ITP-1204GTM

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

ITP-2204GTM

22x 10/100Base–TX + 4x 10/100/1000Base-T
Managed Ethernet Switch

CE FC | EN45545-2 | EN550155 | EN50121-4 | EN61000-6-2 EN61000-6-4 | SmartView | μ-Ring | IEEE 1588v2 | X Code

These models of industrial grade M12 managed Ethernet switches provide total 16/26 ports Ethernet connectivity, come with 12/22 ports 10/100Base-TX and 4 ports 10/100/1000Base-T(X).

The switches use M12/M23 connectors to ensure tight and robust connections to guarantee 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. ITP series switches, defined by the EN 50155 standard, cover power input voltage and insulation, surge, EFT, ESD, operating temperature, 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 and Green Ethernet. They can work with CTC Union's platform SmartView™ Which provides convenient, real-time and centralized device management.

Features

- 12x 10/100Base–TX + 4x 10/100/1000Base-T (ITP-1204GTM)
- 22x 10/100Base–TX + 4x 10/100/1000Base-T (ITP-2204GTM)
- M12 and M23 fiber 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)
- EN45545-2, EN-60950-1, CE, FCC, Rail Traffic EN50155,EN50121-4 certified
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- 4KV surge protection for 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
- Support 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
- 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)	

Standard		
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	
IEEE 802.3ac	Max frame size extended to 1522Bytes	

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Standard		
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE802.3ac	Max frame size extended to 1522Bytes
	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)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
VLAN ID	4094 IEEE802.1Q VLAN VID	
Switch Architecture	10.4 Gbps (ITP-1204GTM) 12.4Gbps (ITP-2204GTM) (Full wire-speed)	
Data Processing	Store and Forward	
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex 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)

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)

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)	
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)	
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℃
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85℃
Housing	Rugged Metal, Fanless, IP64 grade housing protection
Dimensions	113 x 260 x 132 (D x W x H) (ITP-1204GTM) 113 x 360 x 132 (D x W x H) (ITP-2204GTM)
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
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
4KV surge protection	Supported for UTP port
Shock	IEC-61373
Freefall	IEC 60068-2-32
Vibration	IEC-61373

Software Specifications

Topology	
VLAN	IEEE 802.1q VLAN,up to 4094 802.1Q 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(Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
Link Aggregation (Port Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
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 QoS	IEEE802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS
Traffic Classification QoS	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
	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
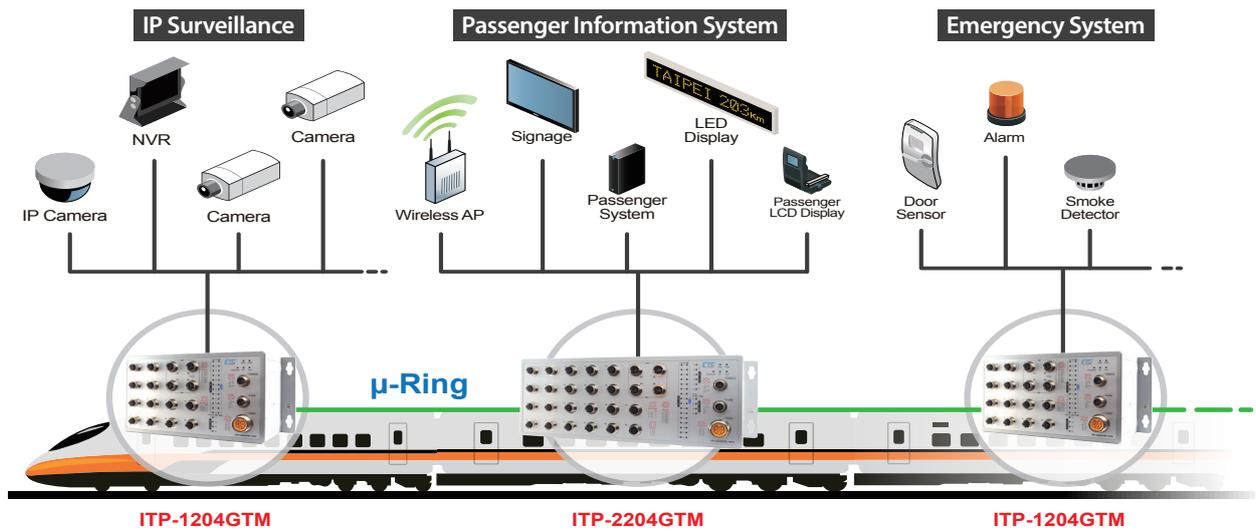L2: Mac address SA/DA/VLAN
L3: IP address SA/DA, Subnet
L4: TCP/UDP

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RADIUS authentication & accounting			IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
TACACS+ authentication & accounting, TACACS+ 3.0			NTP, SNTP	Client
HTTPS, HTTP	Supported		LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
SSL / SSH v2	Supported			LLDP-MED
User Name	Local Authentication		**IPv6 Features**	
Password			IPv6 Management	Telnet Server/ICMP v6
Authentication	Remote Authentication (via RADIUS / TACACS+)		SNMP over IPv6	Supported
Management Interface Access Filtering	Web, Telnet / SSH, CLI, RS-232 console		HTTP over IPv6	Supported
			SSH over IPv6	Supported
Management Features			IPv6 Telnet	Supported
CLI	Cisco® like CLI		IPv6 NTP, SNTP	Client
Web Based Management			IPv6 TFTP	Supported
Telnet	Server		IPv6 QoS	Supported
SNMP	V1, V2c, V3		IPv6 ACL	Number of rules: up to 256 entries
SW & Configuration Upgrade	TFTP, HTTP			for L2 / L3 / L4
	Redundant firmware in case of upgrade failure			L2: Mac address SA/DA/VLAN
RMON	RMON I (1, 2, 3, 9 group), RMON II			L3: IP address SA/DA, Subnet
MIB II	RFC 1213			L4: TCP/UDP
UPnP	Supported		**Others Features**	
DHCP	Server, Client, Relay, Relay option 82 , Snooping		Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
TTDP	Supported (Train Topology Discovery Protocol)			Determine the cable length and lowering the power for ports with short cables
IP Source Guard	Supported			Lower the power for a port when there is no link
Port Mirroring	Supported			LED Power Management :Adjustment LEDs intensity
Event Syslog	Syslog server (RFC3164) (Support 1 server)		Cable Diagnostic	Measuring UTP cable OK or broken point distance
Warning Message	System syslog, e-mail, alarm relay			
DNS	Client, Proxy			

Application

Figure : ITP Series in Onboard Train Application

ITP-1204GTM   ITP-2204GTM   ITP-1204GTM

Dimensions

▶ ITP-1204GTM

Rear View

132.00

260.00

101.00
113.00

Front View   Side View

▶ ITP-2204GTM

Rear View

132.00

360.00

101.00
113.00

Front View   Side View
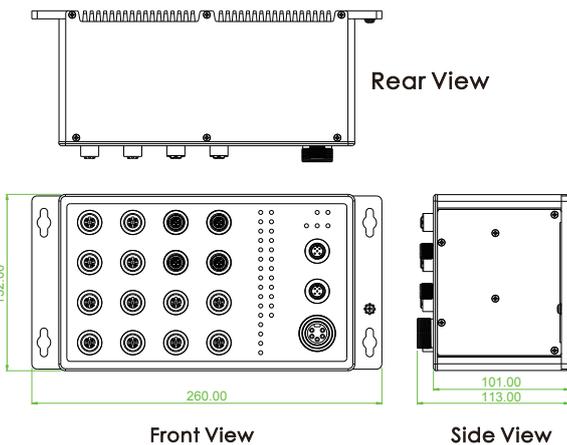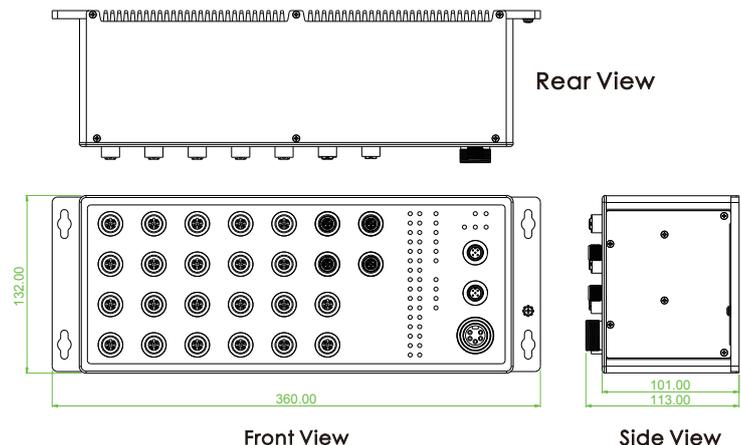
Ordering Information

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

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

Model Naming Rule

ITP	—	22	04GT	M	—	E	—	BP

Industrial **T**ransportation Switch

22: 22x FE UTP
12: 12x FE UTP

04GT : 4xGbE UTP

M: Managed

E: -40~75°C

BP: Bypass model
blank: Non Bypass
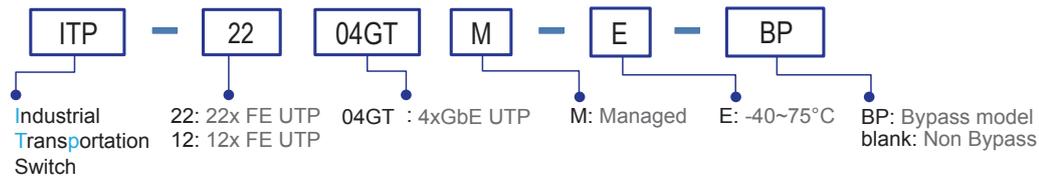
■ Package List

- 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

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EN50155 Managed Switch   ITP-1204GTM & ITP-2204GTM

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