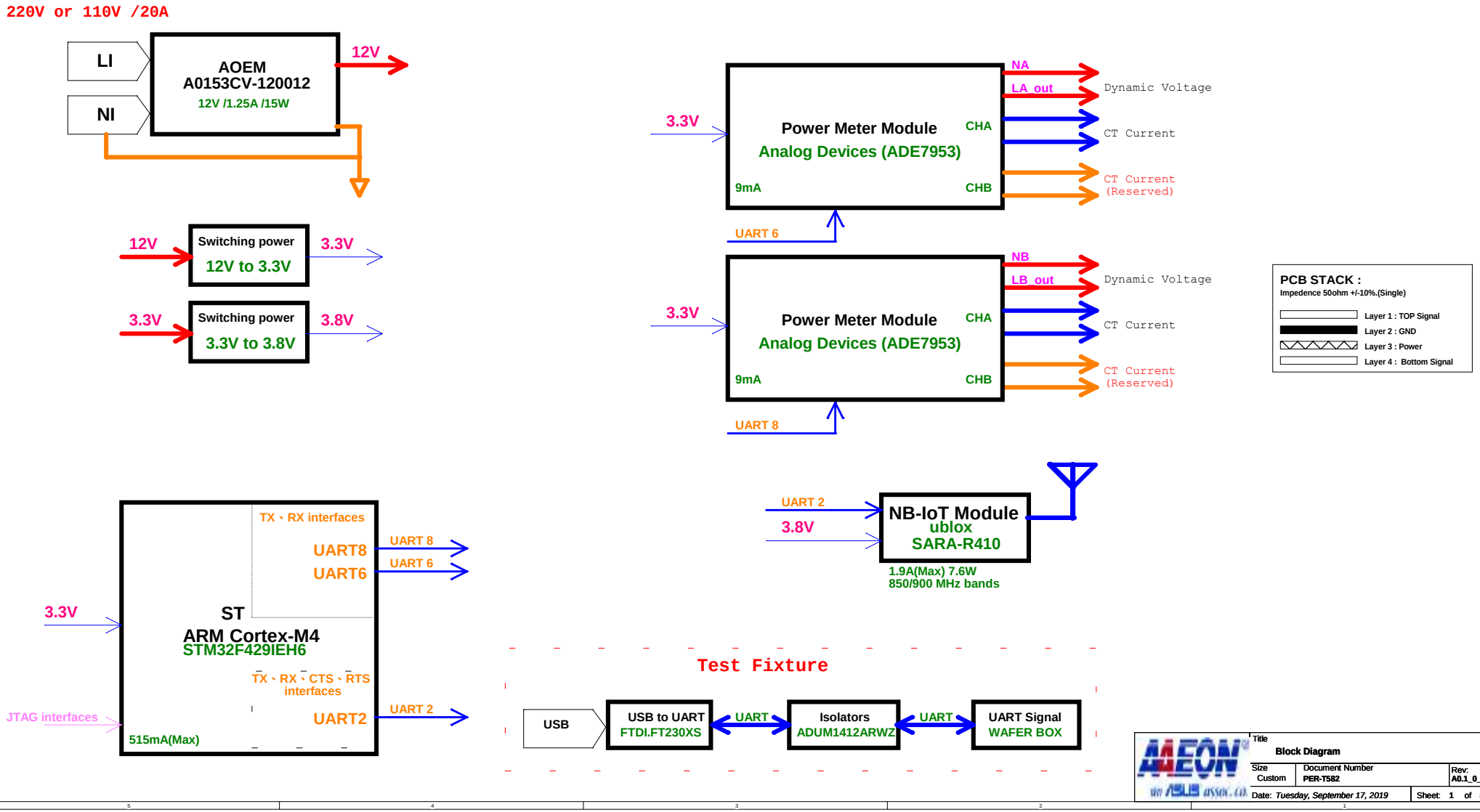
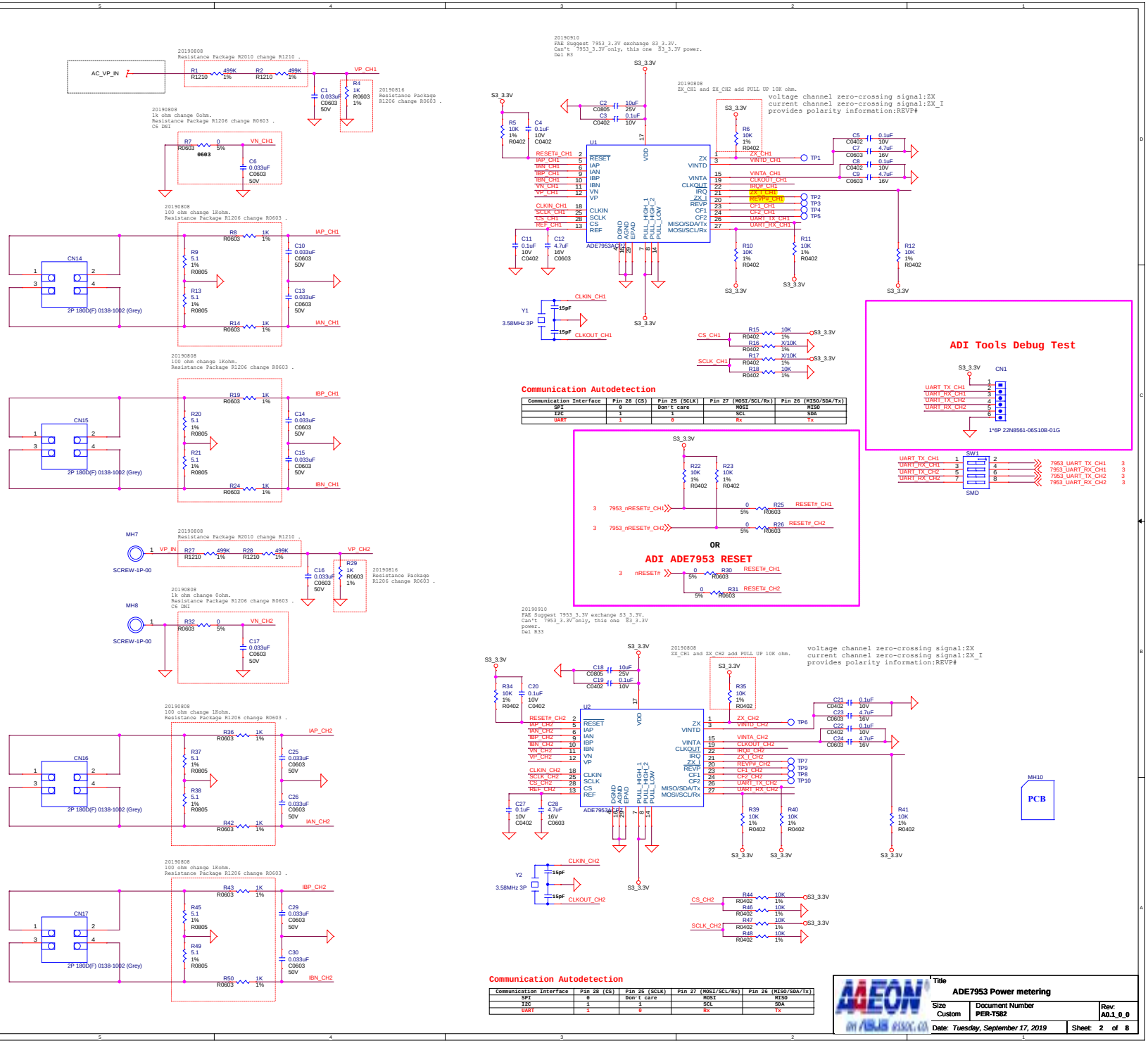
The Power Meter for AC Meter Block Diagram

Project Number : N160201

CHA:Over a dynamic range of 3000:1 PGA=22
CHB:Over a dynamic range of 1000:1 PGA=16



Title: Block Diagram			
Size: Custom	Document Number: PER-T582		Rev: A0.1_0_0
Date: Tuesday, September 17, 2019		Sheet: 1 of 8	


20190808
Resistance Package R2010 change R1210 .
AC_VP_IN
R1 R1210 499K 1%
R2 R1210 499K 1%
VP_CH1
C1 0.033uF C0603 50V
R4 1K R0603 1%
20190816
Resistance Package R1206 change R0603 .
20190808
1k ohm change 0ohm.
Resistance Package R1206 change R0603 .
C6 DNI
R7 R0603 0 5%
0603
VN_CH1
C6 0.033uF C0603 50V
20190808
100 ohm change 1Kohm.
Resistance Package R1206 change R0603 .
CN14
2P 180D(F) 0138-1002 (Grey)
R8 R0603 1K 1%
R9 5.1 1% R0805
R13 5.1 1% R0805
R14 R0603 1K 1%
IAP_CH1
IAN_CH1
C10 0.033uF C0603 50V
C13 0.033uF C0603 50V
20190808
100 ohm change 1Kohm.
Resistance Package R1206 change R0603 .
CN15
2P 180D(F) 0138-1002 (Grey)
R19 R0603 1K 1%
R20 5.1 1% R0805
R21 5.1 1% R0805
R24 R0603 1K 1%
IBP_CH1
IBN_CH1
C14 0.033uF C0603 50V
C15 0.033uF C0603 50V
MH7
SCREW-1P-00
VP_IN
20190808
Resistance Package R2010 change R1210 .
R27 R1210 499K 1%
R28 R1210 499K 1%
VP_CH2
C16 0.033uF C0603 50V
R29 1K R0603 1%
20190816
Resistance Package R1206 change R0603 .
MH8
SCREW-1P-00
20190808
1k ohm change 0ohm.
Resistance Package R1206 change R0603 .
C6 DNI
R32 R0603 0 5%
VN_CH2
C17 0.033uF C0603 50V
20190808
100 ohm change 1Kohm.
Resistance Package R1206 change R0603 .
CN16
2P 180D(F) 0138-1002 (Grey)
R36 R0603 1K 1%
R37 5.1 1% R0805
R38 5.1 1% R0805
R42 R0603 1K 1%
IAP_CH2
IAN_CH2
C25 0.033uF C0603 50V
C26 0.033uF C0603 50V
20190808
100 ohm change 1Kohm.
Resistance Package R1206 change R0603 .
CN17
2P 180D(F) 0138-1002 (Grey)
R43 R0603 1K 1%
R45 5.1 1% R0805
R49 5.1 1% R0805
R50 R0603 1K 1%
IBP_CH2
IBN_CH2
C29 0.033uF C0603 50V
C30 0.033uF C0603 50V
20190910
FAE Suggest 7953_3.3V exchange S3_3.3V.
Can't 7953_3.3V only, this one S3_3.3V power.
Del R3
S3_3.3V
C2 10uF C0805 25V
C3 0.1uF C0402 10V
C4 0.1uF 10V C0402
R5 10K 1% R0402
20190808
ZX_CH1 and ZX_CH2 add PULL UP 10K ohm.
voltage channel zero-crossing signal:ZX
current channel zero-crossing signal:ZX_I
provides polarity information:REVP#
U1
ADE7953ACPZ
RESET
IAP
IAN
IBP
IBN
VN
VP
CLKIN
SCLK
CS
REF
VDD
ZX
VINTD
VINTA
CLKOUT
IRQ
ZX_I
REVP
CF1
CF2
MISO/SDA/Tx
MOSI/SCL/Rx
DGND
AGND
EPAD
PULL_HIGH_1
PULL_HIGH_2
PULL_LOW
RESET# CH1
IAP_CH1
IAN_CH1
IBP_CH1
IBN_CH1
VN_CH1
VP_CH1
CLKIN_CH1
SCLK_CH1
CS_CH1
REF_CH1
VINTD_CH1
VINTA_CH1
CLKOUT_CH1
IRQ#_CH1
ZX_CH1
REVP#_CH1
CF1_CH1
CF2_CH1
UART_TX_CH1
UART_RX_CH1
TP1
TP2
TP3
TP4
TP5
C5 C0402 0.1uF 10V
C7 C0603 4.7uF 16V
C8 C0402 0.1uF 10V
C9 C0603 4.7uF 16V
C11 0.1uF 10V C0402
C12 4.7uF 16V C0603
R6 10K 1% R0402
R10 10K 1% R0402
R11 10K 1% R0402
R12 10K 1% R0402
Y1
3.58MHz 3P
15pF
CLKIN_CH1
CLKOUT_CH1
CS_CH1
SCLK_CH1
R15 10K 1% R0402
R16 X/10K 1% R0402
R17 X/10K 1% R0402
R18 10K 1% R0402
Communication Autodetection
Communication Interface | Pin 28 (CS) | Pin 25 (SCLK) | Pin 27 (MOSI/SCL/Rx) | Pin 26 (MISO/SDA/Tx)
SPI | 0 | Don't care | MOSI | MISO
I2C | 1 | 1 | SCL | SDA
UART | 1 | 0 | Rx | Tx
ADI Tools Debug Test
CN1
UART_TX_CH1
UART_RX_CH1
UART_TX_CH2
UART_RX_CH2
1*6P 22N8561-06S10B-01G
SW1
SMD
7953_UART_TX_CH1
7953_UART_RX_CH1
7953_UART_TX_CH2
7953_UART_RX_CH2
R22 10K 1% R0402
R23 10K 1% R0402
7953_nRESET#_CH1
7953_nRESET#_CH2
R25 0 5% R0603
R26 0 5% R0603
RESET#_CH1
RESET#_CH2
OR
ADI ADE7953 RESET
nRESET#
R30 0 5% R0603
R31 0 5% R0603
20190910
FAE Suggest 7953_3.3V exchange S3_3.3V.
Can't 7953_3.3V only, this one S3_3.3V power.
Del R33
U2
ADE7953ACPZ
C18 10uF C0805 25V
C19 0.1uF C0402 10V
C20 0.1uF 10V C0402
R34 10K 1% R0402
R35 10K 1% R0402
C21 C0402 0.1uF 10V
C23 C0603 4.7uF 16V
C22 C0402 0.1uF 10V
C24 C0603 4.7uF 16V
C27 0.1uF 10V C0402
C28 4.7uF 16V C0603
R39 10K 1% R0402
R40 10K 1% R0402
R41 10K 1% R0402
Y2
3.58MHz 3P
CLKIN_CH2
CLKOUT_CH2
CS_CH2
SCLK_CH2
R44 10K 1% R0402
R46 10K 1% R0402
R47 10K 1% R0402
R48 10K 1% R0402
MH10
PCB
Communication Autodetection
Communication Interface | Pin 28 (CS) | Pin 25 (SCLK) | Pin 27 (MOSI/SCL/Rx) | Pin 26 (MISO/SDA/Tx)
SPI | 0 | Don't care | MOSI | MISO
I2C | 1 | 1 | SCL | SDA
UART | 1 | 0 | Rx | Tx
AAEON
Title
ADE7953 Power metering
Size Custom
Document Number PER-T582
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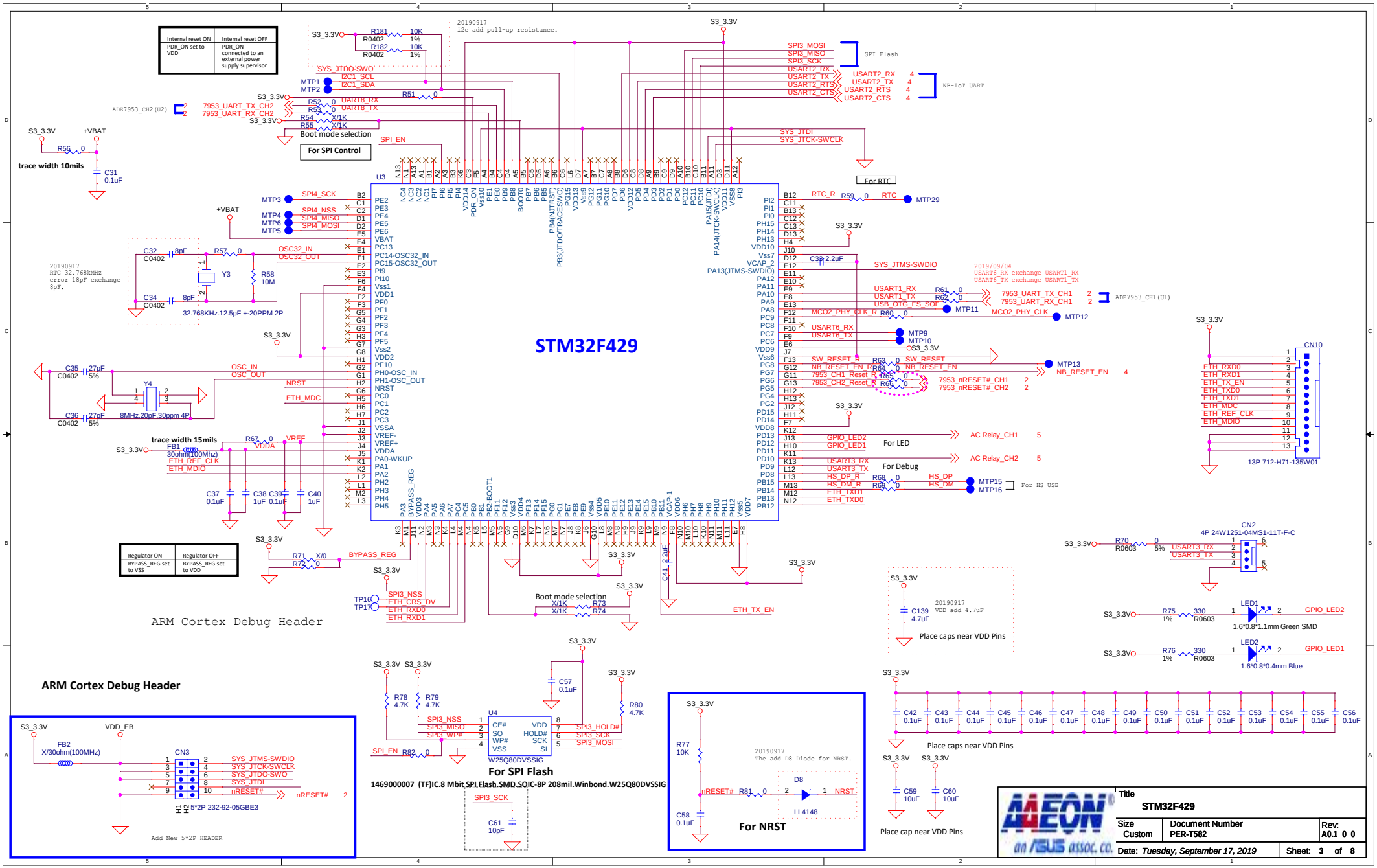
STM32F429
U3
Internal reset ON
PDR_ON set to VDD
Internal reset OFF
PDR_ON connected to an external power supply supervisor
20190917
i2c add pull-up resistance.
SYS_JTDO-SWO
I2C1_SCL
I2C1_SDA
UART8_RX
UART8_TX
Boot mode selection
For SPI Control
SPI_EN
SPI Flash
NB-IoT UART
SYS_JTDI
SYS_JTCK-SWCLK
For RTC
RTC_R
RTC
MTP29
SYS_JTMS-SWDIO
2019/09/04
USART6_RX exchange USART1_RX
USART6_TX exchange USART1_TX
USART1_RX
USART1_TX
USB_OTG_FS_SOF
MTP11
MCO2_PHY_CLK_R
MCO2_PHY_CLK
MTP12
MTP9
MTP10
SW_RESET
NB_RESET_EN
MTP13
7953_CH1_Reset_R
7953_CH2_Reset_R
7953_nRESET#_CH1
7953_nRESET#_CH2
For LED
For Debug
GPIO_LED2
GPIO_LED1
AC Relay_CH1
AC Relay_CH2
USART3_RX
USART3_TX
HS_DP_R
HS_DM_R
HS_DP
HS_DM
MTP15
MTP16
For HS USB
ETH_TXD1
ETH_TXD0
ETH_TX_EN
ETH_RXD1
ETH_RXD0
ETH_MDIO
ETH_MDC
ETH_REF_CLK
ETH_CRS_DV
ETH_RXD0
ETH_RXD1
ETH_TX_EN
CN10
13P 712-H71-135W01
CN2
4P 24W1251-04MS1-11T-F-C
LED1
1.6*0.8*1.1mm Green SMD
LED2
1.6*0.8*0.4mm Blue
20190917
VDD add 4.7uF
Place caps near VDD Pins
Place caps near VDD Pins
Place cap near VDD Pins
20190917
RTC 32.768kMHz error 18pF exchange 8pF.
32.768KHz.12.5pF +-20PPM 2P
OSC_IN
OSC_OUT
8MHz.20pF.30ppm 4P
trace width 10mils
trace width 15mils
FB1
30ohm(100Mhz)
FB2
X/30ohm(100MHz)
Regulator ON
BYPASS_REG set to VSS
Regulator OFF
BYPASS_REG set to VDD
BYPASS_REG
ARM Cortex Debug Header
ARM Cortex Debug Header
CN3
Add New 5*2P HEADER
H1 H2 5*2P 232-92-05GBE3
U4
W25Q80DVSSIG
For SPI Flash
1469000007 (TF)IC.8 Mbit SPI Flash.SMD.SOIC-8P 208mil.Winbond.W25Q80DVSSIG
20190917
The add D8 Diode for NRST.
For NRST
D8
LL4148
Title
STM32F429
Size
Custom
Document Number
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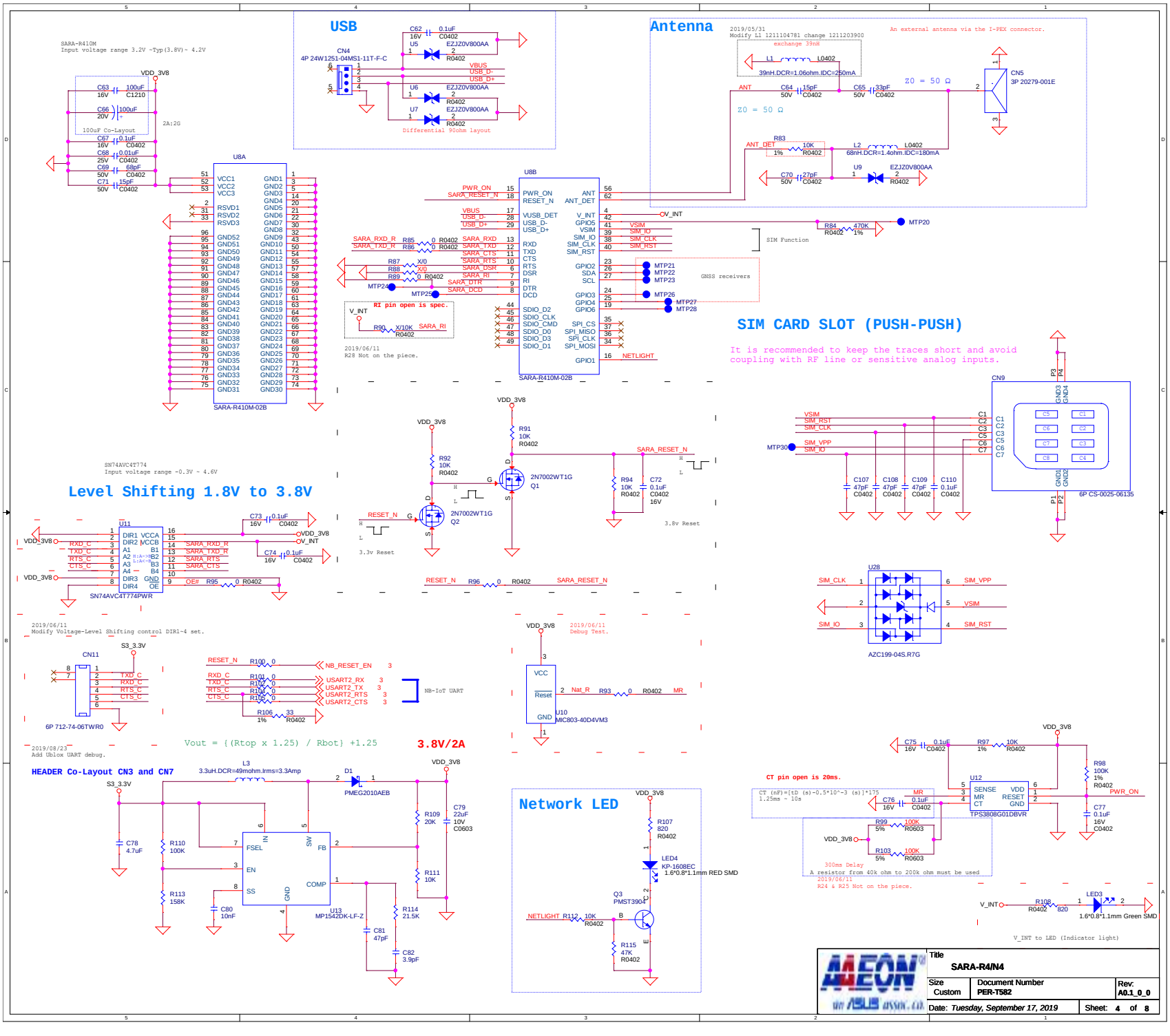
USB
Antenna
SIM CARD SLOT (PUSH-PUSH)
Level Shifting 1.8V to 3.8V
Network LED
HEADER Co-Layout CN3 and CN7
3.8V/2A
SARA-R410M-02B
SARA-R410M-02B
SN74AVC4T774PWR
6P 712-74-06TWR0
CN4
4P 24W1251-04MS1-11T-F-C
CN5
3P 20279-001E
CN9
6P CS-0025-06135
U28
AZC199-04S.R7G
U12
TPS3808G01DBVR
U10
MIC803-40D4VM3
U13
MP1542DK-LF-Z
Q1
2N7002WT1G
Q2
2N7002WT1G
Q3
PMST3904
LED4
KP-1608EC
1.6*0.8*1.1mm RED SMD
LED3
1.6*0.8*1.1mm Green SMD
D1
PMEG2010AEB
L3
3.3uH.DCR=49mohm.Irms=3.3Amp
L1
L0402
39nH.DCR=1.06ohm.IDC=250mA
L2
L0402
68nH.DCR=1.4ohm.IDC=180mA
SIM Function
GNSS receivers
NB-IoT UART
Differential 90ohm layout
An external antenna via the I-PEX connector.
Z0 = 50 Ω
Vout = {(Rtop x 1.25) / Rbot} +1.25
CT pin open is 20ms.
300ms Delay
A resistor from 40k ohm to 200k ohm must be used
V_INT to LED (Indicator light)
RI pin open is spec.
3.8v Reset
3.3v Reset
Title
SARA-R4/N4
Size
Custom
Document Number
PER-T582
Rev:
A0.1_0_0
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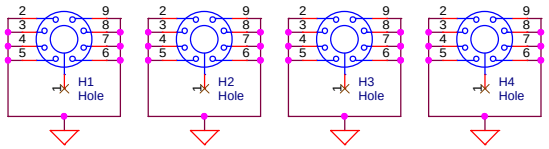
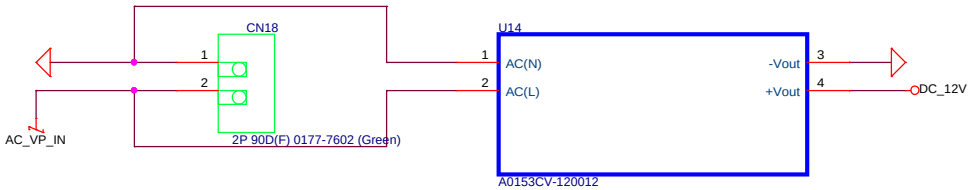
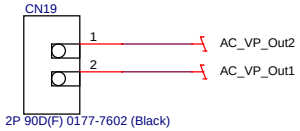
Mounting Holes

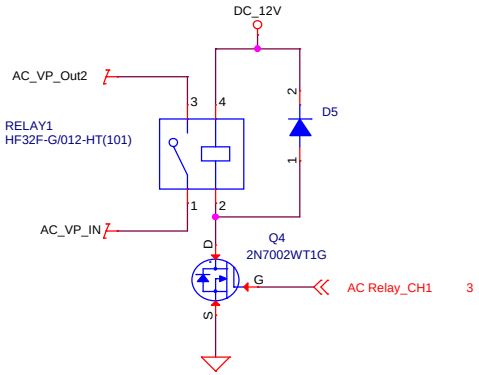


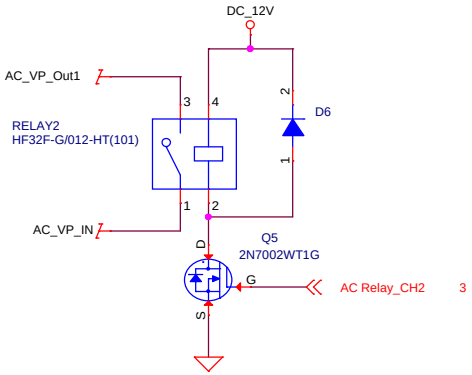
AC Power 220V / 25A



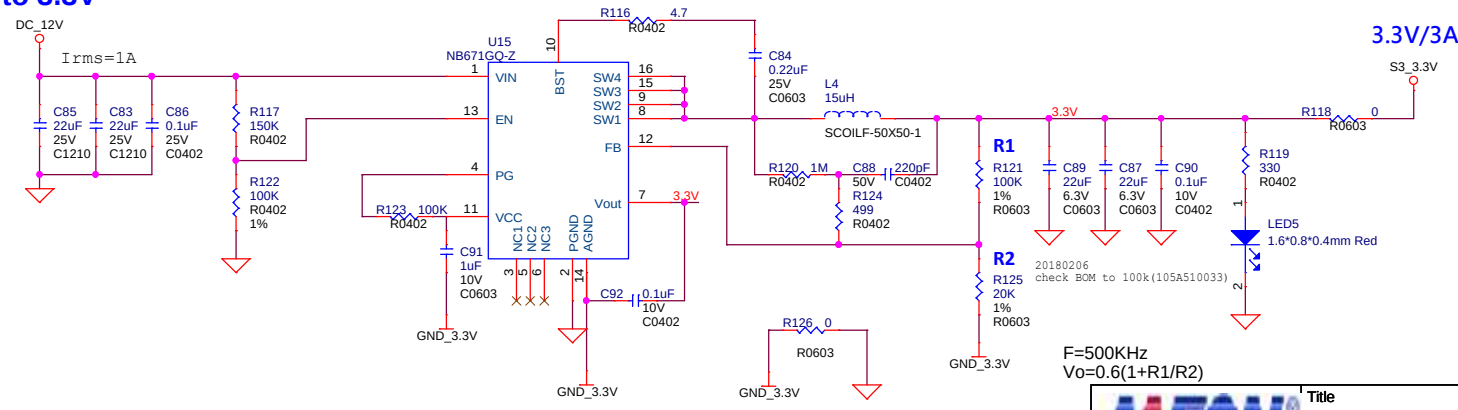
AC/DC.100-230VAC.0.2A.12VDC/1.25A.15W







12V to 3.3V



Title: **AC Power / DC 3.3V**		
Size: **B**	Document Number: **PER-T582**	Rev: **A0.1_0_0**
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Version	Change Item Description	Page
A0.1	AC Power & AC Power Meter & Sub-1G design all PCB.	
A0.2	Modify AtechOEM design AC 110V~220V Power to DC 12V.	P05
	Modify add GPS module QUECTEL.L76-M33.	P06
	Modify dimming control apply Jumper change one features DALI and 1~10V.	P05
	Modify Light Sensor board A0.1 90D exchange A0.2 is on board.	P02
A0.3	Modify CN2 add NB-IOT moudel power 4V ange Gateway 12V is Jumper change voltage.	P02
	Modify Sub-1G TI CC1310 exchange stamp hole moudel.	P03
	Modify add GPS module QUECTEL.L76-M33 change GPS_L80-R modules.	P03
	Modify SLC-001 DC power changed 24V~12V to 3.3V for Sub-1G mode and 24V~12V to 4V for NB-iot.	P05
	Modify SLC-001 CN8 for AtechOEM design AC 110V~220V Power and AC power meter signal.	P05
	Modify SLC-001 NEMA controller board use cable.	P06
A0.4	Modify everlight required add RTC for NB-iot & G-sensor features.	P07
A0.5	20180717 modify Add pull up (R165) 10K for SQW/INT.	P07

Version		Page
A1.1		

AAEON an ASUS assoc. co.

Title: **Revision History**		
Size: B	Document Number: SLC Series	Rev: A0.5_0_0
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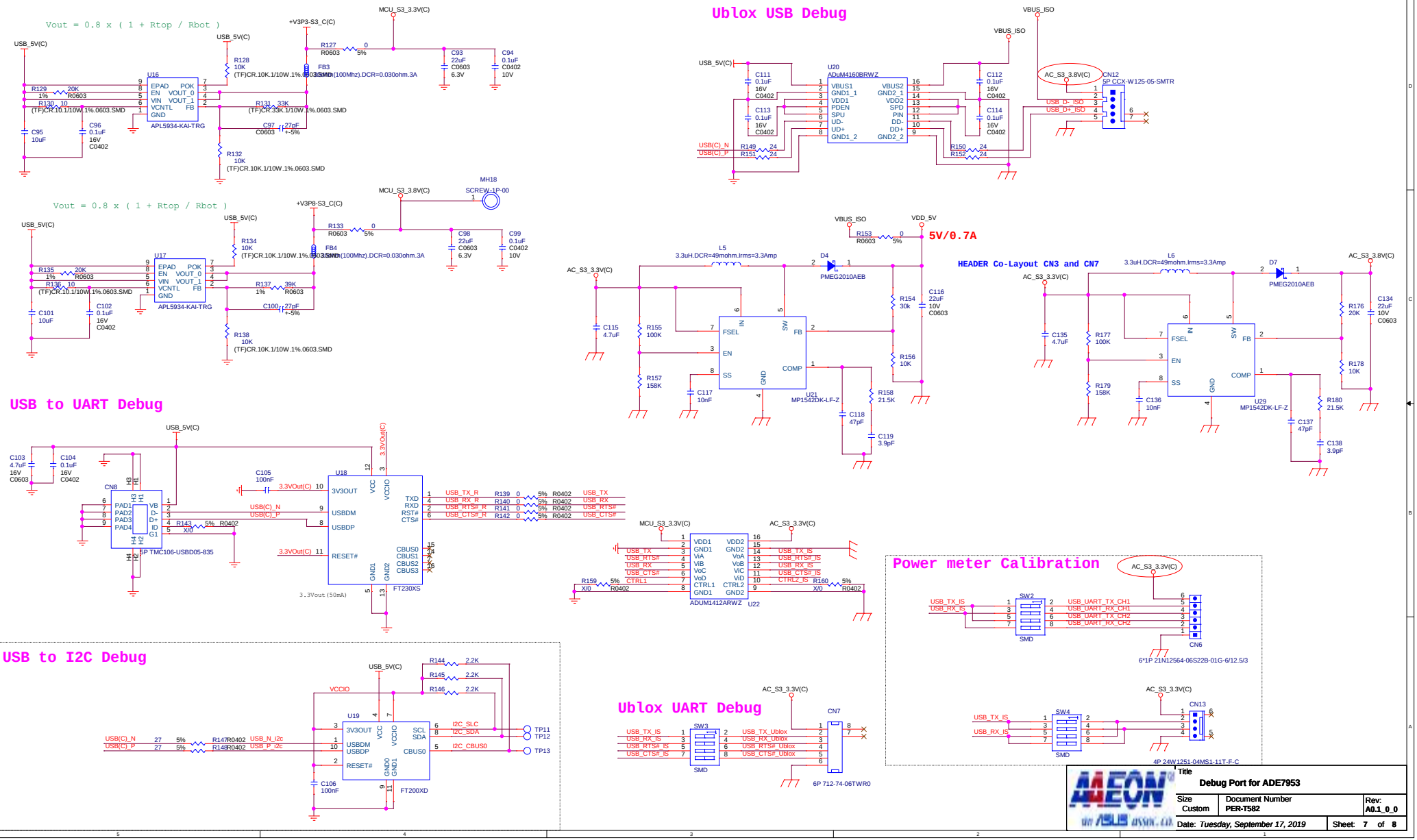
Vout = 0.8 x (1 + Rtop / Rbot)
USB_5V(C)
U16
APL5934-KAI-TRG
R129 20K 1% R0603
R130 10 (TF)CR.10.1/10W.1%.0603.SMD
R128 10K (TF)CR.10K.1/10W.1%.0603.SMD
R131 33K (TF)CR.33K.1/10W.1%.0603.SMD
R132 10K (TF)CR.10K.1/10W.1%.0603.SMD
R127 0 R0603 5%
+V3P3-S3_C(C)
MCU_S3_3.3V(C)
FB3 (100Mhz).DCR=0.030ohm.3A
C93 22uF C0603 6.3V
C94 0.1uF C0402 10V
C95 10uF
C96 0.1uF 16V C0402
C97 27pF C0603 +-5%
Vout = 0.8 x (1 + Rtop / Rbot)
U17
APL5934-KAI-TRG
R135 20K 1% R0603
R136 10 (TF)CR.10.1/10W.1%.0603.SMD
R134 10K (TF)CR.10K.1/10W.1%.0603.SMD
R137 39K 1% R0603
R138 10K (TF)CR.10K.1/10W.1%.0603.SMD
R133 0 R0603 5%
+V3P8-S3_C(C)
MCU_S3_3.8V(C)
MH18
SCREW-1P-00
FB4 (100Mhz).DCR=0.030ohm.3A
C98 22uF C0603 6.3V
C99 0.1uF C0402 10V
C101 10uF
C102 0.1uF 16V C0402
C100 27pF C0603 +-5%
Ublox USB Debug
VBUS_ISO
U20
ADuM4160BRWZ
VBUS1 GND1_1 VDD1 PDEN SPU UD- UD+ GND1_2
VBUS2 GND2_1 VDD2 SPD PIN DD- DD+ GND2_2
C111 0.1uF 16V C0402
C113 0.1uF 16V C0402
C112 0.1uF 16V C0402
C114 0.1uF 16V C0402
AC_S3_3.8V(C)
CN12 5P CCX-W125-05-SMTR
USB_D-_ISO
USB_D+_ISO
USB(C)_N
USB(C)_P
R149 24
R151 24
R150 24
R152 24
USB to UART Debug
USB_5V(C)
3.3VOut(C)
CN8
SP TMC106-USBD05-835
C103 4.7uF 16V C0603
C104 0.1uF 16V C0402
C105 100nF
U18
FT230XS
3V3OUT VCC VCCIO USBDM USBDP RESET# GND1 GND2 TXD RXD RST# CTS# CBUS0 CBUS1 CBUS2 CBUS3
USB_TX_R USB_RX_R USB_RTS#_R USB_CTS#_R
R139 0 R140 0 R141 0 R142 0 5% R0402
USB_TX USB_RX USB_RTS# USB_CTS#
R143 X/0 5% R0402
3.3Vout(50mA)
MCU_S3_3.3V(C)
AC_S3_3.3V(C)
U22
ADUM1412ARWZ
VDD1 GND1 ViA ViB VoC VoD CTRL1 GND1
VDD2 GND2 VIA VoA VoB VIC VID CTRL2 GND2
USB_TX_IS USB_RTS#_IS USB_RX USB_CTS# CTRL1
USB_TX_IS USB_RTS#_IS USB_RX_IS USB_CTS#_IS CTRL2_IS
R159 X/0 5% R0402
R160 X/0 5% R0402
USB to I2C Debug
USB_5V(C)
VCCIO
U19
FT200XD
3V3OUT VCC VCCIO USBDM USBDP RESET# GND0 GND1 SCL SDA CBUS0
USB(C)_N USB(C)_P
R147 27 5% R0402
R148 27 5% R0402
USB_N_i2c USB_P_i2c
I2C_SLC I2C_SDA I2C_CBUS0
TP11 TP12 TP13
R144 2.2K
R145 2.2K
R146 2.2K
C106 100nF
Ublox UART Debug
AC_S3_3.3V(C)
SW3
SMD
CN7
6P 712-74-06TWR0
USB_TX_IS USB_RX_IS USB_RTS#_IS USB_CTS#_IS
USB_TX_Ublox USB_RX_Ublox USB_RTS#_Ublox USB_CTS#_Ublox
5V/0.7A
VBUS_ISO
VDD_5V
L5 3.3uH.DCR=49mohm.Irms=3.3Amp
D4 PMEG2010AEB
U21 MP1542DK-LF-Z
FSEL IN SW FB EN COMP SS GND
R153 0 R0603 5%
R154 30k
R155 100K
R156 10K
R157 158K
R158 21.5K
C115 4.7uF
C116 22uF 10V C0603
C117 10nF
C118 47pF
C119 3.9pF
HEADER Co-Layout CN3 and CN7
L6 3.3uH.DCR=49mohm.Irms=3.3Amp
D7 PMEG2010AEB
U29 MP1542DK-LF-Z
R176 20K
R177 100K
R178 10K
R179 158K
R180 21.5K
C134 22uF 10V C0603
C135 4.7uF
C136 10nF
C137 47pF
C138 3.9pF
Power meter Calibration
AC_S3_3.3V(C)
SW2
SMD
CN6
6*1P 21N12564-06S22B-01G-6/12.5/3
USB_TX_IS USB_RX_IS
USB_UART_TX_CH1 USB_UART_RX_CH1 USB_UART_TX_CH2 USB_UART_RX_CH2
SW4
CN13
4P 24W1251-04MS1-11T-F-C
Title
Debug Port for ADE7953
Size Custom
Document Number PER-T582
Rev: A0.1_0_0
Date: Tuesday, September 17, 2019
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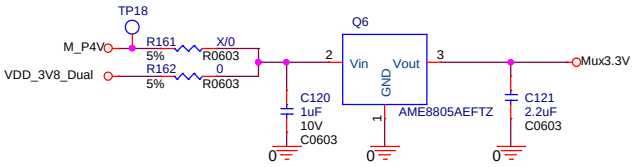
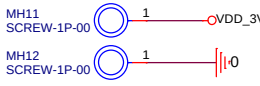
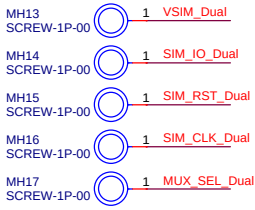
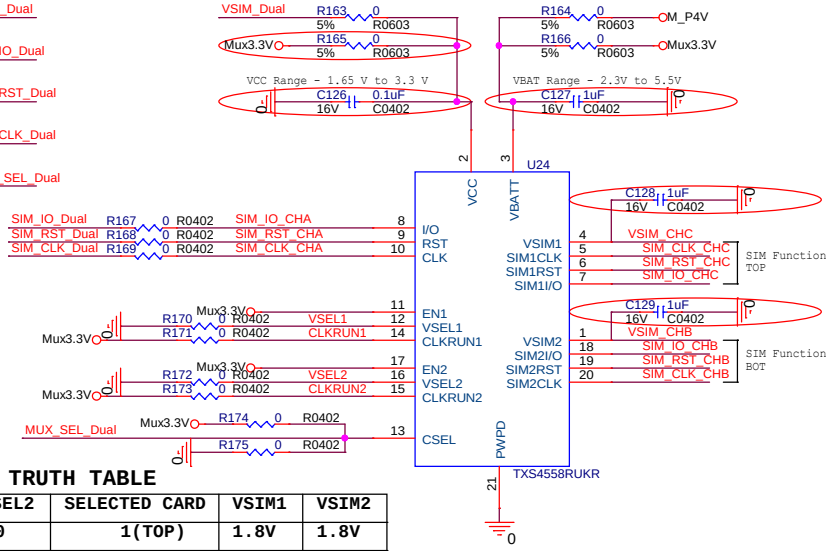








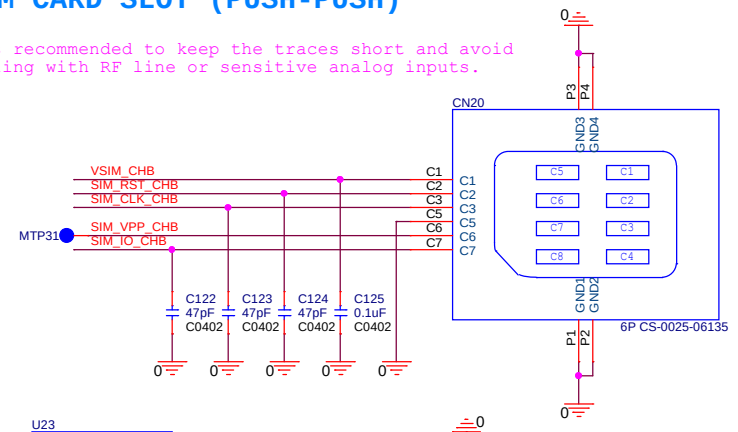
TRUTH TABLE

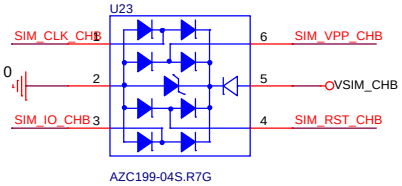
CSEL	VSEL1	VSEL2	SELECTED CARD	VSIM1	VSIM2
0	0	0	1(TOP)	1.8V	1.8V
1	0	0	2(BOT)	1.8V	1.8V

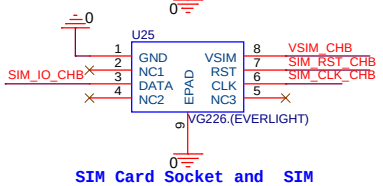
2019/07/31
Mmodify NXP.CBTL02042ABQ change Dual-SIM Card MUX ic

SIM CARD SLOT (PUSH-PUSH)

It is recommended to keep the traces short and avoid coupling with RF line or sensitive analog inputs.



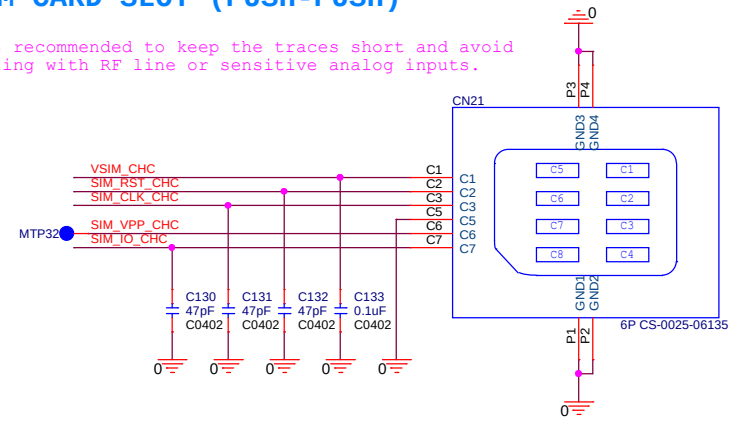


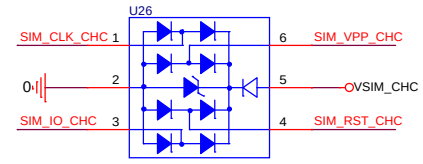


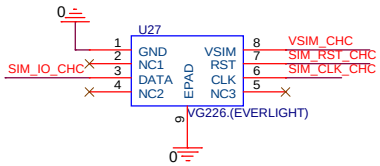
SIM Card Socket and SIM chip Co-Layout

SIM CARD SLOT (PUSH-PUSH)

It is recommended to keep the traces short and avoid coupling with RF line or sensitive analog inputs.







SIM Card Socket and SIM chip Co-Layout

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Size: B	Document Number: **PER-T548**	Rev: **A0.4_0_0**
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