EVB-KSZ9893 Evaluation Board User's Guide

© 2018 Microchip Technology Inc.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE**.** Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, AnyRate, AVR, AVR logo, AVR Freaks, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, Heldo, JukeBlox, KeeLoq, Kleer, LANCheck, LINK MD, maXStylus, maXTouch, MediaLB, megaAVR, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, Prochip Designer, QTouch, SAM-BA, SpyNIC, SST, SST Logo, SuperFlash, tinyAVR, UNI/O, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

ClockWorks, The Embedded Control Solutions Company, EtherSynch, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and Quiet-Wire are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, INICnet, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, memBrain, Mindi, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2018, Microchip Technology Incorporated, All Rights Reserved.

ISBN: 978-1-5224-3463-4

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
═ ISO/TS 16949 ═

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

© 2018 Microchip Technology Inc.

Table of Contents

Preface **5**
Introduction 5
Document Layout 5
Conventions Used in this Guide 6
The Microchip Website 7
Development Systems Customer Change Notification Service 7
Customer Support 7
Document Revision History 8

Chapter 1. Overview
1.1 Introduction 9
1.2 References 11

Chapter 2. Getting Started
2.1 Introduction 13
2.2 Power Source 13
2.2.1 Power Probe Points 13
2.2.2 Current Access Rework/Probe Points 13
2.3 Clock 13
2.4 RESET 14
2.4.1 Power-On Reset 14
2.4.2 Manual Reset 14
2.5 Board features and configuration 14
2.5.1 PHY Ports – Integrated Magnetic Jacks 16
2.5.2 PHY Ports – LEDs 16
2.5.3 Pin Strapping Configuration 16
2.5.4 GPIO Signal Headers 17
2.5.5 INTRP_N Output 17
2.5.6 PME_N Output 17
2.6 Using the EVB-KSZ9893 18

Appendix A. EVB-KSZ9893 Evaluation Board
A.1 Introduction 19

Appendix B. Schematics
B.1 Introduction 21

Appendix C. Bill of Materials (BOM)
C.1 Introduction 25

Appendix D. Silk Screen
D.1 Introduction 29

Worldwide Sales and Service **32**

© 2018 Microchip Technology Inc.

NOTES:

© 2018 Microchip Technology Inc.

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 website (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 the EVB-KSZ9893 evaluation board. Items discussed in this chapter include:

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

DOCUMENT LAYOUT

This document describes how to use the EVB-KSZ9893 evaluation board as a development tool for the KSZ9893, a 3-Port Gigabit Ethernet Switch with RGMII Interface and IEEE 1588v2/802.1AS support.

- **Chapter 1. "Overview"** – This chapter provides a brief description of the EVB-KSZ9893.
- **Chapter 2. "Getting Started"** – This chapter includes instructions on how to get started with the EVB-KSZ9893.
- **Appendix A. "EVB-KSZ9893 Evaluation Board"** – This appendix shows the physical EVB-KSZ9893.
- **Appendix B. "Schematics"** – This appendix shows the EVB-KSZ9893 schematics.
- **Appendix C. "Bill of Materials (BOM)"** – This appendix includes the EVB-KSZ9893 Bill of Materials (BOM).
- **Appendix D. "Silk Screen"** – This appendix includes the EVB-KSZ9893 silk screen.

© 2018 Microchip Technology Inc.

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) { ... }`

© 2018 Microchip Technology Inc.

THE MICROCHIP WEBSITE

Microchip provides online support via our website at www.microchip.com. This website is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the website contains the following information:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases, and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, and Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, and listings of Microchip sales offices, distributors, and factory representatives

DEVELOPMENT SYSTEMS CUSTOMER CHANGE NOTIFICATION SERVICE

Microchip's customer notification service helps keep customers current on Microchip products. Subscribers will receive e-mail notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, access the Microchip website at www.microchip.com, click on Customer Change Notification and follow the registration instructions.

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® REALICE 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, which 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 non-production development programmers such as PICSTART Plus and PIC-kit 2 and 3.

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- 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 website at:
http://www.microchip.com/support

DOCUMENT REVISION HISTORY

Revisions	Section/Figure/Entry	Correction
DS50002797A (08-24-18)	Initial release	

© 2018 Microchip Technology Inc.

Chapter 1. Overview

1.1 INTRODUCTION

The EVB-KSZ9893 evaluation board is a plug-in card that interfaces directly with a mating Microchip host processor or controller board, such as the SAMA5D3 Ethernet Development System (EDS) board. It features the KSZ9893, a highly integrated networking device that incorporates a layer-2+ managed Gigabit Ethernet switch, two 10BASE-T/100BASE-TX/ 1000BASE-T physical layer transceivers (PHYs) and associated MAC units, and one MAC port configured as the RGMII interface. The board's two PHY ports are connected to RJ45 Ethernet jacks with integrated magnetics, and the RGMII MAC interface is brought out to a high-speed multi-pin (HS) connector.

Together, the EVB-KSZ9893 and the SAMA5D3-EDS provide a highly-flexible platform for evaluation of basic PHY/Switch features via static Control-Status Registers (CSRs) and development of firmware for advanced MAC/Switch features that require interaction with upper network layers (for example, IEEE1588 PTP, AVB, and RSTP/MSTP).

The scope of this document is meant to describe the EVB-KSZ9893 setup and its user interface features. A simplified block diagram of the board is shown in Figure 1-1.

© 2018 Microchip Technology Inc.

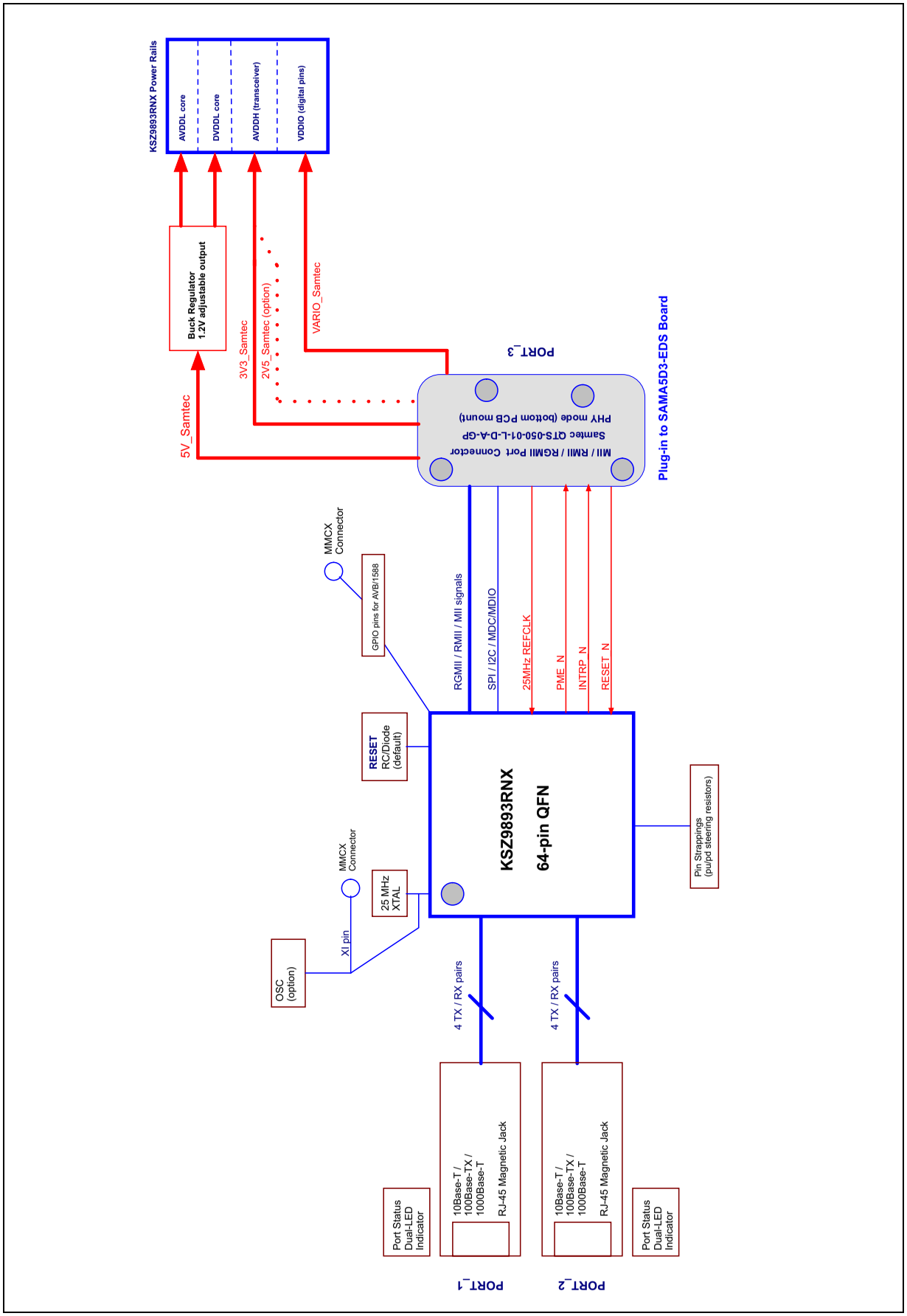


FIGURE 1-1: EVB-KSZ9893 FUNCTIONAL BLOCK DIAGRAM

© 2018 Microchip Technology Inc.

1.2 REFERENCES

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

- *KSZ9893 Data Sheet*
- EVB-KSZ9893 Schematics
- SAMA5D3 Ethernet Development System Schematics
- *SAMA5D3 Ethernet Development System Board User's Guide*
- *MIC33153YHJ Data Sheet*

NOTES:

© 2018 Microchip Technology Inc.

Chapter 2. Getting Started

2.1 INTRODUCTION

The EVB-KSZ9893 evaluation board is designed as a plug-in card to interface directly with a mating Microchip host processor or controller board, such as the SAMA5D3-EDS Board, that supplies full power and provides full register access and configuration via In-Band Management Access (IBA), SPI, or I^2C bus management.

2.2 POWER SOURCE

The EVB-KSZ9893 is completely bus-powered from its mating Microchip host processor or controller board. Input power is delivered via the high-speed multi-pin (HS) connector.

Refer to Figure 2-3 and board schematics in **Appendix B. "Schematics"** for details.

2.2.1 Power Probe Points

The power probe points along with the ground test points are shown in Figure 2-2.

2.2.2 Current Access Rework/Probe Points

The EVB-KSZ9893 design is not intended to perform current measurements on the device. If needed, the current access points to measure the current consumptions of the KSZ9893 power rails are across the following series ferrite beads to the board powers.

- DVDDL: FB2
- AVDDL: FB3
- VDDIO: FB6
- AVDDH: FB4 for 3.3V (default populate) and FB1 for 2.5V (default not populate)

Note:	Populate either FB4 only or FB1 only. If 2.5V AVDDH is desired, FB4 should be "Do Not Populate (DNP)" and FB1 should be populated.

Remove the above ferrite beads and place the current probes in series across the power probe points (**Section 2.2.1 "Power Probe Points"**) that are joined by the ferrite beads. See also **Appendix B. "Schematics"**.

Board LED components are connected to the VDDIO power rail, and thus the measured current is higher than the amount consumed by only the KSZ9893 device.

2.3 CLOCK

The EVB-KSZ9893 utilizes a 25 MHz crystal to generate the input reference clock for the KSZ9893 device. Refer to Figure 2-1 and the board schematics in **Appendix B. "Schematics"** for details.

2.4 RESET

2.4.1 Power-On Reset

The discrete RC/Diode (R12, C8, and D3) circuit provides power-on reset to the KSZ9893 device.

2.4.2 Manual Reset

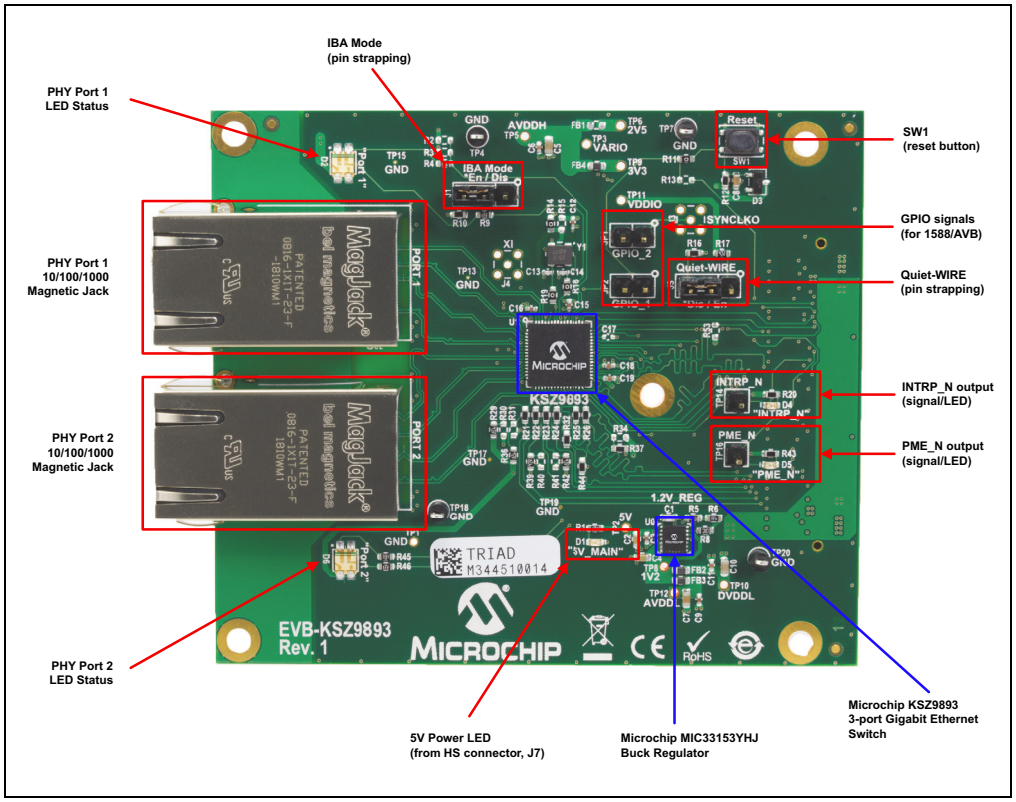
The SW1 reset button can be pressed and released to provide manual reset to the KSZ9893 device after power-up. Refer to Figure 2-1 and the board schematics in **Appendix B. "Schematics"** for details.

2.5 BOARD FEATURES AND CONFIGURATION

The following sub-sections describe the board features and configuration settings.

Figure 2-1 displays the top view of the EVB-KSZ9893 with key features, jumpers, and headers which are highlighted in red. The Microchip components are highlighted in blue.

FIGURE 2-1: EVB-KSZ9893 TOP VIEW WITH CALLOUTS



© 2018 Microchip Technology Inc.

Figure 2-2 displays the power probe points along with the ground test points.

FIGURE 2-2: EVB-KSZ9893 POWER/GROUND CALLOUTS

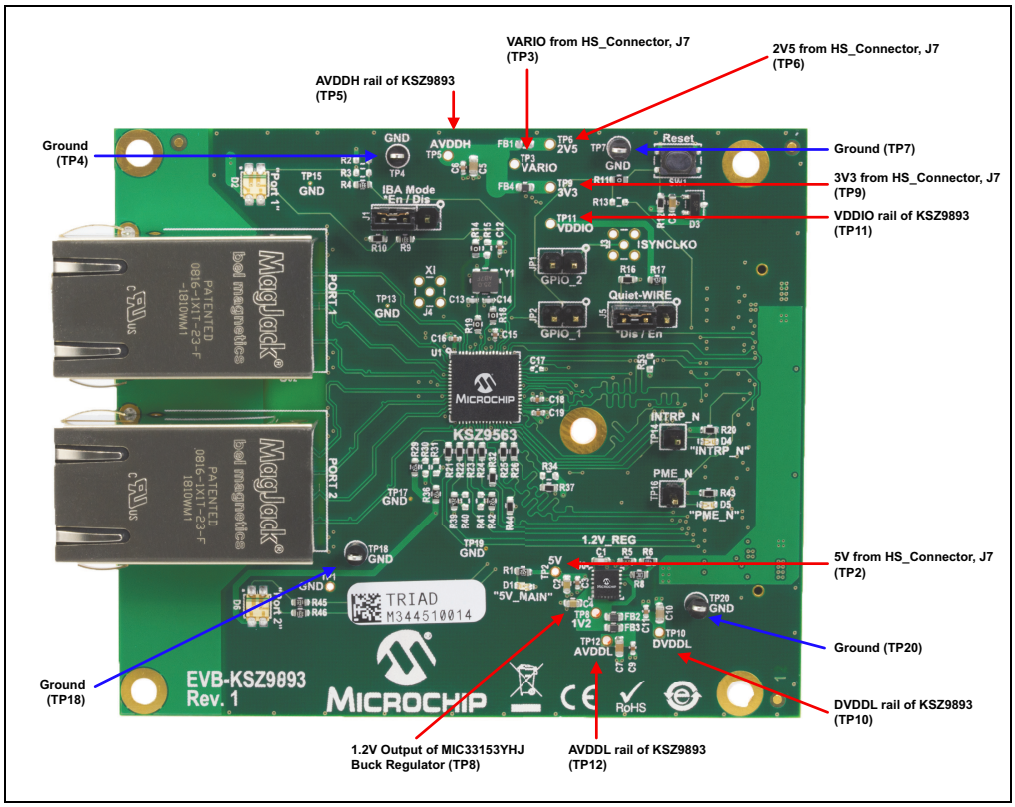
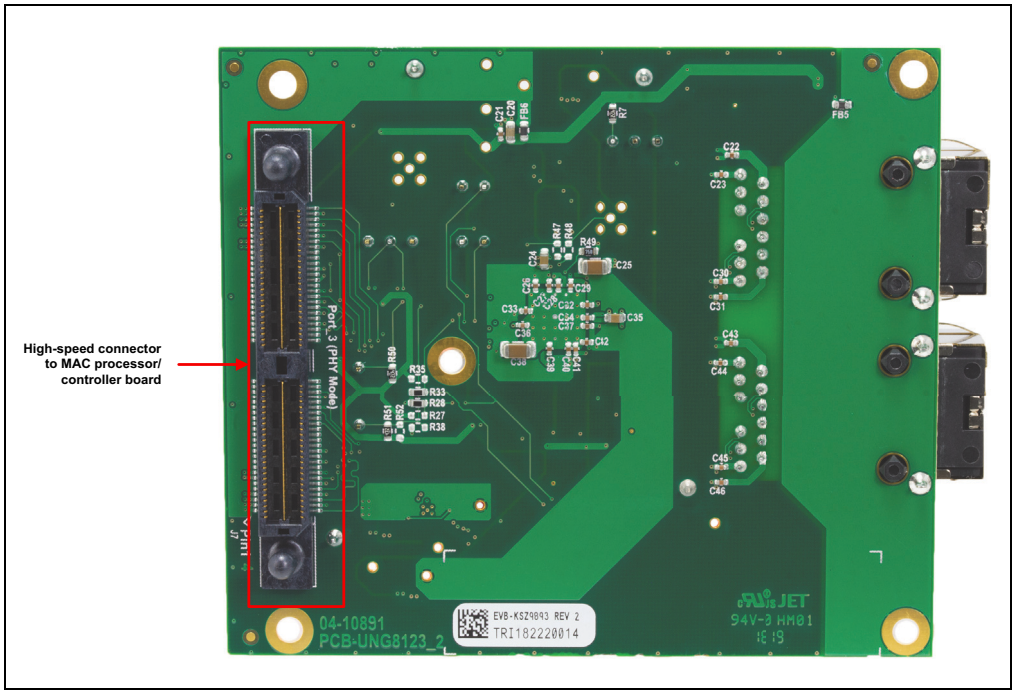


Figure 2-3 displays the bottom view of the EVB-KSZ9893 with the HS connector (J7) (highlighted in red) directly plugging into a mating Microchip MAC processor or controller board.

FIGURE 2-3: EVB-KSZ9893 BOTTOM VIEW WITH CALLOUT



2.5.1 PHY Ports – Integrated Magnetic Jacks

PHY ports 1 and 2 (J2 and J6) support 10BASE-T/100BASE-TX/1000BASE-T with both Auto-negotiation enabled and Auto-MDI/MDI-X enabled as the power-up defaults.

2.5.2 PHY Ports – LEDs

Two Dual-LEDs (D2 and D6) provide the link status for PHY ports 1 and 2, respectively. The LED descriptions are listed in Table 2-1.

TABLE 2-1: PHY PORTS - LED DESCRIPTION

LED	LED Color	Description
D2, D6	Green	Solid color: 1-Gbps Link Blinking: Activity (RX, TX)
	Red	Solid color: 100-Mbps Link Blinking: Activity (RX, TX)
	Orange	Solid color: 10-Mbps Link Blinking: Activity (RX, TX)
	Off	Link off

2.5.3 Pin Strapping Configuration

As the power-up or reset defaults, the KSZ9893 device is configured via internal or external pull-up or pull-down resistors to the following settings:

- **PHY Ports 1 and 2:** Auto-negotiation enabled and Energy-Efficient Ethernet (EEE) enabled
- **MAC Port 3:** RGMII mode at 1000 Mbps speed
- **Start Switch:** The switch forwards packets immediately after hardware reset.
- **Management:** SPI Slave mode

© 2018 Microchip Technology Inc.

The IBA mode and Quiet-Wire® pin strappings can be enabled or disabled using the 3-pin jumpers in Table 2-2. Set the desired jumper settings prior to board power-up, hardware reset, or both.

TABLE 2-2: PIN STRAPPING JUMPERS

Jumper	Label	Description	Close Pins 1-2	Close Pins 2-3
J1	IBA mode	IBA provides full register read and write access via any one of the three data ports.	Disable	**Enable (default)**
J5	Quiet-Wire	Quiet-Wire filtering is implemented on-chip to enhance 100BASE-TX EMC performance by reducing both conducted and radiated emissions from the TXP/M signal differential pair.	Enable	**Disable (default)**

Refer to the board schematics in **Appendix B. "Schematics"** and the *KSZ9893 Data Sheet* for further details on the pin strappings.

2.5.4 GPIO Signal Headers

Table 2-3 shows the GPIO signals that support the IEEE 1588 Precision Time Protocol (PTP).

TABLE 2-3: GPIO SIGNAL HEADERS

Header	Label	Description	Pin 1	Pin 2
J1	GPIO_2	The GPIO_2 pin is configurable to implement IEEE1588 event trigger outputs and timestamp capture inputs to support real-time application requirements.	No Connect	GPIO_2 (KSZ9893 pin 40)
J5	GPIO_1	The GPIO_1 pin is configurable to implement IEEE1588 event trigger outputs and timestamp capture inputs to support real-time application requirements.	Ground	GPIO_1 (KSZ9893 pin 39)

Refer to the board schematics in **Appendix B. "Schematics"** and the *KSZ9893 Data Sheet* for further details and usage on the GPIO signal pins.

2.5.5 INTRP_N Output

The INTRP_N output at test point TP14 provides the interrupt output from the KSZ9893 device. By default, it is active low and drives low to turn on D4 when asserted.

Refer to the board schematics in **Appendix B. "Schematics"** and the *KSZ9893 Data Sheet* for further details and usage on the INTRP_N signal.

2.5.6 PME_N Output

The PME_N output at test point TP16 provides the Power Management Event (PME) interrupt output for Wake-on-LAN (WoL) from the KSZ9893 device. By default, it is active low and drives low to turn on D5 when asserted.

Refer to the board schematics in **Appendix B. "Schematics"** and the *KSZ9893 Data Sheet* for further details and usage on the PME_N signal.

© 2018 Microchip Technology Inc.

2.6 USING THE EVB-KSZ9893

The EVB-KSZ9893 directly plugs into a mating Microchip host controller or processor board, such as the SAMA5D3-EDS Board, that delivers full power and provides full register access and configuration via IBA, SPI, or I^2C bus management.

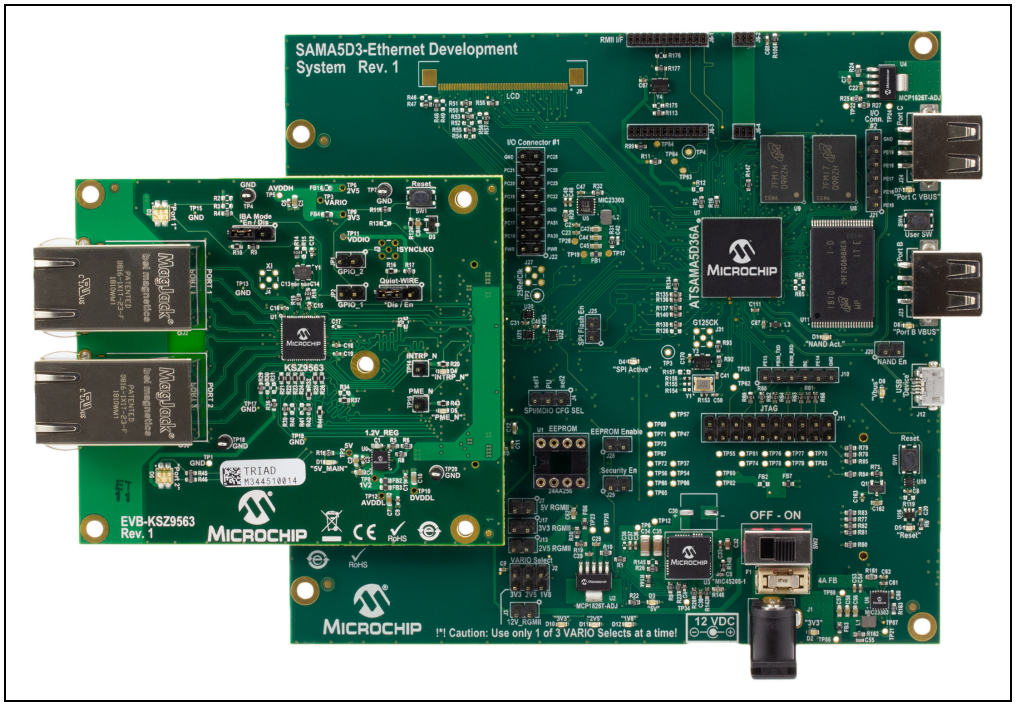
Together, the EVB-KSZ9893 and the SAMA5D3-EDS enable 10/100/1000-Mbps Ethernet traffic switching across all three data ports of the KSZ9893 device, with RGMII MAC Port 3 connecting to the SAMA5D3 processor and PHY Port 1 and Port 2 connecting via copper Ethernet cable (CAT-5 UTP or better) to external Ethernet devices.

All KSZ9893 registers are accessible via IBA, SPI, or I^2C bus management from the SAMA5D3-EDS Board, enabling full evaluation and firmware development for all KSZ9893 MAC/Switch features and interaction with upper network layers.

Refer to the SAMA5D3-EDS Board documentation on its usage.

Figure 2-4 shows the EVB-KSZ9893 connected to the SAMA5D3-EDS Board.

FIGURE 2-4: EXAMPLE OF EVALUATION BOARD CONNECTED TO SAMA5D3-EDS



© 2018 Microchip Technology Inc.

Appendix A. EVB-KSZ9893 Evaluation Board

A.1 INTRODUCTION

This appendix shows the EVB-KSZ9893 evaluation board. See Figure A-1 and Figure A-2.

FIGURE A-1: EVB-KSZ9893 EVALUATION BOARD (TOP VIEW)

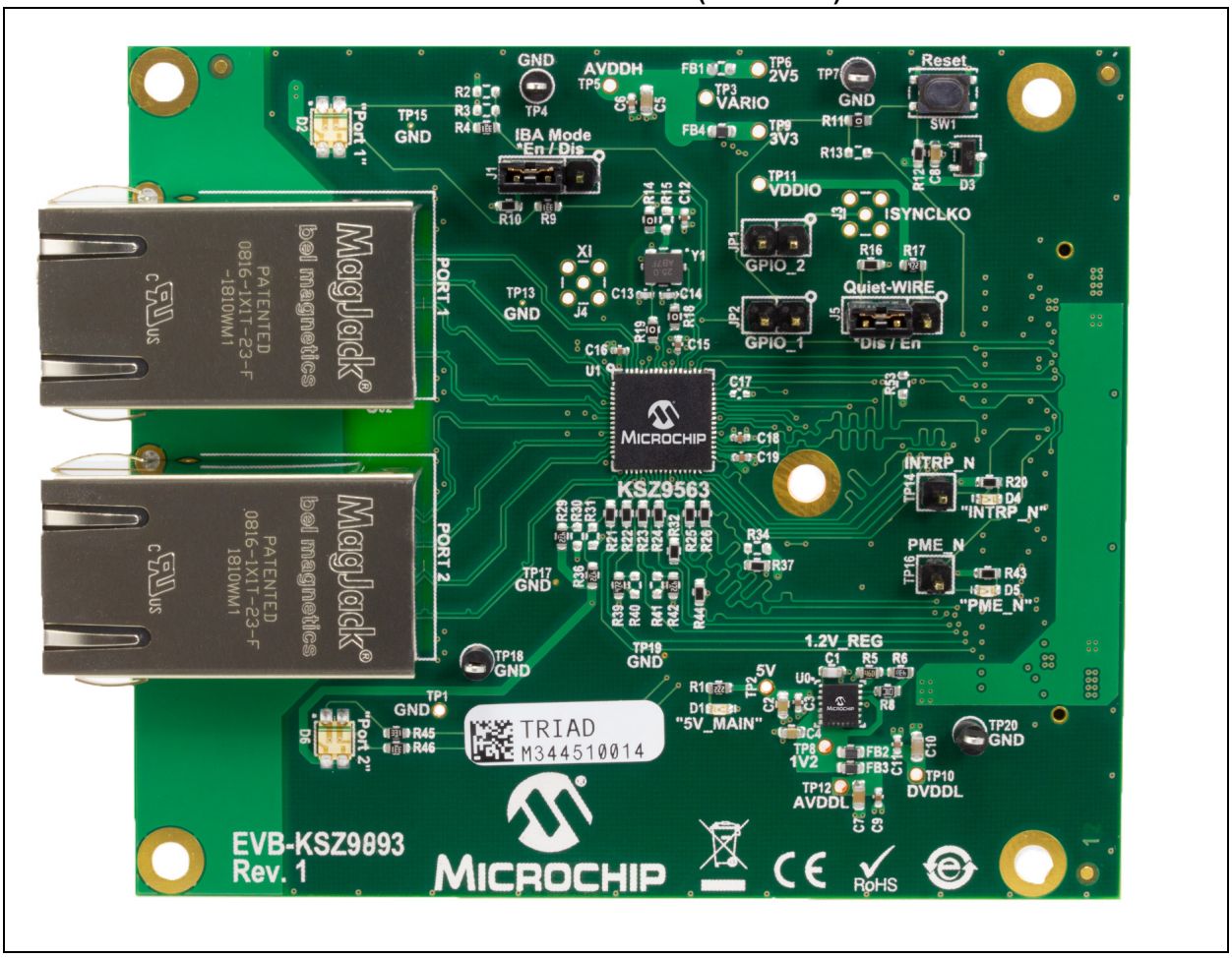
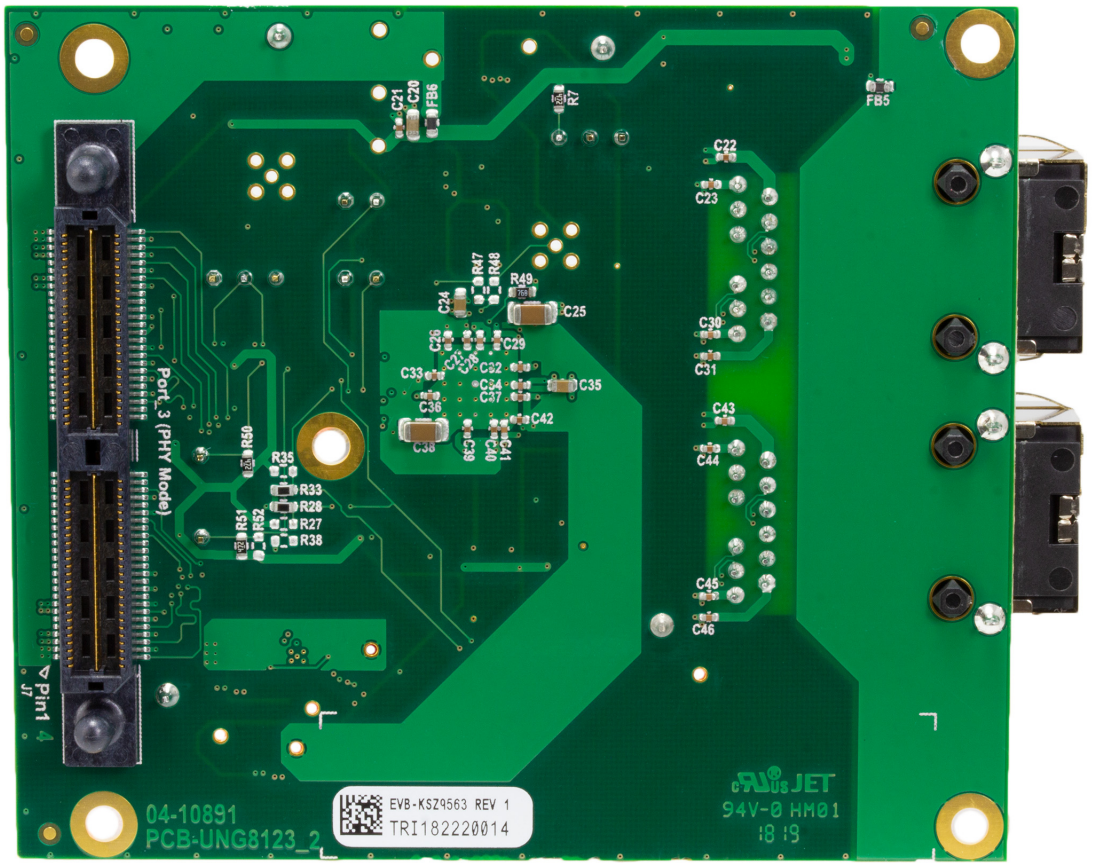


FIGURE A-2: EVB-KSZ9893 EVALUATION BOARD (BOTTOM VIEW)



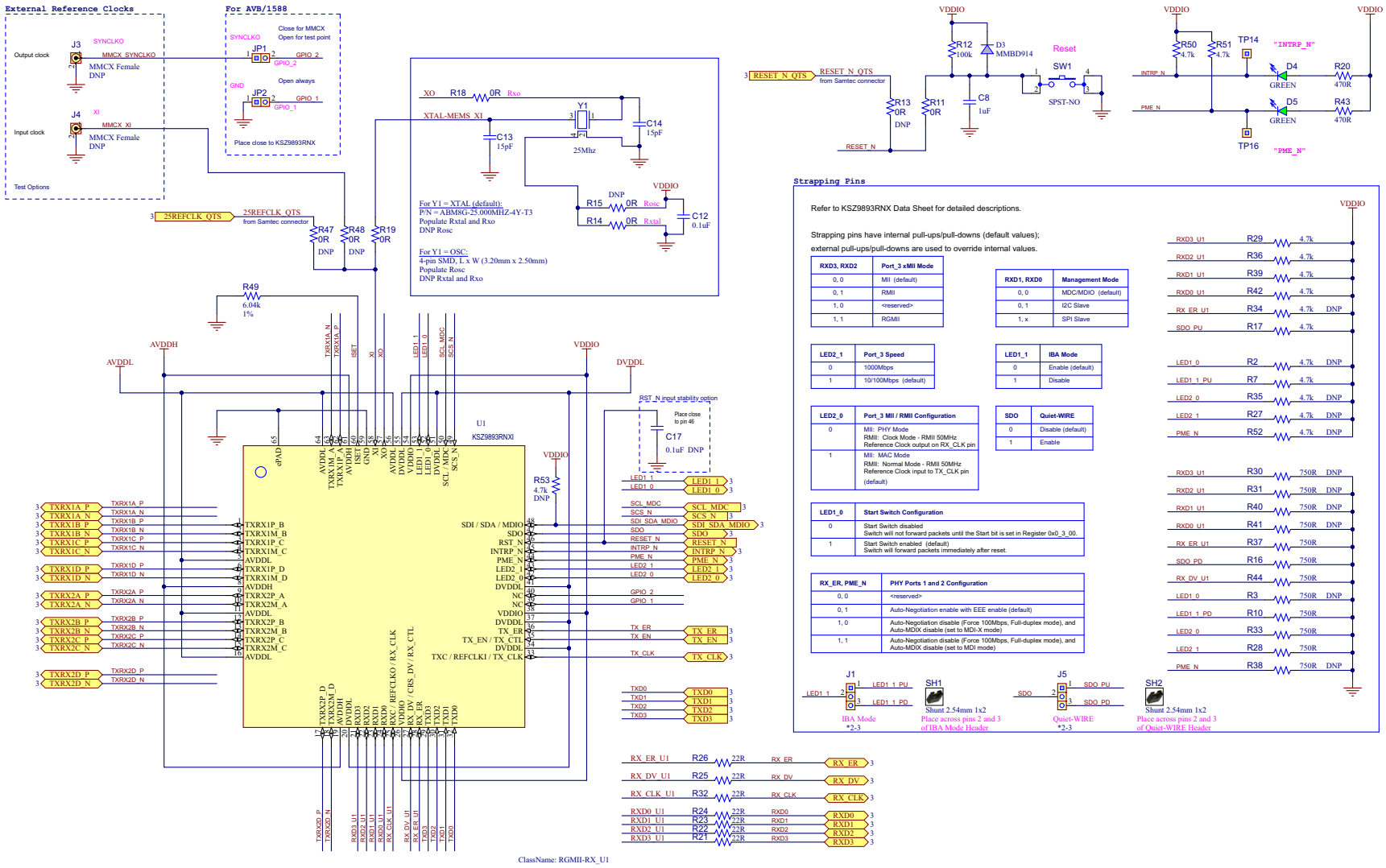
© 2018 Microchip Technology Inc.

Appendix B. Schematics

B.1 INTRODUCTION

This appendix includes the EVB-KSZ9893 evaluation board schematics. See Figure B-1, Figure B-2, and Figure B-3.

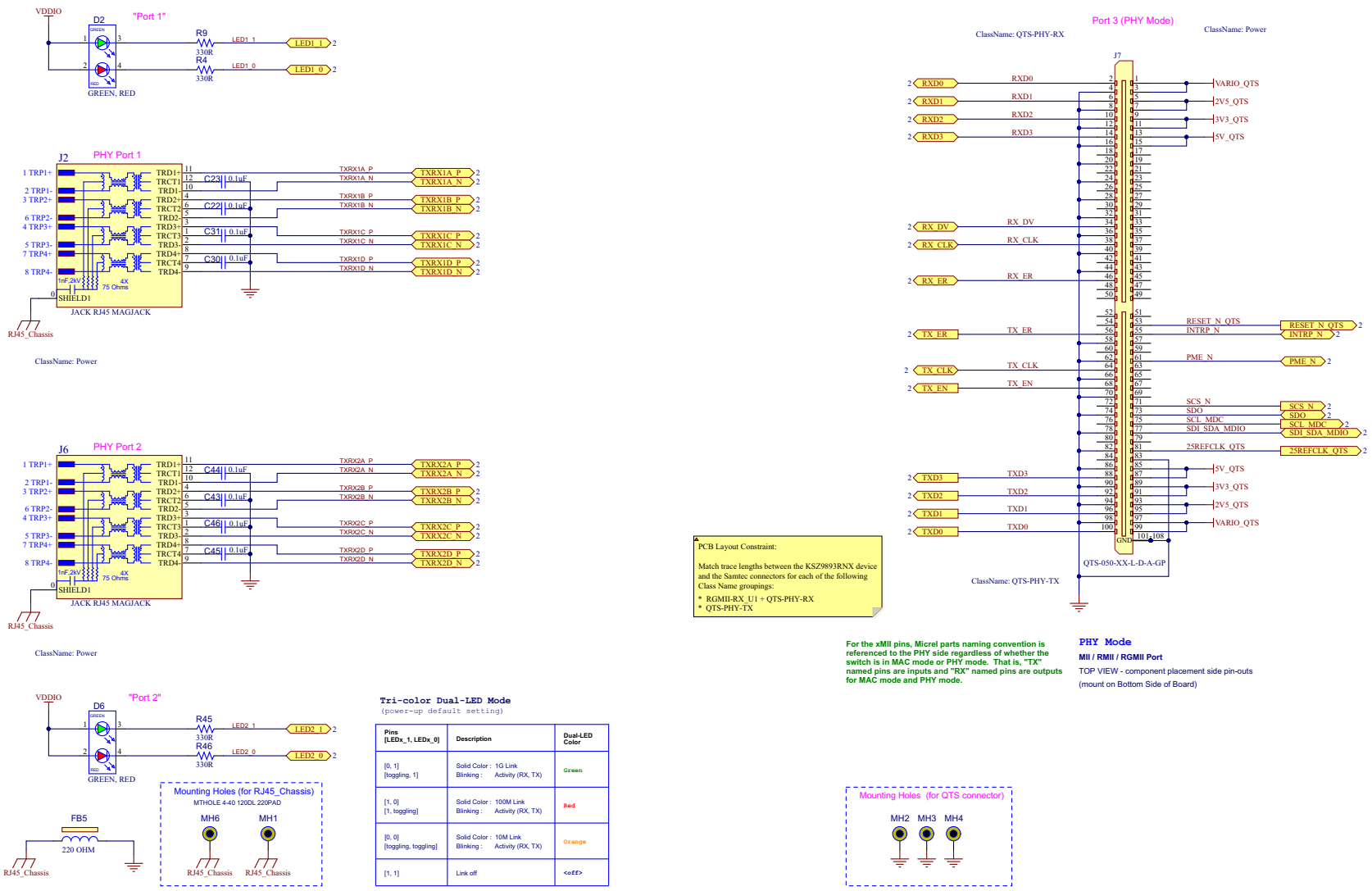
FIGURE B-1: EVB-KSZ9893 SCHEMATICS – KSZ9893 DEVICE, PIN STRAPPING, CLOCK, AND RESET



© 2018 Microchip Technology Inc.

© 2018 Microchip Technology Inc.

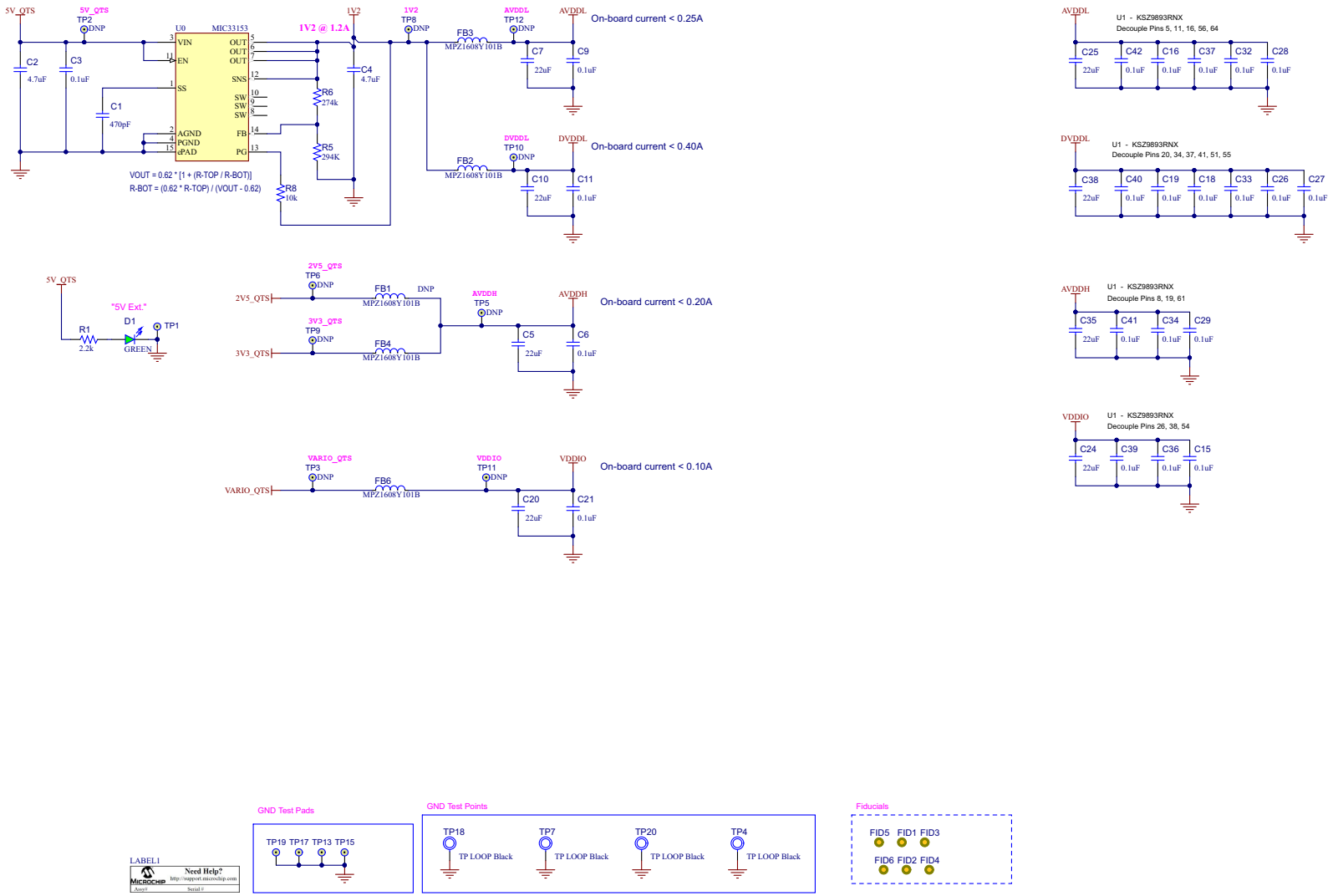
FIGURE B-2: EVB-KSZ9893 SCHEMATICS – PORTS 1 AND 2 PHYS; PORT 3 MAC – MII/RMII/RGMII CONNECTOR



Tri-color Dual-LED Mode
(power-up default setting)

Pins [LEDx_1, LEDx_0]	Description	Dual-LED Color
[0, 1] [toggling, 1]	Solid Color : 1G Link Blinking : Activity (RX, TX)	Green
[1, 0] [1, toggling]	Solid Color : 100M Link Blinking : Activity (RX, TX)	Red
[0, 0] [toggling, toggling]	Solid Color : 10M Link Blinking : Activity (RX, TX)	Orange
[1, 1]	Link off	<off>

FIGURE B-3: EVB-KSZ9893 SCHEMATICS – BOARD POWER I/O AND REGULATORS



© 2018 Microchip Technology Inc.

Appendix C. Bill of Materials (BOM)

C.1 INTRODUCTION

This appendix includes the EVB-KSZ9893 evaluation board Bill of Materials (BOM). Refer to Table C-1.

TABLE C-1: BILL OF MATERIALS

Item	Qty	Reference	Description	Populated	Manufacturer	Manufacturer Part Number
1	1	C1	CAP CER 470pF 25V 5% NP0 SMD 0603	Yes	AVX	06033A471JAT2A
2	2	C2, C4	CAP CER 4.7uF 10V 10% X5R SMD 0603	Yes	KEMET	C0603C475K8PACTU
3	31	C3, C6, C9, C11, C12, C15, C16, C18, C19, C21, C22, C23, C26, C27, C28, C29, C30, C31, C32, C33, C34, C36, C37, C39, C40, C41, C42, C43, C44, C45, C46	CAP CER 0.1uF 50V 10% X7R SMD 0402	YES	TDK Corporation	C1005X7R1H104K050BB
4	6	C5, C7, C10, C20, C24, C35	CAP CER 22uF 10V 20% X5R SMD 0603	YES	TDK Corporation	C1608X5R1A226M080AC
5	1	C8	CAP CER 1uF 16V 10% X5R SMD 0603	Yes	AVX	0603YD105KAT2A
6	2	C13, C14	CAP CER 15pF 50V 5% NP0 SMD 0402	Yes	Murata	GRM1555C1H150JA01D
7	1	C17	CAP CER 0.1uF 50V 10% X7R SMD 0402	DNP	TDK Corporation	C1005X7R1H104K050BB
8	2	C25, C38	CAP CER 22uF 10V 20% X5R SMD 1206	Yes	Taiyo Yuden	LMK316BJ226ML-T
9	3	D1, D4, D5	DIO LED GREEN 2V 30mA 35mcd Clear SMD 0603	YES	Lite-On Inc	LTST-C191KGKT
10	2	D2, D6	DIO LED BI GREEN, RED 2V 30mA 1210	YES	Lite-On	LTST-C155KGJRKT
11	1	D3	DIO RECT MMBD914LT1G 1V 10mA 100V SMD SOT-23-3	YES	ON Semiconductor	MMBD914LT1G
12	1	FB1	FERRITE CHIP 100 OHM 2A 0603	DNP	TDK Corporation	MPZ1608Y101B
13	4	FB2, FB3, FB4, FB6	FERRITE CHIP 100 OHM 2A 0603	YES	TDK Corporation	MPZ1608Y101B
14	1	FB5	FERRITE 500mA 220R SMD 0603	YES	Murata Electronics North America	BLM18AG221SN1D
15	2	J1, J5	CON HDR-2.54 Male 1x3 Gold 5.84MH TH VERT	Yes	FCI	68000-103HLF
16	2	J2, J6	CON JACK RJ45 MAGJACK TH RA	YES	Bel Fuse Inc.	0816-1X1T-23-F
17	2	J3, J4	CON RF Coaxial MMCX Female 2P TH VERT	DNP	Cinch Connectivity Solutions Johnson	135-3701-211
18	1	J7	CON STRIP High Speed Stacker 5mm Male 2x50 SMD VERT	YES	Samtec	QTS-050-01-L-D-A-GP
19	2	JP1, JP2	CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT	YES	Wurth Electronics Inc.	61300211121
20	1	LABEL1	LABEL, NEED HELP WITH ASSY/SERIAL	MECH		
21	1	R1	RES TKF 2.2k 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF2201V
22	6	R2, R27, R34, R35, R52, R53	RES TKF 4.7k 5% 1/10W SMD 0603	DNP	Yageo	RC0603JR-074K7L
23	6	R3, R30, R31, R38, R40, R41	RES TKF 750R 1% 1/10W SMD 0603	DNP	Vishay	CRCW0603750RFKEA
24	4	R4, R9, R45, R46	RES TKF 330R 5% 1/10W SMD 0603	Yes	Panasonic	ERJ-3GEYJ331V
25	1	R5	RES TKF 294K 1% 1/10W SMD 0603	YES	Panasonic Electronic Components	ERJ-3EKF2943V
26	1	R6	RES TKF 274K 1% 1/10W SMD 0603	YES	Panasonic Electronic Components	ERJ-3EKF2743V
27	8	R7, R17, R29, R36, R39, R42, R50, R51	RES TKF 4.7k 5% 1/10W SMD 0603	Yes	Yageo	RC0603JR-074K7L
28	1	R8	RES TKF 10k 5% 1/10W SMD 0603	Yes	Panasonic	ERJ-3GEYJ103V
29	6	R10, R16, R28, R33, R37, R44	RES TKF 750R 1% 1/10W SMD 0603	Yes	Vishay	CRCW0603750RFKEA
30	4	R11, R14, R18, R19	RES TKF 0R 1/10W SMD 0603	YES	NIC Components	NRC06Z0TRF
31	1	R12	RES TKF 100k 1% 1/10W SMD 0603	Yes	Panasonic	ERJ-3EKF1003V
32	4	R13, R15, R47, R48	RES TKF 0R 1/10W SMD 0603	DNP	NIC Components	NRC06Z0TRF

© 2018 Microchip Technology Inc.

TABLE C-1: BILL OF MATERIALS (CONTINUED)

Item	Qty	Reference	Description	Populated	Manufacturer	Manufacturer Part Number
33	2	R20, R43	RES TKF 470R 5% 1/10W SMD 0603	Yes	Panasonic	ERJ-3GEYJ471V
34	7	R21, R22, R23, R24, R25, R26, R32	RES TKF 22R 1% 1/10W SMD 0603	YES	Yageo	RC0603FR-0722RL
35	1	R49	RES TKF 6.04k 1% 1/10W SMD 0603	Yes	Yageo	9T06031A6041FBHFT
36	2	SH1, SH2	MECH HW JUMPER 2.54mm 1x2	MECH	3M	969102-0000-DA
37	1	SW1	SWITCH TACT SPST 16V 50mA PTS810 SJM 250 SMTR LFS SMD	YES	C&K Components	PTS810 SJM 250 SMTR LFS
38	4	TP4, TP7, TP18, TP20	MISC, TEST POINT MULTI PURPOSE MINI BLACK	YES	Keystone	5001
39	2	TP14, TP16	CON HDR-2.54 Male 1x1 Gold 5.84MH TH VERT	YES	Samtec Inc.	TSW-101-07-S-S
40	1	Y1	CRYSTAL 25MHz 10pF SMD ABM8G	YES	Abracon LLC	ABM8G-25.000MHZ-4Y-T3
41	1	U0	MCHP ANALOG SWITCHER Buck 0.6V to 3.6V MIC33153YHJ-TR VFDFN-14	YES	Microchip Technology	MIC33153YHJ-TR
42	1	U1	MCHP INTERFACE ETHERNET KSZ9893RNXI QFN-64	YES	Microchip Technology Inc.	KSZ9893RNXI

© 2018 Microchip Technology Inc.

NOTES:

© 2018 Microchip Technology Inc.

Appendix D. Silk Screen

D.1 INTRODUCTION

This appendix shows the EVB-KSZ9893 evaluation board top and bottom silk screen images. See Figure D-1 and Figure D-2.

FIGURE D-1: EVB-KSZ9893 TOP SILK SCREEN

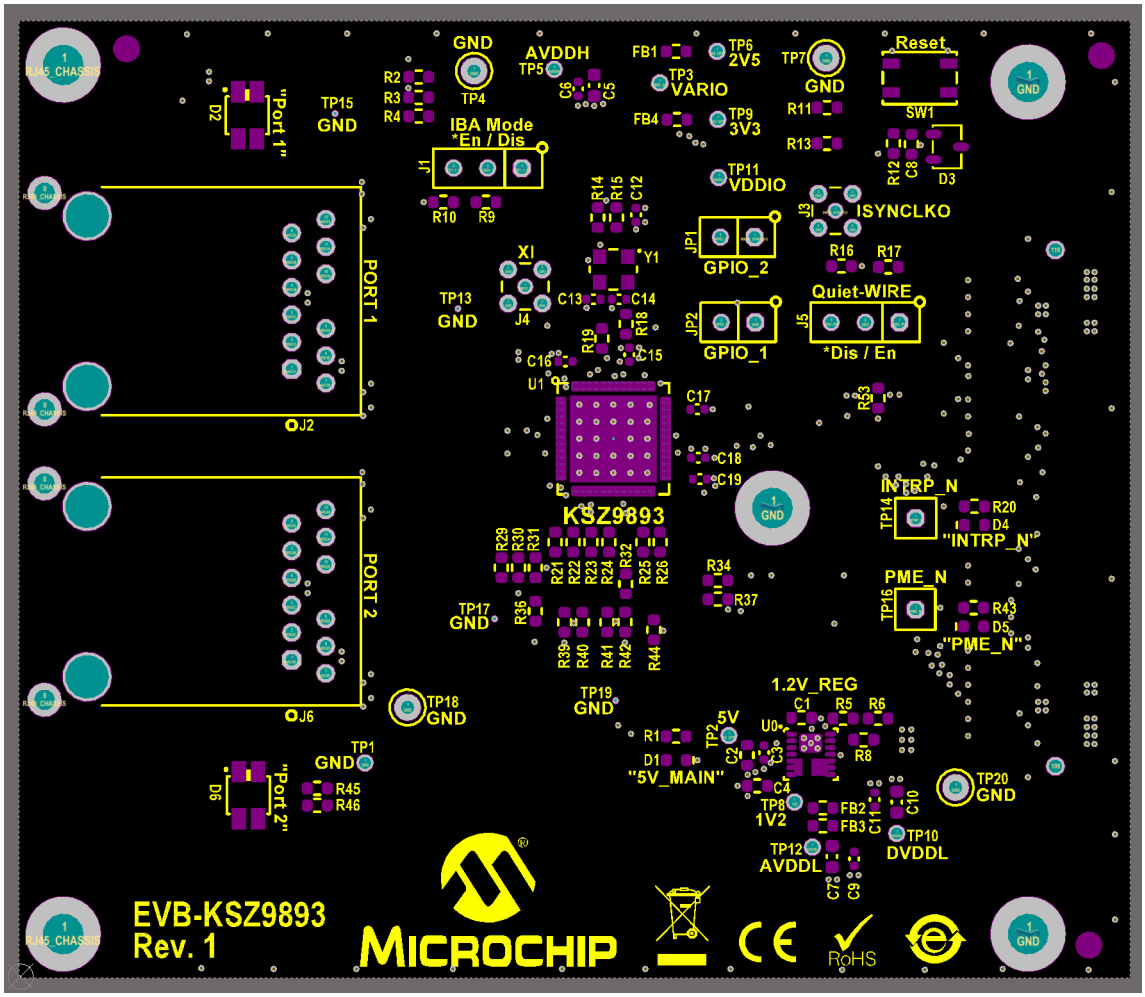
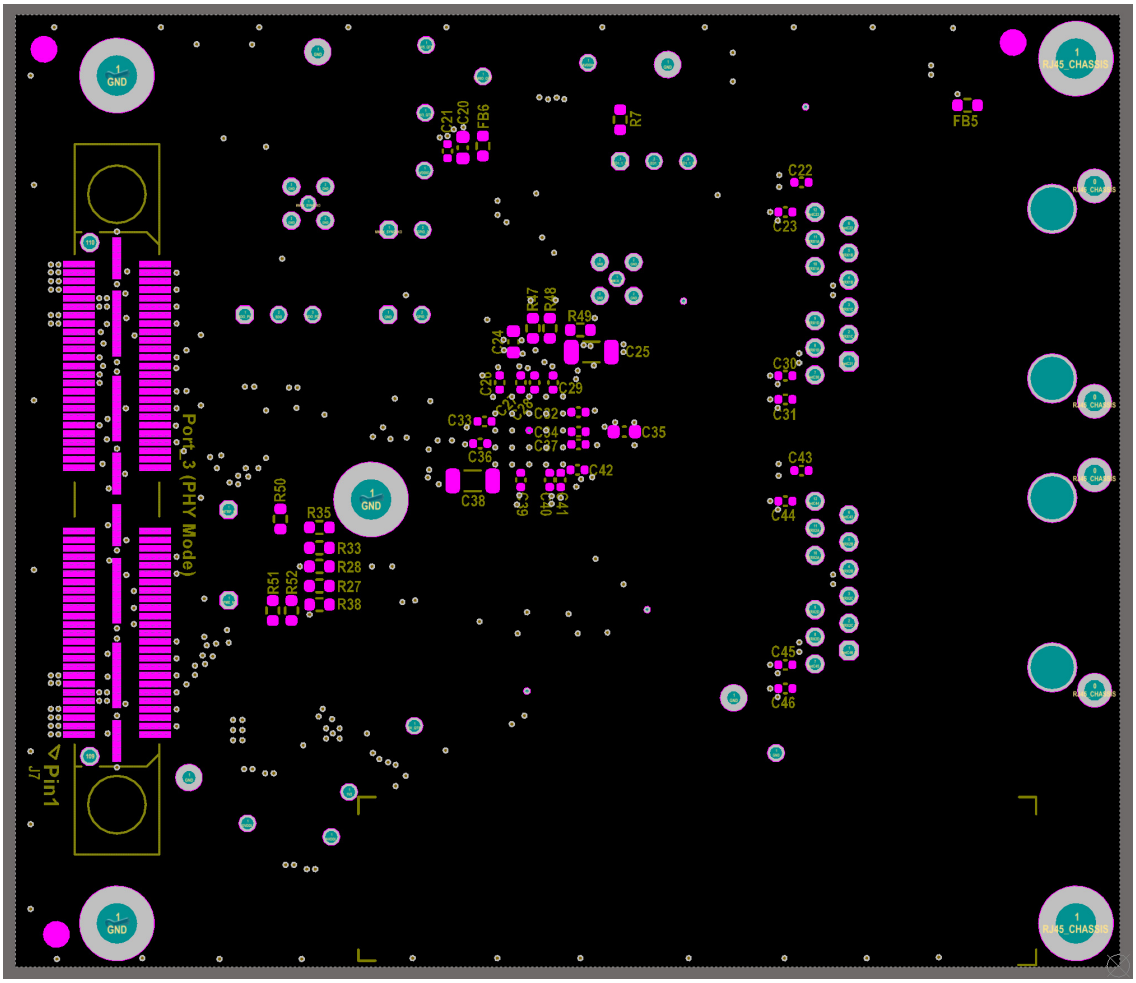


FIGURE D-2: EVB-KSZ9893 BOTTOM SILK SCREEN



© 2018 Microchip Technology Inc.

NOTES:

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880- 3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-67-3636

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820

© 2018 Microchip Technology Inc.