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You can read the recommendations in the user guide, the technical guide or the installation guide for SMC 8748M INT. You'll find the answers to all your questions on the SMC 8748M INT in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual SMC 8748M INT
User guide SMC 8748M INT
Operating instructions SMC 8748M INT
Instructions for use SMC 8748M INT
Instruction manual SMC 8748M INT

TigerStack 10G

Gigabit Ethernet Switch

- ◆ 24/48 auto-MDI/MDI-X 10/100/1000BASE-T ports
- ◆ 4 ports shared with 4 SFP transceiver slots
- ◆ Non-blocking switching architecture
- ◆ Support for a redundant power unit
- ◆ Spanning Tree Protocol, RSTP, and MSTP
- ◆ Up to 32 LACP or static 8-port trunks
- ◆ Layer 2/3/4 CoS support through eight priority queues
- ◆ Layer 3/4 traffic priority with IP Precedence and IP DSCP
- ◆ Full support for VLANs with GVRP
- ◆ IGMP multicast filtering and snooping
- ◆ Support for jumbo frames up to 9 KB
- ◆ Manageable via console, Web, SNMP/RMON



Installation Guide

SMC8724M
SMC8748M



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Manual abstract:

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It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment. You may use unshielded twisted-pair (UTP) cable for RJ-45 connections--Category 3 or greater for 10 Mbps connections, Category 5 for 100 Mbps connections and Category 5 or 5e for 1000 Mbps connections. Use 50/125 or 62.

5/125 micron multimode fiber optic cable, or 9/125 micron single-mode cable, for SFP transceiver connections. Warnings: 1. Wear an anti-static wrist strap or take other suitable measures to prevent electrostatic discharge when handling this equipment. 2. When connecting this switch to a power outlet, connect the field ground lead on the tri-pole power plug to a valid earth ground line to prevent electrical hazards.



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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. Japan VCCI Class A iii COMPLIANCES CE Mark Declaration of Conformance for EMI and Safety (EEC) SMC contact for these products in Europe is: SMC Networks Europe, Edificio Conata II, Calle Fructuós Gelabert 6-8, 2o, 4a, 08970 - Sant Joan Despí, Barcelona, Spain. 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 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997) Warning: Do not plug a phone jack connector in the RJ-45 port. This may damage this device. Les raccordeurs ne sont pas utilisés pour le système téléphonique! iv COMPLIANCES Taiwan BSMI Class A Australia AS/NZS 3548 (1995) - Class A SMC contact for products in Australia is: SMC Communications Pty. Ltd. Suite 18, 12 Tryon Road, Lindfield NSW2070, Phone: 61-2-94160437 Fax: 61-2-94160474 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. v COMPLIANCES Power Cord Safety Please read the following safety information carefully before installing the 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 V ou SJ - 3 conducteurs Le cordon doit être en mesure d'acheminer un courant nominal d'au moins 10 A. La prise femelle de branchement doit être du type à mise à la terre (mise à la masse) et respecter la configuration NEMA 5-15P (15 A, 125 V) ou NEMA 6-15P (15 A, 250 V).

vii COMPLIANCES Cordon électrique - Il doit être agréé dans le pays d'utilisation Danemark: Suisse: Europe La prise mâle d'alimentation doit respecter la section 107-2 D1 de la norme DK2 1a ou DK2 5a. La prise mâle d'alimentation doit respecter la norme SEV/ASE 1011. La prise secteur doit être conforme aux normes CEE 7/7 ("SCHUKO") LE cordon secteur doit porter la mention <HAR> ou <BASEC> et doit être de type HO3VVF3GO.75 (minimum). Bitte unbedingt vor dem Einbauen des Switches die folgenden Sicherheitsanweisungen durchlesen: WARNUNG: Die Installation und der Ausbau des Geräts darf nur durch Fachpersonal erfolgen. · Das Gerät sollte nicht an eine ungeerdete Wechselstromsteckdose angeschlossen werden. · 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 Herausziehen des Geräteretzkabels aus der Netzsteckdose unterbrochen werden.

· Der Betrieb dieses Geräts erfolgt unter den SELV-Bedingungen (Sicherheitskleinstspannung) gemäß IEC 60950. Diese Bedingungen sind nur gegeben, wenn auch die an das Gerät angeschlossenen Geräte unter SELV-Bedingungen betrieben werden. Stromkabel. Dies muss von dem Land, in dem es benutzt wird geprüft werden: Schweiz Europe Dieser Stromstecker muß die SEV/ASE 1011 Bestimmungen einhalten. Das Netzkabel muß vom Typ HO3VVF3GO.75 (Mindestanforderung) sein und die Aufschrift <HAR> oder <BASEC> tragen. Der Netzstecker muß die Norm CEE 7/7 erfüllen ("SCHUKO").



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viii COMPLIANCES Warnings and Cautionary Messages Warning: Warning: Warning: This product does not contain any serviceable user parts. Installation and removal of the unit must be carried out by qualified personnel only. When connecting this device to a power outlet, connect the field ground lead on the tri-pole power plug to a valid earth ground line to prevent electrical hazards.

This switch uses 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. Wear an anti-static wrist strap or take other suitable measures to prevent electrostatic discharge when handling this equipment. Do not plug a phone jack connector in the RJ-45 port. This may damage this device. Les raccordeurs ne sont pas utilisé pour le système téléphonique! Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards. Warning: Caution: Caution: Caution: Environmental Statement The manufacturer of this product endeavours to sustain an environmentally-friendly policy throughout the entire production process. This is achieved through the following means: Adherence to national

legislation and regulations on environmental production standards. Conservation of operational resources. Waste reduction and safe disposal of all harmful un-recyclable by-products. Recycling of all reusable waste content. Design of products to maximize recyclables at the end of the product's life span. Continual monitoring of safety standards. End of Product Life Span This product is manufactured in such a way as to allow for the recovery and disposal of all included electrical components once the product has reached the end of its life. Manufacturing Materials There are no hazardous nor ozone-depleting materials in this product. Documentation All printed documentation for this product uses biodegradable paper that originates from sustained and managed forests. The inks used in the printing process are non-toxic. ix COMPLIANCES Purpose This guide details the hardware features of the switch, including Its physical and performance-related characteristics, and how to install the switch. Related Publications The following publication gives specific information on how to operate and use the management functions of the switch: The SMC8724M, SMC8748M Management Guide Also, as part of the switch's firmware, there is an online web-based help that describes all management related features.

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x TABLE OF CONTENTS 1 About the TigerStack 10G

.
.. 1-1 Overview

.
Switch Architecture

.
Management Options

.
Description of Hardware

.
10/100/1000BASE-T Ports

.
SFP Slots

.
Stacking Ports

.
Status LEDs

.....

.....

.....

.....

.....

Optional Redundant Power Unit

.....

.....

. Power Supply Receptacles

.....

.....

.....

. Features and Benefits

.....

.....

.....

.....

. Connectivity

.....

.....

.....

.....

.....

. Expandability

.....

.....

.....

.....

. Performance

.....

.....

.....

.....

. Management

.....

.....

.....

.....

.....

. . . 1-1 1-2 1-3 1-3 1-3 1-4 1-4 1-5 1-8 1-8 1-8 1-8 1-9 1-9 1-9 2 Network Planning . .

.....

.....

.....

. 2-1 Introduction to Switching

.....

.....

.....

.....

. . Application Examples

.....

.....

.....

.....

. *Collapsed Backbone*

. *Network Aggregation Plan*

. *Remote Connections with Fiber Cable*

. *Making VLAN Connections*

. *Application Notes*

. 2-1 2-2 2-2 2-3 2-4 2-5 2-6 3 *Installing the Switch*

. 3-1 *Selecting a Site*

. *Ethernet Cabling*

. *Equipment Checklist*

. *Package Contents*

. *Optional Rack-Mounting Equipment*

. *Mounting*

.....
..... *Rack Mounting* ..

.....
.....
.....
.....

..... *Desktop or Shelf Mounting* ...

.....
.....
.....

..... 3-1 3-2 3-3 3-3 3-3 3-4 3-4 3-6 xi *TABLE OF CONTENTS Installing an Optional SFP Transceiver into the Switch*

... 3-7 *Connecting Switches in a Stack* ..

.....
.....

.....
.....

3-8 *Stacking Topologies*

.....
.....

.....
.....

3-9 *Connecting to a Power Source*

.....
.....

3-10 *Connecting to the Console Port*

.....
.....

3-11 4 *Making Network Connections*

.....
4-1 *Connecting Network Devices*

.....
.....

... *Twisted-Pair Devices* ..

.....
.....

.....
.....

... *Cabling Guidelines*

.....
.....

..... *Connecting to PCs, Servers, Hubs and Switches* .

.....
... *Network Wiring Connections*

.....
.....

..... *Fiber Optic SFP Devices* ..

.....
.....
.....

.....	
.....	
.....	<i>Connectivity Rules</i>
.....	
.....	
.....	
.....	..... <i>1000BASE-T Cable Requirements</i> ...
.....	
.....	
.....	
.....	<i>1000 Mbps Gigabit Ethernet Collision Length</i>
.....	
.....	... <i>100 Mbps Fast Ethernet Collision Domain</i>
.....	
.....	
.....	<i>10 Mbps Ethernet Collision Domain</i>
.....	
.....	
.....	<i>Cable Labeling and Connection Records</i> ...
.....	
.....
.....	..... 4-1 4-1 4-1 4-2 4-3 4-4 4-6 4-6 4-6 4-7 4-7 4-8 xii <i>TABLE OF CONTENTS APPENDICES: A Troubleshooting</i>
.....	
.....	
.....	
.....	..... <i>A-1 Diagnosing Switch Indicators</i>
.....	
.....	
.....	
.....	..... <i>A-1 Power and Cooling Problems</i> ..
.....	
.....	
.....	
.....
.....	..... <i>A-2 Installation</i>
.....	
.....	
.....	
.....	
.....	..... <i>A-2 In-Band Access</i> ..
.....	
.....	
.....	
.....	
.....	... <i>A-3 Stack Troubleshooting</i> ..
.....	
.....	
.....	
.....	
.....	.. <i>A-3 B Cables</i>
.....	
.....	

.....
.....
.....
B-1 Twisted-Pair Cable and Pin Assignments

.....
.....
..... *B-1 10BASE-T/100BASE-TX Pin Assignments*

.....
B-2 Straight-Through Wiring

.....
.....
.....
B-2 Crossover Wiring

.....
.....
.....
.....
B-3 1000BASE-T Pin Assignments ..

.....
.....
.....
B-4 1000BASE-T Cable Requirements .

.....
.....
.....
B-4 Fiber Standards ...

.....
.....
.....
.....
.....
B-6 C Specifications

.....
.....
.....
.....
.....
C-1 Physical Characteristics

.....
.....
.....
.....
.....
C-1 Switch Features

.....
.....
.....
.....
.....
C-3 Management Features

.....
.....
.....
.....
.....
C-3 Standards .



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.....

.....

.....

.....

.....

.....

..... C-3 Compliances .

.....

.....

.....

.....

.....

.....

. C-4 Warranty

.....

.....

.....

.....

.....

.....

. C-4 D Ordering Information

.....

.....

. D-1 Glossary Index xiii TABLE OF CONTENTS xiv TABLES Table 1-1 Table 1-2 Table 3-1 Table 4-1 Table 4-2 Table 4-3 Table 4-4 Table 4-5 Table 4-6
Table A-1 Table B-1 Table B-2 Port Status LEDs

.....

.....

.....

..... 1-5 System Status LEDs .

.....

.....

.....

.....

1-6 Wiring Map for Serial Cable

.....

..... 3-11 Maximum 1000BASE-T Gigabit Ethernet Cable Length .

. 4-6 Maximum 1000BASE-SX Fiber Optic Cable Distance

4-6 Maximum 1000BASE-LX Fiber Optic Cable Length 4-7 Maximum 1000BASE-ZX Fiber Optic Cable Length

4-7 Maximum Fast Ethernet Cable Length

.....

. 4-7 Maximum Ethernet Cable Length

.....

..... 4-7 Troubleshooting Chart

.....

.....

.....

..... A-1 10/100BASE-TX MDI and MDI-X Port Pinouts

. . B-2 1000BASE-T MDI-X and MDI Port Pinouts

.....

. . . B-4 xv TABLES xvi FIGURES Figure 1-1 Figure 1-2 Figure 1-3 Figure 1-4 Figure 1-5 Figure 2-1 Figure 2-2 Figure 2-3 Figure 2-4 Figure 3-1 Figure
3-2 Figure 3-3 Figure 3-4 Figure 3-5 Figure 3-6 Figure 3-7 Figure 3-8 Figure 4-1 Figure 4-2 Figure 4-3 Figure B-1 Figure B-2 Figure B-3 SMC8748M and
SMC8724M Front Panels

..... 1-2 SMC8748M and SMC8724M Rear Panel

.....

.. 1-2 Port LEDs ...
.....
.....
.....
..... 1-5 System LEDs
.....
.....
..... 1-6 Power Supply Receptacles .
.....
.....
..... 1-8 Collapsed Backbone
.....
.....
.. 2-2 Network Aggregation Plan
.....
.....
. 2-3 Remote Connection with Fiber Cable
.....
.....
. 2-4 Making VLAN Connections
.....
.....
..... 2-5 RJ-45 Connections
.....
.....
..... 3-2 Attaching the Brackets
.....
.....
. 3-5 Installing the Switch in a Rack
.....
.....
.. 3-5 Attaching the Adhesive Feet ...
.....
.....
..... 3-6 Inserting an SFP Transceiver into a Slot
.....
.. 3-7 Making Stacking Connections ...
.....
.....
..... 3-8 Power Receptacle ..
.....
.....
..... 3-10 Serial Port (DB-9 DTE) Pin-Out ..
.....
.....
..... 3-11 Making Twisted-Pair Connections
.....
.....
..... 4-2 Wiring Closet Connections .
.....
.....

..... 4-3 Making LC Port Connections . .

.....
.....
.....

4-5 RJ-45 Connector Pin Numbers

.....
.....

B-1 Straight-through Wiring

.....
.....

. B-3 Crossover Wiring

.....
.....
.....

. . B-3 xvii FIGURES xviii CHAPTER 1 ABOUT THE TIGERSTACK 10G Overview SMC's TigerStack 10G SMC8724M and SMC8748M are intelligent Layer 2 switches with 24/48 10/100/1000BASE-T ports, four of which are combination ports* that are shared with four SFP transceiver slots (see Figure 1-1, Ports 21~24/45~48). On the rear panel there is an extender module slot and two stacking ports. The extender module slot is not currently functional.

There is also an SNMP-based management agent embedded on the main board. This agent supports both in-band and out-of-band access for managing the switch. These switches provide a broad range of powerful features for Layer 2 switching, delivering reliability and consistent performance for your network traffic. They bring order to poorly performing networks by segregating them into separate broadcast domains with IEEE 802.1Q compliant VLANs, and empower multimedia applications with multicast switching and CoS services. * If an SFP transceiver is plugged in, the corresponding RJ-45 port is disabled for ports 21~24 on SMC8724M or ports 45~48 on SMC8748M. 1-1 ABOUT THE TIGERSTACK 10G Port Status LEDs Stack ID Console Port Stack Master SMC8748M 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 Stack ID Stack Link Master Select Power RPU Diag Module Console 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 10/100/1000 Mbps RJ-45 Ports System Indicators 11 12 13 14 15 16 17 18 19 20 21 22 23 24 SFP Slots Stack Master SMC8724M 1 2 3 4 5 6 7 8 9 10 Stack ID Stack Link Master Select Power RPU Diag Module Console 23 24 21 22 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Figure 1-1 SMC8748M and SMC8724M Front Panels Power Socket Redundant Power Socket M1 Module Slot Stacking Ports RPU Up Down 100-240V~ 50-60Hz 2A DC 12V 13A Figure 1-2 SMC8748M and SMC8724M Rear Panel Switch Architecture The switches employ a wire-speed, non-blocking switching fabric. This permits simultaneous wire-speed transport of multiple packets at low latency on all ports. This switch also features full-duplex capability on all ports, which effectively doubles the bandwidth of each connection. The switches use 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. These switches include a slot on the rear panel for hot-swappable 10 Gigabit Ethernet modules. (The 10 Gigabit Ethernet modules are not currently available, but will be supported in the future.) 1-2 DESCRIPTION OF HARDWARE Management Options These switches contain 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, or via SNMP applications. To manage the switch, you can make a direct connection to the RS-232 console port (out-of-band), or you can manage the switch through a network connection (in-band) using Telnet, the on-board Web agent, or SNMP-based network management software. For a detailed description of both switches' advanced features, refer to the Management Guide. Description of Hardware 10/100/1000BASE-T Ports These ports are 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 this 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-4) 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. Each port also supports auto-negotiation of flow control, so the switch can automatically prevent port buffers from becoming saturated.



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1-3 ABOUT THE TIGERSTACK 10G SFP Slots The Small Form Factor Pluggable (SFP) transceiver slots are shared with four of the RJ-45 ports (ports 21~24 for the SMC8724M and ports 45~48 for the SMC8748M). 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. Stacking Ports Each unit includes two stacking ports that provide a 10 Gbps high-speed serial stack backplane connection. Up to eight SMC8724M or SMC8748M switches can be connected together using optional stacking cables. Note that the 24-port and 48-port switches can be mixed in the same stack. The Stack Master button enables one switch in the stack to be selected as the Master.

1-4 DESCRIPTION OF HARDWARE Status LEDs The switch base unit also 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 table. Port Status LEDs 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Figure 1-3 Port LEDs Table 1-1 Port Status LEDs LED 1~24/1~48 (Link/Activity) Condition On/Flashing Amber On/Flashing Green Off Status Port has a valid link at 10 or 100 Mbps. Flashing indicates activity.

Port has a valid link at 1000 Mbps. Flashing indicates activity. There is no traffic passing through the port. 1-5 ABOUT THE TIGERSTACK 10G System Status LEDs Stack Master Stack ID Stack Link Master Select Power RPU Diag Module Console Figure 1-4 System LEDs Table 1-2 System Status LEDs LED Power Condition Green Amber Off Diag Flashing Green Green Amber RPU Green Amber Off Status Internal power is operating normally. Internal power supply fault. Power off or failure.

System self-diagnostic test in progress. System self-diagnostic test successfully completed. System self-diagnostic test has detected a fault. Redundant power unit is receiving power. Fault in redundant power unit. Redundant power unit is off. 1-6 DESCRIPTION OF HARDWARE Table 1-2 System Status LEDs LED Stack Master Condition Green Amber Flashing Amber Off Stack Link Green Flashing Green Flashing Amber Off Module Green Flashing green Off Stack ID 1-8 Status Switch is operating as the Master unit in the stack. Switch is operating as a Slave unit in the stack. System in Master arbitration/ election state.

System in standalone mode.

Uplink and downlink operating normally. Uplink has failed. Downlink has failed. No stacking link present. An expansion module is installed in the slot. An installed expansion module has been disabled. There is no module installed. Indicates the switch stack ID. The Master unit is numbered 1. Slave units are numbered 2-8.

Off In standalone mode. 1-7 ABOUT THE TIGERSTACK 10G Optional Redundant Power Unit SMC supports an optional Redundant Power Unit (RPU), that can supply power to the switch in the event of failure of the internal power supply. Power Supply Receptacles There are two power receptacles on the rear panel of each switch. The standard power receptacle is for the AC power cord. The receptacle labeled "RPU" is for the optional Redundant Power Unit (RPU). Power Socket Redundant Power Connector M1 RPU 100-240V~ 50-60Hz 2A DC 12V 13A Figure 1-5 Power Supply Receptacles Features and Benefits Connectivity · · 24 or 48 dual-speed 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 with 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. · · 1-8 FEATURES AND BENEFITS · IEEE 802.

3 Ethernet, 802.3u Fast Ethernet, 802.3z, 802.3ab Gigabit Ethernet, and 802.3ae 10 Gigabit Ethernet compliance ensures compatibility with standards-based hubs, network cards and switches from any vendor. Provides stacking capability via high-speed serial ports with 10 Gbps stacking bandwidth. Up to 8 units can be stacked together. · Expandability · Supports 1000BASE-SX and 1000BASE-LX and 1000BASE-ZX SFP transceivers. Performance · · · · · Transparent bridging. Switching table with a total of 16K MAC address entries.

Provides store-and-forward switching. Supports wire-speed switching. Supports flow control, using back pressure for half duplex and IEEE 802.3x for full duplex. Broadcast storm control.

Management · · "At-a-glance" LEDs for easy troubleshooting. Network management agent - Manages switch (or entire stack) in-band or out-of-band - Supports Telnet, SNMP V1/V2/V3, RMON 4 groups and Web-based interface · Slave units provide backup stack management. 1-9 ABOUT THE TIGERSTACK 10G 1-10 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. The switch has, 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 TigerStack 10G 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 TigerStack 10G is an excellent choice for mixed Ethernet, Fast Ethernet, and Gigabit Ethernet installations where significant growth is expected in the near future.



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(Optional) To form a wrap-around topology, plug one end of a stack cable into the Down port on the bottom unit and the other end into the Up port on the top unit. Up Down Up Down Up Down Up Down Up Down Figure 3-6 Making Stacking Connections 3-8 CONNECTING SWITCHES IN A STACK 5. Select the Master unit in the stack by pressing the push button in on only one of the switches. Only one switch in the stack can operate as the Master, all other units operate in slave mode. If more than one switch in the stack is selected as Master, or if no switches are selected, the system will select the unit with lowest MAC address as the Master. Stacking Topologies All units in the stack must be connected via stacking cable. You can connect units in a simple cascade configuration, connecting Up ports to Down ports, from the top unit to the bottom unit. Using this "line" topology, if any link or unit in the stack fails, the stack is split and two separate segments are formed. The Stack Link LEDs on the units that are disconnected flash to indicate that the stack link between them is not functioning (see Table 1-2 "System Status LEDs" on page 1-6). When a stack link failure occurs, the stack reboots and a Master unit is selected within each of the two stack segments.

The Master unit will be either the unit with the Master button depressed or the unit with the lowest MAC address if the Master button is not depressed on any unit. When the stack reboots and resumes operations, note that the IP address will be the same for both of the stack segments. To resolve the conflicting IP addresses, you should manually replace the failed link or unit as soon as possible. If you are using a wrap-around stack topology, a single point of failure in the stack will not cause the stack to fail. It would take two or more points of failure to split the stack.

If the Master unit fails or is powered off, the backup unit will take control of the stack without any loss of configuration settings. The Slave unit with the lowest MAC address is selected as the backup unit. 3-9 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 receptacle located at the back of the device. 100 -240V~ 50-60Hz 2A Figure 3-7 Power Receptacle 2.

Plug the other end of the cable into a grounded, 3-pin socket. 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 receptacle 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. 4. If you have purchased a Redundant Power Unit, connect it to the device and to an AC power source now, following the instructions included with the package. 3-10 CONNECTING TO THE CONSOLE PORT Connecting to the Console Port The DB-9 serial port on the switch's front panel is used to connect to the switch for out-of-band console configuration. The on-board configuration program can be accessed from a terminal or a PC running a terminal emulation program.

The pin assignments used to connect to the serial port are provided in the following tables. 1 5 6 9 Figure 3-8 Serial Port (DB-9 DTE) Pin-Out Table 3-1 Wiring Map for Serial Cable Switch's 9-Pin Serial Port 2 RXD (receive data) 3 TXD (transmit data) No other pins are used. Null Modem
 <-----> PC's 9-Pin DTE Port 3 TXD (transmit data) 2 RXD (receive data) 5 SGND (signal ground) 5 SGND (signal ground) ----- The serial port's configuration requirements are as follows: Default Baud rate--9,600 bps Character Size--8 Characters Parity--None Stop bit--One Data bits--8 Flow control--none 3-11 INSTALLING THE SWITCH 3-12 CHAPTER 4 MAKING NETWORK CONNECTIONS Connecting Network Devices The TigerStack 10G 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 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 "Wiring Closet Connections" on the next page.) Otherwise, attach the other end to an available port on the switch. 3. Make sure each twisted pair cable does not exceed 100 meters (328 ft) in length.

4. As each connection is made, the Link LED (on the switch) corresponding to each port will light green (1000 Mbps) or amber (10/100 Mbps) to indicate that the connection is valid. Note: Avoid using flow control on a port connected to a hub unless it is actually required to solve a problem. Otherwise back pressure jamming signals may degrade overall performance for the segment. 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. 4. Equipment Rack (side view) Network Switch Stack Master 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 Stack ID Stack Link Master Select Power RPU Diag Cheetah Switch Workgroup-4549 Module Console 47 w it ch 10/1 0 0 6724L 3 45 46 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 ES4524C ES4549 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.



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Each multimode fiber optic port requires 50/125 or 62.5/125 micron multimode fiber optic cabling with an LC connector at both ends. Each single-mode fiber port requires 9/125 micron single-mode fiber optic cable with an LC connector at both ends. Caution: This switch uses 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. 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. 46 47 48 Mast Selection Stack ID Stack Stack Master Link Power RPU 45 Module Diagram 46 47 Console 48 Figure 4-3 Making LC Port Connections 4. As a connection is made, check the green 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, with auto-negotiation of flow control. 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 Length" 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. 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 Std 802.3-2002 standards. 1000 Mbps Gigabit Ethernet Collision Length 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

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 Cable Type Twisted Pair, 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 APPENDIX A TROUBLESHOOTING Diagnosing Switch Indicators Table A-1 Troubleshooting Chart Symptom Power LED is Off Action . . . Power LED is Amber Diag LED is Amber . . . Stack Master LED is Flashing Amber . . . Check connections between the switch, the power cord, and the wall outlet. Contact your dealer for assistance.

Contact SMC Technical Support. Internal power supply has failed. Contact your local dealer for assistance. Power cycle the switch to try and clear the condition. If the condition does not clear, contact your local dealer for assistance. The stack has not completed its initial configuration. Wait a few minutes for the process to complete. If flashing continues, check that the Master Select button is pressed in on only one switch. Check that all stacking cables are properly connected. A-1 TROUBLESHOOTING Table A-1 Troubleshooting Chart Symptom Stack Link LED is Flashing Green/Amber Action . . . Link LED is Off The uplink/downlink has failed.

Check that the stacking cables are connected properly. Replace the cable if necessary. Power cycle the switch to try and clear the condition. Verify that the switch and attached device are powered on. Be sure the cable is plugged into both the switch and corresponding device. Verify that the proper cable type is used and its length does not exceed specified limits. Check the adapter on the attached device and cable connections for possible defects.

Check that the stacking cables are connected properly. Replace the cable if necessary. Power cycle the switch to try and clear the condition. Verify that the switch and attached device are powered on. Be sure the cable is plugged into both the switch and corresponding device. Verify that the proper cable type is used and its length does not exceed specified limits. Check the adapter on the attached device and cable connections for possible defects.



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