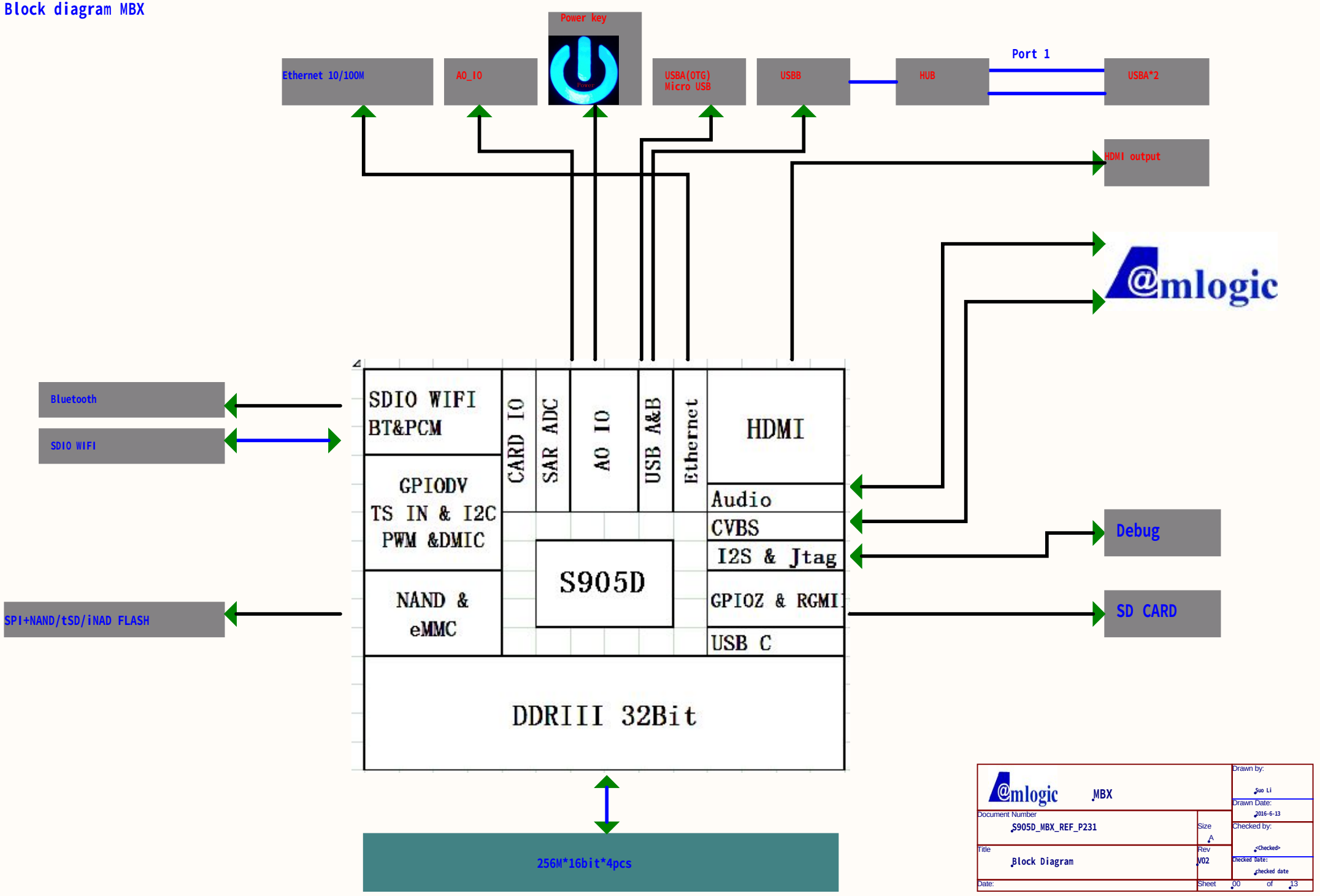
Block diagram MBX



@mlogic MBX			Drawn by: Suo Li
Document Number: S905D_MBX_REF_P231		Size: A	Drawn Date: 2016-6-13
Title: Block Diagram		Rev: V02	Checked by: <Checked>
Date:		Sheet 00 of 13	Checked Date: checked date

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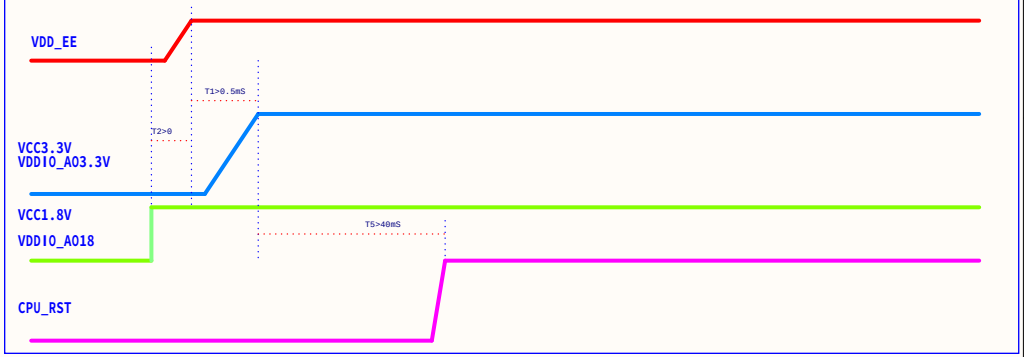
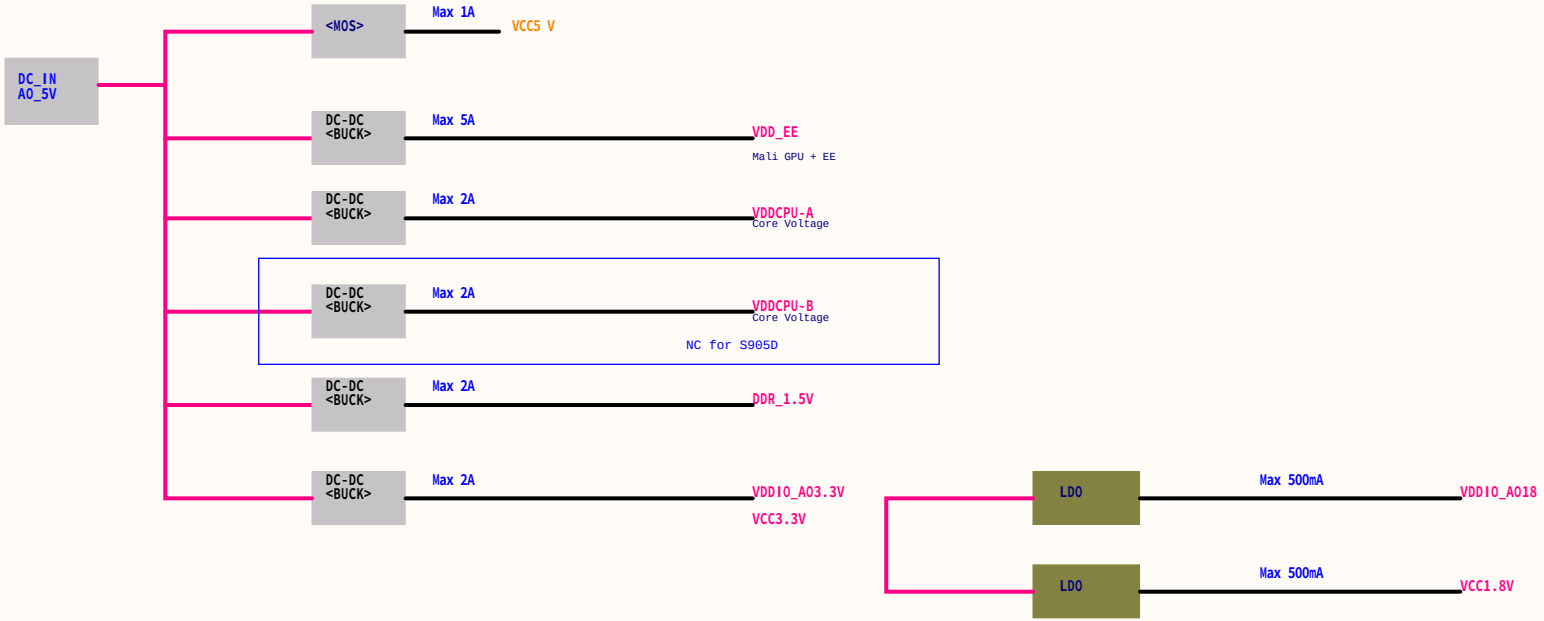
Power On Sequence :



Power Tree



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Document Number: S905D_MBX_REF_P231	Size: A	Drawn Date: 2014-6-13
Title: Power Block Diagram	Rev: V02	Checked by: <Checked>
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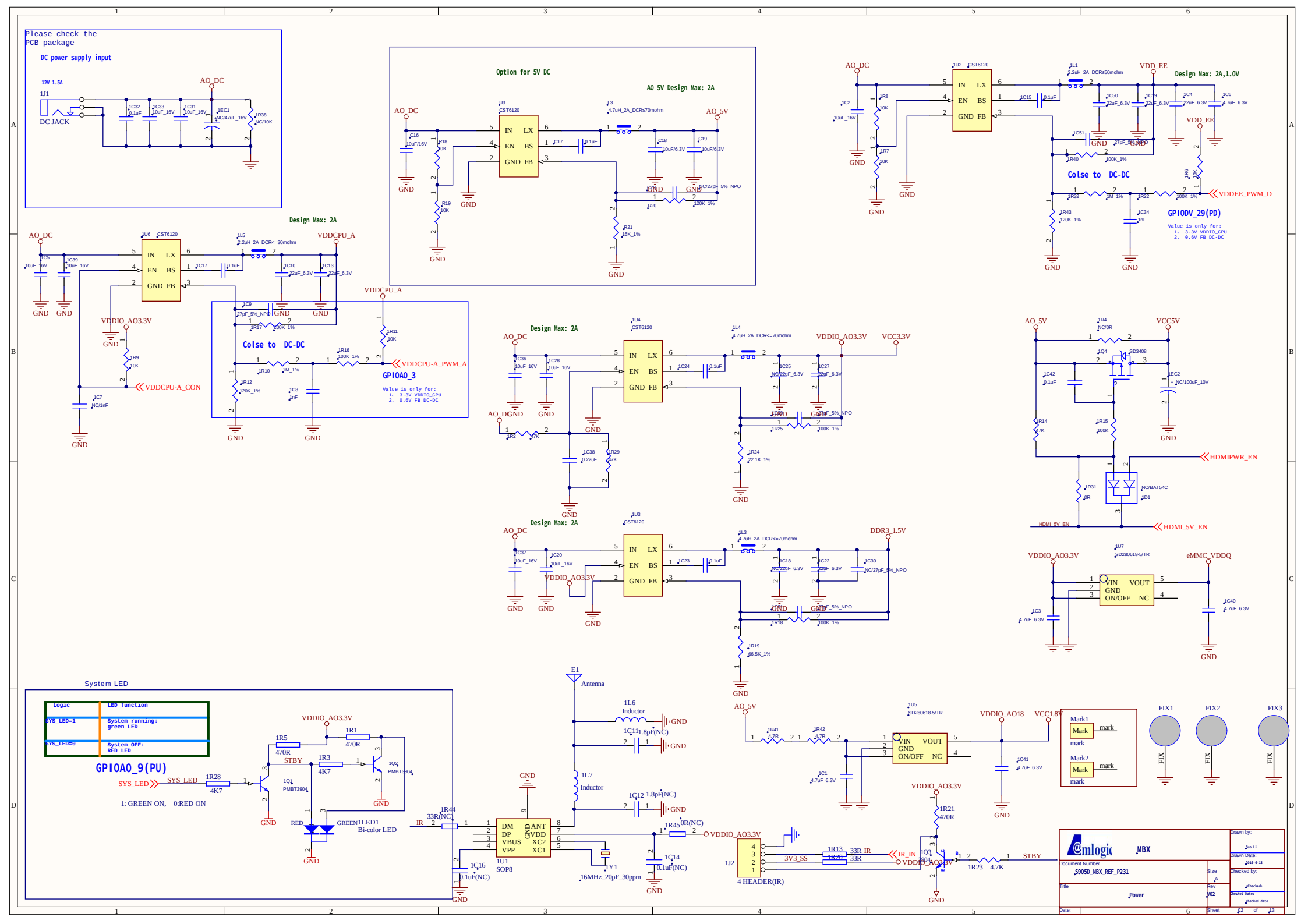
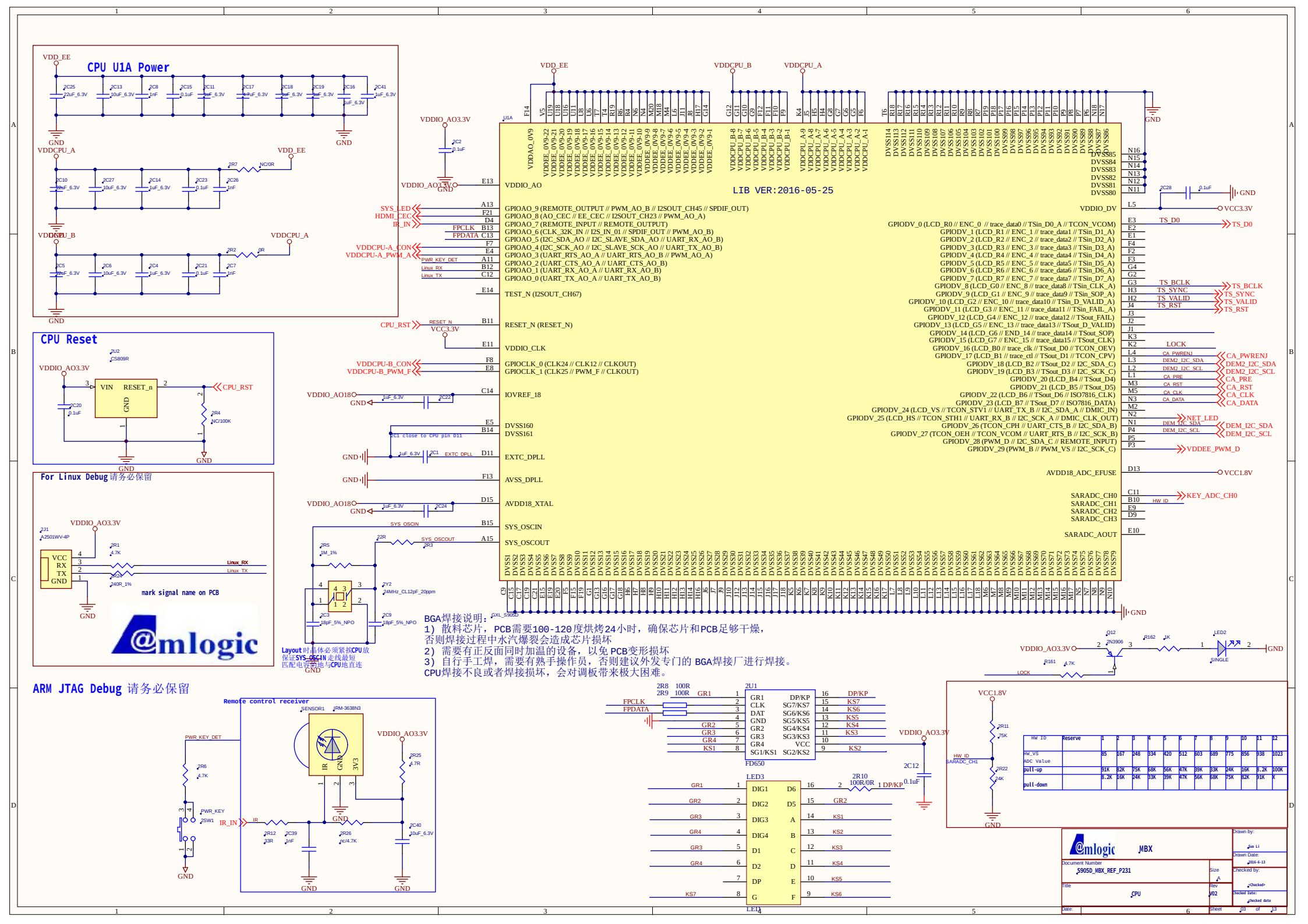

Please check the
PCB package
DC power supply input
12V 1.5A
AO_DC
DC JACK
Option for 5V DC
AO 5V Design Max: 2A
AO_5V
Design Max: 2A
VDDCPU_A
Colse to DC-DC
GPIOAO_3
VDDCPU-A_PWM_A
VDDCPU-A_CON
Value is only for:
1. 3.3V VDDIO_CPU
2. 0.6V FB DC-DC
VDDIO_AO3.3V
VCC3.3V
DDR3_1.5V
VDD_EE
VDDEE_PWM_D
GPIODV_29(PD)
VCC5V
HDMIPWR_EN
HDMI_5V_EN
eMMC_VDDQ
VDDIO_AO18
VCC1.8V
System LED
Logic
LED Function
SYS_LED=1
System running:
green LED
SYS_LED=0
System OFF:
RED LED
GPIOAO_9(PU)
SYS_LED
1: GREEN ON, 0:RED ON
Antenna
Inductor
16MHz_20pF_30ppm
4 HEADER(IR)
Mark1
Mark2
FIX1
FIX2
FIX3
@mlogic
MBX
Document Number
S905D_MBX_REF_P231
Title
Power
Drawn by:
Joe Li
Drawn Date:
2016-6-13
Checked by:
Checked
Checked Date:
Checked date
Size
A
Rev
V02
Sheet
J2
of
J3


CPU U1A Power
CPU Reset
For Linux Debug 请务必保留
mark signal name on PCB
ARM JTAG Debug 请务必保留
Remote control receiver
LIB VER:2016-05-25
BGA焊接说明：
1）散料芯片，PCB需要100-120度烘烤24小时，确保芯片和PCB足够干燥，
否则焊接过程中水汽爆裂会造成芯片损坏
2）需要有正反面同时加温的设备，以免PCB变形损坏
3）自行手工焊，需要有熟手操作员，否则建议外发专门的 BGA焊接厂进行焊接。
CPU焊接不良或者焊接损坏，会对调板带来极大困难。
Layout 时晶体必须紧挨CPU放
保证SYS_OSCIN 走线最短
匹配电容回地与CPU地直连
@mlogic
MBX
Document Number
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CPU
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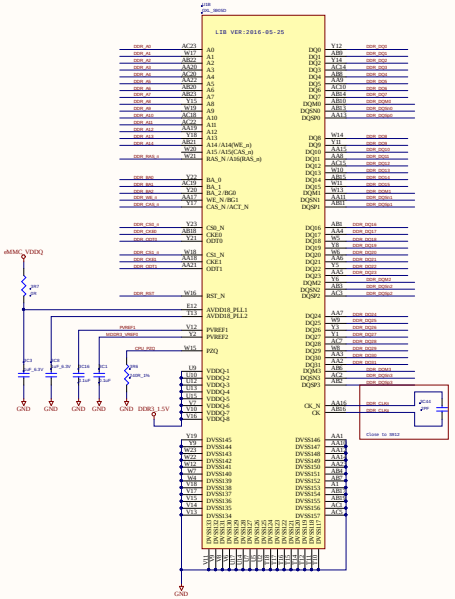
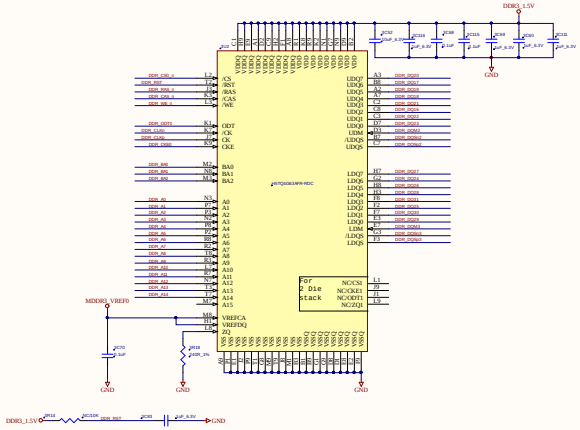
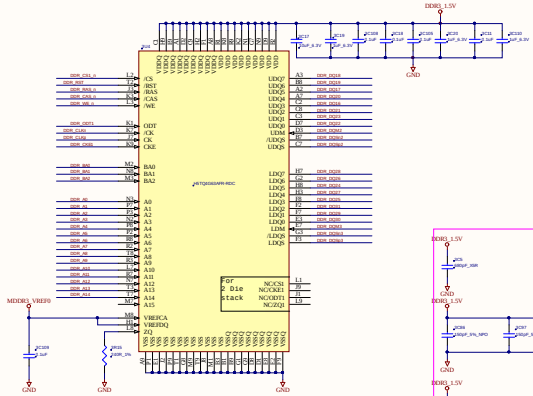
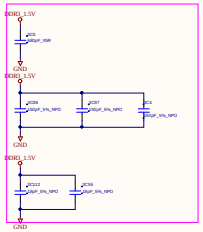
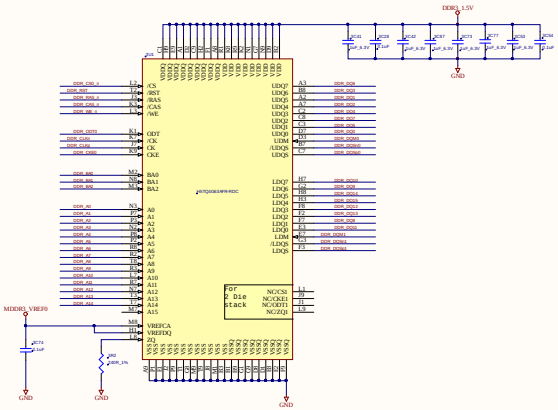
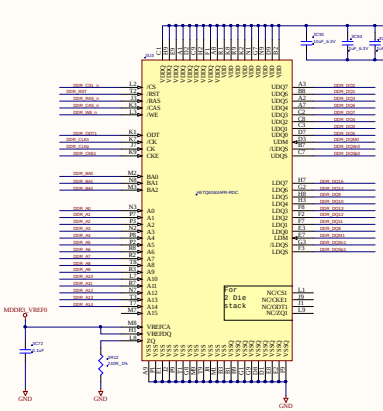


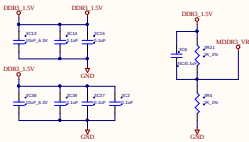


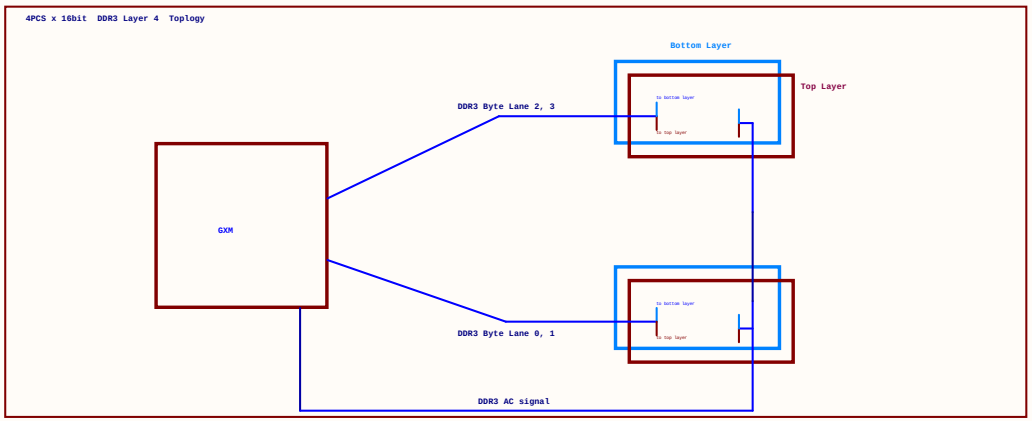




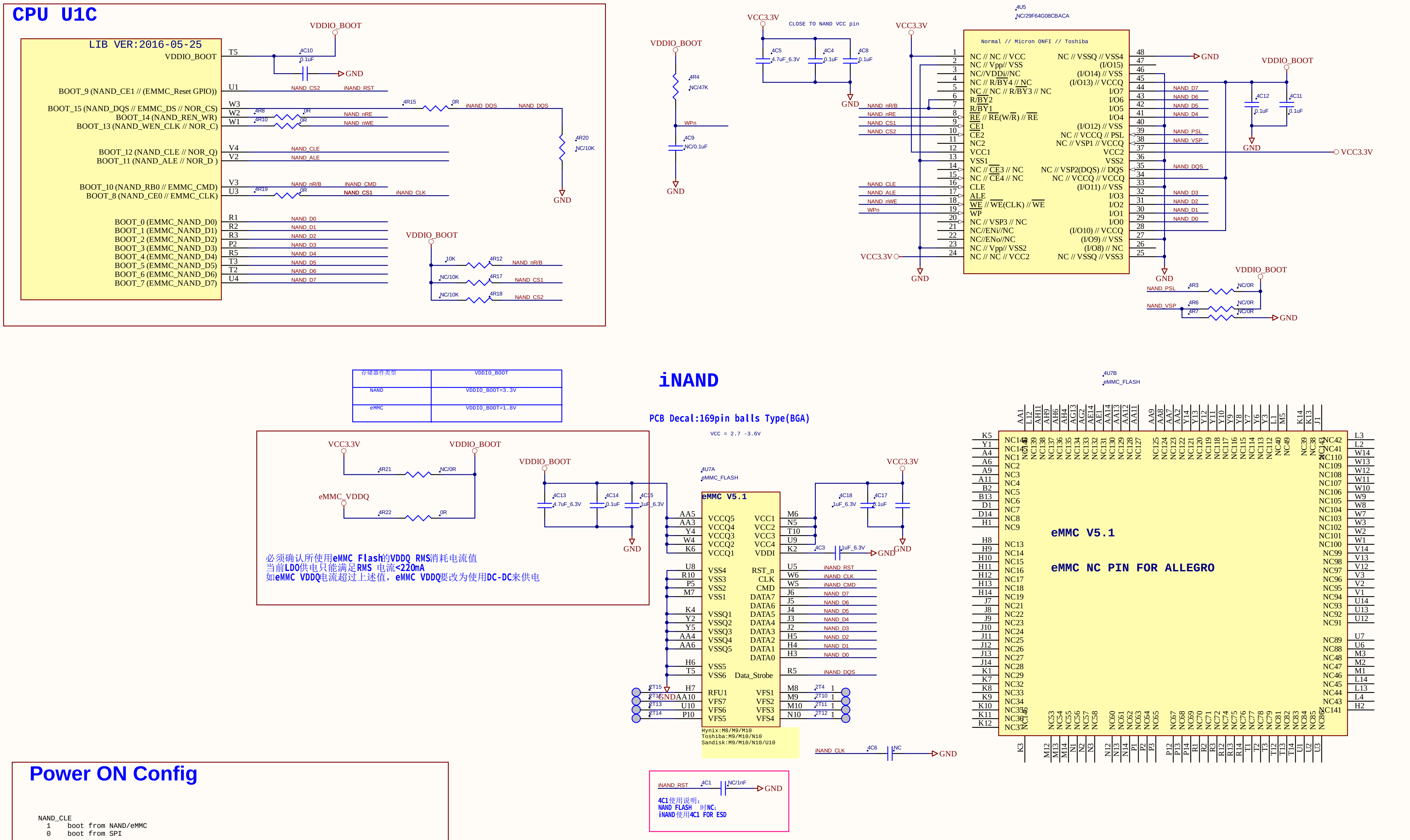








适合**4PCS DDR3** 放在正反面的**4**层板**PCB Layout**
若需要其他类型**PCB Layout**，原理图需要更改
请向**Amlogic**咨询



存储器件类型	VDDIO_BOOT
NAND	VDDIO_BOOT=3.3V
eMMC	VDDIO_BOOT=1.8V

Power ON Config

NAND_CLE
1 boot from NAND/eMMC
0 boot from SPI

Amlogic	MBX
Document Number	S905D_MBX_REF_P231
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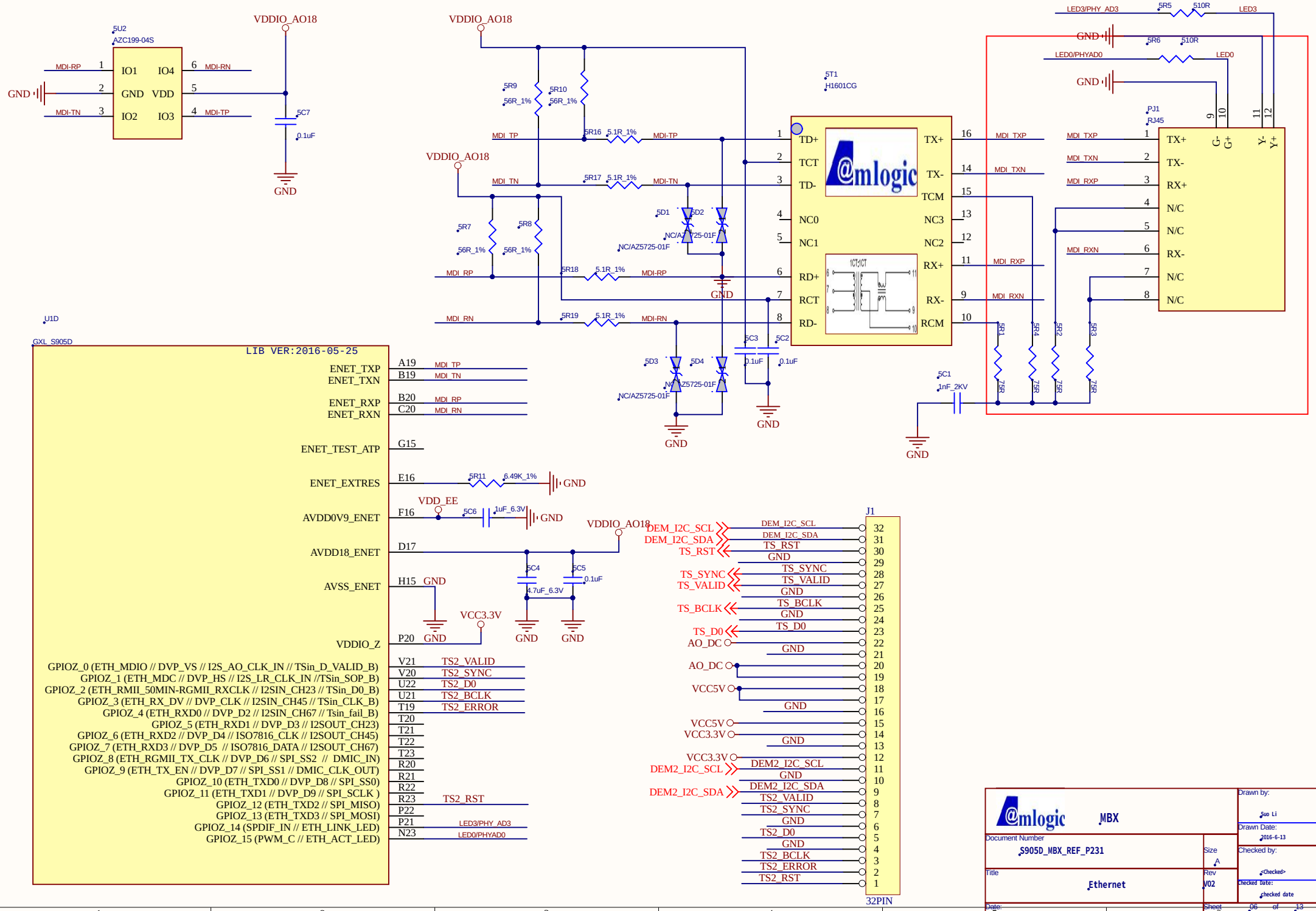
5U2
AZC199-04S
MDI-RP
MDI-TN
MDI-RN
MDI-TP
IO1
IO4
GND
VDD
IO2
IO3
VDDIO_AO18
GND
5C7
0.1uF
5T1
H1601CG
5R9
5R10
56R_1%
5R16
5.1R_1%
5R17
5R18
5R19
5R7
5R8
5D1
5D2
5D3
5D4
NC/AZ5725-01F
5C3
5C2
TD+
TCT
TD-
NC0
NC1
RD+
RCT
RD-
TX+
TX-
TCM
NC3
NC2
RX+
RX-
RCM
1CT:1CT
5R1
5R4
5R2
5R3
75R
5C1
1nF_2KV
LED3/PHY_AD3
5R5
510R
LED3
5R6
LED0/PHYAD0
LED0
PJ1
RJ45
G-
G+
Y-
Y+
N/C
U1D
GXL_S905D
LIB VER:2016-05-25
ENET_TXP
ENET_TXN
ENET_RXP
ENET_RXN
ENET_TEST_ATP
ENET_EXTRES
AVDD0V9_ENET
AVDD18_ENET
AVSS_ENET
VDDIO_Z
5R11
6.49K_1%
VDD_EE
5C6
1uF_6.3V
5C4
5C5
4.7uF_6.3V
VCC3.3V
GPIOZ_0 (ETH_MDIO // DVP_VS // I2S_AO_CLK_IN // TSin_D_VALID_B)
GPIOZ_1 (ETH_MDC // DVP_HS // I2S_LR_CLK_IN //TSin_SOP_B)
GPIOZ_2 (ETH_RMII_50MIN-RGMII_RXCLK // I2SIN_CH23 // TSin_D0_B)
GPIOZ_3 (ETH_RX_DV // DVP_CLK // I2SIN_CH45 // TSin_CLK_B)
GPIOZ_4 (ETH_RXD0 // DVP_D2 // I2SIN_CH67 // Tsin_fail_B)
GPIOZ_5 (ETH_RXD1 // DVP_D3 // I2SOUT_CH23)
GPIOZ_6 (ETH_RXD2 // DVP_D4 // ISO7816_CLK // I2SOUT_CH45)
GPIOZ_7 (ETH_RXD3 // DVP_D5 // ISO7816_DATA // I2SOUT_CH67)
GPIOZ_8 (ETH_RGMII_TX_CLK // DVP_D6 // SPI_SS2 // DMIC_IN)
GPIOZ_9 (ETH_TX_EN // DVP_D7 // SPI_SS1 // DMIC_CLK_OUT)
GPIOZ_10 (ETH_TXD0 // DVP_D8 // SPI_SS0)
GPIOZ_11 (ETH_TXD1 // DVP_D9 // SPI_SCLK)
GPIOZ_12 (ETH_TXD2 // SPI_MISO)
GPIOZ_13 (ETH_TXD3 // SPI_MOSI)
GPIOZ_14 (SPDIF_IN // ETH_LINK_LED)
GPIOZ_15 (PWM_C // ETH_ACT_LED)
TS2_VALID
TS2_SYNC
TS2_D0
TS2_BCLK
TS2_ERROR
TS2_RST
LED3/PHY_AD3
LED0/PHYAD0
J1
DEM_I2C_SCL
DEM_I2C_SDA
TS_RST
TS_SYNC
TS_VALID
TS_BCLK
TS_D0
AO_DC
VCC5V
DEM2_I2C_SCL
DEM2_I2C_SDA
32PIN
@mlogic
MBX
Document Number
S905D_MBX_REF_P231
Title
Ethernet
Size
A
Rev
V02
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CPU U1E

Card Power

LIB VER:2016-05-25

AVDD33_USB_C
AVDD33_USB
AVDD18_USB_C
AVDD18_USB
USBOTG_B_VBUS
USBOTG_B_DM
USBOTG_B_DP
USBOTG_B_ID
USBB_TXRTUNE
USBA_VBUS
USBHOST_A_DM
USBHOST_A_DP
USBA_TXRTUNE

USB_C is only available in S912
Not available in S905D

USBHOST_C_DM
USBHOST_C_DP
USBC_TXRTUNE

DVSS115
DVSS116
DVSS158
DVSS159

VDDIO_CARD

CARD_1 (SDCARD_D0 // JTAG_TDO)
CARD_0 (SDCARD_D1 // JTAG_TDI)
CARD_5 (SDCARD_D2 // UART_RX_AO_A)
CARD_4 (SDCARD_D3 // UART_TX_AO_A)
CARD_2 (SDCARD_CLK // JTAG_CLK)
CARD_3 (SDCARD_CMD // JTAG_TMS)
CARD_6

SD card

靠近卡座

Close to CPU

Close to SD CARD

CA_PWRENJ
CA_PRE
CA_RST
CA_CLK
CA_DATA

CAS用常开

U2
AU6268-JES

Update Button

close to CPU

Near the chip side.

HEADER_4_2.54mm
HEADER_4_2.54mm

Company	@mlogic
Project	MBX
Document Number	S905D_MBX_REF_P231
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AP6181/RTL8189ETV WIFI ONLY
AP6212/RTL8723BS WIFI+BT
AP6330 WIFI+BT+FM
AP6335/6255 WIFI+BT+FM (SDIO 3.0)
QCA9377 WIFI+BT (SDIO 3.0)

NOTE:
AP6335/6255 OSC use 37.4MHZ
Others AMPAK OSC use 26MH
RTL WIFI/QCA9377 OSC NC

NC 7R7 FOR QCA9377

50 ohm impedance RF trace

WiFi ANT

AMPAK WIFI: 7R4 0R,7R1 NC
RTL WIFI: 7R4 NC,7R1 0R

LIB VER:2016-05-25

Close to WIFI PIN 9

Close to CPU

NC FOR
RTL WIFI
QCA9377

AP6181/6212/6330/6255:
7R13 NC
AP6335:
7R13上件

Document Number	S905D_MBX_REF_P231
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Checked date	Checked date
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HDMI output

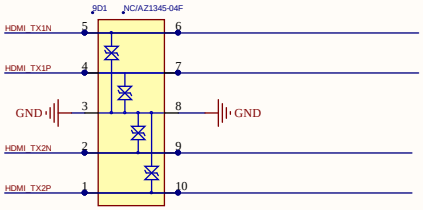
CPU U1G

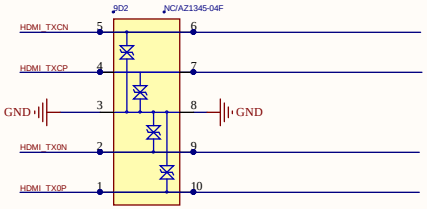
LIB VER:2016-05-25

AVDD18_HPLL — J20 — VDDIO_AO18 — 9C3 1uF_6.3V
HPLL_CEXT — K18 HPLL_CEXT — 9C5 1uF_6.3V
AVSS_HPLL — K19 — GND
VDDIO_H — N20 — VCC3.3V
GPIOH_0 (HDMI_HPD_OD 5V) — F23 HDMI_HPD
GPIOH_1 (HDMI_SDA_OD 5V) — E21 HDMI_SDA
GPIOH_2 (HDMI_SCL_OD 5V) — F22 HDMI_SCL
GPIOH_3 (GPIO_OD 5V) — F22 — HDMI_5V_EN
GPIOH_4 (SPDIF_OUT // SPDIF_IN) — M22 — SPDIF
GPIOH_5 — M19 — MUTE
GPIOH_6 (JTAG_TCK // I2S_AM_CLK) — M21 — TCK
GPIOH_7 (JTAG_TMS // I2S_AO_CLK_OUT) — M23 — TMS
GPIOH_8 (JTAG_TDI // I2S_LR_CLK_OUT) — N21 — TDI
GPIOH_9 (JTAG_TDO // I2SOUT_CH01) — N22 — TDO
VDD_EE
AVDD0V9_HDMITX1 — G19 — 9C17 1uF_6.3V — GND
AVDD0V9_HDMITX2 — H20
9C17 Close to PIN G19
AVDD33_HDMITX — F20 — AVDD33_HDMI — 9C6 0.1uF — GND
AVDD18_HDMITX — J19 — VDDIO_AO18 — 9C9 1uF_6.3V
HDMI_CEXT — H19
HDMI_REXT — D20 — 9R4 1K_1% — GND
AVSS_HDMITX1 — A21
AVSS_HDMITX2 — B23
AVSS_HDMITX3 — D21 — GND
AVSS_HDMITX4 — G20
AVSS_HDMITX5 — H18 — GND
HDMITX_CKP — D23 HDMI_TXCP
HDMITX_CKN — D22 HDMI_TXCN
HDMITX_0P — C22 HDMI_TX0P
HDMITX_0N — C23 HDMI_TX0N
HDMITX_1P — A23 HDMI_TX1P
HDMITX_1N — B22 HDMI_TX1N
HDMITX_2P — B21 HDMI_TX2P
HDMITX_2N — A22 HDMI_TX2N
AVDD18_CVBS — L19 — VDDIO_AO18 — 9C7 1uF_6.3V — 9C1 1uF_6.3V — 9C11 1uF_6.3V
CVBS_COMP — K20 CVBS_COMP
CVBS_VREF — K21 — 9C2 0.1uF
CVBS_RSET — L21 — 9R5 562R_1% — 9R19 75R_1% — GND
CVBS_IOUT — L22 — CVBS — GND
AVSS_CVBS — L20 — GND
CVBS Tracy >10mils Close to CPU PIN

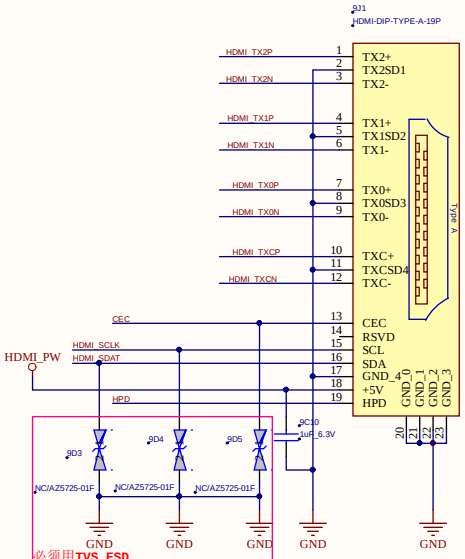
CVBS1.8V滤波电容9C1、Rset 9R5、Vref 9C2、75R 9R19 要单点接地，相互连线尽量短并要直连，GND不能形成单点接地或直连的放到Top层，不放Bottom层，缩短连接到L2 GND的平面路径；
同CPU CVBS AVSS PIN尽可能做到单点连接，连接最短；
VDD_EE电源平面须避开CVBS模块区域

Layout 重叠

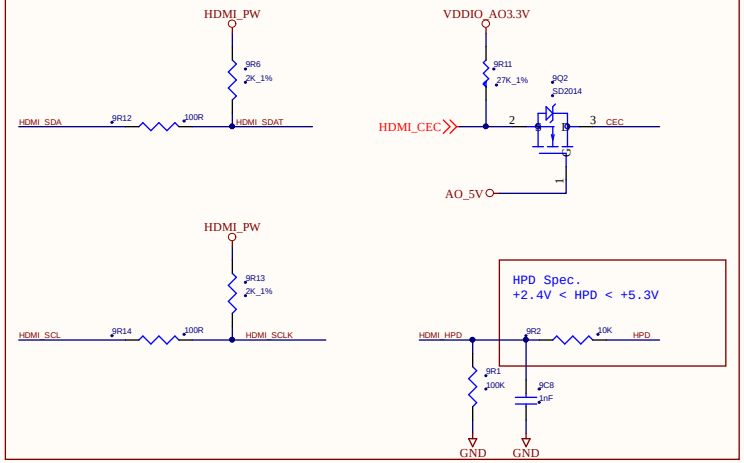


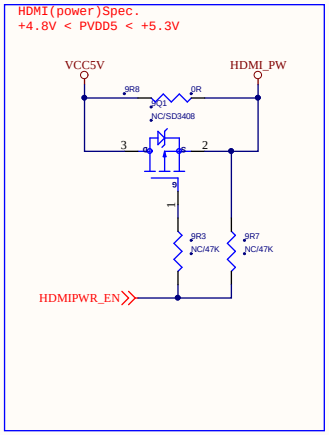


Type A



9Q2防倒灌电路、9R2/9R1分压电路不可删除





Amlogic	MBX
Document Number	S905D_MBX_REF_P231
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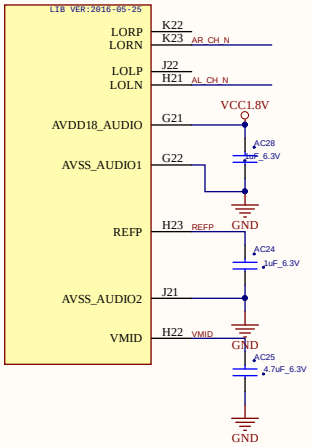
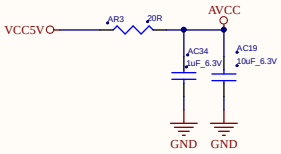
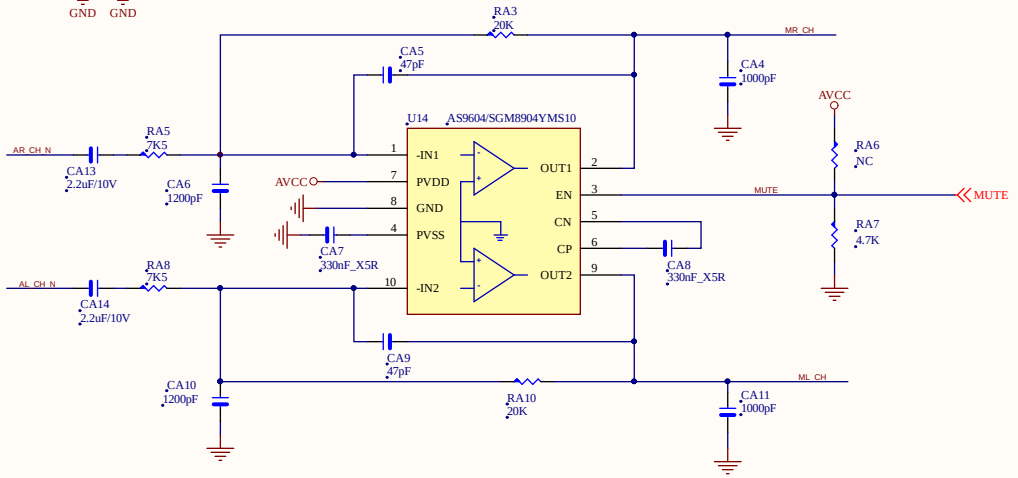
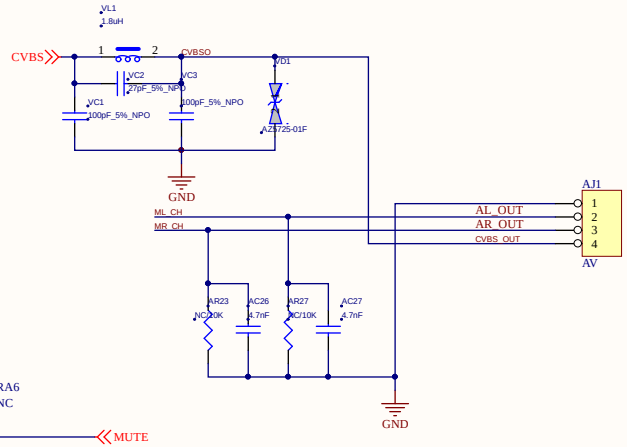
Audio Analog output

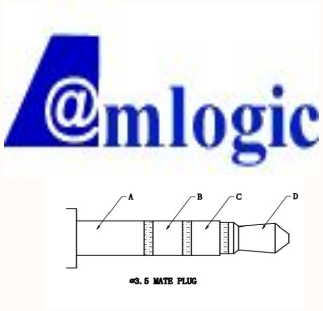
2Vrms to 3Vrms
Adjustable Gain



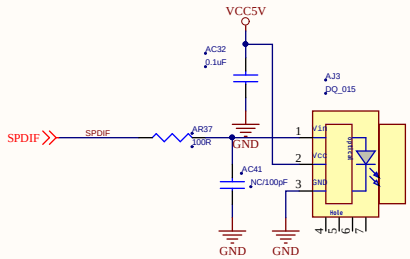








Optical output



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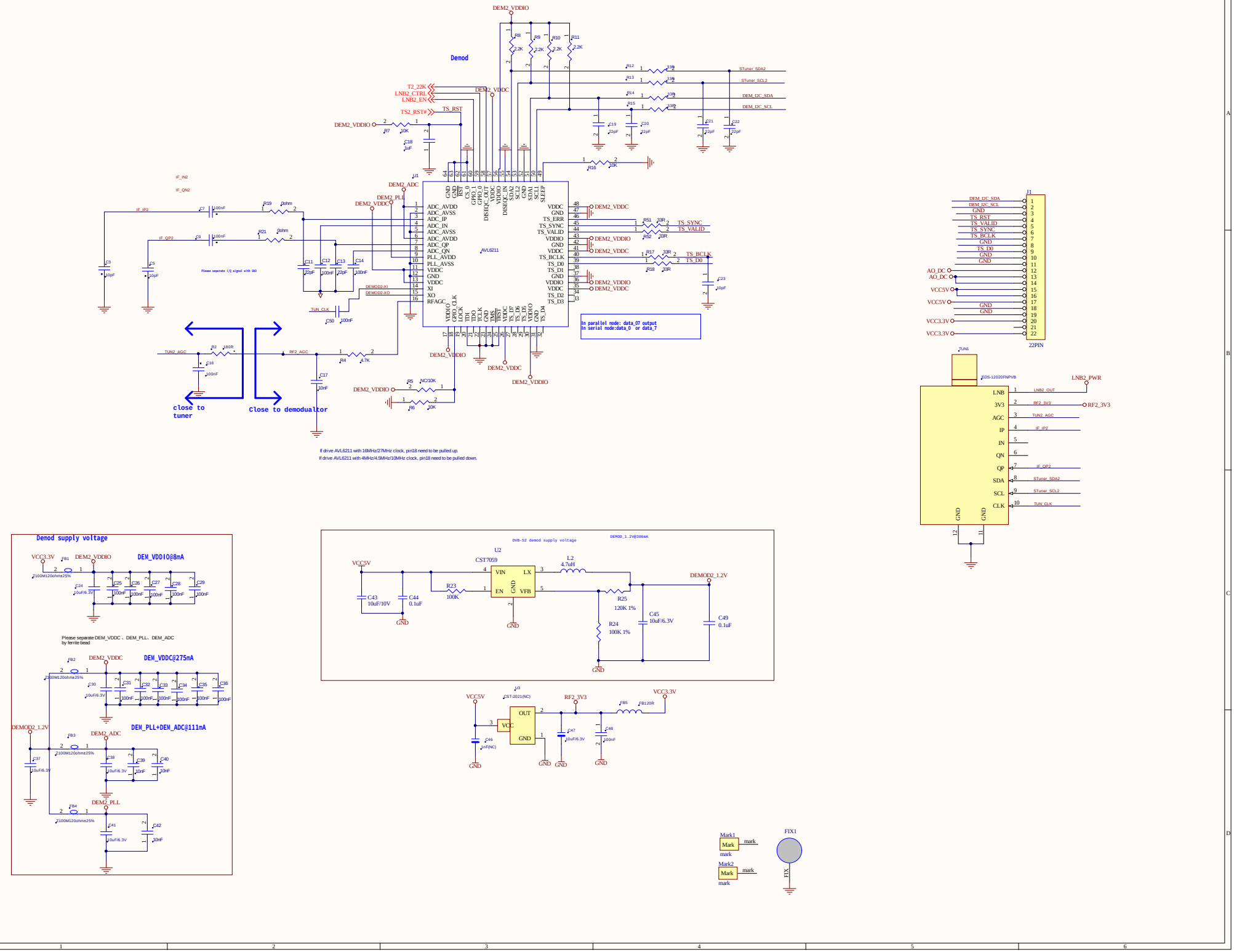
Title: Audio	Size: A	Checked by: <Checked>	
	Rev: V02	Checked Date: <checked date>	
Date:	Sheet: 10 of 13		


Demod
DEM2_VDDIO
DEM2_VDDC
DEM2_ADC
DEM2_PLL
AVL6211
T2_22K
LNB2_CTRL
LNB2_EN
TS2_RST#
TS_RST
STuner_SDA2
STuner_SCL2
DEM_I2C_SDA
DEM_I2C_SCL
IF_IN2
IF_QN2
IF_IP2
IF_QP2
TUN_CLK
TUN2_AGC
RF2_AGC
DEMOD2-XI
DEMOD2-XO
TS_SYNC
TS_VALID
TS_BCLK
TS_D0
close to tuner
Close to demodualtor
In parallel mode: data_07 output
In serial mode:data_0 or data_7
If drive AVL6211 with 16MHz/27MHz clock, pin18 need to be pulled up.
If drive AVL6211 with 4MHz/4.5MHz/10MHz clock, pin18 need to be pulled down.
J1
22PIN
TUN1
EDS-12020FNPVB
LNB2_PWR
RF2_3V3
Demod supply voltage
DEM_VDDIO@8mA
DEM_VDDC@275mA
DEM_PLL+DEM_ADC@111mA
Please separate DEM_VDDC 、DEM_PLL、DEM_ADC by ferrite bead
DVB-S2 demod supply voltage
DEMOD_1.2V@386mA
CST7059
DEMOD2_1.2V
CST-2021(NC)
VCC3.3V
VCC5V
Mark1
Mark2
FIX1

LNB1 Power and DisEqC