WARRANTY AND PRODUCT REGISTRATION

To register SMC products and to review the detailed warranty statement, please refer to the Support Section of the SMC Website at http://www.smc.com.
COMPLIANCES AND SAFETY STATEMENTS

FCC - CLASS A
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

◆ This device may not cause harmful interference.
◆ This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

CE MARK DECLARATION OF CONFORMANCE FOR EMI AND SAFETY (EEC)
This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.
**ABOUT THIS GUIDE**

**PURPOSE**
This guide details the hardware features of the switch, including the physical and performance-related characteristics, and how to install the switch.

**AUDIENCE**
The guide is intended for use by network administrators who are responsible for installing and setting up network equipment; consequently, it assumes a basic working knowledge of LANs (Local Area Networks).

**CONVENTIONS**
The following conventions are used throughout this guide to show information:

**NOTE:** Emphasizes important information or calls your attention to related features or instructions.

**CAUTION:** Alerts you to a potential hazard that could cause loss of data, or damage the system or equipment.

**WARNING:** Alerts you to a potential hazard that could cause personal injury.

**REVISION HISTORY**
This section summarizes the changes in each revision of this guide.

**APRIL 2011 REVISION**
This is the first revision of this guide.
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INTRODUCTION

OVERVIEW

The SMCGS1601 and SMCGS2401 switches provide you with a high-performance, low-cost, ease-of-use, seamless, and standard upgrade that boosts your old network to 1000 Mbps. Increase the speed of your network server and backbone connections make Gigabit a reality. Power users in the home, office, workgroup, or creative production environment, can now move large, bandwidth-intensive files faster. Transfer graphics, CGI, CAD, multimedia, and other large files across the network almost instantly.

The SMCGS1601 and SMCGS2401 switches feature a non-blocking switching architecture that forwards and filters packets at full wire-speed for maximum throughput. The switches are compatible with all 10, 100, and 1000 Mbps Ethernet devices because they are standard-based. The switches protect your existing network investments while providing you with a straightforward migration path to faster Gigabit speeds.

The SMCGS1601 and SMCGS2401 switches are plug-and-play devices; no configuration is required. Auto MDI/MDI-X cable detection on all ports eliminates the need for crossover cables. Each port can be used as an end-node or uplink port, and any port can be simply plugged into a server, hub, router, or switch, using straight-through or crossover cable. Diagnostic LEDs, which display link status and activity, allow you to quickly detect and correct problems on the network.

FEATURES

◆ Complies with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab standards.

◆ 16/24 10/100/1000 Mbps auto-sensing RJ-45 ports supporting Auto-MDI/MDIX.

◆ All ports support full/half-duplex transfer mode for 10/100 Mbps and full-duplex transfer mode for 1000 Mbps.
CHAPTER 1 | Introduction
Overview

- Supports IEEE 802.3x flow control for full-duplex mode and backpressure for half-duplex transfer mode.
- Non-blocking switching architecture that forwards and filters packets at full wire-speed for maximum throughput.
- Supports MAC address auto-learning and auto-aging.
- The SMCGS1601 supports IEEE P802.3az Energy-Efficient Ethernet, which can save up to 49% of power consumption.
- The SMCGS2401 supports Green Saving, which provides significant power saving compared to non-green switches.
- The SMCGS1601 and SMCGS2401 support IEEE 802.1p QoS.
- LED indicators for monitoring power, link, speed and activity.
- Desktop and rack-mountable steel case.
- Internal power supply.

IEEE 802.1p QoS
The SMCGS1601 and SMCGS2401 switches support 802.1p priority queuing Quality of Service, which is an implementation of the IEEE 802.1p standard. With the 802.1p QoS function, network traffic that requires high priority, such as VoIP (Voice-over Internet Protocol), web browsing applications or video conferencing, can be forwarded before other traffic. The switches have separate hardware queues for each physical port, when packets are received with an 802.1p priority tag, they are sent to the appropriate output queue.

The illustration below shows how 802.1p priority queuing is implemented on the switches.

**Figure 1: Mapping QoS on the Switch**
There are four priority levels labeled TC0, TC1, TC2 and TC3. The untagged packets and the eight IEEE 802.1p priority tags (defined by the standard) are mapped to the four priority queues on the switch. TC3 has the highest priority of the four priority queues while TC0 has the lowest priority. The untagged packets and eight priority tags, specified in IEEE 802.1p, are mapped to the switch’s priority tags as follows:

- Untagged packets, and packets with priority tag 1 and 2 are assigned to the switch’s TC0 level queue.
- Packets with priority tag 0 and 3 are assigned to the switch’s TC1 level queue.
- Packets with priority tag 4 and 5 are assigned to the switch’s TC2 level queue.
- Packets with priority tag 6 and 7 are assigned to the switch’s TC3 level queue.

The SMCGS1601 switch uses Weighted Fair Queuing (WFQ) for scheduling. The WFQ scheduling algorithm assigns bandwidth to all the queues based on default weight values. The queue with the highest weight value has the largest bandwidth of the four queues. And the SMCGS2401 Switch uses Weighted Robin Round (WRR) for scheduling. The WRR queue-scheduling algorithm schedules all the queues in turn with every queue assured a certain service time. For both WFQ and WRR mode, the default weight values of TC0, TC1, TC2 and TC3 are 1:2:4:8.
This chapter describes the front panel, rear panel and LED indicators of the switch. The SMCGS1601 and SMCGS2401 only differ in the number of ports, and all figures in this guide are of the SMCGS2401.

FRONT PANEL

The front panel of SMCGS2401 consists of switch LED indicators, and 24 10/100/1000 Mbps RJ-45 ports.

Figure 2: SMCGS2401 Switch Front Panel

PORT AND SYSTEM STATUS LEDS

The switches include a display panel for key system and port indications that simplify installation and network troubleshooting. The LEDs, which are located on the front panel, are described in the following table.

Table 1: System and Port Status LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Condition</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>On Green</td>
<td>The internal power supply is operating normally.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>The unit has no power connected.</td>
</tr>
<tr>
<td>Link/Act</td>
<td>On/Flashing Green</td>
<td>Port has established a valid network connection. Flashing indicates activity.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>There is no valid link on the port.</td>
</tr>
</tbody>
</table>
CHAPTER 2 | Hardware Description

Rear Panel

Table 1: System and Port Status LEDs (Continued)

<table>
<thead>
<tr>
<th>LED</th>
<th>Condition</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000Mbps</td>
<td>On Green</td>
<td>The port is operating at 1000 Mbps.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>The port is operating at 10 or 100 Mbps.</td>
</tr>
</tbody>
</table>

RJ-45 PORTS

The switch contains 16/24 1000BASE-T RJ-45 ports. All ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs.

Each of these ports support auto-negotiation, so the optimum transmission mode (half or full duplex), and data rate (10, 100, or 1000 Mbps) is selected automatically.

Each port also supports IEEE 802.3x auto-negotiation of flow control, so the switch can automatically prevent port buffers from becoming saturated.

REAR PANEL

The rear panel of the switch features a power socket and a grounding terminal.

Figure 3: SMCGS2401 Switch Rear Panel

GROUNDING TERMINAL

The SMCGS2401 already includes a lightning protection mechanism. However, you can also ground the switch through the PE (Protective Earth) wire of an AC power cord, or with a grounding cable. For detail information, see “Connecting to Ground” on page 23.
AC POWER SOCKET
Connect the female connector of the power cord here, and the male connector to the AC power outlet. Make sure the voltage of the power supply meets the requirement of the input voltage.
Before installing the switch, verify that you have all the items listed under “Package Contents.” If any of the items are missing or damaged, contact your local SMC distributor. Also be sure you have all the necessary tools and cabling before installing the switch.

**PACKAGE CONTENTS**

The following contents should be found in your package:

- One SMCGS1601 or SMCGS2401 Switch
- Two power cords
- This User Guide
- Rackmount Kit
- Quick Installation Guide
- SMC Warranty Card
- Four rubber foot pads
Precautions

To ensure a long-term and stable performance of the switch, pay attention to the following before the installation.

Safety Requirements

◆ Before cleaning the switch, disconnect the power supply. Do not clean the switch using a wet cloth, and never use any other liquid for cleaning.

◆ Take waterproof measures during storage, transportation and operation of the equipment.

◆ Use only the power cord provided with the switch.

◆ Make sure the voltage of the power supply meets the requirement of the input voltage of the switch.

◆ Do not push any objects into the openings of the switch.

◆ Ensure the vent holes are well ventilated and unblocked.

◆ Do not open or remove the cover of the switch.

Location Requirements

When you choose a location for the switch, follow these guidelines:

◆ Install the switch on a flat and stable surface that can support the entire weight of the switch with all fittings.

◆ Locate the switch far from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.

◆ To ensure adequate air flow around the switch. At least 10 cm (4 inches) of space at the front and rear of the switch is needed for ventilation.

◆ Make sure that the switch will be accessible and that the cables can be easily connected.
Position the switch away from water and moisture sources, be sure to provide an acceptable temperature and humidity operating environment.

**INSTALLATION**

This switch can be either installed on the standard 19-inch mountable rack or located on a desktop.

**CAUTION:** Please unplug the power cord before installing or removing the switch.

**DESKTOP INSTALLATION**

To install the switch on the desktop, follow these steps:

1. Set the switch on a flat surface strong enough to support the entire weight of the switch with all fittings.

2. Remove the adhesive backing papers from the rubber feet.

3. Turn the switch over and attach the supplied rubber feet to the recessed areas on the bottom at each corner of the switch.

**Figure 4: Attaching Rubber Feet**

4. Upturn the switch and set in the desired location, making sure there is enough ventilation space on all sides for proper air flow.
5. Connect the switch to a power source with the provided power cord. See “Powering On” on page 25.

⚠️ **CAUTION:** Avoid placing anything heavy on the switch.

---

**RACK INSTALLATION**

To install the switch in an EIA standard-sized, 19-inch rack, follow the instructions described below:

1. Secure the supplied rack-mounting brackets to each side of the switch with supplied screws, as illustrated in the following figure.

   **Figure 5: Attaching Brackets**

2. Use suitable screws (not provided) to secure the brackets to the rack, as illustrated in the following figure.
3. Connect the switch to a power source with the provided power cord. See “Powering On” on page 25.

**CONNECTING TO GROUND**

Connecting the switch to ground protects against lightning over-voltage and over-current of the switch, which is also a necessary measure to protect the body from electric shock.

In different environments, the switch may be grounded differently. The following instructs you to connect the switch to the ground in two ways; connecting to a grounding bar, or connecting to ground through the power cord. Connect the switch to ground in the best way according to your specific operating environment.
CHAPTER 3 | Installing the Switch
Installation

CONNECTING TO A GROUNDING BAR
If the switch is installed in an equipment room, where a grounding bar is available. You are recommended to connect the switch to a grounding bar as shown in the following figure.

Figure 7: Connecting to a Grounding Bar

![Diagram of connecting to a grounding bar]

NOTE: The grounding bar and grounding cable are not provided with the product.

CONNECTING TO GROUND THROUGH THE POWER SUPPLY
If the switch is installed in a normal environment, it can be grounded through the PE (Protective Earth) wire of the AC power supply, as shown in the following figure.
Figure 8: Connecting to Ground Through the Power Supply

NOTE: The figure illustrates the application and principle. The power plug in the package and the socket in your situation will comply with regulations in your country, so they may differ from the figure above. 

NOTE: If you intend to connect the switch to ground through the PE (Protective Earth) wire of the AC power cord, make sure the PE wire in the electrical outlet is well grounded in advance.

POWERING ON

The SMCGS1601 and SMCGS2401 switches are powered by connecting to an AC power supply using a power cord. When powering on the switch, it automatically initializes and the LED indicators respond as follows:

1. All of the LED indicators flash momentarily for one second, which represents a resetting of the system.

2. The Power LED indicator turns on green.
CONNECTING NETWORK DEVICES

The switches are designed to be connected to 10, 100, or 1000 Mbps network cards in PCs and servers, as well as to other switches and hubs.

CABLING GUIDELINES

The RJ-45 ports on the switch support automatic MDI/MDI-X pinout configuration, so you can use standard straight-through twisted-pair cables to connect to any other network device (PCs, servers, switches, routers, or hubs).

Each device requires an unshielded twisted-pair (UTP) cable with RJ-45 connectors at both ends. Use Category 5, 5e or 6 cable for 1000BASE-T connections, Category 5 or better for 100BASE-TX connections, and Category 3 or better for 10BASE-T connections.

CONNECTING TO PCs, SERVERS, HUBS AND SWITCHES

1. Attach one end of a twisted-pair cable segment to the device’s RJ-45 connector.

2. Attach the other end of the cable segment to an available port on the switch.

   Make sure each twisted pair cable does not exceed 100 meters (328 ft) in length.

3. As each connection is made, the relevant port LED (on the switch) corresponding to each port will turn on green to indicate that the connection is valid.
A TROUBLESHOOTING

DIAGNOSING SWITCH INDICATORS

THE POWER LED IS OFF
◆ Make sure the AC power cord is connected to the switch and power source properly.
◆ Make sure the power source is ON.

THE LINK/ACT LED IS OFF WHEN A DEVICE IS CONNECTED TO THE CORRESPONDING PORT
◆ Make sure that the cable connectors are firmly plugged into the switch and the device.
◆ Make sure the connected device is turned on and working properly.
◆ The cable must be less than 100 meters long (328 feet).
◆ Check the port on the attached device and cable connections for possible defects. Replace the defective cable if necessary.

POWER AND COOLING PROBLEMS

If the power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet. If you still cannot isolate the problem, the internal power supply may be defective.
INSTALLATION

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.
PHYSICAL CHARACTERISTICS

STANDARDS
IEEE 802.3 10BASE-T
IEEE 802.3u 100BASE-TX
IEEE 802.3ab 1000BASE-T

TOPOLOGY
Star

PROTOCOL
CSMA/CD

DATA TRANSFER RATE
Ethernet: 10 Mbps (half/full duplex)
Fast Ethernet: 100 Mbps (half/full duplex)
Gigabit Ethernet: 1000 Mbps (full duplex)

NETWORK MEDIA (CABLE)
10BASE-T: UTP Category 3, 4, 5 cable (maximum 100 m)
EIA/TIA-568 100 STP (maximum 100 m)
100BASE-TX: UTP Category 5, 5e cable (maximum 100 m)
EIA/TIA-568 100 STP (maximum 100 m)
1000BASE-T: UTP Category 5e, 6 cable (maximum 100 m)
EIA/TIA-568 100 STP (maximum 100 m)

NUMBER OF PORTS
16/24 10/100/1000 Mbps Auto-Negotiation RJ-45 ports
LED INDICATORS
POWER, Link/Act, 1000Mbps

TRANSFER METHOD
Store-and-Forward

MAC ADDRESS LEARNING
Automatically learning, automatically aging

FRAME FILTER RATE
10BASE-T: 14881 pps/port
100BASE-TX: 148810 pps/port
1000BASE-T: 1488095 pps/port

FRAME FORWARD RATE
10BASE-T: 14881 pps/port
100BASE-TX: 148810 pps/port
1000BASE-T: 1488095 pps/port

SWITCHING DATABASE
8K MAC address entries

BUFFER MEMORY
256 Kbytes/device

SWITCHING CAPACITY
SMCGS1601: 32 Gbps
SMCGS2401: 48 Gbps

POWER ADAPTER
SMCG1601/2401: 100 to 240 V, 50-60 Hz, 0.6A
DIMENSIONS
29.4 x 18.0 x 4.4 cm (11.6 x 7.1 x 1.73 in.)

WEIGHT
SMCGS1601: 1.45 Kg (3.19 lbs)
SMCGS2401: 1.652 Kg (3.63 lbs)

FEATURE
Jumbo Frames: 9 KBytes
Auto-MDI/MDIX
SMCGS1601: IEEE P802.3az Energy-Efficient Ethernet
SMCGS2401: Green Saving
SMCGS1601: IEEE 802.1p QoS
SMCGS2401: IEEE 802.1p QoS

TEMPERATURE
Operating: 0 to 40 °C (32 to 104 °F)
Storage: -40 to 70 °C (-40 to 158 °F)

HUMIDITY
Operating: 10% to 90% (non-condensing)
Storage: 5 to 90 °C (non-condensing)
APPENDIX B | Specifications

Physical Characteristics
SMC NETWORKS TECHNICAL SUPPORT

From Singapore in English and 中文 (Mon.-Fri. 9AM to 5 PM)
Tel: +65-63387667, Ext. 4

From the United Arab Emirates in English (Sun.-Thu. 9AM to 6 PM)
Tel: +971 800 222866/+971 4 3564810

From U.S.A. and Canada (24 hours a day, 7 days a week)
Tel: +1 (800) SMC-4-YOU/+1 (949) 679-8000 Fax: +1 (949) 679-1481

English: Technical Support information available at www.smc.com


English: (for Middle East): Technical Support information at muneer@smc-asia.com

Deutsch: Technischer Support und weitere Information unter www.smc.com

Español: En www.smc.com Ud. podrá encontrar la información relativa a servicios de soporte técnico

Français: Informations Support Technique sur www.smc.com

Português: Informações sobre Suporte Técnico em www.smc.com

Italiano: Le informazioni di supporto tecnico sono disponibili su www.smc.com

Svenska: Information om Teknisk Support finns tillgängligt på www.smc.com

Nederlands: Technische ondersteuningsinformatie beschikbaar op www.smc.com

Polski: Informacje o wsparciu technicznym są dostępne na www.smc.com

Čeština: Technická podpora je dostupná na www.smc.com

Magyar: Műszaki tamogatás információ elérhető -on www.smc.com

简体中文：技术支持讯息可通www.smc-prc.com查询

繁體中文：產品技術支援與服務請上 www.smcnetworks.com.tw

ไทย: สามารถหาข้อมูลทางด้านเทคนิคได้ที่ www.smc-asis.com

한국어: 기술지원관련 정보는 www.smcnetworks.co.kr 을 참고하시기 바랍니다

INTERNET
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Driver updates: www.smc.com-> Support-> Downloads

SMCGS1601/SMCGS2401