

Product Specifications

16-Port 10/100TX 802.3at PoE + 2-Port Gigabit TP/SFP Combo Managed Ethernet Switch

FGSW-1816HPS

Version 2.0

This document contains confidential proprietary information and is property of PLANET. The contents of this document should not be disclosed to unauthorized persons without the written consent of PLANET.

Change History:

Revision:	Date:	Author:	Change List
Version 2.0	2019/6/28	Marc Liao	Hardware changed: - Switch controller changed to IC+ IP1829A - PoE PSE controller changed to IC+ IP808AR Software changed: - SDK changed
Version 1.0	2015/4/9	Marc Liao	Initial Release

Author:	Marc Liao	Editor:	Marc Liao
Reviewed by:		Approved by:	Kent Kang

1. PRODUCT DESCRIPTION



PLANET's newly-revised FGSW-1816HPS Layer 2 PoE+ Managed Switch is designed for enterprises and industries where a network of PDs can be centrally managed. The Switch's management functions have been enhanced to include intelligent PoE management, IPv6 management, ACL, GVRP, and more.

Cost-optimized Managed PoE+ Switch with L2/L4 Switching and Security

PLANET FGSW-1816HPS is an ideal Managed PoE+ Switch which provides cost-effective advantage to local area network and is widely accepted in the SMB office network. It offers **intelligent Layer 2 data packet switching and management functions, friendly web user interface and stable operation**. The model complies with **IEEE 802.3at Power over Ethernet Plus (PoE+)** at an affordable price; the FGSW-1816HPS is equipped with **16 10/100BASE-TX** Fast Ethernet ports and **2 Gigabit TP/SFP combo** interfaces with inner power system. With its **16** Fast Ethernet ports integrated with 802.3at PoE+ injector function and total power budget of up to **220 watts**, it offers a rack-mountable, affordable, safe and reliable power solution for SMBs deploying Power over Ethernet networks, or requiring enhanced data security and network traffic management.

Intelligent LED Indicator for Real-time PoE Usage

The FGSW-1816HPS helps users to monitor the current status of PoE power usage easily and efficiently with its advanced LED indication. Called "**PoE Power Usage**" found on the front panel of the FGSW-1816HPS Layer 2 PoE+ Managed Switch, it has four orange LEDs indicating the range of the current PoE power usage.

Solution for IPv6 Networking

With the support for IPv6/IPv4 protocol, and easy and friendly management interfaces, the FGSW-1816HPS is the ideal choice for IP surveillance, VoIP and wireless service providers to connect with the IPv6 network. It also helps SMBs to step in the IPv6 era with the lowest investment and without having to replace the network facilities even though ISPs establish the IPv6 FTTx edge network.

Built-in Unique PoE Functions for Surveillance Management

As a managed PoE Switch for surveillance network, the FGSW-1816HPS features the following intelligent PoE management functions:

- **Real-time Display of PoE Chipset Temperature**
- **PD Alive Check**
- **PoE Port Sequence**
- **PoE Schedule**

Intelligent Powered Device Alive Check

The FGSW-1816HPS can be configured to monitor a connected PD status in real time via ping action. Once the PD stops working and it is without response, the FGSW-1816HPS will resume the PoE port power and bring the PD back to work. It will greatly enhance the network reliability through the PoE port resetting the PD's power source, thus reducing administrator management burden.

PoE Port Sequence

To prevent all the PoE ports of the FGSW-1816HPS from being active at the same time when the Switch has booted up, the PoE ports of the FGSW-1816HPS can be configured to allow each port to be activated at an interval time. In addition, the “**Delay**” setting is to delay power feeding on each port when the FGSW-1816HPS has completely booted up.

PoE Schedule for Energy Saving

Besides being used for IP surveillance, the FGSW-1816HPS is certainly applicable to build any PoE network including VoIP and wireless LAN. Under the trend of energy saving worldwide and contributing to the environmental protection on the Earth, the FGSW-1816HPS can effectively control the power supply besides its capability of giving high watts power. The “**PoE schedule**” function helps you to enable or disable PoE power feeding for each PoE port during specified time intervals and it is a powerful function to help SMBs and enterprises save energy and budget.

Robust Layer 2 Features

The FGSW-1816HPS can be programmed for advanced switch management functions, such as **Multiple Spanning Tree Protocol (MSTP)**, BPDU filtering, BPDU Guard, dynamic port link aggregation, **IGMP/MLD snooping**, DHCP relay agent, loop detection and **GVRP**, voice VLAN and the **Link Layer Discovery Protocol (LLDP)**. The Layer 2 protocol included is to help discover basic information about neighboring devices in the local broadcast domain. Other features included are the port-based/802.1Q VLAN and Q-in-Q VLAN, Layer 2/4 QoS, port mirroring, broadcast storm control and bandwidth control.

Enhanced Security and Traffic Control

The FGSW-1816HPS offers the comprehensive **Layer 2 to Layer 4 access control list (ACL)** for enforcing security to the edge. It can be used to restrict network access by denying packets based on source and destination IP/MAC address or defined typical network applications. The FGSW-1816HPS also provides **DHCP Snooping**, **ARP Inspection** and **MAC Verification** functions to prevent IP snooping from attack and discard ARP packets with invalid MAC address. Also included are per port MAC/IP address binding and MAC address binding. The network administrator can now build highly-secure corporate networks with considerably less time and effort than before.

Cybersecurity Network Solution to Minimize Security Risks

The cybersecurity features that virtually need no effort and cost to have included the protection of the switch management and the enhanced security of the mission-critical network. Both SSH and SSL protocols are utilized to provide strong protection against advanced threats. The network administrator can now construct highly-secure corporate networks with considerably less time and effort than before.

Efficient Management

For efficient management, the FGSW-1816HPS is equipped with **Web**, **Telnet** and **SNMP** management interfaces. With the built-in Web-based management interface, the FGSW-1816HPS offers an easy-to-use, platform-independent management and configuration facility. By supporting the standard Simple Network Management Protocol (SNMP), the FGSW-1816HPS can be managed via any standard management software. For text-based management, the switch can be accessed via Telnet. Moreover, the FGSW-1816HPS offers secure remote management by supporting **SNMPv3** connections which encrypt the packet content at each session.

Flexible and Extendable Uplink Solution

The FGSW-1816HPS provides **2 extra Gigabit TP/SFP combo** interfaces supporting **10/100/1000BASE-T** RJ45 copper to connect with surveillance network devices such as **NVR**, **Video Streaming Server** or **NAS** to facilitate surveillance management. Or through these fiber SFP slots occupied by the **1000BASE-SX/LX** SFP (small form-factor pluggable) fiber transceivers, it can be uplinked to a backbone switch and monitoring center in long distance. The distance can be extended from 550 meters to 2km (multi-mode fiber) to 10/20/40/80/120 kilometers (single-mode fiber or WDM fiber). They are well-suited for applications within the industrial data centers and distributions.

2. PRODUCT FEATURES

▶ **Physical Port**

- 16 10/100BASE-TX RJ45 copper ports with IEEE 802.3at/af PoE+ injector function
- 2 10/100/1000BASE-T Gigabit RJ45 copper ports
- 2 1000BASE-X mini-GBIC/SFP slots, shared with port-17 to port-18
- Reset button for system factory default

▶ **Switching**

- Hardware-based 10/100Mbps, half/full duplex and 1000Mbps full duplex mode, flow control and auto-negotiation, and auto MDI/MDI-X
- Features Store-and-Forward mode with wire-speed filtering and forwarding rates
- IEEE 802.3x flow control for full duplex operation and back pressure for half duplex operation
- Automatic address learning and address aging
- Supports CSMA/CD protocol

▶ **Power over Ethernet**

- Complies with IEEE 802.3at Power over Ethernet Plus
- Complies with IEEE 802.3af Power over Ethernet
- Up to 16 ports of IEEE 802.3af/802.3at devices powered
- Supports PoE Power up to 36 watts for each PoE port
- 220-watt PoE budget
- Auto detects powered device (PD)
- Circuit protection prevents power interference between ports
- Remote power feeding up to 100m
- PoE Management
 - Per port PoE function enable/disable
 - Per Port PoE operation mode selection
 - Per PoE port power budget control
 - PD classification detection and PoE consumption usage status
- Intelligent PoE features
 - Real-time display of PoE chipset temperature
 - PD alive check
 - PoE port sequence
 - PoE schedule

▶ **Layer 2 Features**

- Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)
- High performance Store and Forward architecture, runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
- Supports VLAN
 - Port-based VLAN, up to 18 VLAN groups
 - IEEE 802.1Q tagged VLAN
 - Protocol VLAN
 - Provider Bridging (VLAN Q-in-Q) support (IEEE 802.1ad)
 - GVRP

- Voice VLAN

■ Supports **Spanning Tree Protocol**

- STP (IEEE 802.1D Spanning Tree Protocol)
- RSTP (IEEE 802.1w Rapid Spanning Tree Protocol)
- MSTP (IEEE 802.1s Multiple Spanning Tree Protocol)
- STP BPDU filtering, BPDU Guard

■ Supports **Link Aggregation**

- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- 1 LACP group, up to 2 ports per LACP group
- Cisco ether-channel (static trunk)
- 1 trunk group, up to 2 ports per trunk group

■ Provides port mirror (many-to-1)

■ Loop detection

▶ **Quality of Service**

- Ingress/Egress Rate Limit per port bandwidth control
- Storm Control support
 - Broadcast/ Multicast /DLF (Destination Lookup Fail)/ARP/ICMP
- Traffic classification
 - IEEE 802.1p Qos/CoS
 - TCP/UDP/DSCP/IP precedence of IPv4/IPv6 packets
- Strict priority and Weighted Round Robin (WRR) CoS policies

▶ **Multicast**

- Supports IPv4 IGMP snooping v1/ v2 and v3
- Supports IPv6 MLD snooping v1, v2

▶ **Security**

- Access Control List
 - IPv4/IPv6 IP-based ACL
 - MAC-based ACL
- Port-MAC-IP Address Binding
 - Port-MAC-IP Port Setting
 - Port-MAC-IP Entry Setting
- MAC Address Binding
 - Static MAC
 - MAC Filtering
- DHCP snooping to filter distrusted DHCP messages
- ARP Inspection discards ARP packets with invalid MAC address to IP address binding

▶ **Management**

- IPv4 and IPv6 dual stack management
- Switch management interface
 - Web switch management
 - Telnet command line interface
 - SNMP v1, v2c and v3
- BOOTP and DHCP for IP address assignment

- System maintenance
 - Firmware upgrade via HTTP
 - Configuration upload/download through web interface
 - Hardware-based reset button for system reset to factory default
- SNTP Network Time Protocol
- Link Layer Discovery Protocol (LLDP)
- Event message logging to remote Syslog server
- PLANET Smart Discovery utility

3. PRODUCT SPECIFICATIONS

3.1 MAIN COMPONENTS

Switch ASIC	IC+ IP1829A	x 1
Fast Ethernet PHY	IP1829A built-in	
Gigabit PHY	Qualcomm AR8033	x 2
CPU	IC+ IP211	x 1
Flash		x 1
PoE Controller	IC+ IP808AR	x 2
Power Supply	Gospower 250W (DC 52V output)	x 1

3.2 FUNCTION SPECIFICATIONS

Product	FGSW-1816HPS
Hardware Specifications	
Copper Ports	16 10/100BASE-TX RJ45 Auto-MDI/MDI-X ports
PoE Injector Port	16 802.3af/802.3at PoE+ injector ports
Gigabit Copper Ports	2 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
SFP/mini-GBIC Slots	2 1000BASE-X SFP interfaces, shared with Port-17 to Port-18
Switch Architecture	Store-and-Forward
Switch Fabric	7.2Gbps/non-blocking
Switch Throughput@64bytes	5.35Mpps @64bytes
MAC Address Table	16K entries
Shared Data Buffer	4Mb
Flow Control	IEEE 802.3x pause frame for full duplex Back pressure for half duplex
Maximum Transmit Unit	1522 bytes
Reset Button	< 5 sec: System reboot > 5 sec: Factory default
LED	<p>System: Power (Green)</p> <p>10/100TX RJ45 Interfaces (Port 1 to Port 16): LNK/ACT (Green), PoE-in-Use (Orange)</p> <p>10/100/1000BASE-T RJ45 / SFP Interfaces (Port 17 to Port 18): LNK/ACT (Green), 1000 (Green)</p> <p>PoE Usage: 50W, 100W, 150W, 190W (Orange)</p>
Thermal Fan	2
Power Requirements	100~240V AC, 50/60Hz, 4A (max.)
Power Consumption/Dissipation	Max.250 watts/853BTU
Enclosure	Metal

Power over Ethernet	
PoE Standard	IEEE 802.3af Power over Ethernet/PSE IEEE 802.3at Power over Ethernet Plus/PSE
PoE Power Supply Type	End-span
Power Pin Assignment	1/2(+), 3/6 (-)
PoE Power Output	Per Port 52V DC, 300mA. Max. 15.4 watts (IEEE 802.3af) Per Port 52V DC, 600mA. Max. 36 watts (IEEE 802.3at)
PoE Power Budget	220 watts
Number of PDs, 7 watts	16
Number of PDs, 15.4 watts	12
Number of PDs, 30 watts	7
Layer 2 Functions	
Port Mirroring	TX/RX/both Many-to-1 monitor
VLAN	Port-based VLAN, up to 18 VLAN groups IEEE 802.1Q tagged VLAN - Up to 18 VLAN groups, out of 4094 VLAN IDs Protocol VLAN Provider Bridging (VLAN Q-in-Q) support (IEEE 802.1ad) GVRP Voice VLAN
Link Aggregation	IEEE 802.3ad LACP supports one 2-port trunk group; static trunk supports one 2-port trunk group
Spanning Tree Protocol	IEEE 802.1D Spanning Tree Protocol (STP) IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) STP BPDU filtering, BPDU Guard
IGMP Snooping	IPv4 IGMP snooping v1/ v2 and v3
MLD Snooping	IPv6 MLD snooping v1, v2
Access Control List	IPv4/IPv6 IP-based ACL MAC-based ACL
QoS	Ingress/Egress Rate Limit per port bandwidth control Storm Control support - Broadcast/ Multicast /DLF (Destination Lookup Failure)/ARP/ICMP Traffic classification - IEEE 802.1p Qos/CoS - TCP/UDP/DSCP/IP precedence of IPv4/IPv6 packets Strict priority and Weighted Round Robin (WRR) CoS policies
Security	Access Control List - IPv4/IPv6 IP-based ACL - MAC-based ACL Port-MAC-IP Address Binding - Port-MAC-IP Port Setting - Port-MAC-IP Entry Setting MAC Address Binding - Static MAC

	<ul style="list-style-type: none"> - MAC Filtering DHCP snooping to filter distrusted DHCP messages ARP Inspection discards ARP packets with invalid MAC address to IP address binding
Management Functions	
Basic Management Interfaces	<ul style="list-style-type: none"> IPv4 and IPv6 dual stack management Switch management interface <ul style="list-style-type: none"> - Web switch management - Telnet command line interface - SNMP v1, v2c and v3 BOOTP and DHCP for IP address assignment System maintenance <ul style="list-style-type: none"> - Firmware upgrade via HTTP - Configuration upload/download through web interface - Hardware-based reset button for system reset to factory default SNTP Network Time Protocol Link Layer Discovery Protocol (LLDP) Event message logging to remote Syslog server PLANET smart discovery utility
Secure Management Interfaces	SNMP v3, SSH, SSL
Standards Conformance	
Standards Compliance	<ul style="list-style-type: none"> IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3z Gigabit SX/LX IEEE 802.3ab Gigabit 1000T IEEE 802.3x flow control and back pressure IEEE 802.3ad port trunk with LACP IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree Protocol IEEE 802.1s Multiple Spanning Tree Protocol IEEE 802.1p Class of Service IEEE 802.1Q VLAN tagging IEEE 802.1ab LLDP IEEE 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet Plus RFC 2068 HTTP RFC 1112 IGMP version 1 RFC 2236 IGMP version 2 RFC 3376 IGMP version 3 RFC 2710 MLD version 1 RFC 3810 MLD version 2

3.3 PHYSICAL SPECIFICATIONS:

■ **Dimensions:**

440 x 200 x 44.5 mm (W x D x H, 1U height)

■ **Weight:**

2.8kg

■ **Front Panel**



■ **Rear Panel**



■ **LED Definition**

■ **System**

LED	Color	Function
PWR	Green	Lights to indicate that the Switch has power.

■ **Per 10/100Mbps Port with PoE Interfaces (Port1 to Port16)**

LED	Color	Function
LNK/ACT	Green	Lights: Indicates the link through that port is successfully established at 10/100Mbps.
		Blink: Indicates that the Switch is actively sending or receiving data over that port.
PoE In-Use	Orange	Lights: Indicates the port is providing PoE power.
		Off: Indicates the port is not providing PoE power.

■ **Per 10/100/1000Mbps RJ45 Combo Interface (Port17 to Port18)**

LED	Color	Function
LNK/ACT	Green	Lights. Indicates the port is successfully established.
		Blink: Indicates that the Switch is actively sending or receiving data over that port.
1000	Green	Lights. Indicates the port is successfully established at 1000Mbps.
		Off: Indicates the port is successfully established at 10/100Mbps.

■ **Per 1000Mbps SFP Combo Interface (Por17 to Port18)**

LED	Color	Function
LNK/ACT	Green	Lights. Indicates the port is successfully established.
		Blink: Indicates that the Switch is actively sending or receiving data over that port.
1000	Green	Lights. Indicates the port is successfully established at 1000Mbps.
		Off: Indicates the port is not established at 1000Mbps.

■ **PoE Usage**

LED	Color	Function
50W	Orange	Lights to indicate the PoE power consumption has equal 50W or over 50W.
100W	Orange	Lights to indicate the PoE power consumption has equal 100W or over 100W.
150W	Orange	Lights to indicate the PoE power consumption has equal 150W or over 150W.
190W	Orange	Lights to indicate the PoE power consumption has equal 190W or over 190W.

3.4 ENVIRONMENTAL SPECIFICATIONS

Operating:

Temperature: 0 ~ 50 degrees C

Relative Humidity: 5 ~ 95% (non-condensing)

Storage:

Temperature: -10 ~ 70 degrees C

Relative Humidity: 5 ~ 95% (non-condensing)

3.5 ELECTRICAL SPECIFICATIONS

Input Voltage:	100~240V AC, 50/60Hz, 4A (max.)
Power Consumption (System on):	110V: 14.1 watts/48BTU
	220V: 13.8 watts/47BTU
Power Consumption (Ethernet & PoE Full Loading):	110V: 254 watts*/866BTU
	220V: 253 watts*/863BTU

* With a total PoE power output limited at 220 watts.

3.6 REGULATORY COMPLIANCE

FCC Part 15 Class A, CE

3.7 RELIABILITY

MTBF > 50,000 hrs @ 25 degrees C

3.8 BASIC PACKAGING

- The FGSW-1816HPS x 1
- Quick Installation Guide x 1
- Rubber Feet x 4
- Two Rack-mounting Brackets with Attachment Screws x 1
- Power Cord x 1
- SFP Dust-proof Caps x 2

3.9 PACKING INFORMATION

Box Dimensions (W x D x H):	554 x 308 x 95 mm
Weight (gross weight):	3.175kg
Carton Dimensions (W x D x H):	595 x 525 x 350 mm
Carton Weight (gross weight):	16.7kg
Quantity:	5pcs in one carton