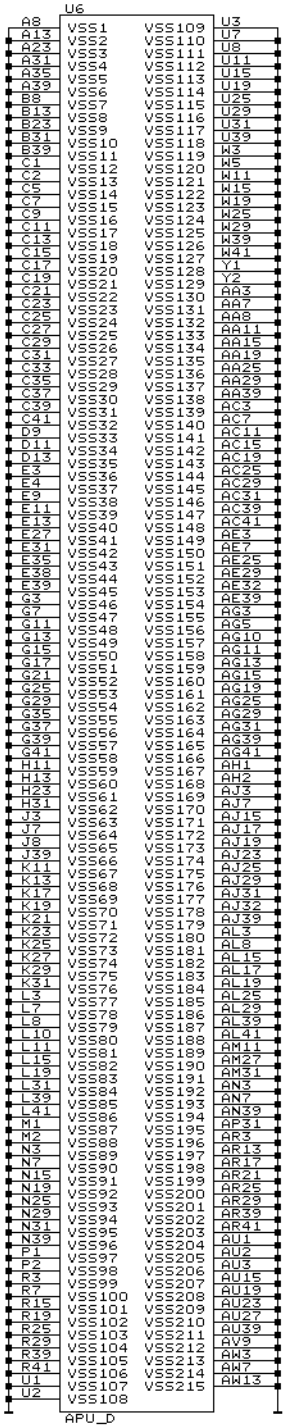
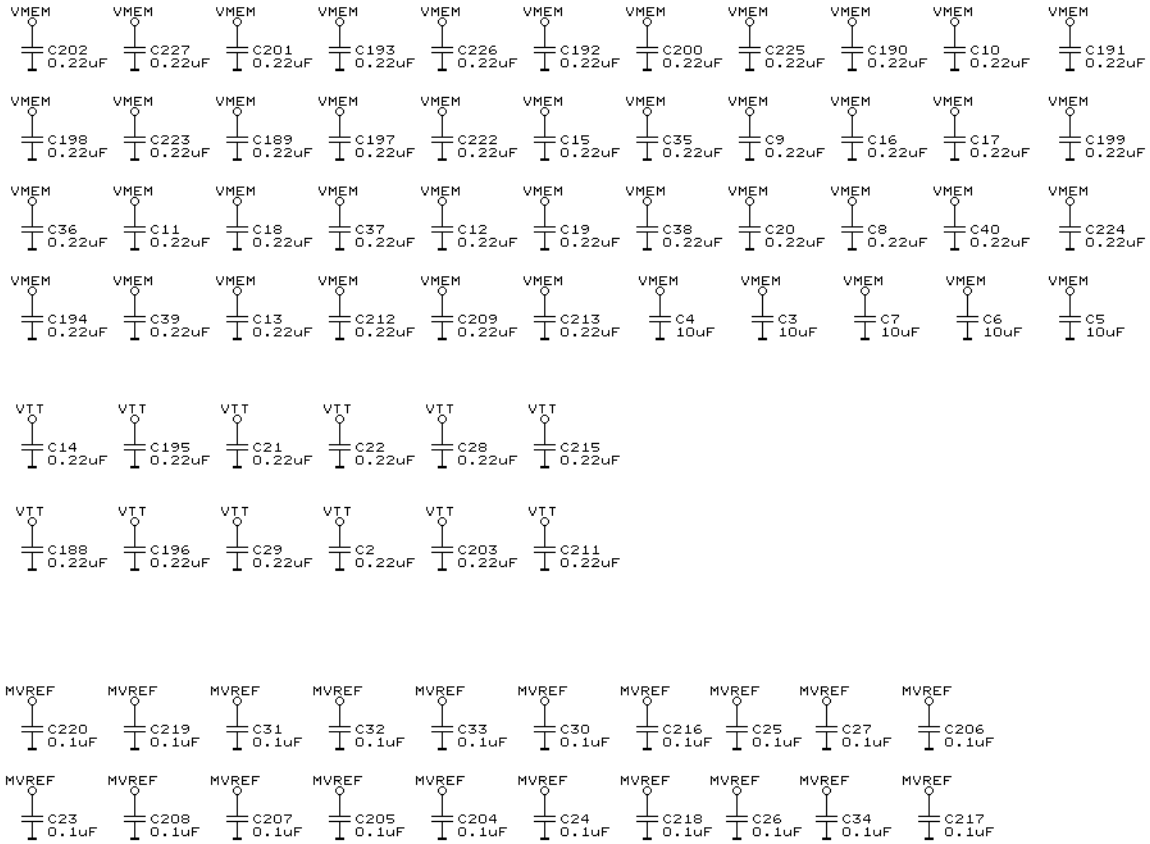


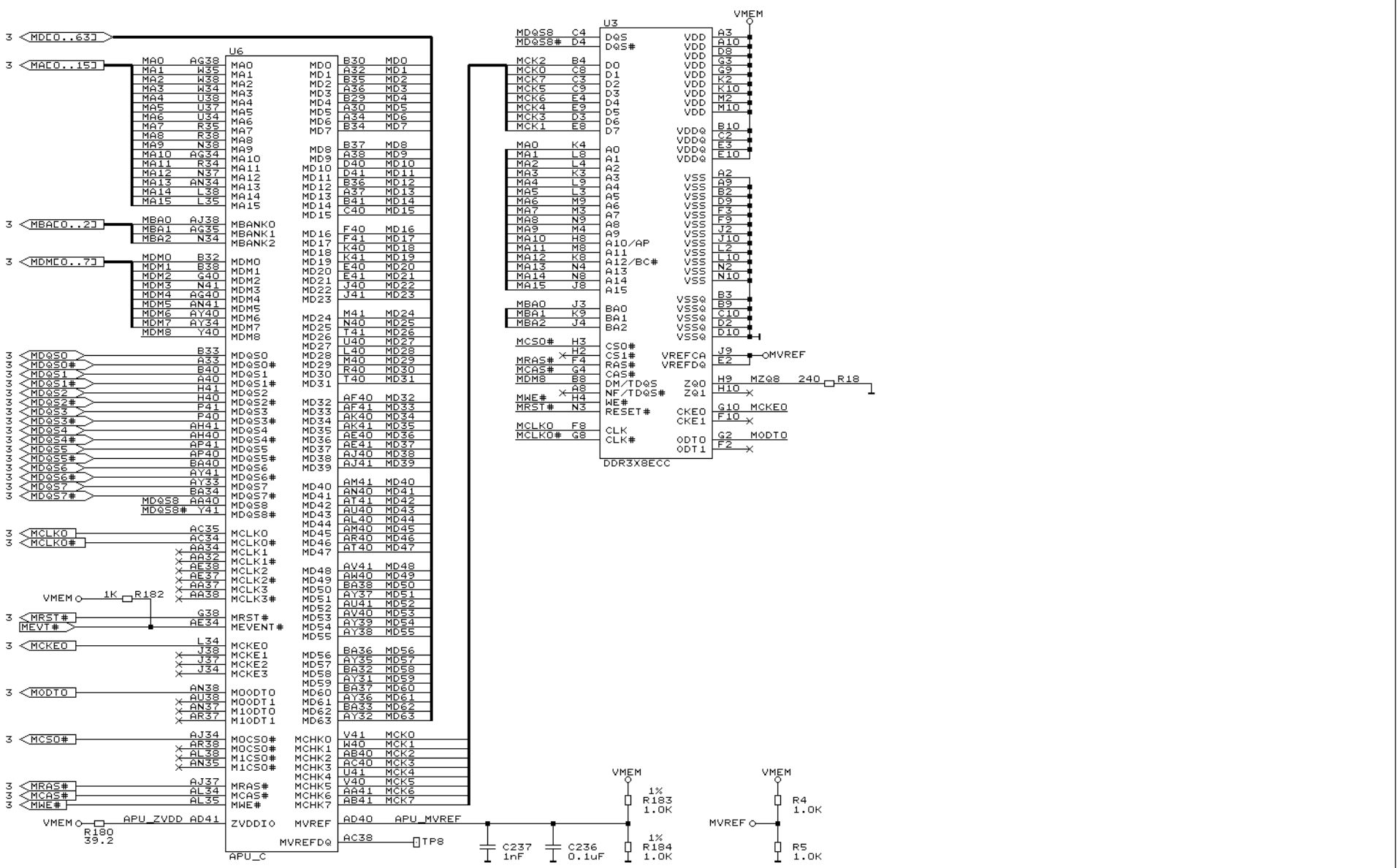
APU ground

DRAM bypass

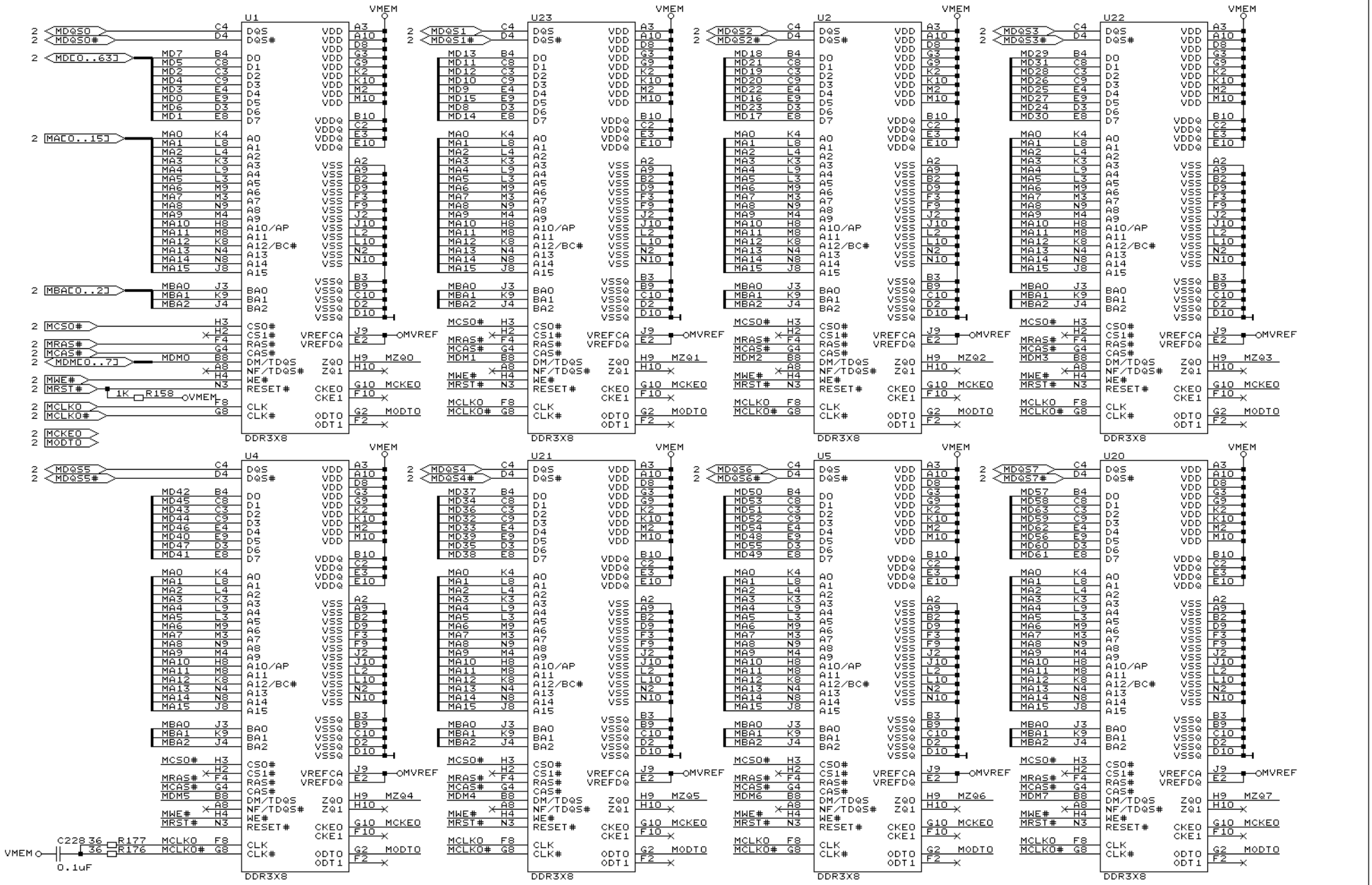


!LINK
!2.SCH
!3.SCH
!4.SCH
!5.SCH
!6.SCH
!7.SCH
!8.SCH
!9.SCH
!10.SCH
!11.SCH
!12.SCH
!13.SCH
!14.SCH
!15.SCH
!16.SCH
!17.SCH

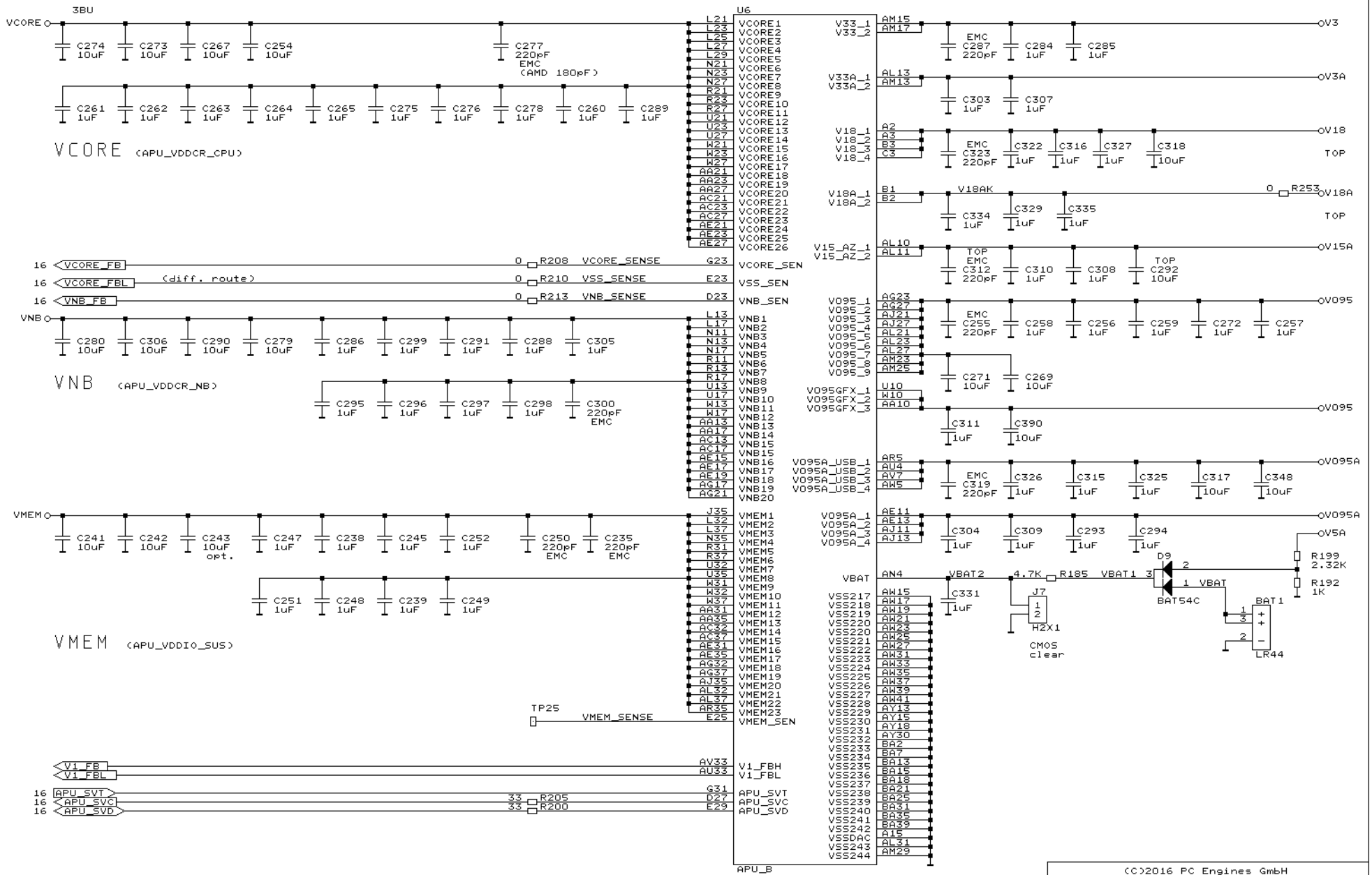
Title	Ground, DRAM bypass	
Size: B	Document Number: APU	REV: 6B
Date: February 5, 2016	Sheet 1 of 17	



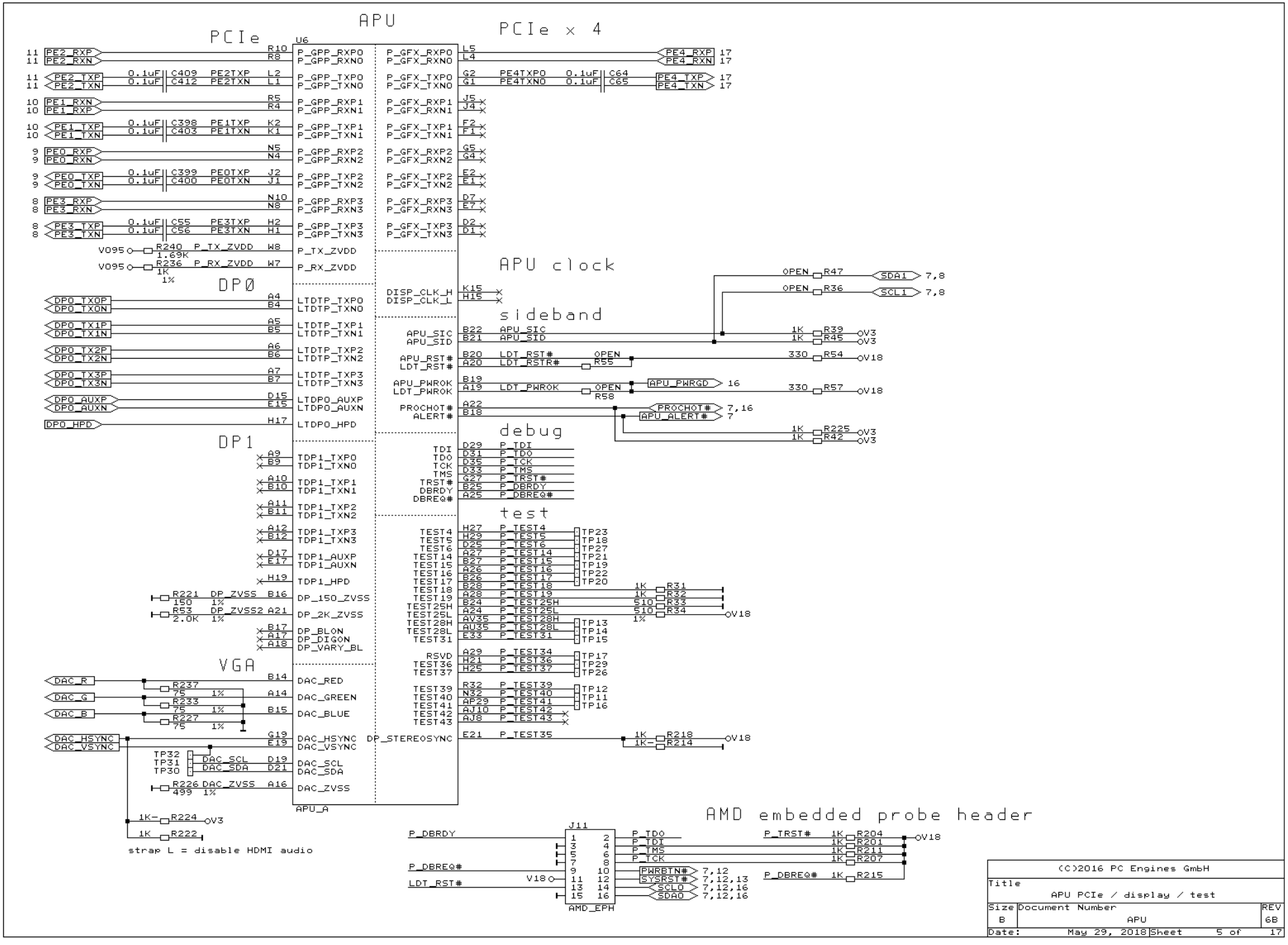
Title	DRAM interface / power	
Size B	Document Number APU	REV 6B
Date: February 5, 2016	Sheet 2 of 17	

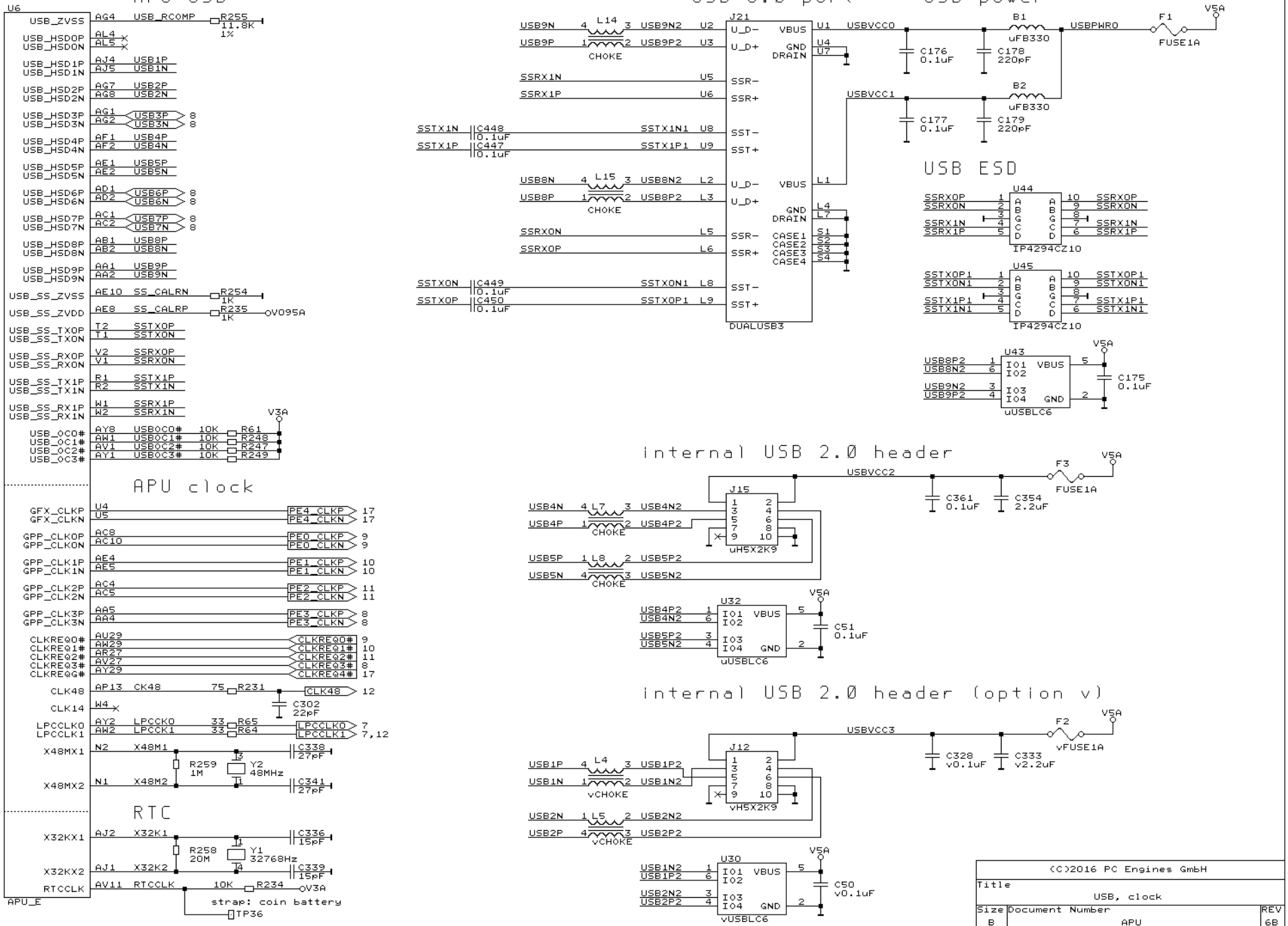

U1
U23
U2
U22
U4
U21
U5
U20
DDR3X8
VMEM
MDQS0
MDQS0#
MDQS1
MDQS1#
MDQS2
MDQS2#
MDQS3
MDQS3#
MDQS4
MDQS4#
MDQS5
MDQS5#
MDQS6
MDQS6#
MDQS7
MDQS7#
MD[0..63]
MA[0..15]
MBA[0..2]
MCS0#
MRAS#
MCAS#
MDM[0..7]
MWE#
MRST#
MCLK0
MCLK0#
MCKE0
MODT0
1K
R158
VMEM
C228
0.1uF
R177
R176
MZ00
MZ01
MZ02
MZ03
MZ04
MZ05
MZ06
MZ07
240
R16
R173
R17
R172
R19
R171
R20
R170
1%
R21
R22
R23
R24
R12
R13
R14
R15
R8
R9
R10
R11
R159
R6
R2
R3
R175
R174
R169
R168
R167
R166
R165
R164
R163
VTTT
(C)2016 PC Engines GmbH
Title
DDR3 DRAM
Size
B
Document Number
APU
REV
6B
Date: February 5, 2016
Sheet 3 of 17

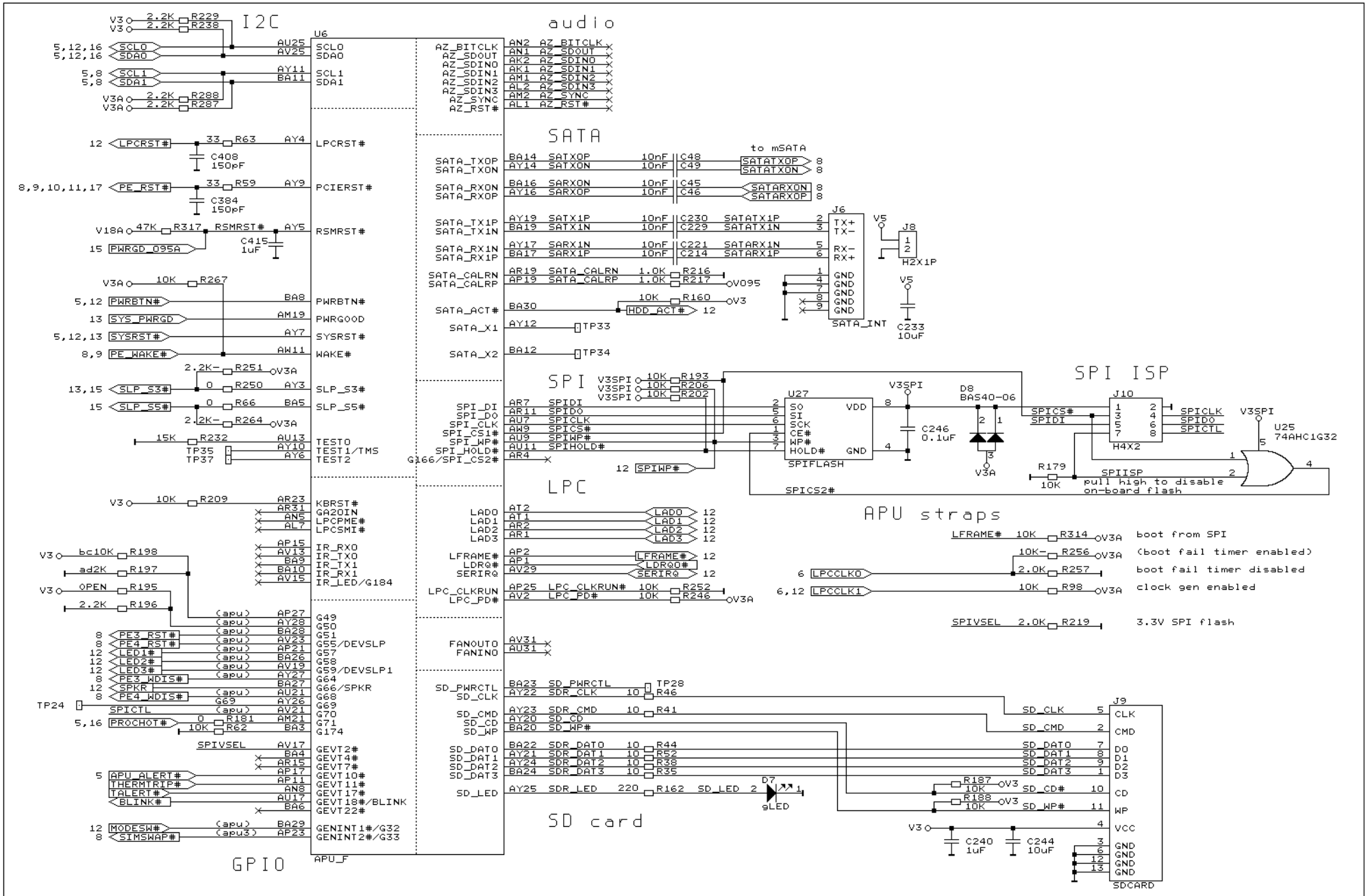
APU power

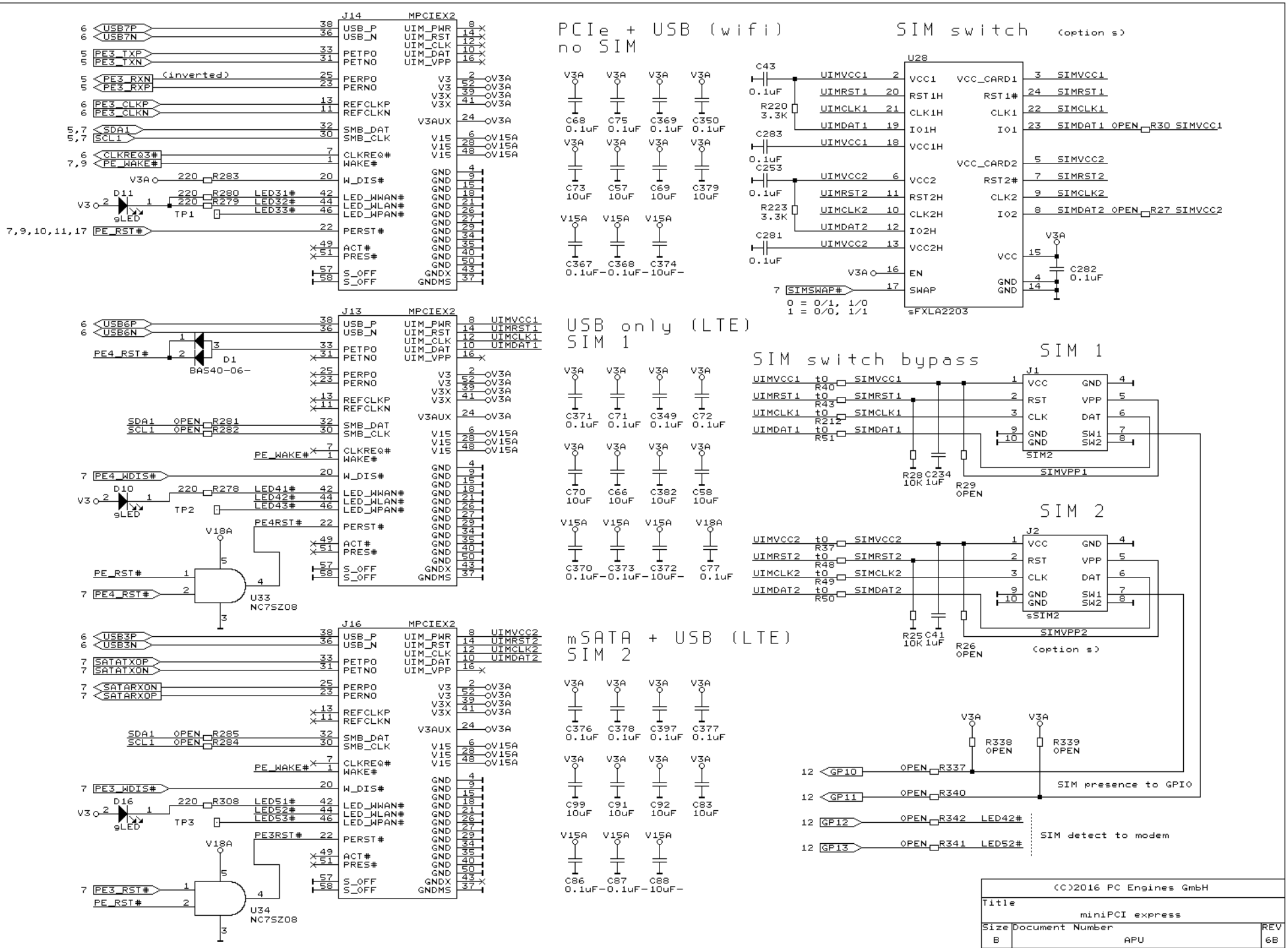


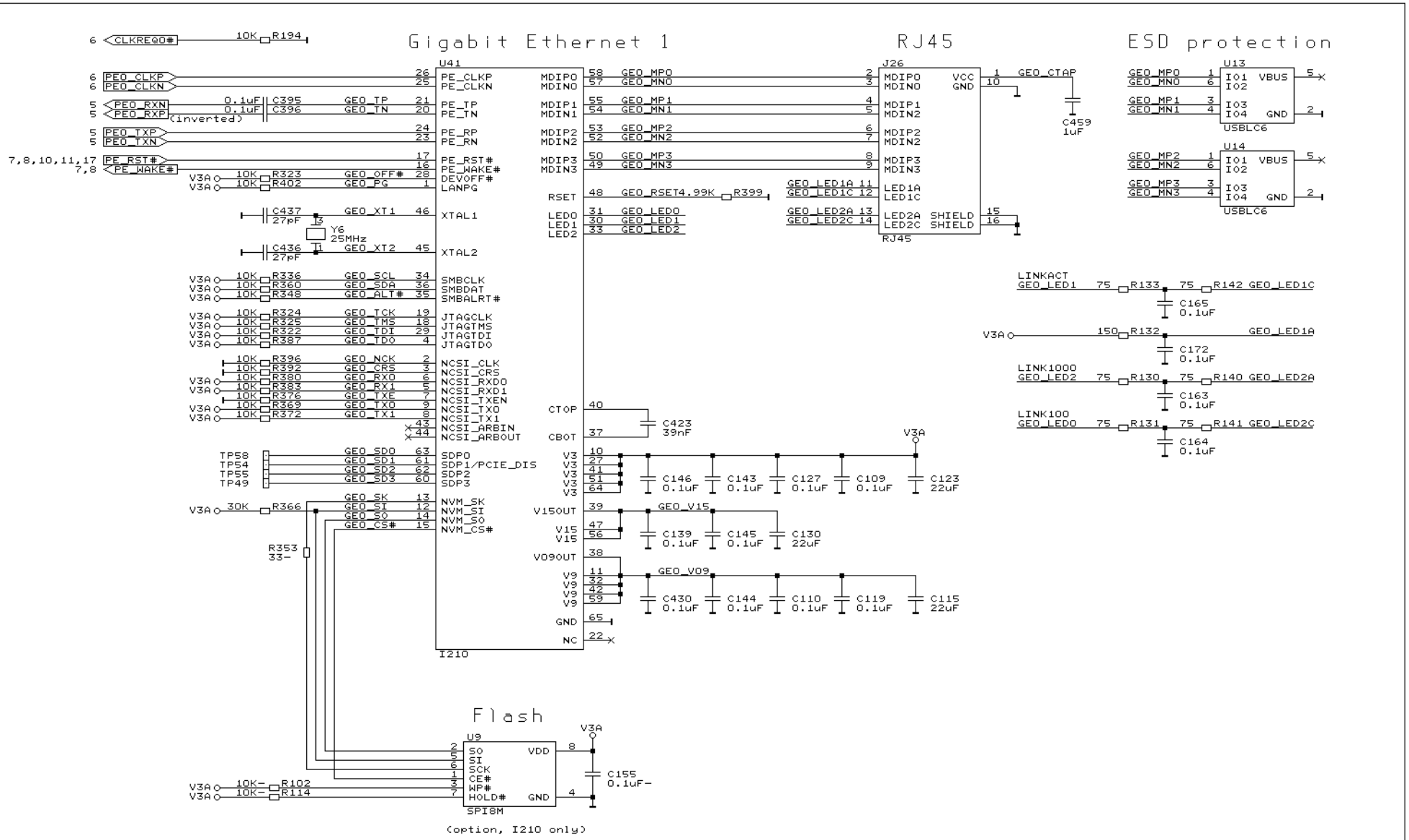
Title	APU power	
Size B	Document Number APU	REV 6B
Date: August 15, 2018	Sheet 4 of 17	

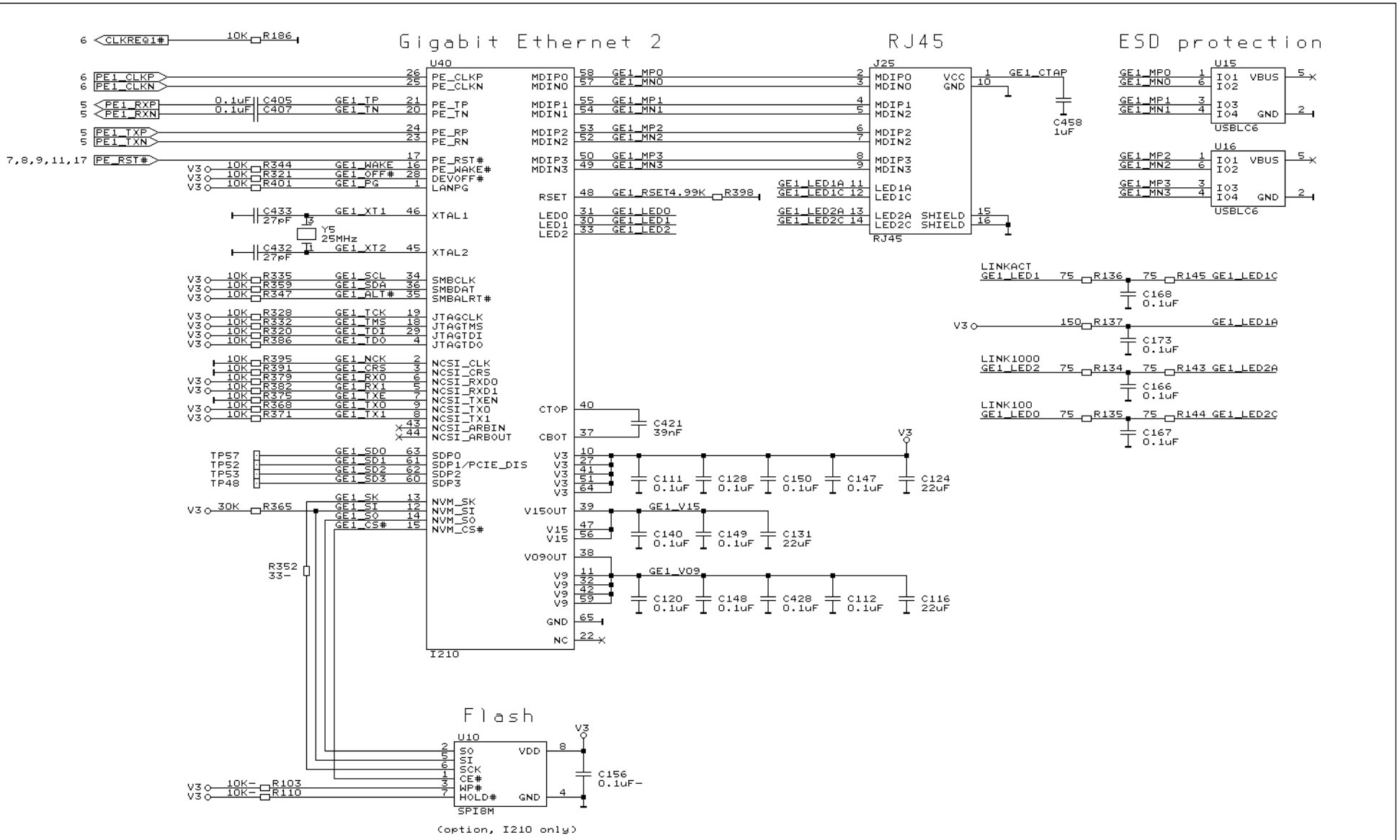

APU
PCIe
PCIe x 4
U6
PE2_RXP
PE2_RXN
PE2_TXP
PE2_TXN
PE1_RXN
PE1_RXP
PE1_TXP
PE1_TXN
PE0_RXP
PE0_RXN
PE0_TXP
PE0_TXN
PE3_RXP
PE3_RXN
PE3_TXP
PE3_TXN
0.1uF
C409
C412
C398
C403
C399
C400
C55
C56
PE2TXP
PE2TXN
PE1TXP
PE1TXN
PE0TXP
PE0TXN
PE3TXP
PE3TXN
P_GPP_RXP0
P_GPP_RXN0
P_GPP_TXP0
P_GPP_TXN0
P_GPP_RXP1
P_GPP_RXN1
P_GPP_TXP1
P_GPP_TXN1
P_GPP_RXP2
P_GPP_RXN2
P_GPP_TXP2
P_GPP_TXN2
P_GPP_RXP3
P_GPP_RXN3
P_GPP_TXP3
P_GPP_TXN3
P_GFX_RXP0
P_GFX_RXN0
P_GFX_TXP0
P_GFX_TXN0
P_GFX_RXP1
P_GFX_RXN1
P_GFX_TXP1
P_GFX_TXN1
P_GFX_RXP2
P_GFX_RXN2
P_GFX_TXP2
P_GFX_TXN2
P_GFX_RXP3
P_GFX_RXN3
P_GFX_TXP3
P_GFX_TXN3
PE4_RXP
PE4_RXN
PE4_TXP
PE4_TXN
PE4TXP0
PE4TXN0
C64
C65
P_TX_ZVDD
P_RX_ZVDD
R240
R236
1.69K
1K
VO95
DP0
DP0_TX0P
DP0_TX0N
DP0_TX1P
DP0_TX1N
DP0_TX2P
DP0_TX2N
DP0_TX3P
DP0_TX3N
DP0_AUXP
DP0_AUXN
DP0_HPD
LTDTP_TXP0
LTDTP_TXN0
LTDTP_TXP1
LTDTP_TXN1
LTDTP_TXP2
LTDTP_TXN2
LTDTP_TXP3
LTDTP_TXN3
LTDPO_AUXP
LTDPO_AUXN
LTDPO_HPD
DP1
TDP1_TXP0
TDP1_TXN0
TDP1_TXP1
TDP1_TXN1
TDP1_TXP2
TDP1_TXN2
TDP1_TXP3
TDP1_TXN3
TDP1_AUXP
TDP1_AUXN
TDP1_HPD
R221
150
DP_ZVSS
DP_150_ZVSS
R53
2.0K
DP_ZVSS2
DP_2K_ZVSS
DP_BLON
DP_DIGON
DP_VARY_BL
VGA
DAC_R
DAC_G
DAC_B
R237
R233
R227
75
DAC_RED
DAC_GREEN
DAC_BLUE
DAC_HSYNC
DAC_VSYNC
TP32
TP31
TP30
DAC_SCL
DAC_SDA
R226
499
DAC_ZVSS
1K
R224
R222
V3
strap L = disable HDMI audio
APU_A
APU clock
DISP_CLK_H
DISP_CLK_L
sideband
APU_SIC
APU_SID
APU_RST#
LDT_RST#
APU_PWROK
LDT_PWROK
PROCHOT#
ALERT#
OPEN
R47
R36
SDA1
SCL1
R39
R45
R54
R55
R57
R58
R225
R42
APU_PWRGD
APU_ALERT#
debug
TDI
TDO
TCK
TMS
TRST#
DBRDY
DBREQ#
P_TDI
P_TDO
P_TCK
P_TMS
P_TRST#
P_DBRDY
P_DBREQ#
test
TEST4
TEST5
TEST6
TEST14
TEST15
TEST16
TEST17
TEST18
TEST19
TEST25H
TEST25L
TEST28H
TEST28L
TEST31
RSVD
TEST36
TEST37
TEST39
TEST40
TEST41
TEST42
TEST43
TP23
TP18
TP27
TP21
TP19
TP22
TP20
R31
R32
R33
R34
TP13
TP14
TP15
TP17
TP29
TP26
TP12
TP11
TP16
DP_STEREOSYNC
R218
R214
AMD embedded probe header
J11
AMD_EPH
P_DBRDY
P_DBREQ#
LDT_RST#
P_TDO
P_TDI
P_TMS
P_TCK
P_TRST#
P_DBREQ#
PWRBTN#
SYSRST#
SCLO
SDAO
R204
R201
R211
R207
R215
(C)2016 PC Engines GmbH
Title
APU PCIe / display / test
Size
B
Document Number
APU
REV
6B
Date:
May 29, 2018
Sheet
5 of
17


APU USB
USB 3.0 port
USB power
USB ESD
internal USB 2.0 header
internal USB 2.0 header (option v)
APU clock
RTC
U6
APU_E
J21
DUALUSB3
U44
U45
IP4294CZ10
U43
uUSBLC6
J15
uH5X2K9
U32
J12
vH5X2K9
U30
vUSBLC6
USB_ZVSS
USB_HSDOP
USB_HSDON
USB_HSD1P
USB_HSD1N
USB_HSD2P
USB_HSD2N
USB_HSD3P
USB_HSD3N
USB_HSD4P
USB_HSD4N
USB_HSD5P
USB_HSD5N
USB_HSD6P
USB_HSD6N
USB_HSD7P
USB_HSD7N
USB_HSD8P
USB_HSD8N
USB_HSD9P
USB_HSD9N
USB_SS_ZVSS
USB_SS_ZVDD
USB_SS_TXOP
USB_SS_TXON
USB_SS_RXOP
USB_SS_RXON
USB_SS_TX1P
USB_SS_TX1N
USB_SS_RX1P
USB_SS_RX1N
USB_OC0#
USB_OC1#
USB_OC2#
USB_OC3#
R255 11.8K 1%
R254 1K
R235 1K
V095A
V3A
R61 10K
R248 10K
R247 10K
R249 10K
USB9N
USB9P
USB9N2
USB9P2
L14
CHOKE
SSRX1N
SSRX1P
SSTX1N
SSTX1P
C448 0.1uF
C447 0.1uF
USB8N
USB8P
USB8N2
USB8P2
L15
SSRX0N
SSRX0P
SSTX0N
SSTX0P
C449 0.1uF
C450 0.1uF
USBVCC0
USBVCC1
USBPWR0
B1 uFB330
B2 uFB330
F1 FUSE1A
C176 0.1uF
C178 220pF
C177 0.1uF
C179 220pF
SSRX0P
SSRX0N
SSRX1N
SSRX1P
SSTX0P1
SSTX0N1
SSTX1P1
SSTX1N1
USB8P2
USB8N2
USB9N2
USB9P2
C175 0.1uF
USB4N
USB4P
USB5P
USB5N
USB4P2
USB4N2
USB5P2
USB5N2
USBVCC2
F3 FUSE1A
C361 0.1uF
C354 2.2uF
C51 0.1uF
USB1P
USB1N
USB2N
USB2P
USBVCC3
F2 vFUSE1A
C328 v0.1uF
C333 v2.2uF
C50 v0.1uF
GFX_CLKP
GFX_CLKN
GPP_CLK0P
GPP_CLK0N
GPP_CLK1P
GPP_CLK1N
GPP_CLK2P
GPP_CLK2N
GPP_CLK3P
GPP_CLK3N
CLKREQ0#
CLKREQ1#
CLKREQ2#
CLKREQ3#
CLKREQG#
CLK48
CLK14
LPCCLK0
LPCCLK1
X48MX1
X48MX2
C302 22pF
R259 1M
Y2 48MHz
C338 27pF
C341 27pF
X32KX1
X32KX2
RTCCLK
R258 20M
Y1 32768Hz
C336 15pF
C339 15pF
R234 10K
strap: coin battery
TP36
(C)2016 PC Engines GmbH
Title
USB, clock
Size B
Document Number APU
REV 6B
Date: February 21, 2017
Sheet 6 of 17

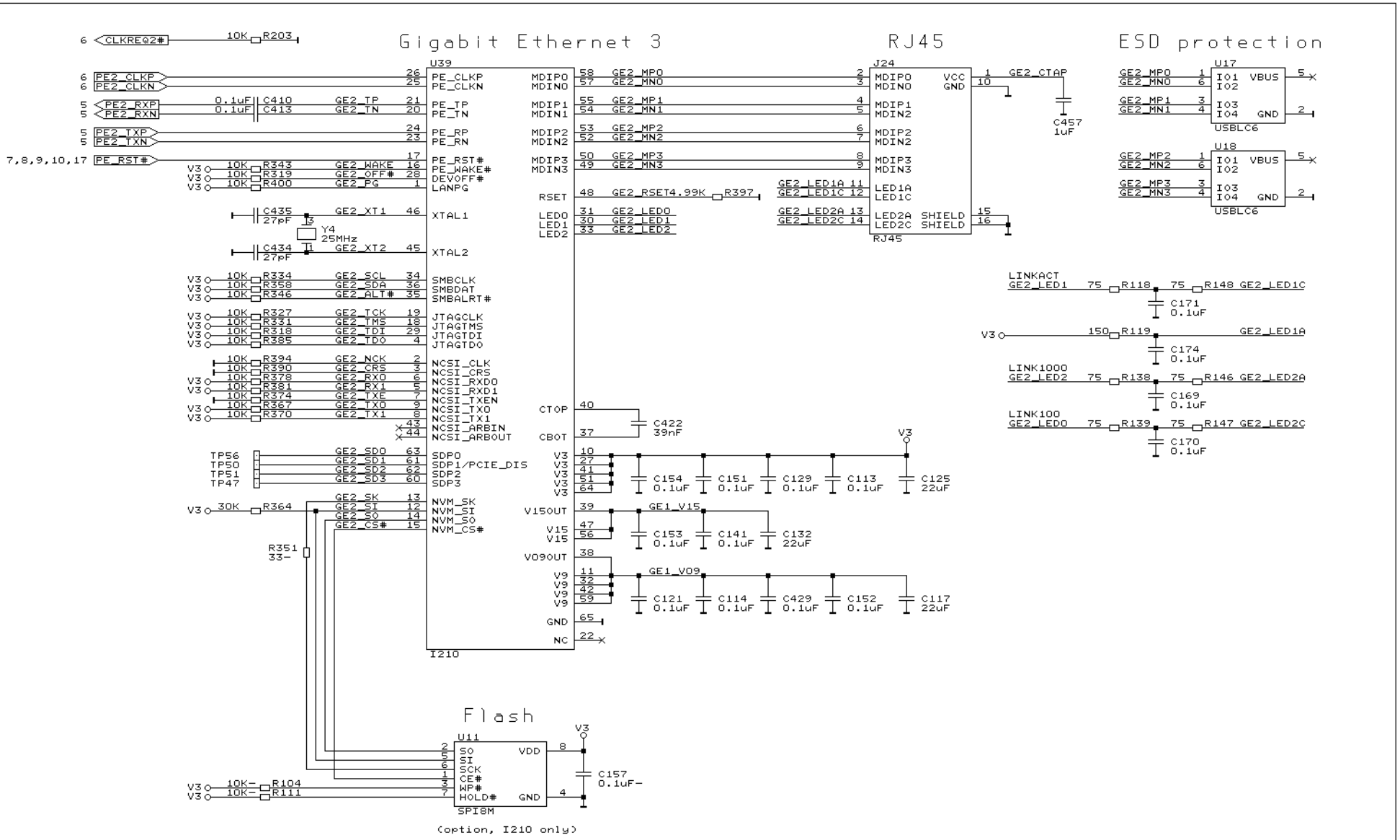

I2C
audio
SATA
SPI
LPC
GPIO
SD card
SPI ISP
APU straps
U6
APU_F
SCL0
SDA0
SCL1
SDA1
LPCRST#
PCIERST#
RSMRST#
PWRBTN#
PWRGOOD
SYSRST#
WAKE#
SLP_S3#
SLP_S5#
TEST0
TEST1/TMS
TEST2
KBRST#
GA20IN
LPCPME#
LPCSMI#
IR_RXD
IR_TXD
IR_TX1
IR_RX1
IR_LED/G184
G49
G50
G51
G55/DEVSLP
G57
G58
G59/DEVSLP1
G64
G66/SPKR
G68
G69
G70
G71
G174
GEVT2#
GEVT4#
GEVT7#
GEVT10#
GEVT11#
GEVT17#
GEVT18#/BLINK
GEVT22#
GENINT1#/G32
GENINT2#/G33
SATA_TXOP
SATA_TXON
SATA_RXON
SATA_RXOP
SATA_TX1P
SATA_TX1N
SATA_RX1N
SATA_RX1P
SATA_CALRN
SATA_CALRP
SATA_ACT#
SATA_X1
SATA_X2
to mSATA
SATA_INT
SPI_DI
SPI_DO
SPI_CLK
SPI_CS1#
SPI_WP#
SPI_HOLD#
G166/SPI_CS2#
SPIFLASH
SPICS2#
LAD0
LAD1
LAD2
LAD3
LFRAME#
LDRQ0#
SERIRQ
LPC_CLKRUN
LPC_PD#
FANOUT0
FANIN0
SD_PWRCTL
SD_CLK
SD_CMD
SD_CD
SD_WP
SD_DAT0
SD_DAT1
SD_DAT2
SD_DAT3
SD_LED
SDCARD
LPCCLK0
LPCCLK1
boot from SPI
(boot fail timer enabled)
boot fail timer disabled
clock gen enabled
3.3V SPI flash
pull high to disable on-board flash
(C)2016 PC Engines GmbH
Title
SATA, LPC, SPI
Size B
Document Number APU
REV 6B
Date: May 31, 2018
Sheet 7 of 17

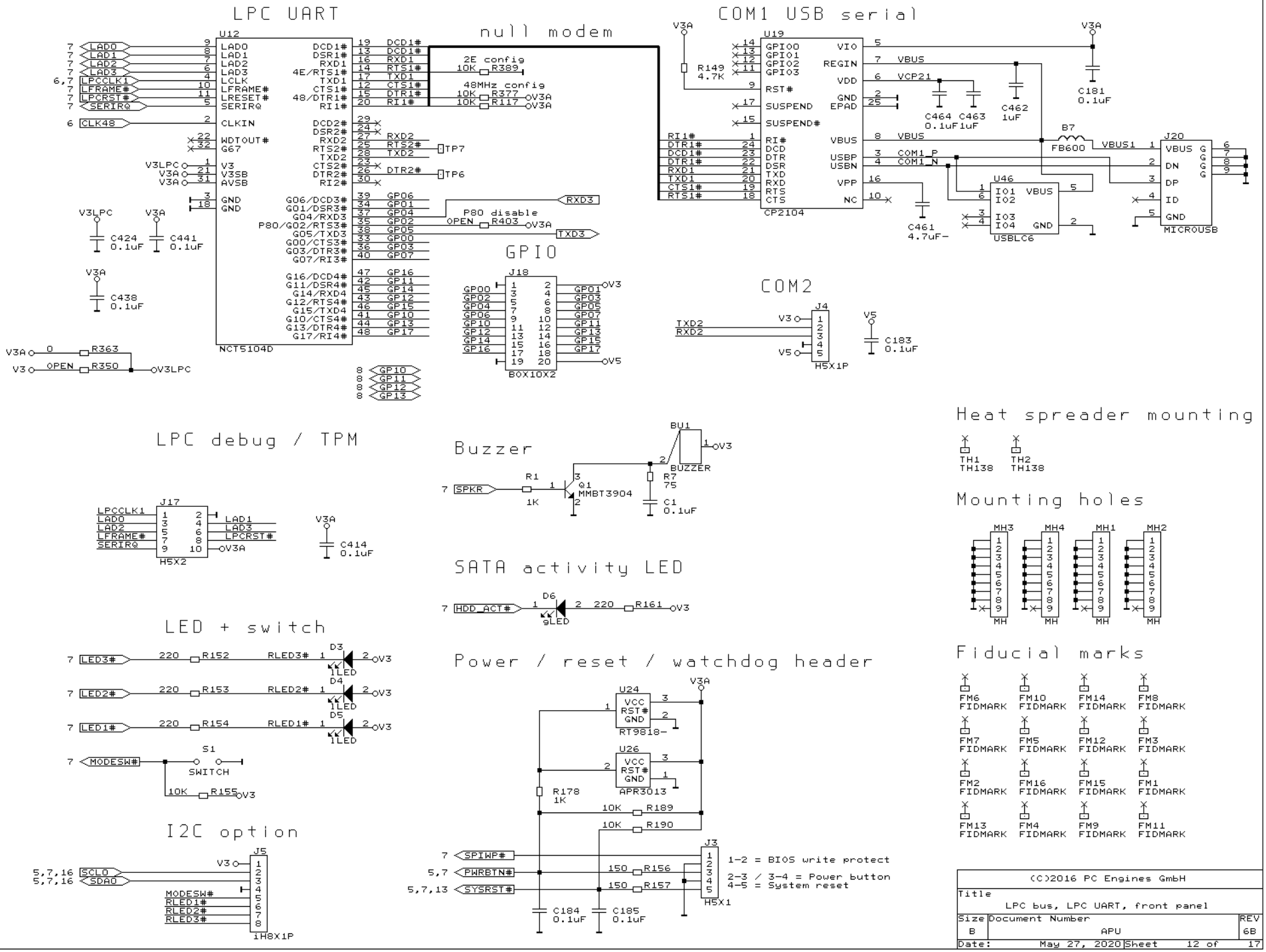

PCIe + USB (wifi)
no SIM
SIM switch (option s)
USB only (LTE)
SIM 1
SIM switch bypass
SIM 1
SIM 2
mSATA + USB (LTE)
SIM 2
J14 MPCIEX2
J13 MPCIEX2
J16 MPCIEX2
U28
sFXLA2203
J1
J2
SIM2
sSIM2
U33
NC7SZ08
U34
NC7SZ08
D11
D10
D16
D1
BAS40-06-
gLED
TP1
TP2
TP3
USB7P
USB7N
PE3_TXP
PE3_TXN
PE3_RXN
PE3_RXP
PE3_CLKP
PE3_CLKN
SDA1
SCL1
CLKREQ3#
PE_WAKE#
PE_RST#
USB6P
USB6N
PE4_RST#
PE4_WDIS#
PE4RST#
USB3P
USB3N
SATATXOP
SATATXON
SATARXON
SATARXOP
PE3_WDIS#
PE3RST#
SIMSWAP#
0 = 0/1, 1/0
1 = 0/0, 1/1
SIMVPP1
SIMVPP2
(option s)
SIM presence to GPIO
SIM detect to modem
(C)2016 PC Engines GmbH
Title
miniPCI express
Size B
Document Number APU
REV 6B
Date: August 20, 2018
Sheet 8 of 17


Gigabit Ethernet 1
RJ45
ESD protection
Flash
U41
I210
J26
RJ45
U13
U14
USBLC6
U9
SPI8M
(option, I210 only)
(inverted)
LINKACT
LINK1000
LINK100
(C)2016 PC Engines GmbH
Title
Ethernet (1)
Size B
Document Number APU
REV 6B
Date: May 28, 2018
Sheet 9 of 17



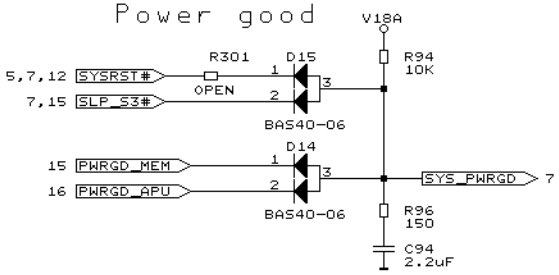
Title	Ethernet (2)	
Size B	Document Number APU	REV 6B
Date: May 30, 2018	Sheet 10 of 17	

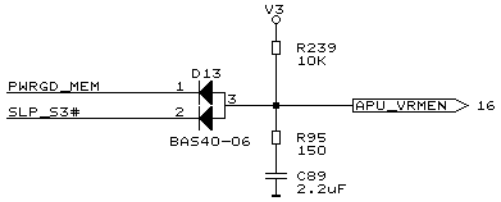

Gigabit Ethernet 3
RJ45
ESD protection
Flash
U39
I210
J24
RJ45
U17
U18
USBLC6
U11
SPI8M
(option, I210 only)
CLKREQ2#
PE2_CLKP
PE2_CLKN
PE2_RXP
PE2_RXN
PE2_TXP
PE2_TXN
PE_RST#
PE_CLKP
PE_CLKN
PE_TP
PE_TN
PE_RP
PE_RN
PE_RST#
PE_WAKE#
DEVOFF#
LANPG
XTAL1
XTAL2
Y4
25MHz
SMBCLK
SMBDAT
SMBALRT#
JTAGCLK
JTAGTMS
JTAGTDI
JTAGTDO
NCSI_CLK
NCSI_CRS
NCSI_RXD0
NCSI_RXD1
NCSI_TXEN
NCSI_TXD
NCSI_TX1
NCSI_ARBIN
NCSI_ARBOUT
SDP0
SDP1/PCIE_DIS
SDP2
SDP3
NVM_SK
NVM_SI
NVM_SO
NVM_CS#
MDIP0
MDIN0
MDIP1
MDIN1
MDIP2
MDIN2
MDIP3
MDIN3
RSET
LED0
LED1
LED2
CTOP
CBOT
V150UT
V090UT
GND
NC
GE2_MP0
GE2_MN0
GE2_MP1
GE2_MN1
GE2_MP2
GE2_MN2
GE2_MP3
GE2_MN3
GE2_RSET4.99K
GE2_LED0
GE2_LED1
GE2_LED2
GE2_CTAP
GE2_LED1A
GE2_LED1C
GE2_LED2A
GE2_LED2C
SHIELD
VCC
VBUS
LINKACT
LINK1000
LINK100
GE1_V15
GE1_V09
SO
SI
SCK
CE#
WP#
HOLD#
VDD
(C)2016 PC Engines GmbH
Title
Ethernet (3)
Size
B
Document Number
APU
REV
6B
Date:
May 30, 2018
Sheet
11 of
17



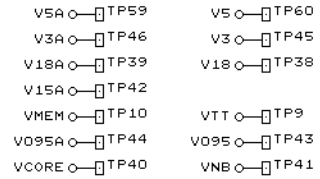
Title	LPC bus, LPC UART, front panel	
Size B	Document Number APU	REV 6B
Date: May 27, 2020	Sheet 12 of 17	

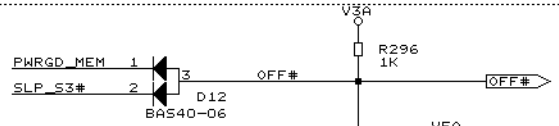
Power good





VRM test points

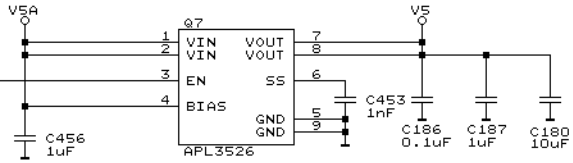




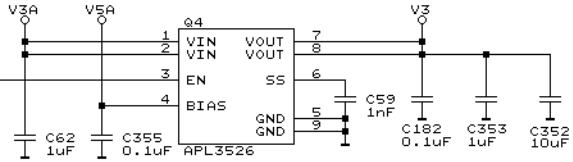
Power sequence:
Turn on after VMEM is good.

Power switch

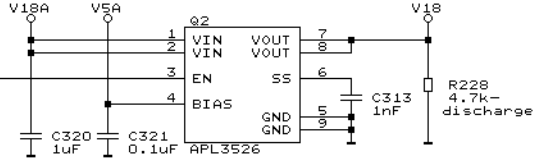
5V



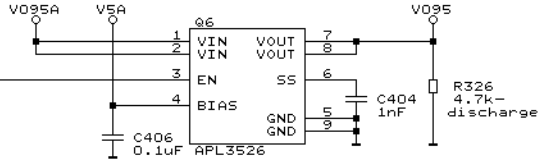
3.3V



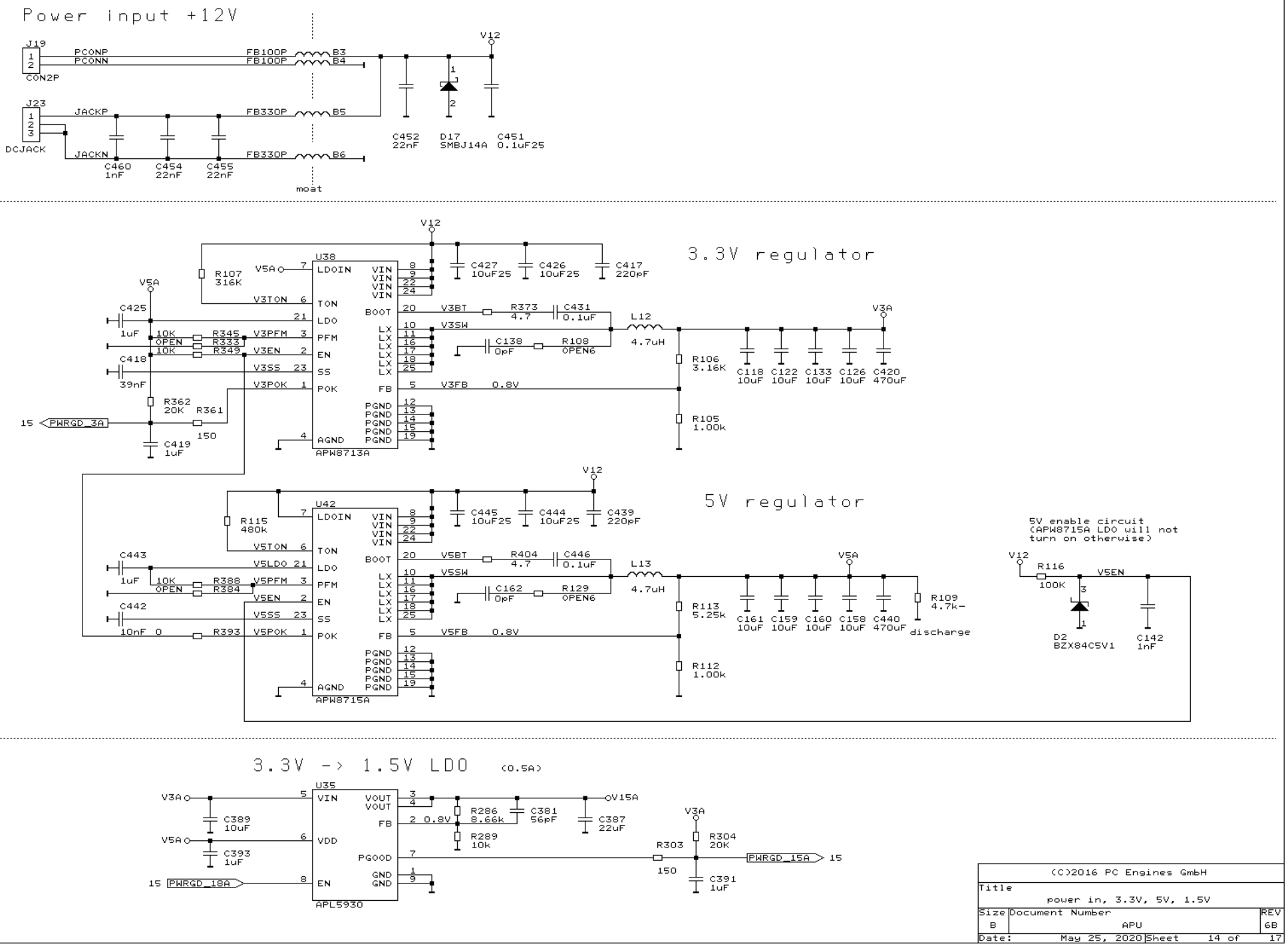
1.8V



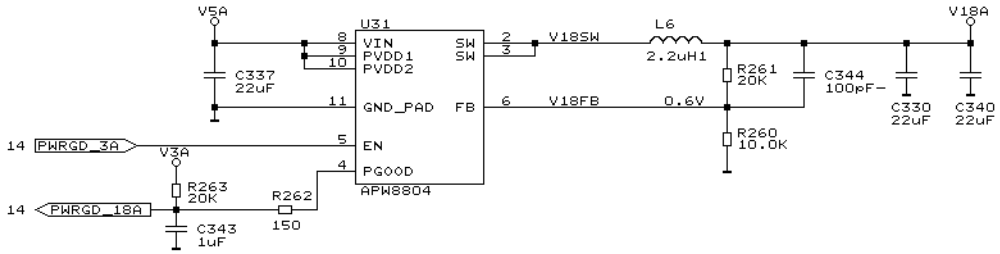
Ø.95V



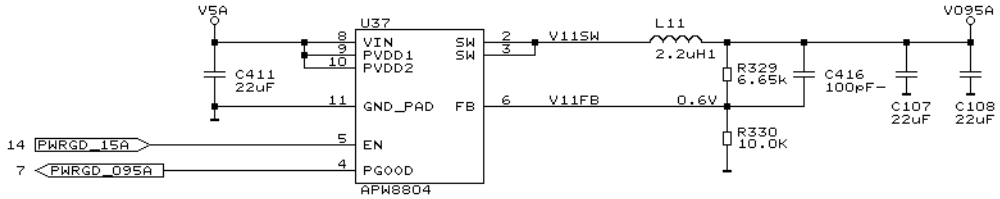
Title	power good, power switch	
Size B	Document Number APU	REV 6B
Date: August 28, 2018	Sheet 13 of 17	



Title	power in, 3.3V, 5V, 1.5V	
Size B	Document Number APU	REV 6B
Date: May 25, 2020	Sheet 14 of 17	

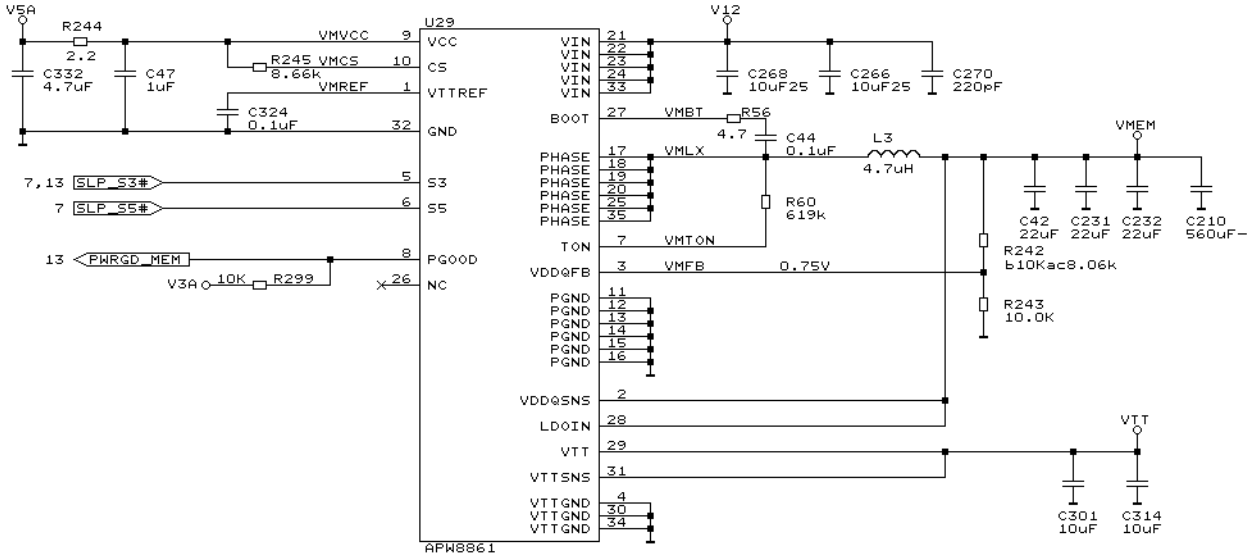


1.8V, 2A



0.95A, 3A

VMEM converter and VTT LDO

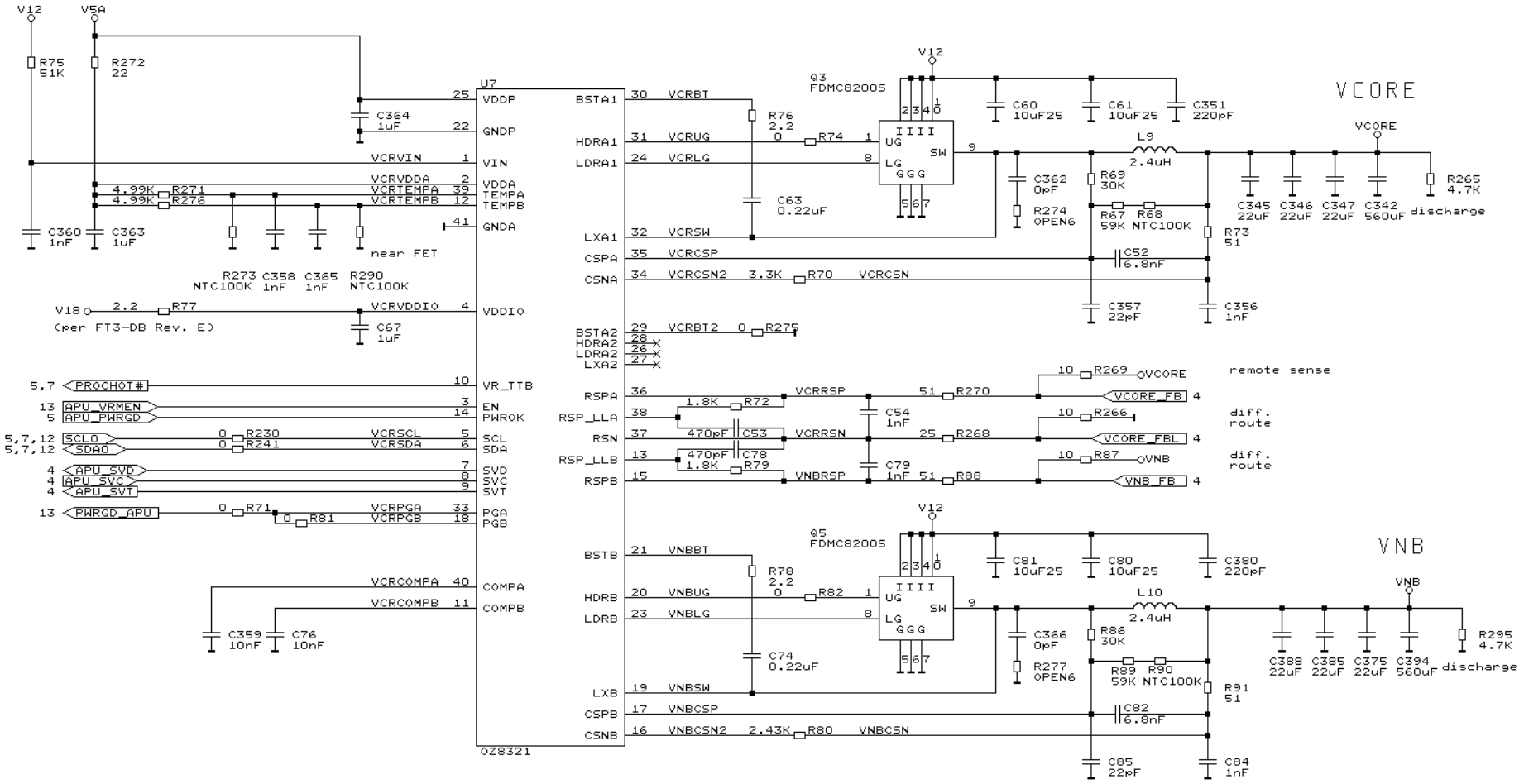


1.5V / 1.35V VMEM

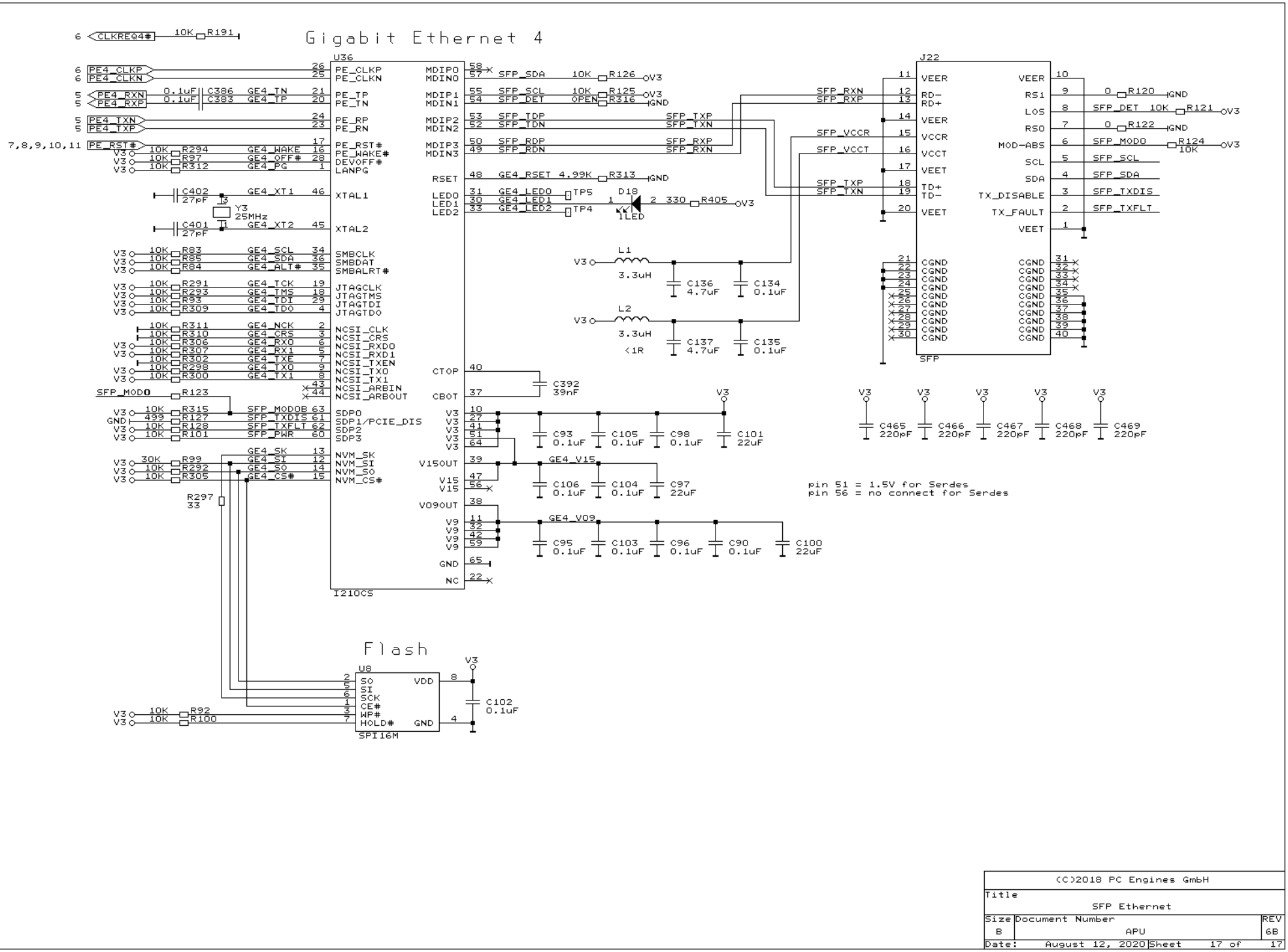
0.75V / 0.675V VTT

Title	1.8V, 0.95V, VMEM, VTT	
Size B	Document Number APU	REV 6B
Date: August 21, 2018	Sheet 15 of 17	

VCORE and VNB converter



Title	VCORE, VNB	
Size B	Document Number APU	REV 6B
Date: May 25, 2020	Sheet 16 of 17	


Gigabit Ethernet 4
U36
I210CS
J22
SFP
Flash
U8
SPI16M
(C)2018 PC Engines GmbH
Title
SFP Ethernet
Size B
Document Number APU
REV 6B
Date: August 12, 2020
Sheet 17 of 17
pin 51 = 1.5V for Serdes
pin 56 = no connect for Serdes