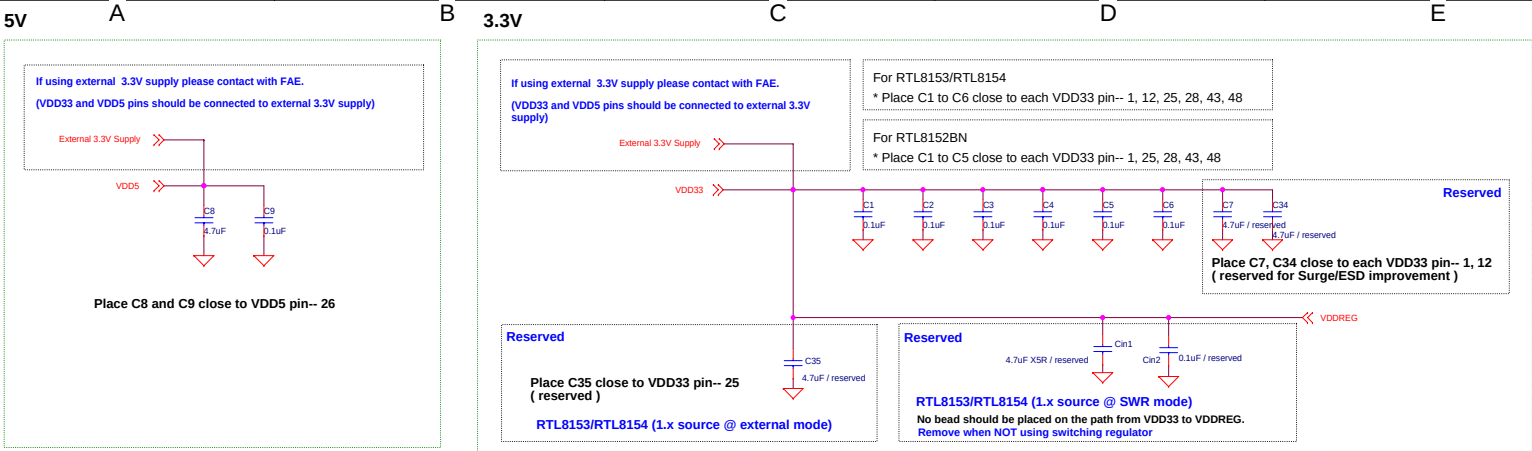
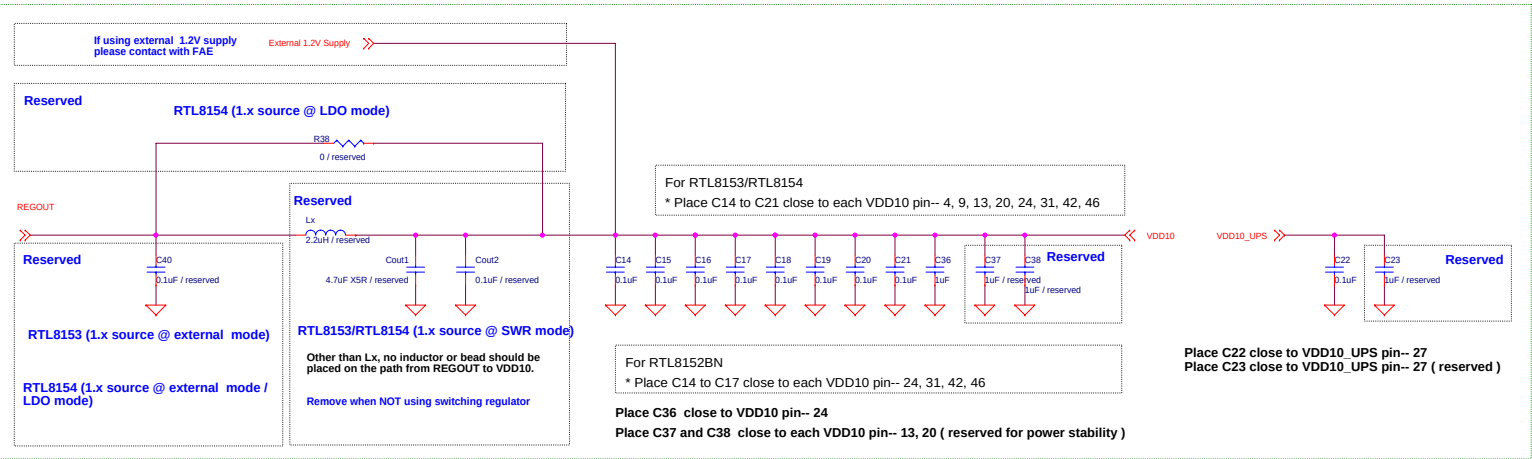


RTL8153/RTL8152BN/RTL8154 48 Pin Reference Schematic V101

PAGE	INDEX
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2.	POWER
3.	CONTROLLER
4.	Reserved Components
5.	Optional Function
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1.xV



1.xV Power-Supply Configurations

	3.3V source	1.xV source	Lx	Cout1,2	Cin1,2	R7	R8	C35	C40	R38
RTL8153 RTL8154	5V to 3.3V LDO External 3.3V	SWR	O	O	O	O	X	X	X	X
RTL8153 RTL8154	5V to 3.3V LDO External 3.3V	External	X	X	X	X	O	O	O	X
RTL8154	External 3.3V	LDO	X	X	X	X	O	O	O	O
RTL8152BN	5V to 3.3V LDO External 3.3V	LDO	X	X	X	X	X	X	X	X

Note:

1. R7, R8, R38 are reserved for the convenience of changing 1.2V supply source between SWR, LDO and external mode for RTL8153/RTL8154.

No design change of PCB model is needed with R7/R8/R38 reserved.

2. Please refer to the table above when using different 1.xV supply source.

3. External 1.2V supply is supported on RTL8153/RTL8154 when NOT using SWR mode.

4. LDO mode is supported on RTL8154 only when the external 3.3V source is selected for VDD33/VDD5.

5. External power supply is NOT permitted for RTL8152BN.

If only one 1.2V supply source for RTL8153/RTL8154 is selected for one PCB model, i.e. no other choices are reserved:

1. R7, R8 and R38 are not necessary.

2. Just make a path of short to replace the use of R7/R8/R38 on the table.

3. SWR mode only (RTL8153/RTL8154)
(1) R7 => short ENSWREG to VDD33
(2) R8/R38 => not necessary

4. LDO mode only (RTL8154)
(1) R8 => short ENSWREG to GND
(2) R38 => short REGOUT to VDD10
(3) R8 => not necessary

5. External supply only (RTL8153/RTL8154)
(1) R8 => short ENSWREG to GND
(2) R7/R38 => not necessary

For RTL8153/RTL8154

5V power input pin-- 26

3.3V LDO output pin-- 25

3.3V power input pin-- 1, 12, 25, 28, 34, 35, 43, 48

1.2V SWR output pin-- 36

1.2V power input pin-- 4, 9, 13, 20, 24, 31, 42, 46

1.2V UPS LDO output pin-- 27

For RTL8152BN

5V power input pin-- 26

3.3V LDO output pin-- 25

3.3V power input pin-- 1, 25, 28, 43, 48

1.05V LDO output pin-- 46

1.05V power input pin-- 24, 31, 42, 46

1.05V UPS LDO output pin-- 27

For RTL8152BN, R5 and R6 are recommended for better EMI suppression.

C24 value should be 0.01uF-0.4uF

R9 could be saved by sharing the pull-up resistor available on the chipset side

The diagram shows three signal lines (LANWAKE, GPIO, XTALDET) connected to a common VDD33 supply. Each line has a pull-up resistor (R9, R10, R11) connected to VDD33. R9 is labeled 10K / reserved, R10 is 10K, and R11 is 10K.

Refer to the page of "Reserved Components" for more detailed configuration of R11 and R28 when using different clock source

Three test points reserved for debug requirement

The diagram illustrates three test points reserved for debug requirements, each represented by a blue circle with a horizontal line extending to the right. The signals are listed in red text to the right of each line:

- TP1** is connected to **EECS/SCL**.
- TP2** is connected to **EEDI/SDA/SPISDI**.
- TP3** is connected to **EESK/LED1/SPISCK**.

Refer to the page of "Reserved Components" for Using External Clock Source

R2 value should be 2.49K (1%) for all application

Refer to the page of "Power" for more detailed configuration of R7 and R8 when using different 1.xV supply source.

VDD33

R7 for Enable Switching Regulator
R8 for Disable Switching Regulator

C26, C27 are necessary only for RTL8153

For RTL8154
NC (Not Connected) pins-- 14, 15, 18, 19

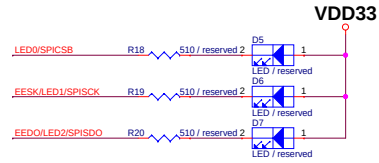
For RTL8152BN
NC (Not Connected) pins-- 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 33, 34, 35, 36

The diagram shows four LEDs (D1, D2, D3, D4) connected in parallel to a common ground. Each LED's anode is connected to a microcontroller pin through a 510 ohm resistor (R13, R14, R15, R16). The microcontroller pins are labeled as follows:

- D1:** _LED0/SPICSB
- D2:** _EESK/LED1/SPISCK
- D3:** _EED0/LED2/SPISDO
- D4:** GPIO / reserved

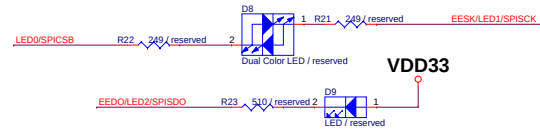
Each LED is represented by a square symbol with a triangle pointing right and a circle with a dot inside. The resistors are shown as zigzag lines. The ground symbol is a triangle with a horizontal line.

Optional LED Configurations (Low Active)



Support R= 249 ohm Resistor For Single Color LED

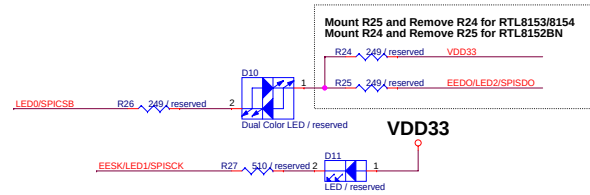
R18, R19, R20 and D5, D6, D7 Reserved for Single Color Configuration (optional)



Support R= 249 ohm Resistor For Single Color LED

Support R= 125 ohm Resistor For Dual Color LED

R21, R22, R23 and D8, D9 Reserved for Single Color + Dual Color LED Configuration (optional)



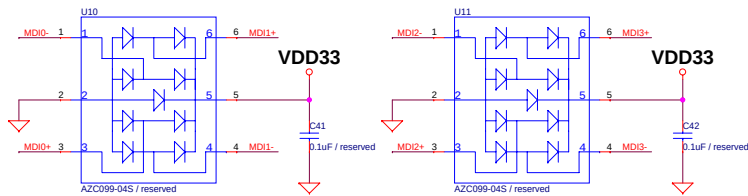
Support R= 249 ohm Resistor For Single Color LED

Support R= 125 ohm Resistor For Dual Color LED

R24, R25, R26, R27 and D10, D11 Reserved for Single Color + Dual Color LED Configuration (optional)

Only support LED0+LED1 / LED0+LED2 Dual Color LED Combinations when using EEPROM or SPI Flash

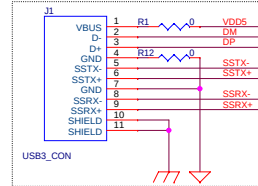
Reserved for TVS Components



Note:

1. U10, U11 and C41, C42 are reserved for line-to-line Surge and Cable ESD on the secondary side (optional)
2. Gas Tube is for line-to-ground Surge on the primary side (optional)

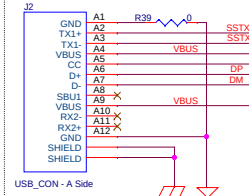
USB Connector (USB Type-C Plug or USB 3.1 Standard-B Plug)



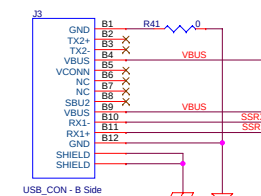
USB 3.1 Standard-B Plug / reserved

R1, R12 are reserved for filtering power noise.
You can just make a path of short to replace the use of R1/R12 if not needed.

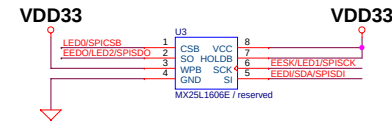
USB Type-C Plug / reserved



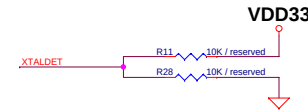
R39-R41 are reserved for filtering power noise.
You can just make a path of short to replace the use of R39-R41 if not needed.



SPI Flash



Reserved for Using External Clock Source



R11 Reserved for Using 25MHz Clock Source
R28 Reserved for Using 48MHz Clock Source

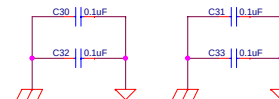
Pin37- XTALDET is Clock Detect Pin.
Mount R11 and Remove R28 when 25MHz clock is used.
Mount R28 and Remove R11 when 48MHz clock is used.

External Clock >>> R29 0 / reserved XTAL2

R29 Reserved for Using External Clock Source (optional)

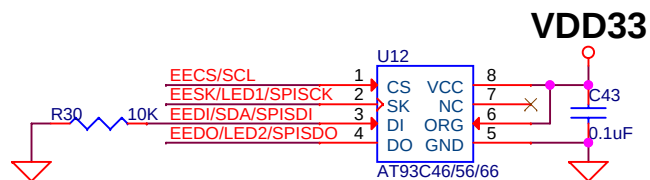
Pin45- XTAL2 is External Clock Input Pin
Pin44- XTAL1 must be floating when using external clock source

Reserved for Noise Isolation

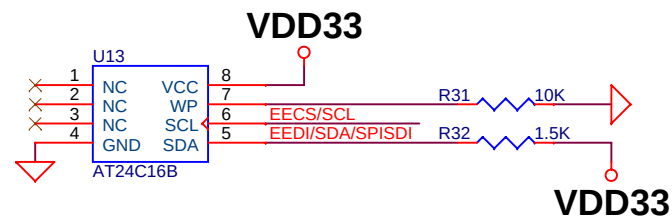


C30 to C33 Reserved for Noise Isolation between Chassis GND and System GND (optional)

For RTL8153/RTL8154 EEPROM / TWSI Function (2 Option)

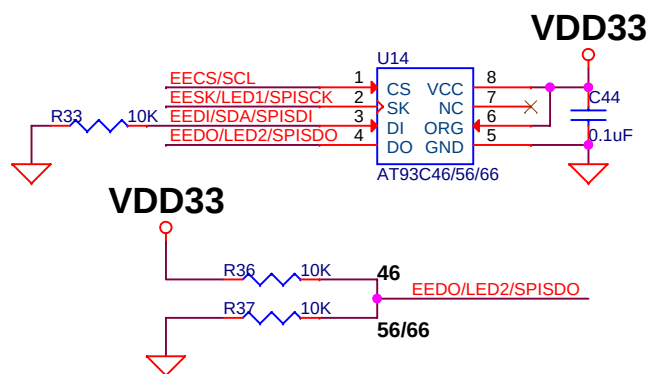


1. All components in this block are needed if EEPROM is used.
Choose 93C46 or 93C56/66 by eFUSE autoload

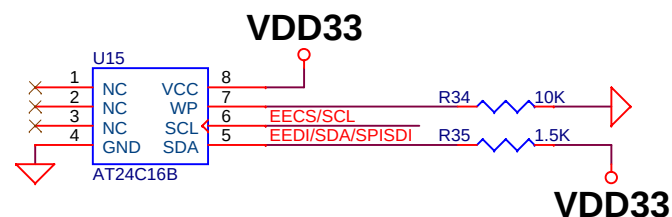


2. All components in this block are needed if TWSI is used.

For RTL8152BN EEPROM / TWSI Function (2 Option)



1. All components in this block are needed if EEPROM is used.
Mount R36 and Remove R37 for using 93C46
Mount R37 and Remove R36 for using 93C56/66



2. All components in this block are needed if TWSI is used.

RTL8153 R-BOM for LAN on Motherbaord

1. SWR mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	20	Cout2,Cin2,C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22,C26,C27	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	2	Cout1,Cin1	4.7uF X5R
6.	1	C24	0.01uF
7.	1	C25	1000pF/2KV
8.	2	C28,C29	27pF
9.	3	D1,D2,D3	LED
10.	1	J1	USB3.0 Connector
11.	1	L1	2.2uH
12.	1	R2	2.49K 1%
13.	4	R3,R4,R5,R6	75
14.	2	R10,R11	10K
15.	3	R13,R14,R15	510
16.	1	U1	Transformer
17.	1	U8	RTL8153
18.	1	X1	XTAL25M

RTL8154 R-BOM for LAN on Motherbaord

1. SWR mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	18	Cout2,Cin2,C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	2	Cout1,Cin1	4.7uF X5R
6.	1	C24	0.01uF
7.	1	C25	1000pF/2KV
8.	2	C28,C29	27pF
9.	3	D1,D2,D3	LED
10.	1	J1	USB3.0 Connector
11.	1	L1	2.2uH
12.	1	R2	2.49K 1%
13.	4	R3,R4,R5,R6	75
14.	2	R10,R11	10K
15.	3	R13,R14,R15	510
16.	1	U1	Transformer
17.	1	U8	RTL8154
18.	1	X1	XTAL25M

RTL8152BN R-BOM for LAN on Motherbaord

1. LDO mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	11	C1,C2,C3,C4,C5,C9,C15,C16,C17,C21,C22	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	1	C24	0.01uF
6.	1	C25	1000pF/2KV
7.	2	C28,C29	27pF
8.	2	D1,D2	LED
9.	1	J1	USB3.0 Connector
10.	1	R2	2.49K 1%
11.	4	R3,R4,R5,R6	75
12.	2	R10,R11	10K
13.	2	R13,R14	510
14.	1	U1	Transformer
15.	1	U8	RTL8152BN
16.	1	X1	XTAL25M

2. External mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	19	C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22,C26,C27,C40	0.1uF
3.	1	C36	1uF
4.	2	C8,C35	4.7uF
5.	1	C24	0.01uF
6.	1	C25	1000pF/2KV
7.	2	C28,C29	27pF
8.	3	D1,D2,D3	LED
9.	1	J1	USB3.0 Connector
10.	1	R2	2.49K 1%
11.	4	R3,R4,R5,R6	75
12.	2	R10,R11	10K
13.	3	R13,R14,R15	510
14.	1	U1	Transformer
15.	1	U8	RTL8153
16.	1	X1	XTAL25M

2. LDO mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	17	C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22,C40	0.1uF
3.	1	C36	1uF
4.	2	C8,C35	4.7uF
5.	1	C24	0.01uF
6.	1	C25	1000pF/2KV
7.	2	C28,C29	27pF
8.	3	D1,D2,D3	LED
9.	1	J1	USB3.0 Connector
10.	1	R2	2.49K 1%
11.	4	R3,R4,R5,R6	75
12.	2	R10,R11	10K
13.	3	R13,R14,R15	510
14.	1	U1	Transformer
15.	1	U8	RTL8154
16.	1	X1	XTAL25M

3. External mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	17	C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22,C40	0.1uF
3.	1	C36	1uF
4.	2	C8,C35	4.7uF
5.	1	C24	0.01uF
6.	1	C25	1000pF/2KV
7.	2	C28,C29	27pF
8.	3	D1,D2,D3	LED
9.	1	J1	USB3.0 Connector
10.	1	R2	2.49K 1%
11.	4	R3,R4,R5,R6	75
12.	2	R10,R11	10K
13.	3	R13,R14,R15	510
14.	1	U1	Transformer
15.	1	U8	RTL8154
16.	1	X1	XTAL25M

RTL8153 R-BOM for USB Dongle

SWR mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	20	Cout2,Cin2,C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22,C26,C27	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	2	Cout1,Cin1	4.7uF X5R
6.	1	C24	0.01uF
7.	1	C25	1000pF/2KV
8.	2	C28,C29	27pF
9.	3	D1,D2,D3	LED
10.	1	J1	USB3.0 Connector
11.	1	Lx	2.2uH
12.	1	R2	2.49K 1%
13.	4	R3,R4,R5,R6	75
14.	2	R10,R11	10K
15.	3	R13,R14,R15	510
16.	1	U1	Transformer
17.	1	U3	SPI Flash
18.	1	U8	RTL8153
19.	1	X1	XTAL25M

RTL8154 R-BOM for USB Dongle

SWR mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	18	Cout2,Cin2,C1,C2,C3,C4,C5,C6,C9,C14,C15,C16,C17,C18,C19,C20,C21,C22	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	2	Cout1,Cin1	4.7uF X5R
6.	1	C24	0.01uF
7.	1	C25	1000pF/2KV
8.	2	C28,C29	27pF
9.	3	D1,D2,D3	LED
10.	1	J1	USB3.0 Connector
11.	1	Lx	2.2uH
12.	1	R2	2.49K 1%
13.	4	R3,R4,R5,R6	75
14.	2	R10,R11	10K
15.	3	R13,R14,R15	510
16.	1	U1	Transformer
17.	1	U3	SPI Flash
18.	1	U8	RTL8154
19.	1	X1	XTAL25M

RTL8152BN R-BOM for USB Dongle

LDO mode

Bill Of Materials		Aug 13, 2014	
Item	Quantity	Reference	Part
1.	1	CON1	RJ45
2.	11	C1,C2,C3,C4,C5,C9,C14,C15,C16,C17,C22	0.1uF
3.	1	C36	1uF
4.	1	C8	4.7uF
5.	1	C24	0.01uF
6.	1	C25	1000pF/2KV
7.	2	C28,C29	27pF
8.	2	D1,D2	LED
9.	1	J1	USB3.0 Connector
10.	1	R2	2.49K 1%
11.	4	R3,R4,R5,R6	75
12.	2	R10,R11	10K
13.	2	R13,R14	510
14.	1	U1	Transformer
15.	1	U3	SPI Flash
16.	1	U8	RTL8152BN
17.	1	X1	XTAL25M

Change Notice from 1.00 to 1.01

- 1. Add USB-CON Type-C plug circuit. (Reserved)

Realtek Semiconductor Corp.		
No.2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan		
Title		
RTL8153/8152BN 48 Pin Reference Schematic : Change Notes		
Size	Document Number	Rev
A3	RTL8153/8152BN/8154 48 Pin Reference Schematic	
Date:	Thursday, October 09, 2014	Sheet 8 of 8