP-2204GTM-16PH

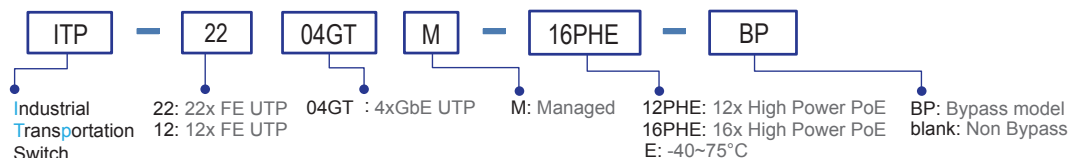


Ordering Information

Model Name	Managed	Protection	Total Port	FE Port	GbE port		PoE Port		Redundant Dual Input Power 24/48/72/96/110VDC (20~137.5VDC)
				D-code M12	GbE X-code M12 UTP	GbE X-code M12 UTP Bypass	IEEE802.3at	PoE Total Power Budget	
ITP-1204GTM-12PHE	V	IP64	16	12	4		12	120W	V
ITP-1204GTM-12PHE-BP	V	IP64	16	12	2	2	12	120W	V
ITP-2204GTM-16PHE	V	IP64	26	22	4		16	120W	V
ITP-2204GTM-16PHE-BP	V	IP64	26	22	2	2	16	120W	V

Model Name	Certification					
	EN45545-2	EN50155 EN50121-4	EN60950-1	EN61000-6-2 EN61000-6-4	CE, FCC	IEC61373
ITP-1204GTM-12PHE	V	V	V	V	V	V
ITP-1204GTM-12PHE-BP	V	V	V	V	V	V
ITP-2204GTM-16PHE	V	V	V	V	V	V
ITP-2204GTM-16PHE-BP	V	V	V	V	V	V

Model Naming Rule



■ Package List

- One unit device
- Protective caps for UTP ports and console, alarm port
- Console cable (M12 to DB9)
- CD (Smartconfig, Manual)
- Quick installation guide

Optional Accessories

■ Optional Cable/Connector

P/N: CAB-M12XM8-RJ45

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



For GbE UTP (X-code)

P/N: CAB-M12DM4-RJ45

M12 D-code Male (4-Pin) to RJ-45, AWG 24, IP67, 1 meter



For FE UTP

P/N: CAB-M12AF5-OPEN

M12 A-code Female (5-Pin) to open wire, AWG 22, IP67, 1 meter



For Alarm

P/N: CAB-M23F5-OPEN

M23 Female (5-Pin) to open wire, (AWG 16), IP67, 1 meter



For Power

P/N: M12D-M4

M12 D-code Male (4-Pin) connector, IP67



For FE UTP

P/N: M12A-F5

M12 A-code Female (5-Pin) connector, IP67



For Alarm