1. Summary

Switch-M48eG is an all Giga bit Ethernet switching hub equipped with eight 10BASE-T/100BASE-TX/1000BASE-T ports and one SFP extension slot with a management function.

2. Feature

(1) Has wire-speed Layer 2 Switching function.

(2) Has a loop detection function, which notifies when a loop occurs with the corresponding port LED and automatically shuts down the looped port.
In addition, when a port is shut down and when it automatically recovers, an SNMP trap can be sent to notify the administrator.

(3) Has a loop detection history function, which notifies when a loop occurs with the corresponding LED and enables a network administrator to identify the looped port after the loop is removed.

(4) Embedded power saving mode detects the connection status automatically and saves power consumption to minimum.

(5) Use of LED indicator switching button saves power consumption of LED lamps.

(6) Ports 1 to 48 are auto negotiation-ready 10/100/1000BASE-T ports. Their speed and communication mode can be changed by configuration.
Ports 45-48 can be used as a 10/100/1000BASE-T port corresponding to auto negotiation or an SFP extension slot exclusively.

(7) 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.
Ports 1 to 44 are set at MDI-X. (default))

(8) VLAN function allows free grouping of up to 256 VLANs.

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

(10) Has an Internet Mansion function, which ensures security between each door.

(11) Has a port grouping function, which groups ports that are allowed to communicate with one another to limit communications between different groups.

(12) Equipped with 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.

(13) The IEEE802.1X compatible user authentication function (EAP-MD5/TLS/PEAP) is supported.

(14) Supports ZEQUO assist. Processes from introduction to maintenance can be performed easily.

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 : 34.6W, Min : 13.7W
3-3. Operating environment	Temperature: 0 - 50℃ Humidity: 20 - 80%RH (no condensation)
3-4. Storage environment	Temperature: -20 - 70℃ Humidity: 10 - 90%RH (no condensation)
3-5. Immunity	ESD :IEC61000-4-2 (10kV) Radiated :IEC61000-4-3 Level2 EFT/Burst :IEC61000-4-4 Level3 Surge :IEC61000-4-5 Level4(AC line) Conducted :IEC61000-4-6 Level2 Power frequency magnetic field :IEC61000-4-8 Level4 Voltage dips and interruptions :IEC61000-4-11

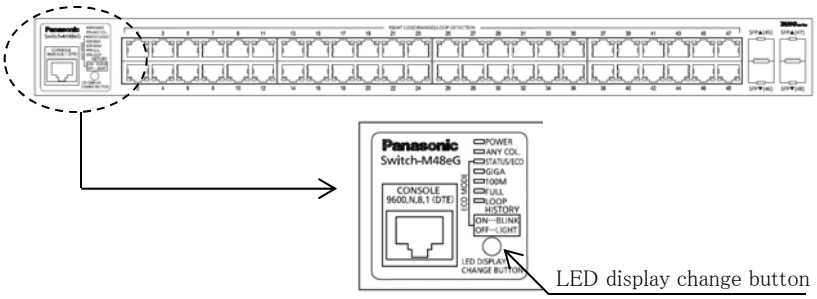
4. Form

4-1. Form and materials/colors	Dimensions :44mm(Height)×440mm(Width)×322mm(Depth) (Excluding protruding sections) Case material :SECC Color : Main unit: Green 03, Front face: Black 03, Face plate label: Black 04
4-2. Mass(Weight)	4,200g

5. Hardware Specifications

5-1. Interface	Twisted pair port 1-48 :RJ45 connector (*1) Transmitting and receiving network system: IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3ab 1000BASE-T 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, and full duplex or half duplex. *1 Embedded power saving mode detects the connection status automatically and saves power consumption to minimum. SFP extension slot 45-48 SFF-8472(DMI:Diagnostic Monitoring Interface) *Select either of RJ45 or SFP for use Optional Accessories :1000BASE-SX SFP Module (PN54021K-ID) 1000BASE-LX SFP Module (PN54023K-ID)
5-2. Switching mode	Switching method :Store and Forward Switching capacity :96Gbps Packet transfer capability :Non-blocking Max 1,488,000pps/port(1000Mbps) Max 148,800pps/port(100Mbps) Max 14,880pps/port(10Mbps) MAC Address table :Max 16K entry/unit Buffer memory :1.5M Byte/unit Flow control :half-duplex Back pressure full-duplex IEEE802.3x Aging timeout :10 to 1,000,000 sec. (Default: 300 sec.) Jumbo frame supported :9KB Transmittable frames :EAP,BPDU

5. Hardware Specifications

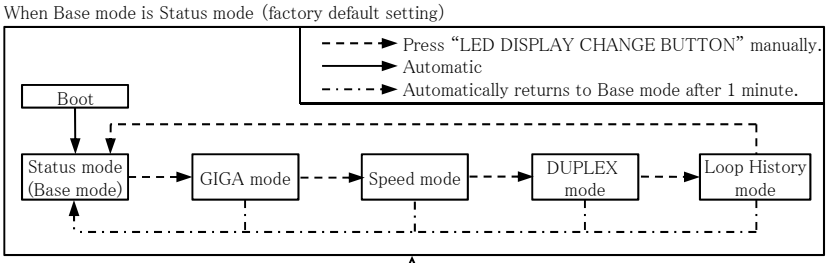
5-3. Terminal emulator connection	Console port :RJ45 connector 1 port Transmission mode :RS-232C (ITU-TS V.24) Emulation mode :VT100 Communication configuration :9,600bps, 8bit, None Parity control, Stop bit 1 bit
5-4. LED display	(1) POWER (Power) LED Green Light :Power is ON Off :Power is OFF (2) ANY COL.(Collision) LED Orange Light : During half-duplex operation, packet collision is occurring in either port. (3) STATUS/ECO (Status/ECO made) LED Green Light : Operating in status mode. Green Blink : Operating in ECO mode. All port LEDs (left) are turned off. Orange Light : Starting Orange Blink : Malfunction (Contact the seller) Off : Power is OFF. (4) GIGA (GIGA mode) LED Green Light : Operating in GIGA mode. (5) 100M (Speed mode) LED Green Light : Operating in Speed mode. (6) FULL (DUPLEX mode) LED Green Light : Operating in DUPLEX mode. (7) LOOP HISTORY (Loop History mode) LED Green Light : Operating in Loop History mode. Green Blink : Loop is occurring, or occurred within the last 3days. Display of each port is refer to table 1 of No.4 . You can display the following items using the LED display change button. Display for the connection with a connected terminal (Status mode), Display for the 1000 Mbps transmission rate (GIGA mode), Display for the 100Mbps or 10 Mbps transmission rate (Speed mode), Display for the full-duplex or half-duplex transmission system (DUPLEX mode), Display for ports with a loop history (Loop history mode), All port LED lamps can be turned OFF (ECO mode). The mode at the start is called “Base mode”. There are two types of Base modes : Status mode (factory default setting) and ECO mode . You can change the Base mode by holding down the LED display change button (for at least 3 sec). When the Base mode is changed normally, all STATUS/ECO , GIGA , 100M , and FULL LED lamps light up at the same time. When you release the button, the Base mode is changed to the selected mode. If the mode is changed to the GIGA mode, Speed mode, DUPLEX mode, or Loop History mode and the LED display switch button is not used for one minute or longer, the mode automatically returns to a Base mode (Status mode or ECO mode). The Base mode is maintained even after the power is turned OFF. 

5. Hardware Specifications

5-4. LED display

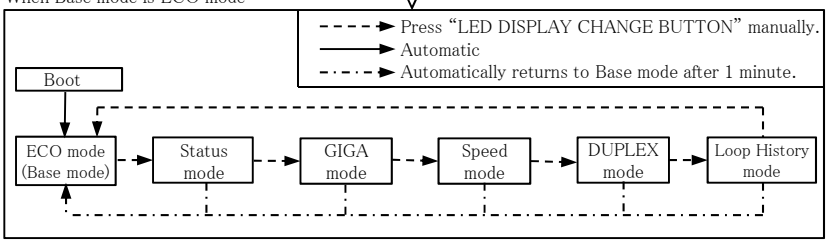
Switch two types of Base mode s and their LEDs in the following way:

When Base mode is Status mode (factory default setting)



Switch Base mode (keep pressing "LED DISPLAY CHANGE BUTTON" over 3 seconds)

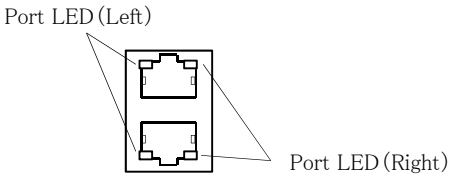
When Base mode is ECO mode



LED lamps for each mode and LED lamps for ports 1 to 48 correspond as the following. (Table 1)

Table 1

Port LED	Display mode	Behavior	Description
Left	STATUS/ECO	Green Light Green Blink Off	Link is established Transmitting and receiving data. No device connected.
	GIGA	Green Light Off	Link is established at 1000Mbps. Link is established at 100Mbps or 10Mbps , or no device is connected.
	100M	Green Light Off	Link is established at 100Mbps. Link is established at 1000Mbps or 10Mbps , or no device is connected.
	Full	Green Light Off	Link is established at full-duplex. Link is established at half-duplex or or no device is connected.
	LOOP HISTORY	Green Light Off	Loop has been detected within the last 3 days. No loop detection history.
Right	-	Orange Light Off	Shutting down by loop detection. Not shutting down by loop detection.



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.
6-2. Switching Hub Control	Switching Hub can be controlled by the following procedures: (1) Control from an asynchronous terminal connected to the console port. (2) Control from a remote terminal using SSH/TELNET and TCP/IP network connection (3) Control using SNMP Manager The switching Hub operation status can be checked using the following functions. (1) Function to display the CPU usage and memory usage (2) SFP module status checking function (DDM: Digital Diagnostic Monitoring)
6-3. Rebooting	The system can be reset from the software in the following three modes: (1) Warm start (2) Reset to factory default (3) Reset items other than the IP address to factory default The reboot timer function can also be used in each mode.
6-4. Supported Agent	Management protocol :SNMP v1/v2c/v3 (RFC1157,RFC1901, RFC1908) TELNET (RFC854) SSH v2 (RFC4251,RFC4252, RFC4253,RFC4254) SNTP v3 (RFC1769) Data transfer protocol :TFTP (RFC783,RFC1350)
6-5. Supported MIB	RFC1213-MIB(MIB Ⅱ) (RFC 1213) (*1) BRIDGE-MIB (RFC 4188) (*2) SNMPv2-MIB (RFC 1907) RMON-MIB (RFC 2819) Only etherStatsTable SNMP-FRAMEWORK-MIB (RFC 2571) SNMP-MPD-MIB (RFC 2572) SNMP-NOTIFICATION-MIB (RFC 2573N) SNMP-TARGET-MIB (RFC 2573T) SNMP-USER-BASED-SM-MIB (RFC 2574) SNMP-VIEW-BASED-ACM-MIB (RFC 2575) SNMP-COMMUNITY-MIB (RFC 2576) IP-MIB (RFC 4293) (*3) IF-MIB (RFC 2233) Excluding IfMIB IEEE8021-PAE-MIB Excluding dot1xPaeSupplicant *1 Excluding following item At, ipRouteTable, icmp, egp *2 Excluding following item dot1dStp, dot1dSr, dot1dStatic *3 Excluding following item ipDefaultRouterTable, ipv6RouterAdvertTable
6-6. System log	Maximum number to be kept: 256 System log transfer (IPv4/IPv6)

6. Software Specifications

6-7. Loop detection	Turns on the port LED with a orange light when a loop occurs in the corresponding port. At this time, the relevant port automatically shuts down to prevent loop from occurring. SNMP trap can be sent to notify the incident to the administrator. During loop is occurring, or if loop has occurred within the latest 3 days, LOOP HISTORY LED blinks to notify this. · Loop detection setting Enabled (factory default setting) Enabled/disabled can be switched by configuring a setting using the console, or by pressing "LED DISPLAY CHANGE BUTTON" for 10 seconds or more. The setting is kept even when the power is turned OFF. · Loop detection port Enabled: Ports 1 to 44 (factory default setting) Disabled: Ports 45 and 48 (factory default setting) · Loop shutoff time 60 to 86400 sec. (Factory default setting: 60 sec.) The set time Port LED lights up orange and the port shuts off. · Loop history retention time 3 days The LOOP HISTORY LED lamp flashes for three days. The Port LED lamp also remains lit for three days after the loop is eliminated.
6-8. Others	ZEQUO assist Syslog Client (Transfers system logs to the Syslog server.) TFTP Client (Upgrades the software and saves/loads configuration information.) Login RADIUS (login authentication function by the RADIUS server)

7. Layer 2 Switching Functions

7-1. Port grouping	Members of the port group can communicate only among member ports in the same group. (Number of group registrations: 256)
7-2. VLAN	IEEE802.1Q Tag VLAN Protocol Port Base VLAN Number of VLAN registrations: 256 (including default) Internet Mansion function
7-3. Trunking	IEEE802.ad Link Aggregation function (STATIC) Up to 8 groups can be created (up to 8 ports per group).
7-4. Port Monitoring	Traffic of the target port can be copied to the specified port and transmitted. (Two or more target ports can be specified.)
7-5. QoS	IEEE802.1p 4 levels of Priority Queue supported (Strict priority queuing)
7-6. Authentication Function	IEEE802.1X Port-based authentication (EAP-MD5/TLS/PEAP Authentication method)
7-7. Access control	Access control can be controlled by the following parameters: (1) IP 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 (9) ICMP type (10) TCP SYN Flag

7. Layer 2 Switching functions

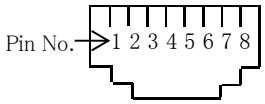
7-8. Fan control	Set the number of revolutions of the fan according to the operating environment temperature.
7-9. Time configuration	SNTP-based time synchronization function Manual mode setting

Fan control	Operating environment temperature	Remarks
High speed	0-50℃	Factory default
Low speed	0-40℃	Set the fan to high speed when using this Switching Hub where the operating environment temperature is between 0 and 50℃

8. Connector Pin Arrangement

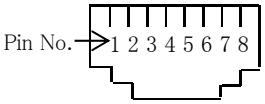
8-1. Port 1 - 48

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-



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



9. Installation Procedures and Accessories

9-1. Installation Procedures	Mounting to rack
9-2. Accessories	(1) Installation Guide :1 (2) CD-ROM(*1) :1 (3) Rubber foot :4 (4) Mounting bracket (for 19-inch rack) :2 (5) Screw(for 19-inch rack) :4 (6) Screw (for fixing the main unit and the 19 inch rack mount bracket) :8 (7) Power cord (CEE7/7)(*2) :1 *1 We discontinued the CD-ROM from October 2020's production lots. *2 The attached power cord is dedicated for AC 100 - 240 V use.

10. Optional Accessories

10-1. 1000BASE-SX SFP Module (Model No. :PN54021K-ID)	Fiber optic port connector type :LC connector (Duplex) Standards : IEEE802.3z 1000BASE-SX Transmission speed : 1000Mbps, full duplex Compatible cable : Fiber cable 50/125μm Multi Mode Fiber 62.5/125μm Multi Mode Fiber Maximum transmission distance : 550 m at 50/125 μm 220 m at 62.5/125 μm
10-2. 1000BASE-LX SFP Module (Model No.:PN54023K-ID)	Fiber optic port connector type :LC connector (Duplex) Standards : IEEE802.3z 1000BASE-LX Transmission speed : 1000Mbps, full duplex Compatible cable : Fiber cable 10/125μm Single Mode Fiber 50/125μm Multi Mode Fiber 62.5/125μm Multi Mode Fiber Maximum transmission distance : 10 km when Single Mode Fiber is used 550 m when Multi Mode Fiber is used

11. Prohibitions when Using the Product to Guarantee Safety

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 disassemble and/or modify this Switching Hub.
Deviation could lead to fire, electric shock, and/or equipment failure.

(3) Do not put foreign objects (such as metal and combustible) into the opening (such as twisted pair port, console port), and/or do not drop them into the inside of the Switching Hub.
Deviation could lead to fire, electric shock, and/or equipment failure.

(4) 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.

(5) Do not place this Switching Hub in harsh environment (such as near water, high humid, and/or high dust).
Deviation could lead to fire, electric shock, and/or equipment failure.

(6) Do not place this Switching Hub under direct sunlight and/or high temperature.
Deviation could lead to high internal temperature and fire.

(7) Do not handle the power cord with wet hand.
Deviation could lead to electric shock, and/or equipment failure.

(8) Do not handle this Switching Hub and connection cables during a thunderstorm.
Deviation could lead to electric shock.

(9) 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.

(10) Do not install this Switching Hub at the location with continuous vibration or strong shock, or at the unstable location.
Deviation could lead to injury and/or equipment failure.

(11) Do not insert any modules other than the optional SFP modules (PN54021K-ID/PN54023K-ID) into the SFP extension slot.
Deviation could lead to fire, electric shock, and/or equipment failure.
For the latest information about compatible SFP extension modules, check our website.

(12) Do not put this Switching Hub into fire.
Deviation could lead to explosion and/or fire.

(13) Do not use the supplied power cord for anything other than this product.
Deviation could lead to fire, electric shock, and/or equipment failure.

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

(15) Connect this Switching Hub to ground.
Deviation could lead to electric shock, malfunction, and/or equipment failure.

(16) Connect the power cord firmly to the power port.
Deviation could lead to electric fire, shock, and/or malfunction.

(17) Unplug the power cord if the STATUS/ECO LED (Status/ECO mode) blinks in orange (system fault).
Deviation, such as keeping connected for a long time, could lead to fire.

11. Prohibitions when Using the Product to Guarantee Safety

(18) Handle the Switching Hub carefully so that fingers or hands may not be damaged by twisted pair port, console port, or power cord hook block.

12. Basic Instructions for the Use of This Product

(1) For inspection and/or repair, consult the retailer.

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

(3) Unplug the power cord when installing or moving this Switching Hub.

(4) Unplug the power cord when cleaning this Switching Hub.

(5) Use this Switching Hub within the specifications. Deviation could lead to malfunction.

(6) Do not touch the metal terminal of the RJ45 connector, the modular plug of connected twisted pair cable. Do not place charged objects in the proximity of them. 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 Switching Hub. 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 Switching Hub).

(10) Do not store and/or use this Switching Hub in the environment with the characteristics listed below. (Store and/or use this Switching Hub in the environment in accordance with the specification.)
- High humidity. Possible spilled liquid (water).
- Dusty. Possible static charge (such as carpet).
- Under direct sunlight.
- Possible condensation. High/low temperature exceeding the specifications environment.
- Strong vibration and/or strong shock.

(11) Please use this Switching Hub in place where ambient temperature is from 0 to 50℃. Failure to satisfy the conditions above may result in a fire, electric shock, equipment failure, and/or malfunction. Such events are not covered by the warranty. Do not block the ventilator of the Switching Hub. Blocked ventilator induces the heat accumulation inside, causing equipment failure and/or malfunction.

(12) When using two Switching Hubs, 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) Operation is not guaranteed if a module other than the optional SFP extension modules (PN54021K-ID/PN54023K-ID) is inserted into the SFP extension slot. For the latest information about compatible SFP extension modules, check our website.