



MICROCHIP

**LAN8814 EDS2
Daughter Card
User Guide**

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Table of Contents

Preface	5
Introduction.....	5
Document Layout	5
Conventions Used in this Guide	6
Warranty Registration.....	7
The Microchip Web Site	7
Development Systems Customer Change Notification Service	7
Customer Support	8
Document Revision History	8
 Chapter 1. Overview	
1.1 Introduction	9
1.2 Features	10
1.3 References	10
1.4 Acronyms and Definitions	10
 Chapter 2. Getting Started	
2.1 Introduction	13
2.2 LAN8814 EDS2 Daughter Card Installation	13
2.3 Quick Start	14
2.4 LAN8814 EDS2 Daughter Card Removal	18
 Chapter 3. Hardware	
3.1 Introduction	19
3.2 Connectors	20
3.3 Test Points	21
3.4 LEDS	22
3.5 Configuration Straps	22
3.6 Reference Clock	23
3.7 Reset	24
3.8 Clocks	24
3.9 Power	25
3.10 LAN8814 EDS2 Daughter Card EEPROM	25
 Chapter 4. System Boot	
4.1 Introduction	27
4.2 EVB-LAN9668 EDS2 with LAN8814 EDS2 Daughter Card Power-Up	27
 Appendix A. Schematics	
A.1 Introduction	33

Appendix B. Bill of Materials

B.1 Introduction	39
------------------------	----

Appendix C. PCB Layers

C.1 Introduction	43
------------------------	----

Preface

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) 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 LAN8814 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 LAN8814 EDS2 Daughter Card. The manual layout is as follows:

- **Chapter 1. “Overview”** – This chapter provides an overview of the LAN8814 EDS2 Daughter Card and a brief description of the card’s features.
- **Chapter 2. “Getting Started”** – This chapter provides information on the setup and operation of the LAN8814 EDS2 Daughter Card.
- **Chapter 3. “Hardware”** – This chapter shows the different connection types found on the LAN8814 EDS2 Daughter Card.
- **Chapter 4. “System Boot”** – This chapter explains how to utilize device tree overlays when booting the host system.
- **Appendix A. “Schematics”** – This section shows the schematic drawings of the LAN8814 EDS2 Daughter Card.
- **Appendix B. “Bill of Materials”** – This section shows the Bill of Materials (BOM) for the LAN8814 EDS2 Daughter Card.
- **Appendix C. “PCB Layers”** – This section shows the PCB layers of the LAN8814 EDS2 Daughter Card.

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Arial font:		
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>Save</i></u>
Bold characters	A dialog button	Click OK
	A tab	Click the Power 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>
Courier New font:		
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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- **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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- Field Application Engineer (FAE)
- Technical Support

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Technical support is available through the web site at:

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

DOCUMENT REVISION HISTORY

Revisions	Section/Figure/Entry	Correction
DS50003983A (11-20-25)	Initial release	

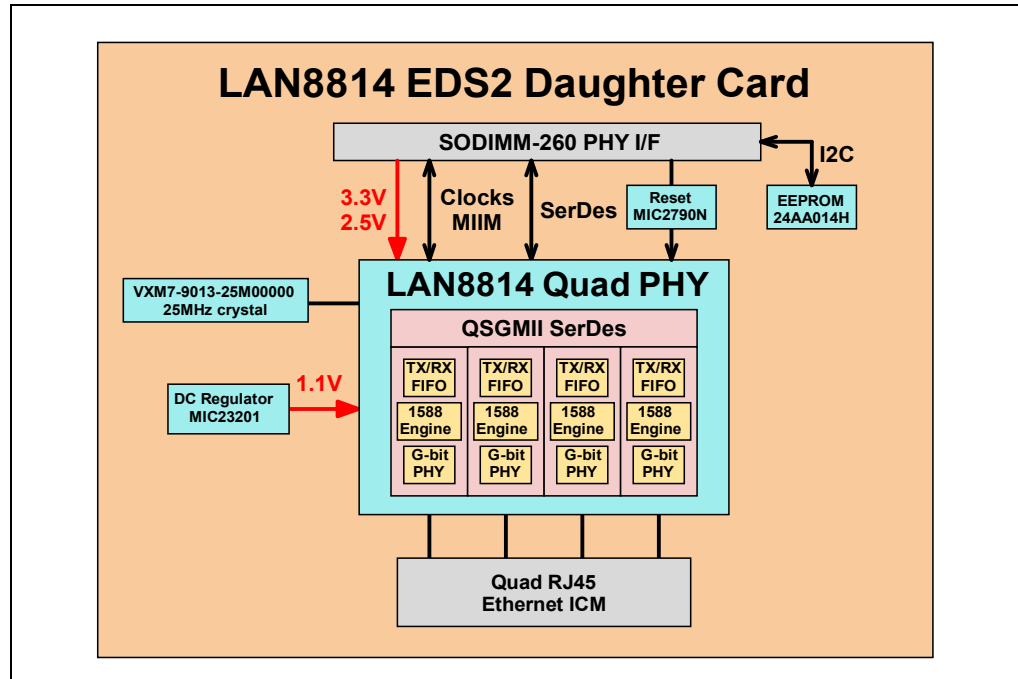
Chapter 1. Overview

1.1 INTRODUCTION

The LAN8814 EDS2 Daughter Card (EV87S66A) is designed for evaluation of the Microchip LAN8814 Gigabit Ethernet SGMII/QSGMII PHY when used with the Microchip EVB-LAN9668 EDS2 (EV83E85A) or other compatible host. A SODIMM 260-pin socket - board fingers for the EDS2 Host - LAN8814 EDS2 Daughter Card Interface is used due to its high performance, high pin count, and low cost.

This document describes the LAN8814 EDS2 Daughter Card setup and use with the EVB-LAN9668 EDS2 Host. A simplified block diagram is shown in [Figure 1-1](#).

FIGURE 1-1: LAN8814 EDS2 DAUGHTER CARD BLOCK DIAGRAM



1.2 FEATURES

Below are the features of the LAN8814 EDS2 Daughter Card:

- Microchip LAN8814 Gigabit Ethernet PHY with SGMII/QSGMII
- Microchip VXM7-9013-25M0000 crystal for 25 MHz
- Microchip MIC23201 2 MHz PWM regulator for 1.1V generation
- Microchip MIC2790N Reset supervisor with Reset LED indicator
- Microchip 24AA014H I²C Serial EEPROM for board identification
- Quad (2x2) 10/100/1000Mb RJ45 Integrated Connector and Magnetics with LEDs
- MDIO management interface
- Compliant with the SODIMM EDS2 Interface Specification
- Selectable LAN8814 25 MHz crystal clock reference or external 125 MHz differential clock reference
- Selectable 3.3V or 2.5V LAN8814 VDDAH analog I/O voltage
- Red Reset LED indicator
- Green LED indicator for 1.1V
- Test points for all power rails
- Test points for IEEE1588 (Precision Time Protocol) timestamp capture and interrupt Reset
- TXP/TXN SMAs for QSGMII signal injection

1.3 REFERENCES

Concepts and materials available in the following documents may be helpful when reading this document. Visit www.microchip.com for the latest documentation.

- *LAN8814 Data Sheet*
- *LAN8814 EDS2 Daughter Card Schematics*
- *LAN8814 Hardware Design Checklist*
- *LAN8814 Silicon Errata and Data Sheet Clarification*
- *EV83E85A EVB-LAN9668 EDS2 Schematics*
- *EV83E85A EVB-LAN9668 EDS2 User's Guide*

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 Page
GPIO	General Purpose Input/Output
ICM	Integrated Connector Magnetic
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input/Output
IP	Internet Protocol

TABLE 1-1: ACRONYMS AND DEFINITIONS (CONTINUED)

Term	Definition
LAN	Local Area Network
LSB	Least Significant Byte/Bit
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
PDU	Payload Data Unit
PHY	Physical Layer Transceiver
PN	Part Number
QSGMII	Quad Serial Gigabit Media Independent Interface
Q-USGMII	Quad Universal Serial Gigabit Media Independent Interface
SMA	Sub-Miniature version A
SODIMM	Small Outline Dual In-line Memory Module
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

LAN8814 EDS2 Daughter Card User Guide

NOTES:

Chapter 2. Getting Started

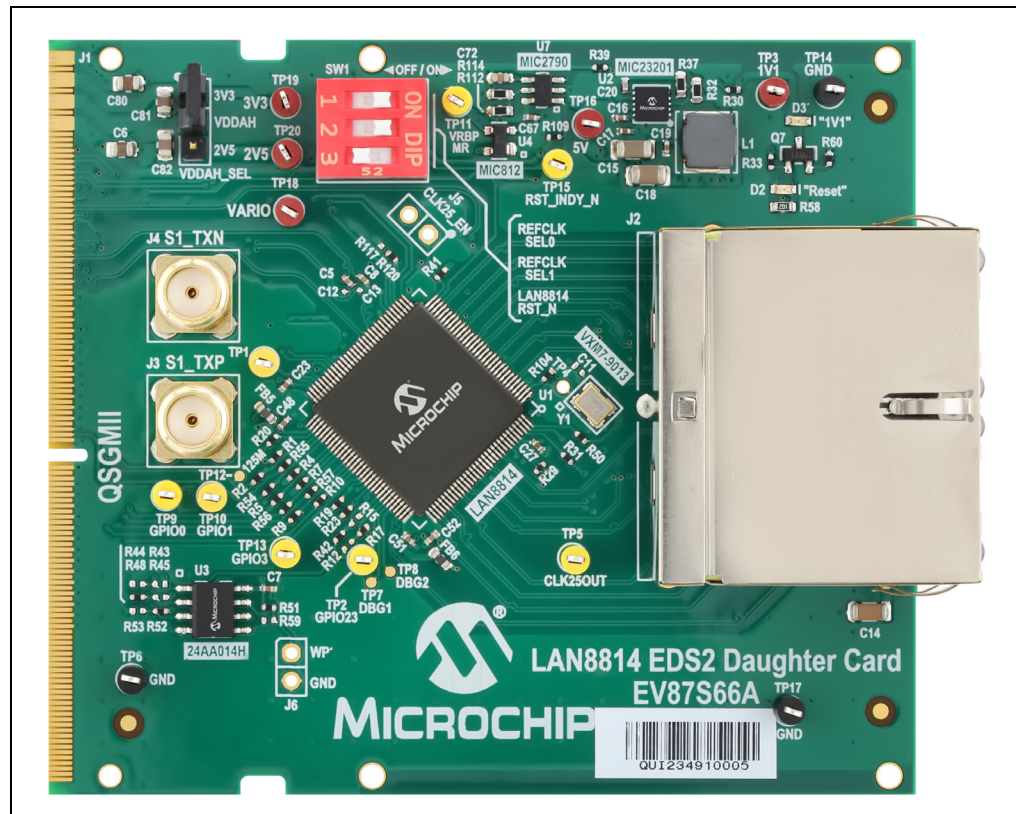
2.1 INTRODUCTION

This chapter provides a quick start guide for the installation and use of the LAN8814 EDS2 Daughter Card.

2.2 LAN8814 EDS2 DAUGHTER CARD INSTALLATION

Figure 2-1 shows the LAN8814 EDS2 Daughter Card.

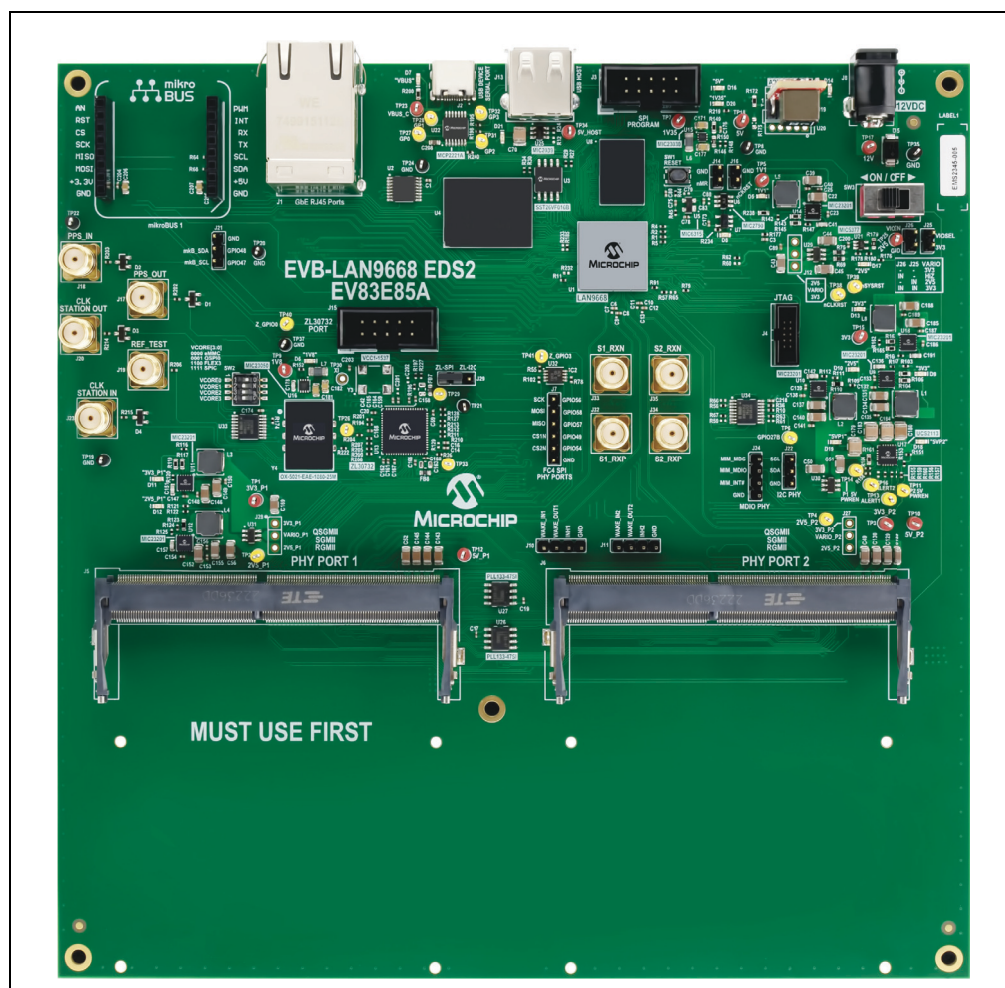
FIGURE 2-1: LAN8814 EDS2 DAUGHTER CARD



2.3 QUICK START

Figure 2-2 shows the EVB-LAN9668 EDS2 Host.

FIGURE 2-2: LAN8814 EDS2 DAUGHTER CARD HOST

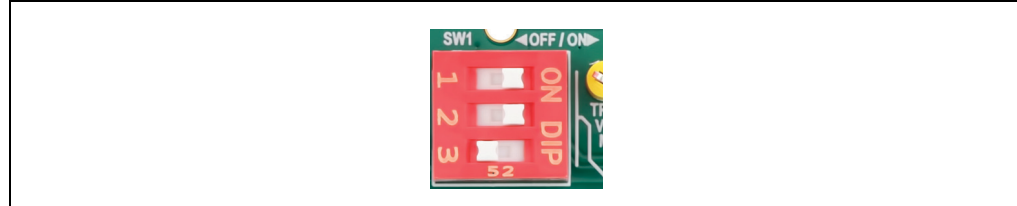


2.3.1 Daughter Card Setup

Implement the following steps to start using the LAN8814 EDS2 Daughter Card:

1. Make sure that the SW1 slide switch is set as shown in [Figure 2-3](#). This setting selects the system reference clock and does not hold the PHY in Reset state.

FIGURE 2-3: SW1 SLIDE SWITCH



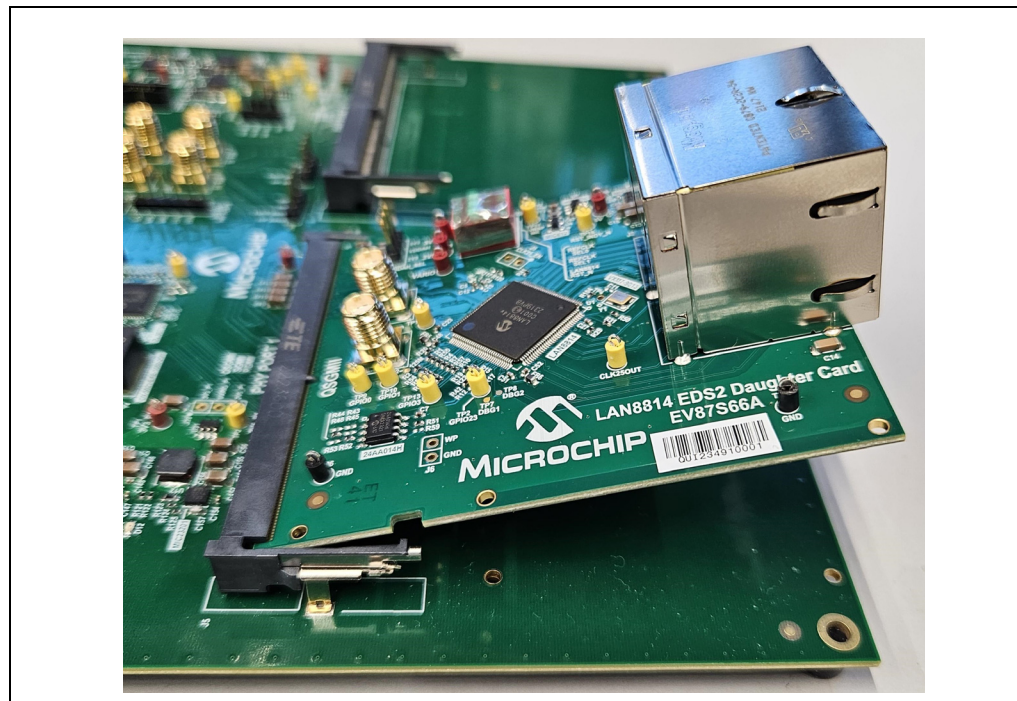
2. Ensure that a shunt jumper is installed at J9[1-2] as shown in [Figure 2-4](#).

FIGURE 2-4: J9 VDDAH_SEL HEADER



3. Verify that the host board power is OFF.
4. Grab the daughter card by its board edges. Align to the SODIMM EDS2 socket and insert the board fingers' edge at a 45-degree angle into the SODIMM socket as shown in [Figure 2-5](#).

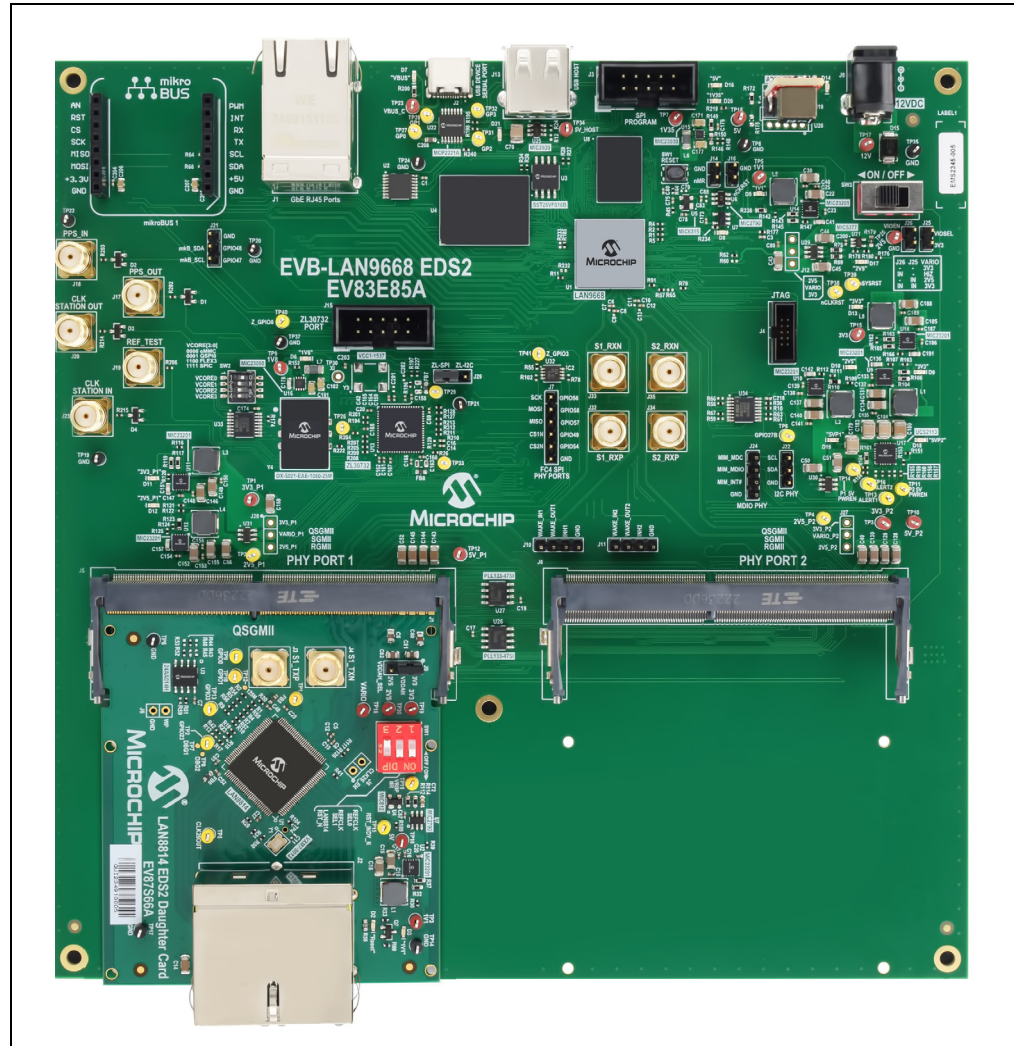
FIGURE 2-5: LAN8814 EDS2 DAUGHTER CARD INSTALLATION



LAN8814 EDS2 Daughter Card User Guide

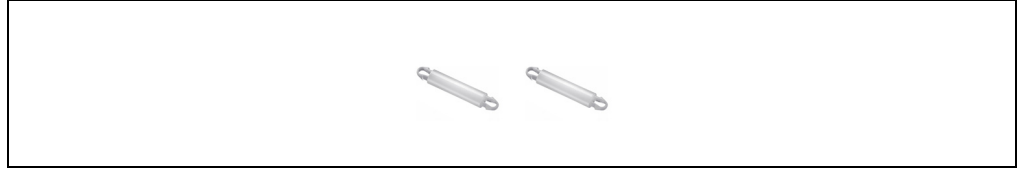
5. Push the daughter card down until it latches into the SODIMM socket latches.
6. After installation, check if the boards appear as shown in [Figure 2-6](#).

FIGURE 2-6: LAN8814 EDS2 DAUGHTER CARD INSTALLED



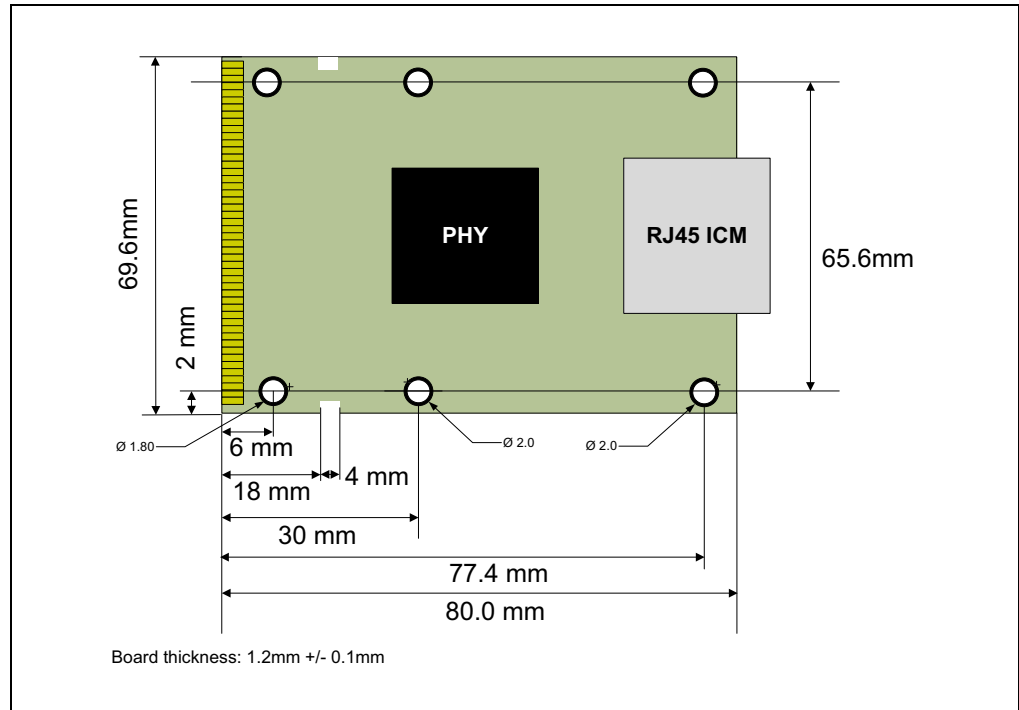
- (Optional step) Secure the board with two snap lock pins (Würth Elektronik part number 709652500, included in the kit). These pins prevent board movement and remove stress from the SODIMM socket due to the RJ45 cable weight and movement. See [Figure 2-7](#).

FIGURE 2-7: SNAP LOCK PINS



- The LAN8814 EDS2 Daughter Card has four (4) snap lock mounting holes, two (2) at 30 mm from the board fingers' edge, and two (2) at 77.4 mm from the board fingers' edge as shown in [Figure 2-8](#). For the EVB-LAN9668 EDS2 Host, use the mounting holes at 77.4 mm. Other hosts may only have the mounting holes at 30 mm.

FIGURE 2-8: LAN8814 EDS2 DAUGHTER CARD SNAP LOCK MOUNTING HOLES



- To use the snap lock pins, first install the snap lock pins on the host board, and then insert the daughter card into the SODIMM EDS2 receptacle. Align the snap locks with the corresponding mounting holes and press the daughter card down until the snap locks are fastened. A pair of long-nose pliers can be used to close the pin locks for easy board installation and removal.
- Proceed to [Chapter 4. "System Boot"](#).

2.4 LAN8814 EDS2 DAUGHTER CARD REMOVAL

To remove the LAN8814 EDS2 Daughter Card 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 daughter card. It should snap upwards.
5. Grab the daughter card by its edges and remove it from the SODIMM EDS2 receptacle.

Chapter 3. Hardware

3.1 INTRODUCTION

This section provides a description of the LAN8814 EDS2 Daughter Card hardware, including headers, test points, LEDs, and switches on the board.

The top side and bottom side of the LAN8814 EDS2 Daughter Card are shown in [Figure 3-1](#) and [Figure 3-2](#), respectively.

FIGURE 3-1: LAN8814 EDS2 DAUGHTER CARD (TOP SIDE)

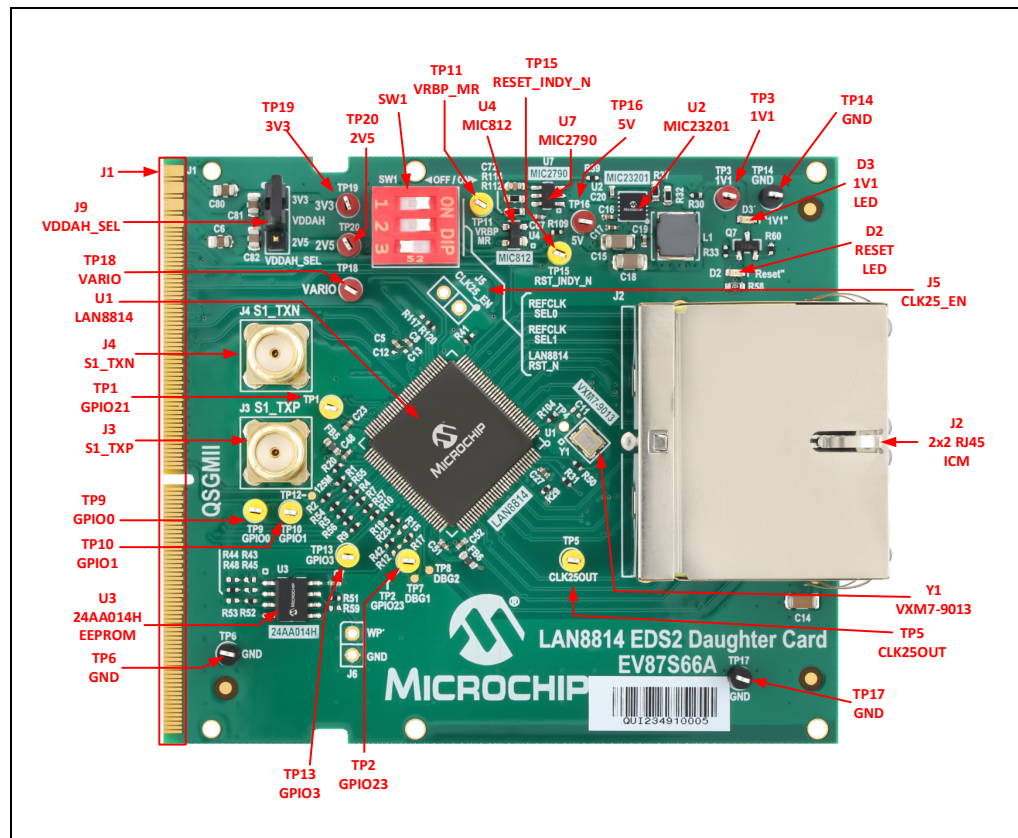
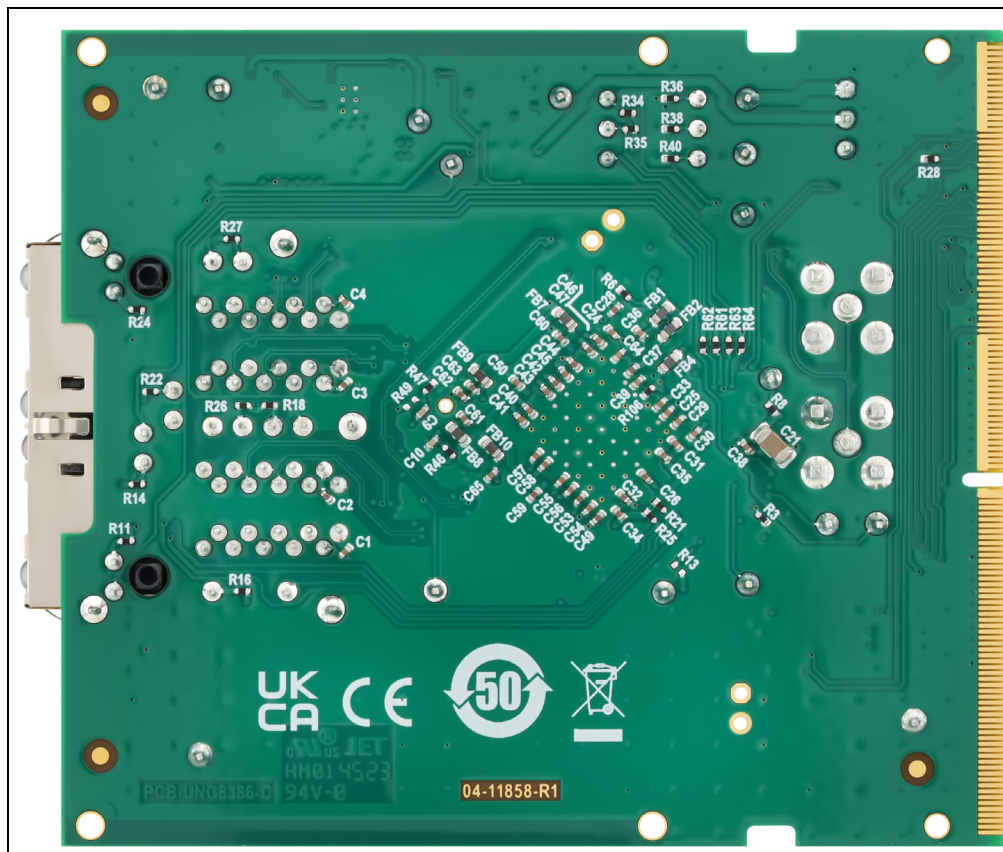


FIGURE 3-2: LAN8814 EDS2 DAUGHTER CARD (BOTTOM SIDE)



3.2 CONNECTORS

Table 3-1 describes the connectors on the LAN8814 EDS2 Daughter Card.

TABLE 3-1: LAN8814 EDS2 DAUGHTER CARD CONNECTORS

Reference Designator	Name	Description
J1	SODIMM-260 pin Edge Connector	Provides power and signals for operation. Connects to Microchip SODIMM EDS2 compatible host.
J2	RJ45 ICM 2x2	Four-port Ethernet RJ45 connector with integrated magnetics.
J3	TXP SMA	SMA for TXP QSGMII signal injection when used with SMA J4. The EVB-LAN9668 EDS2 (EV83E85A) host board includes an RXP SMA for sensing this signal.
J4	TXN SMA	SMA for TXN QSGMII signal injection when used with SMA J3. The EVB-LAN9668 EDS2 (EV83E85A) host board includes an RXN SMA for sensing this signal.

TABLE 3-1: LAN8814 EDS2 DAUGHTER CARD CONNECTORS

Reference Designator	Name	Description
J6	WP Header 1x2	EEPROM Write Protect header footprint. Used during factory programming.
J9	VDDAH_SEL	1x3 header used to select the LAN8814 VDDAH power. [1-2] 3.3V (Default) [2-3] 2.5V

3.3 TEST POINTS

Table 3-2 lists the test points on the LAN8814 EDS2 Daughter Card.

TABLE 3-2: LAN8814 EDS2 DAUGHTER CARD TEST POINTS

Test Point	Color	Description
TP1	Yellow	GPIO21/SOF1
TP2	Yellow	GPIO23/SOF3
TP3	Red	1V1
TP4	—	OSC_EN
TP5	Yellow	CLK25OUT
TP6	Black	GND
TP7	—	DBG1
TP8	—	DBG2
TP9	Yellow	GPIO0/1588_EVENT_A/ALLPHYAD
TP10	Yellow	GPIO1/1588_EVENT_B/MODE_SEL0
TP11	Yellow	VRBP_MR
TP12	—	GPIO2/1588_REF_CLK
TP13	Yellow	GPIO3/1588_LD_ADJ/MODE_SEL1
TP14	Black	GND
TP15	Yellow	RST_INDY_N
TP16	Red	5V
TP17	Black	GND
TP18	Red	VARIO
TP19	Red	3V3
TP20	Red	2V5

LAN8814 EDS2 Daughter Card User Guide

3.4 LEDES

Table 3-3 describes the LEDs on the LAN8814 EDS2 Daughter Card.

TABLE 3-3: LAN8814 EDS2 DAUGHTER CARD LEDES

Reference Designator	Name	Description
D2	RESET	Red LED RESET indicator
D3	1V1	Green LED 1V1 indicator
J2A - Left	RJ45 Port 1 - Left	Yellow Activity LED connected to LAN8814
J2A - Right	RJ45 Port 1 - Right	Green Status LED connected to LAN8814
J2B - Left	RJ45 Port 2 - Left	Yellow Activity LED connected to LAN8814
J2B - Right	RJ45 Port 2 - Right	Green Status LED connected to LAN8814
J2C - Left	RJ45 Port 3 - Left	Yellow Activity LED connected to LAN8814
J2C - Right	RJ45 Port 3 - Right	Green Status LED connected to LAN8814
J2D - Left	RJ45 Port 4 - Left	Yellow Activity LED connected to LAN8814
J2D - Right	RJ45 Port 4 - Right	Green Status LED connected to LAN8814

3.5 CONFIGURATION STRAPS

Table 3-4 lists the configuration straps on the LAN8814 EDS2 Daughter Card.

TABLE 3-4: LAN8814 EDS2 DAUGHTER CARD CONFIGURATION STRAPS

Reference Designator PU/PD	Name	Description
R19*/NA	LED_MODE	0 – Tri-color LED 1* – Individual LED
R21*/NA	PHYAD0	0 – AD0 = 0 1* – AD0 = 1
R23*/NA	PHYAD1	0 – AD1 = 0 1* – AD1 = 1
R25*/NA	PHYAD2	0 – AD2 = 0 1* – AD2 = 1
R13/R15	PHYAD3	Both resistors are DNP. Strap is actively driven from the host board.
R12/R17*	PHYAD4	0* – AD4 = 0 1 – AD4 = 1
R2*/NA	MODE_SEL0	MODE_SEL[4:0] = 11001 – Default strapping for a multi-port system. Auto-Negotiation with 1000FD, 100FD/HD, and 10FD/HD advertisements and EEE are enabled.
NA/R3*	MODE_SEL1	
NA/R4*	MODE_SEL2	
R5*/NA	MODE_SEL3	
R7*/NA	MODE_SEL4	

Note 1: Only one of the two PU/PD resistors is installed.

2: * indicates default.

TABLE 3-4: LAN8814 EDS2 DAUGHTER CARD CONFIGURATION STRAPS

Reference Designator PU/PD	Name	Description
R19*/NA	PORT0_LED1_POL	PORT[3:0]_LED[2:1]_POL = 11111111 – These pins are sampled after Reset to determine LED Polarity, and then used to drive the LED. The pin’s polarity should be opposite of the strap value. That is, this evaluation board is using active-low straps for all LEDs driven by the PHY.
R21*/NA	PORT0_LED2_POL	
R61*/NA	PORT1_LED1_POL	
R62*/NA	PORT1_LED2_POL	
R63*/NA	PORT2_LED1_POL	
R64*/NA	PORT2_LED2_POL	
R23*/NA	PORT3_LED1_POL	
R25*/NA	PORT3_LED2_POL	
R1*/NA	ALLPHYAD	0 – Enable PHY Broadcast accesses 1* – Disable PHY Broadcast accesses If Broadcast accesses are enabled, all PHYs respond to PHY Address 0.

Note 1: Only one of the two PU/PD resistors is installed.
2: * indicates default.

TABLE 3-5: SWITCH SW1

SW1	Signal	Switch position	Logic Value	Description
SW1-1	REFCLK_SEL[0]	ON *	0	Must be set to ON
		OFF	1	RESERVED, do not use
SW1-2	REFCLK_SEL[1]	ON *	0	SYSPLL Reference = 25 MHz QSGMII Reference = 25 MHz
		OFF	1	SYSPLL Reference = 25 MHz QSGMII Reference = 125 MHz
SW1-3	RST_INDY_N	ON	0	LAN8814 Reset input asserted
		OFF *	1	LAN8814 Reset input released

Note 1: * indicates default.

3.6 REFERENCE CLOCK

The LAN8814 REFCLK_SEL_SEL[1:0] inputs select the reference clock used for SYSPLL and QSGMII and are connected to slide switch SW1 switches 1 and 2. See [Table 3-6](#).

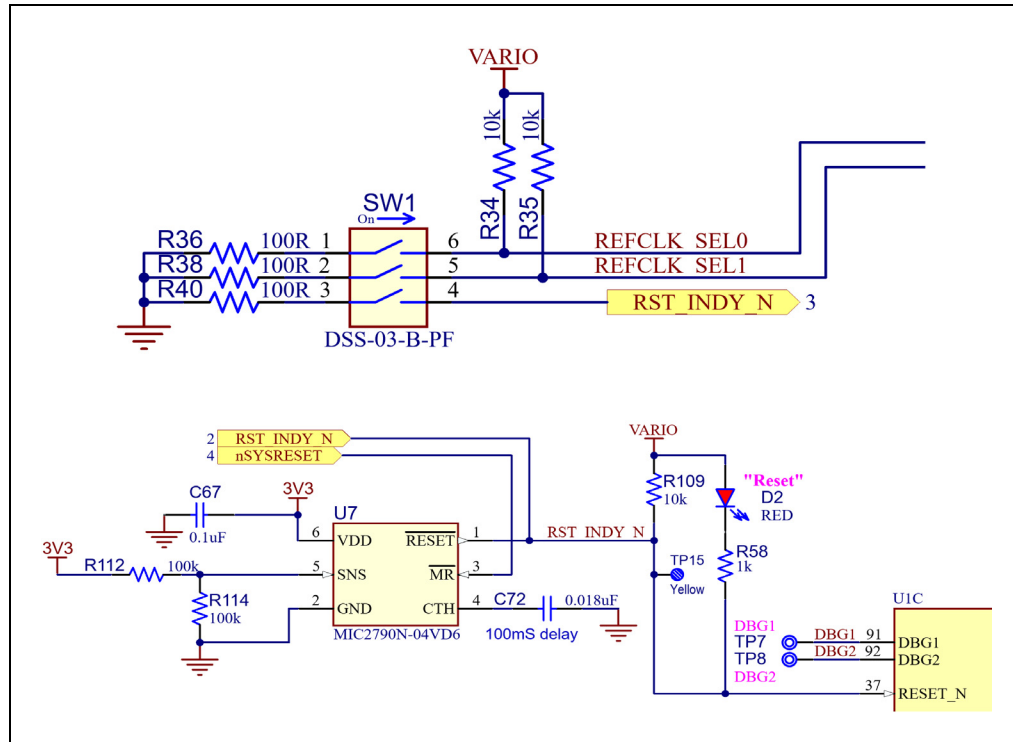
TABLE 3-6: REFERENCE CLOCK

SW1	Signal	Switch position		Logic Value	Description
SW1-[2:1]	REFCLK_SEL[1:0]	ON	ON	00	SYSPLL Reference = 25 MHz QSGMII Reference = 25 MHz
		ON	OFF	01	RESERVED, do not use
		OFF (1)	ON	10	SYSPLL Reference = 25 MHz QSGMII Reference = 125 MHz
		OFF	OFF	11	RESERVED, do not use

3.7 RESET

The LAN8814 EDS2 Daughter Card includes a Reset circuit using the Microchip MIC2790 Reset supervisor as shown in Figure 3-3. The system Reset signal, `nSYSRESET`, is driven from the SODIMM EDS2 host interface and is connected to the MIC2790 master Reset input MR. When MR goes low, the MIC2790 Reset output on net `RST_INDY_N` goes low, resetting the LAN8814 and turning on the Reset LED D2. The `RST_INDY_N` net goes high 100 milliseconds after `nSYSRESET` goes high, turning the Reset LED off and releasing the LAN8814 from Reset. The configuration straps are sampled when `RST_INDY_N` goes high.

FIGURE 3-3: LAN8814 EDS2 DAUGHTER CARD RESET CIRCUIT



The DIP Switch (SW1), as shown in Figure 3-3, can be used to place the LAN8814 EDS2 Daughter Card in Reset without affecting the rest of the system. This Reset functionality is controlled via pole 3. This feature is useful when testing and updating the LAN8814 Linux[®] driver after the system has booted up. Pole 1 and 2 on the DIP switch configure the PHY reference clock selection. The default reference clock selection (both pins ON) configures the SYSPLL REF and QSGMII REF to use 25 MHz from the XI/XO pins on the PHY.

3.8 CLOCKS

The LAN8814 EDS2 Daughter Card uses a Microchip VXM7-9013-25M0000 25 MHz crystal for the LAN8814 clock reference.

The LAN8814 generates a 125 MHz clock for Synchronous Ethernet (SyncE) applications.

3.9 POWER

The LAN8814 EDS2 Daughter Card requires 3.3V, 2.5V, and 1.1V. The EDS2 SODIMM EDS2 interface provides 3.3V, 2.5V, and VARIO (3.3V or 2.5V). An on-board Microchip MIC23201 switching regulator is used to generate the 1.1V required by the LAN8814 analog, digital core, and PLL power inputs.

3.10 LAN8814 EDS2 DAUGHTER CARD EEPROM

The LAN8814 EDS2 Daughter Card includes a Microchip 24AA014H EEPROM with half array write protection (40H to 7Fh) for identification. Only some locations in the protected area starting at 40h are programmed as shown in [Figure 3-4](#). Details on these fields are specified in [Table 3-7](#).

FIGURE 3-4: EEPROM CONTENTS

Offset (h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00000000	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000010	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000020	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000030	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000040	A3	01	00	04	13	10	88	14	01	00	45	56	38	37	53	36
00000050	36	41	43	31	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000060	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00000070	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	AA	00	00	AA

TABLE 3-7: EDS2 DAUGHTER CARD EEPROM

Byte Address	Name	Type	Description
40	KEY	INT	Magic number = A3h
41	REV	INT	EEPROM Revision
42	DCTYPE	INT	Daughter Card type: 0 = PHY, 1 = SWITCH
43	NPORTS	INT	Number of ports
44	MACIF	INT	MAC Interface: RMII 07h RGMII 09h RGMII_ID 0Ah RGMII_RXID 0Bh RGMII_TXID 0Ch SGMII 04h QSGMII 13h
45	DPN_PNUM	INT	Device Part number: 23:20 Product Family 0 = KSZ 1 = LAN 2 = VSC 19:16 Part Number upper 4 bits
46			Device Part number bits 15:8
47			Device Part number bits 7:0

TABLE 3-7: EDS2 DAUGHTER CARD EEPROM (CONTINUED)

Byte Address	Name	Type	Description
48	CTRLIF	INT	Control interface: 7:5 Reserved 4:3 SPI mode 2 SPI Control available 1 I ² C Control available 0 MIIM Control available
49	SPIR	INT	SPI rate
4A	DEVT	ASCII	Dev Tools Part number
4B			
4C			
4D			
4E			
4F			
50			
51			
52	BREVU	ASCII	UNG Board Revision Letter
53	BREVD	ASCII	Dev Tools Board Revision Number
7C	IDBYTE0	INT	ID BYTE 1 = AAh
7D	IDBYTE1	INT	ID BYTE 2 = 00h
7E	IDBYTE2	INT	ID BYTE 3 = 00h
7F	CHECKSUM	INT	CHECKSUM = AAh

Chapter 4. System Boot

4.1 INTRODUCTION

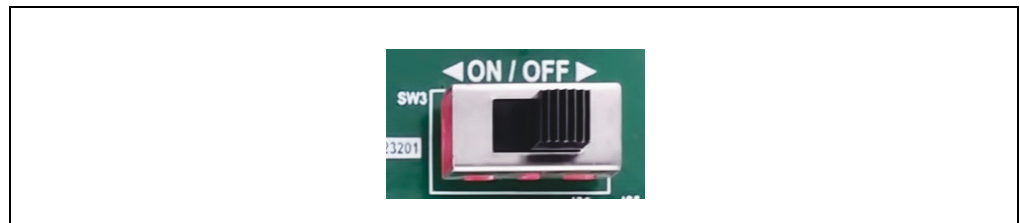
This chapter describes the boot process using the EVB-LAN9668 EDS2 (EV83E85A) host with Linux software factory configuration. Refer to the software documentation for other EDS2 host platform for specific configuration and software details.

4.2 EVB-LAN9668 EDS2 WITH LAN8814 EDS2 DAUGHTER CARD POWER-UP

The LAN8814 EDS2 Daughter Card should be installed as shown in [Figure 2-6](#). Perform the following steps to power up the LAN8814 EDS2:

1. Verify that the EVB-LAN9668 EDS2 power switch is set to OFF (right) position. See [Figure 4-1](#).

FIGURE 4-1: LAN9668 POWER SWITCH



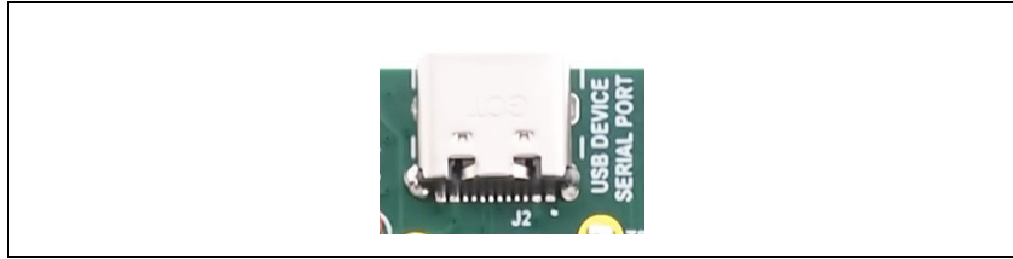
2. Connect a 12V 1A (minimum) power supply with a DC plug to DC Jack J8 on the EVB-LAN9668 EDS2. See [Figure 4-2](#).

FIGURE 4-2: LAN9668 DC JACK



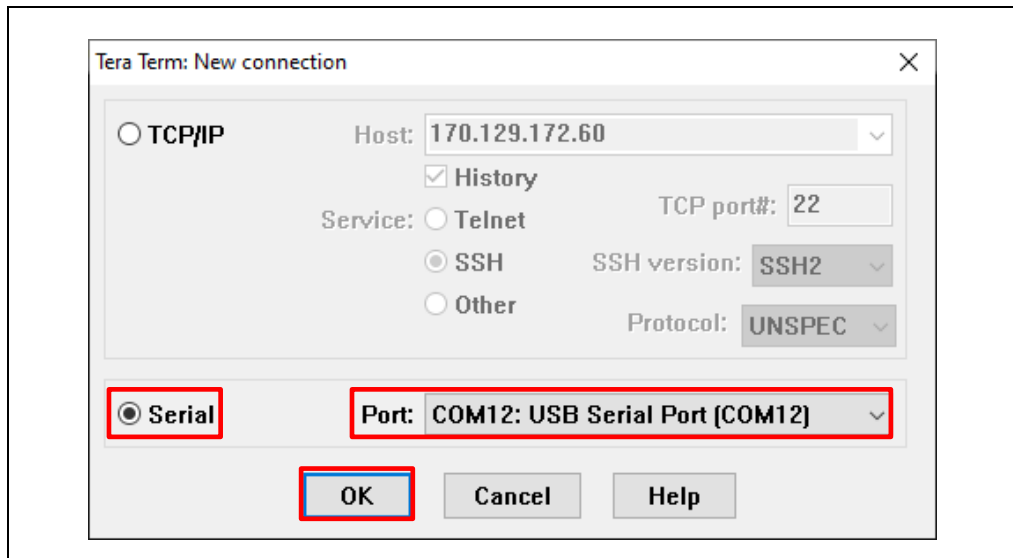
3. Connect a USB-C cable into the USB-C receptacle J2 on the EVB-LAN9668 EDS2 and then insert the other end into a PC. See [Figure 4-3](#).

FIGURE 4-3: EVB-LAN9668 EDS2 USB-C® SERIAL PORT



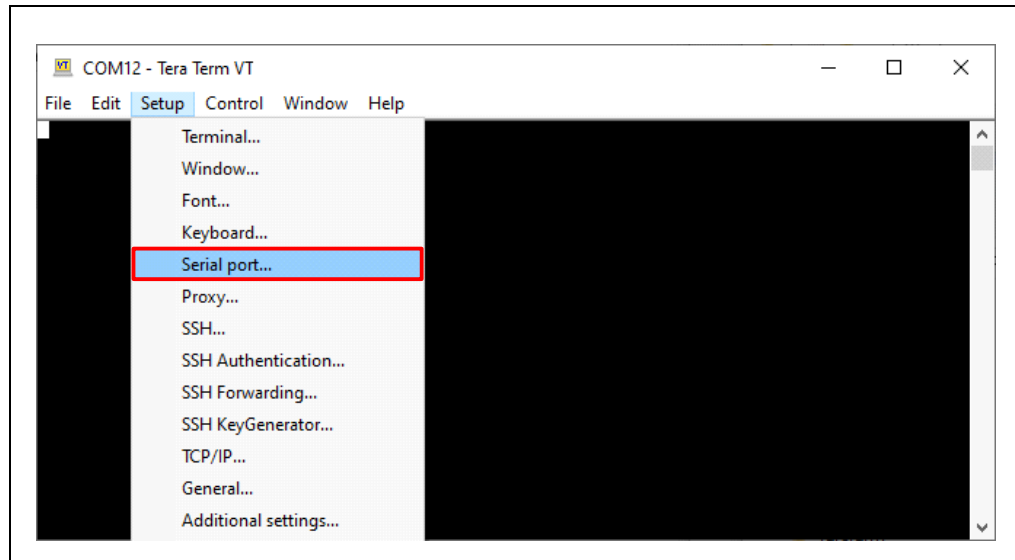
4. Slide the EVB-LAN9668 EDS2 power switch SW3 to the left ON position to turn on board power.
5. Open Tera Term. Select the Serial radial button and look for COMx:USB Serial Port.
6. COM12 is shown in [Figure 4-4](#). Windows may assign a different port number. Click on **OK**.

FIGURE 4-4: TERA TERM SERIAL PORT SELECTION



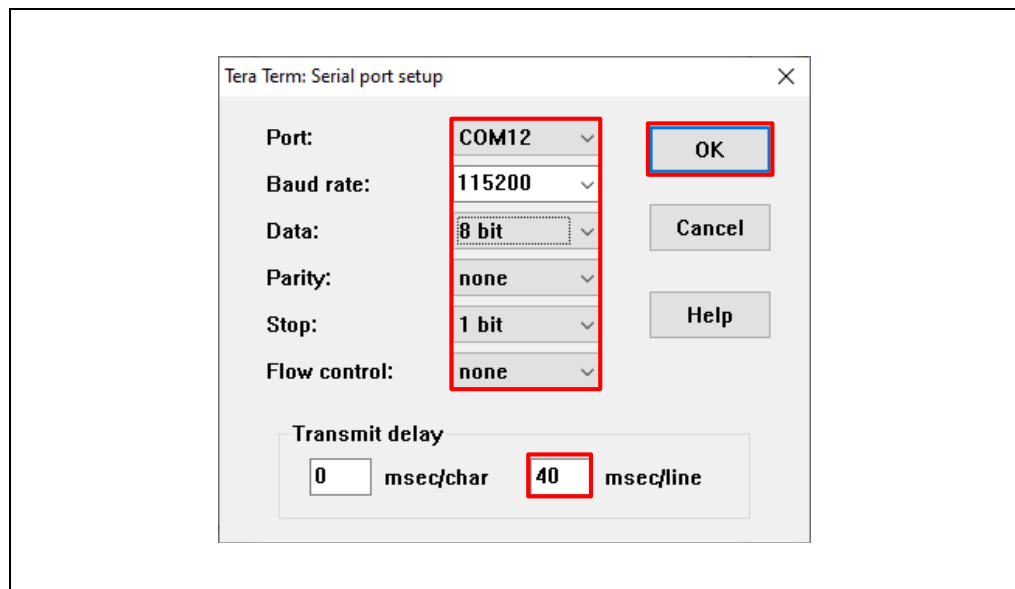
7. Go to the Setup menu and select Serial port. See [Figure 4-5](#).

FIGURE 4-5: TERA TERM SETUP MENU



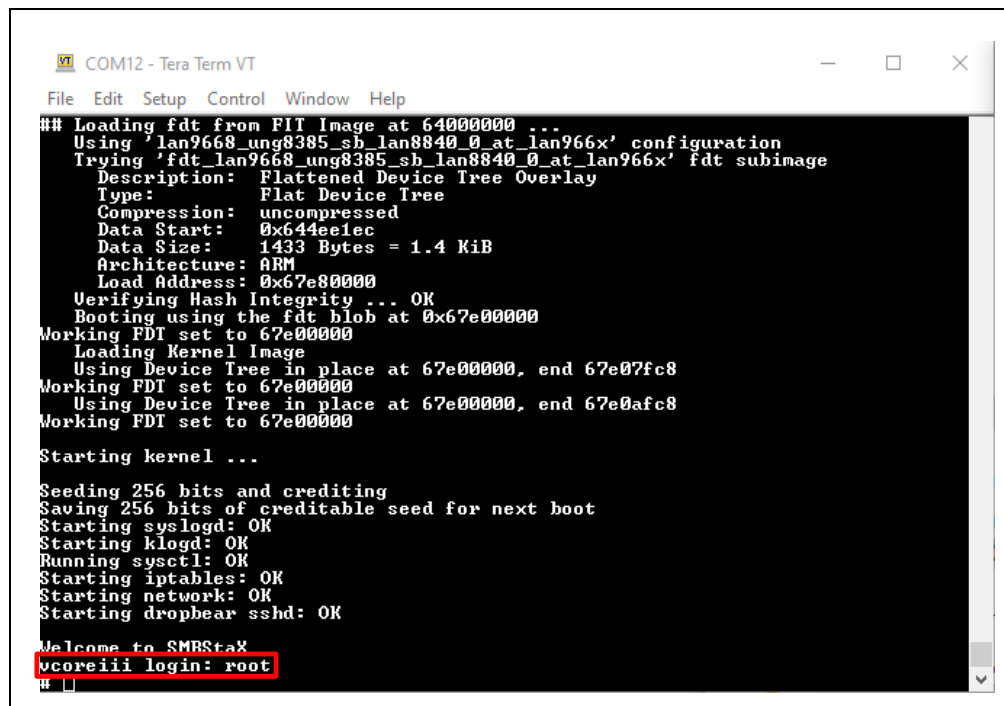
8. Set the selected port to 115200, 8-bit, no parity, 1 stop bit, no flow control, and 40 msec/line. Click on **OK**. See [Figure 4-6](#).

FIGURE 4-6: TERA TERM SERIAL PORT SETUP



9. At login prompt, enter `root`. See Figure 4-7.

FIGURE 4-7: TERA TERM LOGIN PROMPT



```
COM12 - Tera Term VT
File Edit Setup Control Window Help
## Loading fdt from FIT Image at 64000000 ...
Using 'lan9668_ung8385_sb_lan8840_0_at_lan966x' configuration
Trying 'fdt_lan9668_ung8385_sb_lan8840_0_at_lan966x' fdt subimage
  Description: Flattened Device Tree Overlay
  Type: Flat Device Tree
  Compression: uncompressed
  Data Start: 0x644ee1ec
  Data Size: 1433 Bytes = 1.4 KiB
  Architecture: ARM
  Load Address: 0x67e80000
Verifying Hash Integrity ... OK
Booting using the fdt blob at 0x67e00000
Working FDT set to 67e00000
Loading Kernel Image
Using Device Tree in place at 67e00000, end 67e07fc8
Working FDT set to 67e00000
Using Device Tree in place at 67e00000, end 67e0afc8
Working FDT set to 67e00000
Starting kernel ...
Seeding 256 bits and crediting
Saving 256 bits of creditable seed for next boot
Starting syslogd: OK
Starting klogd: OK
Running sysctl: OK
Starting iptables: OK
Starting network: OK
Starting dropbear sshd: OK
Welcome to SMBStax
vcoreiii login: root
#
```

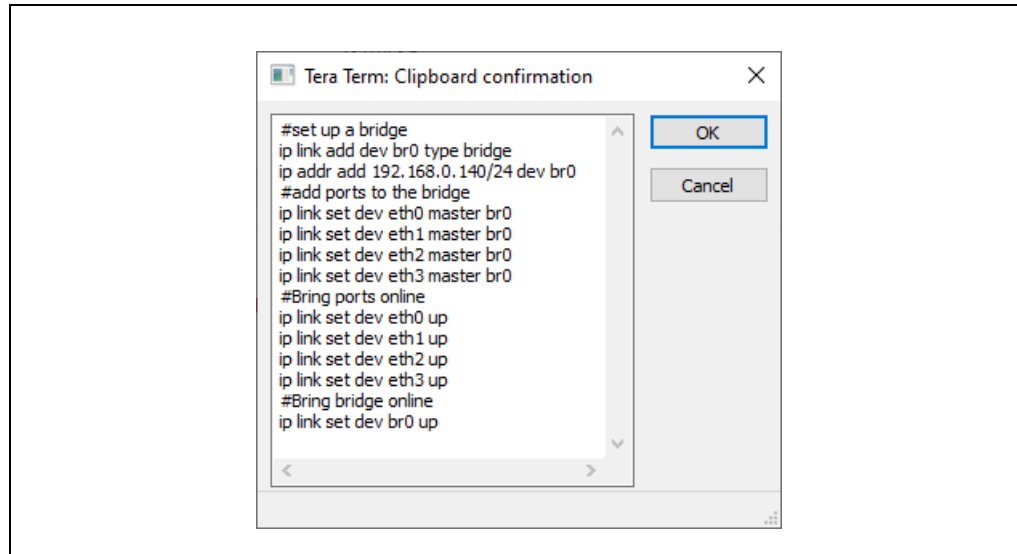
Note: For the succeeding steps, it is assumed that a host PC with an Ethernet port that can be pinged at 192.168.0.80 is available.

10. Copy the following text and paste to the Tera Term screen:

```
#set up a bridge
ip link add dev br0 type bridge
ip addr add 192.168.0.140/24 dev br0
#add ports to the bridge
ip link set dev eth0 master br0
ip link set dev eth1 master br0
ip link set dev eth2 master br0
ip link set dev eth3 master br0
#Bring ports online
ip link set dev eth0 up
ip link set dev eth1 up
ip link set dev eth2 up
ip link set dev eth3 up
#Bring bridge online
ip link set dev br0 up
```

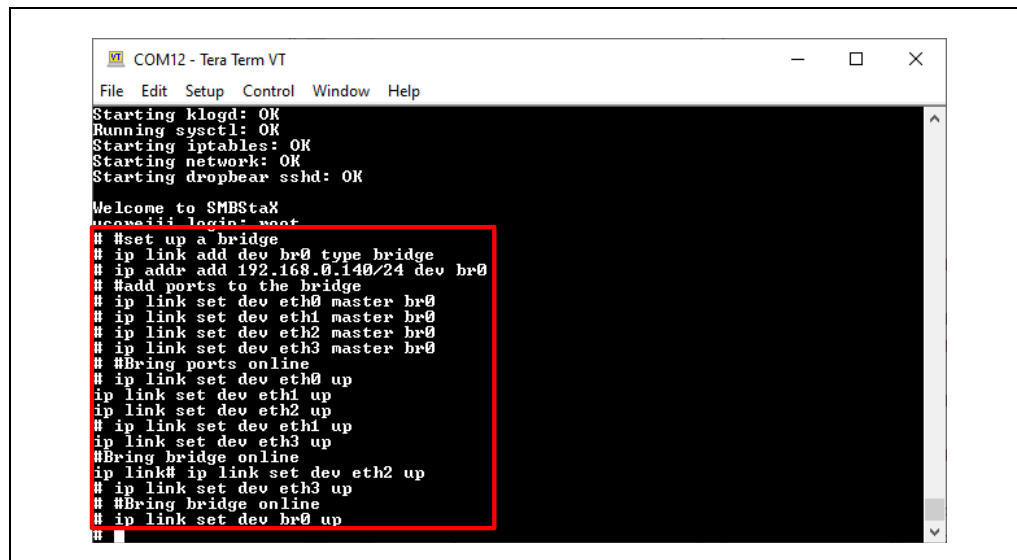
11. Verify that the Tera Term Clipboard appears as shown in [Figure 4-8](#).

FIGURE 4-8: TERA TERM SCRIPT



12. Click on **OK**. On the Tera Term Clipboard, click **return** on the Linux screen after all text is copied. Verify that it looks as shown in [Figure 4-9](#).

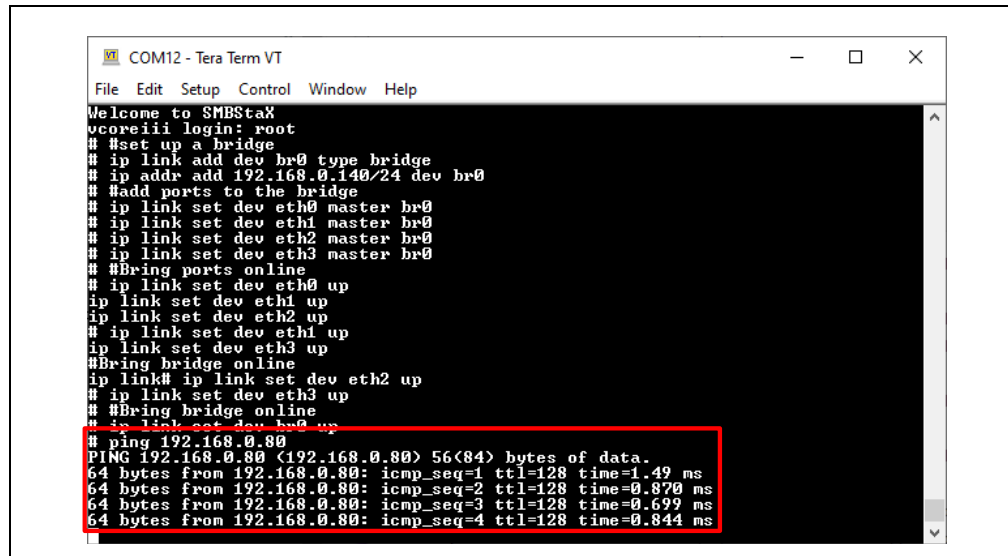
FIGURE 4-9: SCRIPT ON THE LINUX® SCREEN



13. Connect an Ethernet cable to one of the RJ45 ports on the LAN8814 EDS2 Daughter Card.

14. At the Linux prompt, enter ping 192.168.0.80. The pings should appear as shown in Figure 4-10.

FIGURE 4-10: PINGS ON LINUX® SCREEN



```
COM12 - Tera Term VT
File Edit Setup Control Window Help
Welcome to SMBStaX
vcoreiii login: root
# #set up a bridge
# ip link add dev br0 type bridge
# ip addr add 192.168.0.140/24 dev br0
# #add ports to the bridge
# ip link set dev eth0 master br0
# ip link set dev eth1 master br0
# ip link set dev eth2 master br0
# ip link set dev eth3 master br0
# #Bring ports online
# ip link set dev eth0 up
ip link set dev eth1 up
ip link set dev eth2 up
# ip link set dev eth1 up
ip link set dev eth3 up
#Bring bridge online
ip link# ip link set dev eth2 up
# ip link set dev eth3 up
# #Bring bridge online
# ip link set dev br0 up
# ping 192.168.0.80
PING 192.168.0.80 (192.168.0.80) 56(84) bytes of data:
64 bytes from 192.168.0.80: icmp_seq=1 ttl=128 time=1.49 ms
64 bytes from 192.168.0.80: icmp_seq=2 ttl=128 time=0.870 ms
64 bytes from 192.168.0.80: icmp_seq=3 ttl=128 time=0.699 ms
64 bytes from 192.168.0.80: icmp_seq=4 ttl=128 time=0.844 ms
```

15. To check other ports, move the Ethernet cable to any of the other 3 RJ45 connector ports.



Appendix A. Schematics

A.1 INTRODUCTION

This appendix shows the LAN8814 EDS2 Daughter Card schematics.

FIGURE A-1: LAN8814 EDS2 DAUGHTER CARD

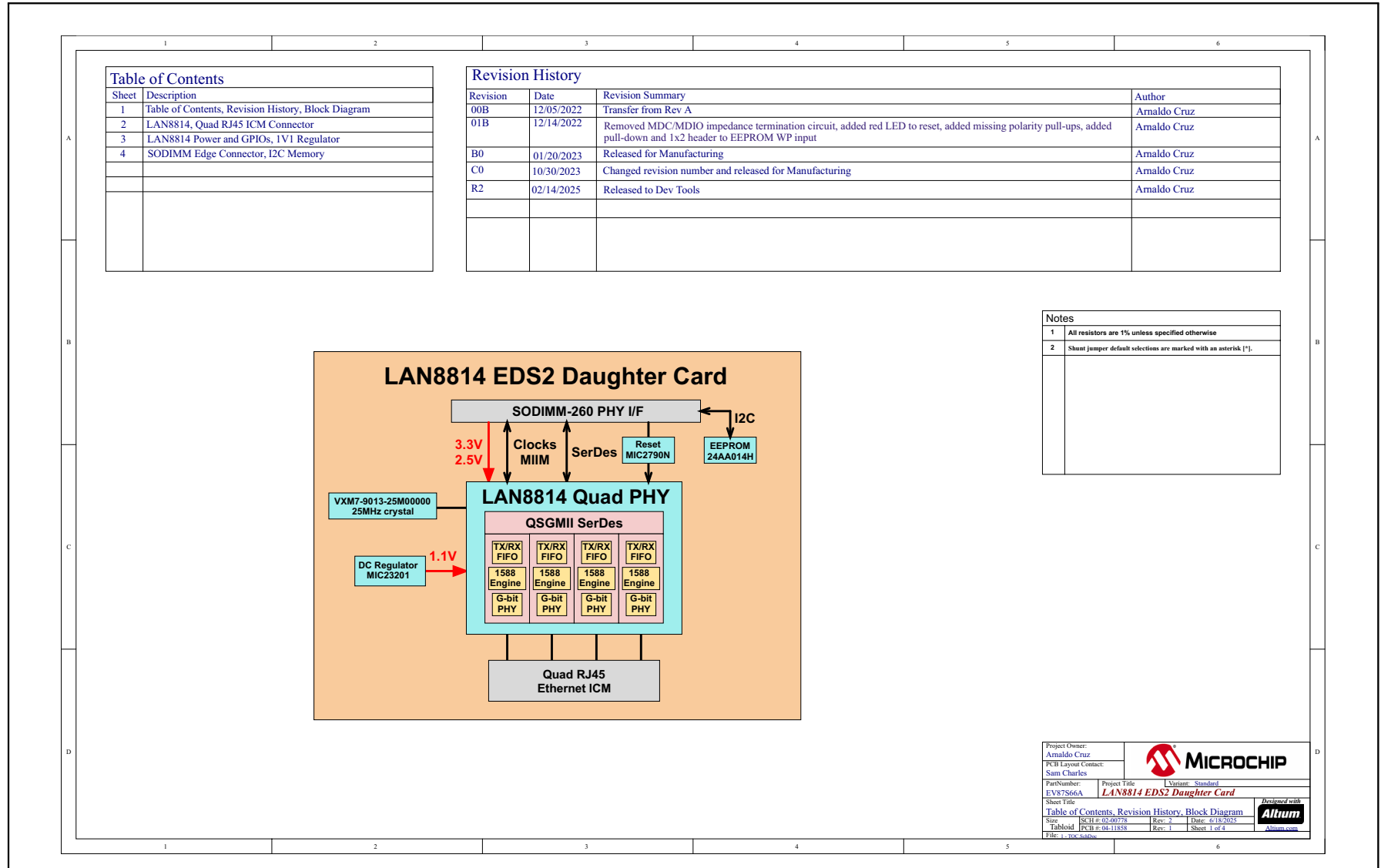
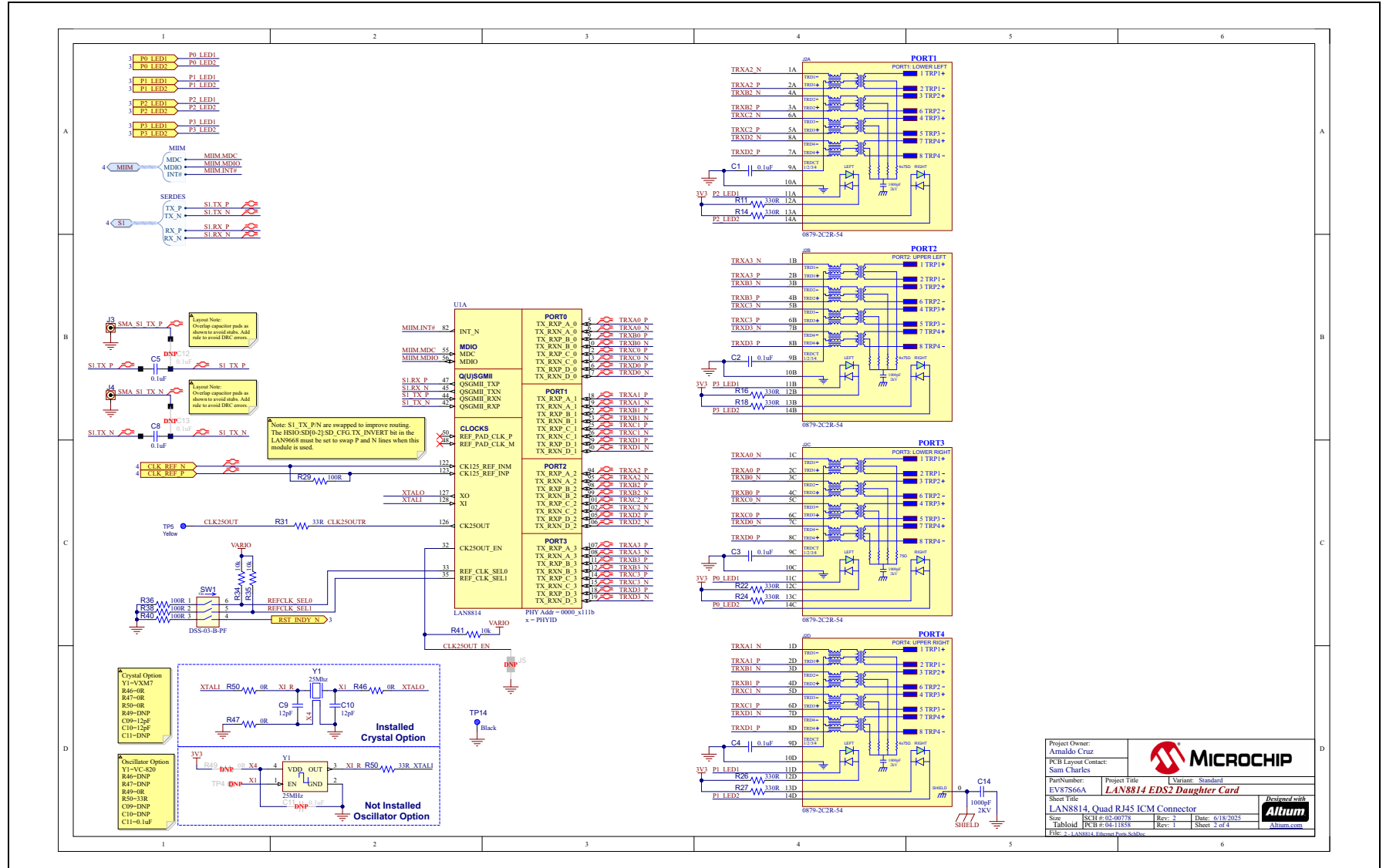


FIGURE A-2: LAN8814 EDS2 DAUGHTER CARD QUAD RJ45 ICM CONNECTOR



Project Owner: Arnaldo Cruz
 PCB Layout Contact: Sam Charles
 Part Number: EV97S66A
 Project Title: LAN8814 EDS2 Daughter Card
 Standard: Standard
 Sheet Title: LAN8814, Quad RJ45 ICM Connector
 Size: 1831 x 02-00778
 Tabloid: PCB # 04-11858
 Rev: 1
 Date: 6/18/2025
 Sheet: 2 of 4
 File: 2 - LAN8814_Eds2_Daughter_Card_SchDoc

MICROCHIP

Designed with **Altium**

FIGURE A-3: LAN8814 EDS2 DAUGHTER CARD POWER AND GPIOs, 1.1V REGULATOR

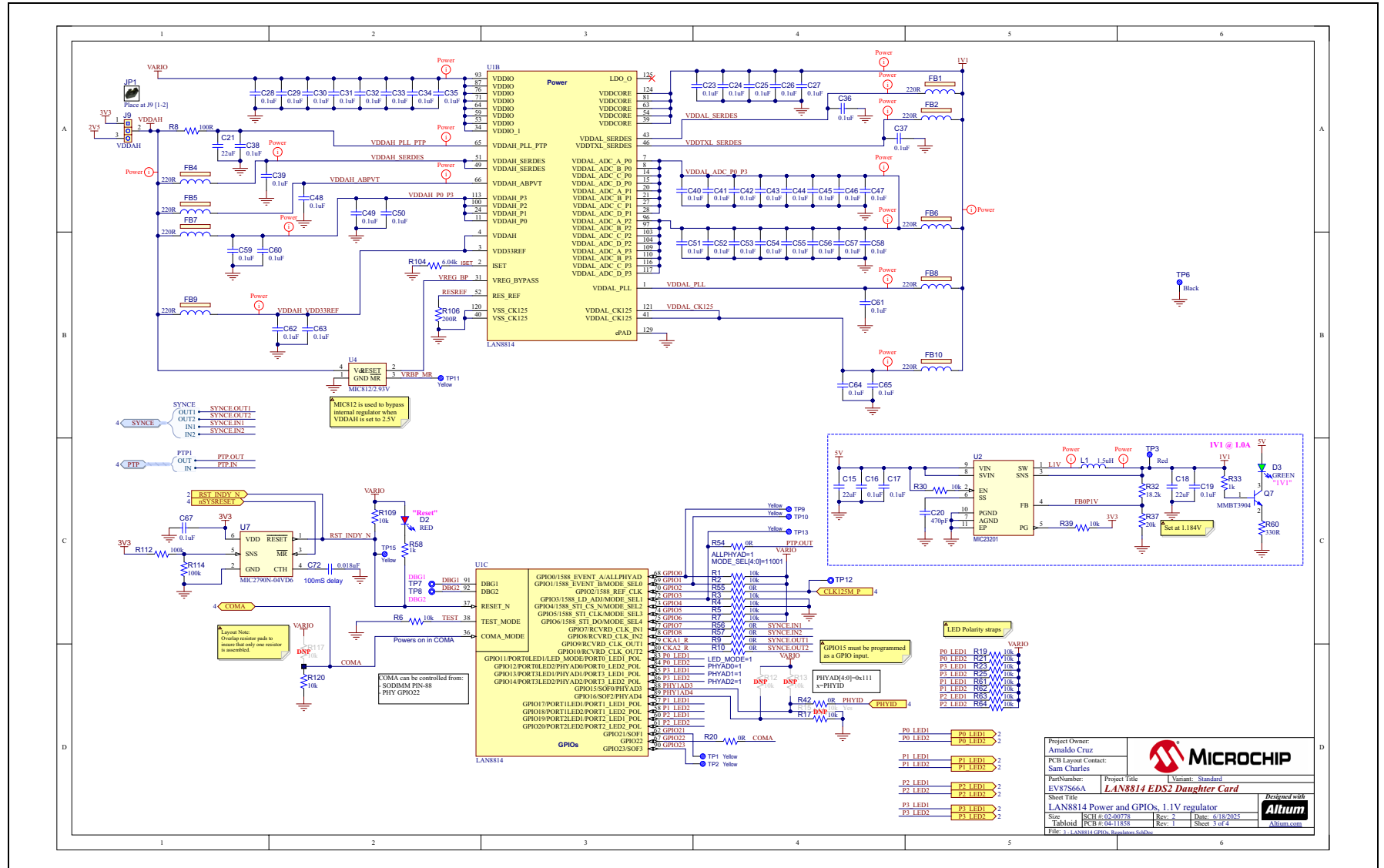
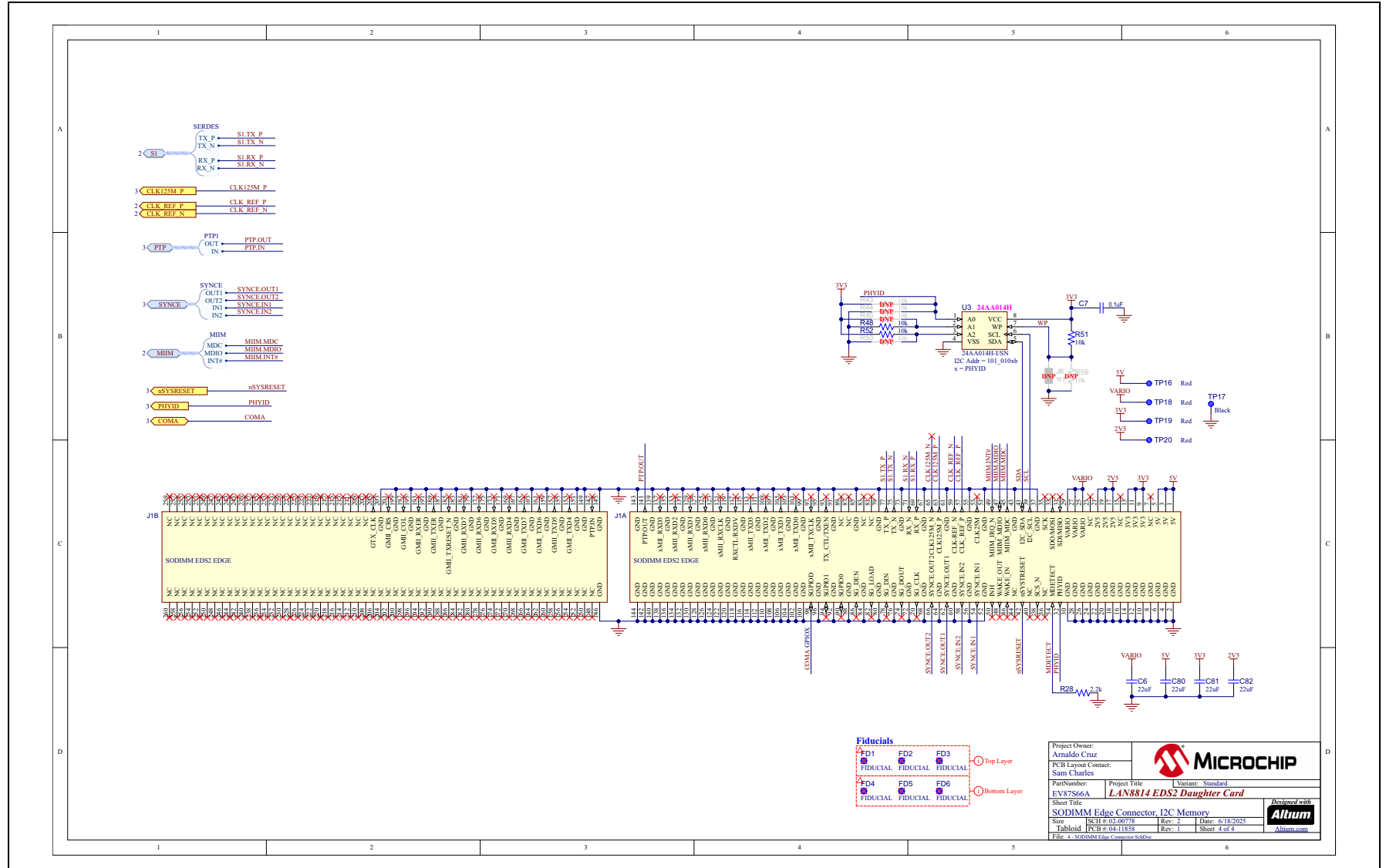


FIGURE A-4: LAN8814 EDS2 DAUGHTER CARD SODIMM EDGE CONNECTOR, I²C MEMORY



LAN8814 EDS2 Daughter Card User Guide

NOTES:



Appendix B. Bill of Materials

B.1 INTRODUCTION

This appendix contains the LAN8814 Bill of Materials (BOM).

TABLE B-1: BILL OF MATERIALS

Item	Qty	Reference	Description	Populated	Manufacturer	Manufacturer Part Number
1	49	C1, C2, C3, C4, C7, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C67	CAP CER 0.1uF 50V 10% X7R SMD 0402	Yes	Taiyo Yuden, TDK Corporation	UMK105B7104KV-FR, C1005X7R1H104K050BB
2	5	C5, C8, C16, C17, C19	CAP CER 0.1uF 16V 10% X7R SMD 0402	Yes	KEMET	C0402C104K4RACAUTO
3	4	C6, C80, C81, C82	CAP CER 22uF 16V 10% X5R SMD 0805	Yes	Samsung Electro-Mechanics	CL21A226K0QNNNE
4	2	C9, C10	CAP HiQ 12pF 50V 5% NP0 2.56GHz SMD 0402	Yes	Johanson Technology Inc	500R07S120JV4T
5	0	C11	CAP CER 0.1uF 50V 10% X7R SMD 0402	Yes	Taiyo Yuden	UMK105B7104KV-FR
6	0	C12, C13	CAP CER 0.1uF 16V 10% X7R SMD 0402	Yes	KEMET	C0402C104K4RACAUTO
7	1	C14	CAP CER 1000pF 2KV 10% X7R SMD 1206	Yes	Johanson Dielectrics Inc	202R18W102KV4E
8	3	C15, C18, C21	CAP CER 22uF 10V 10% X7R SMD 1206	Yes	Samsung Electro-Mechanics America, Inc	CL31B226KPHNNNE
9	1	C20	CAP CER 470pF 50V 5% NP0 SMD 0402	Yes	Murata	GRM1555C1H471JA01D
10	1	C72	CAP CER 0.018uF 50V 10% X7R SMD 0603	Yes	KEMET	C0603C183K5RACTU
11	1	D2	DIO RED 2V 20mA 54mcd CLEAR SMD 0603	Yes	Lite-On Inc.	LTST-C191KRKT
12	1	D3	DIO LED GREEN 2V 30mA 35mcd Clear SMD 0603	Yes	Lite-On Inc	LTST-C191KGKT
13	9	FB1, FB2, FB4, FB5, FB6, FB7, FB8, FB9, FB10	FERRITE 220R @ 100MHz 2A SMD 0603	Yes	Murata Electronics North America	BLM18EG221SN1D
14	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
15	2	J3, J4	CON RF Coaxial SMA Female 2P TH VERT	Yes	Adam Tech	RF2-04A-T-00-50-G
16	0	J5, J6	CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT	Yes	FCI	77311-118-02LF
17	1	J9	CON HDR-2.54 Male 1x3 Gold 5.84MH TH VERT	Yes	FCI	68000-103HLF
18	1	JP1	MECH HW JUMPER 2.54mm 1x2 GOLD	MECH	Sullins Connector Solutions	QPC02SXGN-RC
19	1	L1	INDUCTOR 1.5uH 3A 20% SMD L5W5H2.2	Yes	Murata Electronics North America	LQH5BPN1R5NT0L
20	1	Q7	TRANS BJT NPN MMBT3904 40V 200mA 310mW SOT-23-3	Yes	Micro Commercial Components Corporation	MMBT3904-TP
21	26	R1, R2, R3, R4, R5, R6, R7, R17, R19, R21, R23, R25, R30, R34, R35, R39, R41, R48, R51, R52, R61, R62, R63, R64, R109, R120	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
22	5	R8, R29, R36, R38, R40	RES TKF 100R 1% 1/10W SMD 0402 AEC-Q200	Yes	Panasonic Electronic Components	ERJ-2RKF1000X
23	11	R9, R10, R20, R42, R46, R47, R50, R54, R55, R56, R57	RES TKF 0R SMD 0402 AEC-Q200	Yes	Panasonic	ERJ-2GE0R00X
24	9	R11, R14, R16, R18, R22, R24, R26, R27, R60	RES TKF 330R 1% 1/10W SMD 0402 AEC-Q200	Yes	Panasonic Electronic Components	ERJ-2RKF3300X
25	0	R12, R13, R15, R43, R44, R45, R53, R59, R117	RES TKF 10k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF1002X
26	1	R28	RES TKF 2.2k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF2201X
27	1	R31	RES TKF 33R 1% 1/10W SMD 0402	Yes	Panasonic Electronic Components	ERJ-2RKF33R0X
28	1	R32	RES TKF 18.2k 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF1822V
29	1	R33	RES TKF 1k 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF1001X
30	1	R37	RES TKF 20k 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF2002V
31	0	R49	RES TKF 0R SMD 0402 AEC-Q200	Yes	Panasonic	ERJ-2GE0R00X
32	1	R58	RES TKF 1k 5% 1/10W SMD 0603	Yes	Panasonic	ERJ-3GEYJ102V
33	1	R104	RES TKF 6.04k 1% 1/10W SMD 0402 AEC-Q200	Yes	Panasonic Electronic Components	ERJ-2RKF6041X
34	1	R106	RES TKF 200R 1% 1/10W SMD 0402	Yes	Panasonic	ERJ-2RKF2000X
35	2	R112, R114	RES TKF 100k 1% 1/10W AEC-Q200 SMD 0603	Yes	Panasonic Electronic Components	ERJ-3EKF1003V
36	1	SW1	SWITCH DIP 3 SPST 24VDC 25MA DSS-03-B-PF TH	Yes	C&K	BD03
37	8	TP1, TP2, TP5, TP9, TP10, TP11, TP13, TP15	MISC, TEST POINT PC MINI, 0.040" D YELLOW	Yes	Keystone	5004
38	5	TP3, TP16, TP18, TP19, TP20	MISC, TEST POINT MULTI PURPOSE MINI RED	Yes	Keystone	5000
39	3	TP6, TP14, TP17	MISC, TEST POINT MULTI PURPOSE MINI BLACK	Yes	Keystone	5001
40	1	U1	MCHP INTERFACE ETHERNET LAN8814 QUAD 10BASE-T/100BASE-TX/1000BASE-T PHY TQFP-128	Yes	Microchip	LAN8814-V/ZMXC1
41	1	U2	MCHP ANALOG SWITCHER Buck 0.95V to 3.6V 2A MIC23201YML-TR MLF-10	Yes	Microchip Technology	MIC23201YML-TR
42	1	U3	MCHP MEMORY SERIAL EEPROM 1kb I2C 24AA014H-I/SN 8SOIC	Yes	Microchip Technology	24AA014H-I/SN
43	1	U4	MCHP ANALOG SUPERVISOR 2.93V MIC812SUY-TR SOT-143	Yes	Microchip Technology	MIC812SUY-TR
44	1	U7	MCHP ANALOG SUPERVISOR 0.4V to 5.5V MIC2790N-04VD6 SOT-23-3	Yes	Microchip Technology	MIC2790N-04VD6
45	1	Y1	MCHP CRYSTAL 25Mhz 10pF SMD L3.2W2.5H0.8	Yes	Microchip Technology	VXM7-9013-25M0000000

LAN8814 EDS2 Daughter Card User Guide

NOTES:



Appendix C. PCB Layers

C.1 INTRODUCTION

This appendix contains the LAN8814 EDS2 Daughter Card's silkscreen top and bottom layers.

FIGURE C-1: LAN8814 EDS2 DAUGHTER CARD TOP SILK SCREEN

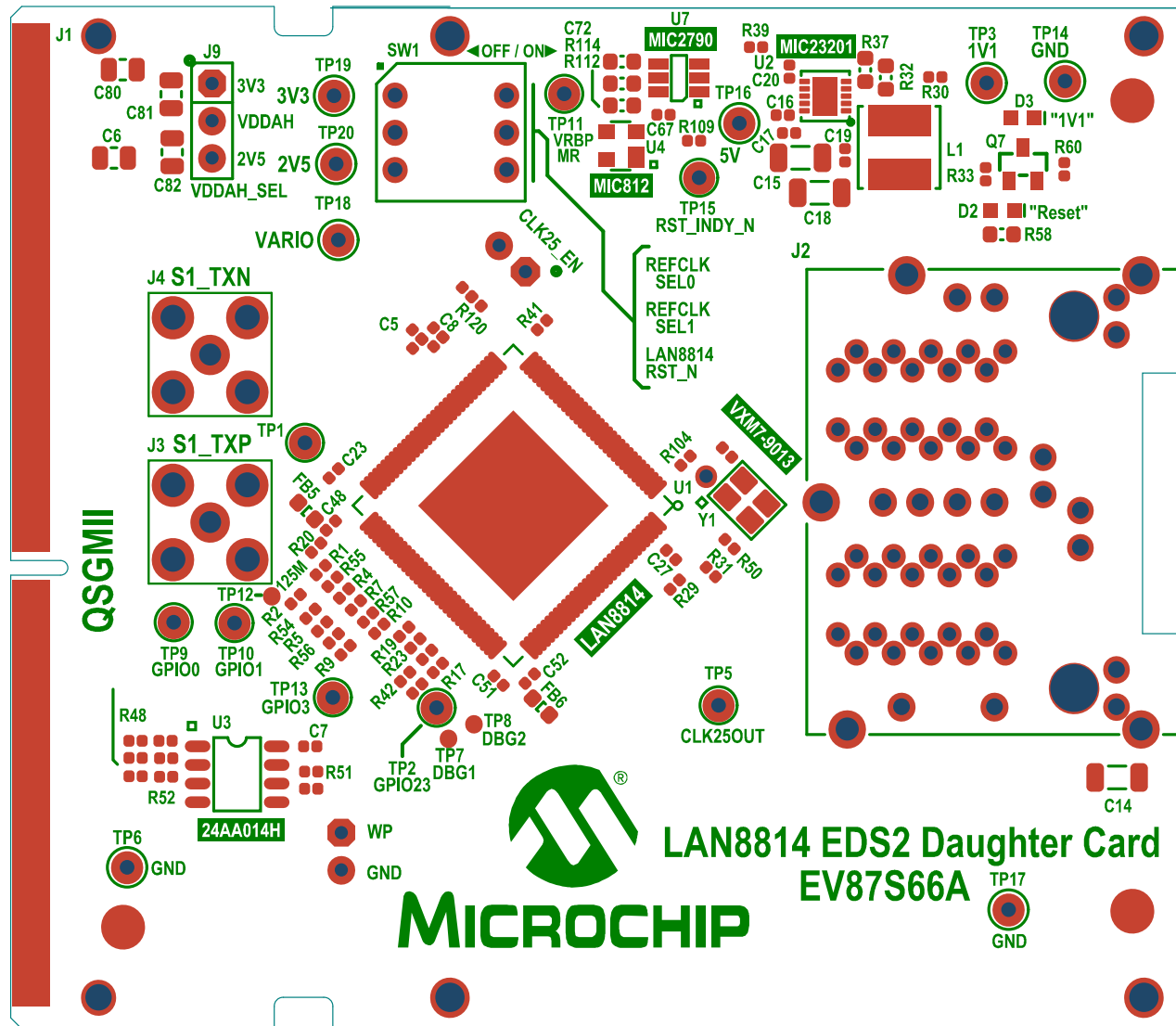


FIGURE C-2: LAN8814 EDS2 DAUGHTER CARD TOP LAYER

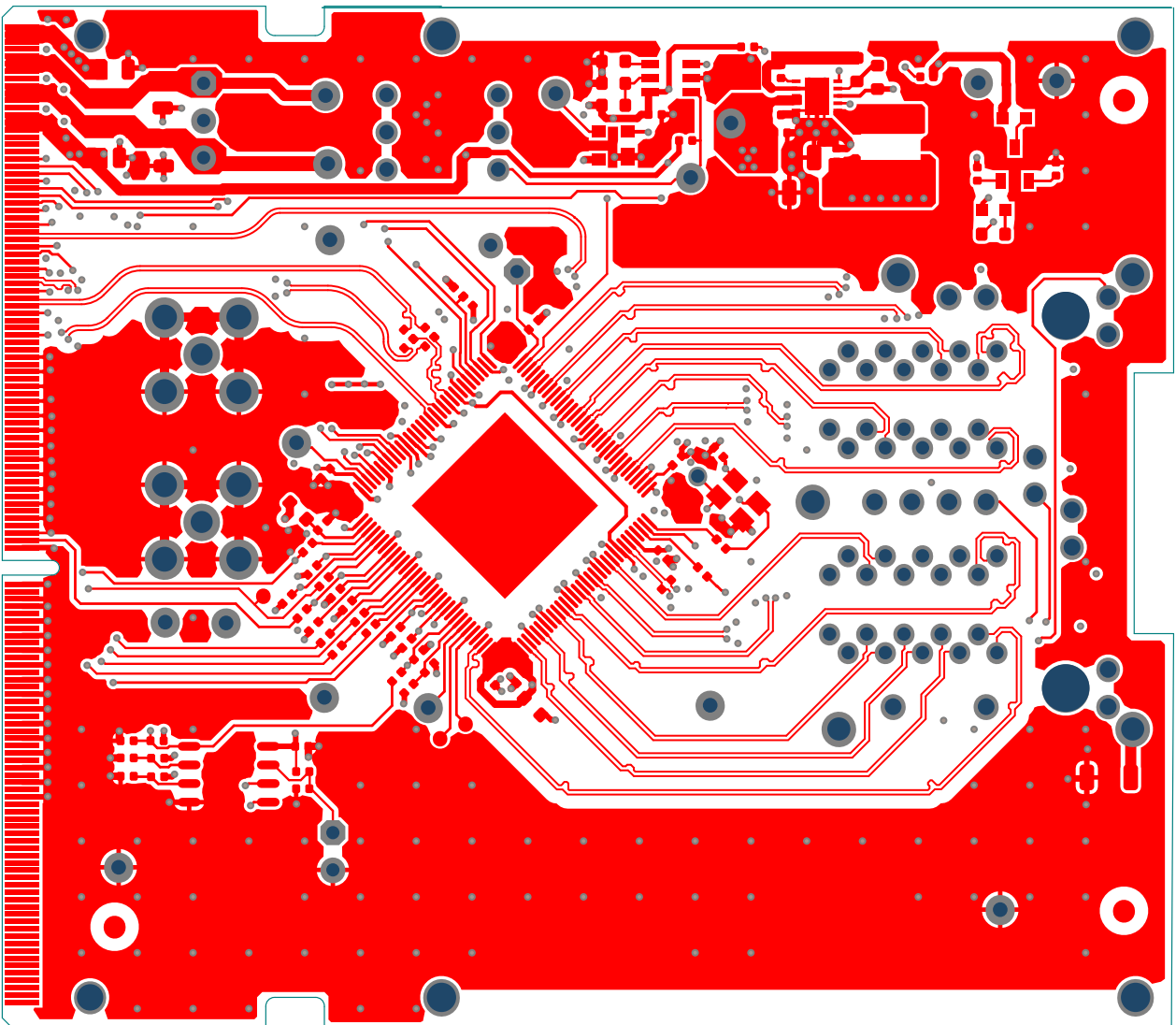
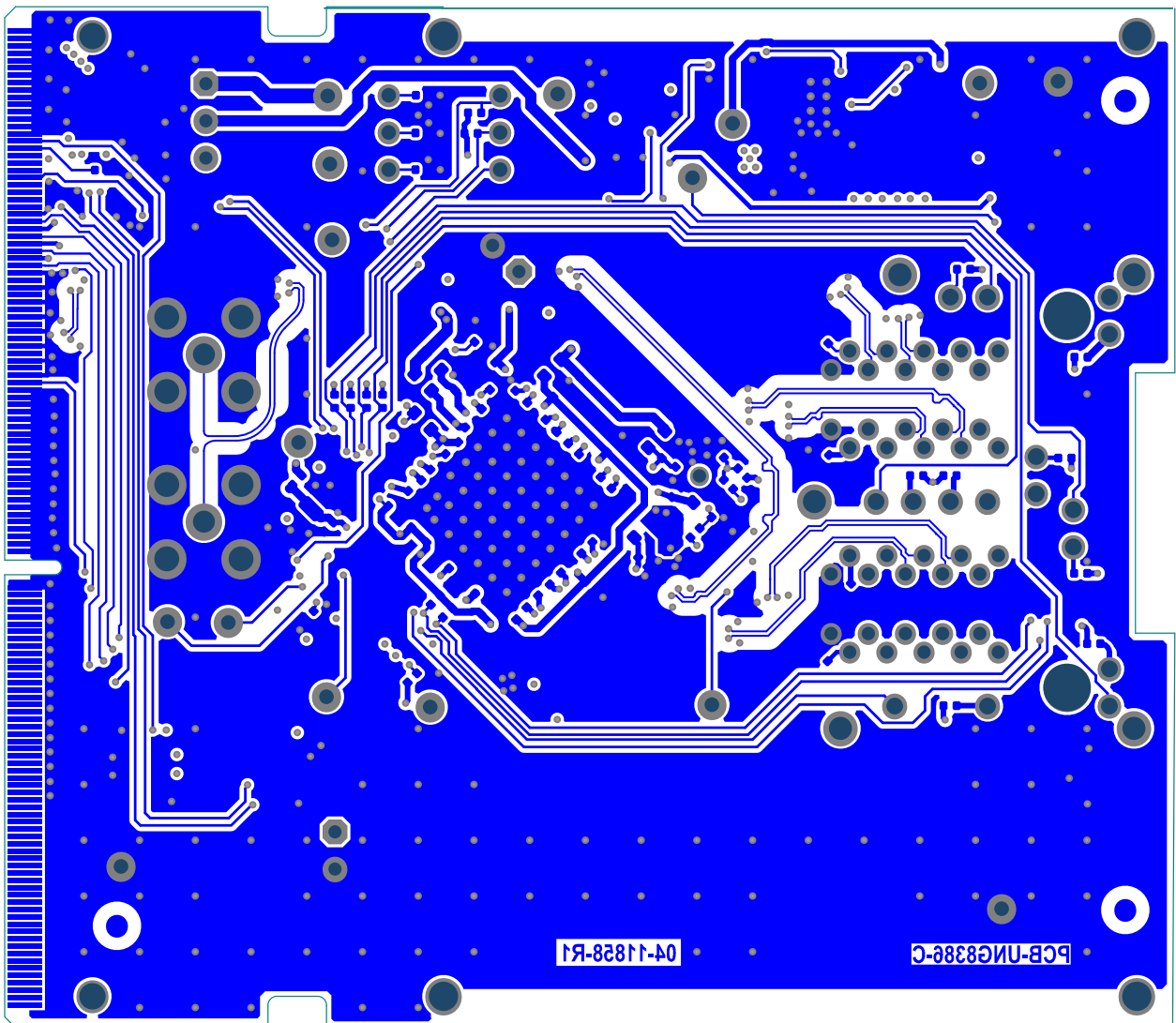


FIGURE C-3: LAN8814 EDS2 DAUGHTER CARD BOTTOM LAYER



LAN8814 EDS2 Daughter Card User Guide

NOTES: