

Preliminary



# ICS-M2404X

3x Modular slot and 4x 10GbE SFP+  
Core Switch



The ICS-M2404X is Layer 2 modular industrial core switches up to 4 ports 10Gigabit for heavy duty bandwidth requirement, the hot-swappable Gigabit Ethernet interface modules can provide up to 24 ports of SFP fiber optic connectors or up to 24 ports PoE/PoE+ Gigabit Ethernet copper connectivity. The ICS-M2404X 10GbE backbone switches use in large scale industrial networks offering accurate information, high performance and high reliability which is increasingly the normal on automation and transportation applications.

The ICS-M2404X support up to 24 PoE+ ports (30Watts power output per port) for industrial PoE devices, such as PTZ IP surveillance cameras, high-performance wireless access points and IP phones. It is designed especially for harsh outdoor cabinet applications with 4kV surge protection to ensure the uninterrupted reliability of PoE systems.

The ICS-M2404X 10Gigabit backbone switches enable users to more easily connect different devices together and aggregate Gigabit Ethernet traffic to provide high performance and the ability to quickly transfer large amounts of video, voice, and data across a network. The switches support a variety of redundant functions, including Ethernet redundant μ-Ring/STP/RSTP/MSTP/ERPS and isolated redundancy power supplies to increase system reliability and the availability for your network backbone.

## Features

- 3x Modular slot plus 4x 10GbE SFP+ (ICS-M2404X)
  - Optional Module:
    - IM-GS800 8x 100/1000Base-X SFP
    - IM-GT800 8x 100/1000Base-TX
    - IM-T800 8x 10/100Base-TX
    - IM-GT800-8PH 8x 100/1000Base-TX with PoE
    - IM-T800-8PH 8x 10/100Base-TX with PoE
  - Maximum up to 24x IEEE802.3af / 802.3at PoE+ output, 30W per port, 400W PoE power budget in total
  - Hot swap module for non-stop operating
  - Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
  - **Supports negative voltage power input (for example in telecom system)**
  - Rugged metal, IP30 protection & Fanless design
  - UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4 certified
  - Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
  - 4KV surge protection for PoE, UTP and Fiber ports
  - 2.25KVDC Hi-pot isolation protection for Ethernet ports and power
  - STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
  - Provides 14 instances each can support μ-Ring, μ-Chain or Sub-Ring for flexible networking applications (Please see CTC Union μ-Ring white paper for more details and more topology application)
  - μ-Ring redundancy, recovery time <50ms in 250 devices
  - DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
  - QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
  - IEEE802.1q 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
  - Flexibility security: Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
  - Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
  - Supports IEEE1588 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, IEEE802.1ab LLDP
  - Supports IPv6 Telnet server /ICMP v6
  - CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management
  - Supports Modbus/TCP protocols for management
  - Provides SmartConfig for quick and easy mass Configuration\*
  - Supports SmartView for Centralized Management\*
  - Supporting Central EMS for management of up to 50 SmartView Server, and maximum up to 25,000 device\*
- \*please see Catalog chapter 1-Software Management for more details

## Specifications

|  |  |  |
|--|--|--|
| <b>Standard</b>                          | 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  | 10 Gbit/s Ethernet over fiber  |
|  | IEEE802.3af  | PoE (Power over Ethernet)  |
|  | IEEE802.3at  | PoE+ (Power over Ethernet enhancement)   |
|  | 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) |
|  | IEEE802.3X   | 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)  |  |
| <b>VLAN ID</b>                           | 4094 IEEE802.1Q VLAN VID   |  |
| <b>Switch Architecture</b>               | Back-plane (Switching Fabric): 128Gbps (Full wire-speed)   |  |
| <b>Data Processing Network Connector</b> | Store and Forward<br><b>Chassis:</b> 3 x Modular Slot plus 4x 10GBase-X SFP+ (ICS-M2404X)<br><b>Module:</b><br>IM-GS800 8x 100/1000Base-X SFP<br>IM-GT800 8x 10/100/1000Base-TX UTP<br>IM-T800 8x 10/100Base-TX UTP<br>IM-GT800-8PH 8x 10/100/1000Base-TX UTP with PoE<br>IM-T800-8PH 8x 10/100Base-TX UTP with PoE (Hot swap interface for non-stop operating)<br><b>10GbE SFP+</b> : Supports 1000M/10G SFP module with DDMI<br><b>SFP</b> : Supports 100/1000M SFP module with DDMI<br><b>UTP</b> : Supports auto negotiation speed, auto MDI/MDI-X function<br><b>PoE</b> : Supports IEEE802.3af/at, 30W per port, 400W maximum power budget |  |
| <b>Console</b>                           | RS-232 (RJ-45)   |  |
| <b>Network Cable</b>                     | UTP/STP above Cat. 5e cable<br>EIA/TIA-568 100-ohm (100m)  |  |
| <b>Protocols</b>                         | CSMA/CD  |  |
| <b>Reverse Polarity Protection</b>       | Support for Input power  |  |
| <b>Overload Current Protection</b>       | Supported  |  |
| <b>CPU Watch Dog</b>                     | Supported  |  |
| <b>Power Supply</b>                      | Redundant 2x High Voltage AC/DC input power (-HH model)<br>Redundant 2x Low Voltage DC Input power (-LL model)<br>Redundant 1x Low Voltage DC and 1x High Voltage AC/DC input power (-HL model)<br><br>Low Voltage DC (L): Isolated 24/48V (18~60VDC), Removable Terminal Block<br>High voltage AC/DC (H): Isolated 110/220VAC (88VAC~264VAC), isolated 110/220DC (88~300VDC)  |  |

## Software Specifications

|                 |   |
|-----------------|---|
| <b>Topology</b> |   |
| <b>VLAN</b>     | IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID<br>IEEE 802.1q VLAN, up to 4094 Groups<br>IEEE 802.1ad Q-in-Q<br>MAC-based VLAN, up to 256 entries<br>IP Subnet-based VLAN, up to 128 entries<br>Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries |

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| <b>Power Supply</b>  | <b>Note:</b> Power input must be 48VDC (44~57VDC) when PoE module is selected and applied, that is "-LL" power optional model for PoE. (50~57V input is recommended for IEEE802.3at PoE+ in 30W applications)<br><br>Supports negative voltage power input (for example application in telecom system)  |
| <b>Power Consumption LED</b>                                 | TBD<br><br>Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Red), Ring Master (Green)<br>P1~P24<br>Per RJ-45 port: 10/100 Link/Active (Green)<br>1000 Link/Active (Amber)<br>Per SFP Fiber port: 100Base-X Link/Active (Green)<br>1000Base-X Link/Active (Amber)<br><br>PoE port : PoE On/Off (Green)<br>Per SFP+ Fiber port: (P25~P28 ICS-M2404X)<br>1000Base-X Link/Active (Amber)<br>10GBase-X Link/Active (Blue) |
| <b>Jumbo Frame</b>   | 14K Byte  |
| <b>MAC Address Table</b>                                     | 32K   |
| <b>Memory Buffer</b>   | 4M Bytes for packet buffer  |
| <b>Warning Message</b>                                       | System Syslog, SMTP/ e-mail event message, alarm relay  |
| <b>Alarm Relay Contact</b>                                   | Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block   |
| <b>Operating Temperature</b>                                 | -40 ~ 60°C  |
| <b>Operating Humidity</b>                                    | 5% to 95% (Non-condensing)  |
| <b>Storage Temperature</b>                                   | -40 ~ 85°C  |
| <b>Housing</b>   | Rugged Metal, IP30 Protection, Fanless  |
| <b>Dimensions</b>  | 315 x 440 x 44 mm (D x W x H)   |
| <b>Weight</b>  | TBD   |
| <b>Installation Mounting</b>                                 | 19" rack mount  |
| <b>MTBF</b>  | TBD   |
| <b>Warranty</b>  | 5 years   |
| <b>Certification</b>   |   |
| <b>EMC</b>   | CE  |
| <b>EMI (Electromagnetic Interference)</b>                    | FCC Part 15 Subpart B Class A, CE   |
| <b>Railway Traffic</b>                                       | EN50121-4   |
| <b>Immunity for Heavy Industrial Environment</b>             | EN61000-6-2   |
| <b>Emission for Heavy Industrial Environment</b>             | EN61000-6-4   |
| <b>EMS (Electromagnetic Susceptibility) Protection Level</b> | EN61000-4-2 (ESD) Level 3, Criteria B<br>EN61000-4-3 (RS) Level 3, Criteria A<br>EN61000-4-4 (Burst) Level 3, Criteria A<br>EN61000-4-5 (Surge) Level 3, Criteria B<br>EN61000-4-6 (CS) Level 3, Criteria A<br>EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A  |
| <b>Safety</b>  | UL60950-1, EN60950-1  |
| <b>Hi pot protection</b>                                     | DC 2.25KV for power to chassis ground, Ethernet port to chassis ground  |
| <b>4KV surge protection</b>                                  | Supported for PoE, UTP and Fiber ports  |
| <b>Shock</b>   | IEC 60068-2-27  |
| <b>Freefall</b>  | IEC 60068-2-32  |
| <b>Vibration</b>   | IEC 60068-2-6   |
| <b>VLAN</b>  | VLAN Translation, up to 256 entries<br>GVRP (GARP VLAN Registration Protocol)<br>MVR (Multicast VLAN Registration)  |
| <b>Link Aggregation (Port Trunk)</b>                         | Static (Hash with SA, DA, IP, TCP/UDP port), up to 14 trunk group<br>Dynamic (IEEE 802.3ad LACP), up to 14 trunk group<br>Per group up-to 8 port  |
| <b>Spanning Tree</b>   | IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP  |

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| <b>Multiple <math>\mu</math>-Ring</b>                        | Up to 14 instances each support $\mu$ -Ring, $\mu$ -Chain or Sub-Ring for flexible networking applications.<br>Recovery time <50ms<br>The maximum number of device is allowed 250 in a Ring.<br>(Please see CTC Union $\mu$ -Ring white paper for more details and more topology application) |
| <b>Loop Protection</b>                                       | Supported   |
| <b>ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)</b> | Recovery time <50ms<br>Single Ring, Sub-Ring, Multiple ring topology  |
| <b>QoS Features</b>  |   |
| <b>Class of Service</b>                                      | IEEE802.1p 8 active priorities queues for per port  |
| <b>Traffic Classification QoS</b>                            | IEEE802.1p based CoS<br>IP Precedence based CoS<br>IP DSCP based CoS<br>QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI<br>QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number   |
| <b>Bandwidth Control for Ingress</b>                         | Per port based  |
| <b>Bandwidth Control for Egress</b>                          | Per port based<br>Per queue / Per port shaper   |
| <b>DiffServ (RF 2474) Remarking</b>                          |   |
| <b>Storm Control</b>   | for Unicast, Broadcast, Multicast   |
| <b>IP Multicasting Features</b>                              |   |
| <b>IGMP / MLD Snooping</b>                                   | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2<br>Port Filtering Profile<br>Throttling, Fast Leave<br>Maximum Multicast Group : up to 1022 entries<br>Query / Static Router Port  |
| <b>Security Features</b>                                     |   |
| <b>IEEE 802.1X</b>   | Port-Based<br>MAC-Based   |
| <b>ACL</b>   | Number of rules : up to 256 entries<br>for L2 / L3 / L4<br>L2 : Mac address SA/DA/VLAN<br>L3 : IP address SA/DA, Subnet<br>L4 : TCP/UDP   |
| <b>RADIUS authentication &amp; accounting</b>                |   |
| <b>TACACS+ authentication &amp; accounting, TACACS+ 3.0</b>  |   |
| <b>HTTPS, HTTP</b>   | Supported   |
| <b>SSL / SSH v2</b>  | Supported   |
| <b>User Name Password Authentication</b>                     | Local Authentication<br>Remote Authentication (via RADIUS / TACACS+)  |
| <b>Management Interface Access Filtering</b>                 | Web, Telnet / SSH , CLI RS-232 console  |

|                                       |  |
|---------------------------------------|--|
| <b>Management Features</b>            |  |
| <b>CLI</b>                            | Cisco® like CLI  |
| <b>Web Based Management</b>           |  |
| <b>Telnet</b>                         | Server   |
| <b>SNMP</b>                           | V1, V2c, V3  |
| <b>Modbus/TCP</b>                     | Support for management and monitoring  |
| <b>SW &amp; Configuration Upgrade</b> | TFTP, HTTP<br>Redundant firmware in case of upgrade failure  |
| <b>RMON</b>                           | RMON I (1, 2, 3, 9 group), RMON II   |
| <b>MIB</b>                            | RFC1213 MIB II, Private MIB  |
| <b>UPnP</b>                           | Supported  |
| <b>DHCP</b>                           | TFTP, HTTP<br>Redundant firmware in case of upgrade failure  |
| <b>IP Source Guard</b>                | Supported  |
| <b>Port Mirroring</b>                 | Supported  |
| <b>Event Syslog</b>                   | Syslog server (RFC3164) (Support 1 server)   |
| <b>Warning Message</b>                | System syslog, e-mail, alarm relay   |
| <b>DNS</b>                            | Client, Proxy  |
| <b>IEEE1588 PTP V2</b>                | Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave  |
| <b>NTP, SNTP</b>                      | Client   |
| <b>LLDP (IEEE 802.1ab)</b>            | Link Layer Discovery Protocol<br>LLDP-MED  |
| <b>IPv6 Features</b>                  |  |
| <b>IPv6 Management</b>                | Telnet Server/ICMP v6  |
| <b>SNMP over IPv6</b>                 | Supported  |
| <b>HTTP over IPv6</b>                 | Supported  |
| <b>SSH over IPv6</b>                  | Supported  |
| <b>IPv6 Telnet</b>                    | Supported  |
| <b>IPv6 NTP, SNTP</b>                 | Client   |
| <b>IPv6 TFTP</b>                      | Supported  |
| <b>IPv6 QoS</b>                       | Supported  |
| <b>IPv6 ACL</b>                       | Number of rules: up to 256 entries<br>for L2 / L3 / L4<br>L2 : Mac address SA/DA/VLAN<br>L3 : IP address SA/DA, Subnet<br>L4 : TCP/UDP   |
| <b>Other Features</b>                 |  |
| <b>Green Ethernet</b>                 | Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption<br>Determine the cable length and lowering the power for ports with short cables<br>Lower the power for a port when there is no link<br>LED Power Management : Adjustment LEDs intensity |
| <b>Cable Diagnostic</b>               | Measuring UTP cable normal or broken point distance  |

## Application

Figure 1 : 10G Backbone application

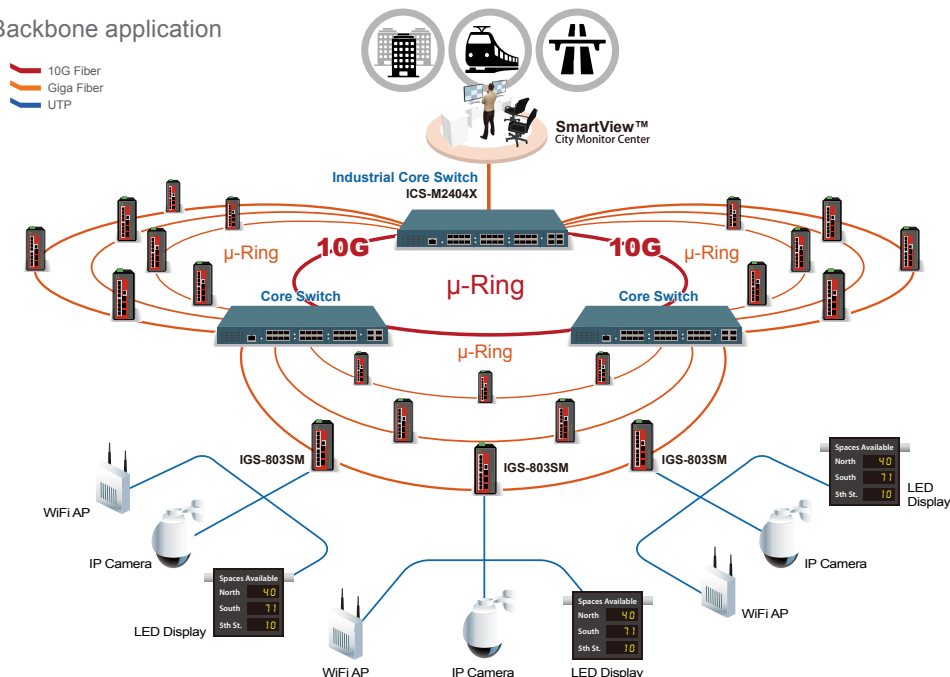
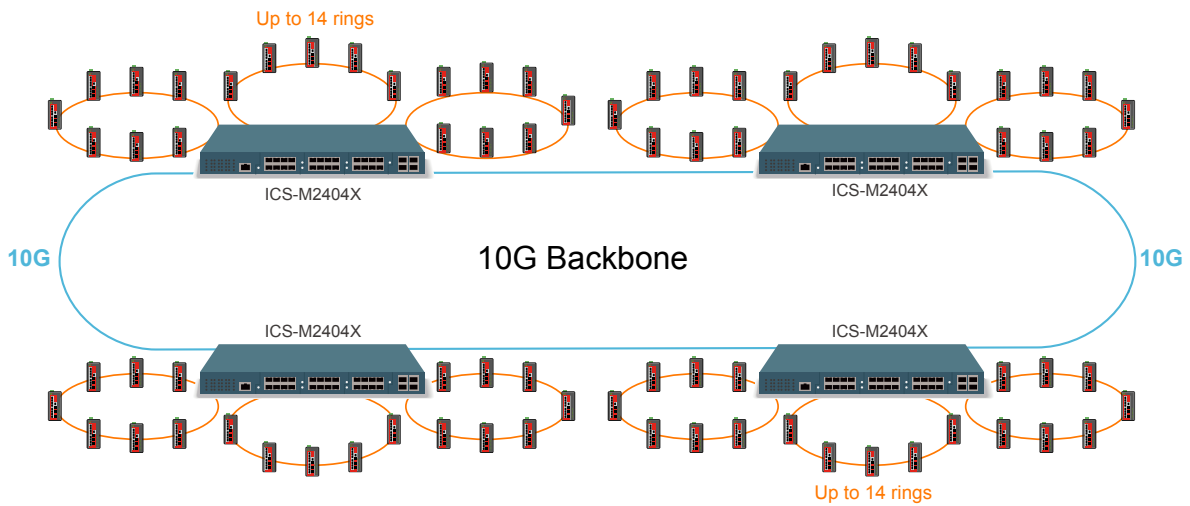


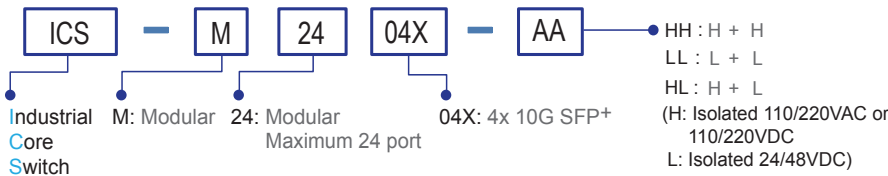
Figure 2 : 10G Backbone with  $\mu$ -Ring topology



### Ordering Information (Chassis)

| Model Name    | Managed | Total Port (Maximum) | Module Slot | 10GbE             |   | Input Power                 |                            | Certification              |           |                         |        |
|---------------|---------|----------------------|-------------|-------------------|---|-----------------------------|----------------------------|----------------------------|-----------|-------------------------|--------|
|               |         |                      |             | IEEE 802.3ae SFP+ |   | (Low Volt) 24/48VDC, -48VDC | (High Volt) 110/220V AC/DC | Safety UL60950-1 EN60950-1 | EN50121-4 | EN61000-6-2 EN61000-6-4 | CE FCC |
| ICS-M2404X-HH | V       | 28                   | 3           | 4                 |   |                             | 2                          | V                          | V         | V                       | V      |
| ICS-M2404X-HL | V       | 28                   | 3           | 4                 | 1 |                             | 1                          | V                          | V         | V                       | V      |
| ICS-M2404X-LL | V       | 28                   | 3           | 4                 | 2 |                             |                            | V                          | V         | V                       | V      |

#### Model Naming Rule



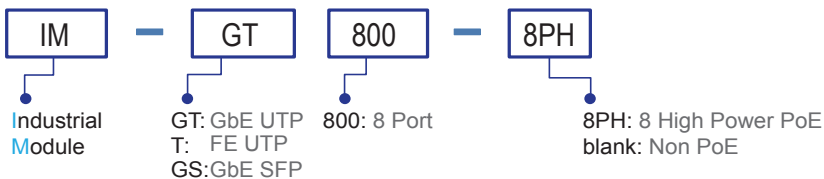
### Ordering Information (Module)



IM-GS800      IM-GT800      IM-T800      IM-GT800-8PH      IM-T800-8PH

| Model Name   | Managed | Total Port | UTTP Port             |                | Fiber               | PoE            | Certification              |           |                         |        |
|--------------|---------|------------|-----------------------|----------------|---------------------|----------------|----------------------------|-----------|-------------------------|--------|
|              |         |            | 10/100/1000 Base-T(X) | 10/100 Base-TX | 100/1000 Base-X SFP | IEEE802.3af/at | Safety UL60950-1 EN60950-1 | EN50121-4 | EN61000-6-2 EN61000-6-4 | CE FCC |
| IM-GS800     | V       | 8          |                       |                | 8                   |                | V                          | V         | V                       | V      |
| IM-GT800     | V       | 8          | 8                     |                |                     |                | V                          | V         | V                       | V      |
| IM-T800      | V       | 8          |                       | 8              |                     |                | V                          | V         | V                       | V      |
| IM-GT800-8PH | V       | 8          | 8                     |                |                     | 8              | V                          | V         | V                       | V      |
| IM-T800-8PH  | V       | 8          |                       | 8              |                     | 8              | V                          | V         | V                       | V      |

#### Model Naming Rule



#### Package List

- ICS-M2404X device
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quickly installation guide
- Rack mount ear with screws
- Power cord (for-H model)