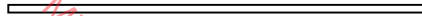
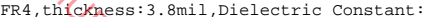



Content Indexing


- 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(Signall)  Cu,thickness:0.7mil,Plating to 1oz


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


POWER  Cu,thickness:1.5mil, 1oz

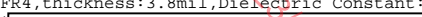
 FR4,thickness:8mil,Dielectric Constant:4.3

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

Signal2  Cu,thickness:1.5mil, 1oz

GND2  FR4,thickness:8mil,Dielectric Constant:4.3

 FR4,thickness:3.8mil,Dielectric Constant:4.3

BOTTOM(Signall3)  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

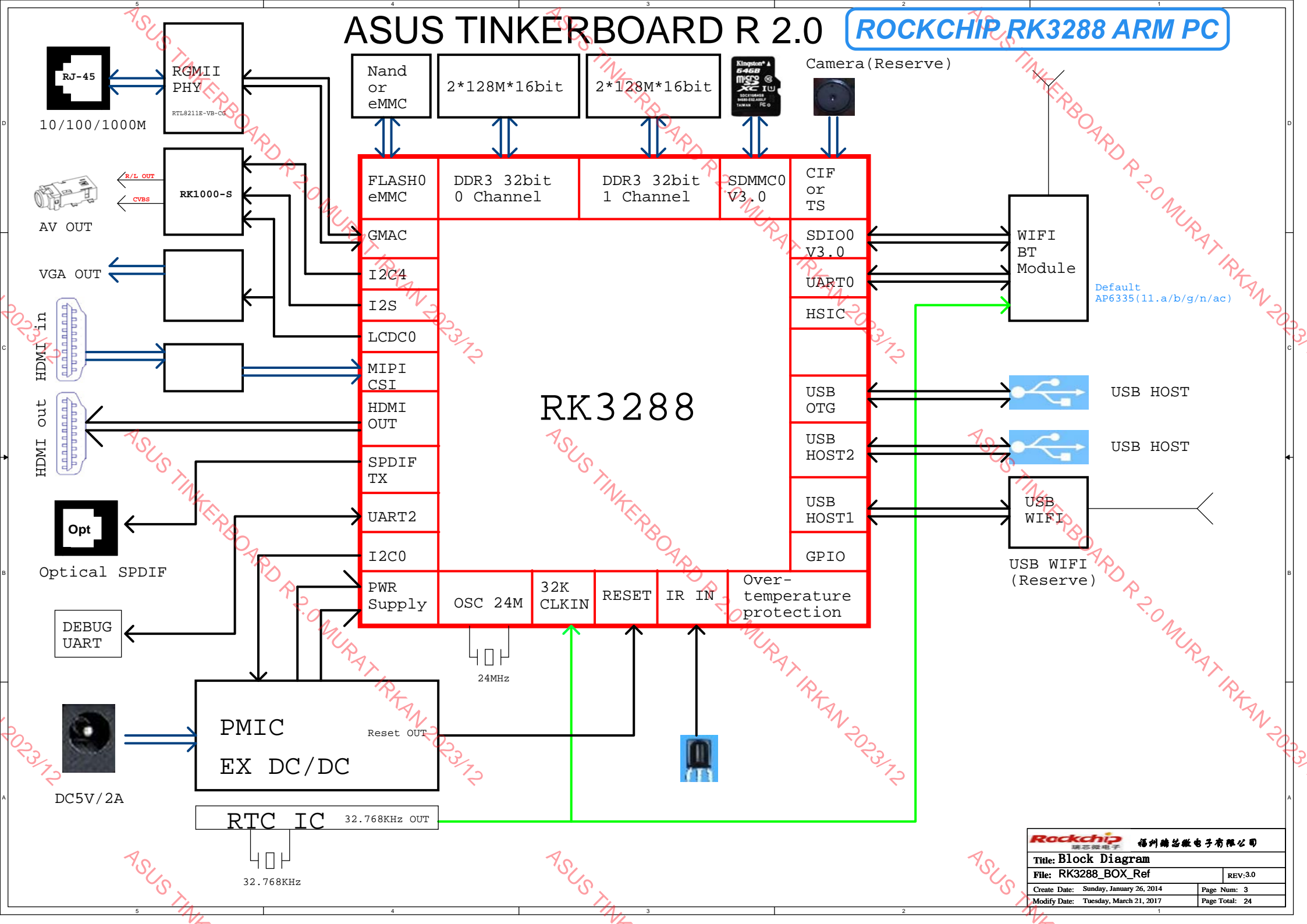
Modify Date: Tuesday, March 21, 2017

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_10 | 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 |
| 1.8V | RK3288 USB PHY |

| | | |
|-----------|--------|----------|
| VCC_Flash | option | FLASH IO |
| 1.8V | | |

| | | |
|--------|--|-----------------|
| VCC_IO | | RK3288 IO Suply |
| 3.3V | | 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 |

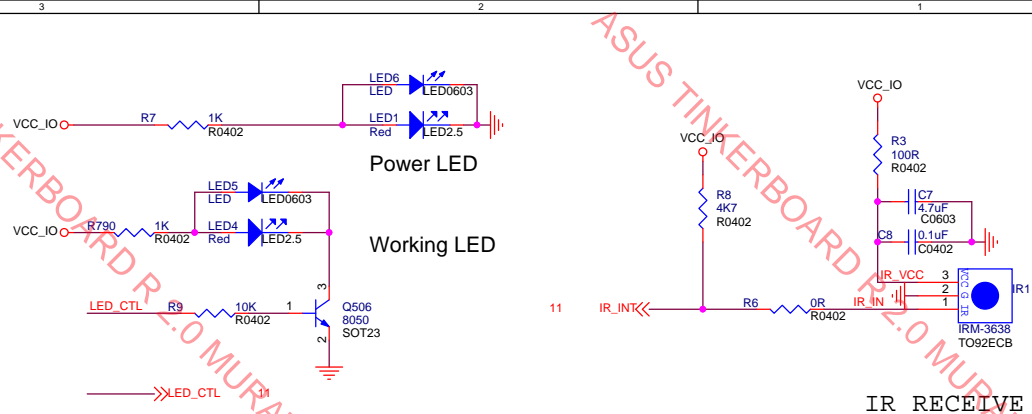
| |
|----------|
| RK1000-S |
|----------|

| |
|--------------|
| Ethernet PHY |
|--------------|

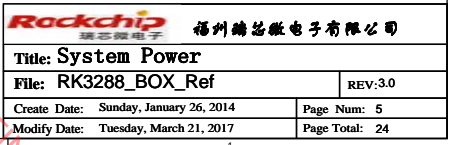
| |
|-------|
| Logic |
|-------|

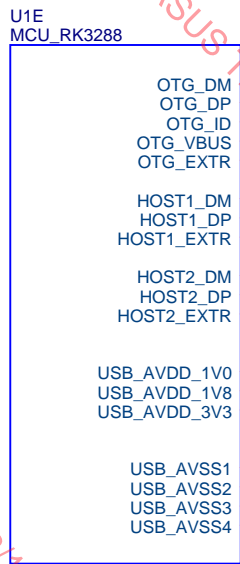
| |
|----------|
| USB HOST |
|----------|

| |
|----------|
| USB HOST |
|----------|

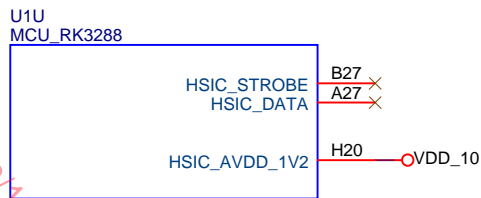
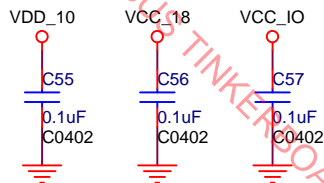


4.8V-5.3V/2A adaptor

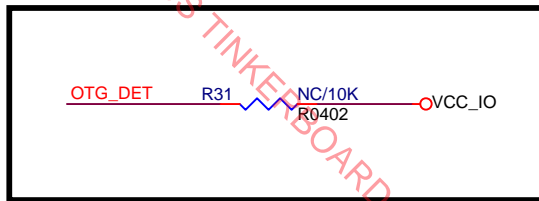




RK3288_E

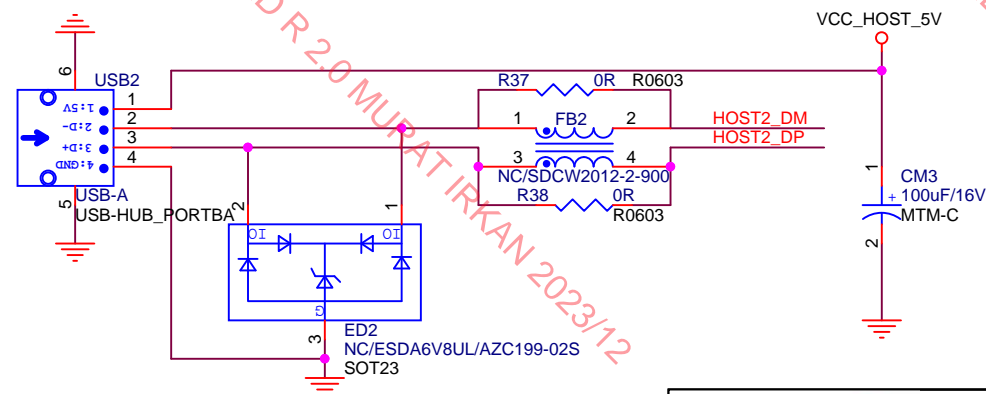
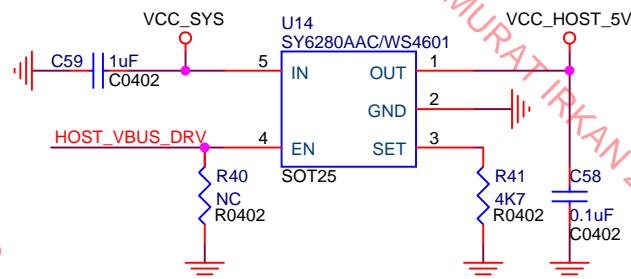
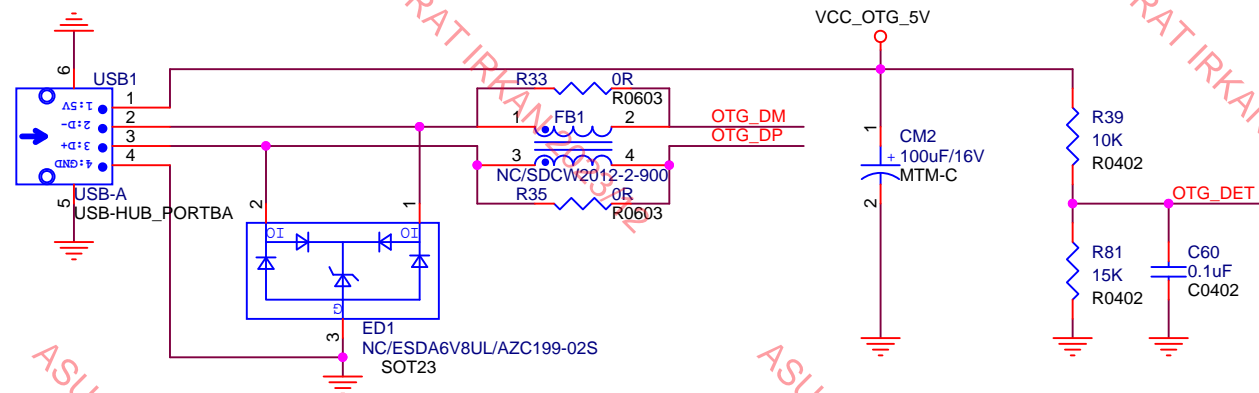
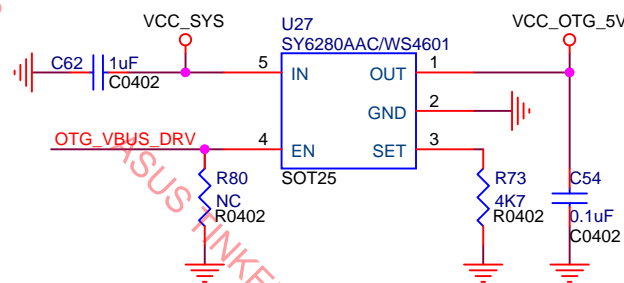


RK3288_U



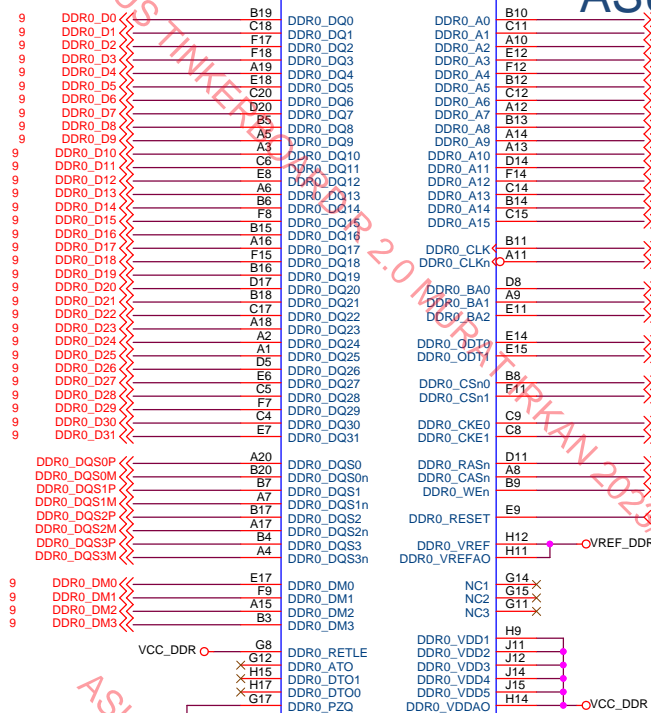
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|  瑞芯微电子 | | 福州瑞芯微电子有限公司 | |
| Title: RK3288 USB/HSIC Controller | | | |
| File: RK3288_BOX_Ref | | | REV:3.0 |
| Create Date: Monday, February 17, 2014 | | Page Num: 6 | |
| Modify Date: Tuesday, March 21, 2017 | | Page Total: 24 | |

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

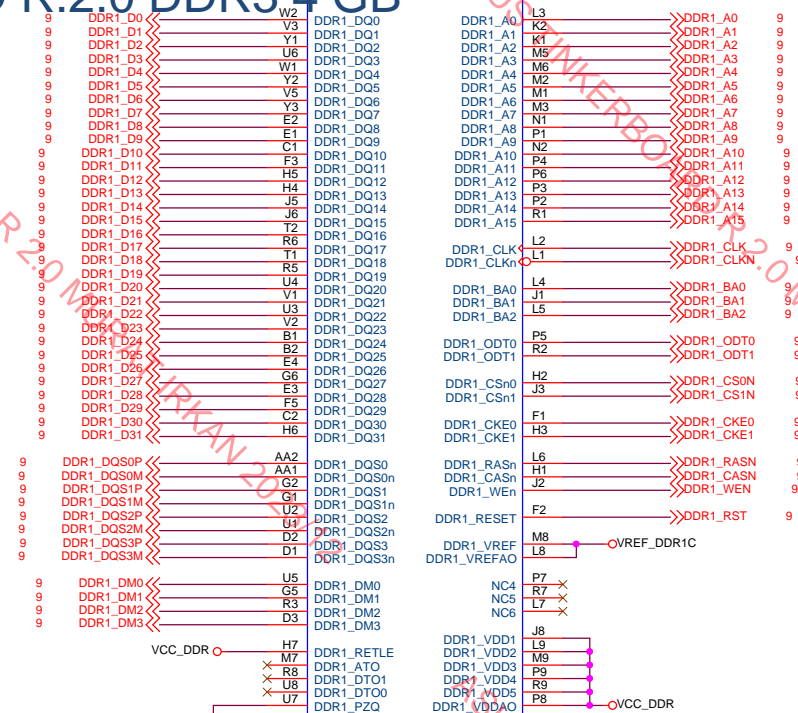


| | | | |
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|  瑞芯微电子 | | 福州瑞芯微电子有限公司 | |
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| File: RK3288_BOX_Ref | | | REV:3.0 |
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| Modify Date: Tuesday, March 21, 2017 | | Page Total: 24 | |

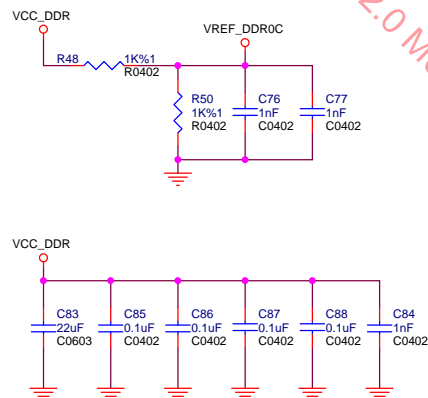
ASUS TINKER BOARD R.2.0 DDR3 4GB



Channel 0

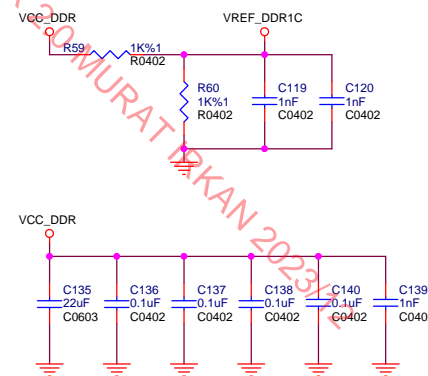


Channel 1



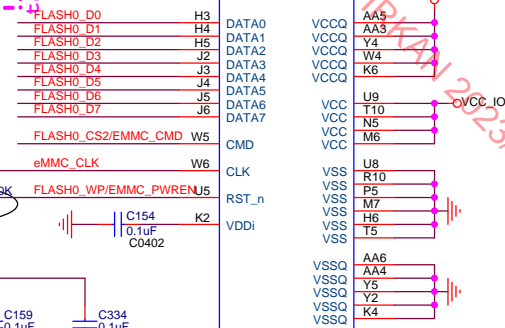
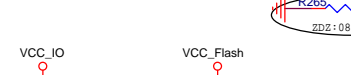
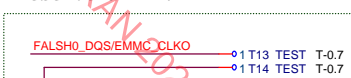
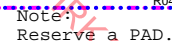
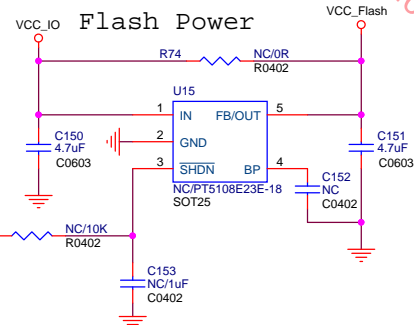
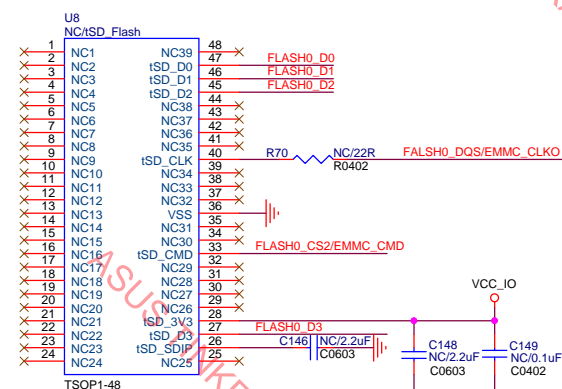
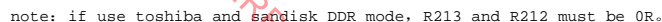
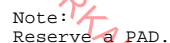
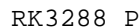
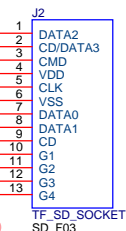
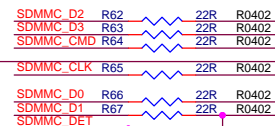
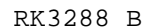
DDR0 FILTER

Note:
These termination resistors must be placed in the middle of trace, and the termination resistor of CLK must be placed in the bifurcation point.

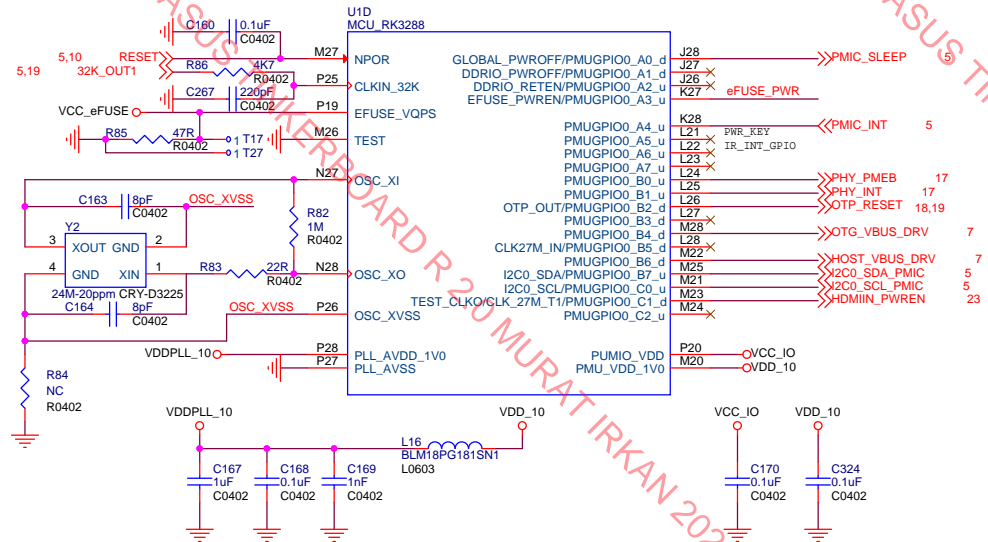


DDR1 FILTER

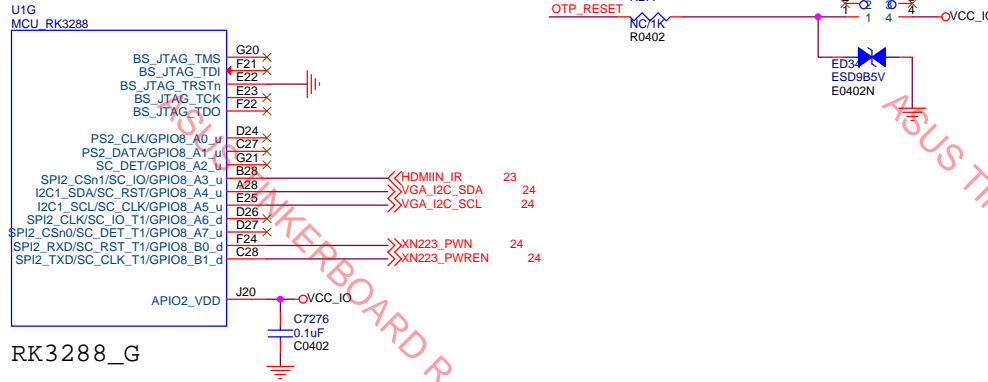
Note:
These termination resistors must be placed in the middle of trace, and the termination resistor of CLK must be placed in the bifurcation point.



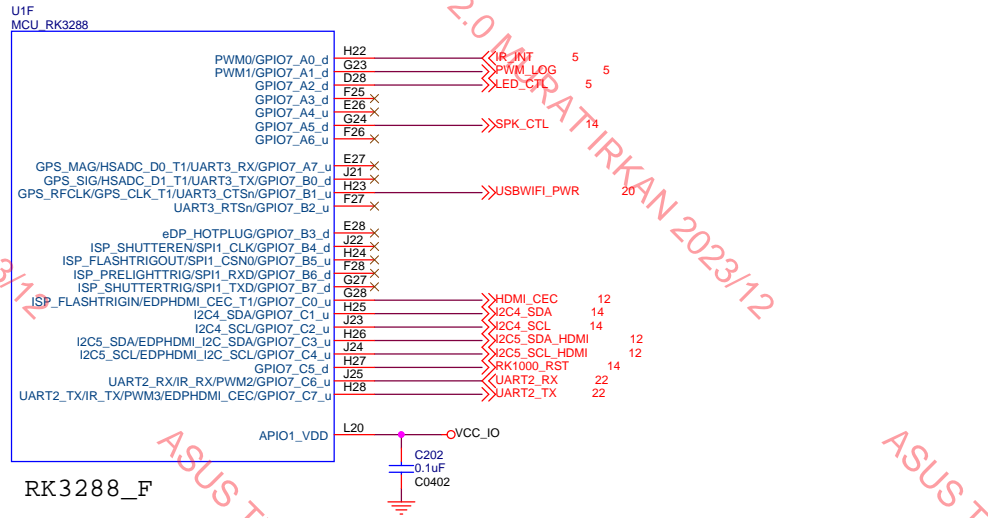
| | | | |
|-------------------|----------------------|--|---|
| | Flash IO voltage | | |
| eMMC (Default) | 1.8V (VCCQ<150mA) | R74:DNP U15:DNP R532:0R | Default |
| | 1.8V (VCCQ>150mA) | R74:DNP U15:PTF5108E23E-18(500mA) R532:DNP | PLS confirm eMMC VCCQ peak current. |
| | 3.3V | R74:0R U15:DNP R532:DNP | |
| Nand Flash | 1.8V (VCCQ<150mA) | R74:DNP U15:DNP R532:0R | |
| | 1.8V (VCCQ>150mA) | R74:DNP U15:PTF5108E23E-18(500mA) R532:DNP | PLS confirm eMMC VCCQ peak current. |
| | 3.3V | R74:0R U15:DNP R532:DNP | |



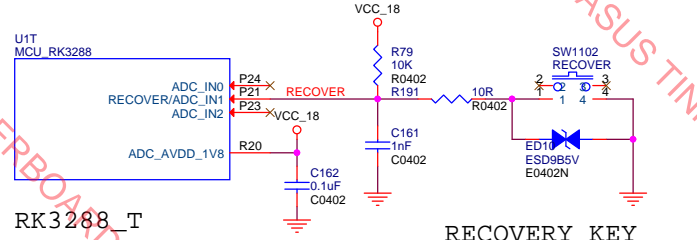
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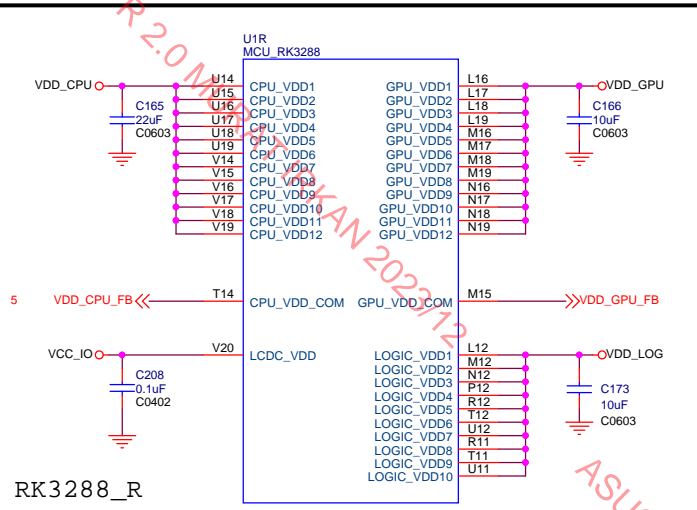
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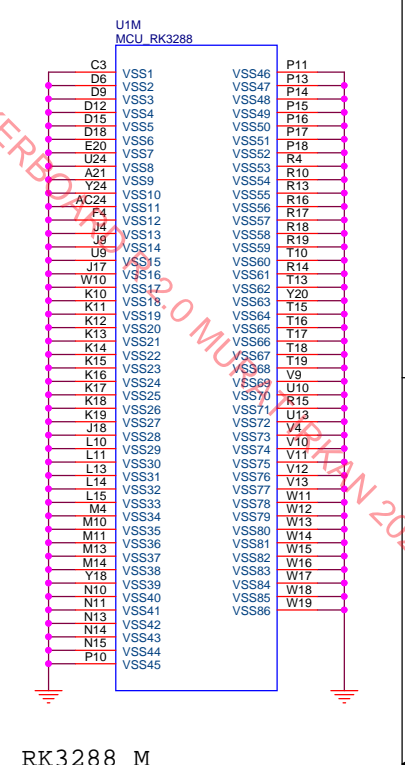
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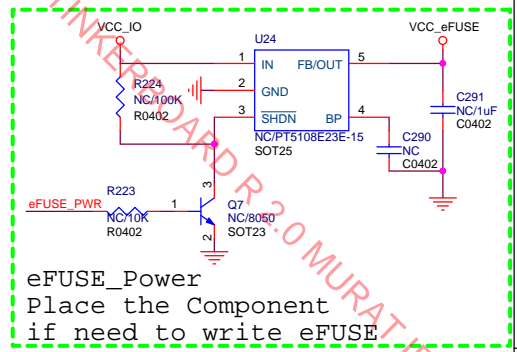
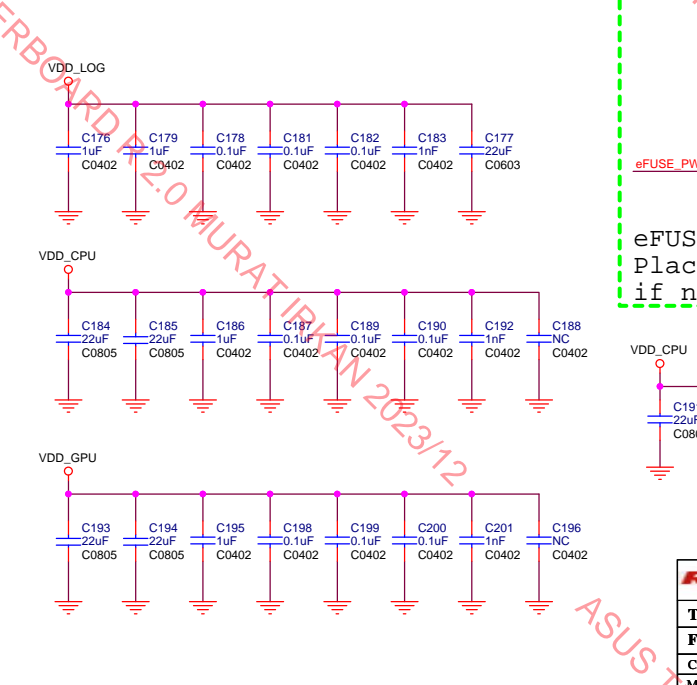


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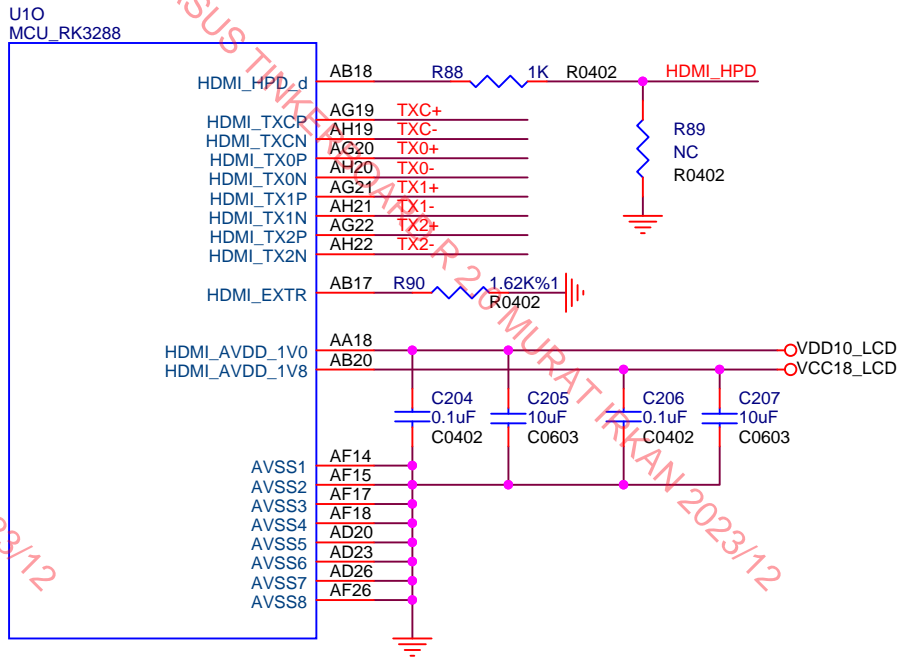


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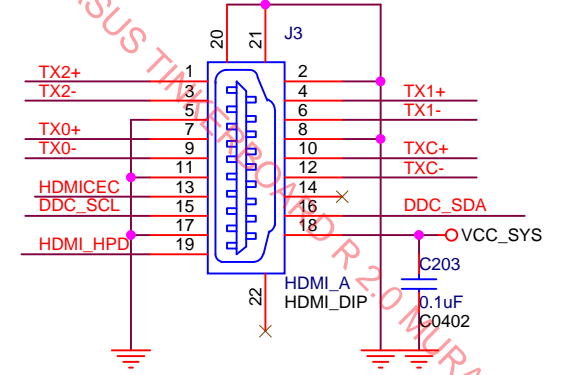
RK3288 FILTER



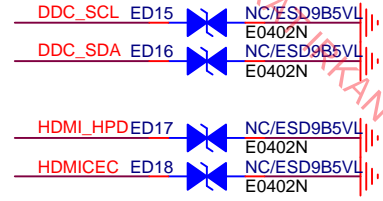
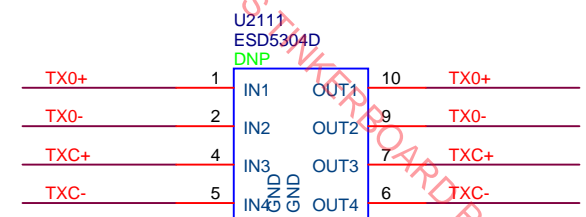
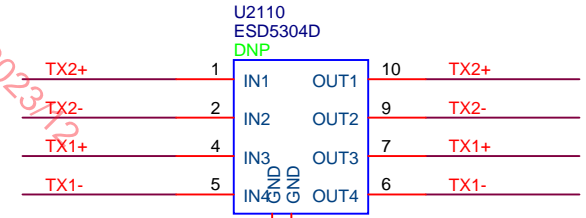
eFUSE_Power
Place the Component
if need to write eFUSE



RK3288_0



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

LCDC0_HSYNC/GPIO1_D0_d
LCDC0_VSYNO/GPIO1_D1_d
LCDC0_DEN/GPIO1_D2_d
LCDC0_DCLK/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

SPDIF_TX/GPIO6_B3_d

APIO4_VDD

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

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

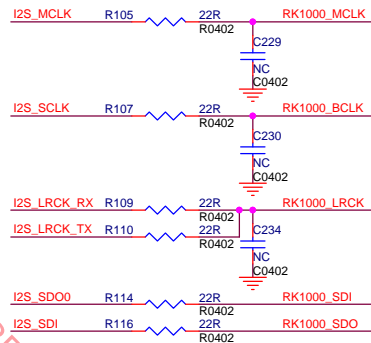
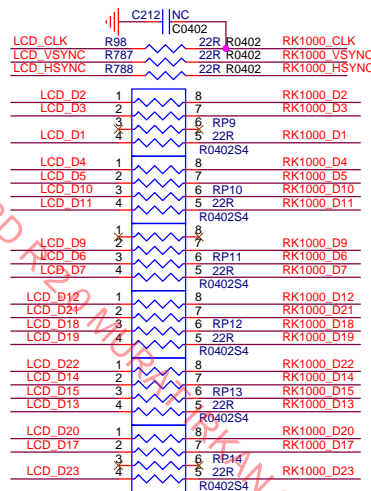
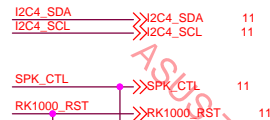
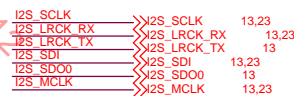
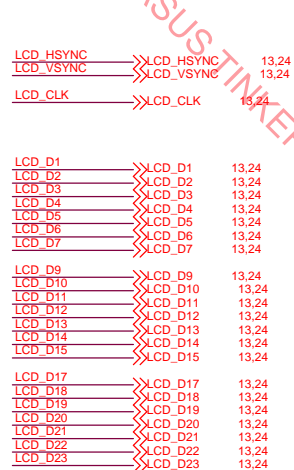
LCD_D0 LCD_D0 24
LCD_D1 LCD_D1 14,24
LCD_D2 LCD_D2 14,24
LCD_D3 LCD_D3 14,24
LCD_D4 LCD_D4 14,24
LCD_D5 LCD_D5 14,24
LCD_D6 LCD_D6 14,24
LCD_D7 LCD_D7 14,24
LCD_D8 LCD_D8 24
LCD_D9 LCD_D9 14,24
LCD_D10 LCD_D10 14,24
LCD_D11 LCD_D11 14,24
LCD_D12 LCD_D12 14,24
LCD_D13 LCD_D13 14,24
LCD_D14 LCD_D14 14,24
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 I2S_LRCK_TX 14
I2S_SDI I2S_SDI 14,23
I2S_SDO0 I2S_SDO0 14
I2S_MCLK I2S_MCLK 14,23

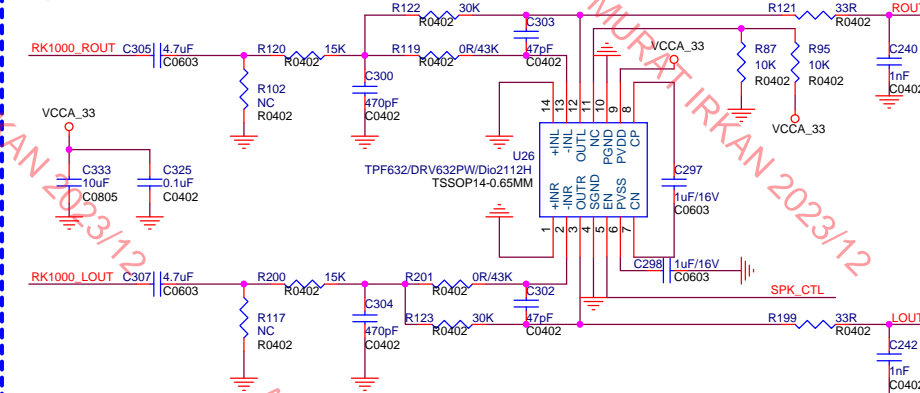
SPDIF_TX SPDIF_TX 15

| | | | |
|--|--|----------------|---------|
|  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 | |

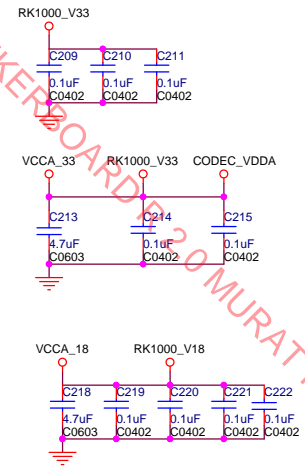
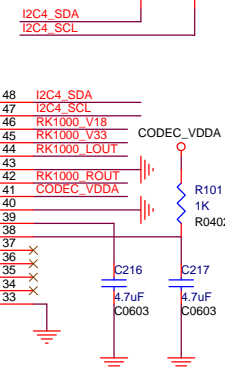
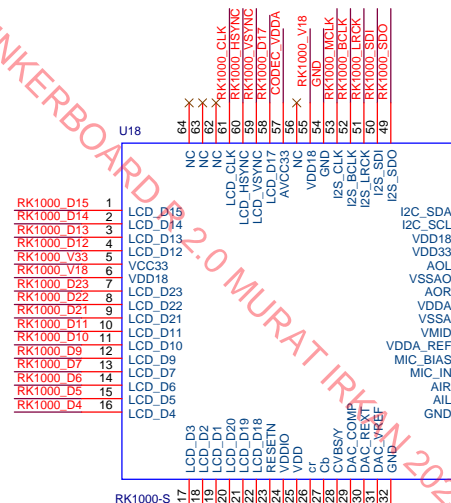
RK3288_I



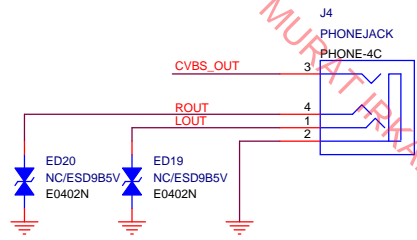
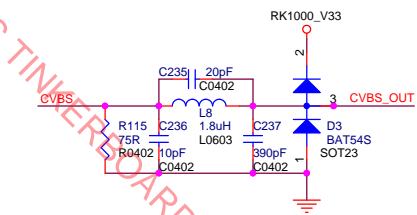
R/L OUT



2-Vrms Audio Line Driver



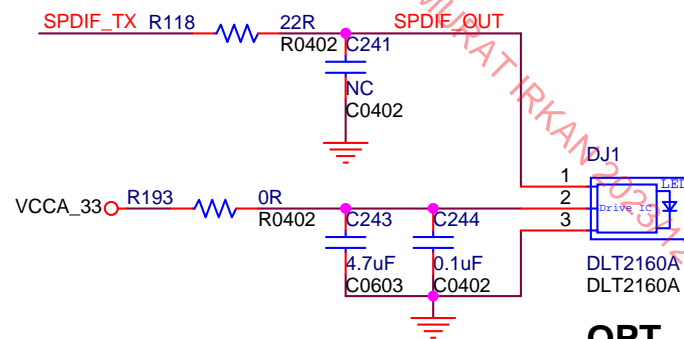
RK1000-S POWER



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

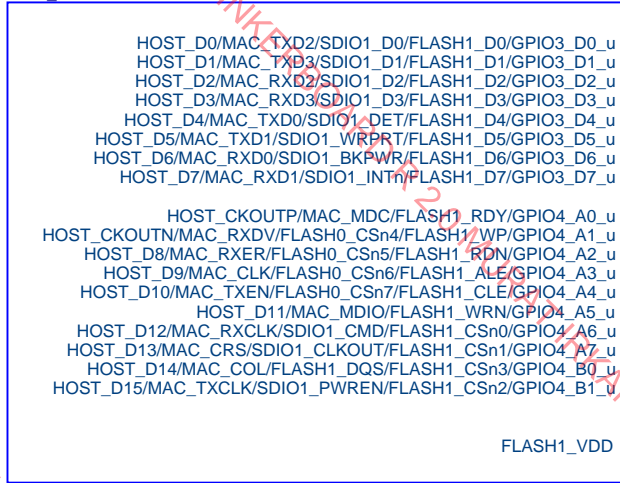


OPT

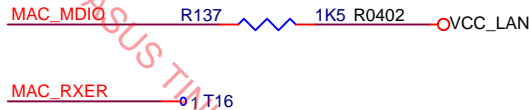
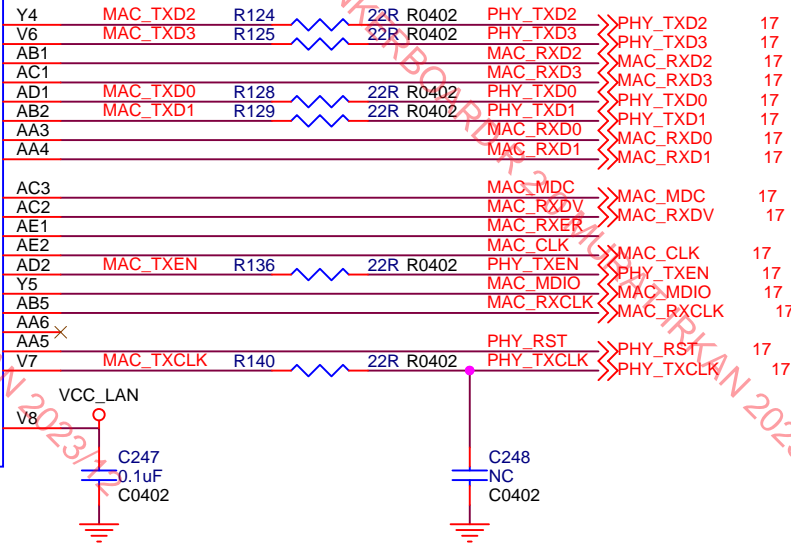
Optical S/PDIF OUT


| | | | |
|--|--|----------------|---------|
|  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 | |

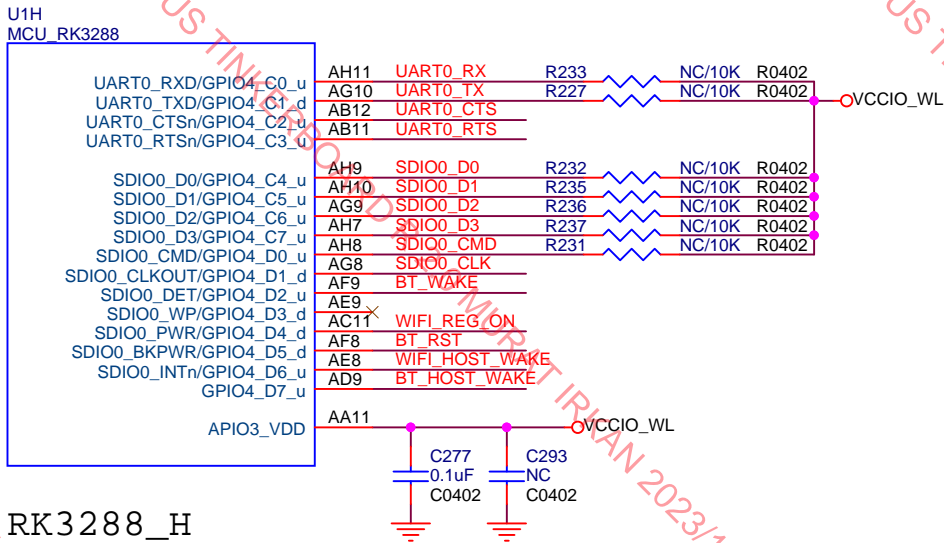
U1Q
MCU_RK3288



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 | |



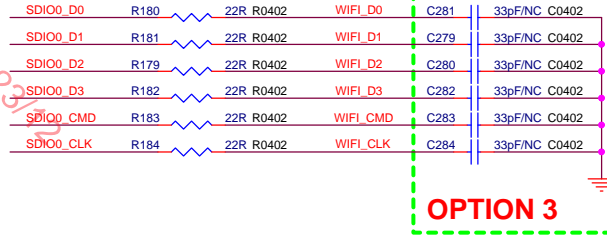
RK3288_H

| | | |
|----------------|------------------|----|
| 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 |

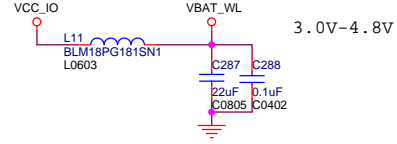
| | | | |
|--|--|----------------|---------|
|  瑞芯微电子 | | 福州瑞芯微电子有限公司 | |
| Title: RK3288 SDIO0 Controller | | | |
| File: RK3288_BOX_Ref | | | REV:3.0 |
| Create Date: Monday, February 17, 2014 | | Page Num: 18 | |
| Modify Date: Tuesday, March 21, 2017 | | Page Total: 24 | |

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

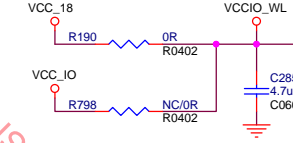
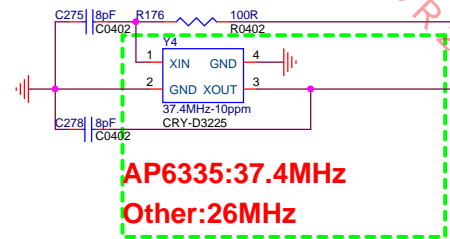
32K_OUT2 5,11



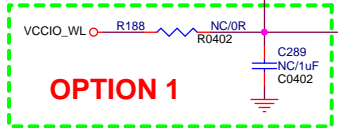
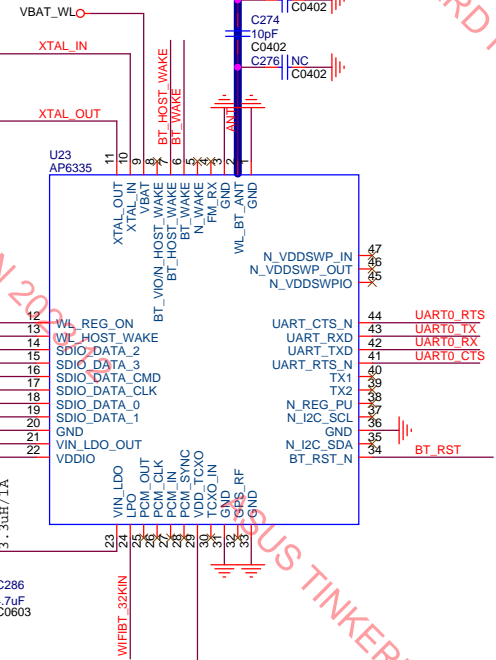
32K_OUT2 R186 0R R0402 WIFIBT_32KIN



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



WIFI_REG_ON 12
WIFI_HOST_WAKE 13
WIFI_D2 14
WIFI_D3 15
WIFI_CMD 16
WIFI_CLK 17
WIFI_D0 18
WIFI_D1 19



| 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

6
6

HOST1_DP
HOST1_DM

U25

GND
USB_D+
USB_D-
VCC
RL-UM12BS-8188EUS

ANT2

GND
ANT
GND
NC/ANT
ANT_JACK

VCC_IO

VCC_WIFI

C268
0.1uF
C0402

Q503
WPM2015
SOT23

C311
10uF
C0805

C312
0.1uF
C0402

11

USBWIFI_PWR

R242

10K
R0402

R274
100K
R0402

ZDZ:0805

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

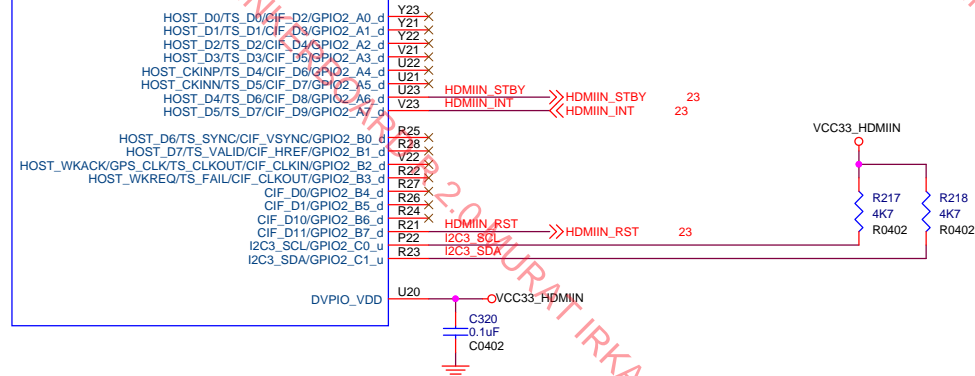
Create Date: Sunday, January 26, 2014

Page Num: 20

Modify Date: Tuesday, March 21, 2017

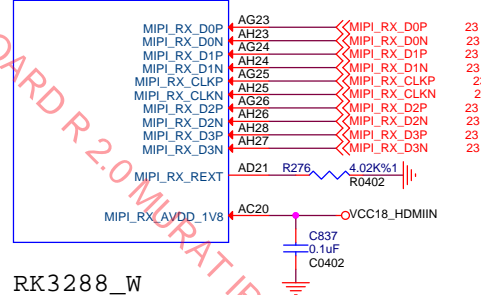
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U1C
MCU_RK3288



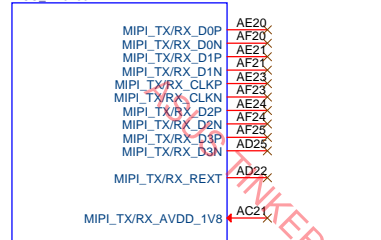
RK3288_C

U1W
MCU_RK3288



RK3288_W

U1X
MCU_RK3288



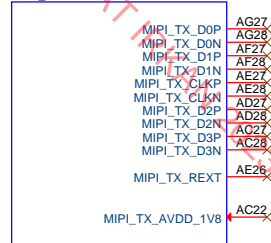
RK3288_X

U1N
MCU_RK3288



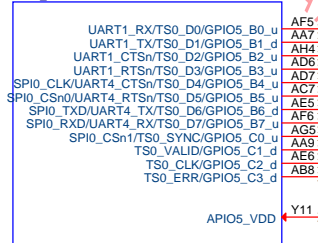
RK3288_N

U1V
MCU_RK3288



RK3288_V

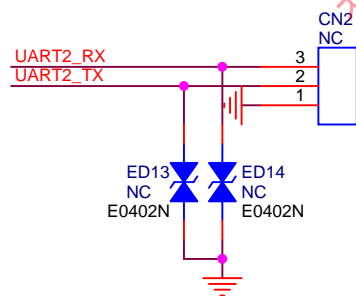
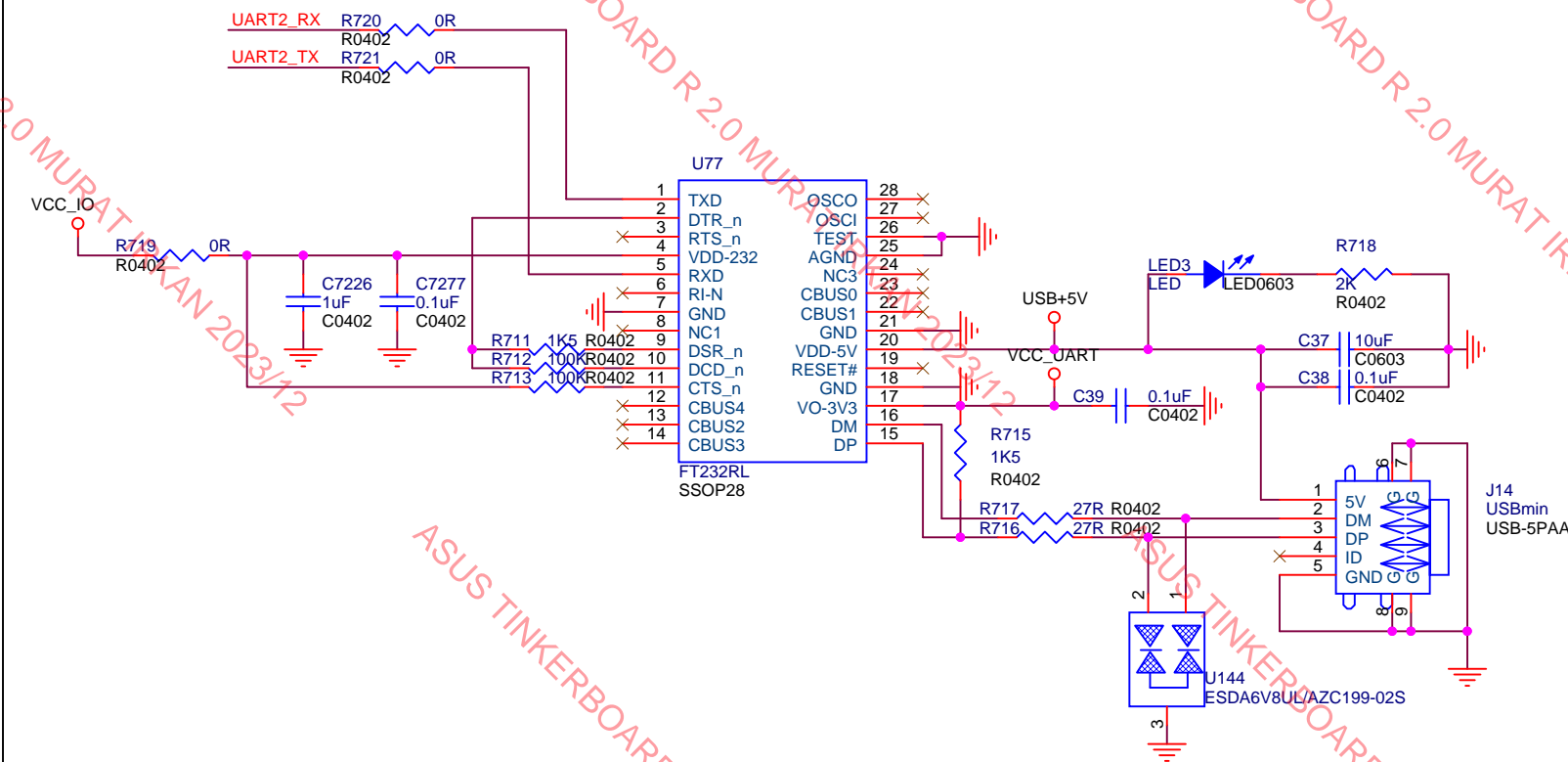
U1J
MCU_RK3288

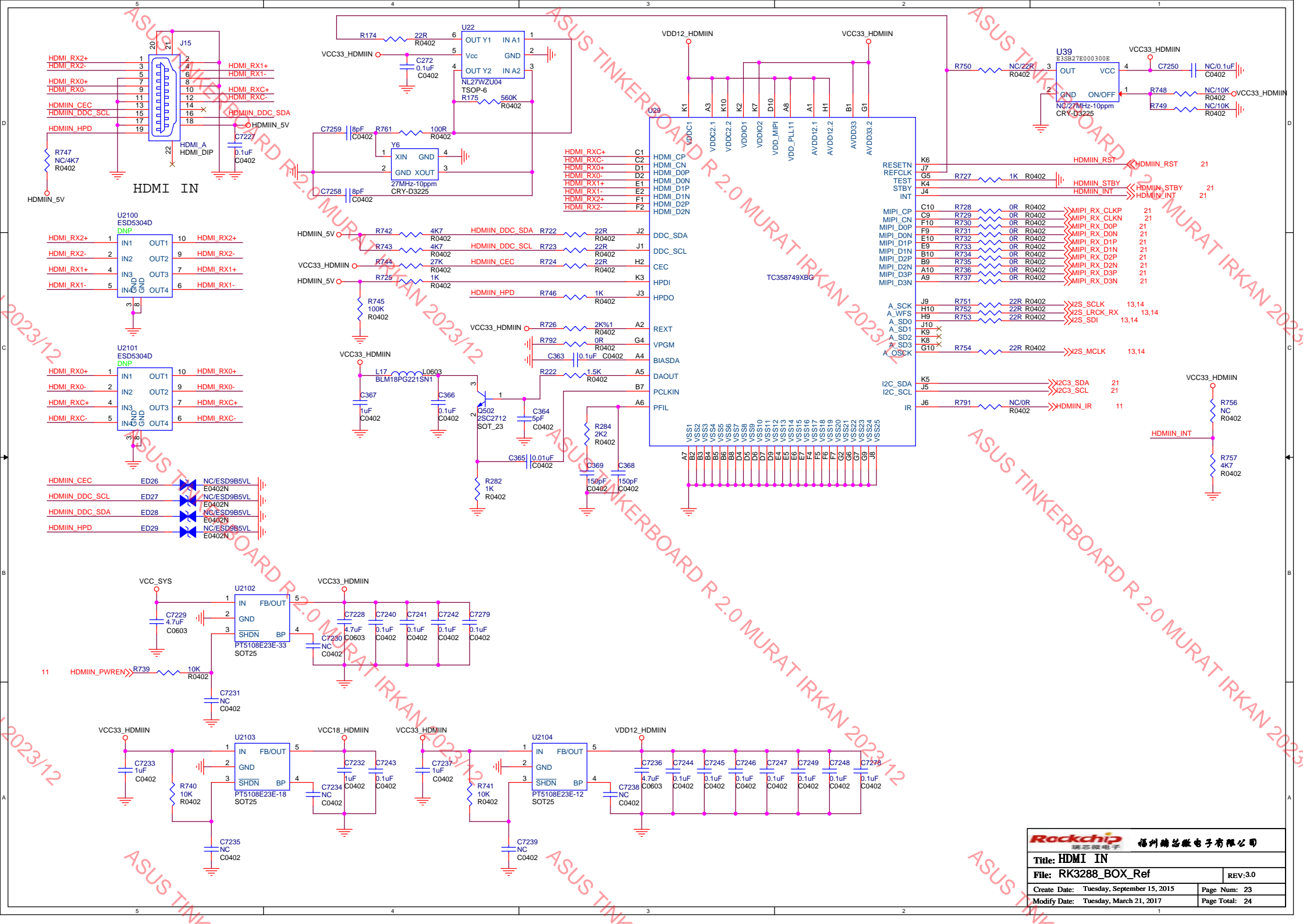


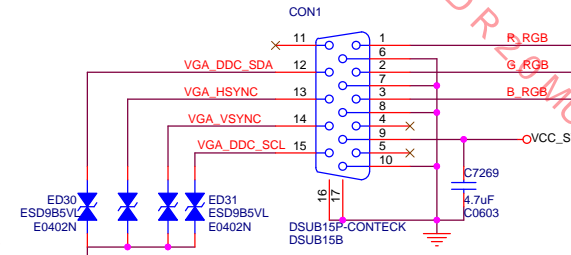
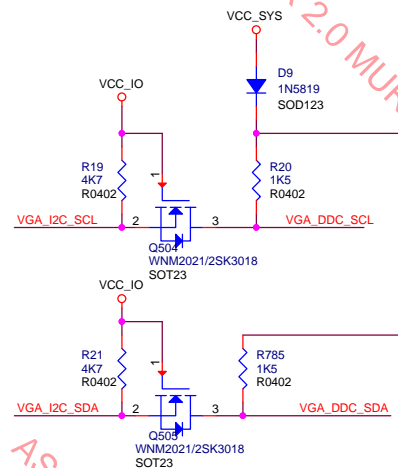
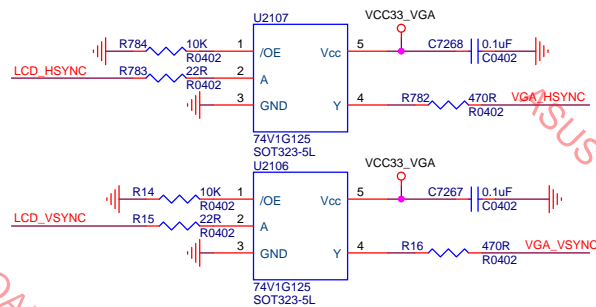
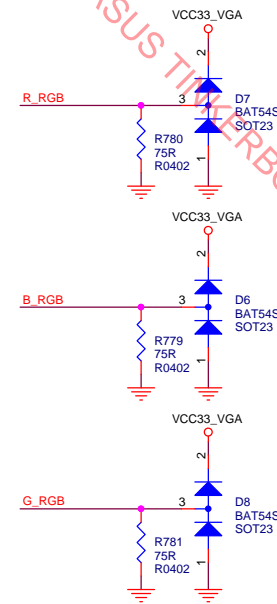
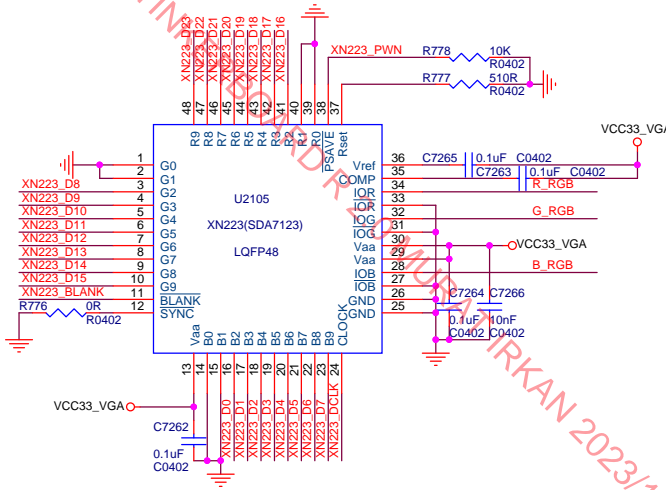
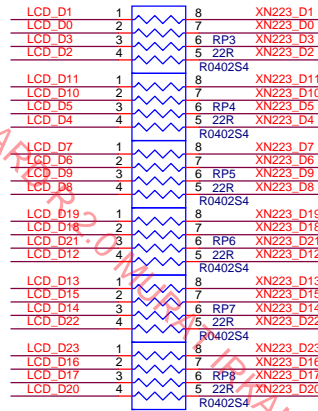
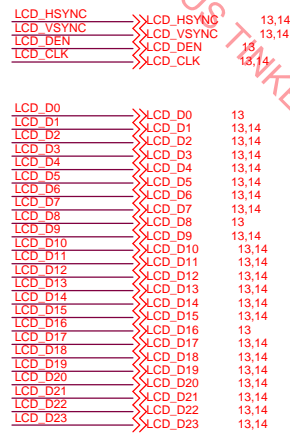
RK3288_J

| | |
|---------------------------------------|----------------|
| Rockchip 瑞芯微电子股份有限公司 | |
| Title: MIPI Interface | |
| File: RK3288_BOX_Ref | REV:3.0 |
| Create Date: Sunday, January 26, 2014 | Page Num: 21 |
| Modify Date: Tuesday, March 21, 2017 | Page Total: 24 |

UART2_RX 11
UART2_TX 11







VGA OUT