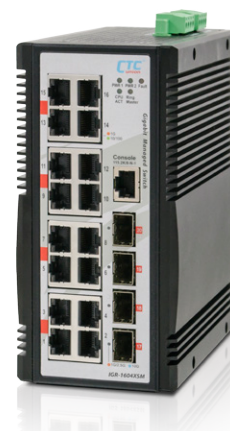


Industrial Layer 3 10G Switch

IGR-1604XSM

16x GbE RJ45 + 4x GbE/2.5G/5G/10G SFP+

- » VRRP v2/v3, L3 IPV4/IPV6 Static Routing, RIP v1/v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- » Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for Redundant Cabling
- » EN62368-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE and FCC Certified



As an industrial Layer 3 Ethernet switch, DIN-RAIL mounting type, suitable for process and transportation automation applications, IGR-1604XSM has 4 10G SFP+ slots and 16 Gigabit UTP ports, Support for static and dynamic routing protocols, fanless design and redundant power input are certified by many industry standards, making it ideal for deployment in harsh environments to provide mission-critical network services.

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 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
	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 RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function SFP port supports 1G/2.5G/5G/10G speed with DDIM									
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	<table><tr><th>Input Voltage</th><th>Total Power Consumption</th></tr><tr><td>12 VDC</td><td>22.7W</td></tr><tr><td>24 VDC</td><td>24.3W</td></tr><tr><td>48 VDC</td><td>28.5W</td></tr></table>		Input Voltage	Total Power Consumption	12 VDC	22.7W	24 VDC	24.3W	48 VDC	28.5W
Input Voltage	Total Power Consumption									
12 VDC	22.7W									
24 VDC	24.3W									
48 VDC	28.5W									
LED	System: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow) UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber) SFP Slot: 1G/2.5G/5G Link/Active (Green), 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 1A @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 and Fanless									
Dimensions	155.6 x 77 x 160mm (D x W x H)									
Weight	2.0kg									
Installation Mounting	DIN Rail mounting or wall mounting (Optional)									
MTBF	251,400 (MIL-HDBK-217)									
Certification										
EMC	CE (EN55032, EN55035)									
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE									
Railway Traffic	EN50121-4									
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	EN62368-1									
Shock	IEC 60068-2-27									
Freefall	IEC 60068-2-31									
Vibration	IEC 60068-2-6									

Software Specifications

L3 Routing

IPv4/v6 Static Routing	Supported
RIP v1/v2 Dynamic Routing	Supported
OSPF v2, OSPF v3 Dynamic Routing	Supported
Layer 3 Redundancy	VRRP v2, v3

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 (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 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	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, 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 and Multicast
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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
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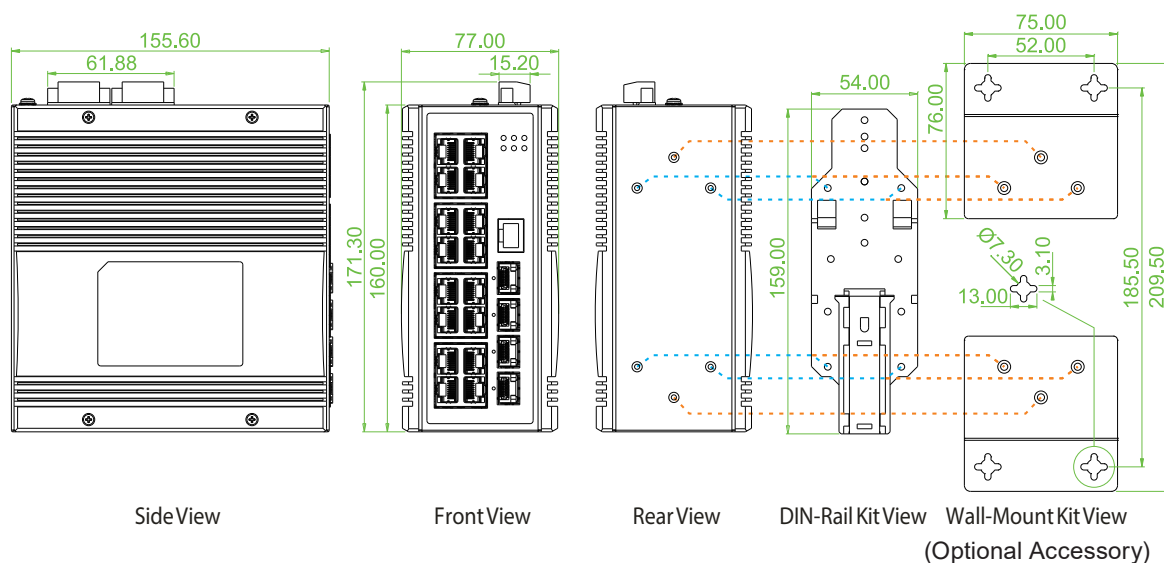
Security Features

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



RADIDS	Authentication, Accounting
TACACS+	Authentication, Authorization and 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 management and monitoring
SW & Configuration Upgrade	SFTP, 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)
Others Features	L4: TCP/UDP
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



Ordering Information

Model Name	Total Port	RJ45	SFP	Input Power	Certification				Operating Temperature
		10/100/1000 Base-T(X)	1000/2.5G/5G/10G Base-X		EN62368-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC	
IGR-1604XSM	20	16	4	12/24/48VDC	V	V	V	V	-40 ~ 60°C

Optional Accessories

■ Wall Mount Kit

IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs)
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■ 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