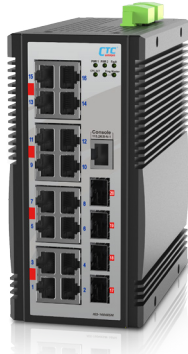


IGS-1604XSM

16x 10/100/1000Base-T + 4x GbE/2.5G/5G/10GBase-X SFP+



- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC certified



An Industrial 20-port Ethernet switch comes with 16 ports Gigabit copper interface and 4 ports 10 Gigabit SFP+ slots, supporting various types of 10 and 2.5Gigabit optical small form-factor pluggable transceivers for long-distance and wide-bandwidth transmission, supports STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for link redundancy. Moreover, CTC proprietary μ -Ring supports recovery time < 10ms in 250 devices to enhance a reliable non-stop network that used to connect various types of Ethernet devices. It adopts an enhanced and hardened design for high surge protection, wide operating temperature and safety certified to meet critical and centralize strict requirements.

Features

- 12/24/48VDC (9.6~60VDC) redundant dual input power
 - Cable diagnostics, identifies opens/shorts distance
 - Provides 5 ring instances that each can support μ -Ring, μ -Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC μ -Ring white paper for more details and more topology application)
 - μ -Ring for redundant cabling, recovery time < 10ms in 250 devices
 - 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 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE802.3ae	10G bit/s Ethernet over Fiber
	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)
	ITU-T G.8031 / Y.1342	EPS (Ethernet 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 802.1ad	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)	
Switch Architecture	Back-plane (Switching Fabric): 112Gbps 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	16x 10/100/1000Base-T RJ-45 + 4x 100/1000/2.5G/5G/10GBase-X SFP connector RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 1G/2.5G/5G/10G speed with DDM1	

Console	RS-232 (RJ-45)	
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant Dual DC 12/24/48VDC (9.6~60VDC) input power, (Removable terminal block)	
Power Consumption	Input Voltage	Power Consumption
	12VDC	22.7W
	24VDC	24.3W
	48VDC	28.5W
LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) Per SFP Fiber port: 1G/2.5G/5G Link/Active (Amber) 10G Link/Active (Blue)	
Jumbo Frame	10KB	
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	
MAC Address Table	32K	
Memory Buffer	4M Bytes for packet buffer	
Device Memory	128M Bytes Flash ROM, 2G Bytes RAM	
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	
DO (Alarm Relay Contact)	Relay outputs with current carrying capacity of 1 A @24VDC	
DI Input	DI 17 to 30 V for state 1 0 to 15 V for state 0	
Removable Terminal Block	Provides 2 terminal block for DO (Alarm Relay), DI, redundant power PWR1 and PWR2	
Operating Temperature	-40 ~ 60°C	
Operating Humidity	5% to 95% (Non-condensing)	

Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	155.6 x 77 x 160mm (D x W x H)
Weight	2.035g
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	251,400 (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN62368-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6

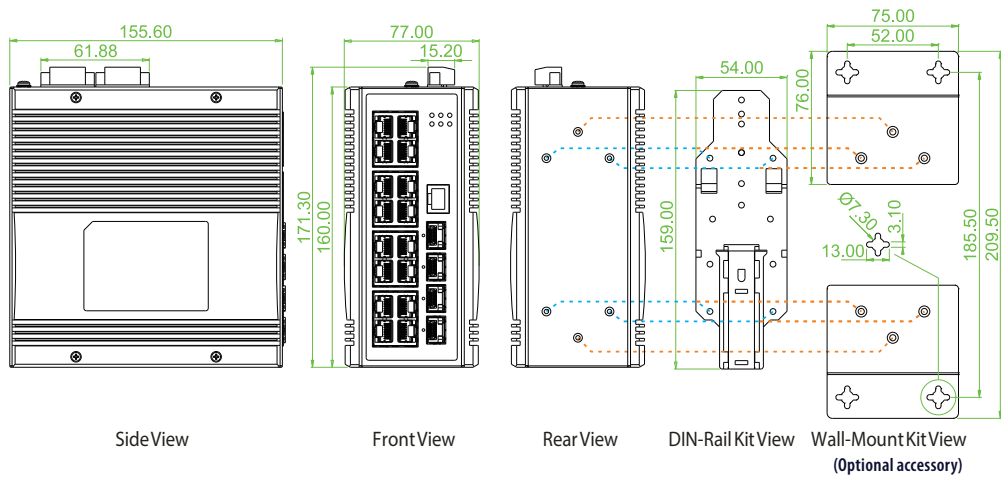
Software Specifications

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 (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries 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 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s 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 Union 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 <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	IEEE 802.1p 8 active priorities queues for per port
Traffic Classification QoS	IEEE 802.1p based CoS, 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	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 / Per port shaper
DiffServ (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, 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
TACACS+ authentication & accounting, TACACS+ 3.0	
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 Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, 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	RFC1213 MIB II, Private MIB
UPnP	Supported
BOOTP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
RARP	Supported
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164)
Warning Message	System syslog, e-mail, alarm relay
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
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	Supports IEEE 802.3az 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 normal or broken point distance

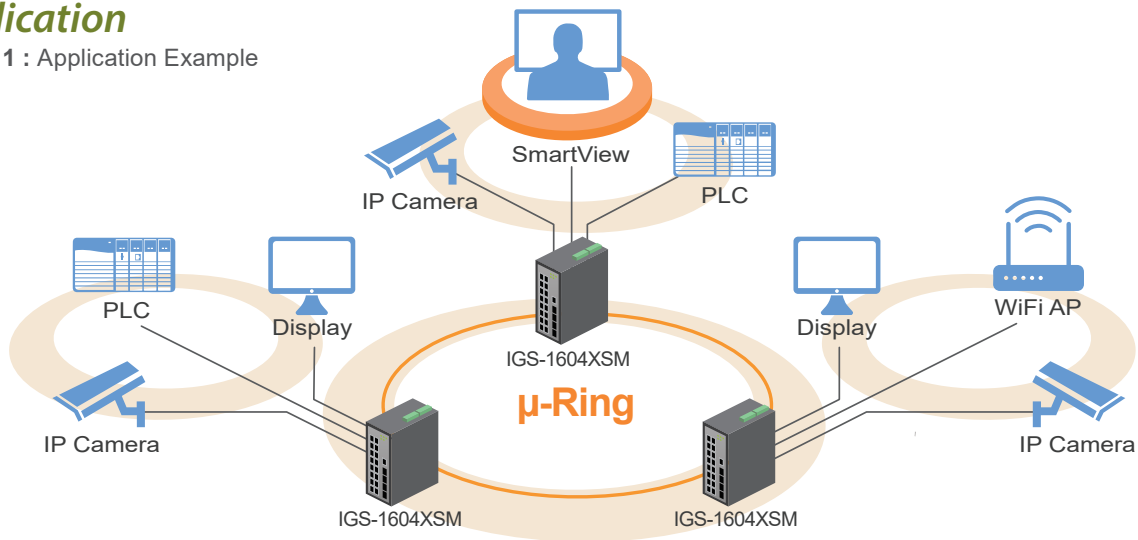


Dimensions



Application

Figure 1 : Application Example



Ordering Information

Model Name	Total Port	UTP	Fiber	Input Power	Certification		Operating Temperature
		10/100/1000 Base-T	1000/2.5G/5G/10G Base-X		Safety EN62368-1	CE, FCC	
IGS-1604XSM	20	16	4 SFP	12/24/48VDC	V	V	-40 ~ 60°C

Optional Accessories

Package List

- One device of the series
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Wall Mount Kit

IND-WMK04 Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs) (IGS-1608SM-16PH, IGS-1608SM-8PH)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

ISFP-M9000-85-D(E)	Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter, wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

Industrial Power Supply

MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C
NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W -20 ~ +70°C