EVB-KSZ9897
Gigabit Ethernet Switch
Evaluation Board
User's Guide

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Object of Declaration: EVB-KSZ9897

EU Declaration of Conformity
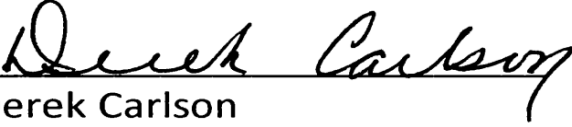
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This development/evaluation tool complies with EU RoHS2 Directive 2011/65/EU.

This development/evaluation tool, when incorporating wireless and radio-telecom functionality, is in compliance with the essential requirement and other relevant provisions of the R&TTE Directive 1999/5/EC and the FCC rules as stated in the declaration of conformity provided in the module datasheet and the module product page available at www.microchip.com.

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Signed for and on behalf of Microchip Technology Inc. at Chandler, Arizona, USA.

Derek Carlson
VP Development Tools

11-NOU-16
Date

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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 "DSXXXXXA", where "XXXXX" 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 EVB-KSZ9897. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- The Microchip Web Site
- Development Systems Customer Change Notification Service
- Customer Support
- Document Revision History

DOCUMENT LAYOUT

This document describes how to use the EVB-KSZ9897 as a development tool for the Microchip EVB-KSZ9897 gigabit Ethernet switch. The manual layout is as follows:

- **Chapter 1. "Overview"** – Shows a brief description of the EVB-KSZ9897.
- **Chapter 2. "Board Details & Configuration"** – Includes details and instructions for using the EVB-KSZ9897.
- **Appendix A. "EVB-KSZ9897 Evaluation Board"** – This appendix shows the EVB-KSZ9897.
- **Appendix B. "EVB-KSZ9897 Evaluation Board Schematics"** – This appendix shows the EVB-KSZ9897 schematics.
- **Appendix C. "Bill of Materials (BOM)"** – This appendix includes the EVB-KSZ9897 Bill of Materials (BOM).

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

Description	Represents	Examples
Arial font:		
Italic characters	Referenced books	*MPLAB® IDE User's Guide*
	Emphasized text	...is the *only* 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	*File>Save*
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	`file`.o, where `file` can be any valid filename
Square brackets [ ]	Optional arguments	`mcc18 [options] file [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
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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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- Distributor or Representative
- Local Sales Office
- 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

Revision A (March 2017)

• Initial Release of this Document.

Chapter 1. Overview

1.1 INTRODUCTION

The EVB-KSZ9897 evaluation board features three Gigabit Ethernet products, KSZ9897R, KSZ9031RNX and LAN7801. The KSZ9897R is a seven-port managed gigabit Ethernet switch. It has five 10BASE-Te/100BASE-TX/1000BASE-T physical layer transceivers (PHYs) and associated MAC units, and two MAC ports with individually configurable RGMII/MII/RMII interfaces. These two ports can be used for direct connection to a host Microprocessor or Microcontroller, another Ethernet switch or an Ethernet PHY.

KSZ9031 is a single chip 10/100/1000 Mbps IEEE 802.3 compliant Ethernet PHY. This demonstration board features the RGMII variant, KSZ9031RNX, of the KSZ9031 family. This feature-rich device offers diagnostic features, such as, LinkMD®, Parametric NAND tree and loopback functions to facilitate system bring-up and debugging in product testing and deployment. The on-chip termination resistors for the four differential pairs reduce the total board cost.

LAN7801 is a USB 3.1 to 10/100/1000 Gigabit Ethernet bridge with integrated OTP and EEPROM controller. The internal USB controller and USB PHY are compliant with the USB 3.1 Gen 1 SuperSpeed standard that implements Control, Interrupt, Bulk-in, and Bulk-out USB Endpoints. The Ethernet controller is compliant with the IEEE 802.3, IEEE 802.3u, IEEE 802.3ab, and 802.3az (Energy Efficient Ethernet) standards. The device provides multiple power management features, including Energy Efficient Ethernet (IEEE 802.3az), support for Microsoft's Always On Always Connected (AOAC), and "Magic Packet", "Wake On LAN", and "Link Status Change" wake events.

An external clock, DSC400, is used on this board to provide very low jitter clock pulses to the KSZ9897, LAN7801 and KSZ9031 Gigabit Ethernet controllers. The DSC400 is a four output crystal-less™ clock generator. It utilizes MEMS technology to provide excellent jitter and stability while providing excellent shock and vibration immunity. The device outputs wide frequency range of 2.3 MHz to 460 MHz with high noise rejection of -50 dbC. The DSC400 provides two independent select lines for choosing between two sets of pre-configured frequencies per bank. It also has two Output Enable pins to allow for enabling and disabling outputs.

On this board, the KSZ9897R Ethernet switch's five ports, 1 through 5, are connected directly to RJ45 Ethernet jacks with integrated magnetics which are available to use with any Ethernet devices. The rest of the two MAC ports are configured as RGMII interfaces. Port 6 is connected to a KSZ9031 Gigabit Ethernet PHY and an RJ45 Ethernet jack with integrated magnetics and port 7 is connected to a LAN7801 USB-to-Ethernet bridge and a USB connector.

The scope of this document is to describe the EVB-KSZ9897 evaluation board setup, which includes RGMII, SPI and I^2C interface and corresponding jumper configurations. A simplified block diagram of the board is shown in Figure 1-1.

FIGURE 1-1: **KSZ9897 BLOCK DIAGRAM**
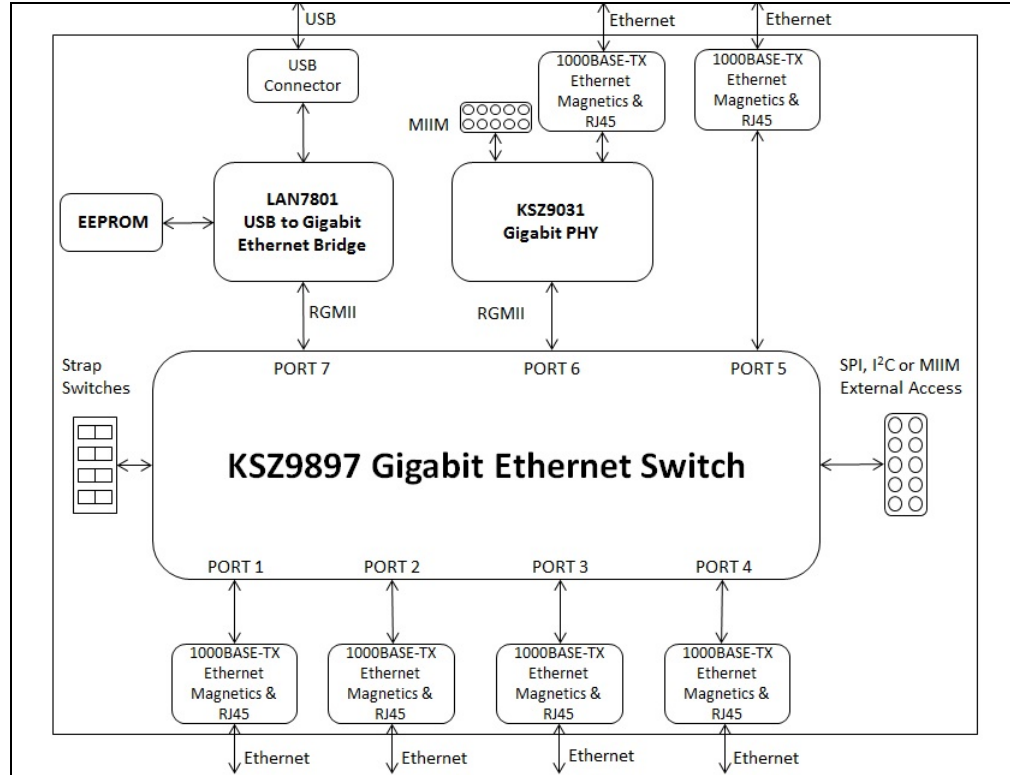
1.2   REFERENCES

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

• *KSZ9897R Data Sheet*
• *KSZ9031RNX Data Sheet*
• *LAN7801 Data Sheet*
• *EVB-KSZ9897 Schematic*
• *DSC400 Data Sheet*

1.3   TERMS AND ABBREVIATIONS

EVB - Evaluation Board

MII - Media Independent Interface

MIIM - Media Independent Interface Management, also known as MDIO/MDC

RGMII - Reduced Gigabit Media Independent Interface

I^2C - Inter Integrated Circuit

SPI - Serial Protocol Interface

PHY - Physical Transceiver

Chapter 2. Board Details & Configuration

This section includes sub-sections on the following KSZ9897 details:

- Power
- Resets
- Clock
- Configuration
- Mechanicals

2.1   POWER

2.1.1   +5V Power

A 5V/2A power supply should be connected to J7 on the board. The SW2 switch must be in the ON position to power the board. The F1 fuse is provided on the board for the over voltage protection.

2.2   RESETS

2.2.1   Power-on Reset

There are three jumpers, J15, J21 and J23, available for configuring the various reset options for the chips. Unless experimentation with reset is required, it is suggested to use the default configurations highlighted in bold text in the tables below. With these default settings, pressing the SW1 reset button will reset all three devices (KSZ9897, KSZ9031 and LAN7801). By changing the jumpers, the effect of SW1 can be limited to a subset of the three devices.

2.3   CLOCK

The evaluation board utilizes an external clock, DSC400, which provides 25 MHz 25 ppm clock to the KSZ9897, LAN7801 and KSZ9031. It also provides 125 MHz to the LAN7801.

2.4   CONFIGURATION

The following sub-sections describe the various board features and configuration settings. A top view of the KSZ9897 is shown in Figure 2-1.

FIGURE 2-1:   KSZ9897 TOP VIEW WITH CALLOUTS
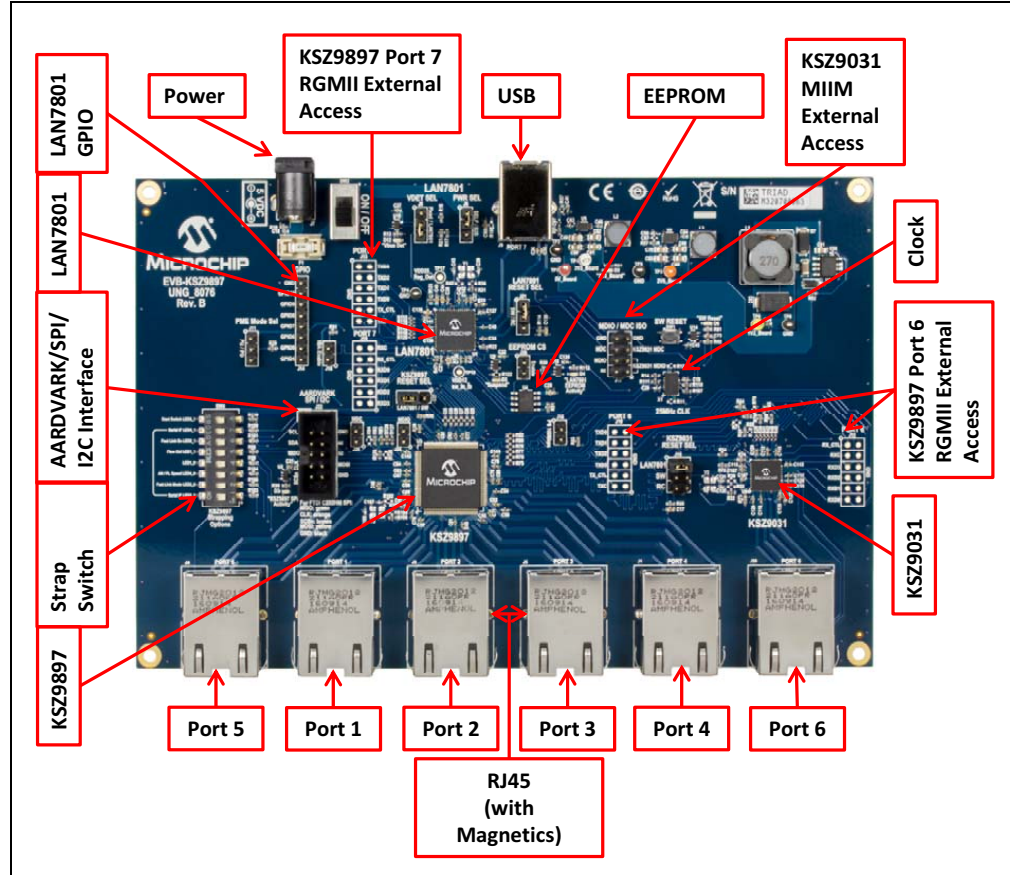
2.4.1   Switch Settings

SW4 is an eight-position switch which controls many of the KSZ9897 configuration strap options. The KSZ9897 samples these signals at the rising edge of RESET_N to determine some internal settings. Following reset, the configuration of these switches is irrelevant. For initial bring-up, leave most switches in the OFF/OPEN position.

2.4.1.1   KSZ9897 MANAGEMENT INTERFACE MODE

The management interface can be configured to be SPI, I^2C or MIIM (a.k.a. MDC/MDIO). This is controlled by switches 1 and 7 of SW4.

Table 2-1 details the switch configuration for the management interface mode.

TABLE 2-1:   MANAGEMENT INTERFACE MODE

SW4.7 (LED4_1)	SW4.1(LED3_1)	Mode
On	On	MDIO
On	Off	I^2C
Off	Don't Care	SPI

2.4.1.2   OTHER SWITCH SETTINGS

Please refer the device data sheet for the detailed configuration strap settings.

2.4.2   Jumper Settings

Table 2-2, Table 2-3 and Table 2-4 describe the jumper settings. The preferred configuration is shown in bold text.

TABLE 2-2:   TWO-PIN JUMPERS

Jumper	Label	Description	Open	Closed
J16	P6 100 Mbps	KSZ9897 Port 6 RGMII speed configuration strap setting. The setting of this jumper takes effect only after reset. This setting must match the actual link speed of port 6. The KSZ9897 port 6 speed can also be set via the SPI or I^2C interface by writing to registers 0x6300 (bit 4) and 0x6301 (bit 6). See the data sheet for details. This method is required when the port 6 link speed is 10 Mbps.	1000 Mbps	100 Mbps
J18	IBA Enable	Enable KSZ9897 In-Band-Management (IBA) (Configuration strap)	**Disabled (Default)**	Enabled
J28	EEPROM CS	Enable external EEPROM for LAN7801	Disabled	Enabled

TABLE 2-3:   THREE-PIN JUMPERS

Jumper	Label	Description	Jumper 1-2	Jumper 2-3
J6	PWR SEL	Board power source: 5V barrel connector or USB	Power from barrel jack	USB powered (not recommended)
J8	VDET SEL	LAN7801 USB Vbus detect	Board +3.3V	**Vbus from USB connector (Default)**
J11	PME Mode SEL	LAN7801 PME Mode input pin	**High (Default)**	Low

TABLE 2-3:   THREE-PIN JUMPERS (CONTINUED)

Jumper	Label	Description	Jumper 1-2	Jumper 2-3
J21	LAN7801 RESET SEL	LAN7801 Reset input source	**Master SW1 & RC Circuit (Default)**	Alternate RC circuit
J23	KSZ9897 RESET SEL	KSZ9031 Reset input source	Master SW1 & RC circuit	**LAN7801 Reset output (Default)**
J24	KSZ9897 MDIO enable	Install these jumpers to allow the KSZ9897 MIIM interface (together with the KSZ9031 MIIM interface) to be accessible from the LAN7801 or from J17. If the KSZ9897 management port is configured for SPI or I^{2}C, do not install these jumpers.		
J25	KSZ9897 MDC enable			

TABLE 2-4:   MULTI-PIN HEADERS

Jumper	Label	Description	Configuration
J15	KSZ9031 RESET SEL	KSZ9031 Reset input source 3x2 header	Install a jumper on one of the three pairs only: **1-2: LAN7801 Reset output (Default)** 3-4: Master SW1 & RC circuit 5-6: Alternate RC circuit
J17	MDIO/MDC ISO	KSZ9031 MIIM (MDC/MDIO) external access and jumpers 4hx2 header	Install jumpers 3-4 and 5-6 to access the KSZ9031 MIIM bus from the LAN7801. (Not currently available) For external access to KSZ9031 MIIM bus, install only jumper 2-4, and use pins 1,3,5 and 7 for external connection.
J14	GPIO	LAN7801 GPIO pins 8x1 header	Provides access to the GPIO pins of the LAN7801. No jumpers.
J22	AARDVARK	KSZ9897 SPI/I^{2}C header for external access 5x2 header	Supports Aardvark (TTP100005 - Total Phase Aardvark I^{2}C/SPI Host Adapter) and Cheetah (TTP100004 - Total Phase Cheetah SPI Host Adapter) from Totalphase.

2.4.3   SPI, I^{2}C and MIIM Management

External access to the KSZ9031 MIIM bus is available via header J17 as outlined in the table above. External access to the KSZ9897 (either SPI, I^{2}C or MIIM) is available via header J22 as outlined in Table 2-4. If both connections are needed simultaneously, it will be necessary to remove resistor R95. Please visit Table 2-5 and Table 2-6 for I^{2}C and SPI connections.

TABLE 2-5:   I^{2}C

I^{2}C Signal	Connector Pin
SDA	J22.3 and/or J22.8
SCL	J22.7 (R126 not currently installed)
GND	J22.2 and/or J22.10

TABLE 2-6: **SPI**

SPI Signal	Connector Pin
MISO	J22.5
MOSI	J22.8
SCK	J22.7
SS	J22.9
GND	J22.2 and/or J22.10

FIGURE 2-2: **SPI/AARDVARK HEADER**
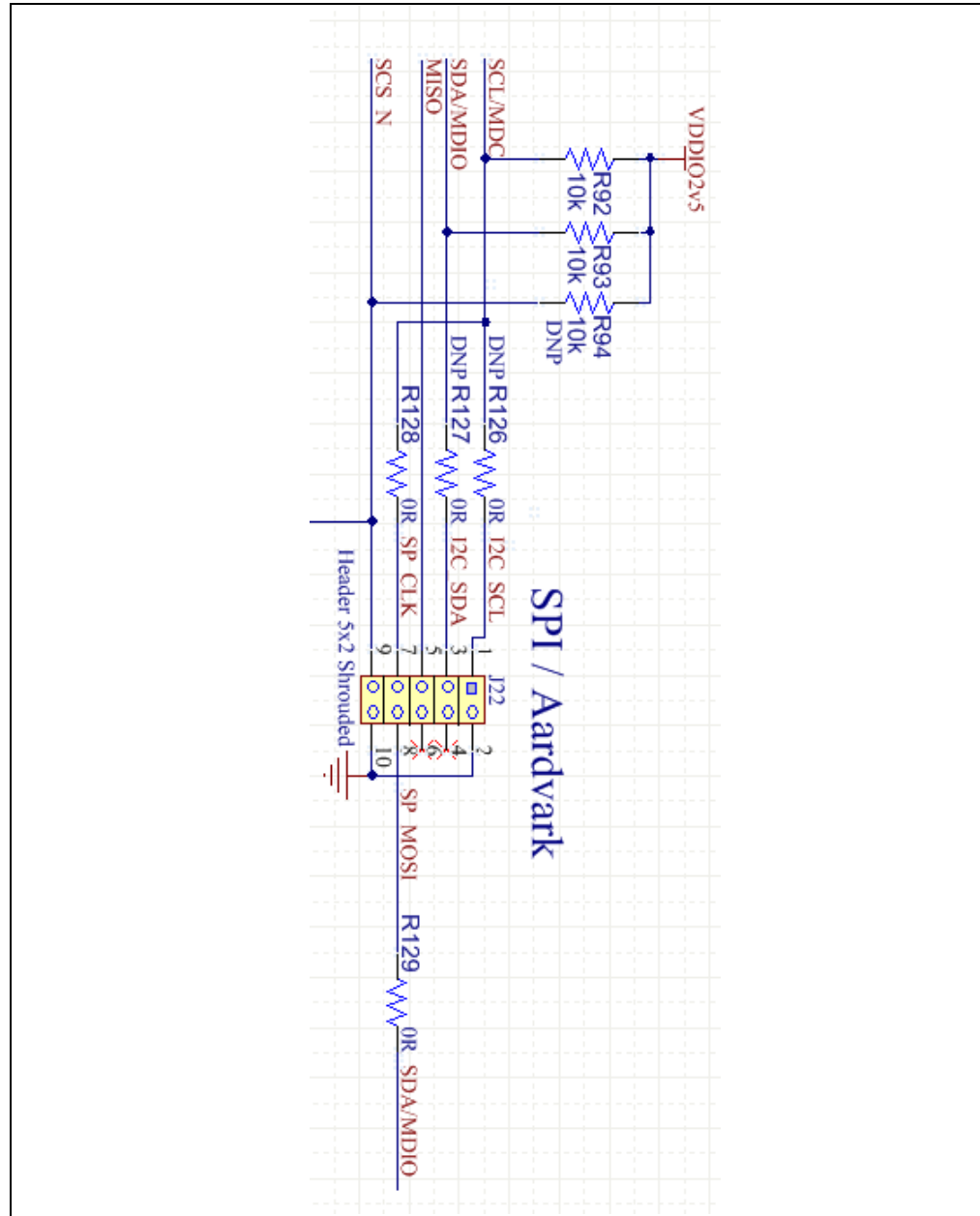
Note: Communication formats and register details are provided in the device data sheets. Note that SPI or I^2C provide access to all KSZ9897 registers, but MIIM does not. It only provides access to the PHY registers of the switch.

2.5   USING THE EVB-KSZ9897

The EVB-KSZ9897 board can be used to connect up to 7 Ethernet devices using 6 Ethernet ports and 1 USB port.

For example, connect a PC (PC1) on port 1 and another PC (PC2) to port 2. Configure both PCs for STATIC IP address using the Ethernet interface's properties windows. Then, run a simple PING command to test communication between the two PCs. Lastly, connect PC2 to the USB port, port 7, on the board.

A user can access the KSZ9897 switch's internal registers by connecting Aardvark I^{2}C/SPI host adapter to jumper 22. The adapter is available to purchase from MicrochipDirect.com web site (part number TTP100005).

2.6   MECHANICALS

FIGURE 2-3:   KSZ9897 MECHANICAL DIMENSIONS
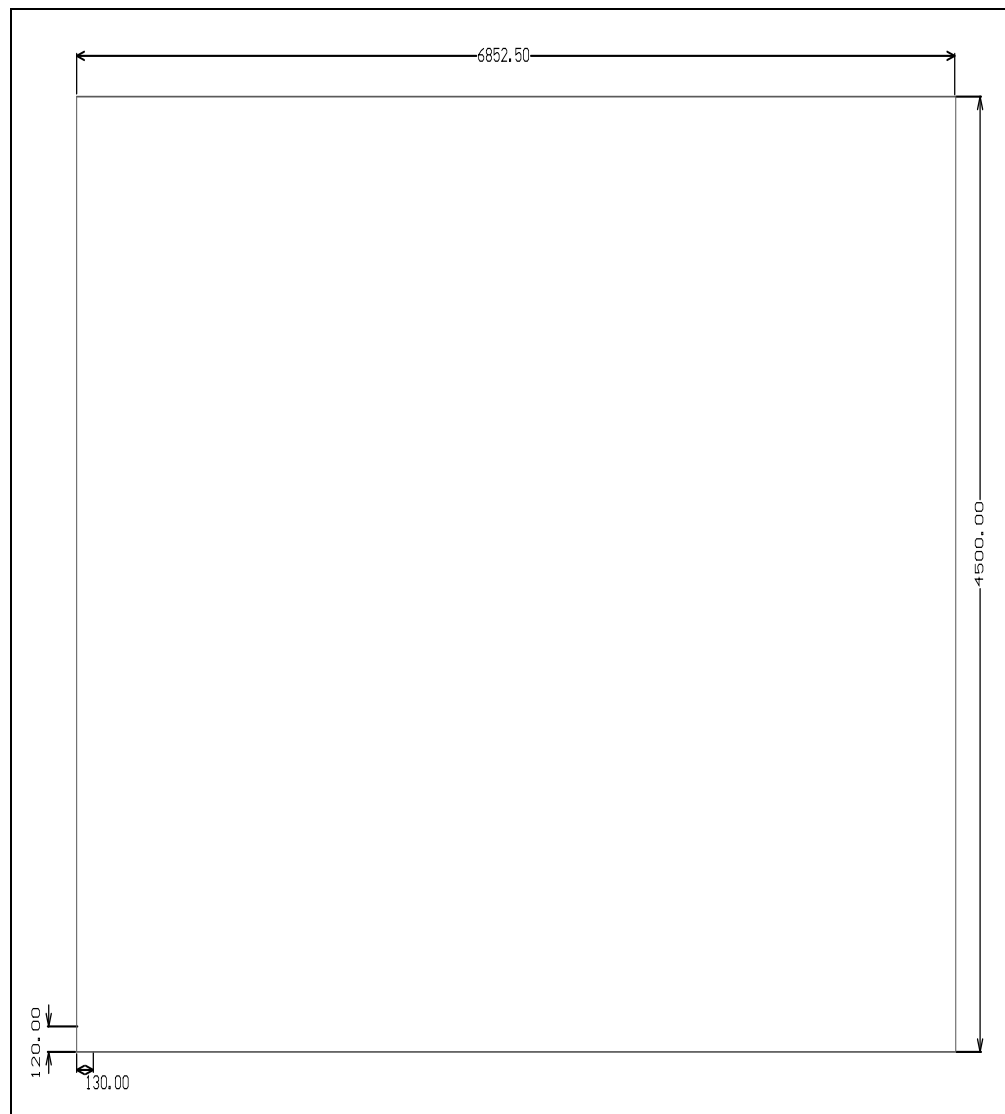
Appendix A. EVB-KSZ9897 Evaluation Board

A.1 INTRODUCTION

This appendix shows the EVB-KSZ9897 Evaluation Board.

FIGURE A-1: EVB-KSZ9897 EVALUATION BOARD
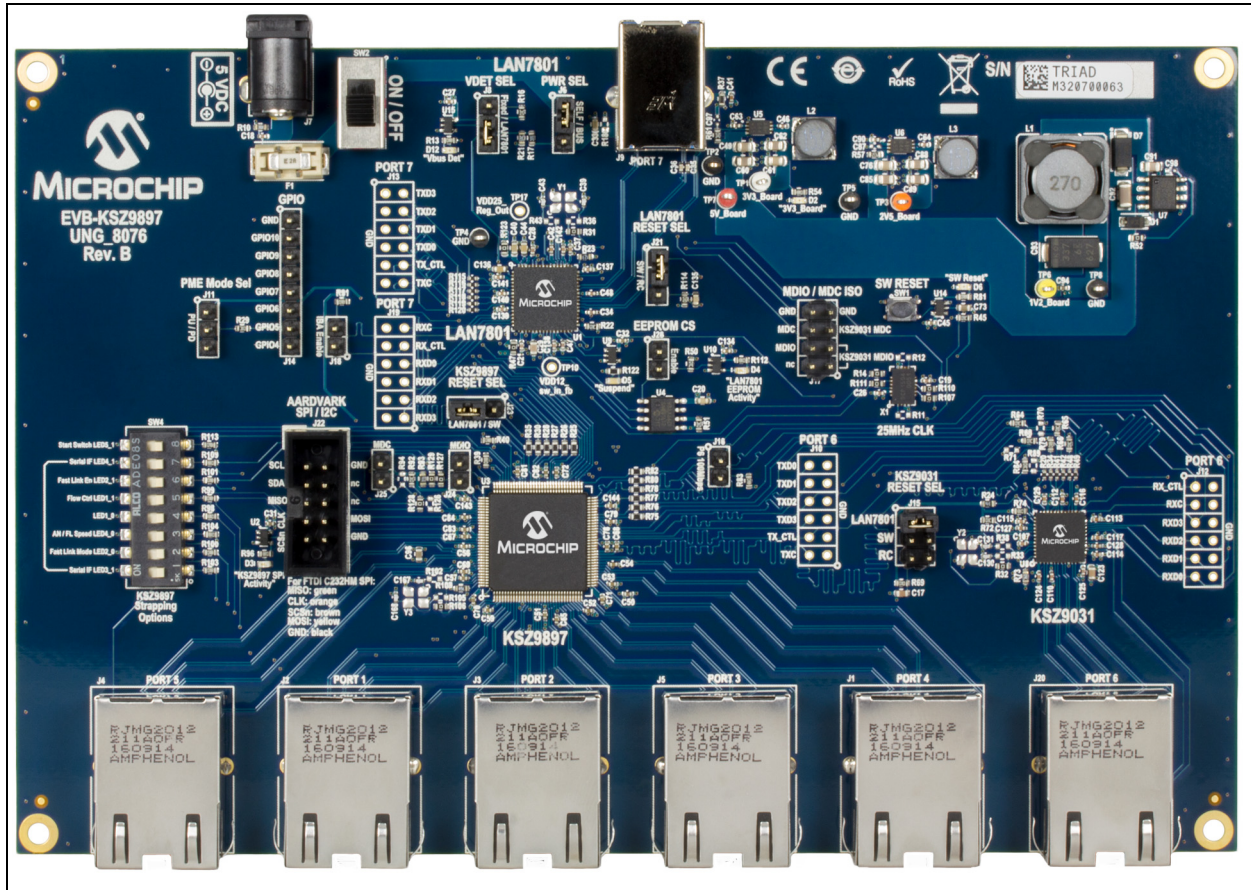
NOTES:

Appendix B. EVB-KSZ9897 Evaluation Board Schematics

B.1 INTRODUCTION

This appendix shows the EVB-KSZ9897 Evaluation Board Schematics.

FIGURE B-1: **KSZ9897 FUNCTIONAL**

Place all termination close to 9897

Prt 6: KSZ9031

Prt 7: LAN7801

9897 Reset Select

1-2 Reset from Push Button
2-3 Reset from LAN7801

Place Reset ckt close to 9897

Strapping Options
(default = all LEDs low)

RGMII layout requirements
1. Match trace legths within 100 mils.
2. RX signals do not need to be length matched to TX signals.
3. Due to KSZ9897 port 6 RGMII setup time requirement, P6_TXC must be routed for additional 1.2ns delay relative to P6_TXD[3:0] and P6_TX_CTL. The amount of required extra delay may differ for different VDDIO voltage or for a different device driving the signals.
4. Alternatively, the additional P6_TXC trace delay is not needed if the RGMII ingress delay bit is set in the KSZ9897: bit 4 in register 0x6301.

FIGURE B-2:   RJ45 MAGJACK CONNECTORS

FIGURE B-3:   KSZ9031 FUNCTIONAL

FIGURE B-4:   LAN7801 64QFN FUNCTIONAL
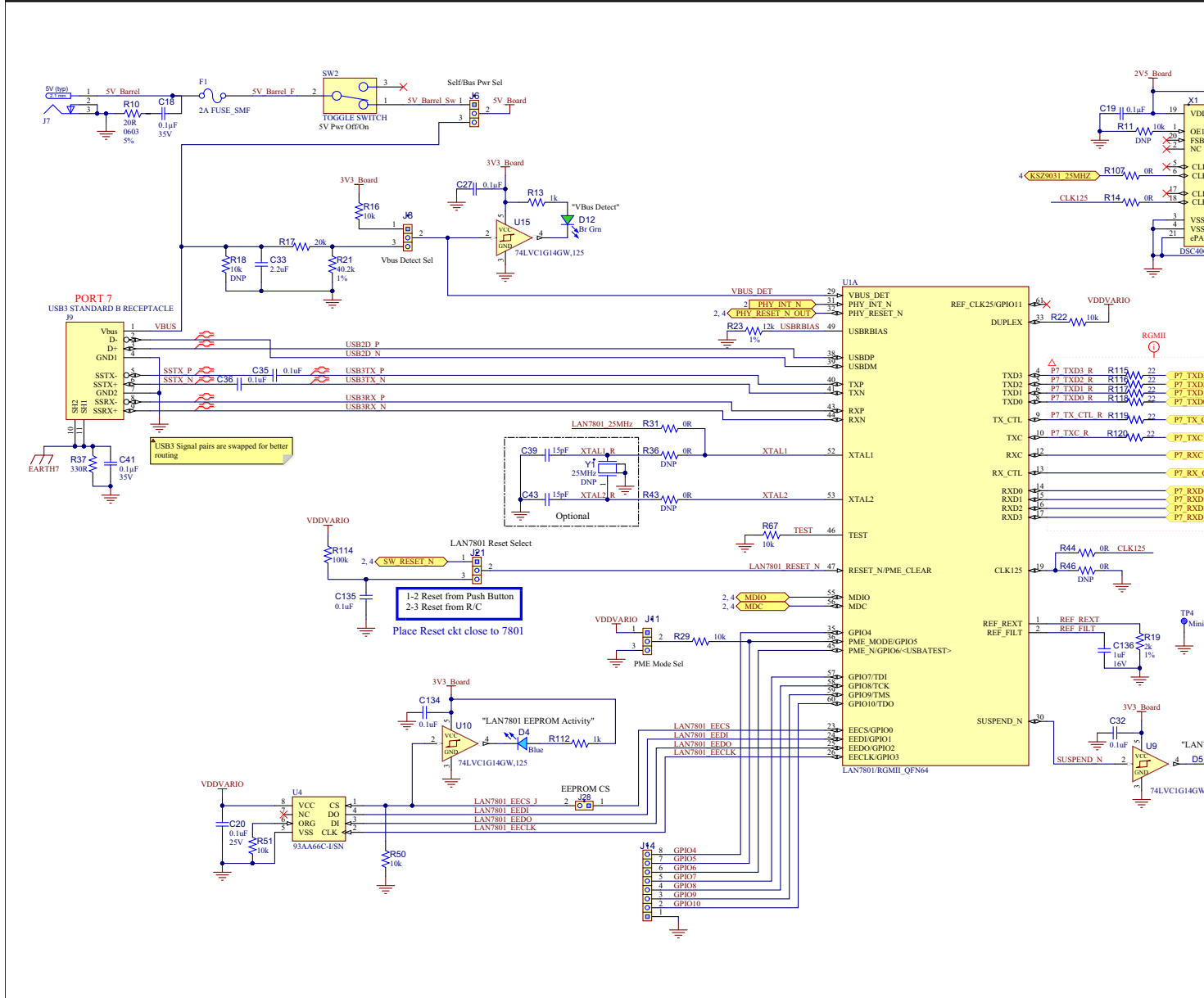
FIGURE B-5: LAN7801 / KSZ9897 POWER & REGULATORS
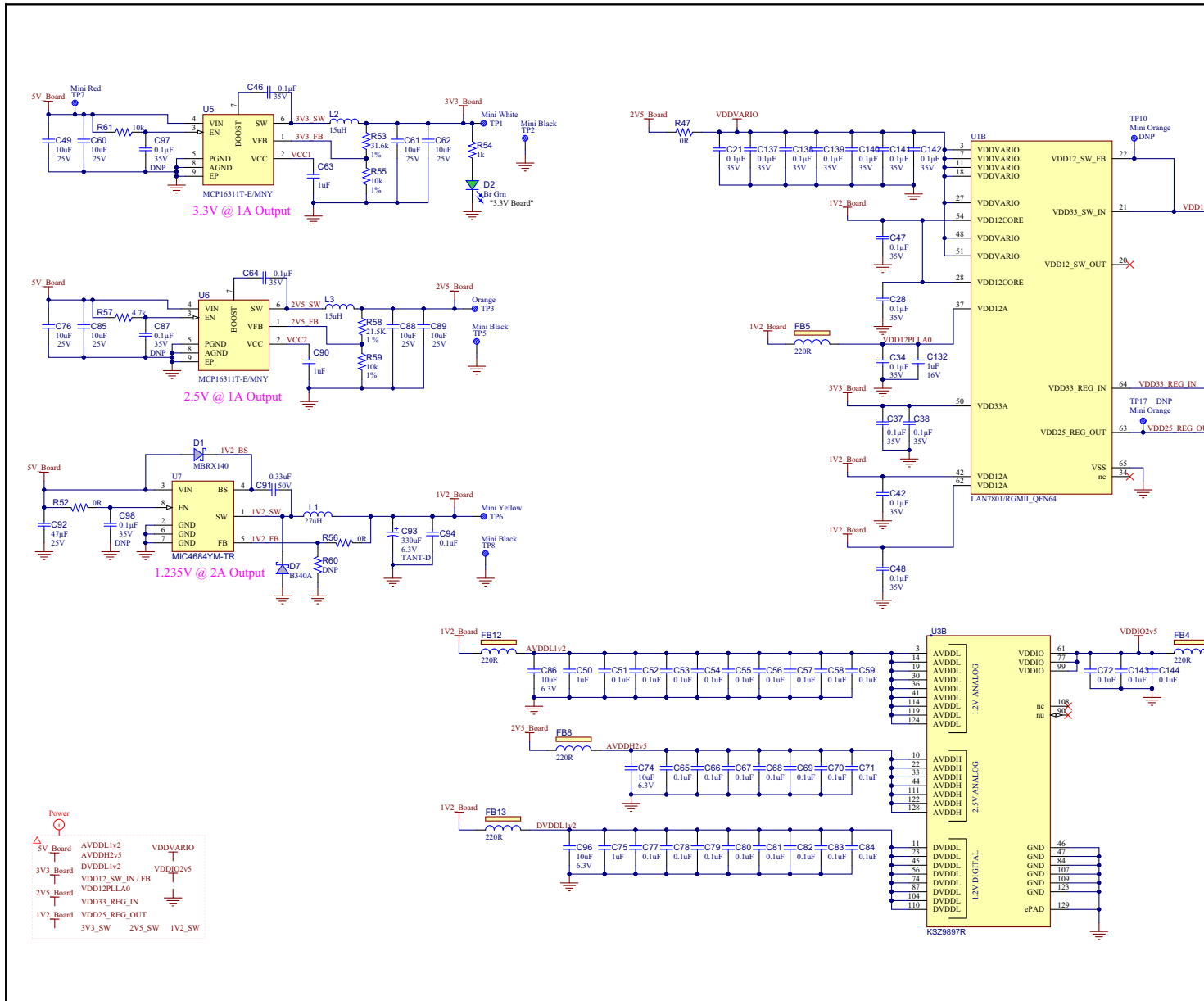
Appendix C. Bill of Materials (BOM)

C.1 INTRODUCTION

This appendix includes the EVB-KSZ9897 Evaluation Board Bill of Materials (BOM).

TABLE C-1: EVB-KSZ9897 EVALUATION BOARD BILL OF MATERIALS

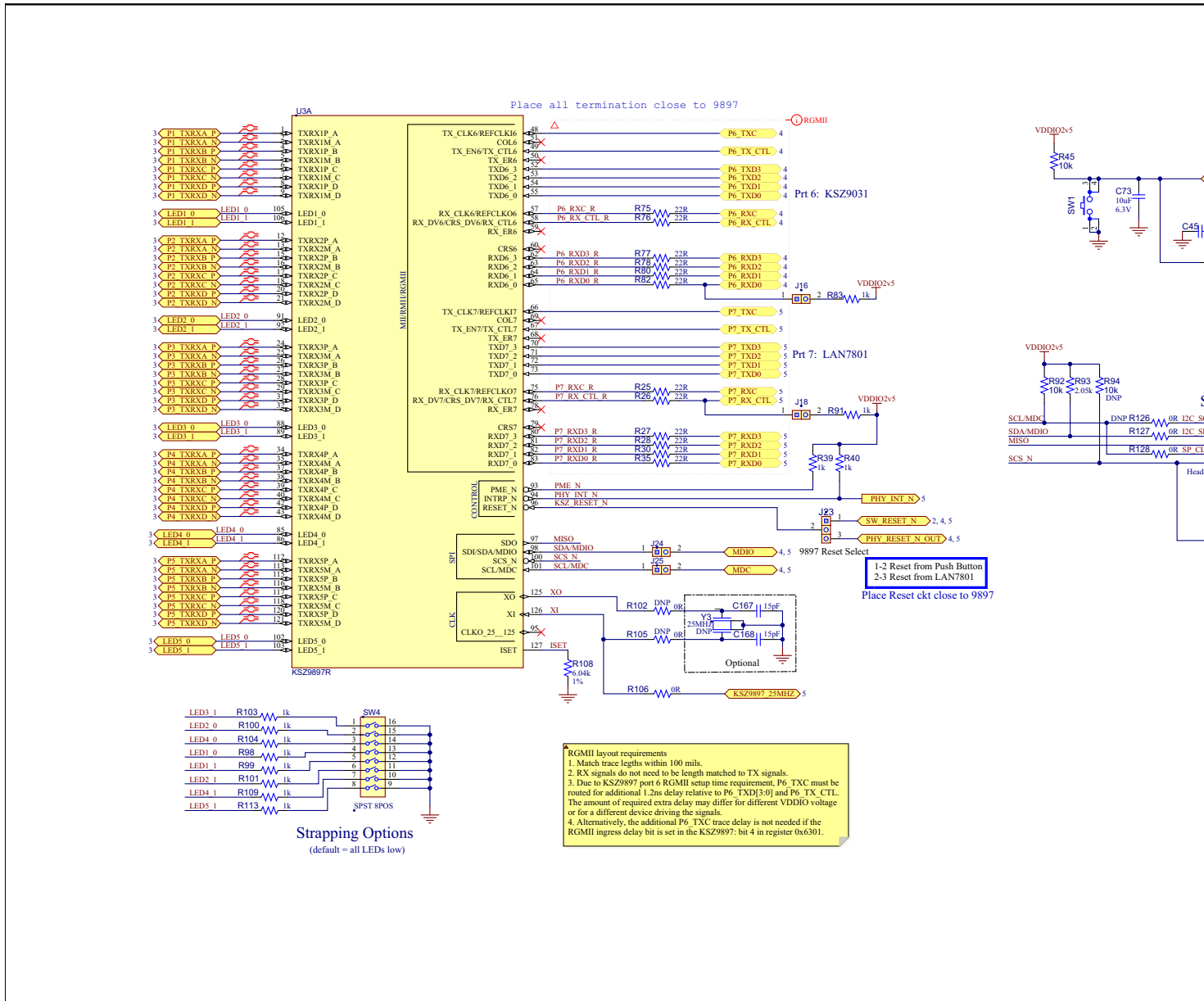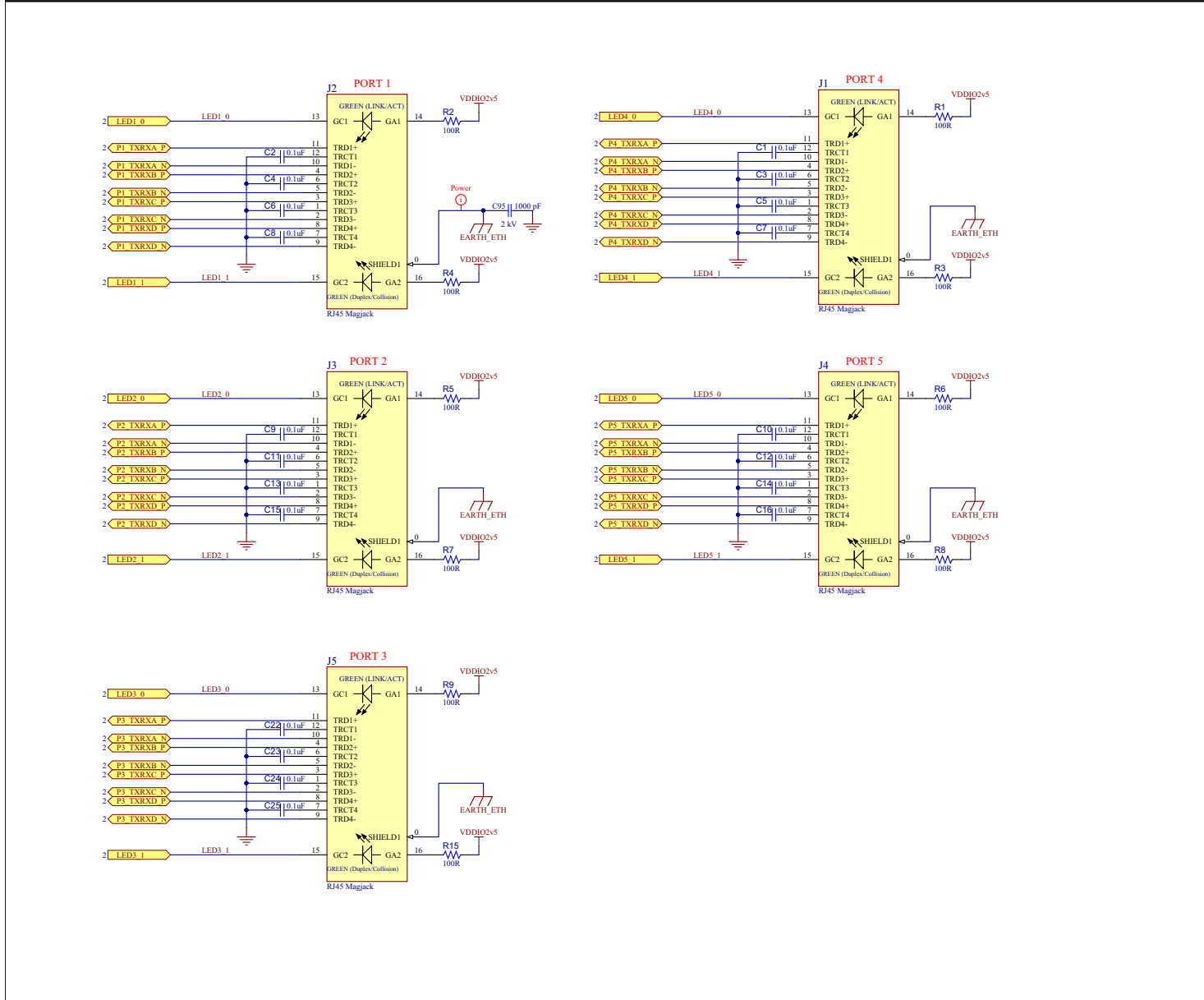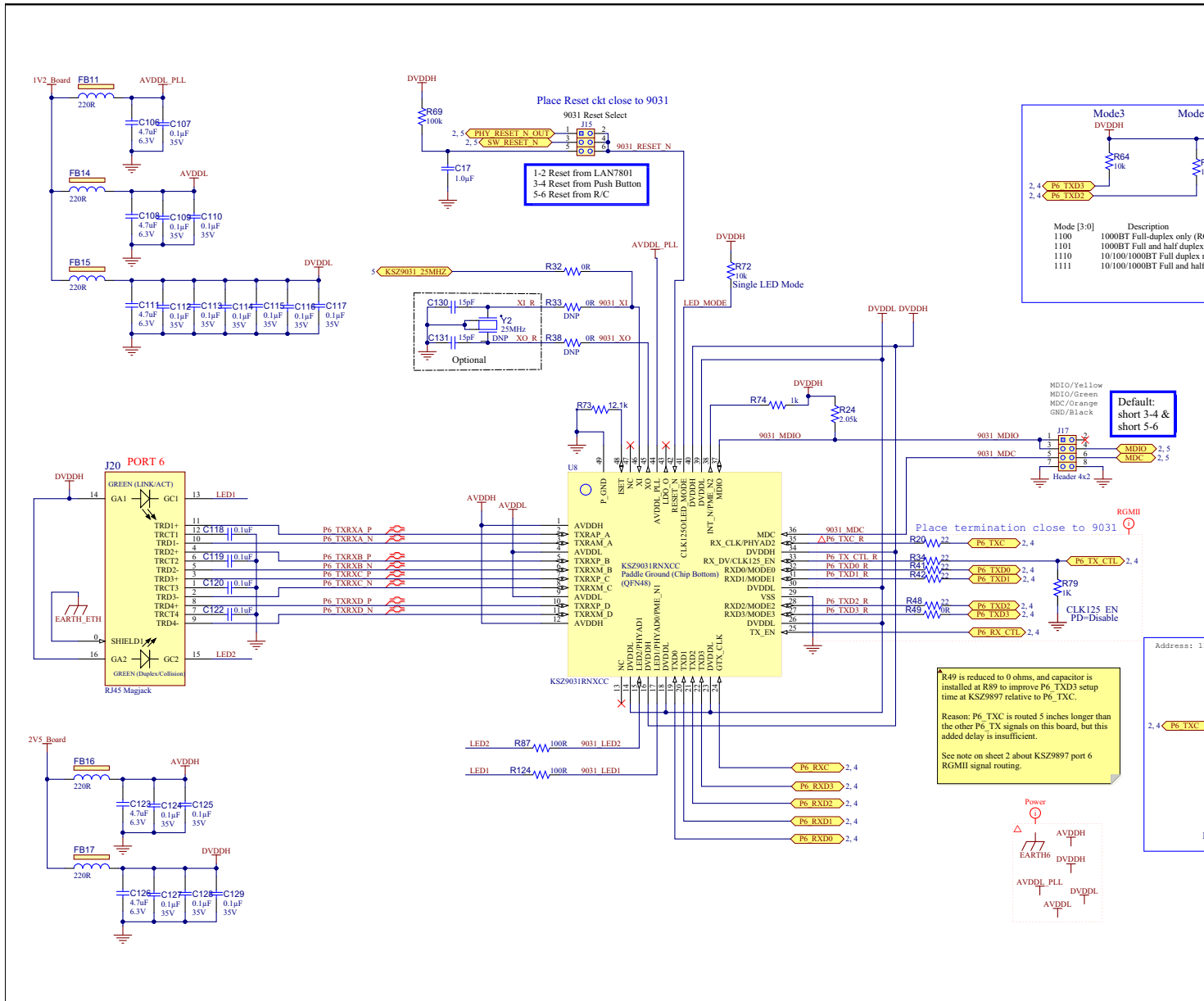| Item	Qty	Reference	Description	Populated	Manufacturer
1	56	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C22, C23, C24, C25, C31, C32, C45, C51, C52, C53, C54, C55, C56, C57, C58, C59, C65, C66, C67, C68, C69, C70, C71, C72, C77, C78, C79, C80, C81, C82, C83, C84, C94, C118, C119, C120, C122, C134, C143, C144	CAP CER 0.1uF 50V 10% X7R SMD 0402	YES	TDK Corporation
2	1	C17	CAP CER 1UF 50V 10% X7R 0603	YES	Taiyo Yuden
3	35	C18, C19, C21, C26, C27, C28, C34, C37, C38, C41, C42, C46, C47, C48, C64, C107, C109, C110, C112, C113, C114, C115, C116, C117, C124, C125, C127, C128, C129, C137, C138, C139, C140, C141, C142	CAP CER 0.1UF 35V X5R 0402	YES	TDK Corporation
4	2	C20, C135	CAP CER 0.1uF 25V 10% X7R SMD 0603	YES	Murata
5	6	C29, C106, C108, C111, C123, C126	CAP CER 4.7uF 6.3V 20% X5R SMD 0603	YES	Panasonic
6	1	C33	CAP CER 2.2uF 6.3V 10% X7R SMD 0603	YES	TDK
7	2	C35, C36	CAP CER 0.1uF 10V 10% X5R SMD 0402	YES	KEMET
8	6	C39, C43, C130, C131, C167, C168	CAP CER 15pF 50V 5% NP0 SMD 0402	YES	Murata
9	4	C40, C44, C132, C136	CAP CER 1uF 16V 10% X5R SMD 0603	YES	AVX
10	8	C49, C60, C61, C62, C76, C85, C88, C89	CAP CER 10uF 25V 10% X5R SMD 0805	YES	Murata
11	2	C50, C75	CAP CER 1uF 16V 10% X5R SMD 0402	YES	TDK Corporation
12	2	C63, C90	CAP CER 1UF 35V 10% X5R SMD 0402	YES	Murata Electronics North America
13	4	C73, C74, C86, C96	CAP CER 10uF 6.3V 20% X5R SMD 0603	YES	AVX
14	1	C91	CAP CER 0.33uF 50V 10% X7R SMD 0805	YES	TDK Corporation
15	1	C92	CAP CER 47UF 25V X5R 1206	YES	TDK Corporation
16	1	C93	CAP TANT 330uF 6.3V 20% 45mOhm SMD D	YES	KEMET
17	1	C95	CAP CER 1000PF 2KV 1808	YES	Murata

TABLE C-1: EVB-KSZ9897 EVALUATION BOARD BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference	Description	Populated	Manufacturer
18	1	R89	CAP CER 12pF 50V 5% NP0 SMD 0603	YES	Panasonic
19	1	D1	DIO SCTKY MBRX140-TP 550mV 1A 40V SMD SOD-123	YES	Micro Commercial Co
20	2	D2, D12	LED, Bright Green, 0603	YES	Lite-On
21	2	D3, D4	LED, Blue, 0603	YES	Kingbright
22	1	D5	DIO LED YELLOW 2.1V 20mA 14mcd Diffuse SMD 0603	YES	Lumex
23	1	D6	LED, Bright Red, 0603	YES	Lite-On
24	1	D7	DIO SCTKY B340A 500mV 3A 40V DO-214AC_SMA	YES	Diodes Incorporated
25	1	F1	Surface Mount Fuses Fuseblock w/ fuse 2A OMNI BLOK 154	YES	Littelfuse
26	10	FB4, FB5, FB8, FB11, FB12, FB13, FB14, FB15, FB16, FB17	FERRITE 2A 220R SMD 0805	YES	Murata Electronics North America
27	6	J1, J2, J3, J4, J5, J20	CON MODULAR RJ45 MAGJACK TH R/A	YES	Amphenol Commercial Products
28	3	J6, J8, J11	HDR 3POS .100" SGL GOLD	YES	Samtec Inc.
29	1	J7	CONN PWR JACK 2.5X5.5MM HIGH CUR	YES	CUI Inc.
30	1	J9	CONN RCPT USB TYPE B 3.0 R/A	YES	Wurth Electronics Inc
31	1	J14	CON HDR-2.54 MALE 1x8 GOLD 5.84MH TH VERT	YES	Samtec
32	1	J15	CONN HEADER 6POS .100" DUAL GOLD	YES	Samtec
33	4	J16, J18, J24, J25	CON HDR-2.54 MALE 1x2 GOLD 5.84MH TH VERT	YES	Samtec
34	1	J17	CON HDR-2.54 Male 2x3 Gold 5.84MH TH VERT	YES	Samtec
35	2	J21, J23	CON HDR-2.54 MALE 1x3 GOLD 5.84MH TH VERT	YES	Samtec
36	1	J28	HDR 2POS .100" SGL GOLD	YES	Samtec Inc.
37	1	L1	IND 27uH 20 % 2.35A SMD	YES	Bourns
38	2	L2, L3	INDUCTOR 15uH 1.16A 20% SMD MSS6132	YES	Coilcraft
39	12	R1, R2, R3, R4, R5, R6, R7, R8, R9, R15, R87, R124	RES TKF 100R 5% 1/10W SMD 0603	YES	Panasonic
40	1	R10	RES TKF 20R 5% 1/10W SMD 0603	YES	NIC Components
41	2	R13, R54	RES 1k 5% 1/10W SMD 0603	YES	Panasonic Electronic Components
42	16	R14, R31, R32, R44, R47, R52, R56, R106, R107, R110, R111, R123, R125, R127, R128, R129	RES TKF 0R 1/10W SMD 0603	YES	Panasonic
43	1	R49	RES TKF 0R SMD 0402	YES	Panasonic
44	15	R16, R22, R29, R50, R51, R61, R64, R65, R66, R67, R68, R72, R84, R85, R86	RES TKF 10k 5% 1/10W SMD 0603	YES	Panasonic
45	1	R17	RES TKF 20k 5% 1/10W SMD 0603	YES	Panasonic

TABLE C-1:   EVB-KSZ9897 EVALUATION BOARD BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference	Description	Populated	Manufacturer
46	1	R19	RES TKF 2k 1% 1/10W SMD 0603	YES	Panasonic
47	11	R20, R34, R41, R42, R48, R115, R116, R117, R118, R119, R120	RES 22ohm 5% 1/10W SMD 0402	YES	Panasonic
48	1	R21	RES TKF 40.2k 1% 1/16W SMD 0603	YES	Panasonic Electronic Components
49	1	R23	RES TKF 12k 1% 1/10W SMD 0603	YES	Yageo
50	2	R24, R93	RES TKF 2.05k 1% 1/10W SMD 0603	YES	Yageo
51	12	R25, R26, R27, R28, R30, R35, R75, R76, R77, R78, R80, R82	RES TKF 22R 1% 1/10W SMD 0603	YES	Yageo
52	1	R37	RES TKF 330R 5% 1/10W SMD 0603	YES	Panasonic Electronic Components
53	17	R39, R40, R74, R79, R81, R83, R91, R96, R98, R99, R100, R101, R103, R104, R109, R112, R113	RES TKF 1k 5% 1/10W SMD 0603	YES	Panasonic
54	2	R45, R92	RES TKF 10k 5% 1/10W SMD 0603	YES	Panasonic
55	1	R53	RES TKF 31.6K 1% 1/10W SMD 0603	YES	Panasonic Electronic Components
56	2	R55, R59	RES TKF 10k 1% 1/10W SMD 0603	YES	NIC Components
57	1	R57	RES TKF 4.7k 5% 1/10W SMD 0603	YES	Panasonic
58	1	R58	RES TKF 21.5K 1% 1/10W SMD 0603	YES	Panasonic
59	2	R69, R114	RES TKF 100k 5% 1/10W SMD 0603	YES	Panasonic
60	1	R73	RES 12.1K 1% 1/10W 0603	YES	Panasonic Electronic Components
61	1	R108	RES TKF 6.04k 1% 1/10W SMD 0603	YES	Yageo
62	1	R122	RES TKF 330R 5% 1/10W SMD 0603	YES	Panasonic
63	1	SW1	Tactile Switch SPST-NO Top Actuated Surface Mount	YES	C&K
64	1	SW2	Slide Switch SPDT Through Hole	YES	C&K
65	1	SW4	SWITCH SLIDE SPST 24V 100mA 1825058-9EXT ACT 8POS 24V	YES	TE Connectivity Alcoswitch Switches
66	1	TP1	TEST POINT PC MINI .040"D WHITE	YES	Keystone Electronics
67	4	TP2, TP4, TP5, TP8	TEST POINT PC MINI .040"D BLACK	YES	Keystone Electronics
68	1	TP3	TEST POINT PC MINI .040"D ORANGE	YES	Keystone Electronics
69	1	TP6	TEST POINT PC MINI .040"D YELLOW	YES	Keystone Electronics
70	1	TP7	TEST POINT PC MINI .040"D RED	YES	Keystone Electronics
71	5	U2, U9, U10, U14, U15	74LVC1G14GW,125 SCHMITT-TRG INVERTER	YES	NXP
72	1	U1	Edinburgh LAN7801/RGMII pinout, QFN64	YES	Microchip

TABLE C-1:   EVB-KSZ9897 EVALUATION BOARD BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference	Description	Populated	Manufacturer
73	1	U3	IC, 7-Port Gigabit Ethernet Switch with 2 RGMII / MII / RMII Interfaces, TQFP128	YES	Microchip Technology
74	1	U4	IC EEPROM 4KBIT 3MHZ 8SOIC	YES	Microchip Technology
75	2	U5, U6	IC REG BUCK SYNC ADJ 1A 8TDFN	YES	Microchip Technology
76	1	U7	IC REG BUCK ADJ 2A 8SOIC	YES	Micrel Inc
77	1	U8	KSZ9031RNXCC Gigabit Ethernet PHY with RGMII	YES	Microchip
78	1	J22	HDR 10POS .100" DUAL SHROUDED	YES	Adam Tech
79	1	X1	OSC MEMS CONFIGURABLE FOUR OUTPUT	YES	Microchip Technology
80	0	C30	CAP CER 4.7uF 6.3V 20% X5R SMD 0603	NO	Panasonic
81	0	C87, C97, C98	CAP CER 0.1UF 35V X5R 0402	NO	TDK Corporation
82	0	J10, J12, J13, J19	CON HDR-2.54 Male 2x5 Gold 5.84MH TH VERT	NO	Samtec Inc
83	0	R11, R12, R18, R94	RES TKF 10k 5% 1/10W SMD 0603	NO	Panasonic
84	0	R33, R36, R38, R43, R46, R60, R102, R105, R126	RES TKF 0R 1/10W SMD 0603	NO	Panasonic
85	0	R70, R71, R88, R90	RES TKF 1k 5% 1/10W SMD 0603	NO	Panasonic
86	0	TP10, TP17	TEST POINT PC MINI .040"D ORANGE	NO	Keystone Electronics
87	0	Y1, Y2, Y3	Crystal 25MHz 10pF SMD 4Pin DFN LCC	NO	Abracon

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