SIEMENS

RUGGEDCOM RS900M

Developer Guide

11/2013

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Table of Contents

FCC Statement and Cautions

Federal Communications Commission Radio Frequency Interference Statement

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.

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Caution: LASER

This product contains a laser system and is classified as a CLASS 1 LASER PRODUCT. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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Caution: Service

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Caution: Physical Access

This product should be installed in a restricted access location where access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Preface

This document describes the features and capablities of the RUGGEDCOM RS900M, a modular, high-port density, routing and switching platform designed to operate in harsh environments.

About This Guide

This guide is meant to provide a reference for OEM equipment integrators seeking to incorporate a RUGGEDCOM RS900M module into their equipment. Mechanical, electrical, command and network interfaces are specified.

This document also covers detail of the networking features of RUGGEDCOM RS900M , to provide a reference for system and network designers considering the overall system in which RUGGEDCOM RS900M will be deployed.

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The following types of alerts are used when necessary to highlight important information.

DANGER!
DANGER alerts describe imminently hazardous situations that, if not avoided, will result in death or serious injury.

WARNING!
WARNING alerts describe hazardous situations that, if not avoided, may result in serious injury and/or equipment damage.

CAUTION!
CAUTION alerts describe hazardous situations that, if not avoided, may result in equipment damage.

IMPORTANT!
IMPORTANT alerts provide important information that should be known before performing a procedure or step, or using a feature.

NOTE
NOTE alerts provide additional information, such as facts, tips and details.

Related Documents

Other documents that may be of interest include:

- *Rugged Operating System (ROS) User Guide for RS900M*

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The latest Hardware Installation Guides and Software User Guides for most RUGGEDCOM products are available online at www.siemens.com/ruggedcom.

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International: +1 905 856 5288

Website: http://support.automation.siemens.com

1 Overview

The RS900M is a 10-port managed Ethernet switch module designed for easy integration into intelligent electronic device (IED) and other OEM products. The RS900M supports:

- Ports 0-7: up to 8 Fast Ethernet ports
- Ports 8-9: 2 additional Fast Ethernet ports

  or

- Ports 8-9: 2 Gigabit Ethernet ports

Section 1.1

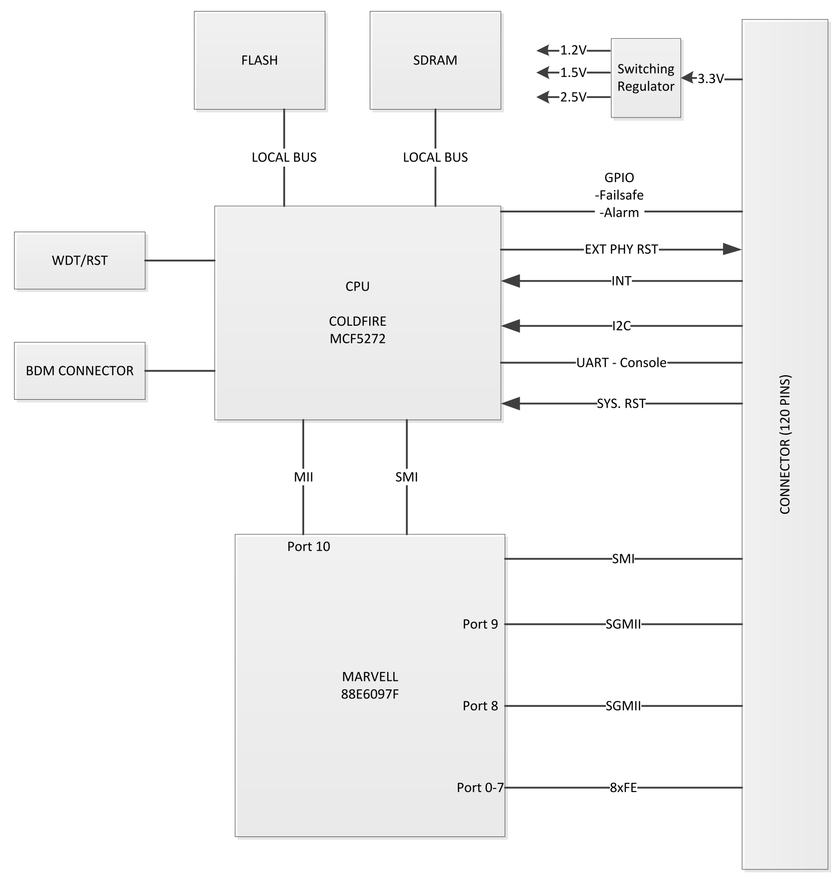
Features and Specifications

- Small-footprint PCB: 4.0" L × 2.7" W × 0.25" D
- Connector: 120 pin, 0.8mm pitch TYCO 6123000-5
- Mounting Points: 4
- Operating temperature: -40° to 85°C (no fans)
- Power Requirements: 3.3 VDC
- Failsafe relay control signal for critical failure or error alarming
- Supports 10/100Base-TX, 100Base-FX, 10/100/1000Base-TX, and 1000Base-LX
- Supports Multimode and Singlemode optical transceivers
- Supports long haul optics over distances of up to 90 km
- Advanced layer-2 switching functions including Flow-Control, Link Aggregation, MAC Bridges, Rapid Spanning Tree, Message Prioritization, VLANs and Port-based Network Access Control

2 Hardware

Section 2.1

Module Block Diagram



Signals	# of Pins
TX+	80 (8 Ports)
TX-	
GND	
RX+	
RX-	
GND	
Config	
LED - Speed	
LED - Link/Activity	
SDET	
SGMII (2 Ports)	12 (2 Ports)
Sys Rst	1
Ext PHY Rst	1
I2C	2
UART - Console	2
INT	2
Alarm LED	1
Failsafe Relay Control	1
SMI	2
3.3V	6
GND	4
Reserved	6
Total	**120**

Figure 1: RS900M Block Diagram

Section 2.2

Pinout Specifications

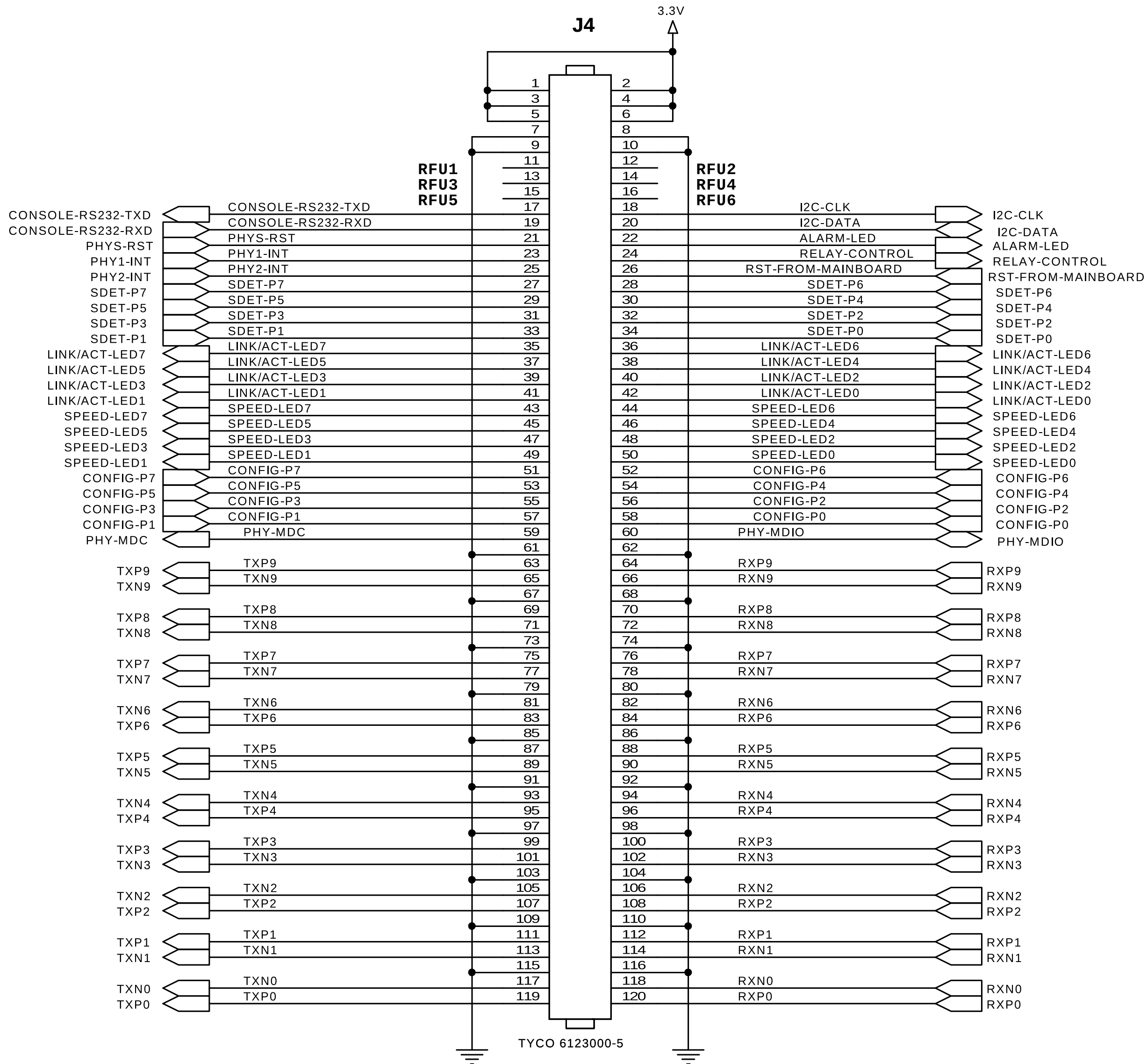


Figure 2: RS900M Pinout Diagram

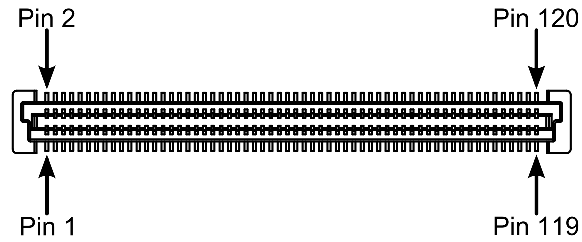


Figure 3: RS900M Connector Pin Numbering

Section 2.2.1

RS900M Pinout Specifications: arranged by Pin Name

Table: Pinout Specifications: arranged by Pin Name

Pin Number	Pin Name	Pin Type	Description
120 112 108 100 96 88 84 76	RXP0 RXP1 RXP2 RXP3 RXP4 RXP5 RXP6 RXP7	Typically Input	Receiver input – RXP[0:7] connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
118 114 106 102 94 90 82 78	RXN0 RXN1 RXN2 RXN3 RXN4 RXN5 RXN6 RXN7	Typically Input	Receiver input – RXN[0:7] connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
119 111 107 99 95 87 83 75	TXP0 TXP1 TXP2 TXP3 TXP4 TXP5 TXP6 TXP7	Typically Output	Transmitter output – TXP[0:7] connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
117 113 105 101	TXN0 TXN1 TXN2 TXN3	Typically Output	Transmitter output – TXN[0:7] connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.

Pin Number	Pin Name	Pin Type	Description
93 89 81 77	TXN4 TXN5 TXN6 TXN7		
70 64	RXP8 RXP9	Input	SGMII input – RXP[8:9] connects to another PHY's SGMII TXP output.
72 66	RXN8 RXN9	Input	SGMII input – RXN[8:9] connects to another PHY's SGMII TXN output.
69 63	TXP8 TXP9	Output	SGMII output – TXP[8:9] connects to another PHY's SGMII RXP input.
71 65	TXN8 TXN9	Output	SGMII output – TXN[8:9] connects to another PHY's SGMII RXN input.
34 33 32 31 30 29 28 27	SDET-P0 SDET-P1 SDET-P2 SDET-P3 SDET-P4 SDET-P5 SDET-P6 SDET-P7	Input	Signal Detect Input. SDET-P[0:7] indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
58 57 56 55 54 53 52 51	CONFIG-P0 CONFIG-P1 CONFIG-P2 CONFIG-P3 CONFIG-P4 CONFIG-P5 CONFIG-P6 CONFIG-P7	Input	Port 0 to Port 7 mode configuration. The CONFIG-P[0:7] pin is used to set the default configuration for port 0 to port 7 by connecting these pins to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
42 41 40 39 38 37 36 35	Link/Act-LED0 Link/Act-LED1 Link/Act-LED2 Link/Act-LED3 Link/Act-LED4 Link/Act-LED5 Link/Act-LED6 Link/Act-LED7	Output	Port 0-7 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
50 49 48 47 46 45 44	SPEED-LED0 SPEED-LED1 SPEED-LED2 SPEED-LED3 SPEED-LED4 SPEED-LED5 SPEED-LED6	Output	Port 0-7 speed LED indicator, Low: 100Mbps High: 10Mbps

Pin Number	Pin Name	Pin Type	Description
43	SPEED-LED7		
59	PHY-MDC	Output	External PHY serial management interface (SMI) clock, master. 2.5V power rail.
60	PHY-MDIO	Input/Output	External PHY serial management interface (SMI) data I/O, master, 2.5V power rail.
18	I^2C_CLK	Output	I^2C clock output, Master
20	I^2C_DATA	Input/Output	I^2C data I/O, Master.
19	CONSOLE-UART-RXD	Input	Console UART RXD , 3.3V LVTTL
17	CONSOLE-UART-TXD	Output	Console UART TXD, 3.3V LVTTL
21	PHYS-RST	Output	Reset external PHYS connected to P8/P9 SGMII interface , active low
26	RST-from-mainboard	Input	Active low, to reset the module
22	ALARM-LED	Output	Active low
24	FAIL-SAFE-RELAY-CONTROL	Output	Active high
23	PHY1-INT	Input	Interrupt from external PHY1 connected to P8 SGMII interface.
25	PHY2-INT	Input	Interrupt from external PHY2 connected to P9 SGMII interface.
11	RFU1		Reserved, do not connect.
12	RFU2		Reserved, do not connect.
13	RFU3		Reserved, do not connect.
14	RFU4		Reserved, do not connect.
15	RFU5		Reserved, do not connect.
16	RFU6		Reserved, do not connect.
1, 2, 3, 4, 5, 6	3.3V	Input	3.3V INPUT
7, 8, 9, 10, 61, 62, 67, 68, 73, 74, 79, 80, 85, 86, 91, 92, 97, 98, 103, 104, 109, 110, 115, 116	GND	Input	Ground

Section 2.2.2

RS900M Pinout Specifications: arranged by Pin Number

Table: Pinout Specifications: arranged by Pin Number

J1 Pin Number	Pin Name	Pin Type	Description
1	3.3V	Input	3.3V INPUT
2	3.3V	Input	3.3V INPUT

J1 Pin Number	Pin Name	Pin Type	Description
3	3.3V	Input	3.3V INPUT
4	3.3V	Input	3.3V INPUT
5	3.3V	Input	3.3V INPUT
6	3.3V	Input	3.3V INPUT
7	GND	Input	
8	GND	Input	
9	GND	Input	
10	GND	Input	
11	RFU1		Reserved, do not connect.
12	RFU2		Reserved, do not connect.
13	RFU3		Reserved, do not connect.
14	RFU4		Reserved, do not connect.
15	RFU5		Reserved, do not connect.
16	RFU6		Reserved, do not connect.
17	CONSOLE-UART-TXD	Output	Console UART TXD, 3.3V LVTTL
18	I^2C_CLK	Output	I^2C clock output, Master
19	CONSOLE-UART-RXD	Input	Console UART RXD , 3.3V LVTTL
20	I^2C_DATA	Input/Output	I^2C data I/O, Master.
21	PHYS-RST	Output	Reset external PHYS connected to P8/P9 SGMII interface , active low
22	ALARM-LED	Output	Active low
23	PHY1-INT	Input	Interrupt from external PHY1 connected to P8 SGMII interface.
24	FAIL-SAFE-RELAY-CONTROL	Output	Active high
25	PHY2-INT	Input	Interrupt from external PHY2 connected to P9 SGMII interface.
26	RST-from-mainboard	Input	Active low, to reset the module
27	SDET-P7	Input	Signal Detect Input. SDET-P7 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
28	SDET-P6	Input	Signal Detect Input. SDET-P6 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
29	SDET-P5	Input	Signal Detect Input. SDET-P5 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured

J1 Pin Number	Pin Name	Pin Type	Description
			for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
30	SDET-P4	Input	Signal Detect Input. SDET-P4 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
31	SDET-P3	Input	Signal Detect Input. SDET-P3 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
32	SDET-P2	Input	Signal Detect Input. SDET-P2 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
33	SDET-P1	Input	Signal Detect Input. SDET-P1 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
34	SDET-P0	Input	Signal Detect Input. SDET-P0 indicates whether a signal is detected by the fiber-optic transceiver if port 0 to 7 are configured for 100Base-FX mode, a positive level indicates that a signal is detected. SDET-P[0:7] is not used if port 0 to 7 are configured for 10/100Base-TX mode but can be left floating since these pins are pulled-down to GND via 4.7K resistors.
35	Link/Act-LED7	Output	Port 7 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
36	Link/Act-LED6	Output	Port 6 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
37	Link/Act-LED5	Output	Port 5 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
38	Link/Act-LED4	Output	Port 4 Link/Act LED indicator, Active low. Low: Link up High: Link down

J1 Pin Number	Pin Name	Pin Type	Description
			Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
39	Link/Act-LED3	Output	Port 3 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
40	Link/Act-LED2	Output	Port 2 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
41	Link/Act-LED1	Output	Port 1 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
42	Link/Act-LED0	Output	Port 0 Link/Act LED indicator, Active low. Low: Link up High: Link down Blink: transmit or receive activity (blink rate is 84ms active then 84ms inactive)
43	SPEED-LED7	Output	Port 7 speed LED indicator. Low: 100Mbps High: 10Mbps
44	SPEED-LED6	Output	Port 6 speed LED indicator. Low: 100Mbps High: 10Mbps
45	SPEED-LED5	Output	Port 5 speed LED indicator. Low: 100Mbps High: 10Mbps
46	SPEED-LED4	Output	Port 4 speed LED indicator. Low: 100Mbps High: 10Mbps
47	SPEED-LED3	Output	Port 3 speed LED indicator. Low: 100Mbps High: 10Mbps
48	SPEED-LED2	Output	Port 2 speed LED indicator. Low: 100Mbps High: 10Mbps
49	SPEED-LED1	Output	Port 1 speed LED indicator. Low: 100Mbps High: 10Mbps
50	SPEED-LED0	Output	Port 0 speed LED indicator.

J1 Pin Number	Pin Name	Pin Type	Description
			Low: 100Mbps High: 10Mbps
51	CONFIG-P7	Input	Port 7 mode configuration. The CONFIG-P7 pin is used to set the default configuration for port 7 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
52	CONFIG-P6	Input	Port 6 mode configuration. The CONFIG-P6 pin is used to set the default configuration for port 6 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
53	CONFIG-P5	Input	Port 5 mode configuration. The CONFIG-P5 pin is used to set the default configuration for port 5 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
54	CONFIG-P4	Input	Port 4 mode configuration. The CONFIG-P4 pin is used to set the default configuration for port 4 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
55	CONFIG-P3	Input	Port 3 mode configuration. The CONFIG-P3 pin is used to set the default configuration for port 3 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
56	CONFIG-P2	Input	Port 2 mode configuration. The CONFIG-P2 pin is used to set the default configuration for port 2 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.

J1 Pin Number	Pin Name	Pin Type	Description
57	CONFIG-P1	Input	Port 1 mode configuration. The CONFIG-P1 pin is used to set the default configuration for port 1 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
58	CONFIG-P0	Input	Port 0 mode configuration. The CONFIG-P0 pin is used to set the default configuration for port 0 by connecting this pin to GND or 3.3V. GND: 10/100Base-TX Auto-Negotiation mode 3.3V: 100Base-FX full-duplex mode CONFIG-P[0:7] pins are configured after reset and are pulled-down on the module so the port will be configured to 10/100Base-TX Auto-Negotiation mode by default if CONFIG-Px pin is left floating.
59	PHY-MDC	Output	External PHY serial management interface (SMI) clock, master. 2.5V power rail.
60	PHY-MDIO	Input/Output	External PHY serial management interface (SMI) data I/O, master, 2.5V power rail.
61	GND	Input	
62	GND	Input	
63	TXP9	Output	SGMII output – TXP9 connects to another PHY's SGMII RXP input.
64	RXP9	Input	SGMII input – RXP9 connects to another PHY's SGMII TXP output.
65	TXN9	Output	SGMII output – TXN9 connects to another PHY's SGMII RXN input.
66	RXN9	Input	SGMII input – RXN9 connects to another PHY's SGMII TXN output.
67	GND	Input	
68	GND	Input	
69	TXP8	Output	SGMII output – TXP8 connects to another PHY's SGMII RXP input.
70	RXP8	Input	SGMII input – RXP8 connects to another PHY's SGMII TXP output.
71	TXN8	Output	SGMII output – TXN8 connects to another PHY's SGMII RXN input.
72	RXN8	Input	SGMII input – RXN8 connects to another PHY's SGMII TXN output.
73	GND	Input	
74	GND	Input	
75	TXP7	Typically Output	Transmitter output – TXP7 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
76	RXP7	Typically Input	Receiver input – RXP7 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
77	TXN7	Typically Output	Transmitter output – TXN7 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN

J1 Pin Number	Pin Name	Pin Type	Description
			connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
78	RXN7	Typically Input	Receiver input – RXN7 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
79	GND	Input	
80	GND	Input	
81	TXN6	Typically Output	Transmitter output – TXN6 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
82	RXN6	Typically Input	Receiver input – RXN6 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
83	TXP6	Typically Output	Transmitter output – TXP6 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
84	RXP6	Typically Input	Receiver input – RXP6 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
85	GND	Input	
86	GND	Input	
87	TXP5	Typically Output	Transmitter output – TXP5 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
88	RXP5	Typically Input	Receiver input – RXP5 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
89	TXN5	Typically Output	Transmitter output – TXN5 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
90	RXN5	Typically Input	Receiver input – RXN5 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
91	GND	Input	
92	GND	Input	
93	TXN4	Typically Output	Transmitter output – TXN4 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input.

J1 Pin Number	Pin Name	Pin Type	Description
			These pins can become inputs if Auto MDI/MDIX crossover is enabled.
94	RXN4	Typically Input	Receiver input – RXN4 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
95	TXP4	Typically Output	Transmitter output – TXP4 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
96	RXP4	Typically Input	Receiver input – RXP4 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
97	GND	Input	
98	GND	Input	
99	TXP3	Typically Output	Transmitter output – TXP3 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
100	RXP3	Typically Input	Receiver input – RXP3 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
101	TXN3	Typically Output	Transmitter output – TXN3 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
102	RXN3	Typically Input	Receiver input – RXN3 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
103	GND	Input	
104	GND	Input	
105	TXN2	Typically Output	Transmitter output – TXN2 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
106	RXN2	Typically Input	Receiver input – RXN2 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
107	TXP2	Typically Output	Transmitter output – TXP2 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
108	RXP2	Typically Input	Receiver input – RXP2 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects

J1 Pin Number	Pin Name	Pin Type	Description
			directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
109	GND	Input	
110	GND	Input	
111	TXP1	Typically Output	Transmitter output – TXP1 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
112	RXP1	Typically Input	Receiver input – RXP1 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
113	TXN1	Typically Output	Transmitter output – TXN1 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
114	RXN1	Typically Input	Receiver input – RXN1 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
115	GND	Input	
116	GND	Input	
117	TXN0	Typically Output	Transmitter output – TXN0 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXN connects directly to the fiber-optic transmitter's negative input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
118	RXN0	Typically Input	Receiver input – RXN0 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXN connects directly to the fiber-optic receiver's negative output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.
119	TXP0	Typically Output	Transmitter output – TXP0 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, TXP connects directly to the fiber-optic transmitter's positive input. These pins can become inputs if Auto MDI/MDIX crossover is enabled.
120	RXP0	Typically Input	Receiver input – RXP0 connects directly to the receiver magnetics. If the port is configured for 100Base-FX mode, RXP connects directly to the fiber-optic receiver's positive output. These pins can become outputs if Auto MDI/MDIX crossover is enabled.

Section 2.3

Port Configuration EEPROM Requirements

Port configuration information can be stored in an I^2C EEPROM chip on the carrier board. For information on programming the port configuration, see Section 3.1, "Port Configuration".

The supported EEPROM component is ST Microelectronics M24256. The EEPROM's I^2C address is 0x55 (hex, 7 bit).

The I^2C clock speed is 100 KHz max.

Section 2.4

I^2C Switch Requirements

If two SFP transceivers are used for Port 8 and Port 9, an I^2C Multiplexer must be used and the following requirements observed:

- The supported component is Phillips PCA9542.
- The multiplexer's I^2C address must be 0x75.
- The multiplexer's first channel must be connected to the SFP of Port 8.

If a single SFP transceiver is used, there is no requirement for an I^2C multiplexer between the I^2C bus and the SFP cage.

Section 2.5

PHY Drivers

The RS900M PHY drivers operate in current mode.

Section 2.6

Reference Implementations

The following sections provide schematics for reference designs to copper and fiber port implementations. These schematics illustrate how the copper and fiber ports are implemented on the RS900M Evaluation Unit.

NOTE
PHY drivers operate in current mode.

- Section 2.6.1, "Port 0 - Port 7 Copper 10/100Base-TX Implementation"
- Section 2.6.2, "Port 0 - Port 7 Fiber 100Base-FX Implementation"
- Section 2.6.3, "Port 8 and Port 9 Gigabit Copper 10/100/1000Base-TX Implementation"
- Section 2.6.4, "Port 8 and Port 9 Gigabit Fiber or 100Base-FX SFP Implementation"

Section 2.6.1

Port 0 - Port 7 Copper 10/100Base-TX Implementation

This schematic illustrates a copper 10/100Base-TX interface on Port 0, as implemented on the RS900M carrier board. Ports 2 through 7 are the same.

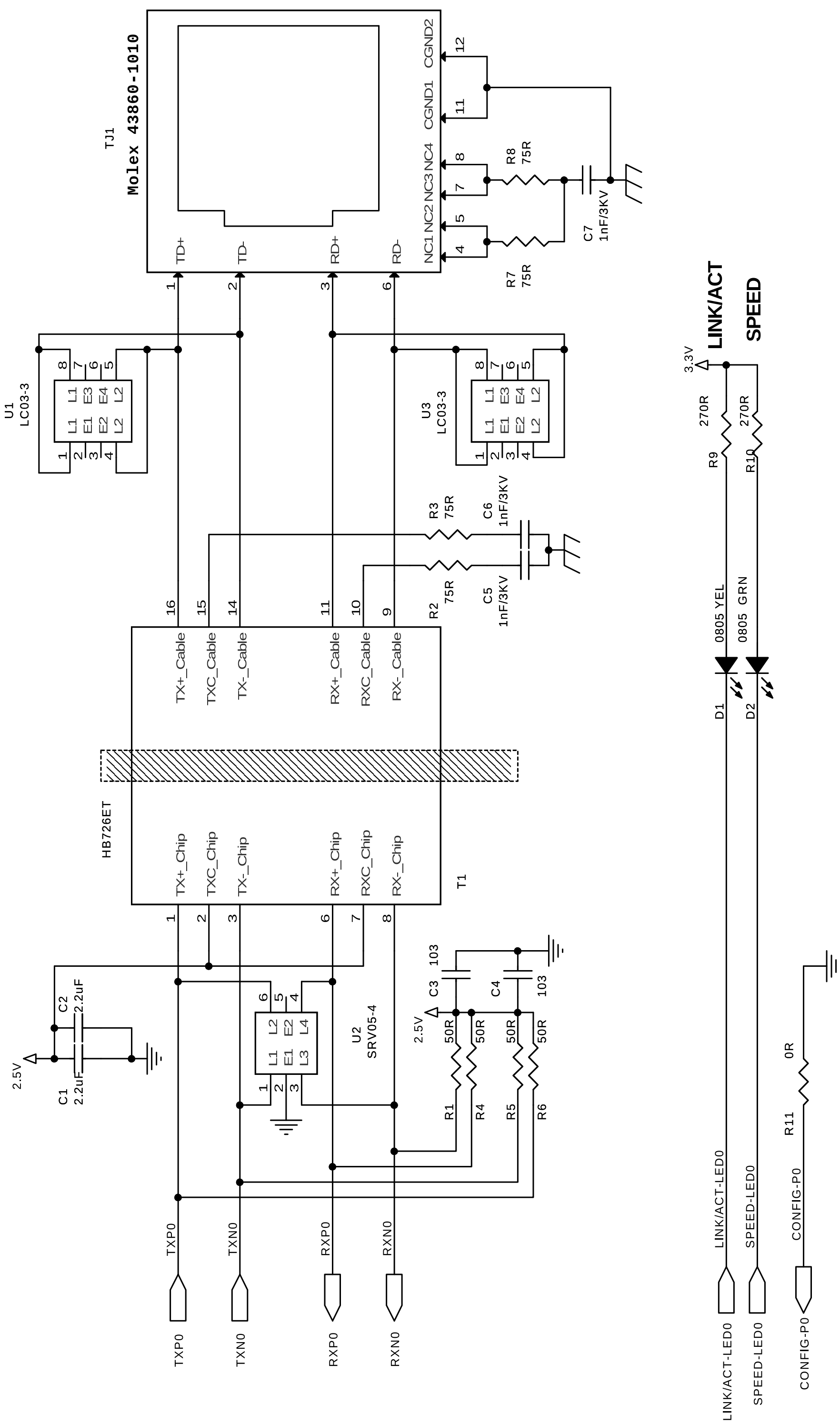


Figure 4: Port 0 - Port 7 Copper 10/100Base-TX Implementation

Section 2.6.2

Port 0 - Port 7 Fiber 100Base-FX Implementation

This schematic illustrates a fiber 100Base-FX interface on Port 0, as implemented on the RS900M carrier board. Ports 2 through 7 are the same.

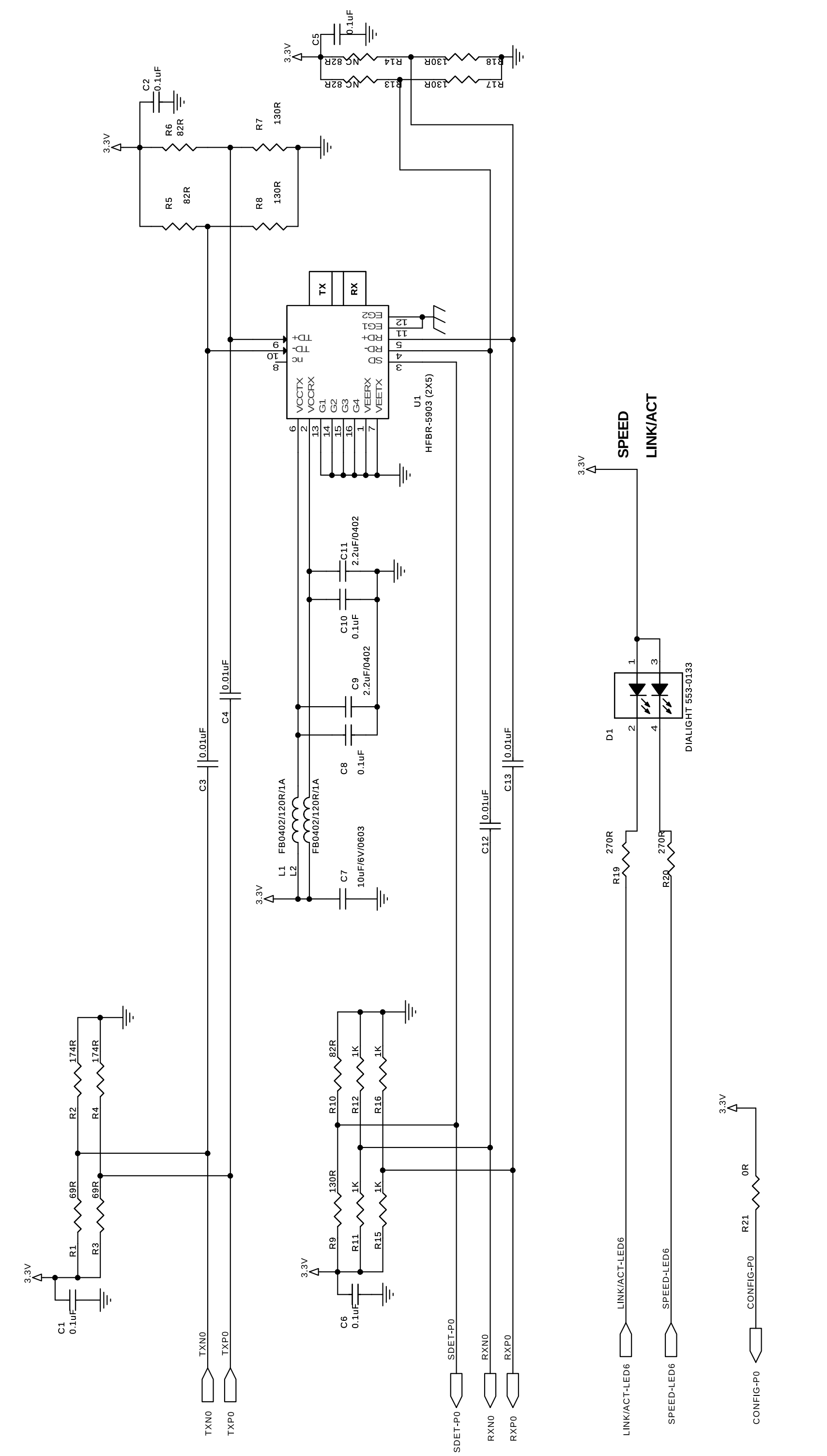


Figure 5: Port 0 - Port 7 Fiber 100Base-FX Implementation

Section 2.6.3

Port 8 and Port 9 Gigabit Copper 10/100/1000Base-TX Implementation

This schematic illustrates gigabit copper 10/100/1000Base-TX interfaces on Ports 8 and 9, as implemented on the RS900M carrier board.

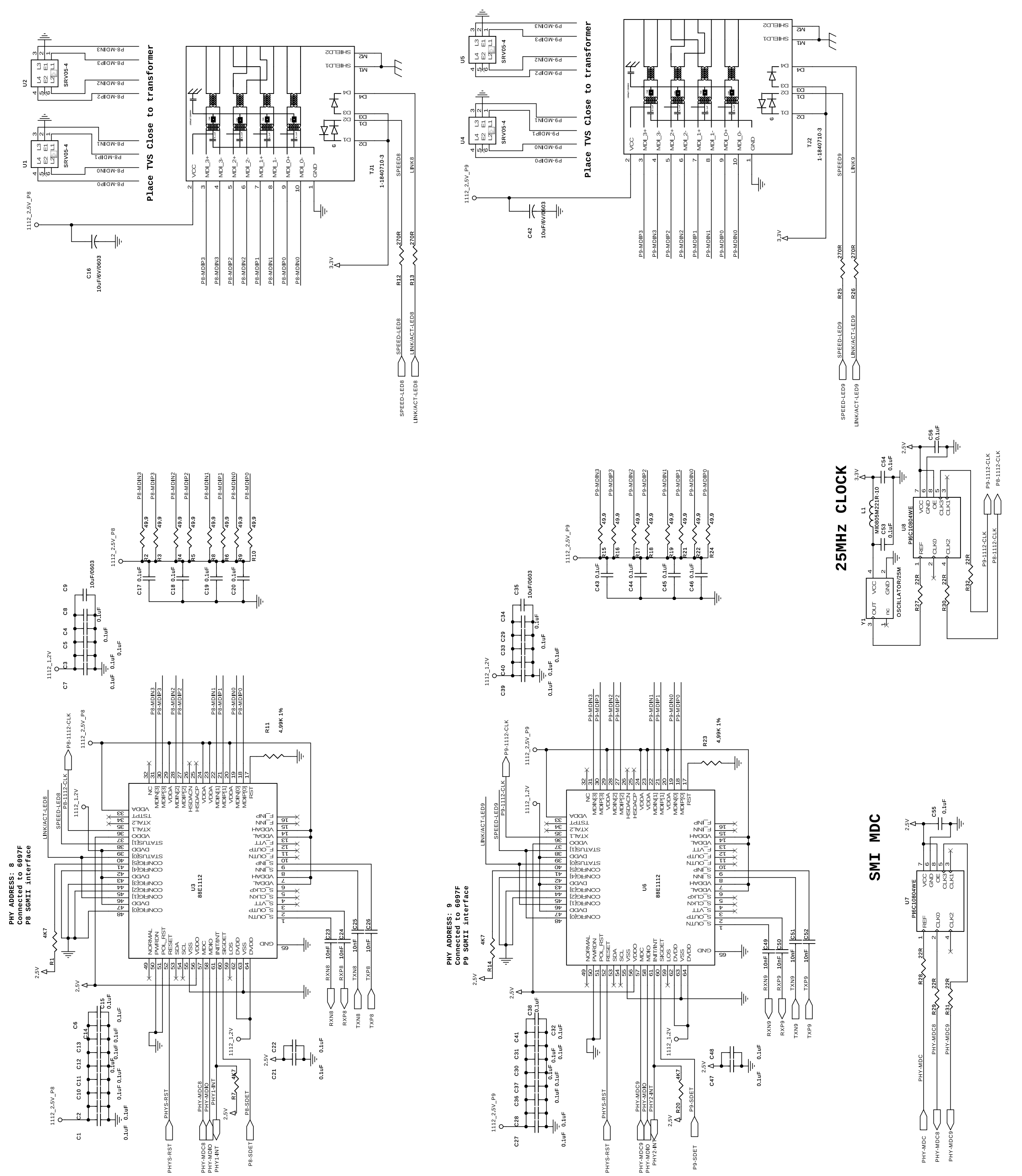


Figure 6: Port 8 and Port 9 Gigabit Copper 10/100/1000Base-TX Implementation

Section 2.6.4

Port 8 and Port 9 Gigabit Fiber or 100Base-FX SFP Implementation

This schematic illustrates gigabit fiber or 100Base-FX SFP interfaces on Ports 8 and 9, as implemented on the RS900M carrier board.

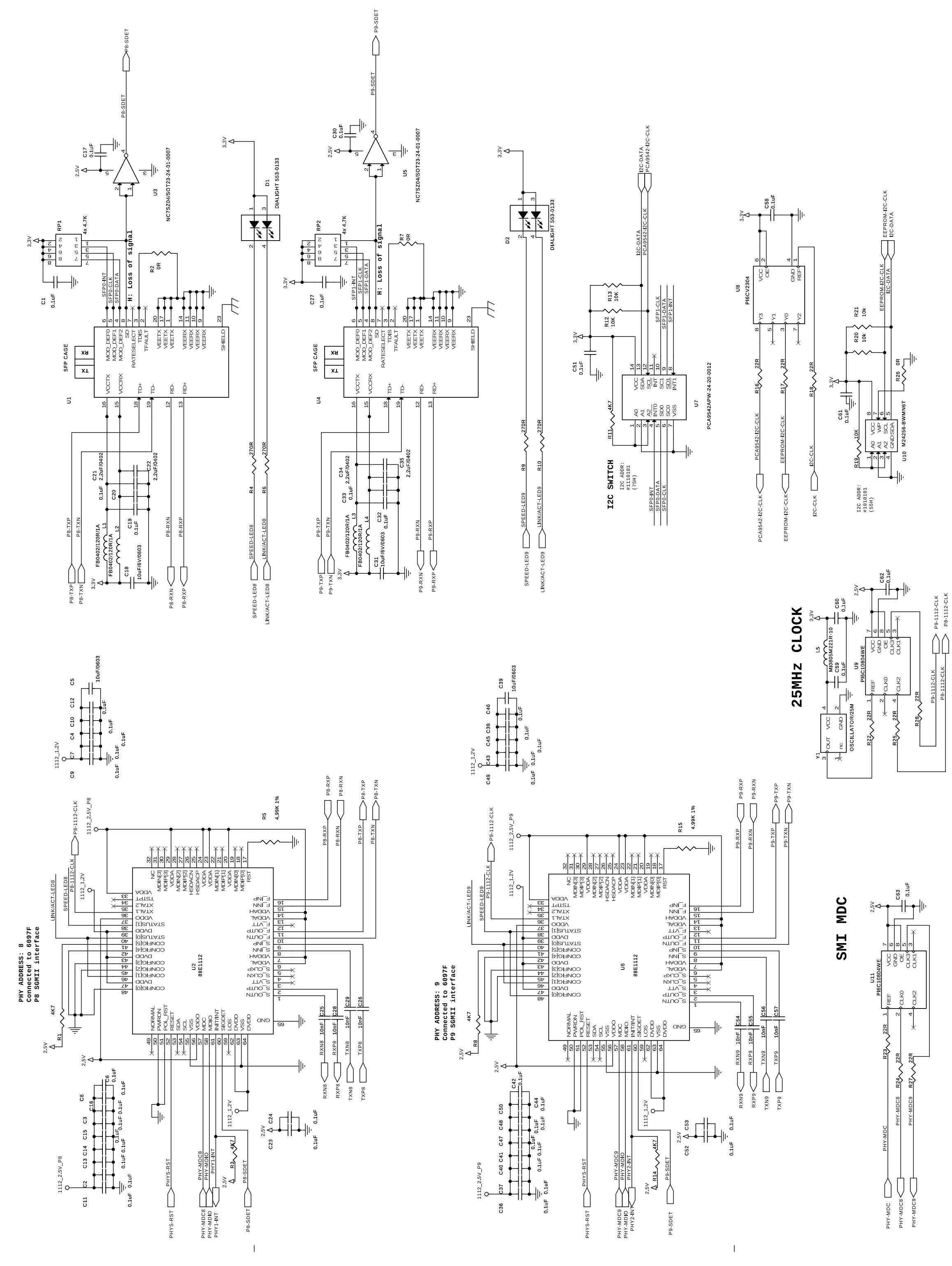


Figure 7: Port 8 and Port 9 Gigabit Fiber or 100Base-FX SFP Implementation

Section 2.7

Mechanical Specifications

Section 2.7.1

Module Dimensions

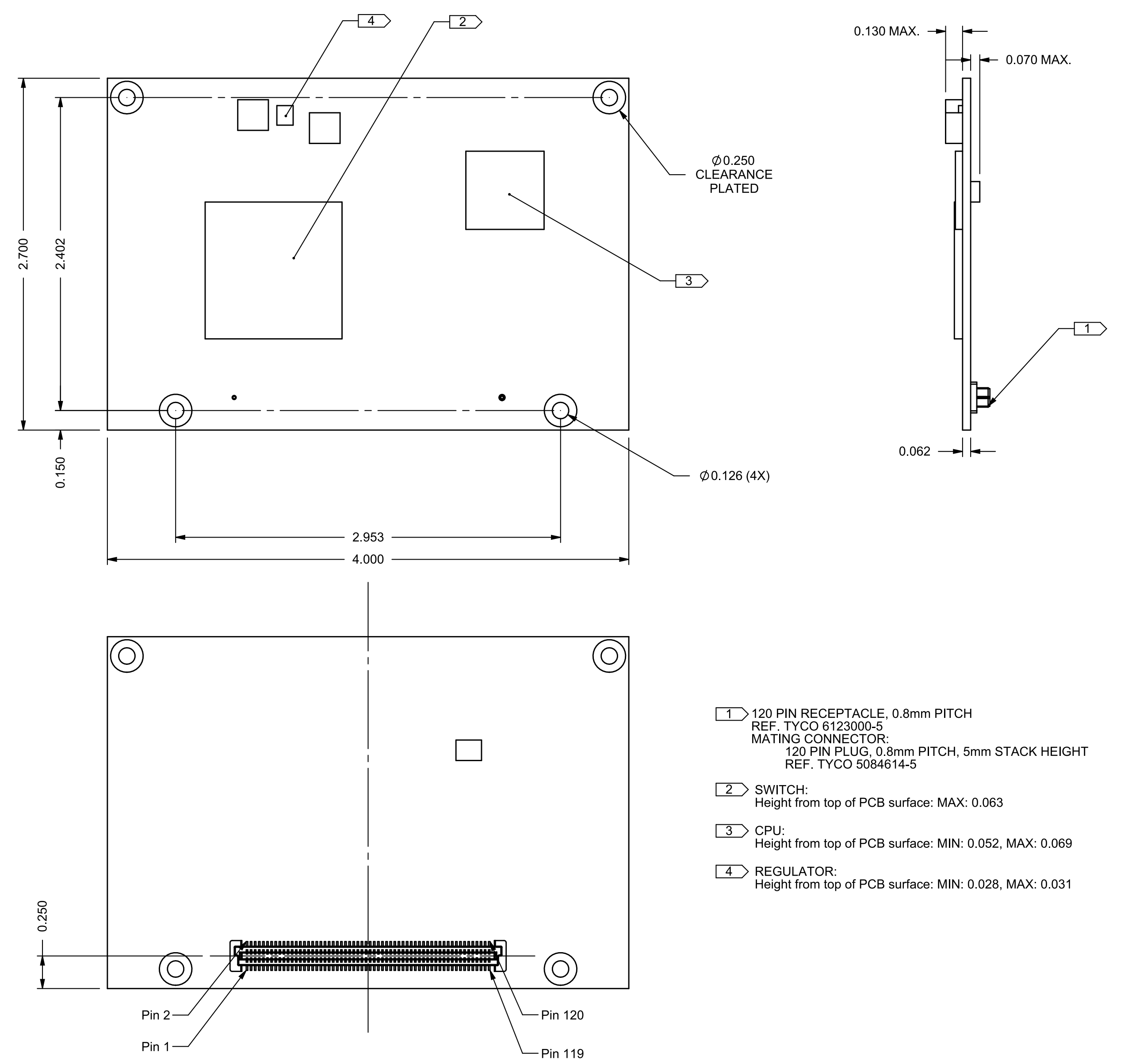


Figure 8: RS900M Physical Dimensions

Section 2.7.2

Heatsink Requirements

The following components are recommended to be heatsinked:

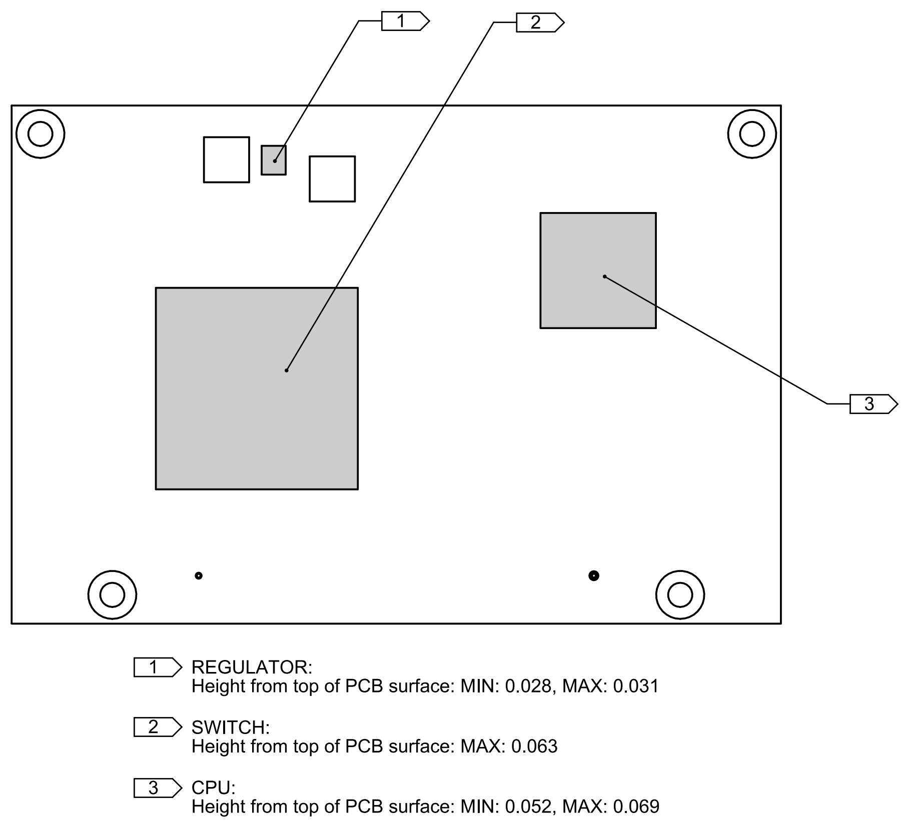


Figure 9: RS900M Heatsink Requirements

Table: RS900M Heatsink Requirements

Component	Max. Junction Temperature	Thermal Resistance (Junction to ambient, no air flow)	Thermal Resistance (Junction to case)	Maximum Power Consumption
Switch	125°C	19.6°C/W	7.60°C/W	2.5W
CPU	115°C	26°C/W	10°C/W	1W
Regulator	150°C	65°C/W	N/A	0.5W

Section 2.7.3

RS900M LED Indicators

The RS900M features two LED indicators, labelled D2 and D3 on the RS900M board.

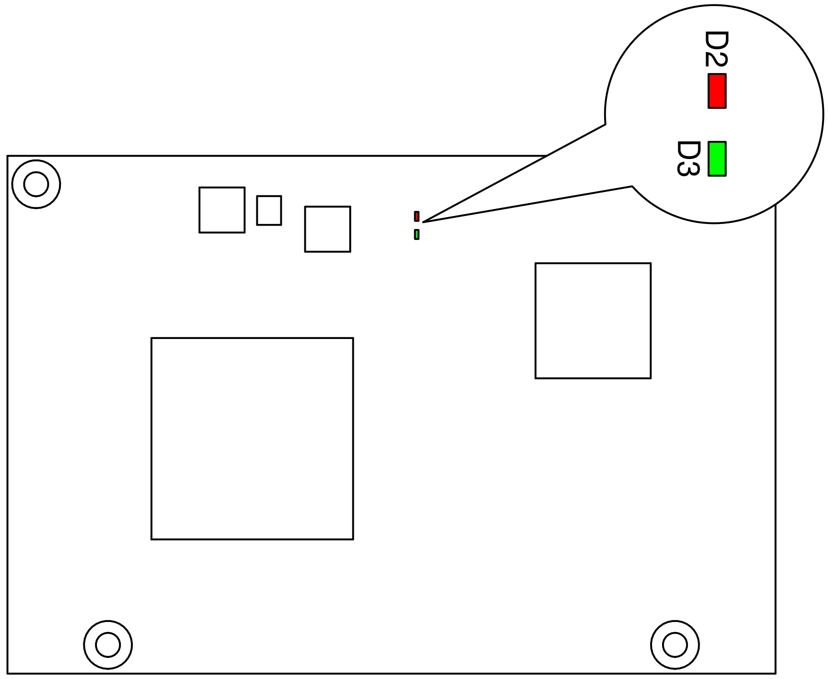
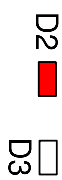
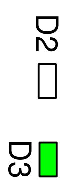


Figure 10: RS900M LED Indicators

Table: RS900M LED Indicators

Color and State		Description
	**D2:** Red, steady. **D3:** Off.	Alarm condition.
	**D2:** Off. **D3:** Green, steady.	No alarm condition.

Section 2.8

Hardware FAQs

Q: The EEPROM data sheet calls out an R/C network on the SDA line whose value depends on the speed of the I²C bus. Are these already on the RS900M board, or do they need to to be on the carrier board? If so, what is the intended operating speed for this device?

A: For the I^2C clock line and data line, there is a 4.7K pull-up resistor to 3.3V on the RS900M. The clock speed is 100KHz max. It is not necessary to have an R/C to these lines on the carrier board.

Q: How does the SysReset pin (pin 22) function?

A: SysReset is essentially a manual reset, equivalent to a power-on reset. If you do not want to use the reset feature, leave Pin 22 unconnected or connect it to 3.3V directly or through a pull up resistor. Logic low on this pin asserts reset. Reset remains asserted while the pin is low, and typically for 360ms after it returns high. The minimum pulse width is 1µs. The delay from assertion to reset output is 500ns. Glitch immunity is typically 100ns.

3 Software

Section 3.1

Port Configuration

The RS900M provides eight Fast Ethernet (100Mbps) ports and two Gigabit Ethernet ports.

> **NOTE**
> *An external PHY is required for the two Gigabit Ethernet ports.*

The ports are numbered as Port 0 (the first internal port) through Port 9 (the tenth internal port) in the 120-pin connector. From now on, we will call these ten ports *internal ports*. Internal ports 8 and 9 are gigabit ports.

By default, the firmware assumes that all ten ports are used and are physically labelled as Ports 1 through 10 on the OEM device. The firmware also assumes that the two gigabit ports are Gigabit Copper (1000T) ports. If the ports are actually used in this manner, there is no need to provide any port configuration data.

The port configuration option provides the flexibility to map internal port numbers to different external port numbers. It also provides the ability to specify a different port type for the gigabit ports. Port configuration is optional. If the port configuration information is not present, the default configuration applies.

Port configuration information can be stored either in an I2C EEPROM chip on the carrier board, or in the factory data on the RS900M module.

The supported EEPROM component is ST Microelectronics M24256. The EEPROM's I2C address is 0x55 (hex, 7 bit).

Upon power up, the RS900M first searches the EEPROM for the port configuration information. If no port configuration information is found on the EEPROM, the RS900M searches the factory data for the port configuration information. If invalid port configuration is found, the RS900M raises an alarm and applies the default port configuration.

When the port configuration is changed, the unit must be rebooted to apply the changes.

Section 3.2

Port Configuration Syntax

Port configuration is comprised of two parts: port map configuration and gigabit port type configuration.

The port map configuration is one line of text specifying how the ten internal ports are mapped to the external port numbers. The format is:

```
PortMap=n1-n2-n3-n4-n5-n6-n7-n8-n9-n10
```

— where:

- `PortMap` is the keyword (case insensitive)
- `n1` through `n10` are the external silkscreen numbers for ten internal ports. The value of `n1` to `n10` can be a number in the range of **`1`** to **`10`**, or the letter **`x`** (case insensitive), meaning that the port is not in use.

The gigabit port type configuration is specified in a single line of text. This configuration is needed only if at least one gigabit port is used and it is a different type than the default. The format is:

```
GigabitPortType=t1-t2
```

— where:

- `GigabitPortType` is the keyword (case insensitive)
- `t1` is the port type of the first gigabit port (internal port 8)
- `t2` is the port type of the second gigabit port (internal port 9).

Valid values for t1 and t2 are one of the following:

- **1000T**: port type is Gigabit (10/100/1000 triple speed) Copper
- **1000X**: port type is Gigabit Fiber
- **1000SFP**: port type is Gigabit Fiber SFP
- **100FX**: port type is 100Mbps Fiber
- **100SFP**: port type is 100Mbps Fiber SFP

> **NOTE**
> *When a gigabit port is marked as "not in use" in the* `PortMap` *section, the port type specified for that gigabit port is ignored.*

Section 3.2.1

Port Configuration Examples

Table: Port Configuration Examples

Configuration	Description
`PortMap=1-2-3-4-5-6-7-8-9-10` `GigabitPortType=1000T-1000T`	All ports are used. The first internal port (port 0) is external port 1, the second internal port is external port 2, … and the last internal port is external port 10. Two gigabit ports are of 1000T. This is exactly the same as the default configuration; in this case, the configuration is actually not needed.
`PortMap=1-2-3-4-5-6-7-x-x-x`	The first seven ports are used and they labelled as port numbers 1 to 7. In this case, if you do not mind that ports 8 to 10 are displayed as "Down" in the ROS user interface, even though there are no ports 8 to 10 externally, the port configuration can be omitted entirely.
`PortMap=3-x-x-x-x-4-x-x-1-2` `GigabitPortType=1000SFP-1000X`	Four ports are used. The first internal port is external port 3, the sixth internal port is external port 4, the ninth internal port is external port 1, and the tenth internal port is external port 2. The first gigabit port is 1000SFP and the second gigabit port is 1000X.
`PortMap=x-x-x-x-x-x-x-2-x-1` `GigabitPortType=1000T-100FX`	Two ports are used. The eighth internal port is external port 2, and the tenth internal port is external port 1. The first gigabit port is not used and the second gigabit port is 100FX.

Section 3.3

Port Configuration Using EEPROM

The port configuration information can be stored in an I2C EEPROM on the carrier board. The advantage of doing so is that different carrier boards can have different port configurations, and the EEPROM can store additional information specific to each carrier board. The disadvantage to doing so is the incurred cost of the EEPROM.

You can use ROS to program the port configuration to the EEPROM. You can also use third party tools to program the EEPROM before the carrier board is connected to the RS900M module.

Section 3.3.1

Programming the EEPROM Using ROS

Procedure: Programming the EEPROM using ROS

1. Create a text file on your PC using any simple text editor. In this example, the sample file is called `myconfig.txt`. Lines beginning with `#` are comments:

```
#This is a comment line
PortMap=x-x-x-x-x-x-x-2-x-1
GigabitPortType=1000T-1000X

#This board has two ports.
#The 8th internal port is external port 2, the 10th internal port is external port 1.
#The first gigabit port is not used and the second gigabit port is 1000X fiber.

#Designed by Winston Smith
#Manufactured by ExampleCom in Canada on October 10 2011
#Serial Number: 2011123456789
```

2. Load the `myconfig.txt` file to the EEPROM using xmodem or tftp. The content in the EEPROM is represented by a ROS virtual file named `extdata.txt`. In the ROS CLI, the `type extdata.txt` command prints the content of the EEPROM.

   - **Loading the file using xmodem:**

     In the ROS CLI, type `xmodem receive extdata.txt` and then send the `myconfig.txt` file in the terminator.

   - **Loading the file using tftp:**

     Ensure that the ROS TFTP server is enabled. For details, refer to the *ROS User Guide*.

     In the PC CLI, type `tftp {RS900M_ip_address} put myconfig.txt extdata.txt`, where *{RS900M_ip_address}* is the IP address of the RS900M module, and press **Enter**.

3. Verify the data on the EEPROM. The content of the EEPROM can be retrieved remotely by retrieving the `extdata.txt` using xmodem or tftp.

   - Retrieving the data using xmodem:

     In the ROS CLI, type `xmodem send extdata.txt` and then receive the file in the terminator.

   - Retrieving the data using tftp:

     Ensure that the ROS TFTP server is enabled. For details, refer to the *ROS User Guide*.

     In the PC CLI, type `tftp {RS900M_ip_address} get extdata.txt myconfig.txt`, where *{RS900M_ip_address}* is the IP address of the RS900M module, and press **Enter**.

Section 3.3.2

Programming the EEPROM Using Third Party Tools

The port configuration information is stored at the beginning of the EEPROM as a simple byte stream dump. There is no traditional file system, such as FAT, in the EEPROM. This makes it very easy to program the EEPROM using a third party tool.

Procedure: Programming the EEPROM using a Third Party Tool

1. Prepare a text file on your PC using any simple text editor. In this example, the sample file is called `myconfig.txt`. Lines beginning with `#` are comments.

   The EOL (End of Line) character in the text file can be in any format: CR, LF, or any combination of CR and LF. This means that you can use any PC operating system to create the text file.

```
# Test port cfg 900M. July 2011.
# This file specifies port mapping and gigabit port types.
# Note that FE port types are auto-detected.

portmap=3-4-x-x-x-x-x-x-1-2
gigabitportType=1000sfp-1000sfp
```

2. Use the third party tool to program the text file as a byte stream to the EEPROM chip. The unused space in the EEPROM can be left blank (all bytes 0xFF) or be programmed to 0x00. Both 0x00 and 0xFF are treated as EOF (End of File) in the EEPROM.
3. Verify the data on the EEPROM. The content of the EEPROM can be retrieved with the ROS `eeprom read` command. The contents in the EEPROM should look like the following:

```
>eeprom read 0 400
Address   Hex                                               Ascii
--------  -----------------------------------------------  ----------------
00000000  23 20 54 65 73 74 20 70 6F 72 74 20 63 66 67 20  # Test port cfg
00000010  39 30 30 4D 2E 20 4A 75 6C 79 20 32 30 31 31 2E  900M. July 2011.
00000020  0D 0A 23 20 54 68 69 73 20 66 69 6C 65 20 73 70  ..# This file sp
00000030  65 63 69 66 69 65 73 20 70 6F 72 74 20 6D 61 70  ecifies port map
00000040  70 69 6E 67 20 61 6E 64 20 67 69 67 61 62 69 74  ping and gigabit
00000050  20 70 6F 72 74 20 74 79 70 65 73 2E 20 0D 0A 23   port types. ..#
00000060  20 20 4E 6F 74 65 20 74 68 61 74 20 46 45 20 70    Note that FE p
00000070  6F 72 74 20 74 79 70 65 73 20 61 72 65 20 61 75  ort types are au
00000080  74 6F 2D 64 65 74 65 63 74 65 64 2E 0D 0A 0D 0A  to-detected.....
00000090  70 6F 72 74 6D 61 70 3D 33 2D 34 2D 78 2D 78 2D  portmap=3-4-x-x-
000000A0  78 2D 78 2D 78 2D 78 2D 31 2D 32 20 0D 0A 67 69  x-x-x-x-1-2 ..gi
000000B0  67 61 62 69 74 70 6F 72 74 54 79 70 65 3D 31 30  gabitportType=10
000000C0  30 30 73 66 70 2D 31 30 30 30 73 66 70 20 20 20  00sfp-1000sfp
000000D0  20 20 20 20 20 20 20 20 0D 0A 0D 0A 0D 0A 0D 0A          ........
000000E0  0D 0A 00 FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
000000F0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000100  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000110  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000120  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000130  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000140  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000150  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000160  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000170  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
00000180  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ................
```

Section 3.4

Port Configuration Using Factory Data

If there is no EEPROM hardware on the carrier board, the factory data file — `factory.txt` in ROS — on the RS900M board can be used to store the port configuration information.

To use this option, contact your RuggedCom sales representative for assistance.

Section 3.5

LED configuration

There are two LEDs for each port used to indicate the Ethernet port status. By default, the Link/Act LED (marked as Link/ACT-LED in the schematics) indicates the Link and Activity status, and the Speed LED (marked as SPEED-LED in the schematics) indicates the port speed.

However, the LEDs can be configured to function differently. The configuration parameter used for this purpose is:

```
ChangeFunctionLED=Yes
```

The configuration parameter can be stored in the EEPROM or `factory.txt` file, similar to the `PortMap` configuration parameter.

If this configuration parameter is set, the Link/Act LED will be changed to indicate the Link status (ON - Link up, OFF - Link down), and the Speed LED will be changed to indicate the Activity status (Blink - Activity, OFF - No activity).

4 RS900M Evaluation Unit

The RS900M Evaluation Unit provides a platform for testing and developing OEM products applications with the RS900M. The evaluation board features the following connections and indicators:

- Ports 1 to 6 RJ45: Fast Ethernet
- Ports 7 and 8 LC Fiber: Fast Ethernet
- Ports 9 and 10 RJ45: Gigabit Ethernet
- Ports 9 and 10 SFP: Gigabit Ethernet
- RS232 Console Port
- Fail Safe Relay Connector
- DC Input Connector: 10VDC to 30VDC
- RS900M Module Connector
- Power LED
- Alarm LED
- Manual Reset Button

Section 4.1

RS900M Evaluation Board Parts List

- Evaluation PCBA (Quantity: 1)
- 12VDC Wall Mount Power Supply, with Interchangeable Plugs (Quantity: 1)
- #6-32 × 3/4" M/F Standoffs (Quantity: 8)
- #6-32 × 1/4" Screws (Quantity: 8)
- M3 x 5mm Screws (Quantity: 4)

Section 4.2

RS900M Evaluation Board Dimensions

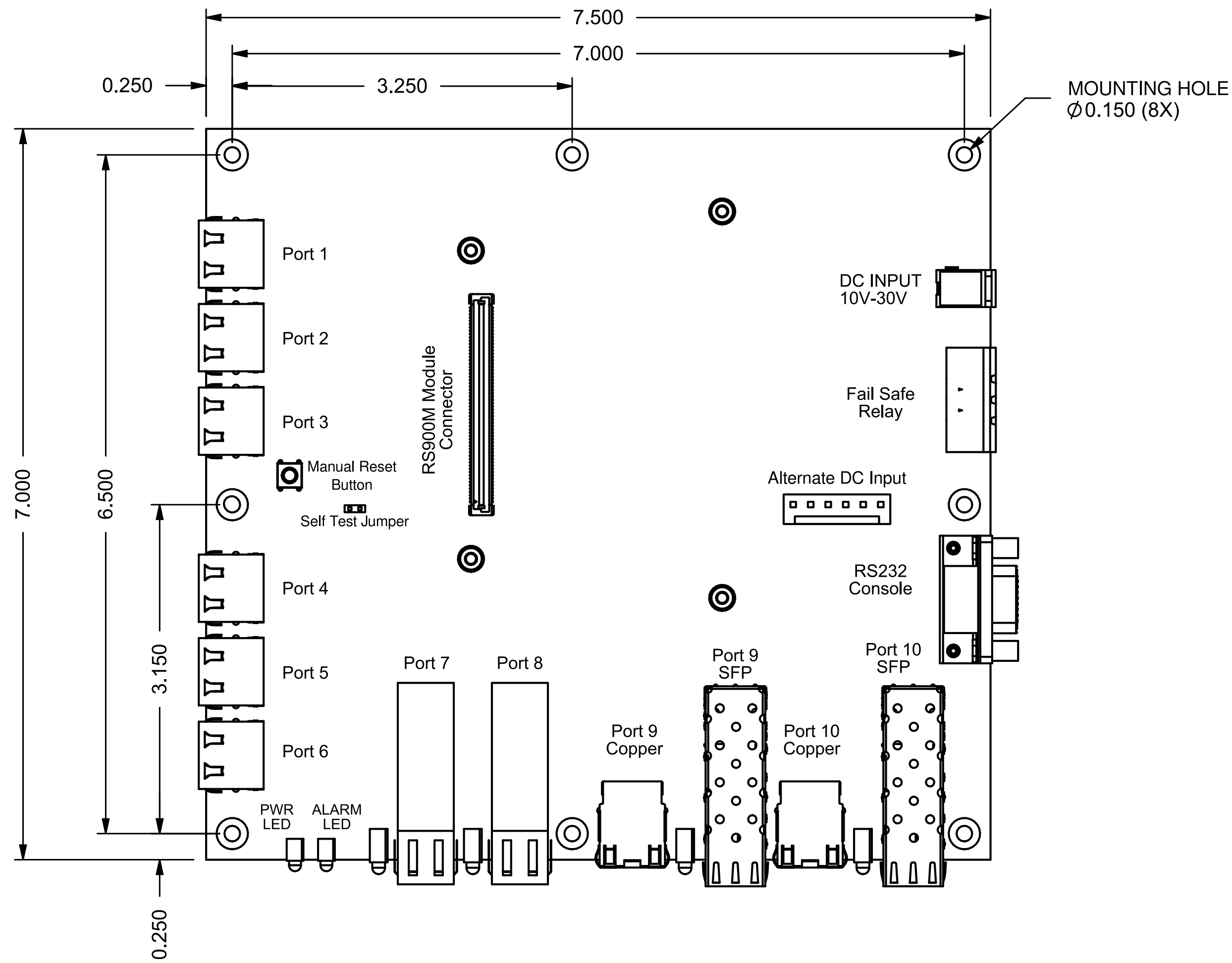


Figure 11: RS900M Evaluation Unit Dimensions

Section 4.3

RS900M Evaluation Unit Assembly

To assemble the RS900M Evaluation Unit, follow the steps in this section.

Procedure: Assemble the RS900M Evaluation Unit

1. Remove the RS900M Evaluation Unit and its components from the packaging.
2. Attach eight (8) #6-32 × 3/4" M/F Standoffs to the unit, using eight (8) #6-32 × 1/4" Screws.
3. Align the RS900M board with the connector on the RS900M Evaluation Unit and press the RS900M into place.
4. Secure the RS900M with four (4) M3 x 5mm Screws.

5. Connect the 12VDC Power Supply to the DC Input connector on the Evaluation Unit.

> **NOTE**
> *You can also use an alternate 3.3VDC power connection: see Section 4.8, “Alternate 3.3VDC Power Connection”.*

6. Connect the appropriate power supply cord to the 12VDC Power Supply.
7. Apply power to the unit.

For instructions on how to log in to the Rugged Operating System (ROS®) software, see Section 4.4, “Accessing the ROS® Console”.

For more information on the connections on the RS900M Evaluation Unit, see:

- Section 4.5, “Serial Console Port”
- Section 4.6, “Fail Safe Relay Connection”
- Section 4.7, “Copper Ethernet Ports”

Section 4.4

Accessing the ROS® Console

To access the Rugged Operating System (ROS®) software on the RS900M, follow the steps in this section.

Procedure: Accessing the Rugged Operating System (ROS®) Software

1. Attach a terminal (or a PC running terminal emulation software) to the RS232 port.
2. Configure the terminal as follows:
   - 8 bits
   - no parity
   - 57.6 Kbps
   - hardware and software flow control disabled
   - VT100 terminal type
3. After connecting to the device, press any key. The terminal prompts for a user name and password.

   The default user name is **`admin`**. The default password is **`admin`**.
4. After logging in, the main menu appears:

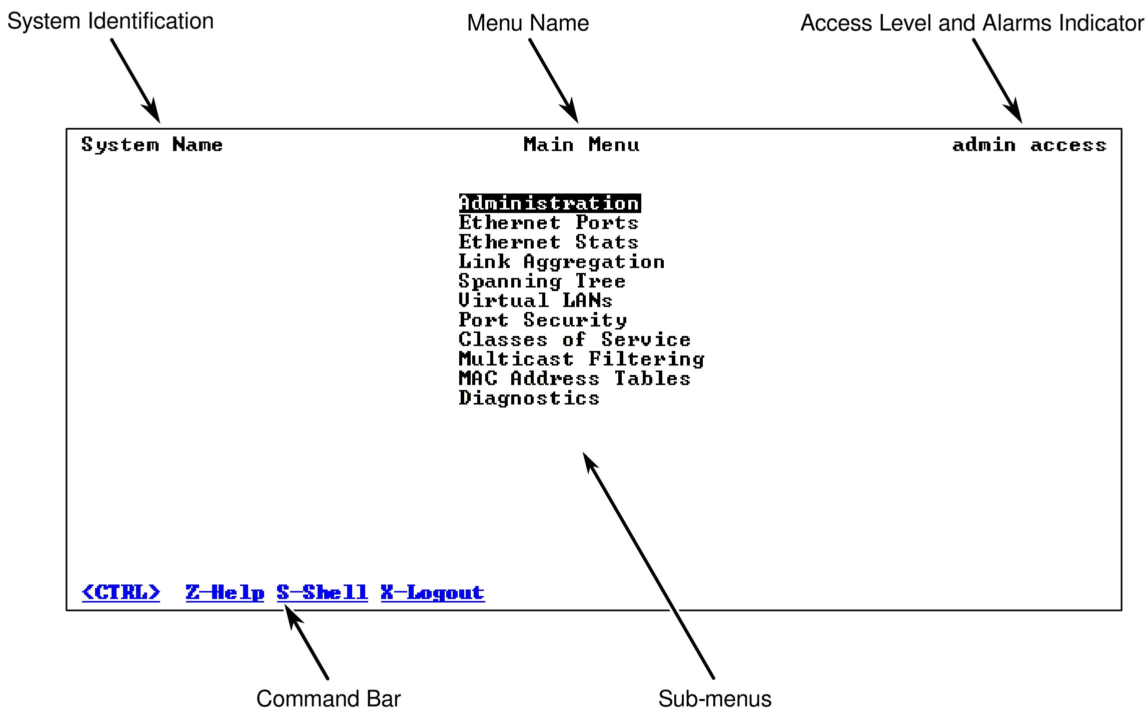


Figure 12: RS900M ROS® Main Menu

For complete instructions on working with the ROS® Software, see the *Rugged Operating System (ROS®) v3.10 for RS900M User Guide*.

Section 4.5

Serial Console Port

The RS232 port is used for configuring the unit. A straight-through serial cable with a DB-9 connector is required. There is no need to crossover the Transmit and Receive signals from the PC side; this has been done internally.

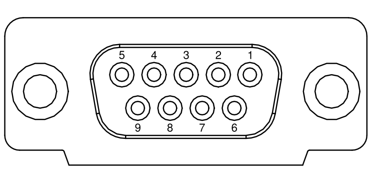


Figure 13: RS232 Female DCE Pinout

Table: RS232 Female DCE Pinout

Pin	Signal
1	No Connection
2	Transmit Data
3	Receive Data
4	No Connection
5	Ground
6	No Connection
7	No Connection
8	No Connection

Pin	Signal
9	No Connection

> **NOTE**
> *Limit the serial console cable to 2m (6.5 ft) in length.*

Section 4.6

Fail Safe Relay Connection

The fail safe output relay is provided to signal critical error conditions that may occur on the unit. The contacts are energized upon power up of the unit and remain energized until an alarm condition or power loss occurs.

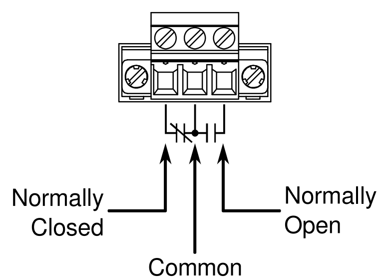


Figure 14: Failsafe Relay Output

Table: Failsafe Relay Specifications

Parameter	Value
Max Switching Voltage	30VAC, 80VDC
Rated Switching Current	0.3A @ 30VAC 1A @ 30VDC, 0.3A @ 80VDC

> **NOTE**
> a. *Resistive Load.*
> b. *For Class-2 circuits only.*

Section 4.7

Copper Ethernet Ports

For copper Ethernet connections, use standard Category 5 (CAT-5) unshielded twisted-pair (UTP) cable with RJ45 male connectors. The RJ45 receptacles are directly connected to the chassis ground on the unit and can accept CAT-5 shielded twisted-pair (STP) cables. If shielded cables are used, care must be taken to ensure the shielded cables do not form a ground loop via the shield wire and the RJ45 receptacles at either end.

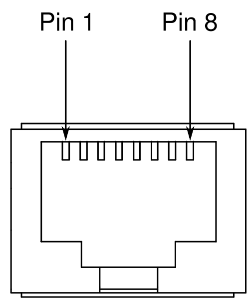


Figure 15: RJ45 port Pinout

Table: RJ45 Port Pinout

Pin	Signal
1	+Rx
2	-Rx
3	+Tx
4	No Connection
5	No Connection
6	-Tx
7	No Connection
8	No Connection
Case	Shield (Chassis Ground)

Section 4.8

Alternate 3.3VDC Power Connection

The RS900M Evaluation Board features an alternate 3.3VDC power input connection. You can use the 6-pin header connection labelled **3.3V INPUT** in place of the provided power supply unit.

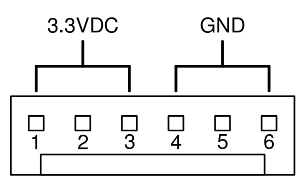


Figure 16: 3.3VDC Input Pinout

Table: RJ45 Port Pinout

Pin	Description
1	3.3VDC
2	3.3VDC
3	3.3VDC
4	GND
5	GND
6	GND

Section 4.9

Manual Reset Button and Self Test Jumper

The RS900M Evaluation Unit features a Manual Reset button to reboot the RS900M, and a Self Test Jumper to reboot the RS900M into its Built-In Self-Test (BIST) mode.

> **NOTE**
> *BIST mode is normally used only for testing at the RuggedCom factory, but you may be asked to enter BIST mode for diagnostic purposes by RuggedCom Technical Support personnel.*

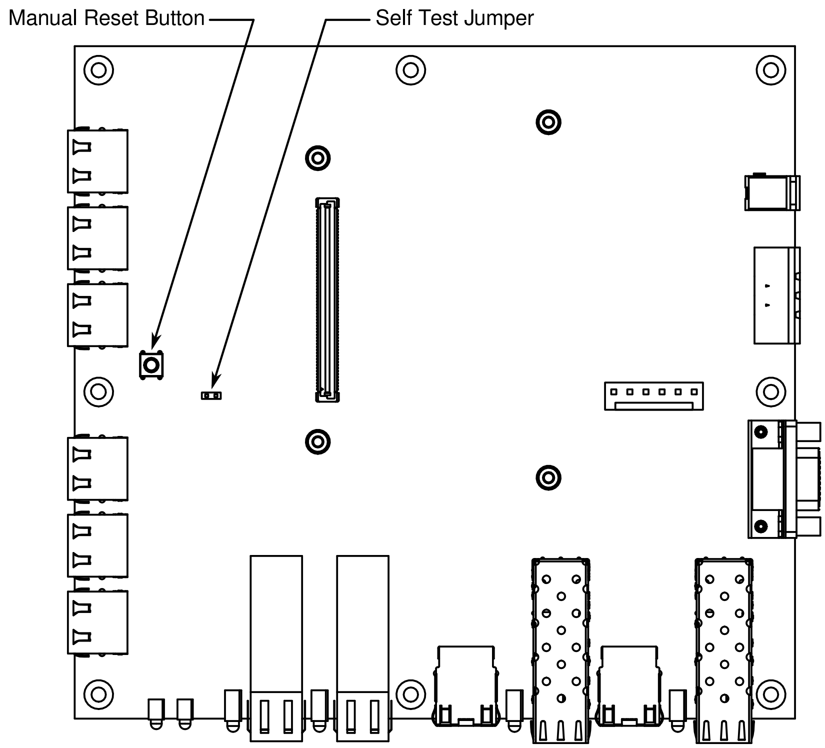


Figure 17: Manual Reset Button and Self Test Jumper

Procedure: To Reboot the RS900M

1. Ensure that the RS900M module is properly installed in the RS900M Evaluation Unit and is powered on.
2. Depress the Manual Reset Button. The RS900M reboots.

Procedure: To Reboot the RS900M in BIST Mode

1. Ensure that the RS900M module is properly installed in the RS900M Evaluation Unit and is powered on.
2. Apply a jumper to the Self Test Jumper pins.
3. Depress the Manual Reset Button. The RS900M reboots in its BIST mode.

Procedure: To Cancel the RS900M BIST Mode

1. With the RS900M in BIST mode, remove the jumper from the Self Test Jumper pins.
2. Depress the Manual Reset Button. The RS900M reboots in its normal operating mode.