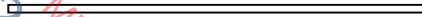
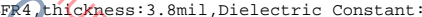


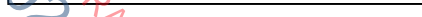
# Content Indexing

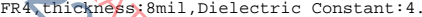
- 01.Index
- 02.Modify note
- 03.Block Diagram
- 04.Power Tree
- 05.System Power
- 06.RK3288 USB/HSIC Controler
- 07.USB HOST Port
- 08.RK3288 RAM Controler
- 09.RAM-DDR3-4X16bit
- 10.Nand FLASH/eMMC/TF Card
- 11.RK3288 GPIO/POWER
- 12.HDMI OUT
- 13.RK3288 LCDC/I2S Controler
- 14.RK1000-S-AV OUT
- 15.S/PDIF OUT
- 16.RK3288 Ethernet MAC Controler
- 17.10/100/1000M-PHY
- 18.RK3288 SDIO0 Controler
- 19.AP6XXX-WIFI/BT
- 20.USB WIFI-(option)
- 21.MIPI Interface
- 22.DTV-(Reserve)
- 23.HDMI IN
- 24.VGA OUT

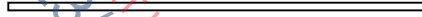
## 6 LAYERS PCB STACK

TOP(Signal1)  Cu,thickness:0.7mil,Plating to 1oz


GND1  FR4,thickness:3.8mil,Dielectric Constant:4.3


POWER  Cu,thickness:1.5mil, 1oz


 FR4,thickness:8mil,Dielectric Constant:4.3

 Cu,thickness:1.5mil, 1oz

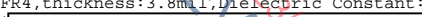
FR4,thickness:adjust thickness according to the thickness of board ,Dielectric Constant:4.3

Signal2  Cu,thickness:1.5mil, 1oz

GND2  FR4,thickness:3mil,Dielectric Constant:4.3

 Cu,thickness:1.5mil, 1oz

FR4,thickness:3.8mil,Dielectric Constant:4.3

BOTTOM(Signal3)  Cu,thickness:0.7mil,Plating to 1oz



福州瑞芯微电子有限公司

Title: Index

File: RK3288\_BOX\_Ref

REV:3.0

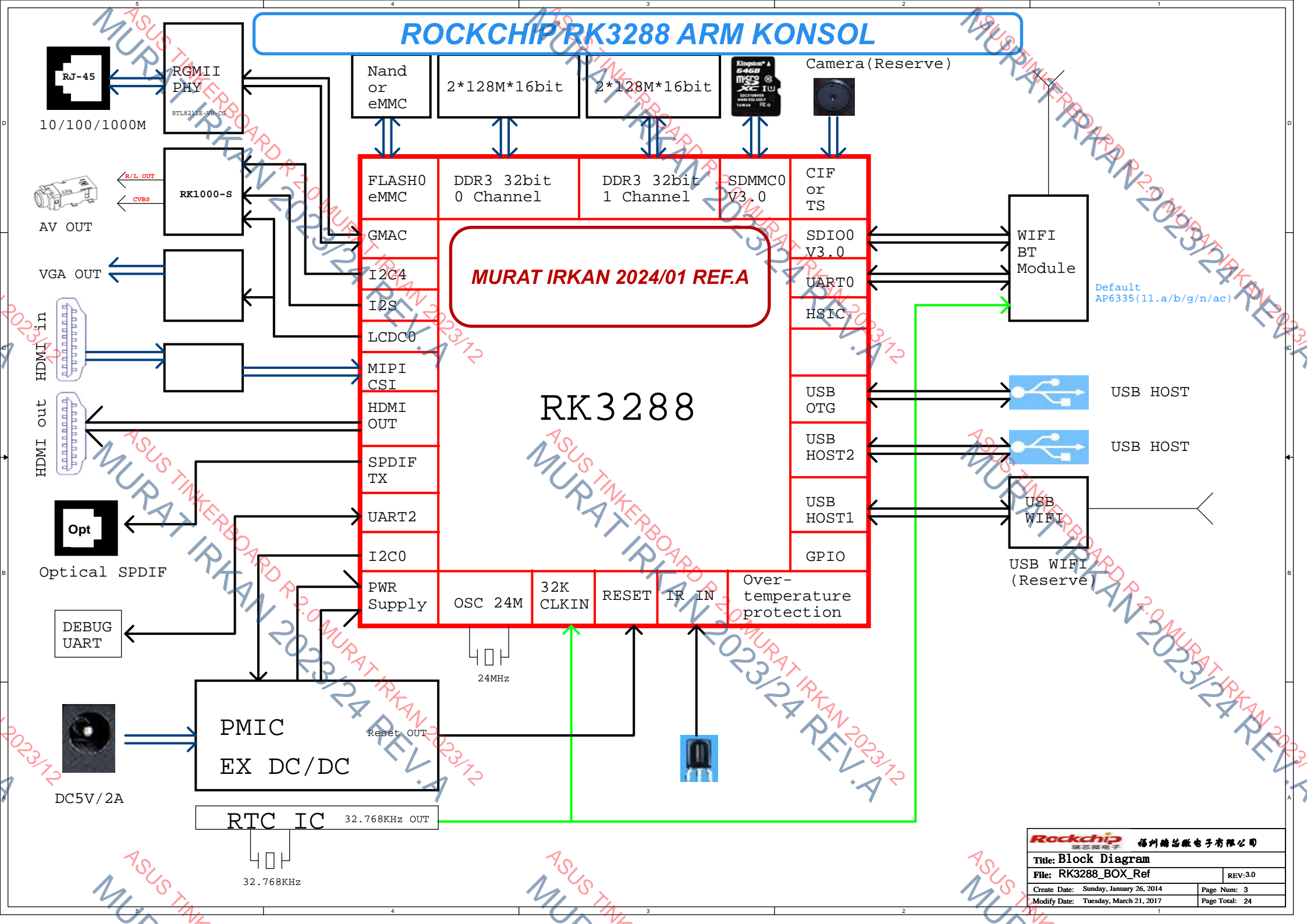
Create Date: Sunday, January 26, 2014

Page Num: 1

Modify Date: Tuesday, March 21, 2017

Page Total: 24

Version	Date	Author	Change Note	Approved
V2.0	20170207	LCH	Update	



Adapter  
5V/2A

VCC\_SYS

VCC\_IO

VCC7

LDO3 100mA

VCC2

BUCK2 5A

VCC1

BUCK1 5A

VCC3

BUCK3 1.5A

LDO7 300mA

VCC6

LDO1 150mA

VCC4

BUCK4 1.5A

RK808-B

VCC9

LDO5 300mA

VCC8

SW1 0.2R

Reset OUT

VCC10

LDO6 150mA

VCC11

LDO8 300mA

LDO2 150mA

LDO4 150mA

VCC12

SW2 0.2R

External DC-DC

Current limiting IC

VDD\_TIO

3288 PMUVDD  
3288 USB PHY  
RK3288 PLL

VDD\_GPU

GPU

VDD\_CPU

CPU Core

VCC\_DDR

DDR\_Ctrl

1.5V

DDR Device

VCC\_18

SDIO WIFI IO  
RK3288 SAR-ADC  
RK3288 USB PHY

VCC\_Flash

option

FLASH IO

VCC\_IO

RK3288 IO Suply  
RK3288 USB PHY  
FLASH  
TF Card  
Ethernet MAC  
LCDC Controller  
WiFi

3.3V

VCCIO\_SD

RK3288  
SDIO-Ctrl

VCC\_SD

SD Card  
Power

RESET

RESET

VDD10\_LCD

RK3288 HDMI  
RK3288 LCDC

VCC18\_LCD

RK3368 HDMI  
RK3368 LCDC

VCCA\_33

VCCA\_18

VCC\_LAN

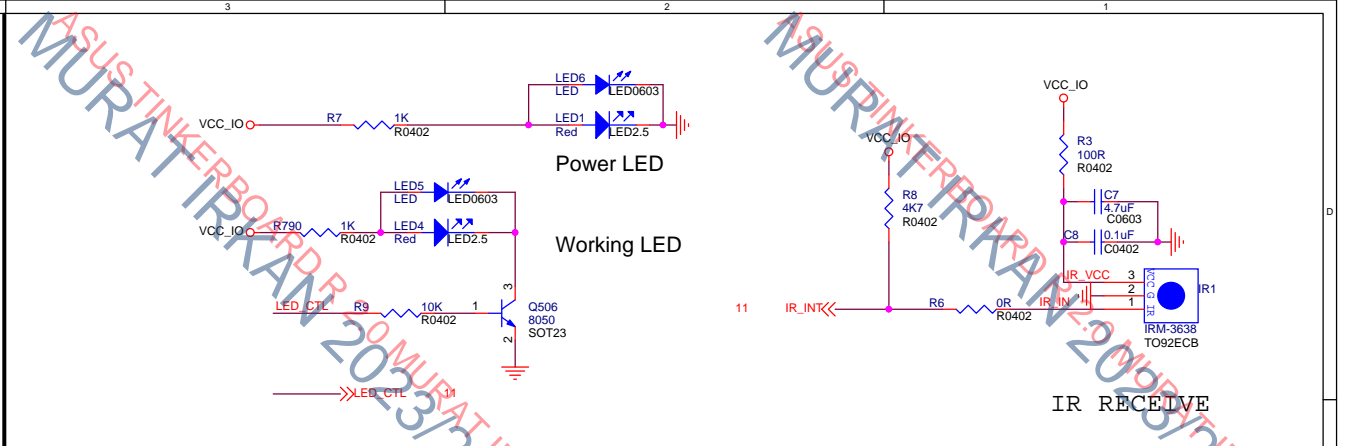
VDD\_LOG

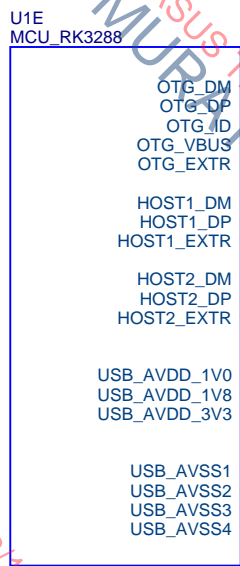
VCC\_HOST\_5V

Power up Timing

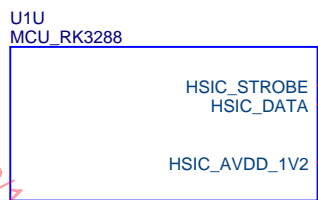
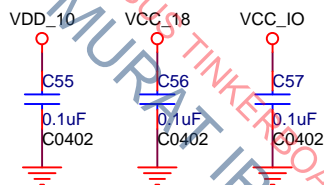
PowerName	RK808-B Channel	timer 2ms	Default voltage	Normal voltage
VDD_10	LDO3	Slot:1	1.0V	1.0V
VDD_CPU	BUCK1	Slot:2	1.1V	DVFS
VDD_GPU	BUCK2	Slot:3	1.1V	DVFS
VDD_LOG	External DC-DC	Slot:4A	1.0V	DVFS
VCC_DDR	BUCK3	Slot:3	1.5V	1.5V
VCC_18	LDO7	Slot:3	1.8V	1.8V
VCC18_FLASH	LDO1	Slot:4	1.8V	1.8V
VCC_IO	BUCK4	Slot:4	3.3V	3.3V
VCCIO_SD	LDO5	Slot:5	3.3V	1.8V or 3.3V
VCC SD	SW1	Slot:5	3.3V	3.3V
Reset		16*2mS+50mS		
VDD10_LCD	LDO6	OFF	0V	1.0V
VCC18_LCD	LDO8	OFF	0V	1.8V
VCCA_33	LDO2	OFF	0V	3.3V
VCCA_18	LDO4	OFF	0V	1.8V
VCC_LAN	SW2	OFF	0V	3.3V

SPDIF
RK3288 I2S
RK1000-S
Audio Line Driver IC
RK3288 LCDC
RK1000-S
Ethernet PHY
Logic
USB HOST
USB HOST

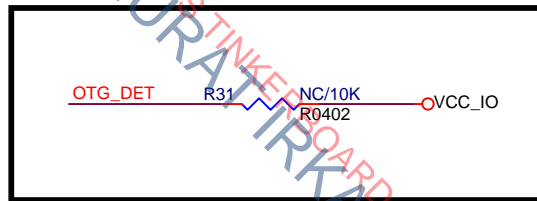




RK3288\_E



RK3288\_U



 瑞芯微电子		福州瑞芯微电子有限公司	
Title: RK3288 USB/HSIC Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date: Monday, February 17, 2014		Page Num: 6	
Modify Date: Tuesday, March 21, 2017		Page Total: 24	

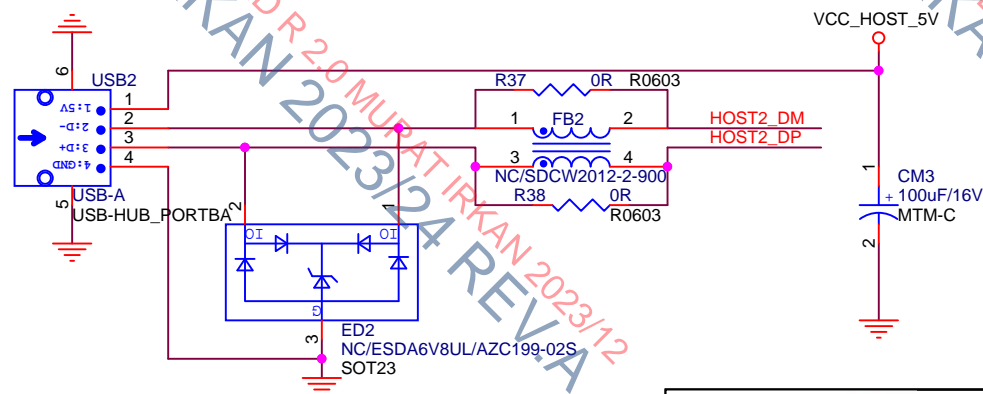
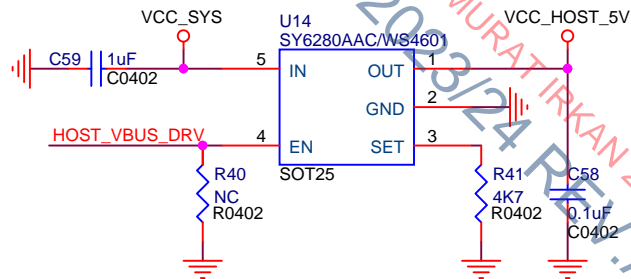
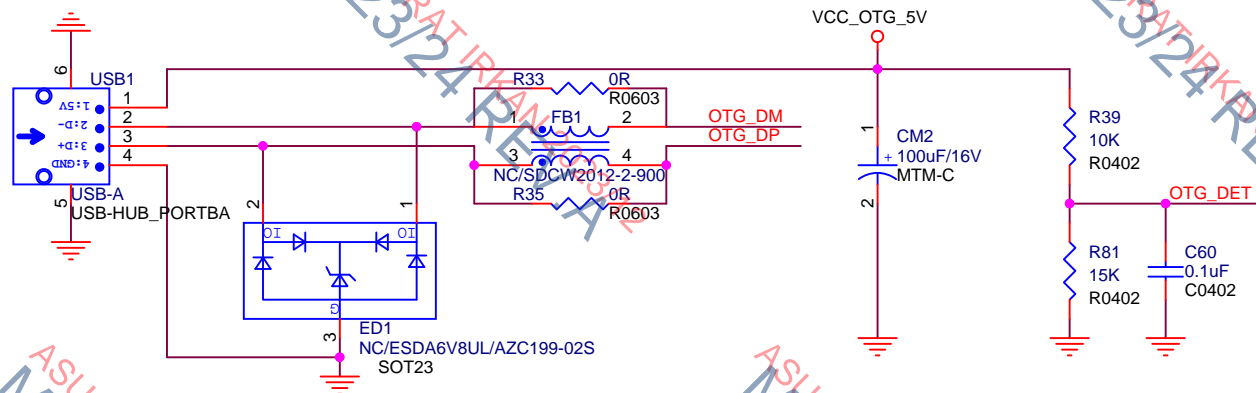
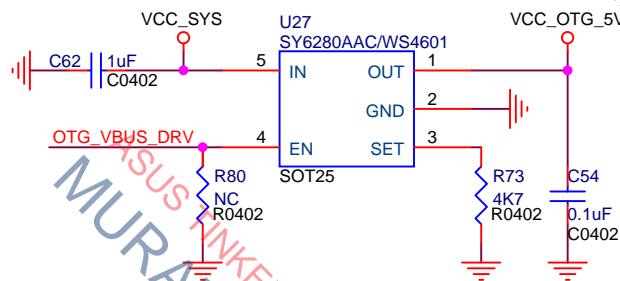


OTG\_DM >>> OTG\_DM 6  
 OTG\_DP >>> OTG\_DP 6  
 OTG\_DET >>> OTG\_DET 6

HOST2\_DM >>> HOST2\_DM 6  
 HOST2\_DP >>> HOST2\_DP 6

HOST\_VBUS\_DRV >>> HOST\_VBUS\_DRV 11

OTG\_VBUS\_DRV >>> OTG\_VBUS\_DRV 11

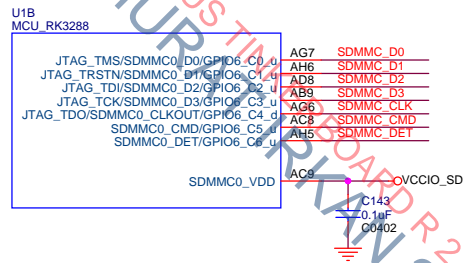


 瑞芯微电子		福州瑞芯微电子有限公司	
Title: USB HOST			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Sunday, January 26, 2014		Page Num: 7
Modify Date:	Tuesday, March 21, 2017		Page Total: 24

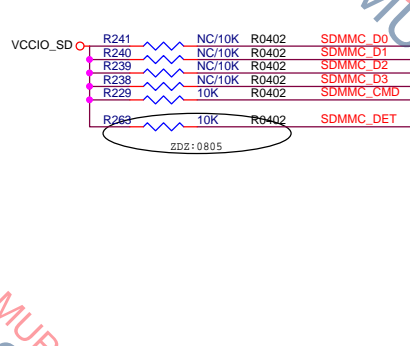








RK3288\_B



NAND FLASH(Option1)

Note:  
Reserve a PAD.

FLASH0\_CLE T-1

FLASH0\_CLE T-1

Use 1.8V IO eMMC,  
the part DNP.

FLASH0\_RDY

FLASH0\_RDN

FLASH0\_CLE

FLASH0\_CS0

FLASH0\_CS1

FLASH0\_CS2

FLASH0\_CS3

FLASH0\_CS4

FLASH0\_CS5

FLASH0\_CS6

FLASH0\_CS7

FLASH0\_CS8

FLASH0\_CS9

FLASH0\_CS10

FLASH0\_CS11

FLASH0\_CS12

FLASH0\_CS13

FLASH0\_CS14

FLASH0\_CS15

FLASH0\_CS16

FLASH0\_CS17

FLASH0\_CS18

FLASH0\_CS19

FLASH0\_CS20

FLASH0\_CS21

FLASH0\_CS22

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FLASH0\_CS248

FLASH0\_CS249

FLASH0\_CS250

FLASH0\_CS251

FLASH0\_CS252

FLASH0\_CS253

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FLASH0\_CS257

FLASH0\_CS258

FLASH0\_CS259

FLASH0\_CS260

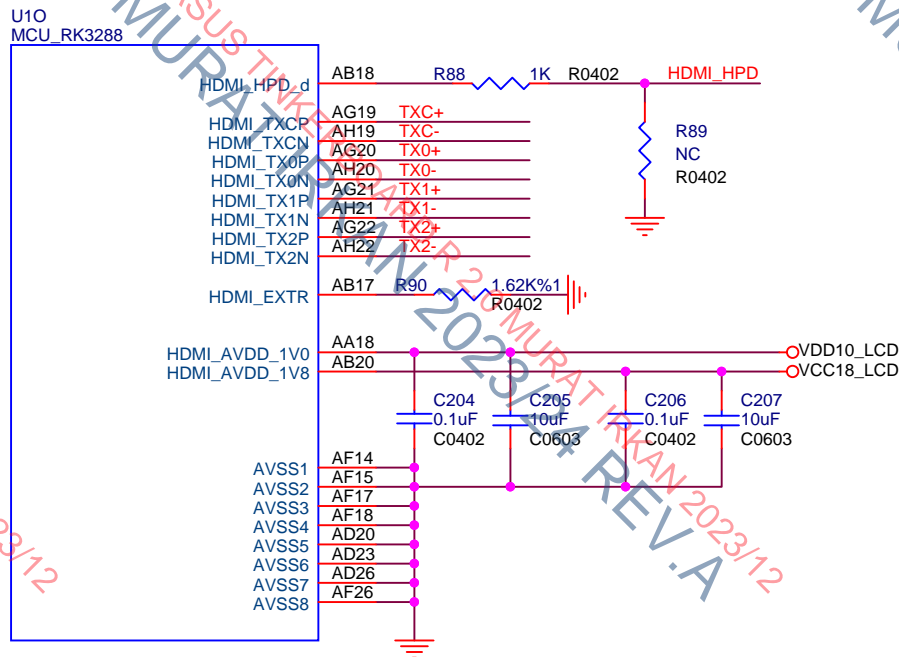
FLASH0\_CS261

FLASH0\_CS262

FLASH0\_CS263

FLASH0\_CS264

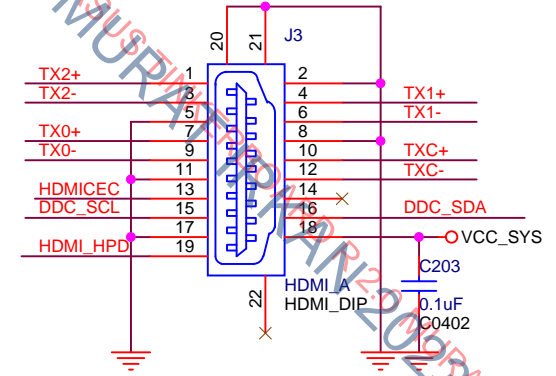
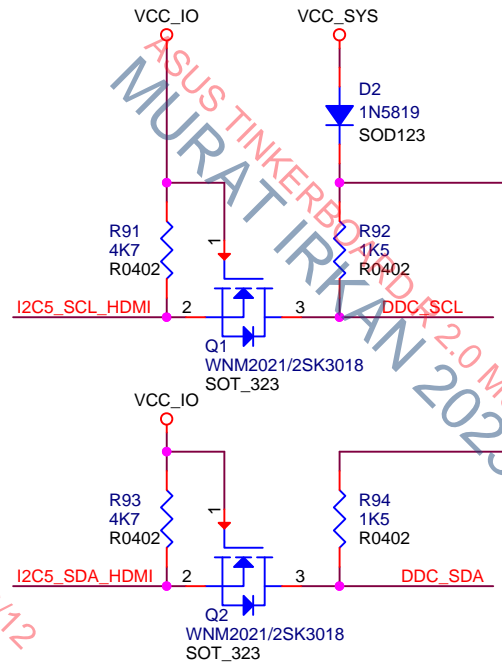
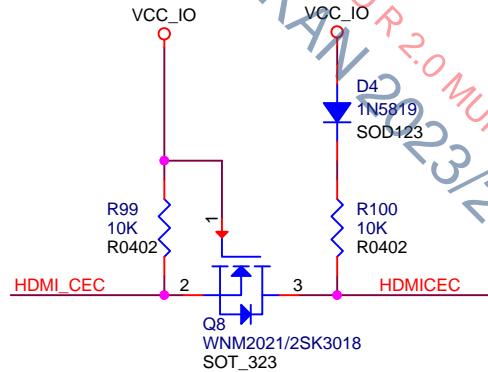




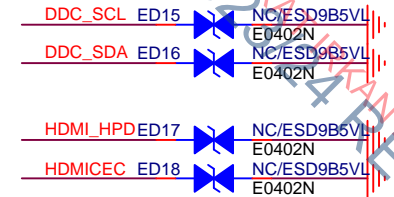
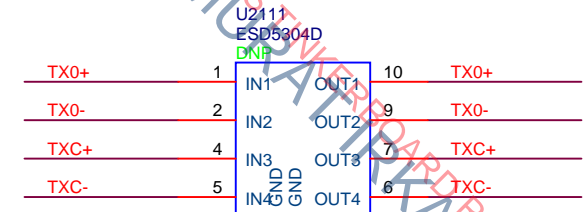
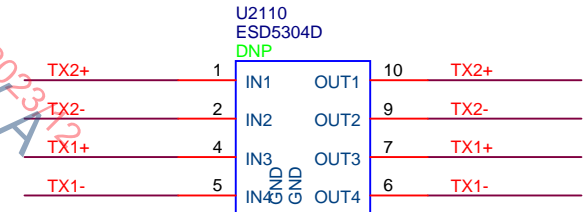
RK3288\_0


I2C5\_SDA\_HDMI >> I2C5\_SDA\_HDMI 11  
I2C5\_SCL\_HDMI >> I2C5\_SCL\_HDMI 11

HDMI\_CEC >> HDMI\_CEC 11



HDMI OUT



 瑞芯微电子		福州瑞芯微电子有限公司	
Title: HDMI OUT			
File: RK3288_BOX_Ref			REV:3.0
Create Date: Sunday, January 26, 2014		Page Num: 12	
Modify Date: Tuesday, March 21, 2017		Page Total: 24	



U1A  
MCU\_RK3288

LCDC domain

LODC0\_HSYNC/GPIO1\_D0\_d  
LCDC0\_VSYNC/GPIO1\_D1\_d  
LCDC0\_DEN/GPIO1\_D2\_d  
LCDC0\_CLK/GPIO1\_D3\_d

AA23 LCD\_HSYNC  
AB24 LCD\_VSYNC  
AA22 LCD\_DEN  
AA24 LCD\_CLK

TRACE\_D0/LCDC0\_D0/LVDS\_D0P  
TRACE\_D1/LCDC0\_D1/LVDS\_D0N  
TRACE\_D2/LCDC0\_D2/LVDS\_D1P  
TRACE\_D3/LCDC0\_D3/LVDS\_D1N  
TRACE\_D4/LCDC0\_D4/LVDS\_D2P  
TRACE\_D5/LCDC0\_D5/LVDS\_D2N  
TRACE\_D6/LCDC0\_D6/LVDS\_D3P  
TRACE\_D7/LCDC0\_D7/LVDS\_D3N  
TRACE\_D8/LCDC0\_D8/LVDS\_D4P  
TRACE\_D9/LCDC0\_D9/LVDS\_D4N  
TRACE\_D10/LCDC0\_D10/LVDS\_CLK0P  
TRACE\_D11/LCDC0\_D11/LVDS\_CLK0N  
TRACE\_D12/LCDC0\_D12/LVDS\_D5P  
TRACE\_D13/LCDC0\_D13/LVDS\_D5N  
TRACE\_D14/LCDC0\_D14/LVDS\_D6P  
TRACE\_D15/LCDC0\_D15/LVDS\_D6N  
TRACE\_CLK/LCDC0\_D16/LVDS\_D7P  
TRACE\_CTL/LCDC0\_D17/LVDS\_D7N  
LCDC0\_D18/LVDS\_D8P  
LCDC0\_D19/LVDS\_D8N  
LCDC0\_D20/LVDS\_D9P  
LCDC0\_D21/LVDS\_D9N  
LCDC0\_D22/LVDS\_CLK1P  
LCDC0\_D23/LVDS\_CLK1N

T27 LCD\_D0  
T28 LCD\_D1  
U27 LCD\_D2  
U28 LCD\_D3  
W27 LCD\_D4  
W28 LCD\_D5  
Y27 LCD\_D6  
Y28 LCD\_D7  
AA27 LCD\_D8  
AA28 LCD\_D9  
V27 LCD\_D10  
V28 LCD\_D11  
U25 LCD\_D12  
U26 LCD\_D13  
V25 LCD\_D14  
V26 LCD\_D15  
AA25 LCD\_D16  
AA26 LCD\_D17  
AB27 LCD\_D18  
AB28 LCD\_D19  
AC25 LCD\_D20  
AC26 LCD\_D21  
Y25 LCD\_D22  
Y26 LCD\_D23

LVDS\_EXTR

LVDS domain

LVDS\_AVDD\_1V0  
LVDS\_AVDD\_1V8  
LVDS\_AVDD\_3V3

AA20 VDD10\_LCD  
AB21 OVCC18\_LCD  
AB23  
R103 0R  
R0402 OVCCA\_33  
C327 Don't remove  
0.1uF  
C0402

RK3288\_A

U1I  
MCU\_RK3288

I2S\_SCLK/GPIO6\_A0\_d  
I2S\_LRCK\_RX/GPIO6\_A1\_d  
I2S\_LRCK\_TX/GPIO6\_A2\_d  
I2S\_SDI/GPIO6\_A3\_d  
I2S\_SDO0/GPIO6\_A4\_d  
I2S\_SDO1/GPIO6\_A5\_d  
I2S\_SDO2/GPIO6\_A6\_d  
I2S\_SDO3/GPIO6\_A7\_d  
I2S\_CLK/GPIO6\_B0\_d  
I2C2\_SDA/GPIO6\_B1\_u  
I2C2\_SCL/GPIO6\_B2\_u

AD11 R801 22R R0402 I2S\_SCLK  
AG11 R803 22R R0402 I2S\_LRCK\_RX  
AF11 I2S\_LRCK\_TX  
AE11 R802 22R R0402 I2S\_SDI  
AG12 I2S\_SDO0  
AH13  
AG13  
AH12  
AC12 R800 22R R0402 I2S\_MCLK  
AF12  
AD12  
AE12 SPDIF\_TX

SPDIF\_TX/GPIO6\_B3\_d

APIO4\_VDD

Y12 OVCCA\_33  
C239 0.1uF  
C0402

LCD\_HSYNC LCD\_HSYNC 14,24  
LCD\_VSYNC LCD\_VSYNC 14,24  
LCD\_DEN 24  
LCD\_CLK LCD\_CLK 14,24

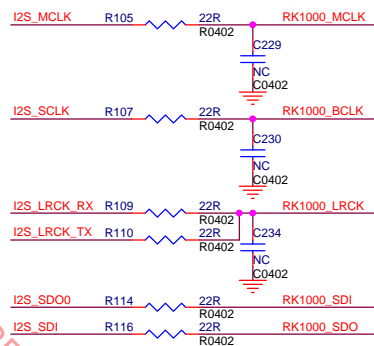
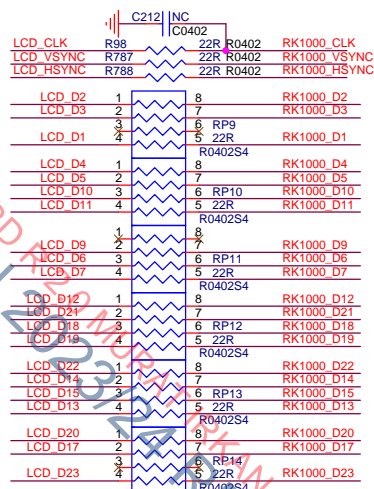
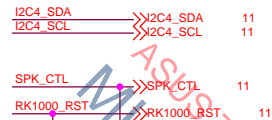
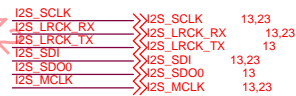
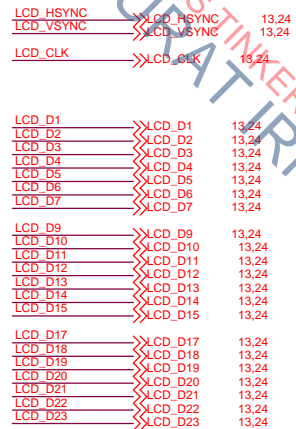
LCD\_D0 LCD\_D0 24  
LCD\_D1 LCD\_D1 14,24  
LCD\_D2 LCD\_D2 14,24  
LCD\_D3 LCD\_D3 14,24  
LCD\_D4 LCD\_D4 14,24  
LCD\_D5 LCD\_D5 14,24  
LCD\_D6 LCD\_D6 14,24  
LCD\_D7 LCD\_D7 14,24  
LCD\_D8 LCD\_D8 24  
LCD\_D9 LCD\_D9 14,24  
LCD\_D10 LCD\_D10 14,24  
LCD\_D11 LCD\_D11 14,24  
LCD\_D12 LCD\_D12 14,24  
LCD\_D13 LCD\_D13 14,24  
LCD\_D14 LCD\_D14 14,24  
LCD\_D15 LCD\_D15 14,24  
LCD\_D16 LCD\_D16 24  
LCD\_D17 LCD\_D17 14,24  
LCD\_D18 LCD\_D18 14,24  
LCD\_D19 LCD\_D19 14,24  
LCD\_D20 LCD\_D20 14,24  
LCD\_D21 LCD\_D21 14,24  
LCD\_D22 LCD\_D22 14,24  
LCD\_D23 LCD\_D23 14,24

I2S\_SCLK I2S\_SCLK 14,23  
I2S\_LRCK\_RX I2S\_LRCK\_RX 14,23  
I2S\_LRCK\_TX 14  
I2S\_SDI I2S\_SDI 14,23  
I2S\_SDO0 I2S\_SDO0 14  
I2S\_MCLK I2S\_MCLK 14,23

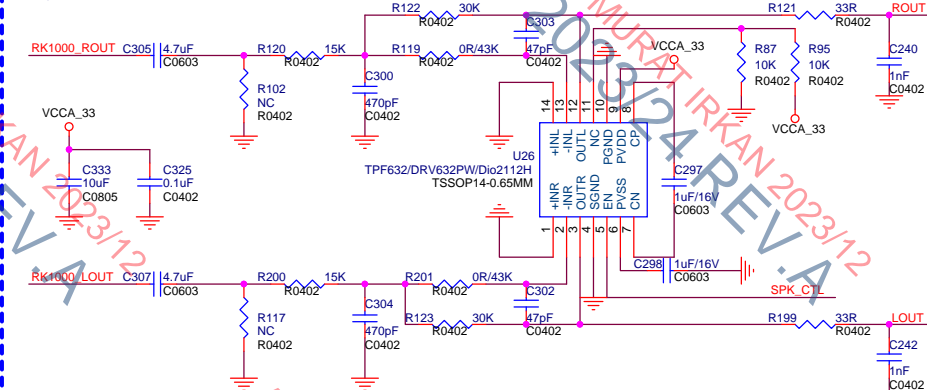
SPDIF\_TX SPDIF\_TX 15

 瑞芯微电子		福州瑞芯微电子有限公司	
Title: RK3288 LCDC/I2S Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date: Monday, February 17, 2014		Page Num: 13	
Modify Date: Tuesday, March 21, 2017		Page Total: 24	

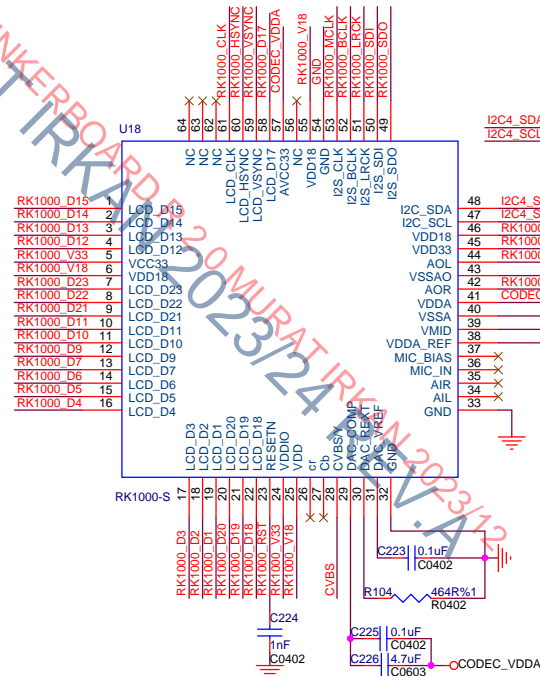
RK3288\_I



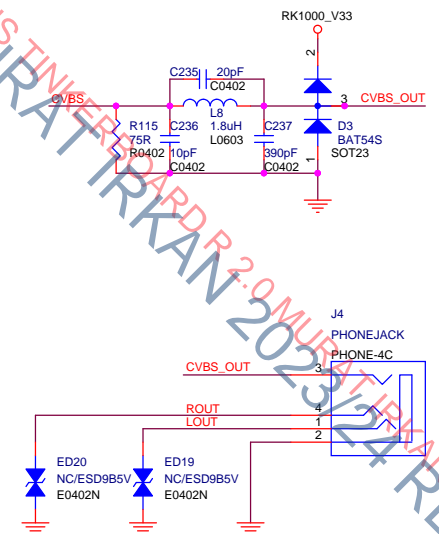
## R/L OUT



## 2-Vrms Audio Line Driver



## RK1000-S POWER

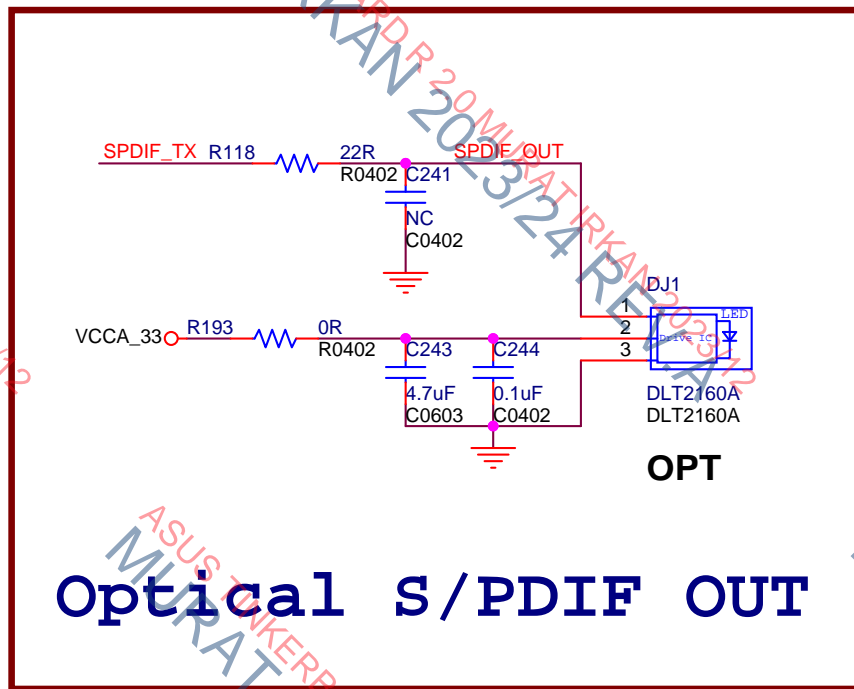


## AV OUT


Rockchip 福州瑞芯微电子股份有限公司		
Title: RK1000-S-AV OUT		
File: RK3288_BOX_Ref		REV:3.0
Create Date: Sunday, January 26, 2014	Page Num: 14	
Modify Date: Tuesday, March 21, 2017	Page Total: 24	



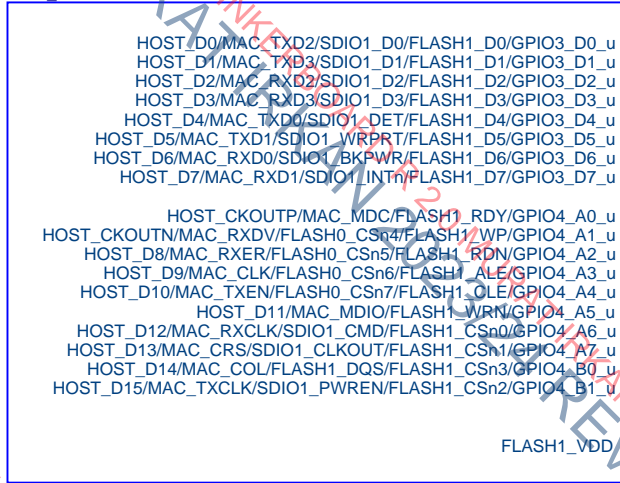
SPDIF\_TX 13



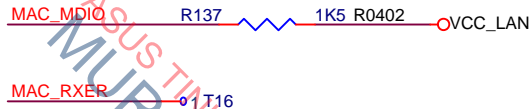
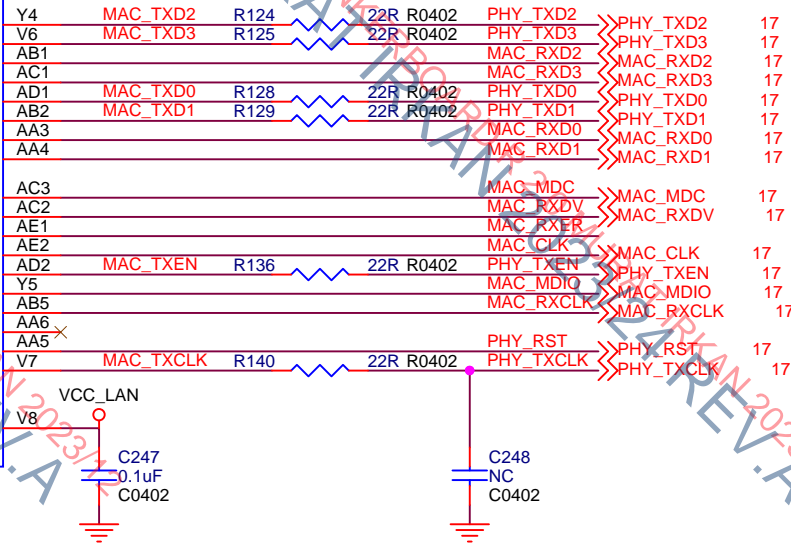
Optical S/PDIF OUT


 瑞芯微电子		福州瑞芯微电子有限公司	
Title: S/PDIF OUT			
File: RK3288_BOX_Ref			REV:3.0
Create Date: Monday, February 17, 2014		Page Num: 15	
Modify Date: Tuesday, March 21, 2017		Page Total: 24	

U1Q  
MCU\_RK3288



RK3288\_Q

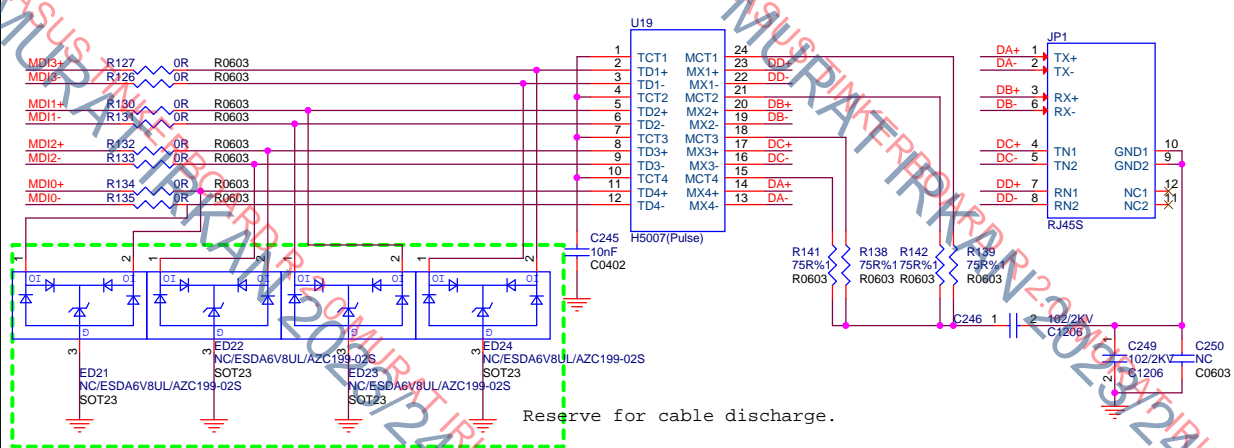


 瑞芯微电子		福州瑞芯微电子股份有限公司	
Title: RK3288 EthernetMAC Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Monday, February 17, 2014	Page Num:	16
Modify Date:	Tuesday, March 21, 2017	Page Total:	24

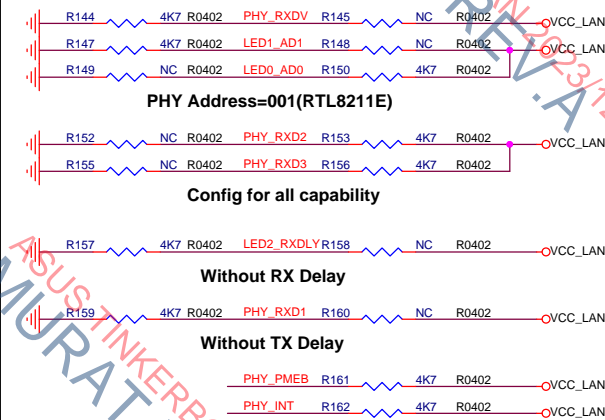
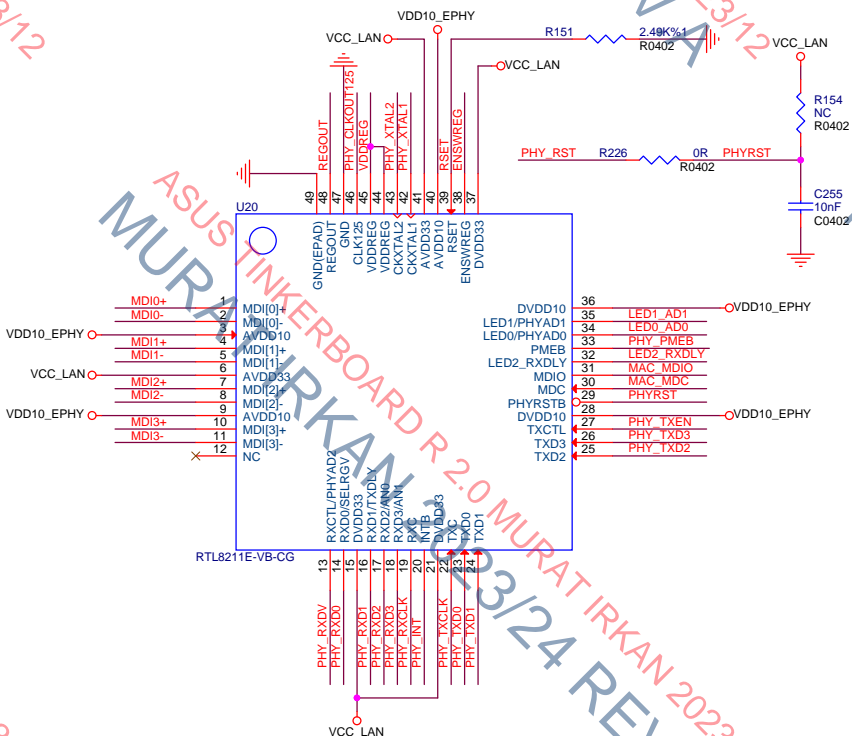
PHY\_TXD0 16  
PHY\_TXD1 16  
PHY\_TXD2 16  
PHY\_TXD3 16  
PHY\_TXEN 16  
PHY\_TXCLK 16  
MAC\_RXD0 16  
MAC\_RXD1 16  
MAC\_RXD2 16  
MAC\_RXD3 16  
MAC\_RXCLK 16  
MAC\_CLK 16  
MAC\_MDC 16  
MAC\_MDIO 16  
PHY\_RST 16  
PHY\_PMEB 11  
PHY\_INT 11

If use external clock  
then the XTAL2 need  
connect to GND for RTL8211E.

MAC\_CLK R143 NC R0402 PHY\_XTAL1  
R146 22R R0402 PHY\_CLKOUT125



Reserve for cable discharge.

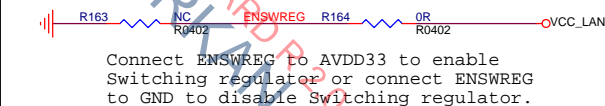
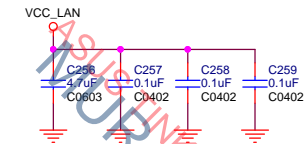
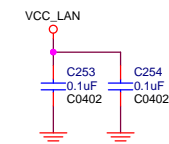


PHY Address=001(RTL8211E)

Config for all capability

Without RX Delay

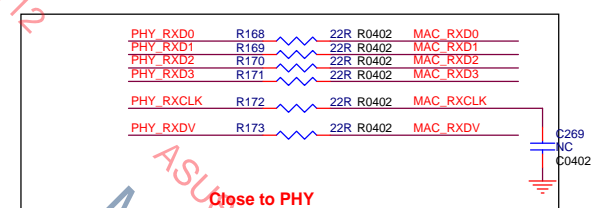
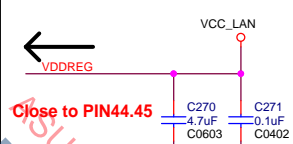
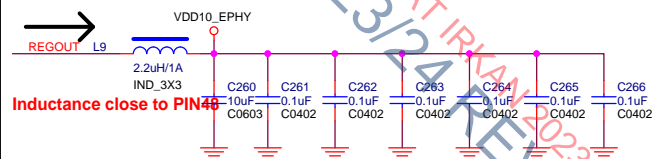
Without TX Delay



Connect ENSWREG to AVDD33 to enable  
Switching regulator or connect ENSWREG  
to GND to disable Switching regulator.



Pull down for 2.5V RGMII(RTL8211D/8211E)  
Pull up for 3.3V RGMII(RTL8211D/8211E)  
Pull up1.5 /1.8V RGMII(RTL8211E-VL only)



Close to PHY

Rockchip 瑞芯微电子股份有限公司

Title: 10/100/1000M-PHY

File: RK3288\_BOX\_Ref

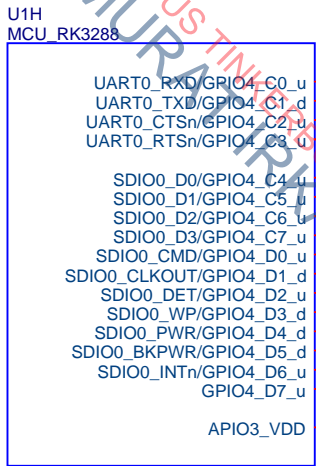
REV:3.0

Create Date: Sunday, January 26, 2014

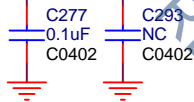
Page Num: 17

Modify Date: Tuesday, March 21, 2017

Page Total: 24



RK3288\_H



UART0_RX	>>>UART0_RX	19
UART0_TX	>>>UART0_TX	19
UART0_CTS	>>>UART0_CTS	19
UART0_RTS	>>>UART0_RTS	19

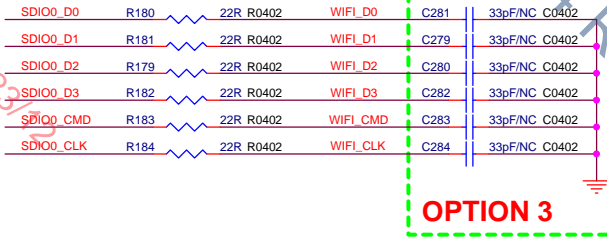
SDIO0_D0	>>>SDIO0_D0	19
SDIO0_D1	>>>SDIO0_D1	19
SDIO0_D2	>>>SDIO0_D2	19
SDIO0_D3	>>>SDIO0_D3	19
SDIO0_CMD	>>>SDIO0_CMD	19
SDIO0_CLK	>>>SDIO0_CLK	19

BT_WAKE	>>>BT_WAKE	19
WIFI_REG_ON	>>>WIFI_REG_ON	19
BT_RST	>>>BT_RST	19
WIFI_HOST_WAKE	>>>WIFI_HOST_WAKE	19
BT_HOST_WAKE	>>>BT_HOST_WAKE	19

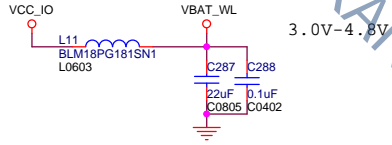
<div><div>Rockchip</div><div>瑞芯微电子</div></div> <div>福州瑞芯微电子有限公司</div>	
Title: RK3288 SDIO0 Controller	
File: RK3288_BOX_Ref	REV:3.0
Create Date: Monday, February 17, 2014	Page Num: 18
Modify Date: Tuesday, March 21, 2017	Page Total: 24

UART0\_RX 18  
UART0\_TX 18  
UART0\_CTS 18  
UART0\_RTS 18  
SDIO0\_D0 18  
SDIO0\_D1 18  
SDIO0\_D2 18  
SDIO0\_D3 18  
SDIO0\_CMD 18  
SDIO0\_CLK 18  
BT\_WAKE 18  
WIFI\_REG\_ON 18  
BT\_RST 18  
WIFI\_HOST\_WAKE 18  
BT\_HOST\_WAKE 18

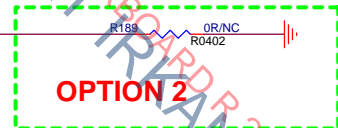
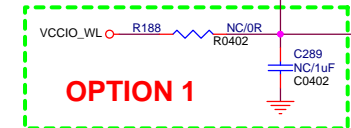
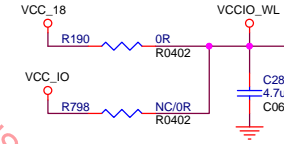
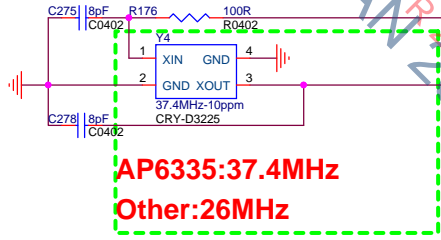
32K\_OUT2 5,11



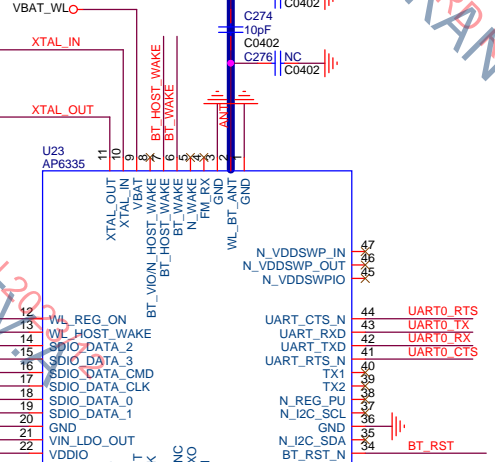
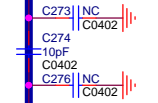
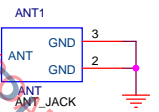
32K\_OUT2 R186 0R R0402 WIFIBT\_32KIN



Note:  
Adjusted the load capacitance  
according to the crystal specification.



50 Ohm RF trace



OPTION	WIFI				BT4.0	Crystals	VDDIO
	a	b/g/n	ac	5GHz			
AP6181		Yes				26MHz	1.71-3.6V
AP6212		Yes			Yes	26MHz	1.71-3.6V
XZ3538		Yes			Yes	26MHz	1.71-3.6V
XZ3660	Yes	Yes		Yes	Yes	26MHz	1.2-2.9V
AP6330	Yes	Yes		Yes	Yes	26MHz	1.2-2.9V
AP6335 (Default)	Yes	Yes	Yes	Yes	Yes	37.4MHz	1.71-3.63V

OPTION	1	2	3
AP6181	DNP	DNP	DNP
AP6212	DNP	DNP	DNP
XZ3538	DNP	DNP	DNP
XZ3660	DNP	DNP	DNP
AP6330	DNP	DNP	DNP
AP6335 (Default)	DNP	Paste	Paste

HOST1\_DM  
HOST1\_DP

HOST1\_DP  
HOST1\_DM

11

USBWIFI\_PWR

R242

R274  
100K  
R0402

ZDZ:0805

VCC\_IO

VCC\_WIFI

Q503  
WPM2015  
SOT23

C311  
10uF  
C0805

C312  
0.1uF  
C0402

U25  
RL-UM12BS-8188EUS

ANT2  
ANT  
NC/ANT  
ANT\_JACK

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福州瑞芯微电子有限公司

Title: USB WIFI-(option)

File: RK3288\_BOX\_Ref

REV:3.0

Create Date: Sunday, January 26, 2014

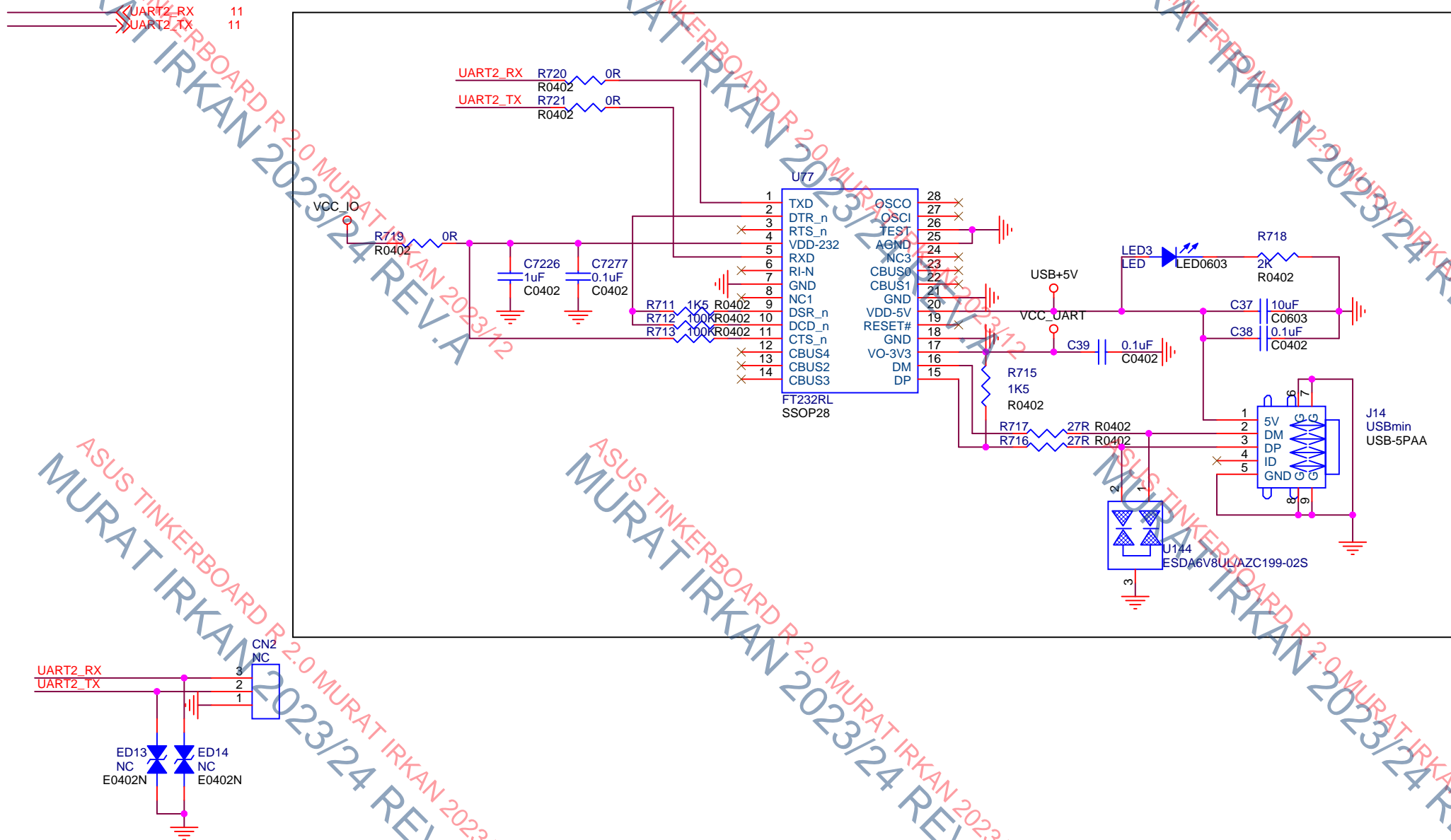
Page Num: 20


Modify Date: Tuesday, March 21, 2017

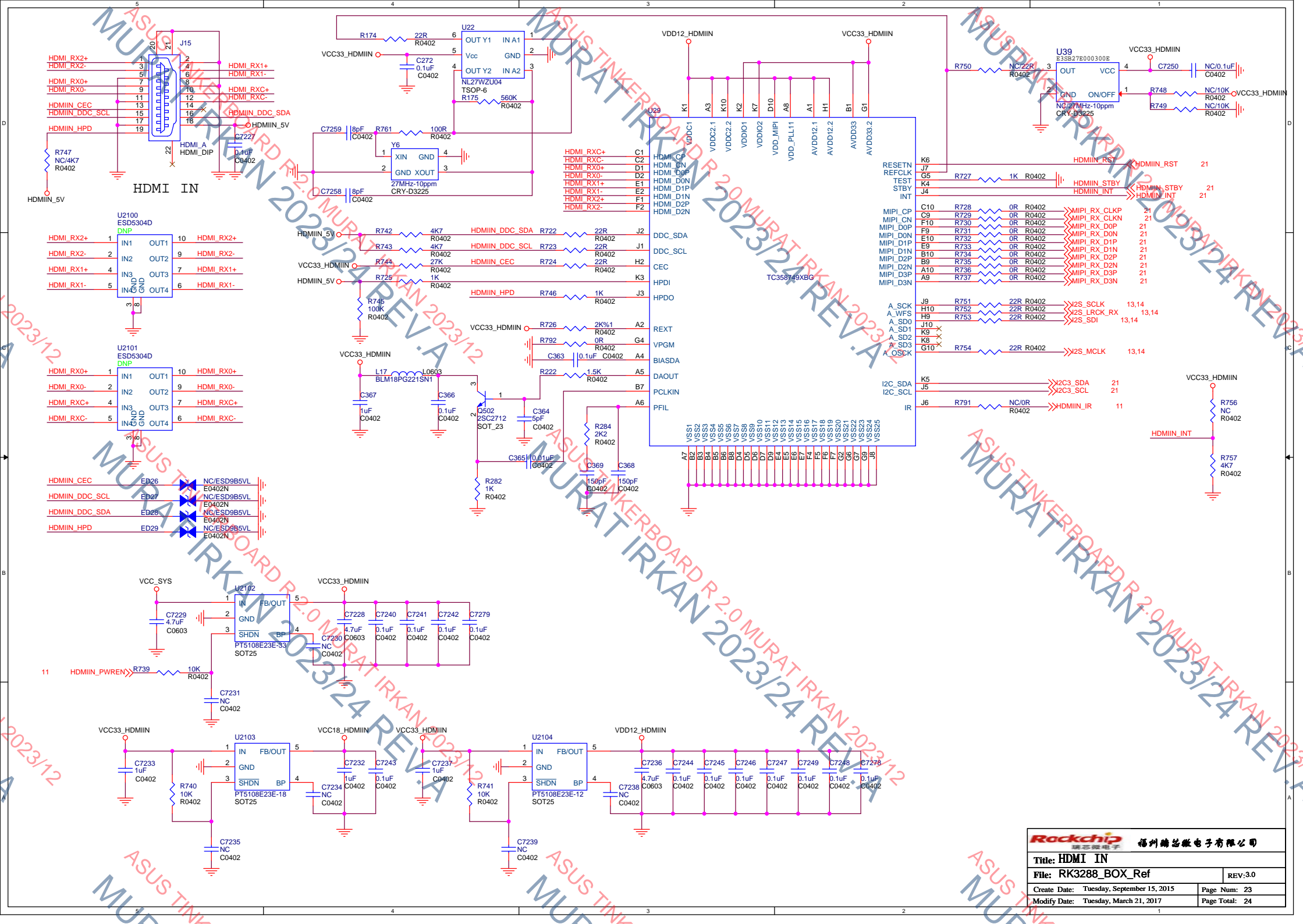
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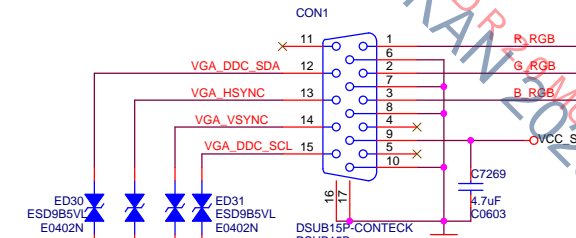
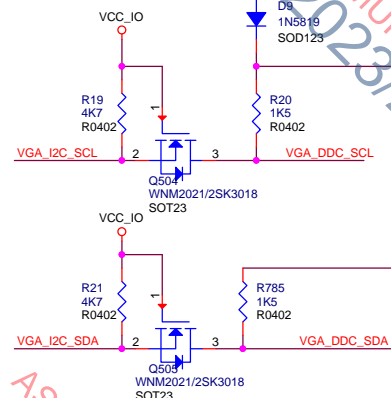
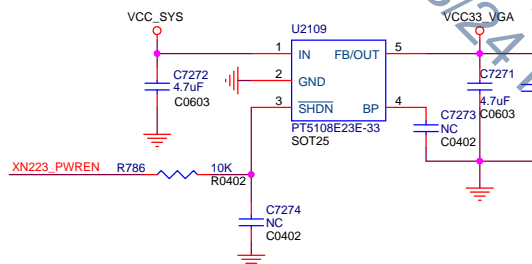
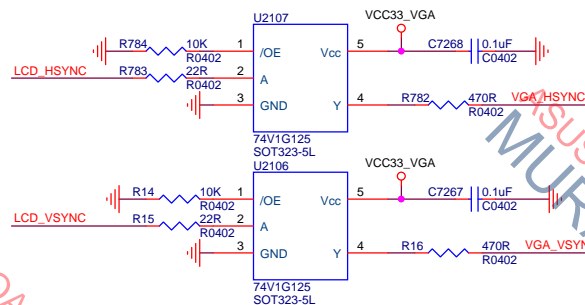
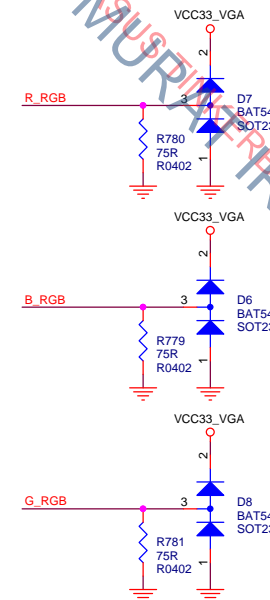
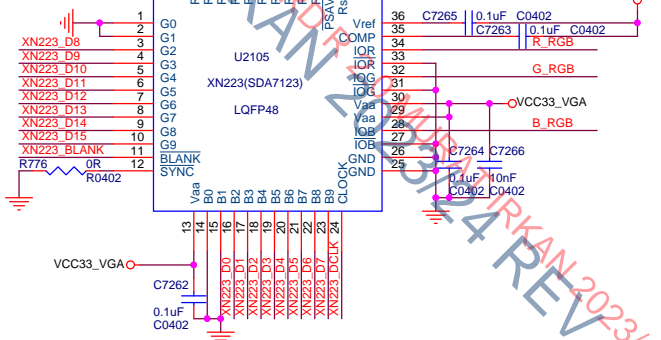
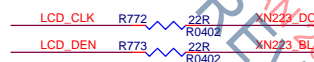
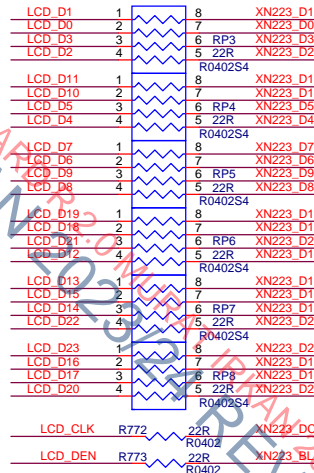
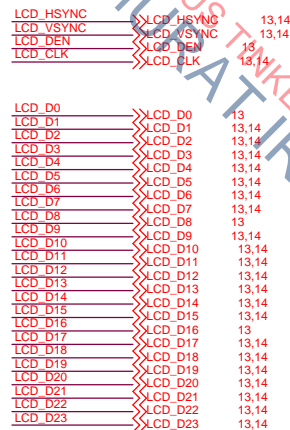






 瑞芯微电子		福州瑞芯微电子有限公司	
Title: UART Debug			
File: RK3288_BOX_Ref			REV:3.0
Create Date: Monday, February 17, 2014		Page Num: 22	
Modify Date: Tuesday, March 21, 2017		Page Total: 24	





VGA OUT

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Title: VGA OUT		
File: RK3288_BOX_Ref		REV:3.0
Create Date: Tuesday, September 15, 2015	Page Num: 24	
Modify Date: Tuesday, March 21, 2017	Page Total: 24	