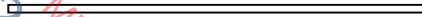
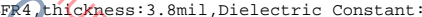


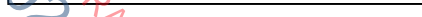
Content Indexing

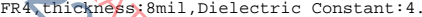
- 01.Index
- 02.Modify note
- 03.Block Diagram
- 04.Power Tree
- 05.System Power
- 06.RK3288 USB/HSIC Controler
- 07.USB HOST Port
- 08.RK3288 RAM Controler
- 09.RAM-DDR3-4X16bit
- 10.Nand FLASH/eMMC/TF Card
- 11.RK3288 GPIO/POWER
- 12.HDMI OUT
- 13.RK3288 LCDC/I2S Controler
- 14.RK1000-S-AV OUT
- 15.S/PDIF 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

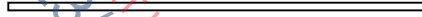
6 LAYERS PCB STACK

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

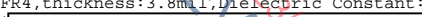
FR4,thickness:adjust thickness according to the thickness of board ,Dielectric Constant:4.3

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

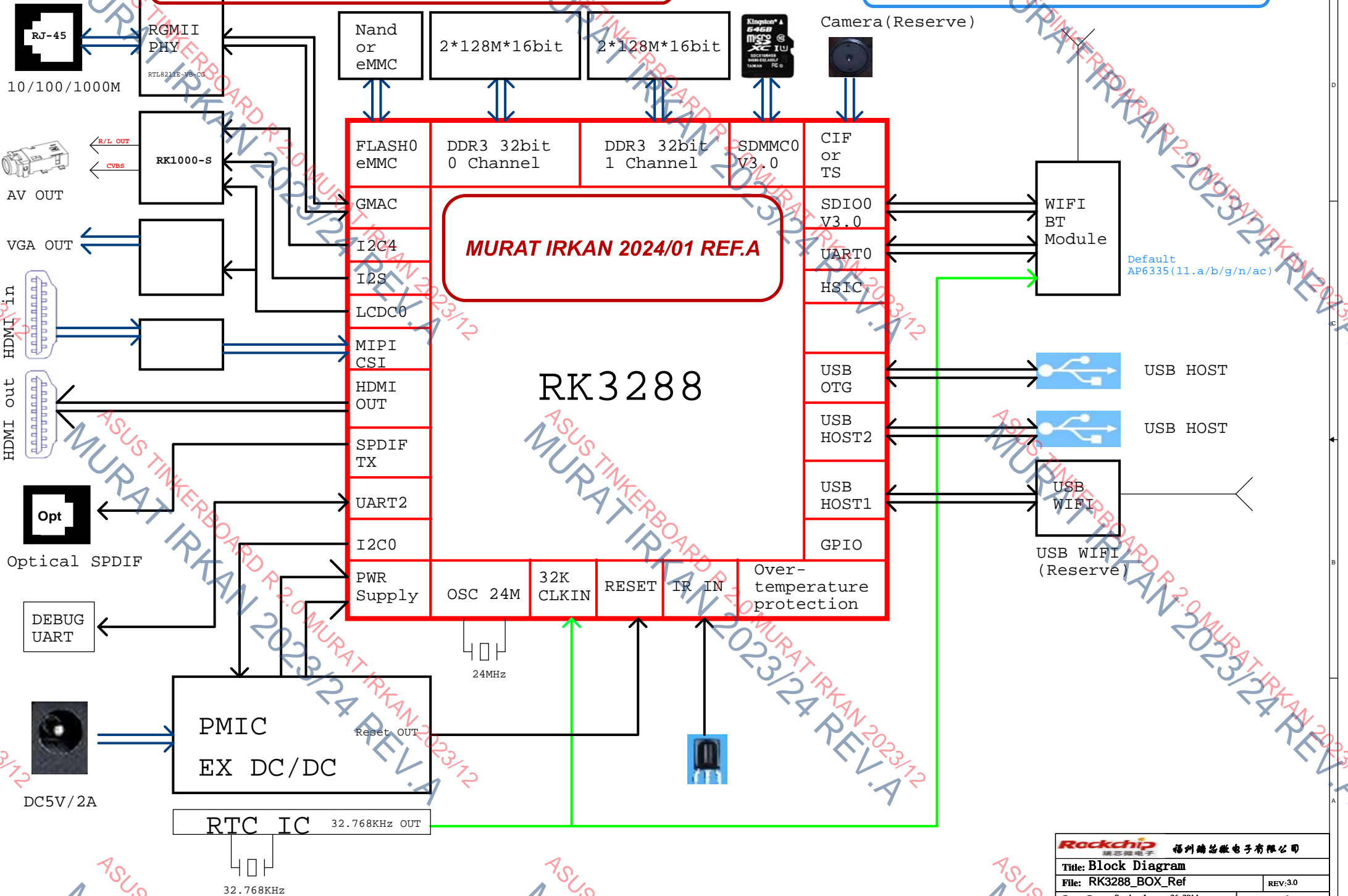
Modify Date: Tuesday, March 21, 2017

Page Total: 24

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

ASUS TINKERBOARD R.2.0

ROCKCHIP RK3288 ARM PC



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

1.8V

VCC_IO

3.3V

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

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

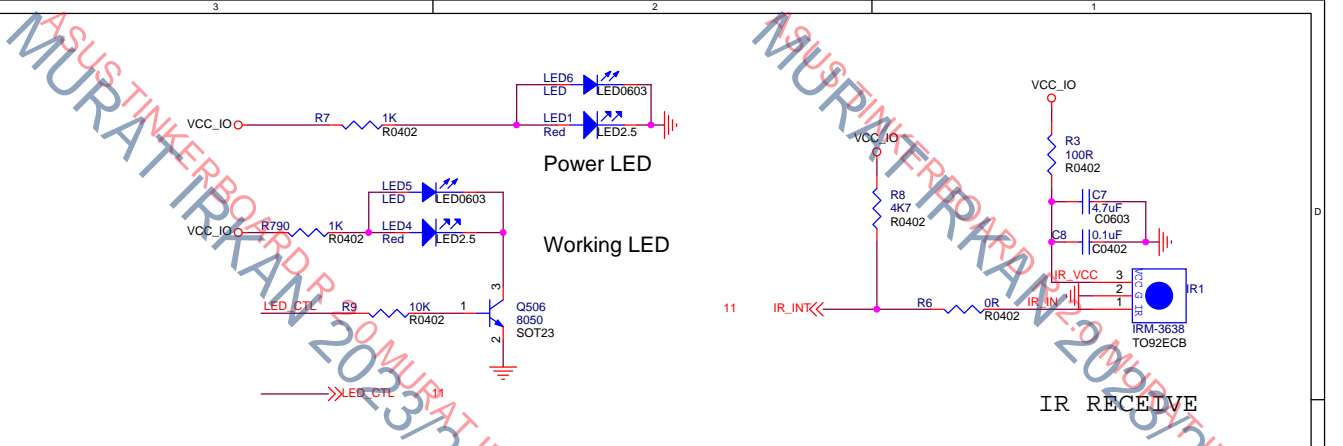
PowerName	RK808-B Channel	timer 2ms	Default voltage	Normal voltage
VDD_10	LDO3	Slot:1	1.0V	1.0V
VDD_CPU	BUCK1	Slot:2	1.1V	DVFS
VDD_GPU	BUCK2	Slot:3	1.1V	DVFS
VDD_LOG	External DC-DC	Slot:4A	1.0V	DVFS
VCC_DDR	BUCK3	Slot:3	1.5V	1.5V
VCC_18	LDO7	Slot:3	1.8V	1.8V
VCC18_FLASH	LDO1	Slot:4	1.8V	1.8V
VCC_IO	BUCK4	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

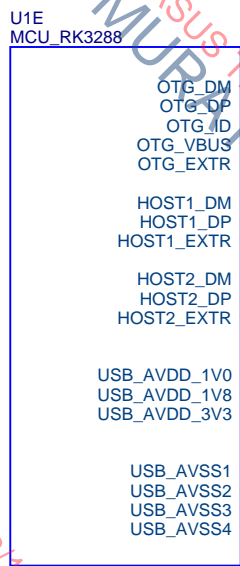
SPDIF
RK3288 I2S
RK1000-S
Audio Line Driver IC
RK3288 LCDC
RK1000-S
Ethernet PHY

Logic

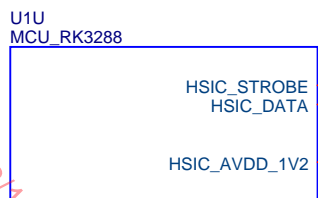
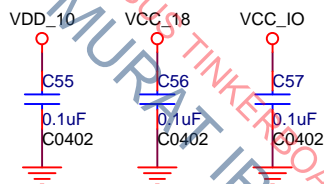
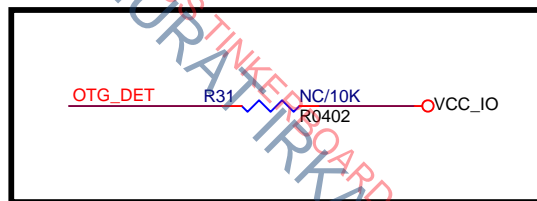
USB HOST

USB HOST





RK3288_E



RK3288_U

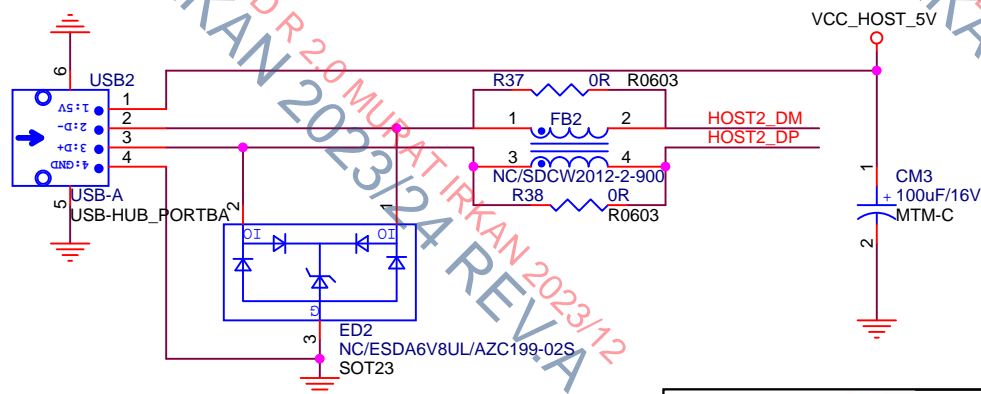
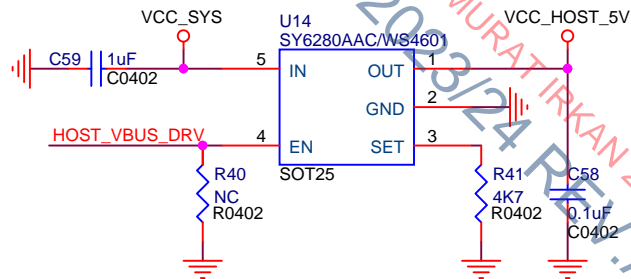
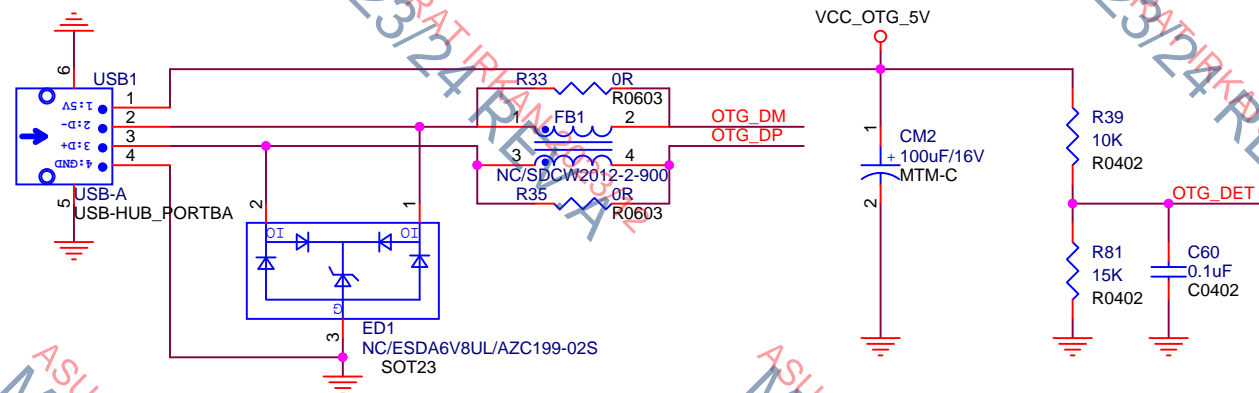
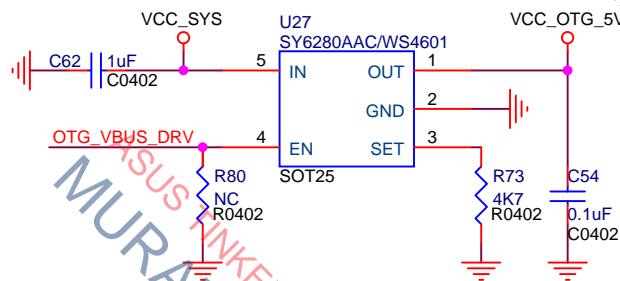
 瑞芯微电子		福州瑞芯微电子有限公司	
Title: RK3288 USB/HSIC Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Monday, February 17, 2014	Page Num:	6
Modify Date:	Tuesday, March 21, 2017	Page Total:	24

OTG_DM >> OTG_DM 6
 OTG_DP >> OTG_DP 6
 OTG_DET >> OTG_DET 6

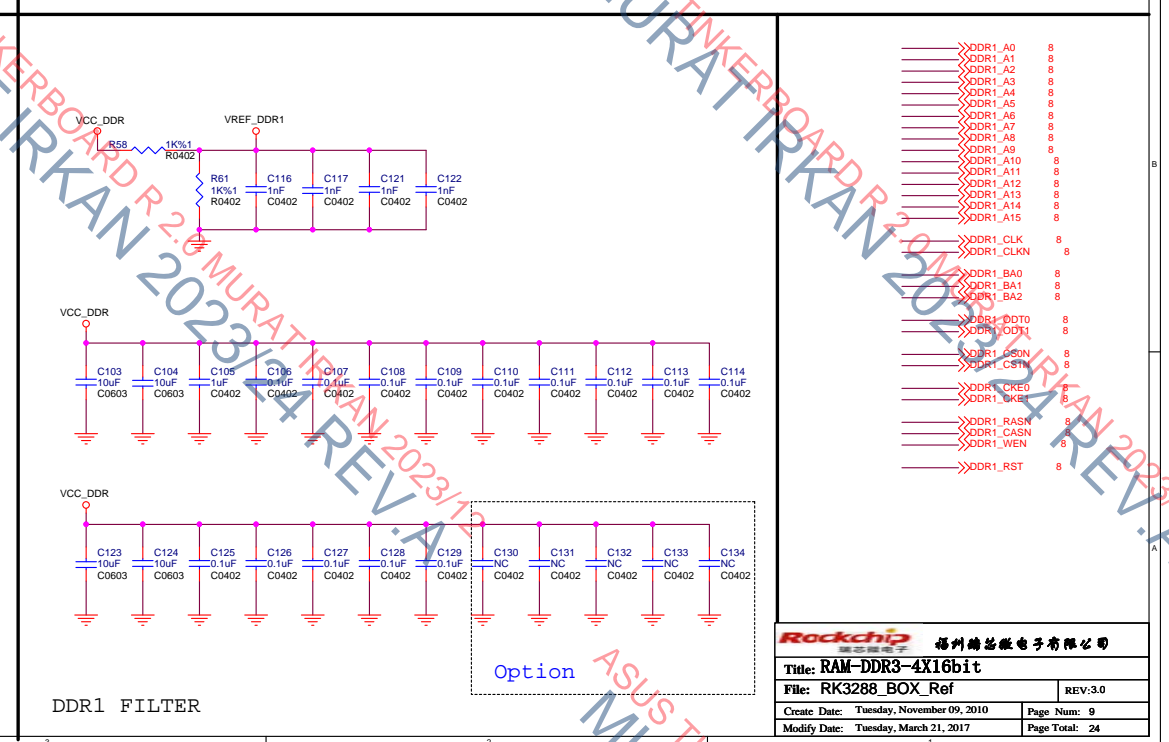
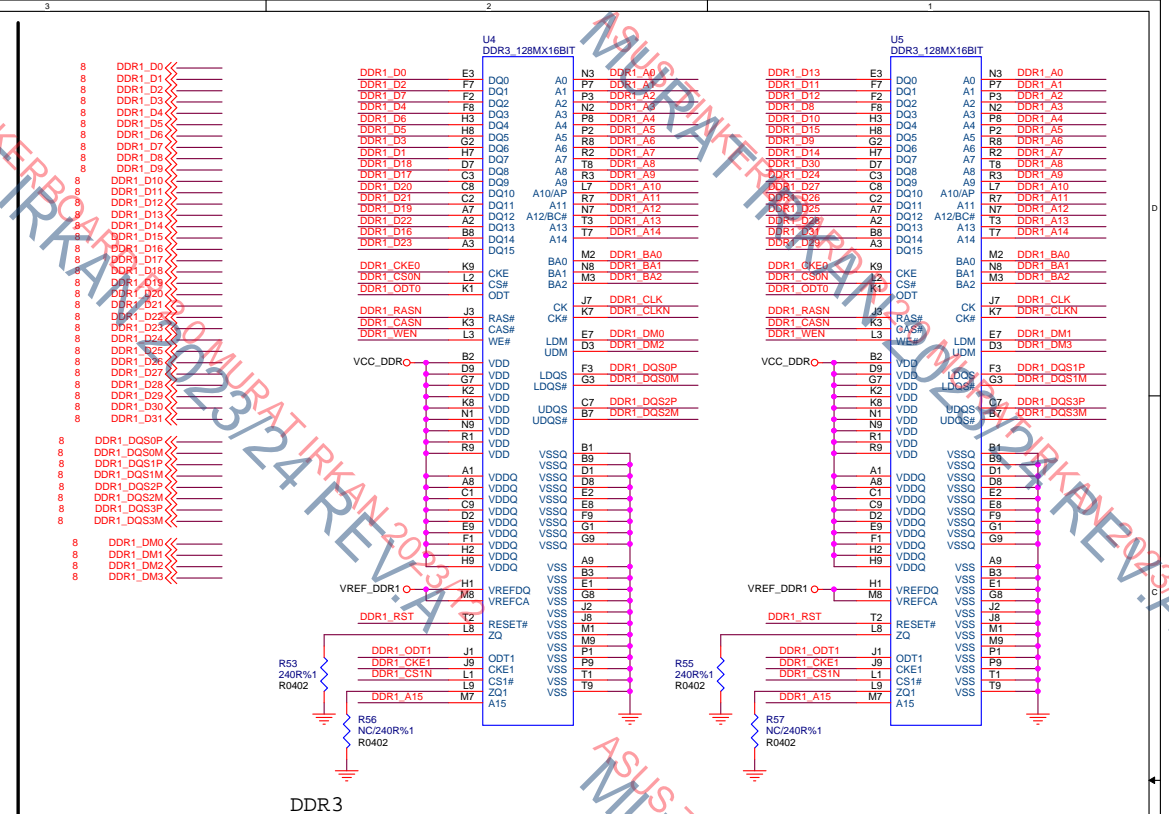
HOST2_DM >> HOST2_DM 6
 HOST2_DP >> HOST2_DP 6

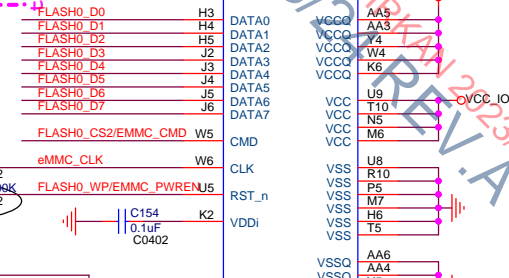
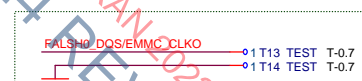
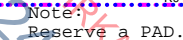
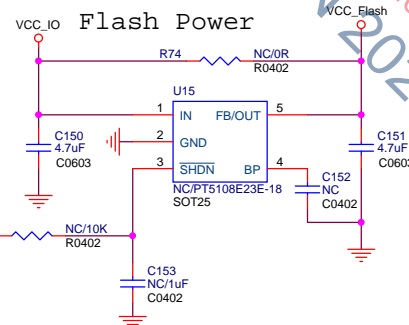
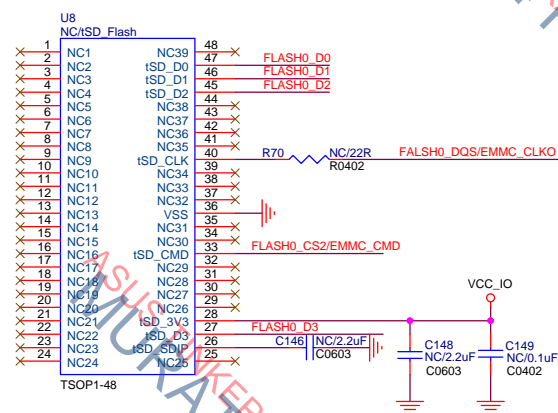
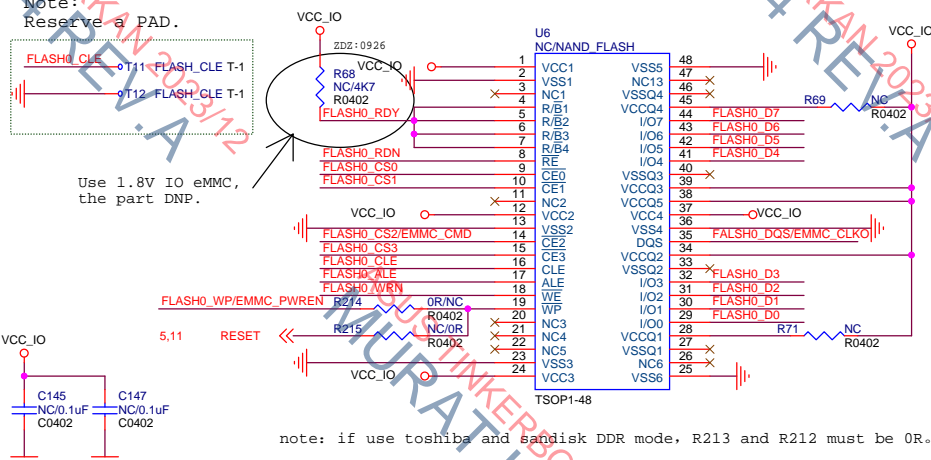
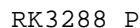
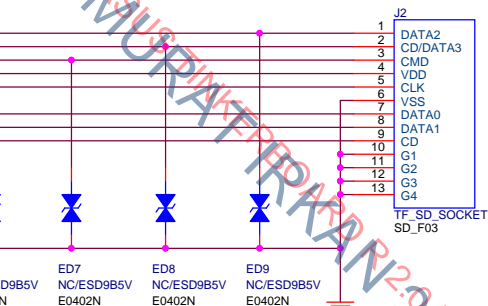
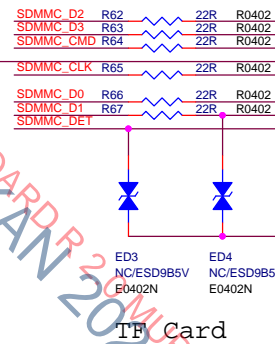
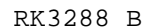
HOST_VBUS_DRV >> HOST_VBUS_DRV 11

OTG_VBUS_DRV >> OTG_VBUS_DRV 11

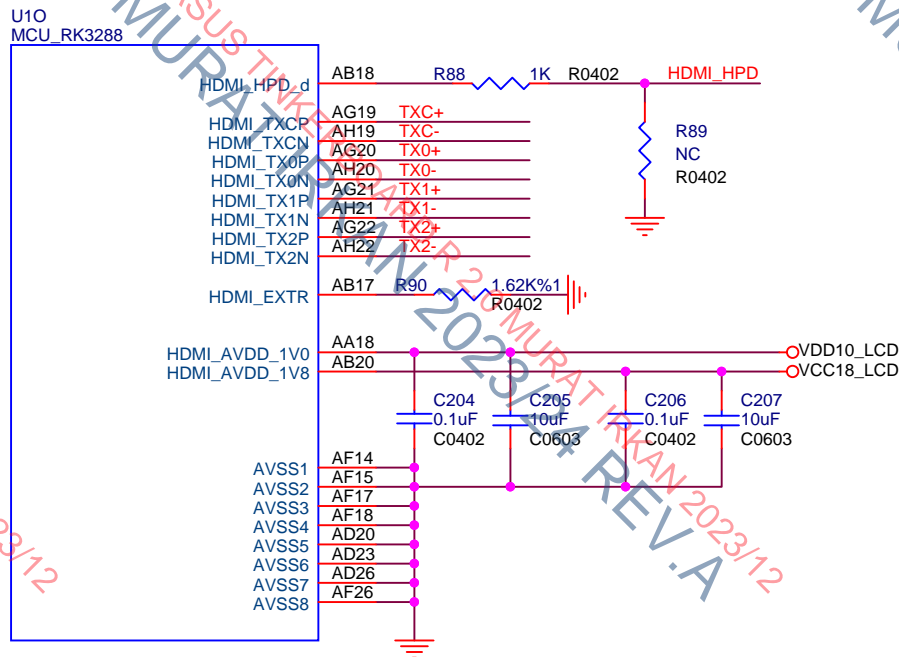


 瑞芯微电子		福州瑞芯微电子有限公司	
Title: USB HOST			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Sunday, January 26, 2014	Page Num:	7
Modify Date:	Tuesday, March 21, 2017	Page Total:	24





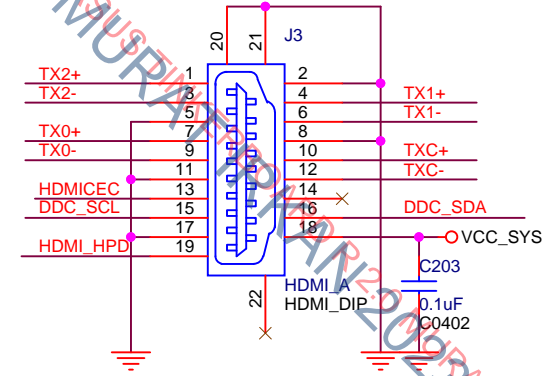
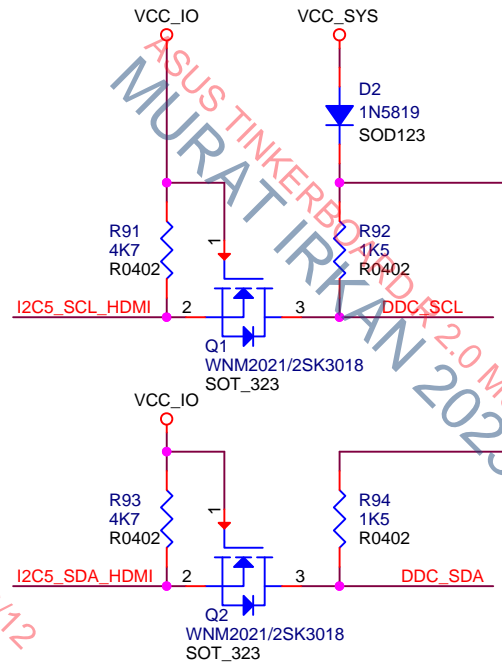
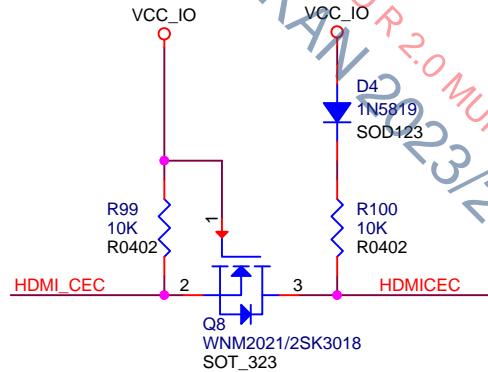
	Flash IO voltage		
eMMC (Default)	1.8V (VCCQ<150mA)	R74:DNP U15:DNP R532:OR	Default
	1.8V (VCCQ>150mA)	R74:DNP U15:PT5108E23E-18(500mA) R532:DNP	PLS confirm eMMC VCCQ peak current.
	3.3V	R74:OR U15:DNP R532:DNP	
Nand Flash	1.8V (VCCQ<150mA)	R74:DNP U15:DNP R532:OR	
	1.8V (VCCQ>150mA)	R74:DNP U15:PT5108E23E-18(500mA) R532:DNP	PLS confirm eMMC VCCQ peak current.
	3.3V	R74:OR U15:DNP R532:DNP	



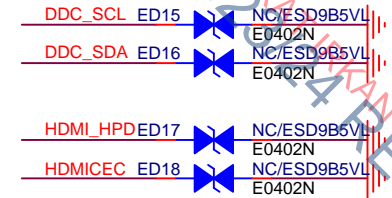
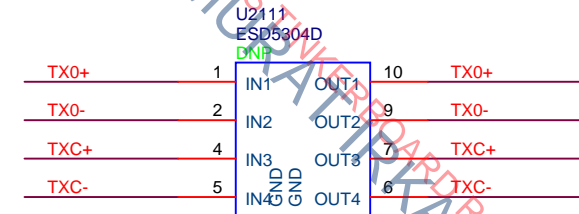
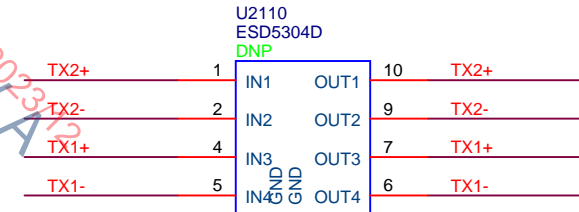
RK3288_0


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

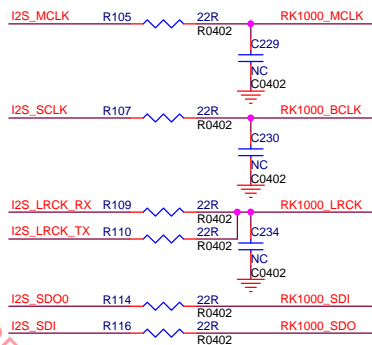
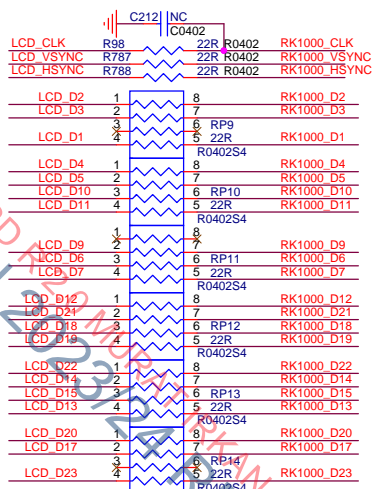
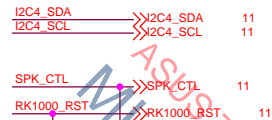
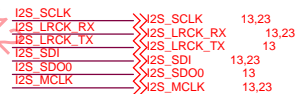
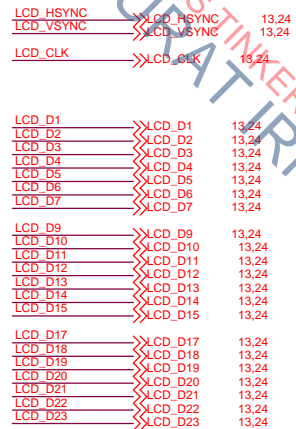
LCD_D0 LCD_D0 24
LCD_D1 LCD_D1 14,24
LCD_D2 LCD_D2 14,24
LCD_D3 LCD_D3 14,24
LCD_D4 LCD_D4 14,24
LCD_D5 LCD_D5 14,24
LCD_D6 LCD_D6 14,24
LCD_D7 LCD_D7 14,24
LCD_D8 LCD_D8 24
LCD_D9 LCD_D9 14,24
LCD_D10 LCD_D10 14,24
LCD_D11 LCD_D11 14,24
LCD_D12 LCD_D12 14,24
LCD_D13 LCD_D13 14,24
LCD_D14 LCD_D14 14,24
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

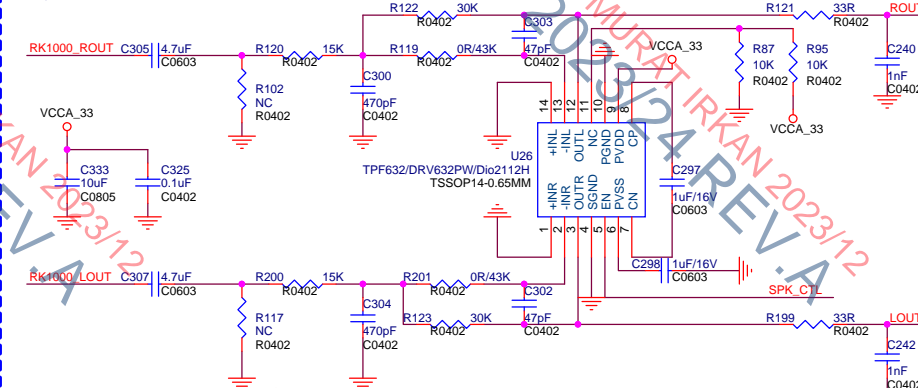
SPDIF_TX SPDIF_TX 15

 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	

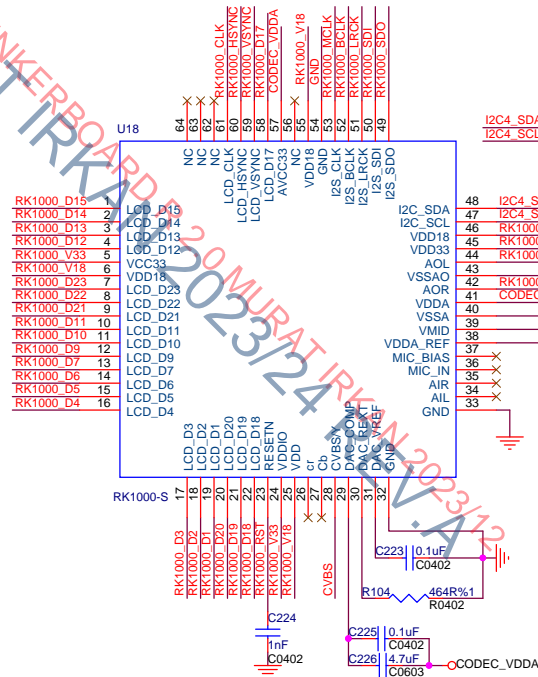
RK3288_I



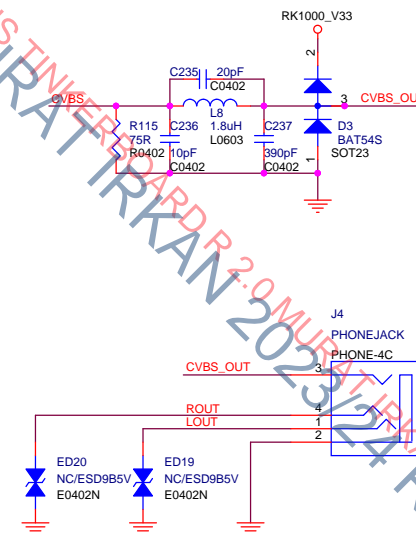
R/L OUT



2-Vrms Audio Line Driver



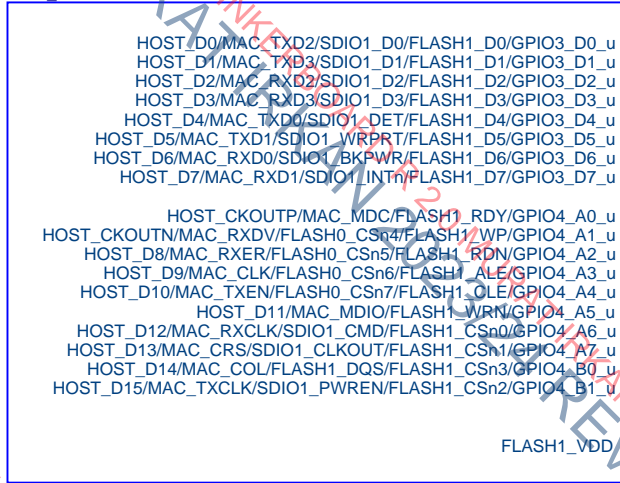
RK1000-S POWER



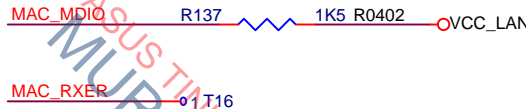
AV OUT


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	

U1Q
MCU_RK3288



RK3288_Q

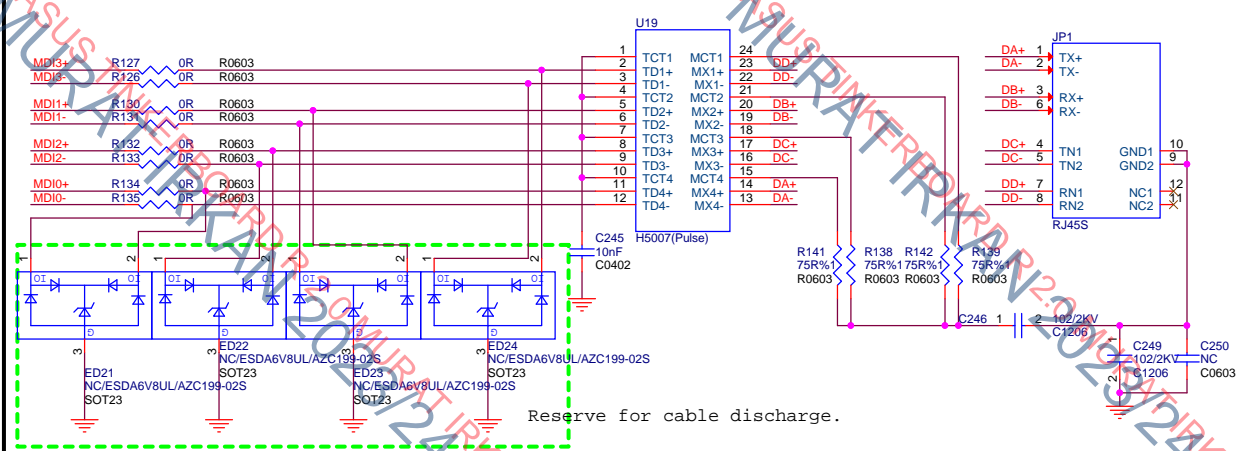


 瑞芯微电子		福州瑞芯微电子股份有限公司	
Title: RK3288 EthernetMAC Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Monday, February 17, 2014	Page Num:	16
Modify Date:	Tuesday, March 21, 2017	Page Total:	24

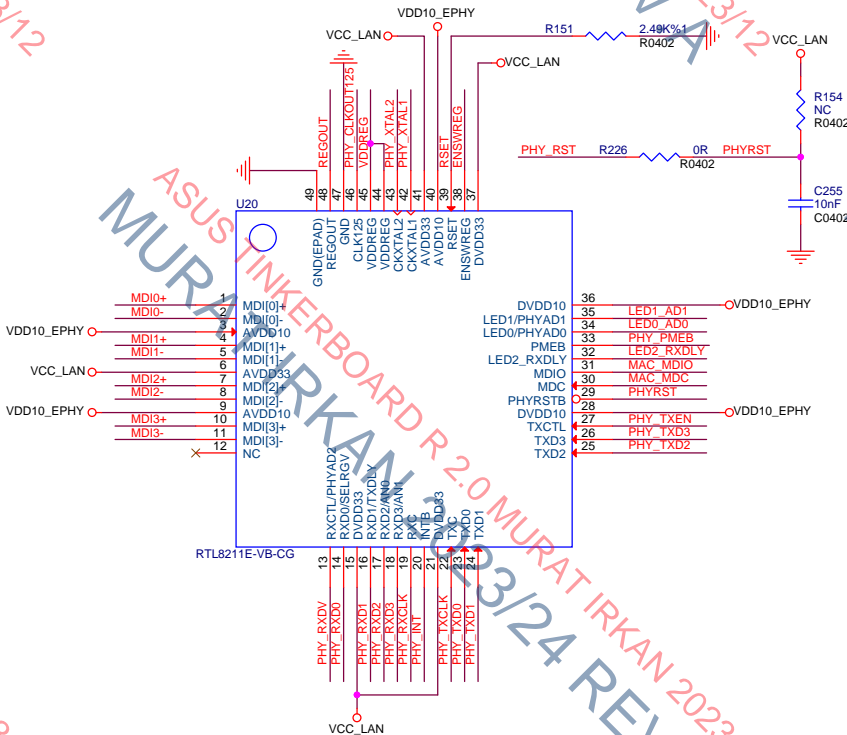
PHY_TXD0 16
PHY_TXD1 16
PHY_TXD2 16
PHY_TXD3 16
PHY_TXEN 16
PHY_TXCLK 16
MAC_RXD0 16
MAC_RXD1 16
MAC_RXD2 16
MAC_RXD3 16
MAC_RXCLK 16
MAC_CLK 16
MAC_MDC 16
MAC_MDIO 16
PHY_RST 16
PHY_PMEB 11
PHY_INT 11

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



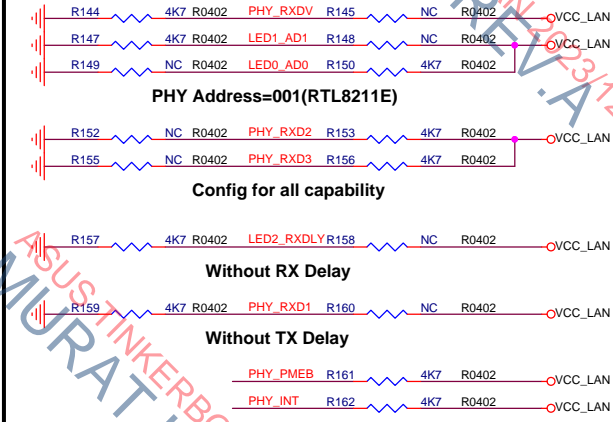
Reserve for cable discharge.



RTL8211E-VB-CG

PHY_RXD0 R168 22R R0402 MAC_RXD0
PHY_RXD1 R169 22R R0402 MAC_RXD1
PHY_RXD2 R170 22R R0402 MAC_RXD2
PHY_RXD3 R171 22R R0402 MAC_RXD3
PHY_RXCLK R172 22R R0402 MAC_RXCLK
PHY_RXDV R173 22R R0402 MAC_RXDV

Close to PHY



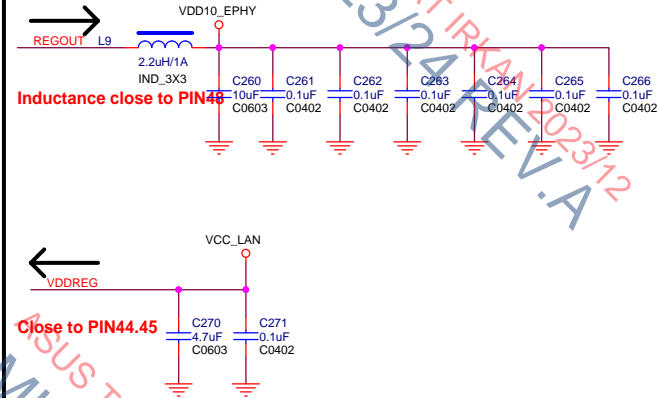
PHY Address=001(RTL8211E)

Config for all capability

Without RX Delay

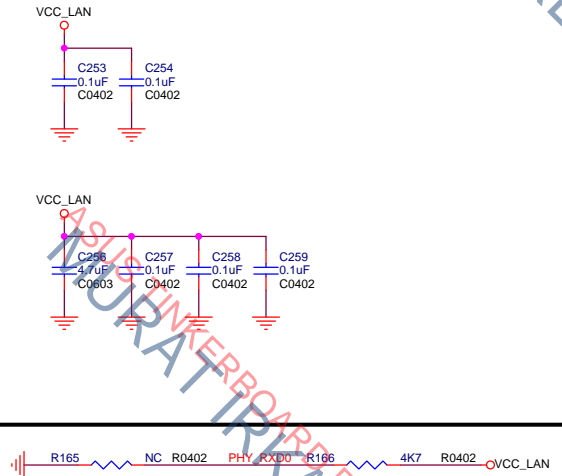
Without TX Delay

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

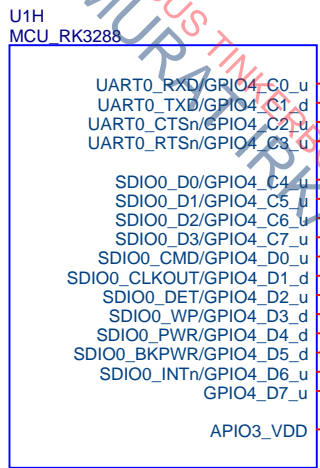


Inductance close to PIN48

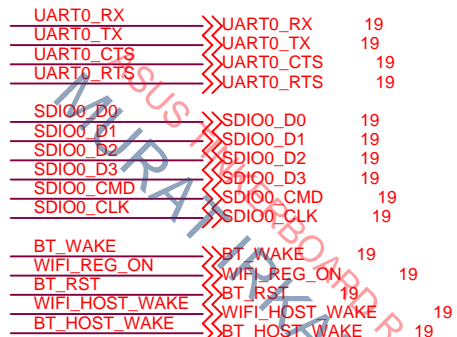
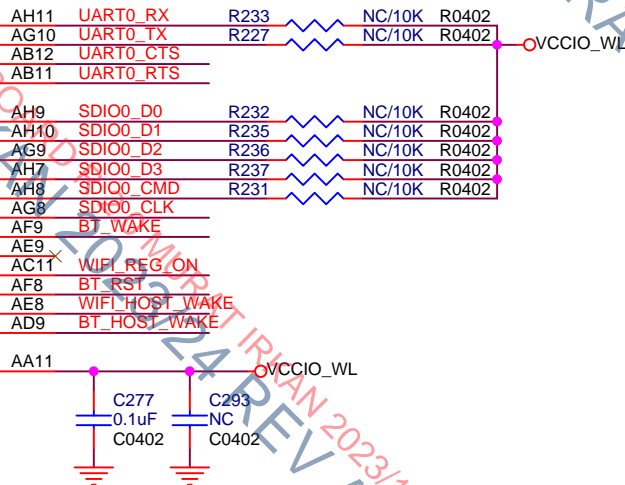
Close to PIN44.45



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)



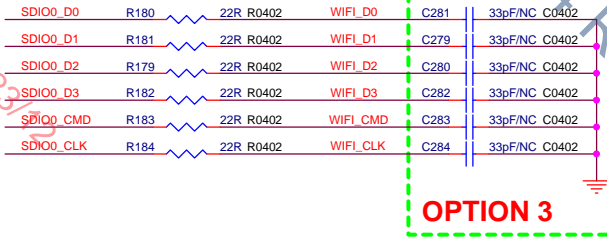
RK3288_H



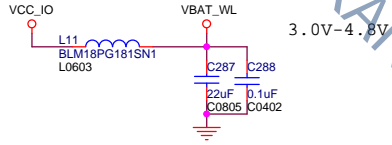
 瑞芯微电子		福州瑞芯微电子有限公司	
Title: RK3288 SDIO0 Controller			
File: RK3288_BOX_Ref			REV:3.0
Create Date:	Monday, February 17, 2014	Page Num:	18
Modify Date:	Tuesday, March 21, 2017	Page Total:	24

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

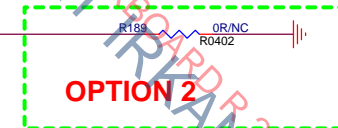
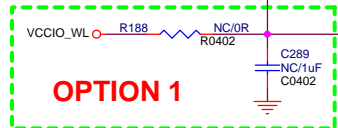
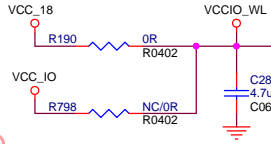
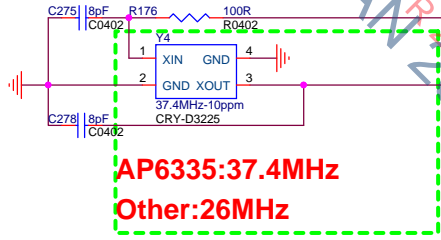
32K_OUT2 5,11



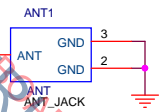
32K_OUT2 R186 0R R0402 WIFIBT_32KIN



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



50 Ohm RF trace



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

Rockchip
瑞芯微电子

福州瑞芯微电子有限公司

Title: USB WIFI-(option)

File: RK3288_BOX_Ref

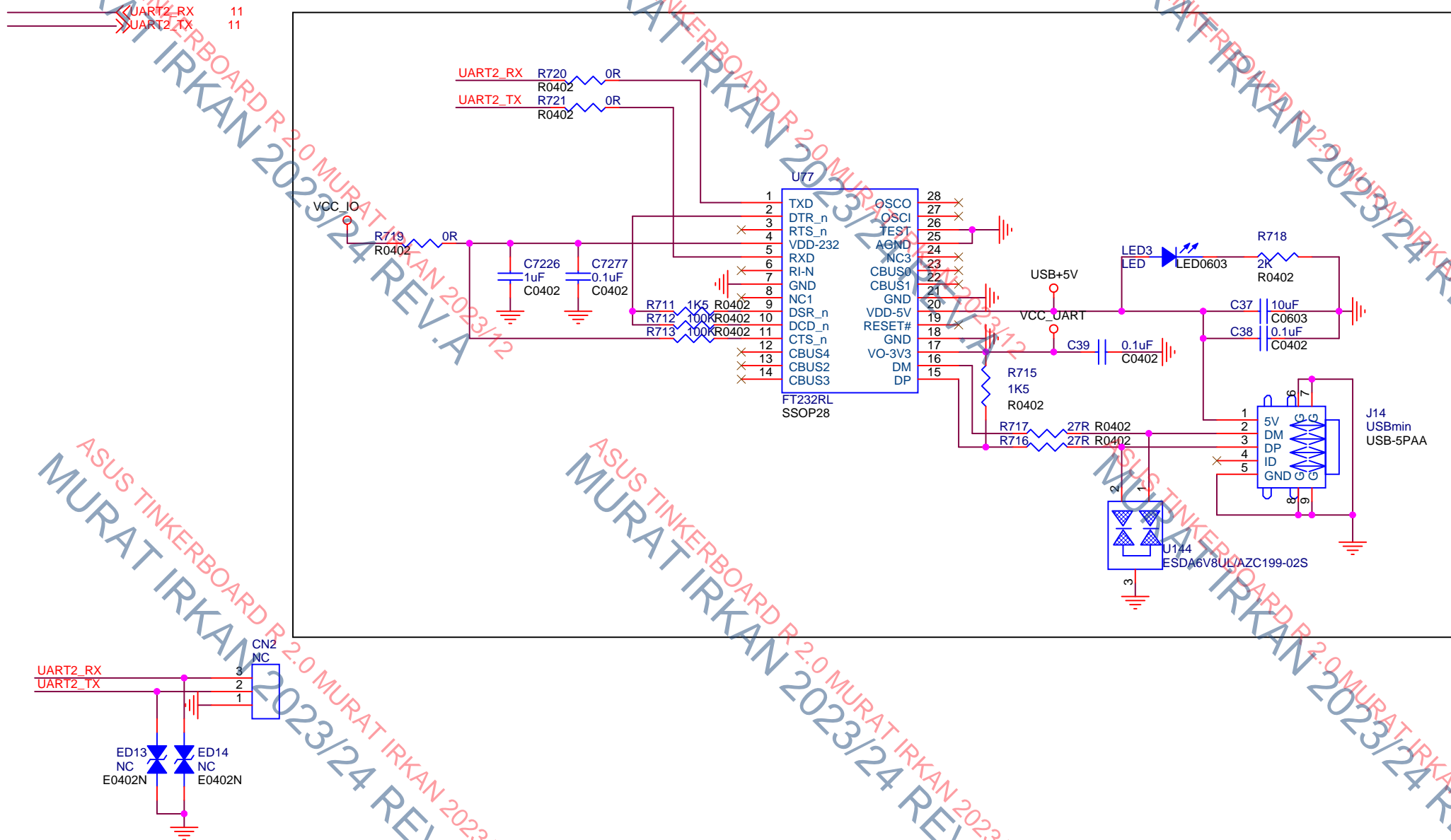
REV:3.0


Create Date: Sunday, January 26, 2014

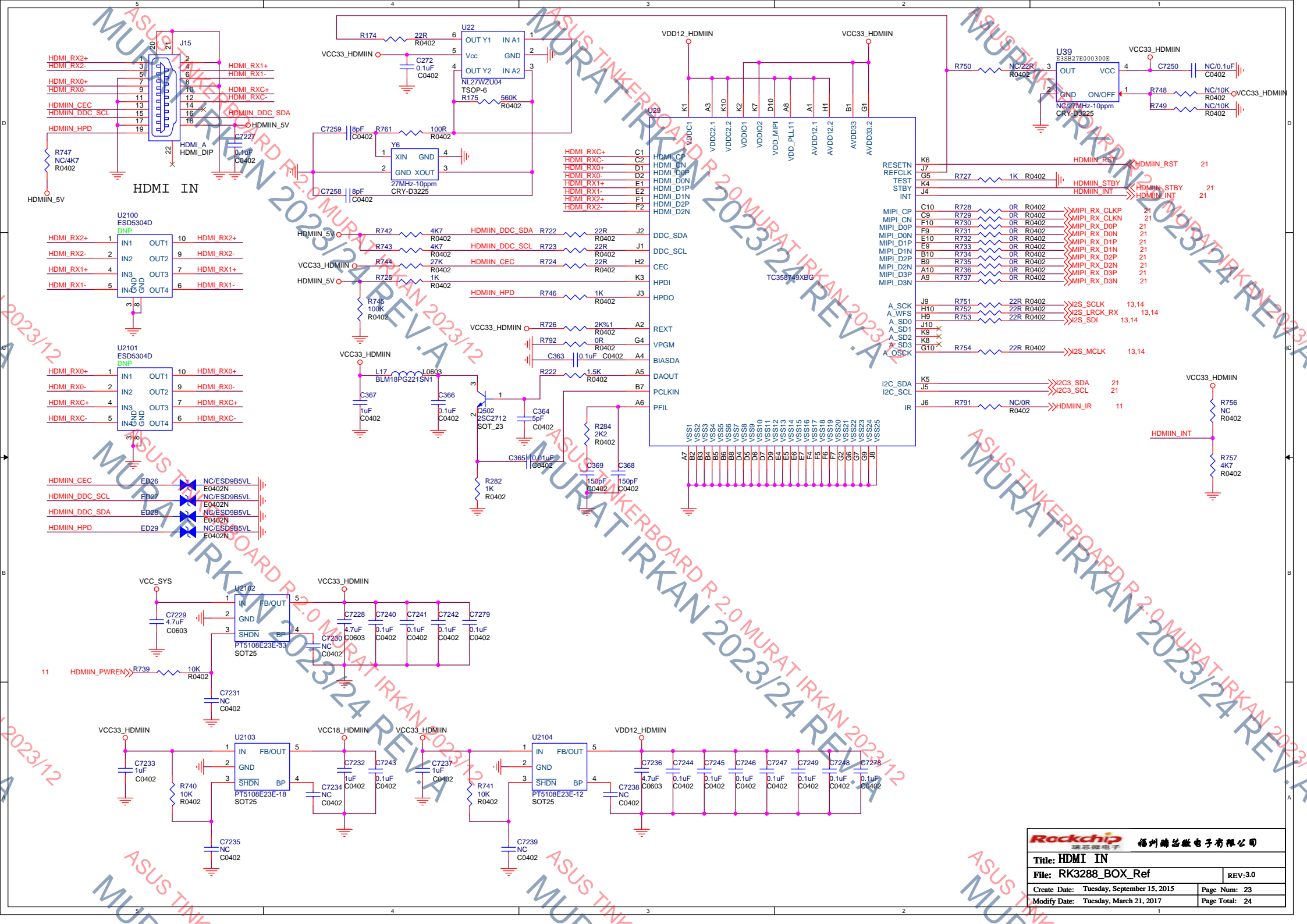
Page Num: 20

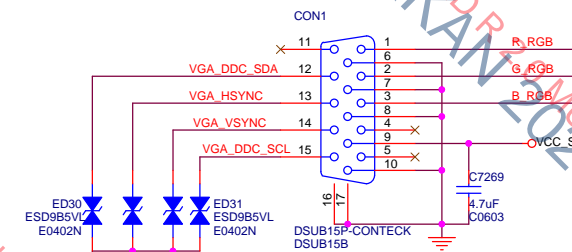
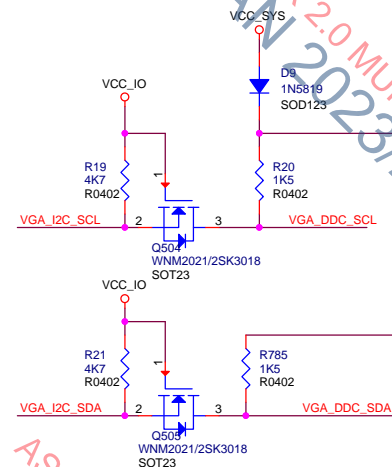
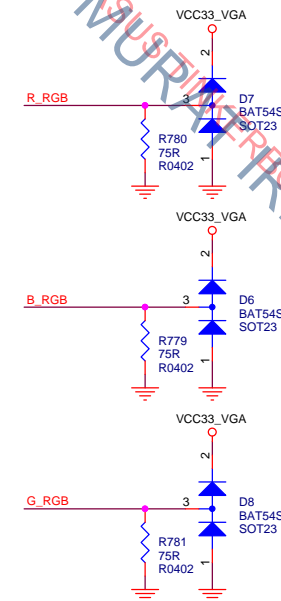
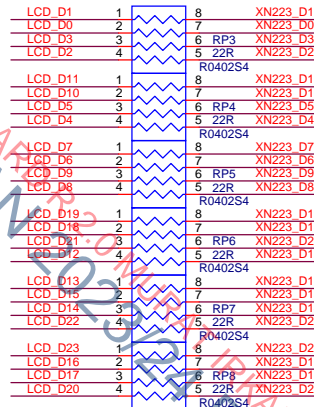
Modify Date: Tuesday, March 21, 2017

Page Total: 24



 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	





Page Total: 24