

KSZ8895MLU/MLUB Evaluation Board User's Guide

KSZ8895MLU/MLUB Integrated 4-port 10/100Base-T/TX and 1 port MII Interface Ethernet Managed Switch

Rev 1.1 May 2014

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Revision History

Revision	Date	Change
1.0	9/29/10	Initial release
1.1	5/05/14	Update eval board photos and add KSZ8895MLUB part.

1.0 Introduction

The KSZ8895MLU/MLUB is Micrel Operations' new generation integrated 5-port switch. The KSZ8895MLU/MLUB contains four 10/100Base-T/TX PHY transceivers and one MII interface with MAC mode and PHY mode configurable for MAC 5 of the port 5. The device had been designed with cost sensitive systems in mind but still offers a multitude of features such as switch management; port and tag based VLAN; QoS priority; CPU control SPI interface and CPU control MDC/MDIO for MIIM/SMI interfaces. The KSZ8895MLU/MLUB is an excellent choice in industrial automatic, automotive, etc. fields and as a managed Ethernet switch. The KSZ8895MLU/MLUB evaluation board is designed to allow the user to experience firsthand the rich feature set of this exciting new product. The evaluation board is highly configurable and easy to use.

2.0 Features

- Micrel KSZ8895MLU/MLUB Integrated 4 copper ports and 1 MAC MII interface for a 5-port Managed Ethernet Switch
- 4 RJ-45 Jacks for Ethernet LAN with Corresponding Isolation Magnetics.
- Auto MDI/MDIX on All Ports.
- 1 PHY mode and 1 MAC mode MII Connector are for the port 5 MAC 5 SW5-MII Interface
- 1 USB Port Interface Configurable to Emulate an I2C or SPI or MDC/MDIO Interfaces to access all control registers and all MIIM registers.
- On Board EEPROM
- 3 LEDs Per Port to Indicate the Status and Activity

3.0 Evaluation Kit Contents

The KSZ8895MLU/MLUB Evaluation kit includes the following:

- KSZ8895MLU/MLUB Evaluation Board Rev. 1.x
- KSZ8895MLU/MLUB Evaluation Board User's Guide Rev 1.x
- Micrel EEPROM/SPI/SMI/MIIM Configuration Software tools for KSZ8895 family.
- KSZ8895MLU/MLUB Evaluation Board Schematics and BOM
- The software, schematics and other design information will be found in the Design Kit (Design Package) of the KSZ8895MLU/MLUB Ethernet switch products on Micrel website. (Contact your Micrel FAE for the latest schematic).
- The USB cable is not included.

4.0 Hardware Description

The KSZ8895MLU/MLUB evaluation board is in a compact form factor and can sit on a bench near a computer with USB connector. There are four options for configuration: strap in mode; EEPROM mode, SMI mode and SPI mode. Strap in mode configuration is easily done with on board jumper options. EEPROM mode, SMI mode and SPI mode are accomplished through a built in USB port interface. Using Micrel EEPROM software and your PC, you can program the EEPROM on board by the USB port. Using Micrel SPI software and your PC, you can access the KSZ8895MLU/MLUB's full feature set registers by the USB to SPI interface. Or using Micrel MDC/MDIO software and SMI software with your PC, you can access the KSZ8895MLU/MLUB's MIIM PHY registers by generic MDC/MDIO interface and full feature set registers by the SMI mode of MDC/MDIO interface. The board also features the MII connectors for the Switch MII interface. These are to facilitate connections from the switch to an external MAC or PHY.

The KSZ8895MLU/MLUB evaluation board is easy to use. There are programmable LED indicators for link and activity on all ports and a power LED. A manual reset button allows the user to reset the board without removing the power plug. A standard 5VDC power supply is included so that the user can supply power from any 110-240 Volt AC wall or bench socket, and the power also can be provided by USB port when close pin 2-3 of the JP47 jumper.



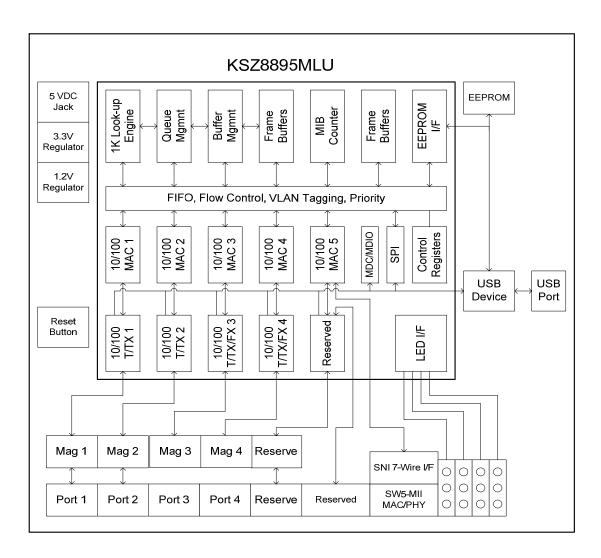


Figure 1 KSZ8895MLU/MLUB Evaluation Board

Figure 2 KSZ8895MLU/MLUB Evaluation Board Block Diagram

4.1 Strap in Mode

Strap in configuration mode is the quickest and easiest way to get started. In this mode, the KSZ8895MLU/MLUB acts as a standalone 5 port switch. The user has to simply set the board's configuration jumpers to the desired settings and apply power to the board. The user can also change jumper settings while power is applied to the board and press the convenient manual reset button for the new settings to take effect. Note that even if there is no external strap in values are set, internal pull up and pull down resistors will set the KSZ8895MLU/MLUB default configuration. Section 4.1.1 covers each jumper on the board and describes its function.

To start in strap in configuration mode, make sure that JP1 and JP2 are open and JP3 and JP9 are closed. In this mode, pins (PS1,PS0)=(0,0), the chip will start automatically, after trying to read the external EEPROM, if EEPROM does not exist, the chip will use the default values and the strap option setting for all internal registers.

4.1.1 Feature Setting Jumpers

The evaluation board provides jumpers to allow the user to easily set strap in configurations for the KSZ8895MLU/MLUB. Table 1 describes the jumpers and their function in the open or closed state.

Jumper	KSZ8895MLU/	2-pin Jumper Open 2-pin Jumper Closed		
-	MLUB Signal	3-pin Jumper 1-2 Closed	3-pin Jumper 2-3 Closed	
JP1	SDA	SPI or EEPROM	MDC/MDIO for MIIM/SMI	
JP2	SCL	SPI or EEPROM	MDC/MDIO for MIIM/SMI	
JP3	SPIQ	SPI and EEPROM	EEPROM and MDC/MDIO	
JP9	SCL	MDC/MDIO	EEPROM	
JP4	PS0	SPI and EEPROM	SMI	
JP5	PS1	EEPROM and SMI	SPI	
JP6	SCONF0	MAC mode or disable MII	SW5-MII PHY mode or SNI	
JP7	SCONF1	PHY mode or disable MII	SW5-MII MAC mode or SNI	
JP8	PWRDN	Normal Operation	Hardware power down	
JP25	PMRXD3	Enable flow control	Disable flow control	
JP26	PMRXD2	Disable Back Pressure	Enable Back Pressure	
JP27	PMRXD1	Drop excessive collision	Do not drop excessive	
		packets	collision packets	
JP28	PMRXD0	Aggressive back off disable	Aggressive back off enable	
JP29	PMRXER	Max Packet Size up to	Max Packet Size up to 1536	
		1522/1518 bytes	bytes	
JP30	PCRS	Force Half Duplex on port 4	Force Full duplex on port 4 if	
		if AN is disabled or failed	AN is disabled or failed	
JP31	PCOL	No Force Flow Control on port 4	Force Flow Control on port 4	
JP32	SMRXDV	Disable SW5-MII and RMII	Enable SW5- MII and RMII	
		Flow Control	Flow Control	
JP33	SMRXD3	SW5-MII Half Duplex Mode	SW5-MII Full Duplex Mode	
JP34	SMRXD2	SW5-MII 100BT mode	SW-MII 10BT mode	
JP35	SMRXD1	LED Mode 0:	LED Mode 1:	
JI 33	Similar	$LEDx_2 = Link/Act$	$LEDx_2 = 100Link/Act$	
		$LEDx_1 = Full Duplex/Col$	$LEDx_1 = 10Link/Act$	
		$LEDx_0 = Speed$	$LEDx_0 = Full Duplex$	
JP36	SMRXD0	Disable SW5-MII Flow	Enable SW5- MII Flow	
		Control	Control	
JP45	LED5_1		Normal Operation (Default)	
JP46	LED5_2	Enable Aging	Disable Aging	
JP44	DC from 5V Jack	1-2 Close: 5V DC from the	2-3 Close: 5V DC from the	
3-pin		power jack of AC adapter	USB connector.	

Jumper Number	Description	Recommended Settings	
JP19	SMRXDV	Open	
JP24	PMRXDV	Open	
JP37	SCRS	Open	
JP38	SCOL	Open	
JP40	Test 2	Open	
JP41	MUX1	Open	
JP42	MUX2	Open	

Table 2 Reserved Jumpers and recommendation

4.2 EEPROM Mode

The evaluation board has an EEPROM to allow the user to explore more extensive capabilities of the KSZ8895MLU/MLUB. The user can conveniently program the EEPROM on board using the USB port from any computer with a WIN 2000/XP environment and the Micrel provided software. This makes it easy for the user to evaluate features like "broadcast storm protection" and "rate control".

To prepare the KSZ8895MLU/MLUB evaluation board for EEPROM configuration follow these steps:

- 1. Copy the Micrel provided EEPROM software to your computer.
- 2. Set JP3 and JP9 as specified in Table 3 for EEPROM mode configuration. Make sure that the EEPROM is installed on the board.

Jumper	Description	Setting
JP1	SDA	Open
JP2	SCL	Open
JP3	SCL	Closed
JP9	SPIQ	Closed
JP4	Serial Bus Config. (PS0)	Open
JP5	Serial Bus Config. (PS1)	Open

Table 3 EEPROM Mod	de Settings
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3. Connect the computer's USB port to the KSZ8895MLU/MLUB board with a USB port cable.

4. There are two way to power up the evaluation board:
a). Connect the 5 VDC power supply to the KSZ8895MLU/MLUB when JP44 pin1-2 is closed.
b) 5 VDC power source from the USP port when IP44 pin 2.2 is closed.

b). 5 VDC power source from the USB port when JP44 pin 2-3 is closed.

- 5. The KSZ8895MLU/MLUB will power up in its default configuration if there is no information in the EEPROM.
- 6. Program the desired settings into the EEPROM using the Micrel software. See the software description section 5.1 for details.

7. Press the manual reset button. The KSZ8895MLU/MLUB will reset and read the new configuration in the EEPROM. After reset, the KSZ8895MLU/MLUB is ready for the operation with EEPROM configuration.

4.3 SPI Mode

From SPI interface to the KSZ8895MLU/MLUB, use a USB to SPI converter that allows accessing all of the KSZ8895MLU/MLUB features and registers. The user can easily access the SPI interface using a computer connected to the evaluation board's USB port interface. Micrel provides a Windows 2000/XP based program for the user to evaluate the KSZ8895MLU/MLUB's full feature set. In addition to all the control registers available via EEPROM programming, a host CPU connected to the KSZ8895MLU/MLUB's SPI interface will be able to access all static MAC table, the VLAN table, dynamic MAC address table and the MIB counters. Prepare the KSZ8895MLU/MLUB evaluation board for SPI mode configuration follow these steps:

- 1. Copy the Micrel provided SPI interface software on your computer.
- 2. Set JP5 as specified in Table 4 for SPI mode configuration.

Jumper	Description	Setting
JP1	SDA	Open
JP2	SCL	Open
JP3	SCL	Open
JP9	SPIQ	Open
JP4	Serial Bus Config. (PS0)	Open
JP5	Serial Bus Config. (PS1)	Closed

Table 4 SPI Mode Settings

- 3. Connect the computer's USB port to the KSZ8895MLU/MLUB board with a USB port cable.
- 4. There are two ways to power up the evaluation board:
 - Connect the 5 VDC power supply to the KSZ8895MLU/MLUB when JP44 pin1-2 is closed (default).
 - 5 VDC power source comes from the USB port when JP44 pin 2-3 is closed.
- 5. The KSZ8895MLU/MLUB will power up initial default configuration with the start switch in register 1 bit $0 = 0^{\circ}$ which means the switch is "off". You can set the bit $0 = 1^{\circ}$ to start switch.
- 6. Open the Windows and navigate to the directory where the Window SPI file is stored. Click its icon to invoke the software.
- 7. Program the desired settings using the Micrel SPI interface software. See the software operation description section 5.2 for details.

4.4 10/100 Ethernet Ports

There are four 10/100 Ethernet ports on the KSZ8895MLU/MLUB evaluation board. The ports J1, J2, J3 and J4 can be connected to a traffic generator/analyzer or a SmartBit via standard RJ45 connectors using CAT-5 cables. Each port can be used as either an uplink or downlink. All ports support auto MDI/MDIX so there is no need for cross over cables.

J1 = RJ45 connector for port 1

J2 = RJ45 connector for port 2 J3 = RJ45 connector for port 3 J4 = RJ45 connector for port 4

4.5 LED indicators Ethernet Port LEDs

There are five columns of LED indicators on the board, one column for each of the five ports. The LED indicators are programmable to two different modes. You can program the LED mode through a strap in option on JP23 or in register 11, bit 1. The mode definitions are shown in Table 5. There are three LEDs per port. The naming convention is "LEDx_y", where "x" is the port number, and "y" is the number of the LED for that port.

Mode 0	Mode1
$LEDx_2 = Link/Act$	$LEDx_2 = 100Link/Act$
LEDx_1 = Full Duplex/Col	$LEDx_1 = 10Link/Act$
$LEDx_0 = Speed$	$LEDx_0 = Full Duplex$

LED1_y are assigned to Port1

LED2_y are assigned to Port2

LED3_y are assigned to Port3

LED4_y are assigned to Port4

Power LED

The board also has a power LED D2 for the 3.3V power supply. D2 LED indicates 3.3V Power on and off.

4.6 MII Ports Configuration

There is one MII ports on the KSZ8895MLU/MLUB. This MII port connects to the fifth MAC in the KSZ8895MLU/MLUB, and we refer to it as the port 5 Switch SW5-MII port. The SW5-MII can be configured to MAC mode and PHY mode by jumpers of JP6 and JP7 as shown in Table 6.

The Switch MII port can be set to SNI mode also. In PHY mode, the Switch MII port will transmit and receive signals on J7 of the board's male MII connector. This mode is usually used to connect the KSZ8895MLU/MLUB to a CPU with MAC. In MAC mode, the Switch MII port will transmit and receive signals on J8 of the board's female MII connector. This interface is normally used to connect the KS8895MLU to an external PHY. We also have provisions on the board to support the SNI 7 wire interface. In SNI mode, the Switch MII port will transmit and receive signals on header pins. The connections between the header pins and the SNI signals are shown in the Table 7.

JP45 Closed as default for '0' Pin 91 LED5_1	JP7 Open='0', Close='1' Pin 86	JP6 Open='0', Close='1' Pin 87	Switch MAC5 SW5- MII	PHY[5] P5- MII (Reserved)
0	Open	Open	Disable, Outputs Tri-stated	Disable, Outputs Tri-stated
0	Open	Close	PHY mode MII	Disable, Outputs Tri-stated
0	Close	Open	MAC mode MII	Disable, Outputs Tri-stated
0	Closed	Close	PHY mode SNI	Disable, Outputs Tri-stated
1	Open	Open	Disabled	Disabled
1	Open	Close	PHY mode MII	Reserved
1	Close	Open	MAC mode MII	Reserved
1	Close	Close	PHY mode SNI	Reserved

Table 6 MII Mode Settings

Table 7 SNI Header Pin Definitions

Header Pin	SNI Signal	KSZ8895MLU/MLUB
		Signals
TP1	RXC	SMRXC
TP2	CRS	SMRXDV
TP3	TXC	SMTXC
TP4	TXEN	SMTXEN
TP5	TXD	SMTXD0
TP6	RXD	SMRXD0
TP7	COL	SCOL

Table 8 Configure for SW5-MII

Modes	JP7 SCONF1	JP6 SCONF0	JP45 LED5_1
SW5-MII MAC	Closed	Open	Closed
Mode with J8 used			
SW5-MII PHY	Open	Closed	Closed
Mode with J7 used			

4.7 MDC/MDIO Interface for MIIM Registers mode and SMI mode

From MDC/MDIO interface to the KSZ8895MLU/MLUB, use a USB to MDC/MDIO converter that allows accessing all of PHY related registers by MIIM mode and all of the KSZ8895MLU/MLUB registers by SMI mode. The user can easily access the MDC/MDIO interface using a computer connected to the evaluation board's USB port interface. Micrel provides Windows based programs for the user to evaluate for both MIIM and SMI. For the MIIM software to be used all of PHY related registers, please use the software tool in the folder of MDC_MDIO MIIM of the software directory. For the SMI software to be used all of registers, please use the software tool in the folder of MDC_MDIO MIC_MDIO SMI of the software directory.

To prepare the KSZ8895MLU/MLUB evaluation board for MDC/MDIO configuration, please follow these steps:

- 1. Copy the Micrel provided software on your computer.
- 2. Set JP2, JP3 and JP4 as specified in Table 8 for MDC/MDIO configuration.

Jumper	Description	Setting
JP1	MDIO/SDA	Close
JP2	MDC/SCL	Close
JP3	SPIQ/SDA	Close
JP9	EEPROM/SCL	Open
JP4	Serial Bus Config. (PS0)	Open (Close for SMI)
JP5	Serial Bus Config. (PS1)	Open

Table 9 MDC/MDIO Settings for MIIM and SMI

- 8. Connect the computer's USB port to the KSZ8895MLU/MLUB board with a USB port cable.
- 9. There are two ways to power up the evaluation board:
 a). Connect the 5 VDC power supply to the KSZ8895MLU/MLUB when JP44 pin1-2 is closed.

b). 5 VDC power source from the USB port when JP44 pin 2-3 is closed.

- 10. The KSZ8895MLU/MLUB will power up initial default configuration with the start switch in register 1 bit 0 = '0' which means the switch is "off". You can set the bit 0 = '1' to start switch in SMI mode. When JP5 and JP4 are open, the switch will be started automatically when power up.
- 11. Open the Windows and navigate to the directory where the Window MDC/MDIO files are stored. Click its icon to invoke the software.
- 12. Program the desired settings using the Micrel MDC/MDIO software. See the software operation description section for details.

5.0 Software Description

5.1 Introducing Application Software Tools

The Design Kit provides some software tools to support SPI interface, EEPROM (I2C) and MDC/MDIO access for MIIM registers and SMI interface. They are located folders in the software tool directory as follows:

- 1. In folder of DOS SPI Tool, there is an 8895SPI_DOS.exe file which can be executed directly. The tool is used to access all registers by SPI in a DOS Window.
- 2. In folder of MDC_MDIO SMI, there is a MicrelSMIIfApp.exe file which can be executed directly by clicking its icon. The software tool is used to access all registers by MDC/MDIO interface with SMI mode.
- 3. In folder of Window SPI_I2C_MIIM Tools, there is a MicrelSwitchPhyTools_1.xx.msi file which is clicked to create two application files in the default folder of Micrel (or you selected folder) and two icons on desktop, they need window drivers supported first, see 5.2 section for detail. One software tool is used to access all registers by SPI interface or is used to read/write all control register on I2C EEPROM mapping. Another software tool is used to access all MIIM registers for all PHYs.

5.2 Install Window Driver First

Before use the Window based application software tool, the support drivers need to be installed to PC/Laptop first and this installation is just one times only. When connect one standard USB cable with type A and type B connectors between the evaluation board and PC computer first time, the Found New Hardware Wizard window will pop-up and then follow the instructions step by step as below.



. Choose	'No, not this ti	ne' radio button	and click the	'Next' button.
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Choose the 'Install from a list or specific location (Advanced)' radio button and click the 'Next' button.

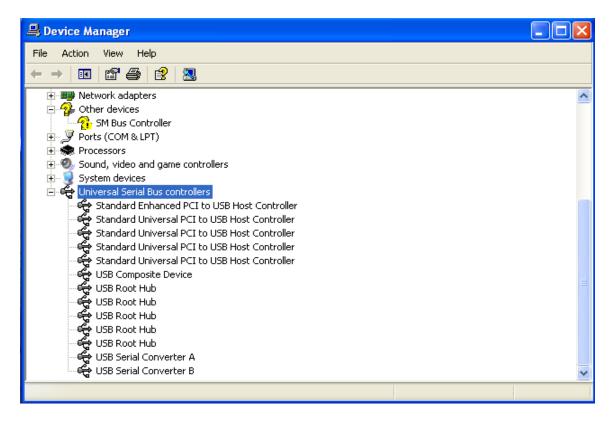
Found New Hardware Wizard
Please choose your search and installation options.
 Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
C:\MicrelEthernetChipConfig\D2XXDriver\CDM 2.02. 🗸 Browse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back Next > Cancel

Click the 'Include this location in the search' check box, and use 'Browse' button to select the

'C:\MicrelEthernetChipConfig\D2XXDriver\CDM 2.02.04 WHQL Certified' directory and click the 'Next' button. The window will install the drivers from this location.



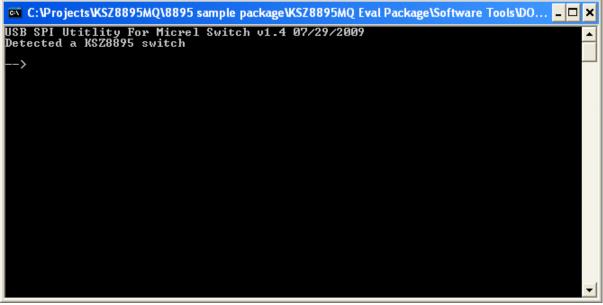
Click 'Finish' button. The Window will install another driver called 'USB Serial Converter B'. After the drivers installed, Window Device Manager will show 'USB Serial Converter A' and 'USB Serial Converter B' as below figure. That means the installation successful.



5.3 DOS SPI Tool

This is a simple and powerful tool to access all register. The tool located in the folder of DOS SPI Tool in the Software tools folder. There is an USBSPI.exe file which can be executed directly by clicking its icon.

Before run the software tool, the JP5 should be closed, please check the SPI setting in 4.3 SPI mode section. After click its icon, a DOS Window will pop up as follow:



Type a 'help' and press Enter, all commands will display as follows,

🛤 C:\Projects\KSZ8895MQ\8895 sample package\KSZ8895MQ Eval Package\Software Tools\DO 💶 🗖
USB SPI Utitlity For Micrel Switch v1.4 07/29/2009
>help
command syntax:
r reg – read register
w reg value – write register
run file — execute scripte file mac — to set or show static mac table
vlan – to set or show vlan table
resetulan — to clear ulan table
showmac — show dynamic mac table showmib — show MIB counters
g - quit the program
A date one breaten
>
•

For Read or Write registers, reg is the offset address of the register, value is Hex number. The 'run file' command can execute multiple commands by a script file, the script file is a .txt file which can be created by any edit tools.

 \rightarrow run xxxx.txt //will run the .txt script file.

5.4 MDC/MDIO MIIM Software Tool

5.4.1 MDC/MDIO MIIM software installation

The software tool can be used to access all MIIM registers for PHY based. This install file of the software tool locates in folder of Window SPI_I2C_MIIM Tools in the software tools folder of the Design Kit, there is MicrelSwitchPhyTools_1.xx.msi file which is clicked to install application file and add two application icons on the desktop, this installation just do one times only, the application file will be copied into the folder of Micrel\MicrelSwitchPhyTools (default) or other assigned folder in the installation. The MDC/MDIO MIIM Software Tool can be executed directly by clicking its application file or icon with name of MicrelMDIOConfigWinApp on the desktop.

5.4.2 On board jumper setting and Software Application

Before run the software tool, the JP1, JP2 and JP3 should be closed, please check the MDC/MDIO setting in section of 4.7 MIIM SMI mode section. After click its icon, a Window will pop up as follow:

🚆 MicrelMDIOConfigWinApp version 1.15	
Select a device to configure	
Device Address	0 🕂 1 🕂
Pre-config file name >>	DeviceID (Hex value) 221450
Pre-config file	Next

Select 'KSZ8895MQ 5 port switch' which supports KSZ8895 family and click Next button, Pop up a MDIO MIIM Configuration window as follows:

By this window, all of MIIM registers on 4 PHYs can be read and written directly (PHY5 is not used for KSZ8895MLU/MLUB switch). Click the mark of down or up, all MIIM registers will display for configuration. Check any writable bits of registers and click Write button, the value of registers will be changed.

Phy1	Phy2	P	hy3	Phy4		Phy5				
				Desister			2222			
15 🗆 Soft reset		m 14	— 1 · · · · ·	Register	_			245	12 🖂 Austa a saatiatina sa ahta	
		-/			(0)	13 🖌 Force		(1)	 Auto-negotiation enable ■ Force full-duplex 	
		-7	PHY Is	olate	(0)		art Auto-negotiation	(0)		(0
Consion rest(11 2 3	-7	Reserved		(0)	• • • • • •		(1)		(0
³ Disable Auto	MDI/MDIX (0) 2	Disable	e far end fault	0)	Disal	ole transmit	(0)	Disable LED	(0
				Register	1: MILS	tatus (0x	7808)			
15 T4 capable	(0) 14	100 Full	-	(1)	_	lf capable	(1)	12 10 Full capable	(1
11 10 Half capabl	e (1) 10	Reserved		(0)	9 Reserve	d	(0)	8 Reserved	(0
7 Reserved	0	0) 6	Preamble	(not support)	(0)	5 Auto-ne	gotiation Complete	(0)	4 Far end fault	(0
3 Auto-negotiatio	on Capable 💦 (1) 2	Link State	Ie	(0)	1 Jabber	test (not support)	(0)	Extended capable	(0
				Register	2: PHYI) High (0x	:0022)			
¹⁵ bit 15	Q	D) ¹⁴	bit 14		(0)	13 bit 13		(0)	12 bit 12	. (0
¹¹ bit 11	0	D) ¹⁰	bit 10		(0)	9 bit 9		(0)	8 bit8	. (0
7 bit 7	Q	D) 6	bit 6		(0)	5 bit 5		(1)	4 bit 4	. (0
3 bit 3	Q	0) 2	bit 2		(0)	1 bit 1		(1)	0 bit0	(0
				Deviator	2. DI MI		4450)			
15 bit 15		o) <mark>14</mark>	bit 14	Register	3: PHYI (0)	D LOW (UX 13 bit 13	1450)	ത	12 bit 12	(1
11 bit 11		ອງ ວງ 10	bit 10		(1)	9 bit 9		ത	8 bit 8	0
7 bit 7		0) 6	bit 6		(1)	5 bit 5		(0) (0)	4 bit 4	(1 (1
3 bit 3		0) 2	bit 2		ത	1 bit 1		(0) (0)	0 bit 0	0
		-)	0112		(0)	DILT		(0)	0110	- (0

5.5 MDC/MDIO SMI Software Tool

5.5.1 MDC/MDIO SMI software

The software tool can be used to access all registers of KSZ8895MLU/MLUB by MDC/MDIO interface

This tool locate in folder of MDC_MDIO SMI in the Design Kit, there is MicrelSMIIfApp.exe file which can be executed directly by clicking its icon.

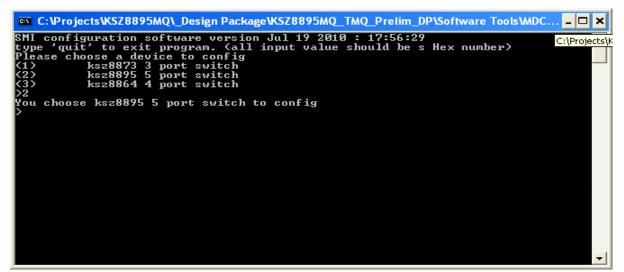
5.5.2 On board jumper setting and Software Application

Before run the software tool, the JP1, JP2 and JP3 should be closed, please check the MDC/MDIO setting in section of 4.7 MIIM SMI mode and pins PS[1:0]=01, JP8 should be closed also. After click its application file of MicrelSMIIfApp, a Window will pop up as follow: There are three options:

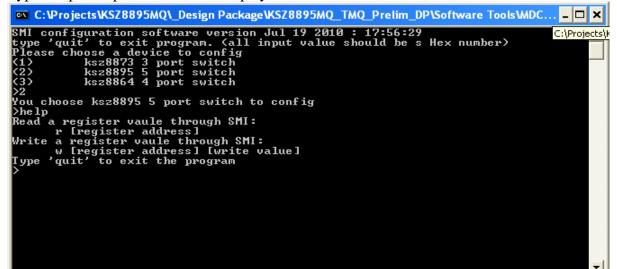
- (1) KSZ8873 3 port switch
- (2) KSZ8895 5 port switch
- (3) KSZ8864 4 port switch

Please select (2) to support KSZ8895MLU/MLUB configuration by SMI mode

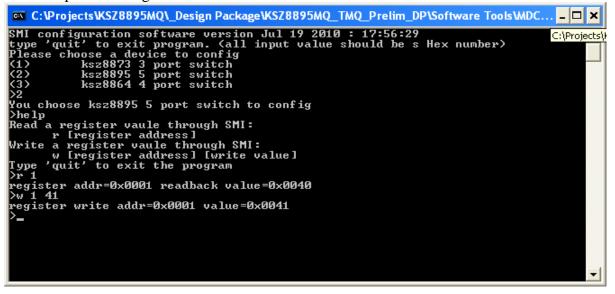
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Type 'help' and press Enter, will display all commands as follow,



For example: Read register 1 and write bit 0 to start switch.



5.6 EEPROM Software Tool

5.6.1 EEPROM software installation

Micrel provides EEPROM software tool can use a PC/Laptop via the on board USB port to program the KSZ8895MLU/MLUB evaluation board's EEPROM without the added expense of an external EEPROM programmer.

The software tool can be used to read/write all control registers of the KSZ8895MLU/MLUB. The installation file of the tool is located in folder of Window SPI_I2C_MIIM Tools in the software tools folder of the Design Kit, there is MicrelSwitchPhyTools_1.xx.msi file which is clicked to install application file and add two application icons on the desktop, this installation just do one times only, the application file will be copied into the folder of Micrel\MicrelSwitchPhyTools (default) or other assigned folder in the installation.

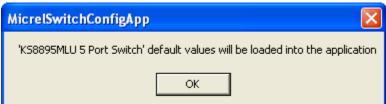
The MDC/MDIO EEPROM Software Tool can be executed directly by clicking its application file or icon with name of MicrelSwitchConfigApp on the desktop.

5.6.2 On board jumper setting and Software Application

Before run the software tool, the JP3 and JP9 should be closed, please check the EEPROM setting in section of 4.2 EEPROM modes. After click its icon, a Window will pop up as follow:

MicrelSwitchConfigApp 1.15
Select a interface
SPI Interface to do switch configuration
C 12C Interface to do switch configuration
I2C Interface to do EEPROM configuration
KS8895MLU 5 Port Switch
Cancel Continue

Select the radio of I2C interface to do EEPROM configuration and press Continue button, pop up a window as follow.



KS8895MLU 5 Port Sv	vitch 1.15		
Global Registers	Name	Value	
Global Registers Power Down Control Advanced Registers Registers of Port	Name Reg 0 : Chip ID0 Reg 4 : Chip ID1 Reg 2 : Global Control 0 Reg 3 : Global Control 1 Reg 5 : Global Control 2 Reg 5 : Global Control 3 Reg 6 : Global Control 4 Reg 7 : Global Control 5 Reg 11 : Global Control 9 Reg 12 : Global Control 10	Value 0x95 0x00 0x0c 0x04 0xf0 0x00 0x00 0x00 0x00 0x4a 0x00 0x54	
<u>O</u> pen	Save Read EEPROM	Remove All Write EEPRO	M

Click OK button, one of read/write EEPROM window will display as follow:

Note: Chip ID has to set to 0x00 for EEPROM contents to be downloaded to all registers in current device revision.

The software tool can read/write all advanced and port control registers into EEPROM as follow. After Write EEPROM, a worm reset can takes the effect for the change.

0x00 0x1f 0x06 0x00 0x01 0x80 0x00 0x5f 0x00 0x80 0x80 0x01	0x00 0x1f 0x06 0x00 0x01 0x80 0x80 0x5f 0x00 0x80 0x80	0x00 0x1f 0x06 0x00 0x01 0x80 0x00 0x5f 0x00	0x00 0x1f 0x06 0x00 0x01 0x80 0x80 0x5f 0x00	0x00 0x1f 0x06 0x00 0x01 0x80 0x80 0x00 0x5f
0x06 0x00 0x01 0x80 0x00 0x5f 0x00 0x80 0x80 0x80	0x06 0x00 0x01 0x80 0x00 0x5f 0x00	0x06 0x00 0x01 0x80 0x00 0x5f 0x00	0x06 0x00 0x01 0x80 0x00 0x5f	0x06 0x00 0x01 0x80 0x80 0x00 0x5f
0x00 0x01 0x80 0x00 0x5f 0x00 0x80 0x80 0x01	0x00 0x01 0x80 0x00 0x5f 0x00	0x00 0x01 0x80 0x00 0x5f 0x00	0x00 0x01 0x80 0x00 0x5f	0x00 0x01 0x80 0x00 0x5f
0x01 0x80 0x00 0x5f 0x00 0x80 0x80 0x01	0x01 0x80 0x00 0x5f 0x00	0x01 0x80 0x00 0x5f 0x00	0x00 0x01 0x80 0x00 0x5f	0x01 0x80 0x00 0x5f
0x80 0x00 0x5f 0x00 0x80 0x80	0x80 0x00 0x5f 0x00	0x80 0x00 0x5f 0x00	0x80 0x00 0x5f	0x80 0x00 0x5f
0x00 0x5f 0x00 0x80 0x81	0x00 0x5f 0x00	0x00 0x5f 0x00	0x00 0x5f	0x00 0x5f
0x5f 0x00 0x80 0x01	0x5f 0x00	0x5f 0x00	0x5f	0x5f
0x00 0x80 0x01	0x00	0x00		
0x80 0x01			0x00	
0x01	0x80			0x00
		0x80	0x80	0x80
	0x01	0x01	0x01	0x01
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x88	0x88	0x88	0x88	0x88
0x84	0x84	0x84	0x84	0x84
0x82	0x82	0x82	0x82	0x82
0x81	0x81	0x81	0x81	0x81
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
0x00	0x00	0x00	0x00	0x00
	0x88 0x84 0x82 0x81 0x00 0x00 0x00 0x00 0x00 0x00 0x00	0x88 0x88 0x84 0x84 0x82 0x82 0x81 0x81 0x00 0x00 0x00 0x00	0x88 0x88 0x88 0x84 0x84 0x84 0x82 0x82 0x82 0x81 0x81 0x81 0x00 0x00 0x00 0x00 0x00 0x00	0x88 0x88 0x88 0x88 0x88 0x84 0x84 0x84 0x84 0x84 0x82 0x82 0x82 0x82 0x82 0x81 0x81 0x81 0x81 0x81 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00

5.7 Window SPI Software Tool

5.7.1 Window SPI software installation

The software tool can be used to read/write all of registers of the KSZ8895MLU/MLUB. The installation file of the tool is located in folder of Window SPI_I2C_MIIM Tools in the software tools folder of the Design Kit, there is MicrelSwitchPhyTools_1.xx.msi file which is clicked to install application file and add two application icons on the desktop, this installation just do one times only, the application file will be copied into the folder of Micrel\MicrelSwitchPhyTools (default) or other assigned folder in the installation.

The MDC/MDIO SPI Software Tool can be executed directly by clicking its application file or icon with name of MicrelSwitchConfigApp on the desktop.

5.7.2 On board jumper setting and Software Application

Before run the software tool, the JP5 should be closed (PS [1:0] = 10), please check the SPI setting in section of 4.3 SPI mode. After click its icon, a control Window will be pop up as follow:

MicrelSwitchConfigApp 1.15
Select a interface SPI Interface to do switch configuration I2C Interface to do switch configuration
C I2C Interface to do EEPROM configuration
KS8895MLU 5 Port Switch Cancel Continue

The default is SPI interface to do switch configuration. From the device selection window to select any KS8895 devices (or press the Continue button directly) and press Continue button. A control window will be pop up as follow.

All register can be read/ written in the window.

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KS8895MLU 5 Port Swite	ch 1.15		
Global Registers	Name	Value	
Power Down Control Advanced Registers Registers of Port Static MAC Table Dynamic MAC Table Vian Table	Reg 0: Chip ID0 Reg 2: Chip ID1 Reg 2: Global Control 0 Reg 3: Global Control 1 Reg 4: Global Control 2 Reg 5: Global Control 3 Reg 6: Global Control 4 Reg 7: Global Control 5 Reg 11: Global Control 9 Reg 12: Global Control 10	0x95 0xf0 0x0c 0x0d4 0x00 0x00 0x00 0x00 0x4a 0x00 0x54	
Open	Save Refresh	Remove All Reset M	11B Counter Exit

The control Window includes all registers, static MAC table, VLAN table, dynamic table and MIB counter that are supported by SPI.

The software can save and open the configuration file as a back-up.

6.0 Reference Documents

KSZ8895MLU/MLUB/FMQ Data Sheets (Contact Micrel for Latest Datasheet), KSZ8895MLU/MLUB Design Package includes all design information as a Design Kit separately for the KSZ8895MLU/MLUB device (Contact Micrel for the updates).

7.0 Bill of Material

Please see the detail BOMs in the BOM folder of the hardware design package for the KSZ8895MLU/MLUB Evaluation Board.

8.0 Schematics

Please see the schematics of the evaluation board and reference design in the schematics folder of the hardware design package for the KSZ8895MLU/MLUB Evaluation Board.

Magnetics Vendors:

See the datasheets for the recommendation.

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