1. Summary

GA-MU8TPoE+ is an Ethernet Switch with management functions which has 10 ports compatible with 10/100/1000BASE-T, as well as 2 SFP extension ports.
Ports 1 to 8 support IEEE802.3at/af PoE power supply function.

2. Feature

(1) Ports 1 to 10 are 10BASE-T/100BASE-TX/1000BASE-T ports corresponding to auto negotiation.
Also their speed and communication mode can be switched by configuration.
Ports 11 and 12 can used as an SFP extension ports.

(2) Ports 1 to 8 can supply power conforming with IEEE802.3at/af.
Supplying power up to 30 W per port, and up to 130 W in total is possible.

(3) Equipped with PoE auto reboot function(PD Lifeguard), it is possible to switch the power supply to the port OFF/ON by monitoring three methods: Ping and LLDP.

(4) The Reboot Flick feature allows the Ethernet switch to maintain PoE power supply, ensuring continuous power to the PD (Power Device) even during the Ethernet switch reboot.

(5) All twisted pair ports support straight/cross cable auto sensing function.
Simply connect devices with straight cables, whether it is a terminal or a network device.
(This function does not work if the port communication configuration is set at Fixed or Link Aggregation.)

(6) Telnet/SSH allows remote configuration changes and verifications of the Ethernet Switch.
Remotely configure the PoE settings for each port (Ports 1 to 8).

(7) Rapid Spanning Tree Protocol is supported, allowing to build a system with redundancy.

(8) The IEEE802.1p compatible QoS function is supported.

3. Rated/Environmental Conditions

3－1. Power supply	AC100-240V, 50/60Hz, 2.5A (with a built-in power supply)
3－2. Power consumption	Normally, Max. : 159W, Min. : 8.8W
3－3. Operating environment	Temperature: 0 - 50℃ Humidity: 20 - 80%RH (no condensation) Note) Please note that if the aforementioned conditions are not satisfied, it may cause fire, electrical shock, malfunctions or mis operations, which are not covered by the warranty. *If it is used beyond the operating environmental temperatures, then the protective devices will start working and the Ethernet Switch power will be shut off.
3－4. Storage environment	Temperature: -20 - 70℃ Humidity: 10 - 90%RH (no condensation)
3－5. EMC compliance	EN 55032 Class A EN 61000-3-2, EN 61000-3-3 EN 55035 IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11
3－6. Safety compliance	IEC 62368-1 EN 62368-1
3－7. Environment compliance	RoHS compliant
3－8. Certification	TEC Certification

4. Form

4－1. Form and materials/colors	Dimensions :44mm (Height) ×330mm (Width) ×230mm (Depth) (Excluding protruding sections) Case material :SECC Color :Case:Black C, Face plate label: Black 10399C (Hairline Finish)
4－2. Mass (Weight)	2,100g

5. Hardware Specifications

5－1. Interface	Twisted pair ports 1-8 : RJ45 connector Transmitting and receiving network system : IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3ab 1000BASE-T Energy Efficient Ethernet (*1) : IEEE802.3az (LPI) Transmission speed : 10/100Mbps, full/half duplex : 1000Mbps, full duplex Compatible cable : Twisted pair cable (At least equivalent to EIA/TIA568 category 5e) Maximum transmission distance : 100m Auto-Negotiation : Communication speed and full/half duplex are automatically recognized. The setting can be fixed to 10Mbps, 100Mbps, or 1000Mbps and full duplex or half duplex. PoE power supply function : IEEE802.3at/af Up to 130W of power can be supplied to ports 1 to 8 in total. Up to 30W of power can be supplied per port. PoE power supply method : Alternative A (Cable signal lines 1, 2, 3, and 6 are used.) Twisted pair ports 9,10 : RJ45 connector Transmitting and receiving network system : IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3ab 1000BASE-T Energy Efficient Ethernet (*1) : IEEE802.3az (LPI) Transmission speed : 10/100Mbps, full/half duplex : 1000Mbps, full duplex Compatible cable : Twisted pair cable (At least equivalent to EIA/TIA568 category 5e) Maximum transmission distance : 100m Auto-Negotiation : Communication speed and full/half duplex are automatically recognized. The setting can be fixed to 10Mbps, 100Mbps, or 1000Mbps and full duplex or half duplex. *1 Energy Efficient Ethernet (EEE) conforming to IEEE802.3az (LPI). When there is no data transmission at link up, the energy-saving state automatically starts so that power consumption can be reduced on each port. Factory default : Disable SFP extension ports 11, 12 Transmitting and receiving network system : : IEEE802.3z 1000BASE-X SFF-8472 (DMI : Diagnostic Monitoring Interface) Optional Accessories : 1000BASE-SX SFP Module (i) (PN54022-IN) 1000BASE-LX SFP Module (i) (PN54024-IN)

5. Hardware Specifications

5－2. Switching mode	Switching method Switching capacity Packet transfer capability MAC Address table Buffer memory Flow control Aging timeout Jumbo frame supported Transmittable frames	:Store and Forward :24.0Gbps :Non-blocking Max. 1,488,000pps/port(1000Mbps) Max. 148,800pps/port(100Mbps) Max. 14,880pps/port(10Mbps) :Max. 8K entry/unit :512K Bytes/unit :half-duplex Back pressure full-duplex IEEE802.3x :10 to 630 sec. (Default: 300 sec.) :9KB :EAP, BPDU
5－3. Terminal emulator connection	Console port Transmission mode Emulation mode Communication configuration	:RJ45 connector 1 port :RS-232C(ITU-TS V.24) :VT100 :9,600bps, 8bit, None Parity control, Stop bit 1 bit

5. Hardware Specifications

5－4. LED display

(1) Power LED
- Green Light : After system boot
- Green Blink : System boot
- Off : Power OFF

(2) Fault LED
- Orange Light : Any Fault
- Off : Normal

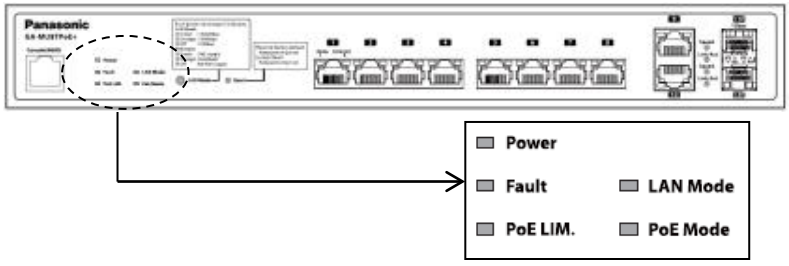
(3) PoE LIM. LED
- Orange Light : The total power supply of the Ethernet Switch is exceeding 130W
- Off : System still has spare power for new PD

(4) LAN Mode LED
- Green Light : Operating in LAN mode

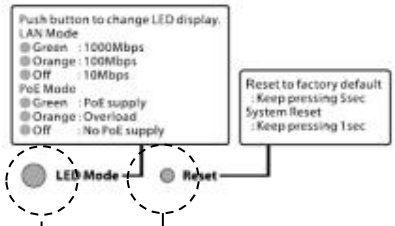
(5) PoE Mode LED
- Green Light : Operating in PoE mode

You can check the LAN mode (communication speed) and PoE mode (power supply status) using the LED on the port section (left). (Factory default is LAN mode) Please refer to table 1 of item 5 for the port display.

You can switch modes by pressing and holding the LED mode button for more than 1 second.



The operation method for each button is shown below.



(1) Reset button
- Reset to factory default : Keep pressing 5sec
- System Reset : Keep pressing 1sec

(2) LED mode button
- Mode change : Keep pressing 1sec

5. Hardware Specifications

5－4. LED display

LED lamps for each mode and LED lamps for ports 1 to 10 correspond to the following states. (Table 1)

＊Ports 9 ,10 do not have a power supply function, so they are always OFF when switching to PoE mode.

Port LED (Left)　Port LED (Right)

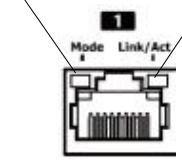
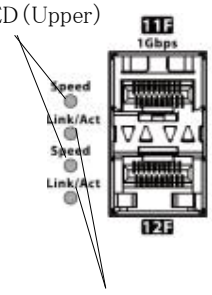


Table 1

Port LED	Display mode	Behavior	Description
Left	LAN Mode	Green Light Orange Light Off	Link is established at 1000Mbps. Link is established at 100Mbps. Link is established at 10Mbps.
	PoE Mode	Green Light Orange Light Off	PoE are being supplied power. Single port overload. Power is not being supplied, or the PoE receiving equipment are not connected.
Right	Link/Act	Green Light Green Blink	Link is established. Transmitting and receiving data.

Port LED (Upper)



Port LED (Lower)

The LED specifications of the SFP extension port are as follows. (Table 2)

Table 2

Port LED	Display mode	Behavior	Description
Upper	Speed	Green Light	Link is established at 1000Mbps.
Lower	Link/Act	Green Light Green Blink	Link is established. Transmitting and receiving data.

5－5. Cascade connections

Port 1-10 corresponding to the Auto MDI / MDI-X
(Allowed change by the setting for the application)
Ports 1-10 are set to “Enable” at factory default setting.

5－6. Fan

installed

6. Software Specifications

6－1. Configuration	Control parameters can be set by the following procedures: (1) Configuration from an asynchronous terminal connected to the console port. (2) Configuration from a remote terminal connected via TELNET and SSH (3) Configuration from a remote terminal according to the Web screen. (Supported browser : Microsoft Edge, Google Chrome)
6－2. Rebooting	The system can be reset from the software in the following four modes: (1) Warm start (2) Warm start(PoE power supply remains continuous during reboot) (3) Reset to factory default
6－3. System log	Maximum number to be kept: 200 System log transfer (IPv4/IPv6)
6－4. Loopback detection	Turns on the Fault LED with an orange light when a loop occurs in the corresponding port. At this time, the relevant port automatically shuts down to prevent loop from occurring. · Loopback detection setting Disabled (factory default setting) Enabled/disabled can be switched by configuring a setting using the console. · Loopback detection port Disabled: Ports 1 to 12 (factory default setting) · Recovery time 60 to 10,000 sec. (Factory default setting: 60 sec.) You can set the time it takes to recover when a loop occurs. It will only be restored if the loop is resolved after the configured time.
6－5. Others	Syslog Client (Transfers system logs to the Syslog server.) TFTP Client (Upgrades the software and saves/loads configuration information.) SNTP Client TELNET Client DHCP Client DHCP Snooping DDM Statistics

7. Layer 2 Switching Functions

7－1. Spanning Tree	IEEE 802.1W Rapid Spanning Tree Protocol IEEE 802.1Q Multiple Spanning Tree Protocol BPDU guard
7－2. VLAN	IEEE802.1Q Tag VLAN Protocol, Voice VLAN Number of VLAN registrations: 4K (including default)
7－3. Link aggregation	IEEE802.ad Link Aggregation function (STATIC) Up to 8 groups can be created (up to 8 ports per group).
7－4. QoS	IEEE802.1p 8 levels of Priority Queue supported Scheduling Method: Strict Priority Queuing (SPQ: Strict priority queuing) Weighted Round Robin (WRR: Weighted round robin) It is also possible to use SPQ and WRR in combination.
7－5. Authentication Function	IEEE802.1X Port-based authentication (EAP-MD5/PEAP/CHAPv2 Authentication method) Guest VLAN using IEEE 802.1X Port Security (Up to 256 MAC addresses per port) Port Isolation DoS Attack Prevention
7－6. PoE power supply function	IEEE802.3at/af power supply function. Up to 130 W of power can be supplied to ports 1 to 8 in total. (Maximum power supplied to a port: 30 W) IEEE802.3at/af : Alternative A(Cable signal lines 1, 2, 3, and 6 are used.)
7－7. PoE auto reboot function (PD Lifeguard)	Monitoring and switching the power supply OFF/ON to ports is possible via two methods: Ping and LLDP.
7－8. Multicast	IGMP snooping(IGMPv2) function (can be up to 256 groups of registration) IGMP Querier function
7－9. Access control	Access control can be controlled by the following parameters: (1) IPv4 address (Source or Destination) (2) IPv6 address (Source or Destination) (3) MAC address (Source or Destination) (4) TCP/UDP port number (Source or Destination) (5) VLAN ID (6) IEEE 802.1p Priority (7) DSCP (8) Protocol
7－10. Time configuration	SNTP-based time synchronization function Manual mode setting
7－11. Storm control function	Unknown unicast, Broadcast, Unknown Multicast of possible control the storm
7－12. Others	ARP table NDP table DDM(Digital Diagnostic Monitoring) Reboot(reboot/restore-defaults) Statistics IPv4 Ping Execution IPv6 Ping Execution

8. Connector Pin Arrangement

8－1. Port 1 - 10

Status	Pin No.	1	2	3	6	4	5	7	8
MDI-X	Signal	BI_DB+	BI_DB-	BI_DA+	BI_DA-	BI_DD+	BI_DD-	BI_DC+	BI_DC-
MDI	Signal	BI_DA+	BI_DA-	BI_DB+	BI_DB-	BI_DC+	BI_DC-	BI_DD+	BI_DD-

Pin No. → 12345678

8－2. Console port

Pin No.	Signal	Pin No.	Signal
1	NC	5	GND
2	NC	6	RXD
3	TXD	7	NC
4	GND	8	NC

Pin No. → 12345678

9. Installation Procedures and Accessories

9－1. Installation Procedures	Mounting to rack
9－2. Accessories	(1) Installation Guide :1 (2) Rubber foot :4 (3) Rack mount bracket (for 19-inch rack) :2 (4) Screw (for 19-inch rack) :4 (5) Screw (for fixing the mount brackets to the Ethernet Switch) :8 (6) Power cord (IS 1293) (*) :1 * The attached power cord is dedicated for AC 100 - 240 V use.

10. Optional Accessories

10－1. 1000BASE-SX SFP Module(i) (Model No.:PN54022-IN)	Fiber optic port connector type :LC connector (Duplex) Standards :IEEE802.3z 1000BASE-SX Transmission speed :1000Mbps, full duplex Compatible cable :Fiber cable 50/125 μm Multi Mode Fiber 62.5/125 μm Multi Mode Fiber Maximum transmission distance :550 m at 50/125 μm 220 m at 62.5/125 μm Operating Temperature :0 - 60℃
10－2. 1000BASE-LX SFP Module(i) (Model No.:PN54024-IN)	Fiber optic port connector type :LC connector (Duplex) Standards :IEEE802.3z 1000BASE-LX Transmission speed :1000Mbps, full duplex Compatible cable :Fiber cable 10/125 μm Single Mode Fiber 50/125 μm Multi Mode Fiber 62.5/125 μm Multi Mode Fiber Maximum transmission distance :10 km when Single Mode Fiber is used 550 m when Multi Mode Fiber is used Operating Temperature :0 - 60℃

11. Prohibitions when Using the Product to Guarantee Safety

Denotes that "Death or serious injuries may be caused".
The manufacturer assumes no responsibility for any problems occurring when the following conditions are not satisfied.
Observe the following items when using the product.

(1) Do not use power supply other than AC 100 - 240 V.
Deviation could lead to fire, electric shock, and/or equipment failure.

(2) Do not handle this Ethernet Switch and connection cables during a thunderstorm.
Deviation could lead to electric shock.

(3) Do not disassemble and/or modify this Ethernet Switch.
Deviation could lead to fire, electric shock, and/or equipment failure.

(4) Do not damage the power cord. Do not bend too tightly, stretch, twist, bundle with other cord, pinch, put under a heavy object and/or heat it.
Damaged power cord could lead to fire, short, and/or electric shock.

(5) Do not unplug nor plug in the power plug with wet hands.
Deviation could lead to electrical shock, and/or equipment failure.

(6) Do not insert, or drop foreign objects such as metal or combustible things into Ethernet Switch through the openings, twisted pair ports, console port and SFP extension ports.
Deviation could lead to fire, electric shock, and/or equipment failure.

(7) Do not store or use the Ethernet Switch in places where it might get splashed with liquids such as water, in places with high humidity, with conductive dust, or in places where there are corrosive and combustible gases.
Deviation could lead to fire, electrical shock, and/or equipment failure.

(8) Do not store or use the Ethernet Switch in places where it will be exposed to direct sunlight or high temperatures.
The temperature inside will rise, which may cause fire.

(9) Do not store or use the Ethernet Switch in places where there are lots of vibrations and impacts, or in unstable areas.
It might fall, which may cause injuries and/or equipment failure.

(10) Do not put the Ethernet Switch into fire.
Deviation could lead to explosion and/or fire.

(11) Do not use the Ethernet Switch in dusty environments such as on floors, underneath floors, the backside of ceilings, or wiring panels.
Do not use the Ethernet Switch in very dusty areas such as in floors, underneath floors, the backside of ceilings, or wiring panels Deviation could lead to fire, electric shock, and/or equipment failure. It is recommended that the Ethernet Switch be operated in environments such as the inside of racks where it is difficult for dust to be generated.

(12) Do not look at the laser beam.
Doing so might cause eyesight impairment. (Class 1 laser product)

(13) Do not connect equipments other than 10BASE-T/100BASE-TX/1000BASE-T to twisted pair port.
Deviation could lead to fire, electric shock, and/or equipment failure.

(14) Do not insert any modules other than the optional SFP modules into the SFP extension port.
Deviation could lead to fire, electric shock, and/or equipment failure.

12. Cautions when Using the Product to Guarantee Safety

Denotes that "Minor injuries may be caused, or property damage might occur".
The manufacturer assumes no responsibility for any problems occurring when the following conditions are not satisfied.
Observe the following items when using the product.

(1) Use the bundled power cord (AC 100 - 240 V specifications).
Deviation could lead to electric shock, malfunction, and/or equipment failure.

(2) Unplug the power cord in case of equipment failure.
Deviation, such as keep connecting for a long time, could lead to fire.

(3) Be sure to connect the ground cable.
Otherwise this might cause electrical shocks, misoperations and malfunctions.
Connect the Ethernet Switch via the supplied power cord to the outlet which is connected to the ground.

(4) Connect the power cord firmly to the power port.
Otherwise this might cause electrical shocks, and malfunction.

(5) Unplug the power cord if the Fault LED lights in orange (system fault).
Deviation, such as keeping connected for a long time, could lead to fire.

(6) Handle the Ethernet Switch carefully so that fingers or hands may not be damaged by twisted pair port, SFP extension port, or console port.

(7) If the device is going to be mounted onto a rack, use the 2 installation brackets(for 19-inch rack mounting) which include the 19 inch rack mounting brackets (for 1 rack) and the 8 screws (for the rack installation brackets and for the main unit connections), and install the installation brackets into each of the 4 horizontal holes in the device, then securely secure it and set it up.
If it is not firmly secured, then deviation could lead to falling, injury and/or equipment failure.

(8) Check whether the optical fiber cable connectors are contaminated with dust, etc.
This might cause the optical signal to not be transmitted normally, and cause misoperations and malfunctions.
If they are contaminated, make sure to clean them off, then connect them to the optical fiber ports.

(9) This Ethernet Switch is to be periodically serviced in order to maintain its performance.
Please choose a product administrator, and have them be sure to implement periodic maintenance.

(10) When using this Ethernet Switch to design systems, use it after applying appropriate measures such as setting up redundant configurations.
Communications failures might be generated due to causes such as malfunctions or misoperations while the Ethernet Switch is being used.

(11) When using this Ethernet Switch for applications which require extremely high reliability, be careful to expend all possible means to ensure safety and reliability.
This Ethernet Switch is not designed nor manufactured with the intention that it be used for applications (in use with railways, aviation, and medical care, etc. where the influence rate due to communication failures is extremely high in regard to systems that directly affect systems and human lives) which require extremely high reliability.

(12) Be aware of glitches which are caused in the usage environments such as age-related degradation, etc.
This may vary depending upon conditions such as utilisation rates and usage environments, but performance might decrease due to the age-related degradation, etc. of components. It is recommended that this Ethernet Switch be replaced about five years after it was installed.

(13) Be careful in regards to environmental restrictions whereby the Ethernet Switch can be used.
Please isolate the business power lines and communication lines. Isolate distribution lines and other distribution lines, and low current power lines, optical fiber cables, metallic water conduits, and gas conduits, etc. Noise may be generated in the communication lines which might cause communication glitches.

12. Cautions when Using the Product to Guarantee Safety

(14) Do not connect the console ports with any other device except for Serial communication terminal.
Deviation could lead to equipment failure.

(15) To connect a power receiving equipment supporting IEEE802.3at to this Ethernet Switch, use a cable rated Cat5e or higher.
Using other cables may result in heat generation, ignition, and/or equipment failure.

(16) It is strongly recommended that a lightning arrester(SPD) be installed on the twisted pair port side and the power supply side of this Ethernet Switch.
Malfunctions might be caused due to overcurrent and overvoltage due to the effects of lightning strikes.

13. Basic Instructions for the Use of This Product

(1) For inspection and/or replacement, consult the technical support.

(2) Use commercial power supply from a wall socket, which is close and easily accessible to this Ethernet Switch.

(3) Unplug the power cord when installing or moving this Ethernet Switch.

(4) Unplug the power cord when cleaning this Ethernet Switch.

(5) Use this Ethernet Switch within the specifications. Deviation could lead to malfunction.

(6) Do not touch the twisted pair cable modular metal terminals which are connected to RJ45 connectors (twisted pair ports) or the connectors, nor place them near electrically-charged objects. Static electricity could lead to equipment failure.

(7) Do not put the modular plug of the connected twisted pair cable on objects that can carry static charge, such as carpet. Do not place it in the proximity. Static electricity could lead to equipment failure.

(8) Do not put a strong shock, including dropping, to this Ethernet Switch.
Deviation could lead to equipment failure.

(9) Before connecting a console cable to the console port, discharge static electricity, for example by touching metal appliance (do not discharge by touching this Ethernet Switch).

(10) Please use this Ethernet Switch in place where ambient temperature is from 0 to 50℃.
(*) If it is used beyond the operating environmental temperatures, then the protective devices will start working and the Ethernet Switch power will be shut off.

(11) Do not block the ventilator of the Ethernet Switch.
Blocked ventilator induces the heat accumulation inside, causing equipment failure and/or malfunction.

(12) When using two Ethernet Switches, do not stack them. When you place them side by side, allow for a space of 20 mm or more between them. This space is not necessary if you use supplied connection brackets.

(13) When mounting Ethernet Switches to rack, leave a minimum of 20mm space between them.