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**User manual SMC GS24C-SMART**  
**User guide SMC GS24C-SMART**  
**Operating instructions SMC GS24C-SMART**  
**Instructions for use SMC GS24C-SMART**  
**Instruction manual SMC GS24C-SMART**



**USER GUIDE**

<b>SMCGS24C-Smart</b>	<b>EZ Switch™ 10/100/1000 24-Port Smart Switch</b>
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**Manual abstract:**

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You may use unshielded twisted-pair (UTP) for RJ-45 connections - Category 3 or better for 10 Mbps connections, Category 5 or better for 100 Mbps connections, Category 5e, or 6 for 1000 Mbps connections. For fiber optic connections, you may use 50/125 or 62.5/125 micron multimode fiber or 9/125 micron single-mode fiber. Industry Canada - Class A This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications. Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

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This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied: RFI Emission: · Limit class A according to EN 55022:1998 · Limit class A for harmonic current emission according to EN 61000-3-2/1995 · Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995 Immunity: · Product family standard according to EN 55024:1998 · Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge: ±4 kV, Air Discharge: ±8 kV) · Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m) · Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply: ±1 kV, Data/Signal lines: ±0.5 kV) · Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line: ±1 kV, AC/DC Line to Earth: ±2 kV) · Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m) · Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz) · Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @ 10 ms, 30% Reduction @ 500 ms, >95% Reduction @ 5000 ms) LVD: · EN 60950-1:2001 Warning: Do not plug a phone jack connector in the RJ-45 port. This may damage this device. Attention: Les raccordeurs ne sont pas utilisés pour le système téléphonique! iv COMPLIANCES Safety Compliance Warning: Fiber Optic Port Safety CLASS I LASER DEVICE When using a fiber optic port, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on. Avertissement: Ports pour fibres optiques - sécurité sur le plan optique DISPOSITIF LASER DE CLASSE I Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

Warnhinweis: Faseroptikanschlüsse - Optische Sicherheit LASERGERÄT DER KLASSE I Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind. Power Cord Safety Please read the following safety information carefully before installing this switch: Warning: Installation and removal of the unit must be carried out by qualified personnel only. · The unit must be connected to an earthed (grounded) outlet to comply with international safety standards. · Do not connect the unit to an A.C. outlet (power supply) without an earth (ground) connection. · The appliance coupler (the connector to the unit and not the wall plug) must have a configuration for mating with an EN 60320/IEC 320 appliance inlet. · The socket outlet must be near to the unit and easily accessible. You can only remove power from the unit by disconnecting the power cord from the outlet.

· This unit operates under SELV (Safety Extra Low Voltage) conditions according to IEC 60950. The conditions are only maintained if the equipment to which it is connected also operates under SELV conditions. France and Peru only This unit cannot be powered from IT supplies. If your supplies are of IT type, this unit must be powered by 230 V (2P+T) via an isolation transformer ratio 1:1, with the secondary connection point labelled Neutral, connected directly to earth (ground). Impédance à la terre v COMPLIANCES Important! Before making connections, make sure you have the correct cord set.

Check it (read the label on the cable) against the following: Power Cord Set U.S.A. and Canada The cord set must be UL-approved and CSA certified. The minimum specifications for the flexible cord are: - No.

18 AWG - not longer than 2 meters, or 16 AWG. - Type SV or SJ - 3-conductor The cord set must have a rated current capacity of at least 10 A The attachment plug must not be connected to an ungrounded AC outlet. · Das Gerät muß an eine geerdete Steckdose angeschlossen werden, welche die internationalen Sicherheitsnormen erfüllt. · Der Gerätestecker (der Anschluß an das Gerät, nicht der Wandsteckdosenstecker) muß einen gemäß EN 60320/IEC 320 konfigurierten Geräteeingang haben. · Die Netzsteckdose muß in der Nähe des Geräts und leicht zugänglich sein. Die Stromversorgung des Geräts kann nur durch Herausgabe of network management. You should be familiar with switching and networking concepts. Zielgruppe Dieser Anleitung ist fuer Systemadministratoren mit Erfahrung im Netzwerkmanagement. Sie sollten mit Switch- und Netzwerkkonzepten vertraut sein. Related Publications As part of the switch firmware, there is an online web-based help that describes all management related features.

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... B-4 xvii FIGURES xviii CHAPTER 1 ABOUT THE EZ SWITCH 10/100/1000 Overview SMC's EZ Switch 10/100/1000 SMCGS24C-Smart is a web managed switch with 24 10/100/1000BASE-T ports, four of which are combination ports\* that are shared with four SFP transceiver slots (see Figure 1-1, Ports 21-24). Port Status Indicators EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 10/100/1000 Mbps RJ-45 Ports 1 2 3 4 5 6 7 8 9 10 11 12 SMCGS24C-Smart 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 1000BASE-T/SFP Ports Figure 1-1 Front Panel 100-240V ~50-60Hz 0.8A Power Socket Figure 1-2 Rear Panel \* If an SFP transceiver is plugged in, the corresponding RJ-45 port is disabled for ports 21-24. 1-1 ABOUT THE EZ SWITCH 10/100/1000 Switch Architecture The switch employs a wire-speed, non-blocking switching fabric. This permits simultaneous wire-speed transport of multiple packets at low latency on all ports. The switch also features full-duplex capability on all ports, which effectively doubles the bandwidth of each connection.

The switch uses store-and-forward switching to ensure maximum data integrity. With store-and-forward switching, the entire packet must be received into a buffer and checked for validity before being forwarded. This prevents errors from being propagated throughout the network. Network Management Options The switch contains a comprehensive array of LEDs for "at-a-glance" monitoring of network and port status. They also include a management agent that allows you to configure or monitor the switch using its embedded management software.

1-2 DESCRIPTION OF HARDWARE Description of Hardware 10/100/1000BASE-T Ports The switch contains 24 RJ-45 ports that operate at 10 Mbps or 100 Mbps, half or full duplex, or at 1000 Mbps, full duplex. Because all ports on the switch support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. (See "1000BASE-T Pin Assignments" on page B-5.) Each of these ports support auto-negotiation, so the optimum transmission mode (half or full duplex), and data rate (10, 100, or 1000 Mbps) can be selected automatically.

If a device connected to one of these ports does not support auto-negotiation, the communication mode of that port can be configured manually. SFP Slots The Small Form Factor Pluggable (SFP) transceiver slots are shared with four of the RJ-45 ports (ports 21-24). In its default configuration, if an SFP transceiver (purchased separately) is installed in a slot and has a valid link on its port, the associated RJ-45 port is disabled and cannot be used. The switch can also be configured to force the use of an RJ-45 port or SFP slot, as required. Port and Power Status LEDs The switch includes a display panel for key system and port indications that simplify installation and network troubleshooting. The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following tables. 1-3 ABOUT THE EZ SWITCH 10/100/1000 0/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 Power Status LED Port Status LEDs Figure 1-3 Port LEDs and Power LED Table 1-1 Port Status LEDs LED Condition Status Gigabit Ethernet Ports (Ports 1-24) Link/Act (Link/Activity) On/Flashing Green Off 1000 Mbps On Green Off Port has established a valid network connection. Flashing indicates activity. There is no valid link on the port. Port is operating at 1000 Mbps. Port is operating at 10 or 100 Mbps.

Table 1-2 Power Status LED LED Power Condition Green Off Status Internal power is operating normally. Power off. 1-4 FEATURES AND BENEFITS Power Supply Socket The power socket is located on the rear panel of the switch. The standard power socket is for the AC power cord. 100-240V ~50-60Hz 0.8A Figure 1-4 Power Supply Socket Features and Benefits Connectivity .. 24 10/100/1000 Mbps ports for easy Gigabit Ethernet integration and for protection of your investment in legacy LAN equipment. Auto-negotiation enables each RJ-45 port to automatically select the optimum communication mode (half or full duplex) if this feature is supported by the attached device; otherwise the port can be configured manually. RJ-45 10/100/1000BASE-T ports support auto MDI/MDI-X pinout selection. Unshielded (UTP) cable supported on all RJ-45 ports: Category 3 or better for 10 Mbps connections, Category 5 or better for 100 Mbps connections, and Category 5, 5e, 6 or better for 1000 Mbps connections. IEEE 802.

3-2005 Ethernet, Fast Ethernet, and Gigabit Ethernet. ... 1-5 ABOUT THE EZ SWITCH 10/100/1000 Expandability .. 4 Small Form Factor Pluggable (SFP) transceiver slots (shared with 1000BASE-T ports) Supports 1000BASE-SX, 1000BASE-LX and 1000BASE-LH SFP transceivers. Performance .. ... Transparent bridging. Provides store-and-forward switching Supports Jumbo frames up to 9.6 Kbytes Supports flow control Broadcast storm control Management .. "At-a-glance" LEDs for easy troubleshooting.



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Network management agent · · Manages switch in-band or out-of-band Supports web-based interface 1-6 CHAPTER 2 NETWORK PLANNING Introduction to Switching A network switch allows simultaneous transmission of multiple packets via non-crossbar switching. This means that it can partition a network more efficiently than bridges or routers. Switches have, therefore, been recognized as one of the most important building blocks for today's networking technology. When performance bottlenecks are caused by congestion at the network access point (such as the network card for a high-volume file server), the device experiencing congestion (server, power user or hub) can be attached directly to a switched port. And, by using full-duplex mode, the bandwidth of the dedicated segment can be doubled to maximize throughput.

When networks are based on repeater (hub) technology, the distance between end stations is limited by a maximum hop count. However, a switch turns the hop count back to zero. So subdividing the network into smaller and more manageable segments, and linking them to the larger network by means of a switch, removes this limitation. A switch can be easily configured in any Ethernet, Fast Ethernet, or Gigabit Ethernet, network to significantly boost bandwidth while using conventional cabling and network cards. 2-1 NETWORK PLANNING Application Examples The EZ Switch 10/100/1000 is not only designed to segment your network, but also to provide a wide range of options in setting up network connections. Some typical applications are described below. Collapsed Backbone The EZ Switch 10/100/1000 is an excellent choice for mixed Ethernet, Fast Ethernet, and Gigabit Ethernet installations where significant growth is expected in the near future. In a basic stand-alone configuration, it can provide direct full-duplex connections for up to 24 workstations or servers. You can easily build on this basic configuration, adding direct full-duplex connections to workstations or servers. When the time comes for further expansion, just connect to another hub or switch using one of the Gigabit Ethernet ports built into the front panel, or a Gigabit Ethernet port on a plug-in SFP transceiver.

In the figure below, the 24-port switch is operating as a collapsed backbone for a small LAN. It is providing dedicated 10 Mbps full-duplex connections to workstations, 100 Mbps full-duplex connections to power users, and 1 Gbps full-duplex connections to servers. EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 SMC8024L2 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 ... Servers 1 Gbps ... Workstations 100 Mbps ..

. Workstations 10 Mbps Figure 2-1 Collapsed Backbone 2-2 APPLICATION EXAMPLES Central Wiring Closet With 24 parallel bridging ports (i.e., 24 distinct collision domains), this switch can collapse a complex network down into a single efficient bridged node, increasing overall bandwidth and throughput. In the figure below, the 1000BASE-T RJ-45 ports on the switch are providing 1 Gbps full-duplex connections for up to 24 local segments. In addition, the switch is also connecting remote servers over fiber optic cable at 1 Gbps. 10/100/1000 Switch EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 SMC8024L2-Smart 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 Server Farm 10/100 Mbps Segments ...

.. Figure 2-2 Central Wiring Closet 2-3 NETWORK PLANNING Remote Connections with Fiber Cable Fiber optic technology allows for longer cabling than any other media type. A 1000BASE-SX (MMF) link can connect to a site up to 550 meters away, a 1000BASE-LX (SMF) link up to 5 km, and a 1000BASE-ZX link up to 100 km. This allows a switch stack to serve as a collapsed backbone, providing direct connectivity for a widespread LAN. A 1000BASE-SX SFP transceiver can be used for a high-speed connection between floors in the same building, and a 1000BASE-LX transceiver can be used for high-bandwidth core connections between buildings in a campus setting. For long-haul connections, a 1000BASE-ZX SFP transceiver can be used to reach another site up to 100 kilometers away. The figure below illustrates three EZ Switch 10/100/1000 switch stacks interconnecting multiple segments with fiber cable.

Headquarters EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 SMC8024L2-Smart 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 1000BASE-SX MMF (500 m) Server Farm Remote Switch TigerSwitch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1000BASE-LX SMF (5 kilometers) Remote Switch 3 4 5 6 7 8 9 10 11 12 TigerSwitch 10/100/1000 1 2 SMC8024L2 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 SMC8024L2 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 10/100 Mbps Segments ..

... Figure 2-3 Remote Connections with Fiber Cable 2-4 APPLICATION EXAMPLES Making VLAN Connections The switch supports VLANs that can be used to organize any group of network nodes into separate broadcast domains. VLANs confine broadcast traffic to the originating group, and can eliminate broadcast storms in large networks. This provides a more secure and cleaner network environment. VLANs can be based on untagged port groups, or traffic can be explicitly tagged to identify the VLAN group to which it belongs. Untagged VLANs can be used for small networks attached to a single switch. However, tagged VLANs should be used for larger networks, and all the VLANs assigned to the inter-switch links.

R&D VLAN 1 SMC8024L2 EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 Tagged Ports Untagged Ports VLAN unaware switch 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 Tagged Port VLAN aware switch R&D Finance VLAN 2 Testing Marketing Finance Testing VLAN 3 VLAN 4 VLAN 3 VLAN 1 VLAN 2 Figure 2-4 Making VLAN Connections Note: When connecting to a switch that does not support IEEE 802.1Q VLAN tags, use untagged ports. 2-5 NETWORK PLANNING Application Notes 1.



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Full-duplex operation only applies to point-to-point access (such as when a switch is attached to a workstation, server or another switch). When the switch is connected to a hub, both devices must operate in half-duplex mode.

2. For network applications that require routing between dissimilar network types, you can attach the switch directly to a multi-protocol router. 3. As a general rule, the length of fiber optic cable for a single switched link should not exceed: · 1000BASE-SX: 550 m (1805 ft) for multimode fiber · 1000BASE-LX: 5 km (3.1 miles) for single-mode fiber · 1000BASE-ZX: 100 km (62.

1 miles) for single-mode fiber However, power budget constraints must also be considered when calculating the maximum cable length for your specific environment. 2-6 CHAPTER 3 INSTALLING THE SWITCH Selecting a Site EZ Switch 10/100/1000 units can be mounted in a standard 19-inch equipment rack or on a flat surface. Be sure to follow the guidelines below when choosing a location. · The site should: - be at the center of all the devices you want to link and near a power outlet. - be able to maintain its temperature within 0 to 40 °C (32 to 104 °F) and its humidity within 10% to 90%, non-condensing - provide adequate space (approximately five centimeters or two inches) on all sides for proper air flow - be accessible for installing, cabling and maintaining the devices - allow the status LEDs to be clearly visible · Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios and transmitters. · Make sure that the unit is connected to a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 2 m (6.6 feet) of each device and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended. 3-1 INSTALLING THE SWITCH Ethernet Cabling To ensure proper operation when installing the switches into a network, make sure that the current cables are suitable for 10BASE-T, 100BASE-TX or 1000BASE-T operation. Check the following criteria against the current installation of your network: · Cable type: Unshielded twisted pair (UTP) or shielded twisted pair (STP) cables with RJ-45 connectors; Category 3 or better for 10BASE-T, Category 5 or better for 100BASE-TX, and Category 5, 5e or 6 for 1000BASE-T.

· Protection from radio frequency interference emissions · Electrical surge suppression · Separation of electrical wires (switch related or other) and electromagnetic fields from data based network wiring · Safe connections with no damaged cables, connectors or shields RJ-45 Connector Figure 3-1 RJ-45 Connections 3-2 EQUIPMENT CHECKLIST Equipment Checklist After unpacking the EZ Switch 10/100/1000 unit, check the contents to be sure you have received all the components. Then, before beginning the installation, be sure you have all other necessary installation equipment. Package Contents · EZ Switch 10/100/1000 unit, SMC GS24C-Smart · Four adhesive foot pads · Bracket Mounting Kit containing two brackets and eight screws for attaching the brackets to the switch · Power cord--either US, Continental Europe or UK · User Guide CD · SMC Warranty Registration Card--be sure to complete and return to SMC Optional Rack-Mounting Equipment If you plan to rack-mount the switches, be sure to have the following equipment available: · Four mounting screws for each device you plan to install in a rack--these are not included · A screwdriver (Phillips or flathead, depending on the type of screws used) Mounting The EZ Switch 10/100/1000 unit can be mounted in a standard 19-inch equipment rack or on a desktop or shelf. Mounting instructions for each type of site follow. 3-3 INSTALLING THE SWITCH Rack Mounting Before rack mounting the switch, pay particular attention to the following factors: · Temperature: Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range (see page C-2). · Mechanical Loading: Do not place any equipment on top of a rack-mounted unit. · Circuit Overloading: Be sure that the supply circuit to the rack assembly is not overloaded. · Grounding: Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains. 3-4 MOUNTING To rack-mount devices: 1. Attach the brackets to the device using the screws provided in the Bracket Mounting Kit. 21 22 23 24 Figure 3-2 Attaching the Brackets 2. Mount the device in the rack, using four rack-mounting screws (not provided). Figure 3-3 Installing the Switch in a Rack 3-5 INSTALLING THE SWITCH 3. If installing a single switch only, turn to "Connecting to a Power Source" at the end of this chapter.

4. If installing multiple switches, mount them in the rack, one below the other, in any order. Desktop or Shelf Mounting 1. Attach the four adhesive feet to the bottom of the first switch. Figure 3-4 Attaching the Adhesive Feet 2.

Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow. 3. If installing a single switch only, go to "Connecting to a Power Source" at the end of this chapter. 4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order. 3-6 SMC GS24C-Smart EZ Switch 10/100/1000 Power 13 1 14 2 15 3 16 4 17 5 18 6 19 7 20 8 21 9 10 22 23 11 24 12 100 100 0 Link /Act 0 Link /Act 13 1 14 2 15 3 16 4 17 5 18 6 19 7 20 8 21 9 22 10 23 11 12 24 21 22 23 24 INSTALLING AN SFP TRANSCEIVER Installing an SFP Transceiver 8 9 10 11 12 9 20 21 22 23 24 21 22 23 24 Figure 3-5 Inserting an SFP Transceiver into a Slot The switch supports the following optional transceivers: · · 1000BASE-SX (SMCBGSLCX1) 1000BASE-LX (SMCBGLLCX1) 1000BASE-ZX (SMCBGZLCX1) To install an SFP transceiver, do the following: 1. Consider network and cabling requirements to select an appropriate transceiver type. Refer to "Connectivity Rules" on page 4-6. 2.

Insert the transceiver with the optical connector facing outward and the slot connector facing down. Note that SFP transceivers are keyed so they can only be installed in one orientation. 3. Slide the transceiver into the slot until it clicks into place. Note: SFP transceivers are hot-swappable. The switch does not need to be powered off before installing or removing a transceiver.



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However, always first disconnect the network cable before removing a transceiver. Note: SFP transceivers are not provided in the switch package. 3-7 INSTALLING THE SWITCH Connecting to a Power Source To connect a device to a power source: 1. Insert the power cable plug directly into the socket located at the back of the device.

100-240V ~50-60Hz 0.8A Figure 3-6 Power Socket 2. Plug the other end of the cable into a grounded, 3-pin, AC power source. Note: For international use, you may need to change the AC line cord. You must use a line cord set that has been approved for the socket type in your country.

3. Check the front-panel LEDs as the device is powered on to be sure the Power LED is on. If not, check that the power cable is correctly plugged in. 3-8 CHAPTER 4 MAKING NETWORK CONNECTIONS Connecting Network Devices The EZ Switch 10/100/1000 units are designed to interconnect multiple segments (or collision domains). It can be connected to network cards in PCs and servers, as well as to hubs, switches or routers.

It may also be connected to devices using optional SFP transceivers. Twisted-Pair Devices 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. 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). See Appendix B "Cables" for further information on cabling. Caution: Do not plug a phone jack connector into an RJ-45 port. This will damage the switch. Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards. 4-1 MAKING NETWORK 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.

Figure 4-1 Making Twisted-Pair Connections 2. If the device is a PC card and the switch is in the wiring closet, attach the other end of the cable segment to a modular wall outlet that is connected to the wiring closet. (See "Network Wiring Connections" on page 4-3.) Otherwise, attach the other end 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 Link LED (on the switch) corresponding to each port turns on to indicate that the connection is valid. 4-2 TWISTED-PAIR DEVICES Network Wiring Connections Today, the punch-down block is an integral part of many of the newer equipment racks. It is actually part of the patch panel. Instructions for making connections in the wiring closet with this type of equipment follows.

1. Attach one end of a patch cable to an available port on the switch, and the other end to the patch panel. 2. If not already in place, attach one end of a cable segment to the back of the patch panel where the punch-down block is located, and the other end to a modular wall outlet. 3.

Label the cables to simplify future troubleshooting. See "Cable Labeling and Connection Records" on page 4-8. Equipment Rack (side view) Network Switch EZ Switch 10/100/1000 1 2 3 4 5 6 7 8 9 10 11 12 1000 Link/Act 1000 Link/Act Power 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8 9 10 11 12 w it ch 10 /1 0 0 6724L 3 SMC GS24C-Smart 13 14 15 16 17 18 19 20 21 22 23 24 21 22 23 24 ES4524C Punch-Down Block Patch Panel Wall Figure 4-2 Wiring Closet Connections 4-3 MAKING NETWORK CONNECTIONS Fiber Optic SFP Devices An optional Gigabit SFP transceiver (1000BASE-SX, 1000BASE-LX or 1000BASE-ZX) can be used for a backbone connection between switches, or for connecting to a high-speed server. Each single-mode fiber port requires 9/125 micron single-mode fiber optic cable with an LC connector at both ends. Each multimode fiber optic port requires 50/125 or 62.

5/125 micron multimode fiber optic cabling with an LC connector at both ends. Warning: the switch use lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on. Note: When selecting a fiber SFP device, considering safety, please make sure that it can function at a temperature that is not less than the recommended maximum operational temperature of the product. You must also use an approved Laser Class 1 SFP transceiver. Hinweis: Bei der Wahl eines Glasfasertransceivers muß für die Beurteilung der Gesamtsicherheit beachtet werden, das die maximale Umgebungstemperatur des Transceivers für den Betrieb nicht niedriger ist als die für dieses Produkts. Der Glasfasertransceiver muß auch ein überprüftes Gerät der Laser Klasse 1 sein. 1. Remove and keep the LC port's rubber cover.

When not connected to a fiber cable, the rubber cover should be replaced to protect the optics. 2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port. 4-4 FIBER OPTIC SFP DEVICES 3. Connect one end of the cable to the LC port on the switch and the other end to the LC port on the other device. Since LC connectors are keyed, the cable can be attached in only one orientation. 8 9 10 11 12 9 20 21 22 23 24 21 22 23 24 Figure 4-3 Making Connections to SFP Transceivers 4. As a connection is made, check the Link LED on the switch corresponding to the port to be sure that the connection is valid.

The 1000BASE-SX, 1000BASE-LX and 1000BASE-ZX fiber optic ports operate at 1 Gbps full duplex. The maximum length for fiber optic cable operating at Gigabit speed will depend on the fiber type as listed under "1000 Mbps Gigabit Ethernet Collision Domain" on page 4-6. 4-5 MAKING NETWORK CONNECTIONS Connectivity Rules When adding hubs (repeaters) to your network, please follow the connectivity rules listed in the manuals for these products. However, note that because switches break up the path for connected devices into separate collision domains, you should not include the switch or connected cabling in your calculations for cascade length involving other devices. 1000BASE-T Cable Requirements All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected.

However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) or Category 6 cable should be used.



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The Category 5e specification includes test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3-2005 standards. 1000 Mbps Gigabit Ethernet Collision Domain Table 4-1 Maximum 1000BASE-T Gigabit Ethernet Cable Length Cable Type Category 5, 5e, 6 100-ohm UTP or STP Maximum Cable Length 100 m (328 ft) Connector RJ-45 Table 4-2 Maximum 1000BASE-SX Fiber Optic Cable Length Fiber Diameter 62.5/125 micron multimode fiber (MMF) 50/125 micron multimode fiber (MMF) Fiber Bandwidth 160 MHz/km 200 MHz/km 400 MHz/km 500 MHz/km Cable Length Range 2-220 m (7-722 ft) 2-275 m (7-902 ft) 2-500 m (7-1641 ft) 2-550 m (7-1805 ft) Connector LC LC LC LC 4-6 CONNECTIVITY RULES Table 4-3 Maximum 1000BASE-LX Fiber Optic Cable Length Fiber Diameter 9/125 micron single-mode fiber Fiber Bandwidth N/A Cable Length Range 2 m - 5 km (7 ft - 3.2 miles) Connector LC Table 4-4 Maximum 1000BASE-ZX Fiber Optic Cable Length Fiber Diameter 9/125 micron single-mode fiber Fiber Bandwidth N/A Cable Length Range 70\* - 100 km (43.5 - 62.1 miles) Connector LC \* For link spans exceeding 70 km, you may need to use premium single mode fiber or dispersion shifted single mode fiber 100 Mbps Fast Ethernet Collision Domain Table 4-5 Maximum Fast Ethernet Cable Length Type 100BASE-TX Cable Type Category 5 or better 100-ohm UTP or STP Maximum Cable Length 100 m (328 ft) Connector RJ-45 10 Mbps Ethernet Collision Domain Table 4-6 Maximum Ethernet Cable Length Type 10BASE-T Cable Type Categories 3, 4, 5 or better 100-ohm UTP Maximum Length 100 m (328 ft) Connector RJ-45 4-7 MAKING NETWORK CONNECTIONS Cable Labeling and Connection Records When planning a network installation, it is essential to label the opposing ends of cables and to record where each cable is connected. Doing so will enable you to easily locate inter-connected devices, isolate faults and change your topology without need for unnecessary time consumption. To best manage the physical implementations of your network, follow these guidelines:

- Clearly label the opposing ends of each cable.
- Using your building's floor plans, draw a map of the location of all network-connected equipment. For each piece of equipment, identify the devices to which it is connected.
- Note the length of each cable and the maximum cable length supported by the switch ports.

For ease of understanding, use a location-based key when assigning prefixes to your cable labeling.

- Use sequential numbers for cables that originate from the same equipment.
- Differentiate between racks by naming accordingly.
- Label each separate piece of equipment.
- Display a copy of your equipment map, including keys to all abbreviations at each equipment rack.

4-8 CHAPTER 5 CONFIGURING THE SWITCH Using the Web Interface This switch provides an embedded HTTP web agent. Using a web browser you can configure the switch and view statistics to monitor network activity. The web agent can be accessed by any computer on the network using a standard web browser (Internet Explorer 5.5 or above, or Mozilla Firefox 1.0 or above). Prior to accessing the switch from a web browser, be sure you have first performed the following tasks:

1. Configure the switch with a valid IP address, subnet mask, and default gateway. (Defaults: IP address 192.168.2.10; Subnet mask 255.255.0.0; Gateway 0.0.0.

2. Set a new password using the web interface. (Default: "smcadmin"). Access to the web interface is controlled by the password. See "Configuring the Logon Password" on page 5-14. Note: If you cannot remember the switch's IP address, you can restore the original settings by following the procedure described in the "Troubleshooting" section.

5-1 CONFIGURING THE SWITCH Navigating the Web Browser Interface To access the web-browser interface you must first enter a password. The user has read/write access to all configuration parameters and statistics. The default password for the switch is "smcadmin." Note: If user input is not detected within five minutes, the current session is terminated.

Home Page When your web browser connects with the switch's web agent, the home page is displayed as shown below. The home page displays the Main Menu on the left side of the screen and System Information on the right side. The Main Menu links are used to navigate to other menus, and display configuration parameters and statistics.. Figure 5-1 Home Page 5-2 NAVIGATING THE WEB BROWSER INTERFACE Configuration Options Configurable parameters have a dialog box or a drop-down list. Once a configuration change has been made on a page, be sure to click on the Apply button to confirm the new setting. The following table summarizes the web page configuration buttons. Table 5-1 Web Page Configuration Buttons Button Apply Cancel Help Action Sets specified values to the system. Discards all changes and restores current values. Links directly to web help.

Notes: To ensure proper screen refresh, be sure that Internet Explorer is configured as follows: Under the menu "Tools / Internet Options / General / Temporary Internet Files / Settings," the setting for item "Check for newer versions of stored pages" should be "Every visit to the page." Panel Display The web interface displays an image of the switch's ports. A port turns green when the corresponding front-panel port is connected to another device. To show port numbers, place the mouse pointer over the port. Figure 5-2 Front Panel Indicators 5-3 CONFIGURING THE SWITCH Main Menu Using the onboard web agent, you can define system parameters, manage and control the switch, and all its ports, or monitor network conditions.

The following table briefly describes the selections available from the web-browser interface. Table 5-2 Switch Main Menu Menu STATUS Overview Provides a basic system description, including system name, IP address, port, trunk, and VLAN information. Shows statistics for port, interface, and RMON. Shows the name of the switch. Sets the LAN IP address, subnet mask, and gateway IP address.

Changes the password. Force the switch to perform a power reset and restore the original factory settings. Upgrade the switch system firmware using a file provided by SMC. Restarts the switch. Enables you to connect to the SMC web site to register your switch. Adds static MAC addresses to the switch MAC address table. Selects traffic statistics you want to monitor. Description Page 5-6 5-6 Statistics SYSTEM Name LAN Settings Password Tools Restore to Factory Defaults Upgrade Firmware Restart Register Product Static MAC Counter Config 5-9 5-12 5-12 5-13 5-14 5-15 5-15 5-16 5-17 5-18 5-18 5-19 5-4 NAVIGATING THE WEB BROWSER INTERFACE Table 5-2 Switch Main Menu (Continued) Menu PORTS Settings Rate Limiting Storm Control Port Mirroring Cable Diagnostic TRUNKS Membership Settings Rate Limiting VLANs VLAN Membership VLAN Port Config QOS Settings Security IP Filter Port Security ACL IGMP Snoop Settings Status LOGOUT Sets up IGMP Snooping configuration Shows IGMP Snooping instances and port states.



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Quits to the Login page. Sets up port IP control filters.

Sets security policy for port. Sets up management access filter. Sets the priority of packets forwarded through the switch. Configure VLAN port groups. Configures VLAN behavior for individual ports and trunks. Specifies ports to group into static trunks. Configures trunk connection settings. Sets the rate limiting parameters for trunks. Configure the speed and duplex mode of the port. Sets the rate limiting parameters for ports. Sets the broadcast storm control parameters. Sets up the port mirroring features of the switch to enable traffic monitoring.

Diagnoses cable faults. Description Page 5-21 5-21 5-22 5-24 5-25 5-26 5-27 5-28 5-28 5-29 5-30 5-30 5-33 5-33 5-35 5-35 5-37 5-39 5-40 5-41 5-41 5-5 5-5 CONFIGURING THE SWITCH Web Configuration Displaying Status Overview You can easily identify the system by displaying the device name, location and contact information. Field Attributes System Information · System Name Name assigned to the switch system. · Number of Ports Number of built-in ports. · Hardware Version Hardware version of the main board.

· Code Version Version number of the code. · Serial Number The serial number of the switch. Address Information · Management VLAN ID of the configured VLAN (this is set to 1 and cannot be changed) all ports on the unit are members of VLAN 1. The management station must always be attached to a port on VLAN 1. @@(Note that the management station must always be on VLAN 1. @@@@Port Information · Type Indicates the port type. @@ · 10hd: 10 Mbps half duplex. · 10fd: 10 Mbps full duplex. · 100hd: 100 Mbps half duplex. · 100fd: 100 Mbps full duplex. · 1000fd: 1000 Mbps full duplex. @@@@ (Default: 1) Trunk Information · Trunk The trunk label. "T1" through "T8" are used as trunk labels. @@This can be changed on the TRUNKS > Settings page. · 10hd: 10 Mbps half duplex.

· 10fd: 10 Mbps full duplex. · 100hd: 100 Mbps half duplex. · 100fd: 100 Mbps full duplex. · 1000fd: 1000 Mbps full duplex. · Ports The ports that are members of the trunk. @@@@The total number of frames (bad, broadcast and multicast) received. @@@@The total number of frames received that were less than 64 octets in length (excluding framing bits, but including FCS octets) and had either an FCS or alignment error. The best estimate of the total number of collisions on this Ethernet segment. Transmitted Errors Received Normal Priority Packets Transmitted Normal Priority Packets RMON Statistics Drop Events Received Frames Multicast Frames Undersize Frames Fragments Collisions 5-10 WEB CONFIGURATION Table 5-3 Port Statistics (Continued) Parameter Received Bytes Description Total number of bytes of data received on the network. This statistic can be used as a reasonable indication of Ethernet utilization.

The total number of good frames received that were directed to the broadcast address. Note that this does not include multicast packets. The number of CRC/alignment errors (FCS or alignment errors). The total number of frames received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed. The total number of frames received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS or alignment error.

The total number of frames (including bad packets) received and transmitted that were 64 octets in length (excluding framing bits but including FCS octets). The total number of frames (including bad packets) received and transmitted where the number of octets fall within the specified range (excluding framing bits but including FCS octets). Broadcast Frames CRC/Alignment Errors Oversize Frames Jabbers 64 Bytes Frames 65-127 Byte Frames 128-255 Byte Frames 256-511 Byte Frames 512-1023 Byte Frames 1024-1518 Byte Frames 5-11 CONFIGURING THE SWITCH Web Click STATUS, Statistics. Figure 5-4 Port Statistics Displaying System Name You can easily identify the system by displaying the device name. Field Attributes · Switch Name Name assigned to the switch system.

5-12 WEB CONFIGURATION Web Click System, Name. Figure 5-5 System Name Setting the Switch's IP Address This section describes how to configure an IP interface for management access over the network. The IP address for this switch is 192.168.2.10 by default. To manually configure an address, you need to change the switch's default settings (IP address 192.168.2.10 and netmask 255.

255.255.0) to values that are compatible with your network. You may also need to establish a default gateway between the switch and management stations that exist on another network segment. Field Attributes · DHCP Enabled Check the box to enable DHCP. (default: enabled) · LAN IP Address Address of the VLAN interface that is allowed management access. Valid IP addresses consist of four numbers, 0 to 255, separated by periods. (Default : 192.168.2.10) @@(Default: 255.255.255.0) · Gateway IP Address IP address of the gateway router between this device and management stations that exist on other network segments. (Default: 0.

0.0.0) Note: If, at any point, you cannot remember the switch's IP address, you can restore the original settings by following the procedure described in the "Troubleshooting" section. 5-13 CONFIGURING THE SWITCH Manual Configuration Web Click System, LAN Settings. Enter the IP address, subnet mask and gateway, then click APPLY.

Note that if you change the switch IP address, you must close the web interface and start a new session using the new IP address. Figure 5-6 LAN Settings Configuring the Logon Password The administrator has write access for all parameters governing the onboard agent. You should therefore assign a new administrator password as soon as possible, and store it in a safe place. Field Attributes · Password Specifies the user password. (Range: 1-16 characters plain text, case sensitive) Note: If you cannot remember the password, you can restore the original settings by following the procedure described in the "Troubleshooting" on page 61. 5-14 WEB CONFIGURATION Web Click System, Password. To change the password for the administrator, enter current password, the new password, confirm it by entering it again, then click APPLY. Figure 5-7 Password Settings Tools On the Tools page, you can restore the switch to default settings, upgrade the firmware of the switch, or restart the switch. Restore to Factory Defaults Force the switch to restore the original factory settings. To reset the switch, select "Reset to Factory Defaults" from the drop-down list and click APPLY.



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