



# **LAN96459F EDS2 Daughter Card User Guide**

# LAN96459F EDS2 Daughter Card User Guide

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ISBN: 979-8-3371-2675-3

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## Preface

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### NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site ([www.microchip.com](http://www.microchip.com)) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXA”, where “XXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

## INTRODUCTION

This chapter contains general information that will be useful to know before using the LAN96459F EDS2 Daughter Card User Guide. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [Warranty Registration](#)
- [The Microchip Web Site](#)
- [Development Systems Customer Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)

## DOCUMENT LAYOUT

This document features the LAN96459F EDS2 Daughter Card. The manual layout is as follows:

- [Chapter 1. “Overview”](#) – This chapter provides an overview of the LAN96459F EDS2 and a brief description of the card’s features.
- [Chapter 2. “Getting Started”](#) – This chapter provides information on the setup and operation of the LAN96459F EDS2 Daughter Card.
- [Chapter 3. “Linux Setup”](#) – This chapter provides information on the setup of a SD card image for the SAMA7D65-Curiosity.
- [Chapter 4. “Hardware”](#) – This chapter shows the different connection types, test points, LEDs and other hardware included in the LAN96459F EDS2 Daughter Card.
- [Chapter 5. “System Boot”](#) – This chapter explains how to power the EVB-LAN9668 EDS2 host board and use a terminal emulator software to configure the daughter card’s ports.
- [Appendix A. “Schematics”](#) – This chapter shows the schematic drawings of the LAN96459F EDS2 Daughter Card.

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- [Appendix B. “Bill of Materials”](#) – This chapter shows the Bill of Materials (BOM) for the LAN96459F EDS2 Daughter Card.
- [Appendix C. “PCB Layers”](#) – This chapter shows the PCB layers of the LAN96459F EDS2 Daughter Card.

## CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

### DOCUMENTATION CONVENTIONS

Description	Represents	Examples
<b>Arial font:</b>		
Italic characters	Referenced books	<i>MPLAB® IDE User's Guide</i>
	Emphasized text	...is the <i>only</i> compiler...
Initial caps	A window	the Output window
	A dialog	the Settings dialog
	A menu selection	select Enable Programmer
Quotes	A field name in a window or dialog	"Save project before build"
Underlined, italic text with right angle bracket	A menu path	<u><i>File&gt;Save</i></u>
Bold characters	A dialog button	Click <b>OK</b>
	A tab	Click the <b>Power</b> tab
N'Rnnnn	A number in verilog format, where N is the total number of digits, R is the radix and n is a digit.	4'b0010, 2'hF1
Text in angle brackets < >	A key on the keyboard	Press <Enter>, <F1>
<b>Courier New font:</b>		
Plain Courier New	Sample source code	#define START
	Filenames	autoexec.bat
	File paths	c:\mcc18\h
	Keywords	_asm, _endasm, static
	Command-line options	-Opa+, -Opa-
	Bit values	0, 1
	Constants	0xFF, 'A'
Italic Courier New	A variable argument	<i>file.o</i> , where <i>file</i> can be any valid filename
Square brackets [ ]	Optional arguments	mcc18 [options] <i>file</i> [options]
Curly brackets and pipe character: {   }	Choice of mutually exclusive arguments; an OR selection	errorlevel {0 1}
Ellipses...	Replaces repeated text	var_name [, var_name...]
	Represents code supplied by user	void main (void) { ... }

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- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

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The Development Systems product group categories are:

- **Compilers** – The latest information on Microchip C compilers, assemblers, linkers and other language tools. These include all MPLAB C compilers; all MPLAB assemblers (including MPASM assembler); all MPLAB linkers (including MPLINK object linker); and all MPLAB librarians (including MPLIB object librarian).
- **Emulators** – The latest information on Microchip in-circuit emulators. This includes the MPLAB REAL ICE and MPLAB ICE 2000 in-circuit emulators.
- **In-Circuit Debuggers** – The latest information on the Microchip in-circuit debuggers. This includes MPLAB ICD 3 in-circuit debuggers and PICkit 3 debug express.
- **MPLAB IDE** – The latest information on Microchip MPLAB IDE, the Windows Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB IDE Project Manager, MPLAB Editor and MPLAB SIM simulator, as well as general editing and debugging features.
- **Programmers** – The latest information on Microchip programmers. These include production programmers such as MPLAB REAL ICE in-circuit emulator, MPLAB ICD 3 in-circuit debugger and MPLAB PM3 device programmers. Also included are nonproduction development programmers such as PICSTART Plus and PIC-kit 2 and 3.

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Users of Microchip products can receive assistance through several channels:

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- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at:

<http://www.microchip.com/support>

## DOCUMENT REVISION HISTORY

Revisions	Section/Figure/Entry	Correction
DS50003971B (03-25-26)	All	Updated "EVB-LAN9668 EDS2" references to "SAMA7D65-Curiosity" throughout document.  Updated document to Rev. C
	Figure 2-1, Figure 2-2	Updated Figures with SAMA7D65-Curiosity board photos.
	Chapter 3. "Linux Setup"	Added new chapter
	Section 5.2 "System Power-Up", Figure 5-2, Figure 5-1, Figure 5-6	Updated section details and figures for SAMA7D65-Curiosity board.
	Appendix A. "Schematics"	Updated schematics
DS50003971A (10-29-25)	Initial release	



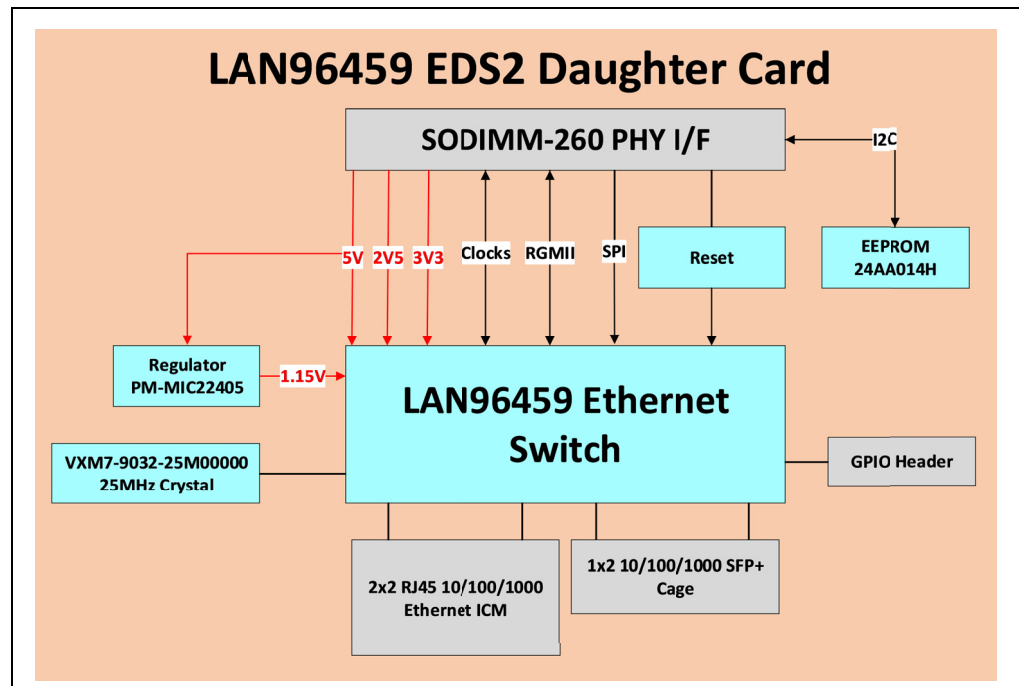
## Chapter 1. Overview

### 1.1 INTRODUCTION

The LAN96459F EDS2 Daughter Card is designed for evaluation of the Microchip LAN96459F Gigabit Ethernet RGMII Switch when used with a compatible Microchip EDS2 host board. A SODIMM 260-pin connector between the EDS2 Host and the LAN96459F daughter card interface is used due to its high performance, high pin count, and low cost.

This document describes the LAN96459F EDS2 Daughter Card setup and user interface features. A simplified block diagram is shown in [Figure 1-1](#).

**FIGURE 1-1: LAN96459F EDS2 DAUGHTER CARD BLOCK DIAGRAM**



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## 1.2 FEATURES

Below are the features of the LAN96459F EDS2 Daughter Card:

- Engineering Development System v2 (EDS2) SODIMM card form factor and edge interface
- Four 10/100/1000 Mbps copper PHY integrated RJ45 magnetic jacks with link status and activity LEDs
- Two SGMII/SGMII+ ports with dual stack SFP module cage supporting copper and fiber modules
- One SGMII/SGMII+ port configurable for QSGMII (4 x 1G) mode supporting LAN8804/14 Quad-PHY EVB
- One RGMII host port supporting 10/100/1000 Mbps for host management
- Configurable SPI (default), I<sup>2</sup>C, and MDIO management interfaces
- One factory-programmed embedded I<sup>2</sup>C EEPROM for EDS2 board identification
- One user-programmable embedded I<sup>2</sup>C EEPROM for SAMA7D65-Curiosity switch initialization
- On-board 1.1V core power regulator
- On-board low-cost 25 MHz crystal (and an available footprint for optional placement of a 125 MHz oscillator)
- On-board Reset generator (MIC2790N)
- Debugging headers and probe test points
- Full Linux<sup>®</sup> DSA software images and source code

## 1.3 REFERENCES

Concepts and materials available in the following documents may be helpful when reading this document. Visit [www.microchip.com](http://www.microchip.com) for the latest documentation.

- *LAN9645xF Data Sheet*
- *LAN96459F EDS2 Daughter Card Schematics*
- *LAN96459F Hardware Design Checklist*

## 1.4 ACRONYMS AND DEFINITIONS

Table 1-1 shows the terms used in this user guide.

**TABLE 1-1: ACRONYMS AND DEFINITIONS**

Term	Definition
ARP	Address Resolution Protocol
COM	Communications Port
DHCP	Dynamic Host Configuration Protocol
DIP	Dual In-line Package
DSUB	D – Subminiature
EP	Extended Package
GPIO	General Purpose Input/Output
ICM	Integrated Connector Magnetic
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input/Output
IP	Internet Protocol
LAN	Local Area Network
LSB	Least Significant Byte/Bit

**TABLE 1-1: ACRONYMS AND DEFINITIONS (CONTINUED)**

<b>Term</b>	<b>Definition</b>
MAC	Media Access Controller
MDIO	Management/Data Input/Output
MII	Media Independent Interface
NIC	Network Interface Card
OUI	Organizationally Unique Identifier
PC	Personal Computer
PCB	Printed Circuit Board
PCS	Physical Coding Sublayer
PHY	Physical Layer Transceiver
PDU	Payload Data Unit
PN	Part Number
QSGMII	Quad Serial Gigabit Media Independent Interface
Q-USGMII	Quad Universal Serial Gigabit Media Independent Interface
RGMII	Reduced Gigabit Media-Independent Interface
SGMII	Serial Gigabit Media Independent Interface
SMA	Sub-Miniature version A
TCXO	Temperature-Compensated Crystal Oscillator
TFTP	Trivial File Transfer Protocol
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VDFN	Very-small Dual Flat, No Leads
VM	Virtual Machine
VREG	Voltage Regulator
XO	Crystal Oscillator
SODIMM	Small Outline Dual In-line Memory Module

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NOTES:

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## Chapter 2. Getting Started

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### 2.1 OVERVIEW

This chapter provides an overview of the installation process for the LAN96459F EDS2 Daughter Card in the EDS2 host system. The following hardware components are required for installation:

- LAN96459F EDS2 Daughter Card
- SAMA7D65-Curiosity board
- 64G SD card (provided in the SAMA7D65-Curiosity kit)
- 5V power supply
- UART to USB-A cable

### 2.2 LAN96459F EDS2 DAUGHTER CARD INSTALLATION

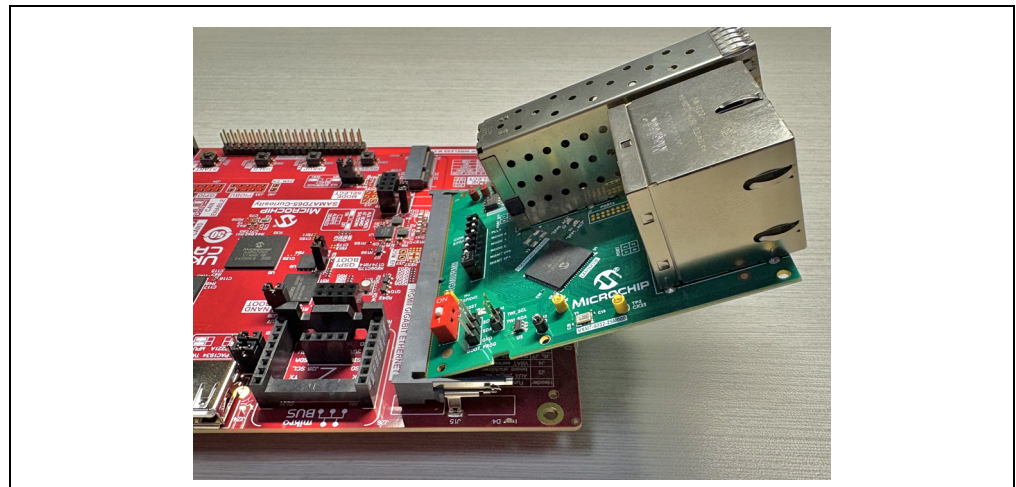
Execute the following steps to install the LAN96459F EDS2 Daughter Card in the SOD-IMM EDS2 connector of the host board:

1. Verify that the host board power is OFF.
2. Hold the daughter card by the outer edges of the board.

**Note:** Proper handling is essential. Please avoid touching or pressing the power modules when inserting the EDS2 Daughter Card into the SOD-IMM slot.

3. Align the SODIMM EDS2 receptacle and insert the connector edge at a 45-degree angle into the SODIMM connector of the host board. See [Figure 2-1](#).

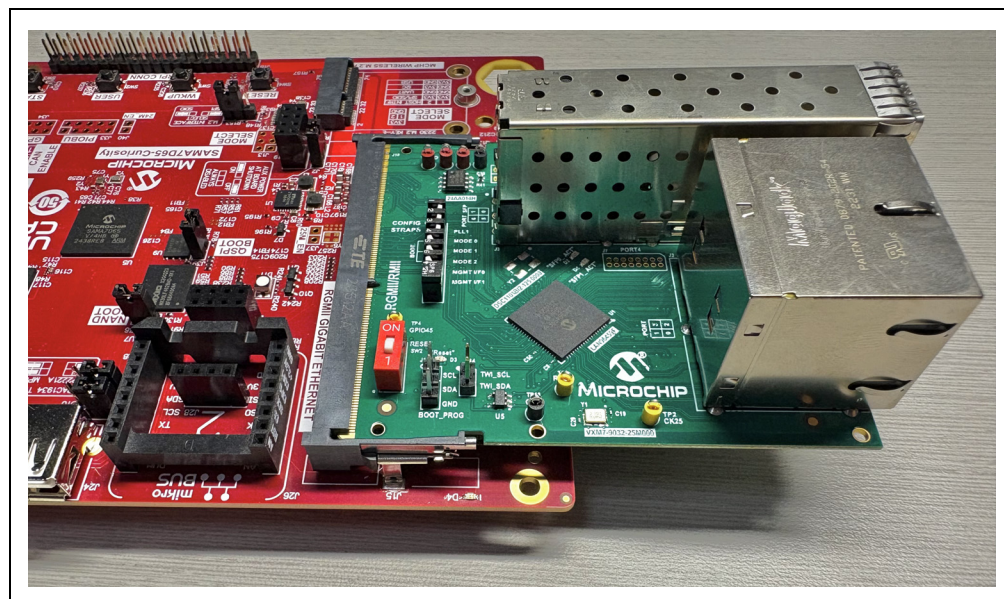
**FIGURE 2-1: LAN96459F EDS2 DAUGHTER CARD INSTALLATION**



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4. Push the daughter card down until it latches into the SODIMM receptacle and sits parallel with the host board. See [Figure 2-2](#).

**FIGURE 2-2: INSTALLED LAN96459F EDS2 DAUGHTER CARD ON SAMA7D65**



5. (Optional step) Secure the board by inserting two snap lock pins into the mount- ing holes of the daughter card and the host board.

## 2.3 LAN96459F EDS2 DAUGHTER CARD REMOVAL

Complete the following procedure to remove the LAN96459F from the SODIMM EDS2 receptacle:

1. Verify that the host board power is OFF.
2. Disconnect the RJ45 cable.
3. If snap locks are used, release them from the daughter card. A pair of long-nose pliers can be used to close the latch pins for easy release.
4. Gently pull the SODIMM receptacle arms away from the LAN96459F EDS2 Daughter Card until they release the card and it swivels upward.
5. Pull the LAN96459F EDS2 Daughter Card by its outer edges to remove it from the SODIMM EDS2 receptacle.

**Note:** Proper handling is essential. Please avoid touching or pressing the power modules when removing the EDS2 Daughter Card from the SODIMM slot.

## Chapter 3. Linux Setup

### 3.1 OVERVIEW

This chapter describes the process of setting up an image on an SD card for the [SAMA7D65-Curiosity](#) board. The SAMA7D65-Curiosity board serves as the host board and MPU for the LAN96459F EDS2 Daughter Card.

Note, setting up an image on an SD card must be completed before booting the SAMA7D65-Curiosity board.

The latest source code and pre-built Linux image required to manage the LAN96459F Daughter Card with the SAMA7D65-Curiosity board can be downloaded from the AWS site: [mscc-ent-open-source.s3-eu-west-1.amazonaws.com/?prefix=public\\_root/bsp/sama7d65/](http://mscc-ent-open-source.s3-eu-west-1.amazonaws.com/?prefix=public_root/bsp/sama7d65/).

**FIGURE 3-1: AWS SITE**

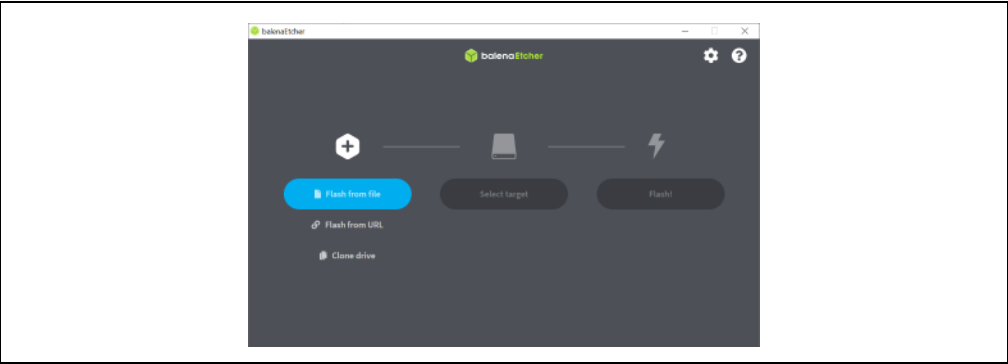
MSCC-ENT Open Source distribution <a href="http://mscc-ent-open-source.s3-eu-west-1.amazonaws.com/public_root/bsp/sama7d65/">http://mscc-ent-open-source.s3-eu-west-1.amazonaws.com/public_root/bsp/sama7d65/</a>		
Last Modified	Size	Key
-----		
		<a href="#">../</a>
2026-02-13T12:14:23.000Z	0.1 kB	
2026-02-13T12:33:02.000Z	0.5 kB	<a href="#">2025.12-0100-buildroot_config.json</a>
2026-02-13T12:33:02.000Z	1.1 MB	<a href="#">2025.12-0100-license-info.tgz</a>
2026-02-13T12:33:01.000Z	529.0 MB	<a href="#">2025.12-0100-sdcard.img</a>
2026-02-13T12:33:01.000Z	1.0 GB	<a href="#">2025.12-0100-sources.tgz</a>
2026-03-02T13:26:52.000Z	0.5 kB	<a href="#">2026.03-0140-buildroot_config.json</a>
2026-03-02T13:28:09.000Z	1.1 MB	<a href="#">2026.03-0140-license-info.tgz</a>
2026-03-02T13:28:31.000Z	529.0 MB	<a href="#">2026.03-0140-sdcard.img</a>
2026-03-02T13:29:48.000Z	1.0 GB	<a href="#">2026.03-0140-sources.tgz</a>
2026-03-13T13:56:42.000Z	0.5 kB	<a href="#">2026.03-0146-buildroot_config.json</a>
2026-03-13T13:56:43.000Z	1.1 MB	<a href="#">2026.03-0146-license-info.tgz</a>
2026-03-13T13:56:44.000Z	529.0 MB	<a href="#">2026.03-0146-sdcard.img</a>
2026-03-13T13:57:13.000Z	1.0 GB	<a href="#">2026.03-0146-sources.tgz</a>

**Note:** Always select the files with the most recent date, as indicated on the left-hand side of the file listings in AWS. See [Figure 3-1](#) for reference.

## 3.2 LINUX SETUP

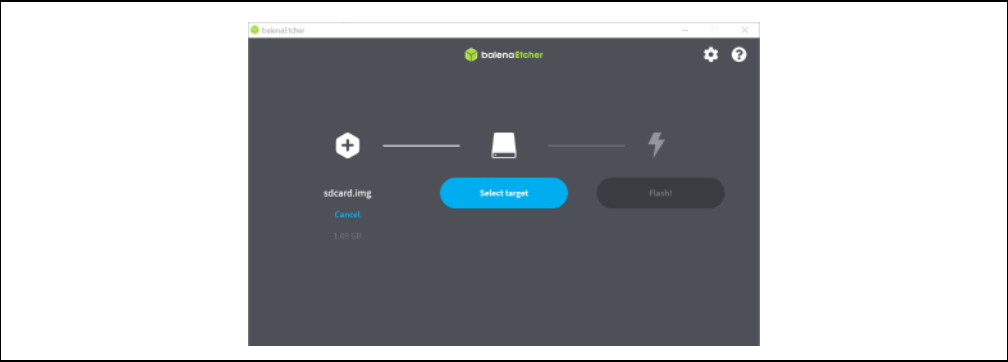
1. Download the latest Linux image 20xx.xx-xxxx-sdcard.img from AWS, see [Figure 3-1](#).
2. Insert the 64G SD memory card into a PC that can download, install and run balenaEtcher.
3. Once balenaEtcher is running, click **Flash from file** and select the downloaded sdcard.img file.

FIGURE 3-2: SELECT LINUX IMAGE



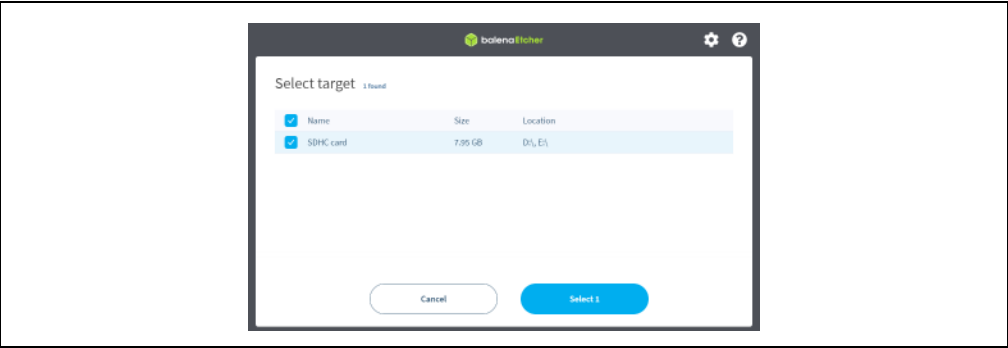
4. Click **Select target** to download.

FIGURE 3-3: SELECT TARGET IMAGE



5. Select the mounted SD card.

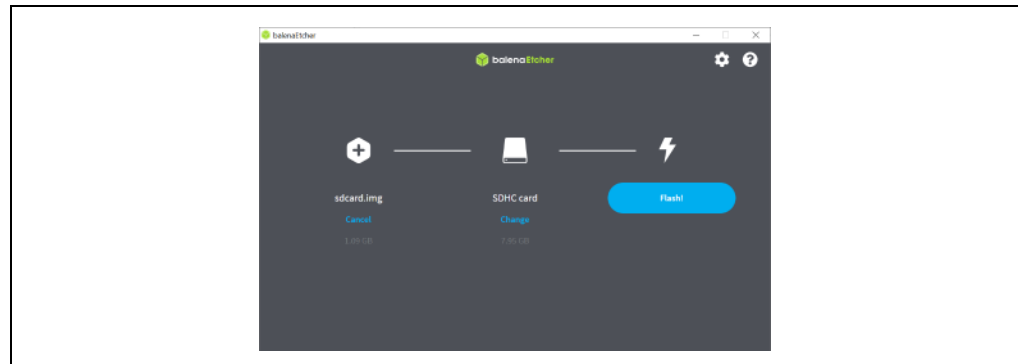
FIGURE 3-4: SELECT SD CARD





6. Select **Flash**.

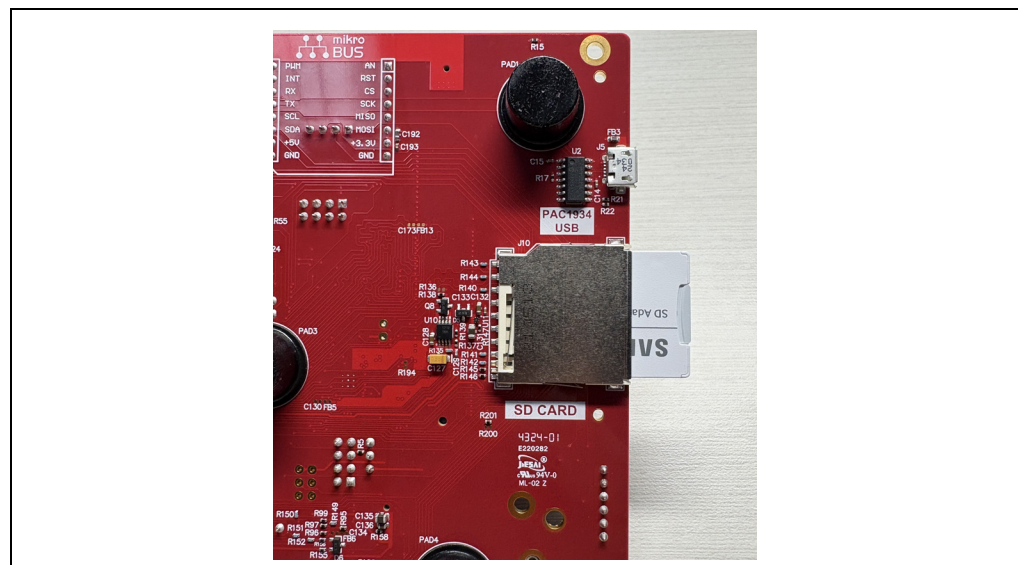
**FIGURE 3-5: SELECT FLASH**



Once balenaEtcher confirms that the SD card has been successfully flashed, the SD card can be removed from the PC.

7. Insert the SD card into the SD CARD (J10) slot of the SAMA7D65-Curiosity board.

**FIGURE 3-6: SAMA7D65-CURIOSITY SD CARD SLOT**



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NOTES:

## 4.1 INTRODUCTION

The top side and bottom side of the LAN96459F are shown in [Figure 4-1](#) and [Figure 4-2](#), respectively.

EV14H52A  
LAN96459F EDS2  
Daughter Card

Microchip  
RGMII/RMII

PORT1 SFP  
6 1 5 0

PORT4  
J7

PORT  
1 3  
0 2

TP1 1V1  
TP5 1V15 Sense  
TP8 PTP.IN  
TP9 PTP.OUT  
TP13 GND  
TP2 CK25

VDDIO 3V3 2V5 GND  
U4 24AA014H  
TP4 SYNC.IN

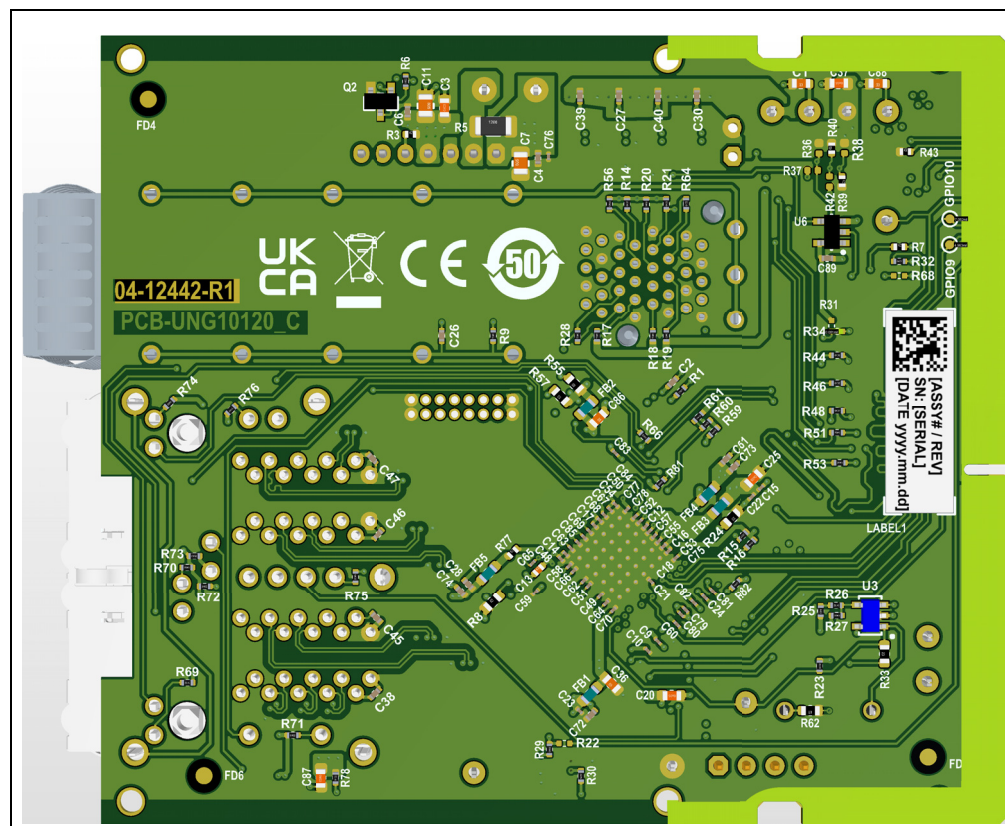
DSCT110B125M000  
LAN96459F  
VXCM7-9032-25M000

Reset  
D3  
RESET  
SW2 Reset

Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 Y10 Y11 Y12 Y13 Y14 Y15 Y16 Y17 Y18 Y19 Y20 Y21 Y22 Y23 Y24 Y25 Y26 Y27 Y28 Y29 Y30 Y31 Y32 Y33 Y34 Y35 Y36 Y37 Y38 Y39 Y40 Y41 Y42 Y43 Y44 Y45 Y46 Y47 Y48 Y49 Y50 Y51 Y52 Y53 Y54 Y55 Y56 Y57 Y58 Y59 Y60 Y61 Y62 Y63 Y64 Y65 Y66 Y67 Y68 Y69 Y70 Y71 Y72 Y73 Y74 Y75 Y76 Y77 Y78 Y79 Y80 Y81 Y82 Y83 Y84 Y85 Y86 Y87 Y88 Y89 Y90 Y91 Y92 Y93 Y94 Y95 Y96 Y97 Y98 Y99 Y100

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FIGURE 4-2: LAN96459F EDS2 DAUGHTER CARD (BOTTOM SIDE)



## 4.2 CONNECTORS

Table 4-1 describes the connectors on the LAN96459F EDS2 Daughter Card.

TABLE 4-1: LAN96459F EDS2 DAUGHTER CARD CONNECTORS

Reference Designator	Name	Description
J1	—	Access to GPIOs 4, 5, 6 and 7
J2	RJ45 ICM (2x2)	Ethernet RJ45 1Gb connector with integrated magnetics.
J3	SFP Cage (1x2)	SFP cage connecting to an SGMII host interface.
J7	Port 4	Additional PHY of the switch. Not used in this application.
J10	SODIMM-260 pin Edge Connector	Provides power and signals for operation. Connects to Microchip EDS2 compatible host.

### 4.3 TEST POINTS

Table 4-2 lists the test points on the LAN96459F.

**TABLE 4-2: LAN96459F EDS2 DAUGHTER CARD TEST POINTS**

Test Point	Color	Description
TP1	Red	1V15
TP2	Yellow	CK25
TP3	Yellow	Reset
TP4	Yellow	SYNCE.IN
TP5	Yellow	1V15_Sense
TP8	Yellow	PTP.IN
TP9	Yellow	PTP.OUT
TP13	Black	GND
TP14	Red	3V3
TP15	Black	GND
TP16	Red	2V5
TP17	Red	VDDIO

4.4 LEDS

Table 4-3 details the LEDS on the LAN96459F.

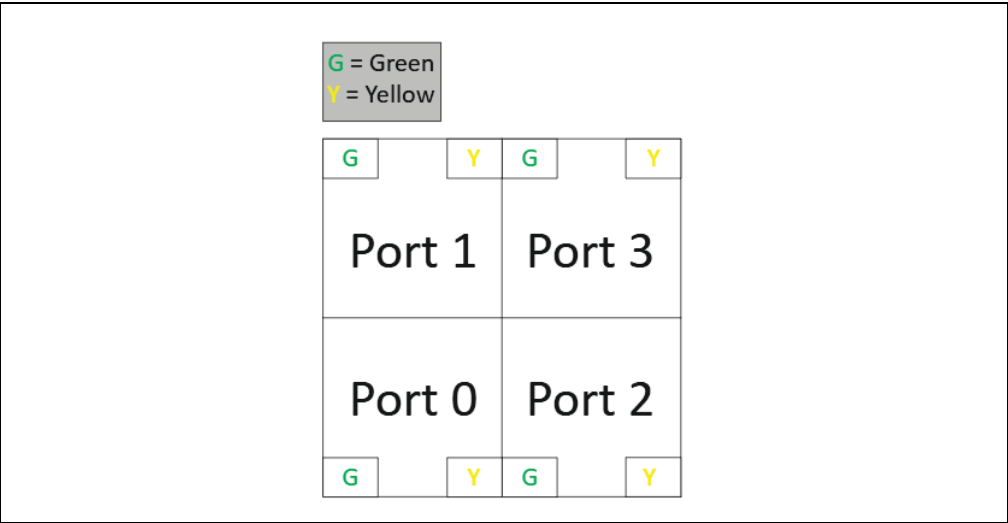
TABLE 4-3: LAN96459F EDS2 DAUGHTER CARD LEDS

Reference Designator	Name	Description
D1	1V1	Green 1V1 Indicator
D2	SFP0_ACT	SFP 0 Active Indicator
D3	Reset	Reset indicator
D4	SFP1_ACT	SFP 1 Active Indicator

By default, the LEDs on the RJ45 ports (J2) of the LAN96459F EDS2 Daughter Card operate in Single-color mode. This means that the Yellow LED (located in the upper or lower right corner of each RJ45 port) indicates the link and activity status.

The LED will stay ON to indicate that there is a link and then flash when there is Ethernet traffic. Refer to Figure 4-3 for the LED location and color.

FIGURE 4-3: LED DIAGRAM OF RJ45 PORTS

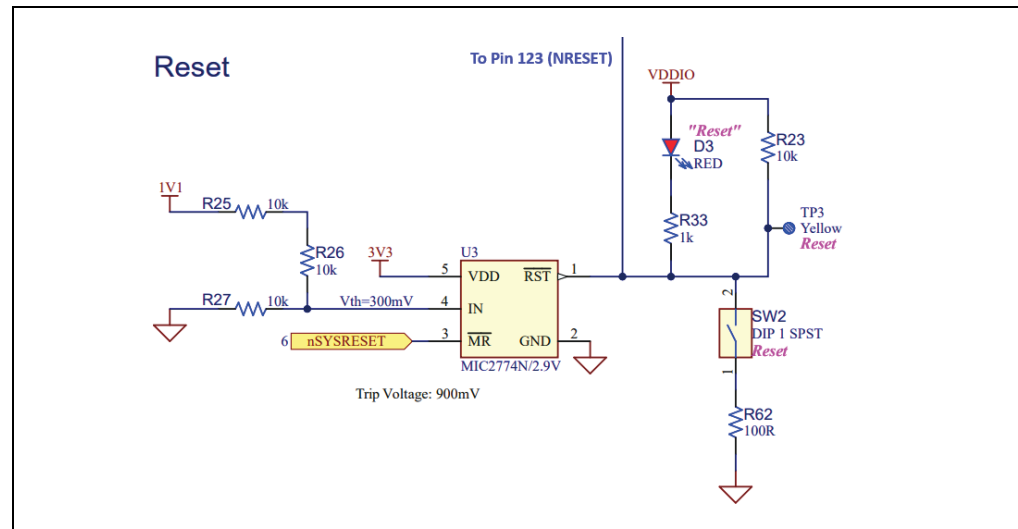


## 4.5 RESET

The LAN96459F includes a Reset circuit using the Microchip MIC2774 Reset supervisor as shown in Figure 4-4. The system Reset signal, nSYSRESET, is driven from the SODIMM EDS2 host interface and is connected to the MIC2774 master Reset input MR. When MR goes low, the MIC2774 Reset output on RST goes low, turns on the Reset LED D3, and resets the LAN96459F on Pin 123 (NRESET). The RST output net will go high 100 milliseconds after nSYSRESET goes high, turning the Reset LED off and releasing the LAN96459F from Reset.

The Reset switch SW2 can be used to place the LAN96459F EDS2 Daughter Card in Reset without affecting the rest of the host system.

**FIGURE 4-4: LAN96459F EDS2 DAUGHTER CARD RESET CIRCUIT**



## 4.6 CLOCKS

The LAN96459F EDS2 Daughter Card uses a Microchip VXM7-9032-25M0000000 25 MHz crystal for the free-running LAN96459F clock reference.

## 4.7 POWER

The LAN96459F EDS2 Daughter Card requires 3.3V, 2.5V, and 1.15V. The EDS2 SODIMM interface provides 3.3V, 2.5V, and VARIO (3.3V or 2.5V). An on-board Microchip MIC33153 switching regulator is used to generate the 1.15V required by the LAN96459F analog, digital core, and PLL power inputs.

# LAN96459F EDS2 Daughter Card User Guide

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NOTES:



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## Chapter 5. System Boot

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### 5.1 OVERVIEW

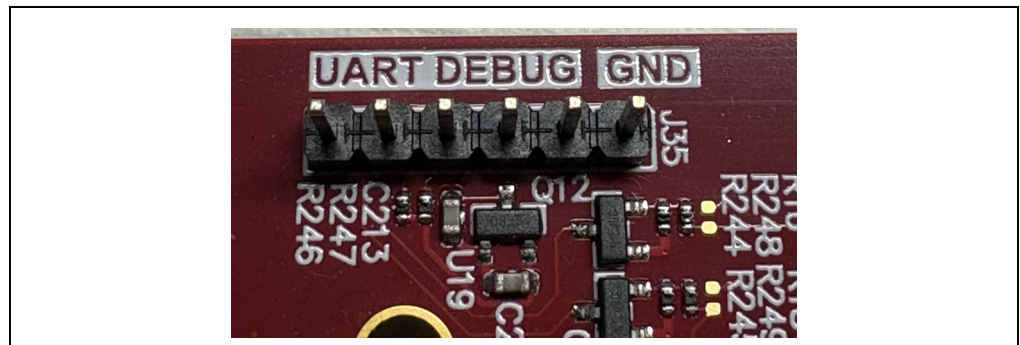
This chapter describes the boot process with the SAMA7D65-Curiosity host using Linux software running on the SAMA7D65.

### 5.2 SYSTEM POWER-UP

At this point, the LAN96459F EDS2 Daughter Card should be installed in the SODIMM EDS2 connector. Perform the following steps to power up the SAMA7D65-Curiosity:

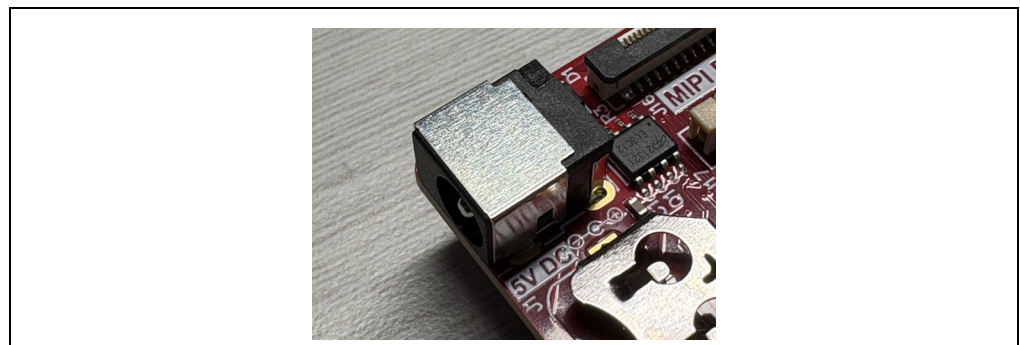
1. Connect the UART side of a USB-to-UART cable to the J35 pins labeled “UART DEBUG” on the SAMA7D65-Curiosity and then insert the USB end into a PC. See [Figure 5-1](#).

**FIGURE 5-1: SAMA7D65-CURIOSITY UART INTERFACE**



2. Connect a 5V 1A (minimum) power supply with a DC plug to DC Jack J1 on the SAMA7D65-Curiosity to turn on the board power. See [Figure 5-2](#).

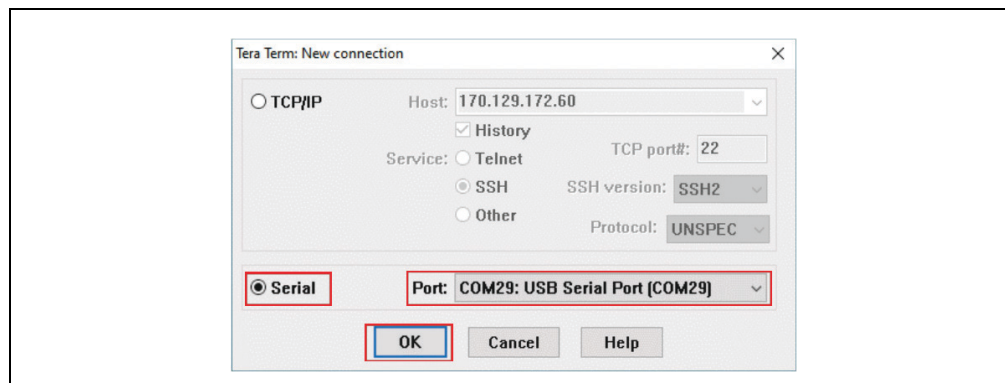
**FIGURE 5-2: SAMA7D65-CURIOSITY DC JACK**



## 5.3 TERA TERM SETUP

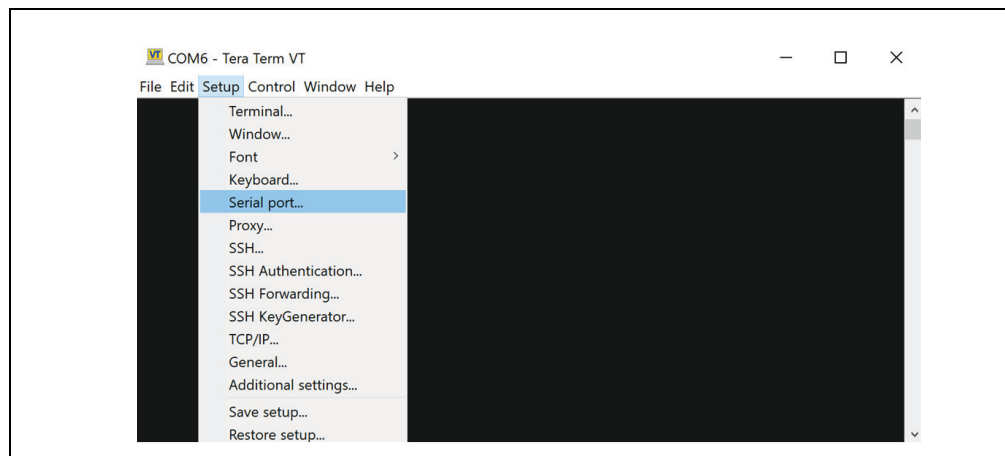
1. Open Tera Term (or an equivalent terminal emulator software). On the menu bar, click on File and then choose New Connection.
2. Select the Serial radio button and look for COMx:USB Serial Port. See [Figure 5-3](#).

**FIGURE 5-3: TERA TERM SERIAL PORT SELECTION**



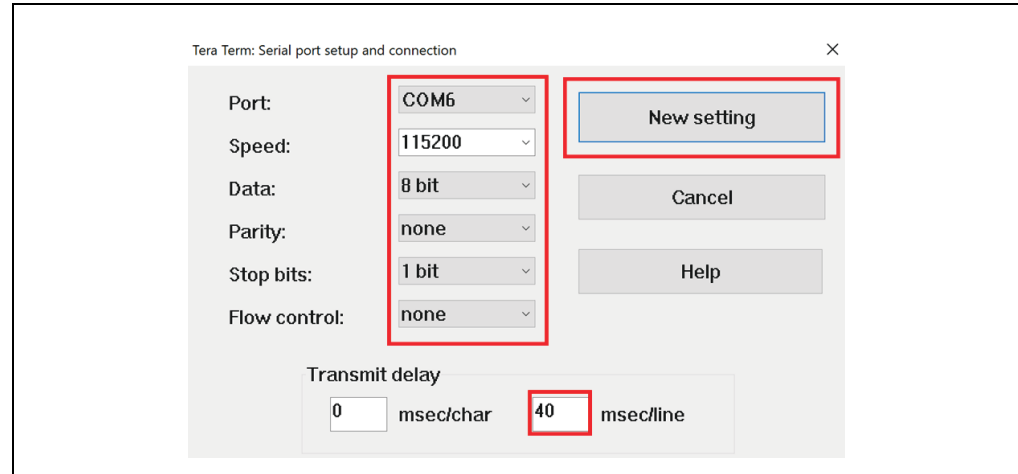
3. Check the port number. COM29 is showing as in [Figure 5-3](#). Windows may assign a different port number. Click on **OK**.
4. Go to the Setup menu and select Serial port. See [Figure 5-4](#).

**FIGURE 5-4: TERA TERM SETUP MENU**



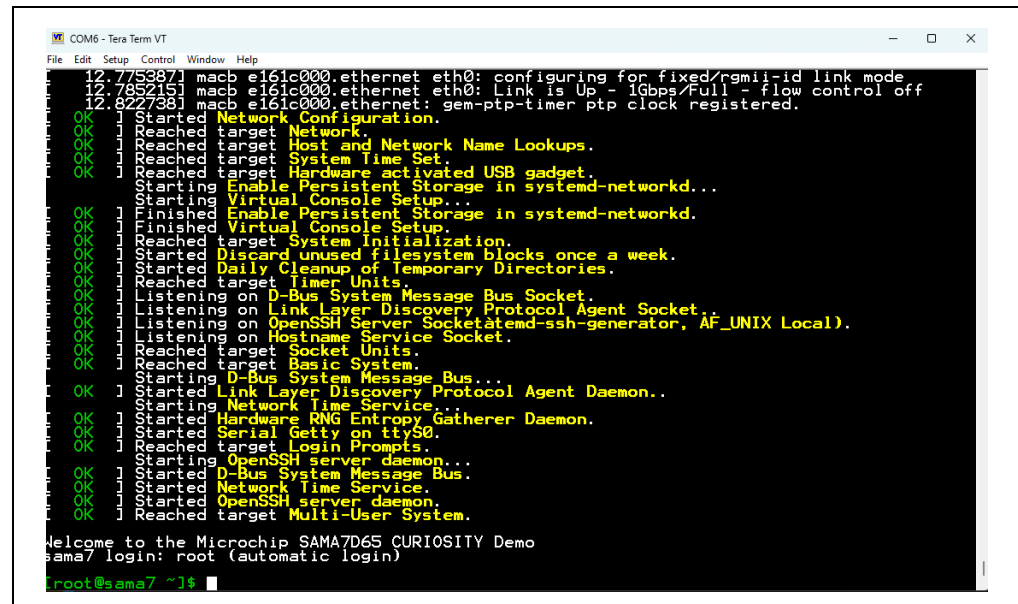
- Set the selected port to 115200, 8-bit, no parity, 1 stop bit, no flow control, and 40 msec/line. Click on **OK**. See [Figure 5-5](#).

**FIGURE 5-5: TERA TERM SERIAL PORT SETUP**



- Check if the serial output appears on the Tera Term screen. If nothing is displayed immediately, press Enter to force the prompt to appear.
- The system automatically logs in upon boot and the command prompt is ready to use. See [Figure 5-6](#).

**FIGURE 5-6: TERA TERM SAMA7D65 ROOT MENU**

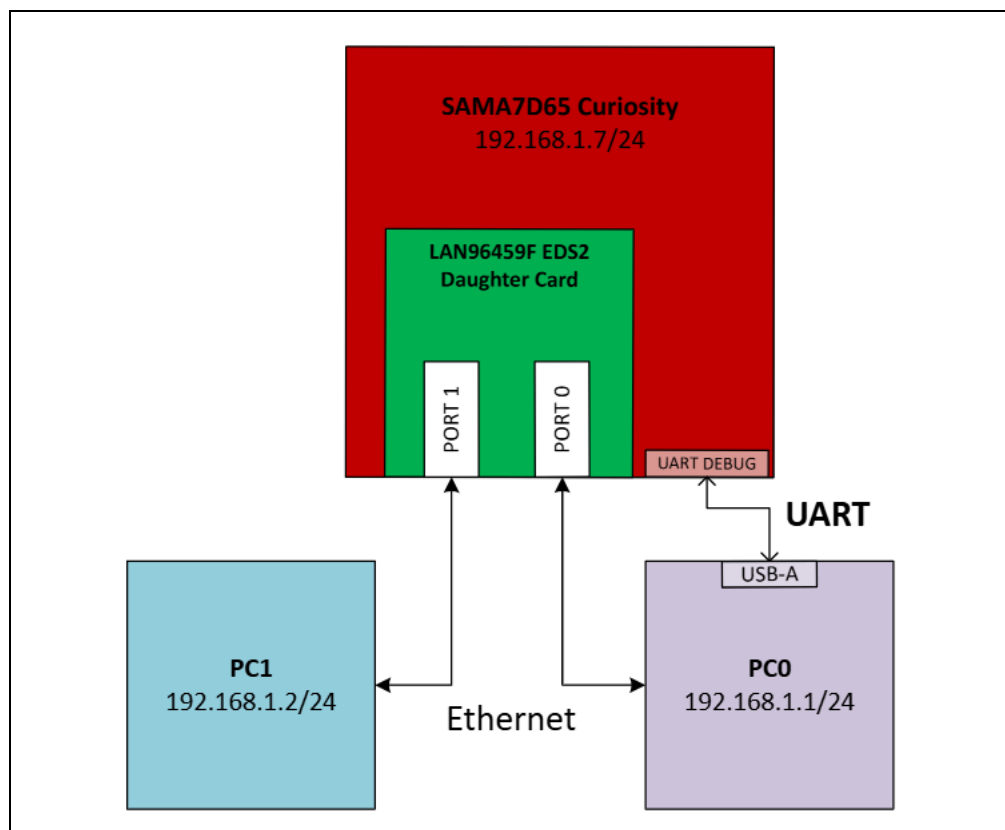


## 5.4 NETWORK CONFIGURATION

Upon boot, the SAMA7D65-Curiosity board detects the LAN96459F switch, after which the ports can be configured through Linux. Before traffic can be forwarded, the ports must be added to a bridge and individually brought up.

As an example, a simple network can be created in which two external devices act as endpoints and are connected to Ports 0 and 1 of the RJ45 connectors on the LAN96459F Daughter Card. See [Figure 5-7](#).

**FIGURE 5-7: NETWORK BLOCK DIAGRAM**



PC0 serves as an Ethernet traffic endpoint. To minimize hardware requirements, this device can be the same system that is running the TeraTerm software that interacts with the SAMA7D65 Terminal. Configure the IP address as 192.168.1.1/24.

PC1 serves as an Ethernet traffic endpoint. Configure the IP address as 192.168.1.2/24.

The LAN96459F Daughter Card is inserted into the SAMA7D65 EDS2 host board. Ethernet cables from PC0 and PC1 are connected to Ports 0 and 1 on the Daughter Card, respectively.

The following commands can be entered into the terminal of the SAMA7D65 to configure the LAN9645F switch. Commands entered are represented next to the "\$" character, indicating the prompt given when viewing the terminal of the SAMA7D65-Curiosity host board.

1. To identify the available ports or interfaces, use `$ ip link`. This displays all available interfaces detected by the CPU. See [Figure 5-8](#).

**FIGURE 5-8: IP LINK**

```
root@sama7-1:~# ip link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether f2:23:67:5d:82:df brd ff:ff:ff:ff:ff:ff
3: can0: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
4: can1: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
5: can2: <NOARP,ECHO> mtu 16 qdisc noop state DOWN mode DEFAULT group default qlen 10
    link/can
6: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1544 qdisc mq state UP mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
7: sit0: <NONE,NOARP> mtu 1480 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
8: lan0@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
9: lan1@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
10: lan2@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
11: lan3@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
12: lan5@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
13: lan6@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
    link/ether 04:91:62:46:b9:9b brd ff:ff:ff:ff:ff:ff
```

**Note:** The interfaces lan0, lan1, lan2 and lan3 refer to the four 1G copper interfaces available on the LAN96459F EDS2 Daughter Card and correspond to Ports 0, 1, 2 and 3, respectively. The interfaces lan5 and lan6 refer to the SFP ports 5 and 6.

2. A bridge must be created, and each interface must be added to the bridge in order to pass traffic through the switch.

To create a bridge named 'br0' and add each interface to the bridge:

```
$ ip link add name br0 type bridge
$ ip link set lan0 master br0
$ ip link set lan1 master br0
```

**FIGURE 5-9: ATTACH INTERFACES TO BRIDGE**

```
root@sama7-1:~# ip link add br0 type bridge
root@sama7-1:~# ip link set lan0 master br0
3371.753156] br0: port 1(lan0) entered blocking state
3371.753828] br0: port 1(lan0) entered disabled state
3371.760942] lan9645-switch e2018400.spi:soc@3:ethernet-switch@1 lan0: entered allmulticast mode
3371.769843] macb e161c000.ethernet eth0: entered allmulticast mode
3371.809219] lan9645-switch e2018400.spi:soc@3:ethernet-switch@1 lan0: entered promiscuous mode
root@sama7-1:~# ip link set lan1 master br0
3381.352051] br0: port 2(lan1) entered blocking state
3381.354692] br0: port 2(lan1) entered disabled state
3381.359631] lan9645-switch e2018400.spi:soc@3:ethernet-switch@1 lan1: entered allmulticast mode
3381.380164] lan9645-switch e2018400.spi:soc@3:ethernet-switch@1 lan1: entered promiscuous mode
```

3. The bridge and each port must now be individually activated in software.

```
$ ip link set br0 up
$ ip link set lan0 up
$ ip link set lan1 up
```

**FIGURE 5-10: BRIDGE AND PORTS UP**

```
root@sama7 ~# ip link add br0 type bridge
root@sama7 ~# ip link set lan0 master br0
3371.753156J br0: port 1(lan0) entered blocking state
3371.753828J br0: port 1(lan0) entered disabled state
3371.760942J lan9645x-switch e2018400.spi:soc@3:ethernet-switch@1 lan0: entered allmulticast mode
3371.769843J macb_e161c000.ethernet eth0: entered allmulticast mode
3371.809219J lan9645x-switch e2018400.spi:soc@3:ethernet-switch@1 lan0: entered promiscuous mode
root@sama7 ~# ip link set lan1 master br0
3381.352051J br0: port 2(lan1) entered blocking state
3381.352693J br0: port 2(lan1) entered disabled state
3381.352693J lan9645x-switch e2018400.spi:soc@3:ethernet-switch@1 lan1: entered allmulticast mode
3381.380164J lan9645x-switch e2018400.spi:soc@3:ethernet-switch@1 lan1: entered promiscuous mode
```

4. To confirm that the interfaces were added to the bridge and activated properly, use:

```
$ bridge link show
```

**FIGURE 5-11: BRIDGE LINK SHOW**

```
root@sama7 ~# bridge link show
8: lan0@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 master br0 state forwarding priority 32 cost 5
9: lan1@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 master br0 state forwarding priority 32 cost 5
root@sama7 ~#
```

Now, the two external devices connected to the switch (PC0 and PC1) should be able to send Ethernet traffic to each other.

5. This can be confirmed using a "ping" command on the terminal of one of the external devices. If sending this command from PC1 which has the IP address 192.168.1.2, use:

```
$ ping 192.168.1.1 (executed on the terminal of PC1)
```

**FIGURE 5-12: PC0 TO PC1 PING**

```
PS C:\Users\ > ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
PS C:\Users\ > |
```

**Note:** Users should ensure that the IP address of each external device has already been configured to be on the same network. In this example, 192.168.1.1 and 192.168.1.2 are used arbitrarily.

Optionally, the SAMA7D65 can function as an Ethernet endpoint in the network. This requires assigning an IP address to the bridge device through software configuration.

6. To set an IP address to the bridge and then confirm that it has been configured, use:

```
$ ip addr add 192.168.1.7/24 dev br0
$ ip addr show dev br0
```

**FIGURE 5-13: BRIDGE IP ADDRESS**

```
[root@sama7 ~]# ip addr add 192.168.1.7/24 dev br0
[root@sama7 ~]# ip addr show dev br0
14: br0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 8e:79:dd:17:33:30 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.7/24 scope global br0
        valid_lft forever preferred_lft forever
    inet6 fe80::8c79:ddff:fe17:3330/64 scope link proto kernel_l1
        valid_lft forever preferred_lft forever
```

7. To confirm that the SAMA7D65 can communicate directly to PC1, use:

```
$ ping 192.168.1.2
```

**FIGURE 5-14: SAMA7D65 TO PC1 PING**

```
[root@sama7 ~]# ping 192.168.1.2
PING 192.168.1.2 (192.168.1.2) 56(84) bytes of data:
64 bytes from 192.168.1.2: icmp_seq=1 ttl=128 time=3.21 ms
64 bytes from 192.168.1.2: icmp_seq=2 ttl=128 time=1.27 ms
64 bytes from 192.168.1.2: icmp_seq=3 ttl=128 time=0.776 ms
64 bytes from 192.168.1.2: icmp_seq=4 ttl=128 time=1.15 ms
64 bytes from 192.168.1.2: icmp_seq=5 ttl=128 time=0.939 ms
64 bytes from 192.168.1.2: icmp_seq=6 ttl=128 time=1.14 ms

--- 192.168.1.2 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5008ms
rtt min/avg/max/mdev = 0.776/1.414/3.208/0.818 ms
[root@sama7 ~]#
```

# LAN96459F EDS2 Daughter Card User Guide

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NOTES:



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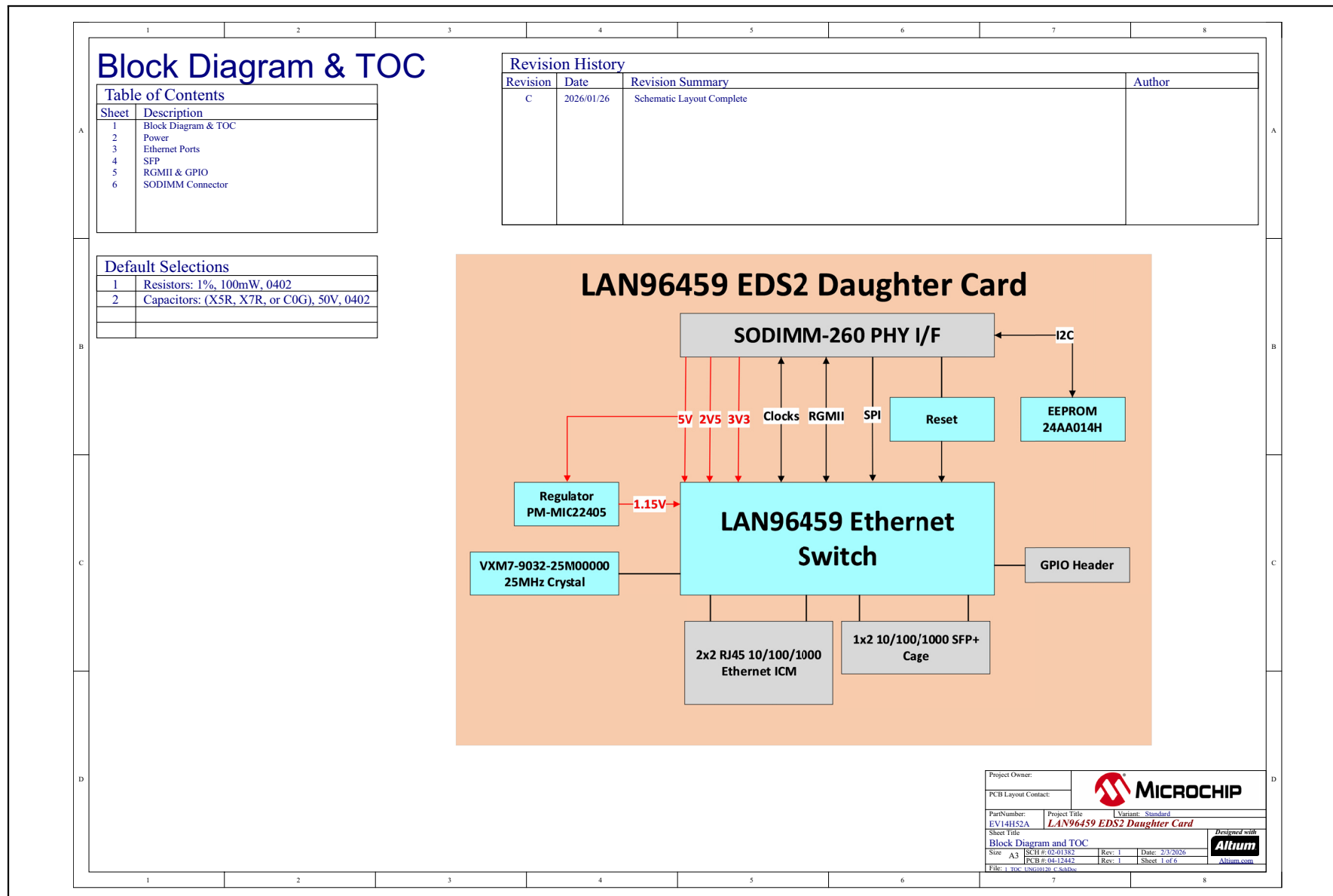
## Appendix A. Schematics

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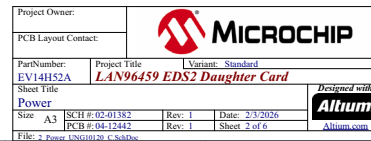
### A.1 INTRODUCTION

This appendix shows the LAN96459F EDS2 Daughter Card schematics. The following drawings are based on the Revision C of the LAN96459F EDS2 Daughter Card.

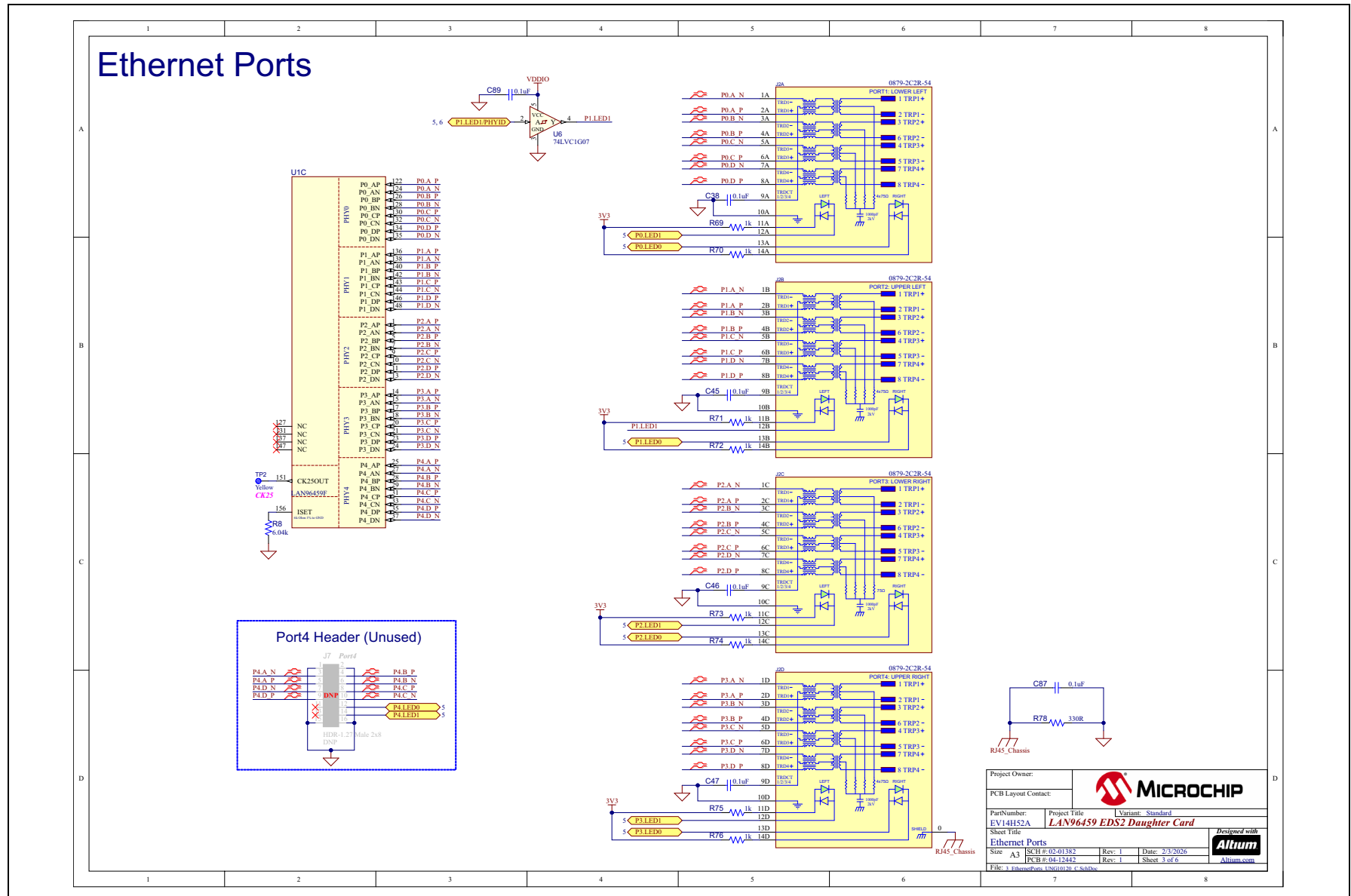
LAN966459F EDS2 Daughter Card User Guide



## Schematics



# LAN96459F EDS2 Daughter Card User Guide



# SFP

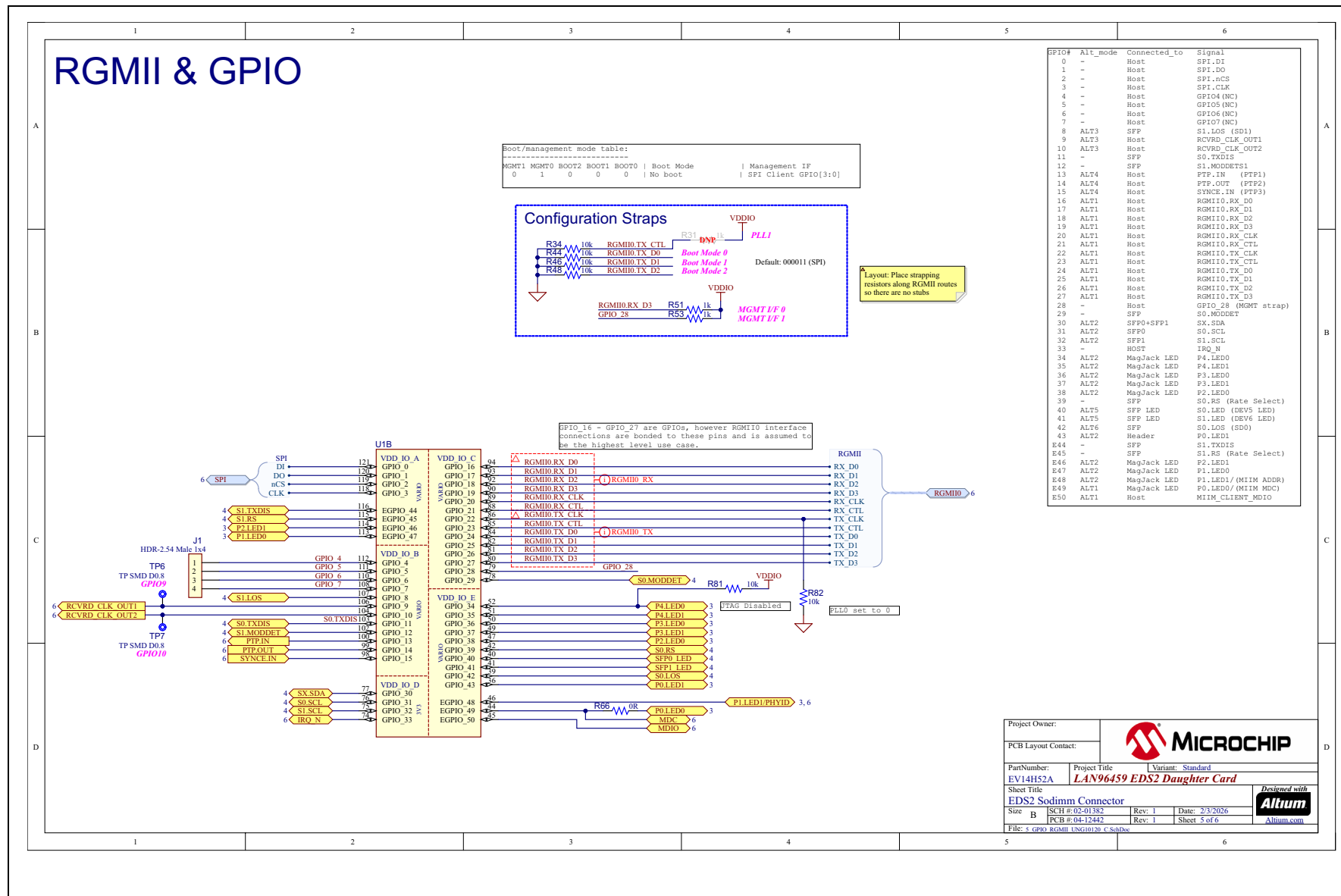
**125 MHz Oscillator**

**25 Mhz Crystal**

**Reset**

Project Owner:			
PCB Layout Contact:			
PartNumber:	Project Title:	Variant: Standard	
EVAL4HS2A	LAN96459 EDS2 Daughter Card		
Sheet Title:			
Ethernet Ports			
Size:	A3	SC H #:	02:01382
Rev:	1	Date:	2/3/2026
File:	4.sfp_eds2m0_4_schdoc	Rev:	1
Sheet 4 of 6		Altium	

**FIGURE A-5: LAN96459F EDS2 DAUGHTER CARD RGMII AND GPIO**





# LAN96459F EDS2 Daughter Card User Guide

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NOTES:





# LAN96459F EDS2 DAUGHTER CARD USER GUIDE

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## Appendix B. Bill of Materials

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### B.1 INTRODUCTION

This appendix contains the LAN96459F Bill of Materials (BOM). The following BOM list is based on the Revision C of the LAN96459F EDS2 Daughter Card.

TABLE B-1: BILL OF MATERIALS

Item	Qty	Reference	Description	Populated	Manufacturer	Manufacturer Part Number
1	8	C1, C3, C31, C33, C37, C41, C43, C88	CAP CER 22uF 10V 20% X5R SMD 0603	Yes	TDK Corporation	C1608X5R1A226M080AC
2	11	C2, C30, C32, C34, C38, C40, C42, C44, C45, C46, C47	CAP CER 0.1uF 50V 10% X7R SMD 0402 AEC-Q200	Yes	Murata	GCM155R71H104KE02J
3	2	C4, C6	CAP CER 0.1uF 16V 10% X7R SMD 0402	Yes	KEMET	C0402C104K4RACAUTO
4	1	C5	CAP CER 47pF 50V 5% NP0 SMD 0402	Yes	TDK Corporation	C1005NP01H470J050BA
5	2	C7, C11	CAP CER 22uF 16V 10% X5R SMD 0805	Yes	Samsung Electro-Mechanics	CL21A226KOQNNNG
6	46	C8, C9, C10, C12, C14, C15, C16, C17, C18, C21, C22, C23, C24, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C62, C63, C64, C65, C66, C67, C68, C69, C70, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85	CAP CER 0.1uF 16V 10% X5R SMD 0201	Yes	Murata	GRM033R61C104KE14D
7	6	C13, C28, C61, C72, C73, C74	CAP CER 0.1uF 35V 10% X7R SMD 0402	Yes	TDK Corporation	CGA2B3X7R1V104K050BB
8	2	C19, C29	CAP HiQ 10pF 25V 5% NP0 3.15GHz SMD 0201	Yes	Johanson Technology	250R05L100JV4T
9	4	C20, C25, C36, C86	CAP CER 4.7uF 10V 10% X5R SMD 0603	Yes	KEMET	C0603C475K8PACTU
10	3	C26, C35, C89	CAP CER 0.1uF 50V 10% X7R SMD 0402	Yes	TDK Corporation	C1005X7R1H104K050BB
11	2	C27, C39	CAP CER 4.7uF 6.3V 20% X5R SMD 0402	Yes	Murata	GRM155R60J475ME47D
12	1	C87	CAP CER 0.1uF 50V 10% X7R SMD 0603 AEC-Q200	Yes	KYOCERA AVX	06035C104K4Z4A
13	3	D1, D2, D4	DIO LED GREEN 2V 30mA 35mcd Clear SMD 0603	Yes	Lite-On Inc	LTST-C191KGKT
14	1	D3	DIO RED 2V 20mA 54mcd CLEAR SMD 0603	Yes	Lite-On Inc.	LTST-C191KRKT
15	5	FB1, FB2, FB3, FB4, FB5	FERRITE 33R@100MHz 3A SMD 0603	Yes	Murata	BLM18PG330SN1D
16	1	J1	CON HDR-2.54 Male 1x3 Tin 5.84MH TH VERT	Yes	Samtec	TSW-103-07-T-S
17	1	J2	CON MODULAR JACK MAGJACK_4PORT 10/100/1000 Base-T MAGNETICS 2xLEDs SHIELD TH R/A	Yes	Bel Fuse Inc.	0879-2C2R-54
18	1	J3	CON JACK SFP RCPT W/CAGE 40P TH R/A	Yes	TE Connectivity AMP Connectors	2007492-8
19	0	J7	CON HDR-1.27 Male 2x8 Gold 3.05MH TH VERT	DNP	Amphenol FCI	20021111-00016T4LF
20	0	J9	CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT	Yes	FCI	77311-118-02LF
21	1	J10	CON EDGE DDR4 0.5mm 260P MALE PCB	MECH	—	—
22	4	L1, L2, L3, L4	INDUCTOR 4.7uH 680mA 20% SMD 1210	Yes	Taiyo Yuden	LBC3225T4R7MR
23	1	LABEL1	LABEL PCBA 18x6mm Datamatrix Assy# / Rev / Serial / Date	MECH	ACT Logimark AS	505462
24	1	Q2	TRANS BJT NPN MMBT3904 40V 200mA 310mW SOT-23-3	Yes	Micro Commercial Components Corporation	MMBT3904-TP
25	24	R1, R3, R14, R15, R16, R17, R18, R19, R20, R21, R23, R25, R26, R27, R34, R39, R40, R41, R44, R46, R48, R56, R81, R82	RES TKF 10k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF1002X

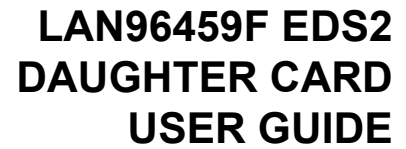
**TABLE B-1: BILL OF MATERIALS (CONTINUED)**

Item	Qty	Reference	Description	Populated	Manufacturer	Manufacturer Part Number
26	13	R2, R28, R51, R53, R64, R69, R70, R71, R72, R73, R74, R75, R76	RES TKF 1k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF1001X
27	1	R4	RES MF 8.98k 0.5% 1/10W SMD 0402 AEC-Q200	Yes	KOA Speer	RN73H1ETTP8981D25
28	1	R5	RES MO 0.005R 1% 1/2W SMD 1206	Yes	Vishay	WSL12065L000FEA18
29	5	R6, R9, R60, R61, R78	RES TKF 330R 1% 1/16W SMD 0402	Yes	Yageo	RC0402FR-07330RL
30	5	R7, R29, R30, R32, R66	RES TKF 0R 1/16W SMD 0402	Yes	Bourns	CR0402-J/-000GLF
31	1	R8	RES TKF 6.04k 1% 1/10W SMD 0603 AEC-Q200	Yes	Vishay	CRCW06036K04FKEA
32	4	R10, R11, R12, R13	RES TKF 0.51R 1% 1/8W SMD 0402 AEC-Q200	Yes	Vishay/Dale	RCWE040251L0FNEA
33	0	R22	RES TKF 0R 1/16W SMD 0402	DNP	Bourns	CR0402-J/-000GLF
34	1	R24	RES TKF 200R 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF2000V
35	0	R31	RES TKF 0R 1/16W SMD 0402	Yes	Bourns	CR0402-J/-000GLF
36	3	R33, R55, R57	RES TKF 1k 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF1001V
37	0	R36, R37, R38, R42, R68	RES TKF 10k 1% 1/10W SMD 0402	DNP	Panasonic	ERJ-2RKF1002X
38	1	R43	RES TKF 2.2k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF2201X
39	1	R59	RES TKF 30R 1% 1/10W MF 0402	Yes	Panasonic Electronic Components	ERJ-2RKF30R0X
40	1	R62	RES TKF 100R 1% 1/10W SMD 0603 AEC-Q200	Yes	D1_Rohm Semiconductor	KTR03EZPF1000
41	1	R77	RES TF 10R 0.1% 1/16W SMD 0402	Yes	Yageo	RT0402BRD0710RL
42	1	SW2	SWITCH DIP 1 SPST 24V 25mA 418117270901 TH	Yes	Würth Elektronik	418117270901
43	4	TP1, TP14, TP16, TP17	MISC, TEST POINT MULTI PURPOSE MINI RED	Yes	Keystone	5000
44	6	TP2, TP3, TP4, TP5, TP8, TP9	MISC, TEST POINT PC MINI, 0.040" D YELLOW	Yes	Keystone	5004
45	2	TP13, TP15	MISC, TEST POINT MULTI PURPOSE MINI BLACK	Yes	Keystone	5001
46	1	U1	MCHP INTERFACE ETHERNET LAN96459F DQFN-156	Yes	Microchip Technology	LAN96459F
47	1	U2	PM-LV2 Regulator PCB Module	Yes	Microchip Technology	AC59B05A
48	1	U3	MCHP ANALOG SUPERVISOR 2.9V MIC2774N SC-74A	Yes	Microchip Technology	MIC2774N-29YM5-TR
49	1	U4	MCHP MEMORY SERIAL EEPROM 1kb I2C 24AA014H-I/SN 8SOIC	Yes	Microchip Technology	24AA014H-I/SN
50	1	U6	IC BUFFER NON-INVERT SN74LVC1G07DBVR SOT-23-5	Yes	Texas Instruments	SN74LVC1G07DBVR
51	1	Y1	MCHP CRYSTAL 25MHz +/-20ppm 10pF SMD L3.2W2.5H0.8	Yes	Microchip Technology	VXM7-9032-25M0000000
52	0	Y2	MCHP CLOCK OSCILLATOR 125MHz DSC1101BI2-125.0000 CDFN-6	DNP	Microchip Technology	DSC1101BI2-125.0000T

# LAN96459F EDS2 Daughter Card User Guide

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NOTES:



## C.1 INTRODUCTION

**FIGURE C-1: LAN96459F EDS2 DAUGHTER CARD TOP SILK SCREEN**

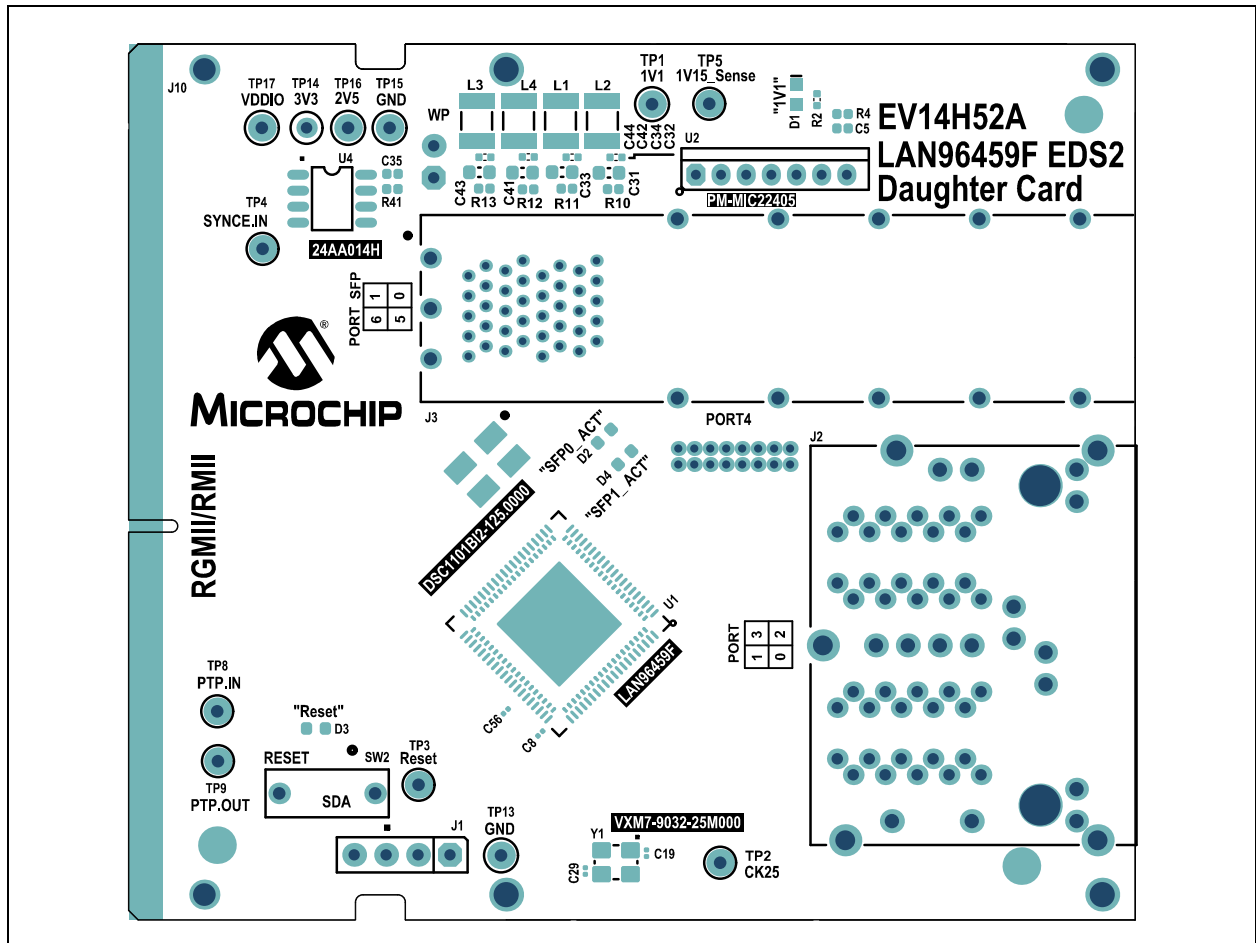
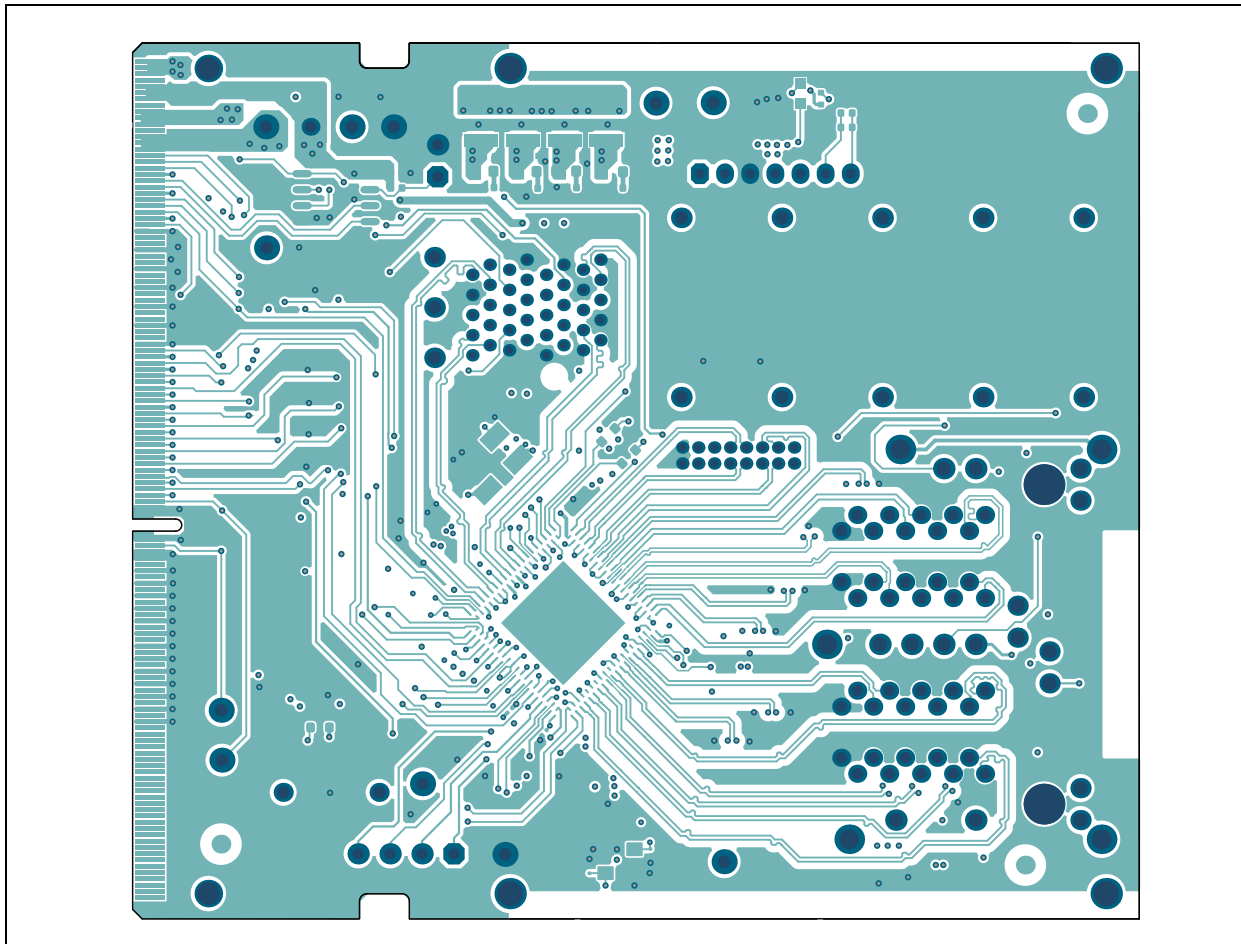
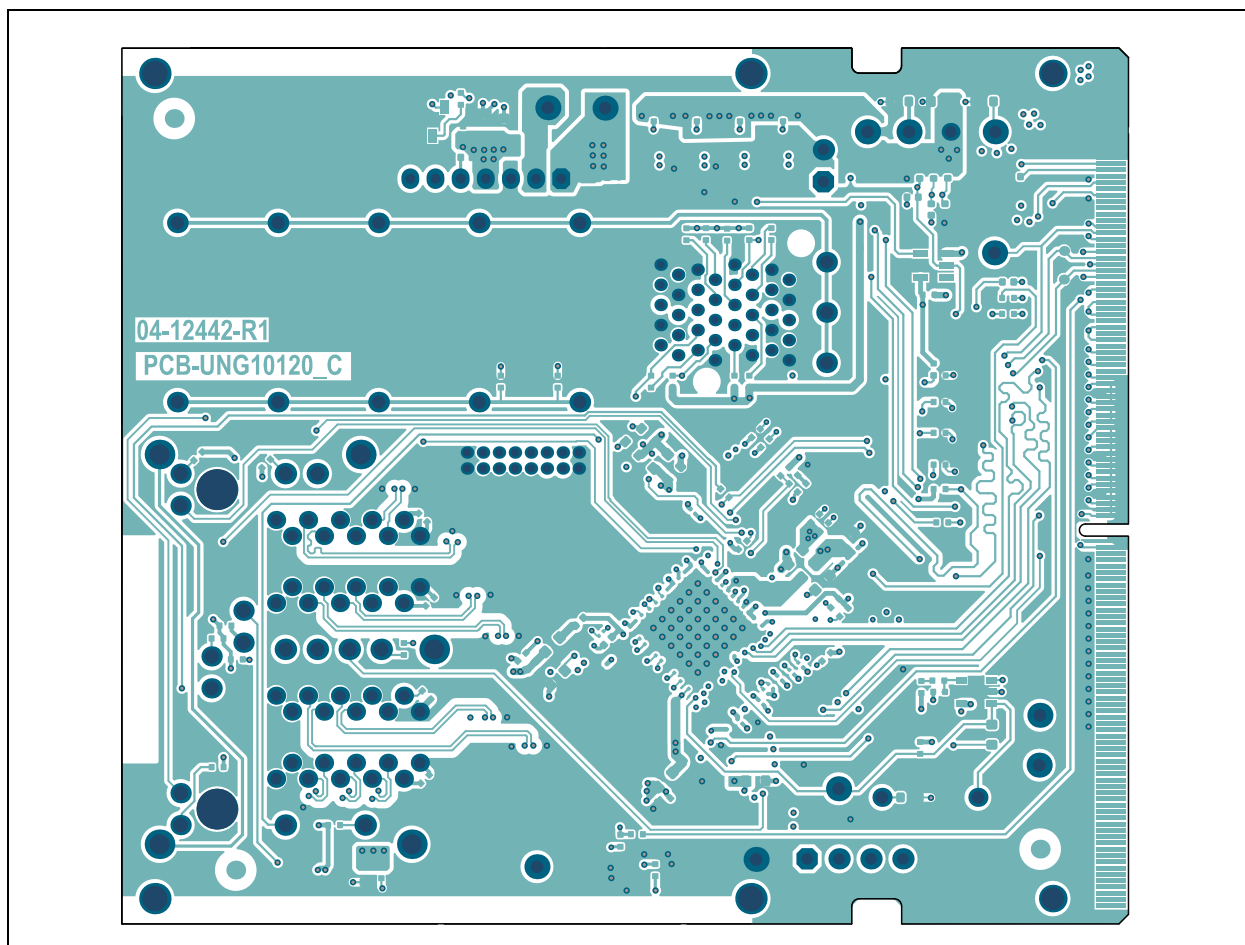


FIGURE C-2: LAN96459F EDS2 DAUGHTER CARD TOP COPPER



**FIGURE C-3: LAN96459F EDS2 DAUGHTER CARD BOTTOM COPPER**

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FIGURE C-4: LAN96459F EDS2 DAUGHTER CARD BOTTOM SILK

